

MARCH

Improving Your Set — Page 483

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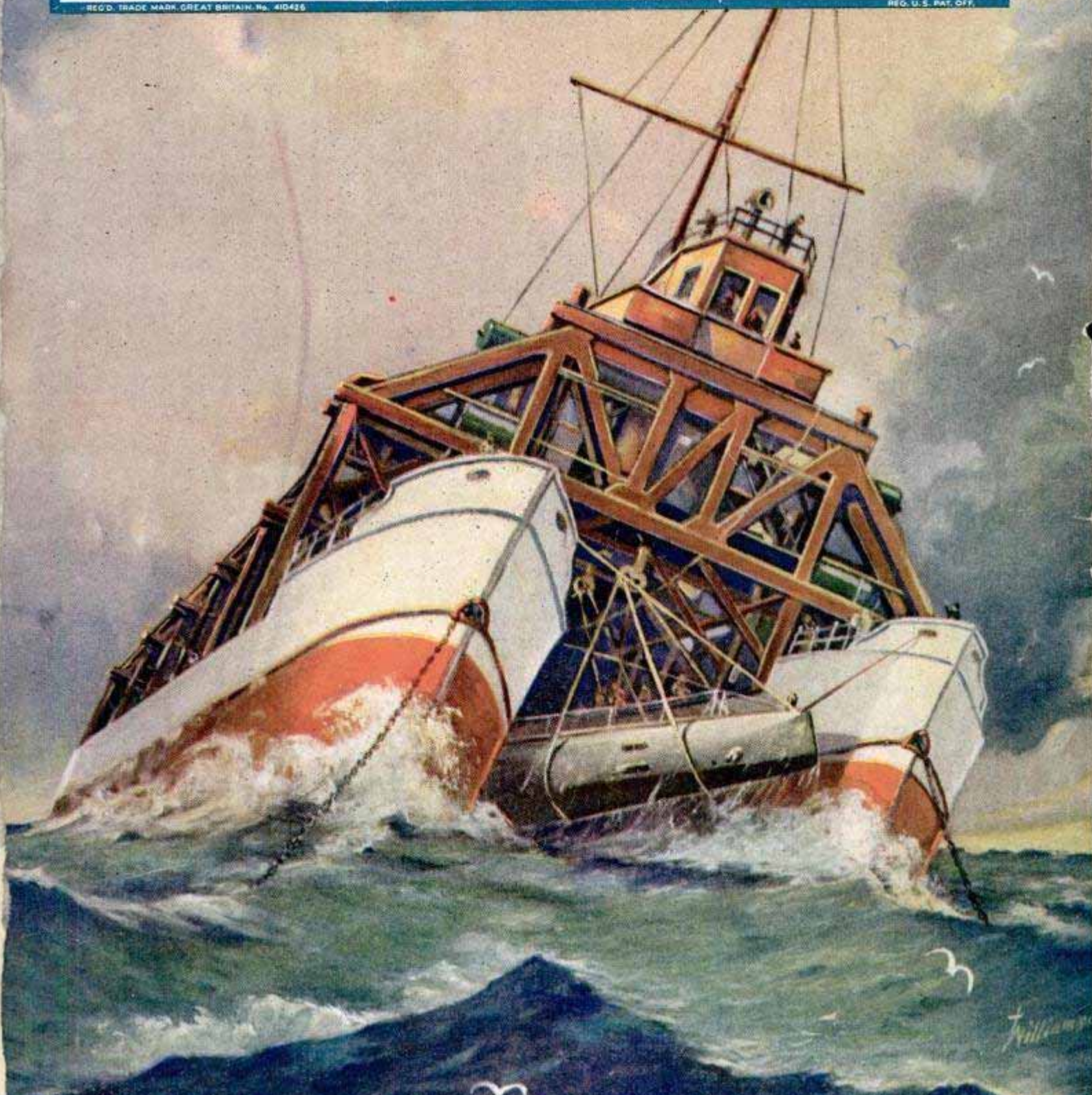
# POPULAR MECHANICS

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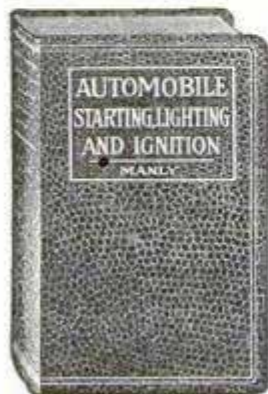


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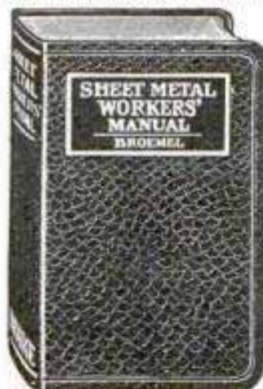
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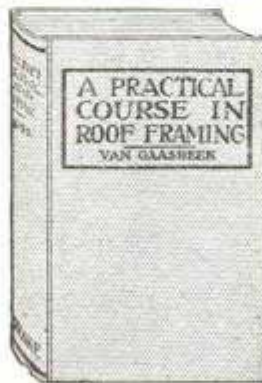
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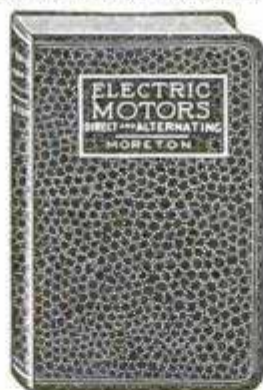
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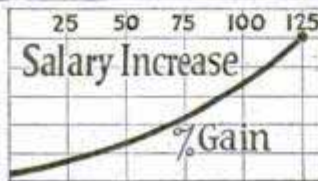
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| <input type="checkbox"/> Traffic Management                          | <input type="checkbox"/> Business English                          |
| <input type="checkbox"/> Railway Station Management                  | <input type="checkbox"/> Commercial Spanish                        |
| <input type="checkbox"/> Commercial Law                              | <input type="checkbox"/> Effective Speaking                        |
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# BUILDERS TRADE GUIDES



## AUDELS CARPENTERS AND BUILDERS GUIDES—4 VOLS. \$6

Inside Information for Carpenters, Builders, Joiners, Building Mechanics—all Woodworkers. **1600 pages; 3700 diagrams; flexible; pocket size.** Short-cut instructions, new methods, ideas, solutions, plans, systems—money saving suggestions. An easy progressive course for the apprentice. A practical daily helper and Quick Reference for the master worker. A Helping Hand to Easier and Better Work and Better Pay. To get this aid for yourself, simply fill in and mail the **FREE COUPON** below.

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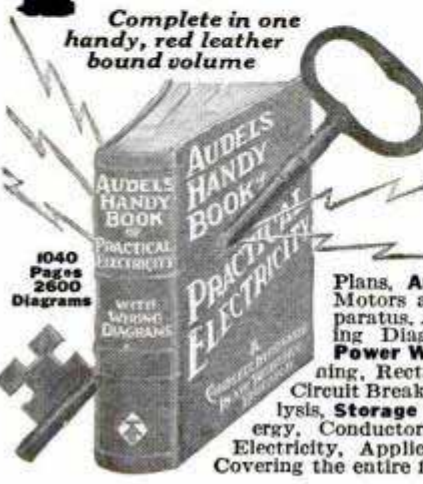
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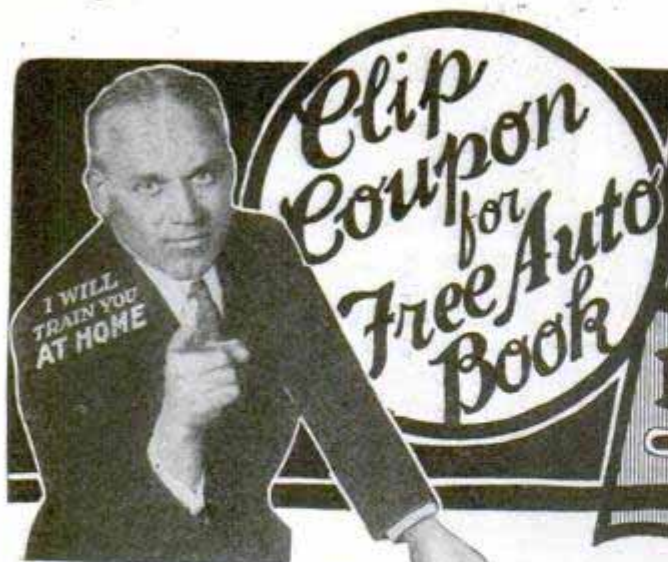
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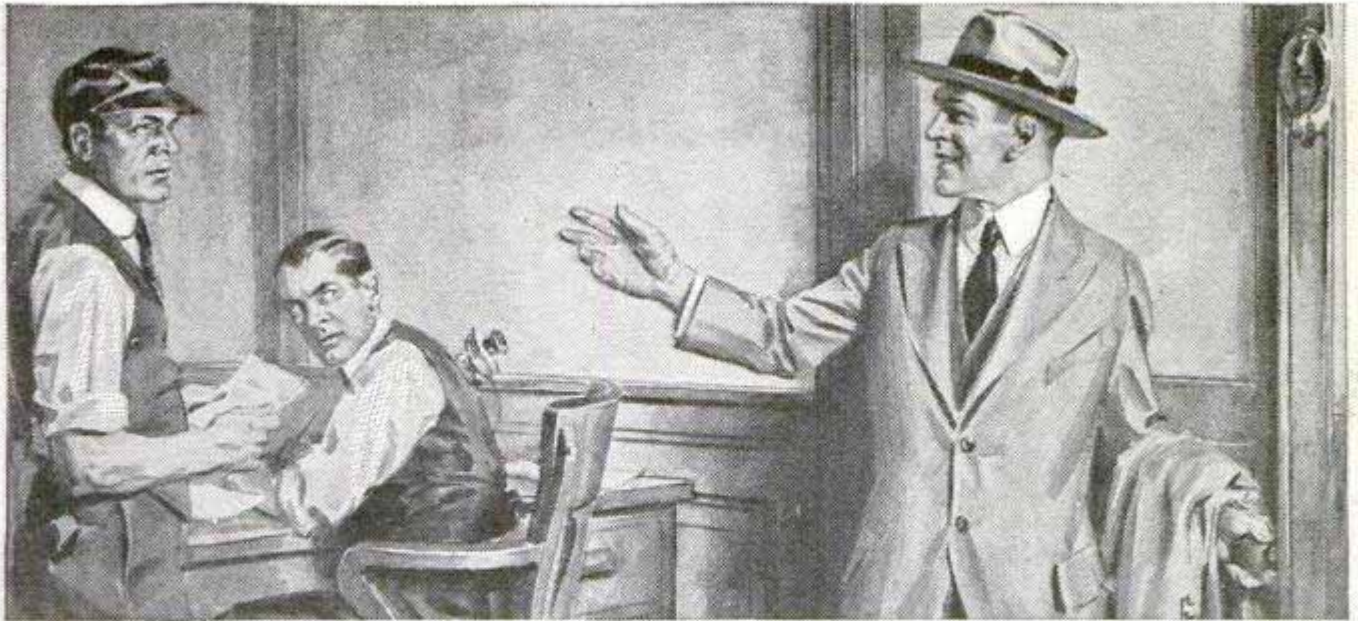
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## “Good Bye, Boys!”

“TODAY I dropped in for a last word with the boys at the office. And as I saw Tom and Dave there at the same old desk it came to me suddenly that they had been there just so the day I came with the firm four years ago.

“When I started here I was put at a desk and given certain routine things to do. It was my first job and I took it as a matter of course. But after a few months I began to realize that I was nothing but a human machine—doing things that anyone could do and that I couldn't expect to advance that way.

“So I had a talk with the manager, and I'll never forget what he said: ‘If you want to get ahead, put in some of your spare time getting special training along the lines of your work. We want men who care enough about their future not only to do their work well, but to devote part of their spare time to preparation for advancement.’

“That very night I wrote to Scranton and a few days later had started studying evenings at home. Why, do you know, it gave me a whole new interest in our business. In a few months I was given more important work and more money. Since then I've had three increases. Six months ago I was put in charge of my department, and now my big chance has come—I'm to be manager of our western branch at \$5000 a year!

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Every day, men who have let the International Correspondence Schools help them are moving up to more responsible positions and bigger salaries. Clerks have become advertising, sales and business managers; mechanics have become foremen, superintendents and engineers; carpenters have become architects and contractors; men and boys have risen from nothing to splendid positions of responsibility

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| <input type="checkbox"/> Personnel Organization         | <input type="checkbox"/> Better Letters         |
| <input type="checkbox"/> Traffic Management             | <input type="checkbox"/> Show Card Lettering    |
| <input type="checkbox"/> Business Law                   | <input type="checkbox"/> Stenography and Typing |
| <input type="checkbox"/> Banking and Banking Law        | <input type="checkbox"/> Business English       |
| <input type="checkbox"/> Accountancy (including C.P.A.) | <input type="checkbox"/> Civil Service          |
| <input type="checkbox"/> Nicholson Cost Accounting      | <input type="checkbox"/> Railway Mail Clerk     |
| <input type="checkbox"/> Bookkeeping                    | <input type="checkbox"/> Common School Subjects |
| <input type="checkbox"/> Private Secretary              | <input type="checkbox"/> High School Subjects   |
| <input type="checkbox"/> Spanish                        | <input type="checkbox"/> Illustrating           |
| <input type="checkbox"/> French                         | <input type="checkbox"/> Cartooning             |

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|---|--|
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| <input type="checkbox"/> Mechanical Engineer    | <input type="checkbox"/> Contractor and Builder                      |
| <input type="checkbox"/> Mechanical Draftsman   | <input type="checkbox"/> Architectural Draftsman                     |
| <input type="checkbox"/> Machine Shop Practice  | <input type="checkbox"/> Concrete Builder                            |
| <input type="checkbox"/> Railroad Positions     | <input type="checkbox"/> Structural Engineer                         |
| <input type="checkbox"/> Gas Engine Operating   | <input type="checkbox"/> Chemistry <input type="checkbox"/> Pharmacy |
| <input type="checkbox"/> Civil Engineer         | <input type="checkbox"/> Automobile Work                             |
| <input type="checkbox"/> Surveying and Mapping  | <input type="checkbox"/> Airplane Engines                            |
| <input type="checkbox"/> Metallurgy             | <input type="checkbox"/> Navigation                                  |
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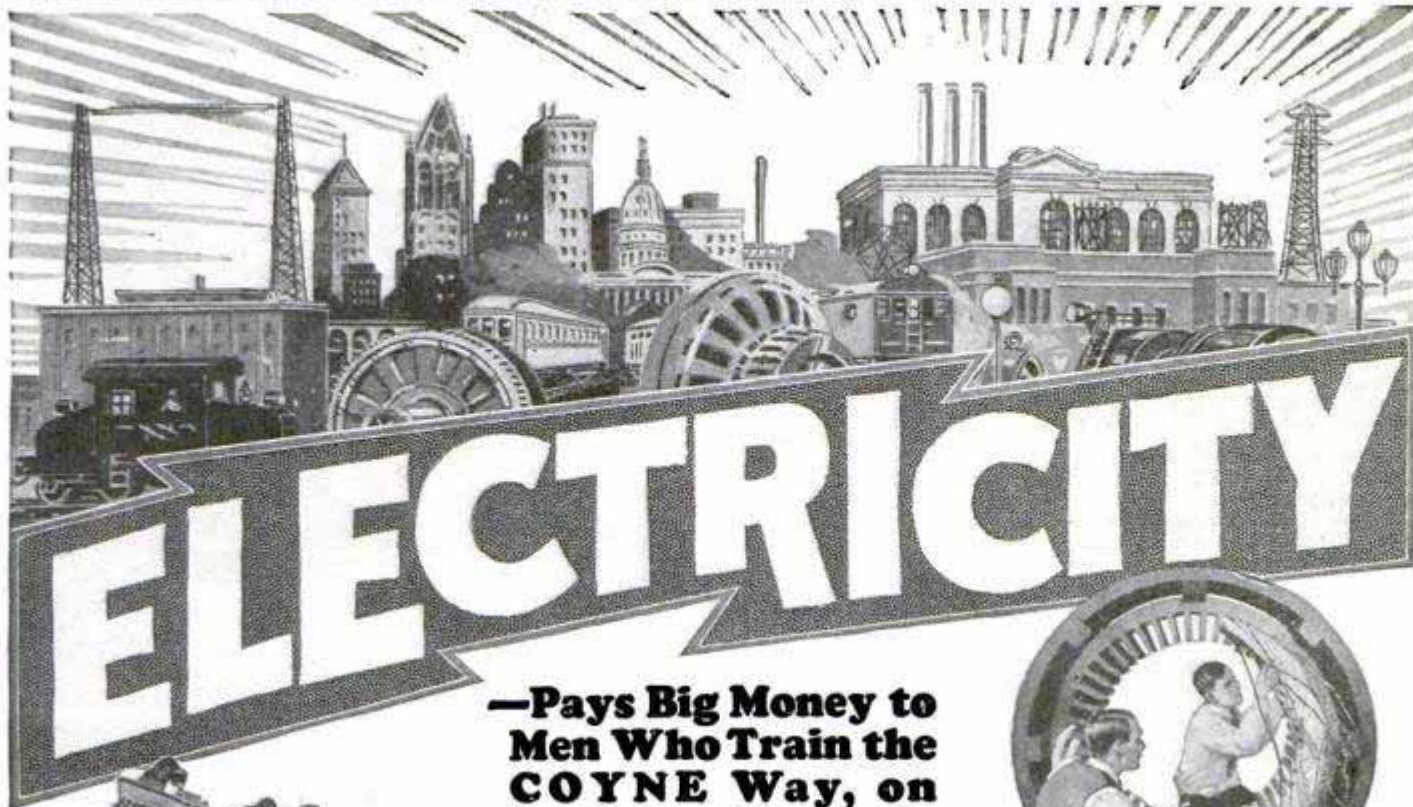
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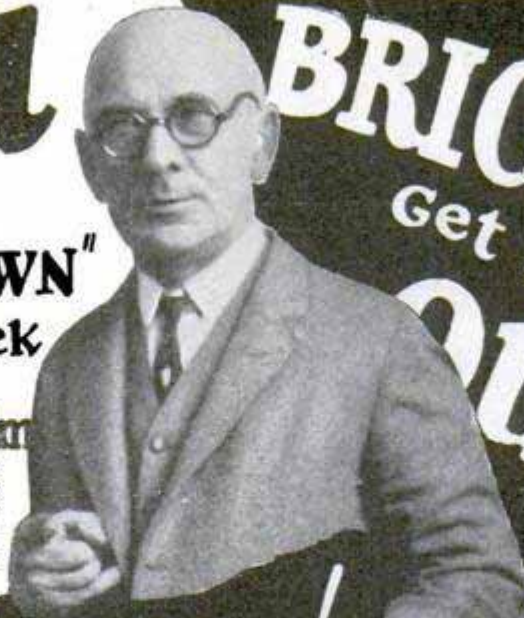
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\$60 to \$90 a week  
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**I Train You at Home  
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You learn right at home, in your spare time. Then in a few short months, you'll be ready to quit your present job for another one a whole lot better. I train you by a remarkable new method, carefully developed by experts who know the trade from A to Z. You learn the trade step by step, using real brick, trowel and mortar. You train in your basement, attic, shed, barn, garage or other handy place. You get real experience as you go along—by actually building corners, angles, jambs, pilasters, panels, and doing every job that a regular bricklayer does on the wall.



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No need to stop at even a bricklayer's big pay. While I'm teaching you the trade, I also teach you to read plans and blue prints. Also to estimate and lay out work. I give you the extra knowledge that a man needs to become foreman, superintendent, contractor or builder. There are opportunities, any number of them, for the ambitious man who has this EXTRA knowledge. You get it—**quick**—through the **Job Analysis Method.**

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The building business—the greatest industry in the world—is going ahead by leaps and bounds. Experts say 1926 will be a record year. That means plenty of work and big wages. The time is ripe, right now, for you to get started. No reason why YOU shouldn't make the same big money a lot of others are making. You can, easily—QUICKLY. Let me show you how.

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"I received your instructions on bricklaying and am more than satisfied. I have my brick, have been practicing the jobs and feel sure I am going to get along all right."

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"I have been laying brick for some time—foundations, chimneys and repair work. But since looking over your lessons, I know I am going to build on a larger scale next year."

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Bricklayers' wages from recent report compiled by National Association of Builders Exchange.

	Per Hour
Atlanta.....	\$1.25
Baltimore.....	1.50
Chicago.....	1.50
New York City..	1.50
Pittsburgh.....	1.62½
Kansas City....	1.37½
St. Louis.....	1.75

These figures are for regular time. For overtime there is always a bonus—either time-and-a-half or DOUBLE time.

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New, FREE book, "The Quick Way To Big Pay Everyday" tells you everything. Tells you how I myself started years ago as a bricklayer and then became foreman, superintendent and builder—and how I can now train you to do everything that I have done, and MORE. No need to lose a minute. Clip the coupon. My message for you is important. Send for it today.

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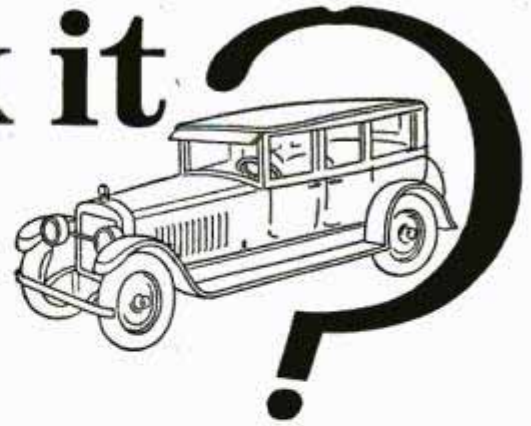
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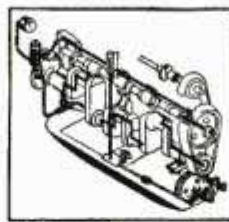
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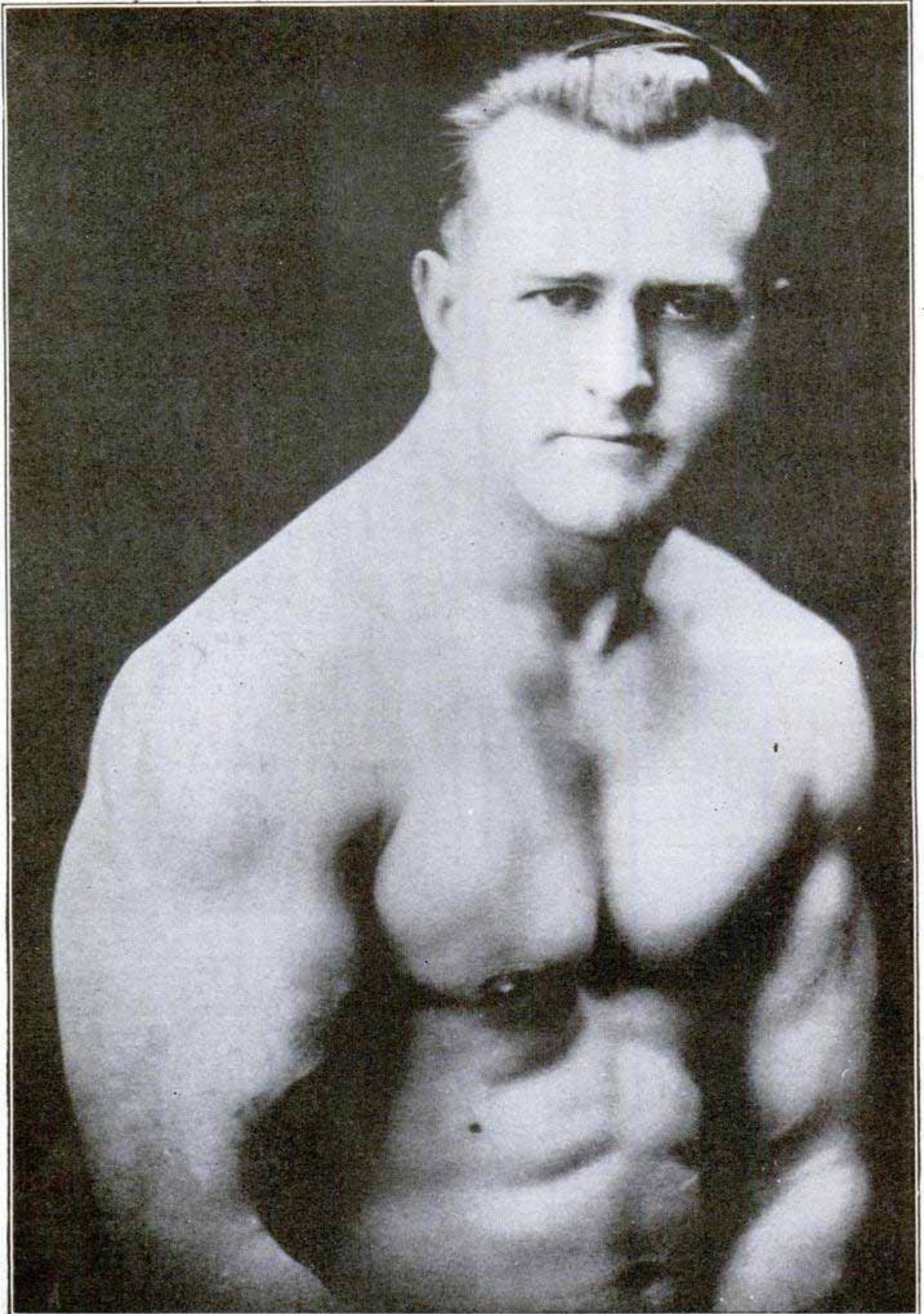
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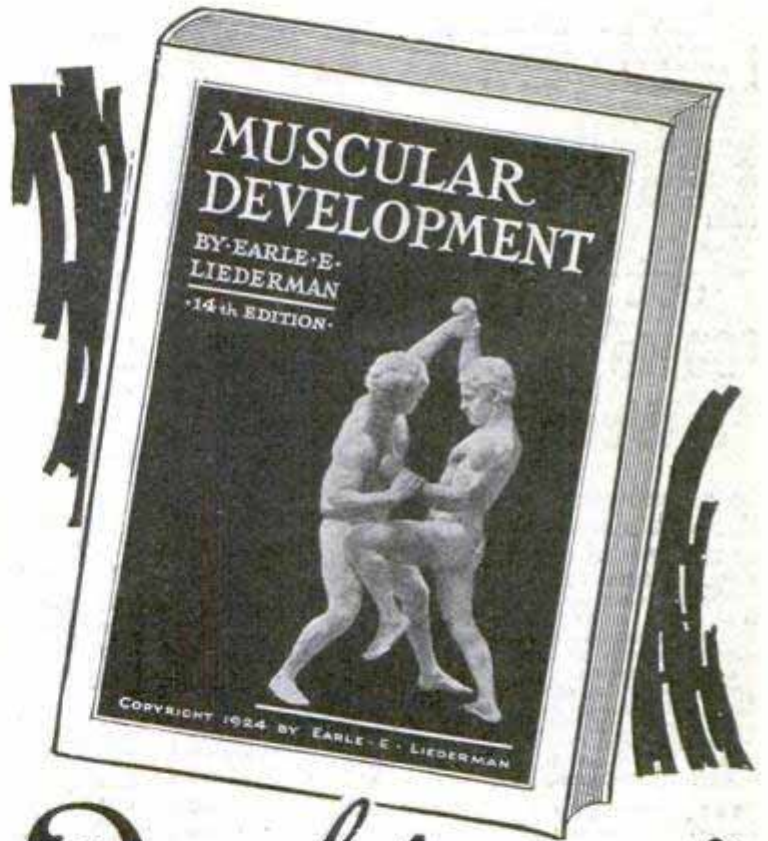
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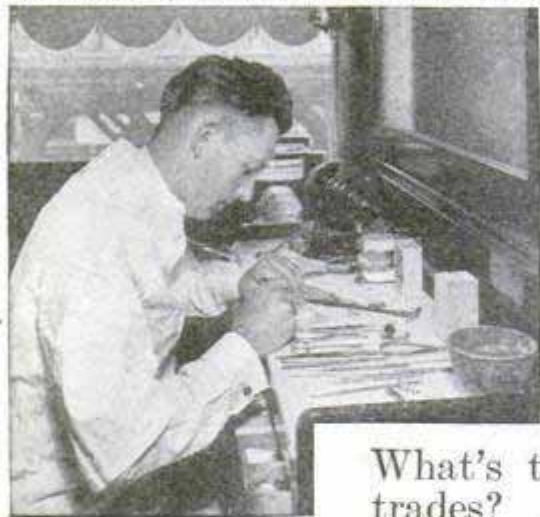
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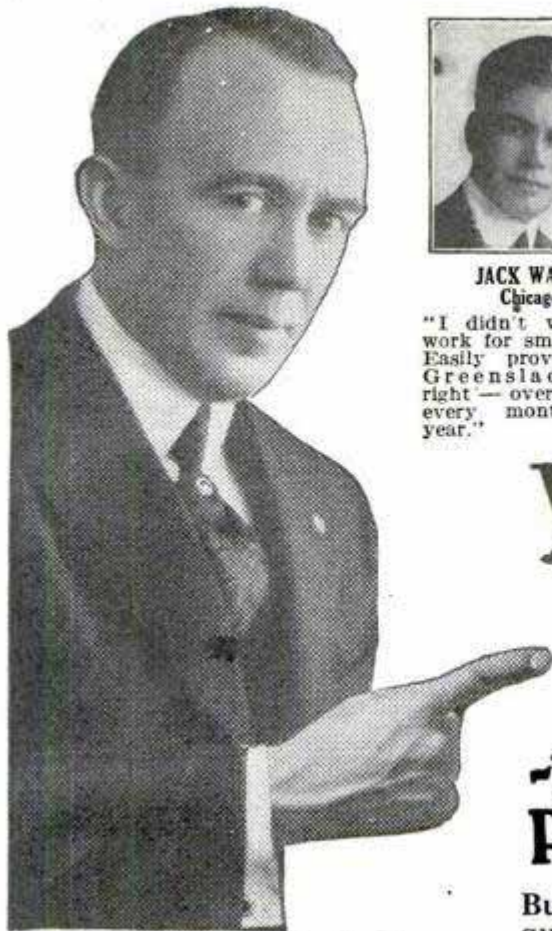
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But let's get down to your own case. You want more money. You want the good things in life, a comfortable home of your own where you can entertain, a snappy car, membership in a good club, good clothes, advantages for your loved ones, travel and a place of importance in your community. All this can be yours. And I'll prove it to you. Free.

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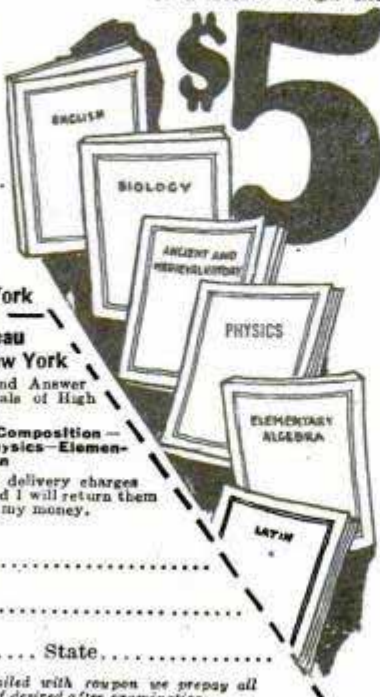
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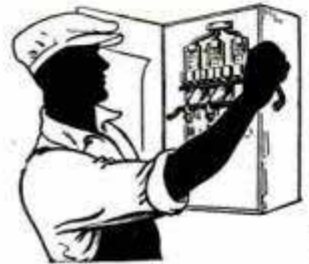


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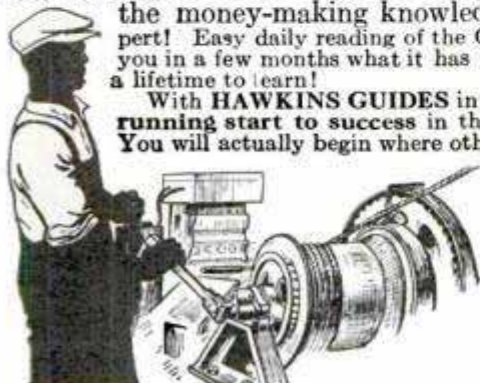


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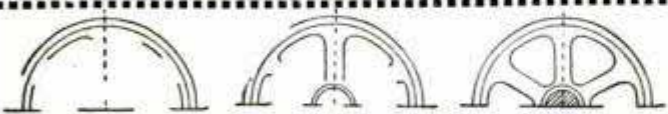
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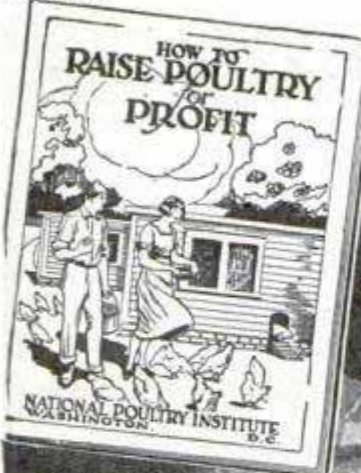
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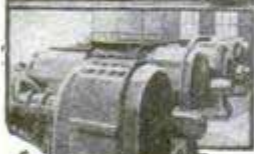
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They had listened—dumfounded. For a moment, now that I had finished, they remained silent. Then thunderous applause! Then questions.

"How did you do it?" they chorused. "And you're the one who didn't know a note!" "Why didn't you tell us you were taking lessons privately?" "Who was your teacher?"

For a moment the questions overwhelmed me.

"Teacher? I never had one," I replied. "I learned by myself, at home."

They laughed in disbelief.

"Laugh if you want," I countered. "I did learn music without a teacher."

"A few months ago I didn't know one note from another. I loved music. But I couldn't afford a private teacher. And I couldn't bear the thought of monotonous exercises. Anyway, I thought a person had to have talent to become a musician."

"You all know how I've just sat around while the rest of you entertained. Time after time I longed to be able to play."

"Then one night I sat at home alone, reading a magazine. Suddenly my eye caught a startling announcement. It told of a new, easy method of quickly learning music—right in your own home—and without a teacher. It sounded impossible—but it made me wonder. After all, I decided, it 'doesn't cost a cent to find out.' So I signed the coupon, and—well, you know the rest."

The course, I explained to them, was more helpful than I ever dreamed possible. It was amazingly simple—even a child could learn to play this quick, easy way. I chose the piano.

And from the very beginning I was playing *real notes, catchy tunes*—just like a regular musician! It was just like a fascinating game!

Now I can play anything—jazz or classical. I am never at a loss to entertain. No more dreary hours of solitude for me. And I even play in an orchestra and make money having a wonderful time!

You, too, can learn to play your favorite instrument by this easy "at home" method that has helped almost half a million people to increased pleasure and financial gain. You don't have to know a thing about music—progress is rapid because every step is easy to understand. Pick out the instrument you want to play. The U. S. School of Music does the rest. And it costs just a few cents a day!

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If you really want to learn to play—if new friends, good times, social popularity and increased income appeal to you—act now! Sign the coupon and send it before it's too late. Instruments supplied when needed, cash or credit. **U. S. School of Music, 73 Brunswick Bldg., New York City.**



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Banjo Steel Guitar	
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Clarinet	Cornet
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And you will not be satisfied unless you earn steady promotion. But are you prepared for the job ahead of you? Do you measure up to the standard that insures success? For a more responsible position a fairly good education is necessary. To write a sensible business letter, to prepare estimates, to figure cost and to compute interest, you must have a certain amount of preparation. All this you must be able to do before you will earn promotion. Many business houses hire no men whose general knowledge is not equal to a high school course. Why? Because big business refuses to burden itself with men who are barred from promotion by the lack of elementary education.

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We have a plan whereby you can. We can give you a complete but simplified high school course in two years, giving you all the essentials that form the foundation of practical business. It will prepare you to hold your own where competition is keen and exacting. Do not doubt your ability, but make up your mind to it and you will soon have the requirements that will bring you success and big money. **YOU CAN DO IT.**

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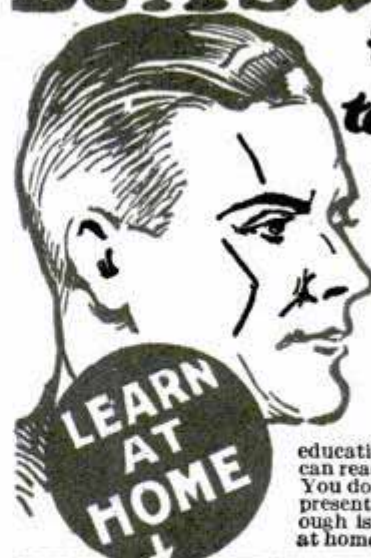
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| ....Cert. Public Accountant | ....Foremanship           |
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| ....Bookkeeper              | ....Surveyor (& Mapping)  |
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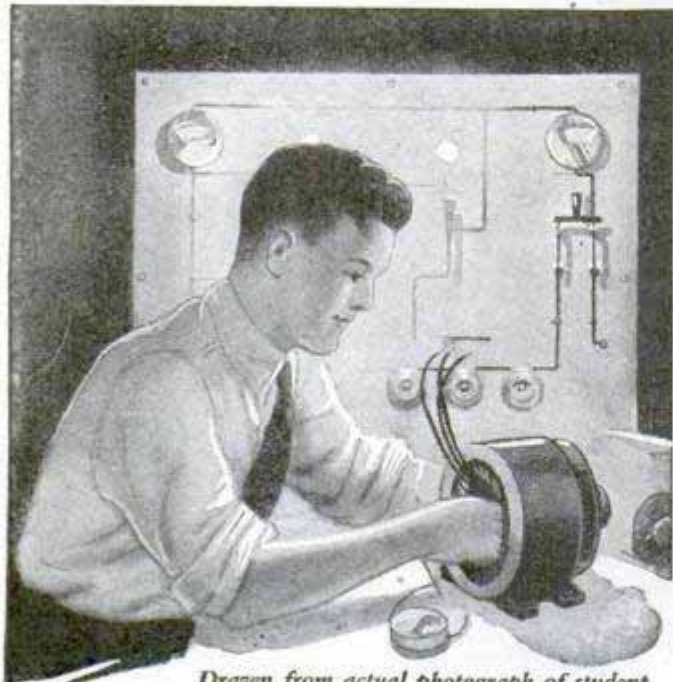
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# BOYS



Drawn from actual photograph of student doing spare time electrical work

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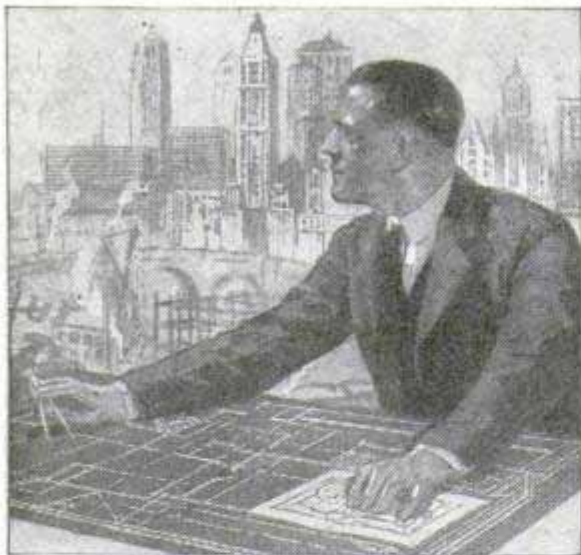
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## In 15 Minutes a Day

And then suddenly I discovered a new easy method which made me a powerful speaker almost overnight. I learned how to bend others to my will, how to dominate one man or an audience of thousands. Soon I had won salary increases, promotion, popularity, power. Today I always have a ready flow of speech at my command. And I accomplished all this by simply spending 15 minutes a day in the privacy of my own home on this most fascinating subject.

\* \* \*

There is no magic, no trick, no mystery about becoming a powerful and convincing talker. You, too, can conquer timidity, stage fright, self-consciousness and bash-

fulness, winning advancement in salary, popularity, social standing, and success. It is the power of forceful, convincing speech that causes one man to jump from obscurity to the presidency of a great corporation; a timid, retiring, self-conscious man to change almost overnight into a popular and much applauded after-dinner speaker. Thousands have accomplished just such amazing things through this simple, easy, yet effective training.

## Send For This Amazing Book

This new method of training is fully described in a very interesting and informative booklet which is now being sent to everyone mailing the coupon below. This book is called, *How to Work Wonders With Words*. In it you are shown how to conquer stage fright, self-consciousness, timidity, bashfulness and fear. Not only men who have made millions but thousands have sent for this book—and are unstinting in their praise of it. You are told how to bring out and develop your priceless "hidden knack"—the natural gift within you—which will win for you advancement in position and salary, popularity, social standing, power and real success. You can obtain your copy absolutely free by sending the coupon.

## NORTH AMERICAN INSTITUTE

3601 Michigan Avenue  
Dept. 1353  
Chicago, Illinois



### What 15 Minutes a Day Will Show You

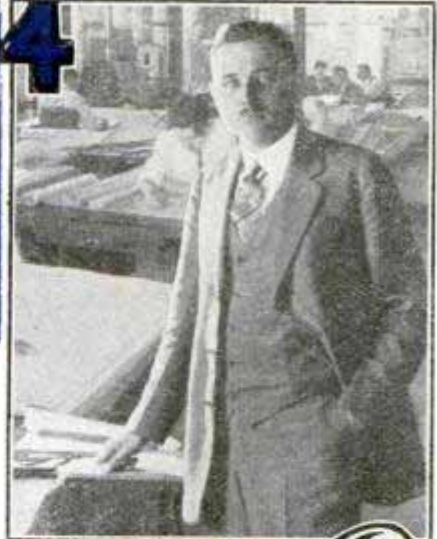
- How to address business meetings.
- How to propose and respond to toasts.
- How to make a political speech.
- How to tell entertaining stories.
- How to write better letters.
- How to enlarge your vocabulary.
- How to develop self-confidence.
- How to acquire a winning personality.
- How to strengthen your will-power.
- How to be the master of any situation.

North American Institute,  
3601 Michigan Avenue., Dept. 1353  
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Please send me FREE and without obligation my copy of your famous book, *How to Work Wonders With Words*.

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# 3 Drafting Lessons *actually* FREE



The Expert Draftsman designs the plans of buildings, machinery, and nearly everything that is made. He does important work and earns big money.

**—to prove you can learn at Home in Spare Time!**

We have invented a new, simplified way to teach Drafting—the first real improvement in Drafting home-instruction in history. We want you to see it, try it—without one penny of cost or obligation. We want to show you how we get away from the copying methods used in the past. See how we make you think, solve problems, do actual drafting room jobs from the first lesson!

## Draftsmen Wanted! \$60 to \$125 a Week!

70,000 fine jobs advertised last year. Get ready to fill one. Get out of the rut. Make something of yourself. Plan your future in Drafting. Even if you have only common schooling, even if you know nothing of drafting, we guarantee to make you a real Draftsman or to refund your money! Special surprise offer right now to the first 500 men who answer this ad—reduced price, easy terms. Coupon brings complete information.

### A new, rapid, simplified Home-Training

Copying drafting lessons prepares you to be only a "tracer." This new "Job-Method" gives you actual drafting room jobs in a new one-step-at-a-time way. With pictures which you can understand almost without reading the "lessons." And that is why American School-trained Draftsmen can qualify for a good job at big pay when they graduate.

### Get my JOB-AND-RAISE Offer, quick!

Coupon brings three lessons absolutely free. Get them. It will not cost you a penny to test YOUR ability to get ready for a fine Drafting job and certain increase in pay. Coupon also brings my sensational Job-and-Raise offer, combining training and jobs in a new way.

### Start with the coupon—mail it today!



**Chief Drafting Engineer**  
**AMERICAN SCHOOL,**  
 Dept. D-374-A, Drexel Ave. & 58th St., Chicago  
 Rush 3 Free Drafting Lessons, Job and Raise offer, complete information, money-back guarantee, etc., to prove I can become a real draftsman at home in spare time.

Name .....

St. No. ....

State..... City



## I WILL MAKE THIS CONTRACT WITH YOU

- Your name here.....
- When you enroll for our home-training in Drafting, we agree to give you:
1. Complete Drafting training, by the new Practice-Method.
  2. Professional Drafting Outfit, as illustrated.
  3. We will help you get a good Drafting position at a substantial increase in pay.
  4. All these things we guarantee, or we'll refund every cent of your money.

*O. C. Miller*  
 Director Extension Work

### Start with the Coupon! Climb to the top in 4 jumps

Thousands of men now earning \$5,000 to \$10,000 a year as Expert Draftsmen started with a coupon. They investigated, they trained, they were placed in a good job, and they made good! You, too, can travel this quick road to success:

1. Mail me the coupon. Get my free lessons, the facts about the opportunities waiting for you in Drafting.
2. I will train you at home in your spare time by a new simplified job method—supply without extra cost a valuable Drafting outfit.
3. I will enter into an agreement with you to prepare you for a well paid position and then to give you, without extra cost, an efficient Employment Service which will help you find the high-salaried Drafting position you seek. Your money refunded, if we fail to make good.
4. After you are established in a good Drafting job, we offer you a valuable Promotion Service—without extra charge. Coupon brings full details of this amazing offer.

**THIS OUTFIT**  
 Given to every Student absolutely without extra charge

O. C. MILLER, Director Extension Work

**American School** Drexel Ave. & 58th St., Dept. D-374-A, CHICAGO

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BUILDER OF MEN

You don't have to be a weakling. You don't have to be one of the crowd of ordinary fellows. You can be an outstanding figure in any gathering and in any contest—you can be a leader.

It's up to you if you've felt the shame of weakness and incapacity and timidity. You needn't be the goat another day.

Believe me, you can be husky and strong. You can have rolling, beautiful muscles to compare with the best of them—a peppy fellow with a powerful body, bulging arms, a punch and a grip that commands respect and admiration wherever you mix with men and women.

## STRONGFORTISM

Through this system I have built up some of the strongest men of the period, and today they are attracting great crowds wherever they exhibit their tremendous muscular ability. Take, for instance, Hajnos, known the world over as "The Navy Hercules." This man is one of my great triumphs in muscular development. You ought to see what a wonderful specimen he is—what a wonderful body!—what arms!—what legs! He is a marvel. I am almost jealous of him—yet I'm mighty proud to be his teacher—as he says, "My only teacher."

You, young man, who wants to be strong; you, middle-aged man, who wants to be stronger; you, athlete, who needs further development; you, business man, who needs exercise and who seeks health through muscular development—to all of you I say:

## Send for My Book

It will tell you more about muscle building and health than any other book available. It will pay you to read it through, as it will help you to understand just what a wonderful thing STRONGFORTISM is and what it can do for you. Send for your copy today. Use coupon below.

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Mr. Lionel Strongfort, Strongfort Institute, Dept. 129, Newark, N. J.—Please send me absolutely free my copy of your book, "Promotion and Conservation of Health, Strength and Mental Energy." I enclose a ten-cent piece (a dime) to help cover mailing expense, and have marked (x) before the subjects in which I am most interested.

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| .. Rupture    | .. Rheumatism     | .. Stomach Disorders    |
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Week  
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Week  
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Now after years of preparation, aided by the best flyers in the world, I have perfected the system of teaching whereby in a short time you become a skilled mechanic, and also if you wish, a skilled pilot. The mechanical and repair work end of aviation, as well as airplane construction, is thoroughly taught you!

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**LEARN TO FLY!** Aviation is no longer a mystery—no longer a hazard; no, it is a business growing greater and more important; you can qualify as a mechanic, or an engineer, or repair man, or builder; five men on the ground are needed for one man in the air, but if you want to become a pilot you easily master the work and can go into postal, government, or commercial work. Flyers are in demand, earning big money at fairs taking up passengers, etc. \$5 for a 10 minute flight is pretty fine pay! The building of the new million dollar Fokker plant here means liberal high paid employment for hundreds of aviation mechanics.

**SEND NAME TODAY** for full details of this aviation mechanical course and photographs of planes and equipment actually used; also full information as to the commercial end of flying and opportunities for young men.

### SWEENEY SCHOOL OF AVIATION

LEARN TO FLY BY FLYING  
**Sweeney**  
SCHOOL of AVIATION  
2306 SWEENEY BLDG, KANSAS CITY, MO.

**T**HIS photograph shows Instructors Wimer and Spencer working with students. The Sweeney System first prepares a student by intensive practical work on motors, building, recovering wings, rigging and all details of construction, repairing and handling. This is called ground school work. Instructor Spencer, an overseas flyer, tells you that it took about 4000 mechanics and assistants to keep several hundred flyers in the air at his field in France. To show you the quality of the men who teach you look at Spencer and Wimer for instance. Spencer was an army pilot and has been teaching and doing commercial flying since 1917. Wimer is a college man, went overseas, was with the 1st Air Park, was an observer, spent over 200 hours in the air and since the war has been with two big aircraft corporations.

### THE SWEENEY SYSTEM

is divided into two parts. **FIRST:** You are thoroughly taught in the ground school. This fits you as an aviation mechanic. You can build your own plane and do anything required in aviation mechanics and construction and repairing when you have finished this work. You are thoroughly taught motors, etc., and work with thousands of dollars worth of new material, including all types of engines. Liberty 12s, Sturdevants, Gnomes, Hall Scott fours and sixes, etc.

**SECONDLY:** after completing this work if you want to be a pilot you take ten hours of flying. Now when you understand that two to seven hours is all the average man needs to learn expert flying you will appreciate what ten hours in the air under skilled men will do for you.

### SEND THIS NOW

EMORY J. SWEENEY, President  
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Please send me full information about your Aviation Course.

Name..... Age .....

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# SHOW CARD LETTERING

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HERE is the very course you need if you want to get a good paying position as a Show Card Letterer or Sign Letterer, or have a business of your own. This course is complete and practical and especially arranged to meet the needs of the student who studies at home. It was written by E. L. Koller, Principal of the School of Art of the International Correspondence Schools, member of the American Federation of Arts, and The National Society of Craftsmen.

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H. L. Wood, a clerk, made more than \$700 "on the side" before he had completed his course and also won \$125 in prizes. Harry William Lord writes that he has more than doubled his salary as a result of studying this I. C. S. course in spare time. William Whitman, a former wagon builder, now has a sign painting business of his own and is earning nearly three times as much as he did before enrolling with the International Correspondence Schools.

There is no doubt that Show Card Lettering and Sign Lettering offer a real opportunity to ambitious men and women. Just mark and mail the coupon and we'll gladly send you a booklet telling all about the I. C. S. course in Show Card Lettering, or any other subject in which you are interested.

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The oldest and largest correspondence schools in the world

Without cost or obligation on my part, please tell me how I can qualify for the position or in the subject before which I have marked an X:

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| <input type="checkbox"/> Industrial Management          | <input type="checkbox"/> Advertising            |
| <input type="checkbox"/> Personnel Organization         | <input type="checkbox"/> Better Letters         |
| <input type="checkbox"/> Traffic Management             | <input type="checkbox"/> French                 |
| <input type="checkbox"/> Business Law                   | <input type="checkbox"/> Stenography and Typing |
| <input type="checkbox"/> Banking and Banking Law        | <input type="checkbox"/> Business English       |
| <input type="checkbox"/> Accountancy (including C.P.A.) | <input type="checkbox"/> Civil Service          |
| <input type="checkbox"/> Nicholson Cost Accounting      | <input type="checkbox"/> Railway Mail Clerk     |
| <input type="checkbox"/> Bookkeeping                    | <input type="checkbox"/> Common School Subjects |
| <input type="checkbox"/> Private Secretary              | <input type="checkbox"/> High School Subjects   |
| <input type="checkbox"/> Spanish                        | <input type="checkbox"/> Illustrating           |

TECHNICAL AND INDUSTRIAL COURSES

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|---|--|
| <input type="checkbox"/> Electrical Engineering                           | <input type="checkbox"/> Architect                                   |
| <input type="checkbox"/> Electric Lighting                                | <input type="checkbox"/> Architects' Blueprints                      |
| <input type="checkbox"/> Mechanical Engineer                              | <input type="checkbox"/> Contractor and Builder                      |
| <input type="checkbox"/> Mechanical Draftsman                             | <input type="checkbox"/> Architectural Draftsman                     |
| <input type="checkbox"/> Machine Shop Practice                            | <input type="checkbox"/> Concrete Builder                            |
| <input type="checkbox"/> Railroad Positions                               | <input type="checkbox"/> Structural Engineer                         |
| <input type="checkbox"/> Gas Engine Operating                             | <input type="checkbox"/> Chemistry <input type="checkbox"/> Pharmacy |
| <input type="checkbox"/> Civil Engineer                                   | <input type="checkbox"/> Automobile Work                             |
| <input type="checkbox"/> Surveying and Mapping                            | <input type="checkbox"/> Airplane Engines                            |
| <input type="checkbox"/> Metallurgy <input type="checkbox"/> Mining       | <input type="checkbox"/> Agriculture and Poultry                     |
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Samuel Glassberg



## Tremendous Future for Every Man Who Enters Building Business Now. Leading Minneapolis Builder Tells How . . .

"Years ago, when one entered the building business, it was necessary to start at the bottom and work up step by step. My start was to carry the water bucket and be a general helper, at \$3.00 per week. I learned by experience, and it took me many years. Often I have wished I could have had the easy, quick, thorough training offered to boys and men today. The Chicago Tech. School for Builders can teach the fundamentals of building, give every man in 10 months' training what took me about 10 years to learn in the slow, hard school of experience. Today this modern method enables every boy and man to obtain his training during spare time. Opportunities now in the building business are the best ever, growing greater every year. There is an endless opportunity for trained men." So writes Samuel Glassberg, greatest home builder of the northwest, Pres. Glassberg Construction Co., Minneapolis. A self-made man who plans, finances, and builds an average of 75 homes annually, and knows every branch of the building business. He started as a boy. Today he has his own lumber mills, finance company, and employs more than 180 men.

### Learn at Home in Spare Time to Earn \$3,000 to \$10,000 a Year

Get into the building business . . . no matter what your job is now. No overcrowding in this tremendous field—room for thousands of new men every day. For building is America's second largest industry. Why huck the competition of crowded industries where only a few men advance to big-pay jobs? Why stay at low wages? In spare time—at home—any man can get his start to become a building expert—and can earn \$65 to \$150 per week.

Clerk or carpenter—office man or bricklayer—salesman or superintendent—it makes no difference. Thousands of specialists—men who can read blue print plans and boss the others—are demanded for the \$6,000,000,000 of buildings that will be erected this year.

Men who are in the building game now know the high wages—\$10 to \$20 a day—paid to foremen, superintendents, and experts in various branches of building.

### Building—Plan Reading—Estimating

Even men with ordinary training make real big money in the building field. But trained men win the top—salaries of \$3,000, \$5,000 and \$10,000. Fit yourself for this work. We'll show you the way. You can get into the building business quickly . . . easily. Or if you are in it now . . . and want to advance . . . you can get the training now that you must have for success.

### FREE TRIAL LESSON—No Education Necessary

To show you how simple this Builder's Course is we send you a free trial lesson and actual blue print plans. Our book "How to Read Blue Prints" . . . written by a practical building expert, covers the first lesson. You will find this whole course as easy to read and understand as your daily newspaper with everything written in everyday language. You learn from actual blue print plans—from practical building experts. That's why Chicago Tech. School for Builders graduates get ahead so fast—why they are picked for the big jobs. And you don't need any other education.

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### From Foreman to Contractor and \$450 a Month

"When I entered as a student I was in charge of a job as a foreman at \$8.00 a day. For the past four months I have been contracting and have averaged \$450.00 a month."

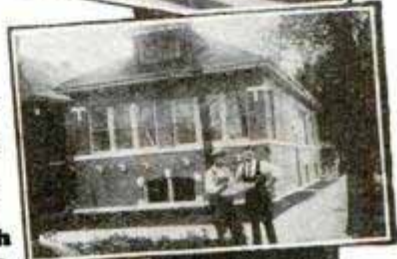
Writes R. H. Edney, Asheville, N. C.

### Salary Increased From \$1.50 a Day to \$210 a Month

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- Plan Reading
- Estimating
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## Mail This Now!

Chicago Technical School for Builders, Dept. 377, 118 East 26th St., Chicago, Ill.

Yes, I want to earn more. Send me, without obligation, details of the opportunities in the business of Building, details on how I can increase my earnings, and a copy of your book, "How to Read Blue Prints." It is understood that no salesman will call on me.

(Write or print name plainly, please)

**Chicago Technical School for BUILDERS**

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Are you ambitious? Are you seeking a better job or a business of your own? If so, here's your chance—a chance to really cash in. There are more amazing money-making opportunities in the automobile business now than ever before. Follow the lead of the thousands of "Michigan State" graduates. They have already proved what real training will do for an ambitious man. They are making big money. You can too! This school has 20,000 graduates. 700 students here now. Come to Detroit, a fine city.

Big business and pleasant climate all year round. Come now and fit yourself for a better job or to run a garage business of your own. Thousands of battery shops, auto electrical shops, tire and welding shops are needed now. Only trained men can run them. Good work is what car owners want, and it takes a trained man to do it. Jerry De Nooyer, Battle Creek, Mich., writes: "Am Service Manager of Cadillac and Olds service station at \$80 a week."

Ray Walker, Bethlehem, Pa., says: "Had my pay raised three times this summer. When I went to M. S. A. S. I knew nothing about a car."

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A thorough training in Detroit, at the "Michigan State," fattens the pay envelope or starts you in business for yourself. You can take a full Automotive Course in 12 weeks. Or our great Master Course in 30 weeks. Or specialize in any of its money-making branches; be an Auto Electrician, Battery Service Man, Engine Man, Tire Expert, or Machinist. All courses include training in Business, Shop Management, Service, Selling, etc., by one of the big men from Detroit's auto plants. Classes always open. You can start at once. Jump right on the train for Detroit. I. Diner, proprietor of General Garage, New Hamburg, Ontario, says: "I started in business 6 months ago and your course has paid me double already."



## Learn at Detroit The Auto Center

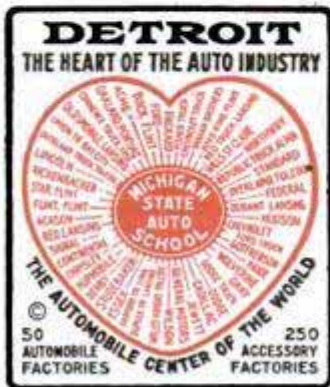
Without any previous experience—just a liking for mechanics—you can learn the auto business from A to Z in a few weeks at the Michigan State Automobile School in Detroit, the heart of the industry. Then step out, equipped with knowledge and training, to a future of certain, big money making. You have great advantages, learning the business here. It's the fountain head of the automotive industry. You are taught under factory endorsed methods. You learn both theory and practice on latest equipment. Go through the great Ford plants. Visit the other auto factories. Learn their methods first hand—and it all means greater opportunities and more certain success. The Michigan State Automobile School, in Detroit, the automobile center, is the logical place to learn the auto business.

### NOW 20 MILLION CARS

Figures just released show 20,200,000 automobiles now registered in the U. S. A. Every year the figure grows. That means more skilled auto men needed—more money spent for repairs—more money that you can be earning when you become a M. S. A. S. graduate. Victor and Elmer Hanson (Buick and Chevrolet dealers), Wakefield, Mich., write: "The net worth of our business is now \$35,000."

### JUMP A HEAD OF THE CROWD

Some men think they can learn the business by starting in green as a helper in a garage. They are wrong. Years of dirty work will be wasted learning wrong methods from poor mechanics. Save all this by coming to the auto center for a few weeks. Learn right, under expert instructors. Learn the short cuts and best ways of doing electrical repairs, engine work, all about autos, trucks and engines. O. E. Parker, Buick dealer, Howell, Mich., writes:



"After finishing at the school I could locate any trouble and fix it, and in many cases quicker and better than men who had years of experience."

## 1926 Buick Master Six

Completely equipped chassis of the 1926 "Master Six" Buick, just furnished to us. The co-operation of the automobile manufacturers is one of the big advantages which you have in coming to the "Michigan State" in Detroit, the Auto Center. Many of the big companies assist us for your benefit. Here you work on up-to-date equipment, under the guidance of expert instructors. M. S. A. S. courses are long and thorough. Your M. S. A. S. diploma means much to you. It gives you the double prestige of being a "Michigan State" graduate, and of being a Detroit-trained man.

**MICHIGAN STATE**  
303 Auto Building Detroit, Michigan

Learn Autos Where Autos Are Made

# BIG MONEY Business

## Here is a Chart of Facts—

authentic figures which point out the opportunities. Autos are increasing faster than repair shops or mechanics can keep up with them. 20 million cars are in use now. The auto industry leads all others in value of production. There are more autos than telephones. 269 cars to every service station. This shows as plain as A-B-C **where the big chance is today.** Walter Burk, Danville, Ill., writes: "I take care of 60 big trucks for the State of Illinois Highway Department, and have been with them since I graduated." What thousands of others have done, you can do, too. You have even a **better chance** than they had, because there is a **bigger demand** for trained men than ever was before. Service managers tell us that 100,000 new trained auto mechanics are needed **every year.** Not nearly enough are starting, and a **trained man** can get a good job any place and any time.

**20,200,000**  
Automobiles in U.S.

One Car to Every  
6 People

269 Cars to Every  
Repair Shop

Thousands more Trained  
Men are Needed

## Good Positions Open

The demand for trained men is greater than the supply. We cannot fill all the calls we get. Look into any garage that is run by trained men—everybody busy, earning big money. These opportunities can be yours too with "Michigan State" training. **Earn while you learn if necessary.** Some students work evenings to pay their way. Others work days and take our evening classes.

## FREE BUSINESS COURSE

Business Management Course by Packard Service Manager is Free to all students. Tells how to locate and start a garage, how to meet customers, how to sell cars, gives you invaluable business advice. No extra charge.

## Home Study Course

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## AUTOMOBILE SCHOOL

3729 Woodward Avenue, Detroit, Michigan

**The Automobile Center**

## YOU CAN MAKE GOOD TOO

Here is Harold Grenert, Holyoke, Mass., one of the thousands of "Michigan State" graduates who have achieved quick success. He is just an ordinary fellow, much like the rest of the men who come to this School to get their start on the **Road to Success.** Read his letter:

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The best training is the only kind you can afford to get. "Michigan State" graduates earn more money. Their Detroit training makes them wanted—Your "Michigan State" diploma will be a valuable money-making asset. The Michigan State Automobile School is known the world over. Wherever autos are used, Detroit-trained men get the best jobs, highest pay. Leading factories, dealers, service stations, garages, shops and farms want men who have trained their heads as well as their hands—the M. S. A. S. Detroit-kind.

**Mail  
Today!**

Michigan State Automobile School  
303 Auto Building, Detroit, Michigan

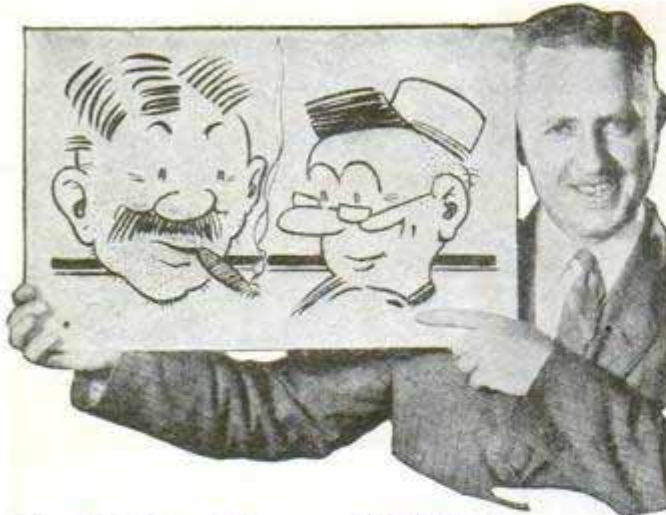
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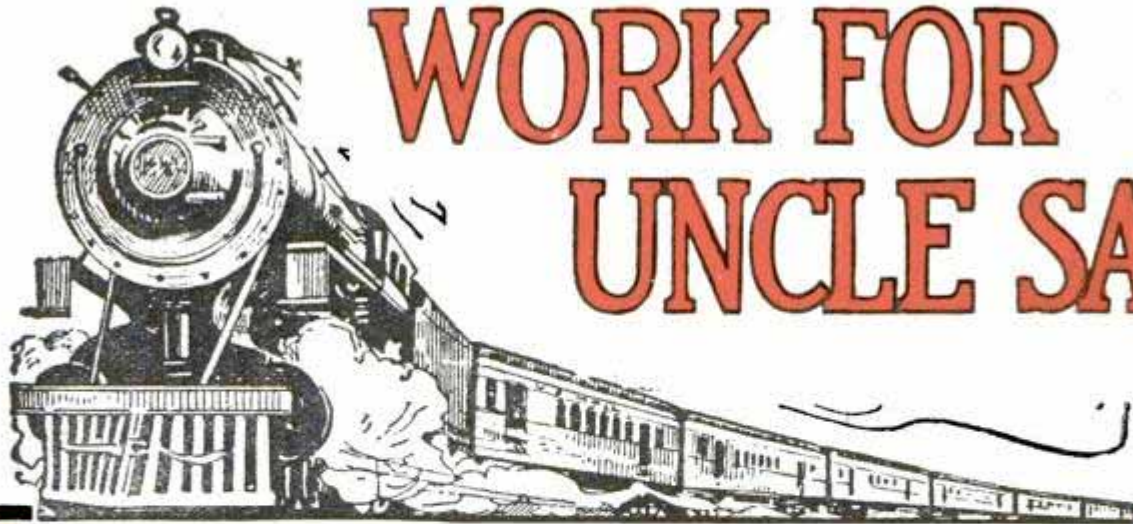
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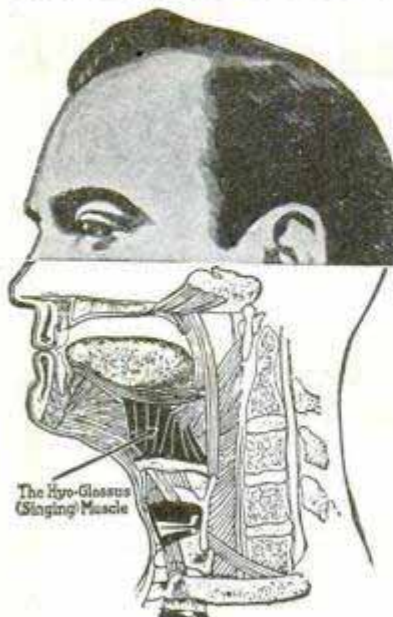
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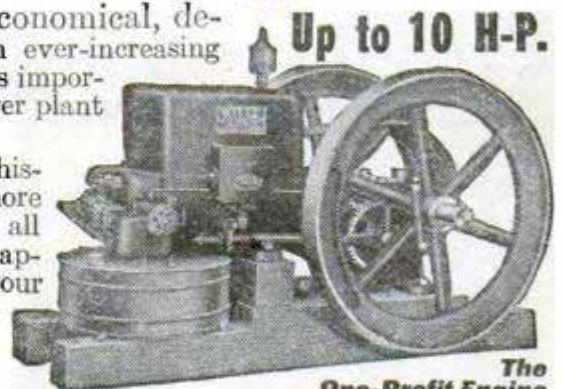
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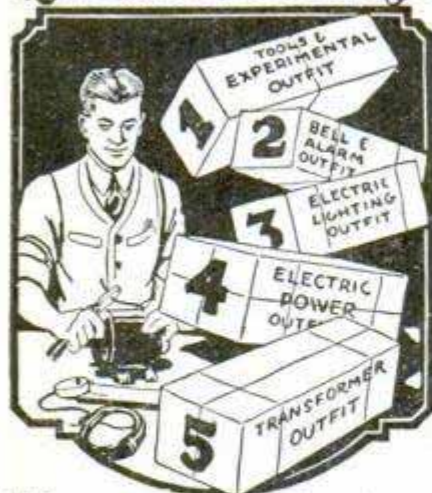
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To be inserted under proper classification in April issue, copy should be in our office February 18th.

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**SELL Radium Health Products—A scientific, drugless treatment needed in every home.** The \$2,500,000,000 spent yearly for health gives you a tremendous market, with no dull seasons. 100% profit. Exclusive territory. Write Radium Applicator Co., 359-S Riley, Buffalo, N. Y.

**"MAKE and Sell Your Own Goods."** Tremendous profits. No Machinery. No experience. We show you how. Write quick for free book. Clover Laboratories, (Dept. PC.), Park Ridge, Ill.

**ALTA Shock Absorber.** Agents can make big money; cost six dollars cash here, selling at twelve dollars. Rare opportunity. Alta Company, 900 O'Farrell, San Francisco, Calif.

**MAIL Order and Agency propositions, including large imprint catalog free.** Pruitt Publishing Co., Station E-16, Kansas City, Mo.

**20th CENTURY Specialties.** Agents (or Mail Order Men). Information 20c. F. G. Briggen, 67 Roslyn St., Rochester, N. Y.

**"LIQUID-LEATHER"** Fills Holes in Shoes, Rubbers, Tires. Dries Instantly. Reliable. Waterproof. Just Imported from France. Tube Retail 60c—Cost 25c. (Dozen in Display Carton.) Sells Housewives, Sub-Agents. Free Sample. Nulife Leather, Hartford, Conn.

**WORLD'S Largest Neckwear Manufacturer wants Agents.** Remarkable opportunity. Immediate commissions 32½%. Advance Styles, complete line. Greatest values. Beacon, 3510 Beaconwear Bldg., Boston, Mass.

**AGENTS—\$40 week.** Introduce finest line insured Hosiery. All styles, colors. 90c hour for spare time. No experience needed. Samples furnished. Wilknit Hosiery Co., Dept. 2278, Greenfield, Ohio.

**TO show Selin Products for Kitchen, Toilet, Table and Laundry is to sell them.** To sell is to make friends. To make friends means \$35 to \$95 weekly. Free Circular. Selin, Dept. A, Selinsgrove, Pa.

**AGENTS!** Just out. New Spark Plug invention, the Beacon-Lite; visible flash from each explosion in cylinders. Big gas savers. Sell on sight. Make \$90 a week easy. Write quick for Free Demonstrator Offer and special Free Deal to start. Central Petroleum Company, 2043 Century Bldg., Cleveland, Ohio.

**AGENTS—No canvassing. No Delivering. No Money Invested. Pleasant Work. Big Money Appointing Local Agents to Introduce Welcome Foods. Welcome Products, 326 Harvey, Ill.**

**We pay \$48 a week, furnish auto and expenses to introduce our Soap and Washing Powder.** Buss-Beach Company, Dept. A12, Chippewa Falls, Wis.

**IMMENSE Profits Silvering Mirrors at Home.** Plating like new, brassy worn-out autoparts, reflectors, tableware, stoves, re-finish metalware, etc. We train you. Plans Free. Sprinkle, Plater, 128, Marion, Ind.

**BIG money daily selling guaranteed Union Made to measure men's suits \$12.50.** Lined suits, flap pockets, \$13.50. Latest patterns—also raincoats, topcoats, caps, riding breeches, boys' suits. Attractive outfit free. Double Service, 1327CB, Washington, Chicago.

**AGENTS, Something new; an Auto Accessory—A Household Necessity.** Every owner a prospect. Sample 50c. Stannard Supply Co., Lake Geneva, Wis.

**AGENTS—"We furnish samples"** if your character and ability warrant, of our complete line hosiery and neckwear. We are "Pioneers" in selling to the consumer. Our Agents make over \$60 weekly. Give references, experience. Pennsylvania Company, Dept. 8, 127 North 8th, Philadelphia, Pa.

**PATENTED Household Necessity.** Hailed with delight wherever shown. Eliminates pesky nuisance. Anyone between eight and eighty can sell it. Samples 25c; five for dollar. Moneyback Guarantee. Seidel Co., Dept. P, Northampton, Mass.

**BIG Money Selling New Household Cleaning Set.** Washes and dries windows. Sweeps, scrubs, mops. All complete only \$2.95. Over half profit. Write Harber Brush Works, 132 3rd St., Fairfield, Iowa.

**LARGE Manufacturer wants agents.** Make \$100 weekly. Outfit free. Sell made-to-measure genuine Cravenette Gabardines, \$14.50. Whitecoats, \$12.50. Reversible Raincoats, \$9.75. Standard Raincoat Co., 16 West 17th Street, New York.

**FOR Steady, pleasant income sell old reliable herb medicine.** Full time or side line. Makes friends and boosters everywhere. Extra fine commissions. Free box and agency terms. Write Bassett's Native Herbs Company, Established 1879, Dept. E, Columbus, Ohio.

**SELL by Mail! Big Profits! Books, Formulas, Novelties, Bargains. Particulars Free!** Elco, 523 South Dearborn Street, Chicago.

**SALES Agents—Take orders High Grade Tailored Neckwear.** Guaranteed for 6 months. Insured never to roll, twist, stretch or bunch. Not sold in stores. Write for beautiful line samples. Better-Made Cravat Co., Wholesale Dept. 6, Columbus, Ohio.

**GET our line first. Big pay daily.** Best made shirts, shoes, suits, pants, raincoats, etc. Sample kit free. Jim Montgomery, 320 So. Franklin, Chicago.

**FREE Sample. "Rain Shield Wiper."** Retail \$1.00—Costs (25 cents). Sold Clear and Rainy Days. No Cloth—No Paste—No Attachment. (1) Rub keeps Windshield clear (48) hours. Experience Unnecessary. Nulife Corporation, Hartford, Conn.

**SALESMEN:** Write your name and address on a card and mail to us. We'll show you sure earnings of \$20.00 a day. Will you risk one minute and a one cent stamp against \$20.00? Mind you, we say we'll show you. Address Dept. 812, William C. Bartlett, Inc., Chicago.

**FIBRE Brooms—detachable handles, fine finish.** Good profits, repeat sales. The Fibre Broom People, 147 New Jersey Ave., Brooklyn, N. Y.

**AGENTS—Mesco Corn and Callous Remover** will build you a steady repeat business. Send today for pocket-size trial outfit. The Moss Co., 275 Searle Bldg., Rochester, N. Y.

**AGENTS:** Sell unique neck-tie pressers. The most wonderful article ever shown. New. No competition—sells on sight. Send 50c for Sample. J. J. Heinrich, 2135 Michigan Ave., Chicago.

**BE your own boss. Build permanent business.** Take orders men's—boys' tailored suits—\$13.95—\$22.50—\$4 commission. Free outfit. Fashion Clothing, 2654N Lake, Chicago.

**CREATE Mail order or Local Business.** New Simple plan gets money, easily, quickly. Steadily. Particulars Free. Edw. Burke, 733 Nineteen, Oakland, Calif.

**AGENTS make \$40 to \$80 weekly selling typewriters re-manufactured like new by the "Young Process."** Lowest prices and easiest terms ever offered. Big Commission—no investment—real opportunity to start in business for yourself. Write Today. Young Typewriter Co., Dept. 7103, 654 W. Randolph St., Chicago, Ill.

**GET Free Sample Outfit! Earn \$3,000 to \$5,000 a year selling most complete line guaranteed Hosiery and Underwear in America.** No experience needed. You can become District Manager and have others working for you—if you act quick! Write today. Malloch Knitting Mills, 563 Grant St., Grand Rapids, Mich.

**66 MILES on 1 gallon—Scientific Gas Saver.** All autos. Demonstrating model free. Critchlow, G-132, Wheaton, Ill.

**IMPORTED—Patented, 5-color pencil; writes Red, Blue, Black, Green, Indelible; sells on sight, everyone a prospect; no competition. Sample \$1.00.** Square-Deal Co., P-236 West 55th St., New York.

**CLEAN up 50c to \$1.00 each sale.** Paid immediately. No delivery, license, nor stock necessary. Free particulars. Mission Factory, 519PM, 519 N. Halsted St., Chicago.

**GETS-U-OUT Tire Lug—New patented auto accessory.** Just out. One minute demonstration. Sure sale. Absolutely prevents auto getting stuck in mud, sand or snow. Big profit. Money back guarantee. Write for exclusive sales territory. Arthur J. Benson, 338 W. 47th St., Dept. 3, Chicago.

**MEN wanted to sell my new puncture-proof inner tube; demonstrate by driving nails into tire.** In tests have given good service after having 500 nail holes in them. Doubles tire mileage. Sold under money-back guarantee. Big money and exclusive territory. Free tube offer. Write D. M. Milburn, 334 W. 47th St., Chicago.

**INCH Display Advertisement 166 Magazines Year \$50.** Weed's Popular Services, Atlantic City, N. J.

**QUICK-SELLING Novelty.** Complete radio set embodied in beautiful ring. Retailing at only 50c. One agent averages \$125 weekly. Agent's Sample 25c. Particulars free. Ross Merchand, Station Eye, New York.

**WILDFIRE sellers! America's cheapest 25c Chemical Windshield Raincloths.** Sample. Box 265, Station C, Los Angeles, Calif.

**QUIT ringing doorbells. I made \$800 monthly, no soliciting, no goods to buy, why not you? Details free.** R. McNow, 303 Wilkinson, Omaha, Nebr.

**AGENTS, Distributors, clean up quickly.** No competition. Sell "Presto." Necessity and Novelty. New Moth-killer, deodorant, flies, germ and insect chaser. Guaranteed, sells at sight, 1 to 6 every home. Not a liquid or powder. Retail 25c each, costs \$1.25 dozen. Free sample. Franco Mfr., 530 N. Waller, Chicago.

**\$5.00 REWARD for any foul spark plug we fail to fire with our Ignition Booster.** Agents clearing \$100 and over weekly selling our Newly Patented Auto Specialties. Others doing it, so can you. Jackson Mfg. Co., 1818 Curtis St., Denver, Colo.

**MANUFACTURE your own products.** Free list reliable plans, patterns, processes for making newest, fast-selling mail order, agents' goods, toys, novelties. Mfg. Bureau, 397A Tracy, Kansas City, Mo

**SELLING Like Blazes! Eleven piece toilet goods assortment at \$2.00 with two piece carving set Free to your customers.** 100% profit. Davis Products Co., Dept. 56, 1311 Carroll, Chicago.

**SELL charming Fashion Frock dresses.** \$50.00 weekly easy. Below retail prices. Guaranteed. Free outfit and sample dresses. Fashion Frocks, Inc., Dept. 3-AR, Cincinnati, Ohio.

**WANT \$50.00 weekly for spare time? And fine automobile free? Write for amazing money-making plan.** No experience necessary. Easy work. Address Desk BC3, Healtho Products Co., Cincinnati, Ohio.

**MARVELOUS Invention! Does away with phonograph needles.** Preserves records. Saves \$25 in needles. Pays \$90 weekly. Sample on approval if requested. Evernlay, Desk B-3, McClurg Bldg., Chicago.

**NEWEST Invention! Sells everywhere.** Automatically prevents telephone and iron cords from tangling and kinking. \$90 weekly. Samples for test if desired. Never-knot, Dept. 3-1, McClurg Bldg., Chicago.

**SIGN agents.** Wonderful sign letters; never tarnish. Samples free. Monroe Sign Corporation, New Haven, Conn.

**AGENTS, Salesmen, get our sure fire proposition.** Details 10c. The Exchange, 214 So. 13th St., Allentown, Pa.

**AGENTS make big money selling our household goods.** Webster Co., 522 Wrightwood, Chicago, Ill.

**SELL \$50 mail shorthand course for \$10.** Macewan, 720 N. Michigan, Chicago.

**GREATEST Sensation of the specialty world.** Over 1,000 genuine embossed Display Signs for retail merchants. Write for information. Artistic Signs, 799-R, Broadway, New York.

**AGENTS, earn big money soliciting yearly subscriptions for magazines; Ladies' Home Journal, etc.** Acheson, 2226 West Carv., Richmond, Va.

**BIG Money. Your Own Business.** Operate Cleaning and Pressing Shop. Complete instructions. Acheson, 2218 West Carv., Richmond, Va.

**SALESMEN—Our men earn \$5 to \$7.50 per hour selling Supreme Shirts.** Write for Free kit. Supreme Shirt Co., 276-M Fifth Avenue, New York.

**SPRING clean-up time in women's shoe game.** Main or side line. No investment. Big money. Style-Arch Shoes, Dept. C-4, Cincinnati, Ohio.

**AGENTS—Distributors: Big money selling Ford Thermatic Carburetor Regulators.** Free demonstrator. "Watch it work." Need managers in few districts. Owens Company, 1919-B Broadway, New York.

**MARVELOUS New Invention 400% Profit.** Liquid Quick Mend for hosiery and fabrics. Tremendous demand. Over hundred other fast sellers. Local and General Agents, J. E. Johnson Co., Dept. 439, 69 E. South Water St., Chicago.

**FREE Booklet describes 52 plans for making \$20.00 to \$100.00 weekly in home or office business of your own.** Downs Co., 2323A Myrtle, St. Paul, Minn.

**AGENTS Wanted to mail circulars.** Fast selling goods. New methods. Big profits. Particulars free. Peerless Service, Waterville, Me.

**CADDIE—For wife and sweetheart, guaranteed seller.** 75 cents parcel post. Auto-bronze Company, 1527 Fawn Street, Philadelphia.

**BIG Money to Live Agents.** Selling Burgid to hotels, bakeries, hospitals, restaurants. Everyone a prospect and buyer. No poison. Every package guaranteed. Territory rights given and protected. Write for details at once. Wex Sales Co., 657 34th St., Milwaukee, Wis.

**YOU Can Make Good Durable Paint and Varnish 40c per gallon.** Write Dept. 2, Emmelmann Bros. Mfg. Co., Indianapolis, Ind.

**AGENTS—Large Profits selling United No-Cement Tube Patch.** United Patch Company, Covington, Ky.

**GET posted—Good prices paid for butterflies, insects.** See Sinclair display advertisement, page 42.

**CAN you beat this money making line? Big variety of shirts, including silks, with a splendid line of union made work and flannel shirts, overalls, coveralls, work pants, play suits, all guaranteed.** Sell direct to wearer full or spare time. No experience required. Write today for Free Selling Outfit. Nimrod Shirt Co., Dept. 8, 4922-24-26-28 Lincoln Ave., Chicago.

**EARN \$15.00 Daily.** Sell Uptheygo Cuff Buttons Direct to Wearers. Stretch Like Rubber. Permits Sleeves to Be Raised over Elbows Instantly, without Unbuttoning Same. Lowered they close automatically. A New High Grade Durable Convenience that Appeals to All. Write Today. Flexo Mfg. Co., Sheboygan, Wis.

**MAGIC Polishing Cloth—Great seller.** Big Profit. Free sample to workers. Get this proposition. Newton Co., 102 Main St., Newark, New York.

**SUCCEED With Your Own Products—**Make them yourself. Formulas, Processes, Trade-Secrets. Modern master methods. Catalog free. B. Thaxly Co., Washington, D. C.

**AGENTS.** Our Silent Selling Method should make big money for you. No experience required. Colman Mercantile Co., 4421 Manchester Avenue, St. Louis, Mo.

**BUILD splendid business** making chipped glass number and name plates, signs, checkboards. Write for particulars. Simplex Utility Co., 1133 Broadway, New York.

**AGENTS.** No-Water hand soap in tubes taking autoists by storm; washes dirtiest hands perfectly clean without water; quick sale, big profits. National Service Co., Dept. "A," Pierre, S. Dak.

**TWELVE Big Money-Making Opportunities.** Including America's Greatest Magazine and Big Wholesale Catalog. All for 25c. Free—14 Articles worth \$2.00. Limited Offer. Write Quick. Lawrence Products Company, Beaver Dam, Wis.

**AGENTS—Sell 5c fast selling candy specialties to stores.** Big profits. Lorrac Products Co., Albany, N. Y.

**AGENTS \$500 monthly easy selling Magic Gas.** New discovery. \$1 box equals 33 gallons gasoline. Proven merits. Your name on cans, 300% profit. Write quick. P. A. LeFebvre & Co., Dept. P, Alexandria, Ont., Canada.

**SOMETHING new—Presto Rubber Repair** for tires, tubes; all rubber goods put on cold, no heat, acid or tools; vulcanizes itself in few minutes. Sells to auto owners and dealers, sample free. Pioneer Products Co., Dept. A, Roebbing, N. J.

**MANUFACTURE Chipped Glass Numbers;** particulars free. Beveridge, 160-22 Locust Avenue, Jamaica, N. Y.

**AGENTS sell 60 5 cent packages** chewing gum or candy mints. You keep \$1.00. Send us \$2.00. We trust you. Acheson, 2247 West Cary, Richmond, Va.

**YOU can be your own boss** with our Key-Check outfit. Good for \$5 a day stamping names on pocket key checks, fobs, etc. Sample check with your name and address, 20 cents. Pease Die Works, Dept. M, Winchester, N. H.

**MANUFACTURE lamb wool polishers,** dusters. Newhall, 65 Court, Brooklyn, N. Y.

**HY-GRADE agents** can average \$50.00 per week besides bonus, selling Household Products. Premiums. Co-operative Sales Plan makes sales easy. County Sales Agents Wanted. Write now for territory. Hy-Grade Chemical Co., Winthrop, Me.

**"IMMEDIATE" Stone Houses,** \$100. Agents' fortune-maker. Bandley, Box 171, New Orleans, La.

**AGENTS—30% commission.** Full line glove silk lingerie and guaranteed hosiery, mill to wearer; lowest prices. Get particulars. Wright Hosiery Mills, Philadelphia, Pa.

**AGENTS—Flashing device** easily sold to garages, barber shops, shoe shining parlors, etc., using globe signs and advertising. Inexpensive. Real proposition for live wires. 100% profit. Exclusive territory. Phelos Electric Co., 29 So. Clinton St., Chicago.

**GENERAL Distributors, Agents, Salesmen—**Send for our live wire proposition and sample. Exclusive territory to workers. See our display ad on page 157. Wallace Rim Tool Mfg. Co.

**ARE You Old at Forty?** See our advertisement on page 153 of this issue. The Electro Thermal Company, 2137 Main Street, Steubenville, Ohio.

**GIVE Polishing Cloth Free** with every package Rust and Stain Remover. Make 233%. Get Particulars. Quality Products, 2712-A Elliott, Minneapolis, Minn.

**MAKE 1926 pay you \$65.00 week.** Our men make this and more selling shoes direct to wearer. Superior Shoe Co., Bangor, Me.

**ANY man handy** with paint brush can start furniture refinishing, job painting, handyman shop on nearly nothing; mostly all profit; experience not needed; winning plan brings customers quickly. John Brace-land, 1457 So. Ninth, Philadelphia, Pa.

**\$8.50 TO \$20.00 Daily pay.** Introducing New Insured Hosiery for men, women, children. 57 styles, 40 colors. Must wear or replaced free. Repeat orders sure. Nyland made \$595 in one month. Edwards \$400.60. Mrs. Bone, \$445.25. Why not you? Even spare time work should pay you \$3 per hour. Your Pay Daily in advance. We deliver and collect. You spend all your time writing orders. No experience or capital needed. We furnish samples. All grades, colors including silks. No matter what you are doing now, write for our offer. Macochee Textile Company, Card 2563, Cincinnati, Ohio.

**AGENTS.** Salesmen—Sell New Thermo-static Automatic Carburetor Control Attachment for Fords. Big profit, full or part time. Burns 95% air. Doubles Mileage. Attached in 2 minutes. No drilling. Does automatically exactly what Ford manual says do by hand. Cadillac now using Thermo-static Carburetor Control under Blanche license. Write today. A. C. Blanche & Co., Dept. 805CX, 602 Lake St., Chicago.

**"C-WELL" Electric Lamp** for Sewing Machines. Fits all makes. Every woman with a sewing machine will buy. Liberal profits. Ask our selling plan. Lucark Trading Co., 799 Broadway, New York.

**AGENTS—Comb cleaners,** self-threading needles and other good sellers to housewives get the money. Particulars. L. Miller, Box 3, Tremont Station, New York.

**PATENTS.** Time counts in applying for patents. Don't risk delay in protecting your ideas. Send sketch or model for instructions or write for Free book "How to Obtain a Patent" and Record of Invention" form. No charge for information on how to proceed. Communications strictly confidential. Prompt, careful, efficient service. Clarence A. O'Brien, Registered Patent Attorney, 58-E Security Bank Building (directly across street from Patent Office), Washington, D. C. See pages 140 and 141.

**AGENTS—Mail dealers,** Concealograph, Secret Correspondence System. Sample 10c. Particulars free. Liggett, 875 Drexel Bldg., Philadelphia.

**A \$5,000 A YEAR Job.** You can make it worth that and more. 400% to 600% profits selling Perry Photo Medallions. No portraits so desirable. Indestructible, hand-colored, fade-proof. Built from photo supplied by customer. Guaranteed. No money risk. No margin of profit so big in any other line. Write. Perry Photo Novelty Corp., 1793 Jerome Ave., Dept. PM, New York.

**REMPE E-Z Typewriter Cleaner.** Makes type cleaning a pleasure. Repeater. Exclusive territory. Rempe Mfg. Co., 2827 Myrtle, Oakland, Calif.

**66 MILES on 1 gallon—Scientific Gas Saver.** All autos. Demonstrating model free. Critchlow, E-132, Wheaton, Ill.

**AGENT'S Protector—Book** every agent should have. Particulars Stamp. "Moore-Made," LaPeer, Mich.

**AGENTS Wanted—Something new—Fyr-Fyter** sells easily. Makes a spectacular demonstration; car owners, homes, factories, stores, practically buy on sight. Our men make \$10 to \$50 a day. Exclusive territory to producers. If you wish to establish a business of your own with unlimited possibilities for making big money, write us today. Fyr-Fyter Co., 998 Fyr-Fyter Bldg., Dayton, Ohio.

**AGENTS.** Big profits. Best and cheapest window letters made. Easily applied. Dime brings five samples. Particulars free. Staibrite Co., 1115 Second Ave., New York.

**WE pay \$200 Monthly Salary,** furnish car and expenses to introduce our guaranteed poultry and stock powders, cleaner, etc. Bigier Company, X 368, Springfield, Ill.

**\$20 DAILY Selling Ver-I-Ezy Men's Shoes** direct. Sell relatives, friends, neighbors first. Low priced. Give real comfort, long service. You take orders, keep big commission. We ship and collect. Full or part time. Write Now. Easy-wear Shoe Company, Dept. 229, Indianapolis, Ind.

**\$100 WEEKLY—Pleasant Work;** Appointing local agents to introduce Mother Hubbard Foods; no canvassing; no delivering; no money invested. Mother Hubbard, 556 Congress, Chicago.

**AGENTS—Three big lines** hosiery, silk underwear, men's shirts. Liberal commissions. Send for free illustrated catalogs. Helix Co., 213ta Fourth Ave., New York.

**MAKE big money** selling Eureka Patching Paste. Patches fabric and rubber. Eureka Cement Co., 208 E 53rd St., Chicago, Ill.

**DIRECT factory representative** to sell changeable letter signs to merchants. Excellent opportunity. Good income assured right men. Address, Maze Manufacturing Co., Norwood Station, Chicago.

**NEW camera** takes and finishes photos in one minute. Make money selling cameras or taking photos. Exclusive territory. Crown Co., Dept. 951, Norwalk, Conn.

**IF We Give You shoes** made-to-your measure in any one 60 leathers, 50 different styles, will you keep them, wear them, show them to your friends as sample of our \$10 Made-To-Order shoes to sell at \$6.85? Advise us today. Your complete outfit will go forward absolutely free at once. Dept. 2000, Tailor-Made Shoe System, 932 Wrightwood, Chicago.

**TAILORING Salesmen:** Our guaranteed \$23.50 and \$31.50 tailored to order suits are \$10 to \$20 dollars cheaper than store prices; commission in advance; monthly bonus; protected territory; beautiful assortment 6x9 swatches free. Our national advertising campaign makes selling easy—big repeat business. DeLonge's record \$343 in one week. In one state alone 47 men average \$57.18 weekly. J. B. Simpson, Dept. 1182, 843 Adams, Chicago.

**BRING Home the Bacon—selling Stuart's** famous Food Flavors. Quick sellers. Big profits. Write for free sample and terms. C. H. Stuart & Co., 6367 Main, Newark, New York.

**EVERYBODY uses Extracts.** Sell Duo Double Strength Extracts. Complete line of household necessities. Big repeaters. Write today. Duo Co., Dept. E-1, Attica, N. Y.

**GIVE Away finest laundry soap Free.** You'll make \$10 daily easy by new selling plan. Big repeat business. Write quick. Wolverine Soap Co., 28 Wolverine Bldg., Grand Rapids, Mich.

**AGENTS: \$65 to \$100 a week.** High grade all wool suits made to measure, \$25 and \$30. Biggest commission in advance. Money-back guarantee. Free sample outfit. Write C. G. Ferrin, Mgr., Box 1997, Chicago.

**WONDERFUL! Startling! Amazing!** Our Ex-Cel Luminous Crucifix and Magical (Luminous) Necklace shine brilliantly in the dark. Sell on first demonstration. Big profits to you. Write for further particulars, or better still, send for sample and territory protection immediately. Crucifix \$1.50, Necklace \$1.00, postpaid. W. G. Hannan Co., Dept. B, 2539 So. State St., Chicago.

**\$100 TO \$150 Weekly.** Wonder-Automatic Washer. Patented. Does large family washing spotlessly clean in 30 minutes. Creates its own power. Will last a lifetime. Sells for \$7.50. Unusually large commissions. Eureka Supply Co., Dept. 6, Sedalia, Mo.

**SHOW Us the Housekeeper Who Likes** to clean stair corners. Ideal Dust Shields keep corners clean. Agents wanted. Ideal Stairway Equipment Co., Canton, Ohio.

**START Business of Your Own.** Increase your income. Catalogue dependable formulas free. S. and L. Laboratory, 321 Larimer, Pittsburgh, Pa.

**AGENTS: 500% profit.** "Happy Home Maker Shampoo" builds your own big business. Martin of Indiana made \$75.00 in one day. Missouri man made \$750.00 one month. Exclusive territory. Geo. A. Schmidt & Co., Dept. P, 236 W. North Ave., Chicago.

**GOLD-LEAF Sign Letters;** make and sell; 1,000% profits. Particulars, Johnston Co., Quincy, Ill.

**PORTRAITS,** photo pillow tops, frames, sheet pictures, medallions, merchant's signs, food products, photo jewelry, guaranteed hose, toilet requisites, luminous crucifixes. Catalog 50 specialties free. 30 days' credit. Jas. C. Bailey Co., Sta. C, Chicago.

**MAKE Money,** silvering mirrors, refinishing auto headlights, tableware; metal plating, bed stands, chandeliers. Outfits furnished. International Laboratories, Dept. 71, 309 Fifth Ave., New York.

**AGENTS,** both sexes, we manufacture and control new household article. Fast seller. Big profits. Exclusive territory. Write now. Connolly, 123 Liberty St., New York.

**300% PROFIT—Quick Seller—Fast Repeater.** Sample Free. Bestever Products Co., 1941-PM Irving Park, Chicago.

**AUTOMOBILE Specialties.** Guaranteed formulas for all latest money makers. Lowest prices. Write for free lists. Murohy, Chemist, Tujunga, Calif.

**REPLATE** brassy worn-off Automobile parts, Reflectors, Bath Room Fixtures, Worn Spoons, Forks, etc., with pure silver. Looks like new. Use U-Kan-Plate Polish. Positively no mercury. \$1.00 half pints postpaid. Satisfaction Guaranteed. Agents wanted. Dept. A, U-Kan-Plate Co., Philadelphia.

**RARE Opportunity.** Men and Women make enormous profits. Articles cost 5c sell quickly for \$1.00. Make \$15 to \$30 daily. Particulars Free. Bags, 3239 Archer, Chicago, Ill.

**AGENTS—Big profits selling Veripure Vegetable Soap for Toilet, Bath, Etc.** Write for Territory. Veripure Laboratories, Box 999, Chicago.

**BIG Money monogramming autos, trunks, bags, etc.** Make \$20 to \$25 daily. No experience needed. Samples, information free. Acme Products, 905 Broad, Newark, N. J.

**MAN** in each town to plate auto parts, reflectors, bathroom fixtures, refinish beds, mirrors, chandeliers; by new method. No capital or experience required. Simple plan of manufacturing at home starts you in big money-making business. Outfit furnished. Free particulars and proofs. Gun Metal Co., Ave. H, Decatur, Ill.

**AGENTS—Shine-Brite Polishing Cloth** polishes all metals. Sample free. Knoll Products, Box 532, Kankakee, Ill.

**AGENTS** make 500% profit handling auto monograms, sign letters, Novelty signs, etc. Catalog free. Hinton Co., 122 E. 58th St., Chicago, Ill.

**MAKE \$75—\$100 Weekly.** Famous Sun-lite household products; Big Quantity Seller; You risk nothing. Your money back for every unsold item. Amazing offer free. Summit Specialty, Union City, N. J.

**\$400 TO \$500** a month easily earned selling New Guaranteed Auto Discovery. Nothing else like it. Big demand; sure repeater. Free folder explains; get it today. Boone Specialty Co., Dept. 327a, Boone, Iowa.

**AGENTS** wanted to sell to Retail Stores our fancy signs; three colors, shaded with airbrush, great variety. C. Pohlmann, 929 Second Avenue, New York.

**WHY Buy Other's Goods?** Start your own profitable business, making them. Free valuable literature tells how, including Chemist's Interesting Lists Guaranteed Reliable Formulas for Latest Specialties. Miller, Chemist, 1706-K Jetton, Tampa, Fla.

**DON'T Buy** so-called "Master Formulas" (old recipe-book-stock-formulas). Get this Free, Interesting, Valuable literature describing Latest, Guaranteed, Special Manufacturer's Formulas for all lines latest specialties. Miller, Chemist, 1706 Jetton-G, Tampa, Fla.

**IF** you want good live agents—fellows who can get the business—ask me how others are doing it. I'll gladly render the necessary assistance. M. L. Rund, Mgr. Classified Advertising, Popular Mechanics Magazine, Chicago.

**ATTABOY—Pung Chow and Joker.** Greatest Amusement games ever played on Billiard or Pool Table. Brooks Mfg. Co., 1183 44th Street, Brooklyn, N. Y.

**OVER 100% Profit, Self-Lighting Gas and Cigar Lighters.** Everybody interested; repeat business. Sell individuals, dealers, subagents. Particulars Free. P. Bernhardt, 148 Chambers St., New York.

**AGENTS:** Full or spare time—to sell hand painted scarfs, doilies, pillows. Extremely low priced. A wonderful new process. Our agents are cleaning up. Paintographs practically sell themselves. Write for full particulars of liberal agency offer and circulars describing Paintographs today. Bradford's Paintographs, Inc., St. Joseph, Mich.

**TURN** your spare time into dollars selling Polmet Polishing Cloth that cleans all metals without liquid, paste or powder. Retail 25c. Our agents say it sells like "hot-cakes." Prove it yourself with free sample sent on request. F. C. Gale Co., 122 Edinboro St., Boston.

**ONLY** one sale a day means \$200 per month! Marvelous new adding machine. Retail \$15.00. Work equals \$350 machine. Ads, subtracts, multiplies, divides, automatically. Computes feet and inches. Speedy, accurate, durable, handsome. Five-year guarantee. Offices, Stores, factories, garages, lumbermen buy one to dozen. A fortune for live agents. Write quick for protected territory and free trial. Lightning Calculator Co., Dept. F, Grand Rapids, Mich.

**BIG Money Selling "Jiffy Tire & Tube Repair Kit."** Contains 3 Self-vulcanizing Tire Shoes; Large Outfit Tube Patch; 3 Puncture sealers, everything complete. Sells to every auto owner and Accessory Dealer. Agents average \$30 to \$100 weekly. We also manufacture Nationally known "Jiffy Tire-Doh." Exclusive territory and free samples. Chicago Tire Patch Co., 347-65 E. 55th St., Chicago, Ill.

**SELF-THREADING Needles.** Needle Books, Machine needles, find sales in every home. Fine side lines, easily carried, big profits, sample and catalogue free. Prentice Lee, 145 East 23rd St., New York.

**AT Last! Diamond Rival Discovered!** Amazing blue white Rajah Gem astounds jewelry world and deceives experts! Beautiful Sample case Free! \$100 weekly! Write Quick! Rajah Diamond Co., Dept. F-7, Salisbury, N. C.

**WILLIAMS' No-Water Hand Soap.** in tubes, has taken Auto owners by storm; washes dirtiest hands perfectly clean without water; easy demonstration makes quick sale. 150% profit. Williams Co., Dept. 265, Montclair, N. J.

**BIG Money and Fast Sales.** Every owner buys Gold Initials for his auto. You charge \$1.50; make \$1.35. Ten orders a day easy. Write for particulars and free samples. American Monogram Co., Dept. 40, East Orange, N. J.

**INSTANT Weld.** Repairs largest punctures without cement or heat. Lenn's profit one day. \$56. Write quick. Free sample; territory going fast. Tourists' Pride Mfg. Co., Desk T, Minneapolis, Minn.

**WE Pay \$50 a Week** and expenses and give a Ford Auto to men to introduce poultry and stock compounds. Imperial Co., D. 23, Parsons, Kans.

**AGENTS—Make a dollar an hour.** Sell Mendets, a patent patch for instantly mending leaks in all utensils. Sample package free. Collette Mfg. Co., Dept. 404, Amsterdam, N. Y.

**\$60-\$200 A WEEK.** Genuine Gold Letters for store windows. Easily applied. Free samples. Liberal offer to general agents. Metallic Letter Co., 438-D North Clark, Chicago.

**AGENTS—Clever Invention!** Inkspoon makes every pen a fountain pen. Fast office seller; big profit, demand increasing everywhere. Exclusive territory offered. Sample free. H. Marui Company, Tribune Bldg., New York, N. Y.

**POLMET—The Wonderful Polishing Cloth** that cleans all metals without liquid, paste or powder. Approved by "Good Housekeeping" and "Modern Priscilla"—sells fast at 25c. Sample free. Gale & Co., Inc., 15 Edinboro St., Boston.

**WASH** Clothes the new way. Use the Torrent Automatic Washer. You will be delighted. Special offer to one in each locality. Storm Royalty Co., 3610 Enright Ave., St. Louis, Mo.

**WE Start You Without a Dollar.** Soaps, Extracts, Perfumes, Toilet Goods. Experience unnecessary. Carnation Co., Dept. 201, St. Louis.

**GET** Our Free Sample Case—Toilet articles, perfumes and specialties. Wonderfully profitable. La Derma Co., Dept. A, St. Louis, Mo.

**BUILD** your own Business! Free Valuable literature explains how you can easily make your own Goods—have others selling them. Miller, Chemist, 1706-A Jetton, Tampa, Fla.

**AGENTS—\$240 a month.** Take orders for well known line of household specialties, food flavors, toilet preparations, etc. Full or spare time. Build a big permanent business. Must satisfy or money back. Write for free sample Outfit and offer. C. H. Stuart & Co., 5567 Main, Newark, N. Y.

**MAIL-ORDER** Houses and Distributors; We pack French made beauty creams, face powders, perfumes, toilet preparations with your label. Chemist, A2700 Wabash Ave., Chicago.

**AGENTS—Here's a New One.** "Best-ever Powdered Hand Soap." Sells like wildfire. Marvelous Discovery. Removes grease, paint, ink, oil, in fact anything from the hands. Cannot harm skin. 150% Profit. Great Repeater. Agents simply coin money. "Free Samples Get the Business." Write immediately. Bestever Products Co., 1945 E. Irving Park, Chicago.

**WINDOW Sign Letters.** One Thousand for \$9.75 Beautiful design. Perfect cut. Free samples, catalogue. Foil Sign Works, 832 W. 11th Street, Oakland, Calif.

**AGENTS—Write for Free Samples.** Sell Madison "Better-Made" Shirts for large Manufacturer direct to wearer. No capital or experience required. Many earn \$100 weekly and bonus. Madison Co., 566 Broadway, New York.

**AGENTS—Stamping names on Pocket Key Protectors; sample Check with your name and address. 25c. Stamping Outfits, Emblem Checks, Check Fobs, Name Plates.** Hart Mfg. Co., Desk 2, 303 Degraw St., Brooklyn, N. Y.

**ORIENTAL Perfumes** bring 100% net profit. Good sellers and better repeaters. Romola Parfumerie, Inc., Woodlawn 10, Chicago.

**NEW Marvelous Self-Lighting Pocket Cigar and Gas Lighters.** No Friction. Sells on Demonstration. Sample 25 cents. Rapid Mfg. Co., 799 Broadway, New York.

**EVERYBODY Buys Davis' Nifty Toilet Goods Assortments.** Useful, handsome gifts free to our customers. Over 250 high quality products. All repeaters. 100% profit. 25 years of success. Write! Davis Products Co., Dept. 56, Chicago.

**AGENTS—\$60 to \$200 weekly** putting up our Burnished Genuine Gold window letters; scripts. Experience unnecessary. Free samples. Premier Letter Co., 121 N. Francisco, Chicago.

**EASY, pleasant work for Mechanics, Shop Men, Clerks,** during spare hours; will add many dollars to their salaries. Also want persons who can give full time. Big wages assured. Novelty Cutlery Co., 67 Bar St., Canton, Ohio.

**AGENTS \$1. Retail \$3. Your Profit \$2.** Wonderful, pocket Adding Machine with Magic Writing Pad. Particulars Free. Typewriter Supply, 905 Hersch Bldg., Pittsburgh, Pa.

**\$31.00 PROFIT—with \$1.50 Outfit—Big Money—Easy Work.** Selling Gold Monograms for Automobiles, Luggage, Windows, Wagons. No Experience. No License. "Samples Free." NuLife Monograms, Hartford, Conn.

**BUSINESS Guide with Free Legal Service** Sells everywhere; Wells cleared \$1,185 in 35 days. Write for free outfit. Nichols Co., Naperville, Ill. Dept. 4B.

**AGENTS** make \$100 week placing advertising Cigar Lighters with glass front. Every dealer wants one. Write for free plan. Drake Mfg. Co., Dept. M, Milwaukee, Wis.

**CALIFORNIA** Rosebuds selling like hot cakes. Agents coining money; new stuff. Big profits. Catalog free. Mission Factory PM 519 No. Halsted, Chicago, Ill.

**DUSTLESS** Sponge Cloth. New Invention. (1) Rub—Dusts. Cleans and Polishes Automobiles, Furniture, Pianos. Retail (50c)—Costs (16c). "Sample Free." NuLife Sponge, Hartford, Conn.

**BIG Profits with Exclusive Territory—\$50 to \$100 weekly easy.** More has often been made in one day's work. A hot or cold running water bath equipment for any home at only \$7.50. No plumbing or water works required. Investigate. Send no money. Write today. Sanitary Supply Co., 753 Allen Building, Toledo, Ohio.

**\$20 PROFIT** daily selling self-threading needles, needlebooks; cost 3-5c each; sell 25c; three samples 25c. Catalog free. Needlebook Specialty Co., 661 Broadway, New York.

**AGENTS: \$300—\$500 monthly** easy taking orders for Morey Rim Tool. Autoists and trade buy on sight. M. Morey Rim Tool Company, Blissfield, Mich.

**BIG Money—fast sales; everyone** buys gold initials for their auto; sell \$1.50, profit \$1.44. Ten orders daily easy. Samples, information free. World Monogram, Dept. 16, Newark, N. J.

**AGENTS—N-R-G Laundry Tablets.** The old reliable moneymaker for live agents. Millions sold—200% profit—sales waiting for you. Clothes washed spotlessly clean in 10 minutes without rubbing. Free samples. N-R-G Company, 230 W. Superior, Chicago.

**GENUINE Gold Leaf Letters** anyone can put on Store windows. Guaranteed to never tarnish. Large Profits. Enormous Demand. Free Samples. Write today. Metallic Letter Co., 438-A North Clark, Chicago.

**AGENTS:** Our gold-eyed Needle Cases are wonderful sellers; immense profits; \$50 to \$300 weekly; proof and particulars free; sample outfit 15c; factory prices. Paty Needle Co., 231 Davis Square, Somerville, Mass.

**A BUSINESS** of your own. Make and sell chipped glass name and house number plates, checkerboards, signs. Booklet Free. E. Palmer, Dept. 512, Wooster, Ohio.

**EARN \$10 daily** silvering mirrors, plating and refinishing metalware, autos, chandeliers, bedsteads, headlights. Outfits furnished. E. Decle Laboratories, 1133 Broadway, New York.

**AGENTS—Steady income.** Large manufacturer of handkerchiefs and dress goods, etc., wishes representative in each locality. Factory to consumer. Big profits, honest goods. Credit given. Send for particulars. Freeport Mfg. Co., 59 Main St., Brooklyn, N. Y.

Now that you have read all these offers, read Macochee Company's (Cincinnati, Ohio) advertisement again.

### HIGH GRADE SALESMEN WANTED

**WANTED—Tailoring Salesmen,** make \$60 to \$125 per week. Biggest merchants in many towns have started with our line. We are the largest made-to-measure tailoring house in the country, furnishing elaborate sample equipments, including 500 all-wool fabrics. You make your own profits from \$8.00 to \$15.00 on each order. Guaranteed absolute satisfaction, perfect fit, best workmanship, or no sale. Write for our line and all accessories to be sent free. Tell us all about yourself. Address N. O. Perry, Sales Manager, Box 483, Chicago, Ill.

**\$91.50 WEEKLY** and up—Your Pay Daily. Introducing New 12 months Insured Hose for men, women, children. You write orders. We deliver and collect (or goods on credit and you can deliver, suit yourself). No experience or capital needed. Samples furnished. All colors, grades, including silks, lises, chiffons, heathers. Write quick. Macochee Textile Company, Card 3043, Cincinnati, Ohio.

**WANTED: Salesmen** to sell Toy Balloons and Squawkers to retail stores. \$200.00 per month easy. National Novelty Co., Gallon, Ohio.

**SALESMEN,** sell men's all wool suits tailored to order for \$29.50. Values to \$45.00. Fit and satisfaction guaranteed. Experience unnecessary. Our instructions enable you to take measurements accurately. Earning possibilities \$75.00 up, weekly. Commissions advanced daily. Spring line now ready. Lee, Whitecup & Gollender, Inc., Dept. 3, 71 Fifth Avenue, New York.

**DISTRICT Manager** for Dr. Gelber's Pyorrhea Home Treatment, 160 Newark Ave., Jersey City, N. J.

**WANTED: Salesmen** to sell our Men's Wide Belts on 20% commission basis, \$200.00 per month easy. National Mailing Service, Gallon, Ohio.

**HERE'S big money maker.** Masterlite Pocket Cigar Lighter; something new in specialty field; sells instantly upon demonstration to consumers and dealers. 50c (stamps) brings sample and selling plans. M. Masterlite Mfg. Co., 110 East 23rd St., New York. (Manufacturers well known Raido Gas Lighter.)

**WANTED: Salesmen** to sell Premiums to Bakeries and other merchants. \$200.00 per month easy. National Premium Co., Gallon, Ohio.

**12 PAIR Men's Pure Silk Hose** cost you only \$1.00 on our co-operative plan. Approved by U. S. Supreme Court. Money back if dissatisfied. Send \$1.00, stating size and color wanted. Conley Sales Co., Dep. F, 186 N. LaSalle St., Chicago, Ill.

**SELL finest quality line Waterproof,** high top boots and work shoes made in the country. We are the largest concern in this field. Write for new free sales Manual at once. Carson Shoe Co., Essex Station, Boston, Mass.

**TIME-SAVER Rubber Half Soles** becoming popular as rubber heels. Something new. Big seller. Quick money. Sell on sight all retail trade and direct. Outwear leather. Cost half. User attaches. No nails. Best season now starting. Write today for the Timesaver facts or send forty cents and pencil outline of shoe sole for your pair if you want to get started at once. Timesaver Co., 771 Arcade, Cleveland, Ohio.

**SALESMEN—We will pay you well.** Hardenburg's famous line of Leather Goods, Diaries, Calendars and other Advertising Specialties. Product of forty-eight years' experience. Easy sales, satisfied customers, big commissions. A serious offer for hustling salesmen. No canvassers. H. B. Hardenburg & Co., Inc., 413 Elizabeth Ave., Linden, N. J.

**THE Improved Luminite Window Bulletin.** Motion—Color—Light. Dignified, yet attention compelling. "Any sign any time" quick, easy, with our exclusive patented changeable letter system. Proof increasing merchants sales 100 to 200%. Liberal commissions. Protected territory. 20 minute demonstration often sells. Workers making \$100 to \$125 per week. World-wide distribution. Ask for evidence and sales plan. Display Products Company, 818 Wyandotte, Kansas City, Mo.

**EXPERIENCED Vacuum Cleaner Salesmen** for a cleaner that can be sold to every home. Responsible representatives are making \$500 to \$1,000 monthly. Past seller—sure repeater. Exclusive territory. The Marvel Co., Dept. 76, Hammond, Ind.

**TIRE Salesmen—Sell tires and tube** direct from factory. Complete line, high quality, low prices, liberal commission. Cable Rubber Co., Sandusky, Ohio.

**SALESMEN—Get this big sensational,** order-getting shirt outfit Free. Sell Stylemor Shirts all year round. It's Chicago's Wonder shirt line. Advanced Spring showing of smartest, snappy patterns. Large double swatches, low prices, quick service, makes shirt selling easy. Bellard of Texas made \$16.00 in two days. We deliver and collect. Write today for big free outfit. Stylemor, 81 W. Van Buren, Chicago, Ill. Dept. 1102.

**A PAYING Position** Open to representative of character. Take orders shoes-hosiery direct to wearer. Good income. Permanent. Write now. Tanners Shoe Mfg. Co., 1-410 C St., Boston, Mass.

**BECOME Your Home Town's Leading Business Man.** Big money. Easy work. Selling groceries, coffee, canned goods, auto oils, men's shirts, ladies' hosiery direct to consumer. Undercut competition. Commission advanced. Liberal credit plan. No experience or capital necessary. Lovrin & Browne Co., 1775 So. State, Chicago.

**SALES Manager** for largest Eastern Tailoring House. To secure direct sales force. Superior line \$29.50 up. Extra trousers free. Large commissions. N. E. Wholesale Tailors, Harrison Ave., Boston, Mass.

**DISTRICT Manager—Largest New England House.** Suits, overcoats, \$23.50 factory to wearer. Largest commissions. Possibilities \$5,000 up. Boston Wholesale Clothing, 47 Beach, Boston.

**SALESMEN: Write your name and address** on a card and mail to us. We'll show you sure earnings of \$20.00 a day. Will you risk one minute and a one cent stamp against \$20.00? Mind you, we say we'll show you. Address Dept. 811, William C. Bartlett, Inc., Chicago.

**DISTRICT Salesman: Must be reliable.** Prefer married man, 30 years old or over and permanent resident. Exceptional opportunity for good man. Address Sales Manager, 844 West Adams, Dept. 213, Chicago.

**MR. BRUSH Salesman:—Old Established** New York Brush Manufacturer requires the services of men in all territories to sell their extensive line of Sanitary Twisted in Wire Brushes. We pay larger commissions than any other Brush House in the country. Write immediately for our proposition. Wire Grip Sanitary Brush Corp., 15 Mercer St., New York.

**SALESMEN: write for particulars** of an interesting and profitable business, selling and operating aluminum refillable salesboard, Square Hole Board Co., 120 Scheerer Ave., Newark, N. J.

**BEST Seller.** Jean Rubber Repair for tires and tubes; supersedes vulcanization at saving of over 800%; put it on cold vulcanizes itself in two minutes; guaranteed to last life of tire or tube; sells to every auto owner and accessory dealer. Get particulars how to make big money and free sample. Amazon Rubber Co., Philadelphia, Pa. Dept. 510.

**\$50.00 DAILY Selling Salesboards—Make** up to \$33 on single sale selling largest, lowest priced line; no sample to carry; write for 3-color catalogue and full particulars. Lincoln Sales Co., Dept. E, 9 So. Clinton, Chicago.

**TAILORING Salesmen: Our guaranteed** \$23.50 and \$31.50 tailored to order suits are \$10 to \$20 cheaper than store prices; commission in advance; monthly bonus; protected territory; beautiful assortment 6x9 swatches free. Our national advertising campaign makes selling easy—big repeat business. DeLonge's record \$343 in one week. In one state alone 47 men average \$57.18 weekly. J. B. Simpson, Dept. 1174, 843 Adams, Chicago.

**DISTRICT Agents—For Union Made** pure wool suits and topcoats retailing at \$23.50, none higher. A remarkable line of 45 beautiful fabrics tailored by a large and well known old established firm, sold only thru our own stores and district agents. A real opportunity for any good man. Big money to start and chance for advancement. We furnish large sale outfit, 9x13 cloth samples. Men over 30 years of age with tailoring or clothing experience preferred. Can use ambitious spare time men in smaller towns. Interested only in serious men who seek a future. Write for free samples and full information. Address M. V. Harvey, Mgr., Box 00, Chicago.

**TAKE orders** for coffee, sugar, flour, meats, canned goods, staple groceries; also paints, radio sets, tires, auto and tractor oils. No capital or bond required. We deliver and collect. Permanent business. Big pay. Write at once. Hitchcock-Hill Co., Dept. 50, Chicago.

**SIDELINE—Good Commission.** Printed Advertising Tying Tape; well introduced; sold to any line business; pocket samples. Neuer, 75 Grand Street, New York.

**SALESMEN Wanted.** Necessary product, no competition. Rapid Sales Co., 687A Main St., Worcester, Mass.

**SIDELINE Salesmen—35c article** eliminates automobile accidents; fast seller; over 400% profits. Sample free. Klear-Vu, 625 Buder Bldg., St. Louis, Mo.

**SELL Men's High Top Boots and Waterproof Quality Work Shoes** factory to Wearer. Our new sales manual will put you in the big earning class in twenty-four hours. Write for free copy today. Carson Shoe Co., Essex Station, Boston, Mass.

**EASY Selling Specialty.** Beautiful, Attractive, Appealing, Luminite Window Bulletin. Increase merchants' business 50% to 100%. Protected territory. \$8 commission on each \$20 sale. Thousands being sold; sells itself on demonstration. Display Products Co., Ltd., 106 Gibraltar Bldg., Kansas City, Mo.

**TRAVELING Salesmen** calling on retail stores wanted by large manufacturer to sell unique line of business-boosting articles. Year round, fast selling, main or side line. If not earning \$150 weekly, address Union Specialty Works, Inc., 222 Charles St., Booneville, N. Y.

**SALESMEN** wanted in exclusive territories by an old established concern, to call on factories, hospitals, schools, department stores, institutions, cemeteries and public buildings. Wonderful advertising co-operation. Proposition will pay from four to ten thousand a year to right man. C. B. Dolge Company, Westport, Conn., Sales Department.

**YOUR trade** uses salesboards. Make up to \$35 on single sale. Largest, lowest priced line. No samples to carry. Elaborate 3-color catalog free. Lincoln Sales Co., Dept. D, 9 So. Clinton, Chicago.

**IF You Think** in Terms of \$6,000 the First Year write Us Now. Strong line for retail stores. Nationally advertised. Established concern. Best season now starting. Liberal weekly advance to producer. The Continental Co., 1922 Euclid, Cleveland, Ohio, Dept. 200.

**SELLS for \$9.75.** Prints ad on wrapping paper, envelopes, etc. \$1.00 commission. Send 10c for sample work. Automatic Ad-Stamp, Joplin, Mo.

**MEN Wanted—to sell dependable** fruit trees, shrubbery, etc. Steady demand. Complete cooperation. Pay check weekly. Write Perry Nurseries, Dept. B, Rochester, N. Y.

**CALIFORNIA Rosebuds** selling like hot cakes. Agents coining money. Absolutely new. Big profits. Catalog free. Mission Factory SP, 519 No. Halsted, Chicago, Ill.

**\$60-\$200 A WEEK.** Genuine Gold Letters for store windows. Easily applied. Free samples. Liberal offer to general agents. Metallic Letter Co., 438-B North Clark, Chicago.

**SALESMEN** Can make \$5.00 a day selling our Calendars, Pencils, Signs, Advertising Novelties, Yardsticks, Whistles, etc. Liberal terms. Sells entire year. Fine side line. Local and traveling agents. Model Calendar Co., Dept. 226, South Bend, Ind.

**FOUR \$7.50 sales** to merchants net you \$20.00 daily. Sayers Systems, 2803 Sheffield Ave., Chicago, Ill.

**SALESMEN—Become Independent.** Own Your business, experience unnecessary selling our \$7,500 Accidental Death; \$50 Accident; \$25 Sick Weekly Benefits—\$12.50 Yearly. Other Amounts proportionate. Guaranteed steady income from renewals. \$250,000 Deposited Insurance Department. Universal Policy, Dept. A, Newark, N. J.

## HELP WANTED

WHY not sell us your spare time, \$2 an hour, \$19.70 daily easy for full time. Introducing New Style Guaranteed Hosiery for men, women, children, 57 styles, 40 colors, including silks, lises, chiffons. No capital or experience required. Just write orders. We deliver and collect. Your Pay Daily; also monthly bonus. Free auto offer besides. We supply samples. Maceochee Textile Company, Card 2603, Cincinnati, Ohio.

RAILWAY Postal Clerk, City Post Office Clerk, City Letter Carrier, Rural Letter Carrier positions highly desirable; obtainable only through competitive Civil Service Examinations. Highly helpful correspondence instruction for reasonable charge. Inquiries solicited. Federal Correspondence School, Inc., Kellogg Building, Washington, D. C.

BUILD splendid business making chipped glass number and name plates, signs checkboards. Write for particulars. Simplex Utility Co., 1133 Broadway, New York.

MEN, women wanting government position \$1,700 to \$2,700 yearly, write Central Institute, Centralia, Ill.

10,000 APPLICANTS to operate Art, Gift Shops, Tea Rooms. Write for particulars. Unit Art Works, Dept. A2, 422 Lenox Ave., New York City.

HOTELS Need Trained Men. Nationwide demand for high-salaried men; past experience unnecessary. We train you by mail and put you in touch with big opportunities. Big pay, fine living, interesting work, quick advancement; permanent. Write for Free Book "Your Big Opportunity." Lewis Hotel Training Schools, Suite J-351, Washington, D. C.

IMMENSE Profits Silvering Mirrors at Home. Plating like new, brassy worn-off autoparts, reflectors, tableware, stoves, refinishing metalware, etc. We train you. Plans Free. Sprinkle, Plater, 77, Marion, Ind.

"UNCLE SAM" Wants You. Steady jobs. \$95-\$225 month. Sample examination coaching free. Write immediately. Franklin Institute, Dept. N-16, Rochester, N. Y.

QUALIFY for \$150-\$300 railroad jobs. Fireman, Brakeman, Baggageman, Sleeping Car or Train Porter. 810 Railway Bureau, East St. Louis, Ill.

LOCOMOTIVE Firemen for railroads nearest their homes—everywhere; beginners \$150-\$250 monthly; promoted, locomotive engineer, \$3,000-\$4,000 yearly. Best paying positions on railroads. Railway Association, Desk M1, Brooklyn, N. Y.

MEN, 18 up, wanting U. S. Mail Service positions, \$142 to \$225 monthly; steady; experience or correspondence course unnecessary; particulars free. Write P. Bradford, 112 N. 50th St., Philadelphia, Pa.

\$35.00 WEEK. Boys—men. Learn Auto repairing. Sample lessons free. Franklin Institute, Dept. N-400, Rochester, N. Y.

ARE you old at forty? See our advertisement on page 153 of this issue. The Electro Thermal Company, 2137 Main St., Steubenville, Ohio.

GET posted—good prices paid for butterflies, insects. See Sinclair display advertisement, page 42.

\$158 MONTH. Railway Postal Clerks. Men 18 up. 25 coached free. Write immediately. Franklin Institute, Dept. N-16, Rochester, N. Y.

66 MILES on 1 gallon—Scientific Gas Saver. All autos. Demonstrating model free. Critchlow, H-132, Wheaton, Ill.

U. S. GOVERNMENT wants men. \$1,700-\$1,900 and up at start. Railway Mail clerk examination coming. Let our expert (former Government examiner) prepare you for this and also Rural Carrier, Post Office, Customs, Internal Revenue, and other branches. Write today for free booklet. Dept. 3, Patterson Civil Service School, Rochester, N. Y.

DON'T prepare for any Civil Service Examination without seeing our catalogue. Free. Columbian Correspondence College, Washington, D. C.

MAKE Money, silvering mirrors, refinishing auto headlights, tableware; metal plating, bedsteads, chandeliers. Outfits furnished. International Laboratories, Dent. 71, 309 Fifth Ave., New York.

COMMENCE \$142-\$158 Month. Mail Carriers, Railway Mail Clerks. Men 18 up. Travel—see country. Sample coaching—free. Write immediately. Franklin Institute, Dept. N-16, Rochester, N. Y.

WANT a U. S. Government Job? \$1,140 to \$3,000 year. Become Railway Mail Clerks, (Travel—See your country) Rural and City Mail Carriers, Post-Office Clerks, Clerks in Government offices. Steady work. Paid vacations. Experience unnecessary. Full particulars and sample coaching—free. Write immediately. Franklin Institute, Dept. N-3, Rochester, N. Y.

WE need more men for Railway telegrapher service in and out of Chicago. No experience required. Day work. Salary \$20 to \$30 while in training. Call or write W. H. Dye, Supt. Room 1114, 159 No. State St., Chicago.

\$158 MONTH. Railway Postal Clerks. 25 coached free. Write immediately. Franklin Institute, Dept. N-16, Rochester, N. Y.

MEN Wanted—prepare as firemen, brakemen, colored train or sleeping car porters, wire for application blank; experience unnecessary; first class roads, no strike. Name position wanted. Railway Institute, Dept. 35, Indianapolis, Ind.

MEN wanting forest ranger, railway mail clerk and other govt. positions. Write for particulars. Mokane, B-23, Denver, Colo.

BECOME a Landscape Architect. Uncrowded profession of wonderful opportunity for money-making. Easily mastered by mail. Earn while you learn. Write for book. American Landscape School, 56-E, Newark, N. Y.

STEAMSHIP Positions—Europe, Orient. Good pay. Experience unnecessary. No compulsory service. Send stamped addressed envelope for list. Box 30-X, Mount Vernon, N. Y. or Box 336-A, Santa Monica, Calif.

\$115-\$400 MONTHLY paid—By. Station—office positions. Free passes, experience unnecessary. Write Baker, Supt., (ABT) Star Bldg., St. Louis, Mo.

SILVERING Mirrors, French plate. Easily learned; immense profits. Plans free. Address, Wear Mirror Works, Dept. 34, Excelsior Springs, Mo.

ALL men-women, 18-60, wanting to qualify for Government Positions, \$140-\$225 monthly, local or traveling, write Mr. Ozment, 101, St. Louis, Mo., immediately.

STORIES, poems, plays, etc., are wanted for publication. Good ideas bring big money. Submit manuscripts or write Literary Bureau, 522, Hannibal, Mo.

EARN \$10 daily silvering mirrors, plating and refinishing metalware, auto, chandeliers, bedsteads, headlights. Outfits furnished. E. Decle Laboratories, 1133 Broadway, New York.

FINGER Print Experts—Excellent paying positions; particulars free. Finger Print Headquarters, 188 East 79th, New York.

INVENTORS desiring to secure patents should write for our book "How to Get Your Patent," tells our terms and methods. Send sketch for our examination and instructions without charge. Randolph & Co., Dept. 418, Washington, D. C.

MAKE money writing Photo-plays; details free to beginners. No correspondence course. Producer's League, 230 Wainwright, St. Louis.

MEN wanting forest ranger positions, \$1,500-\$2,400 year. Write for free particulars of exams. Mokane, B-21, Denver, Colo.

## INFORMATION

ACCURATE, specific information on any one subject \$2. National Information Bureau, 316A Shepard Building, Grand Rapids, Mich. Prompt service, satisfaction guaranteed.

ADVICE on any subject \$1.00. Universal Bureau, 3610 Enright, St. Louis, Mo.

AUTOMOBILES: 753 ideas on repairing and improving, in Popular Mechanics three new books: Auto Repairman's Handbook, Auto Owner's Handbook, Auto Tourist's Handbook. Send No Money. Just write a postal. Pay postman the postage and \$1.50. Popular Mechanics Press, Room 803, 209 E. Ontario St., Chicago, Ill.

## BUSINESS SERVICE

BUSINESS Problems Solved—all kinds—buying, selling, financial, increasing business, advertising, getting men, getting positions, special formulas, processes, etc. Long business experience, thorough research, complete files of information. Complete solution of problem \$3, particulars free. Satisfaction guaranteed. All confidential. National Information Bureau, 316F Shepard Building, Grand Rapids, Michigan.

MAKE 'Em Pay—My system will make them pay their bills. Write for the acid test. Literature free. Burtleigh L. Horr, Horr Omelia Block, Rhinelander, Wis.

CHARTERS—Delaware; best, cheapest; free forms. Colonial Charter Co., Wilmington, Del. (99)

DELAWARE Incorporator. Charters; Fees Small; forms. Chas. G. Guyer, 901 Orange St., Wilmington, Del.

HAVE a Broadway-New York City office address. \$3.00 month. Mail forwarded daily. Ford's Service, 929 Broadway.

REPRESENTATION in Washington, D. C. Mail address. Information, Anything, Anytime. Service, 517 Kresge Bldg.

## TYPEWRITERS AND SUPPLIES

UNDERWOOD Typewriters—only \$3.00 down. Easy monthly payments. Low prices at less than manufacturers. 10 days' free trial. Rebuilt, all worn parts replaced. Just like a new machine. 5-year guarantee. Write for a big free catalogue C-151. Shipman-Ward Mfg. Co., 1513 Shipman Bldg., Chicago, Ill.

TYPEWRITERS All Makes. Save One-half. Thoroughly rebuilt in our factory to the famous "Young Process." Fully guaranteed. Free trial. We handle all standard makes. Cash or sold on easy terms. Write for catalog. Young Typewriter Co., Dent. 5753, Chicago, Ill.

100 TYPEWRITERS Free. Overstocked. Rent rebuilt Underwood or Remington \$3.00 month. If you pay its value in rental, we give machine free. Particulars free. Pittsburgh Typewriter Exchange, 945 Hersch Bldg., Pittsburgh, Pa.

TYPEWRITERS. All Models, used and rebuilt, at lowest prices. Send for price list before buying elsewhere. We save you money. Big Money-Making Plans free with order. Keith's Supply House, Dept. A, Long Branch, N. J.

TYPEWRITERS, all standard makes. \$10 up. Fully guaranteed. Free trial. Write for complete illustrated lists. Northwestern Typewriter Exchange, 121 N. Francisco Ave., Chicago.

TYPEWRITERS, Checkwriters, Adding Machines. Real bargains. Write for list. Earl Warring, Parkersburg, Iowa.

USED L. C. Smith \$5, 2 color ribbon—back spacer \$18.50. Used Oliver \$18. Ray, 296 5th Ave., New York.

TYPEWRITERS—portable, standard, visible, \$2-\$35. Rent. Motorcycles \$10-\$75. Knight, 1512 Locust, St. Louis, Mo.

TYPEWRITER Ribbons of Quality Priced Right. Write. Midwest, Box 47, Springfield, Ill.

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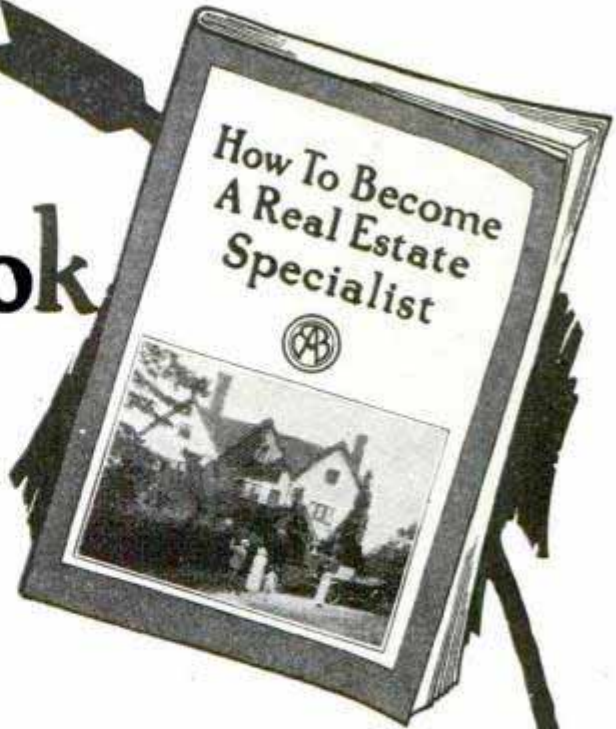
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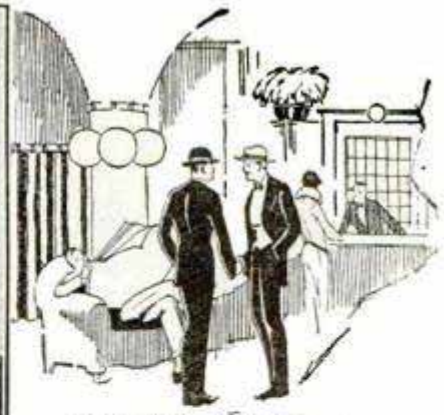
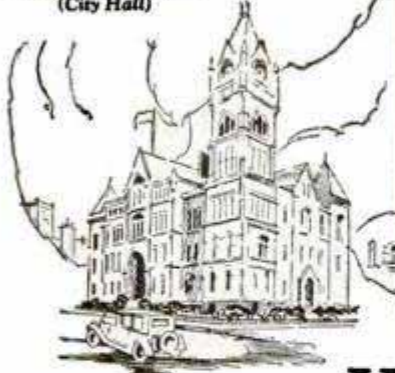
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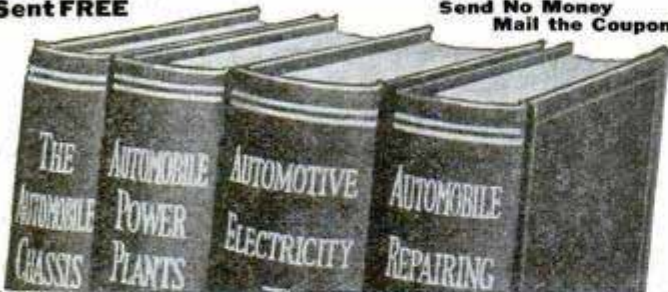
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The SUPER is so designed that it takes advantage of the present Ford Carburetor and properly atomizes the light as well as the heavy elements of the fuel, converting every atom of gasoline and kerosene into power preventing liquid fuel from passing into the cylinders, thus avoiding carbon formation and oil dilution.

### Easy to Sell

#### Sells Like Hot Cakes

This is a recent letter from one of our distributors: "Enclosed find draft for 200 more SUPERS, rush as I need them badly. I sold and banked \$104.00 in one day. Hope to sell 1000 SUPERS next month."  
A. W. LEONARD, Penn.

#### Making Big Profits Every Noon

I have been working the SUPER at noon only. Yesterday noon I made more money with the SUPER than I did at my 11 hours' hard work in the factory all day.  
J. L. LEHNER, Wis.

#### Had No Previous Selling Experience

This letter shows what ambition does: "I sold six SUPERS in less than 2 hours tonight. I think it's a pretty good start—for it's the first thing I ever sold."  
E. MANGOLD, Ind.

E. MANGOLD, Ind.

## \$60.00 TO \$150.00 PER WEEK EASY

You just can't help making Big Money selling the SUPER because a trial sells itself and soon everyone in the neighborhood get talking about this marvelous device. Men like Leonard, Shaw, Manner, Kinsley, Peters, Sands, Beck and Hall are not exceptional salesmen, but just the type of men that saw an opportunity and were quick to grasp it when within reach. No previous selling experience is necessary, just a little ambition on your part to make money is all we ask and we will extend the same opportunity to you. Spare time will pay you well. If you can devote your entire time so much the better, because the SUPER is a whirl-wind seller and takes hold in a locality like wildfire.

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We want distributors in all parts of the country to take orders and deliver the SUPER and to look after the repeat business that is bound to follow and to such distributors we are willing to assign territory. You do not have to own a Ford to take up this proposition but if you have a Ford it is easier to explain its many advantages. However a Trial of the SUPER convinces the most doubtful person and tells a wonderful story.

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# There Ain't No Santa Claus



**I**F YOU were offered a job at a salary of one cool million a year, would you take it? You'd grab it. Well, fellows, don't be misled by any such big-salaried jobs, 'cause "there ain't no Santa Claus"; but—I can put you in line for one of the nicest little jobs you ever dared dream about. Big money? I'll say it is. And when it comes to steady work, there's no such thing as a day off. Business is always prosperous.



## The Man You Work For

Did you ever listen in while some of these big bankers talked about investments? When they want to make a sure clincher, they say, "It's as sure and safe as a U. S. Government Bond;" and that's some sure—there isn't anything better. Well, how about getting on the inside with the crowd that make these bonds so sure that every other country in the world would like to get a hat full?

Did you ever check up on what these government employees get? I want to tell you it's worth looking into. It's big money, sure money, and in just about as pleasant surroundings as any fellow ever wished for.

When you work for Uncle Sam, your friends know you are a somebody. They respect you. And why shouldn't they? In almost every case you're holding down the job they would like to have, but don't know how to get it.

## I Will Show You How

A lot of fellows think every good job in the government is secured by some kind of pull. And they're right. But it isn't the kind of pull they talk about. It's by doing just a little work and pulling yourself out of that rut you've been traveling in all these years.

Honest, fellows, you'd laugh if you knew how easy it is when the thing is explained to you by someone that knows. I tell you what you do. You just write a letter to Arthur R. Patterson, giving your name and address, and I'll tell you all about it. After completing your course with me and receiving your rating, if you are not offered a job within one year I will refund the small fee I charge for teaching you. You couldn't get a better break than that.

But let's not argue over this thing. Fill in the coupon below or drop me a line. This won't cost you a cent. I'm not going to bother you. I just want to tell you about it. If you don't like what I tell you, why, forget it. But if you do, you're going to write me another letter some day and thank me.

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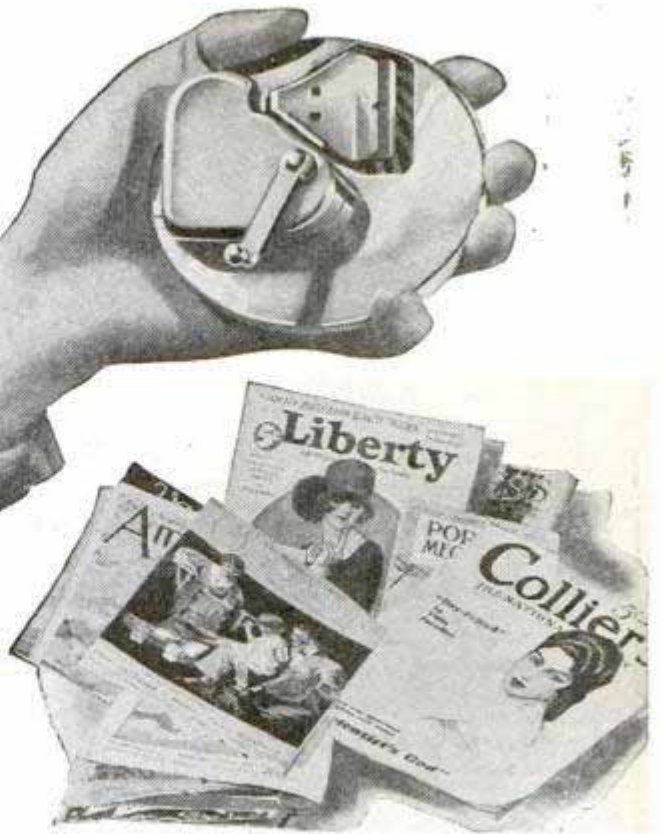
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Marvelous new invention offers unbelievable opportunity to make big money: Kriss-Kross Salesmen everywhere are cleaning up \$30 to \$60 a day with clock-like regularity. Read every line of this announcement.

I DON'T care who you are—you never had a chance to make money like this before. The KRISS-KROSS idea has swept the country like wildfire. Unless you are making over \$300 a month, you're simply cheating yourself if you pass up this opportunity to put away \$350 to \$800 cash profit every 30 days!

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KRISS-KROSS—the magic self-seller—is a super-stropper or blade-rejuvenator. It is showing millions of men an amazing new way to shave without buying new blades. Unlike anything ever placed on the market before. This astonishing invention prolongs the life of any make blade for weeks, months, and even years! Its mechanical ingenuity is little short of marvelous. It strops with a diagonal stroke, just like a master barber. Eight "lucky leather grooves" do the trick in eleven seconds and leave your blade with the keenest edge that steel can take!

### Give Men a Mystery Gift Razor Free!

Our unique selling plan makes everything easy as ABC for you. One of the greatest helps we give you is a brand new kind of razor that you offer FREE to every man you meet. Just think what a wonderful opening that gives you!

This unusual razor is really three razors in one! It is instantly adjustable—straight, T-shape, or diagonal. Exclusive feature cuts beard resistance 45% and gives the smoothest shaves you can imagine. As an attention-getter and salesman, this FREE razor has never had an equal in the history of selling!

### FREE \$5,000 Sales Manual Shows Exactly How to Sell

And now, in addition to advertising in all the big magazines, we are going still farther to help you make big money with KRISS-KROSS. At an expense of \$5,000 we have prepared a

brand-new sales manual—the equal of a \$150 course in salesmanship. This surprising little book tells you exactly how to sell KRISS-KROSS—what to do and save. This remarkable book with all its selling secrets could easily sell for \$2. We give it to you FREE!

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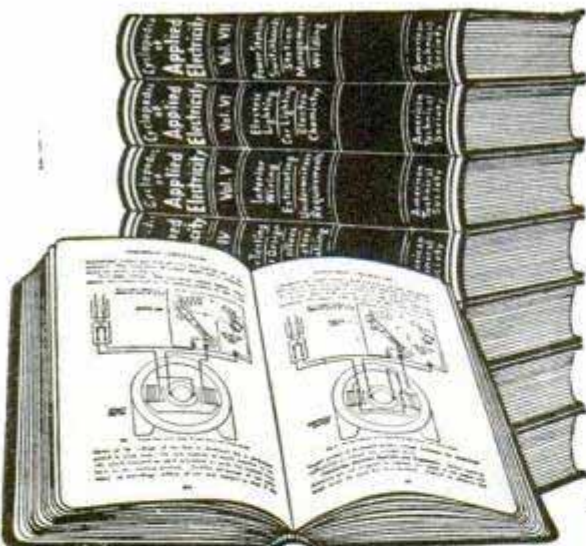
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Solvent fruit, such as grapefruit, berries, tomatoes. UNDER PROPER CONDITIONS:

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(3) Correct liver and kidney troubles; headaches.

(4) Dissolve blood clots as in paralysis.

(5) Dissolve the impurities which cause blemishes to the skin as acne, eczema.



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The following extracts are from sworn statements of pupils:  
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**ARTHRITIS.** All joints swollen with lime deposits. Knees and wrists locked immovable for eight months. Blind for two years. Can now see, walk and do home work.

**CATARRH, HAY FEVER, RESULTING DEAFNESS** decreased from the first meal.

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**ECZEMA.** Age 69. Eyebrows lost. Skin cracked and scaling. Normal in three months.

**PYORRHOEA.** Age 65. Pus ceased on 7th day.

**PREGNANCY.** Age 39. With last two children suffered no nausea, no swollen feet nor constipation as previously. Delivery painless.

**CONSTIPATION.** Three healthy eliminations daily.  
**BRAINY MEALS** make mental work easy. Muscle nourishing meals build firm flesh. Sworn statements. Over 6,000 pupils. Educational book, 10 cents.

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How to make joints, wood turning, sawing, machine tools, simple patterns, crooked patterns, large pattern work, pipe work, stove patterns, molding-machine work, core-making, loam patterns and molds. Send no money. Just write a postal for this complete book. Ask for "Pattern Making". Pay postman postage and 98c.

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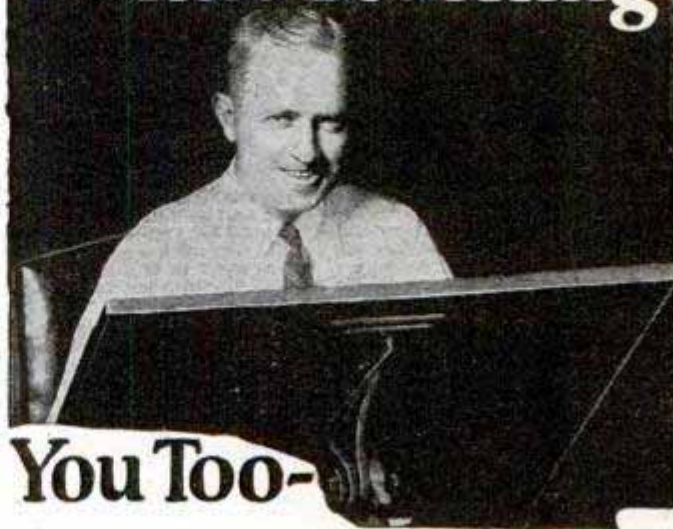
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| 47 ideas on wiring                     | 11 ideas on switches                       |
| 45 ideas for making electrical devices | 6 ideas on installation                    |
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| Gymnasium         | Photography           |
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| Radio             | Stoves                |
| Magic             | Furnaces              |
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WILL your employer think of you when the next good position is open? Will he say, “There’s a man who is training himself to handle bigger work,” or will he pass you by as just an ordinary routine worker?

Do not try to fool yourself. Your employer is watching you more closely than you may think. He’s constantly checking up on your work, your abilities, your ideals, your aspirations. Stored away in the back of his mind or filed away in black and white, are his impressions of the kind of man you are and the kind of man you want to be.

He’s willing and anxious to pay you more money the minute you prove that you are worth more money. But he can’t take chances. When he promotes a man, he wants to be sure he will make good.

Decide now—today—that you are going to be ready when your chance comes. Choose the position you want in the work you like best—then train for it. You can do it in spare time in your own home through the International Correspondence Schools.



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| <input type="checkbox"/> Banking and Banking Law        | <input type="checkbox"/> Business English       |
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| <input type="checkbox"/> Nicholson Cost Accounting      | <input type="checkbox"/> Railway Mail Clerk     |
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Street .....

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City .....

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# Young outdoor men wanted



To a few sturdy young men—lovers of fresh air and sunshine—who want to get away from the grind of indoor work—John Davey's national organization, The Davey Tree Expert Company, offers an exceptional opportunity. Constantly increasing demand will create a limited number of openings. These young men selected will be thoroughly trained by the Company and given a permanent position if they make good. If you are single, between 20 and 30 years of age, free to travel, healthy, industrious, having a good practical education, and able to furnish satisfactory references, you have good chance to qualify. Pay is good at start, advancement assured on merit. We want only men who desire permanent employment in a growing organization and will accept only clean, sturdy young men, thorough Americans, not afraid of vigorous outdoor work. Fill out the coupon and mail it promptly—before the few available openings are all spoken for by other men.

**THE DAVEY TREE EXPERT CO., Inc.,**  
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I believe I am qualified for employment as a member of the Davey Organization in the profession of Tree Surgery. Please send me, without any obligation, a qualification blank to serve in place of a personal interview.

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Tobacco Robs Man of Vitality



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Trying to quit the tobacco habit unaided is often a losing fight against heavy odds, and may mean a serious shock to your nervous system. So don't try it! Make the tobacco habit quit you. It will quit you if you will just take **Tobacco Redeemer** according to directions.

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**Tobacco Redeemer** contains no habit-forming drugs of any kind and is marvelously quick, scientific and thoroughly reliable.

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**Tobacco Redeemer** is in no sense a substitute for tobacco, but is a radical, efficient treatment. After finishing the treatment you have absolutely no desire to use tobacco again or to continue the use of the remedy. It helps to quiet the nerves, and will make you feel better in every way. If you really want to quit the tobacco habit—get rid of it so completely that when you see others using it, it will not awaken the slightest desire in you—you should at once begin a course of **Tobacco Redeemer** treatment for the habit.

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A single trial will convince the most skeptical. Our legal, binding, money-back guarantee goes with each full treatment. If **Tobacco Redeemer** fails to banish the tobacco habit when taken according to the plain and easy directions, your money will be cheerfully refunded upon demand.

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If you are a slave of the tobacco habit and want to find a sure, quick way of quitting "for keeps" you owe it to yourself and to your family to mail the coupon below or send your name and address on a postal and receive our free booklet on the deadly effect of tobacco on the human system, and positive proof that **Tobacco Redeemer** will quickly free you from the habit.

**Newell Pharmacal Company**  
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Street and No.....

Town..... State.....



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**COME TO DETROIT,** the Wonder City, and learn one of the high paying trades taught at the Big School, known as the Detroit School of Trades. Endorsed by Contractors, Builders and Manufacturers, operated under the Supervision of the State Board for Vocational Education.

### Mr. Buick says

D. D. Buick says: The Detroit School of Trades gives you a practical training on the actual work with tools, not books; under skilled instructors who are Master Mechanics. Each student receives individual training, not class instruction.

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Mr. D. D. Buick, Director and Chief Engineer of this school and one of the founders of The Buick Motor Co., says: "Come to our School. Become a trained man and you will not have to work for low wages or be out of employment. A training in this School will mean your future Success in life."

## Greatest Year in History of the World

1926, it is said by those in position to know conditions, will be greatest year in world's history for prosperity, progress, success and opportunity. This begins period of years of building, development, expansion of magnitude never before witnessed. Wonders accomplished—riches—wealth—to fill coming years. Be prepared.

## We Teach Big Pay Trades

Learn a good trade. Put yourself in a position to keep pace with prosperity. Trained men in greater demand than ever. Opportunities will go to the man in a position—QUALIFIED—to grasp them. Learn your trade here in Detroit where the whole world looks for best examples in modern methods. The city "Dynamic" where things are done in a big way.

### DO IT TODAY

Don't wait until tomorrow. Be a *now* man—give yourself a chance. Make today a big day for yourself by sending in this coupon.

## LEARN ONE OF THESE TRADES

Below is a list of most successful trades today and successfully taught in this Big School:

Bricklaying—Plastering—Plumbing—Carpentry—Estimating and Contracting—Electricity—Paper Hanging—Painting and Decorating—Sign Painting—Show Card Writing—Auto Striping—Auto Mechanics—Auto Trimming—Metal Finishing—Auto Painting—Acetylene Welding—Custom Shop Course

## Act Now—TODAY

Don't delay in this important matter. Time is worth more today than it ever was. To put off action until tomorrow is a day's pay lost. The quicker you get here and have learned your trade, the sooner you will be on the road to success.

Select the trade you are interested in, write this in the coupon at the corner, fill in name and address, tear off and MAIL today.

Detroit School of Trades, Dept. 326-A, 217-221 Woodward Avenue, Detroit, Michigan  
I am interested in this

trade.....

Send me full particulars about same.

Name.....

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## DETROIT SCHOOL OF TRADES

Department 326-A

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## These Facts Have Built This Big School

"Learned my trade at your school of plastering last spring. Have been making top wages ever since. Recently went into the contracting business and now have number of men working for me. When I enrolled in your school, was working for Ford Motor Co., making \$6.00 per day. Since learning plasterer's trade have never made less than \$12.00 per day. Since going into contracting business have made as much as \$200.00 in one week. Thank you for all you have done for me."

ARTHUR AUGUSTINE,  
Plastering Contractor.

"Took course in your plumbing department. After few months in your school, went up for examination and take great pleasure in informing you I was successful and now have my license. You take a lot of trouble and pains in teaching your students—you do all in your power to make tradesmen of them."

GEO. B. WELLS.

"Having taken your course in Auto Painting (Pyroxylin-Lacquer) am now working in a Duco Refinishing Shop, here in Columbus, Ohio. My employer says often that 'I am doing very good work.' Going into business for myself in few days, having rented a refinishing shop."

G. C. SAYLES.

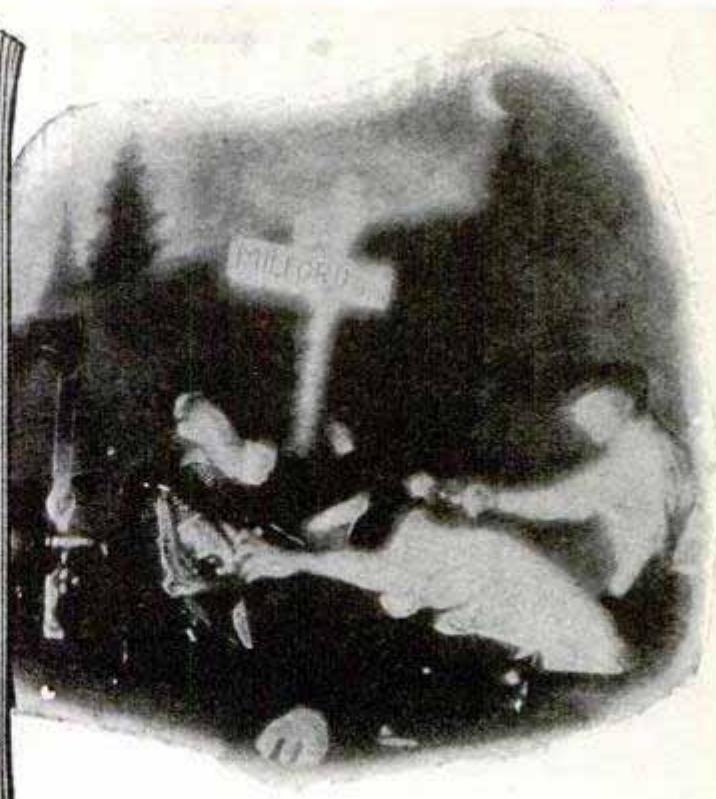
"After taking your custom shop course, am back in Hibbing, Minn., and opening up a shop of my own. Already secured more auto painting than can handle."

VICTOR MISKA.

"After taking your complete course in bricklaying, am working for large building contractor. Get union scale of \$1.50 per hour. Joined bricklayers union."

GERALD WAJET.

More letters from students—records of the success of our students—proof of what this school has done, is doing and will do for its students, are available to you at any time.



## Send for this Free Book!

**A FASCINATING BOOK** of Detective stories that shows how ordinary boys and men have won nationwide fame, thousands of dollars in rewards, and important official positions by solving finger print mysteries!

"... Shortly before midnight a young couple slipped away from the dance. They sought out a long, low, rakish roadster. With powerful headlights picking out the path, it moved cautiously through the parking space and out onto the high road.

"Early next morning—a farm boy found the girl's dead body crumpled in the wayside ditch. Concealed in the bushes at the side of the road lay the boy's lifeless body, also shot from behind."

Who had committed the murder?

Read the rest of the story on page 15 of our new Finger Print book. Find out how the murderers were traced, tried and convicted, and how a certain finger print expert solved five murder mysteries and secured 97 convictions in less than a year.

Find out how you can become a Finger Print Expert.

### Thirteen Thrilling Stories of Mystery and Achievement

Thirteen stories of crime, daring robberies, mysterious murders, thrilling escapes. You'll enjoy "Snowflakes," a great dope story—"The Invisible Finger Print," a blackmail mystery.

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You'll read of men who achieved fame, big rewards and important positions in a short time through the study of finger prints.

Any man who can read and write can become a finger print expert.



#### PARTIAL LIST Graduates U. of A. S. Recently appointed Finger Print Experts of these States, Cities and Institutions.

State of Iowa  
State of Idaho  
State of Colorado  
St. Paul, Minn.  
Columbus, Ohio  
Detroit, Mich.  
Pittsburgh, Pa.  
Great Falls, Mont.  
Idaho Falls, Idaho  
East Lansing, Mich.  
Schenectady, N. Y.  
Lorain County, Ohio  
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Wilkes Barre, Pa.  
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### Finger Print Experts Needed!

More and more the detection of crime resolves itself into a problem of identification. Trained men are needed every month to fill the new positions that are created. Records show that University of Applied Science graduates get first choice at the big positions. Listed below are some of the city and state bureaus to which U. of A. S. men have been appointed.

You can learn finger print identification in a few months in your spare time—at home.

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University of Applied Science

1920 Sunnyside Ave., Dept. 13-53 Chicago, Ill.

University of Applied Science, Dept. 13-53  
1920 Sunnyside Avenue, Chicago, Ill.


Please send me free your 32-page illustrated book "Finger Prints." I understand that there is absolutely no obligation. Also tell me how I can become a finger print expert by studying a few months in spare time—and how I can get a professional finger print outfit free.

Name.....

Address.....

City.....State.....

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Just \$1.00 brings you a complete outfit identical with the kind doctors have bought from us for years and used successfully in treating the ailments listed. Violet Rays give quick relief, permanent results. They scientifically and painlessly remove the cause of pain and sickness. Dr. L. H. Leight, Millerton, N. Y., writes: "I am having wonderful success in treating neuritis, and all stomach cases. I have given over 2,000 treatments with your outfit."

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treated  
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Bought by Doctors and men who know that it is the only reasonable HAIR GROWER known to science. No Drugs Used. Write for application blank, testimonials and booklet on "HAIR," sent sealed in plain envelope, FREE.

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Information on any book free. Write Popular Mechanics Press, Chicago, Ill.



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Send for booklet showing photos of men with and without THE PERFECT LEG FORMS.

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"I have made \$9000 in four months on nine buildings" writes Wm. J. Petrusek, Chicago, Ill.

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"I am making \$210 per month as Architectural Draftsman. Thanks to Chicago Tech." Geo. E. Shafner, Haley, Tenn.

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Architectural or Building Draftsmen are needed everywhere. Get out of the low or moderate pay job. Step into a *real* job. You can do it with training in Architectural Drafting. Salaries are big because of the tremendous demand and the shortage of trained Building Draftsmen. Work is steady and you have a splendid chance to go into business for yourself. This is the opportunity offered to you by this old established school of Architecture and Building Construction. Step out of the \$40 a week class. Learn how to earn \$50 to \$100 a week—and later \$5,000 to \$10,000 a year as chief or superintendent.

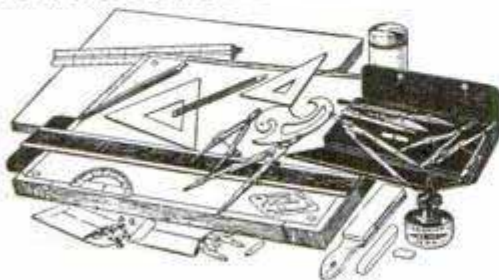
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Just to show you how easy it is to learn Architectural Drafting by our method, we will send you a Trial Lesson and Blue Prints Free. Test yourself and see how you like the work. Send no money—just the coupon. Get this Free Lesson now with our Big Book of Opportunity also free. Make your first step today—it costs you nothing.

**This \$25.00 Drawing Outfit Sent** without extra cost. Good for a lifetime. Mail the coupon and learn how to secure this valuable outfit.



**CHICAGO TECHNICAL COLLEGE**  
Dept. 330, Chicago Technical Building  
118 East 26th Street CHICAGO, ILLINOIS



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CITY OR TOWN.....STATE.....

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 Machine Drafting

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Before becoming a professor, and a lover of music, particularly the tenor banjo, Prof. Six yearned and yearned for the possession of a genuine, professional instrument, the same kind used by the big, successful professionals of the world. Now we want you to succeed. We want to help every music-lover that we can, attain success, and this gift offer is made to pave the way for you, and no previous musical knowledge is necessary.

We have another surprise for you! Not only do we start you on the way to popularity, success and fame by supplying you with an instrument that you can compare to any used or displayed in your town, but under personal supervision you will be given, by mail, the benefit of Professor Harry S. Six's twenty-two years' experience as director of Glee and Instrumental clubs of New York University. We don't just send you a lot of printed words and instructions and trust to luck that you will catch on. Our method is different and has proven to be the simplest devised by man—that is why we claim you'll be able to play in thirty minutes. Put us to the test.

## Learn in 30 Minutes With My Picture Method

Arthur Brisbane, the highest paid journalist in the world, once said that "a single picture is worth a thousand words." He was right, for it stands to reason, when you take your instrument in hand along with the actual photographs of our professor in action as your guide, it is easy to imitate and do the right thing. But that is not all.



**Phonographic Records Free** We also furnish as an additional guide, phonographic records of our professor playing the piece you are learning, along with our thorough, printed and illustrated, easy-to-read course.

Doesn't that sound easy? It is easy. If you could sit at our desk and see the letters and telegrams from our pupils you would be convinced that we have perfected the simplest, yet most highly efficient course to insure your mastery of the tenor banjo.

## Don't Send a Single Cent

Investigate offer today. Don't put off until tomorrow, because you might forge and miss this wonderful opportunity. It might be the turning point in your career. Don't send a single cent. Just drop a line—use coupon or postal card will do—telling you are interested in receiving full particulars about course and to reserve one regular eighteen dollar, full size professional tenor banjo for you, which is offered as a gift.

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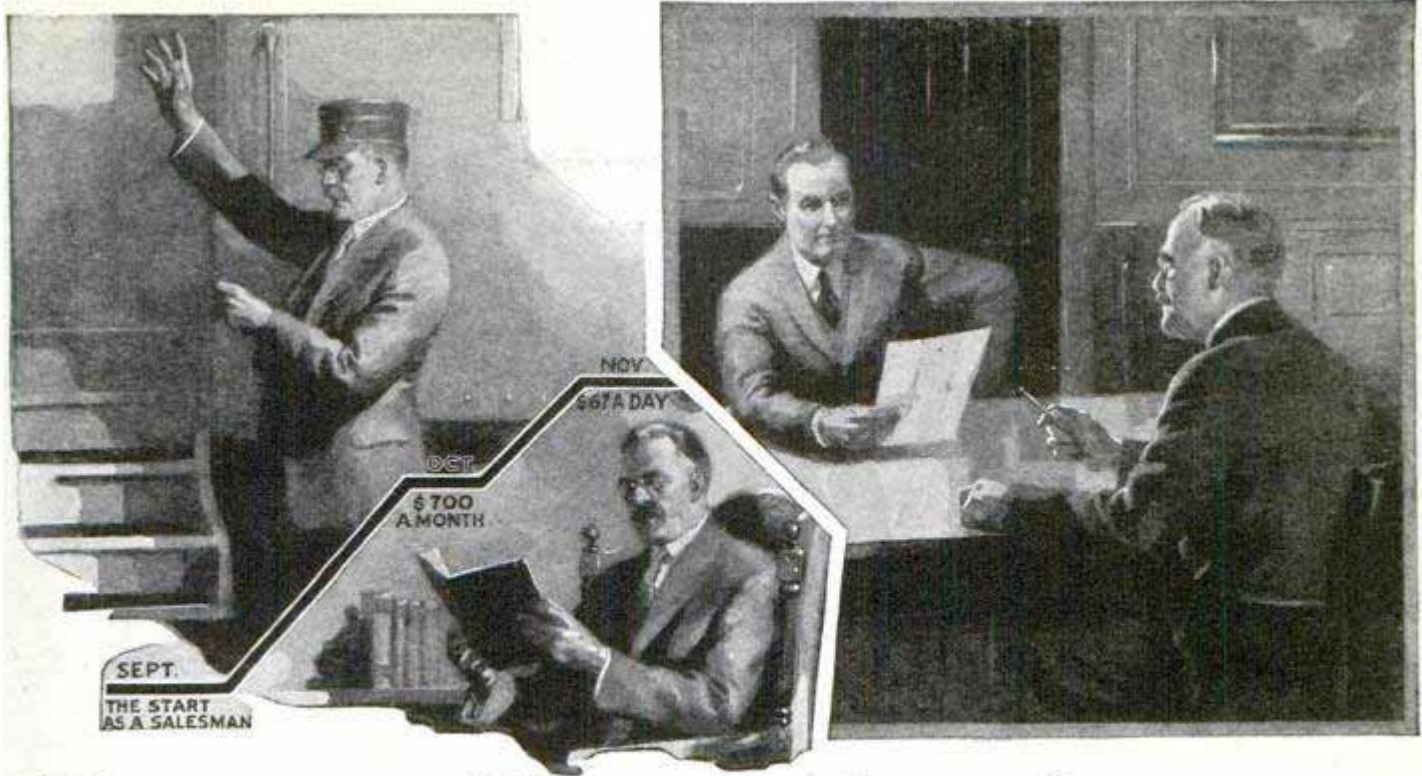
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Do you know the quickest way to make dreams come true?—It's the salesmanship way.

For out in the *selling* field, if a man makes good, "raises" come to him automatically—and many times a year. There was C. A. Thomas, for example.

Thomas, a California man, had been a conductor on a railroad for fourteen years. "One day," said Mr. Thomas, telling of his experience, "I came in on my passenger run and never went out again. Instead, I undertook to sell real estate. The first month I did not make a sale. I saw that I needed something to help me, and I believed I would find it in LaSalle's training in Modern Salesmanship. You can judge for yourself the aid it gave me when I tell you that the next month I cleared \$700, and last month I averaged better than \$67 a day throughout the month. . . ."

J. J. Graney writes of similar success. He was a mail carrier when he enrolled with LaSalle.

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Men privileged to master Salesmanship thru the LaSalle Problem Method will tell you that their success was far from luck; it was the logical result of knowing the hows and whys of their profession.

Whether or not you have had experience in selling—that is not important. The point is that any man of average intelligence who will follow the LaSalle *salary-doubling plan* can quickly multiply his earnings. And this fact applies with doubled force to the man now in the field who is sincerely

striving to increase his volume, to really *sell* in dozens of places which he is now forced to leave without an order.

The complete story of the LaSalle *salary-doubling plan*, which thousands of men have followed with such gratifying results, is outlined in a fascinating book entitled "Modern Salesmanship." This book tells clearly the opportunities in the selling field—points the way to a quick mastery of the very methods whereby the big producers top the list year after year, earn big five-figure salaries. The information contained in this book is of priceless value to the man seriously ambitious to make a real success in the selling field. And—the coupon brings it to you, *free*. If your future is worth a two-cent stamp and two minutes of your time—place the coupon in the mail TODAY.

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Present Position.....

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## Do You Like to Draw?

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### The North American School of Drawing

and is Open to Everybody who likes to Try.

The only persons not allowed to compete are those who have had Drawings purchased by a newspaper or advertiser. This Competition is confined strictly to Amateurs.

### PRIZES

1st Prize - \$100	4th Prize - \$15
2nd Prize - 50	5th Prize - 10
3rd Prize - 25	6th Prize - 5
7th to 20th Prizes \$2.50 each	

### BEGIN NOW!

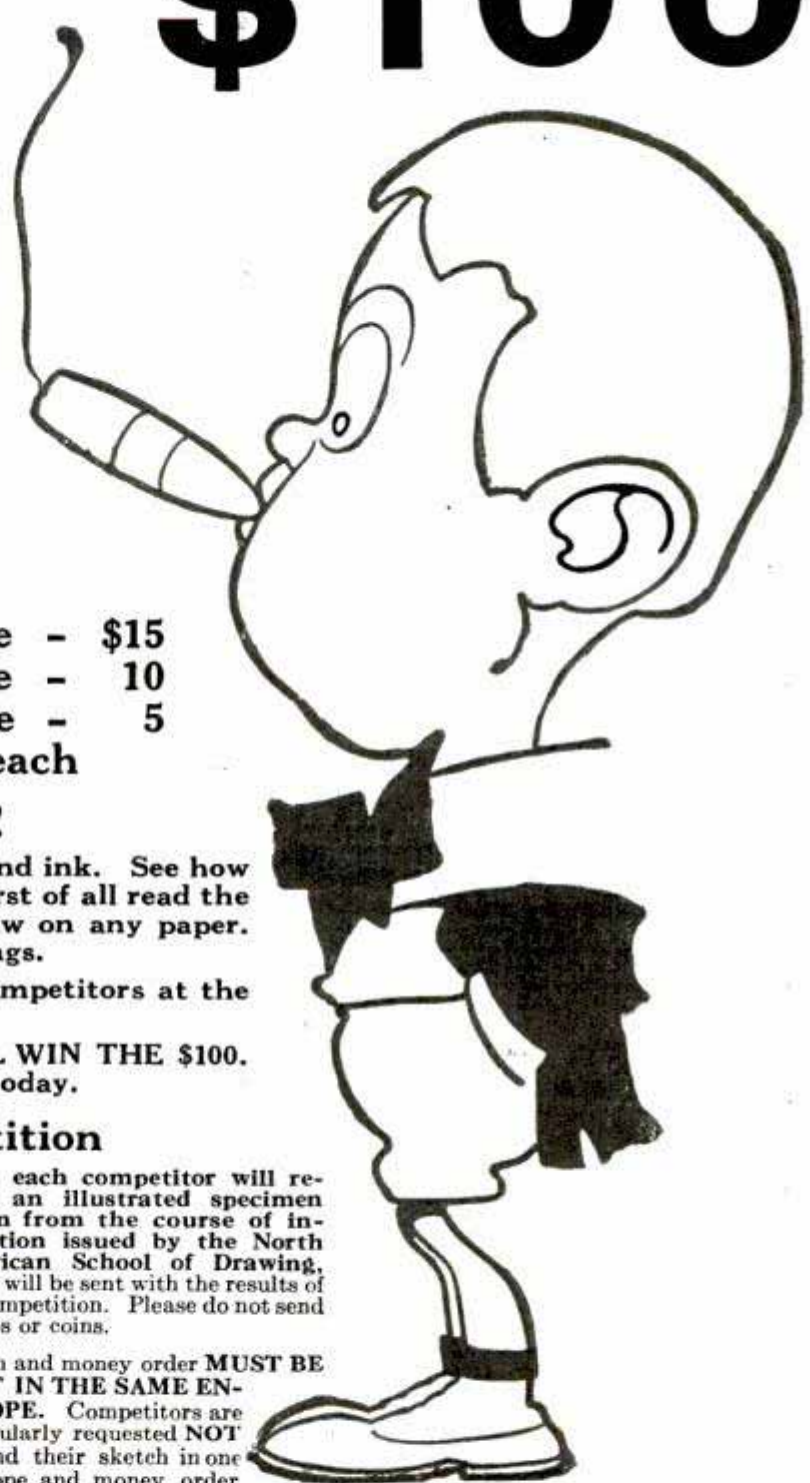
Copy this Drawing in pencil or pen and ink. See how well you can do it. Sit down and try. First of all read the Rules of the Competition. You can draw on any paper. Prizes will be awarded to the best drawings.

All drawings will be returned to the competitors at the close of the competition.

**DON'T MISS THIS! SOMEONE WILL WIN THE \$100. WHY NOT YOU?** Send in your sketch today.

### Rules of the Competition

- 1.—Anyone is eligible to compete except employees of the North American School of Drawing and Professional Artists.
- 2.—All sketches must be mailed on or before March 1st, 1926.
- 3.—Only one sketch may be submitted by each competitor.
- 4.—The bottom left-hand corner of the envelope should be marked plainly —"Competition."
- 5.—Competitor's full name and address must be written on the back of the drawing, with State or Province.
- 6.—Sketches must not be drawn on paper larger than 8 in. high by 6 in. wide.
- 7.—All sketches will be returned to competitors at the close of the competition, together with a list of the prize-winners. The North American School of Drawing cannot be held responsible for any sketch which may be lost in the mails or elsewhere.
- 8.—Sketches must be accompanied by a Post Office or Express Money Order for 50c (fifty cents) in return for which each competitor will receive an illustrated specimen lesson from the course of instruction issued by the North American School of Drawing, which will be sent with the results of the competition. Please do not send stamps or coins.
- 9.—Sketch and money order **MUST BE SENT IN THE SAME ENVELOPE**. Competitors are particularly requested **NOT** to send their sketch in one envelope and money order in a separate envelope.
- 10.—Sketches received insufficiently stamped will not be accepted. All packages should be sealed and bear letter rate of postage (2 cents for one ounce).
- 11.—Competitors agree to accept the decision of the Artists of the North American School of Drawing as final and conclusive.
- 12.—In the event of a tie for any prize offered, the full amount of that prize will be awarded to each tying contestant.
- 13.—The North American School of Drawing reserves the right to purchase any sketch submitted. Any sketches purchased will be paid for at the rate of \$10 (ten dollars) for each sketch.

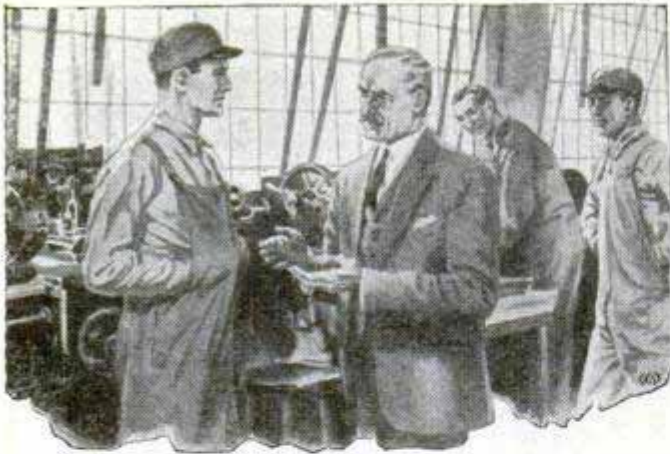


### The North American School of Drawing

155 Ontario Press Bldg.

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Toronto, Ont., Canada



## The Boss Was Afraid to Make Me Foreman

"HE SAID he had always liked me and he thought I could handle men, but he was afraid to make me foreman until he was sure I knew more about the work.

"Tell you what I'll do," he said. "You take up a course with the I. C. S.—let me see that you really want to prepare yourself for advancement—and I'll promise to keep you in mind the next time there's a good job open."

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"I'm making five times as much as I did before the Boss woke me up and literally forced me to take up an I. C. S. course and prepare to earn more money."

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| <input type="checkbox"/> Banking and Banking Law                 | <input type="checkbox"/> Business English                                 |
| <input type="checkbox"/> Accountancy (including C.P.A.)          | <input type="checkbox"/> Civil Service                                    |
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This trains men by actual experience, working with their hands instead of learning from books. This book is a photographic trip thru world's famous and popular trade school. Get the facts about how easy it is now to make big money doing work you like. Be independent. Travel. See the world. Own your own garage, tire shop, battery station. Most fellows start in with jobs \$50 a week up. Take the first step now by sending for this big free book.

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J. A. Stransky



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## 61 Miles on a Gallon

Here's how this amazing new invention works. Your carburetor is adjusted to make starting easy—it gives a rich mixture to start a cold engine. But once your engine gets heated up, the mixture is far too rich, resulting in faulty explosion. Half the gasoline is drawn into the cylinders in a raw state and, instead of exploding, it burns. This causes a heavy deposit of carbon.

But with this startling little device in your car all this is changed. As soon as the engine warms up, this device automatically begins to admit a much larger volume of air, thoroughly vaporizing all the gasoline, giving it fully 50% more power—breaking it up so that it explodes instead of burning!

**\$120 in One Day!**

### Agent Earns Big Money

I took forty orders in one day and wasn't out long. My Ford runs better than it ever did.—**J. M. JAMES.**

### \$51 in One Hour

The results of one hour's work—17 men gave me orders for the Vaporizers.—**J. W. CRONK.**

### \$48 in 3 Hours

I went out Saturday about three hours and secured 16 orders.—**J. A. WILLIAMS.**

Not only does this invention save you half your gasoline, but it also removes carbon, saving you the expense and time of having carbon scraped out—a job costing from \$5 to \$25.

## One Million Satisfied Users

The Stransky Vaporizer and Decarbonizer is absolutely automatic and self-regulating. It has no springs, shutters, diaphragms or delicate parts to get out of order. It requires no adjustment—you can attach it in three minutes. It will lengthen the life of any car—and it's guaranteed to last the life of your car.

## Introductory Sample Offer

To introduce this new invention in your community, Mr. J. A. Stransky, the inventor, will send a sample at his own risk. Write at once for his proposition. The price is so low that all your neighbors will want to order through you, giving you a generous profit. Send the request blank for full details of our amazing offer.

**J. A. STRANSKY MANUFACTURING CO.**  
C-10 Stransky Bldg., Pukwana, So. Dakota

J. A. Stransky Mfg. Co.  
C-10 Stransky Bldg., Pukwana, So. Dakota  
Please send me full details of your special introductory offer.

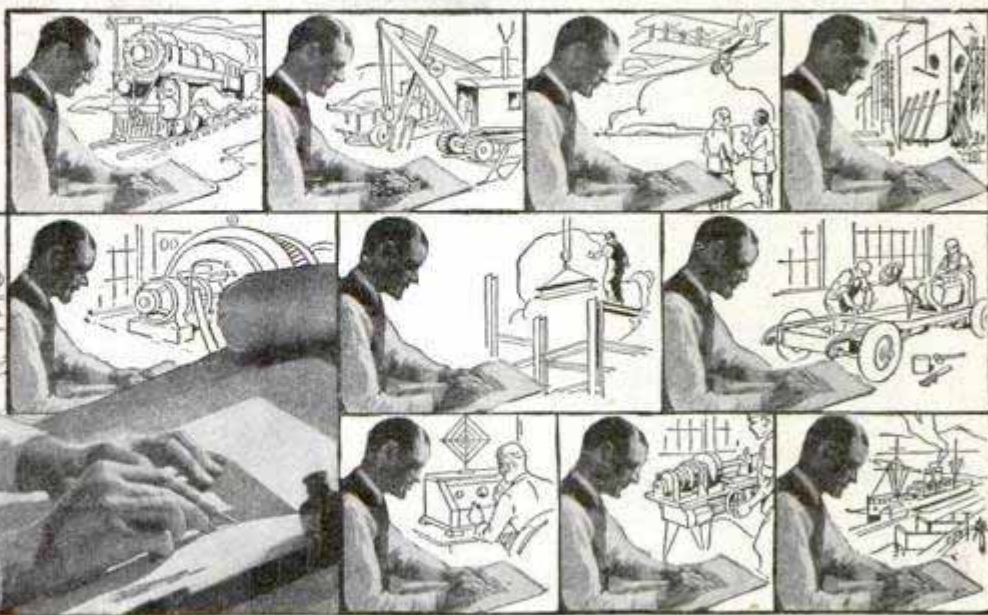
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Address.....

City..... State.....



# DRAFTING PAYS from \$3,500 to \$10,000 a Year



## Well Paid Positions ~ \$75 a Week up

Machine Shop or Mill—Railroading or Radio—Electric Companies or Public Service Stations—Building, Engineering, or Mining—All of the World's Work Calls for Draftsmen—All Interesting and Easy for the Draftsman—The Field that Leads Them All Will Always Be Drafting

**\$20 A DAY** If a hundred dollars a week sounds big—yes, or \$150—you aren't in the right line of business! Get into a broader field—the broadest of all. That's drafting!



"Have completed \$100,000 worth of work this year, thanks to Dobe instruction."—D. E. H. SANDERS (S. Car.)

Drafting is the BIG field, men. Every industry you can name BEGINS with the draftsman. Without mechanical drawings—by the thousands—every shop in the land would be STOPPED.

In fact, it is the SERIOUS SHORTAGE of draftsmen that brings this offer: I will furnish all instruments, supplies, even to the table, to those who start now!

**PAY AS YOU GO** Don't give me the excuse that you have no ready money for this golden opportunity. I am not so interested in cash; I want your application. I want at least 200 men to start right now. I want them ready to recommend by Spring! We will get a flood of letters saying "send us draftsmen," from every sort of industrial and engineering concern, and we must make good.

The first week's pay envelope of many a Dobe-trained draftsman has held enough to cover the entire cost of the course! Most students learn evenings, keeping on with their old work until ready to step into somebody's drafting room. The first month equips you to take on simple drafting jobs on the side. It helps you learn; I gladly permit this.

### Well-Paid Positions Every Way You Turn

A draftsman soon forgets the days when he used to wonder where to get a job. Instead, he asks "What line of work interests me most?" And "What part of the country suits me best?" Twenty of my graduates went to Florida this year; three are in Japan; last month one wrote me from Ceylon. And I wish we had the count of how many Dobe draftsmen have become chiefs!



"My new chief says, Dobe must teach right; I can handle everything so far. They pay me \$65 a week."—LEO NIECKEBERGER (Pa.)



"Just been made chief and got a good boost in pay. Your course has the goods."—Wm. G. HAZLETT (Col.)

Positions loom up almost as soon as you are enrolled in a Dobe class! We receive requests daily for men—for men only partly through our course. "We'll take a beginner," some concerns write us, "so long as he is a Dobe trained man and has begun right!"

**IT'S EASY** and interesting to learn drafting. For drafting isn't "drawing!" You don't need any "talent." A draftsman uses tools for every line and every curve. That's why drafting is so easily learned—and so interesting. For you do everything by rule. So, I guarantee if you can read and write, you can learn this line.

**WARNING!** The special offer of tools is for immediate action. Don't expect me to hold it open indefinitely. Clip the coupon now for free book:



Not a dollar's extra expense for tools, if you are prompt

## GOOD FOR TOOLS

Mail this IN TIME for my FREE TOOL offer and ENTIRE WORKING OUTFIT costs NOTHING extra, if you decide to ENROLL!

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1951 Lawrence Ave., Chicago, Dept. 13-53

Please send FREE and POSTPAID, without obligation, your new, fully illustrated book Successful Draftsmanship, complete information, terms, etc.



Name..... Age.....

P. O. ....

# TO Learn to Write

**GOOD** hand-writing has been truly called the "Bread and butter of a business education." It should be the determination of every body to learn to write at least a good business hand. **Good writing is the very foundation of business success.**

**Easy to Learn** By my system you can become a good penman at home, in your own room during spare time. Don't be content with the notion that good penmen "are born" such. Because one's ancestors may have been noted for poor penmanship, is no excuse for him to remain an illegible scribbler. My system is original, unique, and highly successful—the result of 25 years' experience.

**Your Spare Time** Just your spare moments—that's all I ask. If you follow my instructions you will soon be able to write a beautiful hand that will be a source of pride to yourself and envy to your friends. Notice the improvement shown in Mr. Campbell's writing below.

*Leland M. Campbell*

"I am astonished at the improvement I've made by means of The Tamblin System in so short time."

LELAND M. CAMPBELL,  
Campbelltown, Ohio.

*Leland M. Campbell*

Mr. Campbell wrote his upper signature July 20, and the lower one November 10—a little less than 4 months apart. Hundreds and hundreds of others in all parts of the world are doing as well with my system.

I have had unbounded success in making poor writers good ones and good writers better penmen than they thought possible.

*How to Become a Good Penman*

**FREE BOOK WRITE FOR IT TODAY**

**32 PAGES HIGHLY ILLUSTRATED.**

Penmanship is particularly adapted to correspondence instruction, and I absolutely guarantee satisfactory improvement. Distance no barrier. Ladies taught just as successfully as men.



Don't wait, don't delay, begin now to prepare for that position where good penmanship will be required. Send today for my **Free Book, "How to Become a Good Penman,"** which contains copies and beautiful specimens and tells how others have become good penmen by means of the **Tamblin System.** Your name will be beautifully written on a card with white ink if you enclose stamp

**F. W. TAMBLIN,**  
418 Ridge Building  
Kansas City, Mo., U.S.A.

## FREE BOOK COUPON

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I am interested in improving my penmanship. Please send me free your Book "How to Become a Good Penman."

Name .....

Address .....

Sign and mail this today, before you forget it.

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**Big Prices Paid for Drawings**

Well-trained commercial artists earn \$50, \$75, \$100, \$150 a week, and sometimes even more. If you like to draw, develop your talent—learn the secrets that make your drawings worth *real money.* Well-trained artists are *always* at a premium.

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**FREE LESSONS—A YEAR TO PAY!**  
Our free trial, easy payment plan makes it easy to learn at home. Send coupon below for illustrated literature and details of our special free trial offer.

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**J. C. DEAGAN, Inc., Dept. 1353, 1770 Berteau Ave., Chicago, Ill.**

Dear Sirs: Without obligation, please send me literature and information regarding your free trial Deagan Xylorimba.

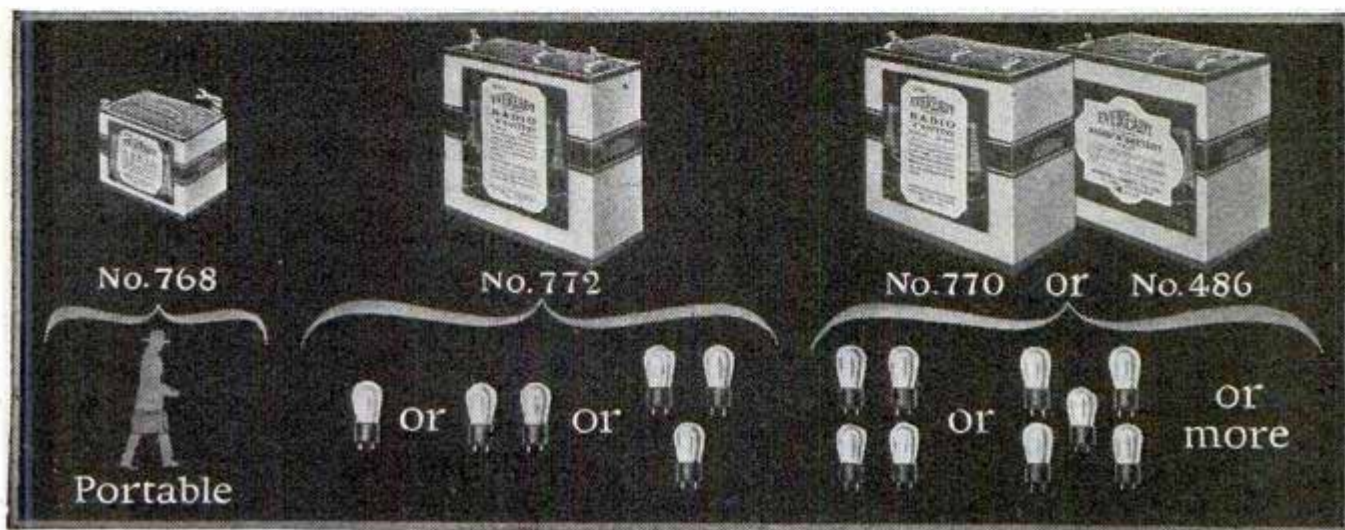
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Perhaps you, too, can cut your  
"B" battery costs in half

Just follow the chart. It gives you  
the secret of "B" battery economy



THOUSANDS of people have made the discovery that Eveready "B" Batteries, when used in the proper size and with a "C" battery\*, are the most economical, reliable and satisfactory source of radio current.

On sets of one to three tubes, Eveready "B" Battery No. 772, used with a "C" battery, will last a year or longer, usually longer. On sets of four and five tubes, either of the larger Heavy Duty Eveready Batteries No. 770 or No. 486, used with a "C" battery\*, will last eight months or more.

These figures are based on the average use of receivers, which a country-wide survey has shown to be two hours daily throughout the year. If you listen longer, of course, your batteries will have a somewhat shorter life, and if you listen less, they will last longer.

Here is the secret of "B" battery satisfaction and economy:

With sets of from 1 to 3 tubes, use Eveready No. 772.

With sets of 4 or more tubes, use either of the Heavy Duty Batteries, No. 770, or the even longer-lived Eveready Layerbilt No. 486.

Use a "C" battery on all but single tube sets.

Evereadys give you their remarkable service to the full when they are correctly matched in capacity to the demands made upon them by your receiver. It is wasteful to buy batteries that are too small. Follow the chart.

In addition to the batteries illustrated, which fit practically all of the receivers in use, we also make a number of other types for special purposes. There is an Eveready Radio Battery for every radio use. To learn more about the entire Eveready line, write for the booklet, "Choosing and Using the Right Radio Batteries," which we will be glad to send you on request. This booklet also tells about the proper batteries for the new power tubes. There is an Eveready dealer nearby.

\*NOTE: In addition to the increased life which an Eveready "C" Battery gives to your "B" batteries, it will add a quality of reception unobtainable without it.

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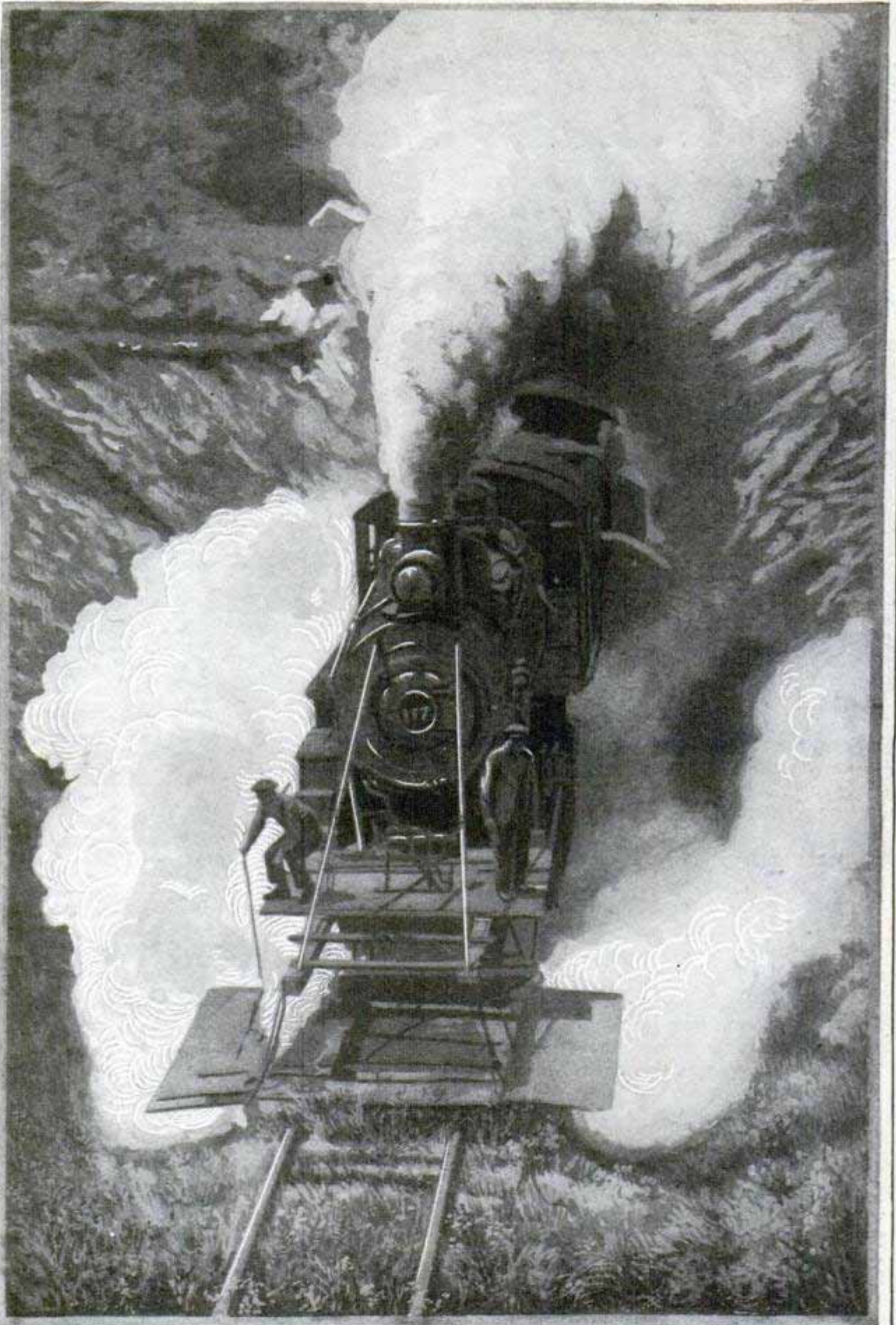
NATIONAL CARBON COMPANY, INC.  
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**EVEREADY**  
**Radio Batteries**  
-they last longer

Tuesday night means Eveready Hour—9 P. M., Eastern Standard Time, through the following stations:

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WGR—Buffalo	WCCO { Minneapolis
WCAE—Pittsburgh	WCCO { St. Paul
	KSD—St. Louis
	EGO—San Francisco, 8 P. M.
	Pacific Coast Time

959



Killing Weeds by "Cooking" Them with Steam; Locomotive Clearing the Right of Way of Troublesome Growths; the "Sprinkler" Is Set in Front under Apron to Direct Vapor Downward—See Page 378

# Popular Mechanics Magazine

REGISTERED IN U. S. PATENT OFFICE

WRITTEN SO YOU CAN UNDERSTAND IT

Vol. 45

129

MARCH, 1926

No. 3

## A World without Pain?

*Journal of Pharmacology and Experimental Therapeutics*

### Goals of Longer Life, Freedom from Disease and Painless Treatments Extended as Science Gropes for Nature's Secrets

A NEW anaesthetic, twice as powerful as ethylene, sure in its action, and swift in permitting recovery, since full consciousness returns within a minute after the flow of gas is stopped, is science's latest discovery in the fight to banish pain.

The new anaesthetic, called propylene, is produced from ordinary artificial gas, and besides its other features rarely produces any after sickness or nausea. In fifteen major operations only one patient was rendered sick by the gas.

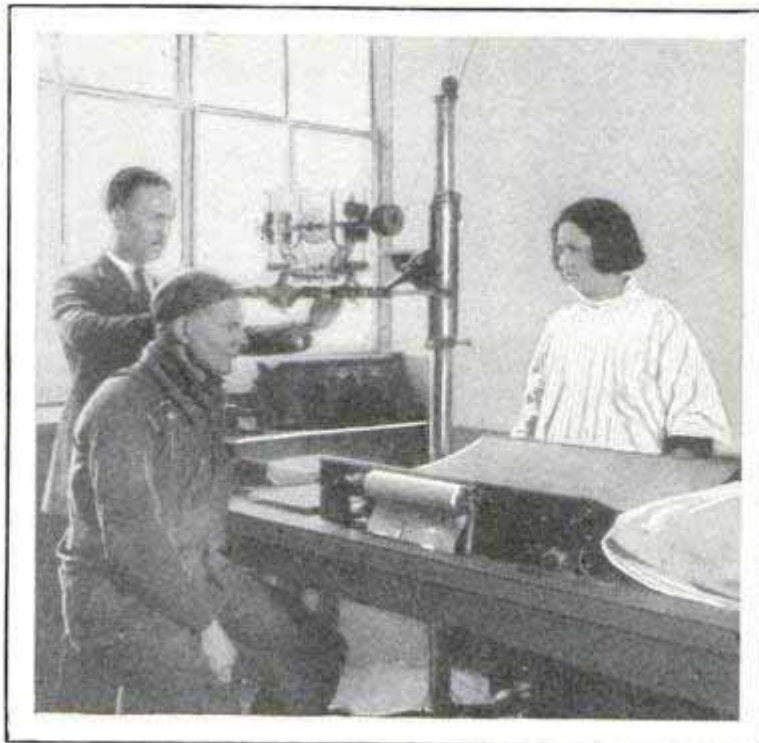
With the normal span of life steadily growing longer as one after another of the mass diseases have been conquered, scientists are confident that in the next half century they will add another twenty years to the average life, bringing it well up to four score years. What this means may be realized when statistics of the past are studied. In the sixteenth century the average life span was but twenty years—the ripe old age of those who grew up being more than offset by the appalling infant mortality due to lack of knowledge of children's diseases. At the close of the eighteenth century the average was still less than twenty-five years. A hundred years ago, in America, it had reached thirty-five years; by 1870 it was forty-one

years, and in the fifty-six years since it has almost reached sixty years.

With the exception of occasional sporadic pests, such as the influenza epidemic which swept away 22,000,000 lives during the war, man has virtually ceased to die from mass complaints, and now dies an individual death, due to breakdown of his own body machinery. Vaccines, toxins and anti-toxins, as well as better medical training, have conquered smallpox, diphtheria, measles, and the myriad diseases that in the Middle Ages claimed a vast proportion of the population in the years of infancy and childhood.

With the individual death from personal troubles replacing the mass diseases, the perfection of medicines and anaesthetics—the latter less than 100 years old—takes on renewed importance, since they deal with the treatment of the individual. The ancients knew how to use drugs made

from the poppy, belladonna, mandrake, solanum, mandragora and nepenthe to produce unconsciousness, and back as early as the third century Chinese record the use of hemp by physicians for this purpose, but they never became general and major operations continued to be performed more often than not without anything to relieve the pain. The sleep-producing qualities



Treating a Workman in the X-Ray Laboratory of an Industrial Plant; Such Hospitals Are Helping Keep Employees Healthy

Cont. *Norman C. McLeod, 1917 St. Paul St. Baltimore Md*

*June 1924 p. 485 - January 1926 499) Published at Mount Royal and published at Baltimore Md.*

929



Top, Taking Blood Specimens for a Test; Center, Treating Yellow-Fever Bearing Mosquito Breeding Swamp, and Below, Microscopic Diagnosis to Isolate Disease Germs



of ether were discovered in the year 1800, but were not put to any practical use for half a century, while it was not until 1847 that chloroform was first used by a physician. The modern science of the cure and prevention of disease did not come into being until still later. Medicine and surgery have been revolutionized in the last thirty years, all with the idea of preventing pain and of prolonging life. Anthrax, cholera, dysentery, hookworm, yellow fever, malaria, leprosy, meningitis, bubonic plague, pneumonia, lockjaw, tuberculosis and typhoid, to mention only a few, have yielded to treatment, to preventive measures, such as the elimination of the mosquito-borne yellow-fever germs, and, through isolation of all their germs, have been, or are being conquered.

Now that science has virtually completed that phase of its work and is turning to the personal diseases, to heart trouble, diabetes, rheumatism, hardening of the arteries, and the host of bodily and mental complaints, an entirely new theory of life

is being developed. Physical examination at stated intervals, preventive medicine, supervised recreation, and other developments are paving the way for the anticipated further extension of life. The chief troubles of the human race are due to the complicated, multi-cell structure of the body. If the human body had but one cell it could be immortal, as one-celled forms of life are. A paramecium, which is composed of only one cell, has been cultivated in the laboratory by Dr. Woodruff for a period corresponding to 8,500 of its generations, and the 8,500 generations of this one-celled life form correspond to approximately a quarter of a million years in the life of a man. Dr. Alexis Carrel, back in January, 1912, took part of a chicken's heart and began growing it in his laboratory. It is still alive after a

little more than fourteen years and growing so fast that it must be divided daily.

Natural death—the personal and individual death which overtakes man in old age—came into being as a result of the evolutionary processes which intervened between the original one-cell life and the multi-cell organism which is the human body today. Death, scientists hold, is not a



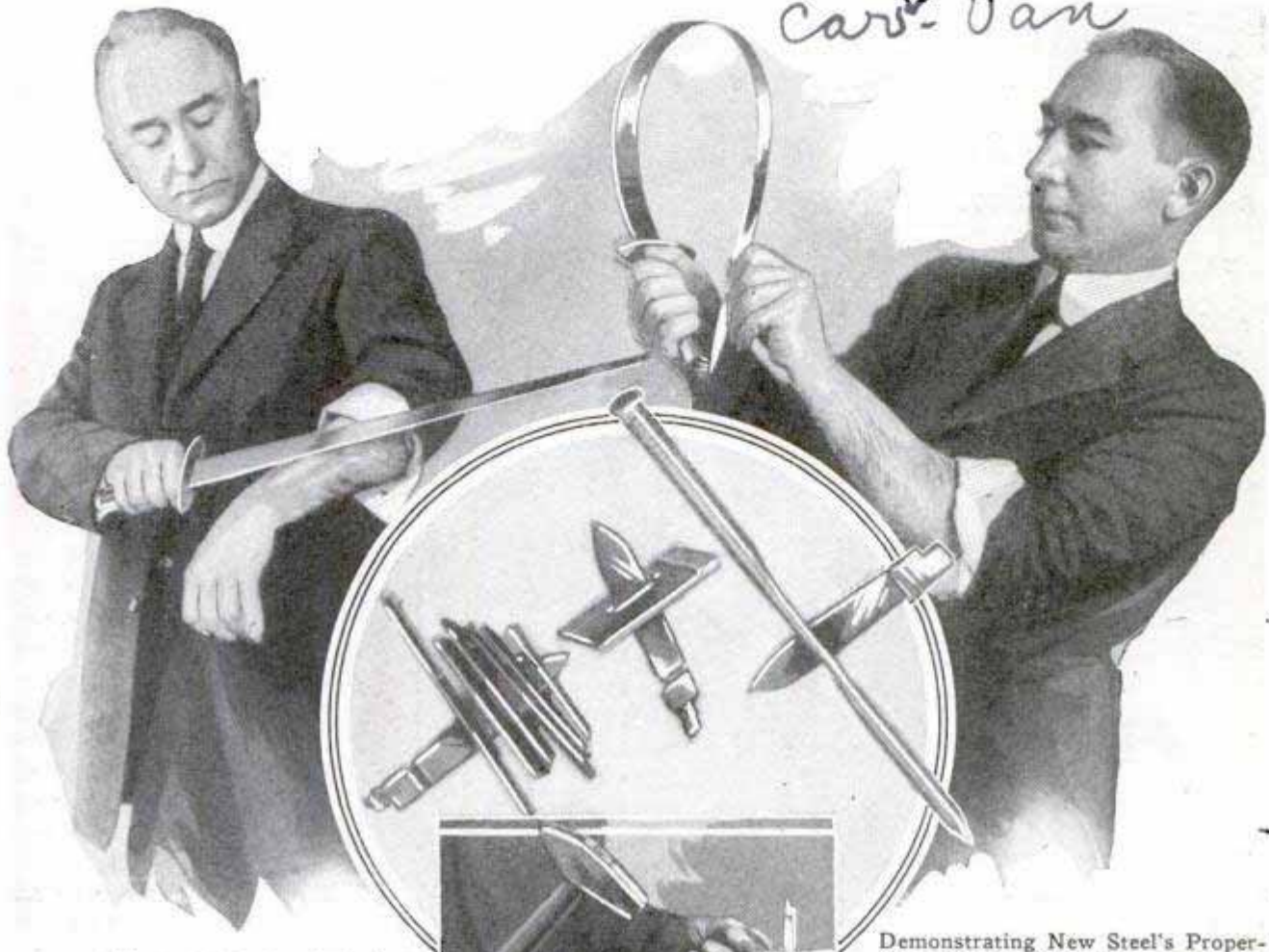
*Am. M. Co. ...  
Carnes, Canton, Ohio*

necessary attribute or consequence of life, and life can and does go on without death. When the multicellular human being does succumb he is merely paying the price for the privilege of enjoying a more complex and interesting life. With so many cells

**NEW STEEL, HARD YET PLIANT,  
1013 TAKES RAZOR EDGE**

Many of the qualities of the celebrated Damascus steel are said to be found in a modern product which an Ohio man has

*carb. Van*



attuned in one body it follows, according to this theory of life, that some must wear out before others, just as one part of a motor car will give out first, and upset the working of the whole machine. When that happens to the body, if the part involved is the carburetor, or heart, the machine will stop as quickly as a motor car with a similar complaint, or if it is one of the other vital parts, an equally serious breakdown occurs, while some minor failure is accompanied by a correspondingly minor, or serious, form of disease.

It is here that modern science has begun to play the part of garage mechanic to repair and replace the worn-out parts. As the mechanics become more successful, the life span grows. The time is not so far off, according to the doctors, when the man who dies before seventy will be either the victim of an accident, or personally to blame.

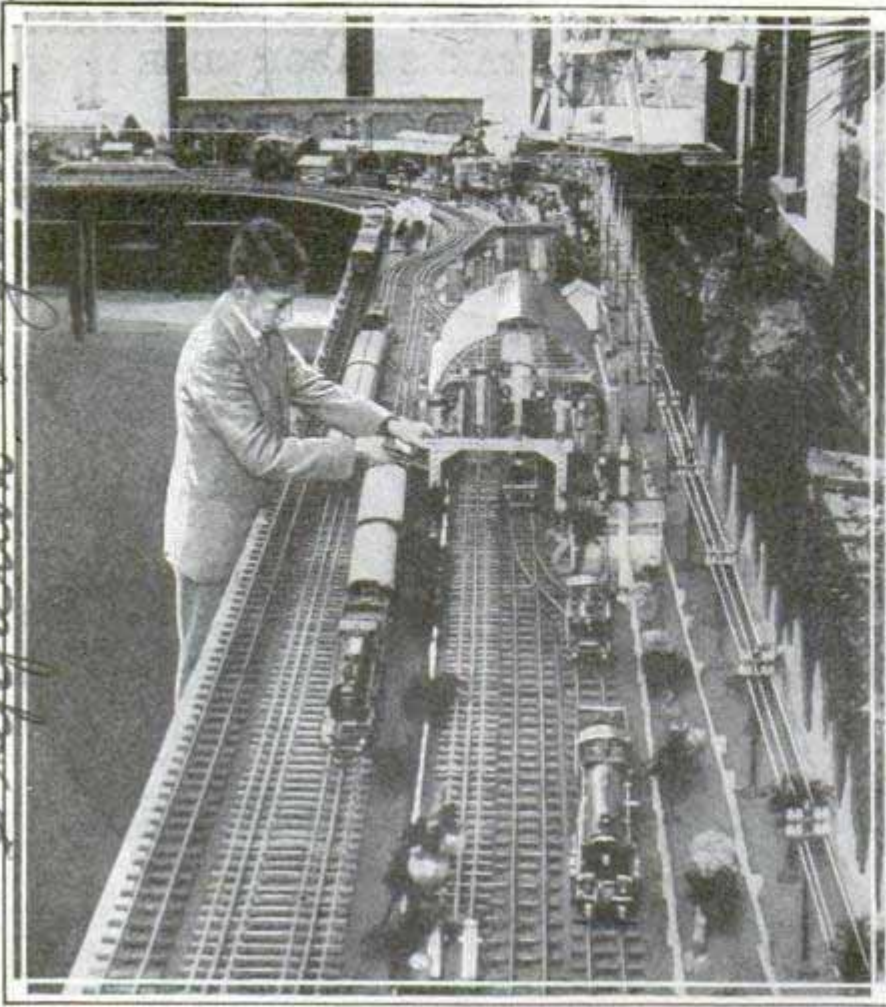
Demonstrating New Steel's Properties; Sword of It Shaves Hair or Can Be Bent Double; Knife Blades Penetrate Other Steels without Being Damaged and Take Different Degrees of Temper

developed by a secret process. He combines iron and carbon in such a way that the resulting steel will bend, keep an edge of razor sharpness, is tough and can be driven through other steels without breaking. A bar of the material, fifteen inches long, was tempered to five different degrees, one end of it being hard enough to cut glass, a section was sharpened like a razor and would cut dry hair without honing or stropping, while other parts in the same bar would cut off a spike under blows of a hammer, would spring or could be bent backward and forward with the thumb and forefinger without breaking. Vanadium is an important element used in the preparation of the steel.

Ⓐ A day in China is divided into twelve parts of two hours each.

*Mfr - Canton Cutlery Co. 1212 7th St. Canton, O.*

102  
Dr Edward Nicholl lately Dr. R. for Hammoth, Litchtoni Park near Hefrepton



Model Railway System Has Four Main Tracks Besides a Subsidiary, and Its Locomotives Are Run by Steam, Electricity or Clockwork

**MODEL OF RAILWAY SYSTEM HONORS INVENTOR**

For the entertainment of his grandsons and to honor the memory of Richard Trevithick, who preceded Stephenson by several years with the invention of England's first passenger locomotive, a British statesman has erected a complete model railway system. It includes 550 feet of rails, four main tracks and one subsidiary, seven model locomotives, and numerous stations, bridges and other equipment. Two of the lines are for electric, one for steam and another for clockwork-driven trains. On Christmas eve, 1801, Trevithick's locomotive hauled the first load of passengers ever conveyed by steam.

**SEEK WAY TO USE SUN'S HEAT WITHOUT PRODUCING STEAM**

Success in harnessing the sun for industrial purposes will probably come, not by turning its heat into steam but by finding some way whereby to convert the heat energy directly into power or to make substances which will produce power, according to W. B. Parsons, an engineering-

authority. He points out that one of the most successful steam plants operated by the sun was capable of running only a small engine with an over-all efficiency of less than five per cent. It was constructed in Egypt in 1913 and had a heat reflecting surface of 13,269 square feet. Only low-pressure steam could be developed. Considering the sun as a source of power, it is estimated that each square foot of its surface exposed to the earth, some 585,750 millions of square miles if projected flat, radiates sufficient heat to generate 12,500 horsepower. Only a small portion of this total energy reaches the earth as most of it is scattered into space, but, theoretically, an acre of sunlight during the noon hour on a clear day at sea level would furnish over 5,100 horsepower-hours. Assuming that there are nine hours of maximum-

intensity sunshine each day and that one-half of the energy is recoverable, a strip of land ten miles wide and 100 miles long would daily develop 14,700,000,000 horsepower-hours. On a fifty-per-cent basis of efficiency, enough sunlight falls on the Great Salt Lake to produce energy equal to that furnished by the whole annual world consumption of fuel.

656 5 for \$1.00 Reg.  
**DESIGNS ON SWITCH PLATES HARMONIZE WITH ROOM**



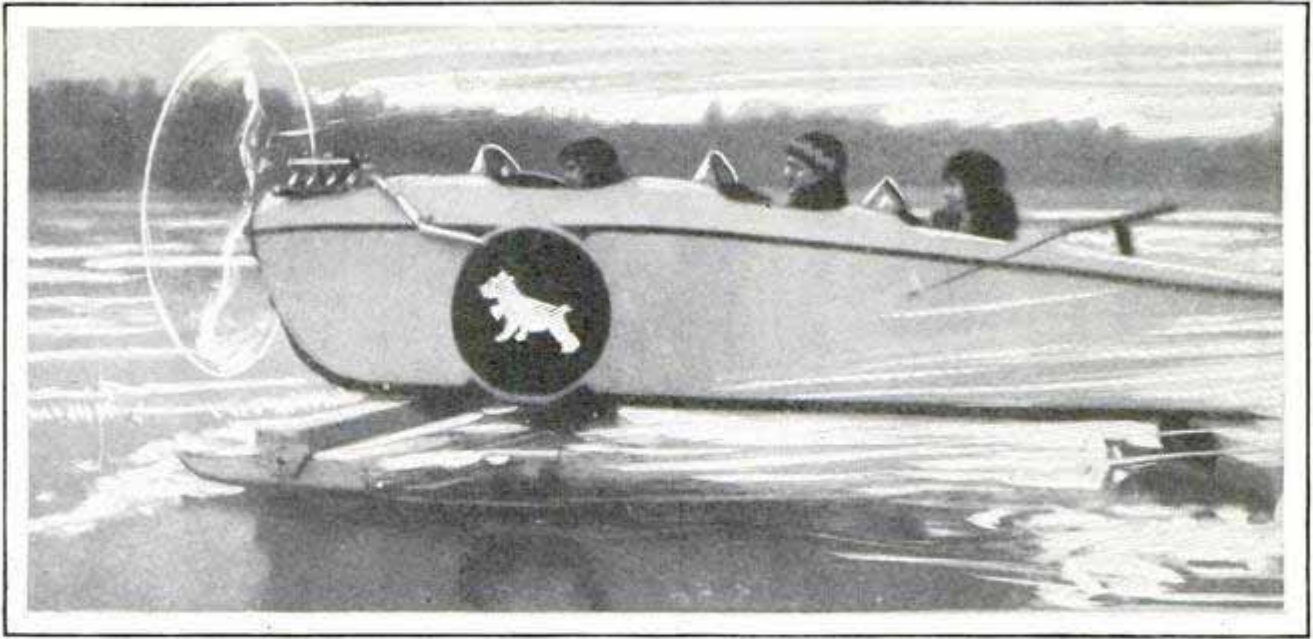
Decorated electric-switch plates to replace plain ones, are intended to blend with the wall paper or color scheme of rooms. The finish is baked on so that it cannot readily tarnish, wear off or fade. The plates can be installed in a few moments.

☐ Nearly half a million persons make their homes on the desert sands of the Sahara.

Cyclopaedia of Engineering Co. 5010 Spring Lane Ana

Journal of Franklin Institute 15 S. Seventh St





Scooting over the Ice on a Trial Spin, the "Airplane" Boat Developed a Speed of Seventy-Five Miles an Hour and Was Turned in a 100-Foot Circle at Forty Miles

**ICEBOAT LIKE AIRPLANE SPEEDS NINETY MILES AN HOUR**

Ice is seen as an ally of the air for army service as a result of the invention, by a civilian employe at McCook field, of an iceboat with a body like the fuselage of an airplane. It is capable of making a speed of ninety miles an hour, its propeller is driven by a motorcycle engine and the framework, cockpits and control system are patterned closely after those of a plane. The rudder is a rear runner which may be operated by a steering wheel near the back, but is also connected to the control apparatus in the forward cockpits. The bottom of the boat is waterproof and will remain afloat with three passengers should the ice break. Runners are of carbonized steel and are attached in such a way that they act as shock absorbers. Because of the limited space available during tests, the craft has not been driven at more than seventy-five miles an hour. It can turn in a 100-foot circle without danger while going forty miles an hour.

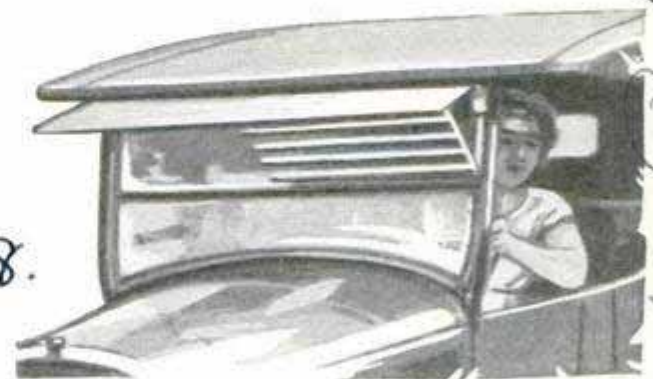
**SILK PATTERNS SENT BY CABLE KEEP WOMEN IN STYLE**

Women in Los Angeles need not be more than twenty-four hours behind their sisters in Paris in the matter of the latest patterns in silk. The designs are now cabled across the ocean from France to manufacturers in California who are waiting with the raw silk on the looms. Just a day after a new pattern appears abroad, it can be purchased across the counters of a department store here. Since 1915, when

silk culture was first started in California, more than 220,000 mulberry trees have been set out and millions of silkworms put to work. It is said that a larger amount of silk is obtained from cocoons in California than in the Orient, as the growing period for mulberry leaves is about two months longer. Between 400 and 600 yards of silk are recoverable from a cocoon in China and Japan, while, in California, the amount is from 1,000 to 1,900 yards.

**BARS ON WINDSHIELD VISOR DEFLECT RAIN AND SNOW**

Two or four bars, set horizontally below the automobile windshield visor, are set to keep rain and sleet from striking the glass and are far enough apart so that the driver can see between them. They may



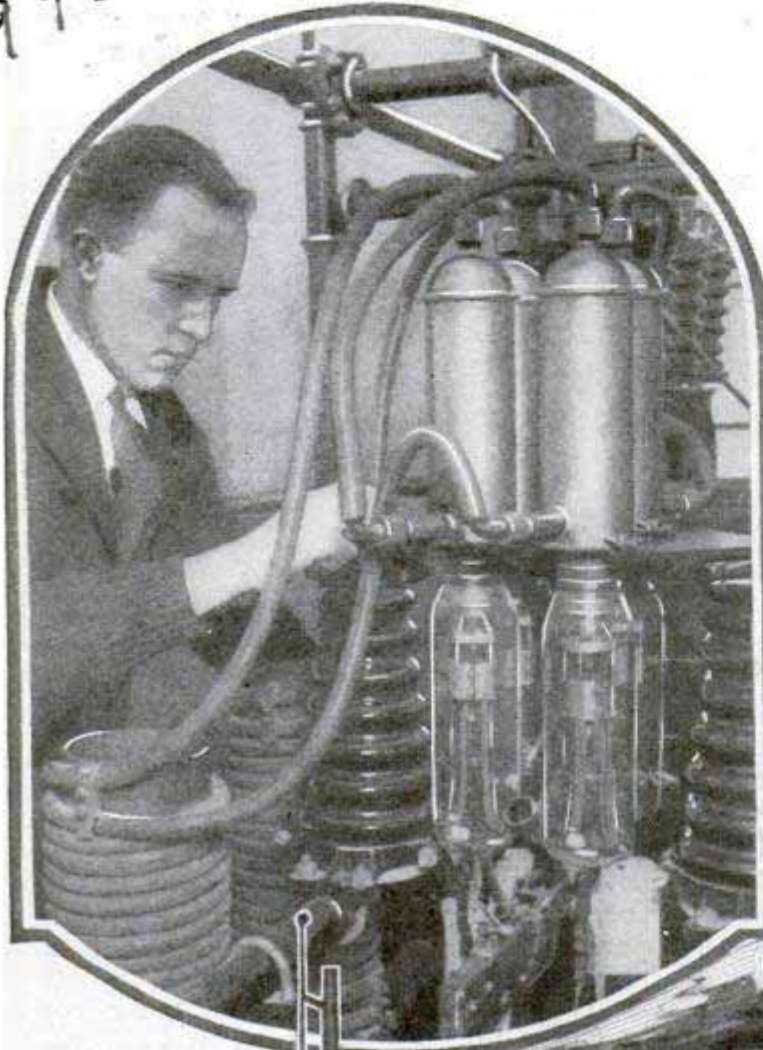
Ribs below Windshield Visor Keep Off Driving Rain or Snow, Eliminating Need of a Wiper

be raised out of the way when not in use or, if desired, help keep the glare of the sun from the eyes. With this arrangement, a windshield wiper is not needed.

*Chicago Daily News*

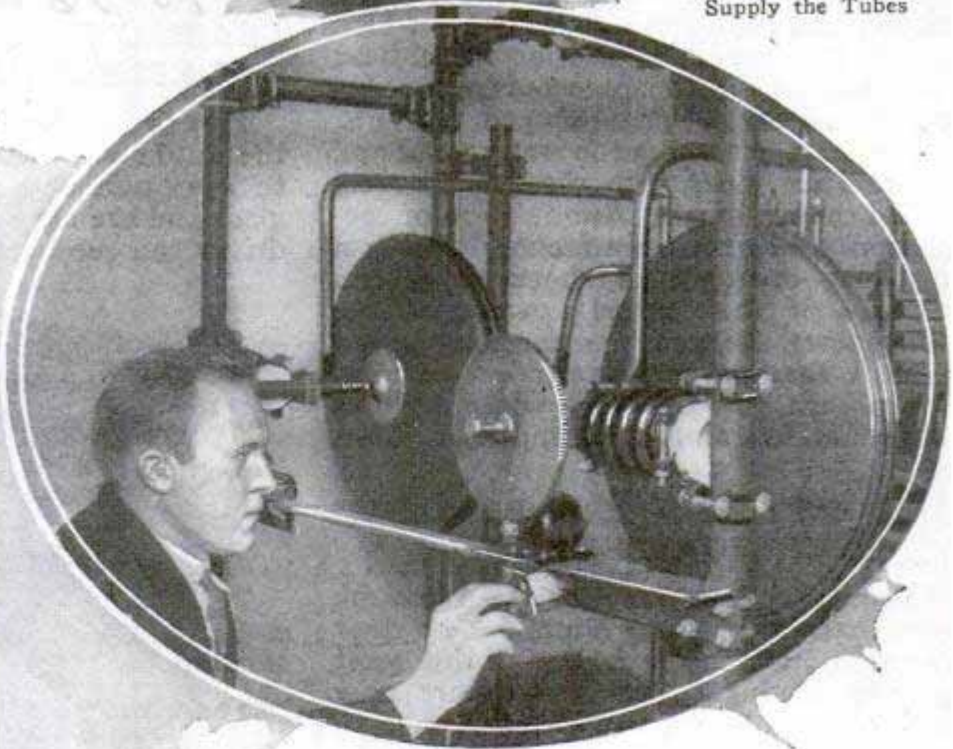
*1036*  
*1038*  
*inventor, R. B. Martin, Wash. Seattle, Wash.*

975

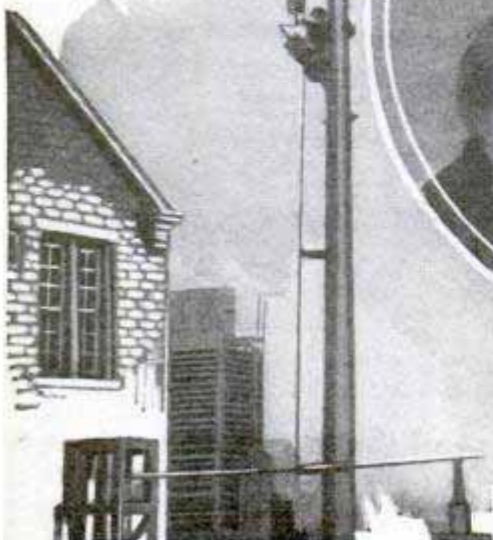


Equipment at Radio Station WJZ: Some of the Ten-Kilowatt, Water-Cooled Tubes, and Below, One of the Short-Wave Antenna Masts with Coil in Center

Huge Water Cooler to Supply the Tubes



Big Vernier Condensers of the Transmitter Set Have Small Electric Motors to Turn Them; One Is Seen above Operator's Hand; Because the Station Can Be Sharply Tuned, Interference Is Reduced, Experiments Have Shown



**FIFTY-KILOWATT RADIO UNIT  
LATEST WIRELESS MARVEL**

Radio's astounding development in the last few years is reflected in the equipment of broadcasting station WJZ at Bound Brook, N. J. a fifty-kilo-watt unit that is expected to span great distances and also overcome much of the static and other stray noises that bother the radio fan. The station's apparatus includes sixty-four ten-kilowatt tubes, all of them water-cooled. A tank that has a capacity of cooling 100 gallons of water a minute has been constructed for this purpose. The condensers are operated automatically by small electric motors. Coils of the short-wave antenna, which will broadcast on seventy meters, are exceptionally rigid and are made of copper tubing of the same size as the aerial itself.

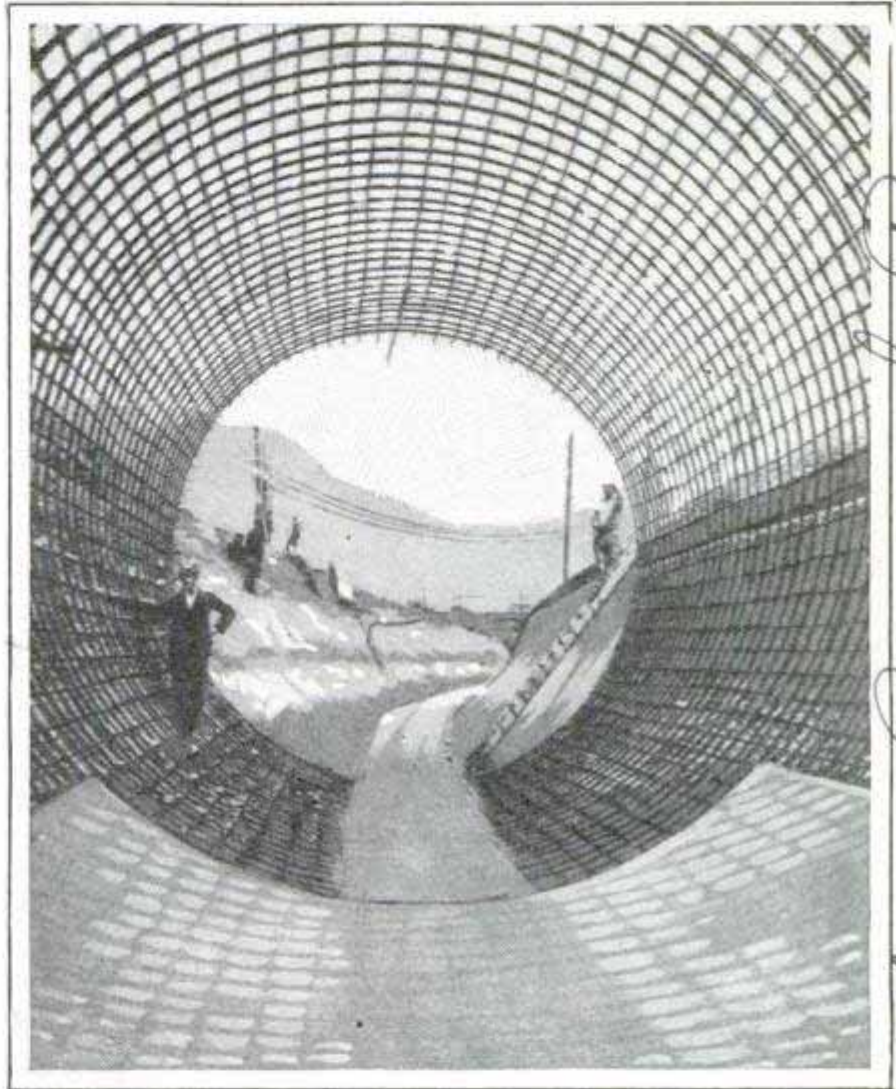
1053

**DUST EXPLOSIONS  
KILL MANY**

Dust explosions and fires resulting from them, killed forty-five persons, injured twenty-eight and did approximately \$3,000,000 property damage in the United States during the past year, according to an associate of the government chemistry bureau. There are 22,000 establishments in this country that handle dusty products, or that manufacture articles likely to give off dangerous dust. Investigation by the bureau of chemistry has shown that practically all combustible dusts, and some not considered combustible, will explode when mixed with the proper proportion of air and ignited by a flame or spark. One common source of such accidents lies in hot bearings, while it has been shown that static sparks can ignite dust. According to an authority of the bureau, no record of a spontaneous dust explosion has ever been obtained. Prevention of the formation of dust clouds in factories and the elimination of all sources of ignition, are urged as ways of avoiding explosions.

<sup>1039.</sup>  
**BIG ARMORED CONCRETE PIPE  
SUPPLIES WATER POWER**

What engineers consider a remarkable example of reinforced-concrete construction is represented in a huge conduit, near



Concrete Pressure Pipe for French Water-Power Station under Construction; besides the Reinforcing Ribs, an Earth Filling Adds Strength

Grenoble, in the French Alps, constructed for a power station. The pipe has an internal diameter of nearly nineteen feet and will handle pressure of a column of water under a head of from twenty-three to forty-six feet. It will utilize the flow from two rivers which have a combined volume, in the spring months when the snow is melting, of more than 7,000 cubic feet per second. A gravel chamber has been constructed to free the water of pebbles before it enters the intake canal leading to the power house. Besides being ribbed with a network of supports, the concrete pipe is further strengthened with a thick earth filling over the top.

☐ The United States now has approximately 52,000 towns and post offices.

Highton G. Brown

Brac-Romanche Power Station

Literary Digest  
11/25/25

**TELEGRAPH KEY OF SOLID GOLD OPENS GATES AFAR**

"The president will flash the signal for the opening of the ceremonies by press-

Chief White House Telegrapher Edward Smithers, with Nugget-Bordered Gold Key Which Presidents Use at Important Ceremonies

© P. & A.



ing a gold telegraph key in the White House." News dispatches have often included such a phrase and the gold key has come to be one of the most important implements in national affairs. With it, the Alaska-Yukon Pacific exposition was opened in Seattle, Wash.; President Wilson touched it to blow up the Gamboa dike of the Panama canal, and it has figured in many other events that happened thousands of miles from Washington. The key is mounted on a slab of Alaska marble and is studded with a score of gold nuggets. It was given to Edward Smithers, chief telegrapher at the White House, by President Taft, in 1909.

**HUGE LOST STATUE OF LINCOLN PLACED IN CHICAGO PARK**

After years of obscurity in a warehouse, a heroic-sized bronze statue of Lincoln, by St. Gaudens, has been placed on a granite base in Grant Park, Chicago. The piece, which shows the figure of the great president seated, was finished in 1906. Nine years later, it was shipped across the country for exhibit at the San Francisco fair, and the following year was returned

to Chicago. While plans were being made for its permanent display, it became temporarily "lost," to the public at least, until interest was re-aroused in it by newspaper and other publicity. The statue was considered by St. Gaudens the best he ever made of Lincoln.

**SALMON ARE ABLE TO TRAVEL HUNDREDS OF MILES A WEEK**

That salmon travel amazing distances in short periods is indicated by the journey of one fish which was liberated at the southern end of Nova Scotia last June and was caught less than a month later in the Moisie river, Quebec. Identification was made by means of the silver tag which had been placed in one of the salmon's fins when it was first captured. Its journey was between 800 and 1,200 miles long. Fish movements are important where the fishing industry is highly developed, and by means of the tags, valuable knowledge is being gained as to the habits of salmon and other fish.

**NON-SKID PADS FOR HORSES HELP PREVENT ACCIDENTS**

Pads of woven material, which may be quickly inserted within horses' shoes, have been devised by a former British army captain to keep the animals from slipping. Several of the protectors may be carried in the



Preparing Material for the Non-Skid Pads, and Inserting One

pocket and no tools are necessary when fitting them. They are said to afford such a secure footing that horses can be ridden over ice with little danger of falling.

*1035*  
39 Charlotte  
mamtoba, Can.  
Chrystie  
W. J. Jamieson  
Capt. C. C. Jamieson

*1021*

*over*

*1028*

*Chicago Evening Post*  
*1/19/10*

*no further information*

# Hunting Mountains under the Sea

Washington, D. C.

Ocean

Ranges and Valleys Never Seen by Man Are Named and as Well Known as the Peaks and Plains of the Continents

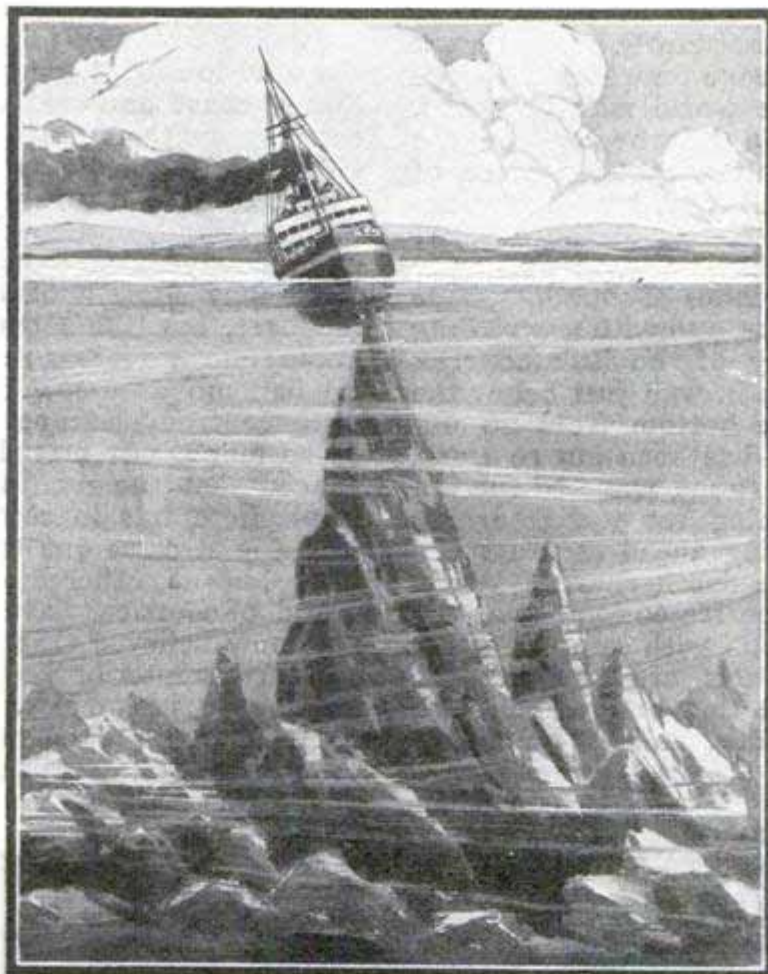
OFF the western coast of Africa lies the Congo Canyon, bigger and deeper than the Grand Canyon of Arizona, and more strangely beautiful, but no man has ever seen its depths, and it is improbable that any man ever will. For the Congo Canyon is at the bottom of the Atlantic, one of the vast valleys between the giant mountain peaks whose tops fail to break the surface of the sea, and so remain unknown to all but the hydrographers who plot the mystery land under the waves.

Out in mid-Atlantic is a tall and stately peak named, for some forgotten reason, Mount Laura Ethel. Put it down in the midst of the rockies and it would tower up with the best of them, but because its highest point falls just a few score fathoms short of reaching sunlight, thousands of transatlantic passengers each year sail over the hidden mountain top without ever knowing it is there. To the hydrographer who constructs the marine charts of the world virtually every part of the ocean floor has its name. To him it is a land of hills and valleys, plateaus and yawning canyons. There is the Telegraph Plateau, half as big as Europe, yet appearing on the maps of no school geography. It lies beneath the North Atlantic, between Ireland and Newfoundland, and because its vast plains are so level and so close to the surface, it made the laying of the first

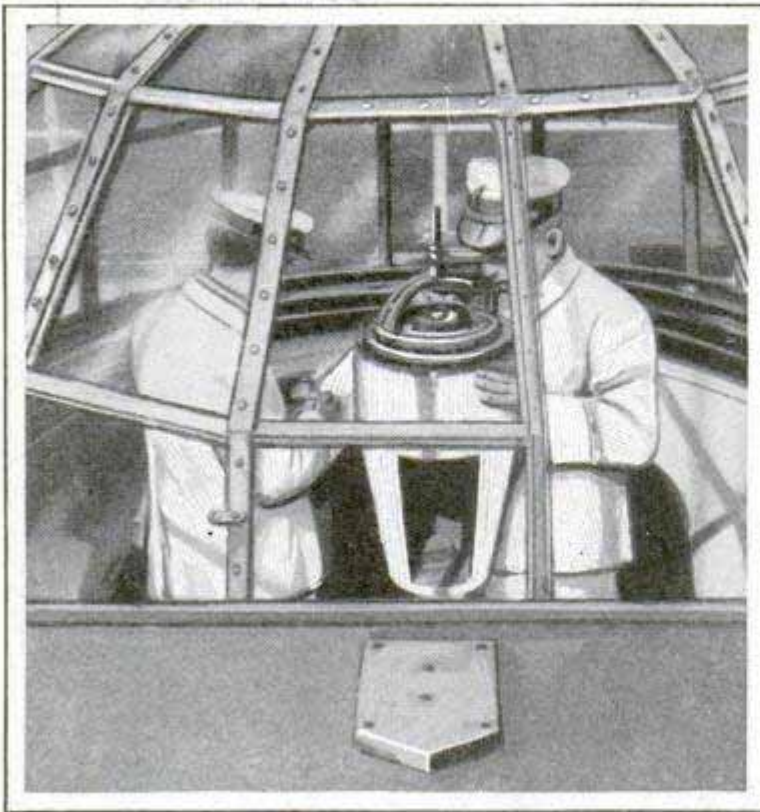
Atlantic cable possible. Then there is the Crozet Rise, the Japan Trench, the Cape Trough, the Marianne Ridge, the Brazil Basin, the Tuscarora Deep, and a vast mountain chain, known as the Edward VI range, to name but a few of the famous lands beneath the sea. The latter mountains, lying in the North Atlantic, have only recently been added to the underwater geographies, for vast stretches of sea remain to be charted. In 1901, the British cable ship "Britannia" discovered an entire new mountain chain in the South Pacific.

When one of the undersea mountains bursts through the surface and becomes an island it gets on the everyday land maps. The Bermudas are merely the tops of a mountain chain whose peaks rise almost straight from immense depths. St. Helena, where Napoleon spent his last years in exile, is another mountain top, as is lonely Ascension island. Off the

Kuril islands, the bottom drops sheer to a depth of five miles. Similar yawning depths adjoin Guam, the mid-Pacific naval station of the United States, and the Philippines. Only a mile or two off the coast of Porto Rico, the mountain of which the island is the top drops almost straight down for 27,366 feet. Charts of the ocean depths have been prepared for many years. The first of the Atlantic was made in 1854 by Matthew Fontaine Maury, the famous American



An Undersea Mountain, Projecting to Within a Few Feet of the Surface, Is a Trap for Every Ship Until Charted and Marked



Officers Making Magnetic Declination Observations Aboard the Non-Magnetic Schooner "Carnegie"

oceanographer. It was he who named the Telegraph Plateau. In recent years survey ships have constantly been at work adding new knowledge on which the shipping charts of the world may be based. The compass ship "Carnegie," of the United States, built without a piece of magnetic metal on board, has revolutionized the magnetic charts of the oceans; United States coast and geodetic-survey ships, with new methods of sounding, have mapped the bottoms, and with a wire drag have located many of the isolated rock pinnacles which lie in wait just below the surface to rip the bottom from an unwary ship. Radio has been put to work, and by flashing a sound wave to the sea bottom and listening for the returning echo, a ship plowing ahead at full speed can make accurate depth charts. Water bottles have been perfected to open at any desired depth and fill with samples of the water, and new nets are trapping the strange marine life that browses through the hidden mountain valleys far below the surface of the oceans.

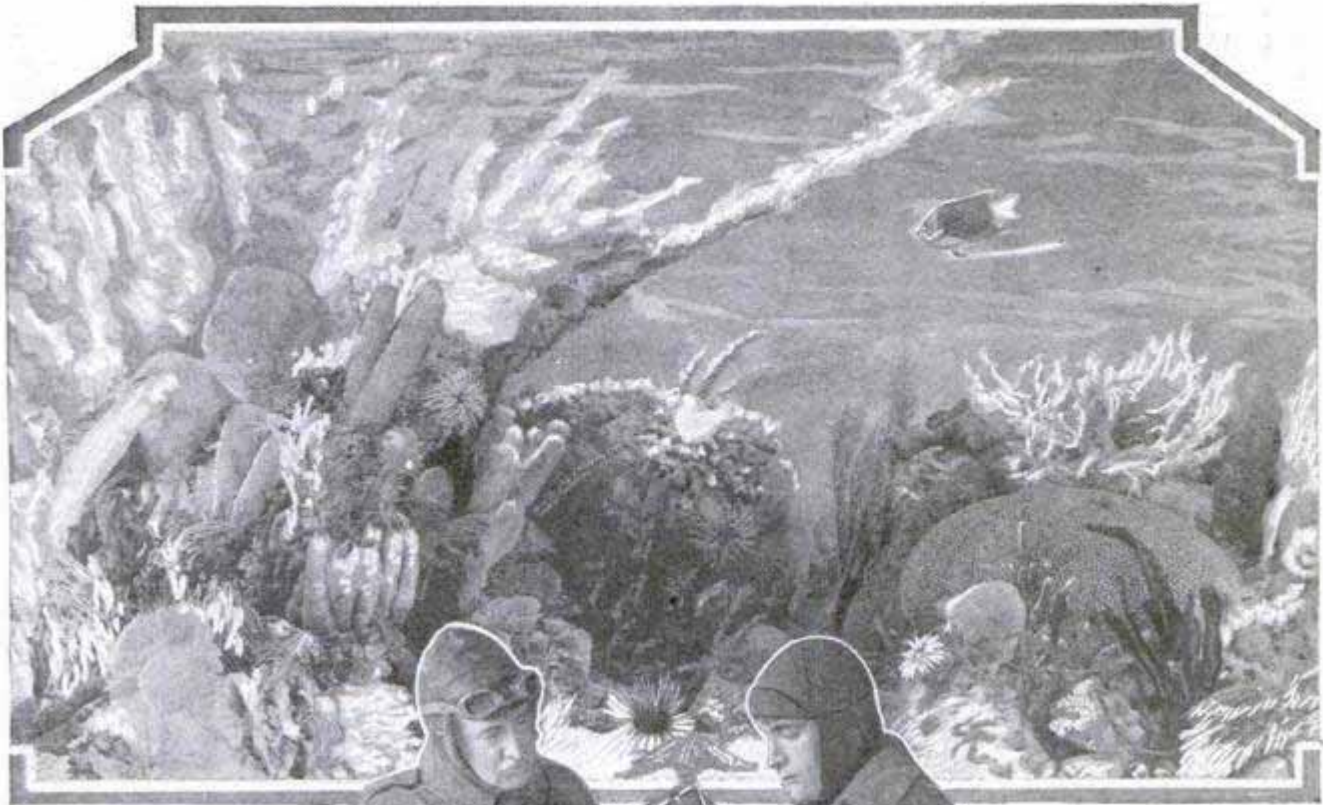
The results of the constant study of the earth under the sea as well as the interior under the land above sea level are expected to have an important bearing on the further knowledge of earthquakes and their causes, the distribution of metals, oil and other valuable minerals, and solve the mysterious movement of the earth's crust. More than 5,000 earthquakes are recorded each year by the many seismographs in use throughout the world. Only comparatively few are strong enough to be felt by man, yet every day there are many minor quakes recorded only by the delicate needle in some laboratory. Scientists hope that, with the completion of accurate surveys of the entire undersea world and a computation of the distribution of its mass, they can, by studying the quake reports, solve the relation of small temblors to large ones, and perhaps learn to predict the imminent arrival of

destructive quivers. There are no "everlasting hills," despite the poet's phrase, according to Dr. William Bowie, chief of the division of geodesy of the United States coast and geodetic survey. The earth, notwithstanding its mass and rigidity, is as plastic as soft putty under the stresses and strains of gravitational force. Islands and continents drift across it, so slowly that measurements a century apart may show a dislocation of only a few feet, but the movement does exist. Some time ago it was reported that America had moved a few feet westward, the distance from Europe being lengthened by so much. At first the theory was advanced that the drifting of the western hemisphere was in some way connected with the stresses due to the earth's rotation, but as other bodies, notably the island of Corsica, have moved eastward, it is now believed that a readjustment of the earth's interior has caused a general shifting of the surface.

The surface movement is determined by thousands of observations of the stars made



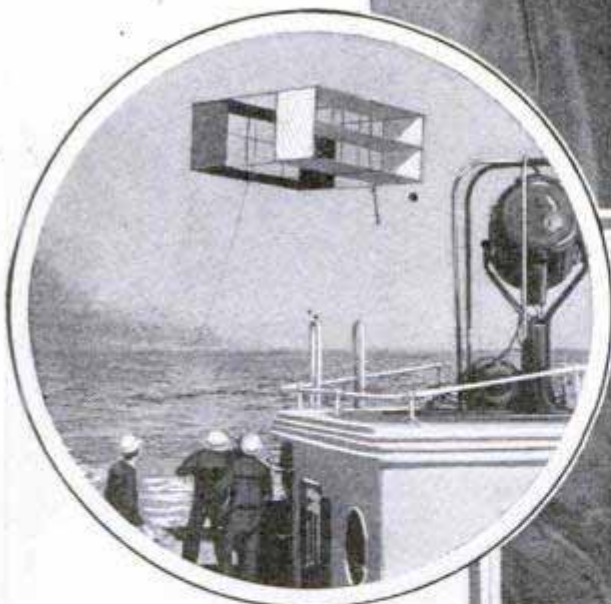
Mountain Ranges of the Pacific Ocean Whose Tops Project Above the Sea and Are Known as Islands; East of the Philippines and Guam Are Two of the Deepest Canyons in the World



The Plains and Valleys under the Sea Have Their Teeming Life, Their Jungles, Forests and Meadows and, in Tropical Seas, a Brilliant Array of Colors; the Coral Jungles Yield Constantly New and Surprising Information Which Has a Bearing on the Study of the Sub-Ocean World

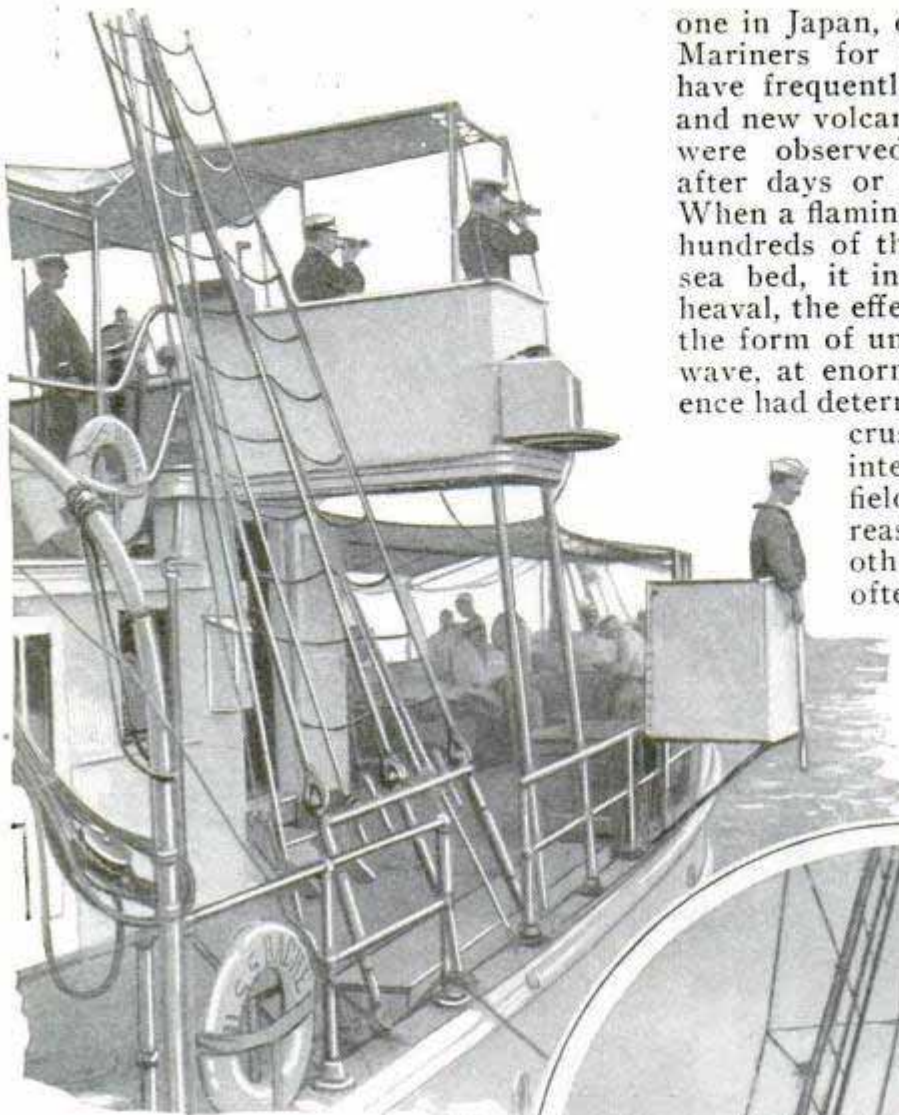


The Aerial Camera Is the Latest Aid in Charting the Lands under the Ocean, Since Its All-Seeing Eye, from Far Above, Readily Detects Things the Surface Observer Cannot See; at Left Is Dr. W. T. Lee and an Army Flyer Inspecting Their Camera before an Observation Flight, and Below Is an Aerial Picture Showing a Dredged Channel, in the Lower Left Corner, a Deeper Cove above It, and, to the Left of the Channel, the Dark Blotches That Mark Shoals Not Far beneath the Surface



Weather-Bureau Observations of Wind Currents Are Regularly Made at Sea by the Coast and Geodetic-Survey Vessels; Above, Sailors Are Launching a Big Box Kite to Carry Aloft Recording Instruments That Write in Ink a Record of the Skies; Half of the Kite Is White and Half Black to Permit It to Be Seen against Clouds or Bright Sky



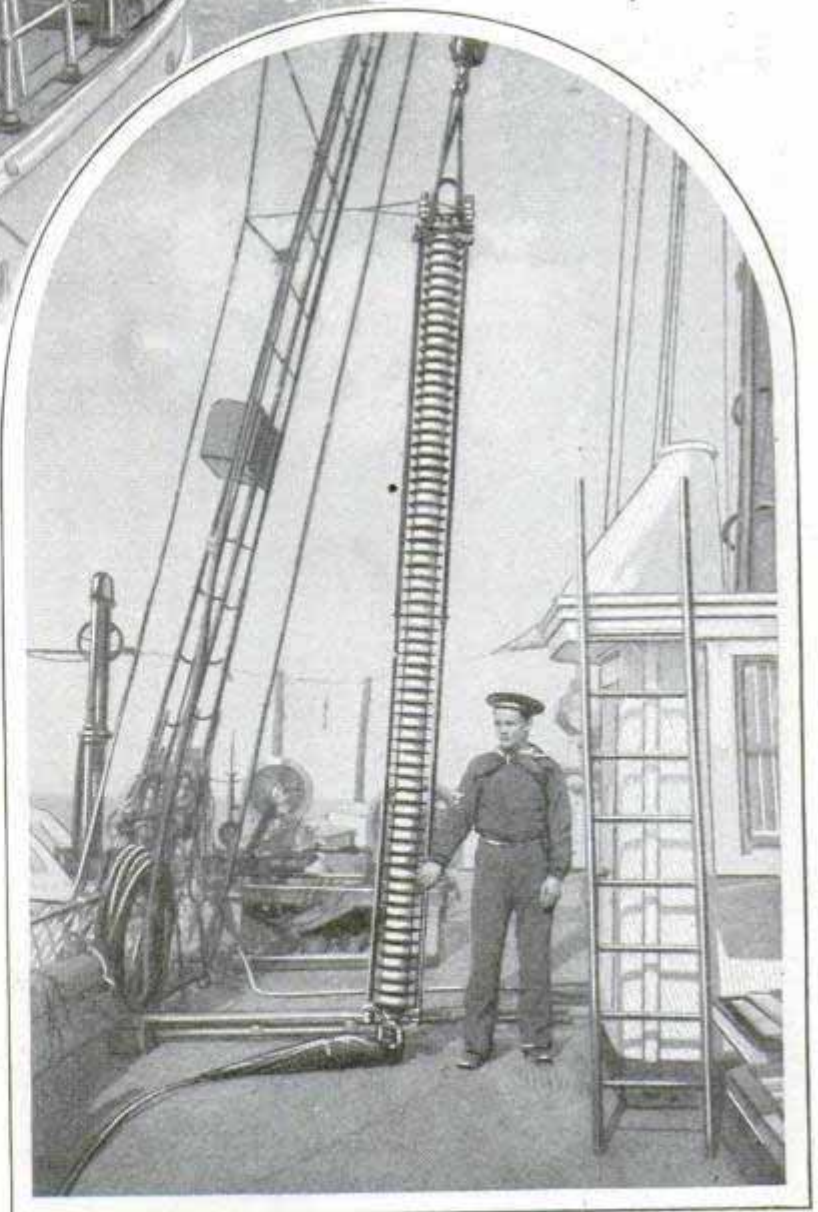


A Sailor Stationed in a "Pulpit" on the Ship's Side Makes Soundings with a Hand Line and Weight in Shallow Water; at Right, String of Shock-Absorbing Cushions Which Acts as Spring on Tow Line in Deep-Sea Dredging

at different points on the land surface, and checked repeatedly every few years. Once the exact latitude and longitude of a given spot are determined by observations of the stars, even a shift of a few feet can be discovered. Scientists have been somewhat limited in their study by reason of the fact that no accurate data on the land under the seas existed. Their calculations, even as to the size of the earth, were based on observations made from dry land, and of the earth's surface of 200,000,000 square miles only slightly more than one-fourth — 57,000,000 square miles in round numbers — is dry land.

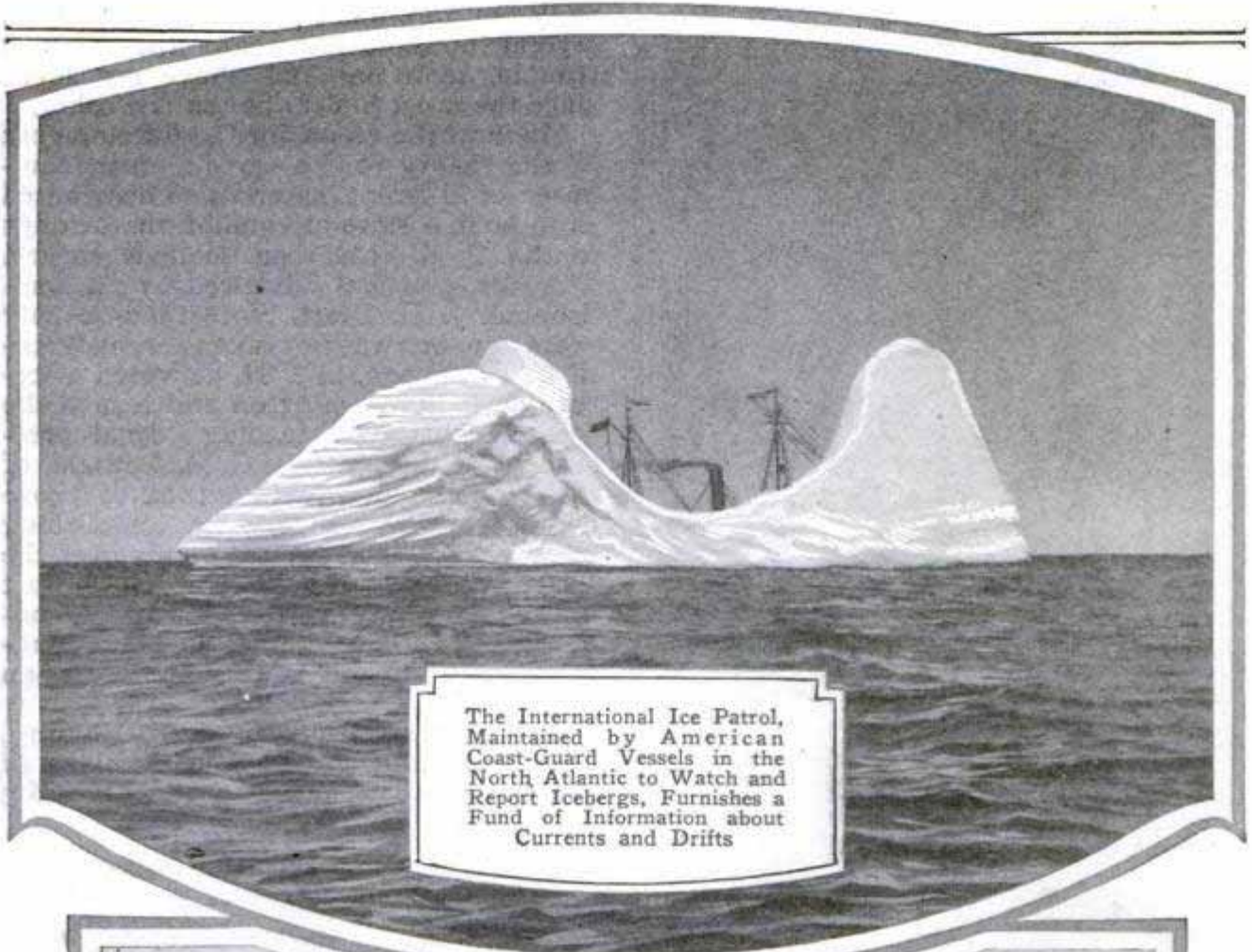
Yet the cause of many earthquakes, such as the destructive

one in Japan, originated beneath the sea. Mariners for more than two centuries have frequently reported strange islands and new volcanoes that rose from the sea, were observed, and disappeared again after days or years. Some few remain. When a flaming volcano can emerge from hundreds of thousands of feet below the sea bed, it indicates a tremendous upheaval, the effects of which may be felt in the form of unusual tides, or even a tidal wave, at enormous distances. Since science had determined that the entire earth's crust is floating on a plastic interior, much as the arctic ice fields float on the ocean, the reason why earthquake and other disturbances occur more often under the sea than under the land is apparent. If something must give way to release the tremendous internal pressure as the earth readjusts its crust, it is easier for the





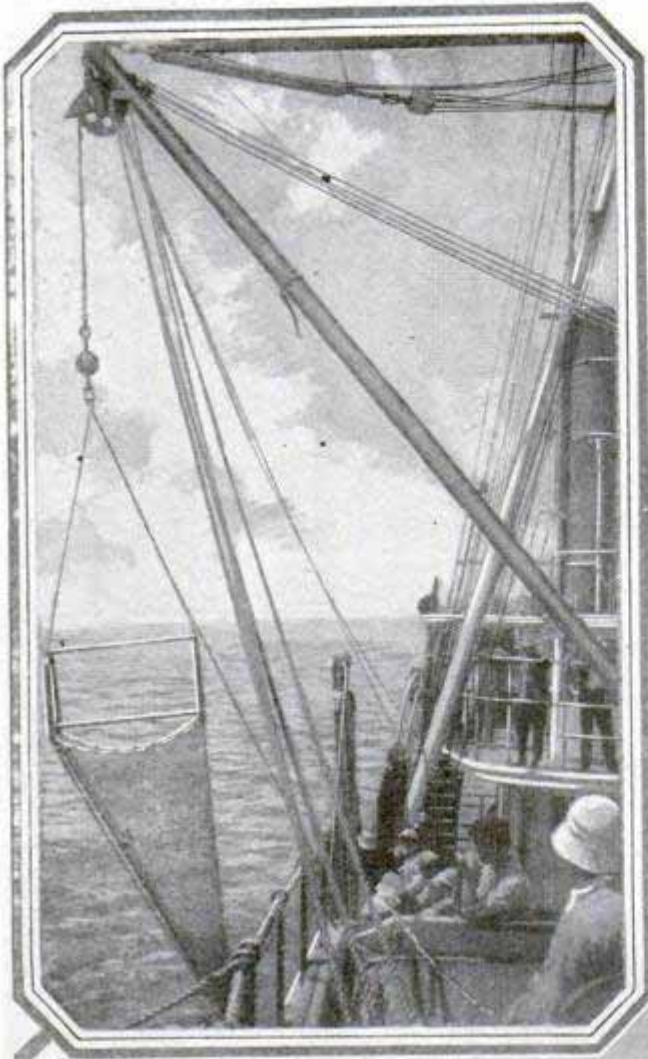
610



The International Ice Patrol, Maintained by American Coast-Guard Vessels in the North Atlantic to Watch and Report Icebergs, Furnishes a Fund of Information about Currents and Drifts



Party from a Geodetic-Survey Vessel Sounding for Shoals in a Busy Harbor; Constant Watch Is Kept over the Shifting Menace of Sand Banks



explosion to burst out on the sea bottom, several thousand feet nearer the scene of trouble, than on land above sea level, since the crust under the sea is weaker.

Much of the credit for the development of the theory of the earth's crust, composed of different materials so distributed as to be in a state of equilibrium, belongs to the U. S. coast and geodetic survey. The idea was first advanced by an Englishman, J. H. Pratt, more than seventy years ago, but was not taken seriously until C. E. Dutton, in 1889, delivered a lecture on it in Washington and named the theory "isostasy," meaning "equal pressure." In the nineties, G. R. Putnam, of the geodetic survey, undertook to prove or disprove the theory by establishing gravity stations at several points over the United States, and decided that the crust under this country was in substantial equilibrium, with the reservation that mountain ranges possibly were supported as an extra load.

Later investigations by J. F. Hayford, Dr. Bowie and three mathematicians of the survey determined that the entire

Lowering a Beam Trawl. Above, to Gather the Living Wonders of the Deep as Part of the Work in Surveying the Hidden World; at Right Is a Party of Coast Surveyors Setting Up a Hydrographic Signal on the Rocky Coast of Alaska

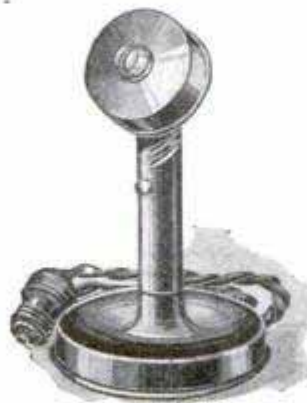
earth's crust, extending for some sixty miles below sea level, was in almost perfect equilibrium, and that even the added weight of mountain ranges was compensated for by lighter material under them, a fact that may in part explain why volcanic eruptions on land occur usually in mountain peaks rather than in the denser mass of the low lands.

If the earth's surface were cut up in hundred-mile-square blocks, to the depth of sixty miles—the thickness of the crust—the separate blocks would weigh so nearly the same, the scientists have decided, that they would float side by side without change of level. The theory can be demonstrated by cutting blocks of metals of different specific gravity to the same cross-sectional area, but allowing sufficient height so that all will weigh the same, and then floating them in a basin of mercury. Despite the difference in size, they all would float to the same depth, so their bottom surfaces would be in line, while the tops would stand out at irregular heights. Lead and silver, two of the heavier metals which will float in mercury, would be represented by shorter blocks as compared with nickel, copper, cast iron, zinc and antimony.

505

**ELECTRIC MATCH LIGHTS PIPE'S, CIGARS OR CIGARETS**

Pipe smokers as well as devotees of cigars or cigarettes are served by an electric lighter with the heating element passed over a knob that fits inside the pipe bowl. Either direct or alternating current can be used from a lighting circuit and is turned on by pressing a button on one side of the holder. The stand is eight inches high and has a broad and heavy base to prevent tipping.

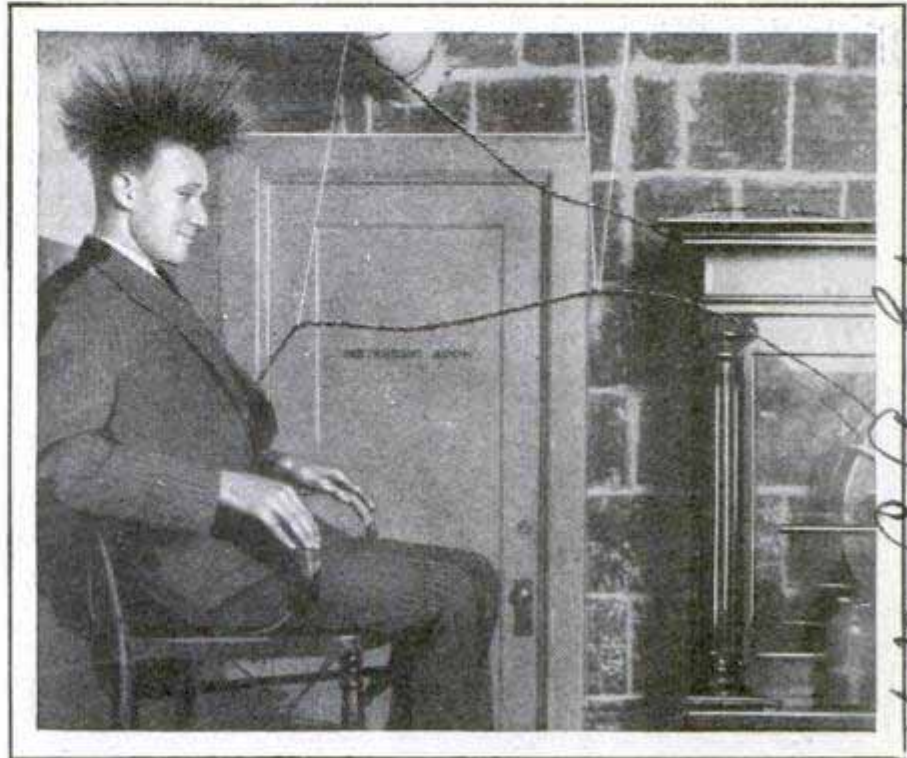


*Russell Electric Co. 340 W. Huron*

**STUDENT HAIR-RAISING STUNT SHOWS STATIC'S POWER**

Static electricity is capable of other queer antics than causing howls in your

1022



He May Have Been Frightened, but Fear Did Not Lift His Hair; It Was Static Electricity from Generator at Right

radio set. At a public exhibition in Portland, Oreg., current from a static generator lifted the hair of men students who sat in chairs near by, giving a realistic imitation of what sometimes happens in registering sudden and intense fear. When the test was tried with young women who had bobbed hair, the results were not so pronounced. Their hair straightened out but did not stand up, possibly because it had been kinked by waving or similar treatment.

103

**ANNUAL COST OF SMOKE IN U. S. SEVEN DOLLARS PER CAPITA**

Damage to property by smoke and soot in America's greatest cities costs the public about seven dollars per capita each year, according to estimates prepared by the United States bureau of mines. Besides this loss, there is the economic waste of burning coal by inefficient methods, and health authorities point out the menace of a smoke-laden atmosphere. In England, plans have been made for the building of 100 demonstration homes which will be heated and lighted by gas and electricity. Records will be kept of the maintenance costs of these houses, for comparison with dwellings that use coal

*Export. 30 Church St. New York City*

*U. M. C. A. Educational Dept. Portland Ore. N.Y. Bulletin 11/26 Central Terminal*

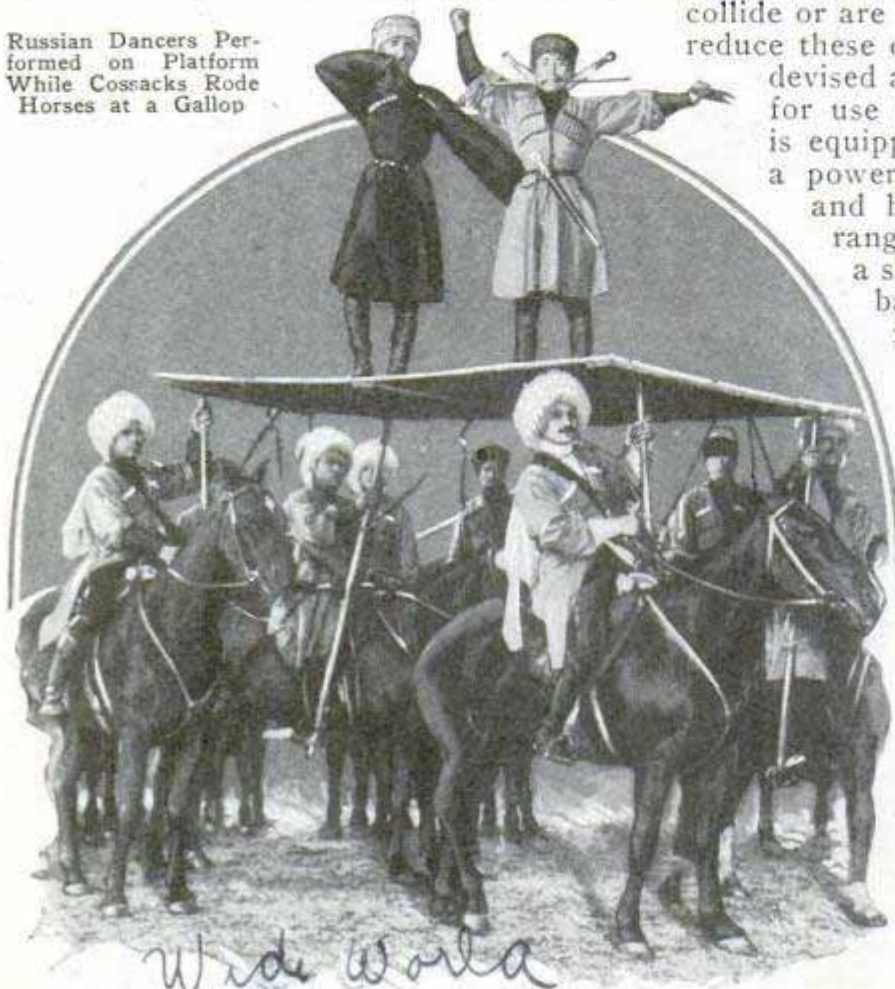
*506.92 no 21 new York*

*Acton London England*

**DANCE ON GALLOPING FLOOR TESTS COSSACKS' SKILL**

930. One of the features of a recent Cossack show in London was a dance performed

Russian Dancers Performed on Platform While Cossacks Rode Horses at a Gallop

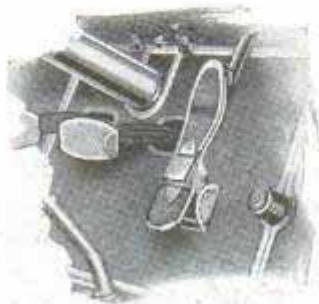


*Wide World*

by two men who were supported upon a platform on poles carried by horsemen. The uprights were fastened to the stirrups and were steadied by the riders as the horses galloped along.

**PEDAL FOR AUTO ACCELERATOR ADDS TO DRIVING COMFORT**

Leg strain, foot burns and damage to the floor of the car are prevented in a pedal for the auto accelerator to rest the driver's foot. It can be adjusted to fit persons of different height, is easily installed and consists of few parts. A steady pressure can be exerted with it and chance of accidental contact with the accelerator is less likely. The pedal has rubber inserts to protect the shoes.



3326

**SEARCHLIGHTS FOR LIFEBOATS AID IN RESCUE**

932. In the excitement of shipwrecks at night, lifeboats not infrequently capsize, collide or are run down by steamers. To reduce these dangers, a London firm has devised a special electric searchlight for use on motor-driven boats. It is equipped with silvered reflectors, a powerful gas-filled type of bulb and has a carriage to alter the range of the light swiftly. By a single turn of a switch at the back of the lamp, the long-range concentrated beam may be changed into a close-range diffused illumination but the central core of light shines undimmed while the change is being made. Besides the searchlight, the boat is also provided with a radio outfit. Controls for the different units are closely grouped for easy handling.

**RADIO-TUBE PHONE AID DEAF**

978. Instruments which make use of the principles of radio amplification of sounds for the help of the deaf have been available for some time and now the vacuum tube has been adapted as a sort of "booster" for the telephone, so that persons hard of hearing may carry on conversation with but little difficulty. The apparatus is contained in a separate box which may be placed against the wall or in the desk. It can be adjusted to meet the needs of the person for whom it is intended, but its use by those not hard of hearing is discouraged as it naturally amplifies all sounds equally. Some hearing aids using radio are said to enable a person suffering from as much as a sixty-per-cent loss in hearing to understand normal speaking three feet away.

967

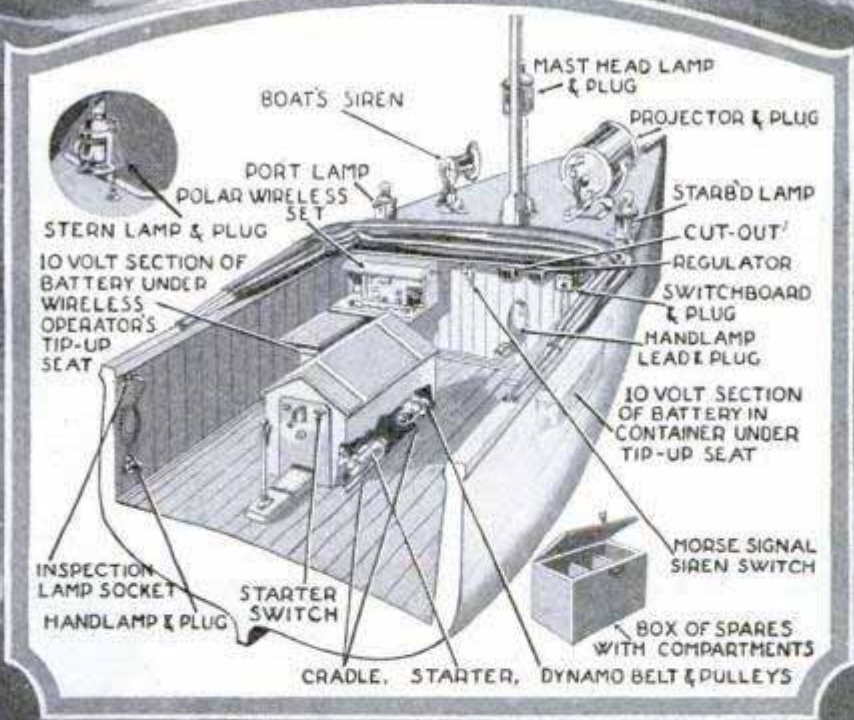
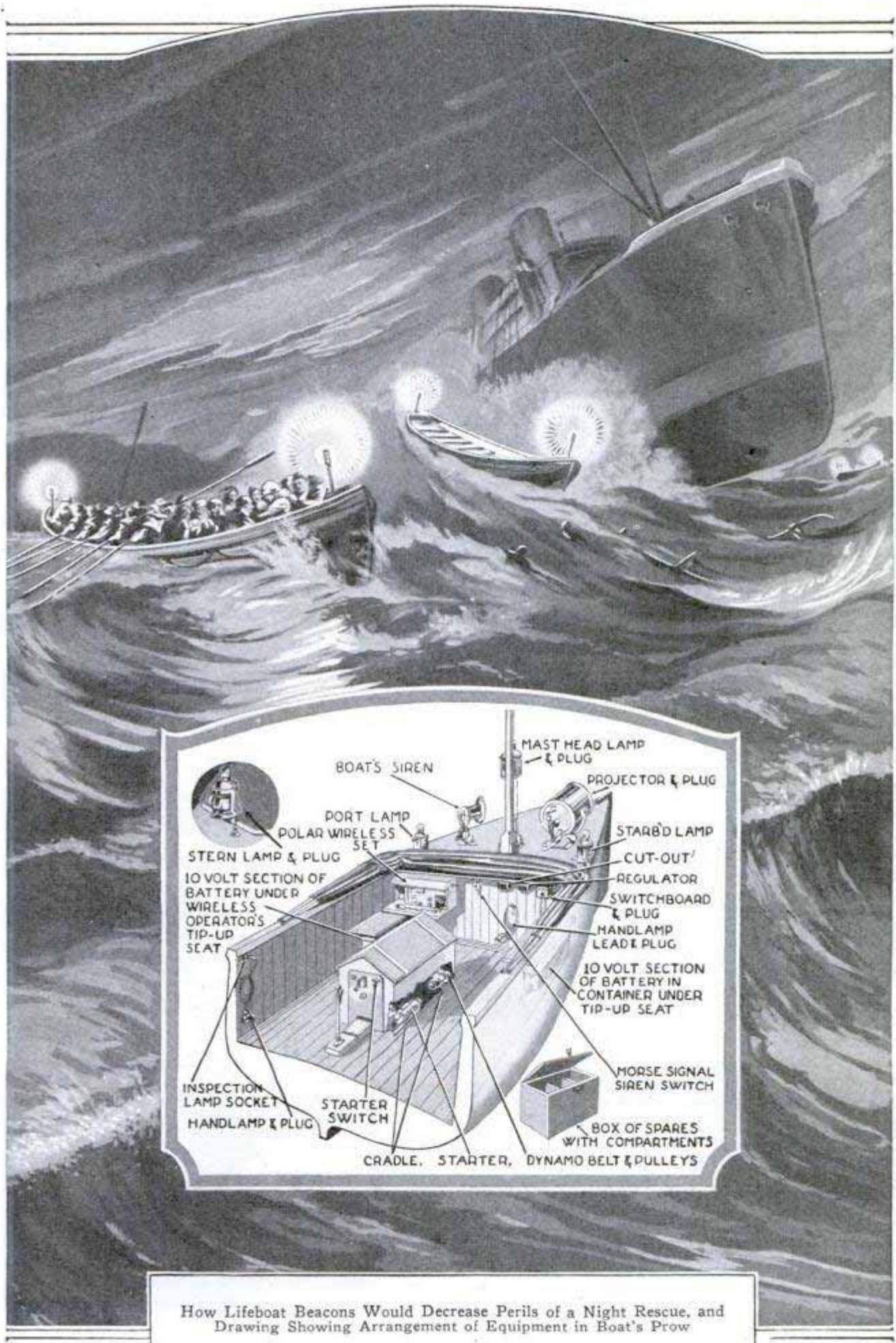
**TUNNELS SPEED WEAR ON RAILS BY DAMPNESS AND SMOKE**

Long tunnels are proving "rough on rails," since dampness and sulphur from the locomotive smoke speed corrosion. Wheels of passing trains chip flakes of rusted metal from the rails, leaving exposed portions open to further action from water and smoke.

*Wholesale - Marshall Field Chicago Auto Supply Co.*

*Bell Telephone Co.*

*Adamo Mfg Co 591 N. Chambers St.*



How Lifeboat Beacons Would Decrease Perils of a Night Rescue, and Drawing Showing Arrangement of Equipment in Boat's Prow

**LIFEBOAT RIGHTED BY RAILS ATTACHED TO KEEL**

Two long folding rails attached to the keel of the lifeboat have been devised by a British sea man to afford survivors a secure grip and help them right the boat



Inventor and Lifeboat with Grip Rails on Keel

in case it capsizes. The rails are within easy reach and when not in use, lie flat against the keel so that they do not interfere with the position of the boat in the deck racks or davits.

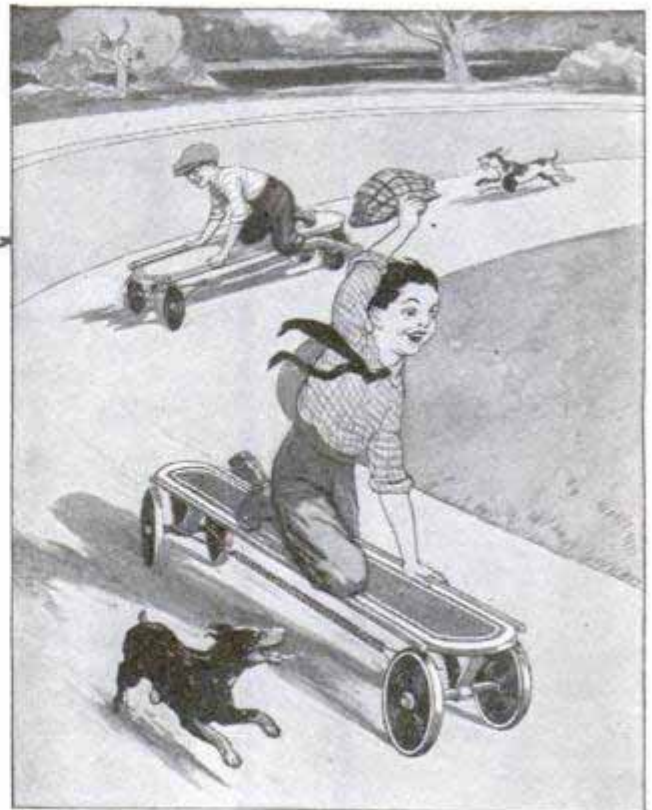
**STEEL AND REFINING COSTS CUT BY SILICA PROCESS**

Marked reduction in the costs of producing steel, refining petroleum and of refrigeration is forecast by Dr. W. A. Patrick of Johns Hopkins university, through the application of an absorbent substance known as silica gel which he invented during the war. It is made with water glass and acids and resembles coarse sand but contains innumerable pores so fine that they cannot be seen even under powerful microscopes. Prof. Patrick estimates that the total surface of the pores, in one gram of silica gel would cover half an acre. The material's use in the manufacture of steel lies in its ability to absorb the moisture from the air that enters the blast furnaces. Water vapor often causes considerable difficulty, but the silica substance, it is said, practically dehydrates the air. Its use is reported to have increased the output of steel in one factory ten per cent and to have decreased the cost of coke fifteen

per cent. In refining crude oil, the gel helps remove sulphur-bearing elements and gum-forming compounds, and the method is said to be cheaper than any yet found. In refrigeration processes, the gel acts as a vacuum pump in absorbing the water vapor and causing freezing as a result. This method of turning water into ice, that is, by pumping off the vapor, has been used for many years. The silica gel makes the use of a pump unnecessary. It absorbs the vapor and condenses it into water. By placing a small flame under the gel, this condensed vapor is driven off, leaving the material free to absorb more vapor. The process is continued until the water is frozen, and thus ice is actually formed by the application of heat. Theoretically, eighty pounds of ice can be obtained from 100 pounds of water by evaporating twenty pounds of the latter.

**COASTER IS STEERED LIKE SLED BY LEANING RIGHT OR LEFT**

Suited to children from four to fourteen years old, a coaster now on the market has no tongue or handlebars but is steered simply by leaning to either side. This shifting of the weight causes all four wheels to turn in the desired direction. One knee rests on top of the coaster and propulsion is obtained by pushing with the other leg. Rubber tires and steel disk wheels add to the pleasure of riding.



Without Handlebars or Tongue, This Coaster Is Steered Simply by Leaning

*Knee Roaster Co.  
2915 S. Wabash*

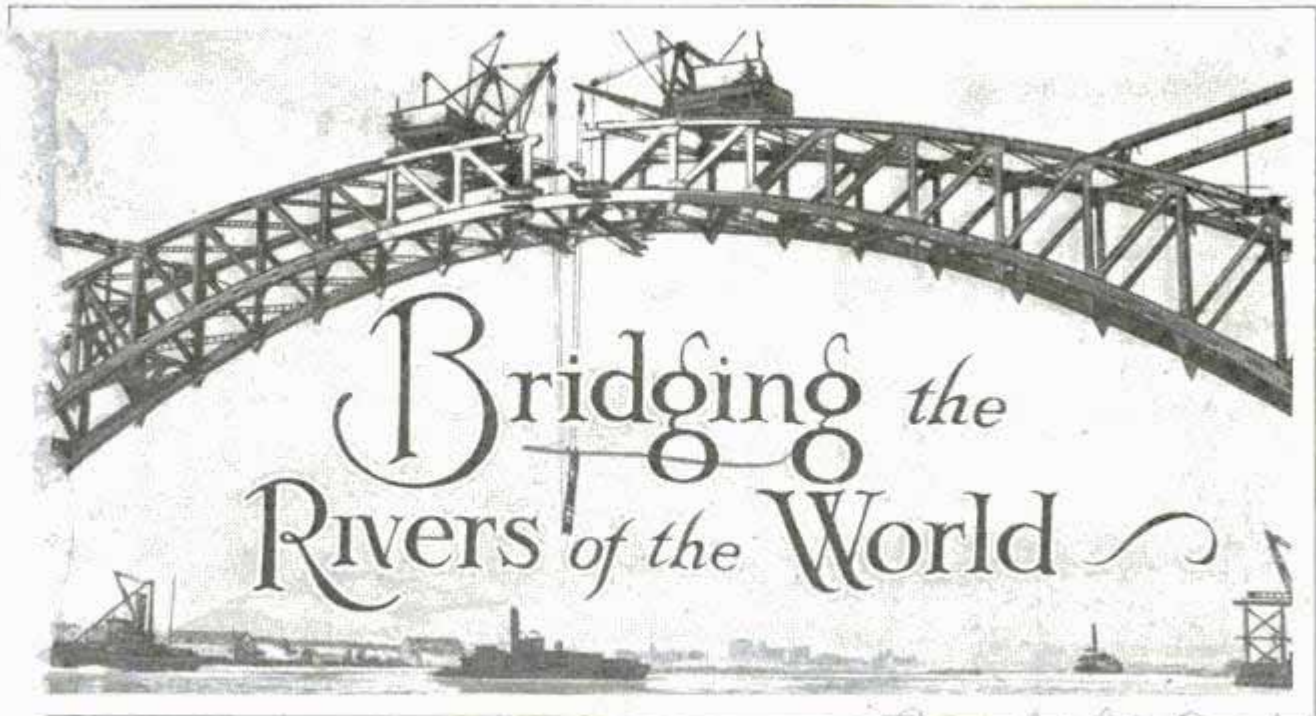
*Capt. A. J. Saunders*

*Baltimore, Md.*

973

965

984



By BOYDEN SPARKES

*Bridge Building*

was in the Philippines, on the island of Luzon. American engineers in olive-drab khaki and leathern boots that laced to their knees were cutting a swath through a jungle inhabited by half or wholly savage people. Stung by insects and harassed by homesickness, these men were building a railroad, using breech-shouldered natives to perform the labor.

Now the construction had reached a rocky gorge down which tumbled the white water of an unnamed river. There a bridge was necessary. For the engineers and their white foremen that bridge was nearly a finished mental job. A sheaf of blue papers, marked with ruled lines of white and with mystical figures and curves and other symbols of engineers, was, for them, the bridge. Timbers and steel with which to build it had followed them on rails that had pushed the frontier of white man's rule to the brink of that chasm.

The white foreman, Patrick Boyle, who served as the blasting expert of the bridge-building force that now moved in ahead of the mere railroad workers, had gotten, somewhere, a brown flat-faced assistant, Jose de Pina y la Cruz.

The day the crew moved forward to blast away the surface clay, the foreman seemed in a bit of a hurry. A round, vertical hole had been drilled down into the clay. Dynamite sticks, with percussion caps affixed to flexible, insulated wires, were placed by him in this drill hole.

"Pronto, muchacho!" he ordered and then, with a mixture of Irish brogue and

bad Spanish, instructed his assistant to carry the magneto box with its plunger over the hill, uncoiling the wires as he went. He finished with a warning to the Filipino to wait beside the magneto box until he, the boss, arrived.

Some of the men whose work waited on this blasting job retired over the hill with the native assistant of the blasting boss. They saw him select a spot sheltered as much as possible from any flying rocks. They saw him fasten the copper wire ends to the binding posts of the magneto box. Then, before any of them could frame suitable words of remonstrance, they saw the little brown man lift the plunger and drive it down.

There was a ground-shaking explosion. With a reverberating "boom," something like a volcano seemed to have been opened on the other side of the hill. Clods sailed high into the air and in the center of the inverted cone of debris, as if to answer an unspoken question in the minds of the watchers, was a bright red fragment of what had been a flannel shirt.

They reassembled Patrick Boyle in a basket, but Jose de Pina y la Cruz, who had started to run away when he recognized the import of that bit of flying red cloth, did not even return for the funeral services.

I thought of that incident the other day when Ralph Modjeski, one of the most famous bridge builders of the world, told me that as a rule the loss of life on bridge-building jobs is due to inexperienced workmen.

"There are unavoidable hazards connected with the work," he said, "but as a rule it is the green man who takes hold of the wrong rope, or steps on the unsecured bit of staging, or does something else against which the experienced workman would have been warned by a knowledge as sure as instinct. Sometimes, though, accidents happen to the most cautious, the most experienced workmen. I have had a few narrow escapes myself." Then he told about a critical day in the construction of a bridge he built across the Mississippi at Thebes, Ill. It was the great moment in the building of a bridge, the making of the central connection, the placing of that final link which makes the structure an actual bridge.

There was a gap of about twenty-five feet separating the steel arms that had been built out over the river from opposite shores of the wide Mississippi. Two groups of workmen for months and months had been working toward each other. If the reckonings of the engineers or the performance of the contractors were inaccurate in the slightest degree, that perfect junction which was necessary would fail. No matter how confident an engineer may be, it is a problem for which mere paper answers are unsatisfactory. Relief does not come until that rendezvous of steel high above mid-river has been kept.

Mr. Modjeski, treading as sure-footedly as any of the contractor's cat-footed steel workers, made his way out to the end of one of the outthrust arms. One hundred feet below him the yellow waters of the greatest of rivers moved toward the distant Gulf. A flat car, bearing a pin that was about to be set in position by a giant traveling crane, was at the end of that part of the unfinished span where Mr. Modjeski stood. It was not an ordinary pin. It weighed something over a ton.

At a signal, the man in the control cabin of the traveler swung the long arm of the

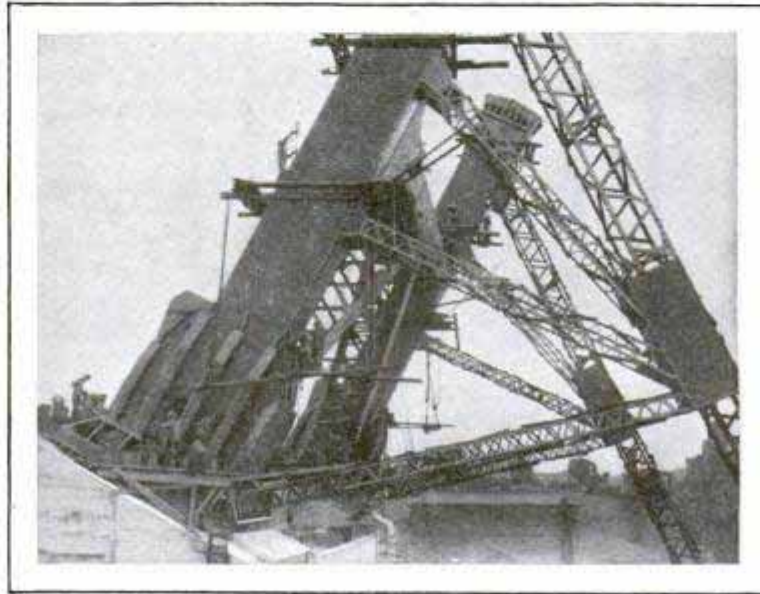
boom into position, but a trailing cable knocked against the pin. It started to roll. Mr. Modjeski was standing on a plank, holding by one hand to a cast-iron loop on the side of the flat car. He saw at a glance that the pin was not going to catch him in its fall, but he saw, too, that the dragging cable was going to sweep down on his outstretched arm. He re-

leased his hold on the car, and as he did so, the huge pin crashed down on and broke the plank on which he stood. In a flash he had grabbed the iron loop again and hung with nothing but air between him and the Mississippi far below. Some of the other workmen quickly leaped to the relief of the chief engineer,

hauling him safely to the floor of the car a few seconds after the geyser splashed up by the fall of that great pin had dropped back to the river.

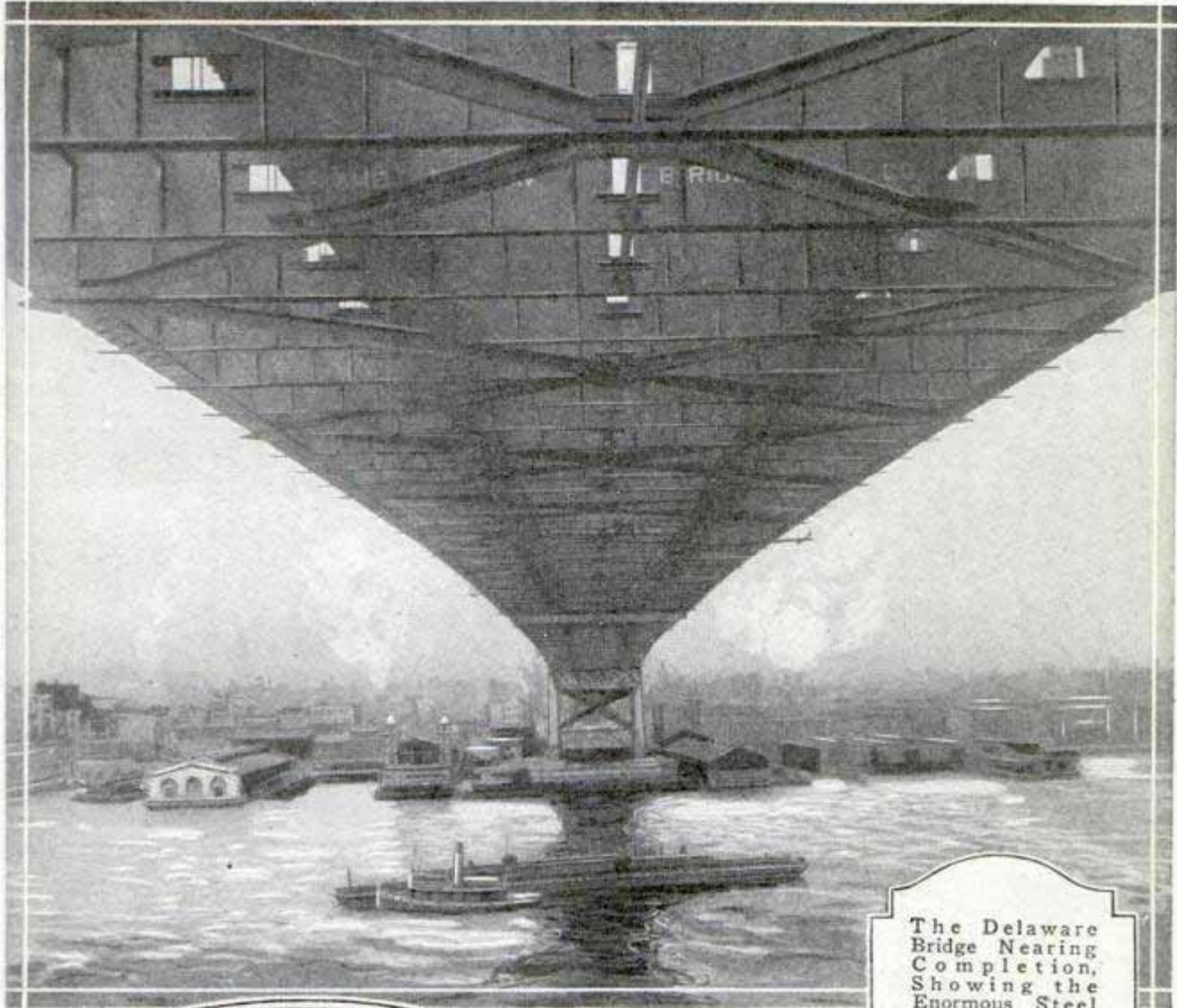
The building of bridges is in the field of engineering what grand opera is to musicians, or Chinese porcelains to connoisseurs of art. It is a work that calls for skill and daring. But above all else, the successful completion of the work calls for a fanatical accuracy even to the least of the details. A single error of mathematics, or the tolerance of any of that sort of scamping that is more or less common in the erection of big buildings, and there is an accident like that which occurred in 1907 to the first bridge which the people of Canada tried to thrust across the St. Lawrence river at Quebec.

It was within fifteen minutes of quitting time for the eighty-five men who were working on the mighty web of steel which these human spiders were spinning across the St. Lawrence. Suddenly they felt the vast structure sinking beneath their feet, at first a slight sag, and then, with a grinding, crashing noise, a drop of thousands of tons of metal into the water. Seventy-four of the workmen died in that horrible fall; eleven others were picked up from the river and taken to hospitals.

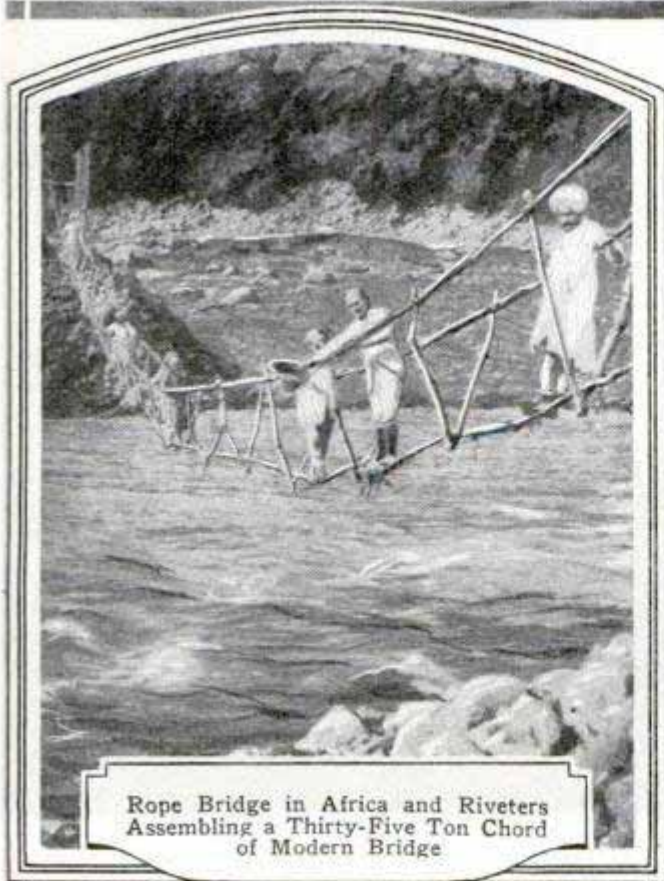


Erecting the Giant Towers from Which the Cables of the Delaware Suspension Bridge Are Hung; the Towers Are 380 Feet High

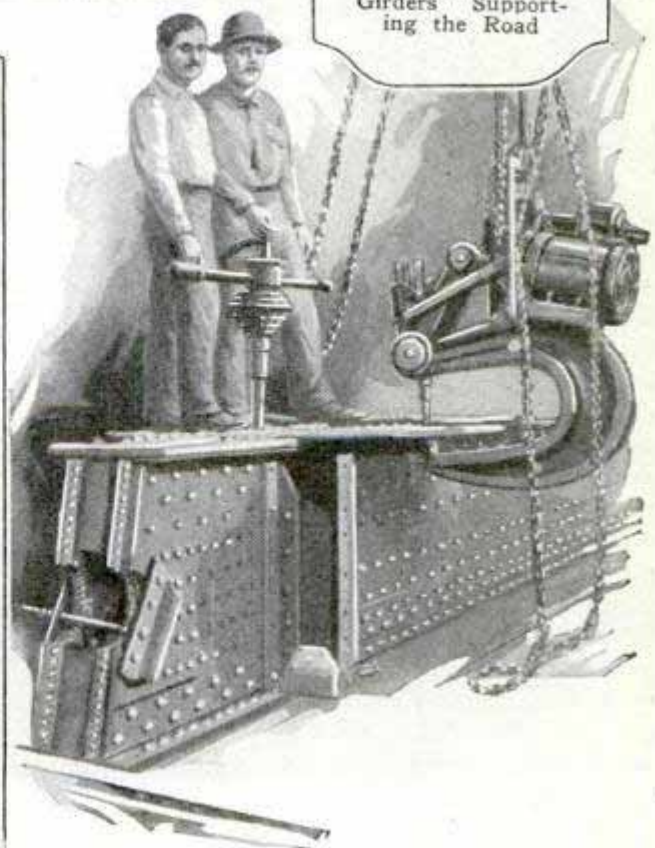




The Delaware Bridge Nearing Completion, Showing the Enormous Steel Girders Supporting the Road



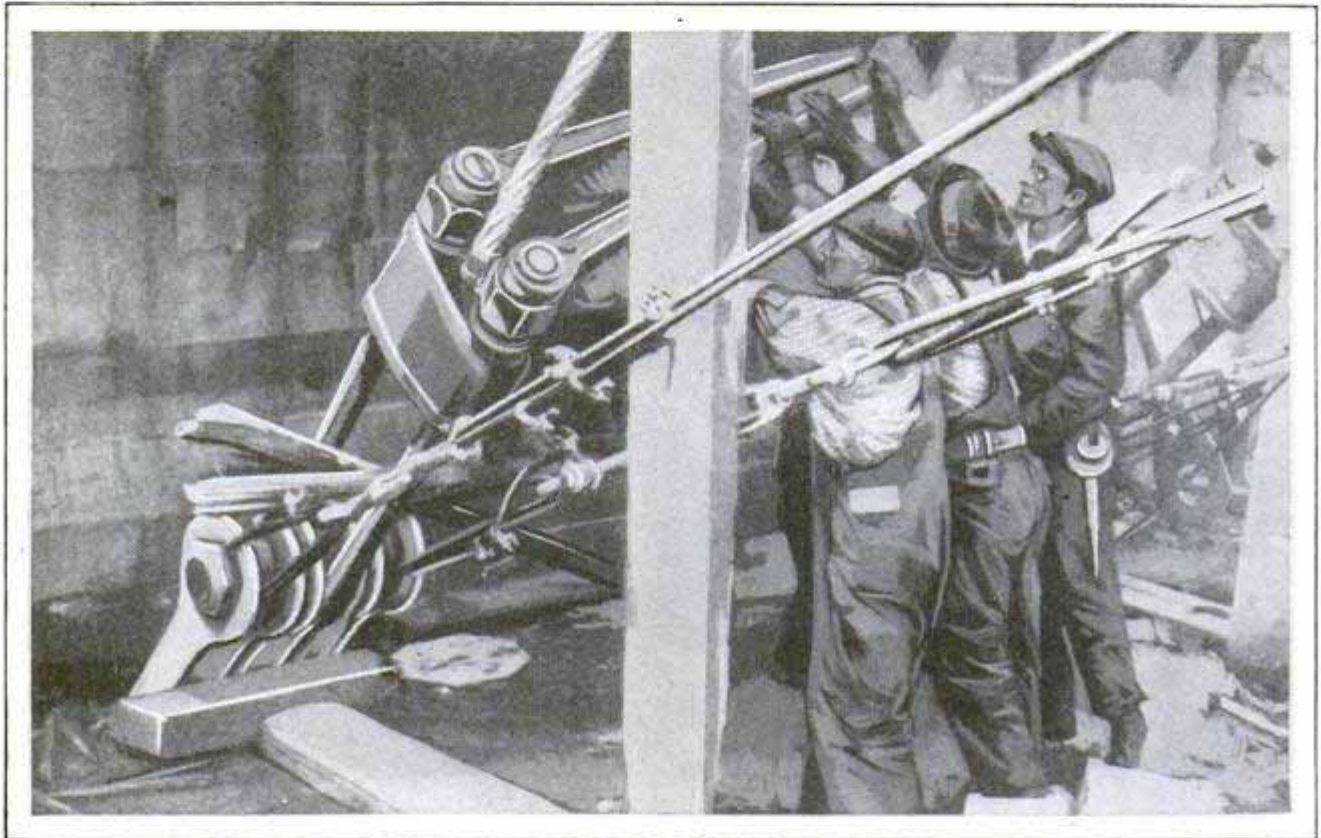
Rope Bridge in Africa and Riveters Assembling a Thirty-Five Ton Chord of Modern Bridge



It required a lot of inquiry to fix the blame for that collapse. Engineers say it was the result of an inadequate inspection service, and, also, of anxiety to build a bridge too light in design. Somewhere in the planning there had been a human failure. It was not the steel that failed; the metal had simply been assigned a task too great for it.

Even the least of bridge-building jobs is a tremendous struggle and the umpire is the law of gravity, with which there can be no argument. When the United States was spreading itself across this

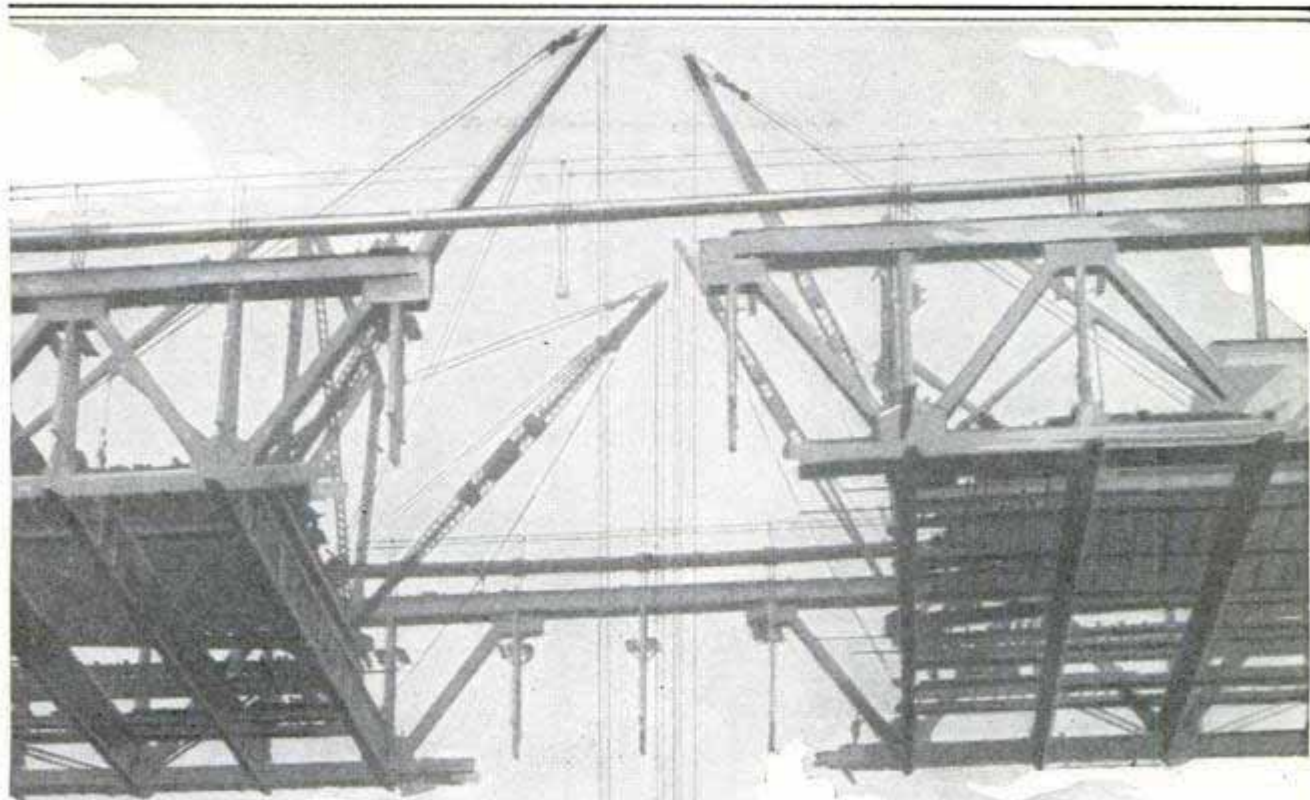
out of insurance benefits are the caisson workers who report at the call of any contractor who undertakes a big bridge job. They are the men who work under heavy air pressure below the level of water, when the foundations are being laid on the bed of the stream that is being bridged. When Mr. Modjeski was building the Memphis bridge across the Mississippi in 1914, about the time Europe flamed with war, something happened which helps to justify the attitude of actuaries toward caisson workers. It was at the Arkansas end of the J. T. Harahan bridge. Eight



Four-Foot Wrenches Give the Leverage for Tightening the Clamps Which Hold the Steel Cables of the Delaware River Bridge; the Cables Are Spun in the Air from Individual Wire Strands

continent as ink from an upset bottle widens in a huge blot, there was always an ample supply of men to occupy whatever posts of danger there were to be filled. Grizzly bears, hostile Indians, rattlesnakes, bad men of every race were not sufficiently menacing to hold back that spreading flood. Human nature has not changed; the frontiers of today are the places in the community where those men work whose occupations are rated in the tables of insurance actuaries as "risks not acceptable." This phrase means that the hazard of their jobs is at least 200 per cent greater than the normal hazards which confront those who serve as lawyers, oculists, florists, auditors and in other mild occupations. At the forefront of those aristocrats of hazard who are counted

men, one of six gangs of caisson workers, started down a ladder into a vertical shaft to the air lock above the working chamber where the gang they were to relieve was expecting them. About fifteen minutes later, an impatient signal inquired of those in charge at the surface why the relief had not been sent. Immediately the outside lock tender and the superintendent began to descend the ladder to investigate. Thirty feet from the bottom of the shaft the lock tender called out that he could see the men piled up at the bottom. He did not finish his observation. An unseen enemy had filled his lungs, poisoned his blood. Without a cry, his hands relaxed and he too plunged downward onto that cushion of dead men. The shaft was filled with a gas that had been generated

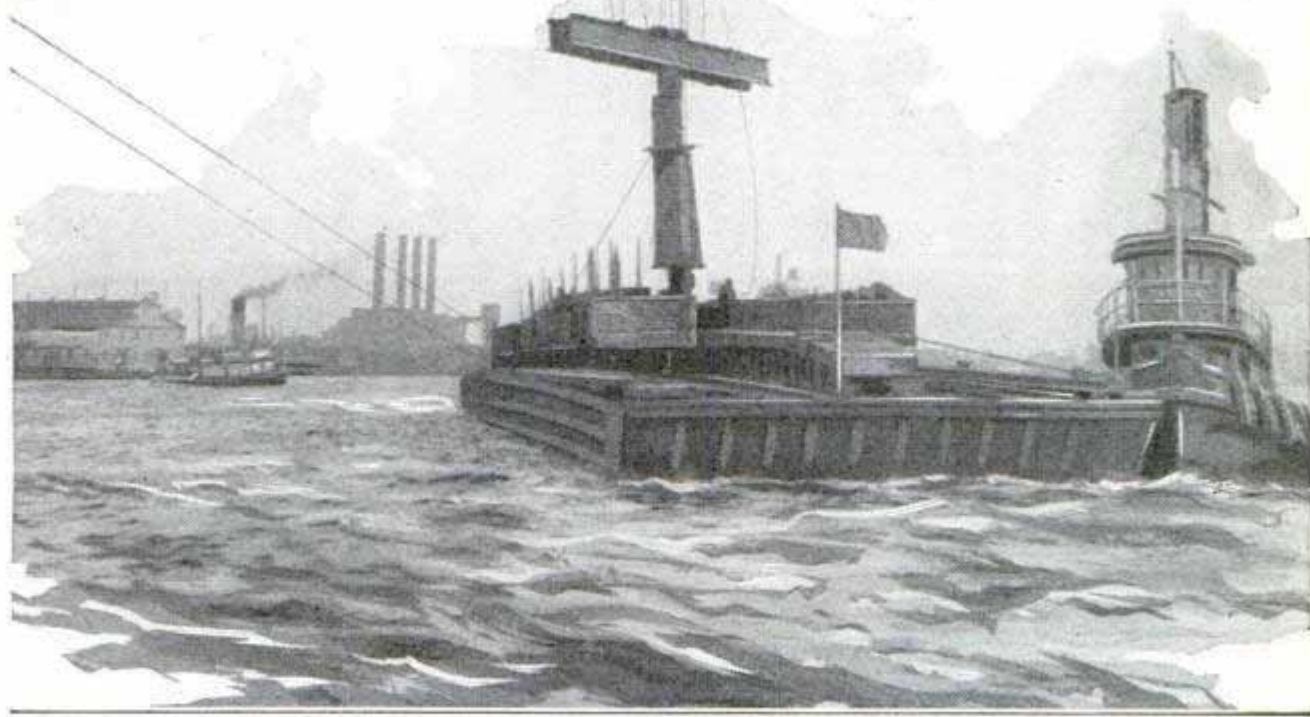


mysteriously. The men in the working chamber beneath that death trap were brought out one by one in a hoist bucket through a material lock. The dead were brought up by men in diving suits and helmets. It was one of those unavoidable accidents that beset the men who make our wonderful transportation systems possible.

"They follow the job," Mr. Modjeski told me. "Fear seemingly has been left out of them. On the

Philadelphia-Camden bridge over the Delaware river where I am now engaged, it was suggested that the iron workers wear life preservers so that any who happened to drop into the river might have a better chance of surviving, but they scoffed at the idea.

"We have kept speed boats in the river ready to dash to the rescue of any who dropped into the water. We have used circus life nets. We have kept these nets strung be-



Hoisting the Connecting Girder in Place to Link the Ends of the World's Longest Suspension Bridge

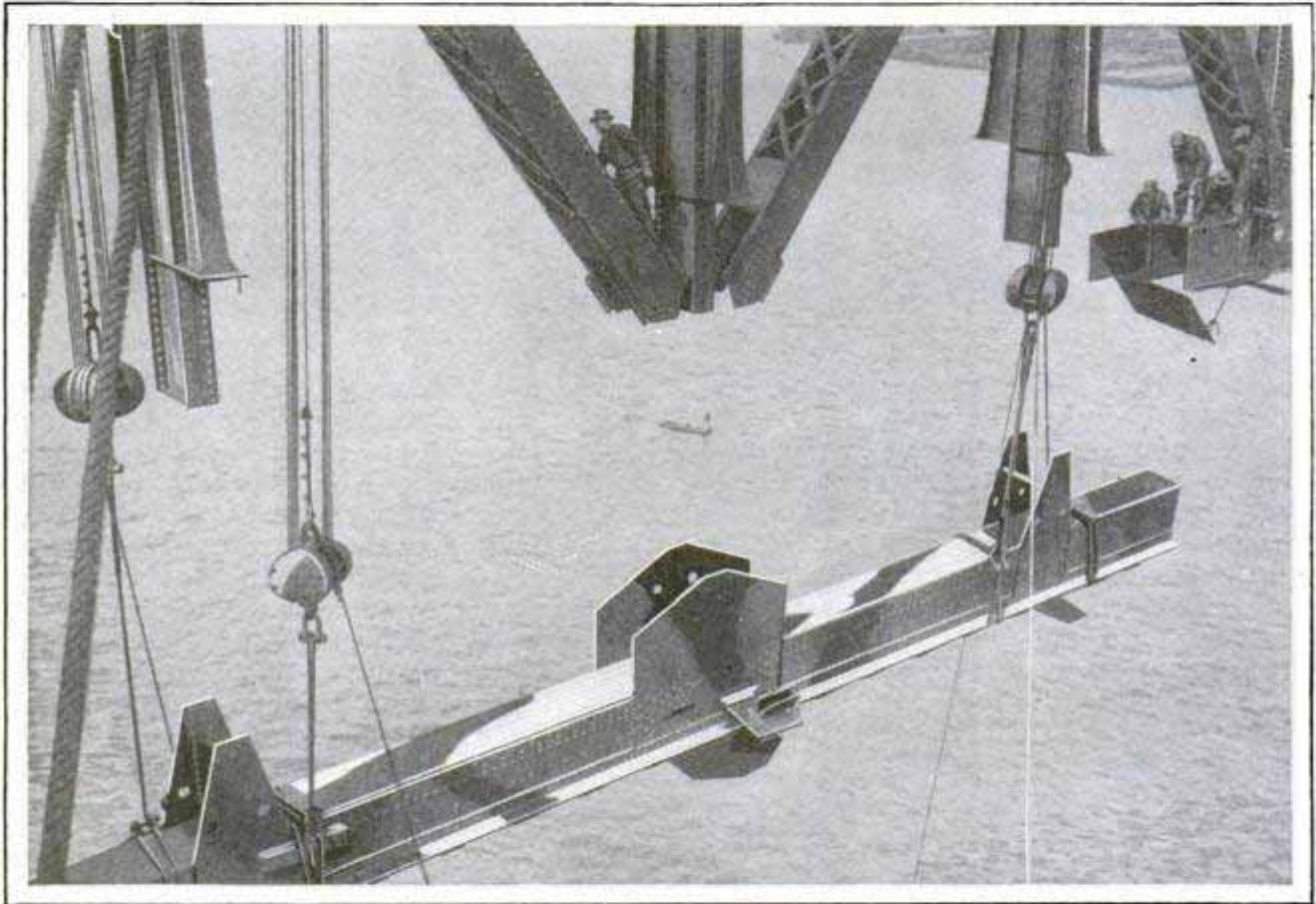
neath the ends of the bridge as the steel was pushed out from the shores of Pennsylvania and New Jersey. We took exceptional precautions with the staging, but in spite of all this the number of men who have lost their lives that this bridge might be built is just about the same in proportion to the weight and cost of the structure as on any of the large bridge-building operations."

Work had just started for the day one morning last August, when Theodore Jorines and Albert Miedema rode out into space on a huge steel beam that was about

fished out so little disturbed by the accident that he only stopped to change into dry clothing before returning to work.

"Since it is to the first interest of contractors to reduce the loss of life on these undertakings, the problem is being studied constantly with the idea of making the work less dangerous."

"If bridges are better today than forty or fifty years ago," Mr. Modjeski said, "it is because steel is better. The most important stride forward since I started was the invention of pneumatic tools. When every rivet had to be driven by hand, en-



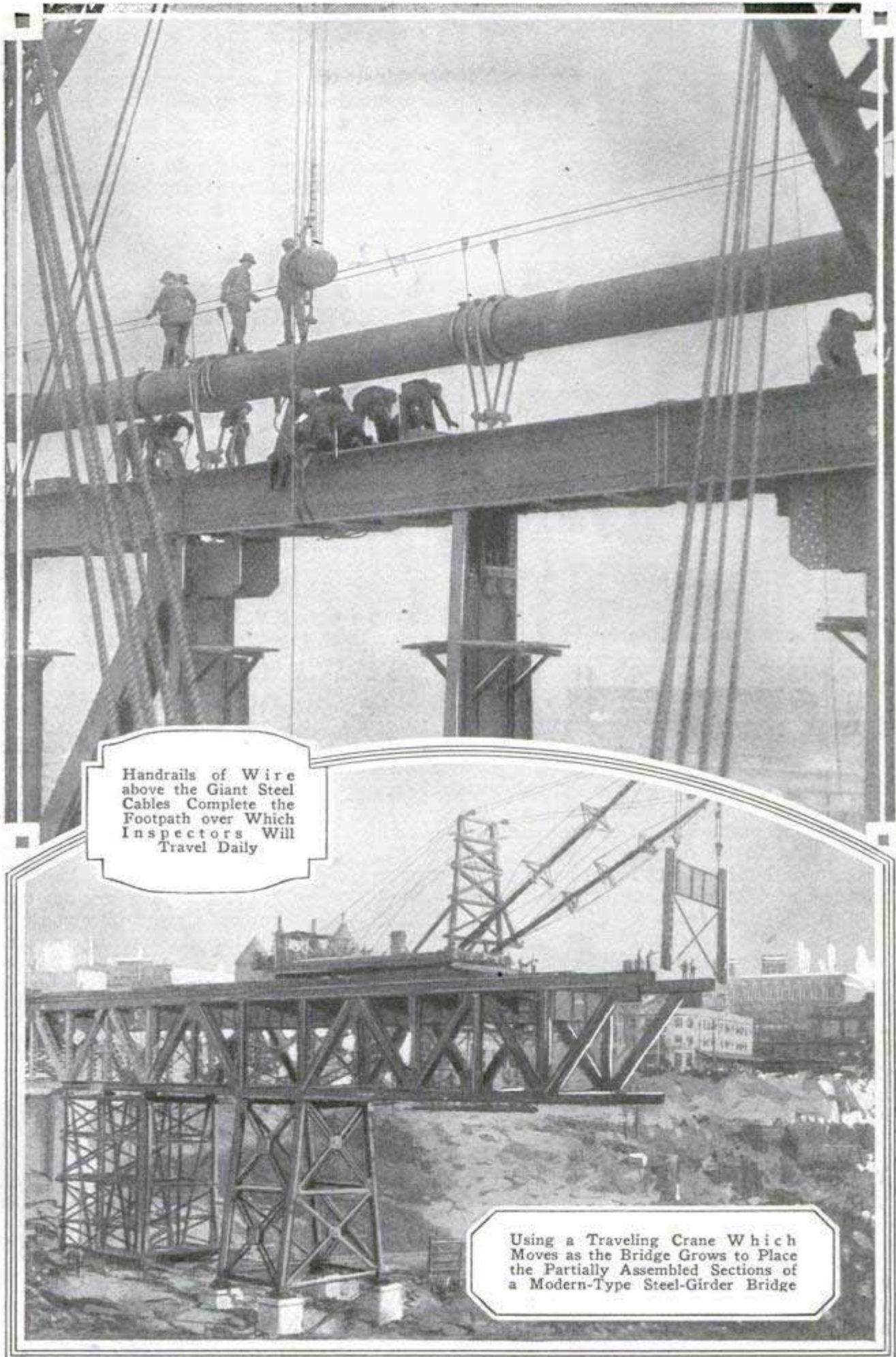
Sure-Footed Iron Workers, Perched Far above the Swirling River, Wait to Bolt and Rivet the Last Connecting Girders in Place, Completing Their Work on the Delaware River Suspension Bridge

to be swung into place by the great traveling crane. The men were standing up, arms outspread, to signal, when the beam slipped in the slings. They were thrown, of course, and turned several times in the air before they struck the river bank sixty feet below. They were the sixth and seventh men to die, and since that time, four or five of their fellows have fallen to death or otherwise been fatally injured.

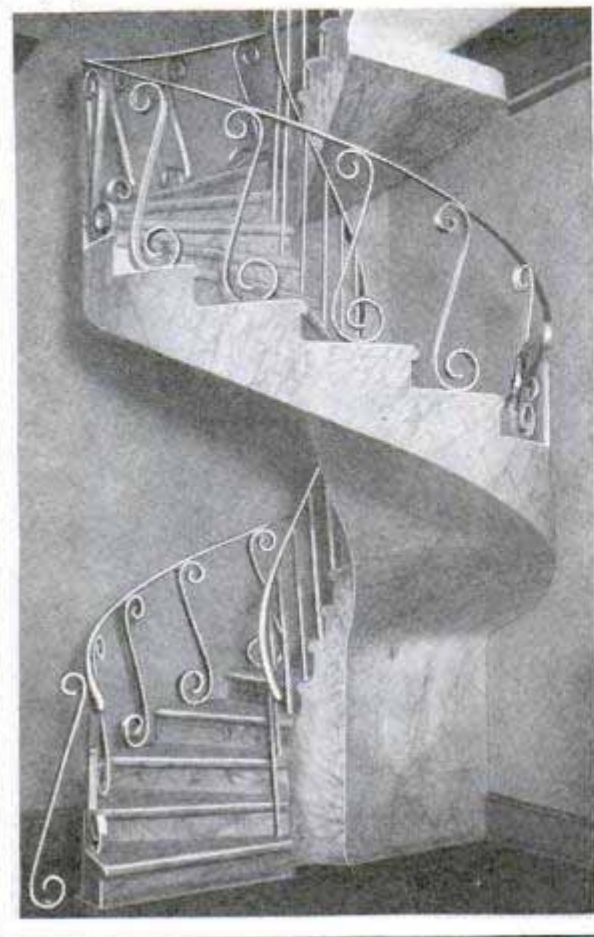
"They get reckless," explained Mr. Modjeski. "But even so, I have seen them fall and live. On the bridge at Thebes one iron worker missed his footing and fell 110 feet into the Mississippi. That is a long way to drop. However, he was

gineers saved as much as they could on rivets. Now we can afford to be prodigal with rivets, which is important because of the steady growth of the loads that bridges must carry today."

There are still some thrilling challenges that have not been met by the bridge builders of the world, according to Mr. Modjeski. One of these is the straits of Dover; another is San Francisco bay, where a 3,000 or 4,000-foot tunnel combined with a bridge would be necessary; another is the Hudson river as it flows past Manhattan island, where a span of 3,400 feet would be necessary in order to satisfy the exacting requirements of the war department.



Atlanta-Birmingham  
 P. O. Birmingham Ala  
 Birmingham Ala  
 1926



Ornamental Concrete Work of Unusual Design, a Staircase Cast as Unit in Molds

**SPIRAL STAIRCASE OF CONCRETE  
 —CAST IN SINGLE MOLD**

Planned and built by a practical construction man, a spiral staircase in a Florida printing plant, has no central support, but is said to be capable of standing a strain of 170 tons and has a carrying capacity of 4,800 pounds. It was built in a single unit from a mold carefully measured to specifications and the concrete poured around reinforcing. Its surface was grained to resemble that of marble. Besides giving an artistic touch to the interior, the stairway saves space.

steam. A "sprinkler" arrangement was attached to the front of the locomotive with shields to direct the vapor down against the track. Moving slowly, the engine thoroughly treated the weedy section, the steam proving especially effective close to the ties and between the rails where the growths would have been hard to reach by other means. Another use for the steam system is in clearing snow and ice from switches.

942 Jan  
**TESTS WITH MODEL RUNWAY  
 SHOW CAB DRIVERS' SKILL**

Are you mentally qualified to drive a cab? On the basis of actual results from more than eighteen months of experiments, Dr. A. J. Snow, consulting psychologist for a large Chicago cab company, feels that science has a means of determining the answer with a considerable degree of accuracy by a series of interesting psychological tests, some of which were described in Popular Mechanics in November, 1924. At that time, the examinations had been given too short a time to derive definite conclusions. But since then, after testing more than 12,000 drivers and prospective drivers, analysis of the findings has been made.

Briefly, the tests aim to determine the subject's intelligence; his ability to react to lights, sounds and the sense of touch; and whether or not he is likely to be reckless, easily scared or quickly fatigued. The trials are now given by cab companies in more than a score of cities. Some concerns offer them to the public at large. They take only half an hour and the results are known almost immediately. The psychology department of the University of Pennsylv-



As Signals Flash in Box, Candidate Endeavors to Guide Toy Cars Accordingly with Controls

959  
**WEEDING RAILWAY  
 RIGHT OF WAY  
 WITH STEAM**

When growth of weeds became troublesome along the right of way of a southern railroad, one of the engineers devised a way to kill them with

The Sphere  
 12/5/25

Dr. Morris S. Viteles  
 U. of Pennsylvania  
 Dept. of Psych.

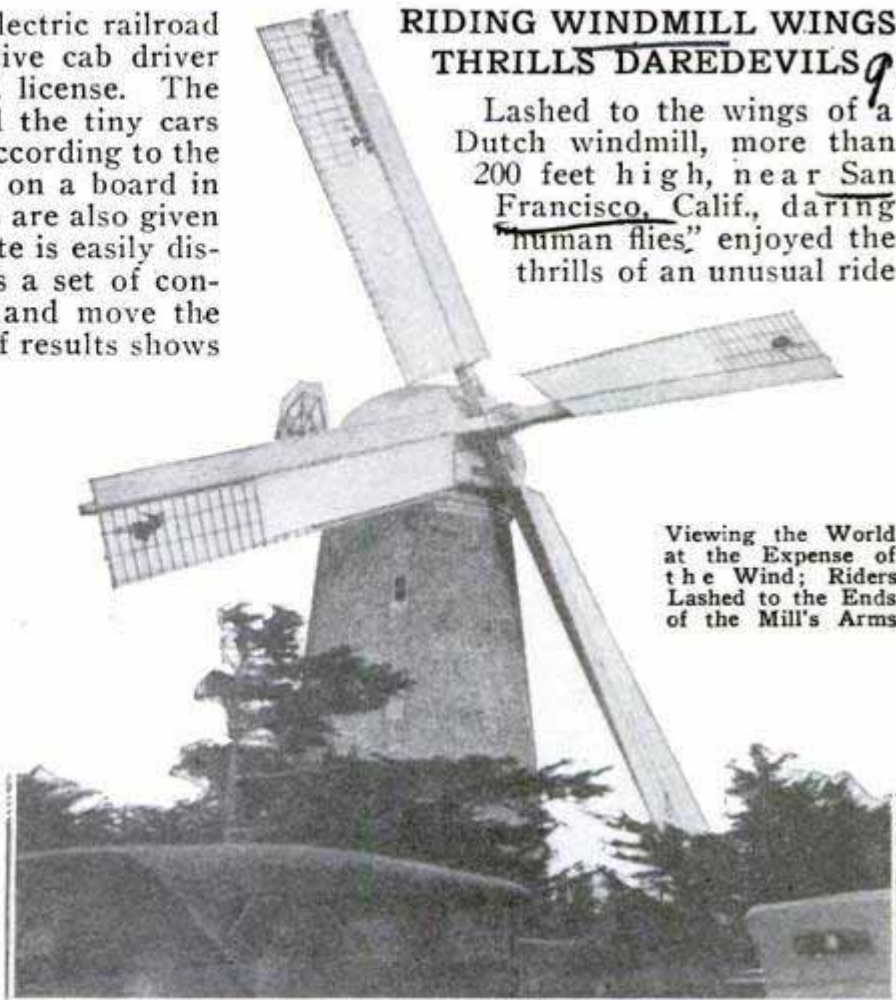
vania makes use of a toy electric railroad to determine if a prospective cab driver is mentally fit to receive a license. The subject is asked to control the tiny cars with hand and foot levers according to the directions of lights flashed on a board in front of him. False signals are also given to determine if the candidate is easily distracted. The examiner has a set of controls to govern the lights and move the cars. Dr. Snow's analysis of results shows that the eight tests he has used provide a means for weeding out the unfit candidate for cab driving. Out of the 12,000 men tested, some fifteen per cent were rejected because of unsatisfactory showing in the mental examinations and tests. But the conclusions were not drawn from the mere paper records made by the candidates. For ten weeks, when the examinations were first started, careful files were kept of the performance both of men who passed the tests and of those who did not,

for at the beginning even men who failed to pass were retained in order that they might be compared to those who received passing marks. In the ten weeks' trial period, twenty-one men who had made unsatisfactory grades in the tests had twenty-six accidents, while 198 who passed creditably had but fifty accidents.

From January 1 to April 30, 1925, after the tests had been used as a basis of hiring drivers, while the company's business showed an increase of thirty-eight per cent over the same time for the previous year, accidents decreased three per cent, although, in 1924, they were twenty-nine per cent more numerous than during a corresponding period in 1923. From March 1 to May 1, 1925, the drivers were divided into two classifications. In one group were newly recruited chauffeurs who had passed the tests satisfactorily. They comprised nine and one-half per cent of all the company's drivers. In the second group were placed the rest of the men, scores of whom had had considerable experience and were known to be competent drivers although they had not been given the tests. In the period observed, the men of the first group had but .5 of an accident per man while those of the second had .8 of an accident each.

*no information available*  
**RIDING WINDMILL WINGS THRILLS DAREDEVILS** *956*

Lashed to the wings of a Dutch windmill, more than 200 feet high, near San Francisco, Calif., daring "human flies" enjoyed the thrills of an unusual ride

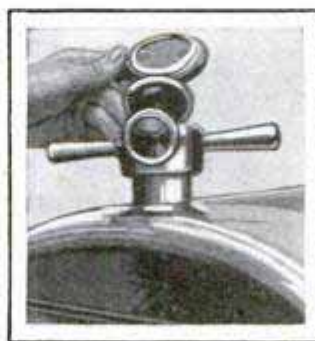


Viewing the World at the Expense of the Wind; Riders Lashed to the Ends of the Mill's Arms

around the huge circle described by the mill's arms. The open latticework on the blades afforded greater security than would have been possible on smooth wings, but the stunt demanded careful balancing. Photographers equipped with motion-picture cameras rode the mill and took views on their topsy-turvy journey.

*Auto*  
**EASILY OPENED RADIATOR CAP HAS HINGED TOP** *898*

Radiator cap and thermometer are combined in a compact unit so adjusted that a quarter turn of a handle loosens the cap



so that it can be thrown back for water. Another quarter turn in the opposite direction secures it again. Since the cap is not removed entirely, there is no danger of its dropping or being lost, the handle keeps the

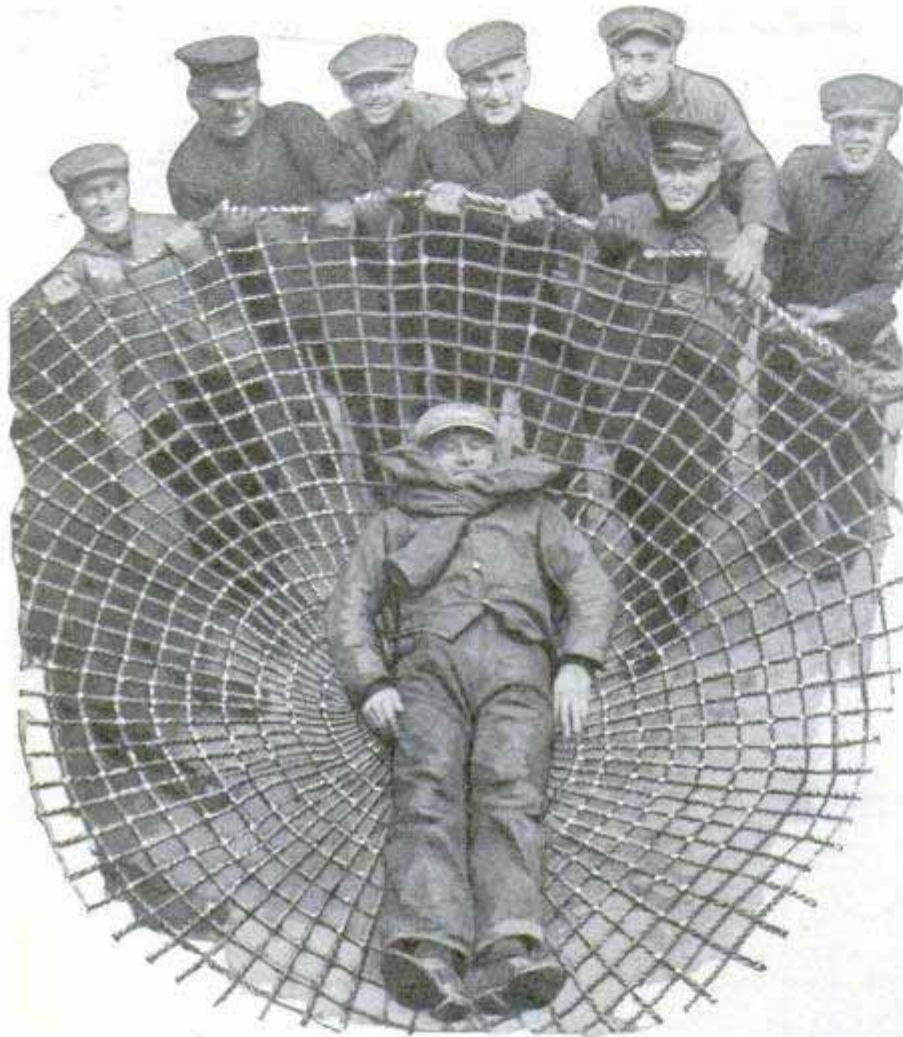
fingers away from steam and hot water, and the thermometer is locked to the cap in such a way that it cannot be taken off without special tools.

*Semaphoric Indicator  
 Sales Co. 1175 Irving Ave.*

## "SPIDER NET" OF WOVEN CORD SAVES LIVES AT FIRES

957 Patterned after a spider's web, a circular net of stout rope, is one of the

Pole. It is believed to lie in the center of a huge ice field and to be more difficult to reach than the North Pole. A primary objective of the undertaking is to open up a trans-Arctic air route for commercial purposes between the continents.



Firemen in Drill with Life Net, a Circular Mesh of Stout Cord with Large Cable on Edge for Tight Grip

pieces of equipment with which Philadelphia firemen drill at their fire school to become efficient in saving lives. The shape of the mesh enables several men to keep a firm grasp on it, and the strands are so arranged that they will yield sufficiently to prevent injury to a falling body.

## SEARCH FOR INACCESSIBLE POLE TO BE MADE BY AIRPLANE

970 Where do the birds go when they keep on flying north? What sort of country lies some 400 miles from the North Pole at 84 degrees north latitude and 160 degrees west longitude? To answer these and other perplexing riddles of the land of ice, an airplane expedition, headed by Capt. George H. Wilkins, is planning to make a 1,900-mile non-stop flight from Point Barrow, Alaska, to Spitzbergen next May, in search of the so-called Inaccessible

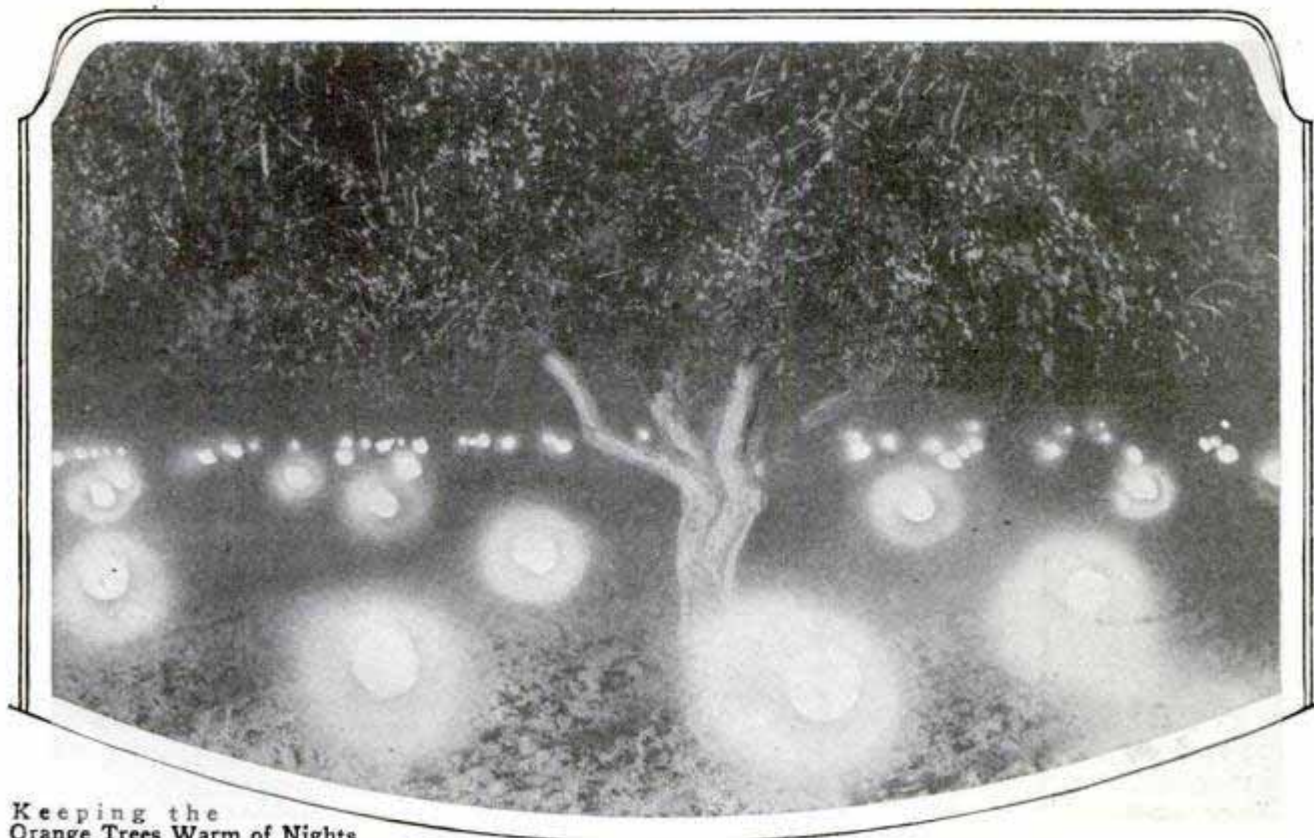
party will greatly aid its success. Capt. Wilkins accompanied Stefansson on his last Arctic trip. Others who have been selected for the expedition are Lieut. Benjamin Nelson, an experienced aviator, and Earl Rossman, an Arctic motion-picture photographer. Lieut. James H. Doolittle, winner of the Schneider cup, and Lieut. John A. Macready, army transcontinental flyer, have been asked to join the party.

## A CORRECTION

921 In the January issue, page forty-three, the statement was made that a moving model of a brontosaurus, as illustrated, had been made for the American Museum of Natural History in New York City. The model was not made for the museum, but is a reproduction of a fossil specimen on display there. It was made by Messmode and Damon, of New York.

Detroit Aviation Society  
American Geographical





Keeping the  
Orange Trees Warm of Nights

## Upper Air to Save the Orange Crop

Unique "Windjammers" Bring Down Warm Currents to Mix with the Cold Air Which Collects on Ground beneath Groves

By N. C. McLOUD, *1717 St. Paul St.  
Baltimore, Md.*

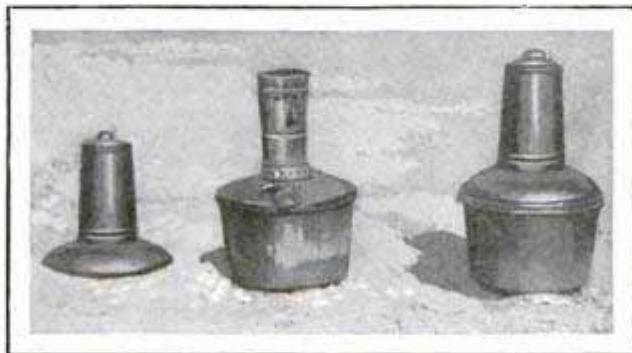
CALIFORNIA fruit growers have learned that it is possible to reach up above the trees and protect their fruit from frost by bringing down the warmer air from above the orchards. To do this they have been working with ingenious machines known as "windjammers," intended to mix the warm air above with the cold layer near the ground. The process has brought interesting results.

This method of orchard protection had its origin in work of the United States weather bureau in demonstrating that there is strong temperature inversion on the average frosty night in southern California, and that the air at the ground is several degrees colder than that above the tree tops. The findings caused inventors to attack the problem of keeping the air well

mixed and preventing its formation in strata.

More than one device along this line failed to meet the tests of actual use. The latest type is said to furnish adequate protection for ten acres. In this outfit there is a pipe of large diameter stretching up into the air for a distance of thirty-five feet. The apparatus uses artificial heat in addition to its function of mixing the layers of air. The pipe starts vertically at a point twenty-five feet from the ground, and is built in the form of an elbow, caus-

ing the upper end to be horizontal. The base is supported by an open framework. Below the lower end of the pipe there is a large oil-burning furnace. An airplane propeller, between furnace and pipe, forces heated air upward and causes it to be dis-



Three Types of Heaters Used in the California Orange Groves to Drive Frost Away

charged toward the tree tops. The warm current thus is sent forth to mix with the air lying above the orchard, to spread a protective wave over the trees.

Another machine is of rather unusual design, which gives it similarity to a Chinese temple. This outfit is built entirely of steel, on a concrete foundation, and equipped with a gasoline motor of 120 horsepower, geared to a vertical shaft. At the summit of the structure, forty feet above ground, is an airplane propeller, connected with the shaft, and revolving at 700 turns to the minute. Operation of the propeller is intended to bring down warm air from above the trees, sending it through the tanklike "barrel" beneath the roof. In this barrel an oil-burning furnace gives added heat to the descending current, and the blast is then directed among the trees. At a point fifty feet from the outlet, the temperature is raised five degrees Fahrenheit without the furnace and eight degrees when the furnace is in operation.

Another form of machine, of simple construction, uses a fifteen-inch galvanized sheet-iron pipe, extending upward for thirty-five feet. Near the base is a forty-

the other forcing it horizontally over the tops of the trees. Small oil burners supply additional heat for the currents. Without the furnaces in operation, the discharged air averages six to seven degrees higher than the outer air at the same elevation. The furnaces increase this difference to thirty-five degrees.

Orchard heating has passed through long evolution. In the first attempts, coal baskets made of large-mesh wire screen were set in the orchards at the rate of forty baskets to the acre. This gave good results, and brought the development of heaters burning oil. The first heaters had low stacks, and these were followed by high-stack outfits which gave better combustion and less smoke. The use of heaters on a large scale, however, creates a serious smoke nuisance, and properly developed windjammers are looked upon as the solution of this problem as well as that of actual protection.

Oil heaters are used also in the cranberry bogs on the Columbia river, where it is not possible to provide frost protection by flooding the bogs as practiced in Wisconsin and New Jersey. With the use of these outfits there is nearly seven



Left, Type of "Windjammer," Which Brings Down Warm Air from Above and Spreads It over the Ground; Right, Another Type That Sends Warm Air above Tree Tops; Both Use Airplane Propellers

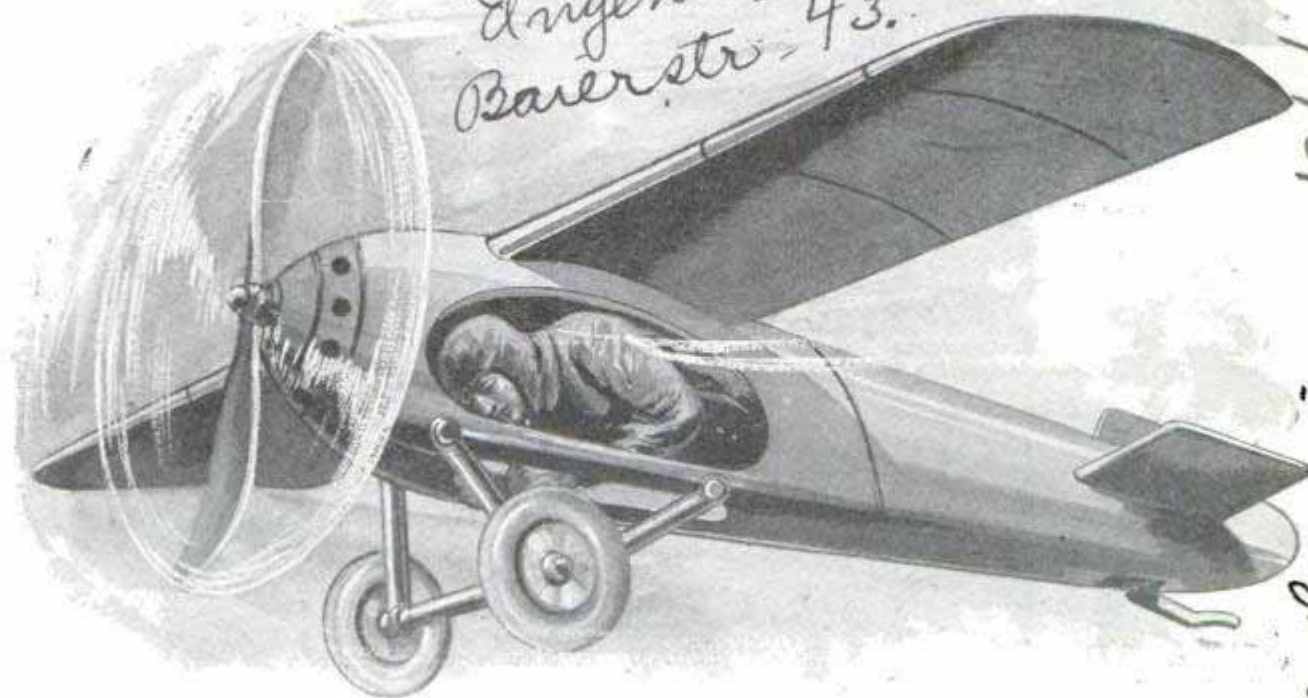
inch centrifugal blower operated by a gasoline motor, to create suction for drawing the warm air from above the tree tops. The descending air is divided between two outlets, one throwing a current downward against the ground, and

degrees increase in the temperature at the surface of the vines.

One of the reasons the flesh of the salmon is red is that it contains a pigment of that color found in sea plants.

from Munich Germany.  
POPULAR MECHANICS

Acetylen - Chromidgas Motor  
Ingenieur Hans  
Bauerstr. 43.



© Henry Miller

Drawing of Midget Plane in Flight, Showing How Pilot Lies in Fuselage and Operates Controls; the Entire Ship with Motor Weighs Only 125 Pounds

### PILOT OF PYGMY AIRPLANE RIDES LYING DOWN 974

To save space, most of the fuselage of a tiny airplane introduced in Germany is devoted to a compartment for the pilot, who lies prone while managing the controls. The motor of the plane develops only four-tenths of one horsepower, and the entire ship, including equipment, weighs but 125 pounds.

### HEALTH CHART HELPS DOCTORS CHECK SPREAD OF DISEASE 972

By means of a carefully tabulated chart showing the number of cases in certain disease epidemics and the rapidity of their increase or decrease, doctors of the Chicago health department are able to forecast, with a fair degree of accuracy, how fast an epidemic will spread and to make preparations for combating it. The chart is compiled from statistics gathered from the reports of a number of years and is arranged in graphic form according to the various health divisions of the city. When an increase of sickness



Health Commissioner Bundesen of Chicago at the Disease-Campaign Map

Dr. Herman Bundesen  
Chicago, Ill.

above normal is discovered, if the ailment is of a contagious nature, extra precautions can be taken at once, more physicians assigned to the afflicted district and other steps taken to stop the epidemic.

### STRAW PRESSED IN BRIQUETTES AS SUBSTITUTE FOR COAL 983

Burning the straw piles on the grain fields just to get rid of the waste will soon be a thing of the past, a Kansas professor predicts, for the material may be pressed into briquettes and used to partly supplant coal. It is first formed into heavy bales by a modified baler and then broken into smaller pieces.

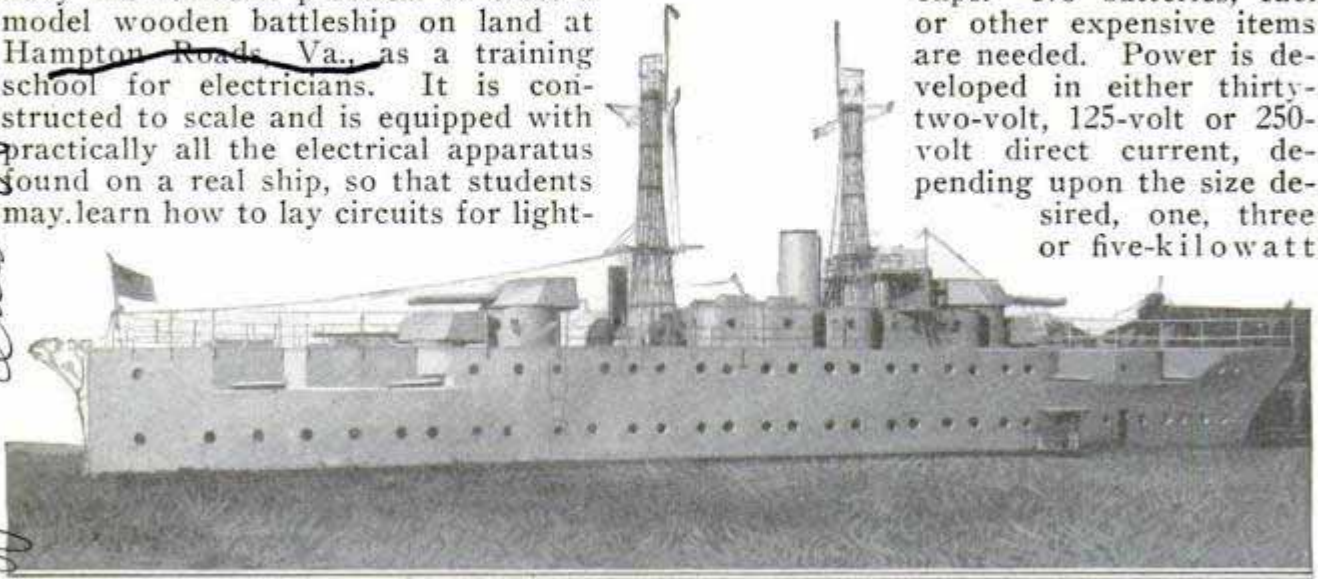
Prof. W. H. Anderson  
Agricultural Engineering Dept.  
Iowa State Agricultural College  
Manhattan, Kans.

**SCHOOL IN BATTLESHIP ON LAND TRAINS NAVY ELECTRICIANS**

Because electrical installations in war vessels are so different from others, the navy has found it practical to erect a model wooden battleship on land at Hampton Roads, Va., as a training school for electricians. It is constructed to scale and is equipped with practically all the electrical apparatus found on a real ship, so that students may learn how to lay circuits for light-

has been devised to meet the needs of the farm or country home. It utilizes power from small streams, is designed to give continuous service and requires practically no attention save to refill the grease cups. No batteries, fuel or other expensive items are needed. Power is developed in either thirty-two-volt, 125-volt or 250-volt direct current, depending upon the size desired, one, three or five-kilowatt

*951 James Duffell & Sons Springfield, Ohio*  
*The Hoopes Water Wheel Co. Springfield, Ohio*



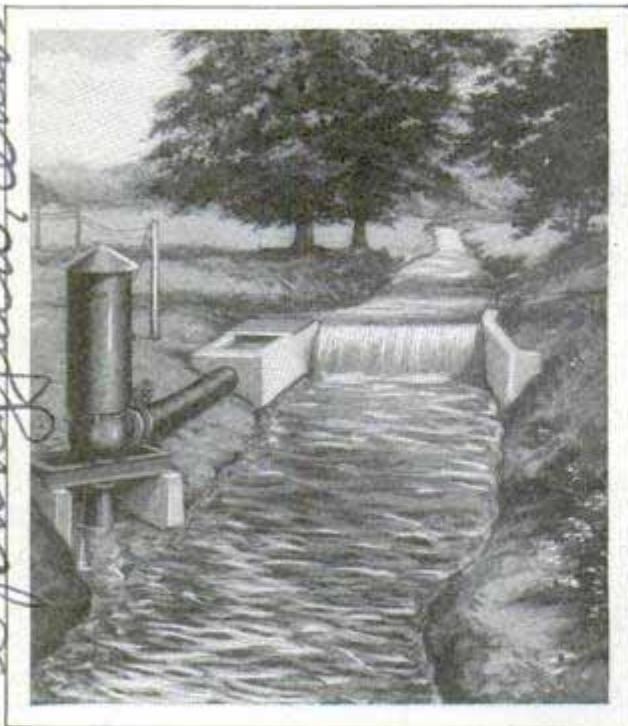
Where Naval Cadets Are Trained to Be Electricians; Model Battleship on Land Contains Classrooms and Affords Actual Practice in Wiring and Installing Intricate Systems Used on Real Ships

ing and ventilating systems, for the turret-training and gun-elevating gear, gun-fire controls and even the searchlights.

**ELECTRIC PLANT FOR FARMS USES SMALL STREAMS**

Completely incased so that a separate power house is not needed, a compact hydroelectric outfit now on the market

capacity. The smallest will light approximately twenty-five forty-watt bulbs or run a one-horsepower electric motor. The next provides sufficient current for seventy-five forty-watt bulbs or a three-horsepower motor, and the largest will light 125 forty-watt bulbs or run a five-horsepower motor. Lamps such as are used in city homes and electric stoves, heaters, irons, toasters, and similar equipment, may be enjoyed on the farm with this power plant, which will also operate small machinery. The generator; instrument board, containing a volt meter, switch and cut-out; turbine rotor and shaft connecting it to the generator, are all protected from the weather in a plate-steel housing. The unit is easily installed and the smallest will operate on as little as a seven-foot head and a flow of 250 cubic feet of water per minute.



Small Hydroelectric Plant for Farm or Country Home Installed at Stream

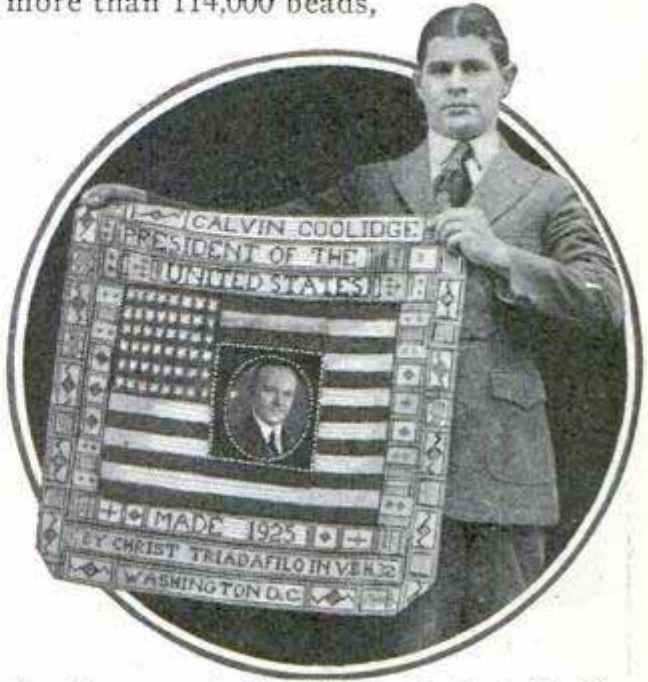
**TRAIN SPEED TO RIVAL PLANE'S WITH ROLLER BEARINGS**

If the public wants speed, the railroads can give it by constructing steel-trussed concrete roadbeds and using roller bearings, according to Frank H. Alfred, president of the Pere Marquette railway. Schedules comparable to those maintained by airplanes can be followed, he predicts, while the superior safety of the railroads will be continued. With the aid of engineers, he has worked out the type of roadbed and bearings, and by their general

*al meeting A. O. A.*

*naval hospital*  
**FRAME FOR PRESIDENT'S PHOTO  
 MADE OF BEADS AND SILK** *94 3*

Containing 2,000 yards of silk thread and more than 114,000 beads,



War Veteran and His Gift to President Coolidge, Elaborate Frame of Beads and Silk

a decorative frame for President Coolidge's photograph has been constructed by a World War veteran and presented to the chief executive. Several hours a day for six months were devoted to weaving the design which includes a replica of the flag, lettering and border figures resembling those of Indian origin.

**CORN WITH FOURTEEN EARS IS  
 DEVELOPED BY BURBANK** *1002*

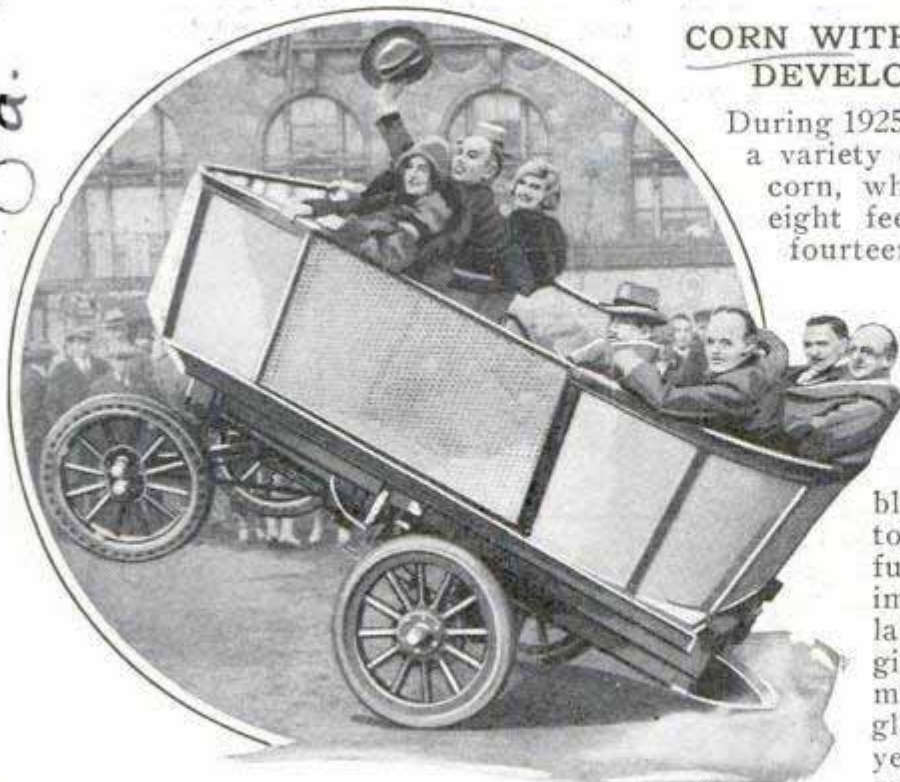
During 1925, Luther Burbank produced a variety of maize from his rainbow corn, which grows to a height of eight feet and has from eight to fourteen ears to a stalk. This is but one of the plant wizard's developments for the year. He announced that he had perfected several major creations and improvements. A new camassia, a striking blue flower; a new species of torch lily that will bloom profusely in cold climates; an improved strain of the popular Shasta daisy; new fluffy giant asters and the development of eighty newly named gladioli are included in the year's accomplishments. He considers 1925 one of his most successful years.

*Luther Burbank Santa Rosa Calif.*

adoption, expects the lines to remain the standard of long-distance transportation. A recent report to the American Railway association showed that several railroad-operating records were established in 1925. The greatest volume of freight traffic was handled; more surplus cars and locomotives were kept in serviceable condition, eliminating delays; the greatest single-month volume of traffic was reached in October with a total of 44,061,988,000 ton-miles; for the week ending August 29, car-loading records were broken with a total of 1,124,436; the average daily movement of all freight cars reached a peak in October with 32.2 miles; less than carload-lot and miscellaneous shipments exceeded, by more than 2,000,000 cars, the record for the previous year; on September 30, 1,090,693 freight cars were moved, the greatest number in history, and the average load of freight per train was 796 tons in August, another high mark.

*Illustration 903*  
**AUTO THAT BUCKS LIKE HORSE  
 LATEST MOTOR THRILLER**

Plunges and turns like those performed by a bucking broncho are duplicated by a specially devised automobile for amusement-park patrons. The front part rises like a rearing horse, while the rear wheels carry the vehicle forward and around in circles. Several persons can ride in it at the same time, and spectators are given thrills as well as the occupants.



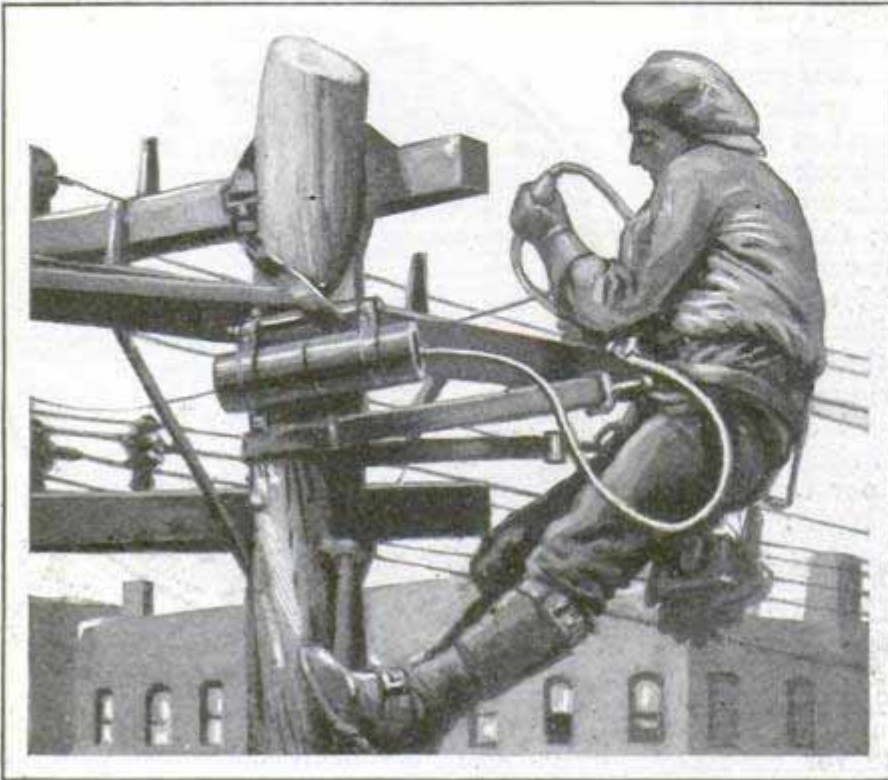
Geared to Buck and Plunge like a Broncho, This Rooney Motor Car Affords Pleasure-Park Patrons Novel Thrills

*At annual convention of national association of Chicago*

*Mr. Traver Engineering Co., Beaver Falls, Pa.*

**PORTABLE TANK FOR SOLDERING SAVES LINEMEN LABOR**

Intended especially for linemen in making repairs, a portable acetylene torch,



Repairing a Break in Line with Portable Welding Outfit; Acetylene Tank Slung on Pole and Special Torch

which can be slung over a crossarm or the top of the pole, quickly heats the soldering iron where the break is to be mended, saving preheating; extra trips and wasted time. An additional advantage is that the flame is not likely to be blown out even on extremely windy days. The torch is shaped to fit the particular needs of the line repairman and is light and easily handled. The special iron that goes with the outfit is attached directly to the gas tank, which is fitted with straps that may be adjusted over the lineman's back.

**FIRE-BOAT NOZZLES ARE USED TO SALVAGE SUNKEN SHIP**

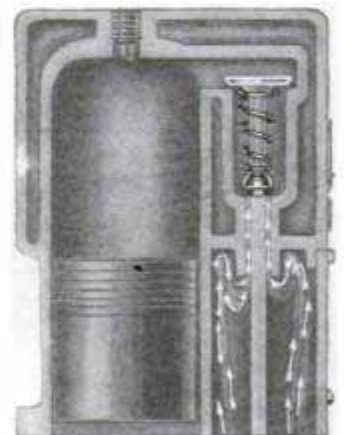
How the monitor nozzles of two fire tugs enabled the British admiralty to raise a sunken ship, after six weeks' effort by other means had failed, has been revealed by Sir Frederic W. Young, famous English salvage officer. The ship had been sunk by a German torpedo in a soft mud bottom. To lift her with her valuable cargo, it was necessary to place thirty-two nine-inch steel cables under the hull, attaching them to winches on pontoons floating on the surface. After six weeks' work, only one wire had been placed un-

der the hull, ten feet back from the bow, the mud defying all efforts to remove it by various means. Finally two fire tugs were requisitioned, their nozzles removed and attached to long six-inch bronze tubes, connected to the fire-boat boilers and lowered to the bottom. The divers guided the nozzles as the high-pressure steam was turned on and literally blew tunnels under the wreck. The entire thirty-two wires were placed in three weeks, and the vessel, weighing 5,200 tons, was successfully lifted by pontoon barges. Sir Frederic also has revealed that the equipment with which the admiralty broke all previous lifting records at sea, consisted of six old 165-foot barges, hastily converted with any sort of parts and equipment which could be picked up without interfering with urgent war work in the shipyards, a circumstance to which he attributes

their success. "If time had permitted," he said, "the vessels would no doubt have been elaborately altered to preconceived conditions, and much of their efficiency would have been destroyed."

**VALVE PACKING IN AUTO MOTOR REDUCES POWER LOSS**

Attached to the valve stems of the automobile engine, a special packing has been devised to seal the intake chamber, thus preventing air leaks and dilution of the mixture from the carburetor. It is intended to afford maximum power from each cylinder, decreasing cold weather troubles, and is said to last for 10,000 miles. The packing is held in place by a spring adjusted between the underside of the valve head and a cup which fits over the sealing material.



Lindblom Auto Part Co.  
2047 N. 6th St.

Chicago - 122 S. Michigan Ave  
927  
Before & restore of marine engineers at Olympia, England  
35

# Keeping the Circus in Motion



By EARL CHAPIN MAY, *Sharon, Conn*

YOU are awakened at peep of day by that unmistakable rumble of steel-hubbed circus wagons. You tumble out of bed and into your clothes. If you are lucky, you reach the railway yards in time to see the last of the hooded cages roll down the inclined "runs" from the gaudily painted circus "flats."

You trail this last cage, drawn by a team of dappled grays, to the circus grounds. There you may help erect the white tents, place the circus seats, water the elephants and in other ways prepare for the show which has been heralded by the billboards. You emerge about ten o'clock at night from the brilliantly lighted big top and stumble through deep darkness to home and bed, dog-tired. And on the following morning there is nothing left of one glorious day but fragrant memories and a few bits of rubbish where once the magic city stood. Circus day has come and gone!

"I wonder where they went from here," you remark. This is merely the echo of a question levied all the preceding day by hundreds of other "towners." No matter where a circus man goes he meets that constant query, "Where do you go from here?" It is an old question to the circus

man before his tenting season opens. For winter and summer he is asking himself, "Where do we go from here?" This question is prompted by the circus man's necessity for moving his amusement factory into a new cash market 150 times or more each season.

Motion is the essential characteristic of a circus. With the exception of a few big cities, such as New York, Chicago, San Francisco and Los Angeles, the "one-day stand" is the rule of the road with the fifteen bona-fide circuses attended by 12,000,000 Americans each year. To the townier who watches, with amazement, the smooth functioning of a traveling circus, the daily routine of setting up and tearing down is a thing to wonder at. But the circus man knows that his biggest problem is the problem of finding a market—of "routing the show into the money." "Any boob can run a circus; the trick is to know where to put it," old circus men say.

The circus that visits your town this season may have a cash replacement value of anywhere from \$200,000 to \$2,000,000. A twenty-car, three-ringed affair, is worth \$300,000 "on the rails." It costs \$3,800 a day to keep it in motion. The annual cost

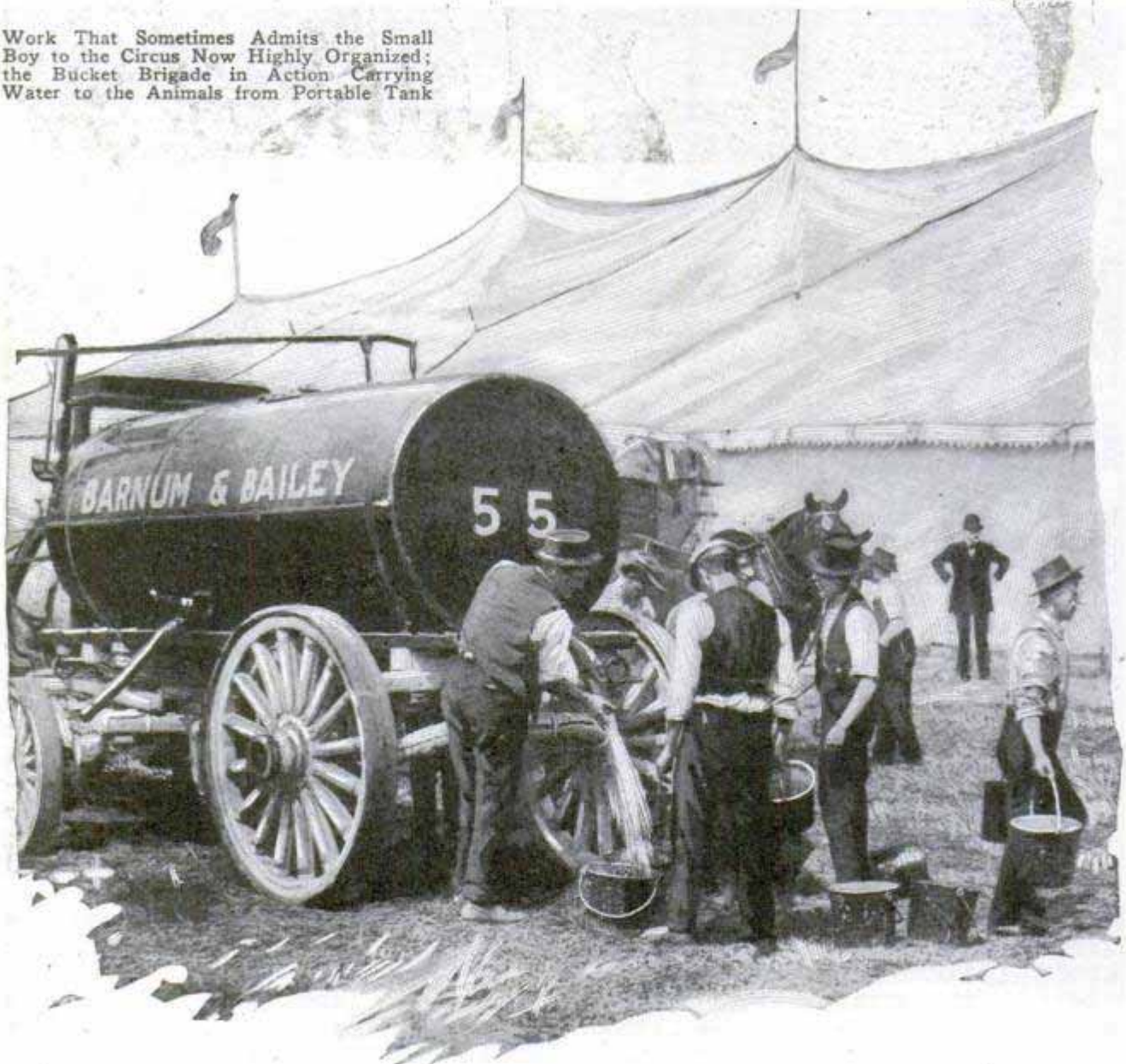
of repairs, replacements and winter up-keep is about half of the cash replacement value. So, such a circus must not only maintain an average daily income of \$3,800 per day from April 1 to December 1—the length of its tenting season—it must also show a profit of at least \$150,000 during the season in order to break even. To accomplish this feat in tented-world finance, it must and does travel about 12,000 miles each season.

This yearly accomplishment is comparable to that which the owners of a candy factory employing 400 people would perform, if they erected their factory in a new town each morning, made and sold, for cash and locally, from \$3,800 to \$7,000 worth of candy before ten o'clock that night, then tore the factory down, loaded it on railroad cars, moved it from twenty-five to 250 miles that night and repeated that process for five months without pausing more than twelve hours in a town or

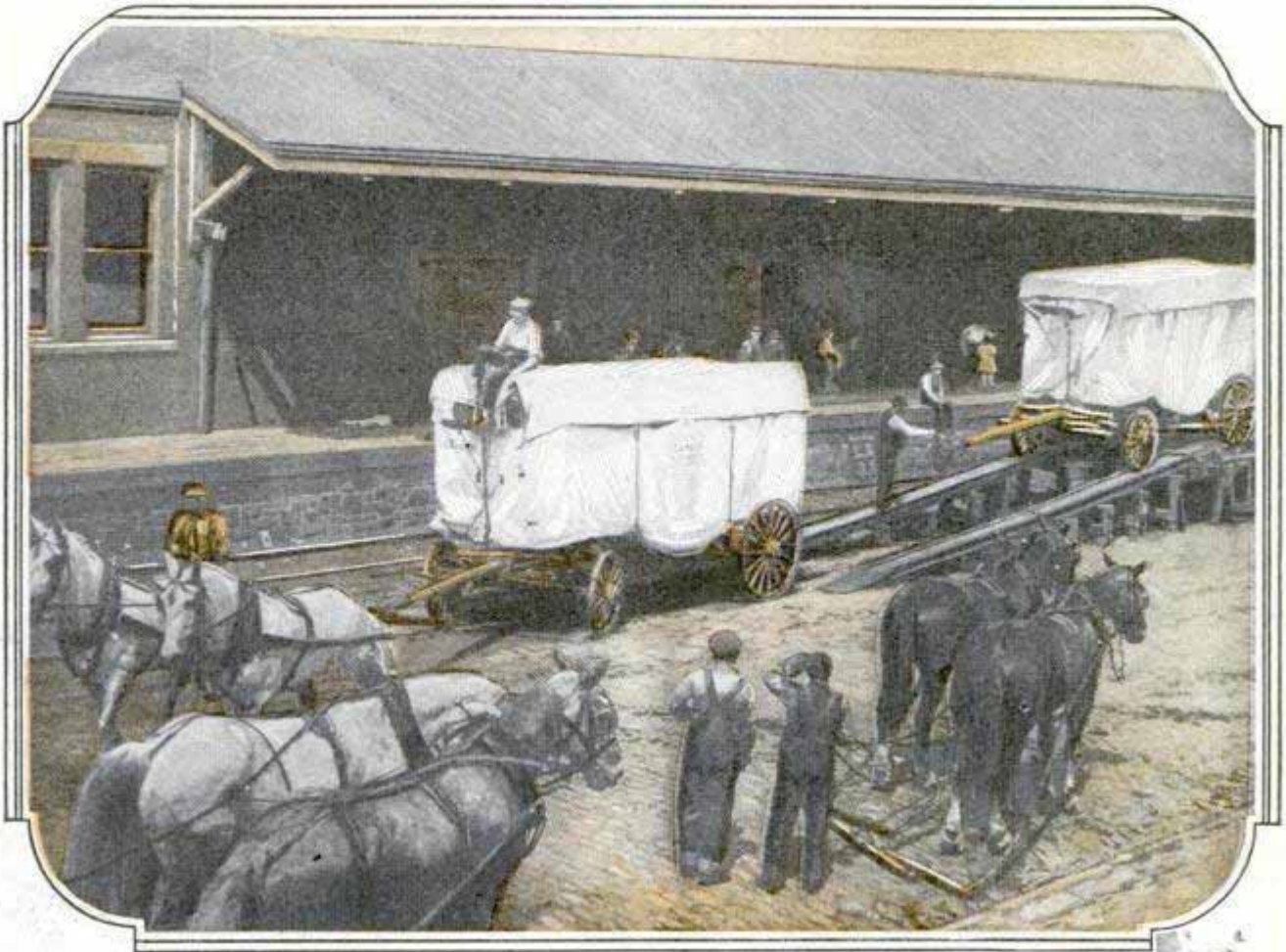
"stand," Sundays excepted. When a circus comes into winter quarters about December 1, the owner knows pretty well where it will go during the next year. And he builds his next circus in accordance with that information. The size and character of any circus are determined by the territory through which it is to travel. And the territory is determined largely by trade conditions. The circus man gets this vital information from banks, railroads, commercial agencies and crop reports, but in the last analysis he depends upon the "dope" sent him by local bill-posters or other tipsters.

The memory of a successful circus man on trade conditions is prodigious. He knows the population and character of every town of more than 2,000 in the United States and Canada. Moreover, he knows the population of each county in which those towns are located, the amount of circus license required, the character

Work That Sometimes Admits the Small Boy to the Circus Now Highly Organized; the Bucket Brigade in Action Carrying Water to the Animals from Portable Tank





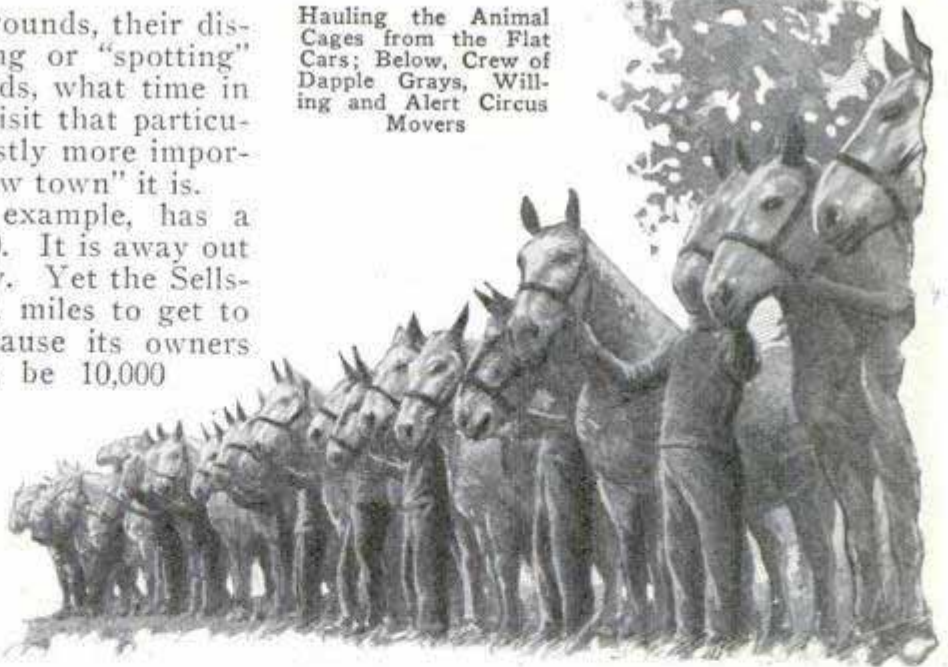


and cost of the circus grounds, their distance from the unloading or "spotting" point in the railroad yards, what time in the year is the best to visit that particular town and, what is vastly more important, what kind of a "show town" it is.

Plainview, Tex., for example, has a population of about 4,000. It is away out in the Panhandle country. Yet the Sells-Floto circus traveled 281 miles to get to that town last fall, because its owners knew that there would be 10,000 persons in town, if weather and crop conditions were fair, to see their circus. But a New England town of 4,000 can rarely be counted on for more than 2,000 circus patrons. The Sparks circus played Yazoo City, Cleveland,

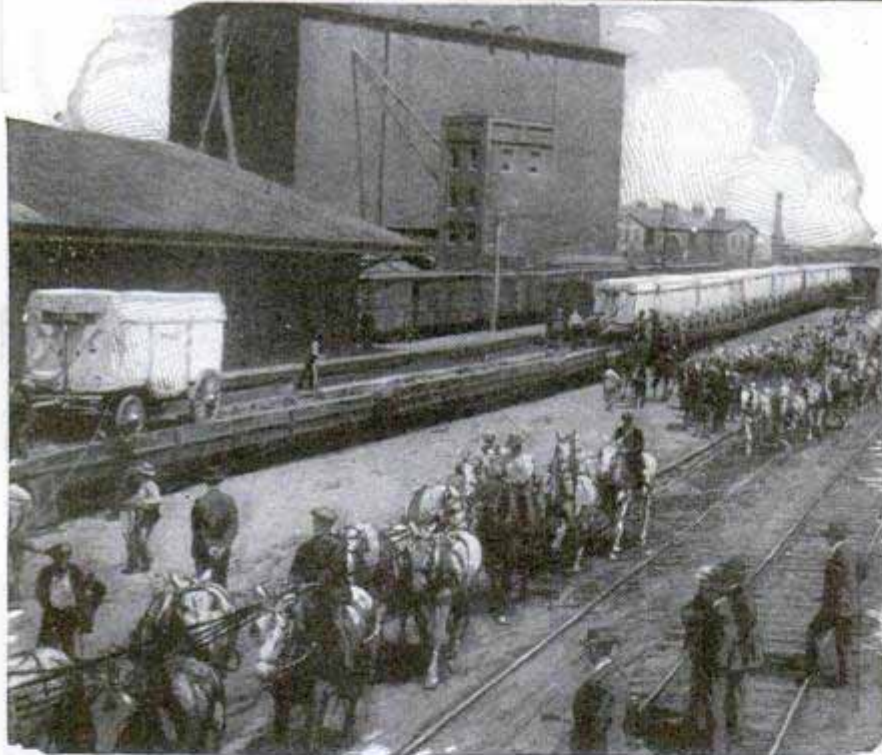
Okolona and other Mississippi towns of from 2,000 to 3,000 population last October, but "cleaned up" in each town, because there was a bumper cotton crop. I have known the Ringling Brothers and Barnum & Bailey combined shows to play to 25,000 people in such towns as Fairmont, Minn., Concordia, Kans., and Norfolk, Nebr., because they knew that

Hauling the Animal Cages from the Flat Cars; Below, Crew of Dapple Grays, Willing and Alert Circus Movers



crops were good, the towns show-hungry and that, if they came into these towns just after the wheat harvest, there would be four times as many circus fans in the big top as there were citizens in each town.

There is a tradition in the circus business that either John or Charles Ringling can, while traveling through the country at night, stick a hand out of a Pullman



Assembling the Cages at the Show Grounds, and Work Horses Leaving the Railroad Freight Yards; Train of Cages at Left

window and tell what town they are approaching "just by the feel of the air." They know every blessed angle and corner of this fair land, do these circus people. But what is more, they know the history of each of the myriad towns which they may want to visit or avoid. This marvelous acquaintance with trade history and possibilities was illustrated to me one day last spring by Charlie Sparks.

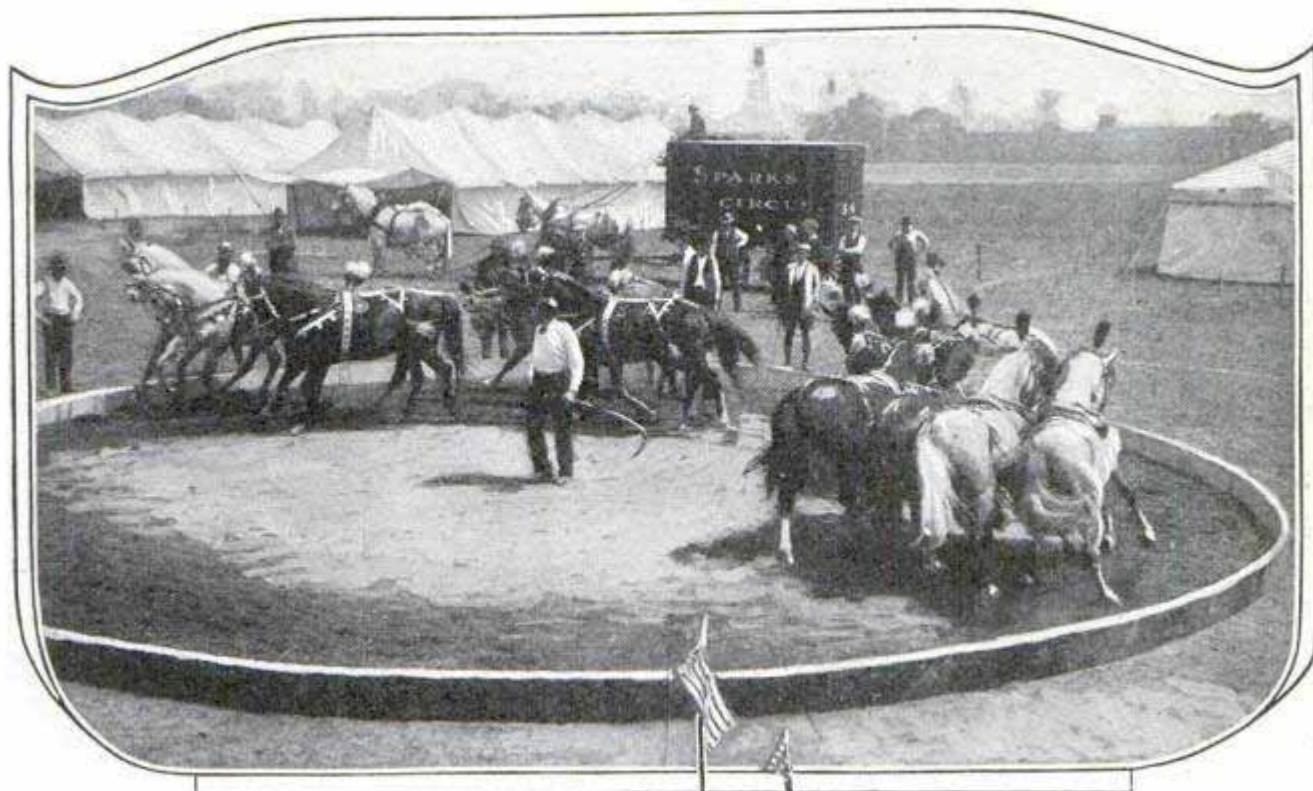
We were standing at his canvas front door on the circus lot at Jackson Heights, Long Island. It was in early May. My

own town, Rochelle, Ill., was circus-hungry. It had not been visited by a circus for many years. It was and is a very prosperous town of 4,000 population, with a number of good factories and in a rich corn and oats section. The chamber of commerce had asked me if I could not get a good circus to visit Rochelle. So I put it up to my friend Charlie.

"Why don't you make Rochelle in July?" I asked him. I mentioned July because Illinois and other corn-belt towns are at their circus-best just after the corn has been "laid by" and the farmers have time to come to town. Without hesitating a moment, Sparks

replied, "No chance. The Gollmar show played Rochelle to only \$2,800 eight years ago. My nut is \$3,800."

I asked him about twenty other towns in various parts of the country. He reeled off facts and figures about them with equal ease and rapidity. If the average sales manager for any big manufacturing concern knew as much about territory as does the average circus owner—who is both production and sales manager—there would be fewer failures in American business.



But the circus man has to know a lot more than merely trade facts, figures and history. He has to know whether the railroads will carry his circus into desirable territory at the proper times. The Florida east coast is a rich territory late in the fall. But nearly every fall the East Coast railway places an embargo on circuses. It has too much passenger and fruit business to handle.

Having decided in January upon the coming season's territory, a tentative route is laid out. After that, the program covering transportation is about as follows: Railroad contracts for the various movements from town to town are signed about three months in advance of the desired movements. About three weeks before the circus is to exhibit in Jonesville, Va., the "bill car," loaded with thirty billposters, banner tackers, programmers, lithographers and press agents, arrives in Jonesville and bedecks town and countryside for twenty miles around. The bill car is followed by a "box brigade" of five or six men, who travel by rail or motor car, usually by rail, to patch up after the bill car, especially if any opposition circus has been "covering paper." Anywhere



Above, Springtime Rehearsal of an Act to Entertain the Thousands Who Will Crowd the Big Top Later in Summer

from ten days to two months ahead of this box brigade, the contracting agent has arranged for circus license, circus grounds, meat, bread, hay and a dozen other essentials. One day ahead of the circus the "twenty-four-hour man" checks up on all these contracts, to be sure there will be no hitch in the proceedings.

If all's well with the world and the show has not been stuck in the mud of a pre-

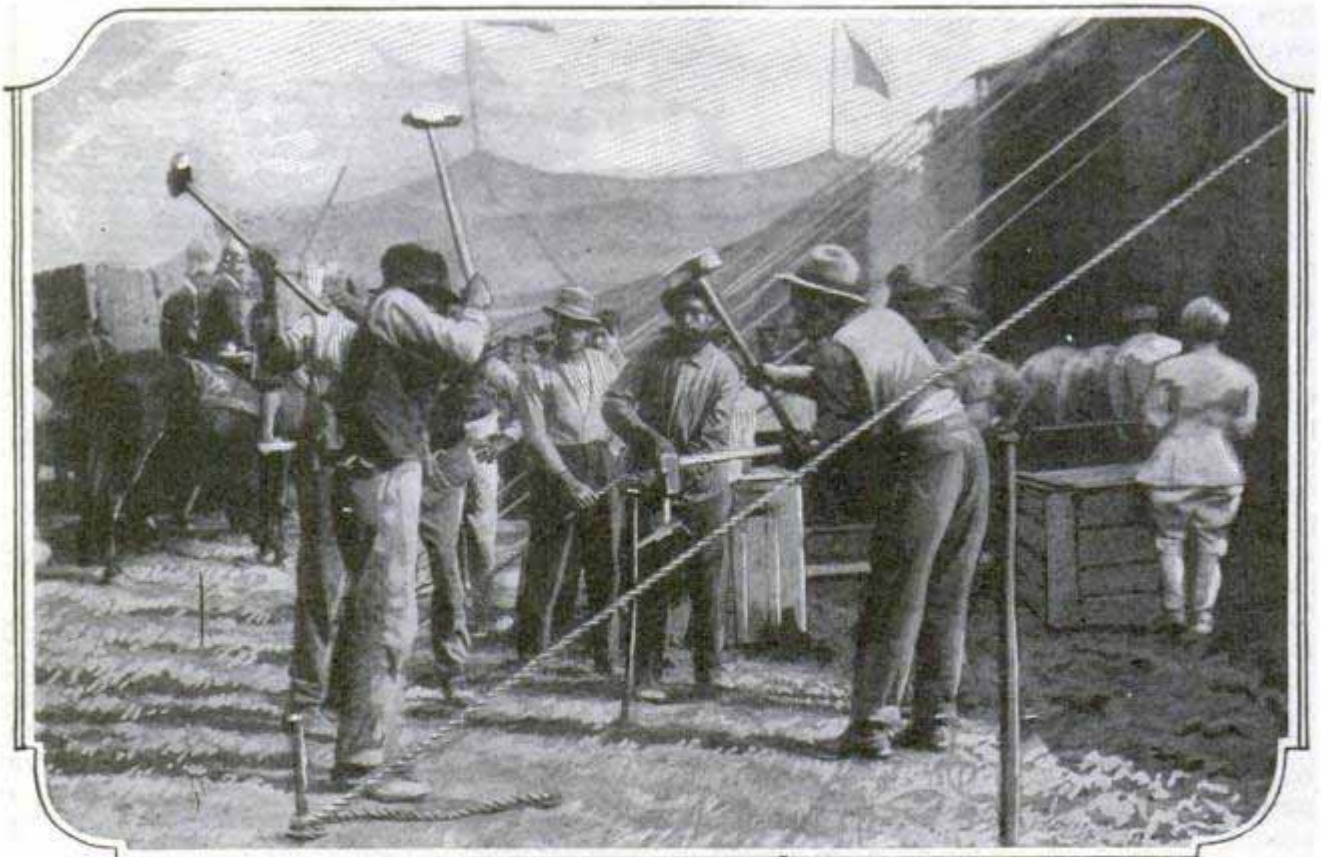
vious day, or has not been wrecked on the road between towns, it rolls into Jonesville about four in the morning. Ten minutes later, it is "spotted" at a convenient crossing arranged for by the twenty-four-hour man. That worthy leads the "stake-and-chain" gang to the circus grounds. This gang lays out the plot by some mysterious method of surveying, marking each stake and center-pole location with an iron pin to which is attached a bit of red flannel, known as "the flag."

Twenty minutes after the stake-and-chain gang has left the circus train, the railroad runs are down, and the first wagon—the cookhouse or commissary wagon—is rolling toward the circus grounds. In an hour, all the wagons are off the flats, all the human beings and live stock unloaded and the big tops and smaller tops are rising. By ten o'clock the parade is on its way downtown. By one-thirty the last of the blue seats are in place. By two-fifteen the afternoon performance is on. By four-thirty the afternoon concert or "after show" is over. By five-thirty dinner is concluded, and the last husky hustles out just as the "flag comes down," indicating that meals are over for that day. By six-thirty the cookhouse and stables are on the way to the railroad yards. By nine p.m. the menagerie and

sideshow tents are "torn down" and loaded. By ten-fifteen the night show is over. By midnight every bit of the circus property has left the circus lot. By one a.m. the circus train is loaded and on its way.

And so it goes day by day. It is motion, motion, motion—provided the elements do not interfere. Weather is the one thing no circus man can figure on with certainty. He can, if he must, switch his circus route, on one week's notice, although such a switch is vastly expensive. But he cannot guess effectively on the weather. That is his one big bet. Last season the Sparks circus played to weeks of unbroken heat in Oklahoma and Kansas, heat so prolonged and intense that it was finally found necessary to do an almost unprecedented thing—wet down the canvas to keep it from dryrotting. Then the show ran into weeks of cloudbursts, so tremendous that many a night show was lost in the southern Mississippi valley. For twelve days all hands stayed on the lot and helped pry the show out of the mud.

The thing that keeps a showman in the show business is the thing that put the covered wagon across the western prairies. It is the fascination in wondering what lies beyond the horizon—the constant search for the pot of gold at the rainbow's end.



Motor-Driven Hammers Pound the Pegs for Some Shows, but the Skilled Sledge Gang Is Still to Be Seen, an Important Unit When the Circus Moves

*Handwritten:* 12/16/25. Brooklyn Daily Eagle

*Handwritten:* Plaster Co. H. Clark

### POPULAR MECHANICS THRILLS OF INDIAN WAR DAYS RECALLED BY MILES' RELICS

### FOOT-POWER VEGETABLE TIER SAVES TIME AND LABOR

Rifles used by Indian chiefs, war bonnets, and clubs as well as peace pipes are included in a valuable collection of relics gathered by the late Lieut. Gen. Nelson A. Miles, which have now been housed in the Museum of the American Indian, Heye Foundation, in New York. The articles recall many stirring and important events in American history and are considered especially valuable to writers, research-workers and scholars as sources of reference. Among the five rifles is the one carried by Joseph, chief of the Nez Perce tribe, who surrendered to Miles in 1877 after a masterly retreat. When the chief handed the weapon to his victor, he said, "From where the sun now stands, I fight no more against the white man." Another rifle was taken from Geronimo, an Apache leader who waged war for several years against settlers in Arizona and northern Mexico. The rifles carried by Chief Rain in the Face, Chief Lane Deer, a Sioux who attempted to kill Gen. Miles but missed and slew a soldier standing near by, and one that belonged to Sitting Bull, who was routed by Gen. Miles in the battle of the Little Big Horn, complete the collection. Other relics include an Arapahoe shield painted with characteristic figures, a drum, bows and arrows and a flute employed by the youth of the Sioux tribe in their woping.

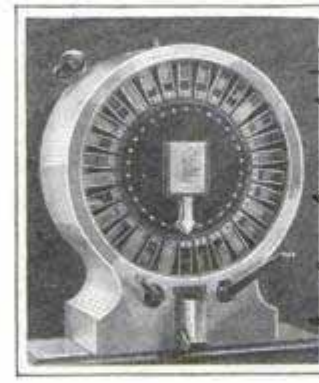
Bunches of vegetables or flowers are quickly and securely tied in a simple outfit operated by a foot lever while the user remains seated. It automatically adjusts itself to bundles from one-fourth to five inches in diameter, and saves



Harvesting Vegetables in Adjustable Press Which Binds Them Securely and Ties Knots

### COIN-IN-SLOT MACHINE HOLDS THIRTY DIFFERENT THINGS

Thirty different articles are dispensed from a slot machine now on the market which is easily operated and automatically rejects imitation coins, slugs or other foreign pieces. It has a large glass-covered face, resembling that of a clock. By moving an arrow indicator opposite the space which holds the object the purchaser desires, dropping the coin in a slot and pressing a lever, the merchandise falls into a cup at the bottom. A list of the contents of the venter is attached to the face. The machine is loaded from the rear, articles being placed in small packages for easy dispensing.



cutting string or tying knots by hand. The operation of the lever makes the cord fast to the bunch, which is inserted against a support on a tablelike rack at the top of the apparatus. The levers move in bronze bearings, adding to the ease of operation and life of the outfit.

### MEALS SERVED IN MOTOR BUS ON LONG-DISTANCE RUN

Passengers of a motor-bus line from Los Angeles to San Francisco are served with luncheon from a compact kitchen built as part of the vehicle. A button on the side of each chair summons the steward who takes orders for either hot or cold dishes. The bus also has a special compartment for women, another for smoking and a third for the driver. The entire rear panel of the smokers' room is a plate-glass window which permits an unobstructed view of the scenery. Washroom space is also provided.

Six months is said to be the average life of a dollar bill.

*Vertical handwritten:* Also see Paper, 1925-570

*Vertical handwritten:* 887... 961... 947

*Vertical handwritten:* Machine... 1194-14th St. P... Arrow Chassis

*Handwritten:* Jeffries Automatic Service Co. 727

Cologne, Germany

### SHOP WINDOWS SET AT ANGLES AFFORD BETTER DISPLAY

So that prospective buyers may view the goods from the side as well as from the front and to increase display space,

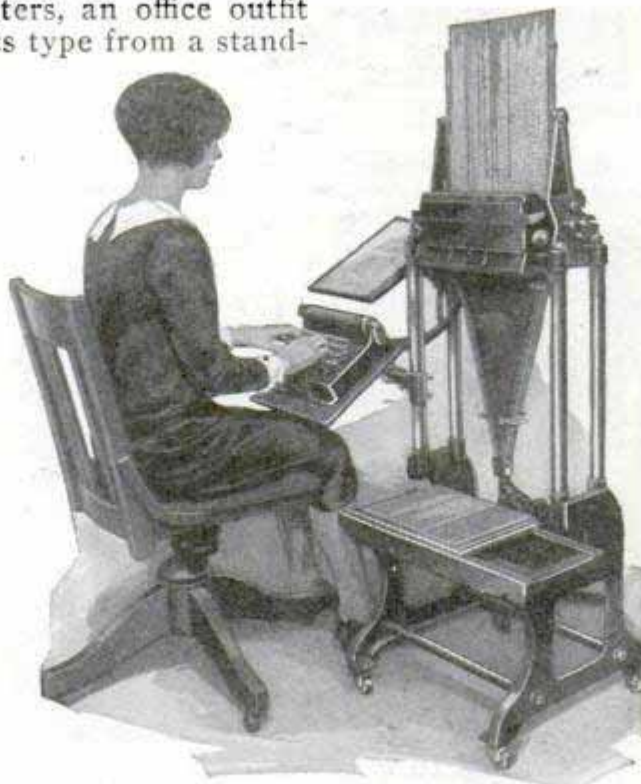


How a German Shop Keeper Has Obtained Extra Show Space; Windows Are Set at Angles, Giving Better View of Goods

a German merchant has constructed his show windows in triangular units. The plan gives a store in the middle of a block something of the advantage of a corner location—show room on two sides.

### TYPE-SETTING MACHINE SAVES TIME IN COPYING LETTERS

For duplicating letters, an office outfit that automatically sets type from a standard keyboard, is said to reduce the time required for preparing the copy from about two hours to five minutes. To accompany this machine, a distributor has been devised which sorts the type back into the proper compartments of the holder. The setter is about four feet high, two and one-half feet wide and sixteen inches deep. Set-ups are made directly into the drum of a standard duplicating device or into flat chases suitable for use on presses.



As Keyboard Is Operated, Type Falls into Forms at Bottom, Nearly Ready for the Presses

Letters or other documents are copied from the original just as they would be duplicated on a typewriter, and when the distributor is operated after the impressions have been made, defective or worn type is separated and discarded automatically, so that at no time in the process of preparing the forms or resorting is it necessary to handle the individual characters.

### FORTY-FOUR ROADS HAVE AUTOMATIC TRAIN CONTROL

With his arms folded, a locomotive engineer recently allowed his train to go past a danger signal at full speed. But no crash followed, for a safety control automatically applied the brakes, bringing the express to a halt. The demonstration was but one of many similar tests that have proved the effectiveness of various safety systems, which are now installed over more than 7,000 miles of track on forty-four of the leading railroads of the country. Such equipment eventually will be universal. An order of the Interstate Commerce commission directing that the work

be completed by Jan. 1, 1925, was extended because of the great cost involved. The total expense, it is estimated, will reach hundreds of millions. There are some thirteen distinct systems of train control, but all are aimed at the removal of the human element of error, reducing the danger of collisions and permitting trains to run with less headway, which will allow increased tonnage over given mileages without increased risks. Most of the installations are simpler than might be sup-

923

946. *Real Estate*  
*makers of control*  
*roads or*  
*no information on roads*

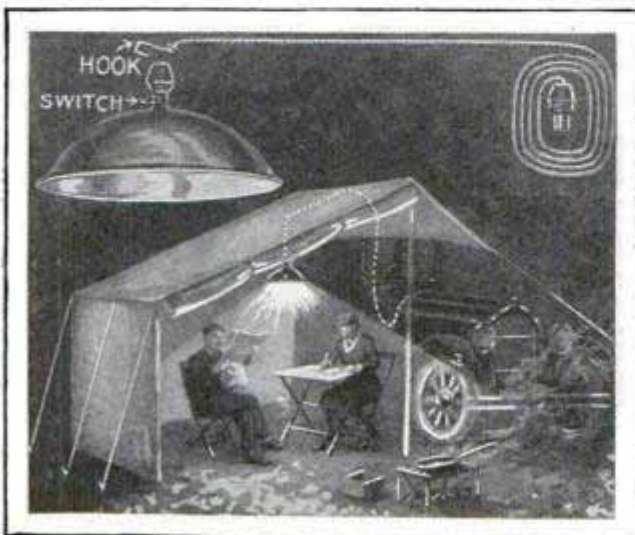
*Laboratory*  
*429 E Third*  
*Development Co.*  
*St. Louis, Mo.*  
*Rayton Engineering*  
*Manufacturing*

*N.Y. Times*  
*12/2/25*

posed. They make use of the tracks, signal systems and pneumatic devices already in operation. Briefly, the service of the automatic train control is to pick up the danger signal from the tracks and then operate the brakes independently of the engineer. The train may be stopped gradually or suddenly depending upon the nature of the trouble. In addition, the equipment gives the engineer a warning inside the cab in the form of three separate signals, either by lights or whistles. The first indicates that there is trouble, perhaps a mile ahead. The second tells that danger lies in the second block beyond and that the speed of the train should be reduced. The third means that the danger is immediate, probably within 2,000 feet or less, and that the train should be halted at once. If the engineer fails to regard the second signal, the automatic apparatus reduces the train's speed or halts it when the third signal is reached. If a train stops ahead, the fact is instantly relayed back to a locomotive cab as far as a mile behind. When a bridge washes out or tracks are destroyed, breaking of the circuit gives the warning.

**TENT LAMP FOR AUTO TOURISTS,  
ALSO LIGHTS GARAGE 934.**

As a substitute for candles or lanterns, an extension electric light for the automobile tourist is easily attached to the car, affords sufficient illumination for reading or writing in the tent and can also be used as an emergency garage or trouble lamp. The equipment includes ten feet of wire cable, a six-volt, four-candlepower bulb and a double or single-contact plug for socket insertion. A switch is provided at the base of the lamp, which is finished in black enamel or nickel.



Extension Electric Light from Auto in Tent, and Detail of Shade, Switch and Cord

**FIRE EXTINGUISHER IN SLING  
— IS CARRIED ON BACK 924**

Equipped with a cradlelike holder, a portable fire extinguisher introduced in Germany can be strapped to the back or



With Fire Extinguisher Slung on Back, Hands Are Free for Carrying Other Tools

released in a few seconds. When it is taken out of its harness, it is in a position for immediate use.

**"EYE" FOR ARMY TANKS GUARDS  
DRIVER AGAINST GAS 918**

Greater safety for the operators and increased effectiveness of the army tank are seen as a result of an attachment tested at the Aberdeen proving ground. It consists principally of a stylus connected to the mechanism in such a way that every turn of the tank is indicated on a scale map of the territory being traversed. Thus, the drivers would not have to expose themselves to get their bearings by day or night and would not be so likely to suffer from gas attacks as they would be tightly inclosed in the tank. The stylus is controlled by a gyroscopic compass, mounted on the rear, and is geared to the tank so that its rate of travel across the scale map coincides with the actual rate of the machine.

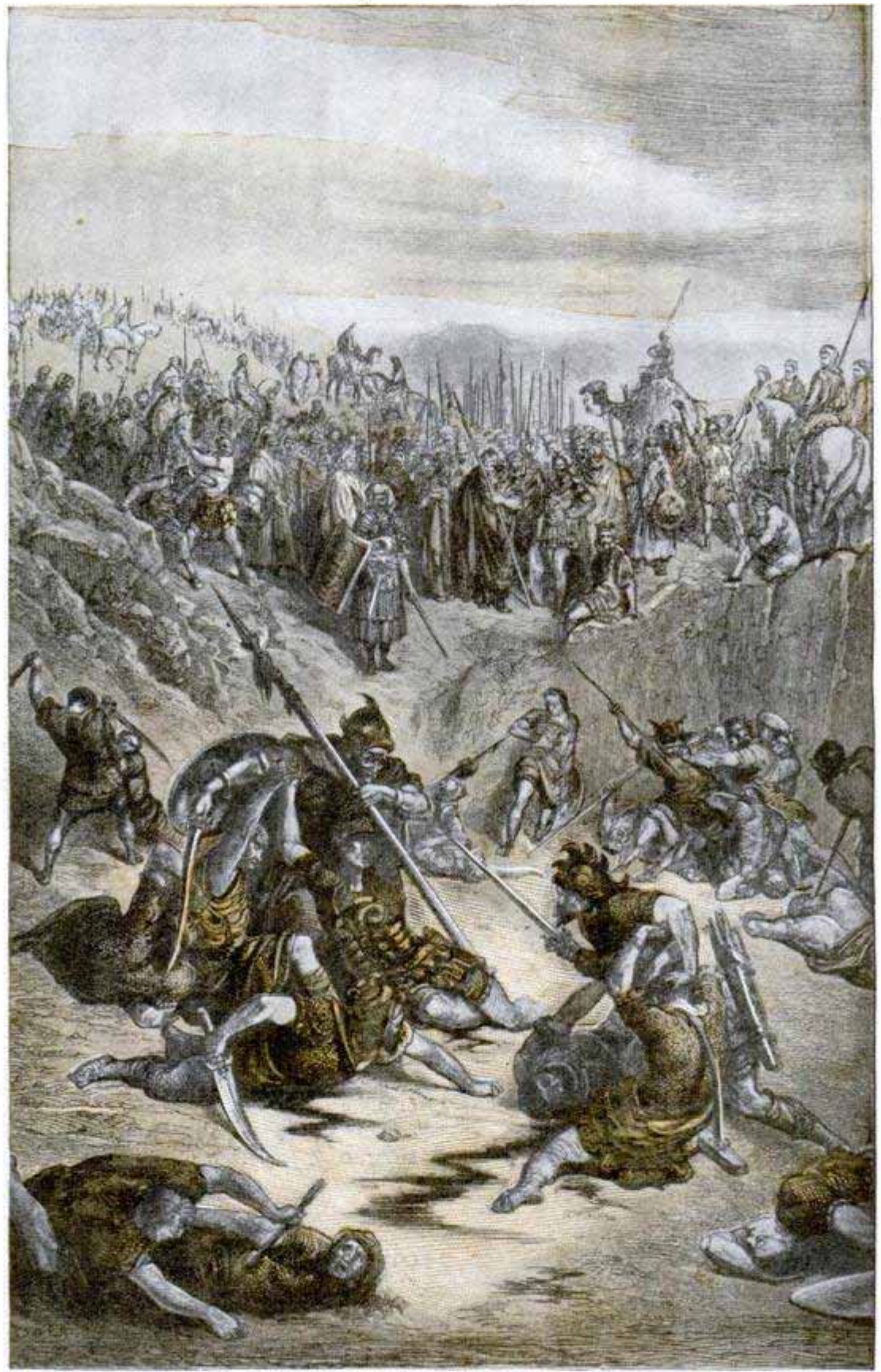
Less than twenty-five per cent of the farm land of Texas is under cultivation.

*J. A. Smith Mfg. Co.*

*New York World 12/10/25*

*W. B. Rochester N.Y.*

747  
396



The Battle between the Champions of David and Saul's Son Isboseth, One of the Events Growing Out of the Suicide of Saul after His Defeat by the Philistines, as Pictured by Dore



# Find Temple Dating Back to Days of Abraham

**A** DISCOVERY which promises to be as important to Bible scholars as King Tut's tomb was to Egyptologists, has been uncovered in Palestine by an expedition from the University of Pennsylvania. The house of Ashtaroth, where King Saul's battle arr... was hung by the Philistines after his defeat, and the wall on which they exhibited his body, as described in I Samuel and Chronicles, has been found at Beisan in Palestine, the site of Beth-Shan or "House of Security" of the Bible.

The ruins of the temple, fifty by seventy-five feet in size, are important, but of still more interest is the discovery of two ancient cornerstone deposits, pottery jars containing a wealth of ingots, rings and jewelry made of pure gold, or gold and silver mixed. Aside from their archaeological worth, the finds in the two cornerstones of the temple were so numerous as to have considerable intrinsic value.

The ruins of the ancient wall of Beth-Shan, uncovered with the temple, still bear traces of fire, presumably the conflagration with which the Israelites wiped out the city when they came to avenge Saul's death and recapture his body. The first book of Samuel, after telling how Saul's army had been defeated by the Philistines and how he finally fell upon his sword and killed himself to escape capture, relates that the victors, on the following day, visited the battlefield to strip the slain, and found the bodies of Saul, his three sons and the king's armor bearer where they fell.

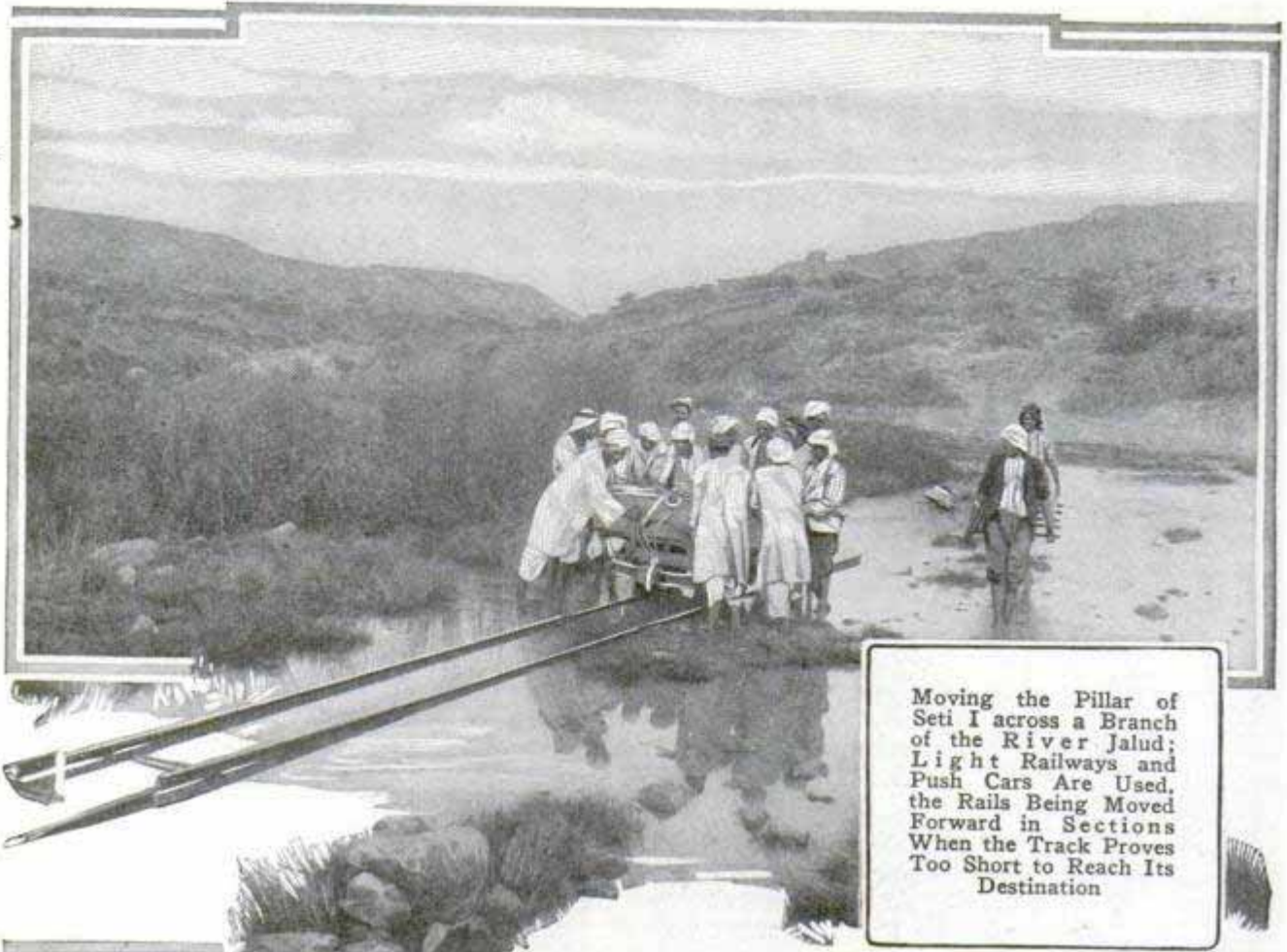
"And they cut off his head, and stripped off his armour," the account continues, adding, "And they put his armour in the house of Ashtaroth and they fastened his body to the wall of Beth-Shan."

To find the ancient ruins, the explorers dug down through layer after layer of earlier civilizations, and having reached the time of the Bible, discovered that still older layers lie beneath, for Beth-Shan is one of the earliest settlements in the world. The top layer was the debris of the Arab civilization which has occupied the spot for the last few hundred years. Under that were broken utensils, weapons

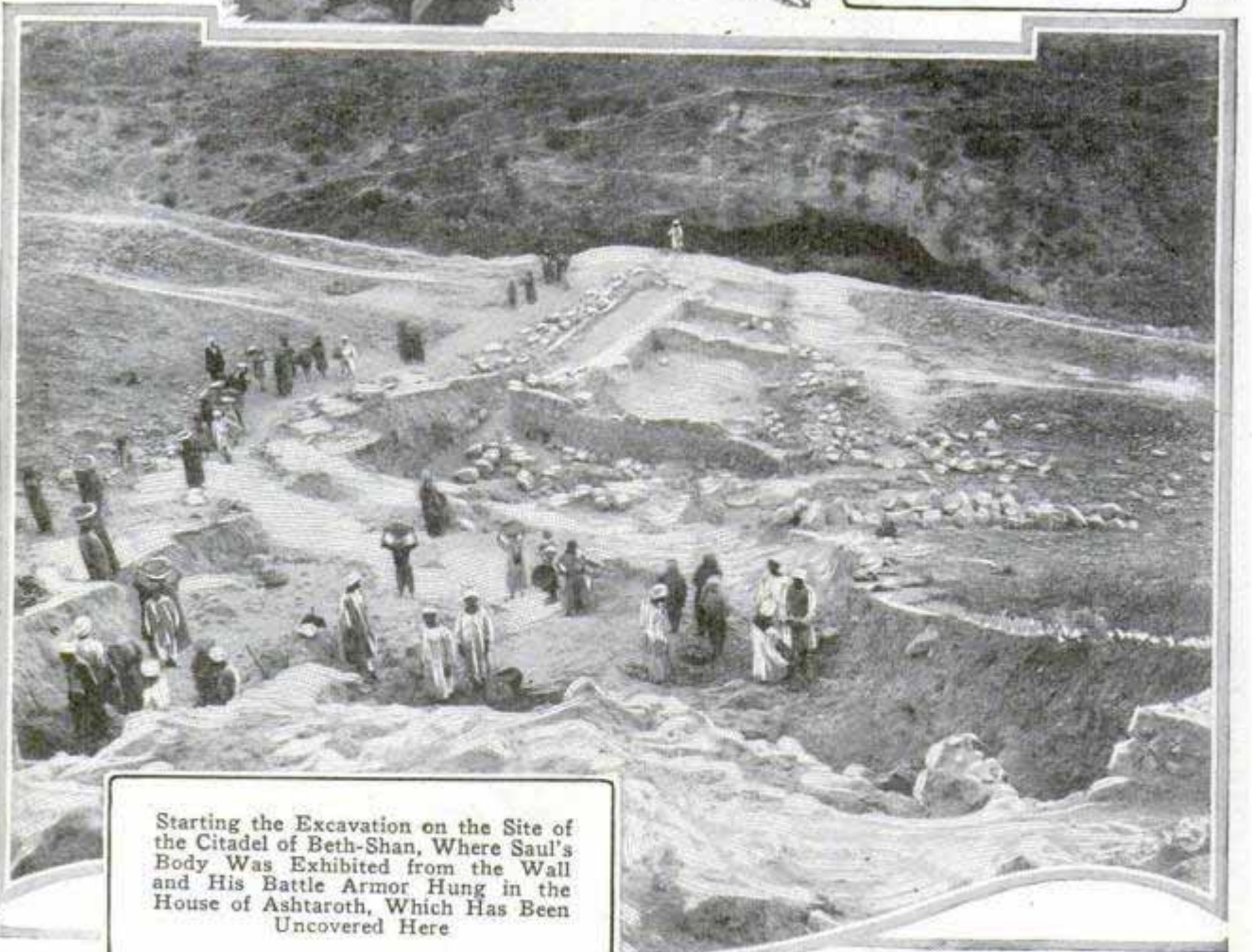


Stele of Pharaoh Seti I, Uncovered by the Pennsylvania University Museum Expedition in Palestine

and other remains of the Crusaders, who held the fortress hill as a strong point



Moving the Pillar of Seti I across a Branch of the River Jalud; Light Railways and Push Cars Are Used, the Rails Being Moved Forward in Sections When the Track Proves Too Short to Reach Its Destination



Starting the Excavation on the Site of the Citadel of Beth-Shan, Where Saul's Body Was Exhibited from the Wall and His Battle Armor Hung in the House of Ashtaroth, Which Has Been Uncovered Here

covering the valley of the Jordan while they fought for Jerusalem.

Beneath the debris of the Christian occupation were the evidences of the Arabs they displaced, Arabs who had taken the hill during the great period of Arab conquest. Beneath that came ruins of Christian, Roman and Greek civilizations. Next were the evidences of the Hebrew conquest of 2,900 years ago, and, underneath, the Egyptian civilization which goes back there to 3,200 years ago, and still earlier civilizations remain to be explored. As a strong point of the highway between Asia and Africa the hill was a strategic position before the dawn of recorded history and was capital of the Jezreel and Jordan valleys, as well as chief city of the once famous Decapolis, or league of ten cities.

The temple of Ashtaroth, which might have gone unnoticed in history save that the Bible linked it with the death of Saul, was erected by the Egyptians to their goddess Ashtaroth (Hathor or Astarte), about 1250 B. C., and was, so far as is known, the only pagan temple remaining intact at Beth-Shan when



Top and Bottom, Two of the Eight Memorials Erected by Moses to the Pharaoh's Daughter Who Found Him in the Bull-rushes, and in Center, a Bedouin Camp

it was conquered by the Philistines.

On one of the door jambs the explorers found the name of an Egyptian commandant of the city during the reign of Rameses II, the garrison commander boasting the hyphenated name of Rameses-Wesr - Khepesh. The stele of an Egyptian of the nineteenth dynasty, depicting him in prayer to his gods,

was another object uncovered near by. Adjoining it, the excavators finished removing a stele uncovered last year, on which appears mention of Kharu, the old name for the inhabitants of Canaan. The same word appears on a famous Israelite stele of King Merenptah, which is now in the Cairo museum.

Next a monument of the goddess Ashtaroth was found, showing her as wearing a long dress and the conical crown characteristic of all Syrian goddesses, with two feathers attached. Above her was written "Lady of Heaven, Mistress of all the Gods."

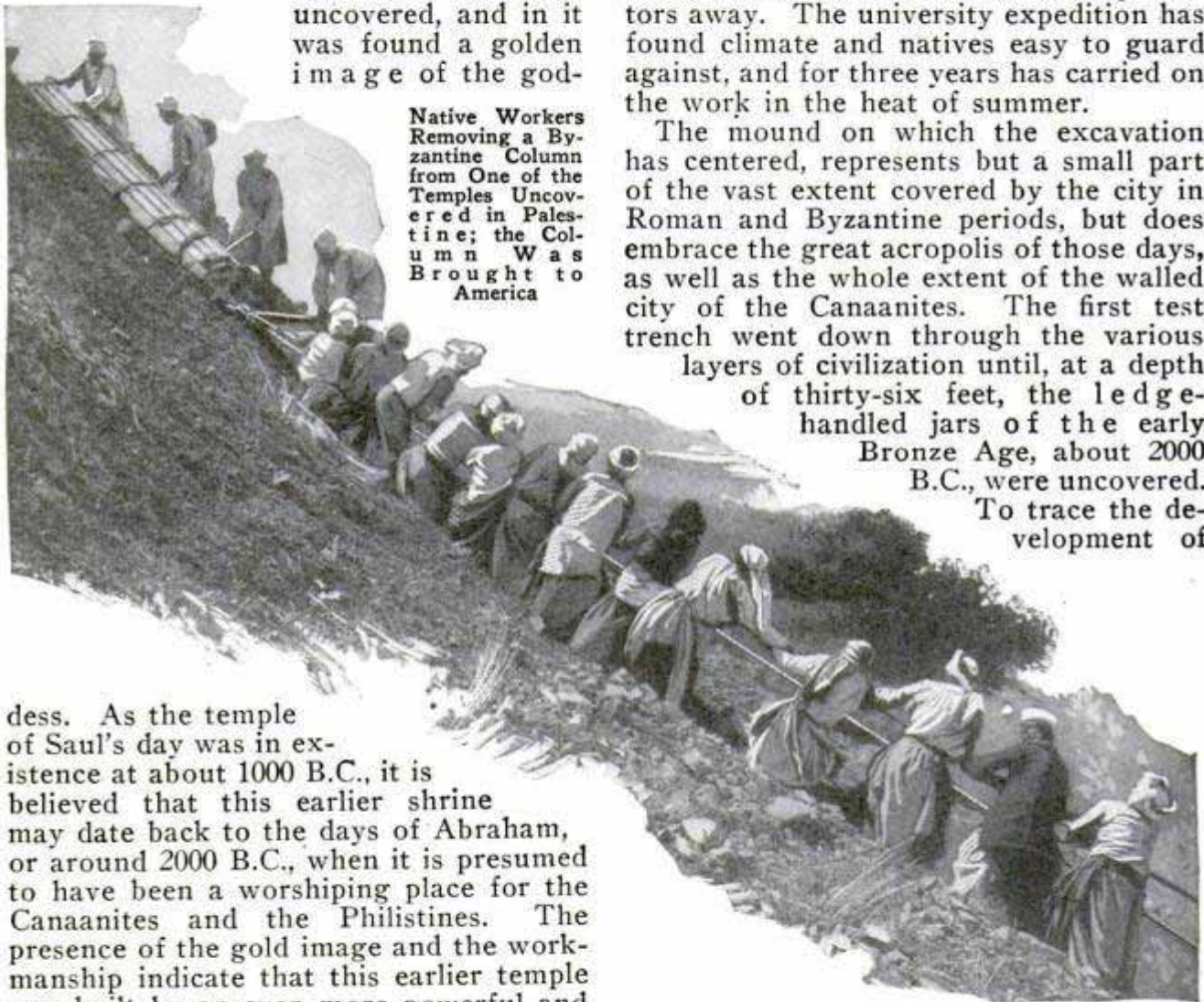
The room of the first of the three temples in which the stele of Ashtaroth was discovered had four stone drums concealed under its floor of hard clay, which



were thought to have once been the foundation for wooden pillars. The room was littered with cult objects, many of types never before discovered.

Beneath the nineteenth-dynasty temple was found still a third temple of Egyptian origin, thought to date from the fifteenth dynasty, or about 1500 B.C. An altar and a scarab from King Thotmes III's times were found here, and the floor of the temple still retains its bright blue color despite the passing of more than thirty-four centuries.

Still farther down another temple of Ashtaroth has been uncovered, and in it was found a golden image of the god-



Native Workers Removing a Byzantine Column from One of the Temples Uncovered in Palestine; the Column Was Brought to America

dess. As the temple of Saul's day was in existence at about 1000 B.C., it is believed that this earlier shrine may date back to the days of Abraham, or around 2000 B.C., when it is presumed to have been a worshiping place for the Canaanites and the Philistines. The presence of the gold image and the workmanship indicate that this earlier temple was built by an even more powerful and skilled civilization than that of the days of Saul and David.

The region in which the university is working is one of the most fertile fields for exploration remaining. For centuries it was closed to outsiders by the Arab and Turkish rulers, and not until England took over the administration of Palestine under a League of Nations mandate could a permit be obtained to open the famous hill. As a result the ruins remain untouched. The region is famous in bible history for many reasons. It was

near this site that David slew Goliath, and around about the adjoining valleys of the Jordan and Jezreel, some of the most stirring exploits of Old Testament history occurred.

One result of the Turkish rule was the protection of the site of ancient Beth-Shan from molestation, since, some fifty years ago, it became the private property of the Sultan Abdul Hamid, preventing any haphazard digging by natives in search of valuables. The reputation of the place for excessive heat, a deadly climate, and a population said to be knaves and thieves, likewise served to keep visitors away. The university expedition has found climate and natives easy to guard against, and for three years has carried on the work in the heat of summer.

The mound on which the excavation has centered, represents but a small part of the vast extent covered by the city in Roman and Byzantine periods, but does embrace the great acropolis of those days, as well as the whole extent of the walled city of the Canaanites. The first test trench went down through the various layers of civilization until, at a depth of thirty-six feet, the ledge-handled jars of the early Bronze Age, about 2000 B.C., were uncovered. To trace the development of

such a superimposed series of civilizations, it is necessary to remove each complete stratum from the entire site in its turn. It took three years in this way to go down between twenty and thirty feet, through eight successive building periods, and reach the brick fortress of the time of Seti I, who ruled Egypt from 1313 to 1292 B.C.

The Egyptian fortress of the Pharaoh Seti had a fairly regular plan, with groups of small chambers and long corridors sur-

rounding open courts. The walls, which in some places still stood to a height of nearly ten feet, were built of large bricks of sun-dried clay, measuring twenty-one by fourteen inches and six inches thick. They were laid in mud mortar, and the faces of the wall were finished off with a fine mixture of clay and lime. The floors had a thick coating of cement laid over a bed of rubble. From one corner, adjoining what appeared to be the main court, a brick staircase led either to the roof or to an upper story. The main entrance, which had been partly destroyed in placing the foundation of later buildings, still showed the great sill and side jambs, all of carefully dressed and fitted blocks of basalt which dovetailed into the brick masonry of the main walls on either side, showing a high degree of workmanship.

Two commemorative steles, or wall plaques, of Seti I and Rameses II, together with a seated statue of Rameses III, all of basalt, featured the main court of the fort. The stele of Seti shows him as a young man wearing only the short skirt and headdress making an offering to Horus. After a long preamble, the text cut below the figure gives a brief account of the campaign of the first year of the pharaoh's reign, in 1313 B.C. One day a messenger came to Seti, according to the text, from the city of Beth-Shan requesting aid against the "vile one" of Hamath, who had formed a league with the men of Pella, a city just across the Jordan from Beth-Shan. Already they had shut up the chief of Rehab in his city, which lay a few miles to the south and was one of the "sister" cities of Beth-Shan.

Seti, at the time, was at Megiddo marching in a campaign against Palestine and Syria. He was resting his army there at the western end of the valley of Jezreel before attacking the Hittites, and seized the opportunity to clean up this local disturbance at Beth-Shan on his way. The stele explains that he sent the division of Ra to occupy Beth-Shan and the division of Amen to attack Hamath, while the division of Sutekh was sent toward the southern foothills of Lebanon as a demonstration to keep the Hittites off the flank of the main army. Seti's fourth division, that of Ptah, is not mentioned, but the explorers presume it was left at Megiddo to guard the road back to Egypt. The inscription concludes with the statement that the conflict was "finished in one day" with a complete victory for Seti.

The change in ownership of the Holy Land after the war has opened up the entire field for intensive study by archaeologists, but finds made before the war are still being examined and identified in museums throughout the world, for the work of translating ancient picture writing proceeds slowly. Announcement was recently made in Germany that eight stone tablets, found in 1905 by Flinders Petri in the ruins of an ancient temple on Mount Sinai, were stone records written by Moses. One of the tablets bears a letter of thanks sent by Moses to Hatshepsut, queen of Egypt, for saving him from the river Nile. At the time the tablets are supposed to have been carved by Moses' order as mementos to the queen, he had been promoted to the highest position in the Egyptian temple.

Native Workmen Listening to Arab Music Played on the Portable Phonograph After the Day's Work Excavating Ancient Biblical Treasures Is Over; Large Numbers Are Required to Remove the Debris

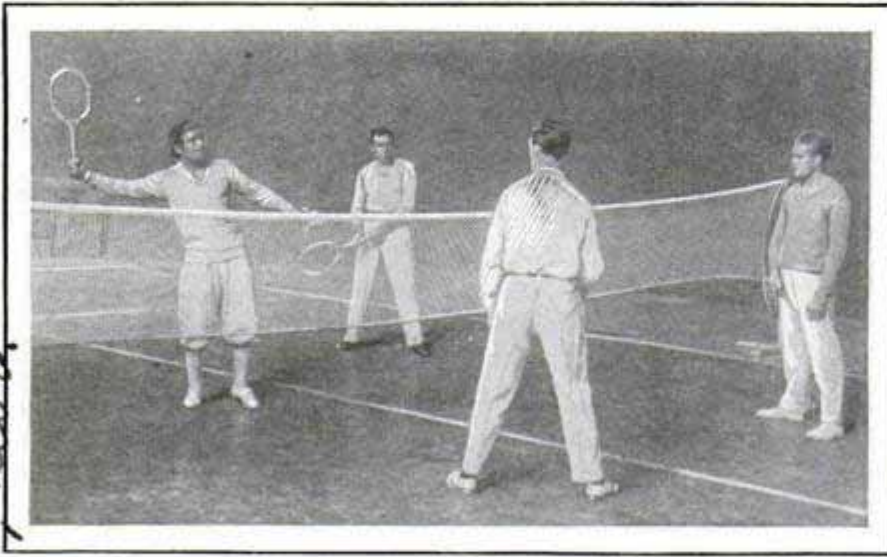


TENNIS IS PLAYED WITH CORKS ON INDOOR COURT

INVENTIONS OF RECENT YEARS SHOW GREATEST PROGRESS

1012 The venerable game of "badminton" has been developed into a strenuous sport

In the last twenty-five years, man has outstripped all other periods in the number and kind of his inventions and their practical application. A quarter of a century ago, no one had heard of the radio, submarines, war tanks, machine guns, airplanes and wireless telephones as articles of almost daily service. The world then was doubting Marconi and the little group of men who believed in radio, while experimenters with airplanes were tolerated as amusing "cranks." Today, the roar of the mail planes daily is heard over the route of the old Pony Express, armies of the



Douglas Fairbanks and Associates Playing the Cork Tennis Game in a Motion-Picture Studio Building; the Net Is Four and One-Half Feet High

that Douglas Fairbanks and others have found nearly as valuable as tennis for keeping in condition. It is played indoors on a court twenty-four feet wide, fifty-four feet long and without the side alleys. The net serves the same purpose as in tennis but is of a finer mesh and is four feet and a half high. Instead of balls, large corks wrapped with friction tape and with five feathers firmly inserted in them are used. Score is kept as in regulation tennis. Winged corks are being devised so that the game can be played out of doors. The feathered missiles, it was found, were too light to carry true in a wind.

LARGEST SEMIRIGID DIRIGIBLE CHRISTENED IN SNOWSTORM

1029 Circling over Scott Field, near Belleville, Ill., for nearly an hour in a light snowstorm and an eleven-mile wind, the "RS-1," the world's largest semirigid dirigible, recently completed a successful trial flight. The big bag, the first of its type to be built in this country, is 282 feet long, has a capacity of 755,500 cubic feet and is propelled by four 300-horsepower Liberty motors. It is the second largest dirigible in the United States, the Los Angeles being the biggest. An average speed of forty miles an hour was maintained during the test, which was conducted by Lieut. Orval Anderson and a crew of eight men. According to Lieut. Col. Paegelow, commanding officer, plans are under way for the erection of a mooring mast.

world fight in the air, and it is becoming the great highway for peace-time travel and shipping. Important applications and changes have been made in old inventions. The reaper, for instance, was known nearly a century ago, but only in the last twenty-five years has it been combined with the thresher. Motion pictures, relaying photographs by radio, the use of radium and the X-ray are achievements of the present century.

735 BOTTLE STOPPER THAT LOCKS HAS REMOVABLE KEY

Bottles are secured against tampering with a stopper that has a separate key to



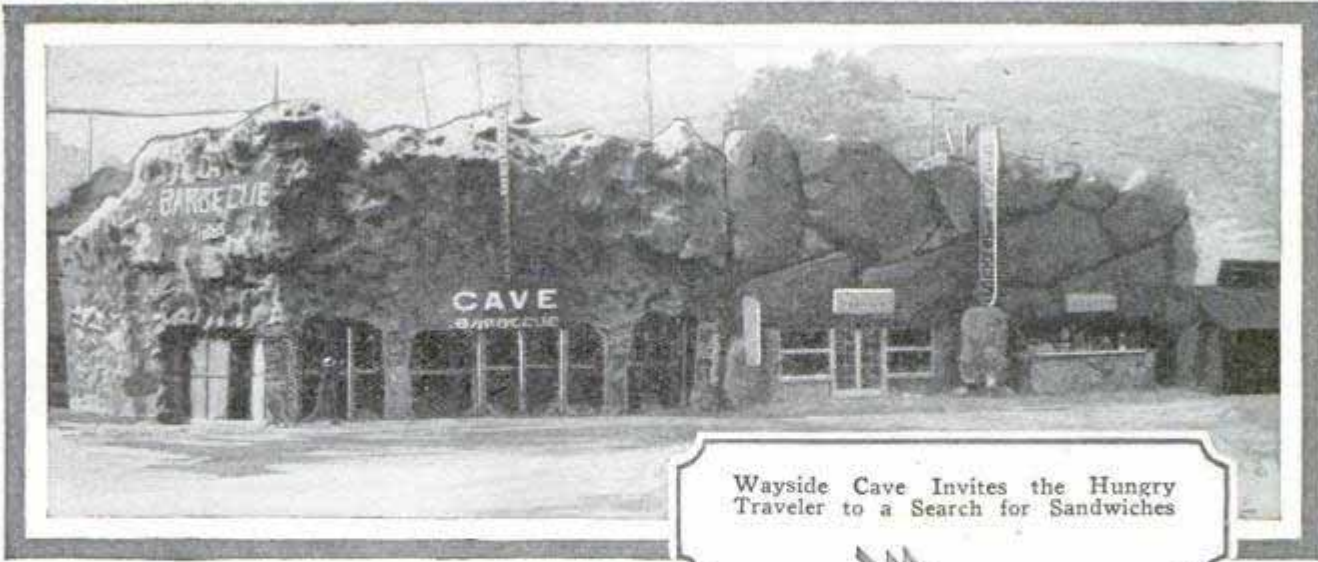
expand two pieces of metal against a rubber section, wedging it to the neck. A reverse turn of the key releases the pressure so that the cork can easily be removed. The stopper is readily identified by touch, enabling a person to select the proper bottle even in the dark, and preventing accidents.

During the last six months of 1924, the world used 6,232,000 bales of American cotton.

1012 Van Horn, Nelson, Cant. Hall Co. Walton, N.Y. Herald Tribune 1/9/26

735 New York, D.C. new, martins + w. s. 7

*Los Angeles* 1939 *Los Angeles Museum*  
**Unique Places of Business in West**



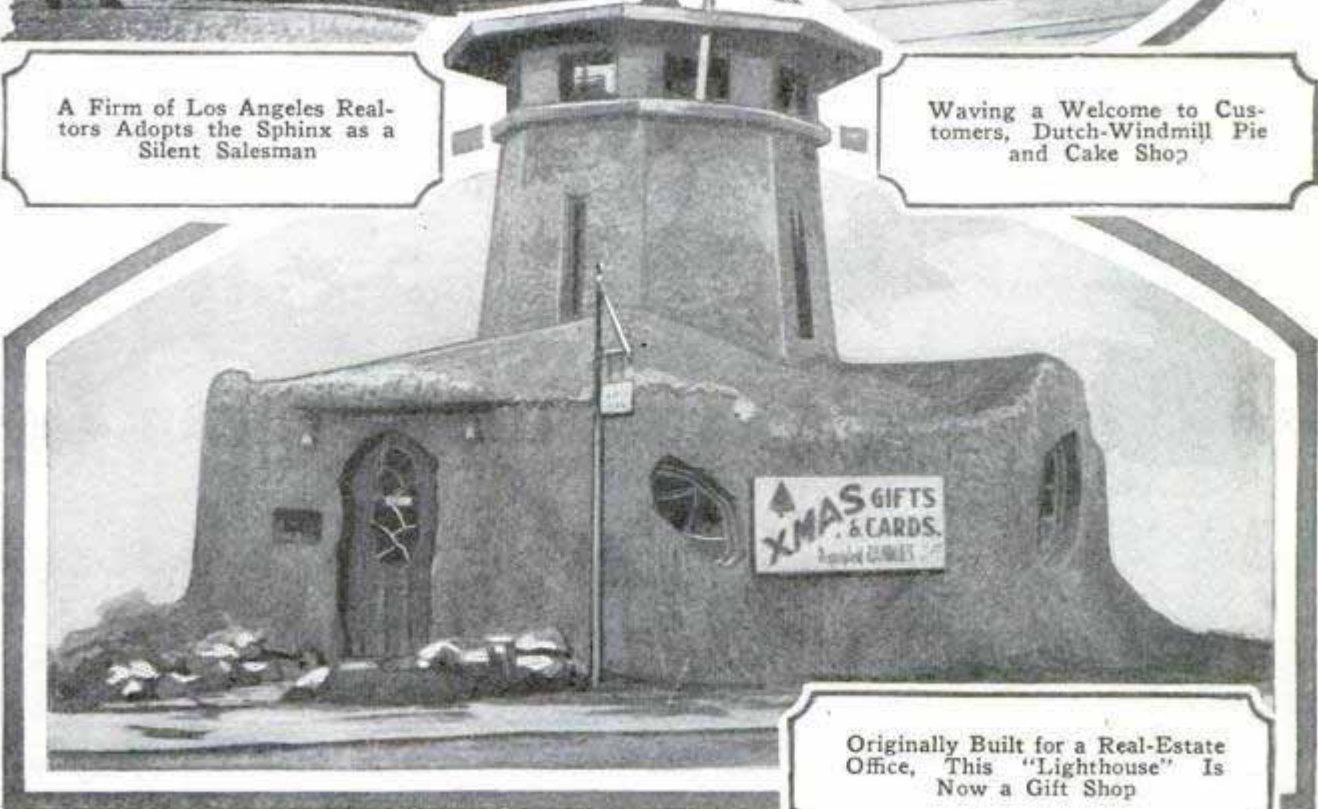
Wayside Cave Invites the Hungry Traveler to a Search for Sandwiches



A Firm of Los Angeles Realtors Adopts the Sphinx as a Silent Salesman

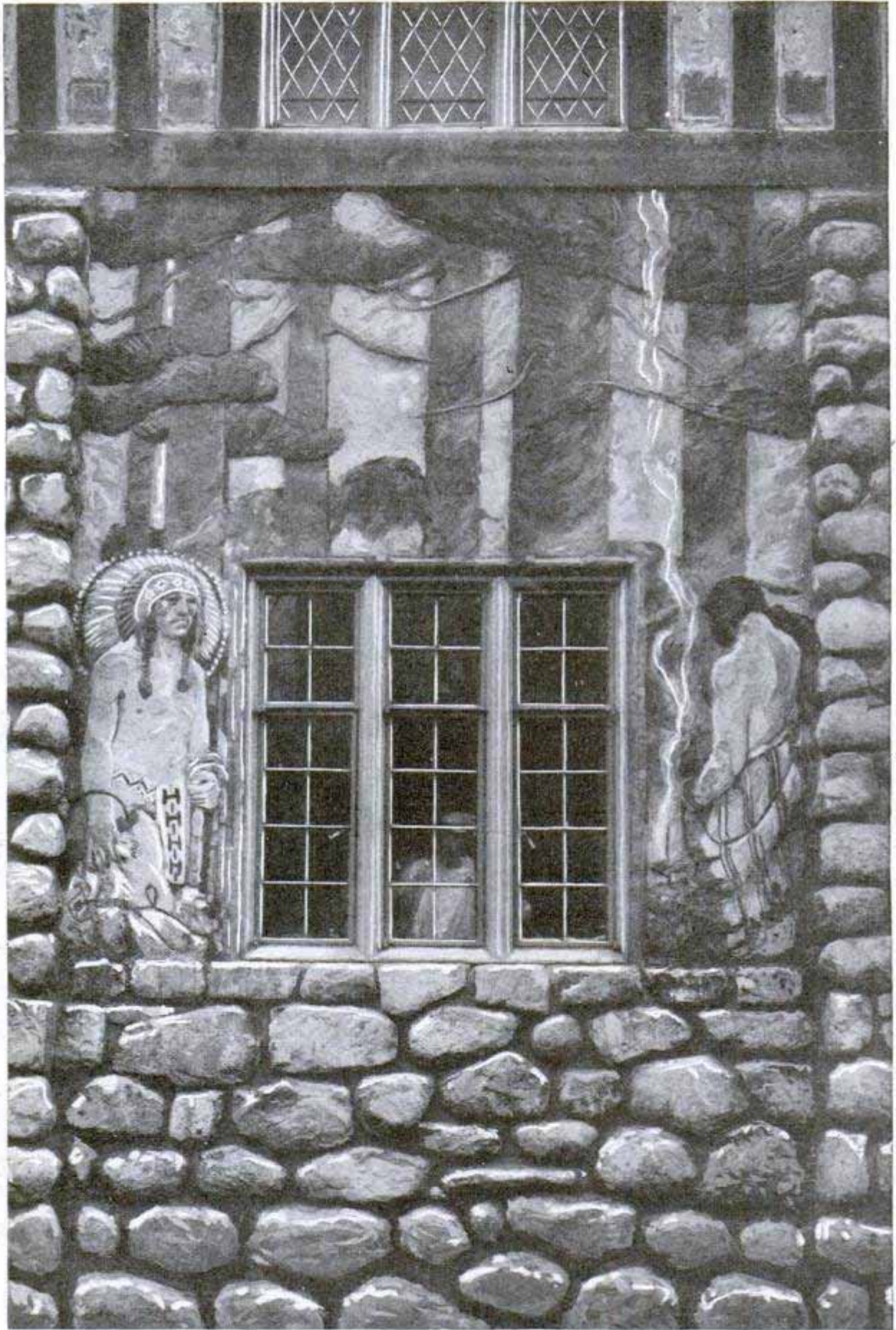


Waving a Welcome to Customers, Dutch-Windmill Pie and Cake Shop



Originally Built for a Real-Estate Office, This "Lighthouse" Is Now a Gift Shop

Paul Honore, 253 E. Howard Ave.  
Detroit, Mich.



An Indian Scene in Many Colors, One of the Unusual Cement Paintings Decorating the Unique Courthouse at Midland, Michigan, Where an Artist Has Used Colored Ground Glass as Pigment



# Colored Glass Used to Paint with Concrete

USING colored ground glass as his medium, Paul Honore, a Detroit artist, has recently "painted" some vivid murals on the outside walls of a new courthouse at Midland, Mich., that promise much for American exterior decoration. Visitors have come from as far away as Florida and California to study the new material, and if their spoken intentions are any indication, similar colorful structures will soon be scattered over the country.

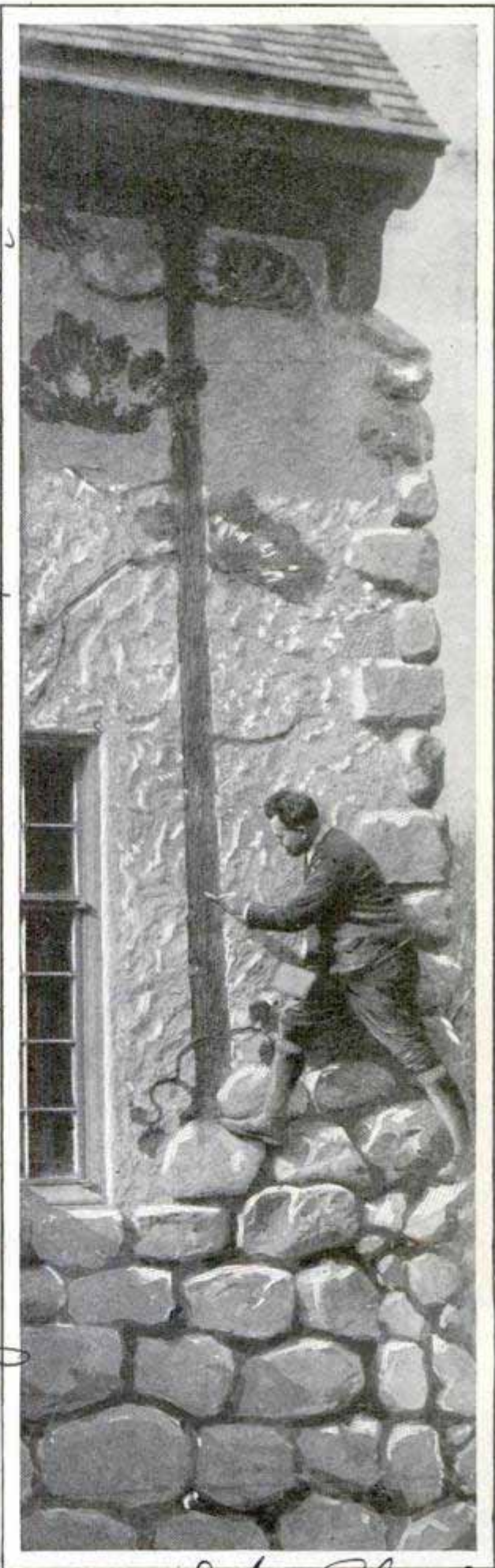
The big point about colored-glass cement is that it is lasting. Never will the richness fade from Honore's pictures of the pioneers of Midland county. Centuries from now, if the building is standing, visitors will still have their retinas tickled by the ruddy splendor of sunsets blazing on the walls, the gaudiness of woodmen's mackinaws and bandannas and the crazy-quilt riots of colors shown in Indian head-dress and blankets.

Heretofore the only kind of outside pictures that have been possible in this rigorous climate was the sort seen on the front of houses in Bavaria and Tyrol—like our more permanent billboards, done in oil paint. Periodic retouching is necessary to keep these designs fresh. Colored stuccos and plasters have been tried, but they will not weather nor dry uniformly. Our houses never could burst out in pictorial color because a soft, imperishable medium was lacking.

The uninformed person might ask, "Why not pour some good fast pigment into cement and make colored designs with that?" There are several objections, an important one being that the ultraviolet rays of the sun would gradually bleach out the color. At least one artist, who made some cement pictures of this kind, found his masterpieces cracking after several months indoors. The chemists who made Honore's cement for him couldn't wait a lifetime to see how fadeless their product was, so they did the next best thing to make sure. They exposed samples of the glass color material to special quartz lamps that in several weeks' time gave the equivalent of 250 years of sunlight. The cement didn't fade a particle.

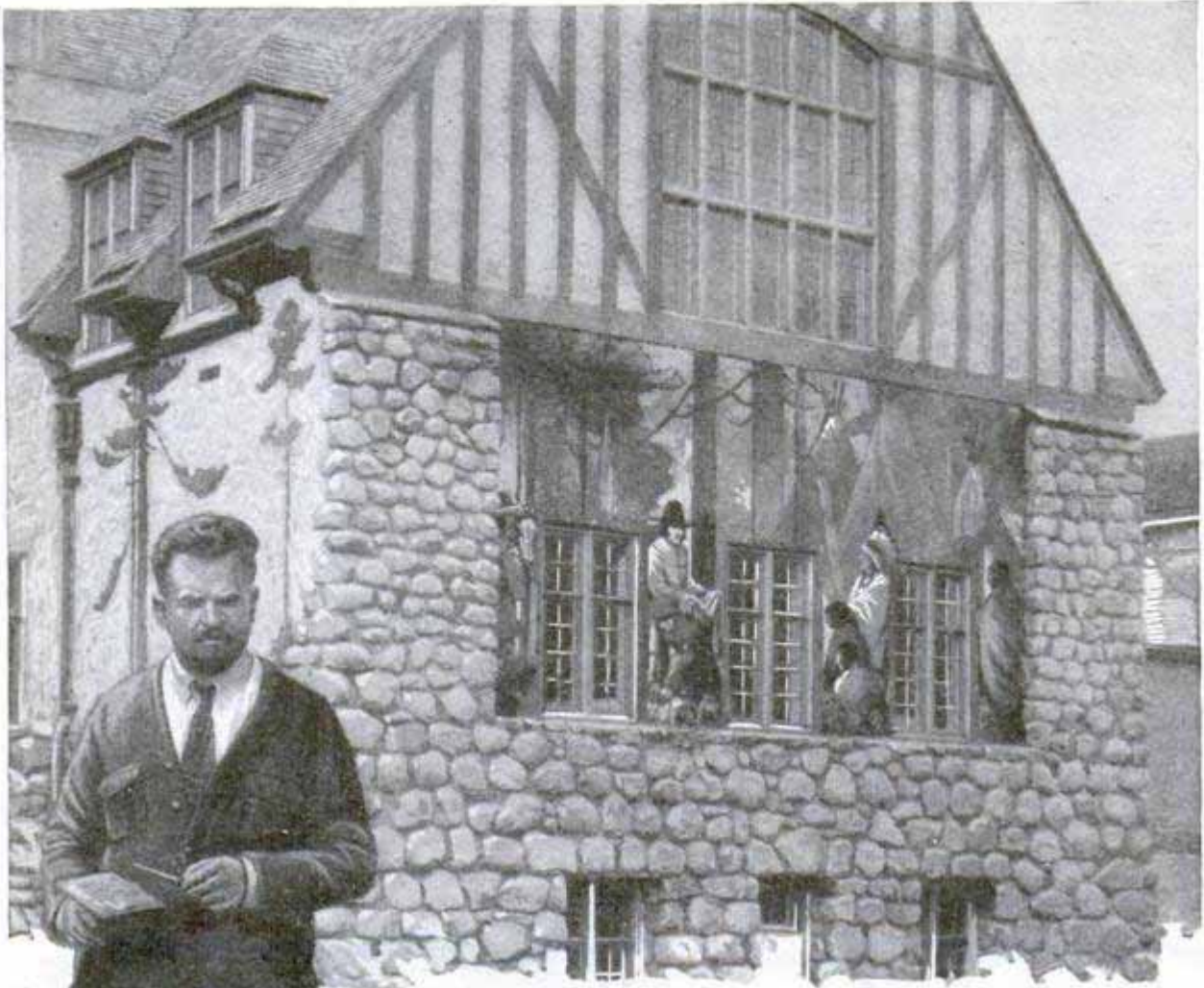
Here's the recipe for the cement: Finely ground glass is mixed up in magnesian cement and then transformed into a paste

colored glass cement. Slow Chemical Co. Midland, Mich.



S. Abermayer Co., 2563 W. 18th, Chicago  
American Magnestone Corp., Springfield, Ill.

893



Paul Honore and One of His Ground-Glass Paintings on the Walls of a Novel Stone, Stucco and Timber Courthouse in Michigan

by the addition of liquid magnesium chloride. The artist applied the material with a small trowel, like a putty knife, a n-

where from one-eighth to one-quarter inch thick. The mixture sets in about four hours. When dry, both its feel and its appearance at close range remind one of the surface of a grindstone. Visualize a slab of colored sandstone, and you have a good idea how the material looks.

Mr. Honore explained why the color was so permanent. "Old paintings and tapestries have retained their color for centuries," he said, "because they were kept in houses with glass windows. That is to say, solar light, before it reached them, was robbed of its destructive rays by the glass. Glass screens off the ultra-violet rays.

"The color in my murals is imprisoned, so to speak, in sun-proof grains of glass.

The bleaching rays can never reach the pigment. Glass cement is also immune to gases and acid fumes that float through the air in a chemical-manufacturing town like Midland. In addition to these lasting qualities, the new cement also has non-cracking features to commend it."

There is something else quite noteworthy about that Midland building. So far as is known, it is the first courthouse ever built entirely out of materials gathered in the county erecting it. Hardware is, of course, excepted.

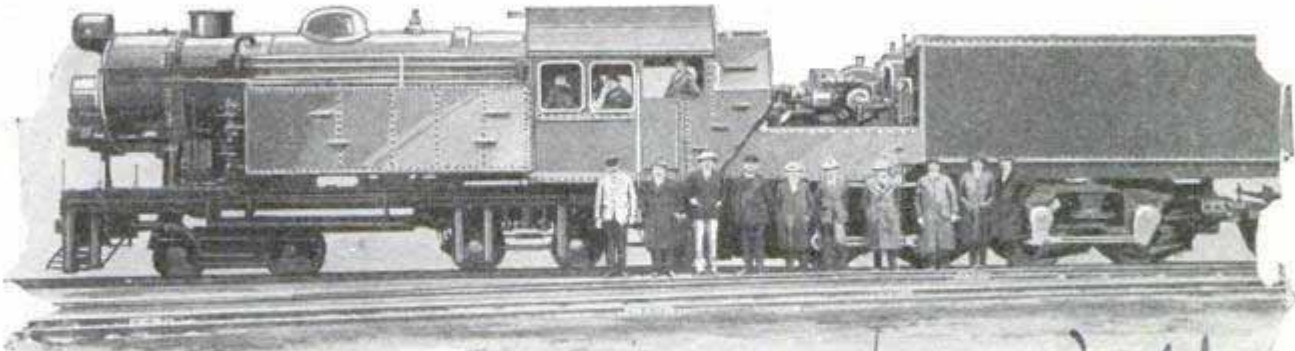
When Herbert H. Dow, of Midland, offered his idea of what the new courthouse should be like, he proposed an American design—not a Grecian temple with a blind-folded statue of Justice in front or on a dome. Furthermore, it was to be constructed of the field stone of the district, of plaster made there and timbers hewn there. Once the building started, almost every farmer contributed at least one load of stone so that the courthouse even has sentiment mixed in its mortar, so to speak.

With this aim of a home-products and home-folks building in mind, the other

problem was to get a design that would be appropriate. Bloodgood Tuttle of Cleveland, the architect, was told to design a building that would fit in and yet stand out. He chose a modified Tudor style. Honore was commissioned to cli-

**SPECIAL CONDENSER ON ENGINE REDUCES WATER WASTE**

Designed by a Swedish engineer for the Argentine railways, a locomotive of the turbine type is equipped with a special



*Wide World.*

A "Camel" among Locomotives; Condenser Engine Designed by a Swedish Expert for the Railroads in Argentina Where Long Runs Must Be Made without Watering Places

max the whole project by depicting on the walls the life and surroundings of the original home folks of the county, the first settlers and their red-skinned neighbors. The plan of making the building entirely a home affair was carried to the extreme of turning the first sod with a spade of magnesia metal, a substance derived from the brine that oozes through the Midland county sands.

Chemists did the research work that led to the new medium. They began with stuccos and cements. When they hit on the ground-glass idea, they still had a lot of work ahead of them in determining what "mesh" of ground glass was best, and other technical details. But now that the process is perfected, a new plastic medium is at public disposal for a variety of uses. Lamp stands, window boxes and molded decorative articles of all kinds may possibly be fashioned from it.

*1008*

**SPRING CLAMP ON ASH TRAY PREVENTS TIPPING OVER**

To hold the ash tray in a convenient position and to keep it from upsetting, a rubber-covered spring clamp is adjustable to tables, desk, chairs and other objects. It is securely fastened to the holder with a wingnut, and has a specially constructed arm to keep the tray upright. The clamp is useful also on trains.



*Albert J. Inc Elfresh  
2126 Pearl St.*

condenser unit between the tender and the engine proper, so that it can cross long desert stretches with a minimum of water consumption. The tank is of unusually large capacity, and the drain on it is partly replaced by the condensed steam flowing back from the locomotive through the reclaiming apparatus.

**SHIPS BUILT WITH SOFT BOWS TO INCREASE SAFETY AT SEA**

*1024.*

With vertical instead of horizontal plates at the prow, vessels could be constructed so that they would not be likely to sink other ships in case of a collision and would be proof against serious damage themselves, according to E. F. Spanner, a British marine architect. He has produced figures to show that a boat of this soft-ended type, should be able to run head-on at ten knots an hour into a solid wall without rupturing the first forward hold. He believes that the vertical plates would yield sufficiently under the impact to take up the force of the collision, thus preventing the shock from reaching other parts of the ship. The soft prow would be built forward of the collision bulkhead. Other ships, from the largest liners down to those of only 150 or 200 feet in length, would also be protected from serious damage, Mr. Spanner states, assuming they were of ordinary seagoing steel construction, as the plates would be dented only instead of being cut through, and repairs would be less costly.

*Lindor Eng.*

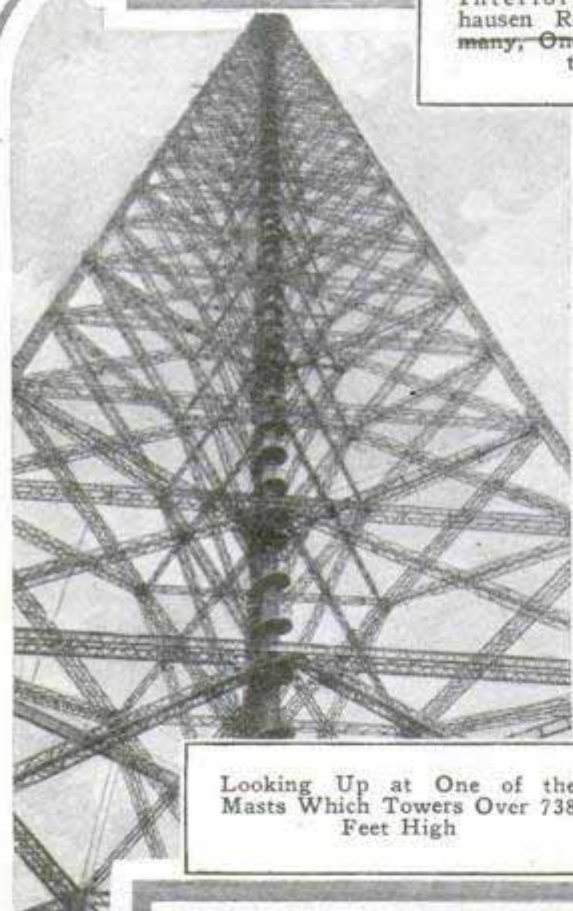
*Christian Science 1/6/26*

Timber losses caused by boring insects amount to approximately \$40,000,000 every year.

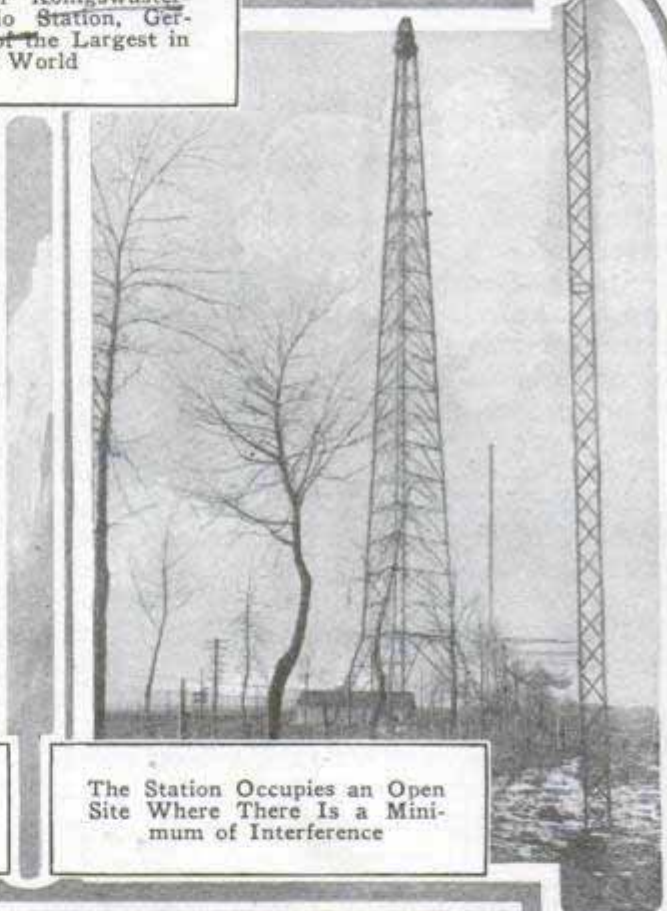
# The Latest German Wireless Station



Interior of Konigswusterhausen Radio Station, Germany, One of the Largest in the World



Looking Up at One of the Masts Which Towers Over 738 Feet High



The Station Occupies an Open Site Where There is a Minimum of Interference



Another View of the Interior, Showing Panels of the Transmitter during Construction

Research Engineers  
POPULAR MECHANICS  
Sluper Radio Corp  
City

### SENSITIVITY OF RADIO TUBES NOT DETERMINED BY LIGHT

Contrary to popular impression, the amount of light given off by a radio tube is not an indication of its sensitiveness or general condition, according to research engineers. The fact that the tube emits light at all is only incidental to its operation, and in some, a manganese coating on the glass permits only a slight amount of light or none at all to penetrate, so that the illumination test is practically worthless so far as indicating how well the tube is functioning. What is desired in the tube is a flow of little particles of electricity, the electrons or negative charges. The easiest way to obtain this action is to heat certain kinds of wires in the glass bulbs from which the air has been exhausted. To make the flow abundant, the temperature must be quite high, and this is done in actual operation in the radio set by current from the A-batteries. The wire becomes incandescent under the heat and naturally emits light as a result, but the light itself has no connection whatever with the actual working of the tube.

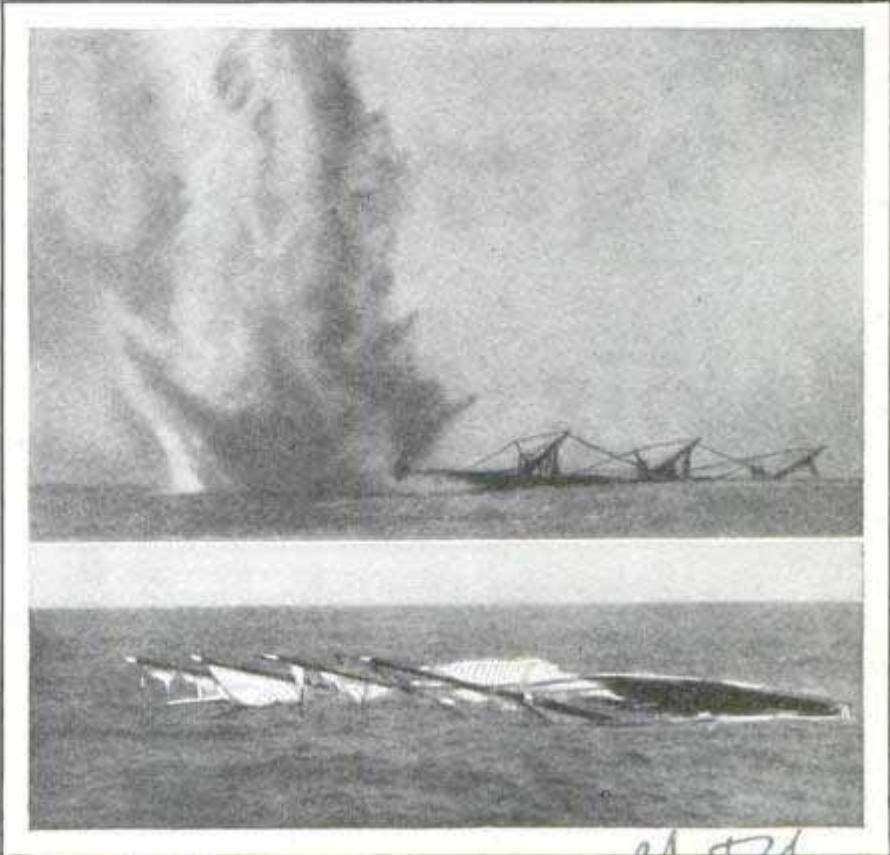
### STEEL COTTER-PIN PULLER HAS JAWS THAT LOCK 950.

Removal of cotter pins is simplified by the use of a steel puller operated like a pair of pliers. When the handles are spread, the jaws are forced out of a steel housing, and a lug on the upper jaw throws them open to engage the pin. Closing the handles pulls the jaws back into the case and, at the same time, locks them on the pin, reducing the likelihood of slipping and also preventing the pin from dropping out and being lost.



### RIDDING THE SEA OF DERELICTS AT PERIL OF SAILORS' LIVES

Removing the hulks of wrecked ships from the sea lanes, so that they will not be



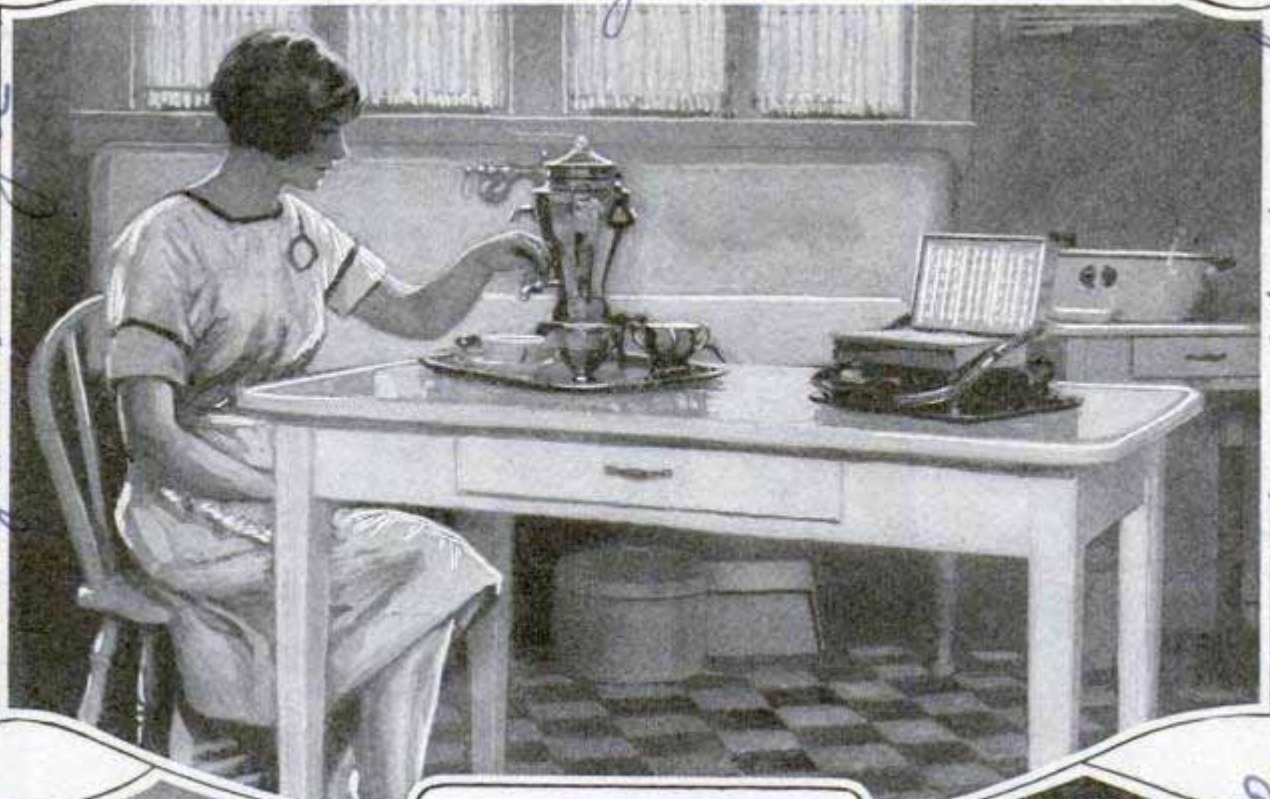
Clearing the Sea of a Derelict; a Mine Exploded under a Floating Wreck of the Schooner "James W. Howard"

a menace to navigation, is one of the perilous duties that falls to the coast-guard service. The task cannot be attempted in stormy weather as high waves make boarding the wreck extremely difficult and placing the charges of explosives with which to shatter the derelict, dangerous. Mines are usually attached to the wrecks and exploded by electric contact from a safe distance. In blowing up the schooner "James W. Howard," of Boston, as shown in the upper photograph, the coast-guard cutter "Modoc" had to wait several days after the wreck until the sea became sufficiently calm to permit small boats to be sent over for placing the mines. The job was only half finished when a heavy southwest storm approached, driving the wreck out of the path of coastwise shipping and compelling the "Modoc" to leave.

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Burke + Isants  
Madison Terminal Bldg

Percolator set  
Londers, Frary & Clark  
200 Lytle Ave. New York



Toaster - Westinghouse  
Electric + myg Co 18. Pittsbu  
+ Randers, and myg Clark Pa

The Abundance of Convenient  
Electrical Appliances, Such as  
the Coffee Service Above, Is  
Expected to Be a Revelation in  
France, Where Electricity Is  
Used Mainly for Lighting

Cleveland Heater Co. 1905 W. 42th St  
Cleveland, Ohio



Latest Model Hot-Water Heater Sup-  
plies Service in Quantity, While  
Even the Floor-Polishing Brush Is  
Operated by an Electric Motor

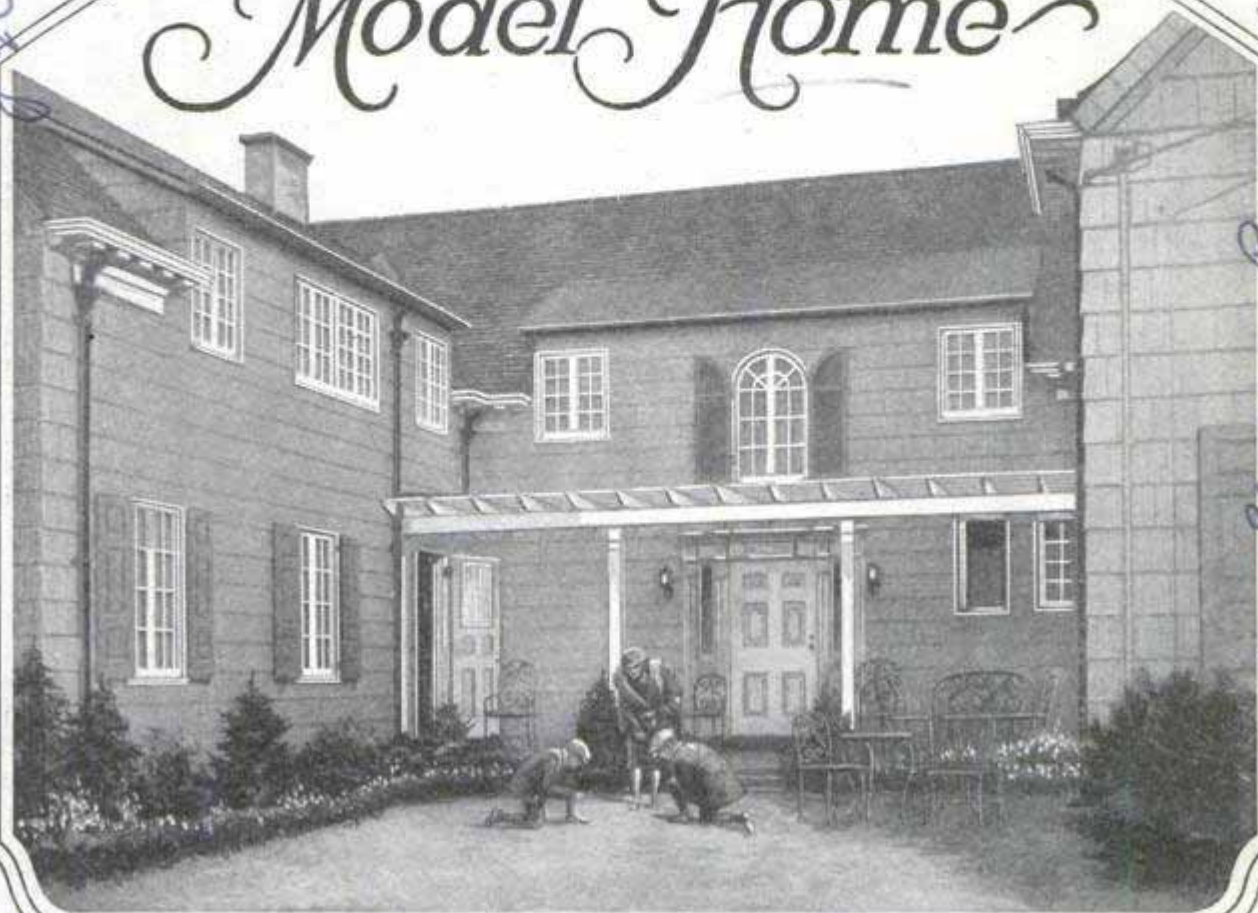
Brushwasher - Washers Wash Washer Co  
129 W. 21st St. New York

The Kent Co  
Rome, N.Y.

Brooklyn, N.Y.

651 411

# The Model Home



## American House, with Latest Labor-Saving Appliances Sent Abroad to Show How Work Is Lightened

IN the Grand Palais in Paris workmen are reconstructing from numbered pieces a "perfect home," erected, torn down and transported across the ocean from the United States. It will be the chief American exhibit at the International Exhibit of Household Appliances and Labor-Saving Devices.

The house represents the combined opinion of leading architects, interior decorators, electrical experts, and others, as to what the perfect home should be. It is of early colonial design, two stories high, of U-shape, with two wings forming a courtyard between them.

It is the interior equipment, however, that is expected to astonish the French housewives, to whom many of the everyday electrical and mechanical household appliances used in this country are unknown. The kitchen and laundry in particular are expected to make them rub their eyes. The vacuum cleaner, wash-

ing and ironing machines, fireless cookers, electrical refrigerator with its arrangement for delivering cubes of ice for table use, and numerous other electrical devices are still curiosities in most sections abroad. The laundry equipment includes white-enameled tubs and washing machine, electric ironer and a hand iron for more delicate work. The polisher for the floors has an electrically driven revolving brush. The hot-water heater works automatically, and for the table there are a number of electrical devices, including a silvered coffee machine, toaster and waffle maker. The rooms are lighted by softly shaded table and floor lamps, as well as wall sconces and overhead chandeliers. All the furnishings and decorations are accurate reproductions of early American designs, some of which were copied from original pieces in the American Museum. Upstairs the same electrical motif is carried out. There is a

Westinghouse Electric & Mfg Co  
East Pittsburgh, Pa.

Warming  
Pa.

Commission Dealer,  
Curling & Co. - Dan. Warming

Domestic Electric Co. 43 Warren, N.Y.  
Electric Corp. 120 Broadway, N.Y.

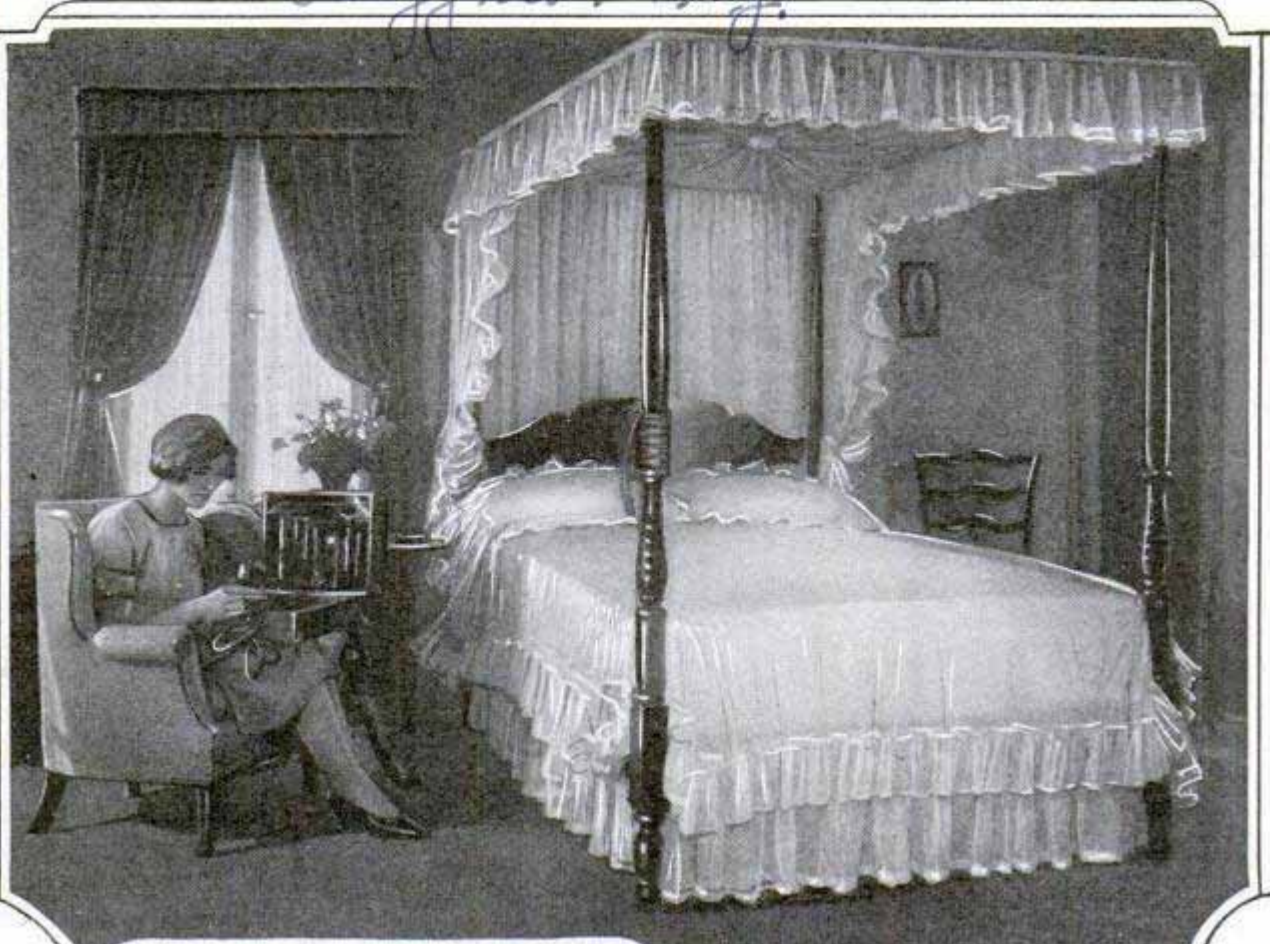
Apex Rotaries Corp.  
24 W 33rd St.

Westinghouse  
Electric & Mfg Co.

Lead Change W of the  
Electrost Start W of the  
Dance

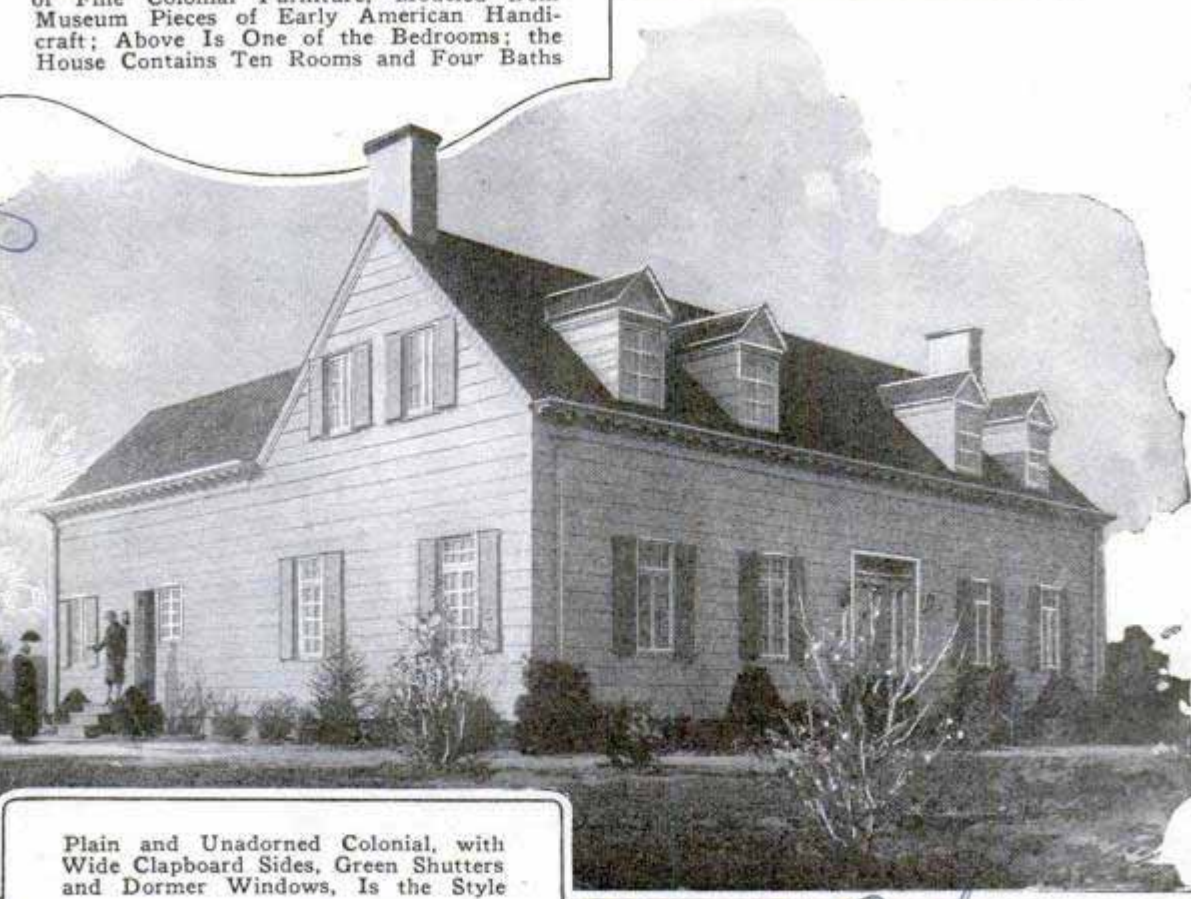
*Buffalo Co-operative Store Co*  
**POPULAR MECHANICS**  
*Buffalo, N. Y.*

*Remily Electric Co 4841  
Edward St. Detroit Mich*



Latest Model Violet-Ray Outfit and Other Electrical Devices Are Shown amid a Setting of Fine Colonial Furniture, Modeled from Museum Pieces of Early American Handicraft; Above Is One of the Bedrooms; the House Contains Ten Rooms and Four Baths

*American Radio Corp  
40 W. 40th St  
New York*



Plain and Unadorned Colonial, with Wide Clapboard Sides, Green Shutters and Dormer Windows, Is the Style

*Radio - Colonial Radio Corp  
Long Island City, N.Y.*





The Dining Room Shows the Simplicity and Charm of Early Colonial Style at Its Best, with Fireplace and Furniture in Keeping with the Period; Plenty of Wall Plugs Are Provided for the Many Electrical Appliances for Buffet and Table



Another of the Bedrooms, Showing the Special Wallpaper in Early Design, and the Electrical Heating Pad, an American Convenience Almost Unknown in France

*and Curling Iron  
 Russell Electric Co  
 740 W. Huron, Chicago*

and Hair Dryer

00 Torrington Conn

65



heating pad and an electric violet-ray machine, as well as a massage device. Even the fireplaces have electric fires, supplemented by portable heaters.

Throughout the ten rooms and four baths the same completeness of equipment has been carried out. After the exhibition closes the house will be presented to some Frenchman, selected by the French government for the most notable contribution to humanity in recent years. It will be taken apart for the second time, and finally erected permanently on the site chosen by the recipient.

The house attracted thousands while it was on display in Brooklyn.

*Phoenix Cabinet Co. Syracuse, N.Y.  
419 Harris Bldg.  
General Sales Dept. Co.  
44 W. Broadway  
New York*



Above is a View of the Hall, Showing the Wall and Table Lights, and beneath it, a Telephone Recess with Bell Box Hidden in Wall

*Westinghouse Electric & Mfg. Co.  
East Pittsburgh, Pa.  
Landers, H. Vanp + Clark, 200 Fifth Ave  
New York*

*Shapiro + Aronson, Inc  
20 Warren St. New York*

651

*Charles Leizer - Puritan Clothing Dryer Co., Cincinnati, O.*



French Women Who Still Do Their Housework by Old - Fashioned Methods Are Expected to Open Their Eyes When They See the Electric Ironing Device Which May Be Operated Sitting



For Smaller Work There Is the Electric Hand Iron. Above, and in the Background May Be Seen the Gas-Heated Clothes Drier Which Does Away with Clothes Lines and Makes Laundry Day Independent of the Weather; at the Left Is the Electrically Driven Washing Machine and Wringer and the Built-In Tubs



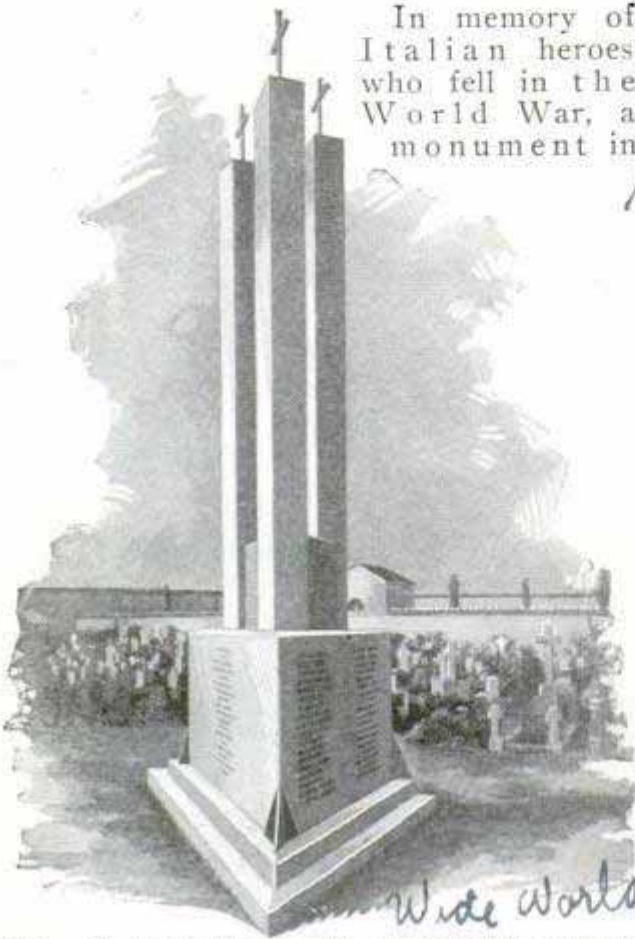
*Westinghouse Electric & Mfg Co., East Pittsburgh, Pa.*

*The Rainaday Co. Pittsburgh Pa.*

*Wide World*

976 **CROSS-TIPPED MARBLE TAPERS HONOR WAR DEAD**

In memory of Italian heroes who fell in the World War, a monument in



"Tapers" of Marble Erected in Memory of Italian Heroes of the World War

the cemetery at Parma suggests three tall candles set in a triangular base and each capped by a cross. Names of the soldier dead are seen on the foundation.

1016 **PENSIONS PAID BY U. S. YEARLY TWO HUNDRED MILLIONS**

More than \$200,000,000 is paid yearly by the United States to the survivors and to widows, helpless children and other dependents of soldiers of the wars. Since 1790, when the pension system was started, this country has paid out over \$7,000,000,000 to such persons. According to official figures, the World War cost the United States \$24,610,000,000, and since the signing of the armistice, \$1,371,645,477 has been expended for pensions. There are now 512,537 pensioners on the government rolls, as compared with 525,539 during the fiscal year of 1924. It costs about \$1,500,000 a

year to maintain the system, although the total amount expended yearly is growing smaller. Nearly \$6,500,000,000 has been paid in pensions as a result of the Civil War, which cost \$4,500,000,000.

1017 **SALVAGE TONS OF OLD RUBBER TO COMBAT HIGH PRICES**

The capacity of American plants for reclaiming rubber has been greatly increased since the imposition of high prices, due largely to the British monopoly, and it is estimated that no less than 400,000,000 pounds of rubber will be salvaged during the present year, to be used in place of the plantation product. In 1924, when the cost of raw rubber was thirty to thirty-five cents a pound, this country produced nearly 170,000,000 pounds of reclaimed material. The government estimates that American industries will need 900,000,000 pounds of rubber this year. Cultivation of a plant that yields rubber is being developed in Texas and other southern states as another means of meeting the situation. *scrch 12/27/26*

1000 **WALLS IN RUSSIAN FACTORIES DISPLAY NEWSPAPERS**

Workers in some of the factories in Moscow, Russia, have but to look at the walls of the buildings to find out the latest happenings, for newspapers, lettered in legible bulletin style, are posted in conspicuous places. The sheets are prepared in inks of various colors and much of the printing is done by hand.

Russians Lettering Newspaper Bulletin and a Sample Display on Factory Wall

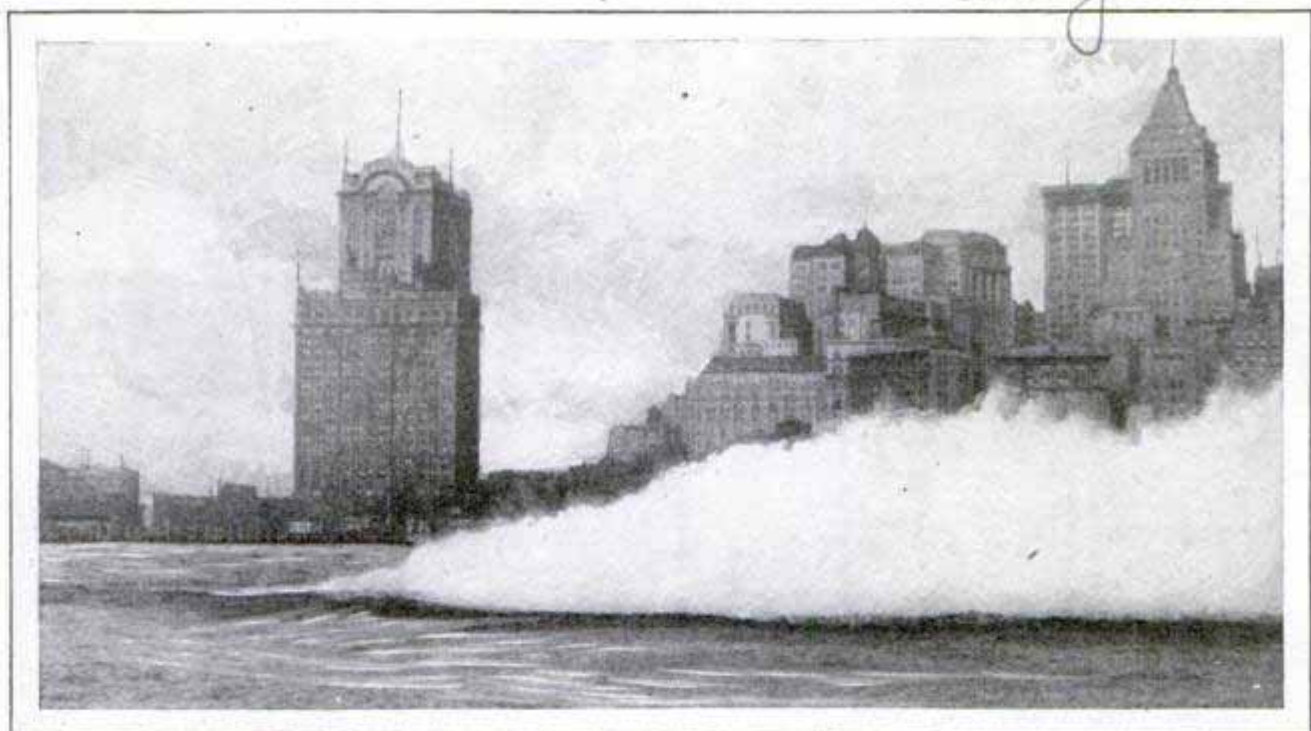


*scrch 12/20/26*

*Wide World*

958

*newspaper  
461-8th Ave  
New York*



Taken an Instant After Submarine Charge of Dynamite Was Exploded; Column of Mud and Water Rising from New York Harbor during Blasting to Widen the Channel

### BLOWING UP NEW YORK HARBOR TO WIDEN CHANNEL *958*

Tons of dirt and water leaping in a sudden gush from the placid surface of New York harbor gave spectators a thrill recently as engineers started blasting the bottom to widen the channel near Governor's island. Each charge contained 500 pounds of dynamite and twenty-four hours were required to set it off.

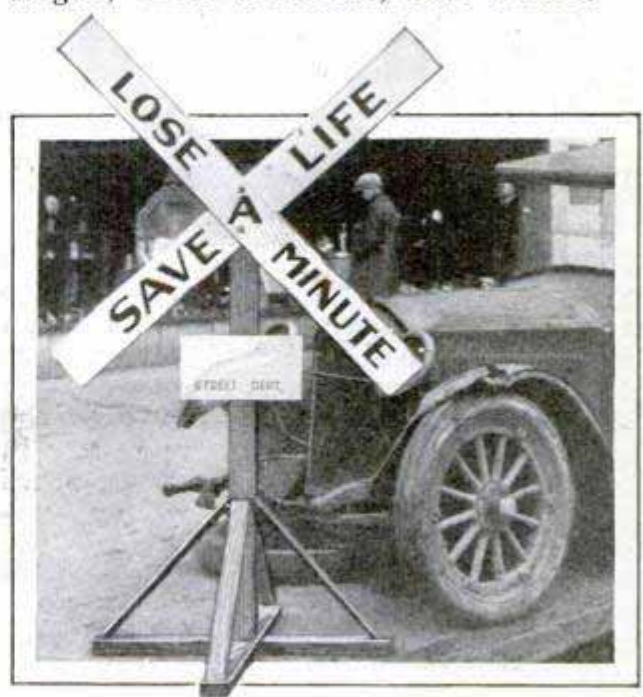
### FOUR-FIFTHS AS MANY HOUSES AS FAMILIES IN U. S. *969*

In spite of the rapid increase in the number of flats and apartments, there are more than 20,000,000 dwellings to house about 25,000,000 families in the United States, a recent survey shows. By family is meant a group of people, not necessarily related, who live as one household and eat at the same table. However, there are several states that have a separate dwelling for every family, and even in more congested sections, the ratio is not so unbalanced as might be supposed. In Illinois, for instance, there are only about forty per cent more families than dwellings, and in New York state only twice as many families as dwellings. Philadelphia upholds its reputation as a city of homes, the number of which is only ten per cent less than the number of families. In crowded New York City, there are about four times as many families as dwellings. The size of the average American family is found to have increased slightly in the

last few years, but there is an average of only six persons to every dwelling the country over, including the large apartment buildings in the cities.

### "LOSE A MINUTE, SAVE A LIFE" WRECKED AUTO WARNS *925*

Its days of running service over, a wrecked auto in Lincoln, Nebr., has been placed at the curb of a downtown street as a warning against careless driving. The message is summarized in a safety slogan, "Lose a Minute, Save a Life."



Wrecked Auto and Cross Sign, Silent Advocates of Safety, Displayed on Sidewalk at Lincoln, Nebraska

*New York Times  
12/20/25*



Nothing in the Picture Indicates It, but This Scene Is Painted on Cobwebs

### ARTIST PAINTS ON COBWEBS INSTEAD OF CANVAS

920 Filmy cobwebs, so delicate that a puff of wind may destroy them, are used by a peasant artist in the Tyrol as a substitute for canvas. He paints a variety of scenes in colors on the material, which is so thin that the picture is practically as distinct on one side as on the other. In spite of precautions taken to protect these pieces, they are likely to be torn and collectors guard them with great care.

### PHONE CALLS READ BY CAMERA FROM AUTOMATIC COUNTER

Development of the automatic-telephone system has necessitated two ingenious aids, an automatic counter which keeps a record of calls made and a camera to read the totals every month. Each subscriber's line is connected to one of the registers, which are set row upon row in panels behind tightly locked, dust-proof glass doors. In a machine-switching station, when a receiver is lifted from the hook, a mechanical "finger" goes "feeling" up and down an intricate device until an empty wire is located for the subscriber, the familiar "dial" tone is sounded, and the connection can be completed by turning to the proper numbers, if the

line is not busy. When the conversation is finished and the talkers hang up, the automatic register clicks a record of the call. With the special camera, these registers can be read once a month in a fraction of the time required by the old method, which generally took two persons working all night, one to read the numbers and the other to record them in a book. The camera contains sufficient film for seventy exposures and fits tightly around a section of six registers. Inside the instrument's hood are small but powerful electric lamps to illuminate the numbers recorded on the register. The exposed films are forwarded to a central mechanical department where they are developed and printed, and the long, narrow strips are distributed to the proper accounting offices. The developed film gives an absolutely accurate reproduction of the totals, which are entered upon special cards so arranged that they form a continuous record for a whole year and from which the number for the month can be computed almost instantaneously.

### CANE HOLDS FOLDING TABLE FOR PLAYING CARDS

872 Constructed like an umbrella, a small folding table, top, legs and all, can be placed inside a walking stick, which also collapses for carrying in the pocket when not in use as a cane. The table is well braced and is of the right height to permit players to use it comfortably when seated.

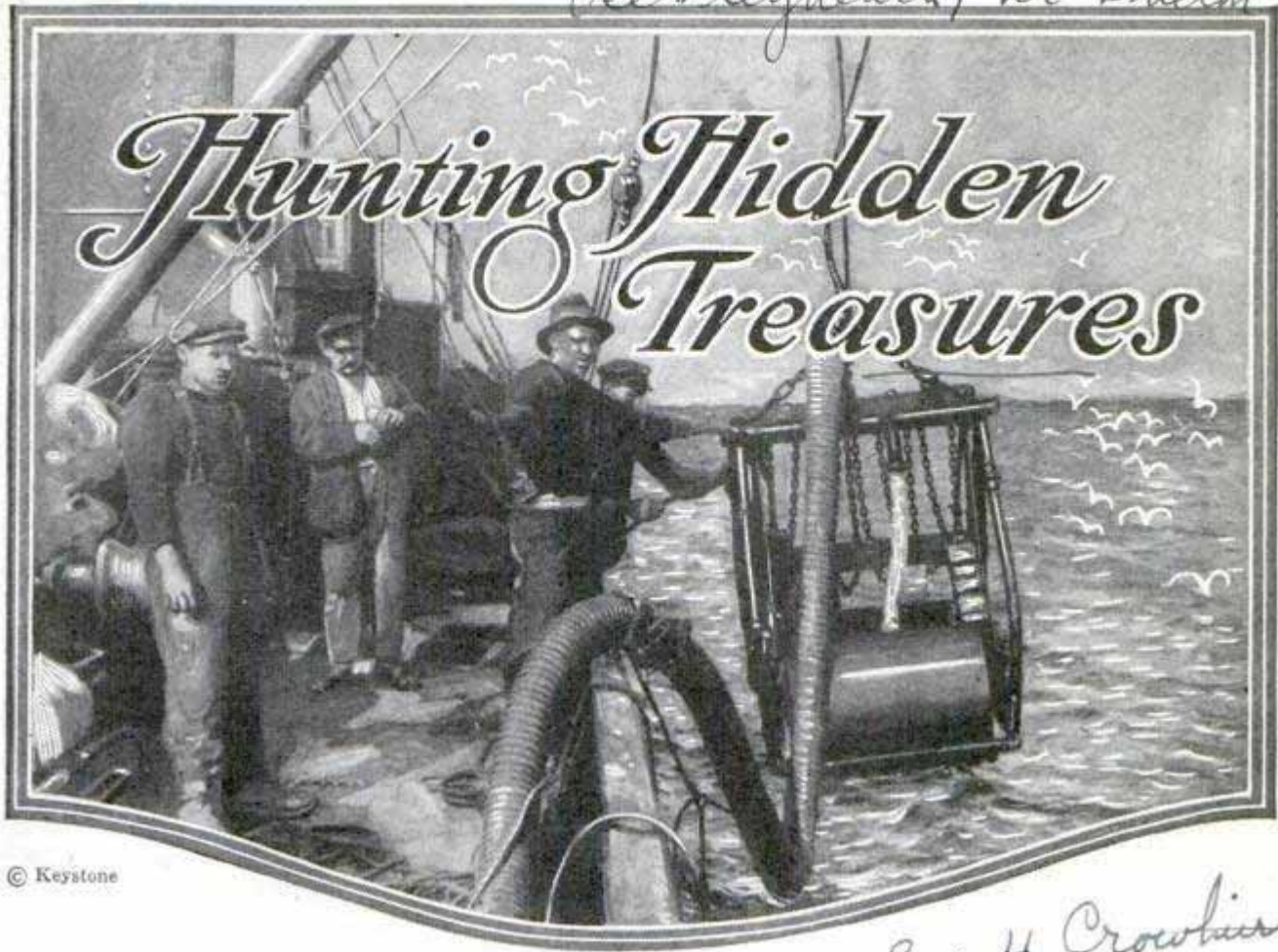
Card Table Ready for Use; When Folded, It Fits inside Cane Which Also Collapses When Empty



Mr. Mac Joseph  
Streatham, Eng.

New York Times  
12/20/25

*knowledg. Colombarie, Barnhurst Road, Besleyheath, nr London Eng.*



© Keystone

By HAROLD T. WILKINS

*Exp. 4, Crowhurst Road, Briston, S.W. 9, Eng.*

A SPANISH seaman, whose face bears a sinister scar, is dying of yellow jack in a plague hospital somewhere in the West Indies. Touched by the kindness of another patient, he beckons and whispers in his ear the secret of a chart, marked with mysterious crosses, anchors and other symbols.

"If you take your bearings from this chart, your fortune is made." He dies; the other seeks out a man of means and adventurous spirit. A syndicate is formed, a ship chartered, and it is sailing to the Spanish Main with picks and shovels to dig up the shining sands of a pirate cove. The treasure is, or more likely is not, found. That was the old-time treasure quest—true to fiction and even to real life.

Today, the quest is organized on scientific lines. An exploration ship, sent out by a learned society, calls, in passing, at some lonely outpost in the South Seas, whose cliffs and caves are known to have been the "bank" of a buccaneer or lesser piratical marauder. Syndicates, with plenty of capital, press into the quest the latest devices of modern engineering. They drain away lakes, blast mountains to pieces and pile up earth in thousands of tons by the aid of steam shovels, to search

for buried treasure of bygone centuries. Sometimes it is found, but oftener fate and chance take a hand in the game.

An American girl diver, Miss Jean Tolley, was recently acting a part in an underwater film, in Nassau harbor, the Bahamas. She dived deep and saw on the sea bed the handle of an iron chest sticking out of the sand. It was hauled up to the yacht from which she had dived, and the astonished performers pried open its sides, when a heap of Spanish doubloons, bearing the date 1790, rolled onto the deck. There were many thousand dollars' worth of them. The British government put in a claim to the treasure trove, and it was deposited in the vaults of the Royal Bank of Canada, pending a law suit.

In August, 1925, an American was searching the ancient ruins of an underground chapel at Torres Junction, Sonora, Mexico, armed with a chart given him by a Mexican woman, in whose family the document had been handed down for generations. He unearthed among the ruins three bags of seventeenth-century Spanish gold coins and ten bars of silver, valued at \$750,000.

Far away in the Philippines, at Calumpit, near Manila, American soldiers are

searching for the great hoard of Spanish gold buried 160 years ago by a Chinese mandarin when the British captured Manila. The finest string of pearls in the world is said to be hidden somewhere in these swamps.

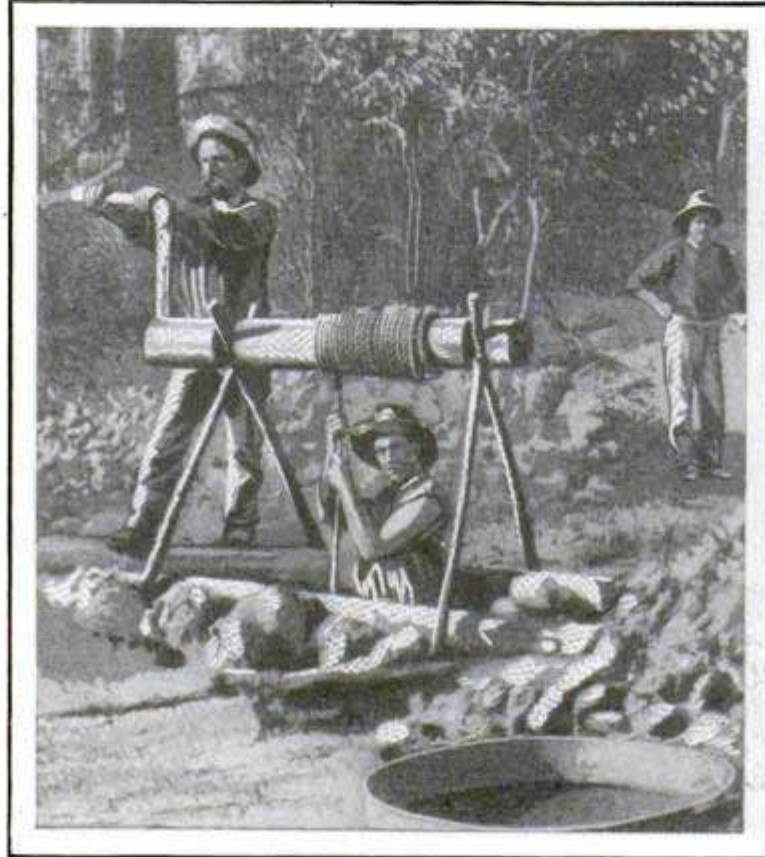
The buried treasure of Sir Henry Morgan, the famous buccaneer of the Spanish Main, whose "bank" was in the lonely isles of the Caribbean sea, is being sought for by Bernard Keegan, the famous American deep-sea diver and second mate of the wrecking tug "Favourite," of the Panama canal. Tradition says the treasure is hidden in a sunken cave. The mouth of the cave, above water in Morgan's day, is now seventy-five feet below the surface of the sea. An

authentic treasure still waits to be found in the Panama Canal Zone. Somewhere in the woods which adjoin the old Camino Real, or royal treasure road to Nombre de Dios, are buried great loads of silver captured by the English buccaneer, Sir Francis Drake, and his sea rovers from the Spanish treasure bands, bound to Panama City. They hastily buried 57,000 pounds of silver in expectation of a return which was never made.

A remarkable story of scientific discovery is that connected with the drilling for the head of the vast meteorite imbedded in the soil in Arizona. Many experts and engineers recently attacked this body, which hit the earth many years ago. The ancestors of the Navaho Indians appear to have seen this comet strike the earth. This meteorite is 300 feet in diameter, lies 1,400 feet below the present surface, and is so hard that it blunts the edges of the finest-tempered steel drill. It is thought to be worth \$50 a ton as it contains microscopic diamonds, platinum,

iridium, nickel and pure iron. Hundreds of thousands of dollars and the wits of the cleverest American engineers and college professors have been vainly spent in trying to solve the mystery of the Money Pits of Oak island and its sheltered haven, Mahone bay, Nova Scotia. Three young

men once landed there with canoes and explored a grove of oaks. They found a clearing in the center of which was a large oak, scarred and blazed with an ax. A rough derrick appeared to have been attached to a lower, sawn-off limb, and block and tackle used. Beneath, some twelve feet in diameter, was a circular depression in the earth. The tide in the cove was low, and, prospecting around, they soon found a ring-



Working a Sapphire Mine in Australia; Simple Methods Still Prevail, Windlass, Pick and Shovel Being Widely Used

bolt, apparently a mooring place of bygone days. A copper coin, dated 1713, and an ancient boatswain's whistle were found.

Then the men dug down into the clearing beneath the oak, and found a shaft in which they could discern the work of other picks and shovels. Twenty feet below the surface, they uncovered thick planking, and ten feet deeper, a timber bulkhead. None of the natives would help as they said ghostly flares had been seen at night in the cove. Numerous attempts were made without success, to solve the secret of the pits, the most scientific being in the twentieth century when a syndicate sank 20 shafts in a ring around the pits, and bored a network of tunnels. About 126 feet below the surface, the drill encountered a piece of iron past which the incasing pipe could not be driven. A smaller auger was used, and thirty-three feet lower, it struck a layer of cement, seven inches thick, covering oak. Beneath was some soft metal and the drill brought to the surface a small fragment of sheep-





Once Owned by King David, This Plate, Approximately 4,000 Years Old, Is Now in the National Museum; Below, Pearl Necklace Worn by Madame Thiers and Valued at \$1,500,000 Contains 153 Beautifully Matched Pearls with a Diamond and Ruby Clasp



Diamond of 127 Carats Priced at \$300,000



Topaz Weighing 180,000 Carats or About Eighty Pounds in the Field Museum of Natural History Collection, Discovered by Dr. O. C. Farrington, Curator of Geology



Emblematic of the Grandeur That Belonged to Imperial Russia, the Elaborately Jeweled Crown; It and Other Regal Gems That Were the Property of the Czar's Family, Are Now for Sale by the Soviets

skin parchment upon which had been written in ink the syllable "wi." Wood and iron were also raised, but the soft metal, presumed to be gold, did not cling to the auger.

It was supposed that the layers of planking were treasure chests. During the borings, seven chests or casks were met with, but it seems most remarkable that any pirates or buccaneers acquainted with the

parchment, yellow with age and bearing an inscription in French. It directed him to go to a certain spot where he would find "buried in plaster, burnt wood, plate and ingots of silver, and a sheep's skull. Beneath is the secret of great treasure." He and his son dug deep at the spot indicated, and found the odd collection of articles together with a rusty iron-bound box. Inside was a chart in old French.



Where Precious Metal Is Handled like Common Freight; Piles of Silver-Lead Ingots on the Wharf at Port Pirie, South Australia

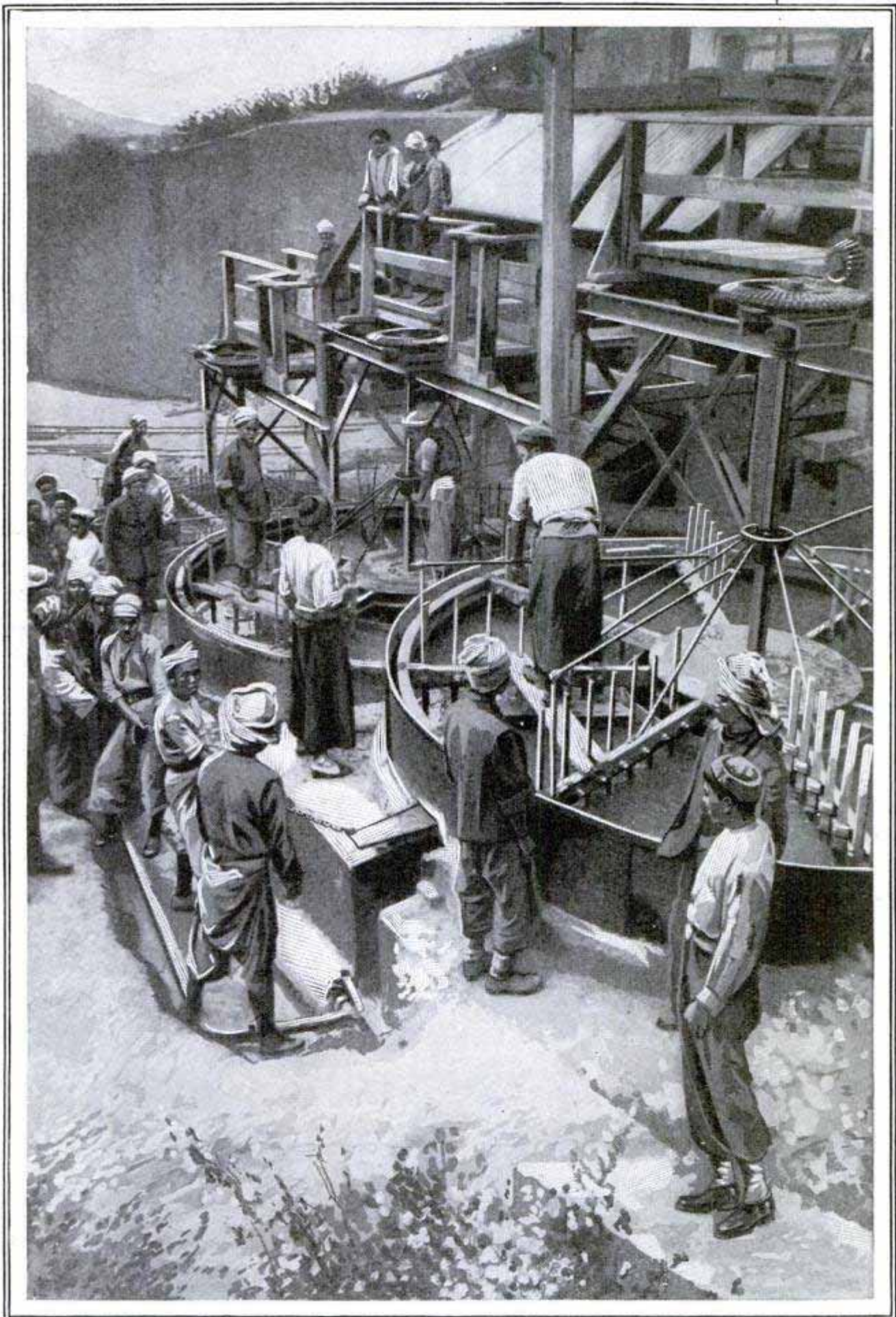
American coast should have gone to the astounding length of digging a hole over 160 feet deep, connecting it with the sea by an underground passage, and guarding it with layers of cement and timber. The syndicate sank a cofferdam near the ring-bolt and found drains, but a high tide rose and overwhelmed the dam. Hosts of engineers, equipped with the latest appliances known to mechanical science, have attacked these baffling pits, but in vain.

A vast treasure of gold doubloons, louis d'or, and grand seigneurs' family jewels from old chateaux in Quebec and France, awaits some lucky searcher on the land of a Catholic church in a little bay on the river St. Charles, near Quebec. It is known that Montcalm, in 1758, ordered all this treasure to be sewn up in hides and pigskins, deposited in brass-bound coffers, and taken in boats up the St. Charles river. All trace of this treasure vanished until the twentieth century, when a French habitant of an old chateau near Quebec found a small silver box in a cavity at the back of his fireplace. It contained a small

and the following: "Across the river St. Charles to the wood near the small bay and peninsula. Twenty feet NNW by N, toward a clump of firs. Fifty feet as the sun sets. Five feet deep and set in plaster, our great treasure out of the citadel."

The land on which the treasure now lies being church property, the two men dug secretly at night. They found nothing because the clump-of-firs clue was rendered useless by the growth of a large wood. The search was abandoned.

Some 600 miles southwest of Panama, in the Pacific, is far-famed Cocos island. Every year sees some ship sailing through the Golden Gate of San Francisco or past Long Island bound to this siren rock. Every year closes its eyes upon some baffled expedition creeping back to the home port. In September, 1925, the English yacht "St. George," sent out by the Scientific Research association, returned to England, after touching, among other places, at Cocos island. They searched for, but found no treasure on it, though there is said to be buried some twelve mil-



© U. & U.

Elaborate Apparatus Used in Burma to Wash Gravel in Search of the Most Precious of All Gems, the Ruby;  
Fine Specimens Are Valued Much More Highly Than Diamonds



© Keystone

lions' worth of plate and jewels stolen, in the revolutionary year 1820, from the Spanish residents of Lima, by a Capt. Thompson of the brig "Mary Dear." Two sea captains, named Keating and Bogue, of Newfoundland, about forty years ago, with the aid of a chart left by Capt. Thompson, are said to have found the treasure in a cave on the island; but the crew mutinied, Bogue was drowned in the surf, his pockets loaded with the loot, and Keating was carried out to sea.

A more costly treasure search, or one in which modern engineering science on a larger scale has been employed, would be hard to find than that of the sacred lake of Guatavita, Colombia. Thirteen years of hard work and \$75,000 were recently spent on draining this lake, in the bed of which is believed to lie \$5,600,000,000 worth of jewels and ornaments. The famous legend of El Dorado, or the "Gilded Man," had its origin in the fact that each new chieftain or Indian cacique cov-

ered himself with gold dust, and plunged into the waters of this lake, where it was washed off, while throngs of watchers threw in jewels and gold to propitiate the goddess of the lake. The lake is about forty-six feet deep and 13,000 feet wide, set in a cup surrounded by conical peaks. A tunnel was driven through the mountains and carried seventy feet below the level of its surface. The water was drained off through carefully prepared sluices, and twenty-five feet of bottom mud was exposed after three years of boring and sluicing. Ornaments and jewels were

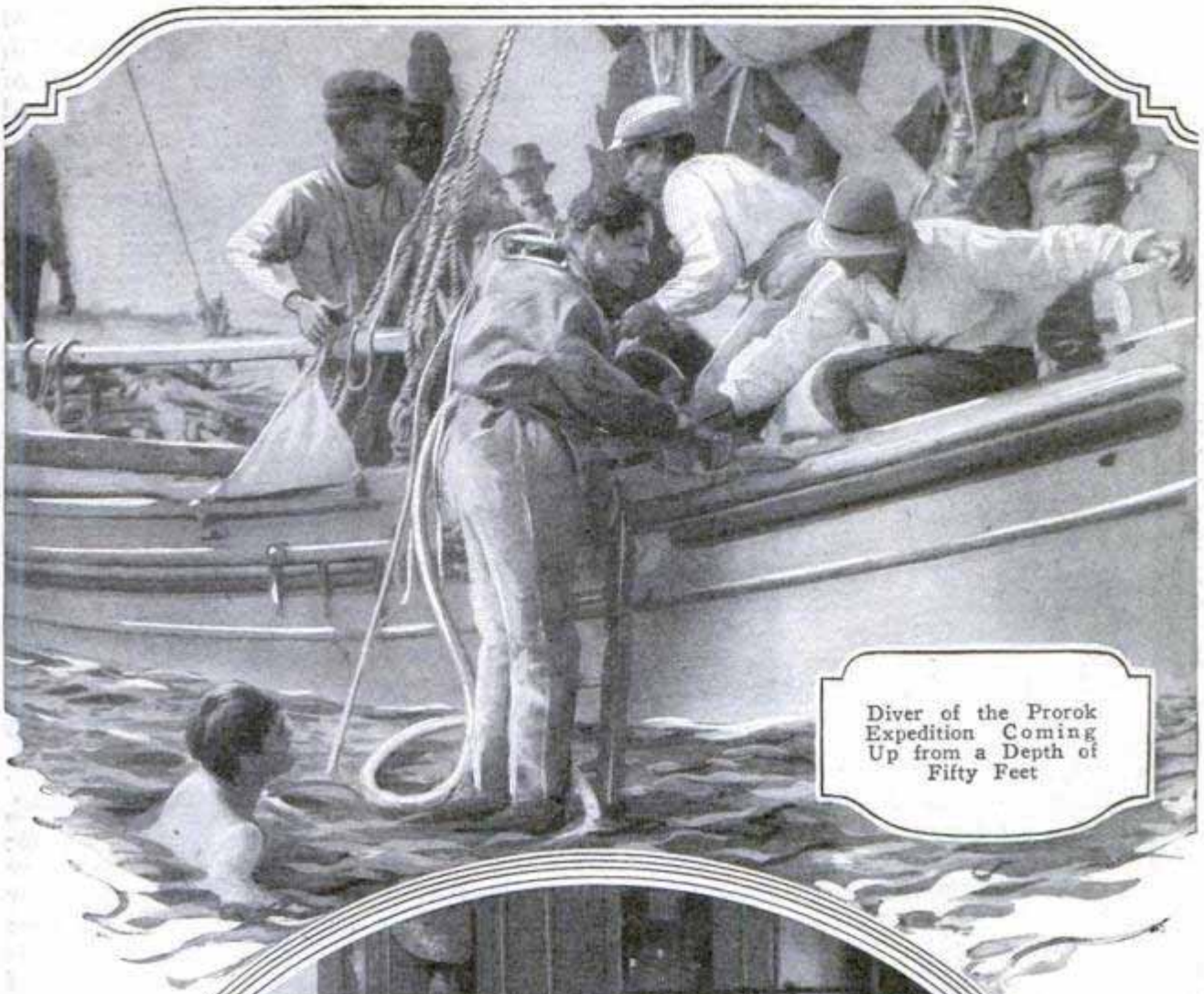
found, but the mud set hard, and an attempt to drive the tunnel from the edge of the lake to the center was given up for lack of funds. Shafts were bored in the petrified mud, and channels driven through it. More gems were found, worth about



© U. &amp; U.



Seascope; Washing for Rubies, and Using Divining Rod



Diver of the Prorok Expedition Coming Up from a Depth of Fifty Feet



Curator of Russian Jewels Examining Some of the Imperial Utensils

\$10,000. The treasure had sunk very deep down in four or five hundred years. Finally, the concern went into liquidation.

Bolivia, too, has its hoard of Jesuit gold, \$44,000,000 worth of it, hidden at Sacambaya. Much good money has been spent in looking for it. It is not generally known that a native of Bolivia did, in 1912, without any flourish of trumpets, actually unearth a hoard of Jesuit gold, valued at \$4,500,000 and derived from gold mines in the district.

One thousand four hundred miles out from Bahia, in mid-Atlantic, is the strange and lonely island of Trinidad, a mass of volcanic rock, surrounded by boiling surf which makes it difficult for boats trying to land. Expeditions are constantly being fitted out to sail to this island on which pirates have buried an immense treasure of gold and silver, plundered from Peruvian churches, in the days of Bolivar, the liberator.

An old sea captain, on a voyage in the East Indies, was handed a chart of the island by a Finnish sailor, who pointed out a spot, called the sugar-loaf mountain, at the base of which the loot was buried. The Finn said he was the sole survivor of a band of pirates, the other members having been hanged by the Spanish in Cuba. Some time after, an English barrister, E. F. Knight, organized an expedition and set sail for Trinidad, calling on the way out at another lonely island in the

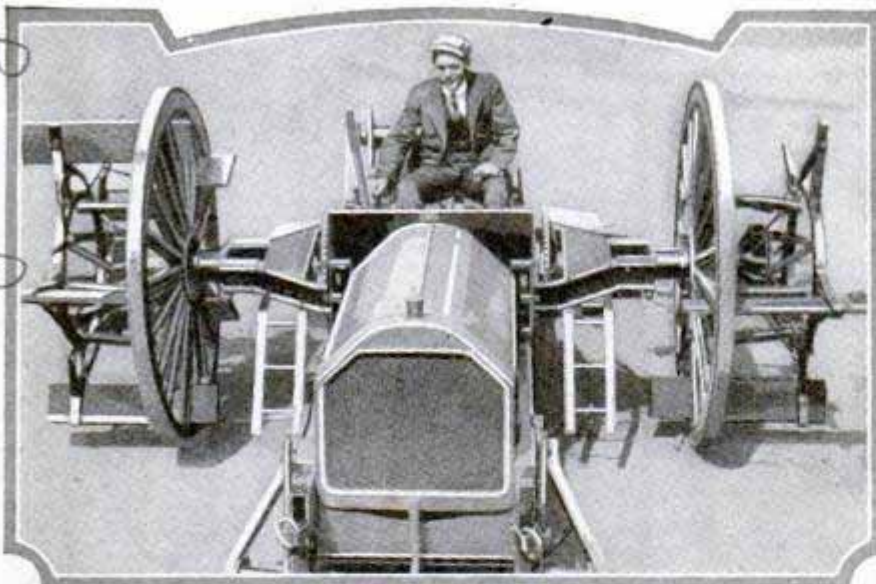
Salvages group (Great Pitou), south of Madeira. On this latter island, the British admiralty records vouch for the burial of \$2,000,000 by a mutinous crew who had murdered the captain of a ship, bound from Brazil to Cadiz, in 1804.

The English barrister and his comrades worked four days on the shining sands of the beach of Great Pitou, but the old chart had been made unreliable by the action of wind and waves on the landmarks. The shores of Great Pitou sank down on the horizon, and the ship sailed on over the Atlantic to Trinidad. Once on its terrible coast they landed mechanical appliances and stores with the utmost exertion. Near a ravine they found a cairn which the pirate's chart depicted as a landmark. They blew up thousands of tons of rock with dynamite and excavated mountains of earth to a depth of twenty feet in the ravine. Battling against tremendous odds they had at last to give up.

922  
**SCOW AND TRACTOR COMBINED TO TRAVEL SEA OR DESERT**

Capable of traveling over rough ground, sand and marshes as well as water, a combination boat and tractor built to carry supplies and men to a mine in the interior of Mexico, has broad steel paddles on its wheels. These propel the scow, which is seventy feet long and has a capacity of twenty men besides several tons of freight,

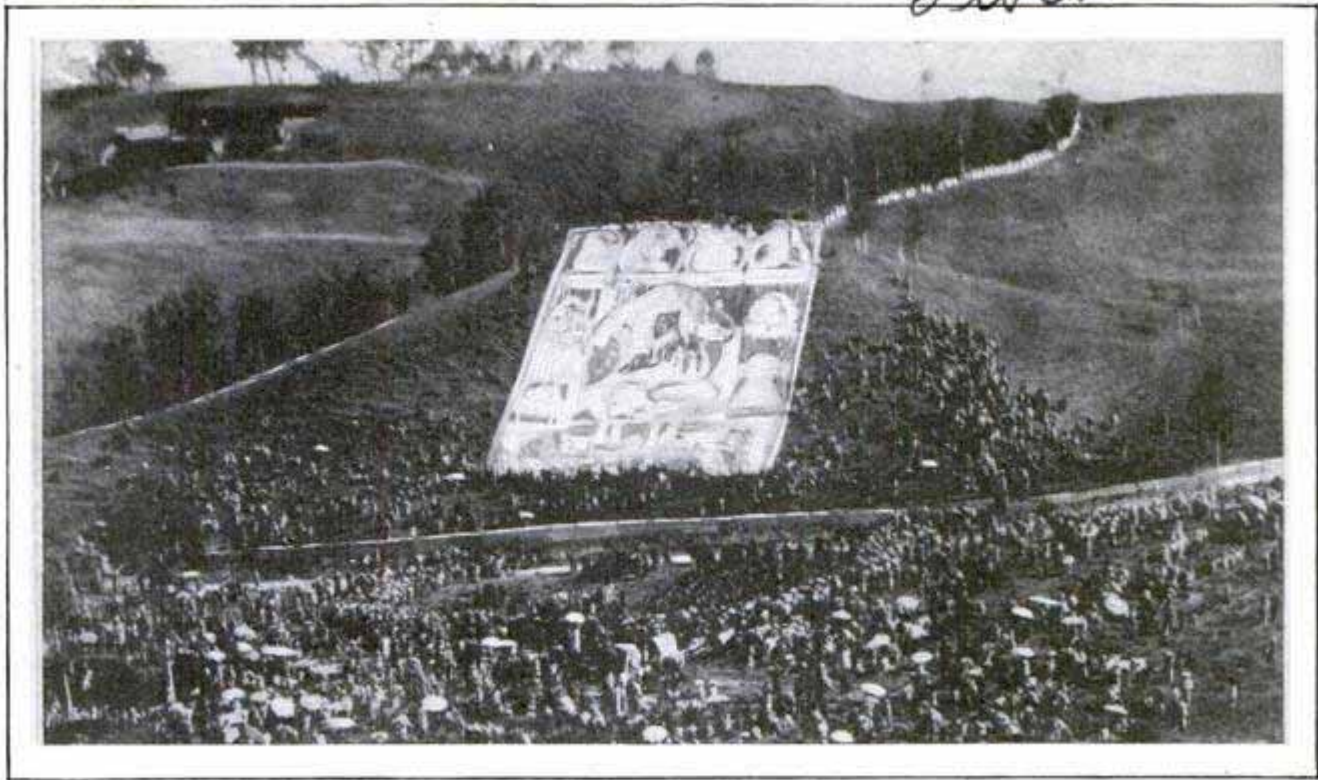
and also afford traction in case the outfit, being driven on land, should sink into soft sand or mud. The motor and chassis, removed from the boat body, are capable of doing dredging, excavating or hauling. A speed of five or six miles an hour on land or water is developed, and included in the equipment is a powerful winch for use when the outfit is working as an excavator.



Upper View Shows the Chassis, Motor and the Huge Wheels with Paddles Attached to Spokes for Water Travel; Below Is the Long Metal Body

Emb. C. S. Percival 152 W. 65th St. New York City

*Suadish Monastery  
near Kumbuw,  
Tibet*



Natives Thronging to View the Great Tapestry of Buddha, Spread Out on the Hillside Once a Year by Tibetan Monks as a Religious Ceremony

**LIFE OF BUDDHA TOLD IN SILK ON HUGE TAPESTRY** 885

Besides a huge portrait, a piece of silk tapestry measuring 30,000 square feet, kept at a Tibetan monastery, depicts incidents in the life of Buddha on its intricately embroidered edges. Once a year, on a bright day, the monks spread the cloth on a hillside in the belief that the display will please Buddha and give him an opportunity to see his devout followers who come from hundreds of miles around to view the tapestry.

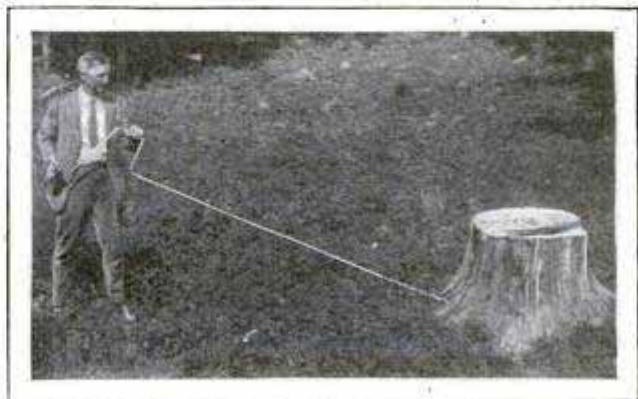
**CITIES TO USE SEWAGE GAS FOR LIGHT AND HEAT** 962

From a by-product in the treatment of city sewage, gas from which heat and light may be derived, can be salvaged instead of wasted as is now the practice, according to a report by the Illinois state water survey. Experiments already conducted indicate that, in a city of 50,000 persons, approximately 90,000 cubic feet of this gas are given off daily from treatment tanks. It is said to contain about seventy per cent methane, which is one of the chief combustible ingredients of natural gas and has a heating value greater than that of common fuel gas, while giving off no more odor than the ordinary commercial product. The gas is formed during the process of converting the sewage into liquids in special tanks. Carbon

dioxide and nitrogen are other gases formed. Experiments are now under way looking toward the collection and utilization of the gas and to developing a new type of tank which will yield a maximum salvage of this by-product.

**AUGER FOR BORING STUMPS HELPS CLEAR LAND** 916

Cut-over land is often cleared by dynamiting the stumps, and to simplify this work, a long hand auger to bore holes for placing the charges has been devised. It is said to operate successfully in all kinds of wood, bores an opening one and one-half inches in diameter, and is six feet long. The auger has also been used to bore holes for blasting quantities of hardened acid phosphate in warehouses.



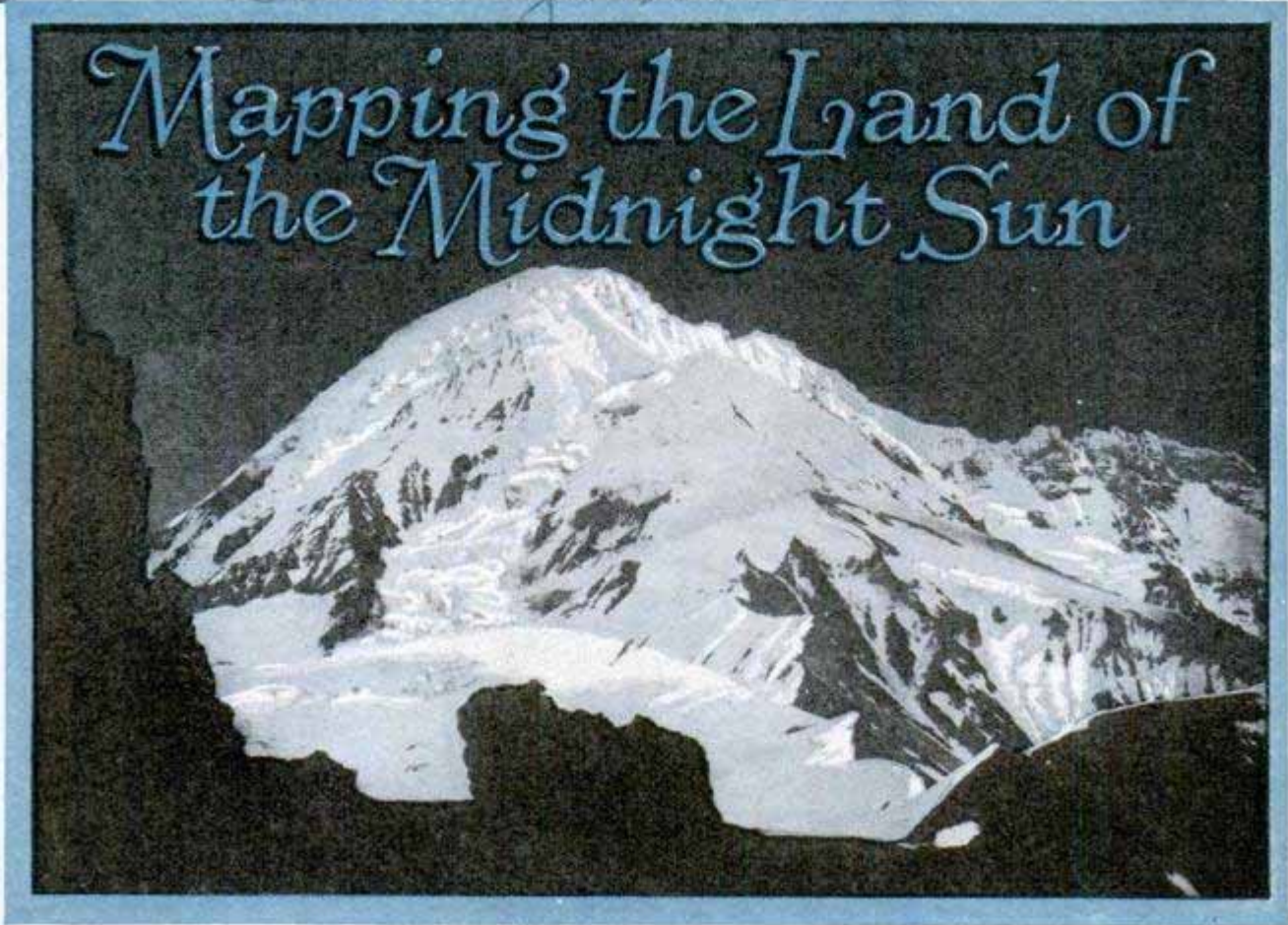
Boring Hole in Stump with Auger for Charge of Dynamite to Clear Land

*Cowan Alford Boring  
Machine Co. 1621 Brown.*

*Ala.  
Birmingham  
near Bleda, Birmingham*

national Bank Bldg  
Washington, D.C.

# Mapping the Land of the Midnight Sun



**T**HE exploration and mapping of some 7,000 square miles of territory in extreme northern Alaska, the greater part of which had never been seen by a white man, resulted from the expedition sent out last year by the geological survey. Gerald FitzGerald and Walter R. Smith, the topographer and geologist of the party, have returned after more than seven months of work, during five of which they did not see any human beings except the other two members of their party, and were entirely out of communication with the rest of the world. The other members were Faye Delezene and Walter R. Blankenship.

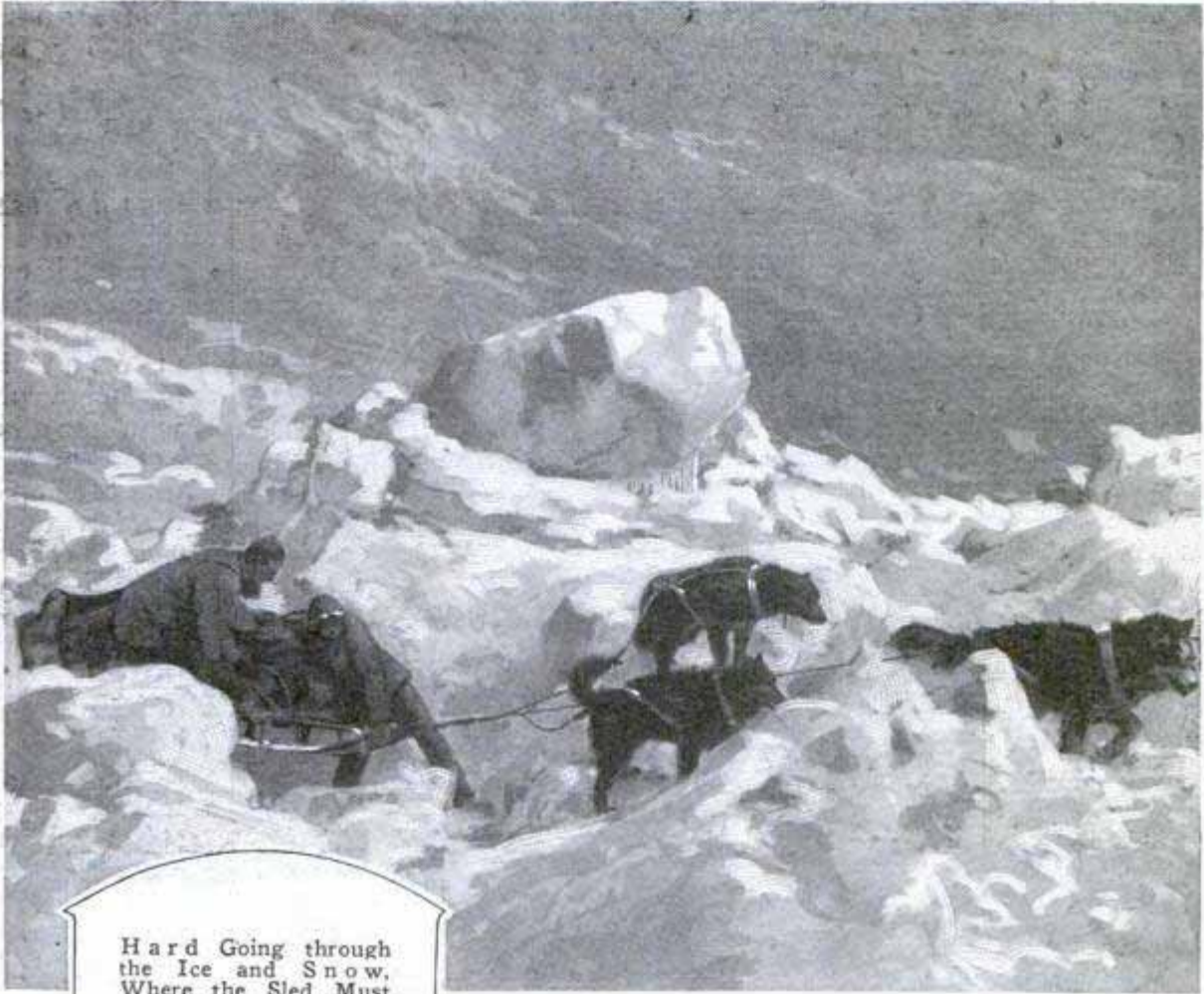
The story of their trip, as reported to the secretary of the interior, is a simple narration of the doing of the job, which was part of their routine duty, but through this simple account runs an enthralling undercurrent of the adventure and romance that are inseparable from exploration in unknown regions, where success depends upon the physical fitness and capable performance of each member in meeting pioneer conditions.

FitzGerald, Smith and Delezene sailed from Seattle and arrived at Nenana, the terminus of the Alaska railroad, last spring. The fourth member of the party, Blankenship, had arrived in Nenana from

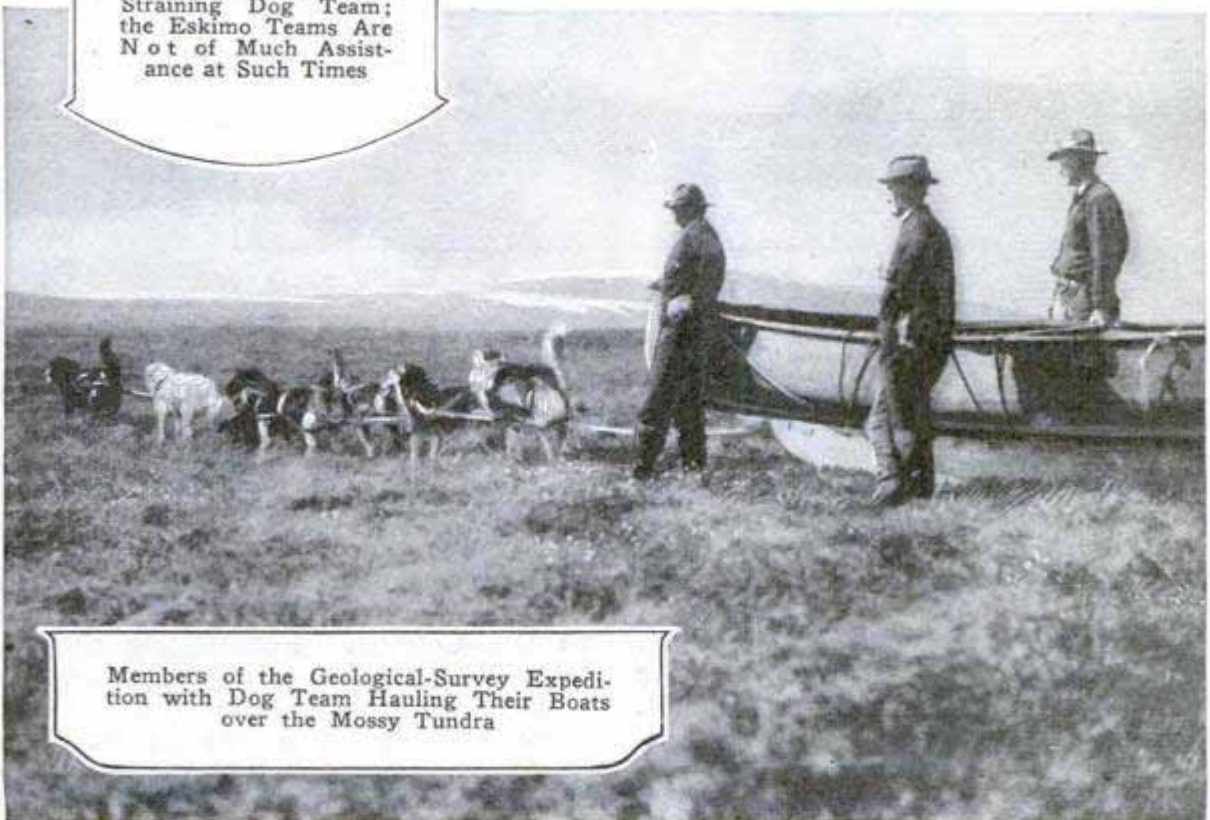
Tanana with two dog teams of eleven dogs in each, the day before. Sixty miles out on the trail, Blankenship had lost a finger while unfastening the dogs from a snubbing post, but he came on to Nenana and had the wound dressed by a physician. This was the only accident of the entire trip. After two days' delay, the party set out with the two dog sleds, each loaded with about 400 pounds of camp equipment and instruments, for the head of Colville river, more than 1,000 miles away.

The route followed led down Tanana and Yukon rivers to Kaltag, overland to Unalakleet, an Eskimo village on Bering sea, northward along the coast, across Norton sound and the base of Seward peninsula, and beyond the Arctic circle to Kotzebue. The distance of about 700 miles from Nenana was accomplished in twenty-six days of actual traveling, so that the average was twenty-seven miles a day. The greatest distance made in one day was forty-two miles. Over nearly the entire distance from Nenana to Kotzebue, at least one man ran behind each sled to guide it by means of handlebars. Often it was necessary to go on snowshoes ahead of the dogs where the trail was obscured by drifts and newly fallen snow. The snow was four or five feet deep, and when the sleds missed the beaten trail a few





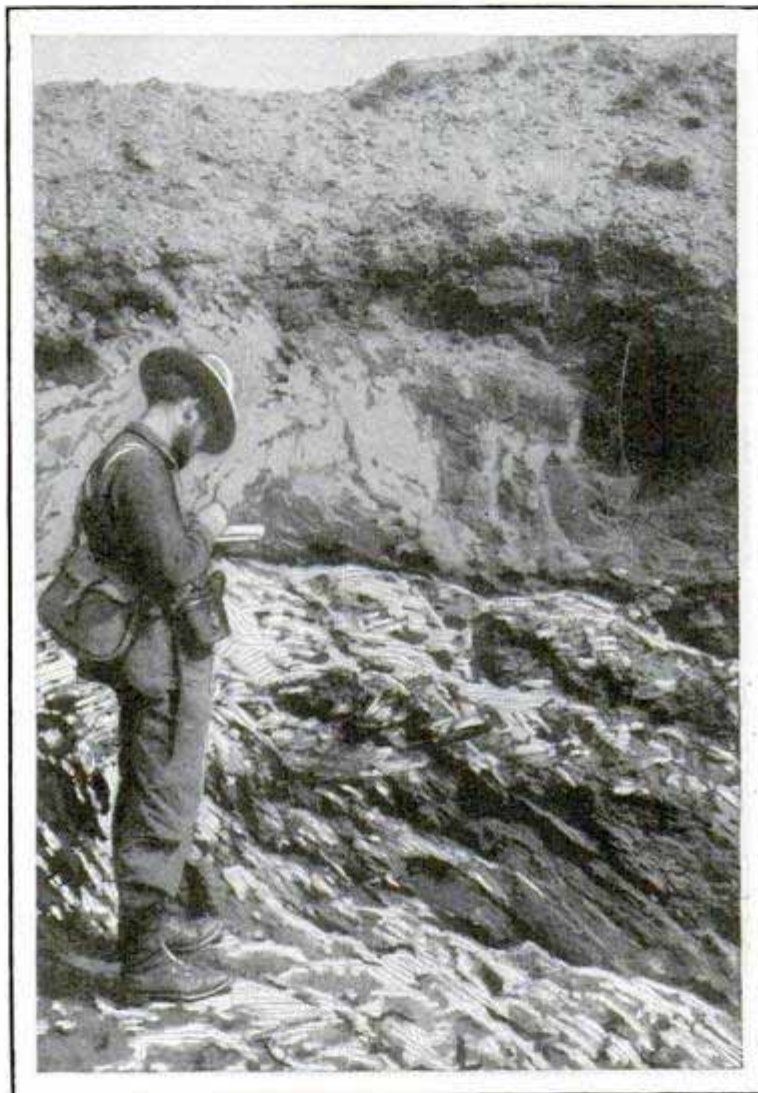
Hard Going through the Ice and Snow, Where the Sled Must Be Lifted over Hummocks to Help the Straining Dog Team; the Eskimo Teams Are Not of Much Assistance at Such Times



Members of the Geological-Survey Expedition with Dog Team Hauling Their Boats over the Mossy Tundra

inches, they would upset in the soft drifts. Little accidents of this kind would sometimes result in a fight among the dogs. The arrival at Kotzebue ended the first stage of the journey, the greater part of it on the trail over which the diphtheria antitoxin had been raced to Nome a few months earlier, and over which the mail

for Nome and places farther north is hauled at regular intervals throughout the winter, regardless of storms and temperature as low as sixty-five degrees below zero. When the survey party left Nenana, the weather was warm and it had been raining, a condition which suggested an early spring and which was rather discouraging for the long trip ahead over the snow. However, the temperature dropped in a few days, and before the party left the Yukon it was thirty degrees below. One member suffered a few frostbites. A heavy snowstorm was encountered while the party was crossing Norton sound on April 1. The snow became incrustated over the eyes of the dogs, and it was necessary for a man to go on ahead of the team. At times it was impossible to see the lead dog. Had it not been for a well-staked trail, the party probably would not have reached the roadhouse at Koyuk that night. When they arrived, however, at eight o'clock, the Eskimo keeper asked in astonishment, "Where you come from?" When informed that they had come from Bonanza, thirty miles across the sound, he replied, "I didn't think anyone would travel through that storm today."



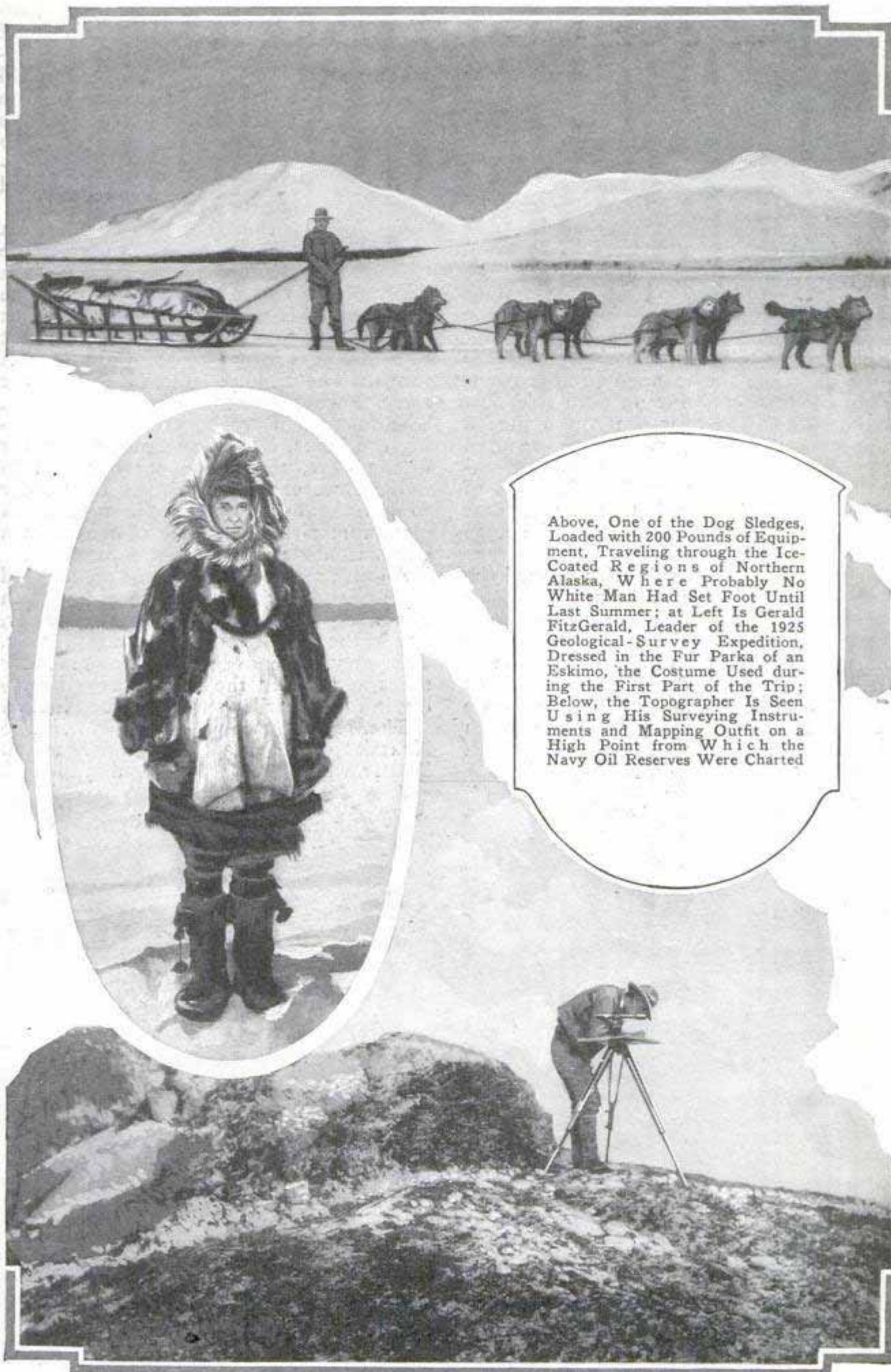
Geologist Examining a Specimen of a Mineral Deposit Found in Northern Alaska

At Kotzebue the party procured supplies for the summer and hired more teams to freight the provisions and canoes up Noatak river and across the De Long mountains of the Brooks range to the Arctic slope. Kotzebue marked the last roadhouse on the trip, and thereafter the party camped in tents, except one night

at the native village of Noatak. This village is probably unique in that it contains neither a white man nor a half-breed and not one of the population of 250 uses tobacco. The Eskimo drivers would not go farther than the head of Utukok river, on the Arctic slope, for fear that the snow would thaw before they could return. As the drivers turned back, the little party of four white men was left alone in the snow-clad Arctic wastes, to be for months out of communication, even by radio, with the rest of the world. Topo-

graphic and geologic mapping was begun from earlier surveys on the south side of the range and carried across to the headwaters of Utukok river. As fast as the weather permitted, the supplies were relayed on toward the head of Colville river, and a canoe, which had been cached by the party of the year before on the Utukok, was picked up and brought overland to the Colville. Fortunately the snow lasted longer than was at first expected, and before the ice left the Colville, the men were camped on its banks waiting to launch their boats. Several times the river opened and froze again during heavy storms, but on May 30 the boats were shoved out in the swift current, and the

586



Above, One of the Dog Sledges, Loaded with 200 Pounds of Equipment, Traveling through the Ice-Coated Regions of Northern Alaska, Where Probably No White Man Had Set Foot Until Last Summer; at Left Is Gerald FitzGerald, Leader of the 1925 Geological-Survey Expedition, Dressed in the Fur Parka of an Eskimo, the Costume Used during the First Part of the Trip; Below, the Topographer Is Seen Using His Surveying Instruments and Mapping Outfit on a High Point from Which the Navy Oil Reserves Were Charted

actual exploration of the upper Colville was begun.

Over white rapids and angry whirlpools and beneath undercut snowbanks, the little group floated on, never knowing what would happen around the next bend, but realizing that, if a boat should upset, it and its burden could not be regained or replaced, and that if anyone was injured, there would be no hospital or physician. Sometimes the boats would strike a rocky bar and would have to be lifted across. The dogs followed along the bank, but in trying to keep within sight of the boats, they would swim across the river many times each day.

The party followed the river for more than 100 miles and mapped an area twenty to thirty miles wide on each side. In making the trips over the rough tundra away from the river, the dogs were used as pack animals, carrying packs of twenty-five or thirty pounds for distances of eighteen to twenty-eight miles a day. Over a short portage some of the dogs carried forty pounds.

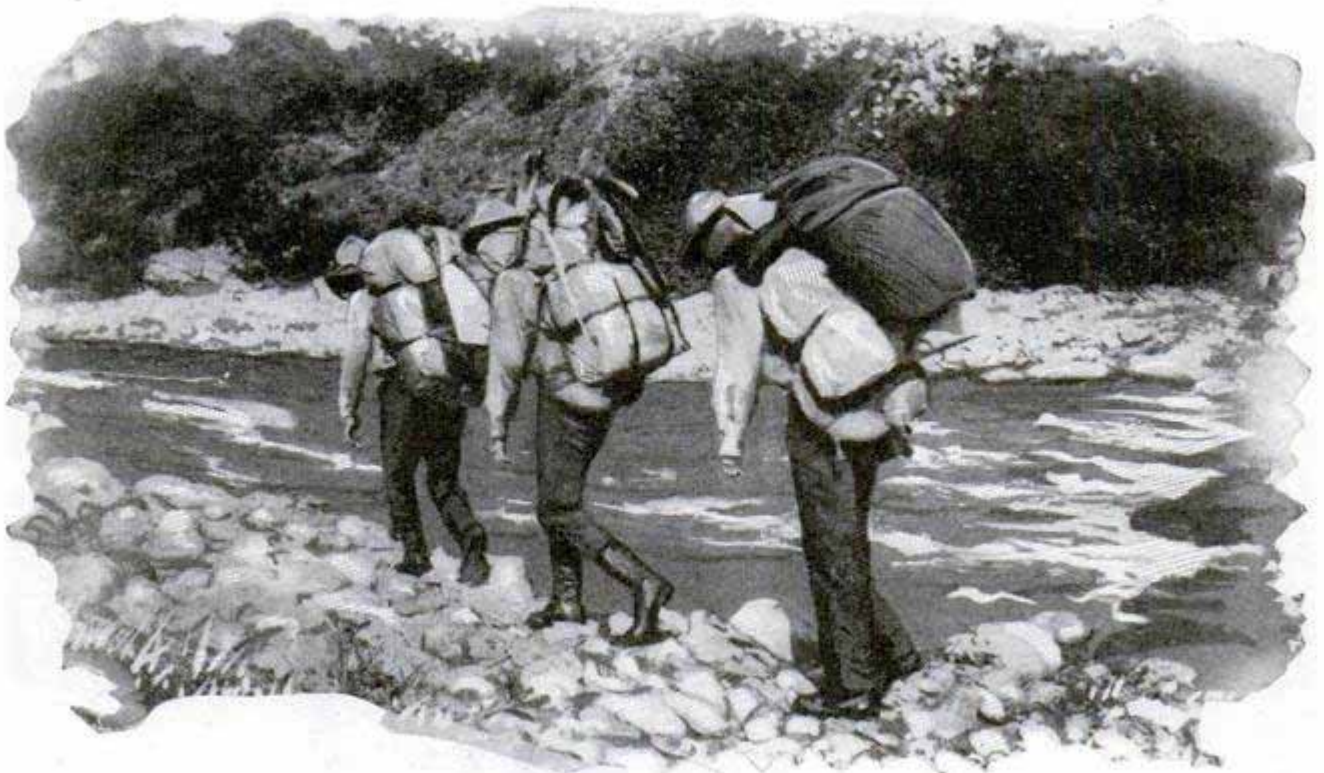
During one of the side trips toward the north from the Colville, the headwaters of Meade river were discovered. Snowstorms were frequent, but the snow did not remain on the tundra, and by the middle of June, the hills were dotted with flowers of many species and colors. Caribou were seen in small bands every day, and enough were killed to supply the camp with fresh meat in abundance.

The country along the upper Colville is not thickly populated with small animals and birds. Formerly the Eskimos lived along its banks, and their old igloos, pieces of clay pottery and broken bone implements were found. The people probably migrated to the coast many years ago to be nearer to the traders and missionaries. Parts of the interior northland are now unknown to the Eskimos.

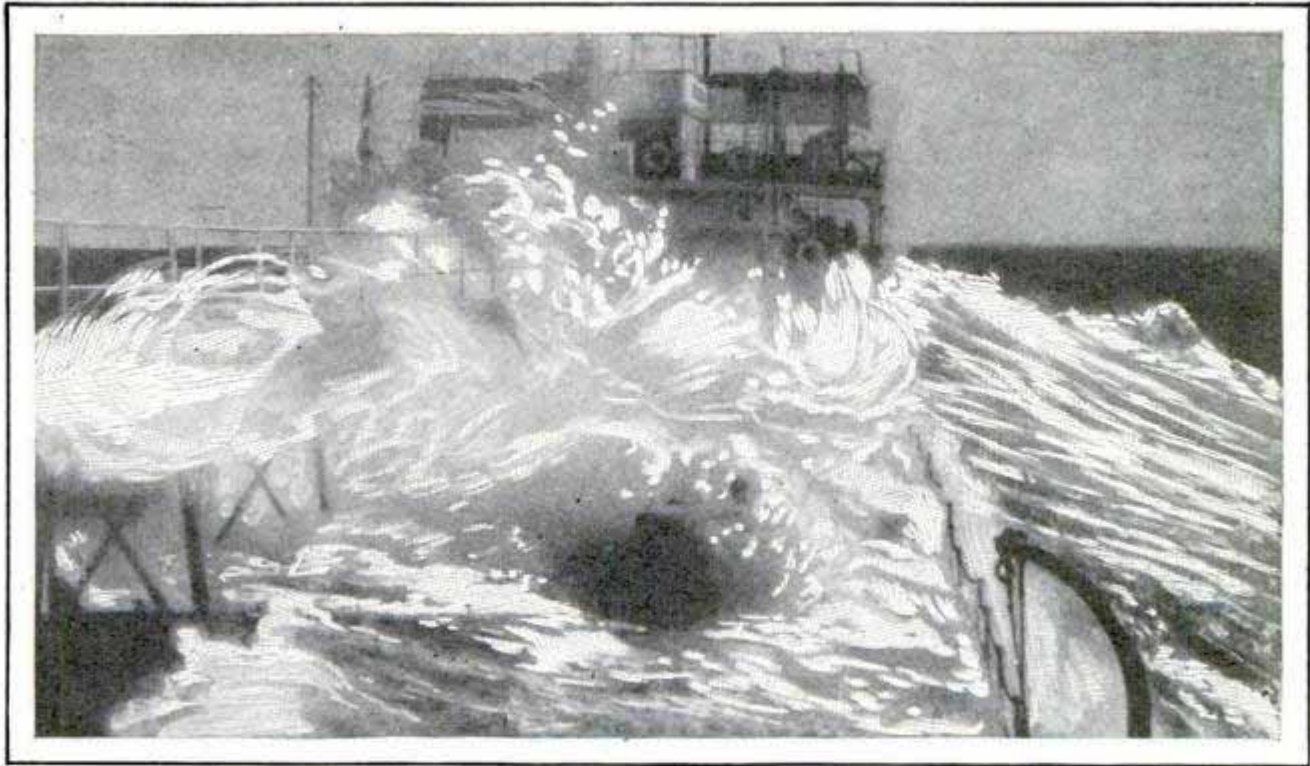
On July 13, the work was tied in to a previous survey of the central part of the Colville valley, and the party turned south up Etivluk river, a large tributary of the Colville. This river was ascended about eighty miles to its source, at the summit of a low pass in the heart of the Brooks range. The Etivluk is a swift, turbulent river, flowing over many rapids and bars. The dogs again proved very useful in lining the boats, but many times a day, for fifteen days, the entire party waded in swift ice water above their waists in order to get the boats across the rapids. A maximum airline distance of ten miles a day was made in this upstream travel.

A low, broad pass was found at the head of the Etivluk, and a portage of less than one mile put the explorers on Aniuk river, one of the main tributaries of the Noatak. The party descended the Aniuk about fifty miles and closed the new surveys by tying in to the earlier survey of the Noatak.

The return trip was made down the Noatak to Kotzebue, thence to Nome and Seattle, where the party arrived in the fall.



A Bit of Hard Going along an Unnamed River, Carrying Heavy Packs on Tumplines; during the Brief Summer Sleds Are Useless, and Away from the Streams, Supplies Must Be Carried in This Way



Almost Submerged by a Gigantic Wave; Photograph of Deck of Steamer "Trimountain" Snapped by a Sailor Whose Camera Caught the Angry Billow at the Height of Its Attack

**BIG SHIP BECOMES "SUBMARINE" DURING HEAVY STORM**

During a severe storm on the Atlantic, an alert seaman obtained the photograph shown here, a view of the S.S. "Trimountain," from New York, almost completely submerged by a heavy wave. It struck the steamer full on the side and, for a few seconds, nearly the entire deck was flooded. Although the big ocean greyhounds of today can plow through stormy weather with comparatively little difficulty, an occasional sea will give them considerable trouble.

1015

**INSECTS USE GAS AND ACIDS IN WAR AGAINST ENEMIES**

Use of poisonous gases and acids in the World War was an innovation in military science, but such tactics long have been used by various insect tribes. The "bombardier beetle," for instance, when pursued by an enemy or otherwise disturbed, discharges a sort of bomb in the form of an ill-smelling reddish acid fluid which changes into a bluish smoke or vapor when it comes in contact with the air. When a log under which these active creatures have made their home is lifted, they often may be seen scurrying away and covering their retreat with a barrage of tiny gas bombs. Their red heads and bodies and blue wing covers, like uniforms, harmonize with their military ac-

*with 12/20/25*

tions. Several species of beetles have similar weapons for defense. The acid secretion from some leaves a persistent red stain and has a bitter taste.

**STORM COVER FOR SCREEN DOOR PREVENTS DRAFT AND RUST**

994

Attached to the screen door with snap fasteners, a storm cover with a window at the top, protects the mesh from rust besides keeping rain and wind from entering the house. It can be adjusted or taken off in a few moments, is easily stored away and is said to last for years.



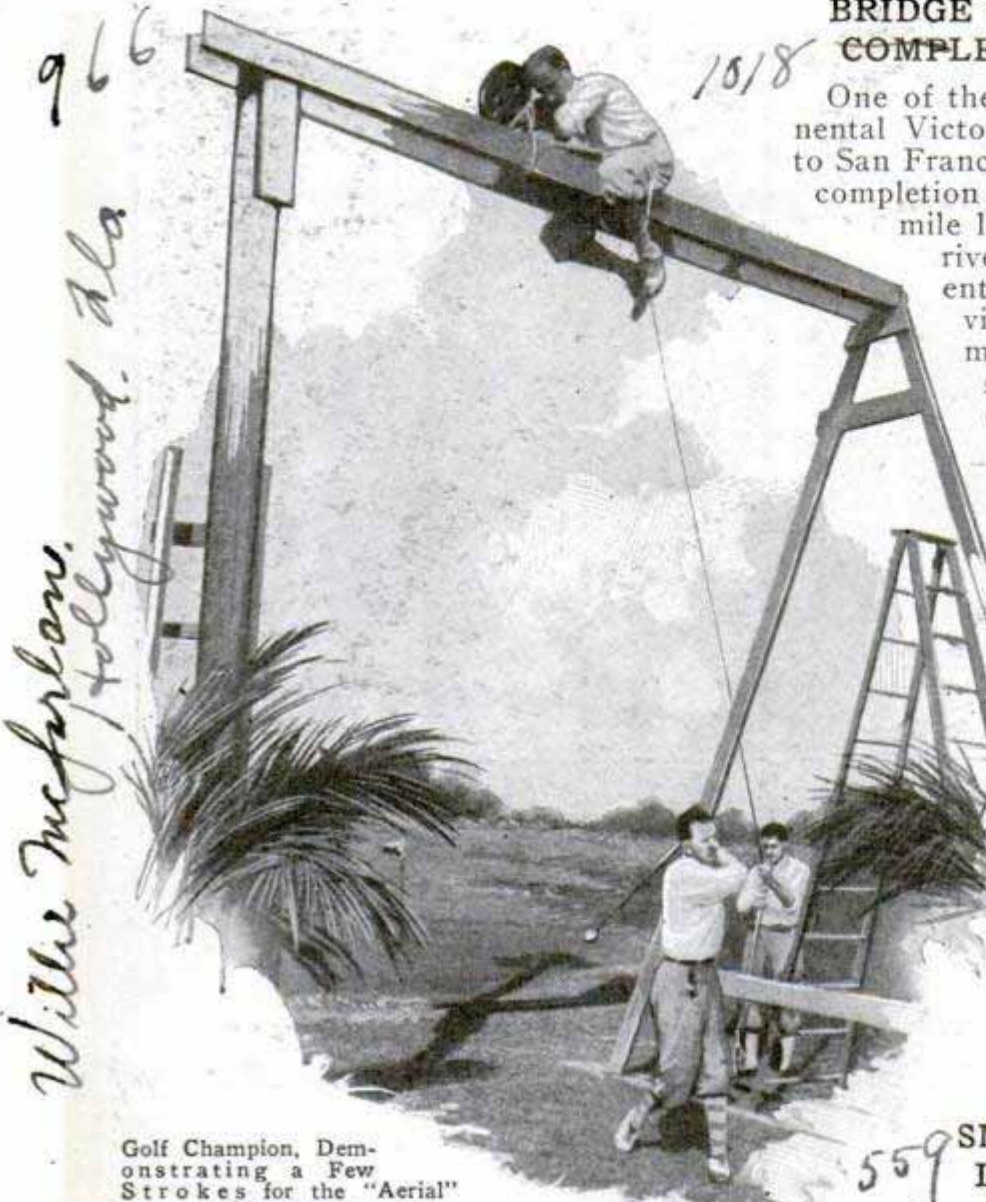
Cover in Place, Showing the Window; and Attaching It to Door with Snap Fasteners

*D. J. Russell  
Box 187  
Pine Bluff*

*California - on a road*

*Auto*  
**BRIDGE NEARLY MILE LONG  
COMPLETES VICTORY ROAD**

One of the last gaps in the transcontinental Victory highway from New York to San Francisco has been closed with the completion of a new bridge, nearly a mile long, across the San Joaquin river valley. The structure, seventy feet above the river, provides navigation beneath it for most ships, while one 270-foot span is of the lift-type and can be raised 135 feet above the water. The San Joaquin has acted as a barrier between Contra Costa and San Joaquin counties, but the new bridge will not link them but open up the fertile delta land country to automobile traffic from San Francisco or the east. The bridge, which cost over \$2,000,000, carries a concrete-paved road, twenty-one feet wide, with a one-way capacity of 1,200 automobiles an hour. The Victory highway, used by many transcontinental tourists, enters San Francisco via Oakland and the ferries across the bay.



*Willie McFaylon,  
Hollywood, Fla.*

Golf Champion, Demonstrating a Few Strokes for the "Aerial" Cameraman

**SLOW MOVIES FROM SCAFFOLD  
SHOW GOLFER'S STYLE**

Golfers have been photographed from nearly every position in playing pose, from under glass, from close and distant range, but recently aerial movies have been taken, showing how a champion player makes a stroke as seen from a vantage point several feet above his head. The camera was an "ultra-rapid" instrument, producing the so-called slow-motion film for closer study of the subject, and was mounted on a scaffold. The operator straddled the crossbar and was further steadied by a rope about the waist and attached to the beam. The lens was directed at such an angle that the pictures would show clearly how far the player stood from the ball, how high the club was raised and the arc it described during the stroke.

☐ The snail's speed limit is about a half mile a week.

**SMALL HAND MAGNET  
LIFTS FIFTY POUNDS**

Supplied with current from the house-lighting socket, a magnet that will lift thirty to fifty pounds, is intended to save time and labor in handling metals. It is energized by closing the circuit with thumb pressure on a push button on the grip. Releasing the pressure, causes the magnet to drop its load. When only alternating current is available, a motor generator set is provided with the magnet to supply direct current, or battery equipment is furnished in case electric power cannot be obtained. The magnet is designed especially for use in foundries, in hardware plants and stores, and in machine shops for cleaning turnings or chips from places not easily accessible, although it is equally serviceable wherever it is necessary to separate magnetic from non-magnetic material.



*K + B Co.  
495 n Third St*



Training the Sense of Touch to Serve in Place of Ears; Deaf Children Interpreting Piano-String Vibrations as to Pitch, Rhythm and Volume through the Finger Tips

## Teaching Deaf Children to Talk

How Radio and Scientists Are Helping the Handicapped to Hear and Speak by Modern Methods

By PAUL PADDOCK

THE piano was going at a sprightly tempo.

"Jingle bells, jingle bells, jingle all the way."

Six young voices, rhythmically reciting the words instead of singing them, gave listeners a thrill, for the pupils were deaf and they were receiving the swing of the jolly sleighing song through vibrations that passed from the piano strings into their sensitive finger tips, placed lightly on top of the instrument.

The scene is the recreation room of the Central Institute for the Deaf at St. Louis, Mo., where medical science and the teacher of the deaf have joined hands in making useful happy citizens out of children who cannot hear. The school is a philanthropic enterprise, founded and directed by Dr. Max A. Goldstein, an internationally known ear specialist, who has devoted more than thirty years to study and practice with a view to helping those handicapped by deafness to break down the barriers of their shut-in world and to take their places in the ranks of normal

speaking and hearing persons. Because of its policy of uniting and correlating the efforts of specially trained teachers and doctors, the school has come to be recognized as one of the leading institutions of its kind. By modern methods, young children are taught to interpret sounds through their finger tips, and they learn to speak so clearly that anyone can understand them, further proving that deafness and dumbness no longer are inseparable. Since speech is only a reproduction of sounds heard, deaf persons were inevitably mute until modern science found a way to establish contact for them by means of vibrations.

The visitor sees about a hundred boys and girls, gathered from twenty different states. They range from three or four up to seventeen years in age and are living and studying happily under the direction of a specially trained corps of teachers in a well-equipped building that contains dormitory quarters as well as classrooms and laboratories. Besides the school for the young, there is a depart-

818 S Kingshighway



This Pupil Failed to Pass a Simple Hearing Test; the Doctor Found That Discharging Ears Were to Blame

ment of lip reading for older deaf persons, a division for the correction of speech defects and a normal training school, which has qualified more than 400 teachers for the deaf in its regular and post-graduate courses since it was started, in 1914.

Recently, the institute has become an important laboratory for the practical testing of what promises to develop into a most helpful aid to the deaf, the radio. With this marvel of the age at its service, the institute already has made two definite advances in this work. First, application of radio principles and those of the telephone has enabled teachers and investigators to determine accurately degrees of deafness and to prepare graphic charts of a child's hearing for the guidance of instructors. Second, by a radio amplifier, remnants of hearing are stimulated so that the capacity for receiving sounds is widened in pupils not entirely deaf. Its service here promises immeasurable benefit, for only a small percentage of congenitally deaf children can be proved profoundly and totally deaf, and of all the children at present in schools for the deaf, it has been found that more than thirty per cent have some degree of hearing.

The apparatus used for this stimulation is a large cabinet containing radio-ampli-

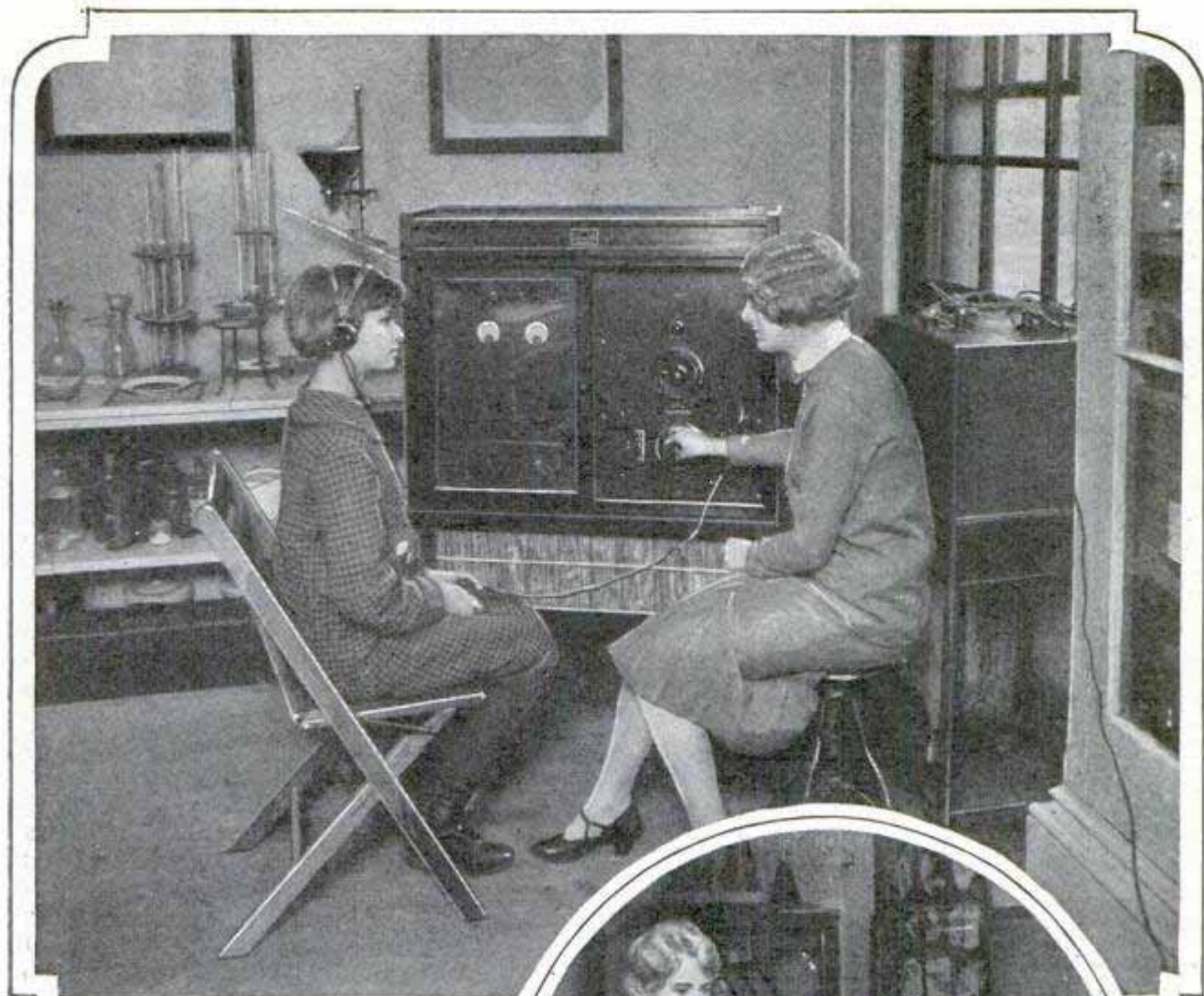
fying equipment. Headphones are attached so that a number of children can be tested and given treatment at once. The source of the sound delivered through the phones, is either a record played on a phonograph built as part of the cabinet, or the human voice spoken through a mouthpiece which may be plugged into the amplifier. Phone sets can be regulated separately as to volume of sound output, so that they can be made to fit the degree of hearing defect in each pupil. Some children who, at first, fail to distinguish the difference between simple vowel sounds, after periods of training, lasting from three months to a year, and practicing with the amplifier only a few minutes daily, demonstrate their ability to hear whole phrases of spoken language. Constant repetition of the same sounds is required to achieve these results, just as repetition is necessary in teaching a normal child to walk.

The use of the radio is in its infancy, and its application to the problems of the deaf is just begun, so that scientists cannot yet tell what results may be expected, but indications are that it holds most promising possibilities. To those who believe that there is something magical about the radio, as an aid to the hearing, the institute's research workers are prompt to answer that its effects are entirely due to enormous amplification of sound, and if a person is totally deaf, radio will be useless so far as receiving sounds directly is concerned.

Leaving this question of radio for the moment, the layman witnesses what is almost as wonderful: totally deaf children translating sound vibrations through their sense of touch. Here is a little girl who can repeat a variety of vowel and other sounds, changes of pitch, words and whole sentences, simply by interpreting the vibrations of a voice as they strike upon a piece of paper tightly stretched as a vibrating diaphragm across the larger end of an ordinary megaphone. She closes her eyes so that the instructor's lips will not give her a clue to the sounds, and places only the tips of the fingers of one hand on the diaphragm.

Going back to the music lesson you first saw, you learn that the pupil's performance is the result of patient training and proof of what can be accomplished by the acoustic method as developed at the Cen-





Testing a Central-Institute Pupil's Hearing with an Audiometer; This Instrument Makes Use of Certain Radio Principles in Producing Sounds of a Definitely Measured Intensity and Also Changes the Pitch of the Tones; the Child Strives to Hear the Vibrations through the Ear Phones; with the Audiometer, Remnants of Hearing That Might Easily Escape Other Tests, Are Discovered, Enabling the Teachers to Gain Access to the Child's Imprisoned Mind. At the Right, Another Pupil Is Demonstrating Her Ability to Interpret, through Her Finger Tips, Vibrations Produced by the Voice on a Piece of Paper Stretched over the Larger End of a Megaphone; the Little Girl's Eyes Are Closed So That She Cannot Read the Teacher's Lips. Before Visitors, She Repeated Words and Phrases in This Way, and after a Few Trials, Learned a Word That She Had Not Previously "Heard"



tral institute. Briefly, this method is to make use of sounds as produced by the voice, various musical instruments and radio apparatus to achieve perception and interpretation of the vibrations in the mind of the deaf child in teaching him speech. As the teacher plays, the pupil's voice responds to changes in pitch and volume as well as tempo. He keeps perfect time even when the rhythm is purposely made irregular. Only one step more, it seems, and he would be singing, were it not that difficulty in performing rapid changes of pitch offered an obstacle.

"These musical and other tests afford practical evidence in support of the theory of the eminent English physicist, John Tyndall, that the sense of hearing, is, after all, merely a modification of the sense of touch," Dr. Goldstein explains. "All other special organs of sense are modifications of the touch sense. They involve the reception and perception of special waves of motion. In case the natural organ of hearing ceases to function, a logical course is to endeavor to use some other channel for conveying the sound waves to the brain. With proper training, deaf pupils manage to do this effectively with their fingers and even with their feet. They learn to keep time while dancing to music from an orchestra by

interpreting the rhythm which is communicated from the instruments, through the floor into their feet, up the bones and into the special centers of the brain."

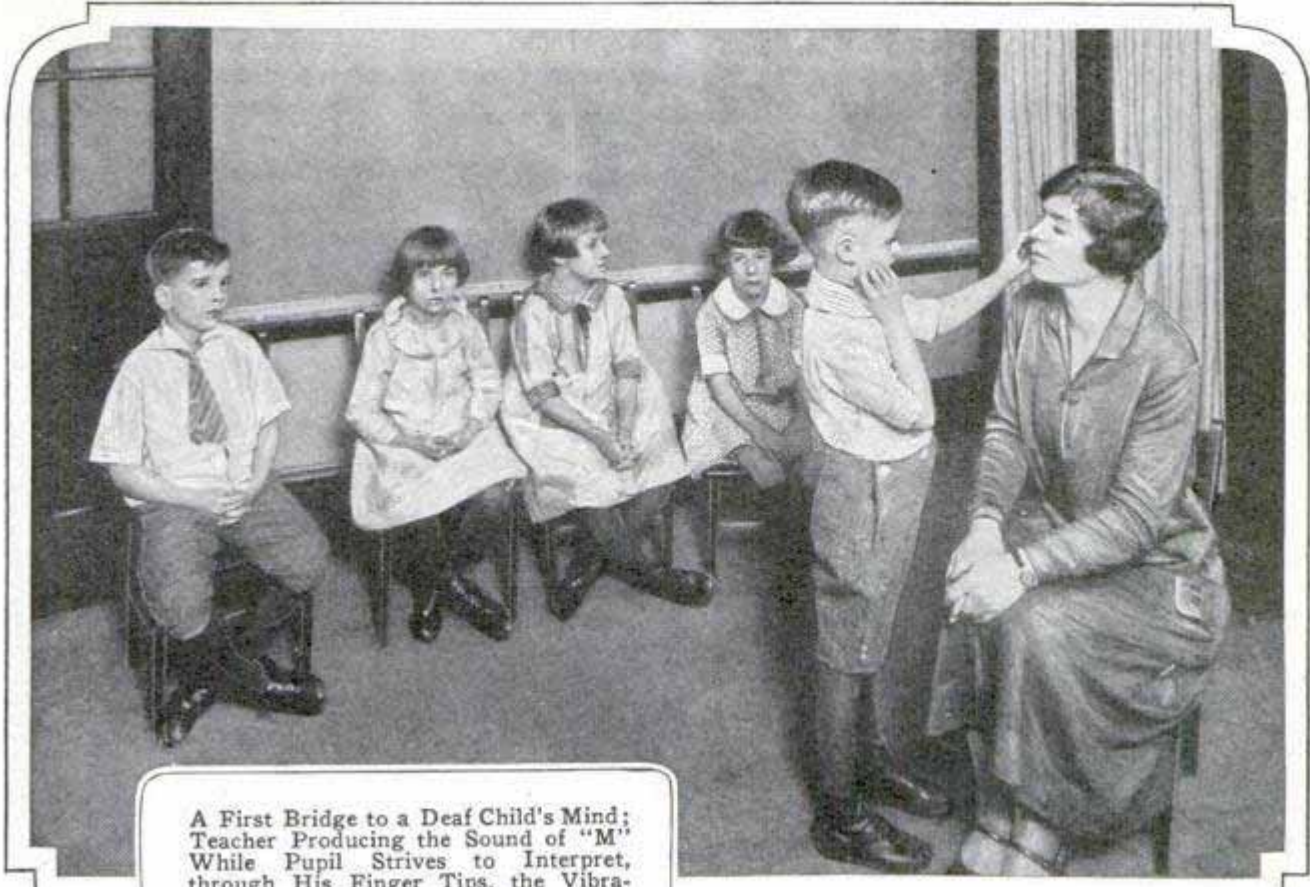
The pupils you have just heard and seen belong to the senior classes. Two of them are ready for graduation into a regular high school, where they will be able to compete creditably with hearing children as other graduates of the school are doing. To prove it, they recite an algebra lesson. Descend to the floor below, and you will see the real beginners of the institute, the three and four-year-olds, and how the first bridge is thrown across the gap that separates the deaf child from the rest of the world. The problem is to get the pupil, who is hardly more than a baby, to produce sounds with his vocal cords. To the layman, the task is like requiring him to draw or build something that he does not know exists and with nothing from which to copy and do it, so well that it can be identified. But the deaf child is given a guide, the teacher's voice, and again the sense of touch helps where the ears are useless.

Beginning with the pupil at this early age is important, for it is at a time when he naturally is trying to speak just as normal children do. Then, if he is allowed to go without this teaching, in a



Teachers Wondered Why These Pupils Had Trouble with Their Lessons. The Reason Was That They Had Poor Hearing; They Failed to Hear Whispers at Twenty-Five Feet

8.72



A First Bridge to a Deaf Child's Mind; Teacher Producing the Sound of "M" While Pupil Strives to Interpret, through His Finger Tips, the Vibrations from Her Cheek Bones



Another Radio Instrument to Aid the Deaf; It Stimulates the Remaining Sense of Hearing by Sounds Which Can Be Regulated to Fit Each Pupil

few years the vocal cords become shriveled up, just as muscles that are not used for long periods.

The pupil places his hands on the teacher's cheek bones. The instructor then makes the sound of "m," drawing it out slowly and distinctly. The child's hands, which have felt the vibrations of the tone, are placed on its own face so that he can feel the vibrations produced by his voice in trying to imitate the sound the teacher made. The time required for successfully taking this first step varies widely in different pupils, as mental efficiency is an important factor in their progress, just as it is with normal children. It may be days before the pupil even realizes what he is supposed to do. A great deal depends upon the skill of the teacher. Her special training is aimed to help her understand the deaf child's psychology; she is required to know much about physiology and the anatomy of the ear. Her task is not only to teach the child lip reading and speech, but she is his guide through the whole school course; he is dependent upon her for all that he acquires from his whole range of studies.

Once the contact is made, it is only a question of time and constant teaching until the child acquires a vocabulary, learns to read lips without depending upon his sense of touch and advances into simple problems in arithmetic and other studies.

In all the courses, the aim is to make the acquiring of hearing a cheerful and spontaneous task. The pupils develop eagerness and brightness, losing the dull, detached expression that usually identifies the sign-taught. Due to their training in lip reading and the application of the touch sense, they sometimes become even keener and more alert than a normal child, and their ability to concentrate easily—for there are no extraneous sounds to disturb them—aid them in their progress.

Recognizing that the deaf, if given proper instruction early enough, can be-

come useful members of society, other organizations throughout the country are putting forth renewed efforts in reclaiming deaf children by modern methods of teaching. There are now more than 200 schools for the deaf in the United States alone, and many public schools and colleges have special departments for teaching deaf children. As a result of the introduction of the principles of radio amplification, instruments are now being constructed by which large groups of children in the normal schoolroom may have their hearing capacity measured and classified with comparatively little expenditure of time and energy. This plan is now being seriously considered and introduced in public-school systems of many of our metropolitan cities. Chicago, Detroit, New York and Kansas City already have begun this work of classification, and the determination of even slight degrees of defective hearing in the mass of public school children. It is estimated that there are between 50,000 and 75,000 deaf children of school age in the United States. While their condition is deplorable, in the eyes of modern science, it is far from hopeless, for, assuming normal brain capacity, every one of them can be taught speech and lip reading so that they can take their places in the world.



Enjoying a Ride in the Push-Seat Swing

<sup>1007</sup>  
**SWING WITH HANDLEBAR SEAT  
DEVELOPS CHILD'S MUSCLES**

Besides affording healthful sport, a child's lawn swing, now on the market, is intended to develop leg and arm muscles, as it is propelled by pushing against supports for the feet and a pair of handlebars. The seat is suspended from three cords, which are adjustable for height to fit children of different ages, and is so arranged that the occupant can swing himself with little effort and yet gain sufficient exercise to benefit

him. The apparatus is easily set up, and occupies but little storage space.

☐Traffic delays in New York City, it is estimated, cost \$500,000 daily.

*Stevens Co.  
American Toy Ground  
Anderson, Ind.*

993

**FRESH AIR FED TO AUTO TUNNEL  
BY EIGHTY-FOUR MOTORS**

What engineers declare is one of the greatest triumphs in ventilation equipment and planning is represented in the automobile tunnel under the Hudson river in New York. The subway consists of two tubes. The main problem was how to insure sufficient circulation to get rid of noxious gases from the autos, and to supply fresh air for motorists and engines too. Some authorities believed that the task could not be accomplished. There were few data applicable to just such a situation, so tests were devised specially to meet the particular problems involved. The plan, as finally adopted, included the installation of eighty-four electric motors with a combined horsepower of 6,260 to turn fans for ventilating the tunnel, which was constructed so that the air would rise from vents near the roadway and pass through flues located in the ceiling. An exhaust-air duct runs the full length of each tube and occupies the upper portion of the passage. Ventilation is introduced at two points, instead of blowing the air into one and drawing it out at the other. Two-thirds of the motors will be kept running constantly, the remainder being reserved for emergency use.



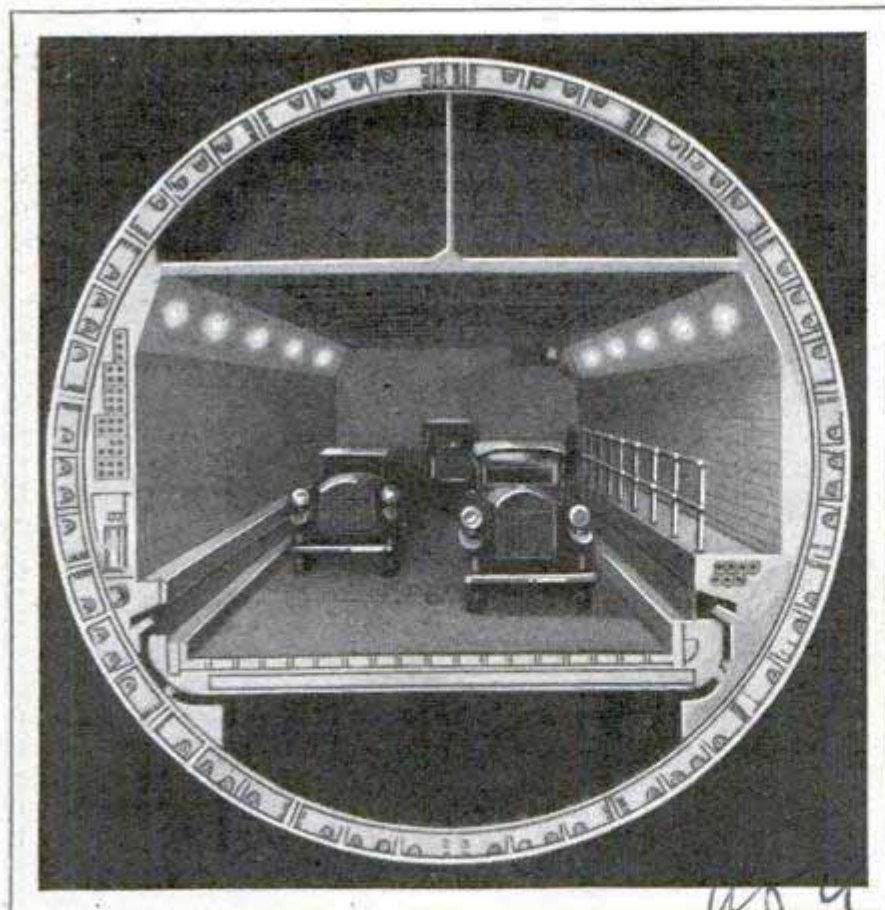
Sight in Middle of Bow Helps Archers in Aiming at Target on Long Shots

**SIGHT SET ON MIDDLE OF BOW  
IMPROVES ARCHER'S AIM**

Fitted to the middle of the bow, a short sight, somewhat similar to that used on rifles, is said to enable the archer to direct the arrows more accurately. It does not interfere with the use of the bow and is said to be especially helpful on long-distance "shots," as it aids in gauging the correct elevation to counteract the downward course of the arrow.

**MOVIE COBWEBS  
MADE OF GLUE  
AND GLYCERIN**

From a mixture of glue, glycerin and powdered chalk, realistic imitations of cobwebs are prepared for motion-picture sets. The substance is placed between two boards which are suddenly drawn apart. Long strands of the composition are formed, which, when draped across old furniture or on walls or ceilings, satisfactorily pass for the real article. Buckets of paraffin wax, which has been melted, will quickly form into "icicles" when allowed to drip from the sets.



Cross-Section Sketch of Hudson River Tunnel for Vehicles, Showing Fresh-Air Vents at Sides and Upper Duct for Poison Fumes

*Southland Archery Club, Los Angeles, Cal.*

*Kans. City Times 1/2/26*

941

*Brooklyn  
Rail*

Inventor Pointing to Guards Tested in Railroad Yards



ALCOHOL IS MADE FROM COAL WITH AID OF STEAM

1004

While the process has not yet been developed to the point of commercial practicability, a system has been devised for producing alcohol from coal and steam. A model of the type of plant required for this was exhibited at a meeting of the American Association for the advancement of science. The process is said to be somewhat similar to that employed in using the nitrogen of the air for the production of ammonia and fertilizer which can now be done without the need of large amounts of water power to supply electricity.

GUARDS KEEP CARS ON TRACK AT BRIDGES AND FLOATS

To prevent derailments at bridges, turntables, car floats, transfer pits and other places in the track where the rails may not be in exact alinement, an eastern inventor has devised a set of wooden guards which are locked to the rails and act as supports to keep the car wheels from slipping off. They are specially adapted to car ferries, it is claimed, in transferring cars to and from the solid tracks, as changes in level and the unsteadiness of the float add to the danger of derailing. The new guards have undergone exhaustive tests for several months in Brooklyn, N. Y., yards, and, according to reports have been found to work satisfactorily.

One of the secrets of the method is the catalyst or substance used to cause the combination of the constituent elements of the product it is desired to make. Heat and pressures ranging from 1,500 to 15,000 pounds to the square inch are employed in the process.

FOOTBALL GAME WITH FINGERS PLAYED ON TABLE

992

One of the latest amusements in London is a mimic football game played on a table with the first and second fingers, which are inserted in miniature boots. Two, four or six persons can play at one time, goals are represented at the sides, and the rules are based on those which govern the soccer game.

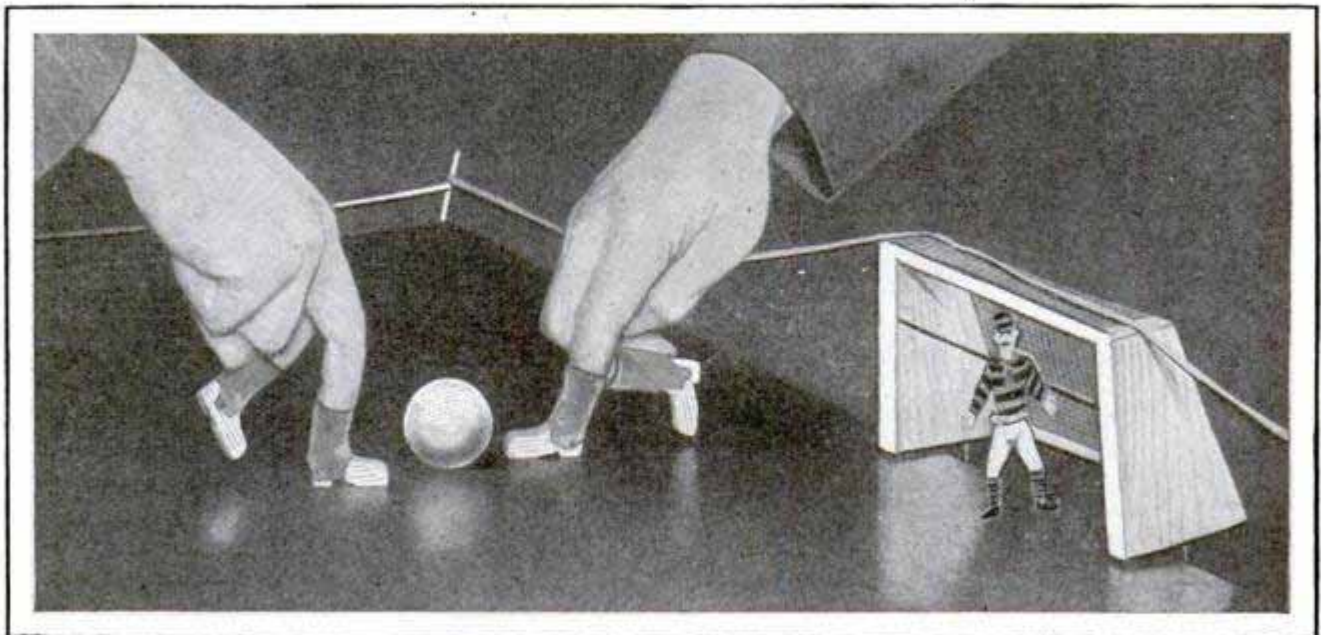
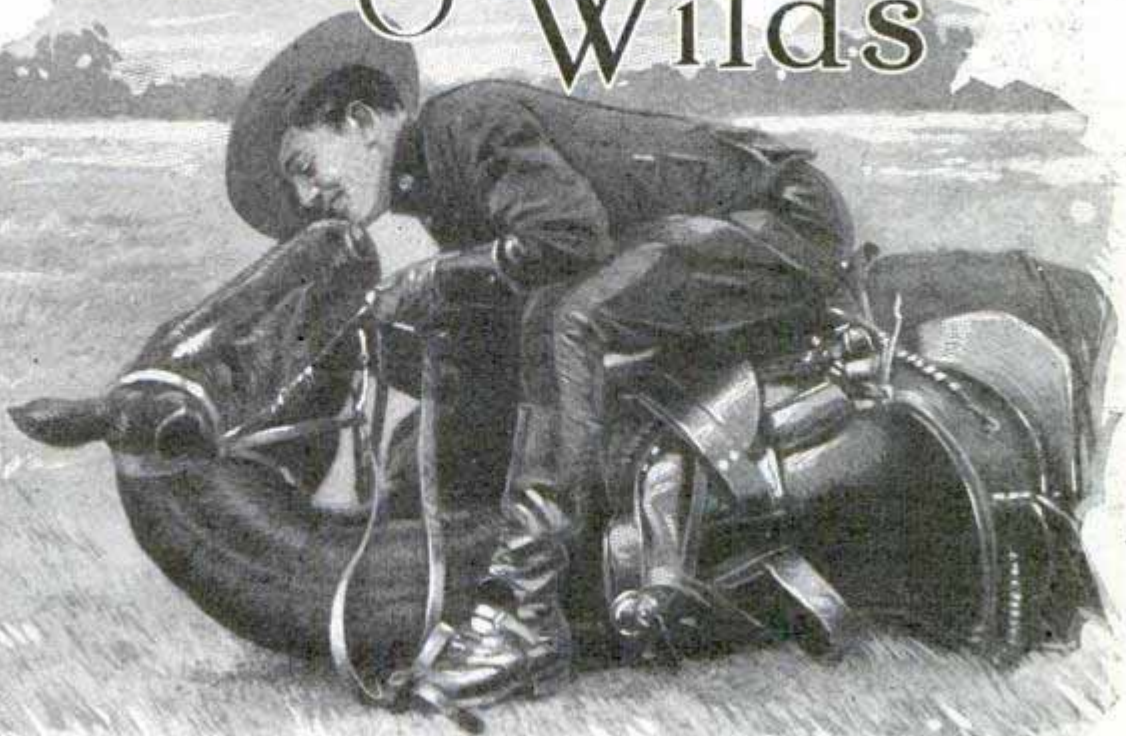


Table Football Players in Action; Little Boots Are Slipped on Fingers for Punting, and the Object, as in the Real Game, Is to Drive the Sphere within the Goals

*English*

# Policing the Arctic Wilds



Horses Are Regarded as Being as Important as the Men in the Northwest Mounted Police and Are Put through a Training School That Turns Them Out Schooled Well Enough for the Stage

By FRANCIS DICKIE,

*Heriot Bay,  
B. C., Canada*

RADIO audiences throughout the eastern section of the United States last winter heard several broadcasting stations halt their programs for three or four nights in a row to send out a message addressed to two men spending the winter far up above the Arctic circle. The message notified them that food was needed at another camp more than 100 miles away, because a supply boat had failed to reach it before the waters north of Hudson bay froze over.

The men at both camps were members of the world's most famous police force, the Royal Canadian mounted police, formerly the Royal Northwest mounted police. With barely a hundred officers and men in the Far North, they police a section embracing nearly one-third of all Canada, and do it so effectively that the fictionist who coined the slogan that "the 'Mounties' always get their man" did not exaggerate so far as might be expected.

They don't always get the man, but when failure comes, it is never through failure to try. Some of the celebrated cases in the annals of the fifty-two-year-old organization were not closed until one

constable after another had tracked a suspect for several years, if necessary.

The use of radio to deliver instructions to one post about sending food to another marks the advent of a new weapon in the policing of the wild. A number of the more distant posts were equipped with receiving apparatus last year, and sending sets will follow later. The wireless waves are expected to bridge the vast distances from Hudson bay to the heights of the Yukon and from Slave Lake to the Arctic sea at Coronation gulf, and simplify the work of guarding the Indians, Eskimos, hunters, traders, trappers, missionaries, and the wild life, moose, caribou and valuable fur bearers of the region. At present, months often elapse before the grapevine telegraph of the north, carrying messages on snowshoes or dog sled, gets word to the nearest post that a mounted man is needed at some distant camp.

Frequently a year or two pass before the principals and witnesses in a case can be rounded up and brought out to civilization, or a judge and court transported in to them. Last summer a judge of the Alberta courts, with prosecutor, defense

counsel, court stenographer and all the appendages of a white man's law court, went north by rail to Waterways, the end of steel, and then took steamer down the Mackenzie to Aklavik, in the river delta country, where an Eskimo was waiting trial for a murder committed at Coronation gulf. With a jury of trappers and steamboat men, they held court on the open deck of the ship and pronounced sentence.

On the same steamer, between twenty and thirty new recruits went north to spend two years in the mounted service at the far-flung posts above the Arctic circle. It takes so long to reach the ground and learn the territory that volunteers are accepted for not less than two years' service.

The red tunic and yellow-striped trousers of the mounted mark its men wherever they go, but there is little glory in wearing the uniform of the service. They work so far from civilization that the world seldom hears of their exploits, and the only record left is a constantly growing pile of reports, each stamped in turn "case concluded."

Inspector T. V. Sandys Wunsche recently handed in completed reports which set forth that he had traveled 2,540 miles to make the arrests in the case, 1,470 miles by steamer, 320 by launch, 250 on foot and 500 by canoe. He came back with a tribal

medicine man who had instigated a murder, the girl who had committed it and three of her brothers. The medicine man was sent to the penitentiary for manslaughter and the girl given a suspended sentence. The white man's law is enforced throughout the north, but tempered with leniency because, to the Indians and Eskimos, practices frowned on by civilization are considered proper. In this case no Indian in the Liard river country believed a crime had been committed when the tribal medicine man decided an eighteen-year-old-boy had bewitched an aged man who was dying, and advised the dying man's daughter to tie the boy out in the snow to drive out the witches. The boy died, and so did the sick man.

The witchcraft episode occurred at Thirty Mile Bar on the Liard river in northern British Columbia. An Indian of another tribe, following a trap line across the mountains, heard the gossip and passed it on to Frank Bass, who runs a little trading station at Liard post. Bass told a party of prospectors, and the story passed on down the river with them. Then the Indian agent in the Etikine country heard the yarn and sent it along to the chief Indian agent at Victoria, who in turn called on the mounted police to investigate.



Photos Copyright, Underwood & Underwood

Horsemanship Has Been the Major Boast, Next to Straight Shooting, of the Mounted Police Since Its Earliest Days; the Forage Caps Have Been Replaced by Stetsons, But the Tunics Are Still Red





Riding Instructor of the "Mounties" and a Bunch of Recruits with "Blackie," One of the Many High School Horses, Trained to Help Its Rider in Many Ways in Time of Need

In the meantime, half a year had elapsed, the nomad Indian tribe had moved on and the trail was almost blotted out, but the inspector started out and, after several weeks of travel, reached the vicinity. There his troubles began. None of the Indian tribes cared to talk about the affair, but advised the mountie to drop the case and go home.

The day after he arrived in the neighborhood, accompanied by two constables from another post, a native visited their cabin and proceeded to "witch" their weapons to keep them from using them. Watching until he believed no one was looking, the Indian slowly revolved on one foot before the gunrack and then touched each rifle in turn, confident that the process would keep them from shooting straight. He was doomed to disappointment, for the inspector, who had watched the performance out of the corner of his eye, arranged a shooting contest and, with the constables, easily out-shot the antiquated trade guns of the natives.

Information was scarce, but the party worked down the Liard, questioning everyone they met about the natives who had camped at Thirty Mile Bar the winter before. Eventually they learned the Loot family of a Dene tribe was responsible for the killing and began to trace them. Some days later, they found a spot beside the river where wolves had been digging and unearthed the body of an Indian boy, with hands and legs still frozen together as he had died while bound in the snow.

While they were thus employed, an Indian stopped his canoe to ask who told them that Atol, the Moccasin, was buried there. He was questioned and turned out to be one of the Loot brothers. Next, his sister, who had done the actual killing, his two brothers and big Alec, the giant medicine man of the tribe, were arrested. The inspector held an impromptu grand-jury investigation on the spot, and after hearing the evidence he had already gathered, committed the five for trial. The investigation disclosed that tying up a person was the accepted method of ridding him of witches, but that frequently if the affair occurred in the winter, the victim froze to death. The boy Atol lived six days bound out in the open.

In the winter months practically all travel by the mounties in the Far North is done by dog sled. Trips of 1,000 miles or more are quite common as they make their rounds. Those who returned last summer from their two years in the Hudson Bay country told of one occasion, while hunting for two Eskimos for the murder of two white men, when a team of thirteen dogs moved a boatload of provisions for four miles overland, the boat and load making a burden of 423 pounds per dog, several times the weight of the animals.

On another occasion, a mounted officer, traveling with one Indian from Split Lake post to Fort Churchill, went snow-blind and at the same time the Indian was stricken with pneumonia. The two made camp on Governor's island, in the Church-

ill river, and after fixing the Indian comfortably, the blind man boarded the sled and gave the dogs their heads. The team took him sixty miles down the river and into Fort Churchill, where he told his story. A relief sled was started out with one man, leaving at five in the morning, and was back at nine at night, having covered 120 miles in sixteen hours. The seven dogs of this team carried the 140-pound constable on the way out and the Indian and a quantity of mail on the return trip.

The records of the force are filled with deeds of heroism and self-sacrifice, or rather, they are filled with skeleton reports which oftentimes hide such deeds. For instance, those of Pleasant Camp, B. C., under date of May 19, 1898, state:

"Constable Frederick Hillier met death by drowning at the ford of the Kicking Horse river at five o'clock p.m. yesterday while returning from border-patrol duty. Report reached here too late to go in record of 18th. Immediate application made to Sergeant-Major Barlow, Atlan division, for constable to fill place on account of miners rioting on Porcupine creek."

Behind that brief entry lies a story of unequalled heroism. Two constables were riding the Dalton trail when they started to ford the river, made dangerous by spring floods. One horse, feeling the quicksand sucking at his feet, threw his rider and escaped. The other horse drifted down to a sandbar and reached land. The lucky rider looked back and saw his companion, waist-deep in the water, being drawn down by the sand scarcely thirty feet from the bank. The only rope they possessed had been tied at the saddle of the runaway horse.

The rider on the bank tried to spur his horse back into the stream, but the animal refused. The rider sprang off and plunged into the river toward his companion, who was silently awaiting his fate. Hillier, held by the sand, shouted to his companion to go back. "You can't help me a bit and you'll only get stuck yourself," he called. His friend refused to heed the warning and pressed on. Suddenly the doomed man jerked a revolver from his belt, shook the water from it and leveled it at his companion.

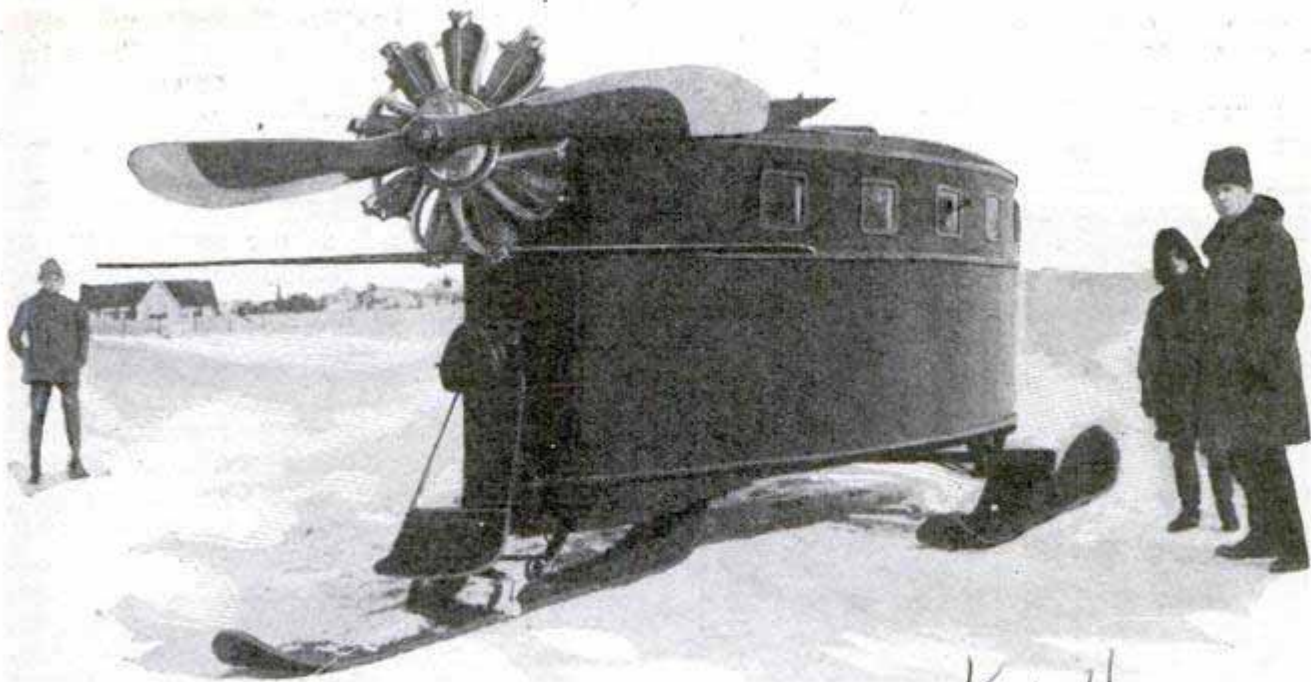
"Jack, I've got less than five minutes to live," he said. "Don't send me out with the stain of murder on my soul. You come another step and that's what you'll do."

The would-be rescuer hesitated for an instant, and in that moment the current snatched Hillier away. Three or four lines in the post log and a hurry-up call for another man because the miners were rioting was his obituary.

The history of the mounties goes back to 1873, when Sir John A. Macdonald decided to organize a body of men "without gold lace." Three hundred men were recruited in Toronto and sent to Fargo, N. D., then the railhead of all the northwest. From there, pulling one small cannon, they walked 800 miles overland to the foothills of the Canadian Rockies and began establishing their posts. Outnumbered by turbulent Indians more than a hundred to one, they succeeded in bringing about order. During the Boer war a detachment of mounties won fame in South Africa as dead shots, and again in the World War the force sent 738 former members to France and 174 to the Siberian front.



Horses of the Mounted Are Taught to Lie Down and Seek Cover as Well as Their Riders, a Valuable Trait When Pursuing Desperate Men into the Wilds of the Far North



K & H

While Winter Snows May Block Roads to Other Vehicles, This Propeller-Driven Bus on Skis Makes Swift Trips over Ice and Crust between Helsingfors and Sveaborg in Finland

**TAXI ON RUNNERS FOR WINTER  
—DRIVEN BY PROPELLER**

Airplane and sled are combined in a useful vehicle for travel during the winter months between Helsingfors and Sveaborg in Finland. Three broad skis, two behind and one in front, have been adapted for runners and the bus, which will hold several persons, is driven by a powerful airplane propeller. Steering is done with the single ski.

possibilities and added efficiency gained by putting the eye in the needle.

**FOLDING CHAIR FOR OUTDOORS  
HAS LOOPS FOR ARMS 981**

For cyclists, campers or hikers, a folding easy-chair that fits in small space when rolled up and is quickly adapted for use, has two loops or slings to hold the arms, so that the occupant can be comfortable while reading. The seat may be placed against a tree or other support, protects the user from dampness and may be adjusted to various angles for reclining.

**998  
MAKING SINGLE NEEDLE TAKES  
WORK OF SEVENTY MEN**

Needles are insignificant things, but to finish a single one from a plain piece of steel to the article ready for use, the work of as many as seventy men is required, and the implement must pass through twenty-two processes before it is ready for the market. Most of the labor is in finishing and polishing them. In primitive times, thorns, pointed sticks and sharp bones were used for needles. One of the important steps in the development of the human race was the discovery of the timesaving

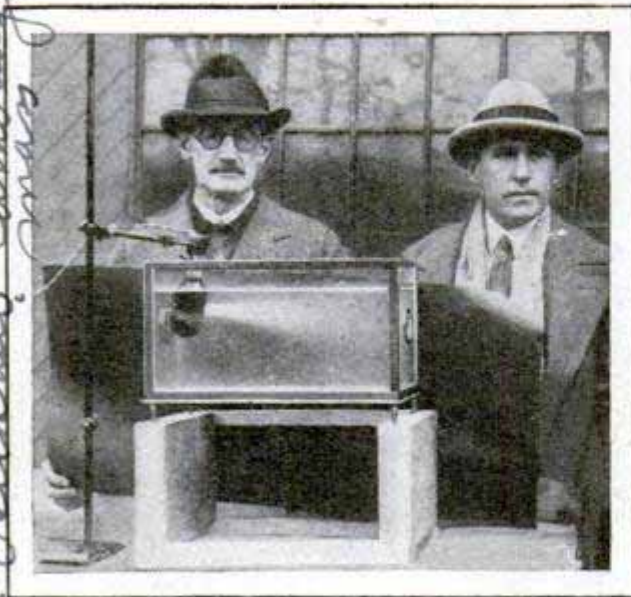


Cyclist Enjoying a Roadside Rest in Folding Chair; the Loop Straps Comfortably Support the Arms While Holding Paper

*Order to Frederic M  
Lelans, 16 Avenue  
F. T. Chera, France*

### ARC LAMP WITH "LIQUID LENS" TO IMPROVE MOVIES

Increasing the intensity of the light for motion-picture projectors and stereopti-

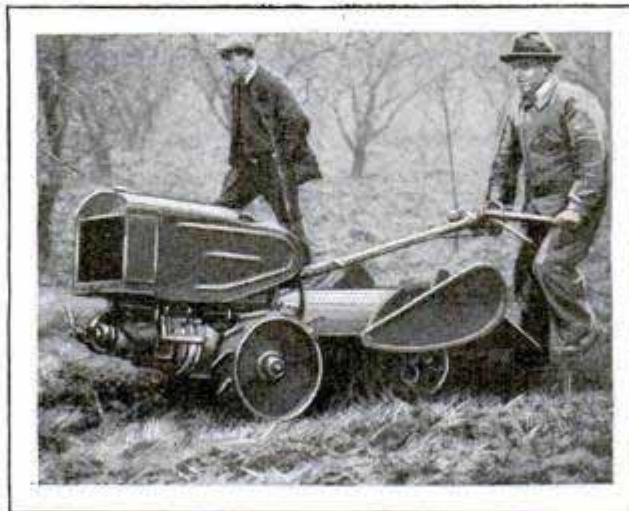


Lamp Surrounded by Its Liquid Lens, a Solution of Substances Which Increase Light's Intensity

cons, a liquid between the lamp itself and the lens, also absorbs the heat. It is a mixture of water and various other substances, and promises to be of great aid in medical application, as beneficial rays can be projected through it for hours over the body with less hazard, and the eye can also be brought close to the light source without danger.

### PLOW AND HARROW COMBINED IN ROTARY SOIL TILLER

Work that ordinarily can be done only by using several implements is said to be performed by a motor-driven harrow and plow for light soil tilling. It is steered and controlled with an extension bar and has a set of twenty revolving steel tines that dig into the ground, loosen and pulverize it while helping the outfit along. One man can easily manage the implement, and it is specially suited to work in orchards, as it can be guided between



Tiller in Operation; Revolving Blades Help Propel the Apparatus and Loosen the Soil

trees, close to the trunks and without damage to branches, such as is likely to occur when larger equipment is used.

### CYCLIST BREAKS SPEED RECORD BEHIND MOTORCYCLE

Pedaling behind a motorcycle as a windbreak and directed through a special speaking tube attached to the driver's back, a bicycle rider in France recently shattered records by attaining a speed of seventy-four miles an hour. The motorcycle was constructed to meet the demands of the test, having a broad shield at the back to keep the wind from the racer and a streamline front of special design. So that the driver's words would be carried more distinctly through the speaking apparatus, a mask screen of transparent material was fitted over his face and around the mouthpiece. Both the driver and bicycle rider wore helmets. The demonstration was staged on the Mont Chery race track, near Paris.

### CLUE TO LOST NATION FOUND IN ARIZONA RELICS?

Did the Jews establish a kingdom in Arizona long before Columbus discovered America? Evidence which seems to support the theory that they did, has been found in a number of relics dug out of limestone, five feet below the surface, near Tucson. While some scientists are in doubt as to the genuineness of the objects, others declare that, whatever their origin, they must have lain under the earth for centuries. The relics show both Jewish and Christian influences and some bear dates of 760 to 900 A.D. The inscriptions have been interpreted as describing

the conflicts of the prehistoric Roman-Jewish kingdom in the southwest with the Toltec Indians, forerunners of the Aztecs. If the objects prove to be genuine, scholars believe that they will help clear up what has been a puzzle to many research students, the evidence of European or other outside influences in the rites and ceremonies of some of the Indian tribes.

Copyright, Special Press

Chicago Tribune 12/13/25

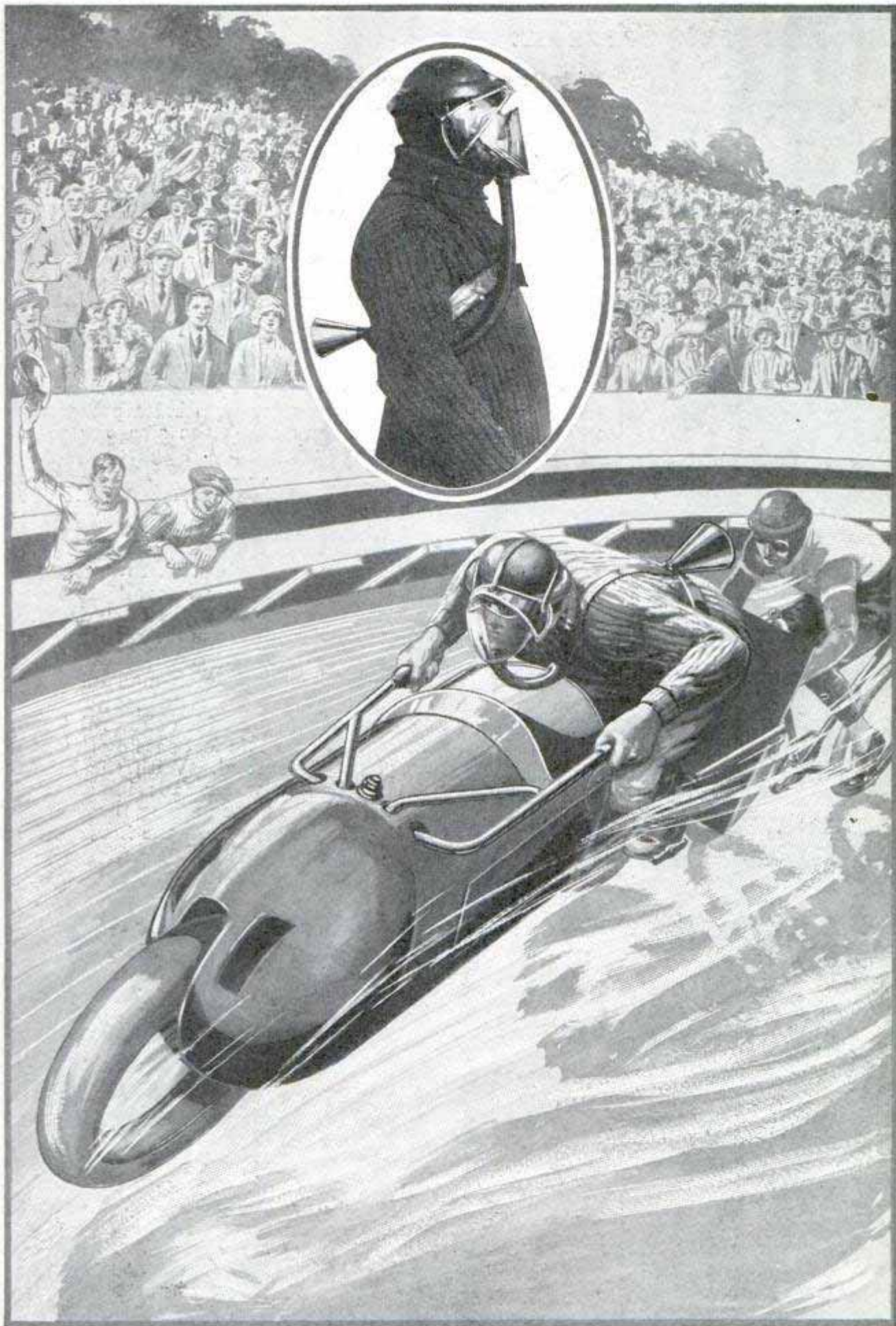
*W. W. Boerter Waterloo, Mass. 905  
H. S. McAlister and  
Signed Richell, Cambridge, Mass.  
Lundm.  
Rototillers  
58 Compton St. Lowell, Mass.*

*near Mont Chery track near Paris*

*1729*

*917*

*864*



Bicycle Rider Sprinting behind Motorcycle at Seventy-Four Miles an Hour and Being Directed through Speaking Tube; Inset, Driver Wearing Mask with Horn Strapped on Back

**METER IN HEAD OF GOLF CLUB RECORDS FORCE OF STROKE**

How far can you drive a golf ball? A meter-equipped club now on the market

*Miss Naomi Arme*



Meter in Head of Golf Club Registers in Yards the Force of a Stroke against the Ball

is intended to eliminate much of the guesswork in such estimates, as it automatically translates into terms of yards the force of the blow when the club strikes the ball. The indicator is set in the head and has a button on the other side by which the mechanism is released for another registering after the reading has been taken.

**JUNGLE WOOD SERVES AS ICE AND SAVES LIVES**

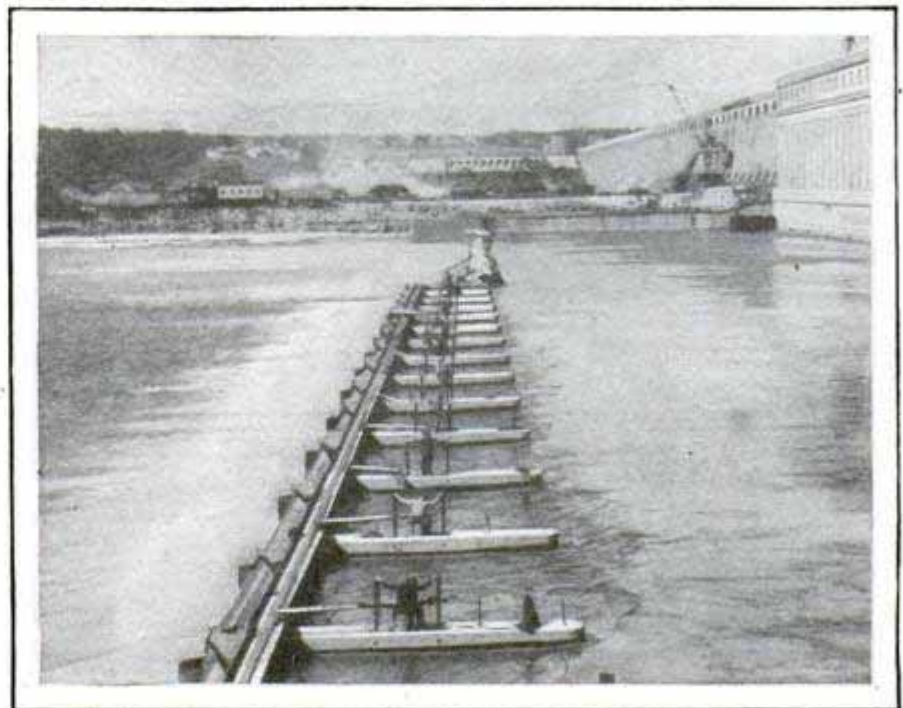
But half as heavy as cork, balsa wood which grows in the tropics, particularly in Costa Rica and Ecuador, has been found excellent for insulation both from heat and cold. A small box of it, packed with fish at one degree above freezing, is said to have kept the contents at almost the same temperature without the use of ice on a journey halfway across the continent. The material is being used for shipping ice cream and chocolates and a New York architect is experimenting with it as lining for a house to keep out cold air and retain heat.

*J. H. Montgath Co. 204 Lewis, New York.*

The wood is also being used for the manufacture of toys, airplane propellers, stage scenery and for museum mountings and specimens. In a New York theatrical production, an imitation stone wall erected for a long run, weighed over two tons. The same set was reproduced in balsa wood for the road and weighed less than ten pounds. It has proved of special use in life preservers and rafts. The natives in the countries in which it grows discovered its value for boats and floats many years ago, the name "balsa" being the Spanish for raft. It is said to have about half the strength of spruce. An advantage claimed for the material in airplane propellers is that it permits the use of motors of slower speed. The government is now experimenting with balsa propellers, which are four times the size of one of ordinary wood, yet much lighter.

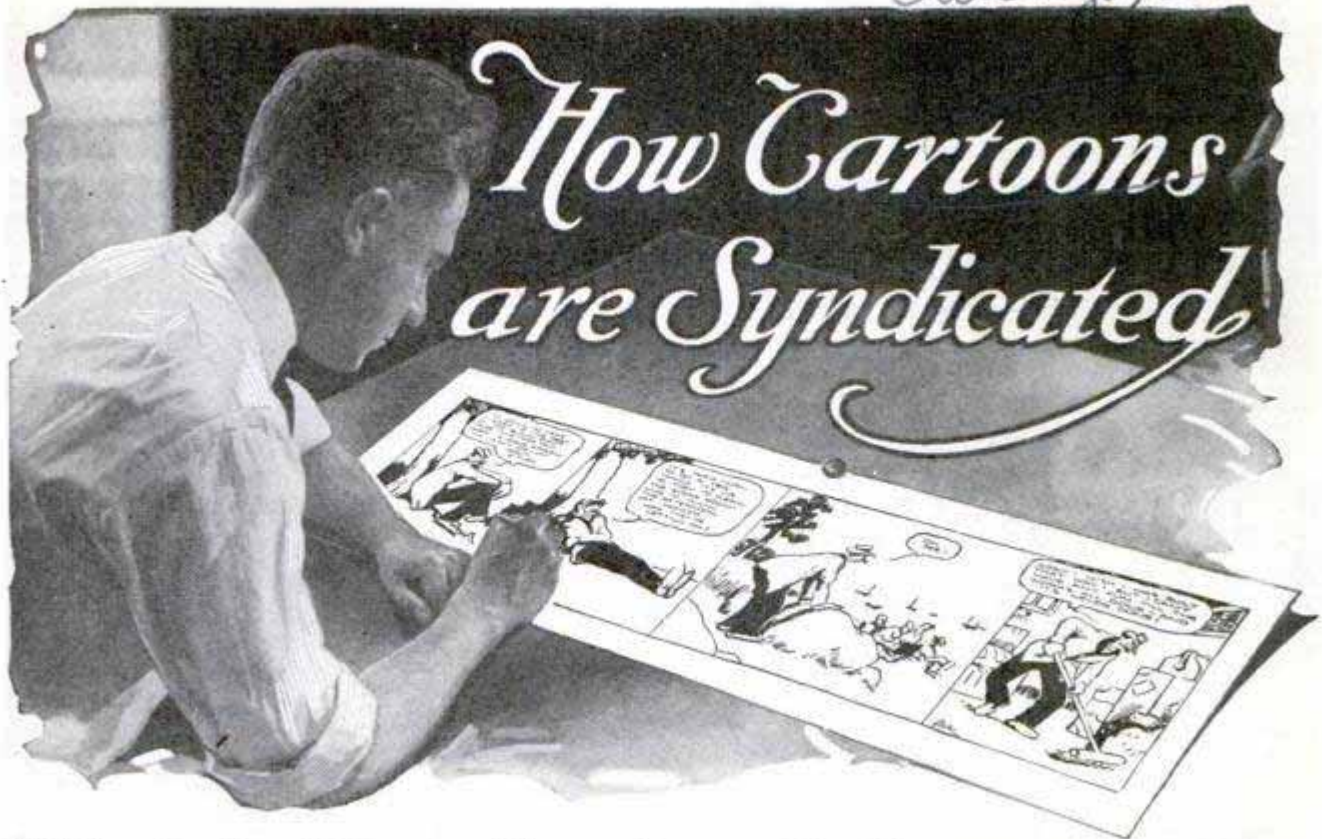
**HORSEPOWER AT WILSON DAM READ ON MANY GAUGES**

Whenever engineers wish to determine how much horsepower is available from the water flowing over Wilson dam in Alabama, a dozen or more men are required to read the gauges which are placed across the channel. Each man takes his place at a given spot on a floating weir and reads the gauge which shows the volume of water in cubic feet passing through that place per second. With the height from which the water falls known and with the total volume passing through all the open gates computed, the horsepower is readily determined.



Reading the Gauges at Wilson Dam to Measure Horsepower

*Keystone*



## Million Dollars' Worth of Space Devoted by Newspapers Each Year to Comic Strip Showing Gasoline-Alley Adventures

**I**N a hundred Sunday-morning newspapers from coast to coast each week appears a full page, in four colors, showing the adventures of a group of just average everyday people whose garages abut on one common alley. In as many, or more, papers the same characters appear each weekday in a "strip" seven or eight columns wide. In a year's time the papers devote more than a million dollars' worth of space (at their current advertising rates) to this one cartoon alone.

The reason lies in the new idea in newspaper comics—human-interest stories with a continuity, as the film people say, instead of the antics of impossible boys sawing holes in the floor for their elders to drop through, or performing similar stunts.

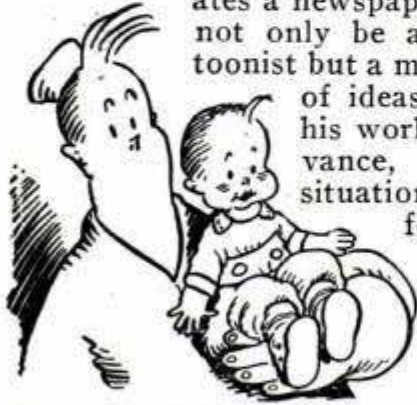
Frank King, creator of "Gasoline Alley," which appears in American newspapers reaching more than 5,000,000 people each day, was one of the leaders in creating the new style in cartoons. From a \$22.50-a-week artist on the Chicago Tribune staff, drawing fancy borders to fit around the pictures of beautiful divorcees and other news celebrities, he has become one of the highest-paid newspaper cartoonists, helping to keep a vast organization busy distributing his work and the work of his fellow comic-strip artists.

The story of the distribution, or syndicating, of the features which appear simultaneously in papers throughout the country is a story of big business organization. No one paper, even the largest of metropolitan dailies, could afford to employ an entire staff of feature writers and artists at the salaries they command, but by syndicating their output among scores or hundreds of papers, the smallest city can see each day the same features that appear in New York or Chicago, and pay only its proportionate share of the large expense.

Newspaper syndicates are owned by a number of the large-city papers, and others work independently, employing their own artists and writers. The cartoonists are usually ex-newspaper artists who got their start, as Frank King did, retouching photographs and drawing borders in some newspaper art room. Then comes a chance to do a cartoon on some timely subject, or the artist in his spare moments gets an idea for a whimsical drawing. From that, if his ideas hold out, he develops a strip; his paper tries it out for a while, and if it takes hold with the public, it goes into the syndicate, and a fat contract follows. Sidney Smith, creator of the Gump-family cartoon a few years ago signed a million-dollar contract, and his newspaper celebrated the event by

presenting him with the most expensive imported limousine on the market.

Both the Gumps and Gasoline Alley appeared in the Chicago Tribune for some time before they were sold to other papers. Both have the same basic idea, the daily adventures of ordinary Americans, each strip featuring various grown-ups and at least one youngster. The artist who creates a newspaper comic must not only be an expert cartoonist but a man with plenty of ideas. He plans his work weeks in advance, creates new situations, and then follows them along for days, and sometimes even for

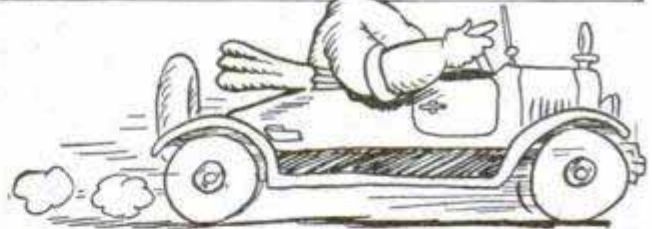


months. In a presidential-election year Andy Gump ran for chief executive on an independent ticket and burlesqued the issues of the day. The comics follow the seasons and their holidays, and, despite the fact that they must be planned days in advance, often mirror the news of the world.

It is customary to have two separate stories running through the cartoons, one in the daily strips and another for the full pages on Sunday, which appear in colors in the comic sections. The reason is that the papers which use the daily strip do not all have Sunday editions using comics, and some of those using the full page on Sunday do not use the daily strip. In addition, the artist, from time to time, must prepare extra strips and pages introducing the characters and giving a synopsis of their lives, to be used by new mem-

bers of the syndicate as they are added.

When the artist sits down at his desk each morning, he may have an idea in his mind, or may turn to the daily papers for one from the latest news, or, if everything else fails, he looks out of the window until an idea comes. The idea is then roughly sketched with pencil on a strip of white cardboard, and put in final form with pen

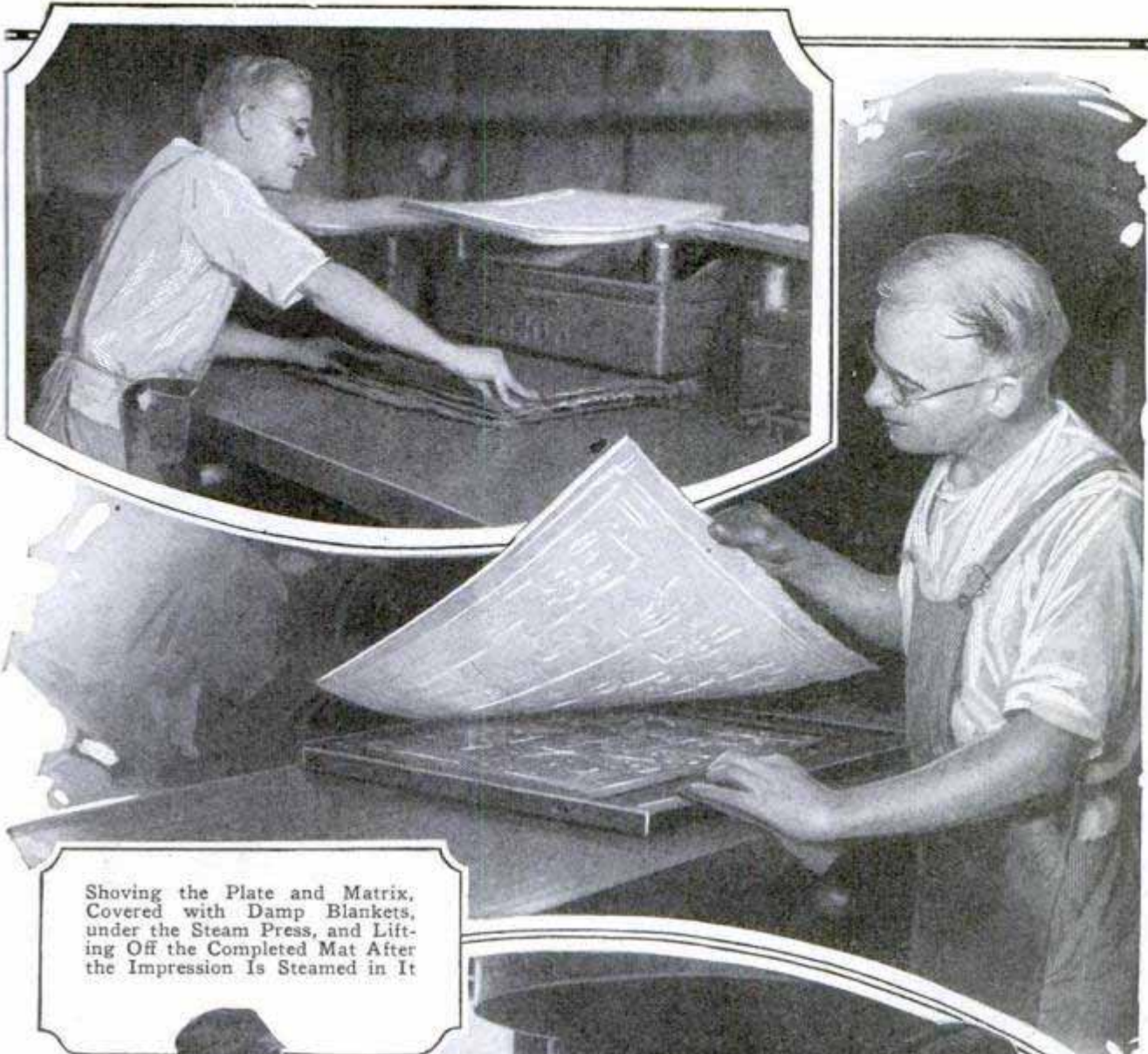


-King- CHICAGO TRIBUNE.

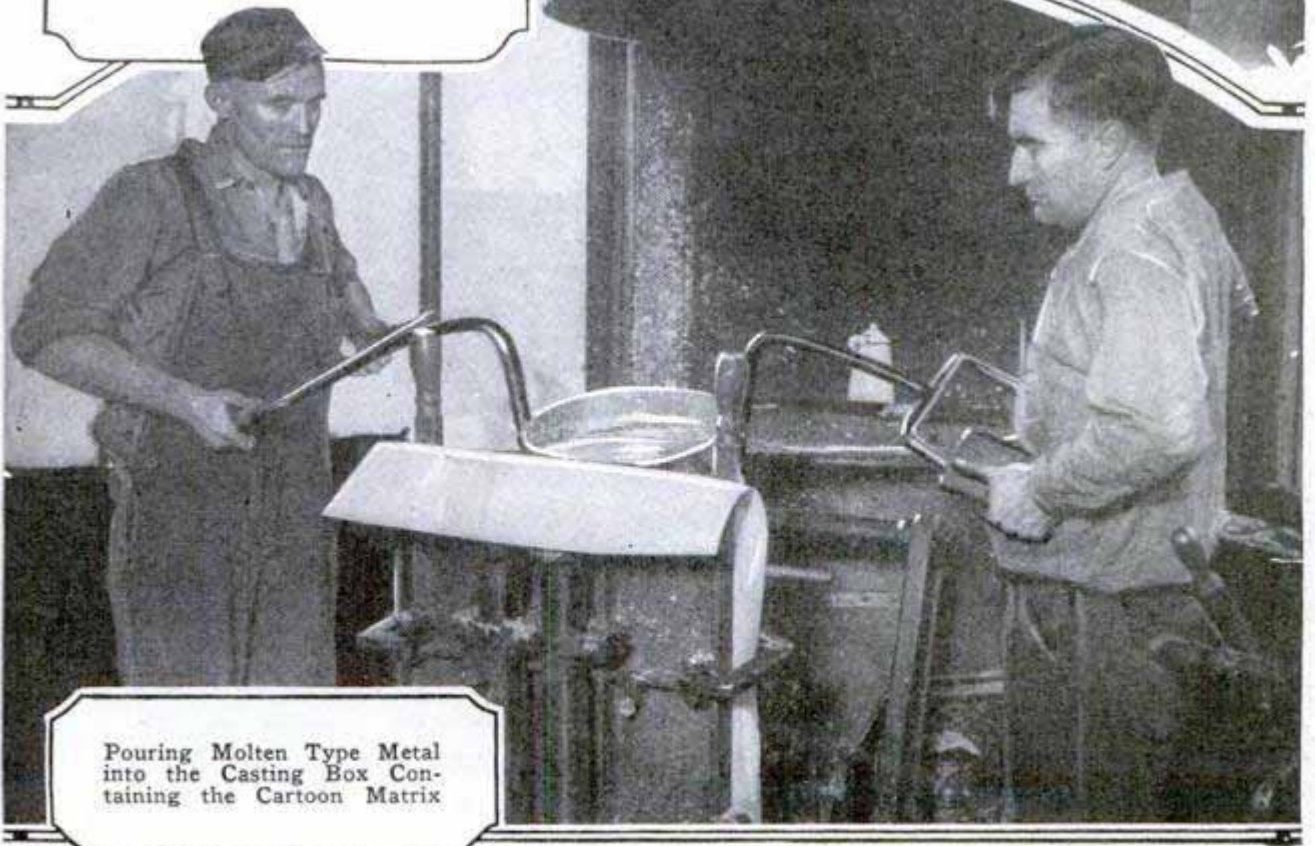


Frank King and His Fellow Artists Inspecting the Day's Work, and, Above, Some of His Drawings of Walt, Skeezix and Rachel, the Maid

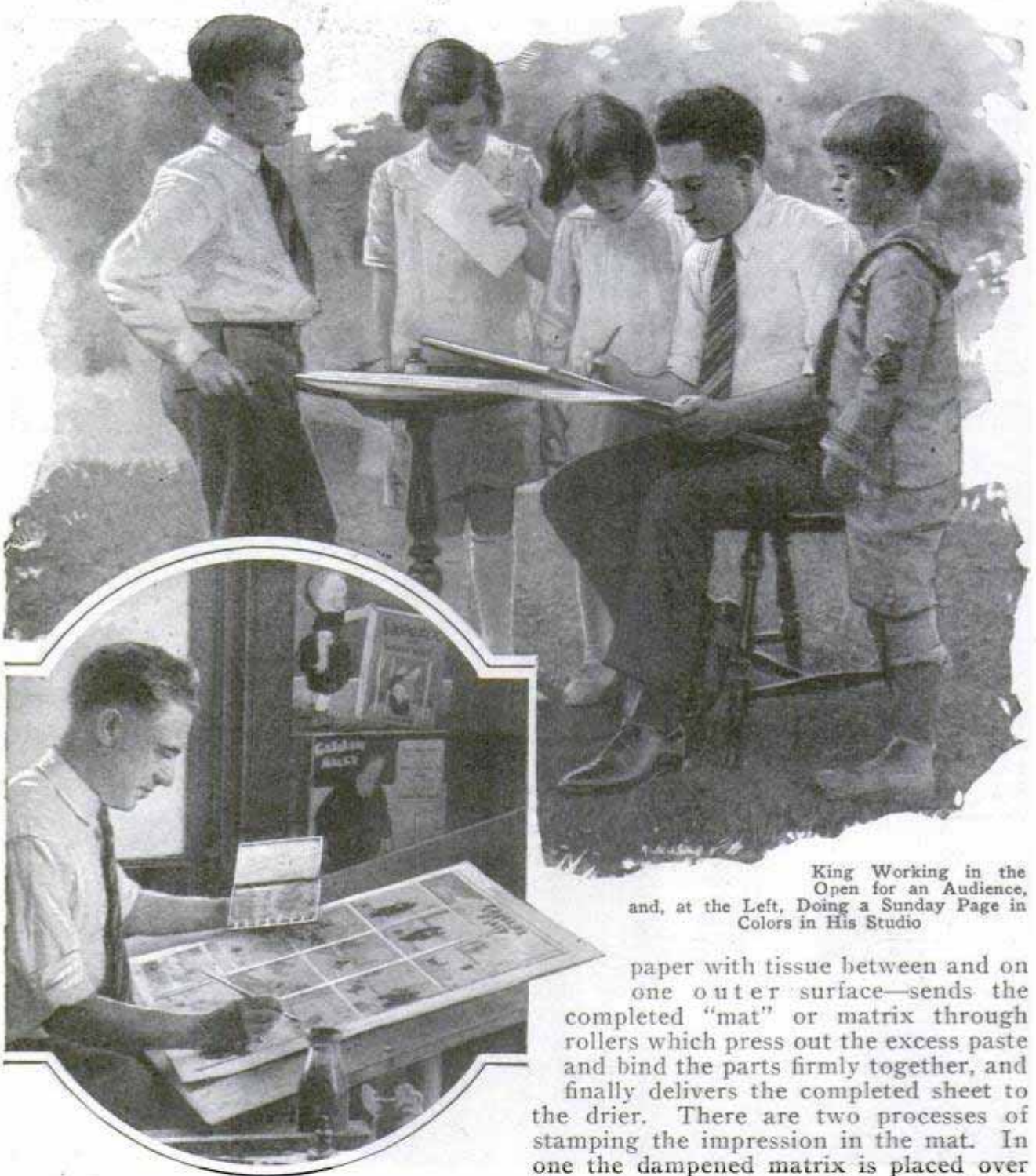




Shoving the Plate and Matrix, Covered with Damp Blankets, under the Steam Press, and Lifting Off the Completed Mat After the Impression Is Steamed in It



Pouring Molten Type Metal into the Casting Box Containing the Cartoon Matrix



King Working in the  
Open for an Audience,  
and, at the Left, Doing a Sunday Page in  
Colors in His Studio

and ink, the larger black parts being filled in with a brush. The title may come first, or follow completion of the strip.

From the artist the strip or page goes to the engraving department, is photographed on a copper plate, engraved and prepared for the mechanical department.

The next step is to transfer the engraving to a paper mold in which type metal is poured to produce the printing plate. A machine carrying rolls of blotting paper and other rolls of a special tissue paper automatically cuts off sheets somewhat larger than a newspaper page, pastes them together—four sheets of the blotting

paper with tissue between and on one outer surface—sends the completed “mat” or matrix through rollers which press out the excess paste and bind the parts firmly together, and finally delivers the completed sheet to the drier. There are two processes of stamping the impression in the mat. In one the dampened matrix is placed over the engraved plate, rolled in until it fills every indentation, then covered with moistened blankets and placed in a steam-heated press to dry the impression in place. A faster process uses a drier mat and heavier rolling pressure, shortening the steaming process from several minutes to a matter almost of seconds.

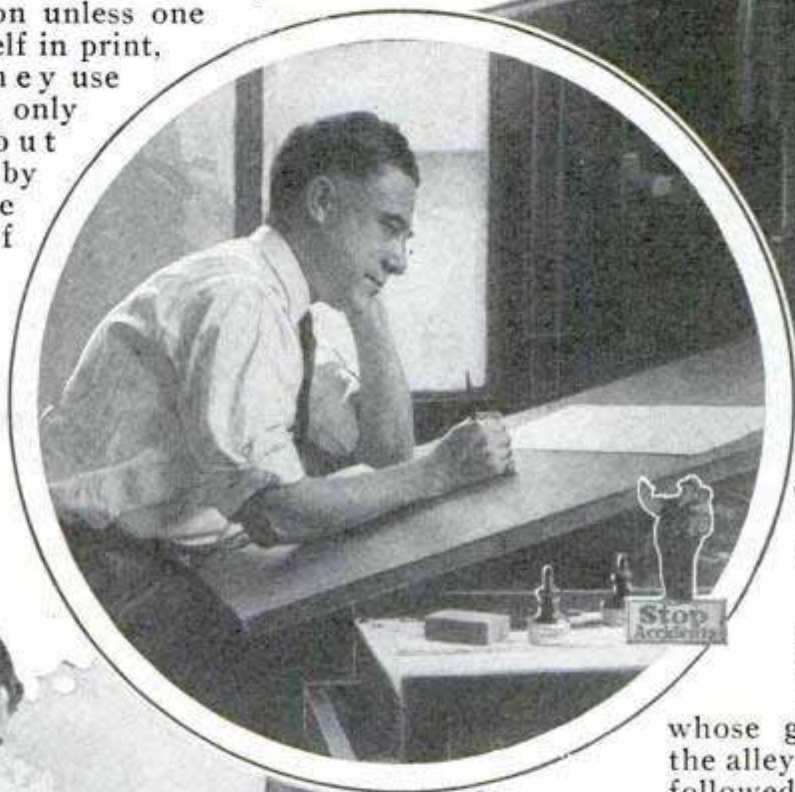
The cartoonist delivers a full week's supply of strips at one time, and all are reproduced on one matrix, which is then clipped apart for convenience in mailing.

At the newspaper plant the process is reversed. The mat is placed in a casting box, surrounded by containing walls just type-high, and molten type metal poured

in. The casting boxes are water-cooled, and the hot metal chills so quickly that the tissue surface of the mat is hardly browned.

The casting, after being sawed to the proper size, is placed in the page form and made up along with the newspaper type. The page form then goes to the stereotyping machine, and a mat is made of it in the same way the original comic-strip matrix was produced. The page mat is bent into a half circle and placed in a large casting box, and the entire page cast in this form, ready for the circular roll of the high-speed presses which print the daily papers.

Being a friend or neighbor of one of the newspaper cartoonists is a precarious occupation unless one likes to see himself in print, for frequently they use their friends, not only for characters, but sometimes even by name. Walt, the leading man of Frank King's Gasoline-Alley bunch, is pictured as a large and carefree bachelor, who lately has been on the verge of marrying the widow Blos-



Cartoonists Keep Regular Office Hours, Cudgel Their Brains for Ideas, and Admire the Finished Job

som, a comely addition to the ranks of those whose garages abut on the alley. Few who have followed his adventures, however, know that Walt in private life is Walter Drew, a long suffering brother-in-law of the artist. It was on a Sunday visit to Drew several years ago that King got the idea for the cartoon strip, which, incidentally, started out not as a strip, but as a rectangle, a three-column-deep cartoon for the sporting pages. Drew had an alley garage back of his home, and King accompanied him there to watch him tinker with his car. Several neighbors were do-



ing likewise, and out of their alley friendship grew the idea. Bill, another of the Gasoline Alley characters is taken from real life, being a locomotive engineer.

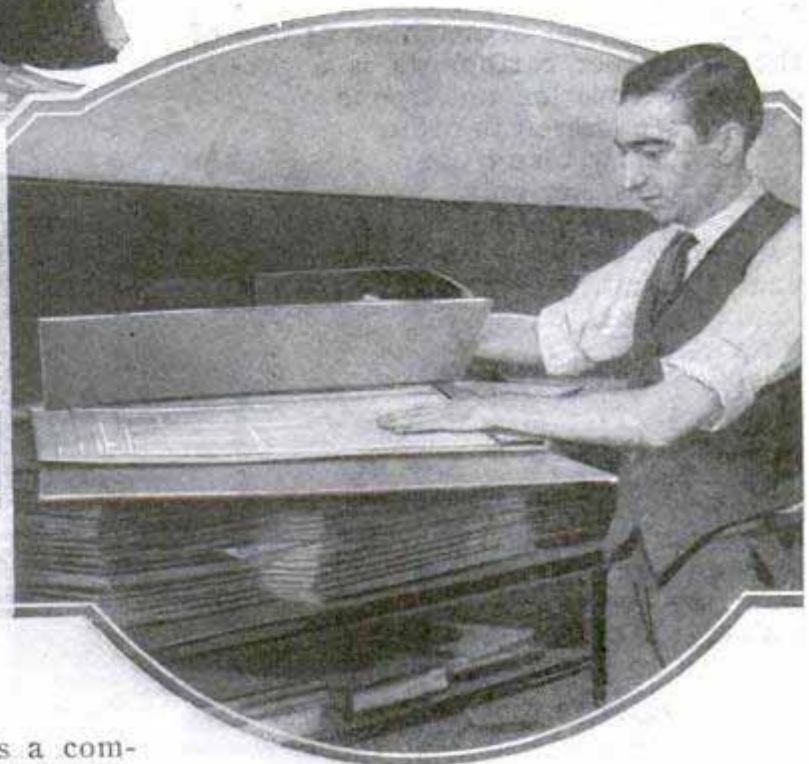


Stacks of Mats Are Delivered to the Shipping Room and Those for Full Pages Wrapped in Large Packages and Backed with Cardboard for Mailing. While Daily Strips Are Cut Apart First

The doctor, known as "Doc," is a composite, according to King, of several characters.

The artists are flooded with ideas and suggestions from readers, most of them impractical for one reason or another, but Mrs. Blossom, the widow, grew out of one such letter. The writer explained that she was a widow and had few friends until she bought a small coupe and rented an alley garage. Then the neighboring garage occupants offered their advice and assistance and frequently took her riding in their larger cars. King introduced a widow to the alley, with the same results. Skeeze, a foundling left on the doorstep of the bachelor Walt, on St. Valentine's day, 1921, and since adopted and raised by him, is modeled after the artist's own son, who happens to be five years older than the cartoon youngster. King, however, explains that he went back in his memory and has reproduced many of the experiences and sayings of his own boy, attributing them to the comic-strip child.

Public taste and desires frequently shape the future for the comic-strip characters. Recently one paper, which features a cartoon built around a little orphan girl, thought she might be losing her popularity because her creator had had her adopted in a rich household. So, for an experiment, the strip was omitted one morning. The result was a flood of telephone calls, personal visits and letters, all demanding to know what had happened to Orphan Annie. The newspaper restored the cartoon next day, explained the omission, and invited suggestions



from readers as to Annie's future adventures. Hundreds of letters resulted, opinion being well divided as to whether she should remain the ward of a rich family, return to a previous home with a poor farmer or some other station in life.

### HACKSAW WITH STEEL FRAME CUTS CORRUGATED IRON



Ordinary hacksaw blades can be used for cutting corrugated iron and other metals with a patented frame introduced in England. It is constructed of steel and is triangular in shape, affording an easy stroke, and is fitted with a special cast-steel blade particularly adapted to cutting asbestos and similar material in either flat or corrugated form.

Arthur Collier, 453  
Briston Road, a Inc

### BUFFALO IN CANADIAN HERDS TOTAL TWELVE THOUSAND <sup>989</sup>

Canada's efforts to preserve the buffalo from extinction have been so successful that the herds have become a problem. Space in the national park at Wainwright, Alta., is exhausted. About 8,000 animals are kept there, and it is estimated that there will be nearly 2,000 more by the end of this spring. Many will have to be slaughtered or part of the herd taken to the Wood buffalo park near Fort Smith, in the northwest territories. In recent years, about 2,000 buffalo have been killed and commercial disposition made of the meat, and of the skins for robes, which were sold for \$50 to \$75 apiece. The present herds are the result of the government's care of an original herd of 700 once owned by a Montana man. The first steps in the preservation program were taken in 1907. The experiment has proved so successful that there are now about 12,000 buffalo in Canada.

### LIGHTHOUSE ON WRECKED SHIP PROTECTS NAVIGATION <sup>955</sup>

When salvaging operations were temporarily suspended on the monitor "Glatton," purposely scuttled in Dover harbor, Eng., during the war, the ship was fitted with a small lighthouse so that the wreck would not be a menace to navigation. The beacon was firmly attached to the highest part of the hull and, though small, provided sufficient illumination to warn boats of the danger. The monitor was sunk when it caught fire with 600 tons of ammunition on board.

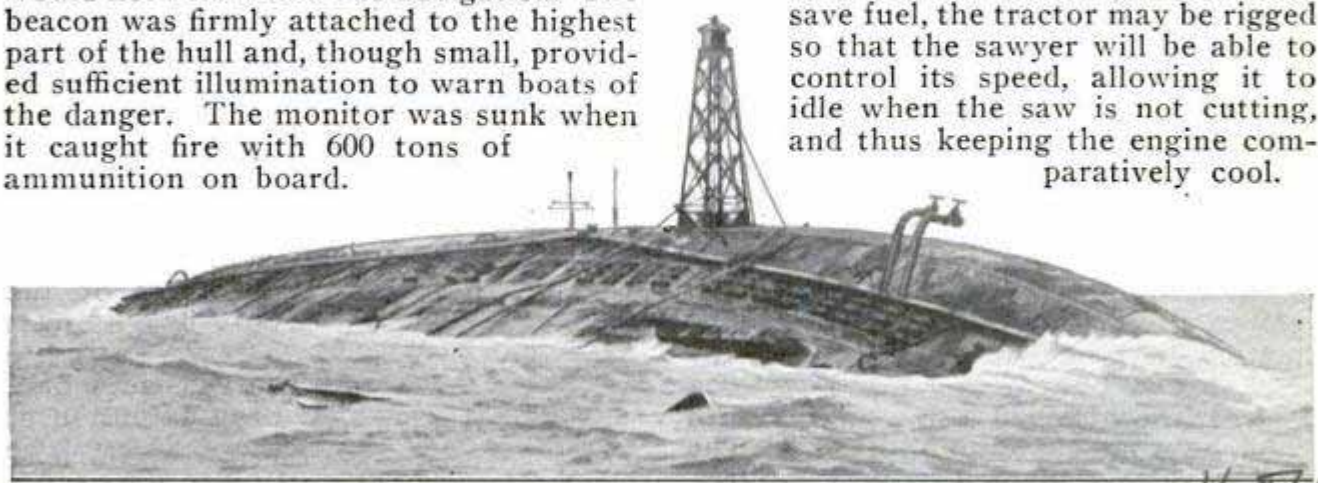
### PORTABLE SAWMILL FOR FARM IS RUN BY TRACTOR <sup>960</sup>

Capable of handling logs as large as thirty-four inches in diameter, a portable



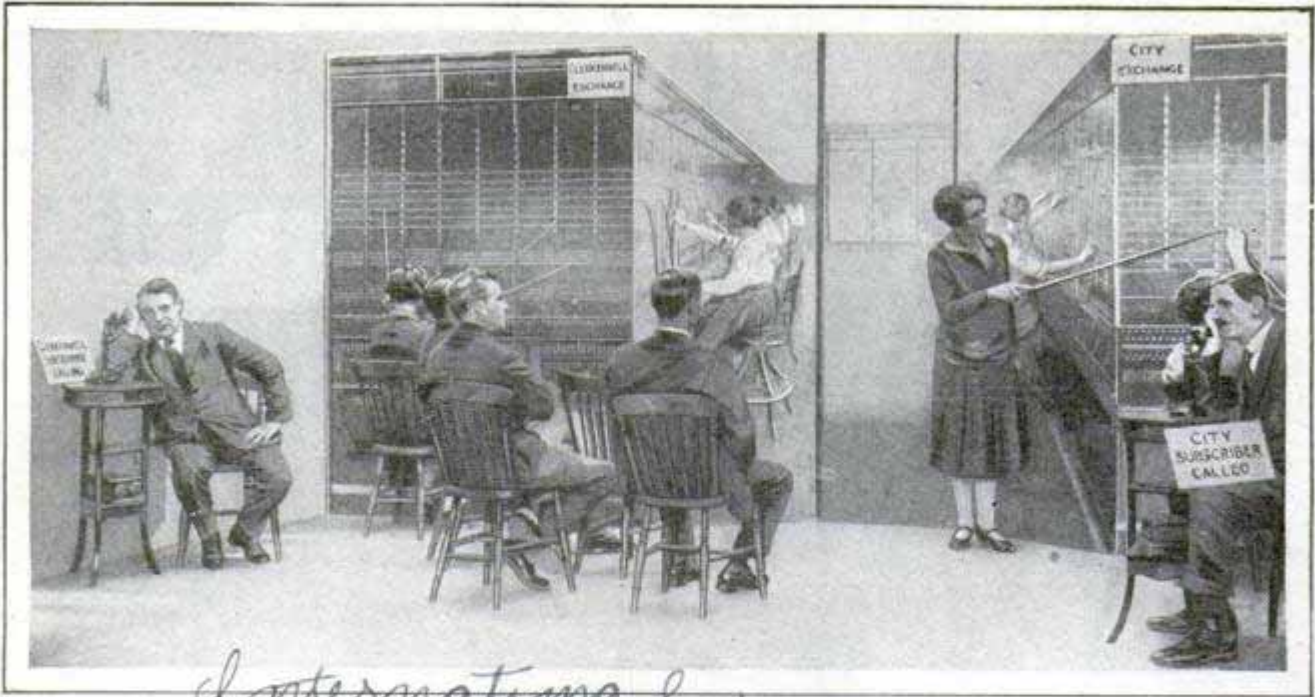
Running a Sawmill with Power from a Tractor; the Outfit Can Be Hauled Directly to the Timber

sawmill, run by power from the farm tractor, can easily be taken to the timber and quickly rigged up or taken down. The carriage is built in standard lengths of fourteen and twenty feet. With the former size, a forty-five-foot trackway and a forty-six-inch saw are suitable. A balance wheel, weighing 300 pounds, is also part of the regular equipment. The outfit is designed to reduce the cost of converting timber into lumber where only small quantities are needed and where the woods are inaccessible to larger units. To save fuel, the tractor may be rigged so that the sawyer will be able to control its speed, allowing it to idle when the saw is not cutting, and thus keeping the engine comparatively cool.



Wrecked Ship Becomes Foundation for a Lighthouse; Beacon on the Monitor "Glatton," Scuttled during the War, Warns Other Vessels While Salvaging Was Temporarily Halted

*J. A. Vance Co., Winston-Salem, N. C.*



English Subscribers Listening to an Illustrated Talk on Telephoning; Screens in the Background Depict the Interior of the Exchange Stations; Successive Steps Are Pointed Out by Lecturer

**HOW PHONE CALLS ARE MADE SHOWN BY EXHIBIT**

Just what happens in a telephone exchange when a subscriber asks for a number has been graphically illustrated by a working model prepared in England. The apparatus consists of replicas of switchboards with operators on duty, and screens depicting the interior of the exchanges. Two persons seated at tables, one on each side of the display and using telephone instruments, represent actual parties to a telephone call. A lecturer explains the various steps involved from beginning to end of the call.

**SKILL OF DIAMOND CUTTERS INCREASES GEMS' VALUE**

If a young Hollander, Ludwig Van Berquen, had not discovered, some 450 years ago, that diamonds can be cut and polished with dust formed by rubbing them together, it is possible that the gems today would be no more highly regarded than they were centuries before Christ, just as bright glasslike crystals, extremely hard, but with no special play of color or brilliance. When Van Berquen went to Paris, the jewelry trade was highly developed and after several years of experimenting, he found that by imbedding the diamonds in cement and grinding them together, he obtained a fine powder with which he could cut and polish them. The art was rapidly adopted by gem workers, and the diamond's value mounted tremendously. Cuttings are now made in

much the same way as they have been for hundreds of years. The stones are first carefully examined to determine their structure and the most suitable way of cutting them to avoid waste. A groove is marked, the cutter places a steel instrument in the depression and strikes a sharp blow with a hammer. Great skill is required, for a single misdirected stroke may ruin a valuable stone. One of the most exciting incidents in the history of gems occurred when the great Cullinan diamond, which weighed a pound and three-quarters in the rough, was cut. The wedge was broken at the first blow, but at the second the great crystal, which looked like a lump of rough glass before it was polished, fell into two parts and from these were prepared the two huge diamonds now among the British crown jewels, and several smaller gems.

**HOLDER FOR CIGAR-BOX COVER IS EASILY ATTACHED**

Covers of cigar boxes are held open at the desired angle for displaying the goods



by an easily attached patented clamp that fits on the edge of the box. The lid rests between the curved sides of a prop extension at the back. The holder does not

hinder the removal of the boxes, cannot break the cigars and fits securely

988

Chicago, Ill. Post  
12/28/25

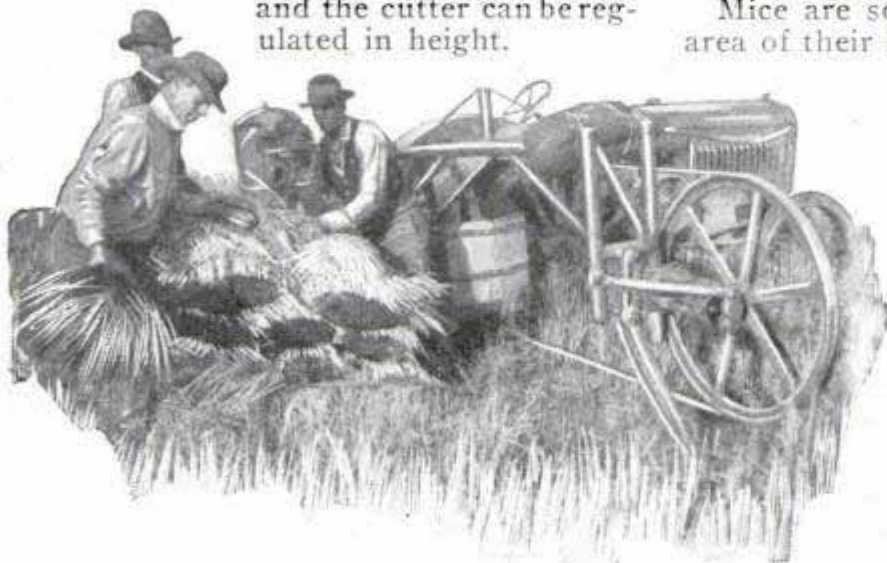
3184  
Ans. J. A. Suggs  
1020 Bush St.  
Berkeley, Cal.

**WOODEN COVER FOR BUILDING PERMITS WINTER WORK 986**

Temperatures of fifty degrees below zero failed to halt work on a hotel at Lake Louise, B. C., which was rebuilt after being partly destroyed by fire. An immense wooden sheet was constructed, five feet from the steel frame. It was lined with tar paper, and steam pipes connected with temporary boilers furnished heat for the workmen. The "overcoat" was 300 feet long, fifty-two feet wide and ten stories high, and cost a large sum, but the expense was considered justified since it enabled the workers to finish the hotel for the summer season. Concrete, brick and plaster work were all done behind the shelter, as temperatures almost as high as those of the mid-year months were maintained without difficulty.

**SAW FOR CUTTING GRAIN SHOCKS SAVES FARMERS LOSS 980**

Intended primarily for use in rice harvesting, but equally applicable to gathering wheat, oats and other grains in shocks, a patented cutter devised by a Texas farmer promises to save much of the loss that often results from rain on crops in the field. It consists chiefly of an ordinary tractor which pulls a band saw, one and one-half inches wide, operated by a separate motor. This saw cuts the top off the shock, freeing the grain-bearing part from the water-soaked base, thus permitting quick drying and hauling direct to the thresher. Only two men are required to operate the outfit, one to handle the tractor and the other to manipulate the cutter. The sawing can be done with little or no disturbance of the butts of the bundles, and the cutter can be regulated in height.



Rice Shock Tipped Back to Show Clean Cut Made by Motor-Driven Saw; Tops So Severed Dry Quickly

*W. Homer J. Walker  
Beaumont, Texas.*

**MOTOR-DRIVEN ROLLER SKATES RUN ON ROUGH GROUND 90**

Propelled by small acetylene or gasoline-burning motors, roller skates devised



On Motor Roller Skates over Rough Ground

by a German engineer are said to develop considerable power and will run not only on pavements but on rough surfaces as well. Controls are operated through connections reached with the hands. The engine is built on principles discovered in making small motors for airplanes.

**LIGHT WEIGHT OF HOUSE MICE PROTECTS THEM IN FALLS 968**

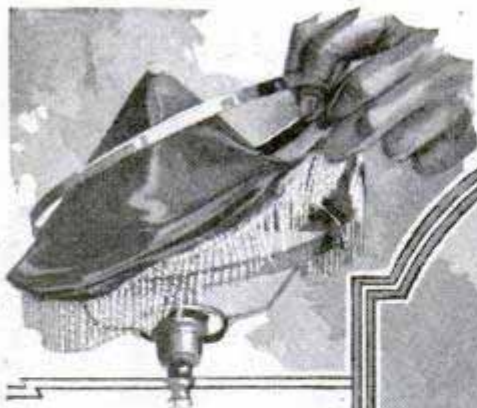
Mice are so light in proportion to the area of their bodies, that if they fell from a height of 1,500 feet, they would suffer only a slight bump, scientists declare. A falling mouse would be borne up after the manner of a parachute, air resistance and the comparatively large surface exposed checking the rate of descent. Rats and larger rodents are not so protected, while a horse or man falling from such an elevation, of course, descends at such speed, despite the greater air resistance, that the fall of necessity must end fatally.

*Ingenieur Hans Seibhardt  
München, Bayern, Germany.*

*Seibhardt of Munich*

*Auckland News  
11/12/25*

# Time and Money-Saving Tools



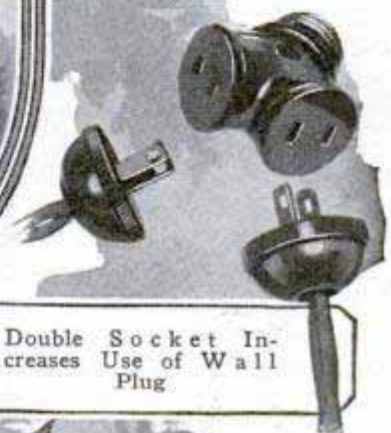
Held on Frame by Metal Band, Lamp-Shade Covering Is Easily Removed



Use for Safety-Razor Blades; They Fit Snugly in This Vegetable Peeler



Turn of the Knob Keeps the Toast from Burning



Double Socket Increases Use of Wall Plug

Rapid-Fire, Sliding-Blade Cookie Cutter Shapes Eighty-Six a Minute



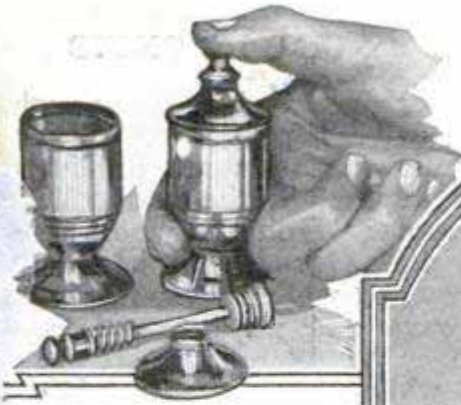
Private Bath for Baby Eliminates Stoopng, and a Canvas Cover on Tub, with Pocket for Garments, Serves as Dressing Table



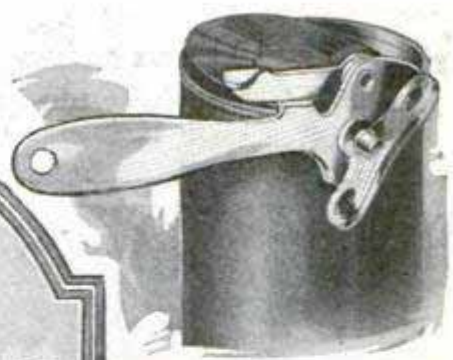
Embossed Name Strips for Stamping Laundry in Indelible Ink with Hot Iron



# for Woman's Workshop in Home



Salt and Pepper Cellars with Button Eliminate Shaking and Regulate the Flow



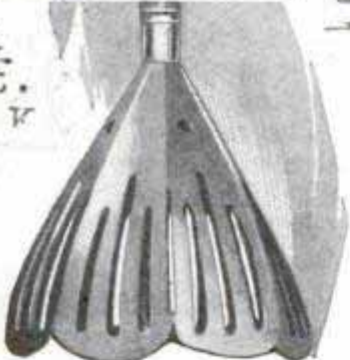
Can Opener without a Blade Leaves Smooth Edge to Prevent Cutting Fingers



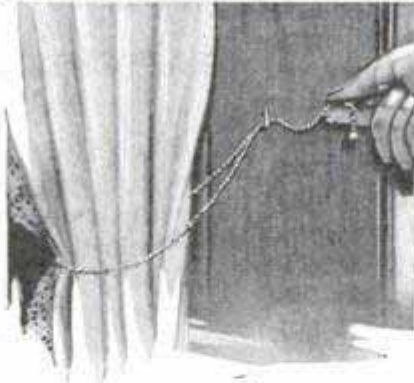
Holder for Cooking Cauliflower without Breaking



Plug with Pointer Tells When Current Is On



Cake Cover with Glass Knob Is Gaily Decorated, Saves Bother of a Box and Is Easily Cleaned



Metal Stems Hold Flowers and Permit Graceful Arrangement

Above Is a Chain to Keep the Curtains Back without Soiling or Mussing, and at the Right, a Combination Furniture and Auto Duster Made like a Glove; the Top Is of Canvas and the Lower Part of Mop Warp: It Is Quickly Cleaned, Saves the Hands and Produces a Polish



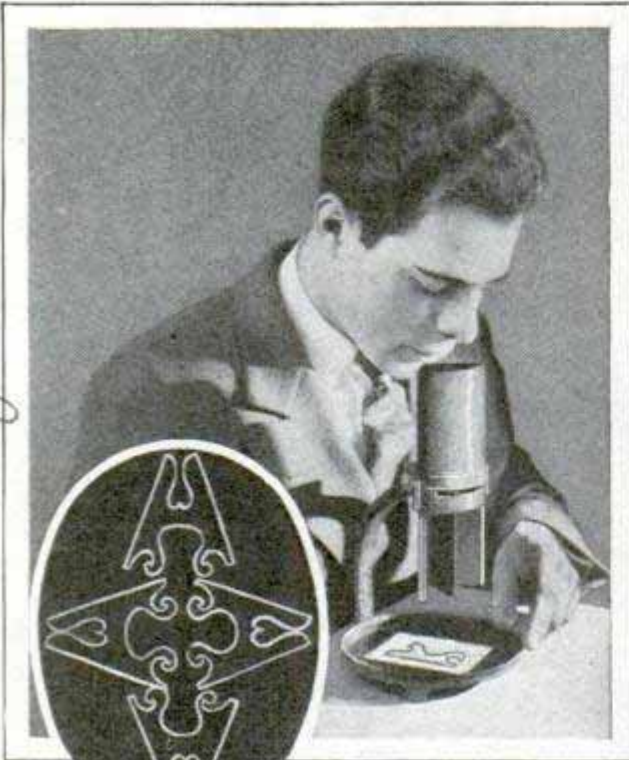
obtain it by addressing Bureau of Information, Popular Mechanics Magazine, Chicago.

897

*Always*  
**PLAYTHING OF PAST ADAPTED TO PRODUCE DESIGNS**

An adaptation of the old-fashioned kaleidoscope, which formed ever-changing

*Analyzer*



Simple Figure Reproduced Eight Times in Geometrical

Design by New Device; Inset Is What the Eye Sees

geometrical designs of colored glass when revolved in the hands, has been invented by a Chicago art instructor to assist artists and designers in producing new forms of patterns. Two black-coated glass reflectors are mounted above a revolving tray in such way that the angle between them may be varied from ninety degrees down to a narrow slit. At the top of the mounting is a peephole for the eye. Looking through it at an object placed on the tray, the eye sees a series of reflections which produce geometrically perfect duplications of the object or design. Varying the reflector angle changes the number of images seen from two, four, five, six, eight, to as high as ten and twelve. An infinite variety of designs may be seen by revolving the tray or changing the angle of the reflectors. A scrap of paper with a few curved lines appears as a complicated design. Even the scrap itself may be used. Jewelers' designs for complicated pieces are created by wadding a piece of paper and placing it between the reflectors, while a tiny fragment of silvered paper becomes a shimmering setting.

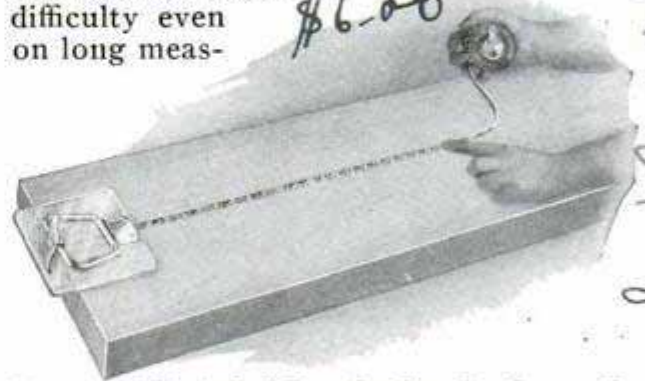
At no place in the British Isles, is the sea more than eighty miles distant.

936  
**DIFFERENCE IN SILK AND WOOL SHOWN BY SIMPLE TESTS**

As a guide for women who wish to avoid adulterations in buying wool and silk articles, the following tests are published in a bulletin prepared by the state college of North Dakota: "Hold the wool material to the light. It should be firmly woven, otherwise it will not keep its shape. Ravel out warp and woof threads and break them. Wool pulls apart with kinky ends, while cotton breaks. Wool burns slowly, giving off an odor of burning feathers, and leaves a large amount of ashes. Cotton makes a flame while burning, has the odor of burning leaves and gives a fine gray ash. If cotton is present in the wool, it will burn with a flame. This is one of the most simple and satisfactory tests for detecting cotton in wool material. The ends of cotton threads spread out when burning. Brush the surface of napped cloth briskly. If the nap loosens and drops off, the cloth will soon wear threadbare and look shabby. Pure silk is light in weight and has long endurance. When silk dresses and blouses crack or give at the seams, soon after they are made up, the silk is weighted. Before purchasing silk, burn a sample of it. True silk burns slowly, giving off an odor of burning feathers. The ash coils up into a tiny ball on the edge of the burning material. Weighted silk burns slowly, holding its shape after being burned."

**FASTENER FOR TAPE MEASURE SAVES EXTRA MAN**

748  
With the aid of a fastener attached to the end ring of the tape measure, one person can use the rule with little difficulty even on long meas-



Fastener Holds End of Tape So That One Person Can Use Measure Easily

urements. The holder is a sharp prong that can be inserted in wood or other material or fits over the edge of the surface. When not in use, it is turned down to lie flat against the ring.

*Keuffel & Esser  
Adams and Third St  
Chicago*

*Dearborn Chicago*

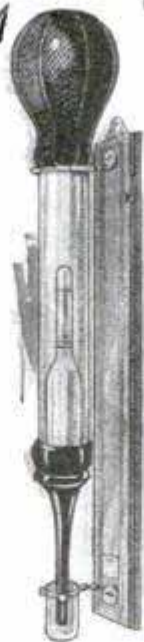
520

12/4/25

*Specialty Co.,  
20 Church  
New York.*

### BEAVER'S DAM-BUILDING SKILL RIVALED BY ITS STUPIDITY 907

While beavers exhibit remarkable cunning in building their dams, they show surprising stupidity at times in other activities, and some of the powers popularly ascribed to them are mere myths, according to R. S. Hunt, a naturalist who has devoted much time to a study of the animals. For instance, they do not form lines and pass sticks to one another; they cannot tell which way a tree is going to fall before they gnaw it down; they cannot drive stakes or suck the air out of logs; do not use their tails as shovels or trowels, and they do not cut up large logs. An evidence of their apparent stupidity is in gnawing, perhaps the better part of a whole night, on a thick limb, then, on returning the next, cutting a new notch so far to the side, that the first is practically useless. They swim with their webbed hind feet only, using the tail as a rudder. The front feet are used in applying mud to their lodges—mounds of sticks, moss and soil inside of which they live. A shelf a few inches above the water is constructed on which to sleep. Entrance to the lodge is deep enough below the surface so that it will not be frozen solid in the winter. The beaver's principal problem is to store sufficient wood to afford bark and juicy food during the months when it is imprisoned. In doing this, an elaborate system of dams and canals as well as roads leading to the depths of the forests, is constructed. Where the current of the stream is slight, the dam will be almost straight, but where the flow is rapid, it will be curved to conform to the current, and successive series of dams will be built to raise the water.



*Alford*

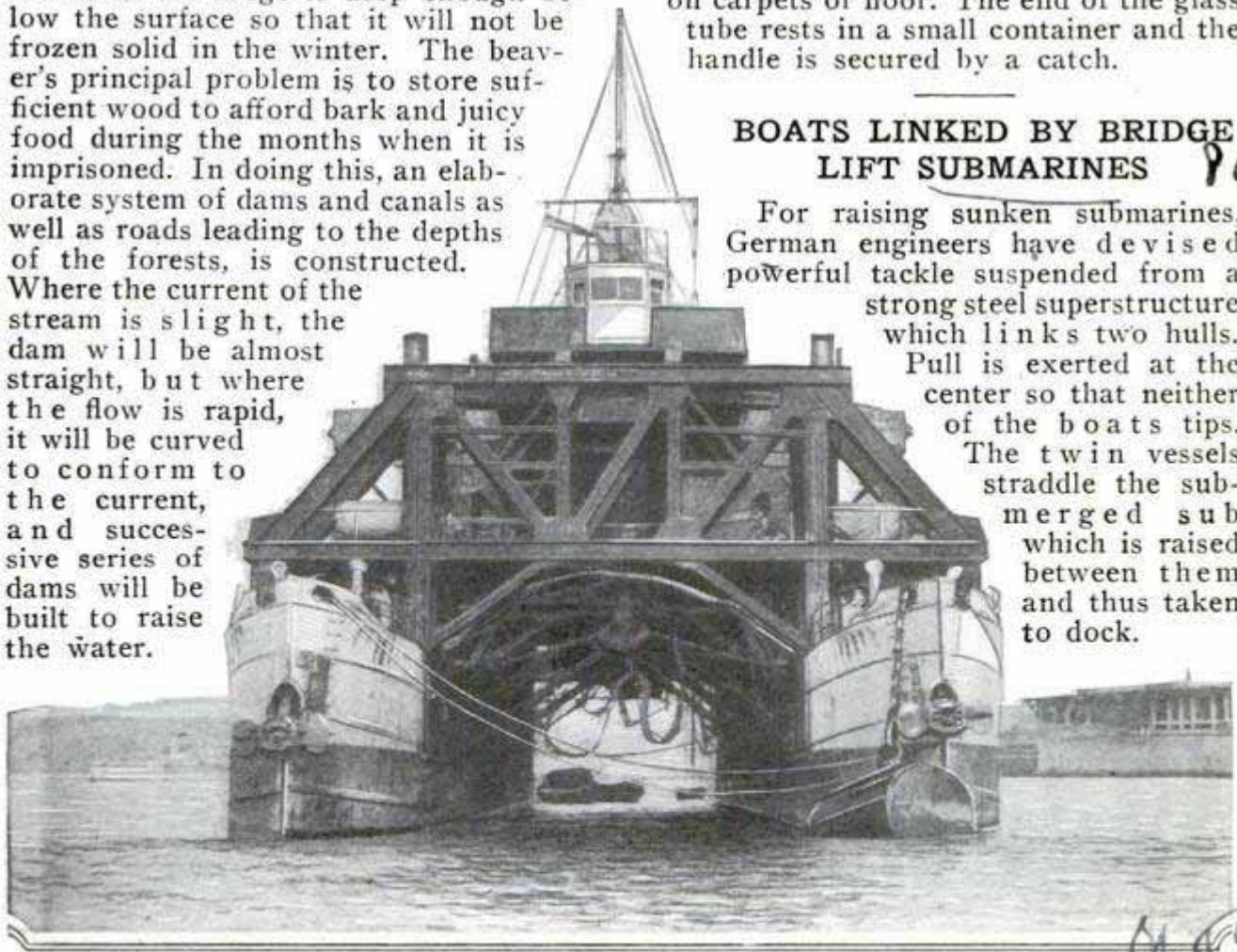
Battery Tester in Rack, Where Drippings Are Caught in Cup; Holder May Be Placed Directly on Battery or on Wall

### HOLDER FOR BATTERY TESTER PREVENTS ACID DAMAGE 844

What to do with the storage-battery hydrometer after using it, has been solved by a small holder that can be attached to the battery itself, keeping the instrument in safety and preventing dripping of acid on carpets or floor. The end of the glass tube rests in a small container and the handle is secured by a catch.

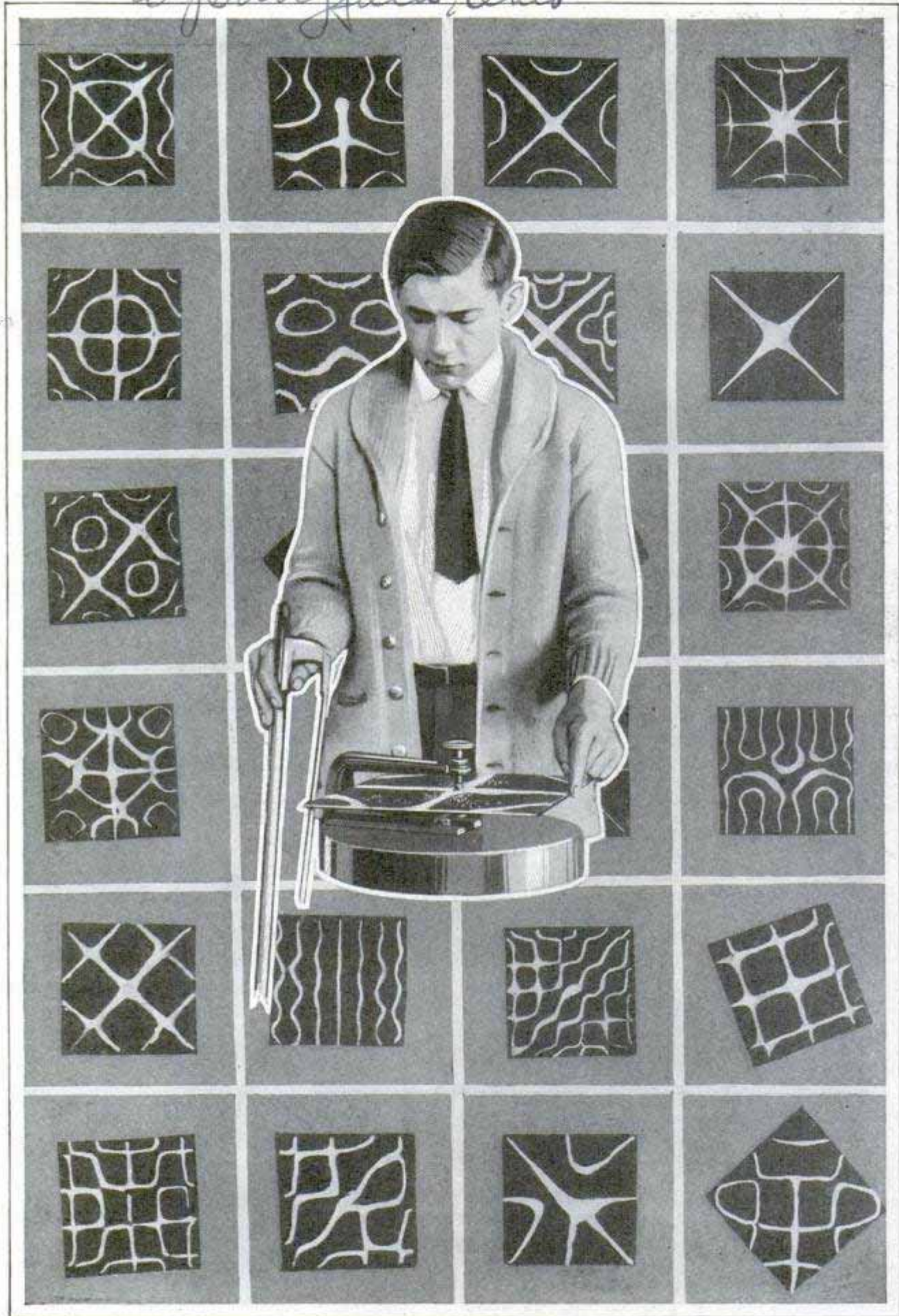
### BOATS LINKED BY BRIDGE LIFT SUBMARINES 950

For raising sunken submarines, German engineers have devised powerful tackle suspended from a strong steel superstructure which links two hulls. Pull is exerted at the center so that neither of the boats tips. The twin vessels straddle the submerged sub which is raised between them and thus taken to dock.



*Alford*

German Submarine Raiser; Powerful Lifting Apparatus Is Supported in Upper Framework and Stress Comes at the Middle, Preventing the Hulls from Tipping Sideways; Pilothouse in Upper Center



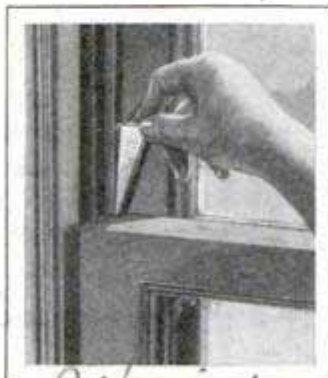
Sand Patterns, Produced by Vibrations, and, in the Center, How They Are Made; Metal Plate, Sprinkled with Sand, Is Held in Clamp, and Violin Bow Drawn against One Edge, While Finger Touches the Other

**SOUNDS ARE PICTURED IN SAND TO SHOW VIBRATIONS** 862

With a violin bow, a clamp, a square brass plate and a small quantity of fine sand, interesting "sound pictures" can be produced to show the effect of different vibrations. The sand is sprinkled on the plate, which is held in a horizontal position by the clamp. While holding the finger on an edge of the metal, the bow is drawn across another edge. The sand immediately leaves the parts of the plate that are in vibration and collects in geometrical patterns which can be changed simply by readjusting the clamp, moving the finger and the bow to a different place. The action of the sand illustrates what takes place when a stringed instrument is played, that is, the string is made to vibrate in equal parts instead of as a whole when the finger is placed at any point on it. Because the plate vibrates in different areas at the same time, the sand is shaken into the peculiar forms that appear. Plates of other material than brass may produce different sand patterns. The shape and size also affect the form of the figures.

**WINDOWS LOCKED BY WEDGE TO FOIL BURGLARS** 3419

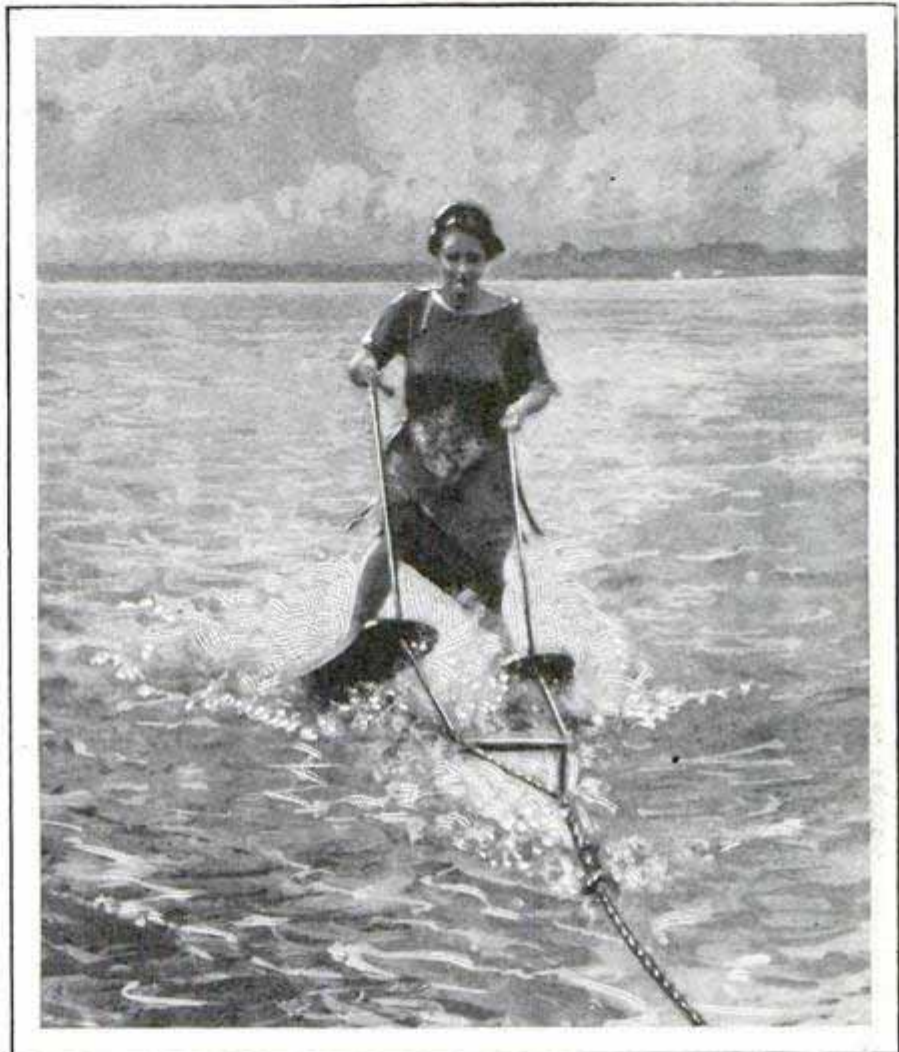
Inserted between the sash and frame, a sharp-pointed wedge locks the window when it is closed and also serves to keep it open at any height for ventilation. Travelers who wish to obtain added safety at hotels or other places may slip this in their bag. The wedge is thin enough to suit most windows.



*Perfection Window Lock Co  
73 E. 20th St. N.Y.C.*

**SURFBOARD HAS TWO RUDDERS TO PREVENT SKIDDING** 909

To eliminate lateral skidding, one of the chief dangers in the sport of surfboard



Roman Riding on the Waves; Double Surfboard Has Rudders and Is Intended to Prevent Lateral Skidding

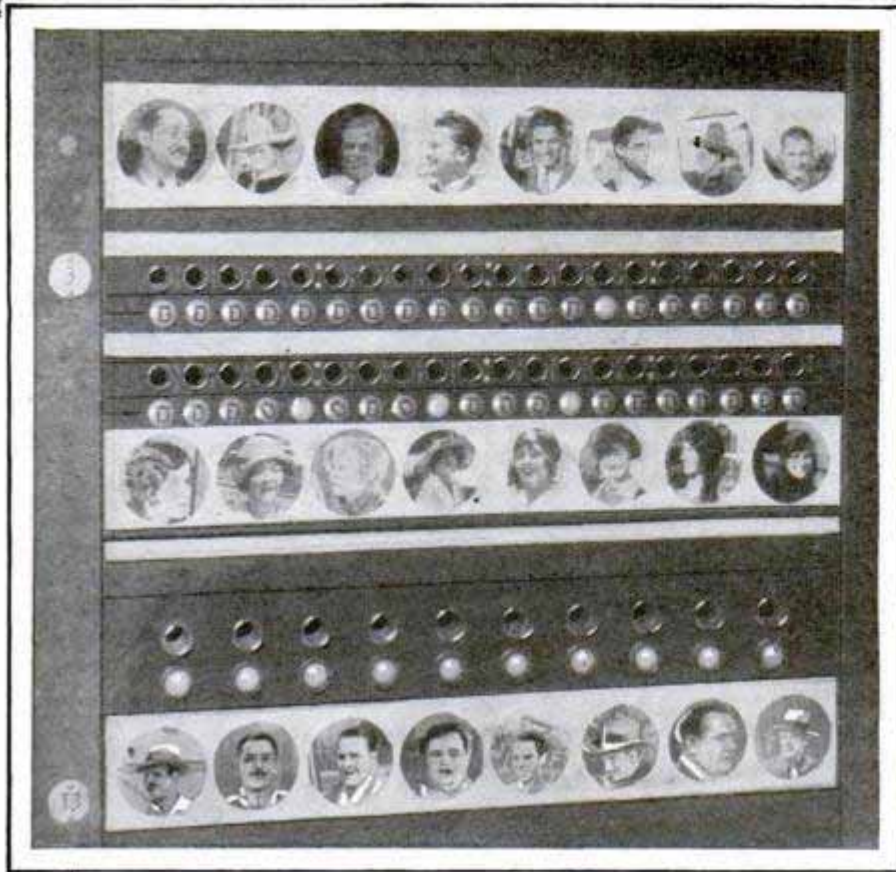
riding, an eastern inventor has devised an aquaplane in the form of rudderlike strips, one for each leg. Their relative position may be shifted as needed by the rider, whose feet rest on pads that are connected by a rod with the end of the rudders.

**SHIPS RETIRED FROM SEAS FIND ODD JOBS** 916

Their days of usefulness for regular sea duty over, many old windjammers enter new careers, escaping the hands of the ship breakers. In Biscayne Bay, Fla., an old vessel has been fitted up as a restaurant; another in Valparaiso, Chile, is being used as a laundry and another as a storehouse for a steamship company. A number of the smaller hulls are converted into lighters for coast service. Some ships are fitted up as training vessels.

*N.Y. Times  
12/13/25*

904



Photographs of Movie Stars Pasted on Switchboard Opposite Connections to Their Private Phones for Operator's Reference

### PHOTOS REPLACE NUMBERS ON PHONE SWITCHBOARD

Photographs of motion-picture stars opposite the connection of their private telephones on a switchboard in a California studio, save the operator the trouble of remembering numbers. They are uniform in size and in case of changes in dressing rooms, the pictures can be shifted accordingly, saving the trouble of copying names or other means of identification.

### FARMING THE OCEAN BOTTOM TO INCREASE FOOD SUPPLY

With population rapidly growing and land reserves diminishing, scientists are turning their attention to the possibilities of submarine farming as a means of replenishing the food supply. That the oceans hold fortunes in sunken treasure and in fish, everyone knows, but deep-sea pastures are not commonly regarded as gardens in spite of the fact that many plants already are being used for food. In the Northern Pacific, there are nearly 2,000,000 square miles of sea bottom which have never been explored. What grows several miles beneath the surface is little known, but waters to a depth of several hundred feet are crowded with many varieties of plants, ranging from those scarcely

visible to the unaided eye to the kelps, some of which have stems 100 feet long and tufts thirty feet across. So plentiful are these growths that the sea is sometimes compared to a thin vegetable soup. In Japan, 100,000,000 pounds of kelp are consumed annually. The product is dried and shredded, and appears on the market in about fifty varieties, including sheets, sticks, sugared sweets, powder as "curry" for rice, and even as a kind of tea. Forty-five factories in Osaka are devoted to converting the kelp into edible substances which have been used in Japan since 1730. From agar agar, a kind of seaweed, gelatin is obtained, and in Japan, it is used for window panes as well as a thickening for soups.

Appetizing dishes are prepared by the Scottish highlanders and Irish peasants from dulse, a seaweed, and a variety of ocean moss, collected in large quantities at low tide, is made into an easily digested kind of flour.

### GLARE SHIELD WORN ON HAT PROTECTS AUTO DRIVER

For protecting the eyes when driving by day or night, a shield adjusted to the hat brim is made in two sections, either or both of which may be tilted back to give a full view ahead if desired. After dark, for instance, the right side of the shield may be tipped back while the other blocks glare from approaching headlights and, at the same time, permits a clear view of the right-hand side of the road. With both flaps lowered by day, the driver can face the sun without squinting or injury to his eyes.



Instruments for recording weather conditions have been sent to a height of four and one-half miles by kites.

*all Lake City Utah*  
*Shompson*  
*Dr. Christian*

*July*

*and uses*

*910.*

*926*

*Get Bits 12/5/25*



# How to Keep Your Feet Happy

By S. C. WOLDENBERG, M. D.

*104 S. Michigan Ave.*

TO tell a person to look in his shoes for health, happiness and success may sound like a riddle, but it isn't. It is a simple truth, the importance of which is growing as we discover that many human ills may be traced directly to foot troubles and that foot trouble generally is due to ill-fitting shoes. Your efficiency at your work, the way you feel when the day's toil is done, your disposition may very likely depend upon how you are treating two of the most faithful, but often the most cruelly abused servants of your body.

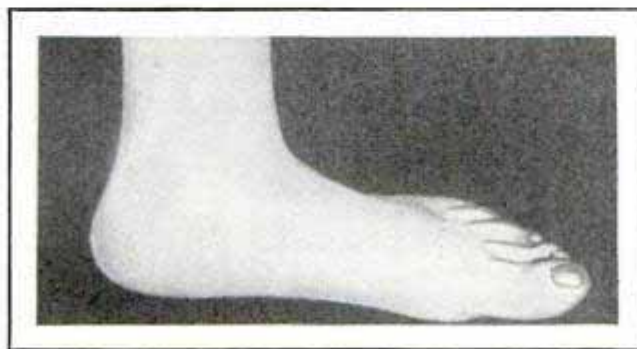
The vice president of a large railroad company, liked for his cheery nature, recently became so cranky during working hours that even his best friends dreaded to enter his office. He was aware of his temper, thought that ill health was partly to blame, but did not know what was the matter with him until a friend convinced him that his real trouble lay in a minor foot ailment. A dull ache, all day long, kept him in ill humor. You know how you feel when your tooth aches. Throbbing, painful feet have much the same effect on the disposition.

When you buy your next pair of shoes, give a thought to your foot. Remember that it is a marvelous propelling machine as well as a support for the body. Nature intended that it should be unfettered, but civilization has produced customs and cement sidewalks; hence, we must incase our feet in shoes. They may be a source of comfort or a menace to your health. Much

depends upon your selection. If you would have a shoe that will not injure your feet, let it be one with a straight last, like that of the army shoe. It should be straight from the tip to the ball of the great toe and the distance from the ball of the great toe to the heel, should correspond, in the shoe, to that in the foot. The toe of the shoe should be rounded, not pointed, and the shank—the portion under the arch of the foot—should be stiff and firm, preferably. Avoid high heels if possible. However, for some persons, high heels may be indicated. In most cases, the body is held erect most easily when a person stands correctly so that a line drawn from the base of the skull to the heel will be perpendicular to the earth's surface. This is what is known as the average normal line of weight bearing.

The weight is distributed to the heel and ball of the foot in a tripod arrangement to help maintain the balance as well as support the body weight. Now, if the heels are too high, they tip the body forward. This must be offset by an effort on the part of the person. Strain on muscles that were not meant to be strained results. Just what this may amount to was computed by army tests.

It was shown that a soldier, five feet seven inches tall and weighing 154 pounds, when wearing a heel three-fourths of an inch thicker than the sole, had to exert strength enough to be constantly lifting fifty-six pounds from the ground to keep his



Typical Flat-Foot Condition, the Result of a Broken Arch Generally Due to Ill-Fitting Shoes

balance. In case he was loaded with sixty pounds of pack and equipment, the balancing strength required was 116 pounds.

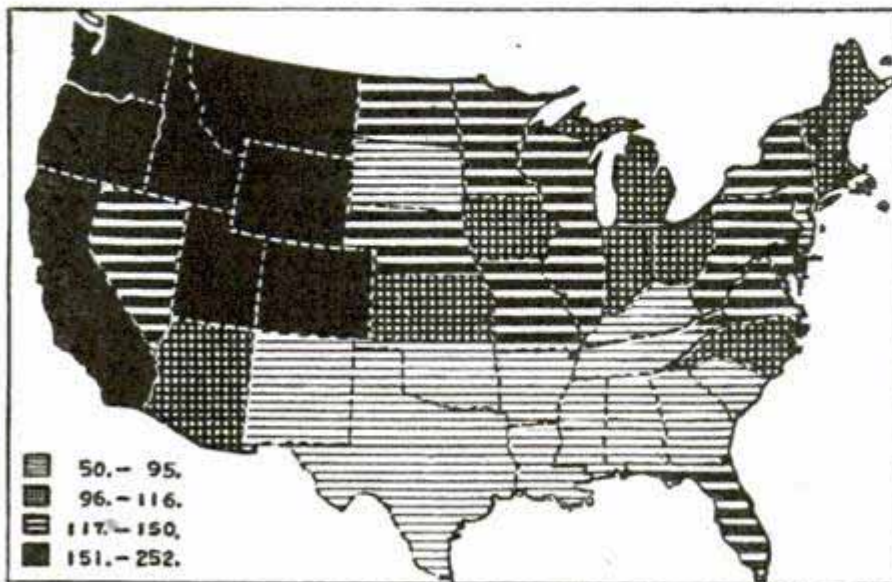
The common effect of too high heels or too short shoes is to crowd the toes downward and inward and to contract the powerful heel cord that helps lift the weight of the body. This disturbance of the normal position of the body may produce such serious results as spinal curvature, backache, pains and deformities of the feet. Shoes for an adult person should be at least one-half inch longer than the distance from the heel to the tip of the great toe. Do not wear thin soles. Thick, firm leather—not the stiff, unyielding kind, like that of the heavy, hobnailed shoes—is better, for it helps in the support of the foot and decreases jarring. If they are of the proper shape, it makes little difference, other than seasonal, whether the shoes are low or high, although, with the low shoe, there is less interference with the tendons.

Of course, you want attractive shoes, but if you are tempted to select too small a size, just for the sake of fashion, and the clerk assures you that they will be all right after you have worn them awhile, remember that the popular idea that every pair of new shoes must be "broken in" is wrong. Your shoes should be just as comfortable the first day you wear them as they are after a month or more. What really happens in the majority of cases of so-called breaking-in, is that the foot is being broken down. Either consciously or unconsciously, you favor that part of the foot which is being chafed or pinched by ill-fitting shoes. In time, this may cause wrong posture of the body or deform the foot, resulting in a flat-foot con-

dition. A survey of about 1,300 school children in Chicago recently, showed that approximately twenty-six per cent of them were suffering from curvatures, and many cases were undoubtedly due to foot defects. The importance of selecting proper shoes for young, growing persons cannot be too strongly emphasized, for it is often at that time of life that foot defects are formed, resulting in serious troubles later. The soles of a young person's shoes should never be too heavy. A firm heel is preferred.

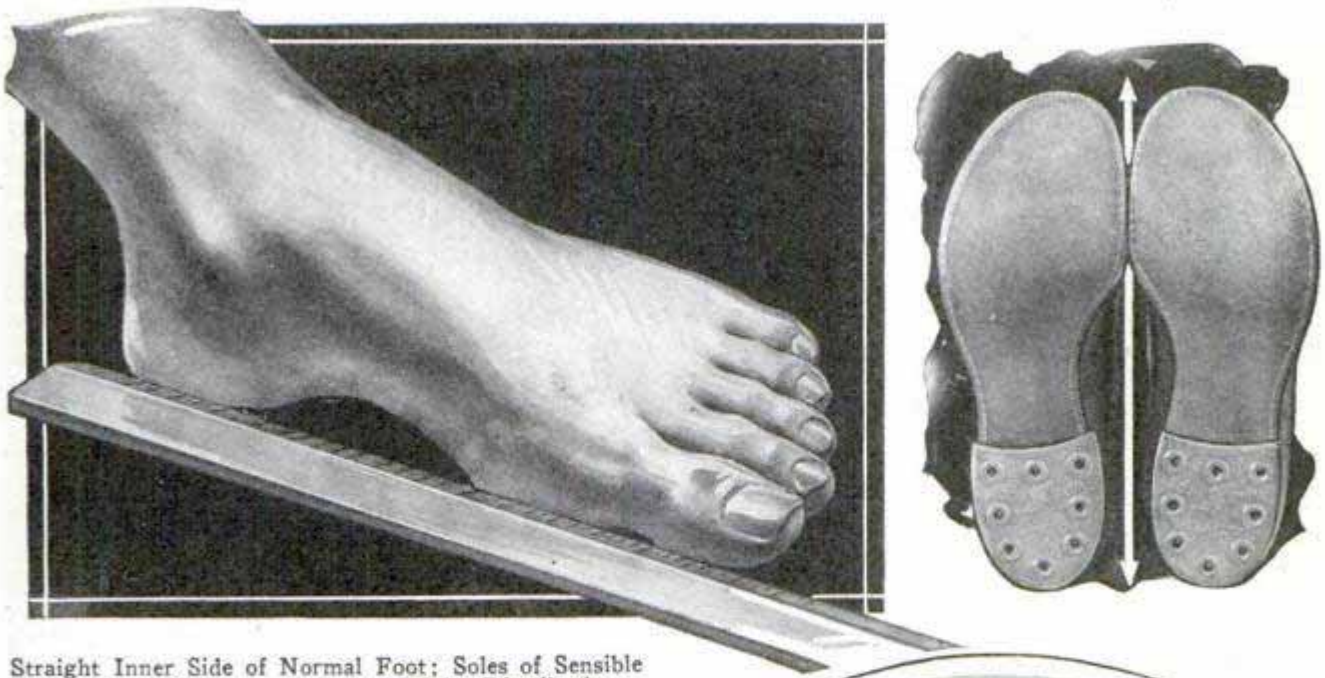
Care of the feet is as essential as the choice of proper shoes. One of the war's great benefits was repeated emphasis of this and other proofs of the relationship between foot troubles and shoes. Army examinations showed that in the south, where going barefoot is common, less than 100 men out of every 1,000 were suffering from pronated (out-turning) or flat feet. The number in other sections of the country reached as high as 252 out of every 1,000, particularly in the mountain regions of the west, where many wear heavy walking shoes, chosen with little thought of fit or comfort, but mainly for durability. Col. Munson, of the army medical corps, declares, "the effect of badly fitting shoes upon the psychology of war is very great. Even when the soldier is able to continue the march, the discomfort produced at every step soon reduces buoyancy of spirits, causing mental irritation, and materially diminishes the fighting capacity."

The same is even more true of the army of workers in peace times. You see them every day, trudging half-heartedly to and from their tasks, toeing in or toeing out, their heels run down at various angles, ankles bulging and many obviously suffering from corns, bunions, poor circulation, indigestion, nervousness and even more serious ailments. Remember that you cannot easily conceal your foot troubles. Almost any skilled orthopedic surgeon, by a glance at your shoes, can detect your pedal ailments. Improper weight bearing, and not necessarily poor workmanship, often causes your shoes to wear out in the peculiar manner they sometimes do, breaking open at the sides or toes or wearing



Cases of Flat and Pronated (Out-Turning) Feet per 1,000 Men, as Discovered during Draft Examinations; Notice the South's Favorable Record



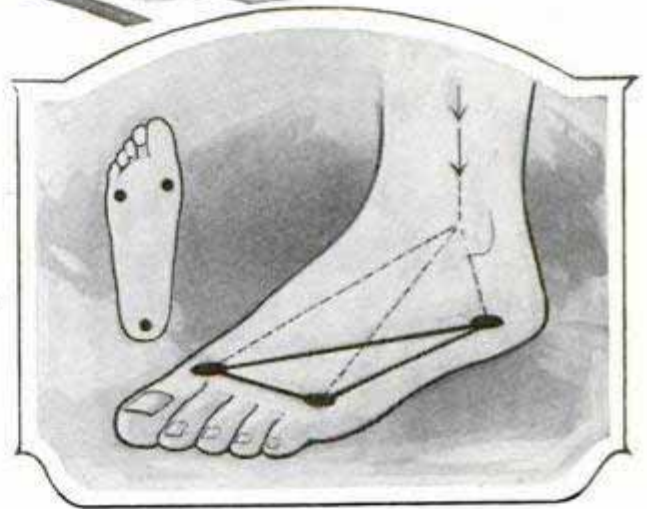


Straight Inner Side of Normal Foot; Soles of Sensible Shoes and Diagram of Body-Weight Distribution

off at various angles at the heel. Toeing out seems to be more common among women than among men. Ill-fitting shoes are almost always to blame. Women, as well as men, were intended to walk in a straight line, the feet pointing directly in front with each step.

An excellent treatment for the feet, whether you are suffering from corns, bunions, excessive perspiration and coldness or not, is what is known as the "contrast bath." This is nothing but alternate immersions in hot and cold water. A recommended method is to use a watch while taking the bath, keeping each foot first in water as hot as you can stand for a minute and then in cold for the same length of time, alternating the process. This should be done at least once, but preferably twice, a day. To make the water soft, a little washing soda should be used. Baths of this kind help stimulate the circulation which often is impeded by pressure of the shoes, prevent excessive perspiration, calluses and various forms of skin disease likely to afflict the feet. Remember that your feet were never intended to be cooped up in such tight quarters as a shoe. If you wear a close-fitting glove, you feel the stiffness and the swelling that it causes in a short time. With improper shoes, your feet suffer this mistreatment to a much greater degree, for the weight of your body aggravates the tightness of the shoe each time you step. If you are putting on weight each year and crowding your feet into narrower shoes, you are doing what an electrician does when he attempts to put a ten-horsepower load on a two-horsepower motor.

There are countless remedies for corns,



but the best of all is a correct shoe. A corn is nothing but a hardening of the skin, a callus which nature provides to resist unnatural pressure on that part of the foot. The right kind of shoe will eliminate the cause of the undesirable chafing and the corn will disappear. Thousands of soldiers were rid of their corns during the war, just by wearing army shoes. The calluses and corns returned in many instances when they went back to the footwear of civil life. One of the best ways to treat a corn or a callus is to rub it gently with pumicestone after washing the feet. This scrapes off the excess tissue, achieving the same effect as cutting, without the danger of inflicting a serious wound. Repeated rubbing will keep the corn down, and it will naturally vanish when proper shoes are worn.

A bunion is an overgrowth of the bones of the big toe due to unnatural pressure and constant irritation of the shoes. An operation is usually necessary for its entire removal, but properly fitting shoes will relieve the suffering in many cases. If conditions are not bettered by a proper

fit in shoes, you should visit a reliable specialist and let him prescribe a remedy which will fit your conditions.

In the majority of cases, artificial arches are not needed. The selection of shoes made along anatomical lines, that is, in accordance with the structure of your feet, will relieve arch troubles and prevent their development. If not, the only safe course is to seek the advice of a trustworthy specialist.

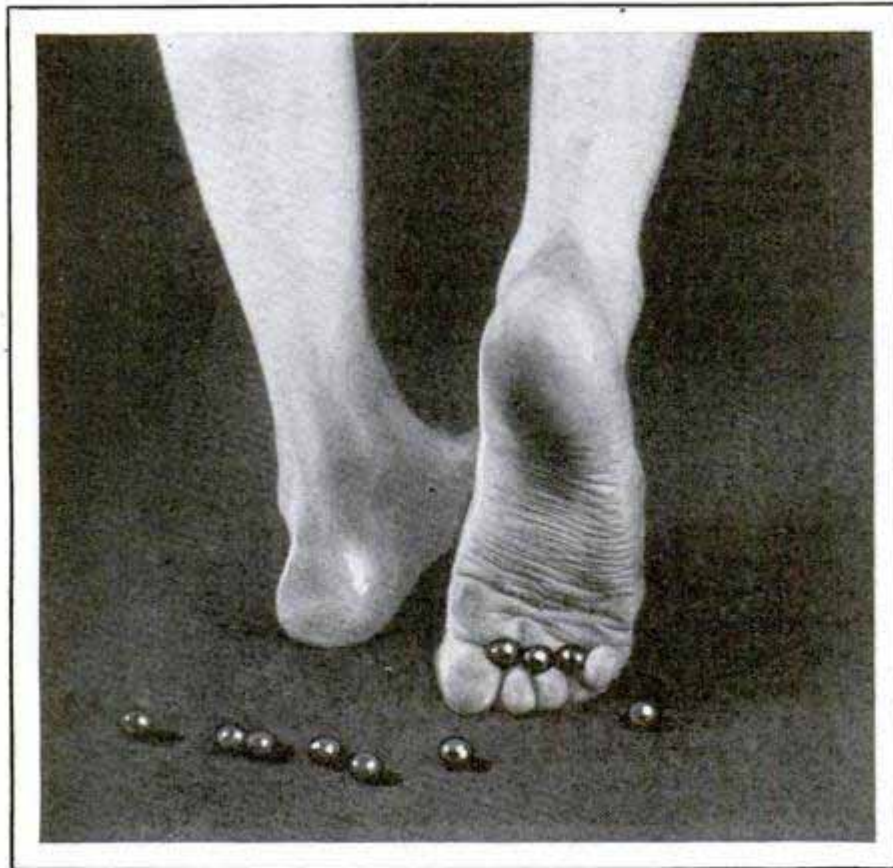
The bones in your feet have no keystone to support the arch as is the case in a building. They would fall of their own weight unless held in place by muscles and ligaments. Remember that there is no relation between the height of the arch and the strength of the foot. Many persons boast of high arches, believing that they indicate a superior foot. It may be that such a condition is a malformation and needs correction. An artificial arch that has been constructed along a common pattern may not be adapted to your special needs. Your foot may be compared to a carefully constructed bridge, made to conform to certain uses, grade conditions and angles. If a prop is needed, it must be adapted to that particular bridge. Putting in a bolster of any kind may throw the whole structure out of alinement and cause a disaster. Such a result is likely to follow a hap-

azard selection of artificial arches and improper shoes.

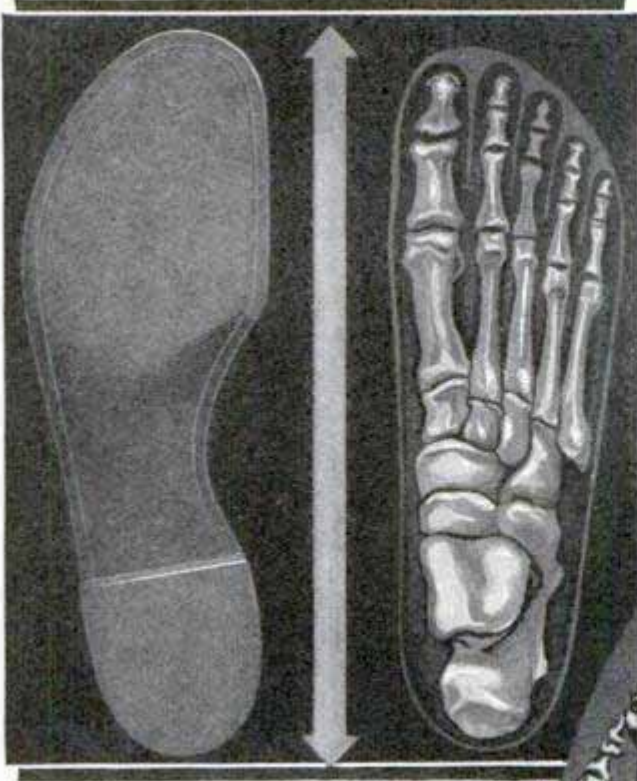
Even if you do considerable walking, your foot muscles may not get the proper exercise, for the reason that they are constricted within the shoe. The common practice is to do less and less walking with the increase of the automobile and other means of easy transportation. The malady called "automobile foot" is common among chauffeurs, draymen and others. It is simply a form of arch weakness. Such persons, and many others, would benefit by resorting to special exercises.

Here are three simple stunts that require but little time and produce helpful returns. Cross the legs and, while holding one knee stiff over the other, extend the supported leg. Now bring the foot upward and inward, repeating the movement until you have counted to 100 slowly. This exercises the large muscles in the front, rear and at the sides of the foot. Assume a squatting position, turn the feet on the outer side and curl the toes inward. Repeat while counting to 120. Picking up marbles with the toes is another excellent exercise. You may fail to clutch them at first, but practice will enable you to grip as many as five or six at one time. All these exercises should be done while barefooted and may be performed both at night and morning. The primary object

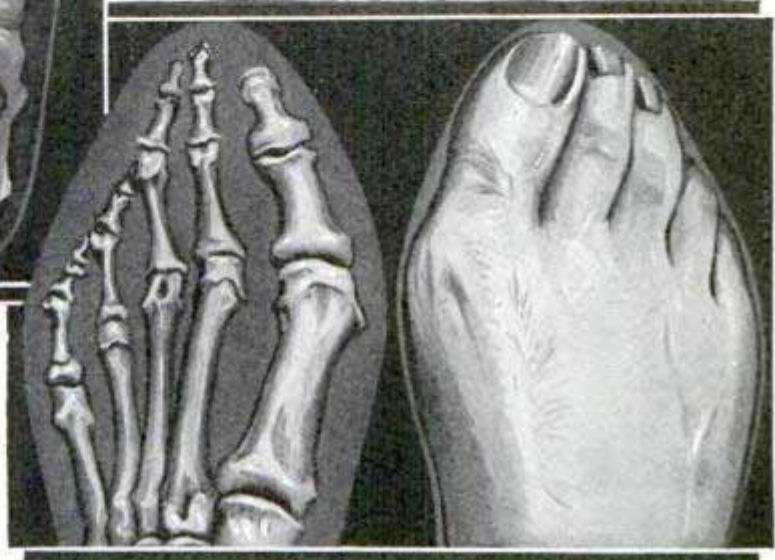
of these simple muscle developers and the wearing of correct shoes, is to prevent foot troubles. To cure a specific ailment may likely require the aid of a specialist, as has been noted, but with a little intelligence and care, you can save yourself suffering and the expense and trouble of treatments. Avoid pain and serious sickness by giving your feet a chance to perform their services as nature intended they should. Other things being equal, the battle in the industrial and business world today goes to the person who has good feet. You cannot be fully efficient at your work if your feet are being shackled, injured and cramped in ill-fitting shoes. If you have persistent aches and cramping of the toes and feet,



How Many Marbles Can You Pick Up with Your Toes? Practice Gives Foot and Toe Muscles Helpful Exercise



Straight Shoe Last Permits Bones of Feet to Lie Naturally Instead of Cramping Them as Shown at Right



aches in the knees or in lower part of the back, at times mistaken for kidney trouble, look after your feet and, if necessary, consult a reliable physician. If you feel abnormally tired at night and lack the pep to take your daily exercises, you may find that the source of the trouble lies in your feet, and that a good pair of shoes may work the remedy.

It is a well-known fact, recognized by the most prominent doctors and surgeons of the country, that frequent backache is, many times, the result of flat or weak feet and incorrect posture. It is impossible for one in such a short article to show the different, definite reasons for this trouble as one would have to go into the details of the mechanism of the body. But, in brief, it can be stated that it may be the result of poor body mechanics. That is, when the feet are thrown out of their normal alinement, a stooping posture may result.

Assume that a man has defective feet or a sore spot on one or both of them. In order to avoid pain, he does not hold himself naturally. And he is put to an effort to maintain his weight in this abnormal posture. New pressure and strain are put upon the muscles of the foot and leg. This, in turn, upsets nature's plan for carrying the weight of the body upon the feet. The weight is distributed unnaturally upon them.

The shoe must give way to respond to the pressure. Conversely, continued wrong posture, if sufficiently pronounced, is likely to distort the foot and also the shoe. Not only will you be guarding your health, but you will be saving money when you choose properly fitting shoes.

Many persons apparently do not recognize the relation between a normal condition in the muscles of the leg and the condition of the foot. But we find defects in the shoe whose origin may not improperly be traced to the fact that the wearer has not kept his leg muscles in

good condition. Perhaps he has not exercised them properly, or has strained or weakened the muscles of the leg through constant standing in one position in his daily work. You can usually see many cases of distorted shoes in factories where large numbers of workers are on their feet all day.

### COMBINATION LOCK FOR AUTOS REQUIRES NO KEY 977

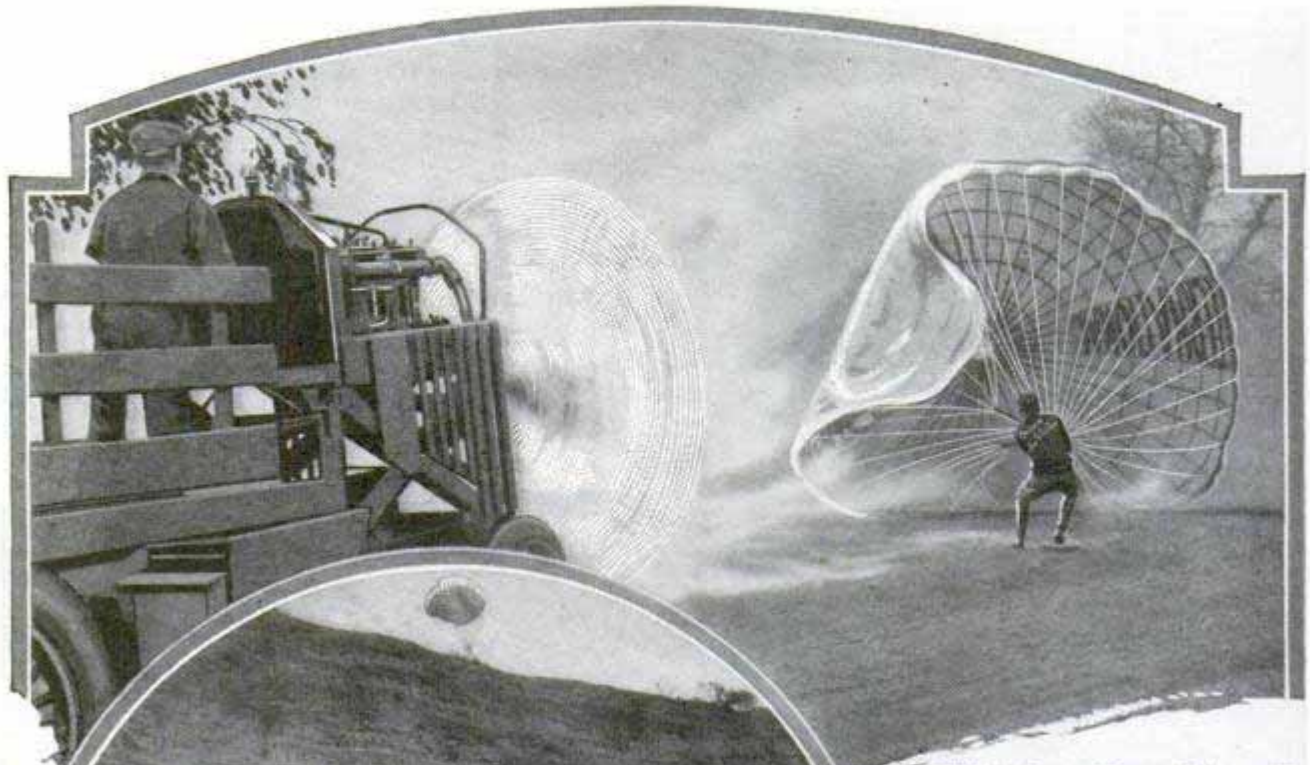
Affording more than 13,800 combinations, a three-dial auto lock now on the market is so adjusted that the driver must lock the car in order to stop the engine, thus insuring security automatically. It has no key, springs, cogwheels or tumblers, the action being obtained



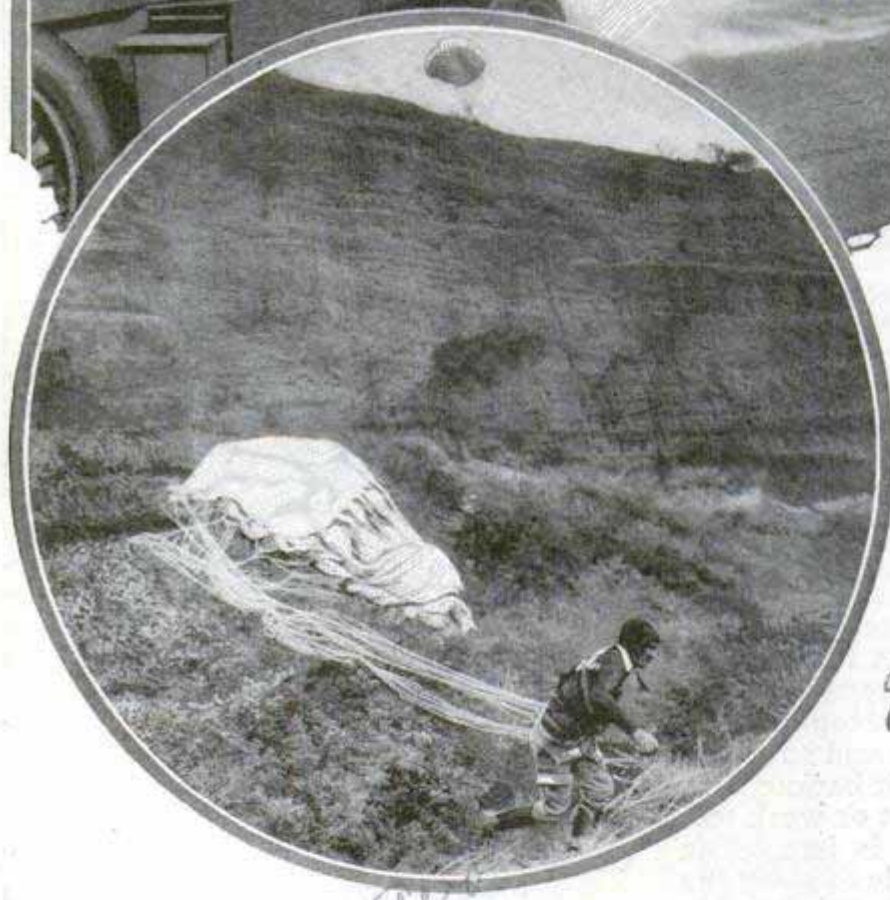
through a coil which is connected up with the starting mechanism and is inclosed in a strong metal box to prevent tampering. The lock is designed to be placed near the dashlight so that the combinations can be set at night.

*Price - \$20.00.*  
*Stop Theft Lock Co., Albany, Ore.*

912  
472



Wind from Motor-Driven Fan Opening Folds of Parachute Which Is Dragging Tester over Cliff; the Lower Is a Composite Photograph, Showing Parachute on Brink of Precipice and Jumper Just Landed



**MAN IS BLOWN OVER CLIFF TO TEST PARACHUTES**

Just to see if parachutes will open as they should, a California man permits himself to be blown over a cliff several times a day, trusting that the support will save him from death or serious injury when he lands at the bottom, 200 feet below. With the harness strapped securely to him, the daring jumper steps into the path of a powerful wind current caused by a motor-driven fan at the top of the cliff and near its edge. If the parachute is properly constructed, the blast of air will open the folds and the tester will be dragged along, suddenly swinging into space for a safe descent. At least three

trials with each parachute are required before the equipment is considered thoroughly tested.

**U.S. IMPORTS BEADS WORTH MILLIONS EVERY YEAR**

933 In 1626, Peter Minuit purchased Manhattan island from the Indians for about \$24 and a few strings of beads. These trinkets, among the first articles ever to be im-

ported into America, therefore figured importantly in the early history of the country, and their commercial significance is still great, for about \$10,000,000 worth are sent to the United States yearly from foreign markets, in spite of the large local manufacture. In the last five years, bead shipments valued at more than \$50,000,000 have been imported from a score of countries, including France, Germany, Spain, Italy, Czechoslovakia, Japan and China. The most expensive varieties come from France. They command more than \$3 a pound wholesale, while the cheapest kinds bring only a few cents per pound. The per-capita consumption of beads in America today is said to be larger than in any other country of the world.

*ny. James 12/13/25*

# A Radio Set for Fifty Cents

Method of Tuning Is Unusual, but Simple, and Principal Parts Are Made from Scrap

By WILL H. BATES

**T**HE crystal set, to be described, which can be built at a cost of about 50 cents, will give good volume on local stations, and will be found an interesting experiment because of the method of tuning.

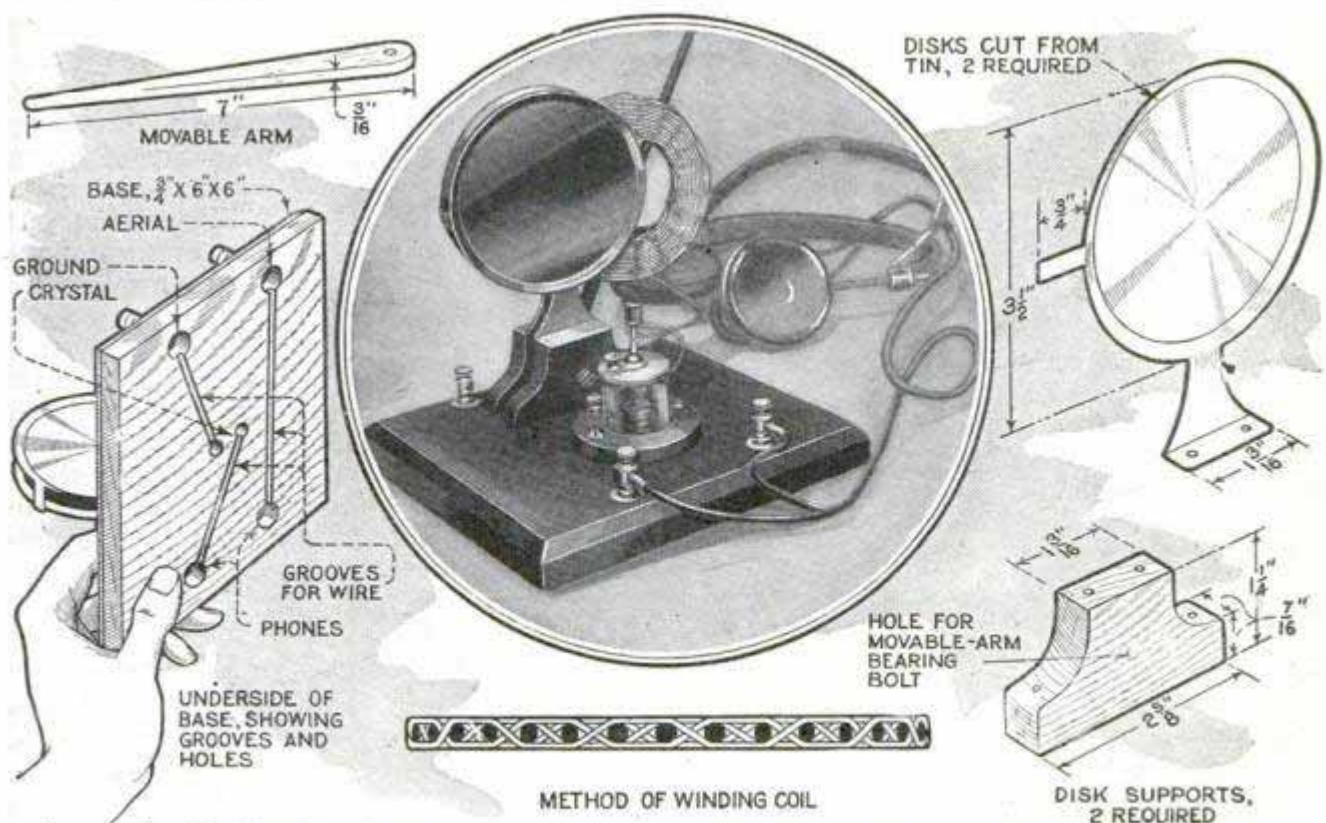
The only parts you need to buy are the crystal and holder, 4 binding posts, a small spool of No. 22 d.c.c. wire and about 8 in. of a flexible wire. They can all be found at the 5 and 10-cent store.

A 6 by 6-in. block of wood forms the base, which can be beveled on the edges, sandpapered and stained. See that it is thoroughly dried in a slow oven. On the underside countersink four holes with a 1/2-in. bit, about halfway through the wood. Then drill holes through to the top to take the binding posts. In the center of the board, drill two holes, about 1 in. apart, to carry wires up to the crystal. Now cut grooves in the underside of the board, deep enough to receive the wires (covered with spaghetti) as shown in the detail drawing, and run a wire from the ground post to one side of the crystal; from one phone post to the other side of the crystal; and from the aerial post to the other phone post. When this wiring has

been done, turn the board over and mount the crystal holder near the center, then connect the wires coming up through the board to the binding posts of the holder.

Two small blocks, cut out in the shape shown, are mounted on top of the base just back of the crystal. The movable arm between them is held in place with a machine screw, and is tightened with a nut on the back to give the proper tension. This arm is made out of a thin piece of wood, about 3/16 in. thick, flat on the end drilled for the screw, and rounded out with a knife in a tapered effect, so that it may be pushed through the openings in the low-loss spiderweb coil.

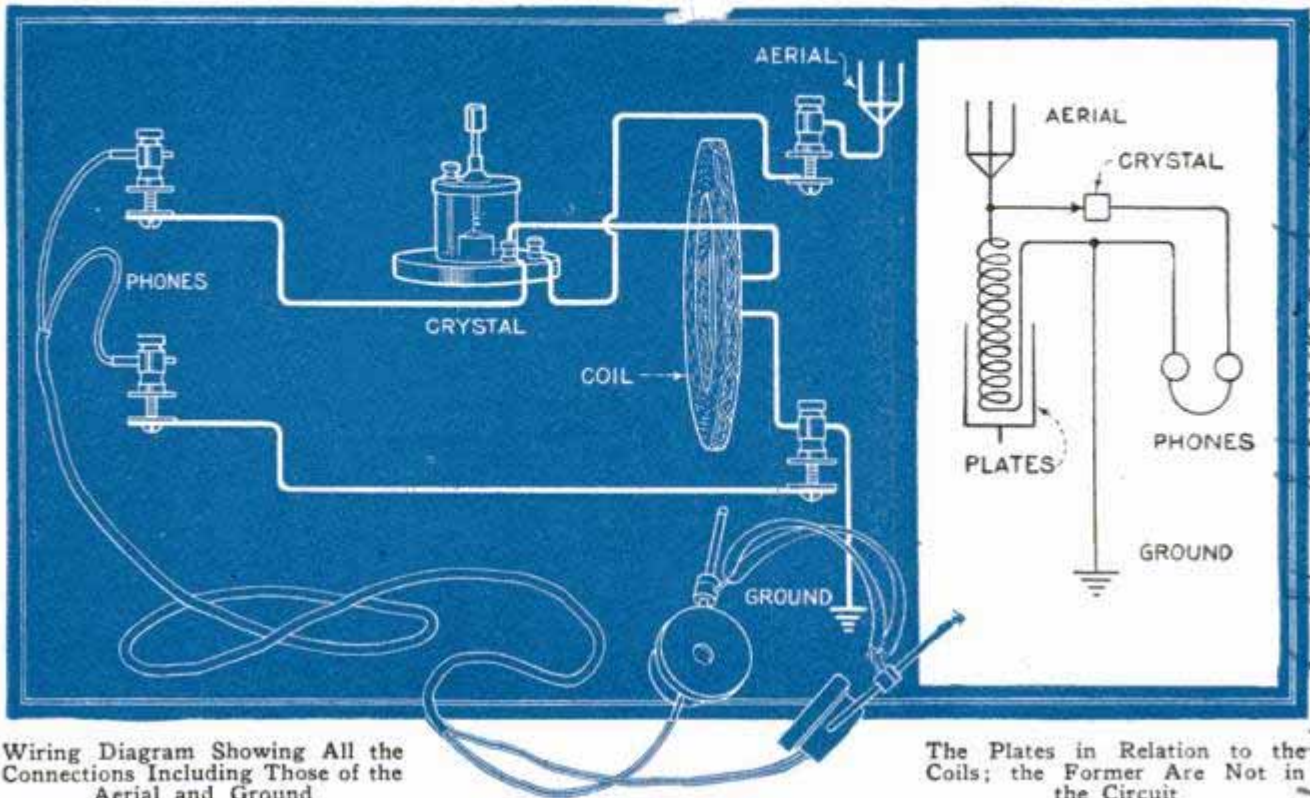
The two metal disks can be cut out of a sheet of tin or brass, or even from the lids of tin cans, as was done in the set illustrated. One should have a strip 1/4 by 3/4 in. projecting at the side, as shown, which is used to bend around the edge of the other and hold the two together. They should be just a trifle larger than the coil, or about 3 1/2 in. in diameter. Mount them on the two little blocks, flush with the inside edges, so that they fit close to the coil when it is moved up between them.



Construction Details of the Crystal Receiver; the Edge of the Coil Is Shown to Illustrate How the Winding Appears on the Finished Coil; Insert, the Finished Set, with Headphones Connected

The coil is wound on a spiderweb form with 17 or 19 spokes, which can be re-

station if it is within a few blocks of you, but even so, it will be found a very inter-



Wiring Diagram Showing All the Connections Including Those of the Aerial and Ground

The Plates in Relation to the Coils; the Former Are Not in the Circuit

moved afterward. Use the "over two and under two" method in winding. About 44 turns will be needed. A few more turns might be put on so that one can experiment by connecting the coil in the circuit, and take off one or two turns at a time until the local station with the highest wavelength comes in good and strong with the coil extended entirely out of the metal disks. The 44 turns were found to be about right for station KYW with a wavelength of 535. If you have no station with a wavelength as high as that, cut down the number of turns, as there is no advantage in having more turns than actually needed, unless you want to "fish" for distance, which is usually very uncertain with a crystal set. When the right number of turns has been found, remove the spokes and tie in the usual way. Solder the flexible wires (4-in. lengths) to the ends of the coil, and connect one end with the crystal and the other with the aerial binding post.

The coil is tuned by moving it up between the two metal plates. These plates pick up the stray eddy currents or the magnetic field thrown out around the coil. By absorbing these currents, it acts much the same as though the coil was being cut down by means of taps.

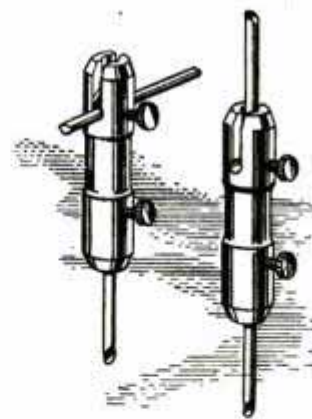
The set will be fairly selective on stations that are several miles away. You will not be able to tune out a powerful

esting experiment in one phase of the mysteries of radio.

626 *De*

**Handy Connectors Make Wiring Easy**

Handy connectors that simplify the wiring of the set are now available. They



are quickly and easily attached, and need no soldering. Two ways of using them are shown in the illustration. At right angles, one end connection may be made through the slotted end without cutting the wire already in place. The setscrews make

good electrical connections, and the absence of soldering flux adds to the efficiency of the set.

**Cuffs for Frayed Terminals**

When using covered flexible wire in the set or on loop terminals, the fabric covering often frays, making a ragged-looking connection. This can be prevented by placing a short cuff of spaghetti over the end of the wire before soldering the joint.

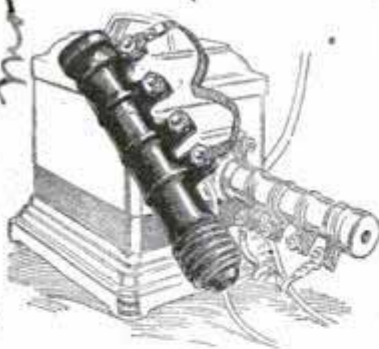
*Illinois Radio Co., 800 S. 4th St., Springfield, Ill.*

**Wire Fence Is Good Substitute for Ground**

Wire fences are very good substitutes for grounds, especially in dry, sandy countries, where damp ground connections are not available. This is a handy thing for the tourist and camper to know, as it is a very simple matter to fasten the ground wire to a near-by wire fence and obtain good results, without the necessity of driving a rod into the ground, which would often be ineffective. The wire fence also acts as a counterpoise, forming a condenser of which the ground is one plate and the fence the other. Wire fences, in fact, often make better grounds than water pipes. Farmers who have difficulty in locating good grounds will also find springs and streams useful. A bare wire strung along the bed of the stream, will often be very effective.

**Resistance Unit Adapts Charger for Wet B-Batteries**

A tapped resistance unit, designed for use with the recent models of a.c. battery chargers of the tungar type, so that storage B-batteries can be charged at their proper rate, has lately appeared on the market. In addition to the rectifying tube in these chargers, a standard lamp socket is provided, into which the resistance can be screwed to reduce the charging rate to suit the size of the battery being charged.



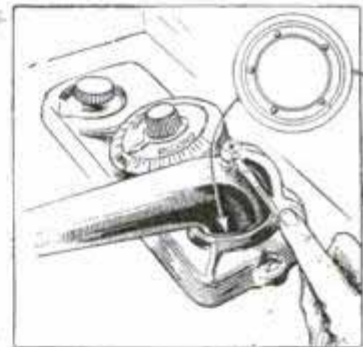
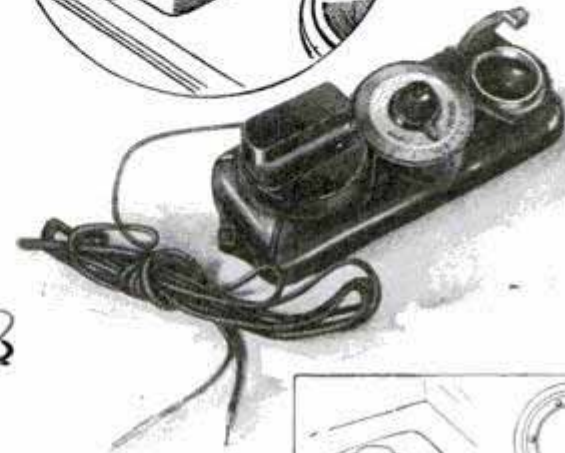
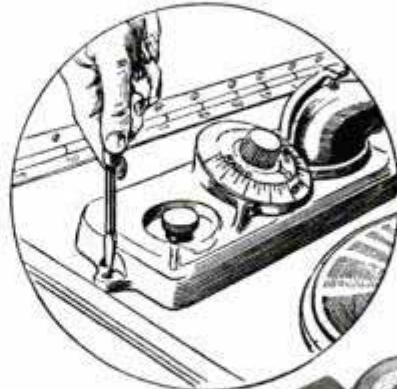
When radio B-batteries are to be charged, the rate must be reduced for the small battery plates. To this end, a resistor is needed, and a separate terminal is provided on the charger for the higher voltage required.

**Variable Resistance Controls Horn Volume**

A variable resistance of the carbon-pile type can be used to control the horn volume without disturbing the balance of the circuit. This unit may be connected across the output terminals; is mounted on the panel at a convenient point or placed on a long flexible lead, so that the volume of the set can be controlled at a distance, if desired.

**Device for Shifting Horn from Radio to Record**

A new device for shifting the horn from the radio set to the record, in combining the phonograph with a radio receiver, without disturbing the tone arm, has appeared on the market.



Handy Attachment Shifts Phonograph Horn from Radio to Record; Above, Fastening Unit in Place; Below, Adjusting Setscrew Holding Tone Arm in Place

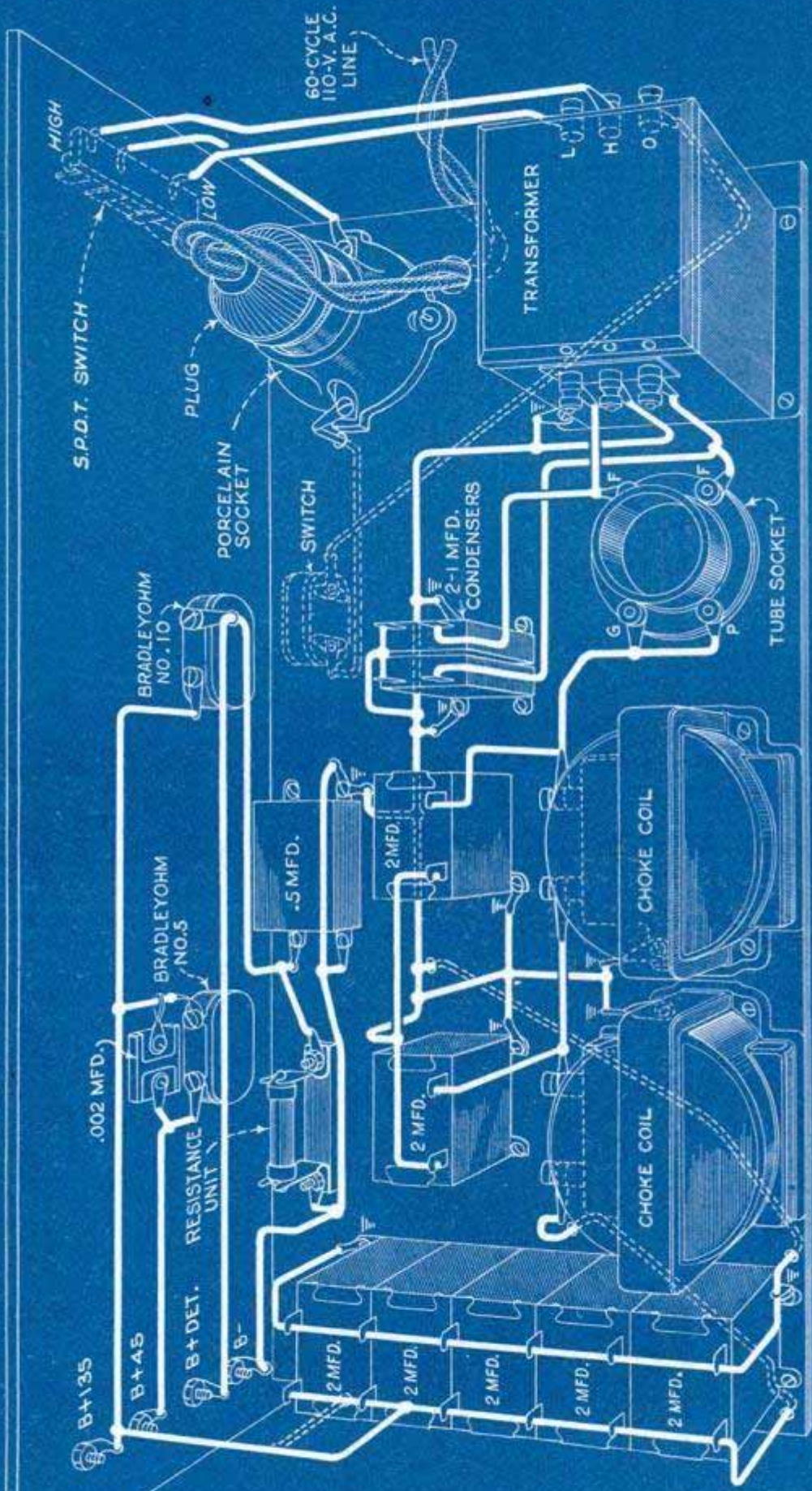
This handy instrument can be fastened to any phonograph with the aid of a screwdriver in a very few minutes. It consists of a microphone and cord for connecting to the radio set, a dial, marked radio on one side and record on the other, and a mounting base for the tone arm. The tone arm is removed from the phonograph by taking out the three screws that hold it; it is then separated from its base by loosening the little screw at the top of the bracket, and the device is then mounted on the phonograph over the opening where the tone-arm base was before, in the manner shown in the upper illustration. The mounting receptacle is a reproduction of the tone-arm base. The ring containing the five bearings is placed under the tone arm which is then placed in position and the pin and setscrew adjusted as shown in the lower illustration. Shifting the dial now changes the phonograph horn over from the record to the radio set and the usual bothersome disconnecting of the microphone unit is no longer required.

Ward. Leonard Electric Co. New York

*Radio Strom*

665 7 1/2 14th Ave New York City

680-02



**B-BATTERY ELIMINATOR**  
 POPULAR MECHANICS MAGAZINE  
 MARCH 1926



# How to Build Your Own B-Eliminator

By F. L. BRITTIN

**C**ONTRARY to general opinion a B-eliminator cannot be built up from the usual three-element tube, a spark coil and a few common condensers. Every part must be specially built, the condensers must be able to carry the load, and at the same time small enough to permit compact assembly. Such parts being available now, the radio fan can build his own B-eliminator so as to deliver up to 180 volts if desired. The instrument to be described works smoothly without the slightest hum when properly constructed, and B-battery troubles are permanently eliminated. Full-strength B-voltage is always on hand, resulting in maximum efficiency of the set at all times. The source of supply is the 110-volt, sixty-cycle a.c. house-lighting current, and the eliminator can be plugged into any convenient wall socket.

We have shown two types of the eliminator to permit our readers to choose the one best suited for their needs. The circuit of both is practically the same. The arrangement shown in the large blueprint was built up in our laboratory for sets of the superheterodyne type requiring a variety of voltages. A standard-size bakelite panel is used, so that the device can be placed in a cabinet if desired. This panel is  $\frac{3}{16}$  by 7 by 18 in. The subpanel is  $\frac{3}{16}$  by 9 by 17 in., and is mounted on brackets, 2 in. above the base of the cabinet, in the manner shown in the illustration. Note that the push-pull switch is the only instrument mounted below the subpanel. The photo of the front panel and the completely assembled instrument will give the reader a good idea of the neat and compact arrangement. The various voltages indicated on the front panel are especially suitable for

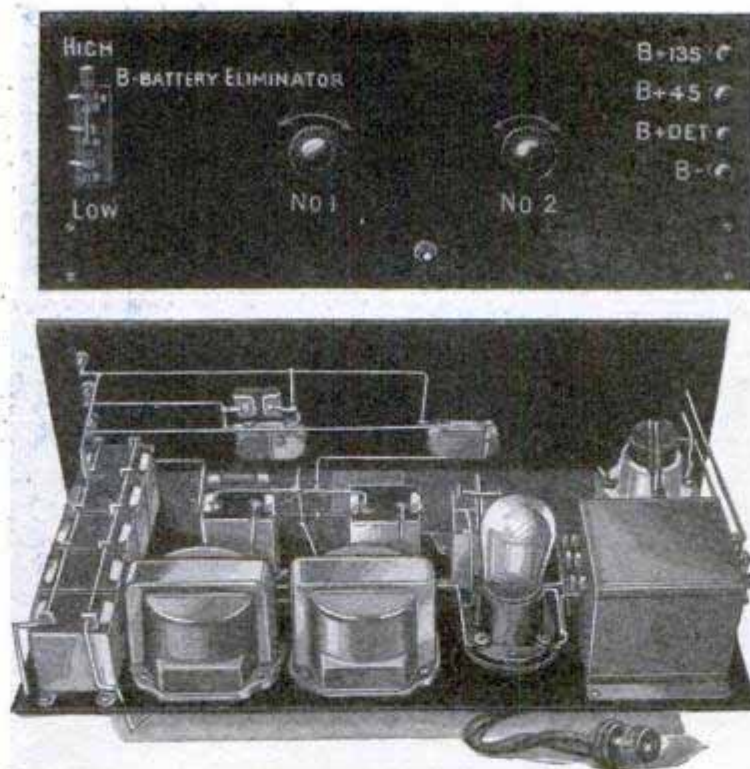
the 1926 model of Popular Mechanics superheterodyne. Control No. 1 is for the first detector and oscillator plate voltages; No. 2 controls the intermediate voltages, and the maximum voltage is taken from the upper binding post. This voltage can be either high or low, depending on the way the small single-pole, double-throw switch, shown on the left side of the panel, is thrown. The position of the instruments on the front panel can be changed to suit the builder, but it is necessary that the instruments on the subpanel are arranged in the manner shown for best results, as it is essential to keep the input and output separated as far as possible.

The fixed condensers may be of any good type, but it is very important that they be of the highest grade, and should be tested to 800 volts at least. The five 2-mfd. fixed condensers placed across the output make for good quality, permitting the low notes to come through the set. The porcelain socket is of the common variety. Twisted lampcord of the length required is connected with a plug at each end and run through a hole in the sub-

panel directly back of the socket, then taken out at the rear of the instrument. In connecting the B-eliminator to the set, either use a cable or bind all the wires closely together in cable form.

By following these instructions the eliminator can be placed as near or as far from the set as desired. When throwing the S.P.D.T. switch from low to high voltage, it will be necessary to adjust

the No. 1 detector voltage. A C-battery is always advised with any radio set using audio amplification. The table at the end of this article gives the values to use with this eliminator and different types and



Rear View of Finished Instrument, Showing Compact Assembly; Above, Details of Front Panel with Controls Plainly Marked

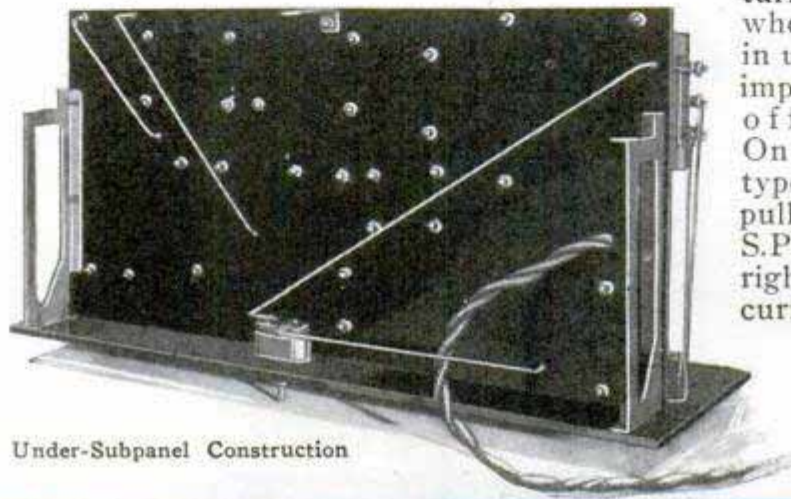
combinations of vacuum tubes. The material list specifies the types of materials used in the models tested out in our laboratory.

The breadboard arrangement of the eliminator is for those who wish a simpler and cheaper type, suitable for sets requiring but three B-battery terminals, namely B—, Det. B and Amp. B. The board is 1/2 by 7 by 23 in. in dimensions and the same instruments are used with the exception of the No. 5 Bradleyohm and the .002-mfd. fixed condenser. The S.P.D.T. switch may be of the cheap porcelain type. The binding posts are mounted on strips of bakelite raised 1/2 in. at each end of the board. The wiring diagram is given above the photo of the completed instrument. This breadboard assembly can, of course, be arranged for the additional 45-volt terminal if desired, but the panel and subpanel design takes up

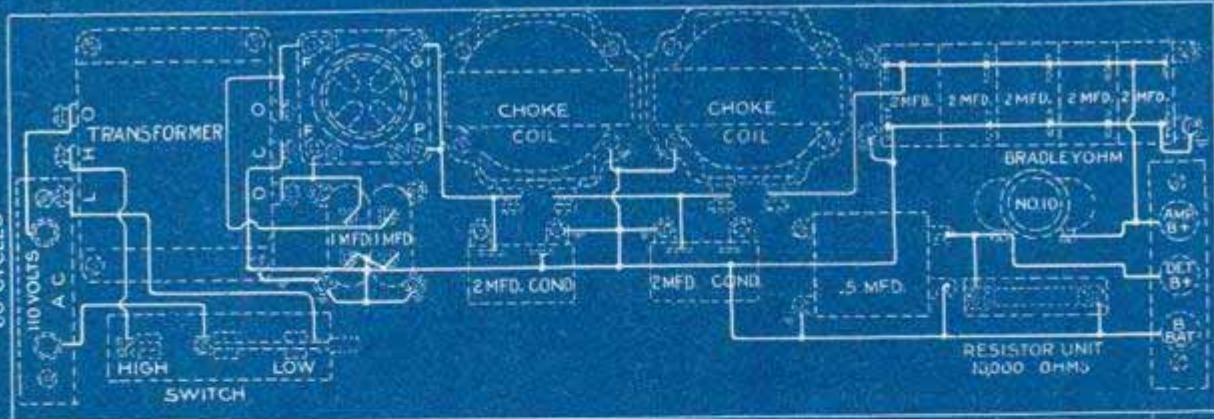
less room and improves the appearance. In both wiring diagrams the points to be grounded are marked with the usual ground symbol. These are not external grounds, however, but circuit grounds to the metal shells of the instruments, and are necessary to obtain good results.

In operating a device of this kind, it is always well to remember that it is connected to the power line, and like any other device operated by the house-lighting current, it should be turned off before handling any part except the insulated controls on the front panel. The push-pull switch on the front panel is used for this purpose. Do not forget to

turn this switch off when the set is not in use; this is just as important as turning off the A-battery. On the breadboard type of eliminator, pull the blade of the S.P.D.T. switch up-right to shut off the current. The eliminators use very little house current, and when correctly built, with the mate-

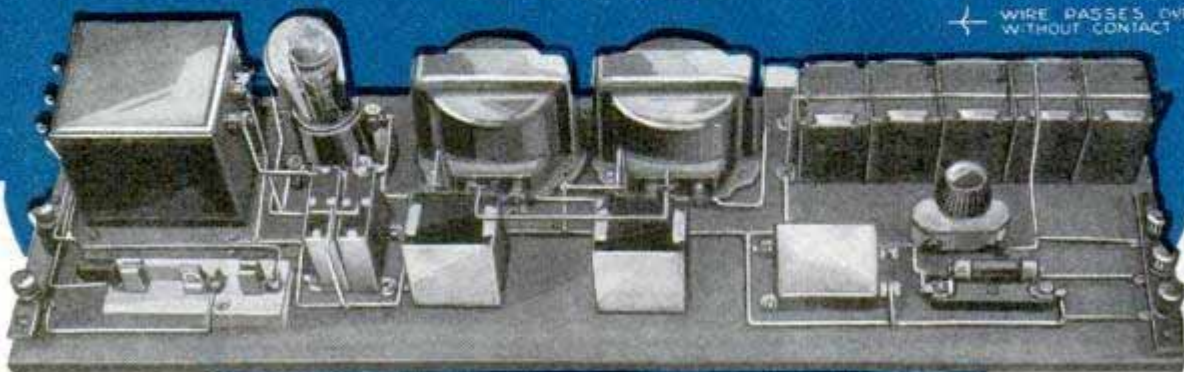


Under-Subpanel Construction



LAYOUT & WIRING DIAGRAM

- CONNECT TO CASE
- + WIRES SOLDERED TOGETHER
- WIRE PASSES OVER WITHOUT CONTACT



Breadboard - Type of Assembly

Simplified Wiring Diagram Above

rials specified, give excellent results. There is no upkeep expense, as the tube and other parts are practically indestructible.

A large blueprint of both circuits can be obtained from the Radio department of Popular Mechanics Magazine, 200 E. Ontario St., Chicago, for 15 cents. Specify blueprint No. 106.

C-BATTERY VOLTAGE TABLE

TYPE OF TUBE	NUMBER OF TUBES IN SET															
	WITH LOW-VOLTAGE TAP								WITH HIGH-VOLTAGE TAP							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
UV-201A; C-301A	10.5	9	7.5	6	4.5	3	1.5	1.5			19	16.5	15	12	10.5	9
UV-199 OR C-299	16	15	13.5	12	10.5	7.5	6	4.5								21
201A PLUS ONE UX OR 301A * CX-112			7.5	6	4.5	3	1.5	1.5	19	16.5	15	13.5	12	10.5	9	
UV-199 PLUS ONE UX OR C-299 CX-220			13.5	12	10.5	7.5	6	4.5							21	18
CX-112 OR UX-112	9	7.5	6	4.5	3	1.5			19	16.5	13.5	12	12	9	7.5	6
CX-120 OR UX-120	15	12	7.5	6	3	1.5					21	15	12	10.5	7.5	

MATERIAL LIST

- 1 bakelite panel, 3-16 by 7 by 18 in.
- 1 bakelite subpanel, 3-16 by 9 by 17 in.
- 2 Benjamin subpanel brackets.
- 1 socket, common porcelain type.
- 2 fixture plugs of the pull-apart type.
- 6 ft. lampcord.
- 1 Cutler-Hammer push-pull switch.
- 1 Acme B-4 transformer.
- 2 Acme B-2 choke coils.
- 1 Raytheon tube.
- 1 standard tube socket.
- 7 Tobe-Deutschmann fixed condensers, 2 mfd.
- 2 Tobe-Deutschmann fixed condensers, 1 mfd.

- 1 Tobe-Deutschmann fixed condenser, .5 mfd.
- 1 Bradleyohm variable resistor No. 10.
- 1 Bradleyohm variable resistor No. 5.
- 1 Bradley fixed resistor unit, 8,000-10,000 ohm.
- 1 fixed condenser, .002 mfd., any good make.
- 1 Marco S.P.D.T. switch.
- 4 binding posts with engraved tops.
- 39 round-head, brass machine screws, 6-32, 1/2 in. long.
- 2 round-head, brass machine screws, 6-32, 1 in.
- 4 doz. soldering lugs.
- 2 two-foot lengths No. 14 round, tinned-copper bus-bar wire.

Leich Electric Co, Seneca, Ill

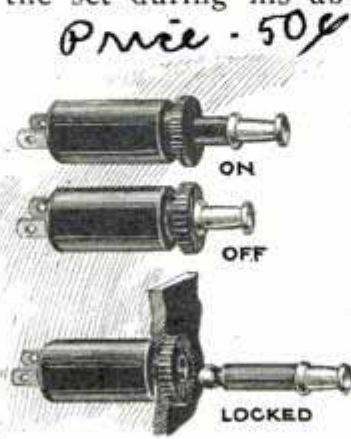
694-OR

New Jack Controls both Amplifier Stages

A two-stage jack which has been marketed recently, is novel in that it may be used in a receiving set for controlling either one or two stages. By inserting a plug into the jack until the first notch is encountered, one stage of amplification may be cut into the circuit, and by pushing the plug all the way in, both stages are automatically connected in it. This eliminates an extra jack and the volume is controlled by a single operation.

Switch Locks Set and Prevents Unauthorized Tampering

The radio-battery switch shown in the drawing assures the operator that no one will tamper with the set during his absence. This will prove a boon where children are apt to turn on the radio set and leave the tubes burning after they have finished listening in. The nickel shaft of the switch shuts off the battery current when it is pushed all the way in. When the shaft is pulled halfway out, the

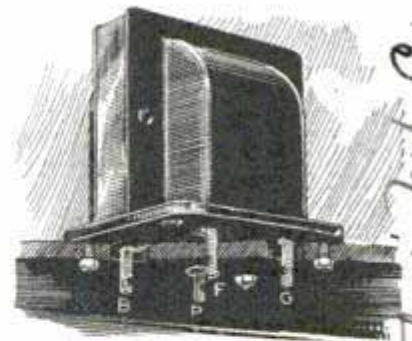


Price - 50¢

current is turned on. The shaft can be pulled all the way out of the switch and carried in the pocket of the owner, in the same manner as he would use his auto key. The A-battery is then shut off and the set cannot be operated until the "key" or shaft is replaced.

Audio-Frequency Transformer Simplifies Wiring

An audio-frequency transformer furnished with leads coming out of the base is intended to simplify the wiring of sets mounted on subpanels.



Obviously, this method of bringing out the leads provides neater assembly, shorter leads, and makes the set look like a factory-made job. Instead of the usual binding posts, soldering lugs are provided.

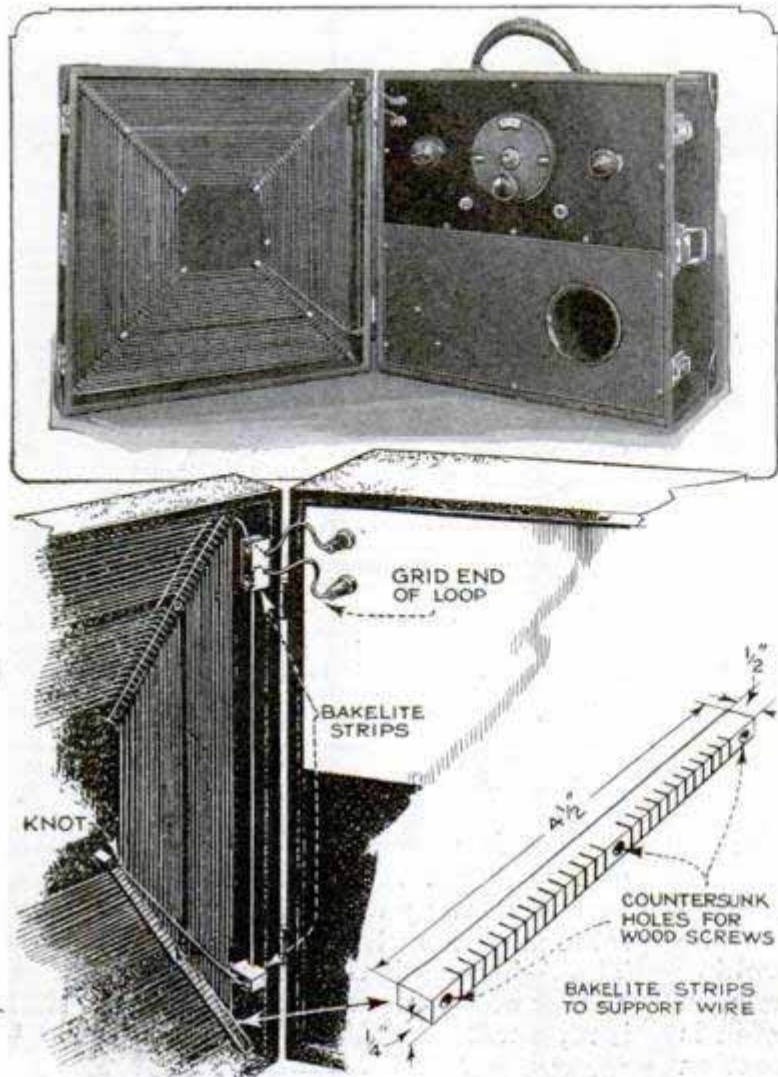
German telegraph authorities are making preparations to establish radio-telephonic communication between liners at sea and telephone systems in Berlin, Bremen, Hamburg and other German towns, via the radio stations at Norddeich, Cuxhaven and Swinemunde.

428-OR

637-OR

Leich Electric, 571, Chicago

Walbert Mfg. Co.  
925 W. Westwood Ave



Loop Built in Lid of Portable Cabinet Is Adjustable for Directional Effect

**Built-In Loop for Portable Set**

A good loop of the pancake type can be built in the lid of a portable receiver cabinet as shown in the illustration. The lid can then be adjusted in any position for directional effects. A loop of this kind takes up very little space, and is much handier than the folding type. Four strips of bakelite,  $4\frac{1}{2}$  by  $\frac{1}{2}$  by  $\frac{1}{4}$  in., are slotted to take the loop wire easily. These slots can be cut with a circular metal-cutting saw and should be deep enough to take the wire. The turns should be spaced about  $\frac{1}{2}$  in. apart, and from 80 to 85 ft. of stranded silk-covered loop wire is used. The bakelite strips are countersunk for wood

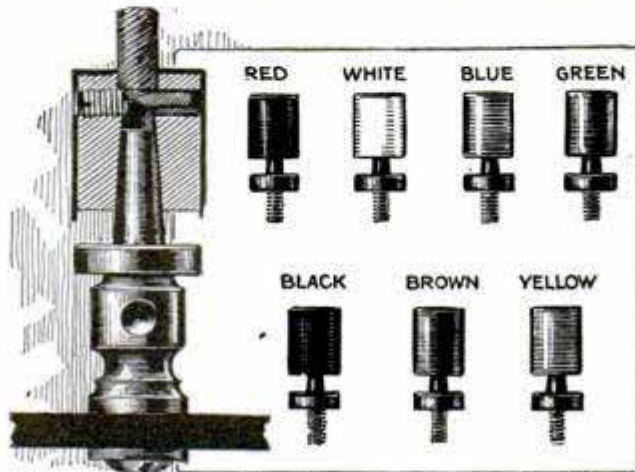
screws and mounted in the lid as shown. The wire is then wound on and the ends brought out through insulating blocks of bakelite to the cord-tip plugs. Note that the grid end of the loop is taken from the inner turn. Sufficient wire should be left at the loop ends so that the lid can be turned out as required.

**Drilling Wood or Bakelite without Splitting**

Holes can be drilled in wood or bakelite panels without risk of splitting out ragged holes on the underside, if a little care is taken. Always drill the hole from the front side of the panel and clamp the piece to be drilled tightly against a piece of wood of similar size and about 1 in. thick. This prevents the chips on the underside of the panel around the hole from breaking away. Use sharp drills, and a tapered reamer in cases where it becomes necessary to enlarge the hole beyond the size of bits on hand.

**Colored Caps Indicate Leads to Set**

Attachment caps made in seven distinctive colors, to indicate the different connections to the receiver and battery leads, are now available. They will fit any standard binding posts by removing the post screws, and replacing them with the screws of the attachment cap, or they can be used as a binding post by putting the screw through the panel and fitting a hexagon nut underneath. The threaded ends of the colored caps match the colors of the battery cables now in use, making it practically impossible to connect the set wrong. The caps are covered with insulating material, so that it is not necessary to keep them separated.



Safety Attachment Caps, in Seven Colors, Identify the Leads to the Set; Left, Binding Post with Cap

Radio station LRT, being installed on the South Orkney islands, is said to be the southernmost broadcasting outpost.

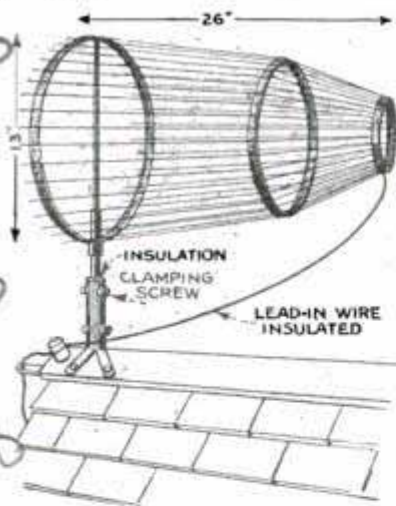
*Council Bluffs Iowa.*  
*Morris Regester Co.*

**Steam Heat Improves Radio Reception by Keeping Set Dry**

Moderate dry heat in the house improves the performance of the set, as it reduces the humidity. The effect on the radio set is to drive the dampness out of the coils, and other parts, with the result that the set becomes more sensitive. The receiver of the future may be so designed as to exclude dampness and this would be a great improvement. Artificial heat could even be applied to the set at intervals to obtain the same result. Some of the early instruments were built in separate, sealed boxes with the tubes in a sealed compartment. This idea may be revived. A common light bulb could be mounted in the set, which would radiate enough heat to keep away moisture. In warm, damp climates this trouble is a real problem and these suggestions should be beneficial. When coils, transformers, rheostats and other parts collect moisture, the set is often permanently injured.

**Novel Aerial Is Easily Installed**

An aerial so shaped that it is easily installed in limited spaces is now available. It is claimed to be more selective than the usual type, limiting interference without reducing volume. It is mounted on the ridgepole with lagscrews in the manner



shown in the illustration, and can be turned in the desired direction and locked in place. This feature is of value as the aerial can be placed at right angles to any power line. The lead is taken to an insulator and

**CLOUD SPEAKER AND AMPLIFIER FOR THE CRYSTAL SET.** A novel and effective instrument described in the April, 1925, issue. This number may be obtained from the Circulation Department, price 25 cents.

**Radio Set Built like Lamp**

**Has Horn in Base**

A radio set built in the form of a table lamp with the horn concealed in the base is a recent novelty. The instrument com-

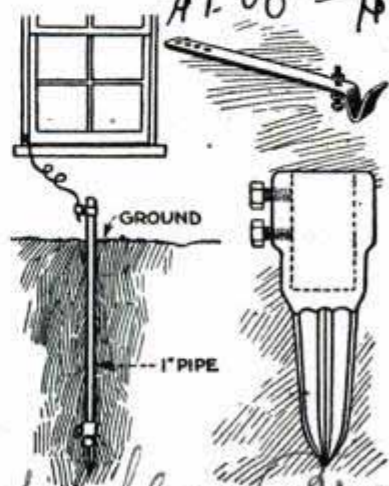


Upper Part of Lamp Shade Raised, Showing Instrument Panel, and Left, Closed for Use as Lamp

bines in one compact unit a three-tube receiver, a loud speaker and a table lamp. The lamp is built of copper, finished in either gold, silver or bronze to harmonize with various interiors. When the instrument is closed, no one would suspect that a complete three-tube reflex receiver was concealed within.

**Attachable Peg for Ground Pipe**

A peg for the end of the ground pipe to make it easier to drive the pipe into hard soil, has been marketed recently. This simple attachment is screwed to the end of a 6-ft. length of 1-in. pipe which is placed as close to the house as possible. A ground clamp, consisting of a strip of copper, with holes in one end and a heavy bolt in the other, is also available. This is fastened to the top of the pipe along with the ground lead from the set and lightning arrester. The installation is clearly shown in the drawing.



*Brown, Stickler & Brown, Inc.*  
128 N. Jefferson St.

Stanley Engineering Co. 70 Monroe St. Lynn, Mass

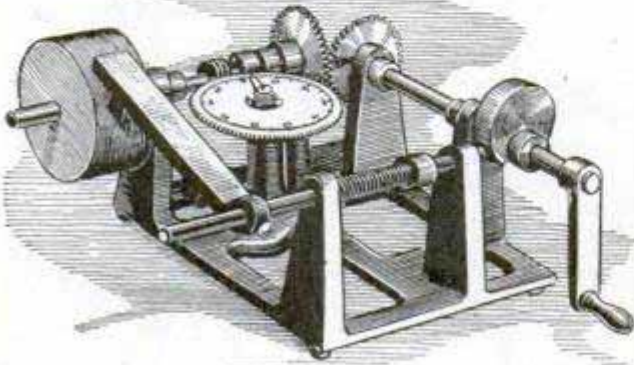
651-02

664-02

*Council Bluffs*  
**Handy Machine Winds  
 Low-Loss Coils** *cl wa.*

*675-06*

A handy machine for winding low-loss coils is one of recent novelties on the



Honeycomb-Coil Winder Showing Simple Construction; Sample of Coil Made on the Machine

market. It will wind the popular honeycomb-type coil any width from  $\frac{1}{2}$  to 1 in., and the diameter may be arranged to suit by putting various sizes of wooden spools on the winding spindle. The recording dial is provided with a movable pointer for counting the number of turns. The instrument is finished in black enamel and is neat in appearance.

**Testing of Tubes Is Necessary  
 for DX Reception**

The ideal radio weather at hand, the set should be in the best possible condition to take advantage of distance-getting possibilities; the tubes should be tested, and if found to be of low efficiency, they should be placed in a tube booster and rejuvenated if they are of the type that can be so treated; if not, new tubes should be provided. Radio tubes lose their efficiency under constant use and the loss progresses to a point where the set operates very poorly and sometimes not at all, although the batteries are in first-class condition and the tube filaments apparently light as usual.

If the tubes are of the thoriated-tungsten type, rejuvenation is very satisfactory and makes a remarkable difference in the performance of the set. Most of the standard tubes now in general use, with the exception of the WD-11 and WD-12 types can be rejuvenated. This reactivating process consists in boiling thorium

atoms out of the interior of the tungsten filament so that they form a new layer on the surface, making possible greater activity within the tube. This is done by operating the filament for a very short time at a specified high voltage, followed by a lower voltage. There are a number of inexpensive tube boosters available for doing this at home, the 110-volt 60-cycle house-lighting current being suitable for the work.

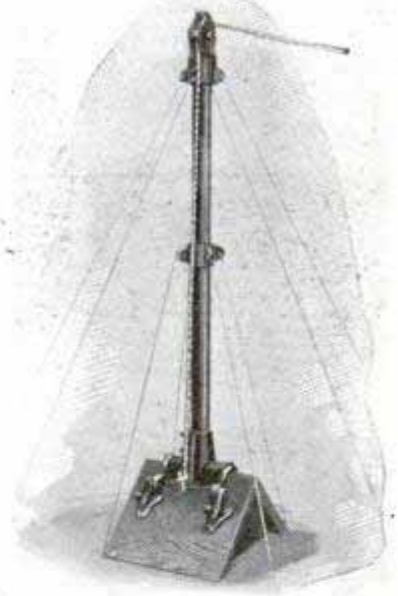
Approximately the same results can be obtained by operating the tube filaments in the set with the A-battery in the usual manner, the B-battery being disconnected from the set. This operation should continue for several hours, the length of time depending on the condition of the tubes.

*632-06*

**Aerial Mast Clamps to Ridgepole**

Metal aerial-mast fixtures for fastening the mast to the ridgepole of the house are now available. The fittings are adjustable to fit various types of roofs and roof pitches, and consist of a cap with a sheave pulley and lugs for guy wires, a collar with lugs and a universal masthead with loop for attaching the aerial cable.

The pipe does not require threads at either end and can be purchased from the local plumber in the length required. One-inch pipe is used for the mast. By adding lengths of pipe the aerial may be made of any height, but in that case, one guy-wire collar should be used on each extra length of pipe to brace it sufficiently.



*Wreidag Mfg. Co., Wreidag, Ill.*  
**Colored Wires Identify Leads** *cl.*

If battery leads are not marked for identification, there is a chance of placing heavy voltage on the filament terminals. This can be avoided by using insulated wire with various-colored braided covering. Stranded wire of this type can be obtained in red, black, white, yellow, green and brown, and with different-colored tracer threads.

# Getting Rid of the Squeals

Howls, Hums and Reradiation Are Usually Easy to Prevent with a Little Time and Effort

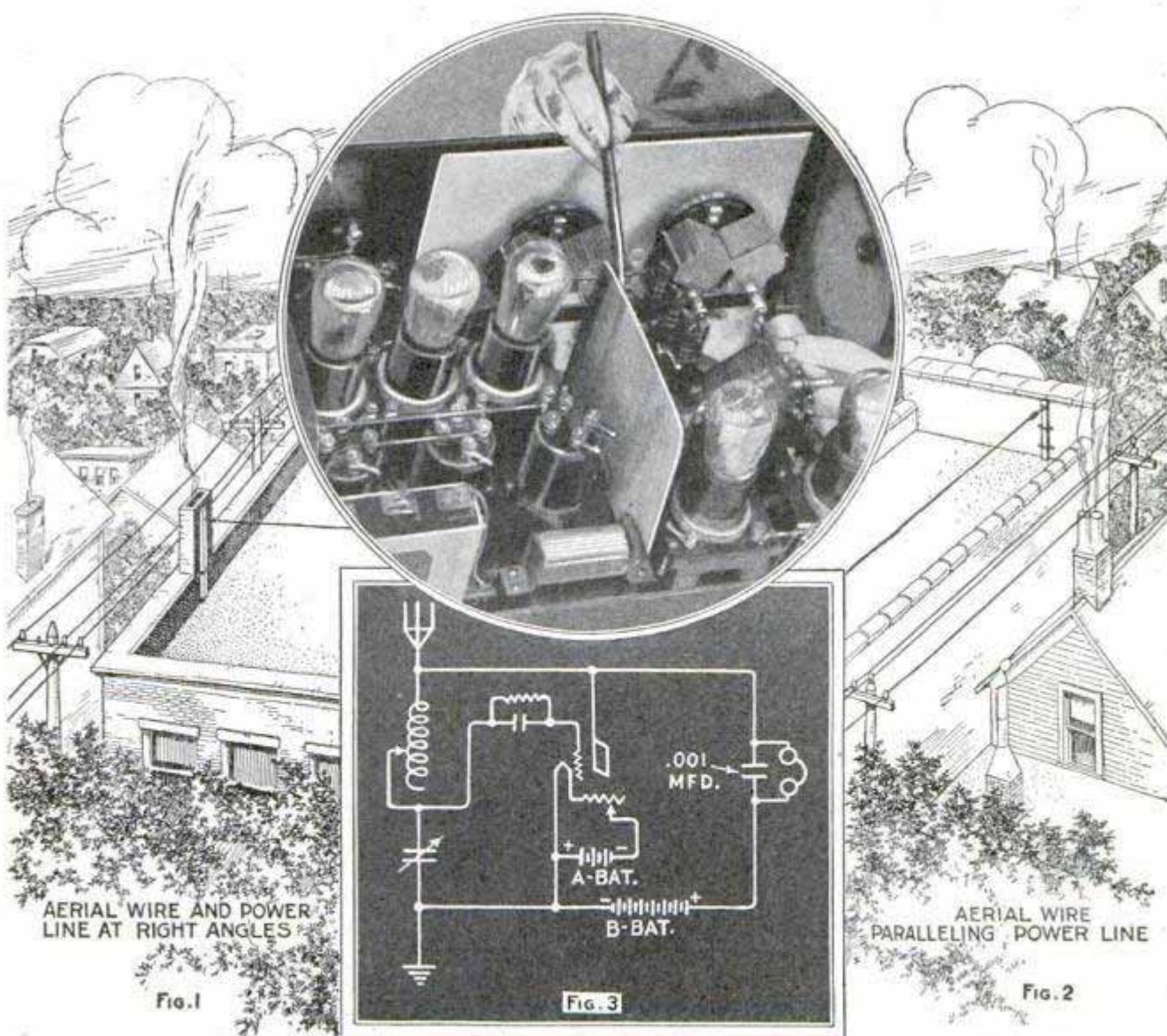
**G**ETTING rid of squeals, howls and hums, and preventing reradiation, are topics of everyday conversation among radio fans. All are interested because these annoying ailments are so common, caused by induction from power lines, interference from regenerative receiving sets or improper tuning.

Power-line hum can usually be minimized or eliminated by running the aerial at right angles to the lines causing it, as shown in Fig. 1. Drumming noises from power lines often can be located in a leaky transformer in the neighborhood. In such cases the power company will usually co-operate to eliminate this trouble by repairing the transformer.

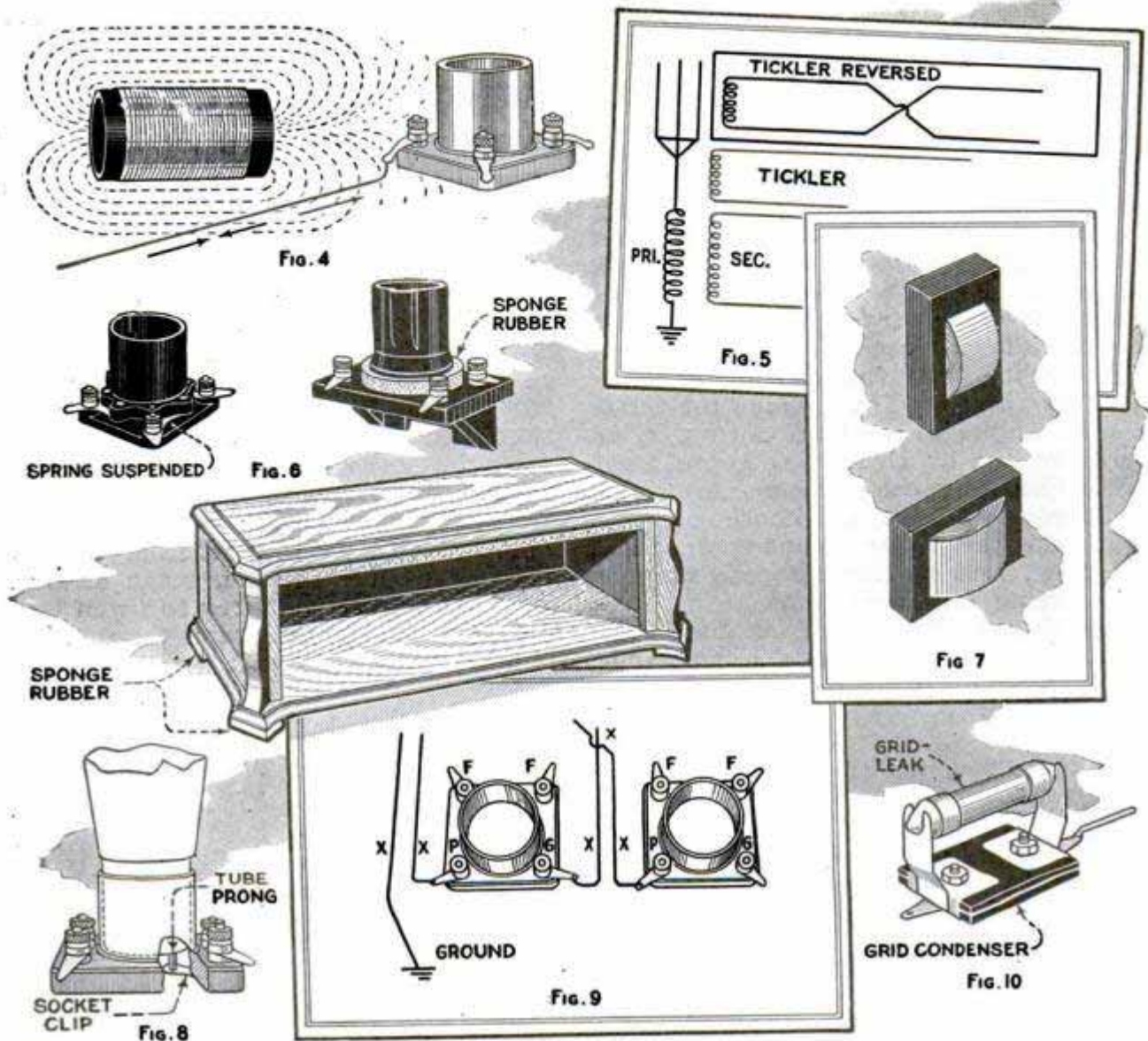
Squeals inherent in the set due to its design can be reduced and often elimi-

nated by properly tuning it. One-tube regenerative circuits of the kind shown in Fig. 3 are of this type. The reradiation is due to its conductive feedback into the aerial. However, this is not the only type of reradiating set that causes howls that interfere with the pleasure of other listeners within a range of several miles; all types of regenerative receivers are troublesome in this respect. Even the superheterodyne receiver, although it does not come under the regenerative heading, is a bad offender when used on an outside aerial.

In order to find out whether your set is causing such trouble, make arrangements with your neighbor to listen in to the same station at the same time. When tuning in your set to that wavelength turn



Above, Shielding Prevents Intercoupling between Transformers and Tubes; Below, Single-Circuit Regenerative Receiver, Which Acts as a Miniature Transmitting Station



Squeals and Howls in Radio Reception Are Often Caused by Faulty Design and Arrangement of the Instruments, Microphonic Tubes, Poor Contacts, Wrong Gridleaks and Other Errors Which Anyone Can Correct

up the rheostats to make the signal as loud as possible up to distortion. This will usually drive the tubes into oscillation. If the set is of the popular tuned r.f. type, detune the first dial, which is closest to the aerial lead-in. Then switch off the set and get in touch with the neighbor to check up the results. If he has heard a squeal while you were carrying on these experiments, and no others in the neighborhood were tuning in to the same station in this way, your set is at fault.

Advancing the rheostats too far gains nothing and shortens the life of the tubes, besides spoiling your neighbor's reception. There are several rules for proper tuning that are well worth knowing. Practice tuning in powerful stations first, and do not try to pick up weak distant stations until you become an expert and know how to control your set. Use both hands, one hand for the regeneration control, such as a potentiometer or tickler if the set has one, and the other hand for the

tuning control. Keep the regeneration control always just below the point of oscillation; the set is then in the most sensitive condition. Turn back the regenerative control as soon as the set accidentally breaks into oscillation. Tune the set so that signals will come in without a whistle. The regeneration control can then be turned up a little to increase volume. Do not try to force regeneration in an attempt to obtain loud-speaker volume from a set not designed for this purpose. Do not force regeneration in an attempt to hear stations beyond the range of the set; be content with those that can be really heard.

Squeals originating in the design of a receiving set can often be traced to coupling tubes or transformers. This can be prevented by shielding these instruments, as shown in the photo insert. If the a.f. transformers are of the type shown in the upper part of Fig. 7, they should be turned at right angles to each other, to prevent



intercoupling of their fields. The lower transformer is of the vertical-core type, and turning it at right angles to another of the same type, has practically no effect, as this does not put their fields in a right-angle relation. Transformers of this type must be spaced a reasonable distance apart, but do not have to be turned. Transformers of the r.f. type shown in Fig. 4 should be placed in the set with care around coils carrying high-frequency currents, destroying the tone. These transformers should be mounted in such a position that the lines of force will cut each other as little as possible. Even with this precaution, the field from the coil sprays near-by wires and pieces of apparatus, inducing current in them that often causes broad tuning and distortion with its usual chorus of howls and squeals. A new doughnut-shaped coil, called a toroid coil, which is so designed that the field is confined to the coil regardless of the position in which it is placed in relation to other instruments and wiring, will remedy much of this trouble.

Receiving sets of the three-circuit type often give poor results if the tickler coil is reversed as shown in Fig. 5, as this "bucks" the current in the secondary coil, thus neutralizing the grid circuit. Horn noises are often caused by vibration, small tubes of the dry-cell type being especially apt to cause this trouble. To prevent it, use sponge-rubber pads under the corners of the cabinet, or use shock-absorber sockets of the type shown in Fig. 6.

A common source of trouble is poor contact of the tube prongs with the socket clips. Pull up the prongs of the socket with a stout string, replace the tube and reinsert the socket. A sectional view of the socket is shown in Fig. 8. Plate and ground leads running parallel as shown in Fig. 9, and plate leads touching grid leads, or running close to them, will cause howls. Keep such leads separated as far as possible, and when necessary to cross them, run the wires at right angles. Fig. 10 shows the common type of grid condenser and leak; trouble can often be traced to a defective condenser. It may have been ruined by excessive heat when soldering, and as a precaution against this,

soldering lugs should always be fastened to such condensers by means of two short brass machine screws, and the wire should be soldered to the end of the lug before the lug is screwed to the condenser. The gridleak may have too much or too little resistance; try different resistances until one is found that gives the best results.

666 - Vernier Dial Has Device for Changing Ratio

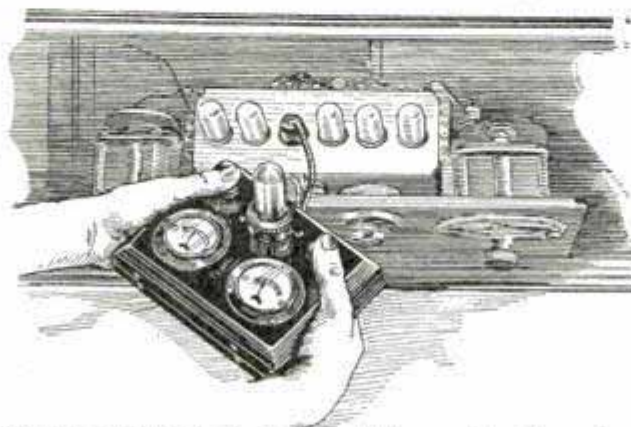
A new dial is provided with a device for changing the ratio. It is designed for mounting on the shaft of any standard condenser without the use of tools other than a screwdriver, and can replace the dial on any receiver where sharper tuning is desired. The ratio-changing device provides for any ratio between 6 to 1 and 20 to 1.



*National Co., A. M. S. 110 Brookline St. Cambridge Mass.*

668 - Combination Tube Tester and Trouble Shooter

An instrument which not only tests tubes under operating conditions but can be used to locate trouble in the set has lately made its appearance on the market. The illustration shows the method of reading the plate current of the tubes in milliamperes. The instrument is also provided with a combination plate and filament voltmeter for testing the A and B-battery voltage. In addition, it can be used to locate defective tube sockets, open circuits in transformers, poorly soldered joints in the circuit and defective contacts in the jacks. A tube tester of this type is really necessary to get the best results from any multi-tube set; one poor tube may spoil the reception in an otherwise perfect instrument and a check on the A and B-batteries is desirable at all times.



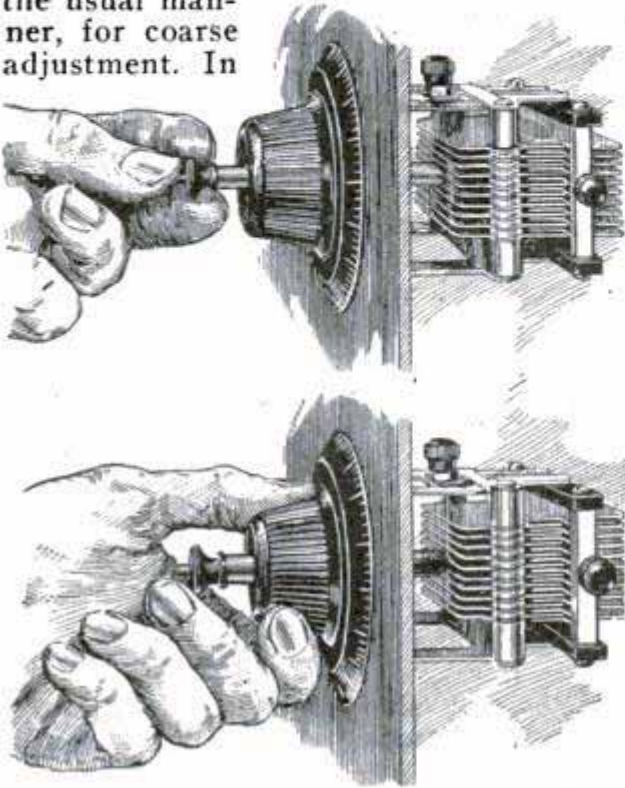
Showing Method of Testing Tubes under Operating Conditions with Combination Tester and Trouble Finder

*Sterling Mfg. Co. 283 Prospect Ave*

Push-Pull Adjustment Features

656-Q Variable Condenser

In a new variable condenser the movable plates are pushed or pulled by means of an insulated stem instead of rotated in the usual manner, for coarse adjustment. In



Above, Moving the Plates with the Stem for Coarse Tuning; Below, Fine Tuning with Dial

addition to this, very fine adjustment can be obtained in the usual way, by means of a dial. A micrometer screw coupled with the mechanism permits a movement of only .0001 in. Graduations on the stem are numbered 1 to 10 and on the dial from 0 to 100. The claim is made that body capacity and losses are reduced to a minimum. The movable plates are connected electrically to the frame and are grounded, and the fixed plates are 2 in. from the inside face of the panel.

Testing Audio-Frequency Transformers

A simple way to test a.f. transformers that are suspected of being grounded to the shell or frame, is of interest to all who have encountered such trouble. Connect one tip of a pair of headphones to the 16½-volt terminal of a 22½-volt B-battery unit, and the 22½-volt terminal to a short length of insulated wire. Without touching the bare wire with the hand, hold it against the case or shell of the transformer, being sure to make contact with the bare metal. Touch the free terminal of the headphones to each trans-

former terminal on the side of the transformer to which the wire is connected. Repeat this test on the other side of the transformer. A distinct click indicates that the terminal to which the connection is made is grounded to the frame. A similar test with the battery and phones can be used to locate an open circuit in the transformer; if there is no click in the phones when the connection is made across the coil, the circuit is open.

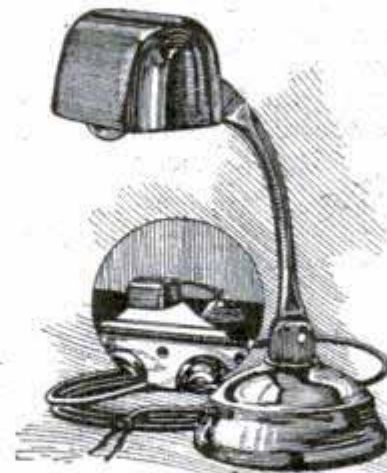
Good Ground Increases Efficiency

The radio set's efficiency can be increased from 25 to 100 per cent by the proper installation of a suitable ground. Many enthusiasts take great pains to erect a good aerial, then make the mistake of twisting the ground wire around a steam-radiator valve or gas pipe, and wonder why the results are not what they should be. A cold-water pipe makes a good ground under most conditions, but not always. The actual ground connection begins where the lead wire enters it. This means that if the water pipe is on the third story, the lead to the ground would be too long to be efficient. In a case of this kind it would be better to place a counterpoise under the aerial. When connecting the ground lead to a water pipe, always use a ground clamp.

Portable Lamp for Radio Receiver

657-Q Is Run by A-Battery

A small portable radio lamp, which is connected directly to the radio A-battery, is now available. It is designed along the



lines of a standard desk lamp, and supplies just the right amount of illumination for easy dial adjustment when placed on the cabinet, as shown in the insert. The eyes are shielded from the direct

rays, and the lamp adds to the appearance of the set. As it is provided with a long cord, it also makes a good trouble finder. A switch is placed in the base. The lamp is a 6-volt automobile bulb and thus draws very little current from the A-battery.

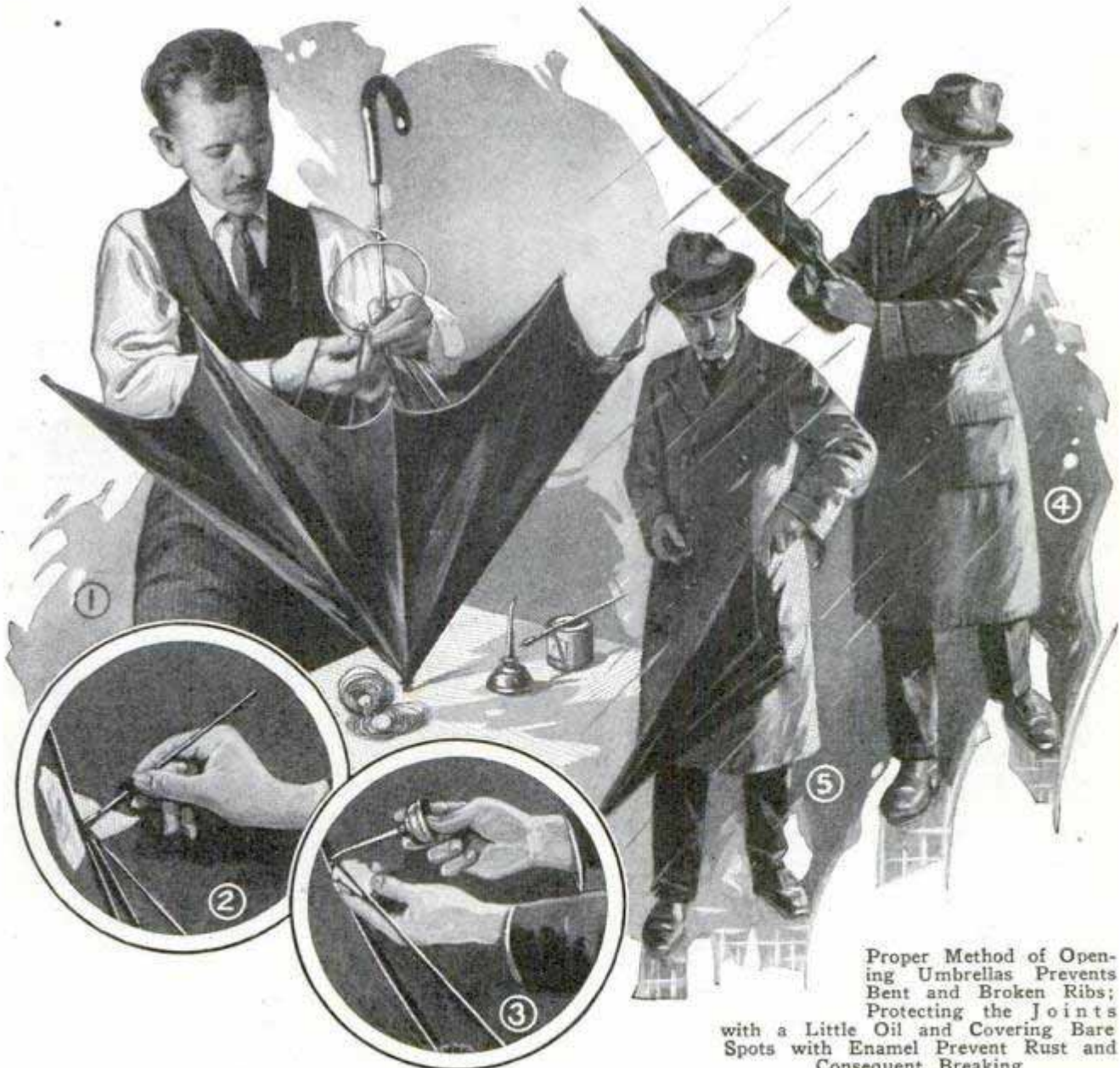


## Taking Care of the Umbrella

By FRANK V. FAULHABER

**B**ECAUSE an umbrella does not close as it should, a rib perhaps tearing into the covering, the user in his hurry and impatience often discards it without attempting to repair it. Usually the trouble is merely due to a broken rib or a rusty, broken wire, which might have been avoided with proper care. The life of an umbrella can ordinarily be lengthened and

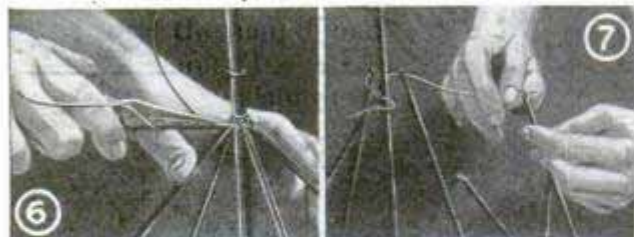
the user can get much more service out of it by keeping all the joints oiled to prevent them from rusting. Use a small oilcan and put a drop or two on each joint, holding a small piece of cloth or paper under it to prevent getting oil on the covering, as shown in photo No. 3. Care must also be taken not to get too much oil on the joint, or it will run off on



Proper Method of Opening Umbrellas Prevents Bent and Broken Ribs; Protecting the Joints with a Little Oil and Covering Bare Spots with Enamel Prevent Rust and Consequent Breaking

the covering after the umbrella has been put away.

In some instances, where the enamel has peeled off the ribs, it is good practice to touch up these spots with a little quick-



Rethreading the Ribs on a Thin Flexible Wire at the Sliding Sleeve Joint

drying black enamel or paint, applying it with a small camel's-hair brush, as shown in photo No. 2. Rusty joints become broken joints sooner or later, so preventing rust is, in most cases, preventing breaks, and your umbrella will last much longer. Oil should also be applied at the joint where all the ribs are attached to the sleeve at the handle. A thin, flexible wire holds the assembly together at this point.

When it is necessary to replace a broken rib, cut the threads that hold it to the covering. Do not pull the rib out, as the covering can easily be torn, especially if it is old. It is necessary to remove the

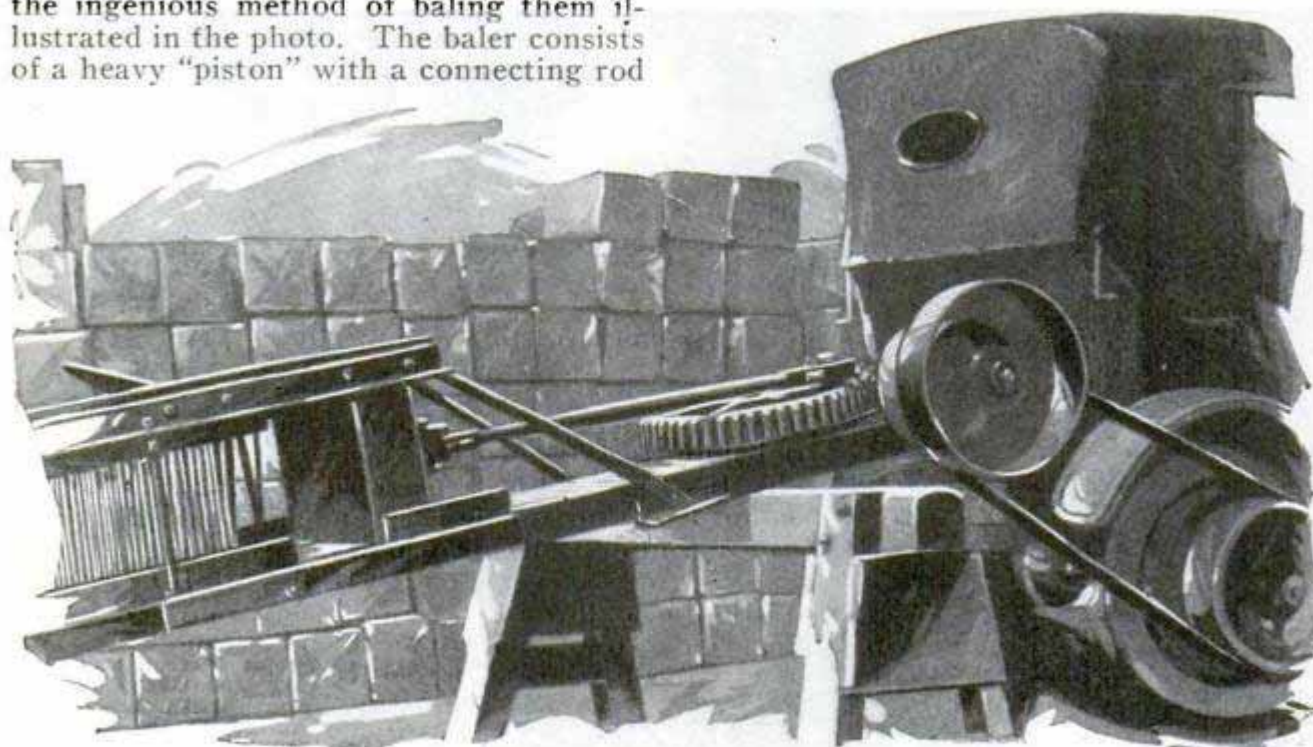
wire where the rib is fastened to the sliding sleeve. Take the other ribs off until the broken one is free, and after substituting a new one, rethread the ends of the ribs on the wire in their proper order. Should a new length of wire be necessary, use a flexible one, the same size as the old one and about 4 in. long. Threading the wire through the eyes of the ribs can be done best with the fingers, as shown in photo No. 7. Twist the wire tight with long-nose pliers, cut off the end and bend it down. This operation is shown in photo No. 6. When doing this, it will be found convenient to have a hole in the bench top, into which the ferrule of the umbrella is set to hold it vertically, as in photo No. 1.

Umbrellas are often opened in a hurry; the sliding sleeve is forced up before the covering has a chance to loosen, as shown in photo No. 4. This practice is the cause of most bent ribs. As soon as a rib is bent the umbrella does not open properly and by forcing it still more, other ribs may bend and break, or the covering may be torn by the strain. The proper method of opening an umbrella is shown in photo No. 5. Hold the umbrella down, twist it around a few times to loosen the covering and it will almost open of itself.

### "Baling" Empty Tin Cans

One junk dealer who bought up all the large square tin cans he could obtain used the ingenious method of baling them illustrated in the photo. The baler consists of a heavy "piston" with a connecting rod

which is fastened close to the rim of a large cog wheel to give a long stroke. This is so proportioned that the cans are compressed enough to admit another one



Old Tin Cans in Junk Yard Are Flattened for Baling by Means of Unusual Device Belted to the Rear Wheel of Automobile

at every stroke, and is run by a worm gear connected to a pulley on the rear wheel of the auto as shown. The piston slides in a steel frame of the proper size to fit the cans. When these are inserted in the frame and the baler is started running, the piston flattens them against the solid back of the frame. On each backstroke of the piston a can is inserted at the front end. The capacity of the baler is 40 cans, which are then tied up, forming a conveniently handled bale. The machine is mounted on a heavy piece of timber, and when in use, one end is placed on an ordinary sawhorse as shown.

### Removing Stamps from Envelopes

When you wish to save a stamp affixed to an envelope, do not attempt to remove the stamp from the envelope but remove the envelope from the stamp. Turn the envelope with the stamp down on the desk or table, then, keeping a fairly heavy pressure on the stamp, roll the envelope up and away from it. This is much more easily done than described, but a few minutes' trial will show how it is accomplished. It is not necessary to touch the stamp. If it happens, as is very likely, that a portion of the envelope remains on the stamp after it has been removed, roll the envelope portion off the stamp in the same manner. —F. C. Avery, Chicago, Ill.

### Safeguarding Children

Small children often fall against the stove and are then severely burned. Such accidents can be prevented by simply providing a fence around the stove as shown in the drawing. This can be made out of strips, 1 in. square. A baby's play yard will be just as useful for this purpose as a handmade fence. It should be fastened to the floor with screw-hooks and eyes so that the children cannot move it.—W. C. Ratcliffe, Tannersville, Va.



Small Baby Yard, Set around Stove, Prevents Accidents



Semicircular Diving Platform Made of Concrete Blocks Adds Attraction to Swimming Pool

### Novel Diving Platform

At Sulphur, Okla., there is a huge swimming pool fed continually by a spring of warm sulphur water. The water is crystal-clear, and people from far away come to use the pool for bathing. A diving platform is built in the pool of concrete blocks, forming a half-circle with convenient steps from the water's edge to a height of 8 ft. above the surface. This type of platform induces patronage and tends to increase one's skill in diving as the bather is tempted to try one step higher. Painted white and having an electric light on a pole at the top, the platform presents a neat appearance. —Dale R. Van Horn, Walton, Nebraska.

☛ A quantity of coarse excelsior, kept in a convenient box in the garage or workshop, will prove very efficient in cleansing hands of grease and oil. Dip a handful of the excelsior in water, rub soap into it and use as a brush.

### Filling the Gasoline Tank

Every tourist and auto driver who has had occasion to pour gasoline into the tank on the road appreciates the difficulty of doing this without the use of a funnel. Still, it is hardly advisable to take a funnel along just for this purpose, as it takes much room and may be bent and broken. However, the motorist usually carries a gallon oilcan and a piece of old inner tube can readily be obtained. Cut a slit in it to fit over the opening in the can, and it will be an easy matter to pour the gas into the tank, as shown in the illustration.

Piece of Old Inner Tube Makes Funnel



easy matter to pour the gas into the tank, as shown in the illustration.

### Burl from Tree Makes Case for Clock

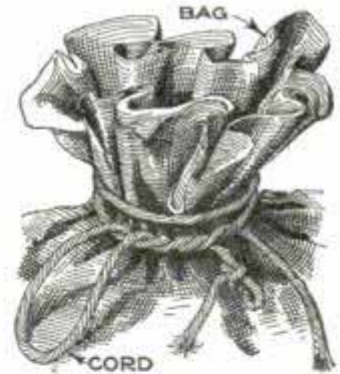
As the accompanying photo shows, a pleasing case for a wall clock can be made from a burl cut from a tree. A burl is a kind of outgrowth caused by a number of branches trying to grow out of the same place at once. Burls of fair size are rather plentiful, and no two are ever quite alike. The burl is sawed from the tree in the same manner as a branch, the cut side providing a flat surface to hang against the wall. The bark is then removed to expose the twisted grain underneath. An inexpensive alarm clock can be used if



desired, and no change need be made in it other than removing the feet and the handle on top. A hole to fit the size of clock used is then cut through the burl, and the clock set in place. It should be so fitted that it will slip in and out of place easily, so that it can be wound and set. A small piece of tin, bent in a curve and with one end fastened in place of the handle, will serve as a spring and help keep the timepiece in place. The burl may be stained and varnished if desired, and this will bring out the peculiarities of the grain.—C. L. Meller, Fargo, N. Dak.

### A Quick Bag Tie

The knotted end of the cord is the key to the "quick-off" feature of the tie illustrated. Farmers can use the twine from bundles of grain, cut near the knot; others can quickly make a knot at the end of any cord. The tie holds as securely as any when tightly drawn, and can hardly be equaled when it comes to untying quickly; it can, in fact, be untied and removed with one hand and at a single pull. The tie is begun by laying the knotless end of the string about the gathered mouth of the bag, leaving quite two-thirds of the knotted end to work with. After the first loop has been thrown around the mouth of the bag and drawn tight, the tie is finished by passing the knotted end once more around the bag, looping it back, passing the looped end about the other end of the twine twice, and then pulling the knot tight by tugging hard at the loop and knotless end. On the other hand, it is evident that untying of the knot requires only a slight pull on the knotted end.—Louis Schneider, Clinton, Mo.

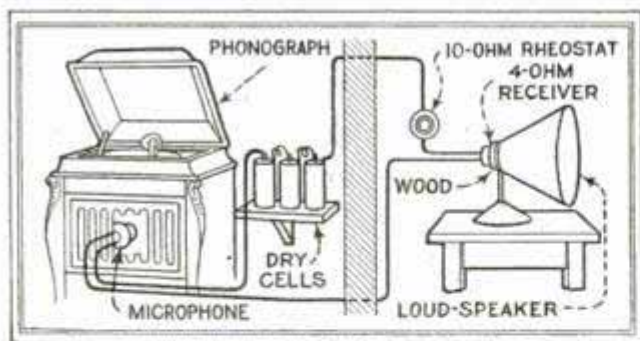


### Aspirin Revives Flowers

Aspirin, a coal-tar product, is used at the Emergency hospital of Dallas, Tex., to freshen and to revive cut flowers sent there to cheer the patients. The experiment has proved entirely successful with cut roses. The flowers are placed in a pot containing water and are not treated with aspirin until they show signs of wilting. A five-grain tablet of aspirin dropped in

Phonograph Provides Music for Two Rooms

The diagram shows a simple method of relaying phonograph music from one room to another. This hookup is useful at parties where two rooms are used for



Relaying Phonograph to Another Room for Dancing by Means of an Improved Arrangement, Consisting of a Telephone Microphone, Dry Cells, Rheostat and Receiver, Fitted to a Tin Horn.

the water refreshes them. Another tablet is later placed in the water and the flowers are again refreshed. The operation may be repeated several times.—William Allen Ward, Dallas, Tex.

Repairing Pumps

When repairing pumps, I have found that, where there is a cement platform and bolts set in the cement, these bolts are in the way of the pump dog when the pipe is taken from the well, and may be bent or broken. To avoid this, I set 1/2-in. bolts in the cement when construction is done. These bolts are set back from the pump base, and steel straps are used to hold the pump in place. This gives plenty of room for the dog and the 1/2-in. bolts are not so likely to be broken or twisted off. It is well to coat the bolts with a thick paint when the nuts are replaced so as to prevent rusting.—W. O. Hendrickson, Argyle, Wis.



Handy Support Facilitates Sawing Trees Single-Handed

dancing or in case those who do not dance wish to listen to the music in another room. A microphone is placed at the mouth of the sound chamber of the phonograph, as shown. Four to eight dry cells are used and a 10-ohm rheostat is connected in to regulate the current. A loud speaker can easily be made from a tin horn and a telephone receiver wound to a resistance of about 4 ohms.

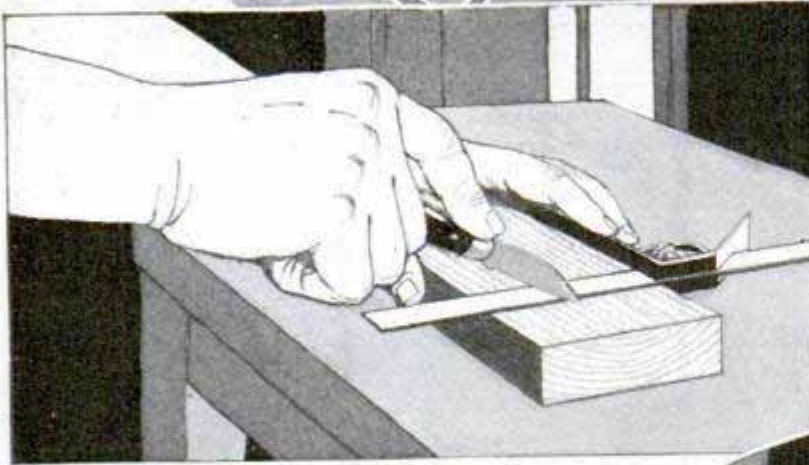
Support for One-Man Saw

Little difficulty is usually experienced in sawing horizontal timber, but to support the saw in a working position when cutting down trees is difficult. A simple support for this purpose can be made from a length of 3/16-in. round steel rod, commonly called pump rod. It is sharpened at the ends and bent to the shape shown. This device is driven into the tree and supports the saw properly without interfering with the "set" of the teeth.

*material from Telephone Maintenance Co. 20 W. My Chicago*

# Making Mortise and

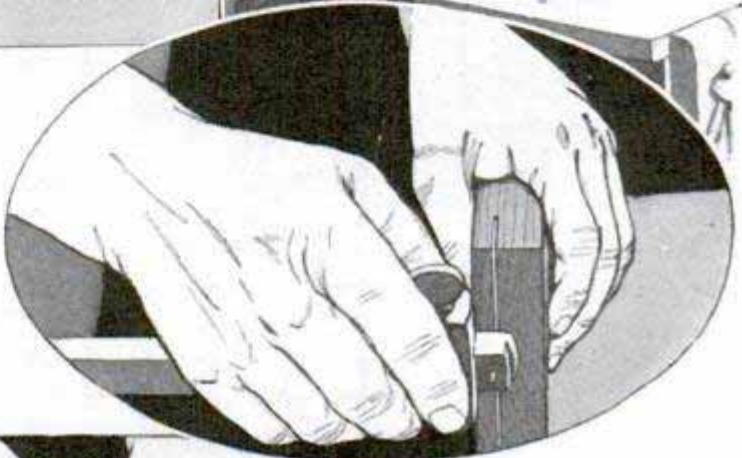
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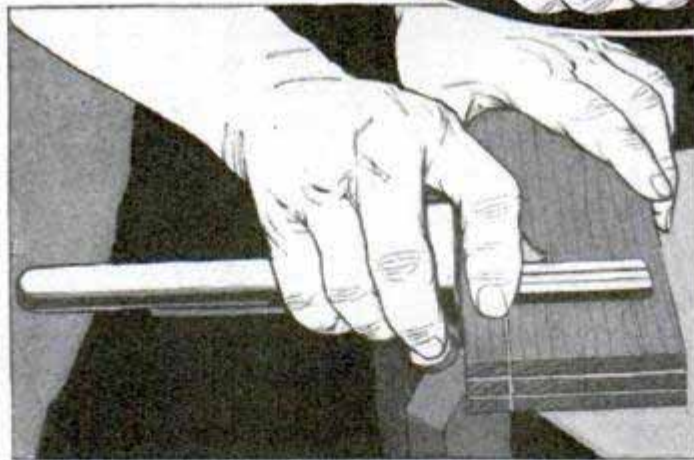
Squaring around the Rail for the Shoulders of the Tenon

THE old adage, "well begun is half done," applies particularly to the making of woodworking joints, and since no work can be perfect, errors and irregularities must constantly be reckoned with. It is, therefore, very important that laying out be carefully done, and that the processes follow one another in the correct order.

A simple form of the mortise-and-tenon joint is one in which the sides of the two members come flush, as in the meeting of the stile and rail in a door, and the method of setting out and making this joint is as follows: Surface the best side of the rail stock and mark it lightly with an "X" for an easy identification as the face side. Joint a good edge with the plane, testing for squareness with the try-square, holding the handle of the square against the face side. Mark this edge also with an "X." Next square the other edge and lastly the other side. The natural impulse is to take the four sides in rotation, but this is almost sure to bring poor results. Very accurate indeed is the surfacing of a piece of stock to within  $\frac{1}{4}$  in. of squareness or parallelism, so that, in squaring in rotation, the errors are continued in the same direction, instead of



Above, Gauging the Thickness, and at Left, the Width of the Tenon



tending to neutralize one another. Square up the stile stock in the same manner, locate the position of the mortise and mark its length.

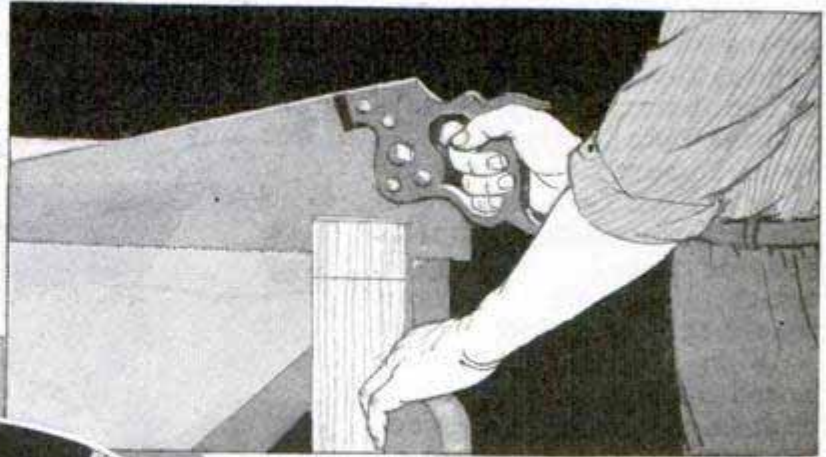
Measure the length of the rail to its shoulder, and with the point of a knife score a light line around the stock, squaring from face side and face edge. Here again, if the sides are taken in rotation, error is certain to result, and the lines will not meet at the last corner, especially if the square happens to be a little out of true.

Set a marking gauge for one-third the thickness of the stock, and guiding on the face side, gauge a line on both edges and end to the shoulder marks. With the same setting, mark one side of the mortise. Then set the gauge for two-thirds the thickness of the material, and repeat. The thickness of the tenon and width

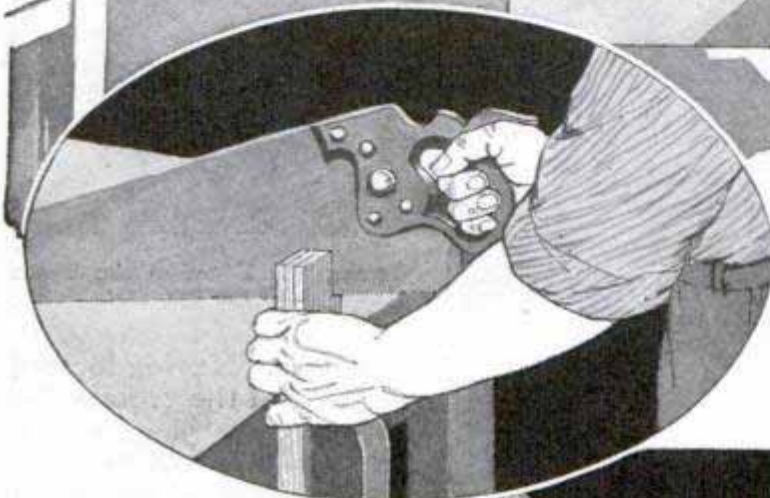


# Tenon, and Dado Joints

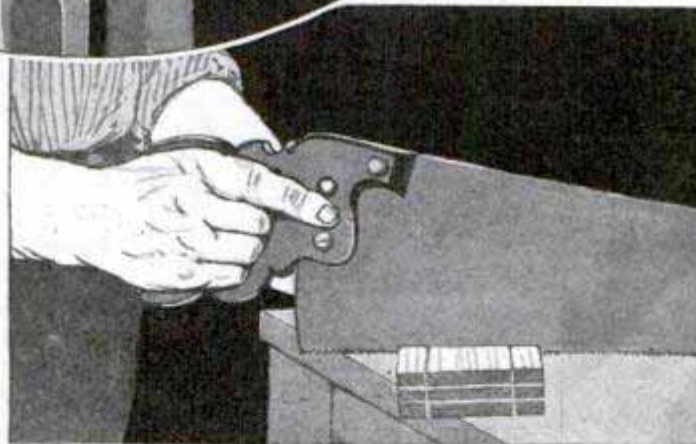
Edwin  
M.  
Love



Cutting the Thickness of the Tenon with the Ripsaw



Above, Ripping the Tenon to Width, and at the Right, Sawing Off the Cheeks



of the mortise are now determined.

The wisdom of gauging both pieces from the face sides is apparent, since, if one is thicker than the other, the good sides will come flush in the joining, and excess stock can be removed from the back. Moreover, the width of the tenon and the mortise would be dependent on the thickness of the material if gauged from both sides. Knowing the width of the tenon and its position on the rail, gauge both edges from the face edge. This completes the laying out.

Clamp the rail vertically in a vise and, with a backsaw or ripsaw, cut the cheeks or sides of the tenon, "splitting the line," that is, leaving half the line on the tenon, the kerf being in the waste wood. If there is any tendency for the saw to "run," or cut to one side, due to having longer or sharper teeth on one side than on the

other, cut alternately from one edge and then the other. If the mechanic is right-handed, the tenon is preferably to the left of the saw, so that the line is kept freely in sight; though, of course, when sawing alternately from one edge to the other, the

tenon must sometimes be at the right. Rip the edges before cutting the shoulders, thereby retaining the guide lines. Crosscut the side shoulders and then the edges. The broad side faces are much more conspicuous than the edges, so that, if any undercutting

occurs, it should be on the edge rather than the face, where it might be were the edges cut first. It is easy to cut the thin edge stock away without marring the faces.

Narrow mortises are best hollowed out with a chisel. Use a full-width chisel, and start cutting a short distance inside of the end mark, since the wood crushes back behind the flat side of the chisel, and if the edge is placed on the line, the mortise will be too long. This is an important point where the end of one board is being housed into another, as there is then no projecting shoulder to hide the mortise edge. Make cuts across the grain every  $\frac{1}{4}$  in., striking the chisel handle with a

mallet, or if this is lacking, with the side of the hammer head, the carpenter's usual method. Having chipped to the end of the mortise, rake out the chips and repeat until the proper depth is reached. Avoid prying against the mortise end, as this bruises the corner.

The tenon should always be a little shorter than the mortise depth, not only to make sure that it will not interfere with the closing of the joint in assembly, but to provide room for excess glue, which, if unable to escape, would split the piece.

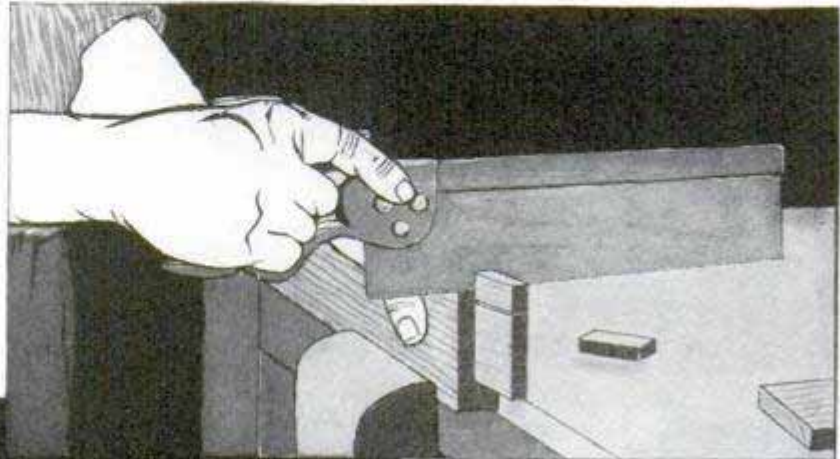
Wide mortises may be bored out with brace and bit and smoothed with a chisel, the work being supported on the bench or in the vise.

Before assembling the joint, coat both the cheeks of the tenon and the sides of the mortise with glue, for in no other way is it possible to be certain that the full gluing surface is utilized. The ends of the mortise and the tenon absorb glue so rapidly that, unless they are previously sized, they cannot be relied upon to contribute to the strength of the joint.

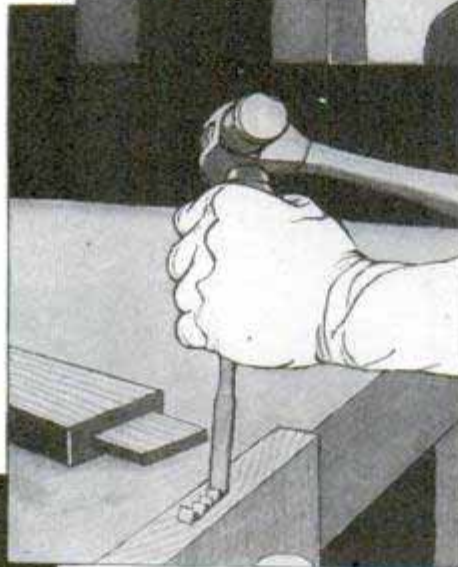
The common gained

or dado joint is especially useful in drawer construction, or for supporting shelves in cabinets. This is really a form of the housed joint, with the mortise lying across the grain, receiving the full thickness of the other piece.

In the common form, the groove is cut the full width of the material. Surface the stock and mark the face edge and side



Cutting the Edges of the Tenon with the Backsaw



Above, Chiseling Out the Mortise; Left, Making the Mortise by Boring



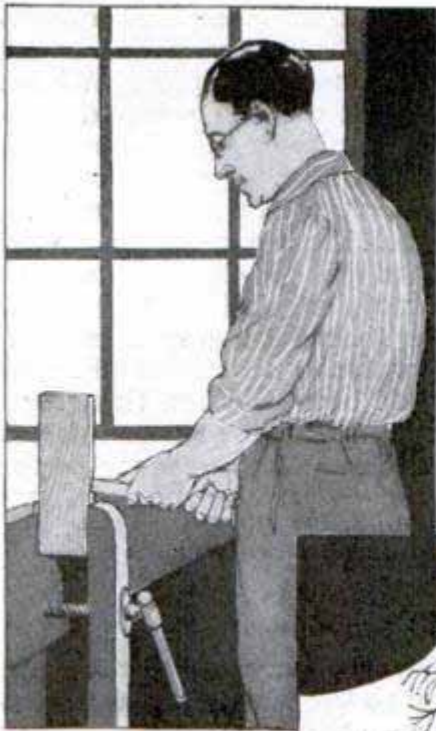
as before. Having located one side of the groove, use the end of the mating piece as a pattern for marking the width, or, if this is not practical, simply measure it. Gauge the depth, which should not exceed one-half the thickness of the stock, and cut both sides with a backsaw or fine-toothed finishing saw, keeping the kerf in the waste wood. If one is skillful with the saw, no guide other than the

thumb of the left hand is necessary; but the average amateur will find it convenient to tack a straight strip of wood along the line against which to hold the saw.

If the dado is wide, chisel a slope on each side in the waste wood before chipping out; otherwise, holding the chisel flat, cut out nearly to finished depth, and smooth the bottom to the line. Use the hand to force the chisel, or, if the wood is tough, use a mallet or the side of the hammer head.

In assembling, if careful work has been done, the mating board should slide snugly in without looseness or crushing. The use of a "dutchman," or wedge, is to be frowned at, and is permissible only for painted work. Since all parts of the joint present end grain on one side, this wood must be sized if the joint is to be glued.

Sometimes the piece dadoed in does not come flush with the other. In this case make a blind dado, which is the type shown in the illustrations, chiseling



Above, Trimming the Mortise after Boring; Right, Marking the Width of a Dado

out a mortise at the blind end, so that a stroke can be made with a saw in cutting the sides. The blind dado can also be used with good effect with a flush shelf by notching the front edge of the latter to fill the space beyond the blind end.

The commonest fault of the amateur is that of trying to trim a tenon with a chisel. This is very bad practice. The tenon should always be cut to exact size with the saw, by "splitting the line," and experience seems to prove that if a man is so inexpert that he cannot do this he will only make matters worse by resorting to the chisel, which, in this case, is a more difficult tool to handle. Moreover, the guide lines are gone when the cheeks are cut away. It is true that some books recommend cutting a little distance from the line and planing and chiseling to size, but most authorities frown on the practice, and a mechanic would never think of doing such a thing. Occasionally, of course, any man will run

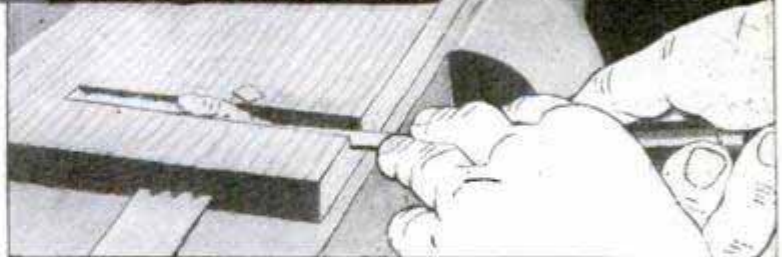
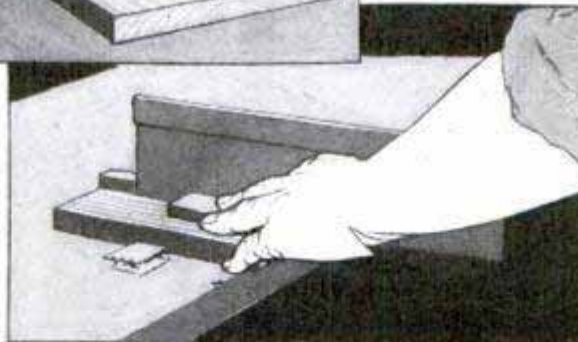
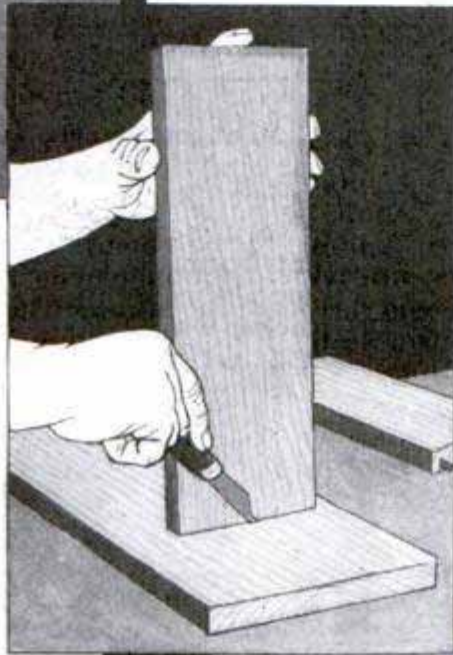
off a trifle, and might touch up the tenon with the rabbet plane, but the tenon should never be started with the intention of finishing it in this way. Sometimes one finds an amateur who trims a rabbet shoulder across the grain with the chisel, and this is worse still. If the saw kerf is made inside the line, the tenon will be made too thin, and will be a loose fit. If it is made on the line, the tenon will again be a trifle on the thin side, but if made as directed before, by splitting the line and keeping the kerf in the waste wood, the tenon thickness will be correct.

In sawing across the grain, it is more than ever necessary that the saw cuts be made in the waste, as the recess formed between the saw cuts in making a halved joint will receive a piece of wood that is already the full width of the stuff being used. In other words, the piece of wood that will go into the recess cannot be made wider to make up for any inaccuracy caused by careless sawing, whereas, should the tenon be cut a trifle narrower than intended, the mortise can be cut accordingly.

### Removing Rust Stains

Rust stains on the family wash are a frequent source of irritation to the busy housewife, while in many textile plants they also cause a loss by producing "seconds," etc. The stains may be the result of a number of sometimes entirely unsuspected causes. Some water contains enough iron in solution to produce a rust mark on white materials when it is used with a soap

Left, Guiding Saw with Strip in Cutting a Dado; Below, Chiseling the Waste Wood from Dado



having an excessive amount of alkali. Other water is normally free of iron, but fungus growths containing iron may develop in the water mains, become dislodged with any increased flow of water, and thus carried into the consumer's premises. Again, the bluing used after washing may contain iron. This type of

bluing is entirely satisfactory provided the clothes are thoroughly rinsed, but if just a little too much soap or washing compound remains on them, the blue will develop a red iron mark. Frequently one may neglect wiping off a wire clothes line before hanging out the wash. There are many other causes of rust marks in the home, as, for instance, the various iron parts of washers, wringers, etc., but those given are probably the most common. In the ordinary household there is not usually enough difficulty of this kind to lead to much experiment on methods of removal, but in some factories it becomes an item of more interest.

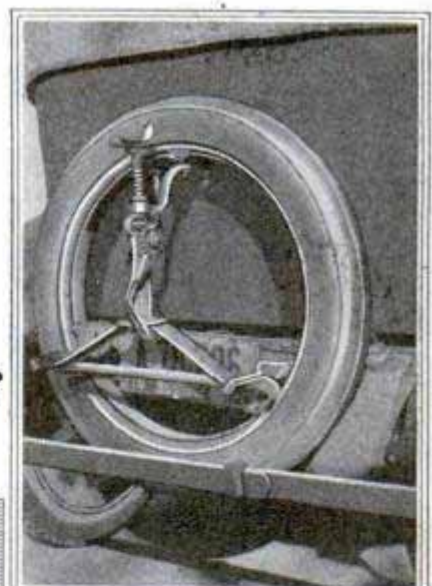
Recently the British cotton-industry research association conducted extensive

investigations along this line and found a method which they considered good enough to recommend. They suggest sponging the mark with a cloth pad saturated with a cold solution containing 1 oz. of oxalic acid and 1 oz. of acid potassium fluoride in 1 qt. of water, until the mark disappears. The excess of solution should then be washed out of the fabric with plenty of clean water, and finally the entire wet space should be dipped into dilute ammonia water to neutralize all traces of the chemicals used. When this treatment is used with care, the rust mark can be removed successfully and, according to the association's report, the most delicate white fabrics will not be injured.—Chas. E. Mullin, Camden, N. J.

### Jack Makes Tire Carrier, Contractor and Expander

The accompanying photos show how an ordinary screw jack may be adapted to form a carrier for an extra tire on the car, making it possible to carry two tires instead of one. In addition, the jack may

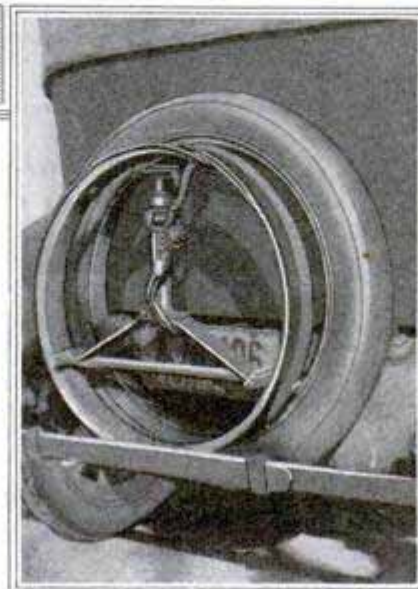
round at one end and threaded to take nuts that bind them to the frame of the regular carrier. At the other end they are bent to form seats for the rim and the ends bent back to make pointed hooks. The supports are bolted to another flat-iron bracket which is riveted to the base of the jack, and strengthened by means of a pipe



Above, Extra Tire in Position; Center, Details of Construction

be used for contracting and expanding the rims, and as it is rigidly attached to the car, the work is greatly facilitated.

The jack is attached to the rear of the car, behind the regular spare-tire carrier, by means of flat-iron supports, made as shown in the center detail. The lower ones are forged



Above, Tire Removed: Left, Contracted Rim Ready for Casing

brace. The upper support is made of lighter iron bent around the neck of the jack and shaped so that it can be bolted to the upper bracket on the carrier. The handle of the jack is bent so that it lies against the bracket that is bolted to the jack base. To the swivel head of the jack another flat rim support, with

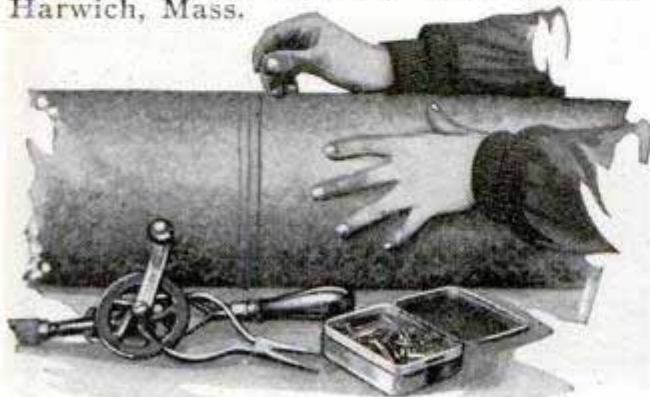
a hook similar to the lower ones, is riveted. When it is necessary to remove a casing from the rim, the hooks are engaged with the edge of the latter, and the screw of the jack is run down, causing the rim to contract. When a casing is to be put on a contracted rim, the latter is placed on the jack, the casing put in position, and the screw run up, thus expanding the rim and pressing it out against the casing. A few more turns of the screw then locks the rim firmly in place on the carrier. The ratchet wheel of the jack may easily be locked to prevent the theft of either tire. —Mrs. Hassie Terrell Hixon, Auburn, Alabama.

### Treating Stucco before Painting

Paint usually peels off stucco very soon, especially if the latter is new. To prevent this, the stucco should be coated with a solution consisting of 20 parts of sulphate of zinc and 80 parts of water. This will cut the caustic effect of the lime in the stucco. After this coat has dried, the paint is applied and it will then stick permanently. —L. H. Georger, Buffalo, N. Y.

### Holding Furnace-Pipe Sections

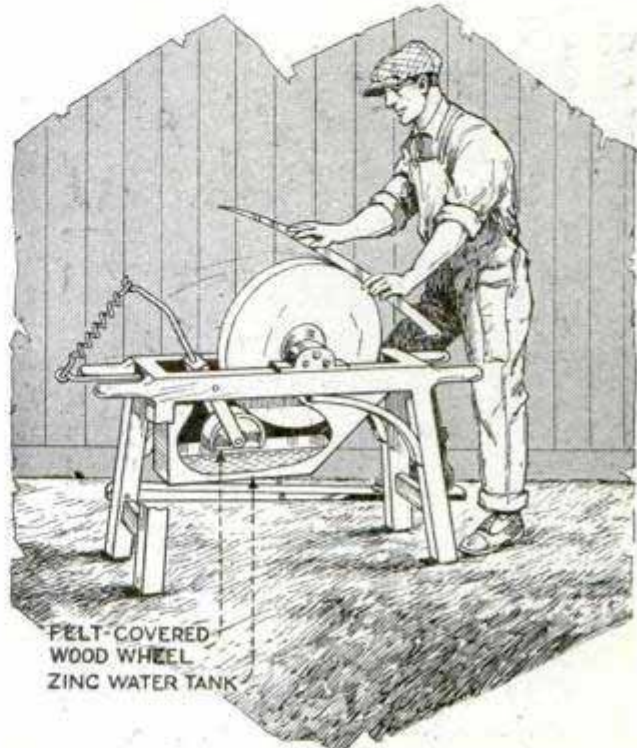
Those who are unfortunate enough to have a long run of smoke pipe from the furnace to the chimney, probably have experienced trouble by sections pulling apart when assembling the pipe. The writer solved this difficulty with a few cotter pins. Two sections were put together at a time. Two small holes were drilled opposite each other at the joint through both pipes. A cotter pin was spread wide apart and the ends then squeezed together with the fingers and inserted into the hole. Sections thus assembled will not part except by lifting out the cotters. By numbering each section and drawing a line across each joint with stovepipe enamel the sections can always be reassembled in exactly the same relation. —L. B. Robbins, Harwich, Mass.



Stovepipe Sections Held Together Securely by Means of Small Cotter Pins

### Saving the Grindstone

Grindstones become soft if left standing in water. To prevent this trouble, a small felt-covered wheel can be arranged to be partly submerged in the water, and



Small Felt-Covered Wooden Wheel Partly Immersed in Water Keeps the Grindstone Moist

at the same time the portion above the surface of the water should be kept in tight contact with the edge of the grindstone by means of a coil spring as shown.

### Cleaning Rolled Seams on Tubs before Soldering

When galvanized-iron tubs and pails with a rolled seam at the bottom develop a leak at this point and the joint is heated for soldering, any moisture, soap or grease in the joint will run out and prevent the solder from sticking. To overcome this apply the flame from the outside and below, and heat the seam until it appears dry and stops smoking; then clean the surfaces about the seam on the inside. When the soldering now is done in the usual way, there will be no trouble. If the soldering torch is held on the outside of a thin sheet of galvanized iron, the inside surface will be burned black, but by applying the flame to the thick seam, this is less likely to occur.

☞ To prevent the absorption of moisture by the salt in salt-shakers during damp weather, place a glass over each shaker, when not in use.



Paris Carpenter Finds Use of Stilts More Practical Than Stepladder

### Stilts to Take Place of Stepladder

For various kinds of work where stepladders are customarily used, a Paris carpenter finds stilts more practical, as they save the time lost in descending and ascending the stepladder every time its position is changed. The stilts are made so that the steps can be adjusted for height.

### Measuring and Cutting Paper from Rolls

A handy cradle which facilitates measuring and cutting off paper from rolls is shown in the photo. It is attached to the end of the counter or bench on the top of which a scale is marked off. The roll of paper is placed in the cradle and the end is pulled along the top of the counter until the proper length is unwound. Then the paper is cut off by simply pulling a pair of shears along the edge of a



Cradle on End of Store Counter Facilitates Cutting Off Measured Lengths from Paper Rolls

sharp piece of metal extending across the end of the counter.—Charles W. Geiger, San Francisco, Calif.

### How to Keep an Aquarium Successfully

"I never had much luck with my aquarium," is a statement you have often heard, but did you stop to consider that, may be, it wasn't so much poor luck as it was lack of knowledge? Fish, to thrive, need good treatment and good food as much as dogs, cats or birds. They breathe oxygen, which is found in the air, and exhale carbon dioxide. Plants, however, need carbon dioxide and give off oxygen. So, you see, that if there are enough fish and enough plants in an aquarium everything works well. This is called a "balanced aquarium." However, if there are too many fish or too many plants, there is too much of one kind of gas and not enough of the other, and one or the other of the living things in your aquarium begins to die. This is one of the biggest troubles of the aquarium keeper, but when you know the reason for it you have it cornered, as it is easily possible to increase or reduce the number of plants until you have a balanced aquarium and so keep all your fish alive.

Feeding fish is fortunately not difficult, but there are some important things to remember about it. Experiment to find out how much your fish readily eat, then give them just that much and at a certain time each day. Be regular about feeding them. Variety of food is one thing that makes healthy fish. Give them a change. Here are some kinds to try: cut-up grubs, scraped or shredded beef, and the manufactured forms, such as ant eggs, wafer food and ordinary crumb food. How often the water should be changed depends on the size of the aquarium.

A small bowl ought to be changed every week, a medium-size, every ten days or two weeks, and a large tank, well stocked with growing plants, only when the water is dirty or you wish to rearrange it. Make the aquarium comfortable for the fish; have a castle or some rock work

and some sand or pebbles on the bottom. Seashells are not advisable for the fresh-water aquarium, as they contain lime, which is injurious to the fish. Place the plants so that there is a stretch of clear water for swimming. Don't let the sun or very bright lights shine on the bowl, for this will heat the water, and warm water is uncomfortable for fish. Snails are scavengers, which help keep the fish bowl clean, and it is therefore a good thing to have a few in the aquarium.

Fish diseases are better left alone by amateurs, as their correct treatment is difficult. If you have healthy fish to begin with and treat them properly, you need have little fear of disease. However, for general poor condition, put the afflicted fish in a small basin of cold, salt water for a few minutes. It is advisable to do this during exceedingly hot weather also. If you have become very interested in your aquarium, you may wish to have some other aquatic pets besides goldfish. A paradise fish or two make a suitable addition, as they are beautiful and graceful, or some of the wild game fish will also thrive. The latter, of course, cannot be placed with the goldfish on account of their warlike tendencies. You may expect your fish to live to a ripe old age if you treat them right, for fish do not die young naturally. In fact, there is in Japan a goldfish which is 19 years old.—Donald Culver, Montclair, N. J.

### Sealing Canned Meat

To prevent canned meat from rising above the fat or paraffin sealing. I cut a number of strips of cedar  $\frac{1}{2}$  or  $\frac{3}{4}$  in. wide, a little longer than the diameter of the neck of the jar. These were pushed under the shoulder of the bottle as shown in the drawing. The paraffin was then poured in. This arrangement keeps the meat down effectively. When opening the can the stick is split and can then be removed easily.—Mrs. M. G. Alexander, Farran's Point, Can.



### Snubbers for Ford Car Made at Home

After he had broken three front springs in one summer, an autoist looked around for a cheap means of preventing further breakage. The remedy he finally devised consisted in riveting snubbers, made from an old belt, around the front axle and the

Old Belting Makes Good Snubbers for Light Cars and Prevents Breaking Springs

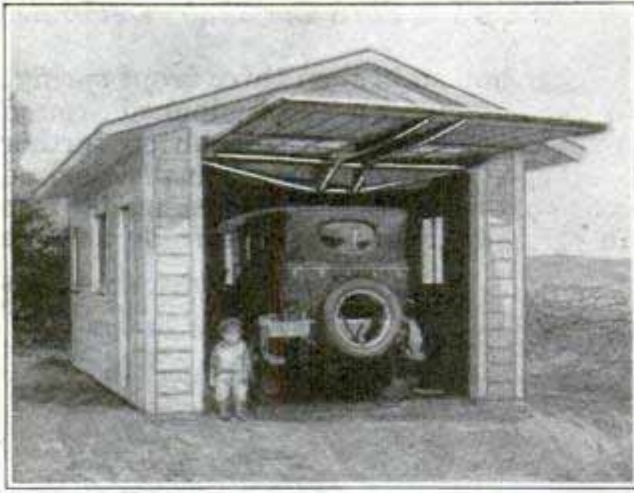


frame of the car. The belting was of four-ply canvas, 5 in. wide, and was cut in two, overlapping the splices 4 in. The photo shows the installation clearly.—Dale R. Van Horn, Walton, Nebr.

### Putting Life into Moth Balls

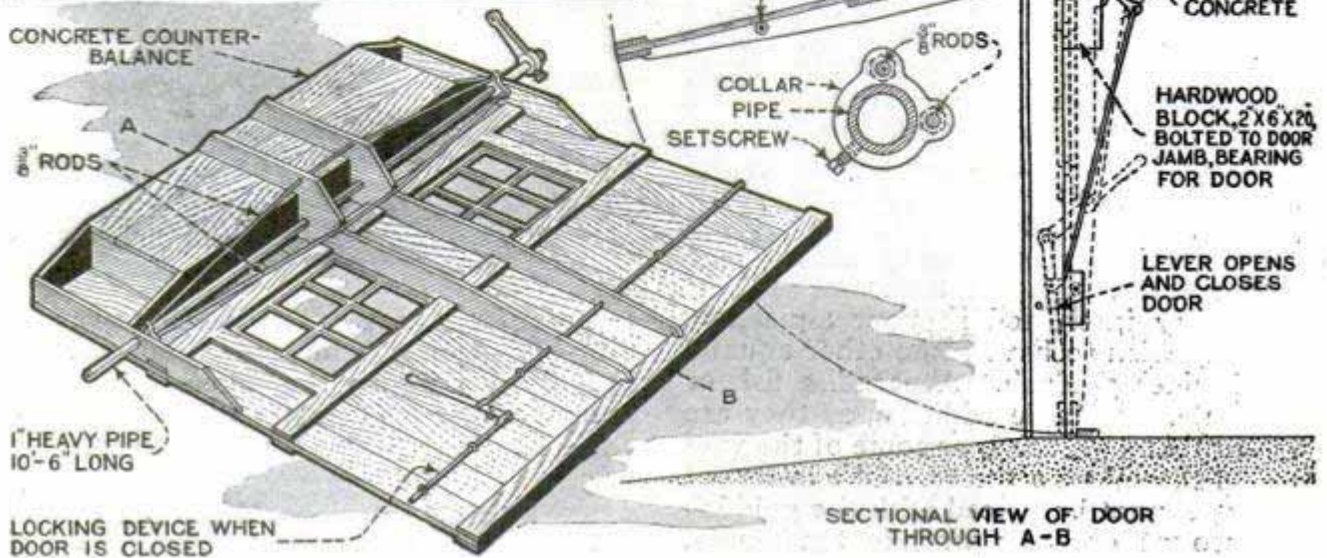
Putting life into moth balls is an interesting experiment for anyone to carry out as it causes curiosity to all those who see it, and is also a good advertising stunt to draw attention to window displays. A druggist found that it brought over 30 persons into his store every day to make inquiries and 25 of these made a purchase. Take a fruit jar that can be made air-tight and has good clear walls. Fill this two-thirds full of water and add equal quantities of potassium bicarbonate and citric acid until the solution is about 1 in. from the top. Then put four or five or more moth balls into the container and screw on the lid. The chemicals will begin to react and the balls will move upward and downward, sometimes two at a time and sometimes all of them, without apparent reason, and the glass wall magnifies the balls and makes them look like balls of cotton.—David J. Morris, Austin, Tex.

Small drills are easily broken, but if a short piece of pencil, with the lead removed, is slipped over them, with only the proper length exposed, pressure can be applied without danger of breakage, as the pencil will prevent the drill from bending and consequently breaking.



rod, and from this a  $\frac{3}{8}$ -in. rod runs down to a lever pivoted on the inside of the door jamb, so that, when the lower lever is down all the way, the door is locked open. Raising the lever lowers the door. The door is locked, when closed, by another lever, pivoted to the lower part of the door. It operates two rods that are

Garage Door That Is Easily Operated and That Does Not Blow Shut: It Swings on a Pipe Shaft



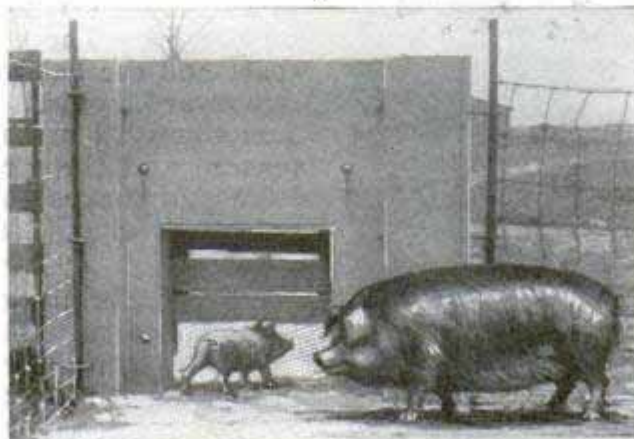
### Garage Door Swings Up to Open

The unusual type of garage door shown herewith is made of  $1\frac{3}{16}$ -in. pine shiplap, except the 2 by 4-in. bracing. At the inside top is a counterweight, made by filling a box form, 8 by 22 by 66 in., with concrete, reinforced with wire. Just below the counterweight is a shaft, on which the door swings. This is 1-in. extra-heavy pipe, 10 ft. 6 in. long, and 2 by 6 by 20-in. hardwood blocks are bolted onto the door jambs for bearings. A collar, with bosses drilled to take  $\frac{3}{8}$ -in. iron rods, is fastened to each end of the shaft;  $\frac{3}{8}$ -in. rods are threaded, passed through the holes in the collars and over and under the door braces and drawn up tight with nuts. On one end of the shaft is fastened an old auto connecting

attached to the door with staples and slide into holes drilled in blocks bolted to the jambs as indicated.

### Concrete Pig Creep Adjustable

To allow the smaller pigs to pass through but not the larger ones, an Indiana farmer made the concrete creep shown in the photo. Removable 1-in. boards, 8 to 10 in. wide, were used to reduce the size of the opening, which was otherwise large enough for the biggest hog to pass through. Incidentally, the gate serves as the corner post for three fences. Large screweyes were inserted in the concrete while pouring it. Lengths of pipe, to which the fence is attached, are slipped through the screweyes.—J. C. Allen, West Lafayette, Indiana.



Concrete Pig Creep Is Adjustable to Allow Only the Small Ones to Pass through It



# How to Make a Toy Derrick

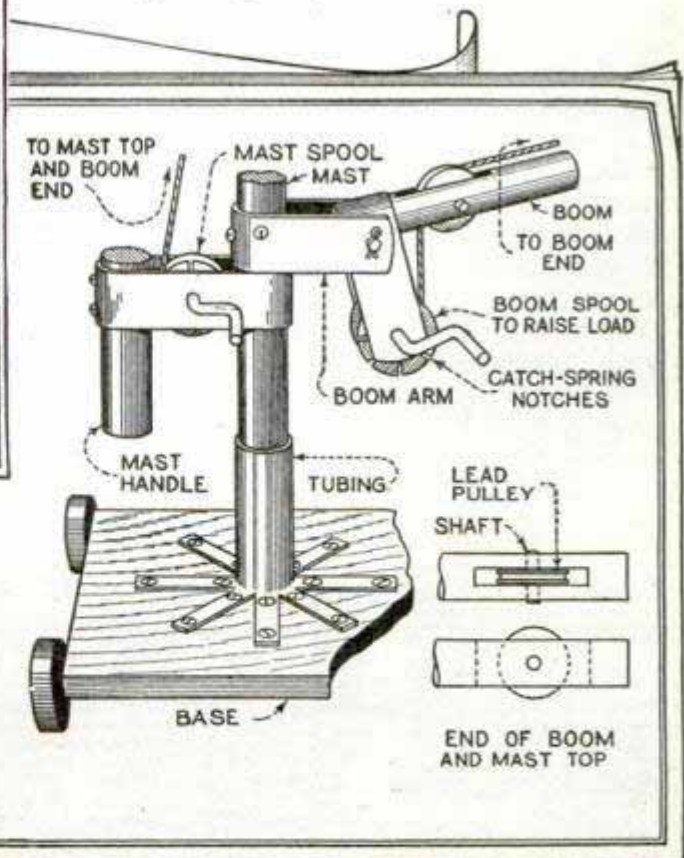
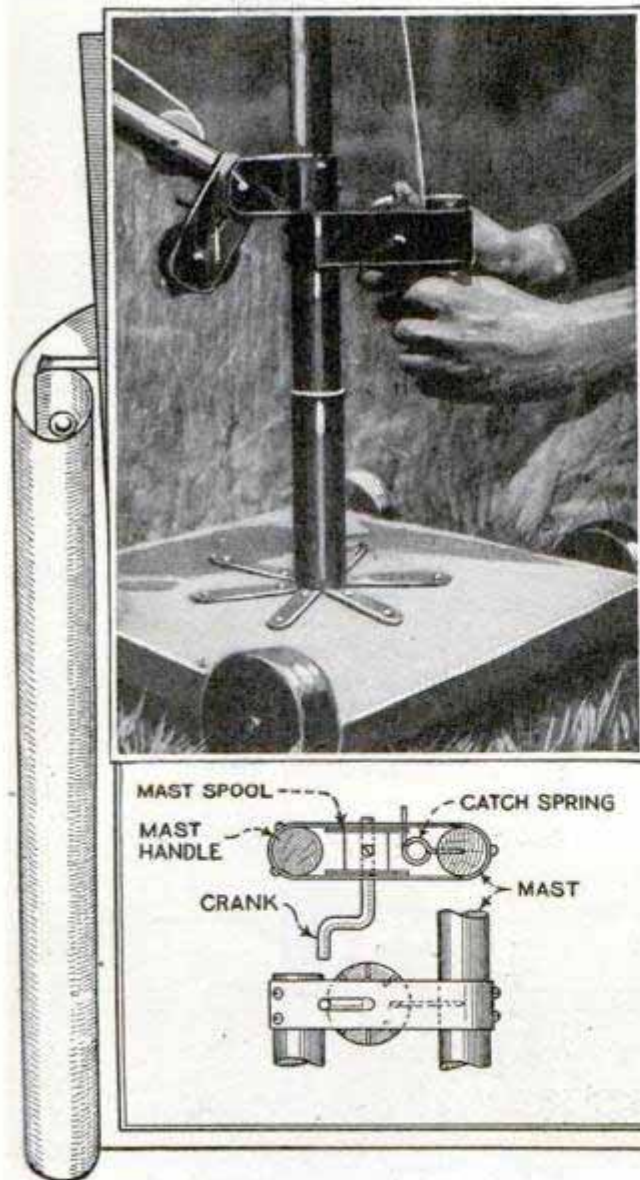
By RICHARD C. TARR

A TOY derrick to amuse the growing boy may be constructed without much trouble and at little cost to the home workman, or by the boy himself, and will stand up under considerable rough usage.

A base, 12 in. square, is first constructed of  $\frac{7}{8}$ -in. pine, battened at the ends to prevent warping, and provided with four wheels, cut from the same material with a coping saw or jigsaw, bored, and attached with screws to the four corners of the base. The socket for the mast is of brass tubing slightly larger than the mast, and having one end slit eight times, lengthwise, about 4 in. in from one end. The slitting is done with a hacksaw. These sections of the tubing are then spread out, drilled and screwed to the top of the base, keeping the tubing rigidly in an upright position. The socket of the derrick pictured was made from a discarded tire

pump. The mast is constructed of a 1 by 36-in. dowel stick, the boom is  $\frac{7}{8}$  by 22 in. and the mast handle is 1 by 4 in., all being dowel stock, which can be obtained from any large hardware store, or a dealer in manual training supplies. A footplate should be screwed to the bottom if a hole is bored through the base to secure additional depth for the mast socket; however, this is not necessary if the mast is permitted to rest directly on the base.

The pulleys at the top of the mast and ends of the boom are of cast lead, grooved with a hacksaw around the edge, and smoothed with sandpaper. Oblong openings are cut, slightly larger than the pulleys, in both ends of the boom and in the top end of the mast, about  $\frac{1}{2}$  in. from the end of the mast and the outer end of the boom, and  $1\frac{1}{2}$  in. from the inner end of the boom. The pulleys are then wedged in place temporarily with cardboard in their respective openings. Holes,  $\frac{3}{16}$  in. in diameter, are bored through wood and pulley, the latter removed, and the hole in it reamed slightly larger. The pulley is then replaced, and a short piece of stiff wire, or wire nail, forced into the hole, for the pulley to turn on. Care should be taken to bore the hole squarely to avoid binding the pulley.



Close-Up View of the Derrick Base and Pulley Fittings, and Details of Construction of the Various Parts of the Toy

The arm securing the handle to the mast is  $\frac{1}{16}$  by 1 by 12 in., the boom arm,  $\frac{1}{16}$  by 1 by 6 in., and the spool bracket,

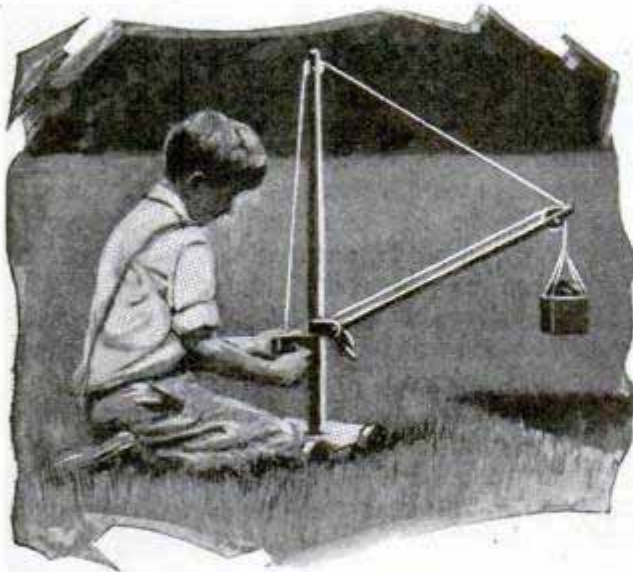


Photo of the Completed Toy Derrick in Use, with a Miniature Bucket at the End of the "Cable"

$\frac{1}{16}$  by 1 by 7 in., all sheet brass. The sketch shows their construction. The notches for the catch springs are made by drilling a series of  $\frac{1}{16}$ -in. holes in the sides of the spools in the places indicated, cutting smooth slits with a small chisel or broach and polishing with fine emery cloth. The catch springs, which hold the spools from turning when in use, and which are held back with one hand while operating the crank with the other, are rather tricky to place in the small holes bored into the mast and boom for them, but once placed will hold their position and work perfectly. The boom swings, within the boom arm, on a pivot made of a length of wire nail, drilled at the ends and held in place with small cotter pins or wire.

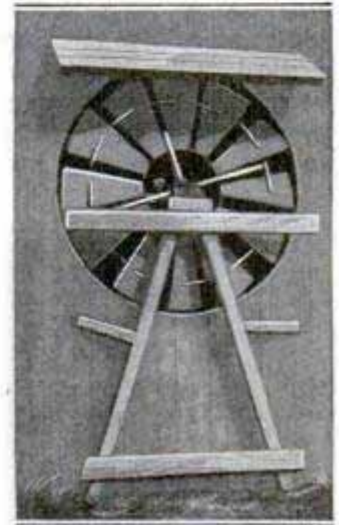
The construction of the spools can be readily understood from the sketches. Sheet brass,  $\frac{1}{16}$  in. thick, is used for the

sides, and a  $\frac{3}{4}$ -in. length of dowel for the centers. Two  $3\frac{1}{2}$ -in. lengths of wire serve as cranks, held in place by small brass screws driven into the spool centers, after the cranks are in place.

Lead weights placed on the outer edge of the base will prevent any tendency toward tipping when in use. The woodwork should be given one or two coats of white shellac, and may be stained, if desired, to any finish.

### Windmill Exhaust Fan

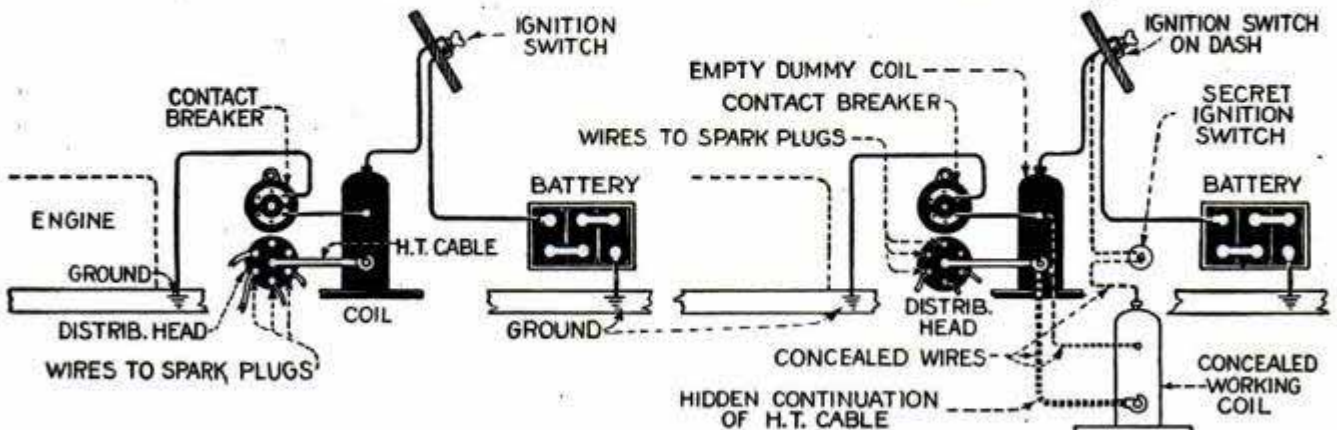
Satisfactory results have been obtained with an exhaust fan made from an old windmill. The arrangement is clearly shown in the accompanying photo. A circular hole, about 4 in. larger than the diameter of the windmill wheel, was cut in the wall, and the wheel was then carefully mounted



with bearings on the inside and outside, and a 10-in. pulley was keyed to the inside end of the shaft. This was belted to a small electric motor, so that the wheel made approximately 200 revolutions per minute. Obviously a large volume of air is displaced with this wheel in a short time.—Dale R. Van Horn, Walton, Nebr.

### Preventing Auto Theft

Theft of his automobile, with snap-on wires and a burned-out ignition coil in-



FACTORY WIRING

MODIFIED WIRING SCHEME USING DECOY COIL

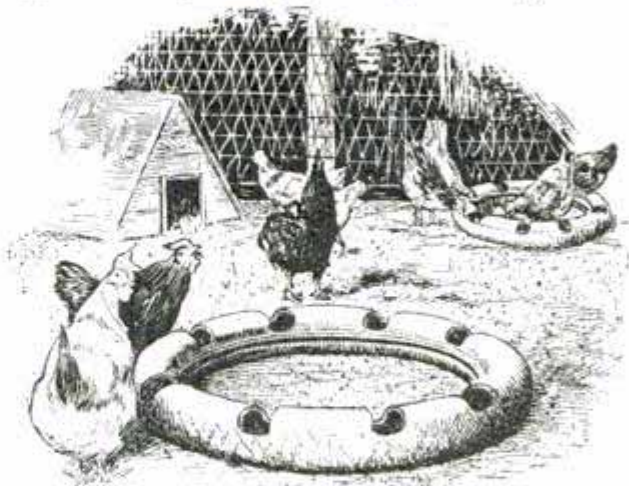
Altering the Wiring System of an Auto and Substituting a Decoy Coil for the Regular Coil, Which Is Hidden, Make Car Theft-Proof

dicating the means by which the machine was taken, recently led a motorist to devise a plan to prevent this from happening again. The scheme involved the use of two coils; a dead one, occupying its usual place on the dash and acting as a decoy, and a carefully concealed working coil, to furnish the actual ignition current.

The problem had its obvious difficulties. If the wires leading from the decoy coil to the circuit breaker, ground and dash switch were to remain intact so as to give the appearance of undisturbed regularity, then it seemed necessary to run wires between these places and the working coil. Naturally this would not do, as the sight of two sets of wires would give the scheme away to the practiced eye of the expert crook. The illustration shows, at the left, the standard, factory-wired ignition system of the car, the ammeter and other minor details having been omitted for the sake of simplicity. The theft-proof wiring is shown at the right, the additional wires being marked as dotted lines. All visible coil connections appear as made at the factory. The wire that runs from the top of the decoy coil to the dash switch is a blind wire; it has copper connectors at both ends, but they are so attached that no electrical contact is made. The wire connecting the circuit breaker to the dead coil is continued through the hollow dummy coil and passed through a hole in the dash to the corresponding terminal on the concealed working coil. The high-tension cable connecting the dummy with the distributor head, is similarly fastened to the high-tension terminal of the working coil. Lastly, a wire is run from the top of the operating coil to the dashboard switch and a second, secret switch serves as additional protection. While ignition coils differ in shape and in electrical hookup, the principle of this wiring scheme may be applied to practically any car. No detour winding or bridging of the switch, not even the possession of the proper switch key, will be of the slightest help to the thief or unauthorized user as long as he remains unaware of the second coil.

## Poultry Watering Trough

Old auto casings may be used to advantage in the poultry yard by cutting holes



Using Old Auto Casings as Watering Troughs for Poultry

through one side of them, placing them flat on the ground and filling them with water. The holes are readily cut with a saw. Do not cut through the beads of the casing and cut only halfway down the tread, as shown in the drawing. The two beads of the casing lie close together, which keeps out most of the dirt.

## "Swinging Darkey" Toy Amuses Children

Although the principle of the toy shown in the illustration is not new, this adaptation is quite novel and will prove popular with the youngsters. It consists of a comic head cut from a magazine and glued to a piece of stiff cardboard. This is mounted on a small block of wood, a length of wire and a weight are attached to the block as indicated, and wire pins are provided under it to serve as pivots. The wire holding the counterweight must be bent so that the head will stand upright when the device is set on the table. A fishline sinker may be used for a counterweight. A swinging movement is imparted to the counterweight and will cause a similar rocking of the head.



This Swinging Head Proves Popular with the Youngsters



Sash Hung with  
Screen Hinges Removed and  
Replaced Easily

### Hanging Sash on Poultry House

Sash on poultry houses should be hung so that they can be easily and quickly removed or replaced. A good method of doing this is to use screen or storm-sash hinges, as shown in the accompanying illustration. With these hinges the removal of sash is but a few moments' work. They may be taken down in the morning and replaced at night, or in case a storm comes up, with little trouble.—Rufus E. Deering, Clements, Kans.

### New Use for Clothespin

Tubes of tooth paste or shaving cream usually find temporary resting places on the window sills or on shelves in the medicine cabinet and in either place they are often mashed. To put the tubes where



they can readily be seen, and on the theory of a "place for everything and everything in its place," it was found that clothespins make satisfactory tube holders. The old-fashioned type of wooden pins should be used for

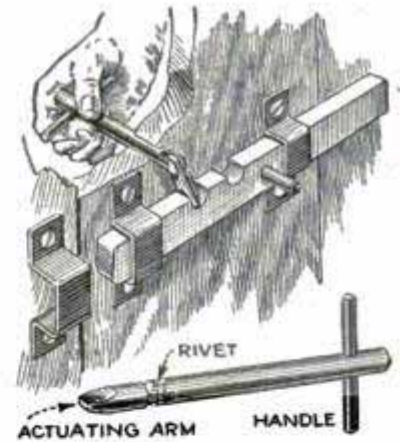
this purpose, care being taken to select straight-grained ones. The head is cut off and a hole drilled through the shank for a woodscrew. A coat of white paint, and a minute's work fastening the holders to the cabinet, or wall, complete the job.—Chester Lyndelle, Trenton, N. J.

### Hot-Water Bag Makes Portable Gas Can

An old hot-water bag will be found very useful to the motorist. It takes up little space under the seat or in a door pocket, and, in an emergency, can be used to carry sufficient gasoline to enable the driver to reach the nearest service station. It can also be used to carry water for the radiator, or for any other purpose for which a pail is usually carried.—Maynard Bodley, St. Paul, Minn.

### Novel Door Latch

Resting on two flat-iron brackets, the door bolt shown in the drawing is actuated by means of a key that engages in notches cut in the top. A small round hole, about  $\frac{1}{4}$  in. in diameter, is the only outside clue



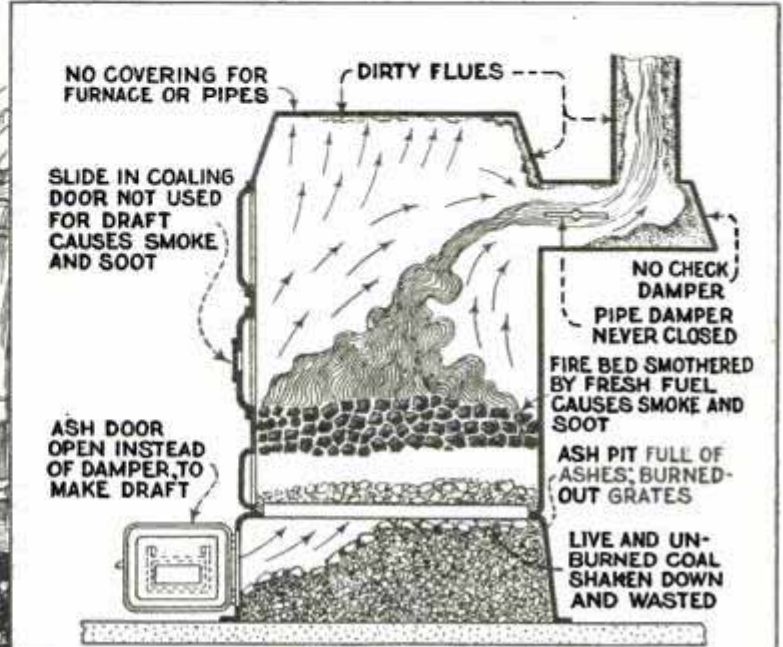
to the presence of the bar. The brackets are bent to the shape shown and screwed to the door, and a similar bracket is screwed to the door post to catch the bar when the door is locked. The key is made in two parts, cut from  $1\frac{1}{4}$ -in. stock. These are joined together with a rivet, one part being slotted to a depth of  $\frac{5}{16}$  in. and wide enough to fit freely over the shank formed by the other, the rivet being placed where it will permit freedom of movement. The key is pushed through the hole in the door; the end drops down engaging one of the notches in the bolt and, as the key is turned, will drive it one way or the other to open or lock the door. The shank of the pivoted end should be rounded on top to permit withdrawal of the key. A stop pin is screwed into the bar to prevent it from coming out of the brackets.—John McNeish, Boston, Mass.

# How to Burn Soft Coal

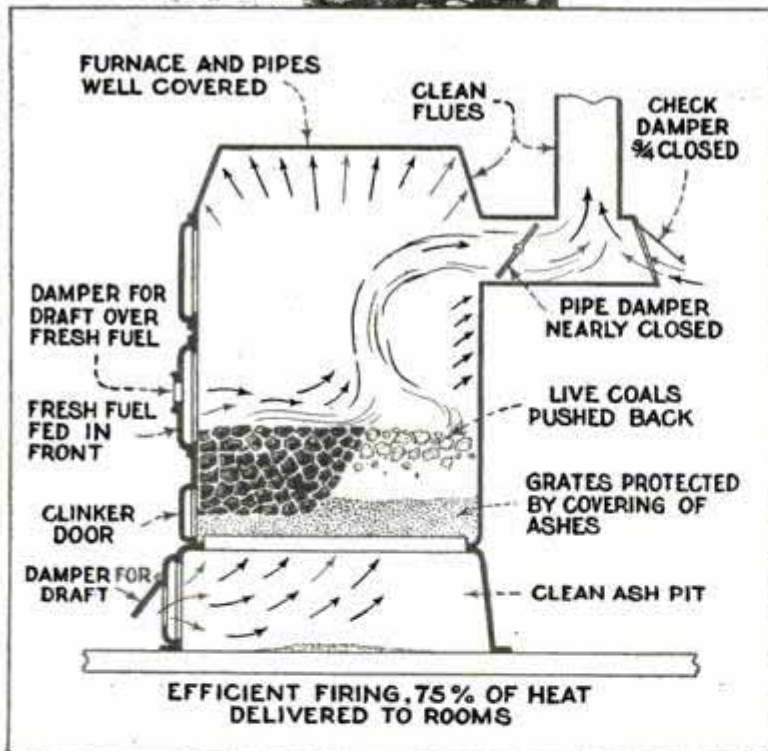
**T**HE first rule in feeding the furnace with soft coal is never to cover the fire completely with fresh fuel. The fresh coal may be placed at the front or the rear of the firepot, at one side or the other, but should never cover more than two-thirds of the fire. A great deal of the heat contained in soft coal is in the form of combustible gases, and if these are allowed to pass off unconsumed much of the heat value of the coal is lost. It is just like turning on the gas in the stove and failing to apply a match, then expecting the gas to heat a pot on the stove. By placing the



fresh coal in front, so that the gases must pass over the bed of live coals on their way to the chimney, but, as stated before, the fresh coal can be fed at the rear, or at either side of the furnace, depending on the design, and on the route the gases have to take to reach the smoke pipe. Another lesson may be learned from the



WASTEFUL FIRING, 25% OF HEAT DELIVERED TO ROOMS



gas stove. We know that a gas flame will not burn properly without the correct amount of air, and that a flame that has insufficient air is not only a slow heater, but is also a smoky one. It is exactly the same with soft coal. The gases coming off the coal need to be mixed with air in order to burn and give up their heat, and the way to supply this air is to open the slide damper in the feed door so as to admit air above the fire. The degree to which this slide is opened depends on the coal and the condition of the fire, and must be found by experiment, but, in general, it will be found

fresh coal over a part of the fire only, the live coals that are exposed in the other part of the fire act as a match to light the combustible gases, and the heat goes to warm the house instead of going up the chimney. The most convenient method of firing is usually to push the live coal to the back of the fire and feed the

advisable to open it wide immediately after feeding the fire, and to shut it down partly or completely after the coal has become well ignited. Most soft coals need the air supply through the feed-door slide as long as they are black. When they are all red, of course, they no longer need the additional air.

By paying attention to both of the foregoing rules, smoke and soot can be prevented to a large extent; soot cannot be entirely prevented, of course, and the flues and other heating surfaces should therefore be given regular attention, to keep them as clean as possible. Soot insulates the heating surfaces just like asbestos, and this wastes coal, so it pays to give these surfaces regular cleanings, just as often as it can be done.

Soft coal is more easily ignited than hard, so less draft is usually required. Too much draft will make gas faster than the capacity of the combustion chamber to ignite it, and so waste fuel; so it pays to experiment with the draft, reducing it as much as possible without interfering with the proper burning of the fuel. At the same time, a strong draft is very necessary at times, when the fire has accidentally been allowed to become low, for example, and the house is cold, and the furnace should be capable of producing a strong draft when needed. All leaks around the furnace and smoke pipes, therefore, should be stopped.

In order to obtain better control of the rate of burning of the coal, some ashes

should be left on the grates. Try to operate the furnace with the ashpit damper closed and the feed-door damper open; if this will not work, open the ashpit damper just as little as will give the desired results. Don't shake the fire until it is absolutely necessary to brighten it, and stop shaking as soon as the first live coal drops through the grate. When cleaning the ashes from the sides of the firepot use the poker, or slice through the clinker door under the fire, not through the fire door.

Keep the firepot full of slowly burning fuel. This will produce more heat than a thin fire burning fast, and will require less attention. Arrange for some sort of water evaporation in the house, because moist air at 65° feels as warm as dry air at 75, and is more healthy. When using Pocahontas coal, moisten it slightly before firing, as this helps to coke the coal and produces better results. Don't bank a fire with ashes or stir up the fire bed so that ashes are turned over the unburned coal, as this will cause the ashes to melt and form clinkers.

Study the illustrations, and follow the hints contained in them.

### Baffling Chicken Thieves

A Nebraska poultryman, who had one disastrous experience with chicken thieves, decided to prevent a recurrence of the loss. Feeling that an ounce of prevention was worth a



Old Pipe, Held in 2 by 4-in. Brackets, Protects This Poultry House against Thieves

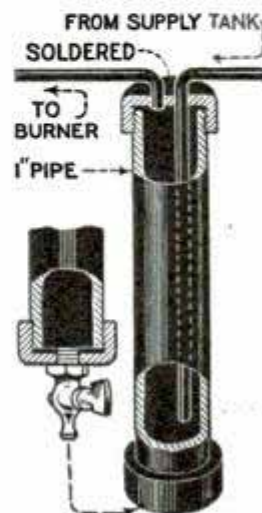
pound of cure, in this case at least, he barred all the windows.

A quantity of ½-in. pipe was purchased very cheaply at a fire sale. This was cut and jointed to form a number of sections of the proper length, and spaced, 6 in. apart, over every window on the place. The photo shows a typical installation. Pieces of 2 by 4-in. stuff, bored for the pipe, are bolted between the sash and at the ends, the bolts running through the sides of the building.

The pipes can, of course, be cut with a hacksaw, but before thieves could cut through any considerable number of the bars, their presence would undoubtedly be known.—D. R. Van Horn, Walton, Nebraska.

### Sediment Trap in Oil-Burning Supply Pipe

General adoption of oil burners for cook and heating stoves and furnaces brings up the problem of using cheap-grade oils without necessitating frequent cleaning of the burners. This may be accomplished by the installation of a sediment chamber at some point along the pipe line between the supply tank and the burner. The chamber shown in the illustration consists of a length of 1-in. gas pipe with caps at both ends; the upper cap being drilled to receive the two ends of the cut supply pipe, which are inserted and soldered in place as shown. In operation,



oil flowing from the supply tank enters the chamber near the bottom and in rising to escape through the outlet it leaves water or solid sediment possibly present in the oil at the bottom. By shutting the supply valve at the tank and removing the cap at the bottom of the sediment chamber occasionally the accumulated water or dirt may be removed, or the draining may be done by fitting the bottom cap of the chamber with a petcock. This eliminates the need of a wrench to remove the cap and also the necessity of closing the supply valve each time.

### Preventing Rattle of Brake Rods

Hand-brake rods on Ford cars sometimes strike against the running-board supports and rattle every time the springs are compressed. This can be stopped by slipping a piece of loom, such as used as insulation by electricians, over the brake rod. The best plan is to use a length almost reaching from the rod support to the clevis at the rear end. The loom can then be turned around when worn in one spot.—E. T. Gunderson, Jr., Humboldt, Iowa.

### Homemade Paper Eye Shield

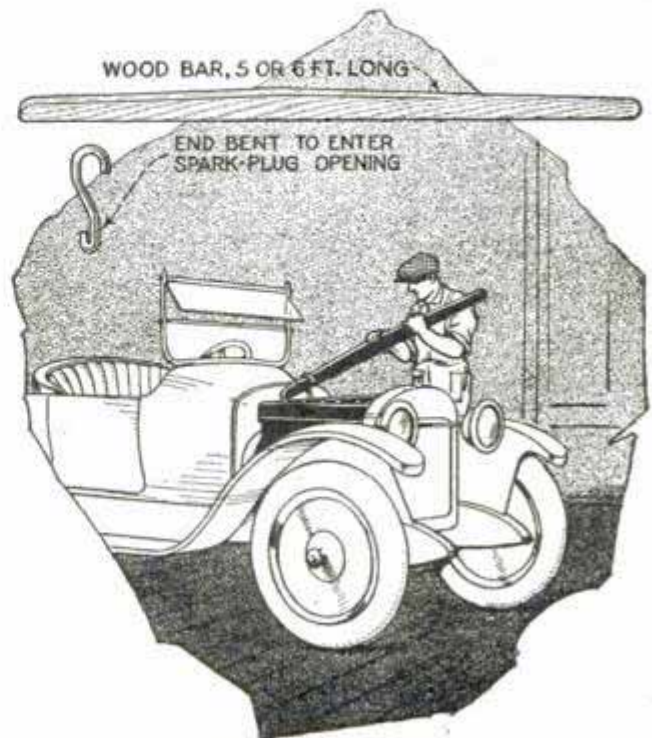
About a year ago I was troubled with a bad eye which could not bear daylight and was so tender that a bandage was uncomfortable. Since I wear glasses all the time, I could not work without them. I tried colored glasses but too much light was reflected from the back side of the lens. Necessity caused me to construct the eye shield shown in the illustration.



The material used is black paper, which can be obtained at any photo-supply shop. A small wire eye is glued between two thicknesses of the paper and is slipped over the ear piece or side bar of the glasses and a slot is cut diametrically opposite the eye to fit the nose bar or bridge. A segment-shaped piece of the paper, pasted upright to the outer, or wire-eye, edge of the shield, prevents light from entering from that side.—Noble D. Gilkeson, Kansas City, Mo.

### Loosening the Engine-Cylinder Head

A cylinder head, put on after shellac has been applied to both sides of the gasket,



Removing Cylinder Head of Automobile Engine with Prybar Usually Saves Gasket

may be very difficult to remove, especially if the gasket must be used again. Driving a wedge under one edge is a practice which invariably destroys the gasket. Slacking off on the bolts and starting the engine is also most certain to blow the gasket, and the mechanic is often puzzled for a good method of removing the head with the least damage. In the illustration a prybar method of removal is shown. Simply provide an S-shaped hanger, one end of which can be passed through the spark-plug holes, while a bar engages the upper hook. The tightest cylinder head will come off readily, and the gasket can, in most cases, be used again.

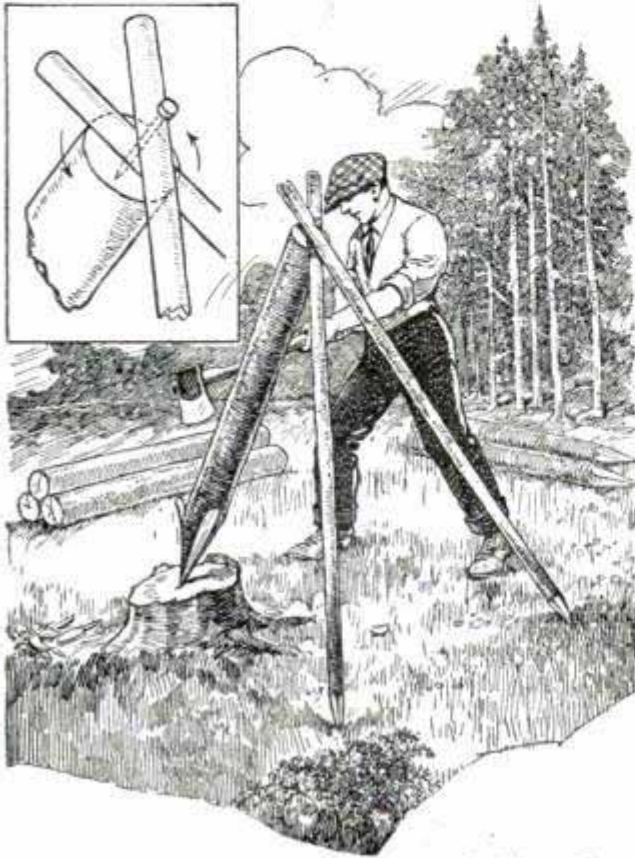
### Making Metal Buttons

Serviceable metal buttons can readily be made from upholsterer's nails by bending the shanks to form eyes. This can be done by means of a pair of round-nose pliers. Buttons of this kind are handy for various uses and will last indefinitely.—C. M. Wilcox, Torrington, Conn.



### Sharpening Fence Posts

Sharpening fence posts usually requires one man to hold and turn the post while another wields the ax. This task may be



Novel Holder Facilitates Sharpening of Fence Posts

done by one man just as easily, if the simple holder shown in the illustration is used. It consists of two stout stakes hinged on a bolt, which projects 3 in. on one side and is sharpened to a needle point at that end. In use, the legs of the holder are opened and driven into the ground to support the device at a slight angle. The post to be sharpened is raised against the holder so that the bolt can be driven into the center. As one side of the post is cut down to the desired mark, it is turned on the bolt until the sharpening is completed.

### Breaking In a New Pipe

No matter if it be a half-dollar or a ten-dollar one, new pipes have to be broken in and you know how bitter, woody and unpleasant the taste of a new pipe is until you have smoked it long enough to get it "crusted." Here is a simple way to break it in and also add to its sweetness right from the start. When the bowl is new, moisten the inside of it with a little water, and then fill the bowl with ordinary granulated sugar and immediately dump it out again. A thin film of sugar will ad-

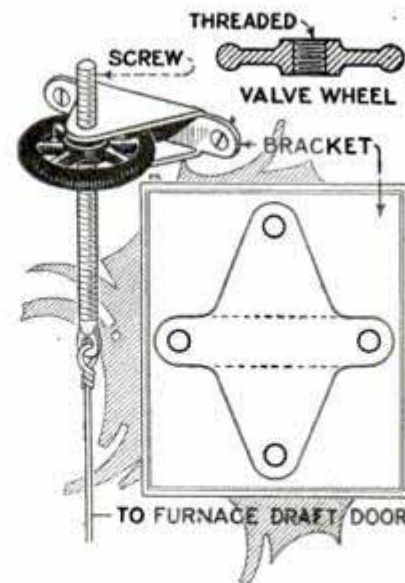
here to the inside of the moistened bowl; now, without knocking this film out, fill the pipe with tobacco and light up. That bitter, woody taste will be gone and the crust, which adds to the mellowness of the pipe, will form quickly. This process may have to be repeated several times.—Harry A. White, Davenport, Iowa.

### Repairing Leaky Eaves Trough

It sometimes happens that a section of eaves trough rusts through in one place, while the rest of it is still in good condition. This can easily be repaired as follows: Cut a piece of canvas large enough to cover the hole, coat it with tar and press it down over the hole. Then coat the patch with tar on the inner side and let it dry. The trough should, of course, be well cleaned and dried before applying the patch.—W. O. Hendrickson, Argyle, Wisconsin.

### Adjusting the Furnace Draft

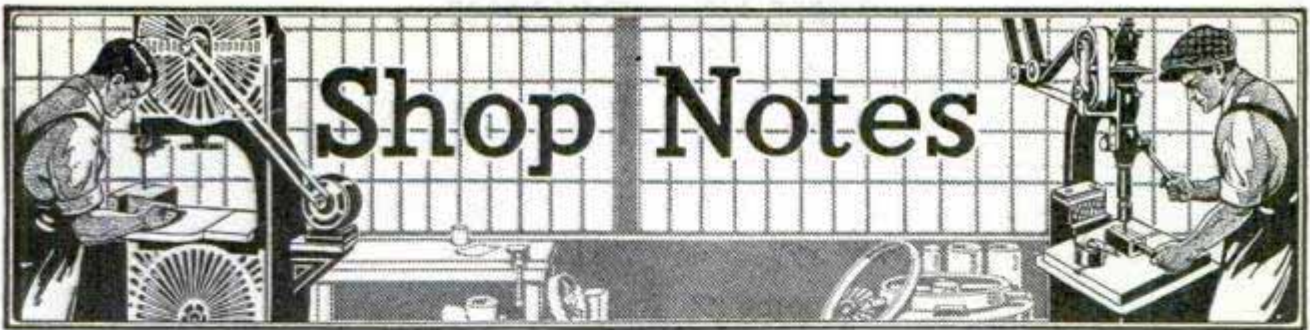
Where remote control is used for regulation of furnace drafts, it is usual that some form of notched segment, series of pins for a ring or other means for holding the weight at any desired place is used. An arrangement which allows closer adjustment of the draft is shown in the illustration. It consists of a metal bracket made to support a small globe-valve wheel. The wheel moves on a threaded



rod, which is in turn attached to the draft-door cable. The cable is led up from the furnace room to a convenient location, using pulleys to guide it if required. By turning the wheel the draft door can be raised or lowered by such small amounts that a uniform temperature can be maintained more easily.—G. A. Luers, Washington, District of Columbia.

Plated brass and plated iron can be distinguished from each other by means of a magnet; the magnet will cling to iron.





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# Making a Convertible Toolpost Grinder

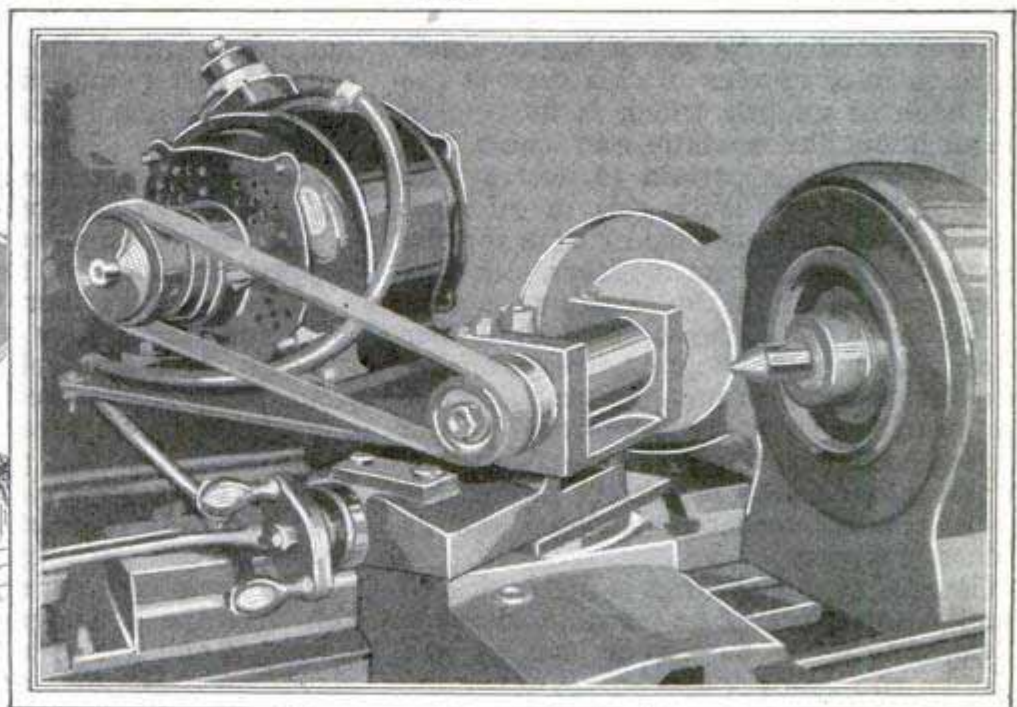
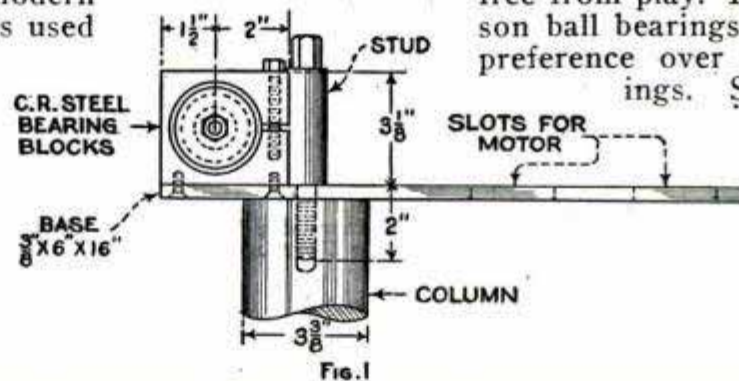
By RAY F. KUNS

**T**HE machine shown in the illustrations was designed to serve in a machine shop where a great variety of automobile and general machine-shop repair and construction work is conducted. Two years of daily service, in which time a number of grinder wheels have been worn out, would seem to prove that the design is good. The only expense or repairs needed in this time, outside of the wheels, has been the replacing of the belt.

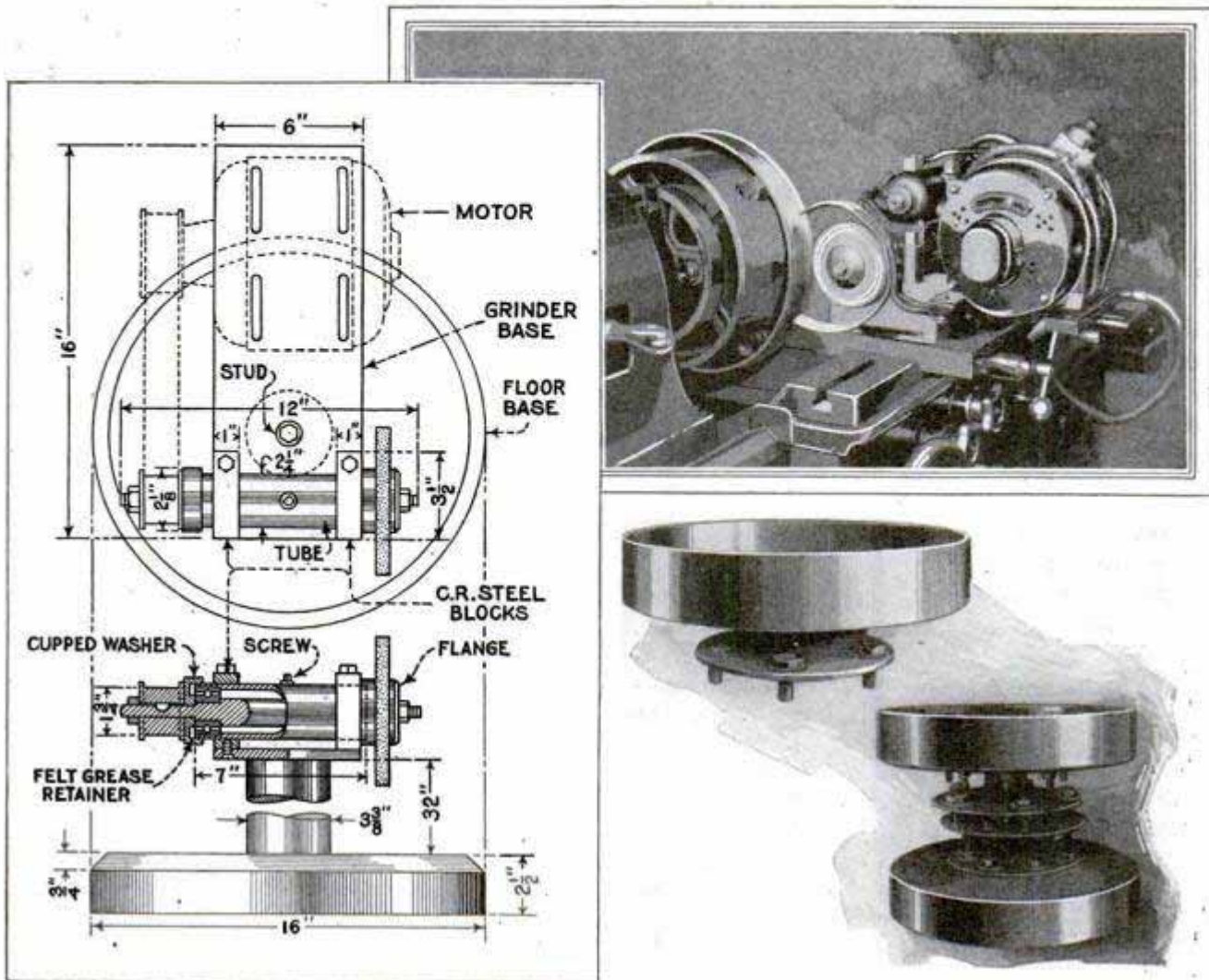
In automobile work as well as in many other instances in our modern shops, heat-treated steel is used

to such an extent that grinding is becoming almost indispensable, if the materials are to be machined. It is necessary to grind after heat-treating, if the work is to be true and free from the inequalities occasioned by the hardening and tempering process.

Accurate grinding work requires an accurate grinding head and a machine free from disturbing vibration. Of necessity the wheel must turn at high speed, and bearings must be accurate and entirely free from play. For this reason ball bearings were given preference over plain bearings. Service has



Upper Left, the Grinder Mounted on the Column for General Grinding; Right, Used to Grind Lathe Centers



Left, General Details of Grinder and Column Assembly; Upper Right, Grinding Brake Drums; Lower Right, Some Reground Drums

proved the wisdom of the choice, since the bearings needed attention only once in a twelve-month period, and are still free of all play.

An essential to the use of ball or roller bearings in a grinder of this type is the exclusion of all grit which is floating in the air about the machine, and which, if it gains entrance, is certain to destroy the bearing quickly. With this in mind, it was decided to use a pipe or tube for the support of the ball-bearing races, and thus insure alinement of the bearings as well as exclusion of all dust from the inner sides. To prevent the dust from working into the bearings from the outer sides of the bearings they are protected by the cupped washers which come over the ends of the tube. Space is left, as shown, for a felt grease retainer which also acts as a dust excluder.

The size of the bearings is not indicated exactly, since it may be possible to adapt salvaged bearings to this service, as was done in the original machine. With the bearings at hand, the tube is selected to conform to them and machined to size on

the outer surface, the ends being bored out to receive the bearing races, which must be just a neat sliding fit. The shaft also must be designed to fit the bearings and the journal for the bearing cone must be just a snug sliding fit. A piece of a vanadium-steel axle was used for the original shaft. This is more difficult to machine, but is a most dependable material and one usually available without cost.

The bearing cones take the thrust of the cupped washers as they are forced on ahead of the grinder wheel on the one side and the pulley on the other. A flange of conventional pattern is made to hold the grinder wheel. The threads on the wheel end of the shaft are right-hand, while those on the pulley end are left-hand. It is a good plan to place a key in the pulley and shaft as an additional safeguard against turning.

As suggested by the title of this article, this machine is designed to serve double duty. When not in use on the lathe carriage, it is mounted on a column at one end of the lathe, where it is readily available as a tool-bit grinder and for other

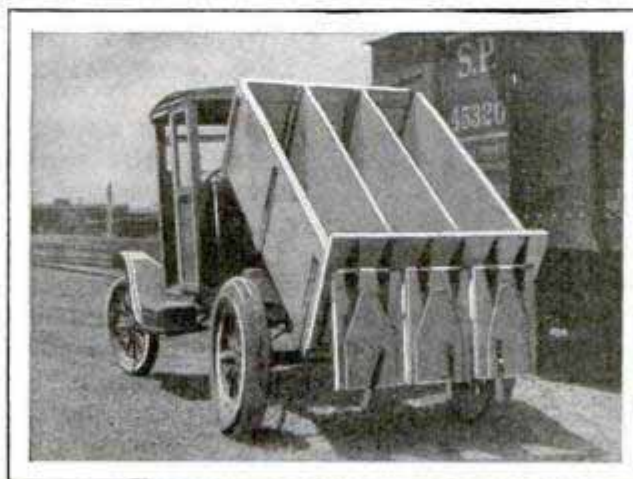
light work. To facilitate this change a stud is made of such length that the upper end extends above the body of the grinder head. This stud is used to clamp the base of the grinder to the top of the column or to the lathe carriage. The base is made from  $\frac{3}{8}$  by 6-in. machine steel. The grinder head is supported in blocks of steel on the front end, and the other end is slotted to receive the motor.

The cold-rolled steel blocks that carry the tube are bored out to the size of the tube and slotted at the rear side. A screw is used to lock the tube into the blocks, after they have been assembled onto the base by means of two taper-head machine screws.

The motor is  $\frac{1}{2}$  hp., and is fitted with a pulley to drive the head at 3,000 r.p.m. The slots in the base of the grinder are made to conform to the base of the motor. This arrangement allows ready adjustment of the belt used to drive the machine. A Ford fan belt was selected for this task, since it is readily obtained. The rubber-composition type is preferred to the leather belt because it is lighter and more flexible, and consequently less likely to set up vibration.

The column was made from a  $3\frac{1}{2}$ -in. round machine-steel bar. The column base was machined from an old engine flywheel. The weight of these items helps to give rigidity when the grinder is used on the column. The base might have been made from 3-in. gas pipe mounted on a large brake drum and the entire column then turned over and filled with concrete to give it weight. When mounting the head on the lathe carriage, a nut to receive the stud is used.

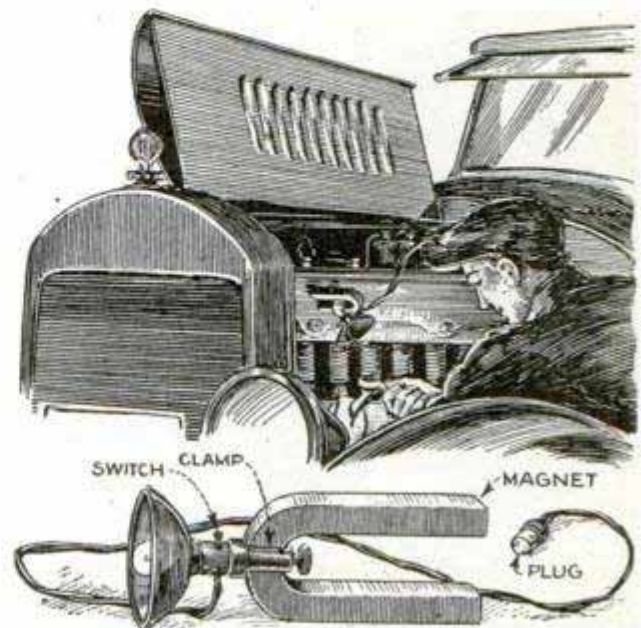
The accompanying illustrations show some of the uses to which this little grinder has been put. Center grinding is always needed. Some brake drums may be turned in the lathe and again they must be ground as indicated in this case. By mounting the rotating knives or cutter heads of lawn mowers in the lathe and supplying a rest for the blade, extremely accurate grinding may be done on them with this machine. It is likely, too, that the cutting bar can be ground with it.



Truck Body Divided into Three Parts Permits Even Distribution of Loads

### Magnet Holds Trouble Lamp

When making repairs or adjustments on an auto engine at night, it is rather difficult to hold the lamp over the work properly. A handy lamp holder can be made



Trouble Lamp Held to Auto Engine by Magnet and Detail Showing Construction

from an old magneto magnet, which can be picked up at almost any junk shop. The magnet will adhere to any iron or steel surface, and by having the lamp adjustable, it can be swung around to any desired position.—Edwin E. Burgess, Jr., Baltimore, Md.

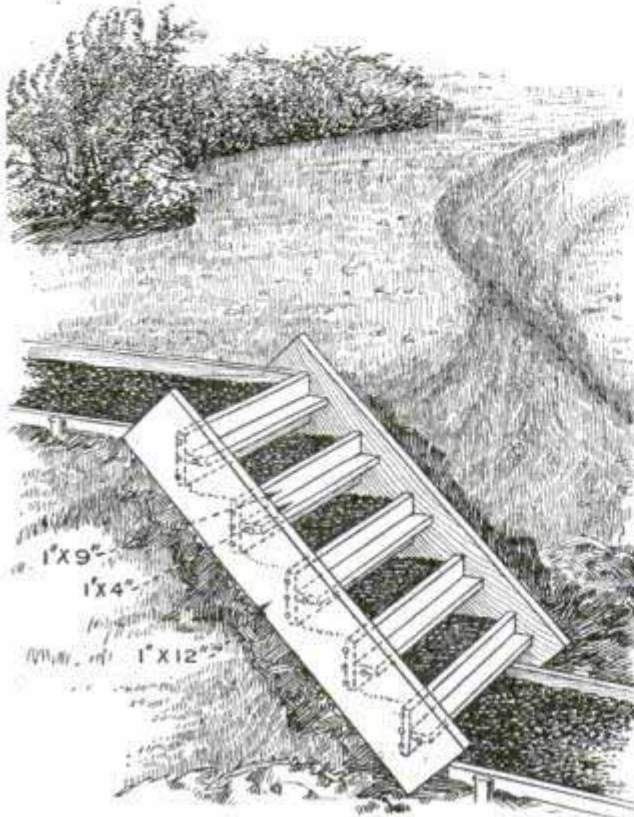
### Homemade Dump Truck Distributes Load Evenly

Where long stretches of highway are to be graveled at one time, a truck with a dump body having three divisions, each holding one third of a yard as shown, has been found a time and money saver. Common one-ton truck chassis are used. The body is bound with flat iron and has three compartments, each of which has a hinged door at the rear. The doors are of simple construction, each being provided with a knife lock, which permits dumping a load in three different places. This insures even distribution of gravel.

Blake C. Van Horn  
Waltm. Huber

### Time-Saving Forms for Concrete Steps

When making forms for concrete steps, it takes much time to notch the stringers and nail on the tread strips. This work



Convenient and Timesaving Forms for Concrete Steps Are Easily Made

can be eliminated by using the type of form shown in the illustration. As is evident, no diagonal cutting of lumber is necessary. The sides consist of 1 by 12-in. stringers, and 1 by 9-in. material is used for the risers. These pieces are cut to equal lengths so that they require only spacing and nailing. Lengths of 1 by 4-in. stock are used to brace the risers. After the concrete has been poured and troweled, a piece of roofing or sheathing paper is tacked over the whole incline. This will carry off rain and prevent the steps from being used until the concrete is sufficiently hard.—G. A. Luers, Washington, D. C.

### To Save Honey Bees

According to the claims of experienced bee keepers, grass or weeds, growing in front of hive entrances, causes a heavy loss of bees during the honey season. The bees returning to the hive overloaded with honey or pollen frequently fall before the entrance and, alighting in the thick grass, become chilled before they can crawl or fly into the hive. To prevent this one bee keeper has placed pieces of tar paper

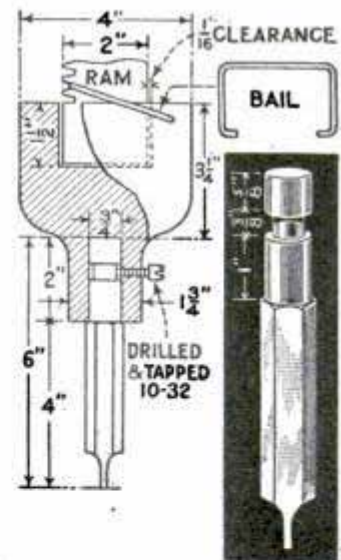
or discarded linoleum upon the ground in front of the hives. These keep down and prevent the growth of grass or weeds and the bees settling upon them are exposed to the warmth of the sun where no obstruction is offered to hinder their flight into the hive after they have rested.—G. E. Hendrickson, Argyle, Wis.

### Small Bottle Useful to Motorist

A bottle small enough to be let down into the gasoline tank with a piece of string tied around the neck is very handy to carry in the auto tool chest when out driving. Should a tube have to be patched, gasoline is recommended as a cleaner for the part of the tube to be repaired. Also, if a spark plug needs cleaning, gasoline is used to do a good job. Greasy hands can also be cleaned very easily with gasoline, and the small bottle provides an easy method of getting it out of the tank.—S. N. Swenson, Harris, Minn.

### Screwdriver for the Arbor Press

In removing large screws, especially those of the flat-head type, the main difficulty is keeping the bit of the screwdriver in the slot, and the workman resorts to the use of a hammer and punch. This, of course, produces a very unworkmanlike job. However, the illustration shows a screwdriver that will take any size of screw on account of the detachable bit, and the fact that it is secured to the ram by a bail arrangement allows very fast use, the screwdriver following the up and down movement of the ram.

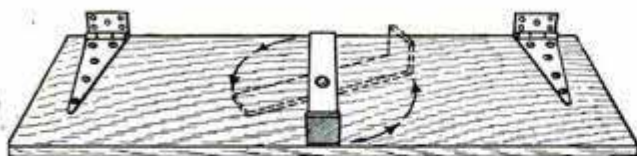


A wrench is put on the hexagonal section of the driver which turns in the fitting, the 10-32 screw simply holding the bit from dropping out. For use in removing the pole-shoe screws on motors and generator frames, a short piece of pipe can be put through the frame to keep it from turning, and the frame itself can be placed on a V-block made by sawing two triangular pieces out of a 12-in. section of channel iron. The body should be turned out of steel, allowing a clearance of  $\frac{1}{16}$  in. be-

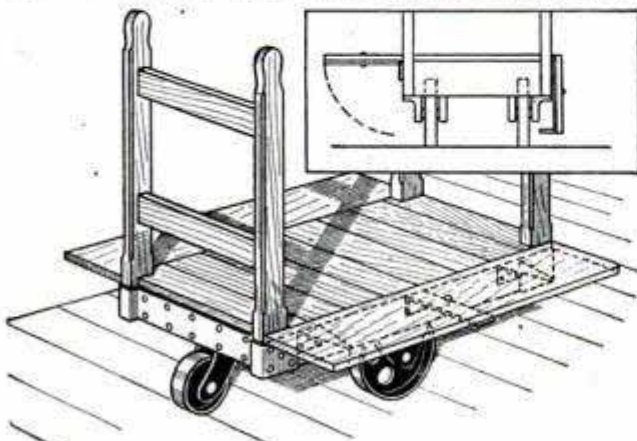
tween it and the ram. The bits, which were of different sizes to fit various screw slots, were made from old chisels that had their temper drawn, and were chucked in a lathe and a 2-in. section turned down and also slotted. The end of the bit was ground to fit the screw slot, leaving a part of the hexagonal for putting on a wrench. When removing or replacing screws the press-operating arm is used to keep the bit in a screw slot. The bail, made of No. 18 gauge steel wire, fits through the rack of the ram and into two holes in the side of the body of the fitting.

### Collapsible Sides for Shop Truck

Fitted to a shop truck the folding sides shown in the illustration serve a double purpose: First, they prevent the load from scattering and second, they provide a gauge to limit the width of the load. When extended, the width should be such that the loaded truck will pass through any doorway in the building. Obviously, if the loading is restricted to this width there will be no danger of the load jamming or need of removing and rearranging it before it will go through. On the other hand, a truck nearly as wide as the doorways is not always convenient for other purposes, so the auxiliary sides are attached to the truck with hinges so that they can be folded down. In the center a strip of metal is pivoted, one on each side. These strips are bent at right angles at one end. When the sides are in use the strip is turned so that the bent portion rests against the truck; when letting them down it is reversed.



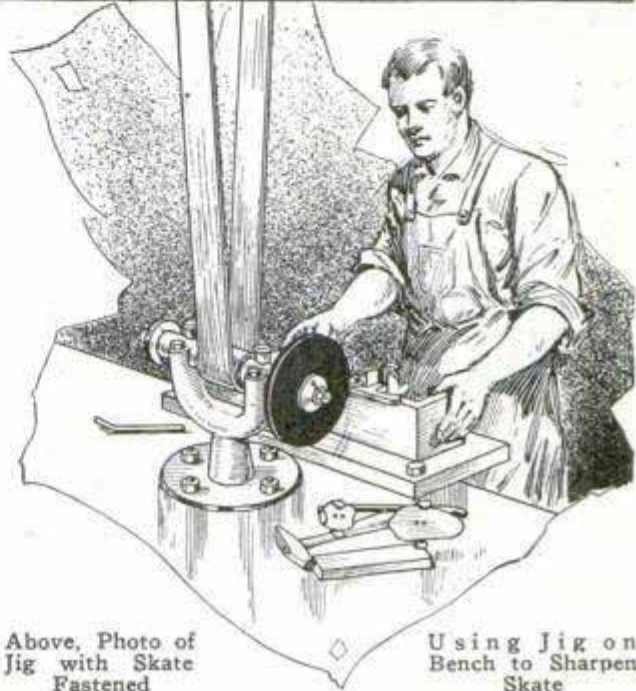
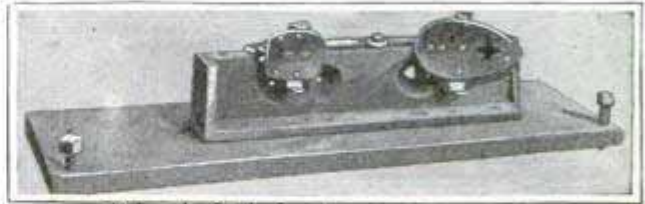
BOTTOM VIEW OF WING SHOWING ITS CONSTRUCTION



Collapsible Sides on Shop Truck Serve as Gauge to Measure Width of Doors

### Skate-Sharpening Jig

While large machine shops usually have a regular supply of jigs for holding all the various models of ice skates for sharpen-



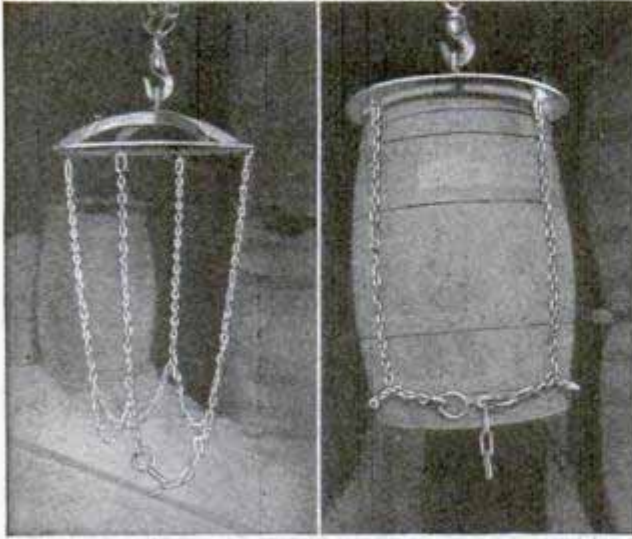
Above, Photo of Jig with Skate Fastened

Using Jig on Bench to Sharpen Skate

ing, the small shop has to work along with a makeshift or a quickly assembled jig. The jig shown herewith was designed by the owner of a small shop and will take skates of all sizes and types, enabling him to do a first-class sharpening job. The base consists of a heavy steel plate, 30 in. long, with a bolt at each end to act either as supports or to permit fastening permanently to the bench. The jig itself is a piece of angle steel somewhat longer than the largest-size skate. The vertical side rises 4 in. above the base and is drilled and tapped with holes, all along the edge, at about 1-in. intervals. One vertical end is drilled and tapped in the same way and a few holes are tapped in the vertical side. A skate is arranged as shown and clamped in position, with bolts and washers over the blade at the most convenient points. The jig is placed on the base, which has previously been adjusted in front of an emery wheel. By pushing the blade against the wheel and moving the jig to right and left the entire blade is ground evenly. The size of the wheel determines whether the blade will be flat or hollow-ground.—L. B. Robbins, Harwich, Mass.

*Used in large works,*  
*Le Poul de nemours Co.*  
 Simple Safety Attachment  
 for Hoisting Barrels

*Wilmington Del.*  
 Barrels are hoisted without risk of dropping them with the simple attachment



Simple Safety Sling for Hoisting Barrels Prevents Accidental Dropping of Burden

shown in the photos. It consists of a flat-iron ring large enough to fit over the head of the barrel, and heavy chains, which are slipped over the side and hooked securely around it near the lower head, so that the barrel cannot get loose.—R. G. Thackwell, Chicago, Ill.

### Small Dams Prevent Creek-Bank Erosion

The erosion of creek banks and the resulting lowering of the water level which occur during flood periods, are especially undesirable in municipalities because the sewer outlets are uncovered with undesirable results. It can be prevented by building small concrete dams along the streams

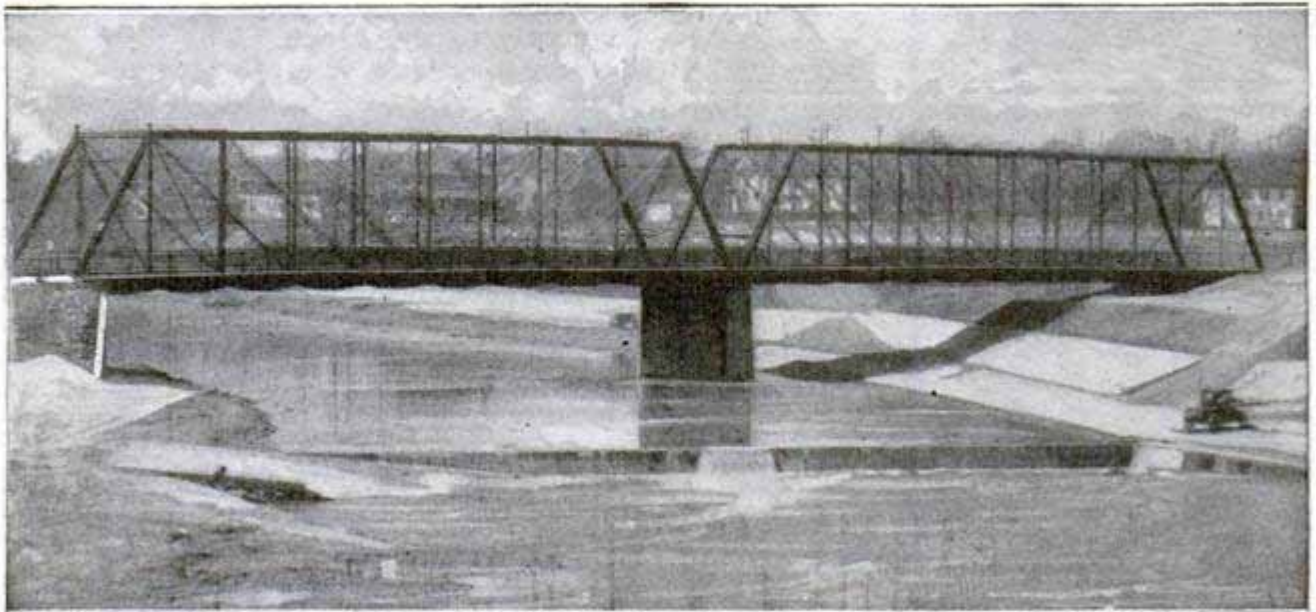
as shown in the photo. The dams are placed from  $\frac{1}{8}$  to  $\frac{1}{4}$  mile apart, depending on the slope of the stream, and are built just high enough to keep the bottom of the channel covered with water from bank to bank, during periods of extremely low flow. Concrete aprons, several feet wide, are built on the downstream sides to prevent damage from undermining.—Ivan E. Houk, Denver, Colo.

### Proper Use of Pine Siding

Be sure all siding is thoroughly dry before installation. Do not put siding on walls immediately after a rainstorm, but let the sheathing and framework dry thoroughly first. To fail in this may mean loose nails, open joints or buckling of portions of the siding. The proper lap for bevel siding is as follows:  $\frac{3}{4}$  in. on 4 in.; 1 in. on 5 and 6 in.;  $1\frac{1}{2}$  in. on wider stuff.

Siding should be cut with a miter saw at all corners. Wherever two pieces of siding join, it is best to use a splice joint. This is accomplished with a miter saw. Joints should be broken with as wide a space as convenient between the joints of overlapping tiers. Where siding butts up against window casings, a square, tight joint should be made. A metal flashing underneath the siding will prevent any possibility of water seeping in. For the finest finish and best work, nails in bevel siding should be countersunk and the depression filled with putty.

Before painting drop or bevel siding containing knots, a coat of thin white shellac should be applied. Siding should be given a priming coat as soon as it is laid, and for widths of bevel siding over



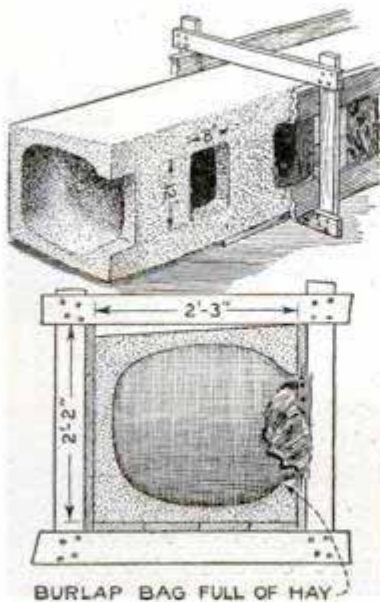
Small Concrete Dams High Enough to Keep Creek Bed Covered with Water Are Placed at Intervals of One Eighth to One-Fourth of a Mile to Prevent Erosion of Banks

8 in., it is advisable to paint the back side before it is put on. After the priming coat, it is well to let the building stand a few days, or as long as convenient, before putting on the finishing coats. This will insure that shrinking will have taken place, and that all surfaces will be properly covered.

There are always areas on the wall of a house where lengths of siding down to 18 in. must be used. Do not demand all long siding from your dealer. Considerable amounts of short siding develop in the process of manufacture and must be disposed of. If the mill man could not get rid of these short pieces, it would be necessary to charge more for the longer ones. Short lengths can also be used to advantage on the porch, on the garage and various outbuildings. At times, an excess of these shorts will accumulate and is sold at reduced prices. If you are in a position to use all short pieces, your dealer may be able to quote a very attractive price on such material.

#### Durable Nests for Poultry Made of Concrete

A simple and inexpensive method of forming the inside of a concrete hens' nest is shown in the illustration. The form is made of burlap, which is sewed in such a manner that it will have the juglike shape indicated. After the burlap form has been sewed, stuff it with rags, excelsior or similar material. Ordinary wooden boxes are used for the outside form. After the bottom of the box has been covered with concrete about 3 in. in thickness, the burlap mold is put in place and concrete is poured all around it. As soon as the concrete has set sufficiently to hold its own weight, remove the packing little by little. It is almost impossible to use wooden molds for this purpose as they cannot be readily removed and will swell after the concrete is poured.—H. H. Siegele, Emporia, Kans.



BURLAP BAG FULL OF HAY



Easily Made Tile Hook Facilitates Laying Drain Tile in Deep Ditches

#### Tile Hook for Deep Trenches

A tool known as a tile hook is valuable for laying tile in deep ditches. The hook consists of a strip of iron, 1 in. wide and 12 in. long, bent so that a 4-in. portion may be attached at right angles to a handle. With this tool the operator stands above the trench and puts the tiles in the correct position.—C. M. Baker, Wooster, Ohio.

#### Never-Slip Gauge Aids Glazier in Cutting Glass

In cutting glass for doors and windows, many glaziers employ a yardstick, or ruler, as a gauge along which to move the cutter. Unless firmly held, such a gauge is likely to move, causing more or less damage and expense. To prevent this, one need only obtain a discarded inner tube and from it cut a strip of rubber of the same length and width as the ruler. With this strip cemented firmly onto one side of the gauge, it will not slip and the worker consequently will be relieved of much strain on the hands or fingers.

### Labor-Saving Snow Shovel

To clear the sidewalk after a sudden heavy snowfall, a janitor lashed a double thickness of corrugated paper board to the



Baggage Truck and Piece of Corrugated Cardboard Make Handy Snow Shovel

front of a small, two-wheeled baggage truck. The sharp steel nose of the truck slid under the snow as easily as under a trunk or box and scraped the sidewalk clean, while the corrugated board widened the sweep and carried big heaps of snow to the curb. In a very short time the broad sidewalk was ready for traffic, and the inventor found time to chuckle at his neighbors, who were still sweating over their shovels.—E. L. Bowman, Evansville, Ind.

### Suggestions on Sash Installation

Sash should be well painted before, or immediately after installation. Dipping in linseed oil before the glass is applied gives a coating that will protect all points against the absorption of moisture. A good priming coat of thin paint should be applied as soon as the sash is in place. The tops and bottoms of the sash should be most carefully painted.

Good service demands that sash be back-puttied, that is, a small amount of putty be placed in the sash before the glass is laid in it, thereby forming an airtight and water-tight cushion for the glass. On the outside of the sash, a mixture of pure linseed oil, white lead and

whiting will give best puttting results. Proper balance and fitting are essential. Weights that are too light or too heavy are often the cause of broken glass. Windows that are fitted too tightly or too loosely are sure to develop annoyances that cause repair expense or replacement.

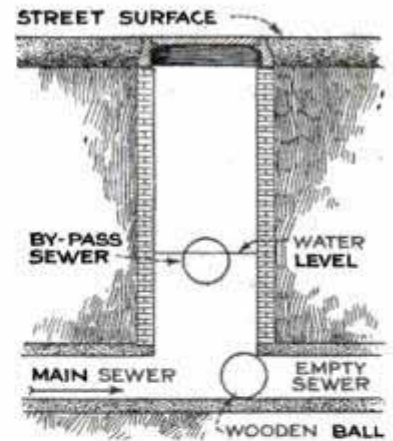
In cold climates storm sash are generally approved and their use in winter assures comfort and coal saving. Window sash last longer by thus protecting them against melting snow and driving rains.

### Sagebrush Mats Protect Canal Banks

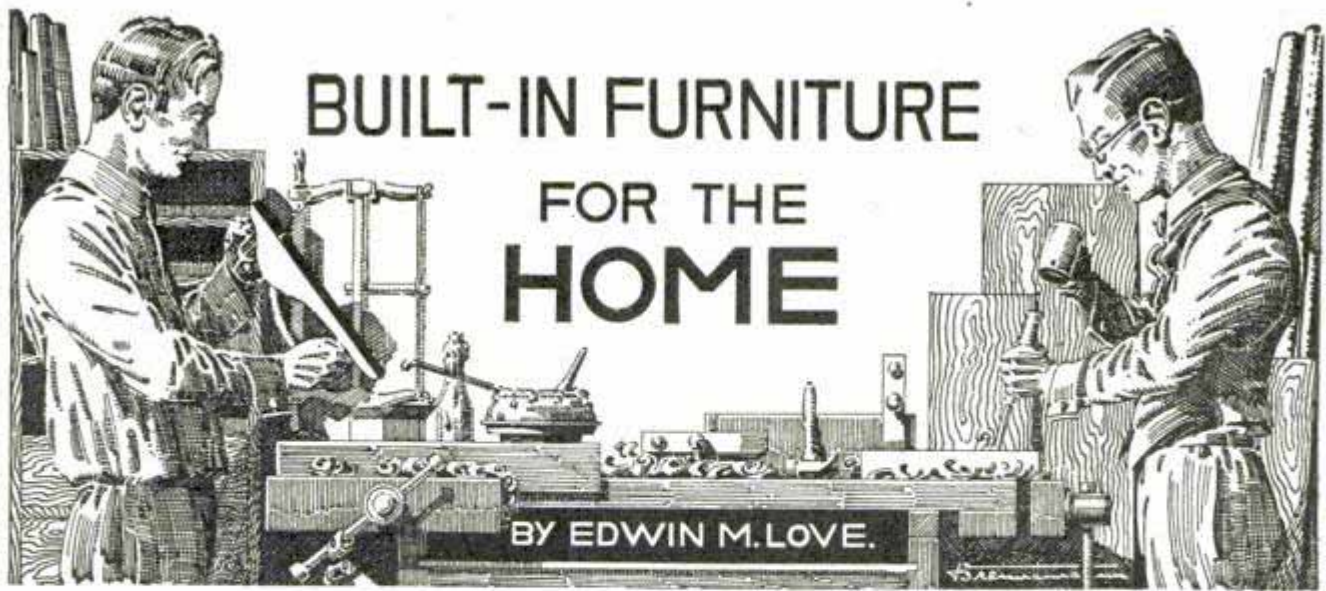
In the arid western states erosion of irrigation-canal banks, due to high velocities of flow, can be prevented by lining the banks with sagebrush mats. Bundles of the brush are laid along the banks, covered with woven wire mesh and fastened securely at short intervals, either by piling large rocks on top of the wire, or by fastening the wire to posts set in the canal bed. The repairs are made during the winter and spring months when no water is carried in the canals.

### Wooden Balls Plug Conduits

Wooden balls can be used to stop the flow in sewers, blow-off pipes through dams, or other conduits where valves have not been installed. The balls are made slightly larger than the conduits and are lowered in front of the openings where the suction of the moving water catches them and pulls them into place, after which they are held securely by the water pressure, which tends to push them into the holes. The ball is dropped through the manhole and will take the position indicated in the drawing. In plugging a pipe through a dam, where the water is often several feet above the opening, the ball is built around a concrete core so that it will sink. Canvas wrapped around the ball helps to seal the small irregularities in the edges of the opening. Such a method was recently used at an irrigation dam where the water was approximately 200 feet above the pipe.







### Part XVI—A Breakfast Nook

**F**ROM many view points a breakfast nook is desirable. Being located in the kitchen, it reduces to a minimum the number of steps required in the preparation of a meal, saving both time and energy for all concerned. It enables the housewife to postpone clearing up the breakfast table, if need be, without exposing it to the scrutiny of early callers, and in addition, if it is well designed, adds to the beauty of the kitchen.

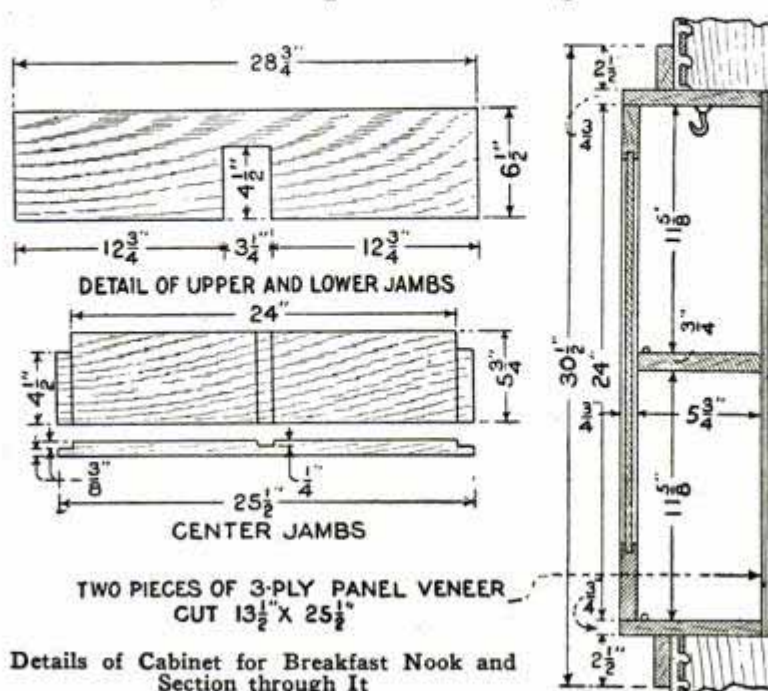
The nook illustrated calls for a recess 3 ft. 6 in. deep and 5 ft. 4½ in., from plaster to plaster, in width, though the design can be adapted to slightly smaller spaces. Glue up the table top from white-pine stock, 1¼ by 6 in., cut a little more than 4 ft. in length to allow for trimming, doweling every 10 in. and laying the heart side alternately up and down, so that warping will be reduced to a minimum. Also glue up stock for the two seat ends, uniting a piece of 1¼ by 10 in. by 3 ft. with one 1 ft. 9 in. long for each, as shown in the layout. The table legs are of 1¼ by 10-in. and 1¼ by 8-in. material, cut long enough for a finished length of 2 ft. 5 in. Surface all this stock before laying out, but keep as thick as the material will allow. Smooth the top by planing

diagonally with a jointer and finishing with the grain. Test for wind (twist) by laying narrow straightedges on each end and sighting over them.

Divide the face side of one seat-end blank into 2-in. squares and lay out the outline of the ends as shown in the perspective. If a bandsaw is available, it can be quickly cut out; but sawing by hand is not especially difficult. Use handsaws and compass saw or a turning saw, and smooth up with spokeshave, wood rasp and sandpaper. One completed end can be used as a template for outlining the other.

Glue up the seat fronts, using 1 by 12-in. stock, cut 4 ft. long. Measure out from the plaster of a side wall 16 in. and up from the floor 1 ft. 6 in., locating the point on the plaster of the end wall. Level to the corner and locate a point ½ in. below it. This gives the backward slope of the

top or seat frame. The slope of the front board is obtained by measuring out from the plaster on the floor 1 ft. 1 in. and connecting with a point on the seat line 1 ft. 3 in. from the side wall. If a stud is found that gives secure nailing, nail up a cleat of 1 by 2-in. stock to carry the seat end, allowing



Details of Cabinet for Breakfast Nook and Section through It



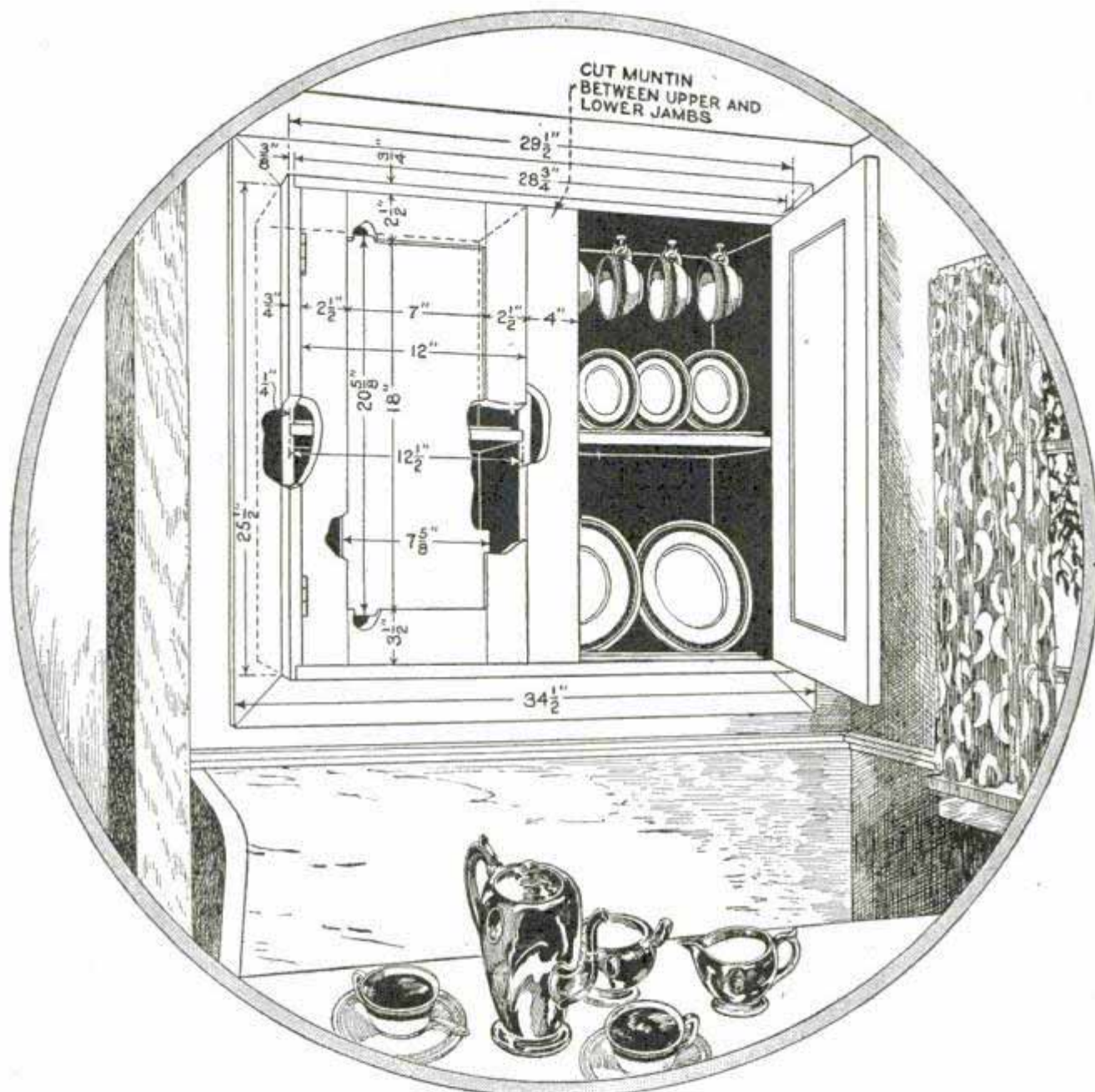
$\frac{3}{4}$  in. for the thickness of the seat, and also a cleat for backing the end of the front. Otherwise cut a solid backing to the correct shape, using glued-up 1-in. stock, and nail in place.

Scribe the back edge of the seat end to the plaster, tack in place, and lay off for cleats on the inside face to correspond to cleats on the end wall, by leveling across and measuring from the back wall. Nail, but do not glue, the cleats, as gluing will cause the end to check when shrinkage occurs. Nail a back-wall cleat of 1 by 2-in. stock to support the back edge of the seat frame. Build the frame of 1 by 3-in. stock, sized to a width of  $2\frac{1}{2}$  in. as shown in the drawing. Lay it on its cleats and scribe the end and back to the walls, giving it a length of 3 ft. 4 in.

Nail a floor cleat with the front edge flush with the front-end cleats. Scribe the front board to the end wall and cut it to

the same length as the top frame. If it is a little narrow, glue and nail a strip to the upper edge. Nail to the wall and floor cleats, lay the seat frame in place and set up the seat end, toenailing it to the floor and nailing the front and frame to its cleats.

Shape a stop cleat of 2 by 3-in. stock, to fit under the front stile of the seat frame, as shown in the section, and make a lid of 1 by 12-in. stock. A cleat of 1 by 2-in. pine, 2 in. from each end on the underside, prevents warping. Hinge the lid with two nickelplated butterfly hinges, and near the front edge mortise in a flush ring lift. If there is any doubt as to the ability of the lid to carry the weight of persons sitting on it, glue and nail a projecting strip of 1 by 2-in. stock under each frame rail to act as stops. Build the other seat in the same way. Finish the table top to a width of 2 ft. 2 in. and a length of 4



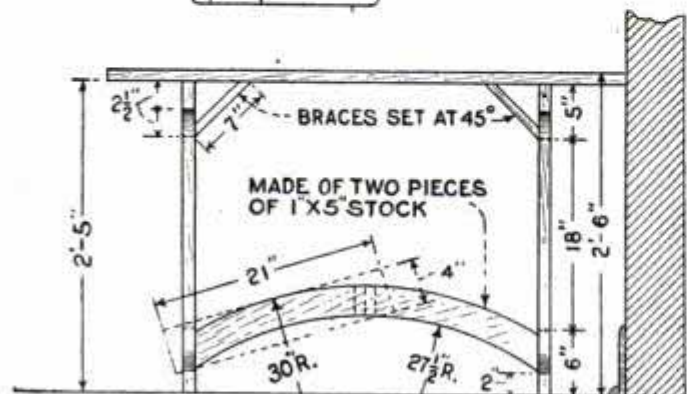
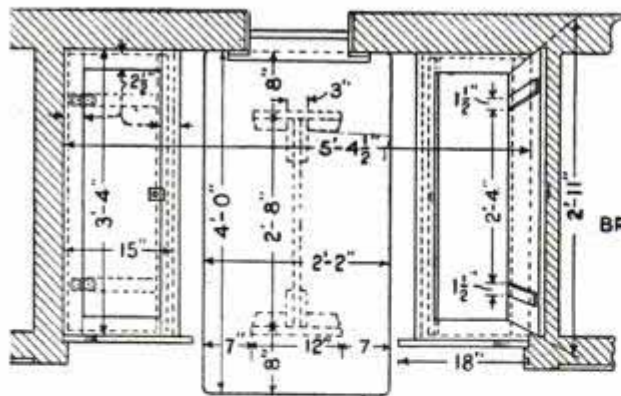
ft., rounding the corners to a radius of 1 in. and sandpapering off the corners of the edges. On the underside, nail two cleats of 1 by 2-in. stock, 12 in. long, set back from the ends 8 in. and centered on the width, for backing for the tops of the legs.

Lay out the legs from a center line as follows: Five inches to right and left for a distance of  $2\frac{1}{2}$  in. from the top end, which has been previously squared with the center line, curve inward to a radius of  $2\frac{1}{2}$  in. for a distance down of  $2\frac{1}{2}$  in.; taper outward for a distance of 1 ft.  $6\frac{1}{2}$  in. from this point to a width of  $5\frac{1}{4}$  in. from the center; curving outward to a  $2\frac{1}{2}$  in. radius for  $2\frac{1}{2}$  in., and finishing 8 in. from the center at a point 2 in. from the bottom end. The finished length of a leg is 2 ft. 5 in.

Lay out the stretcher according to the drawing, using two lengths of 1 by 5-in.

stock, and curving them to radii of 2 ft. 6 in. and 2 ft.  $3\frac{1}{2}$  in. Make each segment 1 ft. 9 in. long, and cut a  $\frac{3}{8}$ -in. tongue, 2 in. long, on one piece to fit into a corresponding slot centered in the thickness of the other segment. Fit carefully, and glue together. When dry, cut tenons,  $\frac{1}{2}$  in. thick and  $2\frac{1}{4}$  in. wide, to fit into mortises cut in the legs, as shown in the elevations. Be sure to keep these in a line with each other, rather than following the curve.

To attach the legs, lay the top upside down on a pad on the floor, and after applying glue to the mortises and tenons, assemble them and toenail the leg tops into the cleats and table top with six-penny finish nails. Square with the top, cut two braces of 1 by 3-in. stock, 7 in. long, miter on both ends, and nail to the legs and top. Sandpaper thoroughly, rounding the corners slightly. A handy accessory for the breakfast nook is the



wall cabinet built to fit between three studs. It provides space for several cups, glasses, saucers and plates. Each of the two compartments has a space, 1 ft. wide, 2 ft. high and 5¼ in. in depth, behind the door.

Make the upper and lower side jambs of 1 by 7-in. stock. Cut the upper and lower jambs to a length of 2 ft. 4¾ in. and notch the back edges to a depth of 4½ in. for fitting around the center stud. The side jambs are 2 ft. 1½ in. long, with the ends rabbeted ⅜ in. deep to receive the ends of the top and bottom jambs. In the center of each is cut a dado, ¾ in. wide and ¼ in. deep, extending 5¾ in. from the back edge. The center jambs are ¾

in. narrower and notched out at the rabbets to fit over the upper and lower jambs in front of the notches. Assemble the jambs, brace the frame square by means of a diagonal strip of wood tacked across the face, and cover the back with two rectangles of three-ply ⅜-in. panel veneer, cut 13½ in. by 2 ft. 1½ in. Remove the brace and fit the muntin casing between the upper and lower jambs, nailing it to the center jambs with six-penny finish nails.

Make the stiles and upper rails of the doors of 1 by 3-in. stock, sized to a width of 2½ in., with lower rails 3½ in. wide. Be careful to select straight, well-seasoned wood for such light doors. Hang with 2½ by 2½-in. loose-pin butts, allowing them to project about ½ in.

To cut the opening for the cabinet, measure up on the wall 6 ft. 10 in., level a short line and locate a stud. Locate the two studs between which the cabinet is to be placed, and remove plaster and lath for a distance of 2 ft. 2½ in. from the upper line. Slip the cabinet over the center stud, level it with the inside of the upper jamb, 6 ft. 8½ in. above the floor, and wedge solidly, nailing through the end jambs into the side studs with eight-penny finish nails. Miter the 1 by 3-in. casing around the outside, fitting each piece to its side before cutting the miters. Near the front edge of the upper and lower shelves tack light strips of wood as stops for the dishes that are stood against the back of the cabinet.

☐ White enamel may be baked on galvanized iron at a heat of about 180° F.

#### MATERIAL LIST

##### Seats and Table

- 1 piece, 1¼ by 10 in. by 16 ft., white pine, S4S, sanded.
- 1 piece, 1¼ by 8 in. by 4 ft., white pine, S4S, sanded.
- 1 piece, 1¼ by 6 in. by 12 ft., white pine, S4S, sanded.
- 1 piece, 1¼ by 6 in. by 8 ft., white pine, S4S, sanded.
- 1 piece, 1 by 2 in. by 16 ft., pine or fir, S4S, sanded.
- 1 piece, 1 by 2 in. by 8 ft., pine or fir, S4S, sanded.
- 1 piece, 1 by 3 in. by 16 ft., pine or fir, S4S, sanded.
- 1 piece, 1 by 5 in. by 4 ft., pine or fir, S4S, sanded.
- 2 pieces, 1 by 6 in. by 10 ft., pine or fir, S4S, sanded.
- 1 piece, 1 by 7 in. by 14 ft., pine or fir, S4S, sanded.
- 1 piece, 1 by 12 in. by 16 ft., pine or fir, S4S, sanded.
- 1 piece, 2 by 3 in. by 8 ft., pine or fir, S4S, sanded.
- 1 piece, ¾ by ¾ in. by 12 ft., baseshoe.

- 1 piece, ⅝ by 6 in. by 8 ft., pine or fir, S4S, sanded, baseboard.
- 2 pair nickelplated butterfly hinges.
- 2 nickel flush ring lifts.
- Cost of materials, about \$12.
- Time to build, about 25 hours.

##### Cabinet

- 1 piece, 1 by 3 in. by 12 ft., pine or fir, S4S, sanded.
- 1 piece, 1 by 3 in. by 10 ft., pine or fir, S4S, sanded.
- 1 piece, 1 by 6 in. by 10 ft., pine or fir, S4S, sanded.
- 1 piece, 1 by 7 in. by 10 ft., pine or fir, S4S, sanded.
- 1 piece, ⅝ in. by 1 ft. 4 in. by 5 ft., three-ply pine or fir panel veneer.
- 2 pair 2½ by 2½-in. loose-pin butts.
- 2 forg catches.
- 2 1½-in. glass drawer pulls.
- Cost of materials about \$3.
- Time to build, 8 hours.

Tech News. Bulletin Nov. 1914

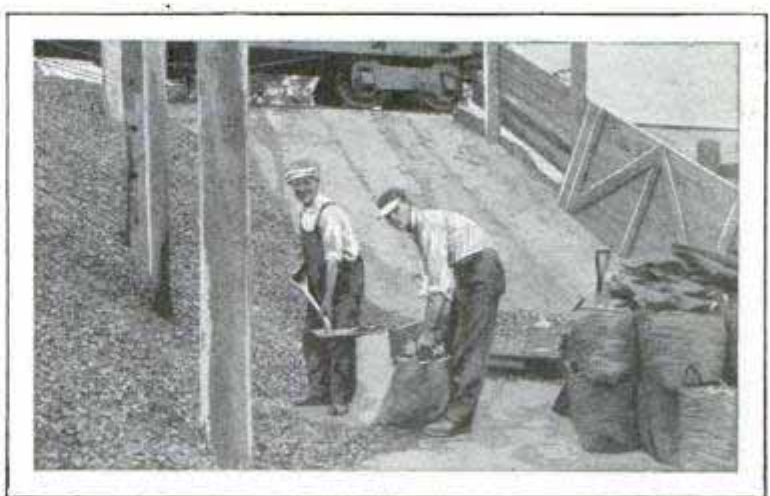
Steam Cleaning a Stone Building

Cement Banking Saves Coal

To meet the changing demand of present-day commercial conditions many old buildings are being altered or remodeled. In order to eliminate the undesirable contrast always present in such cases between the old dirty surfaces and the new stone put in the walls, some kind of cleaning of the old portions is generally carried out. Because of the detrimental effects of acid cleaning or sandblasting, scrubbing with soap powders and hand brushes is customarily employed. This method is effective, but slow and laborious, and in an effort to devise a faster and more efficient means of cleaning limestone, experiments with the use of live steam have been conducted at the bureau of standards.

An interesting demonstration of this experimental work was the steam cleaning of the remodeled building of the Baltimore Commercial Bank, Baltimore, Md., where the scheme was given a practical trial under commercial conditions. The use of live steam at 80-lb. pressure, blown directly against the stone through simple nozzles made of galvanized pipe fitted to the end of 1/2-in. steam-hose lines, was found to be very effective in removing the 20-year accumulation of dirt on this Indiana-limestone building. The cost of the job was somewhat higher than a bid received for acid cleaning. This increased cost is to be explained in part by the experimental character of the work, this being the first complete building ever cleaned with steam. The final color of the stone was not so bright as that of new stone work, but was considered entirely satisfactory, since it combined cleanliness with the appearance of age, which is usually thought desirable in stone buildings. The success of this practical test leads to the conclusion that steam cleaning would, in most cases, be an economical and effective method.

An eastern coal dealer, having a location below the sidetrack, laid a cement floor over the ground and a section of the

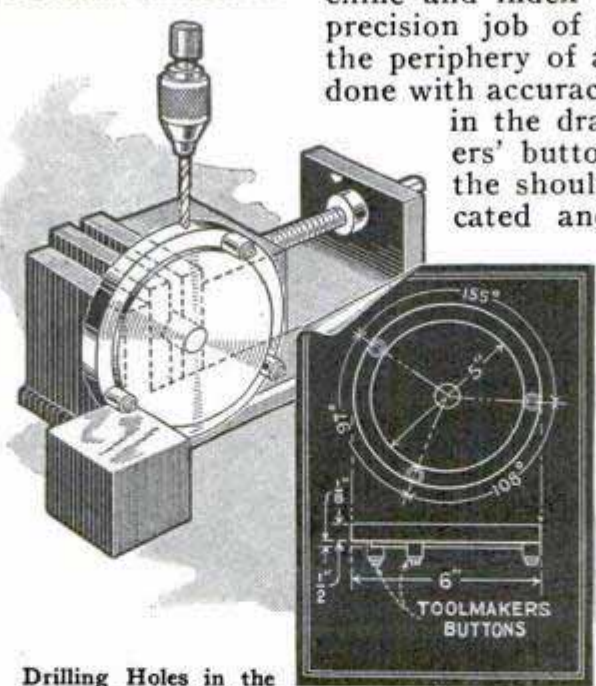


Inclined Bank Faced with Concrete Brings Coal from Cars into the Yard by Gravity

banking up to the track, on which the coal is thrown from the cars. The smooth surface of the concrete brings the coal down to ground level without rehandling, which greatly assists shoveling and prevents considerable waste.

Drilling Holes in Edge of Disk

In a small shop having no milling machine and index head, the writer had a precision job of drilling three holes in the periphery of a brass disk, which was done with accuracy by the method shown in the drawing. Three toolmakers' buttons were placed around the shoulder of the disk as indicated and after being set the proper distance apart the mandrel was gripped in a machine vise, blocks with V-grooves being used to hold the mandrel securely. To get the distance between the buttons on a circle 5 in. in diameter, is a simple calculation, and the buttons are set in the usual way. One button was brought into contact with an accurate block and the hole was then drilled.

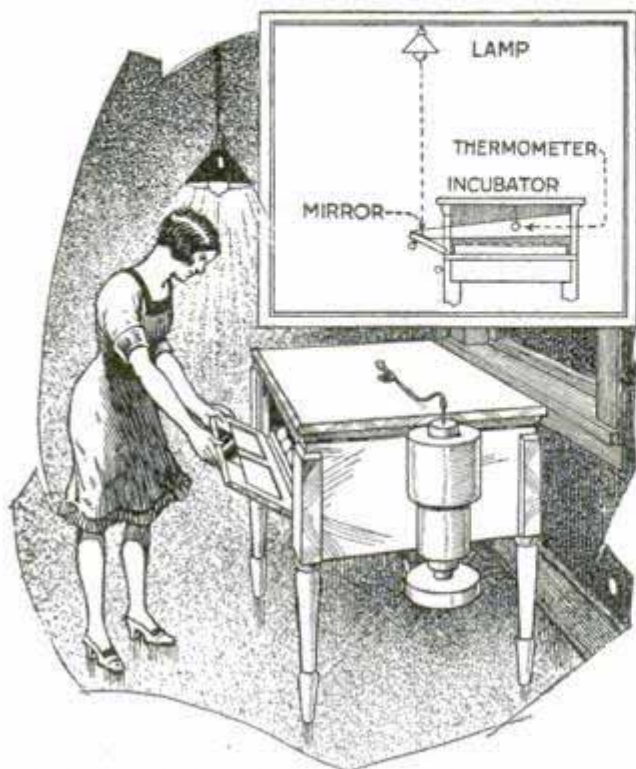


Drilling Holes in the Periphery of a Brass Disk

The other holes were drilled in the same way. The job was entirely satisfactory.—Hugo Ljungquist, Philadelphia, Pa.

### Reading the Incubator Thermometer

As incubators are usually installed in the cellar or basement of the home artificial light is necessary when reading the



Lamp Directly Above and Mirror Inside of Incubator Door Facilitate Reading of Thermometer

thermometer. An overhead light is practical for this purpose in most cases, and if a mirror is placed on the inside of the outer door of the incubator the reading can be done instantly. By opening the door of the machine, as shown in the illustration, the light from above is reflected on the instrument and the temperature noted without difficulty.—G. E. Hendrickson, Argyle, Wis.

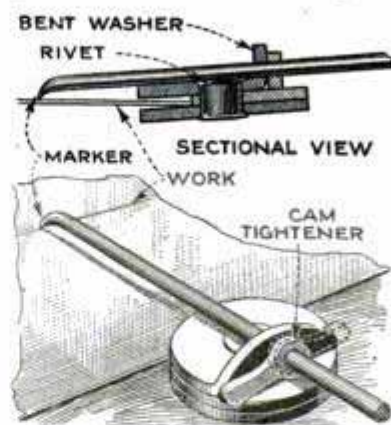
### Care of Oilstones

Oilstones should be properly cared for in order to retain the life and sharpness of the grit, to keep the surface flat and even, and to prevent glazing. With few exceptions, like the India and Crystalon, new stones should be soaked in oil for several days before using. An oilstone should be kept clean and moist. Allowing it to remain dry a long time or exposing it to the air tends to harden it. If the stone is kept in a dry place, it should be put in a box having a closed cover, and a few drops of fresh, clean oil poured on it. To restore an even flat surface on an oilstone, grind it on the side of a grindstone, or rub it down with sandstone or an emery brick. An oilstone can be prevented from glazing by the proper use of

oil or water; either will prevent the particles of metal that are cut away from the tool being sharpened from filling the surface of the stone. Plenty of water should be used on all coarse-grained natural stones. On medium or fine-grained natural stones, such as Arkansas or Washita, as well as on all artificial stones, oil should be used invariably, as water is not thick enough to keep the steel particles out of the pores. To further prevent glazing, dirty oil should be wiped off the stone as soon as possible after using. This is very important, for if the oil is left on the stone, it dries in, carrying steel dust with it. Cotton waste is one of the best things for cleaning a stone. If a stone does become glazed or gummed up, cleaning with gasoline or ammonia will usually restore the cutting qualities; but if this treatment is not effective, scour the stone with loose emery or a piece of sandpaper fastened to a flat board.—J. S. Hagens, Chicago, Ill.

### Marker for Sheet Metal

Workers in sheet metal, whether tin, brass or copper, will appreciate the usefulness of the line-marking tool shown in the illustration. Owing to the flexible nature of this kind of material it is difficult to hold a marking tool in contact with the work, and this is especially the case on brass sheets thin enough to be shipped in rolls. With the tool shown, however, it is impossible to slip off the work, as the metal is guided between two parts as it is slid along. The  $\frac{1}{2}$ -in. washers, held together and riveted by a short piece of steel, make a good body for this tool. The bottom washer is used as it is; the middle one is cut away on one side to within about  $\frac{1}{16}$  in. of the hole, and the top one is bent up at the opposite side

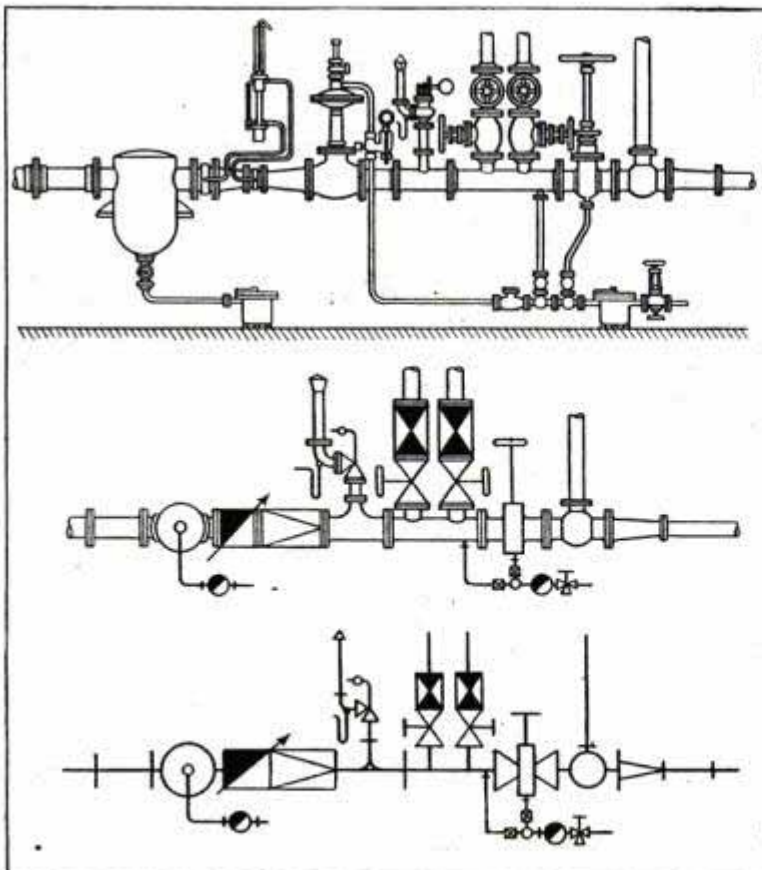


and drilled for the marking tool or scriber. This is held in place by a cam tightener made from a piece of metal, as shown, or from a length of wire, one turn of which is taken round the scriber, a short piece being left for a handle. By filing the outside of the loop it is made to tighten when brought over to one side and loosen when

turned to the opposite. To mark off a strip of metal before cutting, the scriber is set the required distance with a scale from the middle washer and is tightened in place with the cam. Then, with the thumb pressing on the scriber near the point and the four fingers keeping the tool in contact with the edge of the sheet, it is slid along to mark any width of strip desired within the limit of the tool. It is, of course, not practicable to make the scriber too long, as the sheet of metal would then be likely to buckle.—Harry Moore, Montreal, Can.

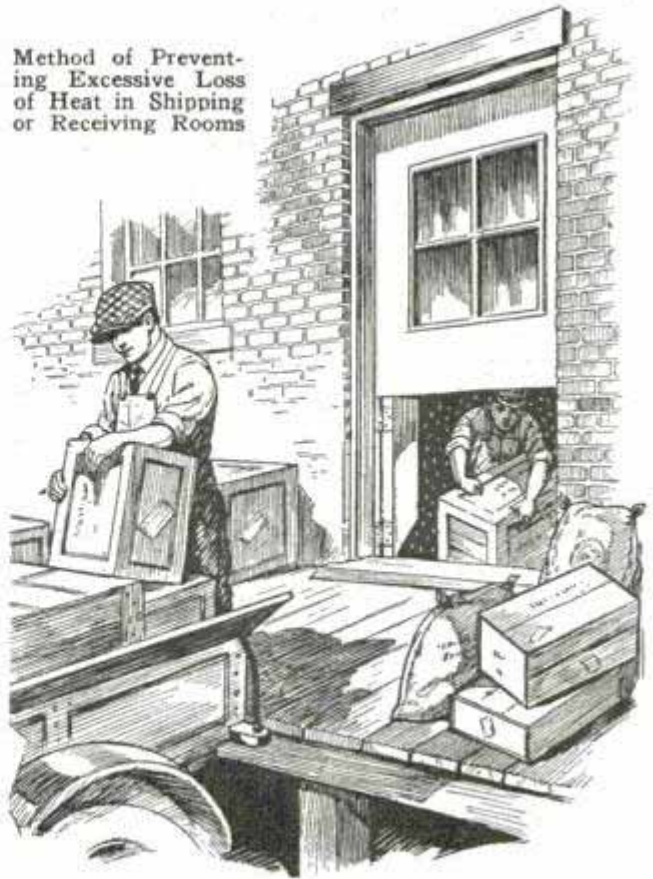
### Shorthand Mechanical Drawings

Complicated mechanical drawings may be simplified considerably by the use of symbols as shown in the illustration. The same steam piping is drawn in three different ways; the first showing the fittings drawn up in the usual way, the second showing the same somewhat simplified, and the lower one showing the drawing reduced entirely to symbols. Much work and time are, of course, saved by this method and the drawing is easier to read. A key of symbols is given in one corner of each drawing or separate key sheets, covering all the symbols used in each drafting department, may be issued.—Dr. Ing. Carl Commentz, Hamburg, Germany.



Mechanical Drawings Can Be Simplified Considerably by Using Symbols to Designate Parts

Method of Preventing Excessive Loss of Heat in Shipping or Receiving Rooms



### Winter Door for Receiving Room

Factory or store receiving rooms often cannot be kept warm and comfortable in cold weather because of the necessity of frequently opening a large outside door to receive small boxes and parcels from delivery trucks, and where lumber or metal bars are being unloaded from cars on tracks outside the building, the door may have to be kept open for hours at a time. The discomfort from cold and loss of money in wasted heat may be partly prevented, if the bottom part of the door is cut and hinged so that it can be opened independently. A glass panel should be put into the upper section so that the clerk can see what is being unloaded.

### Brass Locknuts

In practically every power plant, and in every plumbing and steam-fitting shop, numerous old brass globe and other valves collect, which are usually sold as scrap brass. Before doing this, cut off the hexagonal ends from the old valves with a hacksaw. They can be cut off in a few moments and make locknuts, which are thicker and therefore better than the ordinary ones.

### Support Helps Turn Thin Walls

In turning up large cylindrical pieces, such as belt pulleys, etc., having thin walls, it is very difficult to prevent chat-



tering. However, this can easily be overcome by using a device of the kind shown in the drawing. A 3-ft. arm is made of heavy strap iron, about  $\frac{3}{8}$  by  $1\frac{1}{2}$  in., and bent to the shape shown. A roller, about  $1\frac{1}{2}$  in. in diameter and 1 in. long, is held in a U-piece made from strap iron which is fastened to the arm so that when the end of the arm is hooked inside the carriage the center of the roller will come even with the cutting tool. A piece of wire and a spring hold the bar, and this, in turn, gives the right pressure on the material at the cutting point. Being hooked inside of the carriage, the bar is kept just opposite the tool at all times as the tool moves. For turning the outside, the roller can be fixed to press on the inside, and the same result will be obtained. This device will instantly stop the chattering and will help do a much better job of cutting.—Ed Sundholm, Albert City, Iowa.

### Don't Overlook Your Battery Charger

The life of a battery-charger bulb can be greatly prolonged if it is properly handled. It may become inactive because of a sagging filament, for instance. But if the bulb is inverted as soon as any sagging is noticed, it will last much longer.

At a battery-charging station this has been the practice for some time, and the owner has reclaimed a number of rectifying bulbs by simply mounting the socket, in or outside of the charger, so that it will hang in an inverted position. Sometimes the bulb will light, but will not charge, and this trouble can usually be traced to a loose socket connection. A badly sulphated, or dead, battery may also cause this trouble. Chargers, of the vibrating type occasionally cease to function before the battery has taken a full charge. If this happens, it is a safe bet that the adjusting screw has worked loose and the vibrating points are too widely separated. If the ammeter shows a discharge, the points are sticking together and should be separated at once.—Glen F. Stillwell, Collinsville, Ill.

### Making Patterns for Small Sheaves

To the patternmaker with only limited molding practice, the making of a pattern for a small sheave pulley, such as shown in Fig. 1, for example, may be puzzling. He is not quite sure how the molder would prefer having it made, split on the line AB to be molded in green sand in a two or three-part flash or with a ring of green sand to make the groove, or perhaps a solid pattern with a core print turned on it as at B, Fig. 1, and a box to make the two half cores, these to be pasted together to form the groove. If the sides of the pattern are flat as in Fig. 2, he might be tempted to split the pattern through the middle on the line DE, doweling the two halves together in the usual way. When but one or two, or a half dozen castings are wanted, it makes little difference how the pattern is made, split or solid.

The molder can produce the castings from a pattern made either way. However, I prefer a solid pattern with the groove made in dry-sand core; the pattern is stronger and will retain its shape much longer. If the bottom of the groove is sharp or has a small radius that does not call for machine finishing, the dry-sand core method is the better way,

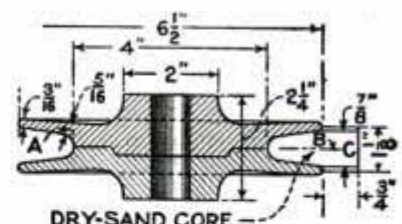


Fig. 1

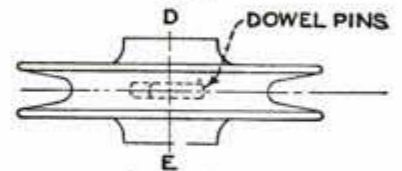


Fig. 2

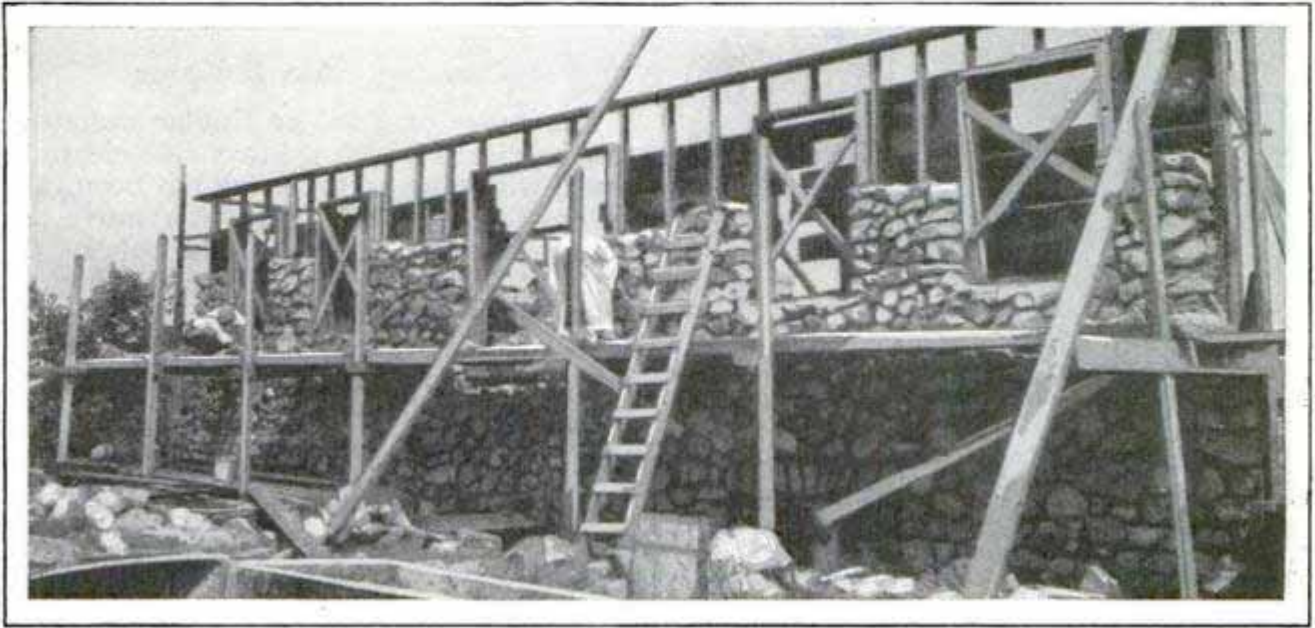


as the sharp green sand would wash away with the pouring of the metal. The method indicated in Fig. 2 is not desirable.

If these sheave castings are to be made in large quantities, it is well to take the

### Siding Saves Time in Stonework

Use of framework and siding in the process of building stonework walls, has enabled an eastern contractor to save



Wooden Frame Aids in Laying Stone Walls and Eliminates Need of Plastering

matter up with the foundry. When making a sheave pattern split through the middle, the apprentice patternmaker insists on making the joint faces of each half pattern recessed, as shown in Fig. 1. When but a few castings are wanted, this recessing is unnecessary; it calls for reverse chucking of the two halves of the pattern. By chucking with the joint face against the chuck, the half pattern can be turned and finished on both sides in one chucking and then doweled together with a single pin in the center. I have made them with only a piece of wire brad for a dowel. As an apprentice, the boy is taught to make his patterns up to a certain standard. A few visits to the foundry and a study of the jobs as they are made by the "old rounders" will convince him that it is not always necessary to line up to the so-called standard in the production of many patterns he is called upon to make.—M. E. Duggan, Kenosha, Wis.

much time in keeping the walls plumb, and the siding serves as a form to hold the inner facing of cement in place, eliminating the necessity of plastering after the wall is completed. The increased cost in erection appears to be more than offset by the saving in time.

### Portable Desk for Shipping Clerks

Shipping clerks, inventory men, appraisers and others engaged in clerical work which necessitates moving about the

store or warehouse with facilities for writing, figuring and checking, will find much convenience in the adoption of a portable desk of the type now in use in a Wisconsin factory. The desk was originally a small writing desk. The back legs were shortened about 6 in., and a pair of wheels and an axle from a discarded baby carriage were attached to them. Two handles were fastened at top.



Portable Desk Fitted with Wheels Is Convenient for Shipping Clerks and Appraisers



Vise Attached to Truck Tailboard Found Handy for Traveling Repairman

**Tailboard Serves as Workbench**

Obliged by the nature of his duties as truck inspector and traveling repairman to cut the working parts of his equipment to a minimum a mechanic, employed by a

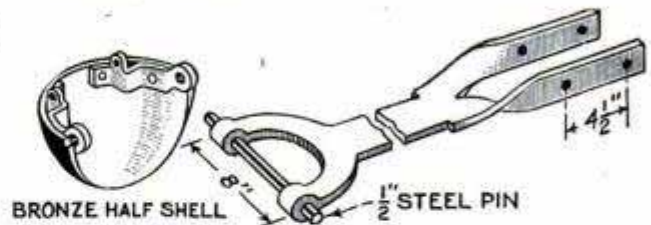
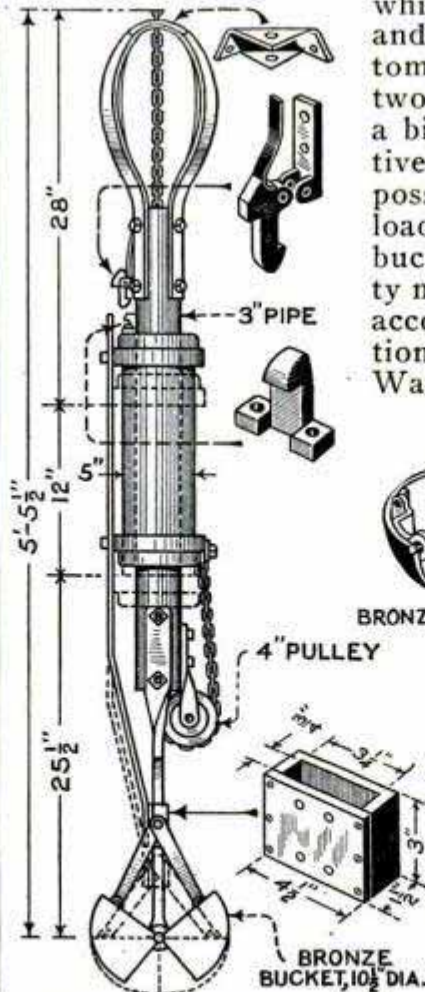
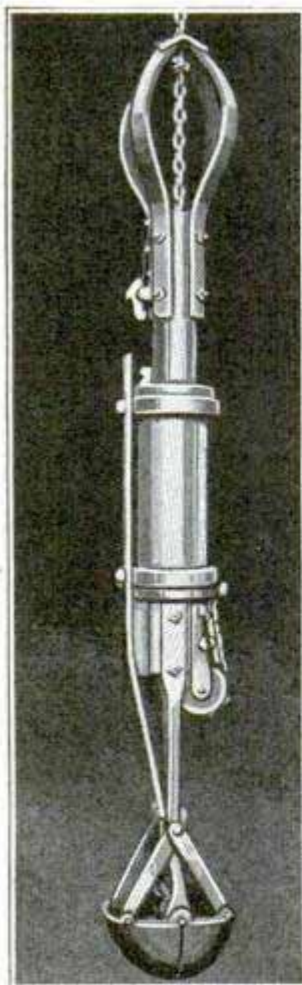
large oil company, utilizes the tailboard of his truck as a workbench, after having bolted his vise on it, as shown. The handy location and utility of the arrangement save much extra work and delay on rush jobs.—Richard C. Tarr, Gloucester, Mass.

**Cleaning Auto Radiator**

The tubes of Ford or similar radiators can be cleaned with a brass rifle-cleaning brush when the bottom tank has been taken out for repairs. This will remove the lime, oil and dirt inside of the tubes. Of course the brush must be used with care, or holes might be made in the tubes. The proper size of brush for the Ford radiator is a rod for a .22 rifle.—E. T. Gundersen, Humboldt, Iowa.

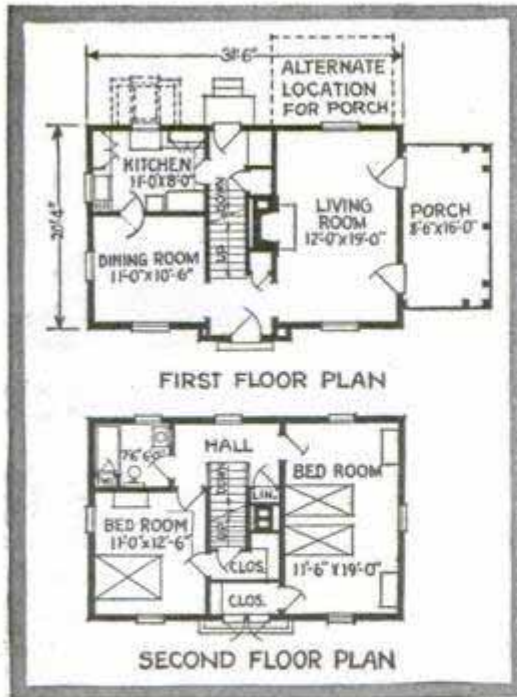
**Improved Sand Bucket for Wells**

The ordinary sand bucket for use in removing sand deposits from large wells, is not entirely satisfactory. The city plant engineer of the pumping station at Lincoln, Nebr., has designed an improved bucket which works on the principle of dam dredges. It is built for an 8-in. pipe which is lowered with the jaws opened and locked. When the jaws strike the bottom, the impact releases the lock and the two halves automatically close and take a big bite. The action is rapid and positive, so that from a well 100 ft. deep it is possible to remove as high as five or six loads a minute. With the ordinary sand bucket, it sometimes takes fifteen or twenty minutes for the bucket to fill once. The accompanying photos show the two positions of the device.—D. R. Van Horn, Walton, Nebr.

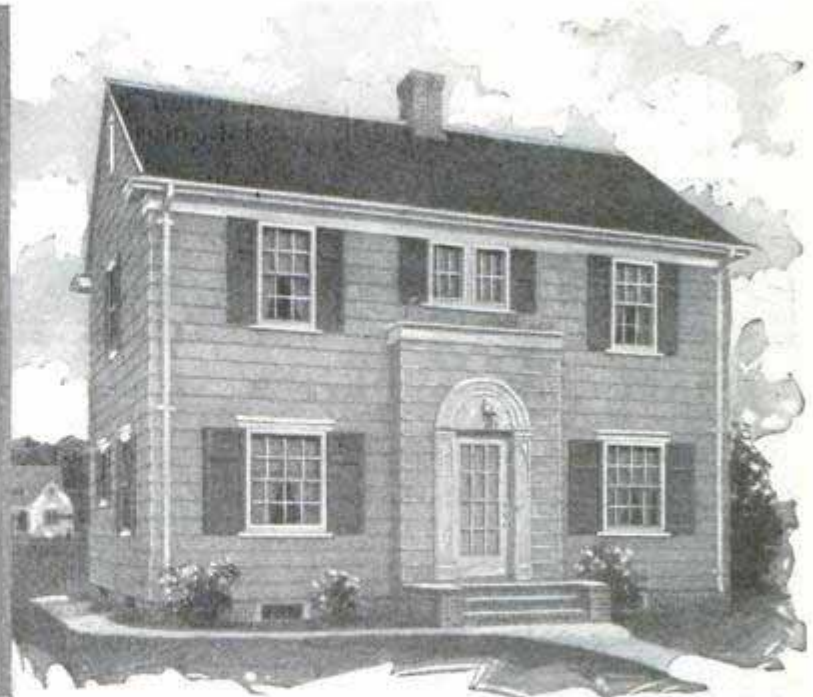


Improved Sand Bucket Works Like Clamshell, and with Its Use, Five or Six Loads Can Be Removed from a 100-Foot Well per Minute

# Colonial House with Shingle Exterior



Plan No. 5A52



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**QUESTIONS** regarding home building addressed to this magazine will be answered by the Architects' Small House Service Bureau of the United States, Inc., controlled by the American Institute of Architects and indorsed by the department of commerce, United States government. Blueprints, specifications and material lists for the house shown above may be obtained at a nominal cost. Inclose self-addressed stamped envelope for reply. If further information is desired send five cents and stamped envelope for a 24-page booklet explaining how the small home bureau functions and showing twelve sample plans.

**T**HE charm of this design—its delightful homelike quality—does not depend upon expensive material or elaborate details, but upon good proportions, nice spacing of doors and windows, and the happy use of a delightful arched Colonial entrance.

In this home you will find a combination of good architecture and true building economy.

As planned, the house is of frame construction, exterior finished with shingles twenty-four inches long, laid eight inches to the weather.

The base is of cement, but might just as easily be of brick, if the owner desires. Stucco or siding can be used for the exterior, if preferred. The house will look equally well in either of these materials.

A fifty-foot lot is required if the porch is built at the side of the house. If placed at the rear, the house can be erected on a forty-foot lot. If the house is swung around and faced to the side, it can be accommodated on a thirty-five-foot lot.

There are five good-sized rooms and bath, within a very small space. There is no waste in hallways, because this is the ever popular center-hallway type with a living room running full depth of the house. Two good bedrooms and a bath complete the second-floor arrangement.

The house was designed to face west or

north, but can be reversed if it is desired to face it in any other direction.

## Home Builders' Questions

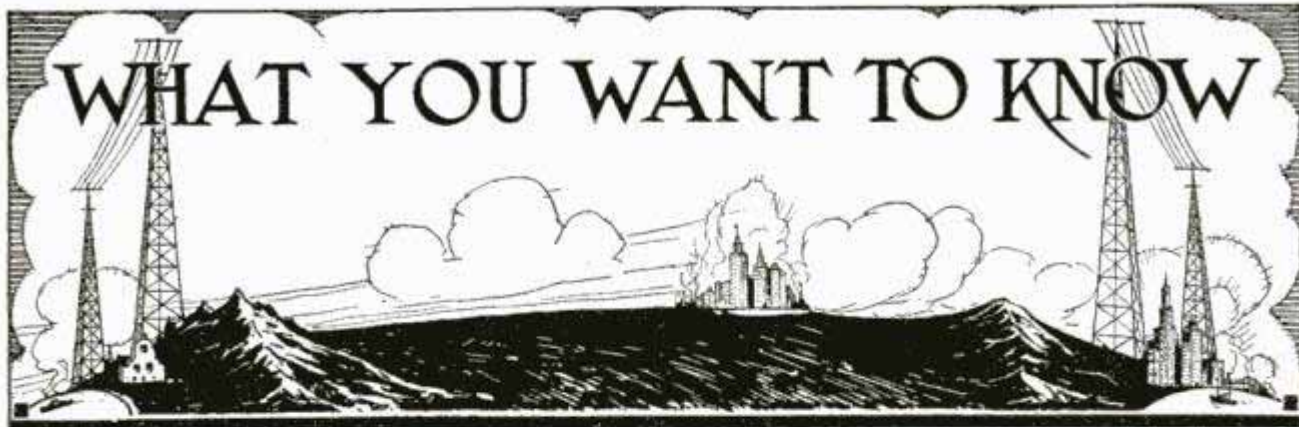
**Q.** How can the exact amount of discount or bonus on second mortgages be obtained? **A.** The amount of discount on a second mortgage is flexible. It depends on what proportion of the whole cost of the house is covered by the second mortgage, for how long a time it is to run, and who the lender is. It is a common practice to discount this paper at so much per \$1,000. If the contract is for \$5,000, the discount may be four per cent per thousand. The borrower would then take \$4,000 cash and give a second mortgage for \$5,000.

**Q.** We are thinking of buying a lot that has been filled with ashes and perhaps with other refuse. Can we build on this lot after it has settled? How long does it take to settle? **A.** It is not safe to build on a fill. It is very difficult to tell when settlement has been completed. The strength of this material is so unreliable that a building placed upon it probably will settle unevenly. If this takes place you will have cracked walls, cracked plaster, and more or less general deterioration. If you purchase this lot you should add the cost of excavation so you can build up from the original soil.

**Q.** How much slope must a roof have for shingles? **A.** Shingles should not be used when the slope is less than thirty degrees. If the slope is less, the shingles will not turn water properly and will deteriorate very rapidly. We recommend sheet roofing for low-pitched roofs.

**Q.** The paint on one side of my home comes off in strips. What causes this? **A.** When paint is put on wood that is even slightly damp, it will not adhere, but will blister, and come off in the long strips of which you speak. If there is some leakage from the roof or gutters so as to keep the wood continually damp underneath the paint, the paint will not adhere. To correct the fault have all the paint scraped off. Before any repainting is done see that the boards are thoroughly dried and that they will be kept so.

# WHAT YOU WANT TO KNOW



**Q.** What is the red terminal on the horn cord for, and how should it be connected to the plug? **A.** The red cord should be connected to the side of the plug that makes contact with the high-voltage B-positive side of the jack, as shown in Fig. 1. If your jack is not connected as shown, the right side can be determined by

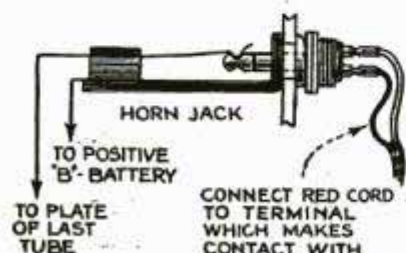


Fig. 1

trial, as the best results will be obtained when the polarity is correct for the microphone.

**Q.** Is a C-battery necessary with a resistance-coupled amplifier? If so what voltages are necessary with 90 and 135 of B-battery? **A.** C-battery is necessary to conserve the B-battery with any type of amplifier.

If you use 90 volts of B-battery, use 4.5 volts negative bias. If 135 volts are used, the negative bias should be 7.5 volts.

**Q.** How can I increase the selectivity of my five-tube neutrodyne receiver? **A.** Shorten your aerial, or reduce the number of turns on the primary of your first neutroformer. Reducing the distance between the primary and secondary coils also will result in greater selectivity.

**Q.** I have three .00035 variable condensers and wish to make a tuned r.f. receiver; how shall I wind the coils so that they will be the right size for these condensers? I have some bakelite tubing, 3 in. in diameter, that I wish to use. Also please tell me what size of wire to use. **A.** For the two r.f. stages the primary should consist of 9 turns, wound over a secondary consisting of 50 turns. The aerial coil can be wound on the same size tube, and 80 turns should be placed on it. Cut each tube about 3 in. long, and use either No. 22 or 26 d.c.c. wire for all coils.

**Q.** Would you advise the use of an a.f. transformer and two stages of resistance-coupled amplification? **A.** One a.f. transformer and two stages of resistance-coupled amplification will give excellent results. Both amplifier units should be of high quality; do not use a transformer of higher ratio than 3½ to 1.

**Q.** What results have been obtained with the new underground antenna? Is it practical, and does it eliminate static? **A.** We have experimented with this type of aerial, and the results were very satisfactory. It reduces static effects and gives good clear signals over a wide range. There are several good types on the market in 75 and 100-ft. lengths.

**Q.** Does a gas pipe make a good ground? I am using this type of ground and the results do not seem to be as good as I am told they should be. **A.** Gas pipes sometimes have rubber and other insulating materials at the joints and therefore make poor grounds. The use of gas pipes for grounds is also prohibited by the insurance companies. Steam pipes also sometimes have

rubber gaskets at the joints and the connecting bolts cannot be depended upon for good connections. A cold-water pipe offers the best type of ground.

**Q.** Can two stages of r.f. be added to a regenerative set? Will it increase the volume and range? **A.** The volume and range would be increased to a very small extent; the addition is not practical, considering the cost.

**Q.** I am having a great deal of trouble with body capacity in my set. When the headphones are touched, the stations are often lost; how can I prevent this? **A.** Ground one side of your filament battery if it is not already grounded. Also try connecting a .002-mfd. fixed condenser across the primary of the a.f. transformer. You may find it necessary to shield the instrument panel, but try the other suggestions first.

**Q.** Would straight-line frequency condensers improve my tuned r.f. receiver? Would I get better selectivity? **A.** These condensers will spread the stations out over the dial, giving a greater apparent selectivity, and make tuning easier on the crowded lower end of the dial. However, the selectivity of the set may depend on other factors that cannot be remedied by changing the condensers. Try a shorter aerial or reduce the number of turns in the aerial coil.

**Q.** Is it possible to make a good variable gridleak of the pencil-mark type? I have tried several leaks of this type, but do not seem to get good results with the hard tubes. **A.** It is very difficult to make a good gridleak of this type. We would advise you to purchase a variable gridleak. They are inexpensive and give satisfactory results.

**Q.** Can UV-199 or C-299 tubes be used in the perfect-tone six receiver described in the November, 1925, issue? **A.** We do not advise the use of the small tubes in this set. Best results are obtained with standard A-tubes.

**Q.** I have two 4½-volt C-batteries of the tapped type; how can I connect them so as to obtain a 4½ and a 9-volt negative grid bias? Also please show me how I can get 6 volts negative for the UX-112 tube at 90 volts. **A.** The diagram is given in Fig. 2. The upper batteries are connected so as to obtain 4½ volts negative bias for the UV-201A tube at 90 volts and 9 volts bias for the UX-112 tube at 135 volts. The lower diagram shows how to obtain 6 volts bias when using the UX-112 tube at 90 volts.

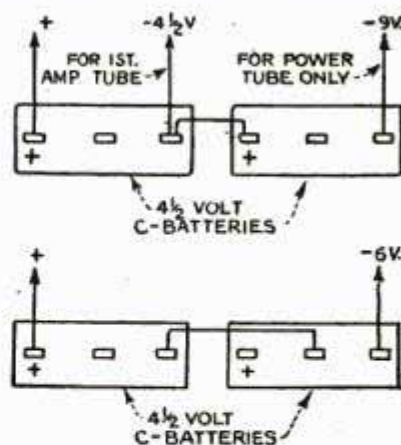


Fig. 2

**I**N accordance with the editorial policy of this magazine never to accept compensation in any form for what appears in our reading pages and also to avoid the appearance of doing so, we are obliged to omit the name of the maker or the seller of any article described. This information, however, is kept on file and will be furnished free, by addressing Bureau of Information, Popular Mechanics Magazine, Chicago. [Editor.]

# Whatever you are sawing —you need the saw that *cuts*



**I**T pays a man to buy a good saw the first time, for there is no telling what he will want to do with it.

He may saw a lot, — or only a little. He may work with clear, seasoned lumber. He may run into plenty of rough, heavy cutting. Probably he'll have both.

Anyhow, if he needs a saw at all he needs a saw that *cuts*.

Recognition of this fact made fame for Henry Disston. For he scrapped



Disston D-20, narrow blade, light weight, superior quality; a leader among Disston Saws

ancient saw-design to develop the fast, true, easy-cutting saw that bears his name.

The Disston Saw cuts faster, holds its edge longer, because of the steel Disston developed. It cuts more easily — truer and smoother and straighter—

because of the improved methods of Disston-trained craftsmen.

It had to surpass in cutting to become "The Saw Most Carpenters Use."

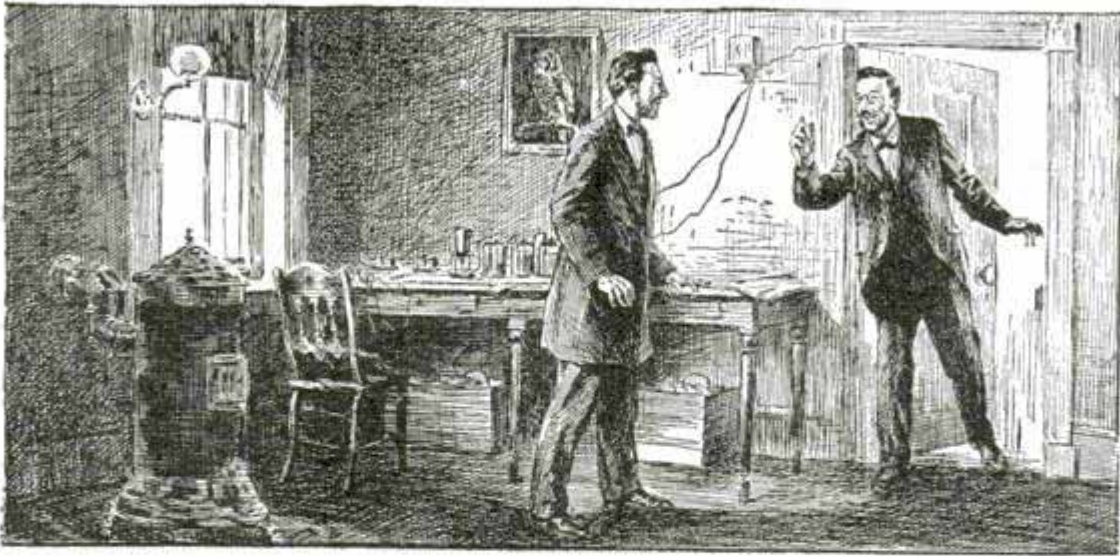
Say "Disston" to any hardware dealer.

### *Ask Disston*

Tell us what work you are doing, in wood, metal, stone, ivory, rubber, leather, cloth, fibre or other materials. We will tell you how to saw it better and easier. Disston issues many free books to aid saw users.

HENRY DISSTON & SONS, INC., PHILADELPHIA, U. S. A.

# DISSTON



## *From One Sentence To Millions*

ON MARCH 10, 1876, a single sentence was heard over the telephone. Now, after half a century, 50,000,000 conversations are heard each day.

"Mr. Watson, come here; I want you," spoken by Alexander Graham Bell, the inventor, was the first sentence.

His first crude instruments had been tested by sounds and single words; the patent had been granted; the principle was established from which a world of telephones has since resulted. But at that time the telephone had not proved its practical usefulness—its power to command.

Bell's words, electrically transmitted over a wire, brought his assistant from another part of the building. And with his coming, the telephone became a dynamic factor in human affairs.

Since that first call untold millions of sentences have been heard over the telephone. Men have traveled vast distances in answer to its calls. The wheels of great industrial enterprises have turned at its commands. Everything that man can say to man has been carried to a distance over its wires, and the thoughts and actions of nations have been influenced through its use.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY  
AND ASSOCIATED COMPANIES

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IN ITS SEMI-CENTENNIAL YEAR THE BELL SYSTEM LOOKS FORWARD  
TO CONTINUED PROGRESS IN TELEPHONE COMMUNICATION



"YANKEE" No. 15 With thumb-turn on blade.

"YANKEE" No. 10 Ratchet Driver.

"YANKEE" No. 41 Bore holes simply by pushing on handle.

"YANKEE" No. 30-A Regular No. 130-A Quick-Return with spring in handle.

Customer at the dealer's counter, trying tools on "Yankee" Demonstrator.

## Like play!—when you work with "YANKEE" TOOLS

Look for this "Yankee" Demonstrator on dealer's counter

No need to ask questions. Learn for yourself how easy, quick and sure "Yankee" Tools will work in your own hands.

With No. 15 you start wobbly screws by revolving thumb-turn on blade with thumb and fore-finger.

With "Yankee" No. 10, turn handle to and fro: and find out what it means to have a "Yankee" Ratchet Screw-driver in your kit.

Push down on the handle of "Yankee" Drill No. 41. See

how handy it is to bore holes in wood.

And on this Demonstrator you can operate the "Yankee" Spiral Screw-driver—the world-standard, high-speed screw-driving tool!

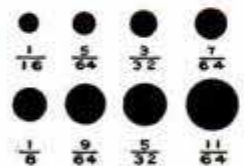
Your hardware dealer wants you to feel free to try "Yankee" Tools. That is why he displays on his counter this new mechanical Demonstrator.

Write us for "Yankee" Tool Book.

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enable you to drill holes with spiral screw-drivers.



Drill Points same as for Push Drills.

"Yankee" on the tool you buy means the utmost in quality, efficiency and durability

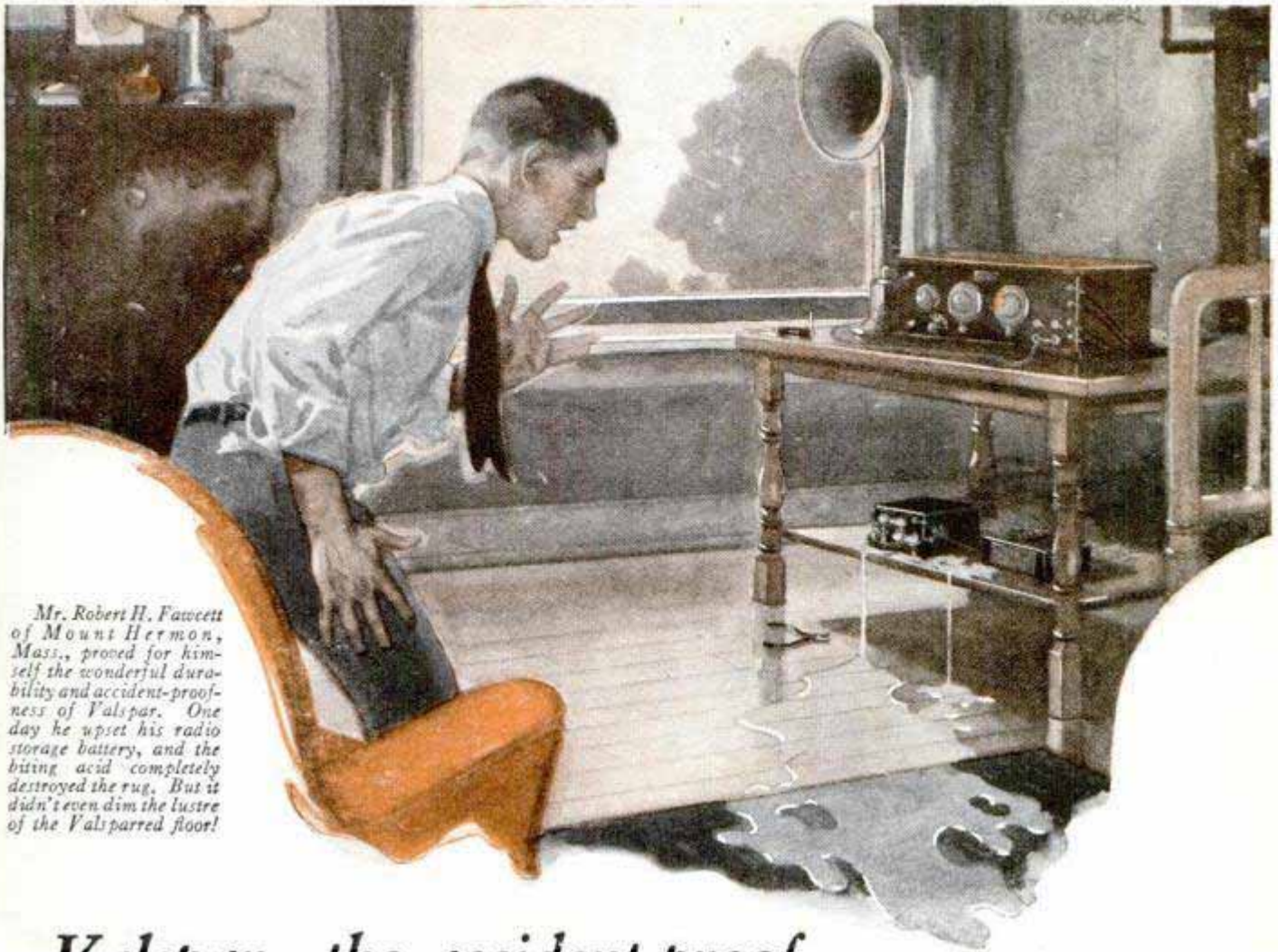
# "YANKEE" TOOLS *Make Better Mechanics*

# "A cut above the ordinary"

IF, LIKE MOST MEN, your taste runs to Turkish Blend cigarettes and you are seeking one a cut above the ordinary because of the finer grades of tobacco it contains, then learn from Fatima *what a whale of a difference just a few cents make*







Mr. Robert H. Fawcett of Mount Hermon, Mass., proved for himself the wonderful durability and accident-proofness of Valspar. One day he upset his radio storage battery, and the biting acid completely destroyed the rug. But it didn't even dim the lustre of the Valsparred floor!

## Valspar—the accident-proof varnish of a hundred uses!

You'll find that Valspar comes in handy in a hundred ways. It's the most satisfactory finish for radios, cabinets, carpentry and metalwork, book-shelves, model boats and airplanes—it's a lasting protection for wiring, tools, musical instruments, autos and motorcycles.

Valspar is *the* accident-proof varnish. Spilled acids, ammonia, hot grease—even boiling water and disinfectants—will not dim its fine lustre. It provides a permanent and beautiful finish.

Valspar offers three types of finish. Clear Valspar (a transparent protection for fine wood and bright metalwork); Valspar Varnish-Stain (clear Valspar plus transparent wood stains, which bring out the richness of the natural grain); and Valspar-Enamel (which provides a complete range of solid-covering colors with all of Valspar's beauty and lustre).

All three finishes are easy to apply, dry hard overnight and can be rubbed to a dull finish if desired.

**This Coupon is worth 20 to 60 cents**

**VALENTINE'S**  
**VALSPAR**  
 The Varnish That Won't Turn White

**VALENTINE & COMPANY,**

**460 Fourth Avenue, New York**

I enclose dealer's name and stamps—20c apiece for each 40c sample can checked at right. (Only one sample each of Clear Valspar, Stain and Enamel supplied per person at this special price.)

*Valspar Instruction Book with Color Charts, 15c extra. Print full mail address plainly.*

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 Choose 1 Color . . . . .  
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P. M. 3-26

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**“Hey!  
Heavy Handed  
Feller—Use the  
Ratchet Stop!”**

**“You’ll do better, more accurate work and y’won’t be springing that mike I just lent you!”**

A Ratchet Stop does help the man whose “feel” is not super-sensitive and it helps *any* man to do quicker accurate work because it relieves him of the necessity of always guarding against springing his mike by jamming the spindle against the work.

That’s one reason why a lot of men like the Starret No. 230—

it has a Ratchet Stop. Another, bigger, reason is the cut-away frame. You can get it into lots of places where an ordinary frame can’t be inserted.

Ask your dealer to show you this tool. Write us for descriptive matter and Catalog No. 23 “AP”.



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*World's Greatest Toolmakers  
Manufacturers of Hacksaws Unexcelled  
Steel Tapes—Standard for Accuracy  
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# Achievements of

# POWEL CROSLLEY JR.

INDUSTRIALIST, PIONEER RADIO BUILDER, MASTER OF MASS PRODUCTION

*Four entirely new radio sets employing four and five tubes*

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- two of them incorporating the Crescendon, a new and exclusive volume control.

*Now being demonstrated by Crosley dealers everywhere.*

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**The Crosley 4-tube—4-29**  
in which the Crescendon is equivalent to one or more additional tubes of tuned radio frequency amplification..... **\$29**



**The Crosley 5-tube—5-38**  
All the volume, selectivity, sensitivity and purity of tone available in the best 5-tube set—plus the Crescendon..... **\$38**



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A set so marvelous in performance that its appearance on the market is bound to create a new standard of comparison..... **\$60**



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*West of the Rocky Mountains all prices as published are 10% higher*

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### Easy to Park

Ride to wherever you want to go — and park there. The New Single fits into any 2x8 space along the curb, in a hallway, shed, garage corner — any place.

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Your dealer has a "Pay-As-You-Ride" purchase plan that makes it easy for anyone to buy this new type motorcycle. Ask him about it.

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Motor Company,  
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- Send me free literature about the New Single.  
 Tell me about your dealer proposition.

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**R**IDE a Harley-Davidson New Single—and be independent of street cars, buses and trains. Come and go without waiting or crowding — at a driving cost that's less than carfare or busfare! 80 safe, comfortable, quick miles to a gallon of gasoline—one-fourth the cost of running the most economical car! A brand new type of motorcycle — ideal for either city or country riding — for work or for pleasure. Plenty of power and speed for all road and traffic conditions. Almost self-balancing — easy to ride and control. Safe! And it's comfortable to ride! You float along smoothly on full balloon tires and a saddle that rests on 19 inches of shock-absorbing springs. The New Single scores on every point. It is the everyday mount for busy, thrifty people.

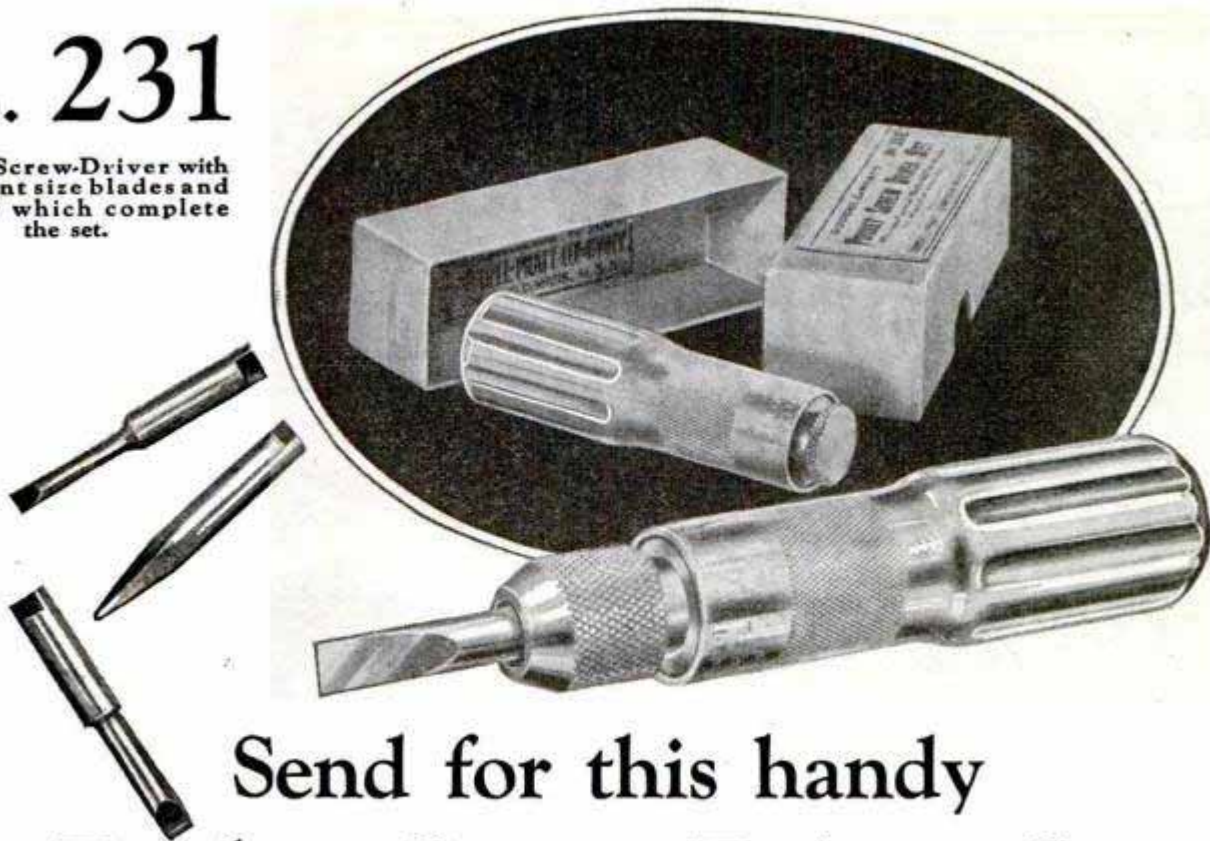
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*The*  
**HARLEY-DAVIDSON**  
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Pocket Screw-Driver with different size blades and reamer which complete the set.



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\$1 brings both to you *Postpaid to any part of the U. S.*

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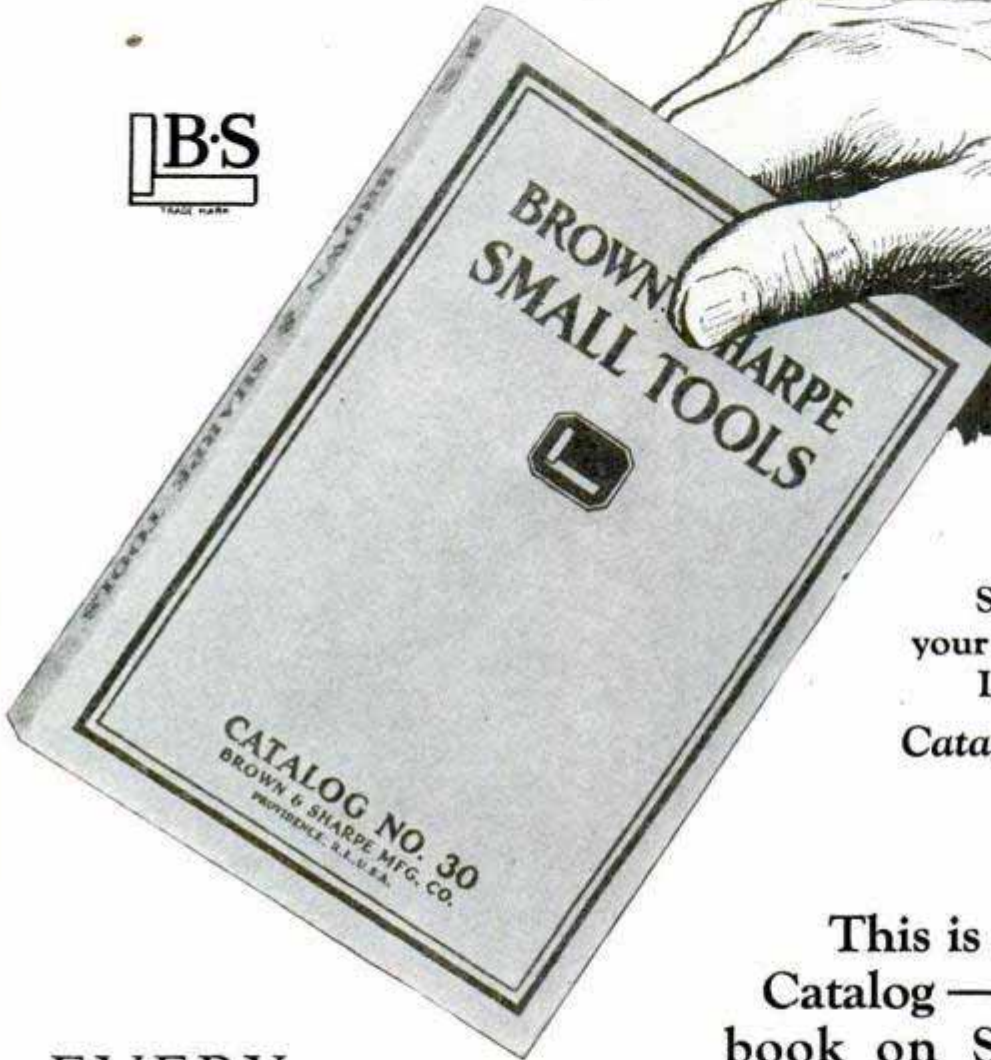
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Q World leadership can never be the result of an accident. It must be merited. And a continuance of this leadership for years proves that the merit has been well won.

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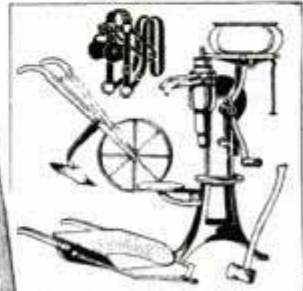
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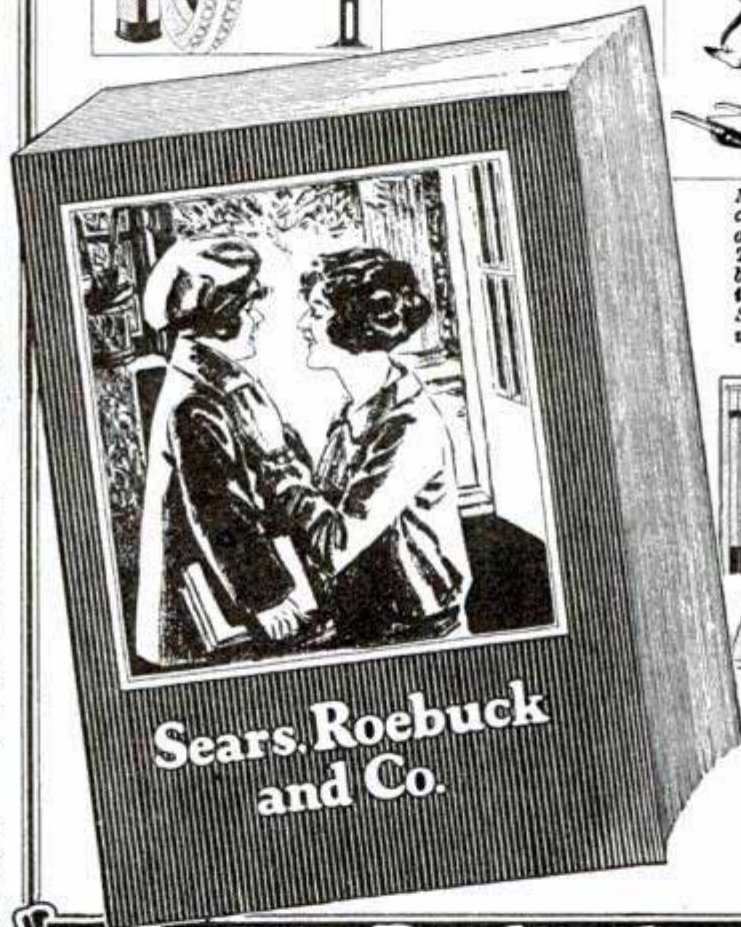
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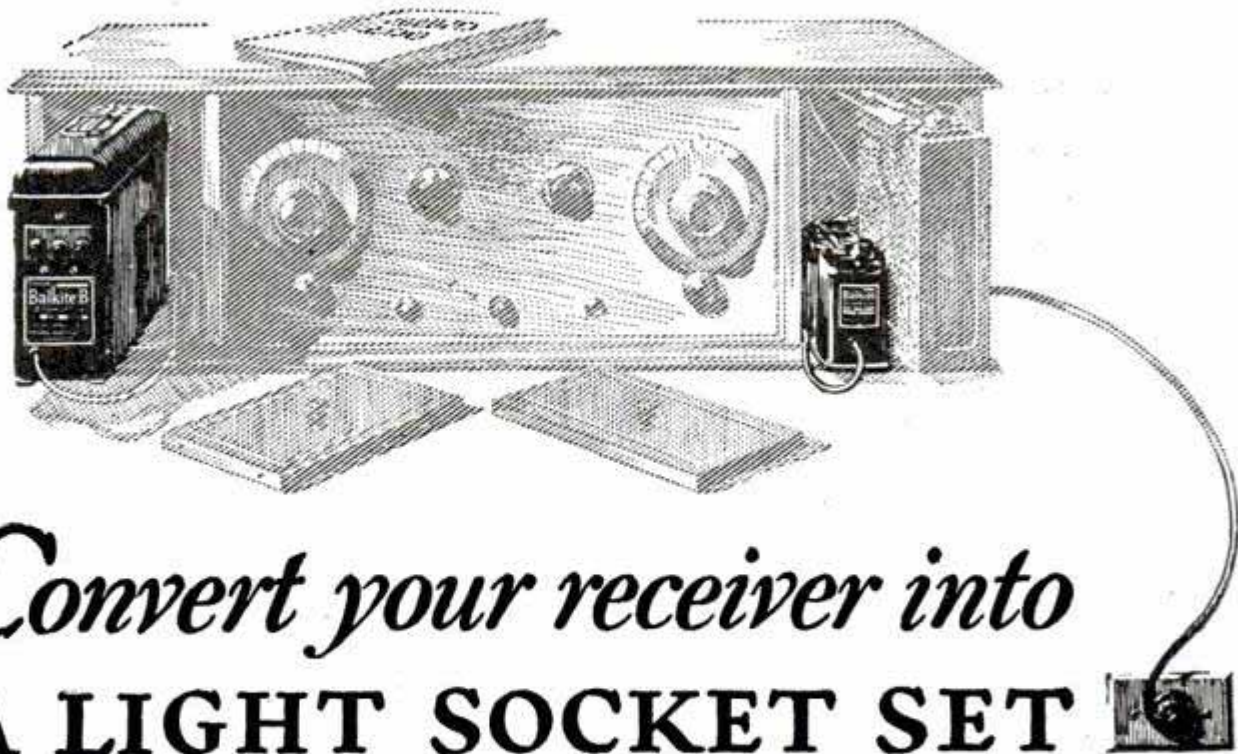
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Now you need wait no longer for a light socket set. Balkite Radio Power Units—the Balkite Trickle Charger and Balkite “B”—enable you to make a light socket set of your present receiver.

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**Only  
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Has All These  
Features:**

- Ball Bearings at all points of wear and friction (636 of them)
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FIVE  
YEARS**

**Send  
No MONEY  
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Coupon**

**FREE  
TO YOU NOW**

Complete Course of Lessons in Touch Typewriting; Tools; and Waterproof Cover; Complete Operating Instructions given with this machine. This is the easiest typewriter to operate and learn. You can learn to use it in a day with our instructions.

**Double Thick**  
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**Break away  
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**T**HE Gem Double Life Blade has the edge on all other makes. It's the keenest edge ever ground on steel—and the steel we use is double-heavy.

The Gem shaves you double-swift and double-smooth—for *double the shaves*.

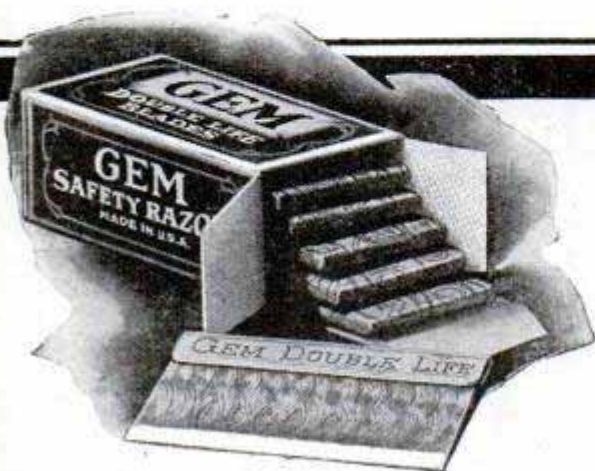
Why be double-crossed by single-life blades when the Gem Double Life Blade will give you *more and better shaves at less cost?*

—Each Gem Blade double-protected and double-sealed. Sold Everywhere.

*P. S.—Your money does double duty when it buys a Gem de Luxe Razor.*

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**GEM**  
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**METAL MENDER**  
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**LATEST "COAST TO COAST" FULLY GUARANTEED**  
**RADIO'S-10 DAYS FREE TRIAL**  
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Users everywhere report Miraco Radios get programs coast to coast on loud speaker; outperform sets three times as costly. Many hear foreign countries. Radio's most amazing values in unconditionally guaranteed, factory-built long distance sets—let testimony of users convince you.

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Powerful New Multi-tube Miraco gets long distance on loud speaker. Set. ONLY \$27.35 retail

FREE! Literature on latest improved 1 to 5 tube models, new low prices, testimony of users and SPECIAL OFFER. Write: **MIDWEST RADIO CORP'N**  
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Sell what everybody wants—radio at low prices—easy sales—big profits—music from Coast to Coast—4, 5, 7 tube radio.

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**OZARKA, Inc.** 120 Austin Avenue P, Chicago, Illinois

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**ORTHOMETRIC CONDENSERS**

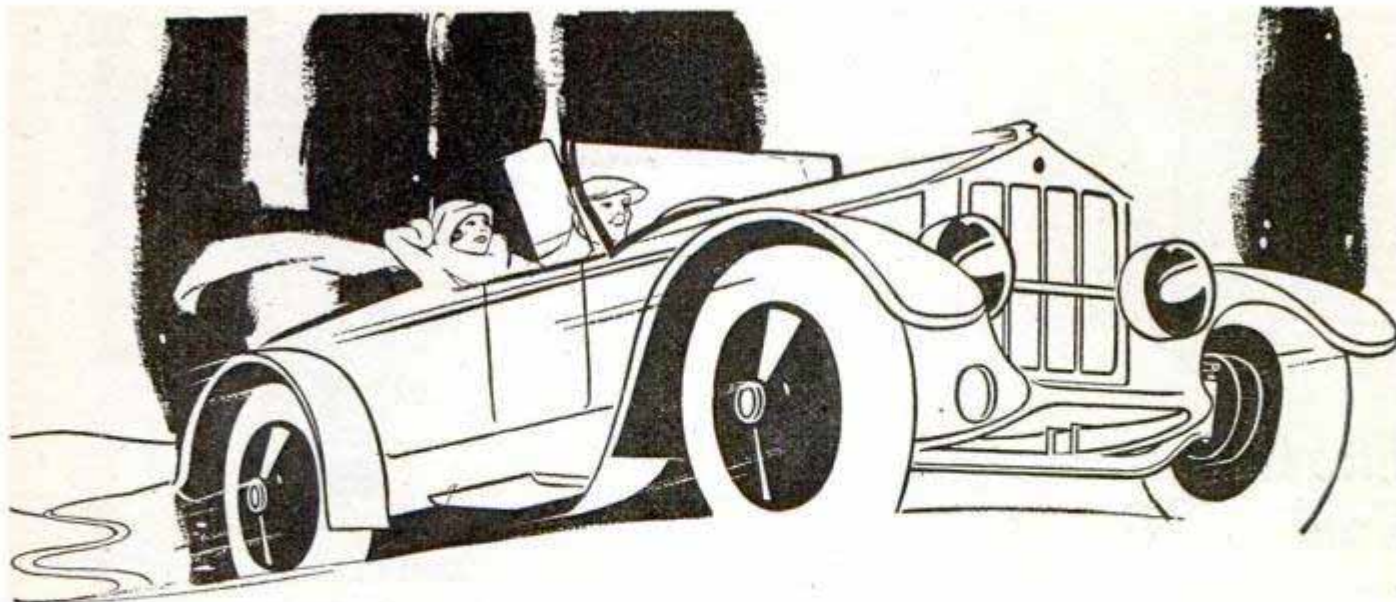
The highest quality parts possible to produce.

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**SOLVE YOUR SAW PROBLEMS**

You will like its sturdy mechanical construction. It will saw wood, fibre, bakelite 1 in. and metal 1/4 in. thick. Sold also without motor. We carry a complete line of bench woodworking machinery.

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**Amazing Invention Makes Practically Any Car Give Double Its Regular Mileage to the Gallon! Fits Any Make or Model Car!**

Now you can cut your gasoline cost as low as 9c a gallon. An amazing new invention makes practically any car give twice its regular mileage to the gallon—many

run from 37 to 57 miles, and even up to 61 miles on a gallon of gasoline! This wonderful invention is the work of Mr. J. A. Stransky of Pukwana, South Dakota. Already it is being used by over a million satisfied car owners—on all makes and models of cars. And now the inventor will send you a sample at his own risk! Read his offer below.

## Earn \$250 to \$500 a Month

And now this amazing new invention is making fortunes for agents and distributors. Now you, too, can make big money—just telling your friends about it. You can easily earn astonishingly big profits in full or spare time—many are earning \$34 to \$69 every day. There is no reason in the world why you cannot start out with this astounding invention and clean up \$250 to \$500 every month.

Here's how this wonderful little device works. Every carburetor is adjusted to make starting easy—it gives a rich mixture to start a cold engine. But once the engine gets heated up the mixture is far too rich, resulting in faulty explosion. Half the gasoline is drawn into the cylinders in a raw state, and, instead of exploding, it burns. This causes a heavy deposit of carbon.

But with this startling little device in a car all this is changed. As soon as the engine warms up, this device automatically begins to admit a much larger volume of air, thoroughly vaporizing all the gasoline, giving it fully 50% more power

—breaking it up so that it explodes instead of burning.

To introduce this new invention, Mr. Stransky, the inventor, will send a sample at his own risk. Not only that, but he will actually pay you for testing his Vaporizer if you are not delighted with it.

The demand for the Stransky Vaporizer is enormous. Agents handling this device are simply coining money. Every auto owner in the country—and there are twenty million of them—wants this splendid new invention the minute he sees it. Just send the coupon at once for full details of our introductory sample offer. Be the man to cash in big in your community.

**J. A. Stransky Manufacturing Company**  
C-960 Stransky Bldg. Pukwana, So. Dakota

**Mail This Coupon Today**

J. A. Stransky Mfg. Co.,  
C-960 Stransky Bldg.,  
Pukwana, South Dakota.

Tell me how I can get samples of the Stransky Vaporizer at your risk.

Name.....

Street or R. F. D.....

City.....State.....

**\$51 an Hour**

The Stransky Vaporizer is one of the biggest sales propositions of the century—you can make big money quick. But don't take our word for it. Read what these men say.

J. W. Cronk made \$51 in one hour. He says: "The results of one hour's work—17 men gave me orders for the vaporizers."

**\$120 in One Day**

I have found out that the Stransky will do what you said it would. I took forty orders in one day, and wasn't out long. My Ford runs better than it ever did. I can save half the gas and it pulls better.—J. M. James.

**\$147.50 in One Day**

My profits for one day were \$147.50. In one week I made \$280. Yes, I am always on the job.—S. E. Herrick, Ore.

**\$48 in 3 Hours**

My gas bill has been cut nearly in half. I have removed every particle of carbon from my engine. Since I installed it, my engine runs as good as new, starts easier and quicker. I went out Saturday about three hours and secured 16 orders.—J. A. Williams.



## The Opportunity You've Waited For!

If you have wanted to get into business for yourself, in a live, hustling field, here's the opportunity you have waited for!

We want a live, hard-working sales representative in every locality to build up a big business on the Harley-Davidson Single, the new-type motorcycle. Easier to sell than cheap cars on a basis of travel economy and flexibility. 80 miles to a gallon of gasoline! No parking or garaging problem. Nearly every man between the ages of 15 and 50 is a prospect.

With our advertising, sales-help and organization backing you, a most profitable business can be yours—if you are a worker.

Write for full particulars. Do it today!

HARLEY-DAVIDSON MOTOR CO.  
DEPT. P MILWAUKEE, WIS.

# The HARLEY-DAVIDSON [New-Type Motorcycle] Single

See our other advertisement on Page 120

**SOFT SNAP FOR AGENTS**  
GLAROFF Kills Headlight Glare  
Our representatives making from \$12 a day up to \$3000 yearly. Simple new device protects driver from glare of headlights and sun. Write for Special Free Offer.  
GLAROFF MFG. CO. 808C Road St., Sioux Falls, S. D.

Information on any book free. Write Popular Mechanics Press, Chicago, Ill.

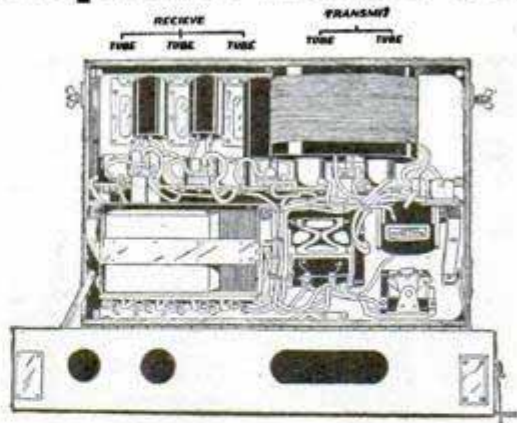


**Saw Table** Can be purchased with 6-inch saw for \$22.50  
Delivery paid East of Mississippi. \$24.50 Delivery paid West of Mississippi.

**Motor** This heavy duty motor can be furnished separately for delivery paid East of Mississippi. \$13.90 Delivery paid West of Mississippi. Complete with Cord, Plug and flat or grooved Pulley. Guaranteed 50% Overload. Special Prices on Quantities of 10 or Over.

PAUL J. DEVITT, 1101-1107 So. 2nd St., Phila., Pa.

## 100 Famous U. S. Army Aeroplane Radio Sets



### MADE BY WESTERN ELECTRIC COMPANY 5 Tubes for Transmitting and Receiving

Here is your opportunity to get most wonderful Radio Set on the market. Receives and transmits by turn of switch. Receiving range 190 to 600 meters. A slight change necessary to transmit on assigned amateur wave lengths. Lives depended on reliability of this set during war. Rubber cushioned and insulated thruout. No vibration—static or distortion. Ideal for Home—Auto—Boat—Clubhouse or Portable Use.

### SPECIAL PRICE OFFER \$39.65 WHILE THEY LAST—Reg. \$138 Set—Only

We understand these Sets cost the government \$138. Only by special arrangements were we able to get 100 Sets and offer them to the public at this sensational price. Regular standard equipment is used for receiving. Any transmitter tube having same base as W. E. Co. power and oscillating tube may be used with this outfit. The greatest buy in Radio Today.

**DON'T DELAY!** Write today for complete details. Orders will be filled in rotation. At \$39.65 price 100 U. S. Army Broadcasting and Receiving Sets won't last long. Reserve yours today!

**WARSHAWSKY & CO.** 1915 South State Street Div. PM-03 CHICAGO

## Makes Old Ford a Tractor

We furnish everything for converting Ford Auto Chassis with Engine into a handy Farm Tractor. Just right for truck growers, small farms, nurseries, etc. Pulls 16" Plow, Discs, Seeds, Cultivates; Runs Belt Machinery. We also build Garden Tractors and Cutter Bar Mower Attachments.

Handles Easily Turns in 15' Circle



Write for Free Particulars.

SHAW MFG. CO., Dept. F, Galesburg, Kan.

## SHAW MOTOR ATTACHMENT MAKES YOUR BIKE A MOTORCYCLE!

A high grade 2 1/2 H. P. motor attachment quickly clamped on any bike frame. Speed 4 to 40 miles an hour. 90 to 125 miles per gallon of gas.

**Special Low Price Now!** Write today for Complete Description and Special Low Prices on SHAW Motor Attachments and the SHAW Complete Motorbicycle.  
SHAW MANUFACTURING COMPANY Dept. 37 Galesburg, Kansas



## MECHANICS BENCH SAW

With this saw you can make your own repairs in shop, home, farm or garage. Makes a clean edge on the toughest wood—no planing necessary. Rips, cross-cuts, bevels, miters, mortises, tenons, or grooves. Attach to any lamp socket. Weight only 61 lbs. Will cut up to 1 1/4" All metal. Saw size 6 in. Table 10x13, base 7x11, height 7 in. Table tilts for beveling 5 degrees left, 10 degrees right.

**WRITE FOR OUR NET PRICE BUILDERS' HARDWARE CATALOG**

# WINDOW SIGNS



## AGENTS

### 500% Profit

### Selling Genuine Gold Leaf Letters Guaranteed to Never Tarnish

For Store Fronts, Office Windows, Bank Windows, Office Doors, Panels, Board Signs, Trucks, Automobiles and Glass Signs of all kinds. No experience necessary. Anyone can put them on and make money right from the start without previous experience. All you have to do is to show your samples, the letters are very attractive and easy to sell. Letters costing 4c sell for 25c. One agent says: "Your letters are the best thing I have seen in years. I have made \$125.00 the first week and still going strong." Paul Clark says: "Smallest day \$28.70." H. Gilder made \$835.00 in six weeks.

### \$60 to \$200 a Week—Now Is the Time

**General Agents** It is easy to appoint sub agents for this line. We pay you 20% cash commission on all orders we receive from local agents appointed by you anywhere. We allow you 50% discount on your own orders. You can sell to nearby trade or travel all over the country as you please. Large demand for window lettering everywhere. WRITE TODAY for free sample, full particulars and liberal offer to general agents.

### Our Agents Are Coining Money

### Be a Traveling Sign Man

READ WHAT THEY SAY

**Makes \$38.75 in Two Days**

Gentlemen: Enclosed please find order and M. O. of \$4.00. Send balance C. O. D. I expect the next order will be a larger one, as I have plenty of sign work on hand. I will send you a picture of the job I have done here. I made \$38.75 in two days, and have about \$150.00 worth of orders already taken, besides many promises.  
Yours truly, A. E. WEINTRAUB, Helena, Ark.

**\$25.00 in Three Hours**

Gentlemen: Please find enclosed \$7.75 for order enclosed. Times are not good here, and this is a small town. However, I sold over \$25.00 worth in three hours. When I leave here and strike a live town, look out for my smoke. I am more than pleased with results. Believe I can make \$25.00 per day in a good town. Will send for a supply when these are up. Please send these by mail. I enclose extra stamps.  
Yours for business,  
J. B. TOWER, Portales, N. M.

**Takes in \$62.80 in Two Days**

Gentlemen: I received the order here today all O. K. and am wiring you tonight an order to be sent to East Radford, Va. I put up \$27.70 worth of jobs here today. I got \$35.10 out of Marion, Va. You may send me 500 more letters C. O. D. to Bristol, Tenn., on receipt of this letter.  
Yours truly,  
F. E. DURAWAY, Bristol, Tenn.

**MAIL COUPON AT ONCE**

**METALLIC LETTER CO., 430 N. Clark St., CHICAGO, ILL.**

For a quick, easy money-making proposition for agents, salesmen and sign painters, there is nothing to equal the selling and putting on of our gold and silver metallic letters for office windows, store fronts, bank windows, and glass signs. No experience is necessary. Anyone can put them on and succeed right from the start. You can sell to local and near-by trade, or travel all over the country as you please.

**Metallc Letter Co., 430 N. Clark St., Chicago**

Please send free sample, full particulars and liberal offer to general agents.

Name.....

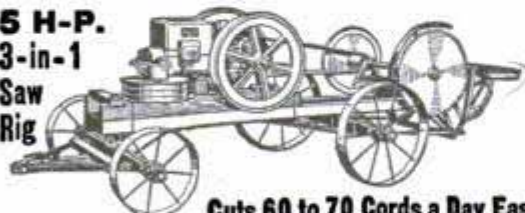
Address.....

City.....State.....

# "Saws 25 Cords In 5 Hours"

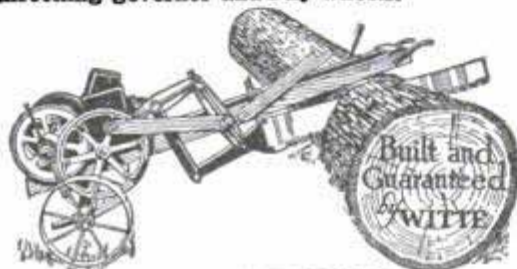
Any hustler can make big money with the one-profit WITTE Saw RIG—Ed. Davis sawed 25 cords in 5 hours—another user sawed 40 loads of pole wood in 3 hours. Hundreds of owners make \$3,000 to \$5,000 a year. Sold on Easy Payments.

**5 H-P.  
3-in-1  
Saw  
Rig**



**Cuts 60 to 70 Cords a Day Easy**

A real all purpose outfit for farmers and men who make wood sawing a regular business. When not sawing you can fill silos, grind feed, shell corn, thrash and do other work. Easy to start at 40 below zero. Completely equipped with WICO Magneto, speed and power regulator, throttling governor and 2 fly wheels.



## WITTE LOG & TREE Saw

Cuts down trees and saws them up FAST—one man cuts 10 to 15 cords a day—makes ties. The WITTE is easy to run and trouble-proof. Thousands in use. Powerful engine runs other farm machinery. Uses all low priced fuels.

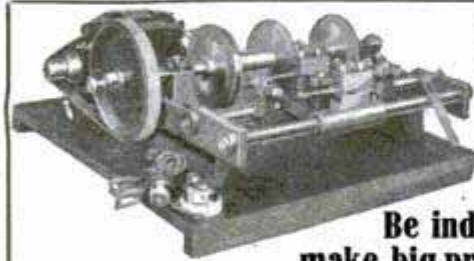
**EASY** Pay only a few dollars down and take a year for the balance of low price.

**PAYMENTS—MAKE YOUR OWN TERMS.**

**FREE** Write today for full description and low price—no obligation. Or if interested, ask for our Engine or Pump catalogs.

## WITTE ENGINE WORKS

**Kansas City, Mo. Pittsburgh, Pa.  
6746 Witte Bldg. 6746 Empire Bldg.  
6746 Witte Bldg., San Francisco, Calif.**



**Don't Be  
a  
Slave**

**Be independent and  
make big profits with the**

## BEISSER KEY MACHINE

You can start a business of your own, no experience necessary. Only machine that will make first keys without taking lock apart. Makes a dozen duplicate keys per minute.

Write Today for Full Particulars

BEISSER KEY MACHINE CO.

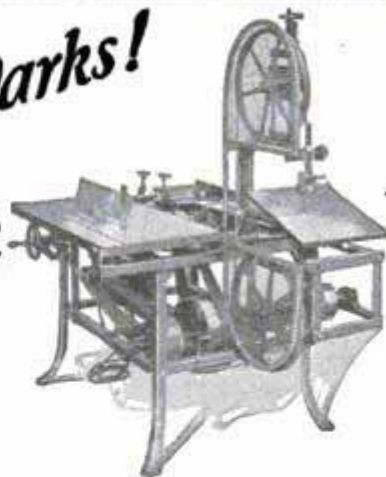
407 Fort Street, East Detroit, Michigan

*A new Parks!*

**Cabinet Shop  
Special No. 7**

**\$250**

as illustrated  
with motor



**You ought to have this handy Parks in your shop!**

A compact, complete machine designed just like a big production outfit at one-fifth the cost. Nothing extra to buy. Motor is included, operating from any light socket. Fits in a corner of your basement. Does any kind of cabinet and joinery work. Circular saw, jointer and bandsaw on permanent all-steel frame. Add lathe, shaper and other attachments at small cost. You can make money with this Parks! Write for circular.

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Canadian Factory: 200 Notre Dame East, Montreal, Can.**

# PARKS

WOODWORKING MACHINES

Send 35c for an All-Work File to  
**FAYETTE R. PLUMB, Inc.**  
4817 James St. PHILADELPHIA

## "Single 6" Wrench Set

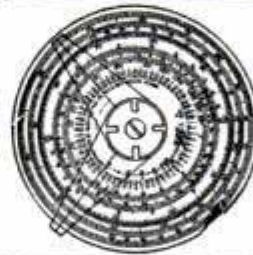


Six strong, finely finished wrenches fitting nuts from 6/15 to 5/8 inches. Mounted on a sturdy key ring so that they can not be lost. Ideal for automobiles, sewing machines, radios and dozens of other needs everyone has.

Sent Parcel Post Prepaid if not at your Dealer.

**Niagara Metal Stamping Corp.**  
Dept. 201 Niagara Falls, N. Y.

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**GILSON SLIDE RULE CO., Niles, Mich.**

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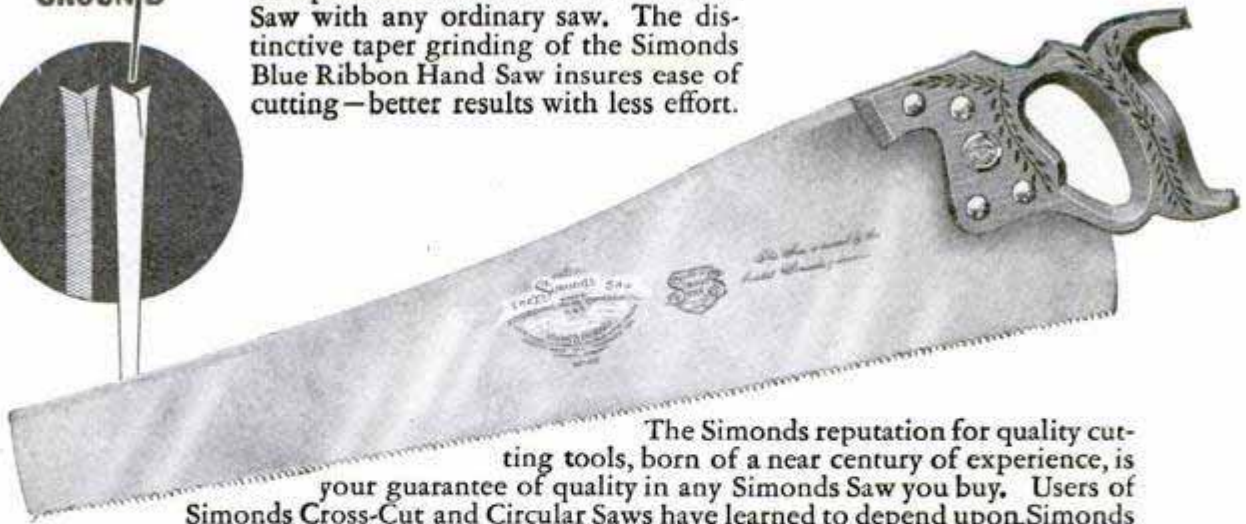
**PROTECT YOUR TOOLS FROM THEFT**  
Write with electricity any name or design on the hardest and finest tools and instruments, or any metal, like writing on paper with pen or pencil. **Complete Outfit \$3.50**—Prepaid Anywhere today. Agents wanted. **ARKOGRAF PEN CO., 1171 E. Stark St., Portland, Oregon**



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GROUND



Compare the cross-section of a Simonds Saw with any ordinary saw. The distinctive taper grinding of the Simonds Blue Ribbon Hand Saw insures ease of cutting—better results with less effort.



The Simonds reputation for quality cutting tools, born of a near century of experience, is your guarantee of quality in any Simonds Saw you buy. Users of Simonds Cross-Cut and Circular Saws have learned to depend upon Simonds quality. Every Simonds Saw MUST be perfect. Ask your dealer to show you a Simonds.

SIMONDS SAW AND STEEL CO., FITCHBURG, MASS.

"The Saw Makers"

Branch Stores and Service Shops in Principal Cities

Established 1838

# SIMONDS

Pronounced SI-MONDS

SAWS FILES KNIVES STEEL

**A NEW TOOL**

A SAW IN CUTTING      A FILE IN EFFECT

DOUBLE EDGED TOOL FOR KEEN ACCURATE CUTTING

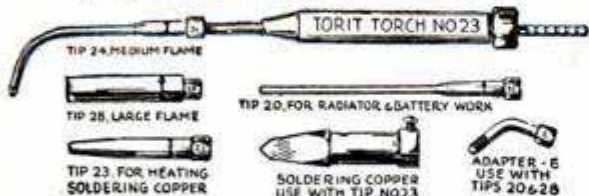
FOR LOCKSMITHS, TOOLMAKERS, MACHINISTS, ELECTRICIANS, DIE-SINKERS, MECHANICS. ADAPTED TO RECEIVE SLOTTING OR BACK SAWS OF DIFFERENT THICKNESSES AND HOLD THEM RIGIDLY FROM SIDE DEFLECTION

POST PAID U. S. \$2.00      HENRY NOYES, 504 18th Street, Oakland, California

## TURN WASTED TIME INTO PROFITS!

Every Purchaser Finds Numerous Uses for the **TORIT Acetylene Torch No. 23**

An Improvement Over the Torit No. 13



Uses Acetylene Only. No oxygen or air pressure required. Tips suck in air. Simply connect to Presto auto tank, light gas, and the outfit is put to work. Gives Heat Instantly! Beats anything you ever tried for soldering, radiator repairing, melting, lead burning, tempering, heating, light brazing, etc. Consists of torch, 4 tips for different kinds of work, soldering copper, 5 feet rubber tubing, tank connection, and full instructions. All ready to use. Quickly Pays for Itself. PRICE (Complete, as shown) **\$7.50**

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**free!**

—Just what you want to know about reducing speeds with the compact, efficient IXL Speed Reduction unit. IXL Speed Reducers may be built into machines, or installed in plants in place of belts, chains and open gearing. They are compact, efficient and safe, transmit power with least possible loss. Made in many types and sizes—up to fifty-thousand-to-one reduction. Send for free booklet.



IXL Spur Gear Speed Reducer

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Sales offices in all principal cities in U. S. and Canada

We make cut gears of all kinds, Micarta Pinions, Micarta Timing Gears, Flexible Couplings, Speed Reducers, Special Machinery.

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Signed .....

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WHY should YOU look for the name "ATKINS" on the blade of the hack saw you buy?

Because it means *extra* value—ATKINS blades are "file tested," insuring longer life and quicker, easier metal cutting. It pays to use better blades.

"ATKINS" means as much on hack saw blades, frames and machines as it does on the famous ATKINS Saws for cutting wood, bone and stone. Look for the name on the blade.

Ask for our booklet "Saws in the Shop" and the ATKINS Hack Saw chart. Sent free.

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Dept. P. INDIANAPOLIS, U. S. A.  
*Leading Manufacturers of Saws for Every Use,  
Saw Tools, Saw Specialties and Machine Knives*

# ATKINS SILVER STEEL SAWS



## Red Devil Tools Better Made

### It's New—It's Different— "RED DEVIL" Giant Grip No. 444

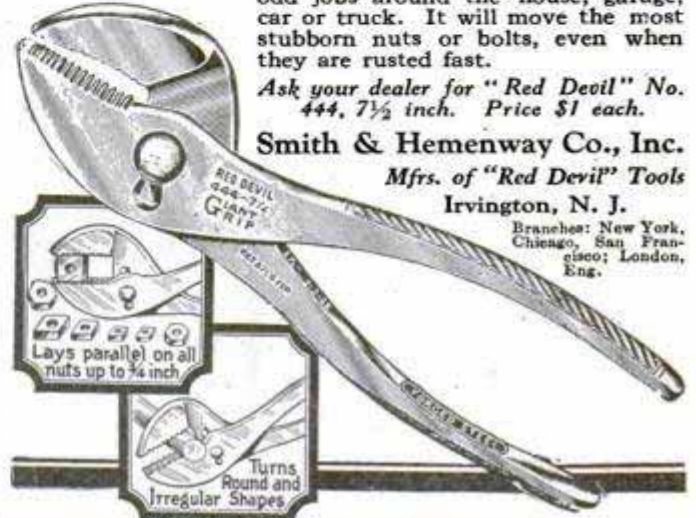
Combines a plier and wrench; it's the greatest improvement since pliers were invented. The "444" has solved most of the plier and wrench troubles. So many things can be done with it that it's the most universal tool made. No springs, no adjusting nuts, no mechanism.

Instantly appeals to the mechanic or motorist for odd jobs around the house, garage, car or truck. It will move the most stubborn nuts or bolts, even when they are rusted fast.

Ask your dealer for "Red Devil" No. 444, 7½ inch. Price \$1 each.

Smith & Hemenway Co., Inc.  
Mfrs. of "Red Devil" Tools  
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Branches: New York,  
Chicago, San Francisco,  
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### TOOL CHESTS of QUALITY

for Machinists and Tool makers  
are shown in our free catalog.  
*Write for it to-day.*

*H. Gerstner & Sons*  
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# MAKE \$15 A DAY

Exclusive Territory



**Sell the Handyman Tool**

**THIS** handy combination tool is a quick, easy seller. Some make \$20 a day. Used daily on farm, garages. Does work of one man. Low price, big profit.

**Only Tool of Its Kind**

Pulls posts, pipes, roots, small stumps; jacks up trucks, tractors, wagons; lifts buildings; stretches fence; splices wire; makes cider press, etc. Money back guarantee. Simple to operate. Lifts, pulls, or pushes with 3 TON CAPACITY.

**Make \$15 a day**—Exclusive Agency to man in each county. Write for sales plan and free demonstrating outfit proposition.

**Harrah Mfg. Company**  
Dept. B 2 Bloomfield, Ind.



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## AIR RIFLE

Made on a different principle from all other Air-Rifles. The Benjamin is really a strong air-pump used to compress the air in the air chamber to any degree of power desired. From one to six strokes of the pump give all the force necessary. Each additional stroke gives increased power. The Benjamin works on the same principle as all air-drills and air-hammers—with this difference:

You control the shooting force as you desire. Look at this block of hardwood. It shows how Benjamin power is regulated as you wish.

You can't have accidents with a Benjamin. It's safe, always, because you control the power. The Benjamin never loses shooting force, and has no springs to get out of order or shake your aim. Write us for an interesting folder about this wonderful air-gun.

If your dealer does not handle arms, and direct to factory—

**(PRICE \$5)  
POSTPAID**

**BENJAMIN AIR-RIFLE & MFG.  
CO., 615 N. Broadway, St. Louis, Mo.**

Ask your dealer for demonstration.

Pacific-Coast  
Representatives  
**THAYER & BOWER**  
Los Angeles  
Calif., and  
San Francisco  
Calif.



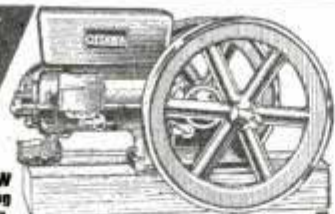
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Write for booklet.

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NOW, ONLY  
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Put This MARVELOUS NEW ENGINE with Easy Starting Device To Work For You.

**Increase Your Profits \$1000.00**

Get my new FREE Book and ridiculously low prices—any size, 1½ H.P. up—Stationary, Saw Rig. Guaranteed to satisfy or your money returned. Built to stand hardest use. 30 days FREE trial. Send postcard for my new Free Book before you choose any engine. Write today. **Harry Overman, Pres.**

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in your  
car!

# ZEV WATER-LESS SOAP

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Send 25c in stamps for half pound sample in convenient tin. Liberal terms to agents and dealers.

**PARKE CORPORATION, KALAMAZOO, MICH.**

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DON'T think of building a new home or repairing an old one without a copy of our free woodwork catalog.

To those who contemplate building or remodeling, this book is a valuable work of reference. In it are found the latest ideas and most advanced styles for everything in millwork. It illustrates and describes windows and sash of all kinds, including porch and storm sash, doors, frames, mouldings, screens, porchwork, stairwork, hardwood flooring, interior finish, cabinet work—in fact, practically everything in manufactured millwork. Every article in the book shows a low money-saving price direct to you.

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PLEASE SEND ME YOUR FREE BOOK

Name \_\_\_\_\_ St. No. \_\_\_\_\_  
Town \_\_\_\_\_  
State \_\_\_\_\_  
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**Book is Free**

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Drive ¼-in. chisel through 1½-in. machinery steel. Lock our wrench with any other wrench and bring pressure until one breaks. Drive rivet punch through auto frame. Cut shavings off axle shaft with bearing scraper. If tools show slightest harm, return them.

## CORNWELL Hand-Made Tools

Made of finest Swedish Charcoal Process Molybdenum Steel, from our famous Cornwell secret formula. Forged, heat treated and hardened and tempered in oil. Made by hand, NOT drop forged and case hardened.

### Tools Like These Never Made Before

Mechanics amazed that such tools could be made. Place trial order at our risk. No other tools can stand these startling tests. Hundred thousand users.

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We replace any tool not standing astounding tests described in booklet. If you ever saw tools like these, return your order and get your money back.

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**CORNWELL QUALITY TOOLS CO.,**  
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Send me illustrated booklet with prices on full line of Cornwell Secret Formula Hand-Made Tools.

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Name .....  
Address .....  
City ..... State.....



# LOFTIS

BROS. & CO. F858

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### CASH or CREDIT



No. 27  
Blue White, perfect-cut Diamond. Solid 18-k White Gold. Price \$100. Terms: \$10 down, then  
**\$2.50**  
A Week



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Blue White perfect-cut Diamond. The ring is Solid 18-k White Gold, \$17.50. P & F \$3.75 down, then  
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18K

**WEDDING RINGS**  
All Platinum, \$25 up. With Diamonds: Three Diamonds, \$65; five Diamonds, \$80; seven Diamonds, \$95; nine Diamonds, \$110; surrounded by Diamonds, \$225. Solid White or Green Gold, \$5.00 up.



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## The Natural Body Brace

Overcomes WEAKNESS and ORGANIC AILMENTS of WOMEN and MEN. Develops erect, graceful figure. Brings restful relief, comfort, ability to do things, health, strength.



For Boys and Girls Also

## Wear it 30 Days Free at Our Expense

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**Keep Yourself Fit** Write today for illustrated booklet, measurement blank, etc., and read our very liberal proposition.

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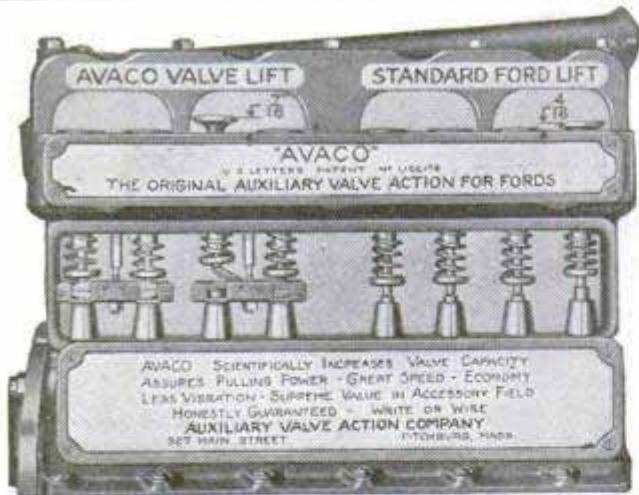


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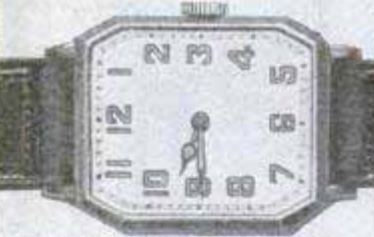
**A76—**Ladies 18K White Gold. AA1 blue-white diamond and regular-cut diamond on each side of shank \$52.



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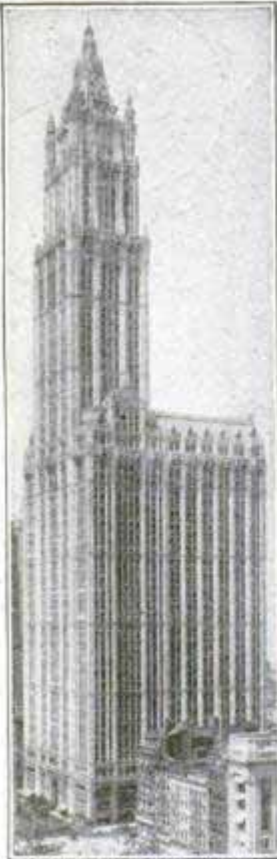
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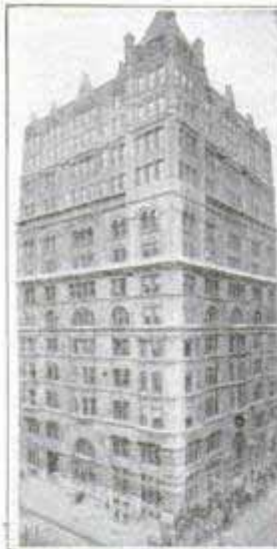
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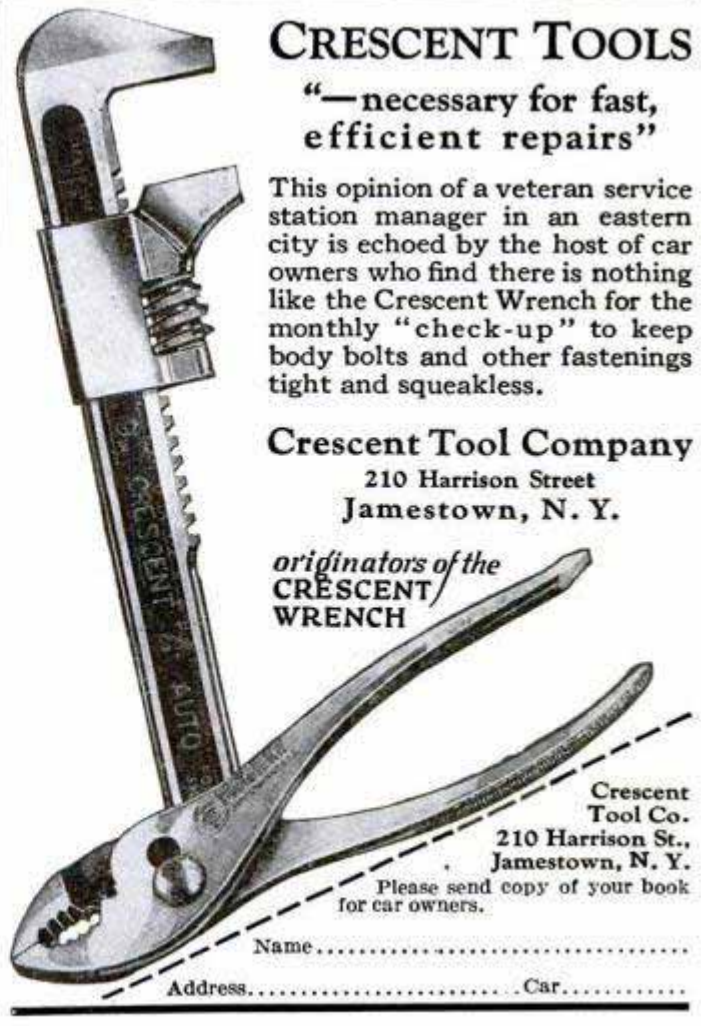
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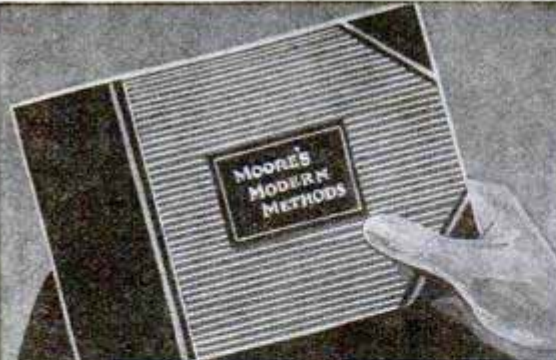
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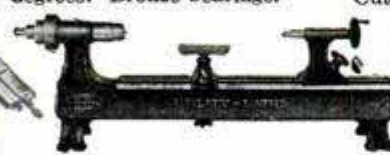
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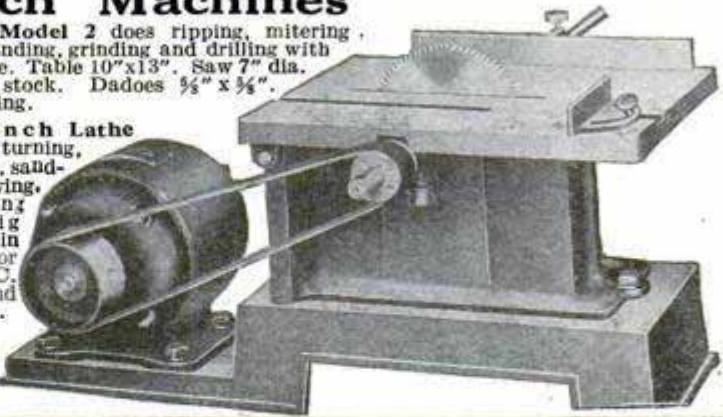
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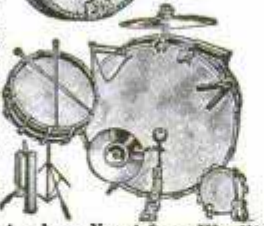
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From the grind of every day—  
From the drudgery of things you have to do?  
Do you want to settle down  
Near a lively, busy town,  
Where the joy of living will appeal to you?

Do you want to scent the breeze  
Coming through the orange trees?  
Do you want to hear the birds call—loud and clear?  
Are you seeking perfect health  
That's combined with certain wealth  
And an income from an orange grove each year?

Do you want a piece of land  
That will grow to beat the band  
All the different garden crops that you enjoy?  
Do you want to make a "Nest,"  
And a permanent bequest  
For the future welfare of each girl and boy?

Do you want a sunny climate  
Where there's fishing all the time?  
Where there's ducks and deer and quail and other  
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Where the summer climate's cool,  
And within each lake and pool,  
You can swim in January—just the same?

Do you want to buy this land  
On an easy-payment plan,  
With about your monthly outlay for cigars?  
Do you want to read a book  
That will make you want to look  
On the finest land that lays beneath the stars?

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Put it in the mail today,  
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After you have read it through,  
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Just address another letter here to me.

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Life will take on added charm,  
And you'll never lack a dollar—nor a meal.

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A BUSINESS TO ENTHUSE OVER — THE "IDEAL" LAWN MOWER SHARPENER

A wonderful invention that sharpens lawn mowers scientifically—quickly—perfectly; does the work as nothing else can.

**Fred C. Milkert, of Roselle, Ill., writes:** "The Ideal Lawnmower Sharpener put me in business, starting in the basement of my home and forcing me now for the third time to move into bigger quarters. Today the dream of my life—a shop of my own—is realized. With a machine like yours and a little hustle any man can have a business of his own and be independent."

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**You Start Now** No town too small. **D. S. Newcomer, Vinton, Iowa, writes:** "People come for miles around and from other towns to get their mowers ground." Lawn mowers are dull—owners don't know where to get them sharpened. Mowing the lawn dreaded because of dull or improperly sharpened mower. Lawn mowing healthful, invigorating and pleasant when mower is "Ideally" sharpened. You do the work scientifically—you are in big demand.

### Lawn Mowers Sharpened to Razor Edge—

People glad—owners delight in mowing lawn with mower sharpened on an "Ideal." Mower runs light—click-click and the grass is cut. Build permanent business for yourself. Start now!

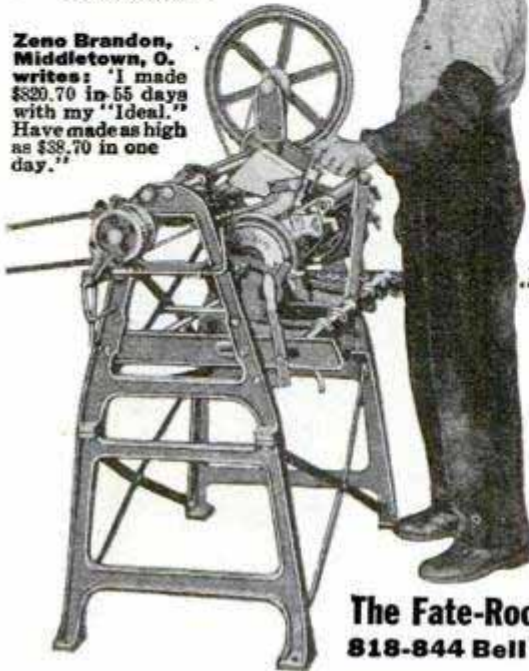
### Write Today—FREE

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Write Today!

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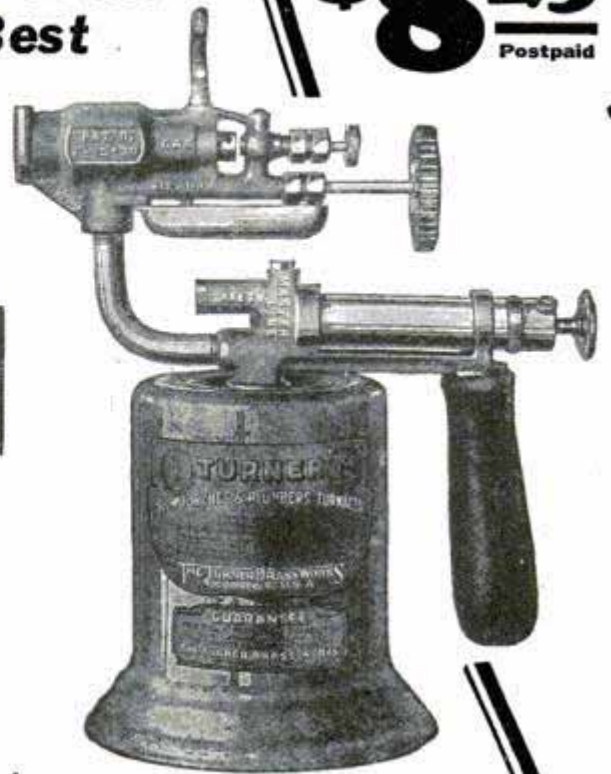
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It permits you to do your best work because all the hazards and troubles common to ordinary blotorches have been eliminated by Turner patented features. Over 50 years' experience have enabled us to perfect a blotorch that is safe, fast, convenient and durable.

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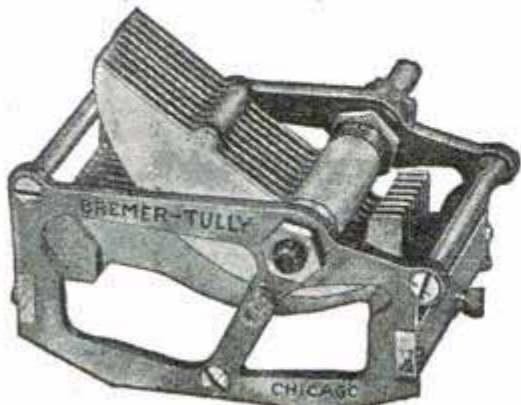
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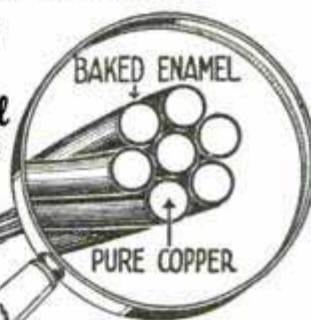


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it's a **Beldenamel Aerial**

**N**O RADIO fan wants to put up an outdoor aerial more than once, if he can help it. That is why the experienced set owner installs a Beldenamel Aerial.

Every strand of a Beldenamel Aerial is carefully coated with baked Beldenamel to resist the corrosive action of atmospheric fumes and smoke. A bare copper aerial soon corrodes and becomes inefficient. A Beldenamel Aerial lasts for years without deterioration.

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Install a permanent Beldenamel Aerial, sold in a distinctive striped carton, clearly labeled for your protection against substitutes. By using a 150-foot length, the aerial wire can be used as a lead-in without joints.

**Belden**

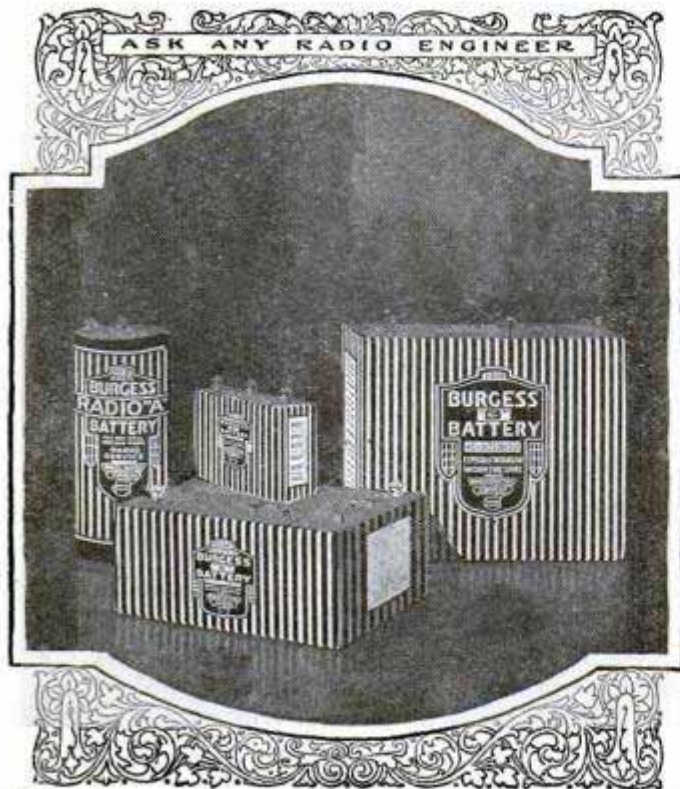
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And to be able to contribute their energy and to add to the complete efficiency of your receiving equipment, those batteries must combine every desirable factor and formula known in the electro-chemical field.

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View of inside construction of the "Model R" (Rauland-Lyric-equipped) showing steel chassis and arrangement of parts.

See it and hear it—  
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## Radio Blueprints at Cost!

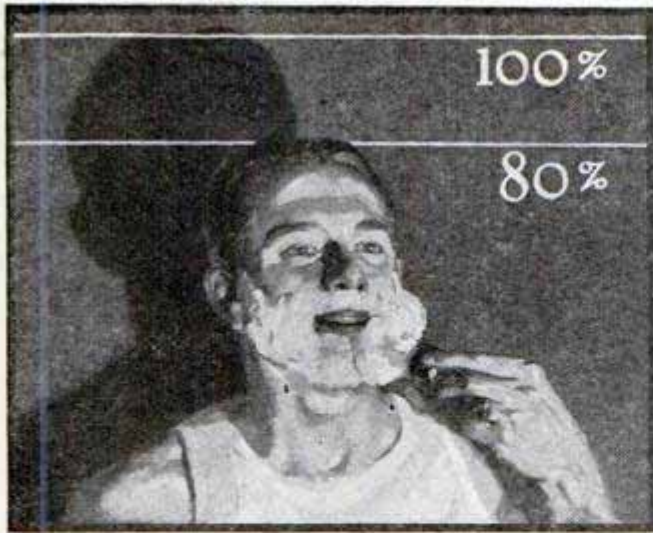
Blueprints for the most popular sets described in Popular Mechanics Magazine can be obtained for a charge just sufficient to cover the cost of production and mailing. The sets for which blueprints are available are:

One Tube Ultra-Audion .....	April 1924 — 10c
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We win 80 out of every 100 men to this unique creation

# Say the word

And we'll send you a 10-day tube of this unique shaving cream to try

(NOTE COUPON BELOW)

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The way we win new customers to Palmolive Shaving Cream is by giving men a 10-day tube to try.

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It embodies the four great essentials 1000 men told us they wanted in a shaving cream, plus a fifth that we ourselves found and added.

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You'll find it superior in at least five major ways:

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Now in courtesy to us, will you accept a test of our shaving cream; give us the opportunity to prove the claims millions make for it?

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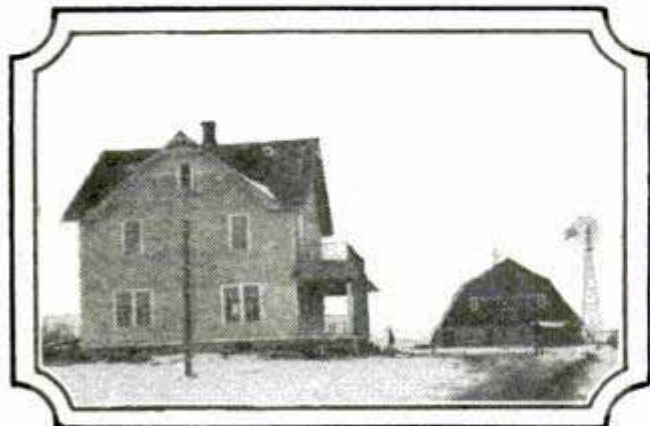
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*Commodious house and barn on Mr. Sather's Farm*

## This Farmer's Experience Can Be Yours

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(Signed) LARS P. SATHER

Alberta, Can., Nov. 19, 1925

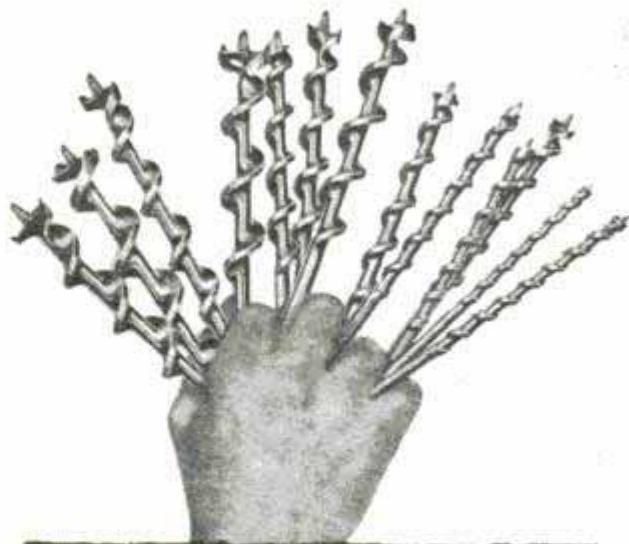
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They will serve better and last longer if you buy them in a set and are careful to select Irwins.

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With such a set you save time by always having the size needed.

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One of these three sets probably will just meet your requirements. Carpenter Set—13 bits and case. Home Set—6 bits and case. Handy Set—10 bits and case.

# IRWIN Auger Bit Sets

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shows, in addition to above profit on our CAIRO mold, he made \$15.00 profit on each of 300 lawn benches; \$2.50 profit on each of 250 ARDMORE vases; \$10.00 on each of 80 bird-baths, etc., etc.

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You too can make these big profits selling this wonderful new invention. Every man who sees it wants 2 to 6 at once.

# Sell Stay-Prest TROUSER PRESSERS

They went like wildfire from the start. It was the very thing men everywhere had been hoping someone would invent. It's a common thing to sell six to a customer. ANYONE CAN SELL THEM! The Stay-Prest puts in knife-edge crease, removes baggy knees and smoothes out entire surface. Easy to use—takes only a few seconds. Saves nap of cloth. Looks rich. Folds to 15 inch package. Over 1,000,000 satisfied customers prove that the article is right. **4 Patents.**

## LOOK AT THESE RECORDS

- \$33** G. M. Stewart, W. Va., tried selling this big repeater in spare time and made \$33 his first week so decided to devote full time to it.
- \$17** S. D. Mathews, Minn., gave this a trial as a side line. He made \$17 in his first two hours and decided to devote his full time to the work.
- \$500** J. W. Varner, Iowa, made over \$500 the first month he sold this big money-making specialty.
- \$32** Mrs. Helen Rhodesby, Oklahoma, made \$32 the first day she tried selling this device. She is now one of the most successful "salesmen" of it.



## YOUR PROFITS IN ADVANCE

Your profits in advance on this big new specialty and it sells quickly—average sale made in 8 minutes. 40% profit to you. Big repeater. You simply write orders. We ship and collect.

**FREE TO ANY MAN OR WOMEN**

Folds to Small Pack 15 in. Long

Special offer enables you to obtain Selling Outfit absolutely free. The Stay-Prest folds into neat, light, compact case. Outfit has everything necessary to begin at once to make \$20 a day—\$35 to \$50 a week spare time—or \$100 to \$150 a week full time. Simply mail the coupon and make the quickest money of your life.

**THE GETGEY-JUNG COMPANY** C-122 G. & J. Bldg., CINCINNATI, OHIO

**THE GETGEY-JUNG COMPANY**  
C-122 G. & J. Bldg., Cincinnati, Ohio

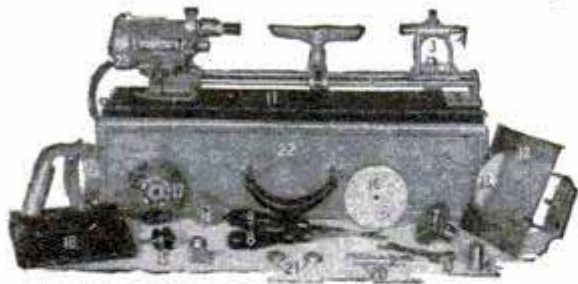
Please send me full information about the "Stay-Prest" Trouser Presser and your New Selling Plan.

Name .....

Address .....

City ..... State .....

# New Speed Way Shop



## 10 Days' FREE Trial in Your Own Home

The SpeedWay Shop consists of a compact metal and woodworking outfit for mechanics, householders and "handy" men. Driven by famous SpeedWay motor which is easily detached, giving you a Portable Electric Drill. Tools quickly interchangeable. We ship it to you for 10 days' free trial. Use these six motor driven tools and satisfy yourself that they are all we claim and more.

### Free Trial of Motor Driven Saw, Lathe, Grinder, Buffer, Cleaner, Drill

Attaches to any lamp socket. All packed under pressed steel case (No. 23 above) with lathe bolted to platform 25 in. x 6 in.

**Check the Numbers on the Photograph**

- |                 |                         |                                   |
|-----------------|-------------------------|-----------------------------------|
| 1. Lathe Bed    | 9. Gouge Chisel         | 17. 4-in. Wire Brush              |
| 2. Tool Rest    | 10. Universal Wrench    | 18. Tool Case                     |
| 3. Tail Stock   | 11. Base 25 in. x 6 in. | 19. Drill Handle                  |
| 4. Centers      | 12. Saw Table           | 20. Drill Bits                    |
| 5. Chuck        | 13. 5-in. Circular Saw  | 21. Nut and Washer                |
| 6. Spur Center  | 14. 2-in. Wheel         | 22. Steel Cover                   |
| 7. Face Plate   | 15. Arbor and Flanges   | 23. The Well Known SpeedWay Motor |
| 8. Parting Tool | 16. Cloth Buffer        |                                   |

## Only \$10.00 Down

Five minutes after receipt you can have the chips flying. Pay as you enjoy it. Use the SpeedWay Shop for pleasure or profit. Nothing will bring greater joy to the mechanic or tool lover, to all "boys under 90" who like to make things, than this SpeedWay Shop.

## Free Job Sheets

We furnish free, Job Sheets explaining just how to make Furniture, Birdhouse, Toys, Trellis, etc. You can do Radio jobs; polish auto and golf clubs; and endless other things.

**Write Today for Full Information**

Every tool in the "Shop" is high grade, for regular work. A money maker for the small job man. Send coupon for full particulars.

**ELECTRO-MAGNETIC TOOL COMPANY**  
DEPARTMENT 23  
1830 South 52nd Ave., Cicero, Illinois (Adjoining Chicago)

**SEND COUPON TODAY**

**ELECTRO-MAGNETIC TOOL CO.**  
Dept. 23, 1830 South 52nd Ave., CICERO, ILL.  
Dear Sirs: Please send me full particulars about 10-day free trial on SpeedWay Shop Model 260.

Name.....  
Address.....  
City..... State.....

## A Baby Grand Lathe in YOUR Home or Shop

An accurate, high grade tool for doing the most fascinating, educational and profitable class of work.

**Make the Things You Want** of metal, wood or other material, on this thoroughly practical machine built for honest service by experienced lathe builders and sold at a popular price direct from factory to user.

**POSITIVE MONEY-BACK GUARANTEE**

We also make Drills, Grinders, Accessories, Tools and Supplies.

The Watson Mfg. Co., Toledo, Ohio

103  
Watson  
Bldg.

Write today for illustrated folder giving complete description and prices.



## AGENTS WANTED \$3.95 Womens Spring Shoes at Factory Prices

GOOD PAY NO INVESTMENT

### Pile Up Amazing Profits Today!

Build up enormous "repeat" business for tomorrow. Women are spenders. Buy as high as 12 times as many pairs shoes as men. Spring BIG MONEY time in women's shoes. Necessity says: Buy new shoes! Fashion says: Buy new shoes! In every house in your town women eager for opportunity of securing choice 35 smartest spring styles at bargain (factory) prices. You write up orders. Interesting work. Pay daily. We deliver, we fit, we collect. Work fast. Send in application today. Big selling season just ahead. Highly-rated pioneer firm.

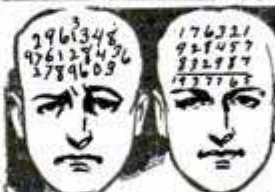
**STYLE-ARCH SHOE CO.**  
DEPT. D-3 CINCINNATI, OHIO

## Handbook for Farmers

861 discoveries by practical farmers, telling how to make, repair or improve the various devices and machines used about a farm or garden. 683 illustrations. "The Most Remarkable Book Ever Published for Farmers," says one authority. **Send No Money.** When the postman delivers the book to you, hand him \$1 plus the few cents postage.

**POPULAR MECHANICS PRESS**  
Popular Mechanics Building, Room 703, Chicago, Ill.

**Auto Tourist's Handbook** tells how to make equipment for inexpensive touring with Auto Owner's Handbook, 98c. **Send No Money.** Just write a postal. Pay postman postage and price. Popular Mechanics Press, Room 703, Chicago, Ill.



## ADD Quick! NEW EASY WAY

NEW patented pocket calculator adds, subtracts, multiplies, divides. Works like \$300 machine. A child can operate it. 9 columns—adds up to a million. Corrects errors without clearing total. Total always visible. Clears automatically. No mechanism—nothing to get out of order. **VEST POCKET SIZE—All-metal machine. Handsome etched brass. Wt., 4 oz. Fits in beautiful blue leatherette case—looks like pocket notebook. Rounded corners—can't tear pocket.**

**AGENTS! \$23 a Day**

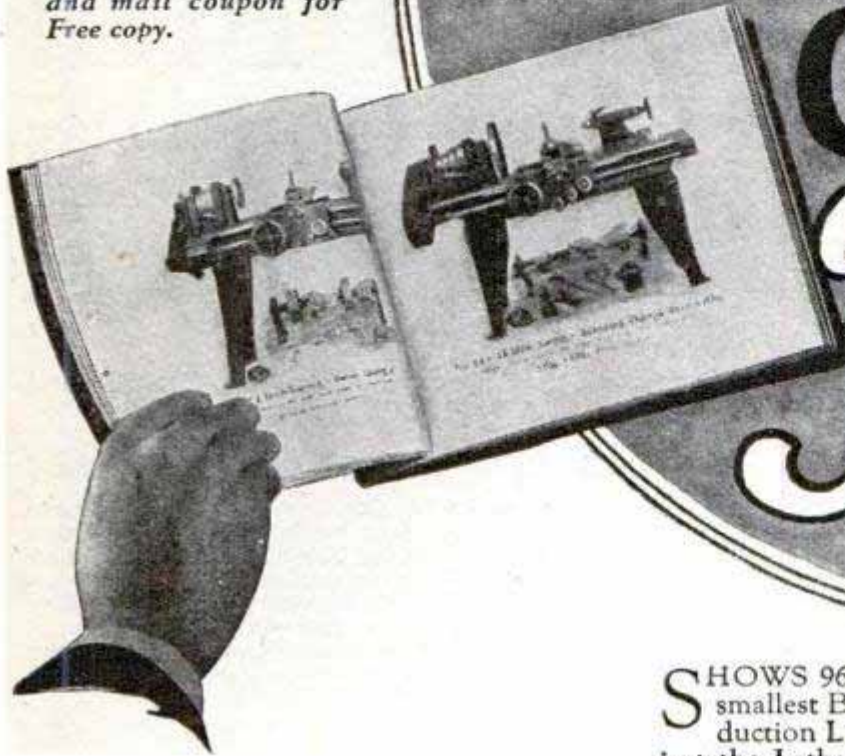
Sells on sight to offices, stores, small business men. Endorsed by noted C. P. A's. Others earning \$15 to \$34 a day. Get special offer.

**FREE TRIAL—Don't send money. We trust you. Simply order on 10-day trial. Pay postman \$2.95 on delivery. Return it if not satisfied and get your money back. Avoid costly arithmetic errors. Save money on expensive machine—V-P-A serves same purpose. Compare at our risk before you decide. Write Reliable Adding Machine Corp., Dept. C-1, 184 West Washington Street, Chicago.**





This 80 page Book illustrates and describes the complete line of South Bend Lathes. Fill out and mail coupon for Free copy.



# New Lathe Catalog

# Free!

SHOWS 96 styles and sizes of Lathes from the smallest Bench Lathe to the largest Factory Production Lathe. In this Free Book you will find just the Lathe you want—Countershaft driven or Silent Chain Motor driven, Standard Change Gear or Quick Change Gear—all offered at surprisingly low net factory prices.

## The New South Bend Lathe

—is NEW in every one of its 352 parts. NEW in design and NEW in pattern development. It is heavier, stronger, has greater belt power, is more efficient and complete. It is a precision Lathe of the finest type. Although we have been building fine Lathes for 20 years and have 33,000 of them in use in the U. S. and 64 Foreign Countries, we devoted 2 years of special development work and an investment of \$250,000 to bring to you this New Masterpiece—the New South Bend Lathe.

Write or send coupon below for a Free copy of this New Lathe Catalog.

If desired, easy payment terms can be arranged for you in the purchase of any South Bend Lathe.

### SOUTH BEND LATHE WORKS

805 E. Madison St. : South Bend, Indiana

#### SOUTH BEND LATHE WORKS

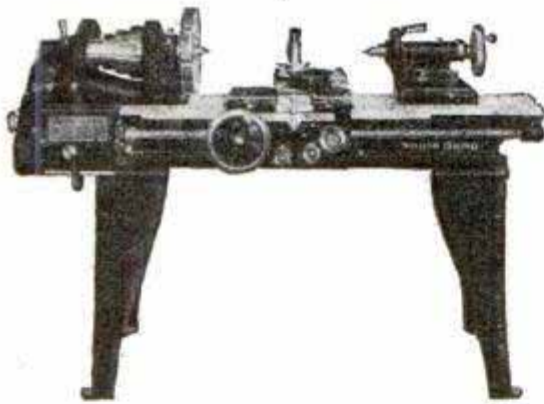
805 E. Madison St., South Bend, Ind.

Gentlemen: I would like your net factory price on a Screw Cutting Lathe, size----- For (check kind of work)  Manufacturing  Garage Work  Machine Shop  Vocational Work  
Please send Free Catalog.

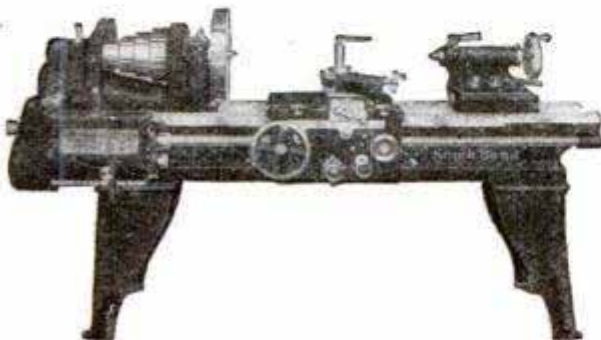
Name-----

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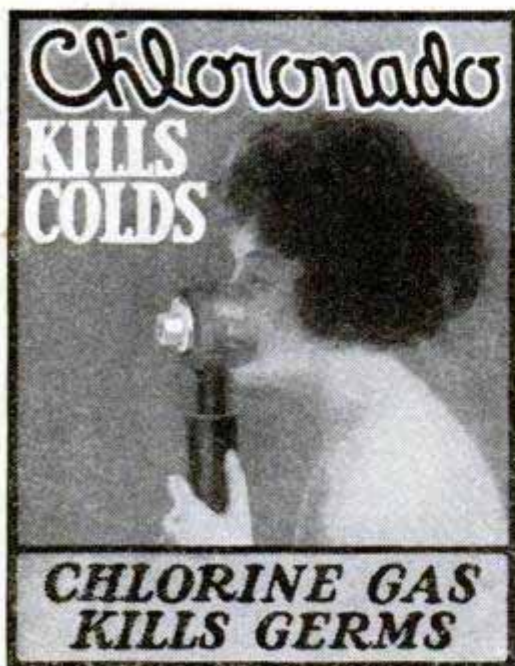
City-----State-----



13 inch Swing over Bed, 5 ft. Bed, Quick Change Gear. Net Factory Price **\$387**  
Easy Payments if Desired.



18 inch Swing over Bed, 8 ft. Bed, Quick Change Gear. Net Factory Price **\$693**  
Easy Payments if Desired.



**Chloronado**  
**KILLS**  
**COLDS**

**CHLORINE GAS**  
**KILLS GERMS**

### Chloronado Needed Everywhere

Chloronado is the first scientific Chlorine Gas Generator for the home. Thousands now in use. Millions need this aid to the prevention of colds and other chronic respiratory ailments.

# Chloronado GOING BIG!

## Earn as Much as \$40 a Day

Here's the opportunity of a lifetime to build a highly profitable business.

Chlorine Gas—the treatment developed by U. S. Army Physicians—for colds, catarrh, hay fever, bronchitis, influenza and many other respiratory diseases can now be had by everyone in their own homes.

The same gas treatment used by President Coolidge and thousands of prominent people with remarkable results.

### A Money-Making Offer to Men and Women

Chloronado salesmen can easily earn \$5,000 or better—distributors \$10,000 to \$15,000. Everyone is interested in preventing disease—everyone is a prospect for Chloronado.

There is still some choice territory open to wide-awake salesmen and distributors. Enter your application in NOW—

Get the cream of the business in your locality by being the first to offer this amazing device. Live leads furnished to salesmen—National advertising and circularizing campaigns—every possible help and co-operation to aid you in building a permanent, profitable business. Write or wire for full details.

### A Very Interesting Proposition to State Distributors

**CHLORONADO LABORATORIES CO.** 439 E. Fort St. Detroit, Mich.

**"Interlox"**  
**MASTER SLIDE RULE**  
Takes accurate inside or outside measurements  
**MASTER RULE MFG. CO., 841-43 E. 136th St., New York**  
Dealers and Agents: request attractive proposition

Works fast. Slides in and out quickly. Durably made of brass trimmed boxwood. Any length 2 to 8 feet, 20 cents per lineal foot. If not at dealer's, sent postpaid.

**APEX VERNIER DIALS**  
ARE BEST ON ANY SET—ASK YOUR DEALER OR WRITE US  
**APEX ELEC. MFG. COMPANY, CHICAGO**

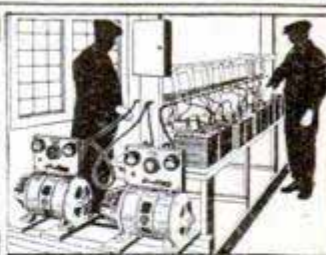
**Ideas for Housekeepers** Over 500 ideas in our Handbook for Women and Home Mechanics. Two books of discoveries for 98c. Send No Money. Just write a postal. Pay postman postage and price. Popular Mechanics Press, Room 703, Chicago, Ill.



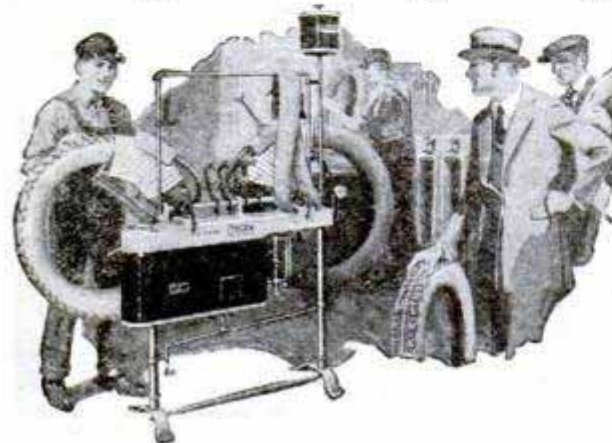
**ONE DAY BATTERY CHARGING PAYS BIG YOU CAN CLEAR \$150 to \$300 MONTHLY PROFITS**

Thousands of HB users are making big profits every month. Every car owner and radio owner wants quick, reliable One Day Charging. Get their business with an HB One Day Battery Charger. Small cash payment brings you complete outfit on 30 days' trial with moneyback guarantee. Only \$16.50 monthly pays for your HB, easily made many times over by your increased battery charging business. Get an HB now. Start making \$150 to \$300 clear monthly profits. Write for free bulletin 326.

**HOBART BROS. CO. Box M3 TROY, OHIO**  
**MAKE YOURS THE BUSY SHOP WITH HB ONE DAY BATTERY CHARGING**



## Easy Money Repairing Balloon Tires



Go into the tire repair business NOW and make \$75 or more a week. One man made \$45 the first day he received his outfit. Millions of new autos every year and high price of tires creating enormous demand for tire repair work. No big investment necessary. We teach you. Easy to learn. *Big profits and independence if you act now.*

### **SHALER** New Tire Repair Outfit Makes it Easy for You

to become expert in a few hours and make big money right away. This wonderful outfit costs but little, yet does everything expensive complicated outfits do. A boy can operate it and make perfect repairs.

**WRITE QUICK** for new Shaler book on Balloon Tire Repairing, and full information..... **FREE**

**C. A. SHALER CO.**

2703 Fourth St.,

Waupun, Wis., U. S. A.

World's Headquarters for Tire Repair Equipment



*"Get Dad in—  
he'll love it"*

**The  
BRUNSWICK  
"Home Club"  
Billiard Table**

a beautiful dining or living  
room table in rich American  
Walnut, instantly con-  
vertible by removing  
the top into a com-  
plete billiard table

## Sport • Fun • Thrills Galore!

—all in your own home at small cost!

COME on, you sport lovers— you young fellows from 7 to 70! Here's some real fun for you! The sportiest, most fascinating game in the world— Billiards— now made available for every home through the Brunswick convertible "Home Club" Table—and you don't have to be well-to-do to own one either. That part's easy now!

There's nothing in all the world that will give you—and will continue to give you indefinitely—more genuine enjoyment, more entertainment per dollar invested than a Brunswick "Home Club" Billiard Table.

Here's a game that everyone

can enjoy. Get Dad into it— Mother too! Let's see who is champion in your house. Strength, size or age doesn't count in this wonderful sport. Sister has just as fair a chance to win as her big husky brother.

Skill is the thing that counts in billiards. Skill that comes with practice—that develops coolness, clear thinking, coordination of mind and muscle and SPORTSMANSHIP.

Get Dad to buy you one of these remarkable Brunswick "Home Club" Billiard Tables. They're convertible. With the

top on you have a beautifully finished American Walnut dining or library table. Take it off and you have a fully equipped, good sized billiard table for either carom or pocket billiards.

Everybody, of course, knows the quality of Brunswick-Balke-Collender Tables. They are the standard, used in all the fine clubs. If you will send in the coupon printed below, a full description of them, together with reasonable prices and easy terms, will be sent immediately.

Let's start today to enjoy life. Get your coupon off tonight.

Play **BILLIARDS** — the  
greatest home game ever devised

The Brunswick-Balke-Collender Company  
Established 1845 Branches in All Principal Cities of the U. S. and Canada

### Do People Like to Come To Your House?

They will, if you have something to entertain them with. Nothing offers as much interest, fun and enjoyment as a Brunswick "Home Club" Billiard Table. The party never lags or grows tiresome. Billiards or pocket billiards offers thrills, excitement, entertainment galore. Try it and see.

The Brunswick-Balke-Collender Company

Dept. H-343, 623 S. Wabash Ave., Chicago, Ill.

Gentlemen: Please send me complete description of your home billiard tables, together with prices and terms, and oblige.

Name \_\_\_\_\_

Address \_\_\_\_\_

# Don't Get Stuck In Mud, Sand or Snow



## USE Gets-U-Out Pressed Steel Tire Lugs

WHENEVER you attempt to drive your car or truck through deep mud, sand or snow—the chances are ten to one you're going to get stuck. And you'll probably end up by paying \$5 to \$10 towing charges.

But with a Set of 4 of my (patented) Gets-U-Out Pressed Steel Tire Lugs in the tool box, you're worry free. In a jiffy you slip 2 on each rear wheel—and out you go—even if you're buried up to the axles. In an instant you slip them off and replace them in the tool box. No fuss—no muss—no trouble—simple—a woman can use them. Constructed of steel, rust proof and with nothing to get out of order, my Lugs will last for years.

Your car deserves a Set.



AMAZING NEW INVENTION

### Grab This New Year Around Seller Earn \$75 to \$150 Weekly

OVER 20,000,000 car owners are waiting for my marvelous device. *Positively nothing like it.* One minute demonstration gets the order. Sells at a low price—with 100% profit. You'll positively coin money—full or spare time—with this much needed accessory. And it isn't necessary for you to invest your bank roll either.

ART. J. BENSON, Gen'l Mgr.

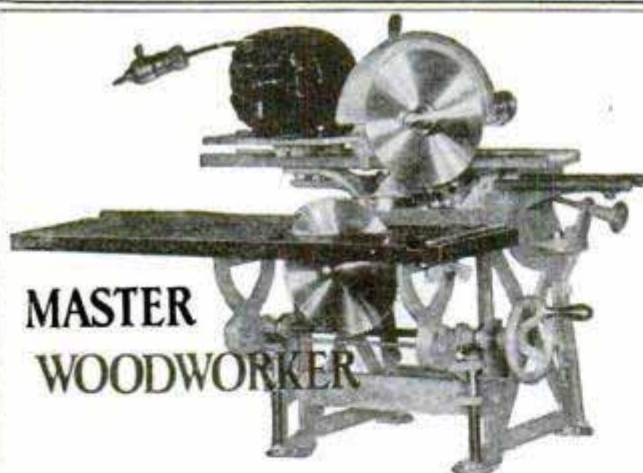
**CHICAGO TIRE LUG COMPANY**  
338 W. 47th Street, Dept. 4, CHICAGO, ILL.

### FREE OFFER To Agents

Act quick. Write me NOW—today—for my FREE OFFER—a postal will do. Territory going fast.

### PROOF

"Your Lugs have never failed to pull my heavy 2 ton truck out of deep mud, sand or snow." J. J. Andrest, Minn.



## MASTER WOODWORKER

Own Your Own Woodworking Shop—Low Price  
Easy Payments

Whether you make things from wood, for fun or for profit, you ought to own this wonderful low-priced, long-lived machine—a complete woodworking shop for home, factory or construction use.

The "Master" is 12 machines in one. It does cross cutting, ripping, jointing, boring, sanding, dadoing, planing, plowing, mitering, rabbeting, molding, band sawing, mortising, tenoning, grinding, matching and stair routing.

Wonderfully speedy and accurate—sturdy and reliable. Lasts a life time—runs from a lamp socket.

Model No. 10, illustrated, rips 1" stock, cross cuts 2" stock. Three larger models for heavier work.

Costs little—sold on easy payments.

MASTER WOODWORKER MFG. CO.  
612 BRUSH ST., DETROIT, MICH.

Send for big description book

P. M. S.



## "The finest Trumpet I've ever played"—

THIS opinion, expressed by thousands of owners of King Saxophones, Trumpets, Trombones and other band instruments, is a tribute to the exacting standards to which "Kings" are built. Every instrument is true in pitch and scale,—is easy to play and has a beautiful tone quality.

### Free Trial—Easy Payments

"Kings" are shipped on 10 days' trial, where there is no dealer. The payment plan makes possible the buying of some instruments for as little as \$5.00 per month.

### Send for a Catalog

If you play any instrument or are thinking of getting one, send for the "King" catalog before purchasing. This catalog will tell you how "Kings" are built, explain the various exclusive features which make "Kings" the finest instruments you can obtain.

THE H. N. WHITE CO.  
Manufacturers of KING Band Instruments  
5211-73 Superior Ave. Cleveland, Ohio

The H. N. White Co., 5211-73 Superior Ave., Cleveland, O.  
Kindly send me free without obligation your latest catalog on KING \_\_\_\_\_ (Instrument)

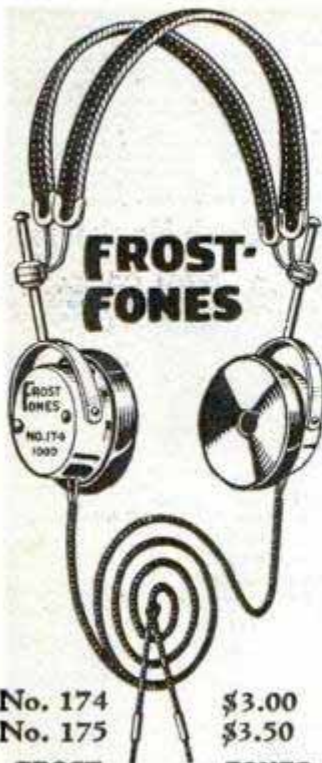
Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

# FROST-FONES

**Highly sensitive to weak signals**



To get any real enjoyment out of DX work you must use a good pair of head fones, which are designed specifically to pick up weak signals. Due to our extreme care in winding coils, lapping shells, grinding magnets and testing and measuring **FROST-FONES** they are about twice as sensitive to weak signals as most other head fones. We could not be more particular about **FROST-FONE** quality if we built them to sell for ten dollars. Our huge production insures low prices and our rigid inspection guarantees high quality. Your dealer in your neighborhood stocks **FROST-FONES**. Order from him today.

No. 174 \$3.00  
No. 175 \$3.50

**FROST-FONES**  
**HERBERT H. FROST, Inc.**  
314 West Superior Street Chicago, Illinois  
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Export Office: 314 West Superior St., Chicago, Illinois

## BIG MONEY—Sell RADIO



### IMPERIAL 5-Tube Set

Demonstrate this wonder receiver. Every demonstration a sale. Price lower than others and performance not equalled by many sets costing several times our price. Hundreds of successful agents. Thousands of sets already sold. \$100 a week—every week—easy. Write at once for agent's proposition—before your territory is taken.  
SIMPLEX CO., 2035 S. Michigan, Dept. 24, Chicago



### 12-Cell—24-Volt Storage 'B' Battery

Positively given free with each purchase of a WORLD "A" Storage Battery. You must send this ad with your order.

Send Your Order in Today

# FREE!



WORLD Batteries are famous for their guaranteed quality and service. Backed by years of successful manufacture and thousands of satisfied users. Equipped with Solid Rubber Case an insurance against acid and leakage. You save 50 per cent and get a 2-Year Guarantee Bond in Writing. WORLD Battery owners "tell their friends." That's our best proof of performance. Send your order in today.

**Solid Rubber Case Radio Batteries**  
6-Volt, 100-Ampers.....\$8.25  
6-Volt, 120-Ampers.....13.25  
6-Volt, 140-Ampers.....14.00

**Solid Rubber Case Auto Batteries**  
6-Volt, 11-Plate.....\$11.25  
6-Volt, 13-Plate.....13.25  
12-Volt, 7-Plate.....16.00

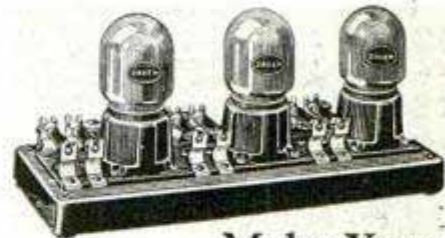
Send No Money wanted and we will ship day order is received, by Express C. O. D., subject to your examination on arrival. **FREE "B" Battery** included. **Extra Offer:** 5 per cent discount for cash in full with order. Buy now and get a guaranteed battery at 50 per cent saving to you.

**WORLD BATTERY COMPANY**  
1219 S. Wabash Ave., Dept. 6, Chicago, Ill.

# World For AUTO and STORAGE BATTERIES RADIO

Approved and Listed as Standard by Leading Authorities including Radio News Laboratories, Popular Science Institute of Standards, Popular Radio Laboratories, Radio Broadcast Laboratories, Radio in the home, and Lofa., Inc.

# Let the Pure Tones Through



The Daven Super-Amplifier used with any set or circuit carries through the full, clear tones of the broadcasting station programs. If you prefer to assemble the Amplifier, obtain the Daven 3-stage Kit, which includes all parts except sockets

**Make Your Old Set a 1926 Model**

**PURE** tones, beautifully clear and full, go out from the broadcasting station. They reach your detector still pure and clear. But what then?

From the detector your amplifying apparatus operates. Distortion arises unless you take advantage of a method of amplifying that far-sighted manufacturers and thousands of set builders are now adopting—Resistance Coupled Amplification. Resistance Coupling is not new, *but Resistance Coupling with real volume amplification is new.* It is the most approved method of letting pure tones through.

The Daven Super-Amplifier costs little. It is easily and conveniently installed in any set made. Buy it complete to save hook-up labor. For those preferring to assemble, the Daven 3-stage Kit gives all the necessary parts except sockets. You will join hundreds who have written to thank us for the Daven improvements.

Write us today for *The Resistor Manual*, an authoritative book on Resistance Coupled Amplification, 25c at good dealers, 30c by mail.



The new Daven Special Coupling Condenser Type "A", for Resistance Coupled Amplification, sold separately and also included in all Daven Amplifiers, Kits, and Resisto-Couplers. For greater volume and better quality.



The new Daven High MU Tube Type MU-20, used with the Daven Super-Amplifier, gives 50% more volume—6 volt, 1/4 ampere. A Daven Power Tube Type MU-6 in the last or output stage helps any set regardless of the method of amplification—6 volt, 1/2 ampere.

DAVEN PRODUCTS SOLD ONLY BY GOOD DEALERS

## Resistor Specialists DAVEN RADIO CORPORATION

*"The Sine of Mccit"*  
Reg. U. S. Pat. Off. Newark New Jersey

CLIP THIS COUPON

DAVEN RADIO CORPORATION  
165 Summit St., Newark, New Jersey

Please send me the following on Resistance Coupled Amplification: *Check One*

Resistor Manual, 30c is enclosed.  
 Complete Catalog (free)

Name.....  
Address.....

*For Dealers: Send your letterhead and we will have our nearest distributor communicate with you*

THE BIG LITTLE THINGS OF RADIO



# JAPANESE ROSE BUSHES

## The Wonder of the World

Japanese Rose Bushes bloom all the year round. Just think of it. Six weeks after planting the seed, the plants will be in full bloom. It may not seem possible, but we positively guarantee it to be so. They will bloom every ten weeks, Summer or Winter, and when three years old the bush will be a mass of roses, bearing from five hundred to a thousand roses on each bush. The flowers are in three shades—white, pink, and crimson. The plants will do well both in and out doors. We guarantee at least three bushes to grow from each packet of seed. Price, 10c packet, 3 pkts. for 25c postpaid.

### Chinese Fragrant Tree Fern

Just introduced: noted for its rapid growth. An exceptionally pretty ornamental plant. Foliage is rich dark green. Forms grand pyramidal bushes about 6 feet high. Branches very desirable for decorative purposes, wreaths, etc. Seeds 15c pkt., 3 for 40c.

### Weather Plant

NATURE'S WEATHER PROPHECY By mysterious changes that take place this remarkable plant accurately forecasts the weather many hours in advance. Will grow anywhere all the year around. An interesting house plant. Bears large, fragrant, pink, butterfly shape flowers. Seeds, 15c packet, 3 for 40c, postpaid

## GROUND ALMONDS

Amazingly Prolific—Easily Grown From Seed The Ground Almond has a flavor that is MOST EXCELLENT, resembling the coconut. The meat is snow white, covered with a shell or skin of brown color. It grows close to the surface and anything from 200 to 300 Almonds may be expected from a single nut. There is no trouble whatever in growing anywhere and in any kind of soil. May be planted any time, and in eight or ten weeks from time of planting you will have an ENORMOUS CROP of the MOST DELICIOUS ALMONDS YOU EVER TASTED. Seeds 15c Pkt.

### Perfume Plant

Blooms only at night, giving forth the most delightful scented fragrance for quite a distance. Causes much comment. For house or garden. Also valuable because of rare perfume made from it. SEEDS, 10c pkt., 3 for 25c.

### SENSITIVE PLANT

Marvel of the Philippines. Leaves curl, fronds droop when touched. Apparently resents interference. A handsome shrub for house or garden; very curious and interesting. Seeds, 15c pkt., 3 for 40c, Japanese Nest Egg Gourd

### Calabash or Pipe Gourds

A luxuriant and rapid growing climber; thrives anywhere. Produces the ornamental gourds from which the famous African calabash pipes are made. Grow this interesting vine and make your own. Seeds, with instructions, 15c pkt., 3 for 40c.



Seeds 15c pkt., 3 pkts. for 40c. J.S. & CO.

## Mammoth Peanuts

Peanuts can be easily cultivated. Their culture is very simple and exceedingly interesting. Mammoth Peanuts grow to an astonishing size. It is a good producer, very prolific, and the giant nuts have a thick, heavily ribbed protecting shell. The plant is very attractive, the leaves being of odd shape and a handsome green shade, tinted through the center with white. You will derive much pleasure cultivating this interesting species. Seeds 15c pkt., 3 pkts. for 40c.

### Shoo Fly Plant

A very remarkable botanical curiosity you should have. Though quite odorless, it is said flies will not remain in a room where it is grown. Bears very pretty blossoms; blooms summer and winter. Grows rapidly from seed. SEEDS 15c packet, 3 for 40c, postpaid

### Japanese Climbing Cucumber

Unusually strong and vigorous growing vine. Attains twice the size of ordinary varieties. Grows readily on fences, poles, trellises, etc. One hill will keep an entire family supplied all summer.

## Gigantic Butter Beans

The New Edible Vegetable Wonder Grows to an astonishing size, the Beans measuring from 3 to 6 feet long, and weighing anything from 10 to 16 lbs. and even more. One Bean is sufficient for a family for several meals. Very palatable and rich in nutritious materials. The delicate Buttery Flavor is much appreciated. The Vines are easily grown, very prolific, and a most welcome and valuable adjunct to your garden. Try them; you will find them the most delicious vegetable you have ever tasted. Imported direct. Unobtainable elsewhere. Sample package of Seeds with full directions for cultivating and cooking. 25c, postpaid.

### A Few Other Seed Novelties You Should Cultivate—10c Pkt.

- Japanese Kudzu Vine (Jack and Beanstalk)
- Chinese Balloon Flower
- Purple Feather Grass (Ornamental)
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- Ornamental Cotton
- Job's Tears (Great curiosity)
- Cathedral Bells
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- Snake Cucumber
- Emerald Isle Kale
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- Ornamental Gourds
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Nitto's Plant & Flower Food changes ill-nourished plants into Luxuriant Beauties, producing masses of blooms that will equal any. Causes plants to bloom early and ahead of others. Friends marvel at success. Brings out New Foliage and Flowers, and causes a Marvellous Transformation. Pkg. 15c, 3 for 40c.

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Fills the Atmosphere with Fragrant Aroma One of the most rapid growing vines known. Under favorable conditions this vine has been known to grow OVER 25 FEET IN A SINGLE WEEK. In a very short space of time indeed the Vine has climbed to a great height, and is covered with IMMENSE FLOWERS, from 5 to 7 inches in diameter. It is, indeed, a great novelty, for, unlike other plants, the flowers OPEN IN THE EVENING, and remain open until about noon the following day. In dull weather they will remain open all day. It is a most INTERESTING SIGHT to watch the opening and closing of the flowers as the clouds appear and disappear. As the flowers open they give forth the most DELIGHTFUL, AROMA and the whole atmosphere around is full of scented fragrance. It is always the object of favorable comment, and much curiosity is aroused by people passing at night time as to the cause of the charming aroma, frequently stopping in an endeavor to satisfy their curiosity. PRICE, 19 CENTS packet, two packets for 35 CENTS, POSTPAID. JOHNSON SMITH & CO.

### The Great Wonderberry

A luscious berry that may be grown and ripened from seed in any soil or climate in 3 months. The flavor is fine and unsurpassed for eating raw, cooked, canned or preserved in any form. The fruit is blue-black in color, and tastes like a luscious, rich blueberry. One bush will produce an enormous amount of fruit, yielding great masses of rich fruit all Summer and Fall. Packet, 10c, 3 pkts. for 25c, postpaid.

### Bush Musk Melon

A vineless Musk Melon, grows in bushes, and thus can be cultivated in the smallest garden. The fruit is of the popular "Jenny Lind" type, but larger, averaging 5 inches in diameter. The flesh is very deep, edible almost to the rind and is colored light green, flushed with salmon toward the center. The quality is superb, lusciously sweet and juicy. Packet of seeds, with full directions for culture, 15 cents, 3 packets for 40 cents, p.pd.

### The Great Umbrella Palm

The Japanese Umbrella Palm is a semi-aquatic plant. It is easily grown from seed either in a bowl of water or in very damp soil. Probably the most usual, as well as the most interesting method, is to cultivate the plant in a bowl or jardiniere filled with water, with two or three inches of good garden soil at the bottom. The seeds soon commence to germinate, and the plant shoots up stems two to three feet high and rapidly assumes a most pretty palm-like appearance, as shown in the engraving. The tops of the stems are surmounted by a whorl of umbrella-shaped leaves, of a waxy appearance. We will send a package of this seed, with full instructions for culture, for only 15c or three packets for 40c postpaid.

### A Gracious House or Conservatory Plant



### Butterfly's Own Bush

This plant is a veritable refuge or haven for butterflies, and it attracts all the most beautiful types of butterflies to the neighborhood. Bees, too, are very fond of it. It is a pretty plant bearing perfectly double flowers, ranging from white to rich crimson, deep red and pink, lilac and other delicate shades. Packet 10 cents, 3 for 25 cents postpaid.

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Beautiful hedge plant, grows 2 to 2 1/2 feet high and resembling a closely clipped evergreen. The globe-shaped or pyramidal bushes are close and compact, and of a pleasing light green color. May be grown singly or in the form of a hedge or background. In early autumn the whole bush becomes carmine or blood red, hence the name of Mexican Fire Plant, or "Burning Bush," as it is sometimes called. Selected Seeds, 10c

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## AGENTS

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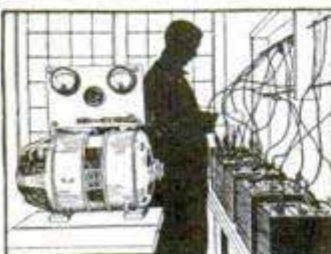
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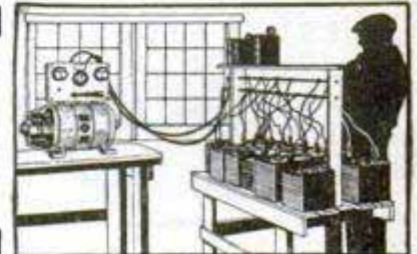


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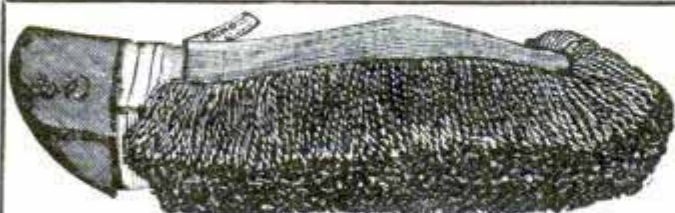
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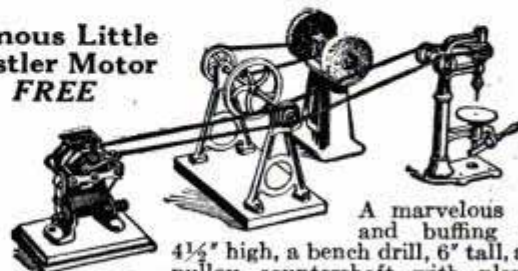
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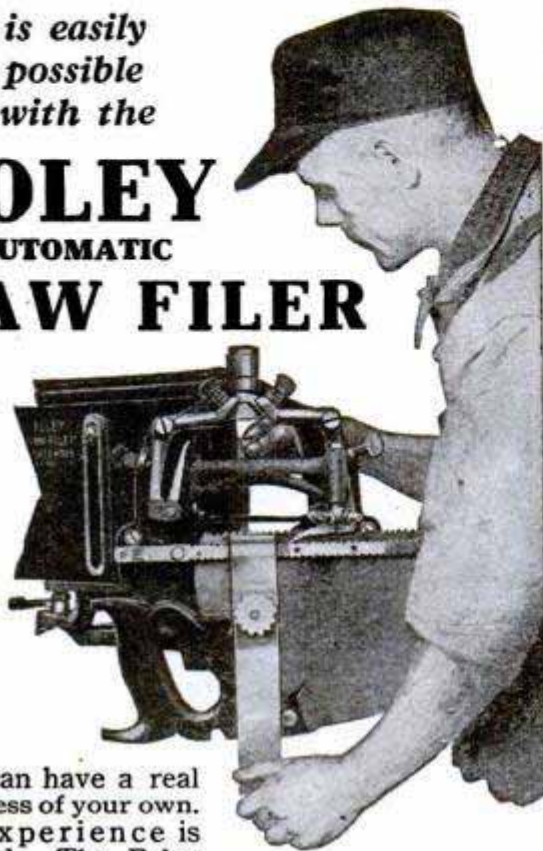
WRITE TODAY for my FREE Booklet—"A CLEAR-TONE SKIN" telling how I cured myself after being afflicted for fifteen years.

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# \$15 to \$20 a Day Filing Saws

is easily possible with the

## FOLEY AUTOMATIC SAW FILER



You can have a real business of your own. No experience is needed. The Foley Saw Filer and Saw Set are a sensation in the saw industry. Automatic in operation—files a saw perfectly in 5 minutes—sets it in 1 minute. Handles hand, back, band, meat, circular and other saws. Every contractor, carpenter, hardware store, manual training department, butcher, woodworker and home that owns a saw has business for you. Many factories and plants need Foley Saw Filers.

"It is just a year since I purchased your Saw Filer and Set, and am getting big business from carpenters. They all approve of my work done on your machine."

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"Am turning out fine work, better than any expert hand filing that I can do or have ever seen done in this city. Am completing a new workshop for my filing business with Foley Saw Tools."—C. R. KNIGHT, 804 2nd St., Klamath Falls, Ore.

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For demonstration purposes we will allow a liberal discount on your order. A few good territories are still open. Your town may be one of them. Be independent—mail coupon now for full details.

### FOLEY SAW TOOL CO.

Room 201 Foley Building  
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Send me more proof of what I can make with Foley Saw Tools and also your special offer to agents.

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Address.....

**\$351.00**

**Cleared in one day (Aug. 1925) by W.H. Adams Dayton, Ohio**



one day. J. R. Bert, Ala. "only thing I ever bought that equaled advertisement."

V. A. Marini, Santa Cruz, Cal. (Nov. 1924) reports \$11,275 sales in 3 months. J. Gordon of New Jersey says \$4000 profit in two months. Alexander of Penn. \$3000 profit in four months. Ira Shook, Flint \$365 in one day. Bram, bought one outfit then 10 more within a year. Patillo, Ocala, writes: "Crispettes all you claim and then some." John W. Culp, South Carolina, writes, "Everything going lovely. Wrappers lying all over. It's a good old world after all." Perrin, \$380 in 1 day. Mrs. Lane, Pittsburgh, 8000 packages in

### WE'LL START YOU IN BUSINESS

Furnish secret formulas, raw material, and equipment. Very little capital required; no experience needed.

### Build Paying Business of Your Own

No limit to the sale of Crispettes. Everybody likes them. It's a delicious food confection made with or without sugar. Write me for facts about a business that will make you independent. Start now, in your own town.

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#### LONG-EAKINS COMPANY

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300% advance on Crude Rubber drives Mr. Car owner to have his Tires repaired, instead of buying new ones.

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We give you instructions Plants \$100 and up Our free Catalog tells you how to save 50% on a plant we have near you. Instruction Book for a \$1.00 bill.

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Protect yourself from toughs and hold-up men. Most amazing automatic, 4 1/2 in. long; gun-metal finish. Can't tell from real automatic until you pull the trigger, and presto! you have Opera Glass, Pocket Mirror, Magnifying Glass, Telescope, Reading Glass, Mirror, Sun Dial, Compass, etc. Loads of fun; useful, instructive; a real protector.

**AUTOMATIC \$1.48**



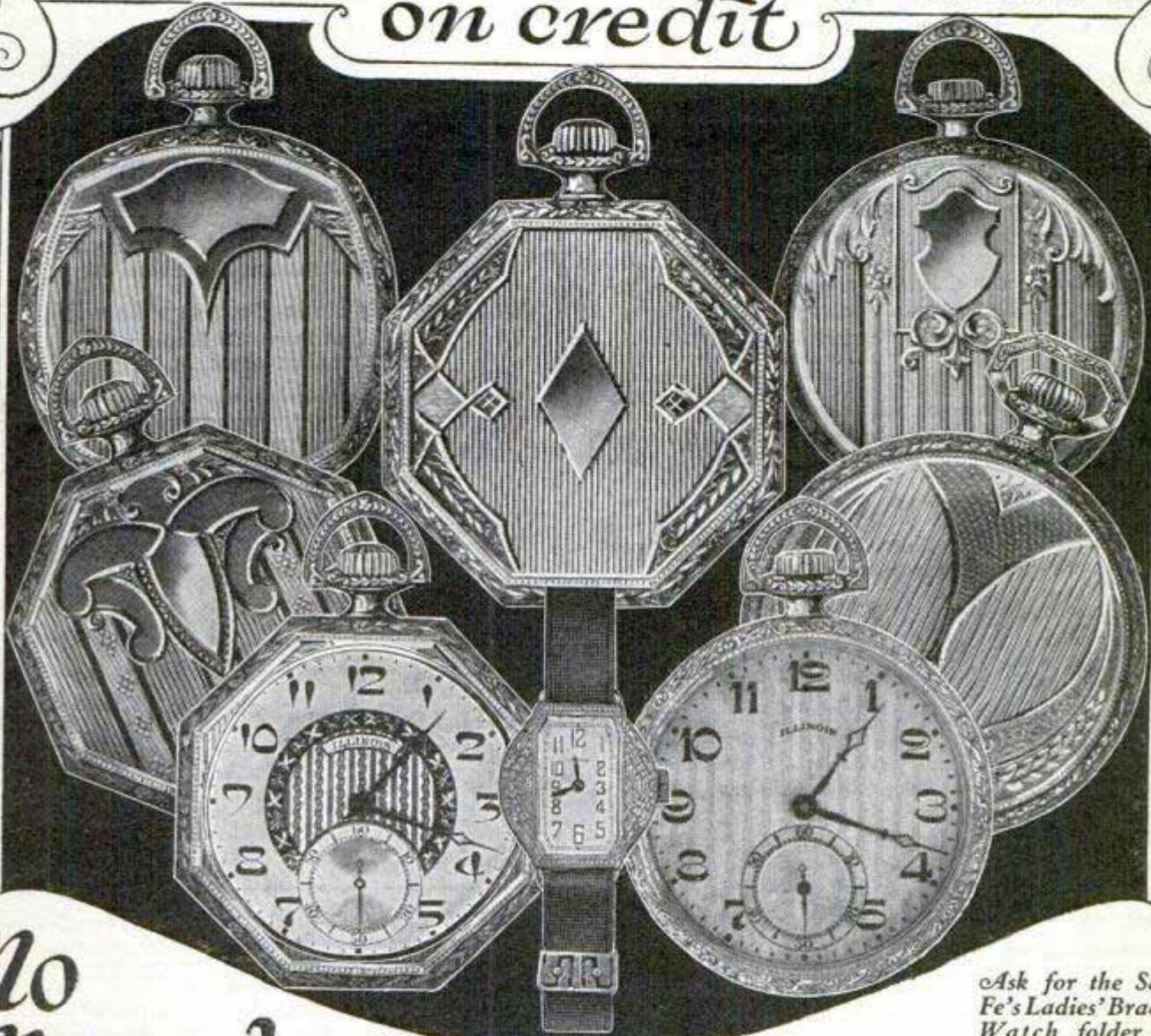
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Just send name. On arrival of "Automatic" deposit with Postman \$1.48 plus a few pennies postage. Satisfaction guaranteed or deposit refunded. Supply limited. Order now. Big Bargain Catalog sent FREE. ORDER TODAY!

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*on credit*



**No  
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WE will send this famous watch direct to you, express prepaid, on FREE Approval. Examine watch and be convinced it's the best watch buy you ever saw. You save  $\frac{1}{3}$  to  $\frac{1}{2}$  your money by purchasing a Santa Fe Special Watch. We trust you—wear watch while paying for it.

*Ask for the Santa Fe's Ladies' Bracelet Watch folder and Diamond folder.*

## Mail Coupon for FREE Watch Book →

Clip the coupon, fill out and receive the FREE WATCH BOOK. All the newest watch case designs in white or green gold, fancy shapes and thin models, are shown. Read our easy payment offer. Select the watch you would like to see; we will send it to you on approval, express prepaid. Wear the watch 30 days FREE. Return at our expense if not fully satisfied.

## SANTA FE WATCH COMPANY

Dept. 36, Thomas Building Topeka, Kansas  
*The Home of the Great Santa Fe Railway*

### SANTA FE WATCH CO.

Dept. 36, Thomas Building  
Topeka, Kansas

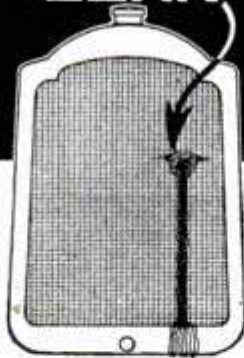
Please send prepaid and without obligation your Watch Book Free, explaining your "No Money Down" Offer on the Santa Fe Special Watch.

Name.....

Address.....

# STOP THAT LEAK WITH SMOOTH-ON No. 1

**Y**OU can apply Smooth-On with radiator full or empty, hot or cold, without removal from the car and without putting inside anything that clogs the circulation.



Merely roll the Smooth-On into a stiff putty, press it against and into the leak with your thumb or pack it into the defect with a knife blade or screw-driver, and scrape off the excess. The leak will stop instantly, and the repair is permanent. For a few cents and in a few minutes you will have avoided all the delays and expense of a professional repair job that couldn't be any better.

**Bursting Water Jackets.** Water jackets of automobile, stationary or marine gas engines which have developed long or short cracks or have even had pieces broken entirely out from freezing can be made thoroughly and lastingly serviceable by similar repair, or by applying Smooth-On under straps or a plate.

Smooth-On No. 1 can be used in a hundred ways in the household, and it often saves from \$50.00 to \$100.00 on the first job.

Keep a can of Smooth-On No. 1 with your tool kit and some day when caught with a repair job you will thank yourself for your forethought.

Get Smooth-On No. 1 in 7-oz., 1-lb. or 5-lb. tins at any hardware store or if necessary direct from us.



Write for  
**FREE BOOK**



Do it with **SMOOTH-ON**

SMOOTH-ON MFG. CO., Dept. 37,  
574 Communipaw Ave., Jersey City, N. J.  
Please send the free Smooth-On Repair Book.

Name .....

Address .....

P. M. ....

## FREE

This booklet tells how to stop not only water leaks in radiators, bursted water jackets, and at loose hose connections, but also how to stop gas leaks from the tank, gasoline lines and exhaust system, and oil leaks at gaskets and at cracks in crank or gear case. It also tells how to make headlight posts, nuts, hub caps and bolts and grease cups stay tight, and shows dozens of simple money saving Smooth-On repair jobs.

Sent free if you return the coupon.

SMOOTH-ON MFG. CO.  
Dept. 37, 574 Communipaw Ave.  
JERSEY CITY, N. J.

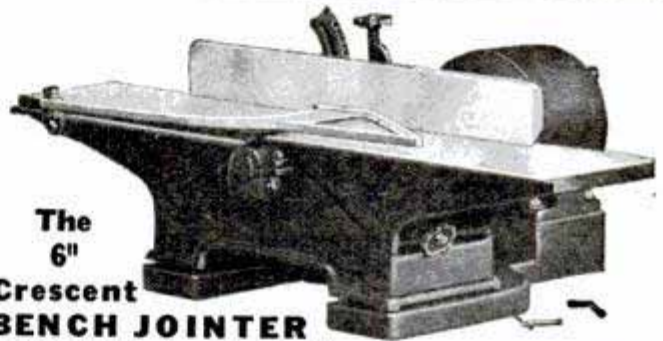
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Via the new 1926

# SUPER-HETRO RADIO

Any radio engineer will tell you that a Super-Hetro Receiver is the most powerful, most selective and greatest distance-getter of all. We offer a 5-tube Super-Hetro giving the results and volume of 8 tubes, in a beautiful cabinet, size 10 by 31 by 11, for the remarkable and most reasonable price of \$45.00 net. Unequaled in construction and appearance; sold on a free 10-day trial, with a coast to coast reception guarantee. Large circular on request.

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48 West Burnside Avenue  
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The  
6"  
Crescent  
**BENCH JOINTER**

Is the latest addition to our line of machines for the small shop. Ask today for special illustrated price list of 6" jointer, No. 12 saw table, with tilting top, 4" bench jointer, 20" band saw, each with individual motors.

**PRICES VERY LOW—QUALITY VERY HIGH**

Send today for circulars of band saws, saw tables, self-feed rip saw, shapers, jointers, variety wood workers, planers, planers and matchers, disk grinders, cut-off table, swing saws, borers, hollow chisel mortisers, tenoners, universal wood workers, are free for the asking.

**THE CRESCENT MACHINE CO., 93 Columbia St., Leontia, Ohio**

### "Best Pen I Ever Had—and costs less!"

That's what users of the Postal say. New filling method—easiest ever devised. Holds 4 times usual amount of ink. Transparent (always know how much ink you've got!). Unbreakable. Only \$2.50! Sent C. O. D. Order now and try it! Money back if you don't like it.

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2-cent stamp brings by return mail our

## Crackerjack SPORTING GOODS CATALOG

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# STOP TOBACCO

Stop tobacco for a month and see how much better you feel. You can easily stop without suffering any inconvenience or feeling the usual craving. Simply get a box of Nicotol, use as directed and the habit quits you. Your health will be better, your resistance to disease will be greater and you will cease to be a slave to nicotine. Nicotol is sold under an ironclad money-back guarantee by druggists, or direct to you for \$1.00 by H. J. Brown Medicine Co., 20 Perry-Payne Bldg., Cleveland, Ohio.

Guaranteed for FIVE Years! A guarantee you'll never use; the average Underwood lasts for LIFE! © 1925, S-W Co.

Thousands use a typewriter at home—to their pleasure and profit. The typewritten letter wins. Stories that are typed sell. There's always a wealth of work for a typist. Learn and earn on an Underwood—fast, spirited touch, and beautiful writer. See our offer!



## Write Us a Check for THREE DOLLARS

### and Own an Underwood

Don't go another week without a typewriter. And don't pay another month's rental on some relic. A genuine Underwood is a joy to use—and easy to own. Act in time to receive one from this new lot!

If you've been "saving" for a typewriter, the time has come to *spend*. The cash involved? *Three dollars*. That's all that stands between you and actual use of your Underwood complete!

The Shipman-Ward price on a factory rebuilt Underwood makes it folly to buy a second-rate machine. And our plan of payment makes it equally foolish to wait.

Don't send *any* money now. But do let us have your name and address at once—for the big typewriter book that's *free*.

The biggest concern in the country buy Underwoods from us. You can make the same big saving, on one machine. So why pay the top price? This is a regular Underwood, the most popular model, with standard 4-bank keyboard, and every improvement; full size and complete equipment; tools and cover.

No other company makes such a wide-open offer; nor could we, on any other make of writing machine. See below.

## Why Be Old Fashioned?

**Modern Letters — Business or Social — Are TYPED!** Four hundred Underwood typewriters, fresh from our finishing room, ready for shipment. They will soon find homes! For the home use of typewriters is increasing by leaps and bounds. A man needs one constantly. A boy in school shouldn't be denied one. Girls who work get ahead much faster at the office if they have their own typewriters at home.

You'll be amazed at the uses everyone in your household will find for an Underwood typewriter. Don't try to do with a less perfect machine, though; it doesn't pay. It isn't necessary. Since Shipman-Ward started rebuilding Underwoods, a fine typewriter is not a luxury in any sense. Few things around your

house cost so little as will now buy your Underwood. Nothing you ever bought was purchased on such liberal terms. These machines are in sparkling condition, rebuilt from the platen down. Not a single worn part; not a fault nor a flaw; nothing but what is just as perfect as its gleaming nickel or enamel finish.

**Send No Money!** All we want is your name and address, and a chance to present the facts about the wonderful Shipman-Ward plan; a plan that has built one of the world's largest typewriter businesses; the plan that was made for the benefit of all consumers. You run no risk buying this way! We let the machine do all the selling. Our big book of typewriters in actual colors is the thing to think of now! Coupon brings it *free*.

### Free Book Coupon

SHIPMAN-WARD MFG. CO.  
2123 Shipman Bldg., Chicago

Please send **FREE**, full offer, catalog, typing manual, and outline your free course in Touch Typewriting without obligation!

Name.....

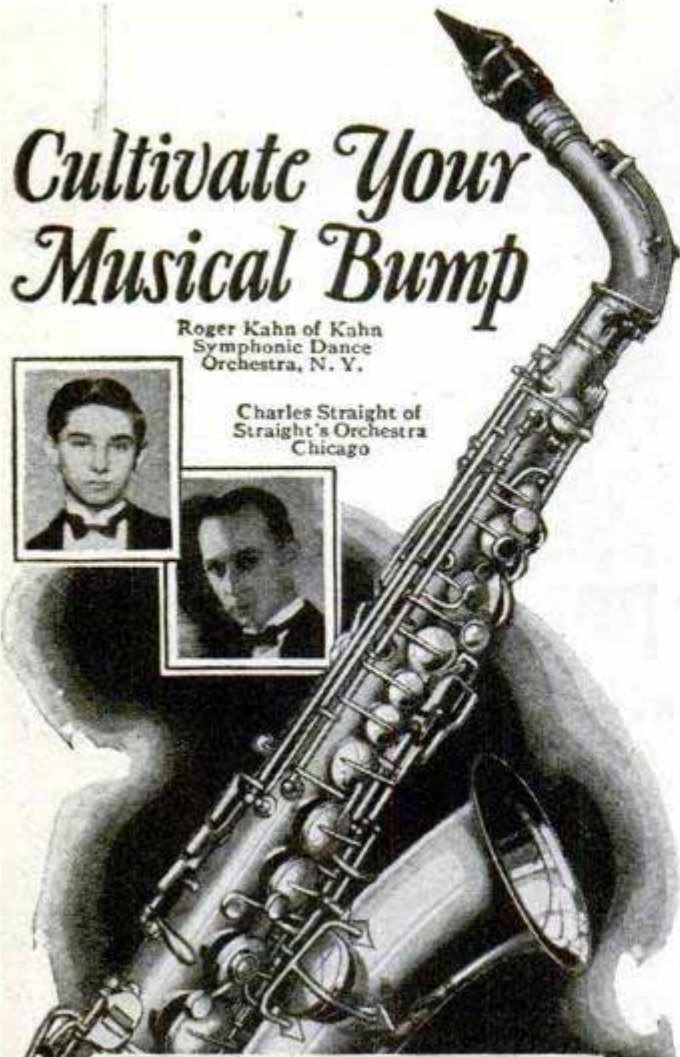
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# Cultivate Your Musical Bump

Roger Kahn of Kahn  
Symphonic Dance  
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Charles Straight of  
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**E**NTERTAIN yourself and your friends; make big money playing whole or part time, if you choose, with a Conn saxophone. Easiest to play, beautiful in tone, perfect in scale, reliable action—chosen by foremost artists for its exclusive features, yet costs no more than others. You'll learn to play it quickly.

Send coupon for free book, "Success in Music and How to Win It," by Sousa and others, and details of trial offer on any instrument. Remember Conn is the only maker of every instrument used in the band.

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WORLD'S LARGEST MANUFACTURERS



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Please send "Success in Music" and details of trial offer on

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## Sport-Thrills-Action on an Indian

**Y**OU'VE got to ride a motorcycle to know what a big kick it is. Throw your leg over. Grab those handlebars. Turn on the throttle. And something happens. You Go!

Go in, out and through crowded city traffic. Go around and ahead of dragging auto parades you meet on country roads. Go over side roads and paths where cars can't go. Go up those hills with a z—z—z—zip. Go! Go! Go! —and get more thrills, more sport, more joy out of life, the more you ride. It's a Go sport, motorcycling. You can't know what you're missing now until you come over and get out and Go.

Send now for the new Go folder. It describes in detail the new 1926 Indians and shows you vividly the joys and thrills which they hold in store for you.

Address Dept. P-3.

## Indian Motorcycle Co.

Springfield, Mass.



**One Year To Pay**



**No. CS2 - Price \$62.00  
\$2 Down and \$5 a Month**

This big cluster of seven best grade sparkling blue white diamonds is set in **SOLID PLATINUM** in this solid white gold ring. Guaranteed to stand any test.

**10 Days Trial**

**No Red Tape**

**SEND NO MONEY** You pay \$2.00 to postman after you get this ring. If you keep it, pay **only \$5.00 a month for 12 months**. If you are not satisfied after seeing the ring, return it in 10 days and we will return your money—every cent. You take no risk in ordering this beautiful, flashing diamond cluster ring. Pay for it in monthly installments, like putting money in a bank.

**Cluster Looks Like \$600 Solitaire**

You now can buy this gorgeous ring at the wholesale price. Compare it with similar rings at \$100.00. We guarantee it to stand any test or comparison. It is the greatest bargain ever offered by any Diamond Importer. We will give you 8% more than you paid for it when you exchange it for a larger diamond ring.

**WRITE FOR JEWELRY CATALOGUE**

This beautiful diamond cluster ring is a sample of the unexcelled values we offer our customers. A thousand and one other selections are shown in our catalogue. Brings our store into your home.

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FOR FORD—Prices from \$27.85 up. Factory to consumer direct—Pay Only One Profit.

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Our net price list. Full line of auto bodies and accessories for Fords at Wholesale Prices. Save big money on bodies by buying Direct from Factory.

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An opportunity is offered one man in each community to secure the sole and exclusive right to operate the famous Nestler Rubber Fusing Process of servicing pneumatic tires. Unlike any other method on earth. The Nestler method is the perfected and only known way of successfully retreading pneumatic auto or truck tires, including all sizes of balloon tires. Every car owner needs Nestler Service. Nestlerized repairs outlast the tire. No previous experience necessary. We teach you the business in two weeks or less. Moderate capital required. Big profit on each tire you do. Here is your opportunity to have a permanent and highly profitable business in your own name. Remember only one man can secure this profitable franchise in each community. Act now if you want to be that man. Write today for two interesting books describing the Nestler Rubber Fusing Process and the methods that are being employed by Nestler licensees everywhere to build up prosperous businesses.

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Never were opportunities so great. Thousands of good paying positions are waiting in every field of endeavor for men trained to fill them.

Whatever be the task confronting the nation, in war or peace, Canada is always in peril of failure so long as the young people of the country are economically unfitted for their tasks. Canadian industry and agriculture demand that you prepare to take your place in promoting the development of the country. There is a big job waiting for you in your present work, or any line you choose.

No matter where you live, the International Correspondence Schools will come to you. No matter what your handicaps, or how small your means, we have a plan to meet your circumstances. No matter how limited your previous education, the simply written, wonderfully illustrated I. C. S. text-books make it easy for you to learn. No matter what career you may choose, some one of the 280 Courses of the I. C. S. will surely meet your needs.

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**INTERNATIONAL CORRESPONDENCE SCHOOLS  
CANADIAN, LIMITED**  
Dept. 1893, 389 Mountain St., Montreal, Canada

Explain, without obligating me, how I can qualify for the position, or in the subject *before* which I have marked an X:

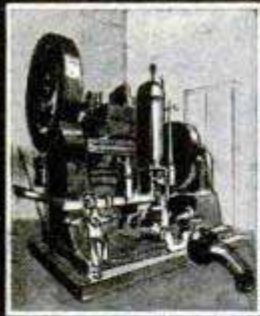
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| <input type="checkbox"/> Machine Shop Practice          | <input type="checkbox"/> BUSINESS MANAGEMENT     |
| <input type="checkbox"/> Toolmaker                      | <input type="checkbox"/> Private Secretary       |
| <input type="checkbox"/> Gas Engine Operating           | <input type="checkbox"/> Business Correspondent  |
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| <input type="checkbox"/> Surveying and Mapping          | <input type="checkbox"/> Stenographer and Typist |
| <input type="checkbox"/> Mine Foreman or Engineer       | <input type="checkbox"/> Cert. Public Accountant |
| <input type="checkbox"/> STATIONARY ENGINEER            | <input type="checkbox"/> TRAFFIC MANAGER         |
| <input type="checkbox"/> Marine Engineer                | <input type="checkbox"/> Railway Accountant      |
| <input type="checkbox"/> Ship Draftsman                 | <input type="checkbox"/> Commercial Law          |
| <input type="checkbox"/> ARCHITECT                      | <input type="checkbox"/> GOOD ENGLISH            |
| <input type="checkbox"/> Contractor and Builder         | <input type="checkbox"/> Common School Subjects  |
| <input type="checkbox"/> Architectural Draftsman        | <input type="checkbox"/> CIVIL SERVICE           |
| <input type="checkbox"/> Concrete Builder               | <input type="checkbox"/> Railway Mail Clerk      |
| <input type="checkbox"/> Structural Engineer            | <input type="checkbox"/> AUTOMOBILES             |
| <input type="checkbox"/> PLUMBING AND HEATING           | <input type="checkbox"/> Mathematics             |
| <input type="checkbox"/> Sheet Metal Worker             | <input type="checkbox"/> Navigation              |
| <input type="checkbox"/> Textile Overseer or Supt.      | <input type="checkbox"/> AGRICULTURE             |
| <input type="checkbox"/> CHEMIST                        | <input type="checkbox"/> Poultry Raising         |
|   | <input type="checkbox"/> Pharmacy                |
|   | <input type="checkbox"/> Spanish                 |
|   | <input type="checkbox"/> Teacher                 |
|   | <input type="checkbox"/> Banking                 |

Name.....

Present Occupation.....

Street and No.....

City.....Prov.....



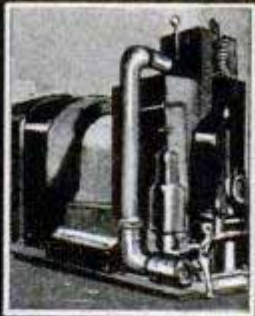
Be a Machine Draftsman—earn \$80 to \$150 a week



Be a Structural Draftsman—earn \$80 to \$200 a week



Be an Architectural Draftsman—earn \$60 to \$150 a week



Be an Electrical Draftsman—earn \$60 to \$125 a week



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to prove you can LEARN AT HOME, IN YOUR SPARE TIME!

We have invented a new, simplified way to teach Drafting—the first real improvement in Drafting home-instruction in history. We want you to see it, try it—without one penny of cost or obligation. We want to show you how we get away from the copying methods used in the past. See how we make you think, solve problems, do actual drafting room jobs from the first lesson!

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70,000 fine jobs advertised this year. Get ready to fill one. Get out of the rut. Make something of yourself. Plan your future in Drafting. Even if you have only common schooling, even if you know nothing of Drafting, we guarantee to make you a real Draftsman or to refund your money! Special surprise offer right now to the first 500 men who answer this ad—reduced price, easy terms. Coupon brings complete information.

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### FREE Job Service

Our employment department will help place you in a good job. Demand exceeds the supply. No charge for nation-wide employment service. Read want-ads for Draftsmen every day in Chicago Tribune or any big city paper—see the opportunities for yourself—and get ready for them.

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### Complete Costly Drafting Outfit GIVEN!

You need a fine outfit like this to do precise, neat Drafting. Not one penny of extra charge for this complete, valuable, high grade outfit. Imported instruments. Table, board, mahogany-edge T square, triangles, ink, thumb-tacks, etc., everything you will need. Retail value \$20. Coupon brings this Free Offer.

### CHIEF DRAFTING ENGINEER AMERICAN SCHOOL

Dept. D-374 Drexel Ave. & 58th St., CHICAGO

CHIEF DRAFTING ENGINEER, AMERICAN SCHOOL, Dept. D-374 Drexel Ave. & 58th St., Chicago

Rush 3 Free Drafting Lessons, Surprise offer, complete information, money-back guarantee, etc., to prove I can become a real draftsman at home in spare time.

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# NEW FORD TIMER

## GUARANTEED for 3 YEARS

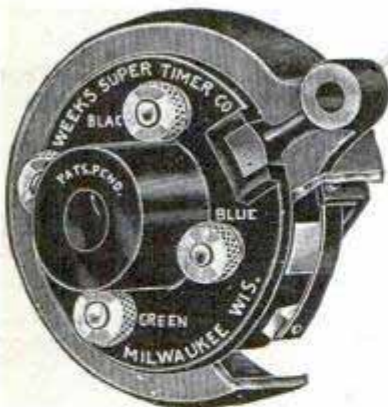
### Entirely New Principle

Study the illustration and you will note the rotating member is the brush principle traveling on the outside surface of the commutator—this assures you of a steady, even and powerful spark at exactly the proper time—The natural centrifugal action of the rotor keeps the commutator clean as it should be—provision is made for the elimination of any oil, grit or grime, therefore it cannot accumulate in the WEEKS SUPER TIMER. This principle is entirely new and unique.

### Sensational Invention

Millions of Ford Owners have been waiting for this SUPER TIMER—does away with common TIMER troubles. Entirely new principle. DYNAMO TYPE, no heavy pressure contact, no rollers to wear flat and cause endless trouble; smooth, easy, positive contact. The faster you run the hotter the spark, positive contact at all times, short circuits impossible, no oiling necessary, perfect firing, gives more power, saves wear and tear, adding many extra miles to the gallon, instant starting in the coldest weather, the motor promptly responds to the hot spark, the pick-up is marvelous. No parts to wear out, and the fact that the SUPER TIMER OUTLASTS 6 ORDINARY TIMERS enables us to guarantee this TIMER for 3 years.

### Ford Owners Wild Over It



Beyond a question of a doubt the most needed article on a Ford today is a GOOD TIMER, one that would accomplish a real purpose and serve the owner—without continual care and attention, annoyance and trouble. The "SUPER" TIMER is the latest achievement of Mr. Weeks whose zealous interest is to make each and every Ford Owner the proud possessor of a better running Ford. Already the "SUPER" TIMER has met with instant approval. Ford Owners everywhere generously acknowledge it to be the BEST TIMER on the market. It is indeed a real TIMER for Fords.

### Fortunes Now Being Made

Every Ford Owner knows the value of a good reliable TIMER on a Ford. He has been accustomed to continual trouble—THE ORDINARY TYPE OF TIMER means nothing but trouble—THE PRINCIPLE OF CONSTRUCTION HAS BEEN WRONG—The SUPER is built on the DYNAMO TYPE—which in itself means uniformity, regularity and long life—When you consider the Big Fortunes now being made in the Ford Field you will realize the big opportunity this proposition offers you—an all-year-round seller—with tremendous profits.

### Be The First in Your Locality—

Its low cost makes it easy to sell and as our advertising campaign will bring in many requests for territory it is greatly to your advantage to act now—will send sample for trial.

### Weeks Super Timer Co.

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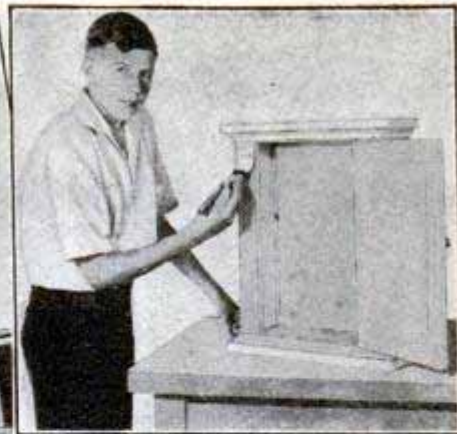
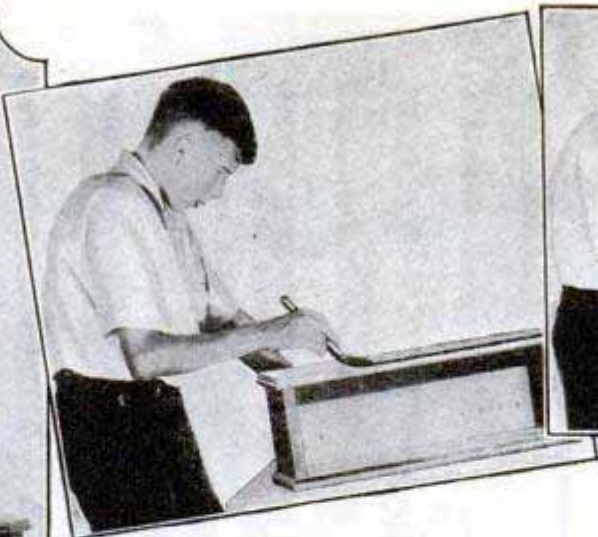
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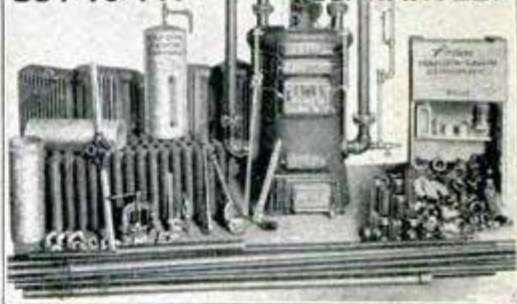
cast-iron, heavy white porcelain, enameled inside and over the 3¼ inch turned-over rolled rim; outside of tub is painted. This is our newest design, having a pleasing appearance and is the highest-grade leg tub manufactured. Fitted complete with heavy brass, nickel-plated compression bath faucet, with china indexed handles, nickel-plated heavy brass adjustable waste and overflow and supply pipes to floor; width 30½ inches, length 4½ or 5 feet, weight 300 pounds.

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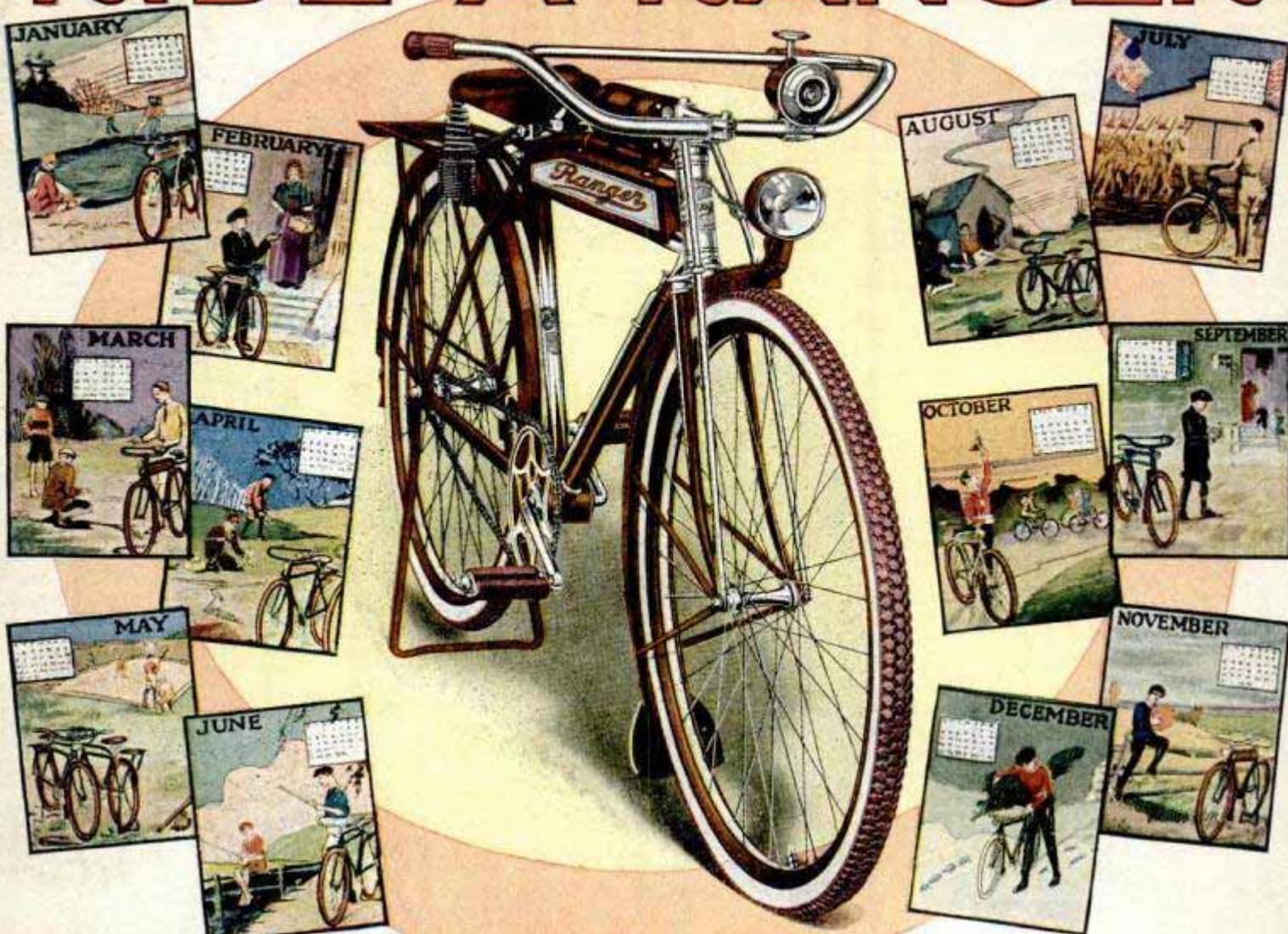
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