

JUNE

25 CENTS

POPULAR MECHANICS



MAGAZINE

SO YOU CAN

REG. U.S. PAT. OFF.

SEE PAGE 839

**FISHING
TACKLE
TIPS**



CHAMPION NATIONAL CHANGE WEEK MAY 4th to 10th

To rid your car
of motor "bugs"
Install a set of
**Champion
Plugs**



CHAMPION National Change Week again reminds every motorist of the wisdom and economy of regularly replacing spark plugs . . . Champion Spark Plugs are effective in overcoming hard starting, sluggish acceleration, loss of speed and poor gasoline mileage, a few of the common motor "bugs". If your motor is afflicted with any of these common "bugs" you owe it to

yourself to take advantage of the special services offered you during National Change Week by your Champion dealer. Have him test and clean your spark plugs. Replace with Champions if necessary. Champions give you the all 'round better engine performance demanded by the world's racing champions who have chosen Champion Spark Plugs for the past twelve years.



Champion Spark Plug dealers have testers which enable you to see the exact condition of your spark plugs, when you need new ones and why you should use Champions.



Most Champion dealers have modern equipment which cleans spark plugs thoroughly. Have your spark plugs cleaned regularly during their efficient life—it saves you time and money.



Your Champion dealer is equipped with regularly revised factory charts which qualify him to install the precise spark plugs best suited to your engine requirements and driving habits.

TO KEEP ENGINES YOUNG, TEST, CLEAN AND REPLACE SPARK PLUGS AT REGULAR INTERVALS

Four Factors Govern a Modern Car's Roadability

ROAD STEADINESS INCREASED BY MODERN ENGINEERING OF WEIGHT, SPRINGS, STEERING AND SWAY ELIMINATION

MODERN TRAFFIC demands cars that "hug the road."

Engineering genius of the 1936 Plymouth accomplishes this with correct weight distribution and equalized spring action... low center of gravity, rigid frame, front-end sway eliminator and shock-proof steering.

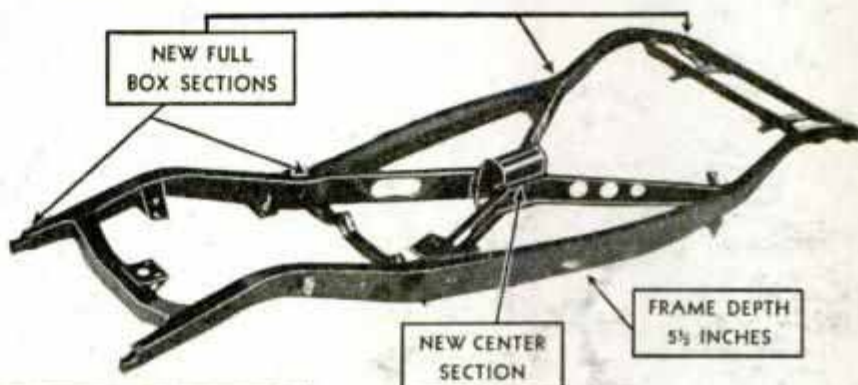
And 100% Hydraulic brakes and Safety-Steel body make Plymouth America's safest car.

Drive this new Plymouth... at Chrysler, Dodge or De Soto dealers. Only \$510 and up... list at factory, Detroit (special equipment extra).

PLYMOUTH DIVISION OF CHRYSLER CORP.



INSIST ON 100% Hydraulic brakes. They STOP quick and sure.

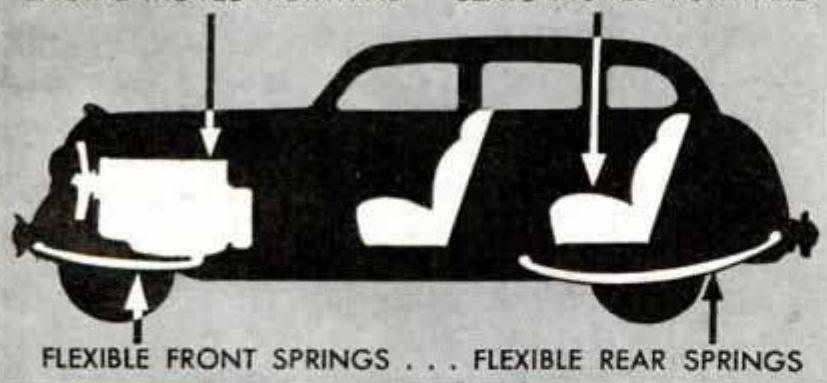


(Above) PLYMOUTH'S MASSIVE steel frame... "Box-section" steel reinforces all major points in this twice-as-rigid "X" frame... giving added strength and protection.

(Left) DIAGRAM SHOWS Plymouth's correct weight distribution. Synchronized spring action and this balanced weight give Plymouth a truly "Floating" ride.

EQUAL WEIGHT FRONT AND REAR

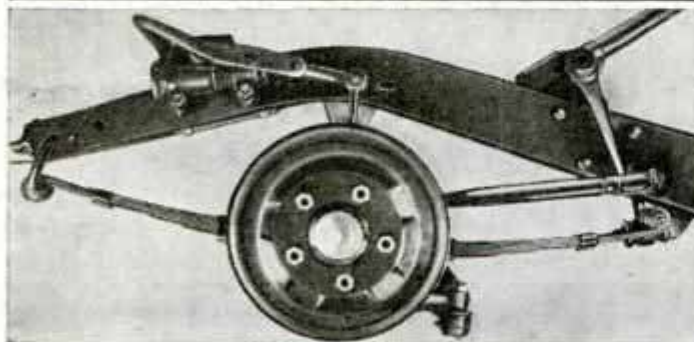
ENGINE MOVED FORWARD SEATS MOVED FORWARD



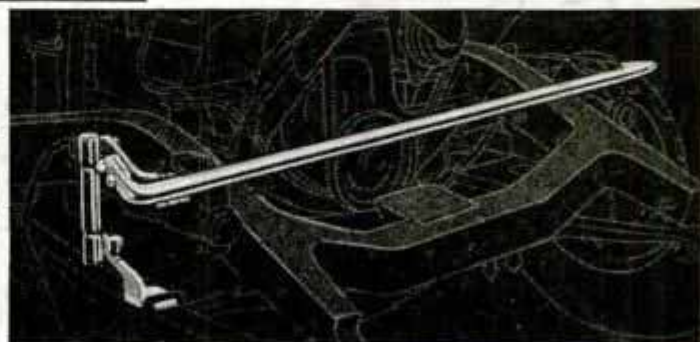
SPRING ACTION IS SYNCHRONIZED

EASY TO BUY

Plymouth is priced with the lowest... and Plymouth terms are as low as the lowest! You can buy a big, new Plymouth for as little as \$25 a month. The Commercial Credit Company has made available to all Chrysler, Dodge and De Soto dealers low finance terms that make Plymouth easy to buy.



NEW STEERING anchors spring, drag link at rear.



SWAY ELIMINATOR always keeps car on even keel.

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"You can reach me by telephone" . . . you say it casually, but there is assurance in your voice. For you can depend on telephone service. You call a number and a voice answers—across the street or across a continent. It's so easy to do—you have been doing it for years. Use has dimmed the wonder of the telephone.

Yet the wonder grows—there is no ending to telephone progress. Service is quicker, clearer and more accurate. Improvements are made each year. Things once thought impossible are now accomplished fact. Tomorrow will see still greater achievement.

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BELL TELEPHONE SYSTEM



Popular Mechanics Magazine

H. H. WINDSOR, Founder

H. H. WINDSOR, Jr., Editor and Publisher

June, 1936

Vol. 65, No. 6

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The Gentleman of the Jungle

THE hunters had brought down a tiger with a single lucky shot and were gathered around measuring him. Then the tiger grunted and scrambled to his feet. What happened next is cited by Capt. John D. Craig as just one proof that a tiger, even a groggy one, is a gentleman. After enjoying Capt. Craig's story of the tree-climbing tiger this month, you will want to read his article next month in which he sets out to prove that the tiger is the real gentleman of the jungle, often an angry gentleman, always a dignified gentleman, but frequently also a gentleman with a sense of humor and an overwhelming curiosity. The author selects many examples of what happened when he encountered tigers on his movie-making expeditions to prove his point.

Next Month

IMAGINE a metal house coated with glass, a home of delicate coloring and enduring beauty, inside and out. The development of porcelain enameled iron for architectural purposes makes such homes both possible and practical, as revealed in the conclusion of the story of porcelain enamel next month. The article is illustrated with eight pages of Coloroto pictures.

Modern Plant Wizards

TWENTY-FIVE per cent of the vegetables and annual fruits we eat today were unknown ten years ago, says an agricultural authority. The peas and beans and potatoes still look much the same, but we are now using improved strains which did not exist a decade past. Read in the July issue how the modern plant wizards are continually creating new varieties of vegetables and fruits by highly scientific methods of breeding.

Meet the Fish

GOING fishing? If so, you'll want to read Bob Becker's article, "Who's Who Among the Fish," next month. Fish parade under different names in different parts of the country, and tackle which will catch a fish under one name in one section won't attract the same fish under another name in a different locality.

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This One



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MOTORISTS WISE SIMONIZ



The Sooner You Simoniz Your Car . . . the Better

Weather and dirt make short work of a car's finish and its beauty. Stop this damage! You can do it easily with Simoniz and Simoniz Kleener. And every car, whether new or old, needs Simoniz to keep it beautiful. Simoniz is more than a wax or a polish. Although easy to put on, it is hard to wear off—perfect protection which makes the finish last longer and stay beautiful. If your car is already dull, first use Simoniz Kleener. It makes the finish sparkle like new. And nothing is so quick, so easy, or so safe! . . . Always insist on Simoniz and Simoniz Kleener for your car.



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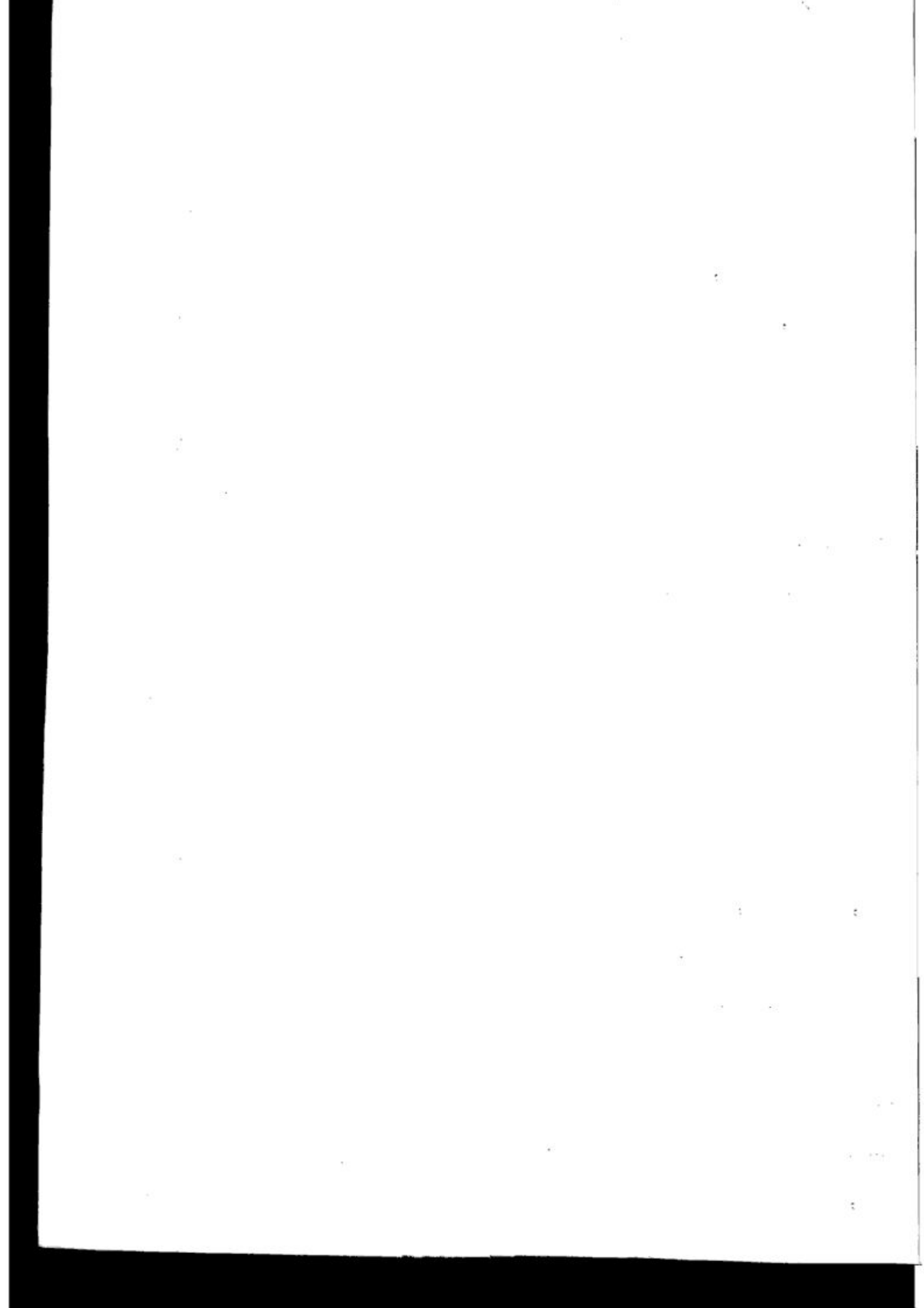
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3 reasons... why Ingram's gives you THE WORLD'S COOLEST SHAVE



1st. WILTS
every whisker to the skin-line



2nd. SMOOTHS
the skin so the razor glides



3rd. COOLS
the face, prevents after-sting

Sharp blade. Rich lather. Maybe you think that's enough for a clean shave—but it takes something more to make shaves cool... stingless. So into each tube and jar of Ingram's Shaving Cream go three special ingredients.

Every day, this is what they do to give you the world's coolest shave—

1st, they wilt whiskers softer—your razor cuts clean without tug or pull.

2nd, smooth the skin—preventing nicks by drawing tiny wrinkles tighter.

3rd, cool your face while you shave, and keep it cool when you've finished.

No sting or burn. No taut, dry feeling. And no lotion needed. Ingram's lather gives you face-comfort from the moment it touches your skin... a bracing coolness that lingers long after the shave is over.

If you are a "bluebeard," you'll like the cleaner shaves Ingram's gives you.

If you have a "go easy" skin, Ingram's will protect it. And either way, you're sure to appreciate Ingram's economy. For this shaving cream is concentrated. It goes further. Three months of cool, carefree shaving in every tube and jar.

Ask your druggist for Ingram's, or try before you buy. Mail the coupon and we'll stake you to 10 cool shaves at no cost.

Tube or Jar
—both COOL



TRY THE WORLD'S COOLEST SHAVE *free*

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I'm ready for proof that Ingram's shaves
are the world's coolest. Send trial tube.

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INGRAM'S SHAVING CREAM

When writing to advertisers please mention Popular Mechanics

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**THIS EVIDENCE OF
PYROIL'S PROTECTION
TO YOUR CAR!**

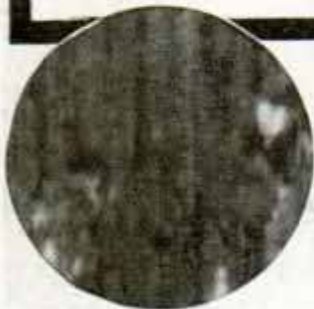


PLATE No. 1

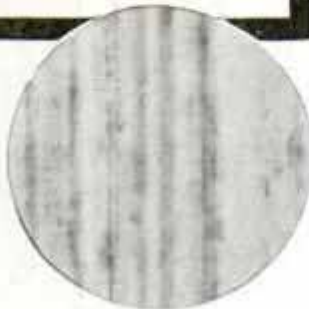


PLATE No. 2

CORROSION (chemical attack) is a dangerous enemy of vital parts in your car, truck, tractor or machine. Corrosion eats metal. It can ruin bearings and other parts in half their normal life.

One condition responsible for corrosion is the accumulation of moisture by natural condensation, setting up an acidic condition. This condition can prevail in any engine.

The startling evidence of how Pyroil inhibits this dangerous corrosion is shown above. **Plate No. 1:** a photomicrograph (125 times enlarged) of an auto bearing run in high grade oil. The dark matter is corrosion! **Plate No. 2:** an identical bearing run with Pyroil added to the oil shows the remarkable (scientifically proved) freedom from this chemical attack!

This is only one of Pyroil's unusual and important qualities of protection—how it saves bearings. In addition, Pyroil reduces wear on all metal parts; reduces heat and friction; increases film strength of oil. Saves far more than its cost because it creates savings in repairs, cuts expense—greatly improves operation.

Mail coupon at once for **FREE METALLURGICAL REPORT** giving the complete facts and pictures of the above. Meanwhile, **safeguard your car and equipment with Pyroil. Use it regularly.** Sold the world over at service stations, garages, other dealers. Manufactured and Guaranteed by Pyroil Company, W. V. Kidder, Founder, 56 Pyroil Bldg., LaCrosse, Wis., U. S. A.

Pyroil has been tested by Popular Mechanics and is used by Popular Mechanics' Presses and Equipment.

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State.....

Simply ADD TO GAS OIL AND GREASE

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Are you, too, up against life's big question— "How Can I Make More Money?"

Every bill to be paid, every need to be met, every dream still unfulfilled—demands the answer to this question. For on its answer hang all the other answers of life: how you live, what you wear, where you go, what you do, the position you hold, the one you hope to hold in future!...

MORE than anywhere else, this question haunts you daily on the job. You want a bigger salary; more pleasant and interesting work to do; more advantages for your loved ones—recreation, travel, social activities. And so, as you keep plodding on, in between the little thoughts comes this big one, again and again: "How can I make more money?"

Well, how can you? . . . By working harder than ever, so as to attract more attention to your industry? Thousands of people are working harder than ever, these days; employers have no worries on that score. By trying to "get a stand-in" with somebody of influence? Plenty of people have tried that, too—only to fall down because they couldn't deliver. By getting "outside work" to do? Sooner or later, your regular job suffers—and then what?

Out of the corner of your eye you can see a long line of folks just waiting for the job you have now. Any time you're "out," a dozen others are ready to step in. So it's dangerous to resign and look elsewhere, isn't it? Besides, jobs in your same line elsewhere are bound to pay about what you're earning now.

What's Wrong, Anyhow?

Let's be quite serious for a moment about this "money" question. Who, as you glance around the business world, are the money-makers in it? Are they the filing clerks, typists, stenographers, bookkeepers, timekeepers and routine clerical people? Or are they the expert salesmen, the accountants and C. P. A.'s, the attorneys, the traffic managers, the personnel directors, the sales correspondents, the sales managers, and other executives who give orders for other people to execute?

And how did these money-makers, with their enviable jobs and opportunities, "get that way"? Was it simply by working hard—having a "pull"—changing jobs till they found the fat salaries they wanted?

Experience says no! . . . They make more money than the rank-and-file in business for just one reason: they



have trained for the better-paid specialized functions that Tom, Dick and Harry, the rank-and-file, cannot discharge.

Their Answer is Yours

That is their answer to life's biggest question. It is *your* answer as well. And LaSalle Extension University has made it possible for YOU—granted a real purpose and adequate education—to train for the field in which you would prefer to earn more money. Without leaving your job, you can do what more than 800,000 men and women have done already: utilize your spare time for home study that definitely equips you to get your money question answered.

The coupon below lists a number of specialized vocations which today offer the interesting work, attractive opportunities, gratifying incomes—all the rewards that go with "bigger responsibilities." Pick out the one that most appeals to you, check it, and add your name and address. Find out the interesting facts about it which your inquiry will bring you promptly, without obligation. Send your request along NOW, and learn how to get the one right answer to this biggest of life's questions—the question of "more money."

Don't act on this advertisement unless you're really in earnest.

LASALLE EXTENSION UNIVERSITY, Dept. 664-R, Chicago

I would like to have your special booklet—without any cost or obligation to me—about my opportunities and your success training in the business field I have checked.

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LaSalle Extension University

When writing to advertisers please mention Popular Mechanics



Shaving with a Piece of Mind

by Walter B. Pitkin
Author of "Life Begins at 40"

DID you ever shave with a piece of mind? I've been doing just that for 25 years but I didn't know it until a few weeks ago.

Having removed some 47 feet and odd inches of whiskers from my shining countenance in the course of a quarter-century with the Gillette razor blade, I was eager to go to Boston to see how this remarkable public utility was made.

Somewhat bewildered, I entered a huge plant spreading over two large city blocks—yet so quiet and clean it seemed almost like a hospital.

An engineer would revel in the ingenious devices Gillette has for checking up on the quality of the blades as they flow through production. But the average man would be more impressed, as I was, by the *Mind Behind the Blade*.

Gillette spends more money on this *Mind* and its laboratories than other companies might spend on an entire factory payroll. That's why the Gillette blade, studied through a microscope, looks like a razor edge, while other blades look like fever charts and buzz saws. Can you imagine an edge only 1/80,000th of an inch thick and absolutely invisible to the naked eye? Probably not. I can't. Yet there the darned thing is!

Before you buy anything, study well the *Mind* behind the goods! If it is a dishonest *Mind*, the goods will probably be dishonest. If it is a dull *Mind*, the razor blade will be dull. If it is an ill-tempered *Mind*, the steel in the blade will go soft. But if it is a keen *Mind*, determined to master every fact and to apply fact to factory, regardless of cost—then buy its product, even if it costs double the price of Half Wit Goods.

The real invisible edge of Gillette is *Mind*, which cuts through error and grows sharper as it cuts.

I hope that some day you, too, may make this psychological pilgrimage to the home of a *Mind* that is sharper than any razor!

Here are the facts about razor blades. Why let anyone deprive you of shaving comfort by selling you a substitute! Ask for Gillette Blades and be sure to get them.

GILLETTE SAFETY RAZOR COMPANY, BOSTON, MASS.

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THE HARDEST THING
IN THE WORLD TO
REALIZE IS THAT

YOU ARE SLIPPING

● PERHAPS it is fortunate that we do not always see ourselves as others see us. But when it comes to making progress in our work, in earning more money, facing the cold facts is courageous even though sometimes upsetting.

How long has it been since you had a promotion?

How long has it been since you found

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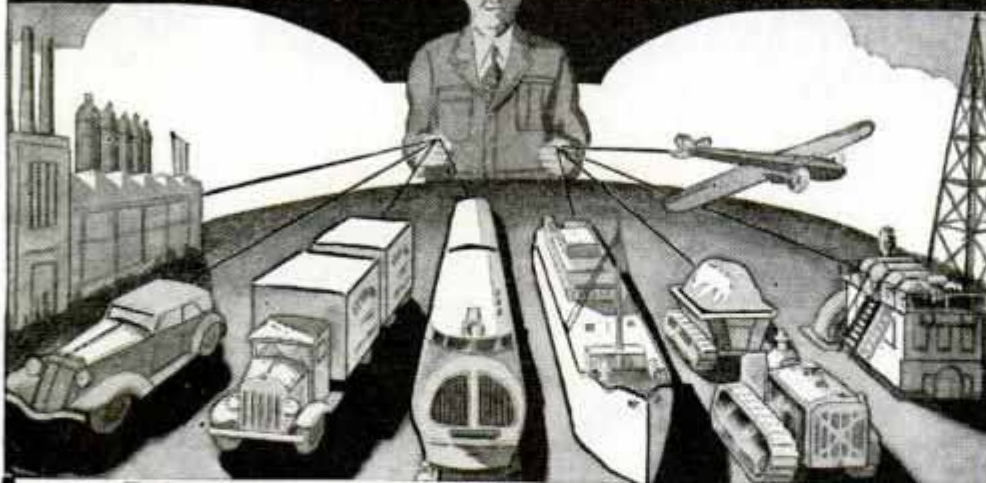
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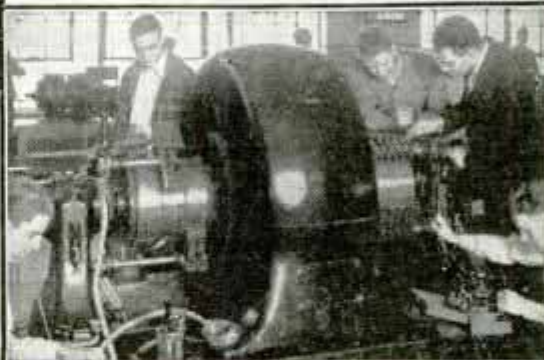
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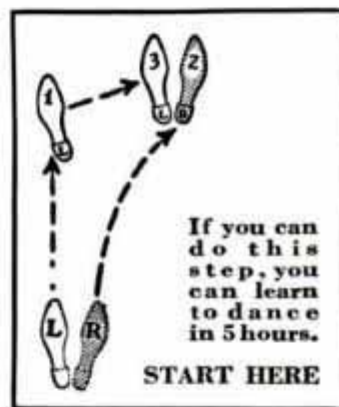
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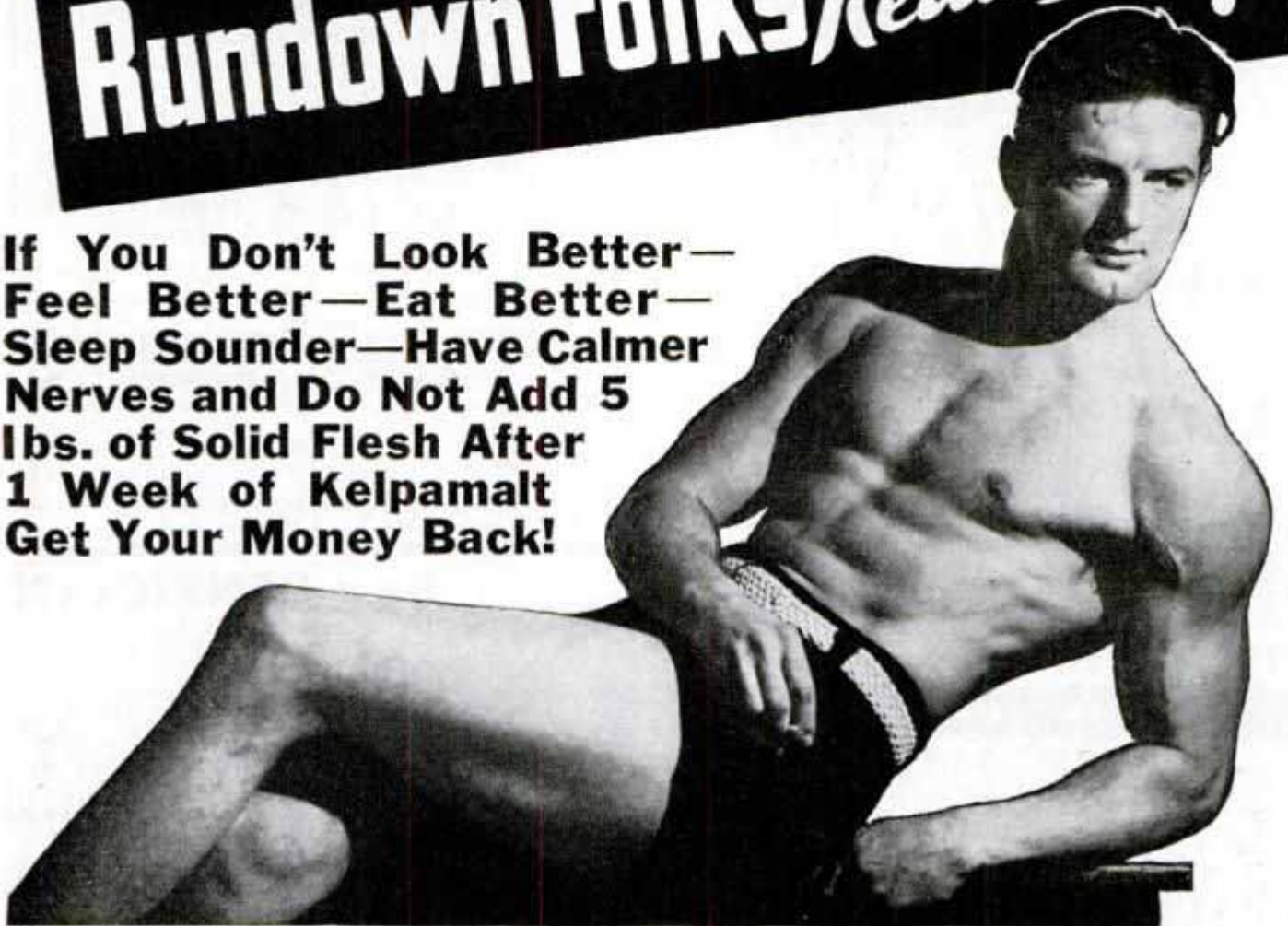
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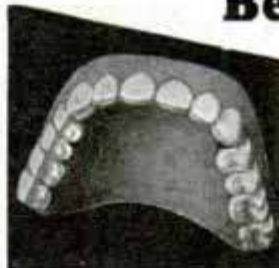
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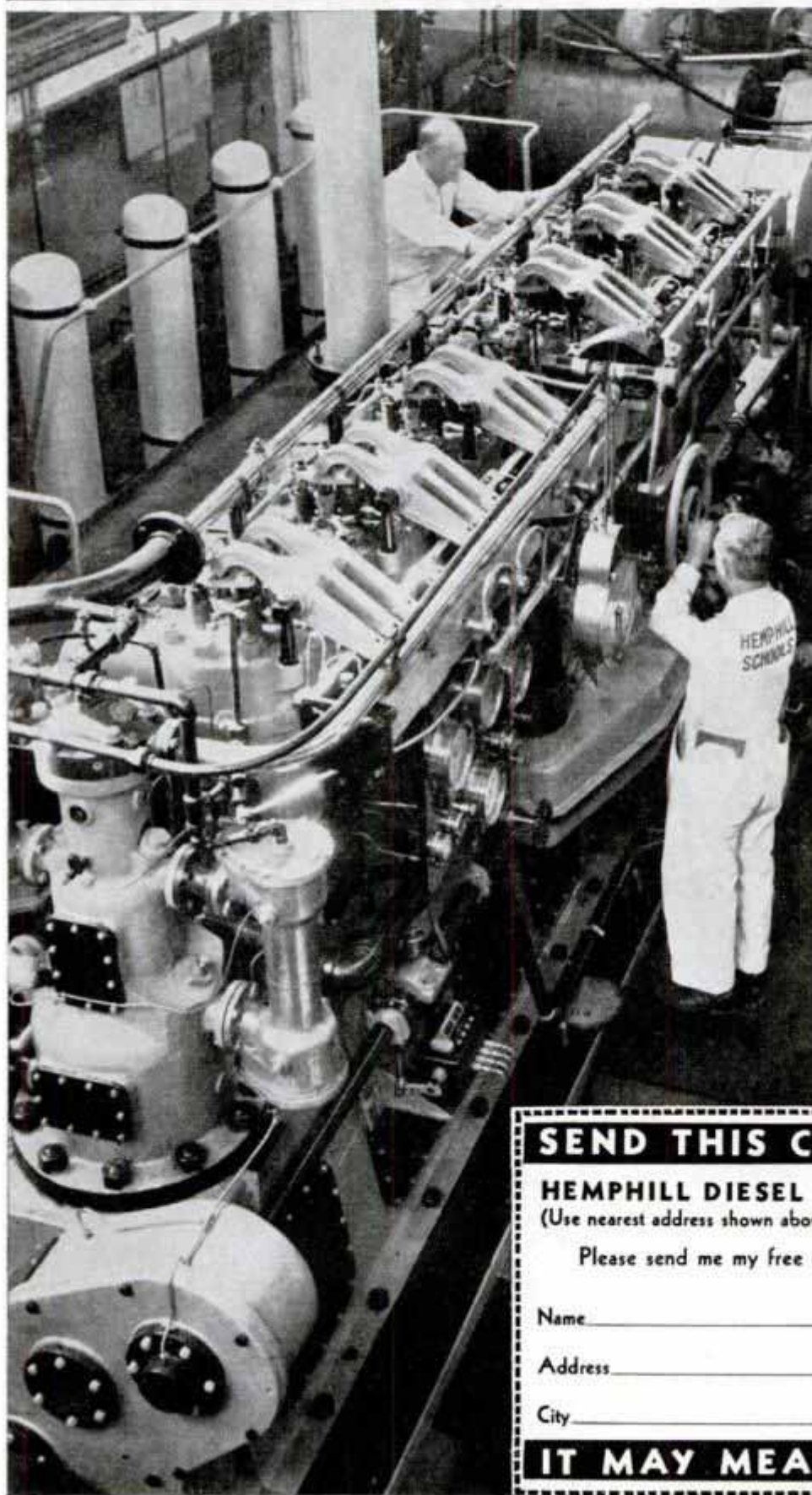
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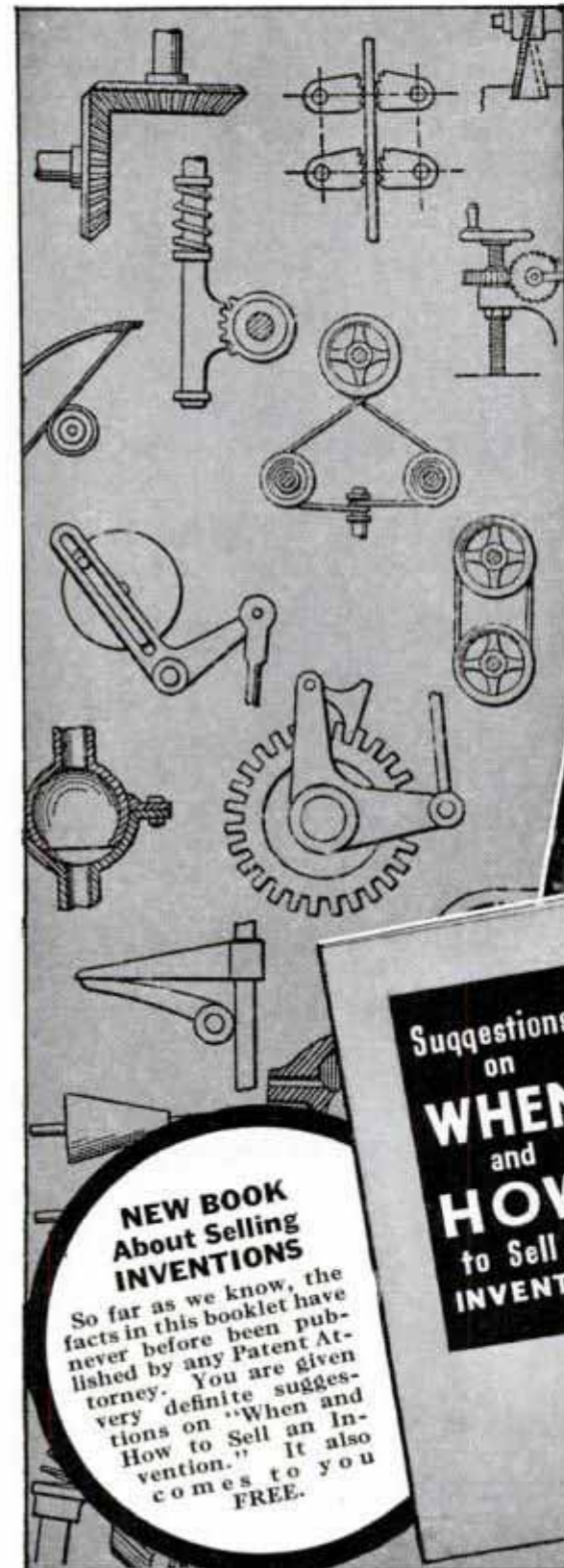
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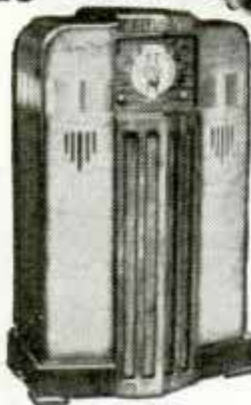
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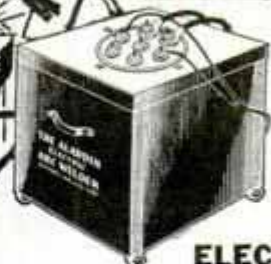
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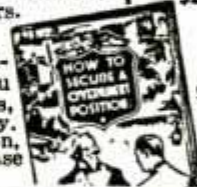
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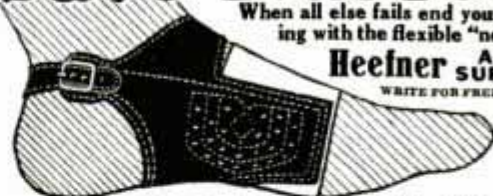


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A Good Job, Mr. Dwyer



"Here is my homemade vehicle, constructed of two bicycle frames, ten feet of water pipe, bicycle motor wheel and connecting parts. It weighs 175 pounds, gets 100 miles to the gallon of gas and travels twenty-five miles an hour. It provides a fairly reliable method of transportation for me as I have no use of my lower limbs."—Kenneth Dwyer, Binghamton, N. Y.

Yes, Yes, Go on



"I noticed in the January issue the statement that a porcupine does not throw its quills. I agree with you that a porcupine does not shoot his quills, but should he use all the quills out of his

tail, he can do a very good job of getting at the reserve with his tail on his back. And it's those that he really can throw. I am speaking from experience."—John P. Mihalek, Sheridan, Wyo.

The Answer: Molecules

"J. O. Perry asks why when two smooth-surfaced objects are slid together with inward pressure they adhere. This is molecular attraction. Two rough surfaces will not do this because there is a layer of air between them which prevents or interferes with this force of attraction."—William Anderson, Johnstown, Pa.

A Builder's Plea

"I find that it would be helpful if a list of items needed were published near the end of construction articles."—A. Lovin Konold, San Francisco, Calif.

Don't Argue with Her



I was to meet my wife at six o'clock. At 5:58 I hopped in my car. I had two miles to go. I drove the first mile at thirty miles per hour and the second at ninety miles per hour. My wife said I was late. Why?—Puzzled.

Why Pick on Our Janitor?

"The majority of our newspapers and magazines are nothing but yellow adver-

(Continued to page 33A)



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"On my V-8 Ford, it works miracles. Its added power, acceleration and top speed has sold me. The results are unbelievable."—Ralph Fields, Mass.

"Very glad to say, the Buick showed an increase of 5 miles more per gallon."—A. V. Grove, Washington.

"On my Plymouth, I obtained an average of 22 miles per gallon, an increase of 7 miles. This means a saving of \$15 a month or \$180 a year."—F. S. Peck, Calif.

"It saves me one gallon a day. I had to buy 5 gallons each day—now only 4 gallons."—L. V. Sweet, Pa.

"My Chevrolet certainly runs smoother, has more power and snap to it since I put the Vacu-Matic on."—J. H. Nelson, Minn.

"On my Dodge 8 I am getting 6 more miles per gal., with more power and pick-up, which is all anyone could ask."—Lee D. Esty, Calif.

"I have twelve Vacu-matics on cars now, and they all show an increase in mileage. The car owners are very well pleased."—Fred Taylor, Okla.

"I averaged 25 miles per gallon on a trip with a model A Ford at 40 miles per hour, where before I only averaged 20. Also better pickup and smoother running."—Wm. Lyons, Calif.

"I have been placing Vacu-matics on expert mechanics' cars. All are well pleased."—J. W. Donahue, W. Va.

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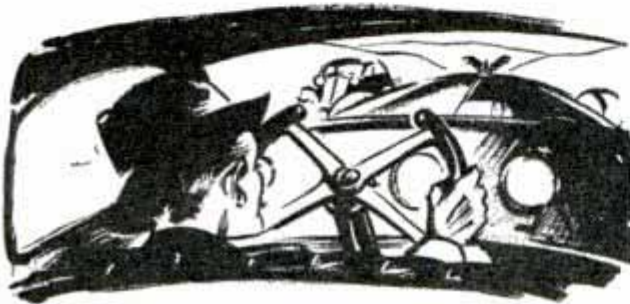


The Editor's MAIL BAG

(Continued from page 30A)

tising sheets and willing to lick anyone's boots for fear of losing business. They are cowardly that they dare not print the truth and real facts, except scandal, murder, crime and racketeering. Most of their janitors could write better editorials than those they publish, and I dare you to print this and tell that it's an untruth."—Fred W. Clute, Dubuque, Iowa.

From a Short Driver



"Are all automobile designers six-footers? I am only five feet and two inches, so when I drive I am forced to peek under the rim of the steering wheel or stretch my neck to peer over the top. Someone would sell a lot of cars to us 'runts' if they would adopt a three-quarter type of wheel like airplanes use. Just 'saw off' the top of the rim. It would improve vision and it would make it unnecessary to slide under the wheel when entering or leaving the car."—John Smith, Chicago, Ill.

Who Can Beat It?



"I notice where one reader has been with the magazine since 1908. I saw the first copy of Popular Mechanics in Winnemucca, Nev., and liked it so much that I subscribed for it, continuing to the present. That was,

(Continued to page 36A)

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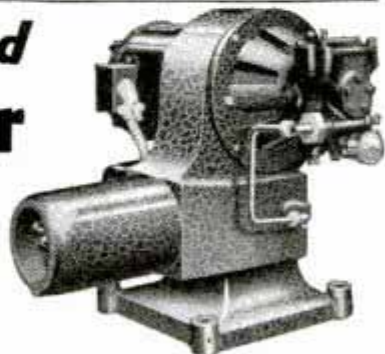
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The Editor's MAIL BAG

(Continued from page 33A)

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(War is destructive—but it is made possible by the perversion of constructive forces.—Ed.)

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(Original letter on file in our office)

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ROLL Developed and printed. Two enlargements, one of them in colors, all for 25c coin. The Photo Finisher, Station E, Box 42, Columbus, Ohio.

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BUY 200,000 Articles wholesale. Information 15c. Quaker, 1110 Haworth, Philadelphia.

PROFIT With new products. Make, sell, repeat. Guaranteed formulas, analysis. Research. Biggest catalog free. Special prices, leads. Gibson, Chemist, BD-4702 No. Racine, Chicago.

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WE Start you in business. Unlimited field! Make, sell compound for puncture-proofing tires, radiators. Big profits, repeats. Free details. Non-Leakable Mfg. Co., Hackensack, N. J.

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STOP Wasting money on cheap money making plans, a dollar invested wisely may save you hundreds. Plans backed by one of national mail order fame. Send \$1.00 for valuable book and success information. Mail Order Research, 26 S. Logan Ave., Trenton, N. J.

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WANTED—1,000 People with cameras. Stamp brings information. Gannon-Service, Muskegon, Michigan.

POPCORN Poppers, roasters, kettles, new, used. Salesmen wanted. Northayde, 2117-Harding, Des Moines, Iowa.

INCORPORATE In Delaware. Cost \$38. Sell shares. Raise capital. Free details. Corporation Fiscal Company, Dept. PM, Wilmington, Delaware.

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"SCHEMER Magazine," Alliance, Ohio, prints schemes, ideas, business starters, formulas—big winners; \$10,000 to \$50,000 reported. 38th year: \$1.00. Trial special: Six months only 30c.

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OPERATE Chain world's finest money making vending machines. Sells four products—same time. Instant success! Small capital—profits immediately. No curiosity seekers. Penny King, 1233 Chouteau, St. Louis.

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LIQUID Marble—Anyone can make! Colorful, glazed! Moulded, brushed, sprayed. Rubberlastic moulds. Composition flooring. Big money in these! Particulars free. Marbleizing Service, Edwardsville, Illinois.

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PLASTEX Industries offers industrious men an opportunity to start a business of their own, manufacturing art goods, novelties, souvenirs, etc., in Plastex and marble imitation. 5c material makes \$1 articles. Rubber moulds furnished for speed production. Small investment brings big returns. You are just in time for the big 1936 business. Write for interesting booklet mailed free. Plastex Industries, Dept. A, 1085 Washington Ave., New York.

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GET Lots of mail. Money making offers, etc. Your name in 10,000 directories, 25c. Roscoe, 4627 Glenshade, Cincinnati.

START Little business anywhere. Everything furnished. No canvassing. Maywood, PM-923 Broadway, New York.

I WANT To send you proof of the wonderful pulling power of Popular Mechanics Magazine's classified pages. What's your proposition? Write me today. F. W. Johnson, Manager, Classified Advertising, 200 E. Ontario St., Chicago, Ill.

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DIME Brings copy "Productive Postage" Magazine. Build yourself a business through spare time. Julius, 517 East Tenth, Amarillo, Texas.

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MILLIONS Jobless! Make money, like we do, supplying them satisfying, job-getting information (got man 76 openings). Keep dollars you receive; we fill your orders free. Stamp brings details. Co-Operative Service, 77 Swan, Buffalo.

FREE Booklet describes 107 plans for making \$20-\$100 weekly, in home or office, business of your own. Elite Co., 214 Grand St., New York.

INVESTIGATE Frog raising—a profitable side line. New book explains and illustrates every phase of subject. Covers very latest developments such as plans of constructing ponds, combination frog feeder and fly traps, getting other live food electrically, also the roly poly, a new mechanical feeder. \$2.00 postpaid. Popular Mechanics Press, Room C35, 200 E. Ontario St., Chicago.

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SUCCEED With your products. Make-sell them. Formulas, analytical service. Catalog free. B. Thaxly Co., Washington, D. C.

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ANY Specific formula you want 25c. B. Sherlock, 6138-Trumbull, Detroit, Mich.

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CHEMICALS, Laboratory glassware and apparatus. Catalog CP. Biological Supply Co., 1176 Mt. Hope Ave., Rochester, N. Y.

PRACTICAL Everyday chemistry—How to make what you use. 2342 practical workable formulas of widely used products. Save 4%. Start a paying business of your own. \$2.00 postpaid. Popular Mechanics Press, Room C35, 200 E. Ontario St., Chicago.

AGENTS WANTED

GUARANTEED Salary plus commissions to producers. New plans undersell stores. Hundreds fast selling necessities. Free gifts. Special deals. Rush name for catalog. National Products, 116, Berwyn, Ill.

PROFIT In Vanco bridge scoring pencil. Fine mechanical pencil. Complete scoring. Retail 50c. Costs \$3.60 per dozen. Useful. Attractive. Sample 25c. Vanco, 210 South Sixteenth St., Philadelphia, Pa.

AGENTS Wanted: 5000 ladies and gents wrist and pocket watches. Hamilton, Illinois. Waltham, Elgin. Good opportunity to become independent. Ask for free catalogue, and new plan. The New York Jobbers, 74 Bowery, New York, N. Y.

SELL Brine-shrimp eggs to tropical fish stores and fanciers. Write for particulars. Back Bay Aquarium, 455 Stuart St., Boston, Mass.

500% **PROFIT!** Gold and colored sign letters for windows, offices, trucks, signs. Monograms. Easily applied. Neonite, Akron, Ohio.

HOSIERY "Run" preventative sells fast. Nevon Labs., 210 - 5th Ave., New York City.

AGENTS—Sell our Luminous Crucifix (it shines in the dark) for handsome profits. Hannan Co., 2620 South Parkway, Chicago.

STOP Squealing—Start crowling!! Drive to country—"movies"—afternoons. Work mornings—home. No canvassing! National Folio-A. (Metro-sta), Los Angeles.

FOUNTAIN-BRUSH. Writes on glass or paper. Retail 50c. Vandrey Sign Service, Truman, Minnesota.

COSTS 40c. Sells \$1.50. 13"x28" changeable strip restaurant sign. Sample 50c. Graham, 1140 - 3rd Ave., Huntington, West Va.

\$6.00 HOURLY. Amazing Karnu refinishes auto like new without rubbing, polishing, waxing or painting. Wipes on with cloth. Lasts 8 to 12 months. Free sample. Karnu, Dept. B-8, Cincinnati, Ohio.

MAKE 100% Profit. Write for particulars. Mailing Bureau, Lawndale, Calif.

SUMMER'S Easiest 25c seller. Liquid White, cleans all white shoes, easy demonstration gets business. Large profit. Williams Corp., 368 Pine, Montclair, N. J.

BRONZE Signs, nameplates, memorial tablets, letters, bulletin boards, railings, metal specialties. Always a ready market. Easily sold. Big profits. Write for full particulars and new catalog. Newman, 671 West Fourth Street, Cincinnati, Ohio.

STRANGE Ironing cord. Saves electricity. Abolishes scorching and kinking. For telephones also. 150% profit. Sales guaranteed. Big free offer. Neverknot, Dept. 6A, 4525 Ravenswood Ave., Chicago, Ill.

HOME Owners—agents! Install private water filtration plants. Purify drinking water. Every home a prospect. Cost fifty cents to build. Complete directions, one dollar. Poocek Laboratories, Algonac, Michigan.

500% **PROFIT** Selling new "20-in-1" kitchen utensil. Retail 25c. Costs you \$1.00 a dozen. \$7.20 a gross. Sample 10c. New Method Co., PMM-42, Bradford, Pa.

LATEST In battery terminals. Quickly attached. Holds tight. Sample 10c. 3 for 25c. Cascadden Bros., Lapel, Indiana.

NEW Patented Gillette or Gem stropper 15c, stropp 10c. Dollar seller. Six for dollar. Blademaster, 305 Columbus Avenue, New York, N. Y.

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FULL Letter size stencil duplicator. Retail only \$3.00! Prints letterheads, menus, advertising, etc., in colors. Complete with ink, stencil, etc. Big demand—offices, stores, clubs, churches, restaurants, etc. Enormous profits to demonstrators. Free samples of work. Rocket Duplicator, Dept. B-879, Cincinnati, Ohio.

\$6.85 HOURLY! Amazing No-Flatz fixes punctures without patching; makes tires puncture proof! Instantly—permanently seals holes made by nails, etc. Big seller. Free sample offer. No-Flatz, Dept. B-172, Cincinnati, Ohio.

AGENTS. Amazing remedy for athletes foot in great demand. This is your big opportunity. Sample and details 25 cents. Paul Chemical Company, 331 Walnut Street, Chattanooga, Tennessee.

BIGGEST And quickest sales are made in brushes. Write for proposition. Wire-Grip Sanitary Brush Corporation, 220 Southern Boulevard, New York.

\$10 STARTS Own business resilvering mirrors. Experience unnecessary. Learn chromium plating. Write Sprinkle, Plater, 128, Marion, Indiana.

WHOLESALE Catalog free, 500 best sellers. Paty Co., 1167 Broadway, Somerville, Massachusetts.

RADIOS For home and auto. Make 100% profit. Wholesale catalog free. Avampato, 43 Meadow, Torrington, Conn.

SUCCEED With your products. Make-sell them. Formulas, analytical service. Catalog free. B. Thaxly Co., Washington, D. C.

SELL Made to measure raincoats. Outfit free. Goodyear Rainwear, 126 West 22nd, New York.

FREE Information big income opportunities. Profitable, pleasant occupations. Scientific Research Service, 302 Sixth Ave., Newark, N. J.

NEW Hawaiian perfume! Sell by mail! Free selling literature! Henkle Importing, 420 Lexington Avenue, New York.

SELL Novelty fun cards, novelties, etc. Samples, list 10c. National, Box 500M, Cincinnati.

MAKE Money! Sell maps. Deal direct with the publisher. Write for full information. Gallup Map & Supply Co., Dept. 11, Kansas City, Missouri.

BUILD Steady income showing amazing new Alumaweld to machine shops, garages, factories! Successfully solders aluminum, die cast metals, cast iron, stainless steel. Sales kit makes quick easy sales for you! Repeat profits assured—Write today! Alumaweld, 2440 South Parkway, Chicago, Illinois.

LOWEST Prices on earth—100 razor blades 25c, gross shoe laces 35c, dozen needle books 10c, thousands other bargains. Original Mills Sales Co., 901 Broadway. Located in New York only. Other branches discontinued.

MEN Or women. Big profits. Quick sales. Repeat orders. Saves customers money. No opposition. Make \$5 and up daily. Master Supply Co., Randolph, Vt.

SELL Beautiful embossed leather neckties. Look like silk. Long wearings. Clean easy. Big money. Big profits. Sample kit 35 cents. Plan free. Royal Tie, Dept. 108, Box 1306, Milwaukee, Wis.

GOLD Letters for store windows. Large sizes penny each. Free samples. Modernistic Sign, B-3004 Lincoln Ave., Chicago.

CASH Paid for butterflies, insects. See Sinclair Display Advertisement on page 16A.

SEND Hose size for samples and chance to earn \$20 weekly. Show sensational guaranteed hosiery. Guaranteed against holes or replaced free. Dignified, pleasant work. Wilknit Hosiery, Desk 37-F, Greenfield, Ohio.

SELL Grocers, restaurants, homes. Sample and particulars 10c. Mishkin, 1885 W. 9 St., Brooklyn, N. Y.

ZIPPER Clothesline. Sensational new invention. Instant demonstration. Free big money plan. Dunn Bros., Hempstead, N. Y.

AGENTS—Sell attractive signs in colors to auto dealers, etc. \$1.00 dozen. Send 50c for sample dozen. Dealers Sign Co., 3331 Madison, Chicago.

ENGRAVED Name plates, signs, numbers, profits large, particulars free. Sample 15c. Brett Bros., Winthrop, Mass.

BETTER Than glue for all purposes. New. Waterproof. Strong. Sample 25c. Exclusive territories. Rubberzet Cement Company, 30 Irving Pl., New York.

DOUBLE-EYED Self-threading needle packages, size 3/8. Blind people thread them, invaluable for failing sight, necessary for good sight. Five samples 25c. Twenty packages, dollar bill, 100 packages \$5.00. Particulars, Wm. Orlesby, Vandalia, Ill.

HOW Would you like to make \$7.50 a day? Own a brand new Ford sedan besides? Be your own boss? I send everything you need. Positively no money risk. Details free. Albert Mills, 2770 Monmouth, Cincinnati, Ohio.

SELL Men's ties, razor blades, etc., big money for you. Heil Premium Co., M-7, Gaylord, Minn.

AGENTS Financed. Good, steady income. Full or spare time. Sample 25c. Particulars free. Westgale, Box 402-A, Plainview, Nebraska.

INITIALING Automobiles biggest money maker today. New type requiring no varnish to apply. Write for samples. International Monogram & Transfer Co., Box 6365, Philadelphia, Pa.

MANUFACTURER Offers big sales opportunity contacting homes and all business establishments, clubs, schools, hospitals, etc. Stocks carried in New York for quick eastern deliveries. Drawer 191, Glendale, California.

PROFIT With new products. Make, sell, repeat. Guaranteed formulas. Analysis. Research. Biggest catalog free. Special prices, leads. Gibson, Chemist, BD-4702 No. Racine, Chicago.

MAN in each town to plate auto parts, reflectors, bathroom fixtures, refinish beds, mirrors, chandeliers, by late method; experience unnecessary. Simple plan of manufacturing at home starts you in big money making business. Free particulars and proofs. Gunmetal Co., Ave. H, Decatur, Ill.

NEW Electro-chemical battery re-charging powder. 25c brings sample, details. Victor Stave, 777 Boulevard, Bayonne, N. J.

AGENTS: Smash go prices. Santos coffee 12c lb. 100 sticks chewing gum 12c. 150 other bargains. Carnation Co., PO, St. Louis, Mo.

MEXICAN Feather pictures. Unusual novelty. No competition. 25c (stamps) brings \$1.00 worth sample and details. Refunded if unsatisfied. Mexican Art, Apartado 1593, Mexico City.

ENGRAVED Initial plates, nameplates, signs, numbers. Enamel finish, five colors, big profit. Hilton Specialty, 29 Portland, Providence, R. I.

COIN Money selling colored people. Give away free pictures of Joe Louis with hair preparation. Valmor, 2241-NM Indiana Ave., Chicago.

MAKE And sell your own products. Employ agents yourself. We supply formulas and full instructions for making toilet preparations, perfume, flavoring extracts, soap, household specialties. Valuable booklet free. National Scientific Laboratories, 1950W Broad, Richmond, Va.

MAKE Big money with our sterling silver initialed photo rings. Send for proposition. Gibson Photo Jewelry, 837 McDonald Ave., Brooklyn, N. Y.

SUCCEED With your products. Formulas, processes, analytical service. Information free. B. Thaxly Co., Washington, D. C.

MAKE Good money taking orders; shirts, ties, underwear, dresses, hosiery, raincoats, pants, uniforms. Sales kit free! Nimrod Company, Department 8, 4922-28 Lincoln Avenue, Chicago.

WANTED—Direct purchasing agents. No experience or money required. Write Purchasing Manager, 174 N. Halsted, Chicago.

AGENTS Mosco corn and callous remover will build you a steady repeat business. Send today for pocket-size trial outfits. The Moss Company, 61 Searle Bldg., Rochester, N. Y.

GOLD Reflecting letters for store windows. Easily applied. Large sizes, penny each, free samples! Atlas Sign Works, 7911 Halsted, Chicago.

100 PROFITABLE Mail order and local business plans. A. Prullit, Elburn, Ill.

AGENTS—Opportunity to make money; book containing 107 successful business plans; home or office; send for free introductory booklet. Elite Co., 214 Grand St., New York.

PROFITABLE Home business. Legitimate. No canvassing. Maywood Publishers, P-923 Broadway, New York.

GENUINE Gold letters for store windows. Easily applied. Free samples. Liberal offer to general agents. Metallic Letter Co., 438-B North Clark, Chicago.

AGENTS: Stamping names on pocket-key protectors. Sample check with your name, address, 25c. Stamping outfits. Emblem checks, check-fobs, name plates. Hart Mfg. Co., 303 Degraw St., Brooklyn, N. Y.

BIG Money and fast sales. Every owner buys gold initials for his auto. You charge \$1.50; make \$1.45. Ten orders daily easy. Write for particulars and free sample. American Monogram Company, Dept. 40, East Orange, N. J.

NEW Cleaner! Washes clothes quickly. Cleans everything. Premium deals. Free sample. Beatco, 5007 Irving Park, Chicago.

BIG Money applying gold initials on automobiles. Easiest thing today. No experience needed. Free samples. "Ralco," 1084 Washington, Boston, Mass.

SELL Townsend postcards, big demand, large dollar assortment starts you. Charlton Associates, Chicago, Ill.

HIGH-GRADE SALESMEN

MAN Wanted by shoe manufacturer established 32 years for sales work. Ready cash daily and extra bonuses to producers. No experience needed. Your own shoes at factory prices. Sales outfit free. Write Mason Shoe Manufacturing Co., Dept. B43, Chippewa Falls, Wisconsin.

AMAZING. New kitchen tool. Positive necessity sells all homes, stores. Clicks instantly. No competition. Exclusive territory. Gadgets, 2527-D, S. Hill, Los Angeles.

BIG Pay daily in advance. Sell complete line printed business necessities, advertising book matches, gummed labels, advertising novelties, changeable price sets, sensational business stimulators, complete line process engraved-like combinations for professional trade. New low prices. New plan. Experience unnecessary. Large outfit free. Federal, G-301 South Desplaines, Chicago.

DON'T Be a job hunter—Start your own business on our capital. No hard times; no lay-offs; always your own boss. Hundreds average \$3,000 to \$5,000 annual sales year after year. We supply stocks, equipment on credit. 200 home necessities. Selling experience unnecessary. Wonderful opportunity to own pleasant, dignified, profitable business back by world wide industry. Write Rawleigh, Dept. F-U-PPM, Freeport, Ill.

MAN—Sideline, full time, handle regular store route 10c counter card merchandise. 100% profit! Fast repeater! No competition! Nationally, locally advertised. Details free or sent 25c for \$2.50 value. NoDoz Awakeners, PM-6, Sacramento, California.

WILL Supply wholesale stock brooms to experienced, responsible hustlers with auto; sell stores. Acme, Box 23, Sedalia, Mo.

SELL Firex—Fully automatic fire extinguisher and alarm. Endorsed by fire chiefs—insurance men. Prospects everywhere—good commissions. Write for territory and testimonials. Firex Corporation, Dept. F-102, 516 S. Broadway, St. Louis, Mo.

SALESMEN. Distributors. We pay higher commission. Exclusive territory. 125 varieties, brushes, mops. Neway Brush Factory, Hartford, Conn.

BIG Money in tire patches. Sell New auto tire patch to service stations, garages, etc. Tiger-Grip patches guaranteed 10,000 miles. \$75 weekly for salesmen or distributors. Protected territory. Write Economy Rubber Co., 803 Burkhardt, Dayton, Ohio.

MAN—Handle regular store route. Place nationally advertised 5c-10c counter card merchandise. New aspirin deal—8 tablets 5c. 85 other fast sellers. 100% profit. No investment. Samples free. World's Products Co., Dept. 6810, Spencer, Ind.

GIVE Away free 1936 short wave and home radios, also full electric automobile radios with our unique "Punch Sales Card Plan." 2 sales daily pays \$203.88 weekly profits. Write for our free starting offers. Deluxe Mfg. Co., Dept. 261, 173 W. Madison, Chicago.

SALESMEN: Sell complete line book matches, labels, carbonized sales books, pricing sets, business stationery. Wonderful sideline. Free deals. Comm. daily. Free sales portfolio. Lionel Press, Dept. KC, 312 So. Hamilton, Chicago.

THYDRO-X (Extra miles). Fast seller! Brand new! Tremendous profits! Million dollar market waiting. "Opportunity knocks." P-Thermo Works, Peoria, Ill.

SALESMEN—Auto accessory, brand new. Sell direct to car owner, also wholesale to automobile dealers, gas stations, garages. Big profits. Exclusive territory. Details free. Accessory Mfg. and Sales Co., 3333 Madison, Chicago.

SELL To stores. New tax laws help close sales. Four \$7.50 sales earns \$12.00 daily. Income Audit Service, Washington, D. C.

BE Independent. Own your business; experience unnecessary, selling \$10,000 accidental death, \$50 accident; \$25 sick weekly benefits—\$10.00 yearly. Other amounts proportionate. Guaranteed steady renewal income. \$726,415.63 securities deposited. Universal Policy, 716-A Lefcourt Bldg., Newark, New Jersey.

SELL Process raised letter printing \$2.95 thousand. Free cut service. Worth \$0.00. Commission \$1.00 advanced. Experience unnecessary. United, F-8 South Dearborn, Chicago.

SELL Retailers; world's best dime value. Southern Products, Enid, Okla.

MAKE More money taking orders; shirts, ties, underwear, dresses, hosiery, raincoats, pants, uniforms. Sales kit free! Nimrod Company, Department 65, 4922-28 Lincoln Avenue, Chicago.

SOMETHING New in fire extinguishers—Red Comet Automatics. Proved in west five years. Exclusive territory. Low price opens pocketbooks. Write, Red Comet, 404 Comet Building, Littleton, Colorado.

SALESMEN: Sell advertising novelties, calendars, fans, thermometers, etc., for nationally known firm. Liberal commissions. Stanwood Hillson Corp., 21 Station St., Brookline, Mass.

NEW Specialty—Sells every business and professional man. Four \$15 sales daily pay \$280 weekly. Foyer cleared \$4920 in three months. Write, F. E. Armstrong, President, Dept. PM, Mobile, Ala.

SALESMEN—New deal guarantees stores \$10 for one. Two \$15 sales net you \$20 daily. Sayers, 2801-123 Sheffield, Chicago.

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DOUBLE Edge blades. Finest Swedish tungsteel. None better. Beautiful packets of five retail 25c. Full satisfaction or money back guaranteed. Postpaid: 5-10c, 25-25c, 125-\$1.00, 1,000-\$7.00, 10,000-\$65.00. Modern Factory, 126 Lexington Ave., New York.

TATTOOING

AMATEUR Tattooing outfits, free illustrated list. "Tatuco," 651A South State, Chicago.

TATTOOING Outfits, supplies. Illustrated list. "Waters," 965 Put-nam, Detroit.

SURVEYING INSTRUMENTS

GUARANTEED Factory rebuilt transits and levels for rent (with purchase option) or sale (cash or terms). Order now before prices advance. We will repair, trade in, or buy your old instruments. Ship prepaid for estimate and valuation. Write for List M-16 and complete information to Warren-Knight Co., 136 N. 12th St., Philadelphia, Pa.

WANTED—MISCELLANEOUS

STAMP Collections—Accumulations, also antiques bought. Write John Kaeser, Bay Shore, New York.

WANTED Immediately—South Bend lathe, reasonable. James Corubia, 126 Lexington Avenue, New York.

CASH For used microscopes, binoculars, slide rules, drawing sets, surveying, scientific instruments, marine equipment; complete libraries and standard sets. Send detailed list. Highest prices paid day shipment received. Satisfaction guaranteed or shipment cheerfully returned. Elman's 2302 VanBuren, Chicago.

BOOKS Covering hundreds of subjects. Big catalog for 3c postage. Popular Mechanics Press, Room (C36), 200 E. Ontario St., Chicago.

PERSONAL

STUTTERING And stammering corrected at home. Descriptive booklet free. Paul J. Wolfe, Box 52, Pittsburgh, Penna.

FREE, Important literature on the attaining and maintaining of natural health. Dr. F. L. Haynes, 308 Bigelow Bldg., Seattle, Wash.

PREVENT Baldness, overcome dandruff, dry, oily falling hair. Natural methods. Complete course \$1.00 postpaid. Health course free. Biggin's Physical Culture Studios, 4561 N. Gratz Street, Philadelphia, Pa.

SKIN Eruptions, chafing, etc. Use new greaseless wonder cream. Healing, soothing, antiseptic. Introductory size 35c, giant \$1.50 size, special 79c. Christo, P. O. Box 1428, Washington, D. C.

EXPERT Confidential advice on business, personal, domestic and financial matters. Send 25c stamps or coin. National Agency, Box-3504, San Francisco, Calif.

PROFIT And pleasure in taxidermy. Complete guide for the preparing and mounting of animals, birds, fish, reptiles, etc., for home, den, or office. \$1.05 postpaid. Popular Mechanics Press, Room C35, 200 E. Ontario St., Chicago.

MISCELLANEOUS

"THE Devil's Reply to Bobbie Burns." A brilliant unpublished long poem of the immortal Scottish poet at his very best. 25 cents coin. No stamps. George Wallace, 2101 University Street, Montreal, Canada.

MAKE Cuts—Penny apiece. Samples free. Pratt, Theatre, Redlands, California.

\$5.50 FOUNTAIN Pen-pencil combination 95c. Written lifetime guarantee. Best quality double edge blue blades, 25 for 35c. Many other bargains. Christo, P. O. Box 1428, Washington, D. C.

CASH Paid for butterflies, insects. See Sinclair Display Advertisement on page 16A.

TRAIN Your eyes to see. Correct nearsightedness, farsightedness, and astigmatism. No drugs. I have helped hundreds. Representatives wanted. A. Jacobson, Box 80, Pasadena, California.

MONUMENTS \$9 Up delivered, erected, guaranteed. Thousands sold. Catalog free. Marble Granite Factory, A-17, Oneco, Fla.

TAKE Advantage of low yen. Order two pure silk neckties, \$1.00 postpaid. Satisfaction guaranteed. John Hayes, 42-C Matsugaye-cho, Nagasaki, Japan.

10 STARTS Own business resilvering mirrors. Experience unnecessary. Learn chromium plating. Write Sprinkle, Plater, 288, Marion, Indiana.

EXTERMINATE Bed bugs permanently. Send 30 cents for my guaranteed formula. Buy ingredients at any drug store for a few cents. No gas, dust or odor. A. Hill, Berne, N. Y.

ALASKA—Opportunities, facts, will amaze you. Details for stamp. Alaska Information Bureau, Juneau.

COCOONS, Butterflies, collectors' supplies, butterfly art materials. Free lists. Maynard, 1192 Lewiston, Rochester, New York.

OIL Burner parts for all makes repaired or duplicated. Engineering Utilities, 811 Walton Ave., New York City.

AMATEUR Cartoons wanted. Particulars. Stamp. Seemann, 3000 Fenwood, Terre Haute, Indiana.

FIND Gold, professional miner, prospector, fortune hunter's methods, equipment. Ten piece kit \$2.50. Guaranteed. Mineral Research Laboratories, 405F, Montgomery, San Francisco.

RADIOACTIVE Treasure finder. Plans \$1. John Segee, Dover, N. H.

GOLD And silver locator, \$5.00 postpaid. 30 days free trial. Write Henry Bergman, Box 398P, Springfield, Missouri.

ELECTRIC Or gasoline portable lamp kills insects automatically. Indoor or outside. \$1.75 up. Literature free. Sauer Bros., East Oakland, California.

CUTS Anybody can make. Zinc etching process. Specimens, particulars, testimonials for stamp. J. C. Day, Windfall, Ind.

BRONZE Tablets, desk plates, wall plates, memorials, grave markers. Bronze, brass and aluminum casting. Wandkey Pattern & Foundry Co., Anderson, Ind.

AMATEUR Cartoonists can earn \$35.00 weekly, spare time, duplicating cartoon advertisements. 3-M Syndicate, Argyle, Wis.

TREASURE Seekers—Make your own gold finders. Wyss, 104½ Frances, St. Joseph, Missouri.

SWAPPER'S Friend, R4, Salline, Michigan. Interests swappers, collectors, sportsmen. 50c year, sample 10c.

TWO Profitable shop books—Lathe and Drilling and Thread Cutting—filled with hundreds of valuable "kinks" discovered by successful mechanics all over the world. To do regular jobs more quickly, easier and better send for these low cost books. Both postpaid for \$1.15. Popular Mechanics Press, Room C35, 200 E. Ontario St., Chicago.

DON'T BUY

Mandolin
Guitar
Banjo or
Drums



Don't buy Guitar, Mandolin, Banjo, or Drums, until you have tried the Slingerland May-Bells. Guaranteed More for your Money. Wonderful, snappy, powerful, pleasing tone. No equal in price. Sold on easy payments and 5 days free trial by all leading music dealers.

Send for free catalog. Mention instrument wanted and nearest music dealer.

Write today:

Slingerland Musical Instrument Mfg. Co.,
1325 Belden Ave., Chicago, Ill.

Cut This Adv.
Out — Good
for \$1.00
Credit



Insure Your
Success for Life

Learn

**ELECTRICITY
TELEVISION
& RADIO**

Enroll
in the oldest
largest trade
School in
West.

Est. 1905

30,000
Graduates

LEARN IN
LOS ANGELES

Learn by practical actual shop-methods. Full instruction in Electricity, Television, Radio, Talking Pictures and Commercial and Broadcast Operating. National's all-inclusive course qualifies you for a successful, profitable future. We help students earn room and board while learning. Coach R. R. fare allowed to L. A.

MAIL COUPON FOR FREE BOOK



NATIONAL SCHOOLS

Dept. PMR-6, 4000 So. Figueroa, Los Angeles, Calif.

NAME.....AGE.....
ADDRESS.....
CITY.....STATE.....

MEN Wanted

to Qualify for Positions
in New Industry

AIR CONDITIONING

We want to personally interview, at our own expense, a number of ambitious men—aged 21 to 40—in various localities. We will select as many as possible to qualify for positions in America's fastest-growing industry. The men we select will be trained for installing and servicing all kinds of domestic and commercial Air Conditioning equipment. Do not reply unless you are mechanically inclined, have fair education and are employed at present at least part time. Character references required. You must be willing to study during spare time for few months at some cost to you. Write giving full details of age, education and present occupation.

UTILITIES ENGINEERING INSTITUTE

Established 1927

400-410 N. Wells St., Dept. 166, Chicago, Ill.

QUICK WAY to make money in RADIO

Modern receivers are demanding men with modern training for service work. New training method and service equipment offer starts you earning almost at once. Up to \$3 an hour easy in a short time. Write today for FREE book of details. Radio Training Ass'n of America, Dept. PM-66, 4525 Ravenswood Ave., Chicago

WHAT PLANE IS THAT?



A book that pictures, identifies and gives the vital statistics of all the leading American airplanes. Written and designed by C. A. Weymouth, Jr., with a foreword by Captain Eddie Rickenbacker. 50 full page drawings. Cloth, 8 in. by 10 in. Postpaid, \$1.00.

F. A. STOKES CO. Dept. M 443 Fourth Ave., New York

ARTISTS MAKE MONEY

Find out your ability. Send name, age, occupation and address for Free Vocational Art Test. Federal Schools, Inc., 6136 Federal Schools Bldg., Minneapolis, Minn.

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Home-Study Courses, leading to Degrees in Arts and Sciences; Education; Writing; Psychology; Chemistry; Business and Commerce; Law; Theology; Agriculture; Engineering; also courses in Business Training; Accounting; Advertising; Sales Management; Public Speaking; Radio. Many others. Low Cost; Easy Terms.

McKinley-Roosevelt University, 4247 Clarendon Ave., Chicago



Earn Cash at Home!

Mrs. M. M. earned \$267 in 3 weeks (sworn statement) raising mushrooms for us in her cellar! Exceptional? Yes, but your cellar, shed, barn may be suitable to bring moderate income. Book, pictures, sample free. Est. 1908. UNITED CO. 3848 Lincoln Ave. Dept. 67 CHICAGO



Forms to cast Lead Soldiers, Indians, Trappers, Hunters, Wild and Farm Animals. 239 different forms to select from. Every form guaranteed to cast perfect figures. Send 5c stamp for illustrated catalogue.

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PENNY EACH!!

Beautiful Window Sign Letters. Lowest Price in America. Finest Quality. 5 Year Guaranteed. New styles. Tremendous Demand. Big Profits. Easily Applied. Record Breaking Offer. FREE Samples and Working Equipment. Hurry! Atlas Sign Works, 7943 Halsted, Chicago, Ill.



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When writing please mention Popular Mechanics



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FREE BOOK!

Learn Taxidermy at home. Write today for Free Book. State age.
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4337 Elwood Bldg., Omaha, Nebr.

FENCING WORLD'S FINEST
EXCITING FUN, HARMLESS SPORT



Boys! Become the best swordsmen in your neighborhood. Great for every member of the family. Develops both body and mind. **Harmless**, because the spring-steel 3 ft. foils are equipped with rubber buttons. Cup shaped aluminum hand guards. Complete set of two steel foils (swords) and directions for fencing.

THRILLING HEALTHFUL CLEAN

only \$1.98 complete, postpaid. Order now.
Industrial Products Co., Dept. 1M, 1182 Broadway, New York

NEW YORK SCHOOL OF MECHANICAL DENTISTRY

Make more money as a DENTICIAN. We show you how! Oldest school. Real Laboratory Training. Day, Eve. Easy terms. Tools FREE. Ask for Catalog P. N. Y. SCHOOL of MECHANICAL DENTISTRY, 125 W. 31 St., N. Y. C.

84 CARD TRICKS 10c

Latest and most mystifying card tricks now explained in new, illustrated book. Tells how to make the "pass," deceptive shuffles, forcing a card, etc. Be popular at parties or earn money in spare time. Price 10c. Book of Coin Tricks, 10c. Book of 153 Parlor Tricks, 10c. All three books, 25c.

FRANKLIN PUBLISHING CO., 800 N. Clark St., Dept. 9484, Chicago



BUILD YOURSELF OR HAVE Carpenter or Garageman BUILD

A RITZY CABIN TRAILER. COST 1500 UP

 <p>Ritzy Standard USE AUTO AXLE OR REGULAR TRAILER AXLE</p>	 <p>Ritzy Coupe Cruiser ALL THREE PLANS \$11.00</p>	 <p>Ritzy Air Ceiling</p>
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SIMPLE PLANS AND SPEC. BY REG. ENGINEER. SIZES 50 WIDE 5 HIGH. 12 AND 11 LONG. EASY TO CHANGE LENGTH AND WIDTH. MAIL 10c BILL TODAY FOR ALL THREE PLANS TO RITZY CABIN TRAILER, BOX 2933, WAPAKONETA, OHIO

MAKE MONEY with "SHOP NOTES"

Ideas, Kinks, Helps



1936 SHOP NOTES and LATHE HANDBOOK

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Popular Mechanics Press, Room 636A, 200 East Ontario St., Chicago

A FEW OF 360 ARTICLES IN 1936 SHOP NOTES Shop Notes for 1936 has 224 pages—360 articles—793 illustrations. Some of the subjects are:

- Air Conditioning
- Auto Owner Helps
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- Brake Tester
- Drill Press Work
- Electrical Kinks
- Furniture Making
- Lathe Operating Kinks
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in 90 Days, at Home

Hundreds of men and women of all ages 18-50 are making \$10.00 to \$20.00 a day giving scientific Swedish Massage and Hydro-Therapy treatments. There is a big demand from Hospitals, Sanitariums, Clubs, Doctors and private patients. The field of reducing alone offers great possibilities.

Learn this interesting money-making profession in your own home by mail through our college extension course. Same instructors as in our **NATIONALLY KNOWN** resident school; same diploma awarded. Course can be completed in 3 to 4 months. No High School training necessary.

Many earn big money while learning. Enroll now and we will include anatomy charts, medical dictionary, patented reducing roller and Hydro-Therapy supplies without extra cost. The reducing course alone may be worth many times the modest tuition fee. Send coupon for special reduced price offer. Complete details with list of successful graduates will be sent free.

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You may send me FREE and postpaid, your illustrated catalog and details of your special offer, also list of successful graduates.

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LOOK! People Now Turned Into STATUES



What a Seller! Any snapshot or photo of adult, child or pet transformed into a life-like natural-color, miniature pictorial statue, 9 in. high. Shows every detail of natural expression. Practically indestructible. Millions of prospects. Amazingly low price. Easily earn up to \$55 weekly. Get Details Free or send 75c for sample and complete outfit. Money-back guarantee.

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Speed up! with VOGUE SPORT SOLES

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Hold with vise-like grip. Ideal for baseball, softball, track, golf, hunting, hiking. No need to buy special shoes. Vogue Sport Soles are pliable, rugged, yet light weight. Fit all shoes from boys' 13½ to men's size 11. Athletes everywhere using them. Very economical. Much better—a lot speedier.

SEND NO MONEY!
Order NOW! Vogue sport soles will fit your shoes. Pay postman \$1.00 per pair, plus a few cents postage. If payment accompanies order we prepay postage. Return for refund in 5 days if not delighted. Send your order today!

VOGUE PRODUCTS
3243 So. State St., Chicago, Ill.

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I will pay the postman \$1.00 plus few cents postage. If not entirely satisfied I will return within 5 days for one dollar refund.

Name.....
Address.....
City.....State.....
 Check here if enclosing \$1.00, thus saving postage charge. Same refund guarantee applies.

Start a POTATO CHIP BUSINESS

IN YOUR KITCHEN and
MAKE MONEY!

Buy Potatoes
for **2c A POUND**
Sell Them as
Vita-Seald Chips for
35c A POUND

THERE'S big money in potato chips for any man or woman who wants a business capable of paying as much as \$23.50 a day in profits. Just think of it. You can install the wonderful new machine in your kitchen—just manufacture and sack a sensational new kind of "Greaseless" Potato Chip—and let the stores sell them for you. Only \$2.50 invested in raw materials brings back \$10.00 in cash.

EVERYTHING FURNISHED You don't have to have a lot of money to start this business. A small investment in the machine puts you in a big profit business of your own. I send you everything including speed-slicer, cooker, oil-extractor (for making new "GREASELESS" chips), a big supply of printed bags and free advertising material. No experience is needed as I send complete, simple instructions showing how to make a profit the first day. Prices, pictures, and complete plans will be sent free for the asking.

DON'T BUY ANYTHING Just send your name and address on a post-card for all this free information including the "Secret of Making Greaseless Potato Chips." No obligation, but hurry and you may become independent as so many others have done with these fast selling new "Greaseless" Chips. Address your card to

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Get in These BIG-PAY Fields AIR-CONDITIONING—REFRIGERATION You Can Learn Quickly at Home!

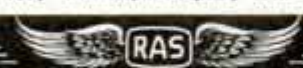
Quality in few short weeks to step into pleasant, life-long work-paying splendid money. We give you thorough, practical training in Air-Conditioning, Refrigeration and Electricity at home. Lowest tuition cost; easiest terms. Write today for Free Lesson and full particulars.

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AVIATION
AT
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COST**

\$250 pays for 6 months' combined Flight and Mechanic's Course. Old reliable school, expert instruction, fine equipment. Write for catalog.

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Dept. 100, Municipal Airport, St. Louis, Mo.



REWIND MOTORS

for yourself and others. Cash in on this interesting field. Send NOW for a complete illustrated course covering the repairing, winding, connecting, and testing of all types of A. C. Motors. ALSO a TROUBLE CHART that locates motor defects instantly. Written so that you can understand it. Price complete \$2.00.

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You can complete our simplified High School course at home as rapidly as your time and abilities permit. Many finish in 2 years or less. Course equivalent to resident school work—prepares you for entrance to college. Standard H. S. texts supplied. Diploma awarded. Credit for H. S. subjects already completed. Single subjects if desired. Free Bulletin on request. No obligation.

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NEW BAKELITE RAZOR FREE to introduce QUALITY BLADES



There is a lot of satisfaction and sure profits in selling high grade blades. There are none better than the Gordon blades. You will agree with us once you have tried them. Send 10c for a package of five blades, double or single edge. We will also send you free a new Bakelite Razor and tell you how to give away Razors to build a steady volume on blades. Experienced distributors and salesmen are all insisting on Gordon Quality Blades. Be wise, write today.

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Easy-to-Build 15 ft. Trailer

PLANS
\$2



Practical plans for Royal Cruiser. Set of 10 simplified blueprints (12 x 18 inches) working instructions, catalog of parts, and price list of ready-cut materials. All for \$2 postpaid, cash or money order—no checks. Not the cheapest but the best. Easy to alter plans as desired. You can buy with confidence, because you risk nothing. Satisfaction or your money back. (Trailer built to order.)

Royal R. Hess Co., 341 Muir Ave., Hazel Park, Mich.

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Genuine Leather Ties 4-In-Hands & Bows For Men and Boys Look like silk. Durable, neat, won't wrinkle. Cleaned with a damp cloth. 40 beautiful patterns. NOTE: We are the manufacturers and originators of the famous "Century" Tie.

Be independent; have your own business. Big profits, repeat orders. Young man sold 23 one night after school. No sales ability needed. Men, Ladies: Send 50c or stamps for sample and kit. Information free.

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MAKE 200 TOYS an Hour... for 1¢ Each!

Sell toys at big profits. Get this complete outfit. You can make 3 different characters thousands of times in moulded metal. Includes paints for coloring and full casting equipment. Price \$2.50. Electrically operated, \$3.25. Send money order, stating choice of U. S. Soldiers, Wild West Cowboys, U. S. Marine Gunners. EXTRA MOULDS for 3 large figures at 95¢ include outfit soldiers, cannon, battleships, animals, Buck Rogers toys (\$1.00). Choice of 188 Different Characters. FREE 2 BIG ILLUSTRATED BOOKS ON CASTING

RAPAPORT BROS., 703 WEST OHIO STREET, CHICAGO

ATTENTION AUTO TRAILER BUILDERS!

New Standard Running Gear Parts

Complete Axles with and without Brakes. Axles, Hubs, Wheels, Bearings, Springs, Spring Hangers, Brakes, Valve Power Brakes and Controls for Power Cars.

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Make Money at Home!
GROW MUSHROOMS in your cellar or shed. Exclusive new process. Bigger, better, quicker crops. More money for you! Enormous new demand. We buy Mushrooms. Write for Free Book.
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Get Shop Notes for 1936! Only 50 cents. May easily be best investment of your entire lifetime. Contains 360 money-making, time-saving ideas, kinks, short cuts, for mechanics, farmers, home workshop fans, handymen—for everyone who uses tools. 224 pages 360 articles, 793 illustrations. Get 1936 Shop Notes too. Only 50c.
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FOR 1936

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RAYE BURNS will teach you HOW to CREATE ORIGINAL CARTOONS at home that you can SELL! Course contains 26 lessons and over 600 illustrations. All for Only \$2.85

Send name and address for free details.
RAYE BURNS SCHOOL, Dept. M-X, BOX 2194, Cleveland, Ohio

When writing please mention Popular Mechanics

SCIENCE REVOLUTIONIZES LIGHTERS,

Taps New Fountain of Profits

A new astonishing chapter in the romance of science has been written with all the dramatic elements of magic, mystery and surprise conspiring to intrigue smokers into new delights and admitting sellers to new fortunes. The Direct Selling field has never had anything to compare with it.



VESTALITE
The Vestalite Spontaneous Flame
Lighter for Pipes and
Cigars—\$1 and up.

HERE ARE THE FACTS From friction sticks to flint, to sulphur matches, to friction lighters—and FINALLY complete abandonment of the friction principle in favor of the CATALYST principle—this is the evolution of LIGHTERS. Catalysis is a unique chemical action which by painstaking scientific enterprise has been adapted to cigarette, cigar and pipe lighters and covered by Patents Numbers 1,889,008; 1,937,097; 1,937,469; 2,005,476-7-8, with Foreign Patents Pending.

After this technical accomplishment came the designing skill whereby the platinum catalyst was cased in beautiful compact holders from 1½ inch size barrels upwards, in various handsome materials, finishes and colors, combined also with lead pencils, cigarette cases, bridge markers, desk sets and with suction cups to attach instantly to windshield or dashboard of automobiles—all put up in attractive packages—and ranging in price from \$1 up.

This is a condensed history of a great triumph of science, skill and capital which required three years of effort and A MILLION DOLLARS INVESTMENT. The result: smokers now have minimum bother with lighting and maximum pleasure in smoking! The Cigarette Lighter is flameless, noiseless, odorless, stainless and absolutely FOOLPROOF—no flints, wheels or moving parts. Its light is merely a glow produced by the puff of the smoker—hence it does not release the coal tar products of tobacco which affect the taste and cause stains on hands and teeth.



POCKET GLOLITE LIGHTER



Flameless Cigarette Lighter. Beautiful color combinations—\$1 and up.

The Flame Lighter for cigars and pipes FLAMES INSTANTLY just by removing the cap! The demonstration of these mystifying Lighters is highly dramatic, the appearance is most attractive—they delight and intrigue all smokers! WE HAVE NO SELLING PROBLEM—it is merely a matter of contacts, display and advertising. The LIGHTERS themselves are our real salesmen! They sell on sight.

HERE IS YOUR OPPORTUNITY! Our Flame and Flameless Lighters are advertised in full page (sometimes double page) advertisements in such national magazines as Saturday Evening Post, Collier's, Liberty, Esquire, Fortune, College Humor and others. Every lighter has an attractive display carton or case and the popular priced items have counter display cards. We also supply window posters and advertising easels. WE GUARANTEE each lighter for one year. Our distributors and their dealers and agents are backed up 100%. A steady, serious, dependable distributor secures with us an ideal set-up for building a permanent, profitable, repeat business.

Remember—the tobacco products industry is the fourth largest in America—and this line of Lighters is just as staple as tobacco itself! The profit margin on these items is exceptionally large. (The coupon below shows only the minimum profit.) This advertisement is directed at earnest, sincere workers who will qualify for exclusive territory—men who will service drug stores, cigar stores, beauty parlors, pool rooms, auto supply stores, gas stations, etc., as well as sell direct to smokers through canvassing agents. If YOU fit in this picture check one of the ACTIONS on the coupon below, attach it to your letter stating your age, present occupation, and whether you desire limited or exclusive territory. If exclusive, state what county or counties, and how much you can invest in stock after you are satisfied with the line.

If you take either ACTION NO. 1 or ACTION NO. 2 we will immediately deal with you as a distributor and shall look for a report from you at the end of your first week. Meanwhile, we will protect your territory for you. Monthly bonus and special discounts to quantity purchasers bring BIGGER PROFITS! These Confidential Wholesale Prices will be revealed only to our distributors.

Make the most of this opportunity NOW—send coupon at once!

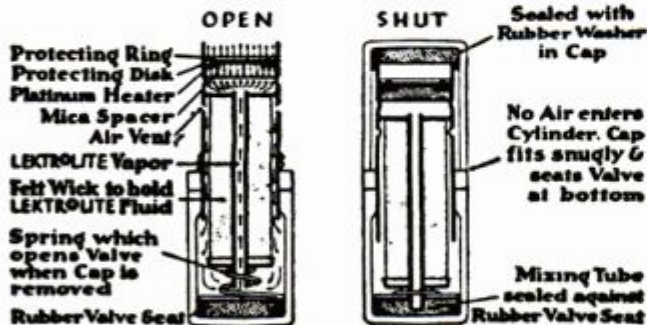


MOTO GLOLITE



Moto-Glolite with suction cup (detachable) for Motorists, no wiring, no drain on batteries—\$1

HOW CATALYST LIGHTERS WORK



When you puff the cigarette, an air current is drawn into lighter thru air vents and becomes mixed with vapor given off by the LEKTROLITE fluid in wick. This mixture rises thru the center tube and causes platinum catalyst to glow—lighting the cigarette.

PROGRESS DISTRIBUTORS INC.
1 East 43rd St., Dept. D-3, New York

.....ACTION COUPON—MAIL TODAY.....

Progress Distributors Inc., Dept. D-3, 1 East 43rd St., New York

Gentlemen:

ACTION NO. 1. Send express prepaid your minimum wholesale order containing your best assortment of Flame and Flameless Lighters and Lektrolite Fluid to retail for \$8.75. Also include one Midget Glolite with my signature etched upon it. FREE. Wholesale Price to me \$5.00. Enclosed herewith. Send C.O.D.

ACTION NO. 2. Send Parcel Post one Moto-Glolite Auto Lighter with suction cup (detachable) etched with my signature, in display carton with Lektrolite Fluid at retail price of \$1.25. Enclosed herewith. Send C.O.D.

I understand that you will ship with my order, order blanks, envelopes, illustrated folders for imprinting my name, complete catalog, Distributor's Manual showing confidential discounts and bonus and other necessary information. Also illustration of all counter and window displays that you supply free to Distributors. I understand also that for two weeks from receipt of this order you will issue no exclusive territory contract for my section. I agree to make a report within one week from receipt of above order stating a monthly minimum for territory desired.

ACTION NO. 3. I prefer to take the time for correspondence and I attach questions hereto.

Name.....

Address.....

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

PATENTS

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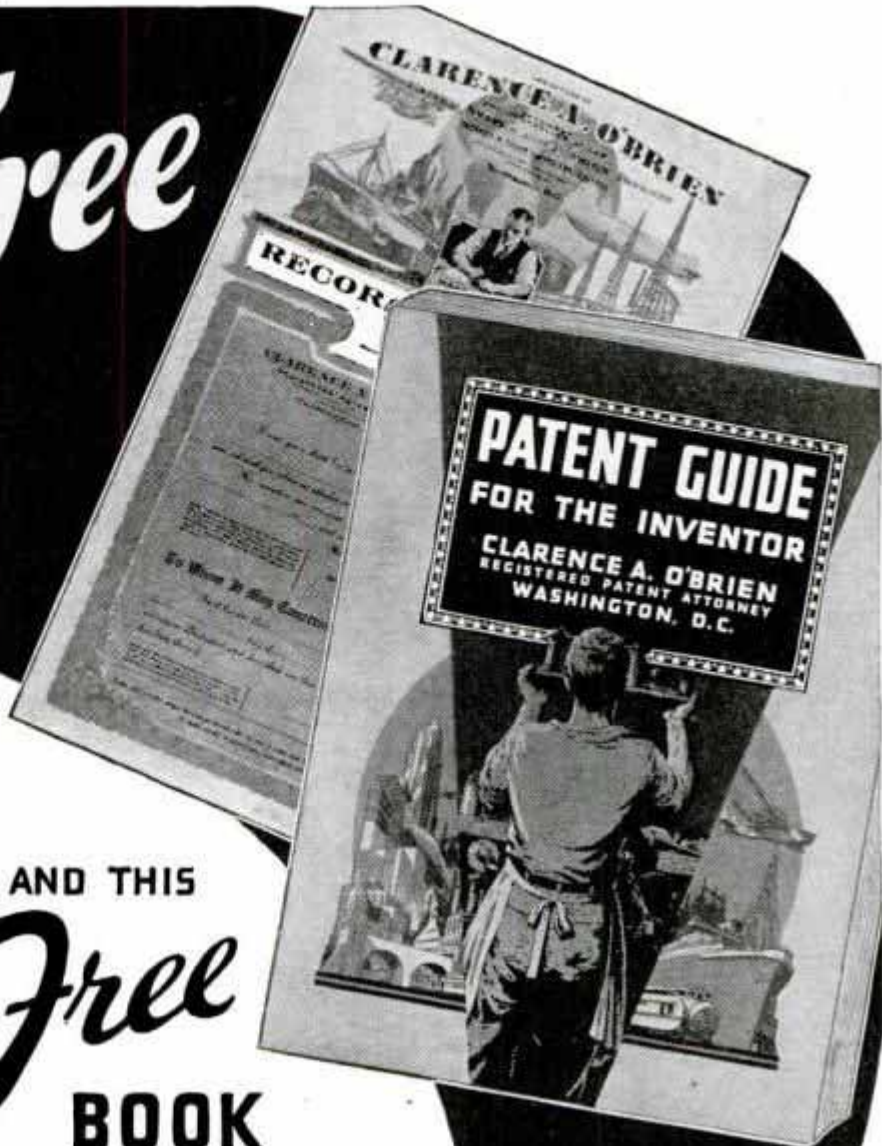
Every year thousands of Patents are granted. Very few, however, represent the discovery of entirely new principles. Most of them provide new methods of doing some everyday thing in a better way—changes for greater efficiency, usefulness, adaptability, or beauty in some previously Patented thing. These IMPROVEMENTS are Patentable if new, and actually represent new invention. These improvement Patents offer large chances for profit if commercially useful. The business world wants improved products and services.

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OL' JUDGE ROBBINS



THE STORY OF BRIAR PIPES

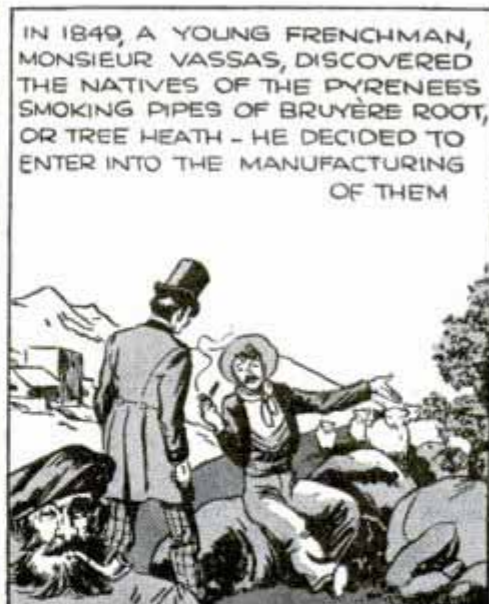
HOW DID YOU LIKE DADDY'S PIPE COLLECTION?

SPLENDID, BUT I STILL LIKE MY OLD BRIAR BEST

HEY - THE BRIAR PIPE ISN'T SO OLD, EXCEPT IN SOUTHERN FRANCE



IN 1849, A YOUNG FRENCHMAN, MONSIEUR VASSAS, DISCOVERED THE NATIVES OF THE PYRENEES SMOKING PIPES OF BRUYERE ROOT, OR TREE HEATH - HE DECIDED TO ENTER INTO THE MANUFACTURING OF THEM



THEN, AS NOW, ENTIRE FAMILIES WERE EMPLOYED IN THE DIGGING, DYING, AND MAKING OF BRIAR PIPES. SELDOM IS MORE THAN A FOURTH OF THE ROOT USABLE



IN THE EIGHTIES, M. VASSAS DISCOVERED IN ALGERIA A BRIAR EQUAL TO THAT OF FRANCE, ITALY, OR CORSIKA



SO YOU SEE, THE BRIAR, AS WE KNOW IT, IS REALLY A MODERN PIPE

LIKE PRINCE ALBERT, A MODERN SMOKE TO SUIT MODERN TASTES AND THE MODERN POCKET-BOOK! EH, JUDGE?



© 1936, R. J. Reynolds Tob. Co.



EXPECT P. A. TO HIT THE JOY NOTE!

Men, don't put off trying Prince Albert. It is mild and mellow—wonderful in flavor—too good to miss! Smoke 20 pipefuls of Prince Albert at our risk. Whiff its fragrance. Note how cool and long-burning each pipeful is. Enjoy steady pipe smoking that does not bite the tongue. You risk nothing. P.A. has to please you. "Makin's" smokers—P. A. makes grand roll-your-own cigarettes.



OUR OFFER TO PIPE SMOKERS
"You must be pleased"
 Smoke 20 fragrant pipefuls of Prince Albert. If you don't find it the mellowest, tastiest pipe tobacco you ever smoked, return the pocket tin with the rest of the tobacco in it to us at any time within a month from this date, and we will refund full purchase price, plus postage. (Signed) R. J. Reynolds Tobacco Co., Winston-Salem, N. C.

PRINCE ALBERT THE NATIONAL JOY SMOKE!

THE BIG
2
 OUNCE
 RED TIN

50 pipefuls of fragrant tobacco in every 2-oz. tin of Prince Albert

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*Fog nozzle sales to
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WRITTEN SO YOU CAN UNDERSTAND IT

Vol. 65

JUNE, 1936

No. 6

F308

This address

FIGHTING FIRES *with* FOG

*Cont. Thomas & Stinson, Jr. 10555 Holman Blvd.
Los Angeles, Calif.*

*Blum
Plexiglas
Los Angeles, Calif.
Fog Electric Corp., 5811
For fire depts.*



THE latest tool of fire fighters is a man-made fog that extinguishes a blaze in only a fraction of the usual time. The artificial mist is produced by directing pairs of high-pressure water jets at each other, the collision of the streams breaking the water into tiny particles. These are drawn toward the hottest part of the fire by convection currents.

This fog is effective against all fires fought with water and also extinguishes or controls chemical fires and other kinds against which solid water is dangerous. Water actually helps spread the flames of a petroleum fire. Fog, however, quenches any type of petroleum fire and does it faster than special chemicals or inert gases. Once, after several companies of firemen had fought a fire in a gasoline refinery for hours, two firemen with fog nozzles put the blaze out in ten minutes. Even casing-head gasoline can be subdued with



Quenching flaming tank of gasoline with fog, and fog nozzle used on fire hose to produce the quantities of mist

*Commercial Western Fire 891
Construction Corp.*



fog. In one demonstration a tank of blazing kerosene, having 150 square feet of surface, with flames and smoke shooting hundreds of feet into the air, was extinguished in eight seconds by one fireman who extended a fog-making nozzle over the wall of the tank.

The fog nozzle, developed by Battalion Chief G. G. Griswold and other members of the Los Angeles county fire department, is an outcome of the old maxim of fire fighters: "Hit the ceiling with the stream." Hitting the ceiling breaks the water into a spray that reduces the room temperature and helps cool the burning substances. The theory on which fire fighting is based is that combustion occurs when a substance is heated enough to give off gas. It is the gas that burns, and the heat of the flame keeps the substance hot enough to produce more gas. Firemen try to cool the burning substance below the temperature at which it produces gas, thus putting out the fire. Griswold decided fires could be put out faster if the gas itself could be cooled and at the same time diluted with water vapor.



Burning substances having a nitrocellulose base are not quenched immediately by fog but the spread of the flames is stopped and combustion can be controlled until the fire is ended by drowning the material in water. One size of nozzle uses one gallon of water a minute and is said to be as effective as 250 gallons of water a minute delivered as an ordinary stream. Fogging begins half an inch from the nozzle and the mist covers an area fifteen feet long. It is not necessary for a fireman to get within fifteen feet of the flames, since convection currents created by the fire draw the cool fog toward it. For extinguishing attic fires or reaching over the rims of large storage tanks a portable duralumin tube extension with a fog nozzle at the tip is connected to the end of the fire hose. Ordinary fire-fighting pressures of 150 pounds to the square inch are used, although pressures as low as 100 pounds can create

(Continued to page 124A)



Types of fog nozzles, oil derrick equipped with fog nozzles, and spraying man-made fog

+ 384.

George P. ...
537 S. Dearborn
Chicago

Giant Flying Boats to Travel Day and Night



Designer's sketch of double-deck planes which will be constructed in England. Four powerful engines will propel the craft at nearly two hundred miles per hour over the far-flung Empire routes

Designed with double decks, giant flying boats are to be constructed for use on British empire routes. The upper deck will be used by the crew and the lower by the passengers. Sleeping accommodations

Imperial Airways

will be provided for sixteen passengers. The big ships will weigh seventeen tons. Day and night operations of the flying boats will be made possible by facilities for carrying large amounts of fuel.

Self-Timer Releases Shutter for Remote-Control Picture

Delayed release of the camera shutter for time exposures from fifteen seconds down to the fastest speed of the shutter itself is possible with a self-timer now available. Controlled by a spring-driven clockwork, it presses the cable release after a fifteen-second delay that allows the photographer to step into the picture. When the camera is set for exposures faster than one second and the self-timer is at zero, the timer's arm compresses the cable button after a delay and operates the shutter at its set speed. For time exposures, the shutter is at "bulb" and the self-timer's winding handle is set for from one to fifteen seconds. Then the control button is released, the winding handle revolves and after fifteen seconds the arm presses the cable button, holds it the desired time and releases it.

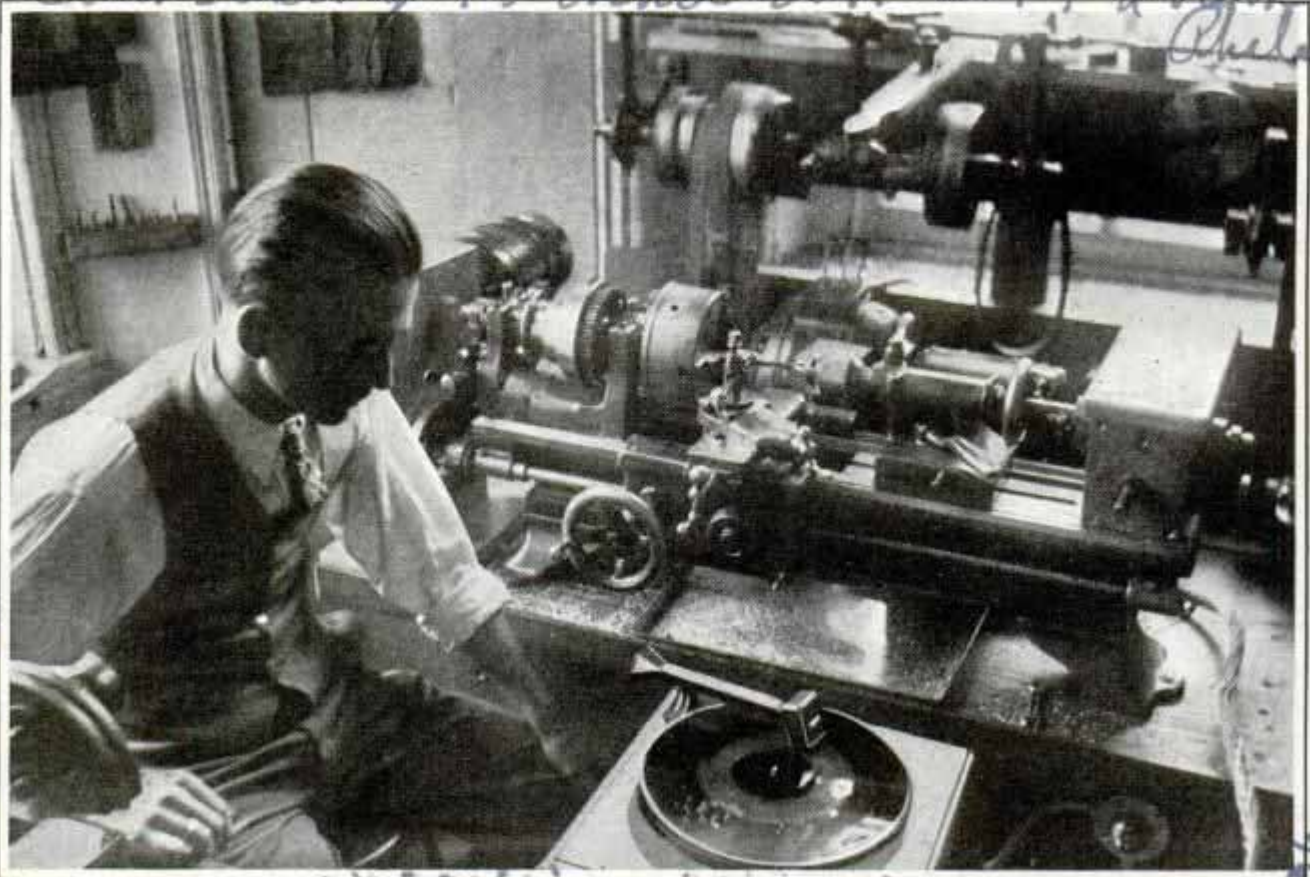


Self-timer for camera shutter, showing how dial is set for time exposure with delayed release

Vertical handwritten notes on the right margin, including '485-5th Ave. N.Y.' and 'Carl Zeiss, Inc.'.

Carl Zeiss, Inc. 485-5th Ave New York.

Phonograph Disk Directs Automatic Machine



Wax record in foreground of picture is controlling lathe in turning out steel tools and parts after patterns set by human workman as he guided lathe while original operation was recorded on master record

Automobile bodies shaped automatically at the direction of a master phonograph record, furniture turned on lathes guided by a wax disk, unmanned machine guns spitting fire at the will of a record far back of the lines—these are some of the promises of an invention by Ivan Eremeeff, sound engineer. Already in his laboratory a phonograph record actually controls a lathe, giving intricate instructions for turning out bolts, nuts and other parts. The master record is made while a human mechanic guides the lathe; afterward, this record can control any number of lathes in a similar operation, even by a radio broadcast of the record. Four synchronous motors using alternating current operate the lathe in its various motions, magnetic controls of one motor operating forward, for example, on 100 cycles and backward on 200. As the lathe moves, under human guidance, the currents flowing from the four motors in different cycles are combined into one current which is recorded as a complex groove on the phonograph disk. When it is played

back, a series of filters analyzes each frequency from the groove, or wave, and the magnetic control for each cycle is brought into function and the respective motor operates. The principles of musical harmonics thus are applied to the control of automatic machinery. From a single blueprint a mechanic may fabricate a part and groove the master record which could set in motion machinery in branch factories in far separated parts of the country.

Object Hidden by Smoke Is Seen in Reflected "Sound Picture"

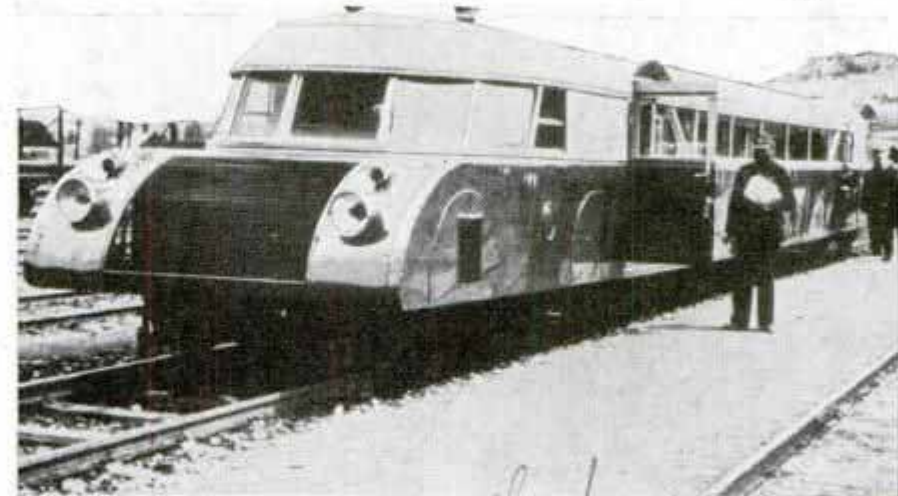
Mountains enveloped in fog, ships lurking in darkness, airplanes hiding behind smoke or cloud screens or lost above airports can now be made visible as a ghostly half-tone picture on a ground-glass screen. Reflected high-frequency sound waves are the key to this magic. By a process just patented, these sound waves are projected as a beam from a noise generator resembling an anti-aircraft searchlight. As the beam strikes, for example, an unseen ship,

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 Dallas, Texas

the sound vibrations are deflected and modified in varying intensities by the shape of the ship and are picked up by a sound receiver and focused on a light controlling panel. The panel consists of a multitude of cells, each of these a short tube with a polished reflecting diaphragm and mirror having two transparent strips at opposite ends. The diaphragm vibrates according to the intensity of the sound wave focused on it. Its vibration varies a beam of light admitted through one of the transparent strips, and the beam is deflected through the second slit to a ground-glass screen. Thus each cell forms part of a sound picture transposed into a visible half-tone picture.

Fast Polish "Torpedo Car" Powered by Diesel Engine



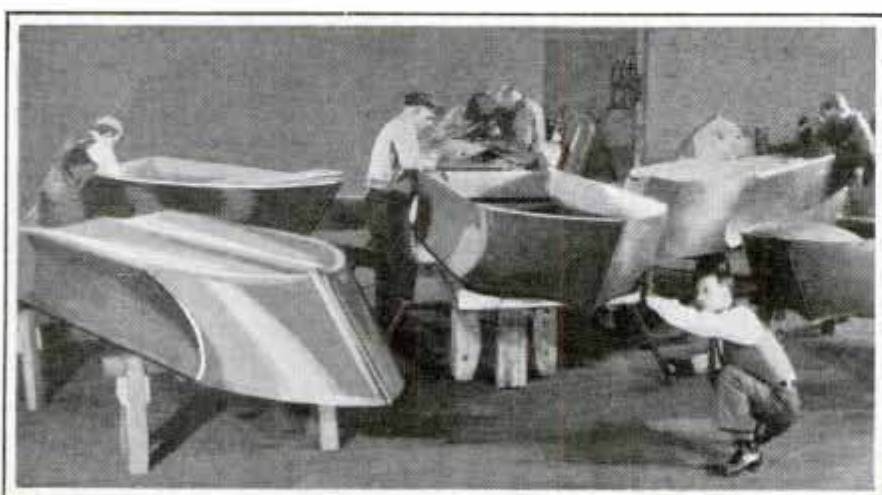
Designed for high-speed, economical passenger service, this "torpedo train" is one of a fleet of Diesel-motored cars on Polish railroads

Poland's "torpedo train," a streamline rail car that travels ninety-three miles an hour, bears the reputation of being one of Europe's speediest trains. It is driven by a Diesel motor with automatic clutch, operating on an extremely economical basis. The car, one of several in service on Polish railroads, carries eighty-six passengers. The engineer's cab is set back from the low, protruding radiator.

Fluted-Bottom Steel Boat May Change Design of Liners

Design of ocean liners may be revolutionized by a construction method advanced by Capt. M. L. Gilbert of Michigan, inventor of an all-steel boat which is said to be unsinkable. The craft is formed by rolling the metal into a tube and breaking it in three places, thus forming two curves in the bottom and one on each side. This

fluting is said to increase strength and rigidity and to cause the boat to ride the surface as its speed increases. The design of the bottom practically eliminates water-spanking, since the water is thrown four ways into the air pocket. Welded throughout, the new boat carries air chambers under the seats. Capt. Gilbert believes



Views of boats with fluted bottom and sides. This form of construction causes the craft to ride the surface as speed increases

that ocean liners built on this design could cross the ocean at a speed of sixty to ninety miles an hour. A 700-foot ship of this type, drawing twenty-eight feet of water while at rest, would draw only six or seven feet upon reaching twenty miles per hour, according to the inventor. From there on, owing to less water resistance, the ship would be able to exceed sixty miles per hour with the same horsepower.

The Sail Boat Co
Holland, Mich.

467 Dept. of Public Relations
 Illinois Central System
 817 Central Station
 Chicago

The Latest Diesel-



Observation end of lounge car of the "Green Diamond," the Illinois Central's five-car streamline train, built to operate between Chicago and St. Louis



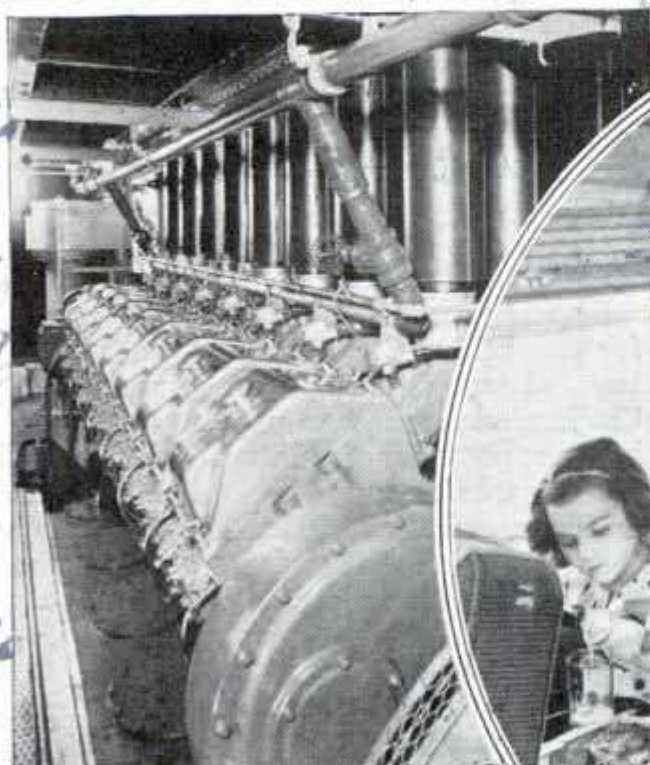
Kitchen and mail-handling section of mail-baggage car of the "Green Diamond." The train is constructed of steel and aluminum, is air-conditioned, weighs 230 tons, half the weight of a standard steam train, and is expected to make its 300-mile run in less than five hours



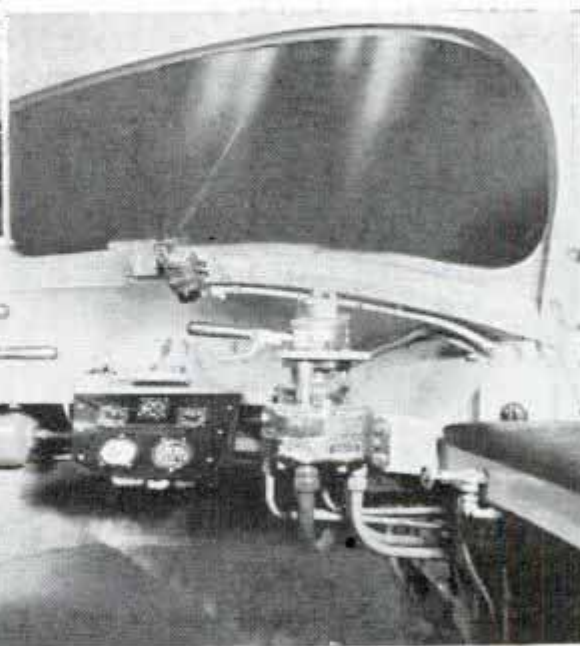
Pullman - Standard Mfg. Co.
 79 E. Adams Chicago

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Electric STREAMLINER



The 1,200-horsepower, sixteen-cylinder V-type Diesel motor which transmits power through a dynamo, and tables for dining in chair cars



A head-on view of the "Green Diamond," and the control cabin. In addition to the sixteen-cylinder, two-cycle, high-compression Diesel engine which generates the electricity to run the train, the power car also contains an engine cooling and exhaust system, storage batteries, charging equipment and an auxiliary engine for lighting and air conditioning

F. 286

MODERN WONDERS OF AN ANCIENT ART



Painting by Peter Field

809



B. J. Sweeney Director of Lusterite Laboratories

COLOR and durability are combined in the decorations of this modern office: Walls are of porcelain enamel with stainless steel trim. Desk top and filing cabinet also are porcelain enamel.

T 286
Assignment for 10/18/28

Chicago Tribune Chamber of Commerce
1401 S 55th Street
Chicago Ill



By H. W. MAGEE
Part I

8/18

PORCELAIN enamel is older than history and yet—in its modern applications—it is as new as tomorrow.

Fifteen centuries or more before the dawn of the Christian era, someone heated a batch of minerals and produced a glasslike substance which he found could be fused to metal with the aid of heat. In the next two thousand years or so man utilized this knowledge mainly to produce beautiful cloisonne vases, medallions, jewelry and other ornaments.

Then, about a century ago, someone else gave a practical twist to what, up to then, had been a fine art. He coated cast-iron pots and pans with porcelain enamel to produce better cooking utensils. And about 1870, well over three thousand years after porcelain enamel first was produced,



at Museum of Art

TEMPERATURES must be controlled accurately in the smelting process. Here a worker is using an optical pyrometer to check the temperature of the molten mass against readings of the controlling pyrometers. Below, ancient porcelain enameled porringer.

Porcelain Enamel Institute
612 N. Dearborn Ave
Chicago

Fireplace in apartment of M. J. Saltzman, Porcelain Enamel

28-29 Borden
and Long Island
City, N.Y.



reg'd Magnolia Petroleum Co
Dorsey Vacuum Co

another genius applied the same principle on a much larger scale. The result was a bath tub.

Thus was evolved porcelain enamel as we now know it, a product so common you see it and use it without thinking from the time you get up in the morning until you go to bed at night. You bathe in a porcelain enameled tub, eat a breakfast prepared in porcelain enameled pans on a porcelain enameled stove, glance at a clock with a porcelain enameled dial, are reminded you need gas by porcelain enameled signs, pumps and filling stations, perhaps eat your lunch off a porcelain enameled table, drink from a porcelain enameled water cooler, use a telephone with a porcelain enam-



THIS porcelain enameled fireplace and jardiniere lend a modernistic touch to the living room. Tables with porcelain enameled tops also have found their way to the living room.

on Magnolia Bldg. Dallas Texas

eled dial and, at night, go to the refrigerator for a late snack and encounter porcelain enamel again.

You see solid panels of it in hospitals, barber shops, meat markets and soda fountains, your bathroom and kitchen fixtures are covered with it, and you encounter it in stoves, scales, thermometers, washing machines, name plates, roofing shingles and scores of other articles. And finally, when you die, a porcelain enameled vault may receive

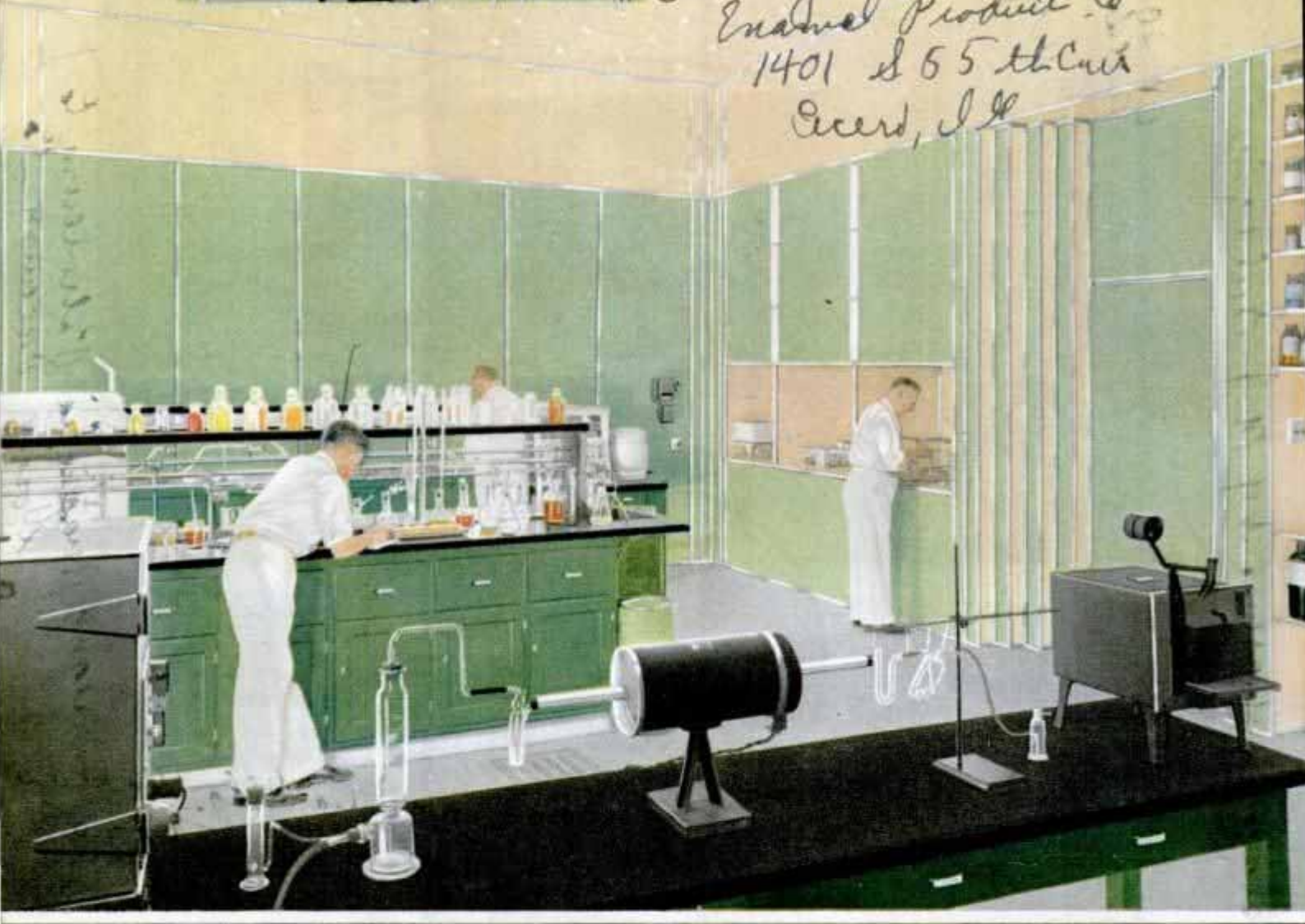
F286

8/2



known for thirty centuries. New
cations are being found for p
enamel daily and even now it
we have not visioned the ultimate
of this union of glass and metal. When
the mile-long tunnel between Detroit and
Windsor, Ontario, was dug, porcelain
enameled tile provided the lining for it.
And porcelain enamel again solved the
problem when a lining was sought for
railroad cars and trucks carrying milk.

Lusterlite Laboratories
Chicago Vitreous
Enamel Product Co.
1401 S 55th Ave
Secord, Ill



ANALYZING raw materials in laboratory of porcelain enamel plant. Note porcelain enameled walls and ceiling. Above, accurate weighing is done in draft-free balance room.

your body and a porcelain enameled monument may mark your resting place.

Yet, despite the multiplicity of uses which have been found for it, man today is just beginning to realize the full possibilities of this product which he has

Right now, if you desire, you can live in a porcelain enameled house, enjoy porcelain enameled furniture and ride on a train coated with the same material. Houses with both exterior and interior walls of colored porcelain enam-

F206

Main laboratory room - Chicago Vitreous Enamel Products Co



Build by Dresser Engineering Co
Julia Ahl

eled metal have been constructed and porcelain enameled furniture already is available while a train with porcelain enameled coaches is being operated abroad.

To understand the many new ways in which porcelain enamel may serve mankind, we must first understand just what it is—and what it is not—how it is made and something of its physical properties. In the first place, porcelain or vitreous enamel is not a paint although it often is confused with paints because some lacquers and glossy paints are called enamels.

Porcelain enamel is a thin layer of glass fused or welded on to a metal base, and it is made somewhat like glass. The metal commonly used is a special grade of steel or "enameling iron" and cast iron. The four corners of the earth provide the raw materials which go into porcelain enamel—feldspar, borax,



MAIN laboratory room of Chicago Vitreous Enamel Product Company's "Lusterlite Laboratories." Porcelain enameled walls and columns in graduated shades of blue show its possibilities as a building material. Indirect lighting is a feature. Below, filling station of porcelain enameled metal.

Jul. Lusterlite - 0301

1401 S. 55th Ave. Chicago

F286

814

Photomicrographic studies in porcelain enamel laboratory.



PORCELAIN enameled table in office with porcelain enameled walls. Left, photomicrographic studies in porcelain enamel laboratory.



quartz, soda ash, nitrate of soda, fluor-spar, cryolite, cobalt, nickel oxide and manganese. The materials are mixed and the mixture is loaded into smelters where it is reduced to molten glass by temperatures as high as 2,200 degrees.

The molten glass is quenched in pits filled with cold water, the sudden change in temperature shattering the liquid glass into millions of granulated particles called "frit." The frit passes through driers and meshed-screen classifiers, then through magnetic separators to remove any traces of iron which might cause specks or discoloration. Batteries of mills grind the frit, along with water and clay and metallic oxides if color is used until the mass is converted into a creamy liquid. This is porcelain enamel ready for applying.

3326 Davenport Steel and
Wolverine Porcelain Enameling Co
Mound, Iowa

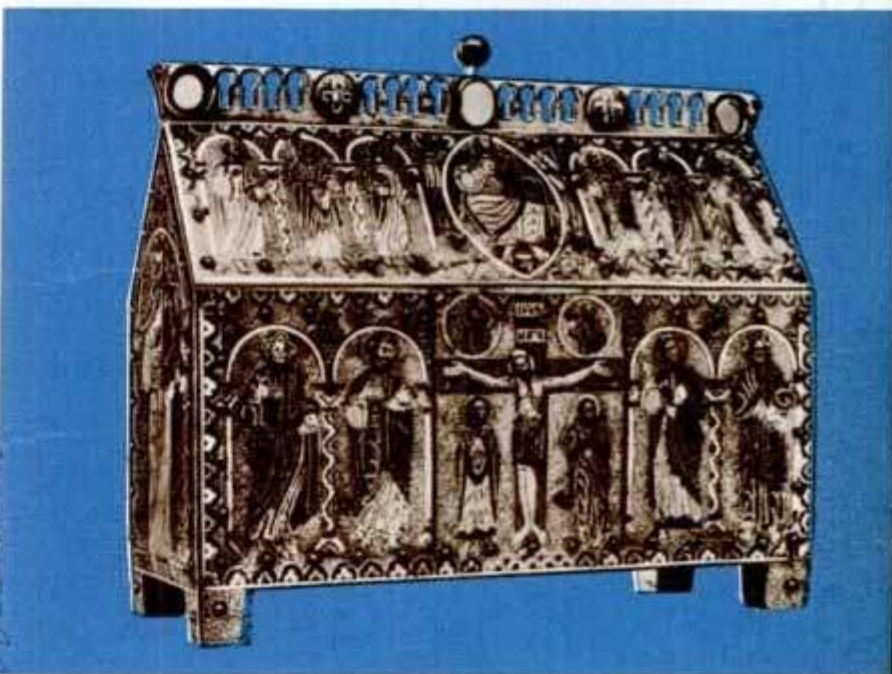
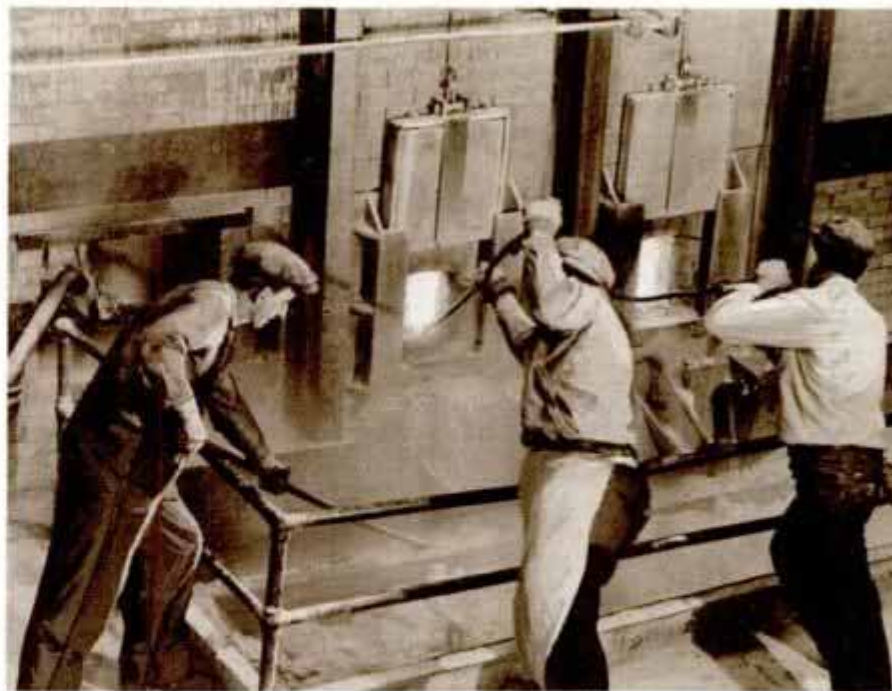
The metal itself must be thoroughly cleaned in preparation for its glass coat. The ground coat is applied by dipping or spraying, then the porcelain enameled metal passes to a drier and on to a furnace where, at a temperature of around 1,600 degrees, the glass is fired or fused on to the metal. After cooling, the process is repeated as two or more finish coats are applied.

The final result is a piece of metal to which has been welded a flintlike inorganic or mineral substance harder than steel—a durable, lasting finish capable of withstanding the cold of a refrigerator or the heat of a gas range indefinitely. It is non-porous, its surface is easily cleaned, its colors are permanent and, if necessary, it may be made acid-resisting.

Making porcelain enamel today has been reduced to an exact science. Raw materials must measure up to strict chemical and physical specifications, the frit undergoes further laboratory tests, smelting and firing temperatures are controlled accurately, colors are blended and matched with scientific precision and the finished enameled metal must stand rigid impact, bending and reflectance tests.

Considering the fact that the ancient enamellers worked with crude equipment and without any modern scientific aids, the jewelry and ornaments produced hundreds or even thousands of years ago become all the more remarkable. Skill in both metal working and enameling was necessary to turn out the beautiful pieces now seen mostly in museums. Several types, distinguished mostly by different makeup or construction of the metal base, were produced down

TOP, stirring molten mass in porcelain enamel plant before smelter is tapped. Center, ancient porcelain enameled reliquary depicting scenes from the life of Christ. Below, home of porcelain enameled metal.



Strain Steel at Century
& Process

7286

815

Lusterlite Submatones, Chicago Chryco Enamel Co.



Clark Park Hall, 608 Harrison, Dedonch, Dedonch

through the centuries, cloisonne enameling being the most familiar.

In cloisonne work, the figure or design to be reproduced was outlined with flat strips of metal or fine wire, the edges of the metal being upright so small enclosures or "cloisons" were formed to receive the enamel colors. The wire was attached to the metal base, the little enclosures filled in with the various colors of enamel, and the glass was fused to the base. Then months often were spent in polishing the finished piece. In other types of enameling, the design was often cut into the metal base, the depressions being filled with the enamel.

Strange as it may seem, porcelain enameling which started as a fine art, (Continued to Page 132-A)



LOCKER room and lavatory demonstrating the versatility of porcelain enamel as an architectural and decorative medium. Below, artist at work on a ceramic portrait.

1921:2 33 1921 1921

1955
Holman
Los Angeles, Calif.

Movie Actors Directed by Short-Wave Radio

Center, actors being directed by short-wave radio. Circle, movie director talking on the radiophone as he controls movements of the actors. Top, radio station of movie company



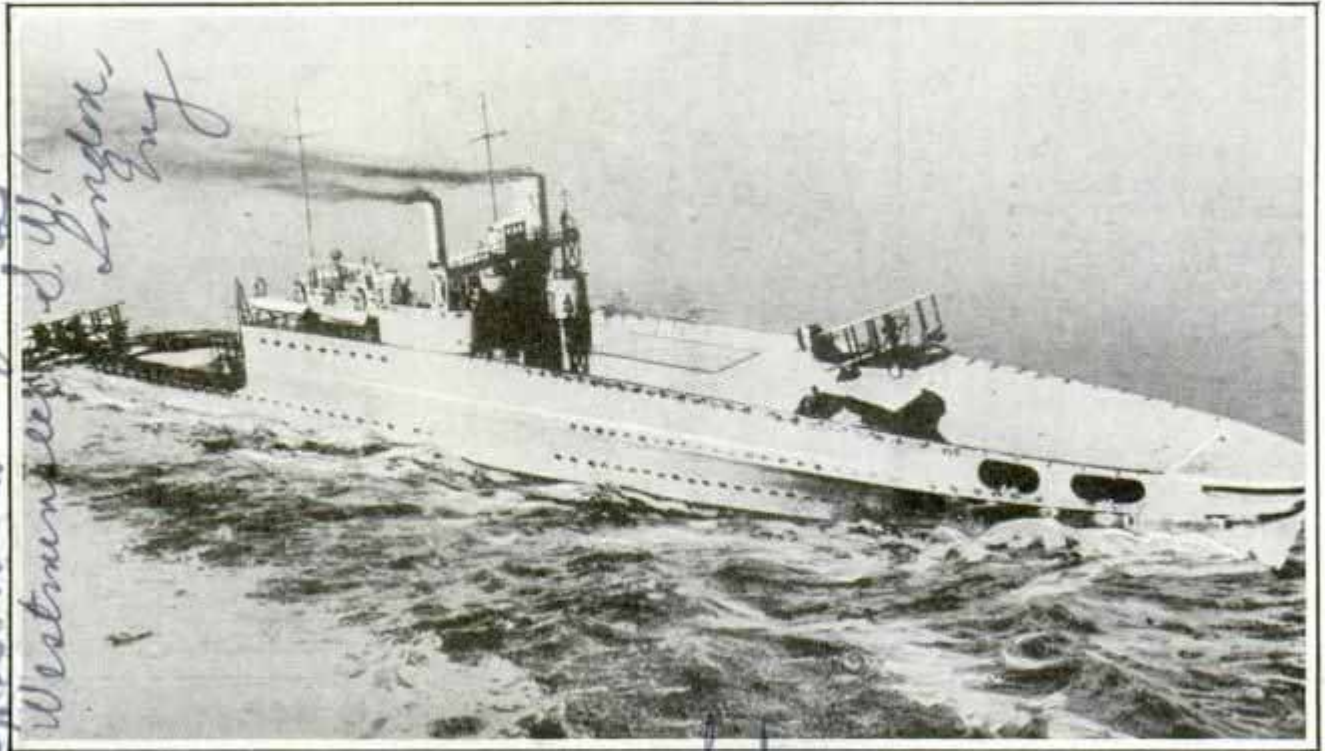
was the filming of battle scenes for "Under Two Flags" on the Arizona desert. The company filming "Under Two Flags" kept in contact with the Twentieth Century-Fox main studio at Hollywood with a 181-meter radio. Many details ordinarily handled by more expensive means of communications were disposed of by short-wave radio, resulting in a saving of \$12,000. Radio technicians also have experimented with a five-meter set by which dummies mounted on horseback are made to fall from the horse. Thus, the director would be able to "shoot down" the dummy members of a charging troop by speaking into the microphone of his transmitter. The voice signal would release a mechanism attached to a small radio receiver on each saddle that would cause the dummy to fall.

By using short-wave radio to control the movements of horsemen spread over a large area, a motion-picture director has finished many scenes without rehearsals. An eight and one-half meter set was the medium with which directions were given to the various troops of horsemen, each accompanied by a radio operator equipped with a portable receiver. The occasion

Prof. J. H. ...
Miller ...
Production ...
Camp ...
Station ...

1955
Holman
Los Angeles, Calif.

'Pocket' Aircraft Carrier to Mother Seaplanes



British aircraft builders propose this 3,000-ton ship, only 361 feet long, as "mother" for a brood of navy seaplanes. It is tiny by comparison with the aircraft carriers now in service

Following the trend toward "pocket-size" warships, an airplane carrier designed by a British aircraft manufacturer has a displacement of only 3,000 tons. It

would be specifically commissioned to handle seaplanes. Over-all length would be 361 feet, with a fifty-two foot beam. Its cruising radius would be 5,000 miles.

Plane-to-Earth Chat Is Heard over Invisible Light Beam



Talking into microphone, speaker's voice travels over infrared wave to photocell and is translated back to sound

Conversation over invisible light beams from plane to ground and between submerged undersea boats is the latest turn of radio-telephony. This telephone, the invention of a Chicagoan, projects the human voice translated into dot-dash code over a beam of infrared light to a distant "electric eye" receiver, which changes the unseen light back to sound. The speaker, facing a microphone, and with a reflector as transmitter, talks in the "da-da-di-da—" code imitating dots and dashes. At the receiving end it is heard as a shrill interrupted whistle. Neither seen nor heard by others than the sender and receiver, this method of communication could be used by aircraft or naval vessels, even submarines, without danger of

F38.2
 Westm... S. Y.
 London
 Guy
 Thornycroft Co. Thornycroft
 South Square
 Chicago
 A. A. Arny...
 325 W. Huron
 Chicago

Mr. A. A. Arny... Chicago
 325 W. Huron

detection. A photocell of the type used for television is the heart of the instrument, and one possible use would be the photography of enemy terrain in wartime from unmanned observation balloons, the picture traveling by television automatically to the ground station. The entire outfit weighs less than ten pounds and can be carried easily in a small knapsack. A small battery furnishes the current.

Engineer's Dream of Capital Comes True after a Century



Vista through arch of national capitol showing park conceived in George Washington's day and completed recently

Loud-Speaker on Bicycle Warns of Gas Attack

Wearing a gas mask and riding a bicycle equipped with a loud-speaker, a modern Paul Revere sped through the streets of Hendon, England, recently, shouting warnings to the citizens of a gas attack. He participated in a test to find the most efficient means of issuing gas warnings in case of actual warfare. Other tests were made with messengers on foot, mounted on a motorcycle and riding in an automobile.



Masked bicyclist with loud-speaker tests this method of warning populace of gas attack

One hundred fifty years ago President George Washington entrusted to a French engineer, Major Pierre L'Enfant, the duty of planning a capital city in the District of Columbia which would rank among the world's most beautiful cities. From the major's drawing board emerged a dream that has developed into reality over more than a century. One of his visions was a park that would reach from the capitol to the site where now stands the Washington monument, and this park was completed only recently. From the arched doorways of the capitol one can look past the statues of Chief Justice John Marshall in the foreground, and that of General Ulysses S. Grant, down the long stretch of green park to the slim shaft raised in memory of the first president.

814 Connecticut Ave N.W.
Washington, D.C.

F113.

Exposing the STAMP



By Cleland van Dresser

WOULD you believe that a convict could manufacture "rare" stamps and sell them through a confederate stationed outside the prison walls for as high as \$600 apiece?

Or that one of the best stamp dealers paid \$65,000 for a block of forty-three "rarities," only to find that he had bought a handful of cleverly tinted and engraved pieces of paper?

These incidents are selected from the files of Mrs. Catherine L. Manning, for fourteen years head of the world-renowned collection at the Smithsonian Institution, Washington, D. C. Most of the 10,000,000 collectors in this country probably believe very few fake stamps are foisted upon the public. Many have been studying their hobby for years and naturally are convinced they cannot be fooled easily. However, Mrs. Manning is armed with facts which defy all arguments. Take the case of the convict and how Mrs. Manning exposed his brilliant forgery.

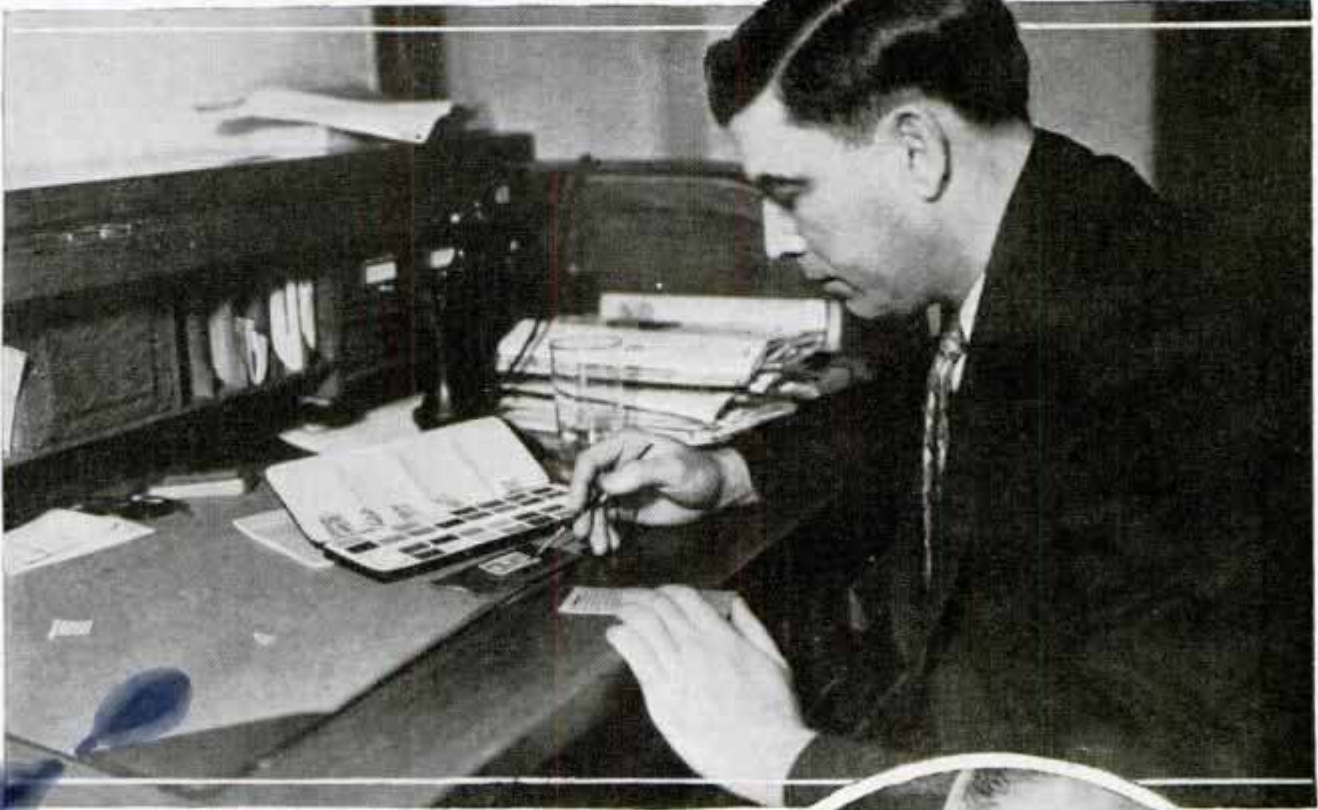
Some years ago she was doing some private work for a Washington dealer, when a man with a "general delivery"



Using the watermark detector and roto-gauge in testing stamps. Below, a real "tete-beche" with two of the heads upside down

+113

RACKETEERS



address at Leavenworth, Kas., wrote for a common type of one cent, 1851, a blue Franklin known as "type 4, imperforated." Nothing unusual about that. Later the same man sent in for appraisal a "rare" variety of the same issue, designated as "type 1."

"Naturally," Mrs. Manning says, "we became suspicious. So we tried a simple test. We put the stamp in warm water. To our surprise the distinguishing feature of type 1, a design made of two complete scrolls, vanished in the water. What had the forger done? With consummate skill he had taken the cheap stamp which we had sent him and completed the scroll design upon it with water colors. Later we learned he was a convict, trying this sort of thing on an ambitious scale and from a prison cell, of all places, and getting as high as \$600 apiece for the 'rarities,' thanks to the super-salesmanship of a confederate outside the prison."

Usually, however, the racketeer in stamps confines himself to forging those of medium value. There are far more of them, and the crook runs less risk of detection. But there are outstanding excep-



Top, watch for water-colored fakes. In circle, "bogus" stamps. Bottom, stamp at right is counterfeit



Left, stamps often are repaired to give them illicit values. Below, the warm-water test revealed a sensational counterfeit case



tions. The story of the dealer who was swindled out of \$65,000 is important because it illustrates one of the cleverest methods of the philatelic crooks. This dealer traveled from New York to Los Angeles to get a block of forty-three "genuine Hawaiian missionaries." These stamps are such rarities that a single one, the two-cent blue, today catalogues at \$15,000 unused and \$12,000 used.

They looked all right to the dealer, so he bought them and returned to New York. A number of old letters and envelopes that bore every evidence of being genuine were attached to the stamps. However, the dealer made numerous tests on his new purchases. To his chagrin, there was no doubt regarding the falsity of the stamps as the paper upon which they were printed was made by a process not known or used prior to 1870, many years after the Hawaiian missionaries had become obsolete. The case was brought to trial in Los Angeles and the dealer was lucky enough to get his money back.

The genuine stamp is photographed and much enlarged by some counterfeiters. It is then retouched or entirely redrawn by an expert who strengthens the weak places on the picture in order to produce a sharp

black replica of the original. Next the engraver rephotographs it, reducing it to the exact size of the genuine. The negative is then printed on a copper or zinc plate which has been coated with a sensitive emulsion. The plate is covered with ink, which attaches itself to the outlines of the stamp, the white background receiving no ink. The plate next is etched or eaten out in a bath of nitric acid or chloride of lime. This etching process is repeated until the entire white background has been eaten out sufficiently to produce a printing plate which is in relief. From this plate stamps can be printed which closely resemble the genuine.

But there are many difficulties in making the reproduction exact. The photo loses some of the fine details; furthermore,

F113
F225.
at I presume England.

Indoor School Teaches Sailors First Principles of Seamanship

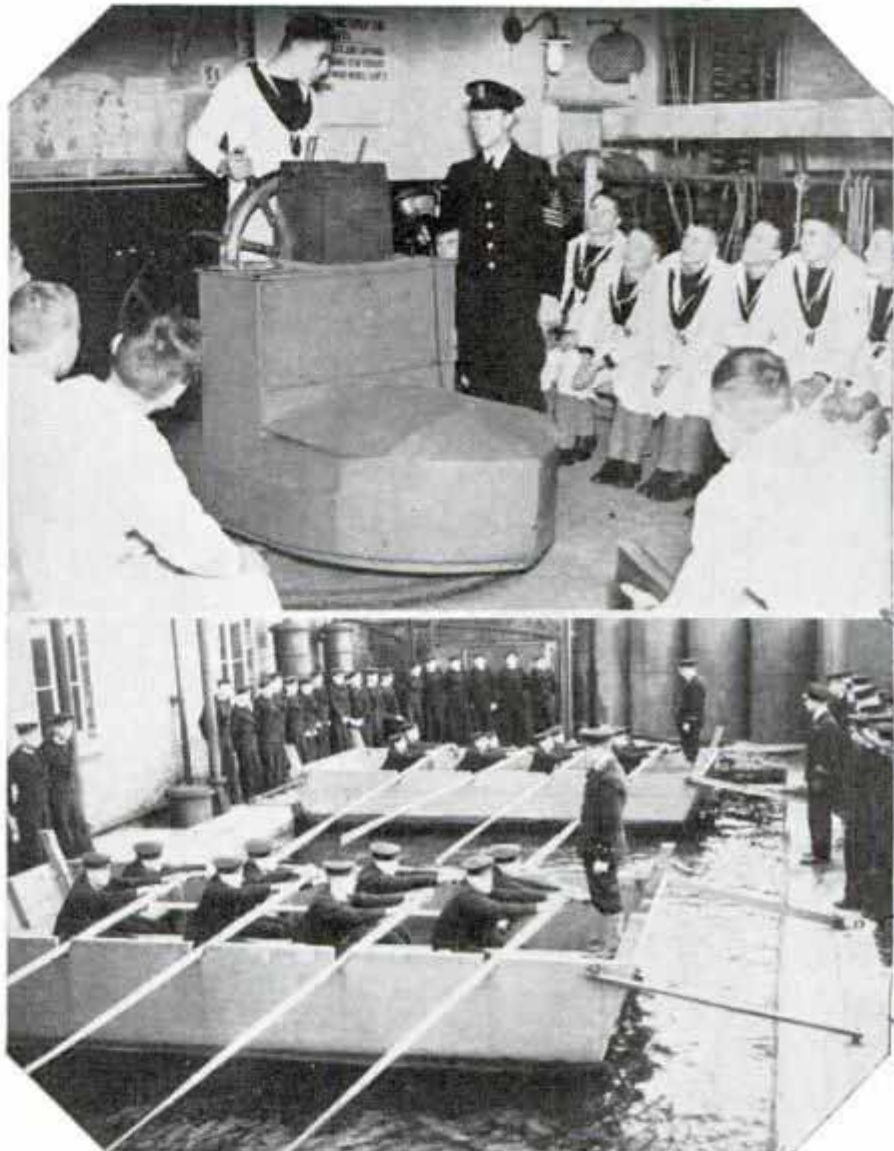
if any retouching is done it is not always precisely accurate, and when the zinc or copper plate is immersed in the acid, great care must be taken lest the acid eat out more than is desired. In the case of the missionary stamps the fakes were compared, by means of greatly enlarged photos, with the genuine, and it was noted that a row of counterfeit letters placed beneath a row of the originals for comparison purposes, showed the effect of the acid in etching out more than was desired.

William C. Moran, head of the secret service, says a counterfeit of the current two-cent stamp recently appeared in New York, and large numbers were used on letters through the mails, so excellent was its character. The agents raided the offices of a stamp broker and quantities of the forged stamps were seized in addition to many documentary stamps from which, according to the federal men, cancellations had been cleaned off with a chemical. The agents also found a gumming and perforating machine, but were unable to locate the plate used for printing.

What can be done to dealers who sell fake stamps as real? In America such shysters are blacklisted from the national organization and are trailed by secret service agents. If proof of their guilt is found, they can be fined and imprisoned.

The largest scale stamp counterfeiting scheme in America dates back to 1895, according to secret service records. The stamps involved were the ordinary two-cent variety. The trail was revealed when a federal man, glancing through a Chicago

(Continued to page 130A)



© Fox Photos

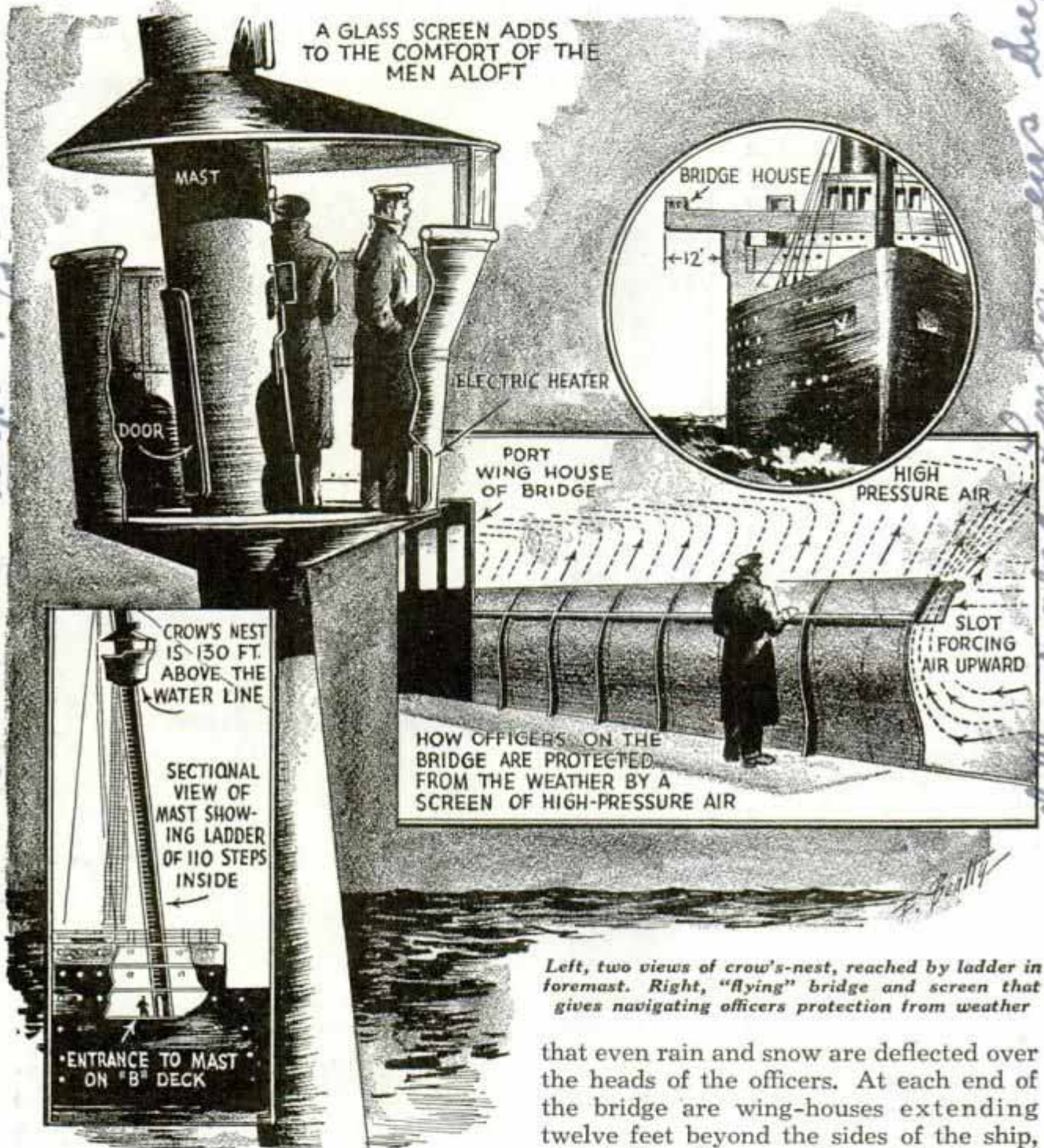
Top, British sailor being taught to steer by compass on indoor bridge. Below, dummy boats in tank used for rowing instructions

Young British sailors receive their preliminary training without going near the water and without going out of doors. First principles of seamanship are learned indoors on a dummy bridge where the sailors are taught to steer by compass. When they are ready for rowing lessons they receive instruction in dummy boats in a specially constructed tank. Later they go to a navy training station for a period of advanced instruction.

Whenever you find that you wish to know more about any article in this magazine, write our Bureau of Information, inclosing return postage.

H. Moran is a very good sailor.

Air Screen Protects Bridge of "Queen Mary"



Left, two views of crow's-nest, reached by ladder in foremast. Right, "flying" bridge and screen that gives navigating officers protection from weather

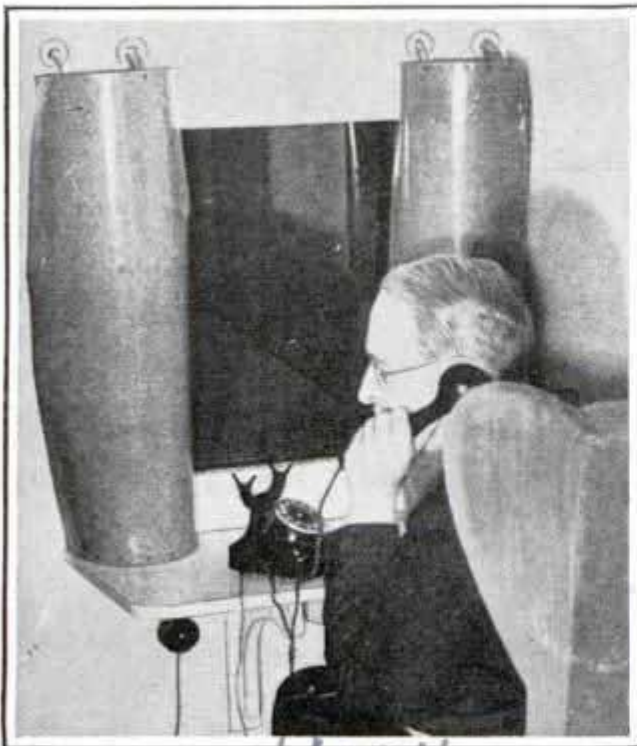
Builders of the "Queen Mary," in designing that floating palace for the comfort of transatlantic passengers, did not forget to plan special refinements of design that add to the efficiency of the men on the bridge and even in the crow's-nest. A unique feature of the open bridge is its curved steel screen with a slot, narrowing toward the top, which catches the onrush of air and thrusts it up, leaving the navigating officers in an area of calm air. So strong is this high-pressure screen of air

that even rain and snow are deflected over the heads of the officers. At each end of the bridge are wing-houses extending twelve feet beyond the sides of the ship, giving the officers unobstructed view of the entire length of the vessel and of particular advantage in docking, manning the boats or maneuvering while small boats are alongside. For the comfort of the lookout high up in the crow's-nest, 130 feet above the water line, there is a glass screen and an electric heater. The crow's-nest is reached by a 110-step ladder in the hollow steel foremast, the lower door opening on deck "B." Each of the twenty-four steel forty-foot lifeboats has an eighteen horsepower Diesel motor, and each

carries 145 passengers—more than were accommodated on the first Cunard liner, "Britannia," built in 1840. In the wheelhouse are twin steering wheels, so that if one control fails the second can be manned in a few seconds. Even without a human helmsman, the Sperry gyro pilot would keep the "Queen Mary" on her set course in any weather.

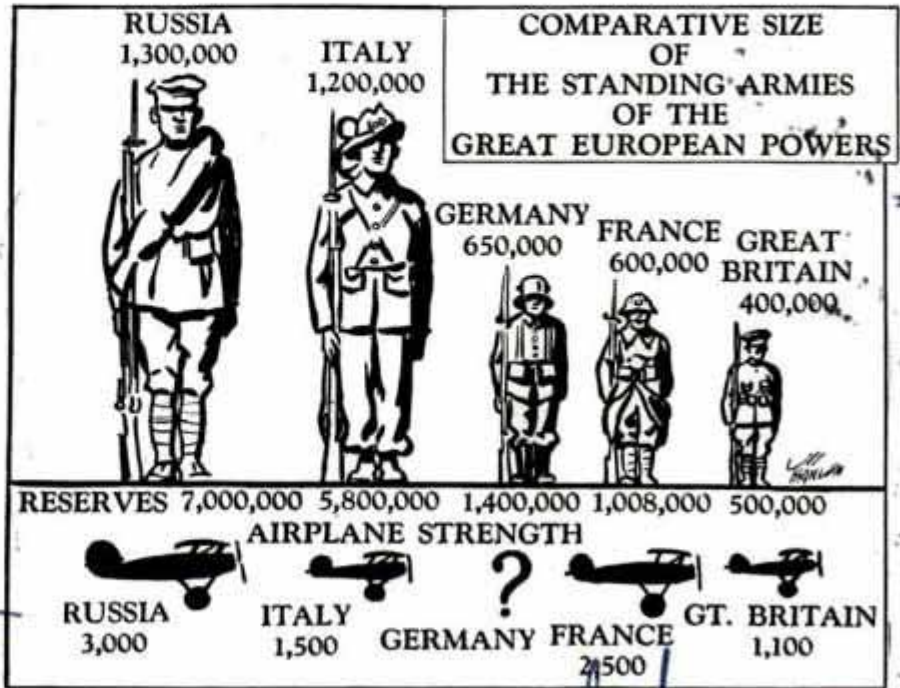
Berlin Phone User Sees Party Called in Distant City

Berlin and Leipzig now are joined by the first public long-distance telephone-television service in the world. Speakers on both ends of the roundabout cable route of 186 miles are visible to each other during their telephone conversation. The images appear on a screen directly in front of the telephone and the service is available to the public at a rate of \$1.40 for three minutes.



Making a telephone-television call. Image of person called appears on the screen

How Europe's Big Nations Match in Fighting Power



Comparative sizes of the soldiers and of the planes indicate how the five nations rank in land and air strength

If war should be declared today, Russia would have more men and more planes at her command than any other nation in Europe. The Soviet Republic boasts a standing army of 1,300,000, reserves of 7,000,000 and an air fleet of 3,000 planes. Italy ranks second in Europe, with a standing army of 1,200,000, which is far above normal strength due to the conflict with Ethiopia, reserves of 5,800,000 and an air fleet of 1,500 planes. Germany's standing army numbers 650,000, her reserves total 1,400,000, but her air strength is kept secret. France has 600,000 men in her standing army, slightly more than one million reserves and 2,500 planes. Her air fleet is second to that of Russia. Great Britain's standing army of 400,000, her reserves of 500,000 and her air fleet of 1,100 planes place that nation last, from a standpoint of readiness for emergency. This comparison of strength was prepared by observers during Germany's remilitarization of the Rhineland, an act which France and other European nations regard as a violation of the Locarno Treaty.

■ A solid platinum flute is credited with the finest tone quality of any flute ever made, due to the high density of the metal.

*Owner. Georges Bave
Flutist*

7252

in EVERYTHING

may 1935



1935-2-26-31



James H. Morse (2)

Is there really music in everything? The growing popularity of many recently devised musical devices used on both professional and amateur radio programs has aroused the interest of science in this question. On one radio program, for example, the jawbone of a horse is being used in the orchestra as a percussion instrument. On another, the bazooka, consisting of two pieces of lead pipe with a funnel in one end, produces weird music, while on amateur hours musical devices ranging from a one-stringed homemade fiddle improvised from a kitchen broom to a set of wine glasses and tumblers containing varying amounts of water have been used.

Sound engineers and other scientists recently have interested themselves in the technical aspects of the sounds produced by improvised musical instruments of this type and have found that in some cases their sound vibrations, photographed with the aid of an oscillograph, compare favorably with those of the more familiar musical instruments.

Psychologists and music critics, however,

Above, making music by rubbing glasses containing water. Below, playing the musical saw

*suggested A. Braunstein
952-109th St.*

Richard (Bill) H. ...

Bob Barne

Advertisement

New York Daily Mirror 235 E. 46th Street



sic must be adapted to some arbitrary system of sound as all music is artificial. The ordinary drum, for example, is not a music instrument while the tympani, commonly called the kettledrum, is a keyed instrument which produces tone."

Musical saws, bazookas and other similar innovations are, according to Mr. Seaman, merely trick devices used to produce



have looked elsewhere for the answer as to whether there is music in everything. Sound, many psychologists point out, is the medium whereby the higher animals express their emotions, and sound conveyed by varying tones had a basic appeal long before the language of human beings came into existence. Thus sound today, produced on unusual and improvised instruments, may excite in you the same emotions primitive drums and other crude instruments aroused in our ancestors.

"This sound, however, is apt to be confused in the minds of many with real music, which it is not," states Julian Seaman, nationally known musical authority. "All music is based upon certain definite harmonic intervals—either diatonic harmony or more primitive systems. No matter what its primitive origin may be, real mu-



Top, two pieces of lead pipe and a funnel make one bazooka. Center, bellows which can be made to sound like a woman's voice. Left, sound box, taut string and bow built on a broom

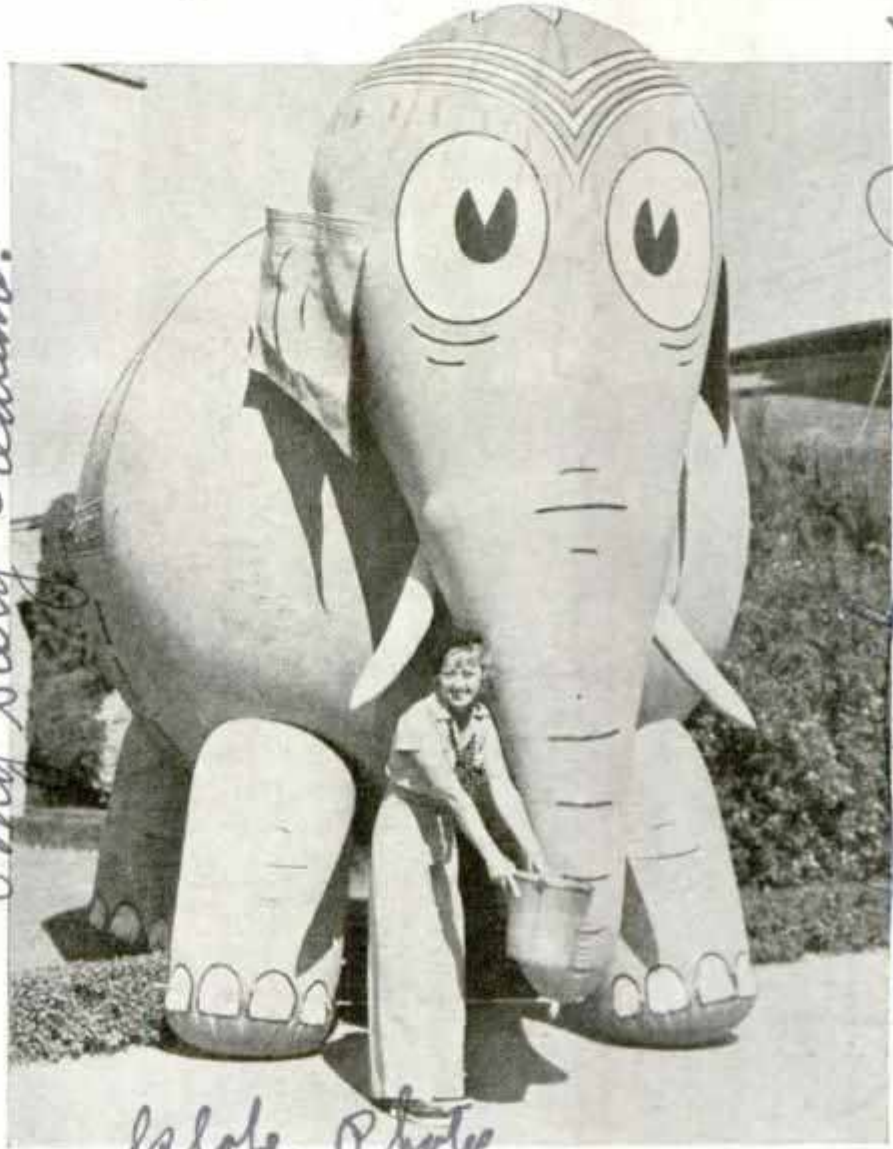
Life-Size Animals of Rubber for Advertising Purposes

tone by extraneous means. Many other types of "instruments" such as musical washboards produce no tone but punctuate like a drum. Such punctuation, depending upon timing, or frequency of beats, say the psychologists, can appeal to our basic emotions just as a certain timing in the beating of a primitive log drum will whip African tribesmen into a fighting frenzy, while a different timing on an ordinary drum will make civilized men forget fatigue on long marches.

A great many of the recently improvised instruments have no special significance other than to show the ingenuity of the performer, scientists say. Others, however, may be the forerunners of new types of musical instruments or lead to the modernization of familiar, accepted instruments. An example of the former class is a weird instrument devised by a Los Angeles amateur who made use of a length of stovepipe with an elbow of the same material. It has an inset of corrugated sheet metal and a hose mouthpiece. Unusual tones are produced either by strumming on the corrugated metal or by blowing into the hose and the two methods, employed at the same time, give out sounds like the booming of a tom-tom and the piping of an oriental reed instrument.

Another ingenious device developed by a Spanish musician is a one-stringed instrument made of a pair of bellows with a handle in the shape of a violin. The string is connected with the needle and diaphragm taken from an ordinary phonograph. With a small horn at the top of the handle, the instrument, when played

(Continued to page 126A)



Life-size elephant made of rubber. Animals such as this are being used on the west coast for advertising and display purposes

Life-size animals made of rubber are proving popular on the west coast for advertising and display purposes. No animal is too large to be duplicated in the rubber zoo, but of course the life-size elephant is the most spectacular member of the menagerie. Some of the members of the rubber menagerie are being used for lawn ornaments.

Popular Mechanics Magazine does not publish the name of the maker of, or dealer in, any device described in its pages, but this information is kept on file and will be furnished by our Bureau of Information upon request, accompanied by stamped, self-addressed envelope.

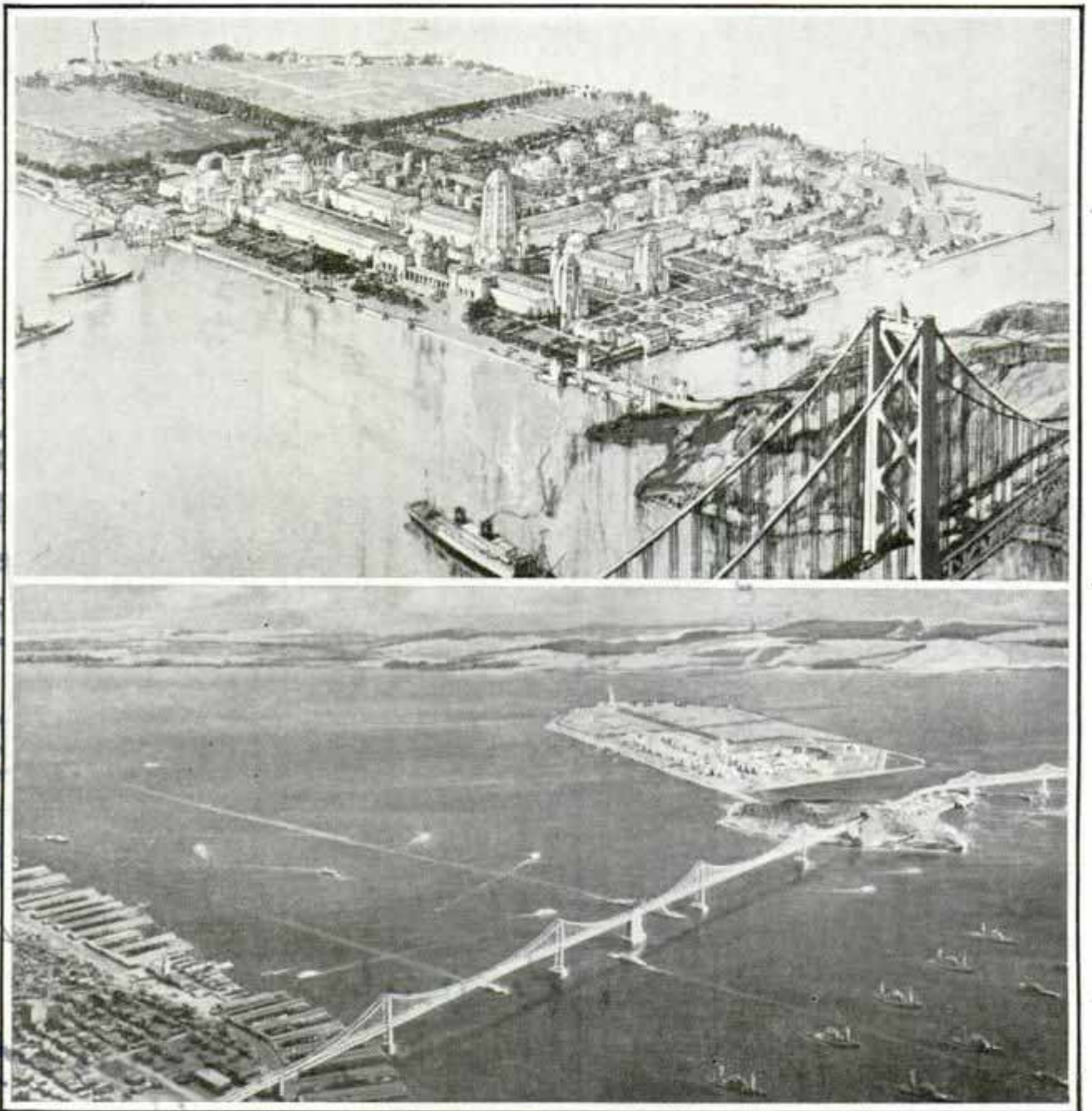
Long day creature.

Isloke Photo

The rubber menagerie is being used for advertising purposes in Hollywood
 Goodyear Tire & Rubber Co.
 Akron, Ohio.

Emb. Jom White Box 44 Alameda Calif
FB 15

Man-Made Island Taking Shape in Bay



Sketches show how face of San Francisco bay will be changed by new bridge and tower-studded exposition city to be built on man-made land adjoining Yerba Buena island

Up from the floor of San Francisco bay an island is rising, destined to be first the site of the San Francisco International Exposition and later an airport where transcontinental planes will discharge passengers just ten minutes away from the heart of the city. It may, too, eventually serve as the American terminal for transpacific air routes to the Orient. The exposition will celebrate completion of the trans-bay bridge. Within a year the filling of land for an island more than a mile long and nearly two-thirds of a mile wide is ex-

pected to be completed. A protective sea wall will inclose the 385-acre isle, midway between Oakland and San Francisco and just north of Yerba Buena island, whose shoulder is crossed by the suspension bridge. Giant dredges and sand suckers must transfer to this new island 18,000,000 cubic yards of fill. On the made land a world's fair city of beautiful buildings, towers, domes, plazas and avenues is planned, all to be dominated by a great tower. Near by will be anchorage for naval vessels, and a yacht harbor.

Emb. Jom White Box 44 Alameda Calif

3/15/36

Engine's Red Headlight Warns Passing Train



Red headlight directly under bell flashes warning that tells crew of passing train to stop immediately

Above the standard headlight on the nose of Chicago and North Western railway locomotives is a special red headlight that can flash a warning: "Stop immediately," to any passing train. It is used only as a safety signal. If an engineer has observed any trouble on the adjoining track he switches on his red light and the engineer of the approaching train halts to investigate. In passing a long freight, the engineer watches the train for any sign of hotboxes, shifting cargo or other danger and flashes his light as warning for the brakeman in the caboose to stop his train.

Nearly Eight Hundred Flyers Are in Caterpillar Club

F418

Nearly 800 names now are on the roster of the exclusive Caterpillar Club, that mythical organization of flyers whose lives have been saved by emergency parachute jumps. The membership includes 771 names, 762 men and nine women, but thirty-two members of the club have

made two jumps each, one has made three and Col. Charles A. Lindbergh has made four emergency leaps. Sixty-nine emergency jumps were made in 1935 compared with eighty-four in 1934. The highest number was in 1930 when 134 individuals yanked the rip cords of their parachutes to gain a new lease on life.

F361

Thermometer for Coat Lapel Keeps Check on Weather

Keeping check on the weather, even when out for a stroll, is easy if you are equipped with a small coil-spring thermometer about the size of a quarter which is worn on the coat lapel. Although it weighs less than one-half ounce, it is said to register the temperature quite accurately.

Thermo Pin



2-14 Market + Broadway
34th St. and Broadway
N.Y.C.

F386

Motor Oil Is Given Quick Test on Portable Friction Block

Motorists and garage attendants can make a quick check of the quality and condition of crankcase oil with a portable

Lab. Oil-Test



oil tester now offered. Only a teaspoonful of oil is necessary for the test. It is dropped on a rotating "piston head" on top of which a stationary piston head is clamped. A small electric heater warms the oil to ordinary engine

temperature, the upper piston head is clamped down and the electric motor starts rotating the lower head, while the oil circulates through the machine. Friction generated is indicated by the temperature reading on a thermometer, and, translated to a graph reading, tells the condition of the lubricant.

Research Laboratory

Long Beach, Calif.

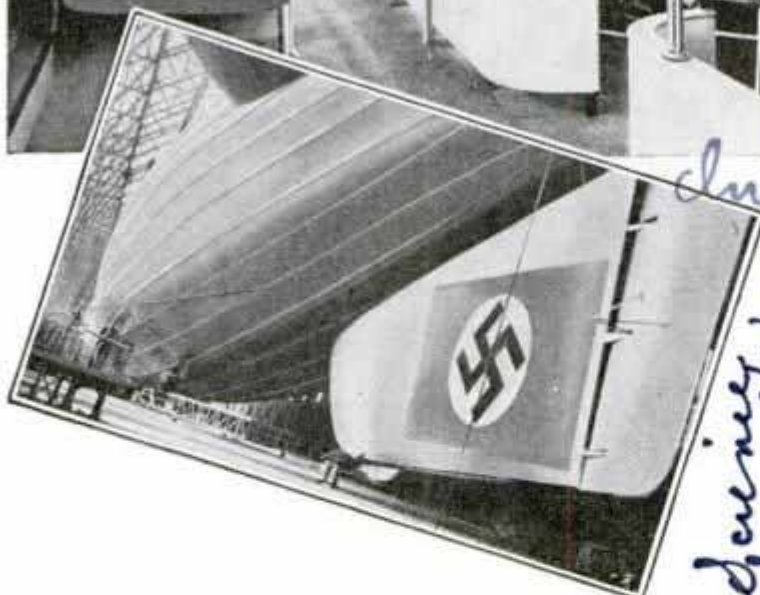
Research Laboratory and Instrument Co.
1517 Prairie Ave

Giant Zeppelin Offers Luxury in Air Travel

Pronounced airworthy in its first test flights, the 812-foot German dirigible, LZ-129, shortly will be placed in transatlantic service between Germany and the United States. The big zeppelin has a passenger capacity of forty, with all modern conveniences for travel. Finely appointed state-rooms, a dining room and large promenade deck are among its features, introducing new luxury into air travel. The LZ-129,



Above, stateroom in big zeppelin. Left, dining salon and observation deck. Bottom, view of the huge aircraft in its hangar a short time before its first flight



which will be named "The Hindenburg," measures 135 feet from gondola to the top of the great bag and has a gas capacity of 6,609,000 cubic feet. It has a lifting power of 210 tons and a cruising speed of eighty miles per hour. A quantity of freight and mail will be carried in addition to the passengers and crew.

Tube Without Filament Cuts Television Cost F_{338}

Int. Service 3/30/36

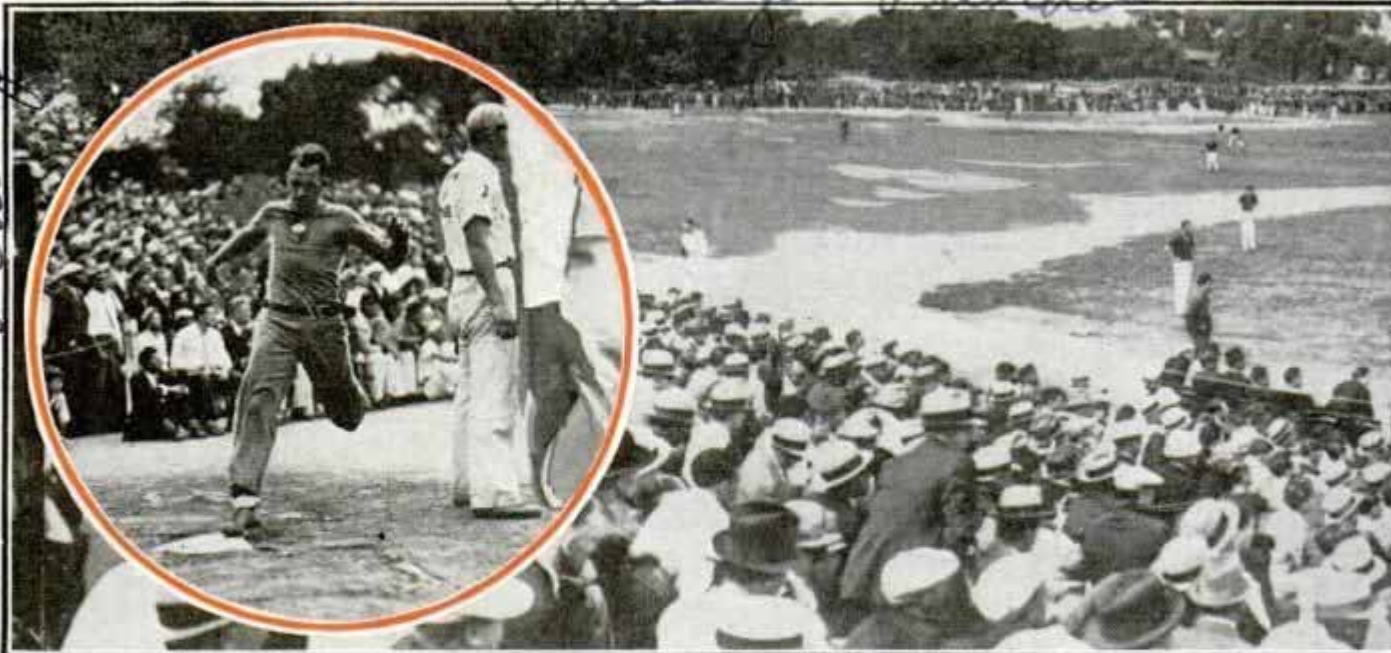
Ultra-high frequency broadcasting without ultra-high costs is anticipated by the development of a radio tube that achieves high amplification without a hot filament. Of the cold-cathode type, it is based on the use of "secondary" electrons emitted by metals when bombarded with other electrons inside the tube. Instead of "boiling" off electrons from hot cathodes, the new tube, developed by Philo T. Farnsworth of Philadelphia, recruits electrons from a cold surface, thus losing little efficiency and requiring fewer tubes. This cuts down the equipment cost for the ultra-high frequency required for television broadcasting.

Felsenstein Laboratories Ltd. 127 & Mermaid

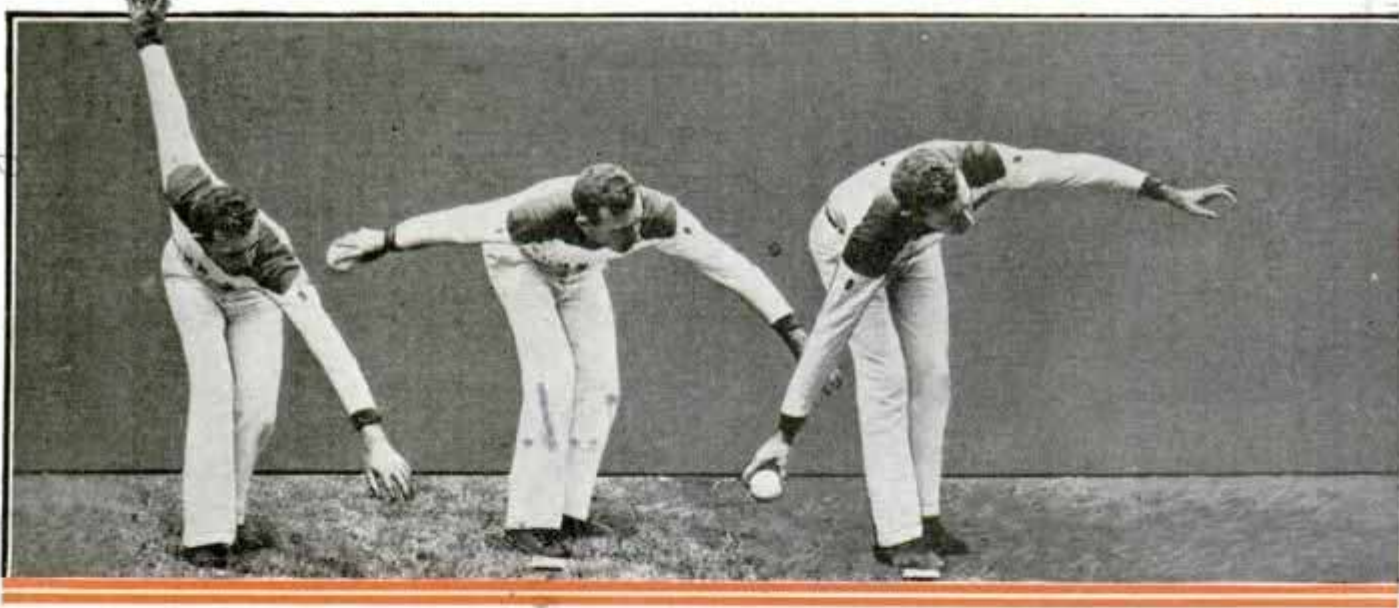
8751.

Amateur Softball Association, Leo Fischer Chicago - President

Leo Fischer - Sport Desk, Chicago Evening American, Hearst Square Chicago



AMERICA'S ~~FASTEST~~



Top, finals of national amateur softball championships in Chicago. In circle, there's plenty of action in softball. Below, correct pitching motions in making delivery

SOFTBALL is the Shirley Temple of the sports world. Almost overnight, it has skyrocketed to national popularity. More than one million Americans are playing it while several millions more shout approval from the grandstands of lighted fields and specially constructed softball parks. It has national, sectional and state governing bodies, a standard set of rules, and even umpire associations.

The game is played as avidly in small towns as in metropolitan centers. Anybody can play it, and, it seems, everybody does. In St. Petersburg, Fla., the Three-quarters Century Club has two teams whose players average more than eighty years per man. In contrast a team of youngsters—all of pre-school age—in Long Beach, Calif., has made a reputation with its brilliant batting and fielding. In the larger cities like Chicago where there are as many as 900 organized teams with 14,000 players, the weekly attendance is

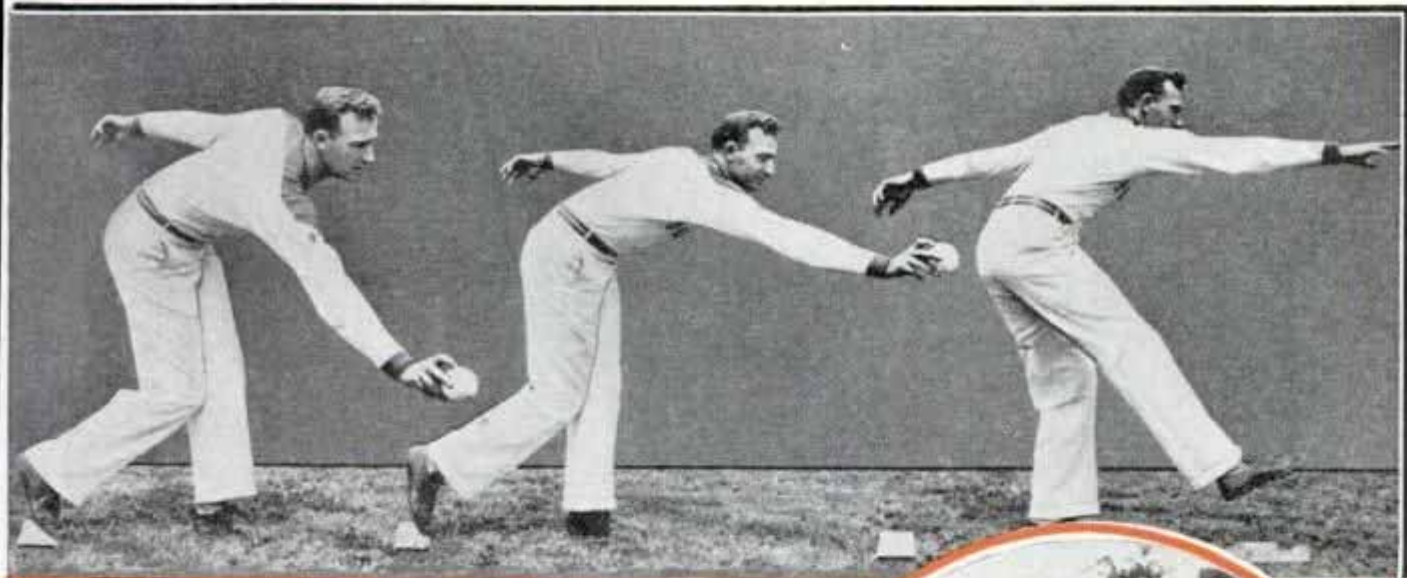
Amateur Soft Ball Assn.

Herald Square Bldg Chicago

6 457 P 3



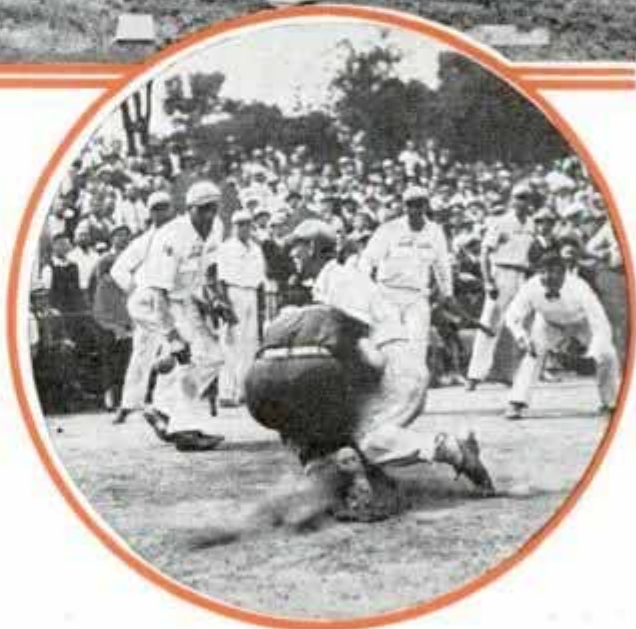
GROWING GAME



Right, a close play in a softball game closely resembles a similar play in baseball

more than 500,000. Fifteen thousand teams in thirty states took part in the national tournament of the Amateur Softball Association last year. Of this number, twenty-two sectional winners of this country and Canada played in the championship games at Chicago, which were witnessed by 200,000 persons.

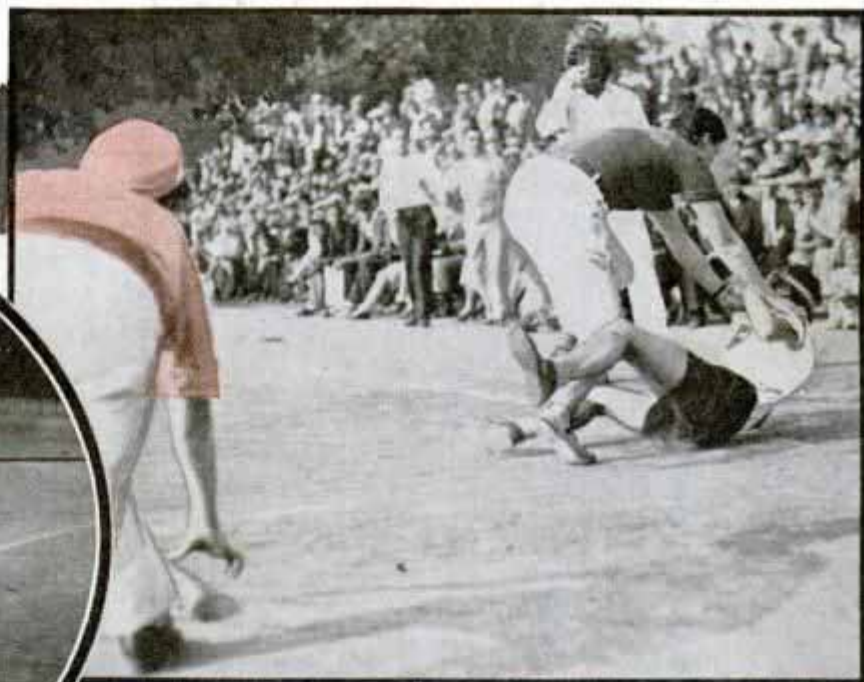
The game, sometimes called kittenball, diamondball or playground ball, is a cousin of baseball—a poor relation until a few years ago. Schoolboys and businessmen





are sixty feet long and the pitcher's box is thirty-seven and one-half feet from home plate. Base stealing is limited because of the shortness of the paths, and pitching is done with an underhand motion. Ten men comprise a team, a short fielder being added to the personnel of a baseball nine. Seven innings constitute a game. In most other respects, the game is similar to baseball. Its popularity is traceable to the brilliancy of fielding, fast pitching and spectacular base running.

The depression was a factor in the game's phenomenal development. The expense of maintaining semi-professional baseball teams was too great a burden for small towns and industrial organizations. Softball was attuned to the times. A few bats and balls were all the equipment nec-



Top, the underhand throw is used in softball. Below, lighted softball park in St. Louis, and a close play in a girls' game

had been playing indoors with a pudgy ball for years. It was a dull and harmless pastime. The present day softball is different, however. It is fast, scintillating. And most players wear gloves, for the ball is anything but "soft."

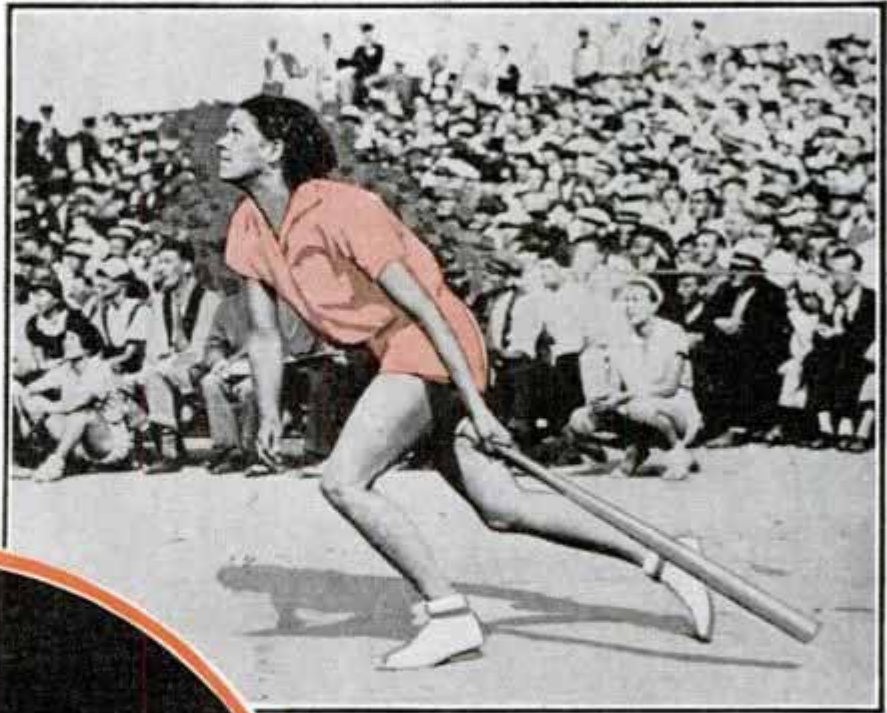
For the fast type pitching game, a ball twelve inches in circumference is used—a bit larger than a baseball. The base lines

essary. It required less space than a regulation baseball diamond. The game has attracted former big league baseball stars, particularly in the promotional end. George Sisler, former first baseman for the St. Louis Browns, operates two lighted fields in that city. Max Carey, Leslie Mann, Ray Knight, Harry Covelski, Eddie Stack, Jack Baird, C. Jensen, and Billy O'Keefe also are actively interested in softball.

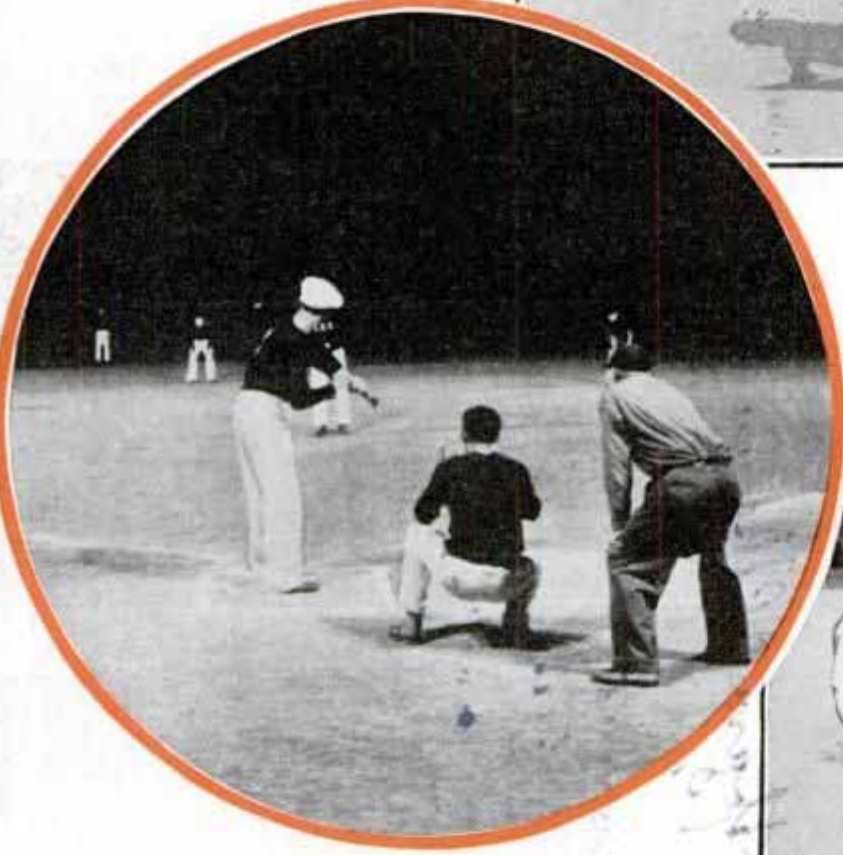
The success of the Amateur Softball Association has been due to its well-knit organization. Under it are the state associations, each with a state commissioner and district officers. These commissioners or-

2-7-51

ganize independent and church leagues, industrial groups and fraternal organizations. Tournaments are arranged between league winners at the close of the season. The sectional champions then play for the state title and the winners vie for national honors. There also is a body designed along the lines of the major league set-up. Its activities are centered around



Above, starting for first base after a hit. Left, waiting for pitch in a night game. Below, runner and ball arriving at base together



night play, the promotion of lighted fields, the development of outstanding players, and the organization of inter-city competition. A franchise is given to one team in each town, regardless of its size. Leagues consist of six to ten teams within the shortest traveling area whose games are played under arc lights in inclosed parks.

A round robin league schedule followed by a progressive, intra-league tournament determines the national champions. Although the fast pitching game belongs in the front rank of thrilling, exciting sports, the slow pitching type of softball has attained popularity in some quarters. Batting and fielding, rather than pitching are

emphasized in this brand. It permits more to participate as it does not require the speed or skill of the other branch.

The slow pitching game is played with a larger ball, fourteen or sixteen inches in circumference. Despite the fact that the ball must be delivered with a minimum amount of speed, some pitchers develop much skill with the slow delivery. Considerable study has been given to the illumination of fields by association officials and electrical engineers. It is their contention that visibility for both players and

(Continued to page 134A)

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Mud Skyscrapers of Desert Built Long before Log Cabin

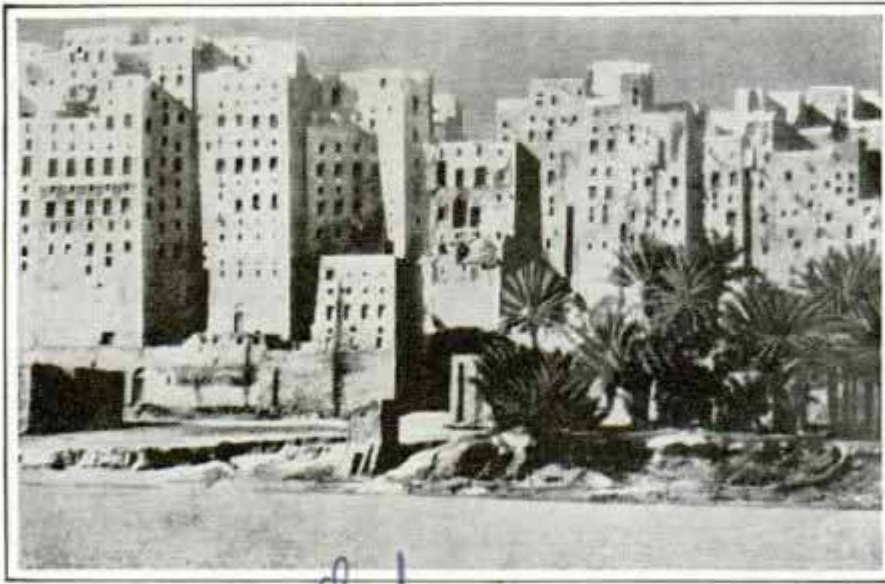


Photo courtesy Robert McBride Co.
Centuries-old city of Shibam in southern Arabia is a cluster of sun-hardened mud skyscrapers that have withstood tests of time and weather

Mud skyscrapers that were hundreds of years old when log cabins began to dot the American wilderness still stand in the ancient city of Shibam in southern Arabia. The modern steel skyscraper is only fifty years old. Shibam was a thriving city of tall buildings in the time of the Queen of Sheba, and still is a busy desert metropolis today. So constructed as to withstand the raids of hostile Arab tribesmen, with windows high above the ground, the Shibam skyscrapers were of mud mixed with straw and maize, dried and hardened by the desert sun.

operator is forced to stand in the water. With the new pump, the operator stands behind the fire plug and turns a crank. The gear pump weighs less than seven pounds and fits on the top nut of the hydrant. The pump also can be used to empty the condensed water in filling-station tanks and to remove oil from drums and crankcases.

moths, flies and other insects. The vaporizer is inclosed in porcelain to eliminate the possibility of shock. It is intended for use in restaurants, bakeries, stores, hospitals and homes.

~~\$344~~ Hand Pump Keeps Fire Hydrants from Freezing

Fire hydrants can be emptied of accumulated water to prevent freezing in two minutes with the aid of a miniature rotary pump, the invention of a Cincinnati fireman. The plunger pump ordinarily used requires about ten minutes to clear a hydrant and usually the

Picture abridged by Hans Helffity
Author of: Land Without a Name

Edelman Co
Chicago
6249 St. Lawrence St.
F. 342

Insects Killed by Vaporizer Heated Electrically



Plugged into the nearest electrical outlet, an automatic vaporizer rids a large space of insects within an hour by emitting concentrated pyrethrum hydroxycarbonate fumes. The vapor

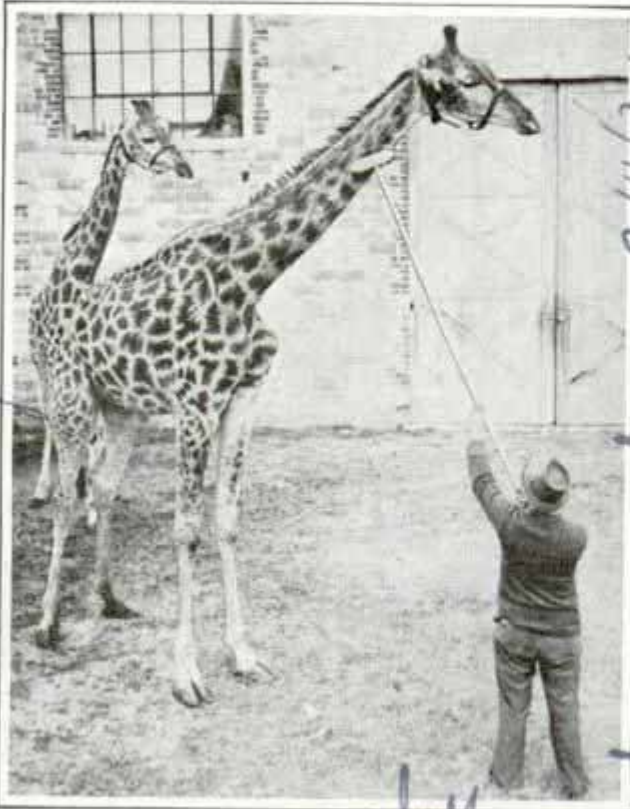
is harmless to human beings, animals, food and furnishings, but smothers mosquitoes,



Rotary pump turned with a crank which clears fire hydrants of water in two minutes

Perfected by Archibald Stratham
Chicago Engine Co. Inc. 3, 1913
Cincinnati, Ohio

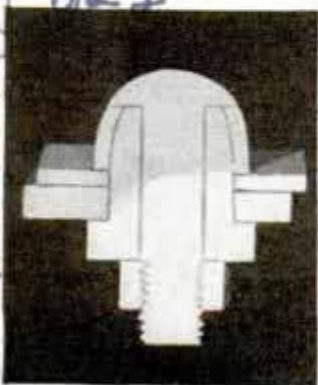
Long-Handled Brush Helps Scrub Giraffe's Neck



Here's how the giraffe gets his neck washed before the circus goes on the road

As the time approaches for the circus to go on its annual tour, there is unusual activity in winter quarters. Performers perfect their thrilling acts, the "big top" is patched or entire sections replaced and the animals get a bath. One of the odd tasks is that of scrubbing the giraffe. No ordinary means can be used for reaching the animal's long neck, so one ingenious attendant has rigged up a long-handled brush which simplifies the matter.

Boilers Riveted from Outside with Expansion Bolt



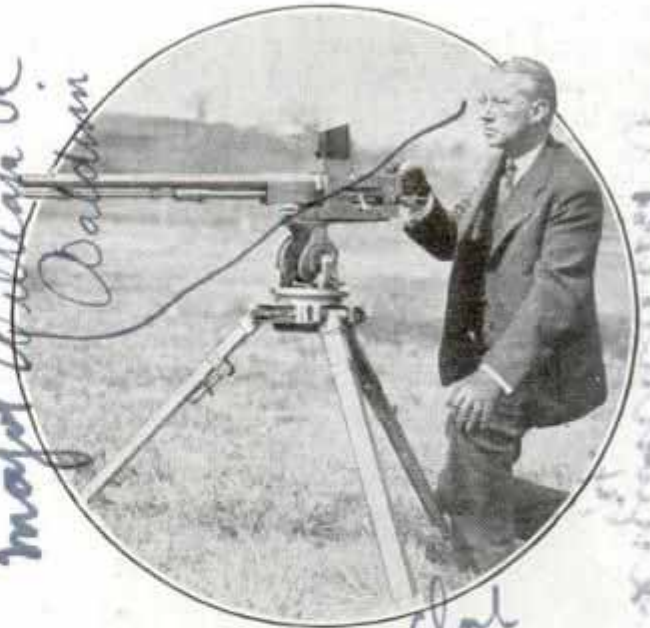
Riveting jobs that are accessible from only one side can be done with a mechanical steel rivet which is expanded, after insertion, by turning a nut. Thus it forms a solid steel rivet head on the

inside. Unaffected by heat or pressure, it withstands severe stress, and can be used for riveting boiler seams, girders, and heavy industrial work.

Flu Epidemic Spread in Alaska by Dog Sled and Airplanes

Epidemics in Alaskan outposts have been quelled by heroic airplane flights and dog teams mushing across the snow with serum. But a deadly epidemic of influenza was spread last year from city to city of Alaska by air and sled travelers. Influenza broke out in Fairbanks January 15, and 500 became ill, five dying. Air travelers carried the infection to Nome and Kotzebue, starting fresh epidemics. Then on April 8 three men flew from Fairbanks to Point Barrow, stopping at Kotzebue, and a week later influenza broke out at Point Barrow, fifteen dying out of a population of 300. A group of Eskimos went by dog sled from Point Barrow to Wainwright, and ten days later most of the 200 Eskimos in Wainwright had contracted the disease.

Kickless Machine Gun Fires at Aircraft Six Miles High



This anti-aircraft machine gun can fire 150 rounds a minute with virtually no recoil shock

One of the most powerful rapid-fire guns ever designed is a thirty-caliber anti-aircraft gun undergoing army and navy tests. Despite its small size, it can

Vertical handwritten notes on the left margin:
F378
Rungling Brothers, Barnum
and Bailey Circus.
F378
F359
melter Seal
123 N. Jefferson
Chicago

Vertical handwritten notes in the middle margin:
F373
F378
F359
D. J. Bergman's
Baltimore

Vertical handwritten notes on the right margin:
F378
F359
D. J. Bergman's
Baltimore
F378
F359
D. J. Bergman's
Baltimore

fire 150 rounds a minute and project a shell 30,000 feet, yet its recoil mechanism is so delicately constructed that a glass of water can be balanced on the barrel during gunfire without spilling.

Cherry and Olive Pitter Saves You Time and Work

Removing seeds from cherries and olives, usually a tedious hand operation, is accomplished rapidly with the aid of a pitter invented by a San Francisco man. A quick pressure on a vertical bar sends a pair of sharp steel fingers into the fruit as it is held firmly by three brackets. The upstroke brings out the pit, leaving the fruit in its original form except for the tiny slit through which the seed emerged.



Cherry and olive pitter which removes seed when vertical bar is pressed and raised

Giant French Bombing Plane Has a Wide Cruising Range

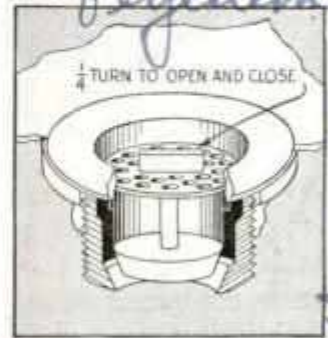


Giant bombing plane recently adopted by French army. Note the turret with twin guns for fighting off enemy aircraft

Capable of staying in the air over a cruising radius of 1,250 miles, an eighteen-ton bombing plane has been added to the French air fleet. It has a speed of 200 miles per hour and carries two and one-half tons of bombs. The big ship marks another step in France's attempt to keep pace with other European nations in the building of fighting aircraft. Unsettled conditions in Europe have precipitated an air race between the great powers, with England, France, Russia, Italy and Germany feverishly engaged in increasing the number of planes in their flying fleets.

Sink for Trailer Has Strainer Requiring No Stopper

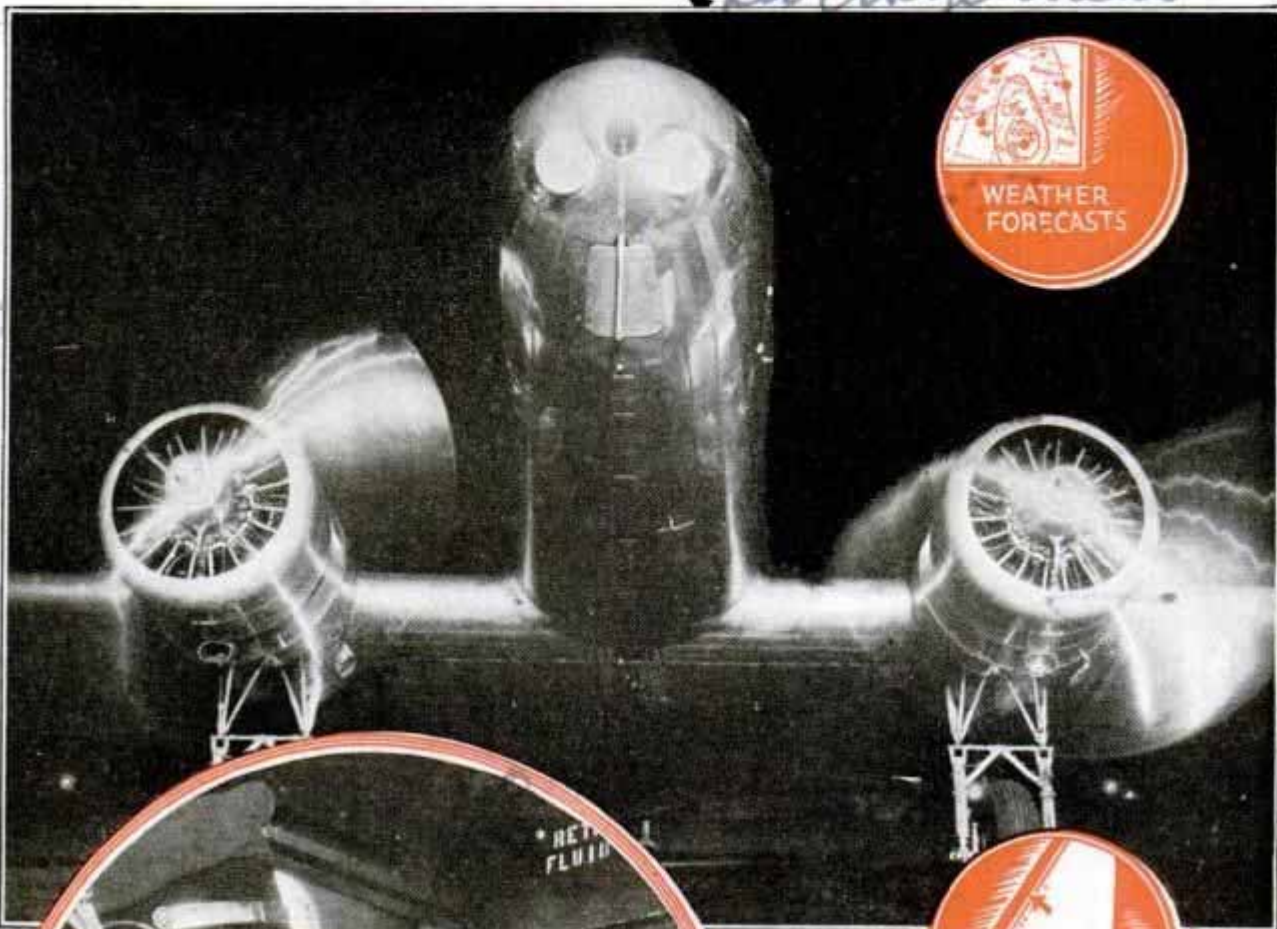
Operated by a quarter-turn to open or close, the strainer in one of the latest sinks for trailers requires no stopper or rubber mat. It is chromium-plated, easy to clean and has nothing to get out of order. The sink has rounded corners for easy cleaning. It is made of steel and has a total weight of only four pounds.



F 368
Harmax
Louis & marsh
262
Perfection
mp. Theodore Bargmann
2842 U. Island Blvd
des Airplanes H. Boulayne
Armory rue de Sully. 16
Seine

F223 *Carl Thomas & Stinson, Jr*
10555 Holman Ave

CONQUERING



Air liner warming up for night flight. Left, throwing switches to keep propellers free of ice

YOU are safer riding in a modern air liner today than traveling in an automobile. That is the conclusion of insurance companies that make a business of estimating your chances of accident.

"In our opinion transportation by air does not present hazards comparable to those incident to the use of an automobile" says one insurance company.

The safety work of aviation engineers begins when a new plane is designed, possibly a year or more before it is put in service. They try to make the airplane proof against all ordinary hazards and then, if the unexpected happens, to enable the pilot to bring his passengers down in safety.

"In trying out the new sleeper liner going in service this spring the test pilots were ordered to hunt for the roughest air they could find," says T. C. McMahan, secretary of the Douglas Aircraft company. "Instruments recorded the stresses and strains and these were checked against the safety factors allowed by the engineers.

"Another part of the flight testing, which

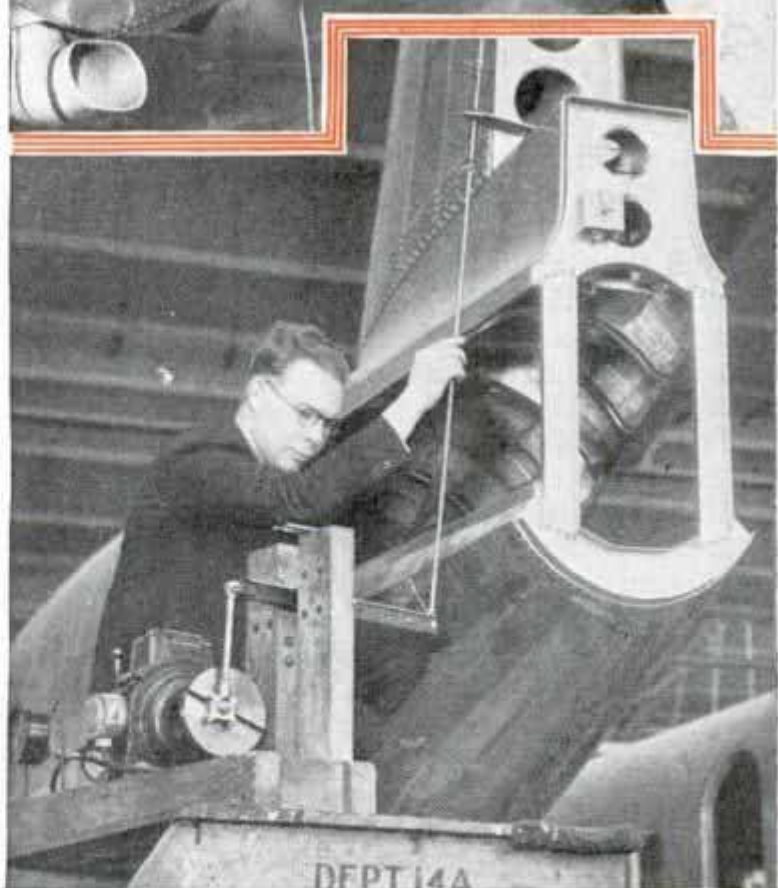
Santa Monica
Calif

Perils of the AIR



lasted for a full month, was to stunt the plane in a way that would never be permitted in passenger service. The pilots looped-the-loop with the twelve-ton giant and did power dive pull-outs so records of the plane's structural strength could be obtained. Another test was to make sure it is so stable it will return to normal flight and fly 'hands off' from any position the pilot puts it in, even when it is unbalanced with one engine shut off. The useful life of an air liner is estimated at about ten years. Douglas has records of its early mail planes that wore out twenty engines each, flying the equivalent of twenty-five times around the equator."

These days airplanes fly all night and through unbroken clouds for hours in perfect safety. Radio keeps the pilot on his course and helps him land. Flight instruments make blind flying safe. Engineers expect to be able soon to couple the automatic pilot directly with the radio beam receiver. Then the automatic pilot will follow the beam and change course when the direction of the beam changes, relieving the human pilot of constantly listening to the radio signals. Among the newest instruments are ice-warning indicators, new types of aperiodic compasses, and vertical speed indicators. A vibration meter for testing, warns a pilot of critical propeller speeds that cause excessive vibration.



Coating spinner with castor oil to prevent icing, and measuring vibration period of hull, an important factor in design and construction



Left, testing air-brake wing flap by which speed of air liner is reduced for landing. Below, inspecting rubber de-icing sleeve on fin of tail group



If a pilot finds he must come down in a field too short for a normal landing he lands with the wheels still retracted. Such a landing, in which the wheel brakes can still be used since the wheels project a few inches below the wings, brings the plane to a rapid stop in which it cannot nose over. For normal landings at regular airports the pilots slow down to about fifty-five miles per hour by extending landing wheels and lowering the air-brake wing flaps. These create 300 per cent additional drag against the air. Engineers would like to find a way of reducing landing speeds even more although they think control should never be sacrificed for slow speed. For this reason huge parachutes that could lower an airplane to the ground do not seem feasible to them.

Either engine of a twin-motored Douglas is powerful enough to fly the plane off the ground and climb it to 8,000 feet, hence if one engine fails in the air the pilot can keep on his way. He usually lands, however, at the first intermediate field to evade a forced landing in case the remaining motor should falter. It is estimated that nearly 2,000,000 miles of flying are accomplished for each breakdown of a modern power plant. Each engine has its own fuel pump, oil supply, and electrical system with no intercommunication. The remarkable dependability of modern en-



gines lies in the fact that they are designed so all critical vibrations occur well outside the range of speeds needed for normal operation. Propellers, likewise, are constructed so no dangerous vibrations occur at the speeds at which they turn.

The latest device to increase engine and propeller safety is the automatic pitch control unit for propellers. The automatic adjustment allows the pilot to set his engines at their smoothest speed. The pitch control then adjusts the propellers to their most efficient angle and the pitch of the blades changes automatically when new conditions are encountered. At higher altitudes the blades bite more air and pull the plane along faster without increasing engine speed, and at low altitudes where the air is denser the blades flatten out so the engines are not forced to labor. The pitch control automatically adjusts the propellers for climbing, single-engine op-

Douglas sleeper plane and, below, rudder tab by which controls are equalized, and one of the several radio aeri-als carried by modern air liner



eration when the air brakes are lowered, different supercharger ratios, and every other condition of flight. Because the propellers are always at most efficient pitch, shorter, smoother takeoffs are possible with a greater rate of climb.

On the western division of American Air Lines, Bart Cox, flight superintendent, uses a blackboard map to give pilots an up-to-the-minute picture of vertical weather conditions along their routes before they take off. Clouds and rain are shown in symbols so the pilots will know exactly what weather to expect. Along the base of the map is drawn the mountain ranges on the beacon course and above these is a green zigzag safety line representing the highest mountain elevations in a twenty-mile strip along each side of the airway. The flyers know that if they stay close to the radio beacon route and above the green line, they will be safe.

Pilots have a saying that you are safe as long as you stay in the air. It's the contact with the ground that does the damage. Forced landings are rarely catastrophic these days and airmen suspect some high-speed crashes that have occurred

(Continued to page 144A)

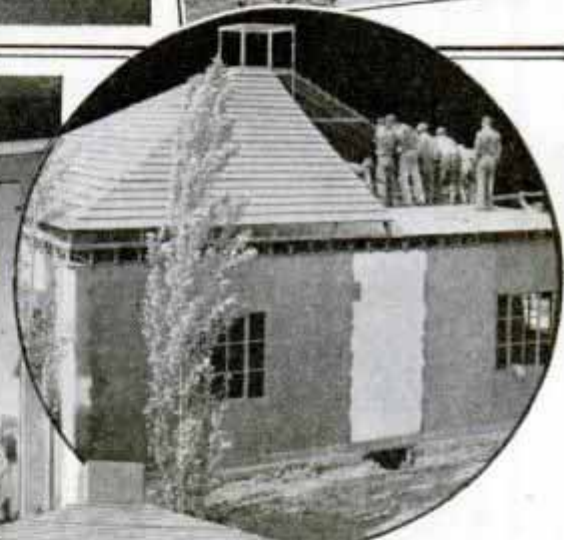
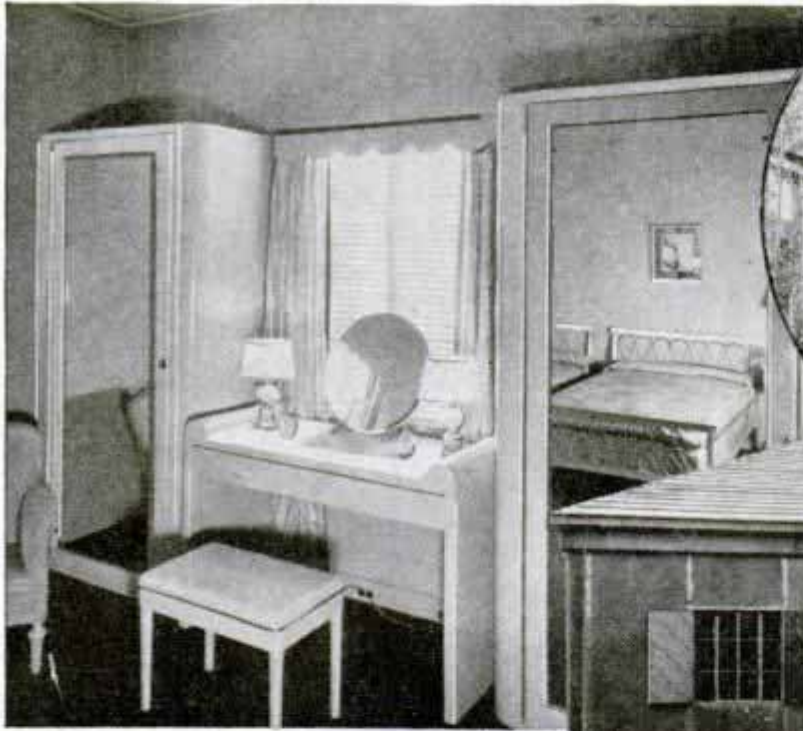


7223
 845
 base
 handbook
 144A

Five-Room Welded Steel Home at Low Cost

The Hobart Bros Co Box 0 m 7375, Troy, Ohio

Box 0 m - 7375, Troy, Ohio



Top, left, living room of all-steel house. Bottom, left, view of one bedroom. Top, right, exterior of house upon completion. Below, three construction views, including welding operation in photo at bottom

One possible answer to the problem of low-cost housing is found in an all-steel home designed to sell for less than \$4,000, including a \$300 lot, the foundation, heating plant, plumbing, wiring, paint and cost of labor for putting it together. The house has five rooms, two full-size bedrooms, large combination living room and dining room, kitchen and bath. If the

purchaser desires, inexpensive metal furniture may be obtained. The house is built of steel-panel sections welded together at the factory and joined by arc welding on the home site, eliminating the use of nails. No framing is necessary and not a piece of wood is used. A thick blanket of insulating material in every panel and over the ceiling sections insures easy heating

Farmer Loads Hay Truck with Labor-Saving Elevator

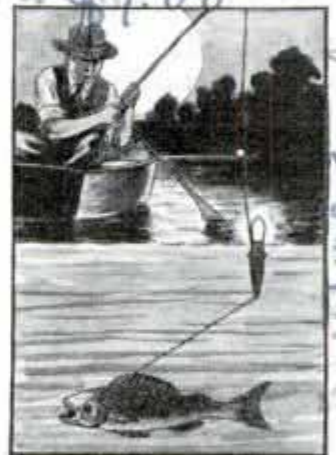


Homemade mechanical elevator takes place of pitchfork crew, hoisting bales of hay aboard farmer's truck

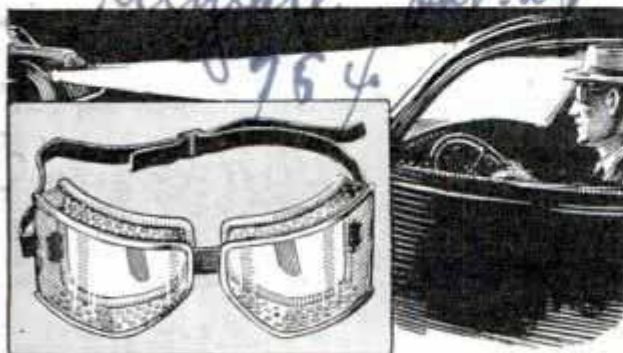
To cut his labor bill and save himself some back-breaking work, a young farmer in California's Imperial valley built a mechanical elevator for his hay truck. Now, in place of the old horse-drawn hay truck and its pitchfork crew, this farmer and his wife team up to harvest the crop. She guides the truck from one bale to the next, the elevator picks up each bale and hoists it up a chain and the farmer pulls the hay aboard with hand hooks.

Fishing Float Flashes Light When You Have a Bite

You can fish in the cool of the evening and let the fish tell you, by flashing a light, when it is ready to be caught. A float now available for fishermen has a small electric flashlight which lights up when the fish bites. It uses standard bulb and battery, and can be used as an ordinary flashlight when not attached to your hook and line. The makers claim one battery will produce about 500 flashes.



Goggles that protect the motorist from the blinding glare of approaching headlights yet permit clear vision of side roads and highway signals have been devised. A small green spot in the focal center at the upper edge of the goggles effectively dims the glare when the head is tilted slightly forward. Except for this tiny dim spot, the goggles are perfectly clear.



Tiny spot of thin green lines at upper edge of goggles cuts glare without hampering vision

Modern Specialties
 Advance Goggles Co. 4551 W. Alameda
 Associates 21119
 Washburn
 Chicago

Frank Hebbly
 Box 804
 Imperial Calif
 F 276
 Cant Evolve Again
 Daney
 Box 248
 Imperial Calif

Frank Hebbly
 Box 804
 Imperial Calif
 F 276
 Cant Evolve Again
 Daney
 Box 248
 Imperial Calif
 Fishing Float Co
 Fishing Float Co
 Fishing Float Co

Umbrella with a Windshield Prevents Accidents in Rain



Rigid, transparent shield aids pedestrian's vision in driving rain and folds into umbrella when not in use

Darting across a street with her umbrella thrust forward to protect her from a driving rain, a Brooklyn woman failed to see an approaching truck and was seriously hurt. To forestall such accidents, she invented an umbrella with a transparent windshield which drops down in front of the face. It allows clear vision, remains rigid, and its metal ribs fold the windshield up when the umbrella is folded.

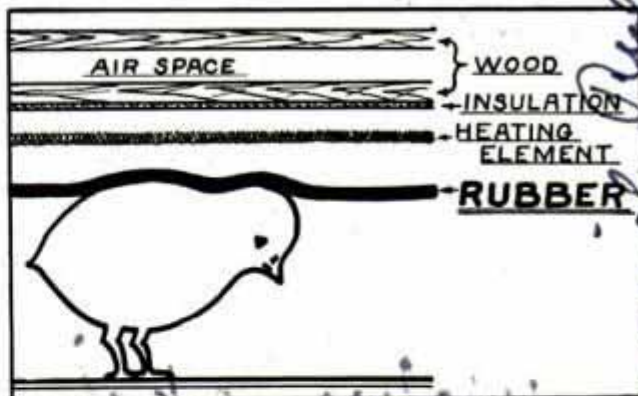
Heat of Sun's Rays Harnessed to Operate Refrigerator

Refrigeration by the heat of the sun is the promise of an invention recently patented. Its object is a cooling system, perhaps an air-conditioning system, without fuel cost. A solution of water and ammonia circulates through coils to and from a tank. The sun's rays warm the coils, causing the solution to circulate and boiling off the ammonia as gas, which then collects and liquefies in a condenser and then flows through pipes to an evaporator containing hydrogen gas. As it evaporates here, the ammonia absorbs heat from the space surrounding the evaporator, thus exerting a refrigerating effect. The cool hydrogen-ammonia mixture flows to an absorber where the ammonia and hydrogen are separated by absorption in water.

the hydrogen returning to work in the evaporator while the water-ammonia solution starts the cycle anew in the sun-heated coils. The refrigerating process is continuous so long as the sun heats the coils.

Rubber Hen Warms Chick in Latest Brooder

Among the new uses for rubber is that of serving as substitute for the mother hen in the raising of chicks. The latest brooder contains an electric heating pad which warms the backs of the tiny chicks just as if they were snuggling under their mother's breast. A thermostatically controlled heating unit maintains the temperature of the pad at an even 105 degrees, equivalent to that of the hen's breast. The chicks raise their backs against the under side of the pad so that the heat transfer is accomplished by direct contact. This method replaces the old practice of heating the air in the brooder. The pad is made of special heat-resisting sheet rubber which offers a soft, non-porous and sanitary surface. Advan



Sketch shows how chick's back is warmed by direct contact with heated rubber pad

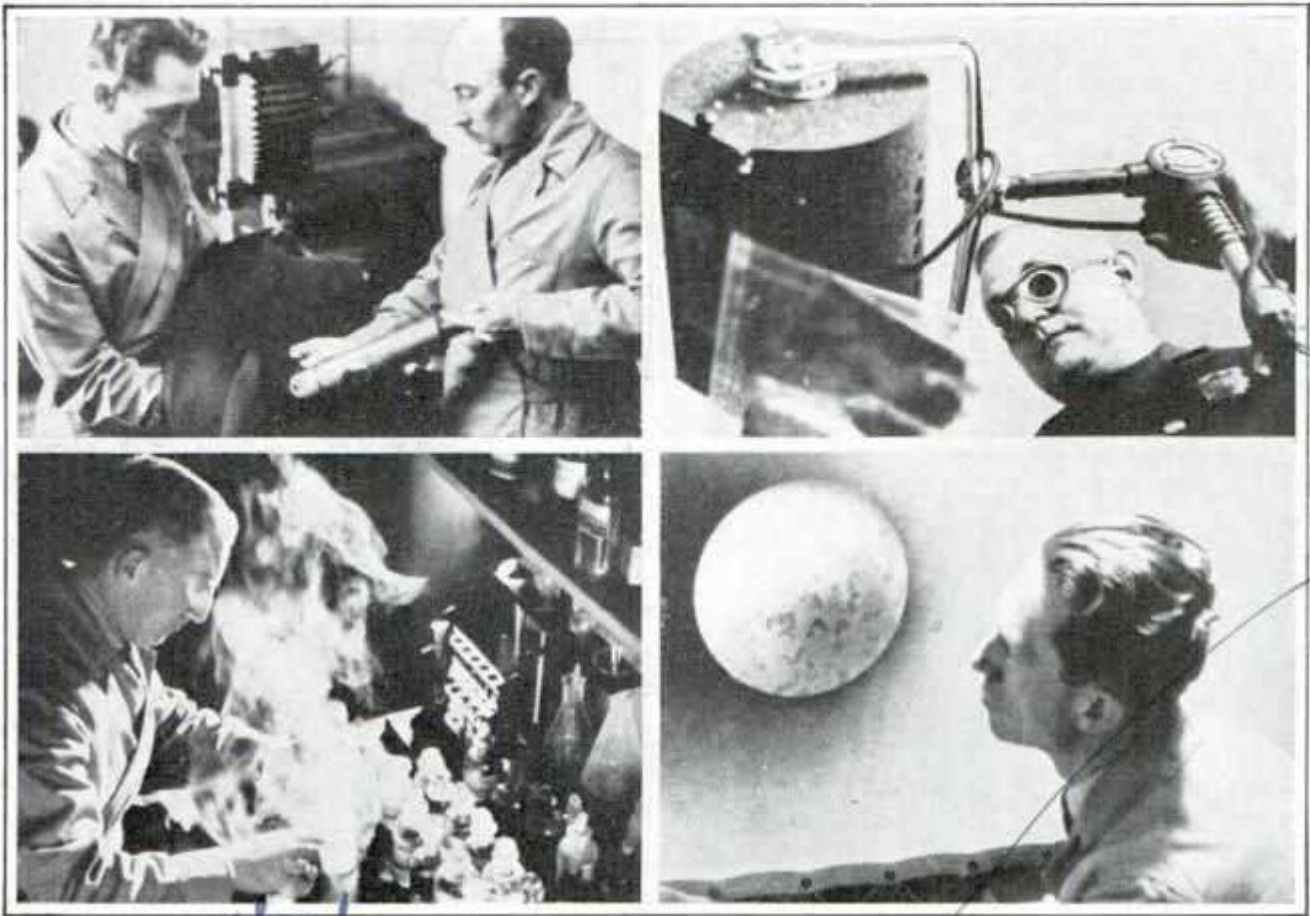
tages claimed for the new brooder are that it permits natural functioning and development of the chick's lungs, which are located in the upper part of the body, and eliminates the danger of overheating, which causes lower resistance to disease.

Ⓢ An "electric eye" in the firebox of an oil burner shuts off the oil flow instantly if the fire goes out.

Handwritten notes:

- Top left: F327
- Top center: Pat # 2,024,105
- Left margin: Mrs Eva Sandmar, 654
- Left margin: Stabill Road Brooklyn N.Y.
- Right margin: F366
- Right margin: Rubber Hen Warms Chick
- Bottom left: A science done 1/10/36
- Bottom center: Pat # 2,030,350
- Bottom center: Mr. Albert J. Portner, Westport, N.Y.
- Bottom right: Mrs Clara Dehrens

Behind the Scenes in the Police Laboratory



Top, left, removing dust from pockets for analysis. Right, examining document under ultraviolet light. Below, making chemical analysis and examining micro-projection of blood crystals

Scientific sleuths in New York's police laboratory fight crime with microscopes, bunsen burners, test tubes and chemicals instead of with clubs and pistols, but the results they obtain often are even more remarkable than the fictional exploits of a Sherlock Holmes. Fingerprints brought out by silver nitrate led recently to the arrest and confession of a man charged with sending ransom notes. Dust particles removed by a vacuum cleaner from the pockets of a suspect sometimes reveal his occupation, the type of neighborhood in which he lives and other information concerning him, even though he may refuse to talk. Suspected documents are examined under ultraviolet light which shows up even the most minute erasures or alterations, and the quartz lamp is used to detect blood stains even after a garment has been washed.

Our Bureau of Information will answer questions regarding articles in this magazine, if accompanied by return postage.

Soup Seventy-Five Years Old Is Still Fresh in Bottle

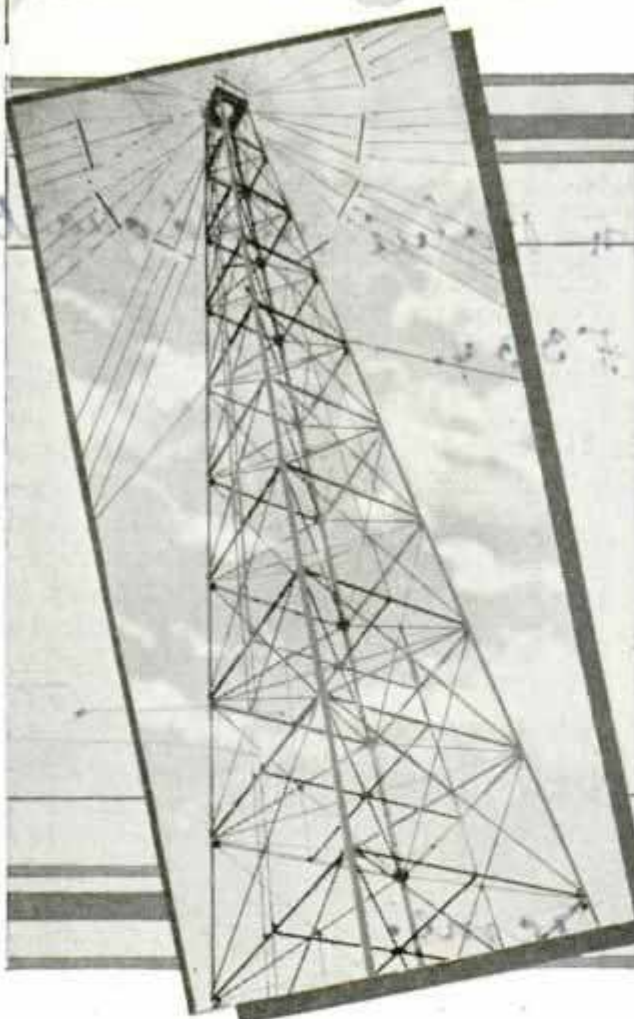
Seventy-five years ago Pasteur, the noted French scientist, bottled some soup in his experiments to prove that germs live in the air. That soup, still in its original bottle, and still fresh and edible as the day it was sealed, is now owned by Dr. Louis La Place of Philadelphia, to whose father Pasteur presented it after the elder La Place had studied under Pasteur.



The faded, yellow inscription on the container reads "Prof. La Place. Veal bouillon. Pasteur." By his experiments Pasteur demonstrated that germs do not generate in matter which is not exposed to air.

7321
 855-55-358
 Sept. 1935
 FBI
 1-1-35

WAMCATS RULE



Wamcats on a hunting expedition at an abandoned cabin for shelter. Below, type of radio tower used in the Wamcats' communication system

"SHE blow up!"

Sergt. Stanley Morgan of the United States Alaskan signal corps service listened to the broken English of an Eskimo as he poured out a story of something terrible he had witnessed.

"She blow up," and the Eskimo made gestures as of a giant bird falling to the ground as it took off in flight. Morgan caught the words "river" and "kill" and "stop" and "Point Barrow." He needed no more. In a few minutes he was headed for the scene of the accident, fifteen miles away, with fourteen Eskimos beside him in the small whaleboat. The story of the recovery of the bodies of Wiley Post and Will Rogers from the bleak barrens of the Arctic wastelands is but one instance of the work of the "Wamcats," that little band of select radiomen and huskies who serve Uncle Sam within the shadow of the Arctic sun.

Sixty below zero! A blizzard is sweeping down across the Yukon flats. Caught in that storm not a human thing can survive. The drifts are running high, the iceladen wind cuts into the flesh. Inside the radio frontier outpost Operator Fred listens to the storm. His faithful dogs are dozing in their snug outer quarters. Fred

7150
322
Cmt. John L. Coontz
Box 460
Anacostia

Cmt. John L. Coontz
Box 460 P.
Anacostia

+150

TOP-O'-the-WORLD



wonders what has become of the party of five prospectors who left him some three hours before to make camp nine miles away before the blizzard hit in full force. And then comes a crackle over his radio. It is the cook at the prospectors' camp calling with a small portable, asking about his master. He and his partners have not yet shown up.

Fred knew the time had passed for the party to arrive at its destination. There was but one thing to do. Throw the huskies into their harness, bite into that storm and try to get to those men. Leaving word for others to follow if nothing was heard from him by morning, he rode into the gray blast. Morning came and with it some abatement of the storm, but not the wind or cold. Late the next afternoon Fred was found by another rescue party, huddled with his huskies, numb with the ice and cold. Two miles farther on the bodies of the prospectors were found. They had not been so fortunate as Fred.

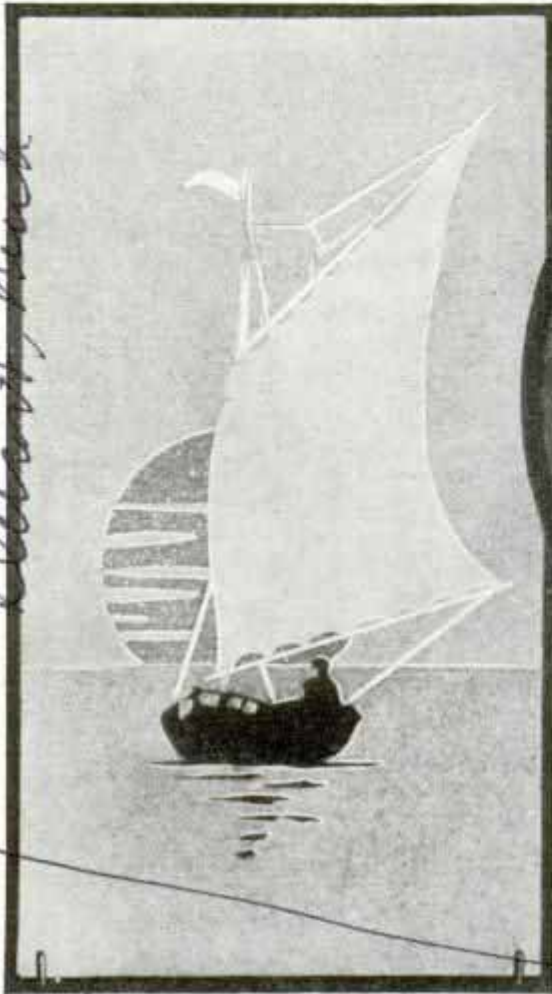
July is the summertime of the year in the frozen north. But even July is not much warmer than our southern winters here. So when Sergt. Morgan began build-

(Continued to page 122A)



Above, moving in radio equipment for a Wamcat station in Alaska. Below, a Wamcat station after a blizzard which disrupted its radio communication

Stone Pictures in Colors Are Aid to Decorator



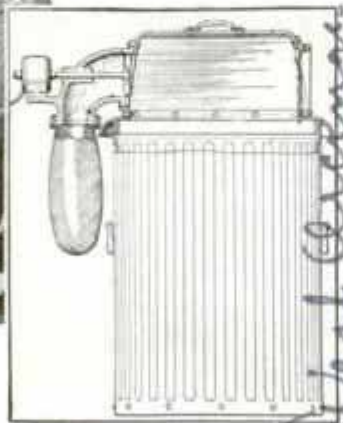
Useful for interior decoration, pictures or artistic designs in pressed stone are being produced in colors. One use is in flooring. Two of the "stone pictures" (left and above) were among those exhibited recently at the convention of the American Concrete Institute to demonstrate the latest aid to builder and decorator

7408 Second Block
 Detroit Mich

Dust-Collector Top for Ash Can Keeps Home Cleaner

Dust clouds which accompany the removal of ashes from the furnace into ash cans can be eliminated by an electrically operated suction device which fits on the

standard ash can. It consists of a sheet-metal hood which replaces the lid of the can. On one side of the hood is an opening for the shovel. Loose canvas swings inward when the shovel is inserted into the hood. On the other side of the hood is a small electric suction fan which exhausts into a bag, like a vacuum cleaner. This bag may be removed for emptying. The fan plugs into the house lighting circuit. As the ashes are shoveled into the can, the fan sucks the dust into the bag, thus keeping it from reaching upper floors. When the can is filled, the dust collector is removed and the regular lid clamped on.



Dust collector, top, in use on ash can. Inset, sketch of the equipment

Toad's Brain Is Planted in Frog and Changes Its Behavior

Successful transplanting of the brain from one animal to another, with a resulting change in personality, has been

Science Service.

3/5/36

F284

H. L. McCaughy,
 25 Braden Terrace

Hand drawing 1-1-36

achieved by a German scientist, Prof. H. Giersberg of the University of Breslau. By an extremely delicate surgical operation he planted in the heads of frog tadpoles the brains of toad tadpoles. Two of the test group matured as normal-looking frogs, and one assumed certain toadlike traits. It crawled like a toad, and kept digging shallow pits in wet sand, as toads dig themselves in daily. Frogs normally bury themselves only in winter.

F 278
**Deep-Sea Diving Tractor
 Hunts Gold on Sunken Ship**



Acme
 Diver wearing telephone head-set ready to crawl over ocean bed in submarine tractor. Notice the powerful searchlight that guides his search

F 3 3 3
**Latest Sport Craft
 Is Pedaled Like
 a Bicycle**

Equipped with twin propellers and driven by foot power, a novel craft maneuvering off Waikiki Beach, Honolulu, has been receiving a lot of attention. It is a pontoon boat with seats for two persons. The pedals for operating the propellers are under the hood. The craft may be used for water sports and as a means of transportation.

Crawling along the bottom of San Francisco bay, a man-made deep-sea monster hunts sunken treasure. It is a one-man submarine tractor, built to prowl over the ocean floor in search of gold lost by shipwreck. Nearly twenty-five years ago the steamer "H. J. Cochran," with \$96,000 in gold bullion on her decks and \$12,000 worth of pig lead aboard, sank after a collision. Its treasure lies about 140 feet deep somewhere near Angel island. Halley Hamlin, young salvage expert, determined to find the hulk and invented the eight-foot undersea tractor, with its twenty-inch wide tube for the diver and two motors to propel it over the bed of the bay. With the aid of a powerful searchlight mounted overhead, the diver sees ahead through a small, circular glass window.



Acme
 This odd craft drew a crowd when its operator pedaled near the Waikiki beach. The pedal arrangement is hidden under the hood

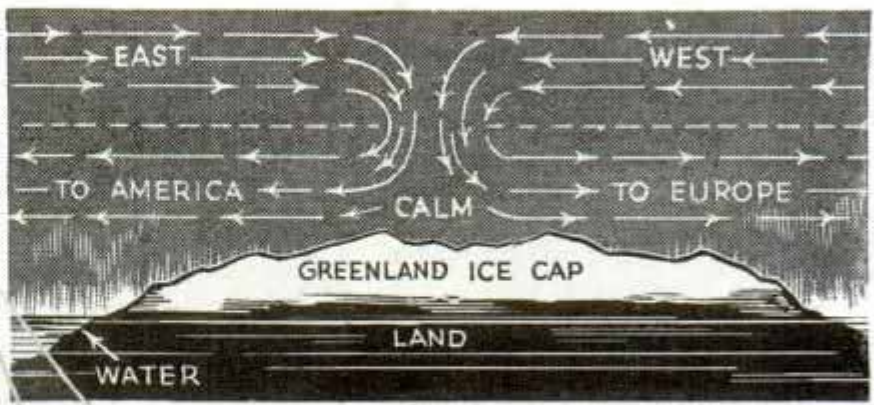
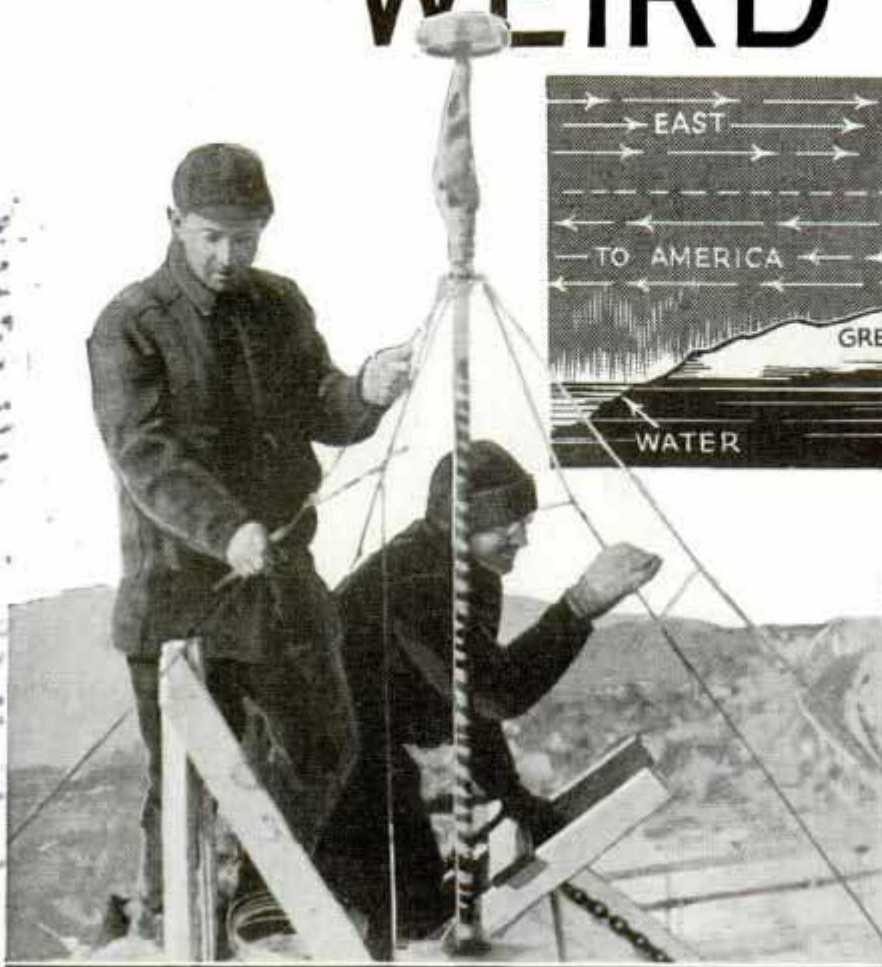
Hence, I was called. Called

The Pedal Boat Co. New York

7222

4 w. 10 3rd fl
newspaper

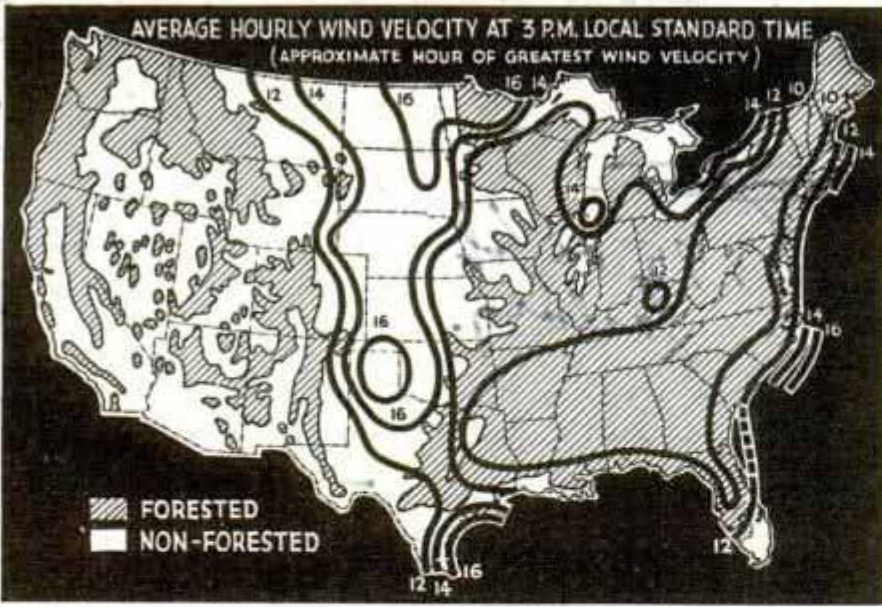
WEIRD WAYS



Wind conditions on Greenland ice cap, electrically heated anemometer atop Mt. Washington, and wind-velocity map

down, speeded up or perhaps blown off their courses. Recently Lou Goldsmith, transport pilot, was taken for a spectacular five-mile-a-minute ride by the wind. On the Portland-Salt Lake City route, he suddenly ran into a snorter that made his engines as feeble as electric fan motors. One puff of that blow hurled him almost 200 miles in a space of thirty-nine minutes.

In Greenland, almost the whole island is in a constant state of blow. Peculiar conditions there make it the windiest spot in the northern hemisphere. About 500,000 square miles of ice 1,000 feet thick cover most of the island. Here you find the North Pole of the Winds, one of the most



FROM ancient times down to the present, man has bowed before the wind. It lays down the law of nature, it makes the weather, clears the air, brings the rains, agitates the ocean, colors the sunsets, and, worst of all, brews the storms.

When the winds blow against man's transports, ships and airplanes are slowed

desolate and lonely spots on the globe. A more appropriate name for Greenland would be Windland. Around the North Pole of the Winds, the temperature frequently is colder than around the North Pole itself. The wind pole temperature compares with the lowest temperatures recorded in Siberia, Alaska and northern

Handwritten notes and scribbles at the bottom of the page, including the name 'Loudy' and other illegible markings.

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of the WIND

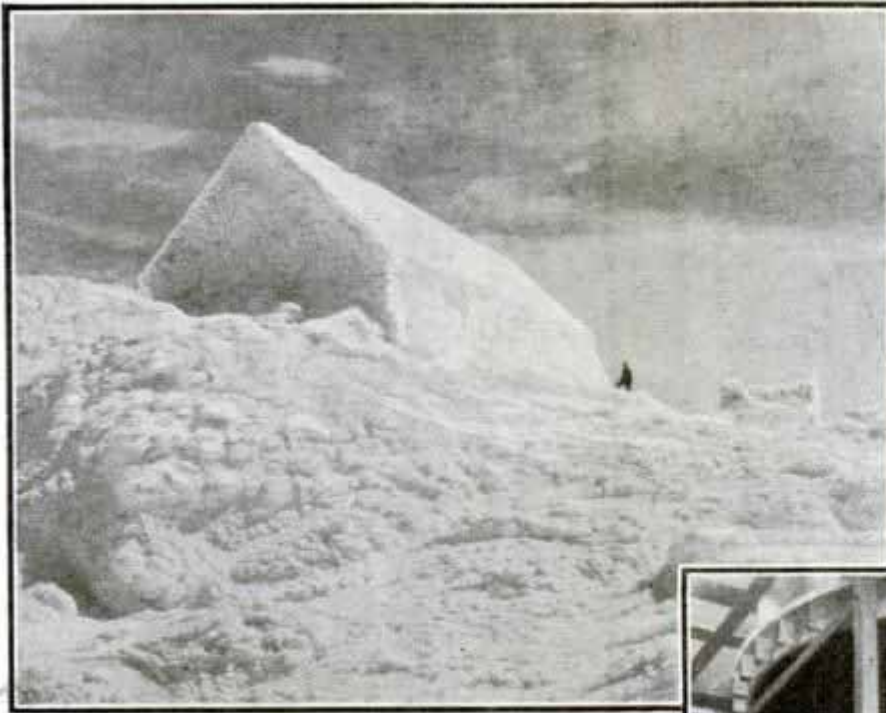
Canada. What makes Greenland the northern wind pole? The island's ice cap roughly approximates the shape of a huge watch crystal, 10,000 feet high in the center and sloping away on the sides. Admiral Peary was the first to observe that when he climbed a slope, the wind struck him in the face; and when he went down hill, he felt the wind on his back. This led to the theory, since verified, that the Greenland winds flow down hill from the center of the ice area.

Greenland's interior is a place of blizzards and record cold. High, cold winds sweep in from the coasts and meet near the center of the island. As they clash, they tumble to the surface of the ice and literally flow down hill, away from the high center of the island. In other words, after they come together, they reverse their direction, and like water, they flow from a high elevation to the sea. This great wind movement causes Greenland's glacial anticyclone.

A number of explorers have noted a strange area of calm in Greenland's interior. It is completely surrounded by walls of wind. This calm probably lies directly beneath the place in the sky where the high east and west winds clash. As the winds blow away from the center, they do not flow down



Above, checking wind conditions on Mt. Washington. Below, taking observations at meteorological observatory in the Bavarian Alps



outside with an eighty-five-miler. And so it continued for a day, subsiding slowly through the seventies and fifties, and then suddenly redoubling its strength, it rose to its climax, 116 miles per hour. Those were the highest velocities recorded during our two-year residence in Adelie Land."

The average wind velocity was 51.5 miles per

the steepest slopes of the ice because the earth's rotation causes a deviation. In North America this deviation is clockwise, and in the southern hemisphere it is counter-clockwise. For example, the winds on the east slope of Greenland come from the northwest, and those on the west slope come from the southeast.

A similar wind pole is known on no other part of the earth save in Antarctica. On this white continent, the winds blow with terrific speed and pressure, but relatively little is known about the Antarctic glacial anticyclone. Explorers in the regions of the north and south wind poles have brought back reports of currents of more than 120 miles per hour, but these are considered "slow and mild" compared to the winds there which have not yet been measured. The difficulty in measuring high wind speeds was, until the present, the lack of a good instrument. The ordinary anemometer blows away at 150 miles an hour, and none of our explorers could measure accurately beyond that.

As to the ferocity of the Antarctic glacial anticyclone, we have the graphic description recorded by Sir Douglas Mawson, who made observations in Adelie Land. He calculated the annual average wind velocity there as fifty miles per hour, compared to 9.5 miles per hour, the annual average for the United States. Sir Douglas said:

"The weather was as thick as a wall



Above, winter conditions faced by Mt. Washington observatory expedition. Below, testing dirigible model in Goodyear Zeppelin research laboratory

hour in April and 60.7 miles per hour in May. Besides the prevailing winds, Sir Douglas reported a "terrific series of herculean gusts—probably 200 miles per hour." So Adelie Land takes its place as the windiest known spot of low elevation on the globe.

In the light of present knowledge, 200 miles per hour is fairly high, but it is by no means spectacular. The "cut-throat" winds of whirling tornadoes have never

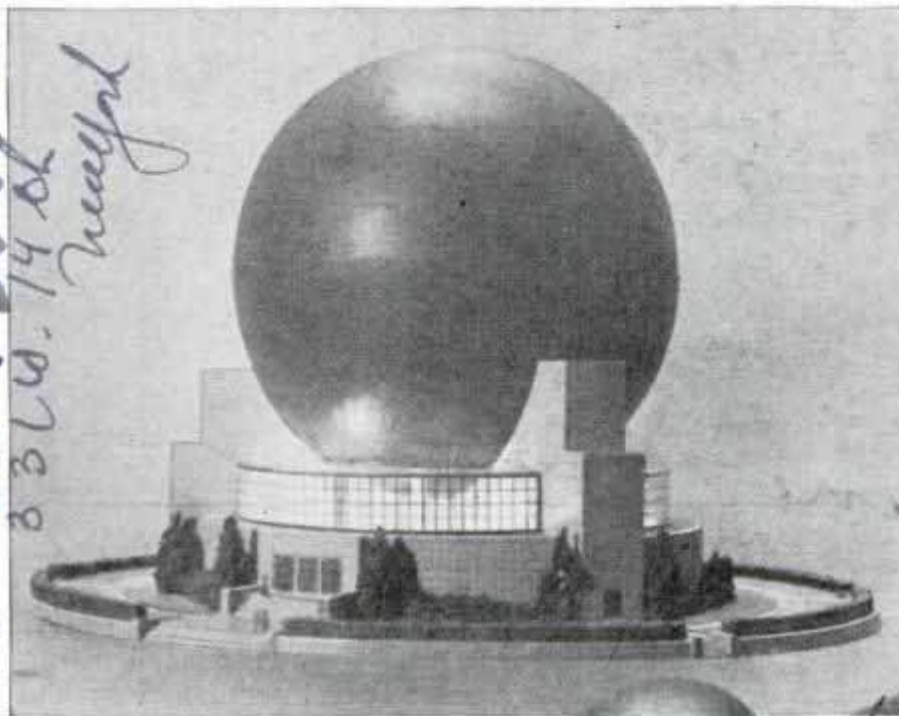
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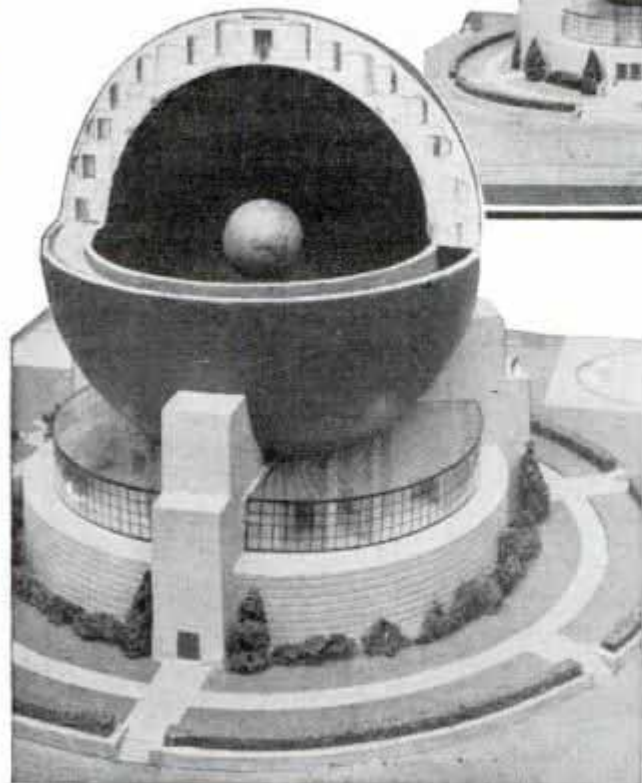
World Is Seen as from 20,000 Miles in Space

Stratosphere flights have shown man what the world looks like from fourteen miles above it. The "Cosmosarium" has been designed to give man an idea of the world from 20,000 miles away. Its giant

sphere, 128 feet in diameter, would rest on three sixty-four foot buttresses. Below the orb is a windowless exhibition hall, lighted by a glass clerestory. Outside, the sphere would be covered with dark blue vitreous tiles adorned with figures symbolic of the constellations. Its walls inclose two spiral ramps for spectators, one ascending and one descending, with points of vantage from which the visitors can peer into the 100-foot dark-



Photos by H. Richardson Cremer
Above and at right, model of "Cosmosarium" with clerestory lighted. Cut-away view below reveals spiral ramp from which visitors view earth "hanging" in space



ened central space in which the earth is poised, revolving upon its axis. It is a twenty-foot globe representing the earth as seen from 20,000 miles in space. On the inside walls of the sphere twinkle pin-points of light representing the planets. Peter J. Bitterman, Jr., Brooklyn architect, conceived the Cosmosarium and a scale model has been displayed at the American Museum of Natural History.

☐ Since automobile horns in Sweden were silenced except for extreme emergency use, there has been a relative reduction in traffic accidents.

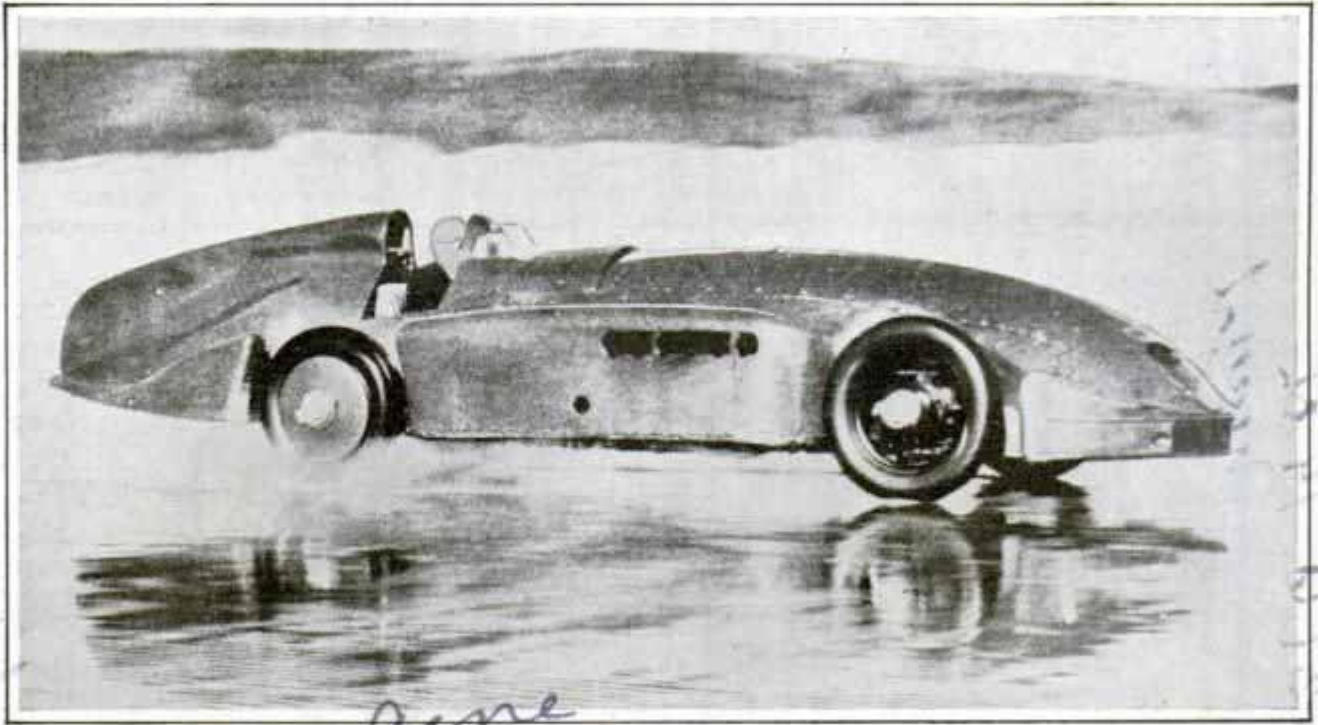
Emb. Charles H. Dow, Dow News Service.

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105 Park Ave. New York

Dept. of Commerce Press Mem. 2/8/3

'Flying Spray' Tops Records of Diesel Racers



The "Flying Spray," twelve-cylinder Diesel racing car driven by Capt. George Eyston, which recently hung up a string of long-distance records

Speed records for Diesel-powered racing cars are being challenged by the "Flying Spray," a sleek streamline racer specially constructed for Capt. George Eyston, famous British racing motorist. The car recently hung up a string of long-distance records, including a mark for

twenty-four hours, during an extended run on a French track. It is fitted with a twelve-cylinder Diesel engine of special design, the specifications of which are being kept secret. An inclosed cockpit protects the driver from flying sand and spray when racing over the seashore sands.

Chemical Test of Exhaust Gas Tells Efficiency of Engine



Taking a sample of gas from exhaust pipe of his car, the motorist can tell by reading the dial how efficiently his engine is operating

Just how efficiently your motor is operating can be determined by a one-minute test with an exhaust-gas analyzer. It requires no technical knowledge or skill, no electrical connection, and the self-contained unit is as convenient for tests on the road as in the garage. While the engine is running, the sampling tube is inserted in the end of the exhaust pipe; a handle—the only moving part—is turned to the "sampling" position, then to the "analyzing" position and the result is read

The Hays Corp. Box 299
 Mechanicsville, Va.
 The Hays Corp. Box 299
 Mechanicsville, Va.

on a scale. The test is based on the principle that the percentage of carbon dioxide in exhaust gases indicates thoroughness of combustion. The gas sample is measured, then passes through a chamber containing caustic potash, which absorbs all the carbon dioxide. The vacuum caused by its absorption is measured and made visible by movement of red liquid in a tube. The scale marking levels of this liquid interprets carbon-dioxide percentages in terms of air-fuel ratio, carbon-monoxide percentage and engine efficiency.

T-320
**Radio Hears Voices
 over a Telephone
 200 Feet Away**

So sensitive is the "wireless eavesdropper" recently invented by a Brooklyn man that its operator can tap a telephone conversation and hear it clearly 200 feet away. In a demonstration at Washington, voices on a telephone in the next room were heard.



Wireless "eavesdropper" listens in on telephone conversation from adjoining room

Giant Dam Is Steam Heated to Set New-Poured Concrete



Steam
 Shooting live steam under the canvas "blanket" keeps new-poured concrete of the Grand Coulee dam from freezing before it has set properly

Fresh concrete on the Grand Coulee dam is put "under wraps" and steam heated when severe weather threatens to freeze the new-poured concrete before it sets properly. In the lower right corner of the photograph can be seen a huge canvas canopy covering a pour in Block 26 of the Columbia river dam during a cold spell. Steam is injected under the canvas to keep the section warm until set.

Popular Mechanics Magazine does not publish the name of the maker of, or dealer in, any device described in its pages, but this information will be furnished by our Bureau of Information upon request, accompanied by stamped envelope.

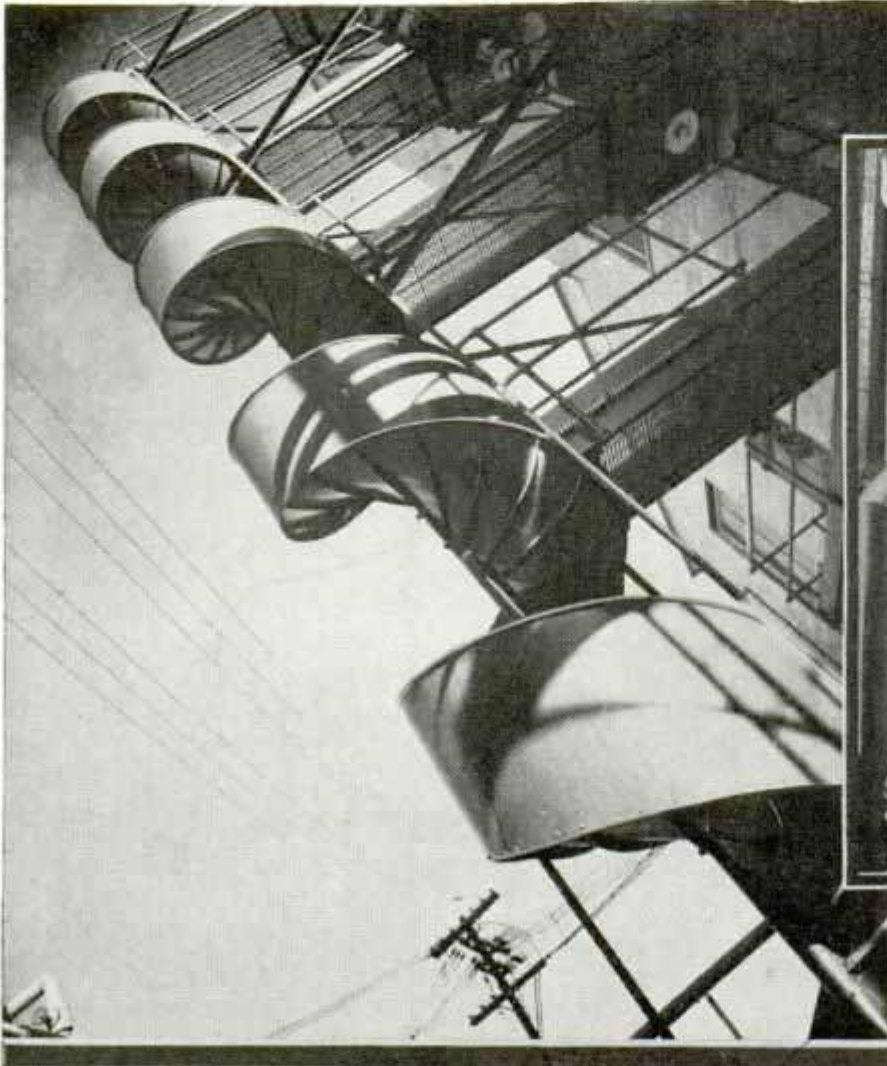
Temporary address

Dr. Samuel S. ...

F 259.

Emt. Lem. Kassman
4 W 103rd. N.Y.C.

The AGE of



Left, exterior of duprene manufacturing plant. Right, interior, showing one of the few employes necessary to keep the automatic machinery operating

down M. Drenton. N.Y.

CHEMISTS' dream of making a better rubber than nature can produce has come true. Barely six years after the first commercial production of synthetic rubber in the United States, the industry now functions on a million-dollar scale and hopes to reach the billion-dollar class before the end of the next decade.

There are two synthetic rubbers being produced in the United States. One called thiokol is manufactured by the Thiokol Corporation, and the other, duprene, is a product of E. I. du Pont de Nemours & Co., Inc. Thiokol is the discovery of Dr. J. C. Patrick and has been on the market since 1930.

The one-acre plant for making thiokol has a production capacity of 200,000 pounds in five hours, compared to one acre of rubber trees yielding about 500

changed to neoprene 2/15/37
pounds of rubber in 500 years. The trees require careful nursing for five years before they yield the white milk from which rubber is made.

Thiokol sells for fifty cents a pound, as against ten cents a pound for crude natural rubber. The chief advantage of the man-made product is resistance to destruction by oils, chemicals and gases. One grade of crude thiokol is able to do service in temperatures between -30 to 200 degrees Fahrenheit.

Industrial firms and consumers are willing to pay more for synthetic thiokol because it withstands trying conditions much better than the natural product. Thiokol is now an army specification for fuel hose. The bureau of standards tested thiokol fabric for lighter-than-air craft gas cells and found it, according to a company

duprene manufacturing

Paul Oslay

F259

MAN-MADE Rubber



spokesman, "twenty-five times better than ordinary rubber for preventing the escape of helium gas."

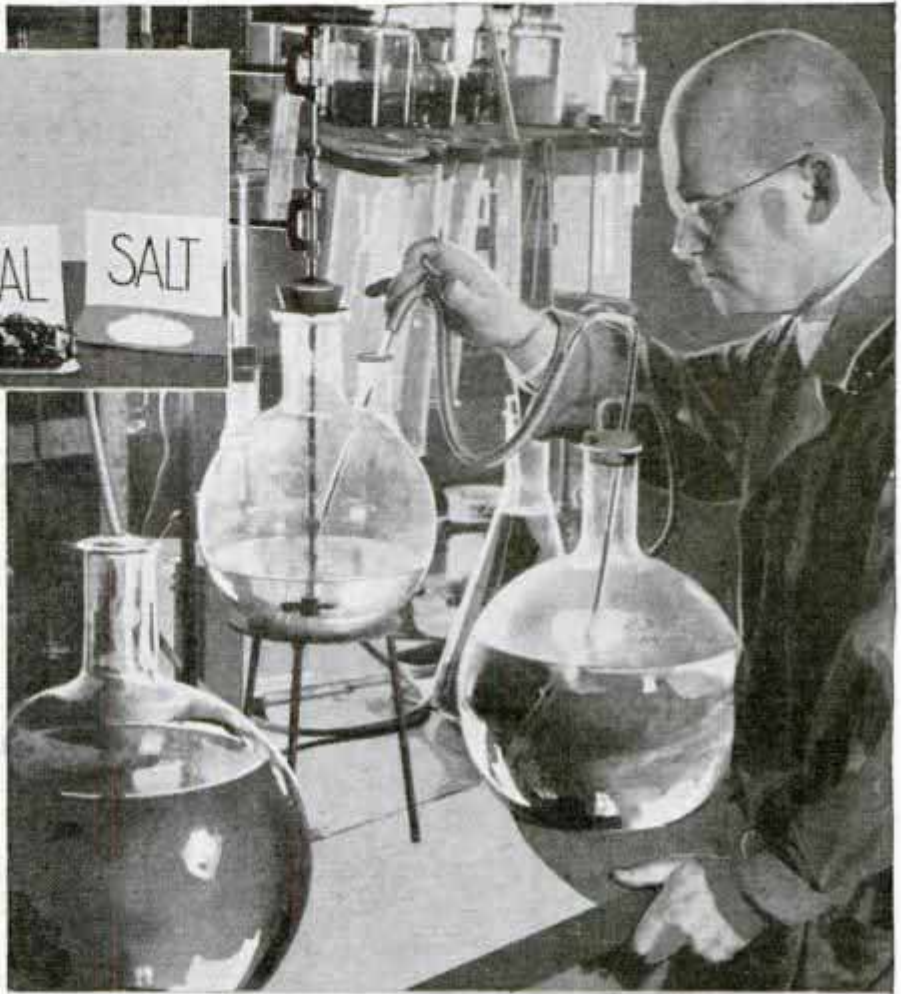
In its record-breaking flight across the Pacific ocean, the gas tanks of the "China Clipper" were sealed with a thin film of thiokol sprayed on the inside of the tanks.

Thiokol is also used in the printing industry. Printers have long complained that rubber press rollers and blankets swelled because they absorbed the ink chemicals. Today some of the largest American newspapers use thiokol blankets.

All sorts of printing plates, including half tones, are now made out of thiokol. The synthetic product is much lighter than metal and, therefore, can save shipping costs.

According to the makers of thiokol, the synthetic-rubber plates use about half as much ink as metal plates, and they also eliminate "make-ready," one of the expensive, time-taking steps in the printing industry.

The latest development



Top, left, ingredients from which duprene is produced. Top, right, chemist at work in thiokol plant's laboratory. Bottom, pouring ingredients into vat to produce synthetic rubber in thiokol factory

Changed to neoprene



Some of the products made wholly or partially from duprene. Inset, comparison of man-made and natural rubber. That on the right is man-made

is a synthetic rubber powder for molding articles of various shapes. Three minutes is all the time required for molding a glossy, smooth, oilproof thiokol product.

The chief ingredients of thiokol are sulphur, salt and natural gas, all of which are abundant in the United States.

Duprene, the other synthetic rubber manufactured in this country, is made of such cheap and common substances as coal, limestone and hydrochloric acid, the latter made from common salt.

The plant recently completed for the manufacture of duprene is practically automatic. Only fifteen employes per shift are required to keep it running at capacity. The annual production is about 1,000,000 pounds.

The raw material produced by DuPont is "plastic polymer," the equivalent of smoked sheet rubber. The processing is done by manufacturers to whom it is sold. The preparation for service is done by the same methods and by the same machinery used in the processing of natural rubber.

Most commercial rubber products contain varying amounts of sulphur, pigments, fillers, carbon, antioxidants, etc.,

which give the finished products special properties. Thus rubber tires differ in composition from inner tubes, and so on.

Duprene can also be endowed with special properties by the addition of various ingredients. In this way, hundreds of uses have been found for man-made rubber. Each use demands specifications which the manufacturer knows how to meet. After the synthetic rubber is compounded with other ingredients it is vulcanized. Then it is ready for service.

One of the great advantages of duprene is the ease of vulcanization. Whereas natural rubber must be vulcanized in the presence of sulphur, duprene requires only heat and pressure to make its composition permanent.

Hundreds of uses have already been found for duprene, but the possibilities are as unlimited as the requirements of industry. Simply by varying the quantity and proportions of the ingredients added to the "crude," thousands of duprene compositions are made possible.

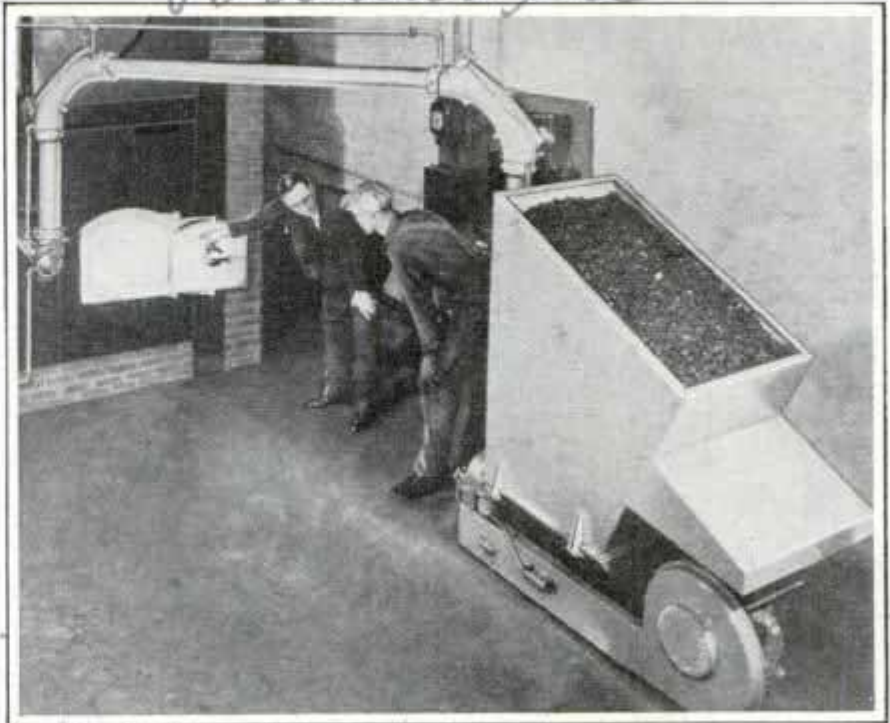
Duprene can be made to stretch 1,100 per cent its ordinary length and it has a

(Continued to page 140A)

neoprene

Air Stream in Stoker Helps to Cut Coal Bill

More efficient firing and economical operation of the heating plant are achieved in a new stoker which employs a stream of air to feed quality steam coal and certain types of low cost coals of high sulphur content into the furnace. The air stream conveys lump particles, such as are fed by powdered coal burners, and lump coal up to one and one-half inches. A short feed worm "measures" the coal and conveys it into a transfer box where it is picked up by the air stream and carried to spreader nozzles located at proper angles within the firebox to give an even distribution of coal on the grates. Finer particles are burned in suspension, while the larger pieces fall on the grates to be consumed in the usual manner with draft supplied by a secondary fan. Little change in the furnace is necessary for installation of the equipment.



Stoker spreads fuel evenly to obtain efficient combustion. An air stream helps move the fuel from hopper to furnace

Two-Way Dump Body Hoist
F 323 Handles Big Load

Equal power for raising or lowering a truck dump body containing a 12,000-pound payload is an outstanding feature of a gearless hoist that may be locked automatically in any position. There are no exposed working parts and the motor has only one moving part. The hoist is positive, fast and powerful.



Body of truck in dumping position, controlled by balanced power, gearless hoist

Food in Refrigerator Saved
by Cold Zone Indicator

Helping the housewife to keep the refrigerator temperature at the proper point, a food safety indicator is a feature of one of the late model refrigerators. The instrument is a thermometer marked off



into three zones, freezing, safety and danger zone, which the housewife may read at a glance. Placed where food storage temperatures prevail, it is an aid in the maintenance of the proper degree of

cold necessary for preservation of all kinds of food kept in the refrigerator.

Frigidair Corp

The Ingersoll Corp

Loud-Speaker Wrecks Sleep in Study of Slumber Habits



Sleeper being "tortured" by loud-speaker in laboratory study of sleep. Reaction time is recorded as din of radio and foghorn wakens subject

cut down bedroom fires, a fire-resistant, sterilized and vermin-repellent mattress has been developed. By a special chemical treatment, the cotton felt, ticking, tape and other materials are rendered both fire-resistant and vermin-proof without material change of sheen, luster, strength, life or elasticity. It is claimed that neither a lighted cigarette nor a blowtorch will set the treated materials afire.

Memorial Is Cut F27 on Leather by Hand

Requiring 1,800 hours of work, a memorial hand-tooled on leather pays tribute to the late Will Rogers. It is tooled of one large piece of leather, the work of Dr. W. A. Maddox, a dentist of Lubbock, Tex. The memorial was designed for display at a dinner in honor of the famous humorist.

Sleep-wrecking is done scientifically with foghorns and loud-speakers at the University of Chicago, where a study of sleeping habits is in progress. At various stages of slumber, the foghorn starts a din and the reaction of the sleeping student is noted. Wakened, he jots down a few notes and then goes back to sleep. The study has demonstrated that sleep is deepest during the first ten minutes; and quite deep during the first hour or two of the night. There is more movement in the last half of the night, and it is easier to waken the subject immediately after a change in position than ten minutes later. To record movements during sleep, apparatus was installed by which every motion shifted weights and pulleys and wrote the record on a graph.

Mattress Made Fire-Resistant F342 and Vermin-Repellent

Fires in dwelling houses claim nearly 7,000 lives annually in this country. Of these, about 1,800 lives are lost, directly or indirectly, through fires originating in bedrooms, many of the blazes starting in mattresses; often from smoking in bed. To

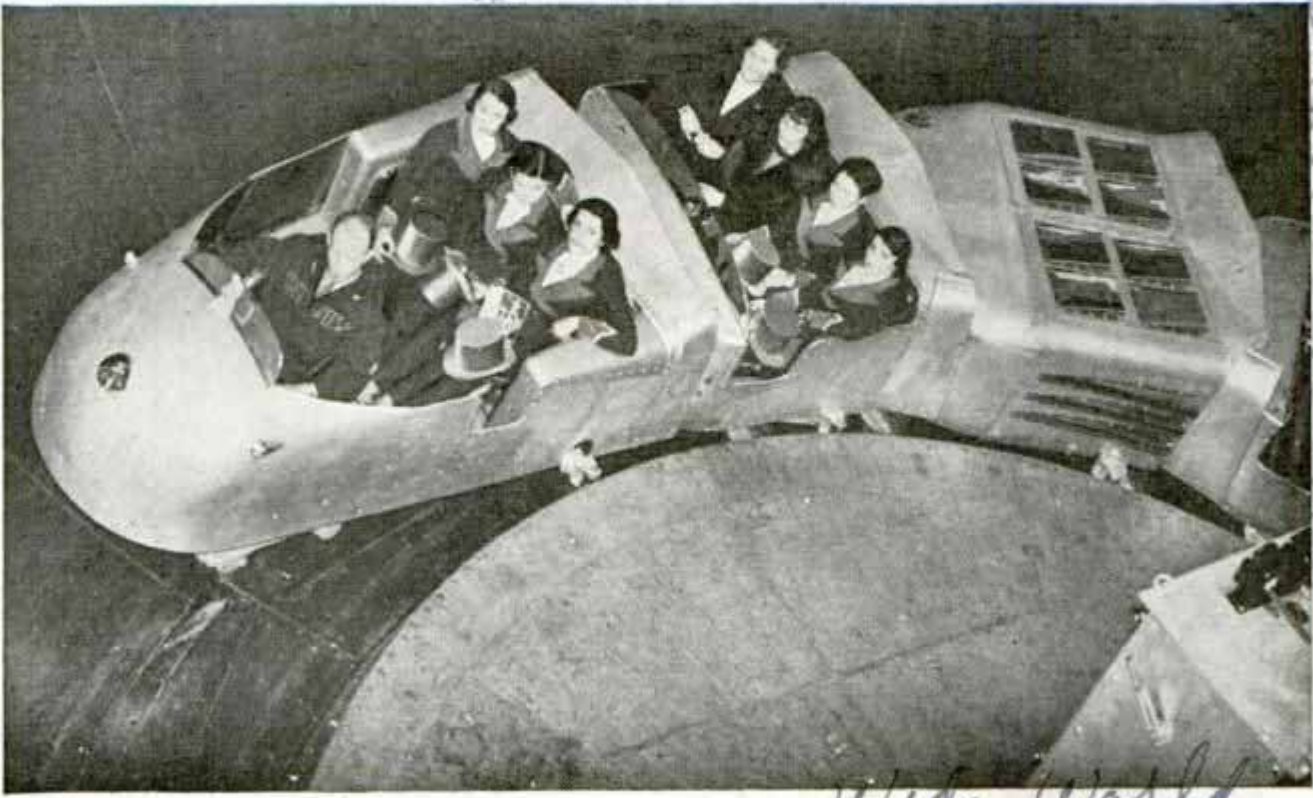


This tribute to Will Rogers was hand-tooled on a single piece of leather

Dr. Hoffman O. Cooperman
Sydney T. Telbaine

Sleepsafe Industries
140 Park Ave. New York

Five-Ton Rocket Car Is Latest in Thrill Rides

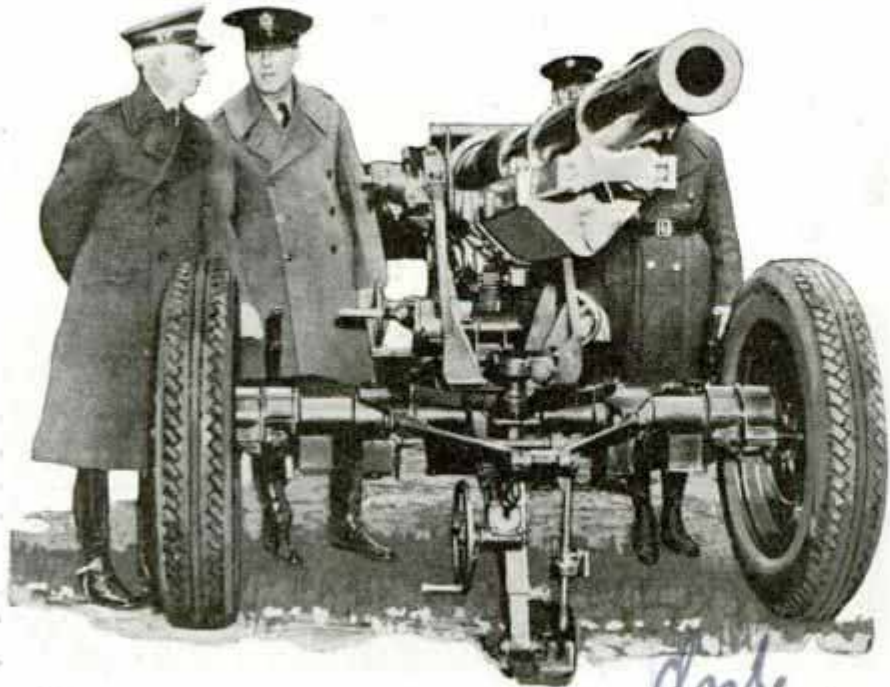


Train of rocket cars ready to start its flying trip around the circular wall. One of the latest thrill rides introduced in England, it is being brought to America as an exposition feature

Hurling around a wall built at an angle of sixty-five degrees, a rocket car is the latest in thrill rides. It weighs five tons and carries eighteen passengers. A speed

of thirty-five miles per hour is reached by the car, the invention of an English showman. It will be brought to America for the Texas centennial exposition.

Army's New Field Gun Weighs Less but Shoots Farther



Officers inspecting new lightweight field gun which has a range three miles greater than the field piece it replaces

With a range of 13,500 yards, or about three miles greater than the range of the same type weapon which it replaces, a new field gun weighs only 2,600 pounds and can be drawn by horse or tractor. The gun, which is a seventy-five millimeter piece, shoots as far as the 155-millimeter gun, which weighs more than 7,500 pounds. The new "75" costs about \$5,000 more than the old type. The gun has been put through a series of successful tests at Fort Myer, Va., by the United States army.

Wide World
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The World's MOST

home address
2 West 174th Street
New York, N.Y.



By Capt. John D. Craig

A TIGER won't climb a tree. I had been assured of that many times by native shikaris in the little-frequented jungles east of Nagpur in British India.

We were out there making moving pictures, had photographed many of the lesser game and were now concentrating our efforts on the tiger.

I was sure a tiger wouldn't climb a tree. So I got one of the greatest shocks of my career, a jolt that nearly cost me my life, when a huge tiger did climb a tree, shook me off a limb and nearly pounced upon me as we fell to the ground together.

We were working near Sironcha, a little village 135 miles from the end of the railroad. We had located several tigers, one an old, much feared man-eater, and were "beating them" from where they were resting during the heat of the day out into a clearing at one end of which we had mounted two cameras in a machan,

Picture made by movie expedition showing wild elephants in Ceylon jungle, and one of stone lions guarding entrance to pagoda in Mandalay

Adventurers Club
147 Michigan Ave

DANGEROUS JOB

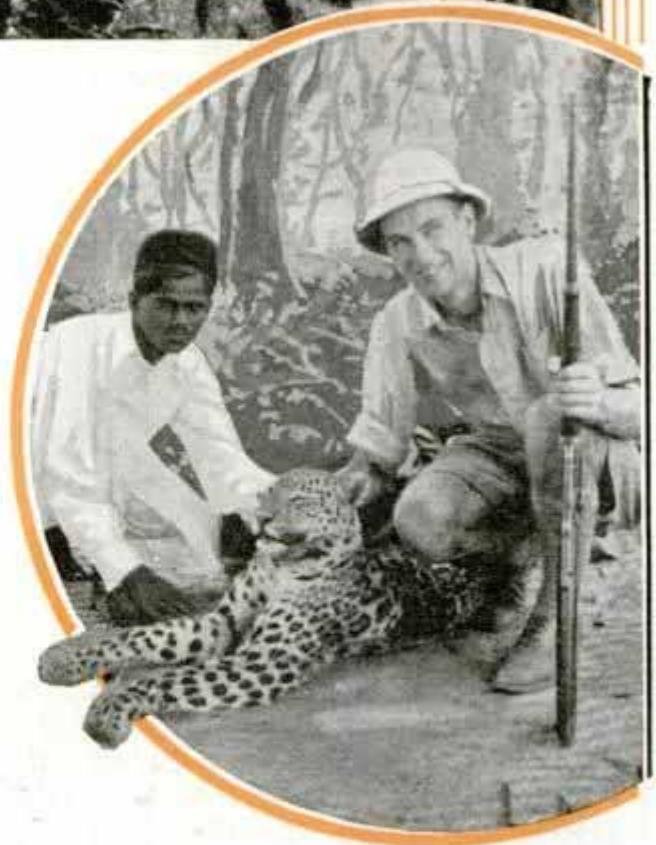


or tree platform. Tigers rarely look up when prowling through the jungle, so it was a simple matter to mount our cameras ten feet above the ground and camouflage them and the cameramen so they would likely be unobserved by the tiger as he came into the clearing in his attempt to get away from the beaters.

The cameramen have their hands full getting the picture without worrying about their safety, so we mounted two smaller platforms to the rear right and left and slightly higher than the camera machan. These smaller ones contained the gun guards.

A deadline had been established across the clearing in front of the camera machan and the gun guards always understood that if the tiger crossed that line, obviously charging the cameramen, they were to shoot him before he could reach and attack the camera boys.

Native beaters had been sent a mile or so back and, at a given signal, had spread out and started the beat. They hammered



Tigers really climb trees, as Capt. Craig found out. Below, the "pretty kitty" is good—and dead—or it wouldn't be in this friendly pose



Life-size stone elephants support this temple near Sironcha. Below, Oscar saw the cameraman do this

on tom-toms and tin cans, shouted and fired guns. The tiger heard them and in trying to escape was approaching our clearing. I heard the excited yelling of the natives as they saw him slip through the underbrush and as the clamor increased one of my men mounted in a tree far beyond the clearing signaled the tiger was approaching.

Hastily I climbed into the right gun guard platform and waited. The machan was three feet wide and six feet long, made of a native cot, a wooden frame laced

with strong rope and generally used as a bed. It was firmly bound to some of the limbs of the tree about twenty feet above the ground and was fairly stable, and strong enough to support my weight. Several armed natives were crouched in the same tree some distance above me. To the left I could see my friend, Campbell, in his machan with gun ready. The camera boys were waiting to begin cranking. It was the breathless moment just before things begin to happen.

I had a good view of the clearing and could hear the tiger approaching. The beaters were quieter now as they drove the beast nearer. Then I caught a fleeting glimpse of the beast as it emerged from the jungle and took refuge in a clump of bushes within the clearing. When the tiger made this move, I realized I was defeated, temporarily at least, because my beaters, who now were climbing trees near the edge of the clearing, would not venture closer in an attempt to dislodge the tiger so we could photograph him.

There was nothing to do but wait until the tiger got ready to make a move, and meanwhile remain alert for fear he might make a sudden break for the jungle and

charge toward the cameramen. I signaled to Campbell to shoot the tiger if it should make a move to cross the deadline after coming out of hiding. But Campbell thought I meant for him to shoot if he saw the tiger make any movement in the bushes, and a moment later he fired.

The bullet inflicted only a slight flesh wound, but it was painful and made the tiger very mad. Like a ball of golden lightning, the infuriated beast rushed from his hiding place and started directly for Campbell's machan. I fired and the bullet knocked him off his feet. But he was up in an instant and charged toward the tree in which I was perched.

I felt safe because I knew a tiger wouldn't climb a tree. My natives had explained the tiger's weight prevents it from clinging to the trunk of the tree and climbing as a house cat does. Thus, when I saw that enraged beast doing the impossible—climbing swiftly with convulsive effort, like some enormous caterpillar, up that tree in which I considered myself perfectly secure, I was startled, to say the least.

With one bullet left in my double-barreled rifle I had no great fear for my life just then. However, the course of the

(Continued to page 127A)

F255
Brake Tester on Windshield Shows Condition Quickly

Attached to the windshield near the rear-view mirror, a small brake tester working on the decelerometer principle



shows the condition of the car's brakes quickly. A sudden application of the brakes while the auto is traveling forty miles per hour will cause the indicator to swing into one of the three divisions on the face of the tester,

showing whether the brakes are "not safe," "fair," or "good." The divisions are colored red, yellow and green, in order, to make the reading easier. A vacuum cup holds the tester on the glass firmly.

Dirty Brake Service
Sales. d. h.

F248
Star Finder Uses Movie Film to Read Heavens



Demonstrating the stellarscope. Film shown at top and bottom contains sky maps

As a means of identifying various constellations and the larger individual stars, a new scientific instrument is an aid to the amateur astronomer and the student. It consists of a lens in a Bakelite case, a pencil-type flashlight and a roll of standard motion-picture film which is moved by hand between the lens and the light. The film roll contains twenty-four sky maps which cover all sections of the sky that can be seen with the naked eye on a clear night. The names of the constellations and the positions and names of the larger stars are printed on each map. No magnification is used and thus the view through the lens is exactly like that seen in the sky with the naked eye. By pointing the instrument, called the stellarscope, in the general direction of the constellation pictured on the map, a little practice enables the user to bring the artificial and the actual view into alinement. Once the student has learned to locate and identify stars with the instrument, he can make a detailed study with a small telescope. The inventor, Prof. Walter Bartky of the University of Chicago, says that an attachment for the instrument could easily be made which would enable aviators without radio, and ships at sea, to determine their position at night by means of the film sky maps.

Everett Case Chicago
5488

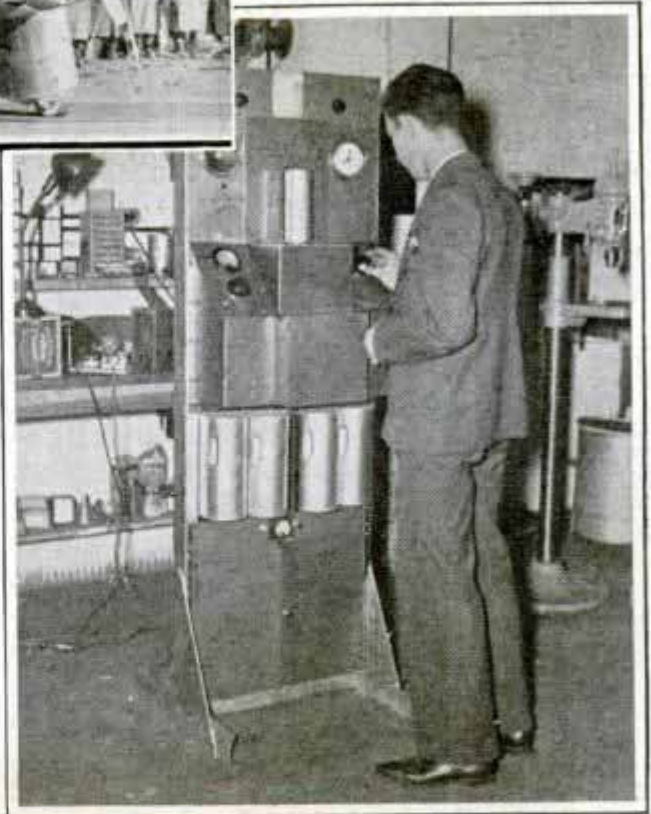
Photos Sent over Phone Wires at Call Rates



Wide World

News photographs now are being transmitted quickly, clearly and cheaply over ordinary telephone wires. With the aid of a light, portable transmitter, Wide World Photos can transmit pictures by wire from any location where a telephone is available at regular station-to-station long-distance rates. By this telephoto method, for instance, a six and one-half by eight and one-half inch picture can be sent across the country at night rates for \$25, or two pictures half that size can be transmitted for the same cost. The mobile transmitter weighs only sixty pounds and can be operated with an ordinary automobile or airplane storage battery and the compact receiving unit can, if necessary, take incoming pictures in broad daylight. The system operates over an inductively applied signal without contact with the telephone company wires. Telegraph wires

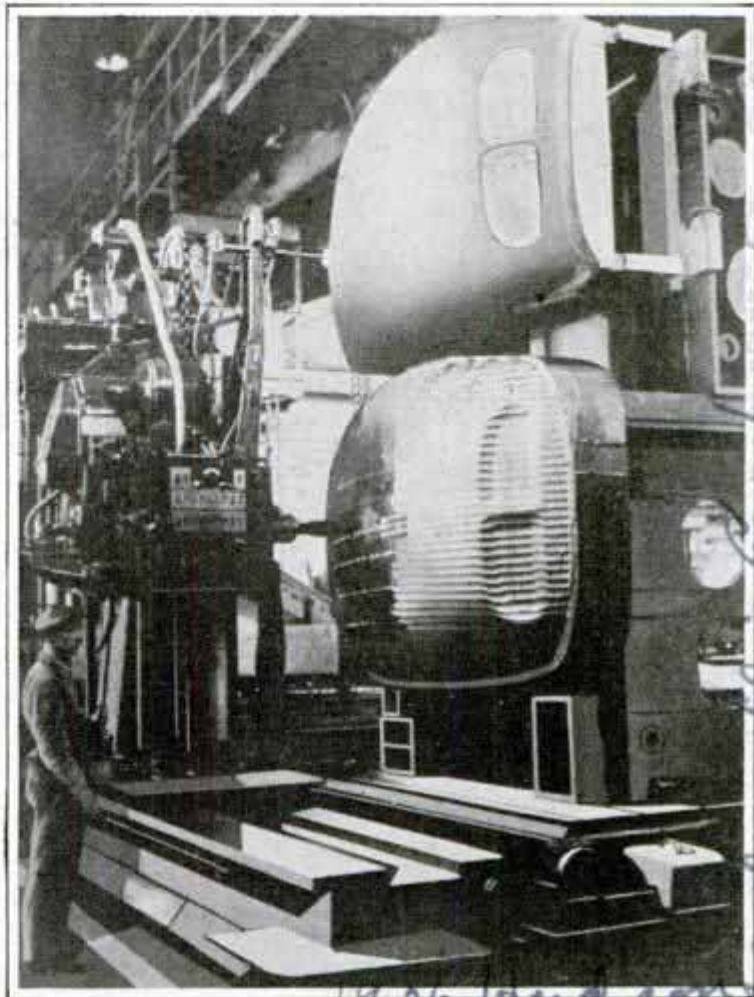
also may be used for transmission if a double wire is available. Pictures to be sent are attached to a metal drum and revolved forty-five times per minute by a six-volt motor. A needle of light shines on the glossy print and is reflected back into a photoelectric cell which transforms the light into electrical impulses. These impulses are converted into sound, the telephone mouthpiece picking up this low, conversational buzz. At the receiving end the process is reversed and the buzz is converted to light which is recorded on photo-sensitive paper to reproduce the picture. Through a syn-



Wide World telephoto transmitter, top, and receiving apparatus, below. Top photo of plane is original picture, and lower one is the picture received over telephone wires

chronization process, this system has conquered the telephone "carrier circuits." These circuits, as differentiated from metallic circuits, are in operation in some parts of the south and west and heretofore distorted photographic signals to such an extent that pictures were spoiled. This has been corrected by the synchronization process to a point where it is claimed pictures can be transmitted over telephone wires when it is all but impossible to conduct a connected conversation.

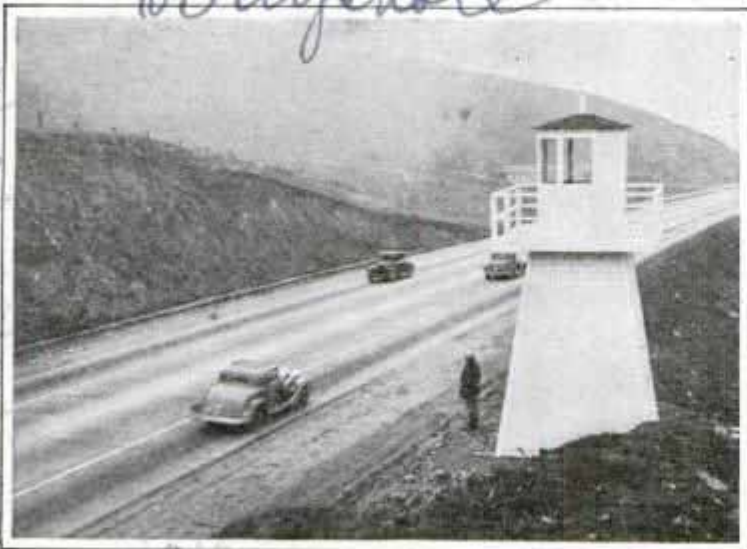
Huge Die for Steel Auto Top Is Ground Like a House Key



Mechanical finger following contour of master model at top guides die-cutter in gouging and shaping steel auto top below

F314.
**Highways Made Safer
by Watch Towers**

In an effort toward reducing the number of accidents on a highway running south from San Francisco, three watch towers were erected along the sections where the most traffic violations occurred. Within a month violations were reduced so sharply that the state of California is building similar towers along high-fatality stretches of other highways. The towers are located so that patrolmen on duty there may see a long stretch of the road in either direction. When a violation is spotted, such as excessive speed, a patrolman mounts a motorcycle and pursues the offender.



One of the watch towers on heavily traveled road. Note patrolman beside highway

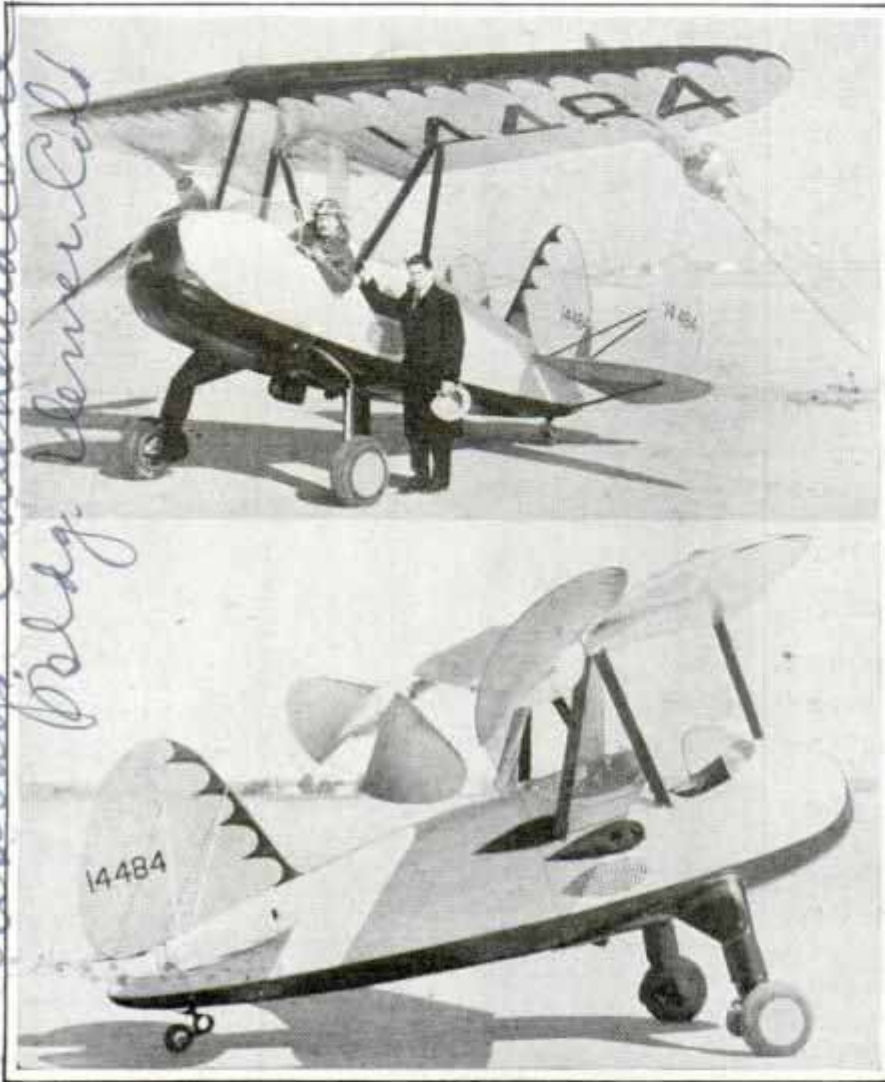
Sensitive mechanical fingers that "feel" the contour of the master model guide a huge die-cutter in grinding out the die for making steel automobile tops. On a vast scale, the die is made in much the same manner a locksmith grinds a key to fit your front door lock. From an original model of plaster, a master model is reproduced in brass-bound mahogany. As the die-cutter's finger follows the surface of the model, the cutter directly below it shapes the manufacturer's die from nickel-chromium iron, with alloy steel inserts at wearing points. Making this auto-top die consumed 12,000 man-hours. It is first rough-cut, then finished smooth as an exact replica of the model. In a giant press, it forms more than ninety steel tops in an hour.

Circle Tom White
Box 44, Alameda Calif

Vertical handwritten notes on the right margin, including "Lester", "Humboldt", "1936", and "Coventry".

Revolving Paddles on Plane Are Substitute for Propeller

the upstroke. Therefore, when the blade at one end of the shaft is lifting the plane as it travels downward, the opposite blade is traveling upward and propelling the craft forward. The angle changing mechanism is automatic, but its speed may be controlled from the cockpit, the pilot speeding up or retarding action on either side, lowering or lifting a wing, as in conventional planes. The paddles are geared to one-sixth of the motor speed. When the ship flew 100 miles per hour on its test flight, the engine was turning over 1,600 revolutions per minute to only 266 for the paddles.



Two views of paddle-wing plane. Bottom photo shows oddly shaped paddles attached to trailing edge of conventional wings

Large linen-covered paddles at the trailing edge of each wing replace the propeller of a new-type airplane which is said to handle easily and to take off and land in less than half the time and space required for conventional planes. A regulation motor at the rear of the cockpit drives the revolving paddles through shaft and gear mechanism inclosed in the wing. In a single revolution the paddles perform a double duty, creating both lift and propulsion. An automatic device changes the angle of the paddles at each half revolution. Mounted on a common shaft the blades assume an almost flat position on the down stroke, creating a lifting effect. Then the angle of the blade is changed so that it will slice into the air, or propel, on

7380

Escape-Proof Cell Sounds Alarm for Warden

If a convict tampers with the lock or bars of a new escape-proof cell, a siren shrieks and an indicator shows the warden the number of the cell. Thus, guards



Indicator in warden's office flashes and siren sounds to warn of attempted escape

Paul M. Lewis, Pres.; Lewis American
Airways; Continental
Bldg. Denver, Colo.

Mr. Montgomery D. Scott,
1205 Delaware St.
Lawrence, Kans.

no further data

Falmouth Oil Corp

tested at Federal Bldg. in Boston. will not get info.

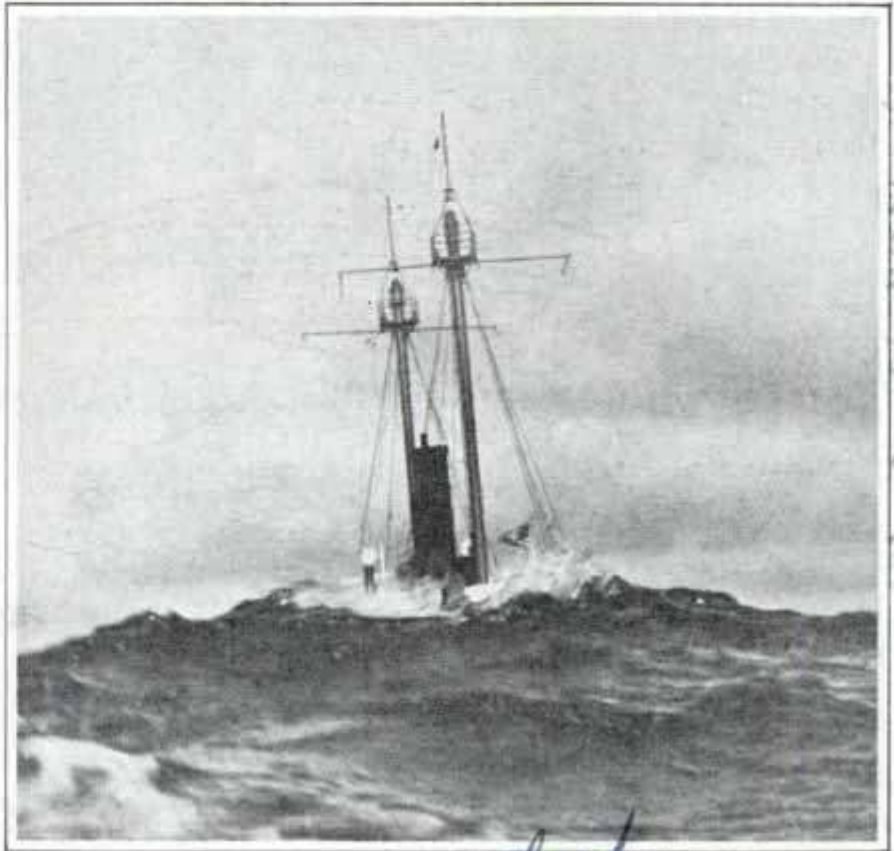
may be hurried to the cell in time to frustrate the escape. The new cell with its concealed alarms has been tested by the government, with the possibility of adoption for use in federal prisons.

Lightship 100 Miles Off Coast Leads Liners across the Sea

#374.

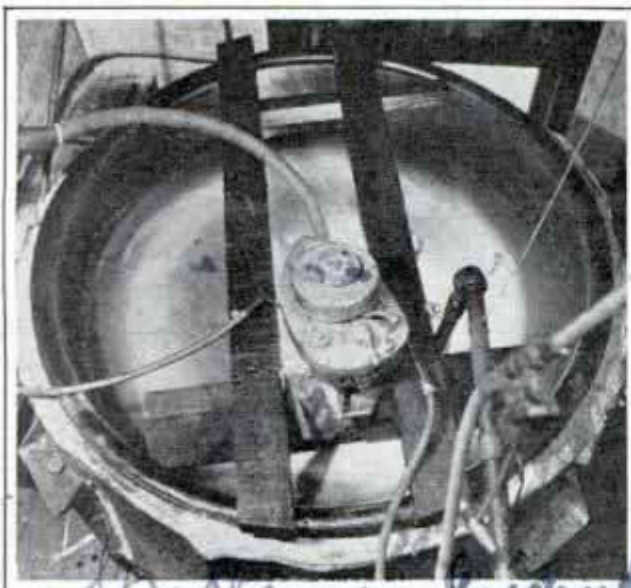
Outboard Motor Blends Oils in Vat

One new use for an outboard motor is that of blending processed oils. One corporation has installed a motor on supports across the top of a 250-gallon vat and set it to work stirring the ingredients. Operating at 2,500 revolutions per minute, the motor moves an estimated 1,600 gallons of the mixture every sixty seconds. The manufacturer reports a reduction in the time required to blend each batch, due to the large amount of oil being moved and the desirable turbulent action. Some of the oils used in the processing are quite thick, but the motor handles them without difficulty. Estimated cost of fuel is two cents for 250 gallons.



dent.
Nantucket lightship sinks almost out of sight in wallow of waves one hundred miles off Atlantic coast. Observe her powerful twin lights

Though mountainous seas all but swallow her and rolling fog banks make her isolation more complete, the Nantucket lightship keeps up every minute of the day and night her steady call to ships at sea. By radio, by submarine oscillator, by vibrant foghorn and by her penetrating twin lights she signals mariners that here is Nantucket light, 100 miles off the American shore in latitude 40.37 north, longitude 69.37 west, most isolated of lightships. Her radio beacon can be heard 1,500 miles twenty-four hours a day. The submarine signal is audible sixty miles, and when the "diaphone," a compressed-air foghorn, begins its warning blasts, heard every fifteen seconds for thirty-five miles, the vibration shakes the little ship and makes sleep impossible for its eleven-man crew. To visitors from Europe, this ship is the first sign of America. It is anchored by 160 fathoms of chain directly over the grave of its predecessor lightship, sunk in May, 1934, after being rammed by the liner "Olympic."



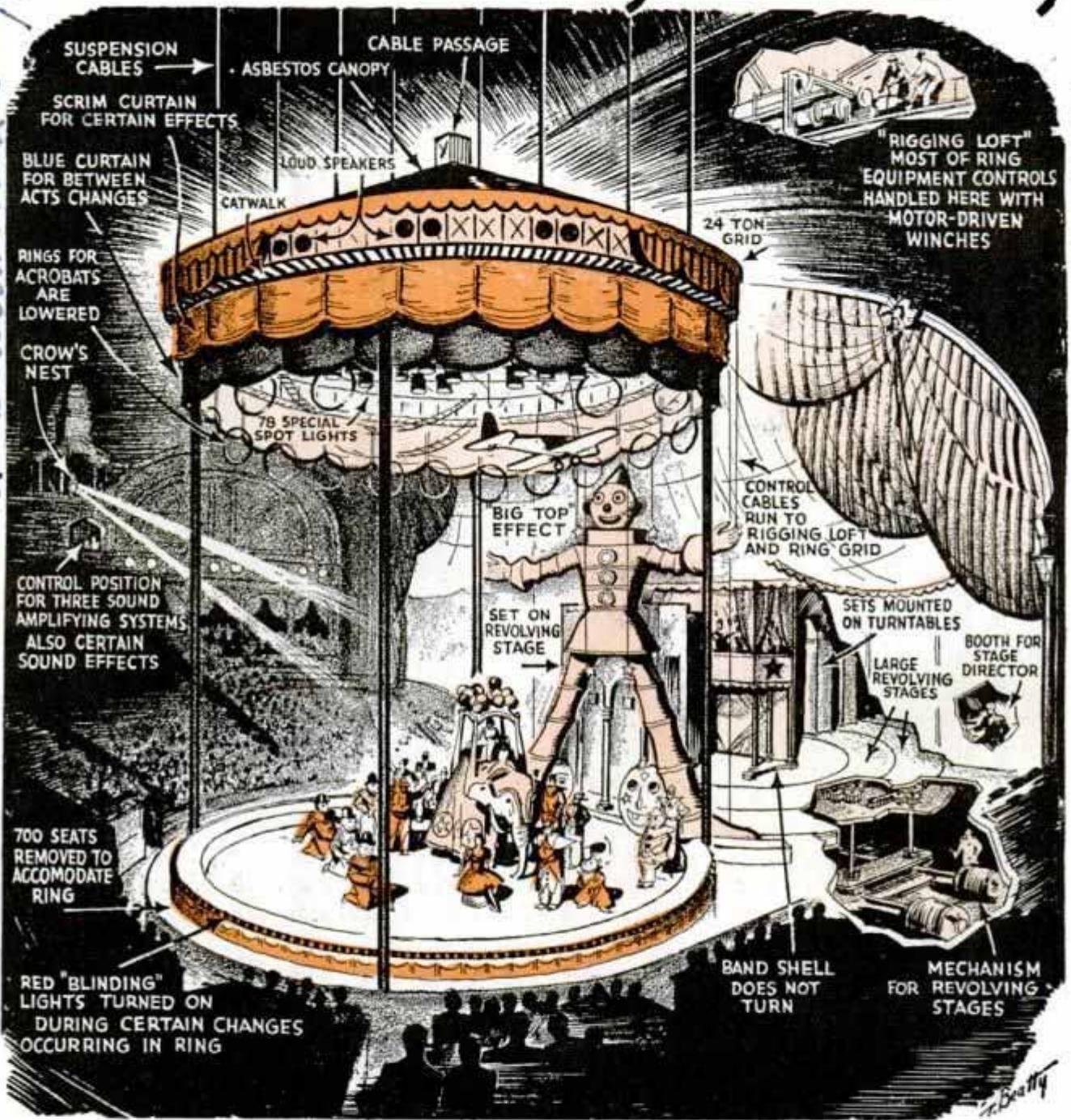
Outboard motor is shown installed above mixing vat in oil-processing plant

Outboard Motors Corp

COPY 6000

CIRCUS Laugh Making

Cont. James McQueen
 20 W. Marlborough Road
 City, Mo.



Drawing showing the ingenious mechanical and electrical arrangement for the spectacular "Jumbo" production, an impressive mixture of musical comedy and big time circus.

Western Clowns

INSTEAD of provoking laughter with comic songs, funny quips and conundrums as did the great circus clowns of the past, the modern Joeys of the big top rely on explosive microphones and slapsticks, collapsible motor cars, ingenious mechanical devices and papier-mache figures for their fun. Owing to the increased size of the modern circus, clowning has adopted the mass-production methods of our age.

There are two types of chalk-face laugh-

makers in the present day circus, the fill-in clown who merely imitates the others, and the producing clown, who originates and builds new acts and gags. Clowning itself divides into two parts also, the "walk-around," a quick, flashy turn performed on the hippodrome track between regular program numbers, and the "clown stop," an interval allotted exclusively to the clowns for the presentation of a feature gag.

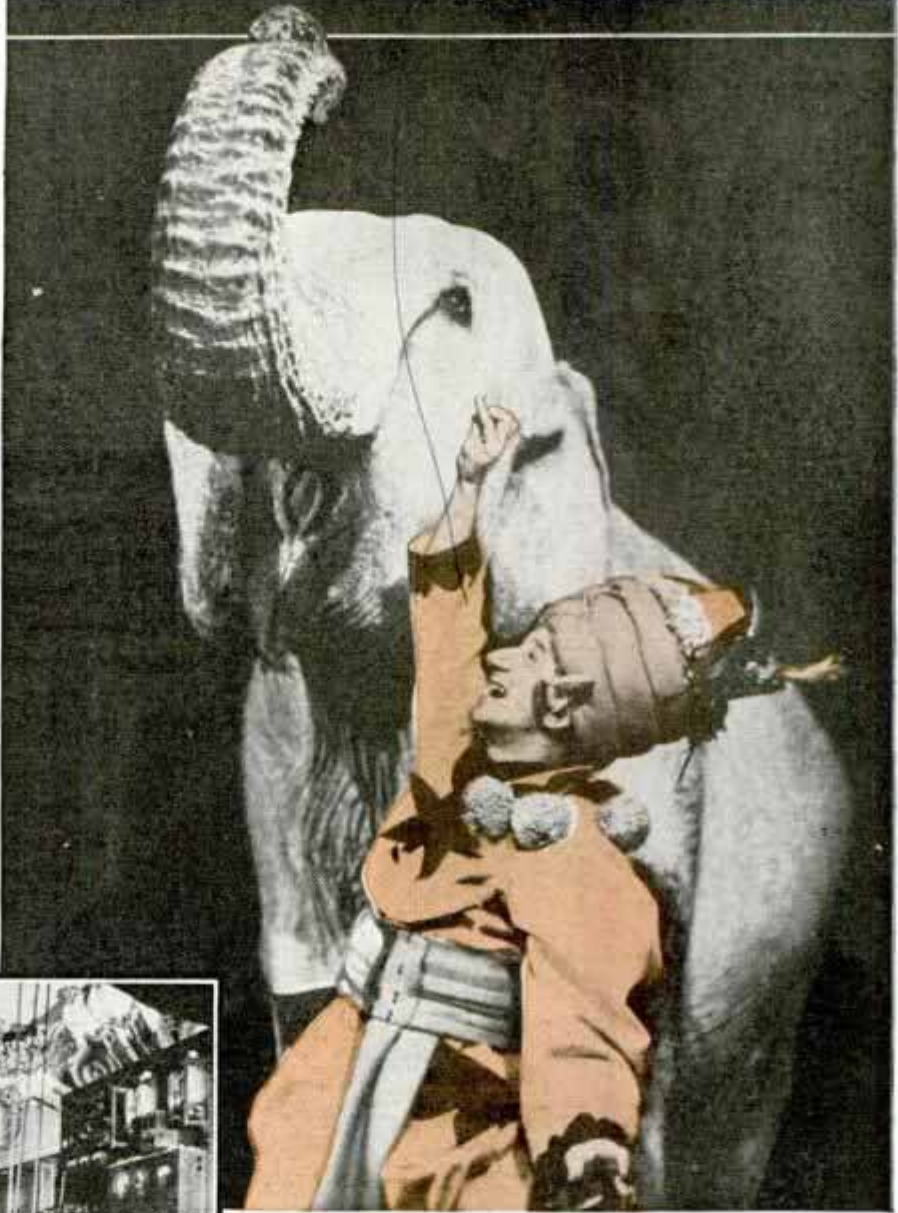
7273

Requires Inventive GENIUS

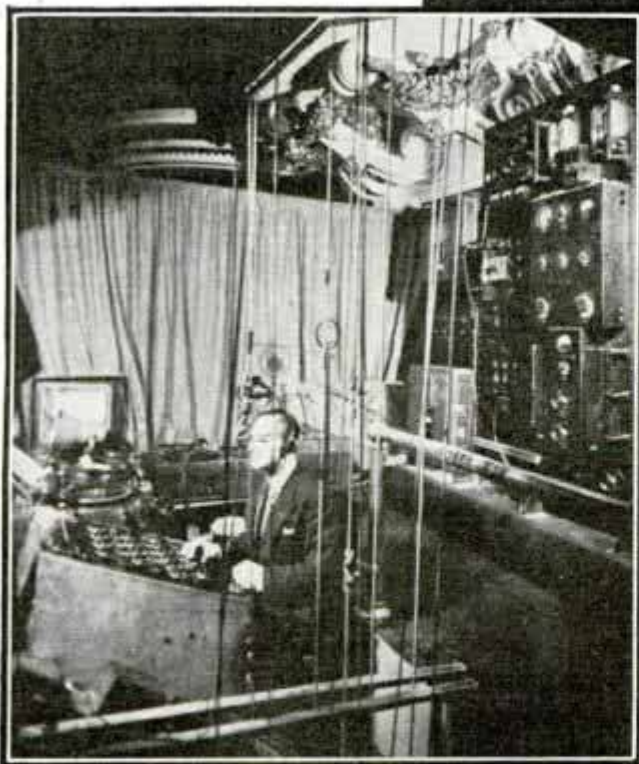
Chas. H. Duran

Clown gags usually are worked by two or more persons because the stunt must tell a story. It is, in reality, a short-short comedy, embodying action and atmosphere and suggesting an incident or a series of incidents. The producing clown's job is no sinecure these days. His antecedent could use a pantomime routine year in and year out but the modern clown must be thinking up new tricks constantly. Selling laughs to a world weighed down with worries is exacting work that taxes the ingenuity of even the greatest clowns.

The Joey must not only think up his gags but also build whatever "props"



Clown's job is to make people laugh - they do it every day



Asked where he got the elephant, this funny man has just inquired, "What elephant?" Below, operator who controls effects of the "Jumbo" show and regulates the loud-speaker system

are necessary. A gag may be born of pure inspiration or progressive workmanship. Otto Griebing of the Cole Brothers-Clyde Beatty show thinks up most of his turns while lying in bed. He keeps a notebook at his bedside so he won't forget his ideas by morning. Lew Hersey of the Al G. Barnes circus, works out his stunts with the aid of a circus-loving merchant in the Kansas town where he spends his winters. But no matter where the ideas originate or who helps produce them, the clowns must come up each spring with a new series of sure-fire laugh hits. Even on the road during the season, the clown constantly is eradicating out-moded stunts and substituting new ones. A stunt that

Western Electric

Juby Taylor - Hagenbeck Wallau
 F293



Two laugh provokers— a toe dance on stilts and a pig-driven prairie schooner

required months of thought and labor may prove a failure when presented, while some simple one coined on the spur of the moment may become a high light.

Clowning is an exact science. If there is a single flaw in the execution of a gag it may not produce a single smile. Nemo's experience with the Ringling, Barnum and Bailey show a few seasons ago illustrates the point. Garbed in a woman's nightgown and a boudoir cap, Nemo would render "How Dry I Am" on a sour-toned cornet until a bucket of water fell on him. The first few times he tried it the audience did not respond with even a smile. One day he accidentally picked up the dripping nightgown and held it about him differently than on previous attempts. This simple movement struck a responsive chord in the audience and transformed an erstwhile dud into a



George Harmon

screamingly funny gag. A clown will do an endless amount of work and research to devise a stunt. Lew Hersey knew if he could build a prop in which a lifelike goose would appear to be chasing him he could garner a bumper crop of laughs. He knew the force of the gag would be lost with a poor imitation of a real goose, so with his merchant partner, he set out to build a perfect prop. They scanned dozens of goose pictures until they found

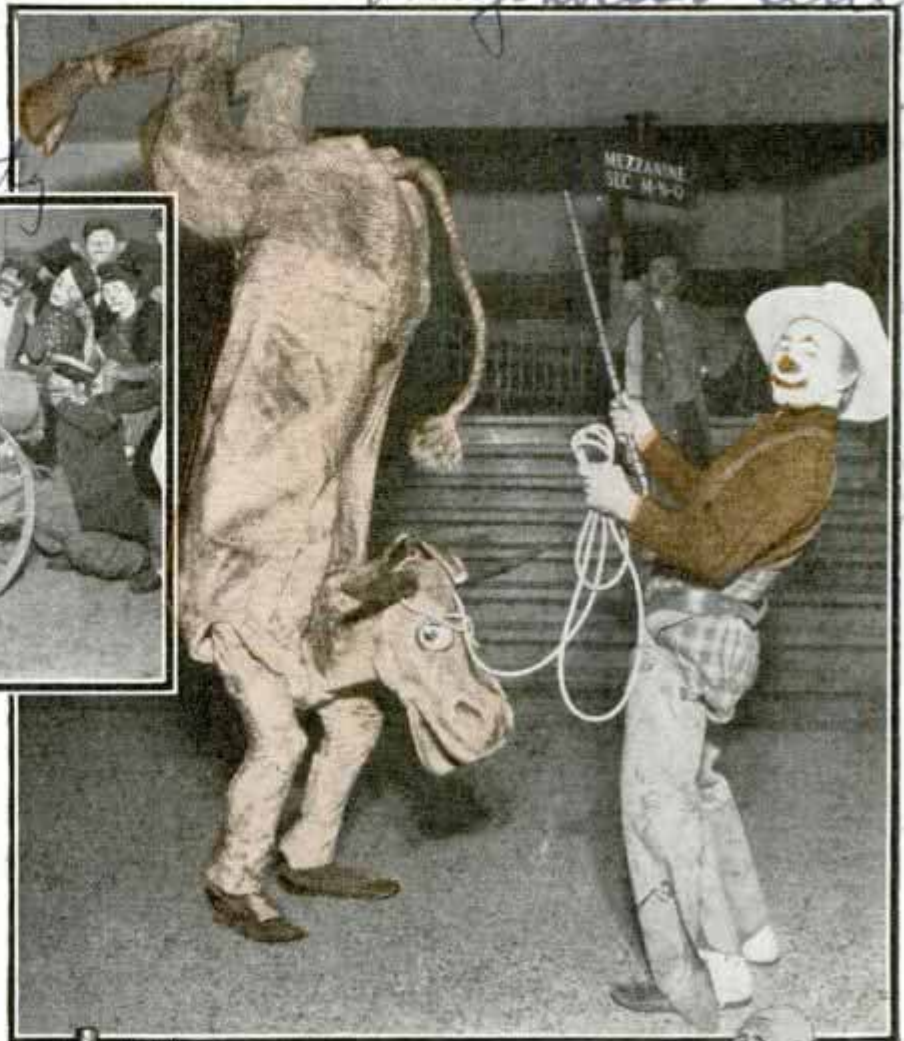
one in a half-running, half-flying position. The framework was then fashioned out of more than 400 feet of wire, requiring approximately 500 soldered joints. To facilitate packing the goose in a prop trunk, the body, wings, neck and head were built separately and equipped with assembly screws. Covering the framework with muslin, the workers then enlisted aid in applying real feathers. When completed, the goose was fastened to the clown's body with steel rods and canvas straps so that as he raced around the hippodrome track the goose was right on his heels with wings flapping wildly.

Newspapers, magazines and the radio furnish the clowns with inspiration. Otto Griebing's impersonation of a political figure giving a radio speech caused wide comment. In pantomime, the clown ranted and gesticulated into a dummy microphone. At the conclusion of the stunt, he was flat on his back, kicking and waving wildly and breaking the microphone to

Handwritten scribbles at the bottom right of the page.

Listening for the big noise, the clown rodeo performer with his steer, and, below, George White and his "patented cigar lighter"

Cole Bros Beaty



pieces. Milt Taylor's travesty of Arctic explorers is a typical clown stunt. Donning a decrepit fur coat, he drives a wheel-driven sled around the hippodrome track with three small fox terriers as malemutes.

There are many burlesques of other acts in the show, too, such as Chesty Harmon's imitation of Clyde Beatty's animal act. Wearing a pith helmet and white duck shorts, the giant clown puts a diminutive fox terrier in a lion suit through its paces. Circus fans who laughed at Silvers Oakley's one-man baseball game, or saw Lon Moore wrestle himself a few years ago are equally amused watching Felix Adler of the Ringling show give an imitation of a Victorian dowager attempting to pick up her purse. As he bends over, his hoop skirt goes over his head, and he goes through several funny stunts before solving the problem.

George White of the Hagenbeck-Wallace troupe gets plenty of laughs with his patented cigar lighter. To set the lighter

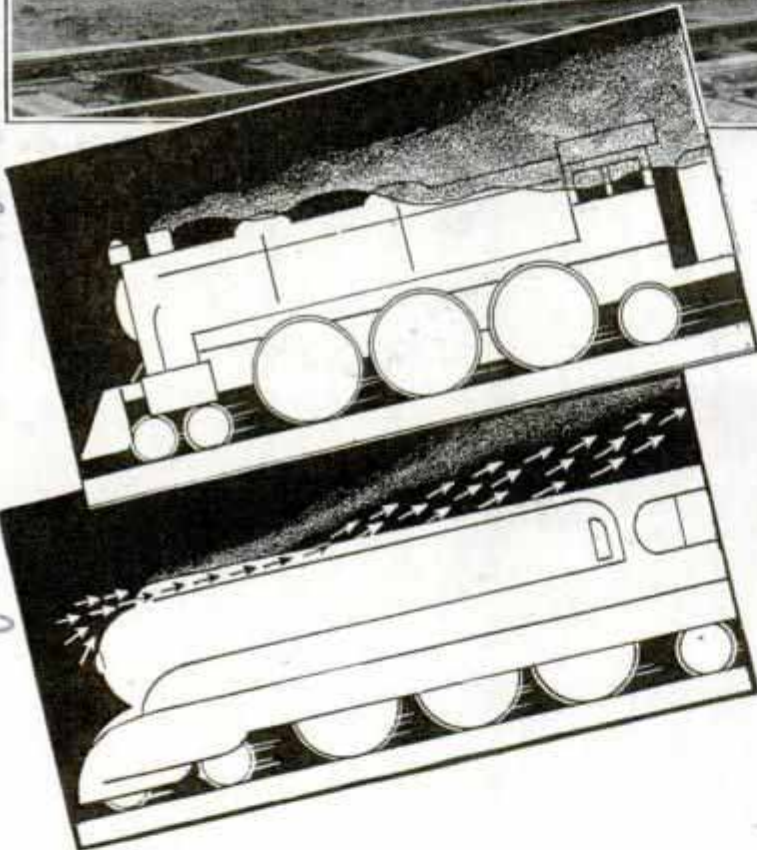
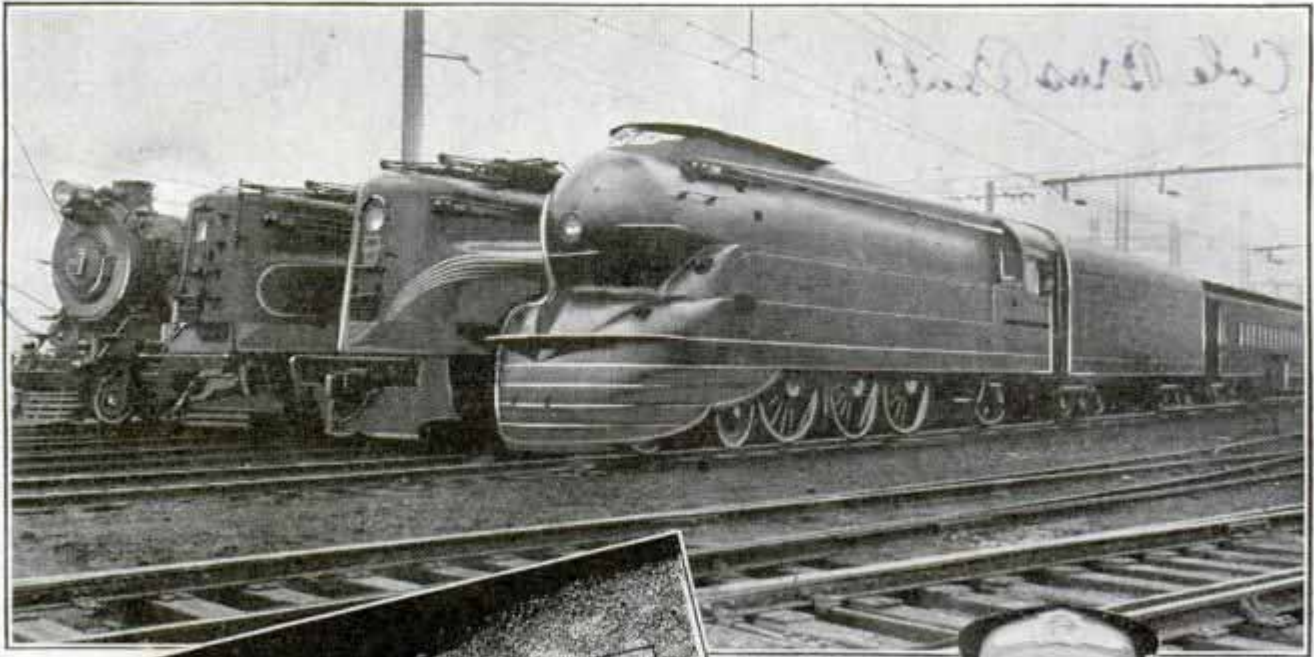


in motion, a billiard ball is started down a wire chute and then passes through a trough, striking a lever that tips a sprinkling can. Thus are the paper flowers in a near-by pot watered and when they spring up, a parrot bends over to pluck them, but in so doing riles a stuffed cat whose tail

(Continued to page 142A)

Streamliner's 'Wings' Lift Smoke above Train

Designer Raymond Loewy, 5-80-5 H. Ave. New York



Top, Pennsylvania's standard steam locomotive, two electric types and new streamliner. Drawings show path of smoke above old and new engines. Right, nose of streamliner showing smoke "wings"

Builders of the youngest member of the Pennsylvania railroad's fleet of streamline locomotives borrowed a fresh idea from airplane designers. That idea has eliminated the smoke screen that dropped down to shroud the view of passengers from car windows; and, equally important from the safety standpoint, has assured the engine crew a clear view ahead, unclouded by swirling smoke or steam. Level with the top of the smokestack are horizontal fins, extending out like airplane wings. Be-

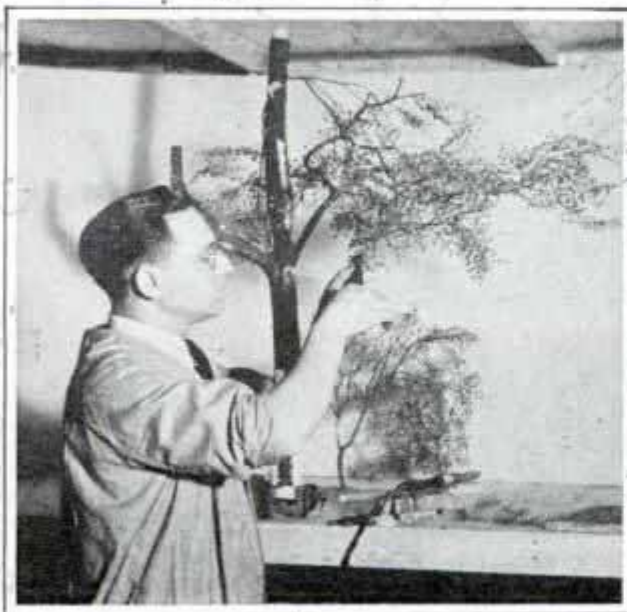
tween these and the upslanting side roof of the engine a stream of air flows back, to catch the smoke and thrust it up, away from cab and train. In designing this latest of steam-powered streamliners, clay models were tested in wind tunnels. The clay was remodeled as the tests progressed. Smoke bombs tested the flow of air, and silk threads blowing in the "slip stream" told the engineers how near their model approached to perfect streamlining. The nose of the pilot is rounded, and one-inch

Bull at work at

steel sheaths a standard type cow-catcher. The coupling is covered, since exposed couplings tended to press down on objects struck; but the cover slides up like a roll-top desk lid when access to the coupler is desired. At a mile a minute tests of the locomotive showed a reduction of one-third in wind resistance, saving nearly 300 horsepower at maximum speeds. Driving wheels are eighty inches in diameter. Engine and loaded tender weigh 627,550 pounds and are ninety-five feet long.

It Takes Months of Work to Make a Model Tree

Tiny scale models of trees, reproducing faithfully in miniature the characteristics of full-grown trees, are expensive to make and call for weeks or months of painstaking work. Single trees are sometimes made from twigs and branches of sagebrush, and as many as four thousand leaves must be put on the model individually. A large tree may cost \$200. Charles Plastow, government technician engaged in this work, says considerable patience and dexterity are required. One set of pine trees with more than 800 pine needle-clusters on each tree was built over a period of several months.



"Building" a model tree from sagebrush

Radio Fountain Is Operated by Electricity from User's Body



Electricity from body is picked up by antenna in fish bowl, shown near the man's head, causing the fountain to flow

Electricity from the human body actuates mechanism which turns the water on and off in a new radio fountain. When a person approaches the fountain, the electricity in the body is picked up by the fountain's antenna, located near by. After being stepped up through amplifiers these "signals" cause the mechanism of the water valve to operate, turning on the water. When the person withdraws the signals cease and the water is shut off. Tests show that the antenna can be set to pick up the signals over distances of a few inches or up to forty feet. The antenna is similar to the directional loop of a radio, the field being in a double egg shape. No photoelectric cell is employed. A metal can be substituted for the human body if it is excited separately by a small electrical current. This makes possible many additional applications of the principle, such as operation of garage doors, safety devices for factory machinery and the like.

Cont. James W. Queng
20 W. Hartman Road

'Chute Jumpers in Gas Masks March on Skis



This group of oddly costumed men dropped by parachute from planes a few minutes before starting long march on skis

Resembling creatures from some strange world, a group of parachute instructors in gas masks recently dropped one after another from a Soviet plane, then marched 200 miles on skis. The skis were dropped from the plane after the twelve men had

landed safely. Thirty hours were required for the long march to Moscow. The demonstration was staged by the instructors as one of the lessons in parachute jumping that the Soviet Republic is offering in training civilians.

Pistol Bullets Reduce Hazard of Blazing Gasoline Truck

When a large gasoline truck caught fire recently on a California highway, traffic was halted in fear of an explosion. To speed up the fire, an officer of the state highway patrol fired pistol bullets into the blazing tank of the truck to release the gasoline at many different points. This stopped the formation of gas inside the tank, which carried 5,700 gallons of gasoline when it caught fire.

Our Bureau of Information will answer questions regarding articles in this magazine, if accompanied by return postage.

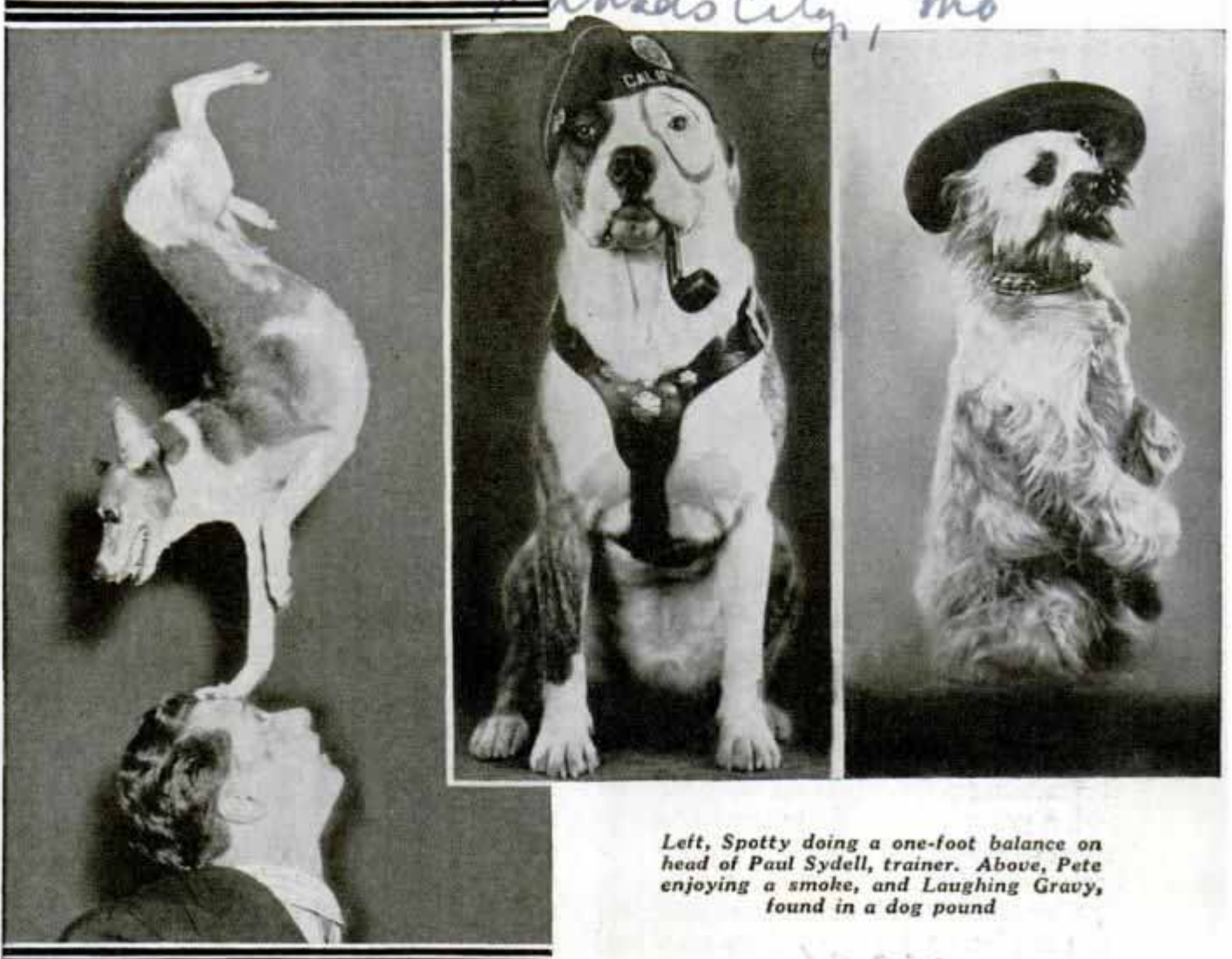


Highway patrolman firing at blazing tank of gasoline truck to speed up combustion. Puncturing the tank prevented an explosion

Capt. Joseph Calahan

7-285.

28 W. Hartman Road
Kansas City, Mo



Left, Spotty doing a one-foot balance on head of Paul Sydell, trainer. Above, Pete enjoying a smoke, and Laughing Gravy, found in a dog pound

Secrets of FAMOUS

HAVE you ever murmured "impossible" while watching the antics of famous dog performers at the theater or movies?

If so, were you correct in your assumption? It all depends on the stunt and who was doing it.

In movie comedies, dogs frequently are called upon to do the "impossible," according to Harry Lucenay, who has spent fifteen years in training canine movie stars, including the renowned Pete of "Our Gang" comedy fame. Veteran of more than 200 comedies and feature pictures, this dog has made a fortune before Hollywood cameras. But natural born actor and comedian though he is, Pete himself would be amazed at some of his screen antics.

For example, Pete frequently is called

upon to register astonishment by putting his paw behind his ear while sitting up on his hind legs. Due to a dog's physical make-up, this is virtually an impossibility. How is it accomplished? Simply by having the trainer place the dog's paw behind the ear before starting the cameras and then shooting the scene in reverse action. A shot then is made of him sitting up in a natural position. In the cutting room the two shots are matched so the action appears to be simultaneous.

When a comedy script called for Pete to smoke a pipe, several plans were tried without success. Finally a profile shot of the dog was made, the cameras being so arranged as to cut out a small portion at the rear. A strip of copper tubing was then fashioned into a Z-shape so one end



DOG TRAINERS



Photo upper right by Stax
 Harry Lucenay and Pete. Above, Kiki doing a balancing act and Pete pawing over his fan mail

could be placed between the dog's teeth, and the other on the outside of his jaw on the side hidden from the camera. To this end was attached a rubber hose that ran along the hidden side to the trainer beyond the camera lines. A pipe was then placed in the dog's mouth and his trainer, blowing smoke through the tube, supplied realistic puffs. Inasmuch as the rear of the dog was not in camera range, the rubber hose could not be seen.

In another comedy, a young married woman, while making a cake, accidentally put a pan of chicken feathers into the ingredients. The laugh came when Pete



was given a piece of cake and started spitting out the feathers. Lucenay experienced little difficulty in getting this effect. After the preliminary shots of the dog munching on cake were taken, the trainer rolled up some feathers in a compact ball and placed them in Pete's mouth. Cameras started grinding and Pete was told to bark. When he did, the feathers shot out of his mouth.

In another picture, a college weakling became the campus hero when, while being chased by a dog, he succeeded in winning a cross-country race. Here the problem was in keeping the dog at varying distance behind the runner. When the athlete showed signs of slowing up, Pete was to move up within biting distance. Attaching a long piece of piano wire to the dog's collar so he could govern the dog's speed from the rear without detection, Lucenay placed Pete's play ball in the runner's back pocket. When the actor started to run, the dog was after him to get the ball.

The methods he has used in training movie dogs can be used successfully in the

education of house pets, Lucenay says. A dog to be trained must have love and confidence in his master, he warns. Too, he must be taught to respond immediately to commands.

"The reason many dog owners fail at training," he explains, "is because they lack patience. They attempt to teach everything in a few weeks, when actually, months, and even years, are required to do the job properly."

The early stages of training should be masked as play, says the Hollywood trainer. Thus, knowledge is instilled without making it a hardship. A hard rubber ball is the best pencil and



Top photo by Stax
Top, Pete finds this hoop a tight fit. Below, Roberta, a performer two and one-half weeks old

slate for the canine kindergarten. If the puppy fails to register enthusiasm when the ball first is rolled, tie a string to the ball and draw it along in front of him. After he has been allowed to catch the ball a few times, he will be enthusiastic.

After a time, a newspaper rolled up and tied with a string should be substituted. This in turn can be supplanted by an old basket, or something else light and bulky. By degrees the weight can be increased. Then, holding the puppy by the collar, the object should be thrown and the dog

commanded to retrieve it. "If the pup brings the object back," says Lucenay, "he should be petted and praised. Walk several steps before removing the object from the dog's mouth. If he doesn't bring it back, roll it around in front of him until he picks it up. When he has mastered this stunt, he is ready to carry a parcel or bring in the evening paper in addition to retrieving."

To teach a pup to sit down, says Lucenay, place your left hand under his lower jaw and gently press his haunches downward at the same time telling him to "Sit down." To teach him to come when called, a light cord several yards long should be fastened to his collar. After placing him in a sitting position walk away and then give the command, "Come here." If he disregards the order, a gentle tug will serve as a reminder. When the gentle tug fails, pull the dog slowly toward you, making certain to encourage and pet him when he is within reach.

To teach a pup to lie down in an indicated spot and stay there, Pete's master gives these suggestions: "Call the pup by name, point to the spot where you wish him to lie, and then in low, even voice tell him to 'Lie down.' Naturally, at first, he won't understand, so after telling him to sit down, pull his front paws slowly forward until he is on his stomach. Place

(Continued to page 120A)

Arched Ceilings Improve Indirect Lighting System



Note fluted or arched sections into which ceiling is divided. This treatment has been found an aid to efficient indirect lighting

Intended for large offices and schoolrooms, a new system of lighting calls for specially constructed arched ceilings. Employing nine 250-watt, clear-bulb, incandescent lamps, it provides more than fifty foot-candles of artificial illumination throughout the room at desk level. The arched ceilings, used in the experimental installation by the Nela Park engineering department of the General Electric company, cause the light to come straight down, most of it uniformly, instead of spreading in a manner annoying to the eyes. The arched sections in the eighteen-foot square experimental room are about five feet wide and sixteen inches deep. The reflecting material is satin-finish sheet aluminum. In a new building, the cost would not exceed greatly that of an ordinary ceiling of metal lath and plaster.

☐ Automobile headlights in France must be yellow instead of white on the theory that yellow is safer and less blinding.

Nela Park Cleveland, Ohio

French Minister of Public Works
Automotive Industries
Mar. 7, 1926

Light-Beam Telephone Uses No Wires



Talking into microphone of light-beam transmitter. Note flashlamp on transmitter

Mechanism consisting of a flashlamp and a microphone fed by the same battery is used in transmitting the voice by light beam in an experimental wireless telephone developed in England. The light varies with the voice and the variations are picked up by a photocell at the receiving station and converted into sound. Thus far the apparatus has been used only for transmitting the voice across the street.

Coupe Has Handy Pickup Body for Carrying Packages

Combining passenger car appearance with the utility of a small commercial car, a coupe with a pickup body is being marketed by one of the large automobile companies. The pickup body, which is built



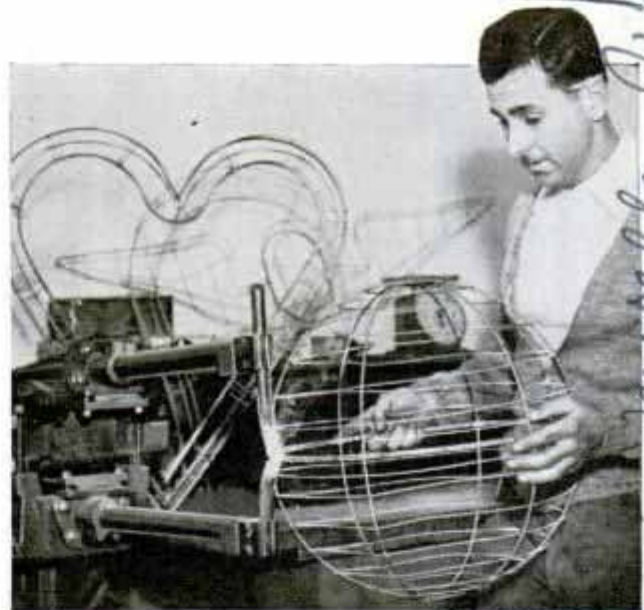
Two views of coupe with pickup body for carrying large load of small packages

in the rear compartment, has a load space of sixty inches in length by forty-one inches in width. The opening under the rear deck is sixteen inches deep, which permits loading large packages well forward on the platform. When the tail gate is lowered flush with the floor, the platform is seventy-one inches long. Heavier springs are used to support the pickup load. The vehicle is designed especially for delivery service and for electricians, plumbers, contractors, oil-field workers and others who haul compact loads. The pickup box is constructed of steel panels with a wood floor that has flush wear irons running lengthwise.

F280.

Wire Frames for Floral Pieces Are Welded in Any Shape

Welding wire into skeletons for floral pieces has been developed into a profitable business by William Morelio of San



Welding wire frames into a variety of shapes appropriately designed for floral pieces

Francisco. The frames are twisted into the shape of hearts, horseshoes, wings symbolic of aviation, crosses, globes, etc., suitable for weddings, funerals, or for decorating business houses at special events. Then the wires are welded to give them permanent shape and strength.

Cold liquid animal hide glue which can be used in ordinary room temperatures without special preparation or heating, is now being manufactured.

Handwritten notes:
F335
Schenectady NY
Mr. B. J. Cramer
General Electric
Model World
F299
William Morelio
155-6 Kings St. San Francisco
Chevrolet motor Co
420 W. Milwaukee Ave
Franklin Blue Co, Phila

#88. Thomas G. Dumeon Jr.
 10655 Holman Ave
 Los Angeles, Calif.

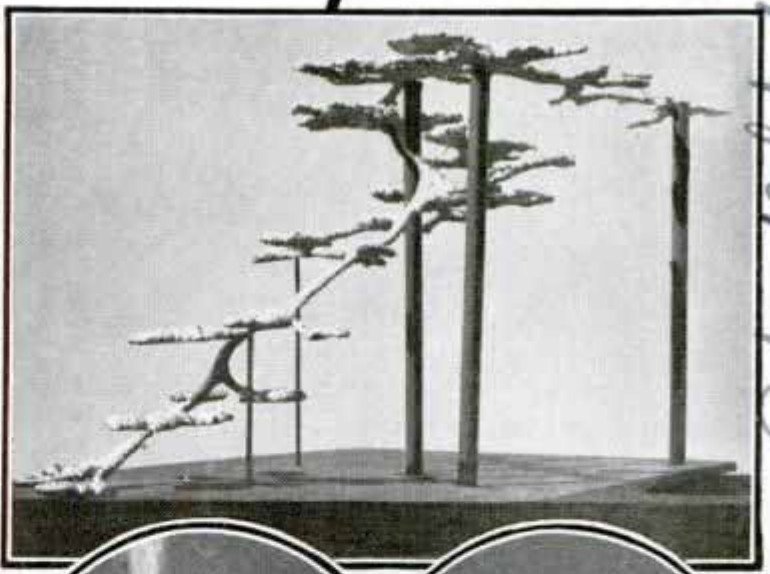


TIPS on Getting RID of ANTS

TO GET rid of ants, plan a definite campaign and attack them in several ways at once because no one remedy is usually effective. If you are lucky you will be free of the pests in a day but you can be certain of eliminating them within a week.

First, keep all food supplies in ant-proof containers. You will reduce the nuisance when you begin to starve the pests out.

"There are dozens of species of ants, and exterminators use many different methods of control," says J. W. Joy, entomologist. "If you go after the pests wholesale you can get as good results as the experts. But remember that poisons effective against ants are deadly to humans and animals. A poison should be used in small amounts and kept in a trap where only ants can reach it. The best time to rid a house and garden of ants is in the spring or fall. During the summer natural foods are



Top, ant sirup can attached to stake, and applying treated burlap to tree. Center, lead casting of interior of ant colony. Bottom, table leg in kerosene, and types of bait traps

Agree. Bulletin # 746
 Washington Post
 Prof. Dept. of Pacific Island
 J. W. Joy, 6816 Pacific

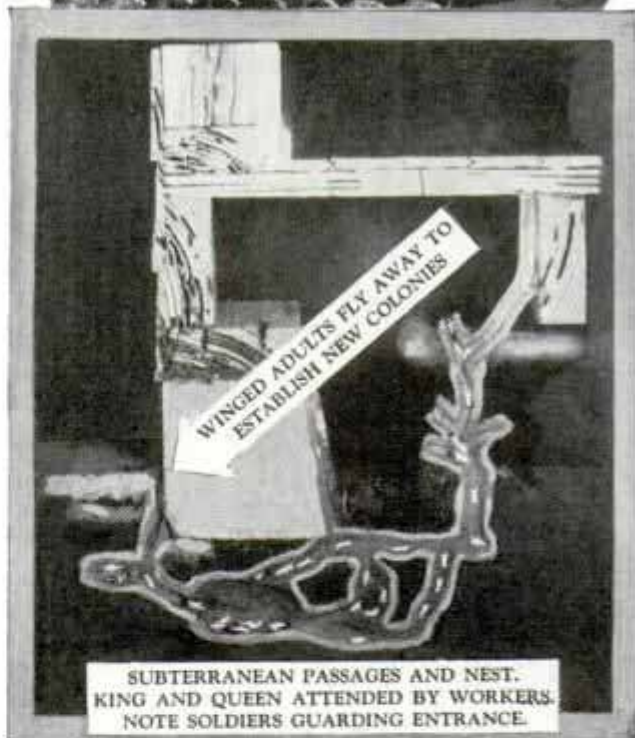


Attaching poison bait trap to tree and, right, cooking poison ant sirup in factory, filling bait cans, and model showing underground nest of termites

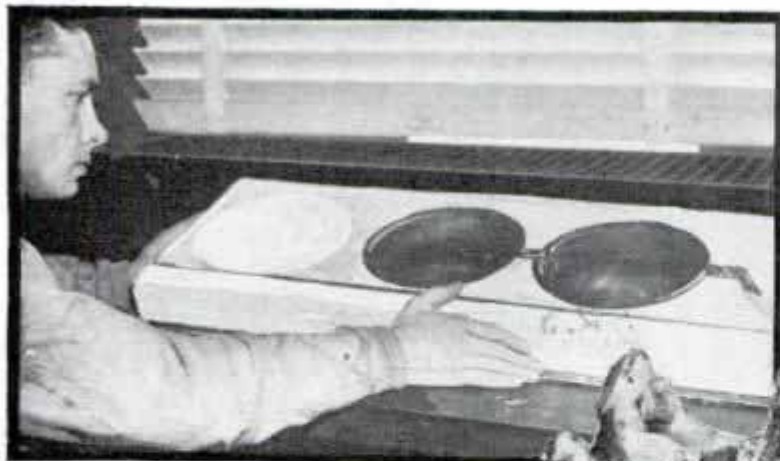
plentiful and ants may not be attracted to poison bait."

Most ant poisons on the market come in non-spillable traps that permit only small amounts to ooze through holes or wicks. These are usually safe since little can be spilled at a time. Most commercial ant poisons contain some form of arsenic, a deadly poison. Experts recommend some brand containing only a small amount of poison because heavily poisoned baits are almost immediately effective on the worker ants and they die before carrying the poison to the nest. Bait with only small amounts of poison eventually is consumed by the queen and other inhabitants of the nest. Any liquid poison should be refreshed every few days with more sirup. Half a dozen bait traps in a house or under it should be enough.

Most species of ants are sweet eaters but they occasionally change their diet. The so-called grease ants which normally feed on greases and meats are difficult to eradicate because they are small and make their nests in out-of-the-way places. As a poison for these, mix a pinch of powdered arsenic with some ground-up walnut meats or rub the arsenic over a few strips of bacon. Place the walnuts or bacon near the ant trails but be sure there is no chance for children or pets to reach the poison. If arsenic is not available, try a regular brand of sweet bait with the



walnuts or meat. Poisoned food is only part of the job of control. Exterminating companies try to locate the nesting places and wipe out the colonies with poison gas. You may try the poison-gas system first and then follow with poisoned food or use both methods at the same time. Ants have



been known to nest in furniture but you will usually find them under a floor or in some part of the house accessible only through a small crack. Some species travel regular paths but other types take round-about routes.

If it is possible to reach the nest you can obtain complete extermination by injecting small amounts of carbon disulphide into it. Kerosene or gasoline may also be used. The fumes of these liquids appear to be deadly to the insects. All fires in the house, especially pilot lights of gas burners, should be put out for several hours. If you can't reach the nest, you may find a small crack near it or about it through which the liquid may be injected with an oilcan or small syringe. Non-inflammable carbon tetrachloride also produces an effective gas. The gases are heavier than air and make their way downward.

Most kinds of ants purposely spread plant lice and scale insects from plant to plant, then valiantly fight off any enemies so they may feed on the honeydew excretions these smaller insects produce. In the citrus regions the aphid was a costly pest until it was discovered that Argentine ants were guarding the aphid from its natural enemies. As soon as control measures were taken against the ants the other pest was practically wiped out. In some parts of the south Argentine ants have infested homes until the occupants were forced to move. These ants are slowly moving north. Sweet poisoned baits are used to control them.

Naturally, when you start an anti-ant campaign you must include the grounds



Top, scientific ant nest with glass top used to study habits, and wood destroyed by termites. Bottom, preparing to "gas" an ant colony

around the house. The work is easier outside since the entrances to nests are easy to find. The same double offensive of poisoned gas and poisoned food should be used. Place as many as a dozen poison bait traps around the grounds in the vicinity of trails and holes. Argentine ants usually nest in the ground at the base of large trees in well drained spots or under piles of manure and other heat-producing rubbish. Other species build their mounds or pits in the open. Pavement ants make their homes under stones and some small black ants nest in rotten wood. Carpenter ants infest the foundations of houses.

(Continued to page 118A)

F292

Carved Animals for Movie Given 'Life' by Animator



acme
Animating wooden animals for Noah's ark scene in the film version of "The Green Pastures"

Wooden animals were "brought to life" for the film version of "The Green Pastures." The scenario called for a procession of animals into Noah's Ark. Miniature animals were carved, animated by L. S. Manning, animation expert, and then marched into the ark two by two.

electric motor located inside. The developing tank is placed on a round table on top of the cylinder. Turning on the motor produces an oscillating motion, which is said to be the best action for proper developing. An automatic time switch which will stop the agitator at the expiration of the developing period also is available.

F325

Sandblasting Bath Tub Makes Enamel Coat Last Longer

Roughening the surface of formed metal bath tubs makes the ground coating of porcelain enamel adhere closely and results in a finish which will last a century. The roughening is done by sandblasting, the sand being driven through the nozzle of the hose under an air pressure of eighty pounds. Proof that the porcelain enamel would withstand four baths daily for more than 100 years was established recently in a special test. A 480-pound weight was dropped into a tub by a special machine twenty-three times per minute until a total of 139,000 times had been rolled up. This was equal to four baths daily for 102 years, according to research men who pointed out that dropping the weight produced the effect of an average-weight person stepping into the tub and bathing.

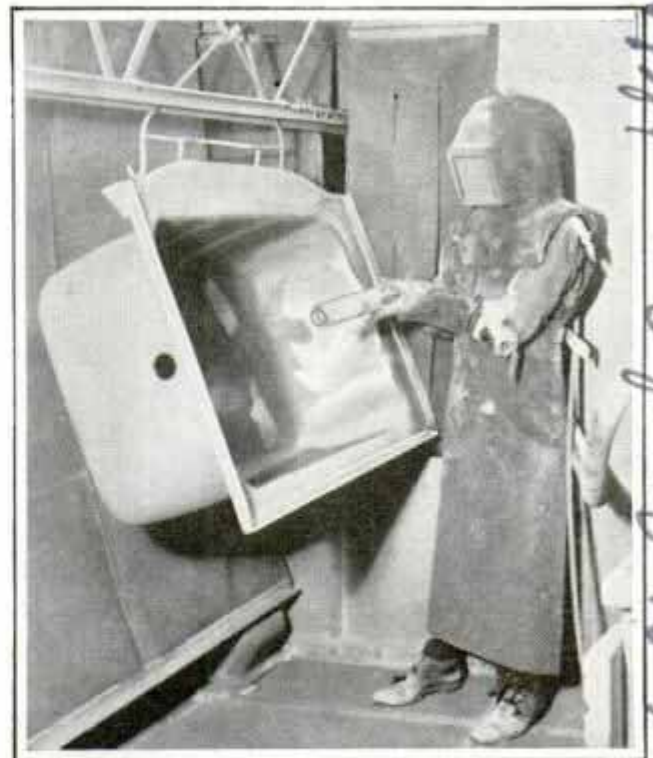
F263

Agitator for Developing Tank Saves Time on Small Film



Designed to produce better results and to permit the photographer to devote his time to other work, a new agitator for the film developing tank is available. It is offered for the proper agitation of Leica and other miniature film and eliminates the unsatisfactory method of tank agitation by hand.

It consists of a cylindrical body of perforated sheet metal with an



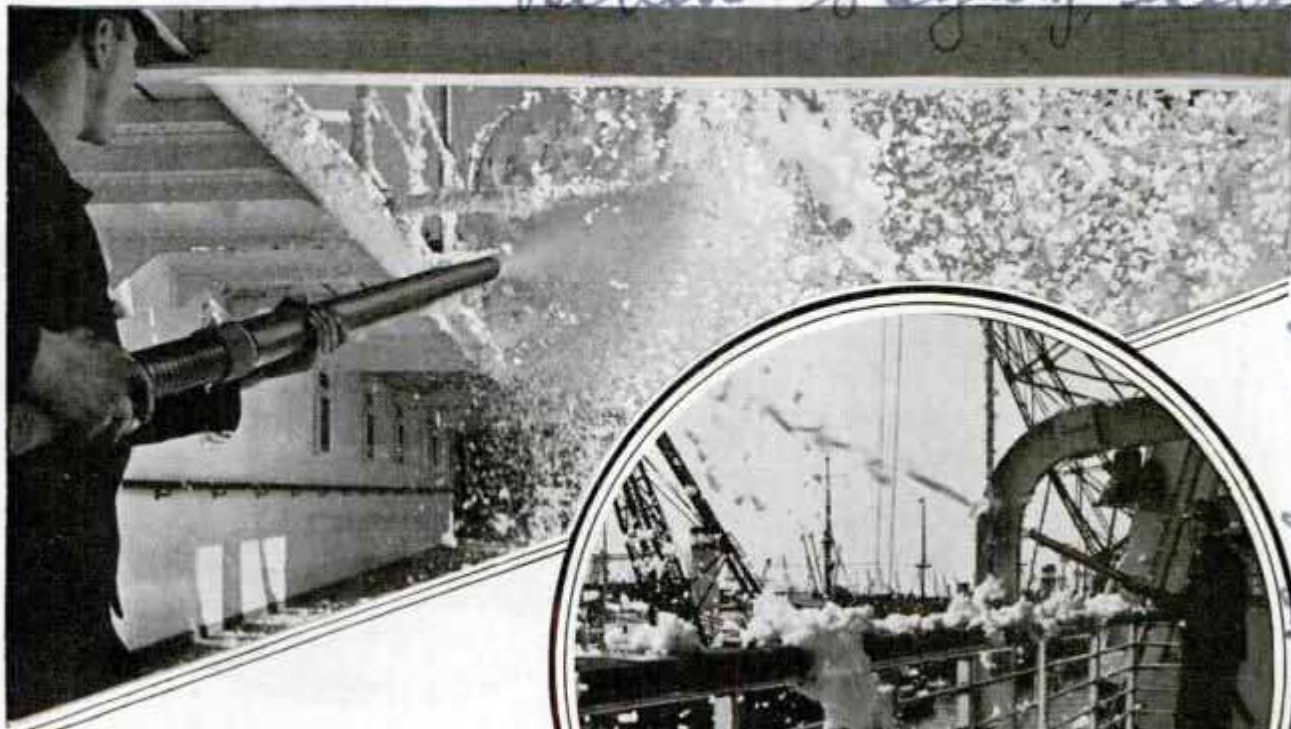
Workman in protective costume as he sandblasts interior of metal bath tub

Electrical Mech
116 31 Mack Ave.

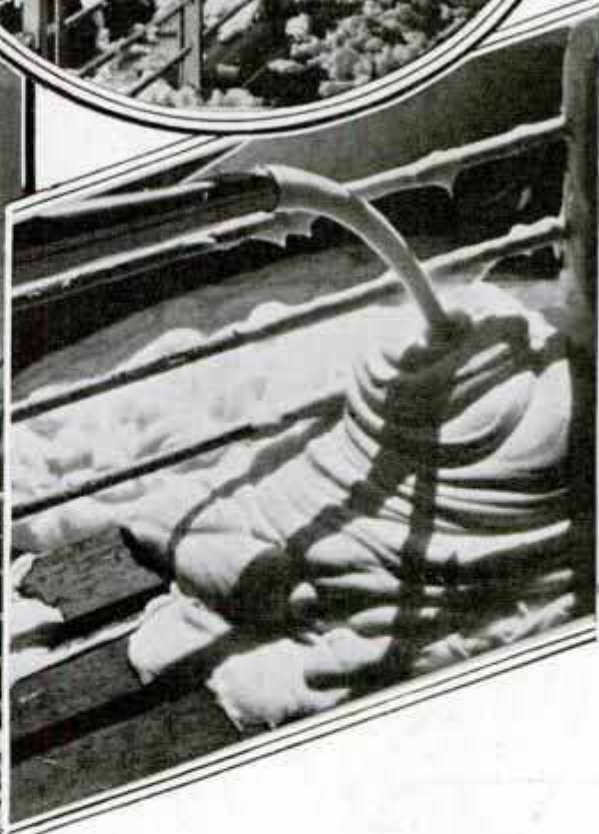
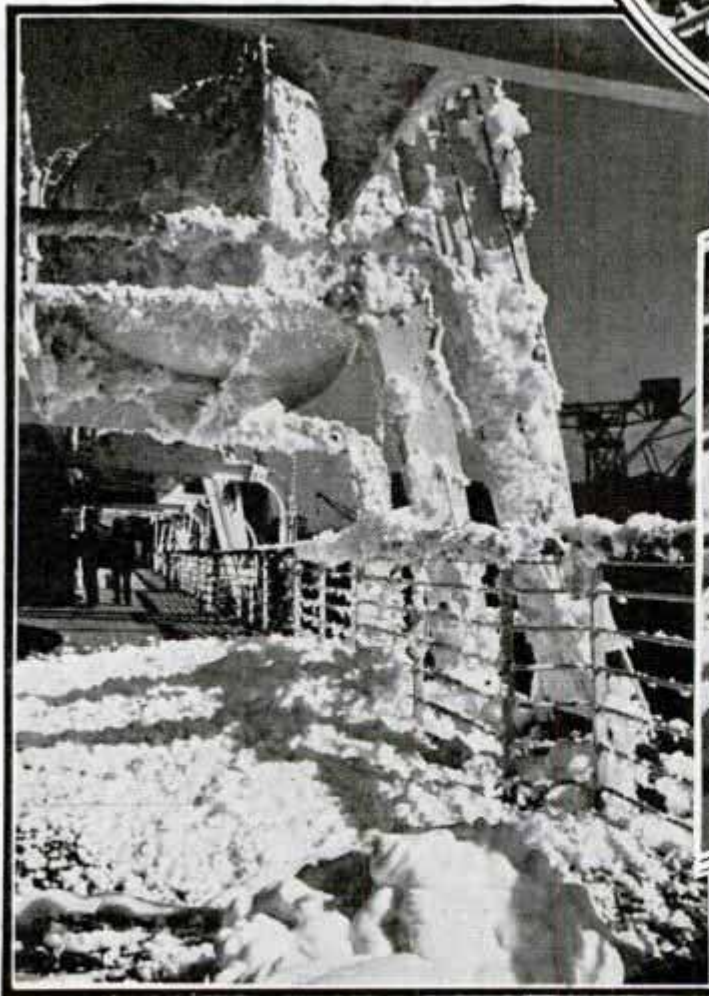
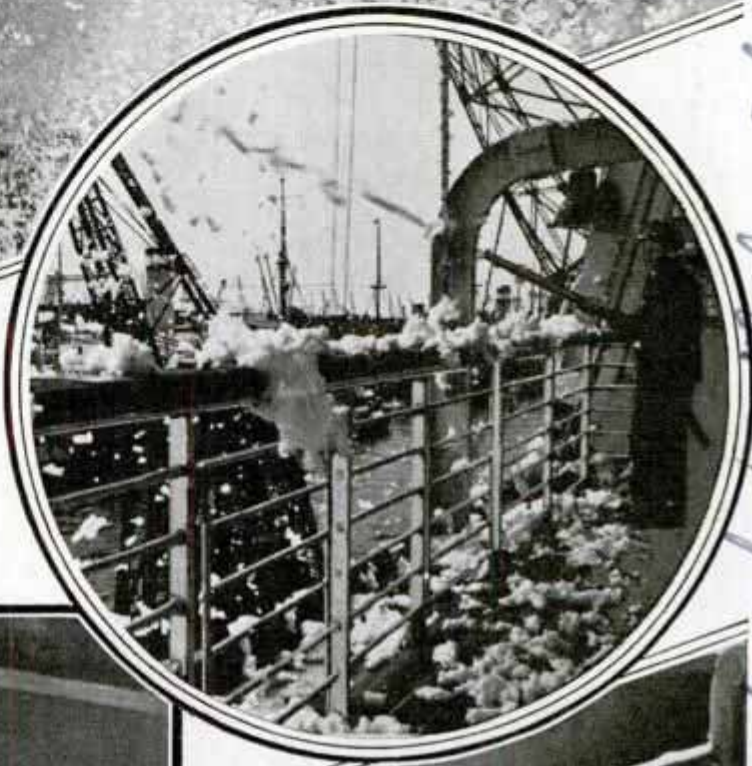
E. Lutz, Inc.
60 E 110th St. N.Y.C.

Burgin Ingr Co
Plumbing & Welding

Ship's Crew Fights Fire with Snow in Tropics



"Snow in the tropics," they call the blizzard of foam shot from hose lines on German motorships as the crew engages in fire drill while cruising tropical seas



Decks are flecked with lather from the fire extinguishing apparatus, whose pipe lines reach every part of the vessel. At low pressure the foam pours like batter

North German Lloyd.
Bremen, Germany.

German motorships "Schamhorst"
"Sachsenwald" of Ostdam

270
North German Lloyd
Bremen, Germany

Fish



Above, walleyed pike caught with bait-casting tackle and deep-diving lures. Left, this muskie is a worthy opponent of any angler. Bottom, a plug fooled this bass. Opposite page, the long whippy rod gets trout, crappies and blue gills

The LATEST

By Bob Becker

c/o Sports Dept.

WITH many kinds of fish to be caught and with thousands of styles of rods, reels and bait-casting lures from which to select, it's not easy for a beginner to pick a serviceable outfit, especially if he wishes to budget his expenditures.

How heavy should the rod be? Is there an all-around rod for bass, pike and big pickerel? How many lures does a fisherman need? Is a fifteen-pound line heavy enough for northern pike? These are just a few of the questions bothering the novice.

When a fisherman begins to assemble an outfit he naturally divides it into these fundamental accessories: a bait-casting rod with case, a reel, a line or num-

Chicago Tribune Chicago



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Glueger Fishing Tackle
Akron Ohio
Creek Club Boat Co
Isarett, Inc.
James Hendon's Sons
Huwagias
Inc.



in FISHING TACKLE

ber of lines, leaders, lures, a box for carrying equipment and a few "fishing gadgets" such as a hook disgorger, a small scale for weighing and a stringer.

When selecting a rod for bait casting, the problems begin. One angler insists bamboo rods are the only thing. Another says a solid steel, one of those whippy rods that make you think of fencing, is just right. A third advises a drawn tubular steel rod. There are also rolled steel rods that are inexpensive and durable. Which shall it be?

In choosing, keep these things in mind. A five-foot rod usually is desirable for bait casting. Bamboo rods have lots of action, but require more care. A steel rod will take more punishment day in and day out. All will catch fish if you do your part, but for rough work on lake and stream the steel "fishing weapons" undoubtedly last the longest.

You can buy a serviceable tubular steel

rod in three pieces for as little as \$1.95. Of course, the lower-priced rods do not give all the working qualities, resiliency and fine finish you get in weapons which cost more, but they will toss lures and enable you to catch fish.

A solid steel rod may cost from five dollars to fifteen dollars. These have blades made for light lures as well as stiffer ones to handle heavier lures. I recommend the stiffer blade for all-around use. The fisherman who has about twelve or fifteen dollars to spend for a rod that will last for many years should consider the hollow drawn steel or bamboo rod. The drawn tubular steel is the newest thing in rods, being light, durable and beautifully made.

Whatever type you buy, pick one with the action needed for your fishing. You can't handle a heavy northern pike well on a rod designed to cast the lightest lures. Many manufacturers make rods that are



many fishermen a lot of sport and service. A good reel is practically a lifetime "fishing partner." It is much easier to cast and catch fish now that reels are being made in the medium-price range which have level winding and anti-backlash attachments. If you are not a skilled caster, I recommend a reel with either or both these improvements. The level winder is a sort of "needle's eye" through which the line passes as it is reeled on the spool. The attachment is geared to the winding apparatus to move back and forth whenever the reel handle moves, placing the line evenly on the spool and eliminating the hit-or-miss method resulting from use of the thumb and forefinger.

A comparatively new kind of



light, medium, and stiff in action, so you can make your choice. For catfish, northern pike, muskies and other heavy fish you need a five or a five and one-half-foot rod with fairly stiff action. You can get them in two or three pieces.

For small-mouth bass and northern large-mouth bass choose a five-foot rod. If you like lightweight lures, the rods can be on the "light side." If you want to cast plugs a rod classed as "medium" is better. For sunfish, crappies, perch, rock bass, and other small fish, it's more fun to use a seven and one-half or eight and one-half-foot fly casting rod, even if you're using bait. You can have a lot of sport with the long, whippy rods, and they can be bought for as low as two or three dollars. If you spend from six to fifteen dollars for one of these fly rods you can get one that will last for years.

Every fisherman realizes the importance of the reel in bait casting. Reels are like fine watches in their mechanism, if you buy one in the medium or high price range. You can buy a reel for as low as a dollar or two, but in the four to fifteen dollar price class are the reels that give



Top, a good day's catch. Center, steel rods landed these northern pike. Bottom, fighting a muskie. Note the pull on the rod

Lightweight steel rod - Seephart
Wd. Co. 224 W. Illinois
Chicago

Model Cigar-Box Houses Built as Latest Hobby

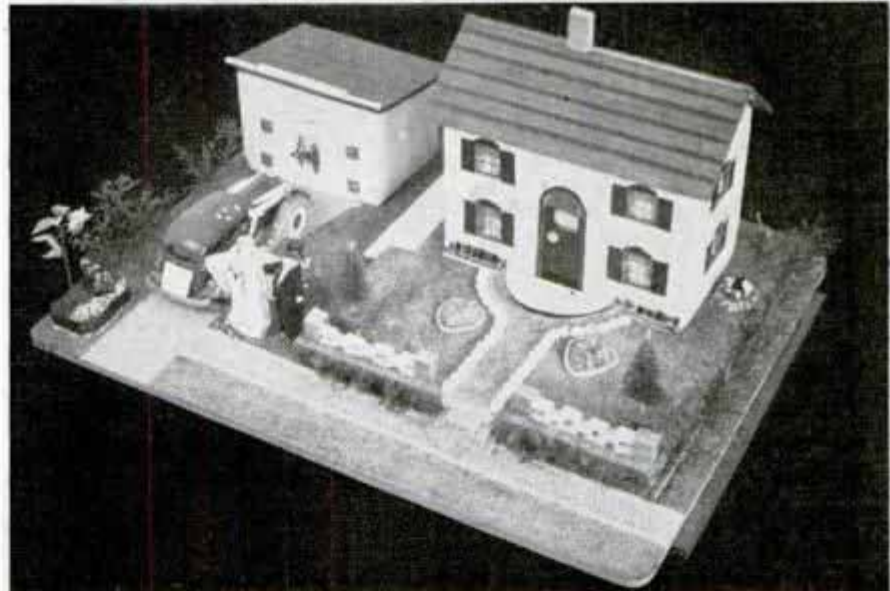
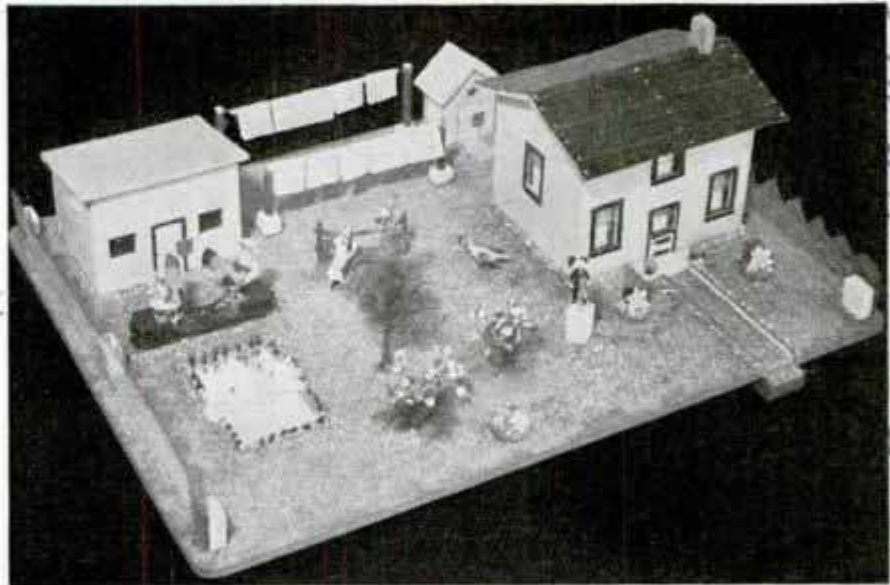
reel that fishermen are finding valuable measures the length of each cast with a meter built into the reel. After you have cast a lure, a glance at the meter tells how far you tossed. The reel also can be used for sounding the depth of water when looking for a weed or gravel bar. Equipped with a level winder, this reel not only does the work of any good reel, but also is a working "yardstick."

Braided silk lines usually are recommended, being strong and easy to cast. A line testing from twelve to fifteen pounds usually is recommended for the caster out for bass, and a fifteen-pound line is a good all-around one for walleyed pike and northern pike. For muskie I recommend a line testing from fifteen to twenty-four pounds. Lines should be well dried after each trip. The old-fashioned method is to stretch the line between two nails driven into a tree, but now there are line dryers which eliminate much of the time and trouble.

When we come to lures for the bait caster we get into something controversial. Every angler has his favorite "plug" or other pet lure, and each has his own ideas as to the proper lures to use under various circumstances. I believe every fisherman should have at least one or two lures of each of the following classifications: surface, semi-surface, deep diving, underwater metal, and spinners and fly combinations. Fishing conditions and situations vary so the wise angler goes prepared to meet the varying conditions.

For instance, you wouldn't use a plug lure when casting a shoreline with thick

(Continued to page 116A)



Two examples of the new hobby. Note the artist's close attention to detail in laying out the grounds of each house

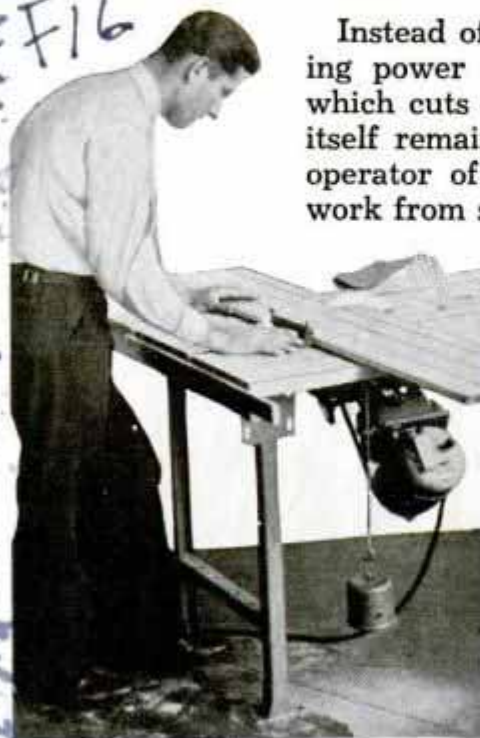
Building miniature houses of cigar boxes and decorating them with tiny fish ponds, bird cages and flower gardens is the hobby of a Missouri woman. One called "The Flower Garden" is built on a three-foot platform. The house is fashioned from a cigar box with strips of a leather belt for roofing. Artificial flowers and shrubs are scattered realistically about the garden, in the center of which is a small pool made of glass. It took 105 hours to make that model. The miniature homes are painted carefully and other details are constructed to give the finished models a natural appearance.

4919a
 From Ogden, Ky.
 Lacked one lb. line, in
 1915

2/27/36

Motor Saw Tilts at Angle While Table Remains Level

Instead of a tilting worktable, a tilting power saw has been developed which cuts at an angle while the table itself remains horizontal, relieving the operator of any effort in keeping the work from sliding. The rotary saw and



Two views of the worktable with counterbalanced power saw which can be tilted at any angle

its motor are adjustable as a unit. Raised or lowered by a hand wheel, the ten-inch blade can be locked in position with a slide bar bolt, a gauge indicating the angles from zero to forty-five degrees. Adjustment is facilitated by a counterweight. When it is desired to use the table top for other work, the saw blade is easily lowered. Depth and angle of cut can be varied with great accuracy.

Marble Given Luminous Beauty by Processing Natural Stone

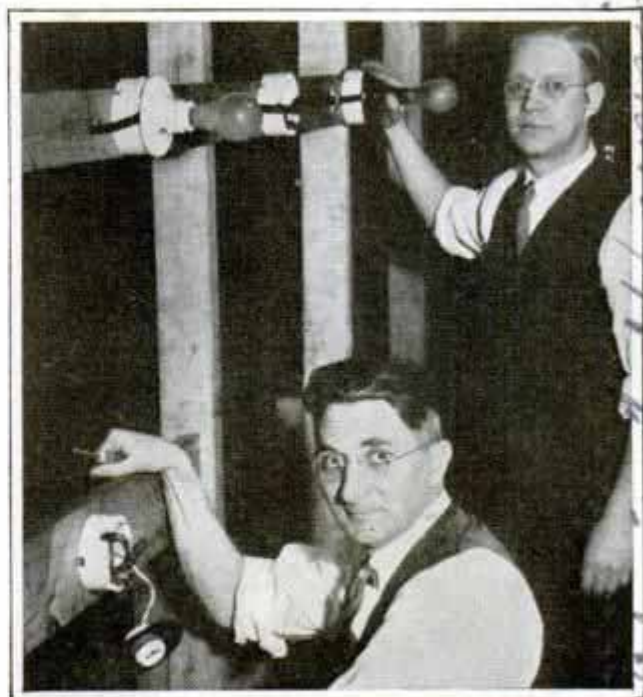
Translucent marble whose sub-surface color and beauty of texture are brought out by a special process has recently been made available for architectural decoration. Research workers studied the calcite crystals which compose marble, and determined the crystal structure best adapted for transmitting light. Then they developed a process which reveals the light and color in the selected stone. Six color styles in this translucent marble are available: deep red, brilliant gold with brown

markings, soft green clouds on a cream background, bands of green and cream, "sunset" shades crossed by green bars, and light and dark waves contrasted with crystal-clear quartz areas.

Shockproof Wiring Is Safer

Designed to replace hazardous outlet boxes and unprotected wiring found in many farm buildings, a new shockproof electrical system has been devised. It includes a porcelain outlet box and non-metallic sheathed cable which will be protected by strips of board up to seven feet from the floor. Present wiring in almost all barns is fully exposed, creating the hazard of an electric

shock strong enough to kill livestock. Wiring is liable to corrosion in barns because of dampness, the presence of gases and the use of disinfectant sprays.



Shockproof wiring system installed in barn. Note the all-porcelain outlets

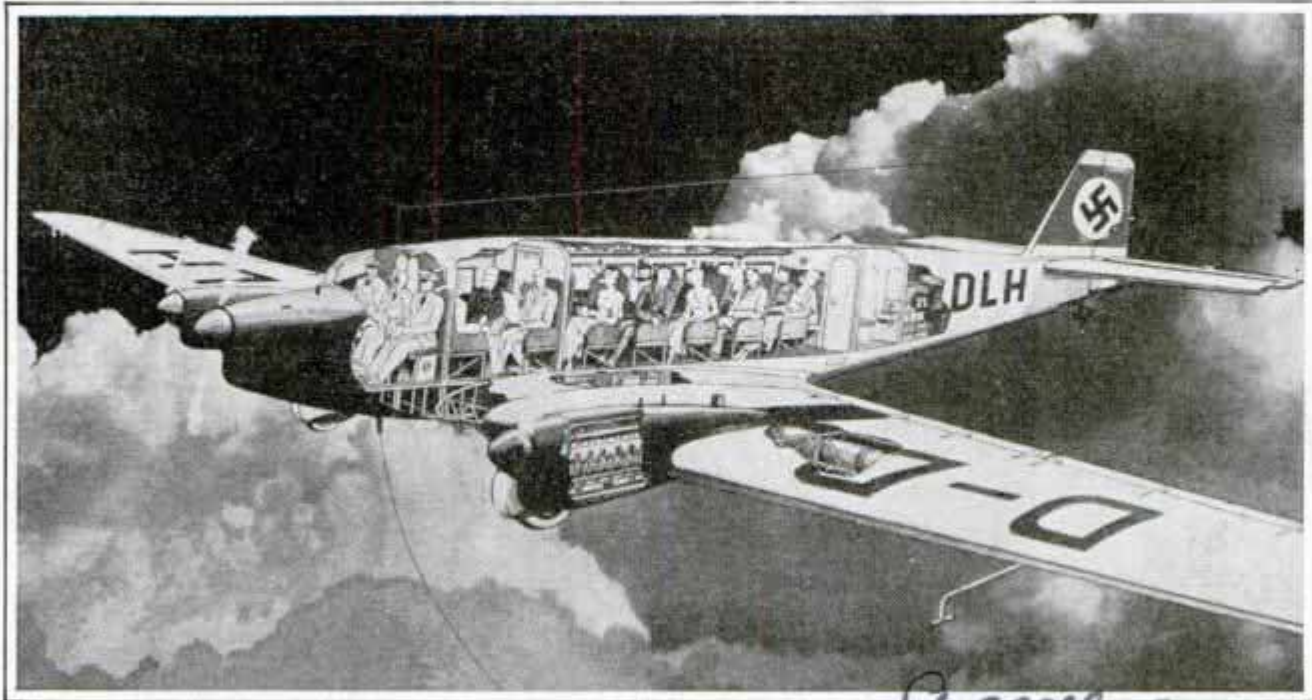
Developed by Mellor
Charitable
F307
Research
F16

Madison
Mrs. J. W. Mason

Vermont Marble Co
Proctor, Vt

Designed by L. G. Larson and J. M.

Tri-Motor Plane to Span Sea from Germany



Cut-away drawing showing interior arrangement of tri-motored German monoplane of the type which may fly the Berlin-New York route. Forward cabin seats three-man crew

When the German Lufthansa inaugurates its transatlantic air service to the United States, tri-motored monoplanes with accommodations for fourteen passengers will probably fly the route. An artist's cut-away drawing of the air liner shows a crew of three in the forward cabin—flight engineer, radio operator and pilot. Behind them is a smoking room with facing seats for four, and in the main passenger compartment are ten adjustable arm chairs. Beneath the main cabin is space for luggage, while mail and freight are stored in the section to the rear of the washroom. The permanent antenna strung overhead is supplemented by another trailing beneath with an "egg" weight to keep it clear of the ship. Fuel tanks can be seen in the cut-away portion of the wing, and on top of the rear of the motor housing is the fuel loading tube. There is a ventilation intake in the roof above the washroom door, and each cabin seat has its individual air duct. An auxiliary altimeter for passengers is mounted above the rear seat. The plane is a Junkers with Schwerol motors.

Our Bureau of Information will answer questions regarding articles in this magazine, if accompanied by return postage.

F 319 Cat Rides Brake Beam of Train Ninety Miles in Storm

From Oakland to Sacramento, Calif., ninety miles, a half-grown cat rode the brake beam of a fast passenger train through severe rainstorms. At Sacramento, a car inspector found it still clinging to the brake beam, almost dead, but it recuperated rapidly on a diet of warm milk.



Trainman removing cat from brake beam after its wild ride through stormy night



Making

HOME TASKS



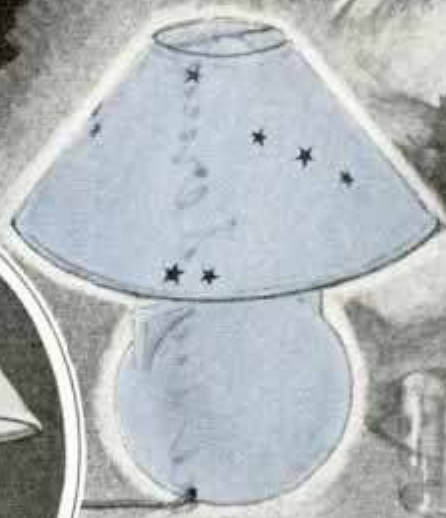
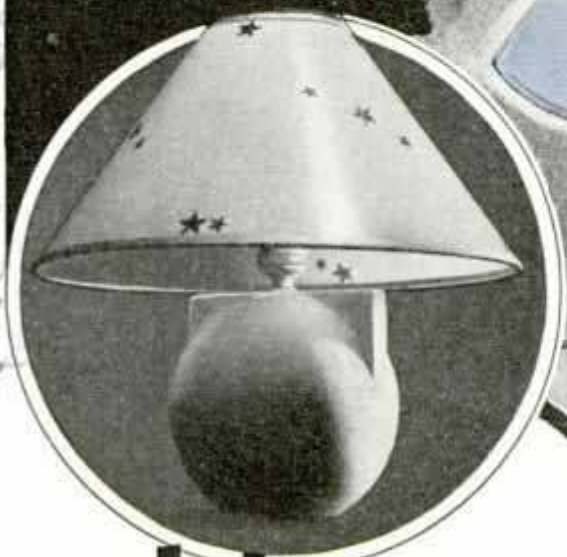
Left, demonstrating how garment can be run through self-adjusting wringer without damaging buttons, or even a watch left by mistake. The machine does a thorough job of wringing, too



Above, "tearless" slicer for onions does the work much faster than by hand. Airtight compartment prevents escape of the onion fumes. Slicer also handles carrots, potatoes and vegetables. Left, chick on top of utensil "cheeps" when egg is boiled to solidity desired. The timing is regulated by the amount of water placed in the top compartment



Lamp for children's room, or the sick room, emits a soft glow after the electricity is turned off. The material producing the glow is applied to the shade in manufacture. The lamp can be washed when soiled



a pleasure



Above, frying, broiling and cooking in glass on top of the stove is possible with these Pyrex saucepans and frying pans. Right, center, baby carriage folds in one motion for stowing in the trunk of the car. It is no larger than a suitcase when folded. Right, bottom, chromium-plated pitcher in the modern mode, shaped like the stacks of the ocean liner, "Normandie"

Campaign to Fingerprint All Waged as Safety Aid



Taking fingerprints of citizens in Berkeley as campaign was inaugurated

Fingerprinting of all citizens as a safety measure and a means of prompt identification in emergencies received an impetus recently in the campaign launched in a California city. At Berkeley a drive for the voluntary fingerprinting of all met an unusual response, with civic leaders offering their own prints to inaugurate the movement. Police and fire departments made a house-to-house canvass and the schools cooperated by taking fingerprints of all pupils. Many civic and social organizations took records of their own members and filed them with local authorities. All the records will be placed in the civilian files at Washington. Similar campaigns are being waged in other cities.

"Dry Ice" Makes Blasting Safer in Mining of Coal

Safer blasting for the miner, more and larger lumps of coal for the operator and a stronger explosive effect are claimed for the use of Dry Ice, solid carbon dioxide, in a blasting assembly patented recently.

Dry Ice, that substance in common use for packing around ice cream, is placed on top of the charge of blasting powder, nitroglycerin or dynamite, which previously has been tamped with clay or stone dust. This clay or stone dust acts as an insulator to prevent the Dry Ice from freezing the explosives. When the charge is set off by fuse, the heat of explosion vaporizes the Dry Ice, forming a volume of carbon dioxide gas which cushions the explosive effect and distributes it over a greater length of the hole. This means that the shattering shock is reduced and the amount of fine coal dust kicked up is less, resulting in a larger proportion of lump coal. Yet the strength of the explosion is said to be greater because the carbon-dioxide gas adds its expanding and bursting effect to that of the blasting-powder gases. On the other hand, any flash resulting from the explosion is instantly stifled, because carbon-dioxide gas is a good flame smotherer. Frequently in coal mines dangerous gases such as "fire damp" are present and a flash ignites them, causing a blast perilous to the miners.

Guide for Boring Hole Straight Directs Drill or Auger

Adjustable to different angles, a guide for boring holes straight directs various sizes of drills or auger bits. It is used on wood or metal. For angle work, the guide is mounted on an axis which is locked at the position desired by set screws. The device clamps on the edge of the timber and can be used



for drilling holes in boards ranging from three-fourths to three inches in width.

Popular Mechanics Magazine does not publish the name of the maker of, or dealer in, any device described in its pages, but this information is kept on file and will be furnished by our Bureau of Information upon request, accompanied by stamped, self-addressed envelope.

Pat. assigned to Imperial Chemical Industries Ltd. E. du Pont de Nemours & Co., Wilmington Del.

Dr. J. M. Anderson

Dr. Vernon Harold Williams

R A

D I O . . .



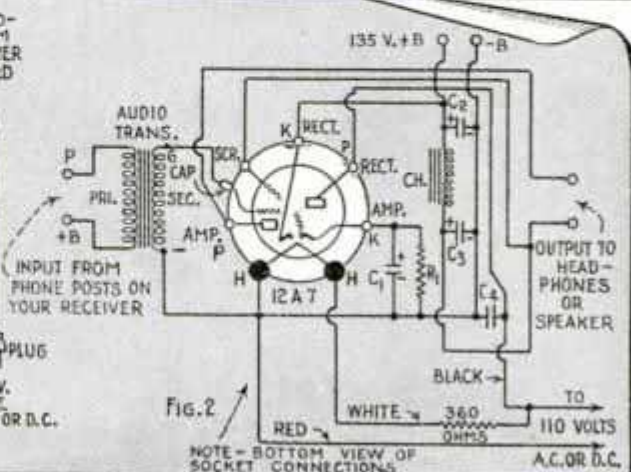
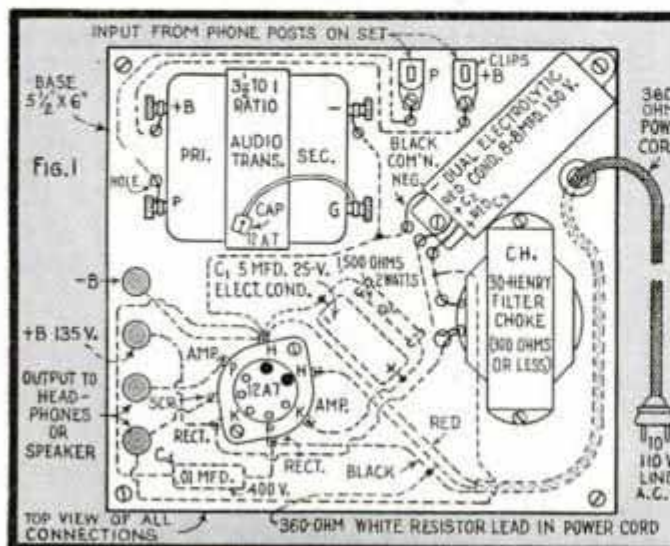
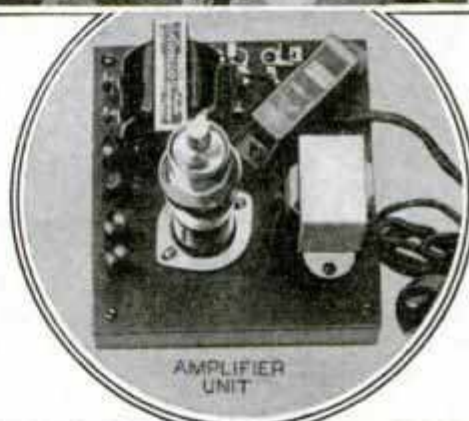
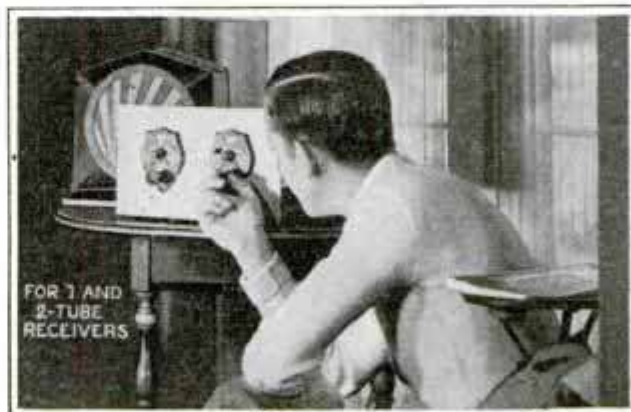
A.C.-D.C. AMPLIFIER and B-ELIMINATOR for Small Sets

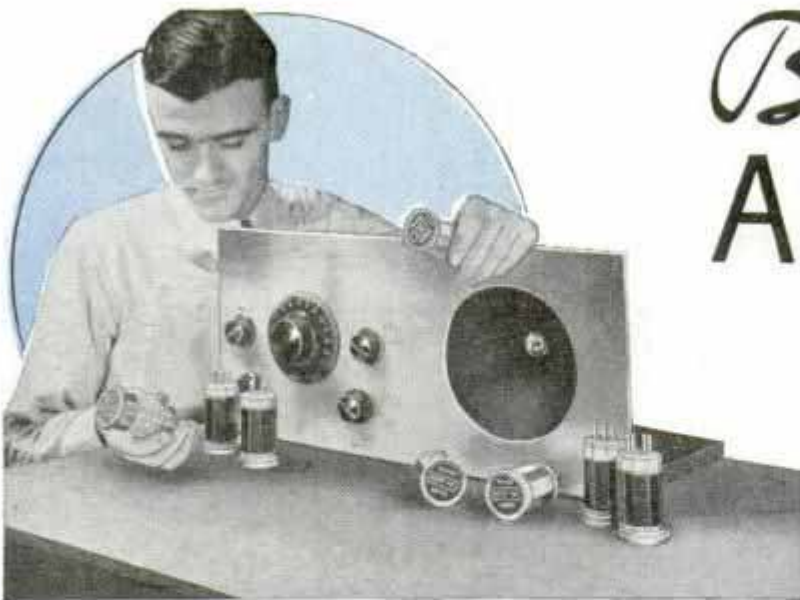
By Stanley Johnson

YOU can build this inexpensive one-stage amplifier unit and use it to increase the output of any small receiver. It will also supply B-voltage for your set and operates on either alternating or direct current. As it is entirely self-powered, the input terminals of the amplifier unit simply replace the headphones ordinarily used. It is very compact and easy to build. With a good crystal set connected to the input terminals and tuned to a local broadcasting station, the amplifier will operate a magnetic speaker.

A single, type-12A7 tube is employed in a simple and efficient a.c.-d.c. circuit. This tube is a combination power rectifier and pentode amplifier that offers unusual possibilities to radio experimenters with limited pocket-books. Operating direct from the 110-volt power line, filament voltage for the tube is supplied by the 360-ohm dropping resistor which is built into the power cord specified. Fig. 1 shows an "X-ray" view

(Continued to page 136A)





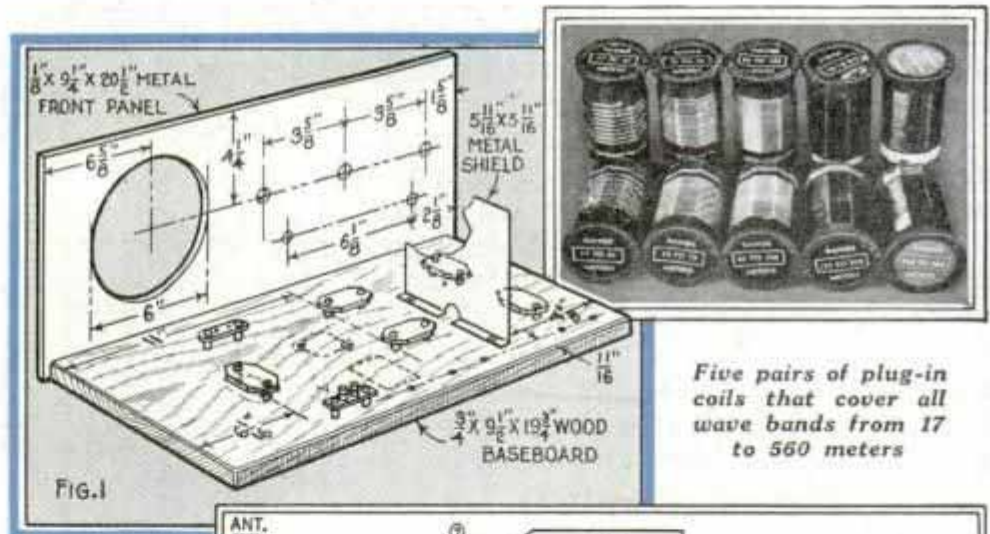
Beginners' ALL-WAVE

By Lewis Winner

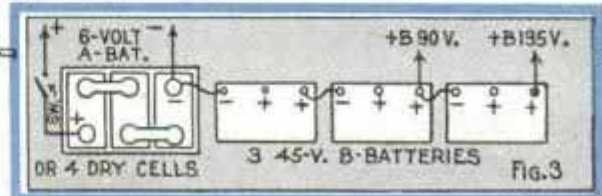
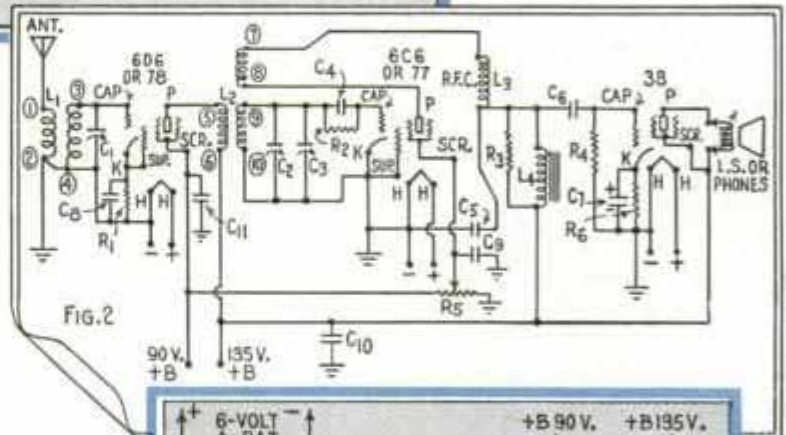
ALTHOUGH only three tubes are used in this simple breadboard style, all-wave receiver, loud-speaker results are possible not only from American short-wave stations, but from foreign points as well. Of course, general broadcast reception is also available with good volume and pleasing tone. Anyone can build a breadboard set of the type to be described, no previous experience is necessary, there are no coils to wind and few tools are required. The parts are inexpensive, but have been carefully selected to insure good results.

A tuned stage of radio-frequency amplification, with a type-6D6, or 78, tube, is followed by a regenerative detector employing a 6C6, or 77, tube. Plug-in coils are used; they are wound on a new material which has been found to have unusually low losses and therefore provide a high gain. An impedance-coupled audio system, with a type-38 tube, produces good quality, and also a very loud

signal to the magnetic speaker. The wood-base and metal-panel dimensions are given in Fig. 1. An aluminum panel was used in the original model. A hole is cut in the panel for mounting the speaker. Incidentally, be sure that the aluminum frame of the speaker is insulated from the metal panel; a ring of heavy cardboard will answer the purpose. Drill oversize holes for the mounting screws, use fiber washers and center the screws in the holes, otherwise there will be a short circuit.



Five pairs of plug-in coils that cover all wave bands from 17 to 560 meters

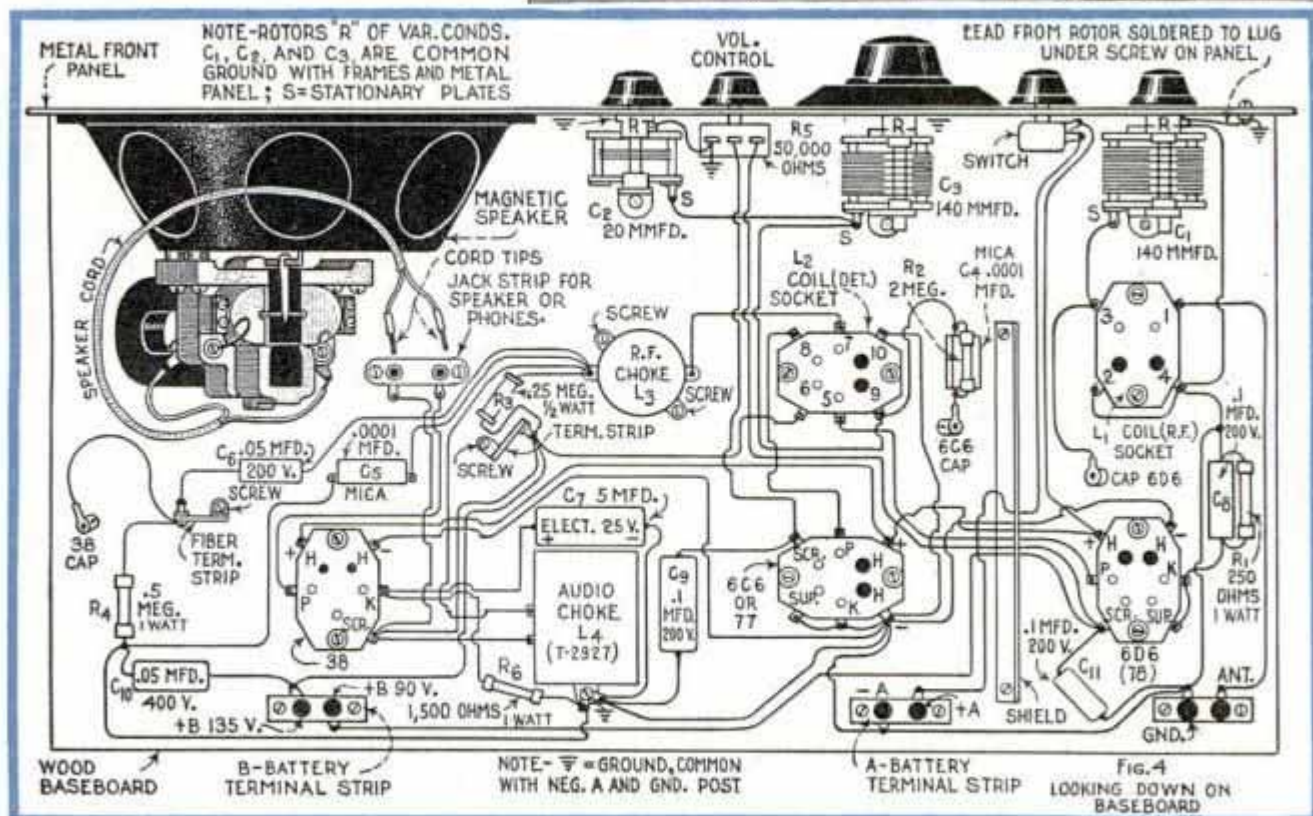
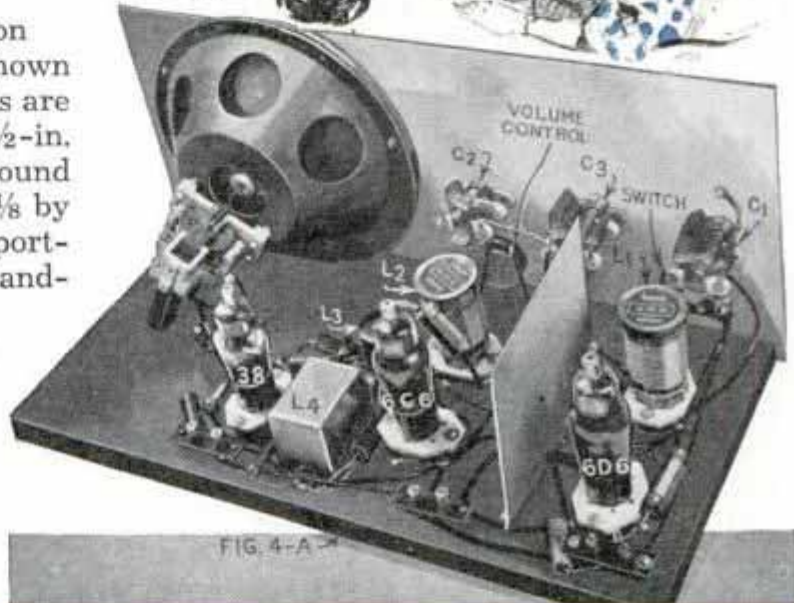


THREE-TUBE RECEIVER

A schematic circuit diagram is shown in Fig. 2, and the battery hook-up is given in Fig. 3. The builder can substitute a 6-volt transformer for the storage battery, and a B-eliminator for the B-batteries if he wishes to do so.

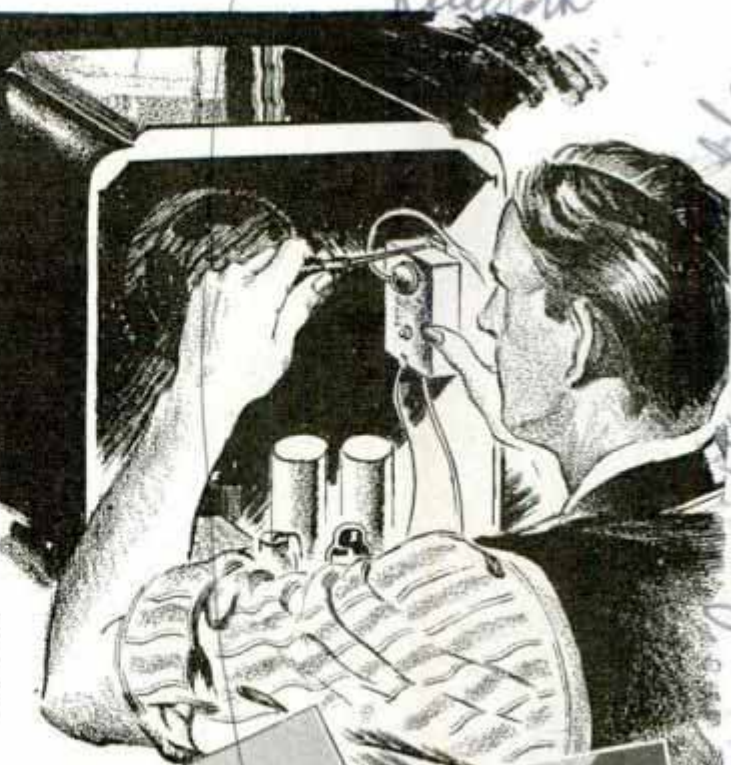
The various parts are mounted on the baseboard and front panel as shown in Figs. 4, 4-A and 4-B. All sockets are of the isolantite type, mounted on 1/2-in. metal bushings. The antenna, ground and battery posts are mounted on 1/8 by 5/8 by 2-in. bakelite strips, also supported on 1/2-in. metal bushings. A standard twin pin-jack strip is used for the cord-tip pins of the magnetic speaker, or phones may be substituted for the speaker at any time. Fasten the parts to the baseboard with wood screws and use ordinary hook-up wire with

(Continued to page 137A)

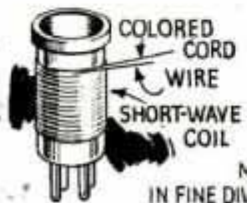


227 Fulton St
New York

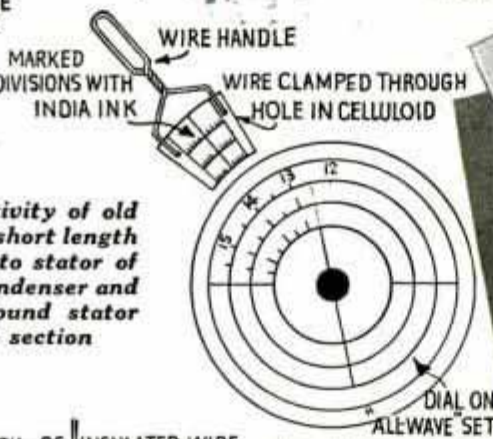
PRACTICAL RADIO Suggestions



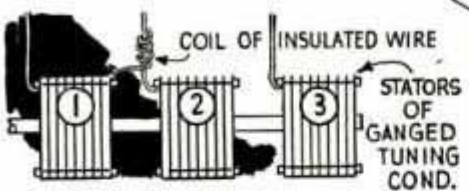
Cord used to space turns when winding sets of short-wave plug-in coils, may be of different colors to identify each wave band



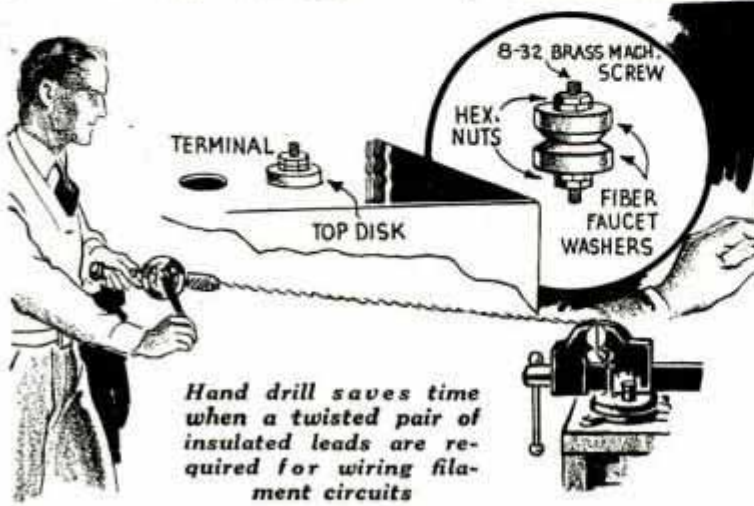
Below, logging aid for all-wave receiver dial shows intermediate points between major graduations



To increase sensitivity of old receivers, connect short length of insulated wire to stator of first r.f. tuning condenser and merely coil it around stator lead to second section



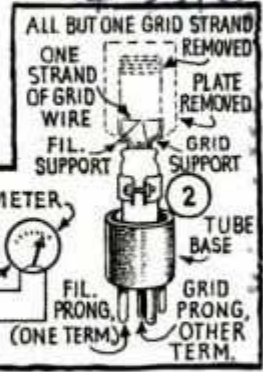
Below, inexpensive insulating bushing. Drill oversize hole for screw, and face tapered sides of washers through metal base



Hand drill saves time when a twisted pair of insulated leads are required for wiring filament circuits



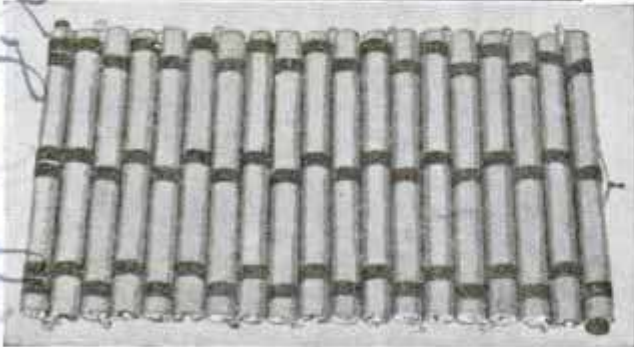
Above, line filter easily installed in or near receiver, eliminates noise received through the electric line which furnishes power from wall outlet. Line balancer screw is adjusted for least noise with best signal. Left, portable radio time switch turns your receiver on or off at any predetermined time; also suitable for lamps or yard lights



Experimental thermocouple made from broken 201-A tube. Filament supporting wires are cut to 1/4-in. lengths and bent outward to each side. No. 30 bare copper wire is soldered to one filament support, passed tightly over the grid wire and soldered to other filament support

M. H. Rhodes, Inc. 119 St. Nicholas Ave. New York

Ribbon B-Batteries Are Flexible



B-Batteries that may be spread, rolled or folded

Portable ribbon-type B-batteries for belt receivers and hearing aids, are now available with 22½, 67½ and 135-volt positive taps. The cells are soldered together, usually in groups of three, in series, in insulating tubes woven together with tough paper ribbons in such a way that the battery may be folded in many odd shapes for portable purposes.

Gear Kit for Experimenters



Consisting of twenty or more assorted pieces, this handy kit of gears enables the experimenter to gang up various tuning arrangements of his own design, vernier dial controls, relay

gadgets and electrically operated devices. The assortment includes bronze, brass, fiber and iron types with a wide variety of pitch and face diameters and number of teeth. There are also three small brass shaft-mounting pulleys for driving cables, bands and belts. These inexpensive parts, usually difficult to obtain from ordinary sources of supply, provide the experimenter with a practical means for carrying out many interesting and useful ideas.

Intermittent Reception

When a crackling sound is heard and signals suddenly disappear for short periods, test all tubes in the set. If tubes are not defective, an r.f. by-pass condenser may be momentarily shorting or a resistor opening at certain temperatures.

F 3530 Midget Set in Mirror Cabinet



"Mirror" set showing speaker grille and controls

Completely housed in a neat glass cabinet, this compact receiver employs six tubes and may be operated either on a.c. or d.c. current. Mirror cabinets of unusual design are now much in vogue for small sets.

Blueprints covering radio construction articles in past issues can be obtained for 25 cents each; material lists are available without charge on receipt of postage.

NEXT MONTH—All-Metal Two-Tuber for Short Waves. A simple low-cost set with hand-wound coils, easily portable and may be operated with the amplifier and B-eliminator unit described in this issue. Other features include: **Amplifier for Guitar; Rechargeable Pocket Batteries**, for hearing aids and belt receivers

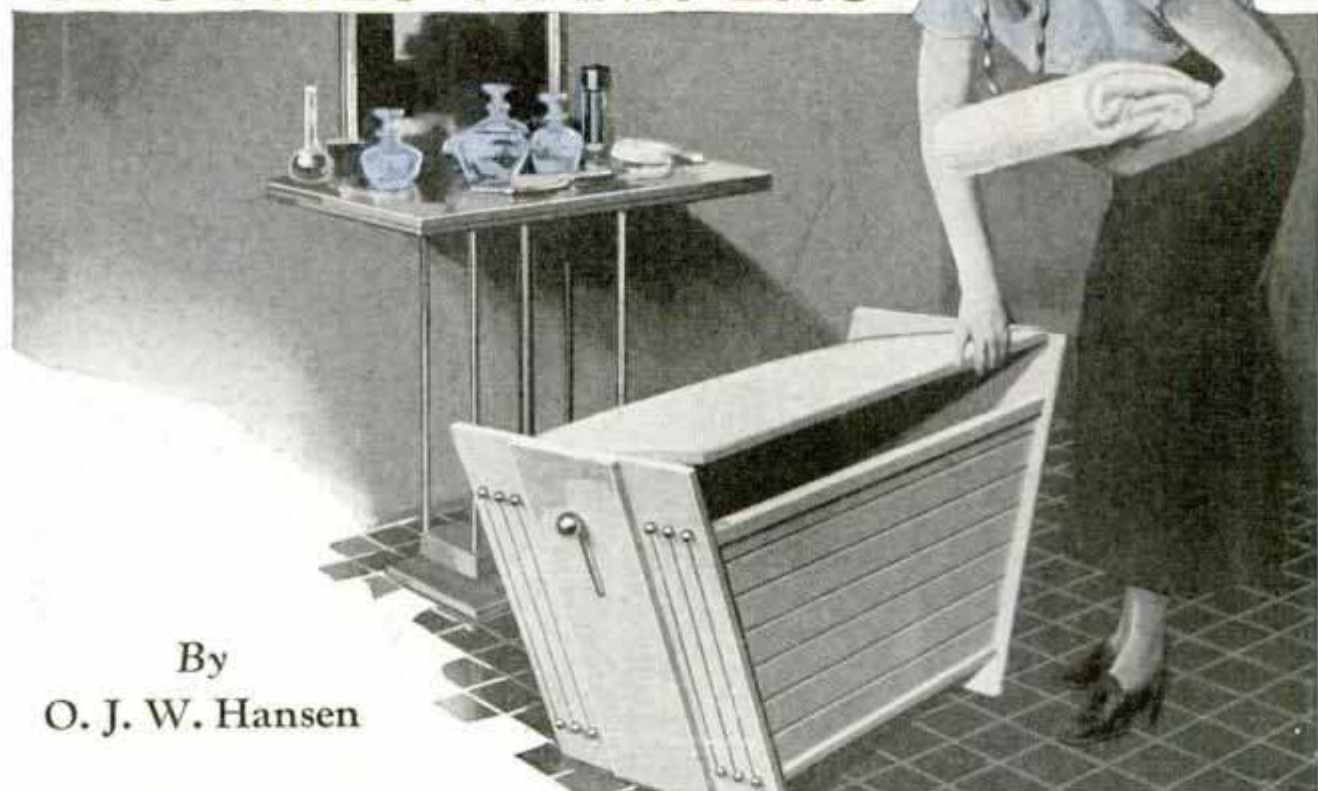
Burgess Battery Co. report, Ill.

Leotone Radio Co. 631 1st St.

Venue Blvd. 1815. Also. Chas. 1815. Calif. Amplifier Co. San Felipe

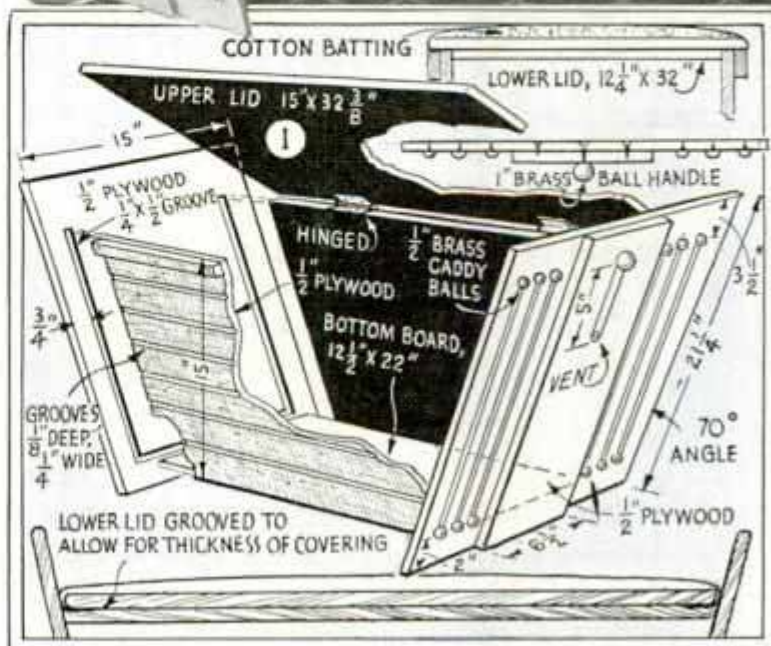


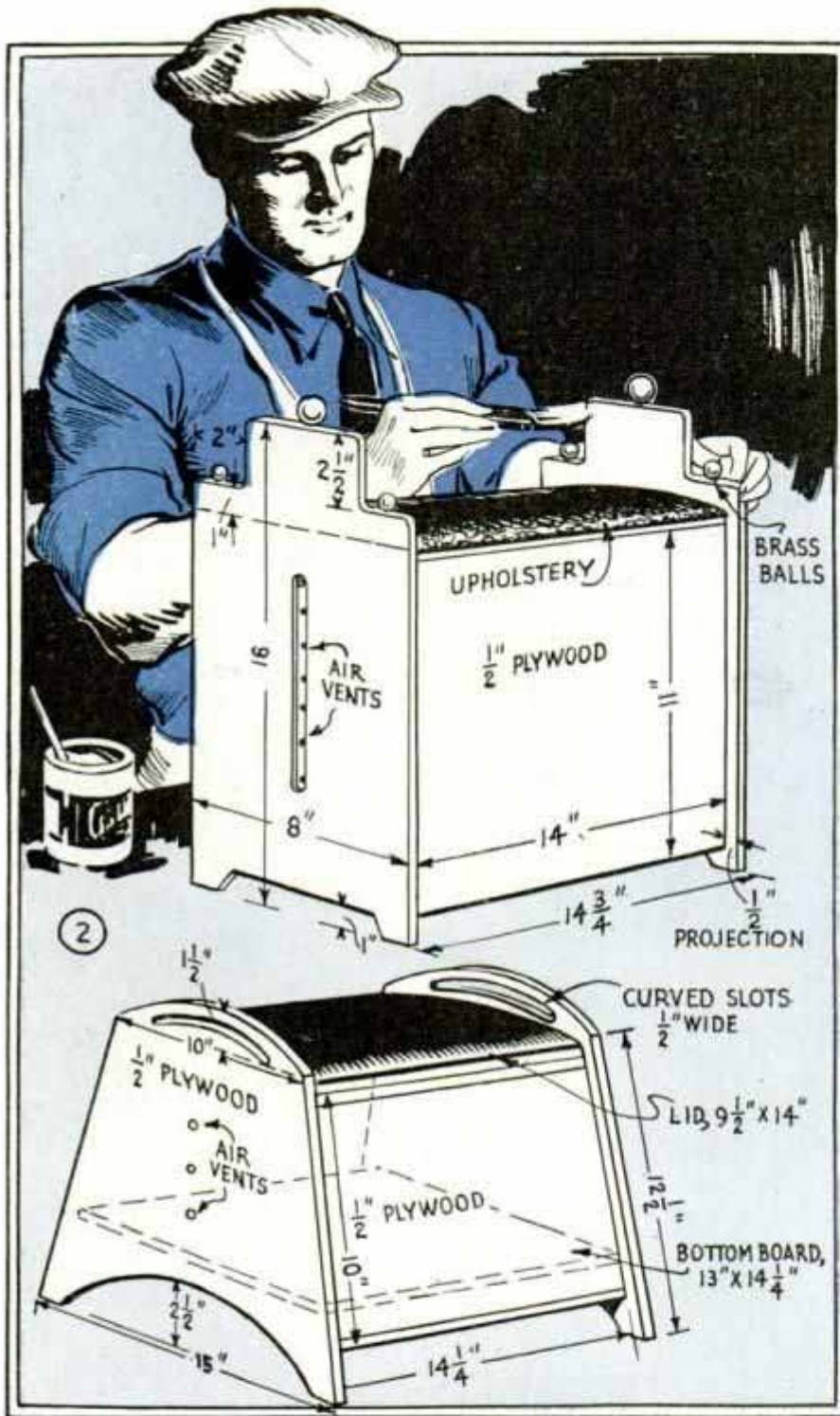
DRESSING SEATS *and* CLOTHES HAMPERS



By
O. J. W. Hansen

DISGUISED by modern lines and a comfortable, padded seat, the commonplace clothes hamper now ranks as a piece of furniture appropriate for the bathroom, bedroom, hallway or dressing room. It may be fittingly called a "hamper-seat." For a moderately large bathroom or bedroom the design shown in Fig. 1 gives a pleasing effect. The material used is 1/2-in. plywood. The end pieces are made first. Six 1/4 by 1/8-in. grooves, three on each side of the center overlay, are cut, the blind ends of these grooves being concealed with 1/2-in. brass "caddy" balls.





cealed with wood putty and finish. The sides are grooved horizontally, the lower groove being located directly over a groove on the inside which holds the bottom and is held by screws in the same manner as just explained. Also, a strip of wood, projecting $\frac{3}{8}$ in. above the surface of the side, is glued in the lower groove to conceal the screw heads and add a finished edge near the bottom. A strip of $\frac{1}{2}$ -in. plywood, 1 in. wide, is glued to the outside top edge of each side. The top consists of two pieces of $\frac{1}{2}$ -in. plywood screwed together. The lower piece fits between the sides while the upper piece projects beyond the sides slightly. A shallow groove, to take the cover fabric, allows the lower piece to be screwed up flush besides concealing the tacked edge of the fabric. For upholstery you can use a layer of hair, covered with a layer of cotton batting and then the cover fabric—preferably a washable imitation leather in white.

The same general methods of construction are applicable to the other designs shown in

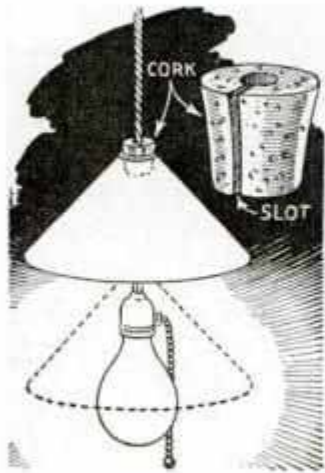
A similar groove, 5 in. long, is routed in the center part, a vent hole is drilled at the lower end of the groove and a 1-in. brass caddy ball placed at the upper end to serve as a handle. Then top and bottom edges are cut off at a 70° angle. On the other side, grooves are cut to take the sides and bottom. Those for the sides should be located directly under the outside groove nearest the edge, to permit flat-head wood screws to be driven through the end members to hold the sides securely in position. The screw heads are con-

Fig. 2. For finish, smooth the surface with sandpaper, apply two coats of enamel undercoat and then two coats of eggshell enamel. Pastel shades are appropriate, in the same or a complementary color to that of the room where the hamper-seat is to be placed.

Excessive steaming of bathroom walls may be prevented by slipping over the bath-tub faucet a length of rubber tubing the free end of which is kept submerged when filling the tub.

Lamp Shade Adjusted for Height

Quickly adjusted to any distance above a lamp, so that light will spread over a



large area, this cork shade holder slips right on the lampcord. The cork must be large enough to fit snugly in the neck or apex of the shade and have a slot cut lengthwise to allow placing it centrally on the cord. When the shade is pushed over the cork, it tends to close the

slot tightly over the cord to hold the whole assembly in place.

Golf-Bag Cover of Rubber

If you are ever caught in a rain with an open golf bag, this simple cover, which can be slipped in place in a jiffy, will save you the extra work of drying and polishing your clubs.

Made from a section of inner tube, the cover costs nothing, and it can be folded and carried in the bag or even in your coat pocket. Select a tube large enough to slip snugly over the bag and cut off a section 18 or 20 in. long. Round one end with a

pair of scissors, turn it wrong side out and sew it together. Then turn it back and the job is done.



Heating Linoleum Rolls

Before unrolling linoleum, warm it by directing an electric radiant heater into one end of the roll, which will soften the material from the inside and prevent cracking. An electric fan may also be used to help circulate the warm air through the roll.

Comfortable Swing Easily Made from Old Truck Tire



Carcass of truck tire between the beads is cut away to leave enough tread for a comfortable seat

Safe and comfortable for small children, this swing is made from an old truck tire in a few moments. About two-thirds of the carcass between the beads is removed, after which the tire is turned wrong side out, leaving the remaining third of the tread for a seat. Chains or ropes attached to the beads and spaced with a rod or stick suspend the swing from a suitable support.

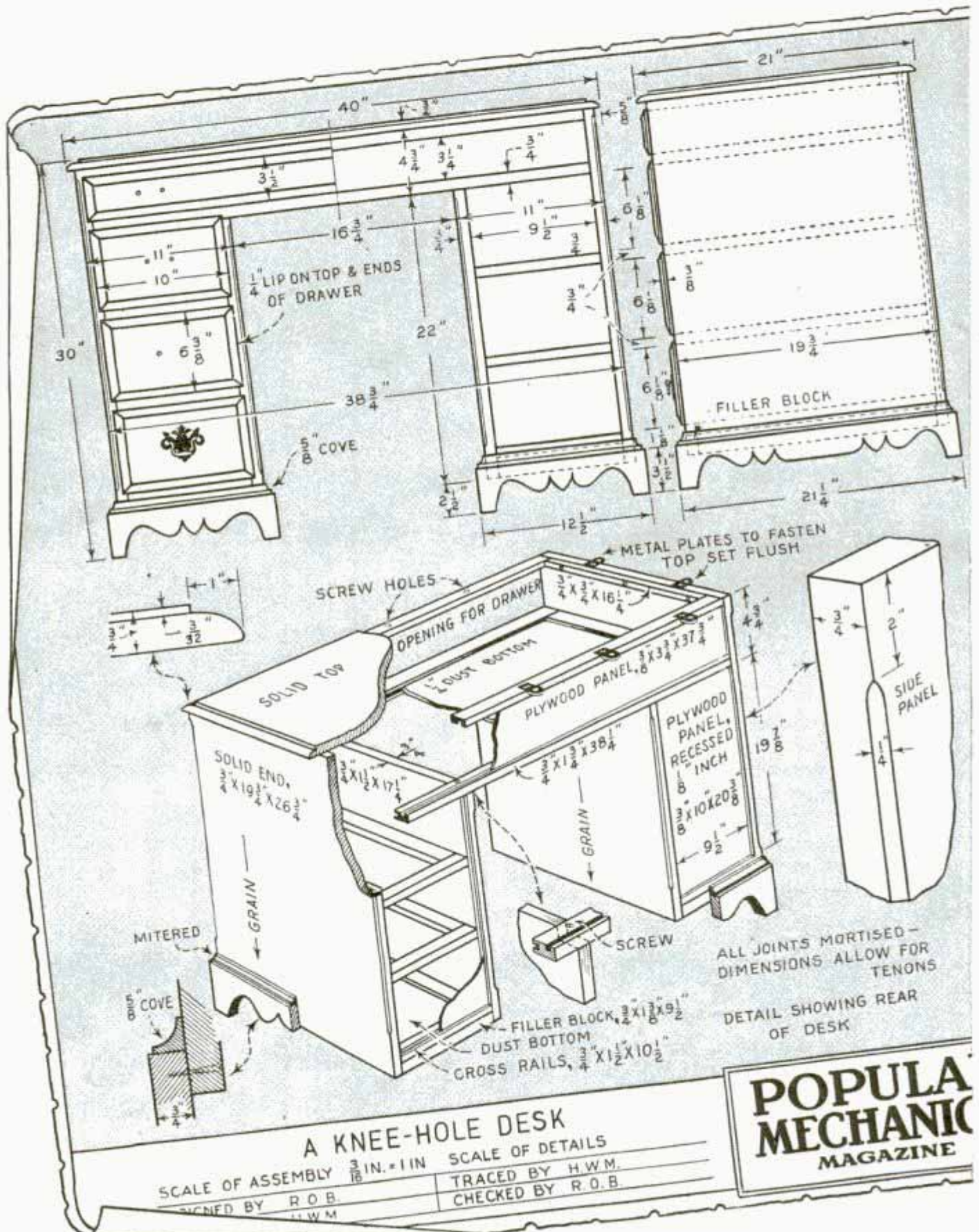
Carving-Knife Blade Is Sheathed to Protect Cutting Edge

If you are in the habit of keeping sharp carving knives in a drawer with other cutlery, strips of corrugated cardboard slipped over the blades will protect the cutting edges

against nicks. Besides this, the sheaths are a safety precaution against accidentally cutting your fingers when reaching in the drawer for other articles.

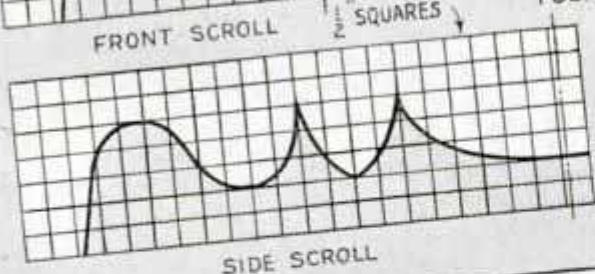
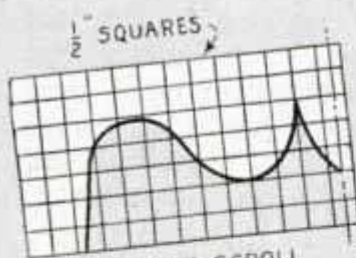
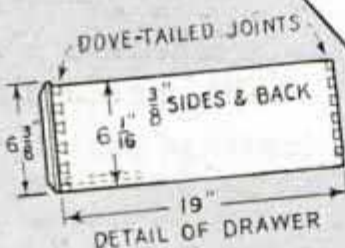
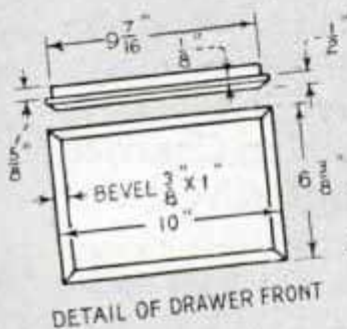


KNEE-HOLE DESK *in*



POPULAR MECHANIC
MAGAZINE

Modernized Chippendale



SHEET NO. 1
 POPULAR MECHANICS MAGAZINE
 250 N. LAUREL ST. CHICAGO

Though small in size and compact in arrangement, this knee-hole desk is a pleasing addition to your living room, library or den. The top drawer may be partitioned off to accommodate various sizes of stationery while the six side drawers afford plenty of space for your correspondence, files, bills, etc.

Screens Painted Economically with Felt-Covered Roller



Roller is saturated with paint and then run back and forth over the screen wire

For painting screen doors and windows, one painter claims that he can do the work faster and more economically with this felt-covered wood roller than he can by using a brush. The felt is saturated with paint and then rolled back and forth across the screen by means of the wire handle provided. When not in use, the roller should be removed from the handle and kept in a fruit jar partly filled with kerosene.

Leg Reflector Always in Motion When Riding Bicycle



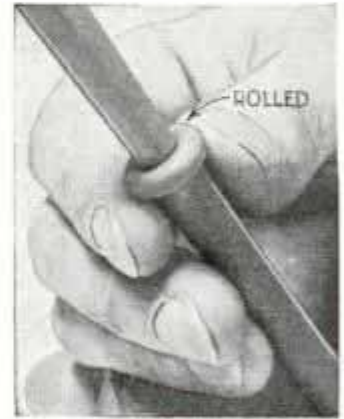
Attached to a trouser guard, and worn on the left ankle, a red reflector of the type shown is in motion as you pedal your bicycle, so that it is more likely to be noticed by a motorist approaching from the rear. The method of attaching the reflector is as follows: Take a strip of sheet metal and drill it near the ends. Then slip it between

the guard and the ankle and bend it over so the reflector screw can be put through the holes.—Robert Putzer, Oshkosh, Wis.

the guard and the ankle and bend it over so the reflector screw can be put through the holes.—Robert Putzer, Oshkosh, Wis.

Rubber Tubing Is Strengthened by Rolling Ends

Small rubber tubing used in the bathroom and kitchen will last longer if the ends that are slipped over the water faucets are strengthened by rolling them so that they do not become enlarged or torn. To roll



the end of a tube, slip it over the end of a penholder and roll it back after applying a thin coat of rubber cement.

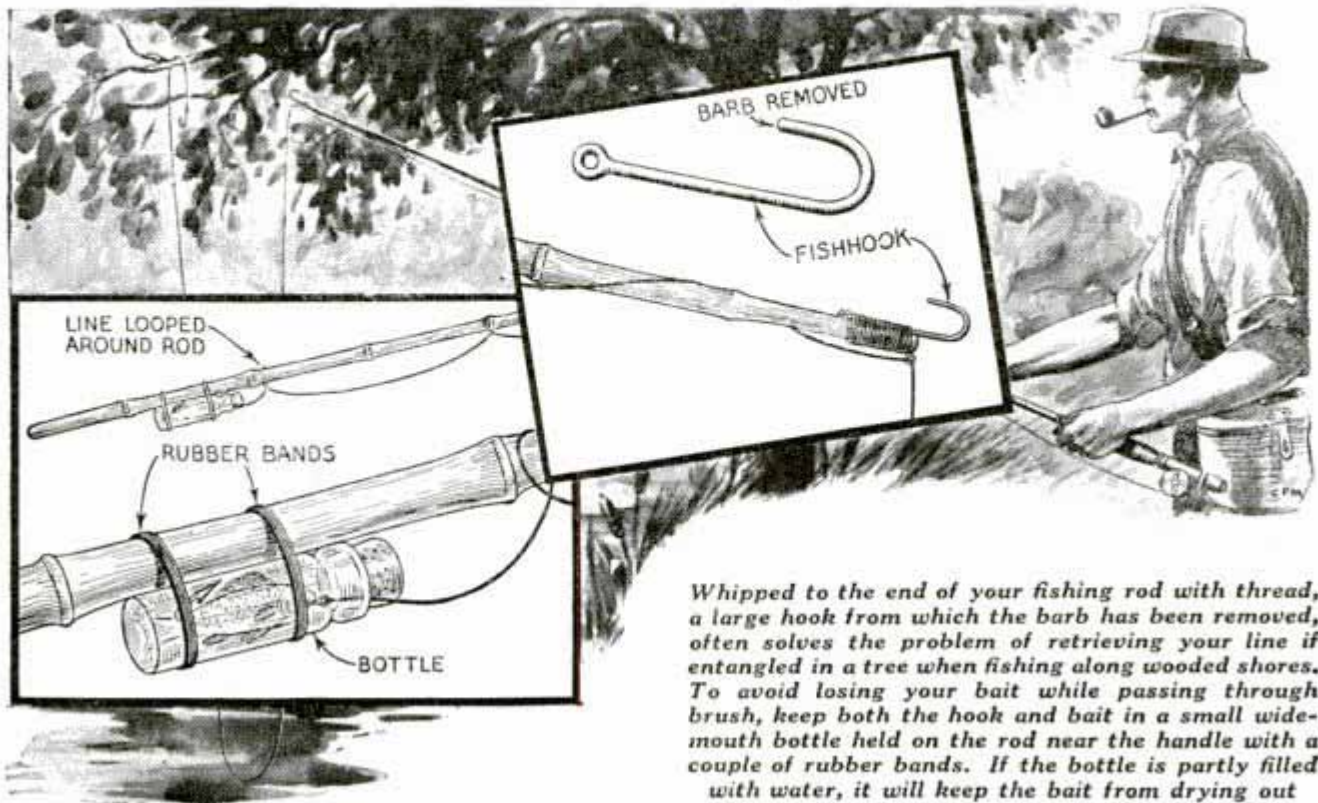
Lawn Sprinkler Position Changed Without Shutting Off Water

Instead of shutting off the water every time you want to move the lawn sprinkler, tie a long, stout cord to the latter so that you can pull it to any location without getting wet or walking in the wet grass. On some types of sprinklers that have a tendency to overturn when they are pulled about, it is a good idea to fasten them to a large disk, or even a pie tin, which will slide readily over the grass.



A simple idea but one that may save you many steps when constantly changing position of lawn sprinkler

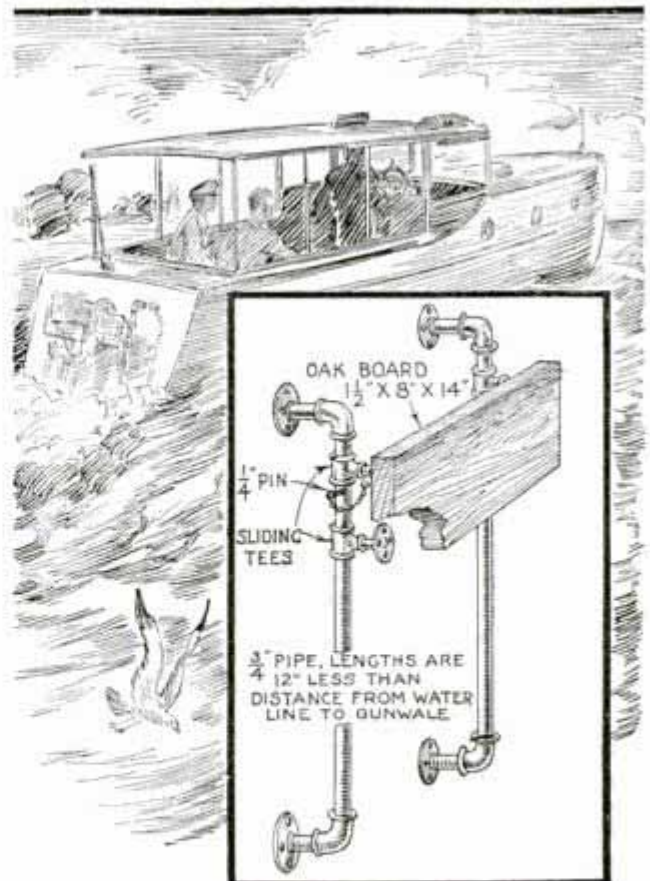
Hints When Fishing Along Wooded Shores



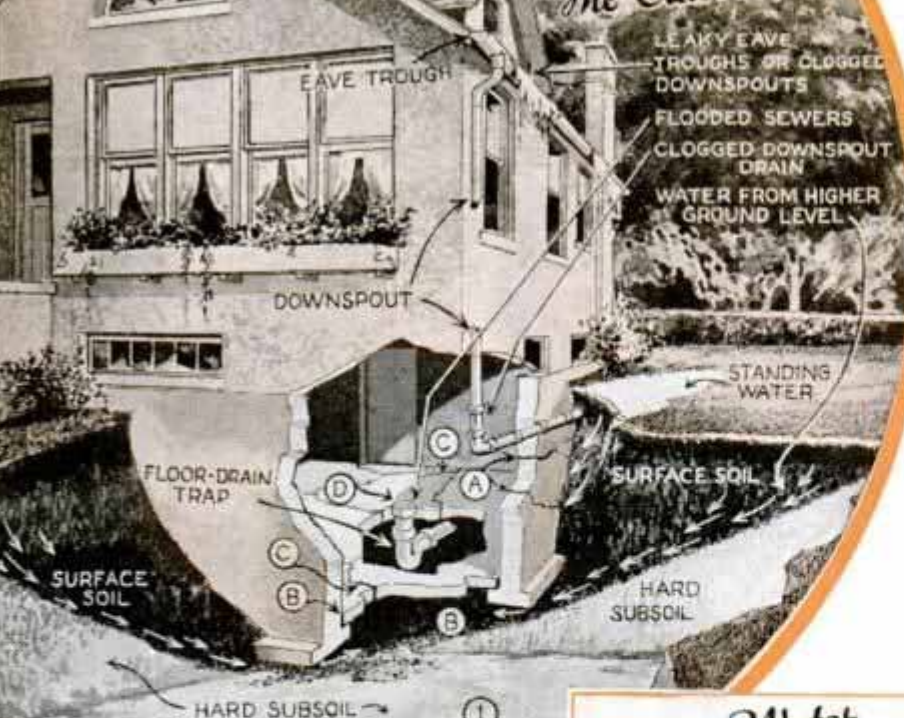
Whipped to the end of your fishing rod with thread, a large hook from which the barb has been removed, often solves the problem of retrieving your line if entangled in a tree when fishing along wooded shores. To avoid losing your bait while passing through brush, keep both the hook and bait in a small wide-mouth bottle held on the rod near the handle with a couple of rubber bands. If the bottle is partly filled with water, it will keep the bait from drying out

Adjustable Mounting on Cruiser Carries Outboard Motor

With this adjustable mounting screwed to the transom of your cruiser, a small outboard motor can be carried as an auxiliary plant for use when additional power is needed, or for an emergency in case the cruiser motor fails. The motor, securely fastened to an oak crosspiece on a substantial mounting made up of brass or galvanized pipe and fittings, can be slid down for use when needed, or up again when not required. The sliding movement is made possible by fitting a couple of pipe tees to each end of the crosspiece with nipples and flanges as shown. The tees are reamed to a sliding fit on vertical pipe rails, which are securely bolted to the transom. Small holes drilled through the rails, near their upper ends, permit insertion of steel pins to hold the crosspiece in the upper position when the motor is not in use. When screwing the vertical rails to the transom, be sure their lower ends are at the proper height above the waterline to allow the outboard propeller to reach the correct depth when lowered. Due to the presence of a rudder on cruisers, the outboard tiller is removed and the motor locked in straight-ahead position



Outboard motor carried on cruiser with this mounting is quickly lowered into water for use as an auxiliary power plant in case of an emergency



Turing

IS YOUR basement damp, or likely to become flooded during rainy weather? Most leaky basements might have been made watertight if good construction practice had been followed when the foundation was built. A well constructed basement should be just as effective in keeping out water as a swimming pool is in keeping it in! However, much can be done to minimize water leaks and in many cases the trouble may be overcome completely. The first step is to locate, if possible, the source of the water.

Where Water Enters

- (A) WALL CRACKS
- (B) POOR JOINT BETWEEN WALL AND FLOOR
- (C) FLOOR CRACKS
- (D) FLOOR DRAINS TO SEWER

Checking the Drainage System:

Strangely enough, we must look first to the roof. Leaky eave troughs, as suggested in Fig. 1, are often the remote cause. Obstructions, such as roofing gravel or leaves, may block up the trough, causing it to rust and leak. Water then runs down the side of the building and accumulates next to the wall, where it gradually seeps through into the basement. Sometimes the soil next to the wall slopes toward it, forming a pocket, where water collects after a hard rain. Another offender is a clogged drain tile into which the downspout empties. The tile becomes clogged, causing the water to back up against the wall and seep through.

Outside Walls: If the drainage system is not at fault, or the building is so located that it cannot be adequately drained, provision must be made to waterproof the wall so that seepage will be prevented. Undoubtedly the best way



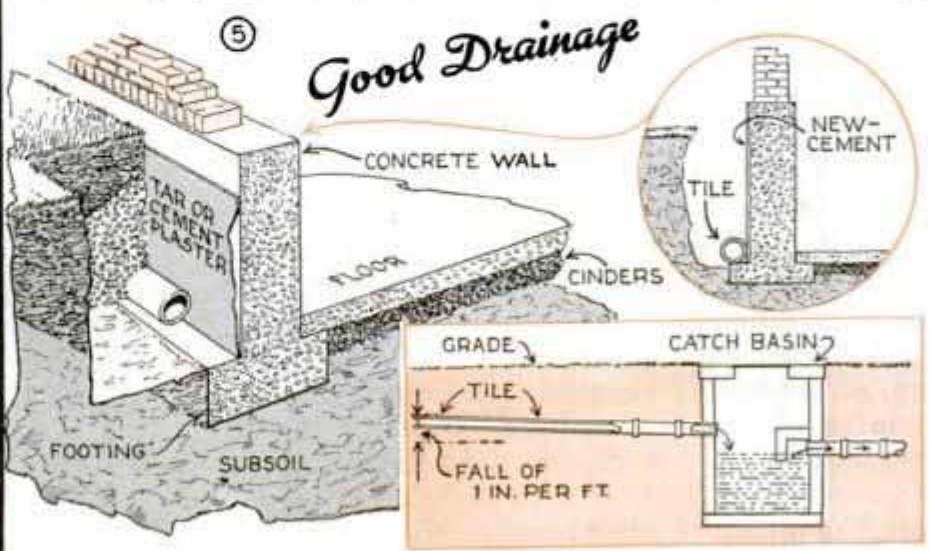
TRENCH IS DUG NEXT TO WALL FOR TILING



FOR BRICK, STONE OR CEMENT-BLOCK FOUNDATIONS ALL MORTAR JOINTS ARE CUT TO V-SHAPE, THEN BRUSHED WITH CEMENT

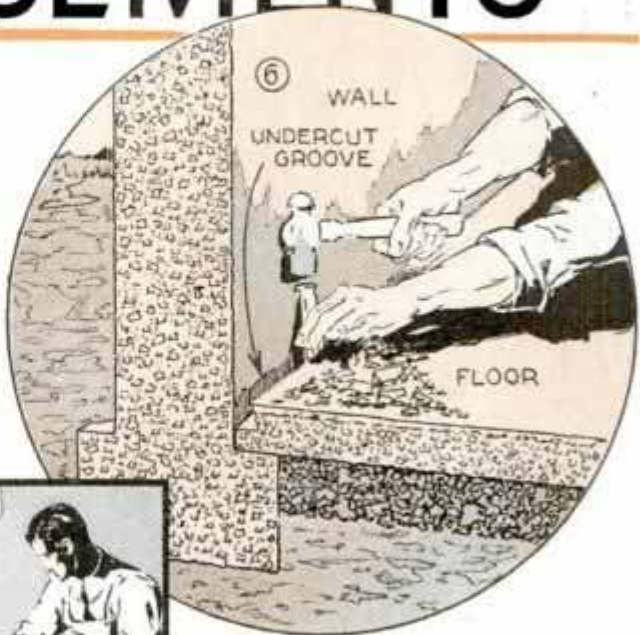


CRACKED AND POROUS CONCRETE WALLS GIVEN TWO COATS OF HOT TAR



LEAKY BASEMENTS

to do this is to dig a trench wide enough for a man to work in, and as deep as the foundation, along as much of the wall as is usually damp. See Figs. 2 to 5. If your wall is built of brick, stone or cement block, the mortar joints must be raked out to a depth of $\frac{1}{2}$ in. and all cracks cut back in a V-shape, as in Fig. 3. The wall should then be thoroughly sprayed with a hose, after which the cracks are filled with a mortar consisting of cement, 1 part, to sand, $1\frac{1}{2}$ parts, and rammed in tight with a calking tool. The reason that the walls are kept wet is to prevent the absorption of water from the new cement in the patches. If this cement dries out too quickly, it will not stick. A grout of cement and water, having the consistency of thick cream, is brushed over the entire surface next. This is followed



Where Floor Joins Wall

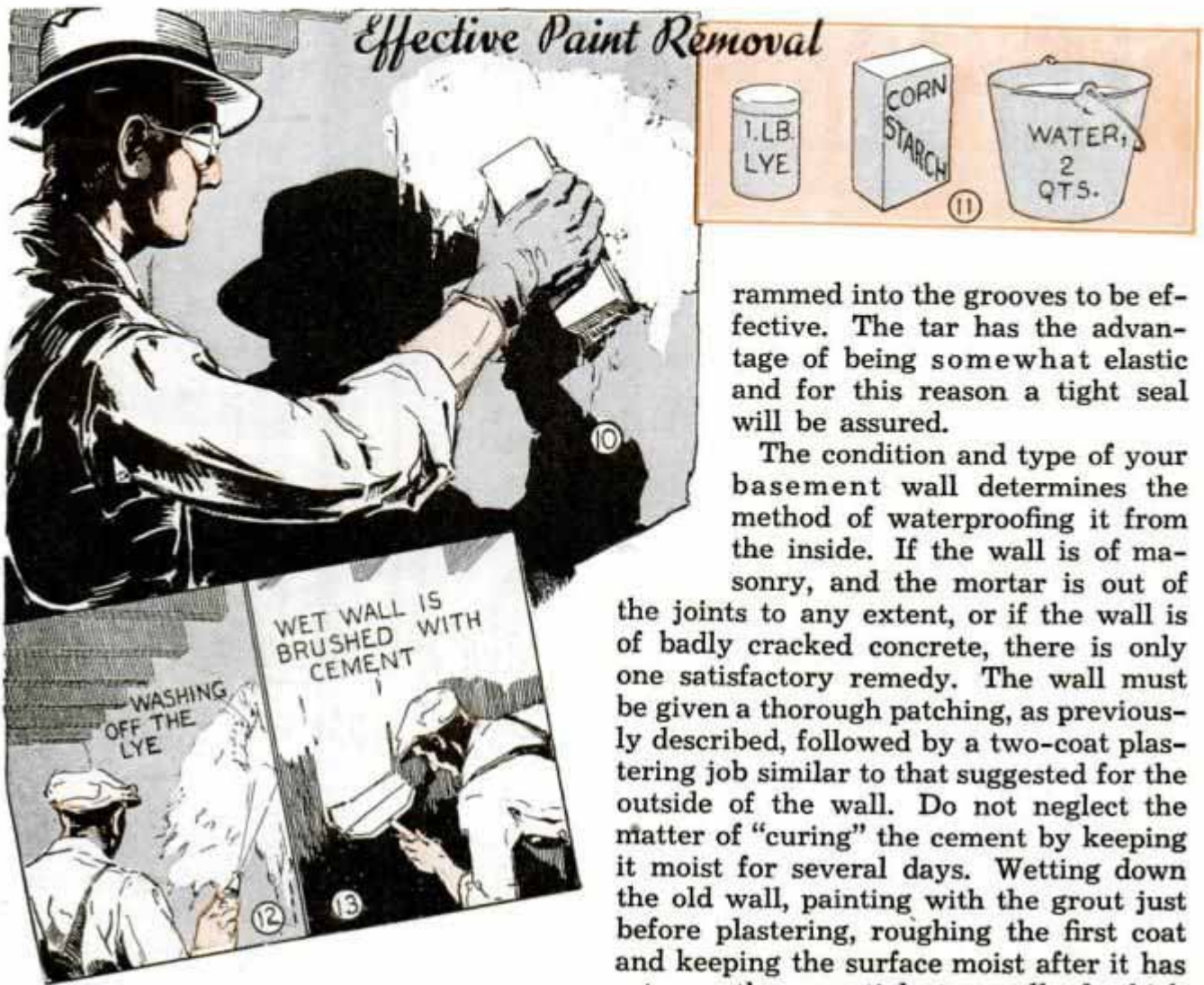


ing" and flaking, caused by the wall absorbing the moisture out of the new material before the chemical action is over. On a wall of solid concrete, which is in fairly good condition, two coats of hot tar, as in Fig. 4, may be used instead of the cement plaster, with good results and considerably less work and expense. However, the tar is not effective over a masonry wall.

immediately by a coat of cement and sand mortar (1 to 2 mix), about $\frac{3}{8}$ in. thick. The mortar should be well worked with a wood float and when hardened sufficiently, roughed with a piece of wire lath to form a good bond for another coat, which also should be $\frac{3}{8}$ in. thick. As soon as the cement has set, the new surface should be kept wet for several days until the cement has cured. This is done to prevent "craz-

If it is possible to secure drainage, a line of drain tile should be placed at the bottom of the trench, as indicated in Fig. 5. Be sure that sufficient fall can be obtained so that the water will drain into your catch basin, septic tank or other outlet, as indicated. The trench should be back-filled with coarse gravel or crushed stone, to a depth of 18 in. and then filled up with soil. The porous material around the tile permits the surface water to drain into the tile at the loose joints.

Inside Walls: If it is not possible to get at the outside walls, owing to sidewalks, shrubbery, etc., the next best thing is a treatment of the walls from the inside. The



usual source of leaks is at the edge of the floor, where it joins the wall. This is caused by the fact that the walls are built first, and the floor is laid later when the concrete of the walls has thoroughly dried. The result is little or no bond between the two. The procedure in this case is to cut a groove next to the wall, to a depth of $1\frac{1}{2}$ to 2 in., which is done by means of a cold chisel as in Fig. 6. The groove should be undercut as much as possible so that the seal will be anchored securely. Hot tar, or a mixture of tar and sand, is poured into this groove, as shown in Fig. 8. The tar will not adhere to wet material, and therefore it should be poured in when seepage is not occurring, if possible. Drying the groove with a blowtorch just before pouring the tar, as in Fig. 7, is also helpful to assure a good bond between the wall and floor. If the use of tar is objectionable, because of appearance, a mixture of any brand of "early strength" cement, one part to two of sand and four of gravel, may be used. It must be well

rammed into the grooves to be effective. The tar has the advantage of being somewhat elastic and for this reason a tight seal will be assured.

The condition and type of your basement wall determines the method of waterproofing it from the inside. If the wall is of masonry, and the mortar is out of the joints to any extent, or if the wall is of badly cracked concrete, there is only one satisfactory remedy. The wall must be given a thorough patching, as previously described, followed by a two-coat plastering job similar to that suggested for the outside of the wall. Do not neglect the matter of "curing" the cement by keeping it moist for several days. Wetting down the old wall, painting with the grout just before plastering, roughing the first coat and keeping the surface moist after it has set, are the essential steps, all of which should be carefully followed in patching any old cement work successfully.

If your wall appears to be in fairly good condition, but does admit moisture, other than plain sweating, proceed as follows: Point up all mortar joints and patch up cracks with a mortar made with "quick drying" cement, 1 part, to sand, $2\frac{1}{2}$ parts, as shown in Fig. 9. Allow the mortar in the patches to set for a period of 36 hrs.

Then brush the walls thoroughly with a stiff brush, to remove all loose material and dirt. If the wall has been painted, the old paint must be removed by scrubbing with a wire brush or other means as in Fig. 10. Lye mixed with a thin paste of cornstarch, in the proportions shown in Fig. 11, is effective in removing oil paint. The lye paste should be allowed to remain on the surface for 45 min., then scrubbed with a wire brush and washed off with water as in Fig. 12. Water paint, calcimine and whitewash will respond to water and scrubbing. When working with lye, be sure to wear goggles and rubber gloves.

Medusa Portland Cement Co. Chicago, Ill. No. 2287 La Salle Chicago 135 E 42nd Ave. Chicago



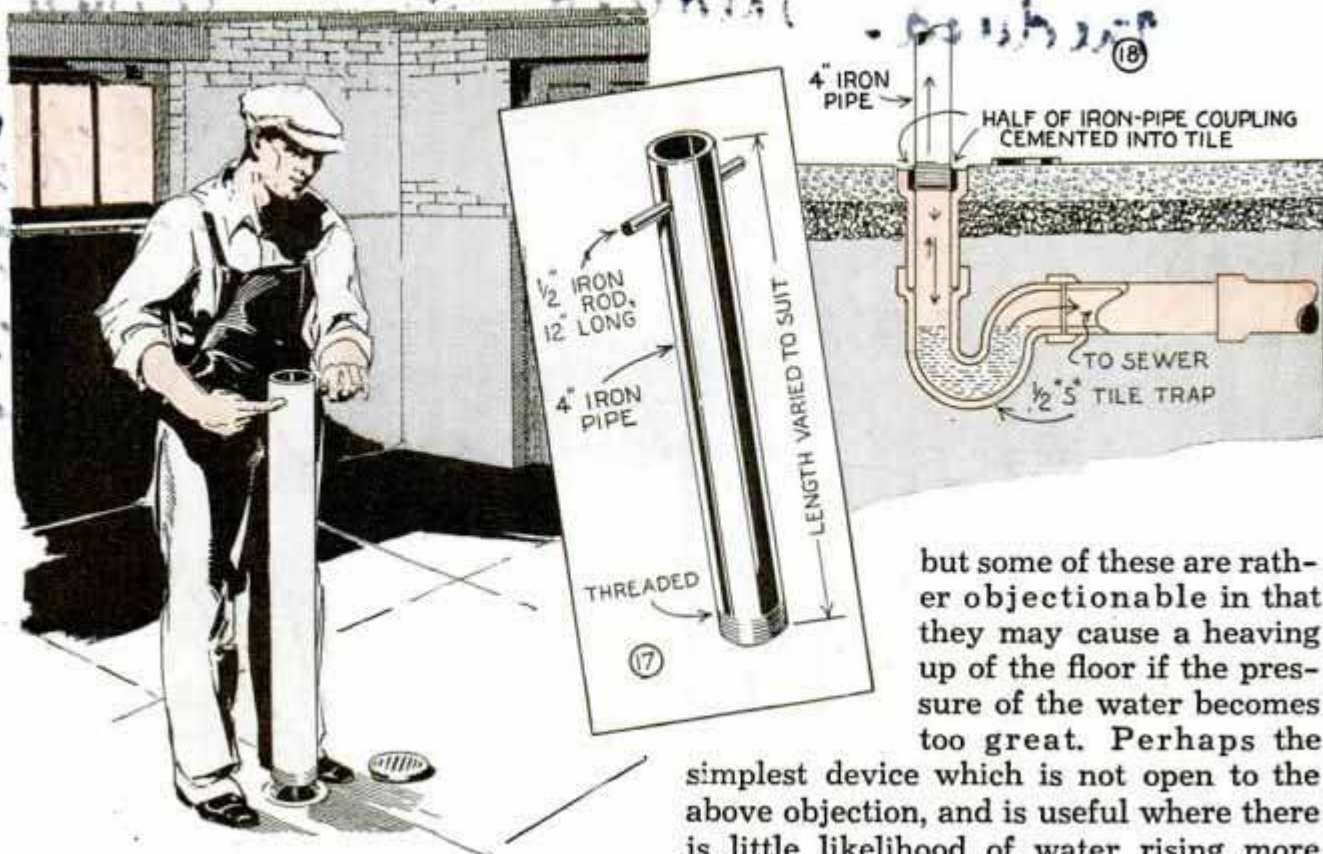
Painting Walls: For painting concrete walls, the powder type of cement paints containing the same ingredients as cement, and mixed with water, actually bond with a masonry or concrete wall so that they become more than a surface coating. They produce a smooth, waterproof surface that is durable. The paint can be obtained in white and several colors, or can be tinted to suit. It is available in quantities as small as 5 lbs., which will cover about 50 sq. ft., two coats. Proceed with the painting as follows: Wet the wall thoroughly with a hose, and apply a coat of the paint, which has been mixed according to the manufacturer's directions. A large paint or calcimine brush is convenient for this work, as in Fig. 13. After 6 and not longer than 24 hrs., apply a second coat of the same paint, but mixed somewhat thicker than the first. The wall should not be moistened between coats. When the second coat is dry, you will have a beautiful and moistureproof wall.

Floor Repairs: Leaky floors are sometimes the cause of wet basements. If the leak is slight or of the seepage variety, patching the cracks in the floor with the cement mixture suggested for the joint between the wall and the floor, will often suffice. Another effective remedy for floors is by means of the "iron method." This is a powder with an iron compound as a base, which is used to fill cracks and also to serve as a coating over the entire floor, to waterproof it. If used in the latter manner, however, it should be covered with a coat of shellac or aluminum paint to prevent the color from bleeding through, and one or two coats of floor or deck paint,



followed by a coat of varnish. If the pressure of ground water has cracked your basement floor, causing the basement to be flooded periodically, the remedies suggested above will not be effective and more drastic measures must be employed.

A new floor must be laid on top of the old one with a watertight membrane between, to prevent water coming up through the new floor. The surface of the old floor, or as much of it as is leaky, usually the area around the walls, should be covered with two or three layers of burlap, which is mopped and cemented into place with hot pitch or tar, as shown in Fig. 14. Tar paper and asphaltum are sometimes used instead of burlap where the surface of the



old floor is reasonably smooth, with equally good results. The tarred burlap or paper should extend a distance of a foot or so up the side wall, to insure a tight corner. A coating of cement plaster, applied as previously described, to the wall, is carried down over the tarred portion, as in Fig. 16. The thickness of the new floor, which is laid directly upon the tarred membrane, as shown in Fig. 15, depends largely on the amount of upward water pressure that must be overcome. A 3-in. thickness of concrete, including the cement topping, is usually considered safe unless an unusual amount of pressure has been experienced. In such a case it may be necessary to use metal reinforcing and additional thickness, to make sure that the floor will not heave up under pressure.

Excluding Sewer Water: In many neighborhoods the sewerage system is inadequate or antiquated so that unusually heavy rains cause the sewer to "back up" and flood the basements. While this water soon drains out again, it leaves a deposit of silt and sludge that is decidedly unsanitary. A tight wall and floor are no protection against this nuisance as the water enters through the floor drain. There are a number of devices on the market for closing this opening if the water backs up

but some of these are rather objectionable in that they may cause a heaving up of the floor if the pressure of the water becomes too great. Perhaps the

simplest device which is not open to the above objection, and is useful where there is little likelihood of water rising more than 2 or 3 ft. temporarily, is the stand-pipe, shown in Fig. 17. It is simply a length of iron pipe in which the water may rise to the level of the water head without overflowing into the basement. Thus all pressure against the floor is relieved. Fig. 18 shows the plan for installing it. Where water in basements may rise over 2 ft., or over the height of a basement toilet bowl, an effective temporary measure to stop "back-up" water consists in plugging the toilet bowl with a sack containing sand, a cement sack being just the thing for this purpose.

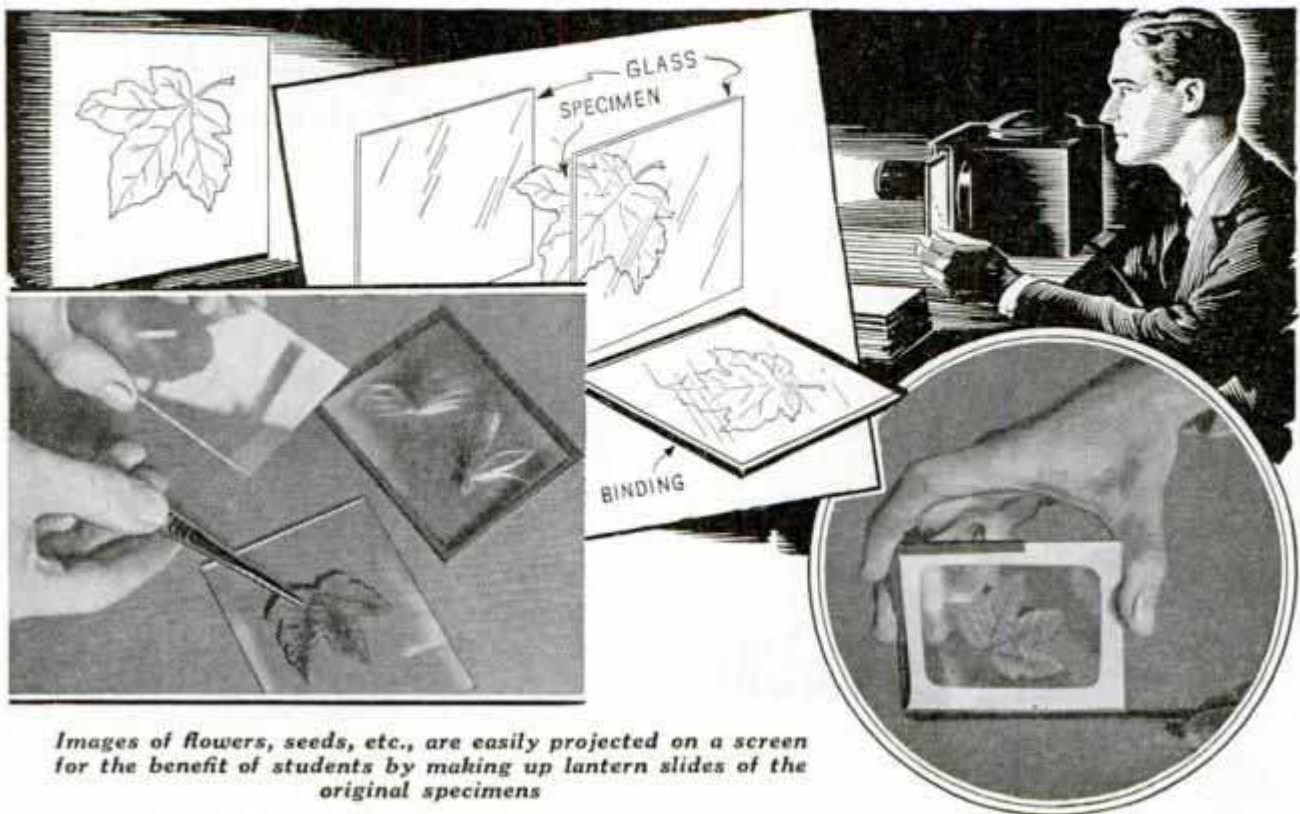
Fruit Juicer Quickly Improvised



When you are out on a picnic and have forgotten a lemon squeezer, it's no trick to improvise one from four nails and a piece of wood. If nails are not readily available, probably some

member of the party has lunch or other articles packed in a wooden box from which a few nails can be removed.

Original Specimens Used in Lantern Slides



Images of flowers, seeds, etc., are easily projected on a screen for the benefit of students by making up lantern slides of the original specimens

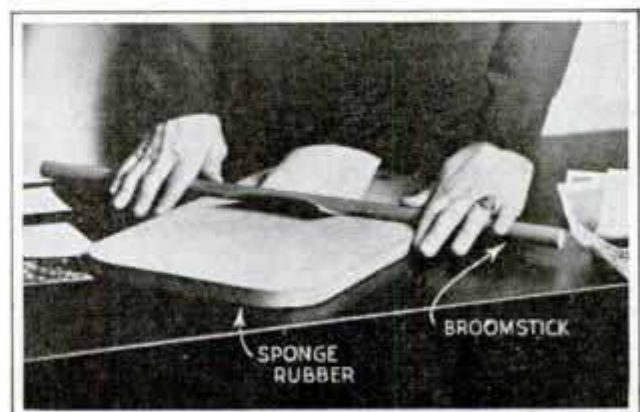
Lecturers, teachers and others who have occasion to use a lantern-slide projector, can save time in making their slides and show the projected images in the natural colors and textures of the original specimens by imitating the microscopist in the way he mounts his prepared specimens on glass slides. With this same method, it is possible to prepare many objects, such as leaves, flowers, mosses, insect wings, etc., by simply mounting them between two pieces of clean glass, which are then taped together at the edges. Objects mounted in

this way should be dry. Plant specimens can be placed between blotters and put under pressure until perfectly dry; or they can be dehydrated by immersion in alcohol. Leaves too opaque to give good images can be rendered more transparent by immersion in 95 per cent alcohol for several hours. This removes much of the green coloring material, leaving the vein system more distinct. The making of such slides will, of course, be confined to objects which can be seen advantageously when magnified a few diameters.

Curled Photo Prints Straightened on Rubber Kneeling Pad

Home photographers will find this a cheap but effective method of straightening curled photo prints. Get a sponge-rubber kneeling pad at the dime store and saw off a 2-ft. length from a broomstick. Lay the curled print face down on the pad and then roll the stick over the print once as shown in the photo, at the same time applying a slight pressure.—Nelson Edwards, Baltimore, Md.

☐ Strips of heavy gummed-paper tape are more satisfactory than tacks for attaching window shades to their rollers.



The broomstick is rolled over the photo which is placed face down on the kneeling mat

Sidewalk Squeegee from Rake Removes Slush



You will be surprised how quickly the walks can be cleaned with this improvised squeegee

For easy removal of slush from sidewalks, your garden rake, with a band cut from an inner tube stretched over the teeth, makes an excellent squeegee. To get best results, the band should be cut wide enough to project about $\frac{1}{2}$ in. beyond the ends of the teeth.

Simple Cure for Smoky Chimney

When troubled with a down draft in a chimney, due to surrounding buildings or trees, which prevent the wind from blowing straight across the chimney, a swinging deflector of sheet metal will often be effective as a remedy. If there are buildings higher than the chimney on either side, the

deflector should be set at right angles to them. The cross rod to which the deflector is screwed, pivots in two small bear-



ings. These are cut from brass tubing and are set in the mortar between the bricks in the top row on opposite sides of the chimney.

Steel Tape Automatically Oiled to Prevent Rust

Rusting of a coiled steel tape of the type shown is prevented easily by fitting an oiled felt disk in the case so that the tape rubs against it when pulled out. A hole is cut in the center of the disk to take the clamp support in the case. The felt does not interfere when pulling out the tape.



Roll-Up Boat Landing Is Stored Easily in Winter

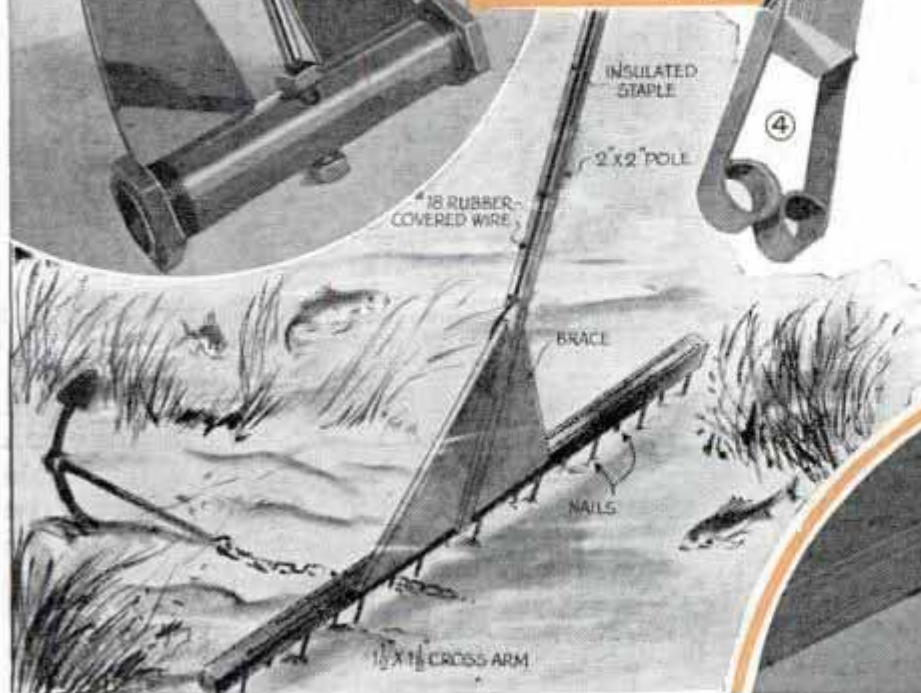
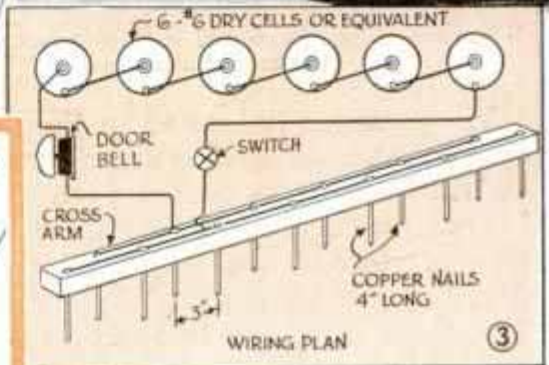
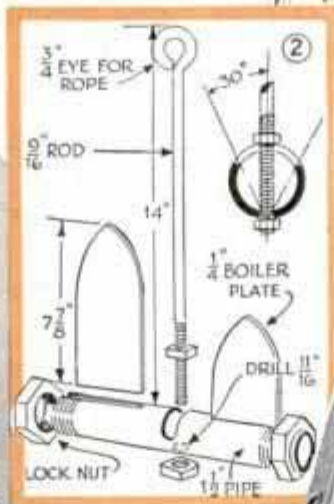
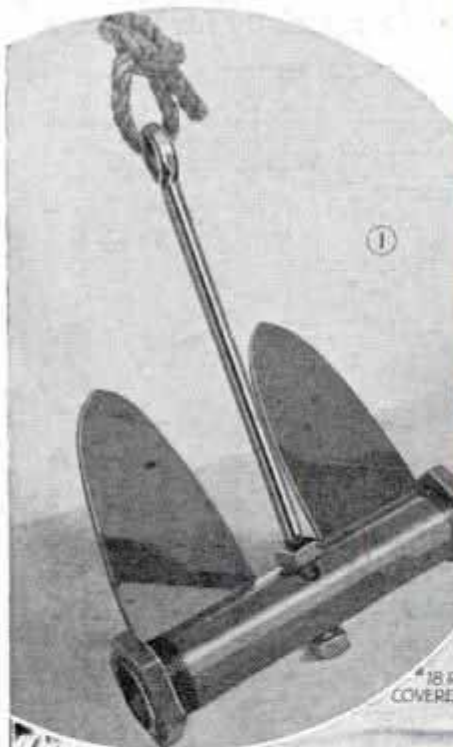
Easily rolled up for storage, this portable boat landing may be spread upon a dock frame, or simply staked out on a sandy beach. It consists of a number of boards 4 to 6 in. wide having two $\frac{1}{2}$ -in. holes bored near each end through which rope is threaded as shown. The landing readily adapts itself to the slope of the beach, and the rope ends may be looped over stakes at the top of the bank to hold it securely in place.



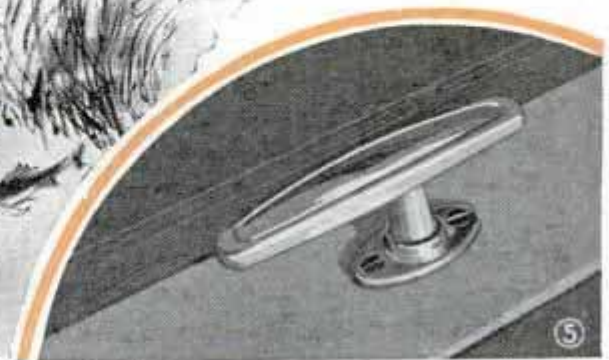
This portable boat landing rolls into a compact bundle for storing or for transporting

Ideas for The Boatman

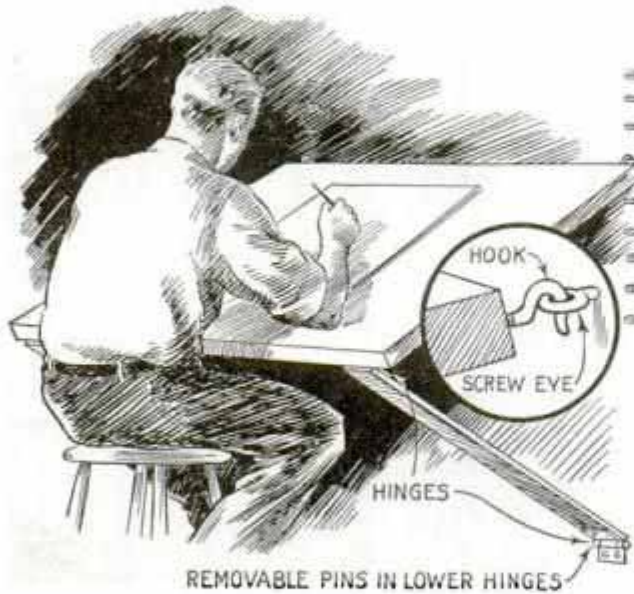
This large steel-toothed rake, fitted with a long handle, will locate metal articles lost in the water. Any adjacent pair of teeth—merely spikes—will close an electrical circuit when they touch a submerged metal object, causing the bell to ring. Once located in this manner, you can take the necessary steps to recover the article. A similar device with the cross-arm mounted on bicycle wheels is useful in combing sandy bottoms for salvage. Below, a navy-type anchor for the small boat made from pipe fittings and boiler plate. The flukes should be a driving fit into slots cut in the pipe so that they will be wedged securely in place when driven home. The slot and hole in the pipe through which the shank is inserted should be cut and drilled to allow the flukes to pivot about 30° to each side, as shown in the inset



Left, an efficient tool which enables you to recover a lost anchor is made by bolting spring-steel strips to the end of a pole. Below, automobile door handles make good cleats for the small boat. The handle is easily locked in position by a rivet or by setting the square inside shank in a suitable square mortise cut in the deck of the boat



Wall Drawing Board Adjusted to Any Angle



When not in use, the board is quickly removed from the wall and stored

Where space is limited in the home or apartment, a collapsible drawing table can be attached to the wall and when the table is not in use, it can be removed quickly and stored in a closet. Get a large drawing board or a piece of plywood $\frac{3}{4}$ or 1 in. thick, and drive two screw hooks into one edge near the sides as indicated. Space them 32 in. from center to center so that they can be hooked to two rows of screw eyes that are driven into the wall and into the concealed studs, which are usually spaced 16 in. apart on centers. The attachment to the studs is necessary to provide firm support. Now hinge two strips of wood to the opposite edge of the board—also 32 in. on centers. Hinges at the free ends of these strips are similarly screwed to the wall with screws long enough to go into the studs. These hinges should have loose pins to permit quick dismantling.—Philip Suttlemyre, Hickory, N. C.

Underlining Typewritten Work



By holding a fountain pen against a non-moving part of a typewriter, while sliding the carriage, as indicated in the photo, it is possible to under-

line words and sentences without removing the paper from the machine. This saves considerable time over the usual method, as the carriage-release key can be used and the work moved along quickly. It also enables the operator to use different colored inks, if desired.

Neat Flowerpot Covers

When you want to dress up flowerpots to conceal their drab appearance, it is often possible to pick up a few cheap, paper-covered lamp shades that will just fit the pots. If care is taken in selecting the shades as to color and design of the covering, they will appear to be made especially for the pots.



Worn Transom-Rod Holder Replaced with Hinge

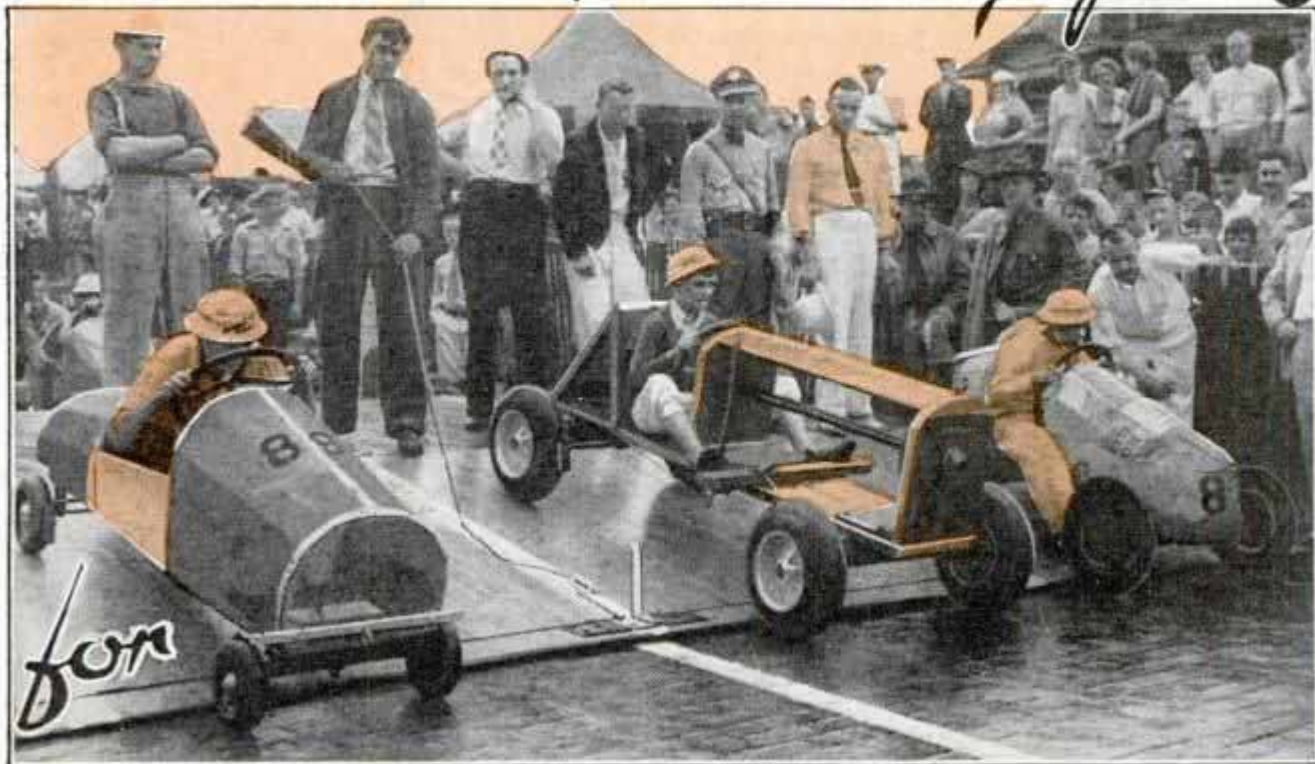


Small, brass hinge with hole in one side substituted for worn transom-rod holder

If a holder for the adjusting rod of a transom loses its "grip," a substitute can be made from a small hinge. Drill a hole through one side of the hinge to take the rod with a snug, sliding fit and screw the hinge to the door casing. When the hinge is released it drops at an angle and grips the rod and the downward pressure of the latter causes it to bind tightly.

*Supplies - see form letter
 Build - Mr. Alex Vences, Dept P. 1/2
 6237 W Lake, Chicago.*

Brakes and Steering Gear

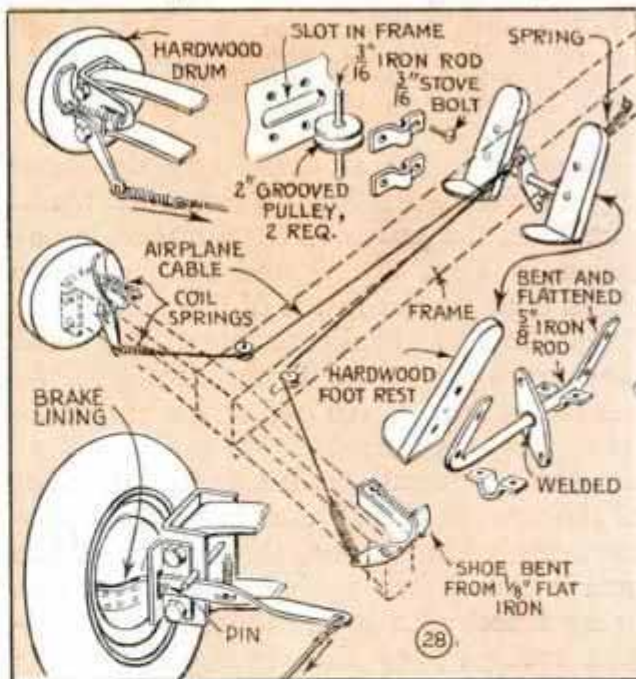


wheels and part & build car according to rules.

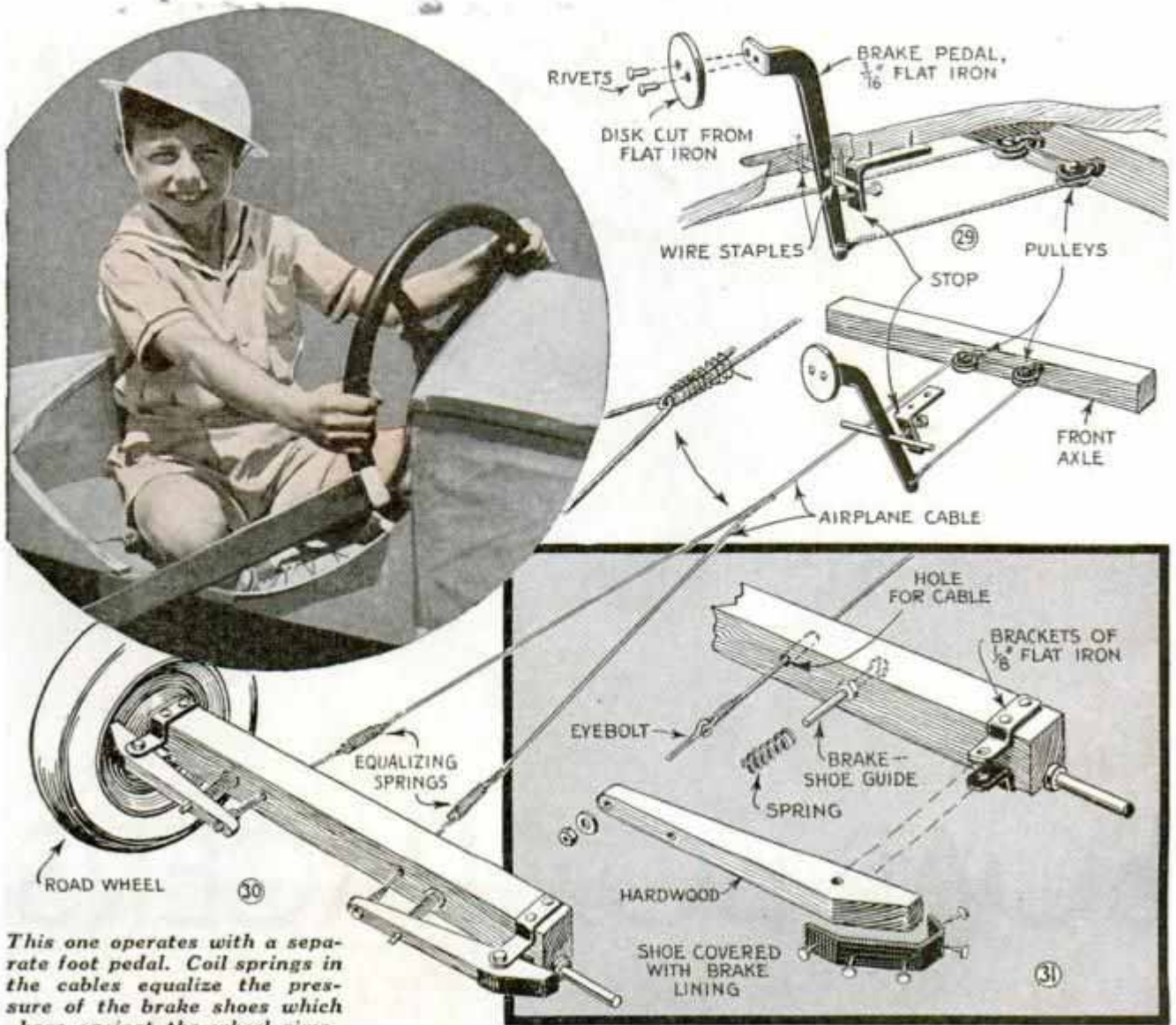
SOAP BOX RACERS

By W. Clyde Lamme

THERE'S one important fact about brakes for Soap Box racers that you should keep in mind: The shoes must touch the drum or whatever they are intended to bear against, only when the brake is applied. There must be a spring or other means provided for lifting or pulling the shoe clear of the drum the instant you release the pressure on the foot pedal or lever. A look at Fig. 28 will show you what is meant. Here two types of brake shoes are shown, one operating on a drum bolted to the road wheel, and the other bearing directly on the bell-shaped hub of the wheel. Only certain kinds of wheels will permit the use of the latter type of shoe. This brake assembly is designed to be fitted to the frames shown in Figs. 1 and 7 of the previous installment. When assembled on these frames the brake pedals provide convenient foot rests. To apply the brake you simply push forward on the pedals. A stop pin pre-



vents the pedals from tilting back too far when releasing the brakes. Springs in the cables equalize the pressure of the shoes so that you can bring the car to a smooth "straight-line" stop with very little effort.



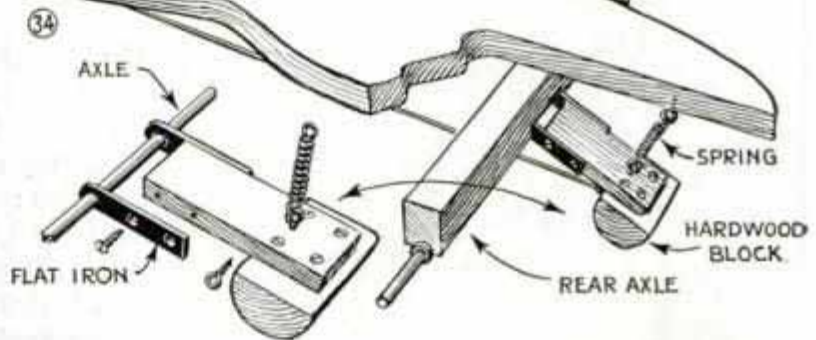
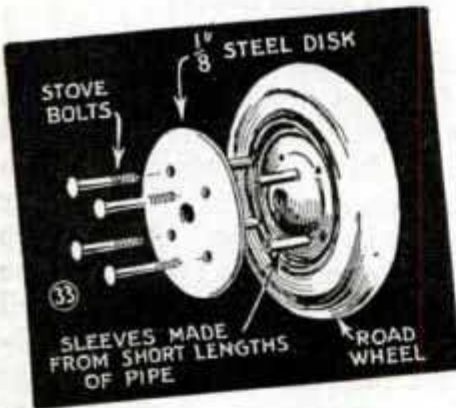
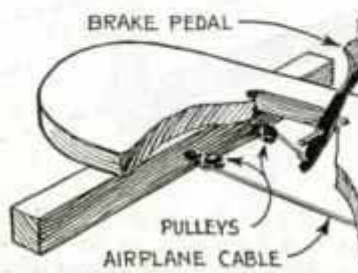
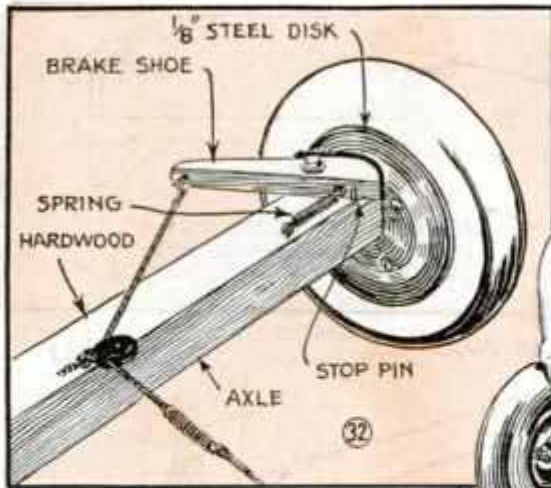
This one operates with a separate foot pedal. Coil springs in the cables equalize the pressure of the brake shoes which bear against the wheel rims

Another brake of essentially the same type and designed for the frame shown in Fig. 12 of the previous installment, is detailed in Figs. 29, 30 and 31. Here the shoes bear on the inside of the wheel rim. A regular foot pedal is provided, the pedal working in a slot cut in the center member of the frame. An adjustable stop limits the return travel of the pedal and at the same time allows a close adjustment of the brake. The "shoe" is really a pivoted arm of hardwood, the portion of the arm which bears against the wheel rim being faced with brake lining. Compression springs keep the shoes clear of the wheels, while tension springs in the cables equalize the pressure when the brake is applied.

Fig. 32 shows another type of shoe that can be worked with the pedal arrangement shown in Fig. 30. This shoe bears on a steel disk bolted to the road wheel as in

Fig. 33. Notice that the bolts holding the disk to the wheel pass through sleeves. This is necessary because on certain types of wheels the rim and hub consists of two disks bolted together with small stove bolts. You have to be careful to see that these sleeves are all exactly the same length so that when the whole is assembled with longer bolts, both the disk and the wheel will run true. The nuts should be drawn down on lock washers.

Now, on all three types of brakes just described, one thing is essential: You should adjust the brake mechanism so that there is always tension in the cables, even when the brake is fully released. The return springs—the springs that force the shoes away from the wheels or drums—should be strong enough to prevent intermittent application of the brakes due to vibration or flapping of the cables when the car is in motion. It's a good plan to

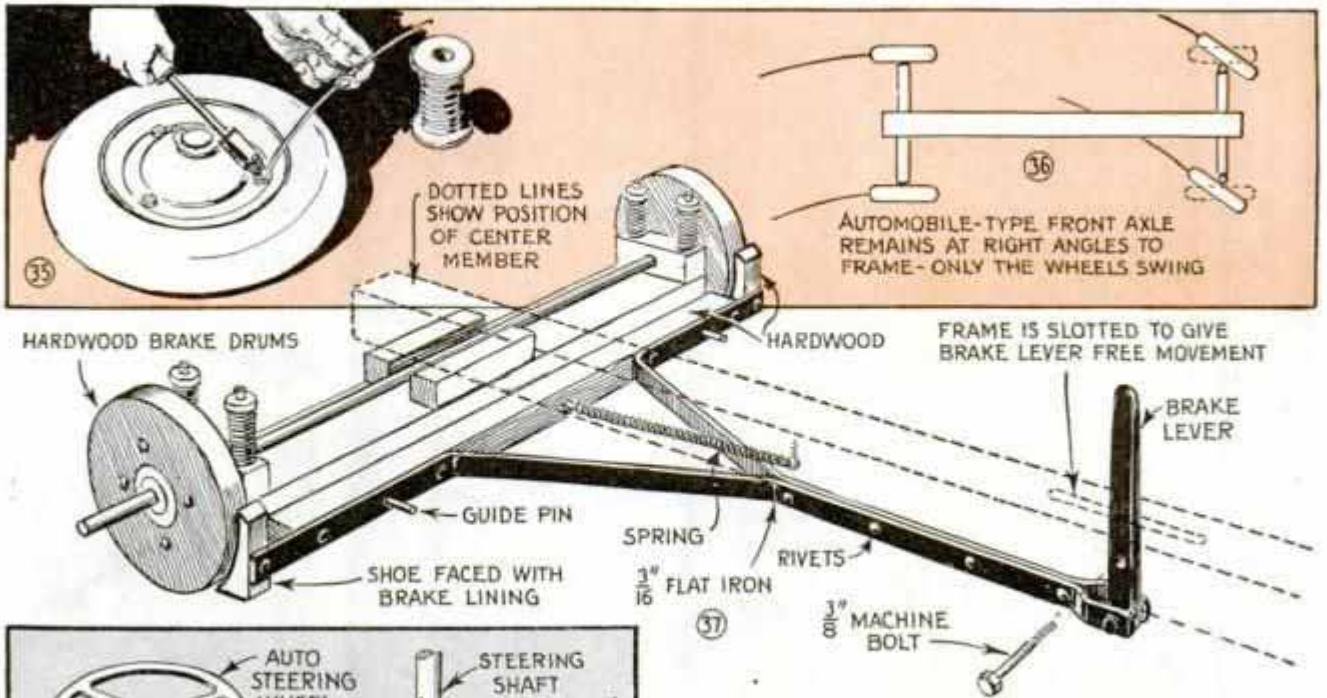


"Drag" brakes are in common use on Soap Box racers. You can construct this type of brake quickly and it will be very effective

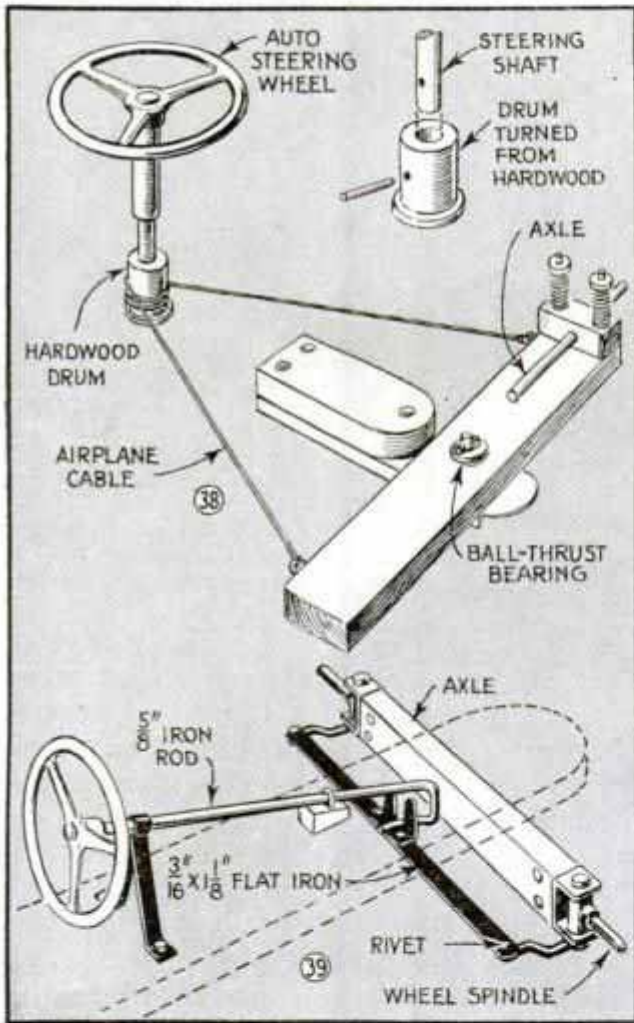
run the cables through screw eyes and then you will be sure of no trouble. The shoe should clear the drum by at least $\frac{1}{8}$ in. when the brake is released; if the shoes drag they will have a braking effect on the forward motion of the car.

Now another—a simple affair of the drag type shown in Fig. 34. You work it with a pedal in the same way as those just described. A single shoe is hinged to the rear axle, the shoe being simply a rounded hardwood block. When you press on the brake pedal the block is brought into contact with the road surface, thus slowing down and stopping the car. Extremely simple to make, it is nevertheless an effective brake. Still another design, lever operated, turns up in Fig. 37. This one is designed to fit the type of frame shown in Fig. 2 of the previous article. A wooden crossbar is moved back and forth by a

lever. Extensions of the flat-iron cross beams carry the hardwood shoes, which are faced with brake lining and bear on hardwood drums bolted to the road wheels. The shape of the brake shoe compensates for the up-and-down movement of the axle, as it touches the drum below the horizontal center line, and the slight twisting motion is taken up by the flat-iron bars. Now these various types of simple brake mechanisms are merely suggestive of what you can do in braking a derby racer. There are other more complicated designs, of course. You could, with time and proper equipment at your disposal, fit your derby racer with either two or four-wheel internal expanding brakes of the mechanical or even the hydraulic type. But this is neither necessary nor is it advisable due to the complications involved in designing a suitable steering gear.

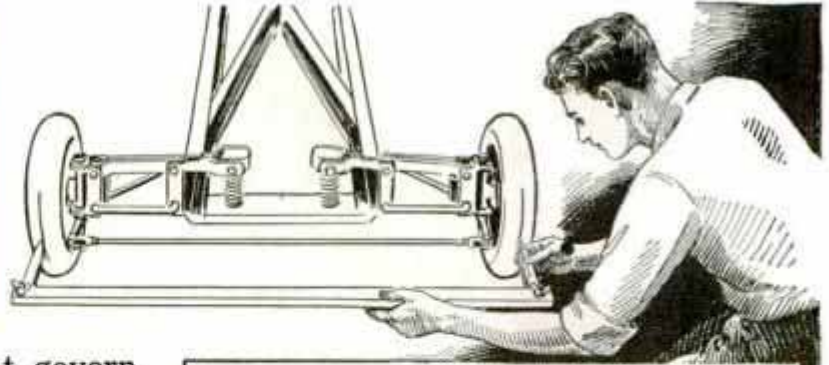
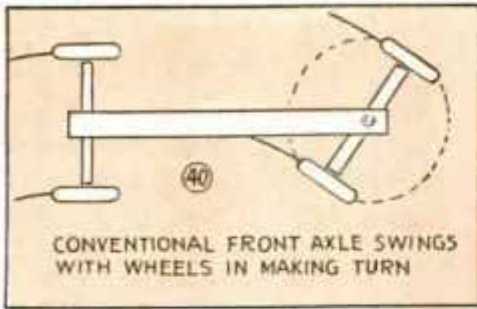


Where the weight of the car is carried on coil springs an effective brake can be made as in the detail above. The shoes engage hardwood drums when the lever is pushed forward



Before you start building the steering gear, it's wise to consider wheel and axle types. In Figs. 36 and 40 you see first the difference between the conventional and the auto-type steering control. In the former the entire axle assembly swings, requiring greater steering effort, while the auto-type steering gear swings only the wheels. Now the small coaster wheel with

the usual solid-rubber tire has little resistance to forward motion, but the area of contact with the road is so small that steering ability in a transverse direction may be so low on a wet track that the car will be greatly handicapped. Unless the wheel is properly sprung to the frame, the solid tire, with its comparatively small cross-section, will, under certain conditions, transmit road shock to the bearings with enough force to cause overloading of the usual type of ball bearings used in these small-diameter wheels. Naturally, this condition slows down the car and at the same time makes it more difficult to steer. On the other hand, the pneumatic-tired wheel with its large contact area, that is, the area of the tire in contact with the road, increases the rolling friction, but at the same time its resiliency absorbs the road shock and takes this additional load off the bearings. The pneumatic tire grips the road even when the surface is wet. It resists skidding and maintains a sure "hold" on the road surface for quick steering and braking. It should be remembered, however, that on a smooth track the solid-tired wheel, properly sprung to the frame, probably has slightly the advantage in speed although it would be difficult to say definitely which is the faster, the solid or the pneumatic tire, as there

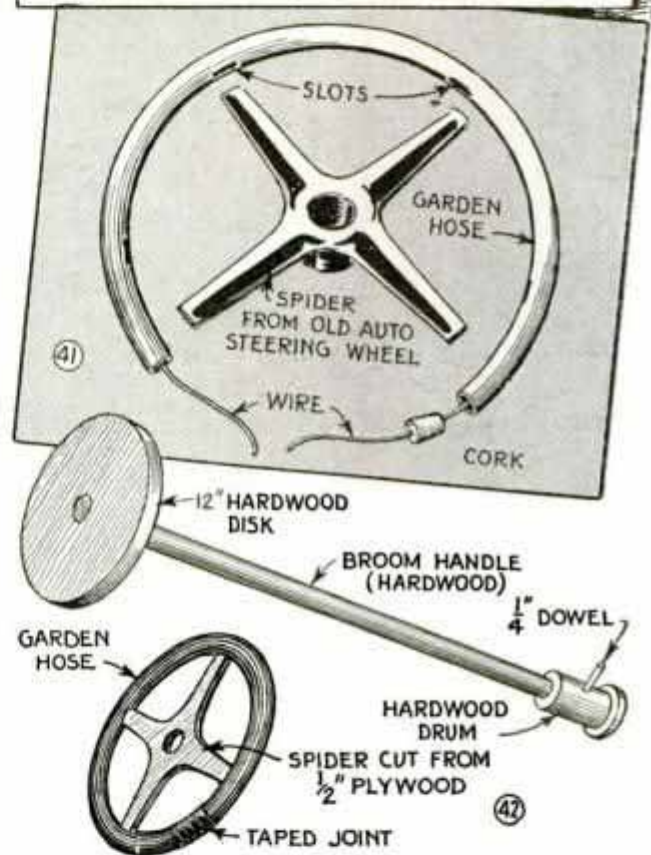


are other important factors that govern the performance of the wheels and tires.

One of these is the steering gear. Fig. 38 starts you off on this part of the construction with a suggested type for the swinging front axle, Fig. 40. To make this, about all you need is an old auto steering wheel and column, which you can easily get at a junk yard. Then you cut the column and shaft to a length that brings the wheel at a convenient height on the racer frame, turn out a hardwood drum with a flange at the bottom and drive this on the lower end of the steering shaft. Cables are lashed through screw eyes turned into the axle. Two turns of the cable around the drum, a staple to keep it from slipping, and there you are.

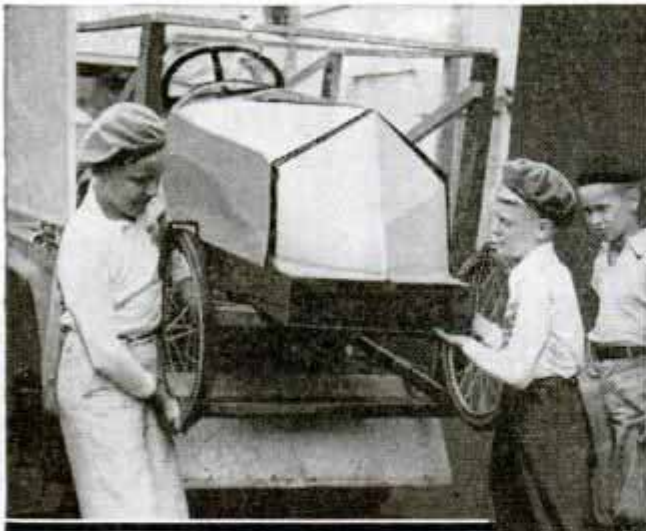
The efficiency of any steering gear that controls the movement of the wheels through cables, depends largely on one thing—tautness of the cables. If these are slack, ever so slightly, you cannot hold your racer on a true course. The gear must be put together in such a way that there is a certain amount of tension on the cables at all times. With this in mind, compare the types shown in Figs. 38, 43, and 44. Those in Figs. 38 and 43 show two ways of making a steering gear to swing the front axle, while that in Fig. 44 suggests a simple gear for the auto-type front axle. This latter gear can be used on any of the frames described in the previous installments, except the one shown in Fig. 2. A similar type, which operates without the cable, is shown in Fig. 39. Here the shaft to which the steering wheel is attached is bent into a U-shape at the lower end, the U-shaped section engaging a slot cut in a short piece of angle iron riveted to the tie rod. A stop is provided to prevent turning the wheels too far and disengaging the gear. Figs. 41 and 42 show how you can make steering wheels, should you wish to do so. An adjustable tie rod

Success or failure may depend on how carefully the wheels are alined. With the wheels just slightly out of alinement the "wiping" action of the tires increases rolling friction and slows down the car

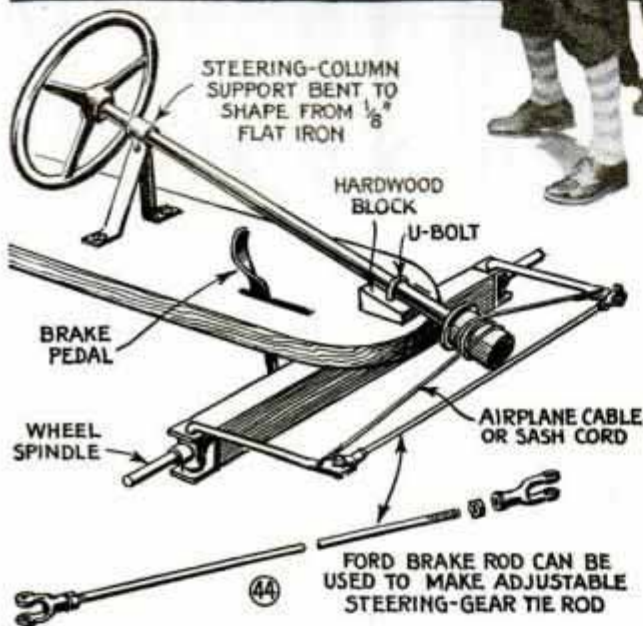


on the auto-type steering gear makes it possible to aline front wheels accurately. A Ford brake rod is just the thing as you can cut it to length and thread one end for the yoke and nut as in Fig. 44. This gives you a close adjustment and at the same time you can be sure it will hold.

It's a good idea to test all four wheels for balance. Mount the wheel on a short piece of shafting of the same diameter as the spindle and lock the shaft level in the vise. Then spin the wheel slowly and when it stops, mark the low side of the tire. Spin again and note the position of the mark. If the wheel stops in the same position as before, it is out of balance. Put



It's important that the ropes or cables of the steering gear pull evenly and in line. On the car shown above, the steering gear swings the front axle



a drop or two of solder on the high side as in Fig. 35, and try again. By adding or scraping away a bit of solder you can bring the wheel in perfect balance.

Now the wheel alinement. With wheels of small diameter this is rather difficult, but the illustration directly above Fig. 41 shows how you can do this with reasonable accuracy. Take a small hardwood strip slightly longer than the width of the tread and bolt a hardwood pointer at each end. Then measure and mark the exact center of the tire front and back. Set the pointers on the marks as shown. With this setting, check the marks on the opposite side of the wheels. If the two sets of marks do not check, the wheels are out of alinement, one with the other. Generally you can correct this by changing the adjustment of the tie rod slightly until the marks check. Now test the rear wheels in the same way. If they are "out" you may have

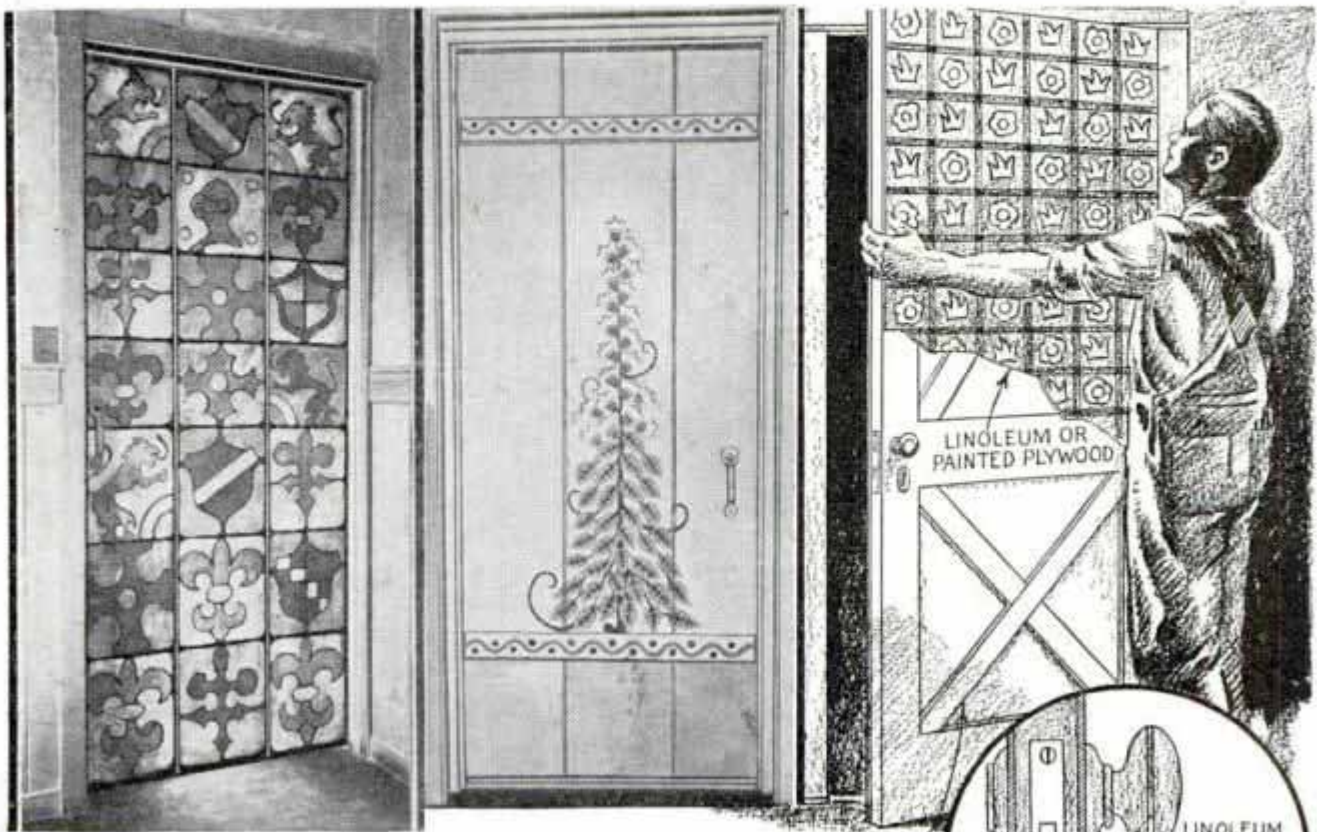
to spring one spindle slightly to bring them in line. Vertical alinement can be checked with an ordinary square while the car is on a level surface. Slight irregularities here may be due to the tire alone and need no adjustment. With the front wheels set straight ahead, alinement front and rear can be checked with a straight-edge laid against the wheels. It is also important that the front and rear wheels "track," that is, each rear wheel must follow exactly in the path of the front wheel when the car is moving straight ahead.

(To be continued)

Cost and General Sizes

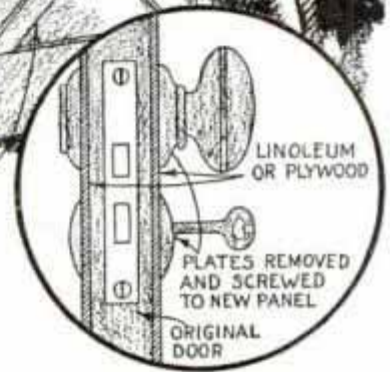
As one of the basic ideas of the Soap Box Derby is to encourage the ingenuity and resourcefulness of the builders, giving everyone who enters an equal chance, the allowance for cost will be definitely limited by this year's official rules, which will appear in next month's issue of Popular Mechanics. With this in view, you should keep expenditures for materials to the lowest figure possible. Just apply yourself to the idea that the racer must be very simple but also highly efficient. Concerning size, we are going to give you suggestions for dimensions of the frames described in the previous installment—these are not the official maximum nor minimum dimensions, but only suggestions so that you will have an idea of properly proportioned racers. These may be varied to suit your individual requirements as much depends on the weight and size of the driver. For this reason also, it is impossible for us to give any specific dimensions of the various parts. Frames of the kind shown will come from 7 to 12 in. above the ground if small pneumatic tired wheels are used. Small wheels of less than 14 in. in diameter are best for these low-slung racers, and if properly proportioned, the length of the frames should be about 54 in., while the width from end to end of the springs or axles, not including wheel spindles, should be about 30 in. The exact location of the steering wheel, seat, brakes, etc., should suit the user.

Dutch Doors Liven Somber Interior of Cabin



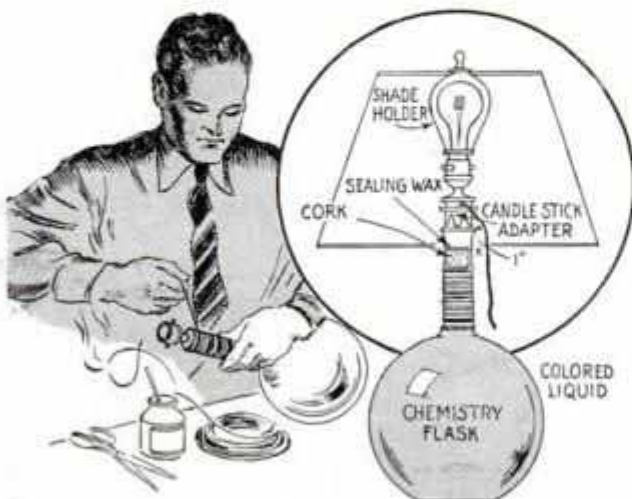
BATTENS PREVENT NEW PANELS SAGGING

Gayly colored doors will do much to brighten an otherwise dull interior of a cottage or cabin. Probably the simplest method is to cover the doors with linoleum, preferably of a neat tile pattern. Before applying it, the lock plates are removed, the panels built up flush with cross battens or, better still, with plywood to fill the entire panel space. The linoleum is cemented or tacked in place. If you are artistically inclined, unusual effects can be had by painting designs directly on the doors



Lamp Base Made from Flask Is Filled with Colored Liquid

Filled with colored water and fitted with a candlestick adapter to which a socket is screwed, a large chemistry flask makes a beautiful lamp that goes well in any sur-



Having a water-filled base, colored to harmonize with other furniture, this lamp does not tip easily

roundings. Water stained with colored crepe paper is recommended as the latter does not precipitate in the bottom. After forcing a cork well down inside the neck of the flask and covering it with sealing wax, colored raffia or cord is wrapped around the outside as indicated. The candlestick adapter, socket and shade holder can be obtained at any electrical store.—R. O. Buck, Chicago.

Seams Sewed Without Puckers

If you are annoyed by having seams pucker when stitching fine materials on your sewing machine, the trouble may be avoided by placing a piece of heavy brown paper under the seam and stitching it to the cloth. The paper can be torn away from the seam when the garment is finished.—A. W. Scheib, Arlington, Mass.

Appearance of Well Enhanced by Lattice "Pagoda"



Screen wire tacked over lattice work inside the housing keeps out birds and insects

For the open well, many of which are still maintained for old-times' sake, a housing like the one shown will not mar its historic value, yet will enhance the appearance considerably. As a large portion of the sides consists of lattice work, adequate ventilation is assured and as wire mesh is tacked over the lattice, on the inside, birds are kept out. One of the lattice panels is hinged to afford easy access. A similar structure, but built of solid material and provided with a large full-length door, will also make an ideal place to store your garden tools, besides being quite ornamental.—Dale R. Van Horn, Lincoln, Nebr.

Fishing Reel Has Rubber Grips to Ease Finger Strain



Slipped over the handles of your fishing reel as shown in the photo, a couple of ordinary penny pencil erasers will enlarge the handles so that you can grip them with less finger strain

when reeling in the line. The shape of the grip may be altered to suit your individual taste by cutting off some of the rubber with a sharp knife. No cement is necessary as there is plenty of grip, once pushed in place.

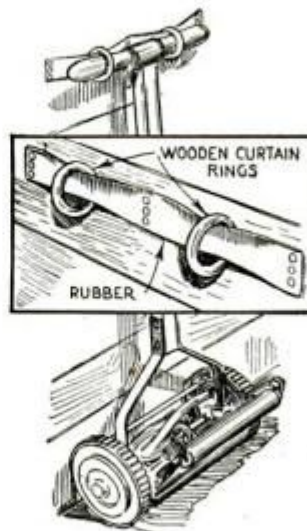
Pipes Cleaned with Amyl Acetate

Instead of running dry pipe cleaners through the stem of his pipe, one smoker finds that a better job of cleaning can be done by using amyl acetate, often referred to as "banana oil." Dip the pipe cleaner in this liquid and run it through the stem to remove all



traces of the deposit inside. Then dip the cleaner in soapy water and run this through the stem to remove all traces of the chemical, taking care, of course, to avoid getting any soapy water in the bowl of the pipe. Cigarette and cigar holders may be cleaned in the same way.—Malcolm Maxwell, Baytown, Tex.

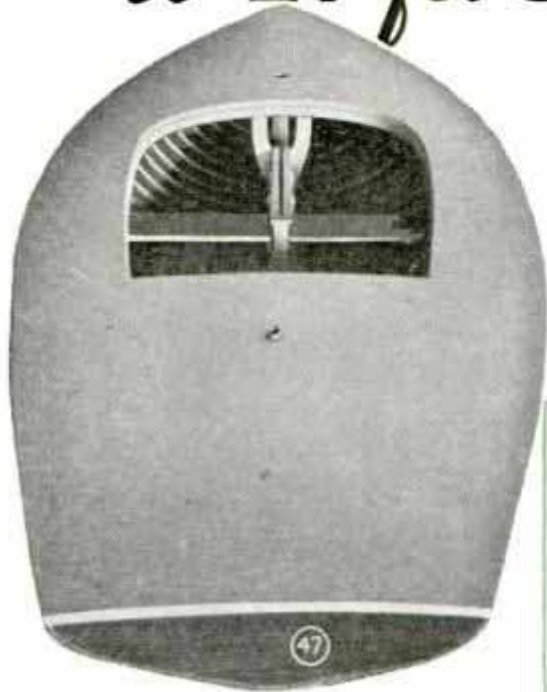
Lawnmower Held Out of Way Against Wall



Tacked to a wall as shown, two strips of inner tube carrying a couple of large wood or wire rings make a good holder to keep your lawnmower close to the wall. The rubber will stretch so that the rings can be slipped on or off the handle easily.

Wood curtain rings were found just the thing for the purpose. They can be obtained from any dealer in draperies.

"ARROWHEAD" a 21-ft. Sloop



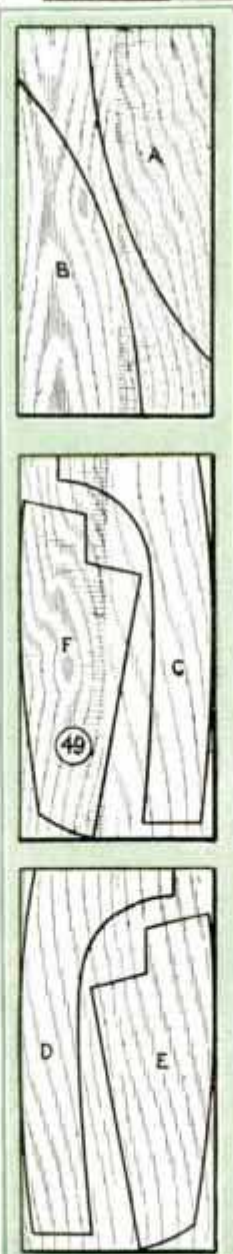
PART 3

Decking, Centerboard and Rudder

"ARROWHEAD'S" deck is of waterproof plywood covered with canvas, as in Fig. 47. Six pieces of $\frac{1}{4}$ -in. plywood are required. These are cut in duplicate from three panels as in Fig. 49 and are to be fitted as in Fig. 52. However, there are two things to be done before you screw down the deck permanently. The false bottom, Fig. 50, should be installed before any work is done on the deck. This will avoid the necessity of walking about on the unprotected ribs and planking when you get inside the cockpit. Although the decking is of thin plywood, which bends easily to the curve of the beams, installing it right is a rather fussy job. The important thing is to make sure of a perfect fit along the



With the deck on as you see it here, the end of the job is in sight. Stretching and tacking the canvas is rather fussy business, but see how neatly it turns out



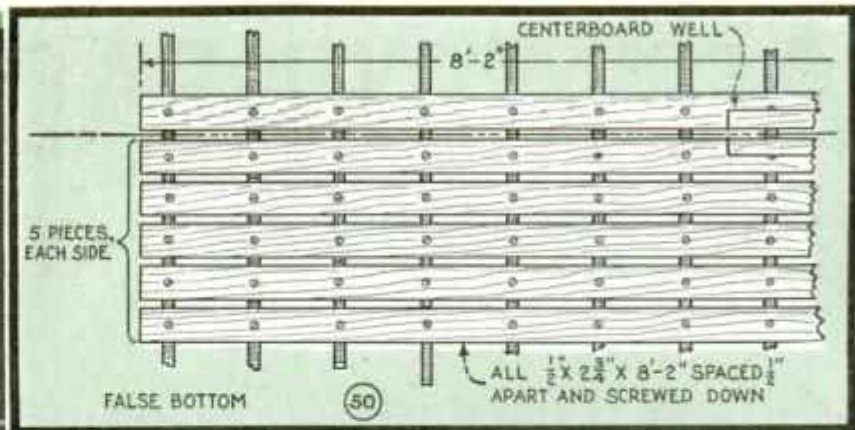
DECK IS CUT FROM THREE PLYWOOD PANELS, $\frac{1}{4}$ " X 4'-0" X 8'-0"

centerline, at the butt joints, and particularly at the gunwales. This means that you will have to fair off the top face of the gunwales so that the curve of the beam is continued unbroken to the outer edge. Unless you are particular in thus fitting all the individual pieces which comprise the deck, you are likely to finish with unsightly bulges or depressions which will mar otherwise smooth contours. When you are sure the fit is right, paint the underside of the plywood one coat of inside hull paint and screw the pieces down to the sheer plank and beams with $\frac{3}{4}$ -in. No. 6 bronze screws spaced as in Fig. 54. Then smooth up flush with plane and sandpaper around gunwales and cockpit.

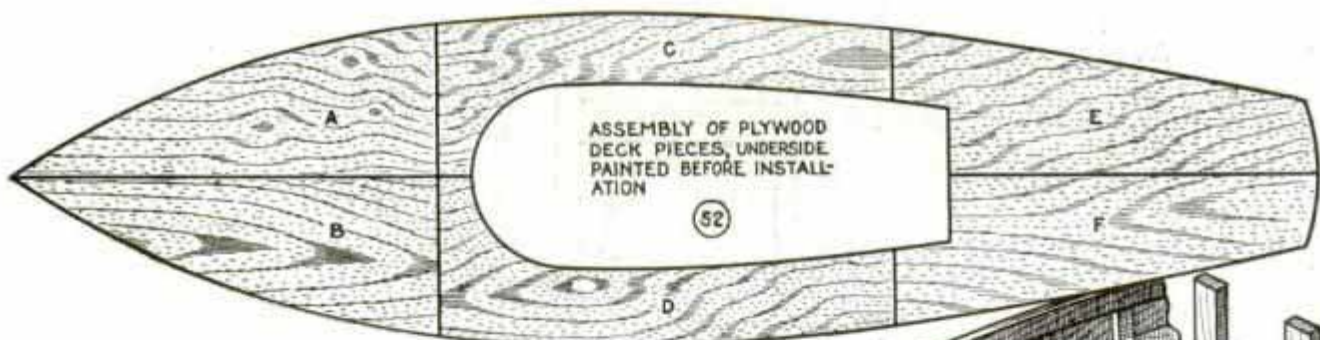
Now give the plywood deck a coat of lead and oil paint, mixed fairly heavy, and before this dries stretch the canvas deck covering, fastening all around at the gunwales and over the transom with copper tacks as in Fig. 51. Notice from the material list that this is No. 10 duck—not 10 oz. Now a line of tacks is run around the cockpit close to the



Be sure that the canvas is folded under at the edge so that each tack goes through two thicknesses of cloth. At the points of greatest strain space the tacks evenly, not more than 1 in. apart

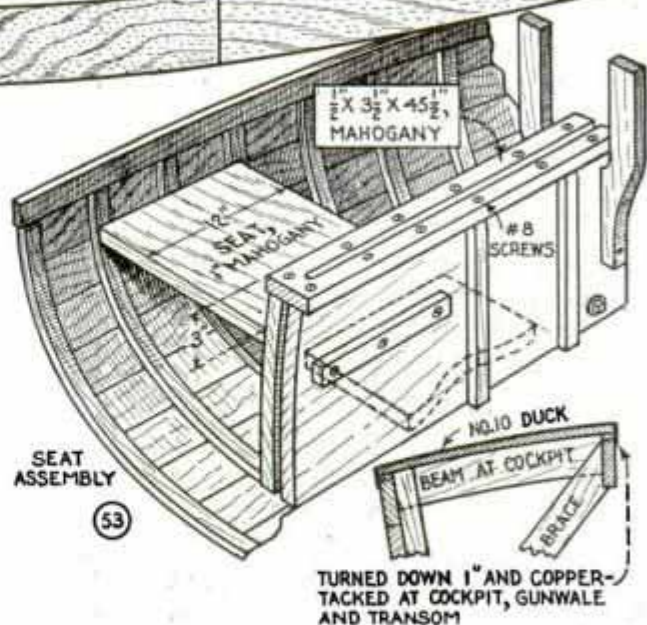


purpose, as they act as braces for the centerboard well and also support cleats for the mainsail halyard and centerboard gear. The seats should be of 1-in. mahogany, the outer ends being supported on cleats screwed to the ribs. A strip of mahogany, slotted to proper width and with top edges neatly rounded, finishes the top of the centerboard well. Details of the coaming you will find in Fig. 58. This is in three parts, the forward section being steamed and bent to fit the curve of the cockpit. The after ends of the side pieces

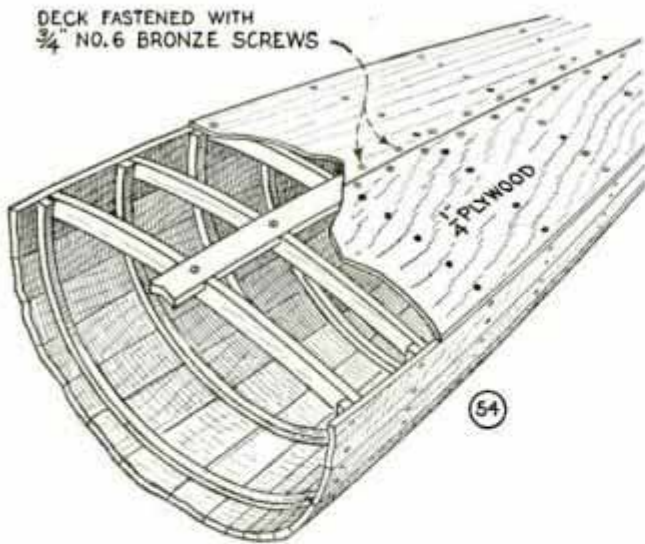


edge on the top side to hold the canvas while you cut away for the opening, leaving a flap or overhang of about 1 in. for permanent tacking. These tacks are driven in only part way so that they are easily removed when the final tacking is finished. Proceed in the same way at the deck openings for the mast and the mainsail halyard, as in Fig. 48. The tacking finished, give the canvas two coats of oil paint, the first coat thinned so that it will penetrate the cloth. Follow the second coat with one of enamel. Most sailors prefer to leave the cloth surface rough, as it gives a safer footing when walking about on the deck.

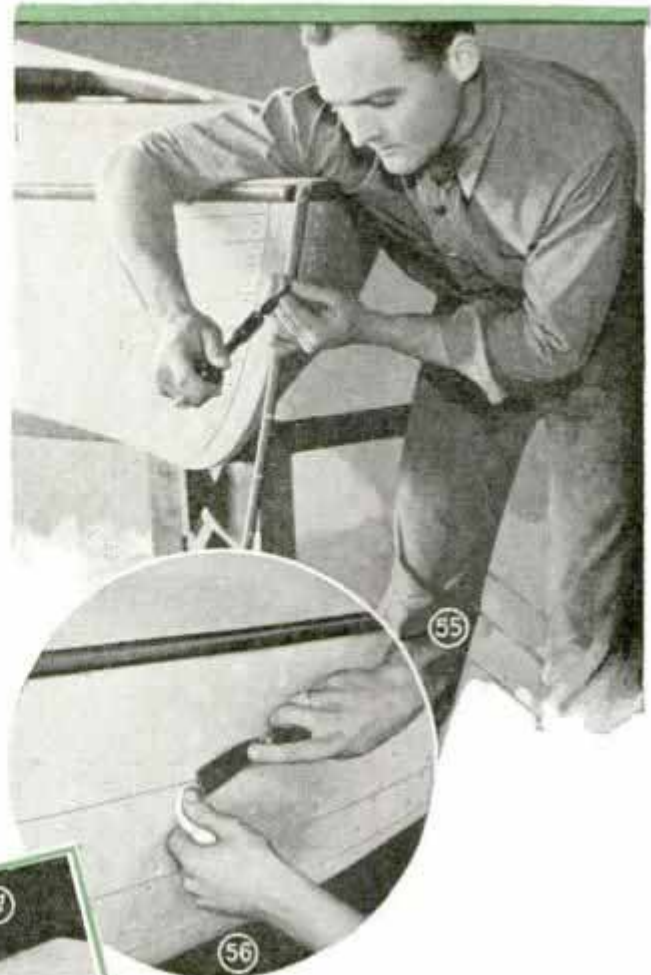
Now you go inside to finish up the cockpit. The seats, Fig. 53, serve a three-fold



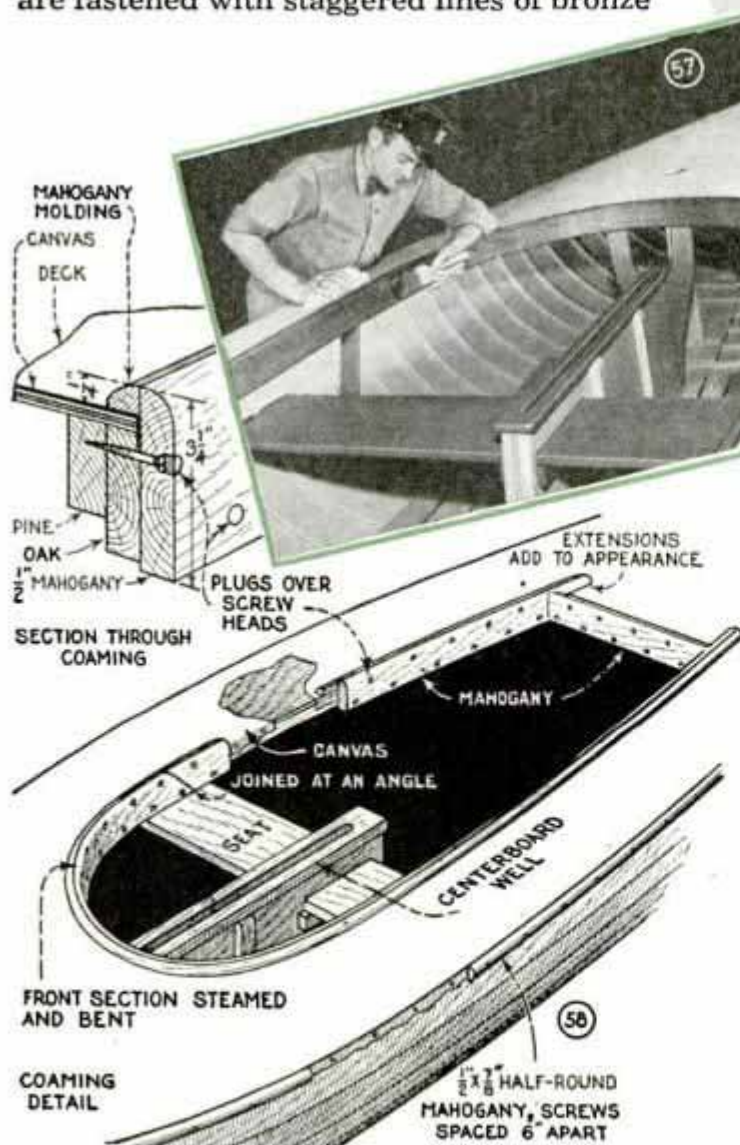
The important thing in installing the deck is to make sure of a perfect fit along the centerline and at the butt joints, so that these do not show under the canvas covering



are notched to provide extensions which add to appearance. Notice especially the angle joint between the side pieces and the curved end of the coaming, Fig. 58. This is not only cut at an angle, but the ends of the joining members are beveled so that one overlaps the other. The parts are fastened with staggered lines of bronze



Screw heads are puttied over with a marine-lead putty after the first coat of paint is applied. All mahogany parts are finished in the natural color with three coats of spar varnish



screws, the heads counter-sunk $\frac{3}{16}$ in. and the holes plugged with mahogany plugs. A $\frac{1}{4}$ -in. molding of mahogany finishes the job. Note that the coaming extends only $\frac{1}{4}$ in. above the deck level in the detail, Fig. 58. If desired, it may be higher. Finally, you have to install braces from the ribs to the edges of the cockpit as in Figs. 53 and 59. These can be installed either before or after you put on the coaming.

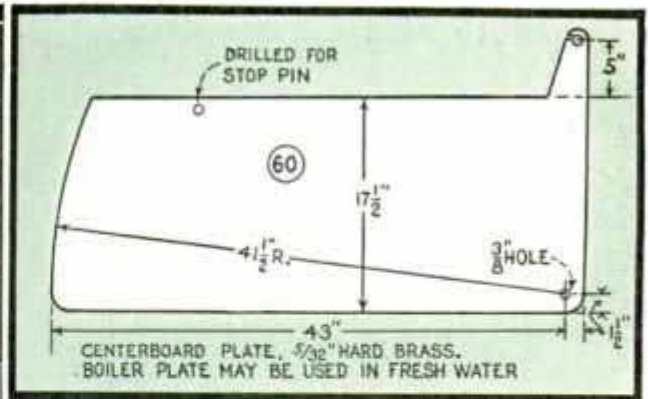
The projecting canvas flap and the line of tacks around the gunwales are covered with a half-round mahogany molding, Fig. 58, and the stem is finished with a half-round molding of solid brass as in Fig. 55. All parts of mahogany including the transom are finished in the natural color with three coats of spar varnish as in Fig. 57.



Braces along the sides of the cockpit carry the strain down to the ribs, thus giving ample strength to support persons sitting on the edge of cockpit

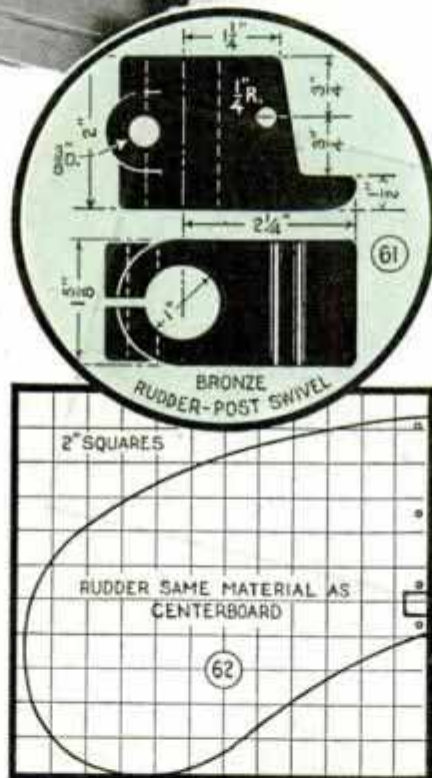
The first coat is thinned with turpentine so that it will penetrate. Succeeding coats are lightly sanded to produce a smooth, satiny finish.

For use in salt water, the centerboard, Fig. 60, should be of hard brass, though for fresh water, boiler plate will be satisfactory. The rudder, Fig. 62, should be of corresponding material of the same thickness in either case. Now, before you install the rudder, turn out the rudder-post bushing and coat the threaded end with thick white lead, then tighten it back in place. The rudder-post head or swivel, Figs. 61 and 65, is a bronze casting shaped as in Fig. 61. The head is drilled and slotted so that it will clamp to the rudder post as in Fig. 65, which shows the complete rudder assembly. Notice that the post is slotted to take the rudder, which is held in the slot with brass rivets. A collar brazed to the post provides a shoulder

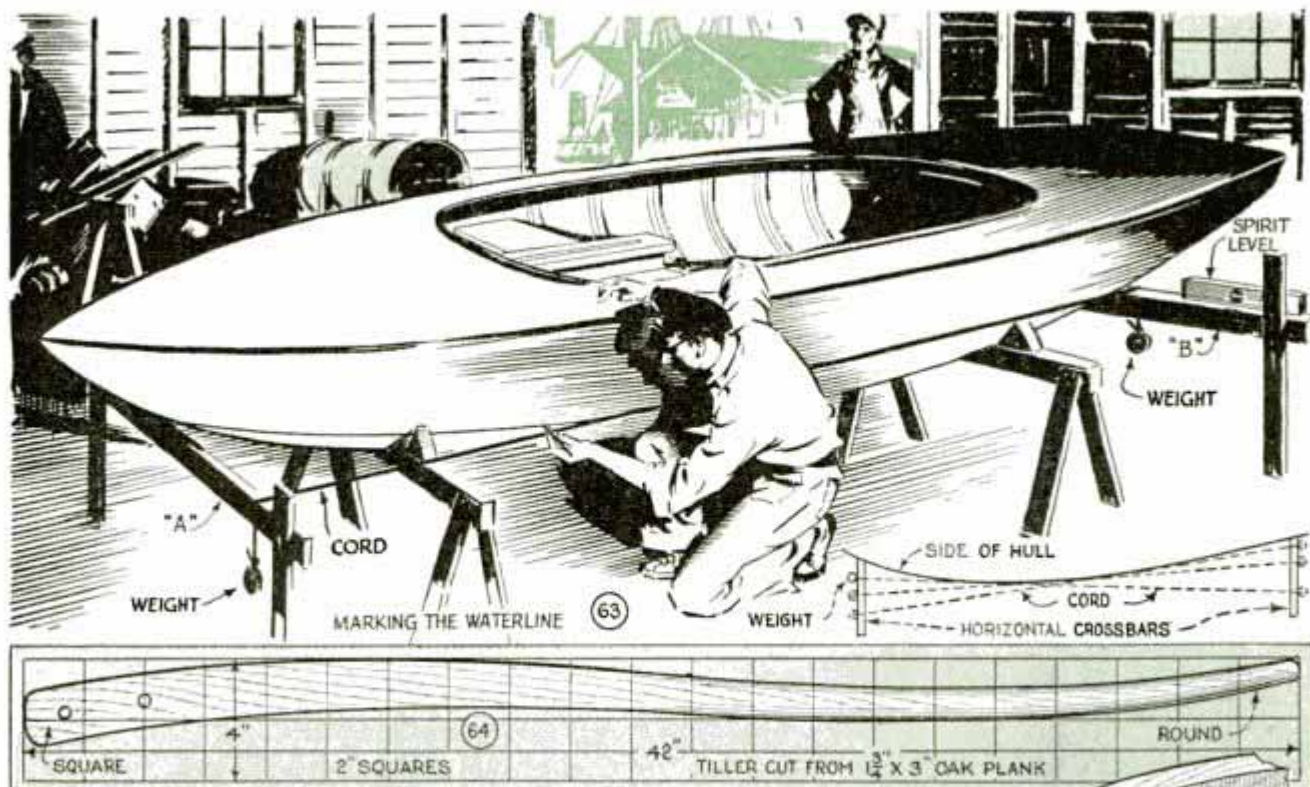


against which any vertical play in the rudder post can be taken up. A brass strap hinges the lower end of the post to the skeg. The tiller, Fig. 64, is hinged to the rudder post head as in Fig. 65.

Now, with these parts in place you are ready for the two operations which finish the hull—marking the waterline and painting. One simple method of marking the waterline is shown in Fig. 63, where the hull is leveled on sawhorses and the line is located by means of a cord, weighted at both ends and supported on straightedges set up so that they touch the waterline at bow and stern. The taut cord is simply moved along the straightedges and the points at which it touches the hull are marked. A line drawn through these points will give you the waterline. Now the area below the waterline is given one coat of anti-fouling bottom paint, and the balance, one coat of marine hull paint of whatever color you



choose. When the first coat is dry, the screw heads are puttied over as in Fig. 56, using a marine-lead putty. Follow with two additional coats of paint, the anti-fouling bottom paint applied below the waterline as before. In painting, the first coat should be reduced somewhat so that it will penetrate the wood and form a base for succeeding coats. Keep the paint film brushed out well as heavy applications are apt to scale or peel back to the wood. Be sure that the preceding coat of paint is

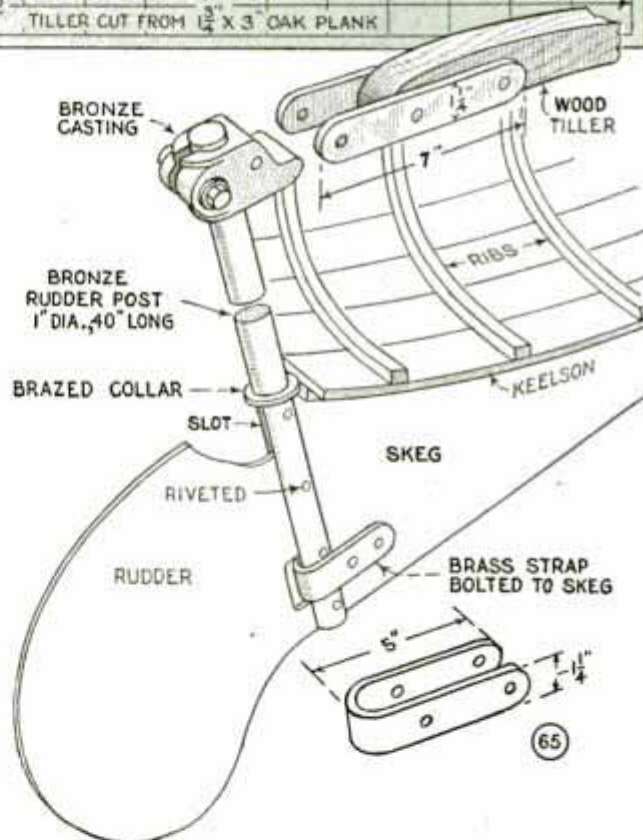


When ready to mark the waterline you're really "on the last long mile." You can do this as shown above and avoid the bother of turning the hull over

thoroughly dry before you apply another. Some sanding may be necessary between coats to assure a smooth surface. Where the paint above the waterline is pure white, some builders apply a final coat of white lead and turpentine. This mixture is chalky and washes away slowly, making the boat remain clean for a longer period of time. Should you wish, you can

Material List

- 3 waterproof-plywood panels $\frac{1}{4}$ in. by 4 by 8 ft.—for deck
 - 2 pcs. mahogany 1 by 12 by 34 in.—seats
 - 1 pc. mahogany $\frac{1}{2}$ by $3\frac{1}{2}$ by 46 in.—cap for centerboard well
 - 10 pcs. pine $\frac{1}{2}$ by $2\frac{3}{4}$ in. by 8 ft. 2 in.—false bottom
 - 24 ft. mahogany $\frac{1}{2}$ by $3\frac{1}{4}$ in.—coaming
 - 24 ft. $\frac{1}{2}$ -in. mahogany quarter-round molding
 - 1 pc. $\frac{1}{2}$ by 2 by 30 in. mahogany—transom molding
 - 23 ft. $1\frac{1}{4}$ -in. half-round mahogany molding—gunwales
 - 1 bronze rudder post 1 in. dia., 40 in. long
 - 7 yds. No. 10 duck, 72 in. wide—deck covering
 - 3 gross $\frac{3}{4}$ -in. No. 6 bronze screws—for deck
- Anti-fouling bottom paint, marine paint, spar varnish, and lead putty



obtain a smooth finish on the canvas deck by sanding with a medium grade of paper and applying successive coats of enamel, sanding each coat only after you are sure that it is thoroughly dry. Don't make the mistake of applying the enamel coat too heavy; two thin coats, carefully brushed out, are far more durable than one heavy application. Proceeding in this way you can build up a smooth surface on the deck.

(To be continued)

'Tong-Spade' Resets Small Plants Without Disturbing Roots



Immediate growth of transplanted flowers is not retarded when this tong-spade is used

To transplant small flowers or vegetables without disturbing the roots or the soil surrounding them, gardeners and florists will find this "tong-spade" convenient. Two scoop-shaped pieces of sheet metal, sharpened at the lower edges, are bolted to a U-shaped flat-iron handle. In use, these are forced into the soil at each side of the plant, after which the handle is gripped firmly so the plant and soil can be lifted together.

Polishing Jewelry Thoroughly with Pipe Cleaners

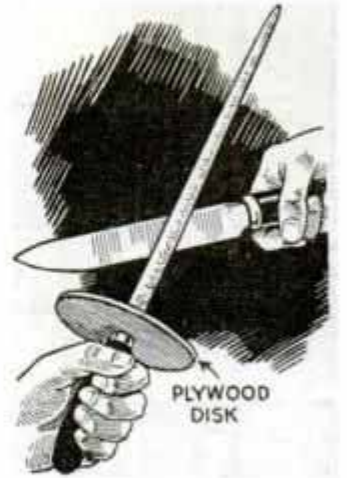


To clean the small, intricate spaces in filigree work of rings, brooches, bracelets and watch chains, almost impossible to clean with a cloth, brush or hairpin, take a pipe cleaner and run it back and forth through them. If the pipe cleaner is dipped in alcohol or warm, soapy water, the dirt will be loosened and removed easily.

Cheap, lacquered jewelry cannot be cleaned with alcohol as this removes the protective film of lacquer which keeps the metal from tarnishing.

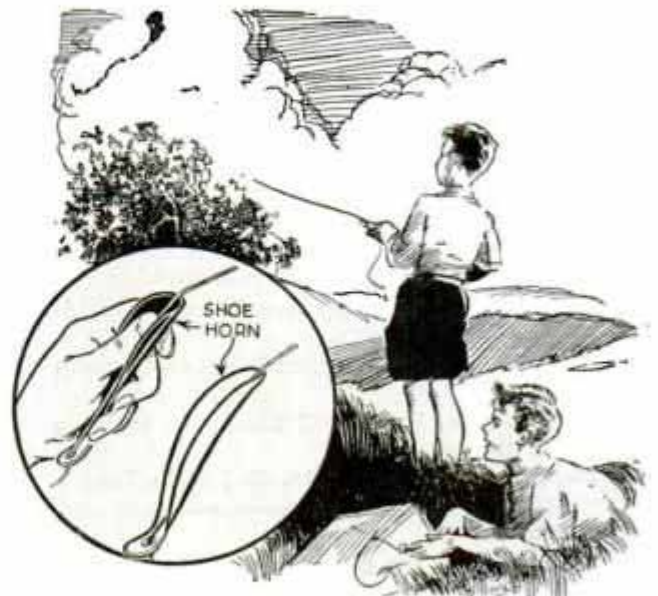
Knife Steel Has Hand Guard

Slipped over a knife steel to rest against the handle, a thin plywood disk makes a good guard to protect the hand against any slip of a knife when sharpening it. A thick wood or fiber washer to fit tightly around the steel, will hold the guard in place when driven snugly against it.—Opie Read, Jr., Chicago.



Shoehorn Brake on Kite String Saves Your Hands

Instead of letting a kite string slip through your hand in a strong wind, which may result in badly burned or blistered fingers, use a shoehorn as a brake. To do this, thread the string through the eye of the horn and hold it as shown. A light pressure of the thumb against the string will then retard its speed.—G. E. Hendrickson, Argyle, Wis.

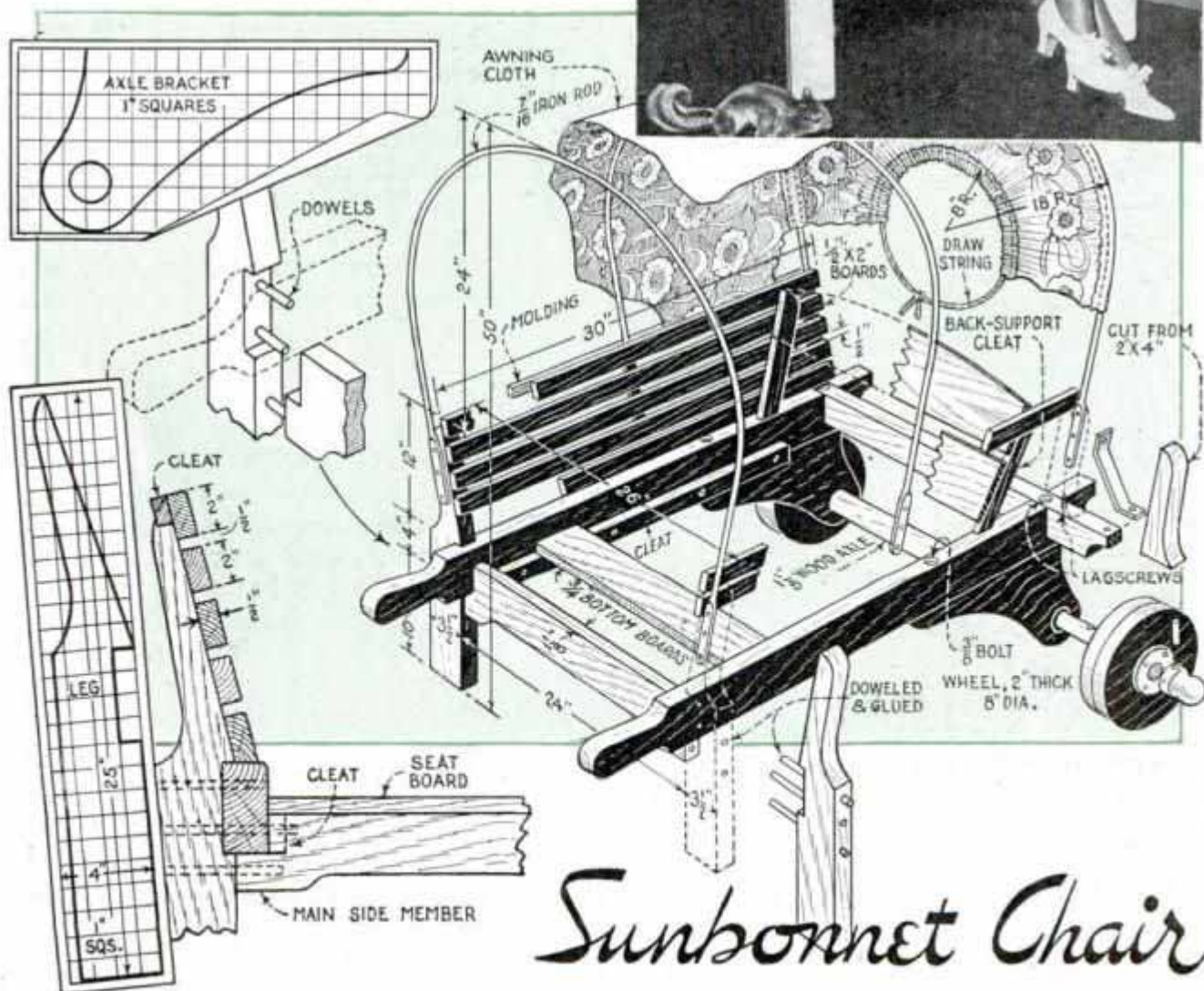


You won't burn or blister your fingers on a kite string if this brake is used

no B. P.

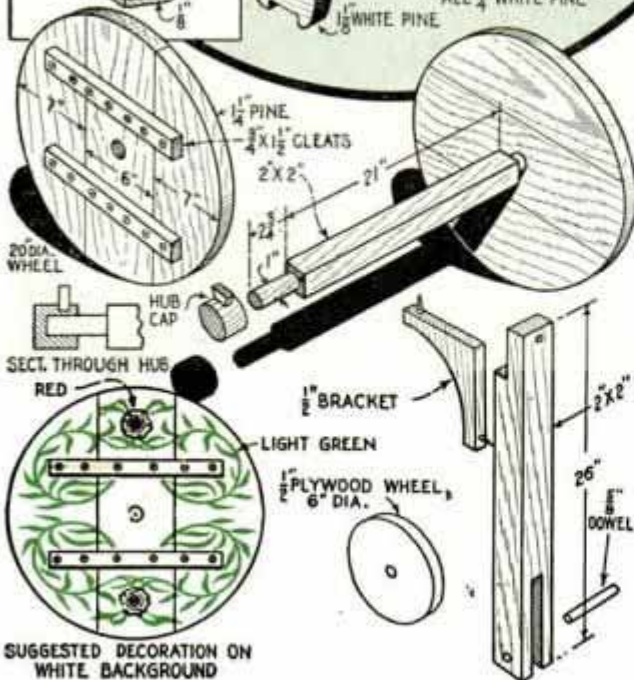
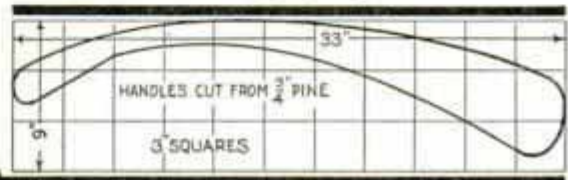
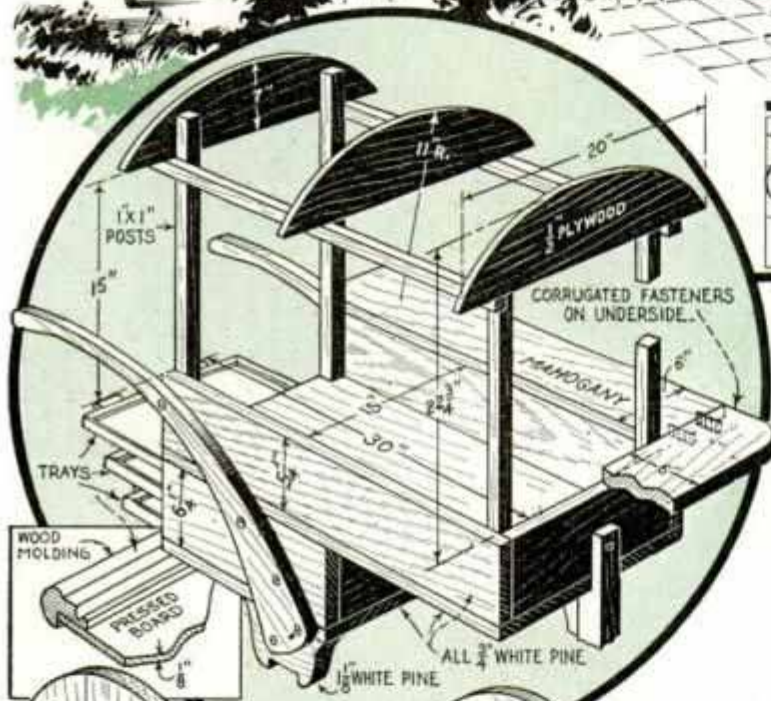
Two Unusual Pieces of GARDEN FURNITURE

SET on your veranda or patio, or in a colorful garden, this quaint, wheeled "sunbonnet" chair gives you shaded seclusion. Its arched hood is covered by either plain white canvas or any kind of gayly colored awning cloth, and the wood parts are painted in the same or in complementary colors. Two short handles project conveniently so that you can push the chair to any desired location in much the same manner as a wheelbarrow. But, instead of being fitted with a single wheel, there are two, one on either side. The slatted sides below the hood, and the circular opening in the rear, permit sufficient circulation of air, while soft cushions on



Sunbonnet Chair

Luncheon Cart from Old Mexico

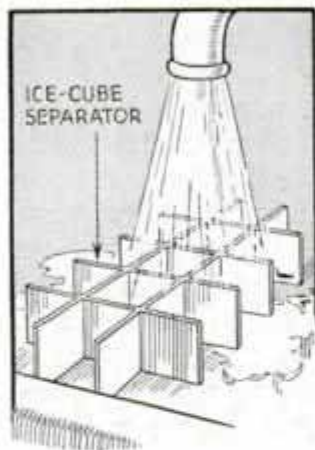


both seat and back assure perfect comfort to the occupant. Three arches of iron rod, which are screwed to the frame to hold them in position securely, support the top. If used outdoors, the parts that are in constant contact with the ground should be painted occasionally in order to minimize the effects of moisture absorption.

The novel luncheon cart is an adaptation of the high, narrow "carretas," which are seen drawn by oxen along the byways of Old Mexico. Of course, the cart shown here is smaller than its prototype, being proportioned for garden use and designed to accommodate a complete buffet luncheon for eight. It has a central well or compartment for food containers besides serving shelves along the sides. Three removable trays are also provided. Just the thing to make outdoor luncheons a pleasure, besides adding a picturesque touch to your garden.

☛ If you use a solution of borax dissolved in lukewarm water to wash the inside surface of your refrigerator it will always be sweet and clean.

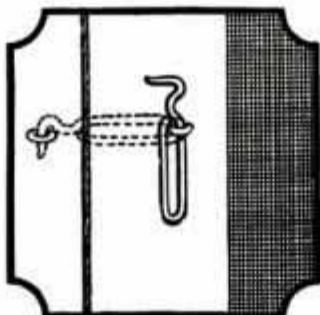
Anti-Splasher for the Sink



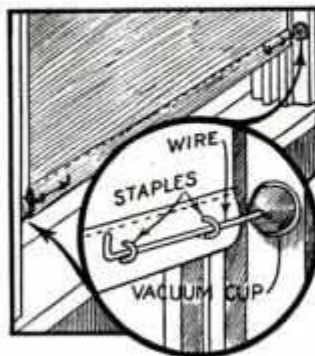
Laid on the bottom of your sink directly under the faucet, a separator from a refrigerator ice tray serves to prevent water from splashing. The separator also provides an excellent surface on which to set pans when filling them from the faucet.

Looped Hook on Screen Door Stays Out of the Way

If the hook on your screen door catches between the door and the jamb, when not in use, replace it with one made as shown, which has a long loop on one end so that it hangs in a vertical position. The hook can be made from a piece of stiff wire and attached to the door with a screw eye in the regular way.—G. E. Hendrickson, Argyle, Wis.

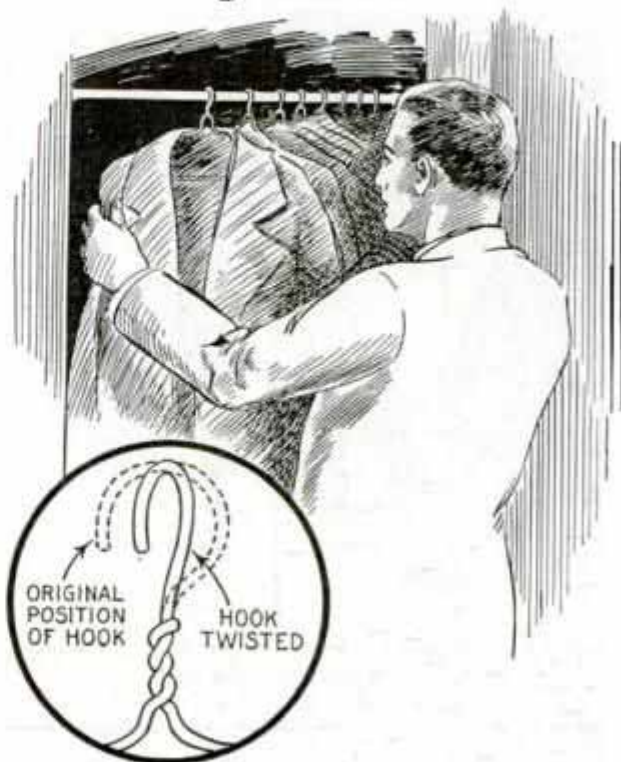


Shade Held over Open Window by Vacuum Cups



When a shade is pulled down over an open window, a vacuum cup fastened to each lower corner as shown, can be pressed against the casing to hold the bottom and keep the shade from flapping in the wind. The cups are attached to pieces of heavy wire or small iron rods, which slide through staples driven into the rear side of the shade slat as shown in the illustration.

More Clothes Space in Closet if Hangers Are Twisted



Clothes hung at an angle to the cross rod give you more space for garments hung on wall hooks

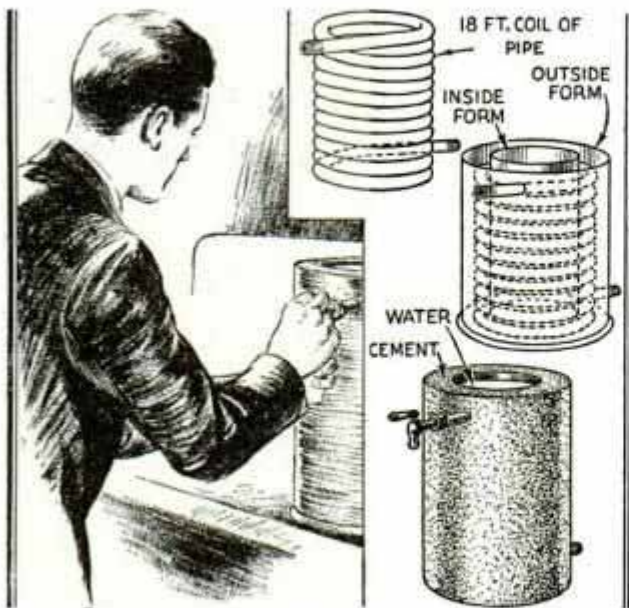
If you have a crowded closet in which a horizontal rod or pole supports a number of garments and you want more space behind them for clothes hung on the wall hooks, twist the hanger hooks so that the garments will be at an angle to the pole. While you can't hang quite as many clothes on the pole with this arrangement, you can pick out the garment wanted much easier as part of the front of each is clearly visible.

Pouring Lip on Test Tube

Solutions can be poured from a test tube much easier if the opening is formed into a pouring lip. To do this, heat the mouth of the tube to a rose color over a bunsen burner and then pull away one side of the opening with a hack-saw blade as shown. Hold the open end of the tube downward while heating it so that moisture formed inside will not break the glass.



Water Coil in Porous Concrete Cooled by Evaporation



Evaporation of moisture from porous concrete cools drinking water in the coil

Connected to a hydrant or faucet, this cooler will provide a supply of cool drinking water during hot weather at no cost. The cooler works by evaporation of water seeping through porous concrete. To make it, place a coil made of copper tubing between two cylindrical sheet-metal forms as shown. Have the inside form shorter than the outside one so that the cement will run under it and provide a bottom for the cooler. Then, over the coil, pour a mixture consisting of portland cement, 1 part, clean sand, 1 part, and powdered asbestos, 2 parts. When the forms are removed after the concrete has set, there will be a small well in the center of the cooler, which is kept filled with water. The cooler can be connected to the water line with regular fittings made for attaching copper tubing to pipe, although a simpler method is to use a piece of hose and clamp it to the pipe and tube.

TOUR IN 1936 STYLE . . .



BOATS

"HI-HO," 14-FT. FAMILY RUNABOUT—840 to 845: Beam 58 in. Powered by outboard, or converted Ford motor. Six prints \$1.00.

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Any six of these blueprints will be sent postpaid upon receipt of \$1.00. For an additional 12c we will include a copy of our 80 pp. booklet, "What to Make," which completely describes Popular Mechanics plans, besides giving valuable information on where to obtain hard-to-get materials, how to read blueprints, saw filing, etc.

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MODEL YACHTS

"ZIP," MODEL RACING YACHT—880 to 883: 50 in. long. Four prints \$1.00.

"VANJA"—899 to 904: Class-A racing yacht, 72 in. long. Planked hull. Six prints. \$1.00.

MISCELLANEOUS

MIDGET AUTO—906 to 909: 58-in. wheelbase, powered by ¼-hp. gas engine of the washing-machine type. Four prints. \$1.00.

VENETIAN BLINDS—926 and 927: Three different styles covered on two prints. 50c.

ARTISTIC DOG HOUSES—826: Shows four attractive designs. Tells how to determine the right size house for any dog. 25c.

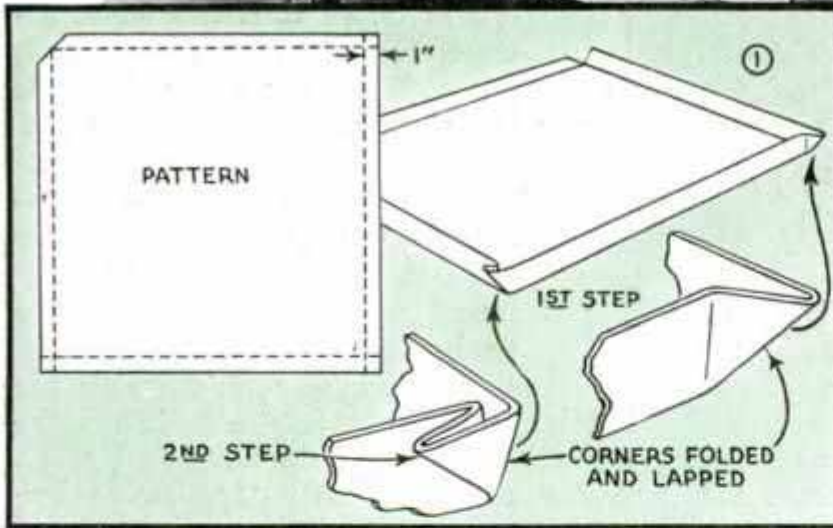
POPULAR MECHANICS MAGAZINE, 200 East Ontario Street, Chicago



Resilvering MIRRORS



SURPLUS FLOWS INTO PAIL

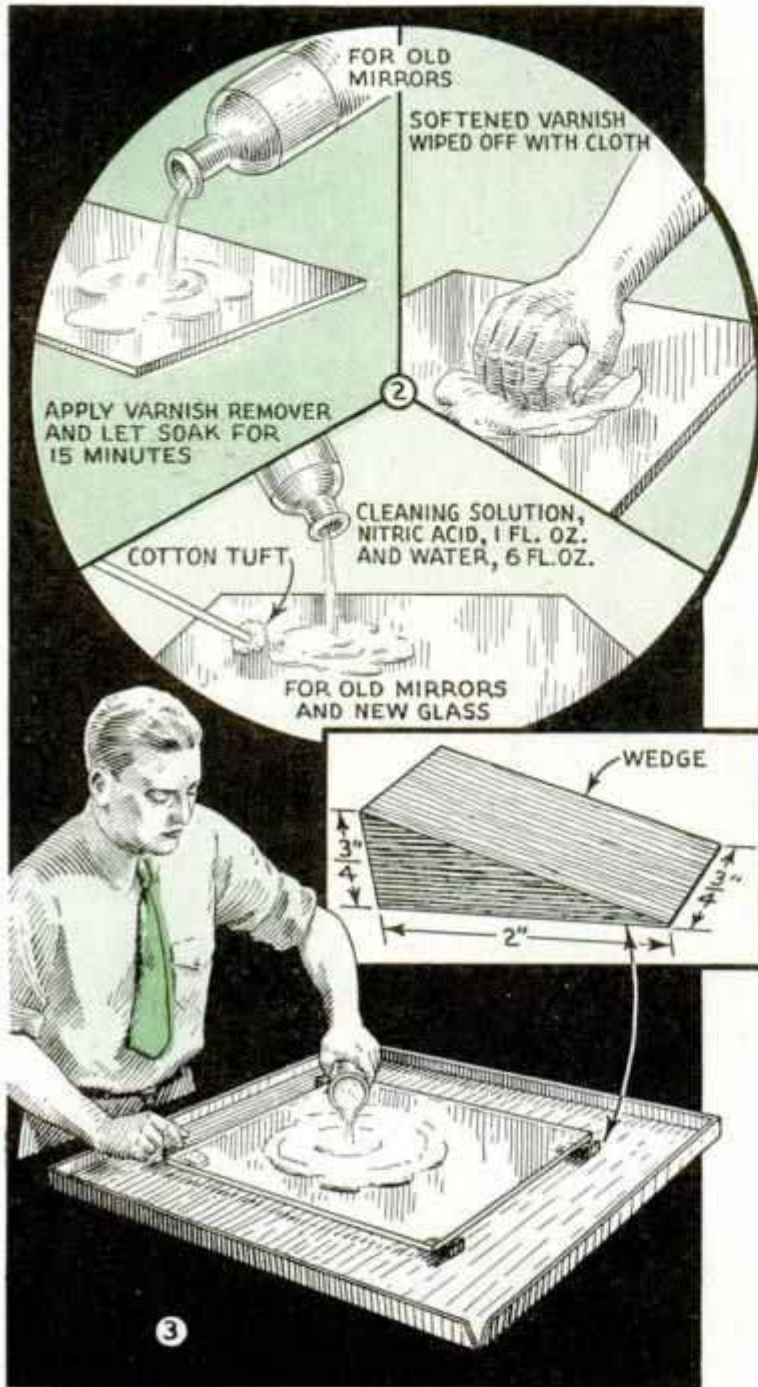


New glass can be silvered or old mirrors renewed by simplified methods. The most important secret of this fascinating art is in getting the glass clean before applying the silvering solution

IN WORKING with mirrors to be resilvered, they should be placed face down on a smooth level surface to prevent breakage and to render the application of cleaning and silvering solutions as simple as possible. A tray large enough to hold the mirror for both cleaning and silvering, is made by bending up the edges of a piece of galvanized sheet iron to form a tray as in Fig. 1. One corner should be cut as shown so that waste solutions may

flow away into a catch bucket. To protect the metal from attack by acids and other chemicals it should be given a heavy coat of asphaltum paint inside and out. You will need four hardwood leveling wedges made as shown in Fig. 3 to support the glass in the tray. When the glass is level, the solution will tend to remain on the surface while cleaning and silvering.

In resilvering an old mirror, first remove the old silver and its protective var-



nish coating, the latter being removed with varnish remover, which is allowed to soak until the film has become soft enough to wipe off with a soft cloth. Avoid scraping as this may scratch the glass, making it impossible to produce an otherwise perfect mirror job. Usually 10 or 15 min. of soaking is sufficient. If necessary, another application can be made. The old silver is removed by flowing onto the silvered surface a solution made by adding nitric acid, 1 fl. oz., to water, 6 fl. oz. This may be swabbed on as in Fig. 2.

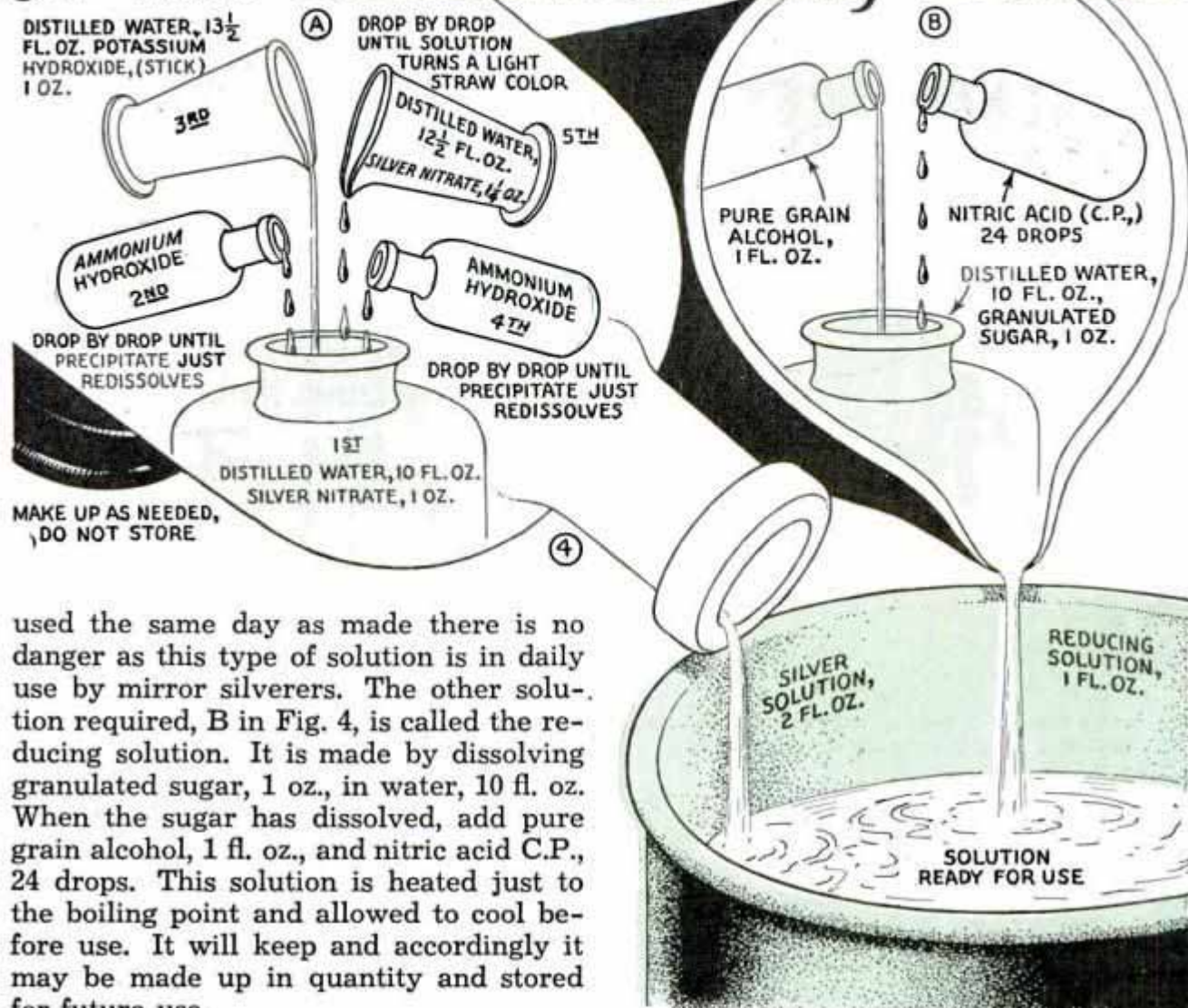
After every trace of varnish and silver has been removed, the glass is submitted to a thorough cleaning routine. Failure to

follow this carefully is the cause of practically every failure, and therefore its importance cannot be overemphasized. The glass is first thoroughly washed with a hot solution made by dissolving washing soda, 1 lb., in water, 1 gal. From this point on the glass must not be touched by the hands. Next, the glass is rinsed thoroughly with warm water, after which an acid solution made by adding C.P. nitric acid, 1 fl. oz., to water, 6 fl. oz., is applied as a final chemical cleaner. The acid is then washed away with distilled water and the glass leveled by tapping the wedges until a pool of water will tend to spread evenly toward the edges. Following the last rinse, a solution made by dissolving stannous chloride, 1 dram, in water, 1 gal., is flowed onto the surface of the glass and allowed to stand until the silvering solution is ready for use.

A standard two-solution type of mirror silvering formula is used. The first solution, A in Fig. 4, is made by dissolving silver nitrate, 1 oz., in distilled water, 10 fl. oz. When the silver nitrate is completely dissolved, slowly add, drop by drop, stronger ammonia (ammonium hydroxide)—household ammonia cannot be used—until the precipitate which first forms just redissolves. No more ammonia should be added than the final drop which causes the

dissolving of the precipitate. When the above solution has been completed, add a solution made by dissolving potassium hydroxide (C.P. sticks), 1 oz., in distilled water, 13½ fl. oz. This addition will cause a heavy precipitate to form. Again add ammonia cautiously as before until the precipitate has just dissolved. Finally add just enough of a solution made by dissolving silver nitrate, 1¼ oz., in distilled water, 12¼ fl. oz., to turn the mixture a light straw color. This completes the first solution. No more of it should be made up than will be used immediately as it becomes dangerous if stored due to the possible formation of silver fulminate. If

A Two-Solution Silvering Formula



used the same day as made there is no danger as this type of solution is in daily use by mirror silverers. The other solution required, B in Fig. 4, is called the reducing solution. It is made by dissolving granulated sugar, 1 oz., in water, 10 fl. oz. When the sugar has dissolved, add pure grain alcohol, 1 fl. oz., and nitric acid C.P., 24 drops. This solution is heated just to the boiling point and allowed to cool before use. It will keep and accordingly it may be made up in quantity and stored for future use.

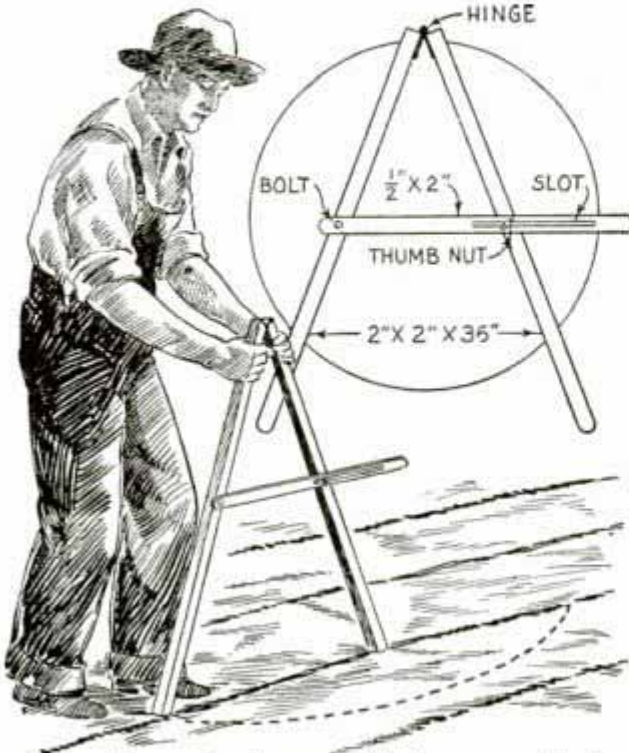
After the above solutions have been completed, rinse the stannous-chloride solution from the cleaned glass with distilled water and immediately mix one part (by volume) of reducing solution with 2 parts (by volume) of the silver solution and flow this onto the glass and let it stand until the silver has completely deposited out of the solution, which will require about ten minutes. After the mirror has been formed rinse the silvered glass with cold water and swab the silvered surface gently with a piece of absorbent cotton. The silvered surface should then be allowed to dry thoroughly. Forced drying should not be used, as this is likely to damage the silvering. When the surface has become thoroughly dry it may be coated with black lacquer, applied with a soft brush. The mirror should be mounted so that the back will be protected from abrasion and dust.

Dropper for Test Solutions

Preventing waste of expensive test solutions, this dropper allows the addition of a definite number of drops of reagent to a solution. To make the dropper, soften a portion of a length of ¼-in. glass tubing near one end in the flame of a bunsen burner and draw it out to an open point or tip. Then fit the tube into a cork stopper so that the tip reaches to the bottom of the bottle. The flow of fluid is controlled with the index finger placed over the upper end of the tube as shown.



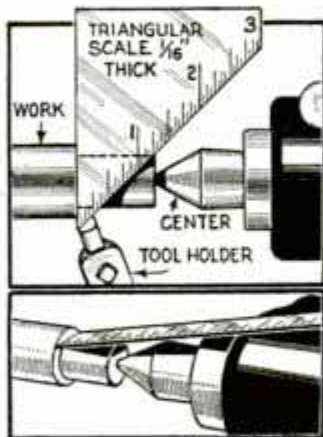
Adjustable Marker Spaces Hills Uniformly in Garden



When this marker is used, plant rows run in two directions, greatly simplifying cultivation

Adjustable to various widths, this garden hill marker is light to handle, and, when used carefully, your plants grow in rows running in two directions so that you can cultivate them both across and along the original row. The marker is used by "walking" it down a guide string or row already marked off, swinging it around on first one leg and then the other.

Measuring Turned Work in Lathe with Triangular Scale



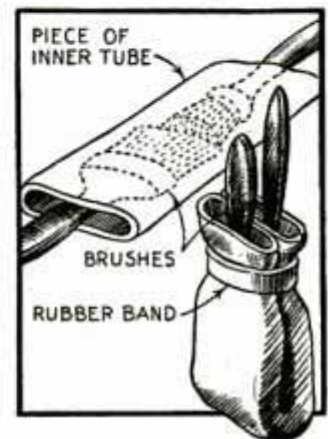
measurements can be made with a triangular scale as shown in the upper detail. A 3-in. scale will be about the right

When a piece is being turned that is smaller in diameter than the lathe tailstock center, it is, of course, impossible to use an ordinary scale to measure up to the shoulder as shown in the lower detail, but direct

length. The scale is marked with a surface gauge by clamping a regular scale to the triangular one and scratching the division lines at right angles to the straight side as indicated by the dotted line in the drawing, deepening the lines afterward with a fine chisel. As the tool feeds along the work, the scale is laid on top and moved toward the operator, keeping the straight side against the shoulder.—H. Moore, Hamilton, Ont., Canada.

Paintbrushes Kept from Drying in Inner Tube

A handy method of keeping paintbrushes from drying out over a short period is to insert them in a piece of inner tube, which is then folded over as shown, and a strong rubber band slipped over the ends to hold them closed. This idea is useful to painters when moving from one job to another.



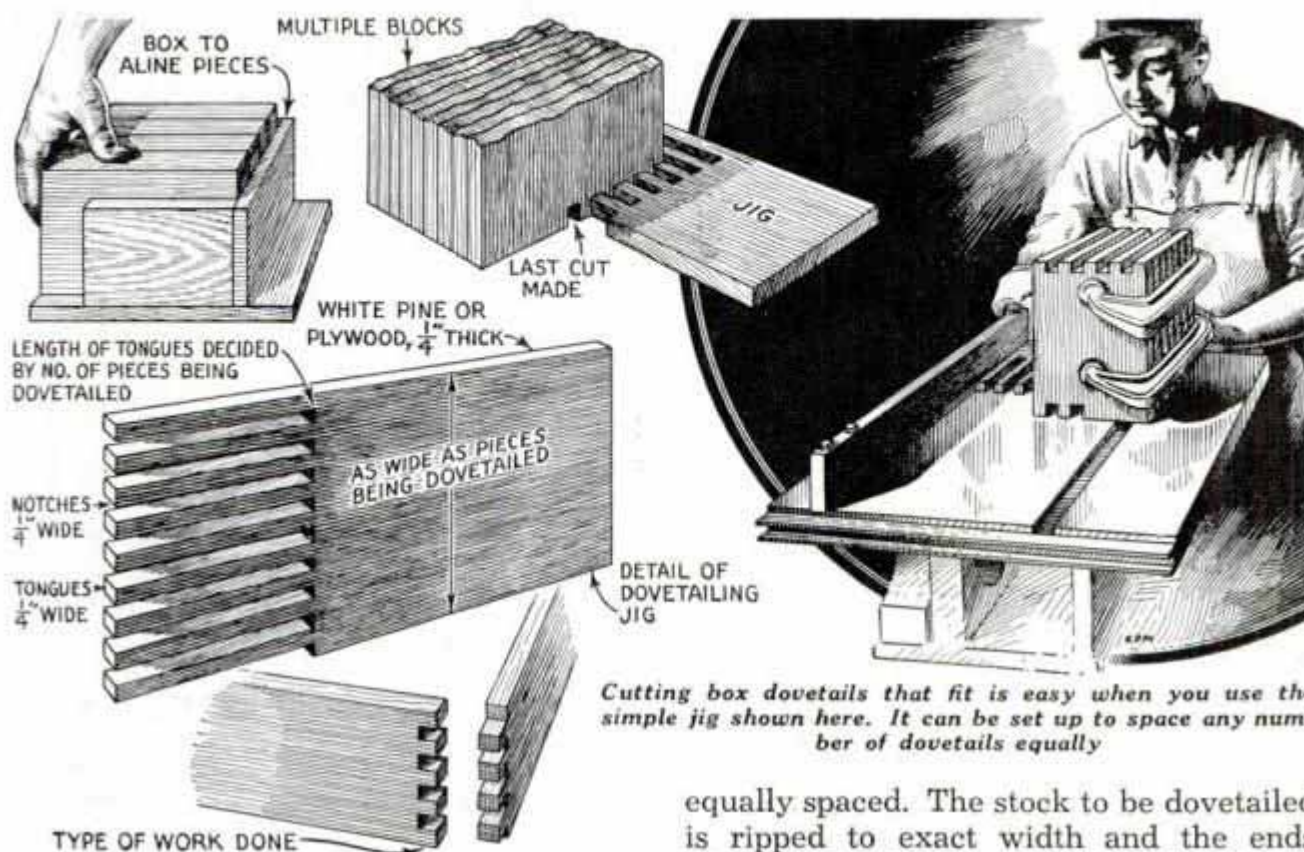
Water Color Applied by Pen to Letter Photos



Neat writing is easily done on a photo with water colors if they are mixed to a thin consistency and applied with an ordinary pen point. The secret of using a pen for this purpose is in keeping the point wet without "flooding" it. This can be done with a small camel's-hair brush, which is kept wet with the color and the pen point touched to it at frequent intervals.

When ordinary alcohol is used in mixing bronze powders, add one drop of a saturated solution of caustic soda for each ounce of mixture to prevent the bronze from turning green.

Dovetails Made Quickly on a Circular Saw



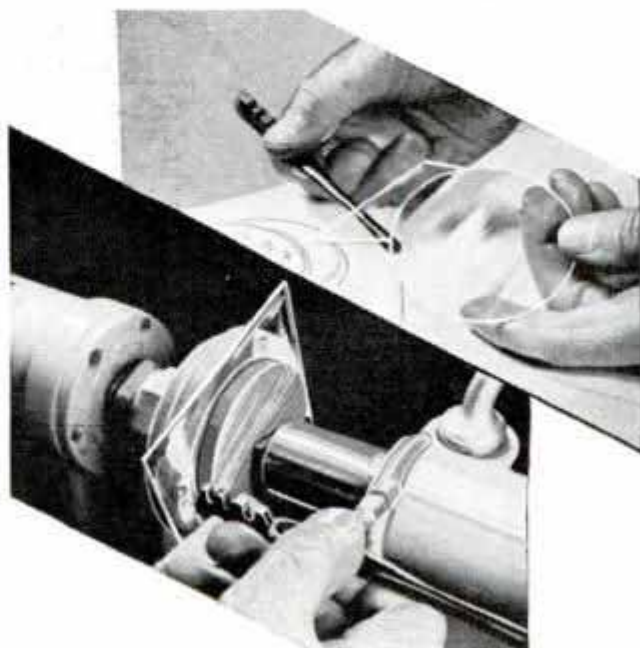
Cutting box dovetails that fit is easy when you use the simple jig shown here. It can be set up to space any number of dovetails equally

To cut box dovetails on a production basis you first set up the dado on your circular saw and then make a jig like that shown above. This can be made on the saw, using the same dado setting as that used to cut the dovetails. As dimensioned, the jig provides for cutting $\frac{1}{4}$ -in. pins and sockets. Notches and tongues must be

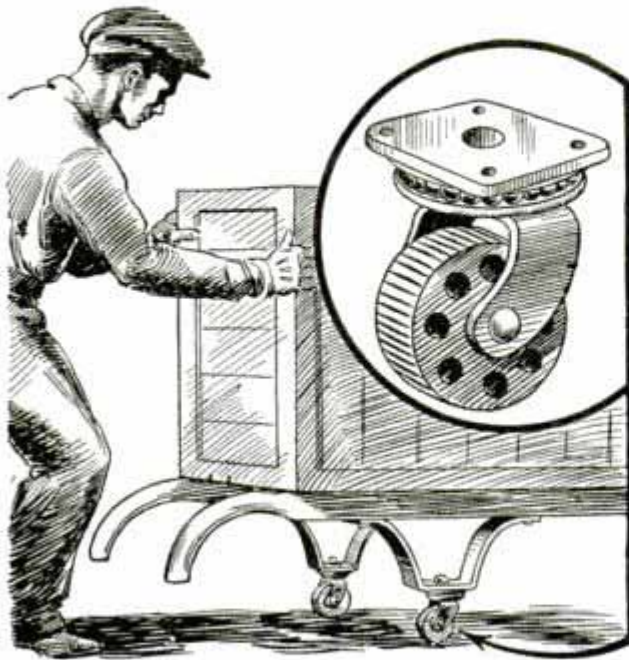
equally spaced. The stock to be dovetailed is ripped to exact width and the ends alined in a box made for the purpose. When the pieces have been clamped together and set on the saw table, the jig bears against the ripping fence. The dado is set to proper depth and the first cut run by moving the setup over the cutters. Then the blocks are lifted from the jig and set over one space. The second cut is run and the procedure repeated.

Glass Disks Cut Accurately on Your Wood-Turning Lathe

Glass disks can be cut accurately and the possibilities of breakage reduced by doing the job on your lathe. The glass is clamped between two wood disks, one being screwed to the faceplate and the other held by the tailstock center, which is adjusted to clamp the glass tightly. The disk next to the tailstock should be turned to a diameter $\frac{1}{8}$ in. less than that desired for the glass disks. To cut the disks, turn the lathe by hand and hold the glass cutter firmly against the glass, resting it on the tool post and using the wood disk as a guide. After removing the glass from the lathe, cut four or more lines radiating from the circular cut. A few light taps with the handle of the cutter will break away the waste glass.



Hand Truck Can Be Used as Cart to Haul Heavy Loads

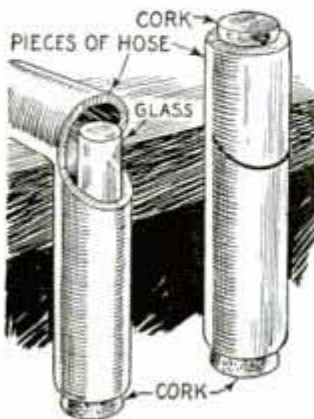


Two ball-bearing casters are attached to the short legs located below the handles on this truck

By simply attaching a pair of heavy casters to the handle supports of a hand truck, it can be pushed about as shown, instead of lifting up the handles in the usual way. Casters of the type shown are fitted with ball thrust bearings so that they pivot readily, which makes it easy to steer the truck. The casters do not interfere when using the truck in the regular way.—A. H. Waychoff, Tempe, Ariz.

Glassware of Chemical Lab Kept in Rubber Holders

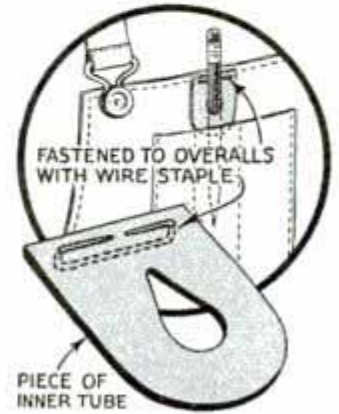
In the testing laboratory of a western oil company, hydrometers, thermometers, test tubes and small glass tubes of samples are protected against breakage by keeping them in holders made of rubber hose. Corked at both ends, the pieces of hose, which vary in size according to the articles kept in them, are cut diagonally about two-thirds their diameter and about an inch or so from the top ends



so that they can be pushed back for insertion or removal of the articles. Each holder is attached to the edge of a shelf with a nail driven through the hose.

Pencil Held in Overall Pocket by Rubber Flap

Sewed or stapled to the bib of a carpenter's or mechanic's overalls directly above the pencil pocket, a rubber or leather flap keeps the pencil from slipping out, yet allows it to be removed easily. The flap has a hole in the center which fits the pencil snugly.



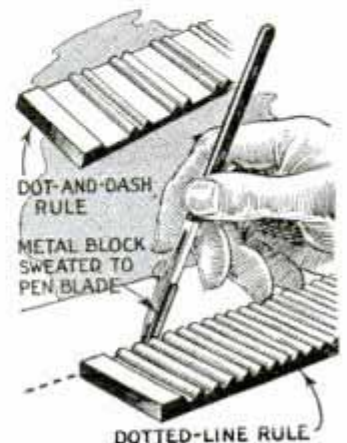
Locking a Cradle Telephone



To keep unauthorized persons from using a cradle telephone in an open office or hotel lobby, you can use a bicycle padlock as shown. Be sure to slip the lock over the shackle so that the key end is exposed, otherwise it may be impossible to remove it.—L. J. Fisher, Beaumont, Tex.

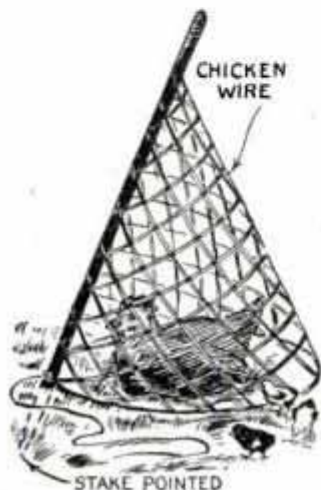
To Rule Dotted Lines Rapidly

Here is a method of rapidly ruling dotted lines that saves hours of labor besides adding neatness to the work that is hardly comparable with the much slower hand method. Simply run the pen along the edge of a ruler



which has a corrugated top surface. The pen has a small piece of metal sweat-soldered to one leg to ride over the corrugations, which raises the pen point off the paper. Dotted, dot-and-dash or any variety of "broken" lines may be had by varying the width and spacing of the corrugations.—E. C. Dean, Erie, Pa.

Hen with Chicks Housed in Wire "Tepee"

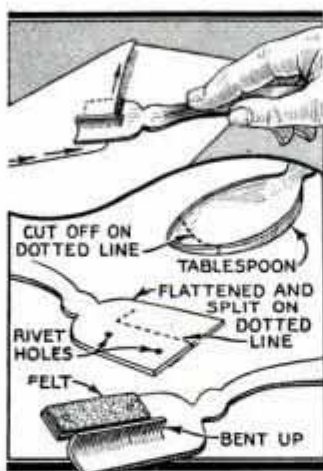


A portable pen that is convenient for moving a hen and chicks about the yard is made easily from a piece of chicken wire rolled into a cone and tacked to a sharp stake. It is an easy matter to pull the stake and move the pen along to a new spot without al-

lowing the hen to escape, and, while the hen is kept inside, the chicks can pass in and out freely.

Envelope Moistener and Sealer Made from Tablespoon

When a number of envelopes are to be sealed and no moistener is at hand, a tool that will do the job in one operation can be made from a tablespoon. The end of the spoon is cut off, the bowl is flattened and split after which one side is bent upward and a piece of felt is riveted to the other side as shown.



☞ To keep painted parts of shop machinery looking like new, go over them occasionally with a cloth dampened in carbon tetrachloride.

Padded Rung Protects Knees When Working on Ladder

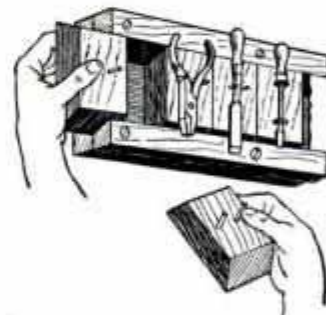


The pad is moved from one rung to another as you work up or down the ladder

To protect his knees when it was necessary to rest them against a rung to keep his balance on a ladder, one painter improvised this removable cushion. It is an old coat sleeve or piece of inner tube having spring clips riveted to it to slip over the rung. Straw, cotton or even old rags make good stuffing.

This Handy Tool Rack Provides for Future Purchases

With this type of tool rack the shop owner can keep small tools in perfect order no matter how many new ones are acquired from time to time. The rack consists of a 1 by 6-in. board to which narrow strips are nailed, the strips being planed to form a groove as shown. The tool clamps or holders are fastened to blocks cut to slide inside the strips.



Working



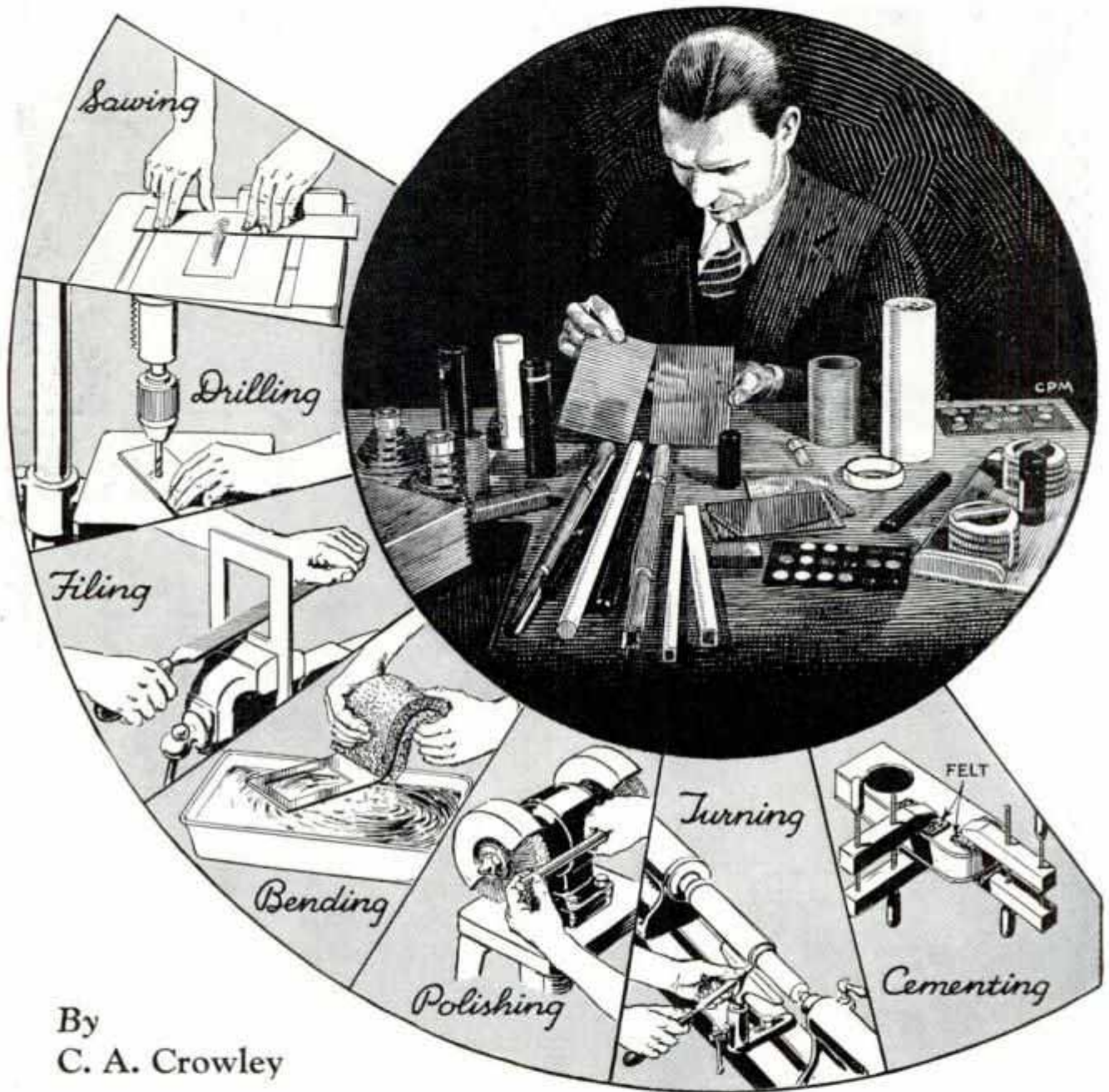
BRILLIANTLY colored plastic materials in sheet, rod and tube form can be utilized by the home shop worker in building many attractive novelties such as candlesticks, jewel boxes, clock cases, vanity powder sets, bracelets, etc., and can also be used in the construction of modern furniture such as recently described in *Popular Mechanics*. Plastics, which are hard, strong and have no grain, are different from either wood or metal so that the technique of working with them is also different in many ways. Yet they can be sawed, turned, carved, ground and polished with ordinary wood or metal-working tools. It is the technique of using plastics that the craftsman is primarily interested in knowing as this is, of course, the prerequisite of good workmanship. Therefore, in this article we will tell you how to handle this new material by going through the various steps in making a telephone note pad, Fig. 1, which was selected because it requires a number of different operations.

Sawing Sheet Plastic: After the telephone note pad has been planned carefully and all dimensions determined, templates are cut to the exact size of the various parts to be cut from sheet, and these transferred to the plastic stock, using a scribe. Straight, outside cuts in sheet material can be made on a circular saw.

The saw blade should be well set, preferably swedge-set, and should have about 9 teeth per in. Wide setting is necessary as the material softens slightly when heated by sawing and then causes excessive friction. The saw is operated at normal speed as when cutting wood. Smooth cuts are produced if the saw is adjusted so that the teeth just barely cut through the material. Should there be any tendency for the work to heat excessively while cutting, water can be applied as a cooling medium. An inside cut is a job for the scroll saw—either hand or motor-driven. Such a cut is also needed on the telephone note pad. Holes are drilled near the corners to permit the insertion of the blade. When cutting with a scroll saw or with a band saw, select blades having about 14 or 15 teeth per inch. For all sawing operations, the work is fed slowly, cutting in the waste portion as closely to the scribed lines as possible.

Filing and Sanding: The stock is then dressed down to exact finish dimensions on the scribed lines, by using files, sandpaper, or by means of a disk or belt sander. If you use files and sandpaper on the work, it can be gripped conveniently in a vise, but in this case a piece of felt or cardboard is inserted between the vise jaws and the stock in order to avoid any mars on its surface. Ordinary files will be

with PLASTICS



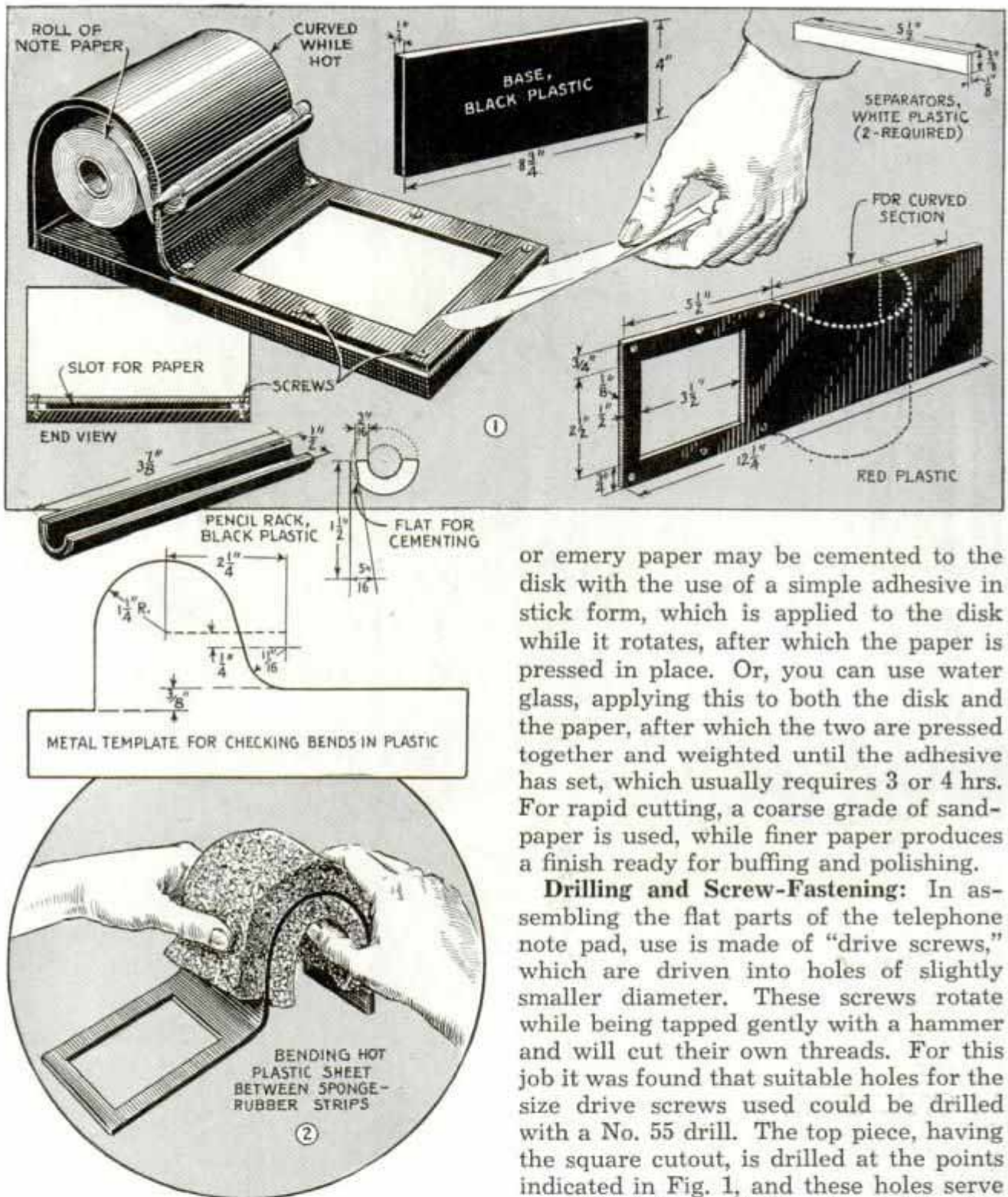
By
C. A. Crowley

satisfactory for the purpose. The final finish to the filed edges is most readily produced with a strip of fine emery or sandpaper. It is advisable to bevel or round the sharp edges slightly to produce the best appearance and to facilitate lustrous polishing.

After the flat stock for the telephone pad has been cut and dressed to exact size, you are ready to make the pencil holder. For this purpose a 1-in. cylinder of black plastic material is cut to length as in Fig. 1. It is then sawed in half length-

wise, dressed down to a smooth finish and polished in the same manner as the sheet stock. Next, a portion of the curved surface is sanded down flat to provide sufficient area for cementing the piece in place. A disk sander will be found especially convenient for making true, flat surfaces and you can readily improvise one.

Simple Disk Sander: Figs. 3 and 4 show a simply designed disk sander which has been found efficient for dressing down small parts of plastic material. Get or make a couple of sanding disks to fit the



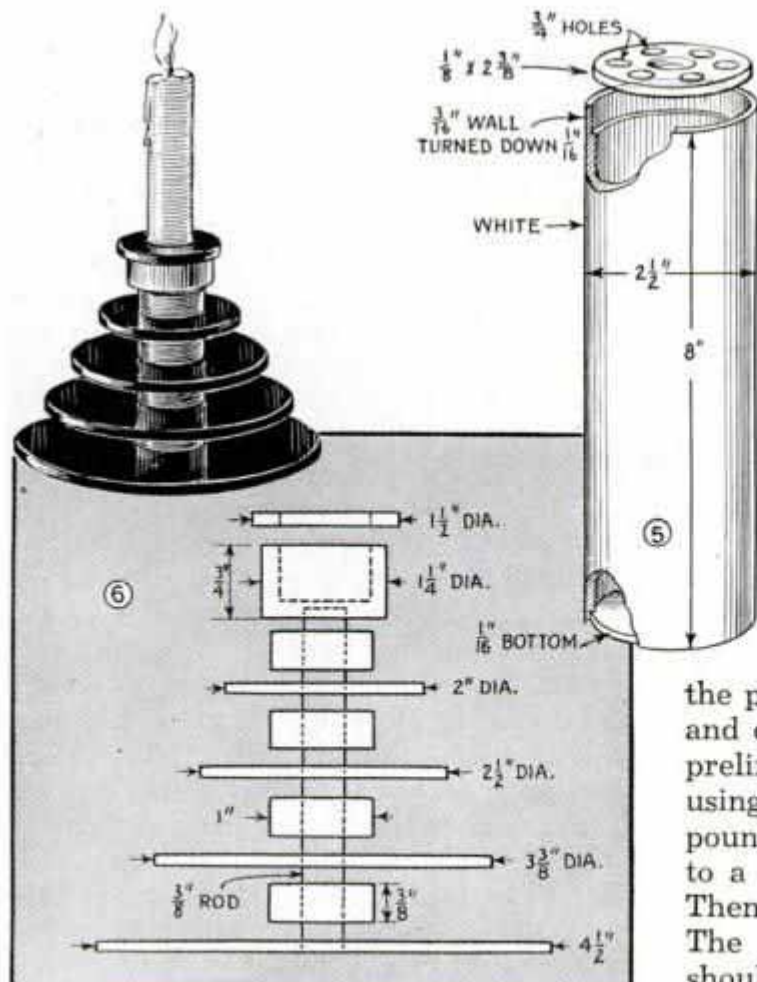
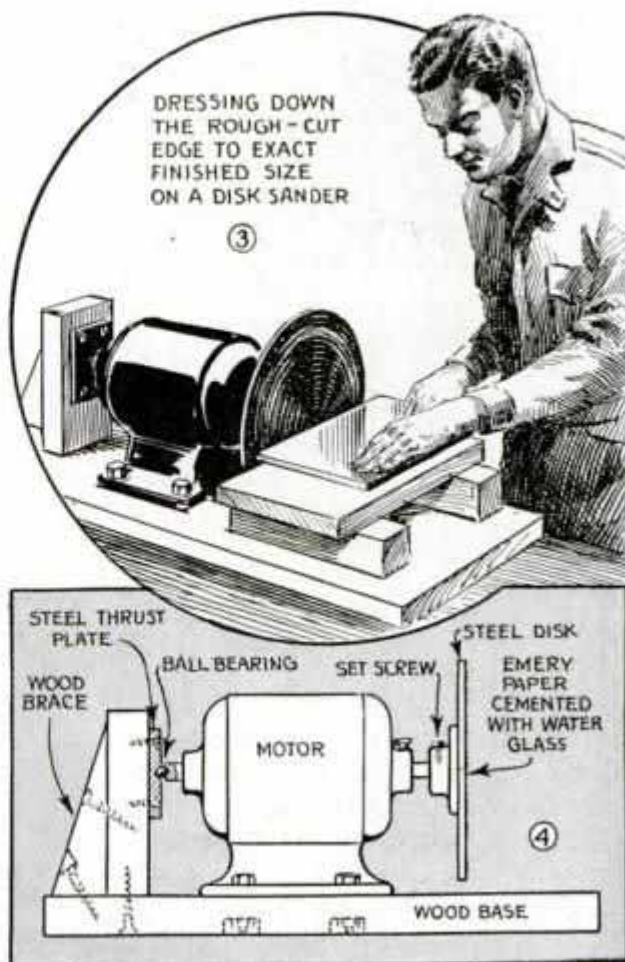
or emery paper may be cemented to the disk with the use of a simple adhesive in stick form, which is applied to the disk while it rotates, after which the paper is pressed in place. Or, you can use water glass, applying this to both the disk and the paper, after which the two are pressed together and weighted until the adhesive has set, which usually requires 3 or 4 hrs. For rapid cutting, a coarse grade of sandpaper is used, while finer paper produces a finish ready for buffing and polishing.

Drilling and Screw-Fastening: In assembling the flat parts of the telephone note pad, use is made of "drive screws," which are driven into holes of slightly smaller diameter. These screws rotate while being tapped gently with a hammer and will cut their own threads. For this job it was found that suitable holes for the size drive screws used could be drilled with a No. 55 drill. The top piece, having the square cutout, is drilled at the points indicated in Fig. 1, and these holes serve as pilots to be used later for drilling the holes through the separators and base piece. Ordinary metal-working drills, preferably of the high-speed variety, should be used for drilling plastics. When deep holes are being drilled, the drill should be withdrawn from time to time to free the hole from chips, in order to prevent wedging, packing and heating. Besides the method of using drive screws, holes may be drilled for ordinary machine screws—slightly smaller than the screws.

shaft of a small motor you may have on hand—a $\frac{1}{4}$ -hp. motor being preferable for size. The motor is bolted to a hardwood base to which a vertical piece is attached to hold a steel thrust plate. The latter is drilled for a steel ball, which fits between it and the motor shaft, providing a simple but effective thrust-bearing arrangement. This is necessary where end pressure is brought against a motor shaft as is the case with this sander. Sandpaper

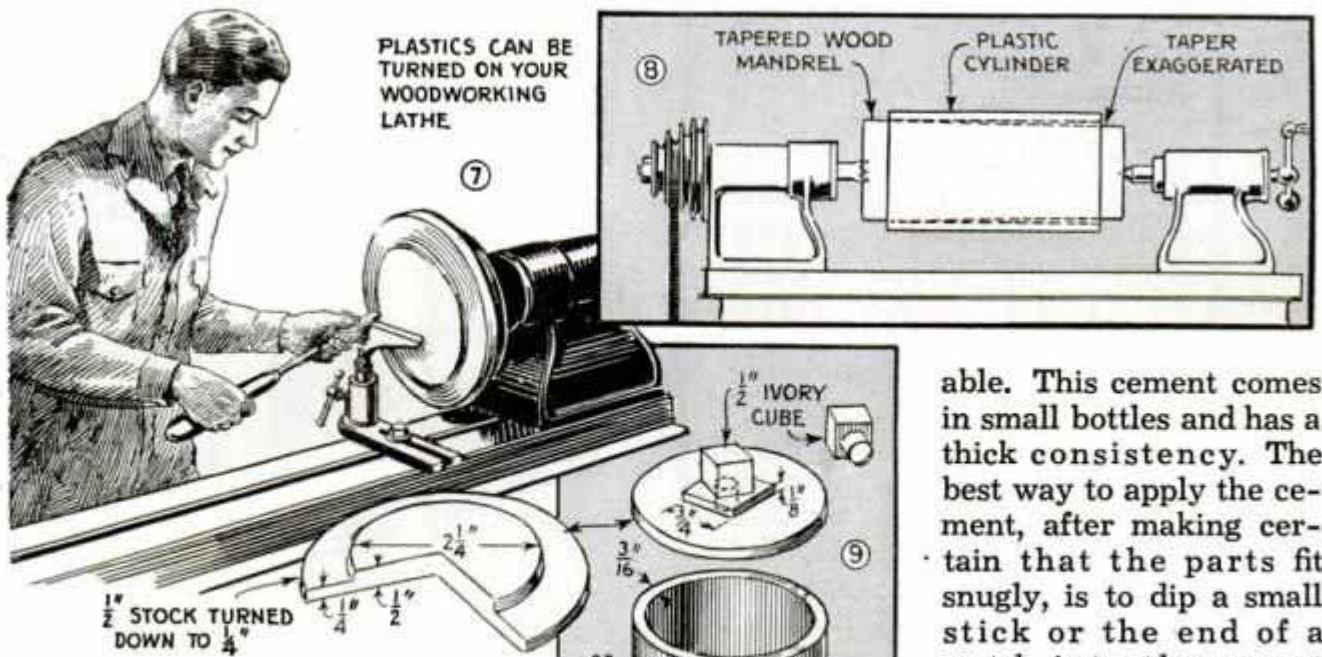
In this case, also, the screws will cut their own threads and therefore it will not be necessary to tap the holes. Wood screws should not be used in assembling plastics as they tend to split the work.

Bending with Aid of Heat: Having all of the parts of the telephone note pad cut to dimensions, it now remains to bend the top section to conform with the curvature shown in the sketch. In order to assure accuracy in bending, it is advisable to make a sheet-metal template as in the upper detail of Fig. 2. Next, the top section of red material is placed in water heated almost to the boiling point. The entire portion to be bent is immersed. The rest of the section is kept out of the water, inasmuch as it is to remain straight. The time required to soften the plastic sufficient for bending is in this case about 5 min. For thicker sections, a longer period of immersion is required. After softening, the work is removed from the water and bent by hand while being held between two sheets of stiff sponge rubber as in Fig. 2. After the bend has been made as required to fit the template accurately, the work should be cooled by immersion



in cold water. When bending plastics, it is important to remember that after the material has been immersed in hot water for a total period of approximately 30 min., the material cannot be softened again and bent by heating. When bending large sections, it therefore becomes important to plan the work in advance so that one heating only is required. For small parts where you heat them for a few minutes at a time, the work may be re-heated several times in order to produce bends which exactly meet the requirements of the project.

Buffing and Polishing: After the parts have been cut to shape, formed and dressed accurately to dimensions, the preliminary polish may be produced by using No. 1 buffing compound. This compound comes in stick form and is applied to a cloth buffing wheel while it rotates. Then the article is held against the wheel. The application of the first compound should continue until all of the surfaces

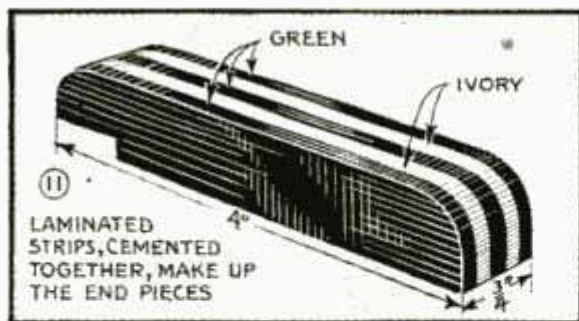


show an even texture free from spots. Spots which appear on the work being buffed are not due to discoloration of the plastic material itself, but rather to the inclusion of compound in depressions and surface defects. So long as these spots or marks remain on the surface, the preliminary polishing operation has not been completed. When the spots have all disappeared, the buff should be changed to No. 2 or finish compound. Avoid using the same wheel for both inasmuch as this will result in mixing of the compounds. Only a short time is required to produce the final luster. In case a buffing wheel is not at hand, good polishing may be produced by hand methods. For this purpose, wet abrasive paper is efficient. There are several grades available for this purpose. A coarse grade should be selected for the first operation. This is moistened with water and applied to the surface of the material. After all scratches and abrasions have been removed, the article is washed with water and the second polish produced by application of a finer grade of paper.

Cementing: After the parts to be screwed together have been assembled, it only remains to cement the pencil rack into position. For this purpose, a special type of plastic-to-plastic cement is avail-

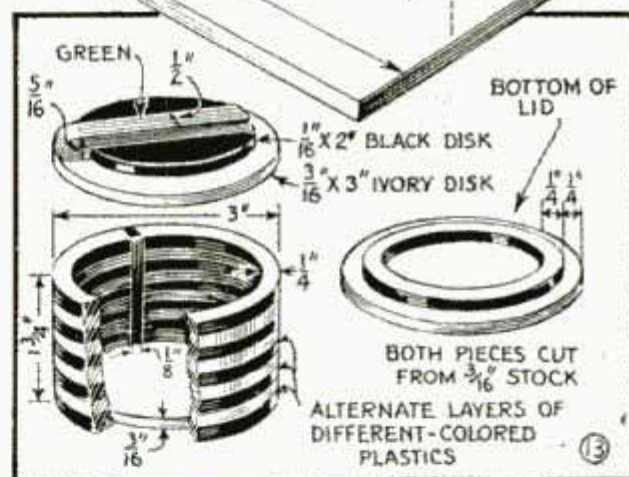
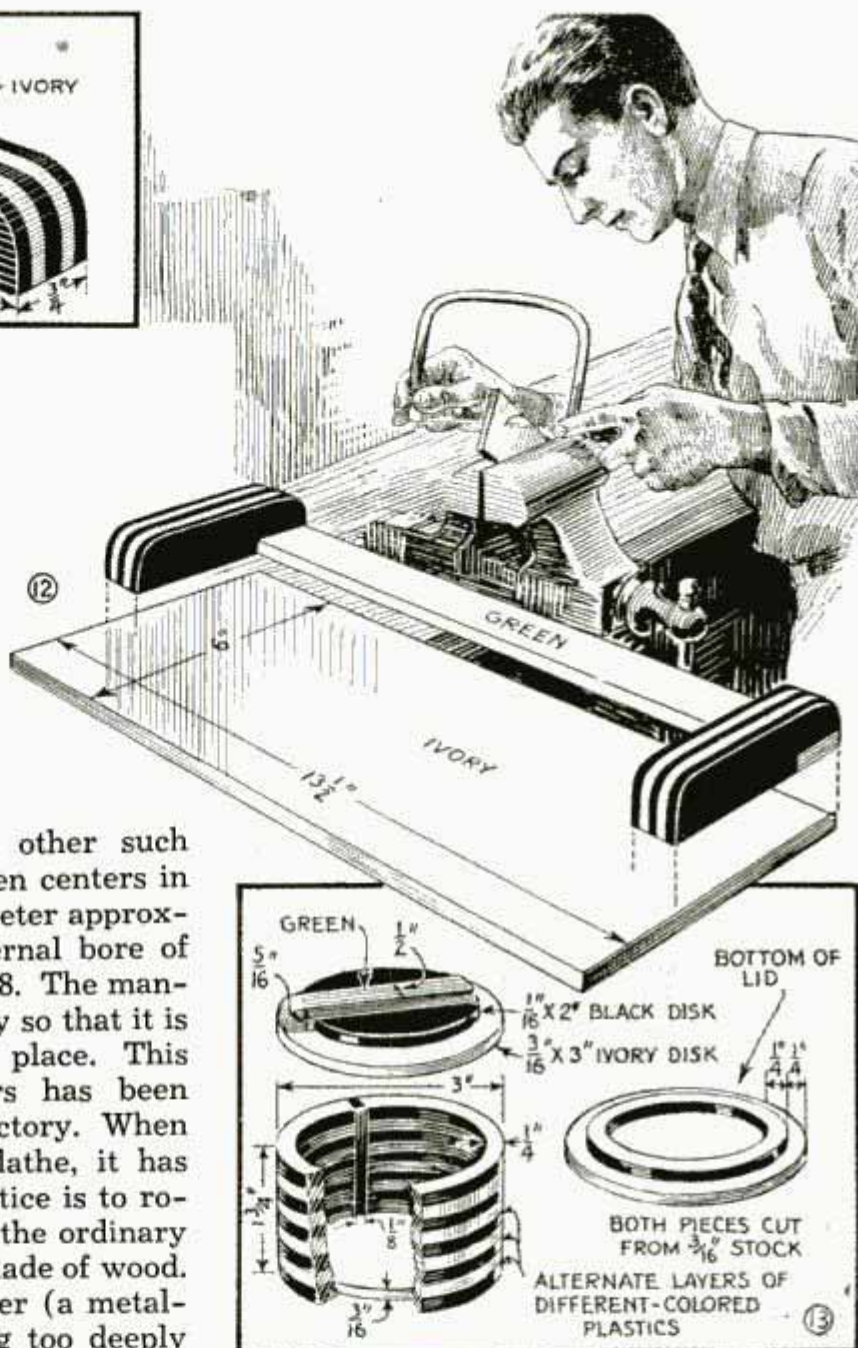
able. This cement comes in small bottles and has a thick consistency. The best way to apply the cement, after making certain that the parts fit snugly, is to dip a small stick or the end of a match into the cement and pick up a small ball of it. The ball of cement is next dipped into ordinary muriatic acid. The cement will not harden properly unless it is treated with the acid as explained. After immersing the stick carrying the globule of cement in the acid, it is applied to the surface of the pencil holder to be cemented, spreading it over the entire surface of the holder and avoiding any excess which might be squeezed out later. Next, the pencil holder is pressed into the exact position where it is to remain. Clamps are then applied to hold it in position until set, which will require from 10 to 24 hours.

Turning: Plastic materials may be turned in any wood or metal-working lathe with ordinary wood-turning chisels. Although ordinary chisels work effectively, it has been found that chisels made from high-speed steel will last longer and are easier to keep in good condition than ordinary chisels. When a large flat section is to be turned, as would be required in the forming of a bowl, dish or lamp base, the plastic is cemented to a piece of wood, which in turn is fastened to the faceplate



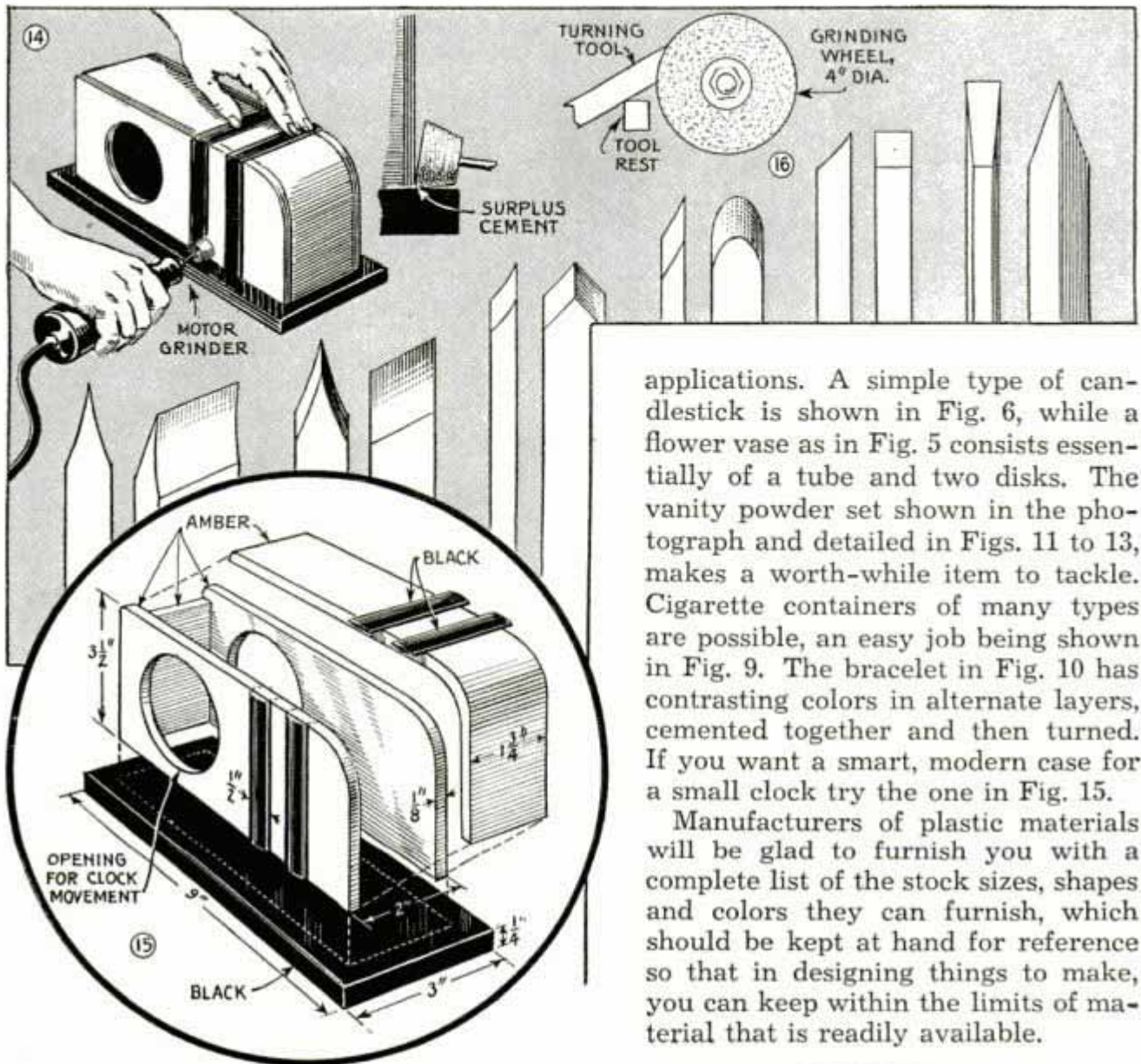
of the lathe with wood screws as shown in Fig. 7. For this purpose, plastic-to-non-plastic cement is used. When the turning and polishing have been completed, the wood may be pried loose readily after removal from the face-plate. To facilitate the turning of cylindrical sections such as would be required in the construction of cigarette containers and other such items, a mandrel, held between centers in the lathe, is turned to a diameter approximately the same as the internal bore of the plastic cylinder. See Fig. 8. The mandrel should be tapered slightly so that it is easy to slip the cylinder in place. This method of holding cylinders has been found by far the most satisfactory. When turning plastic rods in the lathe, it has been found that the best practice is to rotate them between centers in the ordinary way exactly as if they were made of wood. To prevent the tailstock center (a metal-turning center) from working too deeply into the plastic, which tends to soften under heat, it is advisable to make a small disk of sheet iron and center-punch it to correspond with the center, which is drilled in the rod to be turned. Turned plastics should be polished before removal from the lathe by applying the compound to the rotating work with a cloth.

In sharpening turning tools for plastic work, more efficient results will be had if the tools are slightly hollow ground as shown in Fig. 16. They should be roughly ground on a wheel about $2\frac{1}{2}$ or 3 in. in diameter, and after the rough grind, they are finished on a wet wheel of the same diameter but made from very fine abrasive. In using wood-turning chisels, about the only difference that will be noted be-



tween working with plastics and with wood is that the speed of cutting must be reduced. The chisel should be held rigidly and applied cautiously until the proper pressure for best results has been found by the feel of the tool itself. In no case should the tool be forced nor should attempts be made to hurry beyond a reasonable working speed. If excess force is used or if the tool is dull, the material will become hot and the tool will be burned.

Grinding: Irregular slots, depressions, grooves and hard-to-form curves may be produced easily by the use of a small hand grinder, and this is also useful to remove any excess cement between corners as shown in Fig. 14. These units have a



applications. A simple type of candlestick is shown in Fig. 6, while a flower vase as in Fig. 5 consists essentially of a tube and two disks. The vanity powder set shown in the photograph and detailed in Figs. 11 to 13, makes a worth-while item to tackle. Cigarette containers of many types are possible, an easy job being shown in Fig. 9. The bracelet in Fig. 10 has contrasting colors in alternate layers, cemented together and then turned. If you want a smart, modern case for a small clock try the one in Fig. 15.

Manufacturers of plastic materials will be glad to furnish you with a complete list of the stock sizes, shapes and colors they can furnish, which should be kept at hand for reference so that in designing things to make, you can keep within the limits of material that is readily available.

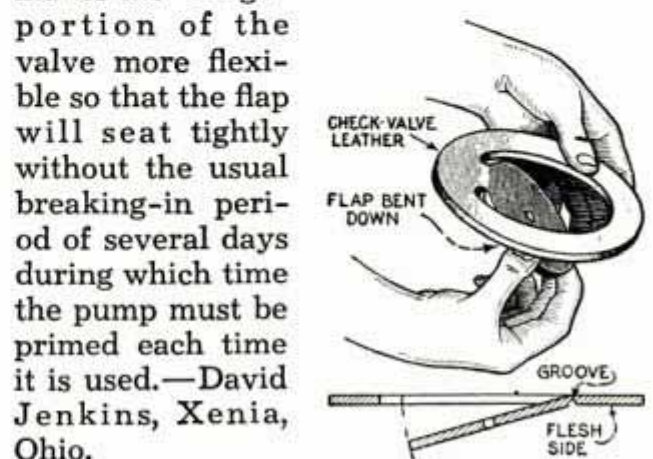
motor in the handle and come equipped with a large variety of hobs, grinders and cutters. By selecting the proper tools, almost any kind of engraving or carving may be done.

Inlaid Designs: Plastic materials can be ornamented in contrasting colors by scratching the design required into the surface of the material with a sharp-pointed, hard-steel scribe. After the design has been scratched into the work and the surface wiped clean, a contrasting color of quick-drying lacquer is applied with a cloth. The lacquer will fill the crevices and the surplus on the surfaces may be wiped away before it dries.

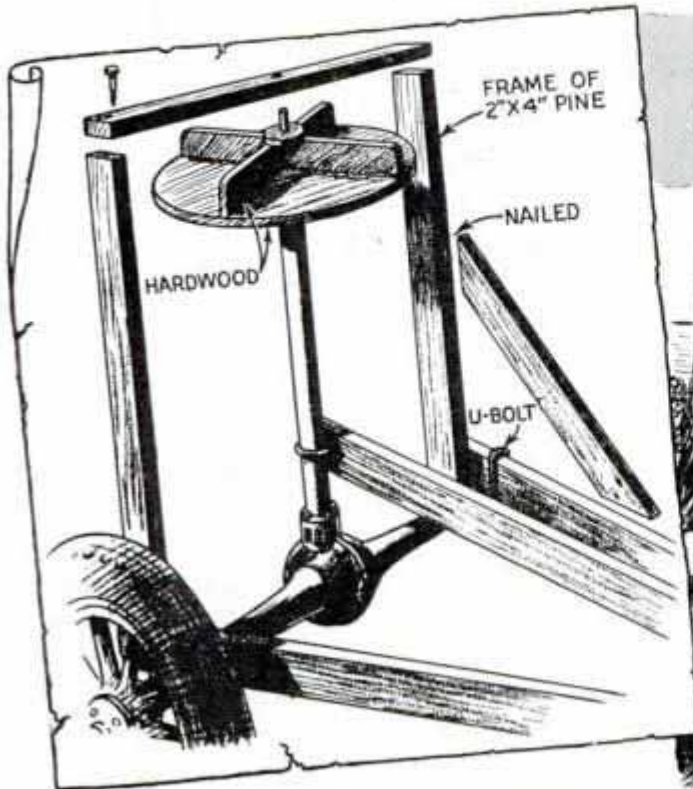
Variety of Applications: After experimenting with plastic materials on some simple project such as the telephone note pad described, you will find many other

Installing New Leather Valve in Lift Pump

When a new leather check valve is put in a lift pump, cut a shallow groove in the flesh side of the leather as indicated. This makes the "hinge" portion of the valve more flexible so that the flap will seat tightly without the usual breaking-in period of several days during which time the pump must be primed each time it is used.—David Jenkins, Xenia, Ohio.



Whirlwind Spreader Broadcasts 'Hopper' Bait



An old rear-axle assembly is about all you need to build this poison-bait spreader



Utilizing an old auto rear-axle assembly, this spreader, which works on the principle of a broadcast seeder, scatters poisoned grasshopper bait uniformly. Besides this, some of the danger of handling arsenical bait is eliminated as the latter is scooped from the tow truck or wagon directly into the spreader without touching the hands. As shown in the drawing, the wheels, axle and drive shaft are left intact, the drive shaft being turned upward

in a vertical position where it is held by a wood framework, which also supports an oil-drum hopper. A wood or metal disk carrying four vanes is fitted to the end of the drive shaft. When the spreader is in motion, the bait passes through a 1-in. hole in the bottom of the drum and onto the whirling disk. It is a good idea to provide a shield so that the bait will not be thrown on the worker in the wagon.—Edward Green, Varsity View, Man., Can.,

Avoiding Burned Insulation When Soldering Wire Splices

When soldering wire splices, very often the rubber insulation close to the bared ends is charred, which not only results in an unworkmanlike job, but may be an unsafe one. To avoid such charring, two spring clothespins with a wad of copper wool wired to each leg are clipped to the wires on each side of the splice so that part of the wool is in contact with the bare wire. There being a great deal of copper-wool surface exposed to the air, practically all of the heat from the splice will be taken up by the wool and dissipated before it has a chance to reach the insulation.—W. C. Wilhite, Edelstein, Ill.



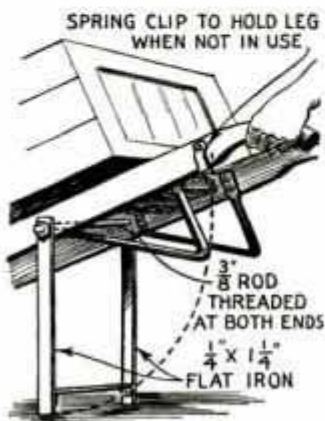
Artist's Materials Kept at Hand by Extension Bracket



This bracket keeps artist's materials at hand without restricting arm movement

The problem of keeping artists' paints, oils and other materials close at hand is solved with a "lazy tong" or extension bracket, which supports a pan holding the materials. The bracket is screwed to a wall near the drawing table, so that the pan can be held in almost any horizontal position, or can be pushed back against the wall when not in use. The pan is soldered or riveted to a piece of flat iron, which is given a half twist at one end so that it can be clamped to the bracket as shown in the lower detail of the drawing.

Pivoted Legs on Hand Truck Ease Workman's Job

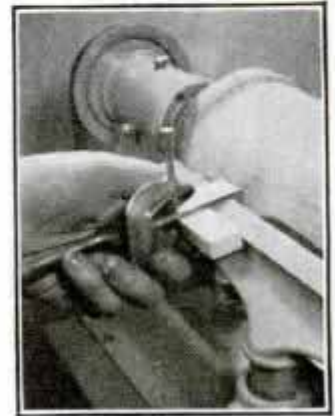


One workman whose job required wheeling heavy loads on a hand truck, saved much of the "back-breaking" work by pivoting a couple of flat-iron legs to the truck as shown. When handling a heavy

load, the legs hung down so that every time the loaded truck was set down for a moment, the worker was not compelled to raise the handles more than a few inches to proceed on his way. When not in use, the legs were held close to the handles with a spring clip.

Turning True Wood Cylinders in a Lathe

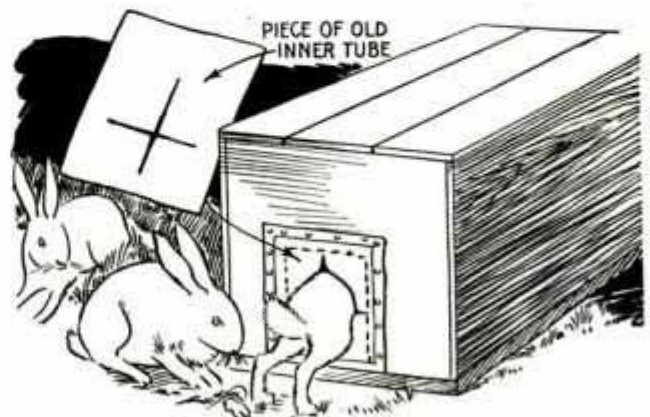
After a turning has been dressed down in a lathe, it can be trued to a perfect cylinder with the aid of this simple jig. It consists of a small wood block fastened to the shank of the chisel with a C-clamp. In use, the chisel is held



so that the block slides against the tool rest as shown in the photo.—Kenneth Murray, Sturgis, Mich.

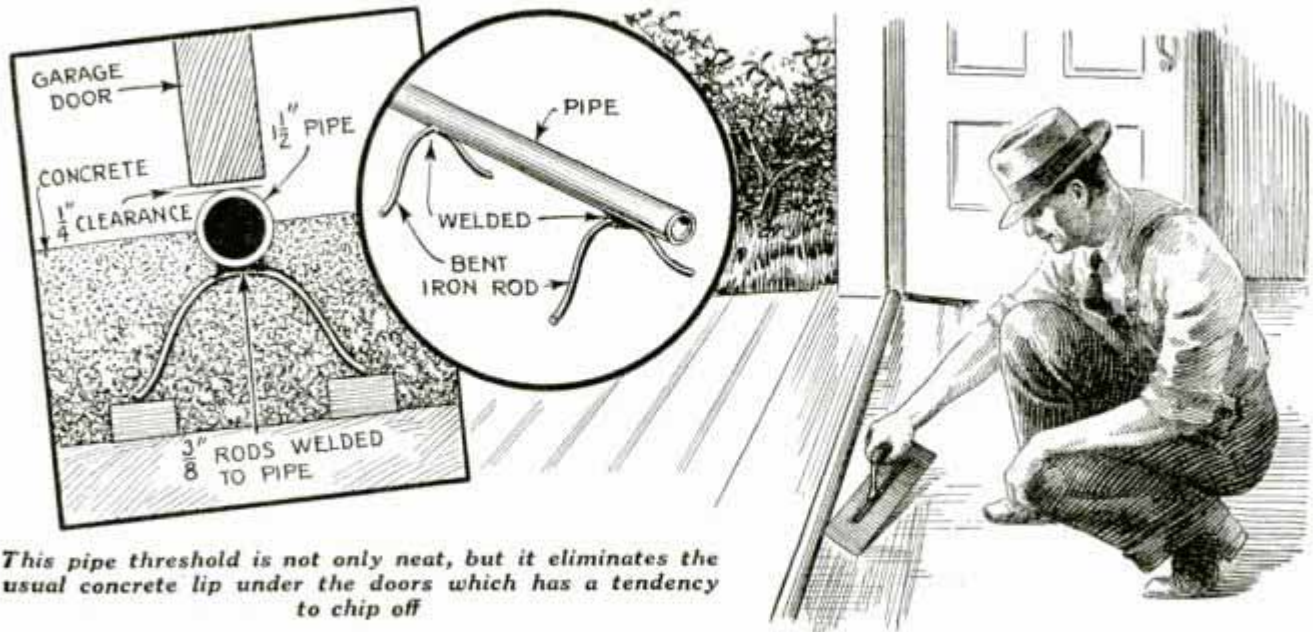
Rabbit Hutch Has Rubber Door

A man who raises rabbits in Arizona claims that rubber doors on the hutches are much more satisfactory than uncovered openings as the animals prefer a dark place to sleep and to care for their young. The doors are merely pieces of inner tube slit both vertically and horizontally and tacked over the openings to the hutches. If the horizontal slit is a little shorter than the vertical one, the four rubber segments or flaps formed by the slits will keep the opening closed except when in use.



Rubber door keeps interior of rabbit hutch dark, which is more like the animals' natural burrows

Pipe Threshold Keeps Water Out of Garage



This pipe threshold is not only neat, but it eliminates the usual concrete lip under the doors which has a tendency to chip off

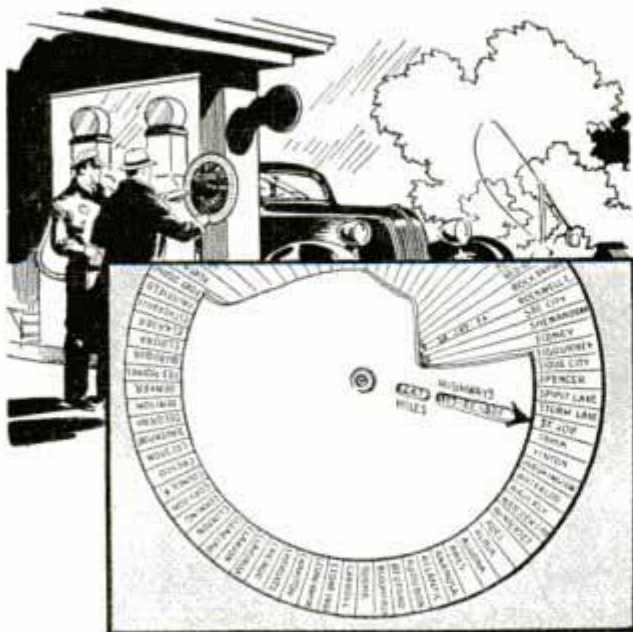
Here is a novel method of weather stripping under garage doors that not only effectively stops water from entering under the doors, but one that is lasting. Instead of the usual concrete offset or lip, a galvanized pipe is buried halfway in the concrete under the doors. To the bottom

of the pipe are welded bent rods, which serve to anchor it securely in the concrete and support it while pouring the concrete. The rod supports are welded at 4-ft. intervals along the pipe. A $\frac{1}{4}$ in. clearance between the pipe and door bottom is about right.—E. T. Holmgren, Chicago.

Motorist "Dials" This Guide to Find Routes and Mileage

As a help to motorists, one filling-station attendant rigged up this simple dial, which shows at a glance the mileage and routes to all important cities and towns within a wide radius of his station. The dial con-

sists of two sheet-metal disks mounted on a metal holder which is attached in a convenient location on the wall. The names of the towns, the mileage and routes to each one are printed on the larger disk, which is pivoted. When this disk is turned to bring the name of a town in front of a large arrow, shown in the drawing, the mileage and route numbers automatically appear at two windows in the front disk, which is stationary.—Bennett B. Smith, Cameron, Mo.

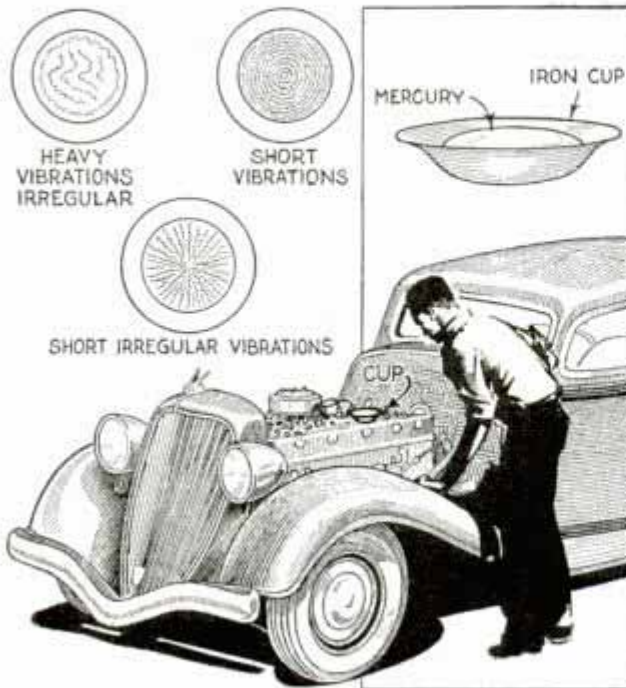


By rotating the dial, the mileage and routes to a given town automatically appear

Cleansing Tissue Used About Car

Motorists will find many uses for a box of facial cleansing tissue, which can be tucked away in a door pocket or glove compartment. In addition to its regular use as towels and handkerchiefs, the tissue is handy for cleaning spectacles and sun goggles, for wiping windshields, headlight lenses, oil-gauge rods, etc. And, as the tissue is discarded when soiled, its use saves cluttering the car with dirty cloths.

Locating Sources of Vibration with Cup of Mercury



With a little practice, sources of vibration can be determined by observing designs produced on surface of the mercury

With the aid of a shallow, curved-bottom iron cup containing a small amount of mercury, it is easy to locate the source of vibration in auto motors and machinery. The cup is placed on the parts suspected of vibration and the surface of the mercury is observed. After a little practice, it is easy to determine the source of the vibration by the shape of the design which will be produced on the surface of the mercury. By this method, it is often possible to locate loose bolts or mounting screws in auto bodies without having to inspect each suspected location.

Rear Car Doors Locked Inside to Protect Children



To avoid any possibility of my small children opening the rear car doors and falling out, I locked them as shown. The door handle inside the car was drilled to take a

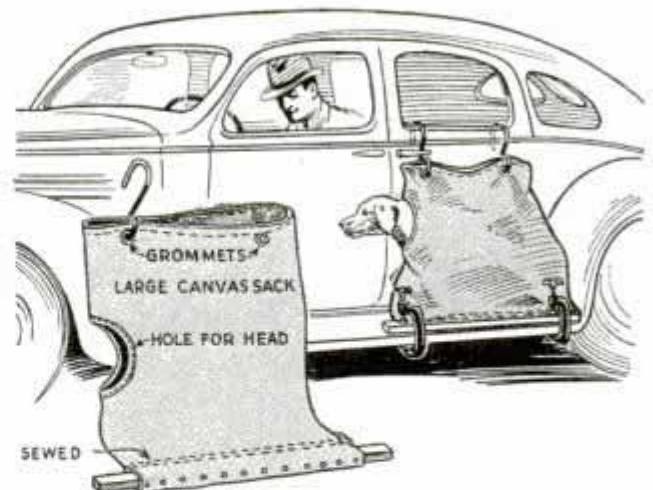
ring, which engaged a harness snap. This was attached to one of the screws in the

window sill with a leather strap, the latter being just long enough to allow the snap to engage the ring when the handle is in the locked position.—L. A. Monaghan, Richmond Hill, N. Y.

Burned Resistance Unit Causes Poor Ignition Spark

After a period of use, the wire in the resistance units, installed on some auto ignition systems to protect the coil when the ignition switch has been left on accidentally, becomes burned so that the size of the wire is reduced. This in turn reduces the flow of primary current and the high-tension spark proportionately. If the ignition spark is not hot enough, the resistance unit should be replaced with a new one. If one is not available, a temporary repair can be made by using a short length of wire taken from an old electric iron or toaster. When rewinding the unit, the current flow through the coil should not exceed 6 amps. as measured with an accurate ammeter. The length of the spark, as tested with a fully charged battery, may be taken as a fair indication of the exact amount of current.

Dog Rides Comfortably in Sack on Running Board



Your dog will ride safely in this sack, which is quickly attached or removed

When you take your dog along for a ride, but prefer not having it inside the car, it can ride safely and comfortably in this sack, which is carried on the running board. The bottom of the sack is clamped

to the running board and the top is fastened to the lower part of an open window with hooks, covered with small rubber tubing to prevent marring the car.

Identifying Cards on Batteries Held by Rubber Bands



When a number of storage batteries are being charged, wide rubber bands, cut to the shape shown, from old inner tubes, make good holders for identification cards. The bands are slipped over the batteries, after

which the cards are inserted behind windows cut in the rubber.

Guide Lines on Garage Driveway Aid in Backing Car

If you have a narrow driveway, a couple of guide lines spaced to clear the wheels a few inches will be a great help in backing the car in or out of the garage. For concrete driveways, apply a thin coat of tar. For dirt, cinder or stone driveways, you can use tennis tape.



By steering close to one of these lines, you can back into your garage easily

☞ To liven the rubber squeegee of an old windshield wiper, soak it in a dish of household ammonia over night; then wash it with soap and water.

Portable Workbench Is Anchored with Large Turnbuckle



With this arrangement, you can anchor a portable bench at various locations in the shop

When a workbench is fitted with casters for moving it to various locations, you can use a large turnbuckle as shown to anchor the bench solidly at each location. A large screw eye attaches the turnbuckle to the underside of the bench top, and a heavy screw hook holds it to the floor or wall, a hook being provided at each location where the bench is to be used.

Rubber Washer Stops Rattles Caused by Bumper

When it is difficult to tighten loose parts on an old car so that they won't rattle, especially on a bumper that has been sprung or bent, try using a piece of old inner tube between the parts. The rubber will help absorb vibration and silence the noise.—Jos. C. Coyle, Phoenix, Ariz.



"Loophole" in Fence Sheathed to Protect Clothing



This frame is held in place firmly between two wires

On farms where it is frequently necessary to step through a barbed-wire fence, this simple wood frame placed between two of the wires will prevent the barbs from catching in the clothing. The frame is made in two parts. These are nailed together with wood strips between them, forming grooves to engage the fence wires.

Electric-Motor Bearings Repaired

Instead of taking the time to make an undersize bearing for an electric motor, after turning down the end of a worn armature shaft, I simply insert a thin brass sleeve in the old bearing to reduce its inside diameter. This is done by boring out the bearing in a lathe to take the sleeve, which is then sweat-soldered in place and reamed to fit the shaft.—John A. Blaker, West Auburn, Mass.

The Next Issue

CONCRETE GARDEN FURNITURE IN COLOR

New beauty in garden benches by using colored cement to harmonize or contrast with the surroundings. You can inlay smart designs in color or apply ornamental relief work. This article—the first of a series on using colored concrete—gives you all details for this fascinating outdoor work.

GET THE MOST OUT OF YOUR CAMPING TRIP

What to take along, where to pitch a tent, how to cure troublesome gas stoves, or lanterns, how to hasten cooking at high altitudes and other helpful tips.

COASTING INTO A COLLEGE SCHOLARSHIP

A boy's homemade coaster will win this prize in the All American Soap Box Derby. It's not too late to start now. Next issue will contain the official rules.

WHAT'S WRONG WITH THAT MOTOR?

Gives simple tests to locate troubles in electric motors, such as grounds, open and short circuits, poor connections, worn brushes, damaged switches, etc.

PROFITS FROM LAWN ORNAMENTS

Scroll-sawed figures that sell at roadside stands, including midget fireman to hold hose, warning policeman, alert watchdog, sprinkling maid and others.

FOR FURNITURE BUILDERS

One article shows an elegant coffee table in modernized Chinese Chippendale; another completely details several pieces of useful cottage furniture.

SCENIC AMERICA

Many a Harley-Davidson rider has seen this beautiful spot—Lake McDonald, Glacier National Park.

from the **SADDLE** of a **HARLEY-DAVIDSON**

No matter where you live, you're within Harley-Davidson distance of rare scenic spots. Hit the shorter trails over week-ends — plan care-free jaunts over distant trails for your next vacation. Harley-Davidson will take you there at least expense. . . . And for 1936 — own this year's new Harley-Davidson. Speed-lines and amazing motor improvements assure you plenty of style, power, speed and riding ease — plus remarkably low-cost mileage.

Ask your nearest Harley-Davidson dealer about his Easy-Pay Plans—get a FREE ride—send in the coupon.



Ride a

HARLEY- DAVIDSON

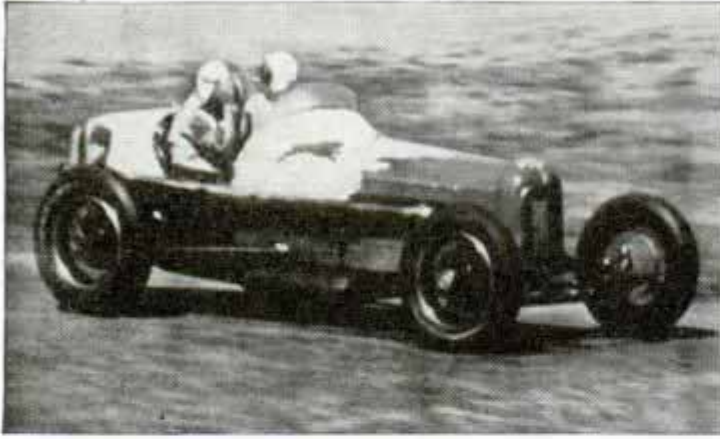
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Interested in motorcycling. Send illustrated literature. Postage stamp is enclosed to cover mailing cost.

Name

Address

My age is 16-19 years, 20-30 years, 31 years and up, under 16 years. Check your age group.



THE WINNER! Kelly Petillo takes the 500-mile Indianapolis Speedway classic. Petillo says: "Smoking Camels with meals goes a long way in helping to keep my digestion in good shape."



DARE-DEVIL. Attractive Uva Kimmey, famous girl parachute jumper, is a steady Camel smoker. "Camels set me right," Miss Kimmey says, "and encourage digestion in a pleasant way."

FOR DIGESTION'S SAKE



A RARE PLEASURE. Above—leisurely diners at Jacques French Restaurant in Chicago. Here it is that soft lights and impeccable service give the perfect setting for such dishes as Baked Oysters *à la Jacques* and other specialties of the house. And Camels add the final touch to dining. "Camel cigarettes are most popular here," Jacques himself (*left*) observes. "They are clearly the favorite with those who know fine living."

CAMELS COSTLIER



ALL ABOARD! Away from home a business man meets many conditions that upset the normal routine of digestion. Camels stimulate good digestion—no matter where you are.



THE FLARE of the welding arc climbs to a temperature of 8700°. Dan Rafferty, master welder, says: "Smoking Camels during and after meals helps my digestion. Camels taste mild and rich."

SMOKE CAMELS

Copyright, 1936, R. J. Reynolds Tobacco Company, Winston-Salem, North Carolina



MASTER DIVER. "Me and food get along swell when there's Camels," Henry Siemer says. "Camels make food taste better and digest better."

Smoking Camels a Pleasant Way to Encourage Good Digestion and Stimulate Good Feeling!

Modern days are tense and trying. Nerves get "wound up." Digestion slows down. Hurry, worry, and strain tend to interfere with normal processes of digestion.

It is a scientific fact that smoking Camels helps to restore and increase the

flow of fluids so necessary to good digestion. You sense a comforting "lift" and feeling of well-being as you enjoy the delicate fragrance of your Camel.

You can smoke Camels steadily. They never get on your nerves or tire your taste.

TOBACCOS

• Camels are made from finer, **MORE EXPENSIVE TOBACCOS**...Turkish and Domestic... than any other popular brand.

789

The Latest in Fishing Tackle

(Continued from page 895)

growths of weeds and a lot of tree stumps preventing your lure from doing its real work, regardless of the success you had with this plug in an open water lake. Under these conditions you want a weedless lure of some kind. Similarly, you wouldn't use a surface lure on a lake when you know the bass are down deep. The true surface lures float on top of the water and stay on top when being reeled in. Made of wood, they are great when muskies and bass are inclined to feed on the surface. I use those with spinners which kick up a fuss when jerked along the surface, and others with no spinners. The idea is to make the lure imitate something crippled and struggling. Muskies sometimes follow and strike these dancing surface lures five or six times in trying to clamp their jaws on them. In this group of lures are the "plunker" types which are very effective on quiet water, especially around evening.

The semi-surface lures are somewhat similar, except that most will float when at rest, but when reeled in will swim from side to side, dive, wobble, and dart about. Some are jointed to increase their action. Many have shovel-nosed fronts so they will dive when retrieved. The primary attraction of semi-surface lures is eccentricity of movement. They are wonderful teasers for many kinds of game fish.

Deep-diving plugs are effective on hot days when the fish are not coming to the surface. They are good especially for walleyes and bass. Other casting lures which cannot be overlooked are the metal, spinner, and pork-rind combinations, darting metal and bucktail combinations, and all metal underwater lures. They cast easily, are small, and are attractive to fish. One bait which has proved a good fish getter has a polished metal body and a combination of hackle and bucktail, with a pork rind added to give a good motion.

Other effective underwater lures are the spoons which look much like a metal shoehorn with a hook attached at the big end and painted gaily. They revolve in the water, and may be used either with or without pork rind. Some have weedless attachments. There are also gold and silver lures which have the hook attached to the inner side of the small "shoehorn."

You need several weedless lures. There are many good ones with big guards over the hook to keep it from fouling. Every angler, too, should have a "log rider," a lure that can be pulled in between and over logs floating on the surface. This has a small spinner on each side of the fly or bucktail, so lifted and arranged that they act as guards to prevent the hook from snagging. You can shoot it into a log pile and toss it among lily pads, too. A few extra spinners and small hooks are needed in case fishing must be done with bait. There is a weedless pork chunk hook that is mighty handy some days when the bait caster wants to work the lily pads for bass.

A few wire leaders are necessary. These have swivels and snaps to keep the line from twisting and to protect it when a muskie or pickerel gets to fighting. Every angler needs a tackle box to keep his equipment orderly and in good condition. These are big enough to carry an assortment of lures, reels, leaders, lines, stringers and other equipment. They range in price from one to twenty-five dollars.

A stringer is another necessity. The usual one is merely a piece of heavy cord with a sharp needlelike piece of metal on one end which can be passed through the lips of the fish. The other end of the cord is tied to the boat. The newest stringers have individual hooks for each fish caught, and keep the fish alive as long as you are on the water.

And don't forget to oil your reel frequently. There are several good reel oils on the market, with dropper attachments on the bottle cap. The only other items you might need are a line dryer, a case for your reel, and a hook disgorger.

7395 Color Card Indicates Humidity by Change from Blue to Pink

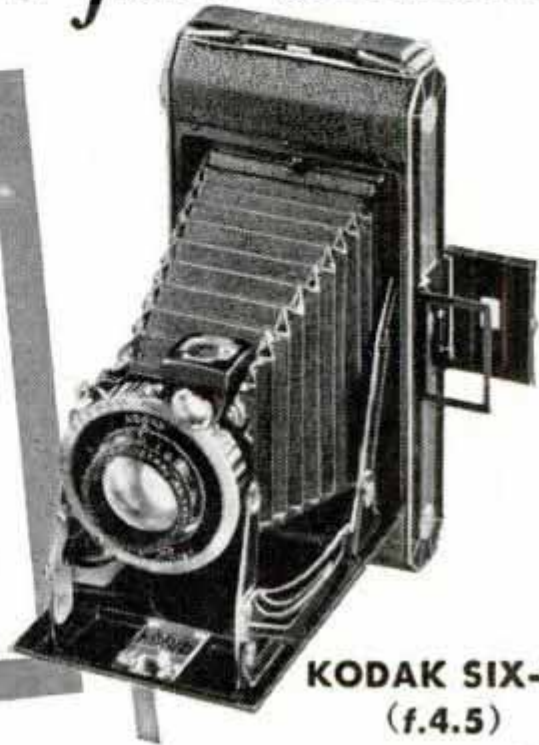
Turning from an intense blue in a dry room to violet and pink as the humidity rises, a paper color card useful as humidity indicator has been developed by a novelty manufacturer. The changing color is supplied by a chemical printing process. It is dull blue when the humidity degree in a room is at the healthiest point.

Nelson. Thomas G
Greenfield, Mass

No wonder it's America's favorite fine camera—

It has all these features

fast f.4.5 lens . . . 8-speed
Compur shutter up to 1/250
second . . . delayed-action
timer . . . close-up focusing
. . . eye-level finder . . . action
front . . . roll-film convenience
. . . large picture size.



KODAK SIX-16
(f.4.5)

KODAK SIX-16 with the fast f.4.5 Kodak Anastigmat lens is America's most popular fine camera, by a wide margin. And a glance at its many features shows why it's a natural "first choice."

This up-to-date Kodak springs into action at the touch of a button. Both eye-

level and waist-level finders. F.4.5 lens makes bright snapshots even in difficult light, and high-speed shutter "stops" action. It's a real all-rounder for one-camera fans. Makes 2½ x 4¼-inch pictures. Costs but \$40. See it at your Kodak dealer's.



3 films for the Kodak Six-16

VERICHROME

FOR OUTDOORS—Double-coated Kodak Verichrome gives you bright, clear snapshots in sun or shade. It adds to the scope of the f.4.5 lens, and safeguards your picture results.



PANATOMIC

FOR ENLARGING—Kodak Panatomic, the film with the microscopic grain. Leads to enlargements of contact-print quality. Fully panchromatic, too, and amply fast for all average pictures.



SUPER SENSITIVE

FOR INDOORS—Kodak "SS" Panchromatic lets you make snapshots at night, using two or more Photoflood bulbs, and increases the range of outdoor picture-making as well.

NEW KODAK POCKET RANGE FINDER

A useful accessory with any focusing camera . . . movie or still. Measures the distance from camera to subject. Eliminates guesswork in focusing. Clips in your pocket like a fountain pen. \$7.



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P. M. 6-36

Tips on Getting Rid of Ants

(Continued from page 889)

Drenching an outdoor nest with boiling water or kerosene is often effective but the recommended way is to inject into the openings a few ounces of carbon disulphide. The ant hole may be enlarged before the liquid is poured in. Then close the entrance with dirt pressed down firmly so the gas from the liquid will be retained. The gas filters through the ground and along the runways, killing all the inhabitants. Carbon disulphide may be obtained at any drugstore. It has a disagreeable odor and must be used with care as its fumes are inflammable.

If there are numerous ant hills in one area of the lawn, punch small holes about one foot deep and eight inches apart. Pour one teaspoonful of carbon disulphide in each hole and cover it immediately. One treatment is usually effective. To keep ants from infesting trees, prune away low branches so the lowest is fully a foot above the ground, then remove weeds and rubbish. Apply a six-inch-wide band of paraffin to the trunk and paint over it with a mixture of one part by weight of finely powdered flowers of sulphur to six parts of commercial tree-banding sticky compound. The applied mixture should be five inches wide and a quarter of an inch thick.

A simple way to keep ants from climbing tables and other furniture is to place each leg in a saucer filled with water to which several moth balls have been added. Kerosene in the saucers will also repel the insects.

A sponge moistened in sweet water and placed where the ants can reach it collects swarms that can be scalded to death, but the practice usually attracts an inexhaustible number of ants. Repellents like camphor, naphthaline flakes, or powdered moth balls are of little permanent benefit. Most commercial ant powders are effective killers when sprinkled on ants or placed where ants walk over them, but their value as poisons to be carried to the nest is doubtful.

To prepare your own ant poison, you may use either of two formulas recommended by the department of agriculture. Dissolve one pound of sugar in a quart of water and add 125 grains of sodium ar-

senate. The liquid should be boiled and strained, then used to moisten small sponges for traps. Or, mix one pound of granulated sugar, 10.3 grains of crystallized tartaric acid, and 14.6 grains of benzoate of soda in one pint of water. Boil slowly for half an hour, then cool. Dissolve twenty-six grains of chemically pure sodium arsenite in 1.8 fluid ounces of hot water and cool. Add the poison solution to the sirup and stir well, then mix in 2.3 ounces of honey. Great care should be used in preparing poison sirups and safeguarding them. If the ants aren't attracted at first, add more honey.

One fairly safe trap for poison sirup is made with a small condensed milk can from which the milk has been drained through holes punched in the top. Boil any remaining milk out of the can, punch several more holes around the sides near the top, and partly fill by pouring sirup through one of the holes. Then bury it halfway in the ground, so ants can reach the holes easily and it can't be kicked over. Or remove the top from a can, punch holes around the sides near the top, and place a sponge or wad of excelsior soaked in poison sirup inside the can. The open end should be covered with the top from a larger can. This can be placed under the house or in other places where it will not be disturbed.

Any small container with a metal screw top makes a good wick trap. Punch a hole in the top to admit a pipe cleaner or thin lamp wick. A pipe cleaner should be boiled previously to remove the sizing. The wick should project outside the metal top one-fourth inch and will draw enough sirup from the jar to feed worker ants. The jar should be boiled to remove odors. The sirup should be renewed every few days because part of the liquid is lost by evaporation.

A jelly bait more permanent than a sirup may be prepared by mixing in less than one per cent of white arsenic with any sweet jelly, which may be poured while still a liquid into small condensed milk cans prepared as directed above. Termites are not affected by regular ant poisons and must be combated in special ways.

WHAT ELSE CAN I EXPECT, SIS— WITH A FACE LIKE THIS...



BUT JIM FOLLOWS A TIP THAT ENDS HIS JOB WORRIES



OH, HELLO, JIM... HOW ABOUT THE JOB... ANY LUCK THIS TIME?

NOPE—DREW ANOTHER BLANK—GEE, IT'S DISCOURAGIN'—OTHER FELLOWS DON'T HAVE BAD BREAKS LIKE I DO!



I WISH JIM DIDN'T WORRY SO ABOUT A JOB. HE'S AWFULLY UPSET, TOO, ABOUT ALL THOSE PIMPLES HE HAS

I DON'T BLAME HIM. PIMPLES ARE SO CONSPICUOUS. BUT CAROL, I'M SURE FLEISCHMANN'S YEAST WOULD GET RID OF THEM. DO GET HIM TO TRY IT



THE ZUCK CO.

LISTEN, JIM—KIT SAID THIS FLEISCHMANN'S YEAST IS THE BEST THING OUT FOR PIMPLES. SO I GOT YOU SOME TRY IT PLEASE!

SAY, IF IT CLEARS 'EM UP I'M YOUR SLAVE FOR LIFE



LATER

SO LONG—I'VE A HUNCH I'M GOING TO LAND THIS JOB!

BET YOU DO JIMMY—YOU LOOK SO UP. AND—COMING SINCE YOU GOT RID OF THOSE OLD PIMPLES



3 MONTHS LATER

WHAT D'YOU KNOW—THEY'RE GIVING ME A RAISE AND A BETTER JOB—GOSH, I CAN HARDLY BELIEVE MY LUCK!

OH, JIM—HOW PERFECTLY GRAND!

Don't let Adolescent Pimples keep YOU down on your luck

After the start of adolescence—from about 13 to 25, or longer—important glands develop. The entire system is disturbed. The skin gets oversensitive. Waste poisons in the blood irritate this sensitive skin, causing

pimples to appear.

Fleischmann's Yeast clears these skin irritants out of the blood. Pimples go! Eat 3 cakes a day, before meals—plain, or in a little water—until skin clears.



—clears the skin
by clearing skin irritants out of the blood

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Secrets of Famous Dog Trainers

(Continued from page 885)

his head on his paws and hold it there for a short time. Loosen your hold and, if he attempts to get up, place him in the original position with the order 'Stay there.' Repeat this several times daily for a week or so. At the outset, it's a good idea to stand over him for a short time to see that he obeys. Then start to walk away and if the dog gets up to follow, place him in the original position with the order, 'Stay there.'

"Get farther and farther away, walking around him in one direction and then in the other. Then go to another room



Pete of "Our Gang" comedy fame is a born show-off who turns acting into play

where the pup can't see you, but you can watch him. If he starts to get up, command him to 'Lie down.' Never allow him to get up until you give him the command, 'Come on.' With a good foundation in these points, the dog can be taught many simple tricks."

It is not hard to train a dog to jump

through a hoop or over a stick, Lucenay says. He should be started with a piece of board held edgewise on the ground because if he is used to a stick, he may try to crawl under it. By lifting one paw gently and then the other, a pup can be taught to shake hands. At the same time repeat "Right hand" and "Left hand," always taking the one demanded and refusing the other. Your hand should be extended to the side of the paw asked for so the other paw cannot reach it.

Another trainer who believes in starting to train puppies early is Paul Sydell, owner of Spotty and Kiki, two of the greatest dog performers in the world. Not long ago, Sydell introduced another member into his troupe. Her name is Roberta and she was just four days old. At her debut, the little pup stood perfectly balanced on its two front feet in the center of the trainer's hand!

All dogs are not cut out for performers, Sydell says. Many with the ability to perform don't care about it and are as useless as those that cannot be taught.

"I've spent weeks trying to teach some dogs a trick that a natural born performer can pick up in a few minutes," he says. "If you find a dog is a show-off it's a pretty safe bet he has good possibilities."

Chemical Core Guards Rope from Marine Growths

Cores of powerful toxic chemicals, embedded in the center of ropes and hawsers, are expected to save fishermen millions of dollars by preventing the growth of barnacles and other marine organisms. Made of paper, the cores are impregnated with copper salts, poisonous to shipworms, barnacles, fungi and other marine life which cause fishermen's nets and ropes to decay in water. Being flexible and soft the cores can be run through machines used for making twines and ropes, and thus can be spun into the center of the rope. When such a protected rope is placed in water, the copper salts slowly dissolve and gradually migrate through the rope fibers into the surrounding water. Marine growths which would attach themselves to the rope are repelled or destroyed.

7285
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Dennis
Arch W. Koon,
de Columbian Radio Co

HALF & HALF MAKES ONE SWELL SMOKE!



No Bite!



No Bite!



Still no Bite!

Just add 'em up, Mister, and you have what it takes. Cool as a "ticket" for overtime parking. Sweet as the proof it was all a mistake. Fragrant, full-bodied tobacco that won't bite the tongue—in a tin that won't bite the fingers. Made by our exclusive modern process including patent No. 1,770,920. Smells good. Makes your pipe welcome anywhere. Tastes good. Your password to pleasure!

Not a bit of bite in the tobacco or the Telescope Tin, which gets smaller and smaller as you use-up the tobacco. No bitten fingers as you reach for a load, even the last one.

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HALF ^{AND} HALF
The Safe Pipe-Tobacco
FOR PIPE OR CIGARETTE

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F150

Wamcats Rule Top-o'-the-World

(Continued from page 851)

ing his new radio station and home combined last year, he timed everything so the outdoor work fell in the warmest season. But at that he found trouble.

"We must at all times use ice for our water supply," he says, "and in order to have some for the short summer, we must provide a method of cold storage. In the Arctic this is simple, just a hole in the frozen ground and our ice box is complete. With this in mind, a shaft was dug under what would be the back storage shed of the house.

"The twenty-eighth of June found us at work digging the shaft for the ice cellar in a tough formation of gravel, sand and some sort of clay all frozen into one solid mass. With a pick a strong man could penetrate this formation a scant half inch. Finally we located a box of dynamite in the village, and by the sixth of July had sunk a four by six-foot shaft fifteen feet deep, but had used all our dynamite. We decided to experiment with bombs made from black powder. Finally hitting on the right size of bomb and the right method of drilling holes for the powder, we succeeded in blasting out a room nine by fourteen feet and by the twenty-third of July the cellar was finished, including timbering and cribbing."

Morgan had an even worse time building his house. His lumber got coated with ice during unloading and warped into all kinds of shapes. It was necessary at times to build a fire in a tent and hold the boards before it to get them into shape.

The chief scrap of the Wamcats always is with nature. Cold, ice, snow and blizzards are their yearly diet. One man fought through a blizzard for fifteen miles, dragging behind him a hunter who had broken his leg. In some portions game abounds and the Wamcats stalk bear, caribou and other native wild life. In the days before the radio, they dwelt fifteen miles apart and communicated with each other by telegraph. But the storms would tear down their lines, as they still do today with their radio antennas, and restoring communication often was difficult.

Why are they called Wamcats? It's just the old American custom of abbreviating names into one word. In this case the

Washington-Alaska Military and Cable Service has been cut down by the use of the first letters and these letters sounded like "Wamcats." Most of the Wamcats have been on the job for years. It seems that those who go into the Arctic like to stay there. Ask a Wamcat if he would like to come back to civilization and he is likely to reply: "We've got civilization at our door just as you have. We hear every radio program you hear. We talk back and forth to Washington, Seattle, Moscow, Berlin or London. We know what is going on in all parts of the world as quickly as you do."

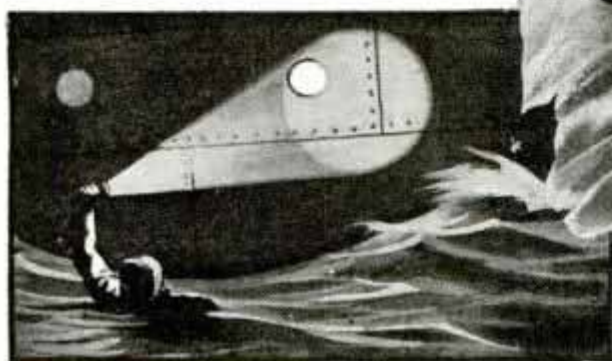
For the most part, the thirty-five stations served by the Wamcats throughout Alaska have no civil officers to administer them. So the Wamcat at the particular station serves not only as radioman for Uncle Sam but civilian administrator of the community as well. He is justice of the peace, mayor, constable, reception officer for visiting delegations and commanding officer. The Wamcats also act as commercial intermediaries for the trading posts of the territory served by them. Perhaps an outlying storekeeper in the Alaskan territory wants an order of goods from Seattle. To write a letter means a delay of at least six weeks before the letter arrives at its destination. So he takes his order to the Wamcat and puts it on the radio. In a few minutes it is in Seattle and comes out on the next boat. If it is fish some one has to sell the deal is made by radio. Market quotations are tuned in and trade goes on much like it does in the states. Weather reporting to Washington is another activity of the Wamcats.

Strange as it may seem, there is always a waiting list at the signal corps headquarters for service with the Wamcats although the hardships are of the severest kind. In a land of gold they use little. Some engage in its search, others are content to lay up their pay checks. Perhaps it is love of nature in the raw or the love of man to venture where few men ever go that impels the Wamcats to stay.

☞ Our Bureau of Information will answer questions regarding articles in this magazine, if accompanied by return postage.

30 Minutes with Davy Jones...and Back to Life Again

Swept Overboard in Midnight Monsoon, Frank Dryden Cheats the Sea



Frank Dryden, who battled Death, and WON!

"It's almost midnight," writes Frank Dryden. "A terrific wave comes over and sweeps me with it over the side. I freeze to the flashlight I'm holding, but I'm dressed for heavy weather. Oil-skins and sea-boots are pulling me under. To get out of them I have to hold the light under water. If it goes out, so will I. But I have to take that chance . . . Then the whistle blows . . . They can see my light!

"For 30 minutes I fight to stay afloat . . . Every minute I expect my light to go out . . . a shark to devour me. Then the ship manoeuvres alongside. It's too rough to launch a boat . . . they throw me a line . . . somehow I get it around me. Once on deck I check out, and my shipmates tell me they have to pry that flashlight out of my fingers . . . And, by the way, it was still burning. After months of daily shipboard use, those Eveready batteries had the

strength to see me through. Because they were fresh when the mate bought them, I am able to give you my story today."



EVEREADY BATTERIES
←
ARE FRESH BATTERIES

NATIONAL CARBON CO., INC.
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New York, N. Y.

Once more the DATE-LINE is a LIFE-LINE



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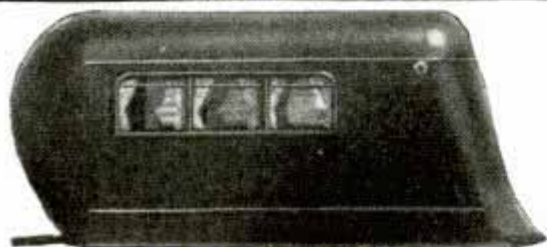
FREE BLUEPRINTS OF THIS FLYING MODEL

Winnie Mae



Get free, easy-to-follow working plans for the Winnie Mae by sending red disc from 25c tube of Du Pont Duco Cement. Quick-drying, strong, easy to use, light in weight. Makes model last more hours in the air. Also choice of plans for Navy Hell Diver, Akron Fighter, Laird 400. Write Du Pont, Dept. B-1, Wilmington, Delaware.

TRANSPARENT • WATERPROOF



De Luxe Trailer Complete at **\$545** New Streamlined Fully Equipped

New ALADDIN TRAILER HOME

At last! Fully streamlined de luxe trailer, completely equipped, at standard price, only \$545. Strong double wall, insulated construction. Twin beds; big wardrobe; refrigerator; ample storage; running water; electric lights and outlets. 80 sq. ft. clear unobstructed room space. Dines 8. Built for long service. Write TODAY for descriptive folder No. 82. **AUTOMOBILE DEALERS**—Unusual franchise opportunity. Write at once! **THE ALADDIN CO., World's Largest Mfrs. Ready-cut Homes, BAY CITY, MICH. or PORTLAND, ORE.**

STRING your own RACQUET

Same Quality String As in Expensive Racquets with string, tools and directions **\$1** Outfit Complete

SPECIAL INTRODUCTORY OFFER:

Good profits made restringing racquets, 37 ft. string. Colors Purple, Green, Red or White—also White & Blue Spiral—with contrasting silk trim, awls, stringer's wax, illustrated easy directions. Money back guarantee. Send for Free Catalog and Money Making Plan!

MAKE MONEY TOO! Send Cash, Check or Money Order \$1, which includes Postage and Insurance. Sent C.O.D. if desired, 15c extra.

Pro Tennis String Co., Dept. Q-6, Harmon, N. Y.

Enjoy Real FOOT COMFORT

If you knew what relief Oil-of-Salt brings to sore, itching, burning, aching feet—Athlete's Foot—you'd never be without it. No matter how foot-sore—it affords marvelous comfort. This soothing liquid should be kept on hand also for cuts, burns, bruises, insect bites, sunburn. For 50c you can prove its great merit. If not satisfied, the druggist will refund the price.

SOOTHING
Oil of Salt
AT ALL DRUGGISTS

Fighting Fires with Fog

(Continued from page 802)

fog. Firemen estimate seventy per cent or more of the damage attributed to fires is caused by the water used in putting them out. Fog causes little or no water damage. After a fire, the only evidence of the water used is a little dew that may be wiped off walls and furniture. As a result, one fire station has reduced the per capita fire loss from more than a dollar to only a few cents per year with the new apparatus, although the number of fires remain approximately the same. When one clothing store fire was put out it was found that some of the clothing had suffered from smoke and heat but none was damaged by water. And a church fire was extinguished with sixty gallons of water as fog although with ordinary streams of water it would have required 2,000 gallons. Another advantage of fog is that it drifts around corners, into confined attic spaces, and between partitions.

Fog also can be used as a curtain to prevent the spread of flames and to protect firemen close to a fire. A fog screen laid between two buildings effectively prevents fire from spreading from one to the next. The fog nozzle has a small button on its side from which two tiny streams of water flow to create a small body of fog that surrounds the fireman's head. This keeps the heat of the fire from reaching him and acts as a mask, allowing him to breathe comfortably in a smoke-filled atmosphere.

Capping a burning oil well calls for courage because men must walk close to apply the cap. In the past they wore heavy asbestos suits and a few minutes in the intense heat was all anyone could stand. When an oil well caught fire recently one fireman in an ordinary uniform and gloves calmly walked up to the well and installed the equipment. He was flanked on each side by a man with a nozzle that spread a thick curtain of fog. The curtains came together in front and protected all three.

Fog nozzles are made in various sizes and a small size is for use with portable forestry outfits. The nozzles are also made as sprinkler heads for ceiling installation.

Our Bureau of Information will answer questions regarding articles in this magazine, if accompanied by return postage.

THERE'S A MAN I'D LIKE TO MEET!



Yet a few weeks ago they laughed at his skinny shape



NEW "7-POWER" ALE YEAST OFTEN ADDS 5 TO 15 LBS. — *in a few weeks!*

NOW there's no need for thousands to be "skinny" and friendless, even if they never could gain an ounce before. Here's a new easy treatment for them that puts on pounds of solid, naturally attractive flesh — *in just a few weeks!*

Doctors now know that the real reason why many find it hard to gain weight is they do not get enough digestion-strengthening Vitamin B and blood-building iron in their daily food. Now with this new discovery which combines these two vital elements in little concentrated tablets, hosts of people have put on pounds of firm flesh — *in a very short time.*

Not only are thousands quickly gaining normal good-looking pounds, but also naturally clear skin, freedom from indigestion and constipation, glorious new health and pep.

7 times more powerful

This amazing new product, Ironized Yeast, is made from special cultured ale yeast imported from Europe, the richest known source of Vitamin B. By a new process this yeast is concentrated 7 times — *made 7 times more powerful.* Then it is ironized with 3 kinds of iron.

If you, too, need Vitamin B and iron to build you up, get Ironized Yeast tablets from your druggist at once. Day after day, as you take them, watch flat chest and skinny limbs round out to normal attractiveness, skin clear to natural beauty — you're a new person.

Money-back guarantee

No matter how skinny and rundown you may be from lack of enough Vitamin B and iron, this new Ironized Yeast should build you up in a few short weeks as it has thousands. If not delighted with the results of the very first package, your money instantly refunded.

Only don't be deceived by the many cheaply prepared "Yeast and Iron" tablets sold in imitation of Ironized Yeast. These cheap counterfeits usually contain only the lowest grade of ordinary yeast and iron, and cannot give the same results as Ironized Yeast. Be sure you get the genuine. Look for "IY" stamped on each tablet.

Special FREE offer!

To start you building up your health right away, we make this absolutely FREE offer. Purchase a package of Ironized Yeast tablets at once, cut out the seal on the box and mail it to us with a clipping of this paragraph. We will send you a fascinating new book on health, "New Facts About Your Body." Remember, results with the very first package — or money refunded. At all druggists. Ironized Yeast Co., Inc., Dept. 536, Atlanta, Ga.



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professional
models*

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World's Most Dangerous Job

(Continued from page 869)

tiger in climbing was such that I couldn't take deadly aim at him while lying on the cot, so I scrambled to my feet. Meanwhile, Campbell didn't dare shoot for fear of hitting the cameramen, and the two native boys who were on higher branches in my tree, armed with rifles, were afraid they might hit me if they fired.

It was up to me to stop that beast before he got close enough to rake me with his claws. But in a standing position, I couldn't keep my balance. My feet pushed through the netlike bed of the cot and I grasped for a limb above my head. At that instant the head of the tiger appeared over the edge of the machan and he struck forward. Pointing the gun with one hand, I fired and saw the bullet clip toes from his huge paw.

Again with terrible effort he lunged forward, sprawling half his huge body into my machan. Fearing he would tear me to shreds before I could reload my rifle, I poked it into his face. The tiger's hind legs were still clinging to the main trunk of the tree and as he lunged again he smashed the wood frame of the cot. Stepping back to avoid the blow, I lost my hold on the limb above. At the same instant, my guard's rifle above was fired so close to my head the concussion jarred me. I lost my balance and fell. But the bullet ended the life of that tiger and he came crashing down into the grass beside me, parts of the machan still in his teeth and claws.

For a moment I stood jarred and trembling, looking at that beautiful animal. It seemed such a profane way of ending the contest. Yet my guard had often said, "A clean shot is the kindest death in the world, and a beast that lives by violence must die by violence."

That is true, but I think I prefer to remember my tigers as just curious big cats who, when left to their own ways, live their lives with a majestic, fearless indifference that is not without humor. They photograph better that way. Yet I am glad in a way that incident happened. If it had not, I might still possess the dangerous belief that a tiger won't climb a tree.

(Another article by Capt. Craig next month)



WHY DO MEN LIKE TOM INSIST ON DANCING CHEEK TO CHEEK? THOSE AWFUL WHISKERS!



NEXT DAY

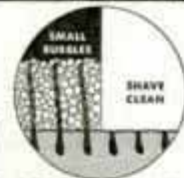
THAT'S WHAT I HEARD HER SAY, JIM... BUT I CAN'T STAND 2 SHAVES A DAY!



NO NEED TO, MY BOY... USE COLGATE RAPID-SHAVE CREAM. ITS SMALL BUBBLES GIVE A COMFORTABLE "SKIN-LINE" SHAVE THAT LASTS HOURS LONGER.



BUBBLE PICTURES SHOW WHY

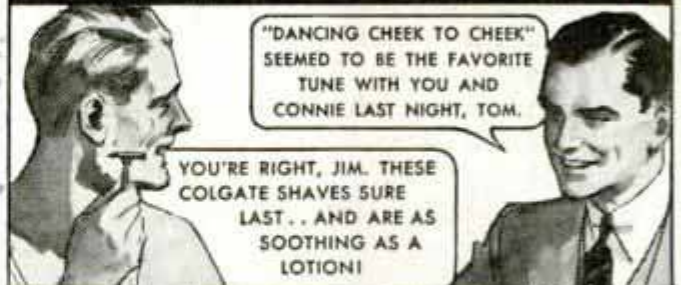


MOST LATHERS are made of bubbles too big to get to the *base* of the beard! Air pockets keep the soap film from reaching the whiskers. So the beard is only *half-wilted*.

COLGATE RAPID-SHAVE CREAM makes tiny bubbles that get clear down to the skin-line. Its rich soap film soaks your beard soft at the base. Makes your shaves last longer.

MORNING AFTER NEXT PARTY

"DANCING CHEEK TO CHEEK" SEEMED TO BE THE FAVORITE TUNE WITH YOU AND CONNIE LAST NIGHT, TOM.



YOU'RE RIGHT, JIM. THESE COLGATE SHAVES SURE LAST... AND ARE AS SOOTHING AS A LOTION!

COLGATE "SKIN-LINE" SHAVES LAST HOURS LONGER



25¢ LARGE TUBE 100 SHAVES

40¢ GIANT TUBE 200 SHAVES

Weird Ways of the Wind

(Continued from page 856)

been measured, but from their effects, they are believed to approximate 500 miles per hour. If you came face to face with such a savage air current, it would pick you up like a bit of paper and literally blow you down with a knockout punch. The greatest wind violence thus far measured by instruments is the blast on Mount Washington, N. H. In this unique wind observatory, 231 miles per hour recently was recorded by an electrically heated anemometer.

Although Mount Washington lies far south of the north wind pole, it is climatologically in the Arctic. The temperature in winter drops to -59 degrees Fahrenheit, and the wind force mounts to hundreds of miles per hour. To measure wind speed while the wind is building frostwork from cloud particles at the phenomenal rate of six feet during the course of one night is impossible with anything but a special type of heated anemometer. Mount Washington long has been known for its ferocious wind blasts. For seventeen years, from 1871 to 1887, weather bureau observers lived through the terrible winters on the mountain top and endured untold hardships to gain more knowledge about the weather.

By comparison with Mount Washington, the winds in other parts of the country are comparatively calm. The windiest cities lie near bodies of water, at opposite ends of the country, and Chicago has an unearned reputation as the "Windy City." According to statistics, it is not.

Here are the maximum winds in some American localities:

Pensacola, Fla., 120 miles per hour; Tatoosh Isle, Wash., 110; Cape Lookout, N. C., 138; Buffalo, 96; Key West, Fla., 110; Point Reyes, Calif., 120. The maximum at Chicago is only about eighty-four.

Words descriptive of winds are used in reference to the Beaufort scale as follows: Calm, 0 to 8 miles per hour; light breeze, 2 to 12 miles; moderate wind, 13 to 23 miles; strong wind, 24 to 37 miles; gale, 38 to 55 miles; storm, 56 to 75 miles; hurricane, 75 up.

The weight of the atmosphere is something to consider also because it is an important factor in measuring wind pres-

ures. The higher the altitude, the thinner the air and the less the actual force of the wind. For instance, the wind's impact at Mount Washington, altitude 6,293 feet, must be discounted if compared with a high-speed wind at low altitudes. Mount Washington's record of 231 miles an hour is equivalent to 180 miles at sea level.

The weight of flying rain and sea spray must be considered also. The wind force in a West Indies hurricane packs a terrific wallop, and although its velocity may not be as great, its force may equal the wind blast on top of Mount Washington. The weight of the earth's atmosphere is difficult to determine, but it is estimated at about sixty million billion tons.

Winds atop Pikes Peak, Mount Whitney, and Mount Wilson have been measured at various times, but complete information about them is still lacking. Winds naturally blow fastest when there are no obstructions. There is a rapid increase in velocity in the first 1,000 feet above the earth; between 1,000 and 5,000 feet the currents build up higher and higher speeds, and reach approximately 200 miles per hour. In flying over Mount Everest, the British found an "alarming" velocity at 25,000 feet. Directly above Mount Everest, the wind was blowing at hurricane speed, 120 miles per hour.

Sounds Unheard by Human Ear Test Warning Signals at Sea

Inaudible sounds on a miniature ocean are aiding Harvard University scientists in studying the vagaries of foghorn warnings at sea. Because of the strange reflecting effect of ocean waves, foghorns sometimes are heard distinctly miles away yet are unheard close to the danger point. Noise bounding up from the surface interrupts sound waves traveling in a horizontal line. This is being duplicated in a Harvard laboratory where the ocean is a five-foot tank of water and inaudible sound is created by a nickel steel rod vibrating 68,000 times to the second, sound too shrill for the human ear to catch. A receiver on the other side of the tiny sea changes the vibrations into audible sound.

Chicago Tribune 3/27/36

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Exposing the Stamp Racketeers

(Continued from page 823)

newspaper, saw an advertisement with a Canadian address stating:

"We have \$115 in U. S. two-cent stamps which we cannot use here. Will send them by express C.O.D., privilege of examination, for \$100.

The agent replied, received the stamps and examined them. The stamps were well perforated and printed in sheets of five stamps only. However, to the agent's expert eye, the color was a trifle lighter than the genuine. At first he decided this was due to a more open engraving process than the government was using. But under a powerful magnifying glass it was found the lithographic process had been used and that they were fakes.

Secret service men first investigated a rumor that a certain Chicago woman kept some machinery in a small room in her apartment. They found two large arc lights, a copying camera, a perforating machine, copper sheets and plates, gummed paper, and all other necessary paraphernalia for producing stamps. The woman was arrested and confessed she had organized and directed a large-scale gang with headquarters in Chicago. She made the stamps and distributed them through a Canadian novelty company. Another office of the gang was located in Chicago in charge of a man. In his office were found 30,000 counterfeits and 130 electroplates.

There are two main types of Confederate stamps and mailing envelopes, provisionals and regulars, or "general" issues. The provisionals were made just prior to the regular issue of the Confederate government late in 1861. Provisionals have been imitated on a large scale probably because their crude design and workmanship are easy to copy. The imitator doesn't even have to engrave or lithograph these since the majority of the stamps are similar to postmarks. Nearly all the generals have also been counterfeited although they are not particularly rare. Single provisionals, on the other hand, catalogue well into the thousands. For instance, a ten-cent variety of Beaumont Texas yellow commands \$3,500. And yet, ironically, the Confederate generals were lithographed and are therefore not as easy to imitate as are the provisionals.

The foreign stamps most often counterfeited, Mrs. Manning finds, are the nineteenth century stamps of the old Italian and German states and some of the copies of Great Britain.

"One of the cleverest of all deceptions practiced upon the unwary collector in Austria and France is that of repairing damaged stamps," says L. Stewart Barr, well known collector. "Certain of them which would be of considerable value were they in perfect shape, can be so repaired by experts in Vienna or Paris that it is almost impossible to detect the fraud.

"Another racket perpetrated on the European collector is the making of 'changelings.' Two stamps have been made, let us say, by a certain foreign government from the same plate. But they are of different colors. One is valuable because of its rarity, the other is not. With chemicals the color of the common stamp may be changed to that of the precious one."

A *tete-beche* is a pair of stamps connected together by the usual perforations but with the two heads upside down. This philatelic monstrosity, achieved accidentally by a faulty die used in the engraving process, is highly prized by some collectors. Many *tete-beches* have been counterfeited in Europe, particularly of the fifteen centimes Swiss yellow-buff stamp. The fakers take two stamps, turn them upside down, then carefully join the edges of the perforations together. The joint may be detected with a microscope.

Know your dealer, is Mrs. Manning's most important word of advice to the average collector. And Mr. Barr adds:

"Whenever a collector buys a rare stamp from a dealer he should make the dealer put his identifying mark on the back. Then, if the rarity proves spurious, the dealer will have to admit he sold it.

"By soaking the stamp in benzine any torn parts that have been repaired will show up, in most cases," he advises. "The use of a quartz lens will detect certain color defects, but doesn't help discover black cancellation marks. However, as all cancellations are not black, the quartz lens or powerful microscope will detect many of them. The method is likewise invaluable in finding changelings."

F113



**HERE'S
THE DIFFERENCE**
(in 37 seconds)



BEWARE a "pinging" sound this summer when you "step on the gas" for pick-up, or hills. It is your engine's way of saying: "I feel hot weather, too. I'm losing power, wasting gas and overheating. Give me better gasoline."



KNOCK is the name of that warning "ping." It occurs when a gasoline breaks down (burns too quickly) under the heat of a modern high compression engine.

Cars built in recent years have high compression engines. And in summer the knocking evil is at its worst because hot weather increases engine heat.

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Modern Wonders of an Old Art

(Continued from Coloroto Section)

today again is reverting to artistic applications. Paintings now are being reproduced in full color in porcelain enamel in much the same way that four-color plates are made for magazines. And at least one man has found a process for reproducing a photographic image in porcelain enamel—a reproduction which will last not a lifetime, but for ten thousand years.

This color-fast, non-porous, durable and easy-to-clean substance had its practical start in life in the kitchen, then progressed to the bathroom and today is moving into the living room where its infinite hues supply the demand for color. A fireplace of porcelain enamel lends a modernistic touch to the living room, and porcelain enameled tables, jardinières, decorative columns and light reflectors fit into modern decorative schemes.

The same qualities which make porcelain enamel suitable for home use have brought it out of doors. The cold blasts of the north have no more effect on a porcelain enameled sign or thermometer than have the sunshine and salt-laden air of Florida.

Its newest conquest, however, has been in architecture. Builders were slow to realize that the same qualities which make it suitable for a bath tub, a gas range or a refrigerator also make it a suitable covering for exterior or interior wall surfaces. How porcelain enameled metal is being used today in architecture and its future possibilities in this field is a story in itself.

(Concluded next month)

F352. Green Light Found Poisonous to Primitive Plant Life

Green light rays are worse than absolute darkness to green plants of the primitive type known as "algae." Most familiar as the green scum that forms on stagnant water, algae flourished in sunlight, multiplying fourfold in two weeks during experiments at the Smithsonian Institution. Under a band of blue light, algae increased threefold in the same period, while red and yellow light brought only a twofold growth. In darkness, the plant cells gradually decreased, but green light actually was poisonous and many of the cells died.

Dr. Florence E. Nees

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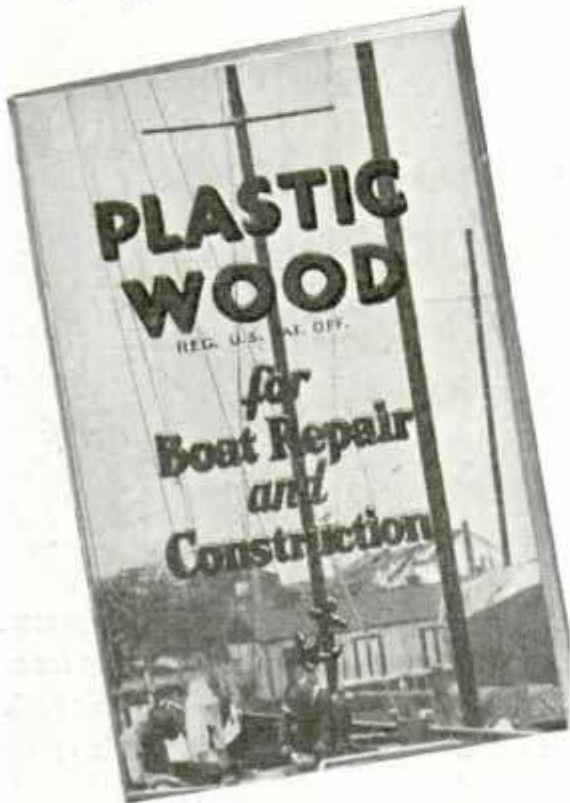


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America's Fastest Growing Game

(Continued from page 837)

spectators is better at night under artificial illumination than under any conditions of daylight.

"In the daytime with a bright sky and brightly lighted surroundings," explains John H. Waterbury, a specialist in field illumination, "the contrast between the objects we wish to see and their background is low. A white ball traveling low, or on the ground, appears white but when the background is bright, too, it may appear black. When the brightness of the ball matches the background closely, the ball is apt to be hidden from view. On the other hand, at night, the surroundings are darker and the ball appears white in all locations if the illumination is proper.

"Objects are made visible to spectators by light reflected from the objects toward their eyes. Lighting equipment should be so located and the rays directed so they will illuminate the surfaces on the sides toward those who are to see. Frequently, high foot-candle intensities are provided on the ground but this is a mistake as it is vertical surfaces spectators must see."

When mounted high in the air, floodlights tend to produce high ground illumination at the expense of vertical surfaces, Mr. Waterbury says.

"My experience," says the engineer, "has taught me that for the best results in lighting a softball field about one watt in lamp wattage per square foot should be used. With 1,500-watt lamps a sufficient number of floodlights will be available to give ample lighting coverage."

The location and arrangement of lighting poles has become more or less standardized. Two are placed behind home plate. With only one pole behind the plate the pitcher is handicapped because of the glare and the shadows. Poles at first and third base are located back of the bases to insure plenty of light on the side of the ball as it travels from home plate. Around second base the illumination on the side toward the outfield is provided by the floodlights behind the outfield.

With outfield poles 175 feet from home plate, the area bounded by the foul lines and four outfield poles is 24,000 square feet. With sixteen 1,500-watt lamps furnishing the illumination, there are 24,000 watts, or one to the square foot.



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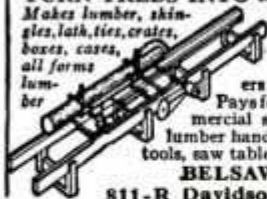
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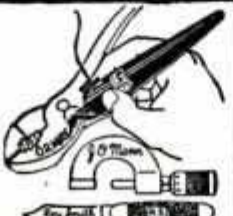
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Amplifier and Power Unit

(Continued from page 901)

looking down on the completely wired unit. The cathode biasing resistor and two by-pass condensers are mounted underneath the 5½ by 6-in. pressed-wood base which is supported by two ¾ by ¾ by 5½ in. strips of wood. Dotted lines indicate all parts and wiring under the base.

A schematic circuit diagram is given in Fig. 2. The tube socket is a 7-prong wafer type; a hole 1⅛ in. in diameter is necessary for mounting it. Four Eby binding posts and two Fahnestock clips complete the assembly. The wiring should be done with flexible, well-insulated hook-up wire and all connections carefully soldered.

Approximately 135 volts of B-power is supplied by the unit. Although not shown in the diagrams, a 20,000-ohm tapped, or adjustable, resistor can be connected across the output terminals of the power supply to act as a voltage divider to furnish intermediate voltages if desired.

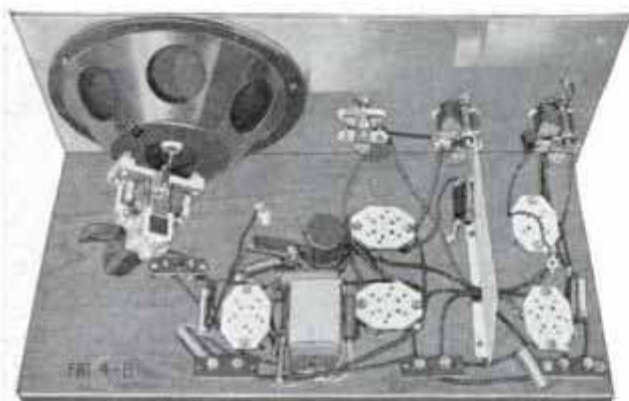
The output of the amplifier depends upon the signal input from the set with which the amplifier is used. Connected to a one or two-tube receiver, the amplifier will drive a loud-speaker with very satisfactory volume. A two-tube short-wave set employing all-metal tubes, suitable for use with this amplifier and B-power unit, will be described in the July issue. A complete material list and blueprint covering both articles will be available at that time. All parts values necessary for the construction of the amplifier unit are clearly indicated in Fig. 1. No direct ground can be used with your receiver if this a.c.-d.c. amplifier unit is employed to supply B-voltage to the set. This applies to any type of vacuum-tube receiver. To avoid shorting the power line, the receiver should be grounded through a paper fixed condenser; a .02 mfd., or larger, 400-volt type will answer the purpose. Merely connect it in series with the ground post on your set and whatever ground connection you are using. If only the amplifier portion of the unit is employed, as with a crystal set, this precaution is not required. When plugging the unit into a 110-volt d.c. line it may be necessary to check the polarity of the line; however, this is quite simple as you merely reverse the line plug in the wall socket.

All-Wave Three-Tube Receiver

(Continued from page 903)

push-back insulation for wiring the circuit. All connections should be soldered carefully with rosin-core solder; keep each lead as short as possible. Flexible, insulated stranded wire is used for the grid leads that terminate in caps for the top of each tube. It will be noted that the gridleak, R_2 , and grid condenser, C_4 , are connected in series with the cap lead to the detector tube.

In the detector circuit, the 20-mmfd. variable condenser serves to spread out the crowded short-wave channels. When tuning in broadcasting stations, this condenser is set half-way in and left alone. The 140-mmfd. condensers are used for tuning



in the usual manner, and the variable resistor is the volume control; for distant stations it should be set at the midway point. If the receiver regenerates too much, the voltage on the screen of the detector tube should be reduced. The tickler-coil windings can also be experimented with by taking off one turn at a time. The terminals of this winding are numbers 7 and 8. Five pairs of Hammarlund plug-in coils are required to cover the bands from 17 to 560 meters. A complete list of the original materials used, and further information, can be obtained upon application to Popular Mechanics radio department, without charge. The blueprint number is R-224. As a suggestion to improve ease of operation, a shielded r.f. choke could be connected in series with the 135-volt positive B lead, close to terminal 6 on the L_2 coil socket. Ground the choke-coil case and connect a $\frac{1}{4}$ -mfd. 200-volt by-pass condenser to the B-positive side of the choke; the other side of the by-pass condenser goes to ground.



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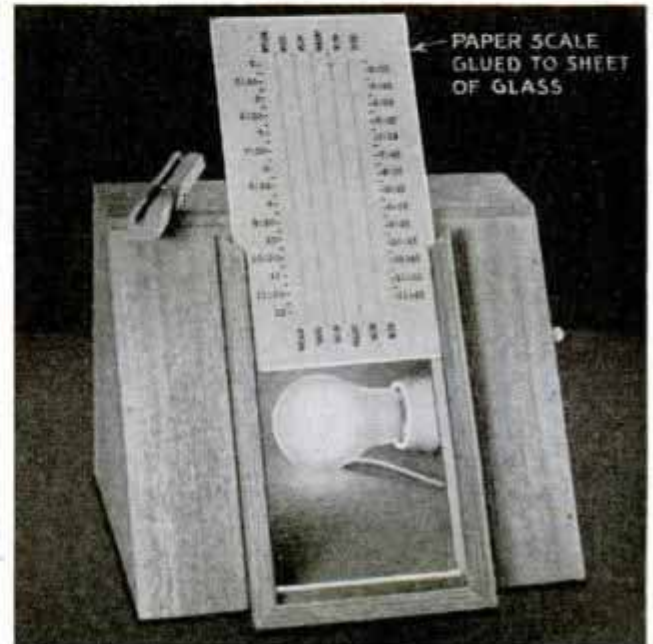
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Shadow-Box Program Guide

(Continued from page 904)

of $\frac{3}{8}$ -in. mahogany, finished with shellac and then waxed. Presdwood, $\frac{1}{8}$ -in. stock, was used for the bottom and back; see dimensions given in Fig. 1. Fig. 2 shows the front dimensions including the frame for the $3\frac{1}{4}$ by $6\frac{1}{2}$ -in. glass panel which is to be backed with the paper scale that may be made on ordinary typewriter paper.

Further construction details are shown in Fig. 3. The glass bearing the scale is



Top of frame is removable for inserting scale

held, paper side to the rear, in a simple wooden frame fastened to the sloping front of the box, over an opening the same size as the frame opening. Note that the bottom edge of the frame is beveled to rest on the supporting surface. With the scale in place, mark along the two vertical frame pieces, opposite the time divisions, to indicate where holes are to be drilled to receive the pins. These holes should be just large enough to permit the pins to slide without binding and clear the glass by about $\frac{1}{16}$ in. Trim the pins to a length that will bring the tips in the center of the farthest station column on the scale when the head is resting against the wood. Bottom and back of box are screwed to $\frac{1}{4}$ by $\frac{1}{4}$ -in. strips nailed and glued to the inside surfaces of the endpieces. The wiring and various construction steps are clearly shown in Figs. 3, 3-A, 3-B and 3-C. Holes should be drilled in the back-piece for ventilation.



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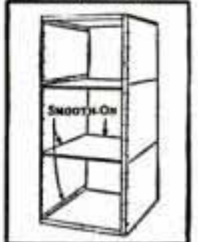
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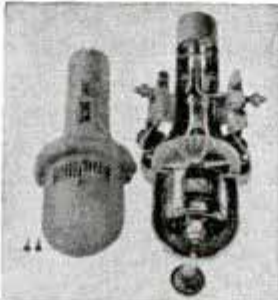
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The Age of Man-Made Rubber

(Continued from page 862)

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Duprene has also been adapted to the manufacture of gaskets, washers and packing; to lining for hose to convey gasoline, oil and kerosene, hospital sheeting and balloon fabric; binder and adhesive for use with leather, cork and felt; gloves for chemical plants and paint factories, as well as dozens of other uses.

Duprene is supplied to manufacturers in three forms, the "plastic polymer" which corresponds to crude rubber; duprene latex, which is a white milky liquid, and duprene cement.

Although duprene was commercialized at a time when natural rubber ranged in price from three to fifteen cents per pound, many manufacturers paid a premium of about one dollar a pound for the synthetic product.

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(Continued from page 877)



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shoots up to the trigger of a revolver. This causes the gun to explode and the flash from the blank cartridge ignites a torch. From this White procures a light. He spends his spare time keeping the device in working order.

Papier-mache figures are widely used, each clown being required to make at least one walk-around in one. The comic strips and animated movie characters come in for a lion's share of attention here. A few clowns do two characters on the same trip. The elongated Kinko of the Cole Brothers-Clyde Beatty show has a prop in which he is Mutt when he stands up but by bending over he becomes Jeff. The change is effected by means of a false head strapped under the folds of his costume. Jimmy McCoy of the same show works his evolution theory, "Man to Monkey," on a similar principle.

The most elaborate make-up used by any of the modern clowns is, perhaps, Paul Jerome's. He has been the No. 1 clown tramp of the past twenty years. He must take unusual precautions in putting on his make-up because in his putty nose is encased a small light bulb that flashes whenever he pulls a string. His dog adds to the stunt with a light on the tip of its tail. And Ray Barret of the Al G. Barnes show, whose immaculate props have won for him the title of America's "neatest clown," has an imitation stove built on his head that flares up as soon as he pulls the string.

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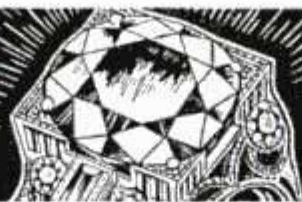
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F223

Conquering Perils of the Air

(Continued from page 845)

happened because the pilots didn't know they were dangerously close to the ground. The sensitive altimeter, usually accurate to within twenty feet, tells the height of the plane above sea level, but doesn't show how high the ground is. After dark or under blind flying conditions a pilot knows his own altitude but can't always tell how close he is to the ground. The present barometric altimeters are affected by weather conditions and to know their real altitudes pilots make frequent corrections according to orders from the nearest ground stations. Under abnormal storm conditions, without new corrections, an altimeter may show an error of several hundred feet.

For more than fifteen years engineers have been trying to find a way to measure instantly an airplane's height above ground. So far, an echo altimeter that measures the time required for a sound from an airplane to strike the ground and bounce back to the plane seems to have the most promise. By multiplying half the elapsed time with the speed of sound, about 1,100 feet per second, the actual distance of the plane from the ground is obtained. Engineers prefer sound waves to radio because radio waves travel so rapidly it would be difficult to measure the time interval accurately. The radio altimeter will be needed when airplanes fly faster than 750 miles per hour because then sound waves would be too slow to catch up.

Working under a grant from the Guggenheim Fund, Leo P. Delsasso of the University of California has produced an echo altimeter that gives a continuous reading of the distance between the airplane and the ground. The instrument takes a "sounding" every three seconds and at altitudes of less than 200 feet three readings a second are automatically given by a neon pointer on the instrument dial.

Delsasso's altimeter consists of a magnetic sound source that taps out 2,000 cycle notes, two octaves above middle C, and a dynamic microphone sensitive only to the same note. The microphone is not affected by ordinary airplane noises. When it picks up the echo of the special signal, a mechanical device measures the

elapsed time, translates it, and operates the neon pointer on the instrument dial, the pilot reading his height directly in feet. Delsasso expects that with improvements the altimeter will be able to show whether the plane is flying over ascending or descending ground. By taking frequent readings it is possible, when flying level, to map the ground contours. The altimeter also permits landings at sea under conditions where the pilot of a flying boat finds it hard to judge his height above the surface. It is estimated the altimeter mechanism and its horns can be manufactured to weigh less than twenty pounds.

To be struck by lightning in an all-metal air liner is not hazardous for large planes have been hit without injury. Sometimes a direct hit puts a radio out of commission but that does not always occur. Passengers and crew rarely see the flash and often the only evidence is a discolored area in the hull discovered during a ground inspection. Engineers regard the fire hazard as whipped. On the Douglas liners, for instance, each engine is shielded in back by a steel fire wall that would confine a fire to the power compartment. Fuel and air lines pass through small insulated holes in the fire wall, and electrical leads plug into connection blocks similar to telephone jacks on each side of the steel wall.

If an engine should catch fire the pilot can put it out in a matter of seconds. He reaches through a small trap door in the floor of the cockpit and twists the proper switch of the pressure fire-extinguisher system. This floods the engine compartment with fire-smothering carbon-dioxide gas that sprays from perforations of a tube encircling the engine, covers the oil tank, and has an opening directly into the carburetor. Fuel, oil, and instrument lines are flexibly connected at short intervals to prevent breakage from vibration. Even if a forced landing bursts the fuel tanks, the chances for fire are remote if the pilot has cut his switches. Aside from cutting electrical leads, stopping the engine for a few seconds allows the hot exhaust stacks to cool below the fire point.

Ice, one of the last bugaboos of aviation,

(Continued to page 146A)

12,360 Sparks per Minute



RAPID FIRING OF FORD V-8 DISTRIBUTOR AT 60 M.P.H.

WHISK along the highway in a Ford V-8 at a mile a minute and the engine is taxed but little. But when the speedometer is saying sixty, a small but vital mechanism under the hood is providing 12,360 sparks a minute to ignite the fuel mixture. The distributor must furnish hot, fat sparks at precisely the correct intervals for efficient performance and economy.

Compare these 12,360 sparks to the 1440 photographs which pass through a modern motion-picture projector in the same



This gage makes sure that the distributor bearing is at right angle with the face of the advance housing flange.



This special testing machine checks the distributor for timing, automatic advance, and vacuum brake setting.

time—or to the 3600 ticks of the second-hand on your watch. Then you will have an idea of the important job done by the distributor on a Ford V-8.

Yet a Ford distributor seldom needs attention. After thousands of miles of use, if it should require repair, your Ford dealer will exchange it for a distributor that has been rebuilt completely at the Ford factory. Then you get the benefit of factory inspection and reconditioning, instead of local repairs—workmanship by men who have every needed tool or machine

at hand. Parts which do not pass their minute inspection in every respect are rejected, and replaced with new parts. The exchange distributor costs little more than the conventional operation of changing points.

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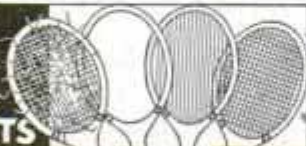
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(Continued from page 144A)

is no longer a terror of the airways. Pilots are warned ahead of time of the air regions where they are likely to encounter ice-forming conditions. Meteorologists know the area is rarely more than 1,000 feet thick, hence pilots can fly above or below it. Also, ice forms on planes only when the temperature is close to the freezing point. Below freezing, the ice is so cold it won't stick. The danger of a freezing carburetor is overcome by carburetor heaters from the engine exhaust. If an air liner should encounter ice these days, the pilot turns a couple of switches and continues on his way. One switch operates a pump that discharges a mixture of glycerin and alcohol from a "slinger ring" at each propeller hub. This coating prevents ice from sticking to the blades. The variable pitch mechanism of the propeller hub is protected with a spinner cap coated with a castor-oil mixture. One application is effective for six hours of flight.

The other switch causes a rubber sleeve on the leading edge of the wing to pulsate, cracking off any ice that has formed. When the front of the wing is kept free of ice hardly any ice gathers on the surfaces behind it. The rubber de-icing sleeve fills with air from an engine pump every few seconds, bulges out an inch or so, then deflates, allowing the ice that has been cracked to be blown away. The leading edges of the control surfaces of the tail group also have de-icing sleeves.

Plane's Speed Limit Is Shown by Movie of Air Waves

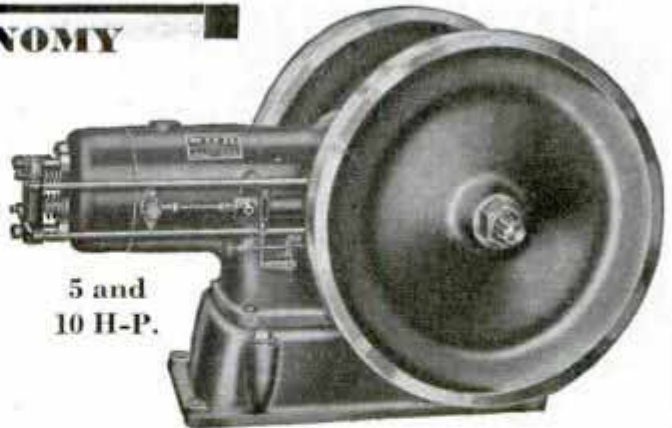
Airplanes of present design cannot exceed 575 miles per hour, it is revealed by a motion picture taken in the 750-mile-an-hour wind tunnel at Langley field, Va. The film shows that the air builds up a feathery "shock wave" which robs wings of lift and checks forward motion at about that speed, according to Dr. George W. Lewis, research director of the National Advisory Committee for Aeronautics. The flow of air over a wing top would begin to "burble" at the maximum speed, just as if the wing were stalled, which would cause the pilot to lose control. Speeds of more than 575 miles per hour may be reached through changes in shape of wings and propeller while in flight.

Langley Field

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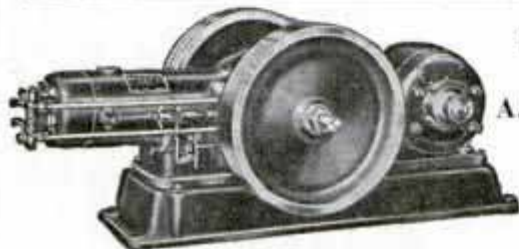
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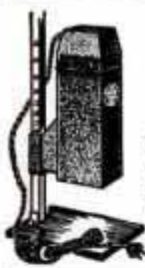


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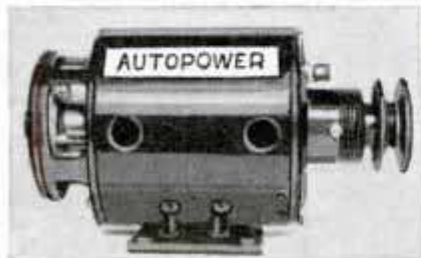
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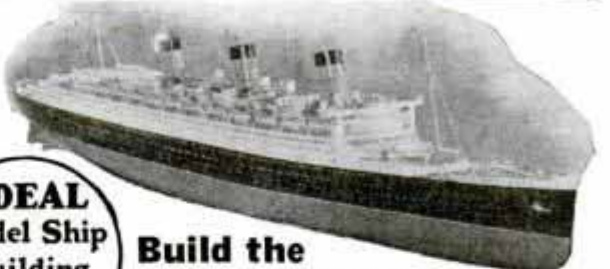
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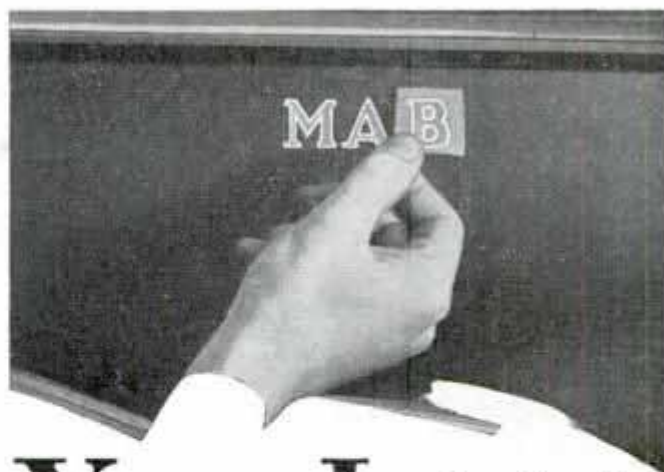
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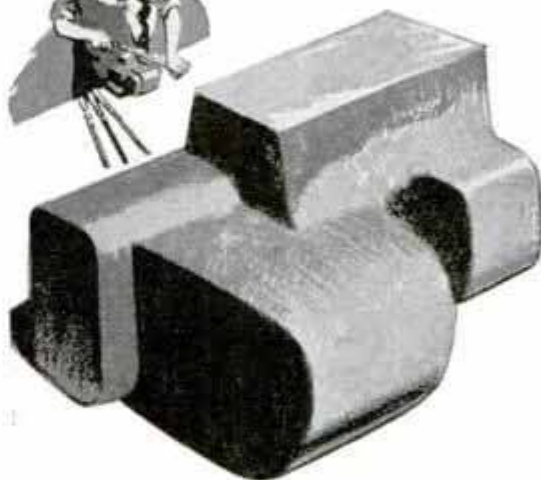


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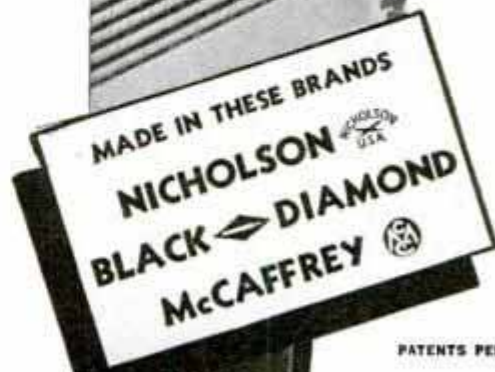


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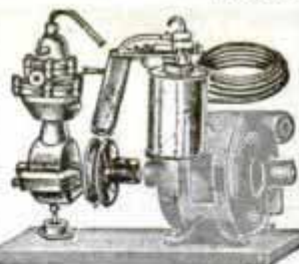
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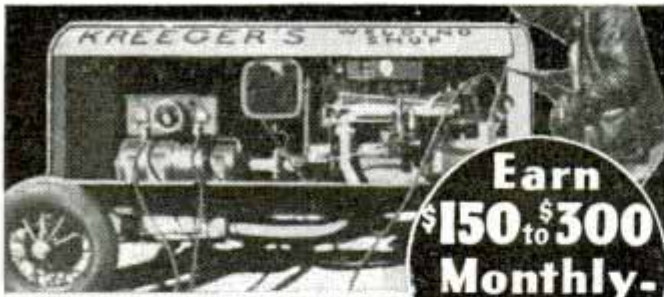
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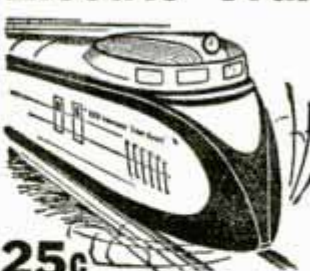


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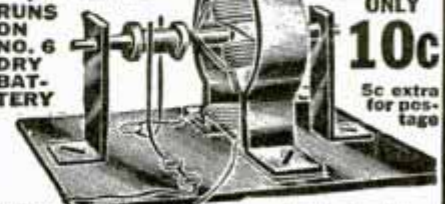
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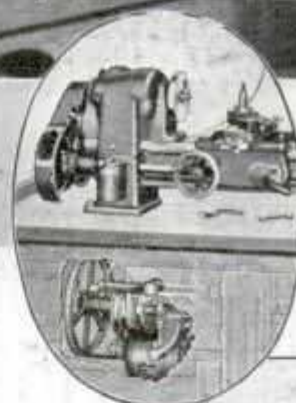
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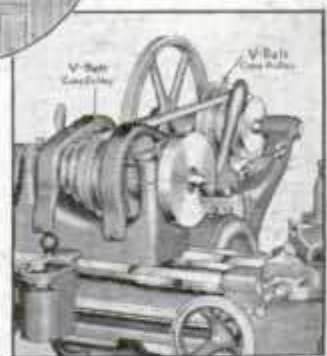
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