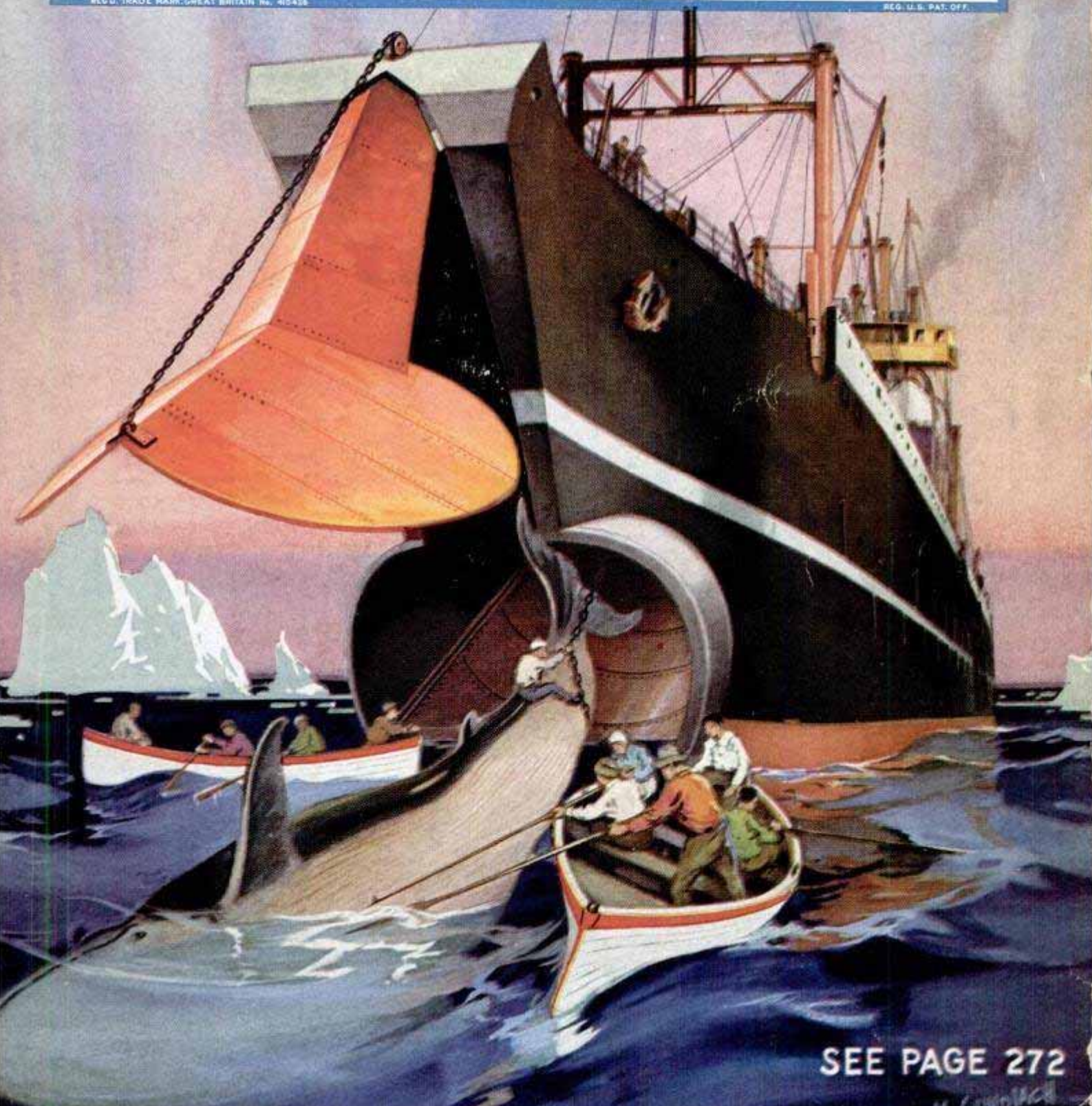


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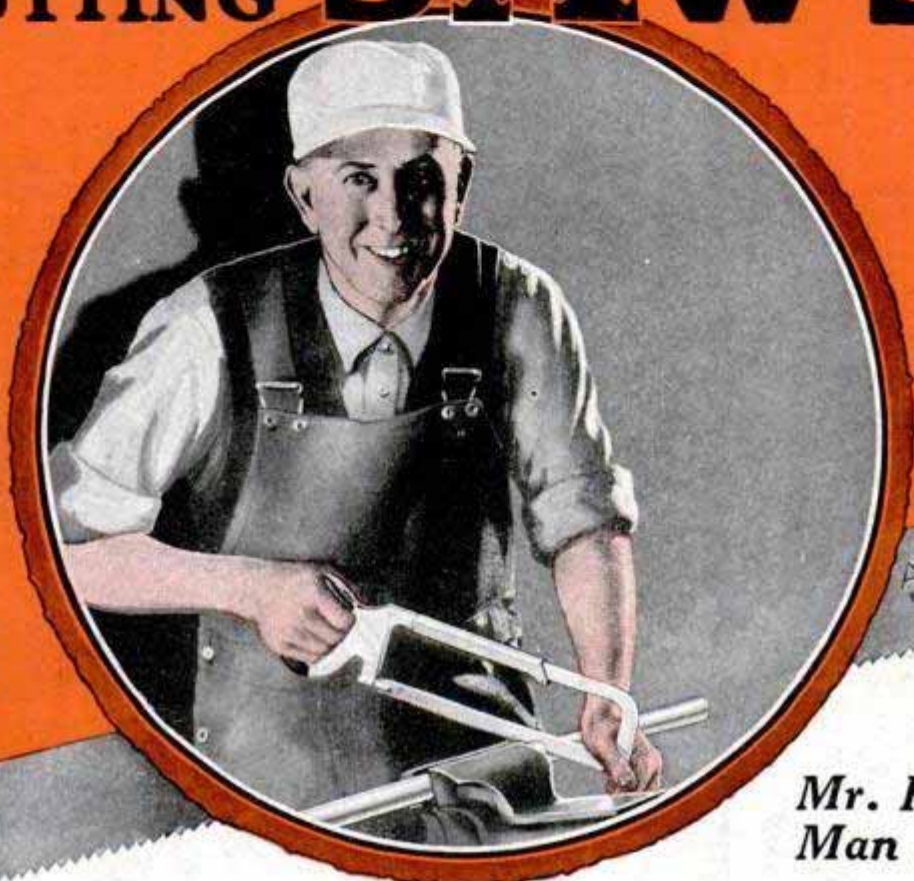
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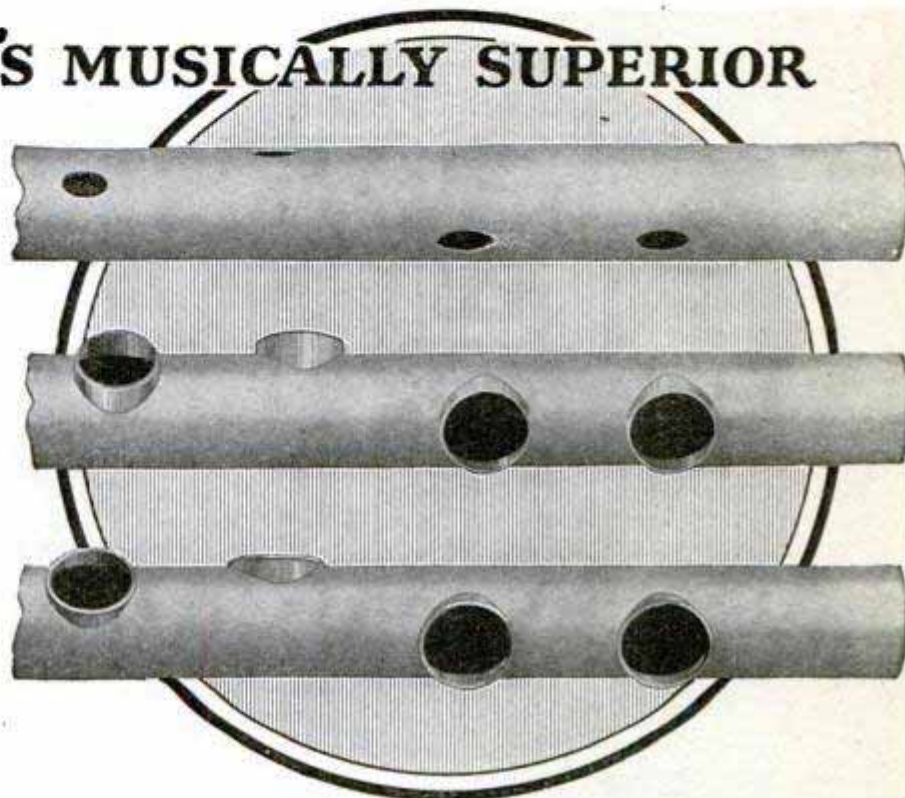
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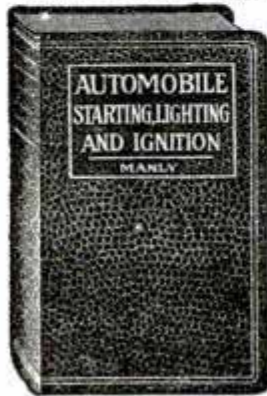
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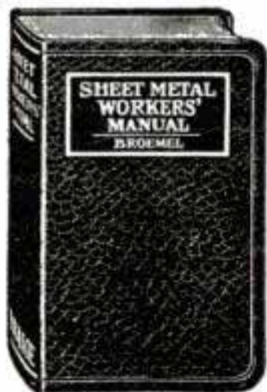
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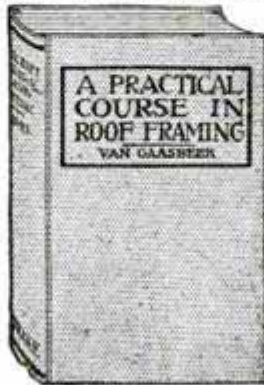
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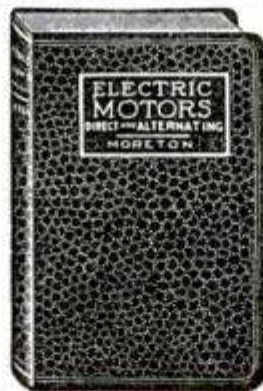
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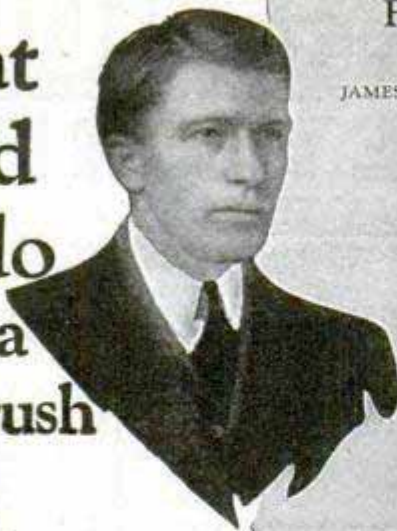
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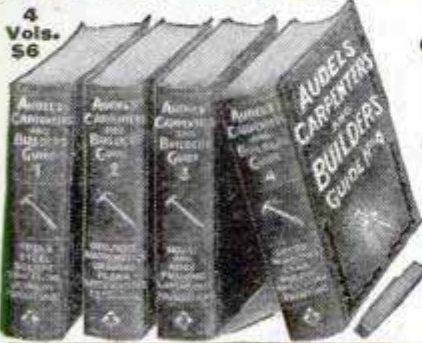
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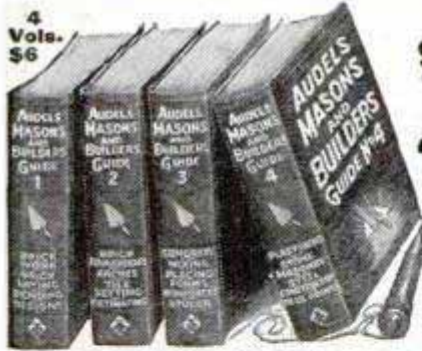
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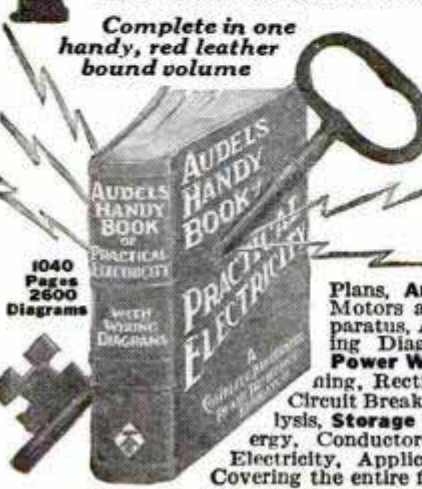
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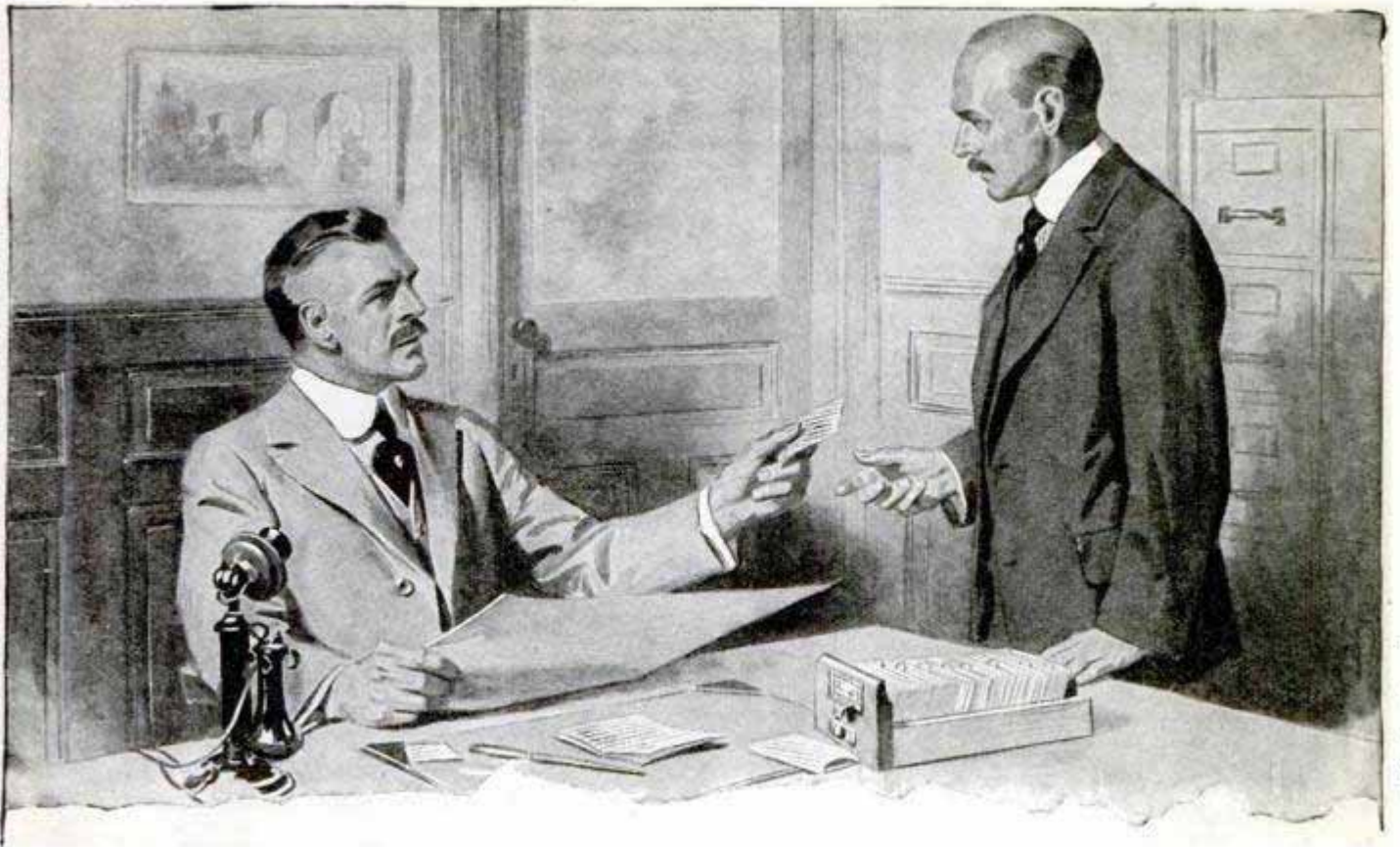
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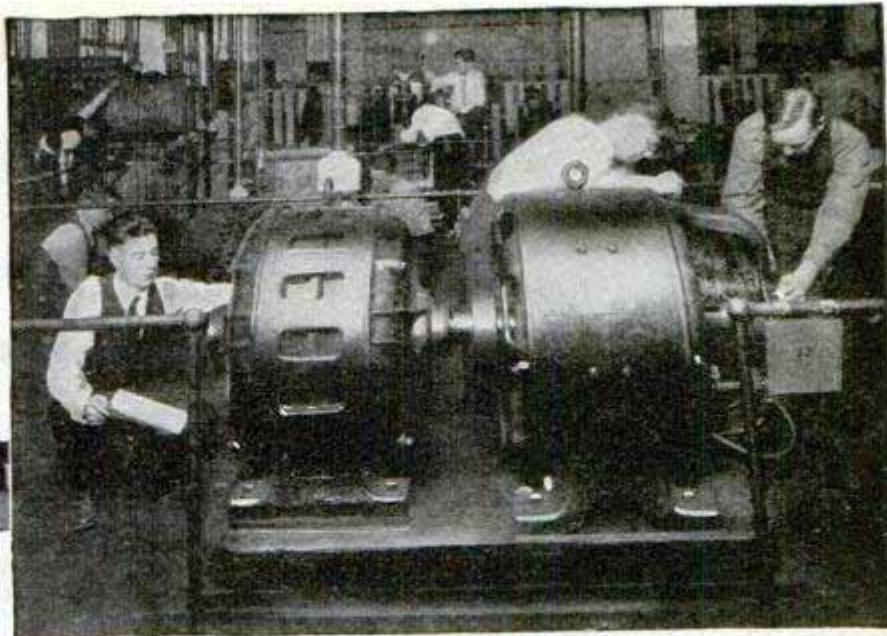
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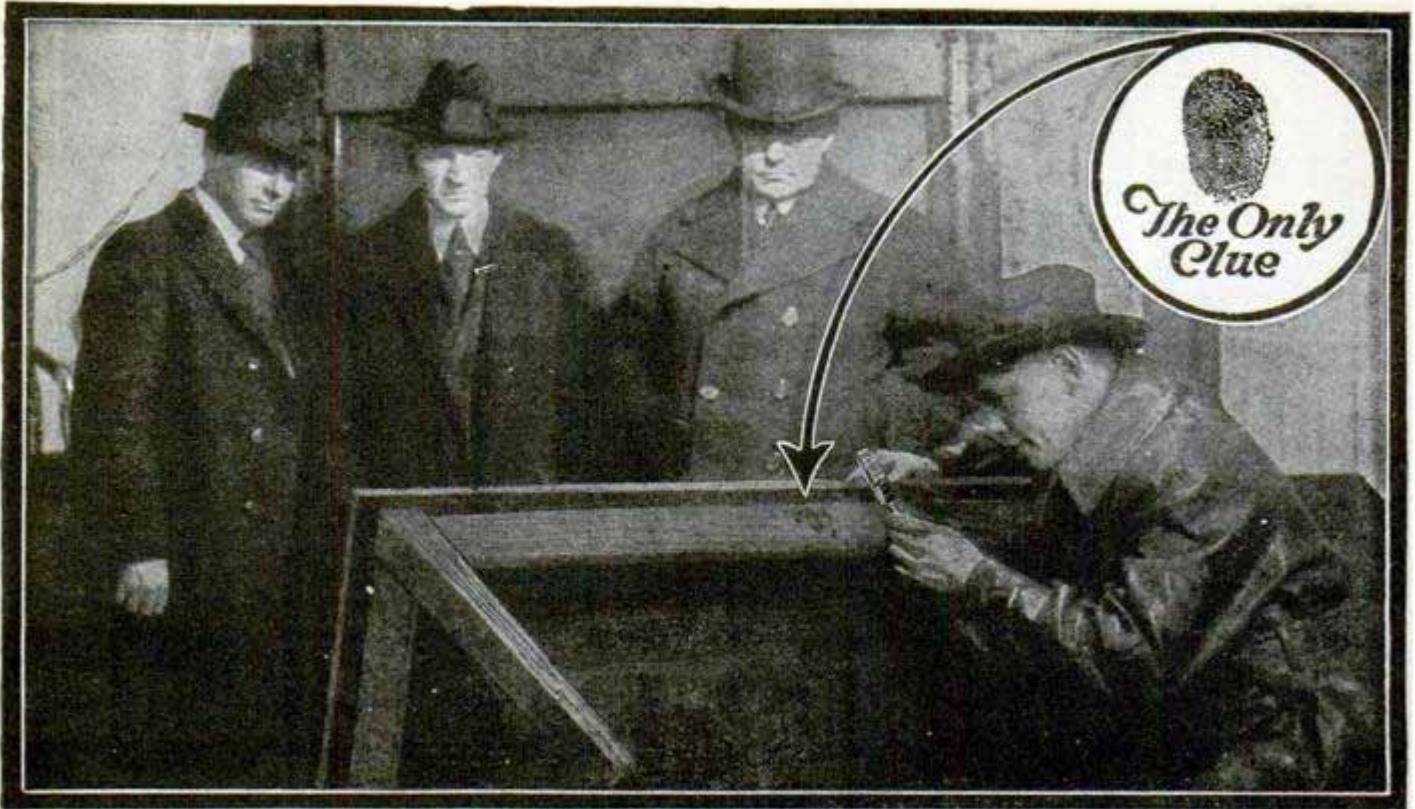
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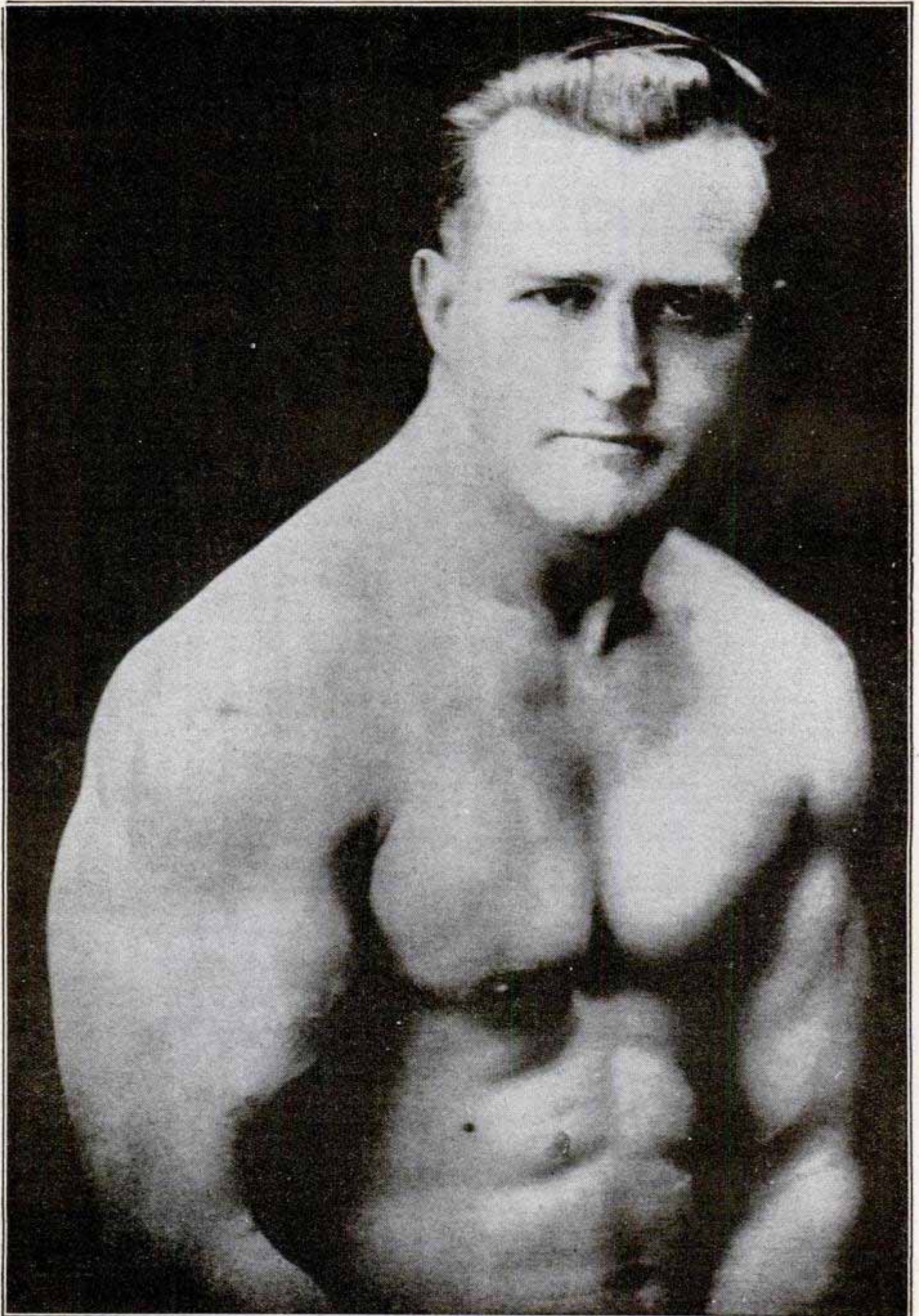
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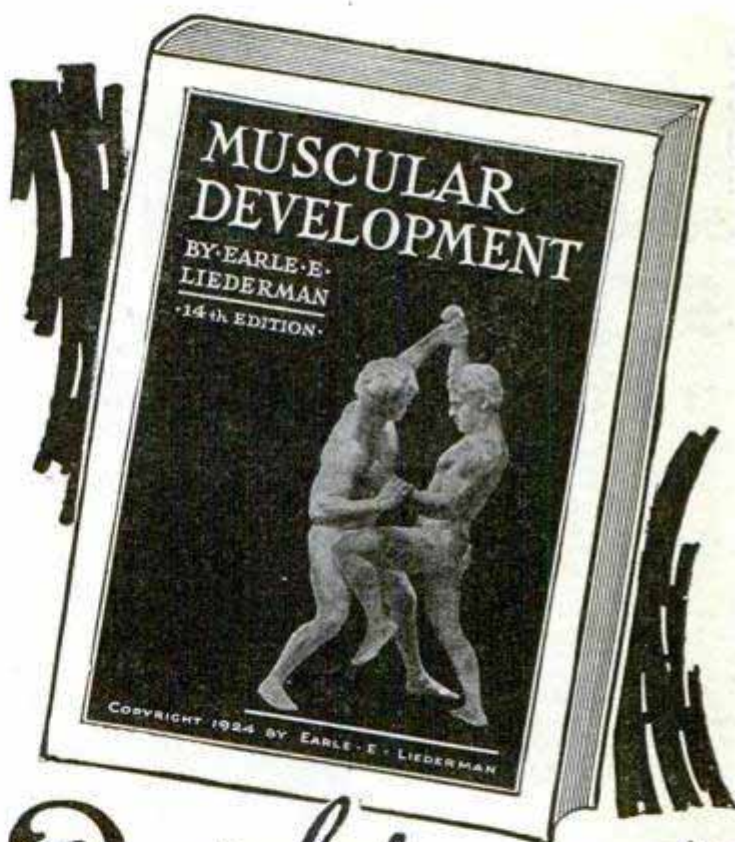
Thank your lucky stars you have another man inside of you. He's the human dynamo. He fills you full of pep and ambition. He keeps you alive—on fire. He urges you on in your daily tasks. He makes you strive for bigger and better things to do. He makes you crave for life and strength. He teaches you that the weak fall by the wayside, but the strong succeed. He shows you that exercise builds live tissue—live tissue is muscle—muscle means strength—strength is power. Power brings success! That's what you want, and gosh darn your old hide! you're going to get it.

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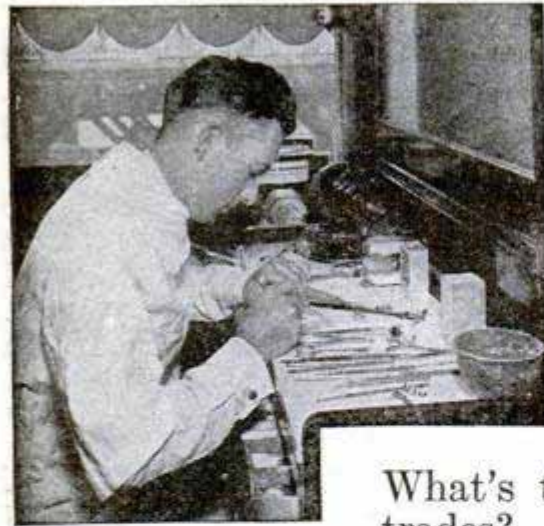
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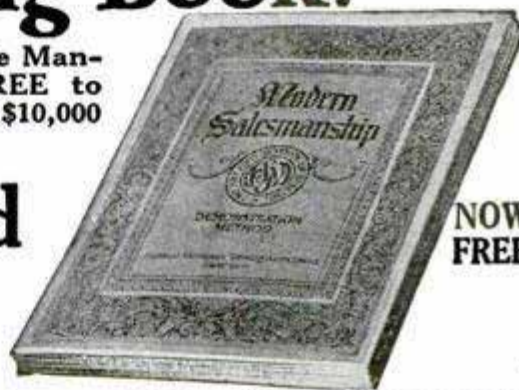


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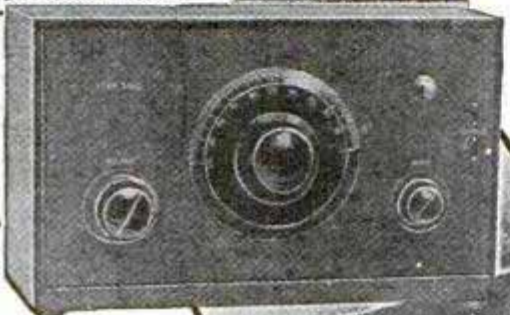


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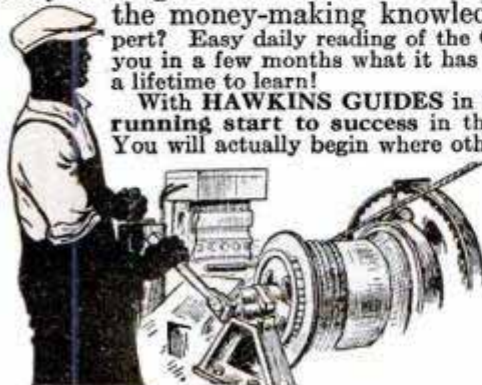


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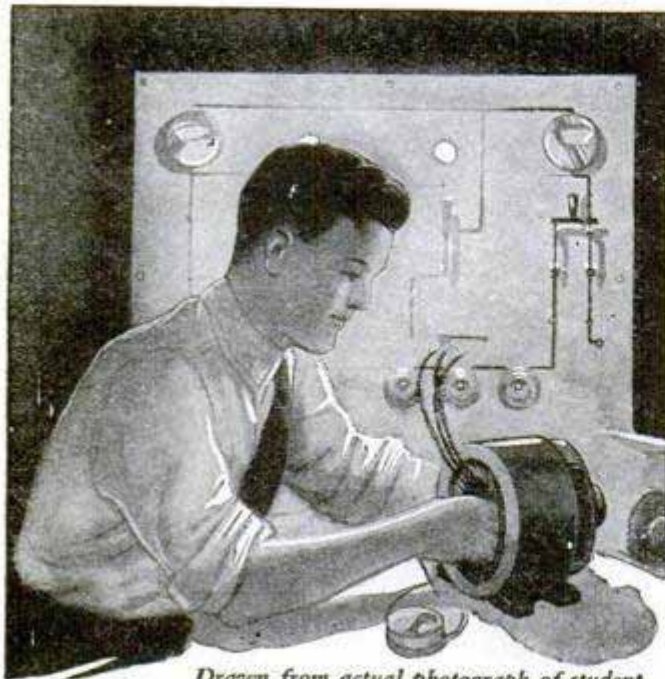
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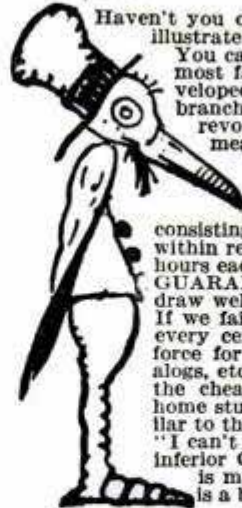
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I stood on the sidelines trying to look happy—trying to smile back at my friends. But it was no use. I was too miserable.

I Make a Blunder

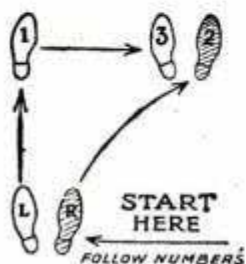
Just then Ruth, a girl friend of mine, came up to me. "Why, Jim, why aren't you dancing?" she exclaimed. I started to explain that I couldn't dance, but suddenly I changed my mind. "I was waiting to dance with you, Ruth," I said cheerfully, not realizing the blunder I was making.

What a nightmare that dance was! I thought I could make a bluff at dancing—thought I could imitate the movements of the other dancers. It was impossible. Half a dozen times I stumbled. Half a dozen times I stepped on Ruth's feet. Finally she lost patience with me. I apologized, and we sat out the rest of that dance in silence.

The very next day I resolved to learn to dance. I had heard of Arthur Murray, the famous dancing instructor, and what wonders his learn-at-home method had

IF YOU CAN DO THIS STEP

Arthur Murray will make you a finished dancer in 10 days.



done for others, and so I decided to send for his course.

The course worked marvels for me. In a few short evenings I had learned the simple steps, and within thirty days everyone admitted that I was a finished dancer. I am certainly obliged to Arthur Murray and his wonderful, simplified method of learning to dance in your own home.

This story is typical, and it shows you just the chance you've been looking for—a chance to become an accomplished dancer right in your own home at a small cost.

Learn to Dance at Home

No matter how poorly you dance now—no matter if you've never been on a dance floor in your life—Arthur Murray's new method makes you a finished dancer in ten days or you don't have to pay a penny for the lessons.

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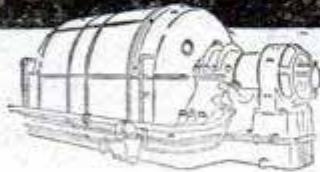
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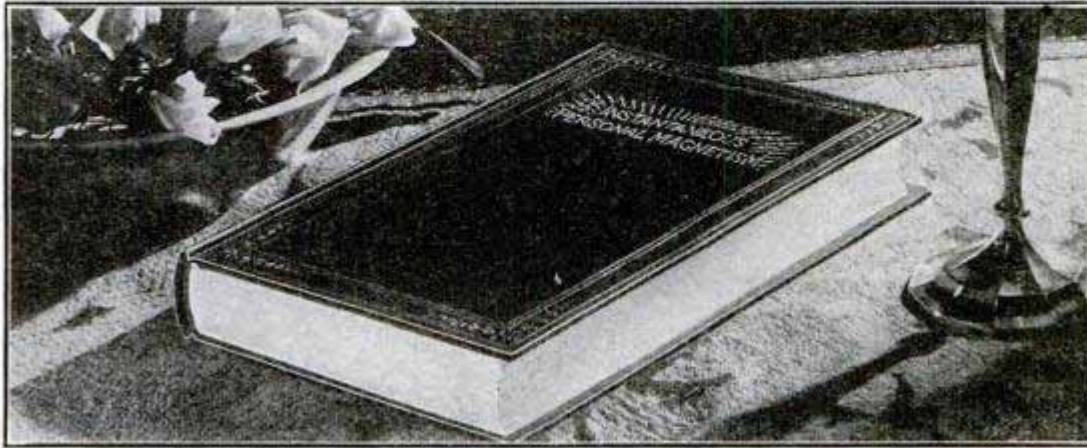


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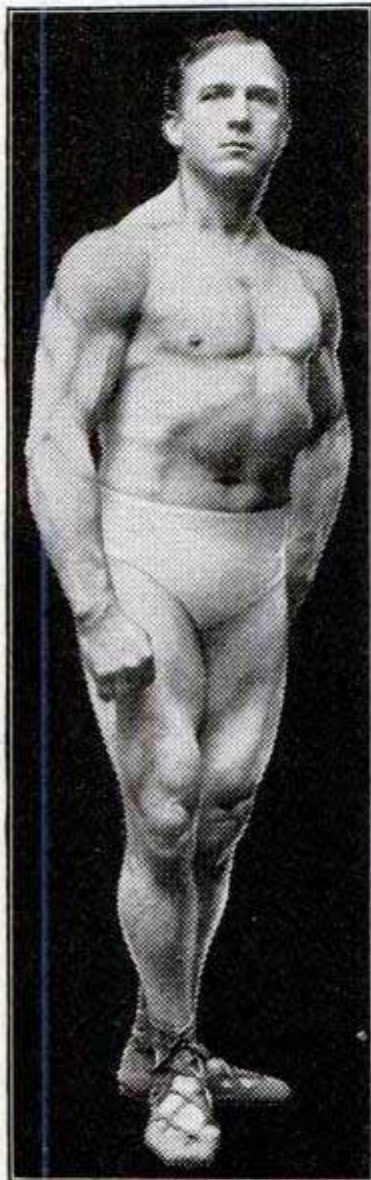
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You won't be regarded as a real man if you are a slouching, nervous, fidgeting grouch—slinking along, afraid of your shadow, timid in company; sallow-complexioned, pimply-faced—with shifting, cowardly eyes; round-shouldered, with unsteady step; a cold, clammy grip—lacking pep, punch or personality—you simply won't get anywhere.

Fellows of this type are not wanted. If you are a weakling, nervous and always pessimistic—you will feel your inferiority wherever you go. Men will shun you. Women will not be attracted to you. Even dogs will bark at you!

It is the penalty you pay for weakness!—but you won't have to pay this price if you will face the facts and make up your mind you are going to go to the mat with ill-health and fight to a finish. It's up to you—to you alone. You can overcome weakness.

You Can Be Strong and Healthy

Like thousands of those who have come to me in a pitiable state of physical bankruptcy you can be restored through STRONGFORTISM, the basic science of health and strength. You can be raised from the depths of despair and despondency to the heights of glorious manhood. You can be strong, vigorous, happy and successful if you but give Nature a chance to work through my proven system.

STRONGFORTISM

Creates New Energy and Strength

Through STRONGFORTISM men all over the world have been rejuvenated and restored to health and strength after they have suffered untold mental and physical horrors as the inevitable result of excesses, fast living, and abuse of their physical power.

STRONGFORTISM has a record unparalleled—there is no other system, or method, or course that compares with it in restoring impaired human beings to health and strength.

STRONGFORTISM begins at the source to create new energy and strength by utilizing Nature's forces scientifically. It builds up the internal muscular system first and thus gets rid of constipation, dyspepsia, indigestion, heart ailments, bad blood, catarrhal troubles, rheumatism and other afflictions, increasing your energy and stamina. External muscular development follows quickly and you become a new man inside and out—a fellow to be reckoned with and envied wherever you go.

NO APPARATUS—NO DRUGS

Strongfort's Course does not depend upon artificial means or stimulants—no dope nor drugs. Nature does the work—all you do is give Nature a chance. Only a little of your time, in the privacy of your home, is all that is required. You will be surprised at how easy it all is, how astonishing the results, how speedily you will feel the effects of the new life animating your whole body.

I Want to Send You MY FREE BOOK

This book of many pages and dozens of pictures tells of my wonderful experience

—how I became the outstanding athlete of the world, performing feats others dared not attempt; how I turned the knowledge gained through developing my own body to the benefit of others, and then how STRONGFORTISM was evolved. It tells what I have done for others, what I can do for you. It doesn't mince words. It tells plain truths.

"Promotion and Conservation of Health, Strength and Mental Energy," points the way from disease and

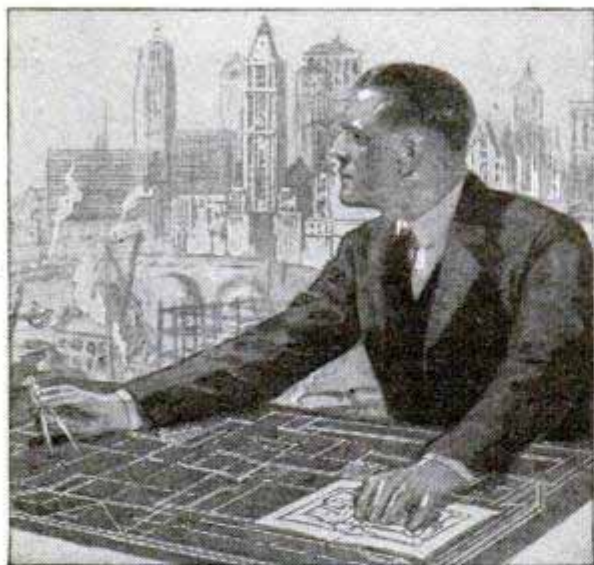
FREE CONSULTATION

Clip and Send this Coupon—Absolutely Confidential

Mr. Lionel Strongfort, Strongfort Institute, Dept. 295, Newark, N. J.—Please send me absolutely free my copy of your book, "PROMOTION AND CONSERVATION OF HEALTH, STRENGTH AND MENTAL ENERGY." I have marked (X) before the subjects in which I am most interested.

- | | | |
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| .. Colds | .. Weak Eyes | .. Great Strength |
| .. Catarrh | .. Flat Chest | .. Lung Troubles |
| .. Asthma | .. Despondency | .. Poor Circulation |
| .. Headache | .. Emaciation | .. Round Shoulders |
| .. Rupture | .. Rheumatism | .. Skin Troubles |
| .. Thinness | .. Nervousness | .. Stomach Disorders |
| .. Pimples | .. Constipation | .. Increased Height |
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| .. Weak Back | | |

Name.....
Age..... Occupation.....
Street.....
City..... State.....



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"When I enrolled with the International Correspondence Schools, I was a plasterer and I didn't know a thing about blueprints. Today I have my own contracting business and I am able to figure the most difficult jobs and execute them to the satisfaction of everyone concerned. My income is between \$12,000 and \$15,000 a year. It certainly was a lucky day for me when I sent in that I. C. S. coupon."

That's a true story of what just one student of the International Correspondence Schools has done. Every mail brings letters from other ambitious men and women telling of promotions and increases in salary due directly to spare-time study.

One hour a day spent with the I. C. S., in the quiet of your own home, will prepare you for success in the work you like best.

Mail Coupon for Free Booklet

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BOX 5630-E SCRANTON, PA.

Explain, without obligating me, how I can qualify for the position, or in the subject, before which I mark X.

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LEARN TENOR BANJO

Now you can have the joy of being your own musical self—the thrill of popularity—new friends—happier evenings—more money-making opportunities—if you wish. You can be admired and wanted everywhere, counted in on every party, because you are a clever entertainer on America's most popular instrument—the Tenor Banjo.

For the first time in the history of my long playing career—five years with Isham Jones' Recording Orchestra—I am now in position to offer you my famous Home Study Tenor Banjo Course. I call it "The Key to Successful Banjo Playing." It is my Course—compiled after years of study and experience with the tenor banjo—the instrument I helped to develop. I am now using this Course successfully in my school, the Chicago Tenor Banjo Institute, and am training beginners, advance students, and professional artists, to reach new heights of popularity and bigger pay jobs.

Easy to Play the McNeil Way

This course can now be yours. Just as if I were sitting at your elbow teaching you the correct finger positions—melody, chords, harmony, etc., etc. My Course is a personalized "A-to-Z" Course. It includes everything you will ever want to know about Tenor Banjo playing. An added feature to help you is the phonograph record—played by myself, illustrating breaks, jazz strokes, etc., etc.

Be the Life of Any Party!

If you are really eager to learn to play, if you honestly yearn for popularity and increased income, then act now. Write today for free booklet and details.

Charles McNeil, Studio Director,
CHICAGO BANJO INSTITUTE
 Dept. 1352, 3345 N. Lincoln St., Chicago, Ill.

Mr. Charles McNeil, Studio Director,
 Chicago Banjo Institute,
 Dept. 1352, 3345 N. Lincoln St., Chicago.

Dear Sir: I would like to find out more about your Home Study Tenor Banjo Course. Without obligation, please send me literature and full information.

Name.....

Address.....

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



B. W. COOKE
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Engineer
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“JOB-WAY”
3 JOB TICKETS AND 3 AUTO LESSONS

NOW
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About the Tremendous Money-Making Opportunities in the WORLD'S BIGGEST BUSINESS!

Find out how you can get into this gigantic Auto Business! Think of it—7 Thousand Million Dollars paid to Auto men every year for upkeep alone! See why there are so many Tremendous Opportunities for the trained Auto Man to get Big Raises in Pay QUICK!—opportunities waiting for YOU! My Free Book shows why. My Free Lessons show how you can take advantage of these wonderful Opportunities.

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If you want to boost your pay quick, Mail the Coupon now. Be an Auto Expert. It's the one Business for the red-blooded, ambitious man who wants to make real money! I help you do it. Get all the particulars about my lifetime Employment Service and my lifetime Consultation Service—both of which I include Free of Extra Charge.

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Learn how men without a day's previous auto experience, and only common schooling become Garage Owners, Superintendents, Managers and can earn up to \$150 a Week and more! See why hundreds of men have found “JOB-WAY” to be such interesting, practical Training! I stand ready to give you absolute proof. Clip COUPON NOW and I'll rush your Lessons to you Absolutely Free!

B. W. Cooke
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3 JOB TICKETS also FREE

ACT QUICK!
My Big New Auto Book Also FREE!

Coupon brings this startling, revolutionary, new Auto Book, also absolutely Free! Shows how hundreds of men have reached Big Pay in amazingly QUICK Time! Shows what you can do!

Send for It Now!

Coupon Brings Full Details of my 4 OUTFITS OFFER

Includes Tools, Tool Bag, Electrical Test Bench, Also 303 Wiring Diagram Charts, Also Special Electrical Outfits.

I'LL PROVE

That I Can Put YOU in Line for the BIG PAY JOBS—QUICK!

Clip coupon now! I'll send you absolutely FREE OF CHARGE—with positively no obligation on your part—3 “JOB-WAY” Auto Lessons and 3 Job Tickets and my big, new Auto Book also FREE! I want you to see for yourself—just why B. W. Cooke “JOB-WAY” Training is bringing so many men BIG Money in such remarkably quick time. I want you to see what it can do for you!

Find out how I train You

AT HOME!

Don't sell your time for low pay! You don't need to! Get all the Facts! Find out how you can become a Big Pay Man in amazingly quick time! See how I train you this fascinating, easy, new way—with LESSONS—JOB TICKETS—TOOLS—and ACTUAL AUTO JOBS! These 3 FREE Lessons show you why you can stay home; keep your present job! They prove that you don't have to leave your doorstep—that you can Master every branch of Auto work right in your own home. Send Coupon while I can still offer you these 3 Lessons and 3 Job Tickets absolutely FREE!

See How You Can Earn up to \$150 a Week

If you're earning a cent less than \$60 a week, clip coupon now! Get the proof. See for yourself how easily you can master Auto work right in your own home—and how quickly you can get in line for the big Auto Jobs that pay up to

\$10,000 a year and more—or in a Money-Making Auto Business of your own. Remember—these lessons and Jobs come to you absolutely FREE of charge and without any obligation on your part whatever.

MAIL THIS COUPON NOW!

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B. W. COOKE DIRECTING ENGINEER Dept. 216A CHICAGO MOTOR TRAINING CORPORATION, 1916 Sunnyside Avenue, Chicago, Illinois

Dear Sir: Send me absolutely FREE and without any obligation on my part, 3 “Job-Way” Lessons and Jobs. Also your Auto Book FREE and Full particulars of your 4 Outfits Offer.

Name

Address

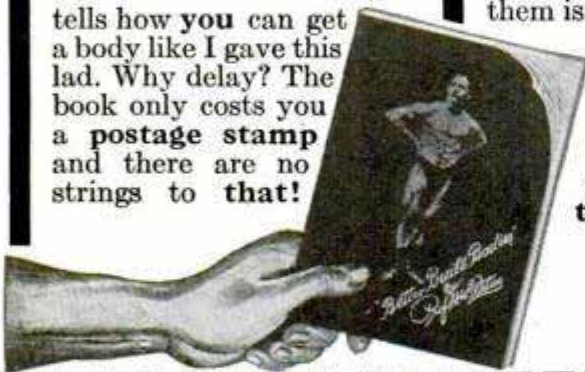
Town.....

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From "Puny" to PANTHER-MAN

My FREE Book

tells how you can get a body like I gave this lad. Why delay? The book only costs you a postage stamp and there are no strings to that!



Titus, Dept. P-111
105 E. 13th Street,
New York City.

Dear Sir:

Mail my copy of your big new illustrated book, *Better Built Bodies*, absolutely FREE and without obligation.

Name.....

Address.....

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

LOOK at these two pictures! LOOK at them!! Then go peek in your mirror and see which one of them is more like you. Never mind blushing! Don't waste time being ashamed! There's no need of staying that way!
The chap in the picture got next to himself and came to me!

In thirty days I built that man from the sparrow-armed boy in the first picture. I loaded him with muscles. I can do as much—maybe more—for you! If you want a real body mail the coupon before you go to bed TONIGHT!

TITUS Dept. P-111
105 East 13th St., New York City



BEFORE

This lad looked pretty hopeless when he came to me. His arms looked like sparrow wings with the feathers removed. His ribs stood out and his bones tried to poke through his skin all over his body. His chest was hollow, his neck scrawny. He had sluggish blood circulation and jumpy nerves. He couldn't sleep. Then he took my course!



30 DAYS AFTER

What a man! In thirty days I built the fellow you see above. I loaded his bones with muscles! I gave him a body that laughs at hardships and illness. He says: "No other apparatus and instruction can touch yours! When the human body will hold another muscle—Titus will put it there!"

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Send drawing or model for preliminary examination of Patent Office records.

ALL BUSINESS GIVEN PROMPT AND PROPER ATTENTION

Listed Patent Lawyer in the latest editions of the Rand-McNally Directory of Bankers and Attorneys, of Chicago, Ill.; The Baggott & Ryall Directory of Attorneys, New York City; The Lawyers Guaranteed Directory, Detroit, Michigan; The Lawyers and Bankers Quarterly, published by the Legal Directory Publishing Company of St. Louis, Mo.; the American Lawyers Annual, Cleveland, Ohio.

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Get \$1900 to \$2700 a Year
Easy Work—Long Vacations

Why work hard for small pay? Uncle Sam offers you a fine position as a Railway Postal Clerk. Travel on fast trains sorting mail. Travel expenses paid. \$1900 a year TO START. \$100 RAISE EVERY YEAR until you reach TOP PAY.

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Let Arthur R. Patterson help you qualify for this wonderful position. He trained thousands now in Civil Service. Write for FREE BOOK. Tells how Mr. Patterson coaches you to pass exams. Also read his Money Back Agreement. Mail coupon now.

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The PATTERSON SCHOOL, Dept. 82, Wisner Bldg.
Rochester, N. Y.

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Rochester, N. Y.

Sir: Send me without charge your catalog describing Railway Mail Clerk and other Civil Service positions.

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

Address.....City.....State.....

Ford

40 Miles on a Gallon

"We have tried them out. Ford got 40 miles on a gallon."—F. S. Carroll.



Saves 50%

F. A. Cole writes he put one on a Studebaker Special Six. Reports a saving of 50% in gasoline.

Buick

36 Miles On 1 1/4 Gallons

"Yesterday I made a trip of 36 miles and used only 1 1/4 gallons." L. L. Robinson.

CHEVROLET

43 Miles On a Gallon

"We have tried them out. Chevrolet got 43 miles."—F. S. Carroll. Rex Deen, another Chevrolet owner, reports he got 25 miles a gallon. Took the device off and mileage dropped to 19. Put it back and mileage moved up to 25.



Almost Double

J. R. Wood writes he increased mileage on his Oldsmobile from 17 miles a gallon to 30 miles a gallon by actual count on 3,000 miles.

INTERNATIONAL TRUCKS

Saves 41%

"I find it better than you recommend it. On the International Truck we use, we are saving by positive test 41% in gas and our engine uses less oil."—George Bell.

Sworn Affidavit

I, L. G. Stransky, Vice President, J. A. Stransky Mfg. Company, being first duly sworn depose and say that the J. A. Stransky Mfg. Company have in their files thousands of unsolicited testimonials from satisfied users all over the world.

Signed L. G. Stransky
Vice President.

Subscribed and sworn to before me this 29th day of November, 1926.

(Signed) Ernest Henegar
Notary Public.



**With This Amazing Device
I Drove 1300 Miles
Without Buying Gasoline**

No wonder over a million car owners have installed the Stransky Vaporizer! Here's a remarkable instance—one of many that shows how this amazing device has saved gasoline and increased power. J. R. Wood of St. Louis writes that he ran his car 3,000 miles on the same amount of gas that he formerly used on only 1,700 miles. Think of it! 1,300 miles without buying gasoline! Read the inventor's daring no-risk offer to you.

\$75 to \$200 In a Week

SELDOM if ever has such a money-making opportunity been offered distributors—experienced or otherwise—full time or spare time. Think how fast the money rolls in when Foster could make \$137.50 in a week—Fuller, \$104.50 in five days—Cronk \$51 in an hour!

If your present job doesn't pay you \$75 to \$200 in a week, think fast! Full page newspaper ads are being used all over America. Over a million car owners have installed it already—on all makes of cars, trucks and tractors—even on an aeroplane. Thousands of car owners have ordered direct from the factory because they couldn't find a distributor. Jump in quick and get your share of the cream!

How It Works

The Stransky Vaporizer was invented by J. A. Stransky, former candidate for Governor of South Dakota. It is based on a newly-discovered scientific engineering principle that has stood thousands of tests by car owners, dealers, garage mechanics and other authorities. It has no delicate

parts to get out of order. There is nothing complicated about it. You can attach it to your engine in about three minutes and it needs no further attention.

Official tests show that most car owners waste 20 to 30% of their gas by improper combustion. Thousands of car owners say that this amazing device has saved them as much as 50%; that it picks up power more quickly, ENDS spark plug and carbon troubles, and works in all weathers or roads. And so convinced is the inventor that it will prove its story that he makes the following no-risk offer.



J. A. STRANSKY
Former candidate Governor of South Dakota is the inventor of this amazing device now installed by over a million car owners.

Mail Coupon Below

Over one million car owners have installed the Stransky Vaporizer at the inventor's risk. This coupon will bring you full details of our plan to let you test this device on your car in the same way. You will also learn a definite plan that has helped others earn \$75 to \$200 in a week, full or spare time. Your request will not obligate you. Rush the coupon today.



Free Gasoline Offer

J. A. Stransky Mfg. Co.,
Dept. B-10, Pukwana, S. D.

Yes, send me without obligation full details of your no-risk test offer. Also tell me about your distributor's money-making plan.

Name.....

Address.....

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

The STRANSKY VAPORIZER
Saves Gasoline

J. A. STRANSKY MFG. CO.
Dept. B-10 Pukwana, S. D.
Resources \$500,000.00



Play Piano Jazz BY EAR

-in 90 days!

YOU can play real tunes from the start. No notes to puzzle you—no tiresome scales to practice.

You need not know a thing about music. Even if you have never touched a piano, if you can hum or whistle a tune, we can teach you to play all popular song hits *by ear* at a very small cost. No need now to spend years practicing under old-time method. My new and original system teaches you easily and quickly. Be a jazz master and make yourself popular everywhere you go. And the best part of it is there is nothing hard about it. Write at once for

FREE BOOKLET To show you how easily it can be done.

This wonderful home course is offered at a ridiculously low cost. A little practice gives amazing results. You can sit down and play any popular jazz piece that you hum.

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Only 10c Send only 10c coin or stamps, for 32 page book, ILLUSTRATED, giving full particulars. Tells the secrets of the big Champions; gives many tricks, holds and other valuable information. A costly

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Learn Watchwork, Jewelrywork and Engraving

A fine trade commanding a good salary, and your services always in demand. Address: **Horological, Dept. P, Bradley Institute, PEORIA, ILLINOIS,** for our latest catalog.



"BECOME A LIGHTNING TRICK CARTOONIST"

Send \$1.00 for Laugh Producing Program of 23 Trick Drawings with Instructions. Catalog of Chalk Talk Supplies Free. **BALDA ART SERVICE, Dept. 1, Oshkosh, Wis.**

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been qualified by my practical, easy-to-learn Shop Method of teaching with real tools on real equipment. I guarantee your money back if I fail. No book study.

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My eight weeks' course is complete. No extras to pay for. This offer is limited. Save one-third while it lasts. Act promptly. Mail the coupon today. Remember "Mac" is one of the world's largest operators of Auto and Tractor Training Schools.

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are paid to thousands of auto experts. Others make more as owners of garages and repair shops. What man of 16 or 60 could ask for a Bigger Opportunity? Write today for my remarkable special reduced tuition offer including your board and railroad fare.

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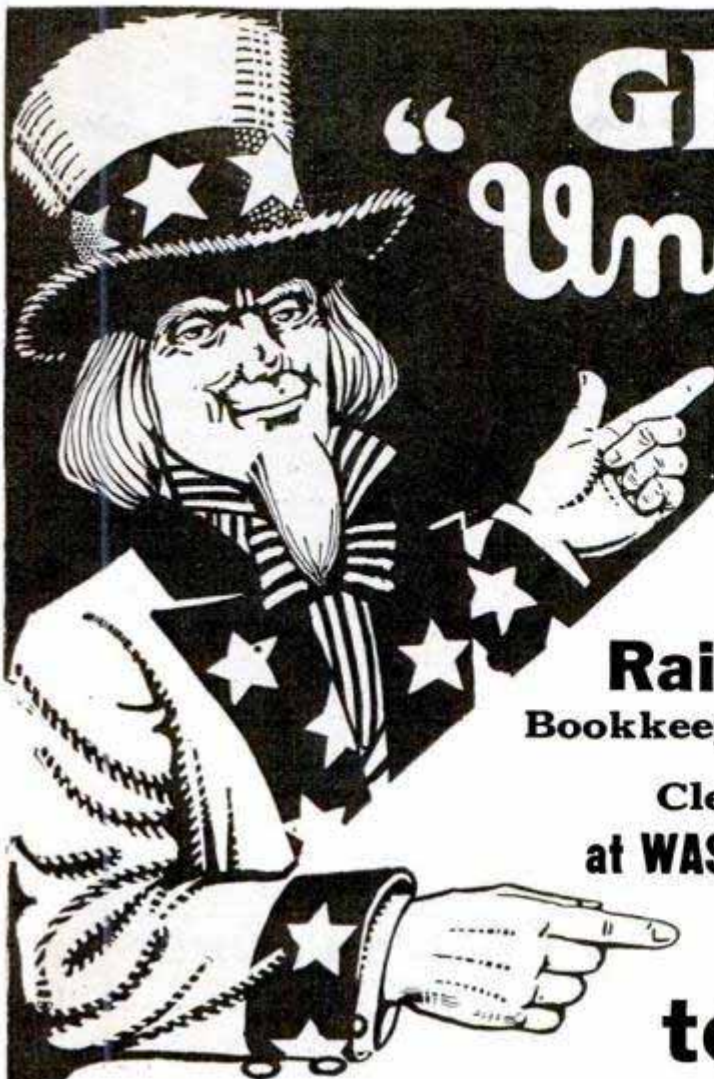
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Please send your Special Offer and Big FREE Illustrated Book.

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“GET ON” Uncle Sam’s PAYROLL

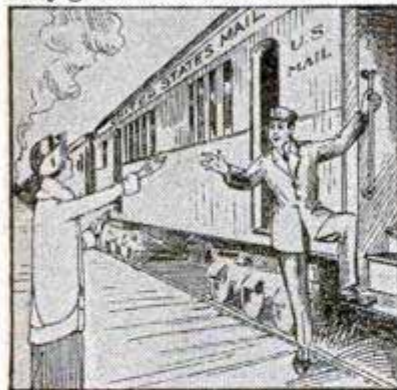
Post Office Clerks
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at **WASHINGTON, D. C., and ELSEWHERE**

\$1140⁰⁰
to \$3300⁰⁰ a Year

These are steady positions. Strikes, poor business conditions, lockouts or politics will not affect them. U. S. Government employees get their pay for full twelve months every year. There is no such thing as “HARD TIMES” in the U. S. Government Service.

RAILWAY POSTAL CLERKS

Railway Postal Clerks now get \$1900 the first year, being paid on the first and fifteenth of each month. \$79.16 each pay day. Their pay is quickly increased, \$100 and \$150 a year, the maximum being \$2700 a year. \$112.50 each pay day. They get extra allowance for hotel expenses when away from home.



PAID VACATIONS

Railway Postal Clerks, like all Government employees, are given a yearly vacation of 15 working days (about 18 days). On runs they usually work three days and have three days off duty, or in the same proportion. During this off duty and vacation, their pay continues just as though they were working. When they grow old they are retired with a pension. As Railway Postal Clerks are continually traveling, they have an excellent chance to see the country. They are furnished with a railroad pass.

CITY MAIL CARRIERS—POST OFFICE CLERKS

Clerks and Carriers get \$1700 the first year regular, and automatically increase \$100 a year to \$2100 with further increase to \$2300. They also have 15 days vacation. Examinations will be held during February at many large cities. City residence is unnecessary.

GENERAL CLERK

(Open to men or women 18 or over)

Salary \$1140 to \$1860 a year. Pleasant clerical work in the various departments and offices at Washington, D. C., and elsewhere throughout country.

WHAT WILL YOU EARN 5 YEARS FROM NOW?

Compare these conditions with your present or prospective condition, perhaps changing positions frequently, kicking around from post to pillar, no chance in sight for PERMANENT employment; frequently out of a position and the year's average salary very low. DO YOU EARN \$1900 EVERY YEAR? HAVE YOU ANY ASSURANCE THAT A FEW YEARS FROM NOW YOU WILL GET \$2700 OR MORE A YEAR, EVERY YEAR?

GET FREE LIST OF POSITIONS

Fill out the coupon. Tear it off and mail it today—now, at once. DO IT NOW—This investment of two cents for a postage stamp may result in you getting a U. S. Government Job.

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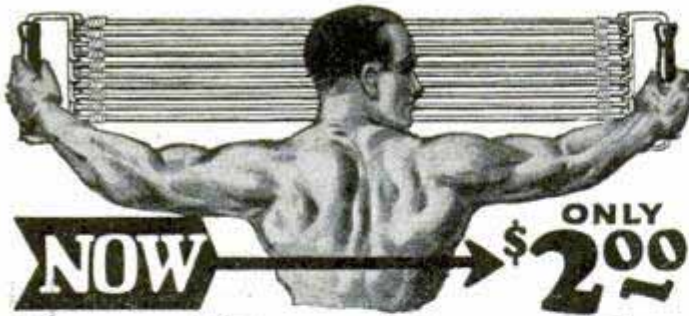
Rush to me, entirely free of charge (1) a full description of the position checked below; (2) Sample coaching; (3) Free copy of 32-page illustrated book, “U. S. Government Positions and How to Get Them,” with list of positions now obtainable.

RAILWAY POSTAL CLERK..... (\$1900-\$2700)
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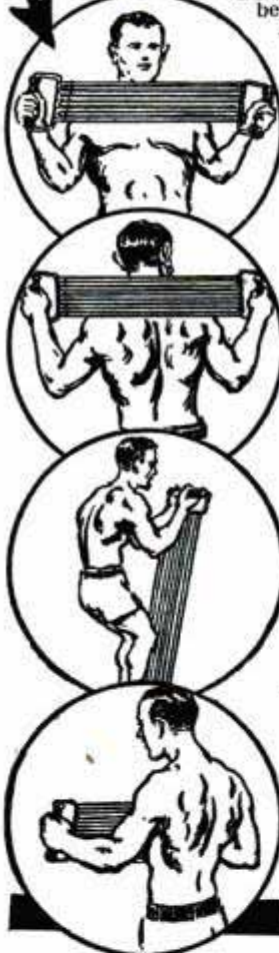


NOW → **ONLY \$2.00**
Giant Chest Expander

and Progressive Exerciser

Be a muscular marvel. Have the muscles of a superman. Become strong for your health's sake or to astound your friends with extraordinary feats which only men of giant strength can do. In a few short weeks you will easily do stunts which now seem difficult—then real muscles and strength will be yours—and yours to keep. If you want exercise to just keep in good shape you can reduce the strength of the Progressive Exerciser by eliminating as many cables as you wish. If you want great resistance so as to build up big solid muscles, then use the full strength.

Send No Money Use This Money Saving Coupon



How the Giant Chest Expander and Progressive Exerciser is Made

The Giant Chest Expander and Progressive Exerciser is made with new live, springy rubber so as to give it long wearing and great resisting qualities. Do not pay more for an exerciser that has forty or less rubber strands to each cable. Get the best and most durable. The Giant Progressive Exerciser has 50 strands of the finest rubber procurable to each cable.

Free Instructions

We do not think it enough to send you an exerciser worth double what we ask, but for a limited time, we will also include instructions absolutely free. These instructions are interesting and simple to follow—they show you the short cut to health and strength. Order today before this wonderful offer is withdrawn.

Your Guarantee

The Giant Chest Expander is sold with a guarantee that you will say it is the finest you ever saw or your money back.

5 Cables or double 10 Cables for \$2 **for \$4**

The double strength exerciser has resistance of over 200 lbs.

How to Order—Send No Money
 Sign your name and address to coupon below and get your Giant Exerciser at the present low introductory price by return mail. The price is made low because we want everyone to enjoy muscles and strength at the lowest possible cost. Don't pay more—order from us—get the most for your money. Use coupon now.

PROGRESSIVE EXERCISER CO.,
 4002 Langdon Bldg.,
 Broadway and Duane Street, New York

Please send Your 10 cable Progressive.
 Your 5 cable Exerciser.

Check the Exerciser you want, and it will be sent you by return mail. Pay postman introductory price, plus few cents postage on arrival. It is understood that if you are not entirely satisfied with your exerciser you may return it within 5 days and get your money back.

Name.....
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 City..... State.....

If you live outside the United States, send cash with order.

Be a High-Salaried GARMENT DESIGNER

Join this wonderful profession with its amazing opportunities for both sexes. Clean, dignified work.

PARRY PRACTICAL TRAINING qualifies you in a few weeks to hold BIG-PAY positions in America's largest fashion salons and clothing and fur industries.

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No experience needed. This long-established school is the only one officially recommended and endorsed by Chicago Designers' Association of Women's Apparel. Write for full particulars of special offer. **PARRY GARMENT DESIGNING INSTITUTE**, Dept. 101, 19 S. Wells St., Chicago, Ill.

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Making and selling your own goods. Formulas, manufacturing processes, Trade-Secrets. All kinds. All lines. Catalog, special circulars free.

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A Great Book Free with this pay-raising library

For a short time only we will give every subscriber to the New Library of Machine Shop Practice a copy of French's Engineering Drawing—the greatest book on mechanical drawing ever written. This book makes drawing as plain as day—tells you all about instruments, plans and methods—and prepares you to handle any drawing job you will ever have to do. It comes to you absolutely free with

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The New Machine Shop Library is written for practical men. It gives you the best methods for every kind of machine shop work. It explains machine tools and their operation, drawing and design, tool work, gears and grinding, jigs and fixtures, automatic screw machines and their tools and all of the mathematics you will ever have to use. It is plainly written, completely illustrated—the very best kind of help to the machine-shop man who wants to advance himself.

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Send me for 10 days' free examination the New Library of Machine Shop Practice. If satisfactory, I will send you \$1.50 in 10 days and \$2.00 monthly until the special price of \$19.50 is paid. If not wanted, I will return the books at your expense.

On receipt of my first payment of \$1.50, it is understood that I am to receive, free of charge, a copy of French's Engineering Drawing.

Signed.....
 Address.....
 City and State.....
 Position.....
 Employer..... P. M. 2-1-27



A New Day IS DAWNING ON ONE GREAT FIELD

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There is no limit to the earnings or business possibilities for the trained electrical expert. Every factory, every home, every transportation system, automobiles, aeroplanes, etc., are using electricity more and more for power and convenience.

I can prove to any thinking man who is mechanically inclined, that his greatest opportunities—surest future—will come if he learns this profitable and fascinating trade and science.

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Every minute of your time in the Coleman Electrical School will be spent on actual equipment, such as used in factories, power-houses, buildings, homes, automotive electricity—such as ignition, starting and lighting systems—electrical refrigeration, telephone and telegraph systems, in fact, the entire field of electricity is covered in a practical way in our school.

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I guarantee that my School is one of practical training. We teach by doing. We have all equipment necessary to make you a practical and competent electrically trained man. I have spent more than ten years training men. I know what you must know in order to earn the big money. I will teach you how to get it.

W. H. COLEMAN, President,
Coleman
Electrical
School

W. H. Coleman, President
Coleman Electrical School
1628 Main Street
Kansas City, Mo.

Dear Sir:

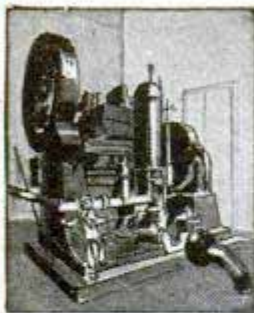
I want to learn about your School. Please send me free and postpaid, your illustrated catalogue that will tell me how you can make me an electrically trained man. It must be free and place me under no obligation.

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

O. C.
MILLERDirector
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The American School

A million Dollar *No-Profit* Educational Institution, now offers men a *double* service—training for a specific job, then help in finding the job. For one small price, on terms of only \$5.00 a month, you are now assured of definite benefits, both in position and salary. Write for complete information—*today!*



No machine can be built until the Draftsman first builds it on paper. My training prepares you for this work.



Never has the world seen anything like the building boom of today. This has created enormous demand for real Draftsmen.

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The big money in Drafting goes to men who specialize in Machine Design, or Electrical Drafting, or Architectural Drafting, or Structural, or Automotive. It is not enough merely to know *general* Drafting practice. You must know how to calculate and design and plan original work. You need many Engineering subjects to fill the kind of a Drafting position that pays \$60 to \$125 a week. The American School now includes this specialized training in its Drafting course.

Costly Drafting Outfit Given!

Fine, imported instruments like these help you learn Drafting quickly and easily. These standard quality, full size instruments, board, table, triangles, T square, ink, protractor, etc., given to every student without extra cost.

O. C. Miller, Director Extension Work

The American School

3 Drafting

to prove you can

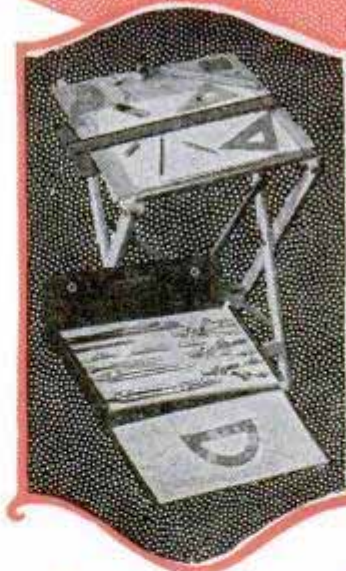
We have invented a new, simplified way to teach Drafting—the first real improvement in Drafting home instruction in history. We want you to see a few of these new Job-lessons, try them, test your own ability to master them—without one penny of cost or obligation. For instance, you will see how we get away from the “copying” methods used in the past, so you develop into a DRAFTSMAN, instead of a “tracer.” See for yourself the ingenious new method which compels you to think, to solve problems, to do actual Drafting-room jobs from the very first lesson!

A New, Rapid, Simplified 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 the American School-trained Draftsmen can qualify for a good job at big pay when they graduate.

Win Success Thru Drafting

Drafting is easy, fascinating work. Short hours. Big pay. And the Draftsman is always in line for promotion to executive positions. This training is complete. It includes high school subjects (if you need them) and all the Engineering and Mathematics Drafting experts require.



FREE Job Service

The American School now offers its students and graduates, without cost, the services of an efficient employment department keeping in constant touch with employers of Draftsmen all over the U. S. We have placed hundreds of men in good, big-pay Drafting positions. We've made this training so complete, so practical, so easy to master, that our students are bound to make good. And so, because the demand for real Draftsmen continues to exceed the supply and because this training actually prepares men for good Drafting positions we back it with a Free Employment Service.

Dept. D-274
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Lessons *Actually* FREE

learn at home in spare time!

Draftsmen Wanted!

\$60 to \$125 a Week!

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.

70,000 fine jobs advertised last year. Get ready to fill one. Get out of the rut. Make something of



Electricity needs Draftsmen who know Electrical principles as well as general Drafting practice. I give you this training.



The demand for Draftsmen experienced in concrete and structural steel work is enormous. Many big-pay positions open.



Every great Auto factory employs Draftsmen who specialize in Automotive work — men who design bodies, plan engines, etc.

I Will Make This Contract With You



American School
—the Million Dollar
Educational Institution



4. or we'll refund every cent of your money.

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.
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O. C. Miller
Director Extension Work

Coupon Brings 3 Lessons FREE!

Get them. Test your own ability to learn Drafting and get ready for a fine job and big pay.

Coupon also brings surprise offer, and complete information about your opportunities for success in Drafting. Mail It Today!

Read These Letters!

City of Chicago
Department of Buildings
Gentlemen: The same day I received my diploma I got word that I was one of the two candidates who had successfully passed the examination for Deputy Commissioner of Buildings of the City of Chicago, a position paying \$3600 per year.

There were eight applicants examined besides myself, all men well known to the architectural and engineering profession. Seven of these failed to obtain a passing grade of 70%. My grade was 84.69.

Inasmuch as I failed to pass this same examination three years before, my present success is mainly due to the knowledge gained through your School.

Yours very truly,
ROBERT KNIGHT

Got His Draftsman's Job

"I wanted to let you know how I came out in getting that job at the Brownell Co., Dayton, Ohio. I was to start and have a trial at Drawing, and I am still in the Drawing room. The engineer seems to like the work I make, and also the other draftsmen. I thank the School very much for getting me in at this place, because your letter of recommendation helped me a whole lot to get the job."

BERNARD WEBER,
730 St. Nicholas Ave., Dayton, O.

Liberty High School Bethlehem, Pa.

Dear Sirs:—This is to thank the American School for all that you have done for me since I signed up for the Drafting and Design Course.

In the eight years since then, I have gradually climbed from the position of tracer to that of Head of the Department of Machine Drawing and Design in our magnificent new \$2,000,000 High School here, at many times the salary which I received at that time.

The officials of the Pennsylvania State Department, and Dr. Wm. C. Ash of the University of Pennsylvania, all claim that our course in Drafting and Design is the best now being taught in this state. Every drafting graduate that we have turned out has proved successful, and one is now Chief Draftsman in a local steel concern. Yours sincerely,
J. S. LEAR

Has Charge of Large Jobs

"Even before I had finished my course, I was put in charge of large construction jobs in different cities. I have been doing that ever since, and the jobs are getting larger all the time. I owe my success to the American School because of the knowledge I gained in mathematics and calculations."

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3 Drafting Lessons *Actually* FREE

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Dept. D-274, Drexel Ave. and 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.

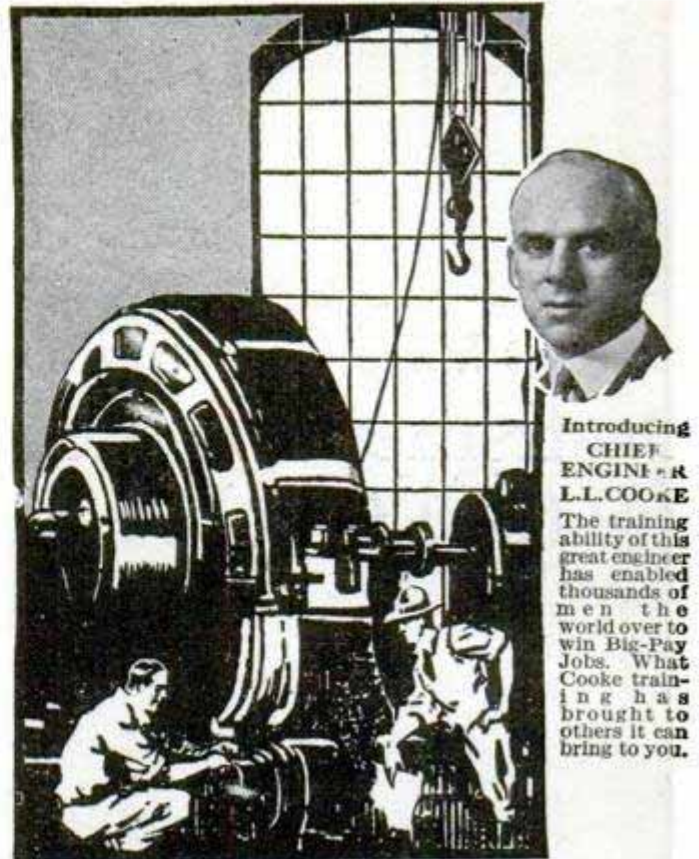
Name.....

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**Make
\$10.00
after supper
while learning**

*That's what Wittenberg
did—and now as a
"COOKE" Trained
Electrical Man
he is earning*



Introducing
**CHIEF
ENGINEER
L.L. COOKE**
The training
ability of this
great engineer
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thousands of
men the
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win Big-Pay
Jobs. What
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ing has
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others it can
bring to you.

NEVER HAVE SUCH OPPORTUNITIES EXISTED BEFORE. Money! Position! Influence! Success—the electrical industry offers you ALL this. In what other profession could you go out of an evening and earn \$10 while learning?—make \$500 during a season's odd moments?—"knock out" \$25 to \$30 a week doing spare time jobs? Yes, these things ARE being done every day. Hundreds of Cooke trained men are doing them!

**The "COOKE" Way to BIG Pay
Easy—Practical—Sure**

Previous experience not necessary. A half hour a day at home, learning Electricity by the simplified practical "Work Sheet" and "Job Ticket" Method of Chief Engineer Cooke, will make you a Trained Electrical man. He furnishes all necessary tools and apparatus—five big Working Outfits—without extra cost. You have nothing to buy.

And you can make good money while you learn. The Chief shows you how to get spare-time work—how to do it—and tells you what to charge. That's while learning! When you have finished you are ready for a BIG PAY Job. Thousands of Cooke trained men earn \$3,500 to \$10,000 a year. Some even more! It's all a matter of ambition—of getting started right—of placing yourself in the hands of one of America's foremost electrical instructors, Chief Engineer Cooke.

Valuable Book FREE—Send for It

Send now for the big, interesting, 64-page illustrated book that Chief Engineer Cooke has prepared for you—"Secrets of Success in Electricity." It's free. Get it—read it. Learn how Cooke trains men, easily, quickly, thoroughly—how thousands of Cooke trained men have won big-pay jobs—how you, too, can win permanent success in this fascinating, big-pay industry. Do not delay—mail the coupon today!

**Over \$6000.00
a year in
ELECTRICITY**

Read what this Cooke trained man has to say: "I have just bought a 5-passenger sedan and my income now amounts to about \$475 a month—\$118 a week. Before I took your Course I never made over \$50 a month. I only had a 6th grade education and this is the only electrical training I have had. Even while taking your Course I often made an extra ten dollars for an evening's spare time work."—Herman Wittenberg, 1930 Grand Concourse, Bronx, New York. Surely, you can do as well! Tear off, sign and mail the coupon to

L. L. COOKE, Chief Engineer

**L. L. Cooke School
of Electricity**

Owned and Operated by
Chicago Engineering Works
(Incorporated)

Dept. 512
2150 Lawrence Ave.
CHICAGO, ILL.



COUPON

CHIEF ENGINEER COOKE,
Dept. 512, 2150 Lawrence Ave.,
Chicago, Ill.

Please send me your free book, "The Secrets of Success in Electricity" and full particulars of your training that helps men into big pay jobs. This does not obligate me in any way.

Name.....

Address.....

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



"Last month I made \$197.00 on spare time wiring jobs. Not bad for a 19-year-old boy. There are fellows in this town who don't make half that much full time. You sure put men in the big pay class." — John Hudec, 223 West 9th Ave., Tarentum, Pa.



"In addition to my regular work I am handling electrical work of all kinds. This is bringing me in from \$300 to \$500 per month, which isn't so bad for spare time work. I am thankful for what you have done for me." —Julius A. Fischer, Wallace, Idaho.

The "Cooke" Trained Man is the "Big Pay" Man

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WORLD'S BEST WANT AD MEDIUM

Advertisements in this section, 30 cents per word, each insertion, minimum 10 words, payable in advance. To be inserted under proper classification in March issue, copy should be in our office January 18th.

ADVERTISING AGENCIES

ADVERTISERS—To buy, sell or to secure agents, salesmen, you can place your 24-word ad in the following 15 leading Sunday papers for only \$15; circulation over 2,000,000: Age-Herald, Birmingham; Gazette, Little Rock; Journal, Atlanta; Star, Indianapolis; Register, Des Moines; Courier-Journal, Louisville; Times-Picayune, New Orleans; Star, Kansas City; World-Herald, Omaha; Courier, Buffalo; Enquirer, Cincinnati; Press, Pittsburgh; Commercial-Appeal, Memphis; News, Dallas; Journal, Milwaukee. Proof of Insertion Guaranteed or Money Refunded. 52-page rate book sent free. Frank W. Lenthoff Advertising Agency (established 1897), 600 North Michigan Blvd., Chicago.

A TEN Dollar Ad may put your proposition over. \$10 pays for a 4 line 24 word classified ad one Sunday in 10 of the largest newspapers. Reach over 7 million readers. Minneapolis Tribune. Buffalo Courier. St. Louis Post-Dispatch. Pittsburgh Press. Indianapolis Star. Atlanta Journal. Detroit Free Press. Birmingham News. Cincinnati Enquirer. Little Rock Gazette. Free catalogue showing other lists of newspapers and magazines sent on request. Ankrum Advertising Agency, 22 West Jackson Blvd., Chicago. Largest classified advertising agency in the world.

ADVERTISING Service. Over 25 years' experience building up advertisers. We prepare, plan and place magazine, newspaper and classified advertising. Also write folders, circulars, letters, etc. Describe briefly your proposition. Send your recent advertising matter, proofs of ads, etc. (if any). We will send you "Advertising Simplified," latest book of rates and valuable information. Ask Dun's, Bradstreet or any publication about us. Charles H. Touzalin Agency, 708 Union Trust Bldg., Chicago, Ill.

ADVERTISE in the classified section of newspapers and magazines, to secure help, money, or to sell. 24-word advertisement in nine big Metropolitan papers \$10.00. Nearly two million circulation. Many other bargain lists. Write for Free 58-page Directory No. 26. Brinckerhoff Advertising Agency, 37 W. VanBuren, Chicago.

ADVERTISE in 24 Big Sunday Newspapers, 24 words \$15.00. Excellent for securing Agents, Salesmen, and Business Opportunities. Catalog listing 1,000 leading Dailies, Weeklies, Mail Order Magazines, Everything. Free. Wade Advertising, Baltimore Bldg., Chicago.

WE sell original letter names. Rural mail buyers, agents, ladies. 5,000, \$25.00. Pennell-Standard, Covington, Ky.

ADVERTISE — Newspapers, Magazines, Country papers — classified (Want Ads) — display space. Free catalog. Martin, 37B West 39th, New York.

SIX Word Line—355 rural weeklies \$3.55. Admeyer, 4112-M Hartford, St. Louis.

FOR ADVERTISERS

ADVERTISE in 275 country newspapers, 28 words, \$10. Keator, Hartford Bldg., Chicago.

WE write letters, every description. Ads. that sell. Booklets and Mail-Order Copy with a "pull." Also Addressing, Mailing. Bids given. Write us your wants. A. W. P. Agency, Dept. 0, Manheim, Pa.

CIRCULARS Mailed. First Class Mail, 25c per 100. Israel, Box 169A, GPO, New York City.

75 **MAGAZINES** 5c word, \$3 inch. Information. Porter, 9416 115th St., Richmond Hill, N. Y.

ADVERTISE 30 words 439 Rural Newspapers \$12.65; Inch \$35.12. Thompson Service, 818 Oak St., Cincinnati.

60 **WEEKLIES**, 25 words, \$1.95; 500 blotters, \$2.95. Commercial Adservice, 5 Pleasant, Worcester, Mass.

25 **WORDS** 88 magazines; \$1.00. Thrice \$2.00. Smith's Service, 1194, Wenatchee, Wash.

SALES PROMOTION

SALES Letters, Advertising, Sales Tax Ad Shop, Box 32, Adrian, Mich.

\$50 TO \$50,000 Daily Sales Developed During 28 years for clients by our direct mail plans, copy, campaigns. One product, 1923, an idea; this year \$100,000 orders booked. Fifty year old concern desired 50 national representatives in 1925; we produced 40 in three months. 700 dealers in 10 months at \$3 each, for another. Ten years Sales Promotion Manager Larkin Co. Submit sales problems for Free diagnosis. James C. Johnson, 118A Woodbridge Ave., Buffalo.

AUTOMOBILE SUPPLIES

SAVE 40-80%. New and Used Automotive Parts, 2,000 models. Bankrupt supplies, 5,000 bargains. Sport shields, \$5.00, roadster tops, \$10.00, complete touring, \$15.00. Wheels, radiators, generators. Brightman Auto Exchange, 321 Windsor Ave., Hartford, Conn.

TUNGAR Bulbs—Increase their lives 30% to 100%. Your tools only, will do it in a jiffy. Particulars 35c. Millback, Box 3266, Tampa, Fla.

SELLING OUT—Reliable Battery Chargers, Radio or Automobile. Guaranteed. \$4.50, 5958 Washington, Chicago.

MIRROBS Resilvered at Home. Costs less. 5 cents per square foot; you charge 75 cents. Immense profits plating auto-parts, reflectors, tableware, stoves, refinishing metalware, etc. Outfits furnished. Details Free. Write Sprinkle, Plater, 77, Marion, Ind.

\$1.00 BACK if misrepresented. Guaranteed 40 below zero Radiator Antifreeze, easy to make don't evaporate, much cheaper than alcohol. Formula \$1.00. Forex Laboratories, Station C., Milwaukee.

VACUUM Ventilator, Sedans, Coupes. Brand new. Big Money, 100% profits. Thousands prospects every city. Make \$25 day easy. Salesmen's Double Outfit \$5. Beebe Co., 338P York, New Haven, Conn.

VULCANIZING Auto Tires is a Paying Business. We have Plants near you from \$50 up. Catalog Free. Instruction Book \$1. Equipment Exchange, 108 East 11th, Los Angeles, Calif.

MAGNETOS, Starters, Generators, Ignition systems, spark plugs, part, timing chains, repairing. Meinerd Magneto Co., 1759 E. 21st St., Cleveland, Ohio.

REPAIR Tires with our Vulcanizers and watch business grow. Cost little to own and little to operate. Adams-Barr, Columbus, Ohio.

AUTO Emblems. Any Lodge. Write. North Central Distributors, Dept. J, Ashland, Ohio.

AUTOMOBILES

PATENTS. Time counts in applying for patents. Don't risk delay in protecting your ideas. Send sketch or model for instruction 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, Security Bank Building (directly across street from Patent Office), Washington, D. C. See pages 154 and 155.

620 **VALUABLE** kinks for all who own, drive, repair or care for automobiles, only 98 cents. Write us to send you Popular Mechanics Auto Owner's and Auto Repairman's Handbooks. Fully illustrated. Pay Postman 98 cents and few cents postage. Popular Mechanics Press, Room 902, 200 E. Ontario St., Chicago.

SHOP Notes for 1927. Get your copy now. Only a limited edition. Contains all the articles published in the Shop Notes department of Popular Mechanics Magazine during 1925. Send No Money. Just write a postal and we'll send 1927 Shop Notes and any one of the other following numbers: 1908, 1912, 1913, 1914, 1915, 1916, 1917, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926. Pay postman 98 cents and the postage when he hands you the two books. Popular Mechanics Press, 200 E. Ontario St., Room 902, Chicago, Ill.

AUTOMOBILE SERVICE EQUIPMENT

AUTO Repair Shop Lathe 9"x3". Back Geared, Screw Cutting; price, including countershaft and equipment, \$150.00. For truing armatures, refacing valves, finishing pistons, making bushings, thread-cutting, etc. Write for No. 33 Auto Mechanics Hand Book describing this lathe. South Bend Lathe Works, 736 East Madison St., South Bend, Ind.

BIGGEST profits in automotive field from Starting-Lighting-Ignition Service with Low-Priced HB Test Bench. No investment required aside from small initial payment. Pays for itself with handsome net profit besides. Write for free bulletin TB. The H. B. Equipment Co., Box M-272, Troy, Ohio.

KING earns \$300 monthly charging batteries by approved fast method. Does three times the work at half the cost of old methods. Cost him only \$16.50 and paid for itself every month. You can handle it in small space without special experience. Write for Bulletin CP. One Day Charger Co., Box M-273, Troy, Ohio.

75% **INCREASE** in business the first month after Coleman put in dependable air service. Easy monthly payments easily carried by increased business. Highest quality, latest principle, most economical 3/4 HB Automatic Compressor built. Write for Bulletin AC. Automatic Compressor Co., Box M-274, Troy, Ohio.

COMMUTATOR and valve truing lathe. Jefferson Mfg., North 2nd St., Fairfield, Iowa.

FOR FORD OWNERS

FORD Flat Rate Price List; Total Cost of Repair Jobs; Agents big money. Only 50c. H & H, 5778 Rivard, Detroit, Mich.

STARBUCK vaporizer has an electrical attachment that makes starting in cold weather easy. Big gas saver. Soon pays for itself. F. M. Starbuck, 642 D St., Northeast, Washington, D. C.

FORD lamp door opener, postpaid, \$1.25. Peter La-Void, Viroqua, Wis.

UNDERSLUNG with "RKO" Swing L0 Irons. See "Red-1-Kut" ad page 151.

MOTORCYCLES, BICYCLES AND SUPPLIES

OVERSTOCKED Used Motorcycles. 1923 Indian Chief \$95.00. 1923 Harley Davidson \$95.00. 1923 Henderson DeLuxe \$120.00. Two hundred others; write for free list. Myerow Brothers Co., 15 Berkeley St., Boston, Mass.

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20c—ANY Formula—20c. Dime Information Bureau, Colorado Springs, Colo.

EASY money maker, just like I use myself; why not you? Particulars for red stamp. W. P. Stump, Hemet, Calif.

10,000 FORMULAS. A real Gold Mine of money-making ideas. Tells how to make almost everything under the sun. You can make and sell cosmetics, mucilage, anti-freeze solutions, battery solutions, beverages, cheese, chewing gum, cleaning preparations, extracts, hair preparations, inks, bluing, leather polish, mirrors, perfumes, polishes, typewriter ribbons, carbon paper, washing powders, liquid soap, and hundreds of other profitable articles. Send No Money. Just write a postal for "Hemley's 20th Century Book of Formulas." Pay postman postage and \$4. Popular Mechanics Press, 200 E. Ontario St., Room 902, Chicago, Ill.

15,000 FORMULAS in "Scientific American Cyclopaedia of Formulas." Includes following and many others: accidents and emergencies, agriculture, alloys and amalgams, artists' materials, beverages, cements, glues, pastes, mucilages, bleaches, renovating, coloring metals, dyeing, glass, heat treatment of metals, household formulas, ice cream, confectionery, chewing gum, lapidary work, exterminating vermin, lubricants, paints, varnishes, photography, condiments, canning formulas, rubber, soap, candles, soldering, toilet preparations, perfumes, waterproofing, fireproofing, writing materials. Send No Money. Just write a postal. When postman hands you book, pay \$5.50 and postal charges. Popular Mechanics Press, Room 902, 200 East Ontario St., Chicago, Ill.

AGENTS WANTED

EARN Big Profits Making New Products. We have secured the country for new products that can be easily made in home or shop. In "Specialty Manufacturing" we describe the manufacture of more than 200 worthwhile, saleable Novelties, Toys, Preparations, Auto, Electrical and Household Appliances, Agent's Goods, Toilet Articles, Fancy Goods and clever novelties from Wood, Cloth, Glass, Metal, etc. "Specialty Manufacturing" sent postpaid \$3. C. O. D. if desired. Money back guarantee. Circular Free. Manufacturer's Bureau, R6, 1129 East 31st, Kansas City, Mo.

\$25 TO \$50 a week—\$1 to \$2 an hour spare time in easy, pleasant occupation. Thousands of men and women are making this income with the famous Ho-Ro-Co Soaps, Perfumes, Toilet Articles, Specialties. Over 200 items; quick sales, appeal in every home. La-Em-Strait Hair Dressing, the fastest seller wherever introduced. Write at once for Free Sample Case offer—the best yet. Ho-Ro-Co., 791 Ho-Ro-Co Bldg., St. Louis, Mo.

LANOWA Polishing Cloth-Mitten Duster Combination selling like wildfire. 200% profit. Appoint agents. Free sample and territory. Fraser Products, 305-J 43rd, Kansas City, Mo.

EVERY automobilist, engineer motorman, needs amazing Windshield Cleaner; pocket size yet one rub keeps entire windshield clear for hours; works while you drive; no rubber, paste, cloth, no attachments; guaranteed 2 years; Wright sold 20,000. Security Mfg. Co., Toledo, Ohio.

AGENTS—Best seller; Jem Ruber Repair for tires and tubes; supersedes vulcanization at a saving of over 800 per cent.; put it on cold, it vulcanizes itself in two minutes, and is guaranteed to last the life of the tire or tube; sells to every auto owner and accessory dealer. For particulars how to make big money and free sample, address Amazon Rubber Co., Philadelphia, Pa., Dept. 505.

AGENTS wanted, either sex, full or part time. Unusual medical proposition. Big profits. Thousands successful. Write Dept. E-1, Richards Cooperative Co., Rockport, Maine.

MAKE money silvering mirrors, refinishing auto headlights, tableware, metal plating, bedsteads, chandeliers. Outfits furnished. International Laboratories, Dept. 71, 309 5th Ave., New York.

SELL Show-Cards. New Line. Big Profits. Quick Sales. Particulars Free. Eifko, 525 South Dearborn St., Chicago.

AGENTS—Greater Profits, Year Round Sales; complete guaranteed line dress and work shirts, overalls, coveralls, work pants, playsuits. \$10-\$25 daily easy. We show you. Complete Outfit Free. Nimrod Shirt Co., Dept. 8, 4922 Lincoln Ave., Chicago.

\$100 WEEKLY—Hundreds making it selling marvelous auto invention. You can too. One size—fits all cars. Installed in three minutes. Sells like hot cakes. If not we take them back and refund. Send for free introductory sample. Mae Auto Products Company, Dept. 902, 6355 Broadway, Chicago.

AGENTS, portraits, photo-pillow tops, frames, sheet pictures, medallions, photo-jewelry, guaranteed hose, laundry tablets, food products, toilet requisites, luminous crucifixes. Catalogue 50 specialties free. 30 days' credit. Jas. C. Bailey Co., Dept. C2, Chicago.

SELL Brushes. 100 quick-selling items. 100% profit. Full or part time. Write for proposition. State age, experience and territory desired. Kautenberg Co., Box 255-P, Freeport, Ill.

AGENTS Wanted to sell Men's Hats direct from factory. Send for Catalogue. Model Hat Mfg. Co., Dept. 5, East Orange, N. J.

AGENTS, Salesmen, Crewmen—You'll have the Devil's own time finding a better seller than "Zippo." Splendid profit on snappy 50c "Go-Getter" repeat article that sells on a ten second demonstration. Works while you watch it! Demonstrates value while others waste time making claims. New development! Greatest scientific triumph of the age! It's the berries! Write immediately for complete proposition. Karam-Smith Company, 602 Bozart Street, Fort Wayne, Ind.

LIVE Agents to Sell Shure Clean Hand Soap, the world's best soap for removing grease, paint, inks, etc. Big commission. H. M. Spencer, 4145 N. Kilbourne Ave., Chicago.

NEW fast selling household specialties. County distributors wanted. Write today. Hess Manufacturing Company, Freeport, Ill.

BIG Money-making opportunities; no peddling. Particulars free. Elite, 38 Elizabeth St., New York.

AGENTS. Two Bits Every Two Minutes. Here's 25c profit on new household specialty you can sell in two minutes. The Pantong—something brand new. A red hot seller. Full time or sideline. Write to The Tyler Mfg. Co., Dept. CL-11, Muncie, Ind.

SELL Better Quality All-Wool Made-to-Order Suits at \$31.50. Profitable new field for men who are conscientious and dependable. No experience necessary. Full or part time—\$45 to \$100 weekly and liberal bonus. Commissions paid in advance. We furnish handsome large swatch samples and complete instructions free. Write W. Z. Gibson Inc., 161 W. Harrison St., Dept. B517, Chicago.

\$18 TO \$25 daily. Biggest selling line of 2-piece suits, \$9.95 and \$12.50; 3-piece wool suit, \$17.95 (regular \$28.00 value). All-wool overcoat, \$18.50. Splendid rain-coats, slickers and boys' suits. Biggest commissions. Free outfit. "Jim" Foster, Inc., Dept. 42-C, 2250 S. Spaulding Ave., Chicago, Ill.

STARTLING Invention: New Shock Absorber for Fords retails at \$3.50. Big profits easy. Exclusive distributors wanted. M & M Mfg. Co., 41, Station C, Omaha, Nebr.

MAKE and Sell clever Novelties, Toys—latest fast selling Auto, Toilet and Food Specialties—Mail order and Agent's items. Free list describes reliable plans, patterns, processes, commercial information. Manufacturer's Bureau, R4, 1129 East 31st, Kansas City, Mo.

WANT Distributing Agent for Handslick, powdered hand soap; removes anything from hands; everybody a customer; sample free. Solar Products Co., J-2142 S. Troy, Chicago.

SELL Reversible Semi-Soft Collars made of one piece of cloth with patented neck curve; newest Broadway styles; 30% commission collected the moment you make sale; quick sellers because nationally known. Send 25c for sample collar your size and novel selling kit. Bitrite Collar Co., 926x Broadway, New York City.

\$20 DAILY Easy selling amazing rain-proof caps. Made-to-measure. Finest fabrics and styles. Big advance profits. Free outfit and free cap offer. Taylor Cap Manufacturers, Dept. Y-5, Cincinnati, O.

AGENTS: Made \$500.00 Monthly. Pay daily. No investment. Rhinestones initial buckles and novelties sell easy everywhere. Exclusive territory. Chaton Novelty Co., 606 Blue Island, Chicago.

OH, Hello! Why didn't I see this before. Christy's Iron Rust and Stain Remover sells like blazes. Write for free sample. Christy, Inc., 5067 Lakeway, Newark, New York.

AGENTS, \$240 month and auto to travel in. Bonus besides. Introduce new line guaranteed hosiery for men, women, children. 126 styles, colors. Beats store prices. Guaranteed to wear 7 months or new hose free. Finest line Silk Hosiery you ever saw. High class proposition. New sales plan. No experience needed. Credit given. Spare time satisfactory. Write for samples. Wilkin Hosiery Co., Dept. 1631, Greenfield, Ohio.

AGENTS: Salesmen—Sell New Thermo-static Automatic Carburetor Control Attachment for Fords. Big profit, full or part time. Increases mileage 50-100%. Attached in two minutes. No drilling. Cadillac now using Thermo-static Carburetor Control under Blanche license. Sales guaranteed. \$15.00 a day Guaranteed to Distributors. Write today. Blanche Auto Devices Co., Dept. 805-B.X., 157 E. Erie St., Chicago.

PATENTS. Time counts in applying for patents. Don't risk delay in protecting your ideas. Send sketch or model for instruction 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, Security Bank Building (directly across street from Patent Office), Washington, D. C. See pages 154 and 155.

SELL Pioneer \$23.50 all wool tailoring, full or part time. \$5 an hour selling our famous tailored-to-measure all-wool suits at \$23.50. Commissions paid in advance. Striking leather brief case containing 100 large swatch samples furnished. We train the inexperienced. Pioneer Tailoring Co., 159 W. Harrison St., Dept. B117, Chicago.

\$50,000. PICTURE Man Friedman made canvassing. Beginners can make \$100.00 weekly with my sales talk. Experienced men make more. Free book. "Profits in Portraits" explains. Samples Free. Picture Man Friedman, Dept. 8-D, 541 W. Lake, Chicago.

AGENTS—Make a dollar an hour. Sell new kind of sharpeners. Sharpens all knives and tools quickly. Demonstrating sample free. Premier Mfg. Company, Dept. 64, Detroit, Mich.

JUST Out—Patented Apron Without strings, straps, hooks or buttons. On or off in a jiffy. Over 100% profit. Commissions paid daily. Write for free sample offer. Sta-Put Co., 202 N. 11th St., St. Louis, Mo.

DO you want to be your own boss—Work out in the open—Make \$50 to \$100 a week? Build up business that will pay you this income for life and a business that no one can take from you? McNess products mean just this to you. Write for proof and information. Furst-McNess Co., 506 Sunlight Bldg., Freeport, Ill.

EVERYDAY Greeting Cards easy seller. Sample box 75c. Particulars free. Messenger, Stillwater, N. Y.

AGENTS are cleaning up with National Fibre House Brooms and Auto Mitten Dusters. Send for Free Catalog and Sample Offer. National Fibre Broom Co., St. Louis, Mo.

"MAGNAKLOTH" taking autoists by storm, one rub absorbs dust from the car or furniture, quick sale, big profits. National Service Co., Dept. "P," Pierre, S. Dak.

VANILLA Salesmen—Try our Concentrate. Add water and bottle. Beats them all. Profit biggest. Sample. Trask, Mfg'r, East Vassalboro, Maine.

DO 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 without cost to you. Address, M. L. Rund, Mgr. Classified Advertising. Popular Mechanics Magazine, Chicago.

CASH Paid for Butterflies, Insects. See Sinclair Display Advertisement on Page 24.

"RED-HOT" Agents, Mail-Order Men, Beginners, Valuable Inside Information; 300% Profit. Samples Circulars Free. Nite Mail Order Supply Co., 609 27th St., Denver, Colo.

AGENTS—Big profits; easy to sell. For Fords and Chevrolets. Retail 75c. Money back guarantee. American Fixture Co., 232 W. Water St., Milwaukee, Wis.

\$50.00 WEEKLY easy, Applying Gold Initials on Automobiles. No experience needed. \$1.45 profit every \$1.50 job. Free Samples. "Ralco Monograms," 1043 Washington, Boston, Mass.

\$11.50 PROFIT, on 50c outfit complete. Hair Tonic in powder form. Simply add water and bottle. Everything furnished. Casey Company, 1043 Washington, Boston, Mass.

WE have a line of goods for which every man in America is a prospect. Can be handled with tremendous profit by any salesman now selling to men. \$20.00 Outfit Free. Address Dept. 51, William C. Bartlett, Inc., 850 West Adams, Chicago.

POSITIONS open selling three complete lines direct to farms. Auto, truck and tractor oils, barn and house paints, roofing products. Permanent customers. Year around repeat order business. Big income assured. No investment or experience. Everything furnished to start. Write today for proposition. Solar Products Co., 404 Century Bldg., Cleveland, Ohio.

HUSTLERS don't skip this. Money-back guarantee. New patented Ford invention. Money saver. 500 sold by one agent in one day. Sample demonstrator postpaid for \$1.00. Retail price \$2.00. Nu Idea Mfg. Co., Inc., Dallas, Texas.

MIRRORS resilvered at home. Costs less: 5 cents per square foot; you charge 75 cents. Immense profits, plating like new; brassy worn-off autoparts, reflectors, tableware, stoves, etc. Outfits furnished. Details free. Sprinkle, Piater, 128, Marion, Ind.

BE Independent. Make—Sell your own specialties. Immense profits. Catalog dependable formulas, special selected agents' best sellers, free. M. Lustrò, 832 East Pershing, Chicago.

AGENTS write for special offer. \$60 a week and latest model Ford auto. Your pay daily in advance. Extra bonus besides. Introduce finest line guaranteed hosiery. Our silks can't be beat. No experience needed. Samples furnished. We give you extra fine silk hose for your own use absolutely free. Write today. Jennings Hosiery Co., Dept. 2231, Dayton, Ohio.

AGENTS: 90c an hour to advertise and distribute samples to consumers. Write quick for territory and particulars. American Products Company, 9020 Monmouth, Cincinnati, Ohio.

AGENTS—Our new selling plan means quick sales and big profits. Toilet Articles, Perfumes, Household Products. We credit you. Carlisle Co., Dept. PM, Huntington, W. Va.

CAN you sell Ford size tires at \$3.50 each? Write for plan. Details free. American Accessories Co., Station 431, Cincinnati, Ohio.

OUR latest Lingerie, Neckwear, Scarf line is unequalled for making money. Write for details. Public Service Mills, 725-F 5th Street, Union City, N. J.

FREE—List of Automobile and Electrical Supplies. Low Prices. Kelly, 5958 Washington, Chicago.

NEW household invention ends window washing drudgery; abolishes ladders, buckets, sponges, brushes; 75% quicker; keeps hands dry; low price. Lady Jane Mfg. Co., Toledo, Ohio.

ELECTRIC Window Flasher sign with changeable letters \$15.00. Brilliant day and night. Retail only \$15.00. Particulars free. National Display, 124 W. 18th, New York.

AGENTS Wanted: Something New. Every Motorist a Buyer of our Electro-Magnetic-Emergency Wonderlamp; takes only one minute to demonstrate and make a sale; no experience necessary; \$5.00 an hour easily made, either full time or evenings. Wonderlamp Co., 920 Fisk Bldg., Dept. 10-A, New York.

AGENTS—men—women—sell beautiful linens at wholesale prices. Every Home Buys. Big commission. Exclusive Territories. Dept. D. Milton Co., 87 Leonard, New York.

\$25.00 DAILY selling Raincoats and Slickers. \$2.95; Newest colors, red, blue, green, etc. Outfit free. Commissions daily. Elliott Bradley, 241 VanBuren, Dept. 699, Chicago.

SELL Tailor-Made Shoes. Sensational new fitting discovery eliminates foot troubles; makes walking a pleasure. 55 men's and women's styles; 24 leathers. Prices lower than stores. Big commissions. Free outfit. Free samples shoes. Tailor-Made Shoe System, 932 Wrightwood, Dept. OA2, Chicago.

SURE Seller to every merchant—no gamble—big profits—steady repeater—free sample and exclusive territory. Embossed Show Card Co., 9174 Euclid, Cleveland, Ohio.

A WINNING line for 1927. 50 essential household articles. A live wire can easily make \$50 per week. Home Supply Corp., Asbury Park, N. J.

HANZO "Removes the grime—in half the time." Best little coin-roaxer out. Sells anywhere and to everybody. Staple repeat order article, used by millions. Investigate this. Sample and information on request. Hanzo Company, 765-A Waveland, Chicago.

\$25 DAILY selling \$10 slickers for \$2.98; also full selections of other raincoats; Quick deliveries; all colors. Outfit Free. American Waterproof, 724P Roosevelt, Chicago.

SEND three references for Samples. 15 Hosiery Styles; 50 colors. \$10.00 Dinner Set Free to customers. S. Q. S. Desk D., Lexington, Ky.

IF I Send You a Suit made in latest style from finest goods, will you keep it, wear it, and show it to your friends as a sample of my sensational \$19.50 suits guaranteed regular \$40.00 values? Could you use \$3.00 an hour for a little spare time? If so, write me at once for my wonderful new proposition. Just write your name and address on a card and mail to Salesmanager, Peoria and Adams, Dept. 574, Chicago.

BEAUTIFUL radiator covers. Adjustable metal Over-Tops. Beats high-priced covers. Several needed every home, apartment, office, having hot water or steam radiators. Past sales. Hire others. Big profits surprise you. Interior Arts, Inc., 4523 No. Clark, Dept. 50, Chicago.

SELL Surety, the Original, Genuine Powdered Hand Soap and make \$5,000 yearly. We furnish sales plans, advertising and Free Samples. Write quick. Surety Mfg. Co., Dept. 56, 25 W. Washington St., Chicago.

SELLING Like Blazes! Eleven piece toilet goods assortment at \$2.25 with two piece carving set Free to your customers. 100% profit. Davis Products Co., Dept. 56, 1321 Carroll, Chicago.

DISTRICT Agents—Sell \$23.50 All Wool Union Made Suits and Topcoats for large, old established firm. Wonderful values; one price. Liberal commissions in advance; money back guarantee. Expensive 9x13 swatch outfit Free. Protected territory. Write 1-D. Harvey, Box 90, Chicago, Ill.

MYSTERY aeroplane 50c—Comic models 25c. Novelty Supply House, Jamestown, N. Y.

FREE: Large wholesale Specialty Catalog, showing latest best sellers from all parts of the world. Spors Co., Lesueur Center, Minn.

RADA-DIAMONDS. Big flash. Big Profits. Agents coining money selling on installments. Sample kit Free. National Co., Box 1174-PM, Omaha, Nebr.

MAKE Much Money—Making and Selling Your Own Goods. Formulas by experts. Manufacturing processes. Trade Secrets. All lines. All kinds. Catalog. Special circulars free. B. Thaxly Co., Washington, D. C.

AMAZING 30-day Offer! To prove our Mexican Blu-Flash Gem really matches finest genuine Diamond Side-by-side, we'll mail perfect \$5.00 picked sample, alive with rainbow fire, for only \$1, with catalog, proof of our claims, and Free \$5 Jewel case proposition. Sells at sight; enormous profits! Write quick. Mexican Gem Co., Monterey, Calif.

START a shoe business of your own. Exclusive agency for Duo-Flex shoes for men, women and children. Low prices. Big profits, and credit extended to reliable people. Write department D, Dyer-Sawyer Company, Lewiston, Maine.

GET Free Selling 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, 572 Grant St., Grand Rapids, Mich.

FREE—Extra Pants with wonderful \$29.75 Suits. Make \$85 weekly. Wonderful \$23.50 line. Big Profits. Free Outfit. Jay Rose, Tailors, 413G, South Wells, Chicago.

AGENTS To Sell The New Waterproof Featherweight All-Purpose Coat. Weights only 26 ounces. Latest styles and colors. Men's \$4.98, Women's \$3.98. Liberal commissions. Write today for sales plan. Featherweight Coat Co., 5713 Euclid, Cleveland, O.

SILVER Mirrors and make \$5 to \$10 a day. Best instructions, \$1.00. Elmer Gutknecht, 445 Idaho St., Milwaukee, Wis.

COMPLETE line of perfumery and toilet goods. Finest quality, lowest price. Big profits for one agent in each town. Indiana Manufacturing Company, Box 102, Evansville, Ind.

AGENTS—Make \$100 weekly selling our auto tire puncture seal. Works instantly, automatically, permanently. Money-back guarantee; exclusive territory. Get free trial offer. Gray Seal Sales Co., 4522 Olive St., St. Louis, Mo.

AGENTS! \$1 an hour selling E. Z. Clean washing compound; sample and particulars free. Real Quality Products Co., Findlay, Ohio.

RITHMETIC KID makes Quick Money. Sample and Wholesale prices 25c. Wholesale Supply Co., Valdosta, Ga.

\$13.80 DAILY in advance (Send for sworn proof) Introducing New Insured Hosiery. 57 styles, 40 colors, guaranteed seven months. No capital or experience required. You simply take orders. We deliver and collect (or you can deliver, suit yourself). Credit given. Pay you daily, monthly bonus besides. Spring line now ready. We furnish samples. Spare time will do. Milton Mathews, Road 5862, Cincinnati, Ohio.

AGENTS—\$13.80 Daily in advance, Introducing New Insured Hosiery for men, women, children. Must wear or replaced free. 57 styles. 39 colors including latest "Silk to the Top" Ladies Hose. Nyland made \$5.95 in one month. Edwards, \$469.60. Mrs. Bone, \$425.45. Why not you? Even spare time should pay you \$3.00 an hour. No experience needed. We furnish samples. Silk hose for your own use Free. New Plan. No matter what you are now doing, write quick. Maccoches Company, Road 2562, Cincinnati, Ohio.

\$14.50 DAILY Easy—Pay in advance, Introducing Chieftain Guaranteed Shirts, 3 for \$4.95. No experience or capital needed. Just write orders. We deliver and collect. Full working outfit free. Cincinnati Shirt Company, Lane 1582, Cincinnati, Ohio.

\$90.00 WEEKLY selling Hosiery and Bed Spreads. Liberty Mills, Dept. 10, Shelby, N. C.

ALL-YEAR-ROUND profitable business selling wonderful new water softener and cleaner. Removes grease, oil, ink and dirt quickly. Every home and business place a live prospect. 100% profit. Big repeat orders. Exclusive territory. Write for free sample. Seacoast Laboratories, Sea Bright, N. J.

NEW Farm Radio—Agent's Set Free. Hear wonderful radio programs from big cities on the Lambert; costs less than any other long distance radio made; no up-keep expense; no electric current, batteries or tubes required; every demonstration sells; just what your friends and neighbors want. Write today. Lambert Radio Co., Wichita, Kansas.

PATENTED—Sanitary Self-cleaning Comb Write for details. Sample 50c. Sanitary Comb Co., 296 Broadway, New York.

AGENTS to introduce new Griddle Greaser. Sample dozen by mail, \$1.00. A. Jensen, R. 6 B. 86, Stockton, Calif.

EVERY Woman Wants a Sewing Set. Home Sewing Sets contain 142 useful sewing articles, \$4 an hour easily made with this 50c seller. Prentice-Lee, 145 East 23rd St., New York.

AGENTS make \$10.00 Daily selling Non-Splash Water Filters on sight. Best canvasser's article on market. Investigate. Write for particulars, Desk 14, Seed Filter Company, 73 Franklin Street, New York.

WE Pay \$50 a Week and Expenses and give Ford Auto to men to introduce poultry and stock compounds. Imperial Co., D23, Parsons, Kan.

AGENTS Wanted to distribute samples, big money, new method, write quick. P. M. Vann, Box 3, Sta. D, New York.

GOLD Leaf Window Letters and Script Signs. No experience; 500% profit. Samples Free. Consolidated, 69-U West Van Buren, Chicago.

DISCOVERED! Diamond Rival—Rajah Gems astound Jewelry world and defy detection. Set in artistic Sterling Silver mountings copies of highest priced platinum designs. Sell like wildfire at popular prices. Salesmen and Agents unique selling plan means enormous profits for you. Write immediately for details. Rajah Company, Dept. X-2, Salisbury, N. C.

NEW Invention—Big Seller—400% profit. Liquid Quick Mend for hosiery and fabrics. Every woman buys. Hundred other fast sellers. J. E. Johnson Co., Dept. 450, 6145 Wentworth Ave., Chicago.

\$75 WEEKLY Man or Woman Wanted with ambition and industry, to distribute Rawleigh's Household Products to steady users. We train and help you so you can make up to \$100 a week or more. No selling experience necessary. Pleasant, profitable, dignified work. Write today. W. T. Rawleigh Co., Dept. IL8253, Freeport, Ill.

AGENTS—Make \$15.00 daily. Opportunity to ride in Chrysler closed car; show samples; distribute teas, coffee, spices, extracts; things people eat. This unusual offer made to first person answering in your locality. Write or wire Health-O Quality Products Company, Dept. 101-B, Cincinnati, Ohio.

POWER Tire Pumps for Fords. Claggett Mfg. Co., Marlboro, Md.

BRAND new plan. Make \$45 a week and up and get your own clothes free. Profits paid in advance. Any man can easily earn this and more, just showing our wonderful outfit and taking orders for our high-grade tailoring. Free suit to each agent. Handsome carrying case outfit of large real cloth samples—everything furnished free. Spencer Mead Company, Sherman and Harrison Sts., Dept. B817, Chicago.

SELL Sozzlem. Amazing New Discovery. Make \$100 weekly. Wonderful Seller. Big Profits. Steady Repeat Year Round. Exclusive Territory. Won't Last Long. Get Yours Quick. Sozzlem, Reading, Mass.

AGENTS—Radio product: Unlimited possibilities! Write, Kimley Electric Co., 2663 Main St., Buffalo, N. Y.

REAL Money selling a great new Health Invention generating Violet Ray, Vibration, Electricity and Ozone. Exclusive Territory now open. Write today. Lindstrom & Co., 30 W. Lake St., Dept. 13-52, Chicago.

AGENTS Wanted—\$45 to \$85 a week selling beautiful shirts. Lowest prices. latest styles, finest tailoring. Henry made \$25 in a day. Free insurance policy wins every sale. Profits in advance—we deliver and collect. Get free outfit quick. Fashion Wear Shirts, Dept. B-942, Cincinnati, Ohio. Old reliable firm.

WOMEN—\$2 an hour spare time; new idea sanitary necessity; sells on sight; every woman buys; new feature never before used; designed by physician; revolutionizes old uncomfortable methods; pay every day; no deliveries, no collections, no experience or capital required. Particulars mailed in plain envelope. Don't delay; Write Mrs. Mary P. Coleman, Meriden, Conn.

WOULD \$100.00 per week interest you? Millions of photos all over the Country just crying to be made into beautiful artistic medallions. We have new plan. Lowest Prices. Speedy service. Experienced agents losing money every day they put off writing us. Art Medallion Co., Department C, Corner Campbell & Jackson, Chicago, Ill.

SELL Radium Water Generators. Entirely New fast seller. Repeat orders sure. Permanent income. Ask Why today. Radium Refinery, 2209 Broadway, Oakland, Calif.

WE pay \$48 a week, furnish auto and expenses to introduce our Soap and Washing Powder. Buss-Beach Company, Dept. A42, Chippewa Falls, Wis.

THANCO Vanilla—Bottle Yourself! Concentrated; add water; free labels. Crushes competition! 500% Profit! Immense seller! Other concentrated products. Write Thomas Manufacturing Company, Indianapolis, Ind.

HERE they are—Fifty fast sellers everybody needs and buys. Fifty Dollars weekly easily made. B. & G. Mfg. Co., Dept. 110, Pittsburgh, Pa.

AGENTS—Try Device Free. Starts Cold Motor Instantly. Saves Gas. Amazing Seller. Write Quick. Elec. SuperStarter, Dept. A-2, Grand Rapids, Mich.

SELL Super-Power, the blue wonder crystals. Latest automobile product. Sells like a flash. Saves gas, increases power and pep, removes carbon while driving. Guaranteed harmless. Just pour into gas tank. Steady repeat article. Your profit 100 to 182%. Particulars free, write today. Cassard Specialty Laboratories, 31A Fountain Street, Grand Rapids, Mich.

WANTED—County Agents and Representatives to market the 3A Garage Door Holder. All owners of private garages are instantly attracted by its Simple, Automatic Action. Write for attractive proposition. Knowlson-Stevenson Co., Ann Arbor, Mich.

99 WOMEN out of 100 want to buy—Biggest seller today. Enormous repeater. Free sample. Budd Products, 1608 East 66th St., Cleveland, Ohio.

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.

AGENTS: Only Domestic Pea Huller on Market. Sells year round. Weight one pound. Retails \$1.00. Home Pea and Bean Hulling Machine Co., Marietta, Ohio.

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

GOLD Leaf Window Letters and Script Signs. No experience; 500% profit. Samples free. Consolidated, 69-U West Van Buren, Chicago.

AGENTS: Our gold-eyed Needle Cases are wonderful sellers; immense profits; \$50 to \$300 weekly; proof and particulars free; sample outfit 10c; factory prices. Paty Needle Co., 231 Davis Square, Somerville, Mass.

\$500 MONTHLY proposition. Particulars Free. B. Davis, 1726 Roosevelt Rd., Chicago.

"MAKE And Sell Your Own Goods"—Tremendous Profits; No machinery; No experience; We show you how; Write quick for Free Book. Clover Laboratories, (P) Parkridge, Ill.

REAL money for you. Our combination Aluminum Cooking set easy to sell. No delivering, no collecting. Make \$10 to \$15 daily. Espy-Biddle Co., Dept. 2, 2325 Carson Street, Pittsburgh, Pa.

\$16 A DAY Easy—I start you in auto accessory business; no investment; no experience necessary. Landin, 3433 Montrose Ave., Chicago.

FOR Christmas. Our Luminous Crucifix shines in the dark and makes a wonderful Christmas present. Our agents always clean up with this Crucifix at this time. W. G. Hannan Co., Dept. B, 2539 S. State St., 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-D North Clark, Chicago.

"LIQUID-LEATHER" Fills Holes in Shoes, Rubbers, Tires. Dries Instantly. Pliable, Waterproof. Just Imported from France. Tube Retail 75c—Cost 35c. Sells Housewives, Sub-Agents. Nullife Leather, Hartford, Conn.

AGENTS—Demonstrators—To sell the Chrisman Ejector Fork—The latest in kitchen utensils—Sample 50c. The Chrisman Manufacturing Co., 301 Anthe Bldg., Covington, Ky.

AGENTS—To sell Catholics—Wonderful Proposition. United Religious Goods Co., 201 United Bldg., Covington, Ky.

NO Dull Times Selling Food. People must eat. Federal distributors make big money; \$3,000 yearly and up. No capital or experience needed; guaranteed sales; unsold goods may be returned. We furnish you with sample case, license and Free Samples for customers—Sure repeat orders. Exclusive territory. Ask now! Federal Pure Food Co., A2307 Archer, Chicago.

BIG Profits. Sell "No-Splash" 4-Strainer Water Filters. Fast sales, lowest prices; send for 8 dozen, \$1.80 postpaid. Jones Mfg. Co., 243E2 Franklin St., Boston, Mass.

LAST Call! Fall in. Here's a Money Maker! Supreme Shirts give 100% satisfaction. Proposition, Kit Free. Supreme Shirt Co., 276-M Fifth Ave., New York.

SELL men's neckwear; wonderful proposition. Astor, 318-M Broadway, New York.

MANUFACTURE Very Latest, Biggest-selling Advertised Specialties yourself—No Machinery; investment small—All lines. Stamp brings Valuable Interesting Literature explaining how others sell your products and big bunch lists Guaranteed Formulas. 500 to 1,200% profit to you. Reliable Information Only. No "Master Formula" trash. Miller, Chemist, 1706-V Jetton, Tampa, Fla.

"AGENTS" Big Money Selling New Household Cleaning Set. Washes and dries windows. Sweeps, scrubs, mops. All complete only \$2.95. Over half profit. Write Harper Brush Works, 132 Third St., Fairfield, Iowa.

AUTO owner tire agent wanted each locality to use and take orders for hand-made Mellinger cord and balloon tires; guarantee bond 15,000 miles; shipped prepaid on approval; get your tires free; no capital or experience required; make \$100 to \$300 weekly. Write for wholesale prices and sample kit. Address Mellinger Tire Co., Dept. 400, Kansas City, Mo., or Dept. 400, Philadelphia, Pa., or Dept. 400, Oakland, Calif.

CALIFORNIA Rosebuds selling like hot cakes. Agents coining money; new stuff. Big profits. Catalog free. Mission Factory PM, 2328 West Pico, Los Angeles, Calif.

A BUSINESS of Your Own—Making Sparkling Glass Name and Number Plates, Checkerboards, Signs. Big Book and Sample Free. E. Palmer, 512 Wooster, Ohio.

AGENTS—New Plan, makes it easy to earn \$50.00 to \$100.00 weekly, selling shirts direct to wearer. No capital or experience needed. Represent a real manufacturer. Write now for Free Samples. Madison Company, 566 Broadway, New York.

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

AGENTS wanted—To sell Ray-O-Lite cigar and gas lighters. Big earnings. Sample 50c. Rapid Mfg. Co., 799-E Broadway, New York.

OVER 100% Profit. Self Lighting Gas and Cigar Lighters; Everybody interested, repeat business. Sell individuals, dealers, subagents. Particulars Free. P. Bernhardt, 127 West 30th St., New York.

MILLIONS stolen. Remarkable new \$5.00 Check Protector stops forgery. Inks, protects two colors. Sensational sales, profits. Write. Safety Devices Corp., Grand Rapids, Mich.

REMNANT Store, Bethel, Ohio. Greatest Dry Goods Bargains on Earth. Agents and Dealers.

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.

\$320 PROFIT First Three Days' Sales for Zindel, Illinois, with Morey Quick Action Auto Rim Tool. Profit \$2 tool. Exclusive territory for hustling agents. Earn \$10 to \$50 cash daily, \$75 to \$300 weekly year round. M. Morey Rim Tool, Blissfield, Mich.

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

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

WANTED: Local and State Representatives for famous ready made Artistic Signs, price tickets, etc. No competition. Full protection. Large profits. For particulars write Artistic Signs, 799B Broadway, New York.

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.

AGENTS: 500% profit. "Happy Home Make 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.

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

MOCCASIN Manufacturer Wants Agents Everywhere to sell a complete line of moccasins to wearers. Entire new line. No competition, repeat orders. Get details. Daley Moccasin Co., Fort Covington, N. Y.

WE Start You Without a Dollar. Soaps, Extracts, Perfumes, Toilet Goods. Experience unnecessary. Carnation Co., Dept. 2480, St. Louis.

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.

AGENTS—Send for Free Sample "Fret-not" Washday Wonder. Big Profit. You don't have to talk; if she doesn't buy at sight, leave sample. Exclusive territory. Credit given. Empire Specialties Co., 1549 N. Wells, Dept. 101, Chicago.

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.

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

MANUFACTURE lamb wool polishers, dusters. Newhall, 358 Broad St., Lynn, Mass.

AGENTS make \$3.00 an hour taking orders for our 40 Fascinating Kitchen Specialties. No competition. Write Quick. General Products Co., Dept. 7-K, Newark, N. J.

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.

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., 1937 E. Irving Park, Chicago.

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.

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.

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.

REPLATE brass 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. Post Paid. Satisfaction Guaranteed. Agents wanted. Dept. A, U-Kan-Plate Co., Philadelphia.

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

PERFUMED Beads from California. Fast Sellers. No Competition. License unnecessary. Big margin. Hire subs. Clean up. Mission, 519PM, 2328w. Pico, Los Angeles, Calif.

AGENTS: Big Money Monogramming by Transfer method. Catalog Showing Over 50 Styles and Particulars Free. Motorists' Accessories Co., Mansfield, Ohio.

FREE Sample. "Rain Shield Wiper." Retail \$1.00—Cost (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.

\$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.

GOLD Sign Letters. \$0.75 for Thousand. Non-Tarnishable. Free sample. Catalogue. Atlas Sign Works, 1032 E. 53th St., Chicago.

KLEENZIT Kleening Pencil—Removes spots and stains from men's garments and similar fabrics. Simply mark spot with cleaning crayon and erase with brush-pad moistened with water. Sells readily at 35c to 50c. Big profit. Sample 25c. Argyle Specialty Company, Argyle, Wis.

HIGH-GRADE SALESMEN WANTED

\$100 PER week—Just Show It and Collect. "Sure-Hold," the screw-driver with fingers that hold the screw and start it where human fingers cannot reach. Positively Sells on Sight. Every mechanic is waiting to buy. Millions Will Be Sold. Made in 3 sizes (to handle any screw or bolt). Sell for \$1.00, \$1.10 and \$1.25 each or \$3.35 per set. To Agents only. Upon receipt of \$2.35 (money order or currency) we will send you sample set by parcel post, prepaid, with agents' confidential price list and full particulars, showing you how to make \$100 Per Week. If you prefer, send 50 cents postage and pay postman \$2.00 upon receipt of sample set. Money Back Guarantee. If you are not delighted with our proposition return the "Sure-Holds" and we will immediately return your money. You take no risk. Biggest Money Maker Today. No Competition. We Guarantee the Sale. Automobile Free. Be First. Sure-Hold Screw Driver Company, Jefferson and Third, Desk X, Seattle, Wash.

SALESMEN—Pomeroy Electric Primer has started coldest autos easily for five years. Underwriters' approval. Guaranteed. Sells \$3.75. Whole or part time. Special advertising campaign. No investment. Write immediately. Pep Primer Co., Mfrs., Rochester, N. Y.

SALESMEN—Local and traveling representatives sell "Wine" Grape Juice in kegs and barrels. Port type, Sherry type, Tokay type, Claret type, Muscatel type, Madeira type, Catawba type, Burgundy type, Reisling type, Sauterne type, French Vermouth and Italian Vermouth. Manufactured by the oldest and most responsible winery in America, shipped from our own vineyards. Be independent, work for yourself, no investment required. Established since 1879 with a high rating in Dun's and Bradstreet's. Call on our established trade for new business, who will also recommend others. The Taylor Wine Company, 152 West 42nd St., New York City.

WONDERFUL Opportunity for reliable man as representative of \$4,000,000.00 firm showing nationally advertised line of staple merchandise to business men. Basic necessity—steady repeater. Underselling competition 30%—Earnings start big, grow larger. Our men earn \$50.00, \$100.00 and more weekly—full or spare time. No experience needed. A few exclusive territories are open. Write for full information—Free. J. B. Simpson, Dept. 1316, 843 Adams St., Chicago.

WANTED—Tailoring Salesmen, make \$60 to \$125 per week. We are the largest made-to-measure tailoring house in the country, furnishing elaborate sample equipment. Over 150 all wool fabrics sell at \$23.50, \$29.50, \$34.50 and \$43.50 which includes commissions of \$3.50 to \$8.50 and bonus. Guaranteed absolute satisfaction, perfect fit, best workmanship, or no sale. We maintain an absolute 6-day delivery schedule. Write for our line and all accessories to be sent free. Tell us all about yourself. Edward E. Strauss & Co., Inc., Dept. 101, 402 So. Market St., Chicago.

SALESMEN: Galacite, the most successful patented puncture-proofing compound for auto tires, is making \$5,000 to \$10,000 a year for our hundreds of authorized representatives. Sells to car owners and dealers in big quantities. Seals any puncture instantly and makes tire puncture-proof for life. Positively guaranteed. Backed by a large, well financed corporation of long standing. Complete elaborate outfit and extensive advertising co-operation ready to back you in your community. The best money-making proposition ever offered you. Write at once to C. F. Johnson & Co., 19 West Jackson Blvd., Dept. 453, Chicago.

\$30.00 A DAY for District Salesmen. Responsible man, 30 years old or over, and permanent resident in community, can make \$30.00 a day and up as District Salesman, taking orders for our finest, tailored-to-order clothes at sensational new low price. No investment necessary. We supply everything, give exclusive territory to producers, pay highest cash commission daily and big monthly bonus besides. Write at once to Dept. 772, Goodwear Chicago, Inc., 844 West Adams, Chicago.

SALESMEN—Distributors, sell marvelous smokers, pocket lighters, gas lighters; every smoker, every home buys immediately; earn large profits; send for self-selling plans. Masterlite Corp., 110-C East 23rd, New York.

TIP-TOP Salesmen to handle our line of Tip-Top Luggage on Commission basis. Line established for 15 years. Petersburg Traveling Goods Co., Petersburg, Va.

WANTED—High-Class Salesmen calling on Plants and Industrials to sell The Klay Universal Gear, Pulley and Wheel Pullers. No competition, Quick Sales, Large Commissions. The Scott & Ewing Co., Bluffton, Ohio.

SALESMEN calling on mills and factories can add to their income \$25 to \$50 a week without increasing their expenses. Write for particulars. Redcone Company, Inc., 1400 Broadway, Room 334, New York City.

MR. BRUSH Salesmen—Old Established New York Brush Manufacturers require services of men in all territories to sell their extensive line of Sanitary Twisted in Wire Brushes. We pay larger commission than any other Brush House in the country. Write immediately for proposition. Wire Grip Sanitary Brush Corporation, 15 Mercer Street, New York.

MEN—Sell dependable shrubbery, fruit trees, etc. Steady demand. Complete co-operation. Commissions paid weekly. Write Perry Nurseries, Dept. R-2, Rochester, N. Y.

75c PROFIT on \$1.00 sale. Auto furniture and glass cleaner. Your name on label. Exclusive rights—free sample. Mfg. E, 213 Griswold, Detroit, Mich.

LADIES' full fashion hosiery mill a wonderful opportunity for men now calling on department store and dry goods trade. Side line if desired. Commission basis to start. In first letter state territory desired and detail your experience. All replies strictly confidential. Toewear Hosiery, Inc., Norristown, Penna.

SELL real \$40 suits for \$23.75—All wool Tailored to order. Write for big sample outfit of 120 All-Wool smart new fabrics. \$4 for you on every sale. A proposition good for \$5,400 to \$7,200 in 1927. Grab it! State age, territory, references, experience if any. Fairbanks Tailoring Co., Dept. C-105, Oakley at Wabansia, Chicago.

SIDE-LINE Salesmen to connect us with Agents to sell our Auto Mitten Dusters. No money needed. No goods to sell. Pay weekly commissions on all orders received from men you appoint. National Fibre Broom Works, St. Louis, Mo.

COLLECTS Money from the Dead-Beats. Retail \$5.00—Cost \$1.00—Profit \$4.00. "New Method." Every Storekeeper, Doctor buys quickly. Wonderful Money Getter. Federal Association, Hartford, Conn.

IF You Think in Terms of \$6,000 The First Year Write Me Now. Strong line for retail stores. Nationally advertised. Established concern. Best season now starting. Liberal weekly advance to producer. Geo. R. Williams, Mgr., 1317 Liberty Bldg., Cleveland.

\$10 To \$20 daily selling Ver-I-Ezy Comfort Shoes to men and boys. Big seller for years. Easy sales. Low priced; Cash Commission. Full or part time. Write, Easywear Shoe Company, Dept. 229, Indianapolis.

SALESMEN! Big season just ahead. Show our line of advertising pencils. Established 15 years. Complete selling outfit. Naco, 126 So. Clinton, Dept. B50, Chicago.

MILLIONS of car owners must have tires. Sell quality cord tires direct from factory. Low prices. Liberal commissions. Hadi Rubber Company, Sandusky, Ohio.

OFFICE Specialty salesmen for sensational seller. Desk name plate Sample 75c. World Signs, H108 North Dearborn, Chicago.

WANTED men or women to sell Furman's full line of guaranteed insecticides, such as Roach Powder, Fly Killer, Rat Bon Bons. Exclusive territory, 60% profit. Furman Company, Kerrville, Texas.

SALESMEN—Try Device Free. Starts Cold Motor Instantly. Saves Gas. Amazing Seller. Write quick. Elec. Super-Starter, Dept. S-2, Grand Rapids, Mich.

BECOME Your Home Town's Leading Business Man. Big money. Easy work. Selling groceries, coffee, canned goods, auto oils, direct to consumer. Undersell competition. Free gifts. Commission Advanced. Liberal Credit Plan. No Experience or capital necessary. Loverin & Browne, 1615 So. State, Chicago.

GOLD Leaf Window Letters and Script Signs. No experience; 500% profit. Samples Free. Consolidated, 69-V West Van Buren, Chicago.

ANTIFREEZE prevents radiators freezing. No evaporation, cheaper, better than alcohol. Greatest winter seller to filling stations, garages. Gallon free. Antifreeze Co., St. Paul, Minn.

WALKER made \$165 first day selling Collection System. Pays ten for one. We show you how. Adjustment Bureau, Mobile, Ala.

SALESMEN ribbons any territory side line 10% commission. Augusta Company, 333-341 Fourth Ave., New York City.

SALESMEN—Are You Making Enough Money? Let us show you how to make Big Profits with Jiffy Washing Tablets. No experience required. Write for Free Sample and Plans. Jiffy Soap Products Co., Dept. A, Dayton, Ohio.

SALESMEN—Become Independent. Own Your business, experience unnecessary selling our \$7,500.00 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, 30 Clinton St., Newark, N. J.

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. Rig pay. Write at once. Hitchcock-Hill Co., Dept. 50, Chicago.

TRAVELING Salesmen Calling on Retail Stores wanted by large manufacturer of fast-selling specialties entirely different from the average. Year-round sales, main or sideline. Big commission paid immediately on original and repeat business. Opportunity for well paid and permanent connection with old-established firm. If not making \$150 weekly, write today. Union Specialty Works, Dept. 222, Boonville, N. Y.

MAGIC Moving Window Salesman. It's Real changeable letter system has actually boosted users' sales 200% to 400%. None but dead dealers indifferent. If you can spot a winner, get the facts and begin pocketing \$100 weekly. Display Products Company, P. O. Box A5123, Gateway Station, Kansas City, Mo.

FREE Adding Machine to "Live-Wires" accepting our Dollar-a-Minute Agency. Improved 2-lb. Calculator. Adds, Subtracts, Multiplies, Divides. Work equals \$300.00 machines. Retail \$15.00. Big demand; large profits. Write quick for protected territory. Lightning Calculator Co., Dept. F, Grand Rapids, Mich.

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

CALIFORNIA Rosebuds selling like hot cakes. Agents coinng money. Absolutely new. Big profits. Catalog free. Mission Factory SP, 2328 West Pico, Los Angeles, Calif.

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

ANY Salesmen Can Sell Them! Merchants everywhere use punchboards. Someone sells them, why not you? Collect big commissions daily. Newest, largest, elaborate catalog sent upon request. Lincoln Sales Co., 9 So. Clinton, Chicago, Dept. D.

SELL Corn Remover Display Easels to stores. Tyrrell Products Co., Martins Ferry, Ohio.

HELP WANTED

\$95.00 TO \$225.00 Month. Men-women 18 up. Get U. S. Government Jobs. Railway Postal Clerks—Mail Carriers—Postoffice Clerks and Clerical Positions. Steady. Life Positions. Paid vacation. Common education sufficient. 32-page book with sample examination coaching and full particulars free. Write today sure. Franklin Institute, Dept. F3, Rochester, N. Y.

BIG Demand in Uncrowded Field—\$3.50 to \$5 per hour for trained Automatic Machine Repairmen. We help you earn while learning. Light, clean, fascinating work. Write St. Clair Technical Inst., St. Clair Bldg., 156 E. Erie, Chicago, Ill.

\$15.00 DAILY (In Advance) Introducing latest Guaranteed Hosiery for Men—Women—Children. Just write orders. We deliver and collect. Capital—Experience unnecessary. Samples furnished. Milton Mathews, Road 2602, Cincinnati, Ohio.

RAILWAY Mail Clerks. \$1,900 first year. Men 18-35. Common education sufficient. Steady work. Specimen examination questions—Free. Write immediately. Franklin Institute, Dept. F16, Rochester, N. Y.

MAKE money silvering mirrors, refinishing auto headlights, tableware, metal plating, bedsteads, chandeliers. Outfits furnished. International Laboratories, Dept. 71, 309 5th Ave., New York.

CASH paid for butterflies, insects. See Sinclair Display Advertisement on Page 24.

MEN to train for locomotive firemen on 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.

RAILWAY Mail Clerks. \$1,900 year. Men 18-35. Sample coaching free. Write immediately. Franklin Institute, Dept. F16, Rochester, N. Y.

MIRRORS Resilvered at Home. Costs Less 5 cents per square foot; you charge 75 cents. Immense profits plating auto-parts, reflectors, tableware, stoves, Refinishing metalware, etc. Outfits furnished. Details free. Write Sprinkle, Plater, 287, Marion, Ind.

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

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. 8, Patterson Civil Service School, Rochester, N. Y.

OBTAIN Employment! 70 Jobs were offered one person, using plan. Send postal now. "Service," Box 39, Station K, New York.

WANTED—Boys—Men. Learn Auto Repairing. \$25.00 week. Sample lessons free. Franklin Institute, Dept. F400, Rochester, N. Y.

MEN wanting to prepare for forest ranger or railway mail clerk examinations Write Mokane, A-23, Denver, Colo.

GOVERNMENT positions pay \$35 to \$75 weekly. We help you get them. Big List Free. Write, Mr. Oament, 101, St. Louis, Mo.

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

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.

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.

SILVERING Mirrors, French Plate. Easily learned; immense profits. Plans free. Wear Mirror Works, Excelsior Springs, Mo.

WE Start You in Business, furnishing everything. Men and women, opportunity to earn \$35 to \$100 weekly operating Ragsdale's original "New System Specialty Candy Factories" anywhere; wholesale or retail. Big commercial candy book free. W. Hillier Ragsdale, Drawer 350, East Orange, N. J.

TYPEWRITERS AND SUPPLIES

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.

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 B-151. Shipman-Ward Mfg. Co., 1512 Shipman Bldg., Chicago, Ill.

TYPEWRITERS, all standard makes, thoroughly re-manufactured by the famous "Young Process" and shipped direct from factory to you on 10 days' trial. Guaranteed 5 years. Easy monthly payments. Write today for free catalog. Young Typewriter Company, Dept. 5742, 654 W. Randolph St., Chicago.

TYPEWRITERS—all makes; real values; guaranteed. Typewriter Bargain House, Ada, Okla.

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

TYPEWRITERS \$5-\$35. All kinds. Send cash. Knights, 1512 Locust, St. Louis, Mo.

PRINTING, ENGRAVING AND MULTIGRAPHING

5,000 20-POUND bond letter heads or envelopes \$11.50, 10,000 \$22.00. First class work. Cash with order. Phillips Printery, 1235 Kings Highway, Dallas, Texas.

QUALITY printing. Lowest prices. Special prices on Letterheads, Envelopes. We print anything. Large or small orders. "Q" Shop, Roaring Spring, Penna.

\$3.00 DELIVERED. 500 Watermarked Bond Letterheads 8½x11, 250 envelopes. Money with order. Lowest prices all printing. National Printing, Goshen, Ind.

PLEASING Quality Envelopes, Letterheads or Cards; 250 \$1.10, 500 \$2.00, 1,000 \$2.90 Postpaid. Artistically printed. Elwood Ericson, Kennedy, N. Y.

250 HOWARD bond Letterheads or Envelopes. \$1.75; 500, \$2.75; 1,000, \$4.00. Wilco Press, 1110 Capitol Bldg., Dept. C, Chicago, Ill.

COMMERCIAL Art, Illustrating, Letterheads, Cut Service. Fred Sipe, Harrisonburg, Va.

"NEARGRAVURE" Process Printed Stationery—Exclusive—Distinctive. Samples Prices. Solldays, Knox, Ind.

PRINTING—Lowest Prices in America. Samples free. Pitts, Amana, Iowa.

FOLDERS—1,000 3½x6, 900 words, \$4.00. Drewton, Box 1051, Fargo, N. D.

PUBLISH Your Own Magazine or House Organ. Our standardized service at one-fifth ordinary prices. Samples and particulars free. Evans Printing Company, Grand Rapids, Mich.

TRY to beat these prices: 5,000 letter heads, 20 lb. Hammermill Bond, \$11.25, 5,000 3X envelopes, \$8.75. Other prices and samples on request. The Low Cost Printers, 123 W. 21st, New York.

LADIES' and Gents' Personal Cards printed 50 for 50c. Midget Cards, 100 for 50c. Card Case free. Liberty Press, Liberty, Ky.

EVERYTHING Printed! Samples Free! Franklin Press, B-32, Milford, N. H.

GUMMED Labels, 500 name and address. 2 lines 35c. 3 lines 55c. Catalogue. Eastern Label Co., B, Clintonville, Conn.

250 EACH Hammermill Bond Letterheads. Envelopes, \$3.00. Samples. Midland Press, 543 West Hickory, Kankakee, Ill.

100 BOND Letterheads and 100 envelopes printed, 98c. Kalata Printing Company, Ironwood, Mich.

250 LETTERHEADS, 250 white envelopes printed and mailed \$3.00. Samples printing free. Sunco, Mohawk, N. Y.

MAKE your own cuts. New simplified method, cheap. Complete illustrated instructions, \$1. F. Record, 247 So. Broadway, Room 10, Los Angeles, Calif.

MULTIGRAPH typewriting business correspondence, two dollars thousand. Hammermill Bond letterheads four dollars. Mayera Corporation, Monmouth, Ill.

BUSINESS Cards, \$3 per 1,000. P. A. Lavin, Coshocton, Ohio.

250 BOND Letterheads, Envelopes, Billheads, Cards, \$1.35 Each. Economic Press, Leonia, N. J.

SUPERIOR quality printing; attractive samples free. Kay Press, 546 Thurston, Rochester, N. Y.

GUMMED Labels, with name, Business and address, 500—30c; 1,000—50c. P. Wetzel, Valhalla, N. Y.

DISTINCTIVE—Artistic Business Stationery that Creates Confidence. 1,000 Letterheads or Envelopes \$3.00. Samples. Moulton Printing Company, 1410-P East 8th, Kansas City, Mo.

WE print Stationery, Booklets, Catalogs, Circulars. Samples. Commercial Press, Batavia, Ohio.

QUALITY Printing! Reasonable Prices! Send for Free Standardized samples and prices. Folders, Circulars. Catalogs our specialty. Ernest Fantus, 525 South Dearborn, Chicago.

PRINTING, OUTFITS AND SUPPLIES

PRINTING Outfits—Presses, type supplies, type novelties. Send stamp for catalogue. Model Press, York, Penna.

USED presses, type, supplies. C. L. Whitfield, Ballentine, Norfolk, Va.

COMPLETE printing outfits, presses, type, ink, paper, supplies. Write for Catalogue. Kelsey Company, G-11, Meriden, Conn.

PRINTING Presses—Type—Supplies. List for 2c stamp. (Bargains.) Foster, 4342 North Robey, Chicago.

DUPLICATORS AND DEVICES

YOU can make 50 to 100 copies of a letter, notice, etc., at a cost of three cents on a Hoyer Quality Duplicator. Write for free trial offer. The Hoyer Duplicator Co., 14 S. Wells St., Chicago, Ill.

"STENCIL-DUPLICATOR" 8 x 11, \$10. Copies like mimeograph. F. Gerwin, Dale, Okla.

RUBBER STAMPS

YOUR Name and address on two line rubber stamp 25c. Brush & Co., Auburn, Nebr.

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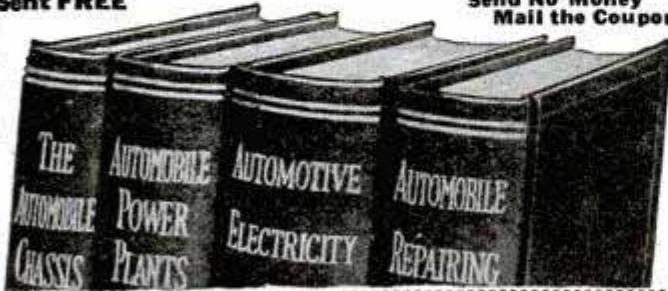
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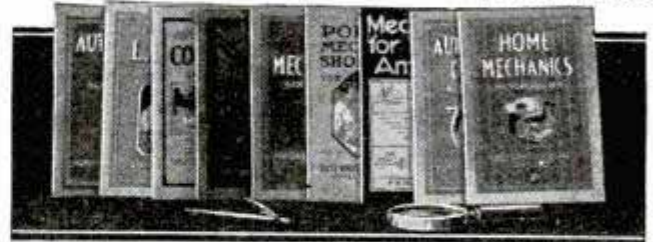
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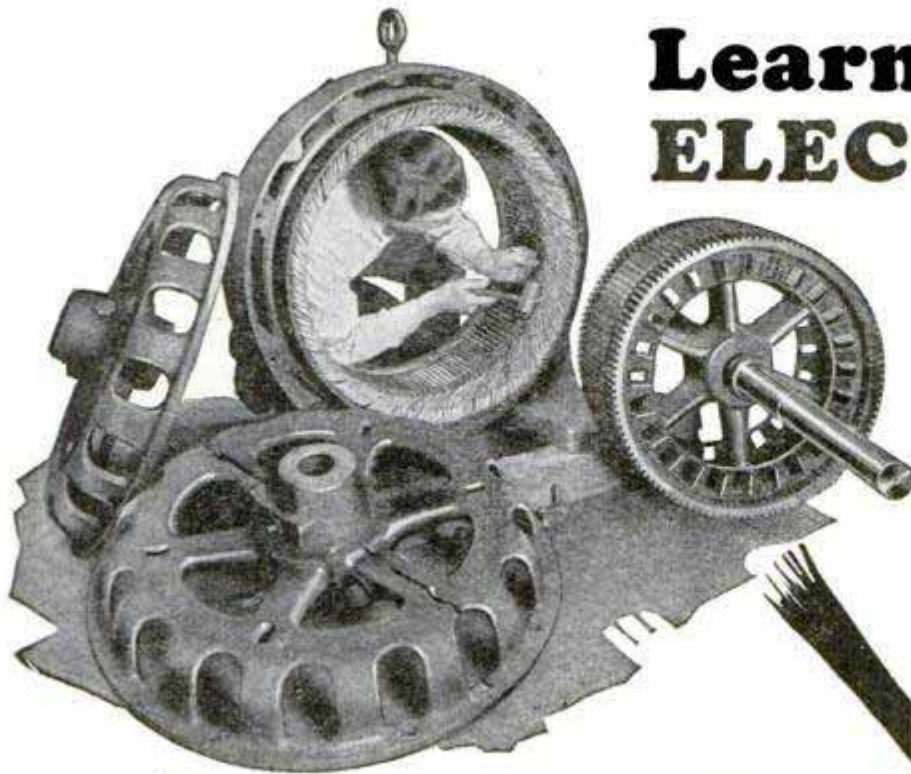
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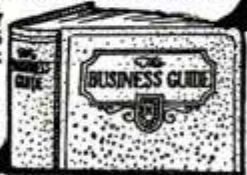
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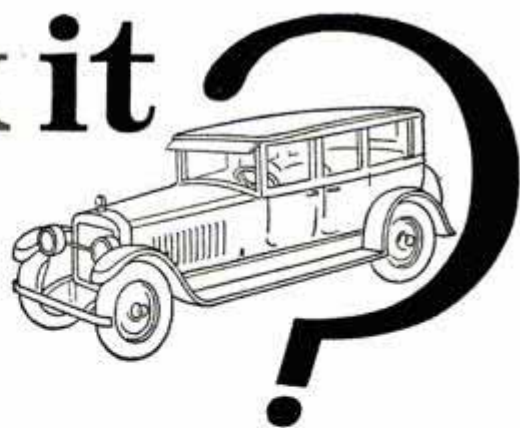
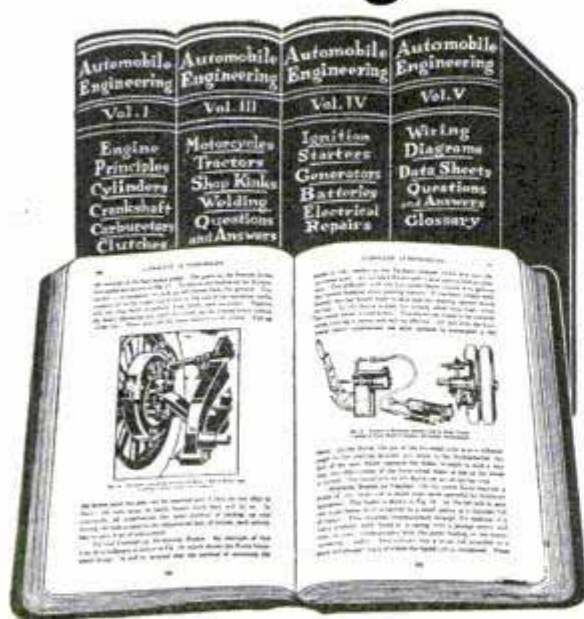
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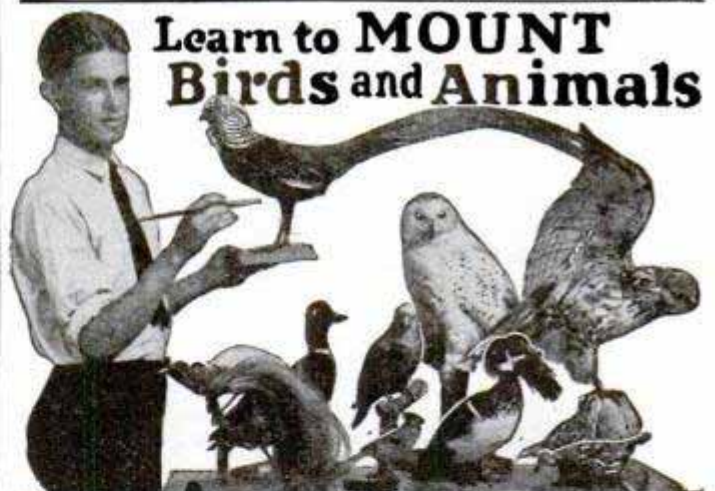


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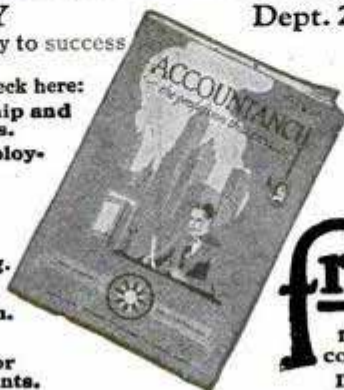
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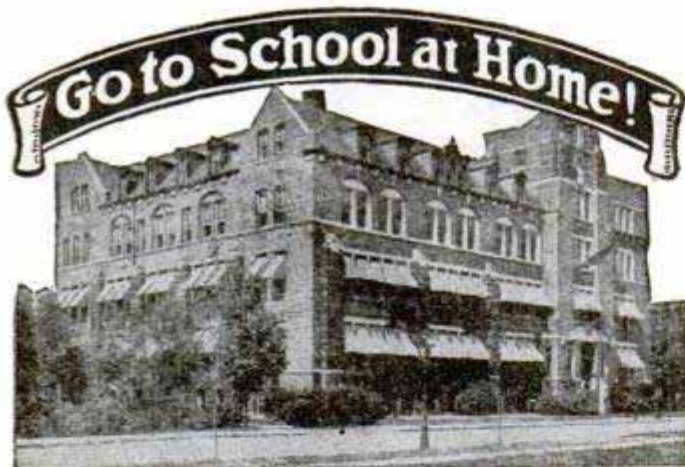


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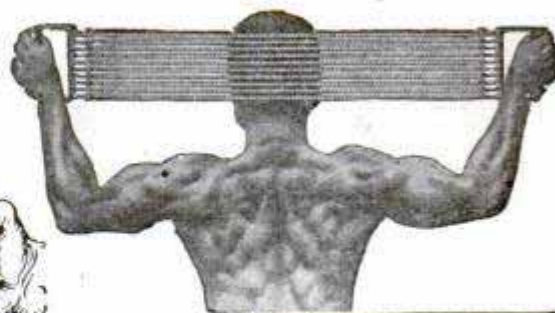
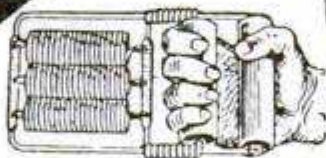
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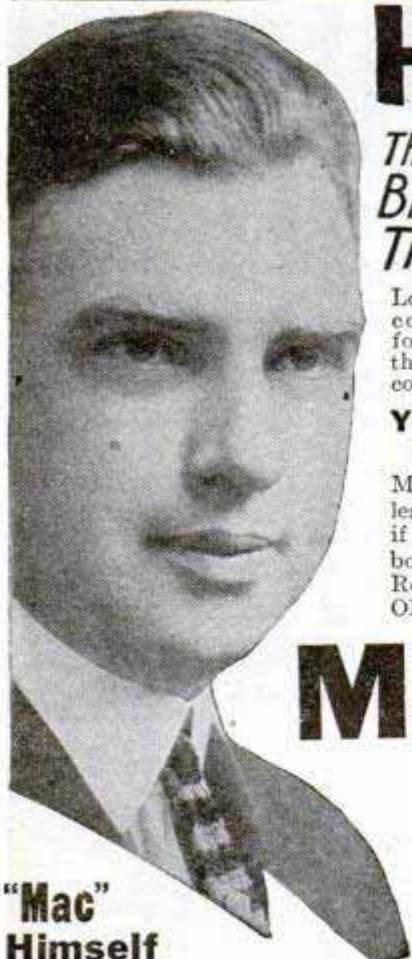
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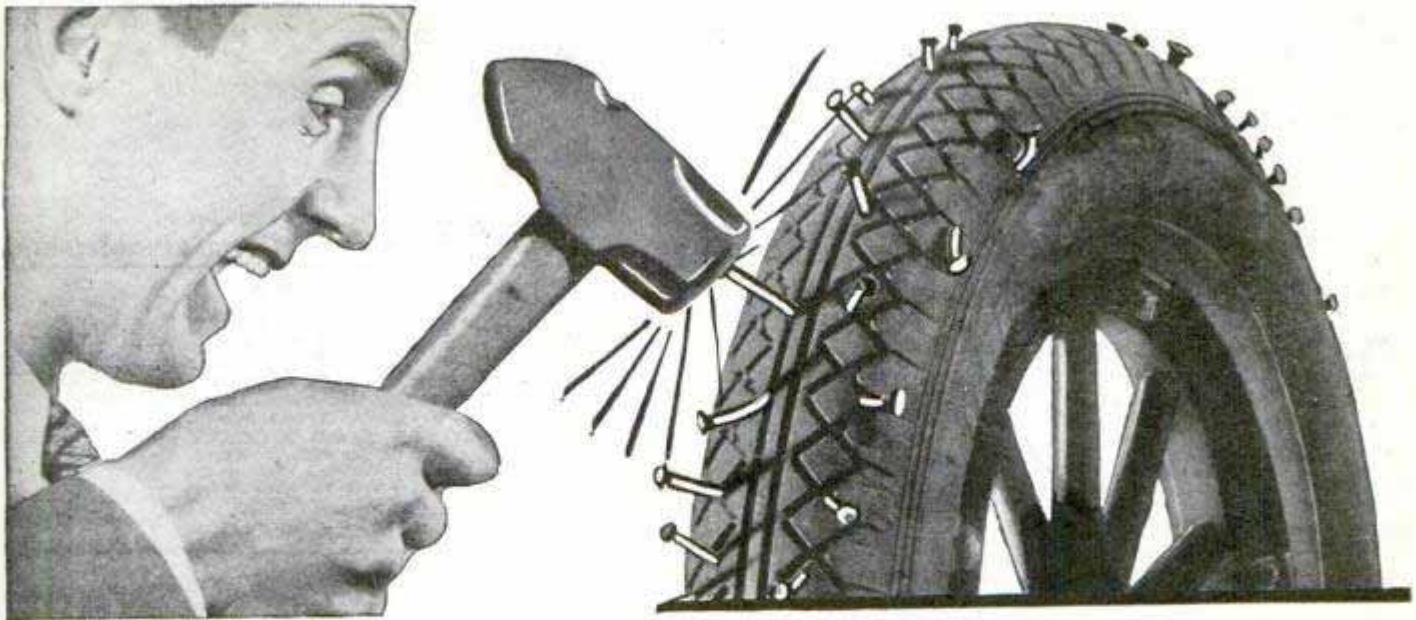
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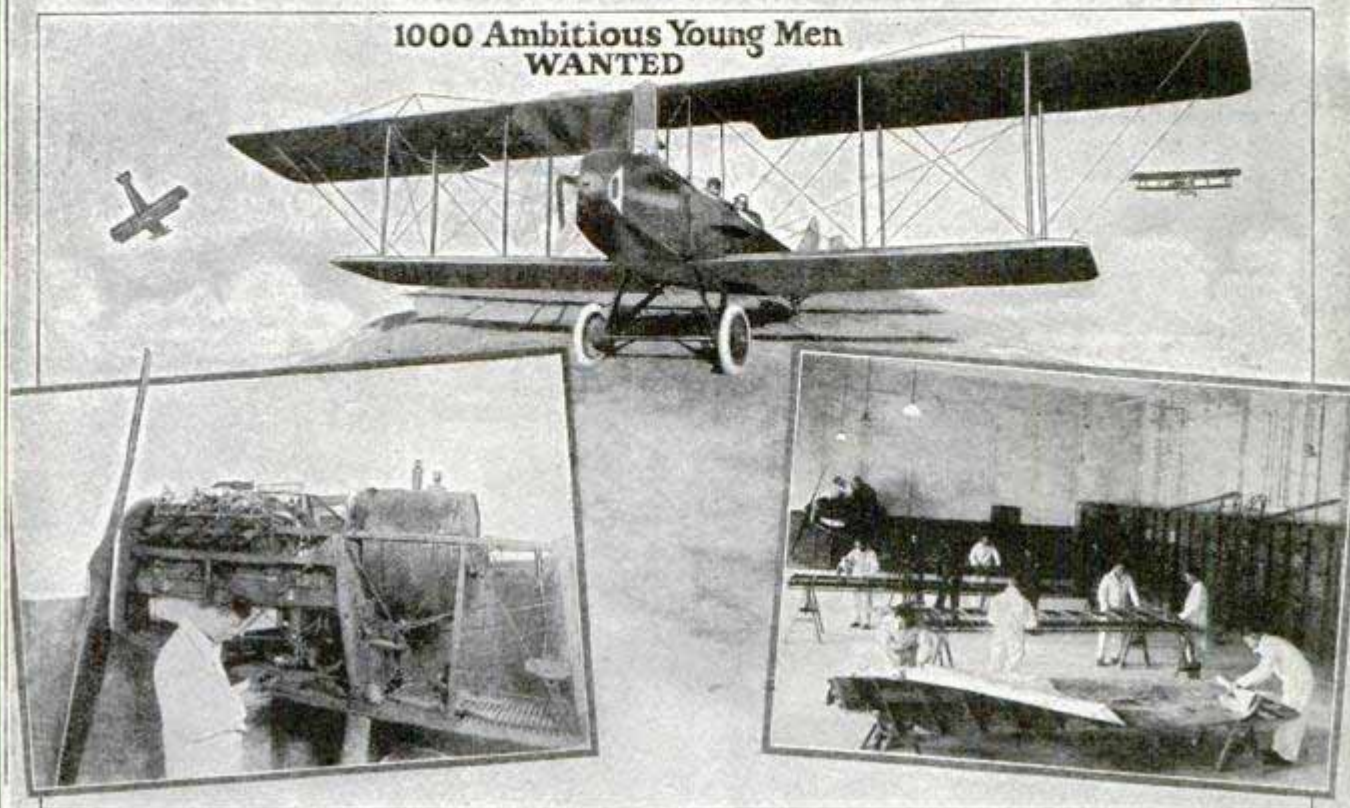
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When I consider the small investment I made in taking your course and the enormous profits I am making now I feel like a profiteer.
M. M. Branner.



REG'LAR FELLERS

I attribute my success to the thorough and highly competent course I received from you.
Gene Byrnes.

I want to show you that with the aid of my PICTURE CHART METHOD of teaching original drawing you can learn to draw as easily as you learned to write. Every step in producing original heads, figures, animals, and all details of original cartoon drawing are PICTURED in an extensive series of Charts, and the text with each lesson shows how to apply the various steps in producing original drawings of your own. This plan is today recognized as the most effective method of teaching drawing ever devised.

RESULTS TELL THE STORY

Here are three of the famous characters created by Landon students who have attained national reputations as Comic Strip Cartoonists. Hundreds of former students of this School are producing cartoons on political and national affairs, sports, comic strips, etc., for leading newspapers and syndicates all over the United States and Canada. Many newspapers now employ from two to five students of this School; one big newspaper employs nine. Many successful students who prefer to work at home are selling their drawings by mail. The record of results produced by this school is evidenced in the increasing demand by newspaper Editors for Landon graduates.

Send NOW for complete information and sample Picture Chart to test your ability. Please state your age, and enclose 6c in stamps for postage.

C. N. LANDON, Director.

The Landon School
1238 National Bldg., CLEVELAND, OHIO



I'll Teach You to Play a Saw in 24 Hours!

C. J. MUSSEHL, Pioneer Artist on the Musical Saw, has taught thousands to become Experts, Vaudeville Stars and High-Priced Entertainers.

I'll Loan You the SAW 5 Days Free

Be Popular—Play for Money or Fun



JUST to prove how quick and easy you can learn to play a saw, I'll send you a genuine, specially tempered Musical Saw for 5 days' trial. I guarantee that in 24 hours you can play tunes like "Old Black Joe" and "Home Sweet Home." Then you quickly learn latest jazz and song hits, operatic and classical music. Amazingly simple—no notes to read, no dreary practice. You don't need to know a thing about music.

Success Positively Guaranteed

I have taught thousands to play the Musical Saw. Just three short simple lessons reveal every secret of my twelve years' success as a professional saw musician. Scores have won fame and fortune. Let me prove that you, too, can quickly play like a professional. The Musical Saw's only rival is the violin for sweetness and expression. Tone effects are positively startling and so unexpected that nothing compares to it in winning instant popularity or becoming a salaried entertainer.

Phonograph Record

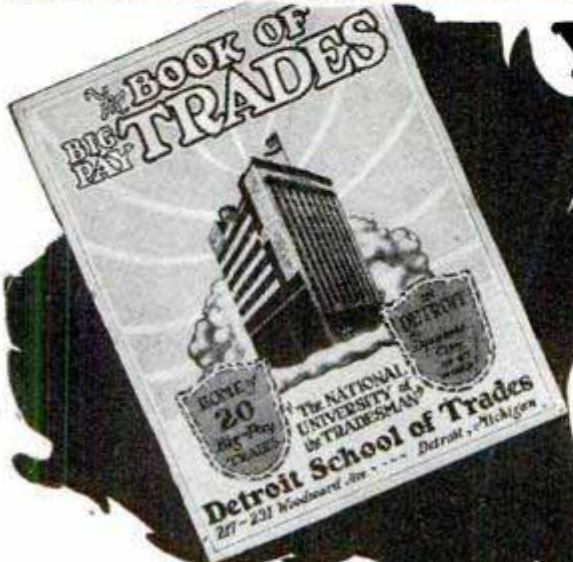
FREE!



Double-disc, demonstration-size phonograph record of beautiful Saw solo and duet, sent with full particulars of my free trial offer. You'll wonder that a saw can produce such marvelous music. But the record proves it. Enclose 10 cents (stamps or coin) to cover record handling and postage. Or if you do not want the record, just ask for my big **FREE TRIAL OFFER**, sent postpaid.

MUSSEHL & WESTPHAL
259-B W. Water Street, Fort Atkinson, Wis.

BRICK LAYING 	ELECTRICITY 	AUTO PAINTING 	STRIPING 	PLUMBING 
\$14.00 A DAY	\$75.00 A WEEK	\$50 TO \$125 A WEEK	\$2.00 AN HOUR	\$300 A MONTH



YOUR OPPORTUNITY

Learn One of these

BIG PAY TRADES

QUICK

Don't spend months in school or digging through dry books. Here you learn by doing with tools on actual jobs—you learn right—and you learn quick. Before you know it you're ready for big pay right here in Detroit.

DON'T Work At a Hard Low-Pay Job Another Day!

Get out of the grease—leave the rut forever—say "Good bye" to low pay. Take your choice of the clean, big pay jobs and start earning \$50 to \$100 a week right from the start in a real trade.

Get This New Big Pay Book

The Most Amazing Door to Quick Big Money You've ever seen. Twenty trades. Pick the one you are best suited for. Work at a job you like. Learn your trade, quick. This book is free.

Steady Work in Detroit's Big Plants

Scores of Big plants, body plants, auto plants, wheel makers, tool makers, designers, finishers, strippers—hundreds of real estate developments and new buildings—plenty of work inside or outside—at big pay. Steady work the year around for men who know their trades.

BIG PAY JOBS GALORE Not Enough Men

The Detroit School of Trades teaches 20 big pay trades. It is called the "National University of the Tradesman". You don't have to learn some old, low-pay, worn-out business. Send for the book, look through, pick the money you want in the trade you want to learn. Then come here, we'll teach you how and help you get a job. Over three hundred of our men now working in one body plant. Hundreds of others in other plants. Hundreds more needed.

Think of These Facts

Hansen made \$183 for one week's work in bricklaying. Brooks jumped from \$35 a week to \$65.85 the first week he left school. Augustine was making \$6.00 a day—learned plastering and makes \$12 a day. Hundreds double their pay. You can do as well. Remember it doesn't cost you a penny for this book. Risk one postage stamp now on what may be the opportunity of a lifetime. Read it, be convinced. Come and see. Succeed for yourself. Send coupon at once. Don't delay. The National University of Trades can do big things for you.

DETROIT SCHOOL OF TRADES
DEPT. 12 DETROIT, MICHIGAN

Come and Work In Dynamic DETROIT

A great city—big—throbbing with life—growing—filled with opportunity—crying for men to take big pay for doing the jobs that need doing. Building trades booming. Automotive trades—real trades—always good—get into the spirit of a big city, fastest growing most dynamic in America—do big things with big men—succeed with successes in this City of Wonderful Opportunity

THE STATE OF MICHIGAN

protects you. The great Detroit School of Trades is licensed by the Michigan State Board for vocational education and conforms in every respect to the standards and requirements laid down by this organization, just the same as a State University or Endowed College.

CHOOSE

In This Great School We Teach These Big-Pay Trades

Bricklaying--\$1.50 to \$1.65 per hour
Plastering--\$1.50 per hour
Plumbing--\$1.25 to \$1.75 per hour
Carpentry -- \$90.00 to \$125.00 per week
Electrical--\$10.00 to \$14.00 per day
Sign Painting--\$1.00 to \$2.00 per hour
Paper Hanging--\$10.00 and up per day
Interior Decorating--\$10.00 to \$14.00 per day
Plan Reading and Estimating--\$70.00 to as high as \$250 a week
Auto Mechanics--\$1.00 to \$2.00 per hour
Auto Painting--\$9.00 to \$12.00 per day
Auto Trimming--\$9.00 to \$14.00 per day
Metal Finishing--\$10.00 per day
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DETROIT SCHOOL OF TRADES, DEPT. 12 DETROIT, MICH.

Send me Free and without obligation your big new book of BIG PAY TRADES. I am interested in

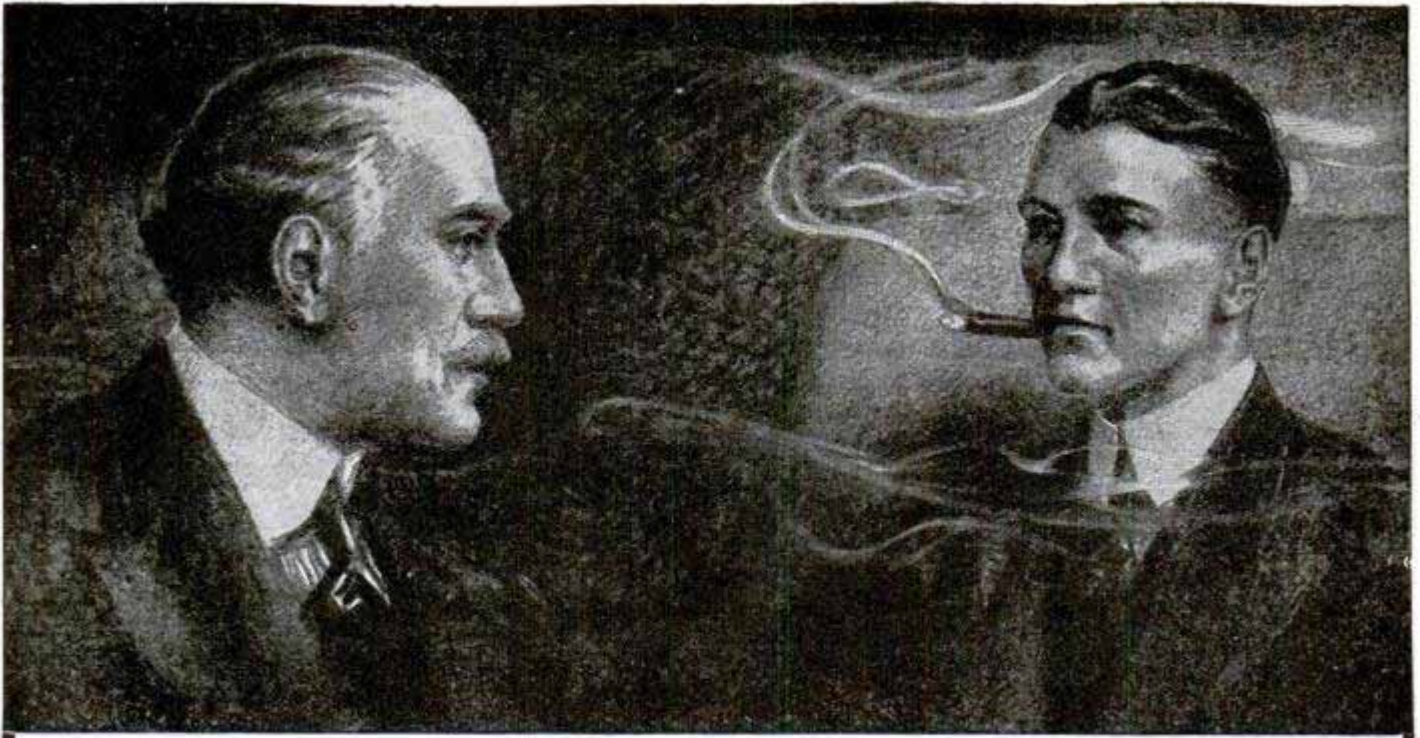
the _____ trade

Name _____

Address _____

City _____ State _____

FREE Send Coupon **10-DAY**



Tobacco Is Hurting You

Look at the facts square in the face, Mr. Tobacco User. You may think tobacco is not hurting you.

That is because you haven't as yet, perhaps, felt the effects of the nicotine poison in YOUR system. For you know that nicotine, as absorbed into the system through smoking and chewing tobacco, is a slow working poison. Slow, yes—but sure.

Tobacco is lowering your efficiency. It slows a man down. Makes it harder for you to concentrate your mind on your work. You haven't near the amount of "pep" and energy you would have if you stopped using it. There's many a man twice as old as you in years who's twice as young in energy, simply because he lets tobacco alone.

Some day you will realize to what an alarming extent tobacco has undermined your system.

When your hands begin to tremble—
and your appetite begins to fail—
and your heart seems to "skip a beat" now and then—
and slight exertion makes you short of breath—
then you have a right to suspect that
TOBACCO is getting the upper hand.

Any well-informed doctor will tell you that these are only a few of many symptoms of tobacco poisoning.

And YOU know that the use of tobacco in any form is an expensive, utterly useless habit. You know you ought to quit.

Tobacco Habit Banished Let Us Help You

It doesn't make a particle of difference whether you've been a user of tobacco for a single month or 50 years, or how much you use, or in what form you use it—whether you smoke cigars, cigarettes, pipe, chew plug or fine cut or use snuff—**Tobacco Redeemer** will positively remove all craving for tobacco in any form in a very few days. Not the slightest shock to the nervous system. Your tobacco craving will usually begin to decrease after the very first dose—there's no long waiting for results.

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

It is in no sense a substitute for tobacco. 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 make you feel better in every way.

Results Guaranteed A single trial will convince you. Our legal-binding, money-back guarantee goes with each full treatment. We will refund every cent you pay for the treatment if after taking it according to the easy-to-follow directions, it should fail to banish the tobacco habit completely.

SEND Coupon for Free Proof Let us send you our free booklet on the deadly effects of tobacco, together with testimonial letters from men all over the country telling how they have been absolutely freed from the tobacco habit by this simple home treatment. You could not ask for stronger proof that **Tobacco Redeemer** will free you from the habit than the evidence we will gladly send on request. Just mail the coupon—or a postal will do.

NEWELL PHARMACAL CO.

Dept. 300 Clayton Station St. Louis, Mo.



Free Book Coupon

NEWELL PHARMACAL CO.

Dept. 300 Clayton Station St. Louis, Mo.

Please send, without obligating me in any way, your free booklet regarding the tobacco habit and proof that **Tobacco Redeemer** will positively free me from the tobacco habit or my money will be refunded

Name

Street and No.

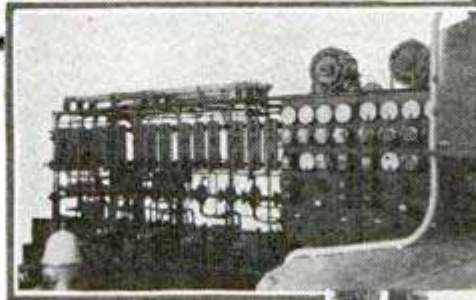
Town..... State.....

An underpaid bank clerk a year ago Today~ a high-salaried ELECTRICAL EXPERT

... Here is an inspiring true story of success. If you're ambitious—if you're making less than \$40 a week—you'll discover in this story an opportunity to get out of the rut and into the big money class.

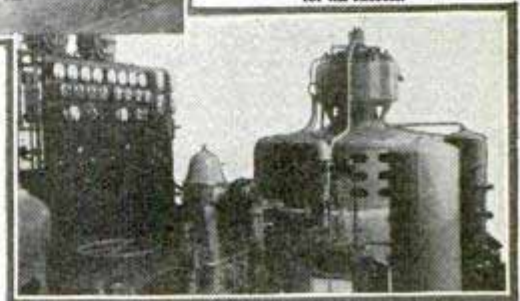


Can you imagine a man who, a few months ago, knew nothing about electricity, installing this big power plant and complicated equipment? It proves that National-trained men are real Electrical Experts.



W. A. Roben—high paid Electrical Expert for the big Utilities Power & Light Corp.—who credits National training for his success.

After a few months of National Electrical School training—Roben installed this complete Wisconsin Electrical Power Plant



"I wasn't making enough money to live on, a year ago," writes W. A. Roben now. He realized he'd never get anywhere as a bank clerk—and after investigating other fields, he decided that the fast-growing Electrical Industry offered more opportunities to make big money.

Lack of Experience Didn't Hold Him Back

But he knew nothing about Electricity. How could he hope to win success against men who had grown up in the industry?

A magazine advertisement like this showed him the way. He sent for the National Electrical School's free book of opportunities. What he read there



Established 1905

caused him to quit his job and enroll for National training.

In this big school of shops, master instructors showed him exactly how to do wiring jobs—to construct radios and operate broadcasting stations—to build motors—operate Electrical control boards and instruments. They helped him do practical work on over a half-million dollars worth of new electrical equipment.

He Learned in Months Instead of Years

"When I left National," he writes, "I was hired immediately with no other recommendation or experience than my National training. I was given top pay and sent to Gays Mills, Wis., where I supervised the installation of a complete power plant. It went into operation without an error. I am next to have charge of a bigger job in Iowa."

Many National Graduates Earning \$200 a Week

Employers are eager to get men who know the things that National teaches you. Big electrical projects are developing so fast that there is a serious shortage of trained men. There's no limit to the pay a real Electrical Expert can command.

Do you want one of these jobs—paying \$50 to \$200 a week and then up—up—up! National can train you—just as it has trained Roben and 16,000 other men for success and big pay. This school has won a world-wide reputation for thorough, **quality** training. National-trained men are in demand everywhere. Send now for the big free book that gave W. A. Roben his start and read how National will help you train for a big-pay job.

Mail Coupon for FREE ELECTRICAL BOOK

National Electrical School,
Dept. 503, 4006 So. Figueroa St.,
Los Angeles, California.

I want a big-pay Electrical Job. Send me your free book telling how to get one.

Name.....

Address.....

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SEND NO
MONEY



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FOR A
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New PHONIC Reproducer

makes an up-
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Phonograph out
of your old one! **Direct
from
Factory**

Now at last you can say goodbye to the squeaky, nasal, rasping, metallic tone of your phonograph. Now you can have the beautiful, natural, full-rounded tone of the expensive new machines which are startling the world. Yet you need not buy a new phonograph if you have an old one. The reproducer is the HEART of any phonograph—and the New PHONIC reproducer makes your old phonograph like an entirely new one. Based on the new PHONIC principle. Makes you think the orchestra or artist is in the same room.

Gives the New Tone and Volume of Latest New Phonographs

Tones never before heard are clearly distinguished when the new PHONIC reproducer is used. Test it on an old record. Hear the difference yourself. Listen to the deep low notes and the delicate high notes. Hear how plainly and clearly the voice sounds. Note the natural tone of the violin and the piano, and the absence of "tinny" music. You'll be amazed. The new PHONIC reproducer is ideal for dancing or for home entertainments. Its volume is almost double that of the ordinary reproducer.

10 Days' Trial — Send No Money

You cannot realize how wonderful the New PHONIC is until you hear it. That is why we want to send it to you on 10 days' trial. Send no money now—just the coupon. Pay the postman only \$3.85 plus a few pennies postage when the New PHONIC arrives. Then if you are not delighted, send it back within 10 days and your money will be refunded. If sold in stores the price would be at least \$7.50. Our price only \$3.85. Over 350,000 people have dealt with us by mail. You take no risk. Mail the coupon now for 10 days' trial. **BE SURE TO STATE THE NAME OF PHONOGRAPH YOU OWN.**

NATIONAL MUSIC LOVERS, Inc., Dept. 582,
327 West 36th Street, New York

Please send me a New PHONIC reproducer for.....
.....I will pay the postman \$3.85
(give name of Phonograph) plus few cents postage. If I
am not satisfied after trial, I will return your reproducer within
10 days and you guarantee to refund my money.

Name.....

Address.....

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

Outside U. S. \$4.10, cash with order.

\$75 A WEEK BUILDING RADIO SETS

now being made

Join the Radio Association of America. Let it train you to build and repair sets, to be the "radio doctor" of your community. \$3.00 an hour easily made in spare time.

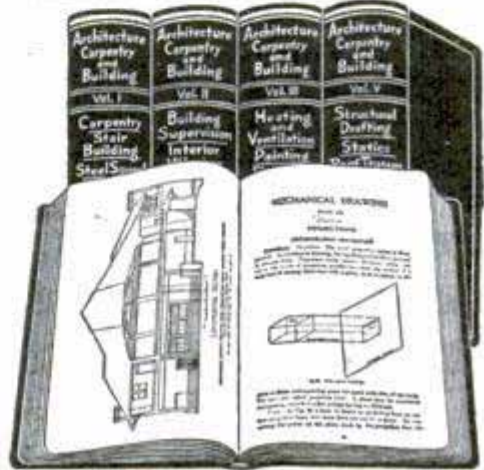


\$500 Earned in Spare Hours

Lyle Folliek, Lansing, Mich., writes: "Have already made over \$500 in spare time." He is just one of many. Our members are starting radio stores, securing better positions, passing radio operator examinations, qualifying as big-pay Radio Experts, as well as making money spare time.

Join the Association Now! By our Special Plan your membership need not cost you a cent. Number of these memberships limited. Write for details NOW!

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For Architects, Draftsmen, Carpenters, Contractors,
Builders and all who expect to build

Men who work with their hands know that headwork gets them more money.

Brain tools make the tools in your tool box at least twice as effective, and the best brain tools you can get are good books—not just any books, but books which tell you the things you want to know, and do it instantly. Carpenters make themselves contractors by learning how to estimate correctly. Contractors are able to handle bigger and more profitable jobs by learning how the big fellows do it, and architects and those who want to enter this highly paid profession earn more money by having facts and figures at their finger tips. This brand new set of five handsomely bound books, covering all phases of architecture, carpentry and building, enables you to get authoritative, specialized information in a moment. No tedious long hours of reading—no hard grinding study, but instant reference to the vital facts. You don't waste a minute—the new jiffy index puts before your eyes, without wasted time, the things you want to know.

The most complete work of its kind we have ever published; nothing has been overlooked. Use of tools—building construction, heating, lighting, plumbing, architectural drawing, blueprint reading; in short, the most comprehensive and easily understood work of its kind.

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and here you have at hand information gathered from hundreds of experts, all for so small a sum you'll never miss the money. Use these books as others have done and you'll get many times their price in a few months. One job alone may repay you several fold. Send for your set today.

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Send now and we will include with these money-making books a membership in the American Technical Society which entitles you to free consultation privileges with twenty highly paid experts. This alone is invaluable. In addition to all this you are entitled to the services of our Employment Department FREE when seeking a better job.

To Men Getting Bald I Say!



No matter how fast your hair is falling out—no matter how much of it is already gone—I make this amazing guarantee! I'll end dandruff—stop falling hair—grow new hair in 30 days—or you don't pay me a cent! No strings attached! No "Ifs," "Ands" or "Maybes"! New hair or no pay! And you are the sole judge!

By ALOIS MERKE

Founder of the Merke Institute, 5th Avenue, New York

SAVE yourself from baldness! Stop falling hair! Grasp this "no risk" offer to grow new healthy hair in 30 days!

Here's My Contract!

If your hair is rapidly falling out—if your appearance is spoiled by approaching baldness—if you have tried countless expensive hair treatments unsuccessfully—it makes no difference. My contract stands! I'll grow new hair in thirty days—or the trial costs you NOTHING.

Here's My Secret

Years of training and research and day after day experience in treating thousands of cases of loss of hair at the famous Merke Institute, Fifth Avenue, N. Y., have taught me many valuable facts about the hair—and this, the most amazing of all—that in most cases of baldness the hair roots are not dead, but merely dormant—asleep!

You're wasting your time—you're throwing away money—when you try to reach these dormant roots with ordinary hair tonics, oils, massages and salves. For such measures treat only the surface skin and never even get to the roots, the real source of trouble. How could they ever possibly grow new hair?

My Method Reaches the Roots

It's no use trying to make a tree grow by rubbing "growing fluid" on the bark. You must get to the roots! And that's just why my scientific treatment is so tremendously beneficial! It penetrates below the surface of the scalp. It quickly reaches the cause of the trouble—the dormant, starving hair roots. It awakens them. Hair begins to sprout again. It takes on new life and color. It becomes

stronger and thicker. And in a surprisingly short time—sooner than you ever imagined possible—you have a new healthy growth of hair—OR I PAY ALL COSTS OF THE TREATMENT MYSELF.

And best of all, my system is so simple that it can be used in any home where there is electricity without the slightest discomfort—and for just a few cents a day!

New Hair or No Cost!

Thousands claim seeming miracles for my treatment. I don't. I admit some cases of loss of hair are hopeless. Only remember this—these cases are so very rare and so many hundreds of others have regained luxuriant hair through my method, that I am willing to let you try it for 30 days—AT MY RISK!

Then if you are not absolutely delighted—say so. And I'll mail you a check immediately—refunding every cent of your money—and the treatment will have cost you NOTHING!

Free Booklet Tells All

The very fact that you have read this announcement shows that you are anxious about the condition of your hair. So why not investigate? Find out for yourself. If you will merely fill in and mail the coupon I will gladly send you without cost or obligation a wonderfully interesting booklet which describes in detail my successful system, which is growing new hair for thousands all over the country. In addition it tells all about my iron-clad guarantee, which enables you to take my treatment without a penny's risk. Clip and mail the coupon today. Allied Merke Institutes, Inc., Dept. 162, 512 Fifth Ave., New York.

Allied Merke Institutes, Inc.
Dept. 162, 512 Fifth Avenue,
New York City.

Please send without cost or obligation a copy of your book, "The New Way to Grow Hair," describing the Merke System.

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EVIDENCE!

Hair Coming Back

"Having used your Thermocap Treatment for 30 days, I find a new growth of hair coming back on bald spot. It is growing in very fine. The Thermocap is a Treatment that everyone who is losing his hair should buy."

G. H. P., Portland, Me.

Dandruff Leaves Entirely

"I want to tell you how wonderful your treatment is. The first week my dandruff left entirely, and by the third week a new growth of hair could be seen all over my head."

Mrs. H. S.,
Port Angeles, Wash.

Partly Bald for 10 Years

"I have been partly bald for the last 10 years and have used your treatment only four weeks to date, but I can already see a new crop of hair coming in."

J. A. K.,
Anderson, Ind.

See the World FREE!



Taste Romance and Adventure In the Far Lands of the Earth

How often you've longed to see for yourself the awe of Egypt's pyramids—the beauties of the gorgeous Mediterranean sunset—the squalor of China's ancient cities!

Spend a few years, or the rest of your life, tasting high adventure on the seven seas and in all the world's great ports—roving the earth's highways and byways! You can do it FREE—all your expenses paid—and earn a good salary besides!

Only one profession will carry you around the world at will, traveling like a gentleman, but that's the most interesting and pleasant work there is—Radio Operating! Easily and quickly learned, there's no other profession like it for the man who wants the experiences and pleasures of world-travel. Radio operators are needed—all sea-going ships like the one shown here must carry from one to half a dozen or more.



Take a Look Beyond the Skyline Without a Penny's Expense

Radio operators aboard ocean liners live luxuriously—they rank as officers of the ship. Meals, a private cabin, all other living needs are furnished free, and besides the operator draws a good salary. You can learn quickly and easily at home in your spare time to be a Radio operator through our practical training methods. Take a look at the FREE BOOK which tells how—mail coupon below.

This U. S. Government-recognized school has been training successful operators since 1914. Our graduates are all over the world. We maintain an Employment Department to put you on your own ship. The world-famous NATROMETER, our own patented invention, obtainable only by students of this Institute, is recognized as the best and easiest way to learn the Radio code. A few short months, with the aid of the famous Natrometer and our quick home training, and you too can be a fully qualified Radio operator, sitting in your cabin like the one shown above, bound out for Liverpool or Nagasaki!

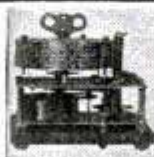
Read the Free Book that tells all about this fascinating profession and our practical Government-recognized methods of training you for it. Send coupon TODAY—no obligation. Special tuition offer now on for limited time includes world-famous Natrometer free of extra cost with your course! Act at once.

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WASHINGTON, D. C.**

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Dept. BB-85, Washington, D. C.

Gentlemen: Without obligating me in any way send me your free book and information about your special limited Natrometer offer.



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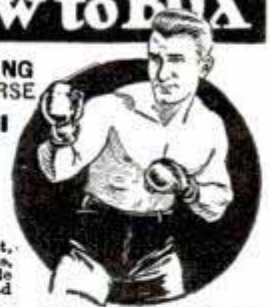
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Learn How to BOX

JIMMY DeFOREST BOXING COURSE

Has Developed Champions by Mail

Hundreds of DeForest Trained-By-Mail Boxers Are Making Good in the ring today!



In 20 weeks under the System of Jimmy DeForest, World's Greatest Trainer and Maker of Champions, you will master the priceless knowledge that has made champions, and started hundreds of boys on the road to Fame and Fortune.

Promising pupils are brought to the front at once. With the co-operation of an Advisory Board of prominent promoters who are enthusiastic about this plan, thirty boys are selected from all weight classes every six months and recommended to leading promoters for engagements.

Champions Give DeForest Course Sole Credit for Success

Champions and other students who are making good in the squared circle, publicly proclaim that the DeForest Course is responsible for their achievements. Read in the "Golden Age of Boxing" the amazing and almost unbelievable stories of John Nemis, welterweight champion of Maritime Provinces, Jimmy Robe, George Tasker, Buell C. Murphy, and other stars. Boys who were rank amateurs are today earning big money. Novices are developed into topnotchers.

Greatest Physical Training System in the World

The DeForest Course is the greatest physical training system in the world. Weaklings have been made strong and men physically rebuilt, energy, strength and courage developed. Prominent men and leaders in all walks of life, including Prof. T. W. Seeley, famous Physical Culturist, box regularly to keep themselves fit.

Read This Gripping Book

Send today for the new famous book, "The Golden Age of Boxing," greatest book of its kind ever written, full of valuable information, photos of great boxers and pupils who became successes overnight. Full outline of the DeForest Course. This book will thrill you. Write now.

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Motion Picture Projection

\$2,000 to \$4,000 a Year

Quickly learned. Short hours, big pay. Best equipped school in Michigan. Projectionists for Movie Houses and Road Shows.

MOVIE OPERATORS SCHOOL

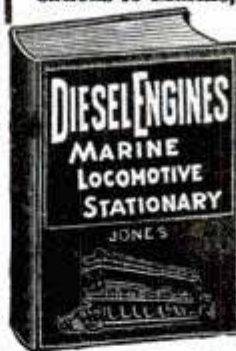
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The importance of the Diesel engine in its various applications to Marine, Locomotive, and Stationary operation can scarcely be overestimated. Every progressive engineer and student of mechanical engineering will realize the necessity of extending his knowledge into this field.



This up-to-the-minute book by D. L. Jones, Chief Machinist, U. S. Navy, is extremely practical, complete and in simplified language. Deals thoroughly with installation, operation and maintenance.

565 pages (6x9)—340 Illustrations.

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Helpful IDEAS for Home Owners

In these two practical books, you will get 502 ideas that will be helpful in making your home a better place to live in—a home to be proud of. The ideas are for the making, improving and repairing of the devices needed about and in the home. The books are:

1. Home Mechanic's Handbook No. 1
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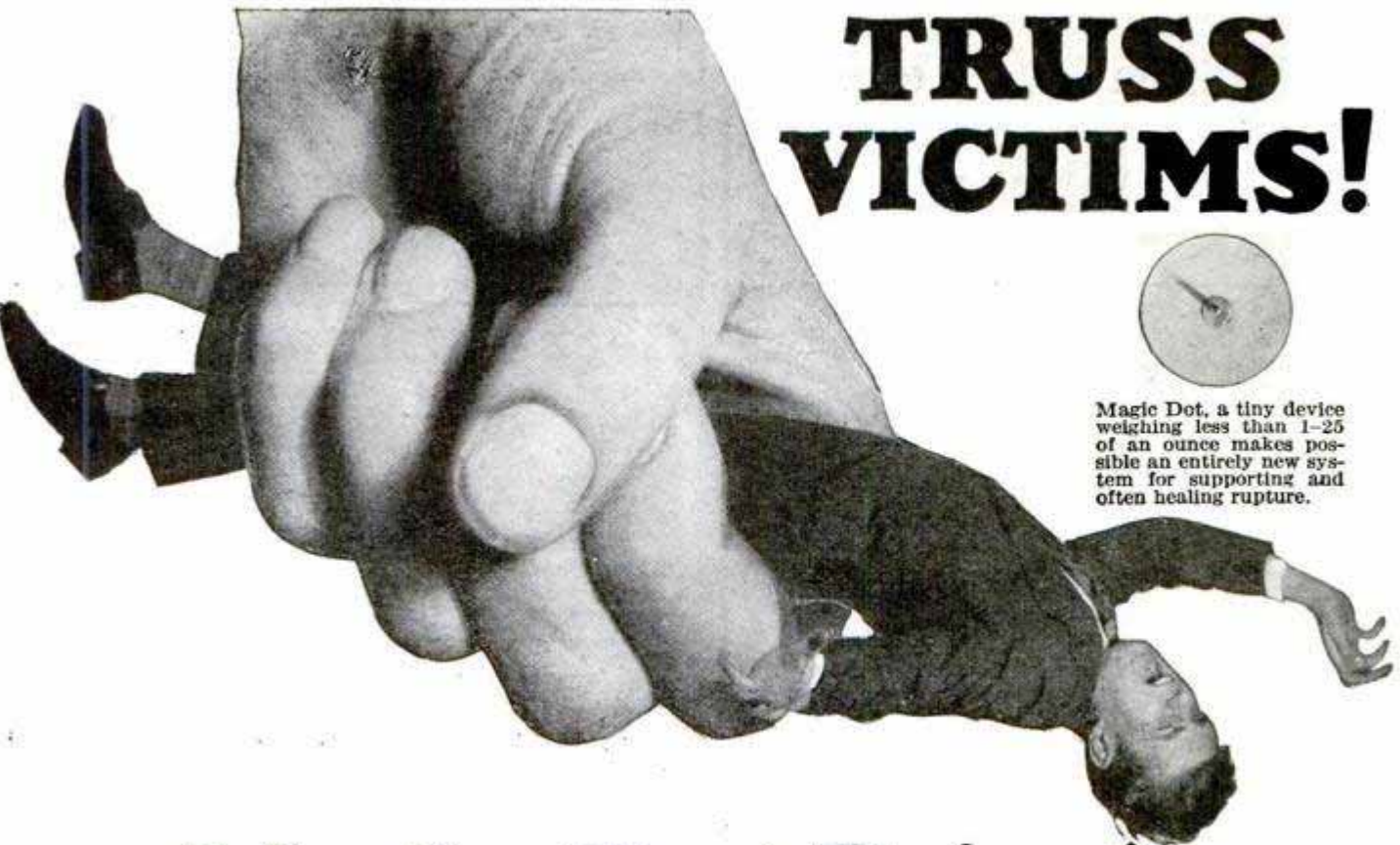
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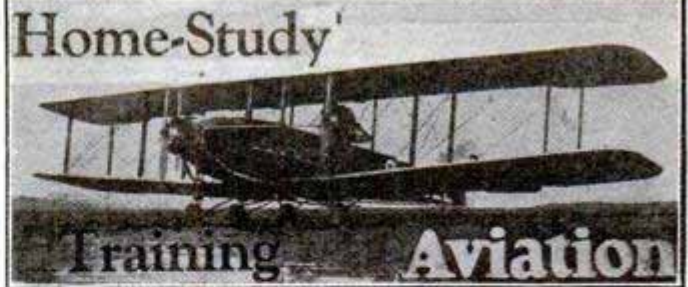
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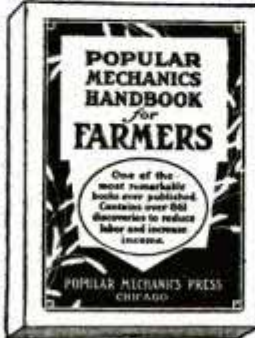
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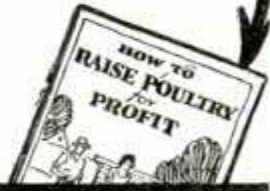
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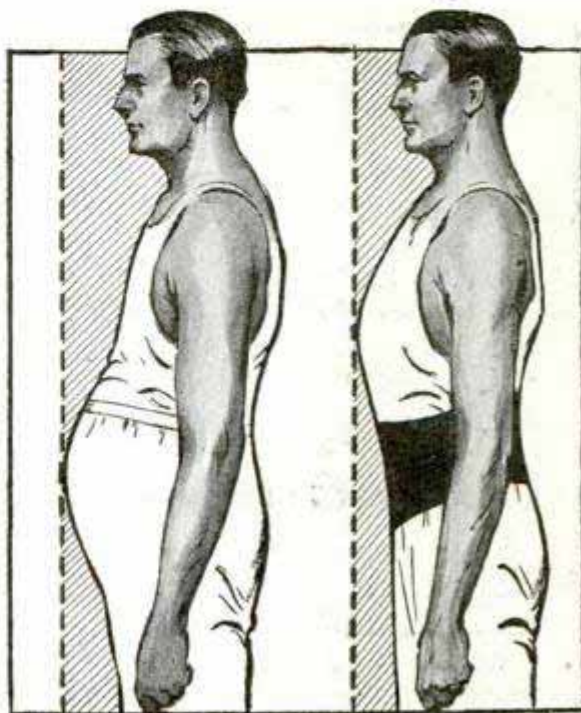
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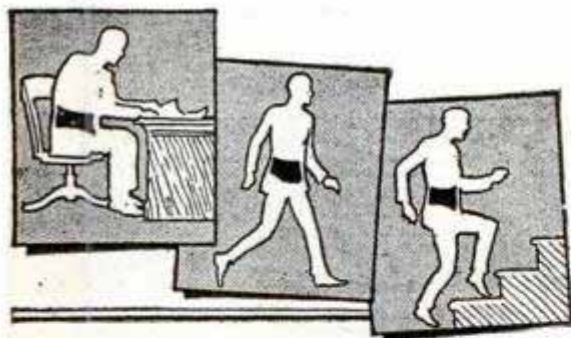
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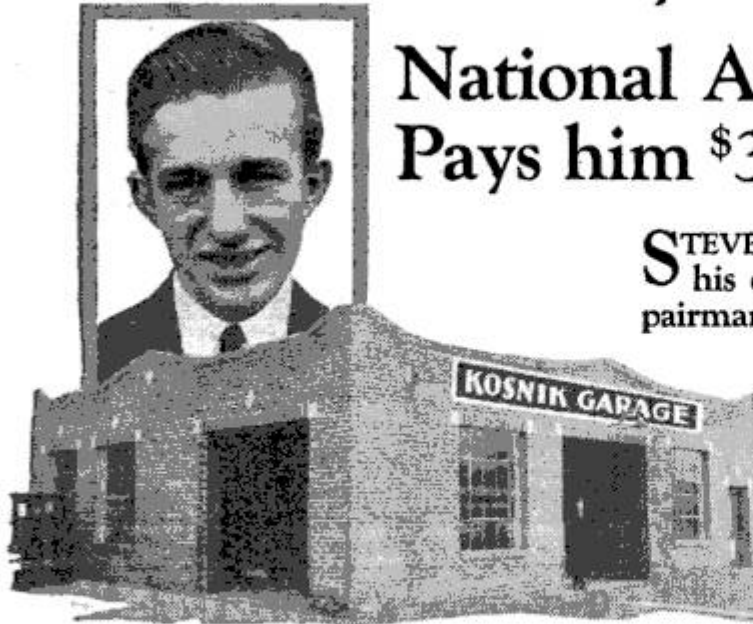
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National teaches you everything you need know to be an Auto Expert—and then makes every effort to get you a good job. Ideal training conditions in Los Angeles—thousands of big-pay jobs open in California alone. National may be able to get you a part-time job to pay your expenses while training. Send right now for your free copy of National's big Auto Book.

Learn
Autos in
Los
Angeles

This
BIG FREE BOOK
Starts You on the
Way to Big Pay!

Read about the opportunities for you in the auto industry—how other men have won top salaries—how National trains you—and how you can soon be in a better job. Mail coupon Now!



National Automotive School,
Dept. 667,
4006 Figueroa St., Los Angeles,
Calif.

Send me your free illustrated
Auto Book.

Name.....

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

National Automotive

and ELECTRICAL SCHOOL

Dept. 667, 4006 Figueroa Street

LOS ANGELES, CALIFORNIA



SHOW CARD LETTERING

Learn at Home

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.

Mr. Koller has had twenty years' teaching experience, and his success in helping other men and women is an indication of what he can do for you.

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.

INTERNATIONAL CORRESPONDENCE SCHOOLS

Box 5629-E, Scranton, Penna.

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:

SHOW CARD LETTERING

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

TECHNICAL AND INDUSTRIAL COURSES

- | | |
|---|--|
| <input type="checkbox"/> Electrical Engineering | <input type="checkbox"/> Steam Engineering |
| <input type="checkbox"/> Electric Lighting | <input type="checkbox"/> Architect |
| <input type="checkbox"/> Mechanical Engineer | <input type="checkbox"/> Architects' Blueprints |
| <input type="checkbox"/> Mechanical Draftsman | <input type="checkbox"/> Contractor and Builder |
| <input type="checkbox"/> Machine Shop Practice | <input type="checkbox"/> Architectural Draftsman |
| <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"/> Automobiles |
| <input type="checkbox"/> Surveying and Mapping | <input type="checkbox"/> Mathematics <input type="checkbox"/> Radio |

Name.....

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Electricity

A Practical Training

in this great profession will make your successful future a certainty.

The School of Engineering of Milwaukee has specialized for 23 years in training young men for

ELECTRICAL ENGINEERING

With a B. S. Degree in 3 years

Junior Electrical Engineering—12 months to 30 months, depending upon previous education. Graduates are technically trained electrical experts. **Commercial Electrical Engineering**—1 year for high school graduates. **Automotive Electricity**—a 3 to 6 months' course will make you a highly paid specialist on all types of starting, lighting and ignition systems. **Armature Winding**—and **Motor Generator Repair**—thorough 3 months' course. **Practical Electricity**—6 to 12 months' course to become a Master Electrician.

We will Aid You Earn Your Way Partly through College, through our practical plan of co-operative industrial employment. Board and room at cost. Student activities, orchestra, daily broadcasting WSOE. **NEW TERM NOW ORGANIZING.** Write NOW for latest catalog and full details. Mention age, education and course of interest.



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Cleared up—often in 24 hours. To prove you can be rid of Pimples, Blackheads, Acne Eruptions on the face or body, Barbers' Itch, Eczema, Enlarged Pores, Oily or Shiny Skin, simply send me your name and address today—no cost—no obligation. **CLEAR-TONE** tried and tested in over 100,000 cases—used like toilet water—is simply magical in prompt results. You can repay the favor by telling your friends; if not, the loss is mine. **WRITE TODAY.** E. S. GIVENS, 428 Chemical Bldg., Kansas City, Mo.



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BULLY YOU

Learn Scientific Tricks of Physical Mastery

By a few simple tricks you can have any assailant at your mercy quick as a flash. The astounding secrets of self-defense, used by the New York Police, are revealed in the marvelous, officially recognized system—

Captain Wallander's Course

All Complete In

Physical Training Manual

By Capt. A. W. Wallander

Commander Physical Training, New York Police

A complete course in physical culture. Scores of gripping action photos showing just how to throw a bigger man and overpower him—disarm a hold-up thug—build up muscle—keep in fighting trim. Hundreds of health hints, too: care of the feet, prevention of colds, correct posture, walk without fatigue. This is the genuine book used by the New York Police, now available TO YOU. **Easy to Learn** Let Capt. Wallander give you his great secrets and detective tricks. You'll hardly believe that such valuable knowledge could be learned so easily.

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In Physical Culture and Police circles this volume is world famous. Send immediately for your copy. **DON'T SEND MONEY NOW.** Send coupon today. When volume arrives, pay the postman \$1.97, plus few cents postage. If you are not satisfied return volume and get money back. **\$1.97**

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A Million Dollar Can Opening Machine

BRAND NEW INVENTION BRINGS FORTUNES TO AGENTS!

Here's Something Brand New! An Amazingly Simple Invention—Yet, Absolutely Revolutionary! For Now, At One Sweep, Millions Of Old Style Can Openers Are Doomed To The Scrap Heap! Think Of It, Men! A Tremendous New Opportunity For Quick Profits In Every Home In America! No Wonder Agents Are Making Astonishing, Almost Incredible Sums—\$75, \$100, \$150 A Week Easily Right Along. So Mail The Coupon For All The Facts And Full Details Of My Remarkable FREE TEST OFFER!

ABOUT once in a "Blue moon" some genius pops up with a new invention that everyone has been waiting for. Then, presto! Almost like magic, agents' profits go soaring overnight to tremendous heights! And now the cold, hard-boiled facts about this amazing new can opener bear convincing proof!

More Than a Can Opener

This queer new device doesn't just cut a ragged hole around the edge of the can. It lifts the entire top completely out, clean as a whistle! The machine grips the can—holds it—opens it—flips up the lid so you can grab it—and gives you back the can without a drop spilled, without any jagged edges to hack your fingers—all in a couple of seconds! You just put the can in the machine—turn the handle—and almost instantly the job is done! Built to do the job better than anything ever devised! Will last a lifetime! It's far more than just a can opener, it's a real can-opening machine!

The Secret of Big Money

Women hate the old style can opener—and with good reason, too. It's the last relic of barbarism in the modern kitchen. Yet every day millions of women have to open cans the dangerous, laborious old-fashioned way. Food is spilled and wasted. Fingers are cut and torn—often followed by infections and blood poisoning that result in expensive doctor bills. Opening cans the old way is a job nasty enough to make most any man swear—this amazing new way—it's so easy a ten year old child can do it with perfect safety! No wonder women—and men too—simply go wild over it!

A Spectacular New Sales Plan

I want you to see this surprising new invention with your own eyes. I want you to know why everyone man or woman, falls for it the instant they see it. Whether you are an experienced salesman, or never sold a penny's worth of anything in your life—I want to tell you about a remarkable new sales plan that wins you a profit on every call you make. This plan is made possible by another spectacular money maker in the Speedo line and guarantees you a steady income of up to \$150 a week!



Free Trial—Act Quickly!

If you are ambitious—if a new, but tested and proved opportunity to make \$75 to \$150 a week interests you—act at once before some other live wire beats you to this lifetime opportunity. Without obligation, learn about these amazing new patented inventions, and get my FREE TRIAL OFFER. Just mail the coupon today—NOW!

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PATENTED HOUSEHOLD SPECIALTIES

CENTRAL STATES MFG. CO.

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Central States Mfg. Co.,
4500 Mary Ave., Dept. B-700,
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Yes, rush me the facts and details of your FREE OFFER.

Name

Address

City State



AVERAGES \$16.53
A DAY!

R. A. Stewart writes, "Made 20 sales in 23 calls. Between the 13th and 28th this month I have made \$248. Speedo has them all beat for real money."

\$72 HIS FIRST WEEK

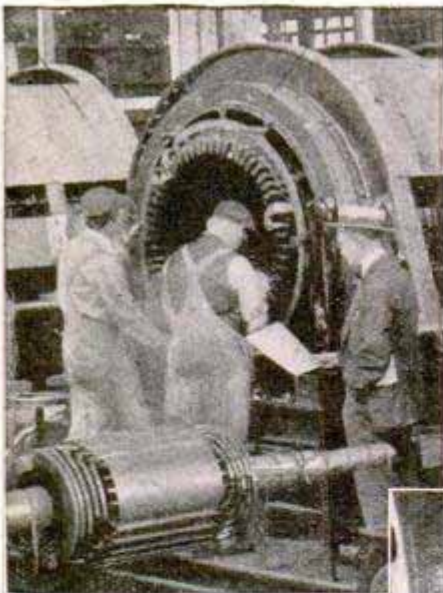
J. F. Riley says, "I made \$72 my first week only working 4 1/2 days. Since then my commissions have been bigger each week."

12 SALES IN 2 HOURS

J. C. Reister wires, "Rush 96 Speedos to me via express. Sold my trial order of 12 in 2 hours spare time."

**FIND OUT
WHY**

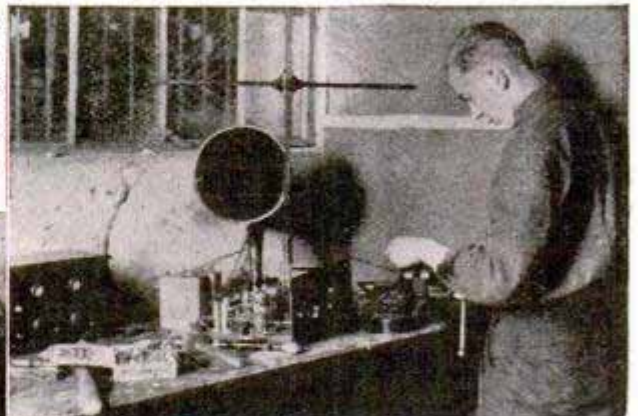
The **COOKE** Trained Man is the **BIG PAY** Man in **ELECTRICITY**



These Men are Making Big Money!

Triples Pay— Now Power Plant Superintendent

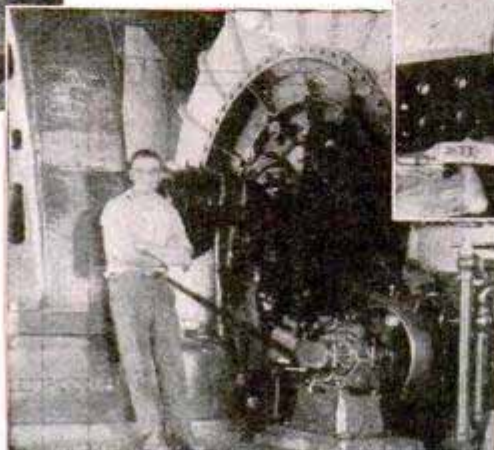
"I'll never regret the day I enrolled with you, Mr. Cooke. A year ago I was a garage mechanic at small pay. Through your wonderful training I am now Superintendent of the Canton Electric Power Plant at three times my former pay. I shall always be a booster for your Course."
W. J. Moore, Supt., Canton, Oklahoma.



\$200 a Month for Spare Time Work

"I am now making \$200 a month doing electrical jobs in my spare time, in addition to my regular pay. Not bad for a 19 year old boy, is it, Mr. Cooke? There are fellows in this town who don't make half that much full time. You have surely put me in the Big-Pay Class."

John Hudec, 223 W. 9th Ave.
Tarentum, Pa.



Pay Goes Up from \$3.00 a Day to \$26 a Day

"Last year I was getting only \$3 a day in the fields. Then I enrolled for Cooke Training and today I make \$26 a day and more, in my own Radio and Battery Shop. I have all the work I can handle. My success is entirely due to your Course, for I knew nothing about Electricity when I enrolled."

E. A. Lehmann, 1521 Market St.,
Oakland, Calif.

Thousands of Cooke Trained Men Earn \$3500 to \$10,000 a year

Be a "Cooke" Trained Man Yourself!

You want to make big money! You want to earn more than a mere \$20 or \$30 a week! Of course you do. Then get into Electricity, the field of big pay and bigger opportunities. I'll train you at home—in your spare time. You work just as you are working now—at your same old job. But you learn Electricity every day,

in an easy,
simple,unfor-
gettable way
—by doing.

And—

5 BIG OUTFITS to work with

NOT TOYS, BUT
REAL HONEST-TO-
PETE TOOLS &
APPARATUS.
NOT A PENNY
EXTRA FOR
ALL THESE!



1 TOOLS & EXPERIMENTAL
OUTFIT

2 BELL & ALARM
OUTFIT

3 ELECTRIC LIGHTING
OUTFIT

4 ELECTRIC
POWER
OUTFIT

5 TRANSFORMER
OUTFIT

Every "Cooke" student will tell you he doesn't see how I can possibly afford to give so many wonderful and big outfits.

You Earn as You Learn!

That's the way I teach Electricity—so that you can make extra money as you go along. That's why my Course is Practical. That's why my students are successful. That's why the "Cooke trained man is the Big-Pay Man," everywhere, and always. \$40 a week is just an ordinary salary in Electricity. \$70 to \$200 a week is what thousands of Cooke Trained Men are earning.

Money Back if Not Satisfied

That's what I'll agree to do in writing. And you're to be the judge and jury, all in one. If you're not satisfied you get your money back—every cent of it. And back of me stands the Chicago Engineering Works, a \$2,000,000 Illinois Corporation.

Nothing Like "Cooke" Training

Don't confuse other Courses with mine. Don't be satisfied with anything but "Cooke" Training, the course with 10,000 boosters. There is nothing like it anywhere. It stands by itself—alone in this field. This is the Training that Electrical men are praising—the training that big Electrical companies select for their employees—the training that has put thousands of men into big-pay jobs.

Before you select any Course, find out about "Cooke" Training with its 16 guaranteed features and its long record of proven success.

If You Are Earning Less Than \$70 a Week—Mail Coupon TODAY!

Don't wait a minute! Find out today why "The Cooke Trained Man is the Big-Pay Man" everywhere! Find out how Cooke Training will help you boost your pay! Mail the Coupon for my big book of proof, pictures and Pay-Raising FACTS. Do it NOW!

L. L. COOKE, CHIEF ENGINEER

L. L. Cooke School of Electricity

Owned and Operated by

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Dept. 12 2150 Lawrence Ave., Chicago, Ill.

FREE BOOK COUPON

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Mr. Cooke:

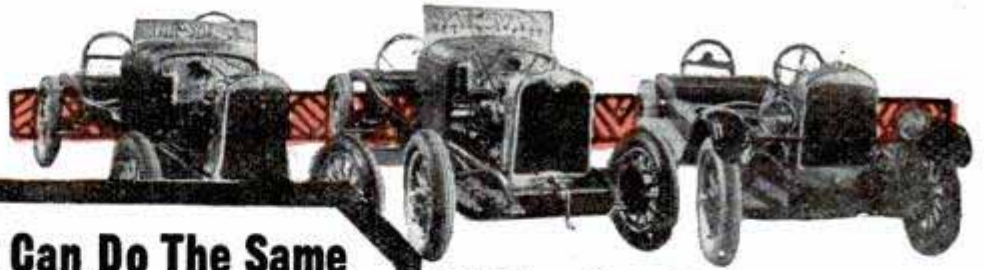
I want to know why the "Cooke" trained man is the "Big Pay" man in Electricity. Send me your big FREE Book with other information. This does not obligate me in any way.

Name.....

Address.....

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





**You Can Do The Same
With M. S. A. S. Training**

I just went thru several hundred letters recently received from M. S. A. S. graduates. Every one is a message of success. One man now has the largest Motor Truck Agency in Central Louisiana. Another says his pay has increased \$75 a month. Another states the Foreman of his Garage has advanced him over men years his senior. The letter reproduced below is a typical example of M. S. A. S. Success Training. **Every one of these men started by doing the same thing you're doing this very minute!** Fill out, tear out and mail the Coupon right now and I'll send you the greatest Success Opportunity Plan of the present age! **Don't delay—do it now.**

R. S. Jeller
Pres.

I'll Give You These Detroit-Made Cars, Latest Models, To Work On

Oldsmobile, Oakland, Jewett, Essex, Hudson, Reo, Packard, Buick, etc.—just some of the new Chassis recently received for you to practice on. All latest model cars. Our location in Detroit, the Automobile center of the world, and our contact with automobile manufacturers, brings us close co-operation and endorsement. This means much to you. Always the latest and most up-to-date equipment and continually being improved.

OLSON GARAGE

General Auto Repairing
OILS - ACCESSORIES - SUPPLIES
MEADOWLANDS, MINN.
June 23, 1926

Michigan State Auto School,
3729 Woodward Avenue,
Detroit, Mich.

Dear Sirs:-

Have been making good money since I left your school and am in business for myself. All the tools I had at the time I left was the tool kit which I purchased at school. Now I have a garage, a good supply of tools and repair equipment; also carry a supply of Ford and Chevrolet repair parts, tires and accessories. Have the agency for the Chevrolet car.

For the last three years I have been kept busy all the time, both winter and summer, when otherwise work used to be rather slack in winter on account of the heavy snow.

I am glad to see that the school is just as much if not more interested in us graduates after we leave school as at the time we attend it. Wishing the school the best of success, I remain,

Harold Olson

MICHIGAN

STATE



Win Quick Success in this Fascinating Business ~

LEARN AUTOS WHERE 19,784 ARE MADE EVERY DAY!

Are you mechanically inclined? If so, then read every word of my message. Right this minute I am placing an opportunity before you to win rapid promotion and a future success which you can make just as big as you want to. 100,000 more trained auto men are needed at once. It's a wonderfully

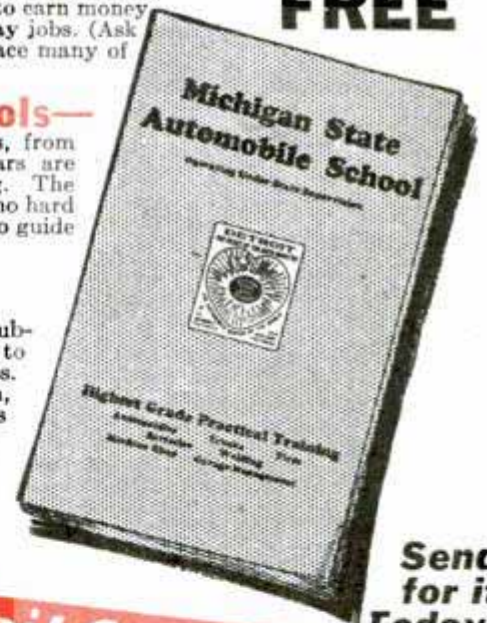
big paying field. It's the biggest business in the world! It is growing so fast that at present there are 269 cars to every repair shop. It is your marvelous opportunity. Come to Detroit now and learn this business right. Within a short time I will send you out on the road to big money.

DETROIT TRAINED MEN GET THE GOOD PAYING JOBS

Three-quarters of all the cars are made right here. Wherever autos are used—Detroit trained men get the good jobs, highest pay. Study autos where they are made. Learn at the famous Michigan State Automobile School—unanimously endorsed by the auto industry. This school knows how to train you right, and that is what you want and need to make the most money in this fascinating business. Come at once. If necessary, we'll assist you in securing part-time work to earn money each week. Students who enroll in our evening courses are assisted to full-time day jobs. (Ask for details, and when writing please explain your circumstances fully.) We help place many of our graduates directly. This employment service is absolutely free.

**NEW AUTO BOOK
FREE**

Work With Detroit Standard Auto Shop Tools— and Learn to Use Them Right! You learn, with tools, from real practice, how cars are made and how to repair them. You have head training as well as hand training. The man whose hands only are trained fails when he hits the hard jobs. There are no hard jobs for Michigan State trained men, for they have the knowledge in their heads to guide the skill in their hands.



Send for it Today!

The Auto Business Needs You NOW

Auto Electricians, Garage Foremen, Service Managers, Repair Shop Owners, Sub-Dealers in autos, General Distributors—all these big paying positions are calling to you. What a chance for the trained man! Car owners search for reliable repair shops. Garage owners advertise for competent mechanics. They don't want green men, but the skilled auto man always has a job. There is a dire need for good garages and battery shops, tire shops, welding shops and electric service stations. Open a shop any place, right at home where your friends are or in some other town or at country cross roads. There is a fortune in this business for you.

FREE Business Course

The former Service Manager of the Packard Motor Car Company trains our students in the business end of running a garage. This business training is worth over a hundred dollars alone, but it costs you nothing extra, another one of the big advantages of Michigan State training. All students get this business course without extra charge.

Send the Coupon NOW

Get all the interesting facts. Mail the coupon at once for big FREE Catalog and for full information concerning your future. It's illustrated with photos of school equipment, factory production and other interesting matter. It contains hundreds of letters from our successful graduates. It tells you how you, too, can get a good paying job—how you can go into business for yourself with little capital. Mail the coupon or send us a postal card today. Write now. (We do not enroll colored students, except for our Home Study Course.)

Michigan State Automobile School
302 Auto Building, 3729 Woodward Ave.
Detroit, Michigan

Home Study Course

For those who cannot come to Detroit now for their training, we have a special Home Study Course. This course covers the same subjects in detail as our regular course. The knowledge you gain in the first week or two in the Home Study Course should enable you to get a job in a garage right away.

52 Starts You

New Plan Starts you on the first two lessons of your Home Study training for \$2.00. Act at once. Sign coupon and mail TODAY.

Mail Coupon To Day

Michigan State Automobile School
302 Auto Building, Detroit, Michigan

Send me free and without obligation full information about Detroit training to make the most money. Also send me FREE your big new illustrated Catalog and Automobile Training Book.

Name.....

Street Number or R. F. D.....

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

I am interested in
 12 weeks' Auto Course
 30 weeks' Master Course.
 Home Study Course.

AUTOMOBILE SCHOOL

Easy For YOU To Have a Profitable Business



Learn to Make Clever Show Cards

MANY EARN \$25 a week in spare time, \$50 to \$75 a week for full time. Steady profits right from the start. Pleasurable work—own your own business.

Now you, too, can build a prosperous, well-paying business! No capital or previous training needed. Wonderfully thorough professional method correctly trains you in clever show card making—right! at home—and quickly prepares you for an uncrowded, fascinating field of really surprising money-making possibilities.

Now is the time to start! Retailers, wholesalers and merchants all around you constantly need distinctive display material. Never before were opportunities as varied, profits as inviting as *right now*. And this practical course is so simple—instruction is so expert—progress is so amazingly rapid—you are creating original, salable show cards almost from the very beginning—and cashing in on the ever-ready demand for your services!

Act NOW! Stores in your own locality form an eager market for sales-boosting show cards. Students even earn while they study—*so can you!*

Coupon Brings Free Book

Send at once for FREE illustrated, descriptive booklet outlining this whole attractive business, telling exactly how to start and conduct your business and giving full details of our practical home study course. Don't delay. Be independent. Earn a good income. Own your own business. Mail coupon NOW!

WASHINGTON SHOW CARD SCHOOL

Room 302-E, 1117-15th St., N. W., Washington, D. C.

Washington Show Card School, Room 302-E,
1117-15th St., N. W., Washington, D. C.

Please send me FREE and without obligation, a copy of your new book, "Quick Success in Show Card Making."

Name.....
(State whether Mr., Miss, or Mrs.)

Address.....

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

Something for Nothing THIS MAGAZINE IS FREE

The Milo Publishing Company is giving you a copy of "STRENGTH" FREE. In order to get this free copy, there is nothing you have to pay—nothing to buy—nothing to do except fill in the coupon below and send it in to us. This big, interesting magazine will then be mailed to you free of charge and postage cost. We are not even going to ask you to look it over or read it, for we know that when you get it in your hands you will be interested and eager to see its contents.

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One of the many illustrations

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You will spend many an enjoyable and profitable hour with it. You'll be benefited in a great number of ways, and be thankful that we acquainted you with this great magazine. Don't turn this page without first clipping the coupon and mailing it to us. Then within a few days your "STRENGTH" Magazine will be delivered to your door, and you will be extremely glad to receive it.

SEND NO MONEY and Don't hesitate to send the coupon, for there is positively no catch in it.

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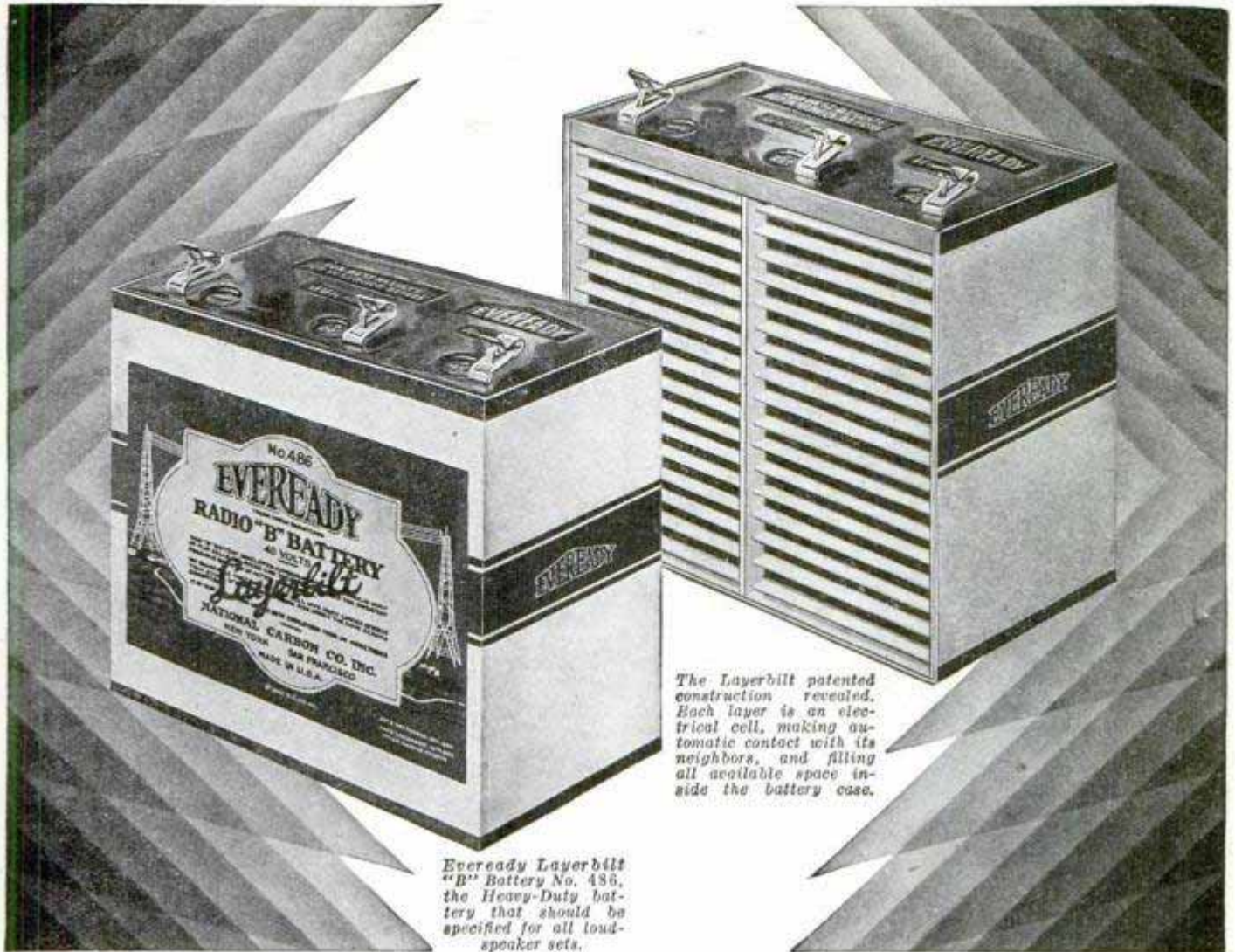
THE MILO PUBLISHING CO., P.M. 2-27
2747 N. Palethorp St., Philadelphia, Pa.

Gentlemen: Please send me immediately, and without any obligation on my part, a FREE COPY of your great magazine "STRENGTH."

Name.....

Address.....

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



Eveready Layerbilt "B" Battery No. 486, the Heavy-Duty battery that should be specified for all loud-speaker sets.

This is the Heavy-Duty Battery in which the new Layerbilt construction provides greater economy

THERE'S an important discovery in radio economy awaiting all users of loud-speaker sets who have been buying the smaller Light-Duty "B" batteries instead of the large Heavy-Duty size required by such sets. Because the Light-Duties cost somewhat less to buy they seem like an economy, but the surprising fact is that the Eveready Layerbilt No. 486 lasts more than twice as long though it does not cost anywhere near twice as much. It is, therefore, much more economical—we believe it to be the most economical "B" battery ever built.

Eveready Layerbilt's remarkable life is due to its unique construction. All other dry cell "B" batteries are assembled of cylindrical cells, with much waste space between them, and many soldered connections bridging the gaps.

The Eveready Layerbilt, however, is built in layers of flat current-producing elements, making automatic connection with each other. Every available inch inside the battery is occupied usefully. You get more battery for your money, and that battery is more efficient.

Remember this about "B" batteries: All loud-speaker sets require Heavy-Duty batteries, and the Eveready Layerbilt has proved time and again to be the longest lasting and most economical Heavy-Duty "B" battery.

Manufactured and guaranteed by
NATIONAL CARBON CO., Inc.
 New York San Francisco
 Canadian National Carbon Co., Limited
 Toronto, Ontario

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

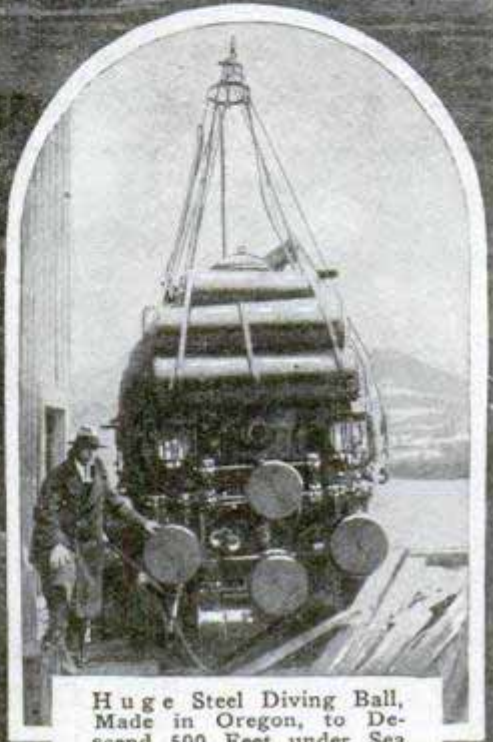
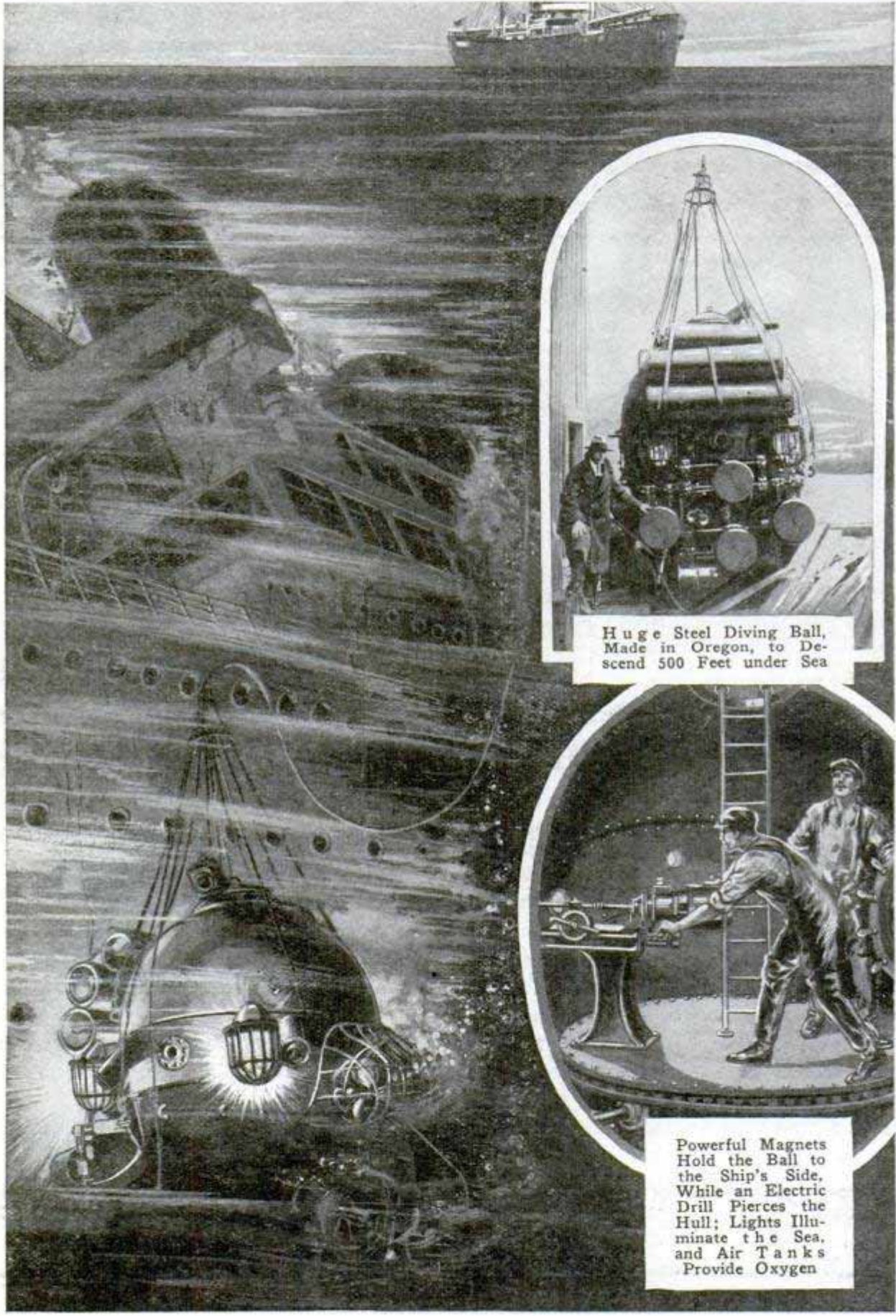
WEAF—New York	WTAM—Cleveland
WJAR—Providence	WWJ—Detroit
WEEI—Boston	WGN—Chicago
WTAG—Worcester	WOC—Davenport
WFI—Philadelphia	WCCO { Minneapolis
WGR—Buffalo	{ St. Paul
WCAE—Pittsburgh	ESD—St. Louis
WSAI—Cincinnati	WRC—Washington

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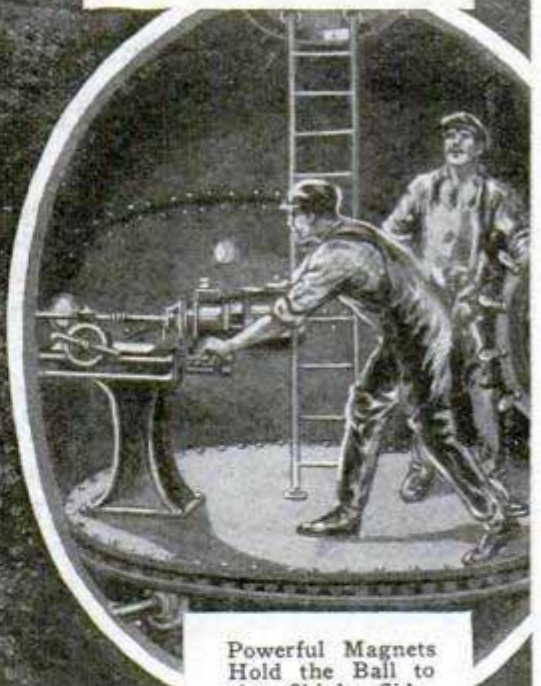
Marine Salvage Co.
Portland, Oregon.

DIVING BALL'S ELECTRIC HANDS TO GRIP WRECKS

Cmt. Carlton Street, 406 Laughlin St.
The Halls, Ore



Huge Steel Diving Ball, Made in Oregon, to Descend 500 Feet under Sea



Powerful Magnets Hold the Ball to the Ship's Side, While an Electric Drill Pierces the Hull; Lights Illuminate the Sea, and Air Tanks Provide Oxygen

Popular Mechanics Magazine

REGISTERED IN U. S. PATENT OFFICE

WRITTEN SO YOU CAN UNDERSTAND IT

Vol. 47

FEBRUARY, 1927

No. 2

To Explore Sea Bottom a Mile under Water

Naturalist Plans to Break All Diving-Bell Records in Search of New Life amid Tropical Coral Far Beneath the Waves

PLANS to explore the bottom of the sea a mile beneath the surface have been completed by Dr. William Beebe, director of tropical research of the New York Zoological society, who a year ago explored the mythical mysteries of the Sargasso sea. He is planning a special steel cylinder with a small glass window, both capable of withstanding the enormous pressure at a depth of 5,000 feet. Oxygen apparatus, carried inside the cylinder, will eliminate the air line used by divers, and reduce the connection with the surface ship to a single steel cable, which also will carry a telephone line.

"No human being has ever visited the deepest part of the ocean," Dr. Beebe says. "It is perfectly simple, however. You have a tight cylinder, with a screwed-on top which cannot possibly work loose with a pressure of a ton to the square inch at 5,000 feet below the surface. You make your own oxygen inside the cylinder as you need it. Physicists assure me the thing is entirely practical. The only reason no one has ever attempted a descent to these depths before, is that there is no financial advantage to be gained from such a trip."

"What do you expect to find?" he was asked.

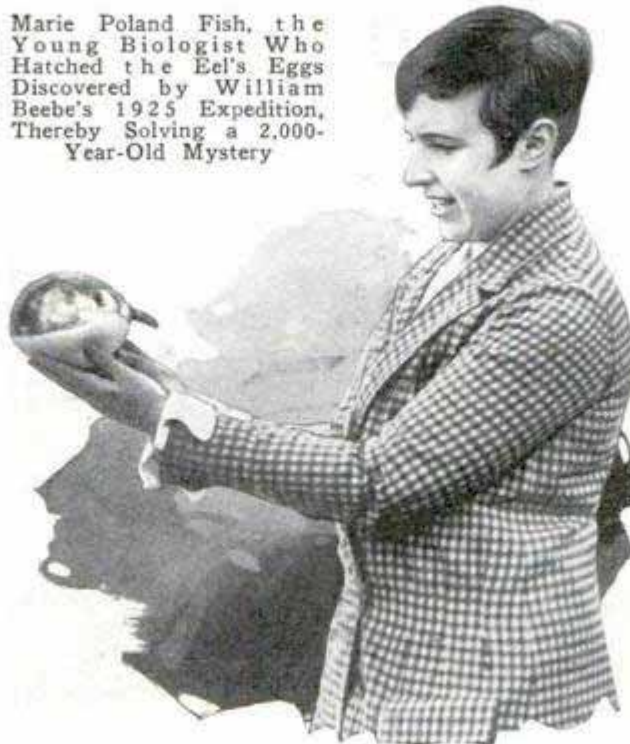
"If I knew, I wouldn't go down," the naturalist retorted. "It will be perfectly brilliant down there under the sea, for most of the deep-sea fishes carry their own lighting plants. Usually they die when brought to the surface, but I managed to keep one alive for a few moments on the Sargasso expedition, and when it was carried to the dark room, it became suffused with a most exquisite pale-green light."

Dr. Beebe has used ordinary diving equipment on several of his expeditions and become an experienced diver. He sailed shortly before Christmas to spend four months in the coast waters of Hayti, and took with him a hand motion-picture camera, completely inclosed in a water-

tight steel case, to take movies of the fish among the brilliant coral reefs of the tropics. He also took a stenographer along so that he could dictate, from the bottom, by means of his divers' telephone, an exact description of everything he saw.

"When I have been down heretofore I had to come up every ten minutes or so and dictate my observations," Dr. Beebe said, "and even then

Marie Poland Fish, the Young Biologist Who Hatched the Eel's Eggs Discovered by William Beebe's 1925 Expedition, Thereby Solving a 2,000-Year-Old Mystery



the written record was limited to what I could remember and describe. It was like describing the circus after you reached home. With the telephone at hand I can describe everything just as it happens."

A three-masted schooner, with several tents on deck to supplement its living quarters, provided a home for this winter's expedition. Next year, however, when he plans to make the attempt to explore mile-deep water, the "Arcturus," the steamer used in the Sargasso expedition, will be outfitted again. Starting from New York, he plans to make his first descent off the New Jersey coast, going down over the edge of a deep-sea cliff known as the "Continental Shelf."

The importance of the work done by Dr. Beebe's expeditions was emphasized recently when it was announced that microscopic eggs, brought up by a deep-sea dredge from the edge of Challenger Bank, a shoal ten miles southwest of Bermuda, had been hatched out and proved to be eels. The discovery, made by Mrs. Ma-

rie Poland Fish, biologist of the United States bureau of fisheries, solved a mystery that has perplexed men since long before the Christian era. The ancient Greeks, unable to find any trace of the origin of eels, attributed their paternity to Jupiter.

Many years ago, however, scientists discovered that the common eels of both America and Europe journeyed to the deep and warm waters around the West Indies to spawn; that the old eels died there and never came back, but that eventually the young ones went unerringly back to the streams from which their parents had come. Tiny larvæ, barely one-fifth of an inch long, were brought up from depths of 600 to 1,000 feet, but until the discovery by Mrs. Fish no one had ever seen an eel's egg. To reach the spawning ground, the eels of Europe make journeys

of 2,000 miles or more. The young eels take three years to return from the sea, spend five or six years growing to full length in fresh-water streams and then go back to sea.

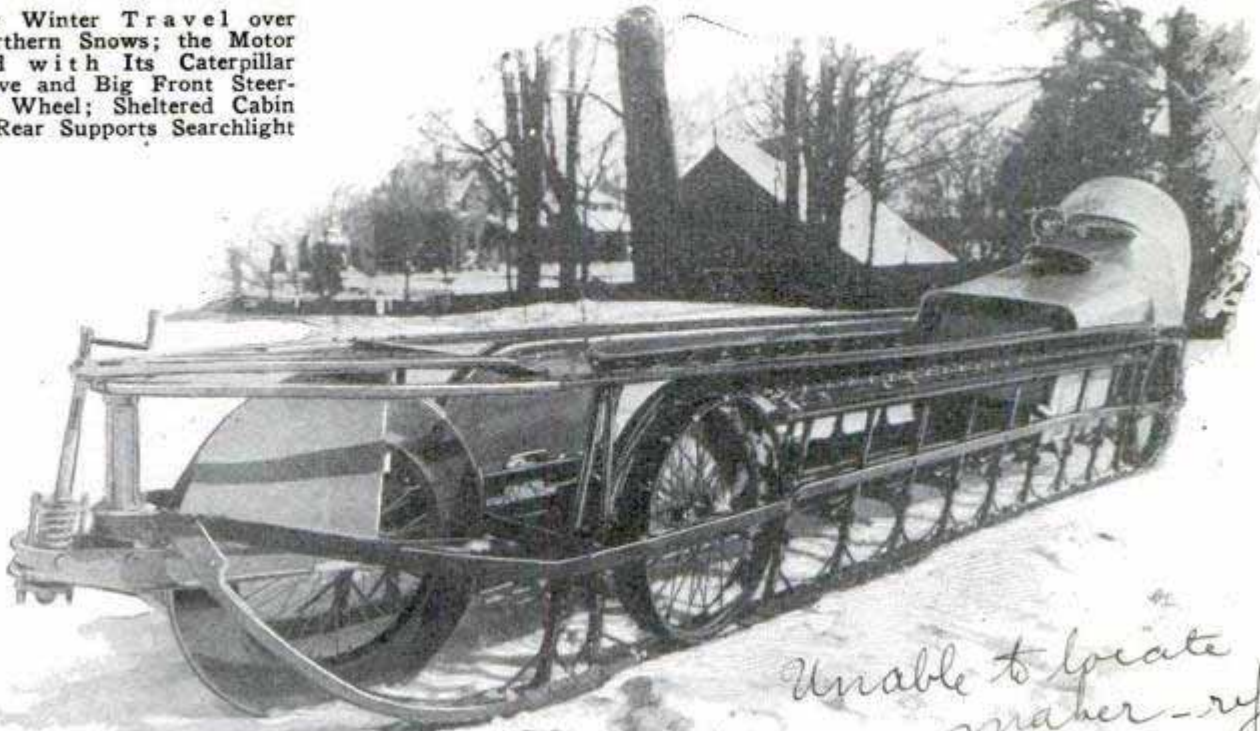


Venus Flower Basket, a Flinty Deep-Sea Sponge Found near the Philippines

Pictures from "The New Natural History," by Prof. J. Arthur Thompson. Courtesy G. P. Putnam's Sons
Sea Horses, So-Called from Their Peculiar Heads, at Left; They Use the Tail to Anchor Themselves to Sea-weed; at Right, a Giant Lizard Caught by Professor Beebe on Galapagos Island

GAS MOTOR REPLACES DOG TEAMS ON MINING SLED *Canada*

For Winter Travel over Northern Snows; the Motor Sled with Its Caterpillar Drive and Big Front Steering Wheel; Sheltered Cabin in Rear Supports Searchlight



Unable to locate maker - refer to Wide World.

Motor sleds propelled somewhat like a caterpillar tractor have been adopted in the mining fields of northern Ontario and Quebec for travel and hauling goods between the small towns. They are steered by a single front wheel and can pass over drifts, as the chains that push it along keep the sled from sinking. A searchlight is attached to the front of the operator's cab at the rear for night travel.

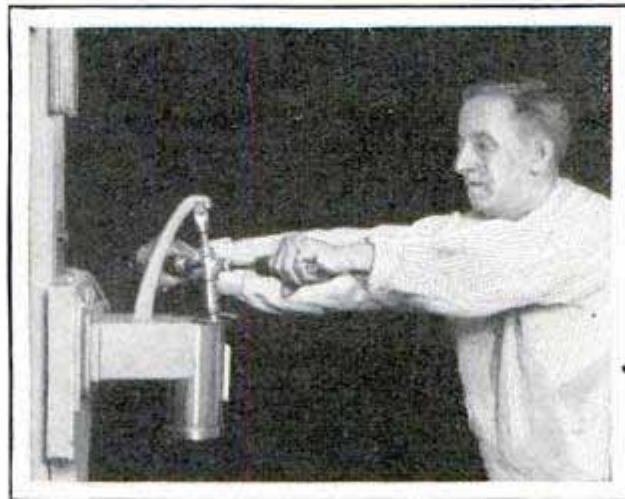
er. On the same ship were four pheasants in a cardboard box between the vessel's side and a berth. The Oriental merchants often will pay \$10 a pair for them. The trappers were fast depleting the stocks of birds when the government intervened.

SMUGGLING BIRDS TO ORIENT
LATEST TRICK OF THE SEA

Following an embargo on shipments of song birds from Australia, a ring of smugglers has been active capturing the songsters and hiding them aboard ship in efforts to evade the custom officers. Not long ago, a number of love birds were found hidden under the stokehold plates in one steam-

RODEO SPORT IS IMITATED
BY WALL EXERCISER 1015

Attached to the wall of the gymnasium or private room, a muscle developer is based on the principle of the bull-dogging contests at the rodeo. It has two handles which represent the animal's horns.



Carrying the Rodeo to the Gymnasium; Trying to Throw the "Bull" by Forcing Plate into Socket

The user grips these and endeavors to force a movable plate into a socket. This plate is pivoted against a strong spring at the bottom and the tension may be increased or diminished by turning a collar at the base, to represent the strength of a bull.

Kansas City Star

11/23/26

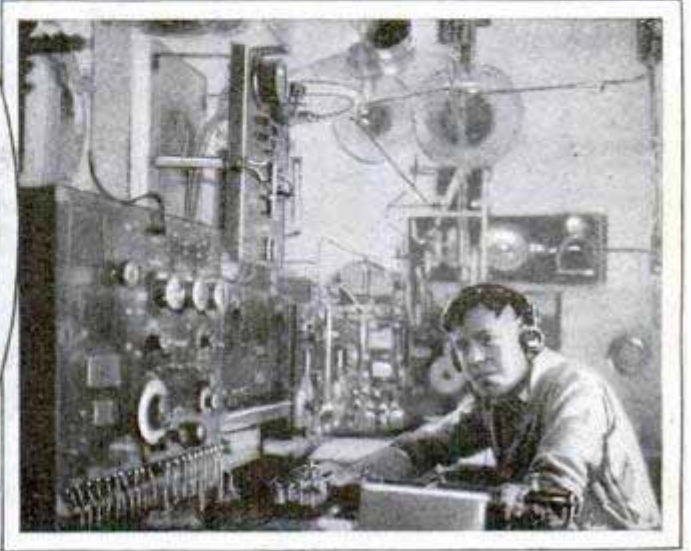
Chas M. Postly

3/12

11/23/26

"SKIP" WAVES GIVE RADIO DIRECTION AND SECRECY

power the wave needs to batter its way through the ether and atmosphere in the daytime or the summer is much greater than the power required for similar transmission at night or in the winter. The



Short - Wave Radio Apparatus on Airplane, a Receiving Station, and Drawing Comparing "Skip" Radio to Skipping Stone

10/3
Radio Officer at North Island, Calif.

The discovery of a radio wave, directional and possessing qualities which open a new field for development, has been announced by Maj. Francis E. Pierce, of the marine aviation expeditionary force. This wave "jumps" over any intermediate receiving station as desired by the operator, so that it is absolutely unaware that radio transmission is in progress. In a test between vessels of the United States fleet, one ship sent radio signals to another while a vessel which steamed between the two was unable to pick up the vestige of it. The exact distance of "skip" can be computed, so that naval vessels can make radio signals jump over enemy ships.

The length of the jump varies with the day and night and the seasons, because the

discoveries of Maj. Pierce are the result of a lifetime of research. Under his direction signals have been sent on forty-three meters from the west coast, from an aircraft, to Washington. To further bring the use of short waves to practical utility, the navy dispatched short-wave apparatus with the Lieut. Ben Wyatt mapping expedition to Alaska last summer, and his planes constantly communicated from Alaska with the fleet in southern California waters. Maj. Pierce is now pursuing experiments aimed to harness what is known as freak radio transmission. He believes that the long distances often attained by comparatively low-powered sets can be reduced from a freak to a common performance.

Chicago Daily News 11/10/26

SPEED OF BIRDS

Tests of bird speed in calm air, made by a German investigator, show that the flyers have a wide range of rapidity and few equal the rate of a moderately fast train. Of those observed, the starling had the greatest speed, slightly more than forty-six miles an hour. Jackdaws made 38.22 miles an hour, the parrot finch, thirty-seven miles, rooks 32.58 miles and hooded crows and gray gulls, 31.05 miles. The sparrow hawk had the slowest speed of all the birds whose flights were measured, making but 25.70 miles an hour.



Teeing Off for the Slanting Target; the Ball Is to Be Sent through One of the Holes, Affording Excellent Putting Practice

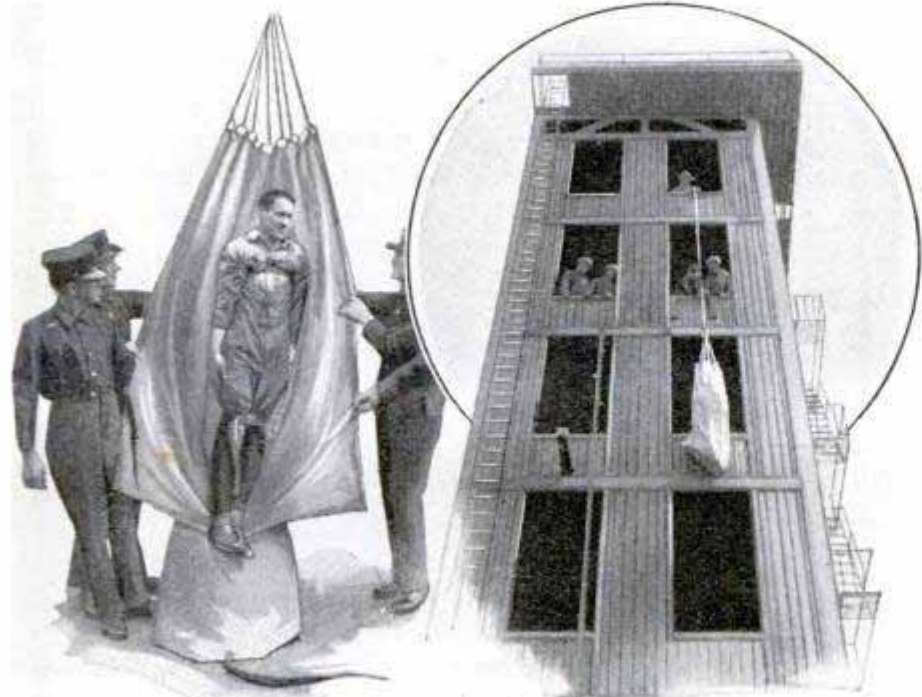
Aug. 26

GOLF GAMES PLAYED INDOORS IMPROVE PUTTING SKILL

Two interesting golf games can be played on an indoor outfit that gives helpful practice in putting and develops other fine points of the outdoor game. Regular balls and clubs are used, and there is no limit to the number of players. A tee is set up, ten feet or more from a slanting target containing five holes of different sizes. In one game, the score is determined by the number of points won for putting the ball through the holes, the smaller holes counting more points than the larger. In the other game, the score is kept as in an outdoor game, by counting the strokes required for holing out.

LIFE BAG AND STRETCHER AIDS IN FIRE RESCUES

To prevent injury to persons being taken from burning buildings, a combination bag and stretcher has straps to hold the victim securely while being lowered. The bands are fastened under the armpits and around the legs, whereupon the occupant is folded in the bag to give him further protection.



Demonstrating the Life Bag; "Victim" Securely Strapped inside the Covering, and Lowering Him from Tower

E. J. Breckman Corp. 20 N. Michigan Ave. Chicago

1027
Largely due to activities in the radio field, an epidemic of invention appears to be sweeping the country, according to Thomas F. Robertson, commissioner of patents, his report showing that more than 110,000 applications for patents and trade-marks were submitted in the year ended June 30, 1926.

Dr. W. H. Blake
Fire Rescue Squad No. 1

916



Off to a Spirited Dash for the Finish; the Tub Racers Warming into Their Rowing While Their "Mounts" Apparently Share the Excitement of the Event and Stretch toward the Tape

**WATER JOCKEYS RIDE IN TUBS
IN NOVEL OAR RACE**

Thrills of the turf were humorously reproduced on the water at a Berlin carnival when oarsmen, dressed as jockeys, climbed into tubs bearing figures of horses' heads and brushes for tails. The race itself was a contest in paddling for the round tubs tended to spin about. The straining necks of the "horses" gave the effect of speed in spite of the actually slow rate of progress.

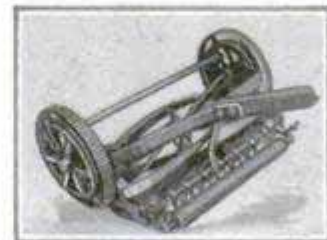
**HOUSE LASTS HUNDRED YEARS
AVERAGE FIGURES SHOW**

According to a survey by engineers of the lumber manufacturers' association, the average life of a house is about 100 years. It was found that individual dwellings may last much longer but, on the average, structural depreciation sufficient to make the house unfit for further use occurs after a century. It also was discovered, according to one of the engineers, that frame dwellings depreciate in value only a little more than those of brick or

masonry. It was pointed out that one of the commonest reasons for abandoning houses is that the neighborhood about them becomes undesirable for residence purposes, and the inmates move away although the dwellings may still be good.

**COMB TEETH ON LAWN MOWER
HELPS REMOVE WEEDS**

Attached behind the cutting blades of the lawn mower, a comb arrangement is designed to remove weeds and other coarse growths from the grass. The teeth



point backward and, on a reverse pull of the mower, cut or drag out the big weeds or raise them so that the mower knives may cut them.

The comb is adjusted to the proper angle by means of thumbscrews, is easily regulated for rough ground, and the teeth are self-cleaning. Single ones may be removed and they may be sharpened as one blade or separately.

national transportation
Olds
Washington, D.C.

Chicago Tribune 4/28/26

Dr. W. John Robertson
55 Eureka St
San Francisco Calif

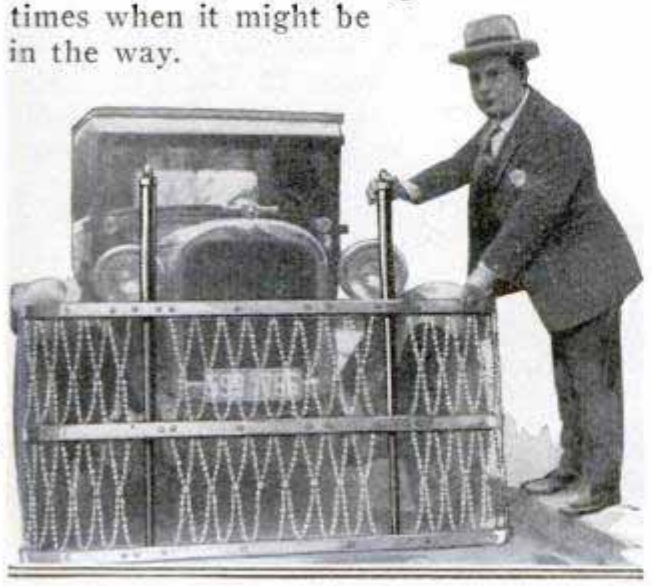
1/17/26

SOLDIERS TEST MAIL TUNNEL FOR AIR-RAID SHELTER 950

Sixty guardsmen offered to run the risk of possible suffocation recently in testing a post-office tunnel in London to determine if it could safely be used as a refuge in time of air raids. The men remained in the passage several hours and when it was noticed that they were becoming faint, as a result of the impure air, fresh supplies were pumped in to revive them. The experiments were conducted by government experts and their details were shrouded in secrecy.

BUMPER HAS NET OF CHAINS TO PREVENT INJURIES 1002

Controlled by the emergency brake, a three-in-one bumper devised by a western inventor is intended to prevent serious injury to a person struck by the car. When not in use, it resembles an ordinary three-plated guard. When the hand brake is thrown in, one member of the bumper falls to within an inch of the ground and another rises above the center piece. A net of chains, hidden in a narrow trough back of the guards when the bumper is not in operation, connects the three parts, making a web to shield the person struck. At the base of the lower bumper is a heavy strip of rubber to prevent hands or clothing from being torn or the victim being dragged under the wheels. The action is achieved by a cable connected to the brake. This may be unhooked when the brake is used in parking and at other times when it might be in the way.



Bumper Extended, Showing the Elevated Section and the Net of Chains between the Guards

Dr. Giuseppe Isaglis



Using Light on Spectacle Frame to Inspect Teeth; Drawing Illustrates Position of the Lens

LIGHT ON SPECTACLE FRAME SAVES DOCTORS' EYES

Attached to a spectacle frame where it can direct the rays from between the eyes, a powerful little searchlight is an aid to physicians and dentists in making examinations, as it relieves eye strain and projects an effective illumination on the area under scrutiny. Current is supplied from a dry battery and the spectacles may be had without lenses or worn over the regular glasses. A feature of the light is that it can be turned off simply by tipping it back. The current goes on when the lamp is brought back to normal position.

FIFTY SEVEN HUNDRED PLANTS GROWN IN MEXICO 1019

Some 5,700 known kinds of plants and trees that grow in Mexico have been listed by Paul C. Standley of the Smithsonian Institution after several years of research. Among these are woods from which fine cabinets are made, rubber and drug producers, the cocoa tree, oil-yielding palms and many fruits. A description of the plants includes their local names and their most important uses.

Empress Oscillator Corp. 14 3rd St. New York 1775

945

\$6 - \$10.00

The Chromium Co. of America
26 Broadway, New York

Wonder Metal and

What It Is

- ¶ A metal the color of platinum.
- ¶ Harder than the hardest tool steel.
- ¶ Can be plated on iron, steel, copper, brass, etc.
- ¶ Impervious to salt spray and all but two acids.
- ¶ Practically unscratchable; so hard it cuts glass.
- ¶ Melting at 3,000 degrees, it resists high temperatures.

AUTOMOBILE radiators and lamps that will neither tarnish, rust nor corrode are being plated in a Detroit automobile factory. In New York, ships' brass work is receiving the same plating to render it impervious to salt spray. In Chicago, exactly the same treatment is being given some 1,500 different articles to render them acid and tarnish-proof, to make them resist heat and terrific wear, and to protect cutting edges by making them harder than the hardest tool steel.

The material of this novel electroplating process is chromium—by no means a new metal, but one which up to three years ago had resisted all efforts to utilize it in practical plating processes. Within the past few years, however, a half dozen investigators, working independently, have perfected chromium-plating processes and brought one of the wonder metals of the world into everyday use.

Chromium belongs to the same general family from which comes the tungsten for electric-light globes; and it is the presence of its salts that gives

the emerald its beautiful color. As a plating material it can be produced with a brighter gloss than nickel, something of the blue-white color of platinum and a wearing ability that the finest steel cannot equal and only the diamond surpass. For years it has gone into chrome steel for armor plate, and when the late Elwood Haynes, the famous automobile inventor, produced steelite, a tool steel harder than any made up to that time, he used chromium and cobalt in his alloy.

The bureau of standards, assigning the diamond an arbitrary hardness value of ten, rates chromium at nine and steelite, its nearest competitor, at eight. Like the diamond, anything coated with chromium will scratch glass and also the hardest steel plate.

Automobile valves plated with it can not be pitted by carbon and, at the end of 10,000 miles, show no visible sign of wear. One manufacturer is preparing to bring out a car in which the cylinder walls, pistons, valves and valve seats, crankshaft and wristpins—in fact, all the bearing surfaces—are plated with chromium. Machinery shafts and bearings plated with it have been in use for two or three years in several plants, and because of its great hardness show no wear.

Greaseless Frying Pans, Non-Stick Pie Tins and Samples of Untarnishable Table and Kitchen Ware. All Plated with Chromium



Capeland branch
 General Motors
 Vacuum Car Co.
 25 S. Haynes, Chicago
 (See process.)

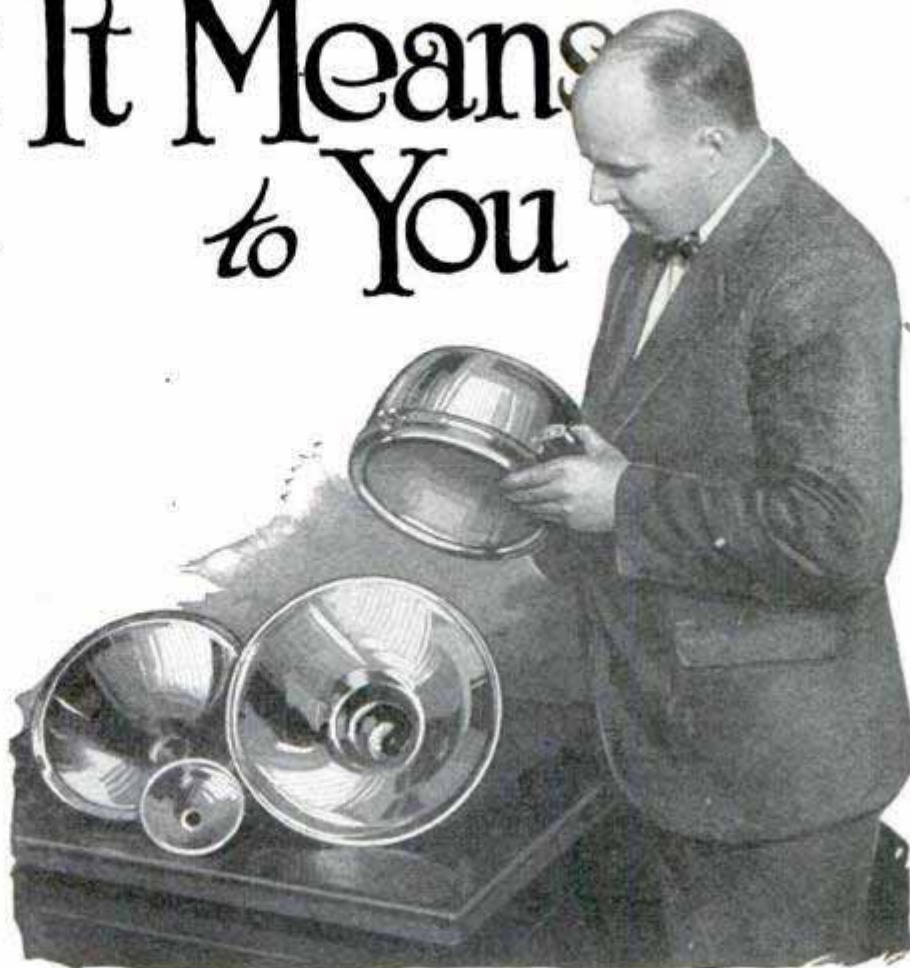
Processed by
 Metals Protection Co. Bld

What It Means to You

Files that have been plated with a coat so thin as not to interfere with the cutting edges have lasted three times as long as the best unplated steel files. Drills and other cutting tools show correspondingly increased life.

Plate a frying pan or pie tin with it, and you require no grease or lard, for the food will not stick. Coat the bottom of an electric iron and starch will not adhere, with the result that faster and better ironing can be done.

Those things have been done in the laboratory, though such plated products are not yet in general use. The reason is that chromium costs more than nickel, and in many lines manufacturers are moving cautiously toward adopting it. It costs about twenty-five cents to plate an average-size file in the plant of the Vacuum Can company, Chicago, where thousands of files and drills have been plated. They wear three times as long as an unplated file, so the cost of the steel file and the purpose for which it is to be used are the determining factors. It would cost as much to put a very thin coat on a five-cent tin pie pan or a ten-cent frying pan. As yet there is no demand for plated cooking utensils at those prices.



Auto Lamps and Reflectors Plated by the New Process Never Corrode or Tarnish and Remain Bright for the Life of the Car

"Chromium," says B. O. Smith, president of the Vacuum Can company, "is a marvelous metal, but not a cure-all. It has a multitude of uses in which it gives marvelous results, but it requires a tremendously high amperage of electricity to get a good deposit, so, for the present at least, its use should be confined to articles where the cost of this electricity and the plating material and labor is not out of proportion to the price of the article.

"If we plate a fine surgical instrument for seventy-five cents, the plating cost is only a fraction of the value of the tool, and the advantage of a rust and tarnish-proof material which requires no drying

25 & Hoynes. Are

What It Means

Cooking utensils

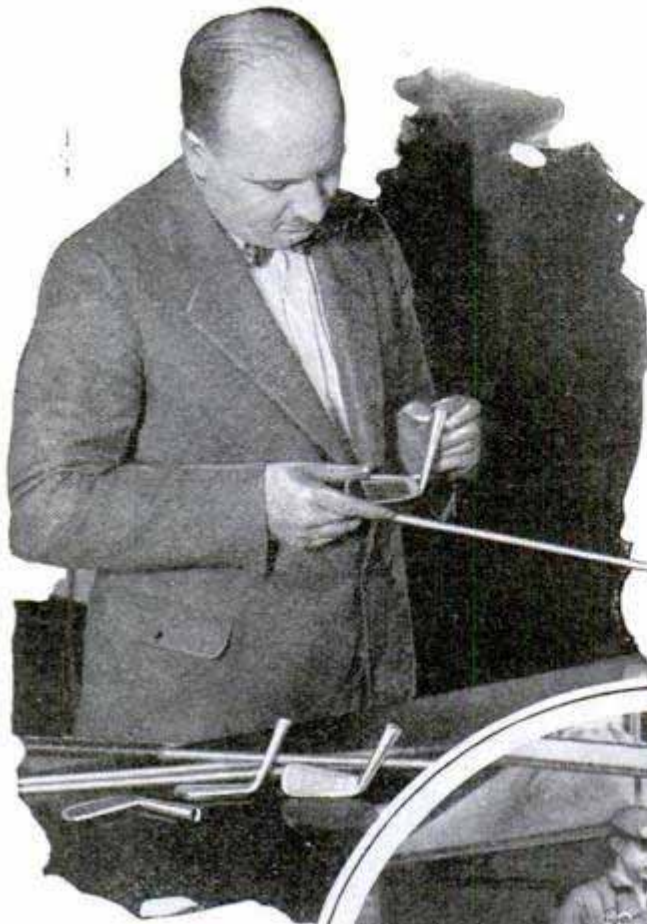
- ¶ Greaseless and stainless frying pans.
- ¶ Electric irons that will not stick to starch.
- ¶ Files and drills that last three times longer.
- ¶ Auto, boat and plumbing parts that never tarnish.
- ¶ Auto valves that will not "pit."
- ¶ Table and kitchen ware that need not be wiped dry.

And resulting enamel for sinks, bathroom, sink and laundry fittings with chromium finish. Standard

El-An. Inc

Crusader Ware

Wardhewer, My C. Woodhouse, My C. 1909 year Salance



more than offsets it. But a kitchen knife or table cutlery, even though they require no drying after washing, do not justify the added expense and won't until a general demand arises.

Because of its hardness and its heat-resisting qualities—chromium melts at nearly 3,500 degrees—it is opening up an entirely new plating field in industry. Plated engine insides already are in use, along with plated shafting and tools. One of the big oil companies has had thousands of small copper tubes, used in its refining processes, plated to resist heat. The chromium coating raised the melting point of the copper tubing 700 degrees, and in tests it was found that even at that point the copper would melt out from beneath the shell and leave the chro-

mium coat, only a few ten-thousandths of an inch in thickness, standing unharmed.

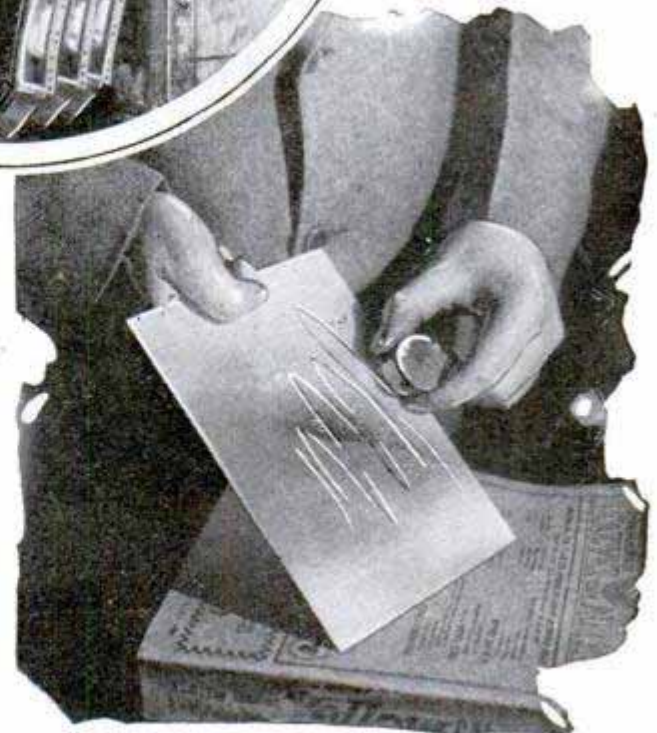
Plating for heat resisting, for rust and corrosion resistance, and for highly polished ornamental parts, such as automobile radiators, headlamps and reflectors, involves three different processes. The metal can be deposited, by variations in the plating process, either as a highly polished coat, a satin-finish effect, or in a dull, murky gray of almost the same shade as a warship's battle paint. The dull-gray coat has the highest heat resistance.

The control over the plating while it is being deposited in the tank is so accurate that, in experiments, safety-razor blades were coated with chromium without dulling their edge, while in use they lasted for

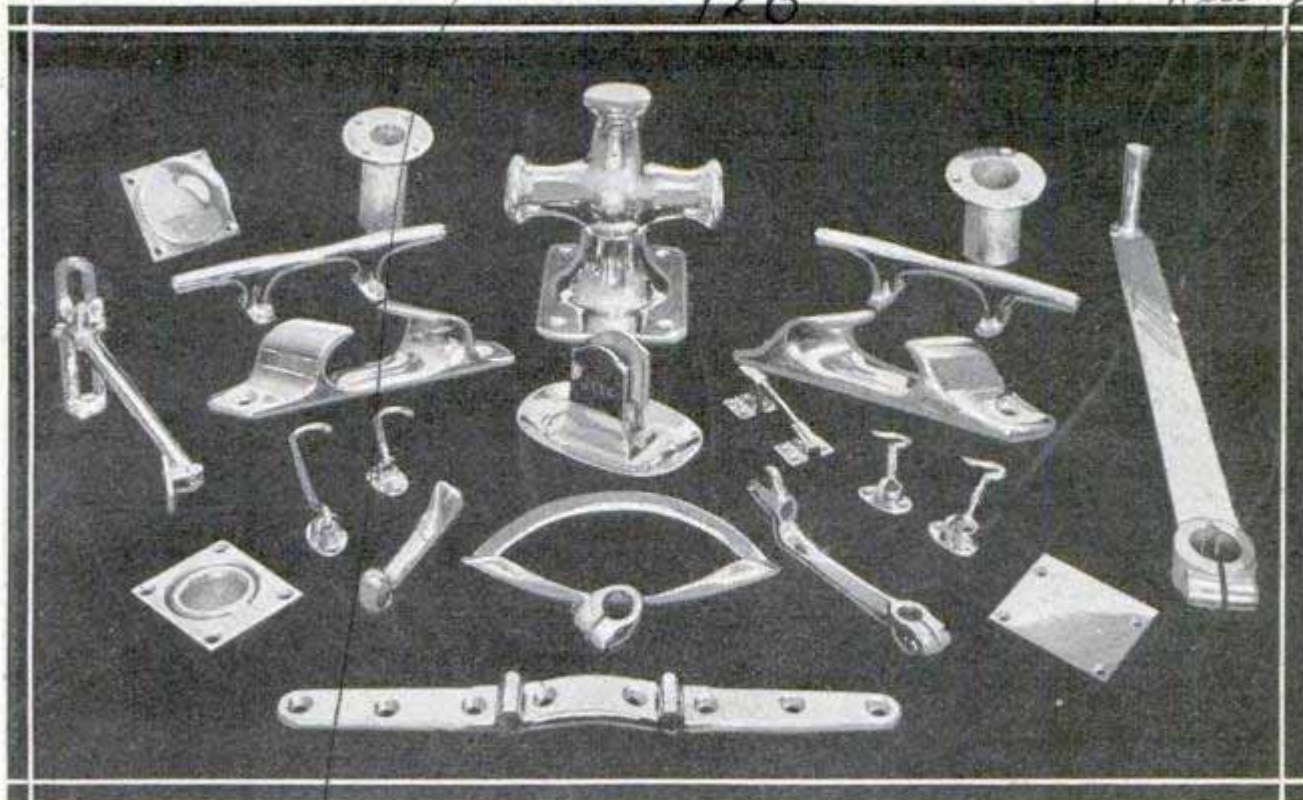
many times the usual number of shaves, because of the hardness of the metal. Gauges used in machine shops are being built up to size after long wear by chromium plating, and one manufacturer is salvaging \$30 hobs in which the shaft hole



Courtesy Iron Age
Golf Clubs and Metal Shafts Can Be Plated Either in a Bright or Satin Finish; Center Picture Shows Auto Radiators Being Plated; at Right, Scratching a Glass Plate with Pure Chromium



*Used by ...
26 Broadway, New York.
120*



Samples of Chromium Plating for Motorboat Parts, Designed to Resist Salt Spray; the Material Is Finding a Wide Use at Sea and Eliminates the Incessant Polishing of Brasswork

was slightly oversized by having them built up to dimensions by plating.

Colin G. Fink, of Columbia University, and associates, who developed one of the chromium-plating processes, has found a wide field of application in plating fine plumbing fixtures and such decorative ship parts as binnacles, bells and other brass fittings, which are constantly exposed to the corroding effects of salt spray.

One of the General Motors subsidiaries, which has been using chromium plating on radiator shells and some other parts for a year, subjected a radiator to a constant bath of salt spray for more hours than would occur in the normal life of a car in a seaside town, without any trace of corrosion.

Chromium is impervious to all acids but two—hydrofluoric, the acid which even eats through glass, and nitric.

Besides its many other uses, chromium is at work printing money and postage stamps for Uncle Sam. Deposited on the case-hardened steel engravings used in the bureau of printing and engraving, chromium has run for more than 150,000 impressions without showing any appreciable sign of wear, whereas the case-hardened steel alone wore out after 50,000 prints had been made. Chromium-plated

electrotypes used for such purposes as printing paper cartons, tags, cards, etc., have run for a considerably greater number of impressions without damage, than can be obtained from the ordinary nickel-plated electro. In New England textile mills chromium-plated steel is replacing other materials for printing delicate fabrics, giving longer life and finer work.

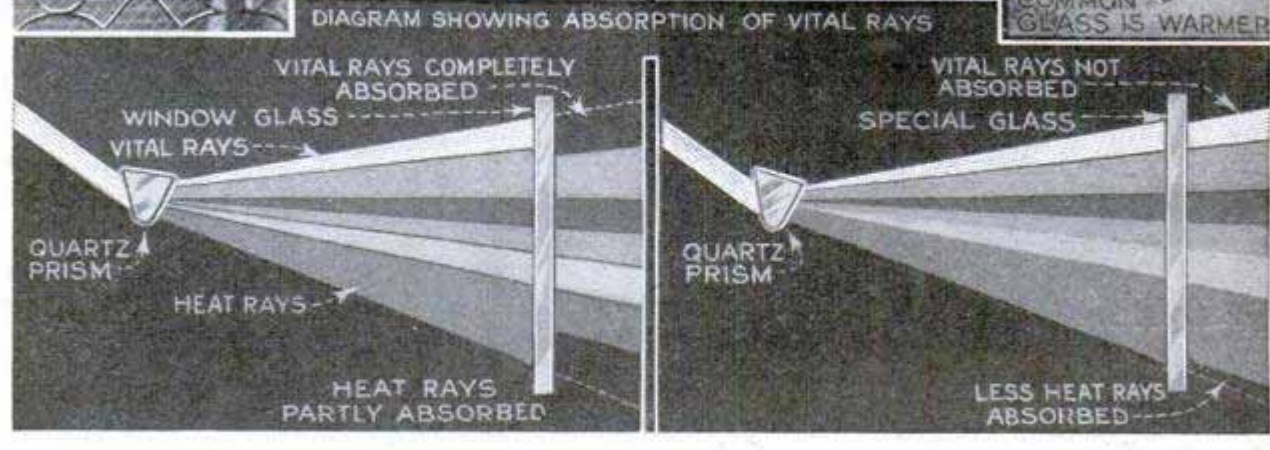
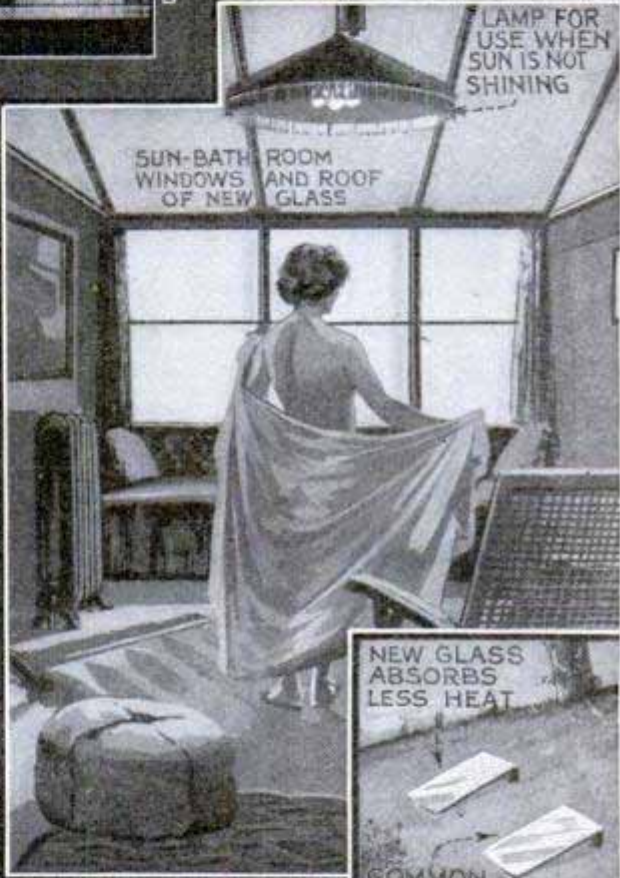
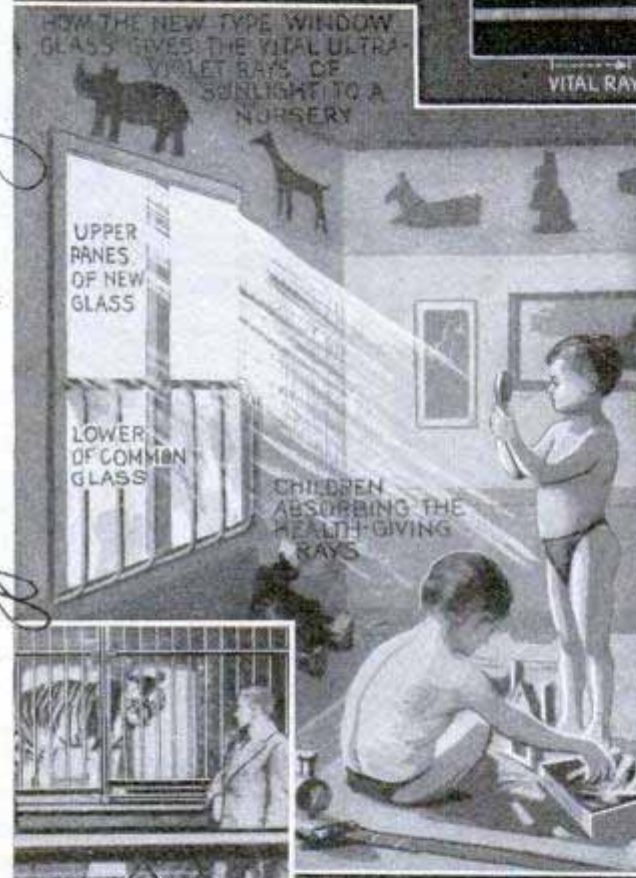
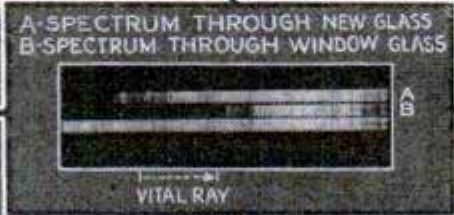
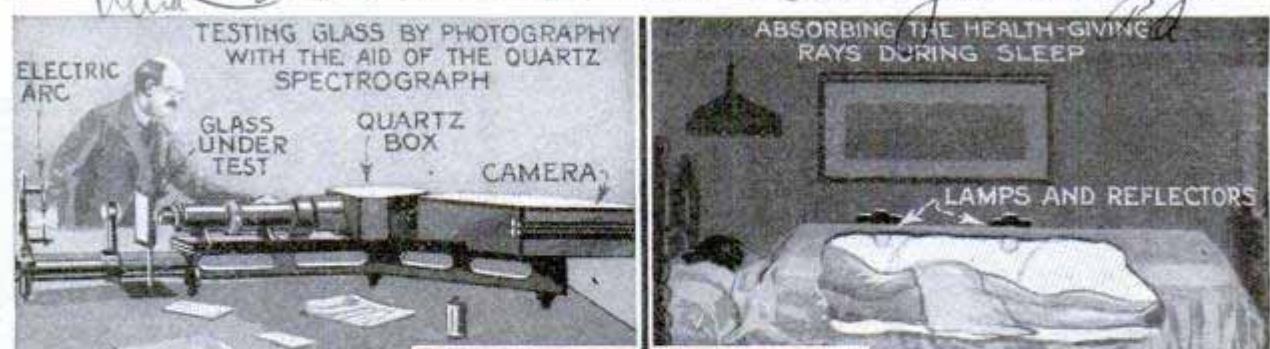
This wonder metal also will protect iron, steel and copper from scale. Several thousand electric-soldering-iron tips have been plated to prevent the breakdown which occurs near the base of the tip after constant heating. Even boiler tubes have been plated on the inside to prevent scale. The plating process differs with different plants. In an automobile factory the radiator shells are first plated with copper to fill the big pores, then with nickel to fill the copper pores, and finally with a "flash" or thin coat of chromium to fill the nickel pores. At the Vacuum Can plant the chromium is plated directly on steel, iron, both forged and cast, copper, brass and other metals. Surgical and dental instruments plated directly on steel show no difference from the same instruments plated over a nickel base, except that sometimes the nickel coat scales and affects the chromium.

Casehardened

*Dr. Colin G. Fink,
Professor of Electrochemistry at Columbia*

*Mr. Chance Bros. & Co. Ltd, Smeethwick, Birmingham
Staffordshire, England*

NEW GLASS LETS HEALTH RAYS THROUGH WINDOW



*Quartz-Lite - Ultra-Violet Ray Glass -
American Window Glass Co. Farmers Bank
5040 100th.*

Copyright, The London Illustrated News

Passing Not Only the Health-Giving Ultraviolet Rays, But More of the Sun's Heat Too, a New Glass Produced in England Is Being Used Both in Homes and at the London Zoo

188

*Vitaglass - Vitaglass Corp -
50 E. 42nd St. N.Y.*

*Nov 6, 1926
P. 881*

(similar to - Corning)

Christian Science Monitor 11/9/26

SUN'S RAYS TO HEAT BUILDINGS
EXPERT PREDICTS

Heat from the sun's rays, harnessed by special equipment on the roofs, may warm big buildings in the future, in the opinion of Col. John R. Kilpatrick, war-time construction chief. He points out that modern structures are being built to last many years and that they lend themselves to the adaptation of such a system.

INSECTS HELP RECLAIM LAND
BY KILLING PRICKLY PEAR

Farmers in Australia are looking to a lowly scale insect and a species of moth to help them save 25,000,000 acres of land from the prickly pear. More than \$40,000 and five years have been spent by experts in finding these natural enemies to the pest plant, which has been spreading at the rate of 1,000,000 acres a year. Care had to be taken that the bugs were not injurious to desirable vegetation and that none of the enemies of the insects themselves would be introduced with them. After many experiments, three strains of the insect and the moth have been liberated to work their worst on the prickly pear, and hope is expressed that they will be victors.



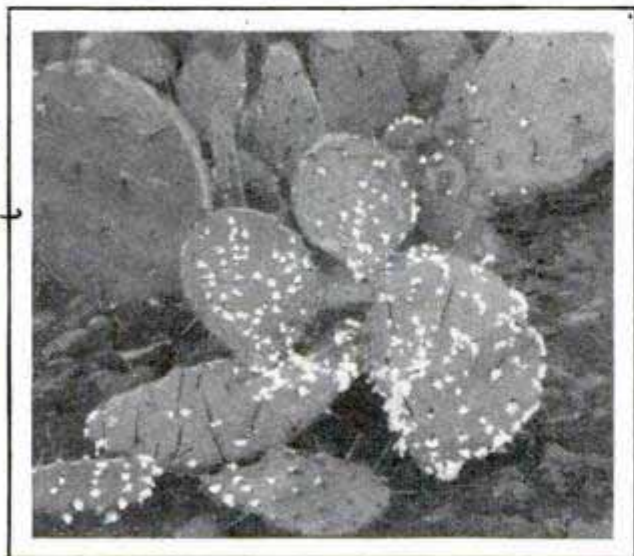
Upper Photo Shows the "Bridge of Hope" to District Attorney's Office; Inset, the "Bridge of Sighs" to the Tombs

"BRIDGE OF HOPE" RIVALS
"BRIDGE OF SIGHS"

As a counterpart to the famous "Bridge of Sighs" in New York city, the passage leading across the street from the criminal-court building to the Tombs, a "Bridge of Hope" now presents a brighter side of the picture. It connects the court building and the district attorney's office where a fate much less depressing than a long prison sentence may await the culprit. Both bridges are similar in construction and design.

LICENSE TAGS FOR AIRPLANES
LATEST U. S. RULING

Airplanes will be tagged and numbered like automobiles, according to a department of commerce ruling under the new aviation laws. A census showed that there were about 5,000 planes in operation over the country late last year. By the new regulations, no airplane can be flown until it has been licensed and tagged.



Prickly-Pear Plant with Evidence of Ravages Worked by Insects Bred to Destroy It

Australian Institute of Science and Technology

Photo by E. R. Sarreger U. S. Federal Horticultural Board

Cmd. Chas. F. Cushing, 138 W. 65th St. New York

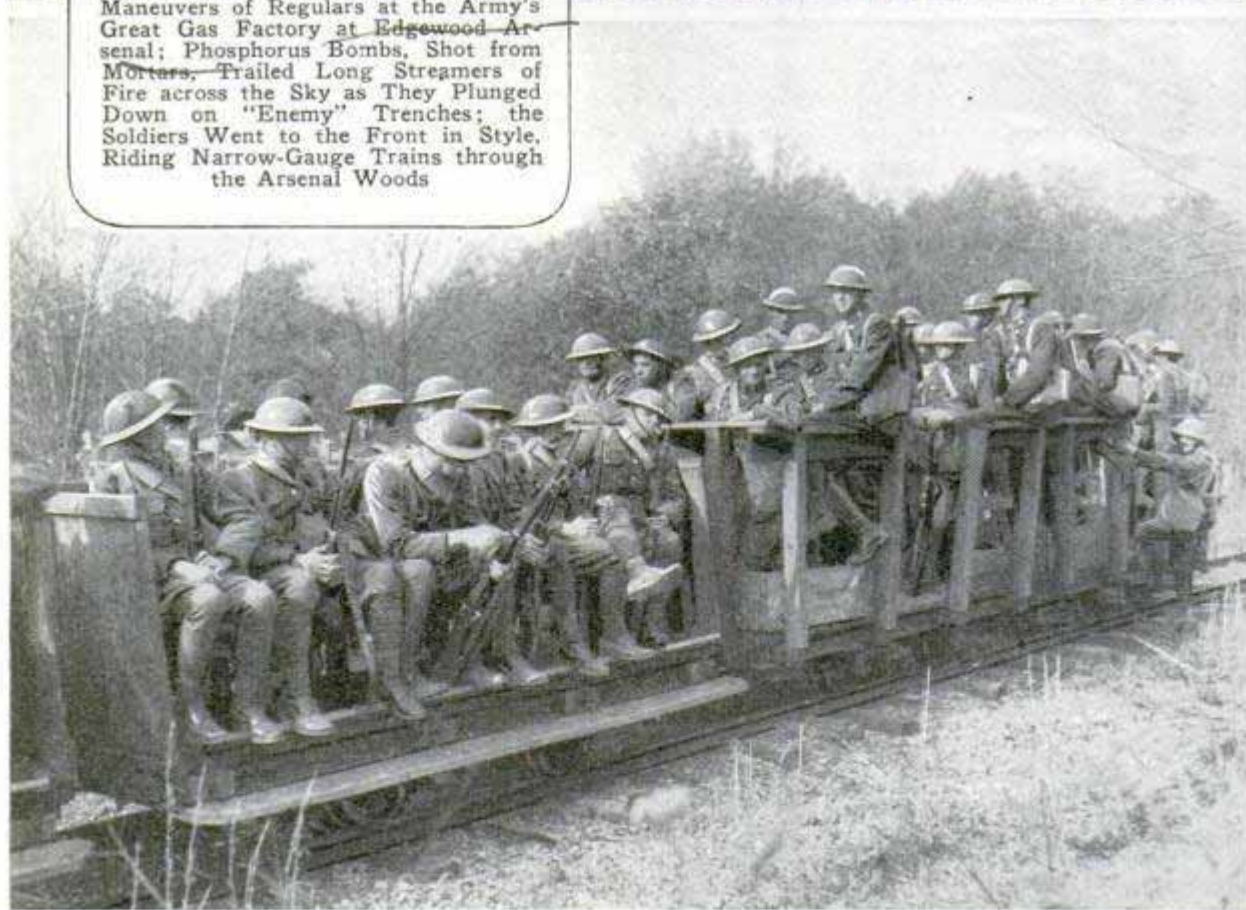
W. J. Idevald 11/7/26

989

SHAM BATTLE TESTS LATEST CHEMICAL WEAPONS



Brilliant Night-Time Displays of Liquid Fire Featured Recent Sham Battle Maneuvers of Regulars at the Army's Great Gas Factory at Edgewood Arsenal; Phosphorus Bombs, Shot from Mortars, Trailed Long Streamers of Fire across the Sky as They Plunged Down on "Enemy" Trenches; the Soldiers Went to the Front in Style, Riding Narrow-Gauge Trains through the Arsenal Woods



25 5

BAY HORSE THE ONLY SURVIVOR OF CUSTER BATTLE

Details of the Custer battle with the Sioux Indians at the Little Big Horn were reviewed recently when a question arose as to the color of the horse that was the only survivor of the massacre. For several years, the mounted hide of "Comanche," a big bay, has stood in a glass case in the Dyche museum at the University of Kansas, as that of the steed ridden by Capt. Myles W. Keogh whose horse was the only living thing found on the battlefield. In a recent story of the fight, Capt. Keogh's mount was referred to as a "big, powerful gray." Museum records were consulted, with the result that the authenticity of its possession seems to be established and there is little doubt that "Comanche" was a bay. The best evidence is seen in a history of the horse sent to the museum by John C. Lockwood, adjutant of the national Indian war veterans, and one of the two men who found "Comanche" on the battlefield after the Custer massacre. Lockwood describes how he and James Severs carried water in their hats to revive the horse, which was removed, suffering from several wounds, out of a pile of bodies. It died of old age several years later, at Ft. Riley, the historian states, and its hide was mounted and placed on exhibition in the museum at the University of Kansas.

AERIAL LIFEBOAT IS PROPOSED FOR CHANNEL RESCUES

To go to the aid of victims of airplane accidents in crossing the English channel, a swift seaplane equipped with life-saving apparatus has been planned. It would be stationed on the English side of the passage and communication by wireless would be maintained with planes in flight. It is pointed out that the aerial lifeboat could arrive at the scene of disaster much quicker than a steamer.

Answers 1/13/26



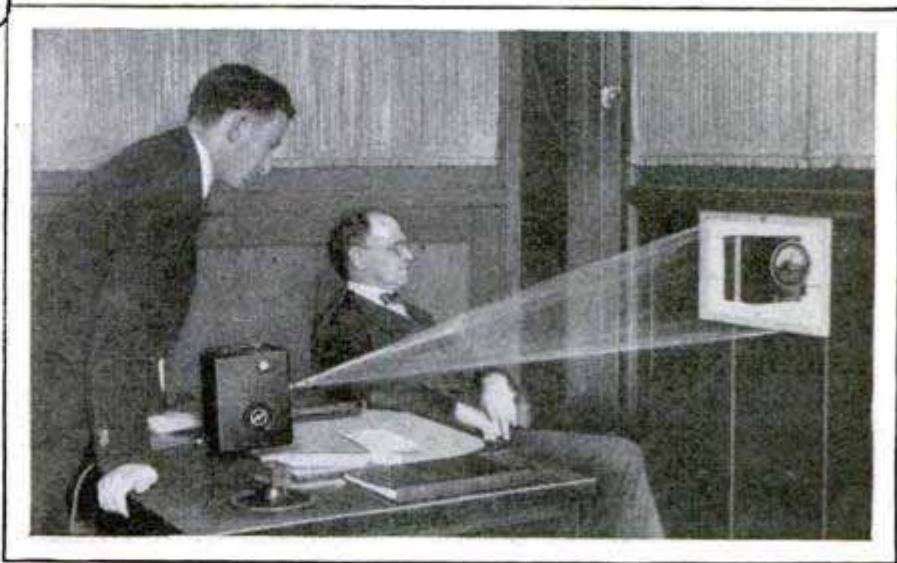
Demonstrating the Combination Powder Box and Horn Button; the Lid Snaps Tightly Shut

VANITY CASE ON AUTO WHEEL SERVES AS HORN BUTTON

For the woman auto driver, a powder box with puff is fixed to the top of the steering wheel. When closed it serves as a button to sound the horn.

MAGIC LANTERN FOR SALESMEN HELPS SELL PRODUCT

For the special use of salesmen in displaying their goods, a lantern projector operated from a light socket, shows pictures, charts and diagrams for the inspection of prospective customers. A plain wall or piece of paper may be used as the screen and an ordinary electric bulb supplies the light for projection.

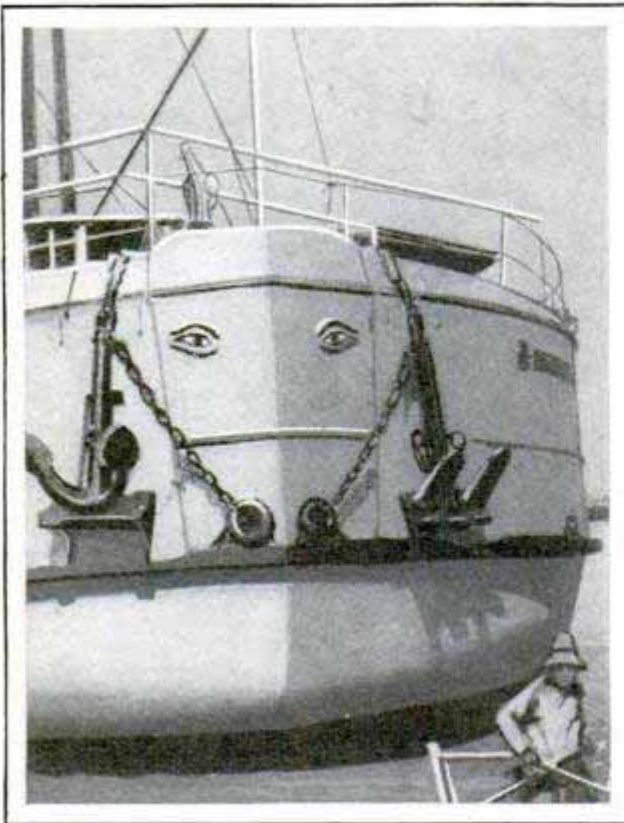


Salesman Displaying Pictures of Goods from Projection Lantern, Which Saves Carrying Catalog and Emphasizes Good Points of Merchandise

Bausch + Lomb Optical Co Rochester

Century News
11/23/26

9/8



To Protect the Ship from Evil Spirits; Eyes on Prow of Chinese Vessel

EYES PAINTED ON CHINESE SHIP TO PREVENT WRECKS

According to a Chinese superstition, a vessel must see in order to avoid wrecks, consequently eyes were painted on the prow of the ship shown here, producing an odd effect. The belief is in line with the feeling that prompted the early adoption of figureheads. They were supposed

to be guardians of safety, capable of pacifying the angry gods of the seas and averting danger from other malicious spirits.

COAST CITIES TO FIGHT ANTS BY BUILDING CODES

10/8

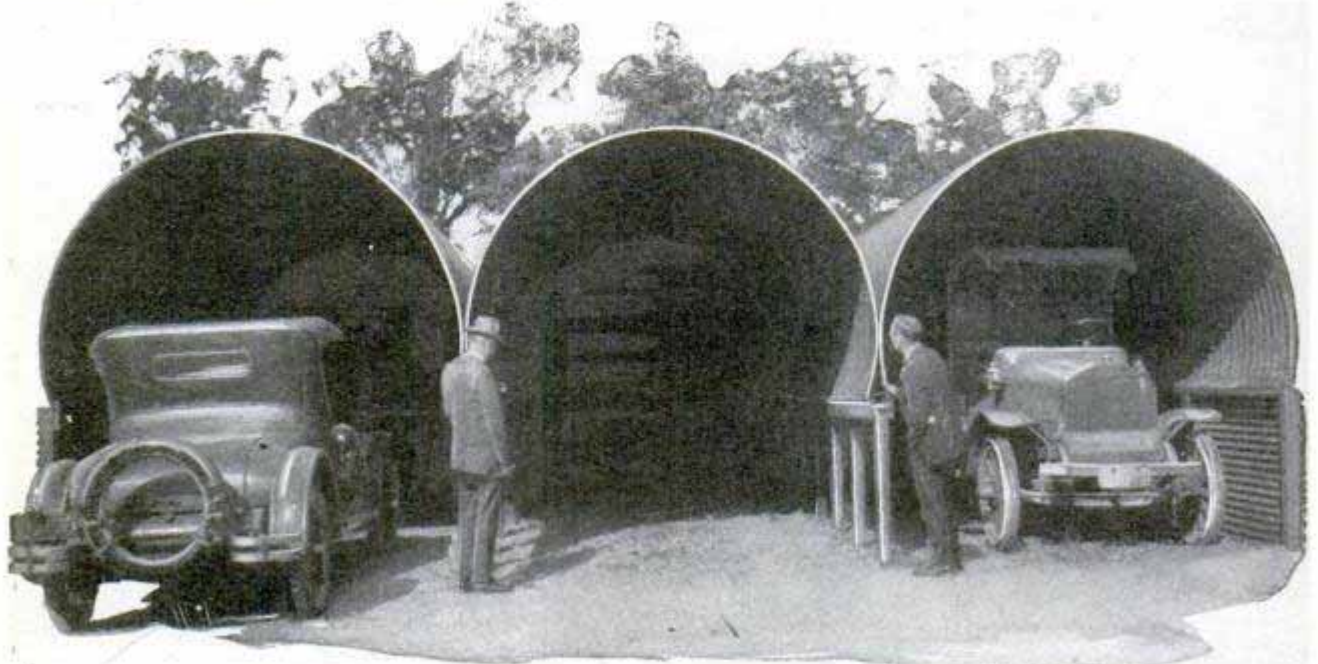
Ravages of white ants in some cities of the Pacific coast have led to proposals for provisions in the building codes to combat the insects. One clause specifies insulation of all untreated woodwork from contact with the ground and application of proper chemicals to other timbers. The report from one city that fifty per cent of its business buildings had been seriously damaged by ants during the last year emphasizes the seriousness of the situation.

STEEL ROOFS MADE FOR WAR

10/3

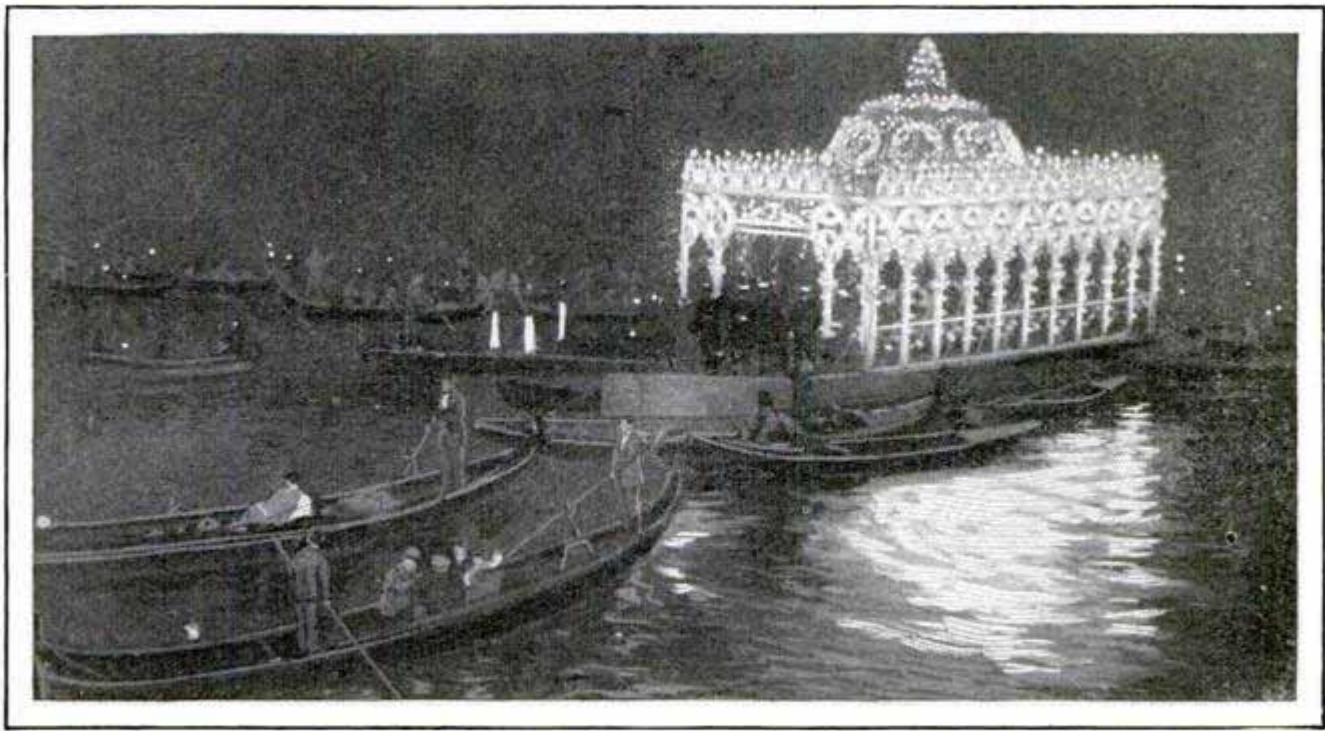
SERVE AS GARAGES

Hoods of half-inch steel, made to resist shell fire, have been adapted to peace-time service as garages at the government plant-testing farm in Virginia. They are easily erected, keep out storms and cold and are of convenient size for one car. At the farm, experiments are conducted with new plants, flowers, soils and fertilizers. Road materials are also tested, and an interesting side issue is the search, made in co-operation with golf experts, for turf and grasses that will provide the best greens for the courses.



Intended for Bomb-Proof Shelters but Adapted to Garages for Government Automobiles; Steel Roofs Arranged to Harbor Cars at the Plant-Testing Farm in Virginia

Arlington Farm
Wa.



Electric Lights Lend Glamor to a Water Fete in Venice; the Glowing Gondola Palace Outlined in Brilliant Colors for the Parade

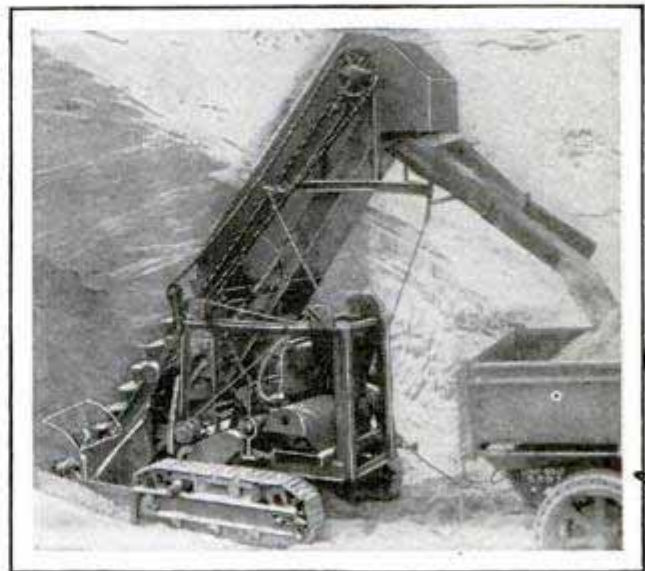
**LIGHTED CANOPY ON GONDOLA
FEATURE OF CARNIVAL**

One of the high lights in a recent water carnival in Venice was a brilliantly illuminated gondola in a parade along the canals. An arched canopy and dome studded with many electric lights gave the effect of a moving palace.

each year." The dendrograph, as the instrument is called, is said to measure variations in diameter with greater precision than any other practical apparatus, and makes a continuous record.

**SELF-PROPELLING SAND LOADER
SAVES HAND LABOR**

Run by a twenty-horsepower motor, an endless-chain loader for sand, or other loose materials, can be moved about on its own treads. It can thus be easily set for the most efficient loading and does the work of several men in less time.



Sand Loader in Action; It Can Be Moved to New Position by Its Own Power

**TREES WRITE THEIR DIARIES
WITH GROWTH RECORDER**

A score or more of trees in the United States today have their pens in hand, so to speak, and are writing their own diaries with an accuracy that leaves nothing to memory. This is the interesting revelation of Dr. D. T. MacDougal, who explains that the "pen" consists of an instrument which records the growth behavior of a tree in relation to changes in the outside world. "With this writing equipment," Dr. MacDougal says, "a tree is able to tell us how its life is affected by rainfall, a series of humid days, a period of drought, or by seasonal conditions of any kind. Many trees of great interest and importance put on yearly layers of wood no thicker than a tenth of an inch, and some, after the first two or three centuries of their existence, add not much more than half of this amount to the wood

The American Association of Washington

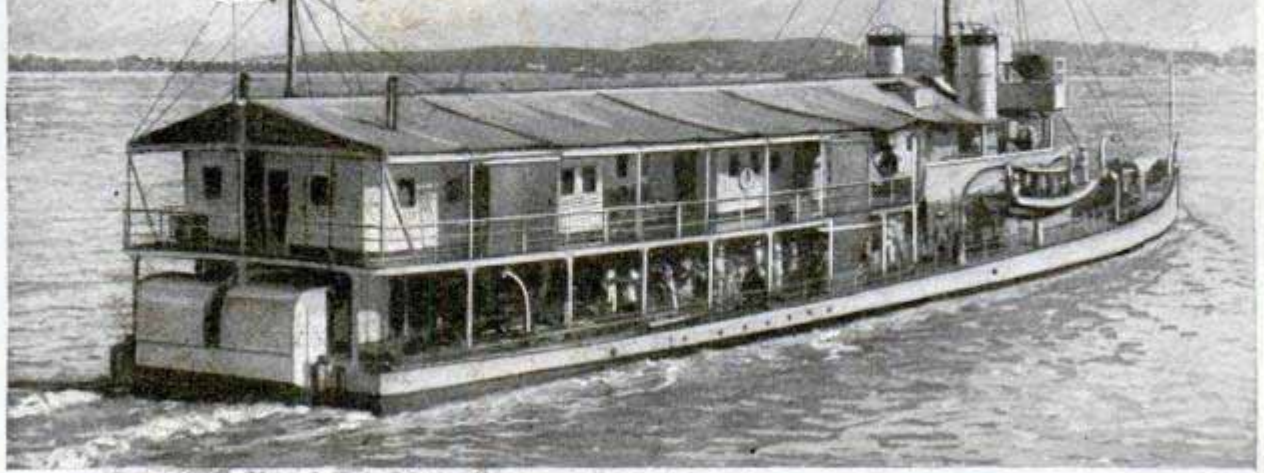
993

Wachy 1026

*Senk - Bell Co. Michigan Ave
910 S. Michigan
Chicago 90*

*in her issue -
American Forests,*

Fighting Pirates



River Gunboat on the Yangtze-Kiang; These Queer Craft, Built in China for Their Special Work, Have All Quarters above Deck Because of the Shallow Draft Necessary

Army, Navy and Marines in Far East Continually Engaged with Rebels, Bandits and Pirate Ships of the Yellow Sea

FIGHTING pirates and bandits is the regular job of picked army and navy units in the Far East—the only spot where enlisted men are sure of getting almost continuous action. Pirates swarm on the rivers of China and in the Yellow sea, while their land-going brothers, the native bandits, work up to the very walls of the biggest cities. To protect American lives and commerce, the American government, like all the principal powers, maintains large forces in China, where, under special treaties, they have power granted nowhere else in the world.

Piracy, as practiced in the Far East, has become modernized since the advent of steamships. In the old days, the pirate junks overtook the slow-sailing ships, boarded them, killed the crews in bloody fights and transferred the cargoes to the native vessels. But a sailing junk can't overhaul a fast steamer, so, nowadays, the pirates take passage as ordinary coolies, and at a favorable moment seize the ship. Then the junks come alongside to transfer the loot.

But the attack isn't always a success. Recently forty pirates seized a British

steamer only eighty miles from Hong-kong, the great British concession, but during the night two of the captured ship's officers got loose, obtained revolvers, and without help killed twelve pirates, drowned another and captured nine, the rest fleeing in the ship's lifeboats.

About the same time American and British gunboats were attacked a thousand miles up the Yangtze by Chinese rebel armies, virtually bandits. The rebels had seized several British and American ships, and when the gunboats went to the rescue attacked them, too, killing a half dozen English sailors.

The naval forces, however, shelled a few rebel camps and succeeded in recovering the captured ships.

Since long before the Boxer rebellion, the army, navy and marine corps have maintained forces in China, engaged in the triple task of guarding the legation at Peking—a marine-corps assignment—protecting American settlements in Tientsin and other cities, keeping the Peking-Mukden railroad open to traffic—a job for the army—and guarding commerce on the Yangtze-kiang, a task which the navy

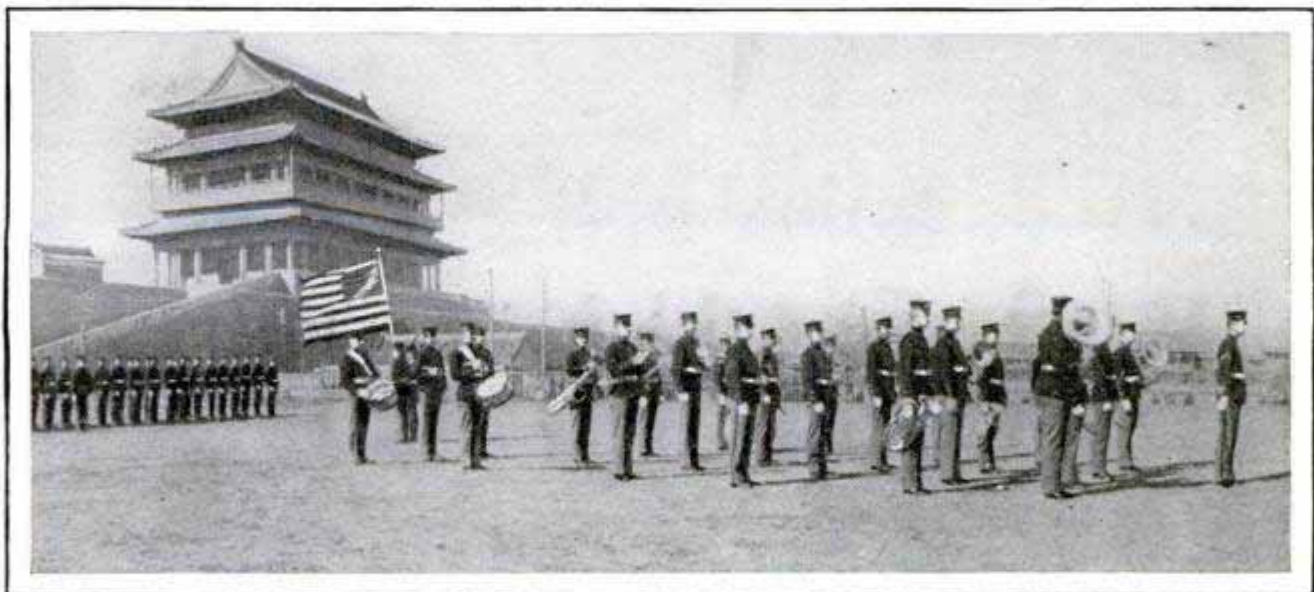
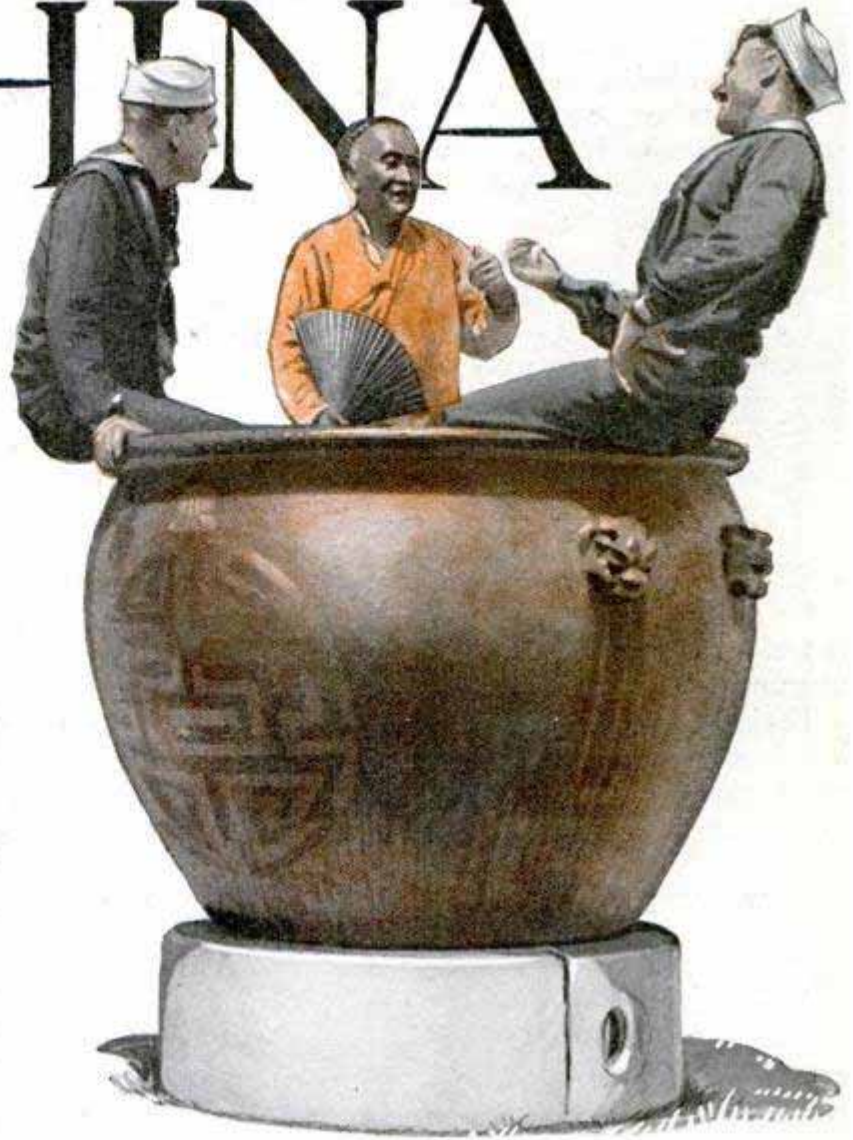
in CHINA

handles with a fleet of seven specially built gunboats. In addition, the Asiatic squadron at sea patrols the ocean highways to guard against pirate attacks.

It was one of the seven river gunboats that was attacked when it joined the British fleet in freeing the captured steamers on the Yangtze. The gunboat navies maintained by all the leading powers on this river are specially designed craft for shallow-river work. With their powerful engines they can invade the famous gorge—a cleft which in places has walls 13,000 feet high—and force their way upstream against the ten-knot current. The path of the river through the gorge is so steep that boats going upstream actually climb 500 feet in 350 miles, and that without a single lock.

Because of their shallow draft, the gunboats are useless at sea, and hence must

be built in China. The seven American craft are the only vessels in the navy built outside American yards, and they also have the distinction of being the only



Marines of the Peking Legation Guard Drilling Beside the Great Wall of the City; the Legation Guard Stood Off the Boxers for Months While Awaiting Relief from Outside

ships carrying their name plates painted in a foreign language, Chinese picture characters being used.

The territory covered by the river fleets stretches from Hankow, 640 miles above the river mouth, upstream for several hundred miles. Below Hankow, the river is navigable for ocean ships, and this stretch is patrolled by destroyers, cruisers and a battleship or two, part of the Asiatic fleet. They also sweep the coast line on constant watch for the pirates of Formosa, who miss no chance to attack and loot both native and foreign vessels. The pirates, who formerly operated from their unwieldy junks, with slatting sails of bamboo and matting, have modernized their methods and now operate with all the efficiency and organization of a band of gunmen.

Their favorite method in recent years has been to take passage on a coasting steamer as ordinary travelers, and, when safely out at sea, seize the ship, loot passengers and crew, transfer any valuables from the cargo to waiting junks, and then disappear, occasionally carrying off a few passengers to be held for ransom.

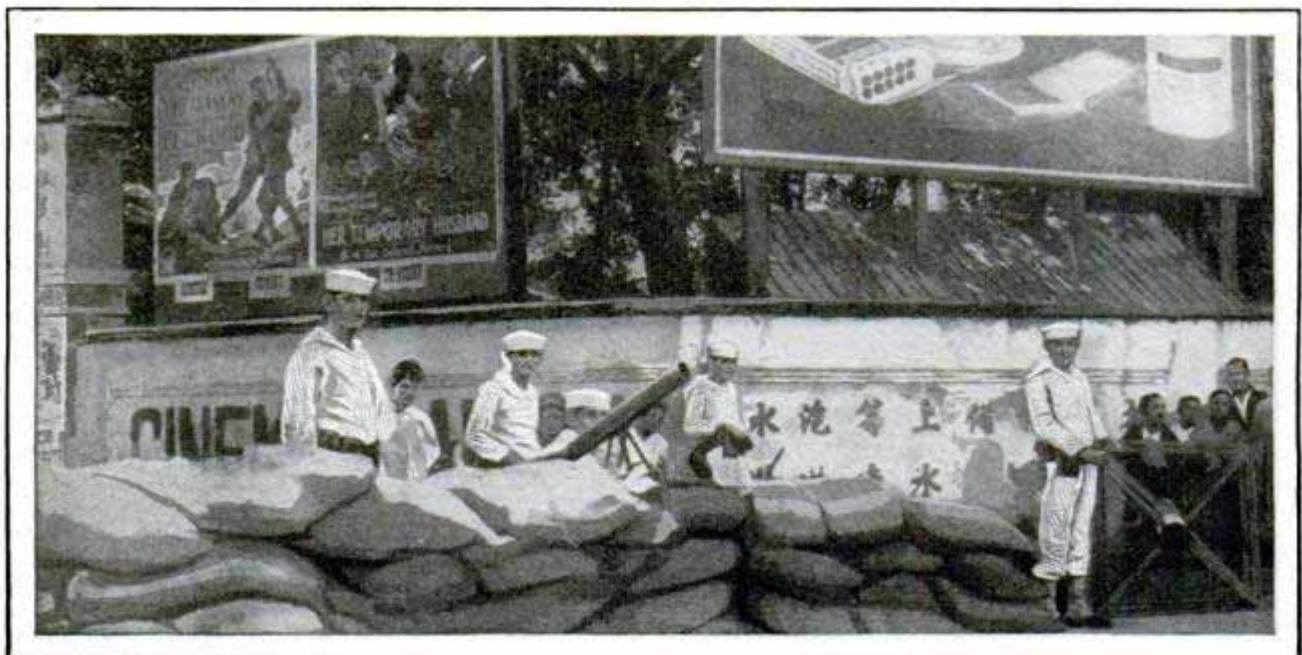
Assignment to the Asiatic station, either of the navy or in the marine corps and army detachments ashore, is eagerly sought, not only because of the promise of active service, but for several other reasons. An army recruiting officer, describing the Chinese service, says:

"Think of soldiering where every dollar is worth two, where all fatigue duty is done by proxy, and where every fighting man has a valet to care for him and his equipment! From the four million men who wore the olive-drab uniform of the United States army eight years ago, such a statement would call forth scornful laughter and soul-felt sentiment given in no uncertain terms.

"Yet, far from being the idle imaginings of some idealistic-minded soldier, this condition actually exists. In Tientsin, at the gates of the mysterious Orient, two full battalions of the Fifteenth Infantry are stationed, and the 700 men of the American forces in China consider themselves as near paradise as any soldier can reasonably expect to get.

"Nor is this all. In China one never hears tales of hardtack, corn-willies or goldfish—those delicacies so familiar to the A.E.F. Instead, the China contingent finds the mess tables loaded with chicken and steak, turkey and venison, and numerous other luxuries. In one month Company I of the Fifteenth Infantry, consumed, exclusive of Sunday and holiday meals, 5,500 eggs and 500 pounds of chicken. Another company claims its men ate an even thousand eggs one morning for breakfast, in addition to other dishes! And beans are practically unknown."

The Fifteenth first went to China in 1900 to help put down the Boxer rebellion, and



American Sailors in a Machine-Gun Nest Guarding the American Section at Hankow; the Man on the Right Is Holding the Loop Aerial of a Portable Wireless Set



Japanese Soldiers Watching the American Rifle Team Win the International Championship of China, One of the Features in Which All the Foreign Troops Engage

was ordered back in 1912, when bandits again threatened foreign lives. It has been there ever since, with the exception of one battalion maintained in the Philippines. No soldier does any fatigue duty, for he can hire a native to do it for him at a salary of seventy-five cents a month. About all the troopers have left to do is drill and target practice, to which the mornings are devoted, while, following the universal custom of the white man in the Orient, the afternoons are given to rest and recreation.

With troops of several countries stationed in Tientsin, there is keen international rivalry, both in drills and on the target range. In the last international match, the team from the American regiment defeated the picked marksmen of the Japanese, British and French Garrisons, winning high praise from Lieut. Gen. Takada, of the Imperial Japanese army, under whose auspices the match was held.

The life of the marine guards at the American legation in Peking is much the same. All the forces maintain baseball, football and basketball teams, while polo is popular with the officers, who play teams from the other foreign detachments.

TOOTH MILLION YEARS OLD FOUND IN COAL MINE 847

That man appeared early in the age of mammals is indicated by the discovery of a fossil human tooth in a coal mine, near

By Mr. J. C. Siegfried

Billings, Mont. From the character of the deposits in which it was found, it apparently had been laid down more than 1,000,000 years ago. Dentists declared that the tooth had been the second lower molar of a human being.

HORN IS CONNECTED TO VIOLIN TO AMPLIFY TONE 1048

Fitted with an amplifying horn, a violin is said to be equal to five ordinary instruments in an orchestra. Besides increasing the volume, the attachment is reported to develop the quality and beauty of the tones. The horn is supported over the



To Increase the Power of the Violin's Voice; Amplifying Horn Connected to Instrument at Rear Rests on the Player's Shoulder

player's right shoulder and does not interfere with the use of the bow.

Access maker rubber room

Violin horn

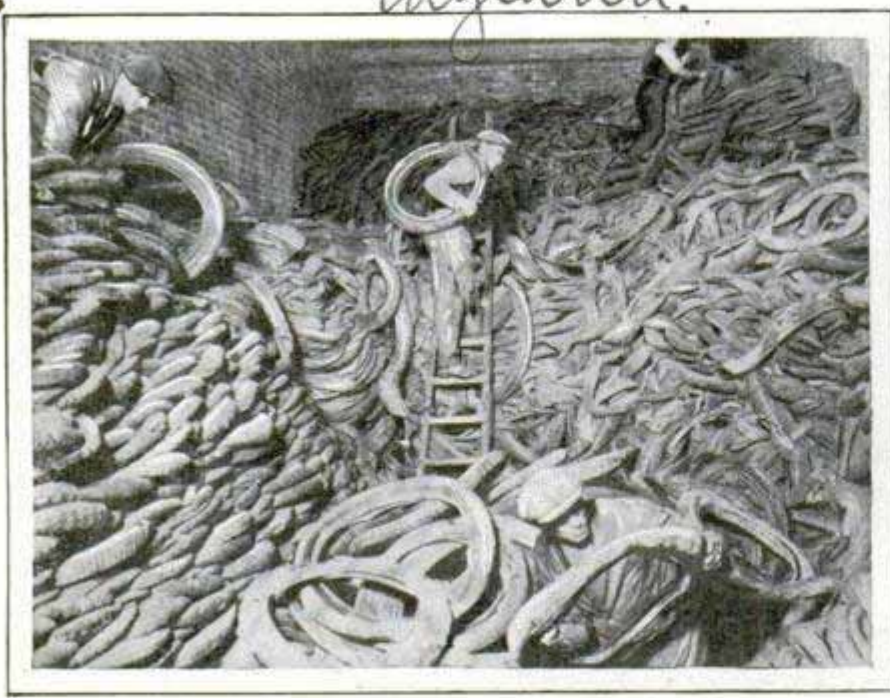
Whole World Vincent Lopez

for University of Iowa.

*J. Schumann
Works at Tottenham
England.*

*James H. Roast
University of Chicago*

986



Picking Out a Few of the Best Ones from a Mammoth Salvage Pile of Old Automobile Tires in London

RECLAIM CAST-OFF AUTO TIRES FOR CANVAS AND RUBBER

Useless for further road service, many discarded automobile tires yield marketable rubber and canvas to the junk men. Some handle little else but worn tires and tubes. The salvaged product appears in the form of mats, packing, shoe soles and other materials. Much of it is used in roofing. Tire-reclaiming is a considerable industry in England, where millions of tubes and casings are junked annually.

CAMERA TO SOLVE MYSTERIES OF OLD TEMPLE

How the camera is being used to save for posterity the records of some of the most interesting chapters in human history, is illustrated in the "inscription salvage" being done on the walls of ancient temples along the Nile. From the original pictures and symbols on the crumbling stones, the photographer makes small negatives, section by section. Enlargements and tracings from the negatives are then taken to the

temple and, while the worker balances himself on ladder or scaffold, he "proofreads" the copy directly from the original. It is estimated that two or three more years will be needed to complete and publish the records from the Medinet Habu temple, at Luxor, alone.

GARDEN IN FORM OF U. S. MAP NOVEL PARK FEATURE

Flowers and shrubs were sent from forty-nine cities throughout the country

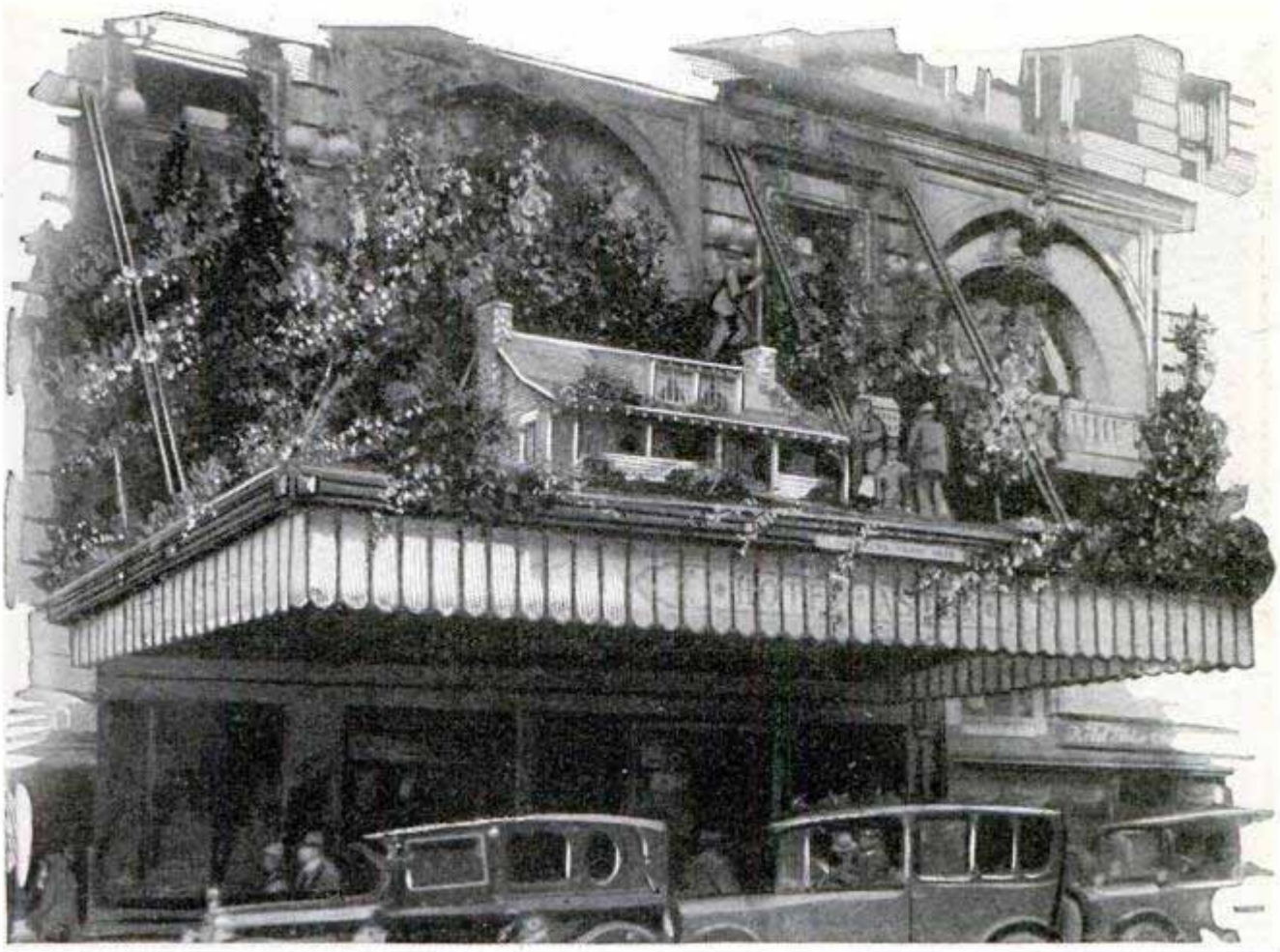
937



The United States Map Garden in Miami, Fla., Park; It Is Planted with Flowers and Shrubs Sent from Forty-Nine Cities

Bay Front Park

969



A City Pauses for a Backward Glance; Replica of a Dutch Farmhouse on the Canopy of the Hotel Astor, New York, Erected for Broadway Anniversary Observances

for planting in a unique garden in a Miami, Fla., park. The plot is lined out to represent the states of the Union and, when in blossom, will constitute a flowering map of the nation. The plants were set by former residents of the states represented.

MODEL HOME ON HOTEL CANOPY SHOWS CITY'S GROWTH

One of the features of the anniversary celebration in commemoration of the beginnings of Broadway, was the display of a model house on the canopy of the Hotel Astor. It was a replica of Heinrick Eden's Dutch home that stood on the site of the hotel in the early days, when he owned a large block of property near by. The contrast between the modest dwelling and the huge hotel, forcibly illustrated the city's growth of a century.

SPREADER TIP ON GLUE TUBE PROTECTS FINGERS 964

Glue is easily applied from a tube, without soiling the fingers, through a spreader tip of rubber. It is shaped to simplify even distribution of the adhesive which is forced through a small hole in the cap. The aperture is self-sealing so that it is not necessary to screw on an extra top. Squeezing the tube opens the hole when the glue is to be used again.



FILAMENTS OF RARE METAL TO IMPROVE LIGHTS 956

Not content with the improvement in the incandescent electric lamp through using drawn wire filaments of tungsten instead of carbon, investigators are experimenting with molybdenum for this purpose. The metal withstands extremely high temperatures, is malleable, and can be forged while hot and worked into rods.

Chicago - 431 R. Wells.

Russia Cement Co.

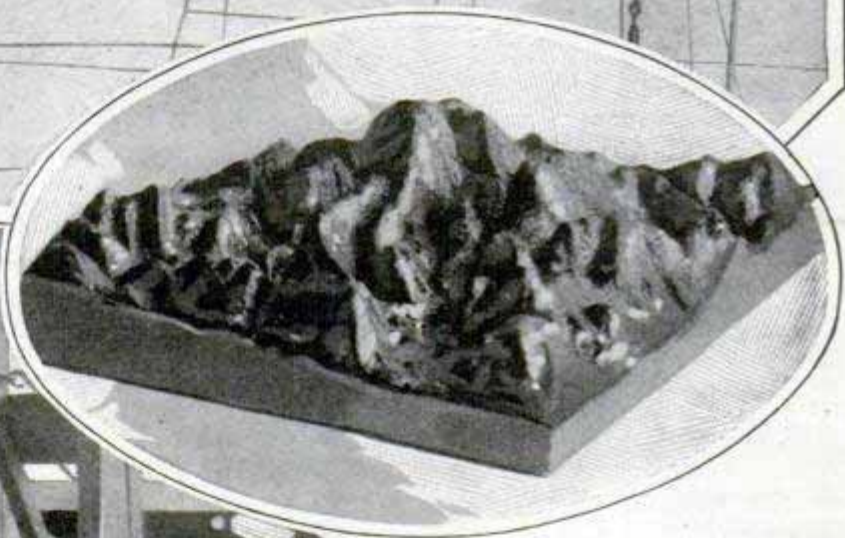
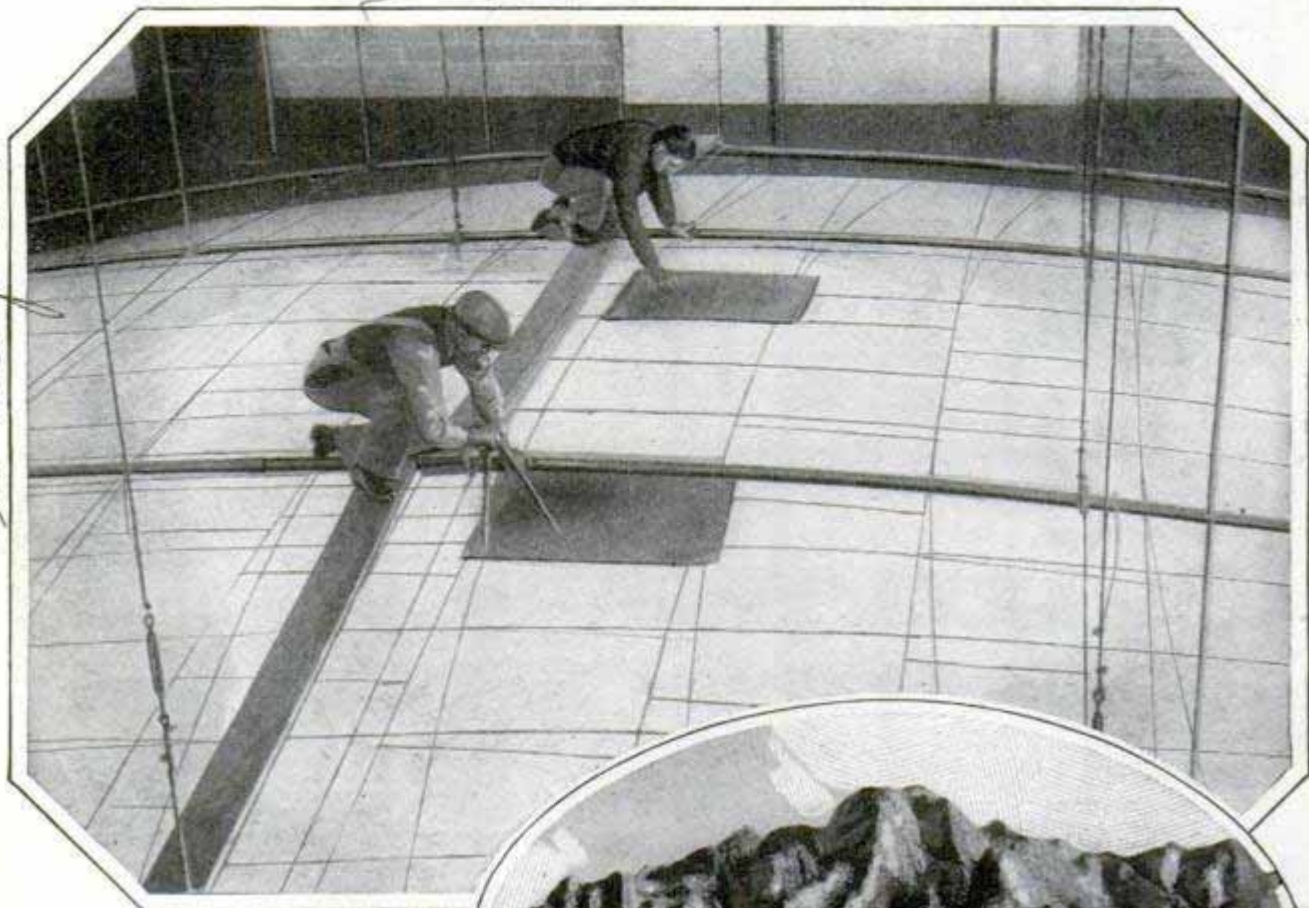
Edwin Jarvis
The Paragon, Washington, D.C.

954

An Oration at the Annual Convocation
Wellesley Hills, Mass

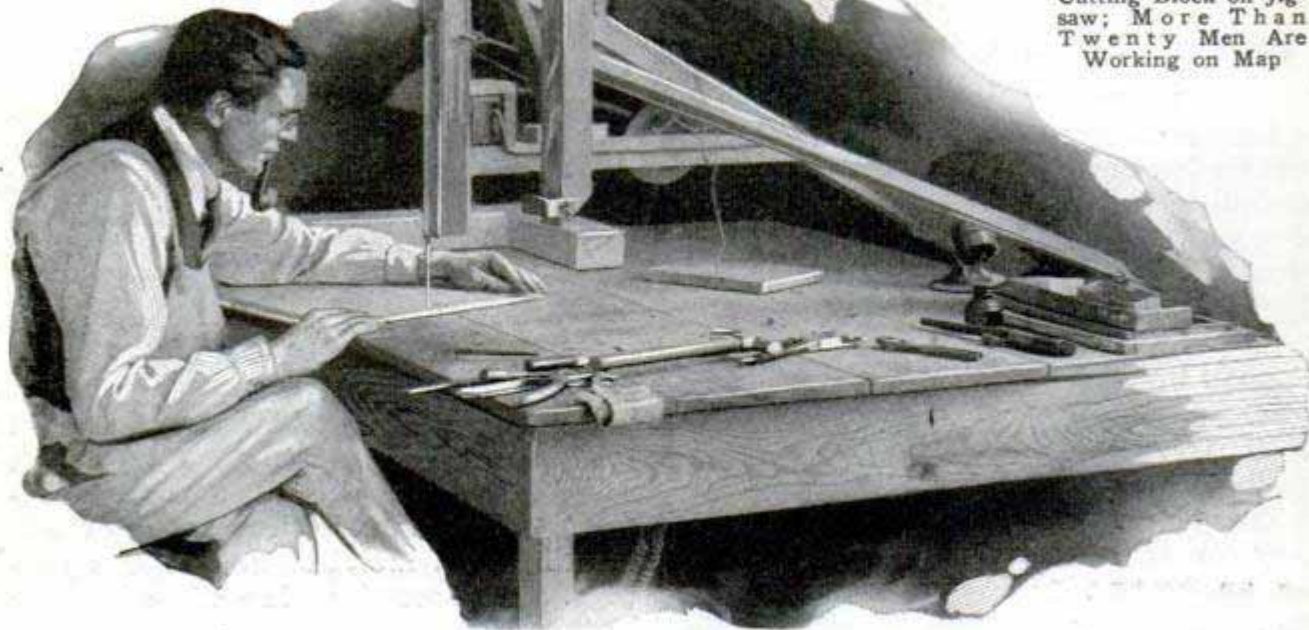
GREATEST RELIEF MAP IS SIXTY-THREE FEET WIDE

E. L. Nicholas, Geographical
Illustrator



At Work on Section of Map of U. S. and Canada; It Is Curved to Conform to Shape of the Earth and the Plots Are Molded Separately; Right, a Block of Mountainous Territory Showing Detailed Modeling; the Finished Map Will Cover 3,000 Square Feet, at a Scale of About Four Inches to the Mile

Cutting Block on Jigsaw; More Than Twenty Men Are Working on Map



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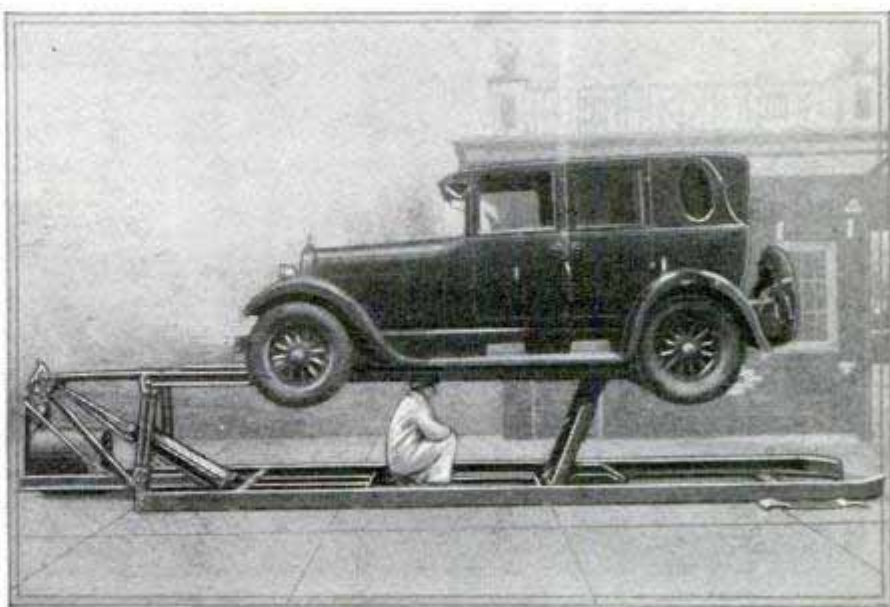
1717 St. Paul St.
Baltimore, Md

HOUSES WITH FEWER PIECES TO CUT COSTS 958

By reducing the number of pieces needed in building a residence, research workers see a way to bring down the costs of construction. Sample houses of concrete blocks already have been built with the units reduced to 100 instead of the 75,000 that are used in the ordinary brick dwelling, when all the units of supplementary materials are counted. The New York tenement-house committee points out that sixty-three per cent of the cost of a house goes into putting the parts together. The hope of cheaper housing is, therefore, believed to lie mainly in cutting down the labor thus expended. It is thought that this can be accomplished, in a great measure, by using larger and standard-sized units. Some officials of the committee hold that it is possible to build concrete houses of these large units in three days, using but 100 pieces for a six-room structure. Representatives of the national lumber manufacturers' association have expressed the belief that frame houses can be planned with even fewer than 100 pieces to the house.

SAFETY REPAIR LIFT FOR AUTO SAVES ROOM 963

For use inside or outside the service station, an automobile lift requires less space than the usual rack and eliminates the task of driving the car up an incline and climbing down. It functions by oil pressure in a heavy cylinder, a motor-driven pump affording the power, and the car is elevated by the front and rear axles, leaving the wheels free. Space under the auto is unobstructed, allowing the mechanic access to all parts. An additional feature is that installation expense is saved. The lifting and lowering operations are smooth, steady and rapid, the manufacturers claim, and it is impossible to drop the car accidentally.



Repair Lift Raised, Showing How Wheels Are Left Free and Worker Has Unobstructed Space Underneath



A Sight-Seeing Ride in the Aerial Barrel: It Is Elevated by a Crane

BIG BARREL SERVES AS AIRSHIP AT AMUSEMENT RESORT

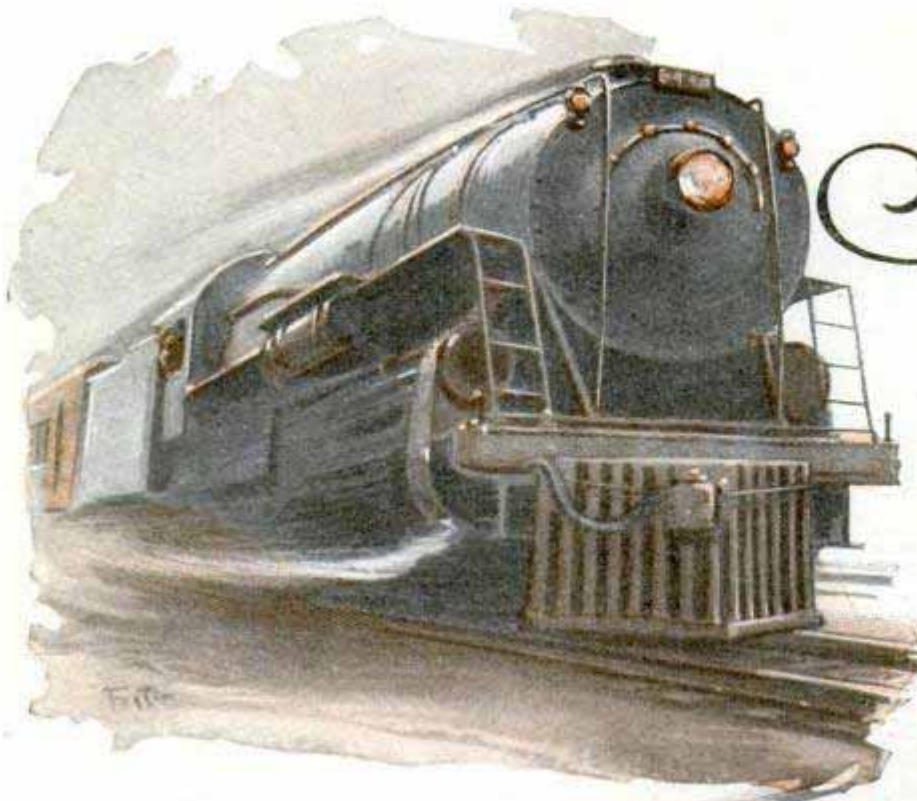
Visitors at an amusement park in Basel, Switzerland, are able to get a bird's-eye view of the grounds and surrounding country while riding in a big barrel that is lifted and swung about on a crane. The upper part of the cask's staves have been cut away so that the occupants can look out and a door permits entrance or exit.

Internal Power and Transportation Exhibits

Weaver Manufacturing Co. Ltd. Canada

Weaver Mfg Co., Springfield, Ill.

621



The

By JOHN

run in the world is made on the Great Western railway in England, from Swinton to Paddington station, London, seventy-seven and a quarter miles in seventy-five minutes at the rate of 61.8 miles an hour. Another train on the same road, the Cornish Riviera express, makes the 226 miles to Plymouth at the rate of 54.8 miles

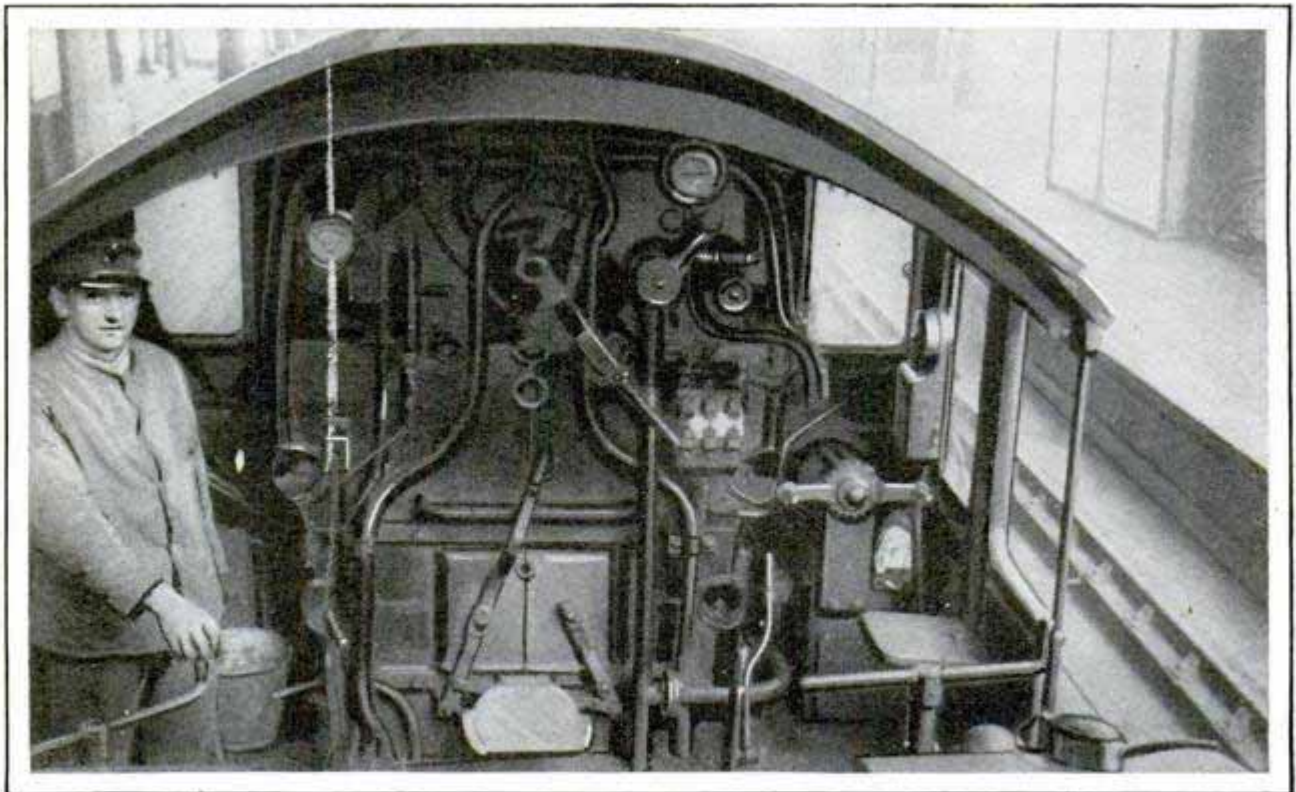
The Twentieth Century Limited, Running between New York and Chicago, Is the World's Fastest Long-Distance Train, Covering 976 Miles

RIDING on one of the world's fastest trains is no easy job, if you are up in front in the locomotive, because you cannot sit down for a minute.

Although American railways are known for their efficiency, the fastest passenger

an hour. This is a non-stop run, during which sections of the train are cut off while it is going at full speed—a thrilling operation.

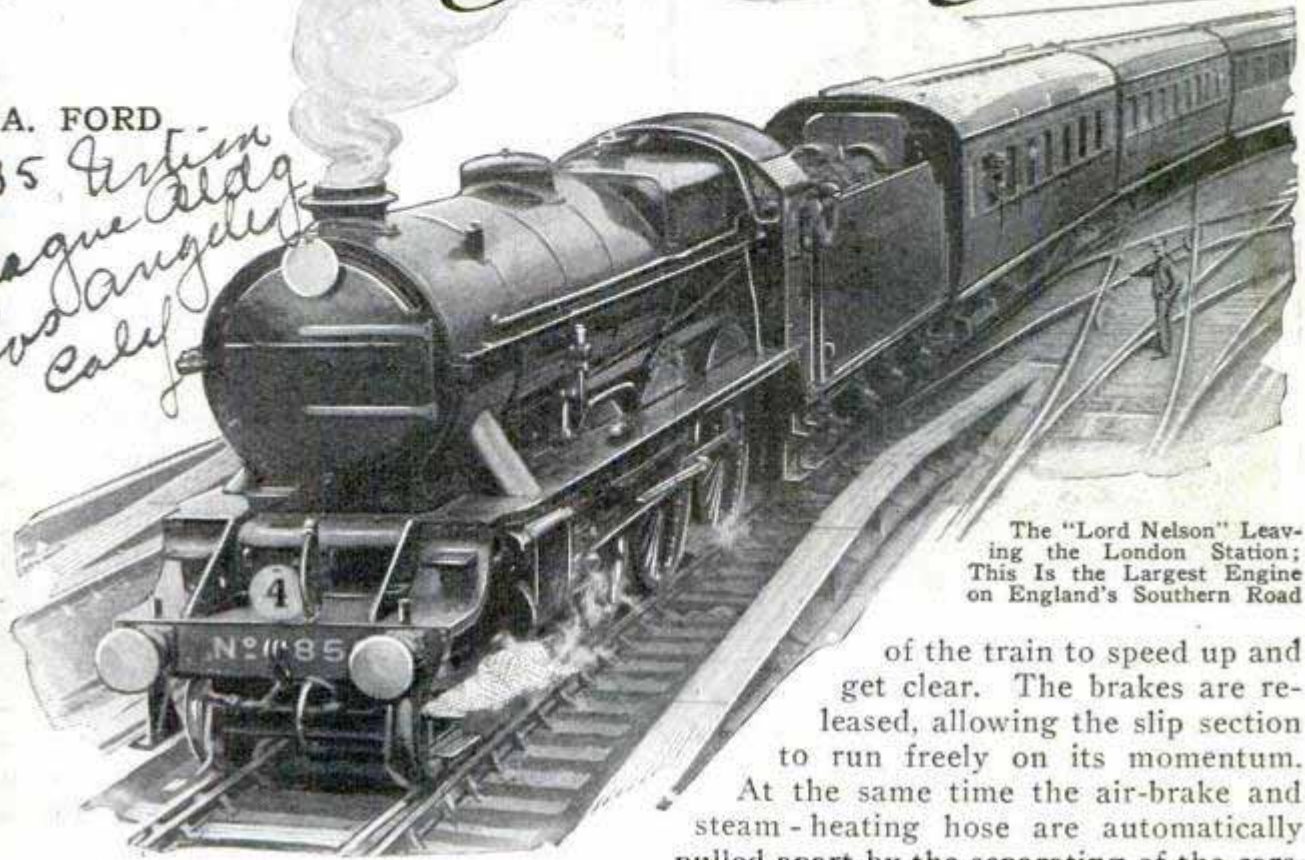
America, however, holds the honor of having the fastest long-distance train in



Interior of the Engine Cab of the "Lord Nelson," Which Hauls One of England's Fastest Trains, the Atlantic Express, Running from Waterloo Station to Devonshire

World's Fastest Train

A. FORD
205 Artistic
League Club
Los Angeles
Calif.



The "Lord Nelson" Leaving the London Station; This Is the Largest Engine on England's Southern Road

the world, the Twentieth Century Limited, which makes the run of 976 miles between New York and Chicago, in twenty hours at the rate of 48.8 miles an hour.

The fastest mile ever made on any railway, at any time, was recorded by the famous locomotive No. 999 of the New York Central on May 10, 1893. On a tangent, slightly downgrade, the speed was 112.5 miles an hour.

The Cornish Riviera express cuts off, or "slips," cars at three stations. In each case the "slipping" is done while traveling at high speed. The moment the engineer signals with his whistle and slackens the train, the guard in the section to be cut off pulls a lever which opens the coupling device, slips the car or cars and sets the air brakes. It only remains for the front part

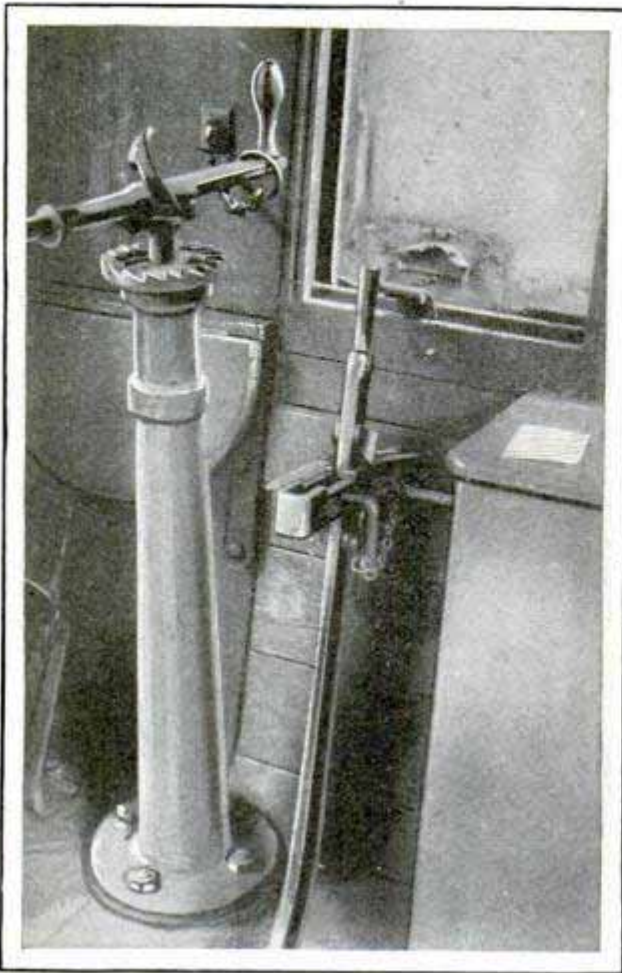
of the train to speed up and get clear. The brakes are released, allowing the slip section to run freely on its momentum.

At the same time the air-brake and steam-heating hose are automatically pulled apart by the separating of the cars. Both are provided with valves which automatically close the exposed ends when the connections have been severed.

On the day I made a trip on this train two cars were to be slipped at Westbury, ninety-five miles from London, while the train was moving at a speed of about eighty miles an hour. Exactly on the dot, the express, composed of half a dozen coaches, started so noiselessly and so smoothly that I would not have known we were moving had I not been looking out of the window. But if the beginning was smooth and noiseless, the rate of acceleration was swift. The lightness of the English trains is a big factor in their quick get-away. Only a few rods outside the station we were moving at more than thirty miles an hour. As we approached

SOME OF AMERICA'S FASTEST TRAINS

			Miles	Speed
Number 1181.....	Penn.	Philadelphia-Atlantic City.....	60	55.4
Number 17.....	Reading	Philadelphia-Atlantic City.....	60	55.4
Twentieth Century Limited.....	N. Y. C.	Chicago-New York.....	976	48.8
Broadway Limited.....	Penn.	New York-Chicago.....	908	45.4
Southwestern Limited.....	N. Y. C.-Big Four	New York-St. Louis.....	1,157	44.1
Washingtonian.....	B. & O.	Philadelphia-Washington.....	133	43.6



Vertical Lever, Right, in Guard's Compartment, Disconnects the Car and Drops It Off at Its Station

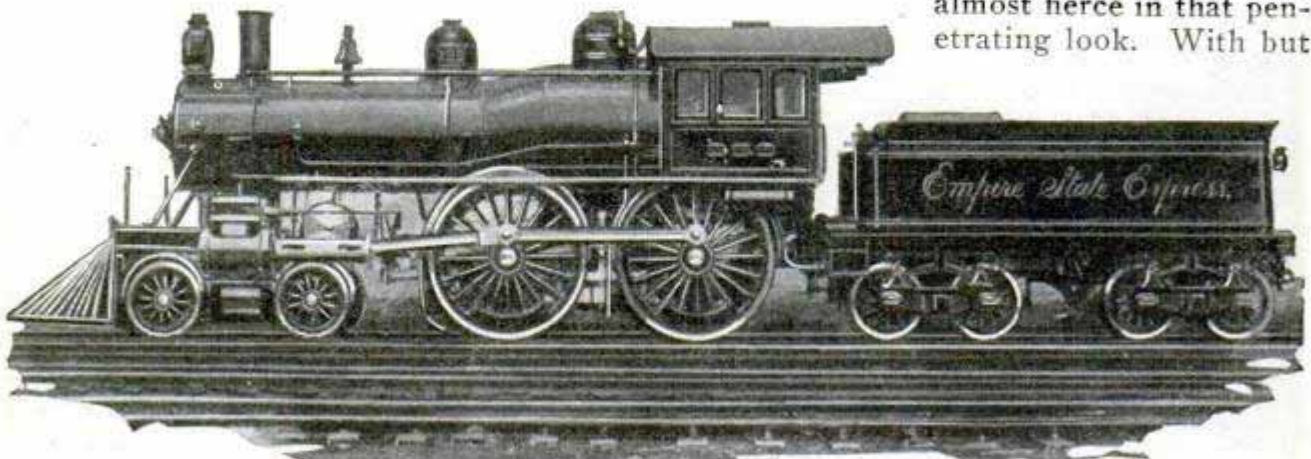
Westbury, the engine gave a shrill whistle and I felt the train slacken for an instant. Then the coach slowed up while the train disappeared from view around a bend ahead. Our speed gradually slackened and we rolled into Westbury as smoothly and quietly as if we had been riding on pneumatic tires. Riding back to London in the cab of the world's fastest train was different.

"Better stand over there by the fireman's window," the driver said when I showed him my special pass. I obeyed and began to get acquainted with the details of a speed monster different from any I had ever seen.

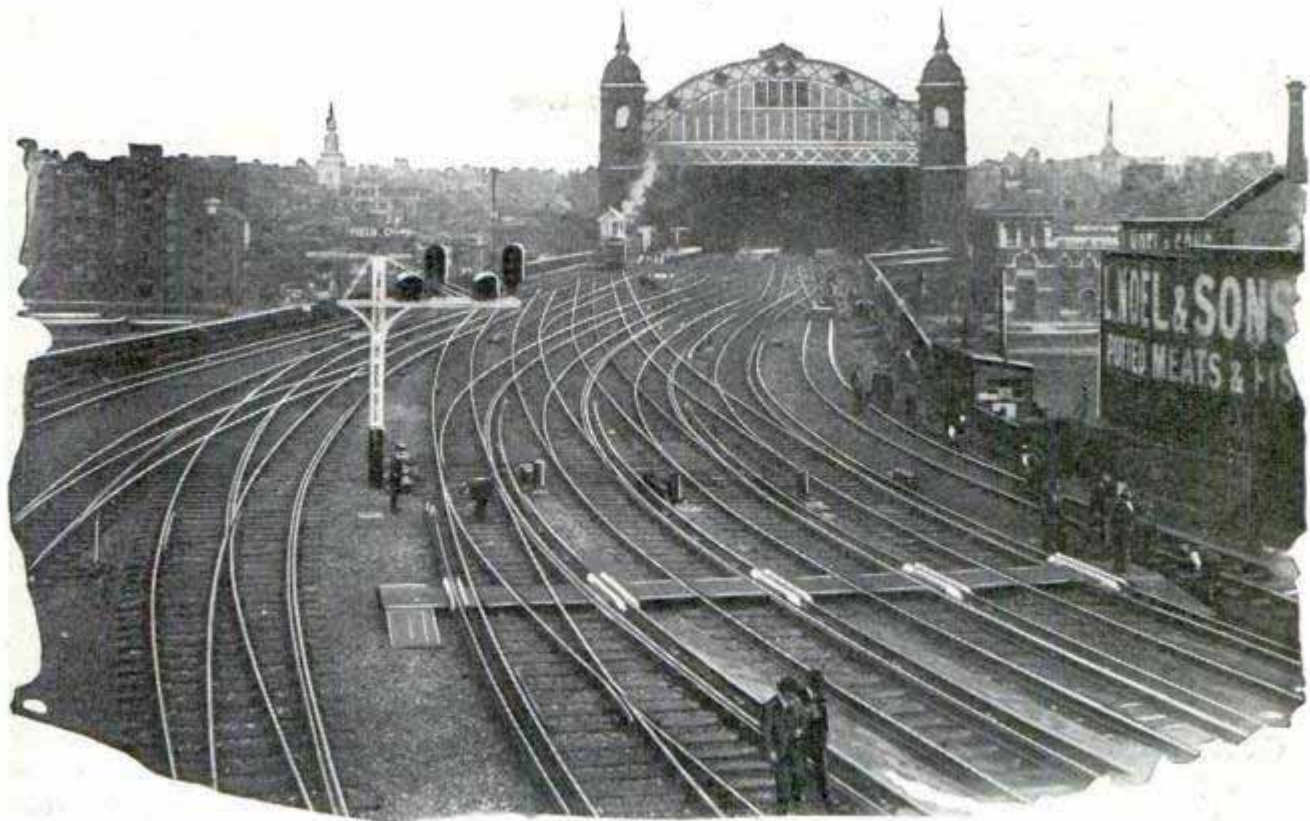
"Charlie," said the driver glancing at his watch, "better take a drink of this tea while you have time. You won't get another chance." And with that he held out to the fireman a steaming cup which had been resting on the vibrating iron shelf just above the fire door.

Charlie dropped his shovel for an instant and took the white cup in his blackened hand. The engineer looked back toward the station and I heard the guard's "go ahead" whistle. The brawny hand of the driver was on the "regulator handle" gradually giving the monster steam. Imperceptibly we began to move. Notch by notch he opened it wider until the whole frame of the speed machine swayed from side to side. To avoid getting in the way of the fireman, whose shoveling was almost continuous for the next hour and fifteen minutes, and to prevent being thrown against hot steam pipes, I kept hold of a brass pipe and spread my feet apart.

The rumble and roar of the engine and train was incessant now that we were under full steam. The engineer's face was a fascinating study. He scorned the folding seat beside him and much of the time leaned clear out of the cab watching the right of way ahead intently. From years of service—later he told me he had been a driver for fourteen years—his face had taken on the same squint that one sees in Bill Hart's eyes. There was something almost fierce in that penetrating look. With but



The Fastest Locomotive That Ever Traveled, the New York Central's Famous Number 999, Hauled the Empire State Express May 10, 1893, at a Speed of 112.5 Miles an Hour



Cannon Street Depot, in London, Which Has Been Electrified, Handles So Many Suburban Trains That, during Rush Hours, One Leaves the Station Every Half Minute

two or three exceptions his hand never left the regulator handle. With a grimy cap pulled well down on his forehead and with his head thrust slightly forward, he forced his locomotive at well-nigh top speed through town and countryside. Now and again he would glance at the steam gauge whose needle quivered incessantly at the red line marked "225." Once or twice in the long wild run he turned to see if Charlie was feeding the iron monster all it could hold.

The towns lie close together in England, especially within a radius of seventy-five miles of London, and they are towns with manufacturing plants, fine railway stations and many other things which mean intricate rail systems. Had I not been prepared for it, the speed with which we roared through these places would have taken my breath away. Gazing at the maze of tracks into which we plunged again and again without slackening speed so much as a hair, I half wondered if we would go crashing into buildings or rolling stock. But always the signals spelt safety and always the vibrating iron horse found a clear path without a second's hesitation.

As the minutes passed and I stood watching the shining rails ahead, I came

to understand more fully one great advantage which British trainmen have over American crews. The American engineer is tortured with the haunting fear that he is going to kill some one. In England that possibility is almost wholly removed. The rights of way are without trespassers, and with but few exceptions there are no grade crossings. The highways in England go over or under the railway tracks. In the few instances where there were grade crossings, high gates were provided. These gates always stand across the highways except when traffic is passing, and when the gates are opened for motor cars or wagons, they are swung across the railway. In England trespassing on railway property is an offense that is quite apt to land one in jail.

At last we were in the outskirts of London, and the buildings became more numerous, yards and gardens grew smaller and less frequent, and street traffic grew more dense. But our driver never slowed up except on one or two occasions. Then the big lever was moved from its position only for a few seconds, after which the shrill whistle was sounded more frequently, often beginning 200 yards before we reached a depot and continuing until we had entirely passed the station platform.

*Mr. ...
A. 525, Union Station
Chicago*

995



Exhibiting Grotesque Mask Molded for Unique Crafts Display in Los Angeles School

GRADE PUPILS MODEL MASKS FOR SCHOOL EXHIBIT

Grammar-school pupils of Los Angeles recently demonstrated their skill as stage craftsmen in an exhibit of miniature scenic sets, masks and other theater equipment. Models of animals from the nursery rhymes, and small boats were also shown.

SLING-SHOT DRILL FOR CADETS IMPROVES MARKSMANSHIP

Cadets at a British military school utilize the lowly sling shot to train their eyes and steady their nerves that marksmanship with guns may be improved. Shooting from difficult positions is often necessary and training is afforded by firing the "rubber guns" while lying on the back.

917



Sling-Shot Drill at British Military School

INQUEST OVER BROKEN RAILS KEEPS RAILROADS SAFE

1036

Every time a steel rail breaks in-service an elaborate investigation is instituted to fix the cause and the blame. The history of every length of rail in thousands of miles of service is kept on file, and if five per cent—from five to seven rails—break in any one batch of rails made from the same "heat" at the mill, all the rest are hunted down, removed from main-line service and relegated to switches, side-tracks and little used branches. The precautions used on the vast mileage of the Pennsylvania railroad system are typical of those common on all American roads. When a break is found, the foreman of the section gang fills out a report covering the complete history of the rail, and on printed outline drawings fills in three views of the break. The fifty-six questions which he must answer cover not only the name of the maker, the heat number and the date the rail was installed, but the hour of the break, whether a train had just passed or not, whether the break interrupted the electrical-signal system and set the stop signal to protect trains, the condition of cross ties, joint bars, ballast and even the kind of drainage near by. All that information passes through several inspectors' hands, and, if the facts warrant, the broken rail is shipped to the experimental laboratory at Altoona, Pa., for chemical, physical and microscopic tests. Modern 130-pound to the yard rails are expected to stand up under the passage of 200,000,000 gross tons before they are removed from main lines to less heavy duty. The ends are then cut off to remove the sections where the greatest wear has occurred, and the shortened rail is used for lighter traffic.

Blind persons in an Iowa city carry canes with a red glass disk at the top and when they want help in crossing a street, hold the stick horizontally to signal for aid; the plan has proved entirely successful.

1062

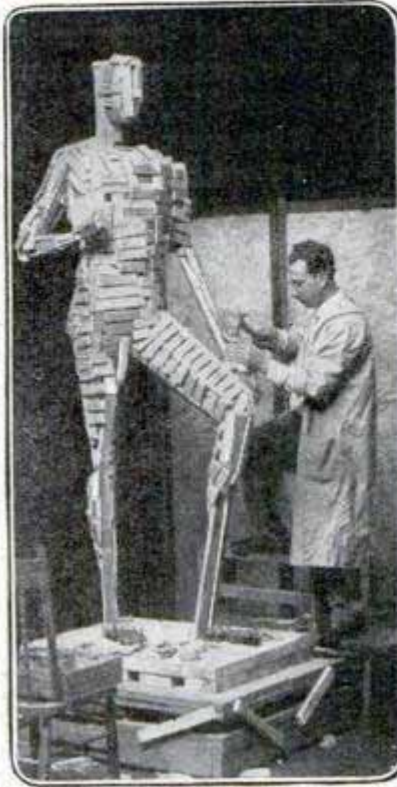
Dubuque

97

Spanish War Memorial

MAKING OF A MONUMENT—FROM MODEL TO BRONZE

for San Juan Hill in Cuba



First Step after Completing Small Working Model; the Wood and Steel Framework



Shellac Is Next Applied; Then the "Armature" or Base Is Covered with Clay



Upon Rough Clay Figure True Points of Small Model Are Made with Pantograph



Clay Is Then Covered with Plaster Which Is Strengthened with Iron Pipe



When Plaster Has Set, It Is Broken Off in Sections and Reassembled



The Bronze Is Made from the Plaster Model, and Is Then Smoothed and Polished

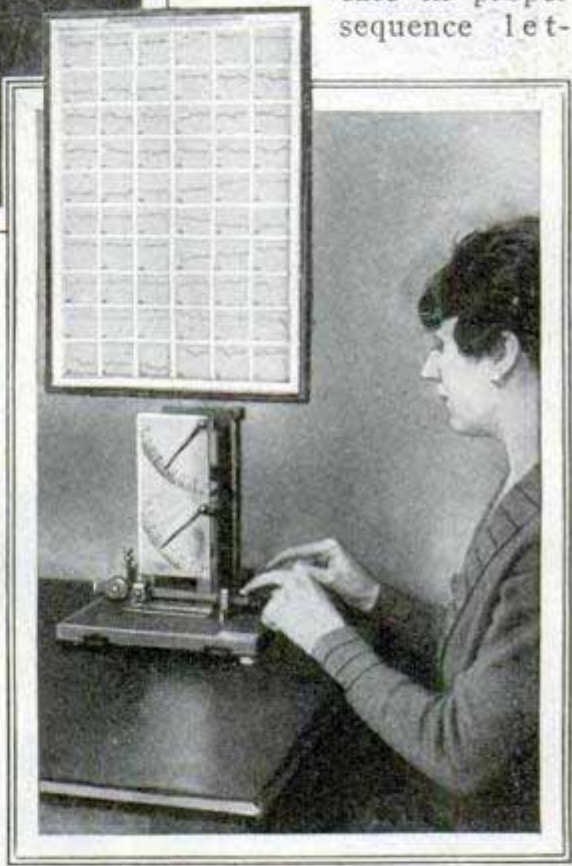
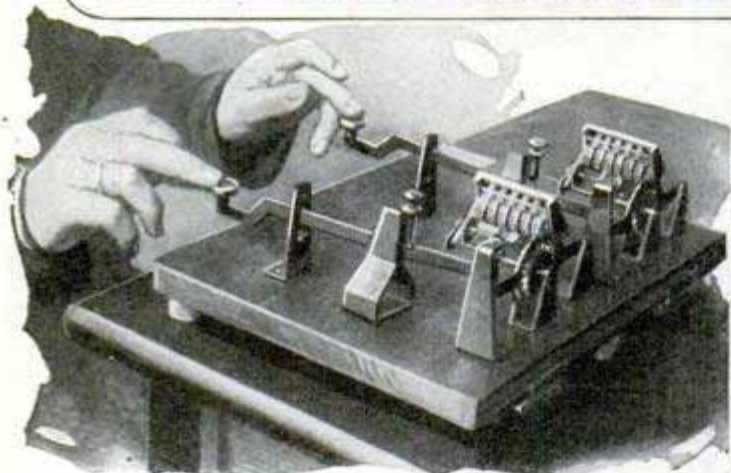
Herbert Photos

SKILL AT TYPEWRITING IS REVEALED BY MIND TESTS

783



sure exerted on the keys. There are tests for optical concentration under a strong light and of visual power. To show whether both hands work well together, pearls are threaded as rapidly as possible on a needle. To test concentration and speed, candidates are required to call out and locate in proper sequence let-



Some of the Tests Given to Typists; Above, Reading Copy Lines, and Finger Tests for Speed and Strength

Tests to determine the qualifications of typists have been worked out in Berlin. First a reaction machine tests speed of finger movement. Two levers, like typewriter keys, are pressed as often as possible for one minute. An indicator counts the strokes and a balance records the pres-

ters which have been disarranged on a calendar. Skill in hand work is shown by a test in taking out screws from a block of wood, using various-sized screwdrivers.

STUDY OF SHORE LINES TO TELL IF EARTH IS SINKING

83 national research
Investigators have started a task that may take twenty-five years to finish, a careful measure of the shore lines along the Atlantic coast to determine if the North American continent is sinking. Some geologists believe that it is subsiding at the rate of one or two feet a cen-

tury, and to find if this is true, hundreds of measurements are to be made with tide gauges in Jamaica Bay, Eastport, Me., and at St. John, N. B. The United States coast and geodetic surveys, New York city dock department and the Canadian government are expected to co-operate in the work. Plans have also been made for measuring the shore lines on the Pacific coast for the same purpose.

Kansas City Journal 6:00 pm. 14, 1926
no further information

**FIFTY-MILLION-DOLLAR LOOT
BURIED ON PIRATE ISLE**

There's fifty million dollars in doubloons, pieces of eight and treasure of the Spanish main waiting on a desolate island off the coast of Brazil for the person who can find them. This is the word of George Finlay Simmons, curator of the Cleveland museum of natural history, who spent two years in the south seas as commander of the steamer "Blossom," visiting three continents and bringing back a number of specimens for the museum's collection. The treasure is believed to lie where it was buried a century ago by two pirates who took it from the Inca Indians. One of the hoards, valued at \$40,000,000, was captured by a Spanish rover, Jose Santos. It was taken from a ship loaded with gold and silver bars, altar vestments and candelabras from the churches of Peru. More than \$8,000,000 additional was buried on the same island by an English pirate who called himself "Zulmiro." Records of the prize were kept and were in the possession of the Russian quartermaster of the ship until he died in the far east. Between 1800 and 1892, eight expeditions were made in search of the treasure. Some of them did not even reach the island. Those who did were foiled in their hunt when they found that landmarks on their maps had been obliterated by a slide.

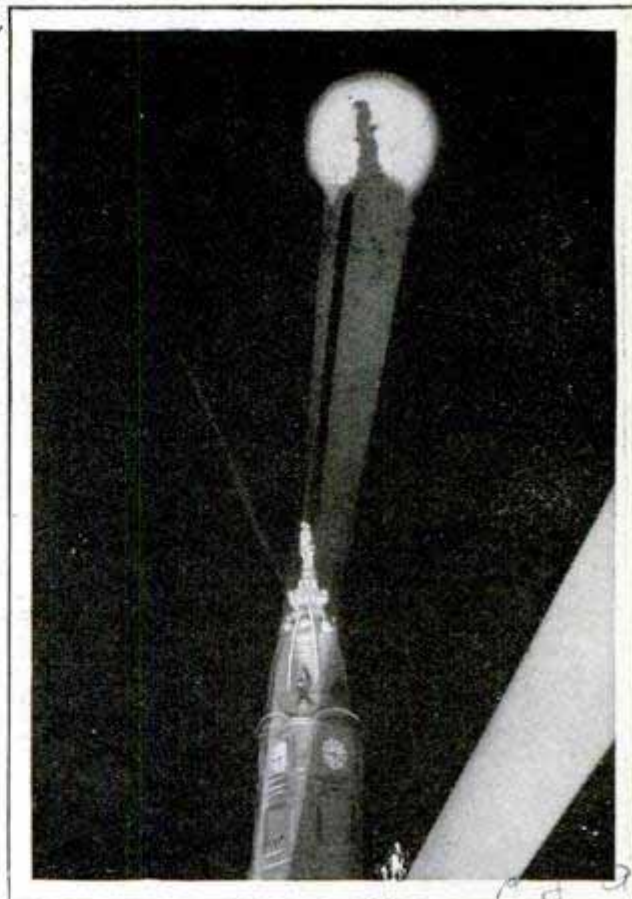
**EMERGENCY OVERSHOES
FIT VANITY CASE**

So small they fit into a box about the size of a vanity case, emergency overshoes are being made of light, transparent rubber. They roll on and off the shoe in a jiffy without bothering as to size or shape. The rubber is about the thickness of that in surgeons' gloves and bathing caps, does not damage the leather and may be worn inside the shoe as an additional protection for the feet against dampness. At present the rubbers are made in the natural color only, but later they will be supplied in various shades to match those of ladies' slippers.



Slipping On the Rubbers, and How They Look on the Shoes

dr. Harry J. Powers,
310 S. Michigan Ave

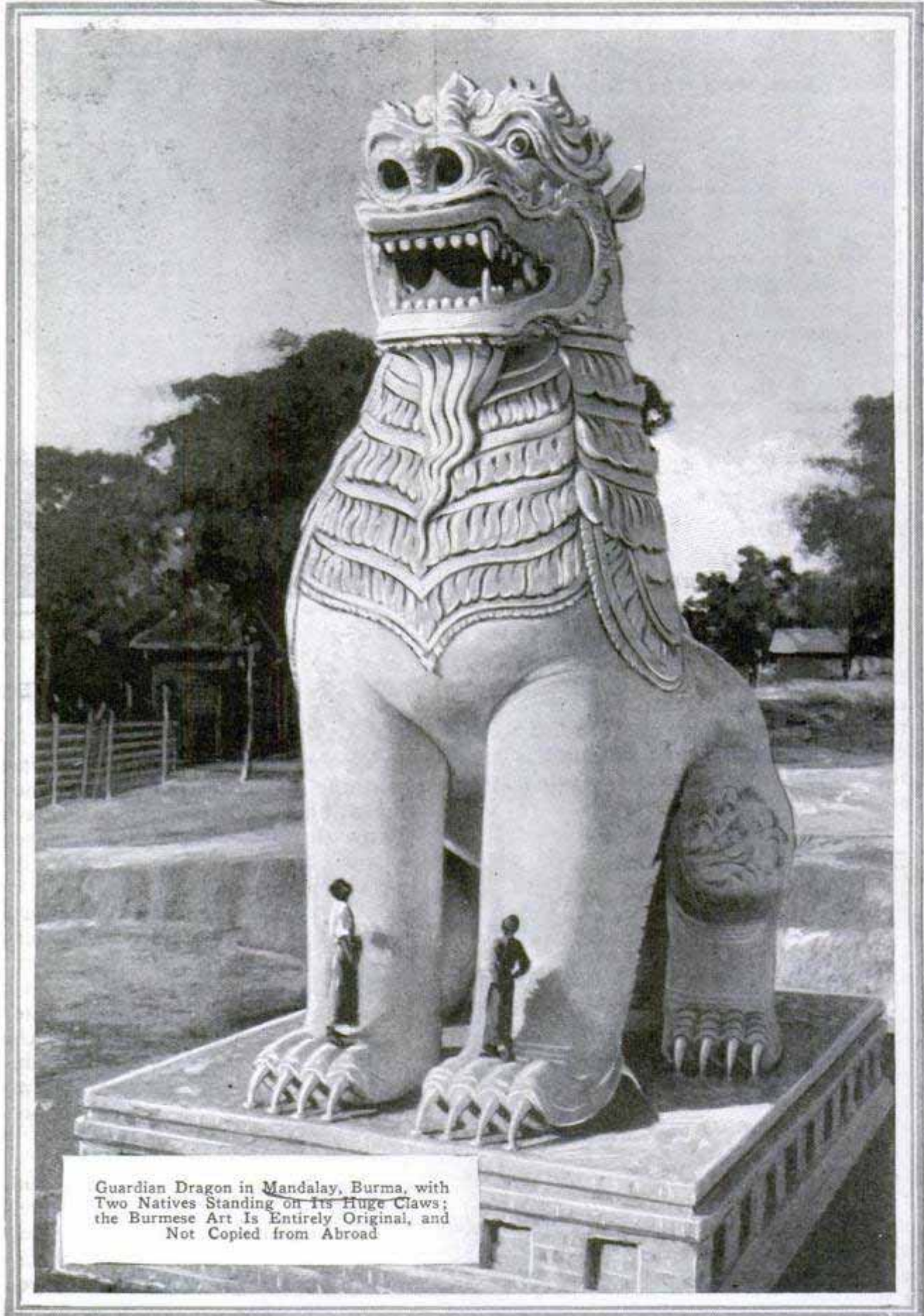


Shadow of Penn Statue Cast on Low-Hanging Clouds by Powerful Searchlight

**STATUE SHINES ON THE CLOUDS
OVER SEARCHLIGHT**

During the illumination of the William Penn statue on the tower of the city hall in Philadelphia, a weird effect was noticed when the shadow of the figure was seen on a bank of low-hanging clouds, giving the impression of a "spirit" or double view. Such occurrences are not particularly rare, but generally the light is not sufficiently strong to cast a shadow that can be photographed. In this case the powerful searchlight, shining from below, caused an unusually clear-cut shadow.

☐ Cable insulation and hard-rubber compounds are being prepared from synthetic rubber that lacks elasticity.



Guardian Dragon in Mandalay, Burma, with Two Natives Standing on Its Huge Claws; the Burmese Art is Entirely Original, and Not Copied from Abroad

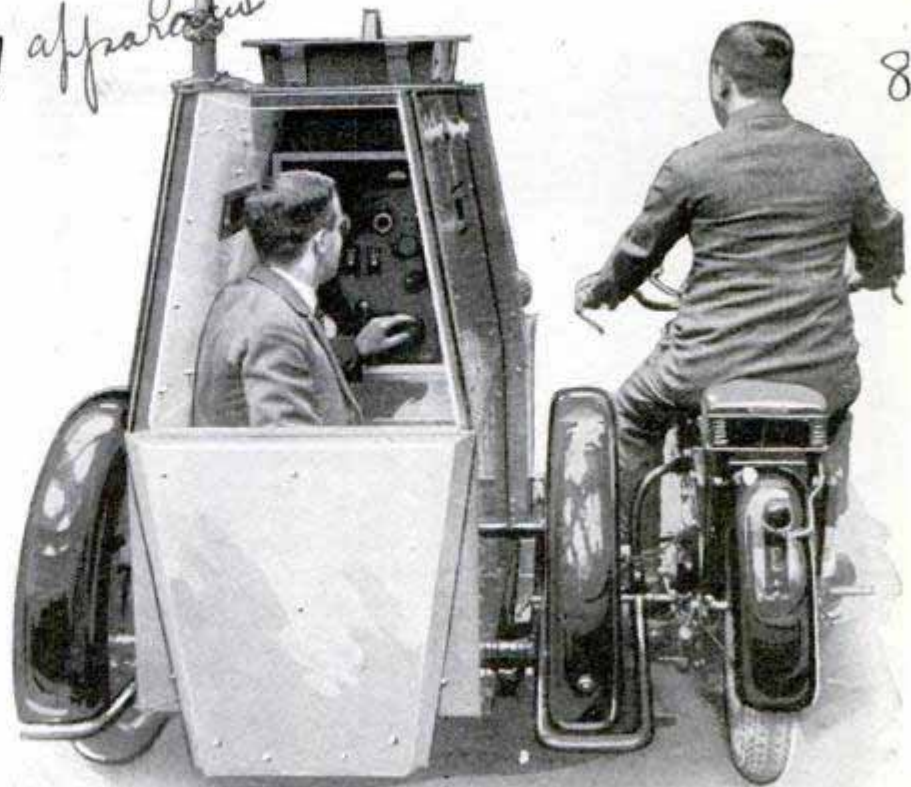
211
inventor surveying apparatus
OIL WELLS DO NOT RUN STRAIGHT

Deep oil wells generally are not straight, but abound in twists and turns, the deflections in some cases running to hundreds of feet. A survey of a well in California showed that at a depth of 6,000 feet it was 517 feet out of plumb. A chart of some wells, it is said, would look more like a corkscrew than a straight line. Strata of different hardness and tilted layers, which make drills slide off at an angle instead of cutting straight down, are among the chief causes for these twists in the wells. A well may be started in the middle of a tract of land and end at the bottom under a different tract. Wells sometimes wander into each other with consequent damage and the possible ruination of a producer. Two wells started together may often vary widely instead of following parallel courses, thus complicating the task of drilling.

FISH KILLED TO SAVE SARDINES START NEW INDUSTRY *981*

Hunting the tuna fish was formerly done to protect the sardines, which they devour in large numbers, but since the tuna is now popular for food, it is the basis of an important phase of the fishing industry. In the Mediterranean, the tuna are detected by watchmen who sit in chairs on high extension steel ladders on the coast and relay word by telephone when a school of the fish is sighted. By means of sardine bait, the fish are lured into a bay, called the "death chamber." This chamber is a square inclosure of heavy netting which is closed at the entrance when a number of fish have been caught in it. Then the men, working from a float around the net, kill the tunnies with spears.

*Herald Examiner
11/21/26*



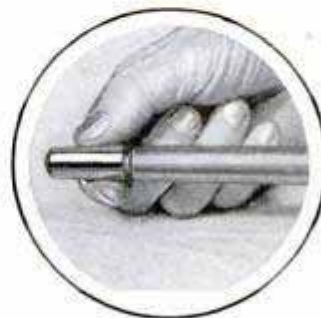
Radio Sidecar for Police Work in Berlin; It Can Be Disconnected and Run on Own Power

ARMORED SIDECAR WITH RADIO AIDS IN POLICE WORK

Besides having a radio receiver, an armored motorcycle sidecar, introduced in Berlin, can be detached and run on its own power. The protected top of the car is built high enough to afford room for the operator inside and slants abruptly in order to deflect bullets.

DETACHABLE BILLIARD-CUE TIP AIDS ACCURATE PLAYING *960*

Caps for billiard cues are made detachable by means of a threaded-sleeve device

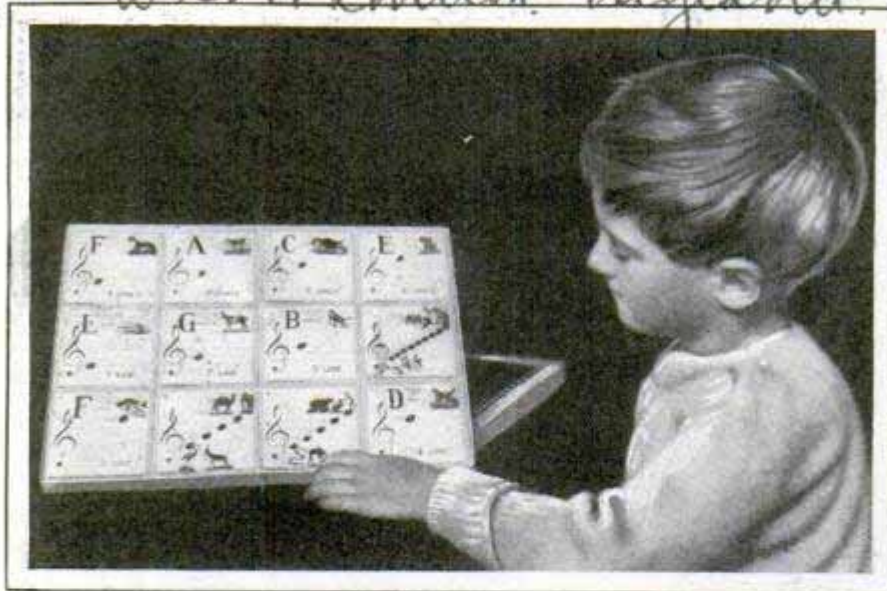


a western inventor has introduced, so that they may be removed and laid away where they will not be damaged after the game. The tip is held securely to the threaded section by gripping jaws so that there is little danger of its becoming loose while a game is being played.

*J. Krstich,
Smith Omaha*

W.C. London, England

844



To Make the Music Lessons Easier; These Blocks Are Printed with Notes and Scales as Well as Animal Pictures

BLOCKS TEACH CHILDREN MUSIC AND NATURAL HISTORY

To familiarize young children with the rudiments of music, blocks have been prepared that have notes and parts of the scale printed on them. The spaces of different notes are designated not only by diagram but by a picture of an animal as "cat" for the note "c."

BIG FLOATING ISLAND CAPTURED TO PREVENT INJURING DAM

Floating islands have been discovered in various parts of the world but few of them caused any trouble. However, when a block of land, estimated to contain eight or ten acres, broke away from the banks and floated down the Racket river, in New York, toward a power-plant dam, men and trucks were hastily assembled to capture it. The island was stopped and lashed to the shore with cables, but broke away again. It was finally made fast by towing it into a bay and building cribs of logs filled with stone about it

882
Hogley Falls, near Potosi, N.Y.

to prevent further journeying. The Racket river is a swift-flowing stream and carries a great volume of water.

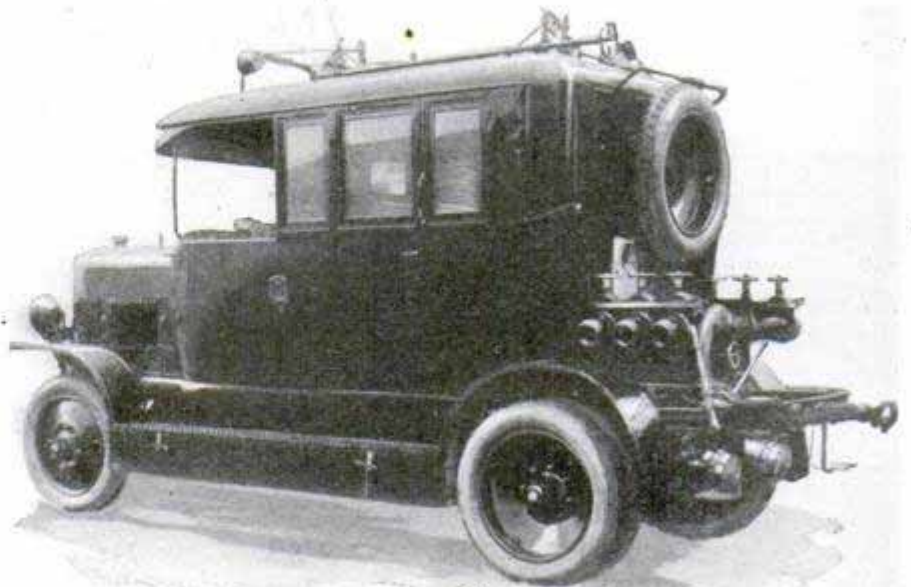
ENGLISH CLIMATE SLOWS U.S.-MADE TIMEPIECES

American visitors to England have found that they must set their watches ahead three minutes or so to counteract the effect of the climate upon the works, and some travelers have had to adjust their timepieces

at least twice a week. One manufacturer attributes the slowing to the damp climate. Many watchmakers declare that a change of altitude is more likely to affect the works than change of temperature.

FIRE ENGINE LIKE LIMOUSINE PROTECTS THE CREW

Firemen of a Paris company are shielded from unpleasant weather and water when answering calls or combating flames as their engine has an inclosed limousine-like body. The unit is provided with heavy tires, wire-glass doors, and several lines of hose can be attached to it at one time. A coupling hook at the rear permits using the outfit for towing.



Luxury for the Firemen; the Limousine Engine of a Paris Company Shields Occupants from Wind and Water

Chicago Daily News 11/10/26



Pilot Wesley Smith, of the Air Mail, Dressed in Fur-Lined Clothes and Ready to Hop Off on a Night Flight across the Mountains, Where Storms Are a Constant Menace to Flyers

LABORING along in a sea of cloud and fog, a night air-mail plane not long ago fell victim to one of the last of the great unconquered enemies of flying—ice—and was brought down at an emergency field in the heart of the Alleghenies. You have seen pictures of great transatlantic liners staggering into port with bows loaded under tons of frozen seas, but few, outside aviation circles, know that the same danger faces the airman thousands of feet above the earth.

When the cold, wet clouds hang low over the mountain tops and the craft are forced to climb through them to gain sufficient altitude to clear the peaks, the trouble begins. The moisture collecting on wings and propeller turns to ice. Great balls of it accumulate along the front edge of the wings and break up the air streams so badly that, even though the added weight may not suffice to bring the ship down, the loss of lift through interrupted air streams does the trick. When that happens, there is nothing to do but hunt an emergency landing field, and trust to luck that it will be good enough to fly out of again without waiting for dawn.

With such fields located every seventeen miles, the danger of a forced landing does not appear great, but actually it is enormous. Many of the fields are bad, since they are only meadows leased from

farmers; few of them are safe to fly into at night and still harder to fly out of. Added to a naturally difficult landing ground is the fact that the load of ice makes the landing speed of the ship from twenty to thirty miles an hour higher than normal—a condition that would be serious on even the best of fields.

"Bad weather," says Wesley L. Smith, one of the pilots who fly the night mail over the Alleghenies, "is our worst problem. And on this stretch we have more varieties of it than on any mail route in the country. I have flown over the Rockies, where altitudes are two and three times as great as they are here, but found them far easier to pass. In summer, the west seldom has thunderstorms, while we have them here almost daily. In the winter, in the Rockies it is either too bad to start out or else good enough to get through without difficulty. Here it is usually possible to start and often so bad at the finish that you wish you had stayed at home."

The summer rainstorms do not cause great trouble in themselves, for rain does not interfere seriously with visibility, but they usually are accompanied by low clouds and fogs, which come within 200 feet of the ground in flat country, and envelop all mountains, often rising to heights of 5,000 to 10,000 feet. At those

altitudes there are strong westerly winds, a decided help to the east-bound pilot, but ruinous for the west-bound plane, since gasoline is soon exhausted fighting them.

A St. Louis-Chicago plane last fall had an experience with fog on a bright moonlit night. When the pilot arrived over Chicago, he found 4,000 feet of fog and, because of the bright moon, could not see the powerful landing lights on the Maywood field. He circled around for two hours, hoping that a cloud might blot out the moon or the fog thin. Finally, with gasoline almost exhausted, he flew to the west for thirty miles to be clear of the city, shut off his engine to save the mail bags from possible fire, and stepped over the side with his parachute, thus making a safe landing.

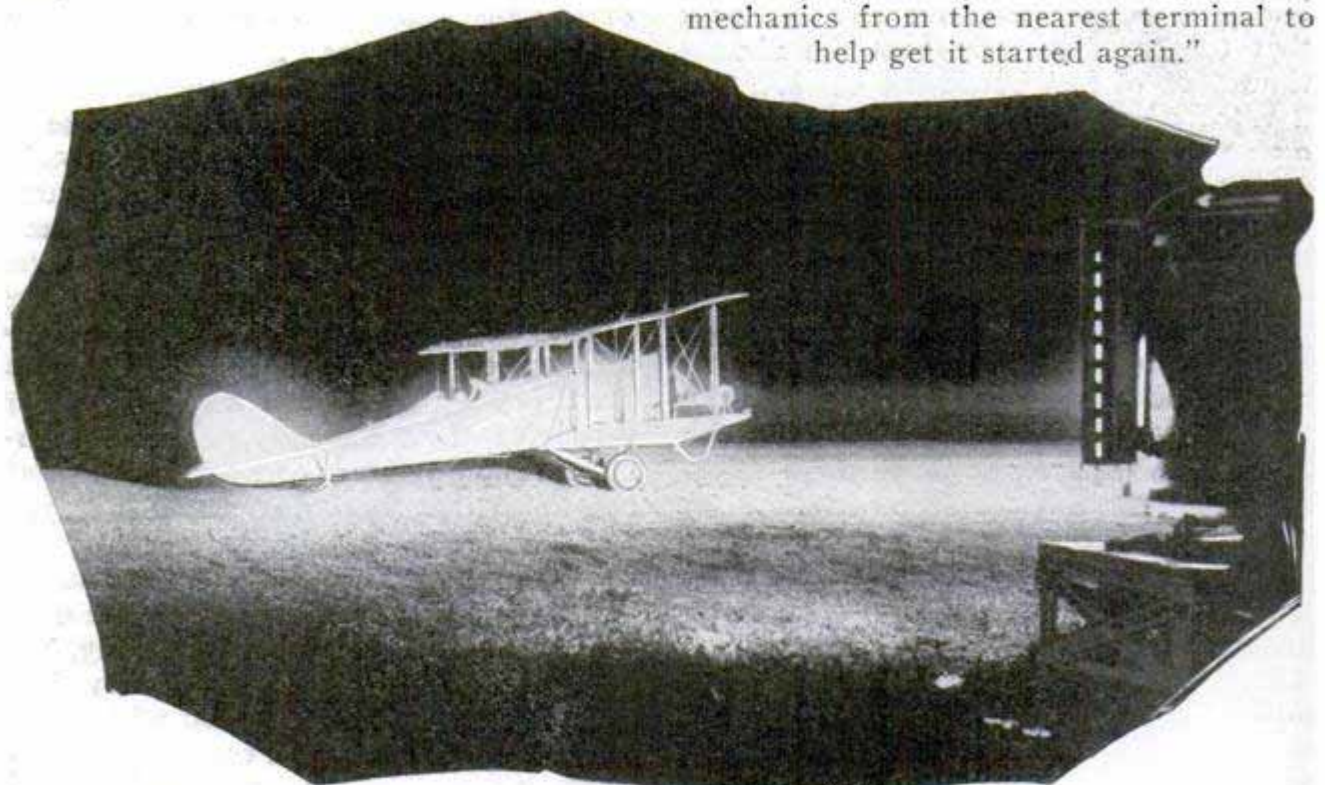
"We can start," Smith says, "in any fog, and land through it if the landing lights are visible. I did this one night at Bellefonte. The mountain near the field rose above the fog and guided me until I could see the landing lights straight down through the mist. I circled off and came back for the landing, only to find I had lost the lights. I made three trials, and on the third got in safely, though the visibility was less than 500 feet.

"Winter brings its own problems, not only of ice, but of snow. The clouds usu-

ally are higher in snowstorms, touching only the mountain tops, but visibility is poor; usually straight down is the only direction in which you can see. I flew through such a storm for an hour east of Cleveland one night, seeing only the towns and beacons as I passed. I was not in the clouds, for my landing lights on the wing tips did not flare into huge balls of luminous vapor as they do when flying in clouds."

Snow is a great help in flying, for even on the darkest night it is possible to see the ground. But, on the other hand, deep snow on an emergency landing field prevents its use, for the unlucky man who lands there must await a thaw, or the arrival of skis to replace the wheels on the ship before he can take off. The main terminals are rolled to pack the snow and planes can land and start easily with the wheels.

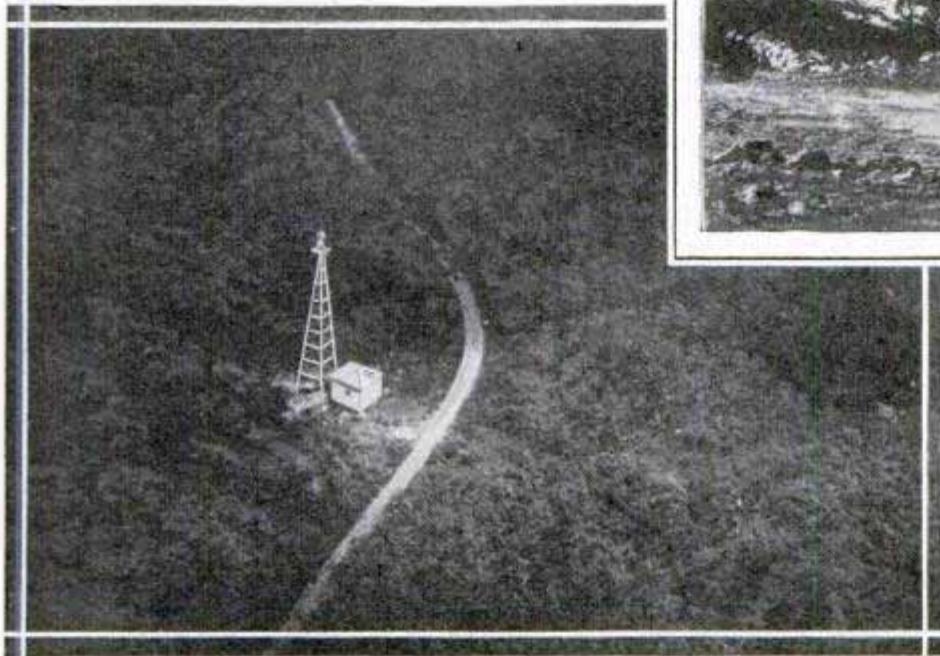
"When forced to land in winter on an emergency field," Smith said, "we always keep the engine running because it is too hard to turn over the propeller and start it again without assistance. An engine can be idled for several hours with very low gas and oil consumption, and the flight resumed when the weather clears. If the engine must be stopped, it usually is necessary to send out two experienced mechanics from the nearest terminal to help get it started again."



Powerful Floodlights on Landing Fields Are Designed to Throw a Low, Widespread Beam, the Top of Which Will Be below the Eye Level of the Pilot, to Prevent Glare

Flying isn't so bad, even in the coldest weather, in the new Douglas planes, which are replacing the old DeHavilands used for so many years. The cockpit is deep and the pilot is well protected, while a heater provides more hot air than really is needed. One of the exhaust stacks is surrounded by a jacket which delivers hot air in front of the flyer's feet. The outlet usually has to be turned away, however, because the air is so hot that it almost will burn the feet.

The pilot sits so low in the new craft that an arrangement had to be provided to hoist him up when he wanted to look over the side. The seat is equipped with powerful coil springs. Normally, his weight holds the seat down, but to get a



Beacon on a Wooded Mountain Top in the Alleghenies, Showing the Lack of Landing Fields; Above, a Beacon on a Wind-Swept Height



look over the side he has only to ease his weight and it shoots up like a jack-in-the-box. To go down again, he presses a button and the seat sinks under him.

The new planes also have reduced the ice danger. Their wings are of the thick type, less inclined to pick up ice balls than the thin wings of the older type; the braided-cable stay wires have been replaced with streamlined steel braces, and the aileron controls are concealed inside the wings. The old craft had the aileron cables stretched along the front edge of the wing, exposed to ice and with unprotected pulleys. It was necessary to work the ailerons on the wing tips constantly in bad weather to keep the pulleys from freezing tight.

whether the pilot is flying straight; a bank indicator to show whether the ship is going into a side slip; the fore-and-aft level, and the usual air-speed, engine-speed, gas, oil, water and electrical indicators. The bank indicator, built by one of the air-mail mechanics, is simply a slightly curved tube, filled with alcohol and containing a large steel ball, with very little clearance between the ball and the tube. If the ship banks, one wing dipping, the movement of the ball indicates the fact.

Besides watching all these instruments, the air-mail flyers have many other accessories to deal with. There are three navigating lights, red and green on the wing tips and white on the tail, and two landing lights, also on the wing tips. In addition



Hangars Are Covered with Lights to Warn the Pilots to Steer Clear in Making a Night Landing; the Dispatcher's Office Is in the Corner, and Back of It, the Pilots' Clubroom

Major Chase, Abbey Road, Chertsey, England.

to the latter, two big landing flares, attached to parachutes, are carried in a special compartment, from which either or both can be discharged by pulling a lever. Another lever pulls out pins which release the gasoline tanks, so that they may be dropped into space to remove any danger of fire in event of a crash. The tanks, which are built into the wings, are held in place by fabric strips passing be-

neath them, while connection to the gas pump line is made by a butt joint, kept tight by springs against the gaskets. All of the tapes are controlled by wedges, and when the release lever is pulled, the wedge slips out, freeing the tapes.

Despite the load of extra equipment for night flying—the lights and electrical system alone weigh 250 pounds—the new mail planes can carry 1,000 pounds of mail.

**GLASS TRAPS FOR SUNBEAMS
AID PLANT GROWTH**

2265

As a substitute for permanent hothouse or garden frames, small tent-shaped glass units held in place by anchor wires have been used successfully in England. Set together along a row, they form a practically shadowless covering for the plants, retaining the sun's warmth, deflecting rains toward the roots and protecting the leaves from soot. The ease with which the "traps" can be moved is considered a desirable feature.



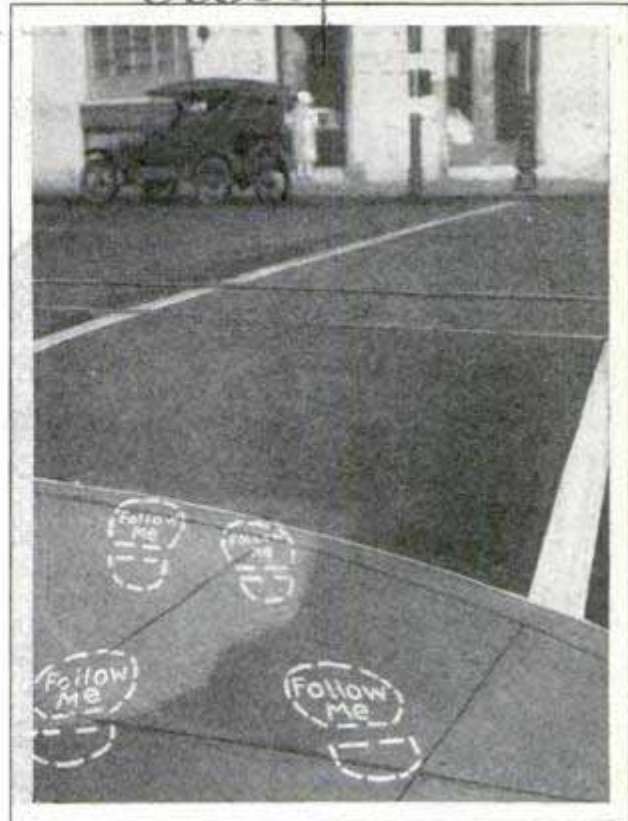
© The Fleet Agency
Little Glass Tents for Garden Plants to Aid Growth

Major Chase, Abbey Road, Chertsey, England.

Los Angeles 1819 E. 25th St. Los Angeles Calif
POPULAR MECHANICS
1032

MONEY FROM CITY RUBBISH

Instead of paying to get rid of its rubbish, Los Angeles sells it to concerns which convert it into marketable materials. Garbage is sold for sixty cents a ton for hog food and a by-products company pays \$500 a month for the city's junk. About eighty truckloads are received and sorted daily. Scrap metal is burned free of wood, paint and other foreign substances, pressed into bales and sold to a copper concern for about a cent a pound. Old automobile bodies are pounded into compact form for shipping by a huge pile-driver press. Tin cans, about 700 pounds to a load of rubbish, 100,000 unbroken bottles a month, paper and rags, radio batteries and electric appliances are among the things salvaged. Broken glass is shipped to China, where it is made into beads and lamp chimneys.



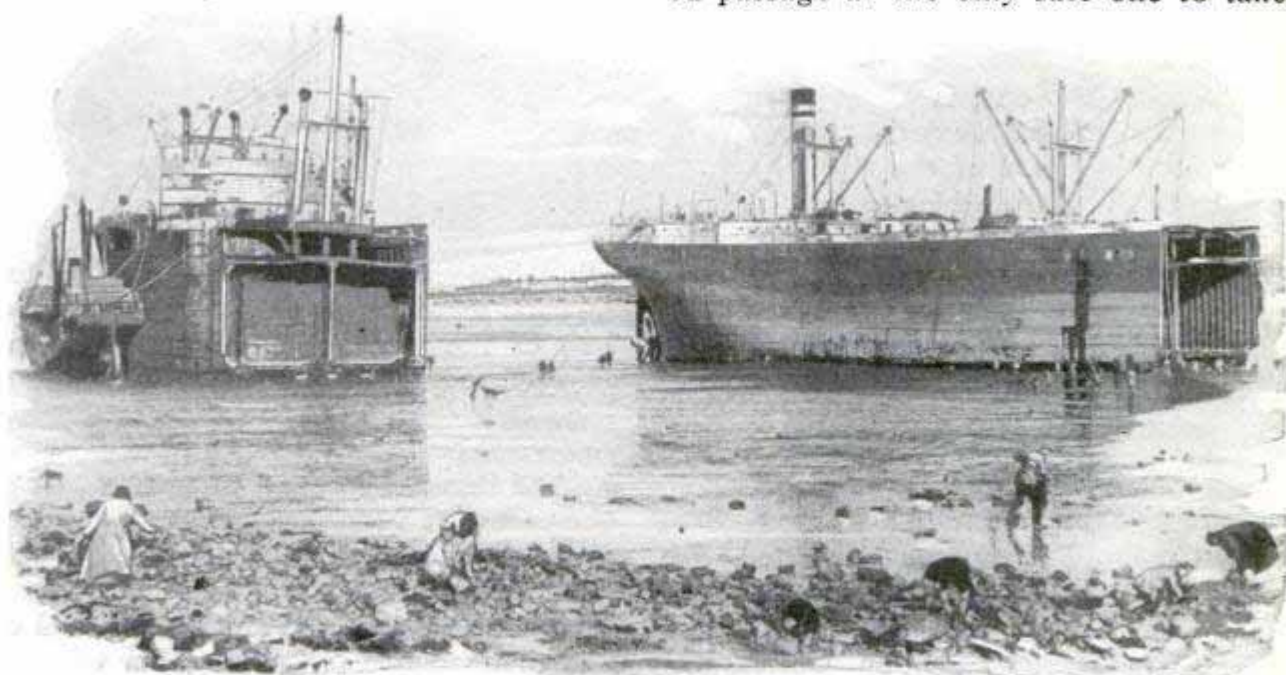
Leading to the Safe Path across the Street; Stenciled Footprints to Guide Pedestrians

BIG STEAMER BROKEN IN TWO BY FORCE OF STORM

Waves pounding against the stranded steamer "Valsesia," off Bary island, near the English coast, finally broke it in two. Before further damage could be done, salvagers towed the wreck to safer waters. The boat was carrying a cargo of coal and, at low tide, persons living near took the opportunity to gather up pieces that had been scattered about by the waves.

FOOTPRINTS SHOW PEDESTRIAN WHERE TO CROSS STREET

The trail of safety for pedestrians is plainly marked at intersections in Berkeley, Calif. In addition to the usual lines indicating the lane to follow, footprints, stenciled on the sidewalks and bearing the legend "Follow Me," point to the guarded passage as the only safe one to take.

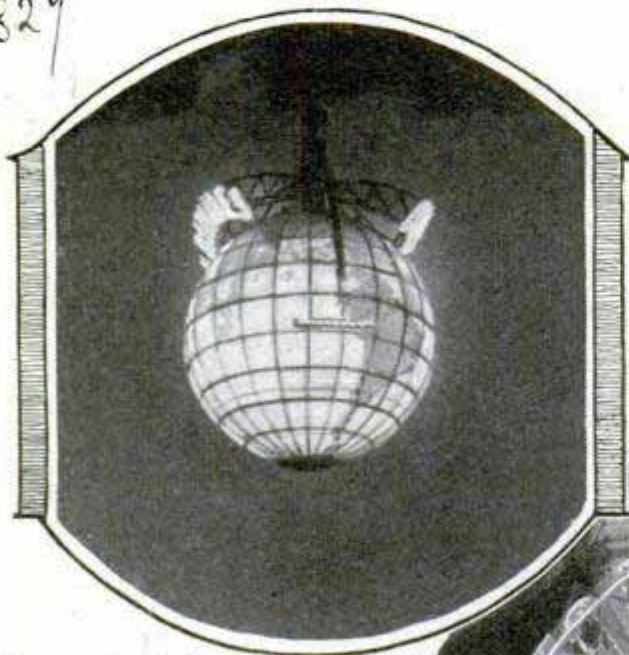


Broken in Two after a Severe Storm, the Steamer "Valsesia" Stranded near the English Coast; in the Foreground Are Villagers, Picking Up Pieces of Coal from the Cargo

the valsesia steamer

LIGHTED WORLD HOISTED AS SHIPPING SIGN

829



Sign as It Appears When in Position at Night with the Replica Ship Moving about the Globe, and Closer View in Day-time Quarters; It Is Lifted into Place with a Derrick

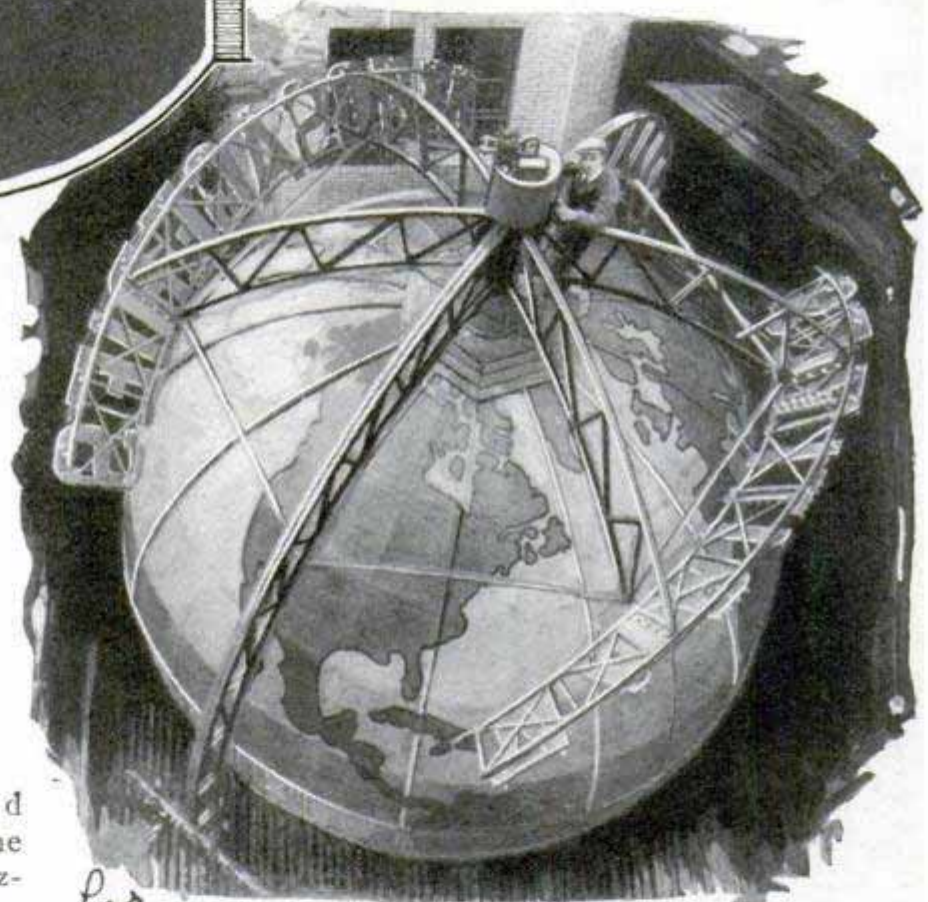
With the continents outlined in electric bulbs and a tiny ship moving across the "oceans," a miniature world is raised on top of a shipping office in Paris each night as an advertising display. The piece is hoisted with a large derrick and, during the day, is lowered to a sheltered alcove in the roof of the building. The large blazing letters around the top of the sphere spell the words "Messageries Maritimes"—the name of the concern.

Paris, France

CHANCE DISCOVERY OF MINES AIDED BY ANIMALS

Oil was recently discovered on an island off the coast of Honduras by the aid of a land crab. The region is infested with these creatures, which burrow into the soil like rabbits. One of them dug into a marsh under a cottage and the next day the occupant of the house detected the odor of petroleum. He had been seeking

oil for years without success but the crab's burrow directed him to a high-grade flow. A western pioneer discovered a valuable quarry of sandstone in Idaho by a fragment in a badger's digging, and a crow aided indirectly in the discovery of the rich gold fields of Pilbarra in western Australia. A small boy picked up a rock to throw at the crow and, noticing glittering particles in the piece, took it to a farmer who recognized the flecks as gold. In his excitement, he telegraphed the governor of the colony, "Boy picked up stone to throw at a crow," and forgot to mention the gold. The governor wired back, "Yes;



what happened to the crow?" The humorous incident marked the discovery of one of the world's richest gold regions. Camp fires have been instrumental in leading men to ore deposits. A Mexican Indian, upon awakening from sleep beside the fire he had lighted, found a piece of silver in the ashes. The chance discovery revealed that he had camped on ground worth thousands of dollars in rich ore. For a long time, settlers in Australia walked on soil that would have made them wealthy, without believing that the rock contained gold. In 1830, a convict was punished

630 21st Ave
New York City

after finding a piece of the precious metal. He was accused of melting a stolen watch, but the gold had come from a camp fire. A South African farmer, attracted by some bright stones in the clay on which his house was built, chipped them out and to his amazement found that they were diamonds. He traced the clay back to the pit from which it had been dug and so discovered one of the first South African mines that since have become world-famous. One of the diamond deposits in Kimberley was discovered by a child who found a "pretty stone" while she was playing on the banks of the river. She took it to her mother, who showed it to a merchant. Everyone laughed when he pronounced it a diamond. He wrote his name on glass with the stone, but the others were still unconvinced. He purchased the diamond for a trifle and sold it for \$2,500.

RACK OF TOYS FOR BABY'S CRIB SAVES NURSE'S TIME

Six or more toys are suspended from a bow-shaped support which is clamped to the baby's crib, preventing loss of the articles and saving the nurse the trouble of hunting for the things or picking them up. The toys are always within the infant's reach and their variety is intended to afford the baby added amusement.



Toy Rack Attached to Crib: Pieces Are within Reach of the Baby and Cannot Get Lost

Shown at the
B. J. Merkerhaus

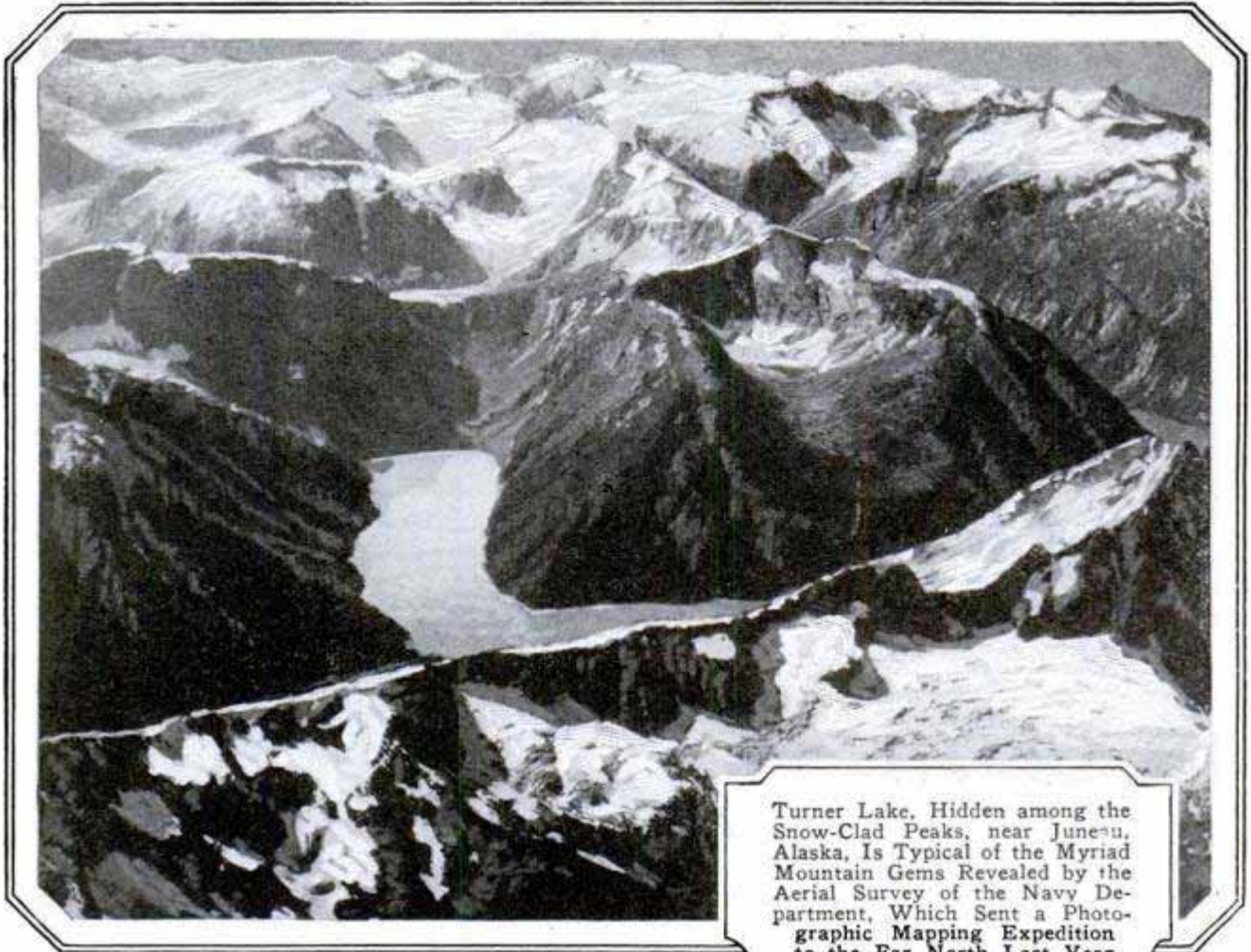
845
"Double" Camera for Action Views: Top Part Is a Finder without Curtain to Interrupt the Operator



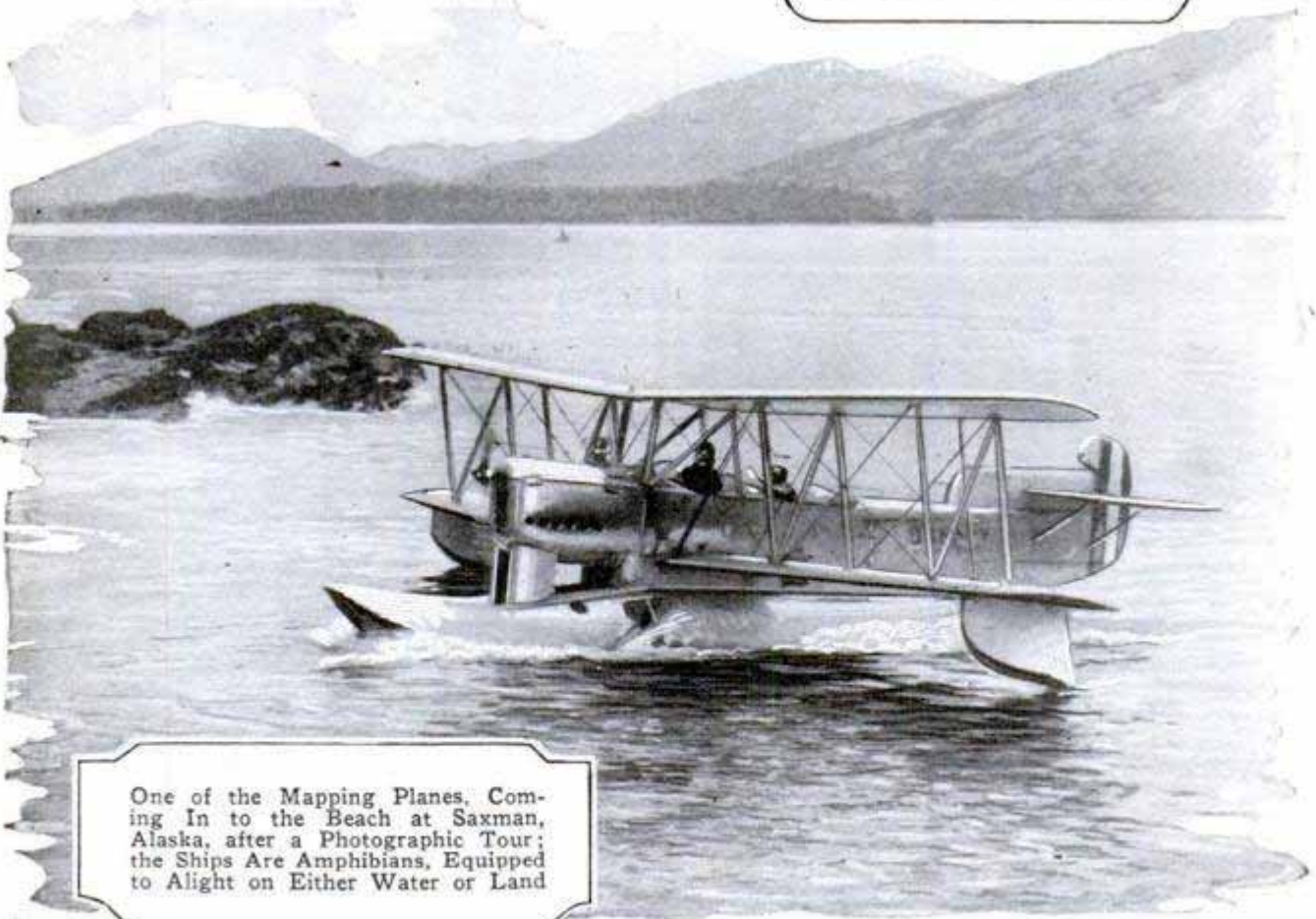
CAMERA FOR ACTION PHOTOS HAS CONSTANT FINDER

One of the difficulties in taking pictures of animals or other moving objects is that there often is a considerable change in the subject's position between the last look at the finder and the instant the exposure is made. To overcome this difficulty, a photographer, who has made a specialty of animal pictures, has devised what appears to be a large double camera. In reality, it is a single instrument, but the upper part is essentially a duplicate of the lower except that it contains no film or plates and projects a constant image of the subject upon a finder at the top up to the very instant the picture is taken. This eliminates the interruption of a "curtain" and makes certain that what the operator last saw in the finder before opening the shutter will appear on the negative properly focused.

☐ In winter, the snowshoe rabbit changes its coat from brown to white.



Turner Lake, Hidden among the Snow-Clad Peaks, near Juneau, Alaska, Is Typical of the Myriad Mountain Gems Revealed by the Aerial Survey of the Navy Department, Which Sent a Photographic Mapping Expedition to the Far North Last Year



One of the Mapping Planes, Coming In to the Beach at Saxman, Alaska, after a Photographic Tour; the Ships Are Amphibians, Equipped to Alight on Either Water or Land

514 Woodward Bldg.
Washington, D.C.



Flying over Burrough's Bay, Alaska, One of the Amphibian Planes Used in Mapping the Mountain Fastness Is Photographed by the Flyers in Its Companion Ship

Flyers Map Alaskan Mountain Ranges

Navy Planes Cover Fifteen Thousand Square Miles and Bring Back Pictorial Record of Impassable Snow-Clad Heights

SUCCESSFULLY mapping some 15,000 square miles of largely unexplored territory on Admiralty and Douglas islands, two of the long chain of American-owned Aleutian islands, navy flyers last summer set a new record for surveying in the Far North. Much of the country covered was so wild that it is questionable whether it could have been surveyed on foot. Over it the planes swept at ninety miles an hour, with cameras clicking automatically every few seconds, and covered in a single hour a greater area than an ordinary surveying party could have traversed in weeks.

In addition to the mapping, in which pictures were taken with camera pointed straight down, hundreds of "obliques" were shot of snow-clad mountain tops, hidden lakes, deeply shadowed coves and canyons and other natural features which will be invaluable in the work of the forestry, agriculture and fish commissions.

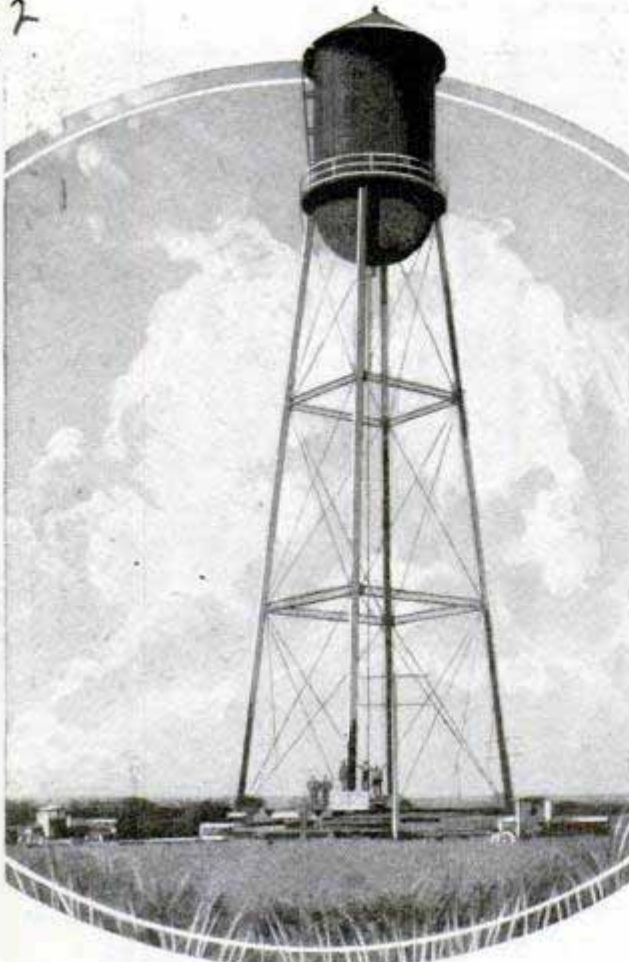
The camera disclosed immense forests, hitherto unknown, containing millions of feet of lumber. Mountain lakes, well stocked with fish, were revealed for the sportsman, and aerial views of great mountain heights, snapped at close hand, will prove of interest to climbers who wish to explore them.

The surveying party was equipped with amphibian planes capable of alighting on either land or water. Because of the isolated region in which they operated most of the time the surveying party had to transport complete equipment and supplies from the States. A mine sweeper furnished quarters for the officers and crew, while a large sea-going barge, fitted with a big deck house, provided a machine shop, photographic laboratory and rooms for the equipment and other supplies.

At some places the facilities of the salmon canneries were utilized, and, at the main base, huts were erected on shore.

11/3/26

877



Pulling the Tower across the Prairie; after a 630-Foot Journey, It Was Only One Inch Out of Plumb

STEEL WATER TOWER AND TANK MOVED SIX HUNDRED FEET

Moving a steel water tower, 150 feet high and surmounted by a large bowl, with a combined weight of more than 150 tons, seems a difficult engineering task, but the problem was solved by a Texas firm. So evenly balanced was the weight, on steel rails laid across the prairie, that one man was able to pull the tank with the aid of the tackle outfit. The first step was to build a framework of heavy timbers about the base of the tower, then tie the four corner posts together so that they could not spread. Rails were then laid and the tower was moved along them by means of steel rollers.

*C. Hansen & Son
Dallas, Texas*

greater distance than any other sound. It may be that vibration of the engine contributes to the noise of the airplane, but this is uncertain. It is possible that means might be found to silence the hum, but little would be gained if the roar could not be stifled also.

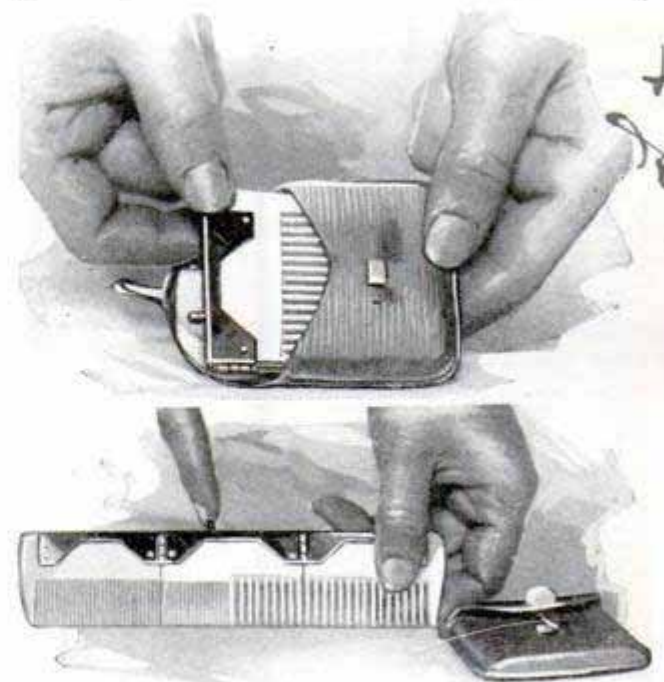
ONLY FEW OCCUPATIONS LEFT TO MEN EXCLUSIVELY

836

Women have established themselves in all but thirty-seven of the occupations followed by man, it was shown at a recent exposition in Cleveland, Ohio. Mining, electrical engineering and driving locomotives are among the fields that have not yet been entered by women, but they have patented a number of electrical appliances and several are engaged in the merchandising and managing phases of engineering as well as in many other branches of this field of endeavor.

FULL-SIZE COMB THAT FOLDS 644 FITS IN SMALL CASE

One of the common objections to pocket combs is that they are too small to be fully effective. This limitation is overcome in a full-size article that folds into a tiny case for the pocket or traveling bag. It has three sections which lock together, making the comb rigid when opened.



Folding Comb and Its Small Case; the Hinges Lock When the Comb Is Extended

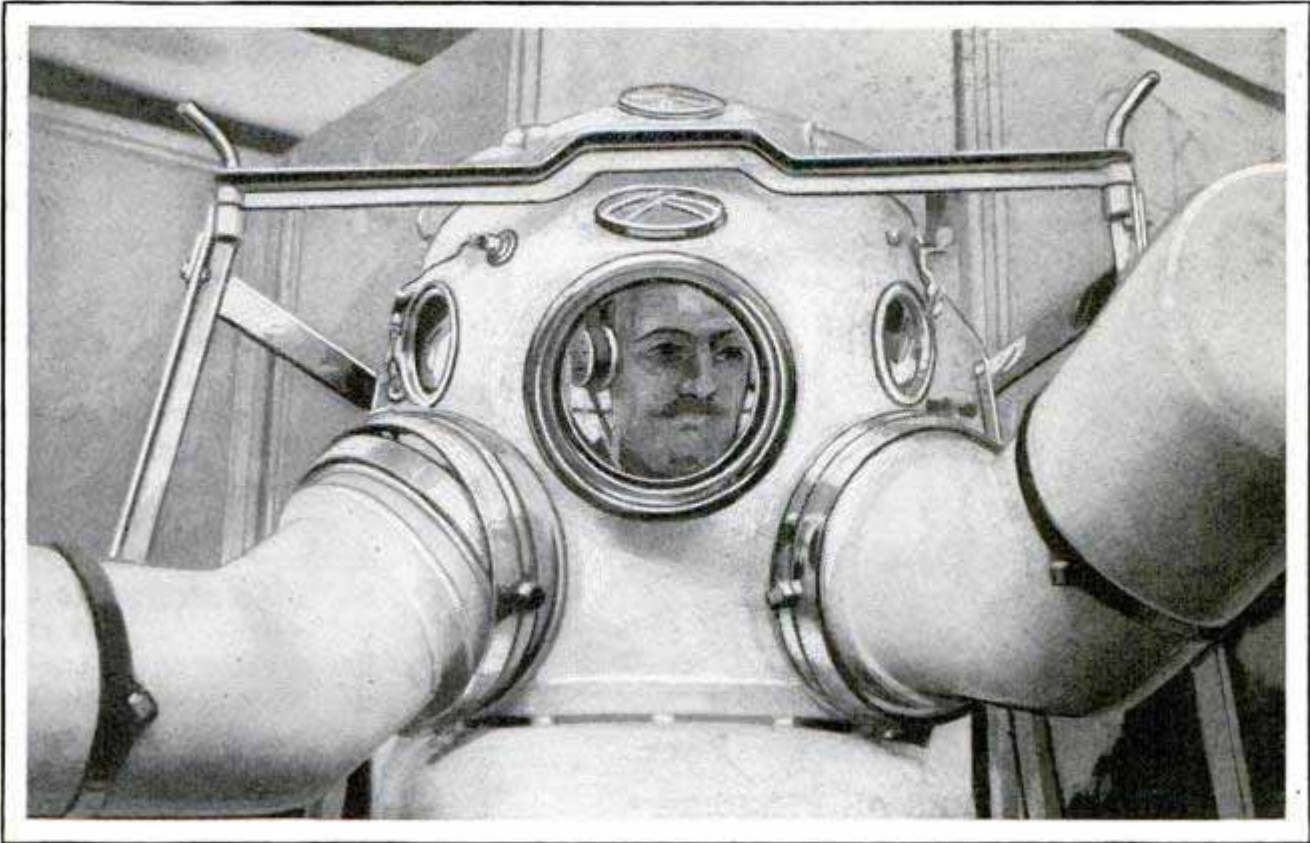
*1133 Broadway
New York City*

853 CAN AIRPLANES BE SILENCED?

Is it possible to silence the airplane? Recent tests in England proved that the noise consists of two parts, a musical hum caused by the exhaust of the engine and a roar from the propeller. The stays of the aircraft have an æolian song of their own, which occasionally is heard at a

*Com. Edwin Tarrise
The Harrop.*

Tom. J.C.



Copyright, Keystone View Co.

Radio Now Serves the Diver; Headphones on Occupant of Cage, through Which He Can Listen to Signals and Speech Broadcast from Tender Crew at Surface

WIRELESS SET IN DIVER'S CAGE REDUCES WORKER'S DANGER

One of the latest types of diving apparatus, exhibited in Berlin, contained radio headphones and connections to a small broadcasting set carried by the tenders at the surface, so that the worker within the cage could keep in touch with the men above. In this way, he could make certain that his signals were received and correctly interpreted.

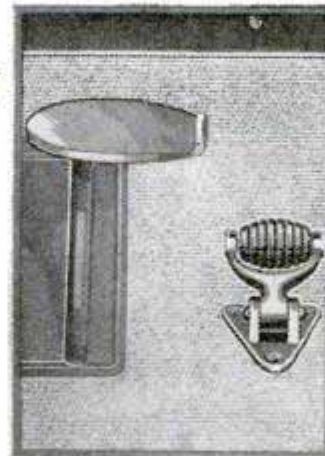
BREAKAGE OF LINER'S GLASS INCREASED BY SALT AIR

Ten thousand dollars a year may seem a large amount to set off against the mysterious breakage of table glass on an ocean liner, but an English expert explains it partly on the ground that the action of the salt air causes a "disease" in the glass which results in extreme brittleness and consequent early breakage. Glass, he declares, is highly variable in strength and its resistance cannot be determined as easily as that of some other materials. The strongest glass, as a rule, breaks into the greatest number of pieces. On ocean lin-

ers, glass decay, due to atmospheric influences, is manifested by minute holes appearing in the substance and these deepen so rapidly that breakage is sometimes occasioned by merely touching the glass with the fingers.

ROLLING AUTO ACCELERATOR MAKES DRIVING SMOOTHER

Safer and smoother driving is said to be realized from a roll type of accelerator



pedal for small cars. It is installed at the right of the other pedals and is easily distinguished from them by its shape and color, so that accidents are not likely to happen through use of the wrong pedal. When pressed, it swings and rolls forward smoothly and without jerks so that a perfectly even, and immediate, response is noticed.

Roller Pedal 32.00

87 77

*Cont. George H. Holder, Esq
Keystone View, 1400 Main Road*

*Williams Brothers, 250 S. Francisco, Calif.
Universal Corp.*

*Franklin Square
L. C., New York*



Forcing Rabbit from Its Burrow with the Steel-Wire Ferret

Screw-Dug
STEEL WIRE SERVES AS FERRET IN HUNTING RABBITS

To drive rabbits from their holes, a western inventor has devised a wire arrangement that takes the place of a ferret. It is twenty-seven feet long when extended, weighs less than two pounds and is easily carried. Made of special steel, it does not break when thrust and prodded in a hole.

LINERS CARRY FORTY GALLONS OF WATER PER PASSENGER

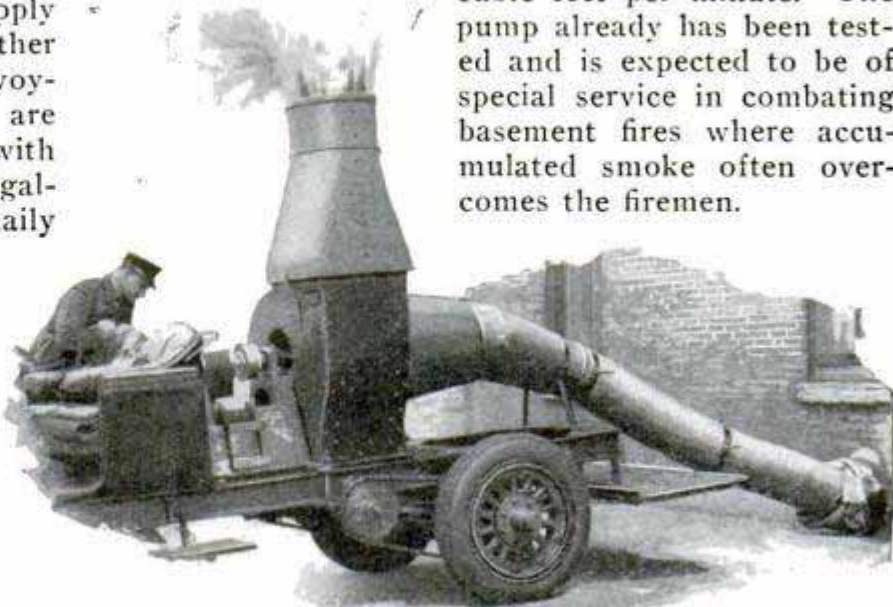
To insure a plentiful supply of water for drinking and other purposes during ocean voyages, the large steamers are equipped with huge tanks with a capacity of thousands of gallons. Estimates fix the daily consumption of fresh water by a first-class passenger on the "Majestic" at forty gallons. The average for the entire ship is approximately twenty-five gallons. The steamer takes on 1,424,000 gallons of fresh water at New York for every voyage. Of this, 804,000 gallons are for the boil-

ers. On a round trip, the "Majestic" uses more than 3,000,000 gallons. The "Olympic" consumes 680,000 gallons, the "Homeric" 860,000 gallons and the "Belgenland," 537,600. Almost all the large steamers are equipped with filtering plants and, although the water is pure when taken into the tanks, it is usually given three filterings before it is piped to the drinking supplies and two before it goes to the bathrooms. In the earlier days of ocean travel, the amount of fresh water each passenger could have was limited. Third-

class passengers received only three pints a day against about fifteen gallons now.

"SMOKE EATER" IS LATEST AID IN FIGHTING FIRES

Operating on the same principle as a vacuum cleaner, a smoke pump is intended to withdraw fumes and polluted air from building interiors, during a fire, for the protection of the men. A huge hose, about fifteen inches in diameter, is passed into the room to be pumped out and air can be withdrawn at the rate of 10,000 cubic feet per minute. The pump already has been tested and is expected to be of special service in combating basement fires where accumulated smoke often overcomes the firemen.

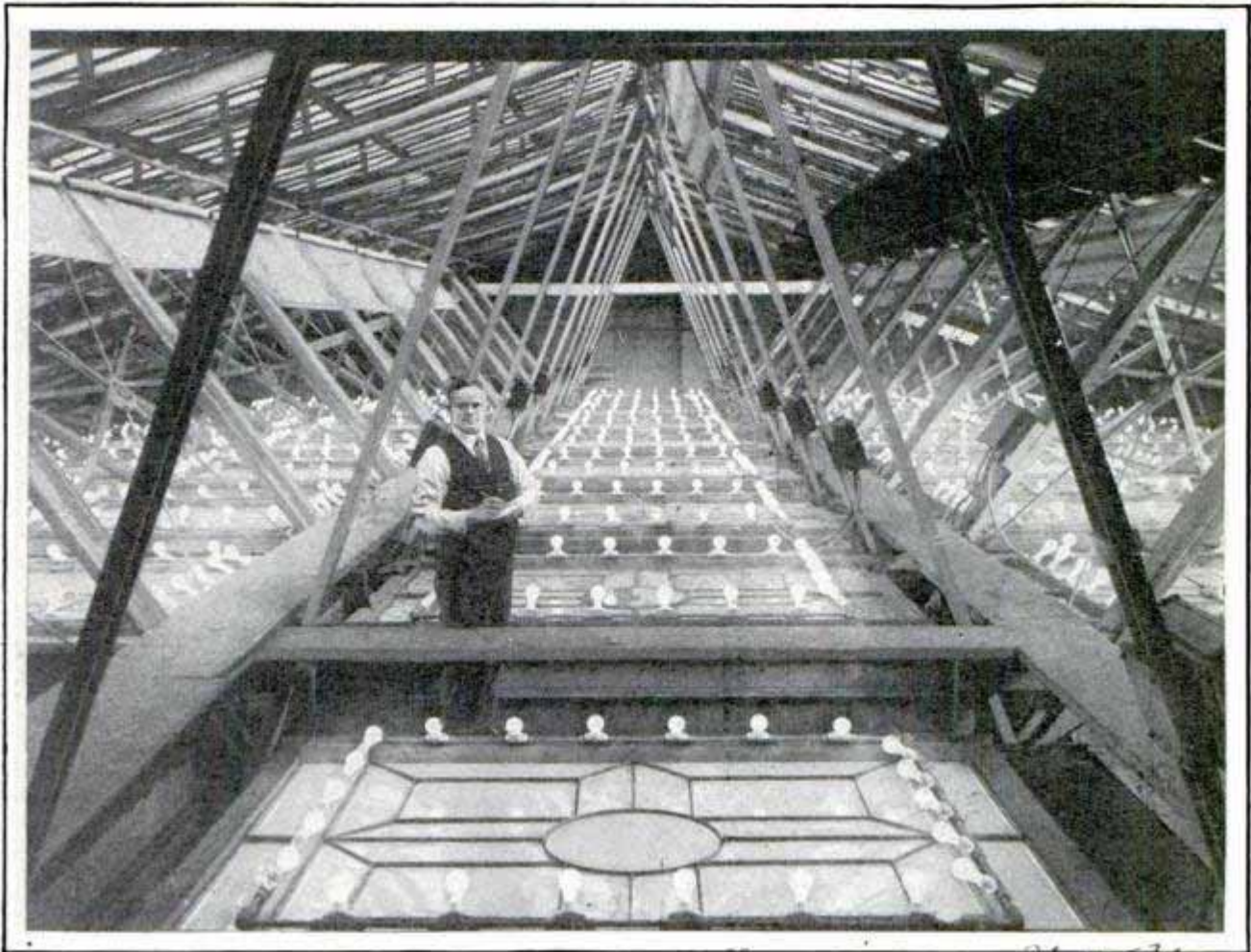


Drawing Smoke from Basement with the Suction Pump

*Wm. Charles King
Fire Chief*

\$4.00 by mail only.

*Ocean Service
New York, 1916*



"Above the Scenes" in the U. S. Senate Chamber; View of the "Garden" of Lights Placed Back of the Ceiling Glass to Illuminate the Room's Interior

HUNDREDS OF HIDDEN LAMPS LIGHT SENATE CHAMBER

To provide sufficient illumination for the United States senate chamber, more than 1,100 electric lights have been installed back of the glass in the ceiling. There are 550 fifty-watt lamps, 460 of 100 watts and 178 seventy-five-watt globes. All are arranged in such a way as to produce an even and effective glow.

FLY WINGS MEASURE HEAT IN DISTANT STARS 862

Parts of an instrument being constructed at the Smithsonian Institution for measuring the heat in the fainter stars are made of fly wings, so delicate are the units for the apparatus. It is the work of Andrew Kramer, "wizard craftsman," who has astonished his fellows by similar contrivances of almost unbelievable accuracy. For instance, he has shaved down a brass tube to such thinness that it crumpled un-

der its own weight like paper. One of the parts in a device for standardizing measurements of the sun's heat received on the face of the earth is a screw thread cut in a piece of ivory so thin as to be almost transparent.

GOLF SCORER ON WATCH STRAP AIDS ACCURATE GAME 824



Attached to the same strap that holds the wrist watch, a dial recorder for keeping track of the number of golf strokes, eliminates the use of a pencil and pad. It may be removed from the strap when the game is

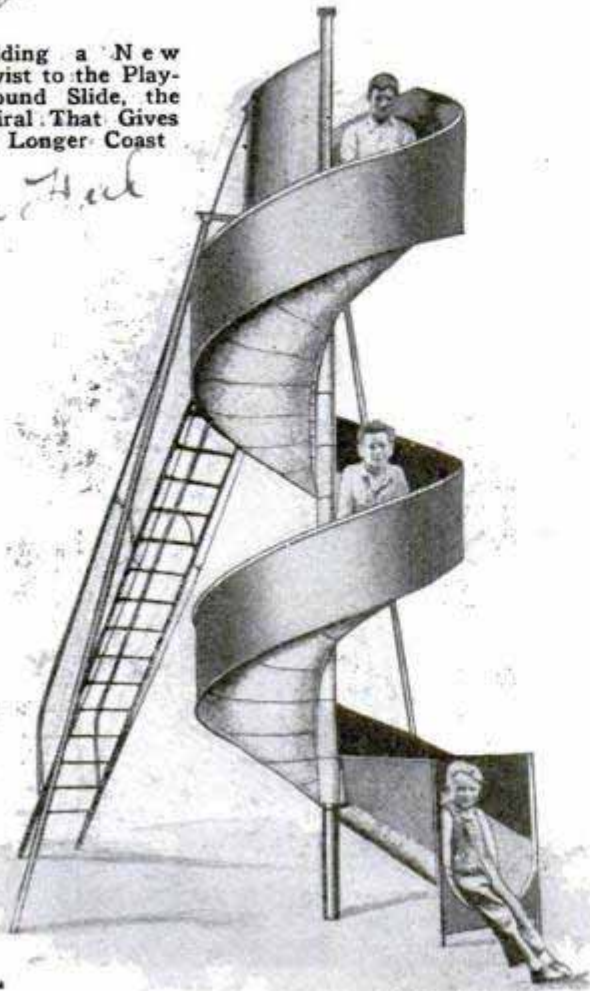
finished so that the timepiece can be worn alone.

*George H. Fuller +
S. J. Co. Madison*

852

Adding a New Twist to the Playground Slide, the Spiral That Gives a Longer Coast

Murphy



SPIRAL SLIDE FOR PLAYGROUND INSURES CHILD'S SAFETY

The principle of the winding slide fire escape has been adapted to a playground unit in a chute with high sides to prevent the child from falling, and a safe ladder for reaching the top. An additional feature of the equipment is that it provides a longer slide than the straight type and does not take up so much room.

HAIR WAYER HEATED BY WATER PREVENTS BURNING

Heated by water instead of by flame or electricity, a hair wayer introduced in England eliminates the danger of burning. Boiling water is poured into a plated container which forms the upper part of the wayer. It cannot spill al-

W. H. Sargent



Hair Wayer, Showing the Chamber for Hot Water at the Top; Long Applications Are Possible

© C. A. Oldroyd

though the steam is allowed to escape. The temperature of the heating element is kept below the boiling point, and since there is little risk of damaging the hair, the wayer may be kept in one position for a longer time, producing more permanent results.

VIOLET RAYS BRING HAPPINESS TO ANIMALS IN ZOO

To improve the health and disposition of animals in the London zoo, authorities have decided to adopt a kind of glass that admits the ultraviolet rays from the sun instead of the ordinary material which excludes the beneficial beams. The effect of the new glass, as compared with the old, was illustrated in the case of "Murphy," a young orang-utan. The animal had been cross and finicky about its feed and was bald in spots, but since the installation of the special glass, "Murphy" has been cheerful, willing to eat almost anything and has a new coat of hair. Like results were observed upon a family of small monkeys, and lizards, which moped and died during the winter months, are being kept in good health with the aid of ultraviolet rays. Zoo keepers in other parts of the world are studying the new glass with a view to using it in animal houses.

ONE TON OF SOFT COAL YIELDS MANY GALLONS OF OIL

Lubricating and fuel oils, and aromatic compounds suitable for "no-knock" motor fuels, to a total amount of 140 gallons can be derived from a single ton of soft coal, according to Dr. Friedrich Bergius of Heidelberg, Germany. He is credited with the invention of a process for liquefying coal into oils by treatment with hydrogen under great pressures. The net yield, after deducting the coal consumed in the operation, is 104 gallons to the ton. Dr. Bergius says that all problems touching the practical and economical application of the process have been solved.

9 + 10 Charing Cross, London S.W.1

10/6 post free - duty England by customer

884

Chicago Tribune 11/16/26

Douglas Jimmy & Co. Ltd. Gloucester England

5-6-7

Magic with Money

By W. B. GIBSON

MANY of the best and cleverest tricks are performed with coins. Those explained in this article are intended for the reader who is not skilled at sleight-of-hand; and they can be learned by anyone with very little practice.

The "Coin from the Elbow" is an interesting trick. You show both hands empty, and deliberately drop a penny down your left sleeve. Then you place the fingers of your right hand against the left elbow, and mysteriously draw the coin through the cloth of the sleeve. Two coins are used. One is set between the buttons of the left sleeve, near the wrist. The front of the left hand is kept toward the people watching the trick, so they do not see the hidden coin. The first is dropped in the left sleeve. Then you



Discovery of the Missing Coin in an Apple or Orange Is a Simple Trick That Always Mystifies the Onlooker

place the tips of your right fingers behind the left sleeve, and slide the right hand down to the left elbow. Your fingers pick up the hidden coin on the way, and carry it down to the left elbow, where it is drawn into view, apparently through the sleeve.

Here is a quick and surprising method of making a coin disappear. Hold the coin in your right hand and slap it into the left palm, two or three times, making a downward sweep with the right hand. As you finish the last sweep, you can show both hands empty. This is accomplished by keeping your eyes on the left hand, so that everyone watches that spot. The right hand, in its last upward sweep,



Here Is How It Is Done, with a Bit of Wax Holding the Coin; in Actual Performance the Finger Hides the Penny

it, tear the box to pieces, to show that the coin is not there. This will prevent discovery of the opening in the end.

A coin may also be made to vanish with the aid of a small piece of paper, about the size of a playing card. Lay the coin in the center of the paper, and fold in the sides, then fold in the outer end of the paper, holding this in your left hand. As you tilt the outer end upward, the coin will slide into your left hand. Then you must fold up the inner end of the paper with your right hand, and lay the paper on the table with the right hand. When the paper is later unfolded, or torn to pieces, the coin will be gone. Either of the preceding tricks may be performed with a borrowed coin, which has been marked. As the coin is in your possession, while the observers think it is in the box or the paper, you can cause it to reappear in



Top Row, Start of Eight-Coin Puzzle, Second Row, the Finish, and the Others, the Four Successive Moves of Two Coins Each

simply drops the coin on the brim of your hat, in front. The coin remains there, while the hands are shown empty. If you are not wearing a hat, you can drop the coin in your hair, but, in this case, a small coin must be used for the trick.

Any coin may be made to disappear with the aid of a match box. First, prepare the box by cutting a slit in one end of the drawer, at the bottom. Place the coin in the box, close the drawer, and shake the box sideways, so that the coin rattles. Then tilt the box and the coin will slide through the slit into your hand. The box is then laid aside, and when it is opened later on, it is empty. If anyone still thinks that the coin is in the box, and wants to examine



The Coin Is Dropped Up the Sleeve, While a Duplicate Is Concealed between the Coat Buttons for Later Production; at Right Is an Easy Way to Make a Coin Disappear



a most mysterious fashion. You need a table knife, with a broad blade and an apple or an orange. They are lying near by. You bring the fruit forward, showing that it is entirely unprepared. Then you cut it in half, and the coin is found in the core.

On the side of the knife blade, rather close to the handle, you must previously affix a dab of soft wax. In getting the knife, press the coin against the wax, bring on the knife with the orange, but hold the knife so that the coin is out of sight.

Cut the examined fruit with the blade, and push the knife forward so that the coin goes into the orange. Press the latter firmly and withdraw the knife. The coin will remain in the orange, and you may let anyone separate the two hemispheres and find the coin between them.

Another method of recovering the missing coin requires nothing more than a piece of cardboard, a little larger than a playing card, or a small pin tray, if one is available. You place the cardboard on your left hand, so that it



How Many Pennies Piled Up Equal One on Edge? Try It and See; at Left Is a Simple Method by Which an Extra Coin Can Be Added to Those Placed on the Cardboard

hides the coin that is resting there. Then you ask different people to lay coins on the cardboard. When you have collected several coins, let them

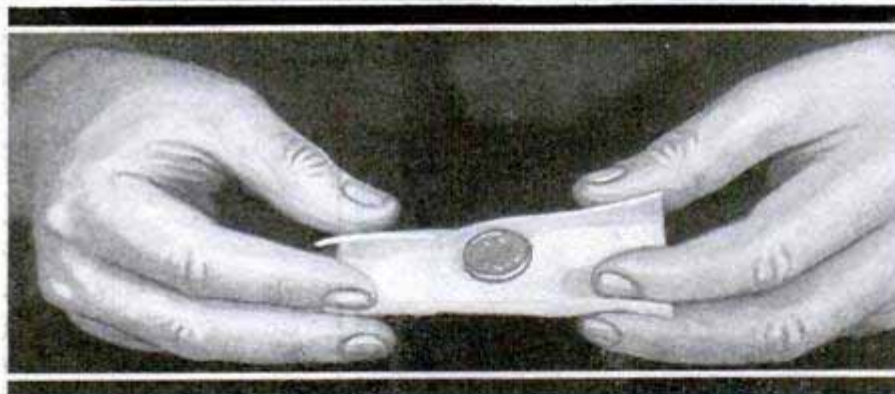
slide into the hands of the person who lent you the missing coin.

At the same time release the coin from beneath the tray, and when he counts the coins that have been deposited in his hands, he will be surprised to find his coin among them.

There are two very interesting "stunts" with coins that are not really tricks; but they are worthy of mention, because they never fail to create surprise. Suppose a one-cent piece is stood on edge. How many pennies, stacked in a pile, would be required to reach the same height? Most persons will say that five, six, or seven are sufficient. But the correct answer is thirteen. When you state that fact, nine out of ten people will not believe you until

A Slit in the End of a Pocket Match Box Provides an Opportunity to Make a Coin Disappear from the Box at Will or to Reappear





Another Easy Method of Making a Coin Disappear from a Folded Paper, Which Can Then Be Torn in Bits

you have actually demonstrated it with the coins themselves.

The other perplexity is this: "How many pennies can you lay on a silver dollar without allowing any of them to extend over the edge?" The pennies, of course, cannot be stacked, but must be laid side by side on the larger coin. Nearly everyone will say that three, four, or more pennies can be thus placed; but as a matter of fact, one is the correct answer. The second penny will go over the edge of the silver dollar. This is another fact that people won't believe until they see it.

A good little trick may be performed with a nickel and a small cylindrical box, of the type which contains a roll of half-

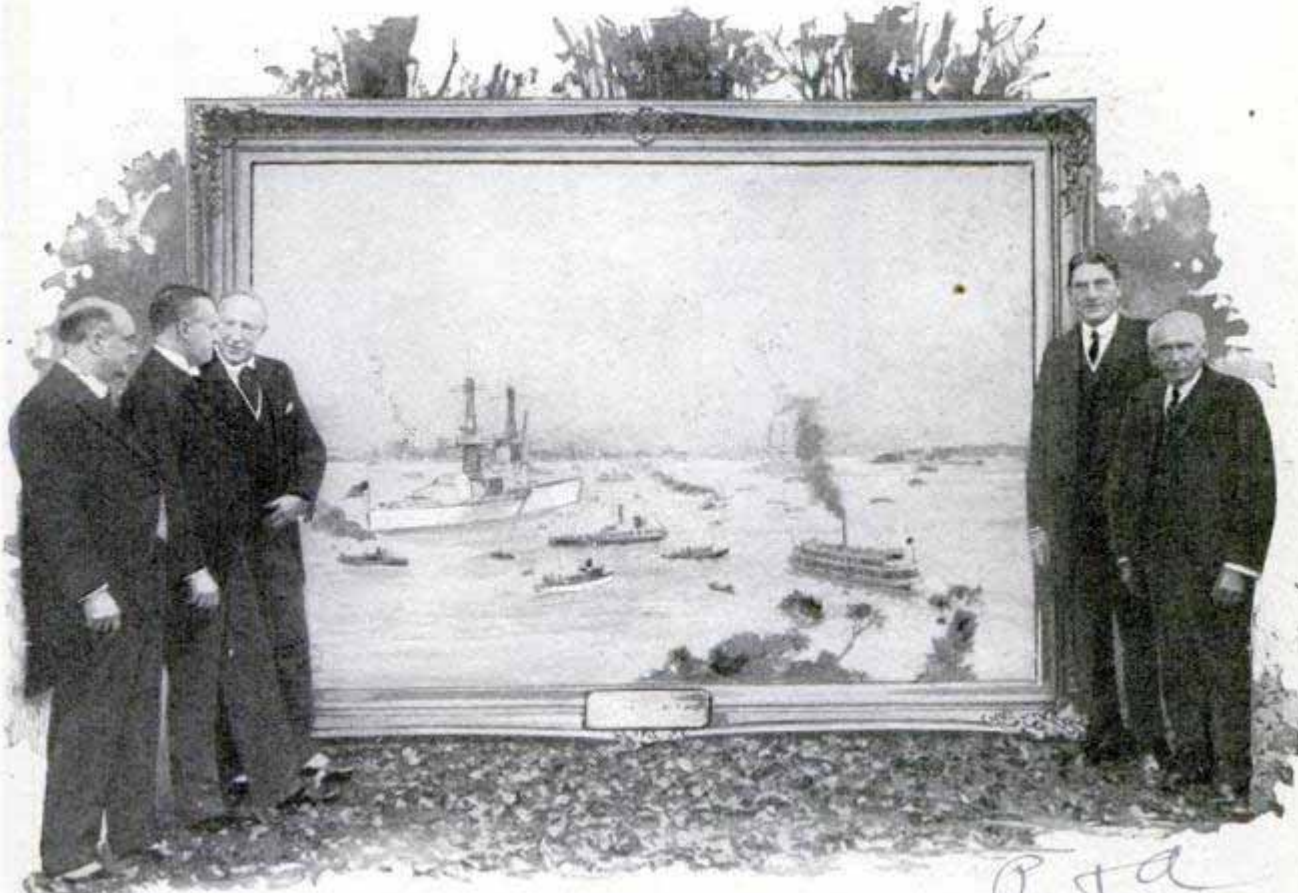
inch adhesive tape. First you drop the coin in the box, put on the cover, and give the box a shake to show how easily the coin turns over inside. The coin is put in head up; after the shake the tail side is up. Then you drop the coin in again, clamp on the lid, and shake the box vigorously for ten or fifteen seconds. Looking at the top of the box, you say: "The coin is now lying head up." When the cover is removed, there is the coin, head up! This trick may be repeated several times; but you will be right every time.

The secret lies in the fact that the box is not quite as high as the diameter of the coin. As previously mentioned, people invariably underestimate the diameter of a coin; and the coin looks very small and insignificant, when dropped in the box.

So when you place the coin in the box, simply note which side of the coin is up. Then you may put the cover on, and shake the box a great many times; but the coin will not turn over.

But before you began the trick, you showed that the coin did turn in the box. This was accomplished by putting the cover on very lightly. The thumb and forefinger hold the cover in place, while you give the box a few revolving shakes, to make the coin turn over. The slight gain in the height of the box thus obtained allowed the coin to turn. Some of these boxes are not quite so deep as others. If you happen to have a shallower box, use a penny instead of a nickel. You can easily discover what kind of a coin to use by standing the different coins on edge in the box. The coin that just barely projects above the rim is the one to use.

There is a very puzzling trick with eight pennies. Lay the coins in a row so that



Left to Right, J. J. Rouse of Sydney, President Coolidge, Sir Hugh Denison, Australian Commissioner, Secretary of Navy Wilbur and Secretary of State Kellogg beside Painting of Fleet

they alternate heads and tails. You must then move the coins two at a time to other positions, so that in four moves all the heads and tails will be together, observing the rule that the two coins moved each time must be side by side.

The diagram explains how the four moves are made, and you should practice them until you can perform them quite rapidly. You can then make the moves yourself, and the average person will be unable to follow them.

A juggling trick, which requires a little practice but is a very entertaining feat once the knack has been acquired, consists in laying a dime or a penny on your wrist, the palm of the hand being held upward, and making the coin turn over without touching it.

Simply snap your thumb and second finger. The wrist action of the muscles will make the coin turn a neat somersault. Find the right spot on the wrist, and it will work very easily.

☐ Lighthouses on the Atlantic coast have been painted with large arrows pointing north to help guide aviators.

GIANT PICTURE OF FLEET GIVEN TO PRESIDENT COOLIDGE

In commemoration of the visit of the United States fleet to Australia, Charles Bryant, of New South Wales, painted a picture showing some of the battleships at anchor in the harbor at Sydney. The painting was presented to President Coolidge and is to hang in the national art gallery at Washington.

FAUCET WATER HEATER RUNS FROM LIGHTING SOCKET 826.

Running hot water is quickly available from a portable electric heater that is attached to the faucet and supplied with current from a light socket. A flexible nozzle leads the stream through a jacket in which is a special heating coil.



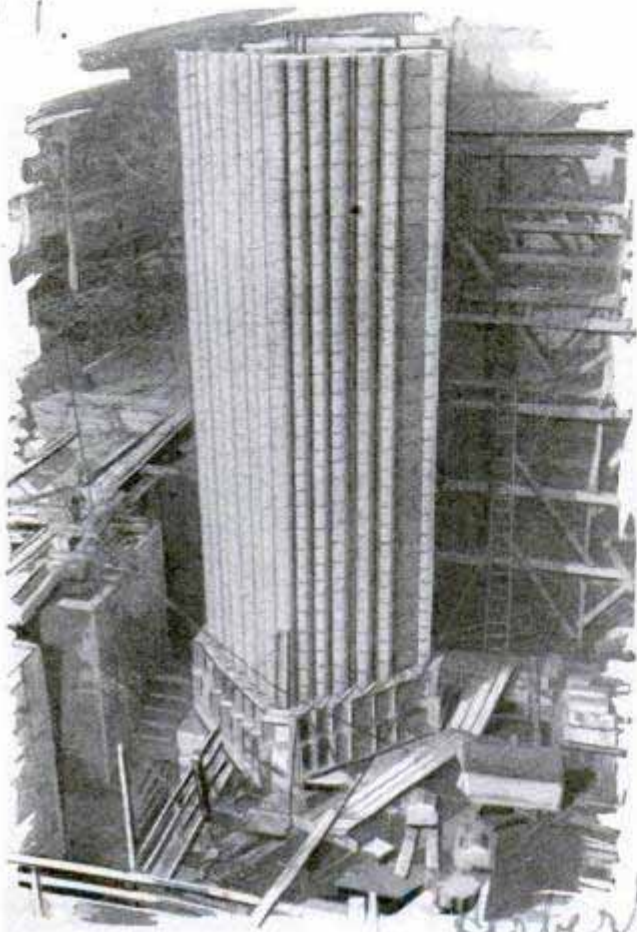
\$12.50.

The hot water comes out of a spout on this housing.

*H. L. Es Mfg Co,
1301 W. 29th St.
Chicago, Illinois*

**BLOCKS IN CATHEDRAL COLUMN
EACH WEIGH EIGHT TONS**

879.



Pillar of the Nave for the Cathedral of St. John the Divine under Construction

Under the expert hands of master craftsmen, the Cathedral of St. John the Divine, in New York city, is slowly taking form. The enormity of the task is emphasized in such details as erecting the huge supporting columns for the nave. The pillars are composed of layers of four great blocks of limestone, each weighing eight tons. The column illustrated here, not yet finished, weighs more than 1,200 tons. Accurate fitting and careful joining are necessary to give the unit its strength and evenness.

909.

**TEMPERATURE EIGHT MILES UP
NINETY-SIX BELOW ZERO**

A United States weather balloon encountered a temperature of ninety-six degrees below zero Fahrenheit at an altitude of a little more than eight miles during a recent "sounding" of the upper air. This represented a drop of more than 166 degrees from that prevailing at the surface near Royal Center, Ind., where the

U.S. Weather Bureau

balloons were started. In all, forty-four flights were made, either singly or in groups. Recording instruments and a self-opening parachute were attached to each. Thirty-seven of the cases were found and returned to the weather bureau after flights that, in some cases, extended over 200 miles. Some of the balloons reached altitudes never attained by any human being. The highest went about ten and one-third miles. At this point, a slightly higher temperature was found than at the eight-mile level. This relatively warmer area is known as the stratosphere. It has several peculiarities, being warmer than the air below, free from clouds, and the winds are less severe than in the layers just beneath it. The bottom of the stratosphere varies in altitude, the instruments showed. Its height is not known. Balloons have ascended nineteen miles without going past it. The balloons used for this service are about forty inches across when inflated and they expand to a bursting point in the rarefied air. The instruments with their parachute and wicker case, which serves to take up the shock when the outfit reaches the earth, weigh less than a pound.

**TIRE VALVE HAS BUILT-IN
PRESSURE GAUGE**

885

An automobile tube now on the market is equipped with a valve which has a built-in air-pressure gauge, visible under a transparent cap, so that each tire shows its condition at a glance. The main valve

Viscometer



stem has a piston, held down by a spring, and the piston wall is engraved and marked for various pressures. The piston is hollow and the usual filler cap screws in the top of it, the valve parts being inside the piston. The dust cap is replaced by one with non-

breakable transparent sides, so that the reading can be made readily.

*The Viscometer Corp
30842 nd st*

Chicago, Ill. U.S.A.

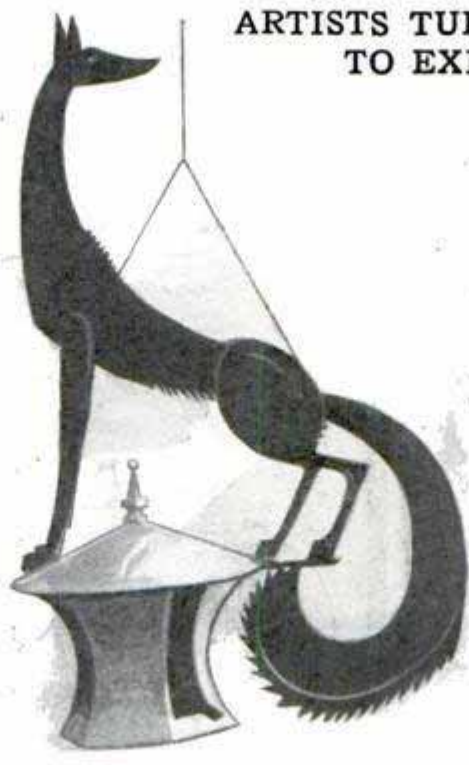
10/4/26

HOW SKYSCRAPER GOT ITS START

The constantly increasing height of modern buildings is made possible by two inventions—the passenger elevator and the steel frame, which not only supports itself but carries the weight of the confining walls. When the first Equitable building was built in New York, in 1869, rising to seven stories, with a passenger elevator with a speed of 100 feet a minute, it was considered a daring departure, but quickly justified itself. It took eighteen years, however, from that date before the first steel skyscraper, twelve stories high, was built in Chicago. That was the Tacoma building. Others followed quickly.

902

ARTISTS TURN TO IRONWORK TO EXPRESS IDEAS



Chimney Pot with Wolfhound Vane Done by American Artist in Wrought Iron



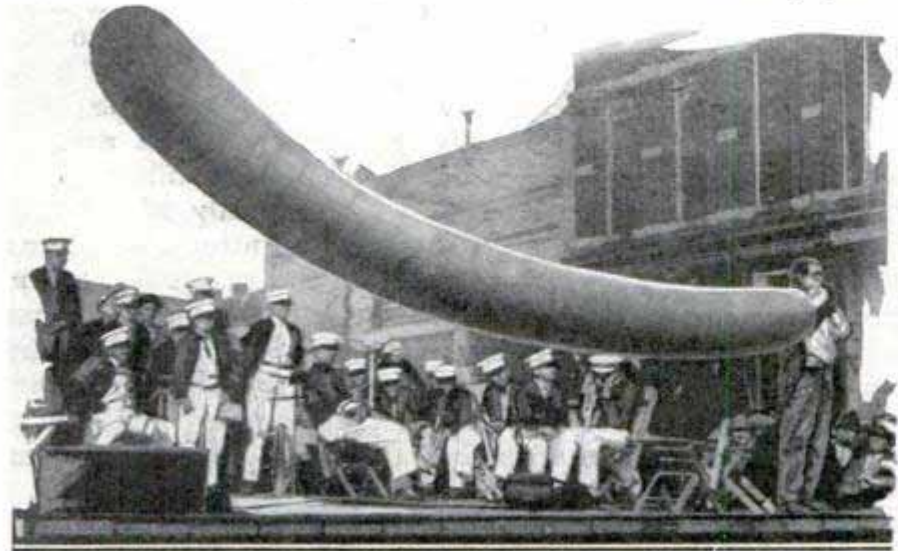
Hunt Liederich American Artist in Paris

Handwrought ironwork, including chimney pots, weather vanes, fire screens and lanterns are being produced by members of the American art colony in Paris who have given up paints and the sculptor's chisel for forge and anvil. Their work has attracted so much attention that recently a number of American artists deserted the annual salon and organized a purely American exhibition. Some of the work, such as the combination of wolfhound weather vane with a revolving chimney pot, showed unusual originality.

STRENGTH OF LUNGS TESTED BLOWING UP TUBE

928

The blowing championship of Nebraska was awarded to a young farmer of that state after he had inflated an inner tube to a length of twenty feet and a circumference of fifty-six inches wholly by his lungs. Shortly after, the tube burst. It took eighty minutes of puffing to fill the tube.



Just Before It Burst; the Inflated Inner Tube After the Champion Had Puffed at It for Eighty Minutes

USES OF SHELLAC

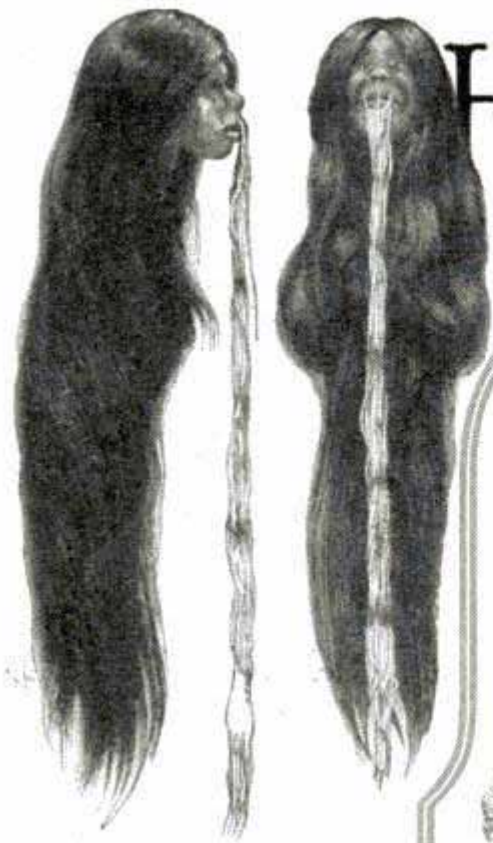
910

Used in hundreds of industries, shellac is an important commodity in scores of articles where it is not commonly known to play a part. For instance, shellac and not wax is the basis of sealing wax; it is used by the ton in making varnish. Hatmakers employ it to stiffen brims and it is utilized in large quantities in the motion-picture film industry.

Tom 'Wanda' Brown Contest at Wood. here

Kansas City 1/20 1916

Head Hunters



Pair of Shrunken Head Fetishes of the Jivaro Indians in the Field Museum, and an Indian Warrior's Gala Dress

BELIEVING that possession of an enemy's head makes the spirit of the dead warrior a slave to his vanquisher, the Jivaros of South America are the possessors of a sacrificial rite that is unique among savage tribes. Although standing very low in the scale of intelligence, they long ago evolved a process of shrinking the captured head to the size of a baseball bat, without destroying the features or their natural proportions.

How it was done remained a mystery long after the first of the peculiar trophies had been brought out of the interior around the headwaters of the Amazon tributaries. At first the heads were passed on from tribe to tribe until they reached the outposts of civilization, far up the Amazon, and fell into the hands of white traders and explorers from museums. Not until recent years have white men succeeded in

penetrating the upper reaches of the Pastaza and Morona, the two principal rivers along which the Jivaros dwell, to learn first-hand the methods used in the process.

Head hunters were known before—there are still some left in the South Sea islands—but the ability to not only cure the skin but actually shrink it to a fraction of its former size without destroying its lifelike qualities was as amazing to the museum explorers as the discovery of the first embalmed body of a long dead Pharaoh.

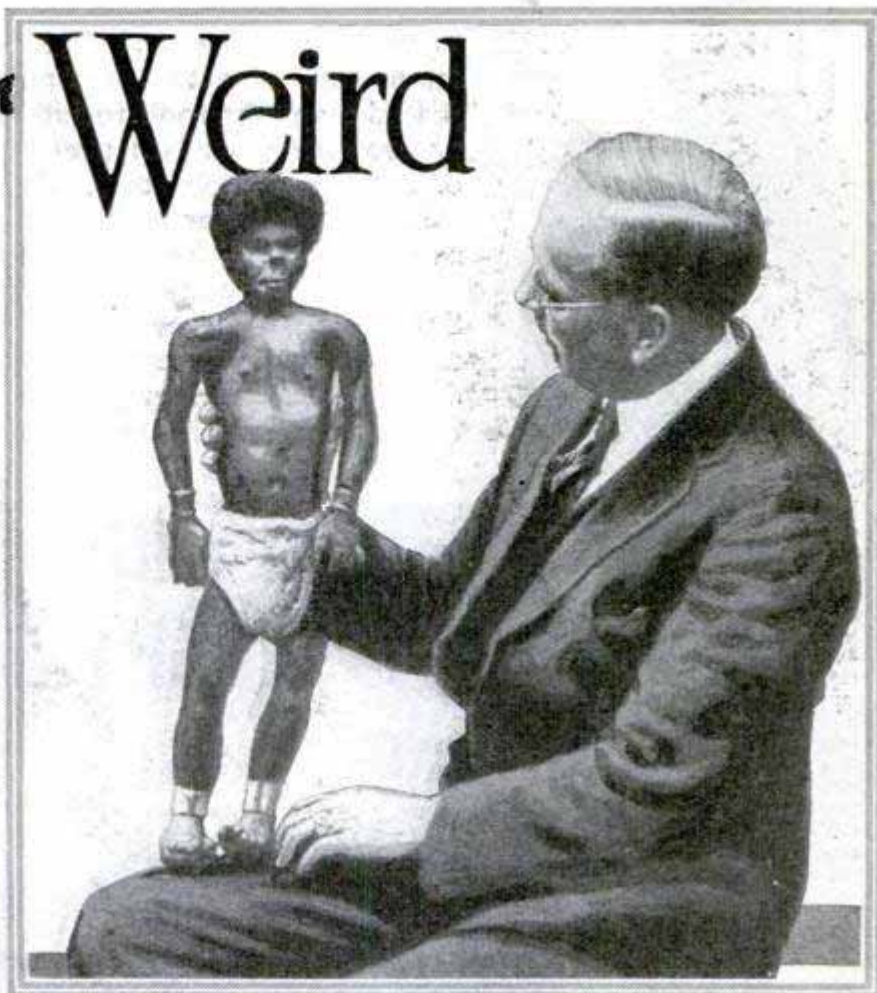
The Jivaros, though only 25,000 strong, are also unique in that they remain as independent today as when the first Spaniard set foot in America, having always succeeded in resisting conquest. Until quite recently their only weapon in battle was the spear and shield, though now they have begun to acquire firearms. They used the blowpipe, too, with poisoned arrows, but only for killing game.

Practically all of the head-hunting expeditions are the result of one or more members of a tribe having died from natural causes, which the friends of the dead ascribe to sorcery from another tribe, whereupon they take the war path, armed and with several smooth round rocks for each warrior.

The rocks are the chief requirement for curing the heads they hope to take. After

and their Weird Rites

the enemy is slain and the head severed, a slit is made up the back of the neck and the skull and flesh removed. The slit is then sewed up, and the head boiled in water with some antiseptic herbs. Next a fairly large round stone, warmed in the fire, is inserted through the neck opening, and with another warm round stone the warrior proceeds to "iron" the skin until it gradually shrinks to nearly the size of the interior rock. This is then removed and a



Entire Body Shrunk by the Jivaro Process; Two Such Are in the Hayes Foundation Collection, but Their Genuineness Is Doubtful; Below, Jivaro Warrior in Costume Worn When Listening for Spirit Voices in the Forest



smaller stone substituted, the process being repeated until the head is reduced to the desired size. The whole preparation is completed in a day.

Following the shrinking, a slit is made in the crown and a long cord inserted to suspend the trophy, while streamers of colored cotton yarn are attached to perforations made in the lips.

When the war party returns, a tribal celebration is held, in which the trophy, suspended from a pole, is the principal feature. The victor for several days has to observe rigid regulations and taboos, without which it is believed great harm would befall him. Eventually, after he is deemed to have mastered the slain man's spirit and made it his slave, the head is removed to his hut as an individual trophy.

The Jivaros are not afraid of open fighting, but usually prefer to attack at night, timing the assault to come just before dawn. Their huts, in which several related families live, stand singly and alone in a clearing of the jungle. The house is



Jivaro Woman; a Fetish Head from the Milwaukee Museum, and a Jivaro Wearing Part of His Ceremonial Ornaments for the Curious Rites That Attend the Enslaving of a New Spirit

built of poles, with a thatched roof, and sometimes is surrounded by an outer stockade. Each man able to carry arms has a separate berth, arranged around the outer wall, with slits through which he can ward off attack. In the narrow jungle paths leading to the clearing skillfully concealed traps

are planted, usually a pit containing a sharpened stake on which anyone stumbling into the trap will be impaled.

Their bravery in battle is almost entirely due to the belief that they have enslaved the spirits of their dead foes, and likewise will receive aid from their departed forefathers. The latter appear to them in dreams induced by drugs made from narcotic plants that grow wild in the forest. Under the influence of the dope they wander through the jungle, listening, they believe, to the spirits of the dead, who give aid and advice.

The heads used as trophies must have come from a member of a rival tribe, as those of one's own tribe are supposed

to be without power. The demand for trophies for museums and collectors became so great recently, however, that the natives took to killing people of their own tribe, or even stray white travelers, in order to earn the price offered by the collectors. As a result, the governments of Peru and Ecuador now forbid exportation of the trophies, as one means of keeping the rite confined to tribal battles.

The Jivaro country is similar in many ways to the South Sea islands, even though it lies more than a thousand miles from salt water. Like the islanders, the Jivaros have developed as a water-going race, since the only means of communication through the tropical jungle is the myriad

creeks. The district, in the main, is quite flat and swampy, all the streams that pour into the Amazon being unable to carry off promptly the tremendous rainfall of the tropics. The nearest approach in North America to the swampy jungle was the interior of the Everglades. The main difference is that the tropical vegetation is even thicker in the Jivaros' land, spanning the streams so thickly that often only tiny tunnels are open



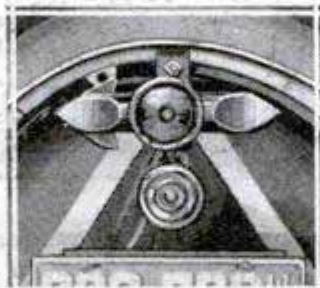
under the hanging vines for the passing canoes. Because of the jungle and the maze of streams, the natives have been able to resist not only other natives but likewise white invasion. Fruit, nuts and some rubber are the chief products in their domain, and they have not sufficed to tempt many traders into the interior.

VEGETATION GIVES OFF LIGHT DURING PROCESS OF DECAY

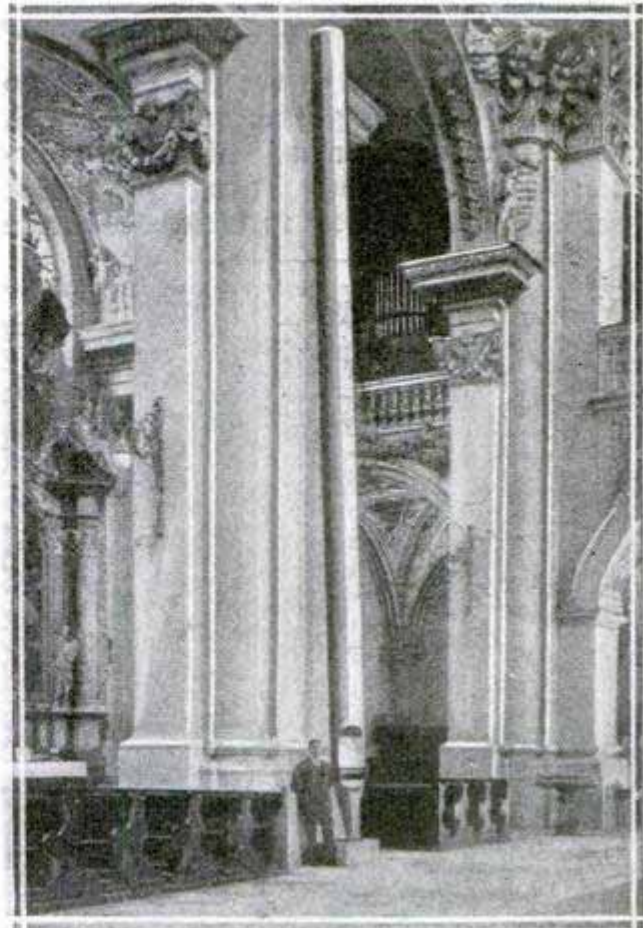
At a certain time in the fall of the year, beech and oak leaves give off a faint glow when they begin decaying. The glow occurs in tiny fibers interwoven in the leaf which are essential to its health although they do not start glowing until the leaves are dead or dying. Examination of the underside of a beech leaf reveals small yellow spots, the centers of the fibers. If these are disturbed with the point of a pin, they will shine more brightly for a few moments. Glow has been recorded at various times from grasses, the lily, a species of poppy and the common nasturtium, but special apparatus is needed to detect these faint lights. There is a kind of luminous moss which may be seen in crevices among large stones and rocks by the roadside, and the roots of the tormentil give off light when the soil is removed.

AUTO STOP-AND-TURN SIGNAL PROMOTES SAFETY

Signals for right or left turns and stops are given from a compact accessory attached to the rear of the auto and operated by two switches. The one that controls the stoplight, in the center, is manipulated automatically by the car brake. The direction indicators, consisting of an arrow for left turns and a pointer of slightly different shape for right, are illuminated by throwing a switch on the steering column near the wheel. The separate operation of the lights is intended to reduce confusion and make each signal more clearly visible.



Heise Electric Shop
125 St. B roadways



Huge Pipe for Organ in German Cathedral Compared with Height of Archway

SINGLE PIPE FOR BIG ORGAN THIRTY-SEVEN FEET HIGH

Weighing nearly 650 pounds, one of the large metal pipes for a huge organ now in course of construction in the cathedral at Passau, Germany, is thirty-seven feet high. The organ takes its place as one of the largest instruments of its kind in the world.

MAKE COAL FLOW LIKE LIQUID BY HEATING PROCESS

Pulverized soft coal can be made to run and seek its own level like a liquid by application of heat, according to an eastern expert. He explains that the warming causes the liberation of vapors or gases, which form tiny bubbles about each fine particle of coal, reducing friction and causing the mass to flow. The condition lasts as long as the vapors are issuing from the particles. It is pointed out that a general application of this principle would result in great changes in mining and combustion methods as well as in the transportation of the commodity.

Illustration Germany
See page 930

New York

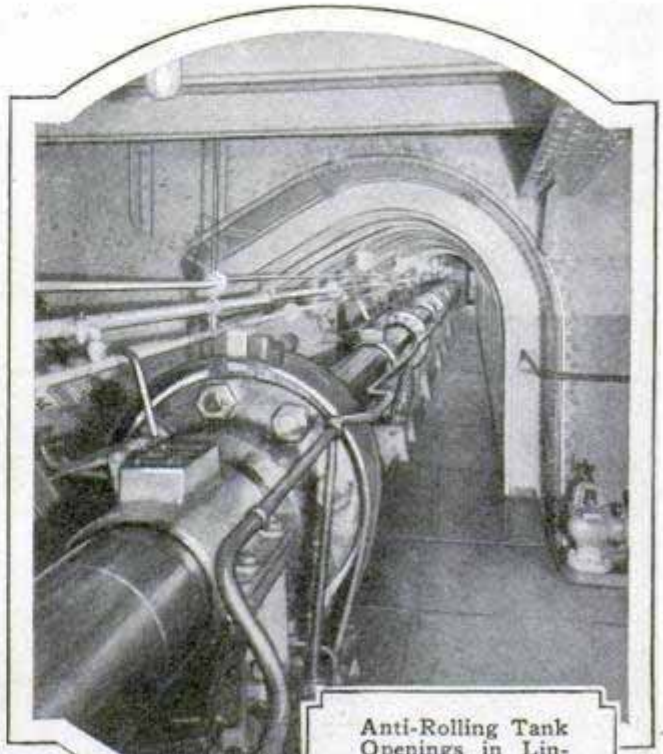
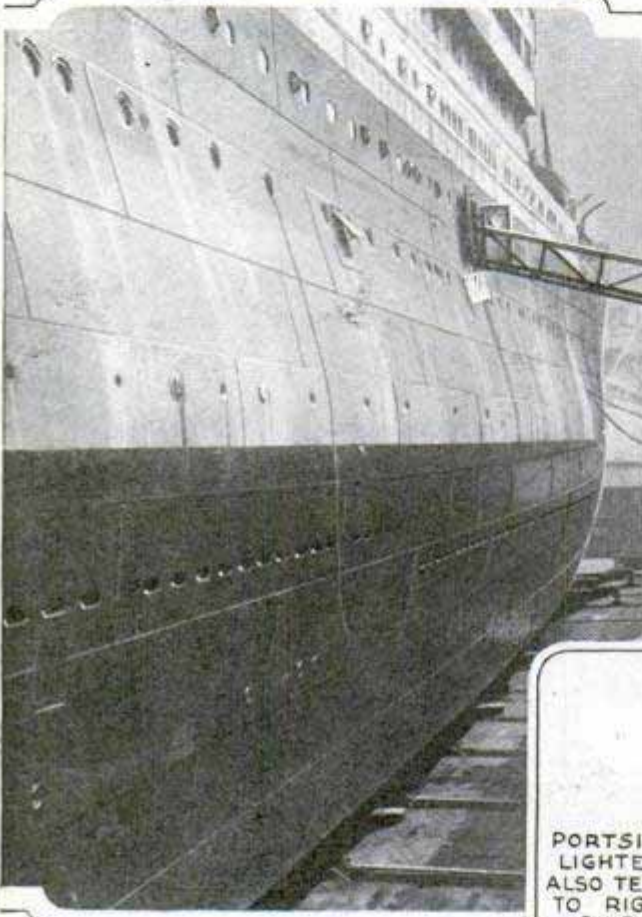
Walter E. Trent, Pres.
Trent & Co.
55 E. 16 St.

839

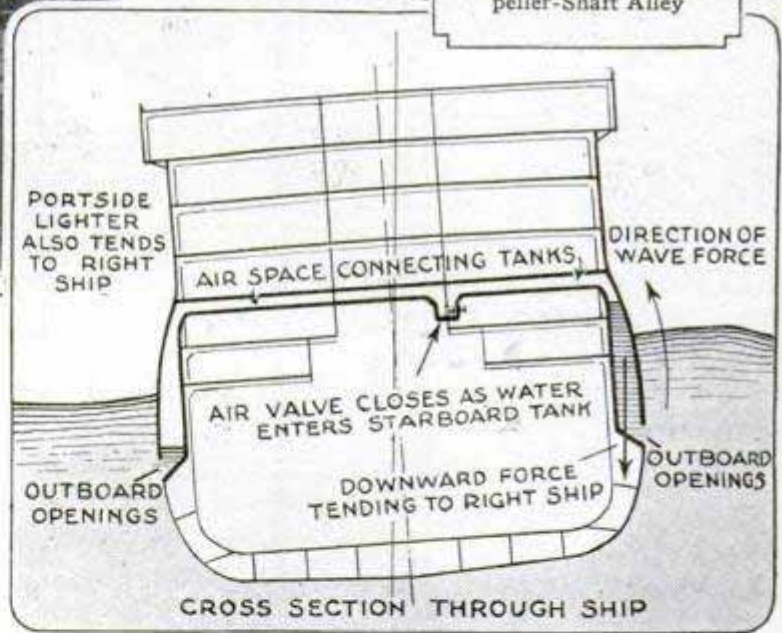
new Winterfelder 24
Berlin W. 30 Germany

WAVE FORCE HARNESSSED TO PREVENT SEASICKNESS

Using the power of the waves to keep the ship from rolling is accomplished with a system of tanks installed in a new German liner, the "New York," to prevent seasickness. Bulges formed along the



Anti-Rolling Tank Openings in Liner's Hull, Sketch of Operation, and View of the Propeller-Shaft Alley



sides of the ship provide a space between the main hull and outer skin. Rows of rectangular openings admit the sea in this space, the bulges being connected at the top with an air pipe across the ship. When a wave strikes one side of the ship and starts it to rolling the pressure of the sea drives water up in the tank, raising its level and increasing the weight on that side. The air forced out by the incoming sea passes through the connecting pipe and drives water out on the other side, lightening it, so that the ship has a tendency to go back to an even keel. The connecting pipe is fitted with an air intake valve to admit air into the tanks from above, but the valve closes under pressure from within and prevents air escaping. The ships are fitted with propeller-shaft

tunnels of a new design so that the full length of the driving shaft is easily accessible for oiling and inspection.

LOSS OF SLEEP AIDS BRAIN BUT FATIGUES BODY 863

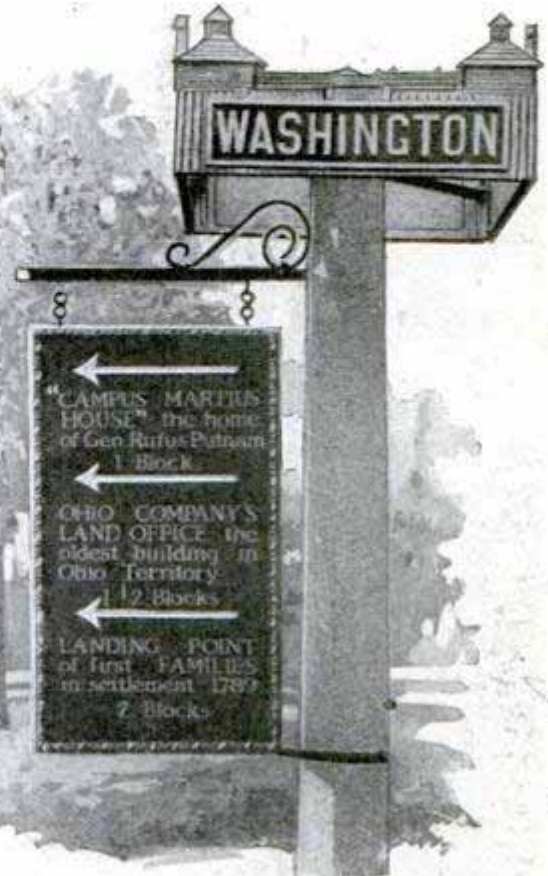
Cutting off two hours of sleep each night, makes the brain more alert but is a considerable drain on the body, tests at Colgate university have shown. The

*Psychology by College
Univ. School of Psychology*

867

experiments were conducted with three young men. Materials used included alarm clocks, a stop watch and an apparatus to measure the consumption of oxygen. To arrive at a working basis for the investigation, the subjects were drilled for weeks in mental multiplication. Fifteen problems were solved each day at a single sitting, while the time required and the errors made were recorded. When a "performance level" had been reached, a point beyond which there seemed to be little likelihood of improvement, the subjects were placed on a strict sleep allowance of eight hours nightly and the results of their problem working again recorded. Then they were tested with but six hours of sleep. With this amount of time devoted to slumber, all showed an improvement in their mental work, but the amount of energy expended when doing the problems increased enormously as compared to that spent when eight hours of sleep were allowed.

SPECIAL SIGNS GUIDE TOURISTS TO CITY'S HISTORIC SPOTS



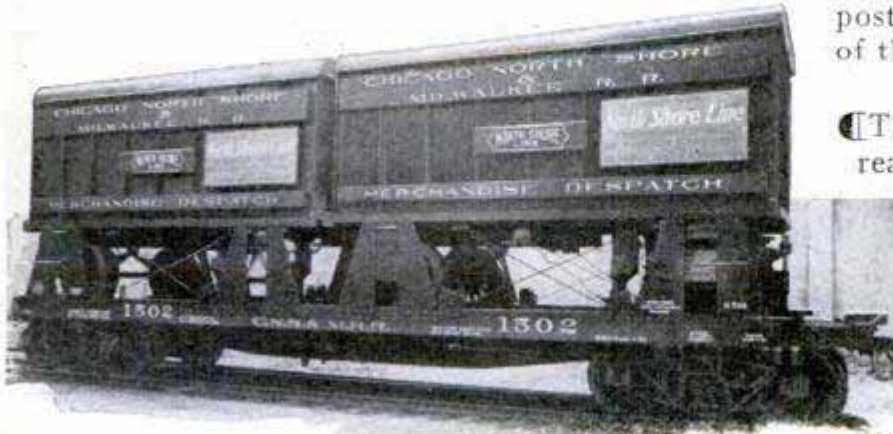
E. M. Haines, Marietta, Ohio

Telling the Motorist What to See; Handsome Signs Erected at Street Intersections to Guide Tourists

More than forty decorative signs, lettered on both sides and easily legible from a distance of sixty to seventy-five feet, have been erected at street intersections in Marietta, Ohio, to direct visitors to interesting places in the city. They are of the finish of antique bronze and the metal characters are faced with gold leaf. Arrows point in the direction of the place described, and the distance is given in blocks. The signs are of uniform pattern and are placed on substantial concrete posts, which also bear the name of the street in clear letters.

HAUL TRAILERS ON FLAT CARS TO SPEED SHIPMENTS

Saving in time and expense by reducing the handling of less than carload shipments to a minimum is expected from an innovation in traffic introduced on a mid-western electric line. Auto trailers, loaded for city distributing, are sent on flat cars without taking off the wheels so that they can be quickly removed at their destination and hauled about the town with their load already arranged for delivery to the purchasers. A central station where the trailers are filled further expedites matters.



Trailers on Board Flat Car for Electric-Railroad Journey; at Destination They Are Hooked to Truck

*Chicago North Shore
Insurance*

The Popular Mechanics Bureau of Information offers its free service to all readers of this magazine. Names and addresses of manufacturers and dealers in articles described, and any other details in our possession, will be promptly furnished by addressing the bureau.

933



Aiding Travelers at a Forest Crossroads in Germany; the Guide-Post Sentinel

NOVEL THREE-ARMED SIGNPOST HAS FACE OF MAN

Travelers through one of the forests in Germany are directed on the proper way by an odd signpost representing a man. Its outstretched arms bear legends giving the destinations and distances.

MOTOR-TRUCK AUTO TRAIN CUTS COST OF CAR DELIVERY

Freight-car loading and unloading costs are eliminated by a motor-truck and trailer outfit which hauls four completely

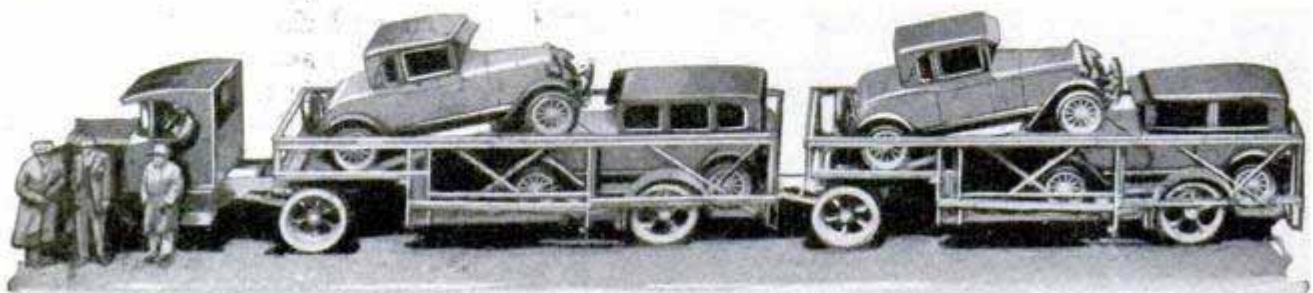
assembled automobiles directly from the factory to the dealer. This method insures the delivery of an absolutely unused car, is said to reduce transportation time, and, as one man can drive the "train," operating costs are not high.

OLD PAINTINGS ARE RESTORED BY FEATS OF EXPERTS

Almost unbelievable feats are performed by men who restore old paintings. One of the first things the worker does in repairing a picture with a canvas torn, cracked or rotted with age, is to purchase a new canvas. A sheet of Manila paper is glued to the painted side and the old canvas is then carefully scraped away. When all the fabric is off, the grounds upon which the paint lies are removed by solvents or gentle scraping until nothing remains of the original but the fragile shell or pigment adhering to the paper. The new canvas is then covered with the strongest fish glue obtainable and pressed firmly down upon this shell. As soon as the painting is attached securely to its new foundation, the only step remaining is to take off the paper. This can be done with hot water. Haquin, a French artist, was, it is thought, the first to successfully transfer a painting on wood to canvas. He glued a sheet of paper over the surface of the painting and afterward upon this a layer of muslin. When the glue was dry, he planed down the panel until it was as thin as matchwood. Then he scraped off the rest with a long, flexible knife. This done, the mere skin of color held together by the paper and muslin was left. It was a comparatively easy task to glue this to a canvas and remove the paper and muslin. If an old picture lacks a portion of its pigment, this may be replaced with fresh colors.

Cont. Edwige Farragut, Washington, D.C.

827



How Autos Are Hauled Directly from Factory to Dealer by Motor-Truck Train; the Conveyance and Special Trailers with Load of Four Cars

See also Motor Vehicle Co., 447 Cass Ave. Detroit, Mich



Cross-Capped Stadium on Mt. Helix, near San Diego, Calif., Where Outdoor Easter Services Are Observed with Impressive Rites; There Are Seats for About 2,000 Persons

STADIUM BUILT ON MOUNTAIN FOR EASTER SERVICES

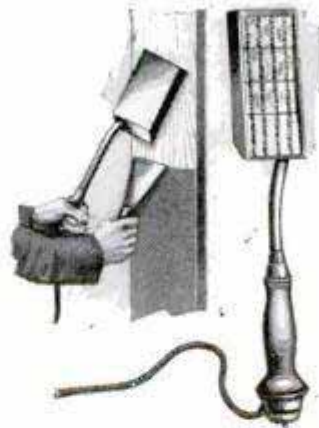
Near San Diego, Calif., a permanent stadium has been constructed on top of Mt. Helix, 1,380 feet above sea level, for the observance of special outdoor Easter services. Although it is used but once a year, it has been carefully built with seats of stone and steps of concrete. It will hold about 2,000 persons. A smooth dirt road leads to the top of the mountain.

HIGH-FREQUENCY SOUND WAVES DESTROY LIFE

That sound waves of extremely high frequency are capable of destroying life and cutting down the number of red blood corpuscles, has been demonstrated in experiments performed by Prof. Robert W. Woods, of Johns Hopkins university. He reported that a minnow was killed after two minutes' exposure to sound vibrations at a frequency of 300,000 cycles and, in fifteen minutes, the blood corpuscles in a mouse were reduced sixty-five per cent. The vibrations were produced in oil and passed through a quartz plate, striped with tin foil, into the receptacles which held the subjects. The experimenter does not believe that the sound-wave method will be used by sportsmen

as a substitute for guns, as it cost \$6,000 to kill the minnow and \$45,000 to weaken the mouse. It is thought that the tests may shed some light on the effects of pernicious anæmia.

ELECTRIC BURNER FOR PAINT REDUCES FIRE RISK



As a substitute for the painter's blowtorch, an electrically heated unit, that may be operated from the lighting circuit, is said to be safer and more easily handled. A scraper can be attached to the frame so that

there will be no need of using more than one tool to remove the coating.

HOW MUCH BLOOD?

If the weight of the body of a healthy man is divided by twenty, the result will be the approximate weight of the blood, according to the results of recent experiments. It is not known whether this formula applies as accurately to women.

English Mechanic 10/1/26

Curran 823

New York World 10/31/26

2638 Leroy Ave

911 Oberway, Ill.

952

INVISIBLE RAY WILL GUIDE TRAINS AND PLANES IN FOG

Greater safety for aviators in fogs and less likelihood of train collisions are promised through the application of rays of light invisible to the eye yet capable of actuating signals miles away from their source. According to an electrical research worker, these rays could be projected thirty miles into space and controlled as to direction. Their function in guiding the planes would be to register signals on a photoelectric cell mounted on the pilot's instrument board. For the purpose of this signaling, the inventor is said to have devised a special tube which

becomes fluorescent in response to the controlled rays. Adapted to railroad use, the cell would show light only at the close approach of another train.

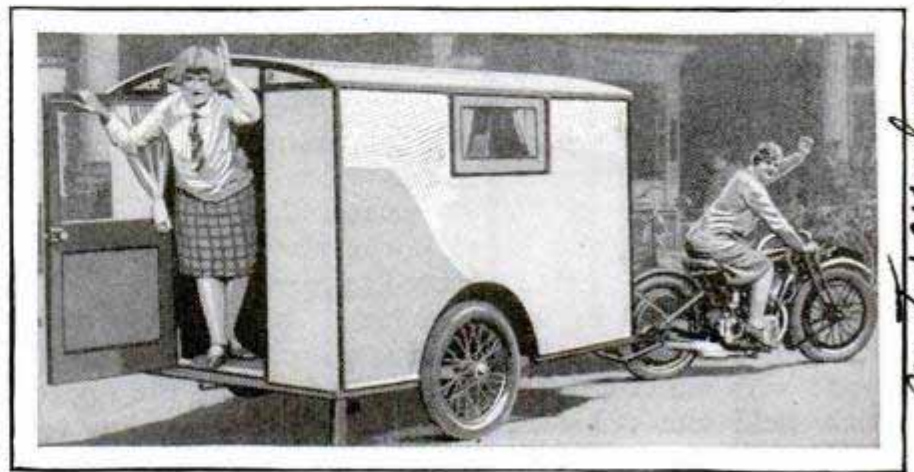
951

TRAILER CAR FOR MOTORCYCLE HOLDS KITCHEN AND BEDS

Space for two beds, cooking and other equipment is provided in a trailer attached to a motorcycle. Designed especially for short camping expeditions, it has sturdy wheels for travel over rough roads, and is so connected to the cycle that it does not jolt any more than the ordinary trailer.

11/10/26

Motorcycling



The Trailer Bungalow Hauled by Motorcycle

Shown at Olympia Cycle



Demonstrating the Sleep-Inducing Outfit; under the Black Band Are a Vibrator and Blue Light

LIGHT AND VIBRATOR BRING SLEEP IN EIGHT MINUTES

A French electrical engineer has devised an apparatus that is said to put a person to sleep in eight minutes. It consists of a black band containing a blue light which is placed over the eyes of the subject. Combined with this is a small vibrator. The effect of the illumination and the vibrations brought on sleep.

FEWER STORMS IN NOVEMBER WEATHER RECORDS SHOW

In the last forty years, only three tropical storms of true hurricane nature have been observed after the first of November. Since 1886, nearly 250 storms of the hurricane type have occurred, although, of this number, only 128 have attained true hurricane force. About eighty-eight per cent of the winds occur in the months of August, September and October.

H. E. Leitchamoin Paris France

Wide World

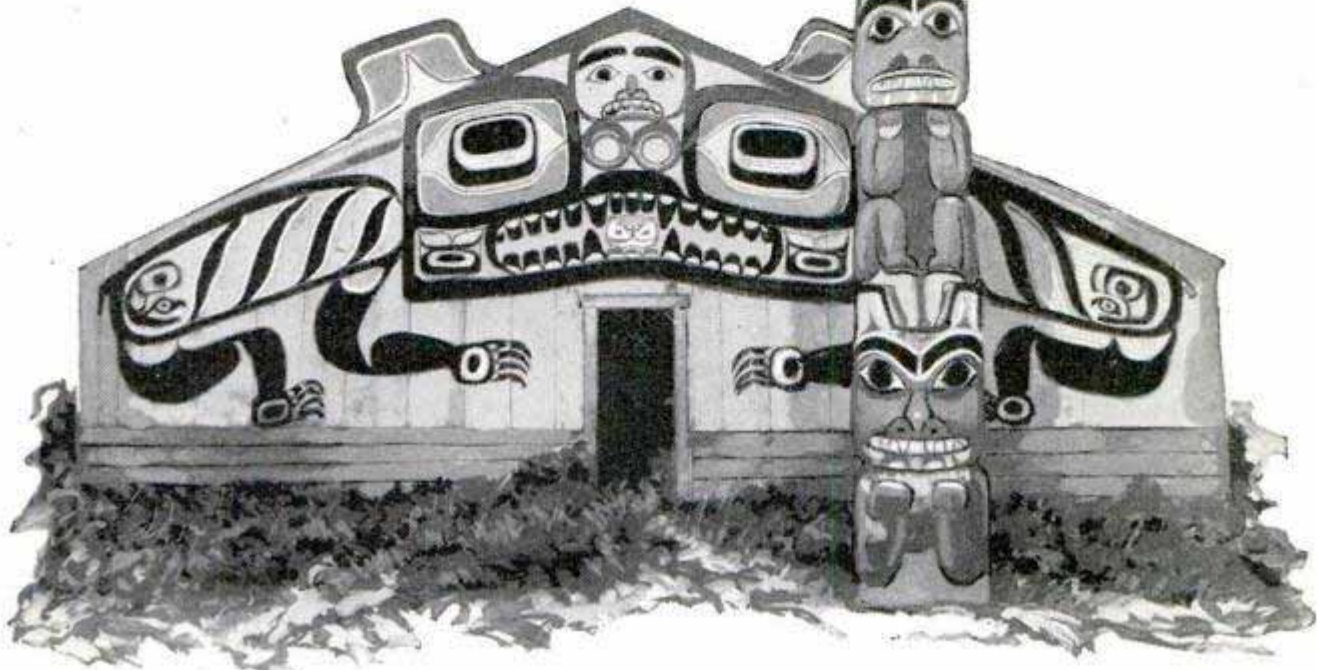
904

New York Sun

Totems Reveal Vivid Picture of Vanishing Race

LIKE the vanishing race whose rare skill at carving has made them possible, the totem poles of the Alaskan Indians are rapidly disappearing through neglect and decay, and even outright destruction, and science seems unable to prevent it. This is the

Houses Grow Ears to Grace Their Highly Decorated Fronts in the Kwakiutl Indian Villages of Alert Bay, Vancouver Island, British Columbia; Totem Art Is Carried to Its Highest Peak in Some of These Decorations



disclosure made by Dr. Herbert W. Krieger, of the Smithsonian Institution, in a lengthy report prepared for the government on the results of his efforts last summer to preserve some of the rarest products of totemic art in the southeastern parts of Alaska.

Dr. Krieger states that many of the villages are no longer occupied by their former inhabitants, while others show evidences of neglect because of the absence of their owners, who are working in the Alaskan canneries or are imitating the white man's ways and are living in new houses of sawed boards, leaving their ancestral homes, which represent the highest skill of the northwest coast Indian, to fall into decay. The wood carver's art of these tribes, Dr. Krieger says, has aroused wonder and admiration from the time of their discovery by the Russian explorer Behring, who first landed at what is now known as Sitka, Alaska, in 1741. Nowhere else in the world may one find a similar type of art, representing for the most part carved figures. The images are

usually of well-known animals, such as the beaver, bear, killer whale, shark, hawk, eagle and raven, but there are also mythical creatures, such as the thunder bird, which is reputed to make lightning by the flash of its eyes and thunder by the clapping of its wings.

These carved figures find expression on the tall wooden totem poles chiefly, although house posts, dugout canoes and many other objects of daily use form subjects for carvings. The most striking bits of artistic efforts of the natives are on the tall columns of cedar wood, which are really memorials erected in honor of the male relative whose property the builder had inherited. These totem poles, some giantlike in height, generally occupy the place of honor at the center of the gable end of the owner's house.

Among the Tlingit and certain other of the coast tribes the totem pole has a hollowed cavity in the rear in which are placed the cremated remains of the one in whose honor the memorial was erected. Nearly all the poles standing at the pres-

887



This, Alaska's Most Elaborate Totem Pole, Stands in the Memorial Park at Sitka; It Came from the Village of Kasaan

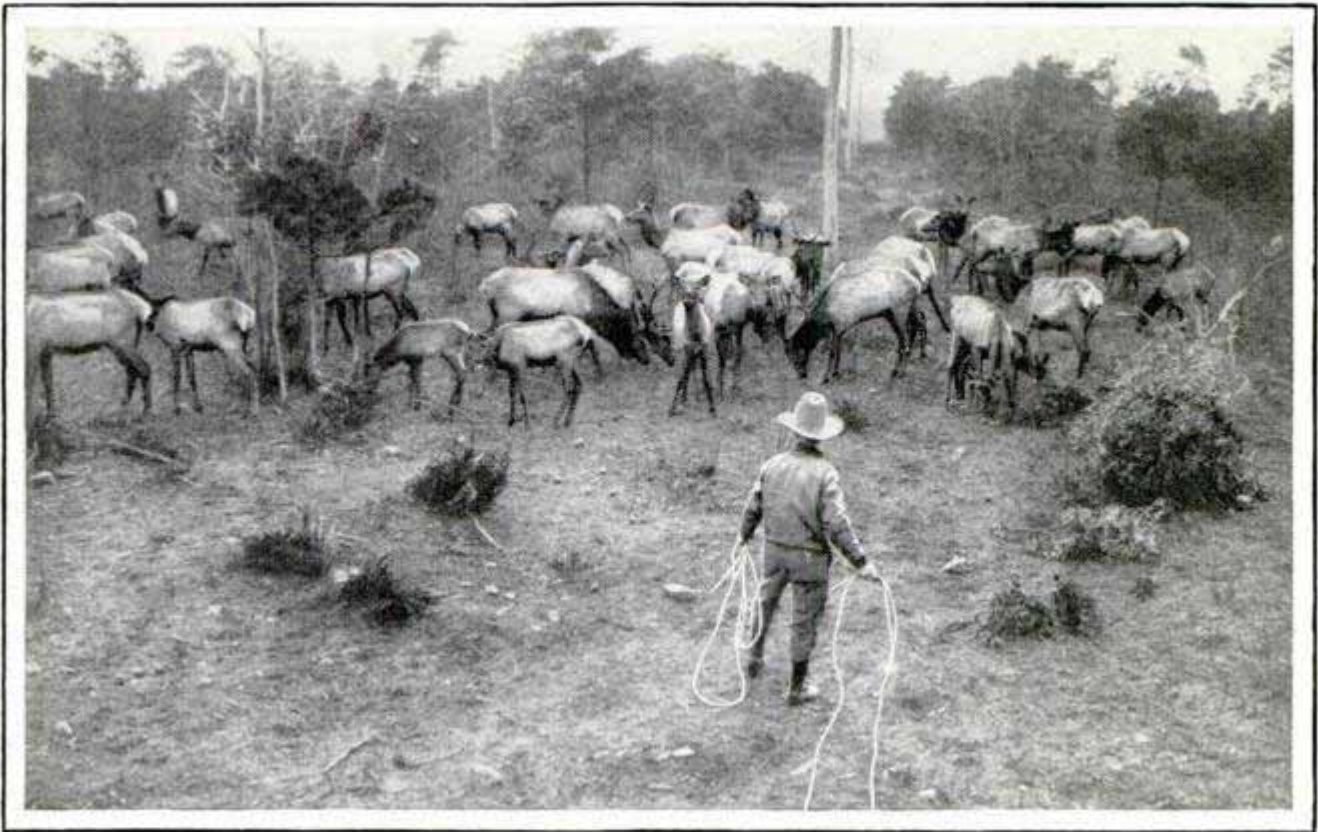
ent time have such cavities. Among the Tlingit the name for totem pole is the word meaning "coffin"; its use and significance would make it, according to our notions, the equivalent for tombstone or memorial column.

Dr. Krieger found that the totem pole which once stood proudly before the house of a family or clan, and showed by its carvings the lineage and personal achievements of the residents, is fast succumbing to decay and ill use. Since the coming of white men, the Indians have lost their pride in tradition. One native cut down some finely carved poles to make a sidewalk. On the west coast of Prince of Wales island is the village of Kowkan, with fifty good totems intact, but this is far from the course of white men's travels and is uninhabited. Tongass village also has some unique totems. Three of these have the carved emblem declared by natives to represent Captain Cook, the first white man seen by their ancestors. One pole has a very fair likeness of Abraham Lincoln carved among its bears and eagles and ravens. The natives think probably that the chief who made it had seen a white man, an event worthy of preservation in native history, and had acquired a picture of Lincoln which he copied on his totem. It is also possible that the carver sought to record the purchase of Alaska by the United States, since one earlier totem has been found with what was probably a portrait of the Czar of Russia.

Any unusual experience in the life of the individual may be incorporated in the carvings on the totem pole. One has the carved figure of a ship under full sail, Dr. Krieger said. This pole belonged to a woman who was the first of her village to see such a vessel and the white men who landed at Sitka. A carved figure on another pole represents the experience of an Indian at Tongass village who once acted as host to a former secretary of the interior on his visit to Alaska. The secretary was asked to sit on a pile of fine furs in the Indian's house. At the close of the interview he was told that he was forgetting his furs. "It is the custom of our people," said the Indian, "that what a visitor sits upon is his."

When the totem pole was erected later by his nephew, the former secretary of the

941



At the Annual Elk Round-Up on a Massachusetts Farm; the Young Animals Are Being Roped and Separated from the Others to Be Put in Special Winter Pasture

interior was represented on it dressed in a frock coat, silk hat and checked trousers.

"Totem pole art," Dr. Krieger says, "is largely a representation of animals. These usually refer to the role played by certain animals as actors in native myths. The curved beak of the hawk is invariably represented as touching the mouth on the underside, while the thunder bird, which wears a cloud hat, has a larger beak. The raven has a long straight beak, while that of the eagle is short and curved. Birds, even when they take human form, are to be recognized by a beak added to an otherwise human face. The beaver usually is biting a stick, which it holds between its paws. Certain mythical water monsters may take on a variety of forms. Animal representations have erect ears placed above the eyes, but are otherwise hard to distinguish from human figures.

"The most important thing in the life of the Indian is his crest or totem. Representations of this animal crest are placed on every conceivable object of daily use; they are even tattooed on his arms and body and are painted on his face. The inheritance of a proper kind of crest determines an individual's chances of success and standing in his community."

ELK ROUND-UP IN NEW ENGLAND — SHOWS ROPER'S SKILL

Capturing elk with a lasso suggests a picture of the wild west in one of its wildest phases but the reality is found in Middleboro, Mass., and the lariat thrower is a Yankee "cowboy." The scene is on an elk farm where, once a year, the animals are separated from the rest of the herd, as winter approaches, and placed on a special range. They are also given a specially selected diet which consists chiefly of milk.

ARCTIC COAL TO BE SENT BY AIR AVIATOR PREDICTS 899

Coal will be shipped to the United States from the Arctic by airplanes within the next forty years, Lieut. Comm. Richard E. Byrd, first aviator to fly over the North Pole, believes. He bases his prediction on the opinion that flying machines of sufficient safety and power for heavy commercial use will soon be produced. Incomplete surveys have revealed that there are millions of tons of coal in Alaska and huge fields of the fuel in other parts of the Arctic.

N.Y. Times 11/14/26

9/26/26

**ANCIENT INDIAN COMIC MASK
RIDICULES BOASTER**

584



The Braggart Was Disliked Even in Early Times; Comic Indian Mask Ridiculing Boasters

Suggesting the cartoon of today, a grotesque mask was made by an Indian tribe to symbolize the boastful warrior, who, on returning from an expedition, tired his auditors with repeated tales of his own prowess. The image, made of wood, delivers its message by the emphasis of a single feature—a huge mouth. The mask has been exhibited in the Museum of the American Indian in New York city.

**MOTOR FUEL FROM COAL TAR
MADE BY NEW PROCESS**

955

Soft-coal deposits in the United States can supply the world's need for motor fuel for the next 800 years, an oil expert declares. He reports the development of a "cracking" process by which tar from bituminous coal is converted into motor fuel of high anti-knocking properties. He

Mr. Isustave Iglofi
Technical Director
Products Co.

estimates that there are 1,600,000,000,000 tons of soft coal in the United States. From this 800,000,000,000 barrels of tar could be produced, sufficient to yield 240,000,000,000 barrels of fuel.

**SIDE SEATS IN STREET CAR
STONE-AGE HERITAGE**

903

Side seats in street cars are popular because of an ingrained preference that comes down from stone-age days, according to Dr. Edwin B. Twitmyer, psychologist of the university of Pennsylvania, who has made a study of the habits of car riders. William James advanced the theory that men prefer to sit with their backs to the wall because their ancestors placed their backs against a rock or tree so that they could not be attacked from the rear. For the same reason, Dr. Twitmyer says, people put their beds near the wall, and make the headboard higher than the footboard. Car riders prefer seats near the door because of the added sense of security or, in some cases, because they want to efface themselves from notice as quickly as possible.

**TRANSFORMER IN LIGHT SOCKET
RUNS SMALL BULBS**

946

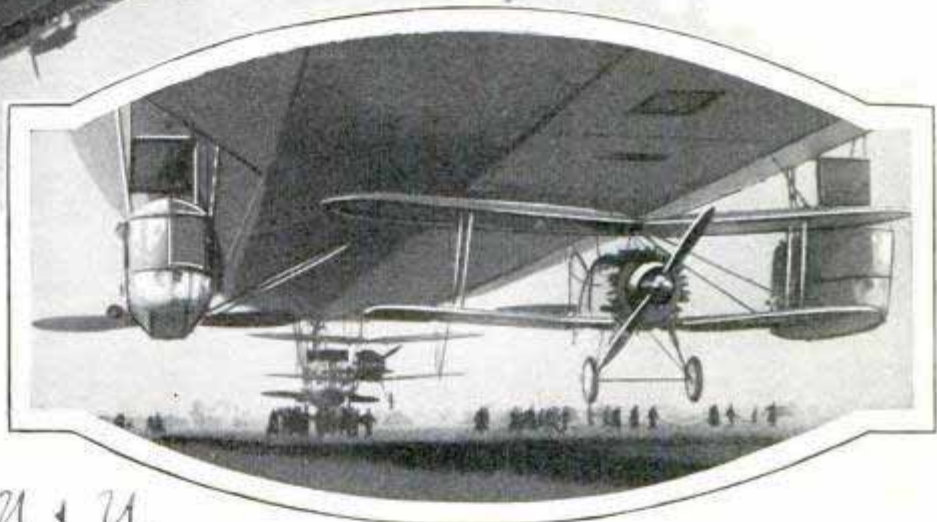
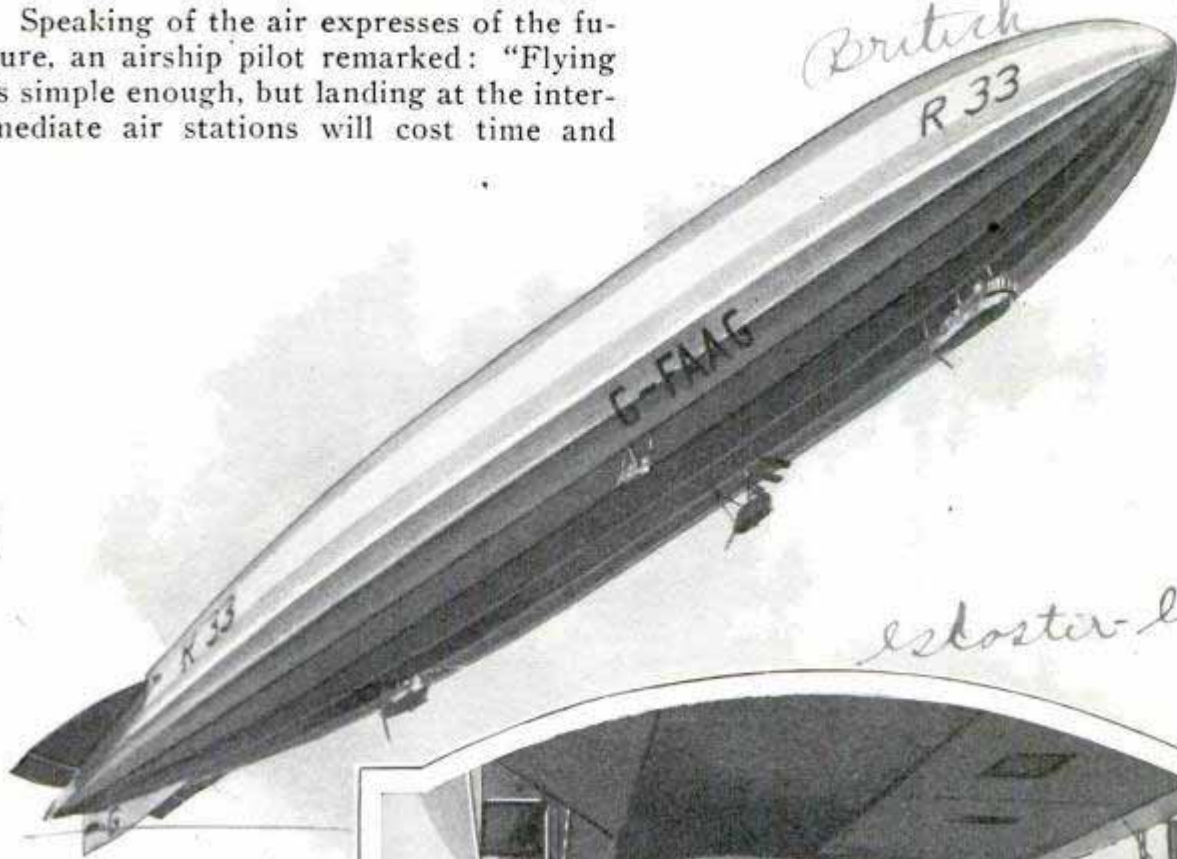
Tiny electric bulbs such as are used in physicians' and dentists' equipment can be lighted from the house circuit through a transformer that is connected directly to the light socket. It reduces a 110-volt current to two and one-half volts and is said not to heat up, even if used continuously. A small bulb can be operated for thirty-six hours at a cost of a cent or so, the manufacturers assert. Tips on the transformer make it easy to connect the cords to the small lamp unit.



Speciallight Corp New York
Compress Oscillator
775 E. 143 St. N.Y.C.

PLANES LAUNCHED BY AIRSHIP MAKE SAFE LANDING

Speaking of the air expresses of the future, an airship pilot remarked: "Flying is simple enough, but landing at the intermediate air stations will cost time and



For Intermediate Landings from Dirigibles; Airplanes Carried by the Big Bag Descend with Passengers, Allowing the Ship to Proceed without Making a Stop

U & U.

money." Speed is the most valuable feature of air-borne passenger and mail traffic, and every landing means a considerable delay. To solve this problem, the British air ministry recently made some spectacular experiments.

Under the hull of an airship two airplanes, weighing over a ton each, were suspended. The ship took the air, and when an altitude of about 2,000 feet had been reached, the pilots of the planes entered them by means of short rope ladders. The engines of the planes were started, a pull on the control lever freed them from the slip hook from which they hung and in a steep dive the machines parted from the mother ship. In a few moments, the planes straightened out and made a perfect landing.

In wartime, fighting machines can be

released from the airship to protect it from attacking enemy craft. Peaceful aviation also benefits largely by such experiments, for they seem to have proved that it is possible to land safely from an airship proceeding at full speed.

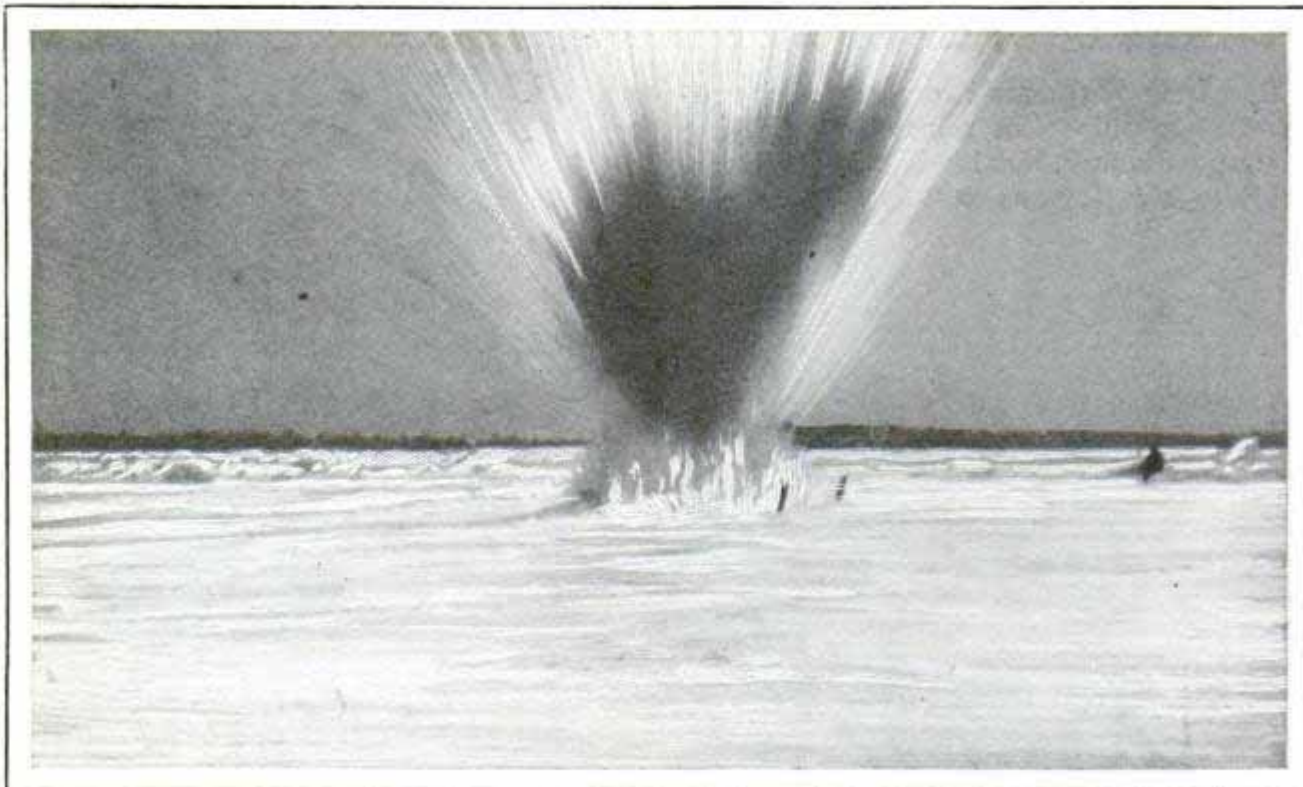
TINY FLAGS PROTECT GARDENS OF JAPAN FROM BIRDS

To keep marauding birds from seeds and young plants, Japanese gardeners use an effective adaptation of the familiar scarecrow. They stake off the field with lath and common wrapping cord into squares about twenty feet wide, and on the strings they attach small strips of cloth or paper. These tiny pennants flutter in the breeze and the continual motion keeps the birds from the patch.

998
 Comd. Lee McCrae
 147 07 N. Hill Ave
 Pasadena, Calif

638

Reaction of the Thermite Charge



The Shot Which Dislodged the Chimney Island Ice Jam in the St. Lawrence River, March 13, 1925; Reaction of a Ninety-Pound Thermite Charge Moved 1,000,000 Pounds of Ice

Fighting Icebergs with Fire

Charges of Substance Producing Intense, Quick Heat Shatter Frozen Masses That Menace Ships

SEVERAL popular ideas about icebergs have been upset and an effective way to destroy the huge wanderers for the protection of shipping has been demonstrated by Dr. Howard T. Barnes, of McGill university, who has made seven expeditions in northern waters in the interests of science and navigation.

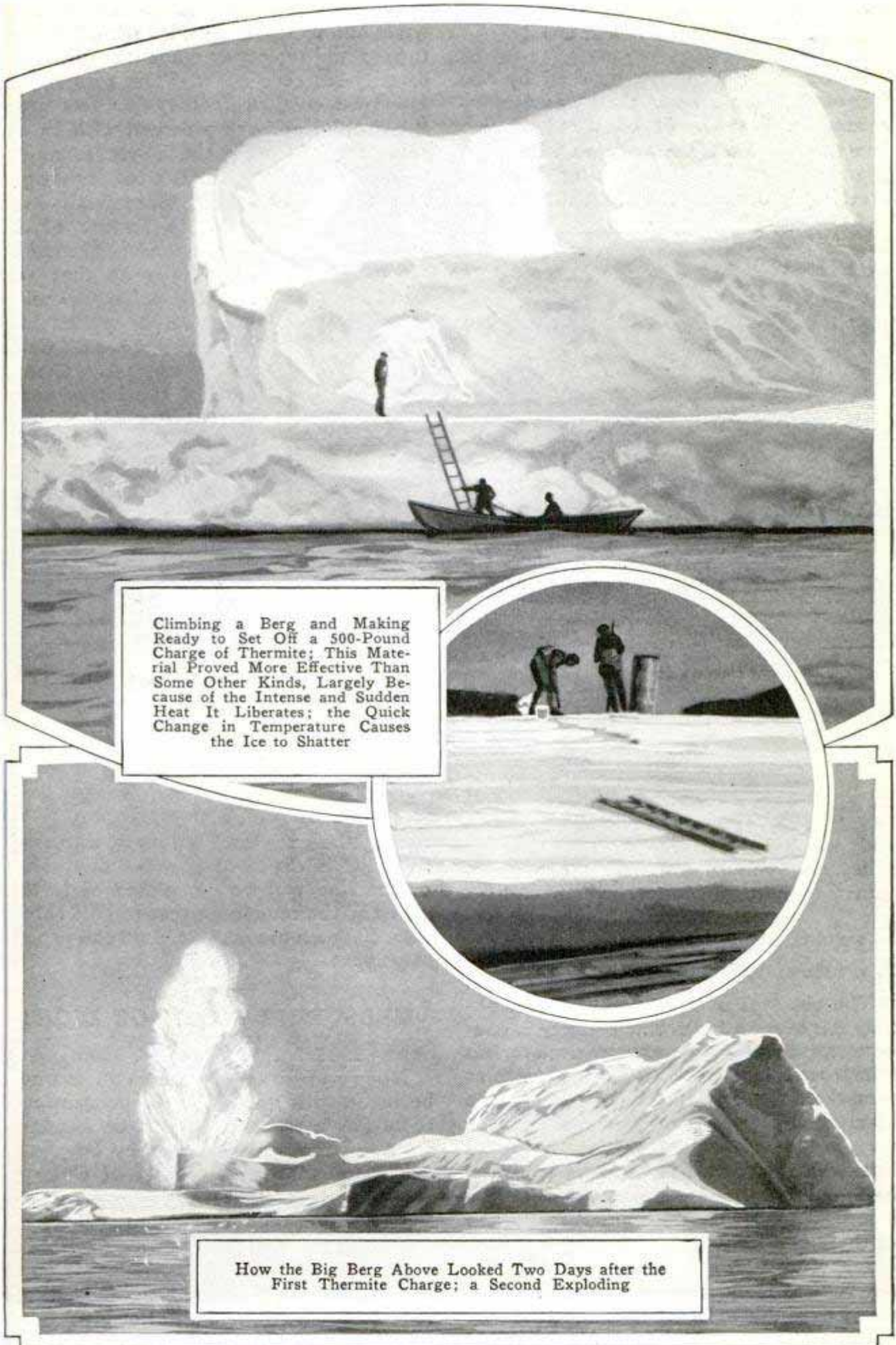
Tests with sensitive thermometers disclosed that often the surface water near a berg is warmer than that farther away. The ice mass acts as a sort of pump, sinking the surrounding sea water by cooling and drawing to itself the warmer surface water, thus contributing to its own destruction. This rise in temperature was noticed as far as five miles from a berg.

Other measurements showed that from one-sixth to one-tenth of the volume of an iceberg consists of air, hence the density is such as to make it float out of the water much more than ordinary hard ice. According to Dr. Barnes, the common statement that nine-tenths of an iceberg is under water is not always true, for

sometimes as much as one-half of the mass may be above the surface.

Chunks of icebergs placed in hot water, hissed like frying bacon owing to escaping air. Samples of the air were analyzed and found similar to the atmosphere today, indicating that there has been no change in the air over the earth since the snowflakes fell on the Greenland ice cap, possibly 5,000 years ago. Where the air bubbles predominate, the color of the berg is white, while blue veins in it are due to the absence of air.

A material that would give a high temperature in the shortest time was found in thermite, a combination of aluminum and iron oxide, widely used for welding and other purposes where great heat is desired. The effectiveness of this substance was demonstrated in the winter of 1924-25, when Dr. Barnes used it to blow out an ice gorge in the Allegheny river. An expedition last summer succeeded in destroying two icebergs with thermite and further tests are planned.



Demmer
the Seine in Paris
France
Swimming
841

**FLOATS PROPELLED BY FEET
AT SIX MILES AN HOUR**

Driven by a propeller worked by the feet of the user, a novel craft was demonstrated in France. It consisted of two floats fitted to a framework on which the operator rests in a swimming position. Steering is done by the front float and a

sist of fifty-four aluminum and seven steel wires and will be suspended from 826 steel towers and twenty-one anchor towers set seventy-six rods apart. The former will hold the conductors fifty-five feet from the ground and are provided with extensions for increasing the height to ninety feet. Each of the smaller towers weighs five tons, and the anchor units ten

tons. A feature of the line is the special method of splicing so that sections of cable five miles long can be pulled into place at one time. Ordinarily, not more than a mile of the heavy wires can be handled at once without risk of breaking. A ten-ton tractor furnishes the power for un-

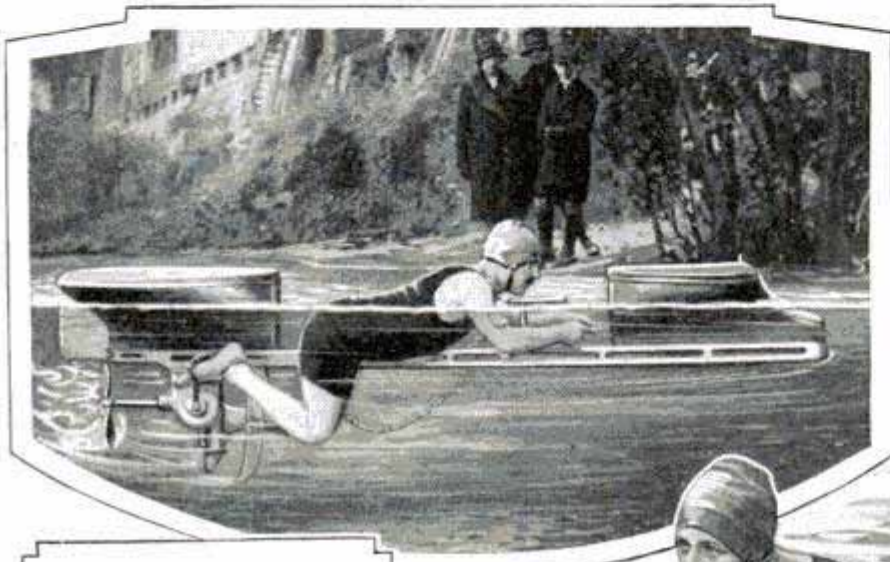


Photo - Diagram of the Foot-Propelled Float in Action, and View of Its Appearance on Surface



© Keystone View Co.

rudder. A speed of slightly more than six miles an hour is said to have been attained without difficulty.

**POWER-LINE BUILDING RIVALS
ROMANCE OF RAILWAY**

The big days of railroad building probably are over so far as this country is concerned, transportation experts declare, but construction projects, in some respects as remarkable as any that characterized the blazing of the railroad trails, are under way in the growing network of power lines and their rows of high steel towers. Such an undertaking is the 223-mile line being strung from the snowy fastnesses of the high Sierras into Los Angeles. Unlike the railway, it is being built through the roughest and most mountainous territory available in order to reduce the cost of the right of way. The cable will con-

reeling the cable and pulling it into position. It is expected that the south half of the line will be completed early this year and the remaining part in 1928. More than 500 men are employed on the project at present.

**MEASURING SPEED OF LIGHT
TO AID SURVEYS**

Maps and surveys of the earth can now be made with greater accuracy than ever before as a result of the latest measurements of the speed of light by Dr. A. A. Michelson of the University of Chicago. He points out that by determining the time it would take for light to travel from one point to another, it is now possible to measure a distance of 100 miles or so in two weeks where the old methods would require two years and still not give as accurate results. By flashing light rays from

Southern California Edison Co
843

848

One more Oct. 19, 1926

revolving mirrors between Mount Wilson and Mount San Antonio in California, a distance of twenty-two miles, Dr. Michelson computed that the speed of light is approximately 299,796 kilometers (186,284

FRONT DRIVE GIVES SOLUTION FOR LOW RAKISH CAR

Success of front-wheel drive on several racing cars during the last two years of-



An English Idea for a Streamlined Body on a Front-Wheel-Drive Car; Notice How the Elimination of the Rear Axle Helps Bring the Body Down for a Low Center of Gravity

miles) a second. This rate is slower by some miles than previously had been believed. Five sets of mirrors were used to reduce the chances of error. They gave equivalent results. By repeating the measuring experiment over a greater distance, the scientist expects to achieve an even more accurate figure.

732

CHAIR HAS RACK FOR UMBRELLA AND SHELF FOR HAT

Theater patrons have individual "check rooms" in a chair fitted with a rack on the back that holds a coat, a bracket at the side for the umbrella and shelf space underneath for the hat or for parcels. The coat holder projects but a short distance from the back of the seat and is arranged to prevent the garment from becoming mussed up by the occupant of the seat behind.



The Wardrobe Chair, Showing How the Various Articles Are Stored

fers a solution of the problem of a low-hung car which will cling to the road, the elimination of steps and the necessity of climbing up to a seat, and removes the difficulties in the way of real streamlining, with true "tear-drop" bodies. Continental designers are already working on custom-built cars in which all of these problems have been met. The propeller shaft running from the engine to the back axle was the one big obstacle in the way of low-slung cars, with the center of gravity below the center of the wheels. The front

drive has no propeller shaft, and therefore needs no back axle, the wheels being capable of side suspension.

A section view of such a car, designed in England, shows how the tear-drop body can be carried back with smooth lines in a tail that incloses gas tank, spare tire and luggage compartments, the latter two being reached through a trapdoor in the car roof, which at this

point is as low as the rumble seat of a roadster. This type of car could take turns at very high speed, and even in a sharp skid would have little tendency to turn over.

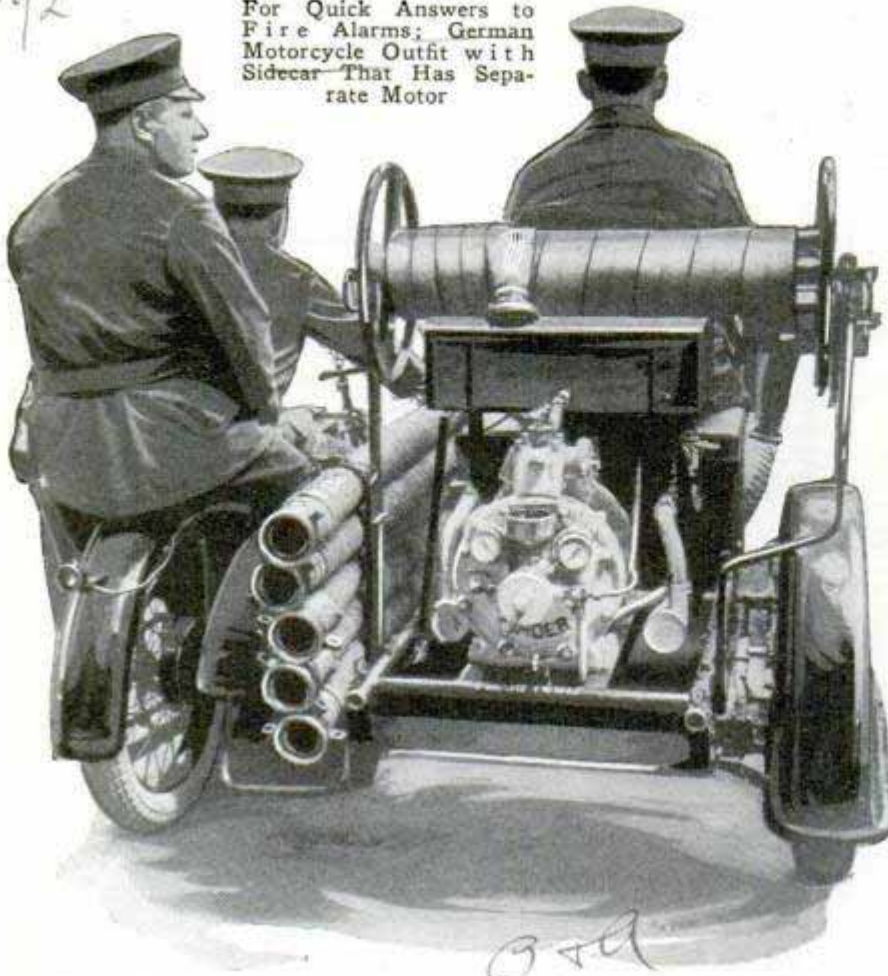
Names and addresses of manufacturers and dealers in articles described in Popular Mechanics, and any other details, will be promptly furnished by our Bureau of Information.

Shown at International Exhibition of Inventors

7, Parkersburg Ave. London E.C. England.

892

For Quick Answers to Fire Alarms; German Motorcycle Outfit with Sidecar That Has Separate Motor



SIDECAR ON CYCLE FIRE ENGINE RUNS ON OWN POWER

For fighting fires, a special motorcycle, exhibited in Berlin, is really two vehicles in one, as the sidecar, containing the apparatus, can be detached from the cycle and made to run by its own motor. Additional wheels enable this operation.

ELECTRICAL "PLOT" FOR OPERA CAREFULLY PREPARED

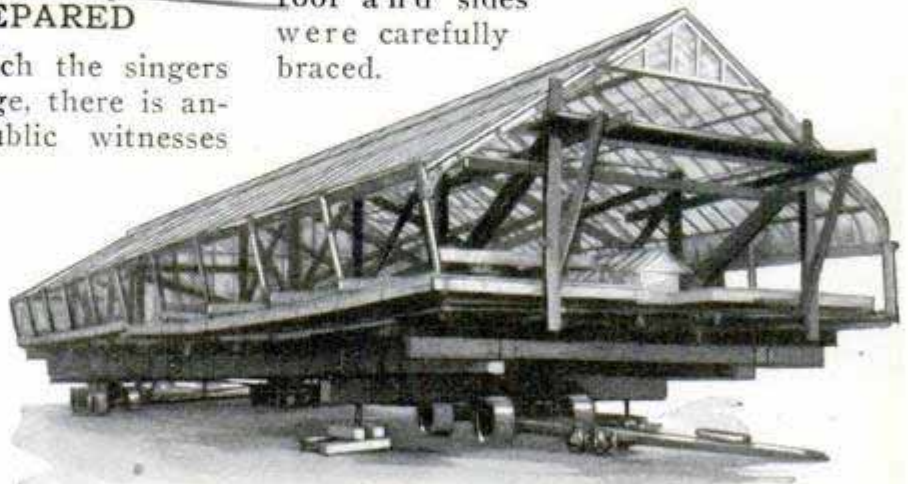
Besides the theme which the singers develop on the opera stage, there is another plot that the public witnesses through the work of hidden actors who are sometimes almost as essential to the success of the scenes as the principals. This is the plan of electrical lighting to accompany the music, which indicates just when certain buttons or switches are to be pulled for the special electrical

effects. The chief electrician is in charge of this inner play. When a cue is reached, he presses a button and a light or buzzer signal relays word to a helper at some far part of the stage that it is time for him to operate a spotlight, raise or lower a curtain or perform some other task. At the Metropolitan Opera house in New York, a man sits in the cellar with his head through a hole in the stage but out of sight of the audience. When he receives his cue, he signals through a speaking tube to an electrician at his feet who operates the lighting switches for the stage. During rehearsal, the chief electrician, stage manager and scenic artist watch the effects from

the rear of the house. They communicate with the stage by means of telephones.

MOVE HOTHOUSE MANY MILES WITHOUT BREAKING GLASS

Movers achieved another triumph recently when they rolled an eighty-foot greenhouse in Los Angeles to a new locality, twelve miles distant, without breaking a single glass in the structure. The roof and sides were carefully braced.



Greenhouse on Wheels Showing Bracing That Saves Glass

Chicago Daily News
11/22/26

Kress House Moving Co.



Bridge and Artificial Island Built in Hudson Bay, at Port Nelson, to Furnish Protection for the Harbor; Steel and Concrete Piers Resist the Ice and Break Up Jams

Bringing Europe a Thousand Miles Nearer to America by Rail

By EARLE W. GAGE *Richville, N.Y.*

ADVENTUROUS engineers are pushing a pair of steel ribbons through the wilderness of the northland which will bring Europe 1,000 miles nearer America, cut off more than 3,000 miles on the journey from Europe to the Far East, and unlock billions of wealth, hidden behind the barrier of waste stretching between Hudson Bay and civilization.

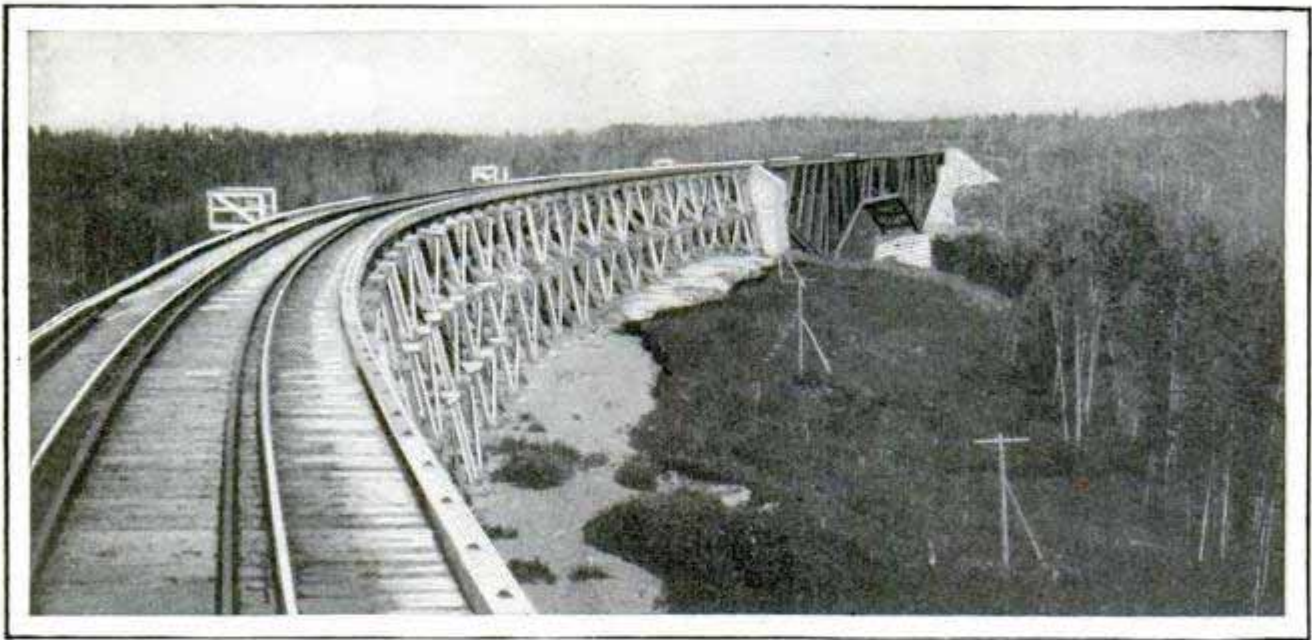
The great transcontinental railroads of the past generation opened vast empires to development, resulting in the settlement of the American continent, but the new Hudson Bay railroad is destined to transform the travel between two hemispheres, vitally affecting the millions of Asia and Europe who look to the vast central American plain for food and clothing.

This 425-mile link that is being forged onto the great American railroad chain will connect more than 20,000 miles of trunk lines with the shortest possible route to Europe, besides tapping the Great Lakes waterways and connecting them with foreign markets. Although it will cost more than \$20,000,000 to push this road from the end of existing steel to Hudson Bay, and more than \$6,000,000 to construct the harbor, docks and warehouses at the mouth of the Nelson river, engi-

neers estimate that the original investment will be returned to the Canadian government at the end of ten years, due to elimination of the long haul halfway across the continent, in order to reach transatlantic steamers.

Canada's great inland sea, Hudson Bay, gives the vast interior region a central outlet to the Atlantic and to world markets. Although this region is often associated with arctic conditions, no part of it comes within the polar circle, and a report says with assurance, "that ships may enter and leave Port Nelson all the year around." The northern part of the bay is in about the same latitude as the highlands of Scotland, while Moose Factory, on the southern shore, is only a trifle north of London. The temperature of the water of the bay is several degrees higher than that of Lake Superior, and it has a mitigating influence on the climate of the vast territory which immediately surrounds it.

Though Hudson Bay remains open, Hudson strait freezes over. Thus, transportation will be possible for only four months of the year, but the saving in cost and time from the freight traffic in the summer will justify the construction of the railroad. During the closed season,



Hundreds of Miles of Virgin Wilderness, or "Bush" as the Canadians Call the Forests of the North, Is Penetrated by the New Railroad in Its Long Run to Hudson Bay

the enormous resources of the region, including farm crops, timber, paper-pulp stock, minerals, and the large wealth of fur, will provide freight business.

Now the bulk of the wheat sent from central America to European markets must pass through the bottle neck at the head of the Great Lakes, or over the more expensive long-haul freight route to the seaboard, when lake ports are locked by ice. This season of relief is only slightly longer than that provided by Hudson Bay's open water, and since the bay route offers ample facilities for seagoing vessels as far as Port Nelson, much larger cargoes can be transported in a shorter time.

The Hudson Bay district constitutes an area of 3,000,000 square miles, including every variety of soil and climate known to the temperate zone. The bay itself is 1,000 miles long, 600 miles wide at the widest part, and is the third largest inland sea in the world. It yields the northern whale, a single adult specimen of which is valued at from \$10,000 to \$20,000, and thirty kinds of edible fish. The large fur companies expend from \$5,000,000 to \$6,000,000 a year in the purchase of furs alone in this area.

To the south lie the fertile farming districts, to the west the grain belt, and, just beyond, the vast cattle-range country. Forests cover millions of acres.

Only recently a man discovered the Belcher islands and also found them veritable iron mines. A geologist estimates

the iron resources of these islands to be not less than 200,000,000 tons and even more ore is in sight in the Nastapoka islands.

Since these islands lie but a few miles from shore, where water power is available and harbor facilities are provided by nature, their value is great, and many claims have already been staked in anticipation of the day when mills will start.

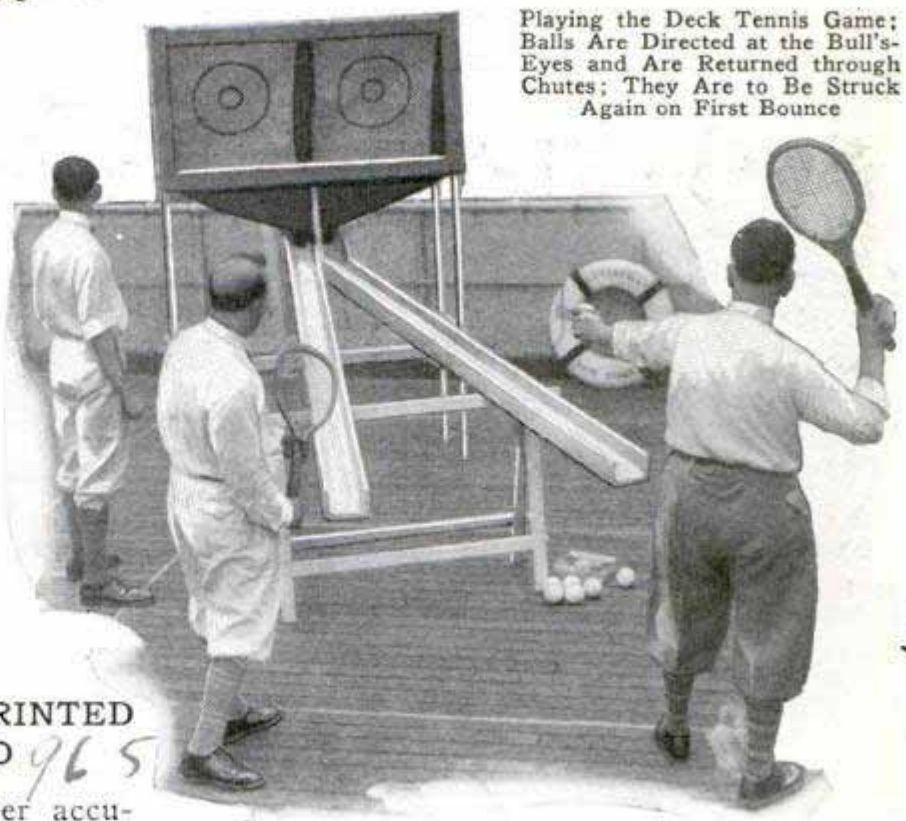
From Winnipeg, metropolis of western Canada, via Hudson Bay to Liverpool, is 3,620 miles, and via Montreal, 4,228 miles; Duluth, via Hudson Bay to Liverpool, 3,728 miles, and via New York, 4,201 miles. Such interior grain-storage points as Brandon, Regina, Calgary, Prince Albert, Edmonton and Saskatoon will be brought from 1,061 to 1,296 miles nearer to Europe's markets with the opening of the Hudson Bay route. On the other hand, Port Nelson is 2,925 miles from London, while Montreal, via Belle Isle, is 2,761 miles, and via Cape Race, 2,927 miles. However, the Hudson Bay route effects an average reduction of 1,000 miles to tide-water, without increasing the ocean distance to world markets.

CRUDE-OIL PIPES RIFLED INSIDE 86 FOR BETTER FLOW

The principle of the rifled gun is sometimes applied to pipes for pumping oil when the fluid is extremely thick. Heat cannot successfully be applied to a long

The Harraqub
Washington, D.C.

conduit, and mixing with too much water results in an emulsion from which the oil cannot be readily separated. Flowing through a rifled pipe, the oil, to which is added a quantity of water, is caused to whirl rapidly. The water, being heavier, seeks the outside and forms a thin film between the oil and the inner side of the pipe. Friction is thus reduced, and with this system, the oil and water issue separately at the end.



Playing the Deck Tennis Game; Balls Are Directed at the Bull's-Eyes and Are Returned through Chutes; They Are to Be Struck Again on First Bounce

BUS-RIDE TICKETS PRINTED AS FARE IS PAID 965

To make possible greater accuracy in the collection and counting of fares on motor-bus and inter-urban-car lines, a register issues tickets and keeps a record of them for checking with the receipts. As passengers enter, they are given a ticket from the machine which stamps the slip to show the date, class of fare, amount paid, number of station and other data. The ticket is handed back to the operator when the passenger leaves so that it can be compared with the record which has been left in the register. Furthermore, the attendant also is enabled to tell by the ticket if the per-

do not print tickets only.



Issuing a Ticket from Register; Machine Keeps a Record of the Fare for Future Auditing

son has ridden beyond the point to which he originally paid his fare and thus collect any balance due.

BULL'S-EYE TENNIS ON LINERS
LATEST MARINE SPORT

For the amusement of ships' passengers, a modified tennis game has become popular and is considered practical, too, as it affords an effective means for players to keep in training while on long voyages. Instead of a net, a target-and-chute apparatus is used. The balls are aimed at bull's-eyes in a frame, fall back through the runway and are to be struck again toward the target on the first bounce. Score is kept by a system of points based on the accuracy of the shots and successful returns without touching the ball with the hands.

COUNT INSECTS ON FRUIT TREES
WITH STICKY PAPER TRAPS 968

Sticky fly paper serves government experts in the war on insect pests that menace fruit and other trees. Placed in screen boxes, it is held under the branches of a tree and the limbs shaken. The insects caught on the paper are counted, so that the investigators can determine accurately at what time of year the bugs are most plentiful. The traps have been used for two seasons in studies of insects that attack orange and lemon trees.

Chicago - 2728 S Michigan Blvd

Levathan

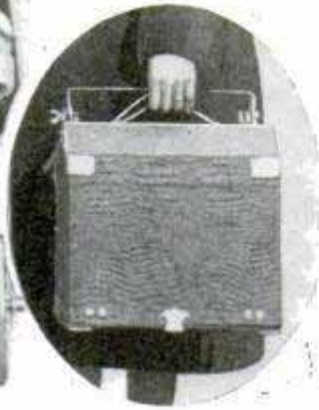
liner

U.S. Bureau of Entomology

Chmer Fare Register Co,

**BABY CART THAT FOLDS UP
CARRIED AS HANDBAG**

Gocart, Unfolded and Col-
lapsed, Showing How It
Can Be Carried as a
Handbag



Weighing only fourteen pounds, a col-
lapsible cart for the baby is folded up in
the form of a handbag for carrying. Sav-
ing of storage space and ease in going up
and down stairs are among the advantages
claimed for it, while comfort and safety
are assured the infant when the carriage
is in use.

**SELF-ADJUSTING AUTO BEARING
INVENTED BY PRISONERS**

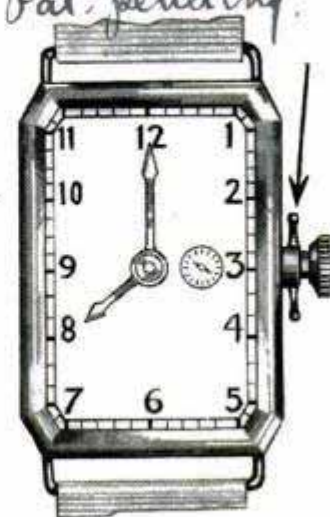
A self-adjusting connecting-rod bear-
ing that automatically takes up its own
slack has been patented by two prisoners
in the Utah state penitentiary. The bear-
ing is springless, working on a cam prin-
ciple. The two inventors worked out the
idea in the prison machine shop and ap-
plied it to all the cars and trucks used at
the penitentiary, as a practical test before
getting their patent. Previous to that,

however, it had been run for thirty hours
in a shop test with no lubricating facilities
save what could be supplied occasionally
from an oilcan. Despite this grueling test,
the bearing is said to have shown no ap-
preciable wear. Because of its nature,
the bearing does not require burning or
scraping in, and as it takes up the wear
and adjusts itself, a car with a new bear-
ing can be closed and driven away at once.

**SUGAR AIDS MUSCULAR ENERGY
CLIMBING TESTS SHOW**

Mountain climbers often experience an
increased desire for sweets and some, who
never touch such things at home, con-
sume large quantities when they are on
tours. A test was performed not long ago
to determine what effect sugar had on a
climber's muscular energy. The subject
was ignorant that an experiment was be-
ing made. On one day, he was given liq-
uid sweetened with sugar and, on the next,
a similar liquid sweetened with saccharine
to make it taste like the other. It was
found that a greater amount of work could
be accomplished on the days when the
sugar was given. Workers in the sugar-
cane regions depend to a large extent up-
on the juice of the cane for nourishment.
One investigator found that eight and
three-fourths ounces of sugar a day in-
creased his work capacity from twenty-
two to thirty-six per cent.

**WRIST WATCH AS ALARM CLOCK
SERVES AS REMINDER**



Attachable to the
ordinary wrist
watch with but lit-
tle change of the
mechanism, a re-
volving unit with
protruding points
that touch the skin
when they turn,
calls the attention
of the wearer to a
pending engage-
ment or may awak-
en him, as the case
may be. The equip-
ment includes a timing apparatus by which
the points are set to revolve at any hour.

Central Hall, London, Eng.

Kansas City, Mo. 11/8/26

*Somewhat similar. Handy Kab.
Jacobs + Karsler, 9 E. 14th St. New York*

*R. D. McCoy and
Archie Sulcos*

*Utah Deputy Warden
Richard H. Wooten*

Pat. pending
Colonado Hotel
St. Louis, Mo.
Dr. Jacob Neuman

11/14/26

Corp?

88/

Elkhart, Ind

FIND TWO COMETS IN ONE DAY ONE OLD, OTHER NEW 90 91

Finding a new comet on the same day as the rediscovery of an old one by the man who originally found it, was reported as an astronomical record recently. The new comet was observed by Dr. J. Comas-Sola, director of the Fabra observatory in Barcelona, Spain, and, following the practice of astronomers it will be given his name. It was seen early in the morning in the southeastern sky. As it is of the twelfth magnitude, it cannot be observed without a good telescope. About the same time, Dr. G. Neujman, at the observatory at Simeis, Russia, was picking up a comet he had discovered in 1916. He had calculated that it would come back every five and one-half years.

COAL DUST MIXED WITH CLAY PROVES GOOD FUEL 895

During the miners' strike, Englishmen learned new lessons in fuel economy. Coal dust, ordinarily considered too fine for furnaces, was rolled into balls with clay, to hold it together, and a coating of sawdust added to promote combustion and prevent the material from becoming sticky. The balls burned a long time and without forming clinkers, it is said.



Molding the Coal-Dust Balls; They Are Coated with Sawdust to Prevent Stickiness.

International



Propeller Windmill and Air-Mail Light, Which Is Supplied with Current from the Mill

ELECTRICITY FROM THE SKY SUPPLIED BY WINDMILL

In place of the familiar wheel with its many blades, an improved type of windmill consists of a propeller, similar to that used on aircraft, and special gearing for driving an electric generator or for pumping water. The outfit is said to have much greater efficiency than the old apparatus, and, once installed, the wheel requires little attention other than two oilings a year. The electric generating plants are of a thirty-two and 110-volt type. One of the reasons that the propeller is so efficient, as compared with the ordinary wheel, is that the two working blades cut the air with the least possible resistance and deliver more power to the dynamo. The propeller is so controlled by the vane that it is deflected out of extremely high winds, automatically protecting the plant and equipment.

Popular Mechanics Magazine does not publish the name of the maker or seller of any device described in its pages, but this information is kept on file and will be furnished, free, by addressing our Bureau of Information.

795



A Fish That Apes the Birds; Nest-Building in Its Home; This Species Also Changes Its Color

FISH BUILDS NEST OF WEEDS AND GUARDS EGGS

Among the peculiar kinds of fish is one that builds a nest of seaweeds and shore grasses around a stick or other anchored object. The eggs are laid in this shelter and are carefully guarded. The fish has the additional faculty of changing color like a chameleon to evade its enemies.

PIPE CARVER REVEALS SKILL IN MEERSCHAUM FIGURES

838

Vienna long has been the center of the meerschaum-carving industry but with the arrival in this country of one of a famous family of pipe makers, persons here have been able to see some of the cutting and finishing processes. The meerschaum is usually soft when first extracted from the diggings, most of which are in Asia Minor, but it hardens on exposure to warmth. After carving, the material usually is smoothed, heated in wax and given a high polish.



Otto Loder Cutting a Claw Design in Meerschaum Pipe Bowl; Several Tools Required for Delicate Carving

Atto Loder, Los Angeles, Calif.

CITY HAS RADIO PHONES

854

Commercial wireless telephoning is already in use at The Hague, where a municipal system with more than 1,000 subscribers has been opened. The service is said to be successful. Tests have shown that radio-phone messages can be sent between New York and London, and regular operation is expected as soon as a tariff has been fixed. Experiments in transatlantic wireless telephoning have been conducted for more than three years.

813

ELECTRO-CULTURE MAY REPLACE FERTILIZER

Will electricity be used as a substitute for fertilizers in raising crops? Striking results, that seem to indicate the possibility of such an innovation in agriculture, are reported from Germany where the electrical treatment was used to grow oats, rye, barley, wheat, potatoes and other crops on an unpromising piece of land without any other fertilizers, natural or artificial. For comparison, precisely the same crops were sowed in an adjacent field and were not given the "electro-culture." They showed strikingly inferior results. A number of masts, some fifteen feet high, fitted with simple electrical apparatus were set up at various points on the lot. From a bar magnet placed across the top of each mast, a zinc-coated iron

wire led over insulators into the earth and was continued underground parallel to the surface in the direction of the magnetic pole. Energy drawn from the air apparently stimulated the growth of the plants near the wires, the effect being noticeable from three to five feet on either side of the charged strand.

Alth. Berlinische near Berlin
Christian Science Monitor 10/18/26
Laurence J. Fogelbach
Berlin

569

Things You Know—That Aren't True

Commonly Accepted Beliefs Prove That "the Exception" Does Not Prove the Rule

By J. EARLE MILLER

WHEN you discover that something you have always known isn't really so, you may think that "that's the exception that proves the rule"—but that familiar old proverb happens to be one of the well-known "facts" that aren't so.



The idea that the exception does prove the rule goes clear back to the days when an old Latin proverb was translated into English. "Probat" was translated into "proves"—

which it may mean—but it likewise means "test," and that is the sense in which the Romans used it, so the proverb really is that "the exception tests the rule." The word is still used in English with the same sense, as for example the "proving grounds" at which cannon are tested. So what the exception really does is test the rule and prove thereby that it was not a true rule.

The commonly accepted beliefs that aren't true are almost numberless. Take the story that James Watt as a boy watched the



steam lift the lid of his mother's tea-kettle, and so conceived the idea for the steam engine. Somebody executed an elaborate engraving picturing young James watching the tea-kettle bubble, and thereupon most

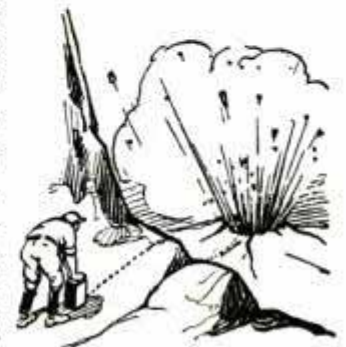


everybody believed the story. What actually happened was that Hero of Alexandria, as far back as 130 B.C., had produced motion from steam and many men had invented crude steam engines, including Newcomen, whose devices were being used in mines be-



fore Watt's time. But they were all quite crude, and Watt, who was an instrument maker, being employed to repair a model of Newcomen's engine, conceived the idea of improving it—and built the condensing engine.

Another well-known "fact" that doesn't stand analysis, is the oft-quoted remark that most great discoveries are the result of accident. Watt's own discovery was really the result of a wide experience as an instrument maker and repairer for Glasgow university, plus close application to the problem of improving the Newcomen engine. Isaac Newton made some of his greatest discoveries by means of a child's toy—soap bubbles—but people who are amazed at the "accidental way" in which he made important discoveries playing with such a device, forget the years of deep study which enabled him to draw important conclusions from such apparently trivial phenomena. Many of his "discoveries" relating to light were painstakingly worked



out through involved mathematical deductions, and then verified with bubbles.

The attraction of gravitation, according to the popular idea, was suggested to him

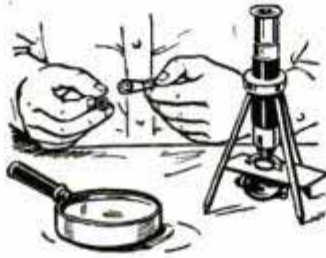


by the fall of an apple; Galileo, according to the same belief, got his idea of the pendulum from watching a swaying chandelier in a cathedral; and Madame Galvani, an invalid

for whom frog soup had been prescribed, noticed the dead animals twitching, called her husband's attention to it, and so he made his great electrical discovery.

The actual facts are that what Newton really discovered was that the same force which causes things to fall to earth retains the moon in its orbit—and it was his

years of mathematical study that made it possible for him to connect the two phenomena. Galileo had been studying falling bodies for years and had proved the absolute regularity of their movements long before he suggested the pendulum as a time measurer; and as for the Galvani story, it is a proven fact that he had been using frogs' legs for electroscopes for eleven years before his wife's health failed. It likewise is known that the pretty story of the invalid and her observations was fabricated by Alibert, an Italian writer.



The idea that whetstones are oiled to reduce the friction of the metal being sharpened on them is another of the well-known, but untrue, facts. The oil actually increases the friction. The reason is that the tiny parts of metal rubbed off the blade being sharpened would be rubbed into an unoiled stone and burrished smooth, lessening its cutting powers, so oil is used to keep the metal parts in suspension and saves the stone.

That lightning never strikes twice in the same place has been repeated so often that many people believe it implicitly. Yet the Washington monument was

struck several times before it was equipped with lightning rods; the steeple of St. Mark's in Venice was struck frequently before it was supplied with conductors; and there is hardly a city in America but what has a tall smokestack or two that has been hit more than once.

Another belief which is general, particularly among people handling explosives, is that the force of dynamite is always exerted downward. Soon after the invention of the explosive, it was found that a stick laid on the ground would tear a deep hole beneath it, or if laid on a slab of stone would shatter the stone, instead of expending its force upward where, apparently, there was no resistance. In neither case, however, was there anything above the stick on which it could have wrought damage! If the stone had been raised on pillars and the stick of dynamite placed under it, the slab would have been shattered as easily. The explanation for the apparently downward action of dynamite is simple. Its destructive power is due to the tremendously fast expansion of the gases generated by the explosion. On a stone slab, three feet square, there rests a column of air weighing nearly nine tons. If moved slowly this air does not offer much resistance, but when the dynamite is exploded and the gases try to move nine tons of air at their own speed the resistance is nearly as great as that of solid matter, so the force is expended downward, as the stone slab breaks more easily than the air will move.

Every few months the newspapers announce that some obscure mechanic has rediscovered the "lost art" of hardening copper and has been offered a million or two million dollars for his "discovery." As a matter of fact, that ancient art of hardening copper is not lost



and there never has been a time when we could not produce copper tools as hard as any the ancient Egyptians made. But copper is more expensive than iron and a copper tool is not nearly so efficient as a steel one, so nobody cares to harden it.

Practically everybody believes that he can see steam—yet this is just another of those well-known facts that aren't facts at all. What you see coming out of the engine exhaust as a white cloud is simply minute particles of water. If they were in the state of steam you couldn't see them at all.

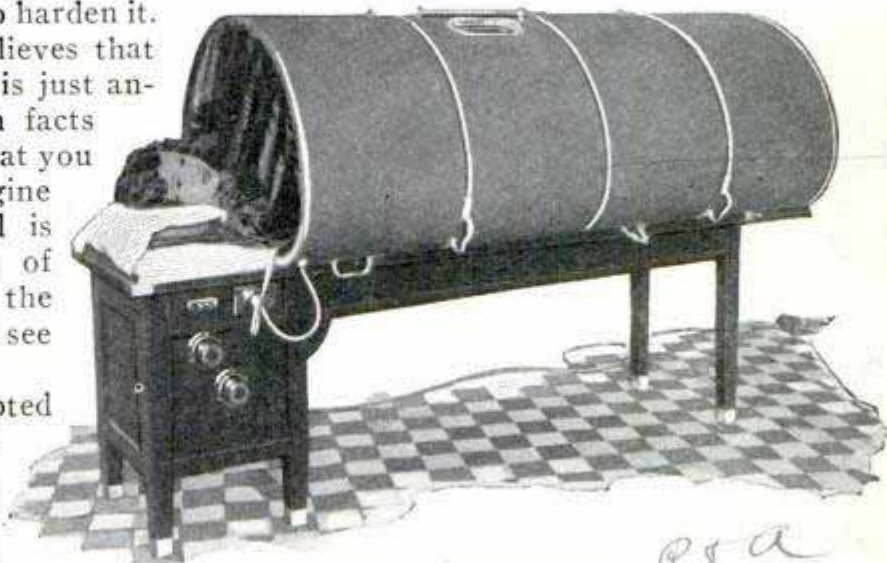
Another commonly accepted fallacy is that large lenses are more powerful than small ones. The power of a lens, meaning the extent to which it magnifies an object, is directly dependent upon the curvature of the surfaces, so it is easy to see that the smaller the lens the greater the curvature, and hence the greater the magnification.

Natural history, as represented by the common beliefs and superstitions, is full of similar errors. For example, there is the belief that when a turtle bites you, it won't let go until it hears thunder, and that small houseflies are the young of large flies. As for the latter, it is not generally known that flies, bees, wasps, butterflies, moths, etc., are as large at the time they emerge from the cocoon or cell as they ever are afterward.

An untruth that bobs up persistently is the theory that a ship sunk in the deeper parts of the ocean never reaches the bottom, but continues to float around in the depths forever. The proof of the mistake lies in the fact that it is impossible to compress water beyond a minute quantity, hence four miles down it has very little greater specific gravity than above. The ship still weighs more than the water it displaces, and so goes to the bottom.

ELECTRIC LIGHT-BATH CABINET TREATS ENTIRE BODY

796 Rays are projected upon the body from below as well as from above in a combi-



Taking Treatment in "Sunlight" Cabinet Which Projects Rays from Below as Well as from the Top

nation electric cabinet for administering light treatments. Lamps are arranged in the table part of the outfit and in the canopy which covers the patient. The heat and light can be accurately regulated.

METER TELLS SAND MOISTURE AIDING FOUNDRY WORK

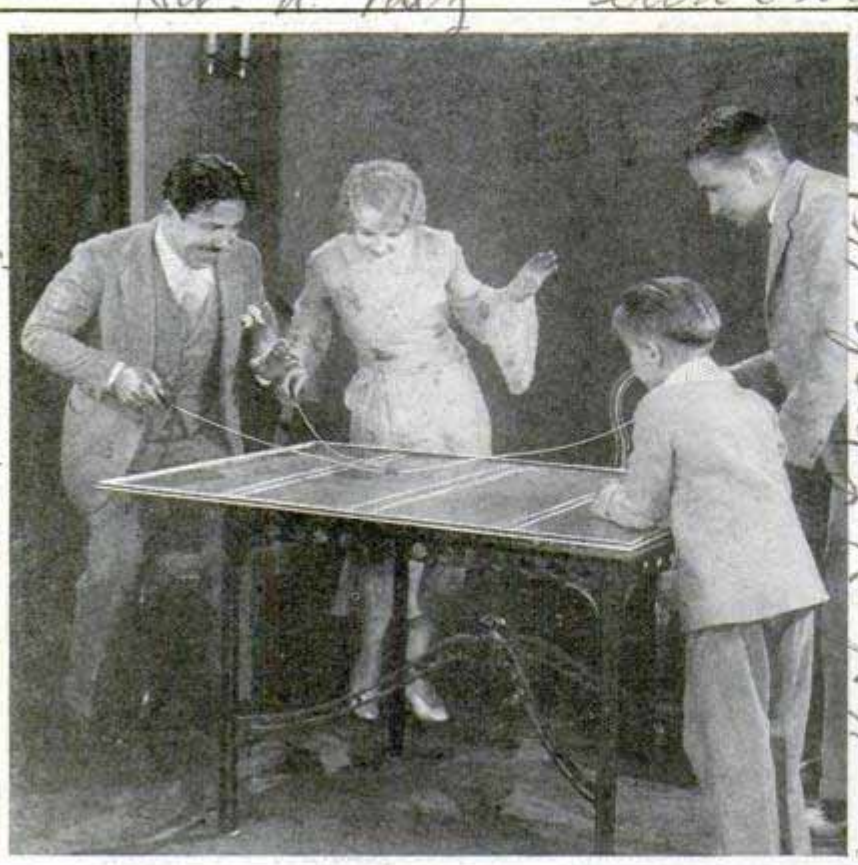
761 To eliminate guesswork in estimating the amount of moisture in sand for foundry purposes, an electrical meter has been devised. It operates on the principle of the varying conductivity of the material according to its degree of moistness. The gauge, which resembles a cane, and contains flashlight dry-battery cells to furnish the current, is simply thrust into a pile of sand and the reading is instantly shown on a dial at the top. A standard chart of moisture-content figures is furnished from which to determine the wetness of the particular sample being tested. This instrument is intended to promote greater accuracy, saves the time and expense of laboratory tests and is simple to use.



Moisture Meter in Use; End of Stick Is Stuck in Sand Pile and Reading Taken from Handle

A. W. McDevaney & Co.,
53 W. Jackson Blvd.
Chicago

74 New Montgomery St. San Francisco Calif
Hot 2 mag



Monte Banks and Pauline Garon Pushing the Disk against a Single Rival; the Game Is a Steady Battle of Skill

TENNIS AND FOOTBALL THRILLS IN LATEST TABLE GAME

Skill and determination are required in playing a table game that has some of the principles of football and tennis. Two or more persons can play at one time. A wooden disk, started at a line in the middle of the folding field, is to be shot with flexible wire pushers into a goal at the opposite side of the board. All players tackle the disk at once so that the contest is a steady battle until a score is made. A foul line is drawn around the field and pushing the disk out of bounds penalizes the offending player or side one point.

MOUNTAIN LIONS ARE COWARDS HUNTERS DECLARE

Mountain lions rarely show fight unless wounded; even a mother will desert her young when dogs draw near, and, though the lions can run with express-train speed for 100 yards or so, they are soon winded and forced to take to a tree. According to M. E. Musgrave, of the United States biological survey, the mountain lion is probably the least courageous of the

larger wild animals. Its cowardice seems hard to reconcile with the facts that it usually weighs 150 pounds or more when grown and is so strong that it can kill horses weighing 800 or 900 pounds and drag them thirty feet into the bushes. It has been known to carry away deer and big calves without any evidence of dragging. The animals are phenomenal jumpers. A leap of twelve or fifteen feet into a tree from the ground is not uncommon, and they have been known to jump down fifty or sixty feet from a branch without injury. Like the cat, they have the ability to land on their feet. Mr. Musgrave reports that he has

climbed out on a limb and taken pictures of a lion while sitting within six feet of it. The animal hissed and growled, but showed no other signs of fight. After a short chase, the lion soon becomes nearly exhausted and sticks to its tree even though punched with a stick.

OLD CHAIRS QUICKLY MENDED WITH SIMPLE BRACE SET



Without extensive overhauling, old chairs that have become loose can be strengthened for further service by attaching a patented set of clamps and wire braces. The device is fastened to the chair bottom and affords a support for each leg. The clamp may be tightened by means of a threaded bar located in the center.

All railroads in Europe with the exception of those in England, are to adopt twenty-four-hour time tables.

Chicago. R. G. Harlan. Morrison Hotel. Probable info. Transp. 21 W. Huron

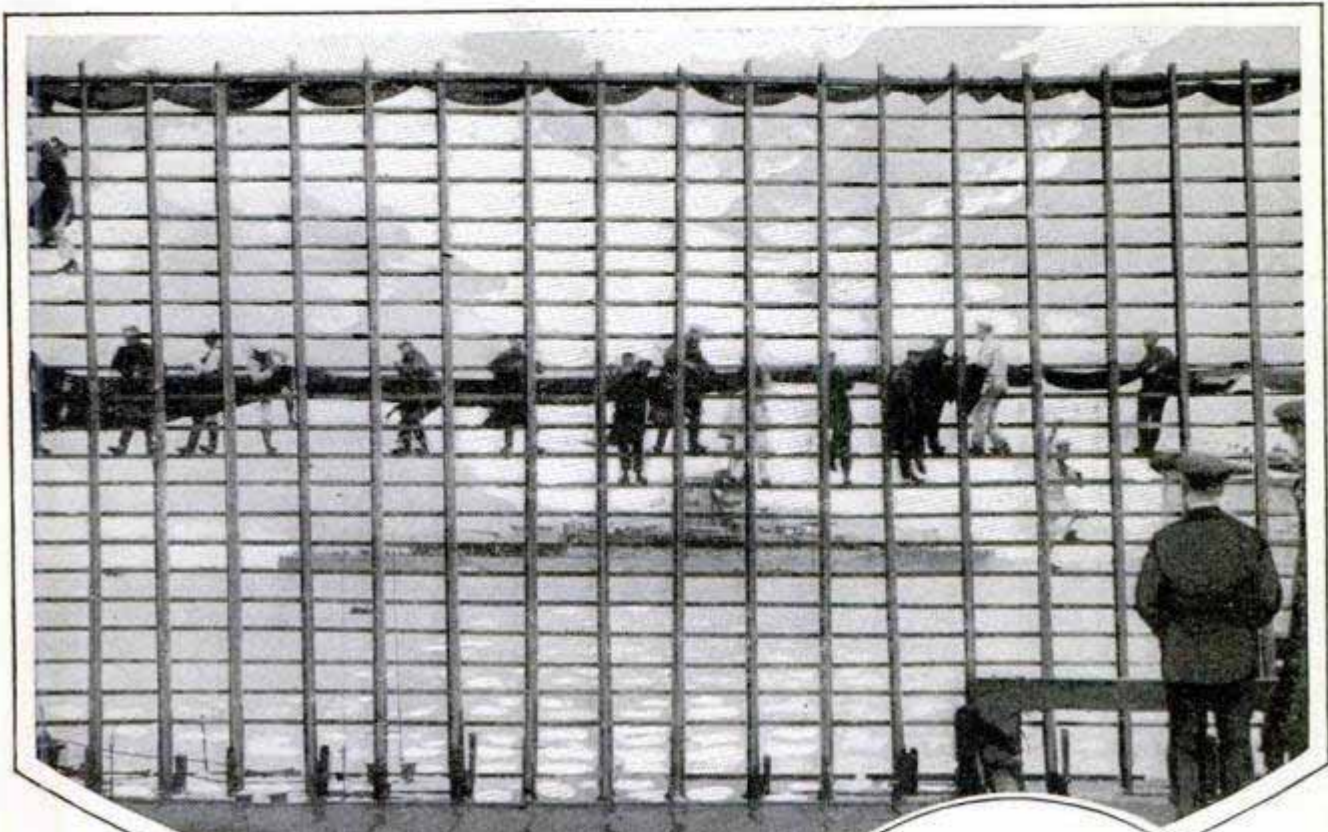
New York N.Y. 1001

Joseph B. Wash
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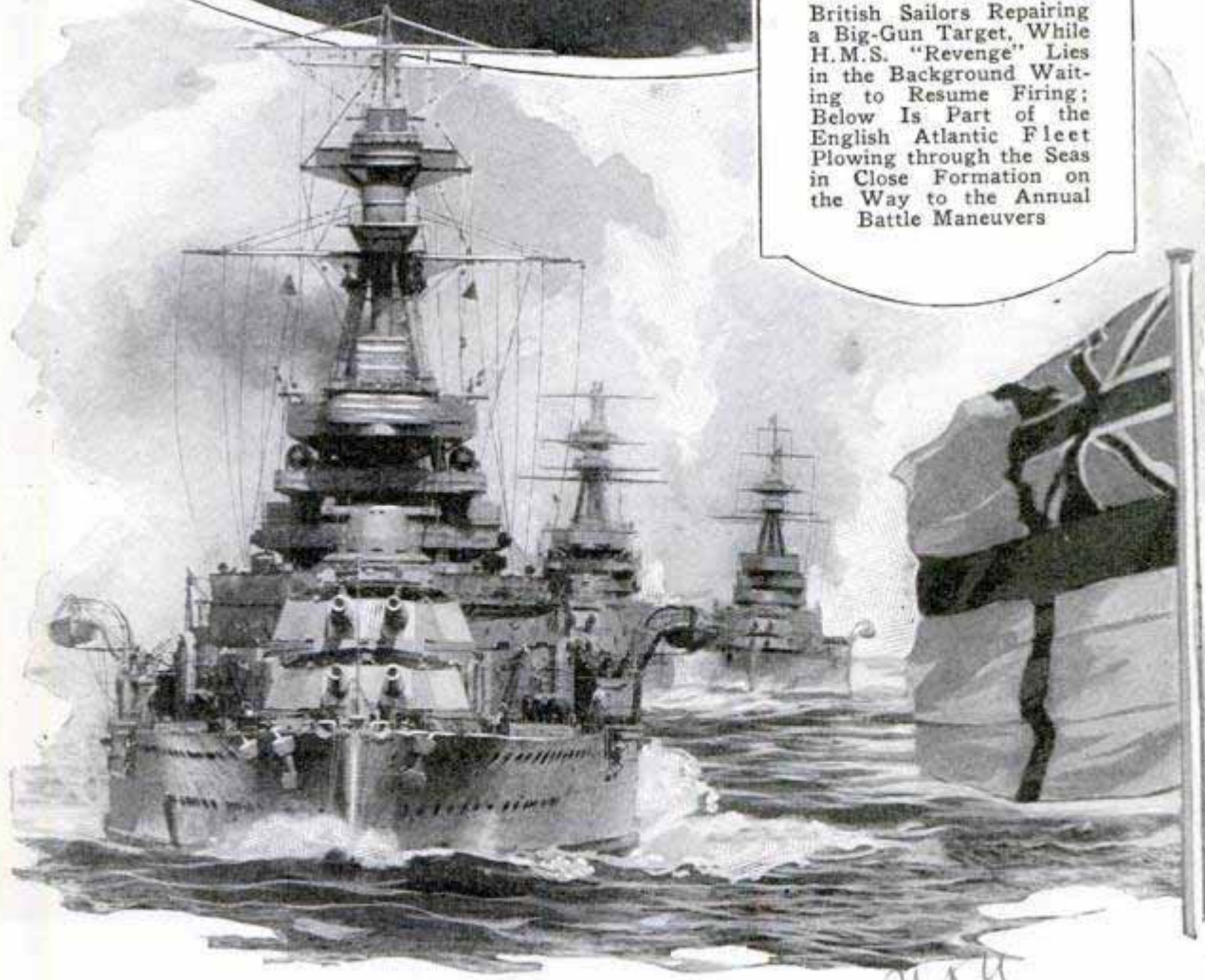
Report to appear in Journal of Mammalogy

849 J. B. ...

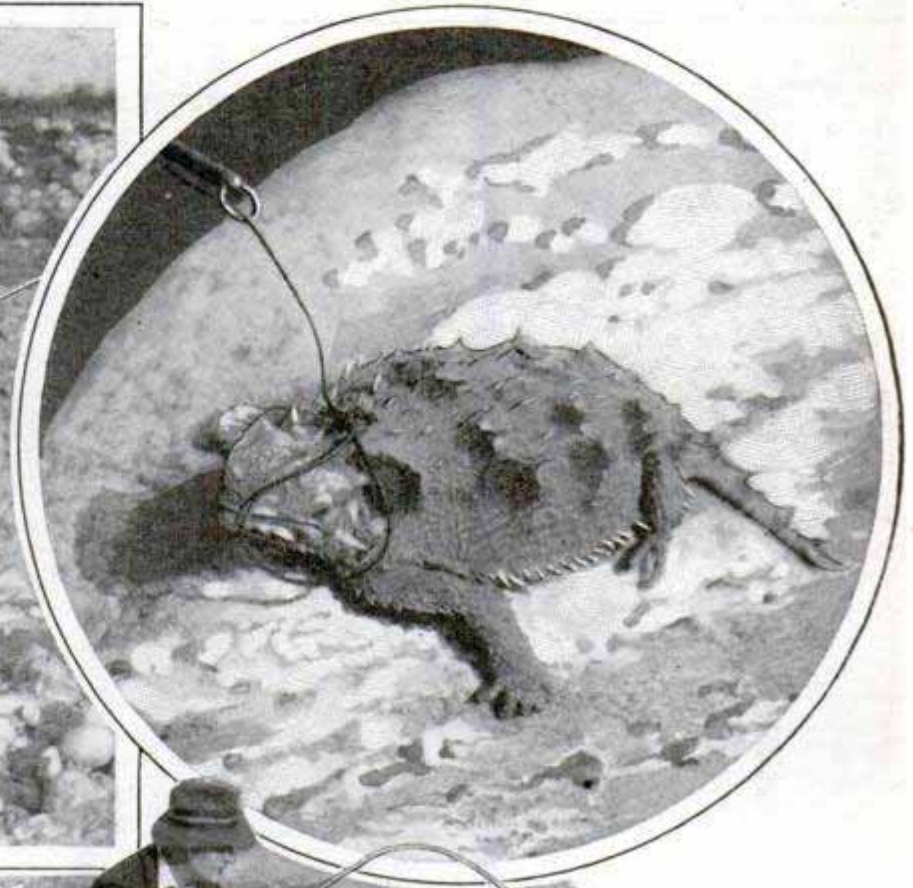
GREAT BRITAIN'S WARSHIPS SHOW THEIR STRENGTH



British Sailors Repairing a Big-Gun Target, While H.M.S. "Revenge" Lies in the Background Waiting to Resume Firing; Below Is Part of the English Atlantic Fleet Plowing through the Seas in Close Formation on the Way to the Annual Battle Maneuvers



FISHING IN THE DESERT FOR SNAKES AND LIZARDS



Mr. Rowe at His "Dry Land Fishing," and Two Specimens; the Noose in the Line Easily Slips over Reptile's Head



If you motor across one of the deserts of the southwest and see a man in the costume of a trout fisherman, carrying a creel and "fishing" in the sage brush and cactus with a rod and reel, his name is Willis A. Rowe, whose specialty in natural history research is snakes and lizards. He catches his live specimens for study with a trout rod and reel, and carries them to his home at San Fernando, Calif., in an ordinary creel. Mr. Rowe, who has been studying snakes for twenty years, has tried "snake sticks" and all the other known methods of catching reptiles alive. The trout-fishing outfit, however, which he devised for his own use, is said to be much safer and more efficient. It is safer because it allows him to work at a distance and is more efficient because a snake or lizard, once ensnared by the trout line, has never been known to get away. No hooks are used for catching snakes. The

scientist merely makes a slip noose on the end of the line, which is then allowed to dangle from the casting rod. When he finds a reptile that he desires for study, the creature is easily approached at a safe distance. The slip noose is then dropped over the head of the snake or lizard, and the reptile is lifted off the ground. It is then easy to gain a handhold upon the reptile's neck just back of the head to avoid any possibility of being bitten.

FIRST COPPER WAS SMELTED WITH PETROLEUM? 830

That the most ancient copper used by man may have been smelted by heat from petroleum, one of the most modern of

*in article to British pub
nature*

666

fuels, is the theory advanced by an eastern scientist. The process, if followed, was probably the result of an accident, nature, rather than man, arranging the primitive procedure. The belief is based upon the similarity of the region along the Iora and Kura rivers in the Caucasus, the home of the early Egyptians, to the description of the Egyptian paradise outlined in the "Book of the Dead." In this area, petroleum, seeping out, has formed small lakes and pools in close proximity to copper ore. The theory is that the oil became ignited accidentally so that when the copper was discovered later, it was in metallic form. The most widely held supposition is that primitive man became a metallurgist when the family campfire had been made where copper ore happened to be present.

**BIG-WHEEL VACUUM CLEANER
ELIMINATES LIFTING**

726

Easily taken up or down stairs, a large vacuum cleaner with a blower attachment can be moved around by one person without lifting. It weighs 100 pounds and the blower is said to be effective in removing dust from difficult places, as from electric motors and other apparatus and behind radiators.



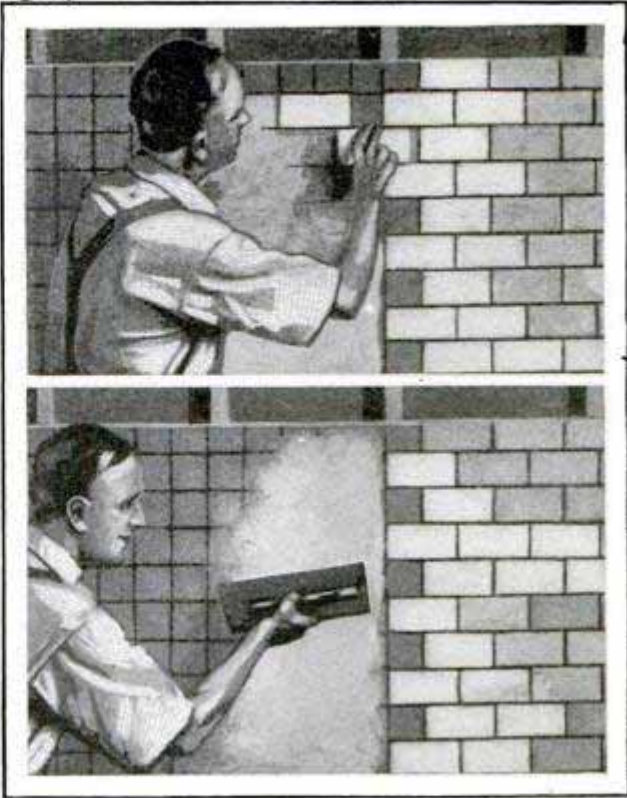
*portable
No. 500*

To Make Housework Still Easier; Big Vacuum Cleaner on Rubber-Tired Wheels Saves Lifting

It is built for use in office and apartment buildings and homes.

*Allen + Billmyre Co. Inc.
512 Grand Central Palace*

Chicago - 118 W. Ellis



Building Wall of the Steel Tile; It Is Laid against a Special Cement and Insulating Material

**STEEL TILE FOR BATHROOMS
CUTS COST OF WALLS**

Tile of the same material as is used in tubs is now furnished for the bathroom walls. It consists of porcelain enamel fused on steel. The pieces form a smooth, durable surface which is easily cleaned and resists corrosion. An insulated base and special cement, against which the tile is laid, help keep out heat and cold.

**BOARD FOR AVIATION PATENTS
TO AID INVENTORS**

A board to consider aviation patents and designs has been organized by act of congress and is now in operation at Washington. It is composed of the assistant secretaries of the army and navy for aviation, and the assistant secretary of commerce. The purpose of the board is to give thorough scientific and practical consideration to all designs, inventions and improvements relating to aircraft that may be submitted by any individual or corporation, and it is authorized to pay not to exceed \$75,000 for any design, improvement or invention it may consider of value to the government. Payments so made, vest the ownership of such inventions in the government.

*Knapp - Harris Co. & Co. 55 St. Louis and
14th St. Excelsior. & Co.
Aeronautical Patents
and Design Board
navy Bldg. Washington D.C.*

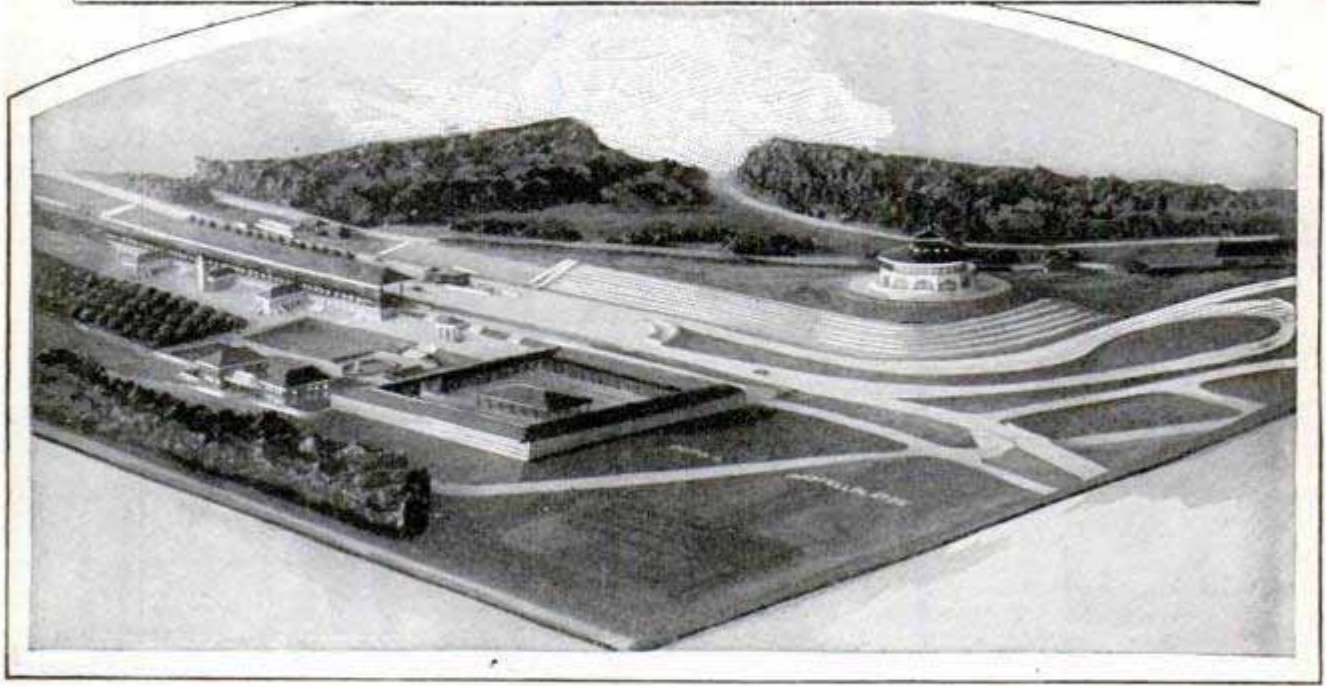
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Mr. ... 537 S. Dearborn Chicago

UNIQUE AUTO RACE COURSE HAS FIVE TRACKS IN ONE



TWISTING and Turning through the Rolling Hills of the Eifel District in Germany, the Nuerburg Ring Motor-Race Course Will Be Practically Five Tracks in One, as It Will Contain Four Smaller Courses within the Largest. The Main Road Will Be Nearly Twenty Miles Long, and Extend over a Section of Territory Six Miles Wide; Stands to Accommodate More than 10,000 Persons Are Being Constructed at the Starting and Finishing Points, Where Garages, Repair Shops and Other Service Facilities Will Be Provided. Above Is Shown a Model Diagram of the Entire Course, the Main Track Being Outlined by the Heavy White Line and the Smaller Rings in Lighter Tracing; Practically the Only Straight Section of the Entire Circuit Is Back of the Lofty Observation Post in the Upper Center. To the Right of the Peak May Be Seen the Starting Point. Below Is a Model of the Grandstand Pavilion, Garages and Parking Spaces at the Start. Races Will Afford Opportunities for Testing Brakes as Well as Speed



PHONE BUOY FOR SUBMARINES TO AID IN RESCUES 894

As a means of locating and communicating with submarines that are unable to rise to the surface, a special buoy has been devised and has been considered by the British admiralty. It is to be carried alongside the conning tower, and if the craft is unable to emerge, the buoy, filled with compressed air, on being released, rises to the surface. It is attached to the submarine with a cable and contains a telephone with connection to the crew below so that rescuers could communicate with the men. The buoy is also equipped with rockets, a lighting apparatus and signal bell in order to attract the attention of passing ships.

REPEATER RAZOR SAVES TIME IN CHANGING BLADES 893

Twenty blades are held in the handle of a magazine safety razor now on the market, and a new one is adjusted simply by tilting the top or head of the razor, pulling out a plunger and pushing it back. The old steel falls out and the fresh one drops into place. The blade can be adjusted by moving the razor head to the best angle for shaving. The used pieces are put back into the "magazine" and when all twenty have been employed, they are thrown away in a package. New blades are furnished in a clip which is easily in-

cannot consider foreign business at present. 4/1/24



Photo Diagram of the Magazine Razor, Showing How the Blades Are Renewed

serted. The entire outfit, when closed, is little larger than a fountain pen.

Magazine Repeating Razor Co.
285 Madison Ave. N.Y.C.

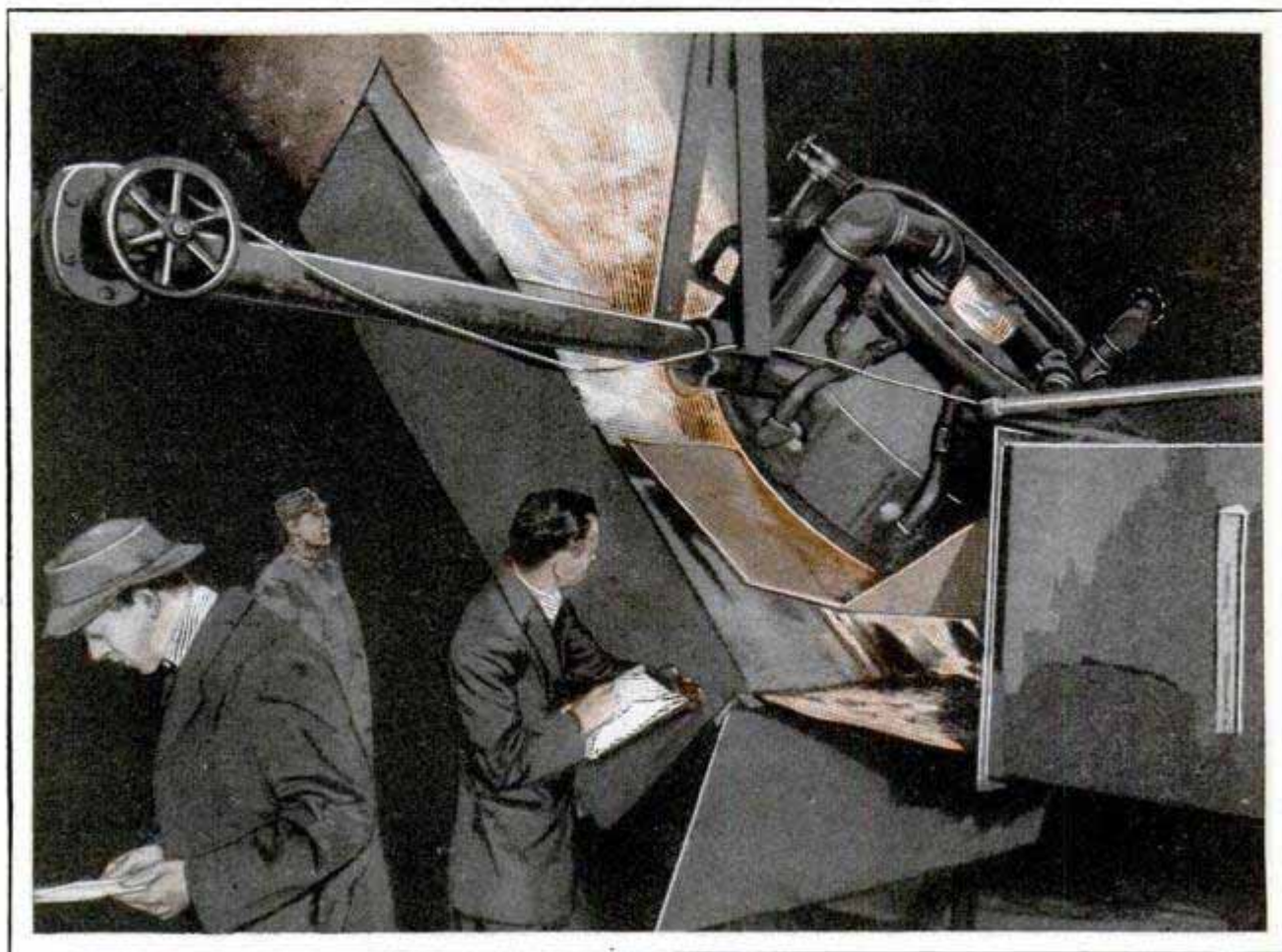


Testing the Parachute with Dummy; the Pockets on Sides Serve as Supplementary Supports

NEW PARACHUTE WITH POCKETS TO EASE DESCENTS

With a row of air pockets about the lower edge, a balloon-shaped parachute devised by an Italian inventor, is intended to make descents more slow and hence ease the shock of landing. The pockets act as small parachutes in themselves and the depth of the main bag as compared with the shallow interior of the usual type of support is a prominent feature. The pockets are also arranged to help open the parachute when the wearer releases it.

The color sense is not developed in children until they reach the age of about two years.



Testing Your Fireproof Roofing with Huge Gas Burner, and Wind Tunnel to Provide the Gale That Blows the Flames Up the Slanting Roof and under the Overlapping Edges

Unseen Firemen Who Guard Your Life

Potential Dangers Located Before They Can Arise by Scientists Who Battle Blazes in War to Protect Your Home and Business

A SHEET of flame from an immense gas burner is being driven against a section of fire-resisting roof material by an air blower.

Firemen, without rubber boots, hats and coats, who never rode a swaying motor truck are standing by. Instead of hose and water they hold loose-leaf clips filled with charts. One watches a clock and another the electrical controls of delicate thermometers which are measuring the heat on top and underneath the section of roof.

They are fighting the fire that may menace your home next year or ten years from now, fighting before it ever happens, and doing it silently, efficiently and out of sight, with never a red-painted hose wag-on to attract the public's eye.

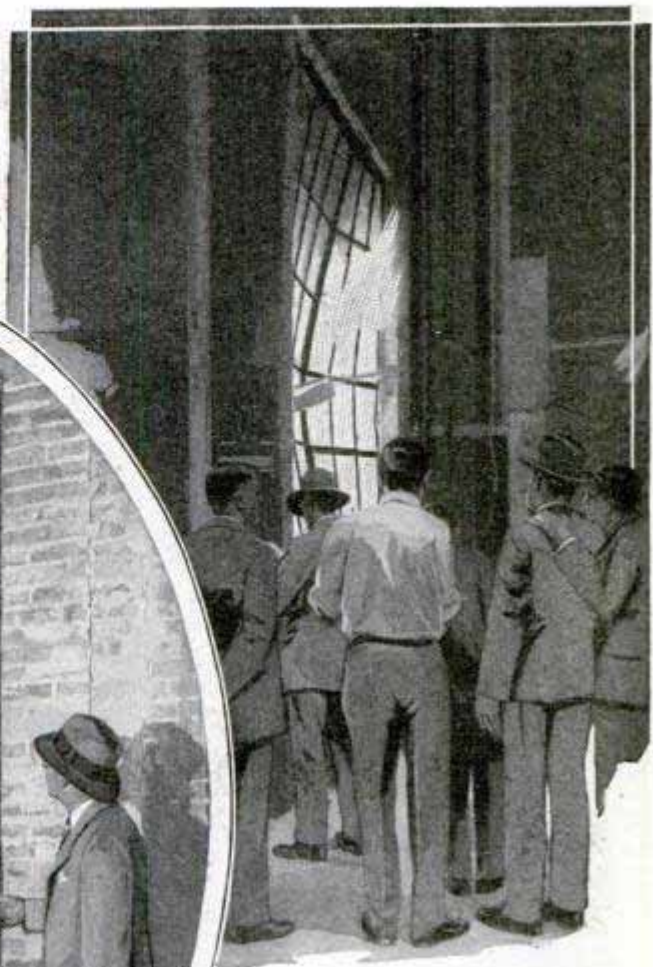
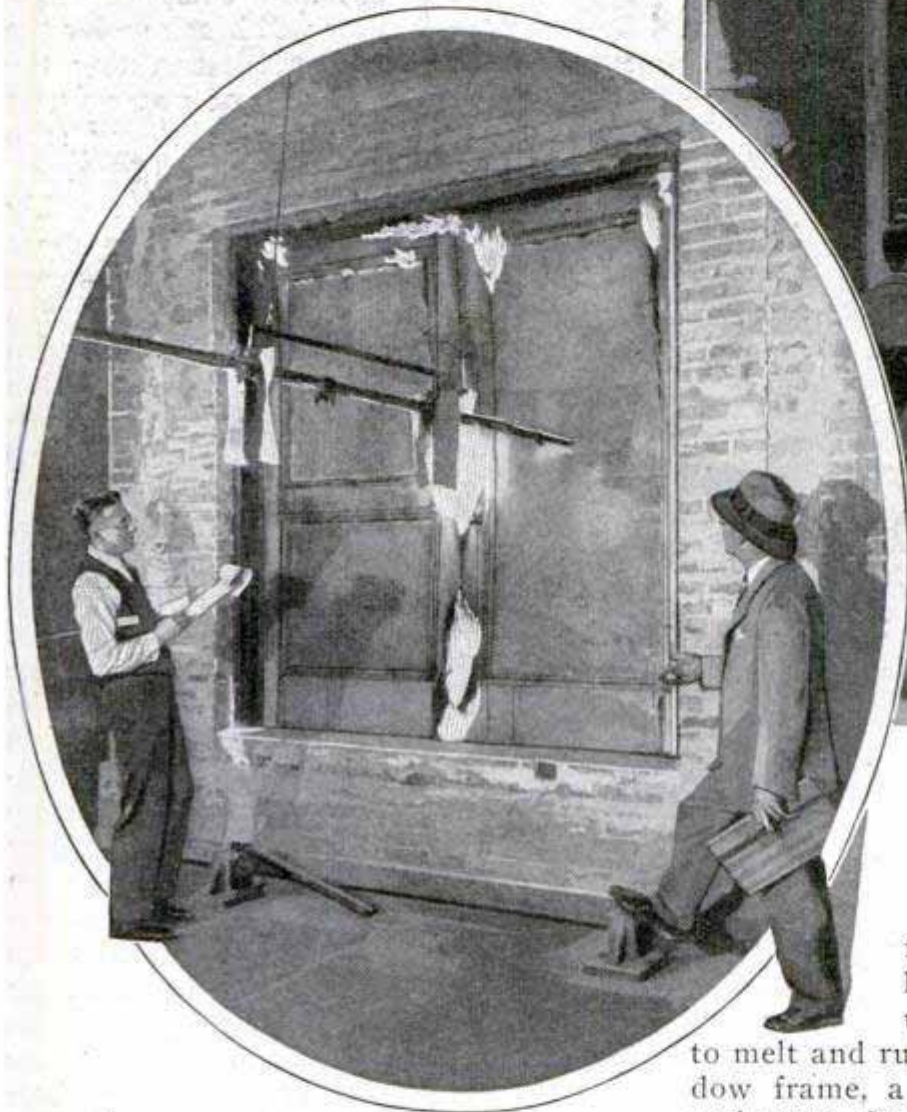
The scene is in the laboratories of the

fire underwriters, a huge plant where scores of trained scientists spend their lives trying to wreck and destroy the cherished inventions of other men, in order that the unsafe and the dangerous may be eliminated and only the things that make life safe get out to you.

The flames shooting up the model section of roofing will be kept at a fixed temperature for a certain period, and then the damage, or lack of damage, will be carefully measured, and the manufacturer will be told either that his product is safe or that it is unsafe. If it is approved as standard, every insurance agent will be prepared to give you a reduction in your premium rate if you use that roofing.

Fire testing is only a small part—though one of the most important—of the work of the laboratories. They reach out into

every branch of fire, safety and burglary protection covered by insurance. Every piece of fire hose manufactured in the United States must pass one of their inspectors, on duty in the factory; out of every dozen or so lengths a small piece is



Expanding on the Side Next to the Fire First, a Huge Steel and Wire-Glass Window Slowly Bends In to the Flame; Left, Metal-Covered Fire Doors Flicker with Wood-Gas Flames as the Interior Carbonizes

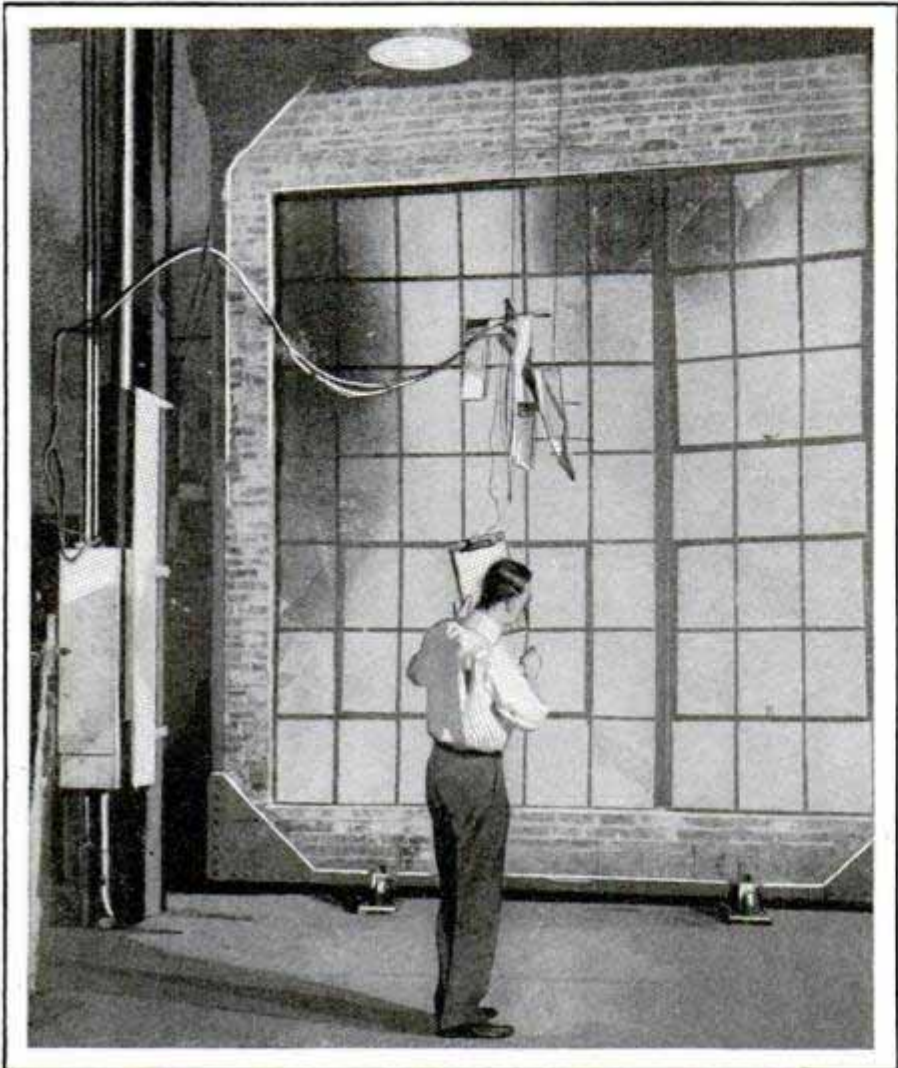
clipped from one and sent in for testing at the laboratory, and from every few hundred an entire length is taken.

In the laboratory itself fires are raging nearly every weekday of the year, burning up roofing and fire doors and windows, and even huge steel safes and office files. Several hundred thousand dollars has been invested in vast gas furnaces in which material can be submitted to tests more severe than any encountered in an ordinary fire.

One of these is equipped with enormous steel front frames, suspended from a track above, in which solid brick walls, twenty feet square and with doors or windows built in place, can be assembled, rolled in

front of the gas burners, locked in place, and burned until the very bricks begin to melt and run. Picture a big steel window frame, a dozen or more feet wide and more than that in height, built into an eight-inch brick wall, and with frames filled with wired glass. The fires are lit, and with thermometers checking the temperature, the heat is gradually brought up to an enormous height and held there until an hour has passed. Long before that time, the glass has cracked in a million places, but the wire binding holds it in place. As the minutes pass, some of the glass begins to run, and little holes appear, with an occasional tongue of flame licking through.

The steel frame itself expands under the tremendous heat and, being hottest on the side next the blaze, begins to bend in toward the flames. The putty next begins to give way, and whole panes of glass will



Heat, So Intense It Will Melt the Wired Glass, Is Raging behind This Big Fire Window during the Test

and, at the call of time, shut off the gas and roll the red-hot brick wall and window to one side. Instantly a two-inch fire hose is played over it to see how badly the window will break under the impact, determining the quantity of water that might pass through to damage stock inside.

The testing of a big steel safe is even more thrilling. The insurance covers valuable papers and records, and losses through the interruption of business, so the underwriters are interested in seeing that they are kept safe. Because of its weight, a safe not only is subjected to damage by fire, but also to that suffered when floors give way and it drops into the basement, possibly from the heights of a tall building. So the manufacturer sends a brand-new safe. It is loaded with old record books, newspapers and loose sheets covered with writing, and put in a big furnace, after holes have been drilled to carry the leads of electrical thermometers placed in the interior and a tube for air samples. The furnace is sealed and the fire started, to burn for hours.

slowly sway out from the top and bend downward. Taut wires are stretched across the furnace front and the distance from them to the face of the glass has been carefully measured at a dozen places before the fires were started. Now the attendants dash into the intense heat at intervals, raise a long steel yardstick and measure the distances again to determine the amount by which the steel frame has been warped.

Suspended in front of the furnace is a long pipe carrying a series of thermometers, to record the temperature at varying distances in front of the window, a check that shows how far inflammable material should be kept away to prevent communication of a fire from an adjoining building. As the last five-minute period of the hour begins, the timer starts calling off the minutes, and on the final one the seconds. Men at the furnace release the chocks holding the framework

papers and loose sheets covered with writing, and put in a big furnace, after holes have been drilled to carry the leads of electrical thermometers placed in the interior and a tube for air samples. The furnace is sealed and the fire started, to burn for hours.

The thermometers inside the safe record the temperature, and show whether it has reached the point where the papers will begin to char, while the air tube enables the observers to take samples from inside the safe and test them for dangerous gases. The latter is important, as the gas pressure may blow the strong box open.

After hours of heating, the red-hot safe is hauled out of the furnace, lifted by a crane and swung thirty feet up a huge brick stack, then dropped to a ten-foot thick concrete floor below. Back into the furnace it goes for more hours of heating, then it is opened and the condition of the contents noted.

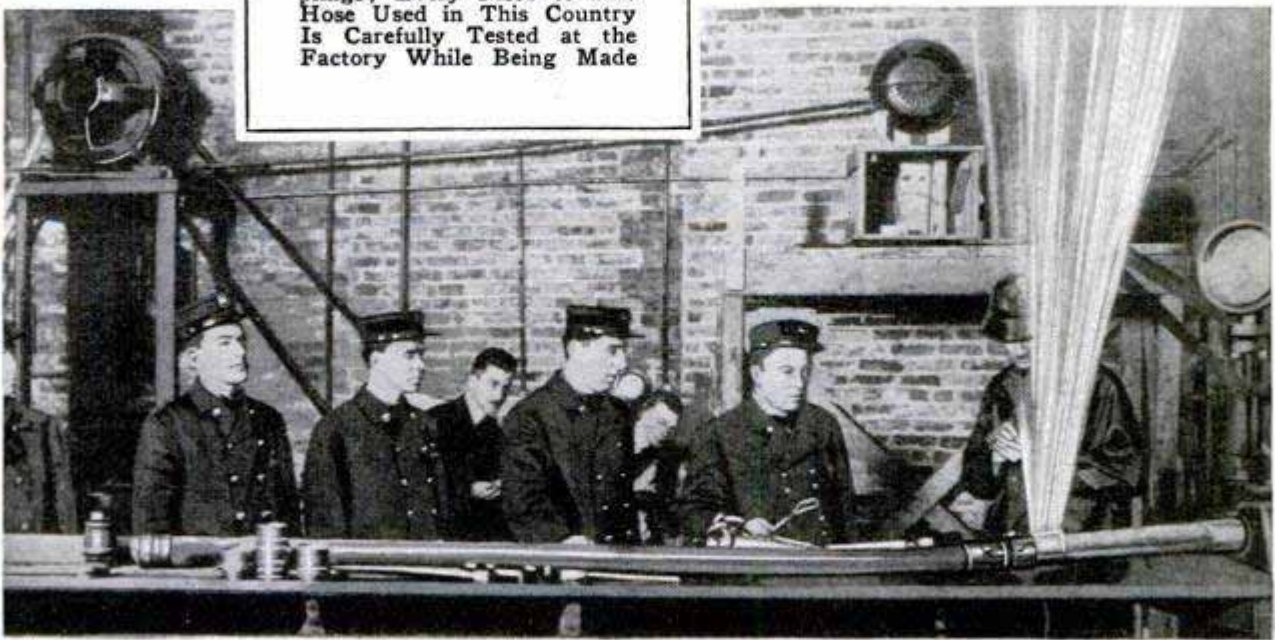
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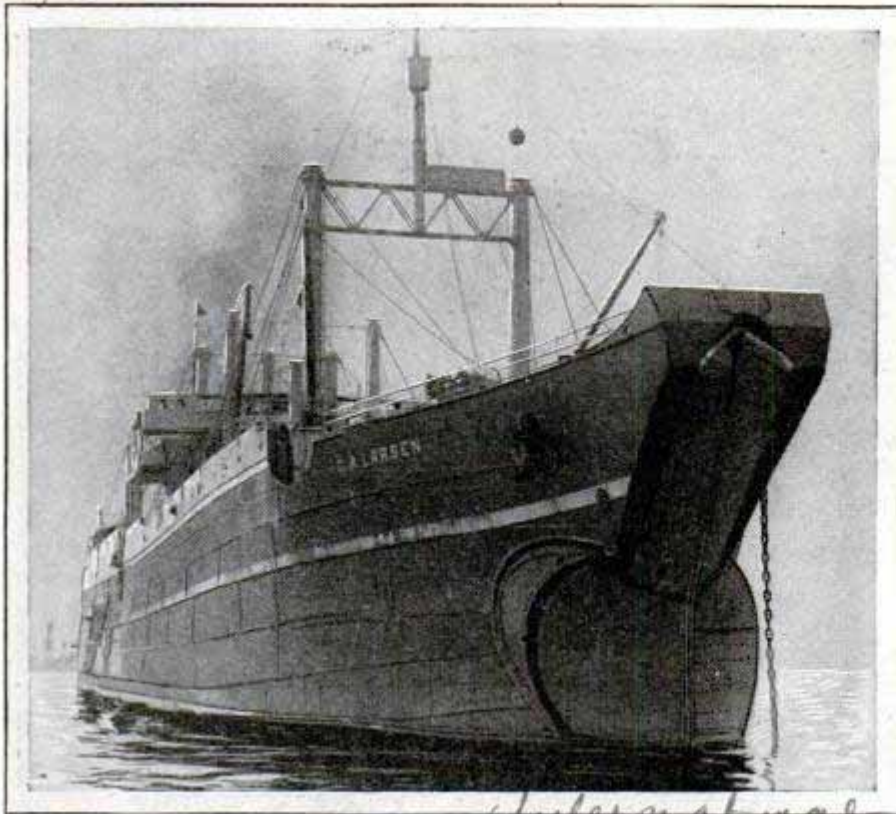
Banks of Foot-Square Pans Are Used to Catch and Measure the Water from an Automatic Sprinkler Head



Cauldrons of Blazing Gasoline Provide a Chance to Try Out Foam Extinguishers; Below, Firemen Are Watching a Test of Hose and Couplings; Every Piece of Fire Hose Used in This Country Is Carefully Tested at the Factory While Being Made



750



Steamer "C. A. Larsen," Showing the Blunt Prow Which Opens to Permit Dragging Whales Aboard

SHIP HAS BIG DOOR IN PROW FOR LOADING WHALES

So that whales can be dragged into the hold, the steamship "C. A. Larsen," flying the Norwegian flag, has a water-tight door in its blunt prow just above the water line. This eliminates the necessity of towing the catch back to shore before working out the oil and preparing the other marketable substances.

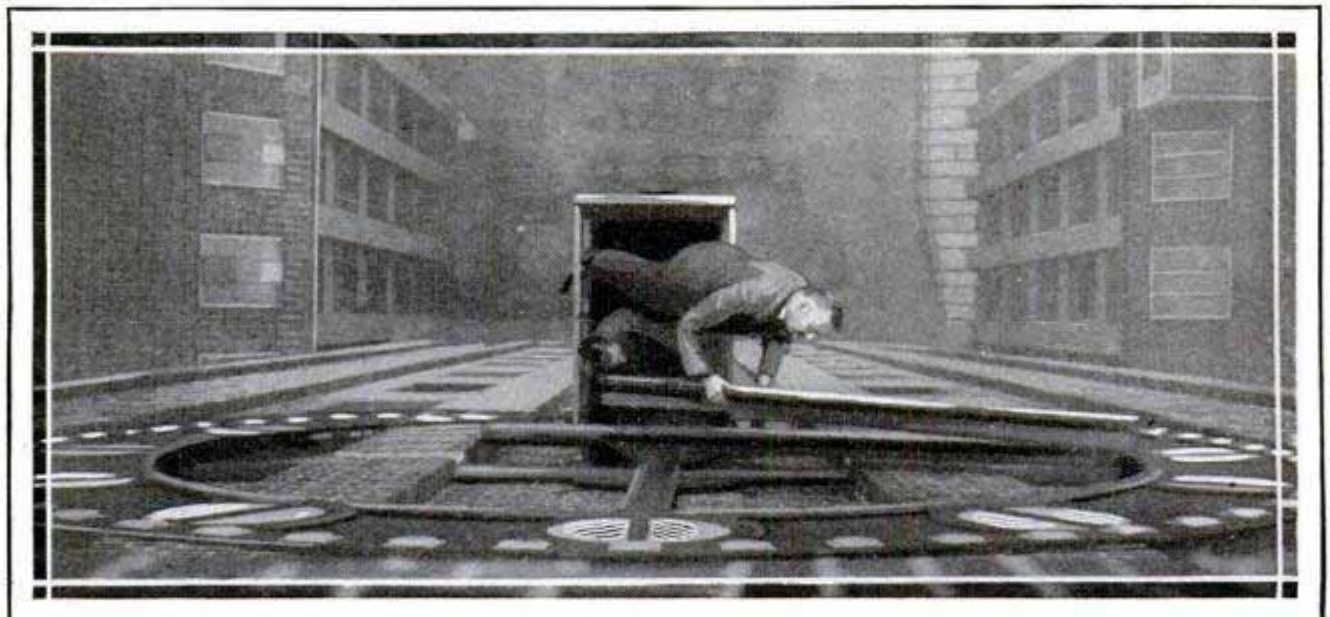
WHY DO WE LAUGH?

Many explanations have been given as to the cause of laughter. Herbert Spencer believed that laughing was an overflow of excessive nervous energy. Henri Bergson, the French philosopher, concluded that laughter was evolved by the race as a means of discipline. Prof. William McDougal, of Harvard university, believes that nature has developed laughter in order to protect us against the excessive working of the instinct of sympathy, first because, when we laugh, the rate of breathing is increased and the circulation of the blood

stimulated, and, secondly, the trend of thought is broken up so that the mind is carried away from a situation that otherwise might tend to cause depression.

REPAIR MEN TURN ACROBATS FIXING TOWER CLOCK

Workmen called to repair the tallest tower clock in Berlin demonstrated their agility as well as their technical knowl-



Looking Down on the Workmen during Repairing of the Tower Clock; the Moving Hands Increased the Hazards of the Task

891
June 11/14/26
N.Y.

869

Key tone

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edge during the job. Confined to a small platform erected just beneath the middle of the dial, they were limited to close quarters and the moving hands, tending to cause a grip on them to slip, presented an additional hazard.

WHERE ONE DIVE INTO THE SEA MAY BRING A FORTUNE

Divers in the south seas flirt with fortune daily, for there is always a chance that the shell they pick up may contain a valuable pearl. A greenish one of twenty-six carats was sold in New York for \$16,000 and although the finder probably did not get more than \$500, the sum was sufficient to make him independent for life. The divers gather shells for making buttons. This brings from \$80 to \$100 a ton. A rule is that the finder keeps the pearls. As they open the shells, the divers' gambling instinct is keenly alive, for their fingers may dislodge a pearl valued at hundreds of dollars. In the shallower waters, clusters of mussels are found which occasionally yield yellow pearls, not so valuable as the pink and white ones but prized for their oddity. No diving apparatus is used and the natives are able to remain submerged as long as two and a quarter minutes. They place the shells in a weighted net at the bottom, which is then drawn up with a cord.

CHINA CAT AND BIRD ON WALL UNIQUE HOUSE DECORATION

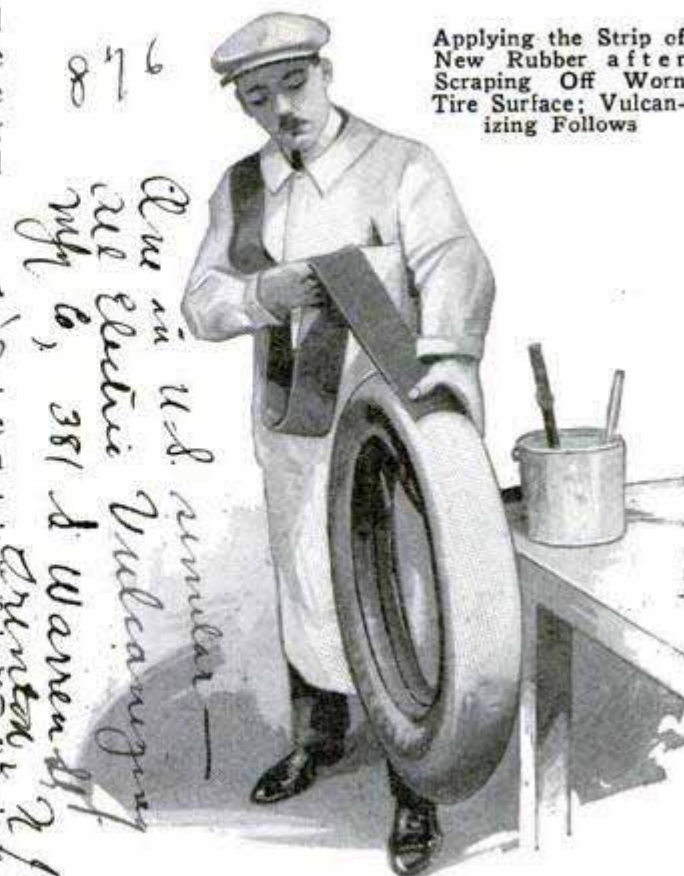
China figures of a cat and a bird on the front wall of a house in England attract attention from passers - by. The cat is posed as though chasing the bird and both are realistically modeled. They are held by hidden brackets.



China Figures of Cat and Bird Attached to Front Wall of House

Household Patent 2908
Harrisburg, Pa.

in South Kensington, England
Direct Agency



Applying the Strip of New Rubber after Scraping Off Worn Tire Surface; Vulcanizing Follows

876
978
905
New in U.S. number
all electric Vulcanizing
Mfr. Co., 381 S. Warren St.
Philadelphia, Pa.

NEW PROCESS OF VULCANIZING TO CUT TIRE BILLS

Old auto tires are said to be reconditioned to such a degree that they will give service equivalent to seventy-five per cent of that of new ones, by a special vulcanizing process developed in France. The worn surface is first removed, then covered with a secret gumlike material. Over this is placed a new rubber strip, then the tire is treated in the machine, which not only vulcanizes the rubber but stamps

it with impressions similar to those on new tires. A feature of the machine is that it can be made to fit any tire.

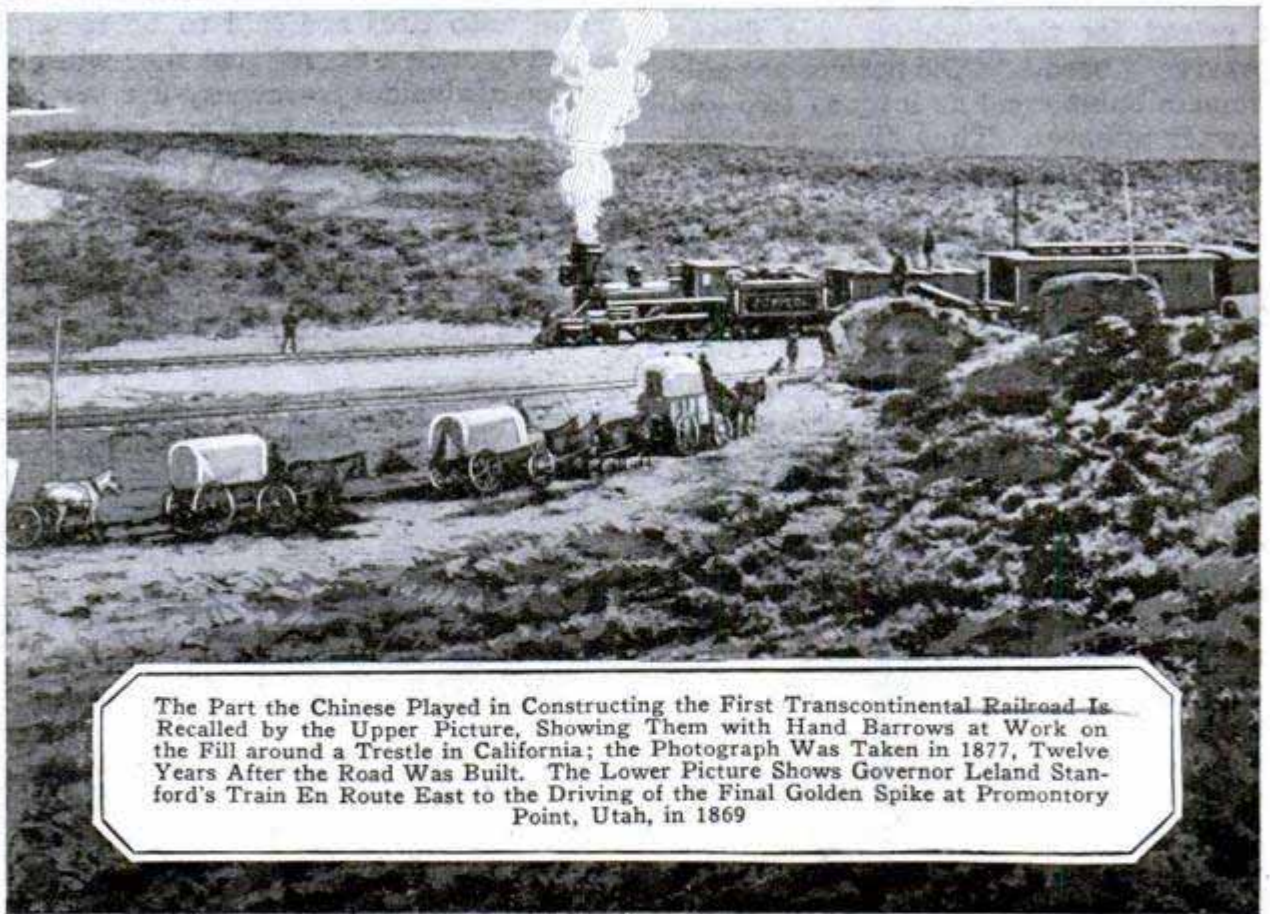
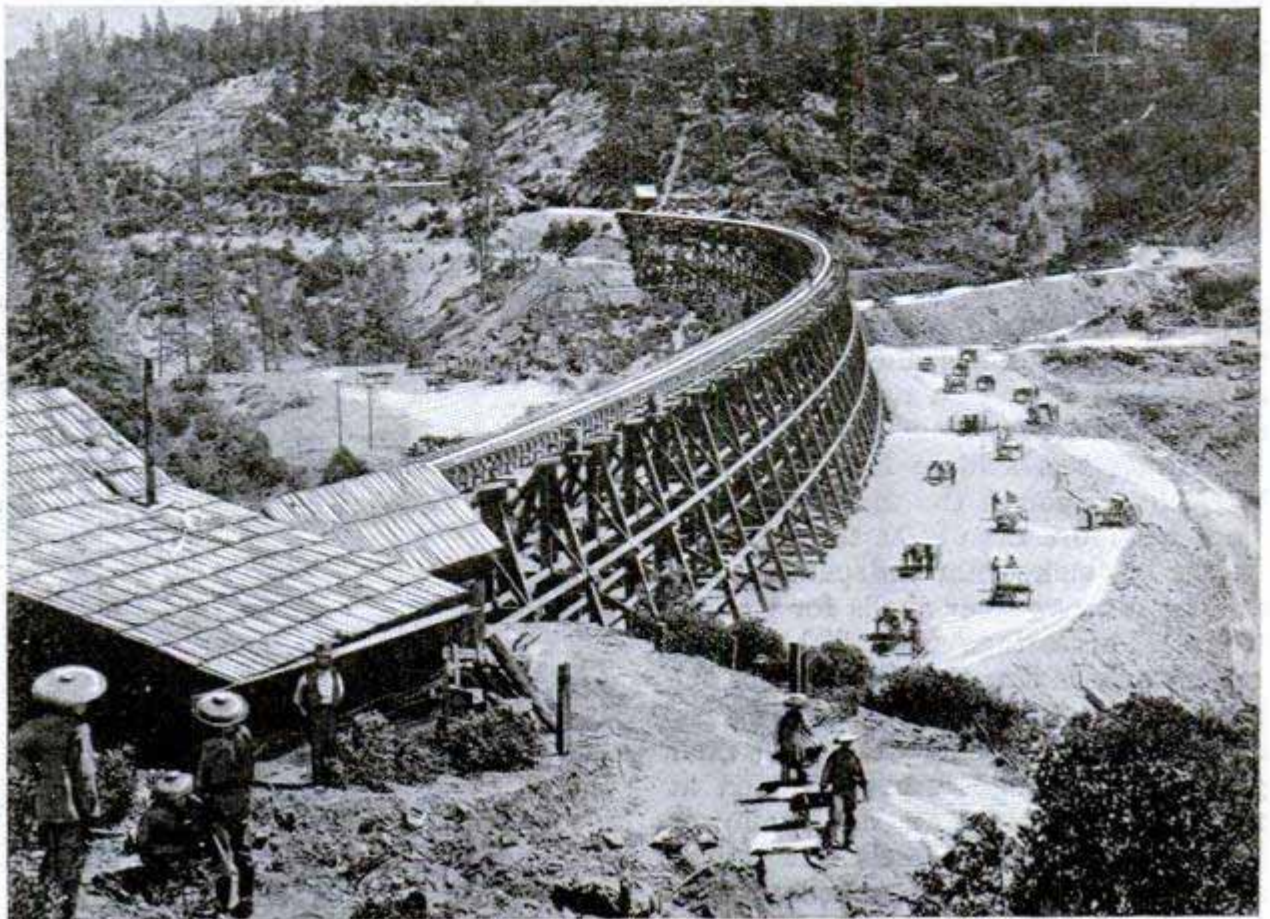
Write our Bureau of Information if you wish to know who makes or sells any article described in this magazine.

Mfr. Societe Anonyme de Procédés "Trik"
26 me d'arr. Jacques, à Grenoble, (France) France

988

Transcontinental

HISTORIC VIEWS SHOW CHANGE FROM TRAIL TO RAIL



The Part the Chinese Played in Constructing the First Transcontinental Railroad Is Recalled by the Upper Picture, Showing Them with Hand Barrows at Work on the Fill around a Trestle in California; the Photograph Was Taken in 1877, Twelve Years After the Road Was Built. The Lower Picture Shows Governor Leland Stanford's Train En Route East to the Driving of the Final Golden Spike at Promontory Point, Utah, in 1869

d interational

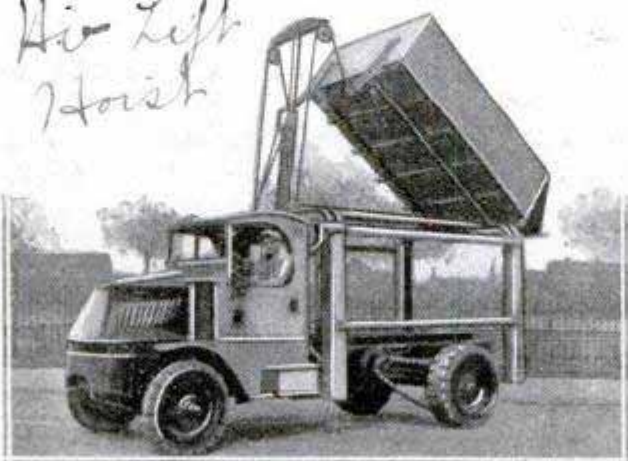
1926

GOLDPLATING DONE WITHOUT ACID IN VACUUM

Textiles, laces and other materials can be goldplated successfully by a new process developed in Germany, according to reports—a method which requires no acids and has other economical features. The metal is deposited upon the object by means of electricity aided by a vacuum container and is dry and in molecular form. No polishing is necessary after the plating, as polished articles do not lose their luster, it is said. On sheet and wire, an even coating is applied but on irregular articles the parts closest to the electrodes receive a heavier layer. This, however, is considered an advantage as they are the areas subjected to the greatest wear. The action of the electric current within the vacuum tends to drive the tiny particles of gold along so fast that they collide with enormous force against anything standing in their way and become attached to it. The process also is said to give a more durable plating.

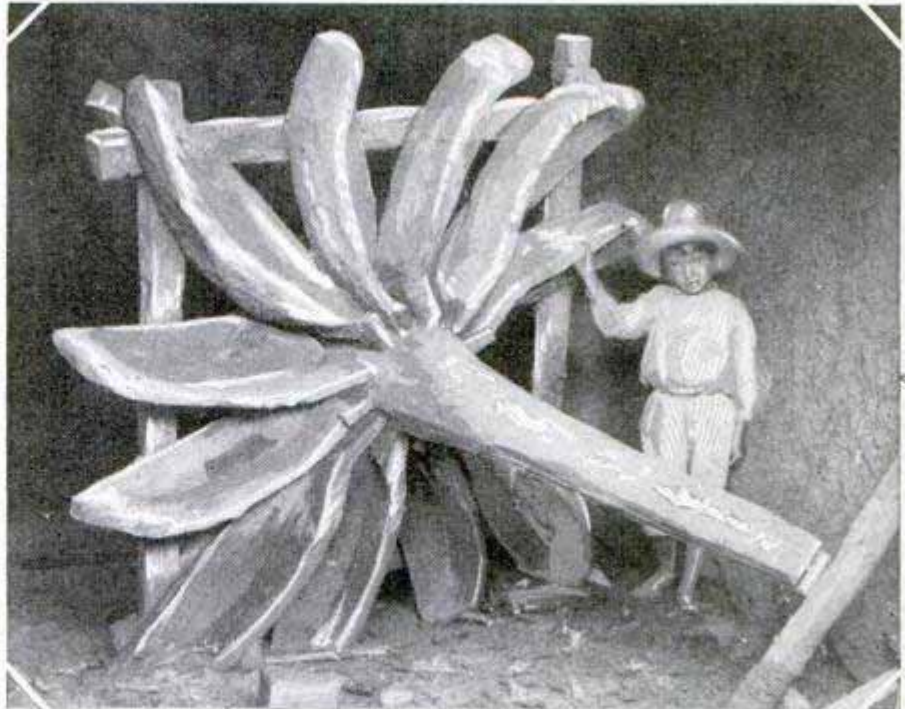
HIGH-LIFT TRUCK BODY DUMPS AT SIDE, TOP OR BOTTOM

Loads can be dumped easily over obstacles from a lift truck body that is raised on four steel screws to the height of eight and one-half feet. It is so designed that it can be emptied from the top, from either side or from the bottom. The special feature by which it will operate without binding even when the truck is on an incline, is of particular value, the manufacturers assert.



Body Elevated for High Dumping from End; It Also Empties from Sides or Bottom

*Jones Isear Co.
Boston Harbor*



Turbine Water Wheel, Cut from Wood Nearly Four Centuries Ago for Mill in Mexico; It Still Operates

TURBINE WATER WHEEL CARVED CENTURIES AGO

Turbines are generally associated with modern power plants, but from Mexico comes proof that this form of wheel was known to Spanish engineers more than 380 years ago. The wheel was carved by hand from hard wood and belongs to a mill in the state of Chiapas. Although built in 1540, the mill still runs and the original wheel is in service. The turbine was adapted so that the fullest efficiency might be realized from the small water power available on the site. A reservoir was constructed to store up water at night so that additional supplies could be used the next day. The turbine was placed deep under the level of the ground to increase the fall. Two wheels of this type were made for the mill. They make from seventy to 100 revolutions per minute. The present owner of the installation intends to use it to generate electricity for lighting and power purposes.

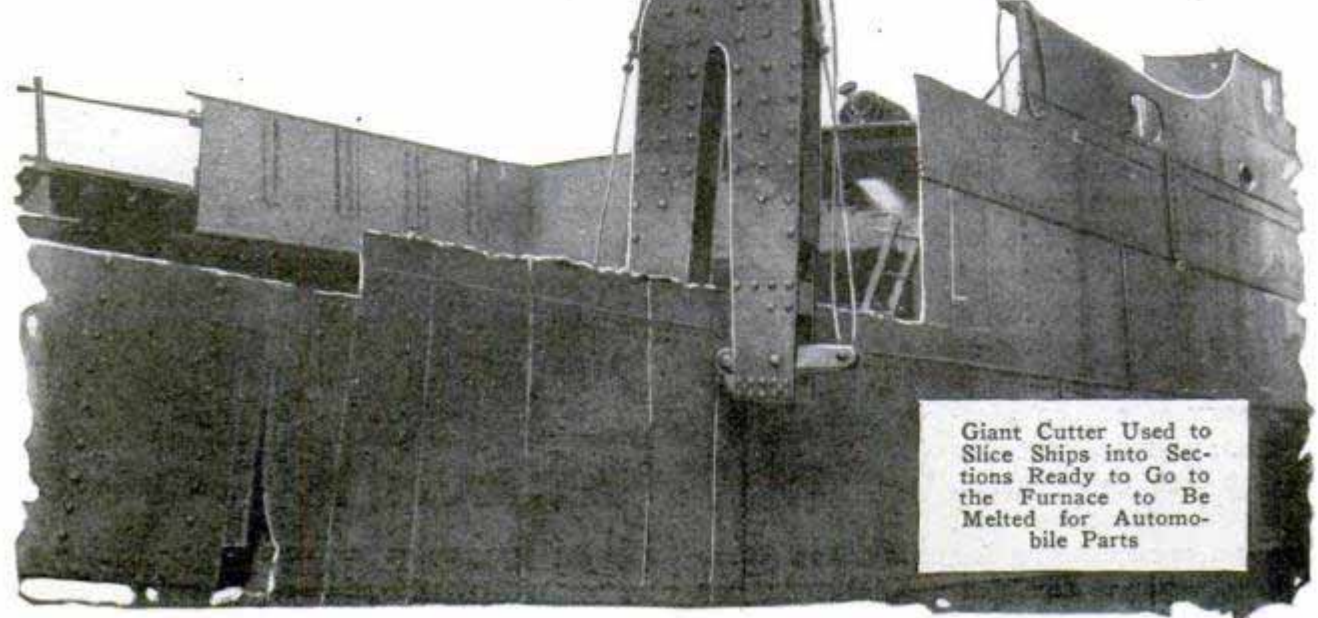
*At El Rosario Molino
Chiapas, Mexico
Traveler's Journal
Apr 1926
J. I. Jones*

608

Kansas City

10/3/26
Salvage

Turning Ships Into Autos



Giant Cutter Used to Slice Ships into Sections Ready to Go to the Furnace to Be Melted for Automobile Parts

WITH a special plant built to cut up 199 war-time steel ships and convert the scrap into automobiles, Henry Ford is demonstrating new ideas in salvage work. Like the packing plants that "save everything but the squeal," the ship workers are using everything but the coating of barnacles and rust the vessels brought up from the sea.

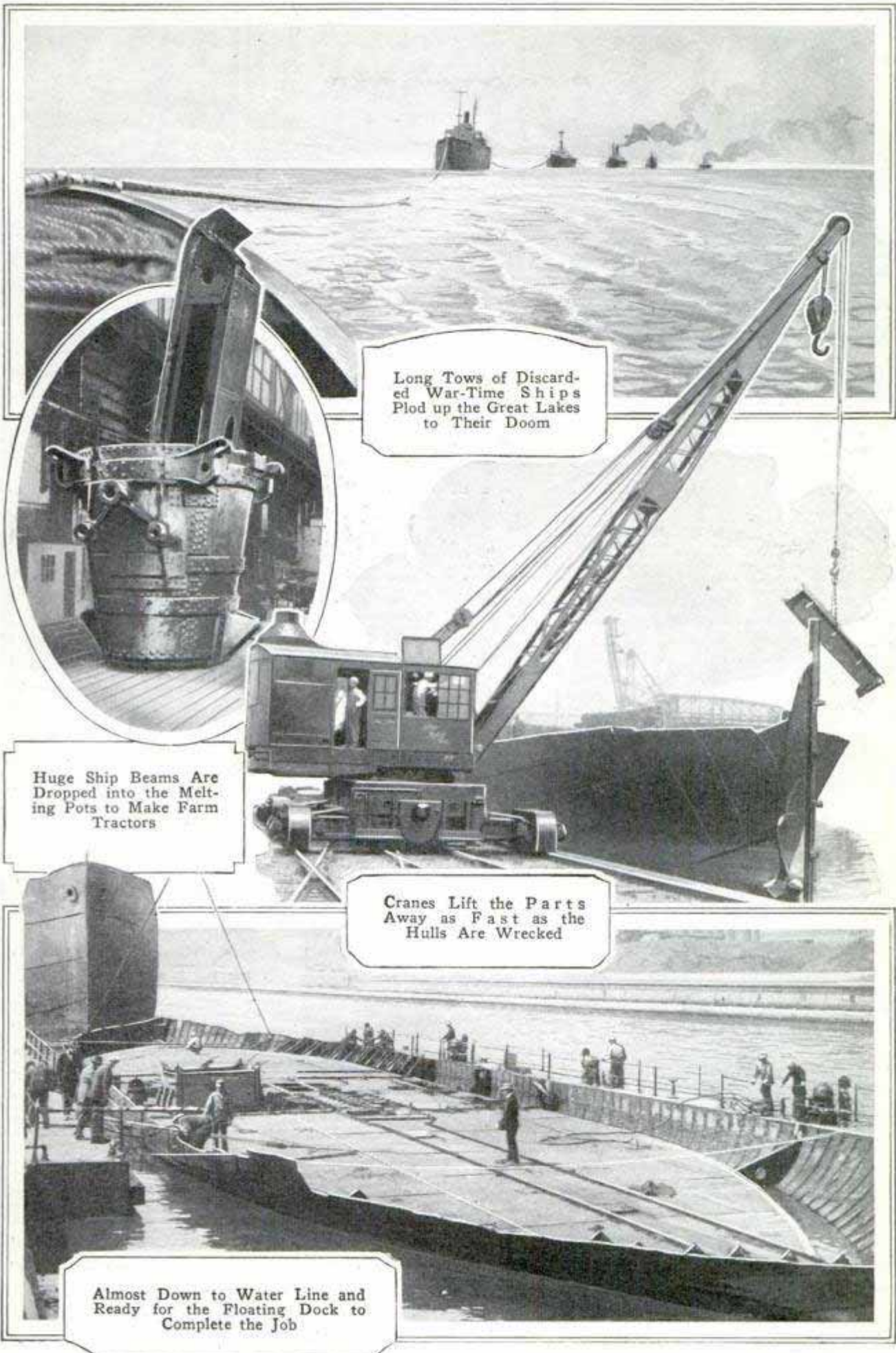
The salvage wharf provides docking space for twelve ships at a time, and the first ship in the line disappears every second day, while a new one moves in at the other end. A different operation is carried out in each berth, the remains moving on to the next place for the following step, until in the last stage, having been wrecked to the water line, a floating drydock slips under what is left and raises it to the surface for the final cutting.

Alongside the dock, one railway line is equipped with a series of wrecking cranes, and beyond that, three other tracks provide for trains to haul the salvage away. Of these, one takes steel scrap to the furnaces to be melted up at the rate of 300 tons a day for auto axles and tractor parts. A second hauls the woodwork to the wood plant, and a third carries away the salvaged parts, boilers, refrigerating plants,

electrical installations, searchlights, life preservers, and myriads of other fittings.

Some of the searchlights are shipped to Ford airplane fields to be used as guides for night planes. Two of the boilers, generating 1,500 horsepower, have been set up at the company's locomotive works to furnish additional power. Other boilers have been shipped to branches in this country, Paris and other foreign posts. Of the electric light and refrigeration plants a number have been installed at company mines and timber camps. The life preservers are emptied of their cork and this is used for refrigeration packing. Deck cabins, lifted off bodily, have been turned into tool houses and small offices and distributed among the various plants.

The 199 ships cost the government \$100,000,000 to build, and were sold as scrap for \$1,697,470. Despite the low price, however, the scrap sent to the furnaces is costing, including labor and other charges, about \$13, whereas similar scrap can be bought in the open market for around \$11 a ton. The company will break even, or even make a profit, on the value of the salvaged parts for which a use can be found. Under the terms of the sale, none of the material can be sold.



Long Tows of Discarded War-Time Ships Plod up the Great Lakes to Their Doom

Huge Ship Beams Are Dropped into the Melting Pots to Make Farm Tractors

Cranes Lift the Parts Away as Fast as the Hulls Are Wrecked

Almost Down to Water Line and Ready for the Floating Dock to Complete the Job

9/14 MAN DEFEATS LIVE ALLIGATOR IN UNDERWATER BATTLE

at a motion-picture studio, while photographers recorded the results. For eighteen minutes, the struggle lasted with but two short rest intervals. The trainer's bathing suit was torn, but he suffered no injuries. He manages to hold their jaws to-



George Link in Wrestling Bout with Live Alligator; the Photos Were Taken in Moving Picture Studio



gether while wrestling with them and can walk barefooted among them without mishap.

CHICAGO POWER LIGHTS LAMPS IN BOSTON 9/19

Switches were closed, electric current from a Chicago generating station sped along interlaced wires and lights in Boston, 1,000 miles away, flashed in response. Another engineering dream had been realized. The demon-

Wrestling with live alligators under water is the strenuous pastime of a western man who has devoted several years to the study and raising of the creatures. To demonstrate his skill and show that he hadn't trained one especially for exhibition purposes, he allowed visitors to pick out any one of the alligators for him to fight. The bout was staged in a glass tank

stration was proof of the power web that has been woven between the east and the mid-west, a vast connecting scheme for the exchange of electric current between stations. It promises, engineers say, economy, greater efficiency and lower rates. It will reduce the need for expensive reserves of power at individual stations, the distribution of peak loads at different hours

Edison Co.

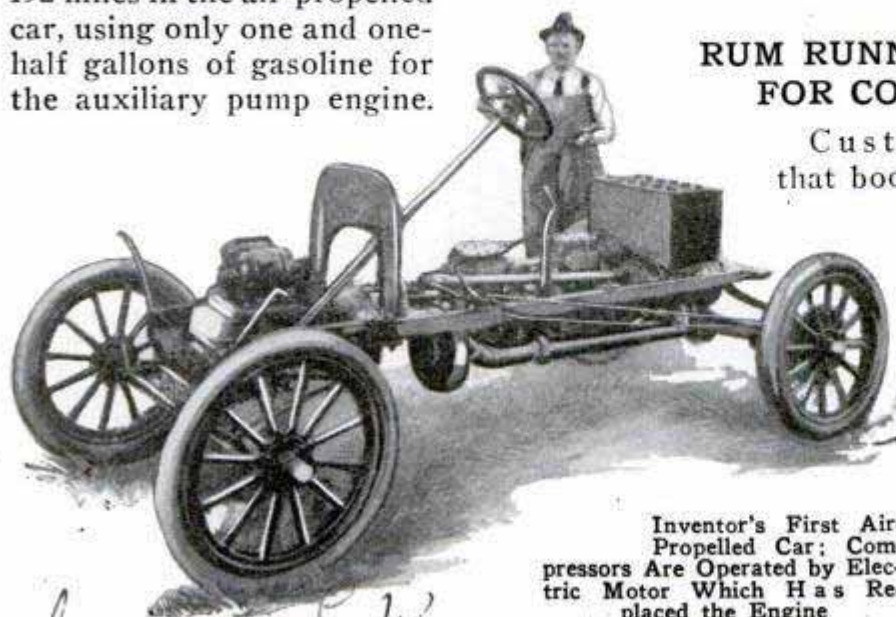
Chicago daily news 9/12/26

London, W.C. 2, England.

in different regions can be done with lower equipment cost, for one station can draw from another instead of buying more generating machinery, and it will reduce the loss of letting equipment lie idle part of the time. The hook-up does not mean that it is yet practical to light Boston from Chicago. Some 500,000 volts would be required for the economical operation of so long a line and that is too much to handle, at present, engineers declare. On the Pacific coast, there is a similar system of interconnecting lines, a 1,800-mile hook-up, with 300 miles the longest transmission, for which 220,000 volts are required. The next step planned is to bridge the Rockies, linking the coasts together.

AUTO RUN BY COMPRESSED AIR CUTS FUEL EXPENSE *972*

Possibilities of compressed air as power for the automobile have been tested by a western inventor in a special car he has devised. It is said to run an average of thirteen miles on one filling of air at 400 pounds' pressure and, at 150-pound pressure, develops thirty horsepower. Fuel expense is reduced to almost nothing, as the operator can refill the tanks at a service station and the pumps on the car are arranged in such a way that the momentum in going downhill helps keep up the pressure in them. On one auto, a motorcycle engine is used to drive the compressor and, on another, an electric motor supplied with current from a storage battery. The inventor recently made a journey of 192 miles in the air-propelled car, using only one and one-half gallons of gasoline for the auxiliary pump engine.



Inventor's First Air-Propelled Car; Compressors Are Operated by Electric Motor Which Has Replaced the Engine

*Edw. J. Kenney
117 S. Myrtle Ave.
Portland*



Kerosene Fire in Grate; the Box Is Filled with Absorbent Wool and Is Easily Removed

PORTABLE KEROSENE FIRE BOX HELPS SAVE COAL

To take the chill off the room, an aluminum box with a handled lid is filled with asbestos wool soaked in kerosene and ignited after placing it in an open grate. One filling is said to afford a hot fire for an hour. If less is desired, the blaze may be extinguished at any time simply by putting on the lid.

RUM RUNNERS USE SUBMARINE FOR CONTRABAND CARGO *996*

Custom authorities discovered that bootleggers had adapted up-to-date naval equipment when they captured an odd-looking craft in Lake Champlain, loaded with 4,800 bottles of ale. It was a submarine that could be towed behind a launch and submerged. Three such submarines were found following a successful escape of the first one, which was being towed.

No U.S. agent known

1932 W. 6th St.

Los Angeles
Calif.

934



20.00

Eye Exerciser in Use; Levers in Front Permit Movements to Relax Muscles

POCKET EXERCISER FOR EYES TO HELP VISION

To relieve eye strain and rest the muscles of the optic organs, an exercising device that can be carried in the pocket or handbag, is intended to be of aid to persons of nearly every age and occupation. It consists essentially of two cup-shaped sockets, one for each eye. By means of small levers at the bottom of the exerciser,

these cups can be rotated inward or outward. This action, combined with gentle pressure, is calculated to give the tired muscles of the eyes necessary relaxation and stretching to help relieve the tension and remove poisons that accumulate with fatigue through overuse. The treatment is said to bring helpful results and it can be used while at motion-picture shows, during automobile trips or other activities that demand unusual effort from the eyes.

ODD PLANT FORETELLS QUAKE; ANOTHER ACTS AS COMPASS

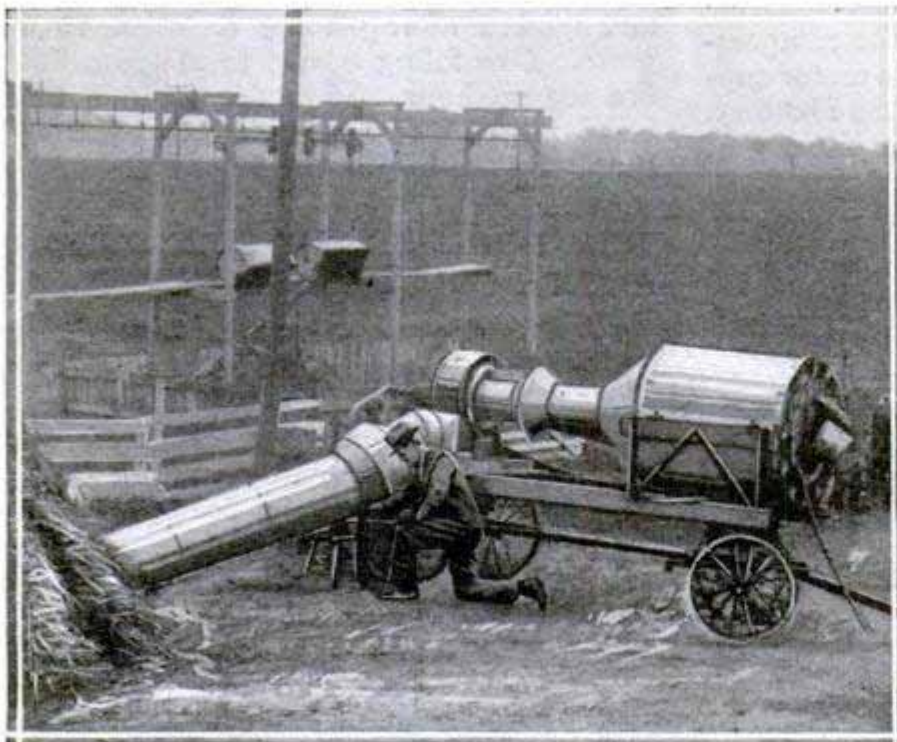
Leaves of the compass plant found in various parts of the Mississippi valley, keep their faces toward the rising and setting sun so that they sometimes serve as guides to persons who have lost their way. In Cuba is a flowerless plant that is said to enable scientists to predict earthquakes and volcanic eruptions. It is highly sensitive to electric and magnetic influences and makes certain movements as a result, by which the trained observer can foretell great convulsions in nature.

1020
Jed - Oct 11/20/26

HOT-AIR FAN FOR DRYING CROPS TO CUT FARM LOSSES

To make the farmer less dependent on the weather and reduce losses are objectives sought in a portable crop drier developed at Purdue university. It consists chiefly of a blower with a capacity of 7,000 cubic feet of air per minute drawn around and through an oil-fired unit and delivered to the stack, which is built over a conical frame, through a ditch eighteen inches square. For drying hay, a temperature of 165 degrees is used. For grain, the heat should not exceed 140 degrees. The burner unit consumes between five and six gallons of fuel per hour. The outfit has been used successfully with soy beans and alfalfa.

1001
Lafayette Ind.

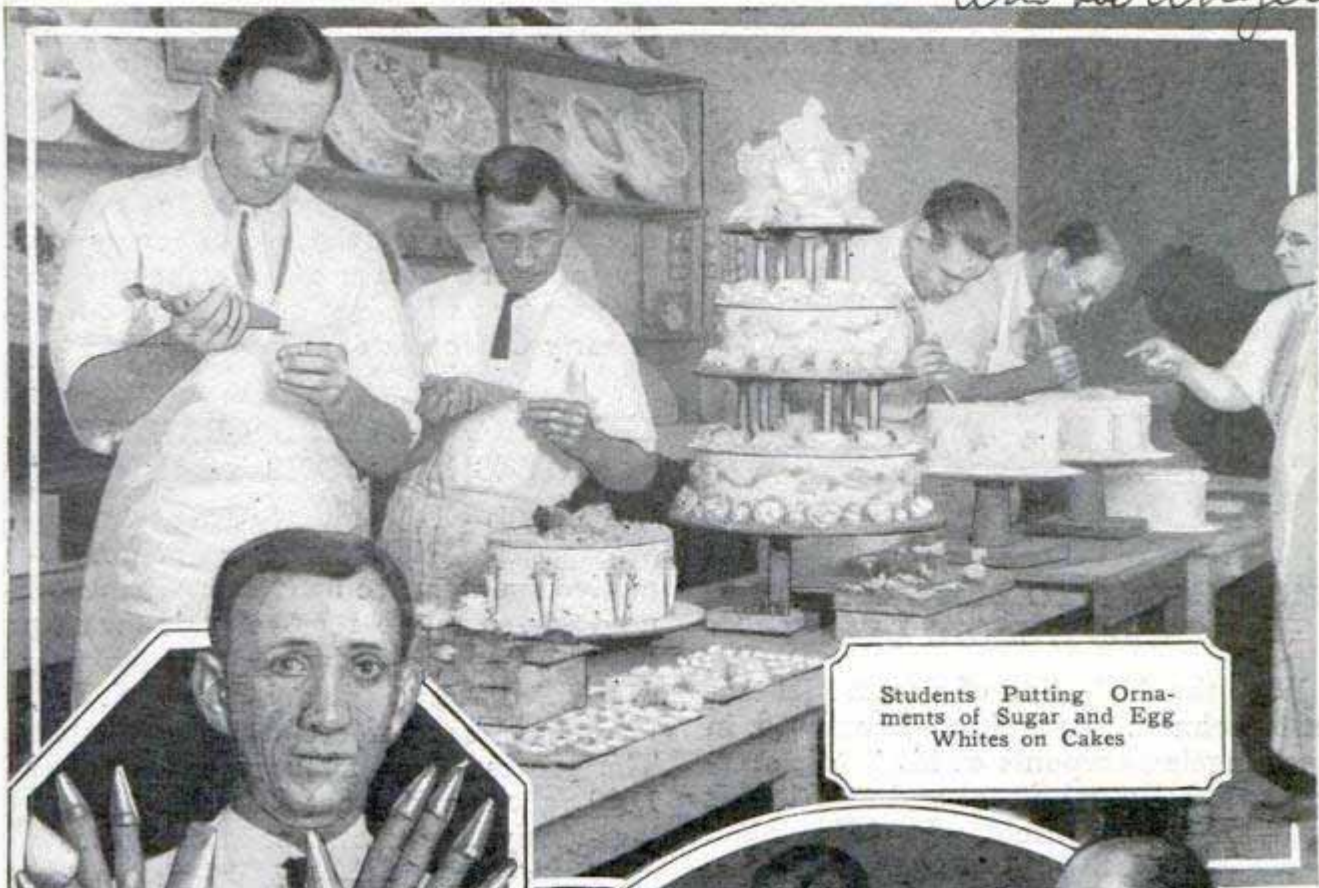


Curing Hay with Blasts of Hot Air from Motor-Driven Blower; the Air Current Is Heated by a Kerosene Burner

Agricultural Experiment Station

Ornamentation 3206 S. Grand
 DECORATING CAKES IS TAUGHT IN UNIQUE SCHOOL
 Ave Los Angeles

Calif.



Students Putting Ornaments of Sugar and Egg Whites on Cakes



John F. Parruch

Instructor with a Few of the Cone-Shaped Tubes through Which Frosting Is Forced, to Form Different Effects and Designs



Applying the Coating to Cake Before the Figures Are Molded, and Close View of Student Making Fancy Flower Decorations; the Frosting Is Squeezed Out of the Cone Held in His Right Hand



985

Honor to a California Hero, the Tablet to "Snowshoe" Thompson Dedicated in Los Angeles



MONUMENT TO MAIL CARRIER RECALLS HEROIC DEEDS

With the dedication of a memorial tablet to John A. "Snowshoe" Thompson, in Los Angeles, accounts of his heroic services to the United States and the pioneer west are being retold. In 1856, when heavy snows had blocked the Sierras, Thompson volunteered to take the mail bags on his back between Placerville and Carson Valley, a distance of ninety miles. He made a crude pair of skis from oak. They were ten feet long and weighed twenty-five pounds. The mail sacks were heavy, from sixty-five to 100 pounds, and the secret of doping the skis with preparations, to make them run more smoothly,

had not been learned then. The snow stuck to Thompson's runners, there were no houses between the towns, drifts, from thirty to fifty feet deep, had to be crossed and no trail had been blazed. For twenty winters, "Snowshoe" carried the mails and without remuneration from the government. He died at the age of forty-nine, known as the pioneer of the stage and the locomotive and as one of the bravest men of early California days.

TREATING WATER ON RAILWAYS SAVES MILLIONS YEARLY

Railroads of the country are saving approximately \$11,000,000 a year in locomotive maintenance by treating the water used for steam to remove scale-forming solids, an expert declares. This figure is considered especially significant since only fifteen per cent of the water is treated. The process costs about four cents per 1,000 gallons and about 50,000,000,000 gallons receive the treatment in one year.

(Time and soda ash)

FOOT BRIDGE OVER AVENUE REDUCES TRAFFIC DELAY

Bridges of the type illustrated here have been proposed for heavily trafficked streets in Paris so that pedestrians may cross in safety and without halting automobiles. The arch slopes gradually so that the steps are easy to climb.

919

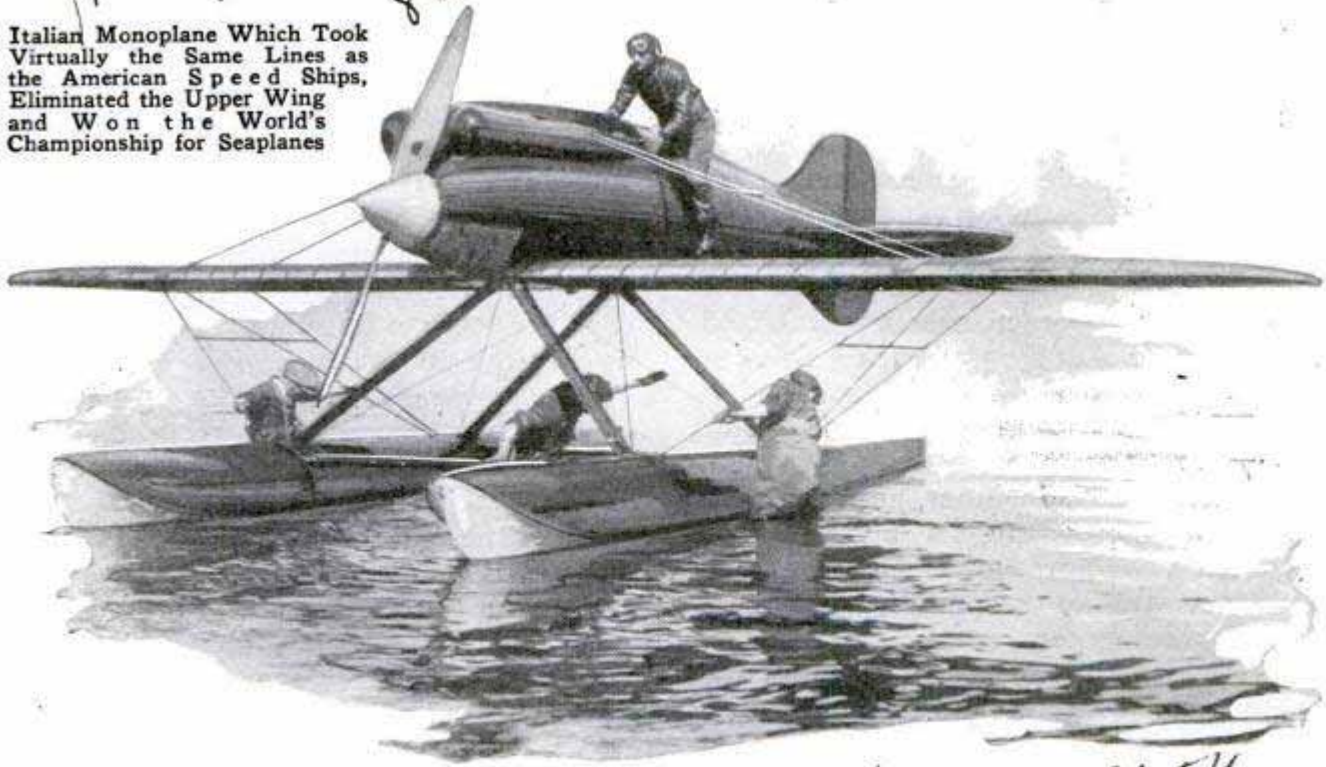
Water, Chairman, American Railway Service Committee, Engineering Association



Bridge for Pedestrians over Busy Automobile Street Is Expected to Reduce Traffic Delays as Well as Help Save Lives; Absence of a Supporting Column Leaves Way Unobstructed

Mach 95
800 hp.
Antonio Lococo

Italian Monoplane Which Took Virtually the Same Lines as the American Speed Ships, Eliminated the Upper Wing and Won the World's Championship for Seaplanes



The Battle of Wings for Air Honors *USA*

U. S. Strives to Retake Records Lost When Italy's Monoplanes Proved Single-Wing Superiority

WITH the last of America's great air records carried away to Italy by Maj. Mario de Bernardi, victor in the Schneider cup race, airplane designers already are at work on new craft to represent this country in the 1928 races in Italy. Before going home Maj. Bernardi set four new world's records, and took away the last of the leading air honors won by Americans in the years following the war. His marks include all of the high-speed records for seaplanes, while French flyers had previously lifted the land-plane speed title, as well as the altitude record.

The defeat of the American flyers, representing both the navy and marine corps, was largely due to the cycle in which airplane building moves. A record-breaking type is developed, and then raced year after year until somebody comes along with a faster ship. The Curtis planes lifted the Schneider cup from Italy in 1923, and proved so fast that nobody came over to race for it the following year. In 1925, both Italian and British ships were sent over, and badly beaten. The Italians went home and built better craft, which in many respects closely resembled the

American ships but had vastly more powerful engines. Racing them in 1926 against the American ships of the year before, they won by many miles an hour.

American flyers, however, still have a chance to gain permanent possession of the Schneider trophy if they win the 1928 race. Under the terms of the gift from Jacques Schneider, the seaplane trophy was to become the property of the nation winning it three times in five years. Having won in both 1923 and 1925, another victory would give the United States the cup, even though the 1928 race falls outside the five-year period begun with our first victory in 1923. The reason is that the international aeronautical federation, which controls the race, decided before last year's event that, if Italy won, races thereafter would be held every other year instead of yearly, so that the cup terms will specify three victories out of five consecutive races, instead of three wins in five years. It is even possible that it may be decided, should the United States lose in 1928, that it will have another chance to win permanent possession of the cup in 1930, as that will be the fifth consecutive

race, since none was held in 1924, owing to the fact that no foreign nation sent challengers at that time.

The American team was not only handicapped by smaller engines and older planes, but also had lost one of its best pilots and best ships before the 1926 race. Lieut. F. H. Conant, who was killed a few weeks before the race, when a standard ship which he was flying struck a fishing-net stake while landing, had attained a speed of 251.5 miles per hour with one of the racers.

That left the 1925 winner, powered with a 700-horsepower engine, and another ship with a 600-horsepower motor. They faced the Italian seaplanes, with 800-horsepower engines.

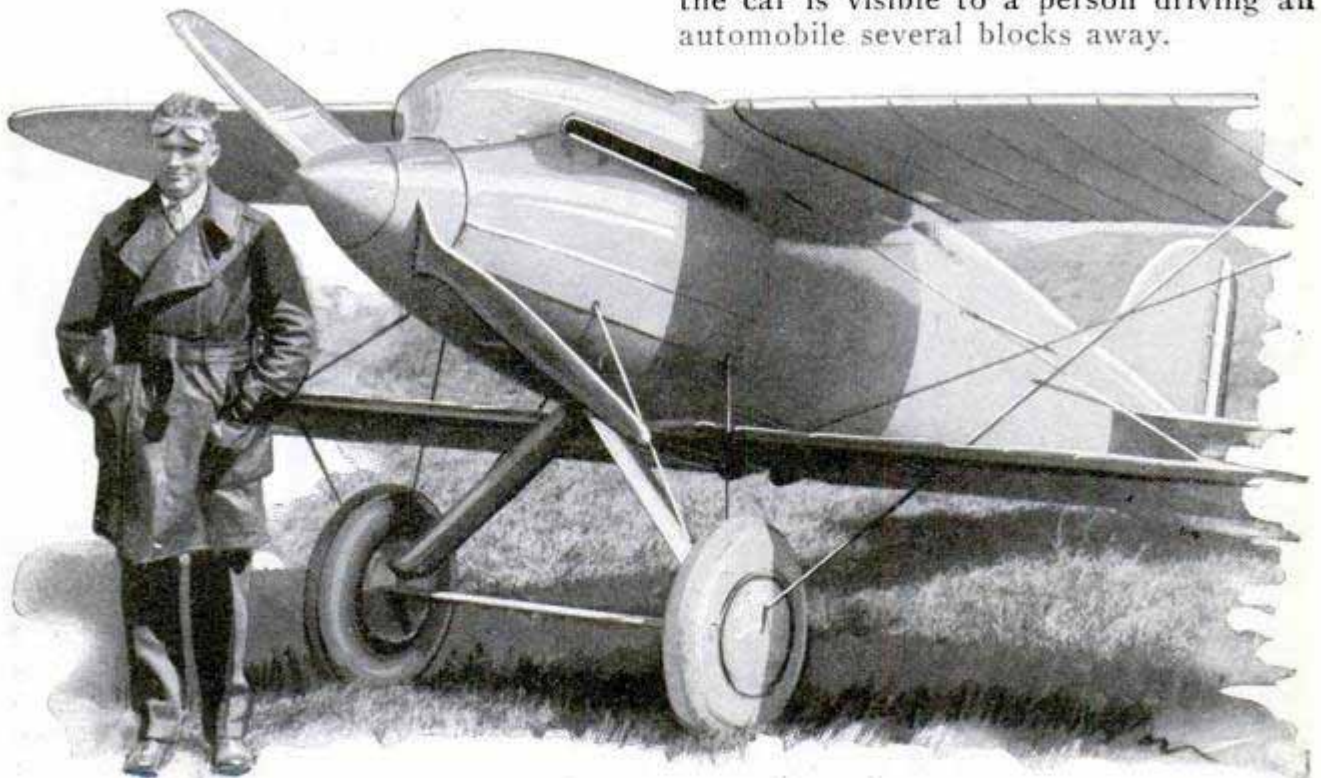
Italy's victory was also a triumph for monoplanes over biplanes. The little Macchi racer, which Maj. Bernardi piloted to victory at 246.4 miles an hour, had much the same fuselage lines as the American ships, but its single wing had sufficiently high lift, without the added resistance of the American double wings. Following the race, the same ship took the high-speed record away from the American army by covering a measured course at an average speed of 258.873 miles an hour. The previous record, made by Lieut. Doolittle, was 245.713 miles.

Flying at such tremendous speeds presents unusual difficulties. Pilots become momentarily unconscious while rounding the pylons at the corners of the triangular course, and, as they fly over the water, are always in danger of plunging into the sea. The racers are so small and fast that it is very hard to correct any minor deviation from the course without "overcontrolling," as the pilots say, and going too far in the opposite direction. The Curtis racers corrected this fault by gearing the control levers, giving a sort of vernier control like that on a radio dial.

One of the oddities of high-speed flight, however, is that a stalled motor, even at very low altitudes, does not offer any particular danger. Flying at better than three miles a minute, the pilot can pull the stick back and zoom a thousand feet in the air if necessary, and there jump out and make a safe descent by parachute. The great speed is sufficient to hurl the plane, even with a dead engine, that high.

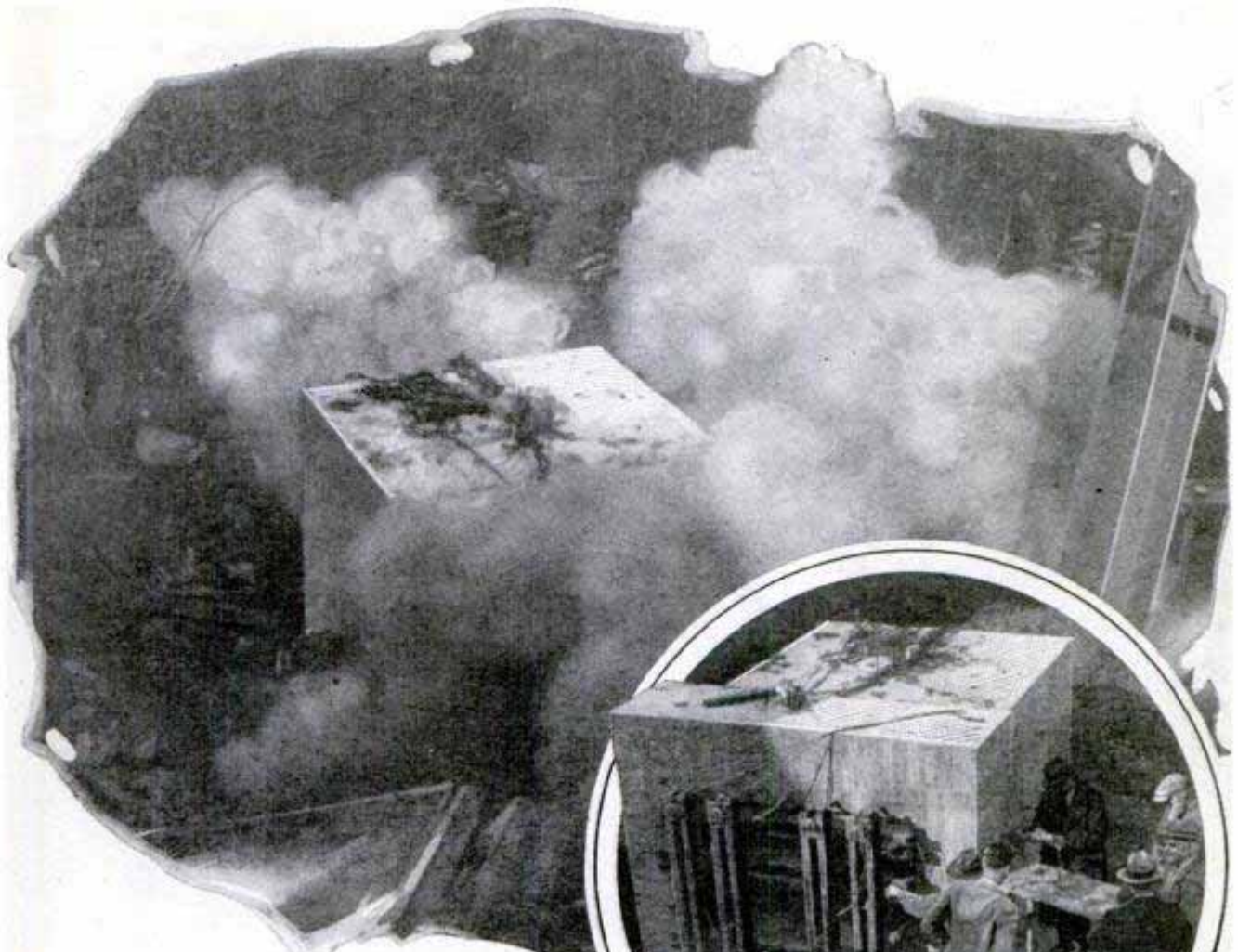
**STREET CARS MADE VISIBLE
AT NIGHT 821**

For greater safety, some of the street cars in San Francisco have been painted white at both ends. At night, reflecting lights shine against the surfaces so that the car is visible to a person driving an automobile several blocks away.



One of the Curtis Ships Fitted with Wheels and Landing Gear as Used in the Pulitzer Race, When They Set the World's Speed Mark, Now Lost; the Pontoons Are Interchangeable with the Wheels

234-195 m JH 615 hp



Photograph of the Explosion and Preparing the Charge; the Results Are Carefully Checked

MAN-MADE BLASTS TO SHOW WAY TO MINE SAFETY

To determine what type of bulkheads will afford the best protection for miners, the bureau of standards has been conducting a series of explosion tests in a special chamber. The results of the blasts are carefully studied as to their effect on various kinds of materials and the explosions are arranged with great ingenuity in order to duplicate as nearly as possible those that occur in mines.

1043

U. S. PROSPERITY IS SPEEDED BY INDUSTRIAL SAVING

British observers, sent to America in search of the secret of our prosperity, discovered two facts that surprised them. One was that we have increased the electrical output of steam-generating stations sixty-seven per cent in five years with only fifteen per cent increase in the quantity of coal consumed. The other was that railroad freight rates have been reduced and

ton-miles of freight handled per employe increased, while the number of workers has been cut by nearly 100,000 men. The results attained in fuel conservation through extension of the use of electricity were even more surprising to the observers. They found seventy per cent of all power used in American factories is delivered to the machines through electrical wires, and the number of homes using electricity increased from 5,700,000 to 15,000,000. There was a forty-three per cent increase in water power—hydroelectric stations providing 8,300,000 of the total of 23,840,000 kilowatts generated in the United States. At the same time the improvement in efficiency of the coal-burning plants engaged in producing electric power cut the fuel consumption from three pounds per kilowatt-hour to two pounds.

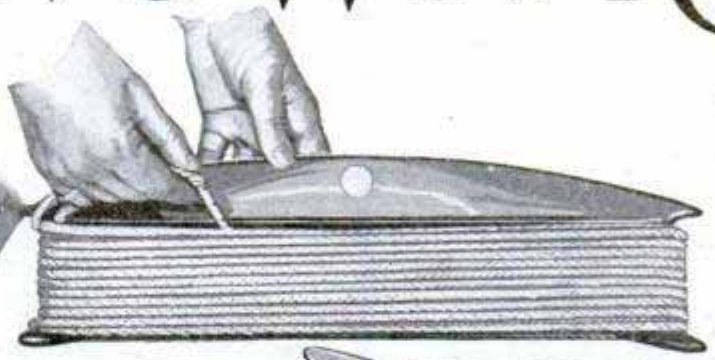
The Times Trade and Engineering Supplement 11/20/26

410. Includes.

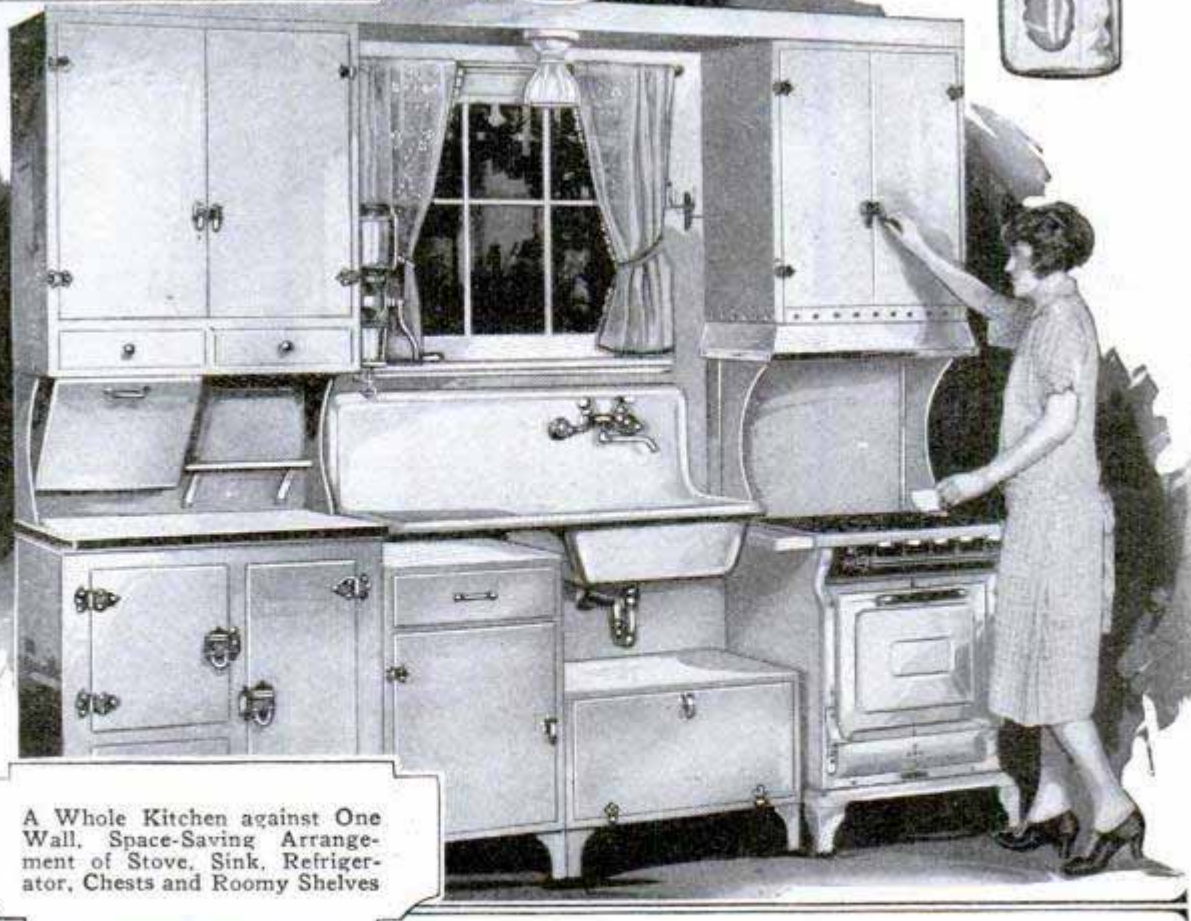
To Save Work



Closely Resembling Linen, a Manufactured Product Is Made Up into Fancy Table Doilies That Can Be Scrubbed with a Brush



Clothesline on Metal Reel to Prevent Snarling, and, at Right, Combined Tongs and Bottle Cleaner



A Whole Kitchen against One Wall. Space-Saving Arrangement of Stove, Sink, Refrigerator, Chests and Roomy Shelves

Anyone wishing further information on devices described in the editorial pages can

in Your Home

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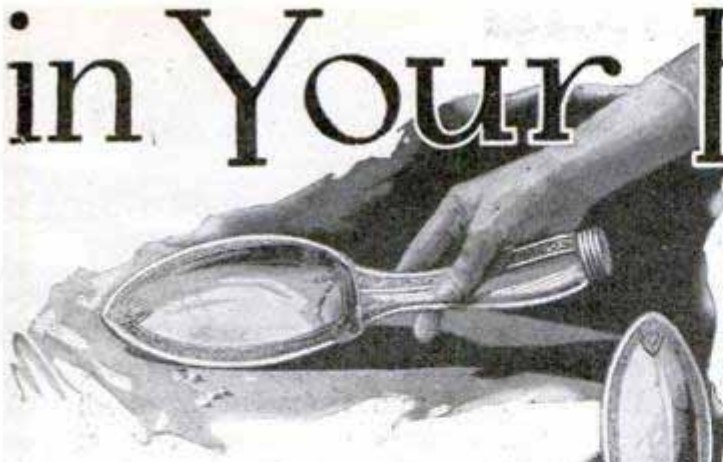


Table Scraper Is Emptied through the Handle and Prevents Scattering of Crumbs



Electric Heater for Rooms Operates from Light Socket and Is Arranged to Afford Ample Circulation for the Warmed Air



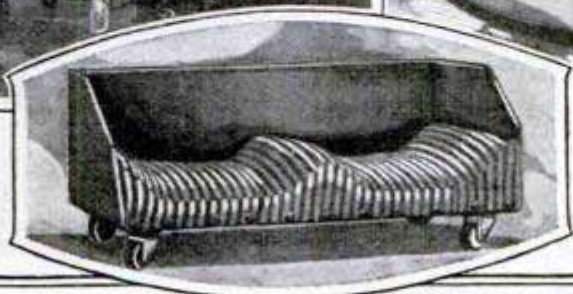
Combination Stool and Hamper for Soiled Clothes Fits in Small Corner of Bathroom; It Has Slits for Ventilating



To Relieve Floor Scrubbing of Its Drudgery, a Rest on Casters Protects Knees and Clothing



Lemon Squeezer and Strainer in One Simple Implement with a Hole for Hanging on Hook



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Monitor 4/13/26

880



For the Safety of Street Sweepers: Belts with Red Glass Reflectors to Warn Motorists

REFLECTORS IN SAFETY BELTS GUARD STREET CLEANERS

Red-glass reflectors attached to the safety belts worn by street sweepers in Portland, Oreg., are intended to attract the attention of automobile drivers at night and thus help prevent accidents to the cleaners who work after sundown. It has been suggested that similar belts be worn by pedestrians abroad at night. There are two glasses in front and two in the back. Reflecting the light of street and other lamps, they are said to be visible at a considerable distance.

SHEEPSKIN "LUNGS" IN METERS PASS RIGID TESTS

Diaphragms used in gas meters are made of sheepskin, as this material has been found most suitable to the demands of accuracy and prolonged performance. In selecting the skins, about six are discarded for one taken, as they must be in excellent condition. Insect bites, scratches and other blemishes make them unfit for service. The skin is soaked in a heavy oil for ninety days to make it proof

against the corrosive elements in the gas; then it is cut and attached to a tin-coated steel ring and is ready for its years of duty.

SECRETS OF EARLY MUSIC HELD IN MYSTERIOUS CURIO

In custody of the Boston symphony orchestra is a nameless musical instrument of dark-grained wood, shaped somewhat like a sword and threaded from end to end with strings set about two inches apart. It is part of a collection of ancient pieces and there is but one clue to its identity, a yellowed bit of parchment inscribed with tiny Chinese characters that have not been deciphered. It is thought that the instrument may have belonged to a period early in the history of music, when Chinese prisoners gave secrets of their ways of music making in exchange for their liberty.

"SHIP" AS REAL ESTATE OFFICE HELPS ADVERTISE LOTS

In keeping with the nautical name of a subdivision near Atlantic City, a real-estate office was built in the form of a ship. Erected on a wide expanse of open land, it was fitted to provide ample space for salesmen and customers.



Real-Estate Office Built in Form of a Ship to Advertise Subdivision

Neptune Gardens

*Ent. Richard J. Bond
1861 6
St. Louis*

888

New England News 11/15/26

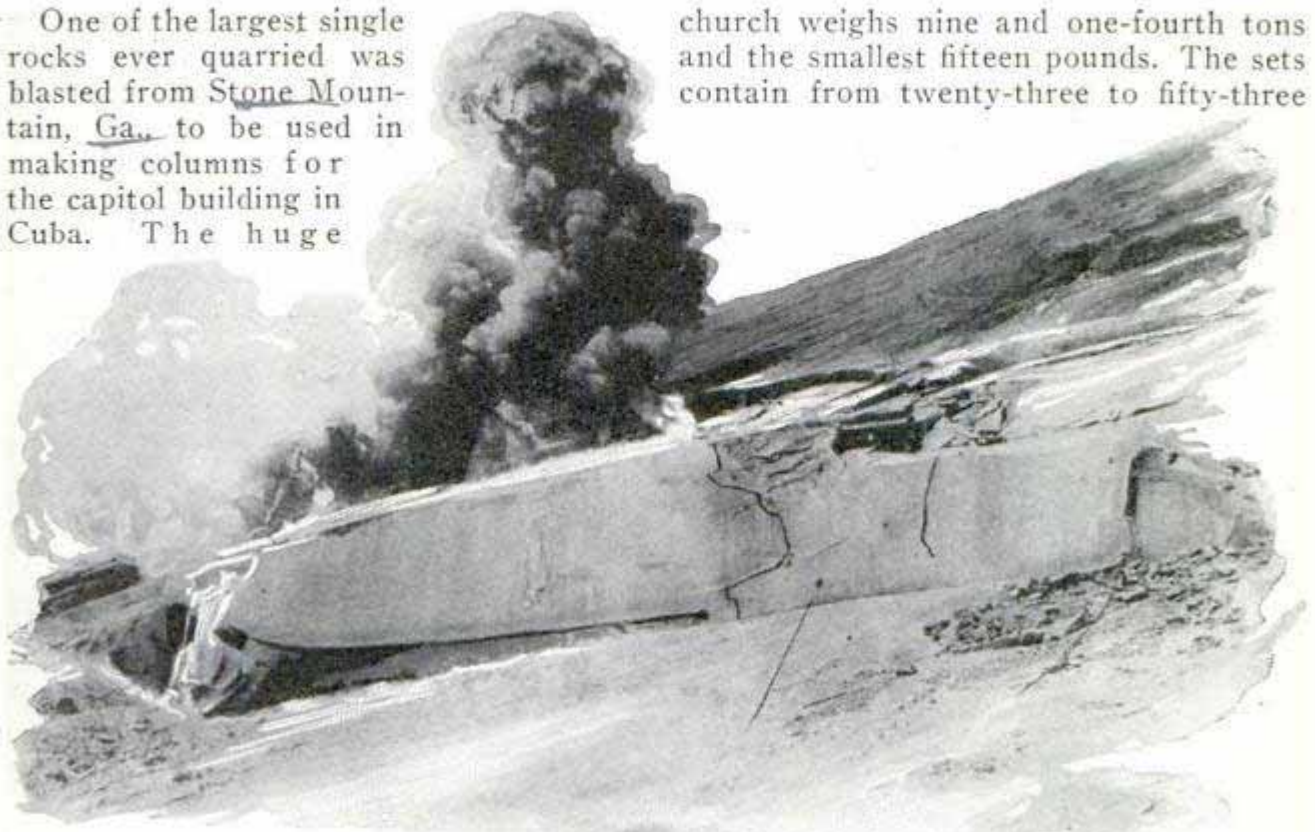
24 Mich St.

770

BLASTING OUT ONE OF THE WORLD'S LARGEST ROCKS

One of the largest single rocks ever quarried was blasted from Stone Mountain, Ga., to be used in making columns for the capitol building in Cuba. The huge

church weighs nine and one-fourth tons and the smallest fifteen pounds. The sets contain from twenty-three to fifty-three



Blasting Huge Fragment from Stone Mountain, Ga., for Cuban Capitol Pillars

"chip" was more than fifty feet high and contained 250,000 cubic feet, enough to fill 650 freight cars. Big as the piece was, it represented but a small part of the mountain itself, which is a granite boulder rising to a height of more than 1,600 feet from a flat plain near Atlanta.

bells. They are tuned to semi-tone intervals and are played with a set of levers arranged like the keys on a piano.

TEACHING BELLS TO SING

Carillons cost from \$10,000 to \$100,000, depending upon the number and quality of the bells, and casting them is a task requiring great skill. Some of the secrets of the old Flemish masters of the art are said to have been rediscovered so that the tones of a carillon of today compare favorably with those of bells made centuries ago. To achieve the exact tone desired, a few shavings may be removed from the interior of the casting with a fine tool. The bell then is given a dull gloss by means of a sand blast. No paint is used, as that would deaden the sound. The sound waves from some of the large bells are sufficiently powerful to shatter a wine glass a yard away. The heaviest bell in the carillon ordered for a New York

FIRE SIGNAL HAS LOUD SPEAKER TO SPEED ALARMS

The person turning in the fire alarm can speak to the men at the engine house and receive a reply, preventing mistakes in locations and other delays, in a signal box that has an amplifying unit for the voice. A loud speaker relays the fire call distinctly, so that



the men at the fire station are called to attention, and the reply can be heard twelve or fourteen feet from the box. This feature is expected to discourage attempts to turn in a false call. Access to the signal is gained by breaking a glass panel as in the ordinary fire box.

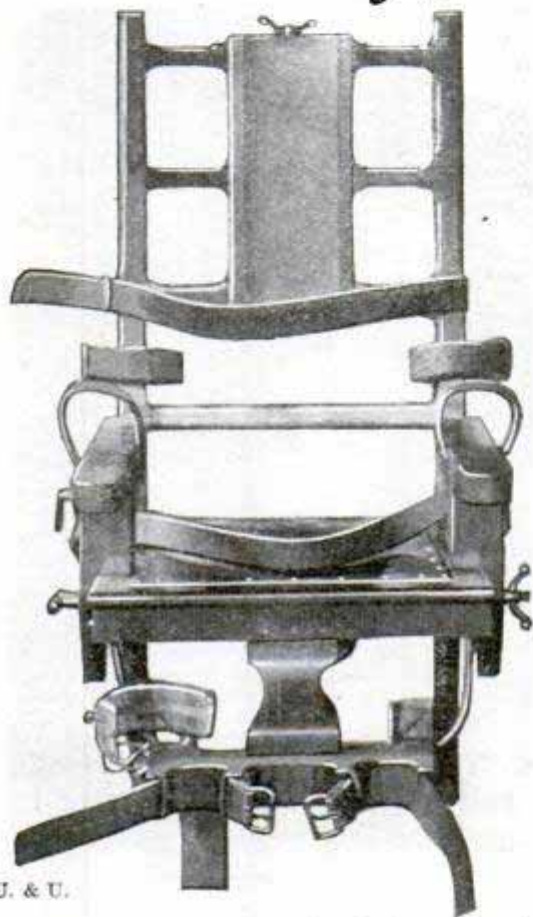
Mess. Lillibet & Johnson, Croydon, England

in Birmingham

511

It's easy to dodge Electric Shocks (if you know how)

By PAUL PADDOCK



© U. & U.

The Electric Chair at Sing Sing Prison, Showing the Helmet and Straps for Hands and Feet

WHILE electricity is still much of a mystery, it may be employed as safely as a stream of water from a hose—if you know how. Spray from an atomizer under many pounds' pressure would hardly cause more than a tingling sensation to the skin because the amount of the liquid is so small, but a stream from a fire hose under the same pressure might result in serious or even fatal injuries.

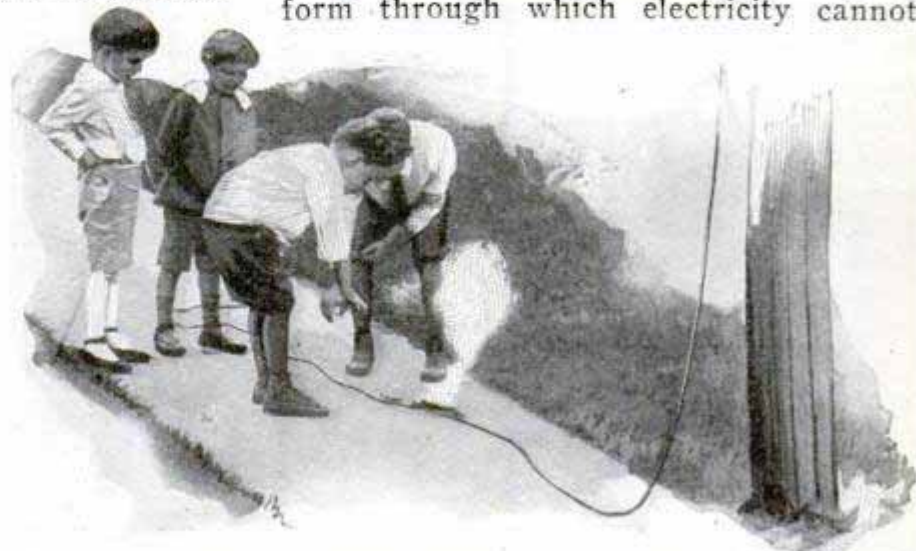
And so with electricity; its safe handling depends not only on the pressure, but on its amount. With water, the quantity is expressed in pints or gallons, and

in electricity it is measured in "amperes." The pressure of water is told in pounds while in electricity the same force is counted in volts.

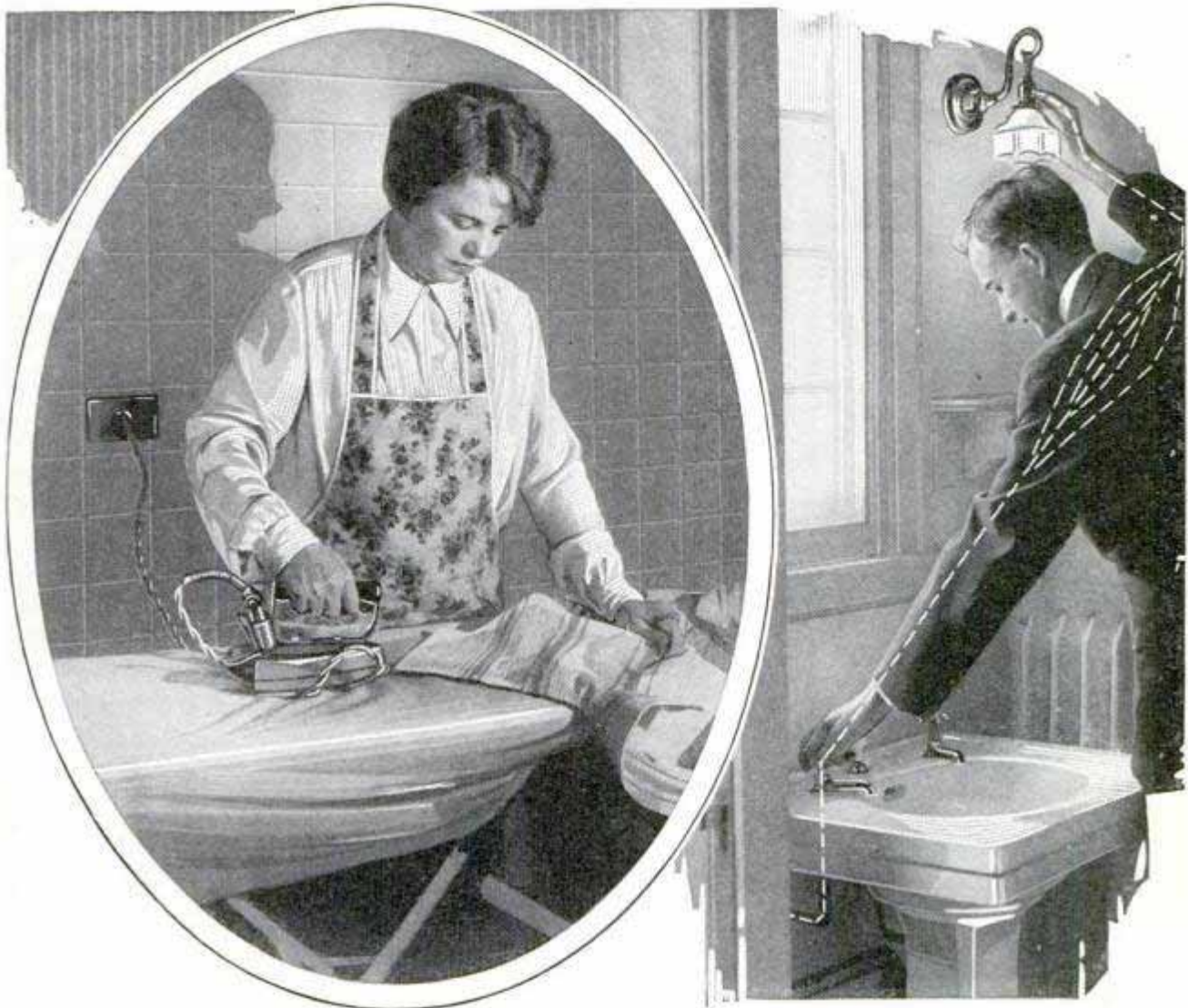
This explains why, although 2,000 volts and about seven amperes are used to kill criminals in the electric chair and shocks from the ordinary 110-volt, ten to thirty-ampere lighting circuit have often proved fatal, no more than a bad jolt results from coming in contact with the 10,000 volts used at the spark plug of an automobile. In the latter case the amount of current, or amperage, is too small to cause any or at least not serious harm.

Like water seeking the lowest level, electricity always takes the easiest route back to its starting point. It works its way through obstacles, lighting lamps and running motors, as a stream surmounts a paddle wheel which has been erected in its course to turn mill machinery. The path in which the current moves is called a circuit and, unless it is complete so it can return to its starting point, it can do no work and cause no damage.

The danger only comes when the current can make a circuit through the body in returning to its starting point. Thus, a repairman standing on an insulated platform through which electricity cannot



A Live Wire Generally Looks as Innocent as a Harmless One; Teach Children to Leave All of Them Alone



How Many Electric-Iron Cords Are Ruined, Leading to Shocks and Fires; Right, Diagrammatic Photo Tracing Path of Current from Faulty Light through Body to Water Pipe

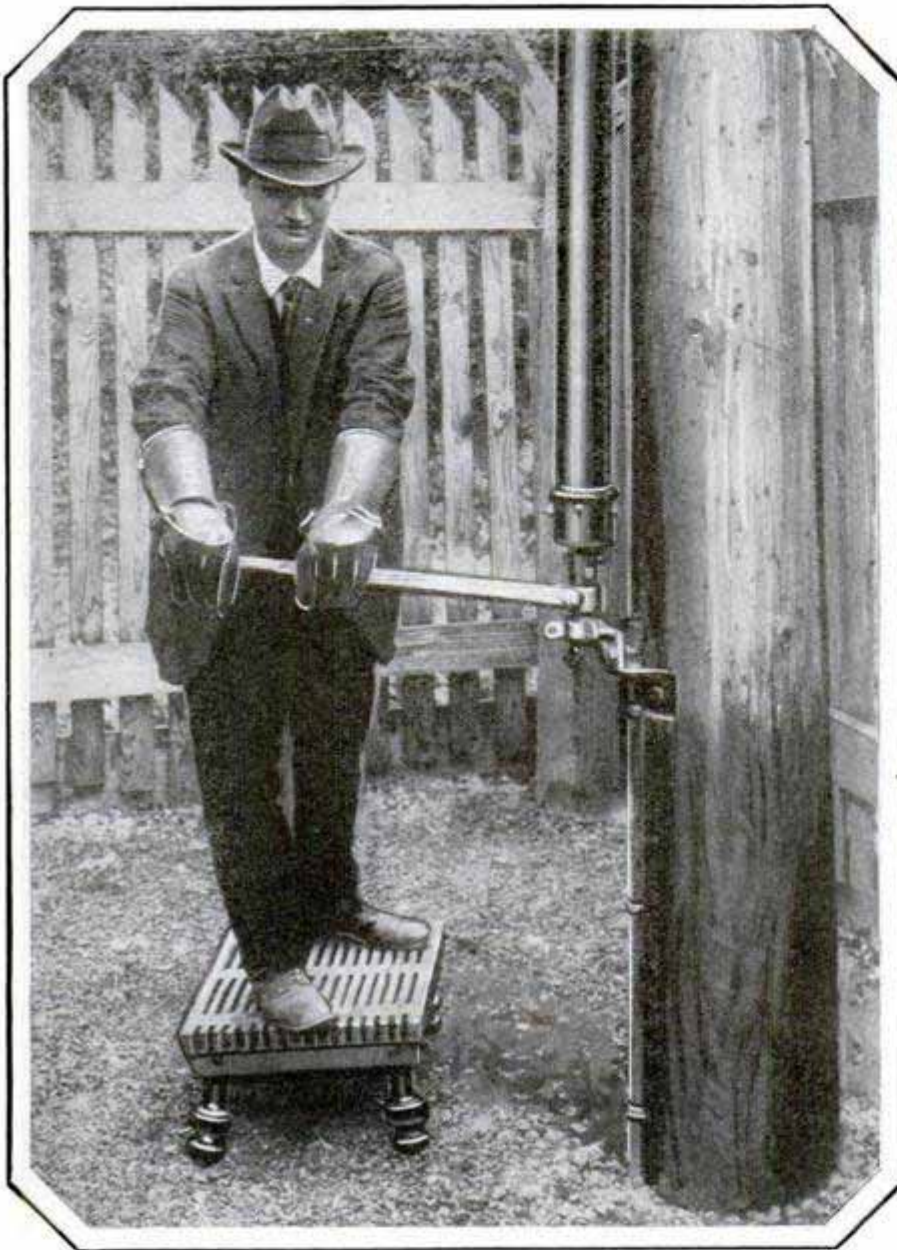
pass, may handle a wire carrying 600 volts in perfect safety, whereas he probably would be instantly killed if he did the same thing while standing on the ground so that the electricity could make a circuit through his body.

When going through the body, electricity works just as it does when lighting lamps or running motors. Its disastrous effect on the human system is to contract the heart and lungs, stopping their operation, if there is enough current, and if the application is continued, the nerves are injured, chemical changes are caused in the blood and serious burns result. A person who has suffered an electric shock is in the same condition as one who has been asphyxiated, and artificial respiration should be applied for an hour or more before giving up hope.

Throwing strings, sticks or wires or flying kites over electric wires, and climbing poles that carry circuits are common haz-

ards that children often take with disastrous results. If the kite string contains tinsel, as it often does, the danger is vastly increased. In the household, the electric iron has been found to be one of the chief trouble makers when not used carefully. If the current is not turned off, a fire may result. Care must be exercised, in handling the cord, not to kink or bend it. That ruins the insulation and may break the small wires inside allowing the electricity to escape just as water leaks out of a defective pipe. All appliances run with cord attachments should be handled with equal care. Exposed wires in connections to floor lamps are a common source of shocks and fires.

Makeshift fuse plugs often cause serious damage. The fuse is simply a protective device to safeguard against overloading the circuits in the home. It is the weakest link in the "chain." If the load becomes too heavy, that is, if too much



Guarding against Injury in Manipulating a Grounding Switch by Standing on Insulated Platform and Using Gloves

electricity flows into the wires, the fuse blows out. That shuts off the supply to the circuit, removing the danger of increased overloading. Putting coins, wires or other articles into the box in place of a blown fuse is hazardous, for more electricity than the wiring can safely accommodate is likely to flow in. The heating elements of toasters and percolators are likely to be melted and wires in the walls may become red-hot, causing fires.

When using the telephone, avoid touching radiators or other metal objects. In laundries, bathrooms or other damp places, never touch metal parts of lamp sockets, fixtures or other electrical devices that may be "alive." The hazard is greatly increased if the person is bathing in a

tub, for more of the body is exposed to the water, which, being a good conductor, tends to draw off the full amount of current.

Radio dry batteries need not be feared, but even a six-volt storage battery may be the cause of a fire if the terminals leading from it become crossed. As battery eliminators are used in connection with the house-lighting circuit and develop high voltages, they afford a possible source of shocks. The metal parts of these units should never be touched when the current is turned on. Knobs, and other parts that need to be adjusted when the set is running, are properly insulated to prevent injury. In purchasing electrical equipment of all kinds, it is advisable to look for labels which show that the pieces have been properly tested before being placed on the market.

Never touch a person who has been shocked while he is still in contact with the live wire. Try to summon someone who knows how to do this, but if assistance cannot be obtained, use a long dry board, a dry wooden-handled rake or broom to draw the person away or remove the wire. Keep out of water and never use a moist object. In taking hold of a live wire, use only one hand and never touch a wet pole that is carrying electric wires.

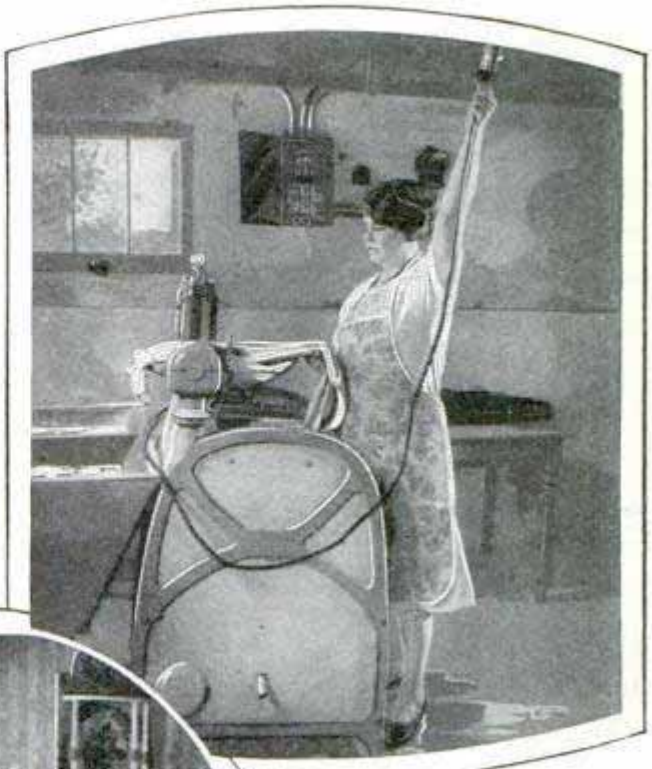
Shocks through the upper part of the body are likely to be more dangerous as they may pass through the heart and other vital organs. Always be wary of fallen wires on the streets, especially after storms where there is danger that the strands may be part of an electrical circuit or in contact with live wires. Don't touch

the worn spots on insulation, have cords and wiring inspected by competent persons, never try to take electrical shocks just to experiment and keep furniture away from interior wiring.

The effect of an electrical shock, if the current is of the alternating or interrupted type, is partly muscular, alternately contracting and loosening the muscles. That is why the current from an ordinary "shocking" coil seems to jerk the hands when you grasp the electrodes.

Most of the house-lighting current, outside certain business and factory districts in some cities, is of the alternating type, reversing its direction sixty times a second. Under ordinary circumstances it is not particularly dangerous, causing only a mild shock when you come in contact with the wire. If you grasped both wires, though, you would receive the full capacity passed by the house fuses, usually twenty to thirty amperes, which might be an exceedingly dangerous or even

Don't Crumple the Electric Heating Pad; Fine Wires May Break, Causing Fires; Keep Hands Away from Water When Using Electric Curling Iron



A Too Frequent Cause of Shocks; Thoughtlessly Touching a Defective Wire While Standing on Wet Floor with Electric Washer Running



fatal amount. When you touch only one wire, the amount of the current which can pass through your body is limited by the material between you and the ground—your shoe soles, the carpet, floors and walls. Usually they insulate you so effectively

that the amount of flow is small and the shock light. Occasionally you may read of some one being killed in his own home by the electric-light current. More often than not the victim is a woman, and the circumstances of death much the same. Usually the newspapers recite that, while taking a bath, the victim attempted to use an electric vibrator or curling iron, a circuit was established through the water and the water pipes to the ground, and a heavy enough current passed to cause death.

The water in the bathtub or washbasin makes a perfect ground for the same reason that you select a water pipe to ground your radio aerial.



915



Jewel-Studded Crown Which Was Worn by Catherine the Great of Russia and Is Now for Sale at Huge Price

FAMOUS RUSS CROWN VALUED AT FIFTY-TWO MILLION

Containing 1,520 diamonds and surmounted by a cross of huge jewels, the historic crown that was worn by Catherine the Great of Russia is valued at \$52,000,000. It is included among the Russian crown jewels purchased from the Soviets. Another famous item is a large jewel given her by the Swedish king, in 1777.

FOLDING TABLE-AND-CHAIR SET FITS IN SINGLE BOX

735

Folding chairs and a table to match are provided for card parties, clubs and hotels in a compact set of five pieces that fit into a single small carton when not in use. The chairs, for instance, stack evenly and a dozen of them occupy a space only eighteen inches wide, three

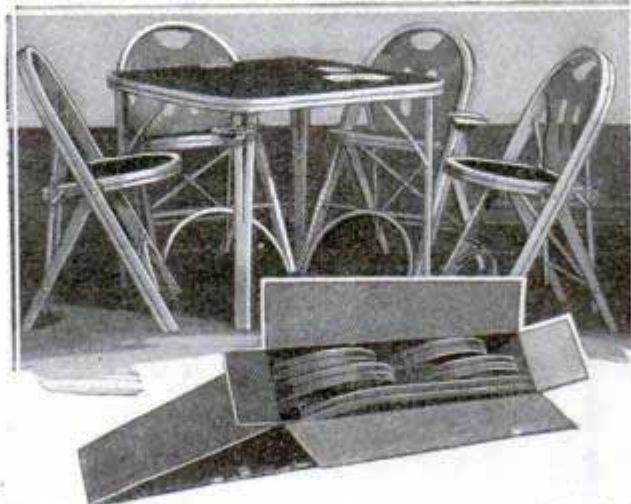


Table and Chairs Set Up and Packed in Box; Note Ash Tray on Front Table Leg

Louis Mastetter & Co. and Wayne, et al.

feet long and two feet deep. An additional feature is an ash tray that slips into a slot in any of the four legs.

FISH SURVIVE FREEZING TESTS

831

That many creatures can survive extreme cold is common knowledge, but a European scientist has made some interesting experiments showing that some species can endure even lower temperatures than is generally believed. A number of fresh-water fish were kept in a block of ice at a temperature of twenty degrees Centigrade below zero. When the ice was carefully thawed out, the apparently

dead fish revived and swam in the melted water. Lower temperatures proved fatal to the fish, but frogs withstood colds of twenty-eight degrees, a water salamander, fifty degrees, and some species of snails endured 120 degrees.

HUNDRED-STORY BUILDINGS FOR STORES AND HOMES

825

Skyscrapers, 100 stories high and containing both offices and residences, will appear in large cities within the next fifty years, an eastern architect predicts. As

he pictures the structures, fifteen floors would be devoted to business and the rest, set back in pyramid fashion at intervals of every three stories or so to admit light, would afford living quarters. Sidewalks at the various levels, with space for small stores, lunchrooms and other conces-

Chicago, Ill. Post 4/3/26

Chicago - 1517 S Wabash

Prof. Pictet, Geneva, Switzerland

Alfred C. Dyson, Eastern Architect

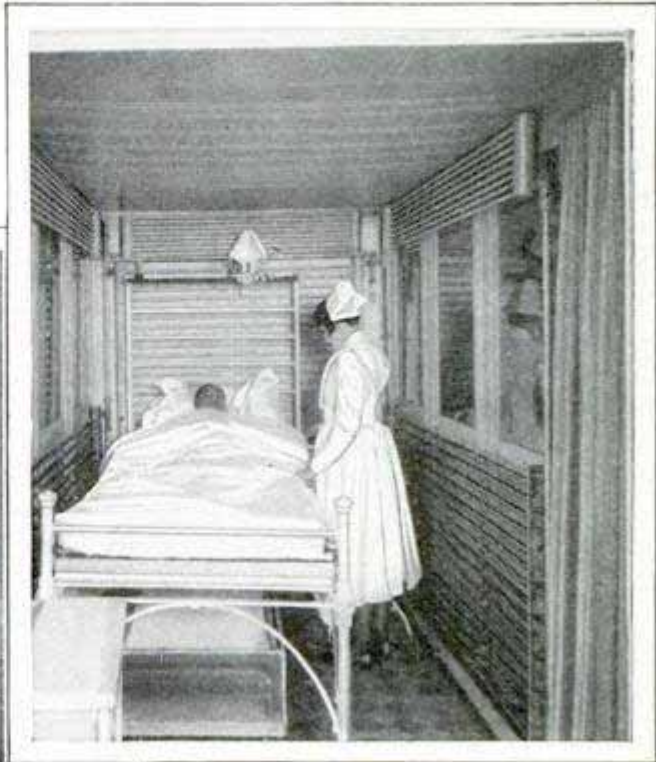
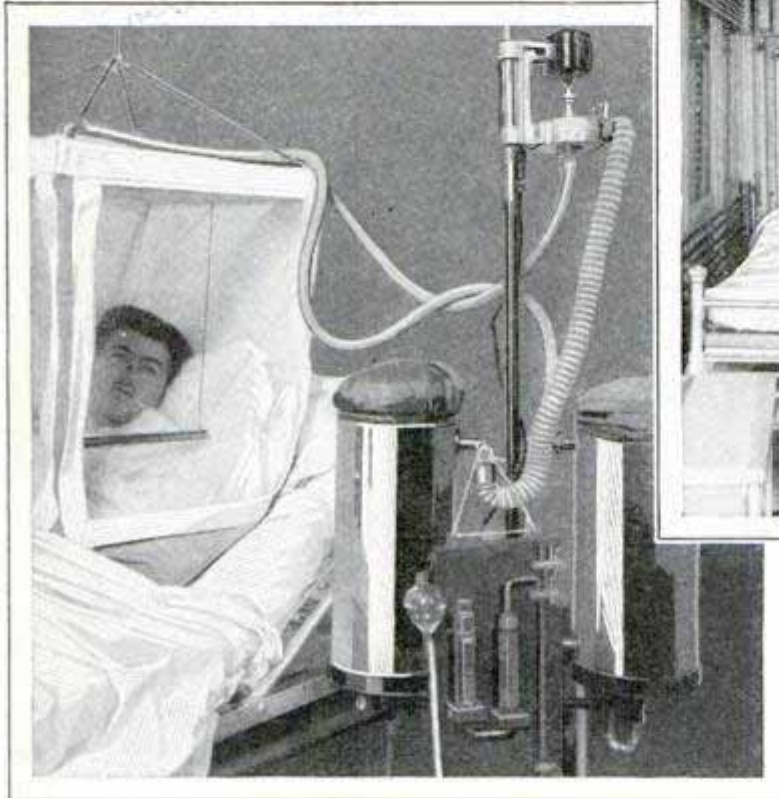
Alvan L. Barach

New York Pneumonia

**OXYGEN HOOD AND CHAMBER
AID PNEUMONIA VICTIMS**

is reported

sions, plots for grass, trees and playgrounds, would be practical under such an arrangement, he declares. Skyscrapers of this type would occupy an enormous base and would be erected at intervals of one block, so that there would be relatively little obstruction to the view from any window of the upper floors.



Oxygen Cabinet and, at Left, the Hood for Use at Cot

Electrical heat would eliminate smoke and chimneys. The plan suggests new standards of health and efficiency in densely crowded cities, the architect believes.

**DISK RECORD BENT DOUBLE
WITHOUT DAMAGE** *842*

Flexible phonograph records have appeared in England and are said to be so elastic that they can be bent double, thrown to the floor and otherwise mistreated without injury. After one of the records had been bent, it was placed on the machine and listeners declared they were unable to detect any impairment in the reproduction. *British*



© Keystone View Co.

ing of oxygen. They are said to be improvements over the old funnel method in many ways, particularly because from forty to sixty per cent oxygen can be given the patient while he rests in any position and for any length of time, whereas but twenty-two to twenty-four per cent oxygen could be administered through the funnel. The hood incloses the head and chest and is suspended from a standard which is mounted on a wheeled base. Celluloid windows on two sides and another in the roof admit light. Air entering the hood is filtered through soda lime to remove the carbon dioxide and is dried by passage over an ice cylinder. In the chamber, the flow of oxygen is regulated by a valve.

☐ We want all our readers to write us freely and often whenever they wish additional information on articles published in this magazine. Address Bureau of Information, Popular Mechanics, Chicago.

Unable to locate maker

similar made by -
Perfect Window Washer & Mop
Amsterdam, N.Y.



To Simplify the Window Washer's Task; Outside Surface Cleaned from Interior with Curved Mop

CLEAN WINDOWS FROM INSIDE WITH CURVED STICK

Washing the outside of windows can be done from the interior with a special scrubber attached to a cane-shaped stick. The article, developed in England, is intended to serve as a substitute for ladders and to eliminate the necessity of standing or leaning in hazardous positions while washing outer surfaces. The cleaning unit can be easily changed.

SAILOR INVENTS AID TO MAIL DELIVERY

Mail delivery to moving steamers in the Detroit river from the floating post office there has been facilitated by the application of a sailor's invention. The letters and packages are carried by a small launch and although the boats cut their speed to half as the mail craft comes alongside, the line, thrown around the timberhead of the larger vessel, frequently has broken by suddenly coming up taut. The mail boat drifted away and no delivery could be made. This difficulty has been solved by the installation of special snubbing posts devised by the second

Electrical Review 10/26/26



Blocks in This Model Tower Are Made of Old Newspapers, Pressed into Shape after Soaking

mate of one of the large lake vessels. They are placed abreast of hatch No. 3 on loaded boats and amidships when the freighters are light. The importance of this device is realized when it is known that, during the season of navigation, the floating post office delivers 1,500,000 pieces of mail and approximately 9,000 telegrams and special-delivery letters.

UNDERGROUND POWER CABLES

INSULATED IN OIL
Installation of two huge power cables carrying current from 132,000-volt generators recently installed in New York and Chicago raised a problem in insulation that was finally solved by filling the underground conduit with transformer oil, under pressure. The New York line is eleven miles long, and, as it supplies current for the high-pressure pumps of the fire-fighting system, the city requires the company to pay a forfeit of \$400 for every minute the line is out of commission. The Chicago power line is six miles in length. Pressure on the insulating oil of the latter is maintained through connections with large oil tanks on top of buildings at several points along the route. The power company built the buildings merely to get the use of the roofs for the tanks, and then leased the lower floors as garages.

MODEL TOWER IS BUILT OF OLD NEWSPAPERS

Old newspapers have been adapted to a novel and ingenious use by a western craftsman. He soaks them in water until they are pulpy then pounds them into blocks with which he builds various models. The six-foot tower shown here has a small elevator inside which is run by a tiny motor. Several cigar boxes, some wooden crocheting needles and more than 300 copies of a daily newspaper were required to complete the model.

Telegraph Works
Clerk in Postland
J. H. Schmeider

A Crystal Set for the Boy Builder

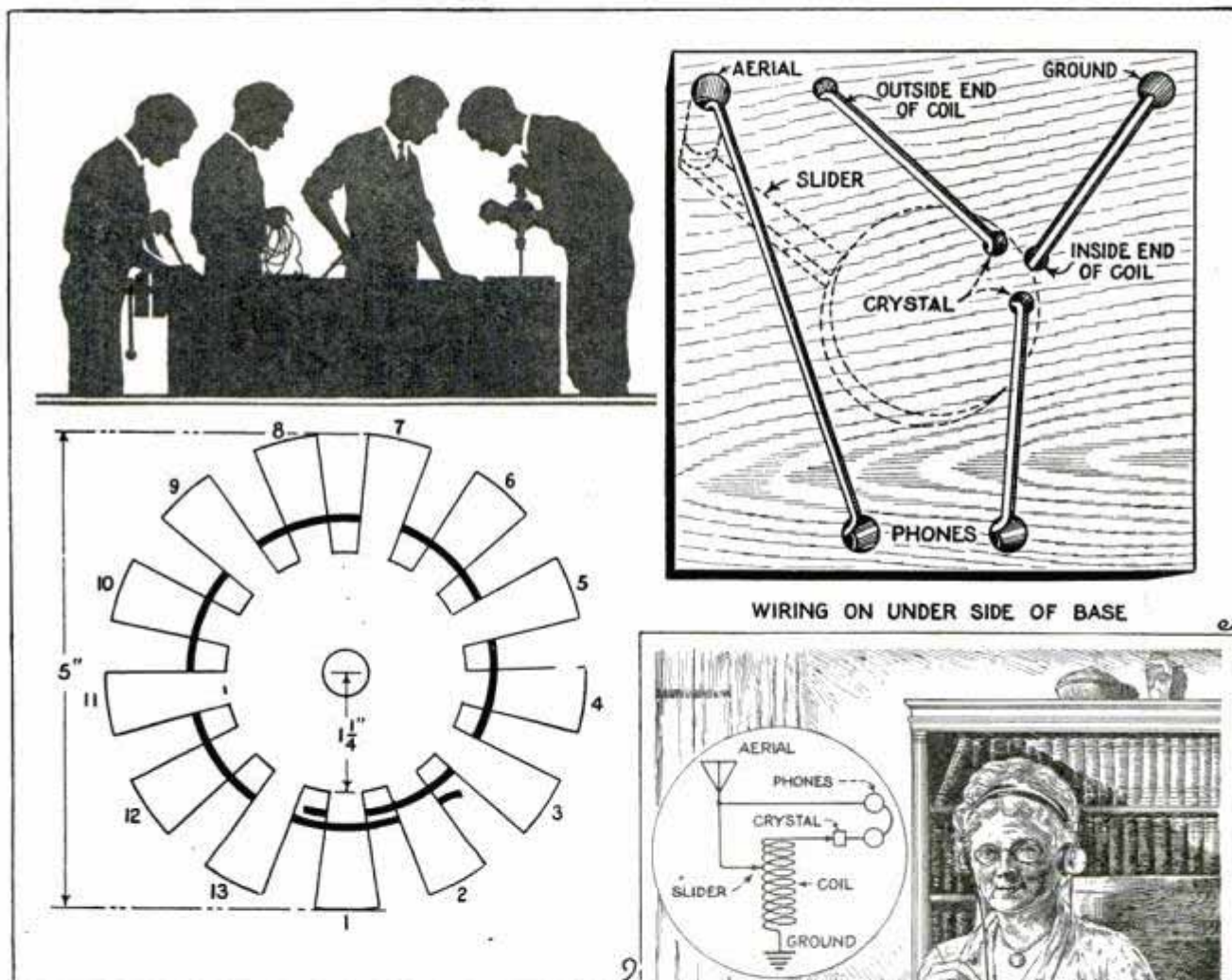
By WILL H. BATES

THIS little set is recommended for the boy builder, although the grown-ups also will enjoy it. Exclusive of the phones, the cost should not exceed \$1. Surprising volume is obtained on the local stations, and the set is more selective than the average receiver of this type.

Very few parts are required. The wood base may be made of scrap material found around the home. The other items can be bought at the 10-cent store, with the exception of the crystal holder. For this, an upright type, as illustrated, should be

coat of mahogany or walnut stain. Drill it for the four binding posts, which are located as shown in the illustration of the under side of the base. A $\frac{1}{2}$ -in. bit is used to countersink these holes halfway through the board from below.

The spiderweb coil is wound on the form shown in the diagram; this form may be cut from fiber or cardboard, and the dimensions should be followed. The thirteen spokes are $1\frac{1}{4}$ in. long, leaving an uncut center $2\frac{1}{2}$ in. in diameter. Wind the turns of No. 24 d.c.c. magnet wire alter-



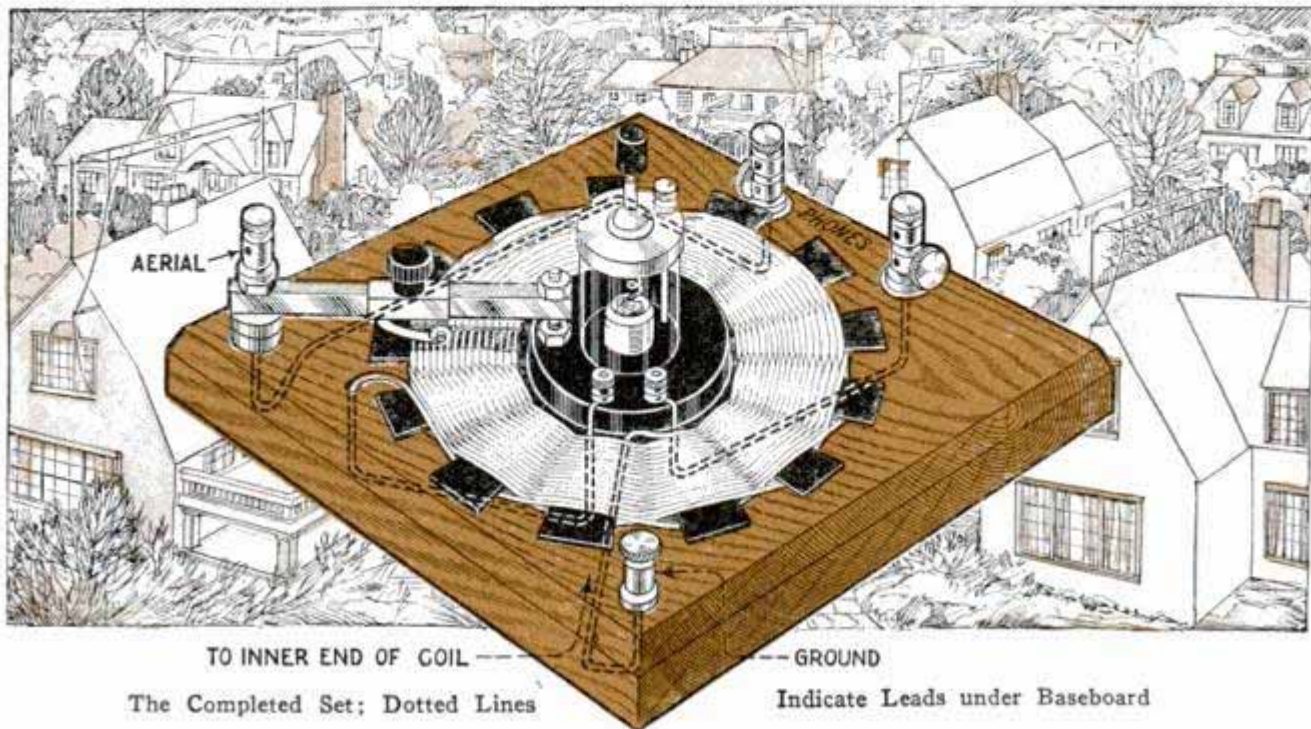
Left, Construction Details of Coil Form; Black Line Shows Method of Winding; Insert at Right, Schematic Circuit Diagram

selected, and may be obtained for about 25 cents. A good pair of 2,000-ohm phones should be used and these are available for about \$2.50.

The base may be beveled on the top edges, sanded down, and then given a

nately over and under the spokes, as indicated by the heavy line. When doing this keep count of the turns by marking one spoke and counting one each time this is passed. Fifty turns are required. Leave

the base, and on the under side, cut a groove in a straight line from this hole to the ground binding post. Run the inside end of the wire down through this hole and along the groove to the ground



The Completed Set; Dotted Lines

Indicate Leads under Baseboard

about 6 in. of wire at the start and finish of the coil, to make the necessary connections to the binding posts. When the coil is completed, scrape off the insulation from the wires on one of the spokes for a space about $\frac{1}{4}$ in. wide, running straight down the spoke toward the center. Put the spiderweb form on the center of the baseboard with the scraped section of the wire pointing to the aerial post. Then place the crystal holder in the exact center of the spiderweb coil, with one of the screw holes for mounting the crystal holder in direct line with the scraped wire and the aerial post. Fasten down the holder to the base with a wood screw through the mounting hole on the opposite side of the crystal holder.

At the starting, or inside, end of the coil, drill a small hole straight down through

post. Also drill a small hole at the outside end of the coil, and another just in front of one of the binding posts on the crystal holder. Join these two holes with a groove, and bring the outer end of the coil down through the base, along the groove and up to the post on the crystal holder. Drill another small hole just in front of the other binding post on the crystal holder, and run a wire down from this side of the crystal, through a groove along the bottom to one of the phone posts. The other phone post is then connected with the bottom of the aerial binding post in the same manner.

With a hacksaw, cut off a section of the square slider bar, long enough to bridge the space between the base of the crystal holder and the aerial post. Measure the distance from the screw hole in the flange of the crystal-holder base to the aerial post, and drill holes in the slider bar accordingly. A 6-32 brass machine screw, $1\frac{1}{2}$ in. long, is brought up through the baseboard, and through the opening in the flange. This hole is drilled down through the flange, using the hole in the crystal holder as a template. The hole on the under side of the base is countersunk for the head of this screw, which is

MATERIAL LIST

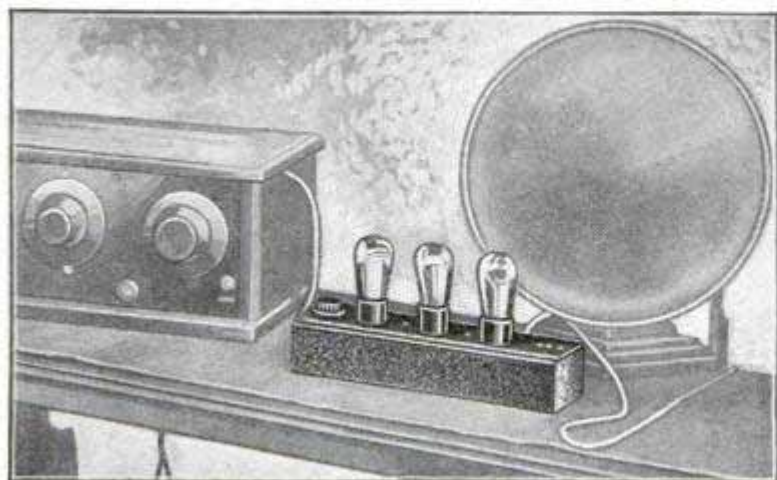
- 1 wood base, $\frac{3}{4}$ by 6 by 6 in.
- 4 binding posts.
- 1 spiderweb form.
- 1 small spool No. 24 d.c.c. magnet wire.
- 1 slider bar, 3 in. long, with slider.
- 2 6-32 brass machine screws, $1\frac{1}{2}$ in. long.
- 1 wood screw, 1 in. long.
- 1 crystal and holder, upright type.
- Washers and extra nuts.

not shown in the illustration as no circuit wires go to it. A nut is fitted on the end of the screw protruding through the holder flange above, and the slider bar slipped down on the nut, where it is held by another nut. At the aerial post, a brass machine screw of the same size is passed up through the baseboard, the lead from the phone post first being securely fastened to the head of the screw on the under side. Washers or a bushing should be used to level the bar. Put the slider on the bar and mount on the screw. The aerial binding post is then screwed down, and the set is ready for use.

To operate the receiver, use a one-wire aerial, about 75 or 80 ft. long, and connect a lead from the ground post to a clamp attached to a cold-water pipe. Then insert the phone-cord terminals in their posts. Tune by moving the slider along the bar until a station is heard at maximum volume and adjust the crystal to the spot where best results are obtained.

1143- R.
New Unit Brings Old Set Up to Date

A new power-amplifier unit that may be used to modernize the old set has lately made its appearance on the market. It consists of three specially designed stages of a.f. amplification in a compact assembly, which can either be placed inside the cabinet, if there is room, or used as shown in the illustration. The cable leads from the unit are merely clipped to the regular batteries of the set. The a.f. tubes are shifted to the unit and one tube is added. A special lead in the cable is provided for connection to the detector tube.



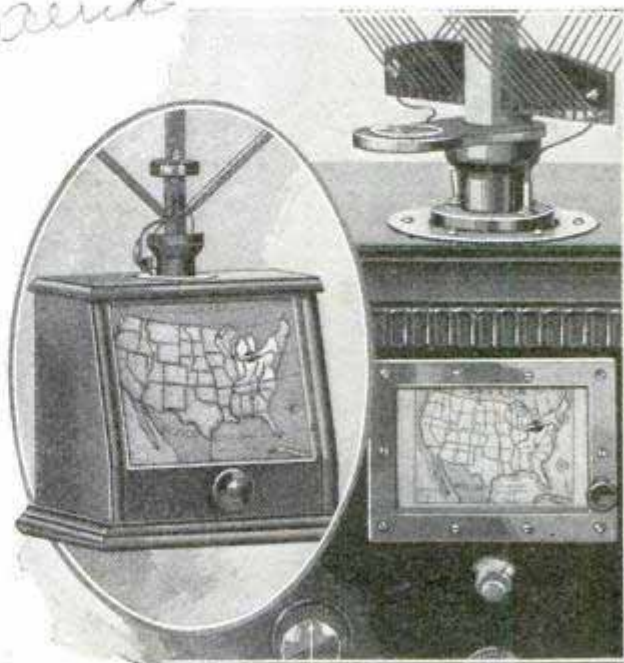
Power-Amplifier Unit Connected to the Old Set, Improves Tone, and Provides Increased Volume

*Alden Mfg Co
 15 ... field Mass.*

*Howe Mfg. Co.
 30 Euclid Avenue
 1136 R. Eddy Cleveland Ohio*

Direction Finder for Loop

A handy device for pointing the loop exactly toward the location of a distant



Insert, Loop Direction Finder as a Separate Unit; Right, Built-In Type for the Set Builder

broadcasting station was exhibited at the recent Chicago radio show, and is now on the market. It is offered as a separate unit, or may be obtained in knocked-down form suitable for mounting in any set. The finder consists of a properly projected map of the United States, under glass, on which is mounted an arrow indicator. There are two control knobs on the instrument, a small one on the side, and a large one at the front. The first controls the arrow only; the second controls both loop and arrow. The first step in using the device is to swing the loop, by hand, until it points due north, as determined by the compass mounted near its base. Then, by means of the small knob, the arrow is also set to point due north on the map. Now, if the larger knob is turned so that the arrow points to the location of the station desired, the loop, swinging with it, will also point to the station, permitting the operator to tune it in at maximum strength.

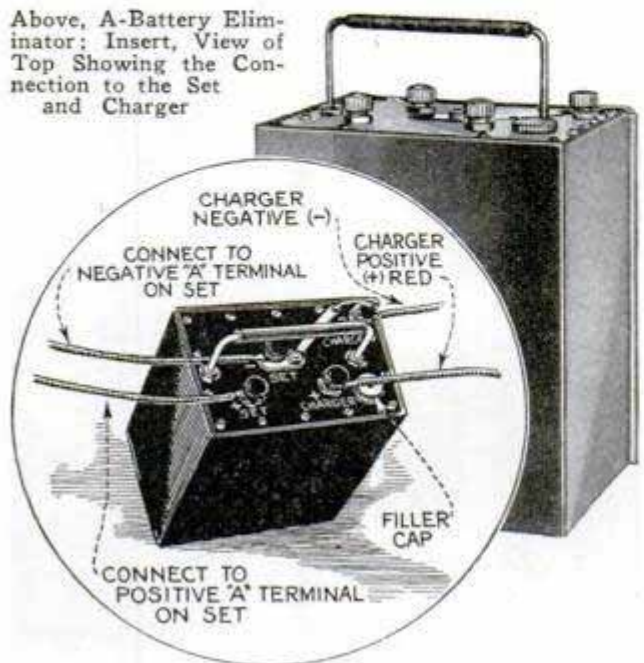
Ⓢ Do not use small B-batteries on large sets, nor large B-batteries on small ones.

300
 1134-2

Filter Eliminates A-Battery

Eliminating the A-battery, a new filter unit is attached to the output of a tungar charger, where it will perform enough

Above, A-Battery Eliminator: Insert, View of Top Showing the Connection to the Set and Charger



“smoothing” and filtering to permit the use of anything from a one to a ten-tube set. For sets employing from one to six tubes of the 201-A type, or equal load, a 2½-amp. charger is recommended and a 5-amp. for those using more than six similar tubes. Vibrator-type chargers are not recommended for use with the unit. As the device supplies no power, its output is limited by the capacity of the charger. The connections are very simple. Based upon an electro-chemical action, the new unit permits the set to draw its A-power direct from a light socket, without alternating-current hum.

Filling Holes in Radio Panels

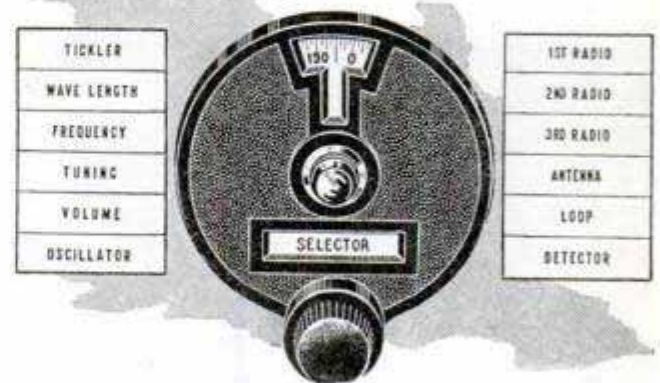
The radio experimenter often wishes to try out new circuits that call for a change in dials and other equipment on the panel. These changes leave a number of unsightly holes that must be filled up if the same panel is used. Countersink the holes on both sides with a “rose-head” countersink after the panel has been stripped of all instruments. Get some black pitch or compound such as is used for sealing storage-battery cells, or for covering dry cells and melt it in a can over a flame. Lay the panel flat on a sheet of paper on the table, and pour the compound into the holes,

leaving a slight surplus above the surface. In about 30 minutes it dries hard and may be rubbed down to the panel surface with fine sandpaper. To put a good finish on the panel, which may be covered with scratches, use powdered pumice and water, and rub with a block of felt, always rubbing the full length of the panel, never across it. Go over the entire surface and wipe clean with either a damp cloth or one containing a slight amount of oil. The filling compound will stay in place as the countersunk holes serve to dovetail and hold it. If any irregular spots are left, apply some of the compound to them, smoothing such places off with a hot soldering iron, and rub down as before.—Harold P. Strand, Malden, Mass.

New Universal Vernier Dial

949-2 Fits All Condensers

A universal vernier dial designed for all types of variable condensers is now offered to the radio builder. This dial may be used for either right or left-hand and for 180° or 360° condensers. A numbered disk is fastened to each side of the rotating plate; to reverse the reading, the plate is simply turned around, making practically four dials in one. Directly under the degree number on the dial there is a logging window with plenty of room for writing in the station call letters, permitting the listener to tune in the station he wants without reference to wavelength charts. There is also a designating window below in which can be placed any of the various



Universal Vernier Dial Really Is Four Dials in One; List of Titles Available for Lower Window

titles shown at right and left of the dial in the illustration. A full set of these is included with each dial.

Imperial Molded Products Corp.

Twelve Dollars Builds This B-Eliminator

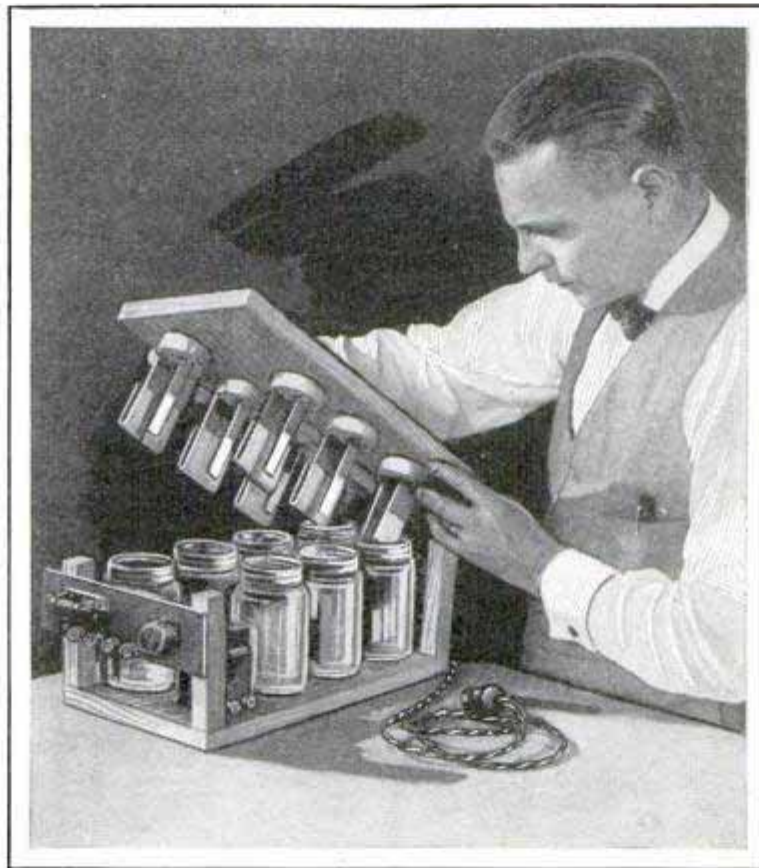
By ARTHUR KENNEDY

TWELVE dollars is indeed a low cost for a really efficient B-battery eliminator, capable of supplying upward of 135 volts at 20 milliamp. An eliminator of the usual design is expensive to build, specially constructed high-voltage transformers, rectifier tubes, filter chokes and condensers being required. This B-eliminator, without any step-transformer, makes use of a well-known principle whereby it is possible to obtain d.c. voltages almost double that of the 110-volt 60-cycle a.c. input. Electrolytic, or "colloid," rectifiers and condensers take the place of rectifier tubes and dry-pack condensers in this unit. They have several advantages; first high resistance to electrical breakdown, and second, extremely high capacity per unit of electrode area, making a simple and compact, as well as an economical, source of B-battery voltage. Many of the parts can be found in the average home, materially reducing the cost of making the apparatus.

Before beginning the construction of the instrument read the whole article attentively, so as to understand each step thoroughly, have all the materials on hand and follow the instructions explicitly. The general construction details appear in the illustrations and, in a measure, are self-explanatory. For mounting the eliminator in one compact unit, the author used two $\frac{7}{8}$ -in. pine boards, 8 by 15 in. To

the upper one, seven wooden disks, cut from similar material and just large enough to fit snugly inside the tops of the Mason jars, were nailed, or screwed, in the manner shown in the photo on this page. The disks were arranged in two rows, one of three and the other of four, the space left in the former being reserved for mounting the filter choke coil on the baseboard. The seventh jar contains

the two by-pass condensers of the voltage divider, as will be noted on the simplified wiring diagram. The section diagram on page 303 gives the reader a detailed view of the top assembly. It will be noted that vent holes are drilled through the disks and top; these holes should be at least $\frac{1}{4}$ in. in diameter. The brass machine screws to which the aluminum and lead elec-



Parts Assembled Ready for Cell-Forming Process

trodes are fastened may be longer, so as to eliminate counterboring, if desired. A long soldering lug, of the round-hole type, is placed under the head of each screw for the circuit connections. After the wood disks are in place arrange seven pint screw-top fruit jars in position on the baseboard and put on the top. Four 1 by 1-in. wood uprights are then cut for supports at the corners; they should be of such length as to allow the wood disks to enter to their full thickness into the jars when the instrument is assembled.

The holes for the electrodes are then drilled $1\frac{1}{2}$ in. apart, and the various lead



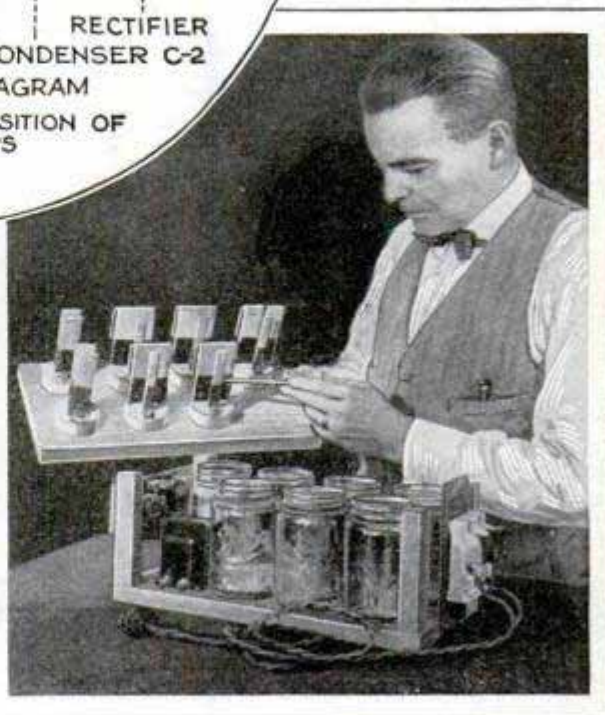
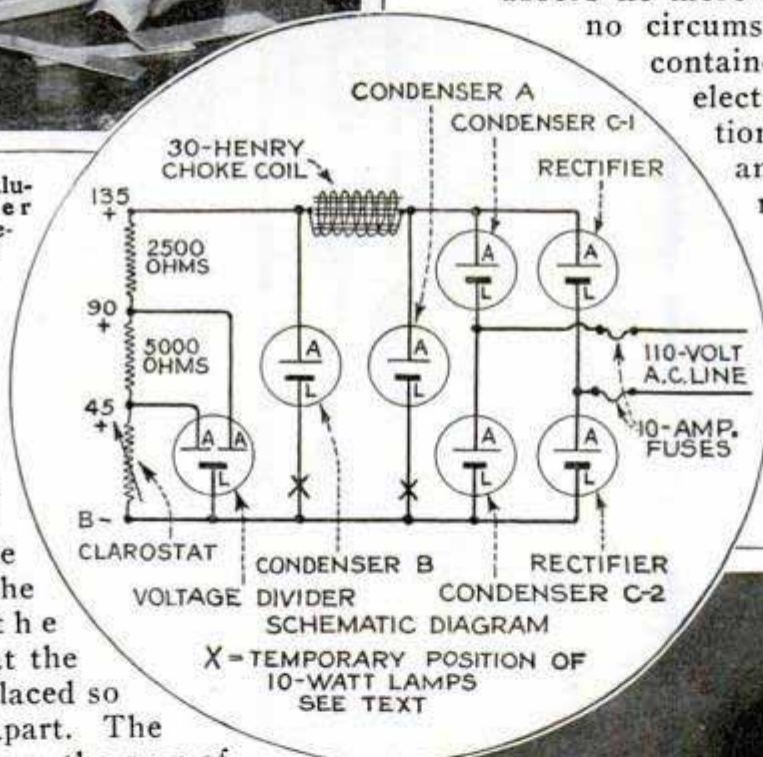
Above, Mounting Aluminum Condenser Plates; Center, Schematic Diagram of Circuit; Below, Pointing Out Taped or Insulated Portions of the Electrodes

and aluminum electrodes are cut and mounted in their respective positions on the underside of the disks. Note that the electrodes are placed so as to be $\frac{3}{4}$ in. apart. The first two jars from the rear of the unit are for the rectifier cells. Each cell has one lead and one aluminum electrode, 1 in. wide, $4\frac{3}{8}$ in. long, and about $\frac{1}{16}$ in. thick, the actual thickness being of little importance, just so that it is not too thin. These strips should be thoroughly cleaned with emery or sandpaper before using, and this applies to all aluminum and lead strips in the unit. The electrodes are bent over about $\frac{1}{2}$ in. at the top and trimmed so as to fit the disk. They are then drilled and mounted on the disks, as shown in the upper photo on this page, by means of the brass machine screws and

held in place with a brass nut. The rectifier electrodes are then rubber-taped, or coated for $1\frac{1}{2}$ in. from the top with PBX paint. This is done to prevent surface sparking, which would cause pitting of the aluminum plates. This method of insulating is carried out on all the electrodes as pointed out in the lower photo.

The solution for both the rectifiers and condensers of this eliminator is the same. One gallon of distilled water is necessary and it is very important that it be distilled. If in doubt, drop a few crystals of nitrate of silver in a small sample of the water. If the water turns milky, do not use it. To the gallon of distilled water add about 1 lb. of good borax or ammonium phosphate to make a saturated solution, which is obtained when the water will absorb no more of the solid. Under

no circumstances use a metal container for making the electrolyte; mix the solution in a glass vessel and stir with a glass rod, to aid the water to dissolve the solid. Fill each rectifier jar with the saturated solution to a point where it covers about a third of the area of the



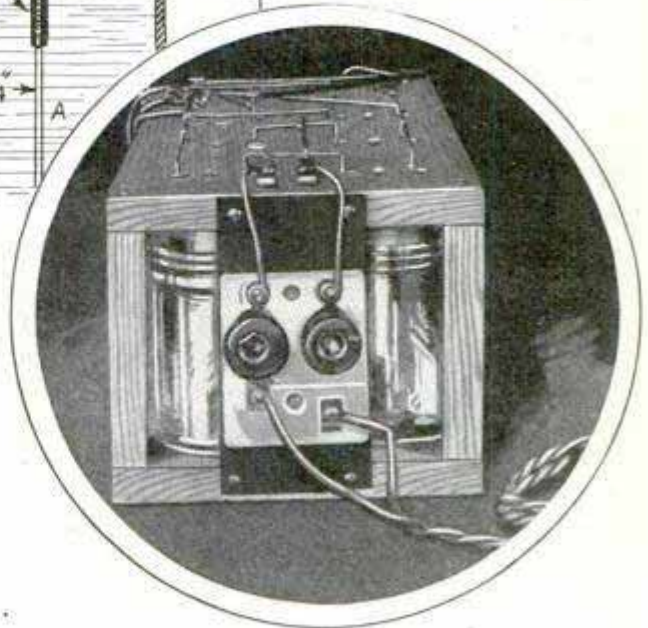
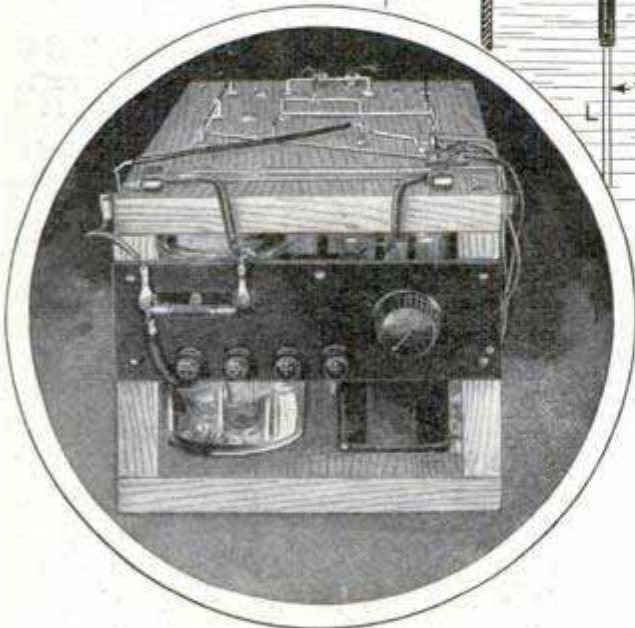
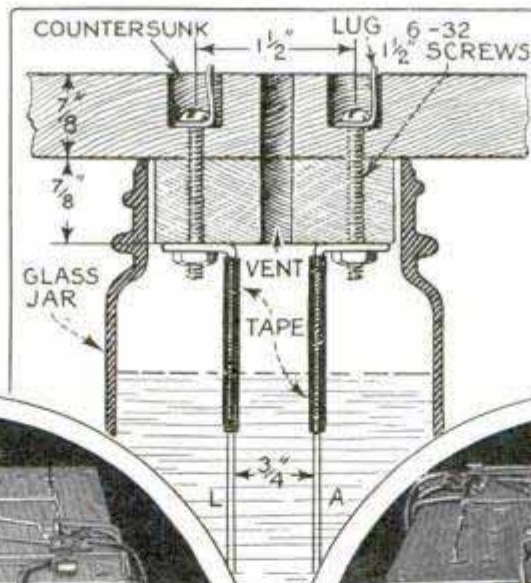
taped portion of the plates. We are now ready to form the two rectifier cells; up to this point these cells will not rectify a.c. current.

Taking each cell separately, make temporary connections to the lugs on the top, with lamp cord, so as to place the cell across the 110-volt a.c. line and connect a 25-watt lamp in one side of this line in series with the cell. Turn on the current and let it flow for a few hours. This is the forming process and changes the nature of the cells, which previously would have passed current in either direction, so that they will pass current in one direction only. As the cells form, the aluminum plate will turn a very light gray, where it is exposed to the action of the solution. This aluminum-oxide coating insulates the lead from the aluminum plate when the current attempts to pass from the latter to the former, but acts as a conductor when the current passes in a reversed direction. If a rectifier cell refuses to form, the aluminum plate will turn a dark sludgy-looking gray. If, after three hours of forming, the aluminum has not turned to a light gray, but instead is dark and dirty-looking, it is an indication that directions have not been followed closely enough. The cause is either un-

clean electrodes, impure water or low-grade aluminum. The aluminum plate must be pure and free from grease and foreign matter before it is placed in the solution. If a cell does not form properly, take the electrodes from the solution, dry them and go over them again thoroughly with emery cloth. Put them back in the solution and repeat the forming process. If after doing this the cell refuses to form and if you are sure that the water used is really distilled, the trouble is due to impure aluminum. Chemically pure sheet aluminum cannot be obtained in the open market, but commercial sheet aluminum of a good grade is pure enough for our purpose and can be bought in any hardware or plumbers' supply house.

If your cells have refused to form and you have been using borax in the solution, try changing to ammonium phosphate; it is a little more difficult to obtain but your druggist can procure it for you through his wholesale house. In a few cases the author found that the borax

was at fault, a possibility that seems quite remote. After the rectifier cells have both been formed, take the electrodes out of their jars, dry them and coat the taped or painted section of each electrode with vaseline. Also



Above, Section Diagram Showing Method of Mounting the Electrodes; Left, Front View of Completed Eliminator; Right, Rear View Showing Fuse Block in Position

coat the bottom of the wooden disks and the inside of the jar, for $\frac{1}{2}$ in. down from the top, with vaseline. This will prevent the borax or ammonium phosphate from creeping. Replace the electrodes in the jars and through the vent hole drop a little kerosene, just enough to cover the surface of the solution. This is done to prevent too rapid evaporation of the electrolyte.

Next comes the preparation of the electrolytic condensers, of which five will be needed. The tank condensers, C-1 and C-2, are arranged as shown in the schematic diagram on page 302. They are 8 mfd. each. At a forming voltage of 110 volts, exactly 8 sq. in. of the aluminum plate must be exposed to the solution; no variation is permissible here. The condensers are constructed and formed in exactly the same way as were the rectifier cells.

The aluminum plates are 2 by 6 in., and

tion of the lead electrode goes below the surface of the solution, otherwise there will be very pronounced surface arcking. In forming the tank condensers, connect each one to one of your already formed rectifier cells. Connect each individual unit in series with a 10-watt lamp to the 110-volt a.c. line. That is, connect the lead electrode of each rectifier cell to one side of the line, and the aluminum electrode of the rectifier cell to the lead electrode of the condenser to be formed. The other terminal of the condenser is connected through two 10-watt lamps to the other side of the line. Each forming unit should be made separately, so that any error in preparing one cell for forming will not affect another that has been carefully prepared.

After the tank condensers have been properly formed, vaseline the electrodes, the bottom of the wood cover, and the inside of the jar from the top as with the

MATERIAL LIST

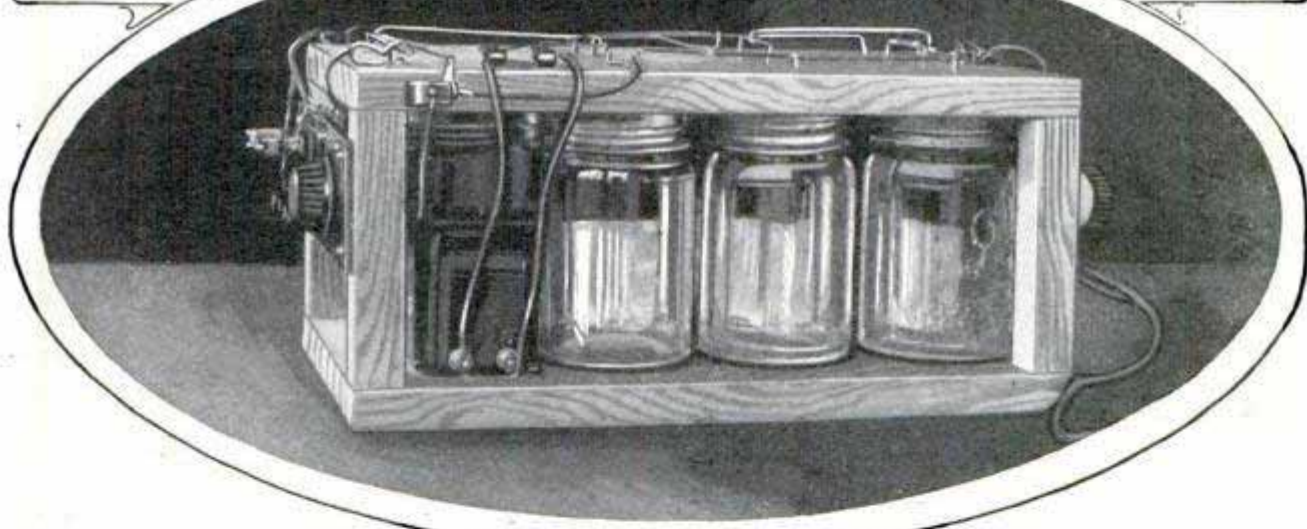
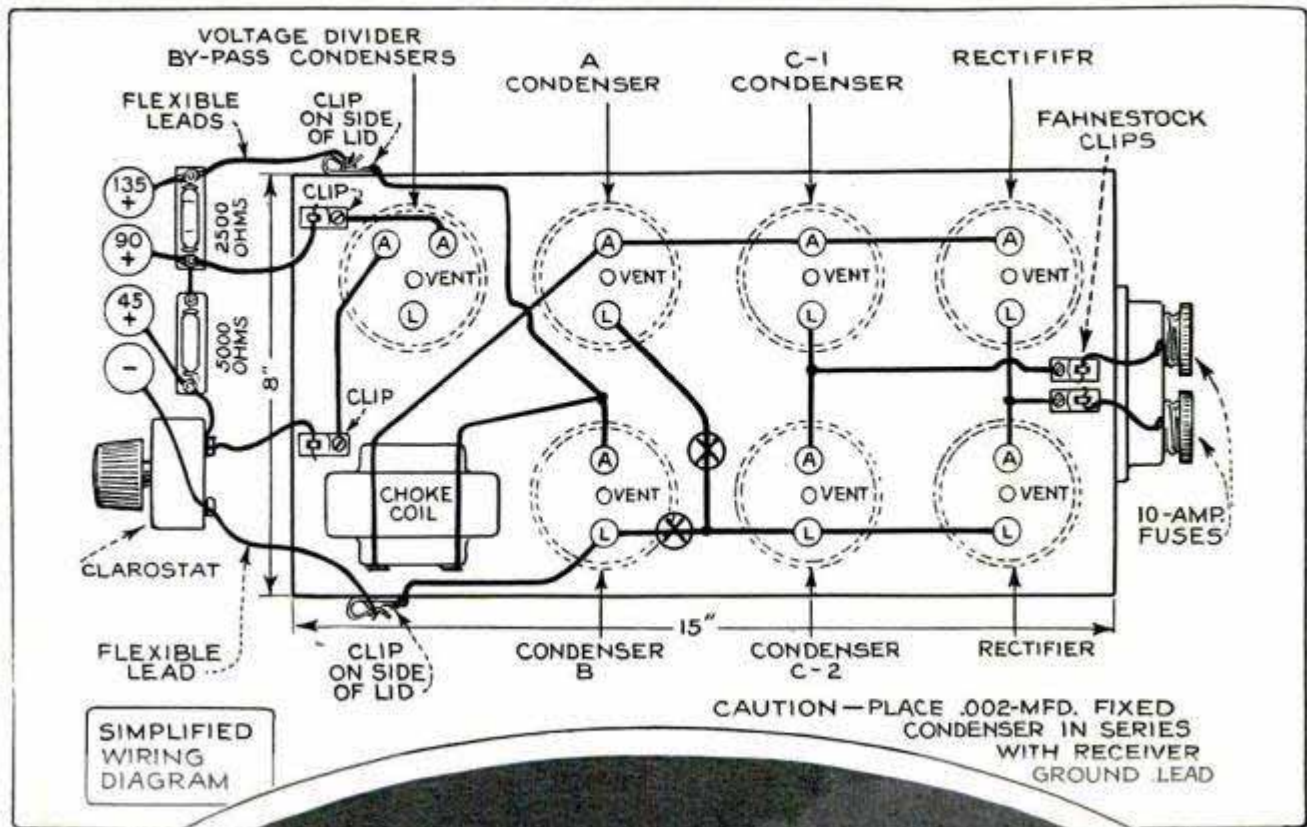
- | | |
|---|---|
| 7 pint Mason jars. | 2 10-amp. fuse plugs. |
| 1 gal. distilled water. | 4 binding posts. |
| 1 lb. borax, good grade. | 1 piece bakelite, 3-16 by 3 by $6\frac{1}{2}$ in. |
| 1 sheet aluminum, 6 by 14 by 1-16 in. | 1 piece bakelite, 3-16 by $2\frac{1}{2}$ by 8 in. |
| 1 sheet lead, 6 by 6 by 1-16 in. | 2 pieces of wood, $\frac{7}{8}$ by 8 by 15 in. |
| 1 Clarostat. | 4 wood uprights, 1 by 1 by $5\frac{1}{8}$ in. |
| 1 fixed resistor, 2,500 ohms, with mounting. | 2 porcelain-base sockets, for lamps used in forming process. |
| 1 fixed resistor, 5,000 ohms, with mounting. | 6 ft. lampcord with plug. |
| 1 Thordarson, or similar type, 30-henry filter choke. | 15 6-32 round-head brass machine screws, $1\frac{1}{2}$ in. long. |
| 6 Fahnestock clips. | Wood screws, rubber tape, soldering lugs, busbar wire, etc. |
| 1 porcelain fuse block. | |

are bent over $\frac{1}{2}$ in. at the top for fastening to the wood disk, leaving $5\frac{1}{2}$ in. free, of which $1\frac{1}{2}$ in. is taped or painted as with the rectifier cells. Bend back the ends of the aluminum plates so that they will not strike the bottom of the jars, but do not let the two surfaces touch each other. The aluminum plate goes to the positive side of the line in all cases.

The filter condensers, A and B, shown next after the tank, or C-1 and C-2, condensers on the wiring diagram on page 305, have the same aluminum plate area of 8 sq. in. exposed, as the tank condensers, but, being formed at a high voltage, they will have just half the capacity of the tank condensers.

The lead electrode of all condensers, tank, filter and voltage divider, is $\frac{1}{2}$ by 4 in. long. Make sure that the taped por-

rectifier cells. Then wire the eliminator as far as the filter choke coil; connect an unformed A or B filter condenser in series with two 10-watt lamps, at points marked X in the schematic diagram. Follow the diagram closely and be sure to connect the lamps in series, as there is 220 volts d.c. across the filter condenser at this point. Place the fuse block in the a.c. line, turn on the current and form as before. After forming, replace the formed A or B filter condenser with the other unformed filter condenser, and form it. As the filter condensers form, the 10-watt lamps in series with them will gradually grow less brilliant and finally go out. At this point, short one of them out of the circuit and continue forming. Connect the eliminator right through to the voltage divider, just as soon as both the filter



Above, Simplified Wiring Diagram; Below, Completed Eliminator Ready for Use

condensers have been completely formed.

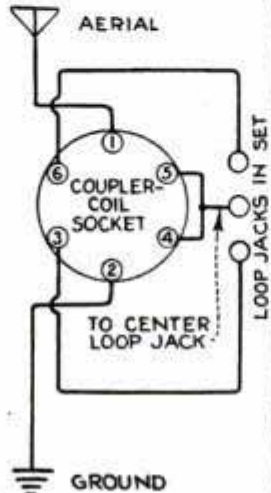
The fixed resistors of the voltage divider are mounted on a strip of bakelite screwed to the front uprights of the unit, as shown in the left-hand photo on page 303. The 2,500-ohm resistor is mounted on the front at left, and the 5,000-ohm at the center on the back of strip. Shunted directly across the detector-voltage terminals is a "clarostat," which is mounted on the strip at right. This variable resistance is to form an artificial load, so that, regardless of the number of tubes in the set, the voltages at the terminals will always remain the same. Even if your re-

ceiver does not require 135 volts, do not omit the 135-volt binding post and its resistor. Build it just as it is and use the 90-volt terminal for your set; you may need the 135 volts at a later date or on some other set. The by-pass voltage-divider condensers are built in the same jar. The two positive aluminum electrodes are 1 by 6 in. and the lead electrode is $\frac{1}{2}$ by 4 in. Prepare the plates as before, bending back and mounting the aluminum plates, side by side and $\frac{1}{8}$ in. apart. To form, first tie the two aluminum plates together, and place the cell, in series with a 25-watt lamp, across the 110-volt a.c. line. Form-

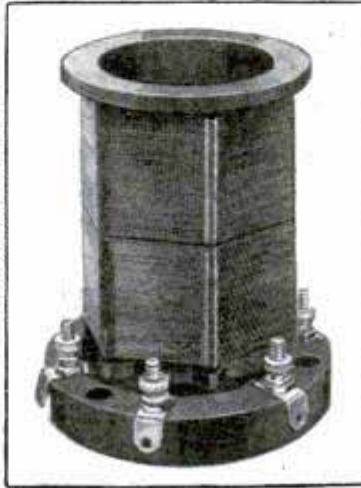
ing is complete when the aluminum plates have turned a light gray. Connect in the voltage divider and condensers and run the various voltage leads to the binding posts arranged along the lower edge of the bakelite strip at front.

It will be noted that six Fahnestock clips are mounted on the top and edge of the lid, to take flexible leads from points below, so as to facilitate removing the top. These flexible leads and clips are clearly shown in the simplified diagram.

A large blueprint of the circuit diagrams and various forming steps outlined in the text has been prepared and may be obtained from Popular Mechanics Magazine Radio department, 200 E. Ontario st., Chicago, for 15 cents, to cover postage and packing. Specify blueprint No. 117.



Left, Diagram of Connections, Showing the Numbered Posts on the Coil Socket; Right, Plug-In Coil



points of the compass come in with equal volume. It is made of copper in the shape of an 8 by 10-in. cylinder and is mounted on an insulated pole.

Aerial Adapter for P.M. Superhet

Numerous requests for information regarding the use of an outdoor aerial with

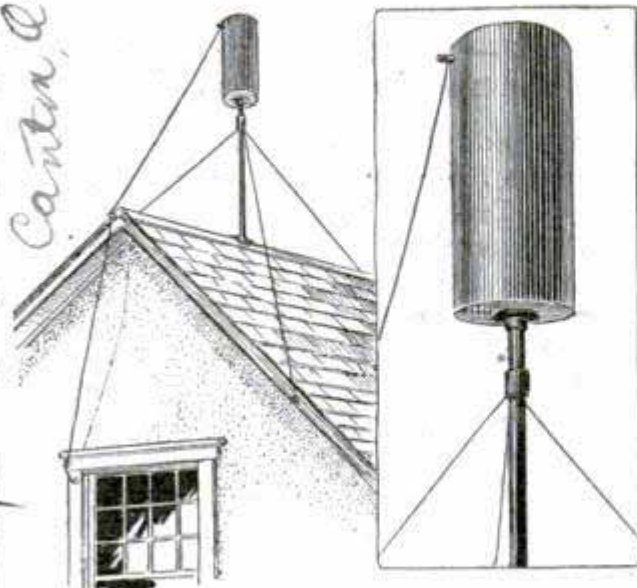
the new Popular Mechanics superheterodyne, described in the October, 1926, issue, are answered by the simple device shown in the diagram. The set is designed for a loop of the three-tap type, and should not be used on an outside aerial, except for extreme long-range experiments, as, over ordinary ranges, the set would tune too

broadly on an outdoor aerial. The plug-in coupler is the S-M type 110-A, with S-M universal socket and is shown in the photo. The binding posts on the socket are numbered as indicated on the diagram, and should be connected as shown. This aerial-coupler device should not be mounted in the set; it can be assembled on a small wood base and placed near the set when required.

This superheterodyne gives excellent results on the loop, and there is no reason for the use of an outside aerial except for experimental purposes. Any superheterodyne used on an outdoor aerial will re-radiate, causing interference.

Non-Directional Aerial

A new type of non-directional aerial does away with long unsightly wires and guys, is compact and can be installed in crowded localities where it would not be practical to use an aerial of the usual type. Being non-directional, stations from all



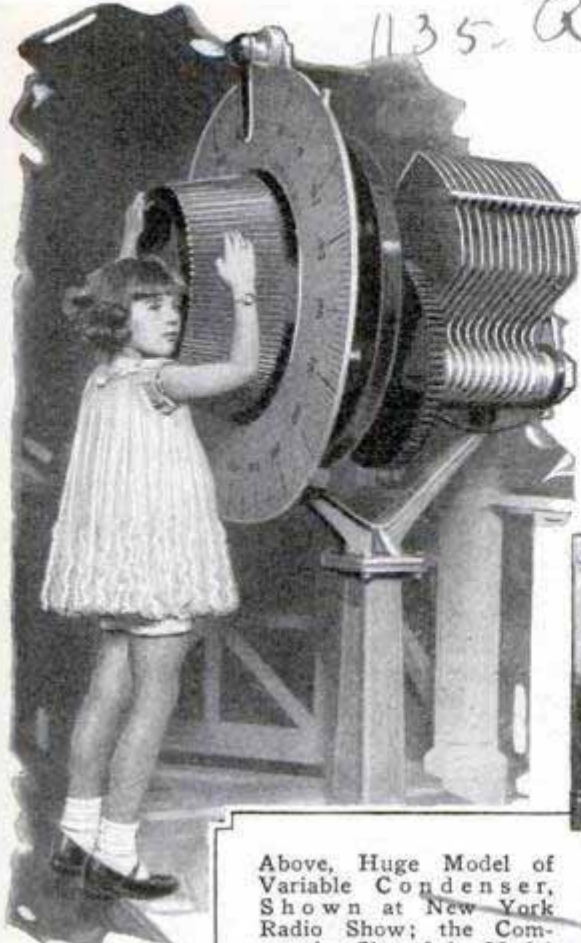
Non-Directional Aerial Consisting of Copper Cylinder Mounted on Insulated Pole

Denatured Alcohol Cleans Hydrometer

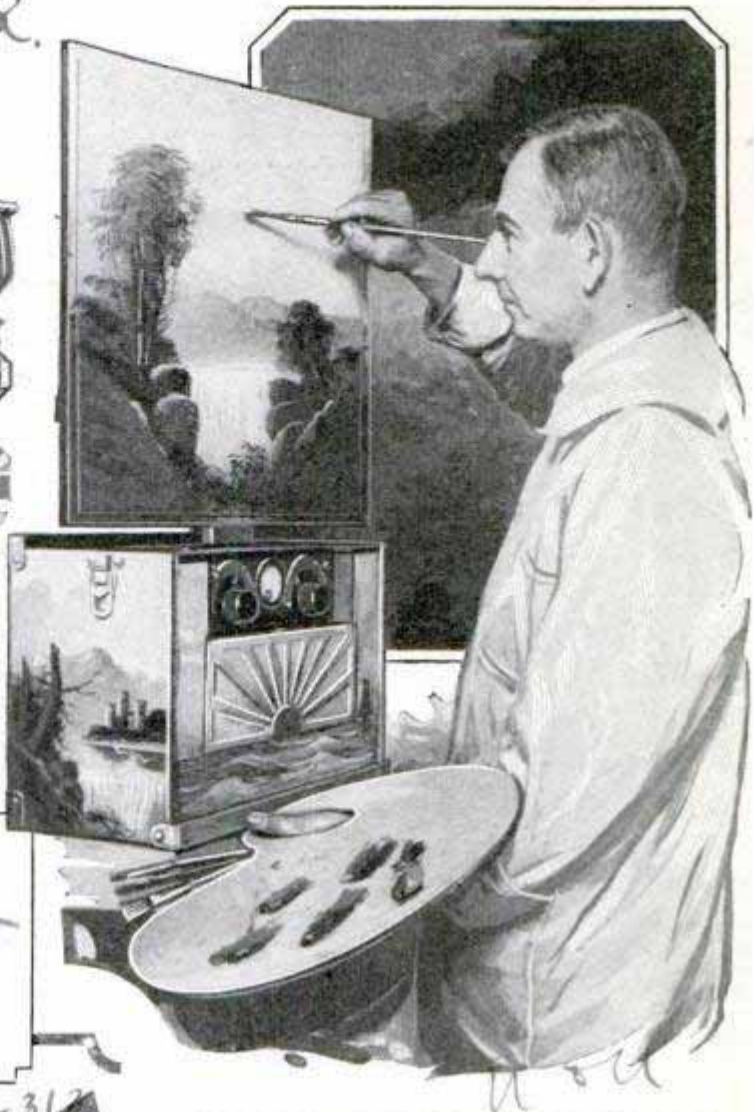
After continued use, the hydrometer becomes difficult to read due to a deposit of fine particles in the acid on the inside of the glass barrel. This deposit may be removed with wood alcohol. Provide a special bottle for the alcohol as it can be used over and over. Draw up the alcohol in the barrel of the instrument and squirt it back into the bottle; this simple method keeps the glass clean, so that graduations on the float stem can be easily read.

Letter filed 6/28/27
1009-R
Brayley Electric Co
329 Des Moines St. E
Centon, Okla

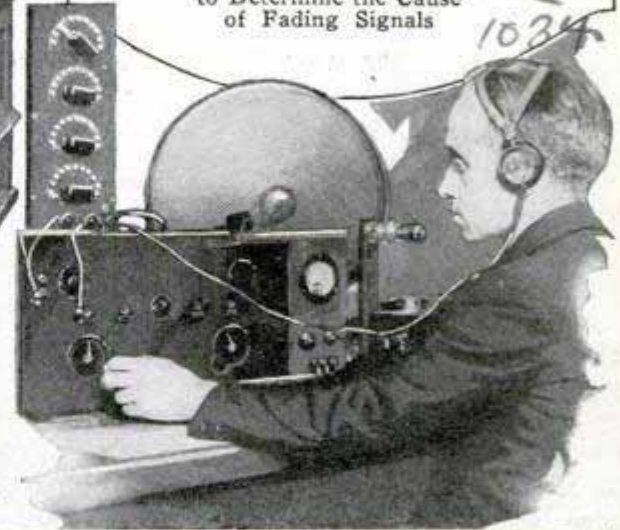
247 Park Ave. *New York.* 1148 R.
Facts and Fads for Radio Fans



Above, Huge Model of Variable Condenser, Shown at New York Radio Show; the Comparative Size of the Model Is Indicated by Little Miss Betty Sargent Who Is Trying to Operate It



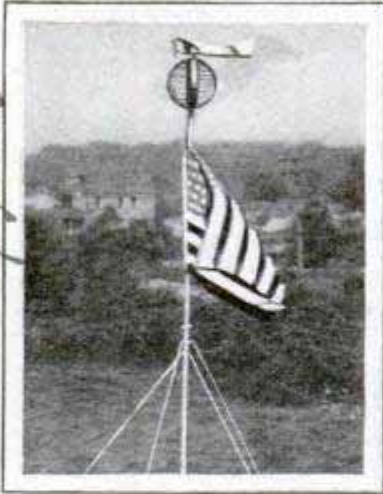
Henry P. Englehardt, a Chicago Artist, Putting the Finishing Touches on an Elaborately Decorated Portable Set; Below, S. S. Kirby, of the U. S. Bureau of Standards, Is Shown Conducting a Test to Determine the Cause of Fading Signals 1034 R.



Left, Six-Tube Radio Set, Built in a Baby-Grand Style; It Fits into a Corner and Attracted Favorable Comment at Radio Show in Chicago

1129 - R *dia*

Flag and Vane Top Aerial Mast

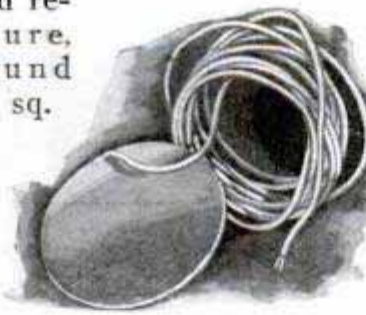


The usually plain aerial mast may be improved in appearance by utilizing it as a flagpole, and also as a support for a weather vane if desired. A pulley should be arranged for raising and lowering

the flag. The photo shows such an installation that is visible for many miles, and has aroused much favorable comment.—Raymond Hadley, Fairfield, Conn.

Ground Disk Retains Moisture

A metal ground disk, containing a chemical compound that has the property of attracting and retaining moisture, provides a ground contact of 175 sq. in. of metal, highly sensitive to radio-electric energy. The chemical in the disk is claimed to retain moisture indefinitely, insuring a good ground for the set at all times. The outfit is provided with ground wire of sufficient length for the average installation.



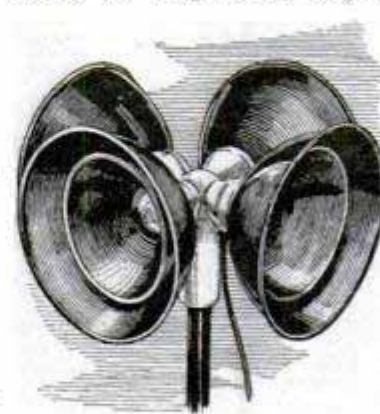
Loose Connections Frequent Cause of Trouble in Receivers

Loose connections are a common cause of trouble; they may be present in a new set fresh from the factory, or may develop in a set that has given good service. This often happens in shipping and is not due to faulty workmanship; the stiff busbar wire used in the circuit is not flexible enough to withstand heavy strains, and breaks in the soldered connections are not uncommon. In the home-built set breaks often occur when the set is removed from

the cabinet or subjected to unskillful handling. If loose connections are suspected, pull each wire separately until the loose joint is located, and apply the soldering iron at once. Too often the solder is depended upon to keep the connection secure, but this is not sufficient. Butting two wires together and applying solder makes a poor electrical connection, and one having a high resistance, even though the solder holds. Always loop the wire around and pinch the loop tight on the wire to be connected before applying the solder. This will not pull loose. Have all wires perfectly clean before attempting to make a joint. Now that under-subpanel wiring is in vogue, stiff busbar wire need not be used for the entire circuit, as it is hidden below the subpanel. Stranded insulated wire may be employed, although this is not always advisable because of the high resistance offered if one strand escapes the solder. Soft drawn No. 16 copper wire, carefully insulated with a good grade of spaghetti tubing will give excellent results.

Radio Antenna of Unusual Design

The illustration shows an antenna of unusual design that has recently made its appearance on the market. The four large receptacles are 10 in. in diameter and the smaller ones 6 in., and the eight together have 854 sq. in. of receiving area. The unit is made of conductive weatherproof material, and the center piece, or junction member, is of porcelain, insulating it from the mast. To install the aerial, a piece of ordinary 3/4-in. pipe, threaded at both ends, is required, together with a base



fixture that may be obtained at any radio-supply store. A pipe, 6 ft. long, is suggested if the unit is to be installed on the ridge of a house. The claim is made

that this type of antenna has many advantages in that it is more selective, minimizes interference and is not directional.

*Yale Specialty Supply Co
123 W. 15th St. Kansas City, Mo*

100 P. A

1048. R

*How. Way Universal Antenna Co.
Rapid Rapids*

*\$12.00 J.O. B
Grand Rapids*

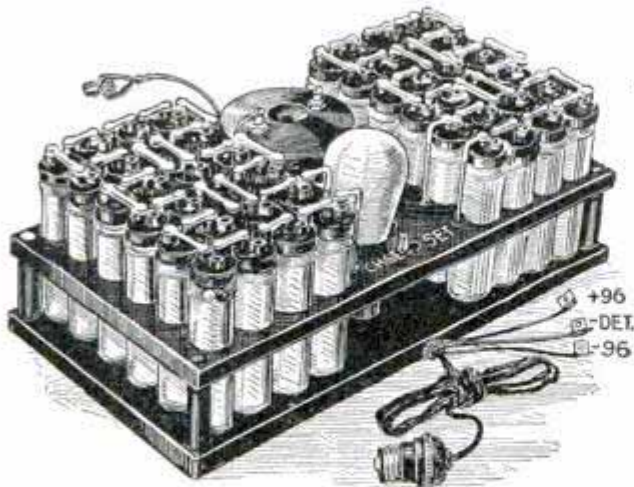
1434 Carroll Ave
Chicago 309
1123-Q

When Local Signals Fade

Fading signals are not always confined to the distant stations; it sometimes happens that signals from the local station behave similarly. The trouble is not in the strength of the signal but usually lies in a defective rheostat. Adjust the rheostats and watch the filaments of the tubes; the flickering or dimming of a tube when a certain point on the rheostat is reached indicates a loose connection that will cause this peculiar fading effect. Take off the rheostat, clean the resistance wire with a small piece of emery cloth and bend the contact arm so as to obtain a good contact at every point. Upon replacing the rheostat, no more trouble will be found as far as local stations are concerned.

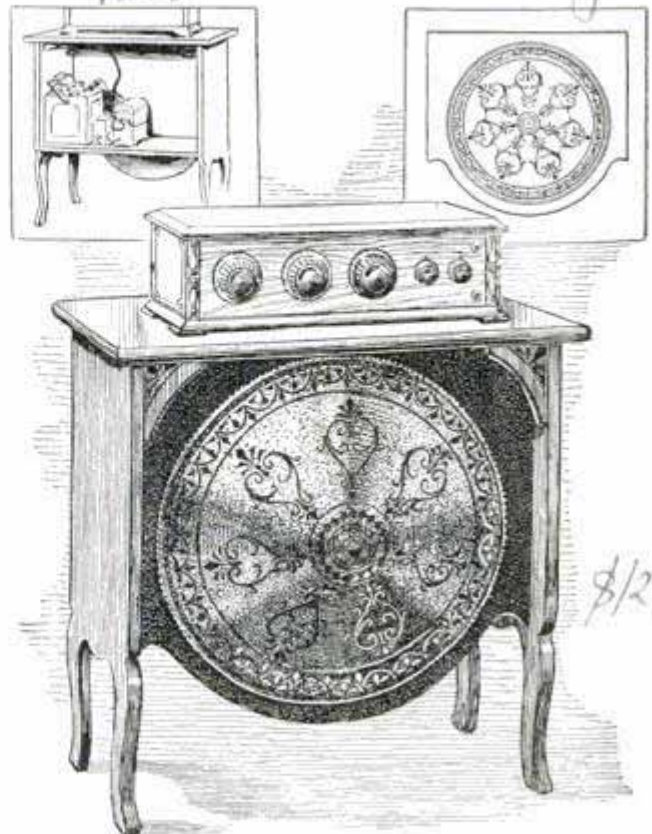
Storage B-Battery Has Built-In Charger Unit 1125-Q

A wet B-battery with a built-in charging unit is now available. Two gravity balls, located in one cell, indicate the state of charge. When recharging is necessary, the switch may be thrown and the noiseless charger brings the battery back to full charge. There are no wires to disconnect. The rack is constructed of steel, finished to harmonize with the brown porcelain cell tops, and rests on rubber feet. The clip shown at the top is provided to enable the detector voltage to be varied; the extension cord and plug may be per-



Storage B-Battery Showing Built-In Charging Unit permanently attached to a light socket. Leads for the set connections are also provided, and the unit is a complete source of B-battery supply that is easy to keep at maximum efficiency.

Zinke Co., 1326 S. DuSable Ave



\$129.00

Console with Cone Loud Speaker; Above, Rear View, Showing Battery Compartment and Cone with Sounding Board Removed

Console Front Is Cone Speaker

An attractive console with a 22-in. cone loud speaker and sounding board forming the front of the cabinet represents a new note in design. The speaker with its spruce sounding board may be quickly removed to permit access to the batteries and charger, as shown in the inset at the upper right. The rear view, at the left, shows the battery compartment. Ample room is provided for accessories, and the back is left open to provide good circulation around the batteries. This unusual combination is pleasing in appearance, and the tone of the speaker is said to be exceptionally good.

Potentiometer for R.F. Tube Control

To control the oscillating tendencies of the r.f. tube, a potentiometer offers a method that is advised unless some other form of control is provided. The potentiometer should be placed across the A-battery, and the movable arm put in the grid circuit of the first tube. If the negative return of this tube is connected to the ground, it should be removed before the potentiometer is put into the circuit.

net agent

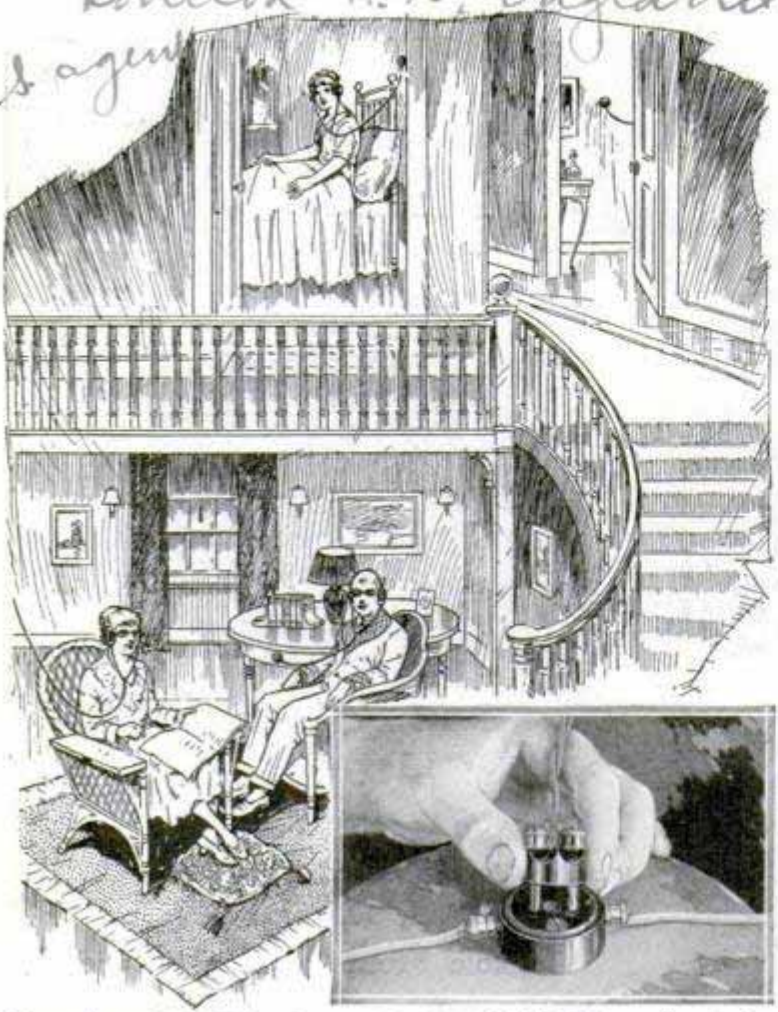


Photo Shows Plug Being Inserted in Jack, While Illustration Indicates a Variety of Applications in the Home

Radio Jack for Inter-Room Connections

The new radio jack, of English origin, shown in the illustration has many useful applications. With it, a loud speaker or phones can be installed in any room in the house. The plug is so designed that the connecting of another speaker or pair of phones does not interfere with any others that may be in use at the same time. It consists of two parts, a circular base and an adapter fitted with two pins. The former is of hard rubber and provided with two brass pins, the ends of which carry terminal nuts. One pin is fixed, while the other may be slid in or out for a fraction of an inch, and behind the sliding pin lies a small spiral spring capable of

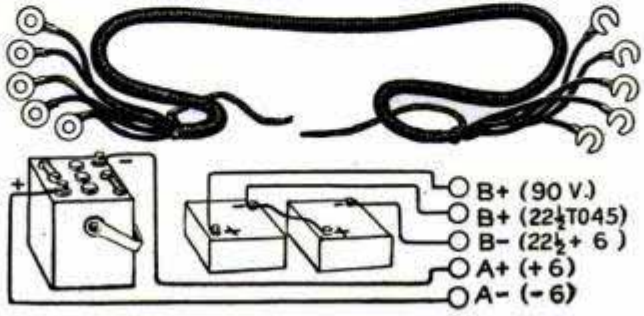
exerting a pressure of seven pounds. When the plug is withdrawn, the spring forces the moving pin against the fixed pin, closing the circuit and shorting out the jack. When the plug is inserted in the jack, the pin is forced out, and the current from the set takes the path through the additional phones or loud speakers. The jacks may be mounted under tables, in cupboards or on the wall, and the connecting wires hidden. Small jacks of the same type may be mounted on the sub-panel of a radio set, wherever a lead is to be broken occasionally. For instance, they may be included in plate leads of tubes, to permit a milliammeter to be inserted, or they may be used as lightning arresters and aerial connectors.

Choke Coil for Reducing Squeals

A regenerative set subject to howls and squeals can often be materially improved by the addition of a choke coil placed in series with the primary of the first a.f. transformer. The lead from the plate of the detector tube to the P-post on the a.f. transformer can easily be traced, and it is a matter of a very few minutes to install the choke coil. These choke coils can be purchased or made by winding from 150 to 200 turns of No. 30 s.c. wire on a bakelite or cardboard form, 1 in. in diameter.

Battery Cable Simplifies Wiring

Battery cables with various-colored leads greatly simplify wiring, the colored leads acting as guides to reduce the risk of error. These battery cables can be obtained in 5-ft. lengths, with five covered leads enclosed in one fabric. They are provided with five lugs or three lugs and two storage battery clips.



Battery Cable with Five Colored Leads, and Diagram Showing Battery Connections

Deley Products Co.
199 Lafayette St.

802-3

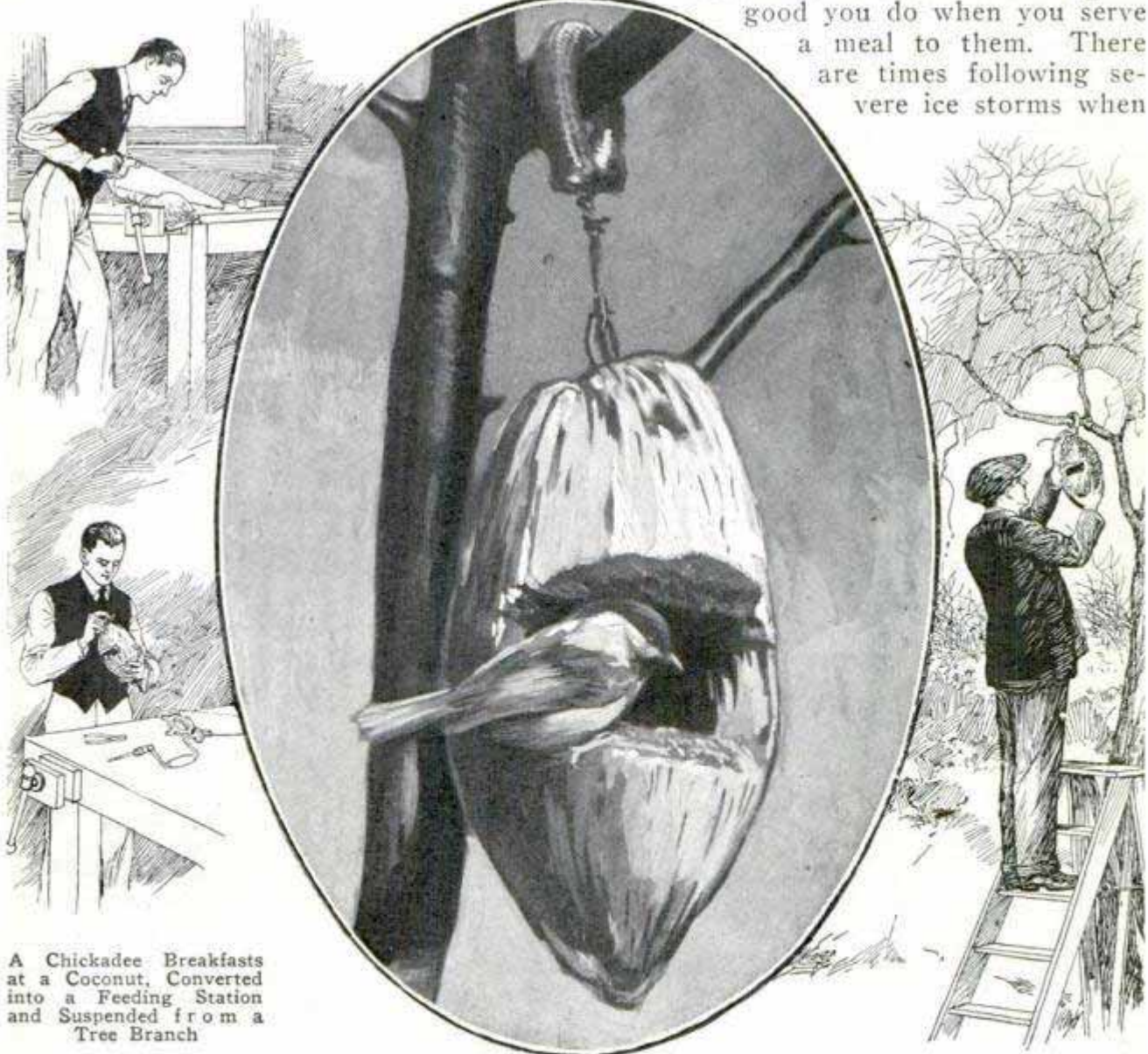


Feeding Stations for the Birds

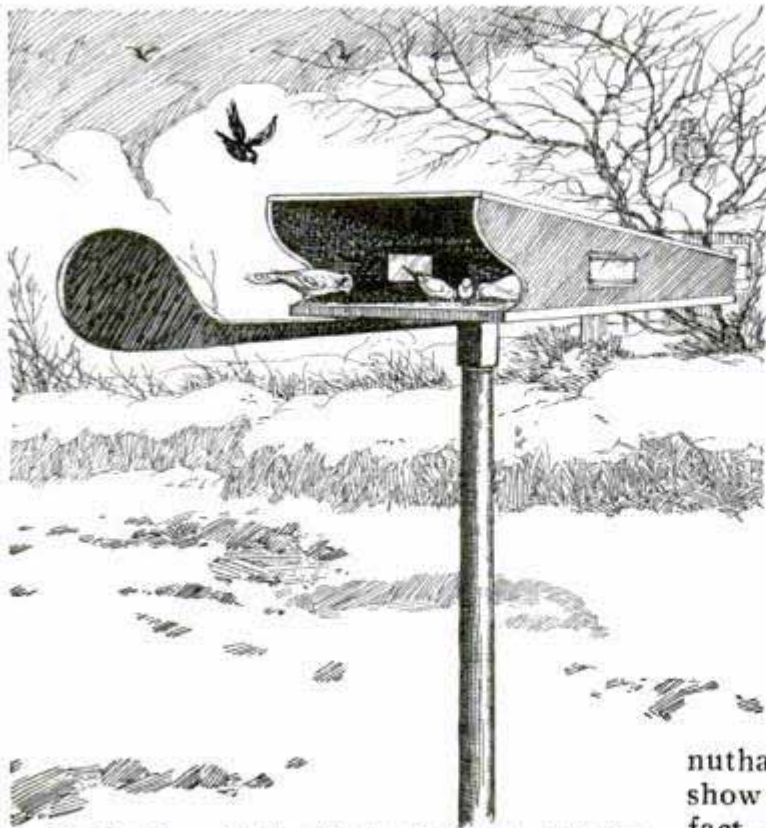
By BOB BECKER

AMONG winter pastimes that grow in popularity with adults and youngsters, operating a "bird cafeteria" is gradually forging to the front because of the genuine amusement the outdoor-restaurant owner enjoys. When winter comes,

our feathered friends can be induced to stay around the backyard or orchard of a suburban dwelling, or kept close to the barnyard of the farm, by the establishment of feeding stations to which the hungry birds come for food. Quite aside from the amusement feature is the great good you do when you serve a meal to them. There are times following severe ice storms when



A Chickadee Breakfasts at a Coconut, Converted into a Feeding Station and Suspended from a Tree Branch



A Weather-Vane Feeding Station Is Easily Made by Any Boy, and Provides Constant Protection for Both the Food and the Birds

a handful of grain means the difference between life and death to such a bird as the bobwhite or quail.

The simplest kind of feeding station is an inexpensive suet holder. Beef or mutton suet is the cheapest and best food for insect-eating winter birds. It does not freeze or spoil, produces a lot of heat and is nourishing. The clownish bluejay, the little black-capped chickadee who sings ever so cheerily even on the coldest days, the red-headed woodpecker, the screech owl, the nuthatch, known as the "upside-down bird," the downy woodpecker, and many other birds, are fond of ordinary suet. If you put out a few chunks of this inexpensive but highly appreciated food this winter, you will be surprised at the number of birds that will visit you daily.

You can make a suet holder at home. Take a piece of $\frac{1}{2}$ -in. netting and make a holder 6 in. wide, 8 in. high and 2 in. deep. If some of the wires at the corners stick out, so much the better. Your feathered boarders will perch on these as they get a square meal. Nail this holder to a flat board about 3 in. wide, and tack a piece of old leather, tin or a strip of rubber from an old inner tube, over it as a cover. Anything that will shed rain and snow will do.

Attach the holder to the south side of a tree. If there is a tree close to a sitting-room window, put it there, and you will have lots of fun watching the birds.

An even simpler method of bringing the birds close to you is the following: Buy a piece of suet, about one pound in weight, and tie it to a branch or to a tree trunk in your yard. If you use just one or two loops of twine the larger birds will soon make away with the lump, so it is best to crisscross the pieces several times with stout cord. If you would like to see a little winter circus with birds doing acrobatic stunts, such as standing on their heads, etc., fasten a chunk to the underside of a branch. The chickadees,

nuthatches and woodpeckers will put on a show for you when they come to it. In fact, you will see the nuthatch do all kinds of upside-down tricks as he pecks away at the suet to get a square meal.

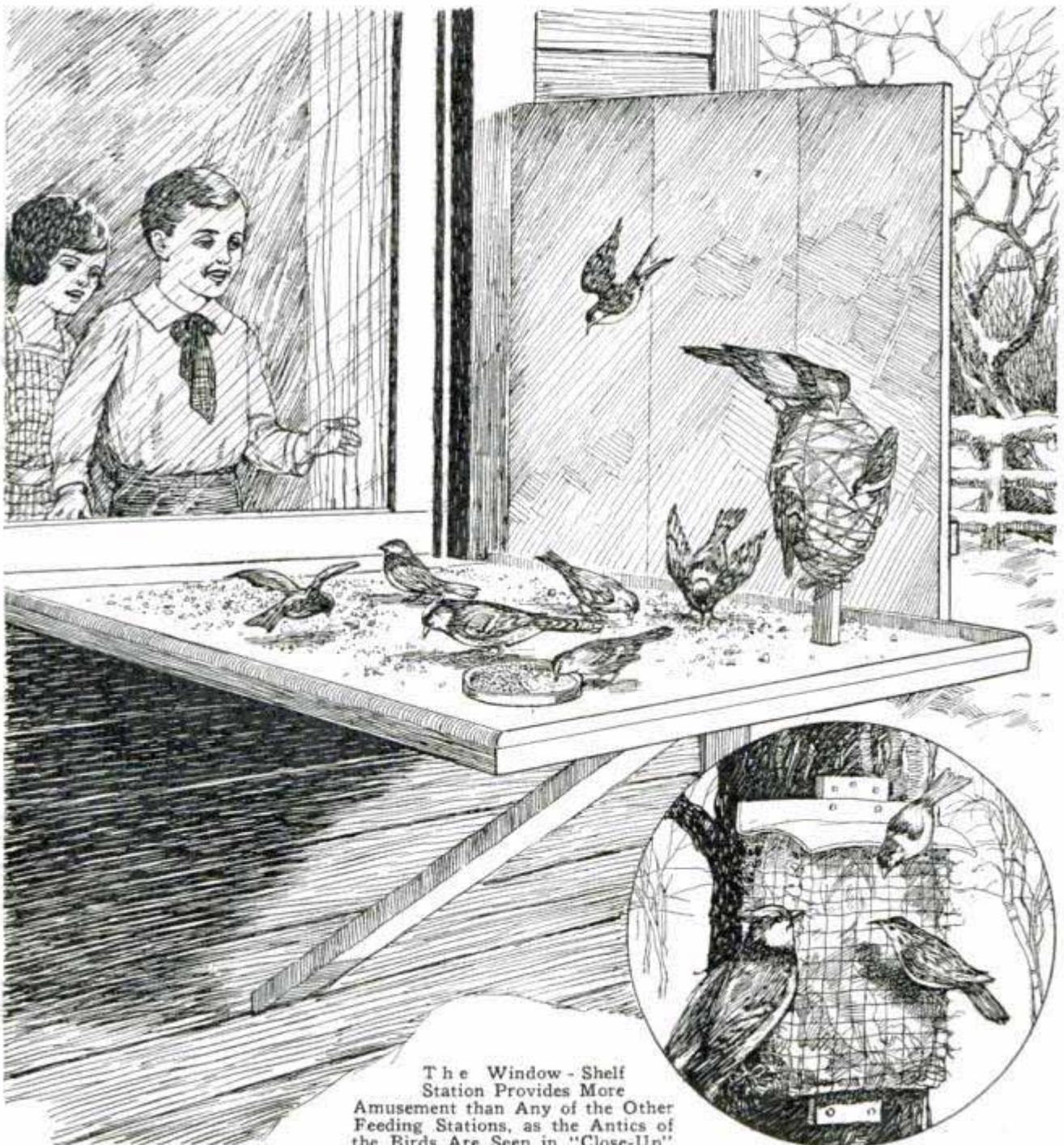
A few minutes' work some evening will make a simple yet efficient food counter for the home, one to which a number of birds usually can be attracted. One or two boards, two or more pieces of lath or old molding, a few nails and a couple of squares of old mosquito netting are needed to make this simple food shelf. Cut your boards to between 14 and 16 in. long. You will want about a 12-in. width for your shelf. To prevent strong winds from blowing the food away, tack a piece of molding or lath around its edges. Three small holes, covered with netting, in the bottom of the shelf will serve as drains to keep the cafeteria free from water. When completed, fasten the counter to a tree near a window, to a corner of the house, or to one end of a window sill. If possible, locate it on the south side of the house. The shelf can be made more sheltered by nailing a vertical board to one or both ends.

Now you are ready to serve meals and here are some tips on "which foods for which birds." The attraction of suet has already been noted. Stock one side of the shelf with suet and bread or dog-biscuit crumbs. The cardinal, or redbird, likes crumbs. Many of these handsome song-

sters winter in the north and can be attracted to a food counter. The brown creeper, the bluejay, the junco, the mocking bird, chickadee and crow have been known to eat crumbs. Hemp seed, chaff, cracked corn, oats, canary seed, buckwheat, broken nuts, millet seed, puffed wheat or rice, rolled oats (the kind you eat as oatmeal for breakfast), sunflower seeds and fat pork are other foods eagerly eaten by various birds which, in different parts of the country, may choose to stay around all winter.

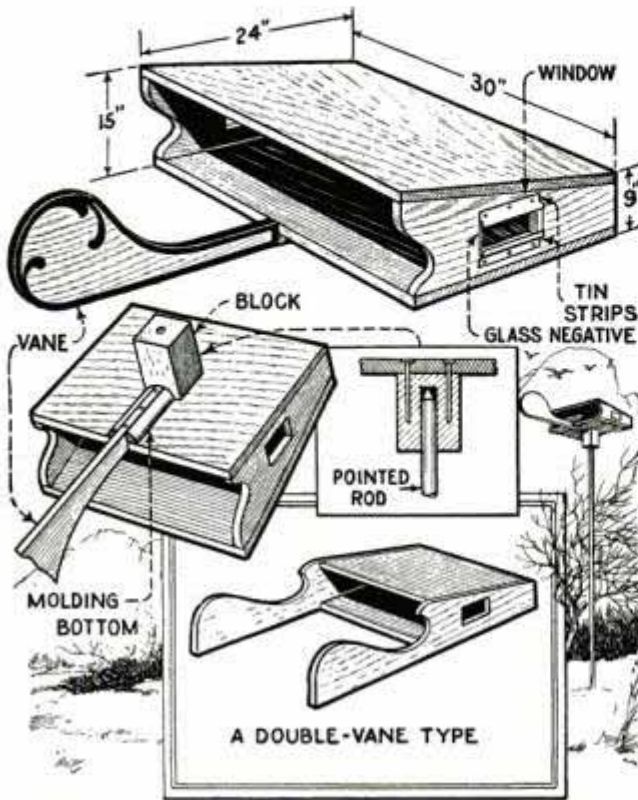
One of the neatest and most decorative bird cafeterias that you can establish in

your yard is made from a coconut. Buy one or more nuts that are dried out (they are not expensive) and proceed as follows: First, cut a small hole in the side of the nut. This may be of any size. If you want large birds to be your boarders cut a hole that will let them get their heads in. If you want to attract only the chickadees and nuthatches make the hole not more than $2\frac{1}{2}$ or 3 in. in diameter. Into the top of the nut put a screw eye, attach a piece of wire or stout cord to the eye and suspend the coconut from a limb of a tree in an accessible position, so that you can easily fill the interior with foods



The Window - Shelf Station Provides More Amusement than Any of the Other Feeding Stations, as the Antics of the Birds Are Seen in "Close-Up"

for your bird guests. Chopped suet with peanuts or other food admixture is the bill of fare suggested for this coconut restaurant.



Constructional Details of Two Types of Weather-Vane Feeding Stations

Another way to rig up a coconut is to bore a small hole in one of its ends, wrap wire mesh around it, fasten a piece of stovepipe or other wire to the mesh and then suspend the nut from a branch near the house or from the porch. If possible place your station near a window so that you can watch your feathered guests. The wire mesh around the nut is rather desirable, as it gives the birds a good purchase on the nut when they alight on it.

For large gardens, farmers' orchards or estates, the weather-vane feeding station is a serviceable and very popular type. Any adult or boy handy with a saw and hammer can make one of these. The idea behind the weather-vane feature is to have a feeding place that swings with the wind, thus providing shelter for the birds as well as for the food.

Here is the way to make one of these weather-vane feeding stations so that it will be not only efficient but attractive. Take some $\frac{1}{2}$ -in. boards and construct a three-sided box, 24 to 30 in. long, 16 to 24 in. wide and 15 in. high at the open side. Let the top slope back so that it

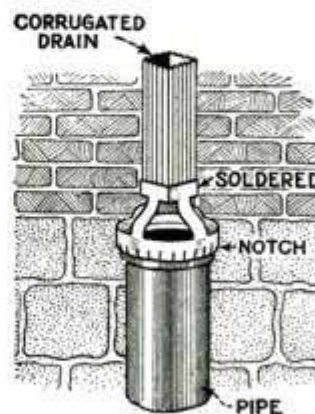
will be only 8 or 9 in. high at the rear of the box. For the floor use a fairly heavy board, as you want to nail a couple of weather vanes to it. In making the vanes you can devise all sorts of artistic designs to obtain an ornamental and attractive effect, but do not make them less than 2 ft. in length. The ends should be 8 to 10 in. wide, to make the whole swing easily in the wind.

The weather-vane station should be set upon a pole reaching 5 to 6 ft. above the ground. At this height the food counter is safe from neighborhood cats. One of the simplest ways to pivot the feeding station is to bore a hole in the center of the bottom of the box and also into the center of the pole. Make this just a trifle larger than the biggest spike that you can buy. Grease the spike, drop it into the hole, and you have a center pivot which will allow the station to swing as the wind blows. Another way is shown in the drawing.

Probably the most attractive and by far the most entertaining method of feeding birds during the winter months is to lure them to a window shelf. It means a three-ring circus for most any winter day, and the home owner can sit in a comfortable chair inside the house and watch the fun. Another advantage of luring winter birds to a window shelf is that crows won't be among those present. The black rascal refuses to get chummy in this manner.

Improving the Rain Spout

During the winter months perpendicular rain spouts are often weighted with ice and wall anchors are not always strong enough to hold the weight. After a spout had fallen twice in one winter, we hit on the plan shown in the illustration. Usually the spout is cut and swaged at the lower end where it enters

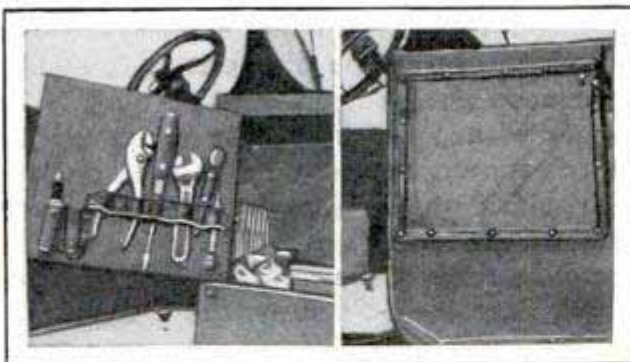


the cast-iron or tile soil pipe. This arrangement allows the latter pipe to settle

and draw away from the gutter, throwing all of the weight of the pipe and ice on the wall anchors. To overcome this, we designed a bell flange, or collar, which was soldered to the outside of the spout and then flanged around the bell of the soil pipe. This gives more support and rigidity to the whole structure and thus will prevent further trouble from this cause.—O. S. Sprout, Lancaster, Pa.

Convenient Tool Chest for Auto

Finding it annoying to have to dig under the back seat every time I needed a small wrench, screwdriver or pliers, I put a tool compartment rack on the door of my car. I pulled off the lining of the front door and cut away the upper half of the metal lining. Then I made a little door of three-ply veneer to fit this opening, covered it with a piece of top material and finished it with some binding tape and black-headed upholstery tacks. On the inside of the door I made leather loops for the tire gauge, a pair of pliers, two screwdrivers, a small crescent wrench and a platinum file. In the pocket part of the door I keep a canvas water bucket, a parts catalog, a celluloid glare shield, extra valve cores and some coil points. The covering of the tool door is tacked onto the frame of the car door, thus completely concealing the



Compartment in Front Door of Auto Makes Tools Easily Accessible

hinges. There is a little button at the right, near the top, to keep it closed.—H. J. Blacklidge, Tucson, Ariz.

☐ Before putting on a tire casing, wipe it carefully with a moist rag to insure that the inner tube will not be damaged by dirt or sand lodged in the casing.

Lads Make Their Own Ice Skates

Santa Claus had failed to furnish skates for these boys, so they decided to make them themselves. They proved their in-

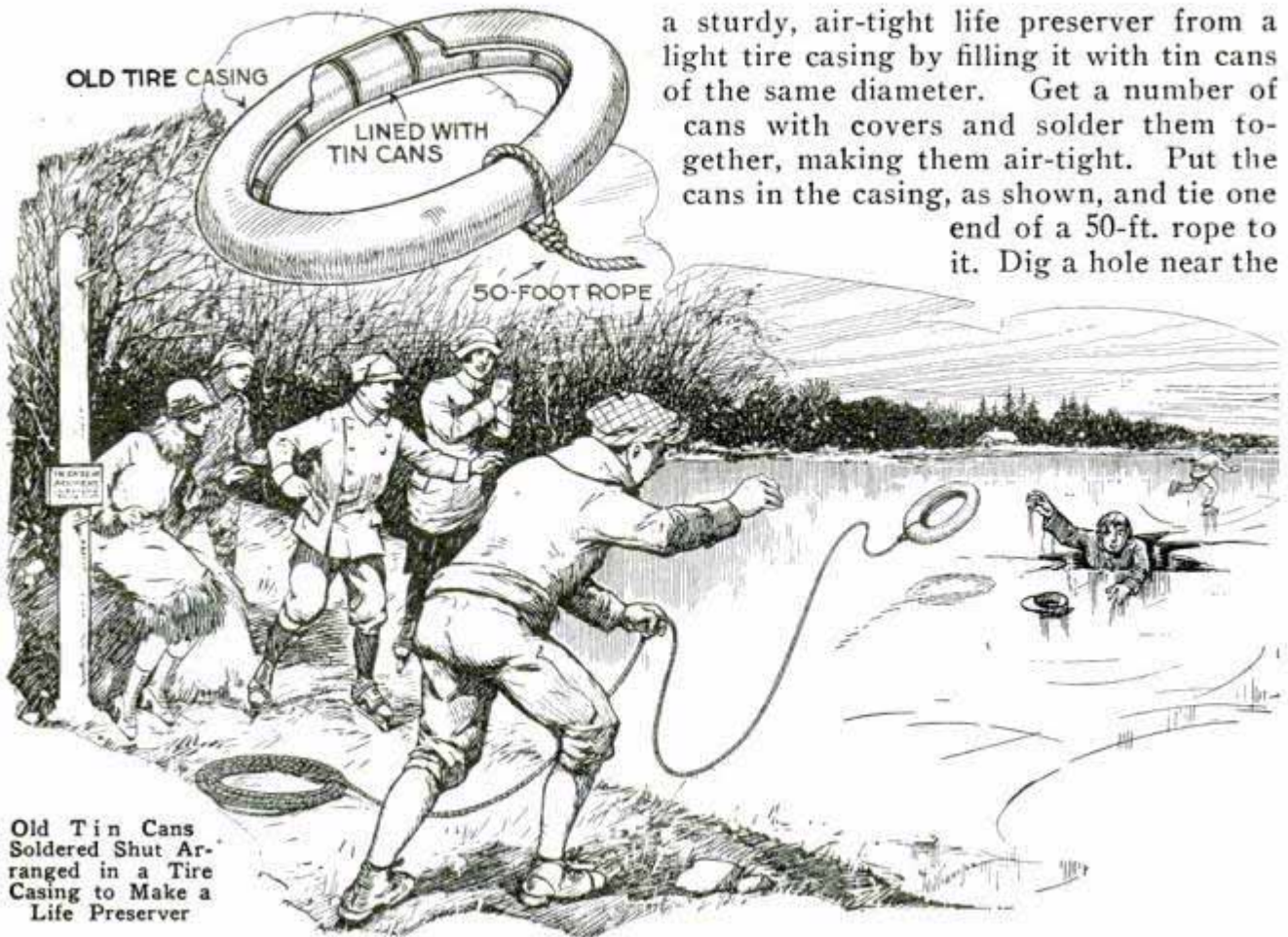


Lads Make Their Own Skates from Pieces of Firewood and Lengths of Wire

genuity by getting some wire barrel hoops, a few pieces of firewood and some string, and from these they fashioned the skates, which proved satisfactory and serviceable. The wood was whittled down to the approximate size of their feet and the front rounded, as shown in the photo. A shallow groove was cut along the edge to receive the wire, which was securely stapled on at the top and back. The wire was filed to a triangular form to prevent the skates from slipping sideways.

Testing Contact of Charging Clips

A pocket voltmeter with the terminals marked is useful when charging storage batteries at home with a small portable charger. The voltage is taken on the clips while the charger is going, and if much higher than the usual voltage of the battery, indicates a poor contact of the clips with battery terminals. Cleaning of the clips and terminals will bring down the voltage unless the battery is badly run down, when it may have a high resistance for a time, until the coating is removed from the plates. The voltmeter is also useful to show which terminal is positive if the markings are worn off.—E. T. Gunderson, Jr., Humboldt, Iowa.



Old Tin Cans Soldered Shut Arranged in a Tire Casing to Make a Life Preserver

a sturdy, air-tight life preserver from a light tire casing by filling it with tin cans of the same diameter. Get a number of cans with covers and solder them together, making them air-tight. Put the cans in the casing, as shown, and tie one end of a 50-ft. rope to it. Dig a hole near the

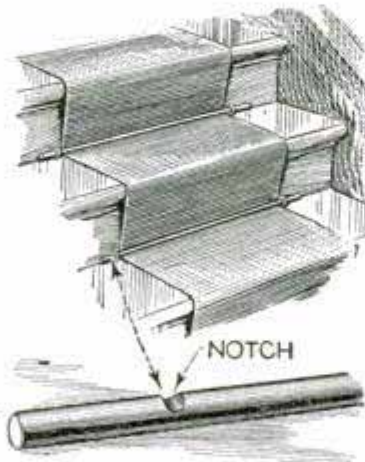
Life Preserver for the Skating Pond

Whether you skate on a small pond or a large lake, you should have a life preserver hung upon a post near the edge of the ice in case of accident. You can make

edge of the lake and set up a tall post, with its top well out of the way of curious youngsters. Drive a spike near the top of the post and another one a few feet lower down. Then place the tire over the top nail and coil the rope on the other one.

Non-Slipping Stair-Carpet Rods

If metal rods are used to hold a stair carpet in position it will be found that they have an annoying tendency to slip out of the eyes. This can be prevented by filing a notch in each, as shown in the drawing. If screweyes or clips are used to hold the rods, the latter will be forced against the former by the carpet, the notches registering with the clips, so that



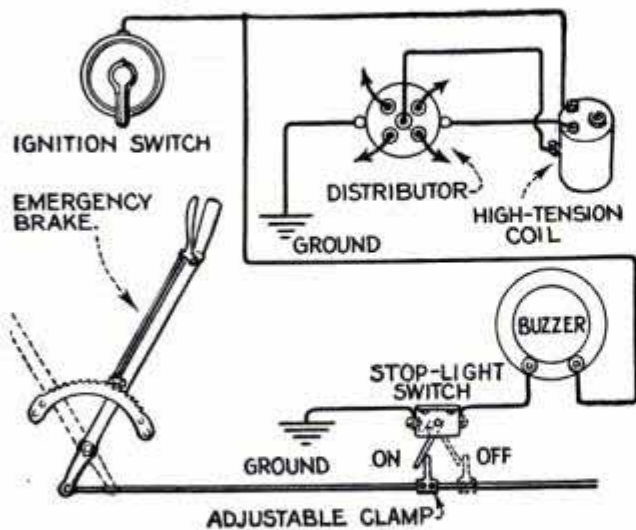
the rod cannot slip out sideways. The notch need only be filed out at one side, and need not be deep. It can quickly be made with a flat file. The width of the notch should be about $\frac{1}{16}$ in. greater than the width of the screweye. To remove the rod the latter is pressed down until the notch is clear of the screweye.—C. A. Oldroyd, Barrow-in-Furness, Eng.

Buzzer Arranged to Prevent Running with Emergency Brakes On

Motorists, especially beginners, sometimes forget to release the emergency brakes when starting and their attention is not called to this fact until they smell burning paint and brake lining. But it is then too late, as the brakes will have to be readjusted or relined, which is expensive in any case, and annoying because of the

delay of having them fixed. A buzzer and switch, in combination with the emergency brake and ignition system, can easily be wired so that, when the emergency brakes are on, the buzzer will give warning as soon as the ignition is turned on, and cease sounding the moment the brakes are released. The materials necessary for this installation are a door buzzer, a stop-light switch and some insulated wire, which can be purchased at any accessory house. Fasten the switch under the car in a suitable position, or according to the directions that accompany it, to connect with the adjustable clamp on the emergency brake rod, as shown, so that when the brakes are on the switch will be thrown in. The buzzer can be fastened anywhere on the dash behind the instrument board. Connect, or ground, one side of the switch to the frame of the car and the other side to the buzzer terminal. Connect the other terminal of the buzzer to the wire that leads from the ignition switch to the high-tension coil, or the terminal on the coil that this wire connects to.

This done, everything should be in working order, and the buzzer will give warning as soon as the ignition switch is turned on, provided the emergency brakes



Buzzer Sounds Warning That Emergency Brake Is On When Starting Car

are on and the stop-light switch has been so adjusted that it is closed.—Francis G. Le Merle, Washington, D. C.



Whirling Clown Amuses Children

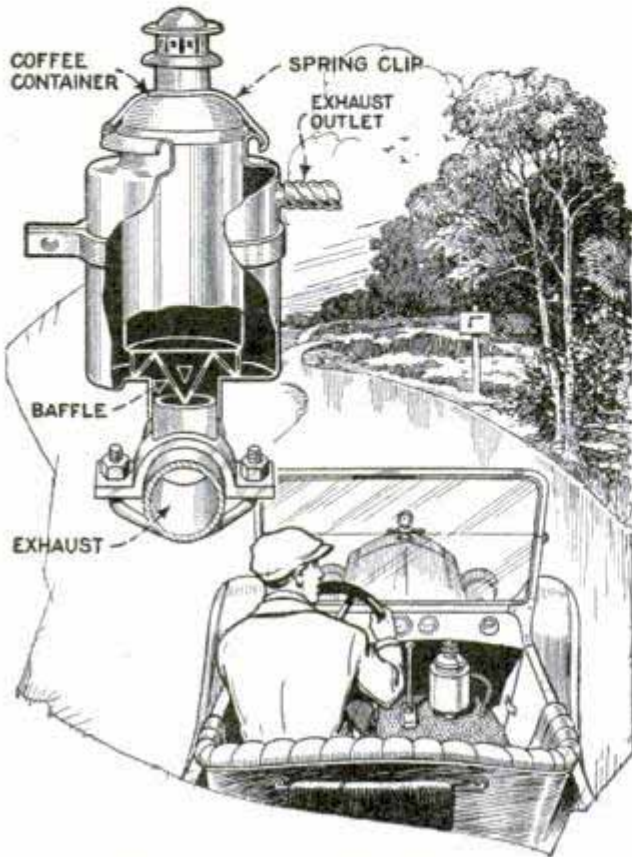
By pulling a string, a small figure of a clown, made of wood, can be whirled back and forth rapidly. A slat, cut from a piece of cigar-box wood, serves as a base and a peg is provided in the center for a spool to rotate on. At one end, a rubber band is fastened by means of a staple or screweye, and a length of cord is attached to the rubber band, looped around the spool and then passed through two staples, as indicated in the drawing. The clown also is cut out of cigar-box wood, painted suitably and attached to the top of the spool. Pulling the cord causes the spool and the clown to turn in one direction and releasing the cord allows the rubber band to contract, making the spool turn in the opposite direction.—E. F. Gustafson, Chicago, Ill.

Retouching Scuffed Places on Furniture

Mix a little color with turpentine to the same shade as the surrounding surface. Dip the end of your finger in shellac and touch the scuffed spot. Then immediately dip your finger in the color and apply it on the shellac. This will dry in a short time and the color will remain. When all the spots have been thus attended to, shellac, varnish or polish in the usual way.—Francis W. Henry, Pottsville, Pa.

Exhaust-Heater Coffee Pot for the Car

Hot, fresh coffee is invigorating on an auto trip so I made an exhaust-heated



Exhaust Heater Mounted under Dashboard Is Handy for Making Coffee on Long Trips

coffee pot for my car. A hole was cut in the exhaust pipe just ahead of the dash and a regular cut-out, with the valve removed, was attached just above the hole. A tinner made the outside retainer to fit a standard metal jar. The retainer was provided with a neck underneath to fit over the open cut-out, to permit entrance of the exhaust gas. A hole was drilled in the side near the top, a short nipple was soldered over it and a length of flexible, metallic hose was attached to provide an outlet for the exhaust. The top of the retainer was provided with a spring clip to hold the jar securely. Within the retainer, at the bottom, I had a concentric conical member, which served to deaden the effect of the exhaust both as to noise and pressure on the jar. Ports were cut through this piece so that the exhaust gases could readily pass through it and around the jar but not directly against it. The retainer was fastened to the car by means of a strap-iron bracket. Besides making coffee, one can boil eggs and cook soup, etc.,

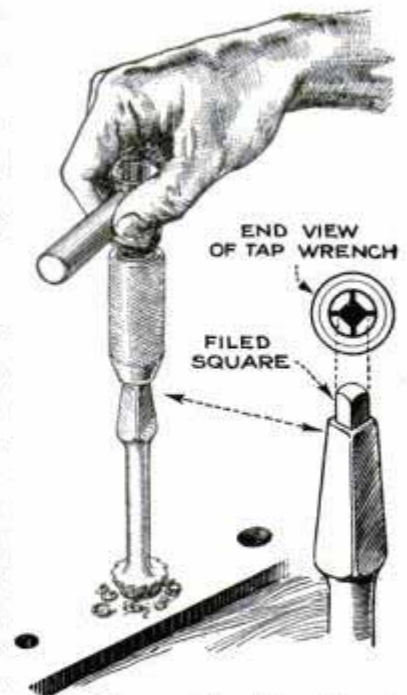
in this device. It will prove a boon on long trips, picnics, and the like.—C. C. Hermann, Moline, Ill.

Care of Knives and Forks

Silver knives and forks often have separate handles and pouring hot water over them when washing will cause the handles to loosen on the shanks. This can easily be repaired without going to the expense of taking them to the jeweler or some other party doing this kind of work. Heat the handles carefully without direct contact with fire and remove all the material which the handle holds. Then prepare a mixture consisting of beeswax, $\frac{1}{4}$ lb.; plaster of paris, $\frac{1}{4}$ lb., and rosin, 1 lb. Melt these ingredients together and fill the hole in the handles with the mixture. Before the handle cools insert the shank, being careful that it is in alignment so that the job will not have to be done over. The mixture can be put aside and used again, reheating it each time. It is inexpensive and easy to make so that this method offers a convenient and economical means of repairing and keeping the knives and forks in good shape all the time.—L. H. Georger, Buffalo, N. Y.

Tap Wrench Holds Countersink

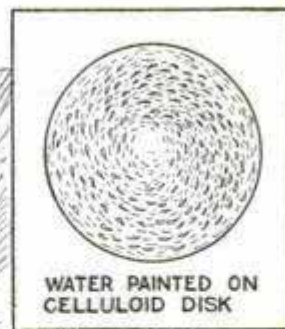
When drilling holes in wood, it is inconvenient to change often from a bit to a countersink if both are used. If the countersink butt is squared with a file, as shown in the drawing, it may be fastened in a tap wrench, and can then be handled with much more convenience and does not have to be put in the chuck of the brace each time.—Richard C. Tarr, Gloucester, Mass.



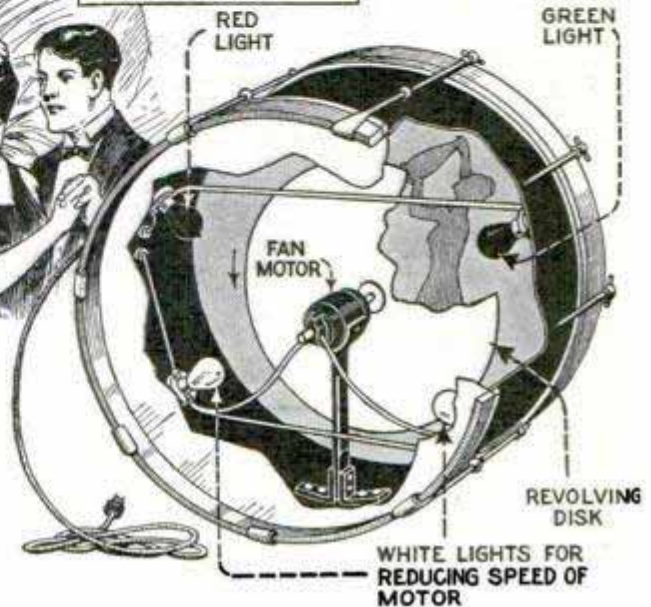


Increasing Jazz Effect of Drum

Jazz for the eye as well as for the ear is the idea of a drummer in a jazz orchestra, who has embodied his plan in a drum that displays a "moving" picture. He had a scene painted on the drumhead to represent a woman pouring water from a vase and, when the device is operating, it seems as if the water actually flowed. The effect was obtained by means of a revolving disk of celluloid, painted as indicated. The disk is driven by means of a fan motor, which is wired in series with two small electric-light bulbs. These serve the double purpose of reducing the speed of the motor and furnishing illumination. Two additional colored lights operated by a small thermo-static sign flasher intensify the effect of motion and color. The motor and disk are supported on a wooden post attached to the shell of the drum by means of two brass angle brackets. A length of flexible cord with a plug attached is connected to the motor, so that it is



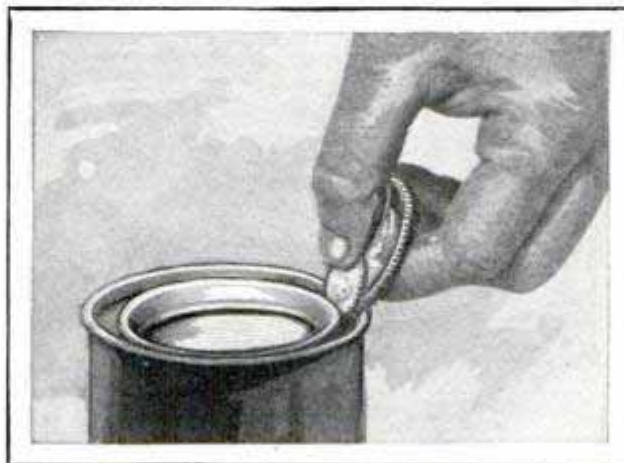
Drummer Intensifies Effect of Orchestra's Jazz Music by Realistic Display of Moving Water Poured from a Jug and Intermittent Flashes of Colored Lights



possible to plug in at any convenient socket. So realistic is the effect of this simple device that, when it was tried out at several fraternity dances, much sport was had in holding punch glasses near the figure in the scene as if getting some of the water.—H. N. Loeb, Cincinnati, Ohio.

Dollar-and-Dime Can Opener

Next time you have to open a can having a friction cover, take a silver dollar and a dime and pry off the cover as shown. The dollar gives enough leverage in the right place and the dime is slipped under the cover to raise it easily. You will save time, patience, a knife blade and also avoid the possibility of cutting yourself.—F. Bentley, Missouri Valley, Iowa.



Method of Opening Can by Using a Dollar and a Dime as a Lever

Runners for the Motorcycle

During the winter months of continuous snow, near Lake Superior, it is often

attached to the axle. In order to provide traction, it is, of course, necessary to use a skid chain on the rear wheel.—J. H. Deniston, Bayfield, Wis.



Provision of Runners on Motorcycle Permits Travel through Heavy Snow

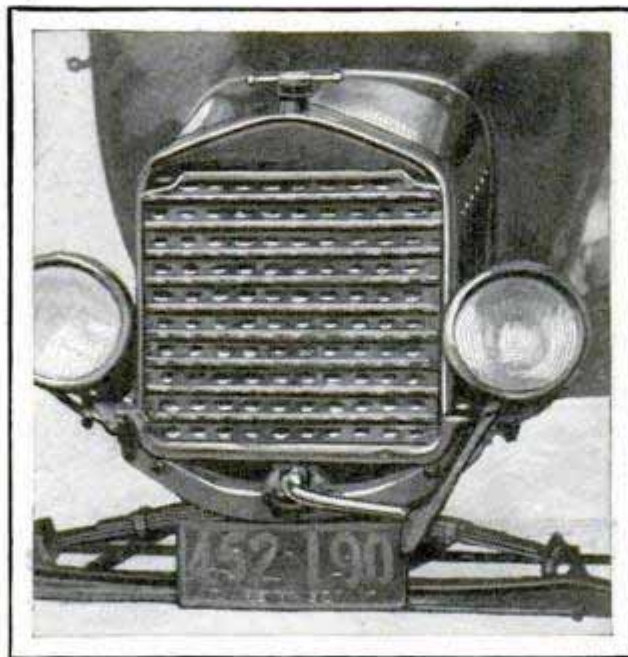
impossible to travel with autos. A doctor must, however, make his calls and as a horse and cutter are too slow, one doctor adapted his motorcycle to the snow-covered roads by the addition of runners, as shown in the photo. The front runner is made from an old wagon tire, 4 in. wide and 36 in. long. A 10-in. section at the front and a 3-in. section at the rear are curved upward. The runner is fastened to a 2-ft. length of 4 by 4-in. wood, gouged out to fit the tire, and the wheel is attached to the runner by means of clamps, shaped to fit around the rim and held in place with bolts. The runner is attached when the tire is partly deflated so that there will be a very tight fit when the tire is pumped up. The sidecar wheel is removed and a runner is provided. It is also made from a 36-in. length of old wagon tire, 2 in. wide, and is supported by a U-brace

How to Stencil Neatly

With painted and lacquered furniture quite the vogue at the present time, the following method for applying stencils will be helpful for the home worker. Cut any size or design suitable from light tag or two-ply bristol board. Fasten it to the work with four 2-oz. tacks to hold the stencil in place. Then, with a soft printers' roller, well inked, go over the stencil, applying pressure enough to make sure that the ink comes into the small corners. In removing the stencil care should be taken, when withdrawing tacks and lifting stencil, that the ink is not touched, and you will have a neat, clean-cut design, without hairy or fuzzy edges. The ink will dry as quickly as ordinary paint. If desired, a light coat of varnish may be applied over the design when dry.

Shield Keeps Auto Engine Warm

It is necessary that your Ford be kept warm on cold days if you are using it. This can be done by obtaining a piece of



Radiator Cover for Cold Weather Can Be Made from Metal Lath

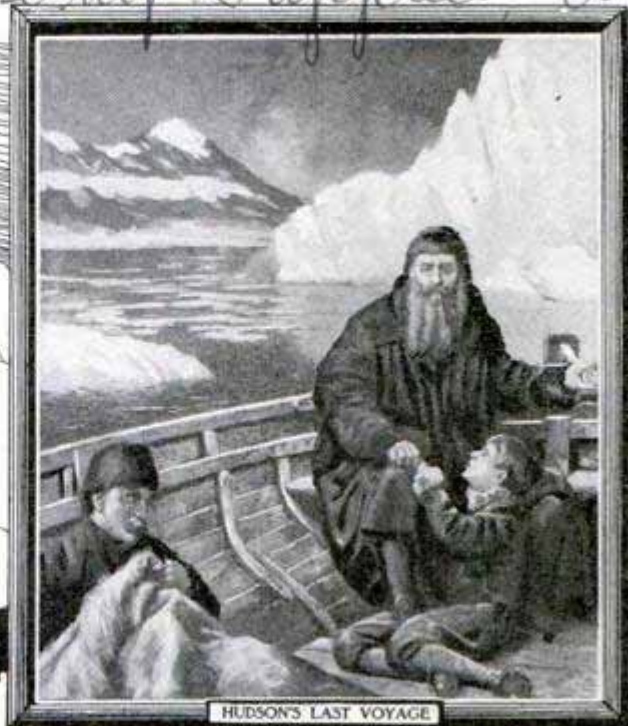
metal lath of the kind shown in the photo, cutting it to fit over the front of the radiator and attaching it with a couple of stove bolts. This, when painted black, will have the appearance of a winter front that has been purchased at some accessory store and will answer the purpose almost as well. It allows enough air to enter but the engine cannot overheat on a cold day.

Shipping Dept. Fore and aft.
 Huntington, NY
 Model Ship Supplies Box 613,
 Freeida
 NY.

BUILD YOUR OWN SHIP MODEL



by J. Earle Miller



After Painting by John Collier

Parts 1, 2, 3 and 4 appeared in the October, November, December, 1926, and January, 1927, issues

YOU are now ready for the job of fitting the running rigging, and for this 84 blocks are required, of the size shown in one of the drawings in the preceding article. They can be obtained from the model-supply house. Department stores sell hard wooden beads, about $\frac{1}{8}$ in. in diameter, and these can be made into very effective blocks; they require to be flattened on two sides and trimmed to shape, as shown in the drawings, and this means patient work, but it will save some money. Another way to make them is to get a cheap folding rule, in the ten-cent store, cut it into strips and make the blocks from these. Be sure the rule is made of boxwood. The strapped blocks have a fine wire twisted around them, in the "score" on the sides, some with a hook on top, and some with a hook on top and an eye at the bottom. Examination of the enlarged sketch of the lift block in one of the drawings will make this clear.

The first step is to attach the yards and the lifts, the latter being the tackle by means of which the yards are raised and lowered. The yard is held to the mast by means of a wire "parrel" (shown in the top left-hand corner of illustration on page 322), one ring of the wire embracing the mast and another the yard. The lifts of the main and fore lower yards are fitted in the same manner. Number 60 holes are

drilled through the yardarms, just inside the black tips, and an eye, made of fine wire, fastened through the holes, the eye being on top of the yard. Hook a block in the eye, then fasten another block to an eye on the cap of the lower mast and attach the end of a length of button thread to the eye on the bottom of the strap. The button thread may be black, but it is better to use the light-tan thread sold in the ten-cent store, as it is more nearly the color of the actual rope. The end of the thread is now passed through the block on the yardarm, from the bottom to the top, then around the block hooked to the cap of the lower mast, and passed through the lubbers' hole to the deck; the part that leads on to the deck is the halyard, and the main-yard halyard is passed through one of the holes in "Noah," around the windlass and belayed, or made fast, to the bollard. The foreyard halyards are belayed to pins driven through the lower mast about $\frac{3}{4}$ in. above the deck. Remember that in most of the drawings only the rigging on one side of the yards is shown, and that the other side is rigged in exactly the same manner. The rigging on the model, while following very closely the original, has been simplified to a certain extent, as it is almost an endless task to build a model of this size exactly to scale in every respect.

Better to buy blocks plain and put

blocks are cheaper

The lifts and halyards for the fore and maintopsail yards are fitted in the same way, but the lift for the lateen yard on the mizzen is single, and attached at the center of the yard, the upper block being hooked into the end of a short length of thread—a pendant—fastened just under the mizzen top, and the halyard belayed at the starboard pin rail.

Very neat brass belaying pins can be obtained from the model-supply houses, but a short length of an ordinary pin, driven through the hole in the pin rail and projecting $\frac{1}{4}$ in. above and below it, will answer just as well. The ends of the lines should be belayed to these in the form of a figure eight, not simply wound around them; a drop of shellac keeps them from coming free. Owing to the difficulty of getting the hands among the rigging, all lines should be cut about 1 ft. longer than necessary. Take an 8-in. length of $\frac{1}{8}$ -in. wire, grind the ends down to about $\frac{1}{32}$ in. for a distance of 1 or 2 in., and then form a small eye on one end and a hook on the other. By threading the end of the thread through the eye, then holding the end in one hand, so as to keep it taut, and the wire in the other, it is possible, working from the opposite side of the model, to belay the ends without difficulty.

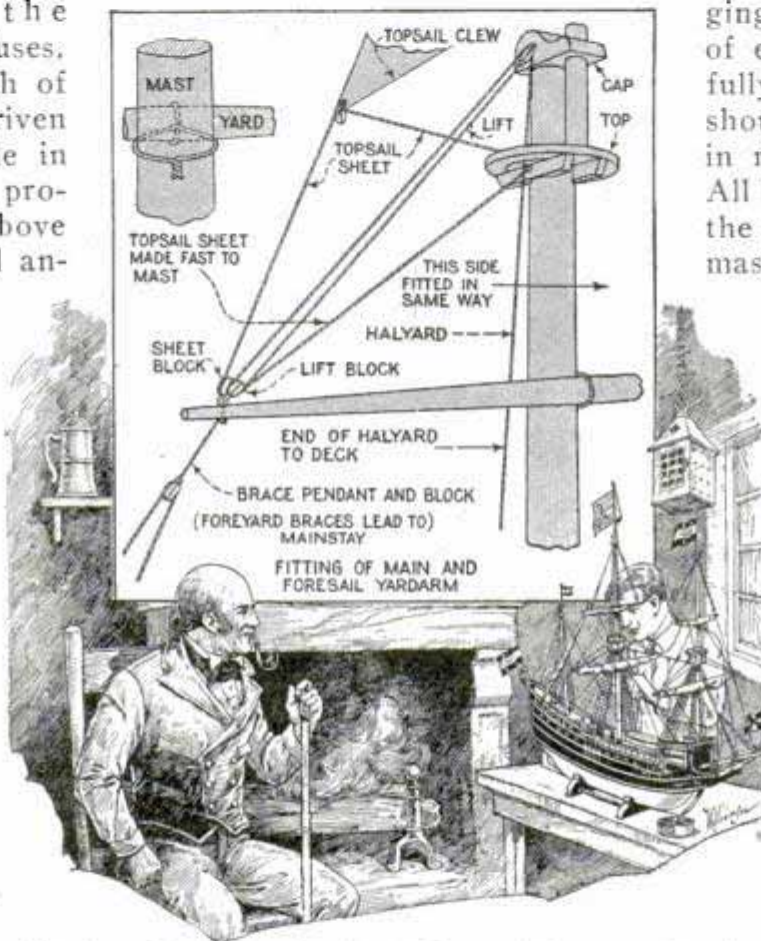
The lateen yard hangs at an angle of 45° to the yard, and is fitted with a peak halyard at the upper (the left or port) yardarm. This is attached by means of a crowfoot, as shown, and a euphroe can be used instead of a block for the latter. This fitting simply consists of a thin sliver of

boxwood, drilled for the crowfoot threads and the end of the halyard. The other end of the halyard runs through a block under the maintopmast cap, then down to a block about 2 in. away from the mast. From an eye on the starboard side of the quarterdeck rail, a length of thread runs around this block, and then back to the quarterdeck pin rail, where it is made fast.

The drawings show all details of the rigging, and if the lead

of each rope is carefully studied, there should be no trouble in rigging the model. All lines leading from the fore and maintop-

masts straight down to the deck go through the lubbers' holes in the tops. Do not set up any of the lines on one side too taut until the corresponding line on the other side has been rigged, otherwise the trim of the yards will suffer. The spritsail yard, on the bowsprit, is parreled to the latter in the same manner



Wire Parrel for Yards; Details of "Dummy" Sheets on Topsails, and Lifts and Halyards of Main and Foreyards

as the other yards are attached to the masts, but the lifts, on this yard, become "outhauls." The cargo whips, shown in one of the drawings, need little description. They are attached by means of pendants to a heavy thread stretched from main to foremast, under the tops.

The braces are the tackle by means of which the yards are swung from side to side, and these are fitted next. The braces on the spritsail are rigged as shown in the bow view, the standing end (the end made fast) being attached to the forestay, 3 in. up from the bowsprit. The other end goes down around a block on the yardarm, up through another block on the forestay, just above the standing end,

through a block under the top and down to the pin rail. Both sides are rigged alike.

The foreyard braces are led straight back to the mainstay, and the foretopsail-yard braces to the maintopmast stay. The latter run up to a point on the stay $3\frac{1}{2}$ in. from the upper end. The main braces run back to blocks hooked to eyes on the quarterdeck bulwark rail, and the maintopsail braces to blocks hooked under the mizzen top. Remember there is a brace on each side of the yard. The lateen-yard braces are clearly shown.

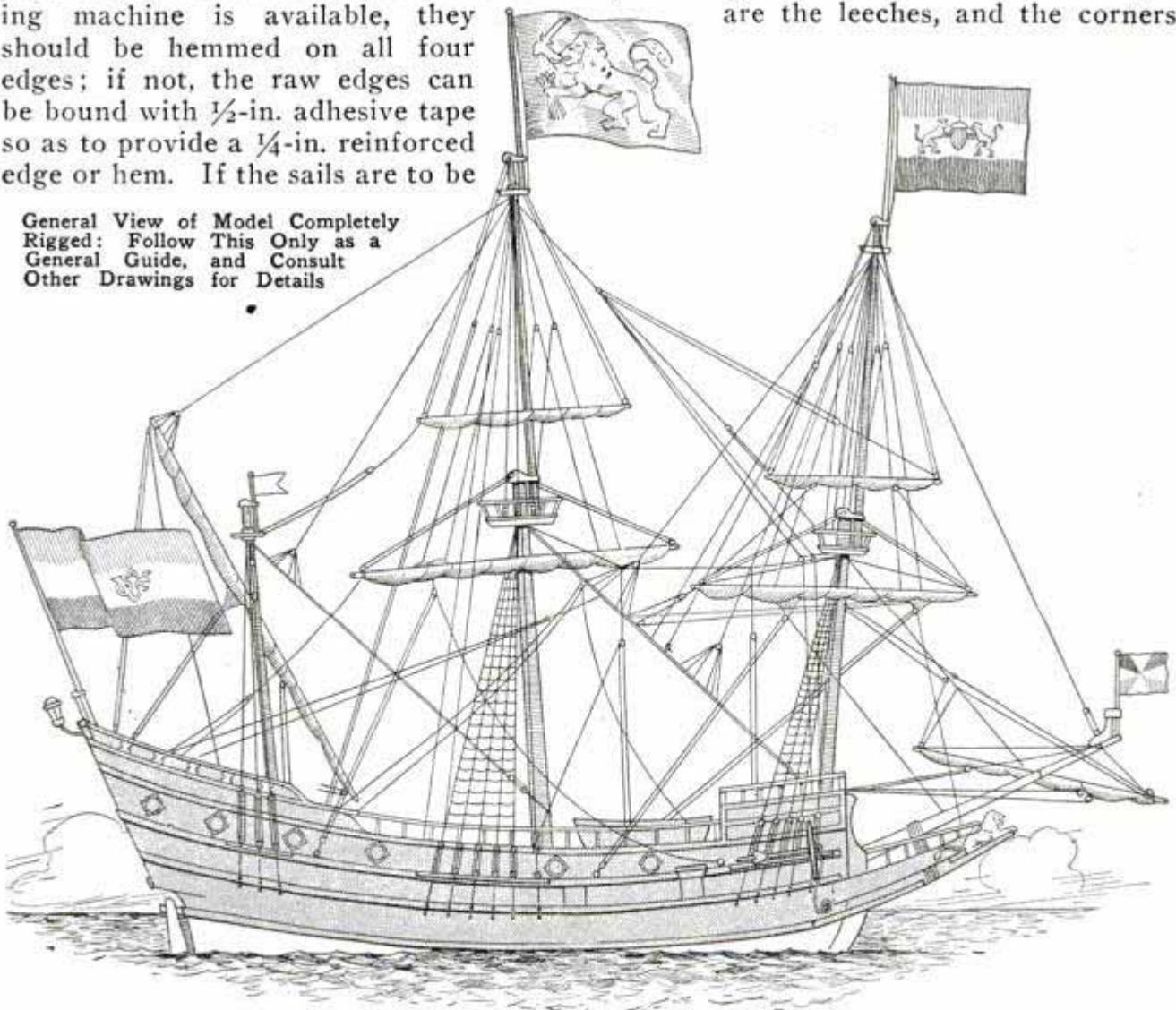
The sails and their lines come next in order. On this model the sails are furled, but, of course, the reader can have them spread if he desires. The material used is unbleached muslin, which is of a light-tan color. Do not use white. In order to make a neat job of furling, the sails were cut the full width, but only half the "drop" or height. All the sails are cut so that they will be 1 in. shorter than the yard when hemmed or bound. If a sewing machine is available, they should be hemmed on all four edges; if not, the raw edges can be bound with $\frac{1}{2}$ -in. adhesive tape so as to provide a $\frac{1}{4}$ -in. reinforced edge or hem. If the sails are to be

furled, the drop of the main and foresails is $3\frac{1}{2}$ in.; that of the maintopsail, foretopsail and spritsail $2\frac{1}{2}$ in., and the triangular lateen sail measures $9\frac{1}{2}$ in. along the yard, $7\frac{1}{2}$ in. along the foot and $3\frac{1}{2}$ in. along the leech, or short side. The foot, with the yard at 45° , is parallel to the deck plane.

If the sails are to be set, the mainsail should be 6 in. in the drop, the maintopsail 6 in., the foresail $4\frac{1}{2}$ in., foretopsail 5 in., spritsail 3 in., and the lateen sail 6 in. When the sails are set, the yards are attached as high on their respective masts as they will go, hoisted up, in other words, and the spritsail yard is hauled out on the bowsprit. When furled sails are used, the yards are dropped down to about the points shown on the assembly drawing and, of course, the spritsail yard also is hauled in.

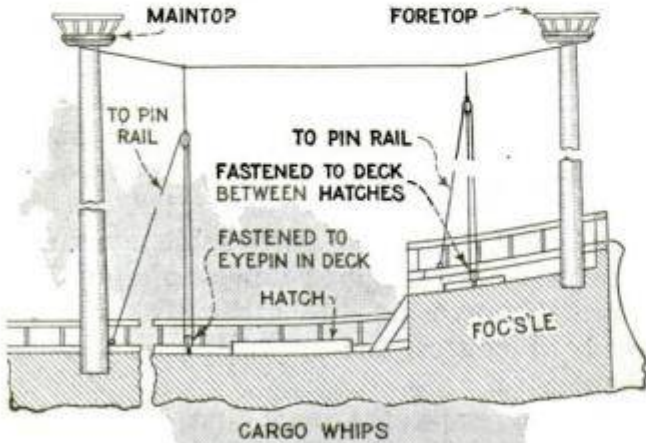
On the sails, the edge that is attached to the yard is called the head and the opposite edge the foot. The two side edges are the leeches, and the corners

General View of Model Completely Rigged: Follow This Only as a General Guide, and Consult Other Drawings for Details

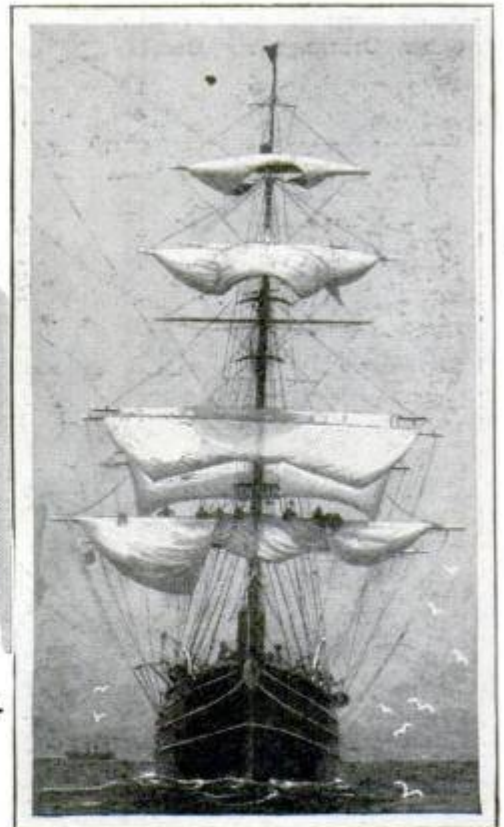
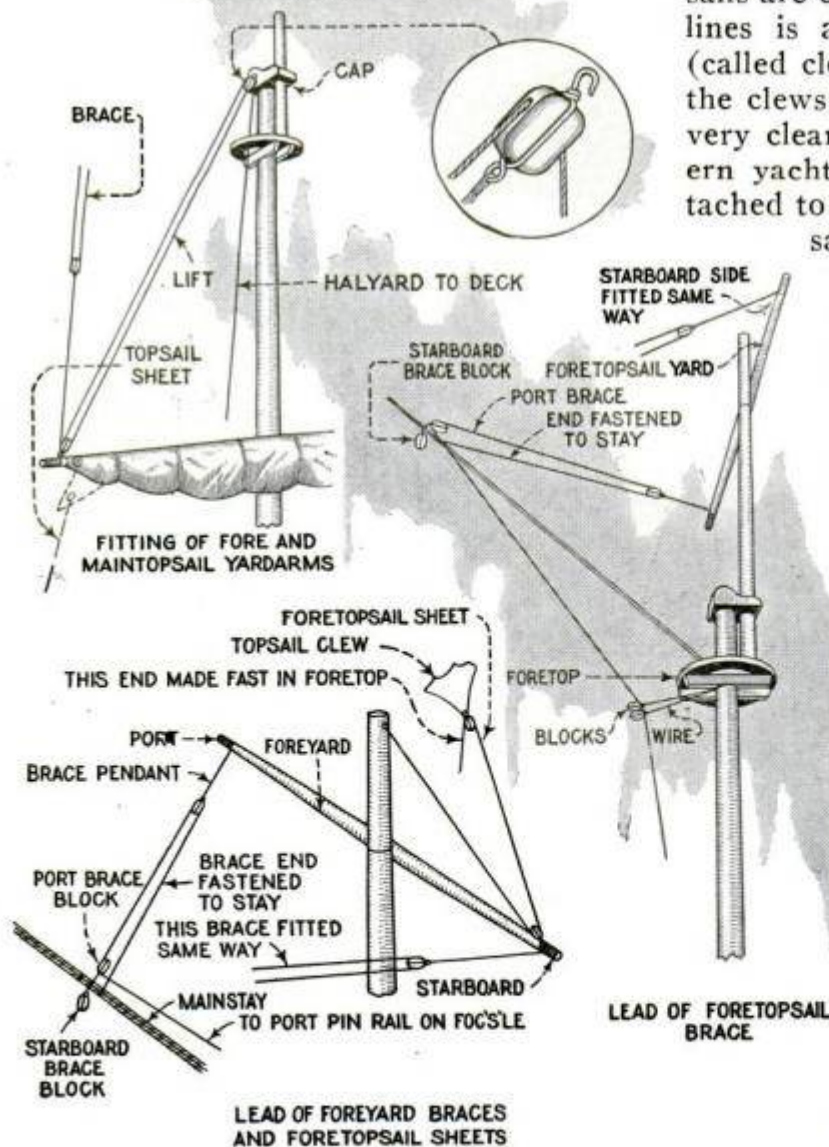


of the sail the clews. The middle of the sail is the bunt. The sheets are not the sails, but the tackle attached to the lower clews of the sails for handling them and holding them fast against the pressure of the wind. The sheet blocks are fastened by means of fine wire to the lower clews of the sails. The port main sheet runs from the eye in the strap of the sheet

block around a block wired to the after boomkin, then around the sheet block again and down to the main pin rail. The port side is rigged the same way. There is also a single line (the tack) leading from each clew of the mainsail down through a hole in the forward boomkin and back to the rail. The foresheets are rigged to the middle boomkin, then to the forecastle rail; the port foretack runs down under the beak and up to the starboard forecastle pinrail, and the starboard foretack in the reverse way. The lateen sail, having but one lower clew, has only one sheet. The topsail sheets are more or less dummies, and their rigging is shown on page 322. The yard in this drawing is shown dropped, of course; if the sails are set it will be hauled closer up under the top.



Looking at the view showing the after side of one of the courses, as the lower sails are called, the purpose of the various lines is as follows: The clew garnets (called clewlines on the upper sails) haul the clews up to the yard. This is shown very clearly in the illustration of a modern yacht below. The buntlines are attached to the after side of the foot of the sail then pass under the foot, up

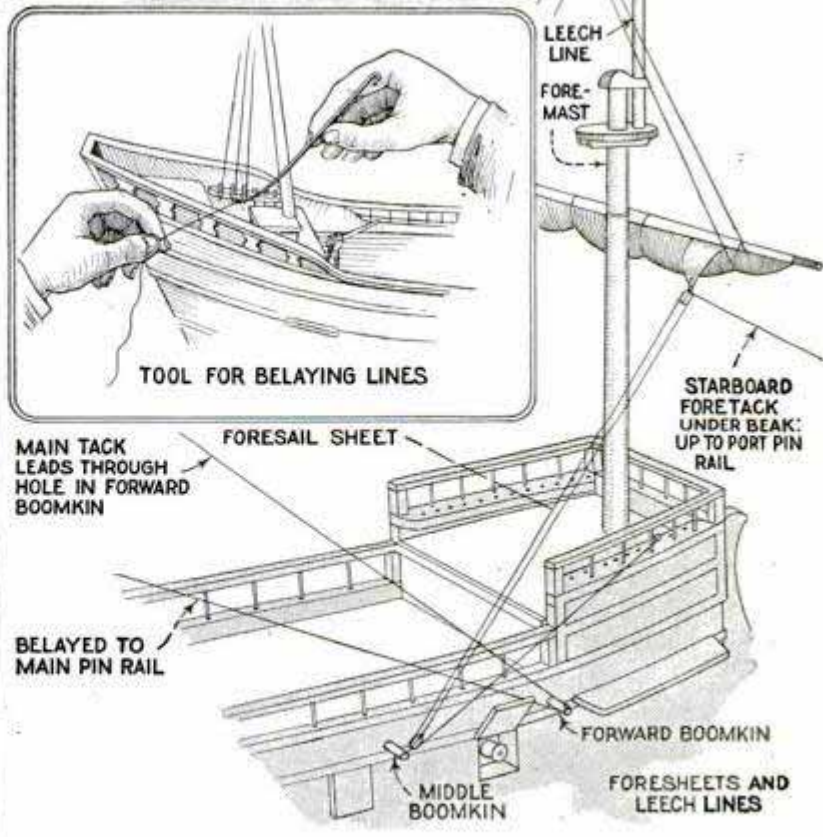
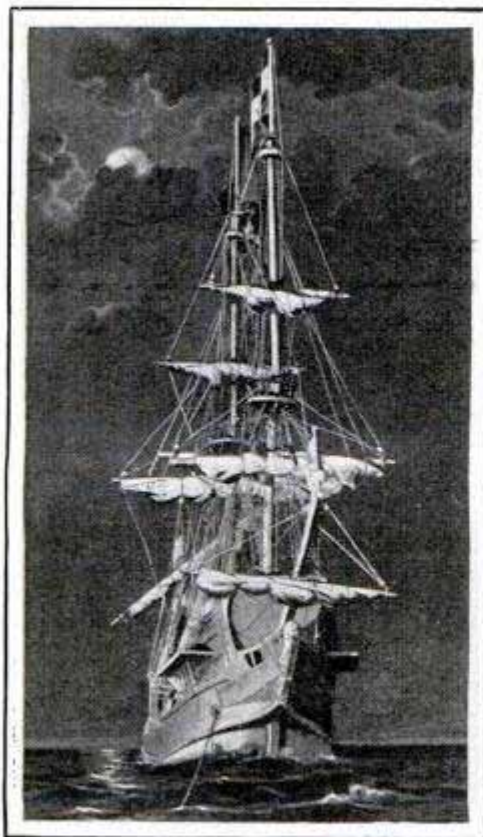
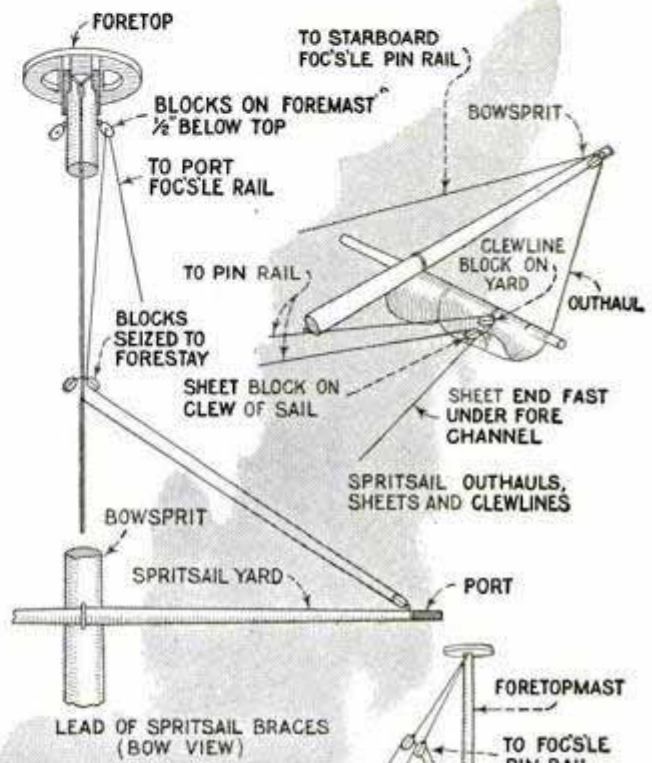


Right, Modern Yacht "Aloha," Showing How Sails Are Clewed Up Ready for Furling

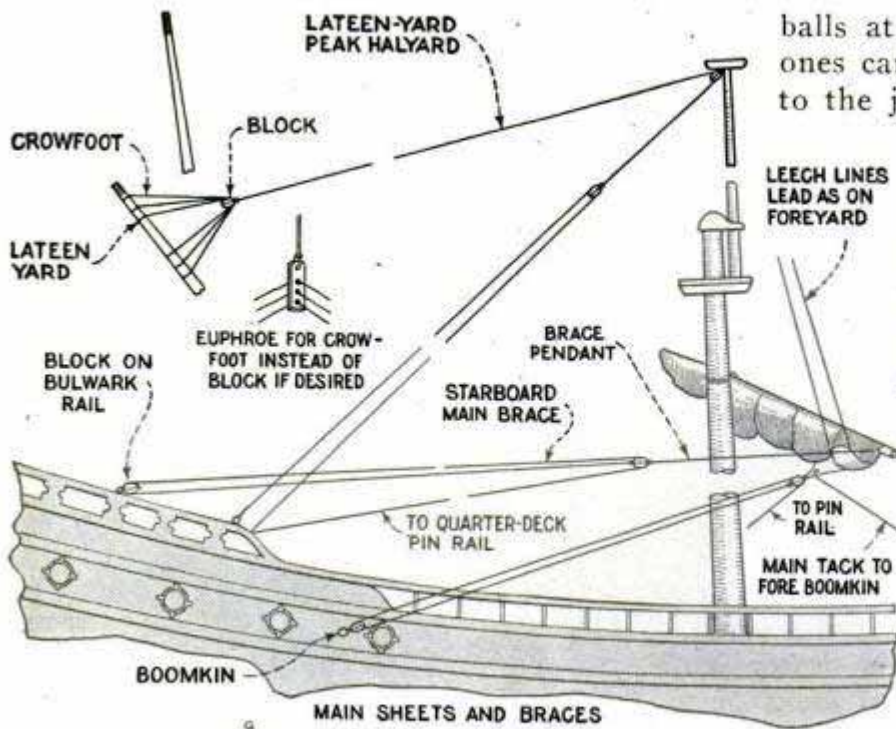
to blocks on the forward side, as shown, and down to the deck; they are for hauling the body or the bunt of the sail upward and forward for convenience in furling and stowing. The leech lines serve a similar purpose. While these lines can be dispensed with, they add considerably to the realism and appearance of the model. The sail is attached to the yard by wire rings passing through the head of the sail and around the yard; while not exactly correct, this is sufficient for our purpose. On the original model, after the sails were attached and furled, they were given a light coat of orange shellac to add to the antique appearance of the whole. If the reader desires, he can furl and attach the sails before slinging the yards, and probably he can make a neater job in this way. The furled sail looks best when full at the center, tapering to the yardarms and well up on the yard.

About the only practical way to "belly" the sails, if they are made to be set, is to sew soft copper or iron wire in the hems, and bend the wires to keep the belly in the sail, also giving the latter a coat of shellac. It is well, too, to draw parallel lines with a soft black pencil vertically on the sails, about $\frac{5}{8}$ in. apart, to mark the cloths making up the sail.

The dimensions of the various flags are as follows: The flag at the main, which was the banner of the Dutch States General, is $4\frac{1}{2}$ by $2\frac{7}{8}$ in.; the fore flag, which was the flag of Amsterdam, is 3 by $2\frac{1}{4}$ in.; the mizzen, the pennant of the city, $\frac{1}{2}$ by $\frac{7}{8}$ in. with a $\frac{1}{4}$ -in. swallow tail; the stern staff, the flag of the East India Com-

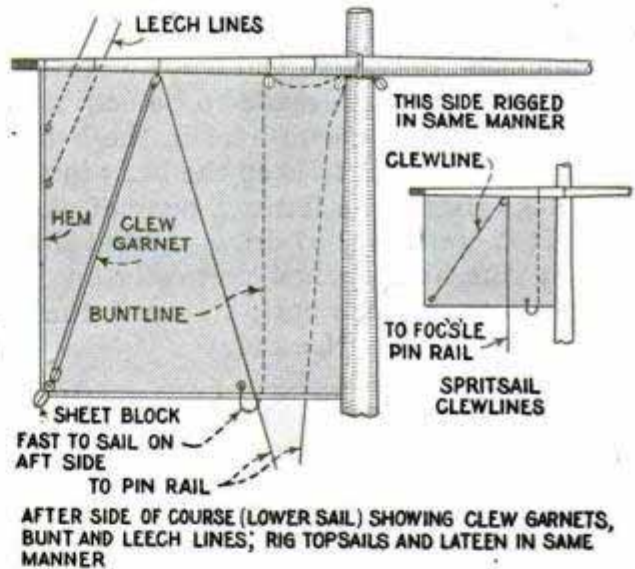
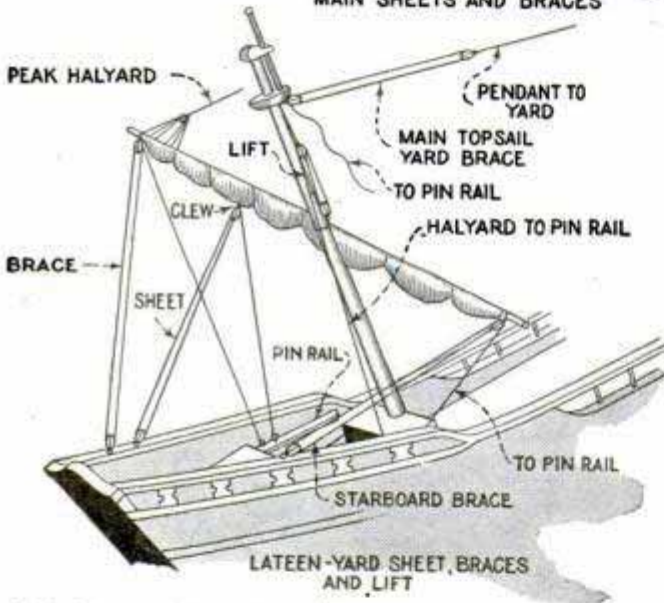


How the Wire Tool Is Used for Belaying the Running Rigging; Note Wire Pendants for Leech Line Blocks



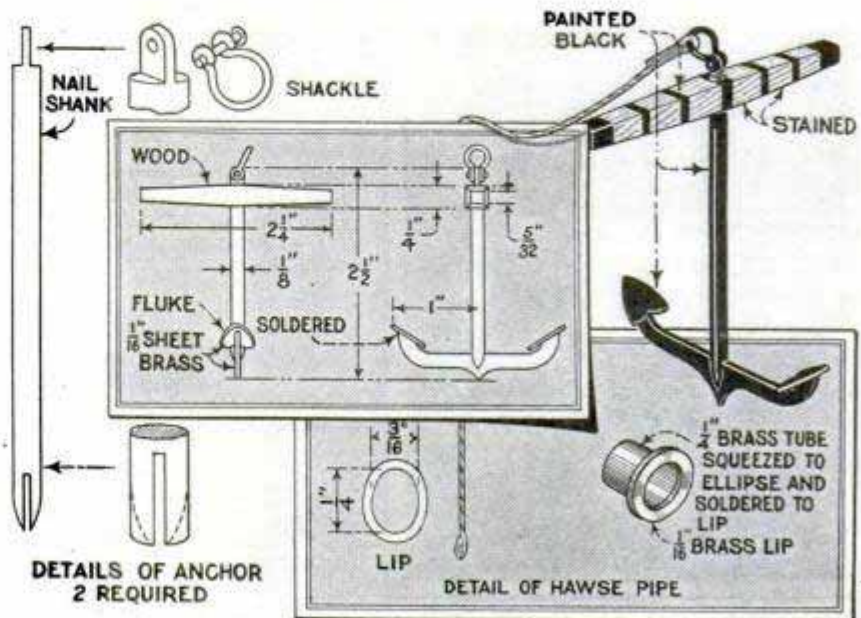
balls at the masthead; the smaller ones can be attached with fine wire to the jackstuffs.

The last job is the making of the anchors, and full details for this and the making of the hawse-pipe lips are given in one of the drawings. The anchors are stowed on the fore channels and lashed to the shrouds. Do not use chain for the anchor cables, as chain was not in use at the period of the "Half Moon"; use heavy cord that looks as much like rope as possible. Now go over the model and retouch all



The Lower View Shows How to Construct Very Simple but Effective Built-Up Anchors

pany (Ost Indische Cie Van Amsterdam), $4\frac{1}{2}$ by $2\frac{7}{8}$ in., and the flag on the bowsprit, which was a "prinzen gosch" of the States General, $1\frac{1}{2}$ by $1\frac{1}{8}$ in. A key to the colors is given in the drawing of the flags. They are made of unbleached muslin, given a coat of shellac, to stiffen them and to prevent the paint from running. The flags on main, fore and the stern staff are hoisted on halyards that run through holes drilled in the



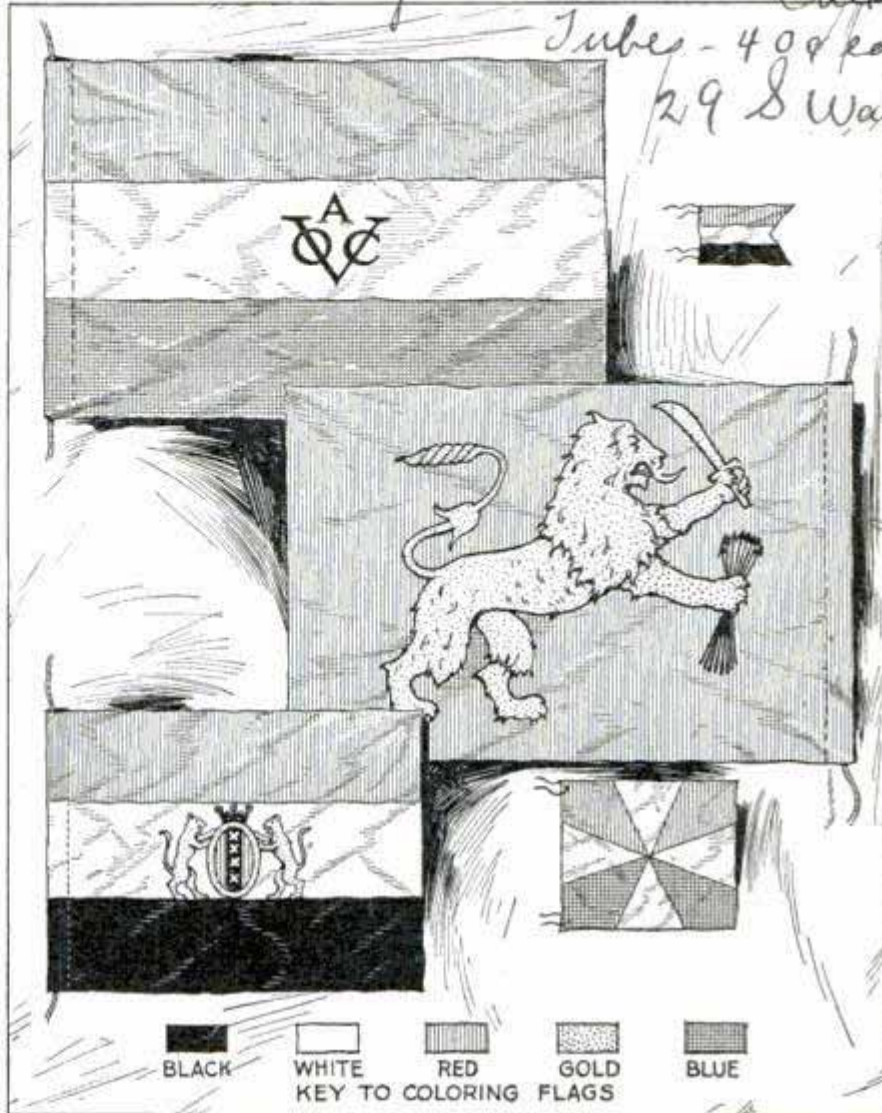
Any large paint store or Lee Voe & Co
 POPULAR MECHANICS
 Reynolds #40 Tube Chicago

29 S Walach

necessary parts with paint, including the touching up with flat black paint of all pin-heads and wire fittings, and your model will be completed.

One final word. You have been instructed previously to use automobile paints ground in japan for the model. Now, the color scheme used on the original model may be modified or changed in any way that appeals to the maker, but you should stick to the flat paint specified, and, on no account, use a shiny paint or enamel anywhere. After several coats of the flat paint have been applied, and have dried, if the paint is rubbed briskly with a clean soft rag, it will acquire a soft polish that makes the hull look as if the surface had been worn by handling for years; in other words, it gives a sort of artificial "patina," that antique collectors talk about. As the cloth polishes only the high spots, and the corners of the strake joints, etc., remain flat, the effect of age is heightened. If the color scheme is changed, keep the new colors as subdued as possible, consistent with good decorative effect, since glaring, new-looking colors on a model of this type are entirely out of place. You do not want to make a fake antique, of course, but neither do you want a model of a vessel of this period to look like a cheap factory-made toy. A number of ways to "age" the model will occur to the builder, such as smudging the brighter colors with darker paint, but do not overdo these things, or it may easily happen that you will spoil the very effect you are trying to achieve.

Owing to limitations of space, there may be some details that we have not made quite clear to the reader. In case of any doubt or difficulty, simply drop a line to



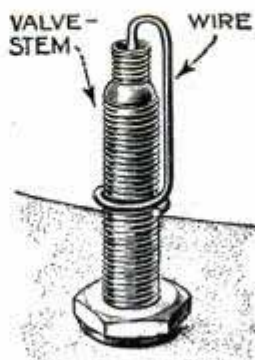
Upper Left, East India Company's Flag; Upper Right, Amsterdam Pennant; Center, Flag of States General; Lower Left, Flag of Amsterdam; Lower Right, "Prinzen Gosch" of States General

Don't flag and fairlead block can't be purchased

Amateur Mechanics department, and we shall be very glad to serve you with advice and help in every possible way.

Holding Tire Valves Open

It usually takes some time to let the air out of a tire, but the simple tool shown in the illustration, which holds the tire valve open, allows the air to escape and frees the motorist's hands to do other work. The tool is a short piece of wire with a hook bent at one end, to hold the valve open, and a loop on the other end, to catch the



threads of the valve stem.—E. A. Goering, Langenburg, Sask., Can.

Flags can be bought from Sea Arts Guild 405. 9 Eleventh Ave. N.Y.C.

Running Lampcord through Metal Molding

Lampcord on the floor is broken and worn out rather easily and always collects dirt besides being a fire risk. To overcome these troubles, the installation



Lampcord Protected from Injury by Installing It in Metal Molding Screwed to Baseboard

shown in the drawing will be found practical. Metal molding of the kind used by electricians for concealing wires run over walls and ceilings is obtained, and an elbow fitting if a corner has to be passed. The molding comes in any color and shade desired to match woodwork. Run it along the baseboard and screw it in place, as indicated. The lampcord is inserted in the molding and the cover snapped on so that one can only see the plug and the socket end of the lampcord.

Dark-Room Light "Pirates"

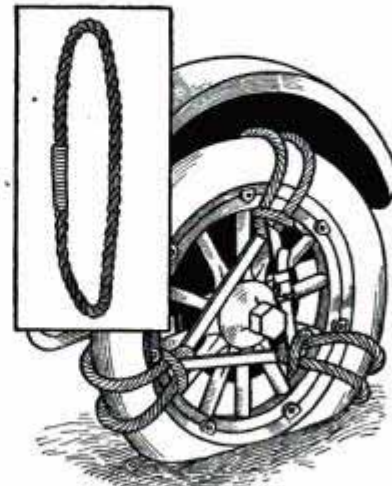
Recently I made some experiments to find out what damage was done by light "pirates" in the photographic dark room. My pirates consisted of a red light, a lighted cigaret, the rays from a luminous-dial wrist watch and the flash from an electric switch. For ordinary work these lights do no serious damage, but for the particular operator handling ordinary work, and for all work of precision, it is wise to guard against them. No so-called safety light is absolutely safe. The rays from any red light register upon a film, but it is rather a matter of how much ex-

posure the film can stand without doing any serious damage. A red light, which I had always considered safe with portrait film, showed considerable registration upon a piece of dry film exposed for one minute at a distance of 3 in. Such long exposure to a dry film is seldom necessary, and it is true that a wet film is less sensitive, but this exaggerated result showed that some registration would take effect upon wet film while exposed to the red light for examination in the process of development.

There are a few photographers of my acquaintance who persist in smoking cigarets in the dark room. This is unsafe even in the most adverse working conditions. Cigaret light is white, and three puffs of a cigaret held 6 in. away from a piece of dry film resulted in considerable fogging and was sufficient to ruin the film. A 30-second exposure of a piece of portrait film to the luminous dial of a small wrist watch resulted in the complete breaking down of the silver deposit. One minute's exposure at a distance of 4 in. made a noticeable registration. A flash from an electric switch registered enough to ruin a film. Although this exposure was for a fraction of a second, the flash contained rays, to which portrait film is very sensitive.—Edward H. Flaharty, Parco, Wyo.

Emergency Tire Chain

Many motorists do not have chains, and during the summer months it sometimes happens that they are caught on soft ground or mud unexpectedly. It is better



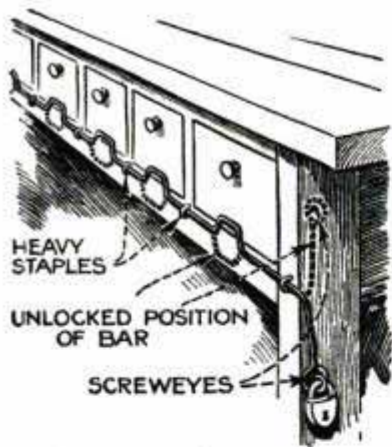
to be prepared for such emergencies by carrying along six endless ropes and two strong leather straps. When you get on soft ground where you cannot make any headway, slip the ropes over the wheels as shown in the drawing, holding them in place with the straps.

Rubber Band Replaces Book End

When books do not completely fill a shelf or are placed elsewhere without any support for the end ones, a strong rubber band will be found an efficient substitute for book ends. The band is slipped around the last two or three books and placed so as to coincide with the framing lines of the title so that it will not be conspicuous. Books held together in this way will stand quite firmly, preventing those next to them from falling, and a rubber band is likelier to be at hand than an extra book end.—Harold E. Benson, Denver, Colorado.

Several Drawers Locked with One Bolt

To eliminate the necessity of individual locks for the several tool drawers in his workshop, a garage owner made use of the illustrated attachment, which locks or releases all the drawers from one point at the end of the bench. A length of $\frac{1}{2}$ -in. round steel rod was shaped in the manner shown and attached to the bench just below the drawers by means of heavy staples, which were clinched on the inside. The rod was bent at a right angle at one end of the bench and formed into an eye large enough to pass over a screw-eye to which a padlock is attached, as shown. Another screw-eye is fastened to the bench above the bar. The operation is obvious.



which a padlock is attached, as shown. Another screw-eye is fastened to the bench above the bar. The operation is obvious.

Making Gold Leaf Adhere Permanently

To make gold leaf adhere permanently to any surface, try the following: Put some isinglass in a little water and heat slowly without allowing it to boil. Add as much nitric acid as isinglass. Allow the mixture to cool and apply carefully with a brush. This mixture not only makes a permanent job of the work, but will not be absorbed by the paper pages of any book on which it may be used.

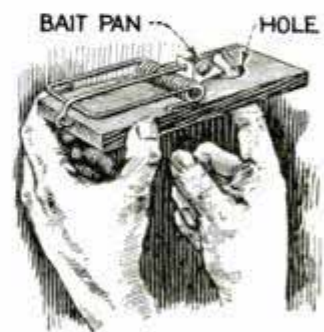


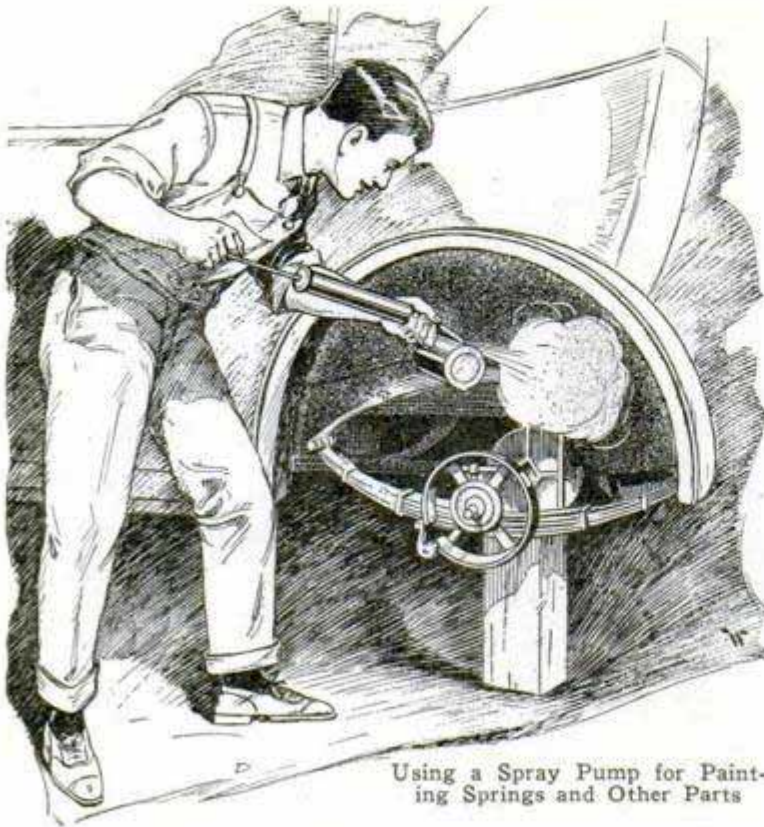
Paper Pulp Makes Good Fuel

I have been making paper fuel of the kind shown for a number of years from scrap paper that accumulates around the house. Each year I make enough to last the whole winter, burning it in an open grate. The paper is soaked to form a pulp and is then pressed into shape using molds made of 4-in. iron soil pipe, 12 in. long and sawed lengthwise. It is then allowed to dry out thoroughly. This makes good fuel, which gives plenty of heat, is economical and serves well also as kindling for starting a coal fire.—John E. Mason, Hamilton, Ont.

Setting Mousetraps

The danger of setting mousetraps can be eliminated by using the method shown in the illustration. A $\frac{3}{4}$ -in. hole is drilled through the wood base of the trap just under the end of the bait pan. By inserting the finger in the hole from the underside of the trap and lifting the pan to the position indicated, so that it engages with the catch holding the spring, you are fully safeguarded against any chance of injury to your fingers.





Using a Spray Pump for Painting Springs and Other Parts

Spray Pump for Painting Springs

Usually a good brush is used for painting the body and fenders of a car, as these surfaces are smooth and can be thoroughly cleaned before applying the paint. However, it is quite a difficult matter to clean the springs and other parts under the car and by painting them with a brush one always picks up dirt out of the cracks and corners, which covers the brush and spoils the painted surface. By doing the painting with a spray pump, as shown in the drawing, this trouble is avoided. If ordinary rust-proof paint is used no thinner is necessary, but auto enamel should be diluted with about ten per cent of turpentine. The spray enters the cracks and crevices, and places which are inaccessible with a brush.

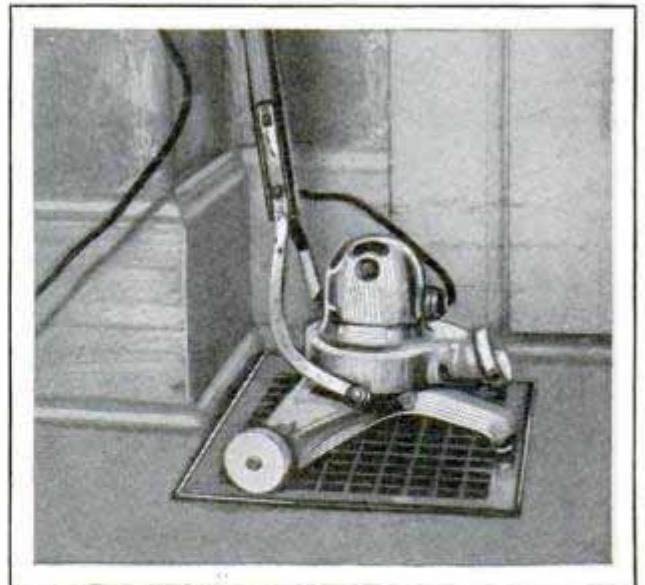
Soot for Furnace Covering

When cleaning out some large flue pipes at a power plant where a lot of wood, sawdust, etc., was burned in the boiler furnaces, a large quantity of soot had to be removed. As an experiment I made a thick mixture of this soot with water, then used equal parts of the soot mixture and ordinary asbestos cement to cover a heater, using the ordinary form of wire

netting as a holder for the compound. When the soot-asbestos covering dried out, not only had it fewer cracks than the asbestos coverings on other heaters, but the soot-asbestos surface also was cooler than the all-asbestos, which meant an appreciable saving in boiler efficiency.—J. E. Noble, Toronto, Can.

Vacuum Cleaner Helps Heat Second Floor

In old furnace installations the pipes often lead only to the first-floor rooms and the upper rooms are provided with floor registers extending through to the ceiling of the room below. The upper rooms get their heat in a very slow and indirect fashion in this way, and if these rooms have to be heated quickly, some auxiliary apparatus is almost necessary. One housewife overcomes the difficulty in a simple manner. When an upper room is to be heated she simply takes the dust bag out of the vacuum cleaner, places the sweeper over the open register and turns on the current. Acting as a power circulator the sweeper draws the warm air from the



Using a Vacuum Cleaner on Second-Floor Register to Draw Heat into Upper Rooms

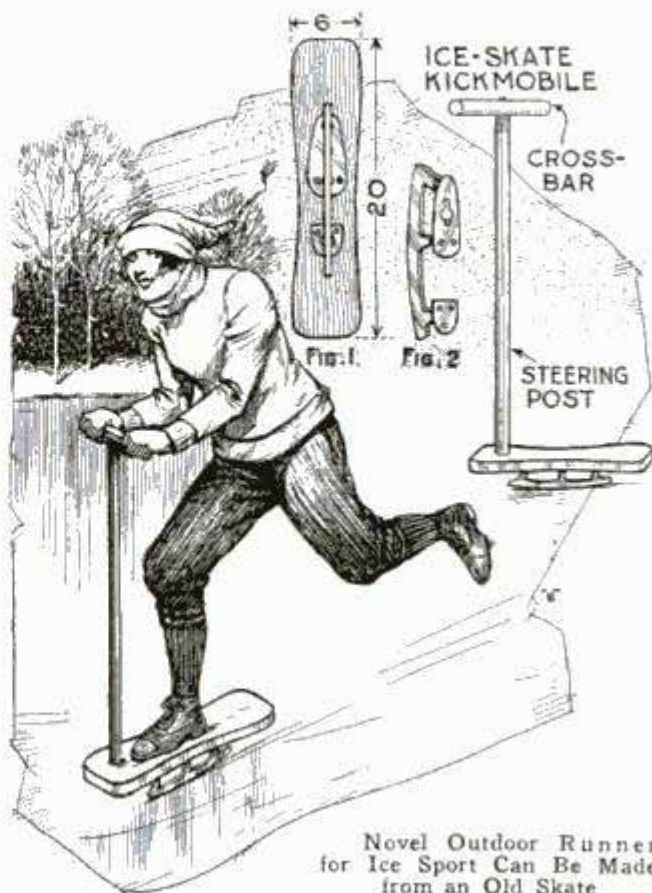
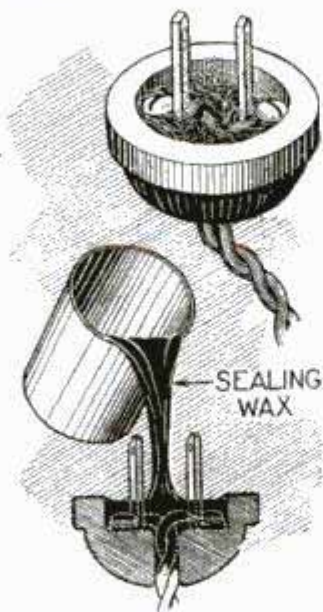
room below and shoots it out into the cold upper room. It does it so fast and effectively that only a few minutes are required to make a large room comfortable.

Substitute for Child's Bow

An easily made substitute for a bow, which is especially desirable for children interested in archery, can be made from a discarded automobile inner tube. A strip, about $\frac{1}{2}$ in. wide, is cut across the tube, making a large rubber band. The arrows, which should be about 16 in. long, can be made from reeds or cat-tail rushes, by driving a shingle nail into the thick ends and wrapping them with adhesive tape. The arrows need not be feathered. To shoot them, slip the band over the thumb and first finger of the left hand. Then place the arrow in the band, grasping it through the rubber with the thumb and finger of the other hand. Stretch the band to its limit, then release it, and the arrow will be driven out of sight if aimed into the air. The thumb and finger serve as a crotch, while the band serves both as bow and string. Arrows may be shot with great accuracy as it is comparatively easy to aim. In shooting with the band, as with the bow, the arrow should be pulled back in line with the eyes. Children in our neighborhood are able to shoot nearly 200 ft., although 25 to 50 ft. is better for target practice.—C. Bernard Petersen, Minneapolis, Minn.

Sealing Extension-Cord Plug

One of the most common causes of short circuits in extension cords is the loosening of the bared ends from the screws in the plug, which in turn is caused by strain on the cord. A knot is usually tied in the cord by electricians to take the strain, but the method shown in the drawing is an additional safeguard. Melt some sealing wax and after fastening the bared ends tightly, pour in the wax until it is level with the outside edge.—Adolph F. Lonk, Chicago, Ill.



Novel Outdoor Runner for Ice Sport Can Be Made from an Old Skate

An Ice "Kickmobile"

Boys will find the "kickmobile" shown here quite different from ordinary outdoor winter devices. Fig. 1 is the footrest, about 20 in. long and 6 in. wide. It is made of 1-in. wood and an ice skate is securely screwed to it, as indicated. A steering post, with a crossbar attached to the top, is also provided, which completes the runner. The steering post can be made from a piece of willow branch or a strong broom handle, set snugly in a hole drilled in the center of the base, toward the front.

Vulcanizing Small Holes in Auto Tops

When a tear occurs in the top of an automobile, it is usually patched by the cement method or else the hole is stitched like the hole in a stocking. A better method of repair is to vulcanize the top. Fill the opening carefully with the heavy rubber mastic or tire dough used in filling small holes in casings. Then heat two flat-irons and press them against the rubber from each side, being careful not to have the iron so hot as to scorch the fabric. In three or four minutes the rubber will be vulcanized.—L. B. Robbins, Harwich, Massachusetts.

Tin Cup Used as a Level

On a camping trip, I had occasion to make a table and seat. As there was nothing horizontal or vertical to use to



Tin Cup Filled with Water Makes a Serviceable Level for Campers in Making Furniture and for Other Purposes

plumb things up, I took a tin cup and filled it to within $\frac{1}{8}$ in. of the brim and found that it made a very serviceable level. Table and seats came out perfectly true.—Albert L. Ball, Niagara Falls, N. Y.

Tape on Child's Legging

It is possible that many a young mother does not know a good method of keeping her child's legging elastic in condition, as it soon wears out under the child's foot. An easy and permanent method of mending is to buy a roll of electric tape from the 10-cent store and cover the elastic of each legging in the following way: Begin by unrolling several inches of the tape, then start at the point where the elastic is joined to the legging at the side and lay the end of the tape across the elastic in such a manner that the adhesive side will be stick-

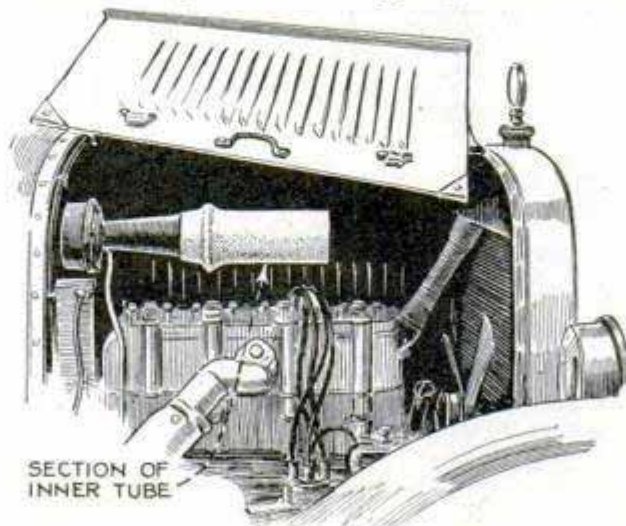
ing to the elastic. Continue to wind the tape around the elastic, several turns, by bringing the tape through the opening where the child's foot goes, and at the same time taking care to overlap the edge of the tape at each turn. In this way you will cover the entire elastic and terminate the winding at the end opposite that at which you started. You will find such a covering will enable the child to play about in wet weather, during winter, as the electric tape is not only waterproof but very tough and durable.—J. R. Clough, Washington, D. C.

Lighting a Fire in a New Fireplace

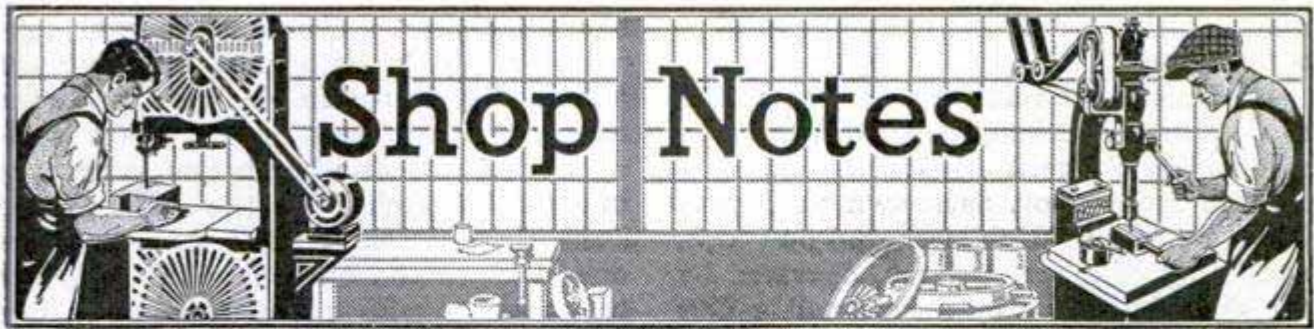
New fireplaces are likely to smoke badly when a fire is first built in them, due to the dampness of the flue. This is also true of a fireplace that has been unused for a considerable length of time. To overcome this smoking is a simple matter. Open any dampers and hold a lighted newspaper high up under the arch and at the beginning of the throat. One or two such applications of heat will absorb the moisture from the surface of the flue bricks and the fire can then be built with little danger of smoking.

Changing Tone of Auto Horn

By taking a piece of old inner tube and slipping the end over the horn, as shown, a new tone can be obtained. A loud horn can be made to produce a soft tone resembling the moo of a cow. Horns having an armature give the best results. The piece of inner tube should be about 1 ft. long, and small pieces are cut off until the desired tone is obtained.—Carlton Groat, The Dalles, Oreg.



Section of Inner Tube Slipped over Auto Horn Changes Its Tone Agreeably



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What You Should Know About Locks

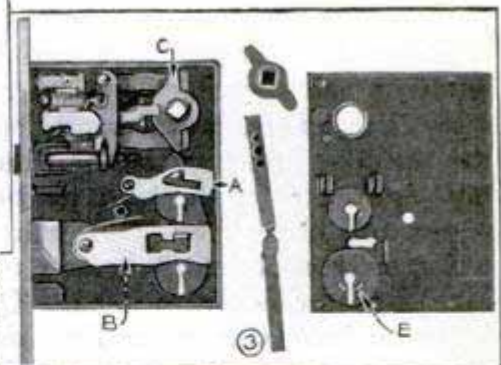
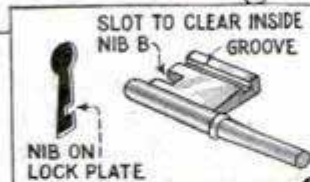
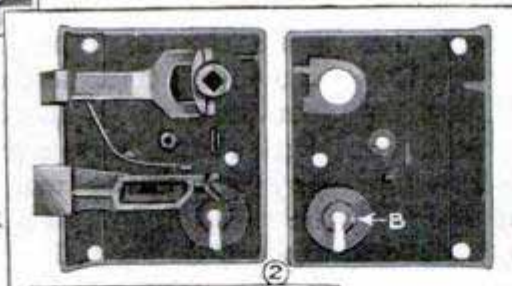
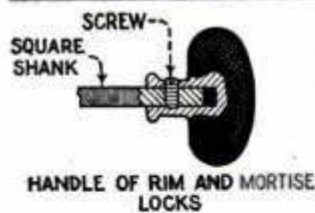
By A. C. LESCARBOURA

SO long as we have locks, the home owner must know something about these seemingly intricate, yet really simple, devices. It may be that he wishes to repair a lock. Again, he may wish to make a key, or to change the lock so as to render the issued keys useless. In any event, a little knowledge about locks will save a lot of time and trouble.

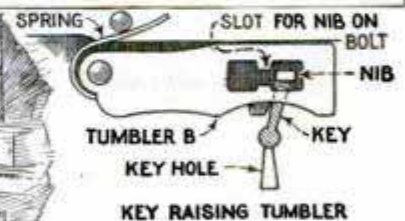
To begin with, there are three general types of locks to be found

and rim types are about the same, so that Fig. 2, showing the inside of the rim-type lock, actually covers both cases.

The operation of the usual door lock is simple enough. The key is inserted in the keyhole, and the turning motion causes the bolt to be thrown back. However, by studying the details of Fig. 2, it will be noted that there is a barrier, B, which prevents the key from turning unless the tongue of the key is cut with slots to clear the barrier. Sometimes there is also a nib on the lock plate, and it is in order to clear these barriers that ordinary keys are slotted and grooved in characteristic fashion. Ad-



in the average home. The door locks are usually of the ordinary mortise type, with the lock proper let into a slot cut in the edge of the door. Fig. 1 shows the mortise type of lock being removed for examination and repairs. The rim type, on the other hand, merely screws on one side of the door—the inside, of course. The internal details of both mortise



Details of Common Rim and Mortise Locks; Also Interior View of Front-Door Lock with Split Handle and Locking Pins

ditional keys may be made by following the profiling of an

existing key, or taking the lock apart and studying the barriers so as to file the key to pass them.

Because of the relative ease with which the ordinary lock may be picked, the lock mechanism is generally more elaborate for the front door, as shown in Fig. 3. Here is a combination latch-and-bolt lock, consisting of a spring latch, operated by the door knobs or by a key, and a bolt lock for the lower portion, also operated by a key. The latch is the portion ordinarily employed during the day, but the bolt is used at night. The latch may be opened by turning the inside or the outside knob, provided the buttons or small lever on the edge of the lock are not thrown so as to lock the cam which is moved by the outside knob. The inside has its own cam which is always free to turn. Should the outside knob cam be locked, then a key must be used to throw back the latch independent of the cam. The cam C is the one connected with the outside knob. In this view it is shown locked by the push buttons.

Keys are cut for the foregoing lock in much the same way as for the simple door lock, except that there must be notches cut on the end and side of the key, since the key must not only clear a barrier, indicated by E in this view, but also lift a "tumbler" to permit throwing back the latch or the bolt, as the case may be. The tumblers are shown at A and B, and in detail in the sketch. The key must have a slot on its face, cut to exact depth, to lift the tumbler just high enough but not too high, so as to let the latch or bolt nib or projection slip through. Such a lock is necessarily more complicated and therefore more difficult to pick. Ordinarily, just one lock, the upper lock or latch, is for day use in this combination. The lower lock or bolt is used only at night, and is then locked from the inside with the key.

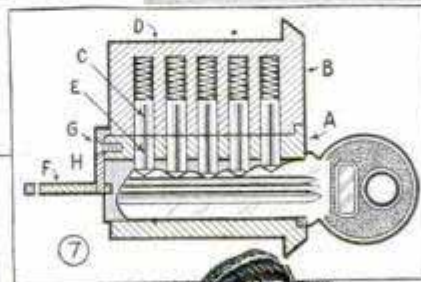
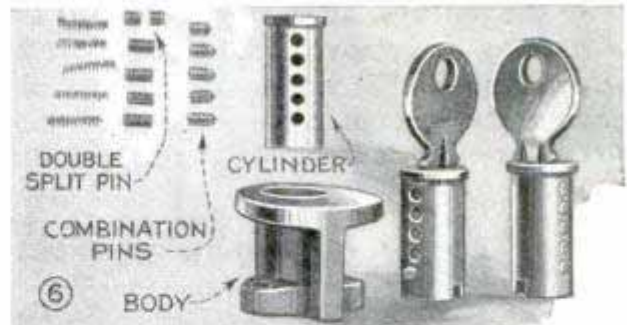
It may be desired to reverse the way in which the door is to close, or, when the lock is purchased, the bevel or slant of the latch tongue may be wrong. This may be reversed by pulling the tongue back clear of its slot, and then reversing it. The cams shown at C must also be turned around, as the manner in which this lock works is to have one of the cams lock

with the buttons or small lever on the edge of the lock, so that the outside knob cannot throw back the latch and a key must be used, while the inside knob is always ready to throw back the cam that is always free, so that a key is unnecessary to unlock the latch from the inside. The shaft that passes through the lock from one knob to the other is split, and each half engages with one of the cams. The portion of the shaft with the pins goes to the outside, so that the knob cannot be removed from that side and the shaft then pushed through the door so as to operate the free cam and unlock the door without a key.

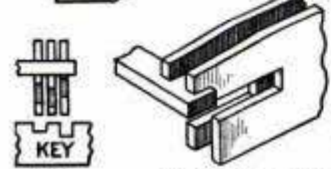
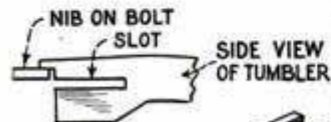
Inside the home, there are various cabinet locks having internal details quite similar to those shown in Figs. 4 and 5. Here is a lock having a number of tumblers, all of which must be lifted a certain distance by the notches in the key before the bolt is presented with a straight or alined slot in the tumblers through which the nib on the bolt may slip back. This is a complicated lock to file a key for. The best plan is to remove the tumblers and proceed to file the key so that its notches raise the tumblers, one at a time, to the point where the slot is in perfect alignment. Care must be taken to get the tumblers back in their proper order, otherwise the combination will be changed. However, if it is desired to change the combination of the lock so as to render outstanding keys useless, the tumblers of any lock having two or more tumblers may be rearranged and a new key fitted to the revised combination.

The next popular type of lock found about the home is the pin-tumbler, or cylinder, lock, commonly known as the Yale lock. This is a compact lock, virtually fool-proof and capable of unlimited combinations. Figs. 6 and 7 show the essential parts of this type of lock. It will be noted that the lock is composed of a cylinder, A, and a body, B, together with a series of pins, C and E, which serve to lock the cylinder rigidly in the body so that the former cannot turn. However, if the pins E are pushed flush with the curved face of the cylinder, then the cylinder can be turned with the key, and the bolt of the lock, which comprises the mechanism fastened on the inside of the usual door, can

be thrown back to unlock the door, through the parts G, H and F. The part shown here, in other words, is a sort of a gateway through which the key must pass before it can throw the bolt and unlock the lock itself. Now the pins of this lock are divided into two members, one called the combination pin, E, and the other the locking pin C. (The double split pin, comprising two pins for the locking pin, will be explained later.) The combination pins fit into the cylinder, with the locking pins pressing down on them because of the coiled springs, D. Normally, the combination pins, being

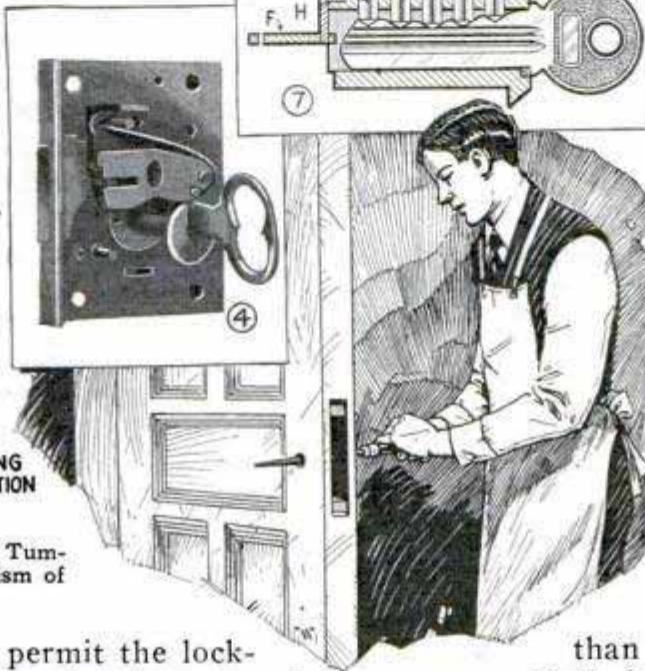


tumbler locks, and the home key may be designed to fit both locks, while the garage key may be designed to fit just the garage lock. This is especially desirable when the help is provided with a key to fit just a certain lock, while the master has a key that will fit several doors. There is nothing more to



SKETCH OF TWO TUMBLERS SHOWING VARIATION IN LOCATION OF SLOTS

Cabinet Lock with Multiple Tumblers, and Internal Mechanism of Pin-Tumbler Locks



such an arrangement than to have the two locks—or more if desired—arranged with the same combination as the house. The house lock, however, is provided with plain pins, while the garage lock is provided with a split pin. The chauffeur's key is arranged so as to operate the split pin on one section, while the master's key is arranged to operate the split pin on the other section, corresponding with the solid pin of the home lock. In this manner, one person may have a key to open a number of locks, while others may be provided with individual keys for their individual locks. This arrangement may be multiplied any number of times through the use of split pins.

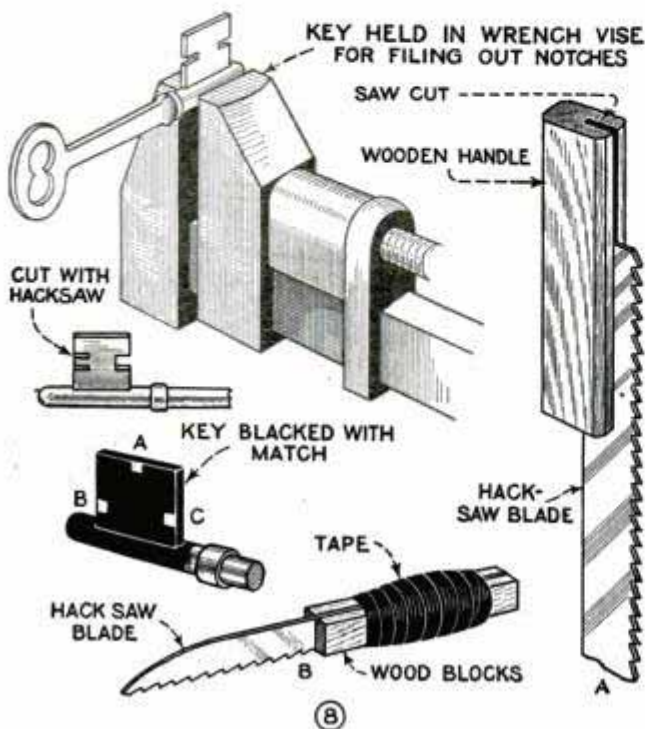
of different heights, permit the locking pins to enter more or less into the cylinder holes, thus locking the cylinder with the body and preventing the cylinder from turning. A key which is properly shaped so far as the lengthwise grooves are concerned, may be inserted into the keyhole. Its teeth will raise the combination pins more or less. If the key is the correct one, the teeth will raise the combination pins to the correct height, thereby bringing the combination pins and the locking pins flush with the space between cylinder and body, and permitting the cylinder to be turned by the key.

Fig. 6 shows the results of inserting the proper key, at the right, and the wrong key, at the left; note how the combination pins are lined up in the former.

The purpose of the split pin is to enable one key to fit just one lock, while another key may fit that lock and another lock as well. For example, the home and the garage may both be fitted with pin-

To file a key for the pin-tumbler type of lock, it is necessary to take the lock apart. Some locks have provision for doing so, usually in the form of a sliding cap over the top of the body. Others have no such provision, and then it becomes necessary to file off the top of the body so as to ex-

pose the springs, after which each of the parts may be removed. The key must be selected so that it will fit in the keyhole, having the proper arrangement of side slots. If a key is at hand for the lock, the



Hints for the Amateur Key Filer, Showing How the Position of the Wards Is Located without Taking the Lock Apart

lock need not be filed apart. Instead, the screws and plate may be removed from the rear of the body, after taking the lock proper from the door; the key inserted so as to line up the combination pins, and the cylinder withdrawn, so that the combination pins remain in the cylinder while the other pins and springs fall out. This is not harmful, but it is quite a tedious job to reassemble the pins and springs. Nevertheless, this practice is perhaps simpler in the long run than to file off the top of the body and then have to make a new cover.

To file a key for the pin-tumbler lock, the blank should be inserted in the cylinder and the combination pins placed in their respective holes. Be sure the key is all the way in. Now gently tap the pins, which causes a small mark to be made on the edge of the blank to indicate where the filing is to take place. In filing a key of this kind, only one of the pins should be fitted at a time. It will be necessary to try the key frequently, and not to bear too hard on the file, since a small error in filing will render the key useless. A

three-cornered file may be used for the purpose, but as it is not of the proper angle it must be tilted from side to side to approximate the angles of the original key. It is not advisable to hold a key that fits up against the one to be filed, because to file the original even slightly is apt to ruin it. Keys can be made in special machines, following the notches of the original and in no way affecting the accuracy and fit of the latter. This is the quickest and easiest way to duplicate keys.

Now a few words on key fitting in general. When a vise is not available, and especially when it is desired to do the fitting near the lock, a monkey wrench can be used, as shown in Fig. 8. Set up the knurled screw with a pair of automobile or lineman's pliers and the wrench will hold nearly as well as a vise.

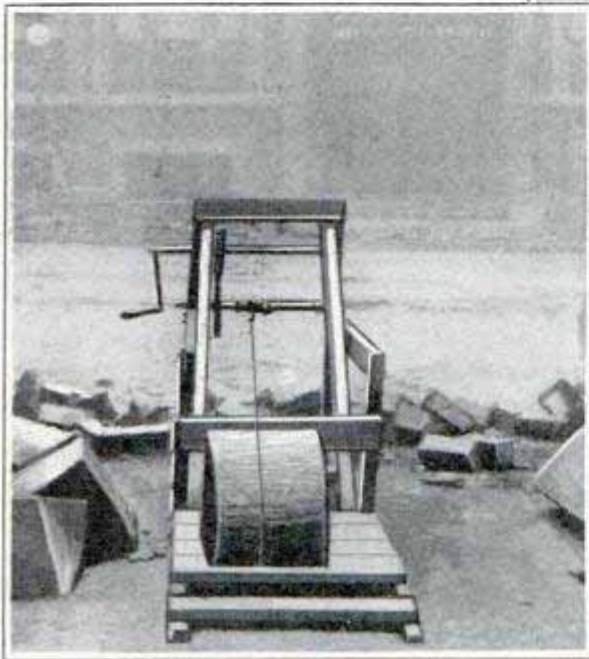
To fit a key to a common mortise or rim lock, without taking the lock apart, obtain a key blank which will nearly or quite go into the keyhole, hold the key close above a lighted match or candle until smoked evenly and completely. Place the key in the lock as far as it will go and turn it back and forth, then remove from the lock and seek the bright spots where the black has been wiped off the key by the wards in the lock.

Bright spots are shown at A, B and C, and cuts must be made in the key to remove the metal at these points. Possibly the key will not go into the lock and bright spots may be found at the inside edge of the blade, indicating too little distance between the blade and the collar, in which case it will be necessary to file away some of the blade, if it is wide enough, or to work back the collar a bit. If no thin "warding file" is at hand, cut in the key with a hacksaw as shown; then break out the thin piece and file smooth.

Bits of broken hacksaw blades make good key tools. Cut a hacksaw slot into the handle block, as shown in the illustration, then fill the groove with "smooth on" cement, and push the blade into the handle. Next day, the saw will be found solidly set in the handle. If no smooth on is at hand, set the blade with litharge and glycerin. A "ready-to-wear" file may be quickly made by placing two bits of wood on either side of the hacksaw blade, and then winding on tape to form a handle.

Practical Tar-Cutting Machine

In construction work there is frequent need of tar, and the cutting of this product is more or less troublesome. One contractor made the machine for this purpose shown in the photo, and found that it was effective and timesaving. It consists of a wooden framework with a platform at the front for holding the cakes of tar to be cut,



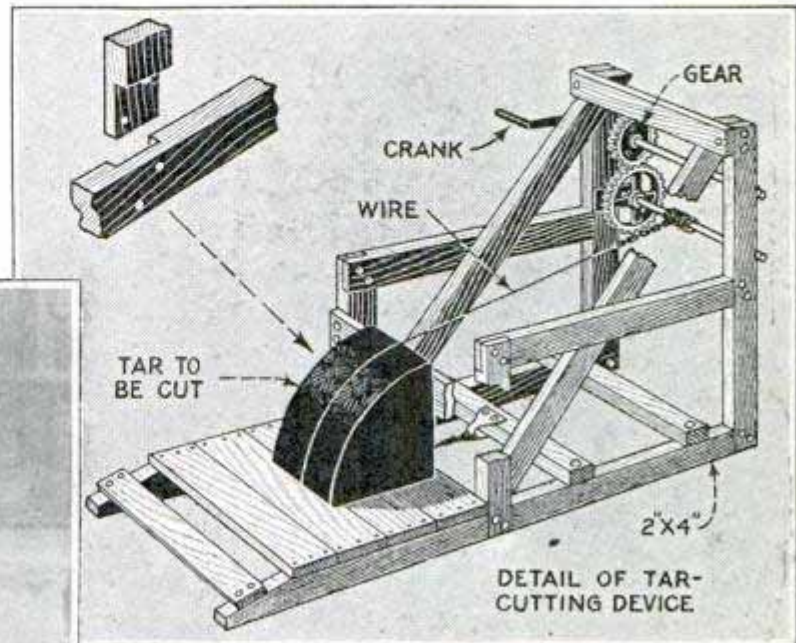
Platform and Mechanism for Cutting Large Cakes of Tar with Little Effort and at a Considerable Saving of Time

and the operating mechanism, which comprises a crank, two gears and a winch arrangement, at the other end. A stout wire is attached to the winch and to the framework so that it can be placed over the cake of tar. Then, upon turning the crank, the wire is drawn through the tar with little effort.—Roy M. Singer, Chicago, Illinois.

Gassing Best Means for Killing Ground Hogs

With steadily increasing farm acreage in the middle west given to legume crops, alfalfa clover and soy beans, the damage caused by the ground hog, or woodchuck, is becoming serious. It is especially fond of these crops and, besides, its burrowing makes the ground rough and hard to cultivate and often starts the forming of a ditch. Trapping and bounties have been

used to fight the pests, yet they seem to be on the increase. Gassing them is a new method which has been tried successfully in several localities in Iowa. Calcium cyanide is used. In the entrance to



the burrow 2 or 3 oz. of the chemical is placed. A long-handled kitchen spoon gets the material far enough into the hole, then the entrance is plugged with grass, sod, or an old gunny sack, to avoid any risk to the operator. The moisture in the soil causes the calcium cyanide to give off hydrocyanic-acid gas, which is so deadly that it kills the pests in a few seconds. In one township of Iowa, where about 6,000 burrows were treated, only a very few of them opened again, showing that the animals had been killed in great numbers.—F. L. Clark, McGregor, Iowa.

Simple Paintpot Hook

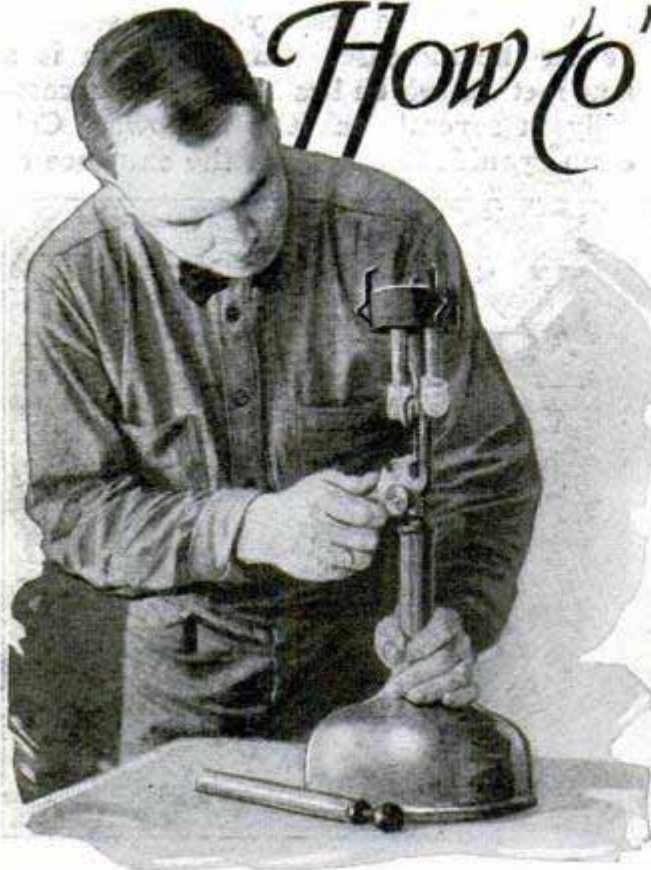


A simple paintpot hook intended for use on a ladder is shown in the drawing. It consists of a length of No. 9 galvanized-iron wire bent to the shape shown. Fasten it to an ordinary spring snap. This allows the bucket to hang on the outside of the ladder, and the bail will assume a slanting position so that

it is out of the way of the brush.—W. W. Irwin, Albany, Ohio.

How to TAKE CARE GASOLINE

by L. B.



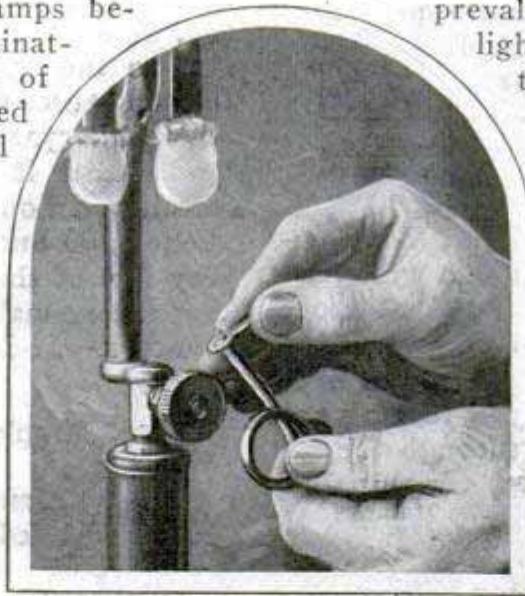
WHERE rural communities are as yet unsupplied with electric current for lighting, gasoline lamps have supplanted the old-style kerosene lamps because of their great illuminating power. Thousands of such lamps are now used and homes are well lighted even without electricity. But, like anything else, gasoline lamps are sometimes subject to little troubles that affect the illumination or cause the lamps otherwise to function improperly.

When the flame dims, the valve steams or the illumination is irregular, just keep in mind that there is practically no danger provided the filler plug is not removed and the gasoline in the fount exposed to air while the lamp is lit or the mantles are in the least bit incandescent. Turn the valve off and wait until the mantles become white and cold and then you can proceed to trace the trouble and remedy it. Troubles with the gasoline-lamp illumination can be traced to either an improper

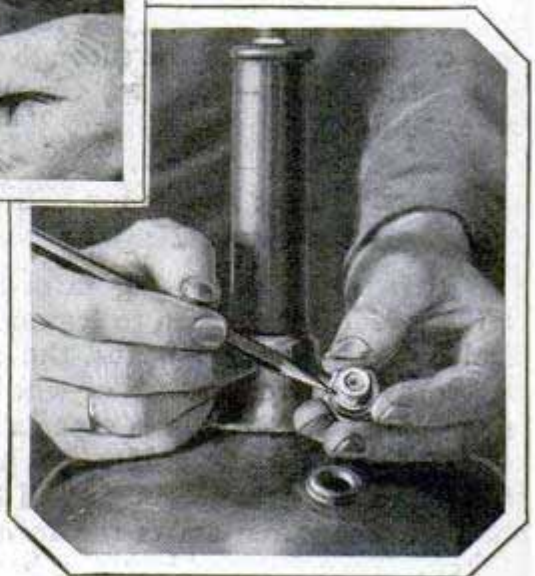
mixture of gasoline and air in the mixing chamber over the mantles, a plugged generator or impure or dirty gasoline. Either of the first two troubles may be due to several causes, but the elements of poor lighting remain unchanged.

First, last and always, use a good grade of gasoline and strain it when filling the fount. This is essential because the gasoline enters the mixing chamber through a very minute hole and any impurities will surely plug the aperture and cause loss of pressure. Also, good gasoline will form much less carbon than cheap grades, and this keeps the generator passage clear for its normal life.

Dependent upon the above is the most prevalent cause of dimming lights: a carbonized generator or plugged tip. These conditions usually give warning by a gradual dimming of the light, which may extend over a period of several nights. More and more air pressure



Unscrewing Generator Tip; Right, Inspecting Lead Washer on the Filler Plug

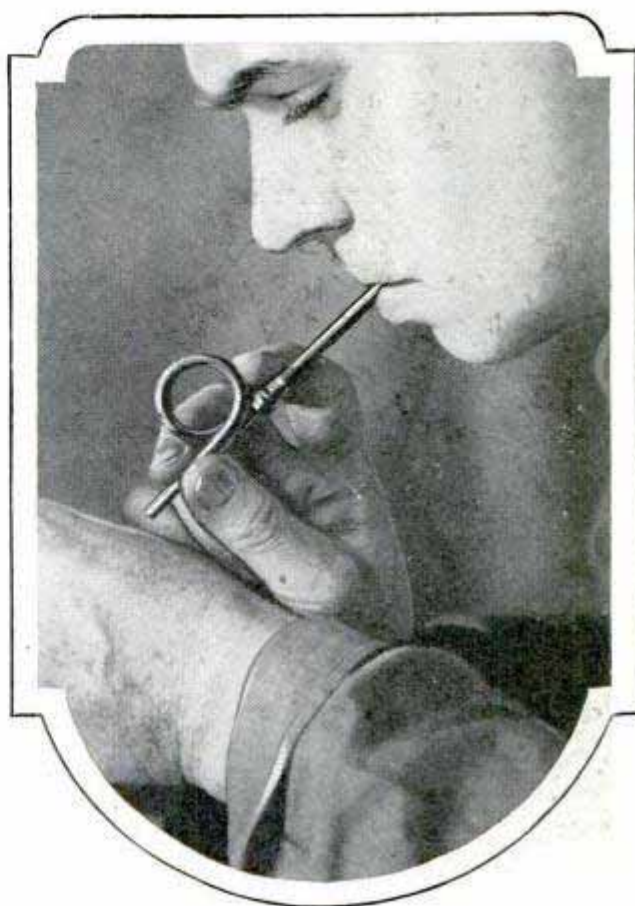


OF YOUR LAMPS

Robbins

must be pumped into the fount as the dimness increases, but finally the brilliancy falls so that the lamp is practically useless. Assuming that there is the required amount of gasoline and air in the fount, it is necessary to remove the generator. This is best done by grasping the circular portion of the generator with the fingers of the left hand and then turning the nut at the bottom of the generator to the left, which unscrews it from the seat below and between the mantles. Use the wrench provided for the purpose or a pair of smooth-nosed pliers.

Lift the generator from its seat, taking care not to injure the mantles, and first inspect the tip. This may be cleared of obstructions by means of the fine wire in the holder usually provided for the purpose by the makers. If, on retrial in the lamp, the light still remains dim, the trouble probably lies somewhere else; undoubtedly the generator is carbonized. Prove this by removing it once more

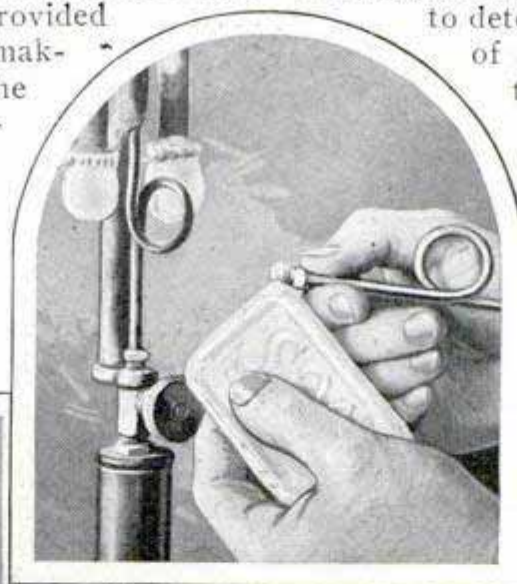


from the lamp and taking off the tip with the wrench. Then blow hard through the threaded end of the generator and attempt

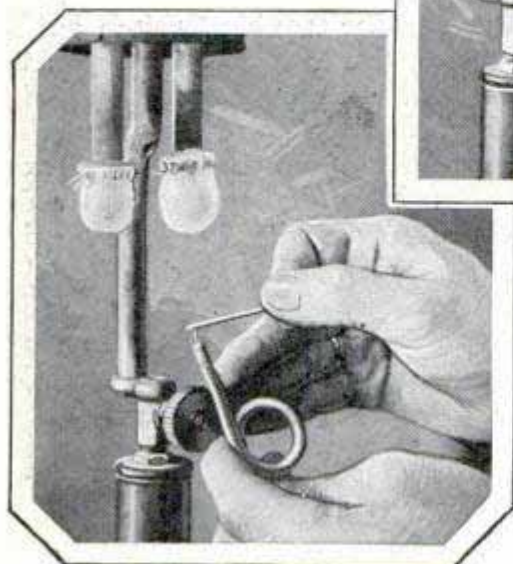
to detect the presence of a stream of air by holding the back of the hand close to the end from which the tip has been removed. In a clean generator, you will be able to feel a fine, cool stream of air on the skin. If the generator is plugged, no passage of air can be felt under normal lung pressure. Throw the generator away and substitute a new one. Trying to clear a carbonized generator is useless labor.

The fine passage is filled with asbestos which, with an accumulation of carbon from long use and low-grade gasoline, eventually makes a solid mass that thoroughly closes the passage to any flow of gas even under high pressure.

When a new generator is to be put in the lamp, clean out the tip and blow through the generator as previously described, so you will be sure of a



Above, Soaping the Generator Threads; Left, Cleaning Out Generator Tip

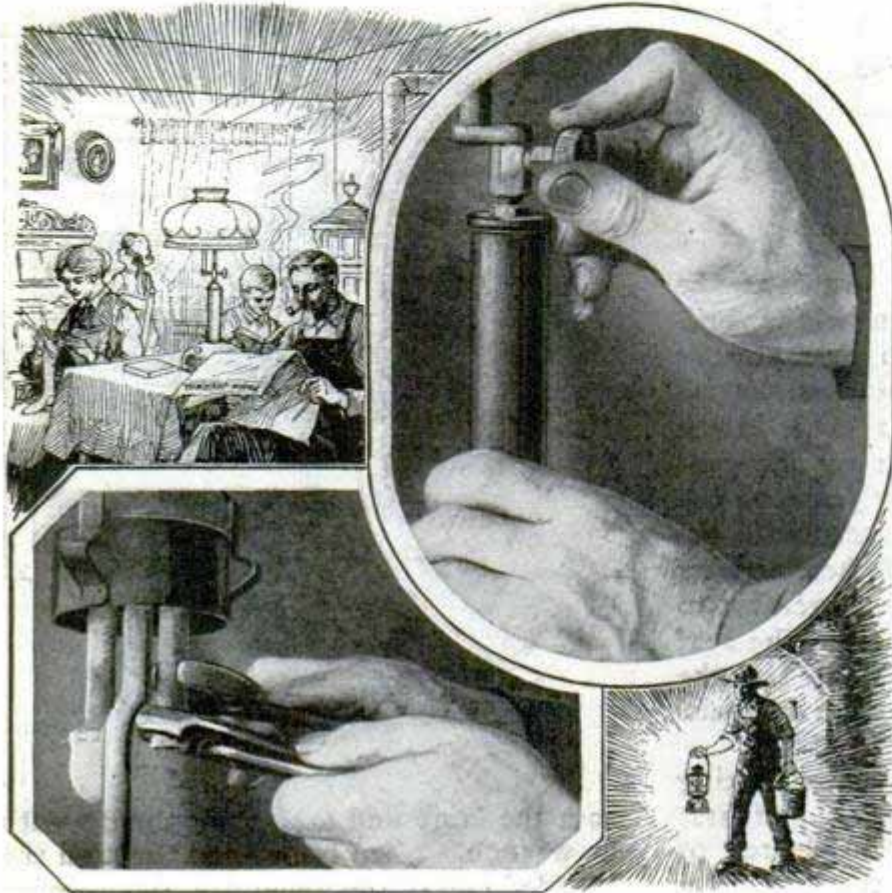


good replacement at the start. Never use a needle to clear a tip. It is much too big and will ream the tip hole so large as

be clogged with soot or other foreign matter. This rarely happens, but if it does, blowing the tubes out with a tire

pump will usually clear them. Another cause may be that the screens at the lower ends of the tubes to which the mantles are attached may be clogged with scale that has dropped from above. Or perhaps they are burned through by heat. If either of these conditions is discovered, remove the screens from the tubes by using two pairs of pliers, as shown, and either clean the meshes or put in new screens. A carbonized generator may also cause this condition, and the removal and treatment of this unit have already been described.

Sometimes, after all the foregoing remedies have been tried, there is still lack of pressure through the generator



Above, Testing Flow through Valve; Below, Removing Screen from Lower End of Mantle Tube

to render it useless. This hole has been drilled with great accuracy and is large enough to feed the gas into the air chamber above to form a mixture of the right proportions. A larger hole will admit too much gas, the mixture will be too rich and the mantles will blacken, thus destroying the proper functioning of the lamp. When replacing a generator, it is wise to rub the threads of the nut with soap. This is unaffected by gasoline and makes a tight joint. If not soaped, gas is likely to seep around the threads and will sometimes take fire and burn with a small flame. While there is no danger in this, a little soap on the threads will prevent it and make a workmanlike job.

Now let's consider blackening of the mantles. This occasionally happens from no apparent cause, but there is a reason for it nevertheless. As previously stated, it may be caused by a too large hole in the generator tip. If so, the remedy is obvious: renew the tip. In some cases the air chamber above the mantles may

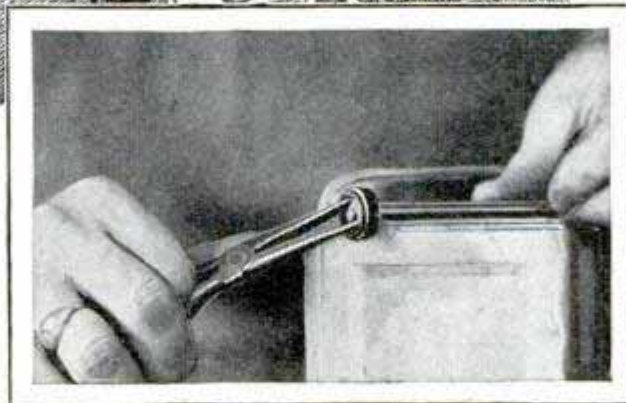
with one or more of the unsatisfactory results following. There is still the possibility that some foreign substance has been forced up from the fount to lodge in the valve and thus cut down the flow of gasoline to that point. To test this, remove the generator and turn on the valve very slowly. If no gasoline spurts out into the fount with plenty of pressure, you have found the trouble. Often opening the valve wide and closing it as quickly as possible will clear it. If not, try running a fine, flexible wire through the crooked opening. Always be careful not to get any soap from the generator threads into this seat, as it will surely lodge in the valve passage below and clog it. As a last resort, release the pressure from the fount and, opening the valve, try forcing air through it by means of an automobile pump. This will often do the trick. Then pour out the gasoline in the fount, strain it, pour back and flush it a second or third time, and then fill with freshly strained gasoline.

Occasionally air pressure cannot be retained in the fount. This, of course, causes the light to dim after the lamp has been lighted a short time and might be mistaken for plugged passages above the fount. A few strokes of the pump will show whether pressure in the fount has escaped. The only probable place this can happen is through the filler plug. Remove the plug, turn it over and inspect the lead washer. If nicked or torn it will surely allow some air to escape. A new one can be quickly slipped on and reseated by simply screwing the plug down in place. Then again there may be a speck of dirt at the bottom of the air stem in the plug. Unthread it and take it out, then squirt a bit of gasoline around it. This will loosen any dirt that may have accumulated around the ball check in this passage and thus allow the ball to close automatically, as it should when the pump is removed from the stem. These two points, and a leaky valve above, are the only three logical points from which air pressure can escape from the fount. So, by eliminating the valve first, any loss of pressure can finally be traced either to the filler-plug washer or the air-stem ball check inside the plug. After considerable use the leather washer to the plunger inside the pump may become so worn as to refuse to pump air into the fount. When this happens, remove the two little screws in the wooden plug in the top of pump, pull out the plug and then remove the plunger rod. As shown in the photograph, the nut holding the plunger washer in place can be removed with a pair of slender-nosed pliers and a new one installed by reversing the procedure. Then a drop of thin oil will lubricate it.

The principle of the lamp is simple.

It consists in forcing a fine stream of gasoline through a continually heated copper tube, to mix with the right proportion of air and flow downward into the mantles as a gaseous mixture. Use clean gasoline and a good air pressure in the fount to force it up. Then keep the valve free and tight-closing, use only free-flowing generators and tips with openings of right bore. When a mantle breaks, replace with a fresh one, because a broken mantle means loss of light and possibly a cracked shade from an escaping flame.

Assuming that you already understand the lighting and general handling of a gasoline lamp, with proper attention and care it should last for years with only an occasional replacement of some part that will naturally burn out from the intense heat. Luckily these parts are few and cost little. Study the few little tools furnished by the manufacturers. Each serves a purpose and should be used when necessary. Then, when a little trouble occurs, you will know how to correct it. There is absolutely no reason for shelving such a lamp because it has failed to shed its former brilliancy. Too many times this has been done, so take down the idle lamp, and, by following the foregoing rules and the accompanying illustrations, you should be able to remedy the trouble.



Removing the Nut That Holds the Washer on the End of the Pump Rod



Protecting Tractor Radiator

A shield made by attaching heavy hail screen to a wooden frame and hinging the latter to the base of the radiator of the tractor prevents corn stalks from breaking and bending the fins of the radiator.

The frame with the screen is set at an angle, leaning forward to push the stalks down. It is attached to the top with a brace and hinged, to facilitate its removal and allow cranking of the motor.

Rotating Advertisement on Auto

A phonograph-shop proprietor in Jackson-



Advertising Phonograph Records by Means of Rotating Wheel on Auto Radiator

ville, Fla., who is a firm believer in the advertising value of motion, made a large wheel out of tin, arranged it so that it would turn on a pivot when set in the wind and mounted it on the radiator of his auto. A full-size picture of a phonograph record was pasted in the center of the wheel. As he travels around the city this rotating sign attracts much attention.—Russell Raymond Voorhees, Jacksonville, Fla.

Twine Holds Crankcase Gaskets

To avoid the annoyance, delay and expense of oil-pan or crankcase gaskets slipping out of place while the pan or lower half of the crankcase is being fitted into position, tie the gasket lightly in place by



means of lengths of easily broken twine, threaded through two or more holes in the gasket and pan, as shown in the drawing.

If shellac is used to fasten the gasket, time must be allowed for it to dry be-

fore fitting the pan and it always will be a slow and unsatisfactory job to clean off the old gasket when a new one is needed. By tying the gasket in place, the pan can be set into position without any danger of the gasket slipping off and several studs can be started. Then the twine is pulled out and the rest of the studs are driven in.—G. C. Douglas, Raleigh, N. C.

Keeping Soapstone Handy

While running a lathe I had occasion to use a piece of soapstone very often to determine if the stock was properly centered in the chuck. My soapstone was always getting lost or broken, and I spent more time looking for a new stone than I did in centering the stock. So I devised the simple method of attaching a dozen rubber bands to the stone and fastened these to a length of strong twine suspended from the ceiling. This ended my trouble; the soapstone was always at hand yet entirely out of the way.—Thos. H. Duffy, Juniata, Pa.

Simple Holder for Soldering Copper

The user of either the electrical type or the flame-heated soldering copper will appreciate the attachment shown in the drawing. Bend a small piece of iron or spring wire to form a large coil and clip this to the bit so that the handle end will be heaviest.

When hot, the iron is rested on this simple holder without burning the bench or table top.—G. A. Luers, Washington, D. C.



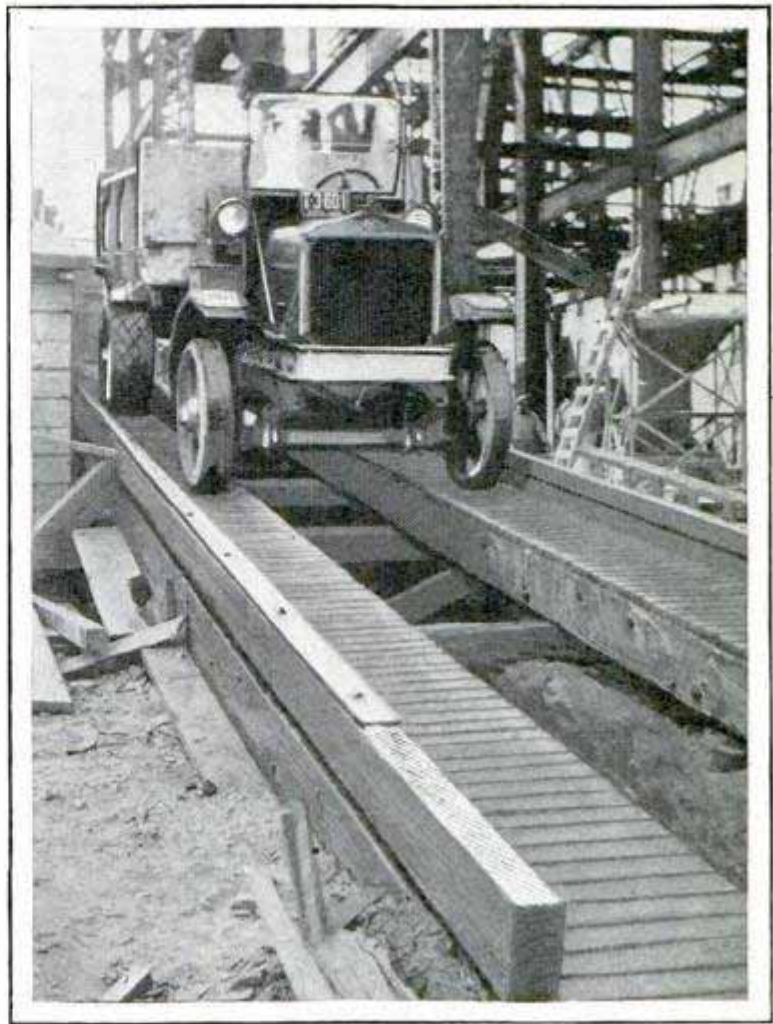
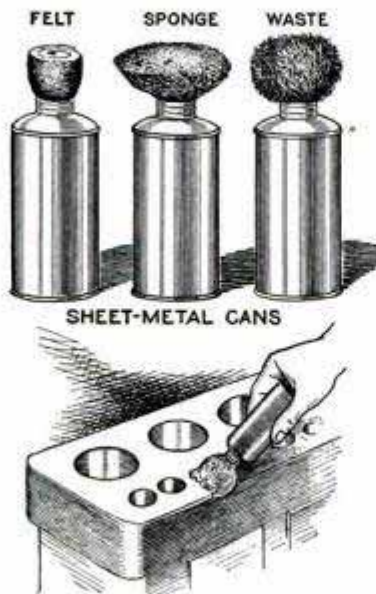
Easily Made Socket Wrenches

Sections of seamless steel tubing, cut from the frame of a discarded bicycle, can be made into strong, serviceable socket wrenches, which will reach almost inaccessible places and take a firm hold on stubborn nuts and hexagon machine-screw heads. Get a nut of the size you

wish your finished wrench to fit and, after screwing it to a bolt of the same thread, clamp the bolt firmly in a vise. Then, with a hacksaw, cut a piece of tubing from the bicycle frame, long enough to provide a sufficient handhold. Heat the end red-hot and drive it quickly over the nut, tapping the sides to a snug fit. If, by chance, the tubing is a trifle too large, it can be shrunk easily while hot by hammering carefully and turning the metal beneath the hammer, and if too small, a tapering punch driven into the end will enlarge the opening sufficiently. Drill a hole through the handle, insert a piece of round stock for additional leverage, touch up the rough spots with a file, and you will have a good wrench.—J. W. Briggs, Poughkeepsie, N. Y.

Practical Gasoline Brushes for Cleaning Parts

Gasoline brushes for cleaning parts can be made up quickly and at small cost, as shown in the illustration. Open-mouth cans are fitted with a sponge, a roll of felt or a wad of waste. As these brushes are absorbent, they take the gasoline which is contained in the can and apply it to the surface to be cleaned. The use of the materials suggested depends upon the need for either a slow or a rapid feed; the sponge permits an almost continuous flow while the felt only keeps moist. One feature of this method of handling the gasoline is that the brush can be set aside and the stopper will prevent the contents from evaporating.

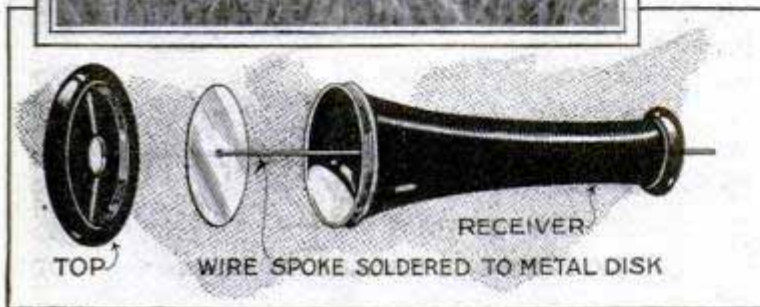


Inclined Runway to Concrete and Sand Bins Which Feed a Mixer Located in Excavation

Runway and Large Material Bins Save Time in Concrete Mixing

By installing his mixing plant and hoisting mast in one corner of the excavation of a building with bins holding 50 yd. gravel and 30 yd. sand, which are filled directly from trucks, a western contractor saves a great deal of time and labor. In order to reach the bins with the trucks, a runway of heavy timbers was laid to them from the curb. The wheelways were made of narrow strips, laid crosswise to afford traction, as there was considerable rise in the runway. Guard rails of heavy timber were provided on the sides. Three men mix concrete and it goes into the building at the rate of a batch, or $\frac{1}{3}$ cu. yd. of concrete, per minute. This method eliminates the gang of laborers who usually wheel the material.—J. C. Coyle, Denver, Colo.

☛ To split off a tight machine nut with a cold chisel is sometimes more economical than to risk ruining the bolt threads.



Simple Device for Detecting Leaks in Water Pipes, Made from an Old Telephone Receiver

Device for Detecting Water Leaks

A water company's instrument for detecting leaks in pipes having been broken accidentally, an inspector made a simple and efficient device to take its place. In the small end of an ordinary telephone receiver case he placed a cork, and after cutting from a broken steel spoke in a truck wheel a piece about 3 in. longer than the receiver, he soldered a metal diaphragm, of the same size as the thinner diaphragm removed from the receiver, to one end of the steel wire and filed the other end to a point. Then he removed the cap from the case, inserted the point of the spoke and forced it

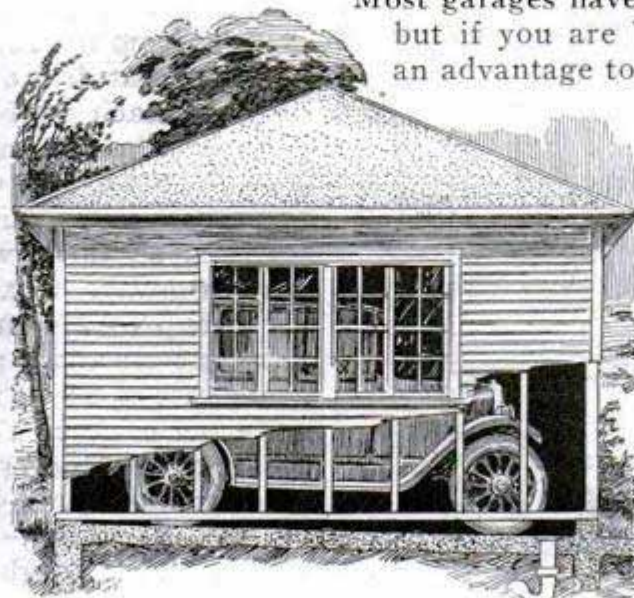
through the middle of the cork, seating the new diaphragm in the place the phone diaphragm had occupied. The cap was then screwed on again. When the point of the spoke is applied to a pipe, or to any metal connected with the water system, and the ear placed at the receiver, it is easy to hear running water if there is even a small leak within 200 ft. Leaks 500 ft. away have been detected with this device.

Precautions to Observe in Melting Lead

When working with hot solder or lead the experimenter should take care to prevent the molten liquid from popping into his face when he pours it. Any metal, such as steel and iron, absorbs a certain amount of moisture and, when hot lead or solder is poured into a mold of such material, the liquid will likely splash in every direction, if the mold has not been preheated to drive out the moisture. This precaution never should be neglected. The heating can be done with a blowtorch or the molds may be placed over a gas flame. The same safeguard should be observed in adding bits of dirty solder or lead to a pot of melting metal. The fragments should be dropped in carefully so that there will be no splash, and all dirty pieces should be cleaned.

Sloping Floor for the Garage

Most garages have a perfectly level floor, but if you are building one it will be an advantage to slope the floor slightly toward the door. This enables you to roll the car out of the garage by merely releasing the emergency brake, without the necessity of starting the engine. The incline also prevents water from entering under the door and remaining on the garage floor.—Dale R. Van Horn, Walton, Nebr.



Sloping Concrete Floor in Garage Has Distinct Advantages

Cutting Down the Fuel Bill

By N. L. REA

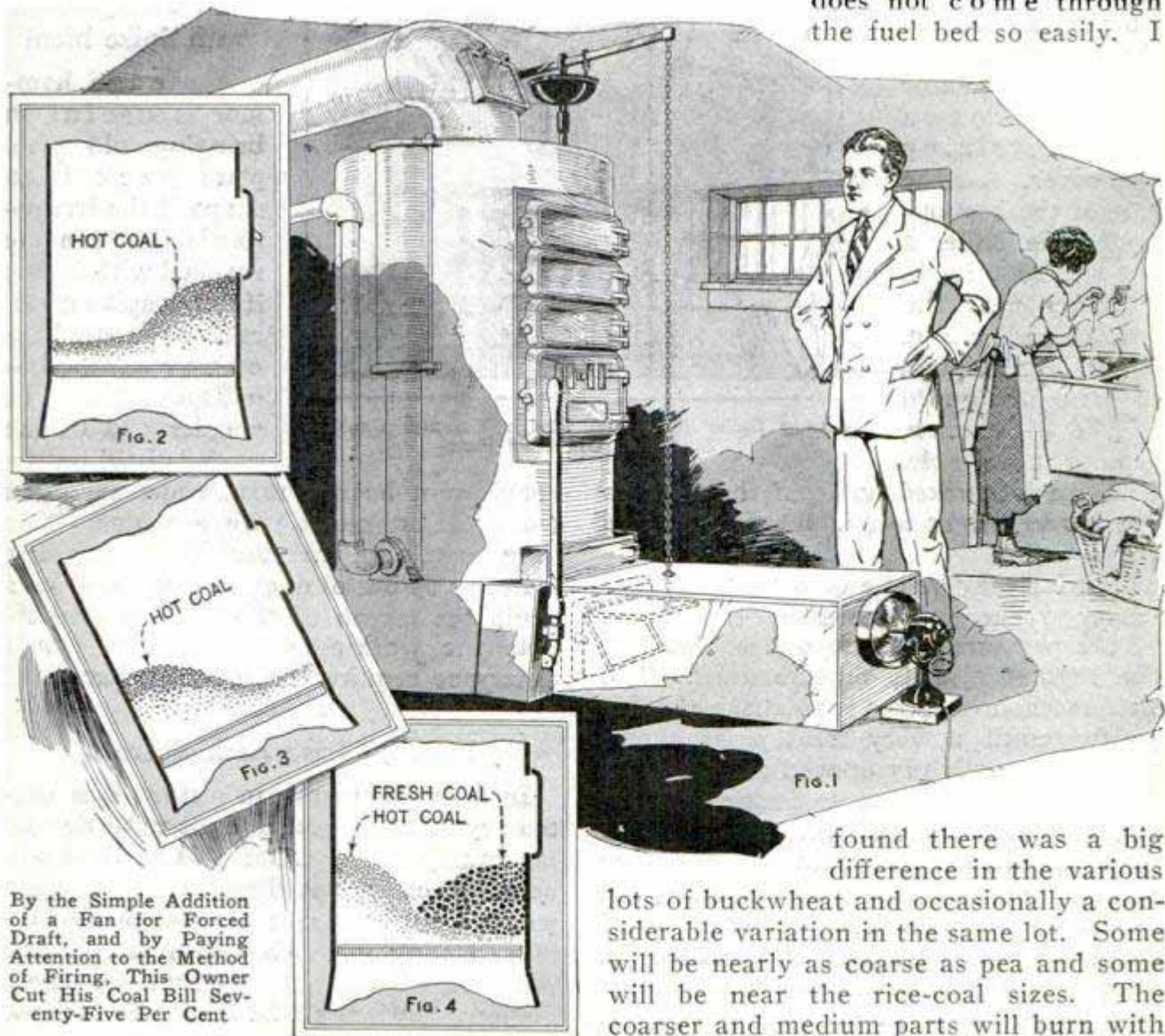
THE problem of burning the smaller sizes of coal will be an active issue with many householders this winter. Perhaps my experience will be interesting and instructive.

Two years ago I began experimenting with the aim of reducing my fuel bills. My heater is a standard vertical boiler designed for burning the larger sizes of coal. This has a rectangular fire box. First, I began mixing some pea with stove-size coal. Then I mixed two tons of stove, one ton of pea and a half ton of buckwheat. This worked so well that I bought some pea and buckwheat and kept them separate so I could experiment. I tried to obtain new grates with smaller openings for my boiler, but was unsuccessful

and decided to try what could be done with the regular grates.

To make a long story short, I am burning No. 1 buckwheat and getting heat aplenty. The procedure is as follows: The grates are set so they are all even and the openings between them as small as possible. The ends of the shaker extension are marked so that I can keep them in this position. One pair of grates did not match the others and the grates were lowered and these two shifted to match with the rest.

A thin fire is started with chestnut or pea borrowed from the kitchen-range supply, then the buckwheat used altogether. A thinner fire should be carried than when burning the large sizes of coal, as the air does not come through the fuel bed so easily. I



By the Simple Addition of a Fan for Forced Draft, and by Paying Attention to the Method of Firing, This Owner Cut His Coal Bill Seventy-Five Per Cent

found there was a big difference in the various lots of buckwheat and occasionally a considerable variation in the same lot. Some will be nearly as coarse as pea and some will be near the rice-coal sizes. The coarser and medium parts will burn with

natural draft, but the finer stuff needs some encouragement. Then, too, one may want to get heat in short order and the buckwheat is slow to respond to increased draft opening.

My thoughts naturally turned to some way of obtaining forced draft. There was a small 8-in. fan that wouldn't be needed while the boiler was in service and I decided to try to apply that to my problems.

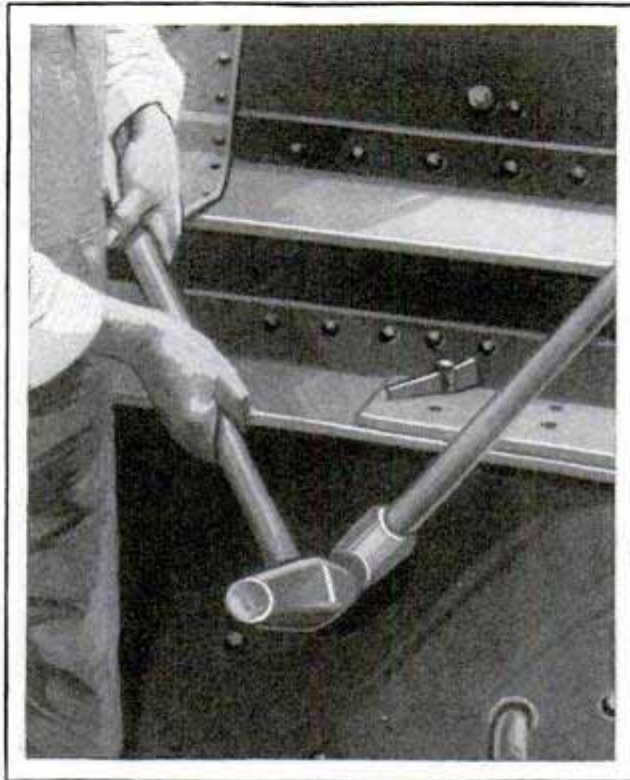
The arrangement is shown in Fig. 1, and is as follows: A box of galvanized iron, with one end open and having the concrete floor as its bottom, was made and set in front of the draft opening, its width being much greater than this. The box is nearly 2 ft. long. A 1/2-in. hole was bored through the cover, so located that the chain from the draft regulator drops through without striking the cover. In the side of the box opposite the boiler I cut a hole 8 in. in diameter near the top, and put a 2-in. collar, large enough to take the guard of the 8-in. fan, around the hole.

The fan is blocked up from the floor to the proper height to match the collar and the opening.

The fan may be idle or running as necessary to meet coal or weather conditions. If the pressure runs up due to the fan, the regulator shuts off the draft. The best method of firing is to shake the fire gently, until a very faint light shows through the slightly opened ash-pit door. Shut down the fan before shaking. Then open the fire door and, with an old spade or light slice bar, work any dead coal or ash out of the back corners and along the side of the fire box. If there are any dead spots in the fire, work them down gently, keeping a thin crust on the bottom. (See Fig. 2.) Then work the bulk of the hot

coal toward the back of the fire box, as shown in Fig. 3, leaving a thin layer of hot coals in front. The new coal is put in the front of the fire box, as in Fig. 4. This gives a belt of red-hot coal across the back so that every bit of gas from the fresh coal is burned. In general the depth of the fire is about half to three-quarters of that carried with larger coal.

Of course, it takes a little more care and some experimenting to learn the right way of handling the coal and draft, but I realized a saving of 75 per cent in my fuel bill and that was worth working for. The radiators were equipped with vacuum-type air valves, and all valves re-packed to eliminate air leaks.



Railway Spike Maul and Sledge Hammer Used to Straighten Old Steel Plate

Steel Straightened with Spike Maul

A sledge hammer is useful in bringing old steel plate back into shape if the irregularities can be reached with it, but if not, a spike maul, such as is used on every railway, is indispensable. The smaller end of the maul is held on the

rough spot by one man, while a second workman strikes it with a sledge. The long handle on the maul allows the first man to stay out of danger from the sledge, while the length of the maul itself permits the working of spots that would otherwise require the use of a bar.

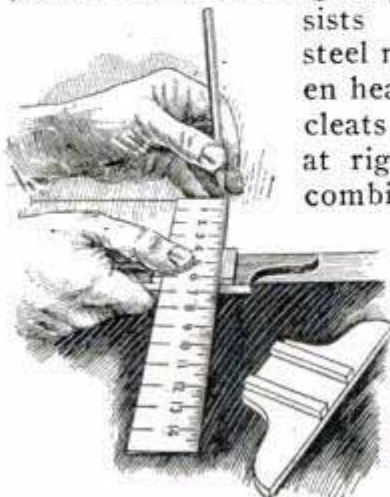
Fitting Wristpins in Pistons

In fitting wristpins in pistons it is customary to ream out the hole until the pin fits snugly in it. Often this method will be satisfactory, but there are some cases where a little more labor will result in a more lasting job. Cast iron and bronze are not always of uniform hardness. Sometimes when a hole is reamed the tool

goes through, the hard spots recede till the reamer is out of the hole and then spring back. This happens especially with a dull reamer. The spring of the metal is slight yet sufficient to make a loose fit after a short while. When a wristpin is driven tightly through such a hole, it bears against the metal only at certain spots, with the result that the hole will not keep its size very long. A better job, because more lasting, is made this way: Ream out the hole about .0005 in. smaller than the wristpin. Drive the pin through after it has been coated with Prussian blue or chalk. The high spots will show up shiny. Carefully remove these with a scraper; drive the pin through a few times, and repeat the scraping till the connecting rod will fall by its own weight when assembled. In scraping the hole, take care to work in different directions; that is, cross the scraping marks to prevent vibration marks. If no micrometer is at hand, another method can be followed. When the hole is reamed until the wristpin starts to go into the hole tight, or starts to bite, it is ready for scraping. A clearance of .002 in. will produce a knock at high speed, the first thousandth is the most important. Pistons get out of round sometimes when driving the wristpin in, even without scraping, but can easily be made round again by light pressure in a vise. Holding it in the hand and hitting it with a wooden mallet or a soft hammer will also do the job.—J. H. Smit, Newark, N. J.

Combination Gauge and T-Square

Carpenters and cabinet makers will find the combination gauge and T-square shown in the drawing very useful. It consists of an ordinary steel rule and a wooden head provided with cleats to hold the rule at right angles. The combination takes less space in the tool box than a separate gauge, ruler and T-square, and is just as handy as the latter.



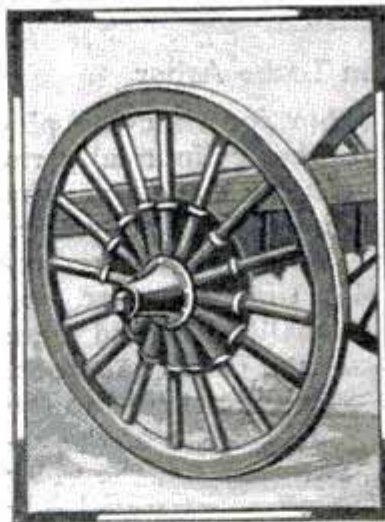
Shield Stops Flying Rivets

Many injuries were suffered by the men in a Denver steel shop from rivets flying through the air, when they were driven out by an air hammer or with a back-out tool and a sledge, so a shield was provided to prevent this. This shield is bent at one end so that it can be hung up in front of the flying rivets. When driven out, they strike the shield and drop harmlessly to the ground.—Jos. C. Coyle, Denver, Colo.



Reinforcing Weak Wagon Wheels

Where wooden wheels are subjected to extremely heavy strain, as in hauling sand, cement, stone, etc., they can be strengthened by the simple and easily made device shown in the photo. It consists of a sheet-iron disk cut out in the center so it can be slipped over the hub on the inside of the wheels and fastened securely to the spokes with U-bolts. The disk offers a counter effect to the outward tilt of the spokes and prevents the wheel from collapsing, no matter how heavy the load may be.—Ralph W. McPherson, Wahoo, Nebraska.



Wood may be preserved indefinitely by keeping it perfectly dry or submerged in still water, to prevent attacks of insects.

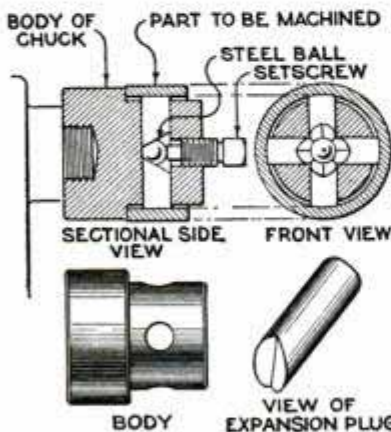
Safety Measure for the Electric Switch



The drawing shows a simple but efficient method of making an electric throw switch safe. Raise the switch to a height of about 8 ft. Cut down a broom handle to a length of 4 ft. and have a blacksmith make an iron clamp, about 8 in. long, on which the handle is to pivot, and two links which attach the handle to the switch. Drill two holes through the broom handle, one about 2 in. and the other 10 in. from the end, and mount the broom handle as shown.—Grover Brinkman, Okawville, Ill.

Expansion Lathe Arbor

An expanding arbor for chucking pistons, bushings and other cylindrical parts in the lathe is very easily made from the accompanying drawings. The body is of steel or cast iron. Four holes, intersecting at right angles to the center, are drilled through the smaller part and these are fitted with sections of round bar stock, the outer ends of which are curved to the



arc of the arbor, the inner ends being slotted with slanting V-grooves for a small hardened-steel ball. When the setscrew in the end of the body is turned in, the ball forces the expansion plugs out on four sides, gripping the work and holding

it tightly. Only a slight movement of the wrench is necessary to set a part on the arbor or release it.—G. A. Luers, Washington, D. C.

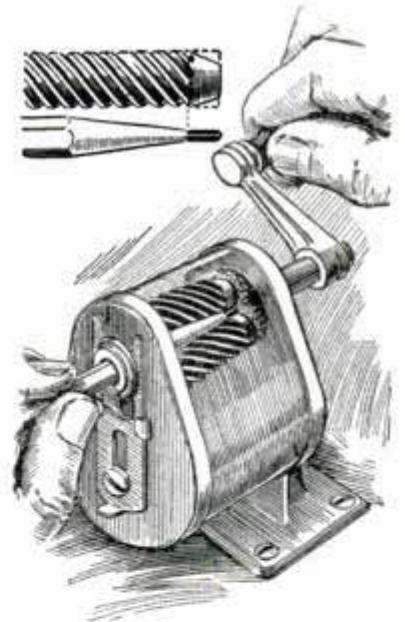
Handy Case for Printers

One of my acquaintances, who is employed in a large printing shop, obtained a number of boxes in which sewing cotton had been packed, these being 4 in. wide, 6 in. long and about 1 in. deep. Cardboard partitions, sewed with strong thread, were arranged in them, in the same order as the standard quad cases. Being so small, the boxes can be carried to any part of the shop, the type set from the case and spaced on the spot, instead of running back and forth. Although the boxes are made of cardboard, they last for quite a long time and the cost involved is practically nothing.—H. R. Calhan, San Francisco, Calif.

Improving the Pencil Sharpener for Draftsmen's Use

Pencil sharpeners of the ordinary style grind the lead to a point which is unsuitable for draftsmen. This difficulty can readily be overcome by removing the cutters and grinding the cutting edges toward the handle smooth for about $\frac{3}{8}$ in.

as indicated. This clearance may have to be varied depending upon the casting.—W. J. Edmonds, Whitehall, N. Y.



How to Adjust Coulters of Plow to Do Best Work

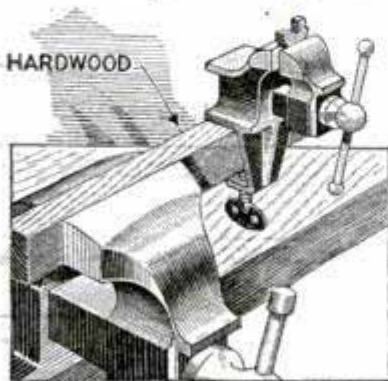
The rolling coulters of any plow has two particular purposes. First, it should cut through all trash, such as old stalks, grasses, etc., so that the portions of these

outside of the landside will not be turned in with the furrow. Otherwise this trash will be thrown on top of the plowed ground rather than turned under it. Second, the coulter should cut the earth in a clean, straight line so that the moldboard can lift the dirt cut with ease and without breaking or tearing it apart. To do these things, the coulter should be set so that it will run about 3 in. back from the point of the share, that is, the axle of the coulter should be set at this point. Following directly in line with the shin, or outer side of the moldboard, the coulter should be set to cut $\frac{1}{2}$ or $\frac{3}{4}$ in. outside of this. This insures a cleaner-cut furrow and prevents the bank of the furrow from rolling down after the plow has passed. These adjustments should be made after the plow has been started, as it is then easier to find the line in which the swiveled coulter will run, than attempting to get it into the correct position after you have begun plowing.

Large Vise Holds Small One

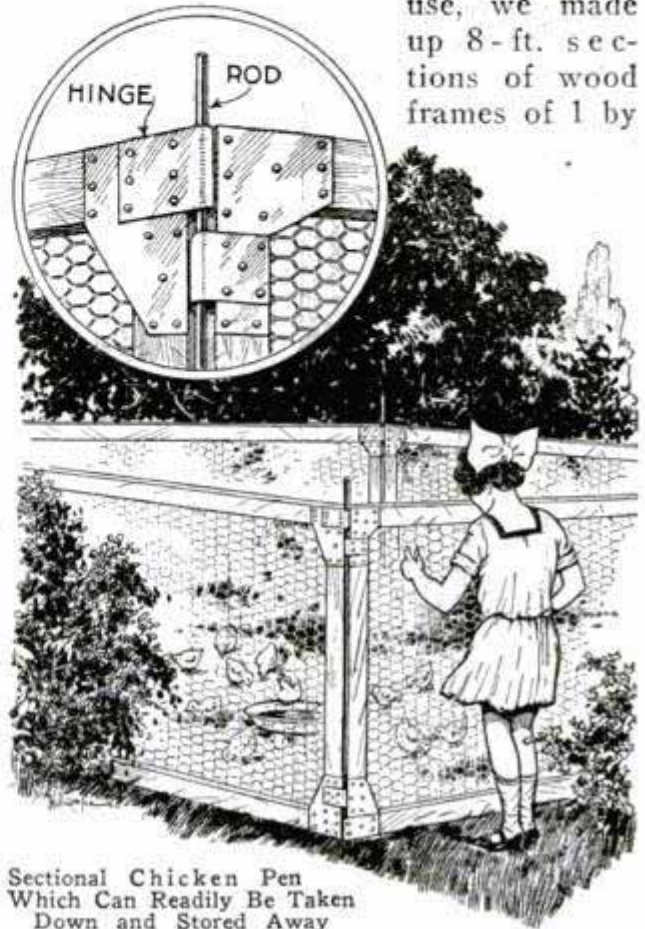
Experimenters often find use for a small vise, and if a large vise is available it can be used as a holder for the small one as shown in the illustration. The latter is attached near one end of a piece of 2 by 2-in. hardwood, about 1 ft. long. This is clamped in the large vise when in use, and can be held solidly in several positions. The small vise is better located for use than if attached to the top of the ordinary bench, which is often too low for small work. Also, as many small vises have a screw clamp on the base, they will not open far enough to clamp on the edge of a thick bench top. Some small vises have two screw holes for attachment to the top and these can be attached to the hardwood stick by means of two wood screws or stove bolts.

—E. T. Gunderson, Jr.,
Humboldt, Iowa.



Portable Chicken Fence

To do away with bulky chicken pens that were always in the way when not in use, we made up 8-ft. sections of wood frames of 1 by

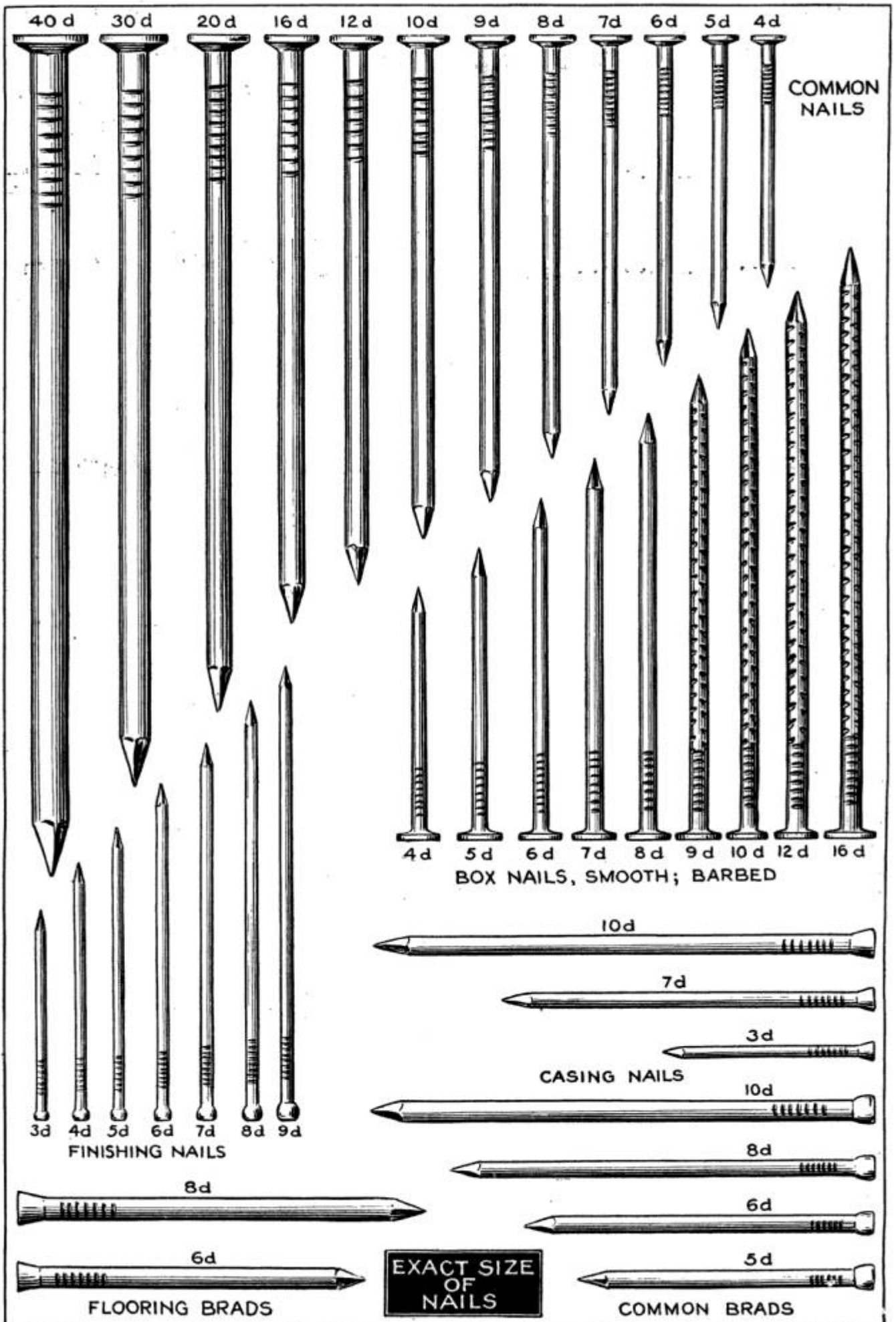


Sectional Chicken Pen
Which Can Readily Be Taken
Down and Stored Away

2-in. material and covered them with fine-mesh netting. At the ends we tacked on loops of tin so that, when the ends of the frames were brought together and an iron rod run through the loops, they served as hinges. For the baby chicks we used as many of these sections as necessary to accommodate them. To insure greater stability the rods may be driven into the ground after they are inserted through the hinge loops. The pen is easily and quickly taken down or moved, and any size or shape of pen that best suits the needs and the ground on which it is to stand can be built. When the chicken season is over these sections come in very handy to protect the garden, new flower beds or to set up a tight but temporary fence wherever needed. And when all use for them is over, they can be taken apart and stored away.—R. W. McPherson, Wahoo, Nebr.

Ⓞ A special file should be provided for filing babbitt and it should be oiled slightly to prevent the metal from sticking.

Tack This Up in Your Home Workshop

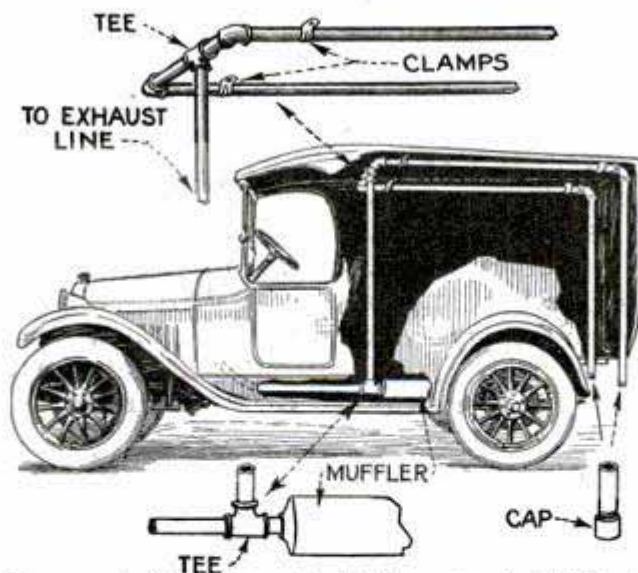


Cement for Asbestos Steam-Pipe Covering

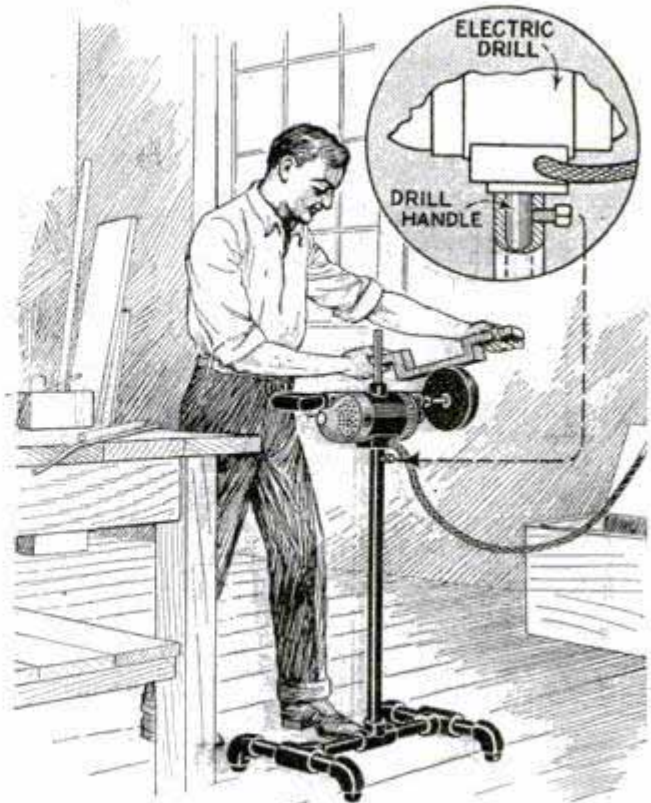
When steam pipes are to be covered with asbestos and the cellular covering so common nowadays cannot be had, a good covering paste can be made as follows: Mix a thick paste of ground asbestos and a solution of sodium silicate. Then add a small amount of calcium chloride to render the mass insoluble after the paste has set. Steam will not soften it, and it will cling to the pipe and offer good insulation.—L. B. Robbins, Harwich, Mass.

Heating the Delivery Truck

During winter months the groceryman, milkman and others, who must deliver their products some distance, will find a heater within the car of a great advantage. Commercial exhaust heaters cost from \$15 to \$25, including the installation, and a serviceable heater can be made at much less expense. Remove the exhaust line and muffler from the car and insert a tee between the forward end of the muffler and the end of the exhaust line, employing 1½-in. pipe fittings. Then screw a vertical section into the tee fitting and insulate the lower section of this where it comes in contact with wood. Place a tee fitting at the top of this vertical pipe and run two branches, as shown, through the truck body. Run two lengths down with their ends just projecting through the floor of the car. During the summer months the ends of the pipes are closed with pipe caps, but in the winter these ends are left open so that the exhaust gases will circulate around the car.



Homemade Pipe Heater for Delivery Trucks Which Is Attached to the Exhaust Pipe



Simple Holder for an Electric Drill Which Permits It to Be Used as a Grinder

Portable-Drill Stand Enables Its Use as a Grinder

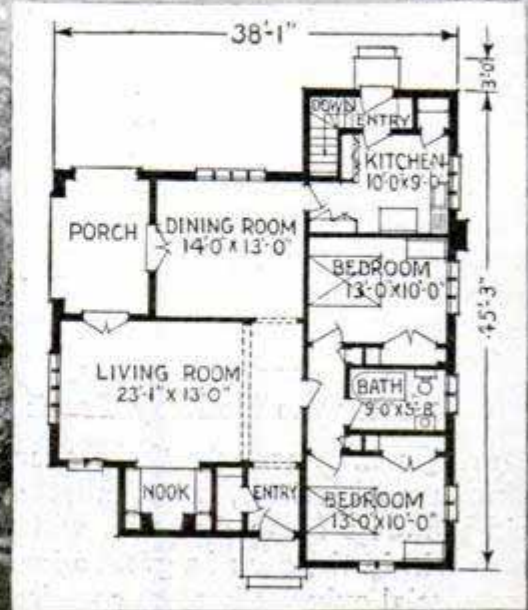
Besides being an ordinary holder for the electric hand drill, this stand permits the drill to be used as a grinder. It is made of lengths of ordinary gas-pipe and fittings. The construction is simple and can readily be followed by carefully observing the drawing. A small set-screw is driven into the top end of the upright and locks the handle of the drill securely, as may be seen in the insert.

Ⓞ Rivets should be cut off before they are put into place, so that just enough metal is available for proper riveting.

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Plan No. 5B6

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 endorsed by the United States department of commerce. Inclose 10c and self-addressed envelope. Blueprints, specifications and material list for the house shown here may be obtained at nominal cost. Inclose self-addressed stamped envelope for reply. If further information is desired, send 5c and stamped envelope for a 24-page booklet explaining how the Small House Service Bureau functions and showing 12 sample plans. A new booklet, entitled "Fifty Ways to Lower Home Building Costs," illustrated by ten bureau houses actually lived in, and showing how as much as \$1,000 can be saved on a home, may be obtained for 20 cents.

THIS bungalow should appeal strongly to those seeking individuality in a home. It is romantic in character, having its origin in the small farm houses of southern Italy. It has five main rooms, an inglenook, bathroom and five closets. The basement is only partly excavated, although a full basement can be provided.

The building plan of the house calls for hollow tile walls on masonry foundations. The exterior finish is troweled stucco. The roof is of mission tile. A lot from forty-five to fifty feet in width will be required.

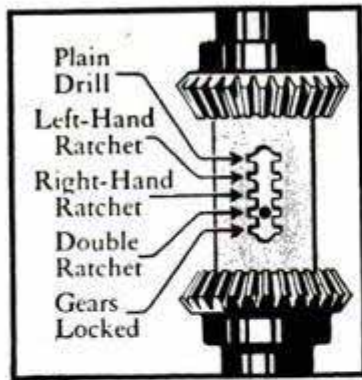
There are many interesting features. The general form is unusual, and the treatment of the inglenook and chimney is delightfully impressive. The break in the roof around the chimney softens the outline. The arched entrance doorway, well-proportioned gables, close cornice and casement windows with solid outside blinds combine interesting details, all of which contribute to a successful whole and a happy blending of the various units.

The living room is unusually long for a house of this size, twenty-three feet. An inglenook, containing fireplace, seats and bookcase is the outstanding feature of the room. The dining room faces the garden, and opens directly onto the rear porch. The kitchen is provided with every working convenience, plenty of cupboards and a storage pantry. The bedrooms are separated from the main part of the house by a private hall. Here is a bungalow of distinction that can be built in any section of the country.

Home Builders' Questions

Q. Please advise what is proper to use on a shingle roof, paint or stain? **A.** You may either paint or stain your shingles. In any case they should be preserved with creosote applied under pressure. It can be stained or paint can be applied over it.

Q. Someone has told me that I can get a powdered paint that will be cheaper than ordinary paint. Can I use this for exterior work? Where can I obtain this and how is it mixed? **A.** The paint you are inquiring about is so-called "water paint." It cannot be used for exterior work as it will wash off. Paints that are subjected to weathering must be mixed with a vehicle of oil. Water paints can be obtained in any paint shop.



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Ratchet Breast Drill
No. 1555**

A finger touch on Ratchet Shifter gives any one of five adjustments.



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Ratchet is a Short Cut to Results

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Ratchet Breast Drill No. 1555 (Illustrated), 3-jaw; No. 555, 2-jaw. Hold $\frac{1}{2}$ in. Drills. Ratchet Hand Drill No. 1545, 3-jaw; No. 545, 2-jaw. Hold $\frac{3}{8}$ in.

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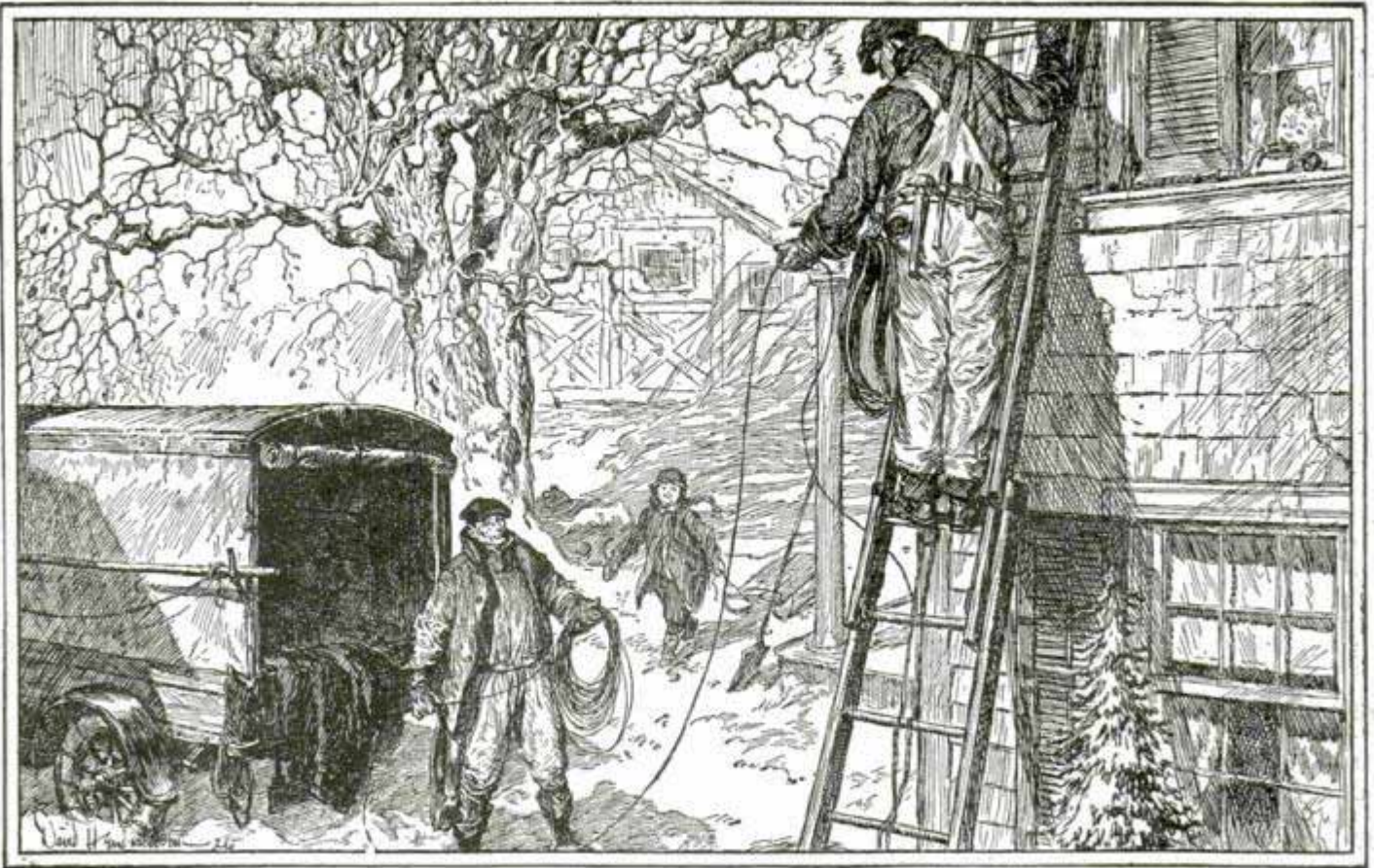
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Each telephone call may be compared to a taxicab, whose destination is controlled by the subscriber. The telephone company extends its wires to the homes and offices of those who desire service, placing its telephones within immediate reach. The call is made at the time, from the point,



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At the disposal of each telephone subscriber are the talking channels of the entire Bell System. He may make a call a few or thousands of miles, and he may extend his voice to any point, to any person who has a telephone.

This is the essence of communication. Because of it, the number of telephones has increased in the last five years three times as fast as population. Because of it, the Bell System carries more than twenty billion messages in the course of a year.

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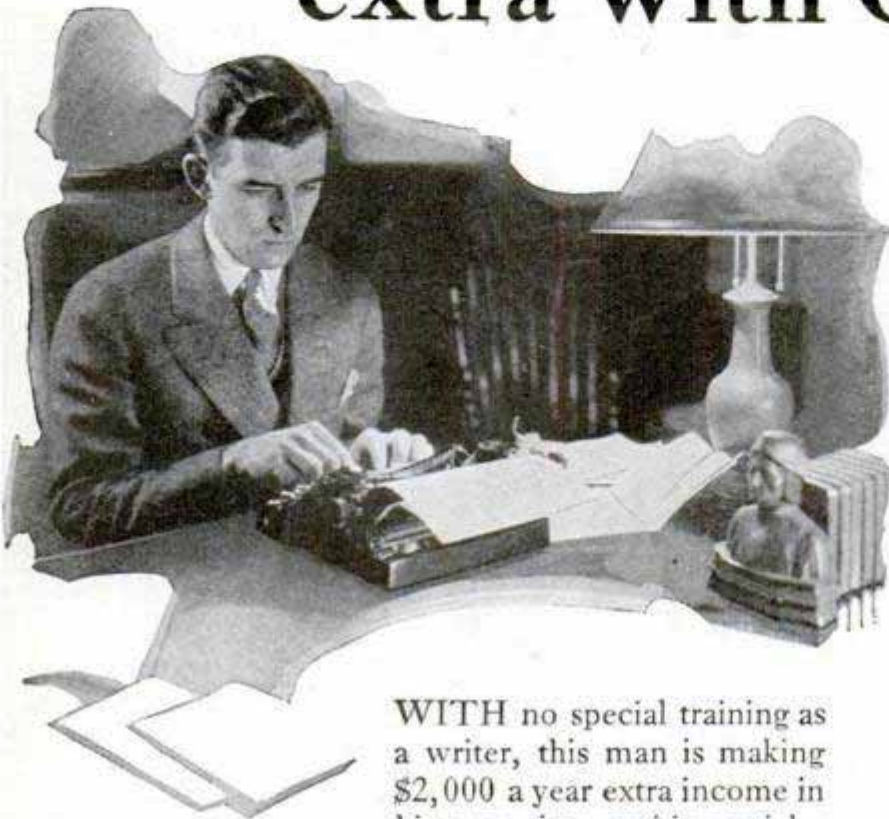
It's a real hatchet,—this Plumb. You can sink it deep—or slice just a shaving. Plumb balance sends the blade where you aim it.

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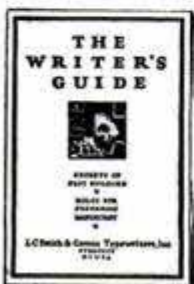
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Visit the Philco dealer, or if you prefer, mail this coupon to us and we will give you the full details direct from the factory. We will send you complete information on our Easy Payment Plan and Trade-In Allowance offer for your old storage battery.

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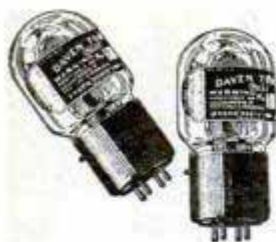
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Clarify and beautify Tone by utilizing the full power of which your set is capable without blasting or choking. MU 6, \$4.50. MU 20, \$4.



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Type A. Proper capacity for resistance coupling. Will pass every audible frequency without blocking. \$1.



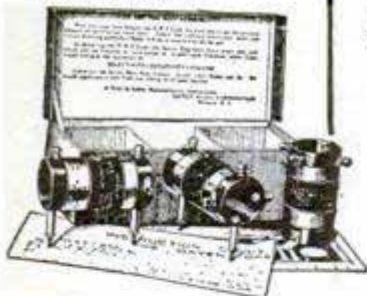
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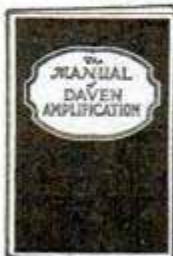
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BACK of every Daven Radio Accessory is one aim—to improve and perfect Tone in radio reproduction. Doing away with extraneous noises, avoiding distortion, preventing losses, are a few of the ways in which the Daven Radio Products contribute to the production of natural tone.

The clear, deep, natural tone of the Daven Bass Note Circuit which utilizes the various Daven units to fullest advantage, is proof of the success of the Daven aim.

This new radio hook-up, which we sincerely believe to be the most satisfying circuit ever produced, and whose principle is the basis of the leading factory built sets of the coming year, may easily be built by any radio enthusiast. The necessary units are obtainable everywhere that good radio parts are sold; or the Daven Bass Note Set may be obtained in factory built form.

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TRADE MARK "Resistor Specialists" REGISTERED
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DAVEN

FAMILY OF RADIO PRODUCTS



Daven Bass Note Set

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New Book for Set Builders

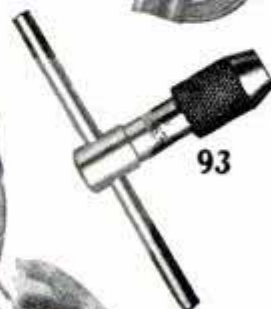
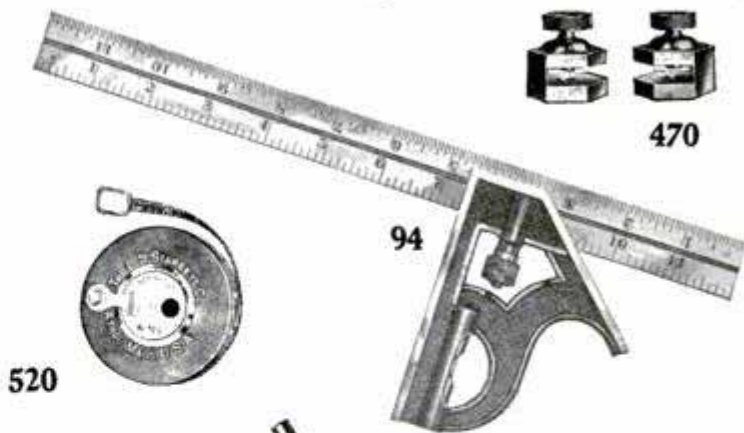
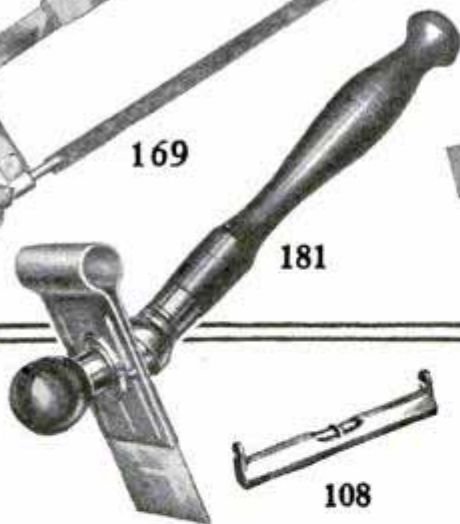
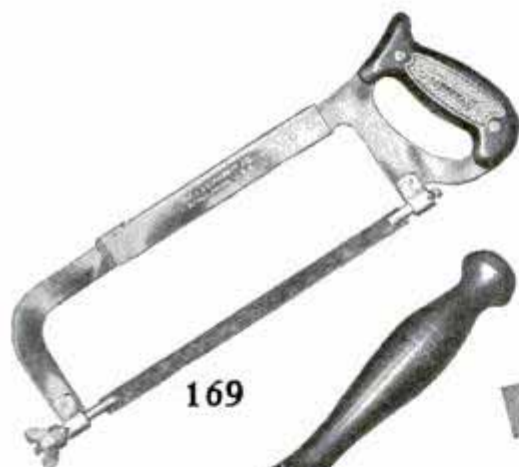
Tells simply, yet completely how to assemble a Daven Bass Note Set. Lifesize diagrams. Anyone can follow it. 25c at Daven Dealers. (30c by mail.)

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470

94

520

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No. 439. Floor, Bench and Cabinet Scraper
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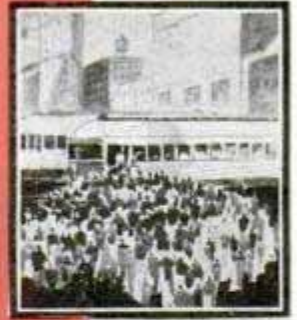
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SAFE-COMFORTABLE-EASY TO RIDE



A comfortable spin in the fresh air!

At quitting time you breeze home in comfort—while the other men are jamming into crowded street cars or busses. You get fresh air all the way—save time—enjoy a great outdoor sport—all at a cost of one cent per mile!

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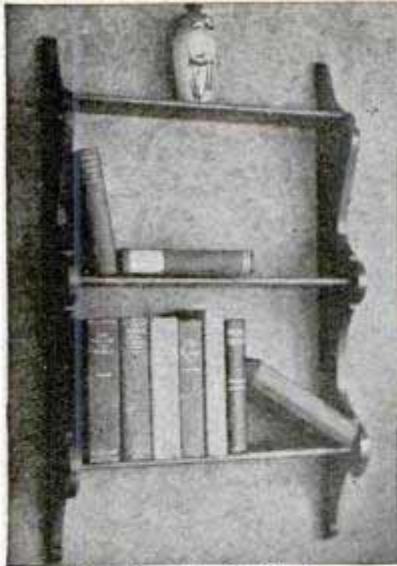
Big sales opportunities in open territories.

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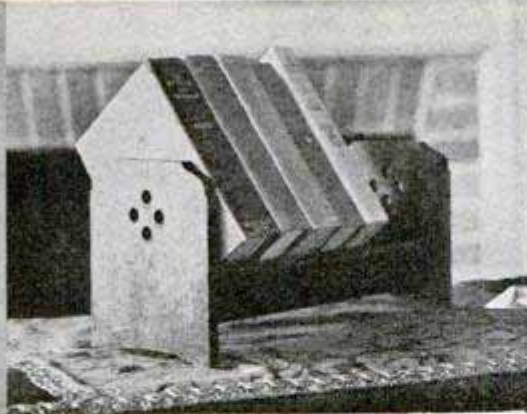
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Add the new Balkite Combination



U. S. Patent, Oct. 12, 1926

to your radio set now
with your "A" battery it supplies
all radio power automatically from
the light socket



Balkite "B"

—3 new models

Eliminates "B" batteries and supplies "B" current from the light socket. Three new models. Balkite "B"-W at \$27.50 for sets of 5 tubes or less requiring 67 to 90 volts. Balkite "B"-X for sets of 8 tubes or less; capacity 30 milliamperes at 135 volts—\$42. Balkite "B"-Y for any radio set; capacity 40 milliamperes at 150 volts—\$69. (In Canada "B"-W \$39; "B"-X \$59.50; "B"-Y \$96.)



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MODEL J. Has two rates. A low trickle charge rate and a high rate for rapid charging. Can thus be used either as a trickle or as a high rate charger. Noiseless. Rates: with 6-volt battery, 2.5 and .5 amperes; with 4-volt battery, .8 and .2 ampere. Price \$19.50. (West of Rockies \$20. In Canada \$27.50.)

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All Balkite Units operate from 110-120 volt, 50-60 cycle AC. The Balkite Charger is also made in 25-40 cycle model.

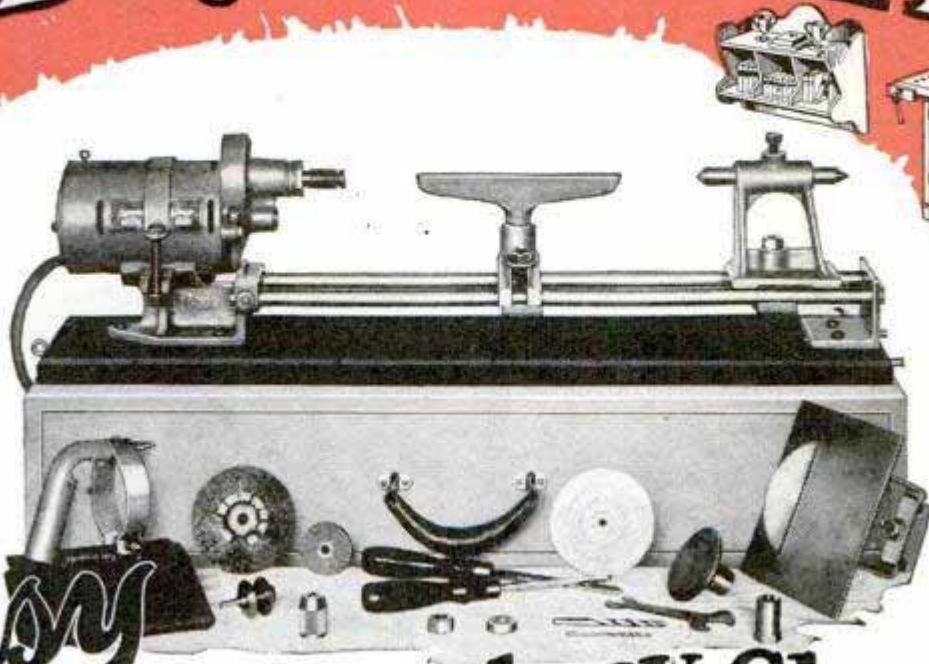
Once connected to your "A" battery and set and plugged into the light socket, the new Balkite Combination Radio Power Unit *supplies automatic power to both circuits.* You need not even turn it off and on, for it is controlled by the filament switch already on your set and is entirely automatic in operation.

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FAN STEEL
Balkite
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8 motor driven tools

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A complete wood-turning lathe, bench saw, scroll or jig saw, a portable electric hand saw, and all accessories for both portable and stationary power drilling, buffing, grinding and cleaning. Attaches to any light socket and converts a work bench into a complete private tool and machine shop.

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Each month for a year we will furnish you a blueprint of your own selection free to help you to get maximum service from the SpeedWay Shop and Tools. Write for a list of the interesting blueprints we have for you.

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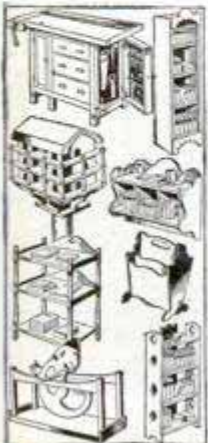
ONLY \$10.00 DOWN

Don't hesitate. We want you to know more about the SpeedWay Shop and Tools. Every tool in the "Shop" is high-grade, built for regular work. A money maker for the small job man. A pleasure for the householder.

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ELECTRO-MAGNETIC TOOL CO.

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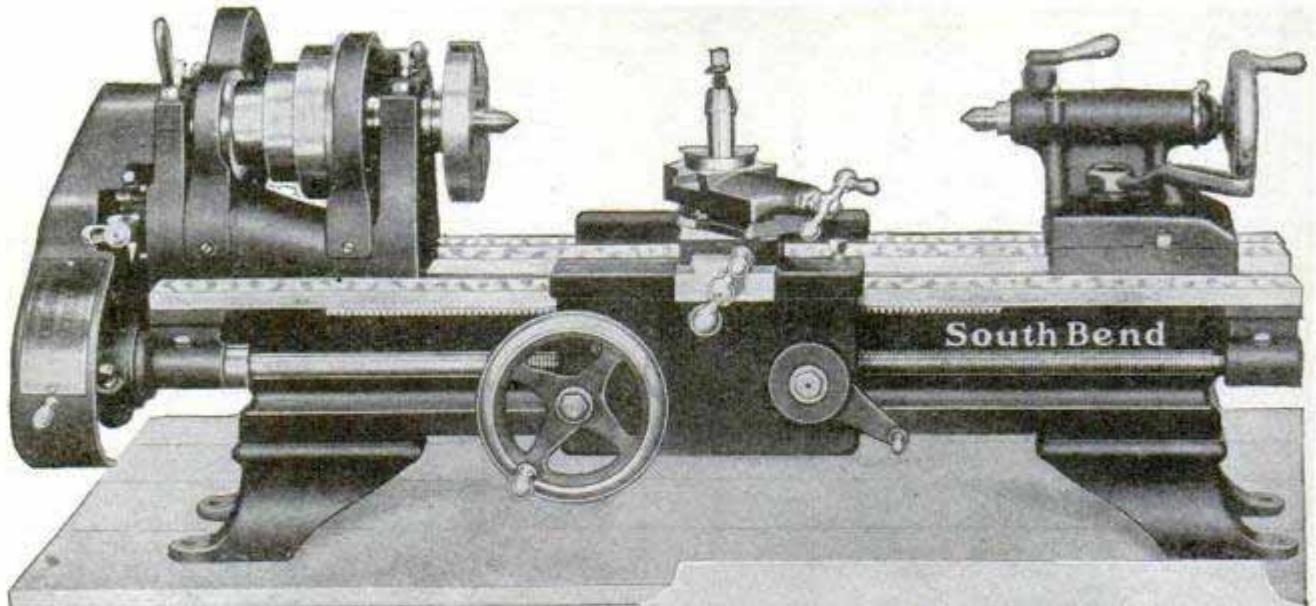


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Dear Sirs: Please send me full particulars about your 10 Day Free Trial. Free Blueprints and Your Easy \$10.00 Down Payment plan on the SpeedWay Shop.

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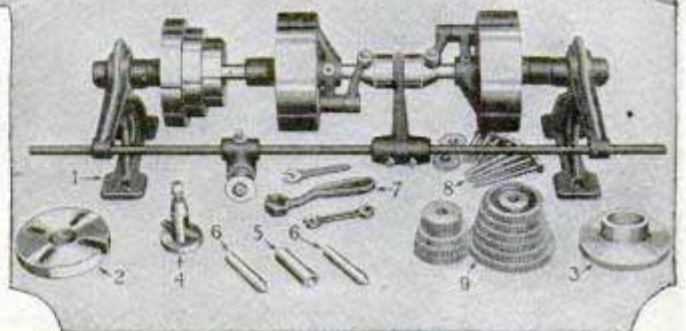


No. 22 Junior — 9"x3'
Back Geared
Screw Cutting
Bench Lathe

\$150

(Easy Terms If Desired)

**A Good Lathe
At a Moderate Price**



Countershaft and Equipment Included in Price

This is our regular 9"x3' Standard Change Gear Lathe—a high grade tool of accuracy and precision—stripped of parts not needed in the average shop. It is a practical tool for the small shop where a wide range of work must be taken care of.

Specifications

Swing over bed 9 1/4 inch
Length of bed 3 ft.
Size of Centers No. 2 Morse
Taper
Distance Between Centers 18"
Hole through Spindle 3-4 inch
Net weight Lathe C'shaft 375
lbs.

Features

Powerful Back Geared Head
Stock
Six Spindle Speeds
Headstock Spindle Ground all
Over
Phosphor Bronze Spindle Bear-
ings
Power Feed to Carriage
Set-over Tail Stock
Graduated Compound Rest
Micrometer Graduated Collars
on Cross Feed and Com-
pound Rest

Attachments

Draw-in Collet Chuck
Graduated Taper Attachment
Milling and Keyway Cutting
Attachment
Electric Grinding Attachment
Turnstile Bed Turret
Chucks, and many other at-
tachments

Some of the Work You Can Do

This lathe is equipped to cut standard screw threads, right or left, 4 to 40 per inch, machine pistons, reface valves, true armatures, undercut mica, turn, bore, chuck, drill, ream, face, file, polish, and many other jobs coming into the general repair shop.

Only 1/4 H. P. Motor Required

The No. 22 Junior Bench Lathe can be driven from overhead countershaft or 1/4 H. P. Reversible Motor, connected to light socket.

Send for Bulletin No. 22-J describing in detail this precision lathe, and showing some of the work that can be done.

South Bend Lathe Works
618 E. Madison St. South Bend, Ind.

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In the past 20 years over 35,000 South Bend Lathes have been built and are giving satisfactory service in all lines of work.

South Bend Lathes are built in two types—Quick Change Gear and Standard Change Gear Lathes. Quick Change Gear Lathe provides screw cutting without removing gears, while Standard Change Gear Lathes are equipped with loose change gears for this purpose.

There is a South Bend Lathe for every job—from 9-in. to 24-in. The most popular sizes are listed below.

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9"x 3'	\$ 258.00	\$ 228.00
11"x 4'	308.00	268.00
13"x 5'	387.00	337.00
16"x 6'	521.00	461.00
18"x 8'	693.00	628.00
21"x10'	1032.00	949.00
24"x12'	1437.00	1338.00

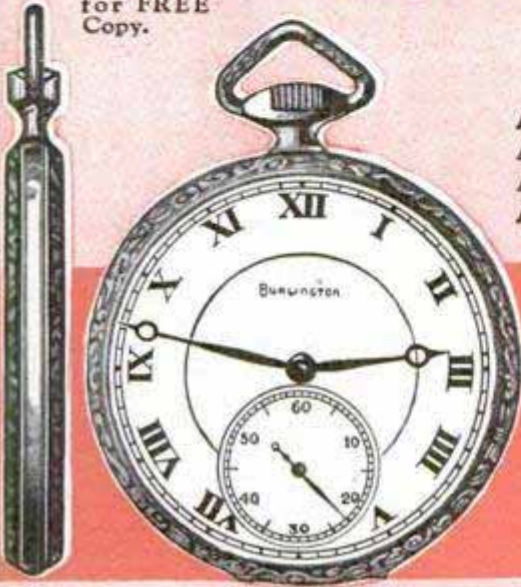
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Burlington Watch Company

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Print name and address plainly

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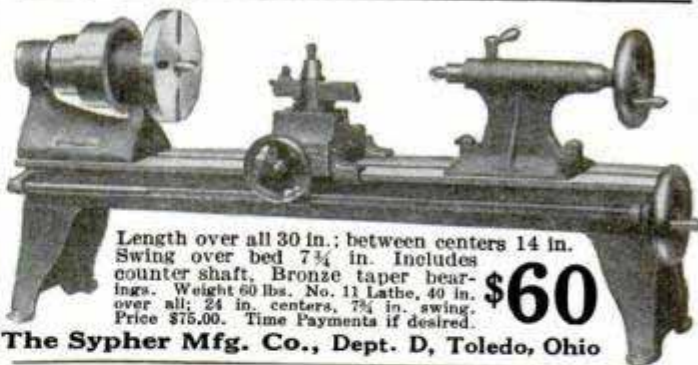
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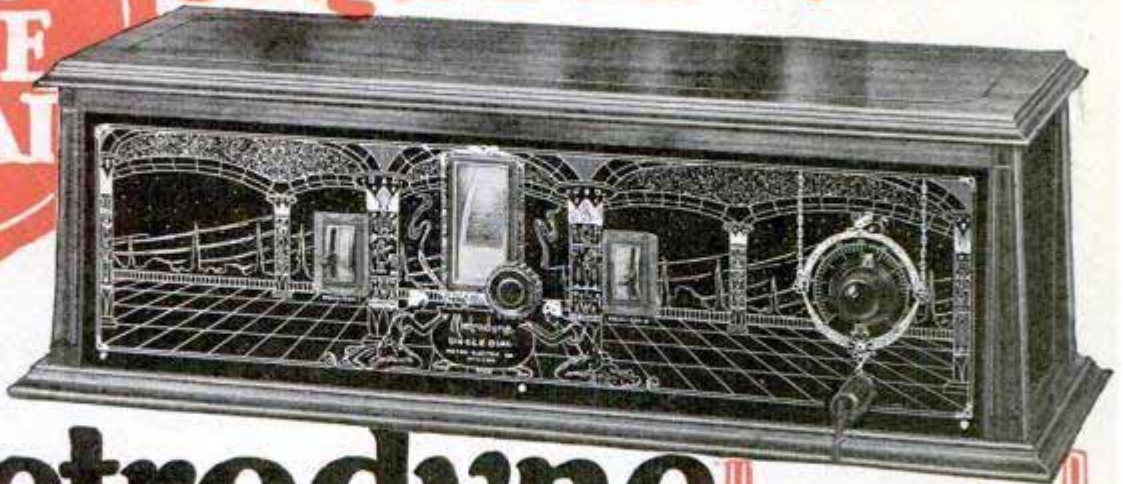
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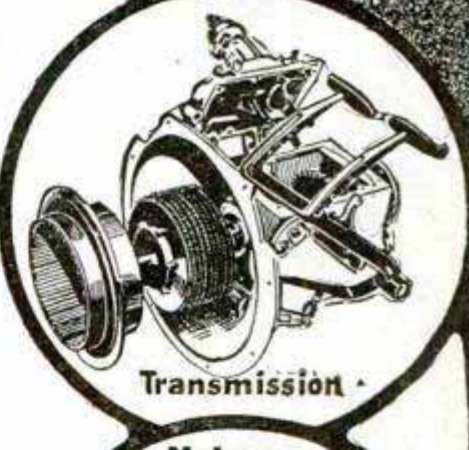
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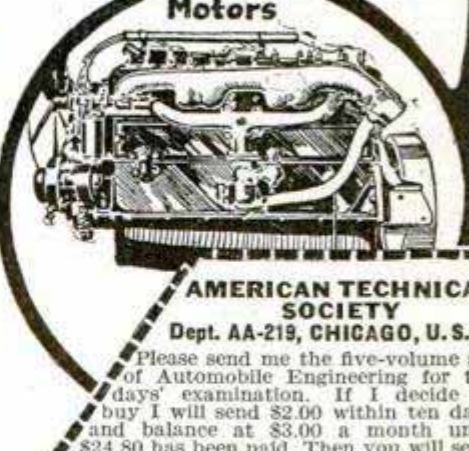
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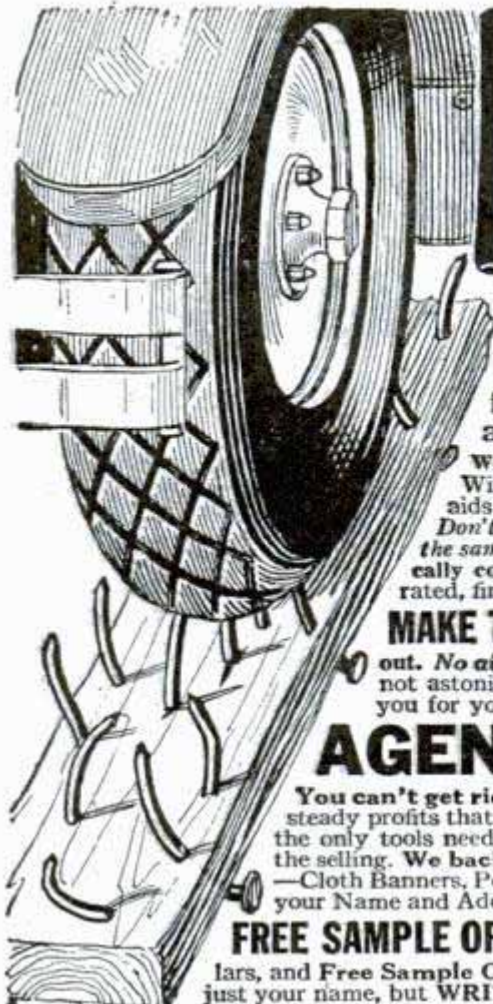
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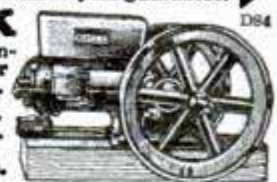
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This simple, but sensational demonstration easily convinces and astonishes even the skeptical. Agents everywhere report wonderful results. Mr. R. K. Waite ordered 1000 devices in 1 month. Profit \$3000.00. Mr. Clyde B. Jones sold 63 devices in 1 day. Profit \$189.00. No experience needed. Thrilling demonstration sells for you. Guaranteed results of Blanche Control, backed by National advertising, assure such remarkable savings, to users that sales by Blanche Agents are made faster and in greater volume than ever before known in the Direct Selling Industry. One demonstration never fails to bring big returns.

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Blanche Auto Devices Co.

Dept. 805-B

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Cadillac and Delco Light now use as Standard Equipment Thermostatic Carburetor Control under Blanche License.

STRONGEST GUARANTEE

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Price \$10 and up purchased through our Co-Operative Plan for as low as \$1.00 down and \$1.00 per week

Indians Harley-Davidsons Ace Henderson and Clevalands

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Motorcycles shipped to all parts of the world

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\$130. QUICKLY—EASILY

PER MONTH

Hundreds of ordinary people are selling famous Premier Accident and Sickness Policy. Entire costs \$10 yearly. Pays \$5,000 for stated Accidental Death, \$25. Accident and Sickness benefits, hospital benefits, emergency relief fund, other benefits. No medical examination, anyone 16 to 71 accepted.

No selling ability required. Strong old-line company. Liberal commission or salary, bonus. Direct-by-mail outfit, advertising campaign. Policy sells itself. Write for territory.

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"Please accept my thanks for your check for \$200.00 in payment for the copper cent I sent you. I appreciate the interest you have given this transaction. It is a pleasure to do business with a firm that handles matters as you do.—JULIAN D. MARTIN, Virginia

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\$1.00 to \$1,000 paid for certain old cents, nickels, dimes, quarters, etc. Right now we'll pay \$50 for 1913 Liberty Head nickels (not Buffalo) \$100 for 1894 dimes, "S" Mint. \$8.00 for 1853 quarters, no arrows. \$10 for 1866 quarters, no motto. \$200 each for 1884 and 1885 Silver Trade Dollars. 10cents each for 1912 "S" Mint nickels, etc.

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The "Original"
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Send 1 pair Wonder Style, \$1 and postage. Miracle Style (extra wide for severe cases), \$1.50 and postage. Send free book.

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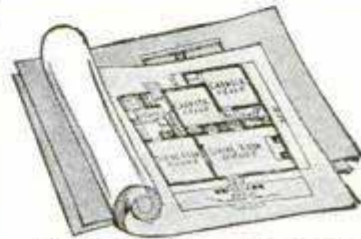
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Kindly send your illustrated catalog.

Instrument.....

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Abraham Lincoln and the Harmonica

On one of his journeys for a debate with Douglas, Abraham Lincoln picked out of his pocket a little harmonica and played upon it, seeming to get happiness in the playing thereon. Says Carl Sandburg in "Lincoln, The Prairie Years": "Someone remarked about his playing on the harmonica and he said: 'This is my band; Douglas had a brass band with him in Peoria, but this will do for me.'"

Back in the days when Abraham Lincoln was engaged in his world-famous debates with Stephen A. Douglas, the Hohner factories were engaged in making "The World's Best" Harmonicas. Today, Hohner Harmonicas are available at leading dealers the world over. Ask for the Free Instruction Book. M. Hohner, Inc., Dept. 181, 114 East 16th St., New York City.



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Recharged in a jiffy.

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Don't let unruly hair spoil that shot!

SHOOT!

Score tied! Two minutes to go! Then—a lightning dribble down the floor, a sudden turn, and—

"Make that basket!" ...

At times like this your hair won't get in your eyes if you use—*Stacomb*. And at times when you want your hair to look its best—smooth, lustrous, in perfect order ...

To make unruly hair lie down more fellows rely on *Stacomb* than any other dressing for the hair!

And here's the secret—no matter how stubborn your hair is, *Stacomb* keeps it in place, right—*all day long*.

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Stacomb comes as a combing cream—in jars and tubes—and now in the popular new liquid form as well. All drug and department stores.

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Send me free sample of *Stacomb* as checked:—
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5 Sections 8-Power Lenses Thousands Delighted!

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Send name and address and Ferry Wonder 3-ft. Telescope with free Carrying Case will come by return mail. Pay postman special bargain price of \$1.85 plus a few cents postage. Satisfaction guaranteed or your money back. Supply limited.

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21 Ruby and Sapphire Jewels
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Your choice of Dials
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New Ideas in Thin Cases

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Artistic, dependable ladies' wrist watches — perfect timepieces, beautiful hand engraved cases in white or green gold. Send for New Watch Book and see the new shapes and designs. Sent on approval and sold on payments.

Write for "Santa Fe" Watch Book

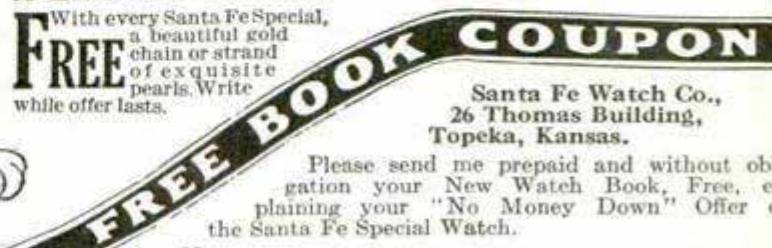
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W. Z. Gibson, Inc., Chicago

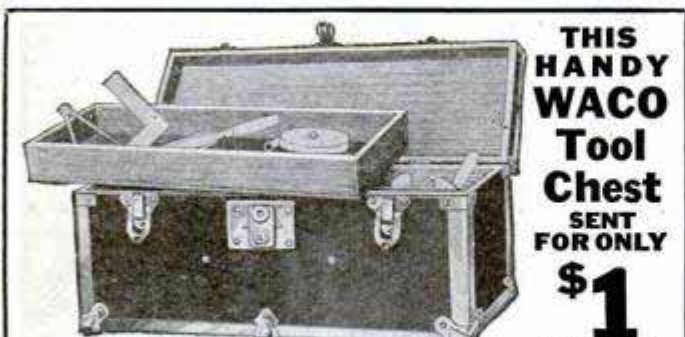
Dept. B-516, 161 West Harrison Street

Without obligating me in any way, please send me complete information regarding your new plan to earn \$100 weekly.

Name.....

Address.....

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



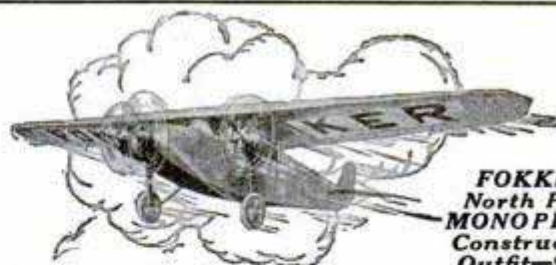
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Hollis Root
Glencoe, Ill.

A real chest for small tools. All metal covered, metal bound wood chest that measures 17x8x8. Heavy plated bumpers and corners make it very substantial and attractive. Keep your tools under lock and key, hammers, screw-drivers, wrenches, pliers, tape-line, plane, squares, drill bits, bolts, screws, everything. Carry it anywhere. Send only \$1.00 (bill, money order or check) with your order. Pay the postman just \$4.00 plus a few cents postage and you own it. Absolutely guaranteed. Send it back if not what you need.

WACO TOOL WORKS, 2915 So. Wabash Ave., Chicago, Ill.
Enclosed find \$1.00 for Tool Chest. Will pay balance \$4 on arrival, Satisfaction guaranteed.

Name.....
Town.....



FOKKER North Pole MONOPLANE Construction Outfit—\$8.50

BUILD AND FLY MODELS OF Famous Airplanes!

It's the most interesting thing you ever tackled; develops your mechanical ability; teaches the principles of aviation; shows you the parts of big machines, how they are constructed and covered, what makes them fly, and many other things real aviators must know. Any bright boy can do it. Ideal Scale Drawings and Building-Flying Instructions show how, and Ideal Model Airplane Construction Outfits contain everything needed. For 25 cents we will send you the complete plans (3 ft. size) for any one of the following famous airplanes:

Every Boy's Airplane

The finest idea in Model Airplanes. Looks like a real one; clips together easily and quickly, ready to fly in 2 hours. **ONLY \$6.00**

FOKKER North Pole Plane; Curtiss JN4D-2 Training Plane; DeHavilland "Round-the-World" Flyer; NC-4 Naval Seaplane; Bleriot, Nieuport or Taube Monoplane; or Cecil Peoli Racer. Send 25c now and get plans for the one you want to build. (All 8 plans for \$1.50.)

Catalog Model Aeroplanes, Flying Toys and Supplies, 5c postpaid.

Ideal Aeroplane & Supply Co.
408 West Broadway, New York



Ask your Dealer for Ideal Model Aeroplane Construction Outfits.



EASY TO BUILD THINGS

"S-B" Big Economy Wood Metal Saw. A real tool. Strongly built. Fully guaranteed. Tilting table, 10x13, 6" combination saw. Adjustable top. Replaceable Phosphor Bronze Bearings. Ripping capacity 2". **\$19.90**

F. O. B. Chicago

JUST THE TOOL FOR BUILDING THINGS AT HOME

Radio, Patterns, Carpenter Work and numerous other practical and useful articles. Without saw, \$17.00. We also manufacture Motor-Driven Saws, Bench and Stand Type. end for descriptive circular.

Scott-Bansbach Machinery Co., Dept. 227, 130 S. Clinton St., CHICAGO, ILLINOIS

RADIO AGENTS: NOTICE!

Just out—latest, greatest, 5 tube set made. Built-in speaker, front drop panel, piano hinged top. Temple speaker with finest unit, walnut finish two toned cabinet etched in gold 32x10x9 all complete with 5 matched tubes, and complete aerial outfit to retail at only **\$59.50** less handsome commissions to you. Wire or write for detail's quick!

AERIAL ELECTRIC CO. LA SALLE and KINZIE CHICAGO, ILL.

Boils 50 Gallons In Less Than Hour

No Other Compares With This

Improved Oil Burner

Use Ordinary Kerosene or Coal Oil
[Burns Outdoors as Well as Indoors]

THE most remarkable Kerosene Burner ever built. Boils down apple cider, maple syrup, molasses, etc., in half the ordinary time. Ideal burner for dairies, butchers, indispensable on the farm.

PRODUCES TERRIFIC HEAT WITH SILENT BLUE FLAME


**NO NOISE
NO SMELL
NO SMOKE
NO SOOT**



So efficient it produces amount of heat of City gas at half the cost. So simple anyone can install and operate. Double generator assures continuous operation without shut-downs. Nothing to wear out, starts in a jiffy, will last a life time. Every burner guaranteed fully. Write for special introductory price. Free descriptive catalog.

HOME MANUFACTURING CO.
Dept. 43, 18 E. Kinzie Street, CHICAGO

I made \$93 my first week



"Since then I've been earning over \$100 every week selling the Stay-Prest Trousers Presser"—says S. L. Patterson of Iowa. Jack Ames made \$24.00 in four hours. Randle sold twenty-five the first day. Mary Roberts cleared \$10.00 in one evening. You too can make big money by selling this

Wonderful New INVENTION
Stay Prest Trousers Presser

Keeps pants always pressed. Puts in knife edge crease, removes baggy knees and smooths out entire surface. Easy to use—takes only a few seconds. No steam or heat. Saves nap of cloth. Lengthens life of trousers. Durably made of hardwood—lasts years. Finished in black leatherette. All metal parts heavily nicked. Looks rich. Fits any size trousers. Folds to 15 inch package to fit small handbag. Over 250,000 in use.

Profits in Advance

Your profits in advance. Simply write orders. We ship and collect. Stay-Prest sells quickly—average sale made in 8 minutes. 40% profit. Newest thing out. Big repeater.

FREE ~ To Man or Woman

Special offer enables you to obtain Selling Outfit absolutely free—everything you need to take orders. We guarantee you will make sales. Write for plan and exclusive territory.

The Getgey-Jung Co., B-121 G. & J. Bldg., Cincinnati, Ohio
Smith & Bourke, 110 Dundas Street, London, Ontario, Canada

The Best Friend on the Road

A great traveling companion, this Barbasol. No tools to pack except the good old razor. No brush. No rub-in. And a real head-barber shave! 35c and 65c tubes.



The Barbasol Co. Indianapolis Ind.

I enclose 10c. Please send trial tube.

Name

Address

.....

P-M-2-27

For Modern Shaving



Agents - Salesmen

New, patented Cigarette and Match Case. Holds a package of cigarettes and box of safety matches. Made of grain finish, black leatherette.

A whirlwind seller—write for particulars on liberal profit proposition.

ALL-IN-ONE SALES COMPANY

Dept. A-2 2810 Portland Ave. Minneapolis, Minnesota

SAMPLE 50c

Chemical Tricks for Boys



Surprise and puzzle your friends with magic chemical tricks; make ink, dye cloth, test water and soil; write secret letters with invisible ink; pour blue, brown and black liquid from a pitcher of water. All these and many more chemical stunts are easy with Chemcraft Junior. It's the best box of fun you ever had! Get yours now. Order at once and we will include the New 1927 "Boy's Hand Book of Chemistry," a regular 25-cent book containing 60 pages of experiments, formulae, chemical facts and money-making ideas; both for only **35c**

The Porter Chemical Co.
113 Summit Ave. HAGERSTOWN, MD.

SAVE 1/2 ON PLUMBING & HEATING SUPPLIES

CATALOG FREE

90 pages. Beautifully Illustrated—Warranted high quality or money back. Get our Catalog before you buy.

STANLEY PLUMBING SUPPLY CO., Inc.
1000 Spring Garden St. PHILA., PA.

\$150 to \$300 MONTHLY PROFIT WITH THIS ONE DAY BATTERY CHARGER

30 DAYS FREE TRIAL ON ABSOLUTE MONEY BACK GUARANTEE

Charge batteries in 1/4 the time required by others and get the business. Latest method recommended by the leading battery companies and approved by the U. S. Bureau of Standards. **BIG YEAR ROUND PROFITS.** Best paying business in automotive field. Requires no special experience, uses small space. **30 DAYS' FREE TRIAL** at our risk under absolute money back guarantee. Write today for bulletin X, giving full particulars.

HOBART BROS. CO. Box M-271 TROY, OHIO

and it cost only \$16.50 monthly



DEVITT 8" COMBINATION SAW

13 TOOLS IN ONE

Saw table raised, showing Emery wheel, saw guard and drill attachment.



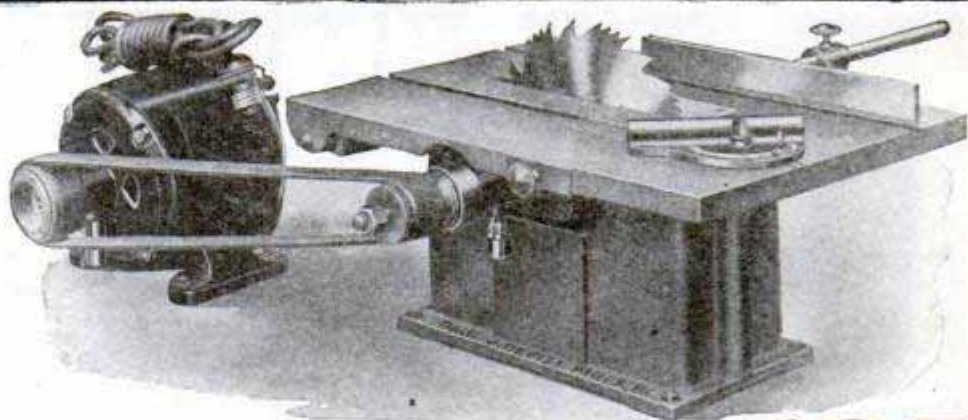
Planer attachment on saw table.

Showing Sanding disc attached.



Table tilted for beveling.

Dado head attached for grooving.



YOU save a great deal of money, time and space by buying a Devitt 8" Combination Saw. Why buy special tools for beveling, grooving, buffing, etc.? The Devitt Combination Saw will rip, cross cut, bevel, miter, groove, mortise, tenon, drill, rabbet, grind, buff and polish. The attachments are easily and quickly adjusted. The saw and motor when set up ready for work occupy very little room. The $\frac{1}{4}$ H. P. 60 cycle 110 volt A. C. motor can be run from a light socket and provide power for other purposes when the saw is not in use. A cut up to $2\frac{1}{4}$ " can be made with the 8" Combination Saw without planing. The ideal machine for shop, factory or home, complete with attachments: 12"x16" table, 8" Combination Saw, iron pulley for saw table, 12" ripping fence, adjustable cut off miter gauge, motor-specifications as above, 1 1/4" endless leather belt, wood pulley, 8 ft. cord and plug, 6" buffing wheel, 3/4" 3 jaw drill chuck, 5" emery wheel, 8" sander, saw guard, and 2" dado insert. \$35.00 F. O. B. Phila. Height 16", shipping weight, 100 lbs. (Planer attachment to fit on table top will smooth pieces up to 2' wide, \$12.00 extra F. O. B. Phila.)

\$35
F. O. B. Phila.

Write for our beautifully illustrated 4 page circular.

PAUL J. DEVITT 1102 South 2nd Street PHILADELPHIA, PA.

Italian Accordions

We manufacture and import all kinds of first-class hand-made

ITALIAN ACCORDIONS

the best in the world. Ten year guarantee. Our prices are lower than any other maker's. Free Accordion instructions to buyers. Write for FREE catalog.



RUATTA SERENELLI & CO.
1014 Blue Island Ave., Dept. P, CHICAGO, ILL.



CLASS PINS 25¢
NEW CATALOG FREE!

DESIGNS SHOWN—SILVER PLATE 25¢ EA., \$2.75 DOZ., STERLING SILVER 40¢ EA., \$4.00 DOZ., GOLD PLATE 35¢ EA., \$3.50 DOZ.
3395 1 OR 2 COLORS ENAMEL, ANY LETTERS AND DATE



BASTIAN BROS. CO. 20 BASTIAN BLDG. ROCHESTER, N.Y.

Catch Fish!

Eels, Mink, Muskrats with our new fold-in; galvanized STEEL WIRE TRAP. Write for our FREE TRAP OFFER and Bargain Catalog. \$1 Box of our famous Fish Bait FREE to introduce our traps. **WALTON SUPPLY CO., 3500 JUNIATA AVE., ST. LOUIS, MO.**



Beauty of finish

What do you look for in a finish—beauty, color, durability? Valspar gives woodwork and metalwork all three, plus absolute water proofness. Send 20c for sample can and literature. Valentine & Co., 452—4th Ave., New York, N. Y.



Clear and in Colors

VALSPAR

Colors: Red (Light and Deep), Green (Medium and Deep), Blue (Light, Medium and Deep), Vermilion, Yellow, Brown, Ivory, Gray, Orange, Black, White, Mahogany, Oak (Light, Dark), Walnut, Cherry, Moss Green, Clear.



Speed Lathe \$10.50

complete with spur center and adjustable rest. Longer bed \$1.00 per additional foot.

7" swing, 24" metal bed, 3 speed cone pulley. **JEFFERSON MFG. CO., FAIRFIELD, IOWA**



\$25.00 PAID DAILY

FREE SLICKER for WORKERS for just a little work on your part **WOMEN, MEN WANTED**

It's Easy. You show raincoats. We deliver and collect. **WRITE FOR FREE OUTFIT**
Super Built Co., Box 453, Desk 2, Chicago, Ill.

\$150 to \$300 MONTHLY PROFIT WITH THIS ONE DAY BATTERY CHARGER

30 DAYS FREE TRIAL
ON ABSOLUTE MONEY BACK GUARANTEE

Start a **Big Profit-Making Business** of your own—"One Day Battery Charging." Requires **small space** and **practically no investment**. Anyone can successfully operate. Charges batteries in $\frac{1}{4}$ the usual time at $\frac{1}{4}$ the cost. **Every car owner a customer**. The HB One Day Battery Charger will pay for itself on easy monthly payment plan with practically no expense to you—and bring you a handsome profit besides. **Write for full particulars in Bulletin M. NOW!**
HOBART BROS. CO. Box M-27 TROY, OHIO

and it cost only \$16.50 monthly



THIS MAN has started *Thousands* on the road to *Fame and* *Fortune!*



He can do the Same for YOU

THIS famous instrument maker, F. A. Buescher, the man who made the first saxophone *ever produced* in this country, is responsible for the fame and success of *thousands of musicians*.

Many of them *never dreamed* they could do anything with music. They took it up "just for fun" and *they were amazed* to find how *easily* they learned to play their Bueschers. They made rapid progress. Today their names are famous *throughout the land*.

Buescher Makes It Easy

You can learn to play any Buescher instrument. You do not have to be "talented" or "gifted." If you can whistle a tune, if you can mark time to music, *you can learn* the scale—then easy tunes—then there is

no limit. But *only with a Buescher* is this rapid progress *assured*. Simplified fingering; easy blowing; perfect tuning give you *special advantages*. You don't have to fuss and favor for certain notes. Just open the key and *blow normally*. You'll say it's like *play*.

Free Trial, Easy Terms

Buescher will send you any True Tone Instrument for six days' trial in your own home. See what you can do. Then send a small down payment and pay the balance monthly. Satisfaction guaranteed. Mail coupon below for catalog of your favorite instrument. Do this Today.

BUESCHER BAND INSTRUMENT CO.
Everything in Band and Orchestra Instruments
1915 Buescher Block
Elkhart, Ind.

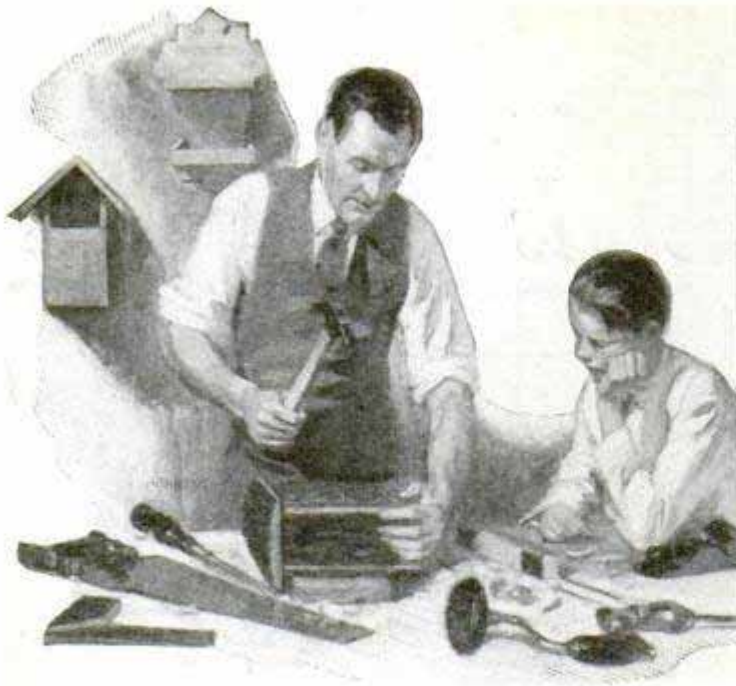


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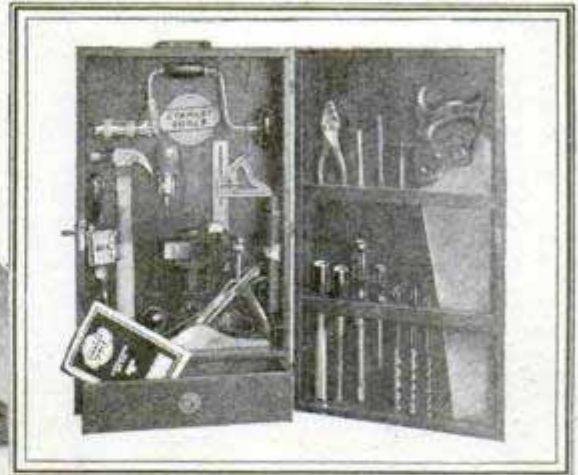
COUPON

Buescher Trumpets, Trombones, and other band instruments are superior in easy playing, perfect tonal qualities, and are used by the leading artists throughout the world. Any instrument sent on six days' trial. Easy terms of payment. Mail coupon for special catalog of your favorite instrument.

BUESCHER BAND INSTRUMENT CO.		365
1915 Buescher Block, Elkhart, Ind.		
Gentlemen: Without obligating me in any way please send me your free literature. I am interested in the instrument checked here. Saxophone <input type="checkbox"/> Cornet <input type="checkbox"/> Trumpet <input type="checkbox"/>		
Trombone <input type="checkbox"/> Tuba <input type="checkbox"/> Mention any other.....		
How old are you?.....Do you play any instrument?.....		
What?.....		
Name.....		
Address.....		
City.....		State.....



*Buy separately
or in assortments*



To bird lovers only!

DO you know that a bird house which is properly made for a bluebird or a swallow will repel a wren or robin? Stanley Plan No. 9 tells how to make several types of bird houses—each designed to attract a particular species. It will show you how to make homes that will attract your favorite birds and keep the undesirable ones away.



Of course you know that good work calls for good tools. The amateur user needs good tools just as much as the professional. Most carpenters use Stanley Tools because their wide experience has taught them that the name Stanley stands for correct design, perfect balance, and great durability. And Stanley Tools are

standard equipment in thousands of manual training classes.

You can buy Stanley Tools separately and so collect your own set. For your convenience in buying there are also complete sets of Stanley Tools in chests at a wide variety of prices from \$15 to \$95. Or there are assortments in strong cardboard boxes containing directions for making your own tool chest. Price \$2.15 to \$20.



Stanley Plan No. 9 will give you the right start. Your hardware dealer has this plan as well as other Stanley plans for making useful articles, or he can get them for you. Ask him also for Catalogue No. 34-D, which shows the most complete line of woodworking tools on the market. If he cannot supply you write direct to The Stanley Works, New Britain, Conn. The plans cost only 10c each. The catalogue is free.

The best tools are the cheapest to use
Ask your hardware dealer

STANLEY TOOLS

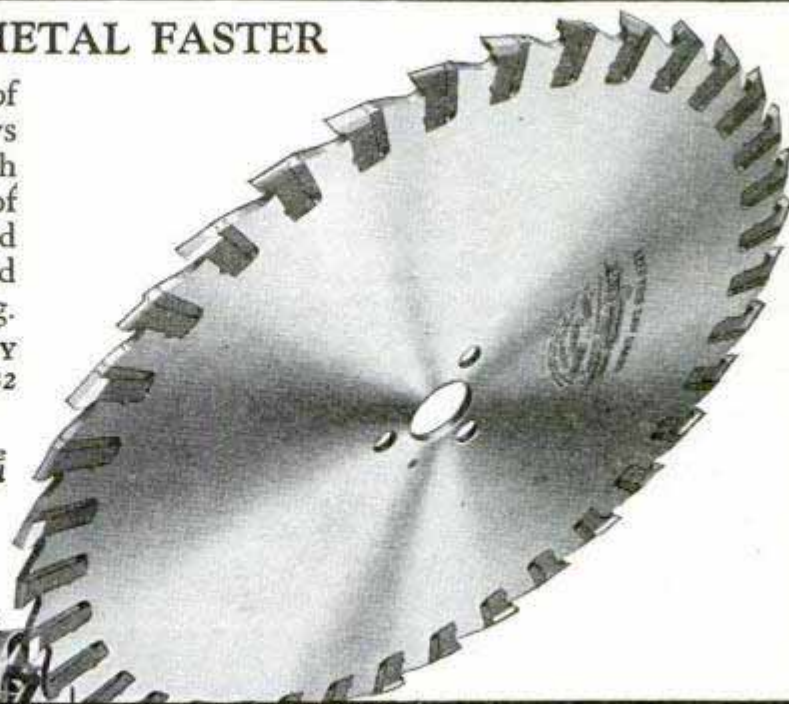
SAWS THAT CUT METAL FASTER

THE High Speed Steel Teeth of Simonds Inserted Tooth Saws make short work of heavy, tough metal-cutting jobs. The plates of wear-resisting steel are tempered to give maximum strength and stiffness for heavy duty cutting.

SIMONDS SAW AND STEEL COMPANY
 "The Saw Makers" Established 1832
 Fitchburg, Mass.



Branches and Service Stations in Principal Cities



SIMONDS

Pronounced SI-MONDS

SAWS FILES KNIVES STEEL

\$25 to \$45



GET THE NEW IDEA BATES MOTOR SAW — 6 SAWS IN 1 —

Does the work of band-saw, rip-saw, cross-cut, miter, bevel and scroll-saw. A wonder worker for the home shop. Direct drive! Can't stick! Cuts 2" wood. Most amazing variety saw ever invented. Does more, costs less! Not a toy. Write for circular.

BATES MOTORCRAFT COMPANY
 Dept. M 28 N. Clinton CHICAGO, ILL.

Interlox

MASTER SLIDE RULE

Takes accurate inside or outside measurements

MASTER RULE MFG. CO.,



Works fast. Slides in and out quickly. Durable made of brass trimmed boxwood. Any length 2 to 8 feet, 20 cents per lineal foot. If not at dealer's, sent postpaid.

Dealers and Agents: request attractive proposition



Toolmakers and Machinists FIND GERSTNER Tool Cases

valuable because of the time they save. No tools mislaid — every tool has its place. Use one and you will wonder how you got along without it. Catalog free.

A. Gerstner & Sons

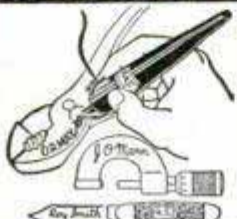
438 Columbia St., DAYTON, OHIO

BURN YOUR NAME ON TOOLS WITH THE ARKOGRAF

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. Interesting Illustrated circular free. Write today. Agents wanted.

ARKOGRAF PEN CO., 1171 E. Stark St., Portland, Oregon



For sure grip... or clean snip!



In wrenches and pliers you want "gripping power." In wire cutters, nippers, and tin snips you want "snipping power." In Crescent-Smith & Hemenway Tools you find both at their best.

Hardware and accessory dealers have them.

**CRESCENT
 TOOL COMPANY**
 210 Harrison St.
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CRESCENT and Smith & Hemenway TOOLS

Fastest Cutting

**Saws Fifteen Cords
a Day!**



**Men—
Let Me Send You My
Greatest LOG SAW Offer!**



It's easier now than ever before to own this fastest-cutting, easiest-moved, most powerful Log Saw. Now, you can make big money sawing firewood, stave-bolts, ice, shingle timber, etc. Write today for full details of this most wonderful offer. Know how easy it is to make big money sawing fifteen cords of wood a day with no hard work.

350 Saw Cuts a Minute—

nearly six each second. Just think of it—now you have a log—in a few seconds it's all sawed up into lengths you can use—without any hard work! The OTTAWA has balanced crank shaft, power force feed, friction clutch.

Make BIG MONEY—

Wood selling at \$3 a cord brings owner \$45 a day. Saw your own wood—go into the wood business. Don't let the lack of ready money stop you. Remember, we sell on very easy terms. More in use than all others combined.

**ONLY
\$39**

**Puts the OTTAWA
Working for YOU!**

I average \$20 profit a day with my OTTAWA. — J. Schill, New York. "My OTTAWA has earned \$700 for me." — S. Graham, Wisconsin. "I can make more money with the OTTAWA than by farming." — D. Goff, Missouri.



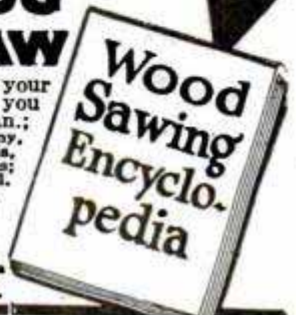
OTTAWA 4.H.P. LOG SAW

30 Days to Try—one whole month to use the OTTAWA at your own sawing. Shipped on trial only—backed by 10-year guarantee. Prove to yourself how easy you can saw 15 cords or more a day—at a cost of 1 1/2¢ a cord.

FREE Send me your name and address on postcard today, so I can send you my wonderful new edition of the "Wood Sawing Encyclopedia." Educational, instructive. Be sure to investigate—will help you to make big money.

HARRY OVERMAN, Pres. OTTAWA MFG. CO.
1742-P Wood St., Ottawa, Kans. Room 1742-P, Magee Bldg., Pittsburgh, Pa.

To Save You Freight—and get your machine to you a few days after you order, I ship from: Ottawa, Kan.; Pittsburgh, Pa.; St. Paul, Minn.; Albany, N. Y.; Memphis, Tenn.; Indianapolis, Ind.; Pueblo, Colo.; Ft. Worth, Texas; Portland, Ore.; San Francisco, Cal.

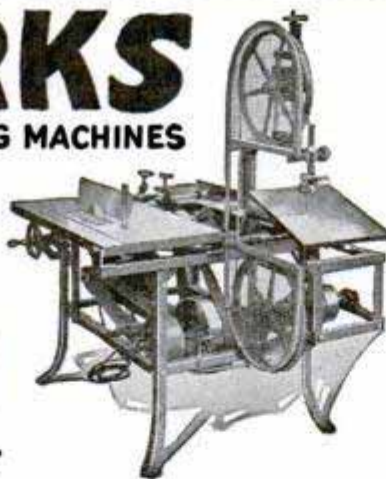


**PARKS
WOODWORKING MACHINES**

*Cabinet
Shop
Special*

\$290

with Motor



You ought to have this handy Parks in your shop. It is a compact, complete machine designed just like a big production outfit at one-fifth the cost. Includes 8-inch circular rip and cross cut saw with polished cast-steel saw table, 16-inch band saw with tilting table for bevel-sawing, 6-inch jointer, and motor operating from any light socket. Just plug in and go to work! Fits in a corner of your basement. Does any kind of cabinet and joinery work. Add lathe, shaper and other attachments any time at small cost. For the man who does "odd jobs" in his off time this Parks is a big money maker. Turn out as much as a four-man shop working by yourself.

Write for circular and Parks complete catalog of handy woodworking machinery.

The Parks Ball Bearing Machine Co.

1500-1540 Knowlton St. Cincinnati, Ohio

Canadian Factory: 208 Notre Dame East, Montreal, Can.

Makes Old Ford a Tractor

Now you can convert that old Ford car into a useful farm tractor without altering any Ford parts. We furnish the traction wheels, drive gears and auxiliary axle and mountings, ready to clamp on to the Ford frame. Pulls 16' plow.



Write for Free Particulars.
SHAW MFG. CO., Dept. S. Galesburg, Kan.

**REMINGTON
PORTABLE TYPEWRITER
Dealers and Branches Everywhere**

**Imperial
Sanitary
Floor**

Put on like Plaster
Wears like Iron
-waterproof
fireproof
resilient
noiseless
dust-
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A composition material easily applied in plastic form over practically any kind of floor. Laid about 3/8 inch thick. Imperial floor does not crack, peel or come loose from foundation. A continuous, fine-grained, smooth, non-slipping surface. No crevices to gather grease, dirt, dust, disease germs or moisture.

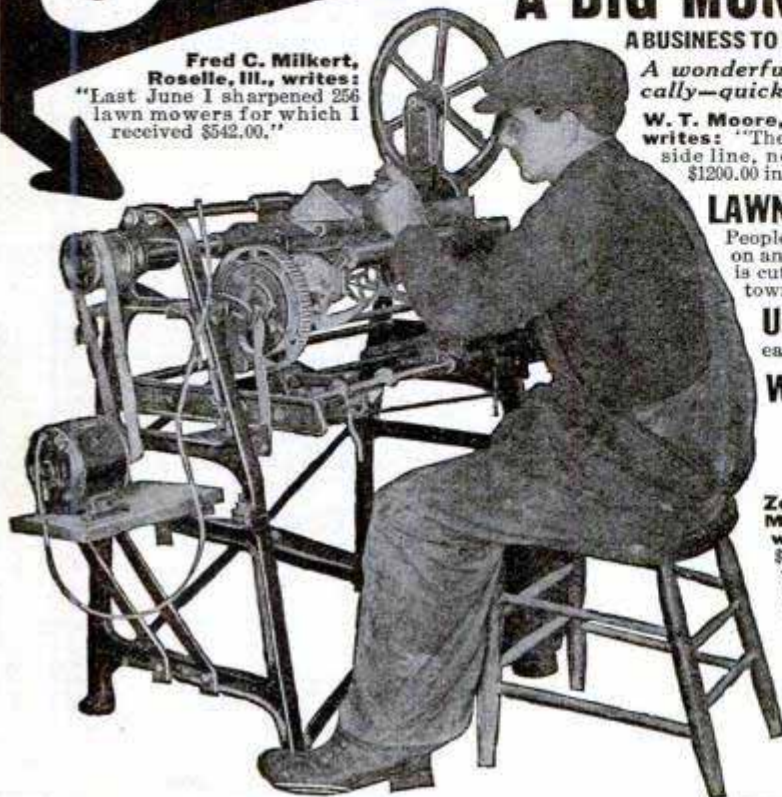
Ideal Floor for Kitchen, Pantry, Bath Room, Laundry, Porch, Garage, Restaurant, Theatre, Hotel, Factory, Office Building, Railroad Station, Hospital—wherever a beautiful, substantial floor is desired. Several practical colors. Full information and sample FREE of your first and second choice of colors.

Imperial Floor Co., 80-84 Halstead St., Rochester, N. Y.

A. Success for 15 Years

\$542⁰⁰ Earned IN ONE MONTH

A BIG MONEY-MAKING BUSINESS



Fred C. Milkert, Roselle, Ill., writes:
"Last June I sharpened 256 lawn mowers for which I received \$542.00."

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.

W. T. Moore, Twin Falls, Idaho, writes: "The Ideal Grinder, as a side line, netted me a profit of \$1200.00 in 90 days."

W. F. Kendt, Buffalo, writes: "I sharpened 994 lawnmowers last season and the receipts were nearly \$2,100 which is not bad for a side line."

LAWN MOWERS SHARPENED TO RAZOR EDGE

People glad—owners delight in mowing lawn with mower sharpened on an "Ideal." Mower runs light—click-click-click and the grass is cut. Build permanent business for yourself. Start Now! No town too small.

Use Your Spare Time If you work at a trade, put an "Ideal" in your basement and earn \$4 to \$6 an hour evenings and Saturday afternoons.

WRITE TODAY for full information of this wonderful money-making machine. **FREE**

THE FATE-ROOT-HEATH MANUFACTURING COMPANY
Plymouth, Ohio

Zeno Brandon, Middletown, Ohio, writes: "I made \$820.70 in 55 days with my "Ideal." Have made as high as \$38.70 in oneday."

USE THIS — MAIL IT TODAY

The Fate-Root-Heath Company
818-844 Bell Street, Plymouth, Ohio

Please mail free Illustrated Catalog and booklet with scores of letters from "Ideal" owners and pictures of their shops.

Name _____

Address _____

Agents \$12⁰⁰ a day

NEW Self-Heating IRON

New invention now makes ironing easy in every home. Ends hot stove drudgery. Cuts ironing time in half. Saves steps. Costs one cent for 3 hours use. No attachments. No cords. No tubes. Gives quick regulated heat. Guaranteed. Sells fast. Mrs. Wagner, Ohio, sold 24 in few hours spare time. Moyer, Pennsylvania, made \$164 in one week. You can do as well. Work all or spare time. No experience needed. No capital. New plan. Simply take orders. We deliver and collect. Commissions paid same day you take orders. Send for exclusive territory and FREE OUTFIT OFFER. Write today.



THE AKRON LAMP CO., 32 Iron St., AKRON, OHIO

THIS WONDERFUL INVENTION



converts any ordinary cook stove into a gas stove. OXO-GAS is made from kerosene and air. Cheaper, cleaner and more efficient than coal. Responsible distributors wanted.

GLORIA LIGHT CO.

111-2 N. May St. Chicago, Ill.

KINKADE GARDEN TRACTOR AND POWER LAWNMOWER

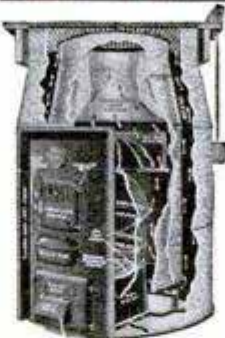
A Practical, Proven Power Cultivator for Gardeners, Suburbanites, Truckers, Florists, Nurserymen, Fruit Growers.

AMERICAN FARM MACHINE CO.
1058-33rd Ave. S. E., Minneapolis, Minn.



Catalog Free

PLUMBING and HEATING



ALL-CAST PIPELESS FURNACE

home. Kinks and Wrinkles and Savings that will surprise you. With our simplified plans and new easy method, you can do the installing. We loan tools FREE. Our Bonded Guarantee is backed by Million Dollar Plant and 50 Years in Business.

HARDIN-LAVIN CO.

Established 1876

107-17 West Pershing Rd., Chicago, Ill.
MAIL THE COUPON NOW!

HARDIN-LAVIN COMPANY,

107-17 West Pershing Rd., Chicago, Ill.

Gentlemen: Please send me your FREE BARGAIN CATALOG with special wholesale prices. I am interested in:

- | | | |
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| <input type="checkbox"/> Water Supply System | <input type="checkbox"/> Stm. Htg. Plant | <input type="checkbox"/> Warm Air Furnace |
| <input type="checkbox"/> H. W. Heating Plant | <input type="checkbox"/> Pipeless Furnace | <input type="checkbox"/> Bathroom Outfit |

NAME _____

ADDRESS _____

P. O. _____ STATE _____

Buy at Wholesale—Save Half

Send coupon for FREE bargain catalog. Explains our new easy method and shows everything in highest grade Plumbing Outfits, Heating Plants, Water Supply Systems, Pipe, Fittings, etc. For 50 years we have been saving our customers hundreds of thousands of dollars and now we have made arrangements so that you can BUY ON EASY TERMS.

FREE PLANNING SERVICE

Send us a rough sketch of your rooms and we will figure the wholesale cost of Heating Plant or Plumbing Outfit designed especially to fit your



PM-2-27

Print Your Own

Cards, stationery, circulars, tag, labels, paper. Complete Outfits, \$8.85 up, Job Presses \$11 up, Rotary \$149. Card Cutters, \$3. Save money. Print for others, big profits. All easy rules sent. Write for catalog presses, type, paper cards, ink etc. **THE KELSEY CO., H-37, Meriden, Conn.**



The Old Reliable Credit Jewelers

LOFTIS BROS. & CO.

Dept. K-894
108 N. State St.
Chicago, Ill.

DIAMONDS

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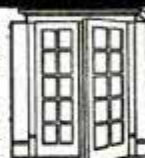


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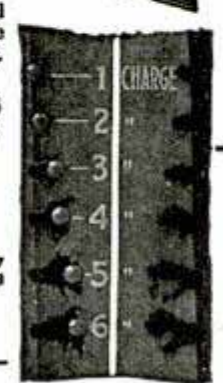


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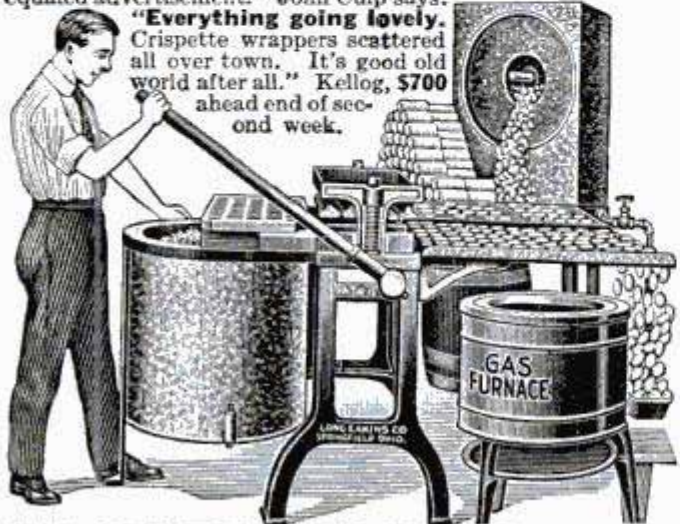
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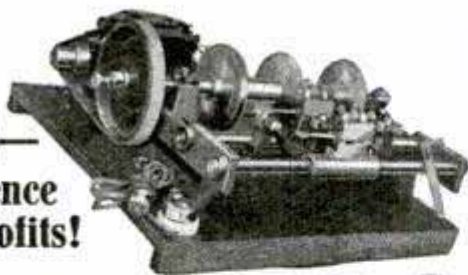
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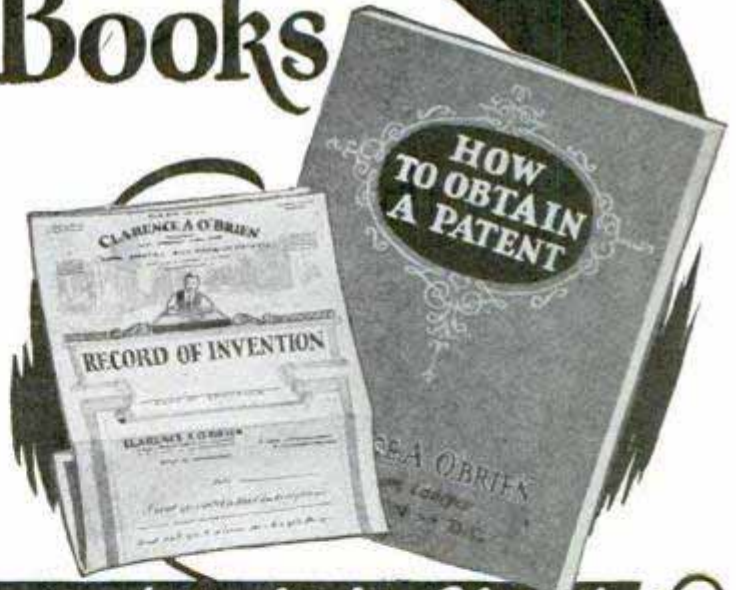
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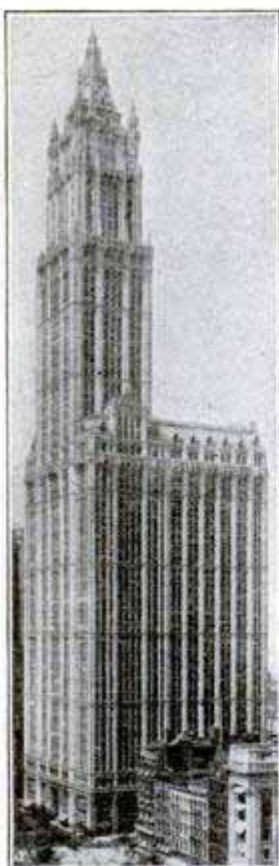
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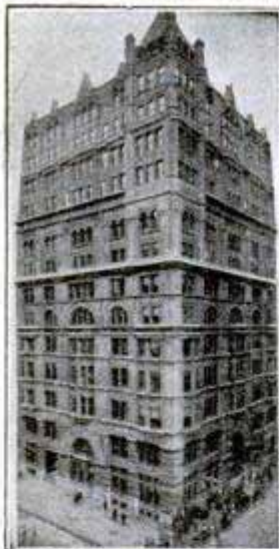
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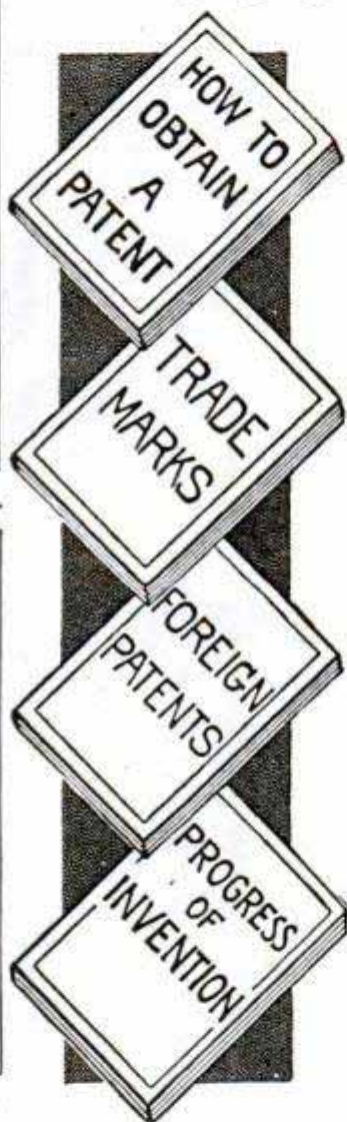
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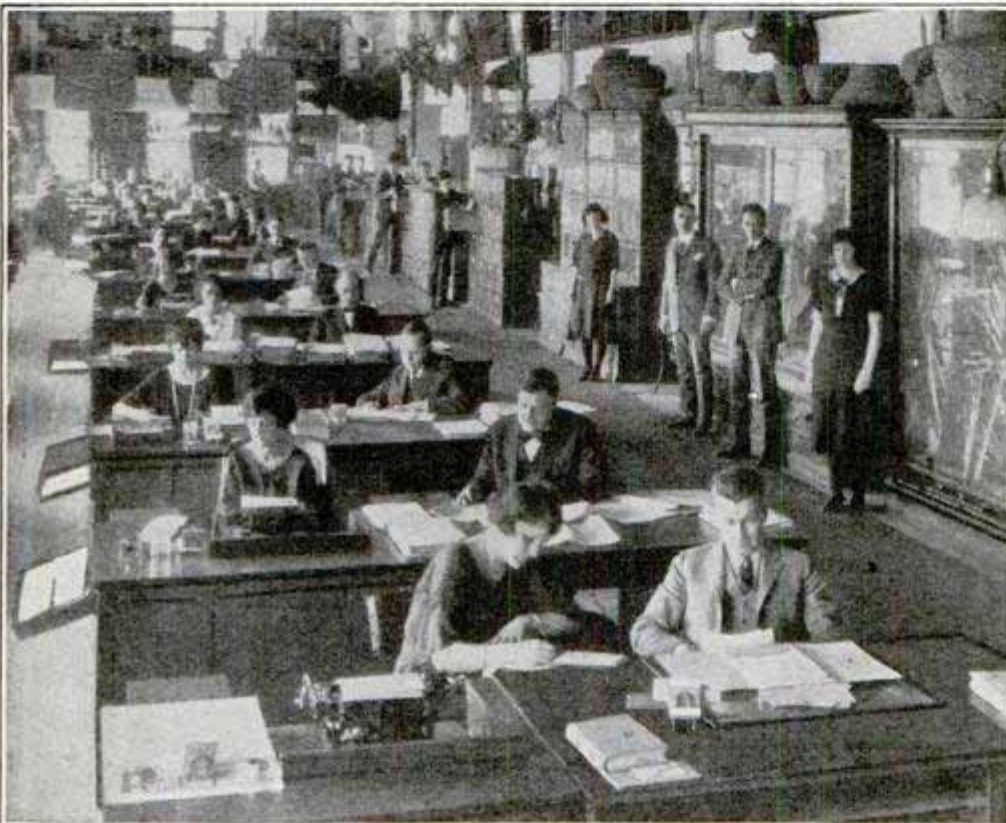
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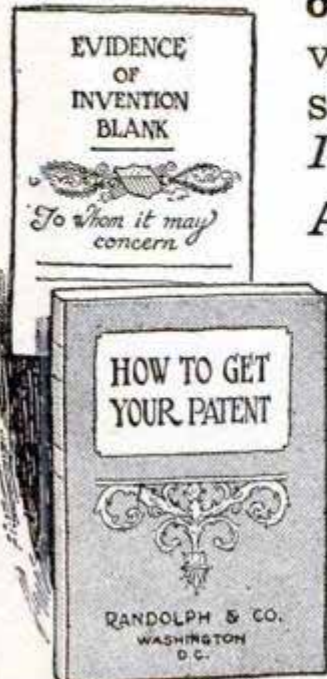
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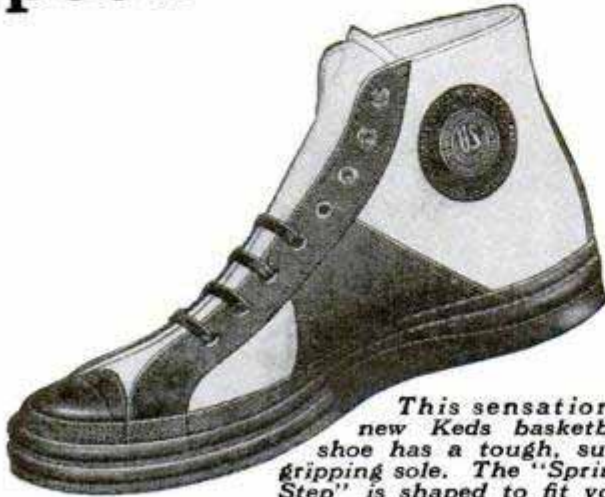
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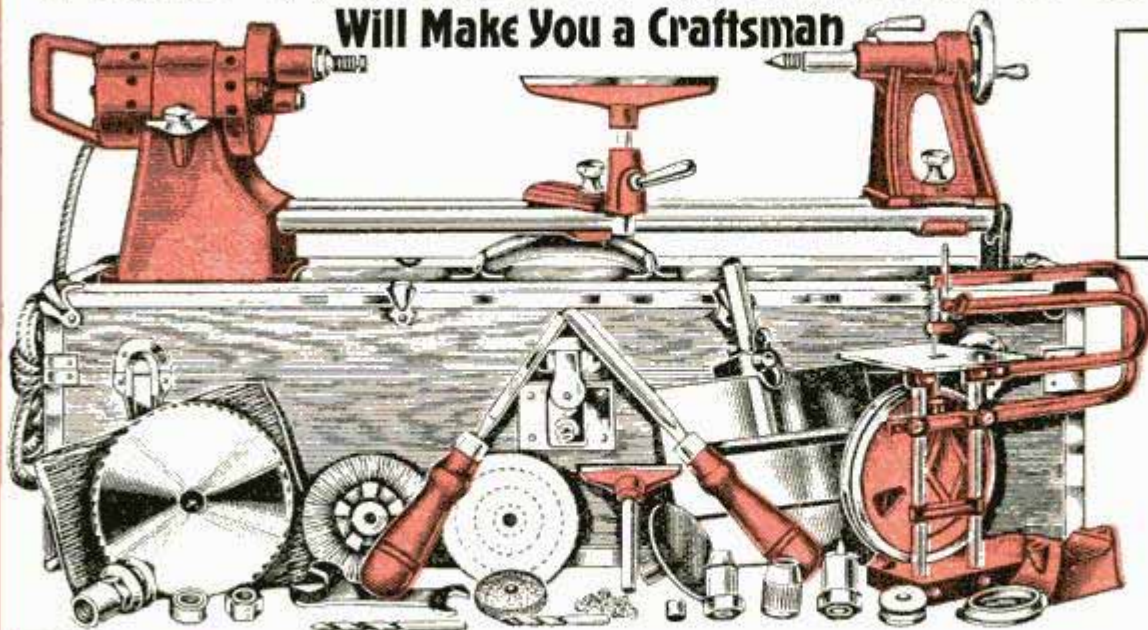
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The most confidential messages can be written with this ink, for the writing **Makes No Mark.** Cannot be seen unless you know the secret. Invaluable for many reasons. Keep your postals and other private memorandums away from prying eyes. Great fun for playing practical jokes. **Only 15c** a Bottle; 3 for **40c**.



REAL PISTOL Miniature Watch Charm Pistol

Exact reproduction of a real pistol; actually fires **Real BLANK CARTRIDGES** of miniature size. Illustration is actual size. **1 1/4** inches long, with ring at end for attaching to watch chain. Looks like a regular pistol. Pull the trigger and it goes off with a loud bang. Pistol is break-open type; illustration shows position for loading. Made entirely of high grade steel, nickel plated, octagon barrel, handsomely engraved handles, complete in box with cleaning rod. **PRICE \$1.75.** Also furnished with **pearl handles, \$2.50.** **BLANK CARTRIDGES, 50c** per box of 25. **JOHNSON SMITH & CO., Dept. 803, RACINE, WIS.**



RESURRECTION PLANT

One of the most wonderful plants known. Possesses the strange power of turning in a few minutes from an apparently lifeless, dry herb to a **BEAUTIFUL LIVING FERNLIKE PLANT** of a dark green color. Simply place the plant in saucer of water, it will open up and start to grow in 20 minutes. When taken out it will dry up and go to sleep until placed in water again. Fine house plant—summer or winter. **10 cents** each or 3 for **25c.**, 75c per doz., postpaid.



Microphone Transmitter Button



You can easily make a highly sensitive detectophone by using this Transmitter Button to collect the sound waves. You can build your own outfit without buying expensive equipment. It is simple and inexpensive. You can install an outfit in your home and hear conversations being held all over the house. You can connect up different rooms of a hotel. This outfit was used by secret service operatives during the war. It is being used on the stage. It is ultra-sensitive and is the greatest invention in micro-phones. You can mount the button almost anywhere—card board boxes, stove pipes, stiff calendars, on the wall behind a picture frame, etc. Button is so light and small it cannot be detected. Persons can be overheard without suspecting it. You can listen in on conversations in another room. A deaf person in the audience can hear the speaker. Connected to phonograph, piano or other musical instrument, music can be heard hundreds of feet away. Button may be used to renew telephone transmitters; often makes an old line "talk-up" when nothing else will. The ideal microphone for radio use; carries heavy current and is extremely sensitive. Amplifies radio signals. Countless other similar uses will suggest themselves. Experimenters find the button useful for hundreds of experiments along the lines of telephones, amplifiers, loud speakers, etc. Many fascinating stunts may be devised, such as holding the button against the throat or chest to reproduce speech without sound waves. \$5.00 is given to anyone who sends in a new suggestion for the use of the Button providing the manufacturers find it suitable for use in their literature. **PRICE \$1.00 POSTPAID ANYWHERE.**



Send remittance (Postage Stamps accepted) for all articles listed on above and previous page to

MAGICIAN'S OUTFIT

Apparatus and Directions for a Number of Mysterious Tricks Enough for an Entire Evening's Entertainment

ANYONE CAN DO THEM 75c



It is great fun mystifying your friends. Get this Conjuror's Cabinet, and you will be the cleverest fellow in your district. It contains the apparatus for seven fantastic tricks, including The Disappearing Rose, that, when placed on the lapel of your coat, vanishes from sight at will; the Magic Vase and Ball Trick (a Wooden Ball is placed inside, and upon replacing the lid has disappeared and is found in someone else's pocket); The Magic Nail with which you can apparently cut your finger almost in two; the Wonderful Card Trick (a card is placed in an envelope, and when open an entirely different card is found); The Disappearing Coin Box (a coin is placed in the little wooden barrel, and, when opened, is found to have vanished entirely, or can be made to change into a coin of another denomination); The Famous Dissolving Penny Trick; The Glass Goblet and Vanishing Coin Trick (a coin is dropped into a glass of water, and when the water is poured out the coin has vanished). With the tricks described above we send full printed instructions for performing each trick, so that anyone can readily perform all the tricks to the great amusement of their friends or the public. Any boy of ordinary intelligence, with this Cabinet of Tricks in his possession, can give a parlor entertainment not inferior to some regular magicians. Besides the tricks contained in the Cabinet, there are many other feats and illusions fully explained with full printed instructions, for which you easily make or procure the necessary apparatus. This unexcelled Cabinet of Tricks for **ONLY 75 CENTS POSTPAID TO ANY ADDRESS.**

Great Fire Eater

Most Sensational Trick of the Day! With the Fire Eater in his possession any person can become a perfect salamander, apparently breathing fire and ejecting thousands of brilliant sparks from his mouth, to the horror and consternation of all beholders. Harmless fun for all times, seasons and places. If you wish to produce a decided sensation in your neighborhood don't fail to procure one. We send the Fire Eater with all the materials, in a handsome box, the cover of which is highly ornamented with illustrations in various colors. **Price of all complete only 30 cents,** postpaid.



SQUIRT ROSE

25c A REAL STARTLER. This is the most popular of all squirt tricks. The flower in your coat looks so fresh and sweet that everyone is tempted to inhale the delightful perfume. Then is the moment to press the bulb. Geewhikkens! Don't they jump? There is a very long rubber tube that easily reaches to the pocket of your coat or trousers, and the bulb is large enough to make a dozen shots with one loading. **PRICE 25c** each, or 3 for **65c** postpaid.



PISTOL, OPERA & FIELD GLASS

PRICE POSTPAID, \$1.00 It is made in the shape of and looks like a regular Automatic Pistol. No one is likely to stop and ask you whether it is real or not. Thus it is likely to prove itself very handy in an emergency. On pressing the trigger it opens up, as shown in the illustration at the right, revealing nine most useful articles—Opera and Field Glass, Telescope, Mirror, Magnifying Glass and Burning Lens, Reading Glass, Sun Dial, Sun Compass, etc. In the handle of the revolver there is a place for various pocket necessities, such as First Aid Articles, Buttons, Pins, etc. The Pistol is of sheet metal, blued finish, that can be carried comfortably in pocket. **PRICE \$1.00.**



LOOK!

SURPRISE MATCHES

More fun than fighting with your wife. Look just like ordinary matches. Put up in boxes just like regular Safety Matches. As the victim tries to light one he gets quite a surprise. **PRICE 10c** per box, 3 boxes for **25c,** or 12 for **75 cents.**



SEEBACKROSCOPE

By merely placing this clever instrument to your eye, you can see what is going on behind your back, and sometimes you see very interesting things when no one thinks you are looking. Why it is just like having eyes at the back of your head. **PRICE ONLY 25 cents,** postpaid, 3 for **50 cents.**



NEW BOOK ON ROPE SPLICING

A most practical handbook giving complete and simple directions for making all the most useful knots, hitches, rigging, splices, etc. Over 100 illustrations. All about wire rope attachments, lashing, blocks, tackles, etc. 37 Heraldic Knots illustrated. Of great value to mechanics, riggers, campers, boatmen. **Price 20 cents** postpaid.



The "Little Giant" Typewriter

A First Class Writing Machine For \$1.50 A perfect little typewriter for \$1.50. There are thousands of persons who would like to use a typewriter but whose needs and business do not warrant the expense attached to the purchase and use of a fifty or seventy-five dollar machine. To such persons we cordially recommend our Little Giant. It is strongly made, but simple in construction, so that anyone can quickly learn to operate it, and write as rapidly as they would with pen and ink. The letters of the alphabet most frequently used are so grouped as to enable one to write rapidly, the numerals 1 to 10, and the punctuation marks being together. With this machine you can send your best girl typewritten love letters, address envelopes, make out bills, and do almost any kind of work not requiring a large, expensive machine. With each typewriter we send a set of ink and full printed instructions for using the machine. **Price complete \$1.50** by mail postpaid to any address in the world.



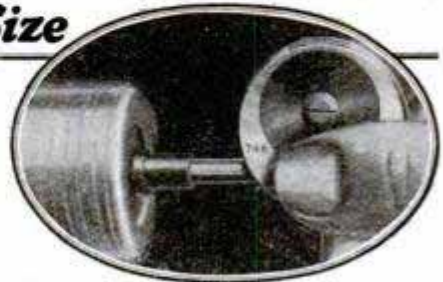


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A NEW SPEED INDICATOR —Vest Pocket Size



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Speed indicators have been made before—but never one like this. The size of No. 746 alone makes it different from any other such device. It slips into the vest pocket as easily as a watch. Light in weight—only 1½ ounces.

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No. 746 is simple in construction. Only four major parts. And into its manufacture has gone the skill that has made

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For such a quality tool the price is very moderate—in- **\$1.50**
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Men who are responsible for checking the speed of shafting and maintaining the R. P. M. of machines need a device like Vest Pocket Speed Indicator No. 746. It measures accurately all speeds, giving exact readings in either direction. Get this device from your hardware dealer. Also ask him for a Brown & Sharpe Small Tool Catalog. If he cannot supply you write us direct.

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Complete instructions, with photographs and drawings, for making the most attractive styles of ornamental iron work.

Andirons	Grilles	Rosettes
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Bulbs	Drawer Pulls	Door Plates
Window	Door Keeps	Spiral Deco-
Fasteners	Fire Sets	rations
Lamps	Candle Sticks	Picture
Coat Racks	Chairs	Frames

Thomas F. Googerty, the author, is one of the best-known makers of this type of metal work. The illustrations are all of work made by the author. Almost every page has one or more illustrations either made from drawings or from photographs. Anyone interested in this type of work can soon develop his ability so that he can make these articles for his own use or for sale. There is a growing demand for articles of this type.

Send No Money Simply write a postal for this book of instructions, asking that "Hand-Forging" be sent C.O.D. When postman hands you the book, pay him the postal charges and \$2.00.

POPULAR MECHANICS PRESS, Room 702, 200 East Ontario St., Chicago, Illinois

OUTDOOR SPORTS THE YEAR 'ROUND

Popular Mechanics New Useful Book—Outdoor sports appeal to us all. But the fun is double when you make your own devices. There are 226 clearly written and concise articles telling how to make equipment for new and popular sports of many kinds in the new Outdoor Sports book. There are clever devices for such sports as:

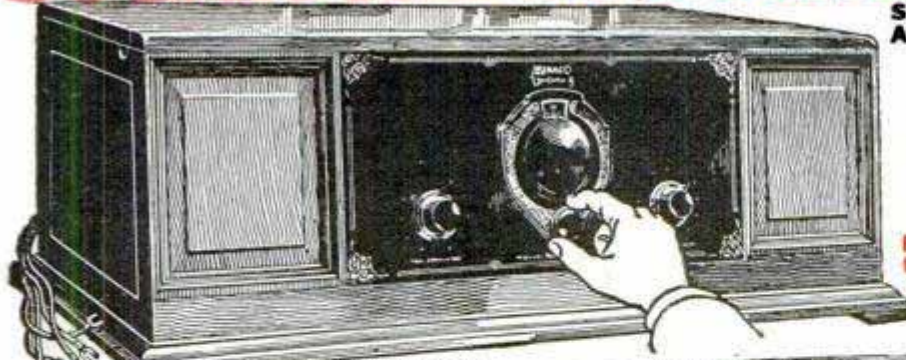
Swimming	Trapping	Photography	Kite flying
Camping	Tobogganing	Tennis	Summer games
Football	Baseball	Outdoor winter	Nutting
Swinging	Fishing	games	Pushmobiling
Trolley coasting	Golf	Skating	Racing
Roller skating	Boat sailing	Boating	Skiing
	Toy making		

It is easy to make the devices described because there are 317 helpful illustrations. The articles are clear enough for boys, yet interesting enough for any man.

Send No Money Just write your name and address on a postal card and say that you want Outdoor Sports the Year 'Round. When the postman hands you the book, give him \$1.50 plus the few cents postage. That is all. If you live outside the U. S. or if you are not at home when the postman delivers the mail, then send \$1.50 with your order. Address your postal to

POPULAR MECHANICS PRESS Room 102, Popular Mechanics Bldg. 200 E. Ontario St., Chicago

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Built like—to look like—and perform like \$200 sets

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The celebrated Miraco Ultra—U. S. Navy type circuit, has also been adapted to Single Dial Tuning—without sacrifice of selectivity, volume, clearness, power, tone, or distance getting qualities! In the magnificent big Miraco Unitune, above shown, you turn one vernier knob for stations everywhere. Beautiful hand-rubbed, piano-hinged, solid walnut cabinet, 28 in. long, 15 in. deep, 10 in. high. Sloping Bakelite panel in walnut finished to match. Also offered on 30 days' free trial!

Coast to Coast and Foreign Reception Certified by Miraco users

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Send for Proof!
Enormous sales again enable us to add hosts of costly new features, latest refinements and up-to-the-minute improvements. Miracos this year are still better—more beautiful—more selective—more powerful for less money than ever before.

USER-AGENTS WANTED - WRITE!
Reports from users everywhere leave little for us to add. These are only a few of the many in our files and which we receive daily. Send coupon for plenty of additional proof and testimony of nearby users.

Miraco Separates Stations That More Expensive Sets Can't

Logged stations from coast to coast the second evening we had Miraco and got some difficult stations because of so many broadcasting stations coming in under the same number. We can separate them where some of the best receiving sets in the neighborhood cannot. We are well pleased with the set and heartily recommend it.

W. J. PRINSON, Seibert, Colorado.

N. Y. Heard Europe

I received six foreign stations during last week: 21.0, OEH, OAX, Lima, Peru, Hamburg, Germany; PTT, Paris, France; SCR, Brussels, Belgium. The Miraco is some set!

Local and distant stations come in so loud that you have to shut it down. Had Porto Rico on the loud speaker last week so you could hear it through the whole house.

GUS ESHMAN, Fulton, New York.

Beats \$200 to \$300 Sets in Demonstration

Miraco is the best performer in this town. I have demonstrated against \$200 and \$300 sets and beat them for distance and quietness.

ORREN W. FAWCETT, Saybrook, Illinois.

Experts Say It Can't Be Beat

I am very well pleased with my Miraco. Fact is, it was such a surprise that I haven't gotten over it yet. I have operated sets all over the world for the last seven years. I think that I ought to have some idea of what a broadcast receiver should be. I am sure that you have a set that can't be beat. I logged fifty-six stations first night.

A. W. BRYANT, Terre Haute, Ind.

Out Performs Costlier Sets

Like the Miraco very much. The first night I received KFI (Los Angeles), WPG, WHN, CFCF. This is covering from coast to coast; received 47 stations that night, and the next night I received 27 stations. That is more than a lot of sets are doing that cost from \$9 to \$100 per cent more than mine. It is all you claimed it and a little more.

C. A. MOONZ, Van Dyke, Mich.

Alaska Hears Chicago

I am living up here in Alaska one thousand miles from Seattle and it takes a good receiver to pick up any radio in this district, especially near Juneau, our Capital City, which seems to be bothered with electrical currents and static, but the Miraco picked up stations as far as Chicago. I've heard Omaha several times.

LESLIE F. PARKER, Gustavus, Alaska.

Finds It Superior to High Priced Set

Miraco is working fine. Have compared it with the (names expensive set) and find it superior in performance. The most pleasing feature of this machine is the counter balancer. I haven't seen another set with this remarkable feature, and it makes an impression on those who hear and see.

WILLIAM R. CUMMEL, Mapleton, Iowa.

Tested and approved by all of Radio's Highest Authorities



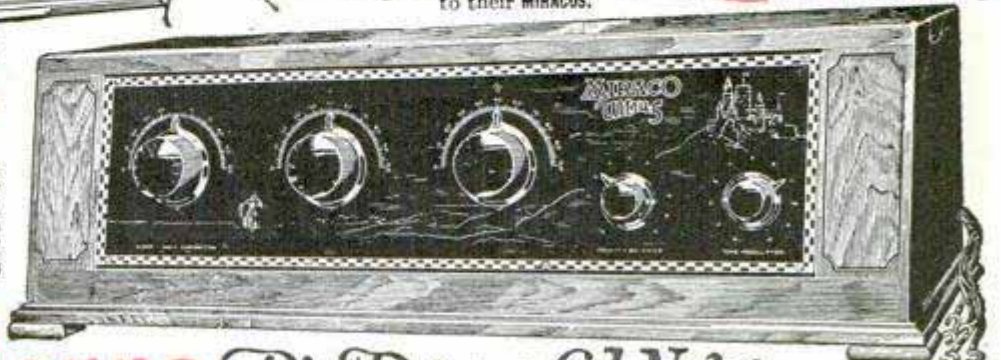
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Retail LIST Price **49.75** GET SPECIAL OFFER now only **29.75** one year GUARANTEE



27 in. Long Solid Walnut Cabinet

Big Powerful New MIRACO

ULTRA-SELECTIVE LONG DISTANCE RECEIVERS - EASY ON CURRENT

Tremendously increased sales of the beautiful big Miraco's—due to user-agents finding them unbeatable among the fine, high-grade sets (even at several times the price!) for razor-edge selectivity combined with extreme long distance reception, clear natural tone, powerful loud speaker volume and economical operation—enable us to GREATLY REDUCE the wholesale prices. Latest, up-to-the-minute models—Sets and accessories! Get the big new discounts and Amazing Special Offer! Send postal or the coupon today—Now!

Compare with Any 6 to 8 Tube Sets—

Unless 30 Days' Trial proves your Miraco the most selective, the clearest toned and most powerful distance-setter among sets using up to 8 tubes—don't buy it! Enjoy a powerful big Miraco in your home—at our risk—and be thoroughly convinced. Your verdict final—absolutely no strings to our offer. Satisfaction unconditionally guaranteed.

Operate from Light Socket or Batteries

Miracos are specially adapted and unsurpassed for economical operation with A- and B-light socket power supply units—or with batteries. Power tubes and more than 90 volts of "B" Current may be used, although the power built right into a Miraco makes unnecessary the use of other than regular tubes and 90 volts.

Factory Prices Save You 1/2! Send Coupon

Save or make a lot of money on sets and accessories by dealing direct with a big, old, reliable manufacturer (7th successful year). Greatly reduced wholesale prices—get User-Agent's Special Offer on Demonstrating Set (no contract to sign, no red-tape). Our offer will AMAZE you. Send Coupon now!



RELIABILITY!
The Midwest organization was one of the very first to engage in the manufacture of radio sets. We consider them to be both morally and financially responsible. They have a reputation for fair and square dealings.—THE PROVIDENT SAVINGS BANK & TRUST CO.

7th ANNIVERSARY SPECIAL!

Only \$19.95 net—an unheard-of price for a high-grade fully guaranteed 5-tube radio! It's the new \$30 (retail list) Miraco Compact—14" wide, finished in brown mahogany. Can't be equalled anywhere near the price in quality of construction, selectivity, distance-getting power, tone, ease and economy of operation—let 30 days' trial prove this! Complete with high-grade accessories—nothing else to buy—only \$49.85 net. Act quick—supply limited. Get Special Offer! Another bargain, direct from factory. Coast to Coast range. Powerful, selective; clear, sweet tone.

FREE!
30 DAY TRIAL!
5 TUBE GUARANTEED RADIO
\$19.95

All the Proof you want is waiting for You!

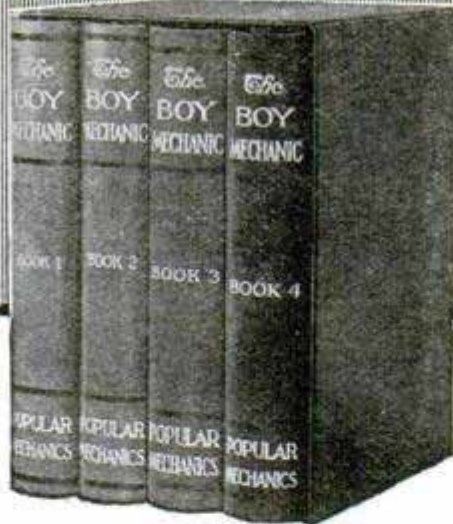
Coupon or postal brings reports from hosts of users in your vicinity and elsewhere proving that Miraco sets at rock-bottom money-saving factory prices, outperform sets costing up to four times as much. You can also buy speakers, tubes, batteries, etc., at big savings from us! Get our proposition before spending money elsewhere.

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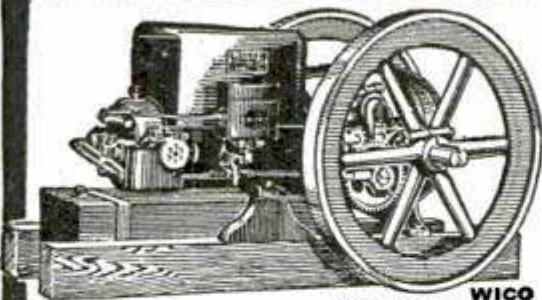
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Every detail given for performing the seemingly impossible feats of famous mediums. Startling revelations that show how easy it is to fool the credulous. Many of these tricks have made the greatest magicians wonder.

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What makes a trick good is its simplicity. No complicated or expensive apparatus needed for these, the best of spiritualistic tricks. You can do such wonders as:

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Where water or moisture seep in through cracks or porous spots in the floor or walls, you can make and keep your cellar dry and sweet—a fit place to work, free from odor, mold and rust—by filling the cracks and coating the moist surface with Smooth-On No. 7.

This is the one practical waterproofing that you can apply yourself, easily, from the inside, to wet or dry surface and with every assurance of thorough watertightness, even in the wettest seasons.

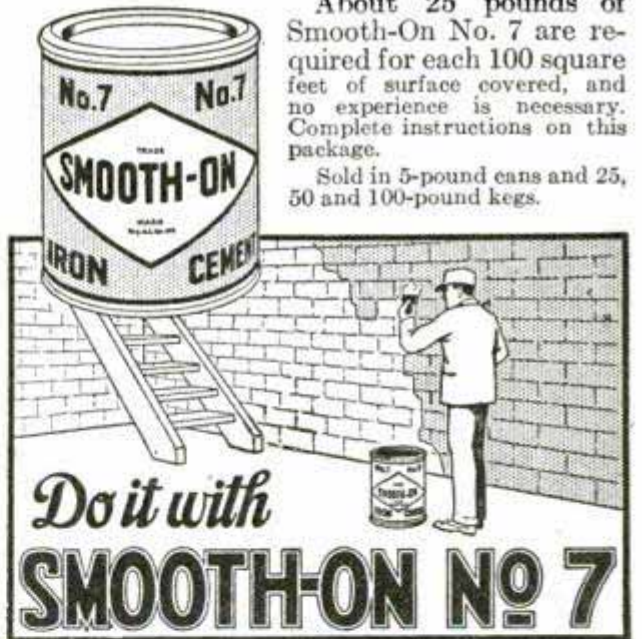
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18 KARAT

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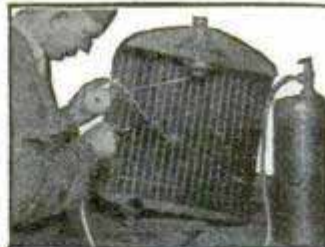
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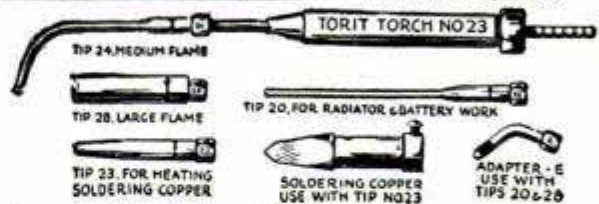
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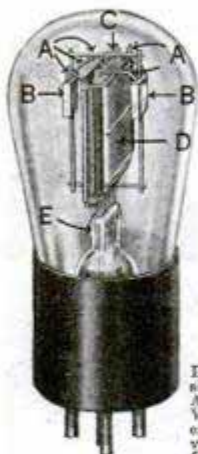
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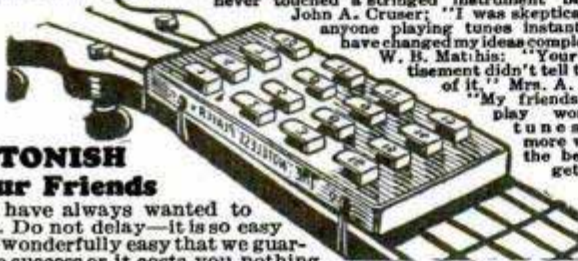


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| Auto Repairing | Battery Care and Repair | Lapping Bushings | Bracing Fence Corners | Novel Cab Stands | Cleaning Lantern Chimneys | Outside Hay Chute | Repairing Air Compressor | Durable Nests for Poultry | Boxes for Cream Cans | Shop Tools | Electrical Equipment | Homemade Elevator | Wings | Cleaning Enamel | Concrete Working Ideas | Carpenters' Shortcuts | Fitting Made Easy | Ventilation Flues | Tool Boxes | Printers' Helps | Making a Blowtorch | Garage Equipment | Irrigation Canals | Jewelry Kinks | Draftsman's Kinks | Lathe Operator | Electroplater | Cabinet Worker | Lumber Yard Management | Mechanical Drawing | Farmer's Helps | Micrometers | Sheet Metal Working | Painter's Equipment | Motorist's Helps | Storekeeper | Pattern Making | Drainage | Outdoor Air Press | Workbench | Welding | Plumbing | Using Spindle Drills | Making Grinders | Raising Vertical Piping | Cutting Wallboard | Rubber Stamp on Thimble | Pin Stamping | Service Station Attendance | Lettering |
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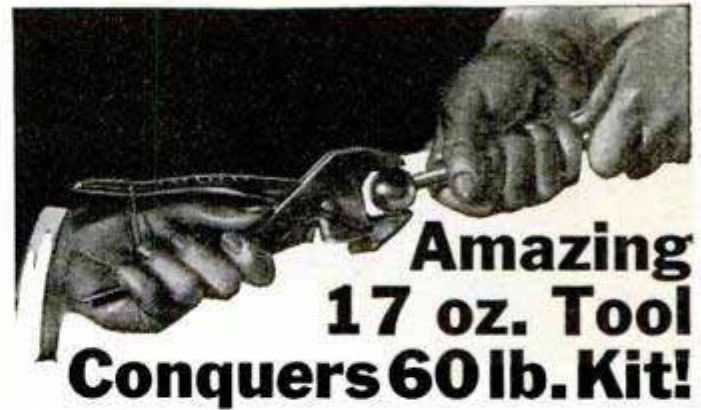
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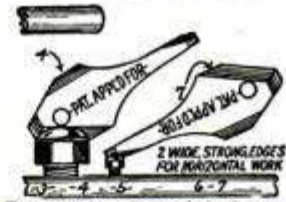
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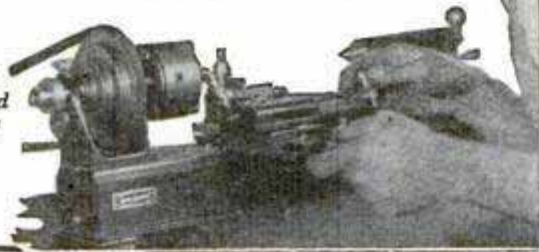
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Please send FREE your catalog showing each machine in full colors, also your special Free Course in Touch Typewriting offer. This is no obligation on my part whatever.

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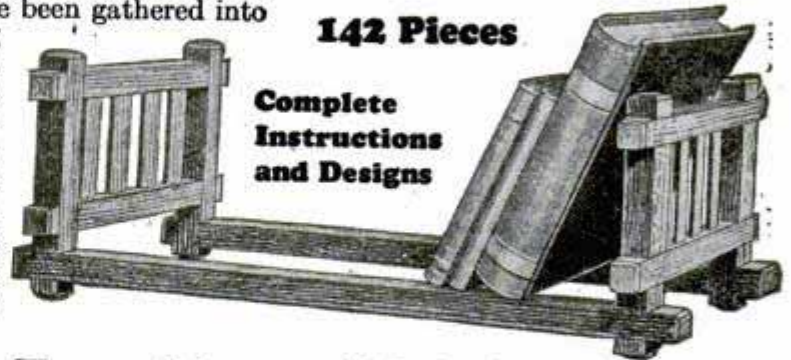
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Make FURNITURE at Home

You Can Do It in Spare Time—It's Easy

THE simple designs in furniture are, after all, the most attractive. And the best of the easily-made styles have been gathered into "Popular Mechanics Furniture-Making Books." These books are filled with pictures that show you how the finished piece looks, and how to lay out, saw, and put together the various parts. You are also told how to finish your furniture in the most attractive ways. Nowhere else will you find instructions more clear. Nowhere else will you find such a marvelous assortment of simple designs to select from. Think of it! 142 different designs, including all the pieces of furniture and the different styles of lamps you need to make your home a pleasant place to live.

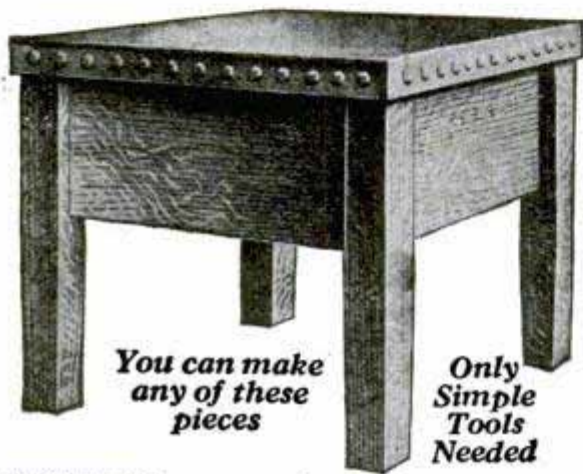


142 Pieces

Complete Instructions and Designs

Popular Mechanics Furniture-Making Books

Tell How to Make These 142 Pieces of Furniture and Lamps



You can make any of these pieces

Only Simple Tools Needed

- Settee
- The fuming of oak
- How to make black wax
- 40 styles of chairs, beginning with the Egyptian style made 500 years before Christ
- Piano bench
- A shaving stand
- A waste paper basket
- A cellorette pedestal
- A princess dresser
- A sideboard
- A window seat
- A plant stand
- A bedside medicine stand
- A hall chair
- A side chair
- An arm chair
- A book case
- A lamp stand
- Extension dining table
- An oak-bound cedar chest

- A dresser for child's playroom
- Arts and crafts oil lamp
- China closet
- An oak bedstead
- A footstool
- A library set in pyro-carving
- A grille with pedestals to match
- A lady's writing desk
- A telephone stand and stool
- An oak medicine cabinet
- Home-made mission chair
- A lamp stand and shade
- A porch chair
- A chair
- A morris chair
- A mission book rack
- A substantial library table
- A mission candlestick
- A low-back mission chair
- A magazine stand
- A lawn swing
- A portable table
- A combination billiard table and davenport

- Easily made book shelves
- A blacking case tabouret
- A Roman chair
- A roll top desk
- A pyrographer's table
- A piano bench
- A library table
- A princess dresser
- A sewing box
- A fern stand
- A wardrobe
- An oak table
- A book trough
- An oak serving table
- An umbrella stand
- A shaving-dish buffet
- A writing desk
- A music rack and book stand
- A dictionary and magazine stand
- A leather back arm chair
- A wall shelf
- A pedestal
- A magazine rack
- A hall tree

- One-light portable lamp
- Two-light portable lamp
- Four-light chandelier
- Dining-room dome
- Reading lamp
- Parlor or den lantern
- Lantern
- One-light portable
- Shade for droplight
- Four-light chandelier
- One-light bracket
- Piano lamp
- Newel post lamp
- Electric candle sconce
- One-light bracket
- Droplights
- Reading lamp No. 1
- Reading lamp No. 2
- Square dining-room dome
- Mission chandelier
- Desk light
- Droplight No. 3
- Chandelier
- Hexagonal library lamp
- Hexagonal dome
- Lamp No. 1
- Lamp No. 2
- Lamp No. 3
- Lamp No. 4
- Conventional patterns
- The butterfly design
- The pyramid design
- An oak buffet
- Oak stain
- A plain oak hall clock
- A rocking chair

- A curved back arm chair
- A plate rack
- A tool for marking dowel holes
- A magazine table
- A waste paper basket
- A writing desk
- A couch with cushions
- Shade for dining room
- How to bend wood
- A smoking stand
- A china closet
- A leather-covered footstool
- Arts-craft mantel clock
- A music stand
- Wall case with mirror
- A table for the den
- A burlap-covered seat
- A quarter-sawed oak settee
- A screen
- A mission book rack
- A round extension table
- An arm dining chair
- A hall bench
- A sewing table
- A side chair
- Another piano bench
- Another screen
- A folding card table
- A magazine stand
- A tabouret
- A porch swing
- A foot warmer
- Plate rack
- A mission sideboard

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It's Fun to Make Things. It's Profitable to Make Furniture and Lamps

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Tables 36" long. Safety head with knives 4 1/2" wide. Ball bearings. Fence tilts 45 degrees both ways. Cuts mouldings.



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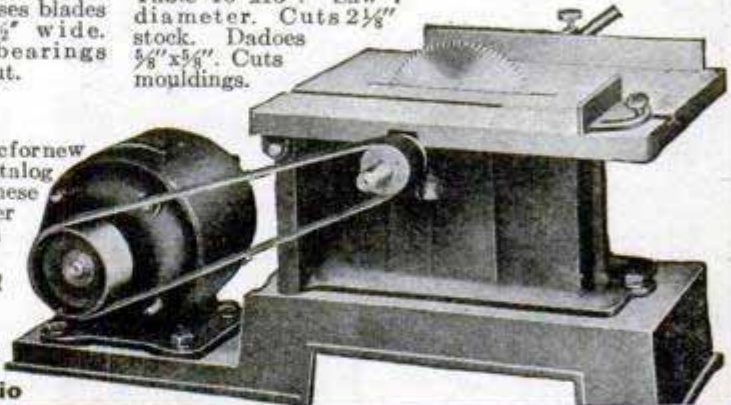
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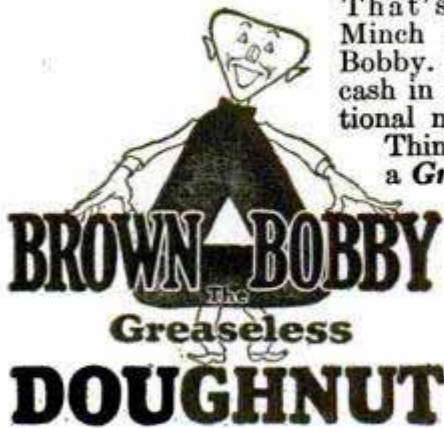
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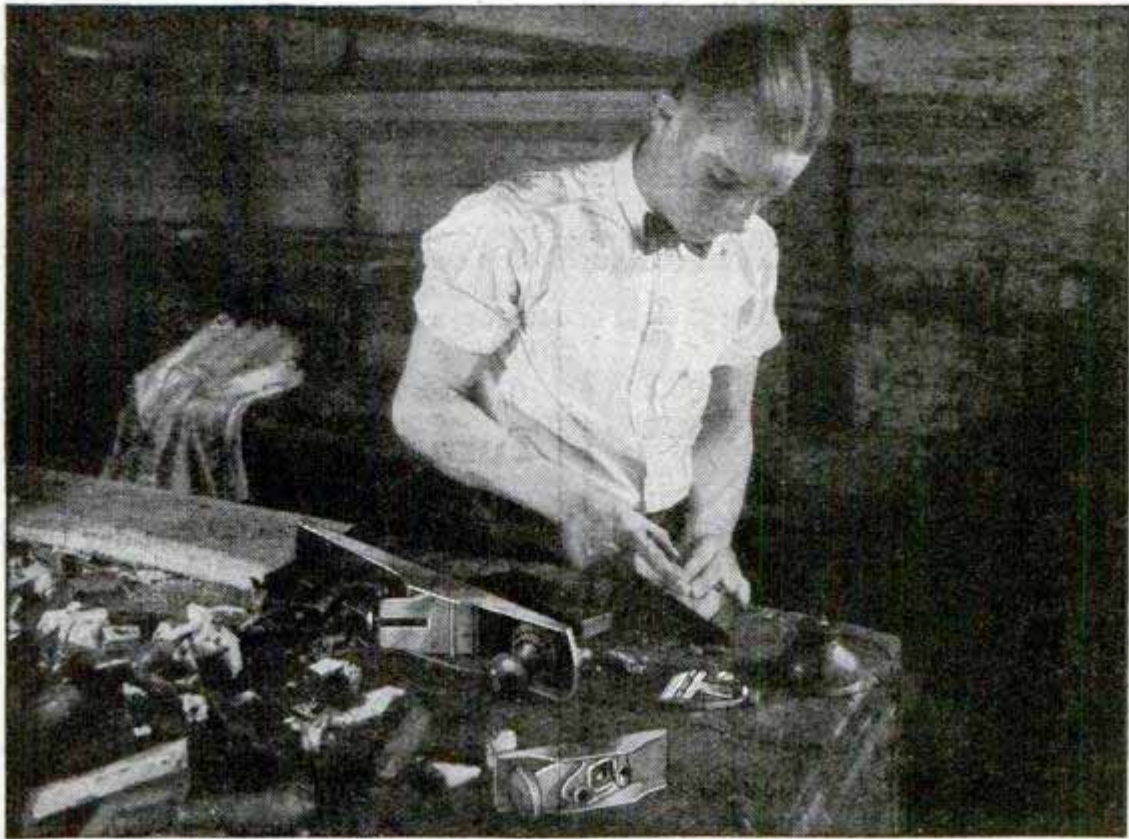
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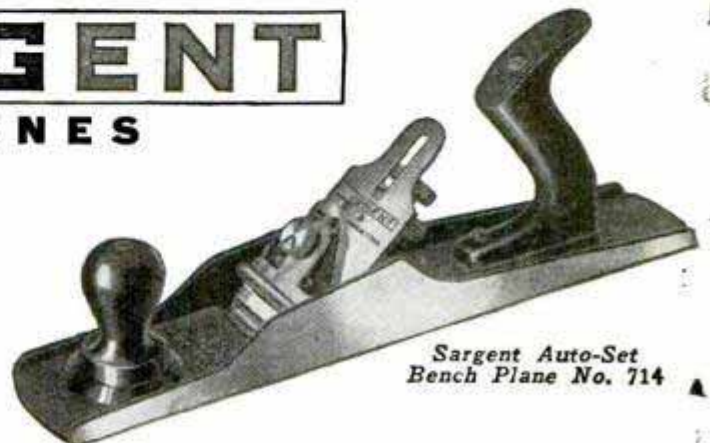
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SARGENT

PLANES



*Sargent Steel
Block Plane
No. 5206*



*Sargent Auto-Set
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Make big money from repair work



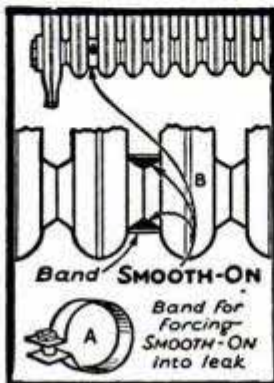
Practically every householder spends at least \$10.00 to \$50.00 each year and many spend several times that much on simple repairs that can be made *quickly, easily and well* with

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With a can of Smooth-On, you can save this money in your own home—and by doing similar repair work for others, you can make money.

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Ask for the **Turner Master No. 45**

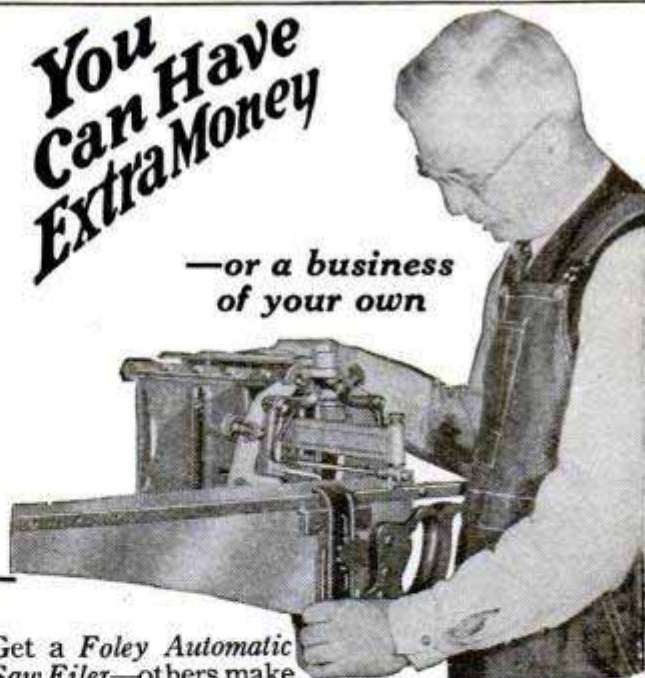
400° greater heat with present-day kerosene or gasoline. Perfect flame regulation. Absolute safety; one opening in tank and that above fuel line; safety valve. Large, comfortable, pistol grip handle.

Write for a **TURNER MASTER No. 45 \$7.75** Post-paid
Fearlessly Guaranteed

THE TURNER BRASS WORKS
Industry Ave., Sycamore, Ill.

You Can Have Extra Money

—or a business of your own



Get a *Foley Automatic Saw Filer*—others make \$20 a day with it, in their own business, filing saws for carpenters, contractors, schools, shops, and woodworking plants. B. V. Kennedy of Adrian, Mich. says: "I file 15 to 18 saws a week. I work 8 hrs. a day for the N. Y. Central R. R., so my filing is done mostly evenings." No studying or experience. Practically no competition for the first man who gets started in this big paying business in every community—*be that man.* Write today for **FREE INFORMATION.**

Foley Saw Tool Co., 212 Foley Bldg. 914 E. Lake St. Minneapolis, Minn.



1/4-inch holes thru 1/2-inch Cold Rolled Steel in 13 Seconds

NOT just one hole, but hole after hole, hour after hour. No overheating—no letting up—no distress signs. The same smooth, dependable drilling for long periods.

A drill that performs like this in hard shop service won't go back on you.

No. 1042 is called a Heavy Duty Drill because it's motored heavy enough to *more* than justify that title. No job that comes within its range is too hard

for this drill. Uninterrupted performance is built into every part of every electric drill bearing the Goodell-Pratt nameplate. There are no weak points.

Write us for folder that tells complete details. Then order through your tool merchant. If he hasn't stocked your Goodell-Pratt Electric Drill, he can get it for you quickly.

Note these features and refinements of Goodell-Pratt Electric Drills

MOTORS—Powered for continuous drilling at the rated full capacity.

PATENTED SELF-OILING ARMATURE BEARINGS—Long, special, high-speed bearings, in perfect alignment; automatically lubricated from capacious leak-proof oil reservoirs.

EFFICIENT VENTILATION—Uninterrupted flow of clean air through the motor.

PATENTED CABLE LOCK—Eliminates most connection troubles. Cannot be pulled or jerked out.

GEAR OPERATED CHUCK—Ball bearing, with self-tightening action that makes the key unnecessary most of the time.

ACCESSIBILITY—Every vital part surprisingly get-at-able.

WIDE-FACED HARDENED GEARS—Double gear speed reduction—hard bronze gear and spindle bearings—instant switch control.

HOUSING—Polished aluminum, with pleasing lines. Good looks as well as remarkable efficiency make Goodell-Pratt Electric Drills a real joy.

Type Schedule

Universal Motors—for A. C. or D. C.—for 110 and 220 Volts

Type	Lbs. Wgt.	Capacity	Approx. No Load Speed	Type	Lbs. Wgt.	Capacity	Approx. No Load Speed
1042	6	1/4" Heavy Duty	1800	1045	18	1/2" Standard	650
1043	11	3/8" Heavy Duty	1100	1046	21	1/2" Heavy Duty	600
1044	12	1/2" Light Duty	700	1048	22	5/8" Heavy Duty	550

GOODELL-PRATT COMPANY, GREENFIELD, MASS., U. S. A.

MAKERS OF *Toolsmiths* MR. PUNCH

GOODELL-PRATT

1500 GOOD TOOLS

**CROSLLEY 1927
RADIOS**

Each set giving the utmost in radio enjoyment at its price. All prices slightly higher west of the Rocky Mountains. All prices are without accessories.



The 5-50—\$50

Enthusiastic owners report amazing performance—a drum delivering stations loud, clear and sharp; each an almost imperceptible turn of the drum apart. Write station letters on drum, return to them at will. Single drum Station selector. Accumulators, power tube adaptability and all metal chassis that shields the units from each other. Beautifully finished. Mahogany cabinet, rose gold trimmings.



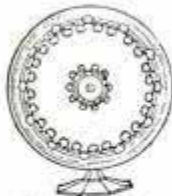
The 5-75 Console—\$75

This set includes ideas for radio reception perfection not found in any other radio. Marvelous exclusive Crosley "Crescendo" and "Accumulators" increase volume on distant stations and bring in programs entirely missed and passed by on ordinary one-dial control radio. Console model stands 40 inches high. The Crosley Musicone is skillfully built into the cabinet in a manner which is both an artistic and an acoustical triumph. Ample space for batteries and accessories.



**"6 Tube RFL-90"
Console, \$90**

Introducing the double drum station selector! Crosley's winning non-oscillating perfectly balanced tuned radio set. Includes Musicone skillfully built into exquisite console mahogany cabinet of two-tone finish to match finest surroundings. Room for batteries and all accessories; 40 inches high; 30 1/2 inches wide.



**The Crosley
Musicone**

The secret of the popularity of this biggest selling loud speaker on the market lies in its actuating unit. This and NOT the cone shape is the reason for its perfect reproduction of all audible sound. BEWARE of imitations. There is only one genuine Musicone. It is built solely by Crosley under mass production methods which makes its unmatched value possible.



"—as long as I can pick up 27 programs in 30 minutes beside our 3 locals interference won't bother me

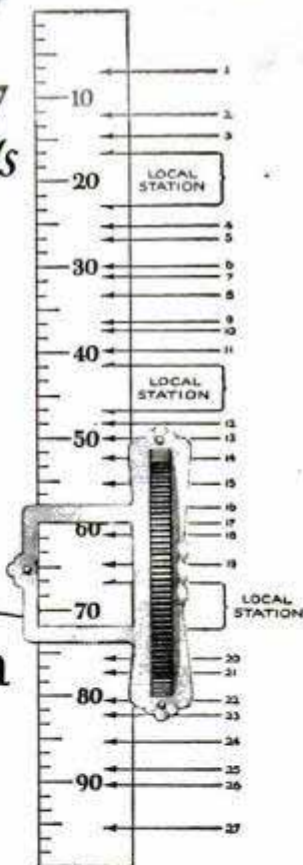
"I sat down the other night with this Crosley set. One control. Beginning at one end of the broadcasting wave band, I tuned in 27 stations, loud and clear, just like the Cincinnati stations, three of which were going full blast. I listened to each program; identified it; didn't hear any others in the background, and passed on to the next,—all with one finger. It was between 7:00 and 7:30 P. M. Central Standard Time.

The air was certainly full. Some of the stations were less than a dial marking apart. It is amazing how the jiggers they call "accumulators" helped on such fine separation.

Even using a hundred-foot aerial the local stations were easy to go through. One of them only a few blocks from my home.

Some radio, I call it! \$50.00 seems too little. I'd like to see some two-hundred-dollar sets do as well!"

Write Dept. 15, for Catalog



The above scale reading shows how stations picked up by Mr. X—appeared on the Crosley graphic drum station selector. Name on request.

**Single Drum
Control**
\$ 50.
Prices slightly higher West of the Rocky Mountains.

THE CROSLLEY RADIO CORPORATION

CINCINNATI, OHIO

Powel Crosley, Jr., Pres.

Crosley sets are licensed under Armstrong U. S. Patent No. 1,113,149, or under patent applications of Radio Frequency Laboratories, Inc., and other patents issued and pending.



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With All Kinds of Razor Blades

Makes Blades Keener Than New—Prolongs Their Usefulness for Months and Even YEARS—And Gives Coolest Shaves Imaginable! See Generous Special Offer Below! Send Coupon Now!

365 Shaves a Year With Same Blade!

KEEN, velvety shaves forever and no more blades to buy! That's what the astonishing invention of a St. Louis man offers the great army of American shavers today!

KRISS-KROSS revolutionizes all old-style methods of shaving. Its performance is so sensational that it seems hardly fair to call it a stropper. Rather it is a super-stropper or blade-rejuvenator! Almost literally it makes a new blade out of an old one every day—and gives them a sharpness they seldom possess when brand new! Actually—you can often take a blade right out of a fresh package and improve it as much as 100% in eleven seconds with KRISS-KROSS!

Magic Diagonal Stroke

Until you've seen KRISS-KROSS, and tested its uncanny dexterity yourself, you'll never know how amazing it really is! It employs the famous diagonal stroke, same as a master barber uses. Never before has anyone captured the secret of reproducing it automatically. Eight "lucky leather grooves" do the trick in 11 seconds, with a precision it takes a master barber years to attain.

But that's not all, KRISS-KROSS embodies still another feature that has hitherto baffled mechanical reproduction. It strops

from heavy to light. It's absolutely uncanny the way the strokes grow lighter and lighter until an adjustable, automatic jig flies up and notifies you that your blade is ready—ready with the keenest-cutting edge that steel can take!

KRISS-KROSS not only produces unbelievable sharpness—but prolongs the life of any razor blade for months and even years. Fits all brands and makes except Durham. Eliminates 83% of shaving costs—and gives you keen, velvet-smooth shaves forever!

3-in-One Razor FREE

And now for my surprising offer. To introduce KRISS-KROSS, I am giving with it Free a new kind of razor. Possesses remarkable features. Instantly adjustable to any shaving position: (1) T-shape; (2) straight (old style); (3) or diagonal (new way). Gives a sliding instead of pulling stroke. Simply zips right through the toughest crop of whiskers. Comes with 5 special-process blades and is entirely unlike anything you ever saw before!

Send for Free Offer Today

Send for full information on these remarkable new inventions today. Write for illustrated description and full details of free razor offer. It's even more remarkable than I can tell you in this short space. Clip the coupon now! Mail it today!

**FITS ALL
BLADES**

**CUTS SHAVE
COSTS 83%**

**ENDS BUYING
BLADES**

**JIFFY
QUICK**



AGENTS:

Make big money with KRISS-KROSS. FREE razors boost your profits amazingly. H. King made \$66 in one day. H. C. Paire made \$104 in 3 days! Others average \$350 and up to \$750 a month! Spare time workers, Office and Factory men make \$6-\$12 extra a day showing KRISS-KROSS to friends and fellow employees. Get details at once. Check bottom of coupon and mail it tonight!

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() Check here if interested in making money as authorized KRISS-KROSS representative.

Solid walnut cabinet. Compartments for all batteries—no unsightly wires. Built in imported loud speaker.

Five tube, tuned radio frequency. Cabinet 50 inches long, 26 inches deep and 42 inches high. Retail price including all accessories

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Built to equal the best in radio and yet sell at a price within the reach of all.

OZARKA



Handy portable radio, built-in loud speaker. Compact, light in weight, uses dry cells. An ideal instrument for home use as well as outdoors. Weight complete 25 lbs. Retail price including all accessories..... **\$75.00**



Five tube tuned radio frequency, built-in loud speaker and space for "B" batteries. Cabinet 25" long and 16 1/2" deep. Bronze panel, longest distance possible, selective and a tone which will please. Retail price complete with all accessories..... **\$100.00**



Extra long distance radio, loud, clear reception coast to coast. Large cabinet, space for "B" batteries. Furnished complete with imported English Hi-Power loud speaker built to more than meet any competition for distance, tone, volume or selectivity, retails complete with loud speaker and accessories for..... **\$132.50**



Make More Money Sell Radio in Spare Time-Evenings

IN four years we have taught 4500 men how to make \$50 to \$100 a week selling Ozarka radio instruments, evenings.

These men were not experienced salesmen—our (12) FREE Sales Lessons taught them just what they needed. They did not understand radio—our (10) FREE Radio Service Lessons gave them the technical knowledge they needed. Today many of these men have been so successful they have been able to give up their jobs, put all their time on Ozarka. Many have other men working for them.

What these men have done, others can do, who are willing to try.

Ozarkas are sold in competition with all other instruments—results speak for themselves—distance, volume, tone, selectivity and appearance. Your selling price is away under any instrument of similar high quality—the commissions are large, from \$30.00 to \$80.00 a sale—two sales weekly is a low average.

We not only furnish sales and service lessons and leads from our national advertising but attractive literature, booklets, letterheads, envelopes, business cards, window signs,

movie slides and movie reels all with your name printed on them. Your selling is made just as easy as possible—the results of these 4500 men prove this. The necessary investment is small—the possible profits are large. In territory, not now covered, we need exclusive Ozarka representatives.

Send for Our 100-Page Book —The Ozarka Plan

You'll find this book very different to any you ever read—it's a true story of life, why some men struggle to get ahead while others make money rapidly. You'll find it a thoroughly tried out and proven plan of making money in your spare time—an entirely different and easier plan of selling radio—the one article in big demand today.

While this book has been expensive to publish it is FREE to any man who is anxious to get ahead. It has meant a turning point in many a man's life—it may mean the same to you. Costs nothing to get it, and yet may mean so much. If you really want to make more money, you'll send for it today! Simply use the coupon below!

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