

MARCH

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POPULAR MECHANICS

MAGAZINE

WRITTEN SO YOU CAN UNDERSTAND IT

REG. TRADE MARK, GREAT BRITAIN, NO. 410426



SEE PAGE 338

THE POWER OF THREE
"Twentieth Century"
Locomotives
IN A 38 FOOT BOAT



Gar Wood knows his engines

Miss America X romps over the flying spray at more than two miles a minute. A record is shattered. Gar Wood again shows the world a triumph in speed.

Sixty-eight hundred horse power drove that boat! One thousand firing strokes *every second* from her motors! There are 48 cylinders and 192 valves. The engines operate at 2,600 r. p. m. The pro-

pellors, stepped up to 7,500 r. p. m. develop a nine-ton thrust. It is super-service for these engines—a tremendous test of oil and gas.

Gar Wood uses Texaco Marine Motor Oil and Texaco Fuel in Miss America X. He uses Texaco Products in his pleasure boats, his cars and plane. He knows engines as few men do—and he knows the products

that give the best in performance.

You, too, can have this same security in your car. You can enjoy this same *Fire-Chief* power, pep and action—this same effective lubrication. Drive up to the Texaco pump whenever you need gas or oil. See what a difference it makes in the work of *your* engine.

THE TEXAS COMPANY
Texaco Petroleum Products



TEXACO



A Sensational New Business

That—Almost Overnight—Can

Sweep You to Riches

This is among the first public announcements of what is undoubtedly the most amazing money-making opportunity ever offered to the readers of this—or any other—magazine. It tells how any ambitious, level-headed man can establish—practically overnight—a remarkable new kind of business that can pay a steady net cash profit of from \$165.00 up to \$1,021 a month, depending upon the man—a business that offers unlimited opportunity—a business that is destined to make many men independently wealthy.

HERE, briefly, are the "high-spots" of this thrilling new business that will create "fortunes" for those with the vision and foresight to get in on the ground floor now:

- 1** An utterly new product with a natural, staple demand and big repeat business, yet one that has all of the appeal of a novelty.
- 2** Requires no house-to-house canvassing or selling. You simply manufacture. Stores will sell your entire output.
- 3** Produces up to \$40.00 a day net profit, selling your entire output at wholesale.
- 4** Pays steadily; no lean seasons.
- 5** Big profits to be made in smallest town or largest city.
- 6** Absolutely no experience needed to be successful.
- 7** No expensive equipment needed. Your whole investment will be less than your first week's potential income.

This is truth; not fiction—fact; not theory. To the best of our knowledge, no other business in America offers one-tenth the opportunity for profit and independence.

No Selling—No Canvassing

Do not confuse this new product with anything you have ever heard of before. It is not candy, not a cheese chip, not a paste preparation, not a popcorn—but a natural product that comes from the sky, from the ground, and from the air. It is not like anything you ever saw or heard of, or imagined. The simple truth about it is stranger than your wildest dream. And you can be the first to supply this great demand, selling your entire output at wholesale to stores.

\$100.00 a Week, Net, to Start

According to accurate figures, the very minimum of the first operation should produce a net cash profit of at least \$100.00 a week. Since it is possible to make \$40.00 a day, you can see that it would take only two and a half days of full operation to make a profit of \$100.00. This, we figure to be a minimum. We would not be interested in licensing men who could not make at least that much every week. Then, as demand increases, other men can be put to work for you and you can double or triple your weekly profit as steady repeat business develops.

No Expensive Equipment

Ordinarily a proposition as big as this would require the purchase of expensive equipment. But our manufacturing process has been so simplified that we can furnish you with everything you need, start off making a profit the very first day—all for an investment of less than \$150.00.

No Experience Needed

Absolutely no experience is required to quickly become successful in this thrilling and fascinating new business. We tell you how to start—how to establish yourself quickly—how to operate the business the very day you are ready to go. We furnish all necessary plans, systems and equipment. Any man with ordinary intelligence and a real desire to succeed is bound to make money.

Small Town or Big City

Another feature that makes this business unlike any other is that it

can be operated anywhere. No matter where you live—in the smallest town or the largest city—you can establish yourself practically over night and start enjoying an independent income at once. From the foregoing facts, you can readily see that this is not a business for the timid operator who is satisfied to make a bare living, but for the wide-awake, aggressive go-getter who wants to see his energy and enthusiasm produce the greatest possible results in the shortest possible time.

Facts Sent Free

To all such men, we request permission to mail an unusual and complete presentation. After you have read the amazing facts and figures in this presentation, then you can decide whether or not an initial investment of less than \$150.00 is too much to ask for a complete business that can pay back that investment right at the beginning, and then continue to pay as much as \$252.00 a week net profit to those men who have the ability to organize and direct other men.

Act Quickly

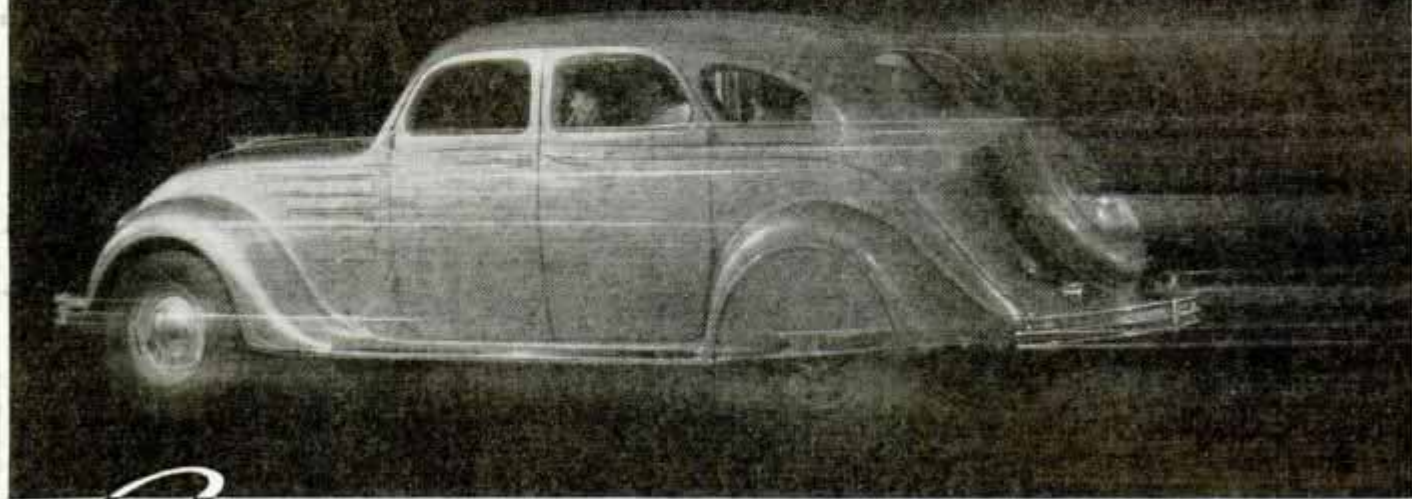
There is no time to lose. Today this proposition is new. Tomorrow it will be a little older—next week a little older still. So get the facts without a moment's delay. It's the newcomers in any enterprise of this sort—the "ground floor operators"—who always reap the richest rewards.

There is no coupon on this page. We do not want to hear from coupon clippers. If you don't agree that this is worth a letter—or a telegram—you are not the man for the business.

So write or wire today—without the slightest cost or obligation—and get the information that can make you independent for life.

PAUL GRANT Director of Distribution
Department 33
 510 N. Dearborn St., Chicago, Ill.

NEW *Airflow* CHRYSLER



Streamline - with a Reason!

...RIDE AT THE CENTER OF BALANCE OF A MOTOR CAR



IMAGINE a motor car that actually seems to ignore the road it runs on . . . a car that lets you read or write as you ride at speeds up to 90 and 95 miles an hour! That's the Floating Ride in the new Airflow* Chrysler!

All the important weights in the car have been redistributed. The engine is *over* the front axle. The rear seat is 20 inches *forward* of the rear axle. Passengers ride in the middle of the car . . . exactly at the center of balance . . . the point of least motion.

In addition, the "periodicity"—or rate of spring action—has been greatly slowed down. The motion of the car becomes a long, easy glide.

No motor car in years has introduced so many scientific advancements as the new Airflow Chrysler. It is different in looks . . . different in action . . . different in riding comfort . . . different in its genuine streamlining . . . different in its refreshing new beauty. See the new Airflow Chrysler and ride in it.



Four Distinctive 1934 MODELS

CHRYSLER AIRFLOW EIGHT . . . 122 h. p. and 123-in. w. b. Six-pass. Sedan, Brougham and Town Sedan, five-pass. Coupe.

CHRYSLER AIRFLOW IMPERIAL . . . 130 h. p. . . . 128-in. w. b. Six-pass. Sedan and Town Sedan, five-pass. Coupe.

AIRFLOW CUSTOM IMPERIAL . . . 150 h. p. . . . 146-in. w. b. . . . magnificently-styled, individualized body types.

1934 CHRYSLER SIX . . . With independently sprung front wheels . . . for a levelized cushion ride . . . 93 h. p., 5 body models on 118-in. and 2 body models on 121-in. w. b.

FLOATING RIDE BOOKLET FREE—Write for the interesting booklet which describes the romantic development of Floating Ride. Address the Chrysler Sales Corporation, 12208 East Jefferson Avenue, Detroit, Mich.

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Recent changes in postal regulations make it necessary that subscribers advise us immediately of changes in address to eliminate delay and additional expense in delivery of magazines

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SIMONIZ

YOUR CAR



Then It Will Stay Beautiful

Millions of motorists will tell you that your car can't be expected to stay beautiful unless it is Simonized!

A new car should always be Simonized right away. But the sooner any car is Simonized, the better. Simoniz protects the finish from weather and dirt. Stops them from dulling and destroying a car's beauty. Makes the finish last longer and keeps the colors from fading.

So be sure and insist on Simoniz and Simoniz Kleener always. Refuse substitutes! Nothing else gives lasting beauty . . . and they're easier, quicker, and safer to use. Sold by hardware, accessory stores and garages everywhere.

Motorists Wise

SIMONIZ

KEEPS CARS BEAUTIFUL

Simonizing a car is easy. You'll enjoy doing it yourself. If the finish is dull, a few strokes with the wonderful Simoniz Kleener will make it sparkle like new again. A remarkable new cleaning feature does away with all hard rubbing.

After cleaning the finish, apply Simoniz. It doesn't take long and Simoniz keeps your car always beautiful.



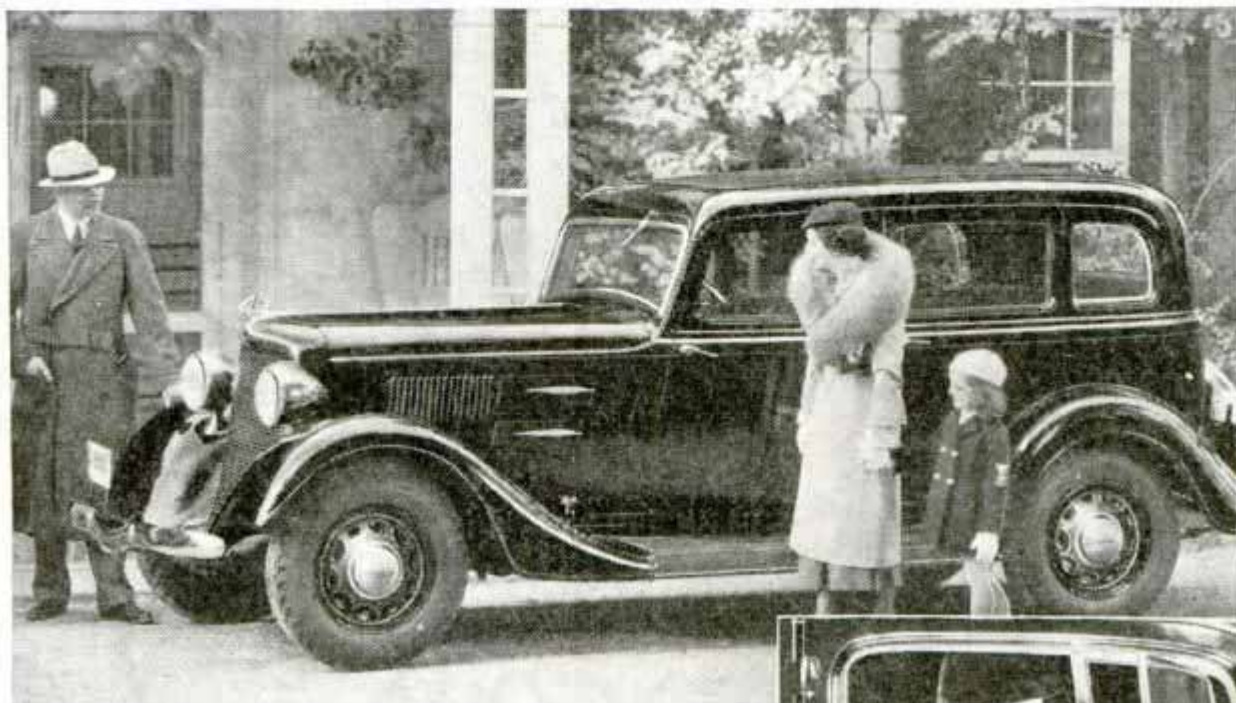
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FULL MECHANICAL STORY OF 1934 PLYMOUTH SIX



Read this and you'll agree *Plymouth is the best engineered car in the low-price field*

WHAT'S the big news about the 1934 Plymouth? Simply this: Plymouth is not only a car with new features—it's a *whole new car built for better riding!*

Years ago Plymouth engineers perfected Floating Power engine mountings and eliminated engine vibration. This year they add a "levelized" ride by replacing the usual front axle with individual wheel springing in *every model!*

There's power to spare in this year's engine—a 77-horsepower six!

And in addition to Plymouth's smooth, self-equalizing hydraulic brakes, you get still greater efficiency, for the braking surface has been increased one-third in the De Luxe models!

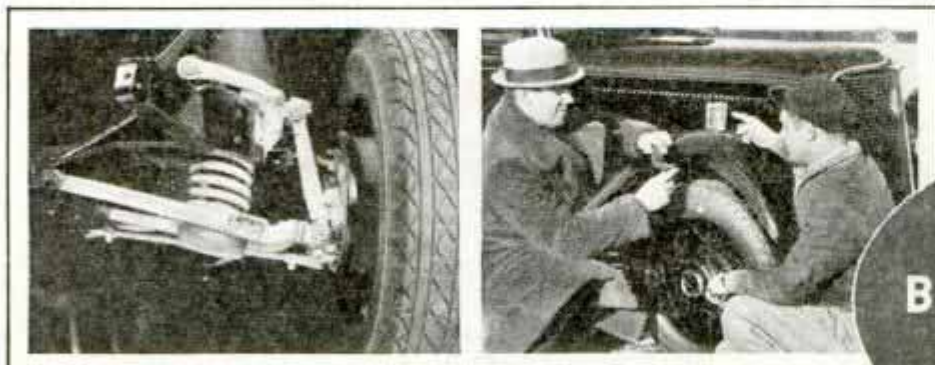
Bodies on all Plymouth models are of modern safety-steel construction. Steel reinforced with steel—



All-Weather Ventilation in De Luxe Models

permanently welded together for long life and perfect safety.

Plymouth is the only low-priced car with Floating Power, hydraulic brakes and safety-steel body as well as individual front wheel springing. Be sure to see it. Visit the nearest Dodge, De Soto or Chrysler showroom today. One short ride will show you Plymouth's the best engineered car in the low-price field!



Plymouth's Individual Springing is simple, dependable. It does away with the old-fashioned front axle.

In this Floating Power test, engine races, but glass of water on the fender does not tremble.

**IT'S AMERICA'S
BEST ENGINEERED
LOW-PRICE CAR**

"I CAN USE A
GOOD STOKER"



DEVIL TAKE the unpopular soul who neglects his pipe till it's gooey and offensive. Bliss is reserved (at 15¢ the tin) for those pipe lovers who tend their briars and fill them with sunny tobacco . . . like Sir Walter Raleigh. This heavenly mixture of mild Kentucky Burleys brings everlasting happiness to a man's tongue. It's well aged and seasoned. Fragrant—but eternally mild. Try it. It *may* be the smoke you hoped you'd some day find. (Kept fresh in gold foil.)

Brown & Williamson Tobacco Corporation
Louisville, Kentucky. Dept. P-43.



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FREE
BOOKLET

It's 15¢
—AND IT'S
MILDER

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business training institution in the world, the authoritative findings of scores of able accounting specialists, the actual procedure of the most successful accountants.

Thus—instead of fumbling and blundering—you are coached in the solving of the very problems you must face in the higher accounting positions or in an accounting practice of your own. Step by step, you work them out for yourself—until, at the end of your training, you have the kind of ability and experience for which business is willing and glad to pay real money—just as it was glad to pay these men.*

Five Men Who Tested and Proved It for You

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Is it not worth getting that information?



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This Book

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over 800,000 members



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Please send me, free of all cost or obligation, your 64-page, illustrated
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profession of accountancy and your training for success in that field.

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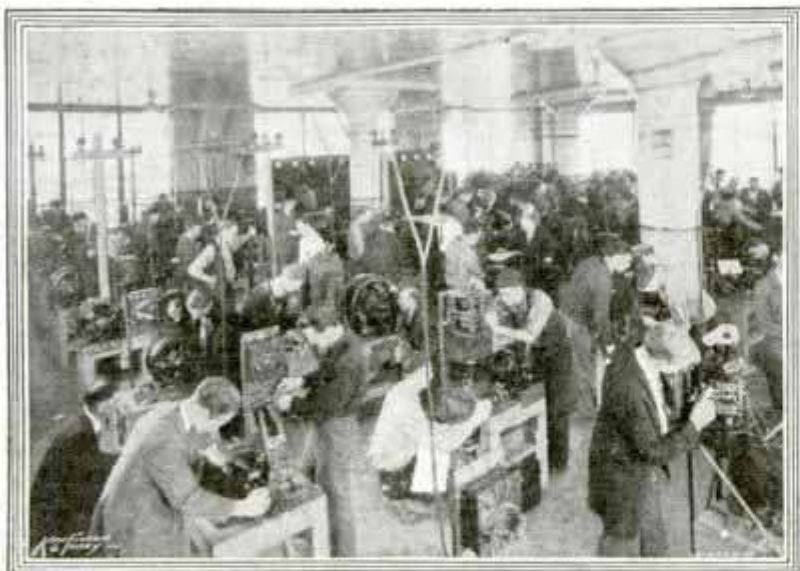
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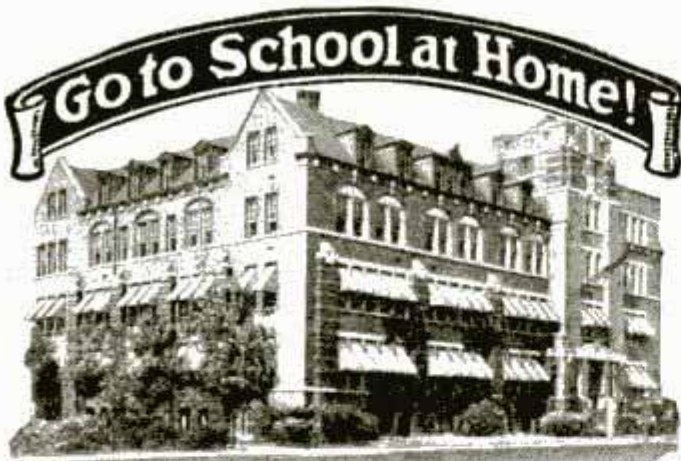
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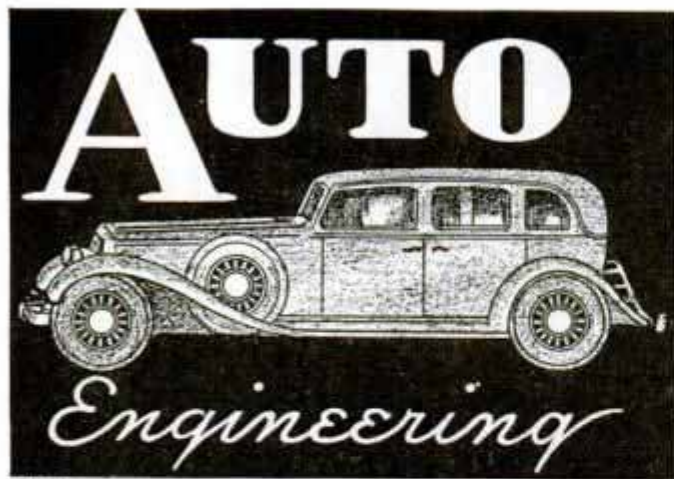
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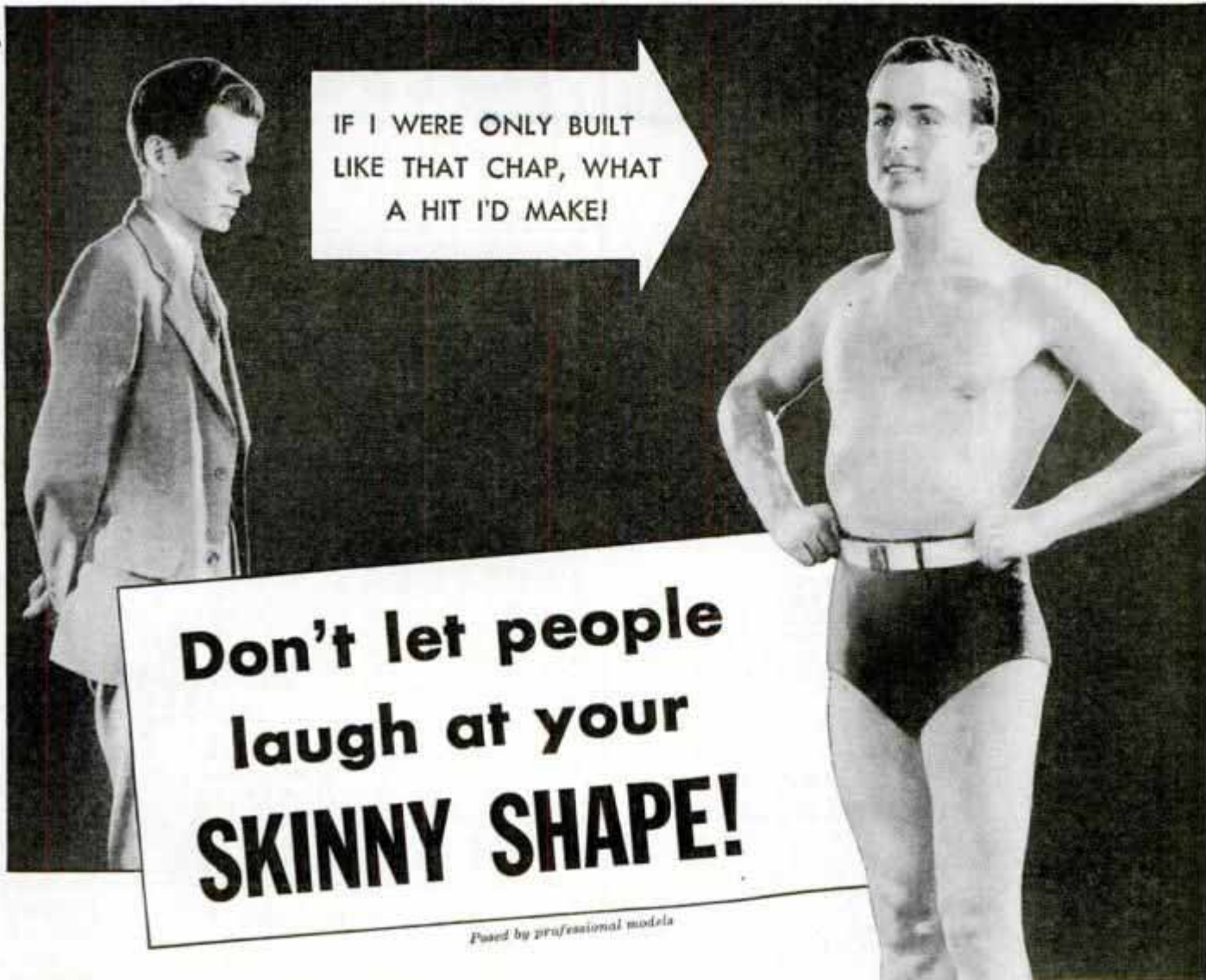
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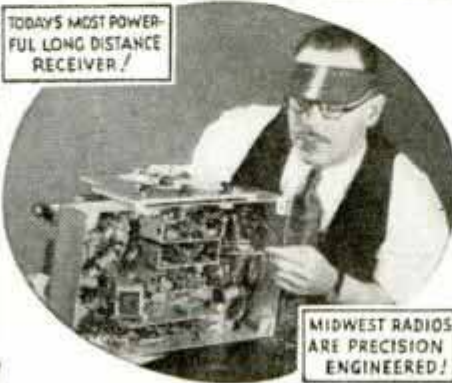
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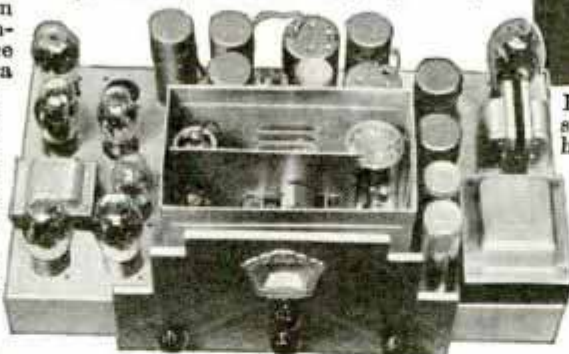
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TESTED Formulas. Newest, guaranteed! Catalog free. Grinstead Laboratory, Edwardsville, Ill.

3,000 MONEY-MAKING Formulas \$1.00. National Service, Tamarack, Cincinnati, O.

SUCCEED With your products. Formulas, Processes. Analytical service. Catalog free. B. Thaxly Co., Washington, D. C.

ANY Formula three dimes or money refunded. Ogg Laboratories, Tampa, Fla.

LATEST Formulas for almost any preparation. Particulars. Chemist, 830 South 41st, Omaha, Nebr.

FORMULAS, Practical plans. Particulars free. M-Koller, 231 Hamilton, Trenton, New Jersey.

3,000 FORMULAS, Facts, processes, trade secrets in Dr. Brown's Book of Formulas—380 pages. Price, postpaid \$1.00. Ogilvie Publishing Co., 57 Rose Street, Dept. 25, New York.

MAKE Your own products. Employ agents yourself. Toilet articles, soap, extracts. We furnish everything. Valuable book free. National Scientific Laboratories, 1950W, Broad, Richmond, Va.

MILLER'S Foremost formulas. Exclusive. Inexpensive, practicable, correct for guaranteed goods, all lines. Successful manufacturers use no others. Latest interesting literature free! Miller, Chemist, 1707-FPM, Tampa, Fla.

FORMULAS, All kinds. Guaranteed. Catalog free. Kemico, 31, Parkridge, Ill.

CHEMISTRY

CHEMISTS' Slide rule, editorial Jan. issue, saves time solving equations, gives molecular weights, shows formulas, 391 compounds. Durable precision instrument. Post-paid, complete instructions, two dollars. MWC Company, 508 Andrus Bldg., Minneapolis, Minn.

PARAMOUNT Chemistry service. Twenty years successful experience. Detail your requirements in letter. Atlantean Research Laboratory, 1501 Euclid, Cleveland.

HANDBOOK For chemical experimenters (revised 1934) illustrated, 50c. Experiment booklet 15c. Catalogue 10c. General Chemical Co., Reading, Penna.

FREE! "Sciencecraft" magazine for 6 months! Enclose 3c stamp. P-5049 Bernard, Chicago.

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

AGENTS WANTED

SEVENTEEN Year old firm wants direct selling agents for fastest selling auto accessory on market, every car owner a prospect. Jacobs theft proof gasoline protector puts a stop to the gas stealing racket, absolutely syphon proof. Sells itself—make \$5.00 per day easy in your spare time. Sample and sales plan 45c. J. J. Jacobs Motor Co., 15th and L Sts., Sacramento, Calif.

100% PROFIT In the mystery cigar lighter. No flint or friction. What makes it light? No wind can blow it out. Retail 50c. Sample and sales plan 25c. New Method Company, Desk PM3, New Method Bldg., Bradford, Pa.

CASH Income daily resilvering mirrors at home. Replating autoparts, tableware, etc. Outfit furnished. Write Sprinkle, Plater, 128, Marion, Ind.

MEXICAN Hand made leather pictures. Send 25c (stamps) for \$1.00 worth samole and details. Mexican Art, Apartado 1593, Mexico City.

SUCCEED With your products. Formulas. Processes. Analytical service. Catalog free. B. Thaxly Co., Washington, D. C.

BIG 7 Soap, pearls, neckties, pens, all big sellers. Get our list. H. Premium Co., Gaylord, Minn.

PROFITS On your own goods. Make, sell them. Guaranteed formulas. Special prices, leads. Catalogs free. Gibson, Chemist, BD-4702 N. Racine, Chicago.

HOW Would you like to make 99% on "new deal plan"? Thomas Redfearn, 4 Church Street, Paterson, N. J.

AGENTS Wanted—For new style piston and ring nationally advertised. All-Power Piston & Ring Co., 1001 E. First Street, Los Angeles.

NEW Rotary Can Opener. At last the perfect tool. Amazing new device uses shearing principle. Simple, safe, fast. Two cutting wheels, reversible. Guaranteed for 5 years. Send 25c for sample. You can't judge this tool without seeing it. Money promptly refunded. Roto Shear Co., 6092 Newburg Ave., Chicago, Ill.

BEEMAN'S Gas saver and top oiler; guaranteed saving 20 to 50% any make auto; \$4.00 complete; 10 days trial; agents wanted. Beeman Co., 46 S. Broadway, Denver, Colo.

IT'S New—Nothing like it! Sell the Little Wonder burglar-proof lock for all doors. Every home prospect. Sample 25c. Target, PM-361 W. Superior, Chicago.

SELLS Like hot cakes. Big profits. New laundry soapflakes. Perfumes clothes lasting when washing. Territory given. Sunset Laboratories, Lynbrook, N. Y.

FREE Wholesale catalogue. World's lowest prices, needle books, threaders, run-menders, blades, soap, scissors sharpeners, household specialties, drug sundries. Paty Needle Co., Somerville, Mass.

AGENTS-DISTRIBUTORS. Sell moth oaks, pads, crystals, bowlizers. People buy millions. Fastest selling line in America. New Items. Big profits. Patterson E-Co., 3705 University, Des Moines, Iowa.

AMERICA'S Greatest food bargains! Miraculous premium deals! Values that beat chain stores! Want free proof? Mail a post-card today. Kennedy Spice Co., Kokomo, Indiana.

FAST Selling pharmaceutical product. Sample 10c convinces. Russell Products, 144 E. 34, New York.

FREE Literature describing many business plans. Belfort, 4042 No. Keeler, Chicago.

AGENTS: Make 600% profit selling cleaner, polish, shampoo, vanilla, tonic laxative, spot remover, etc. Your name on labels. Free sample. Standard Chemical, Dept. E-34, Dayton, Ohio.

CHEWING Gum—Sell merchants, new brand, fast repeater. Pacific Gum Co., San Francisco.

300% PROFIT Selling mystery gas lighter. Retail 25c. Costs you \$1.00 per dozen. Sample 10c. Square Deal Co., Desk PM2, Bradford, Pa.

GIVE Away genuine RCA Victor radios on unique salescard plan. Big money for hustlers. Write for particulars. Lipault Corp., Dept. P, 1028 Arch St., Philadelphia, Pennsylvania.

OUTFIT Free of Standard Food household toilet medicinal products. Quick sellers. Good repeaters. Big profits. Write for information. Dept. 1, Sam Swann, Candler Bldg., Baltimore, Md.

DISTRIBUTORS—Home and foreign for Soderite cold flowing solder. Attractive proposition to reliable parties. Soderite, Van Wert, Ohio.

1000 BARGAINS—Drygoods, notions, toiletries. Agents—undersell stores. Free catalogue. Jobbers, Z-504 S. Crawford, Chicago.

300% PROFIT Selling new "20-in-1" kitchen utensil. Retail 25c. Costs you \$1.00 a dozen. Sample 10c. New Method Co., PM3, Bradford, Pa.

AGENTS—Clever invention! Inkspoon makes every pen a fountain pen. Fast office seller; big profit, demand increasing everywhere. Exclusive territory offered. Sample 5c. H. Marul Company, Tribune Bldg., New York, N. Y.

DISTRIBUTORS—Agents—Salesmen wanted. New invention—Electric weed killer. Territory open. Sells easily. Good profit. \$1.00 brings sample and full particulars. Hess & Dick, 700 - 5th Ave., South, Great Falls, Mont.

AGENTS: Build additional income; 14 legitimate business enterprises; spare, full time; home, office; proved money-makers. Free booklet. Royalton, 99-12 Metropolitan Ave., Forest Hills, N. Y.

MAKE More money selling shirts, ties, underwear, dresses, hosiery, raincoats, coveralls, pants, uniforms, playsuits. Outfit free. Nimrod Company, Department 8, 4922-28 Lincoln Avenue, Chicago.

FAST Repeater, twenty Cellophane bags auto radiator stop leak. On loud self talking display card. 55c the card. Lots of twelve. Zenith Factories, Minneapolis, Minn.

MOVALL—Cleans and polishes glass, silver, etc. Distributors wanted. Murval Products, Drexel Building, Philadelphia.

HAVE You spare time at home? Need extra money? Hetzel, 802 Garden, Hartford, Conn.

AMAZING Zipper pinless clothes line—Lightning demonstration. Sure sale every home. Free guarantee sales plan. Dunn Bros., Hempstead, N. Y.

MEN With cars wanted to advertise our goods and distribute introductory packages to consumers. Must be satisfied with 90c an hour at start. Write for full particulars. Albert Mills, Route Mgr., 4444 Monmouth, Cincinnati, O.

AGENTS 100% Profit demonstrating the new "Automatic Service Fork." Every housewife a prospect. Sample 25c. Hutchison Mfg. Co., Nashville, Tenn.

600% PROFITS—Making your own flavorings. Employ others. Everything supplied. Superior Specialties, Springfield, Ill.

SELF-THREADING Needle packages. Sample 10c. Wm. Oglesby, Vandalia, Ill.

LIFESAVER Burglarproof window ventilating locks. Sample 25c. Agents wanted. Amco, 5610A Washington Blvd., Milwaukee.

SALES Kit free. Write for our free offer and catalog of household deals, cosmetics, extracts, etc. Make big money selling your friends and neighbors. Clyde Collins Chemical Co., Dept. PM-2, Memphis, Tenn.

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

JACKETS—Raincoats. Latest patterns. Union made. Lowest prices. Biggest commission paid. Sample outfit free. Goodyear, AA-714 Roosevelt, Chicago.

MAKE Products yourself. Tested formulas. Catalog free. Grinstead Laboratories, Edwardsville, Ill.

OVER 200% Profit—No competition. Fast sales! Every home a customer. Free literature. Samples 25c. Premier Labs., 122 Fifth Avenue, New York City.

MONEYBACK Gas savers guarantee heat where wanted—selling them guarantees money where you want it. 20 years successful business makes selling easy. F. G. Wright, 4362 39th St., San Diego, Calif.

AGENTS: Smash go prices! Santos coffee 12c lb. 4-oz. vanilla 8½c. \$1.00 size tonic 14c. Razor blades 5 for 8½c. 100 sticks chewing gum 12c. 150 other bargains. Experience unnecessary. Write, Carnation Co., PO, St. Louis, Mo.

"CRE-MOFF" Cream siphon. Starts itself. Stops itself. Every demonstration a sale. Sample and catalog 25c. Dickey, Lawndale, Calif.

AGENTS—Sell rich quality shoes \$2.95 up. Adams, of Calif., 90 pairs in 4 days, profit \$70.00. You can do same. Write for catalog and selling plan. Exclusive territory. Sample pair \$1.95. Avon Shoe Co., 100 Court St., Brockton, Mass.

CASH Paid for butterflies, insects. See Sinclair Display Advertisement on page 8A.

BURNING Perfume candles. Sure fire quick sellers. Repeater. Particulars free. Mission, 2528 W. Pico, Los Angeles, Calif.

REDSTAR Liniment sells like hot cakes! Big profits. A. Bucknam, 1219 Washington, Bath, Maine.

FLAVORING Extracts—Bottle yourself! Labels furnished. 600% profits. Whirlwind money-makers! Repeaters! Free offer! Thomas Manufacturing Company, Indianapolis, Ind.

WHY Sell goods with stingy profits? Make today's most profitable, biggest-selling specialties yourself. Have 1934 your best year. Valuable information free! Miller, Chemist, 1707-APM, Tampa, Fla.

SELL Fade-A-Way, household necessity; good profit, repeat sales. Build your own business. Write for information. Fade-A-Way Co., Mt. Vernon, Ohio.

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.

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

AGENTS—Opportunity to make money; book containing 87 successful business plans; home or office; send for free introductory booklet. Elite Co., 214 Grand St., New York.

MAKE Money. Collect \$6, keep \$5. Two quick selling dollar per month "hard times" life policies. Write the Fidelity Mutual Benefit Association, Rockford, Ill.

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.

AMAZING Cleaner. Cleans everything. Sample free. Bestever, 5007P Irving Park, Chicago.

A BUSINESS Of your own making sparkling glass name plates, numbers, checkerboards, medallions, signs. Booklet and sample mailed free. E. Palmer, 512, Wooster, Ohio.

SOMETHING New, electric bulb attachment perfumes home. Purifies air. Destroys cooking odors. Attractive package. Quick seller. Sample 25c. Werner Mfg. Co., 172 Court St., Brooklyn, N. Y.

FREE Booklet describes 87 plans for making \$20-\$100 weekly, in home or office, business of your own. Elite Co., 214 Grand St., New York.

MAKE Your own products. Employ agents yourself. Toilet articles, soap, extracts. We furnish everything. Valuable book free. National Scientific Laboratories, 1950W Broad, Richmond, Va.

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.

NAME Plates, number plates, signs, etc., hand engraved, easily sold with large profit. Brett Bros., Winthrop, Mass.

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

HIGH-GRADE SALESMEN WANTED

DON'T Be a job hunter—Start your own city business on our capital; no hard-times; no lay-offs; always your own boss; hundreds average \$4,000 annual sales year after year; we supply stocks, equipment on credit; some 225 home necessities; selling experience unnecessary; wonderful opportunity to own pleasant, dignified, profitable business backed by \$17,000,000 world-wide industry; for complete information write Rawleigh Co., Dept. C-U-PPM, Freeport, Ill.

MANUFACTURER Guaranteed shoes. 30 years in business, wants salesmen. Ready cash daily. No experience required. Sales outfit free. Write Mason Shoe Manufacturing Co., Dept. G3, Chippewa Falls, Wis.

STRANGE Chemical sponge cleans wall-paper like magic. Banishes housecleaning drudgery. Women amazed. Agents cleaning up. Outfit free. Kristee Mfg., Box 1433, Akron, Ohio.

AT Last! \$20.00 day opportunity. Life and accident protection at cost. Not insurance. Benefits up to \$1,000.00. Experience unnecessary. **Hurry!** National Aid Society, Dept. B, Springfield, Ill.

HERE'S An unusual opportunity to make \$200 monthly extra. Nationally known line work uniforms, coveralls, jackets, pants, shirts, caps. Advertising embroidered. Every business a prospect. Outfit free. Write Master Co., Dept. 414, Ligonier, Ind.

MAKE More money selling shirts, ties, underwear, dresses, hosiery, raincoats, coveralls, pants, uniforms, play suits. Outfit free. Nimrod Company, Department 65, 4922-28 Lincoln Avenue, Chicago.

SALESMAN Acquainted with garages, filling stations, to handle local business. Write Colgra, Station C, Milwaukee, Wis.

GO Into wholesale business without investment. Call on stores with biggest line self-selling counter displays: Aspirin, razor blades, handkerchiefs, breathlets, household cement, 79 different items. Up to 125% profit for you. Experience unnecessary. Write for catalog and plans. Procopax, Dept. 36-S, 1956 S. Troy, Chicago.

BIG Profits selling garages necessity item at bargain prices. New, proven fast seller. Cash daily. Stockwell, 551 W. Lake, Chicago.

SELL Metal garden markers, long profit, unlimited market. Write Specialties, 934 Bayless Ave., St. Paul.

EARN To \$100.00 weekly. Experience unnecessary. Sell protection at cost. Ages 1 to 80. Not insurance. Benefits to \$1,500.00 natural or accidental death. Also old age and disability benefits. Address Federal Aid Society, Cedar Rapids, Iowa.

SELL Hard worsted suits \$18.95. Make \$5.00 profit. Extra pants at cost. Finest workmanship. \$25,000.00 bond guarantees satisfaction. DeLux sample outfit free. Actual leads furnished. Bonus sample suit. Williams Bros. Tailoring Corp., Dept. M-76, Troy, N. Y.

MAN—Handle regular store route. Place nationally advertised 5c, 10c counter card merchandise. Complete line; world's largest firm. Over 100% commission for you and merchant. No investment. Catalog free. World's Products Co., Dept. 3810, Spencer, Indiana.

500 ENVELOPES And 500 letterheads or statements \$2.95 prepaid. 250 full pages expertly mimeographed \$1.85; multigraphed \$2.45 prepaid. Qual-I-T-Printers, Greenfield, Ohio.

SALES Demonstrators. U-Kan-Plate with pure silver. 1 oz. polish 20c, 3 oz. \$1. Justice, 904 Walnut, Philadelphia.

\$2.00 HOURLY With new scientific cream that mends all cloth easily, quickly, invisibly, without needle and thread. Stands laundering. Free sample. Sew-No-More Co., Dept. S-744, Cincinnati, O.

SELL Business necessities, printing. Everyone in business buys. Big commissions. Pay every day. Large free cut service. Full time or part time. Send for big complete sales outfit free. Printrite, Inc., Dept. A, 640 Stinson Blvd., Minneapolis, Minn.

AUTO Accessory salesmen. Complete line fastest sellers. Prices dealers want to pay. Big commission daily. Exclusive territory. National, 1910-F Wentworth, Chicago.

DISTRIBUTORS—Represent manufacturer. Sell Latex—self-sealing bandage that breathes. Great demonstrator. Lowest prices. Tremendous profit. Good repeater. Exclusive territory. Neway, 3815-BT Harrison, Chicago.

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., 683 Burkhardt, Dayton, Ohio.

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.

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. \$250,000 deposited insurance department. Universal Policy, 716-A Lefcourt Bldg., Newark, N. J.

BRAND New guaranteed business building plan for all retailers. Sweeping country. Inexpensive. Salesmen cleaning up. Big selling outfit free. Stimulators, Inc., 4311 Ravenswood, Chicago.

FINANCIAL Independence and income for life through constant, ever-increasing repeat commissions without call backs. The business made rich by the depression. Business and professional men buy on sight. 400% initial profit. Commonwealth-F Co., 508 S. Dearborn, Chicago.

SELL Stores or homes—Scissors sharpeners, gas lighters, razor blades, aspirin, breath gum, chewing laxative, adhesive tape, polish, handkerchiefs, polishing cloths, shoe laces, many others. Attractive displays. Catalog free. Superba Co., S-303, Baltimore, Md.

SALESMEN—Four \$15.00 sales to stores net you \$40.00 daily. Sayers Systems, Est. 1895, 2801-123 Sheffield Ave., Chicago, Ill.

GIVE Profits—Up to \$170 weekly. \$500,000 punchboard firm announces new no investment plan. Season starting. K&S, 4326 Ravenswood, Chicago.

HELP WANTED

IF You want to get your groceries and household supplies at wholesale, and a wonderful chance to make \$15 cash profit a day besides, send me your name immediately. No experience necessary. Albert Mills, 4445 Monmouth, Cincinnati, O.

AGENTS—Mosco corn and callous remover will build you a steady repeat business. Send today for pocket-size trial outfit. The Moss Company, 44 Searle Bldg., Rochester, N. Y.

CASH Paid for butterflies, insects. See Sinclair Display Advertisement on page 8A.

EDUCATIONAL AND INSTRUCTION

HAWAIIAN Guitar given students taking course of home instructions. Simple as abc. Pay as you play. Paramount Conservatory of Music, 246 East 18th, Vancouver, Canada.

RESORT Hotel positions. Beginners instruction. Lee Institute, Drawer 1706, Boston.

LEARN To repair and rewind electric motors. Free information. Randle Bros., 520 Fourth St., Waukegan, Ill.

LEARN Newest methods in quick arithmetic. Frederick A. Smith, 2410 Smalley Ct., Chicago.

GOVERNMENT Jobs. \$105 - \$175. Men-women, 18-50. Qualify for coming vacancies. Common education. 25 coached free. Write immediately. Franklin Institute, Dept. A3, Rochester, N. Y.

LEARN Chiropody. Complete course by correspondence. Evans Foot Inst., Montgomery, Ala.

LEARN Doctor of Theotherapy. Worldwide instruction. Seminary "B," South Whitley, Indiana.

BECOME A landscape architect. Easy to learn by mail. Wonderful opportunity for money-making. Earn while you learn. Write for free opportunity booklet and details. American Landscape School, 805 Plymouth Bldg., Des Moines, Iowa.

WE Can qualify you for secret service and scientific investigators career. International Secret Service Institute, PM-24, Hoboken, New Jersey.

WANTED Immediately, names of men-women, age 18 to 50, who are interested in qualifying for steady government jobs paying \$105-\$240 month. Write, Ozment Instruction Bureau, 101, St. Louis, Mo.

LEARN Sign painting, the big paying trade. Circular free. Matthews, 3627 Finney, St. Louis, Mo.

EARN Money while learning watch repairing at home. Modern—original system. Good watch repairers always in demand and earn up to \$75 weekly. Wisconsin School of Watch Repairing, 526 E. Mason, Milwaukee, Wisconsin.

U. S. GOVERNMENT Positions. \$1700-\$1900 and up a year. Let our expert (former government examiner) prepare you for a position in the railway mail service, rural carrier, post office, customs and other branches. Write today for free booklet. Dept. S, Patterson School, Rochester, N. Y.

PRINTING, MULTIGRAPHING AND MIMEOGRAPHING

BETTER Grade printing, reasonable priced. Free samples. Economic Press, Leonia, N. J.

COIN Carriers increase cash returns 50%. Further details free. Byers, Grinnett, Mo.

PERSONAL Stationery. Excellent quality. Finest printing. Sixty sheets, fifty envelopes, boxed, \$1.00. Parke, Park Avenue, Kewanee, Ill.

1000 LETTERHEADS \$2.00. Billheads, statements, envelopes. Samples. Village Press, Somerset, Mass.

200 LETTERHEADS (8 1/2 x 11) And 200 envelopes printed \$1.00 postpaid. Satisfaction guaranteed. Coats Press, Borden, Ind.

100 8 1/2 x 11 LETTERHEADS And 100 6 1/2 envelopes, \$1.00 postpaid. Moritz Printery, Saginaw, Mich.

50 PERSONAL Cards, 35c. Rademan, 437 N. 39th Street, Philadelphia, Pa.

250 LETTERHEADS, Envelopes, statements, cards, \$1.25. Samples. Drachprint, 1534 N. 16th, St. Louis, Mo.

1000 PRINTED Business cards \$1.00. Many other bargains, samples free. Write Box 565, R. 1, Huntington Beach, Calif.

5000 ATTRACTIVE Envelope slips, \$3.90; 10,000, \$6.75 prepaid. Circulars, letterheads, envelopes, postcards—\$2.95, 1,000; 2,000, \$4.95; 5,000, \$9.95. Samples. Goodprint, Harrisonburg, Va.

1000 BUSINESS Cards, card case, \$1.50. Miller, Printer, Ambler, Pa.

REDUCED Prices, stationery, circulars, checks, loose-leaf binders, ruling. Commercial Press, Batavia, Ohio.

PRINTING OUTFITS AND SUPPLIES

NEW Golding 6x9 hand printing press, type, cases, bargain. J. J. Rendleman, Cairo, Ill.

USED Press bargains. What size do you want? Send stamp for reply. Exchange D-1, 480 E. Main, Meriden, Conn.

PRINT Your own cards, stationery, circulars, advertising, etc. Save money. Easy rules furnished. Print for others; big profits. Junior press, \$5.90; job presses, \$11; power, \$149. Write for free catalog and full information. Kelsey Co., T-11, Meriden, Connecticut.

TYPE—Real values, prices. Chas. Pascoe, 5934 Goodwin, Dallas, Texas.

USED Type bargains, presses. Send stamp. Box 15, Cambridge, Mass.

PRINT Your own circulars, envelopes, with home made press costing less than \$1.00. Illustrated instructions 10c. Carl Edquist, Odessa, Minn.

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

TYPEWRITERS AND SUPPLIES

TYPEWRITER Bargains—Genuine late model Underwoods, Royals, Remingtons, L. C. Smiths refinished \$100 office models at 60% saving. Fully guaranteed—10 day trial, easy terms—10c a day. Free catalog. International Typewriter Exchange, Dept. C301, 231 West Monroe St., Chicago.

TYPEWRITERS \$3.99-\$19.99. Radios \$1.19-\$7.19, watches \$1.19-\$5.99, music clothes. Knights, 1517 Olive, St. Louis, Mo.

TYPEWRITERS—All makes, \$10.00 up. Bargains. Write for literature. 121 No. Francisco Ave., Chicago.

DUPLICATORS AND DEVICES

DUPLICATING Machines \$3.85 to \$95. Rotary stencil, clay composition, gelatin film. Most complete line in America. Photo-Litho folder free. Pittsburgh Typewriter Supply, Suite 577, Pittsburgh, Pa.

STENCIL Duplicator. Anyone can make! Particulars free. Rapid Duplicator Service, Edwardsville, Ill.

RUBBER STAMPS

TWO Lines 25c; three lines 35c. Stamp Works, Coeur d'Alene, Idaho.

NAME, Address, 2 lines 25c; 3 lines 35c. Stamp Works, Auburn, Neb.

RED-RUBBER, 2 Lines 25c; 3 lines 35c. Fehiberg, 921 Farnam, LaCrosse, Wis.

ELECTRICAL EXPERIMENTS

EDUCATIONAL. Entertaining. Electrical laboratory experimental kits, sixteen valuable pieces, \$4.89. Seven piece kits, \$1.77. Hand driven a.c. generators, 91c. Microphones, 44c. Detetophone kits, \$1.74. Etc. Instructions with all. No toys (Western Electric, Kellogg, Stromberg-Carlson salvage equipment). Jewell meters. Bargain bulletin, stamp. Engineering Service Company, 3722 "A" Street, Lincoln, Nebr.

GUMMED LABELS

PRINTED, 50c Thousand up. Manzier, Dorking Rd., Rochester, N. Y.

PRINTED Name, business, address stickers, 500-25c, 1,000-40c, 3,000-\$1.00. Wetzel, Vaiballa N. Y.

1,000 PRINTED; Name, business, address 50c. JBS Company, Box 93, Holyoke, Mass.

FOR SMOKERS

AUTOMATIC Cigarette machine \$1.85. Ask for illustrated folder. Automatic Cigarette Machine Wks., 1055 Sheridan Rd., Chicago.

TOBACCO

GUARANTEED—Natural leaf smoking tobacco, 5 lbs. 65c; 10 lbs. \$1.00. Cigarette burley, extra five lbs. 75c; 10 lbs. \$1.25. Free gift. Howards Plantations, Mayfield, Kentucky.

GOLDEN Cigarette burley, 5 lbs. \$1.00. Cigarette lighter, roller, papers free. 10 lbs. pipe smoking or chewing \$1.00. Box cigars free. Reliable Tobacco Co., B35, Bandana, Kentucky.

CIGARETTE Burley, mild, 10 lbs. \$1.25. Cigarette roller, papers free. Tobacco Union, A13, Melber, Ky.

GUARANTEED—Fine quality, mild, fragrant chewing or pipe tobacco, 5 pounds \$0.75; 10—\$1.25. Farmers Union, Mayfield, Kentucky.

RAZORS AND BLADES

SHARPEN Razor blades. Opportunities everywhere. Easy, light work. Ideal proposition for elderly men. Excellent machines \$75.00 to \$150.00. Velvet Edger Co., 725 West 59th Place, Los Angeles, Calif.

LEATHER

LEATHERCRAFTSMEN—Write for free instruction sheet and price list of leather, tools, etc. Send 5c for sample cards. Address Wilder & Company, Dept. M, 1038 Crosby St., Chicago, Ill.

FOR MECHANICS

SLIDE Rule—Pocket size, accurate and substantial. Time saver for engineers, mechanics, machinists, electricians, etc. Its use is fascinating. Complete with leather case, manual and course of instruction. Send \$3.45 for four inch model, with magnifying indicator—\$3.95. Five inch model—\$3.65. American Specialty Company, 424 South Broadway, Los Angeles, Calif.

FIELD GLASSES, TELESCOPES AND MICROSCOPES

MAKE Your own telescope. Mt. Wilson type, 6"—\$4. Catalog, complete instructions 10c. Precision Optical, 991 East 163d, New York.

TELESCOPES—Astronomical and terrestrial. Excellent quality, world's lowest prices. Optical Research Associates, Box 33P, Plainfield, N. J.

FREE Catalog of lowest priced telescopes and microscopes in America. Brownscope Co., 246 Fifth Ave., New York.

DIAMONDS, WATCHES, CLOCKS AND JEWELRY

WATCH Movements, material, tools. Repair instruction. Catalog 5c. Stewart's, Sixth Olive, St. Louis, Mo.

GUNS FISHING TACKLE AND SPORTING GOODS

NEW Pocket weapon 40c! Kills game! Blue steel. Maple grip. Illustrated literature for stamp. Grant Sportgoods, Box 75-M, Detroit, Mich.

MINERALS, (SEMI) PRECIOUS STONES

ROCKS And Minerals, a magazine for mineral collectors. Issued monthly—\$1.00 a year; sample copy 10c. Rocks and Minerals, Peekskill, N. Y.

WATCH REPAIR

OLD Watches made new. Repairing, re-building, recasing. Expert workmanship. Lowest prices. Reliable Watch Co., Carthage, N. C.

ANTIQUES, WAR RELICS AND INDIAN GOODS

INDIAN Relics. Beadwork. Coins. Curios. Catalogue and arrow, 6c. Vernon Lemley, Northbranch, Kans.

INDIAN Relics. Beadwork. Coins. Curios. Catalogue and arrow 6c. Vernon Lemley, Northbranch, Kans.

SEND 5c For fine new list Indian relics, antique firearms. F. E. Ellis, Webster Groves, Missouri.

MUSIC AND MUSICAL INSTRUMENTS

LITTLE Ruth Lee sentimental song, with waltz time. Hear it, sing it, play it, dance to it. Only then can it be appreciated.

MUSIC Composed to words. Wonderful proposition. Bauer Bros., Oshkosh, Wis.

XYLOPHONES: Buy, sell through Bledsoe Marimba Studio, Kimball Building, Chicago.

WANTED: Original poems, songs. MMM Publishers, Studio Building, Portland, Ore.

COMPOSE, Arrange, make money. Wonderful lesson course. Free information. Chenette, DeKalb, Ill.

VIOLINS, Deep, mellow, soulful—on credit. Get details today. Gustav F. Henning Fisher Studio, Seattle, Wash.

POEMS Wanted. Work guaranteed. We publish. Great Eastern Song Bureau, Dept. 27, Thomaston, Me.

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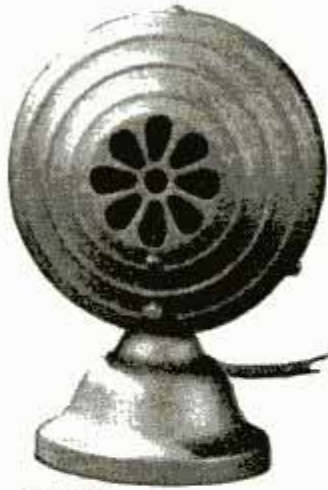
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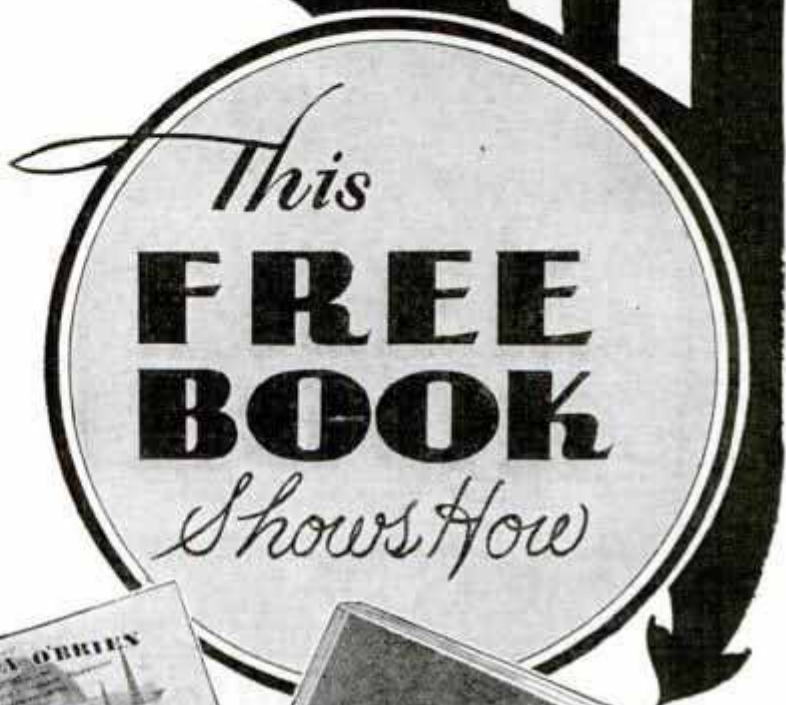
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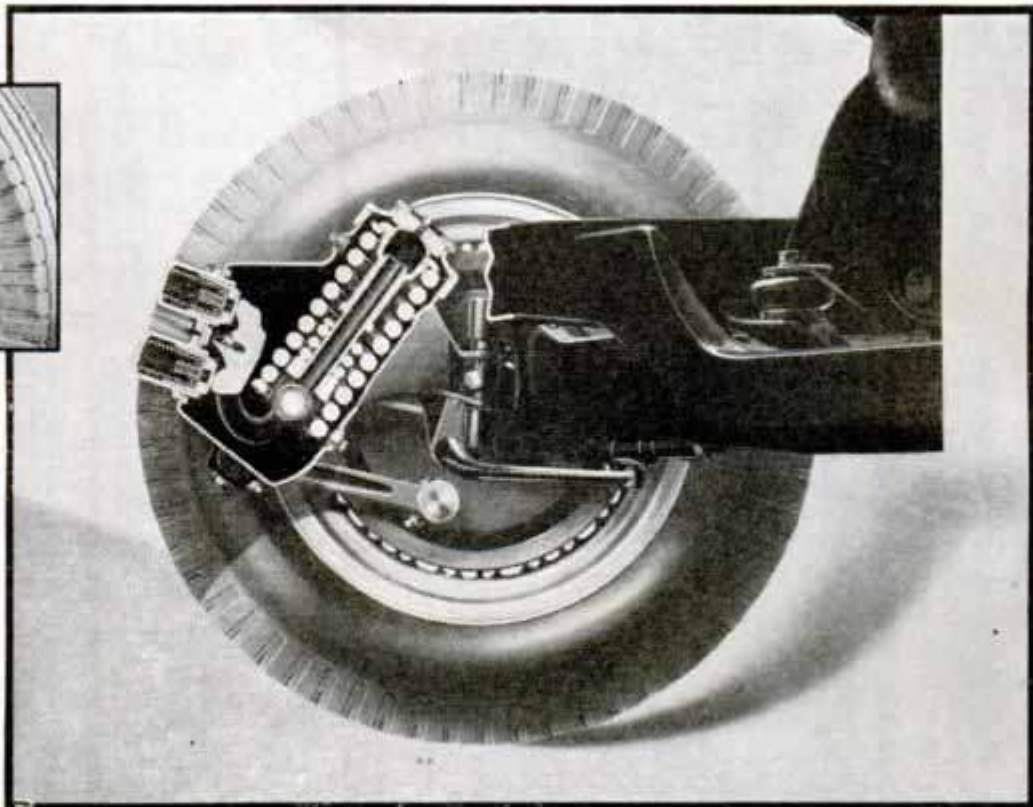
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At the right is a cut-away view of one of the Knee-Action front wheels of the 1934 Pontiac Straight Eight. The wheel and spindle are carried by a heavy steel arm connected to the frame by a sturdy assembly of soft coiled spring, double-acting shock absorbers, housing and king pin.

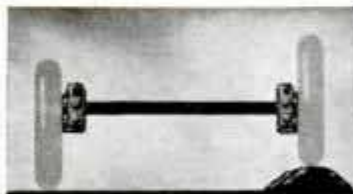


How

Knee-Action Front Wheels Provide More Rear Seat Comfort in the NEW PONTIAC STRAIGHT EIGHT



The common type of front axle binds the wheels together. When one wheel meets an obstruction, the axle tips and the car tilts.



When the front wheel of a new Pontiac meets a bump, the wheel mounts it independently—scarcely disturbing the level of the car.

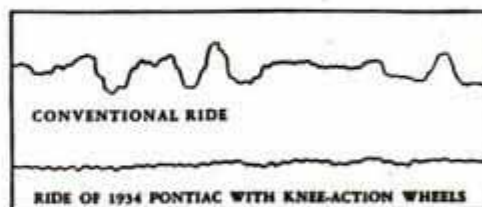


Here is one of the amazing things about Pontiac's new Knee-Action wheels. They classify as a front-end improvement, but their greatest advantage lies in the gentle, rhythmic ride they provide for rear seat passengers.

In conventional cars stiff front springs and soft rear springs fight each other in their rate of flexing. The car is bound to pitch and gallop. In the new Pontiac, on the other hand, the soft coiled front springs are tuned to react in unison with the soft leaf springs at the rear. There is no pitching and bobbing. The rear seat does not "rear up" at intervals and throw passengers forward. Instead, the car glides along

smoothly, and rear seat passengers enjoy fully as much comfort as those in the front.

Write Pontiac Motor Company, Pontiac, Michigan, for full information on Knee-Action wheels.



The two graphs above were made by a highly sensitive instrument developed at the General Motors Proving Ground. The top graph records the effect of an extremely rough road on the back of a person in the rear seat of a 1933 car. The lower graph is the record made at the same speed, over the same road, with the passenger in the rear seat of a 1934 Pontiac.

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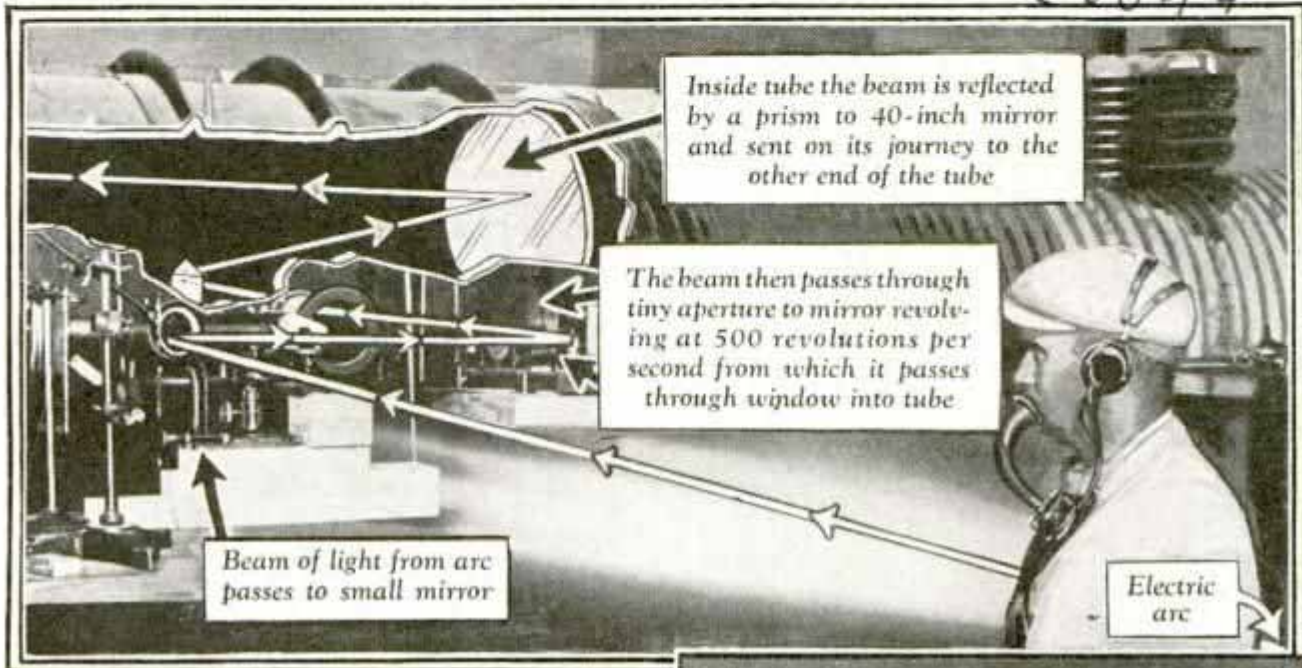
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Vol. 61

MARCH, 1934

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What is the SPEED of LIGHT?

LIGHT still continues to be one of the great riddles of science after centuries of study and experiments by some of the world's greatest physicists and astronomers.

The latest average value of the velocity of light, which probably will be accepted as the world standard, recently was announced by scientists of Mount Wilson observatory as 186,276 miles per second. They also made the amazing statement that their measurements showed fluctuations indicating the speed of light may vary in regular and rhythmic cycles.

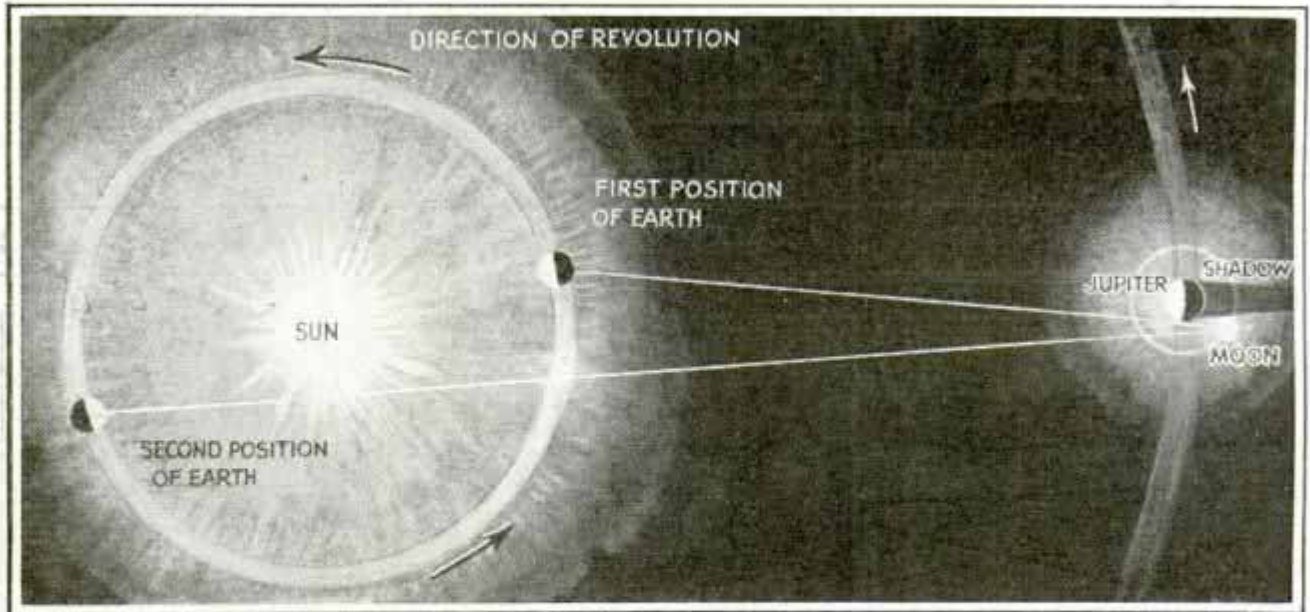
The technical term, light, includes radio waves, infra-red, ultraviolet, X-rays and radium waves, and many modern theories, including Einstein's theory of relativity,



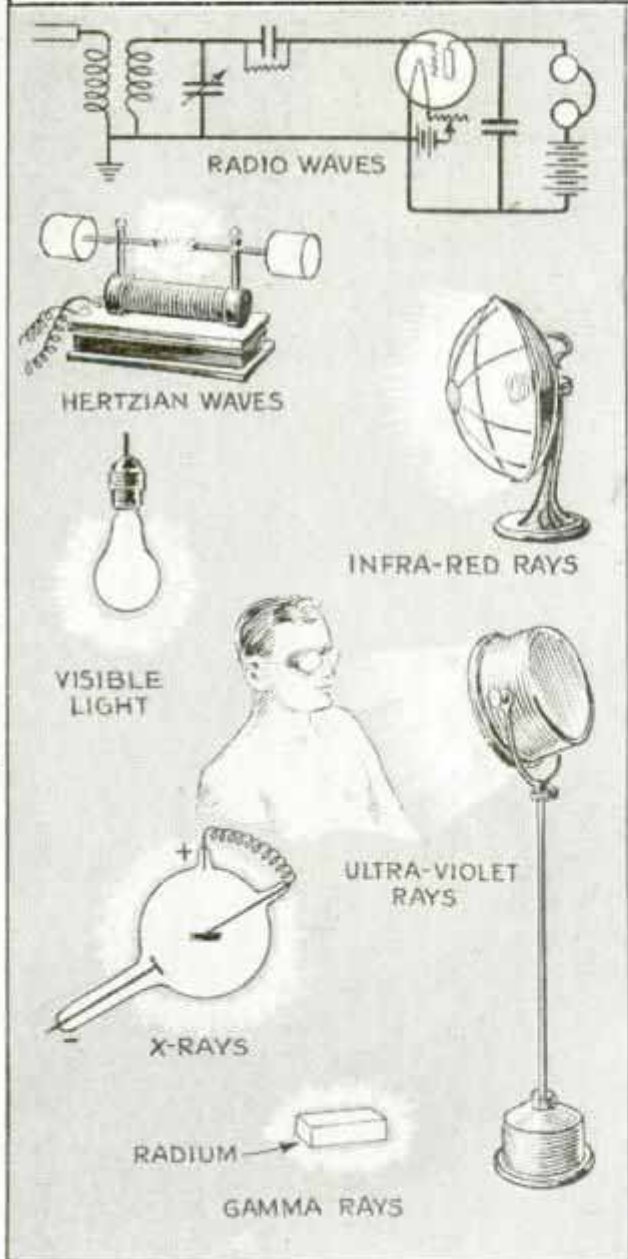
Top, Method for Sending Beam of Light through Mile-Long Tube Used in Making the Measurements; Below, a Section of the Tube

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Roemer's experiment on the speed of light
 by observing the eclipses of Jupiter's moons
 and the difference in time between the eclipses
 when Jupiter was at the two opposite ends of
 Earth's orbit



Roemer, Danish Astronomer, Calculated Speed of Light by Selecting One of Jupiter's Nine Moons and Observing Difference in Time in Which It Emerged from Jupiter's Shadow at Two Ends of Earth's Orbit; the Time Varied Because the Satellite's Light Had to Cross the Earth's Orbit

are based upon the absoluteness of the speed of light, so any proof that it fluctuates in velocity would have a stupendous effect, not only in the world of science, but in our everyday affairs.

Astronomers take the speed of light as a unit, engineers base their calculations of radio and related waves upon the absoluteness of the velocity of light waves, and even surveyors, measuring a distance of 100 miles, must base their figures on the speed of light.

The new velocity value is slower than the figure reached by the late Dr. Albert A. Michelson, University of Chicago physicist and Nobel prize winner, who placed light's speed at 186,284 miles per second in 1927 after flashing light beams with mirrors between two mountain peaks. He was not satisfied with the accuracy of this figure and had a mile-long vacuum tube built for further experiments. He died as tests were being made by flashing light with a revolving mirror back and forth through the tube.

Dr. F. G. Pease, of Mount Wilson observatory, and Fred Pearson, of the University of Chicago, carried on the work, completing their observations nearly a year ago. For months they labored over their findings to obtain an average of the many observations made.

"While there were fluctuations which might indicate variations in the speed of

Light Waves Are Made Up of Many Rays; This Drawing Lists All Known Waves or Rays, in Order of Decreasing Size, Ranging from the Long Radio Waves Down to the Tiny Gamma Rays

Pasadena, Calif.

light," says Dr. Walter S. Adams, director of the Mount Wilson observatory, "we are inclined to the belief that these were due to conditions which affected the instruments. The last hypothesis to be adopted is that the velocity of light varies. If a man knows accurately when the sun should set, but observes that according to his watch it sets five minutes ahead of time, a logical person does not assume that the motion of the sun varies, but that his watch is wrong."

The two men who carried on the experiments observed fluctuations suggesting a double variation, including a short period of fourteen and three-quarters days and a long period of one year, the range of variation in each case being about twelve miles per second. The curve of variation resembled that of the tide-raising force, although there is no known way in which variations in this force can produce changes of this kind.

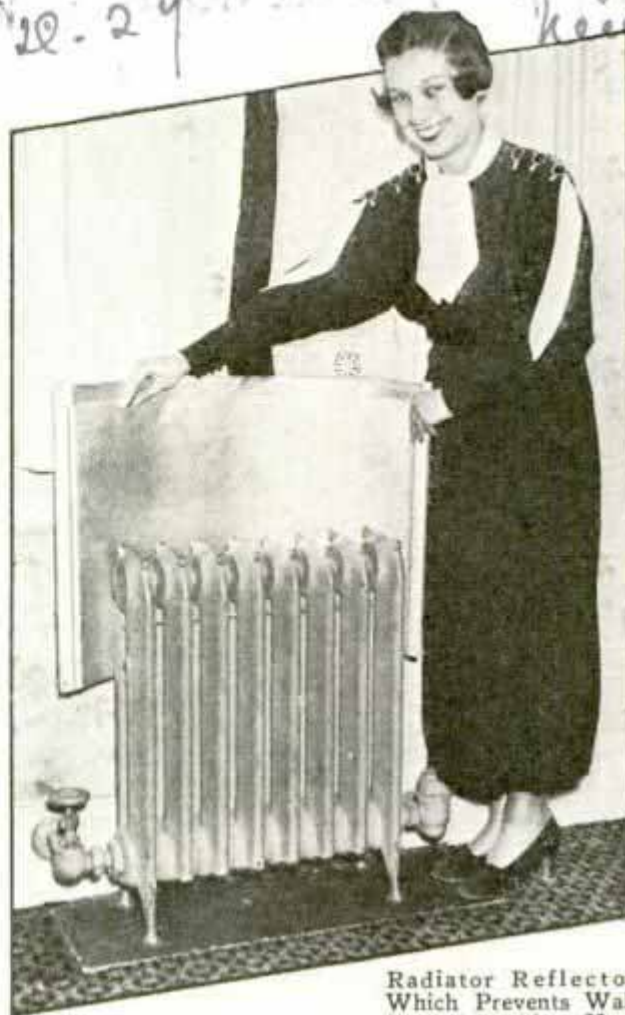
Further analysis of their figures may change the speed value by one or two units, but this may require many months of work. Dr. Adams says that to obtain any more accurate figure on the speed of light, much more complicated equipment must be used than any thus far employed, including quartz mirrors, a more stable pipe line and very elaborate timing devices, because the precision required in such an experiment is extremely high.

The story of light is filled with romance, for great scientists like Galileo, Roemer, Bradley, Frizeau and Foucault have puzzled over its riddle. Roemer, the seventeenth century Danish astronomer, arrived at a speed figure of 186,000 miles per second by a very simple method. Jupiter has nine moons revolving around it at regular periods. Roemer selected one of these moons and observed the difference in time at which it emerged from Jupiter's shadow at two ends of the earth's orbit. The time varied because of the fact that the satellite's light had to cross the earth's orbit. The diameter of this orbit is 186,000,000 miles and it required sixteen minutes and thirty-six seconds, or about 1,000 seconds, for the light to cross it.

There were 2,188 airports and landing fields in the United States on January first, an increase of seventy-one in a year.

Dept. of Commerce

The Reynolds Metals Co. 19 Reitor St. 22-29



Radiator Reflector Which Prevents Wall from Absorbing Heat

"HEAT BOUNCER" OF ALUMINUM FITS BEHIND RADIATORS

Much of the heat from home radiators which is lost through absorption by the walls can now be saved by fitting radiators with "heat bouncers," thin aluminum sheets fitting behind the radiators and reflecting the heat out into the room. It has been estimated that about twenty-five per cent of the heat thrown off by a radiator is wasted by wall absorption. The reflectors are intended to save much of this waste. No special mounting is needed for installation, the curved metal sheet slipping between the radiator and the wall.

HILL-CLIMBING MOTOR COACH HAS A DOUBLE DRIVE

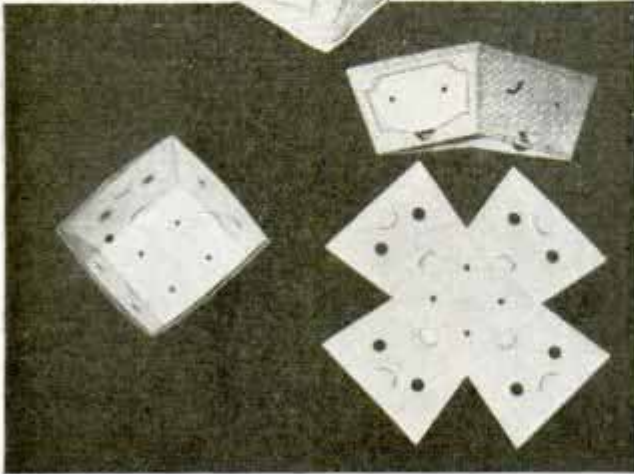
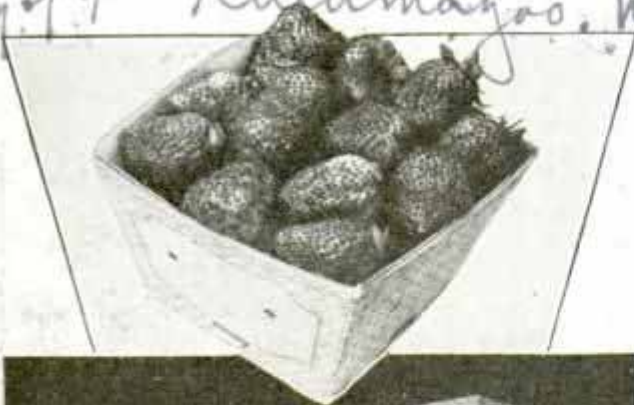
Germany has developed a powerful motor coach for traveling through the mountainous regions on long overland journeys. The vehicle has a 320-horsepower twin six-cylinder engine, each motor driving one of the two rear axles. The capacity of one engine is sufficient for level stretches, but both are used for climbing.

Reported by American Consul General

2/2/21

**AIR ROUTES OF FUTURE SOUGHT
IN STRATOSPHERE FLIGHTS**

France and Germany are racing for the honor of being first to send an airplane into the stratosphere. Germany has constructed and is testing a Junkers ship intended to penetrate the atmosphere ten miles or more above the earth, and France has a Farman plane under test for a similar venture. When these ships actually start for the stratosphere, they will be pioneers just as truly as were the mariners who steered the first frail craft across the Atlantic for, while balloons have carried their crews to the stratosphere, heavier-than-air craft have not penetrated it. The purpose of the flights is to determine the behavior of planes in this vast region of perpetual calm and rarefied air where it is believed airplanes of the future can travel at speeds of 500 miles per hour, bringing Paris within six hours of New York by air. Each of the ships has a sealed metal cabin, but in the German plane the pilot remains in one position in his metal container. The pilot of the French plane, however, obtains a maximum range of vision by sitting on top of the fuselage for the takeoff. As he climbs, he enters the cylindrical cabin but his head protrudes through the open hatch. As he goes higher, he lowers himself inside, seals the hatch, turns on the breathing apparatus and thereafter an engine-driven compressor maintains air in the cabin at a pressure equivalent to that of 10,000 feet altitude, while the flyer uses his instruments for the rest of the climb. It is impossible to vision all the hazards that may face these pioneers when once the stratosphere is reached. Despite many precautions to take such things into account, lubricating oil and fuel may freeze at the extremely low temperatures, the rare air may not mix properly with the fuel and ice may form on wings and propellers. To forestall such troubles, laboratory experiments have been carried on for months. Metal alloys have been found which resist the formation of ice, it is claimed, and a special type of air screw has been devised which is extra large and has a variable pitch for use in the rare air. Metals have been tested by the score in efforts to find those which do not become brittle at extremely low temperatures.



Boxes for Berries and Small Fruit Made of Paraffined Paper; Note Ease of Assembly

**BERRY BOXES MADE OF PAPER
ARE EASY TO ASSEMBLE**

Boxes for berries and small fruit are being made of paraffined paper and provide cartons of attractive appearance which are well ventilated and sanitary. The boxes reach the shipper in two parts which are quickly and easily assembled without the use of any tools.

**CHEMICAL CLOCK FORECASTS
WEATHER FOR THE DAY**

One German inventor has produced a chemical clock which, it is claimed, forecasts the weather for periods of from eight to fifteen hours. It automatically computes the humidity, or lack of it, and registers wind direction and velocity, giving the result in terms of future weather. The instrument is expected to be of value to aviation and particularly in the field of transportation.



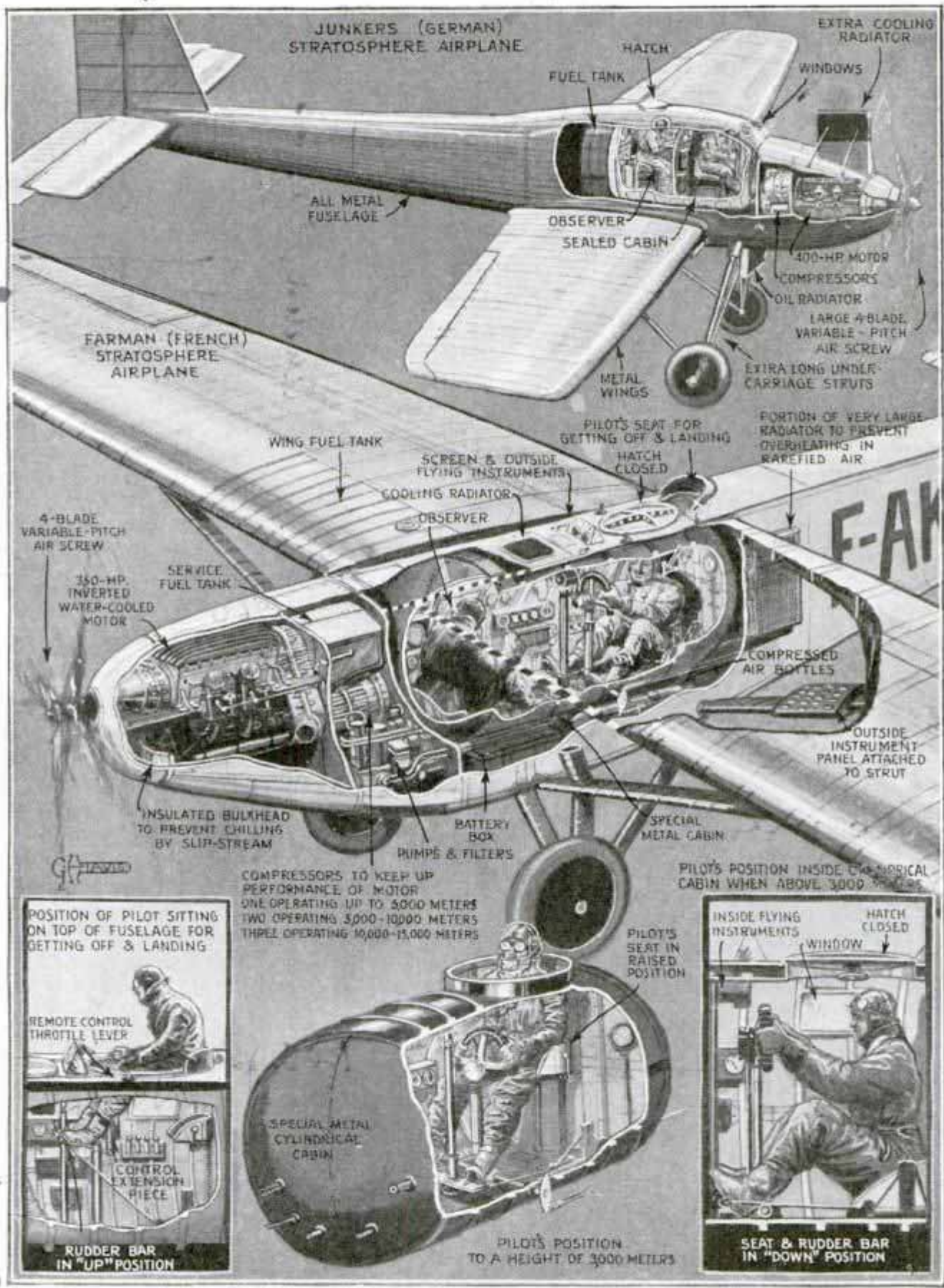
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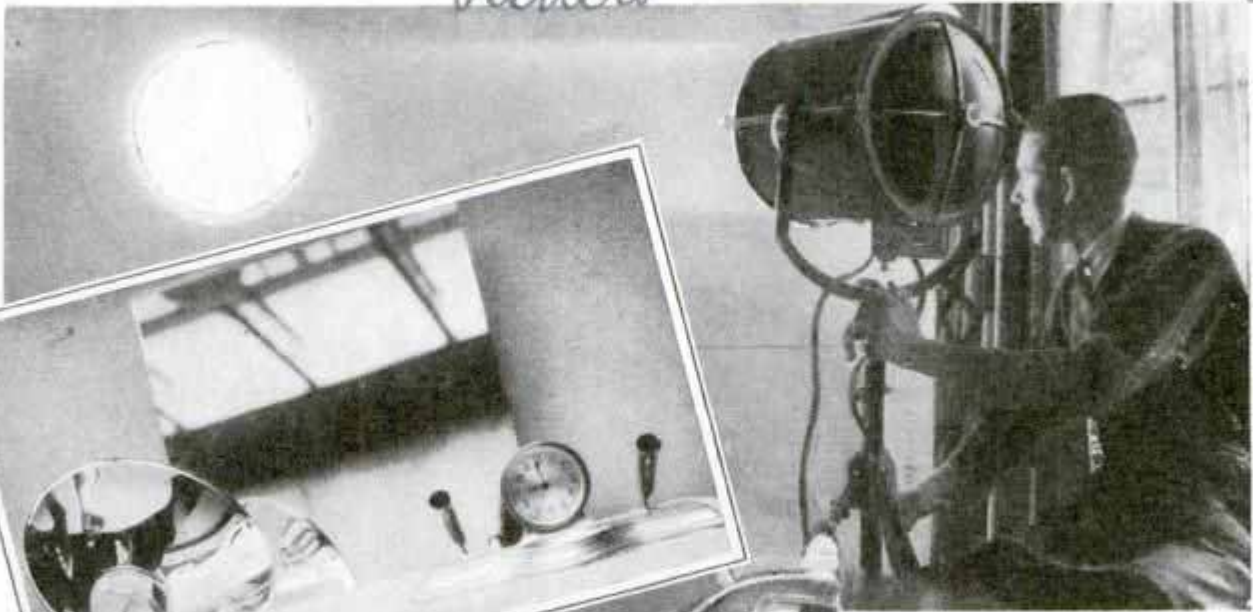
Two Planes to Blaze Trails in Stratosphere



Drawings Showing Details of the French and German Stratosphere Planes; Each Is Equipped with a Variable-Pitch Propeller and Air-Tight Metal Cabin; Note How Pilot of French Plane Sits on Fuselage to Take Off, Then Lowers Himself Inside the Hatch and Flies with Head Protruding until High Altitudes Force Him to Seal Himself in and Rely on His Instruments; the Planes Have Extra-Large Radiators to Prevent Overheating in the Rarefied Atmosphere

see opposite page

Aluminum Mirrors Reflect Light and Colors



Top, Mirror and Lamp Reflector of Aluminum Alloy and a Spot Light Equipped with the Reflector; Right, Watching Aluminum Evaporation Process

Mirrors with a surface of aluminum alloy have been found to reflect more light and more colors than the ordinary kind. The usual silvered mirrors are poor reflectors of colors toward the purple end of the spectrum but the aluminum ones not only reflect about ninety-four per cent of the light but also most of the colors, hence are used for make-up and as photographic reflectors for powerful lights. The surface is applied by placing the mirror and a quantity of aluminum alloy in a vacuum

chamber where the alloy is heated above its melting point, the atoms being deposited in a thin, uniform film on the mirror surface. The process takes only a few minutes, is inexpensive and mirrors thus treated do not scratch easily or tarnish, it is claimed. Astronomers hope the mirrors will open new possibilities

for ultraviolet photography of the stars, and telescope mirrors are already being given aluminum coats. It is expected dental, optical and microscopic mirrors also will be thus treated. The same process can be used for applying an exceedingly thin film of metal to almost any object, giving them coats of gold or silver.

©2037

INSIDE OF TIN CANS ENAMELED TO PROTECT CONTENTS

When tin cans are used for the preservation of food, those with special enamel linings are recommended by the federal bureau of home economics for canning certain products. Foods containing certain red pigments lose their color unless placed in bright gold enamel-lined tins, known as "R" cans. Cans with an enamel lining called "C," which is dull gold,

should be used for canning foods high in protein. These "C" cans, however, should not be used for acid foods. Snap beans, chicken and other meats, greens including spinach, okra and okra with tomatoes and mixed vegetables should be placed in plain tins. Corn, succotash and peas should be canned in "C" enamel tins while beets, cherries, berries, pimentoes, plums, rhubarb, tomatoes and tomato juice should be placed in the "R" tins. Pickled beets should go only in glass.

Washington, D.C.

Ms. Steady 12/23/33

Vertical handwritten notes on the right margin, including "937" and "Sycamore".

Handwritten notes at the top of the page: "937 Sycamore Los Angeles, Calif" and "Panier".

How to Tell Value of Your Old Gold Jewelry

John W. Farrington, 220 W. 42nd Street, New York



Above, Display of Old Gold Scrap; in Circle, Testing Old Watchcase by Stone Method to Determine Its Gold Content; Left, Weighing Old Gold

a mechanical bent can employ an easy method of determining values which is accurate enough for small transactions. In fact the method is used by many gold merchants in fixing a price for articles containing the metal. The first step is to file a notch in the article being tested and apply a drop or two of nitric acid. If the trinket is plated, a green line ap-

Since the price of gold has advanced, old trinkets and jewelry containing the precious metal have increased in value. The exact worth of such pieces can be determined only by melting them and extracting the gold content, but anyone with

appears, as the acid acts on brass and other base metals with that result. The tester next rubs the article on the touchstone, a slab of black jasper or similar mineral. On the surface of the stone will appear a thin yellow streak which the expert reads eas-

John W. Farrington, 220 W. 42nd Street, New York

ily by its shading. The novice employs touch needles, each tipped with gold of a different fineness until he obtains a streak which seems to correspond to that of the article being tested. He may then check on his finding by applying a few drops of acid of the strength designated for articles of this class. Pure gold is not soluble in any of the ordinary single or simple acids, but if the streak contains other metals, it will be darkened by the acid and will show certain effects which indicate its composition. The article is then weighed and its value determined on the basis of its gold content as indicated by the tests. The metal obtained from melting down old gold, known as "gold scrap," is used in the arts and industries for the most part.

C2022

LIGHTED HANDS STOP TRAFFIC FOR PEDESTRIANS TO CROSS

New York City is experimenting with traffic lights which give pedestrians a chance to use the streets with all vehicular traffic at a standstill. Red and green lights control vehicular traffic, as is the case with the ordinary traffic signal, but there is also a big red hand which, when illuminated, stops all traffic on wheels for a brief period while pedestrians cross intersections between light changes.

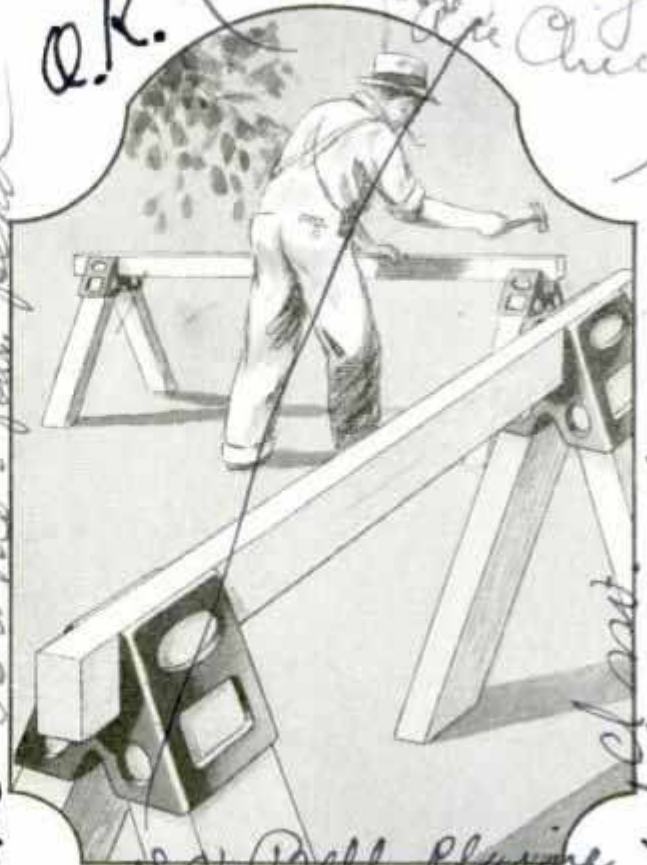


Traffic Signal with Lighted Hands Which Stop All Vehicles for Pedestrians to Cross

Screen Letter 12/30/33

(Tusks of the male African elephant usually weigh about forty pounds, but some weigh more than 200 pounds each)

511-5th Ave. N.Y.C. (2)
 Dr. John A. Harbison



Metal Joints for Setting Up Sawhorses Quickly Hold the Wooden Pieces Firmly

JOINT FOR MAKING SAWHORSE SPEEDS UP CONSTRUCTION

Sawhorses, trestles, understaging and scaffolding may be constructed quickly by means of metal joints that are applied by a few blows of the hammer. Use of the joints makes possible the erection of a sawhorse in two minutes, ready for use. The sawhorse may be knocked down and moved or stored in small space. No experience is required in the use of the metal joints. Two sizes are available, the smaller to fit one-by-three lumber and the larger to fit two-by-fours.

C2033

GAS RISING ABOVE OIL WELLS IS HAZARD FOR PLANES

Aviators have been warned of the danger of flying through the gas-drenched air above oil fields after tests by the navy which showed columns of natural gas mounting a mile or more into the sky above the wells. A spark from an exhaust could ignite this gas and cause a terrific explosion. The navy has warned its pilots to stay away from oil fields, unless at high altitudes. Above one mile, the danger from gas is slight because it is diluted.

and Bureau of

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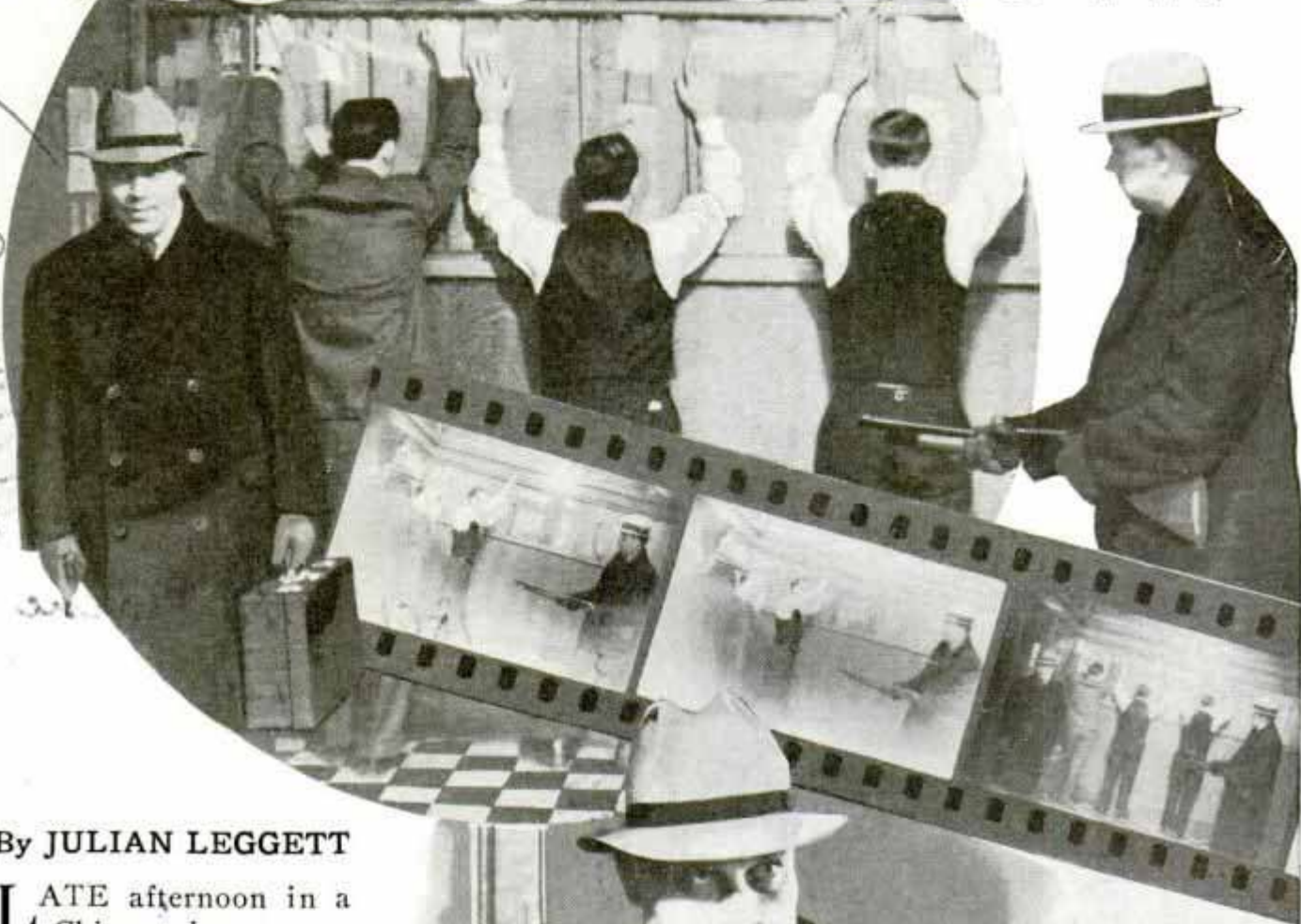
91-5 Daily 12/30/33

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204721 John Hankenbury Associates
 Aug. 6-7 10 S La Salle
 Chicago

ROBOT SLEUTH



By JULIAN LEGGETT

LATE afternoon in a Chicago insurance office . . . stenographers' fingers flying faster . . . girl cashiers counting and bundling the day's receipts . . . belated customers standing in line . . . all signs that another business day is about to end.

Four men stroll in, hats low over their eyes, and join the customers' lines, patiently waiting their turn. A fifth man walks in, then over to the only guard in the room. As they stand talking, the man suddenly presses a gun against the officer's side and shouts: "Listen! Keep your traps closed, do as we say and we won't hurt you. Lie down on the floor, all of you."

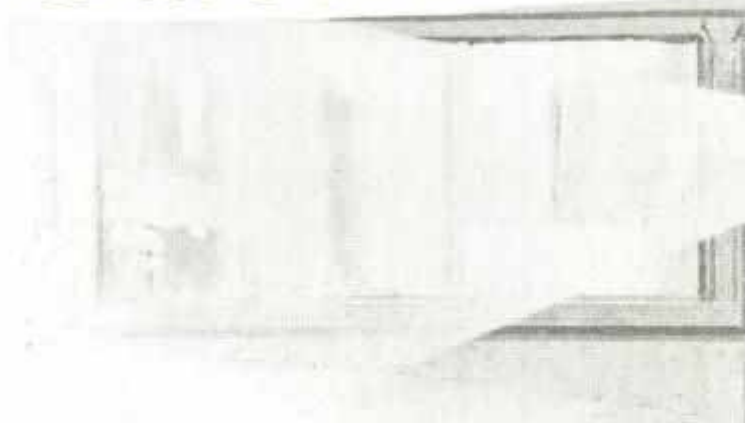
Twenty women and five men employes



Top, Enlarged Photo of Holdup Scene Made from Film Strip Shown at Center; Bottom, Detective Camera Catches Bandit in Act

chaotically drop to the floor, together with two customers who had not had time to complete their business. As the bandit chief's command is obeyed, his four con-

Gets His Man!



Top, Right, Drawing Illustrates How Camera Hidden behind Wall Grill Gets the Picture; Bottom, Right, Photo Taken by Robot Shows Bandit Holding Up Cashier; Even This Side View Gives Police Some Help in Their Search



federates pass in and out of the cash cages, scooping up currency. It is all over in three minutes and the men hurry from the office into the street, there to mingle with home-bound crowds.

Hardly have the bandits reached the street before the alarm is sounded, bringing a police squad from the station near by. Each victim is questioned and then comes the surprise—no two witnesses give the same description for any one bandit. Right at the start, the police have nothing on which to base their hunt. Suspects are picked up but cannot be identified and the case finally is pigeon-holed as “unsolved.”

This holdup is typical of 15,200 robberies, not including burglaries, committed in a mid-western city during 1932. Only

397 arrests were made and only 210 convictions were obtained. Why such a poor showing?

Police officers place the blame directly upon witnesses, charging that in only a small percentage of robbery cases is it possible to get positive identifications. Assuming, then, that identification is the key to the problem, science has produced a robot that not only sees bandits at their work, but also remembers every detail sufficiently well to bring about identification, apprehension and conviction of suspects.

This robot, which works silently and efficiently, makes pictures of criminals in the act. It doesn't matter about the light, for the apparatus works equally as well in artificial illumination as in daylight.

Invented by August H. Meyer, the robot is a photo identification system which snaps a picture every three seconds. In the insurance holdup, the apparatus would have produced sixty separate and distinct photographs during the three minutes the



Left, Holdup Photo Snapped by Robot; Right, Identification by Means of Holdup Photo; Opposite Page, Top, Left, Arresting the Suspects; Right, Courtroom Scene Showing Enlargement of Holdup Photo Being Used to Aid Identification

bandits were in the office. Out of that many, sufficient identification material would have been available to help police in their search.

This equipment consists of several power-driven cameras, concealed about the bank, pay station, theater ticket booth, post office, store or other places liable to be held up. Supervisory circuits for starting the cameras, batteries for supplying energy and a control cabinet complete the system, which is entirely self-contained, independent of power subject to interruption.



Ordinarily one to six cameras will serve the purpose but the number may be increased to provide adequate protection to any building. The cameras are so placed as to photograph from different angles to take advantage of the best illumination. The preferred practice in locating the cameras is to place them within walls and partitions of rooms to be protected, behind grills and even camouflaged as telephones, with the mouthpiece serving as the robot's "eye."

Foot or hand controls for setting the cameras in motion are placed at points where they can be operated without noticeable movement and where they will

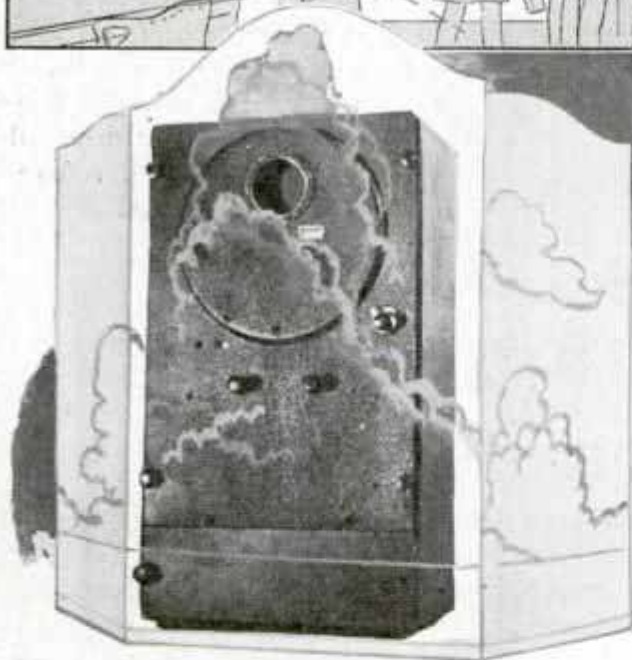
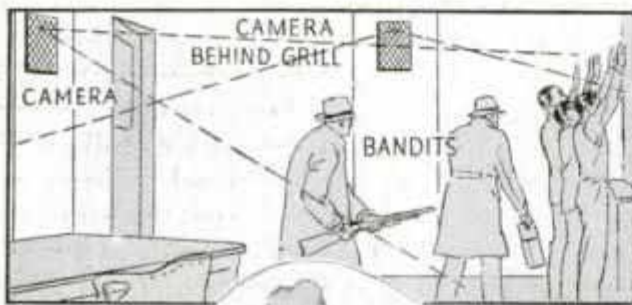
not be liable to accidental operation. The camera will make 240 exposures during a period of about twelve minutes for each loading, an exposure occurring at three-second intervals, fast enough to follow the movements of each criminal. Three exposure-time values are repeated consecutively, one of which will be approximately correct for the existing illumination at the time the camera is in operation. Super-sensitive film is used and from its negatives may be made enlarged photographs or film for projection on a screen at police headquarters or perhaps in court.



Drawings at Upper Left Show Foot and Hand Controls; Right, Light Warns Official



Police officers who have inspected the system find that the arrangement is practically fool-proof, as well as proof against detection by the criminal. Tampering with any part of the system starts the cameras



Center, Left, Drawing of How Camera System Gets Several Views; Bottom, Small Camera Cut Away to Show Method of Camouflaging the Camera; Right, End of the Story—Bandits Behind Bars

and photographs the culprit. Thus, if the criminal should discover and destroy one of the cameras, all others in the circuit would capture his image on film for identification purposes.

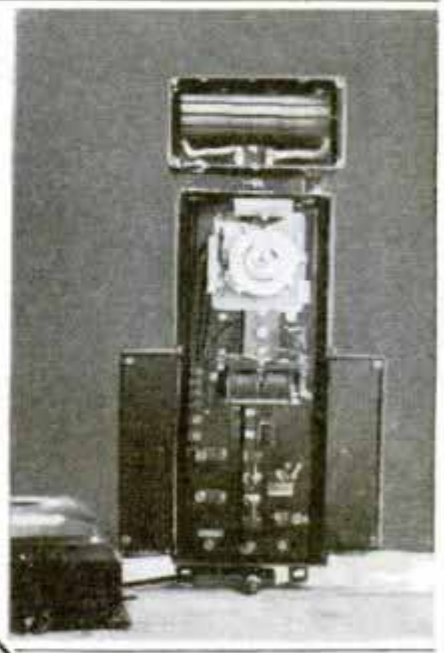
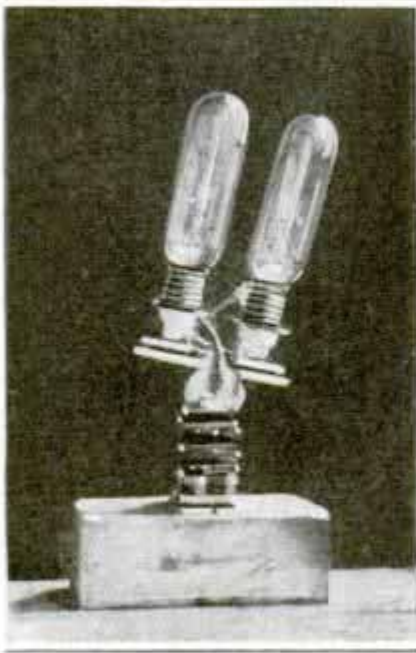


One feature of the robot is the control cabinet, which may be placed on the desk of some officer of the bank, theater or other place under its protection. The instant that the cameras are started, a red light glows at the front of the cabinet, warning the executive. To prevent "inside" jobs, where an employe might turn on the system to empty the cameras, the warning light is arranged to continue glowing until the official unlocks the cabinet and resets a control device. Tampering with the system at any point is detected quickly by this means.

After each operation, an exposure counter on one of the cameras is read to determine the amount of unexposed film. For more accurate identification of suspects, a calendar clock may be placed within range

(Continued to page 122A)

Thrills in Keeping Afloat Air-Mail Beacons

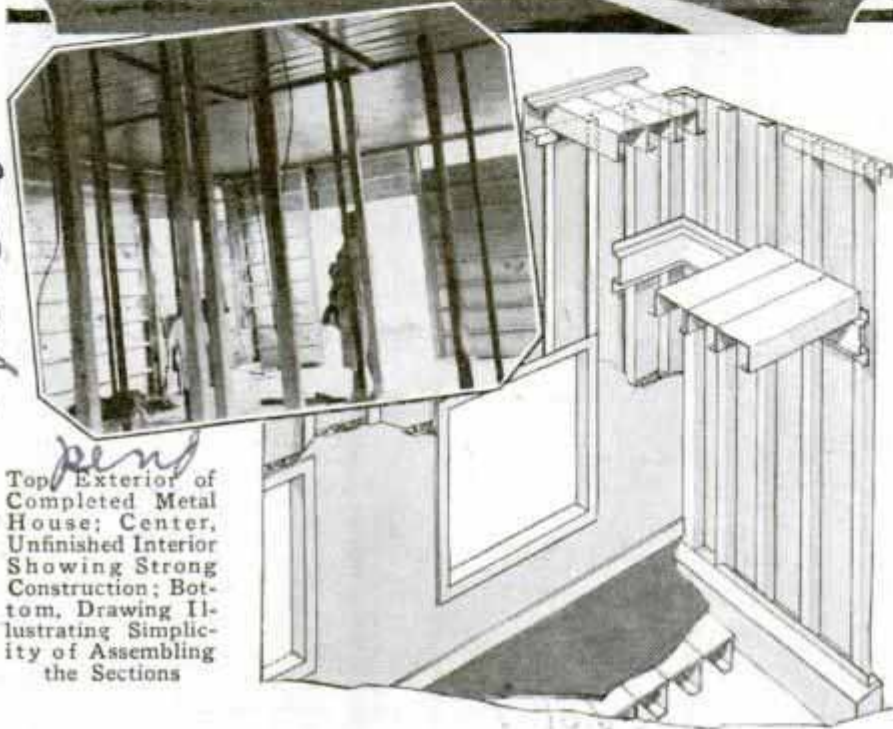


Top, Left to Right, Automatic Lamp Changer for Beacon, Acetylene Flasher and Astronomic Clock; Below, Isolated Beacon and Its Electric Plant

Keeping in service the ground lights which blaze a trail across the continent for air-mail and passenger pilots is filled with thrills and is a test of human ingenuity in conquering natural odds. Typical of the equipment used wherever power lines cannot be reached are those on the Pueblo-to-Cheyenne air-mail route—from south-central Colorado to southern Wyoming. A considerable portion of the 200-mile span is through craggy mountain ranges, and across plains country hostile to human and scientific invasion. Where gasoline engines can be transported by automobile truck or horse-drawn wagon, individual electric plants are installed to supply current for the beacons. An astronomic clock, which tells the date, the exact moment when sundown and sunrise will occur, controls all mechanism. Automatically, at sundown, it routes electricity from a 32-volt storage battery to a gasoline engine which, in turn, activates an electric generator. The generator supplies current to the beacon. These plants are equipped with two gasoline engines which work on

alternate days; or if the scheduled engine is balky, its companion goes on the line. The clock is so regulated that it trips a switch fifteen minutes before sundown, allowing the motor to warm up, without tripping the generator switch; then, promptly, when the sun disappears behind the western horizon, the generator goes into action. In bitterly

cold weather, when mercury descends to realms far below zero, the clock sometimes has a busy quarter-hour switching current from one engine to the other until a motor chooses to run. This almost-human timekeeper is electrically wound, automatically, whenever the mainspring unwinds sufficiently to nudge a lever that connects the storage battery with a tiny motor on the clock panel. In charge of the isolated beacons on the Pueblo-to-Cheyenne air-mail route is C. M. Dowers, a former cowboy. He is constantly driving his small government truck to stations that can be reached on wheels, then climbing to pinnacles, crossing chasms or arroyos, to inspect plants that cannot otherwise be approached. His is the responsi-



Top, Exterior of Completed Metal House; Center, Unfinished Interior Showing Strong Construction; Bottom, Drawing Illustrating Simplicity of Assembling the Sections

INEXPENSIVE HOME OF METAL BUILT OF FACTORY UNITS

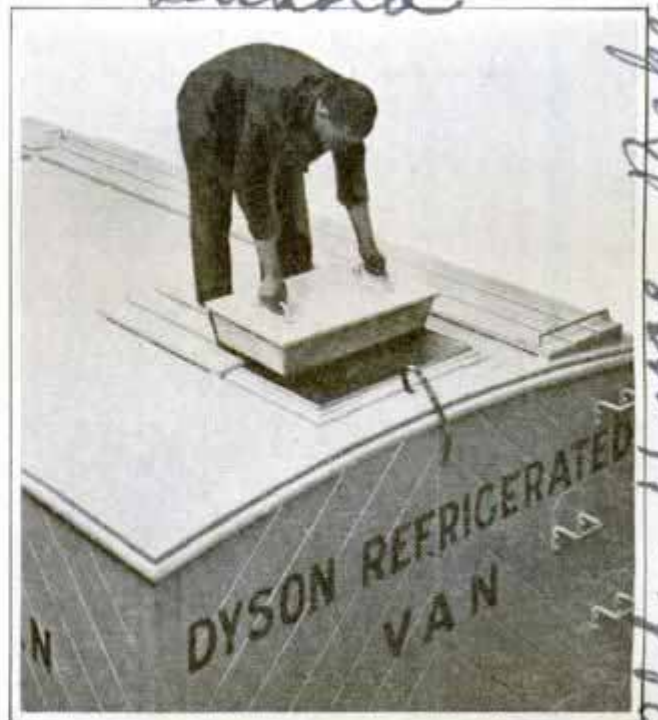
Fabricated in accurate units at the factory, inexpensive houses of metal may be obtained from an Ohio home-building corporation. The company's policy is the production of houses at prices within the reach of small incomes. An experimental home contains a large living room, three bedrooms, a bath, aette-kitchen and a large porch. In central Ohio, the home can be duplicated for \$2,700, although the company plans to build individually planned custom-built houses. The exterior siding is sixteen gauge ingot iron formed in a trough-shaped section to give it rigidity and load-carrying ability. A frameless "double-strength" method of construction is used. The exterior is sprayed with enamel paint. Floors and roof are of cellular construction of sheet steel. These units are assembled on the job, although the floors may be factory-assembled. Window sash, frames and

bucks are of steel. Doors and trim are pine. Gypsum board is used as a sub-floor over the steel, while finished floors are hardwood in all rooms but the bath where mosaic tiles are used. Field erection is not difficult.

2029 FOOD VAN COOLED WITH "DRY ICE"

Constructed like a refrigerator freight car, a van built on a ten-ton trailer chassis is cooled with solidified carbon dioxide, known in this country as Dry Ice, and is used in England for hauling perishable food products. The refrigerant is loaded into receptacles through the van roof after the truck has been filled with freight and the air-tight main door sealed. As the solid carbon dioxide is converted to gas, the van is cooled

in the same manner that a container of ice cream is kept frozen with Dry Ice.



Bunker in Top of Food Truck Which Provides a Receptacle for "Dry Ice" Refrigerant

Emb. C. American Rolling Mill Co. Middletown, Ohio

London, N.Y. 7 W. 1. Baker St. Albany Home, Baker St.

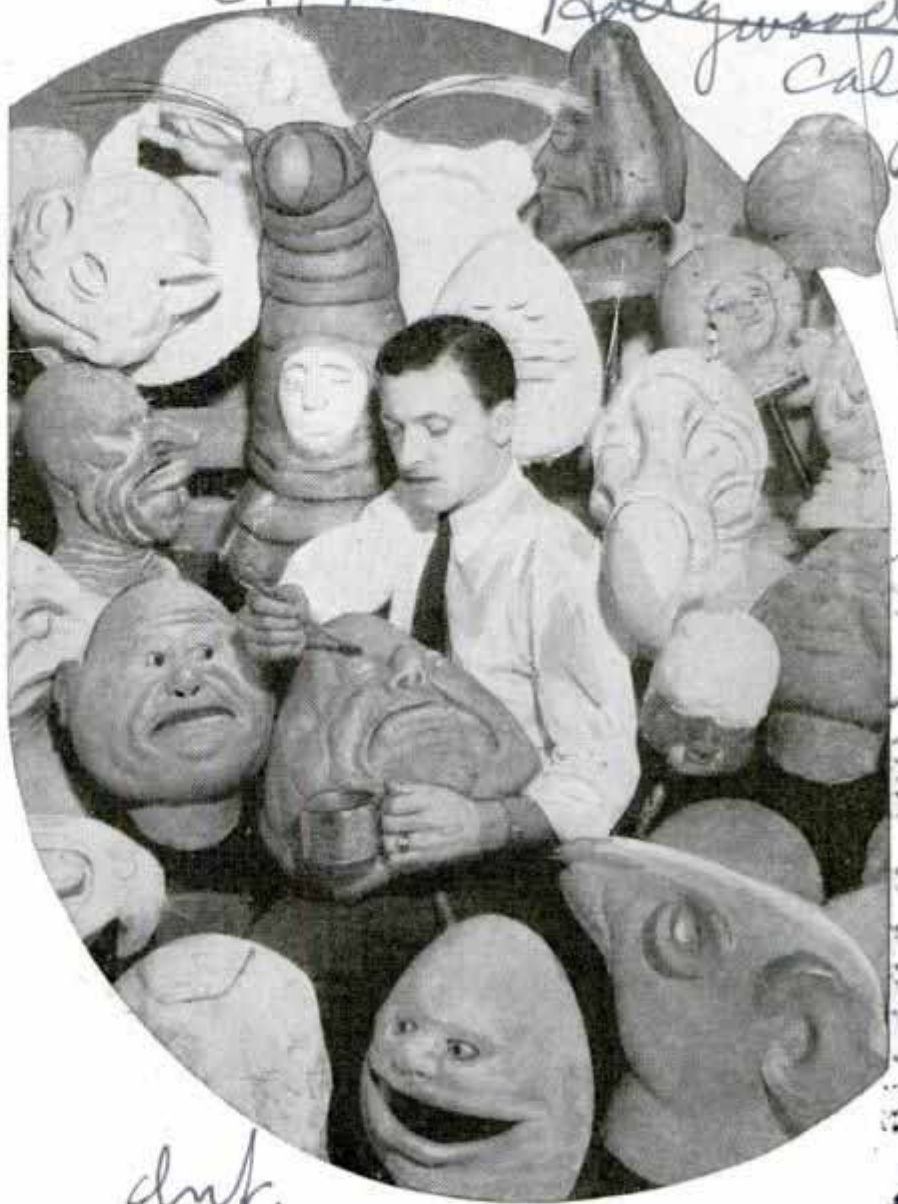
J. N. Walford, Frigida

Westmore 337
Hollywood
Calif

SUN'S RADIATIONS AFFECT RADIO RECEPTION

By sending radio impulses to the outer regions of the earth's atmosphere, far above the stratosphere, physicists have found evidence that regular variations in radio echoes from this "radio roof of the world" are due to the effect of ultraviolet light or neutral corpuscles from the sun. There are, however, striking abnormalities in these echoes which are due to more obscure causes, according to Dr. Harry Rowe Mimno and Dr. Pao Ho Wang, of Harvard university, who conducted measurements of the radio-reflecting Kennelly-Heavisidelayer. For several years physicists and engineers have realized that the rarefied gases in the outermost layers of the earth's atmosphere normally possess relatively large electric charges, and may carry electric currents of great magnitude, it was explained. The electric conductivity of this charged region, or ionosphere, changes continually and the variations affect our daily lives. Most auroral displays occur at great heights and are often accompanied by violent magnetic storms interfering with telegraph and cable communications, while less violent disturbances may improve or completely disrupt radio reception. Long-distance transoceanic radio communication would not be possible if these atmospheric charges were not dense enough to deviate the radio wave and turn it back toward the ground. Even at short distances the "reflected" waves produce fading in broadcast reception, "ghost images" in television, and are responsible for the slow alterations in signal strength noticeable at night. Radio transmission is also affected by the eleven-year sunspot cycle.

Science Service 12/22/33
Cambridge Mass.



Making Animated Rubber Masks for Use in the Movies; the Wearers Are Able to Alter Facial Expressions of the Grotesque Figures

ANIMATED MASKS OF RUBBER USED IN MOVIES

Animated rubber masks are being used in motion pictures for novel effects. Invented by Walter J. Westmore, the masks make possible the animating of grotesque characters, such as are found in "Alice in Wonderland." In making the masks, the original of the face desired is modeled in clay. Then a reverse mask is made and liquid rubber is sprayed into the mold, being built up layer by layer to form the outside. The mask is so arranged that the proper facial expression and movement may be attained by the actor wearing it.

Latest estimates of fatalities due to the World War place military deaths at 13,000,000, and civilian deaths at 28,000,000.

375
L. Camden
Berkeley
Calif

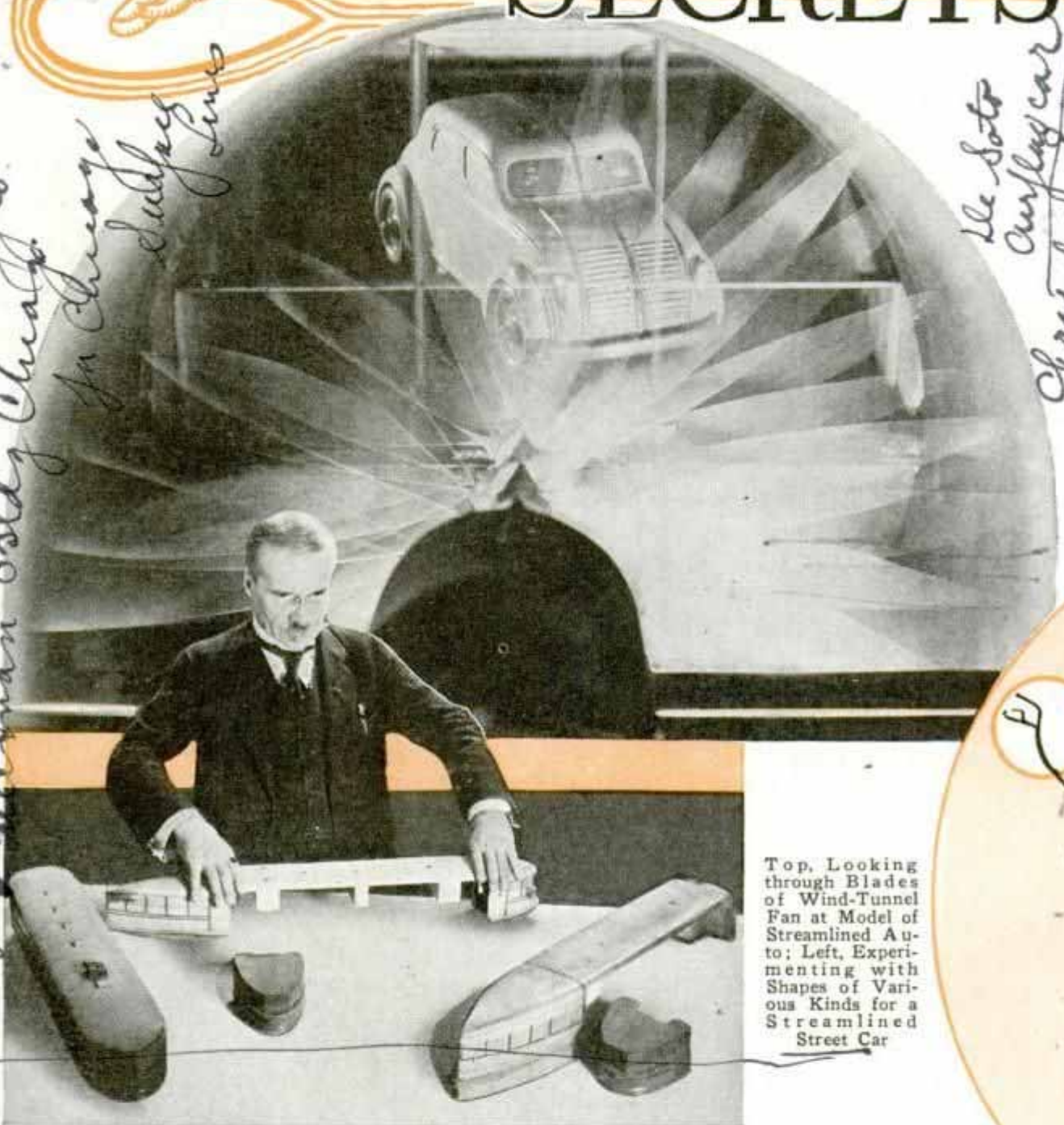
© 1811

Chas. F. Williams, Inc.
Columberia, 29 Bean Road,
Desley Heath, nr London, Eng

SECRETS

Being built by Pullman Car & Locomotive Co
William Boldy Chicago
In Chicago
Dodge
Limo

He Soto
Curfley car
General Engineering
Columberia



Top, Looking through Blades of Wind-Tunnel Fan at Model of Streamlined Auto; Left, Experimenting with Shapes of Various Kinds for a Streamlined Street Car

FFIFTY miles to the gallon, smoother, faster riding and, consequently, more comfort at less cost—these are the ultimate aims of hard-headed engineers in turning to “teardrop” automobiles.

These streamlined cars are not just freaks, or somebody's effort to be different. They simply can't be laughed off because they mean that the automobile is emerging from the horse-and-buggy stage into its own field of fast transportation.

W. E. Lay, professor of mechanical engineering at the University of Michigan,

where air resistance and related problems have been studied at length, concludes that “streamlined cars provided with variable-gear transmissions may be built to travel three times as far on a gallon as the conventional sedan can at normal touring speeds.”

This statement was made after models of automobiles, trains, street cars and airplanes had been subjected to wind-tunnel tests, the results being checked later with the performance of real vehicles built from these models. Tests have also been

133
133

of SUPER-Speed!



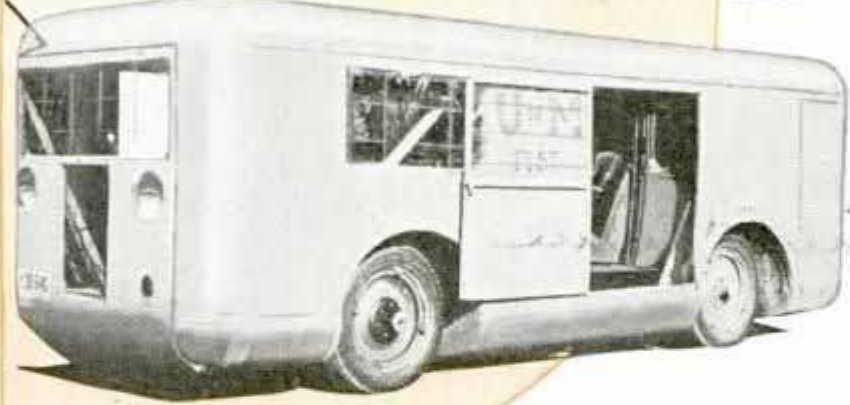
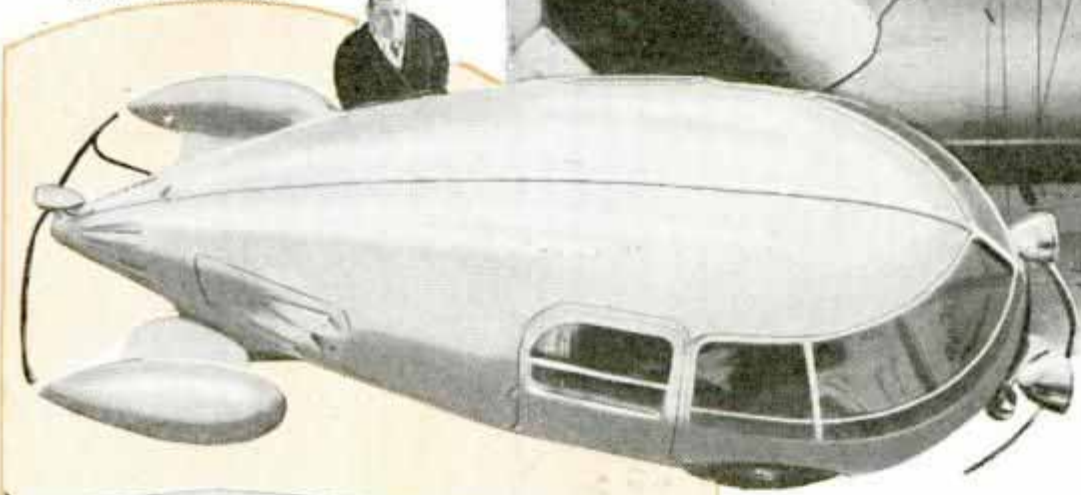
ILLUSTRATES THE EFFECT OF STREAMLINING IN REDUCING WIND RESISTANCE



DEPICTS RETARDING FORCE SET UP BY NON-STREAMLINED CAR IN MOTION



Above, Lockheed Model in Wind Tunnel; Left, Teardrop Car with Rear Engine Designed by Lyman Volpel



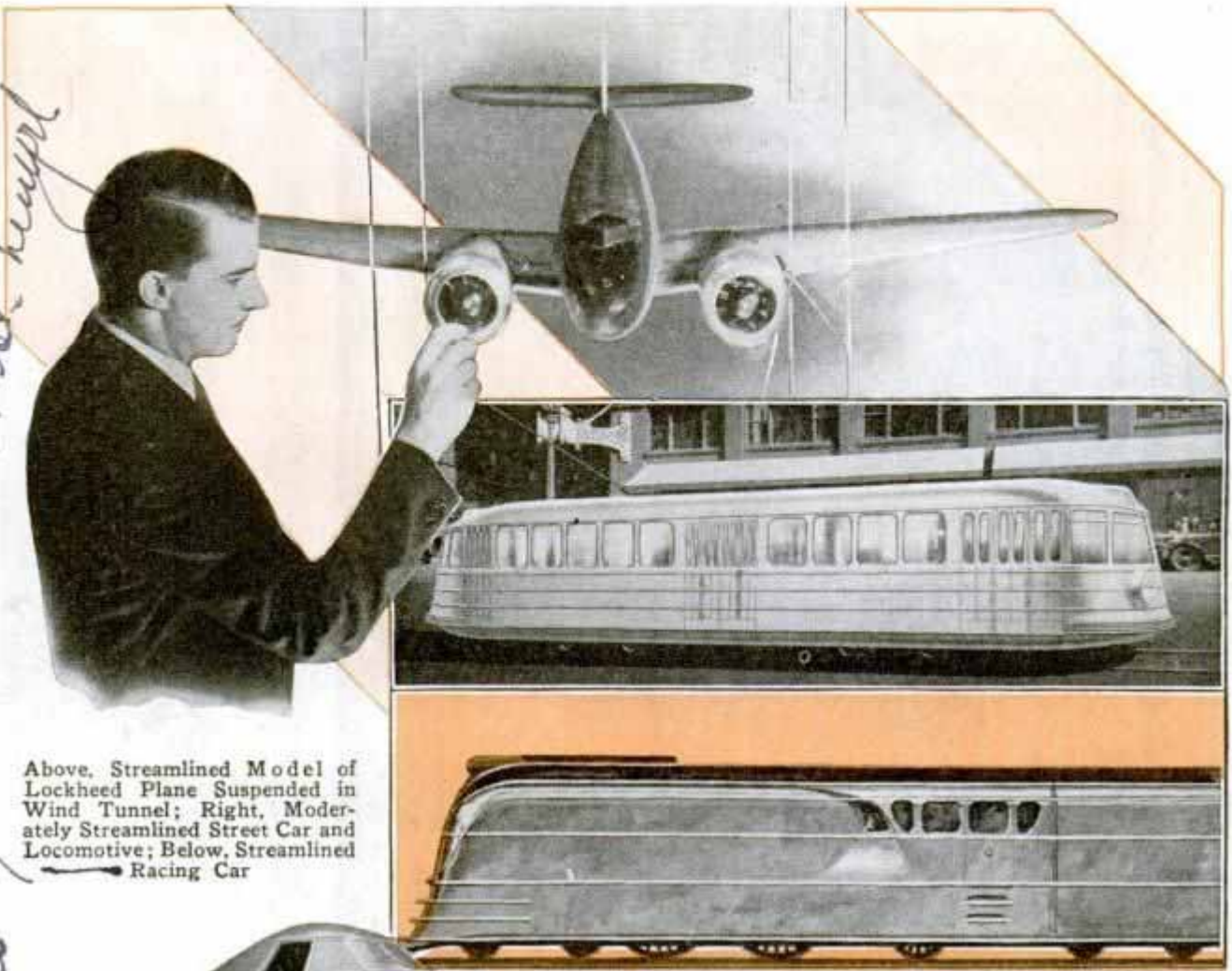
Floating Body on Auto for Wind-Resistance Test; Yawmeter in Front Measures Force of Side Winds

made at the university with full-size cars fitted with boxlike bodies set on ball bearings which allowed the body to move back as the wind exerted its force, the resistance being recorded on indicators, and other experiments have been made with

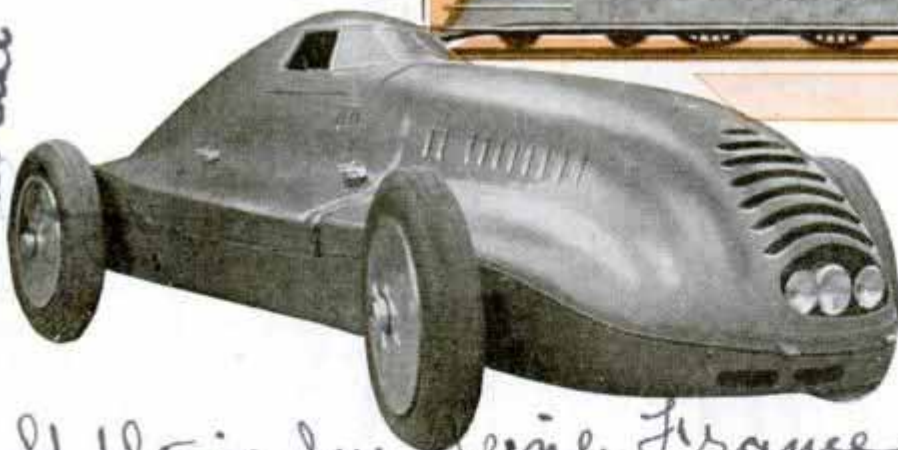
the yawmeter which enables the engineer to study the effect of side winds on a moving vehicle. From such experiments, Professor Lay offered several suggestions to manufacturers who want to build a car in which the power is used to propel the vehicle instead of to fight the wind. Here are some of his ideas:

Remove the wind-claws from the body or build the body out to inclose them; replace sharp edges and corners with rounded surfaces; build the front of the car to bore a hole through the air with the least possible disturbance of the surrounding air, and the rear to lay the air back in place without eddies or turbulence. He points out that the shape of the ideal streamline form naturally provides space for housing the engine at the rear

47423 Sheridan U boat
 Cheap
 Jan. 1934



Above, Streamlined Model of Lockheed Plane Suspended in Wind Tunnel; Right, Moderately Streamlined Street Car and Locomotive; Below, Streamlined Racing Car



power plants. In casting about for ways to provide more speed without building bigger engines eating more fuel and adding more weight, they learned that air resistance absorbs much engine power above thirty miles per hour.

By reducing air resistance, these experimenters found they could kill several birds with one stone. Streamlining, they discovered, cut down the power requirements to propel a vehicle. The power thus saved could be used to develop more speed with no increase in power plant. They also found that the pure streamline form offers vast possibilities in the saving of weight, and this in turn saves power and adds still more speed.

and that full advantage cannot be taken of correct streamlining without improving the transmission so the engine will operate at the most efficient speed for all car speeds. This suggests a gearshift with more than three forward speeds, but Professor Lay believes the solution is in the variable-speed automatic or partly automatic transmission.

For several years normal driving speeds and maximum car speeds have been increasing. This increase has been accomplished mainly by using larger engines, but engineers have realized that this policy, if continued, will lead to ridiculous

The conventional boxlike sedan body, it was found, has about half as much air resistance as a flat plate of the same size. Merely rounding the corners of a sharp-

*American Locomotive Co.
V.B. Churchhill, St. Louis*

*Hitchcock (P)
et Cie*

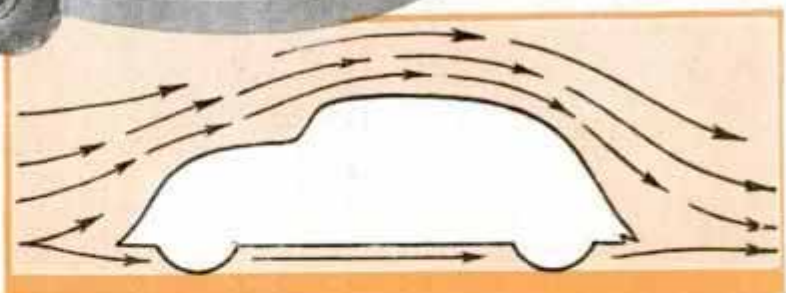
St. Denis sur Seine, France

*Chrysler Labours large
the date
car*



Diamond Truck

Above, Looking through Window of Wind Tunnel at Car Model under Test; Left, Streamlined Tank Truck with Rear Engine; Below, Air Flow as It Passes over Streamlined Car



edged body, may reduce its air resistance to nearly one-half, but by streamlining front and rear this resistance may be reduced to one-tenth the original value. Tests have shown that one form of streamlined cars offers air resistance of six pounds per square foot at 100 miles per hour, compared with fifteen pounds for the boxlike body.

At thirty-five or forty miles an hour about one-half the engine power is used to overcome air resistance with the conventional car. Eliminating fifty or sixty per cent of this resistance, therefore, adds twenty-five or thirty per cent to the engine power available. But it is also contended that correct streamlining would lend itself to cutting over-all weight from twenty-five to forty per cent, so the en-

gine in the car of pure streamline would also have less weight to propel.

Some of these things have been known for a long time, but the public has very definite ideas of how an automobile, a train or an airplane ought to look, and the makers have been afraid to change the appearance. Gradually, however, corners have been rounded, some of the protuberances have been removed from bodies, windshields have been slanted, radiators rounded, fenders skirted and an attempt has been made to mold the rear into some-

no. 10. 11.

1775 Broadway
New York City



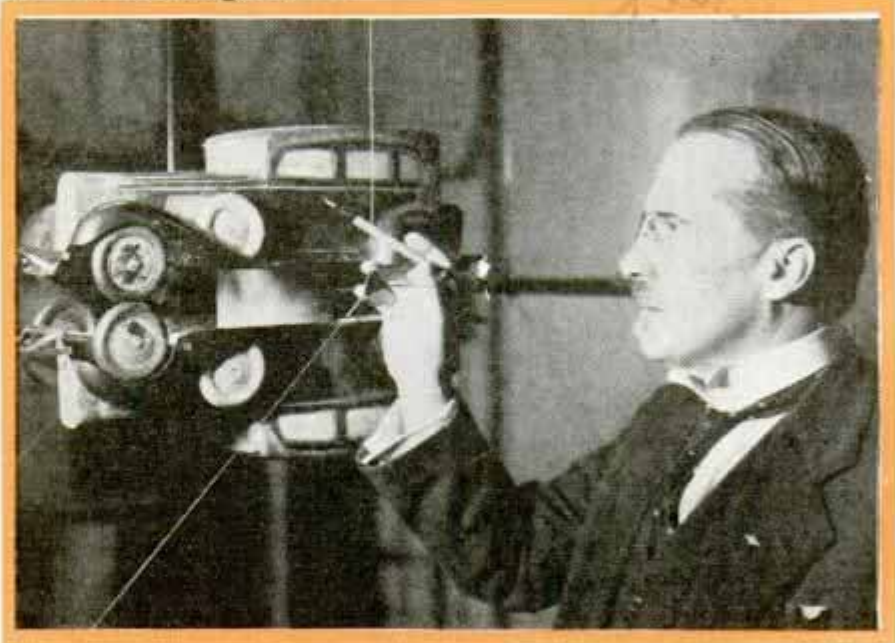
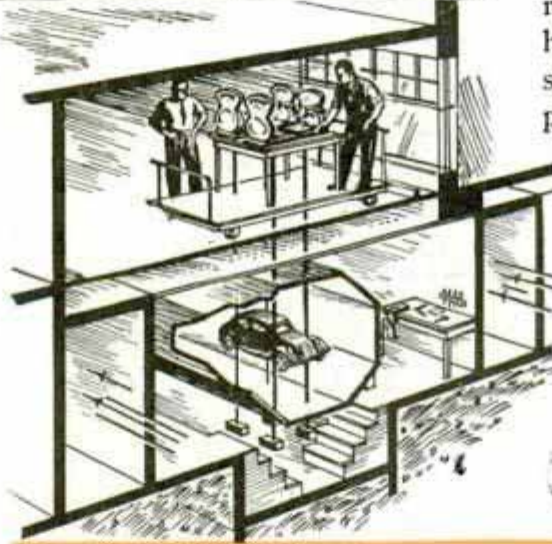
used heretofore to support the weight.

Europe has carried streamlining to the underside of its cars and now offers models with the bottom of the chassis entirely inclosed. Hal Holton, sales engineer of the New Era Motors corporation, advises automobile manufacturers to allow machine tool makers and pressed steel men to try their hands at making a simply designed structure fully streamlined.

"If they ever do," he remarks, "they would have a car that could be sold at a reasonable profit per pound; one that the poor white-collar man could afford to operate and one that the so-called common people could use in place of street cars; a vehicle that could be sold throughout the world."

thing less like a rectangle. How far has streamlining progressed toward its ultimate goal? Not very far, say engineers. But the public is at last becoming streamline-conscious, and will become more so when it is generally known that it means more than a startling body style. One critic has declared that a pure streamlined car could be made so beautiful as to make present models look like "a very intermediate streamline form hiding a mechanical buggy with one foot in yesterday's buggy graveyard."

Pure streamlining—a bulletlike nose, smooth flowing line and a long tapering rear section—naturally lends itself to a commodious passenger compartment so placed as to assure a maximum of comfort. It also gives the body builder a chance to create stamped designs of pressed metal and the car builder an opportunity to discard some of the iron which he has



Above, Balances from Which Readings Are Taken in Wind-Tunnel Tests of Models; Center, Diagram Showing Arrangement for Testing Models in Wind Tunnel at University of Michigan; Below, Applying Plastic to Give Streamlined Model the Shape of Old Square-Cornered Car

Israhahm

PUBLIC EDUCATION BEING SUPPLIED BY NATIONAL PARKS

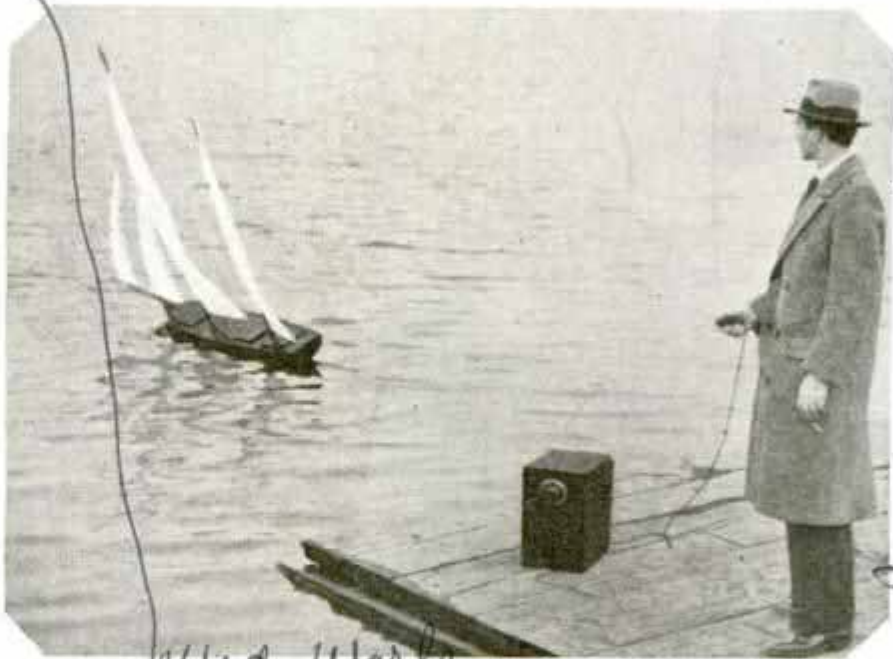
With the recent addition of human history to the original program of natural history, the American national parks have become great educational areas where visitors gain a wealth of information through lecturers. Thirteen years ago, the pioneer efforts in nature lecture and guide work were started and today eighty-eight per cent of travelers in the parks attend these government-sponsored explanations of the natural wonders. Recently the custodianship of famous historical spots, like Jamestown, Saratoga and Morristown, has come into the care of the national parks division, and historians have been added to a staff, which at first included only naturalists.

AIR REGULATOR GUARDS MOTOR AGAINST FLOODING



Protection against flooding the engine with raw gasoline in starting is provided for the automobile by an air regulator that helps to maintain the proper fuel mixture. The regulator is screwed into the vacuum connection of the intake manifold. It consists of a hard rubber sleeve actuated by the vacuum pull against a small spring. When the motor is idling the stronger pull of the vacuum closes the valve, cutting off the flow of air. As the speed of the motor increases, the valve ascends, the sleeve passing a series of air intake holes. Thus, as the motor is accelerated, the valve allows more air to enter, resulting in increased mileage.

Vapor-rite Mfg Co
Power



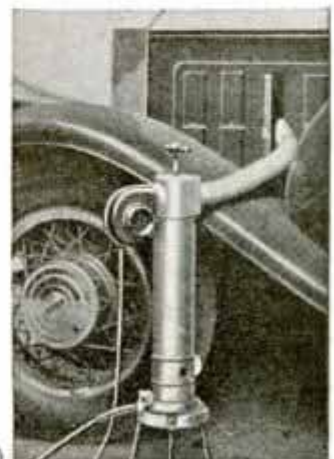
Model Sailboat Being Manipulated by Radio Signals Transmitted from Shore; Bulb on Mast Lights When the Boat Receives a Signal

RADIO DIRECTS TINY SAILBOAT BY SIGNALS FROM SHORE

Every movement of a model sailboat constructed by Robert H. Packard is controlled by radio signals from equipment on shore. Due to the boat's size, it was necessary to build tiny batteries and other apparatus in order that the weight would not be too great for the craft. It turns to the right or left, hauls in its sails when running close-hauled and releases them when running before the wind. A bulb on the masthead lights when the radio signal is received.

GAS-ELECTRIC ENGINE HEATER RUNS AT LOW COST

Automobile engines may be kept warm by means of a gas-electric heater that blows heated air. This warm-air blanket envelops the motor, assuring quick starting in the coldest weather. Since the heater directs its blast under the hood, there is a considerable saving in comparison with the cost of heating the garage.



Reynold Mfg Co

Science Service 12/20/33

Washington C 1948

U.S. World

Salem, Mass Graduate
Student of Harvard
Cambridge

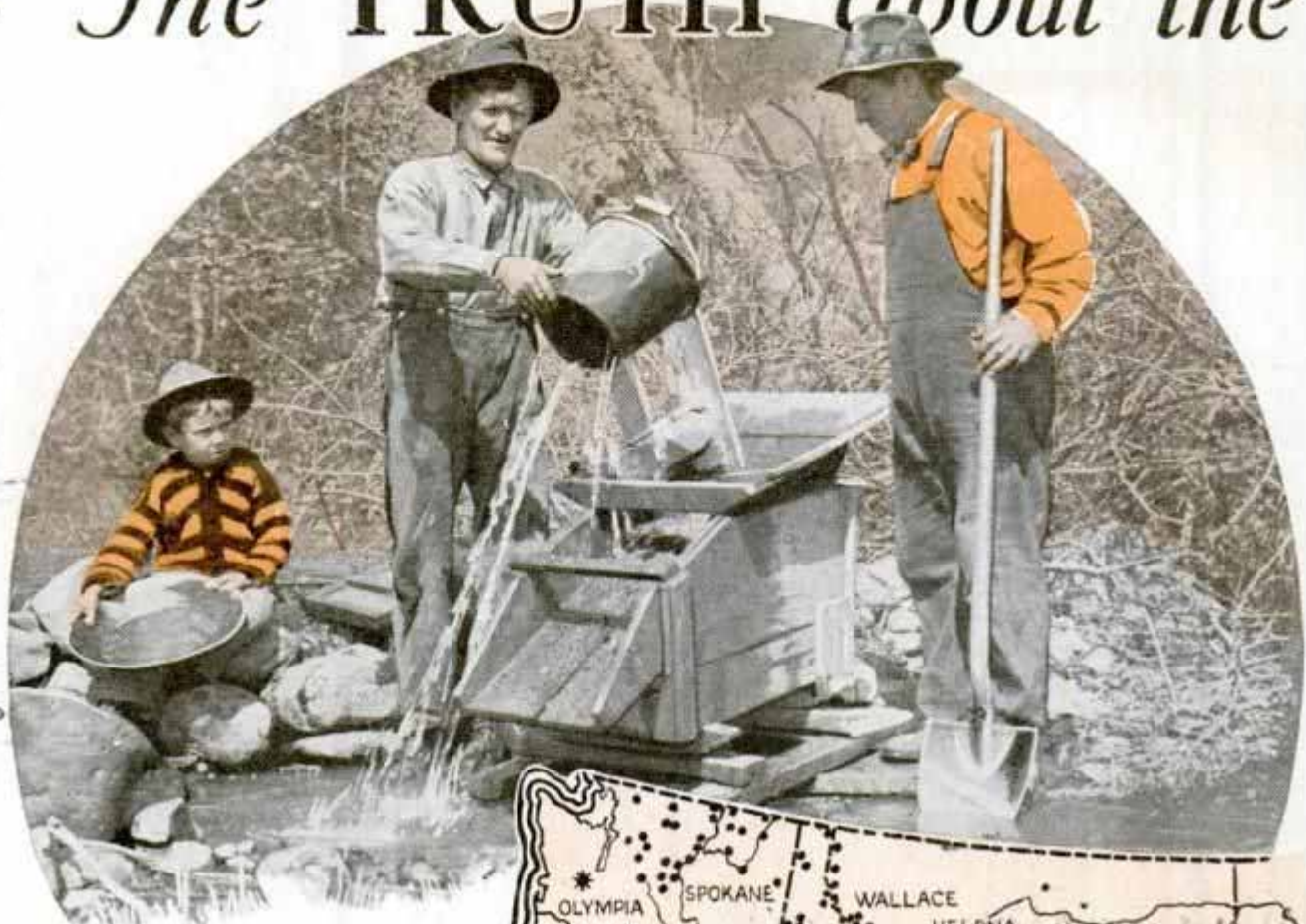
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The TRUTH about the

University of Park Denver Col



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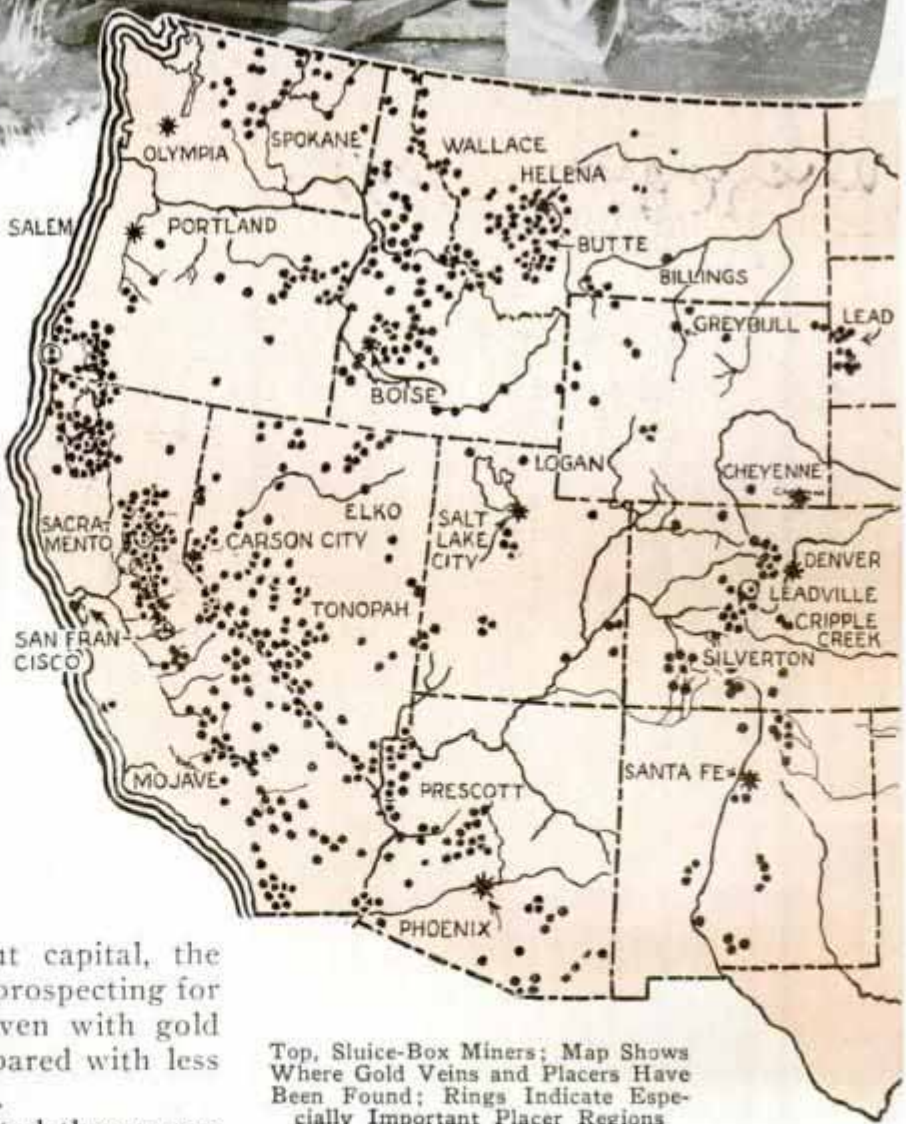
By P. G. WORCESTER
 Professor of Geology
 University of Colorado

THERE still is gold in "them thar hills"—untold millions of it.

The real problem today is: "How much does it cost to get it out?"

The mining company tries to reduce the cost of producing gold by using machinery capable of handling a large volume of ore. The prospector playing a lone hand must figure the cost in terms of time and labor expended to obtain an ounce of the yellow metal. For the inexperienced man without capital, the chances of making a living prospecting for gold are not promising, even with gold around \$34 an ounce, compared with less than \$21 a few months ago.

For instance, it is estimated there were



Top, Sluice-Box Miners; Map Shows Where Gold Veins and Placers Have Been Found; Rings Indicate Especially Important Placer Regions

U.S.A. Lee,
Arcaño, Nevada

CPA-5-1

NEW GOLD RUSH



Top, an Old Prospector at the Entrance to His Dugout; Below, Moving Gold Coins through the Busy Streets of New York City



returns from the mint. She sent one shipment representing about a week of work by sixty-four men. The largest amount paid any individual on this basis was \$14.90, the smallest was ten cents. The average per man with \$34 gold would have been about \$4.50.

Thousands of idle men and boys see a chance for productive employ-

ment in the world-wide demand for gold today. They have seen the price skyrocket as nations bid against each other for the supply, they have heard stories of the rejuvenation of old mines, and of hordes of happy tourists scooping up gravel in pie pans and washing out gold flakes.

Their fathers and grandfathers heard even more fantastic tales in the days of '49 and '59. They listened to stories of people building sledges with rasps on the bottom, hauling them to the top of Pikes

12,000 placer miners in California in 1932 and they recovered \$493,437 in gold at prices then prevailing. If they worked sixty days each, their earnings per day averaged less than seventy cents per man, or less than \$42 for two months of hard work. Even at \$34 an ounce, their average earnings still would have been under \$70 for the season.

A woman grocer in Arizona paid placer miners \$18 an ounce for their gold, making up the difference after she received

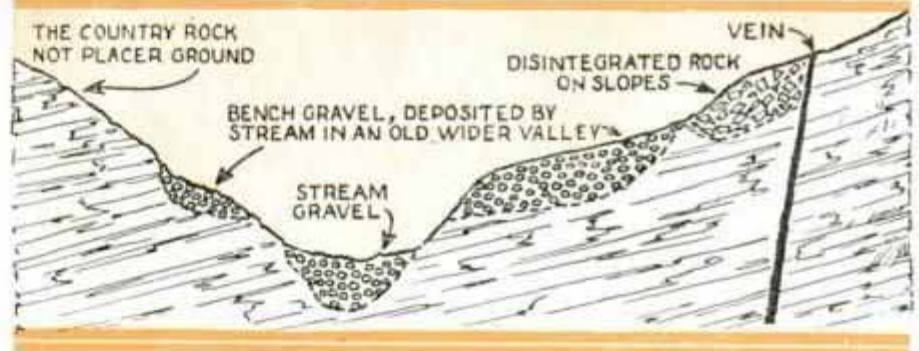


Above, Hydraulic Miner Washing Down Gravel; Below, Typical Occurrence of Placer Gold Deposits and the Vein Where They Originated

Peak, climbing aboard and sliding down, arriving at the bottom literally rolling in the riches scraped off the gold-plated mountain on the descent. Such yarns spurred enthusiastic but wholly inexperienced men to feverish haste westward. A few months later they came stampeding back, a bitter, disappointed and disillusioned mob. For every man who found real pay dirt, thousands of others had but a few cents a day to show for weary months of privation and hardship.

Today there are indications that history is about to repeat itself. Unemployment and the demand for gold have combined to focus attention on the happy hunting grounds. Footloose men with old cars vision a trip over good roads to the gold fields, and a carefree life in the open digging for yellow riches. Where the Forty-Niner went to make a million, these men would be satisfied with making a living.

What about it? The gold is there, and no harder to find than before the price went up. Can the inexperienced man make a living getting it out at the increased price? Can he even make expenses? How about a strike?



The answers are discouraging. So much so, in fact, that he cannot even depend on making expenses, and should not take the chance at all unless he has a "grub-stake" of at least \$100 plus transportation both ways. Without ready cash for his equipment and living expenses, he is likely to become a charity case within a month—and there are plenty of experienced miners on charity rolls now.

But suppose you feel lucky, have the grub-stake and an old car. After all, you must live somewhere and living in the open is inexpensive. And of course, there is always that long chance of a strike! So, knowing the worst in advance, let's assume you are going to spend a season searching for "colors."

Where shall you go? Any sour-dough knows the answer. Go where gold has been found before. You have a choice of a dozen western states and can obtain in-



formation from the bureau of mines of the state you pick as to the gold-producing districts.

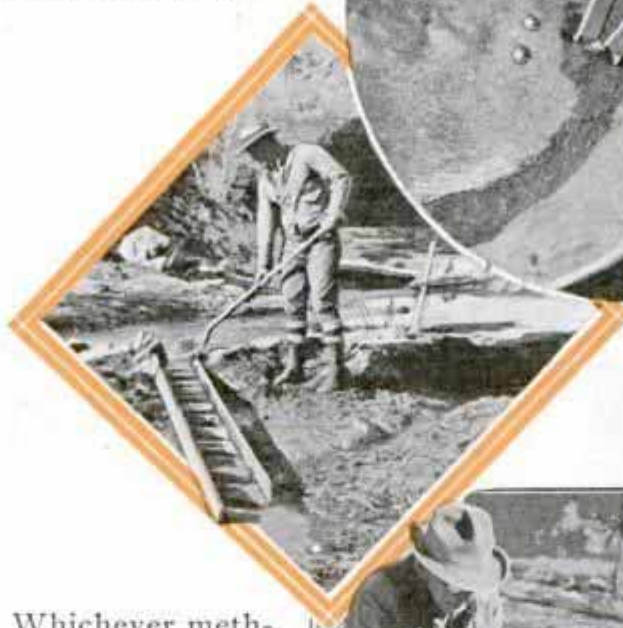
When shall you go? Don't start too early, just to be first on the ground. You can't work frozen ground and, while you will need water for mining, you don't need a flood. Melting snows swell little mountain streams to torrents in the spring. Late spring, summer and early autumn are open seasons for the prospector.

Wherever you go, you will have four chances to find gold. You can try placer mining, prospecting for new veins of gold-bearing ore, working over old mine dumps and tailings from old mills, or join with two or three others, lease a small mine and work it. Whichever method you choose, you will find others have been there before you. This does not mean all the gold is gone, because it is being found every season on worked-over ground. But there is scarcely a foot of gold-producing territory which has not been examined by experienced eyes. So you have about as much chance to pick up a nugget as to draw thirteen spades at bridge.

Placer mining, hunting gold in the places streams have left it, means hard work and



Above, Panning Operations; Removing Gold with Quicksilver, and Black Sand with a Magnet



Using a Sluice Box to Wash the Gravel, and a Placer Miner and His Equipment for Panning; the Simple Equipment Shown Costs about Fifteen Dollars, Exclusive of a Light Camping Outfit

© 1957
350

plugging away day after day, but it is inexpensive. To pick a likely location, you must know something about veins. Gold is where you find it, but it did not "just happen" to get there. A gold vein occurs in a fractured rock which has been filled in with mineral matter by water seeping through the cracks. A lode is a group of these veins emanating from this central zone of fracturing and the mother lode is this central zone.

A placer deposit consists of gold eroded from the vein by streams or glaciers, or disintegrated solid rock not yet eroded. Such a deposit may be found anywhere from a few hundred feet up to ten or fifteen miles from the vein. So, to find placer gold, you must pick a site along a stream flowing away from a region where veins have been found. Your hunting ground is in the gravel of such stream channels, on benches in gravel where streams once flowed, or in the disintegrated rock near gold veins.

Virtually all known placer ground is covered by patented claims, a title conferred by the government in return for development work, or is under lease from the state. The county recorder can tell you the owner of the location you want to work, and the owner will probably want ten per cent of what you find. If the land

is unclaimed, you have the privilege of staking a claim, but you must remember that if gold ever had been found on the location you are considering, it probably would have been claimed by an earlier investigator. And the chances are that the spot you select has been examined many times by experienced prospectors.

You have a choice of three methods in working your placer deposit. You can wash the gravel with a gold pan, or use a rocker or sluice box. Regardless of which method you use, your equipment will cost between \$40 and \$50. It should include a complete camping outfit—tent, stove, bedding and cooking utensils—a wheelbarrow, gold pan, quicksilver for picking up the flakes of gold from the pan, chamois skin for straining off the mercury, a mercury retort to volatilize and reclaim your quicksilver, a mortar and pestle to crush specimens for tests, a magnet to draw off certain heavy ores from your pan, an ax, rubber boots, a pick and a shovel.

By panning, using water to wash off the lighter gravel, you can handle about one-half a cubic yard of gravel a day, or 1,800 pounds. If you want to operate on a larger scale, build a rocker or sluice box. The rocker, favorite tool of the Chinese in California, is a tray on rockers with a screen

(Continued to page 126A)

W Frame Screen Co. Box 296
Elmhurst, Ill. Tel. Elmhurst 3260

\$2.00 - 5.95

© 1999

FRAMELESS WINDOW SCREEN HANGS LIKE A CURTAIN

Window screens which are applied without the use of frames have several advantages over the ordinary kind. They are easy to install, present a neat and attractive appearance and can be rolled like a curtain for storing, thus saving space. The frameless screen has a metal strip at the top and bottom of wire netting fitting between the window casing or molding. The screen is stretched in place and held in position by special fasteners. It can be installed from inside, gives a wider opening and cannot be opened from outside except by cutting or mutilating the wire netting. They do not need to be removed for window washing. Instead, they are unfastened at the bottom and then hang out like a curtain, giving free access to the outside of the window. There is no danger of dropping or damaging the screen.



Window Screen without a Frame Which Is Hung Somewhat Like a Blind or Curtain

12/17/33
Herald Tribune

Web address for Wisconsin
C 2008 POPULAR MECHANICS Paper Co

Downey 351
Calif.

OLD PHONE BOOKS USED AGAIN IN MAKING PAPER

What happened to your last year's telephone book when the company collected it? It may be a part of the new directory you are now using. If telephone books are printed with a new type of ink, the paper can be reprocessed by a method recently developed and used again for paper making. The bulky telephone books in some of the larger cities are being reclaimed in this manner. The special ink used can be bleached and dissolved from the paper fiber and subsequently is washed away from the recovered pulp. This recovered pulp also can and has been employed in the making of high-grade white paper of better quality than that used in telephone books, in some cases eighty per cent being used successfully.

Airplane with Folding Wings Which Makes Storage and Handling a Very Easy Matter



WINGS OF AIRPLANE FOLD UP
IN THREE MINUTES

For easy storage and convenient handling, the wings of a new airplane may be folded in a practical manner. This makes possible the storage of the ship in a much smaller space. The wings can be folded in three minutes.

FOUR CARS PACKED ON CARRIER
THIRTY-NINE FEET LONG

Four of the largest automobiles in the industry may be stored on an odd-looking tractor-trailer carrier that is only thirty-nine feet long. This is made possible by an ingenious method of topleading and overlapping. The laws of many states, especially those on transcontinental routes, specify that such carriers shall not exceed a length of forty feet. The new vehicle was created to carry the same number of cars without violating these laws.

C 1943
Sweeney Bros 12/20/33



Although It Is Only Thirty-Nine Feet Long, This Tractor-Trailer Carrier Can Haul Four Cars by Topleading and Overlapping

WAR UPON INSECTS HAS SAVED
MAN MILLIONS OF DOLLARS

Science has been waging war on insects for only about a century, but in that period mankind has been saved hundreds of millions of dollars. Dr. Warren Elmer Hinds, president of the American Association of Economic Entomologists, says the fight against two cotton pests alone, the pink boll worm and the boll weevil, saves \$100,000,000 a year to the south. The wiping out of cattle ticks will stop losses as great as \$130,000,000 annually, and the wiping out of the Mediterranean fruit fly, after its alarming introduction into Florida, prevented losses beyond any estimate in money. Also in wiping out yellow fever and abating malaria through the attack on their carrier mosquito species, great savings of lives have resulted.

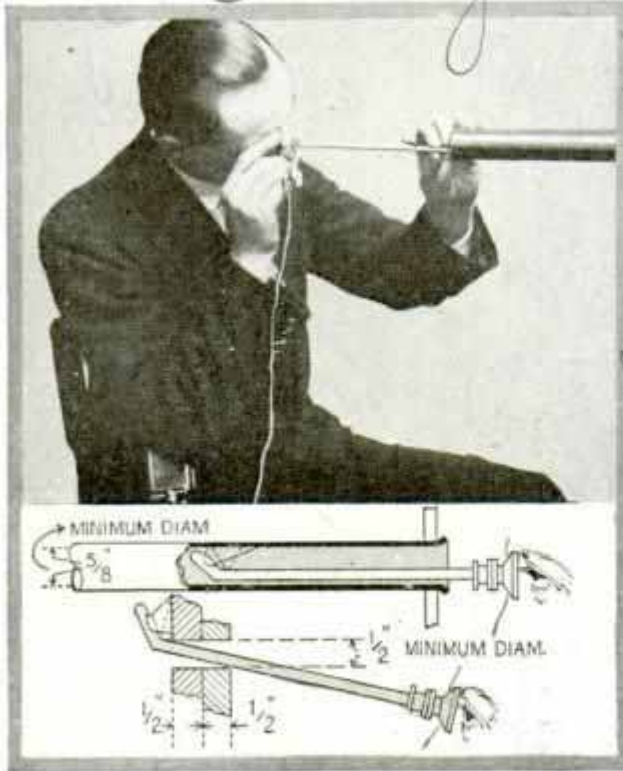
C 2014

Washing to prevent
Sweeney Bros

Mechanical Handling Systems

© 1932
352

Chicago
Co. 4115 Roosevelt Ave
POPULAR MECHANICS



Top, Inspecting Inside of Gun Barrel; Bottom, How Instrument Is Applied by Inspector

GUN BARREL FLAW DETECTOR FITS INSIDE THE BORE

So small that it may be slipped inside a gun barrel to examine the inner surface for flaws, corrosion and other defects, a new instrument is being used to inspect firearms. It consists of a small tube, in some cases less than one-fourth inch outside diameter, with an eyepiece at one end and a prism and mirror system at the other. A small electric lamp illuminates the surface under inspection, its rays striking obliquely. Inequalities are thrown into bold and high relief. Rotation of the tube to three positions illuminates the entire inner surface of the gun barrel. The eyepiece is removable and extra sections may be added to the original eleven-inch length as needed for the work in hand. The critical inspection made possible by the detector prevents installation of dangerous material and eliminates most of the risk of failure with possible loss of life.

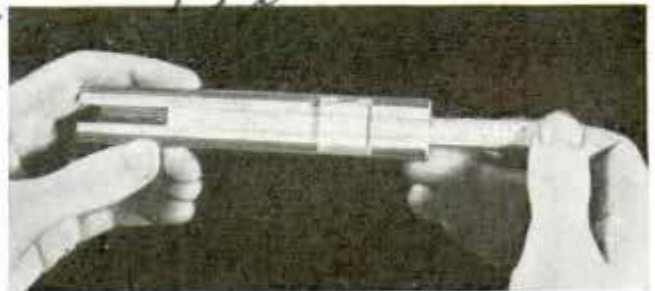
WINCH FOR LAUNCHING GLIDER RUN BY JACKED-UP AUTO

Operated by an automobile with its rear wheels blocked off the ground, a launching winch for gliders has been tested successfully in the United States. The ar-

range-ment imitates the towing system, in which an auto pulls the glider, but in this case the car is stationary, doing away with the wear and tear of driving the car over the ground while the glider takes off. Essentially, this equipment consists of a winch on which is mounted a drum of heavy gauge steel, welded to form one solid structure. The drum rides a steel shaft suspended in regular line-shaft hangers. Power transmission is accomplished through a double-chain drive on the rear wheels of the auto. Because of the gearing of the drums, the wheels need turn at only one-half the speed required ordinarily to give the glider flying speed. In tests, the winch has enabled gliders to attain 1,300 feet of altitude with 3,500 feet of line. The towline is airplane steel, approximately three-thirty-seconds of an inch in diameter, with a tensile strength of 125,000 pounds per inch, about 100 times stronger than any rope used for towing. A small parachute connected to the ring at the end of the line lowers the wire to the ground. When the glider pilot releases the towline, a small parachute at the end lowers the wire line to the ground, preventing kinking and twisting.

SLIDE RULE HELPS ENGINEERS TO CHECK FIGURES QUICKLY

Quick checking of figures and calculations may be made by a slide rule for engineers, pilots, mechanics, field men and students. Ideal for rough calculations, the slip stick is six inches long, with solid celluloid faces. It is ingeniously assembled in its chromium-plated metal back with



Simple Slip Stick Helps the Engineer to Check His Calculations Quickly on the Job

clear, non-breakable cursor. It is equipped with a leather case. The rule is accurately divided with scales A, B, C and D sufficient to perform multiplication, division, squares and square root.

Developed by. Abbatross

of index co., 239 John
1131 Broadway, Conn

Accurate Engineer 12/1/32

Accurate Engineer 12/1/32

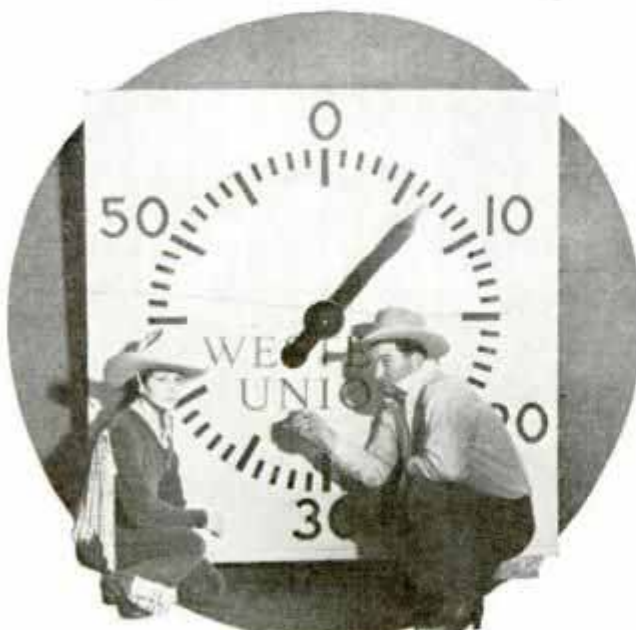
Science Service

**ANESTHETIC INJECTED IN VEIN
 MAY REPLACE ETHER**

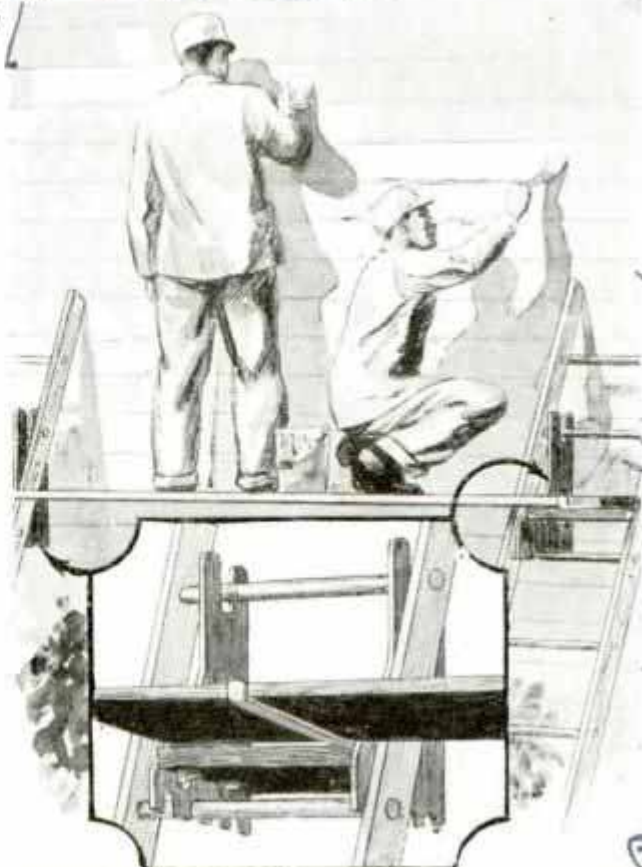
Tried extensively in Germany and England, a new anesthetic which is injected directly into the blood may prove as valuable as ether for certain types of surgical operations. It is called evipan and produces a deep, normal sleep within thirty seconds. It is injected through a vein in the arm. The operation then can be started immediately and the patient awakens without any unpleasant after-effects.

**HUGE CLOCK LIKE STOP WATCH
 TIMES SPORTS EVENTS**

Overgrown stop watches in the form of giant clocks which can be seen by all spectators are being used to time rodeos, football games and other sports events. Such a clock is controlled by the official timekeeper who keeps his finger on a button which he presses to denote "time out" in a football game. In a rodeo, another button returns the clock to the starting point after each event is timed. Each clock can be started, stopped or reset by the timekeeper, and special relay circuits may be employed to cause the timepiece to stop at any predetermined time and blow a horn. For a rodeo only giant second hands are used, but for a football game there is a minute hand which makes a circuit of the face in fifteen minutes, and a second hand which becomes the center of attention during the last minute of a game.



Big Clock Which Operates Like a Stop Watch and Is Used in Timing Sports Events



Removable Step with a Wide Tread Which Fits Any Rung Ladder and Gives Comfortable Footing

**REMOVABLE STEP FOR LADDER
 IS EASY ON THE FEET**

To make it possible for a workman to stand on a rung ladder as comfortable as on the floor, a removable step with a wide tread has been made to fit any ladder. It consists of two steel brackets supporting a wood tread bolted to four angle braces. Each bracket is held securely between any two rungs of the ladder by means of slotted prongs at the top of the step and one of four semicircular notches at the bottom of each bracket. The several notches make it possible to place the step in a horizontal position, regardless of the angle at which the ladder is placed. By employing two ladders and two such steps, the device can also be used as a scaffold support. For such use, a projecting bar is bolted to the tread to support the plank platform of the scaffold.

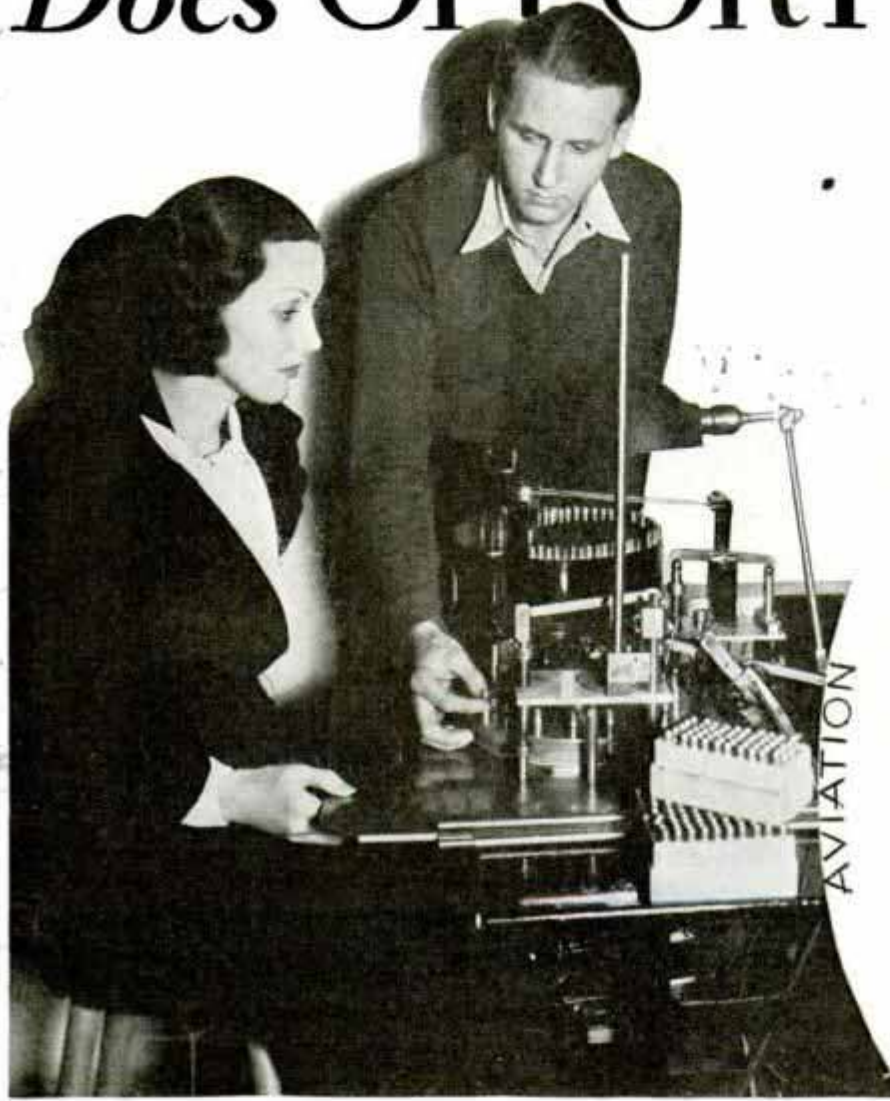
Popular Mechanics Magazine does not publish the name of the maker of, or dealer in, any device described in its pages, but this information will be furnished by our Bureau of Information upon request accompanied by return postage.

*C. 245.7 W. opward Ave
 Detroit, Mich
 D. J. Crowley*

Western Union Telegraph

21931

Does OPPORTUNITY



By EMILE C. SCHNURMACHER

22 E 69th Street

WOULD you like to push the hands of the clock back for a generation? Do you believe that the professions and the occupations were less crowded then than they are now and there were more opportunities to get ahead? Do you think that in this day of big business, of ultra-modern machinery that is rapidly replacing skilled human beings, the door to opportunity has been swung tightly shut in your face? Or do you believe that opportunity still exists?

Instead of wishing for the return to a generation ago, science points out that not only does opportunity exist for you today as it always has, but in seizing that opportunity you can do so with greater ease and comfort as well as with more help than formerly.

The big problem today is not to deter-

Above, Machine Which Turns Out Cartridges for Smoke and Noise Scenes in Movies

mine if opportunity exists, according to Dr. Charles S. Slocombe, associate director of the Personnel Research Foundation, but where opportunity exists.

"In doing this, it is exceedingly important that we know which occupations are growing, which are declining and how fast these changes are taking place. And that is just what we are finding out," states Doctor Slocombe.

In the basic industries, such as farming, mining, manufacturing and transportation, as a result of a survey extending over twenty years, Doctor Slocombe finds that

29 W. 39th

Still EXIST ?



RADIO



RESEARCH



opportunity is limited. He points out that employment in these industries has increased but six per cent since 1910 although production has increased by eighty-six per cent.

How about opportunities for a young man in the occupations and professions which render service, such as doctors, lawyers, dentists and architects?

"The group of workers concerned with rendering service to other workers has grown by fifty per cent," states Doctor Slocombe, "while the population itself has grown only thirty-five per cent."

Here then is a field that is being overcrowded not because science is replacing human beings with machines but because the growth of the population itself has not kept up with the growing number who are seeking opportunities in this field.

There is still a third field to be considered. And in that field, Doctor Slocombe and other scientists and economists believe many opportunities are to be found. While science may devise machines that

Above, Television Experimenters at Columbia Broadcasting Studios; Circle Shows New Industries Which Offer New Opportunities Which Did Not Exist a Few Years Ago; Below, Experimenting with a Television Broadcast



Above, Airplane "Garage" and Service Station; Left, Installing Radio Equipment in Admiral Byrd's Ship Previous to Its Departure for the Antarctic

will replace human beings in producing merchandise, that merchandise itself can neither be supervised nor disposed of by machinery. This must be done by human beings.

"No less than 5,000,000 people have found employment in financing, selling and trading in the goods produced or grown" states Doctor Slocombe, "as well as in managing and administering all of the public and private business of the country. It was in these groups that the greatest increase in workers took place. The total number of workers so occupied actually increased by eighty-one per cent."

In pointing out the opportunities in this field, Doctor Slocombe explains that while each ton of nails may now be made by fewer men, it takes just as many people to finance and supervise its manufacture, to keep accounts, to advertise and to sell it as it did twenty years ago. Now many more barrels of nails are made, so many more managers, clerks and salesmen are given opportunities.

"Administrators and traders have, in fact, increased in about the same proportion as has the quantity of manufactured goods, administrators a little faster, traders somewhat slower," states Doctor Slocombe.

In spite of the many opportunities in this field, those opportunities are recognized by comparatively few men. An indication of this may be found in the result of a survey among Harvard freshmen on the choice of careers. Of 508 men who replied to a questionnaire, only six per cent had settled on a business career. The remaining men were scattered among a dozen different callings.

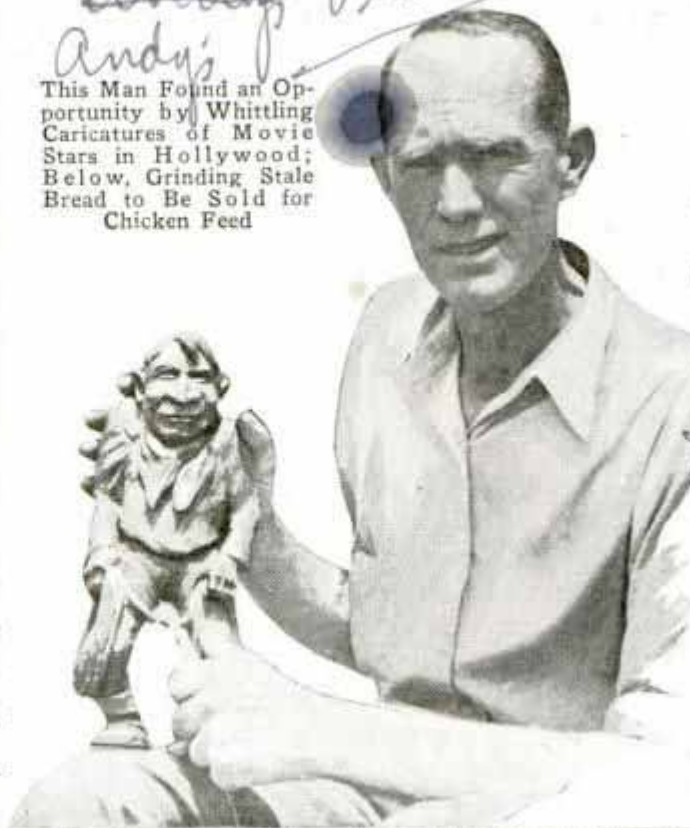
How do these opportunities affect you directly? In the first place, no matter which field you may choose, the old adage that "there's always room for a good man"

holds true today as it always has. While there may be fewer opportunities of starting at the bottom in some occupations and professions, there are as many, if not more, openings of real positions for people who can handle them capably.

Even among such "crowded" professions as engineering, Doctor Slocombe knew of positions that were open during the depression because there could not be found unemployed engineers capable of filling them.

States Dr. Thomas S. Baker, president of the Carnegie Institute of Technology: "The world may make use of fewer engineers, but it will place an even higher premium upon expert knowledge and skill." And in commenting upon opportu-

Andy's Place
Andy's
This Man Found an Opportunity by Whittling Caricatures of Movie Stars in Hollywood; Below, Grinding Stale Bread to Be Sold for Chicken Feed



near Lower Ants Court
Cahuenga Pass, Cal.
Hollywood



nities for engineers in the future he says: "Competition between nations in the world market for the sale of manufactured commodities will be keener and therefore the engineer who creates and directs processes in manufacture must not only have profound technical knowledge but also a broader understanding of world econom-

ics than that possessed by engineers of the past generation.

"During the depression it has been customary to disparage engineering, to blame technology for many of the economic difficulties and to prophesy for the engineer a less important role than he has played in the past. The first intimations of indus-

trial recovery seem to show that modern business is inextricably mixed with technology and that the technologist will, as far as we can see, continue to guide industrial progress."

But perhaps you feel that such opportunities are too far removed from your own life—that they are available only to a few capable technically minded men. Well, then, on a much smaller scale many more opportunities exist.

The familiar story of F. W. Woolworth and his chain of five and ten cent stores is known to everyone. It wasn't the unusualness of the merchandise which he had to sell. It was merely the merchandising idea of presentation which he carried out successfully. Today even more opportunities are to be found.

Charles M. Kinsolving, well known economist, in discussing opportunities that exist today recently said that every new device and discovery paves the way for many more.

"The automobile industry may be taken as an example of this," points out Mr. Kinsolving. "Let us suppose that today there exist no opportunities for a young man in automobile factories, factories making automotive accessories, garages and service stations catering to the automobile owner, or road construction companies making the road over which the automobile travels.

"Granting all this, we still find, as a result of the invention of the automobile, that during the past few years over 30,000 tourist camps have sprung up. Here alone are 30,000 opportunities which did not exist in your father's youth."

The same is true of other infant industries such as the radio, airplane and motion-picture industries which were born during the past few decades.

Whether in the business or industry of today, or in the yet to be created industries, opportunity exists for the capable man as it has since time immemorable.

AUTO TRAILER IS STREAMLINED FOR HIGH-SPEED TRAVEL

C1926

Mounted on a chassis with independent springing for each of the two wheels, a trailer recently offered is so fully stream-

lined that it handles better at high speed than the ordinary type. It is claimed the streamlined trailer is so well balanced and air resistance is reduced so much that it is free of the rolling, weaving, shimmying and bobbing associated with some trailers

Range for Ford.

Streamlined Auto Trailer on Chassis with Independent Springing



when traveling at more than moderate speed. It is built for two or four persons and is equipped with beds, stove, sink, ice box, water tank, cabinets, screens and shades for windows and a lighting system. A parking jack makes it possible to connect the trailer quickly and also makes it easy to level up the coach on uneven ground.

*Notwood Trailers
Notwood (Houston, Ohio)*



D-4

SUPER-HURRICANES ON STARS MEASURED FROM EARTH

Earth's hurricanes seem like mere zephyrs when compared with the mighty winds which have been discovered in the atmosphere of distant stars. Dr. Otto Struve and Dr. C. T. Elvey, of the Yerkes Observatory of the University of Chicago, find evidence of powerful turbulent cur-

Will Williams Way

12/29/33

5756 Carlton Way
Los Angeles, Calif.

rents, upsetting the belief that the outer gaseous atmospheres which surround the luminous lower strata of the stars are relatively calm. Drs. Struve and Elyey have measured the most frequent wind velocity of individual stars. The faint star known as seventeen Leporis has an atmospheric velocity of forty miles per second. In epsilon aurigæ, it is twelve miles per second and in the first magnitude bright star Alpha Persei, the velocity is about four miles per second.

e/1974

TINY LAMP BRINGS MOONLIGHT INTO THE HOME

Emitting a soft glow comparable to moonlight, tiny night lamps utilizing filament wires so fine as to be almost invisible to the naked eye have been developed by the General Electric company. The night lights, in two types, are of three-watt consumption and are fitted with prongs so they can plugged into the baseboard or other convenient outlet. Adding a screw part of any standard attachment plug permits them to be used in any regular socket. A choice in the amount



of light to be obtained is possible since the output of the smaller lamps, which are equipped with resistors, ranges from one lumen to twelve and one-half lumens for the larger size which operate on regular line voltage. It

is claimed five such lamps use no more current than one fifteen-watt lamp.

Dr. J. P. Rideaux
Held Park



This Table, Bench and the Vases Are Made of Sections of Colored Mirrors Which Are Assembled without Any Unsightly Fastenings

FURNITURE MADE OF MIRRORS IS VARIOUS COLORS

Furniture made of colored mirrors is now being produced without any bulky or unsightly fastenings in assembling. Tables, benches, vases and even a mirrored radio are offered. Blue, green, gold, antique gold and pale rose mirrors are used.

C 2042 ABSORBENT USED LIKE WASTE IS MADE FROM WOOD PULP

Made from wood pulp, a cellulose fiber absorbent is used instead of waste in garages and service stations as a sweeping compound and as a material for wiping oily hands or tools. The flaky material has one-thirteenth the weight of sawdust and is packed under pressure in twenty-five and fifty pound containers.

Cottontex Products Co
Millsboro, Del.

Md.

LAWN MOWER CUTS OLD TUBES INTO RUBBER BANDS

Ms. Durbin game 2422 S.E. (no answer club) 39th Portland Ore



Slicing Up Old Inner Tubes from Auto Tires with the Aid of a Lawn Mower Having a Special Cutter and Blades

Finding himself without a job, a Portland, Ore., man decided to make work for himself. He saw a ready market for sturdy rubber bands after he learned that merchants would rather use the bands than twine to wrap bundles. The man solved the problem of supplying the demand by changing the gears of his lawn mower and attaching a special cutter and blades. He obtained some old inner tubes, ran them through the mowing machine and they came out rubber bands, ready for delivery.

SPEED OF AVERAGE CAR DRIVER IS THIRTY-FIVE PER HOUR

C1985

How fast do you drive? If you are an average motorist, your speed is 35.5 miles per hour. This fact was revealed by a speed detector which spied on 41,000 drivers traveling Maryland roads. The detector consists mainly of a square box containing a mirror. When you drive by, a reflection is flashed to an observer stationed a measured distance down the road. He then times you until you cover the distance to him. Eight per cent of the vehicles timed were going only fifteen to

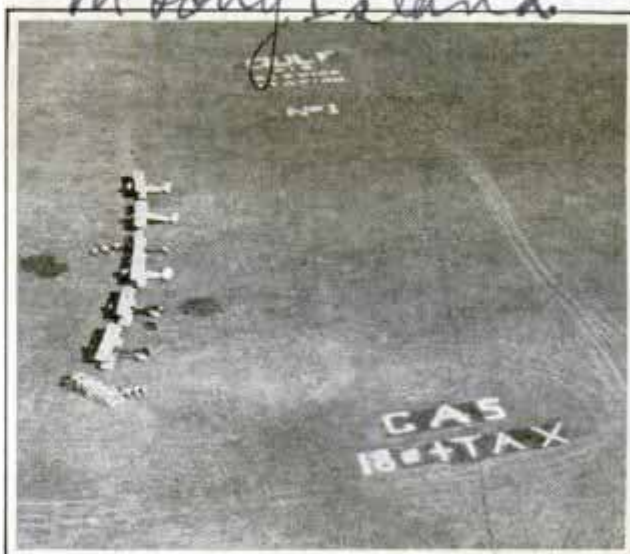
twenty-five miles per hour, one per cent was traveling over fifty-five, twelve per cent between forty-five and fifty-five, forty-three per cent between thirty-five and forty-five, and thirty-six per cent between twenty-five and thirty-five. These facts were revealed by Prof. A. N. Johnson, of the University of Maryland, at a recent meeting of the highway research board. Tests reported by E. H. Holmes, of the federal bureau of public roads, showed that ordinary traffic, not including that of rush hours, gets along with least delay when there are no lights or policemen at intersections. Of the various means for controlling traffic, the policeman caused the least delay, but lights, when changed rapidly, and when operated by the traffic itself, were nearly as efficient. Dr. Walter R. Miles, of Yale University, told the meeting that drinking of alcoholic beverages affects driving ability in four different ways and is partly responsible for about one-third of fatal traffic accidents.

C1803

PLANE SERVICE-STATION SIGNS CAN BE READ FROM AIR

Near New York City is a service station equipped to refuel airplanes, so its signs are placed on the ground instead of on signboards. The price of gasoline is painted on the landing field in letters twelve feet high which can be read with ease from an altitude of 2,000 feet. The names of the products handled likewise appear on one of these ground signs to attract the aviator passing overhead.

on Long Island



Airplane Service Station Viewed from the Air. Note the Signs Set in the Ground

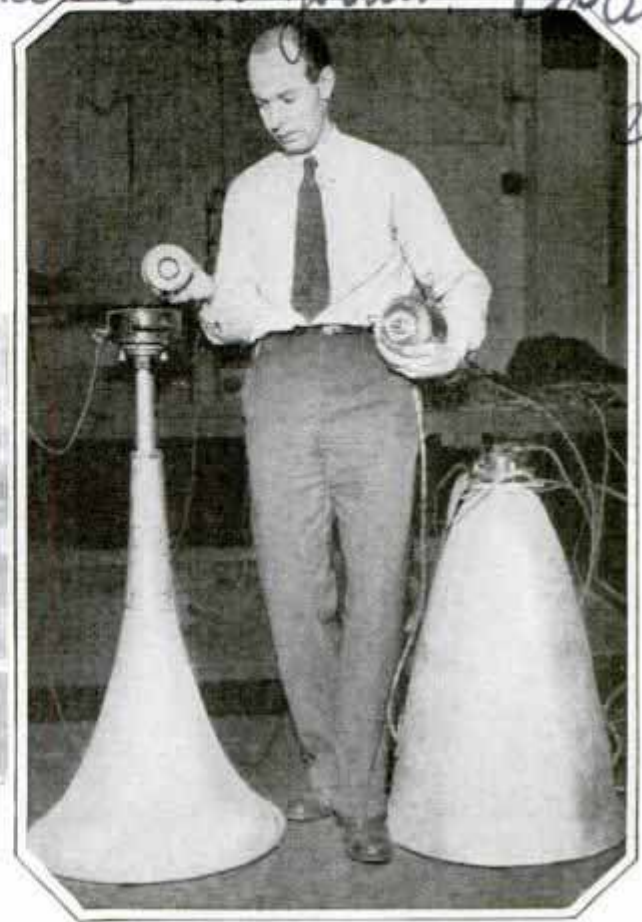
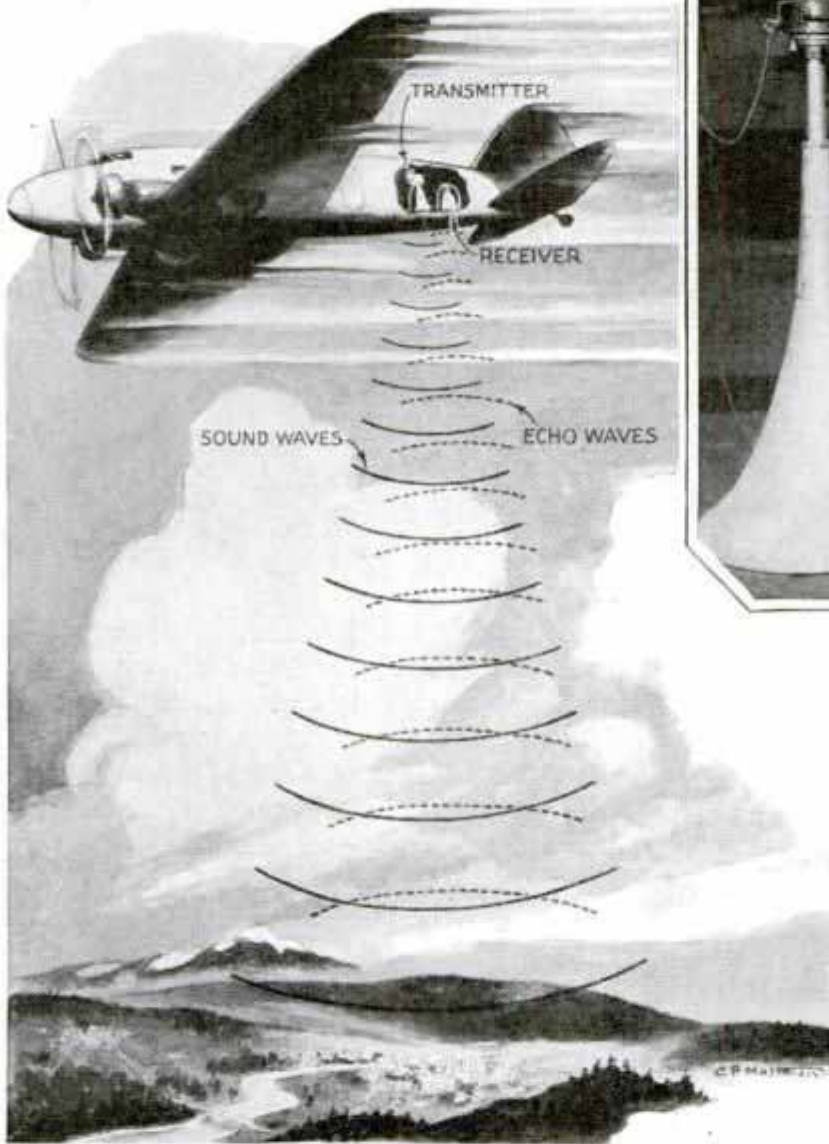
Cont. J.C. Holahan, 208 Hill St.

Science News Letter 12/16/33

Westwood Campus, University of Southern California, Los Angeles Calif

Sonic Altimeter Tells Height above Earth

Measuring height above the surface of the ground instead of above sea level, an acoustic altimeter has been designed to aid the airplane pilot flying in fog or other weather with poor visibility. The instrument operates by "bouncing" a sound signal against the surface of the earth and measuring the time which elapses until



Receiver and Transmitter for Sound Altimeter for Planes, Which Shows Pilot Height above Ground over Which He Is Flying

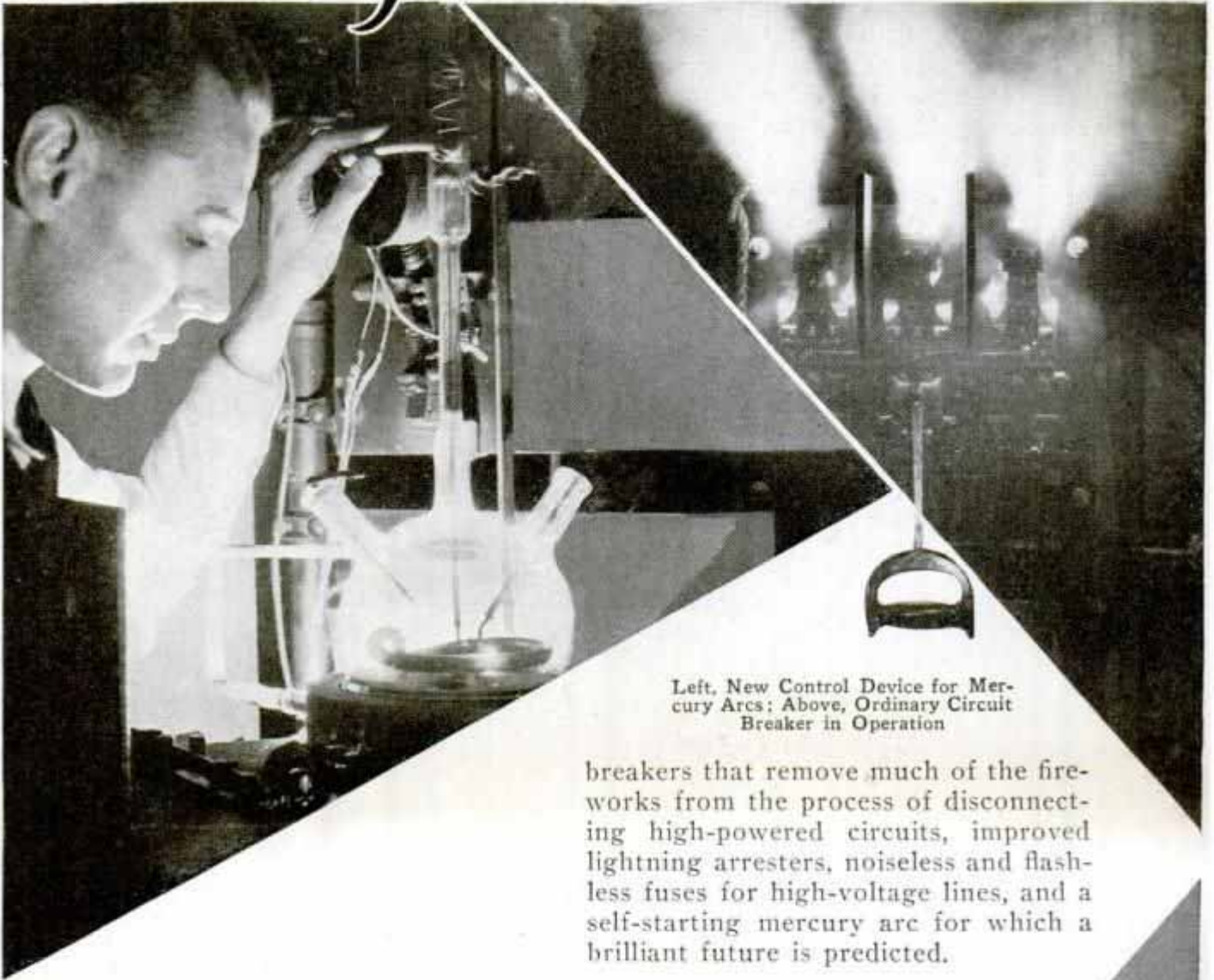
the echo is received back by the apparatus. In this respect it is similar to the sonic depth finders used on ships. It is claimed the altimeter is accurate to within ten feet and not only serves to tell the pilot how high above the ground he is flying, but also whether he is flying over level or hilly country, and warns him in time to avoid mountain peaks and similar hidden obstructions. Its accuracy is not affected by barometric pressure. In producing the instrument, it was necessary to design a

selective microphone sensitive only to a certain high pitch of sound. So in spite of the many noises produced by the ship in flight, the microphone rejects all sound except the single pitch to which it is tuned. The complete apparatus consists of a high-frequency transmitter horn, the receiving microphone, a mechanism which transforms time delay into terms of feet, and an instrument dial which automatically registers the distance of the plane above the ground. One purpose of the altimeter is to take all the guesswork out of landing blind on a fog-shrouded field. After locating the field by means of the radio range beacon, the pilot descends until his altimeter shows he is less than twenty feet above the ground, then cuts the motors and levels off as he can make a landing safely from this height.

1-25

C 76 6 6 10 32 Florida Ave
Akron, Ohio

Taming ELECTRIC



Left, New Control Device for Mercury Arcs; Above, Ordinary Circuit Breaker in Operation

breakers that remove much of the fireworks from the process of disconnecting high-powered circuits, improved lightning arresters, noiseless and flashless fuses for high-voltage lines, and a self-starting mercury arc for which a brilliant future is predicted.

East Pittsburgh, Pa

DURING the past few years an almost unbelievable array of discoveries and inventions has emanated from an East Pittsburgh laboratory, where a research expert has spent day after day studying the peculiarities of the commonplace electric arc. And the end is not yet in sight, for the work is still proceeding and new facts about arcs are being learned daily.

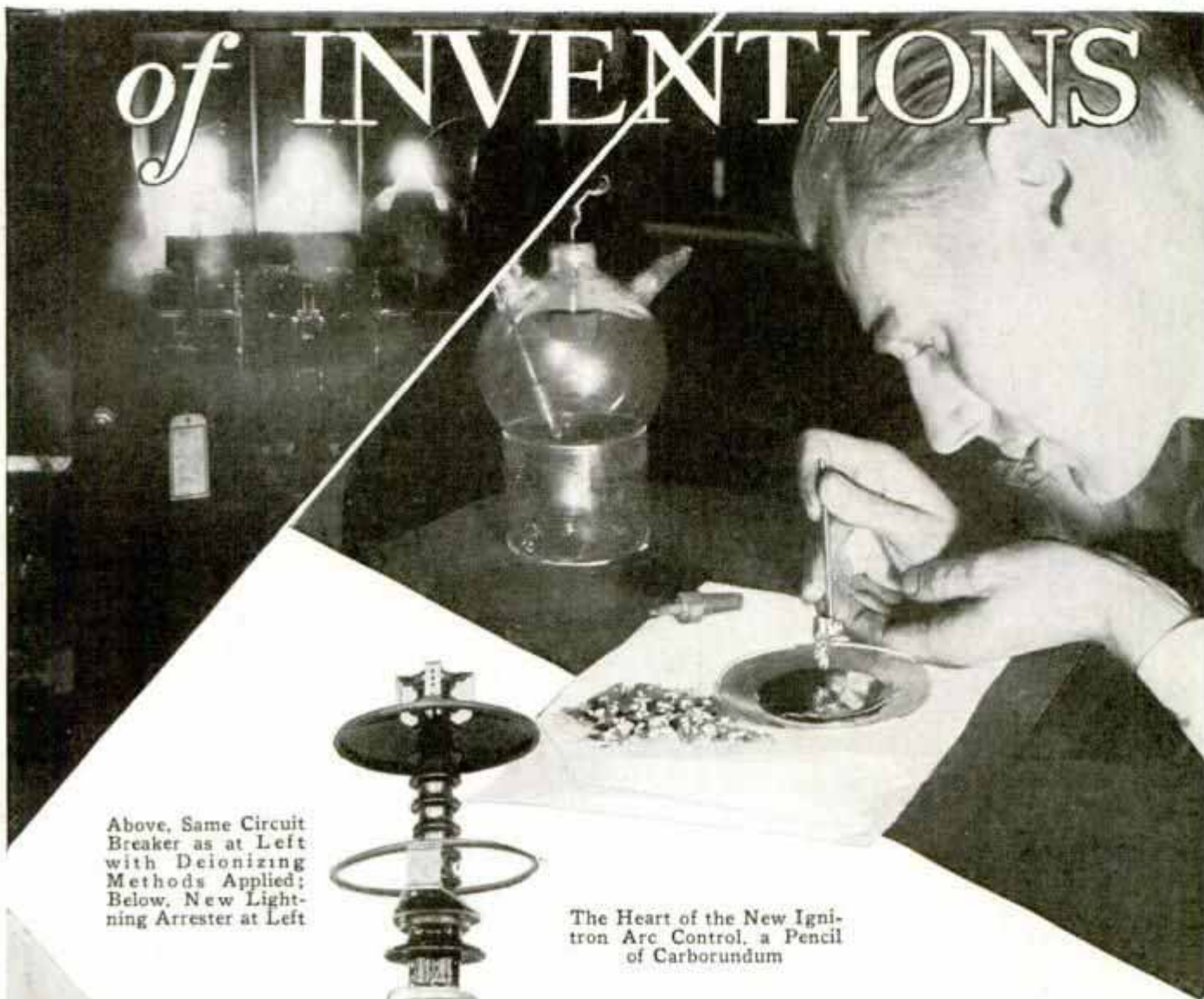
One man is responsible for most of these developments, and his work represents modern scientific research in its highest form. He is Dr. Joseph Slepian, electrical engineer of the Westinghouse laboratories, and his inventions are of vital interest to you, because each points the way to more dependable and less costly service.

One is a small circuit breaker that takes the place of the often troublesome fuse plug. Others include improved circuit

Doctor Slepian with His Lightning-Arrester Button Which Has More Than 200 Square Feet of Surface and Replaces the Entire Pile of Disks Shown on the Table Beside It

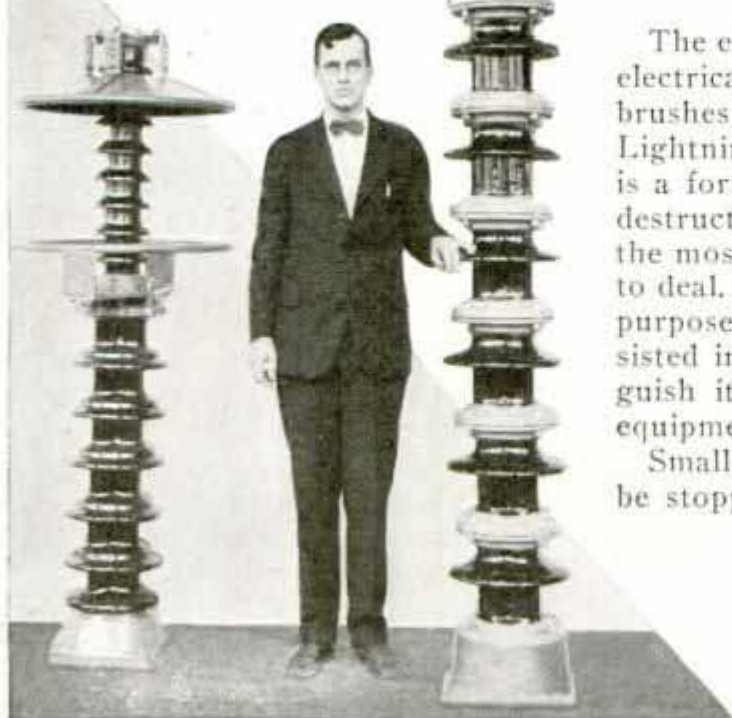


ARC Releases Flood of INVENTIONS



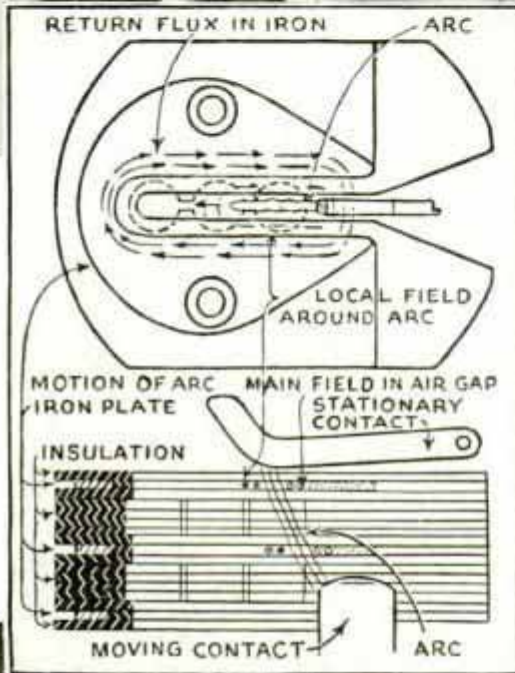
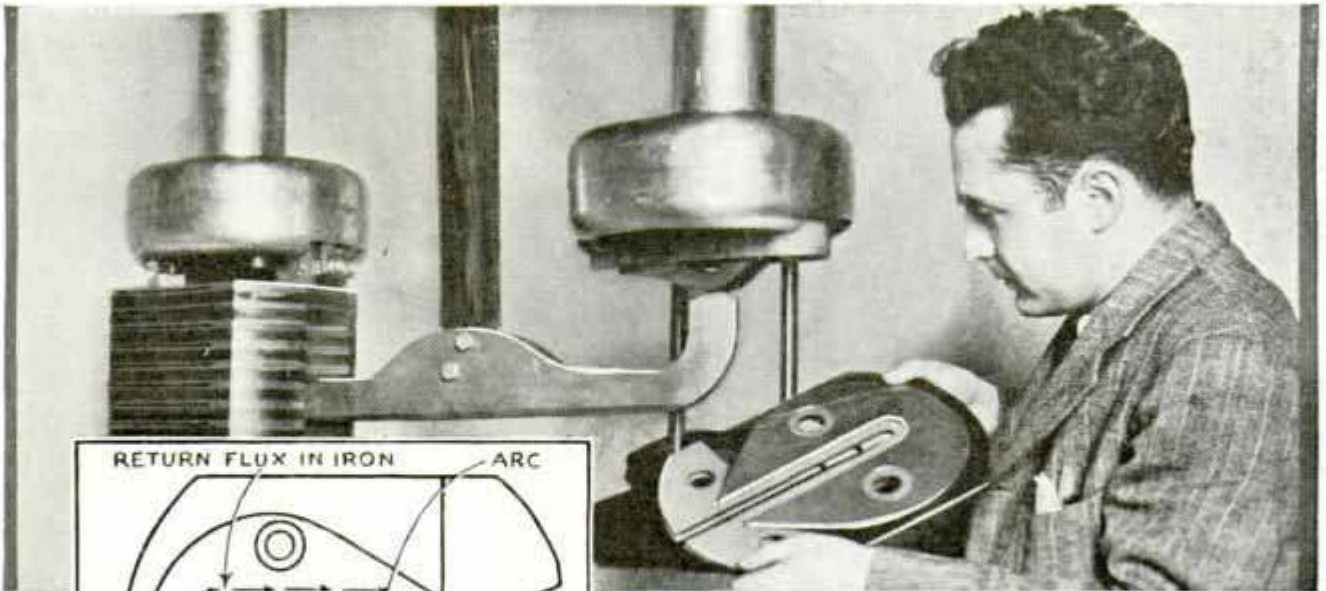
Above, Same Circuit Breaker as at Left with Deionizing Methods Applied; Below, New Lightning Arrester at Left

The Heart of the New Ignitron Arc Control, a Pencil of Carborundum



The electric arc is encountered wherever there are electrical circuits. The sparks visible around the brushes of a vacuum-cleaner motor are tiny arcs. Lightning leaping between a cloud and the ground is a form of arc. Some arcs are useful, others are destructive. Up to a short time ago, it was one of the most stubborn things with which engineers had to deal. When they tried to maintain an arc for the purpose of welding or melting substances, it persisted in going out; and when they tried to extinguish it in order to prevent damage to valuable equipment, it roared merrily on.

Small arcs, electrical men learned long ago, can be stopped by blowing them out with magnets or letting them occur between carbon pieces. Larger ones can be drowned in oil. But as power lines became larger, the problem of drowning arcs became more difficult to solve. You cannot break a circuit carrying hundreds of thousands of horsepower

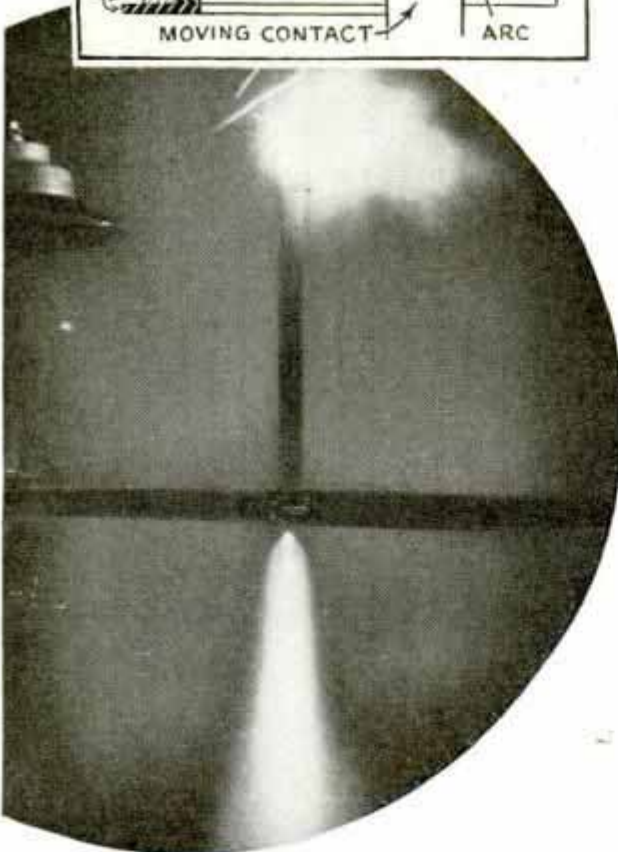


Above, Circuit-Breaker Grids; Left, Drawing of Deionizing Grid for Circuit Breakers

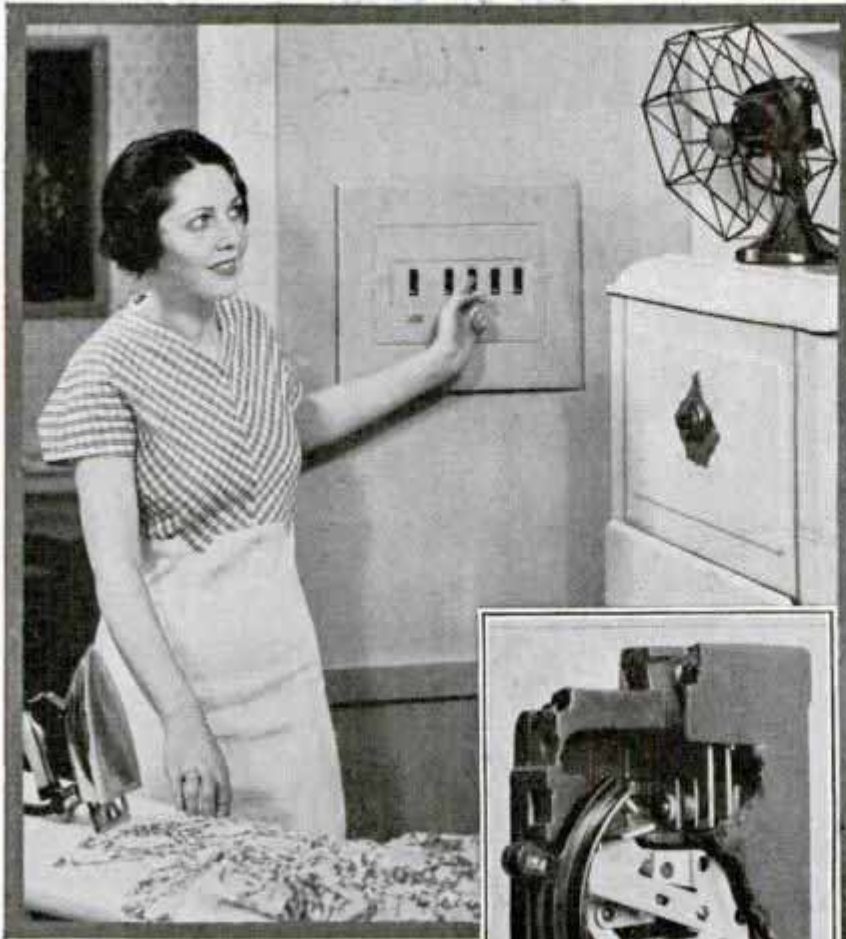
merely by pulling a switch. The current's onward rush carries it over the gap, and a powerful arc is formed. It is the formation of this arc that has made the apparently simple job of circuit breaking one of the most troublesome problems in electrical engineering.

Doctor Slepian had a theory that an arc is a fierce dance of ions—a torrent of atoms carrying electrical charges and going places at a high rate of speed. As long as these atoms possess their charges, they roar across the gap, generating great heat, but when they lose their charge they combine immediately into harmless gas molecules, and the arc stops. To "deionize" the arc by relieving the atoms of their electrical charges became the goal of Doctor Slepian.

He discovered that an arc powerful enough to melt fire clay as if it were wax would not scorch cotton if it were kept moving rapidly enough. One of the most effective ways of making fierce ions combine into peaceful molecules, he found, is to bring them into contact with cool metal surfaces. Another is to keep them in a state of turbulence by churning them with gases. So he put metal into an arc in order to stop it! At first he tried a series of gauze layers. This arrangement worked, but gave indications that it could be improved. Next he experimented with a series of metal plates, and finally evolved an arrangement for oilless circuit breakers that is several times as effective as anything formerly devised.



Here Is a Very Simple and Inexpensive Fiber-Tube Lightning Arrester in Action; Gases Generated by Passage of Lightning Choke Off Power Current

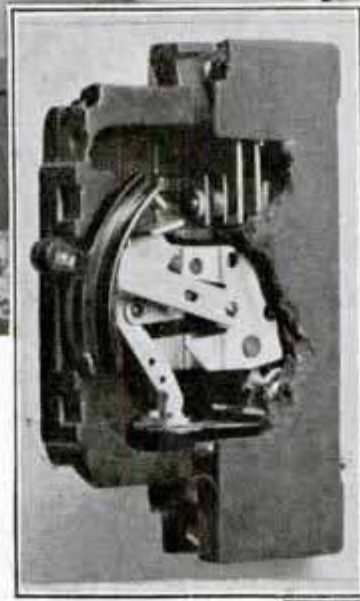


handle restores service. There is nothing to be replaced, and no troublesome hunting for fuse plugs in the dark. Because of a slight time lag, the breaker permits momentary overloads such as that imposed by starting a motor, but opens the circuit before the wires are heated to the danger point.

Engineers a short time ago were having trouble with lightning arresters.

The arc is permitted to leap into a stack of copper plates arranged so that there are small air spaces between them. If the arc were to come into contact with those plates at ordinary speeds, it would melt them instantly. But Doctor Slepian discovered a method of using a magnetic field to drive the arc at the tremendous speed of 750 miles an hour or more! At this speed, the arc can be driven into the stack of copper plates, and broken up into a series of small arcs which whirl madly in circular paths between these plates, then die out. Oilless circuit breakers using this principle whirl to death the arcs formed when a 23,000-volt circuit is broken, and 40,000 amperes are flowing across the gap.

The smallest circuit breaker working on this principle is a substitute for the familiar household fuse. When the line is overloaded, as by a short circuit, a piece of bi-metal is heated, and permits the breaker to open. Metal plates at the breaker contacts prevent the formation of a troublesome arc. When the short circuit has been removed, a flip of the operating



Top, Household Circuit Breaker; Insert Shows Inside of Device; Above, Inserting Boric-Acid Filler into Cartridge Fuse

There was urgent need for a device that would let lightning pass but would stop the power current that follows it. Such arresters are used on power lines to protect valuable equipment from storm damage. Piles of thin conducting disks of a certain character would do the trick, Doctor Slepian said. The high voltage of lightning would carry it through the series of disks, but the lower voltage of power current would not be sufficient to cause it to flow to ground. So a lightning arrester

(Continued to page 118A)

*Johnson 1114. Id. State
Ball Lake City
Wash*



This Strange-Looking Craft Is Driven through the Water or on Land by Propeller Mounted at Rear; Note Wheels and Steering Arrangement for Use on Land; the Boat Is Particularly Useful to the Duck Hunter

ODD LAND-WATER DUCK BOAT HAS AIR PROPELLER

Driven by an airplane propeller, an unusual duck boat has been devised for use on land or water. When operated in the water, the vehicle has its rubber-tired wheels drawn up above the water line. For use on land, the wheels are lowered. The body is shaped like other boats.

gives the driver an always visible record of the speed at any instant and also for nearly a half mile previous, and preserves a record in case of accident.

ELECTRIC EYE TURNS ON LIGHT C1967 IN INSECT TRAPS

Man is now being aided in his war on insect pests by the electric eye or photoelectric cell. Such an eye is being used in one apple orchard to turn on electrically lighted insect traps at dusk and turn them off at dawn. It is entirely automatic in operation, turning on the lights in the traps when the light intensity falls below forty-five foot-candles. A time clock would work just as well if dusk always arrived on schedule, but clouds often interfere, and the eye recognizes the changing shades of afternoon light much more accurately than could a human attendant. It is important to turn on the lights in the traps at the proper time, because investigation has shown that moths begin to fly and to lay eggs about twenty minutes before sunset. The orchard, when the traps are lighted, resembles a garden illuminated for an evening party. The traps are placed among the foliage and in one kind, the insects are caught in pans of water under the light, while in another they are electrocuted upon coming in contact with wires surrounding the light.

SPEEDOMETER KEEPS RECORD OF RATE AUTO TRAVELS

In addition to providing the information offered by the ordinary type of automobile speedometer, a perpetual speed recorder gives a written report of the rate of speed at which the car has been driven for the preceding 2,200 feet. The record is produced by a continuous flexible marking element held in position by the close contact of two revolving surfaces. The stylus is operated by the speed of the car. The instrument has been tested on both automobiles and locomotives, its cost being about the same as for a speedometer of conventional design. It



*Mr. J. R. Siedale
Box 51, Beaver Creek, Ont., Canada
C1928*

*W. W. Rodgers
Westinghouse Electric &*

© 1902

*Test made at Progressive
Institute Westchester
N.Y.*

ARTIFICIAL ICE IS STERILIZED BY SILVER TREATMENT

© 1906

Sterilized ice is usually produced by freezing sterilized water, but such a product is liable to infection during transfer from the factory to the user. Germany is now experimenting with a process of sterilization by the use of metallic silver which has been used formerly in sterilizing water. Artificial ice made from water so treated is not only sterile but also has bactericide qualities. Tests have shown that germs introduced into the melting water of ice thus treated were killed after a few hours, so that certain destruction of any bacteria coming into immediate contact with the ice is assured.

Rep. of Commw. 12/4/33

GIRL INVENTOR USED HER HEAD AND SAVED HER ARMS

© 1899

Buckets of water are heavy burdens for young arms, as a little girl in Sweden found when assigned the chore of bringing home the water supply. She finally made the task a pleasure by evolving a simplified "wheelbarrow." It consisted of nothing more than a pole with a wheel at



A Long Pole with a Wheel on the End Solved Water-Carrying Problem for This Little Girl

Paul

one end and a peg in the center to hold the bucket as she easily trundled it down the road.



Pulling a Lassoed Turtle up the Skidway at One of the Water Corrals in Key West

TURTLE TENDERS USE LASSOS TO ROPE THEIR VICTIMS

Key West is the turtle metropolis of the nation and about 5,000 green sea turtles, ranging in weight from 150 to more than 400 pounds, are placed annually in the confines of the turtle corrals. This industry is strangely reminiscent of the cattle business in the west. The corrals are constructed in shallow water and are formed by placing cement pilings about four inches apart and arranging them in the shape of square pens, each about twenty-five feet long. The turtles are fed a variety of sea grass during the period of captivity and when butchering time comes, these tenders or turtle "cowboys" use lassos to catch victims around their flippers and haul them up a skidway. Most of the green sea turtles today are caught in nets by fishermen off the Nicaraguan coast. While they have made turtle soup famous, they are also valuable for other uses. Turtle steak is second in value to the soup, but combs, knobs, handles and similar objects are made from parts of the shells.

ⓄCopper can now be used in exposed places without tarnishing by fusing a thin, flexible silicate coating to it.

*Write Copper and
Patent Department*

*Edwards (Buff)
1924 - 7
California*

TWO-PAIL UNIT FOR CLEANING MAKES WORK EASIER



How Twin Pails May Be Used Atop Ladder in Cleaning; Note the Single Bail

Cleaning tasks around the home may be made easier by use of a twin-pail unit. Two eight-quart pails are fastened together so that they may be handled easily as one unit on a ladder or the floor. One pail holds soapy water and the other clear rinsing water. They are made of copper alloy hand dipped in pure zinc.

HOW SLEEP COMES IS RIDDLE OF CONFLICTING THEORIES

Although you spend almost a third of your life in sleep, the problem of how sleep comes about is still a mystery. Dr. S. W. Ranson, of Northwestern university, points out that many theories have been advanced to account for sleep, but all are unsatisfactory. It had been supposed that during activity, fatigue substances accumulated in the blood and exerted a narcotic action on the brain, periodically inducing sleep during which they were excreted. But the facts show that an afternoon nap may come when there is little

fatigue, that extreme nervous fatigue often leads to sleeplessness, and that normal sleep, unlike ether narcosis, is easily interrupted by noise or other disturbances. Another theory has been that during sleep the conduction pathways in the nervous system are broken by the retraction of small contact points between the neurones, which are the conducting units composing the nervous system. If this actually occurred, it would stop all nervous activity just as effectively as pulling the plugs from a switchboard would stop telephone communication, but there is no evidence to support the theory. Sleeping sickness has been found to be accompanied by damage to a point in the midbrain near its junction with the forebrain, and this region has been found to have an important relation to the alternation of sleep and wakefulness.

©1933

BIRD BATH MADE DEMOUNTABLE FOR EASY REMOVAL

Equipped with a pedestal that fits into a metal cup installed flush with the ground, a metal bird bath has the added feature of being demountable when its removal is desired. The metal cup is pointed so that it may be driven into the ground. The bath is twenty-one inches in diameter. The bowl is rustproof and removable. The bath may be set up in a few minutes without screws, bolts or tools. Its height is thirty-two inches above the ground.

metal pipe \$3.50



This Bird Bath Is Easy to Move or Clean; Its Pedestal Lifts Out of a Cup Sunk in the Ground

Essential Products

424 E. 11th

Prof of Neurology
University of Washington
Neurology

Evanston

©1900 Wheeling W. Va
Corrugating Co

12/16/33

Canton, Mass.

1601 Rosedale
369

Ave Baltimore Md.

Science Service 12/26/33

MIGRATING CENTERS OF ACTION CAUSE WEATHER CHANGES

When the sun is pouring out light and heat most energetically, the weather in some parts of the world may be growing colder and stormier instead of warmer. An explanation of this paradox has been offered by H. H. Clayton, a student of weather science, who says changes in weather trends, and in the mutual relationships between weather conditions in different parts of the world, are to be accounted for by shifts in the "centers of action"—the veritable weather factories hovering persistently above certain spots on the globe. There is a tropical center of action over the south Atlantic between tropical Africa and the mouth of the Amazon river, and another over the Indian ocean. Similar centers exist in the temperate zones. If these centers stood still, things would be much easier for meteorological science. But they do not and it is their shifting, as correlated with solar radiation fluctuations and the regular seasonal changes in the sun's position, which offers a clue to much which has hitherto been baffling in weather studies.

© 1968

FRUIT AND VEGETABLE JUICER WORKS AUTOMATICALLY



Juices of fruits and vegetables may be extracted easily by means of an automatic juicer. The mechanism consists of a one-quarter horsepower electric motor, a small hydraulic pump, two hydraulic pressure cylinders and a high-speed rotating grinder. Fruits or vegetables are dropped into the feed hopper through a trap door in the top of the machine. When the switch is turned on, the pump and grinder are started. Hydraulic pressure actuates the feed ram, which forces the fruits or vegetables at an even rate into the revolving grater. The pulp falls into the pressing chamber. When grinding is completed, the pressure is automatically transferred to the pressing ram, which forces the juice into a tray and thence to a glass.

*Apta Fruit Juicer
30 Vesey St*



Spring Puller for Removing Broken Automobile Rear-Axle Shafts from the Housing

SPRING TYPE OF AXLE PULLER MAKES REMOVAL EASY

Removal of a broken automobile rear-axle shaft from the housing is simplified by using a spring type of puller consisting of a length of heavy steel spring wire on each end of which is wound a short tapered helix of a size to fit most car axles. By inserting the end nearest the size of the broken axle shaft in the housing and turning the tool in a counter-clockwise direction, the spring winds around the broken end, securing it in a viselike grip which permits its easy removal.

© 2003

REVOLVING LAMP SHADE MAKES PLEASING DECORATION

Revolving lamp shades which fit over small electric bulbs make pleasing decorations for festive occasions and cost nothing to operate since the heat from the globes causes them to turn. They produce varied color effects as they move and are reminiscent of the flicker of wax candles, but without the dangers.



*Deubner's Shopping Bags
Bosch Ave. East*

Deubner's Shopping Bags

12/26/33

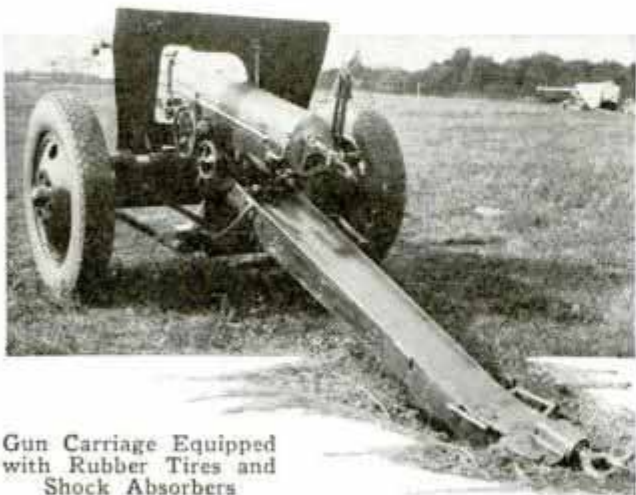
Washington, D.C.

of the department of agriculture, points out that they knew the fertilizer value of wood ashes and sea shells, they had learned that weak-lye solutions softened food, thereby making possible lye hominy, they knew how to concentrate the sap of corn-stalks and maple trees, and how to get salt out of brine by evaporation. California Indians could get the bitter tannin out of acorns and those in South America found a way to de-toxify cassava root. The highly civilized Indians of South America, Yucatan and the Mexican plateau added to the world's commodity list such things as rubber, chocolate, cochineal, copal gum and guano, each requiring a certain amount of practical chemistry in its preparation. Their medicines included such items as quinine, coca and tobacco and they knew the principles of fermentation.

© 2002

**RUBBER-TIRED GUN CARRIAGES
MAKE GREATER SPEED**

Some of the lumbering field pieces of the United States army are being speeded up by equipping them with carriages fitted with rubber tires and shock absorbers. The adapters consist of rubber-tired steel wheels and shock-absorber assemblies and enable the artillery to transport these guns, weighing about 1,800 pounds, at speeds up to fifty miles per hour. The guns can be fired directly from the rubber tires with accuracy, it is claimed, and the adapters can be installed in less than half an hour on a gun in the field. Each wheel can be locked separately for firing or mov-



Gun Carriage Equipped with Rubber Tires and Shock Absorbers

ing the equipment over rough ground, and brakes can also be applied together or separately.

York News Bureau



Vibrator for Making Concrete More Compact Is Shown in Operation; It Is Air-Powered

**AIR-DRIVE CONCRETE VIBRATOR
MAKES IT COMPACT**

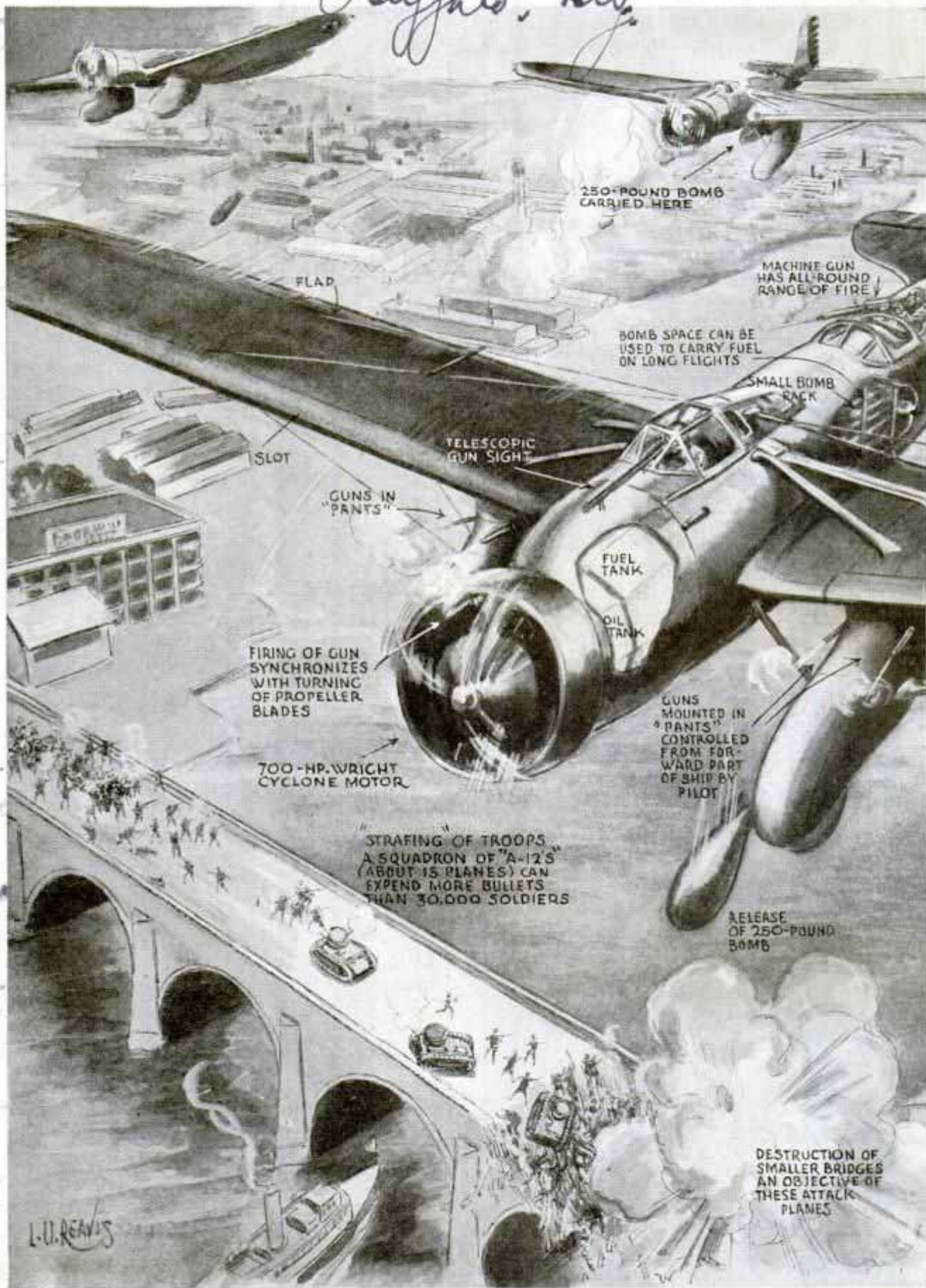
Production of good concrete is made easier by an air-driven vibrator which, applies high-speed vibration to the fresh concrete in the forms to make it more compact. The equipment is made in stationary-tube or flexible-shaft form. The first consists of an outer tube containing a rapidly turning rod held in place by several roller or ball bearings and having a heavy unbalanced weight attached to the lower part. The point of the machine is directed into the stiff concrete by the operator. The flexible-shaft type is adapted particularly to vibration of mixtures in deep walls and may be operated at a depth of twenty-five feet. By means, of an adapter that is attached to the air motor, the rigid-shaft unit is made interchangeable with the flexible-shaft unit, the same motor being used.

see data for branches
The University of Michigan herbarium has more than 220,000 examples of plant life, that have been collected over a period of ninety-five years.

Ident. Alfred L. Lindau 205 W. Wacker Drive, Chicago
 Mfr. Vibor Co. Ltd. 613 'N. Hewitt St. Los Angeles, Calif.

Flying Fort Bristles with Guns and Bombs

Buffalo, N.Y.

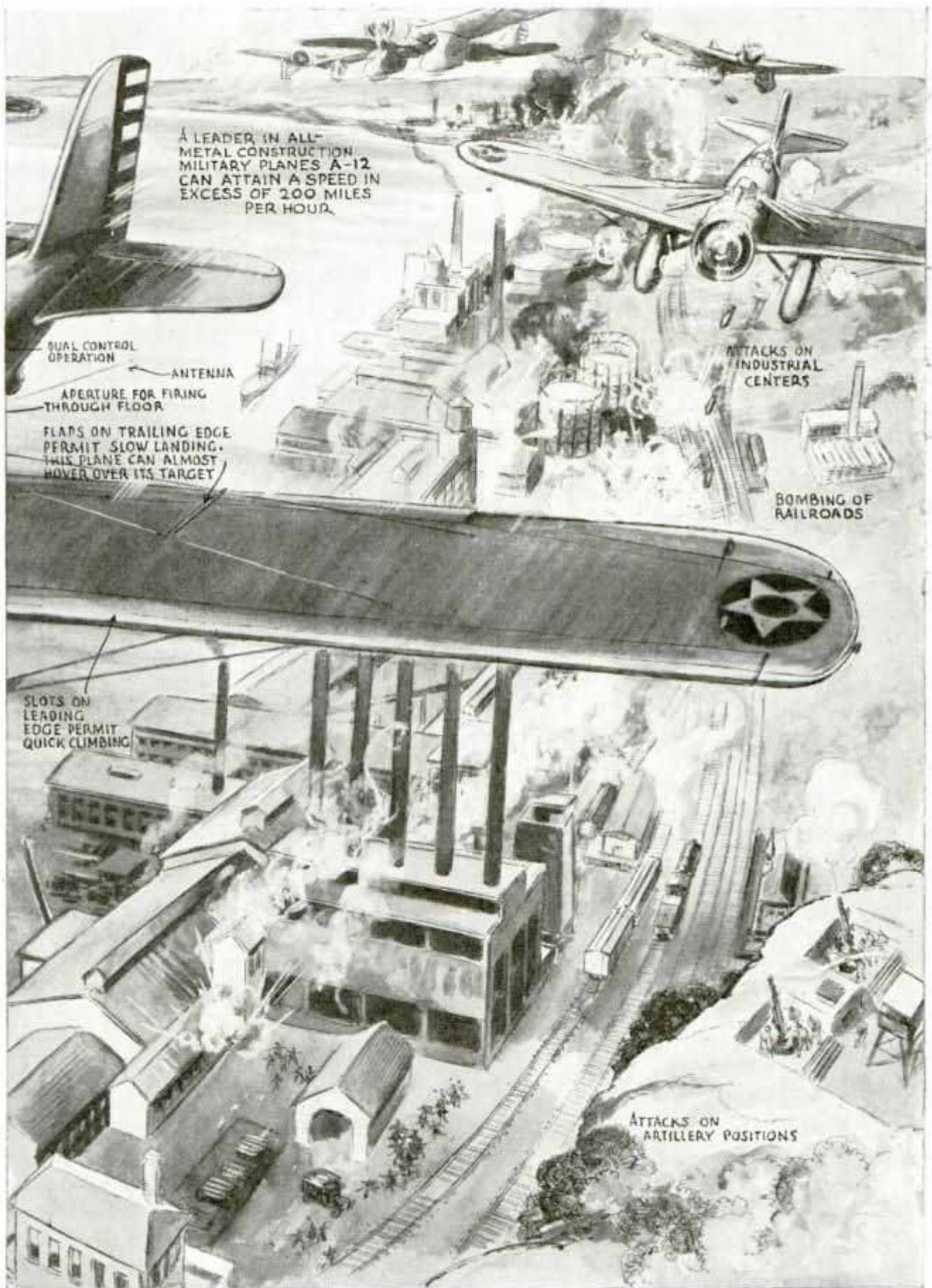


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Attack Plane Being Built for United States Army: It Is a Metal-Clad Flying Fort, Carrying Six Machine Guns, a 250-Pound Bomb and Several Thirty-Pound Ones

L. U. REAVIS

Squadron Can Do as Much Damage as Army



This Plane, Manned by a Crew of Two, Has a Speed of More Than 200 Miles per Hour, and a Squadron of Such Ships Can Fire as Many Bullets as an Army of 30,000 Men

Men's Elastic-Thread Suits Hold Their Shape

Sold by Franklin-Sumner Co.
414.5th Ave New York



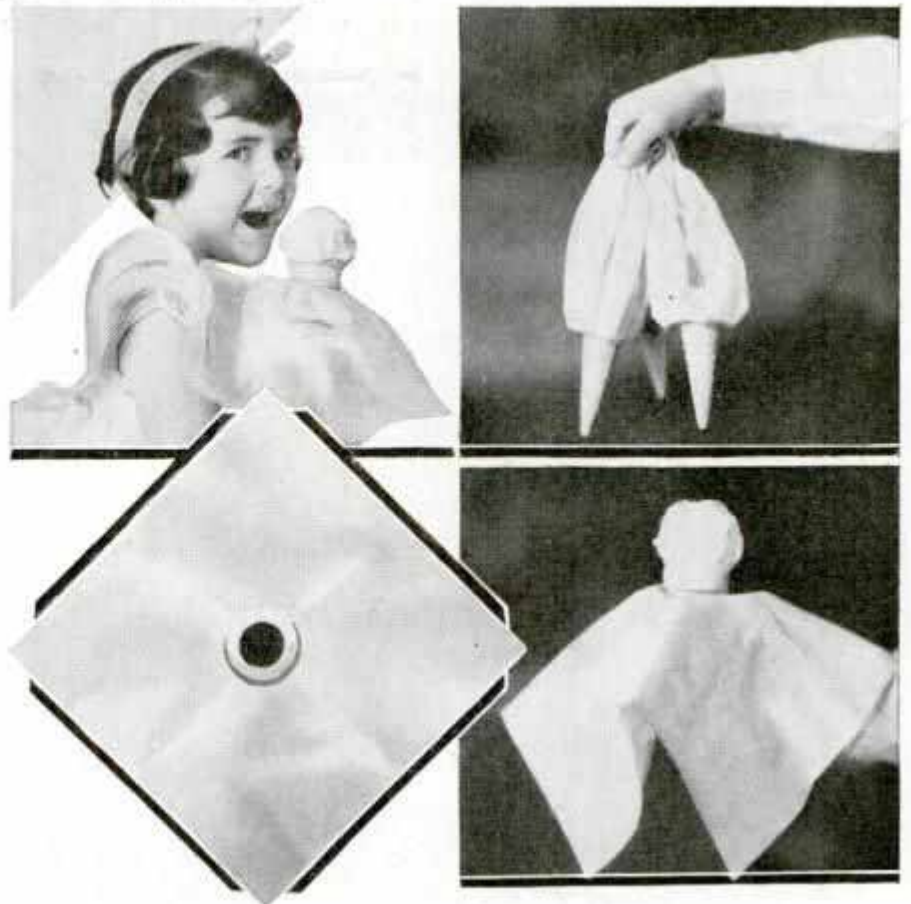
Several Photographs of Latest Men's Suits Showing How the Clothing Springs Back into Shape After Stretching; Elastic Thread Is Used

Clothes that give way to every movement and come back to their original shape are the latest fashion for men. A suit of a new elastic material fits snugly, yet remains wrinkle-proof for several weeks, even under violent exercise. The secret of these suits is that into the cloth of which they are made have been woven strands of flexible yarn. The core of the yarn is a round fiber spun from the product of the rubber tree latex, after treatment by a patented chemical process. The fluid thus created is forced by machinery through tiny holes and hardens into a firm thread. The elastic core is wound with wool, linen, cotton, silk, rayon or whatever fiber is required. Wool, of course, is most used in the men's clothing industry. The yarn is incorporated with other fibers into a cloth, the proportion being regulated according

to the elasticity desired, and from this fabric the manufacturer makes up the garments. The elastic core has been subjected to the severest tests—pulled, stretched, yanked, soaked and pickled and pressed with the hottest irons—without damage. The new cloth can be woven so as to be stretched in all directions. The yarn can be introduced both lengthwise and crosswise by the weaving or knitting machine. It is extensively used in intimate wear of women, such as corsets, girdles, garters and hosiery. Now the men are getting a chance, as clothes for them that give athletic comfort are just coming on the market. Even the ironlike tuxedo, with its stovepipe "pants" and its stiff boiled shirt, no longer has any terrors. The elastic tuxedo becomes a comfortable dinner or lounging jacket. For everyday business wear the

Naugatuck Chemical Co
179 Broadway N.Y.C.

elastic garments are capable of letting a man stretch and exercise, without finding his coat collar riding up over his neck. One does not have to worry about the strap and buckle at the rear of the vest giving way, for the flexible back takes up all the slack. The trousers insure the utmost "freedom of the knees." Once pressed the elastic garments keep their knifelike front creases for many weeks, as their fabric returns to its original position. For sports wear the elasticized garments have become popular even in the short time which has passed since their introduction. In the ready-made clothing industry, use of the elastic textile may lead to a reduction in the number of sizes. If a man is a perfect thirty-eight, for instance, he may be able to wear a thirty-seven, which will extend itself over him without pinching. Tight fits will become loose, and loose ones snug, just as the motions of the body demand. Fewer alterations will be required. The clothes can be scrubbed without shrinking, leading manufacturers of them say, and certainly they require considerably less pressing to preserve their neat appearance than they would if not treated for resilience. Caps of the new material can be worn without pressure and yet be proof against being blown off by the roistering winds. The invention is also applied to the welt or tops of socks. A thin area of the springy strands acts as a garter and does away with the need for supporters.



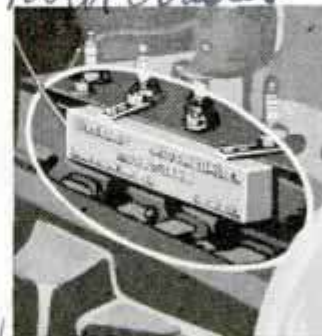
Four Views Showing How Paper Napkin with Hole in Center May Be Used for Carrying Ice-Cream Cone without Soiling the Hands

thirds of the cone, but will not permit it to drop through, the cone hanging in the hole like a flowerpot in a supporting ring-stand. A ring of cardboard glued around the hole gives it the required stiffness.

C 1992

ELECTRIC HEATER FOR MOTOR MAKES STARTING EASIER

Winter starting of the automobile engine is facilitated by an electric heater that is attached permanently to the top of the motor block.



The cord with its plug is concealed under the hood while driving. When the car is placed in the garage on cold nights, the plug is inserted into an electric socket and the heater keeps the engine from becoming too cold for easy starting. The device operates on either alternating or direct current. It can be installed in two or three minutes.

\$ 3.95

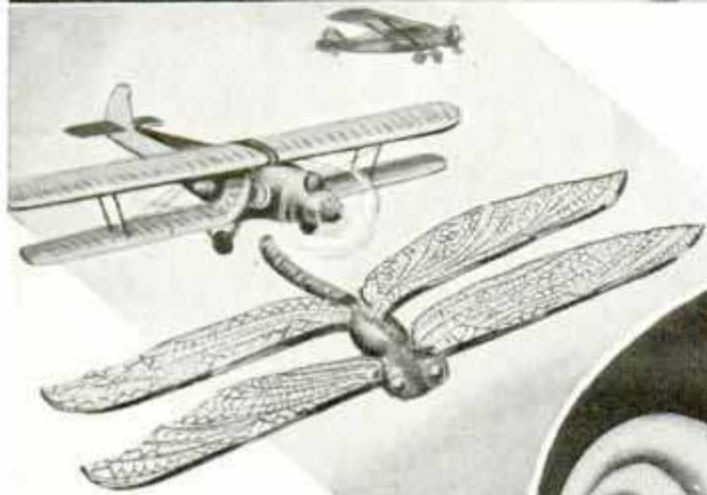
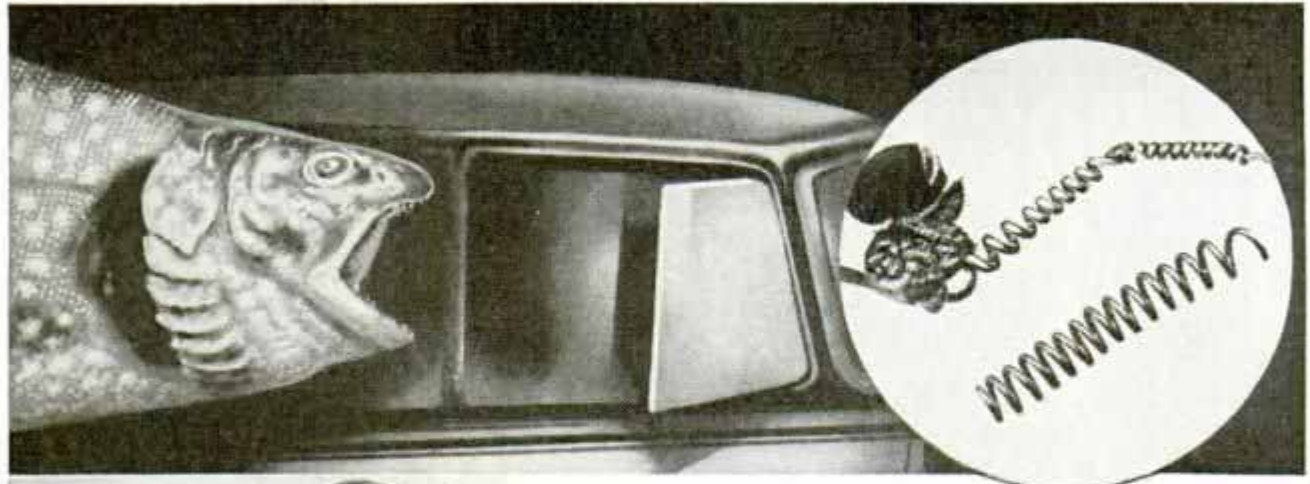
C 1950.
NAPKIN WITH HOLE IN CENTER CARRIES ICE-CREAM CONE

Cutting a hole in its center converts the paper napkin into a convenient carrier for ice-cream cones. It also protects the clothing and hands while the cone is being eaten. The hole will admit about two-

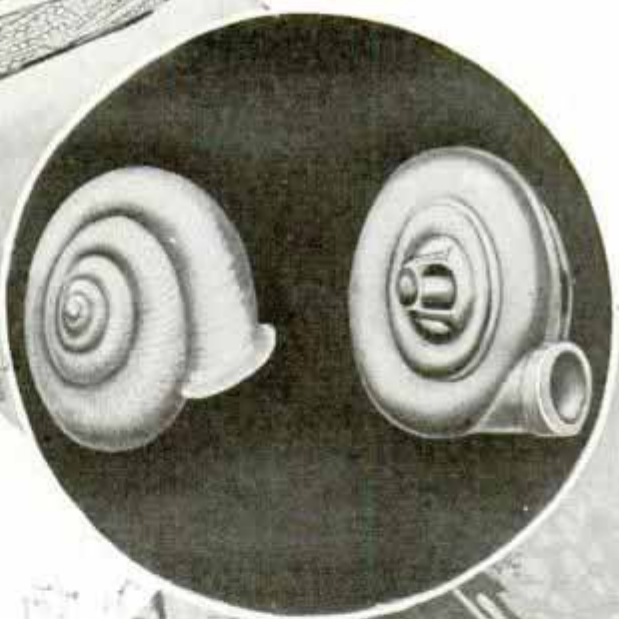
Mrs. C. B. Lester
319 N. H. St. St.

Robertson Harris Co.
347 N. 10th St.

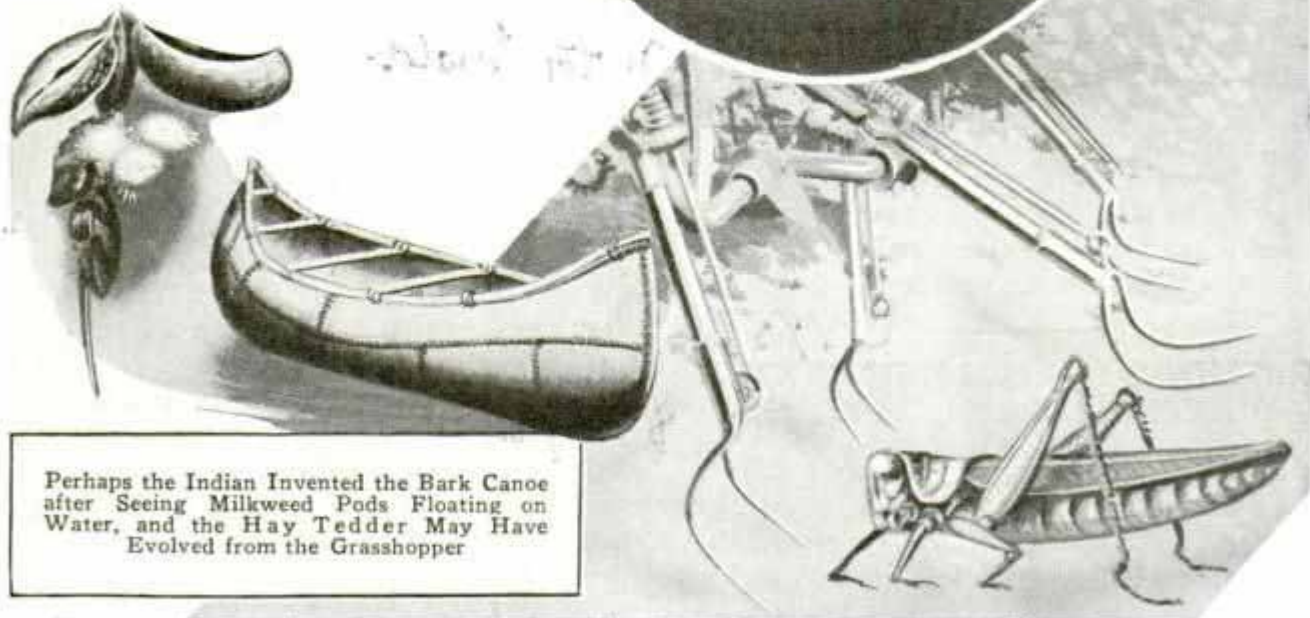
Nature Best Designer and Man Is Copy-Cat



Designing Has Been Defined as "Thinking and Marking around the Thought," but Even So, Man Must Have Stolen a Few Ideas from Nature; Above, the Tendrils of a Climbing Vine Go the Coil Spring One Better, for They Coil Right and Left and Have a Shock Absorber in Center



Top, Fish Had No-Draft Ventilation Before They Put Gills in Autos, and the Biplane Might Have Been Suggested by the Dragon Fly; Right, Which Is Rotary Blower and Which Is Snail Shell?



Perhaps the Indian Invented the Bark Canoe after Seeing Milkweed Pods Floating on Water, and the Hay Tedder May Have Evolved from the Grasshopper

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APES LEARN TO USE "MONEY" IN SLOT MACHINE

Dr. B.

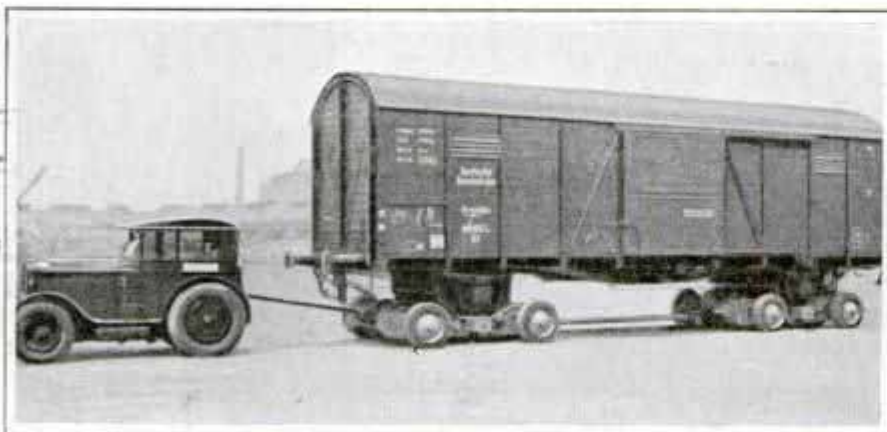
Science & Nature 12/29/33

Apes are capable of learning to use "money" to buy food delicacies, to choose small white token rather than a larger one with less purchasing power and even to "hoard" more of the tokens than they can spend at one time. Dr. John B. Wolfe, of the Yale Laboratories of Comparative Psychobiology, conducted experiments in which poker chips were used as money, the apes being taught to place them in a specially devised slot machine and then to reach for the food at the opening in the machine. Chimpanzees were used in the experiments. Another use of the money was the "purchase" of an opportunity to play with the experimenter by placing a yellow chip in the proper machine. A blue chip properly spent entitled the ape to leave the experimental room and go back to its living quarters, this trick being taught more easily than the others. The animals quickly learned to discard a brass check which could be inserted in the machine, but which brought no reward.

1908

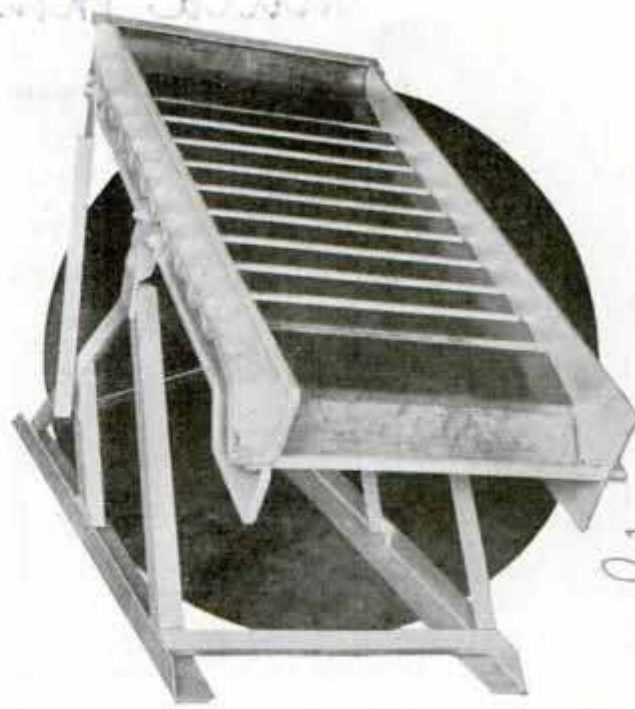
FREIGHT CAR RIDES TRUCKS TO CONSIGNEE'S DOOR

Freight may be carried from the main line of a German railroad to the purchaser's door in the same car in which it was shipped. This is accomplished by means of movable trucks weighing eight tons. The trucks are placed against the railway track so that the car may be shunted off of the main line and towed directly to the purchaser's door. Curves are taken by turning the car's sixteen wheels mounted on movable axles.



Moving a German Freight Car Direct to Door of Person to Whom Its Contents Are Assigned; It Rolls on Movable Trucks

Prof. Hans J. Rutschbach



Separator for Collecting Flour Gold Has Copper Plates Shown in Photo as Resembling Steps

FLOUR GOLD IN MERCURY COAT CLINGS TO COPPER PLATES

Tiny particles of gold, known as "flour" gold, may be recovered efficiently by means of a machine called the induction amalgamator. After being washed clean, gravel containing the gold particles is fed into the machine, moving down an inclined plane of successive copper plates. At six-inch intervals are small rollers two-thirds submerged in mercury, which serve the double purpose of pushing the gravel down the plane and of covering each gold particle with a coating of mercury. The affinity between mercury and copper causes the gold grains to be attracted to the plates while the gravel moves on. Electrical current keeps the mercury agitated, creating a field passing from the trough

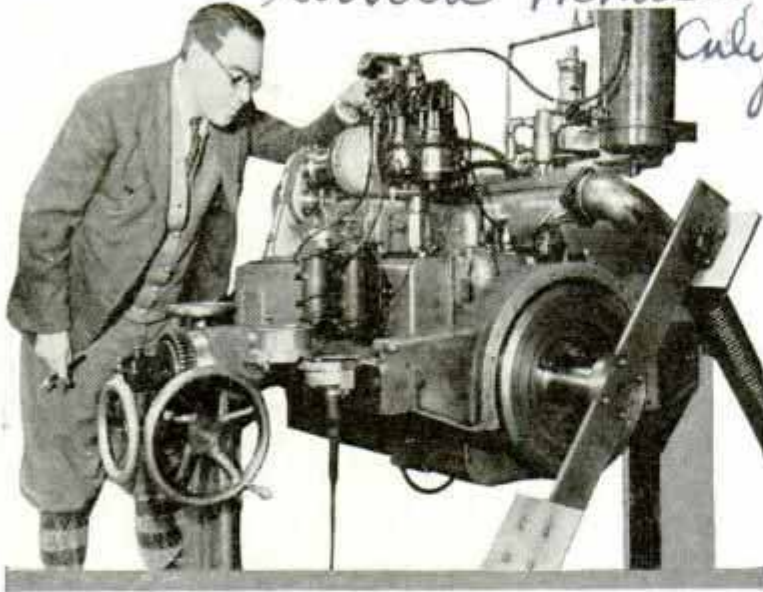
to the iron roller, thus breaking the surface tension and letting the rollers do their work. The electrical field naturally pulls some of the gold down to the mercury. Tests indicate that the machine is many times as efficient as the standard amalgamator process.

Frozen milk does not become less nutritious, experiments indicate.

Perfected by: Carl D. Spencer, 4308 3rd, Spencer & Morris, Los Angeles

12/30/33

1309 Pico Ave
POPULAR MECHANICS
Santa Monica, Calif



Valveless Airplane Engine Which Weighs Only 900 Pounds but Can Develop about 1,100 Horsepower

SMALL PLANE ENGINE WEIGHS POUND PER HORSEPOWER

Developing 1,100 horsepower, but weighing only 900 pounds, a valveless airplane engine is now being built. It is of the two-cycle type and has eight horizontal cylinders, each equipped with two pistons which move outward from central combustion chambers. Power is applied through offset rocker arms and delivered equally from opposite directions at the same time, thus reducing vibration. Other advantages claimed for this engine are low fuel consumption, wide speed range, high torque and high mechanical and thermal efficiency. The engine operates smoothly under load at any speed from thirty to 6,000 revolutions per minute. It has sixty per cent less moving parts than the typical four-cycle engine and it is claimed virtually no carbon is formed and it will not detonate even with low grades of fuel.

SAND FORMATIONS TELL STORY OF GEOLOGICAL CHANGES

Sandstones were once loose sand, and the fossils embedded in them were parts of living animals or plants for which the sand was an environment. For this reason, a study of present sand deposits can yield information of value in understanding the processes that went on when sandstones of various types were in the making. According to Prof. W. H. Twenhofel, of the University of Wisconsin, sand deposits

can be grouped under five heads—wind-blown sand, sandy parts of alluvial fans, river sand, shore sand of lake or sea, and lake or sea bottom sand. Each type offers a harbor to a different class of living community, each presents different problems for its inhabitants to solve, and each has various factors that foster fossilization or prevent it. Thus, wind-blown sand is essentially a desert habitat, even when it occurs in the midst of a relatively humid land, and the plants that grow on it are succulents, like the cactus, or leathery-leaved shrubs, like the beach plum. The animal population will be predominantly small in size

with low-water requirements, and chances of permanent burial resulting finally in fossilization are relatively poor. Bottom sands of ocean and lake are at the other extreme. The animal and plant life forms found in and on them are naturally largely aquatic or at least amphibian, movement is much less and hence chances of permanent burial and fossilization are much better.

EMERGENCY AUTO TIRE CHAINS ARE STRAPPED IN PLACE

When an unexpected snowstorm catches the motorist on the road, he can avoid delay by carrying a set of individual emergency tire chains which are strapped in place quickly.

This aid in overcoming mud and snow consists of two single chains attached to a strap and clamp which extends around the rim of the wheel. The chains are placed on the tread and the strap is wrapped around the rim, the end being fed through an opening in a clamp and drawn tightly into place. One or more such units applied to each wheel give traction which cannot be obtained from the tires alone.



newark, N.J.

same name 12/26/33

Madison, Wis. Pyrene Mfg Co

C/O... 1032 Florida Ave
Sharon Ches



Is The Spare Tire DOOMED?

MOTORISTS long have dreamed of puncture-proof tires. But what is being done about it?

A survey of leading rubber manufacturers reveals that the failure-proof tire is nearer realization today than ever before. The time, however, has not yet arrived when you can sally forth without a spare.

Tire engineers generally are agreed that the pneumatic tire is here to stay—at least until someone comes along with a better absorber of road shocks than imprisoned air. Solid tires are out of the picture, because they are too heavy, tear themselves to pieces at high speeds, and they may blow because of the generation of gases inside the rubber.

Several tire manufacturers are turning out "puncture-proof" inner tubes of the compression type. Such a tube is manufactured with the inside out, and is then turned and joined at the ends to form a



Driving Nails into a Truly Puncture-Proof Tire, Then Pulling Them Out without Losing Any Air; Running the Car around the Block Seals the Holes

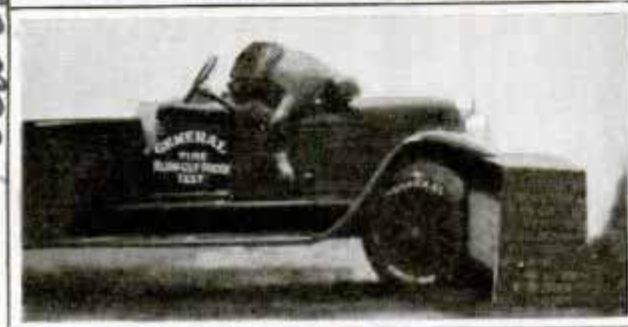
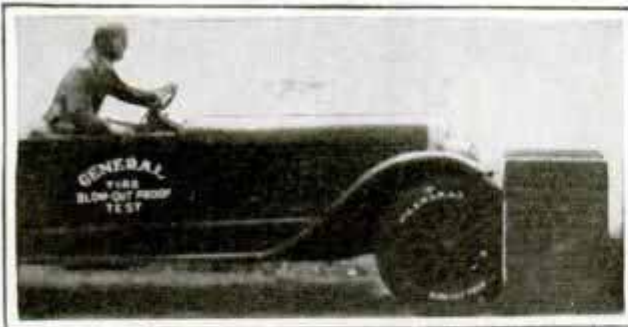
ring. The portion of the tube that rests, in service, against the inside of the casing under the tread is made several times thicker than normally. It happens that rubber, when stretched or bent, always tries to return to the form in which it was vulcanized. Thus, when the thick-walled tube is ready for use, the rubber that was on the outside when vulcanized is now inside, and is under compression because it is trying constantly to return to its original form.

This tube, when in its casing and inflated, resists punctures because a hole such as that made by a nail cannot remain open; pressure of the rubber forcing it shut and preventing escape of air. If the object remains in the tire, the rubber presses against it so forcefully that no air will escape.

Another type of tube is built like a sand-

rubber Co. Ches
Delbering
plastic dough!

B. J. Goodrich
460 Main
Aberdeen



Going into a Stone Wall with Low-Pressure Tires; the Tires Were Not Hurt by the Impact

sandwich. They act perfectly to keep the uncured rubber from shifting.

Both compression and plastic-dough inner tubes have long lives. Test cars using the plastic-dough tubes have traveled more than 100,000 miles on the same set of tubes—but using three sets of casings—with no loss of flexibility or puncture-sealing properties.

The fear of punctures, however, is not the only thing that harasses the motorists.

Below, Compression Inner Tube; Sliced Portion Shows Form Tube Tries to Take



Above, Withdrawing Nail Pulls Plastic Dough to Outer Surface of Tube

Blowouts are, if anything, more to be dreaded. Aside from the general improvement of tires during the past years, a number of outstanding steps have been taken to reduce this danger.

Often a blowout is traceable directly to under-inflation. The ordinary tire should be inflated to recommended pressure at least every week, but recently there have been developed several tubes which need inflation only once a month, or even less often. The two types already described are included.

A direct descendant of the airships "Macon" and "Akron" is a zeppelin-type tube. In developing improved helium cells for the airships, rubberized fabric was coated with a gelatin preparation. This was found to retain helium, and to replace the costly goldbeater skin formerly used in airship cells. Tube men reasoned that, since the coating will prevent passage of helium gas, it ought to work even better

General Tire & Rubber Co.
reporting the
results of
tests
made
at
the
General
Tire
Plant
at
Akron
Ohio
in
1927

wich. Two layers of rubber inclose a layer of "adhesive gum" or "plastic dough." The sandwich construction extended over the portion of the tube lying directly under the tire tread.

This tube worked excellently, but when run, the plastic collected in a narrow ring along the center of the sandwich portion, because of the action of centrifugal force.

Then someone thought of the modern battleship and its bulkheads that prevent water from flooding more than one portion of the interior if a break is made in the hull. So bulkheads—parallel partitions of cured rubber running around the tread section of the tube—were built into the

Goodyear Tire & Rubber Co.
460 Main
Aberdeen

CS 89

with air, whose molecules are larger than those of helium.

So an inner tube having an inside coating of airship-cell gelatin was introduced a short time ago. One expert has said that half of the blowouts that present-day motorists experience can be attributed to rim and bead cuts. The use of rubber rim strips and the placing of soft-rubber toes on the beads are reducing such failures, but among the most important contributions is the two-part tube.

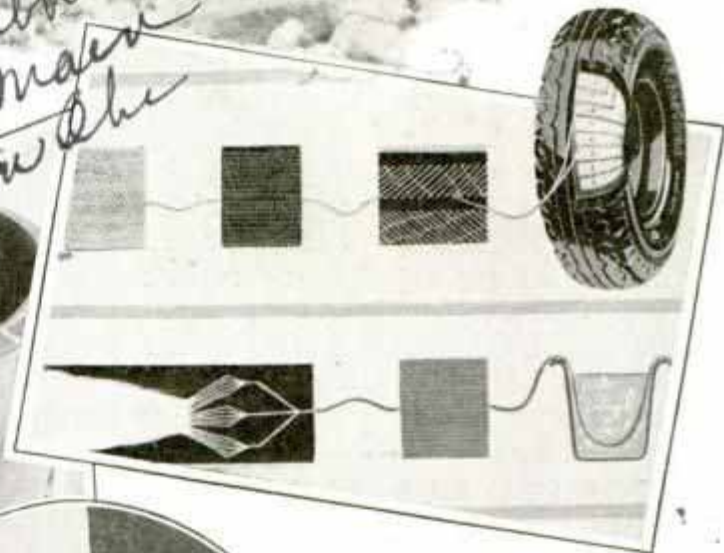
Another improvement is the valve that is an in-



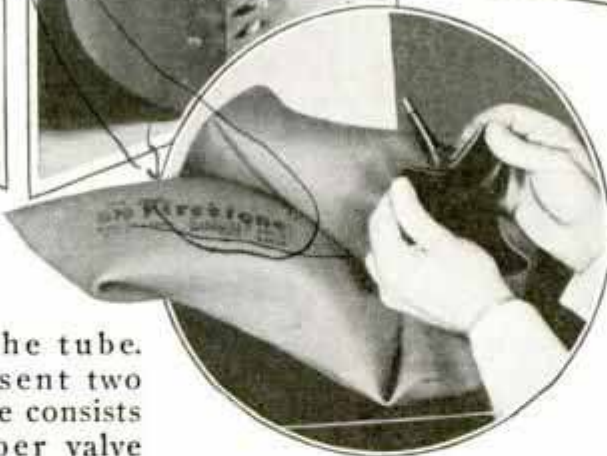
*sure & Rubber Co
1400 S. Main
Akron, Ohio*



Driving Nail into This Tube Rolls Up Ring of the Uncured Rubber



Top, on Bad Roads, Puncture-Proof Tires Are Invaluable; Below, Diagram Showing How Gum-Dipped Tire Is Made



Above, Rubber Ring Pressed Flat around Hole to Form a Rubber "Rivet"; Below, Flexible Valve Stem Cured into Tube

tegral part of the tube. There are at present two general types. One consists of a flexible rubber valve stem whose base is united, during vulcanization, to the rest of the tube. The other is a rigid metal stem having a rubber jacket that is joined to the tube. Such constructions reduce air seepage from the tube.

An interesting example of a tubeless, punctureless casing is the so-called zero-pressure tractor tire. This is of solid rubber with a hollow core. Air pressure in

the core is the same as that of the outside atmosphere. Tests have shown the tire to have a cushioning effect equal to or surpassing pneumatics, and to outwear both solids and pneumatics in service. However, the zero-pressure tire cannot be used on pleasure cars because of its weight and unfitness for high-speed operation. Although considerable effort has been directed toward improvement of the inner tube, development of tire casings that are more difficult to puncture or blow out has not been lagging. One manufacturer stresses

(Continued to page 128A)

D. J. Goodrich *Chas. P.*

JANITRESS RIDES MOTORCYCLE
FITTED WITH SCRUB PAILS



Cleaning Outfit Which Is Driven from Door to Door by Woman Operator

Paul

Traveling on a motorcycle equipped with scrub pails and mops, a charwoman rides along the roads and streets of London, ready to perform her duties in any house upon call. A charwoman performs odd domestic jobs in England, similar to the work of a janitress or scrub woman in the United States.

MIRROR SHOWS PITCH OF VOICE
AS VIBRATIONS COINCIDE

Pitch of his own voice may be seen by the singer in a mirror and disk arrangement devised by a California scientist. The mirror is attached to a loud speaker so that the sound vibrations shake the mirror. The singer looks in the mirror at the reflection of a spinning disk, on the face of which are drawn concentric rings of short spokes or radii. They all appear as a blur. When the singer's voice touches middle C, the mirror vibrates at exactly the rotation rate of one of the concentric circles. Immediately in the mirror, the circle appears to be standing still, although circles around it on the mirrored disk are still a blur. Likewise, any other musical note will show on the disk when the voice strikes that pitch, if the tone is pure. The device is the result of the scientist's observation that when a mirror is set so that it can be vibrated rapidly, like a tuning fork, it will "stop" the spokes of a

Reported in Science

wheel until they appear to be standing still. This occurs when the vibrations become synchronized. The wheel in the device is the concentric circle.

TENDONS FOR TENNIS RACKETS
ARE IMPERVIOUS TO WATER

Tennis rackets now are being made of tendons instead of the gut formerly used, the new material for stringing being impervious to water and having the additional advantages of not stretching or raveling. It is claimed the new material is "livelier" than that previously used and has far more durability. Calf tendons are used in making the strings, the material being broken down until it resembles cotton, then formed into yarnlike strings which finally are woven together. The tendon strings are also being adapted to musical instruments.

UNDERFOOT LIGHTS FOR BRIDGE
ELIMINATE THE GLARE

Instead of the conventional overhead lights, the roadway of a Cincinnati bridge is illuminated with underfoot lights which show the road as a ribbon of radiance at



Cincinnati Bridge Illuminated with Underfoot Lights Which Eliminate Most of Glare

night. It is claimed these lights are safer than the ones mounted on posts because they eliminate the glare.

Viaduct to Western Hills section

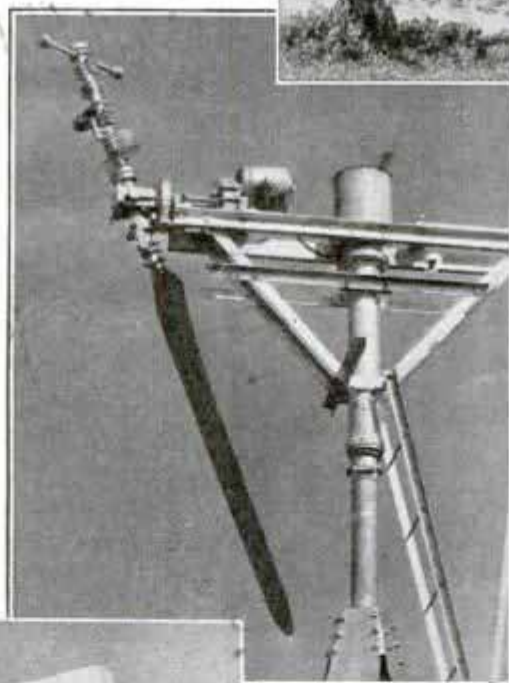
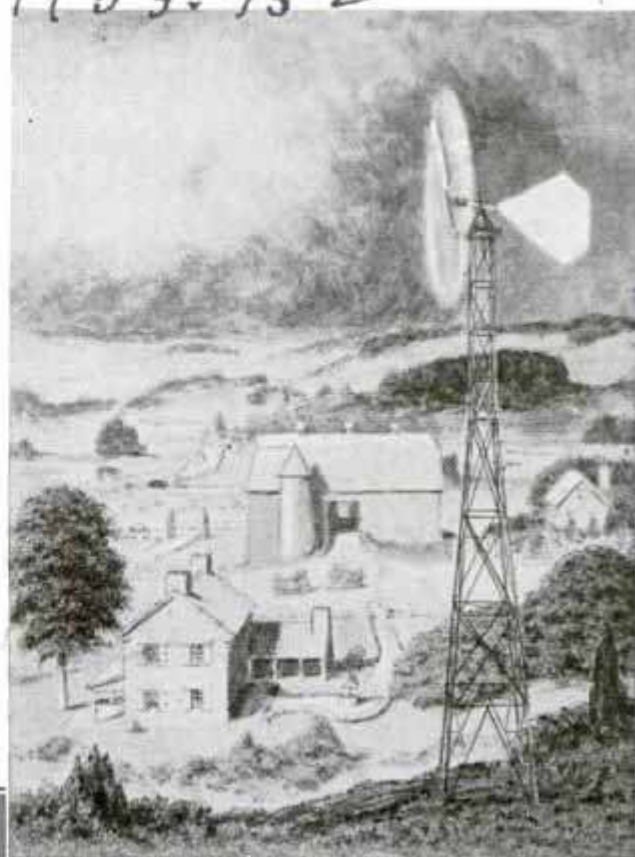
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Air Turbine Produces Power in Light Wind

Depending entirely upon the wind for the energy to produce electricity for farms not served by power lines, the latest air turbine has been found satisfactory and safe after exhaustive tests. The plant is a large one-arm windmill, a single-bladed wind turbine. The blade is made of thin sheets of stainless steel welded together to form a hollow air foil. Since stainless steel does not rust, the blade requires no attention. An electric generator is driven by the blade through a set of gears. On account of its large size, the blade covers a huge wind area, developing usable power in light winds of seven to twelve miles per hour. Such breezes blow almost every day in the year. By means of a centrifugal governor, the blade turns only at a moderate speed, no matter how strong the wind may get. In gales, the arm turns its edge to the wind, changing its pitch to suit conditions. The speed is never more than that for which it is adjusted. This safety factor frequently saves the power plant from damage. Since the turbine produces considerable electricity even in light breezes, moderate size storage batteries may be used. The batteries are left almost fully charged at all times, due to the constant generation of current. This easy method of operation in-



creases the life of the batteries to eight or ten years. With the wind turbine, the farmer is equipped to produce electricity for all his needs at about the same cost as current purchased from a public utility company. The 1930 census showed that out of 6,288,544 farms in the United States, only 570,953 were served by electrical lines. Of the total farms, 270,380 had their own plants and

more than 5,000,000 were without electricity of any kind.

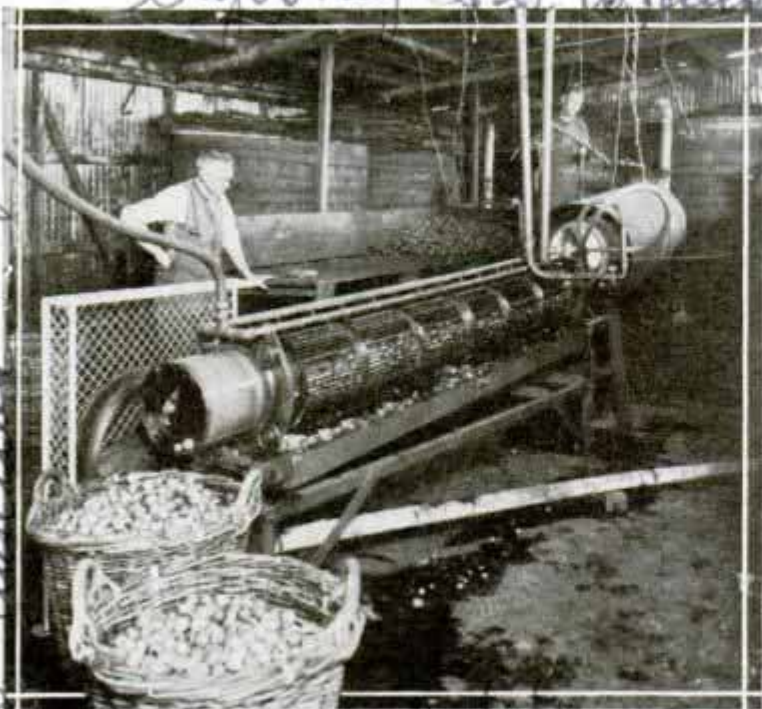


Top, Air Turbine on Sixty-Foot Tower; Center, Close-Up of Blade; Bottom, Power Plant Mounted on Auto for Tests in Wind Velocities up to Fifty Miles per Hour

WINDOW IN CARPET SWEEPER SHOWS WHEN TO CLEAN IT

To eliminate removing the dust pan except when it is filled, a carpet sweeper is equipped with a window or transparent top so the housewife will know when it is time to empty the container. A set of steel combs keeps the brush clean.

E. G. Wagner, Inc.



Onion Peeler Shown in Operation; Cylinder at Right Is Equipped with Gas Burner for Loosening the Skins for Easy Removal

ONION PEELER HAS GAS FLAME FOR LOOSENING THE SKINS

Onion peeling on a commercial scale may be done speedily and efficiently with apparatus devised in Australia. The onions are fed from their sacks into a hopper at one end of the machine, where they enter a revolving cylinder. At the end of the cylinder, they encounter a gas flame which singes and chars the outer coverings. A blast of air blows off the skins. Water is sprayed over the onions and they emerge at the other end of the machine ready for use. Less brine and bleaching materials are required because the onions are placed immediately into bottles and treated.

WHEN WATER FLOWS UPHILL

Water flows uphill in plants through the thousands of tiny tubes making up the woody parts of the stems, but it does not flow as water does in the plumbing pipes of a house. It does not go up in solid streams, at least in times of water scarcity, but forms films that adhere to the walls of the tubes and flow along them, the hollow spaces in the middle being filled with water vapor. This hypothesis of sap ascent in plants has been advanced by Prof. George J. Peirce, of Stanford university. The theory most commonly held has been that the water in the tubules of the plant,

because of the very small diameter of its columns, has a strength like that of fine wires, and that the pull exerted upon these columns by the evaporation taking place at the top in the leaves literally drags the water upward through the stems. But Prof. Peirce has performed delicate experiments with plants near the wilting point, and these tests indicate to him that water in the liquid form exists only in contact with the cell walls. The hollow space within these water cylinders, he maintains, is filled with water vapor which can move through the plant much faster than water molecules can travel when they are parts of a continuous water mass. Only at times of water surplus, he says, are the

tubes filled with continuous columns of liquid water.

PISTOL SHOOTING ONLY BLANKS HAS AUTOMATIC EJECTOR

Firing only blank cartridges, a seven-shot pistol without a magazine is equipped with an automatic ejector. Cartridges are placed directly in the barrel and when fired, the flash escapes from the end of the



Pistol Which Fires Only Blank Cartridges; It Has an Automatic Ejector and No Magazine

barrel like a real gun. Empty shells are ejected after each shot.

Columbia sheep, developed in Idaho, are said to produce heavier fleeces than any breed commonly raised in range areas.

Cmd. Adrian Ashton, Coy "B" 38th, Sydney, New South Wales, Australia
Twelve St. & W. Australia
2037
22/26/33
Stanford P.O.

Laszlo 507-566
317 Broadway
New York

See letter 2/30/33
S.E. Laszlo, New York

England - J. & Holdersworth
Bicycle with a Low Frame Is Easy to Propel

*99 Leonard Road,
 Beckenham, Kent,
 England*



Paris.

Riders on Ancient, Conventional and Newest Models in Bicycles; the Ones at the Right Have Comfortable Seats and Are Propelled by Pushing Forward on the Pedals

Bicycles with low-slung frames bearing little resemblance to the vehicles of ordinary design have made their appearance in Europe. The wheels are smaller than those of the ordinary bicycle, the rider sits well back on a more comfortable seat, guides the vehicle with a long, slanted handlebar and propels it largely by a forward push on the pedals instead of a downward pressure.

C1919
VIBRATION ELIMINATOR STOPS AIRPLANE "TAIL FLUTTER"

To prevent the dangerous "tail flutter" which is likely to increase in frequency and intensity as an airplane exceeds a speed of 200 miles per hour, engineers have developed a vibration dampener which is attached to the elevator of the new low-wing "Orion" air liner.



This counterbalance consists of a five-pound lead weight on the end of a curved arm attached to the elevator sev-

eral inches from the hinge. The arm, a duralumin casting, is shaped to extend over the elevator hinge and to hold the weight in a recess in the stabilizer when the elevator is in neutral position. When the elevator is raised or lowered, the weight protrudes below or above the stabilizer surface into the air stream. The installation is duplicated on the elevator on each side of the rudder and gives a seventy-per-cent static balance around the elevator hinge, making it easier for the pilot to operate the control. The weight, having a different period of vibration than the elevator itself, in effect dampens out all noticeable vibrations of the elevator.

C1958
INK WASHABLE FROM CLOTHES IS PERMANENT ON PAPER

Permanent on paper but washable from clothes, a new ink is sold in a bottle that is hard to overturn. The ink resists ink eradicator, thus overcoming the danger of erasure and substitution of other figures or words, yet its stains may be removed from clothing, rugs, fabrics and the human skin with soap and water. Non-corrosive and free from sediment, the ink comes in a three-cornered bottle with a wide base. An inner-groove cap eliminates the chance of the fluid squeezing out.

Lockheed Aircraft

Quill Ink Corp

© 1935 N. W. ...
merchandise mart
Chicago

RADIO NEWS



Above, Broadcasting Eruption of Volcano in Hawaii; Map Shows Position of Planes in Three-Way Air-Mail Broadcast

By H. W. MAGEE

WHEREVER man can go today, a microphone can follow. The radio accompanied Lieutenant Commander Settle on his stratosphere flight, followed Admiral Byrd to the Poles, traveled with William Beebe in his bathysphere 2,200 feet beneath the sea and is standard equipment on commercial air liners.

This versatility of radio, combined with its ability to transmit the human voice thousands of miles in the twinkling of an eye, has brought the radio reporter, a man trained to give a vivid spoken account of what he sees and hears, just as the newspaper reporter supplies the written account. But there is more to supplying news by radio than hiring a chap with a "gift of gab" and handing him a microphone.

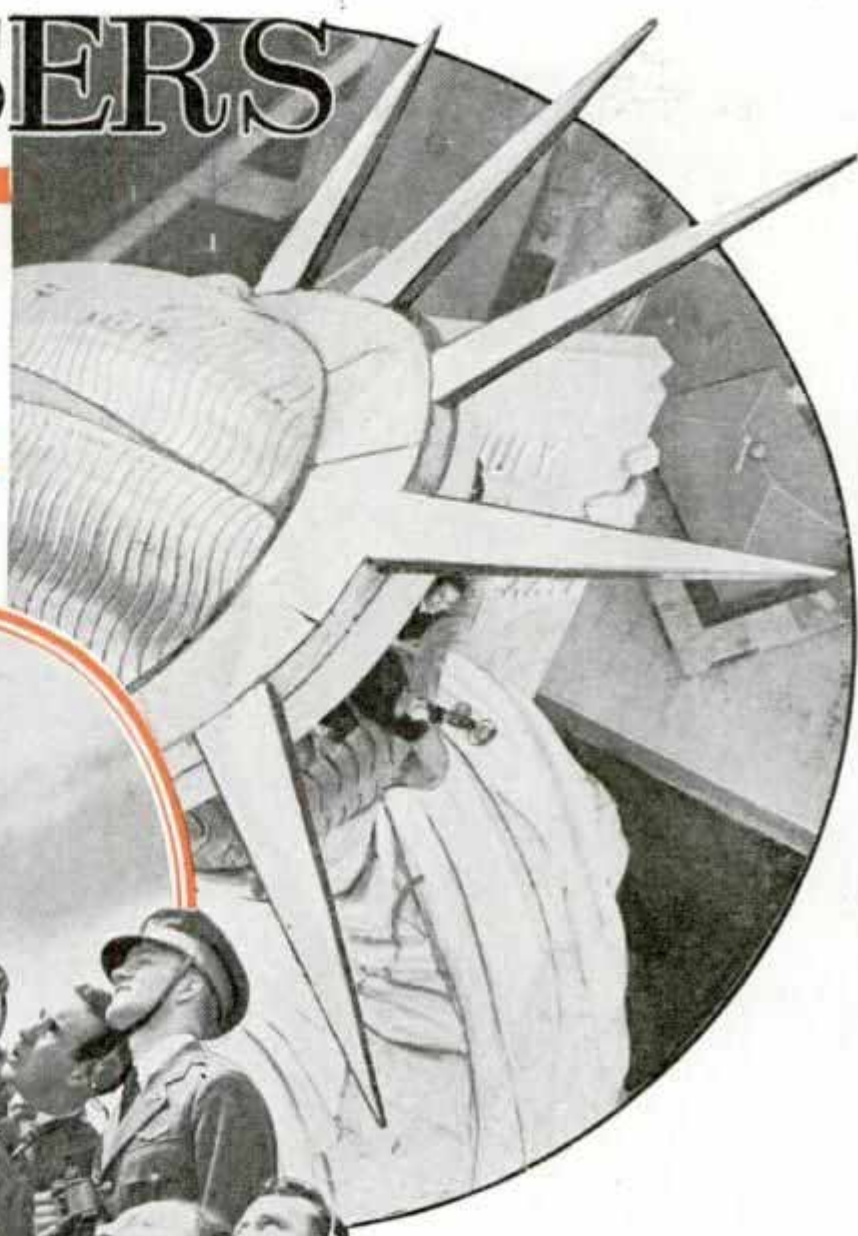
Bringing the details of a national news



Destroyer Used as Station to Broadcast Yacht Races, and Radio Reporter Interviewing Divers Testing New Equipment for the Navy

CHASERS

10:30 P.M. 11:30 P.M.



Picture Taken from Arm of Statue of Liberty Showing Radio Reporters Talking from Top of Statue; Below, Describing an Air Show

zation extending from coast to coast during the actual time the broadcast is in progress.

When President Roosevelt came to Chicago to address the American Legion last fall, he left his train in the downtown district, rode through crowded streets to the hall where he delivered his address, was carried by auto several blocks to the World's Fair grounds, from

story to you by radio involves the use of equipment valued at millions of dollars, days and sometimes weeks of preparation on the part of the chain broadcasting companies, the solution of a thousand and one difficult problems by radio engineers and finally, the teamwork of the entire organi-

there went to a cemetery ten miles distant, and finally, rode back to his train. During the entire day, the National Broadcasting company followed him and described virtually every moment of the eventful visit. Not once during the day was the President near a broadcasting



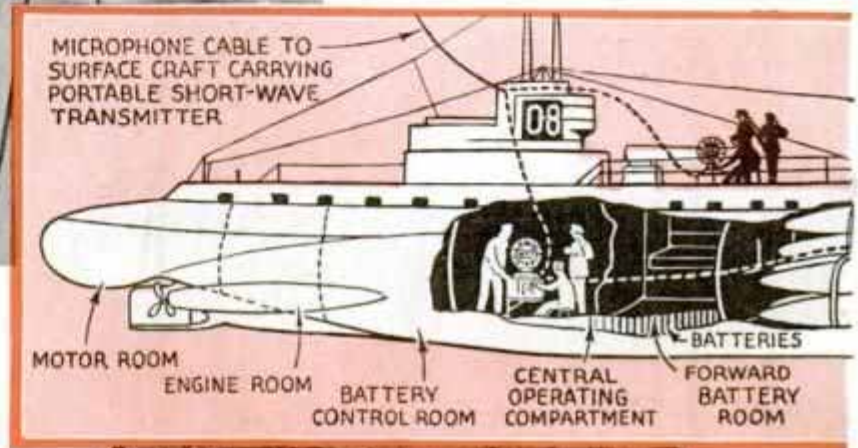
trol car in the streets of Cleveland, jumped back to New York music, proceeded on a tour of the Fair grounds in Chicago, went from there to a United States cruiser in Honolulu harbor, swung back to a walk with a reporter through Times Square, New York, and then proceeded to an airplane flying across the continent.

This broadcast used virtually all of radio's bag of tricks and demonstrat-

studio, yet radio was able to tell what happened from the time he left his train in the morning until he waved good-bye in the evening.

How are such things done? The answer is radio engineering plus trained reporters capable of describing clearly what they see and hear. At the station direct wires connected to the N. B. C. studios were strung to the trainshed to enable reporters to record the scene there. Along the streets, the procession was followed by a broadcasting truck carrying a portable short-wave transmitter which had its receiving counterpart on one of the lofty towers of the World's Fair sky ride, from where the words were carried to the studios. At the convention hall a microphone was connected by direct wires to the studios for the address itself.

This was a relatively simple feat compared with the program broadcast in connection with the visit to the World's Fair of Senator Guglielmo Marconi, father of wireless. It began with an orchestra in New York, switched to a police radio pa-



Top, Knapsack Transmitter; Center, Position of Microphones for Submarine Broadcast; Below, Talking from Submarine

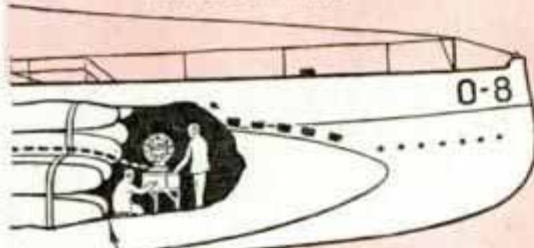
ed the ability of the radio reporter to cover the air, the sea and an entire continent in the space of a few minutes with the aid of the engineer. The national hook-up of stations received and transmitted words and music by long-wave, by short-wave,

from a truck in the Fair grounds carrying a portable transmitter and, in Times Square, from a pack transmitter carried on the back of the reporter like a knapsack.

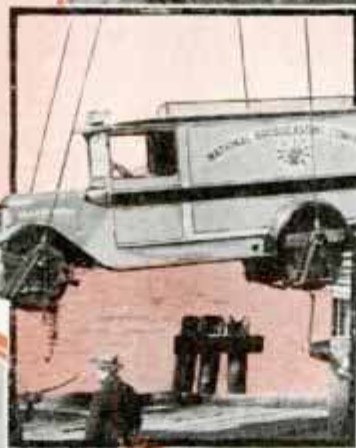
This ability of radio to cover important events while they are happening is due mainly to the development of the two types of portable transmitters, the big one carried in a truck and the little one borne by the man on the scene of the



CHART OF MICROPHONE POSITIONS
USED IN BROADCAST
FROM SUBMARINE



TORPEDO ROOM



story. These are completely self-contained and the speaker and engineer are not concerned about wire lines when the portable equipment goes into action. The pack transmitter, for instance, makes it possible for you to hear the radio reporter interview the baseball star on the field at a big game while the truck transmitter can follow a parade or other moving story for miles.

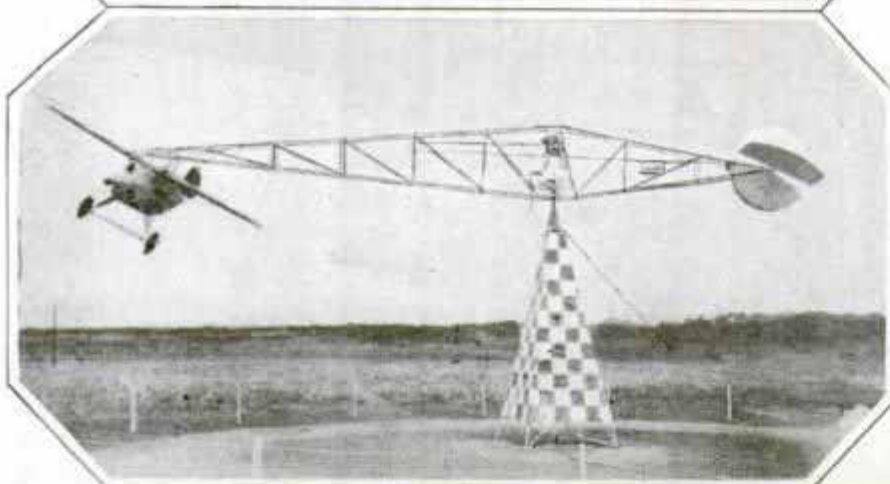
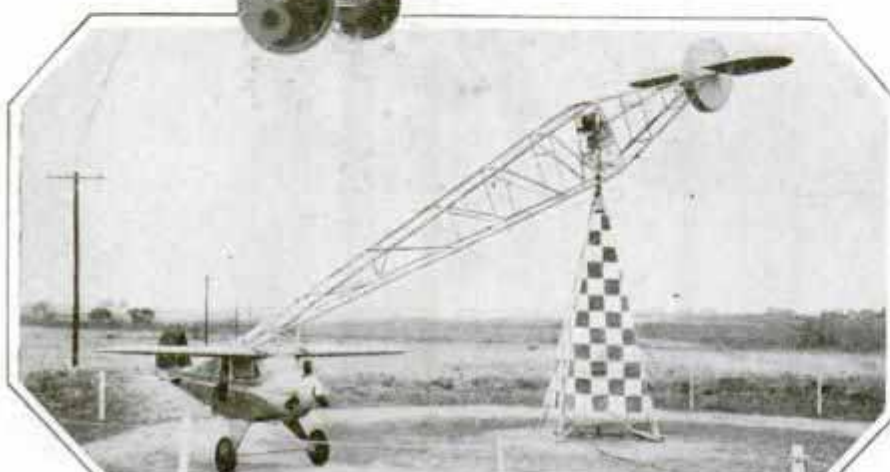
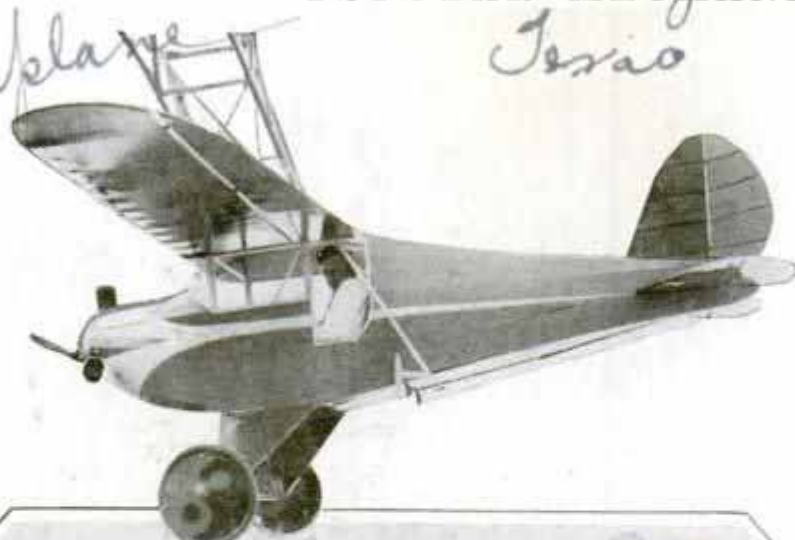
Sometimes these radio engineers decide to perform the "impossible." Then you hear stunts like the two-way, short-wave conversation between mountain climbers on Pikes Peak and their base at the foot, or a Japanese commander in Manchuria explaining his country's position direct from the battlefield—all of it "hot off the air."



Top, Talking from Airplane; Insert, Hoisting Broadcasting Truck on a Barge Preparatory to Talking by Radio from Top of Statue of Liberty; Below, Radio Reporters, Covering Lindbergh Kidnaping

*Hydplane
Rald*

Texas



This Plane Can Be Maneuvered Like a Real Ship, but the Counterbalance on the Beam Keeps It from Getting Out of Control

AIRPLANE ON BALANCED BEAM CAN BE FLOWN BY NOVICE

Happy landings are always assured if you ride in an airplane which actually takes off and flies under its own power, yet cannot fall or get out of control regardless of how the novice mixes the controls. It consists of a conventional type of ship, powered with a five-horsepower electric motor which is controlled by an operator on the ground. The plane is attached to one end of a beam which in turn is pivoted to the top of a central stand, allow-

ing the ship to revolve and move in a vertical plane. A hydraulic check allows only a limited movement up and down of the beam, and on the end opposite the ship the beam has stabilizing equipment in the form of a horizontal surface set at the same angle as the plane's wings and a vertical surface or fin in the form of a tank containing sufficient water to counterbalance the weight of the ship. The horizontal surface counteracts pressure as the plane banks and the vertical fin counteracts the drag when the ship is going against the wind and retards the ship as it flies with the wind. An adjustable counterbalance, also controlled by the ground operator, helps balance the varying passenger load. By adjusting the speed of the motor in the plane or the counterbalance, the ship can be made to fly at a height of from one to twenty-five feet and takes off when it has reached a speed of about twenty miles per hour. By using controls in the cabin, the passenger can zoom and dip the ship in a businesslike

manner. When the motor is throttled or cut off the plane glides to a landing. When in flight, the beam and most of the stand are hidden from the view of the flyer.

c2001

COLLISION OF GEESE IN FLIGHT RESULTS IN BROKEN WING

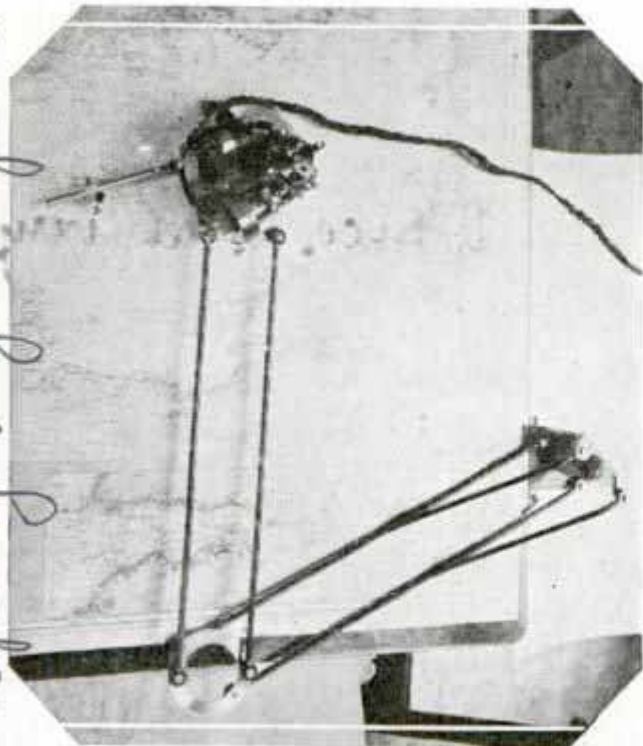
When two geese collided in the air near a California town recently, one fell to the ground with its wing broken while the other dropped several feet, regained its balance and flew on. As two hunters watched from their blind, they saw one

*Arville Mercury
12/4/35*

goose flying north to join a flock headed in the opposite direction. Instead of wheeling into line, the lone goose crashed into the leader of the flock. One fell to the ground directly in front of the hunters' blind, its wing almost severed. The unusual accident occurred about 150 feet in the air.

C188 3
SHIP'S COURSE IS TRACED ON MAP BY RECORDER

Automatic recording of a ship's course is accomplished by an electrical device called the odograph, which traces the course on a chart. The odograph is actuated jointly by the ship's electrical log and by the gyro-compass that steers the vessel on a set course. A magnetized wheel on a swivel holds the recording instrument on the chart while a pencil arm traces the course. As the ship moves forward, its progress is measured accurately and recorded by the electrical log, intermittent electrical impulses from the log causing the odograph pencil to move forward proportionately on the scale map. Changes in direction are communicated to the pencil by the gyro-compass. A glance at the chart thus tells the navigator his position.



Close-Up of Ship's Chart on Which the Odograph Is Shown Tracing the Vessel's Course



Walter Gooche
Automobile Body with a Telescoping Rear Section Which, When Extended, Transforms It into a Bed

AUTO WITH TELESCOPING BODY TRANSFORMED INTO VAN

One British inventor has designed an automobile body with a telescoping rear section which, when extended, converts the car into a commodious van for sleeping or for storing extra luggage. The rear section pulls out when safety catches inside are released. When extended, the seats of the car collapse, transforming the interior into a comfortable bed. The body can be fitted to any make of car and a trunk at the rear is used as storage space for clothing or camping equipment.

C2000
RUBBER TUBING OVER FISH LINE ACTS AS SHOCK ABSORBER

Elastic Line
Many anglers use rubber bands to take up the shock when trolling or still fishing for fish with tender mouths, but when such bands break, the fisherman is likely to lose his tackle as well as the catch. To eliminate this hazard, a shock absorber for the line is being offered. It consists of a length of rubber tubing with a line on the inside. The tubing is strong and will stretch, but if it breaks, the angler still has the line inside the tubing on which to rely. Sizes suited to various lines are being made.

Sperry Gyroscope Co. 40 Flatbush Ave. Bklyn. N.Y.

Walter Gooche, Sutton, England

Sperry Gyroscope Co. 40 Flatbush Ave. Bklyn. N.Y.

Chas. J. Hillman, 1426 Division St.



Storage-Battery Lamp for Use around the Auto Burns Eight Hours on One Charge

HANDY LANTERN FOR AUTOIST USES STORAGE BATTERY

Eight hours of continuous illumination may be obtained from a portable automobile lantern equipped with a storage battery. When the energy is exhausted, the battery is recharged. The lantern consists of a cylindrical battery, a six candlepower, six-eight volt bulb in a reflector, a screw type switch, a bracket, and a relay to control charging. When the lantern is placed on the bracket and a lever locked in place, the battery is connected automatically to the generator of the automobile. The bracket may be mounted in the engine compartment in any convenient place. The lantern is useful to hunters, campers and repairmen, as well as motorists.

EARTH ONLY INHABITED PLANET LATEST STUDY INDICATES

That the earth probably is the only place in the universe where life can exist is the opinion of astronomers after extensive study. This is a reversal of the belief that there may be life on other planets of the solar system or on planets elsewhere in the universe. There is little evidence, says

Kansas City Star
12/16/13

Dr. Walter S. Adams, director of Mt. Wilson observatory in California, that other systems of planets like ours exist. Reporting the latest discoveries about planets in the solar system, Doctor Adams says that only two, Venus and Mars, could possibly support life and of the two, Venus is much more favorable. No one ever has seen Venus, due to perpetual clouds that surround it. Above this cloud layer is a layer of carbon dioxide half a mile thick, which may indicate the presence of plant life. The surface of Venus probably is warmer than the earth, Doctor Adams says, but above the clouds it has a stratosphere resembling our own with a temperature of twenty-five degrees below zero. No sign of oxygen, which would be necessary to life as we know it, has been found in the atmosphere of either Venus or Mars, but Venus may have oxygen and water vapor, also essential to life, below its cloud bank.

c1913.

LETTERING GUIDE AIDS NOVICE IN PRINTING BY HAND

Neither skill nor previous experience is necessary in lettering by hand if a lettering guide now available is used. Seven styles of lettering are offered in various sizes, and different sizes and types of letters can be made with each guide by employing different pens, the latter being part of the equipment. The height of the letter is governed by the guide selected, and the thickness of the line is governed by the pen used. The guides are grooved on the under side to prevent smearing of ink and can be used for any purpose where uniform standard lettering is desired, be-



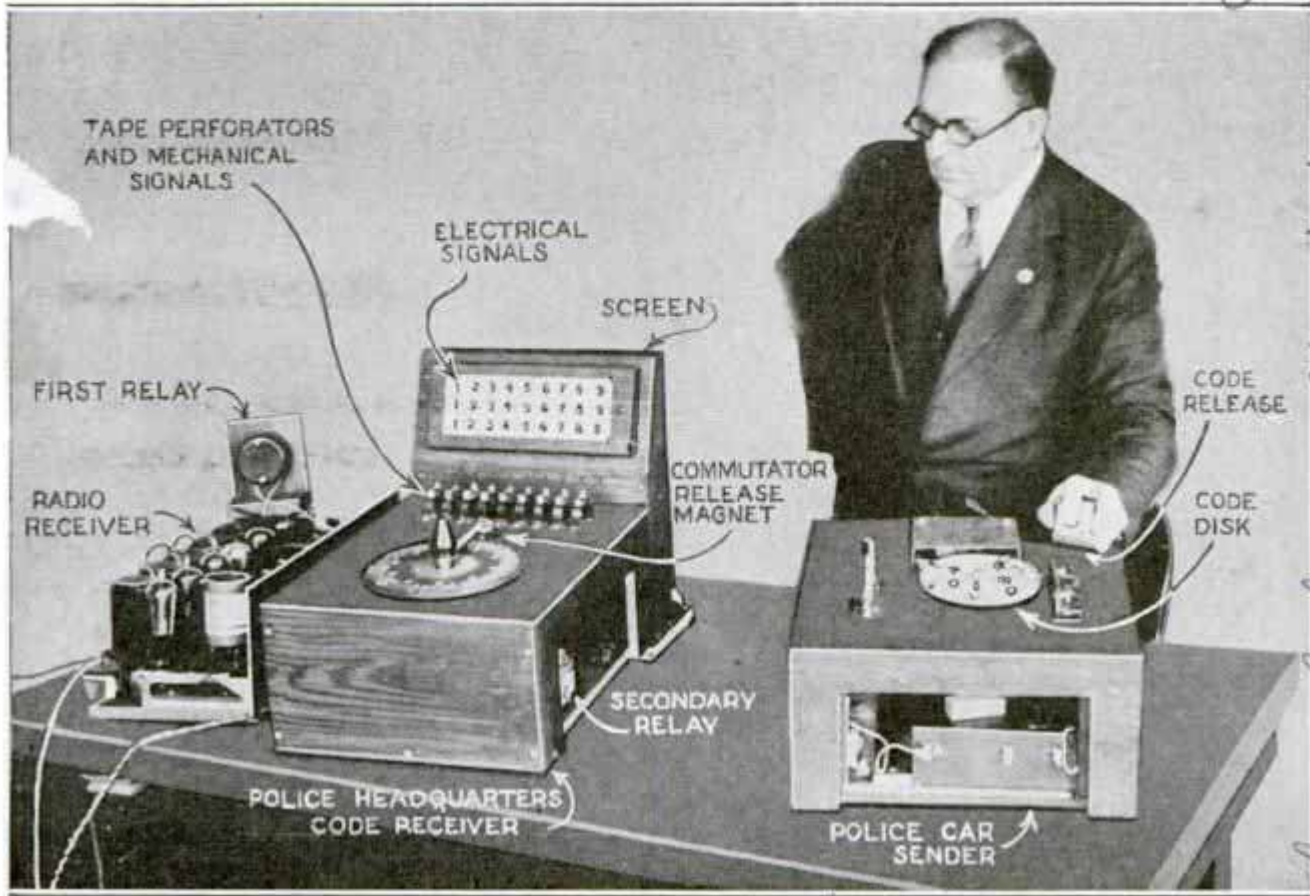
Lettering Guide Which Enables the Novice to Print Show Cards without Previous Experience

ing suited particularly for printing small advertisements or sale signs.

Warren Knight Co
136 N. 1st St. Phila

c2005

Radio Gives Football Strategy to Police Cars



Transmitter and Receiver Which Enables Police Car to Send Code Numbers by Radio during a Chase to Advise Headquarters of Its Location and Direction of Travel

Police cars can now run signals and employ all the strategy of a football squad when pursuing a fleeing auto if they are equipped to transmit radio code signals to headquarters indicating their position and the direction in which they are proceeding. This information is then broadcast to cruising police squads nearby, enabling them to join in the chase or throw a cordon of cars around the area in which it is occurring. Under this system, recently demonstrated in Detroit, each police car would carry a very simple portable transmitter operated by pressing numbered buttons which in turn perforate a roll of tape and send a signal corresponding to the number pressed. A code signal would consist of three numbers, one representing the car, the second its direction and the third the street it is on. By consulting a master map with similar code numbers, the headquarters crew then requires only a moment to figure the position and direction of the reporting squad, and only a few seconds to broadcast this information to other police cars. Since few police cars

are equipped with voice transmitters, a squad has no way of communicating with its headquarters during a chase except to stop and telephone, thus losing much time. If the code signal system were used, the cruising car could advise its radio station as soon as it started a chase, the code giving the exact position and direction, and enabling other squads to assist. The signals at the receiving end are perforated on a tape and also flashed on a screen.

NIGHT AIR MORE RADIO-ACTIVE THAN DAYTIME ATMOSPHERE

Night air, which grandmother used to think unhealthful, contains about one-third more radio-active matter than the daytime atmosphere. Carnegie institution scientists have discovered that we breathe more radio-active matter at night, but there is no indication of whether this is harmful or beneficial. Both day and night the human system takes in small amounts of radio-active material in the form of radon and thoron, which float in the air.

*Wm. Seleni W. Watam
20 Ingrand Blvd
Binghamton, NY*

*NY Herald Tribune
12/17/52*

Washington, DC

© 1898
5-6 W. D. E. the mayor

WINGS



ALL aboard for Europe by air! The long-awaited plans for transatlantic flight routes have crystallized beyond the blueprint stage, and are now up for immediate action. Five major operating companies of Europe and America have donated all transatlantic information to a common pool, from which any participant may take whatever data are needed. As a result, Pan American Airways, collaborating with Imperial Airways, Lufthansa, Air France, and K. L. M., the Royal Dutch Lines, will be in a position to decide at once which is the most favorable route. Lindbergh's report on his north Atlantic survey is also available to the foreign operators.

The American government, foreseeing the immense advantage of a merchant air marine, has expressed its willingness to build an experimental airdrome if the invention can be proved practicable. But airdrome or no, transatlantic air service may actually be in effect before



Top, Plane Being Catapulted from Deck of the "Westfalen," German Liner Converted into Floating Airport for the Use of Planes Engaged in Transoceanic Travel; Below, Proposed Round-the-World Air Route

1930

over the OCEANS



Left, Martin Transatlantic Metal Flying Boat Now under Construction; Above, Probable Routes of Aircraft over North Atlantic; Southern Route Is Established

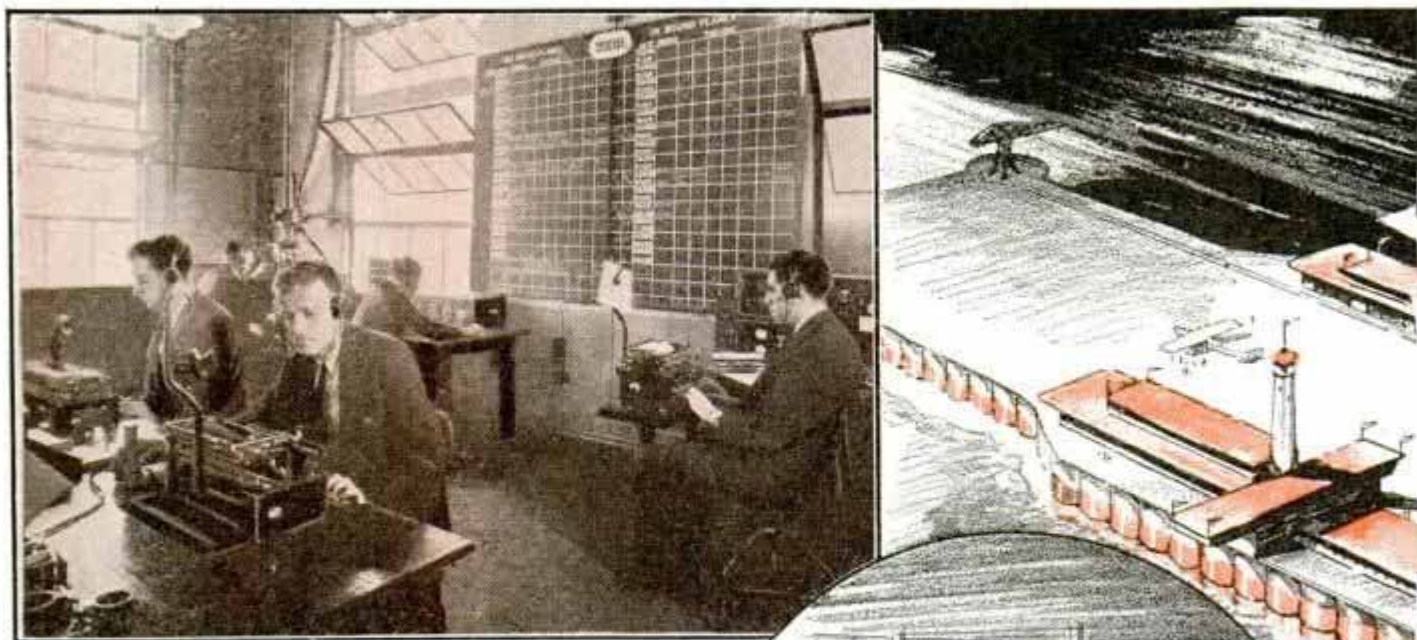
the end of 1934. What chance have American interests to obtain and hold leadership in aerial commerce across the Atlantic? By all indications, they appear to have an advantage over all foreign competitors.

American aviators, flying American made planes, have had long and varied experience in long-distance ocean hops. The present Pan American system covers the longest scheduled over-water route on any commercial air line, the 600 miles between Kingston, Jamaica, and Barranquilla, Colombia. The same system operates about

2,000 miles of airways in Alaska, and a great network of lines in the Caribbean Sea and tropical South America.

The radio used by Colonel Lindbergh on his recent aerial survey defied the aurora borealis, tropical storms, and electrical disturbances to interrupt its operation. Its power and range are almost uncanny, and its value in commercial overseas operations will be tremendous. Whether seadromes or mother ships are stationed across the Atlantic will make little difference. American craft will keep in touch with sea-level stations constantly.

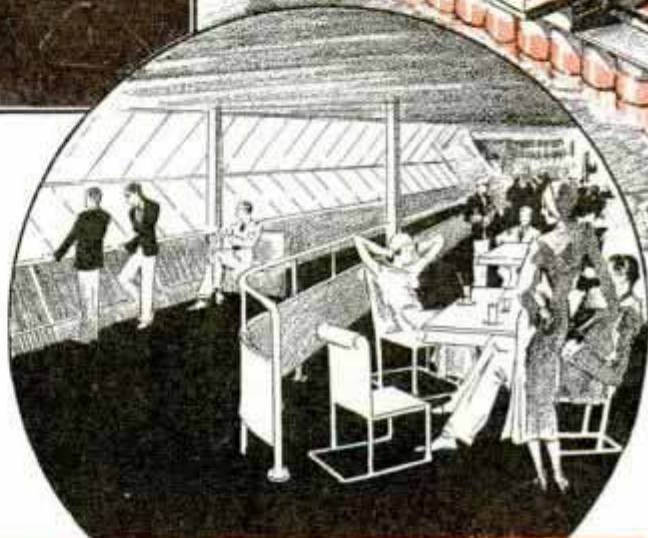
A big feather in the American hat at



Above, Receiving Radio Reports from Pan American Planes at the Company's Miami Offices

present is the fleet of fast clipper ships, built especially for transatlantic service by Sikorsky and Martin. None of the foreign companies has equipment which compares with that now under construction for Pan American. The transatlantic clippers embody improvements which have been flight-tested for years in the great laboratory for ocean flying, the Caribbean sea. The experience gained there has given American aviators an advantage that will make the flying clippers as famous as the Yankee sailing clippers in their day.

The "S-42," flagship of the fleet, just launched, is the first of three sister ships under construction by Sikorsky. Three others will soon be launched by the Glenn L. Martin company, in Baltimore. Specifications called for a flying boat capable of transporting a full mail load more than 2,500 miles against head-wind conditions of thirty miles per hour. Actually, the "S-42" has a greater range. She is now fitted out as a thirty-two-passenger airliner. With these passengers, a crew of five, and 1,000 pounds of mail, the "S-42" has a range of 1,200 miles. The same clipper in transatlantic service would have a smaller passenger capacity on account of the space demand-

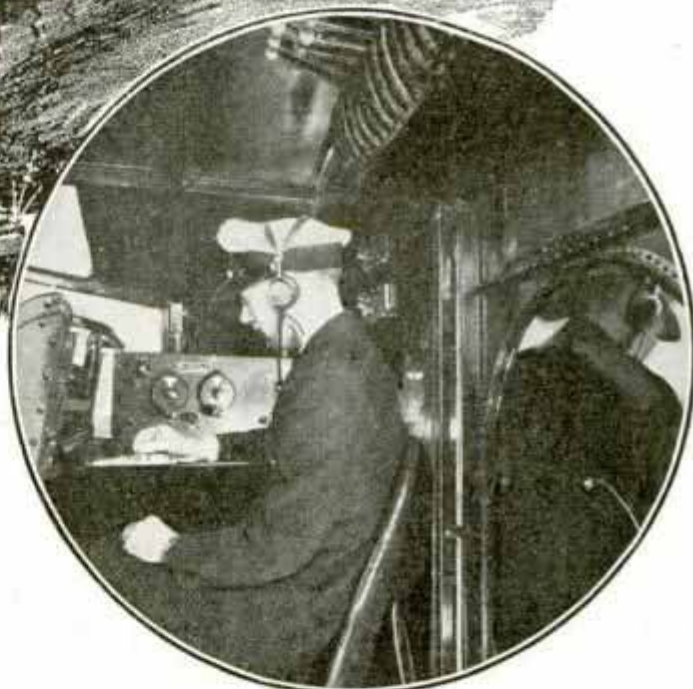
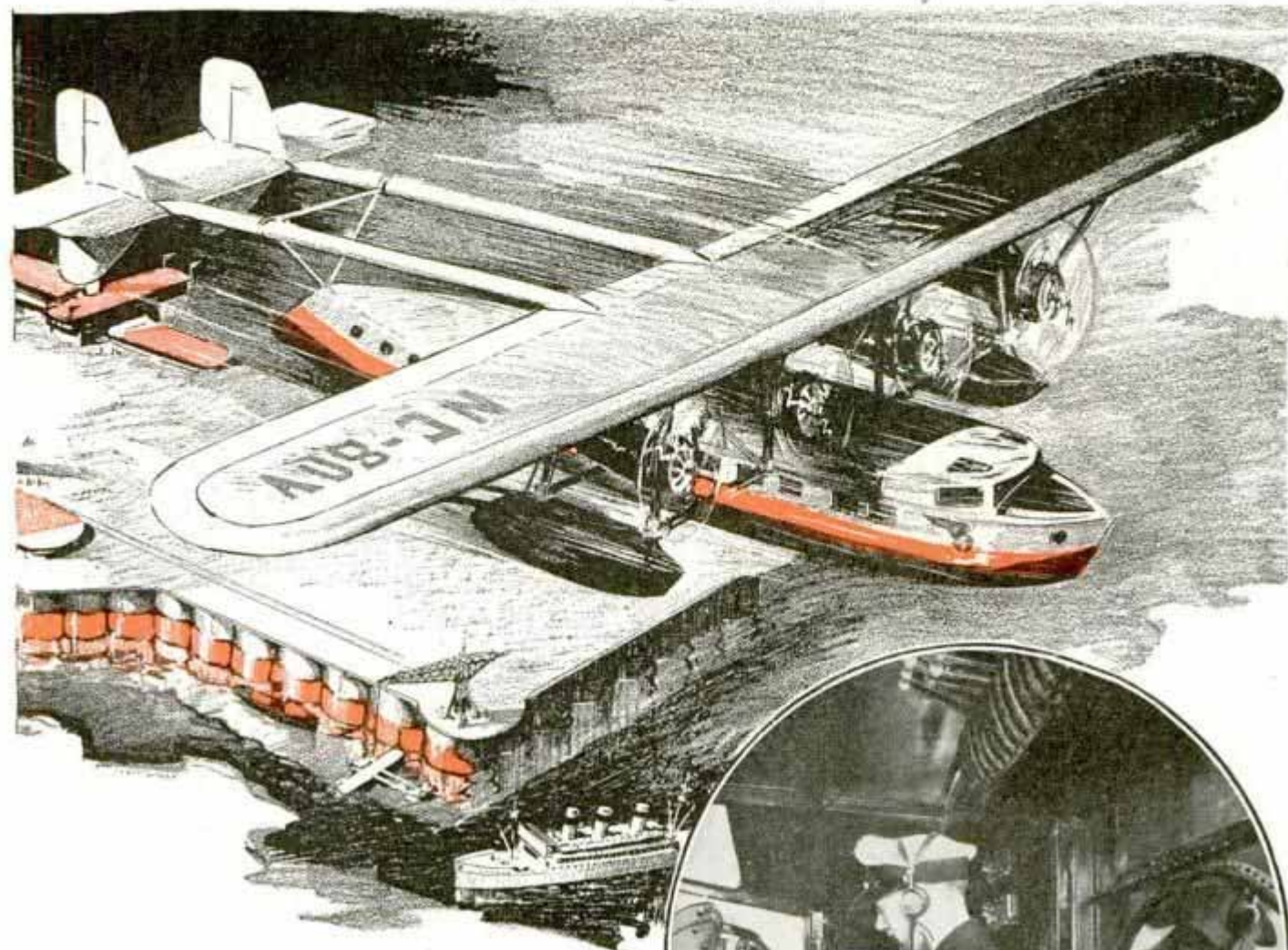


In Circle, Artist's Drawing of Promenade of Proposed New German Zeppelin; Below, Marine Air Terminal Being Built at Miami

ed by fuel tanks. Her fuel capacity will give her a range thirty per cent more than is necessary to cross the ocean at its widest point.

After the trial flights of the "S-42," the government will undoubtedly come to the fore with an offer for mail bids. The

C1890



Top, Artist's Conception of Transatlantic Plane Passing over Ocean Airport; Below, Radio Operator at Work on a Clipper Ship

immediate success of commercial lines will depend largely on mail contracts, and when they are awarded, service will commence at once. A mail contract is a golden subsidy, and a prize worth fighting for because transatlantic mail traffic is very heavy.

With letters written on thin paper, it is possible to write about forty to the pound—at twenty-five cents per letter. Thus a 500-pound mail load would yield \$5,000 for each trip. Present international air mail subsidies pay operators two dollars per mile. The cost of operations per mile across the Atlantic is uncertain, but experts point out that its initial cost can be reduced after a short experience in operation. Transcontinental lines succeeded in cutting the mileage cost of operations from \$2.21 in 1929 to forty to sixty cents in 1932.

The principal argument advanced in favor of seadromes is that they can increase the pay load tremendously. Instead of 500 pounds of mail, aircraft will be able to carry 1,500 pounds; and instead of five or

ten passengers, it will be possible to carry about twenty.

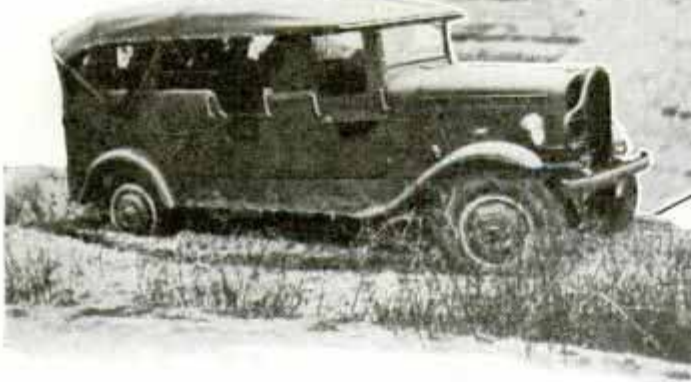
Plans have also been made for expediting transfer of passengers and air mail after they have reached a port of destination. American architects, engineers, and aviators have drawn designs for elevated airports to be built over the ship docks of congested cities. By means of pneumatic tubes, a letter from overseas can be transferred to the postoffice in record time.

In keen anticipation of transatlantic service, many have forgotten that the

(Continued to page 124A)

Cross-Country Auto Has Four-Wheel Drive

Marrini-Herrington Co



Car for Cross-Country Travel Which Has Four-Wheel Drive, Ten Speeds Forward and Four Reverse

Combining the features of a modern truck and passenger car, but differing in many respects from both, a motor vehicle for cross-country driving and for army operations has been built by an American truck company and delivered for army service abroad. The car employs driving power through both front and rear wheels, enabling it to negotiate deep sand, steep hills, ditches and other kinds of terrain or-

ordinarily considered impassable. On the open road it has a speed of sixty-five miles per hour. The vehicle seats nine passengers and has a space in the rear for a motorcycle for the use of couriers. Similar cars have been designed to seat twelve passengers. The military type has a collapsible top and side curtains but enclosed bodies are practicable. The wheelbase is more than 147 inches, the engine is a heavy-duty six cylinder of 106 horsepower and there are both standard and auxiliary transmissions with a total of ten speeds forward and four reverse. Vehicles of this type have numerous commercial applications.

COAL PLANT TO MAKE GASOLINE IS PLANNED IN GERMANY

Production of gasoline from coal on a commercial scale is planned in Germany. The state government of Saxony is preparing to construct a plant that will convert 600 tons of lignite into gasoline daily by a special process, with an annual output of between 5,000 and 20,000 metric

tons of gasoline. At present Germany depends largely on imported gasoline. Of an estimated consumption in 1933 of 1,360,000 metric tons, more than 825,000 tons were imported. A marked increase in the use of automotive fuel is expected in 1934 as a result of improved highways and lower taxes. The extraction plant is in line with a national motorization scheme developed by the present German government.

Dept of Commerce 12/11/33

Report from Consul J. J. Huddleston

398, Harrington & Herrington Co. 1001 York St. Indianapolis

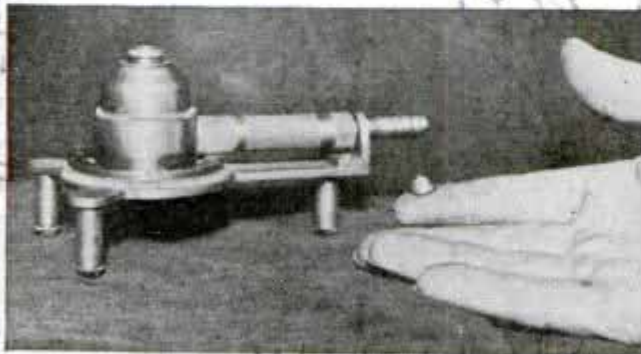
AMERICA SPEEDS UP PLANTING OF FORESTS

More than 48,000 acres of national forest land were planted to trees in the fall of 1933, the United States forest service reports. Approximately 39,000 acres, mostly in the lake states region, were planted by civilian conservation corps workers, while the other 9,000 acres were covered by men paid from the allotment from the public works administration for the improvement of national forests. The planting, which covers a six-month period, is greater than the acreage attended in national forests in any preceding twelve months.

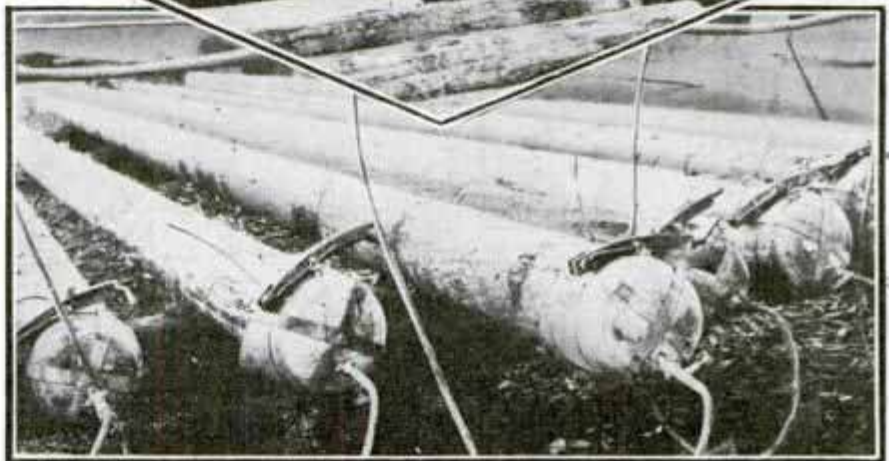
C/1937

TINY CENTRIFUGE IS ULTRA-FAST

Capable of sending its steel rotor at a speed of 1,200,000 revolutions per minute, a small centrifuge motor about the size of a teacup develops a centrifugal force 7,600,000 times greater than the force of gravity. The rotor is so small that it may be placed upon the fingertip, appearing tiny in comparison. The small motor was exhibited at the exposition of chemical industries in Grand Central Palace, New York.



High-Speed Centrifugal Motor; Note the Tiny Steel Rotor Shown on the Fingertip



Top, Arrangement for Injecting Preservative into Logs; Bottom, High-Pressure Air Lines Connected to Caps on Logs Force in the Fluid

LIQUID FOR PRESERVING LOGS IS INJECTED BY AIR GUN

Logs are preserved for use as telegraph and telephone poles by a new method which consists of forcing a fluid into the grain of the wood by air pressure. The sap is forced out of the log by the pressure of fifteen pounds and a rubber cap is clamped on the butt. Then the preserving fluid replaces the sap.

C/1973

SPRINGS RUN CLOCKWORK AUTO

People in India are using clockwork autos introduced into that country from Japan. The cars run forty miles to a winding and sell for less than \$150. They are operated somewhat like the top spring autos and are causing worry to British automobile dealers selling conventional cars.

no further info

Wall Street Journal

Used by Portland High & Power Co. Portland Oregon

Shaples & Peaslee Co. 23rd and Washington

Streamlined Bus Replaces Camels in Desert



Interior and Exterior Views of Motor Coach for Travel across Syrian Desert; It Seats Thirty-Five Passengers and Is Powered with a Diesel Engine; Note Buffet Arrangement

Travelers across the Syrian desert from Bagdad to Damascus now can use a modern motor coach instead of a camel. An American manufacturer recently delivered two huge buses for this traffic, one for freight and the other, almost as big as a Pullman car, for carrying passengers. The passenger coach is sixty-nine feet long, seats thirty-five passengers in comfortable armchairs, and is insulated against both heat and cold. The bus boasts a buffet and refrigerator in front, a two-place range for cooking, and space for carrying provisions for five days for a full load of passengers. Motive power is a 385-horsepower Diesel engine with twelve speeds forward and three reverse. There are three driving axles, and a fuel tank back of the cab carries 250 gallons of oil, enough for a round trip. Luggage is locked in dust-proof compartments and front and rear storage spaces accommodate 6,100 pounds of baggage while interior shelves in the first-class compartments hold another ton. The tires are changed after each trip, due to the wearing effect of the sand. The crew consists of a conductor, steward and

three drivers, one driver sleeping in a berth back of the cab. A telephone system connects the drivers with the crew. The run of about 470 miles is made in twenty-four hours as compared with the usual trip of twenty days by camel or twenty-five days by boat. The coach follows no road, but swings out across the desert sands and climbs to an elevation of about 2,400 feet. Two rivers are forded, since there are no bridges big enough to hold the vehicle. The freight van carries a payload of twenty tons, the equivalent of an eighty-camel caravan.

KITCHEN MOUNTED ON WHEELS SHOWS HOW TO COOK FISH

Housewives in Germany are being taught how to cook fish by instructors in a kitchen mounted on a truck chassis. The kitchen contains ten electric hearths, refrigerators and other equipment, as well as a lecture room. Radio and motion-picture machines also are used. The exterior of the kitchen displays pictures of all kinds of fish found in German waters.

*Nairn Transport Company of Iraq
Baghdad, C.I.*

*Sender Body to 671 Parkerton
Are Cleveland
Ohio*

*© 1928
Conrad John H. Bruns*

*© 1928
Conrad John H. Bruns
Hamburg*

Mass
**AUTO ENGINE RUNS GENERATOR
AND HEATS WATER**

form file
Continuous hot water for the home and 16,000 watts of electricity per month are supplied by a second-hand automobile engine connected to a twenty-five-horsepower generator. When a Massachusetts garage operator found costs of electricity for storage-battery purposes too high, he rigged the engine to the generator, which was set in concrete. With the motor running constantly, this arrangement produces 16,000 watts per month, sufficient for his purpose, at a cost of about \$60. Hot water from the engine is piped to a tank in the attic of the garageman's home.

C839
**VIBRATOR UNIT FOR CONCRETE
SPEEDS UP COMPACTING**

Consolidation or compacting of concrete in highway construction is speeded up and accomplished more efficiently by means of a vibrator unit. It consists of two air-driven vibrators mounted on an eight-inch board. Two men guide the board. Use of the vibrator in highway work is comparatively new, apparatus of this type having been acquired but recently by the New Jersey highway commission.



Vibrator Board for Tamping Concrete Is Handled Easily; Vibrators Are Air Driven



Twice as Many Oysters Can Be Opened Safely with This Device as with the Oyster Knife

Hotel St George
**TURNING CRANK OPENS OYSTERS
QUICKLY AND SAFELY**

Oysters may be opened quickly and easily by means of a simple machine invented by a Brooklyn chef. It contains but two moving parts, a knife blade and a handle. The oyster is placed against a notch in the machine and the handle is turned, bringing the blade to the shell and prying off the upper half of the shell. The opener eliminates the hazard of the knife slipping which often happens when the work is done by hand.

Dept of Commerce
12/13/32
**U. S. SAND FOR ART WORK
SOUGHT IN TESTS**

Tests on domestic sands are being conducted by the United States bureau of standards in an effort to find a sand to replace the imported material used in foundries in production of fine precious metal and bronze ornamental work. Imported sand has a peculiar combination of grain and bond which gives it high permeability and refractoriness. Shop tests, which follow the laboratory experiments, are made at the Washington navy yard.

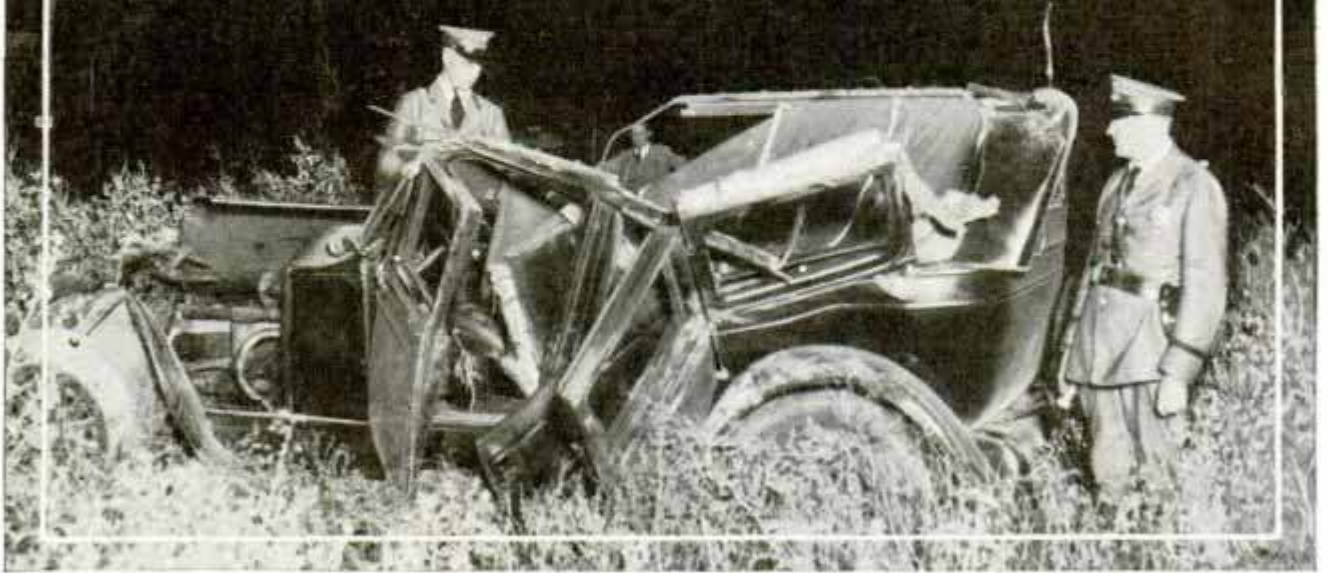
Munsell Concrete Vibrators
- 222

Washington, D. C.

C1664

6750 Normal Blvd
Chicago

DEFEATING



All-Night Parking Gave Thieves a Chance to Steal This Car Which Was Wrecked When the Police Gave Chase; Secure Garaging and Locking Would Have Saved the Owner Money

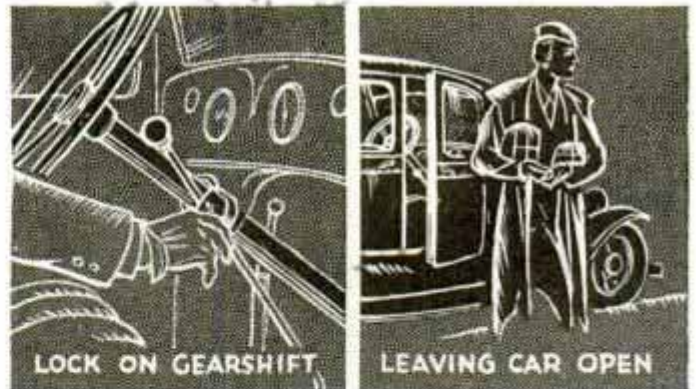
IS your car safe from auto thieves? The toll of the auto thief amounts to millions of dollars annually. And this loss is shared by insured and uninsured motorists alike. So great is the auto stealing "industry" that for several months in one large city the automobile thefts exceeded the new car sales.

Insurance does not protect. It merely spreads the loss of a few among many. But protection is possible. Automobile thieves dread certain things, and their greatest fear is that of being delayed. They also dread anything that attracts attention to their work. Tooting horns or flashing lights have scared many a thief away—and there are automatic devices for doing just this.

So anything you can do to make the thief's job more hazardous is in your favor. Of course, there is no such thing as a theft-proof car. But some cars are far easier to steal than others. And police records show that it is the car that is easy to steal that the thieves go for.

So simple a thing as a hidden switch in the ignition system is one of the surest ways of keeping your car out of the hands of thieves. Of course, you may have a door handle twisted off, and your ignition lock may be jimmied. But when your car

fails to start readily, no thief is going to hang around long trying to find out what is wrong. For that reason, shutting off the fuel supply, removing an ignition part,



Locking the Gear Shift Gives Added Protection; Don't Leave Doors Open or Unlocked

or putting in the hidden switch are among the surest ways of defeating the automobile thief.

And if one lock is good, more are better. A "good" thief can open any lock. But each takes time. So the more locks there are, the greater is your chance of keeping your car. In some cars it is easy to snap a heavy padlock on the gear shift lever so that the car is kept in gear. Of course, this lever can be removed or the lock cut off. But the thief reasons there

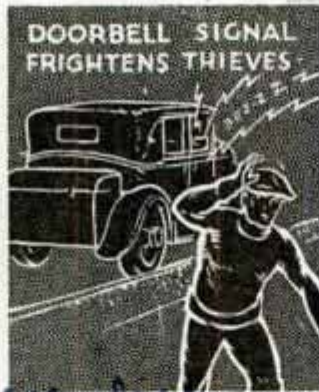
the AUTO THIEF



It Is Easier to Thwart the Thief Than Try to Get Your Car Back after It Has Been Stolen



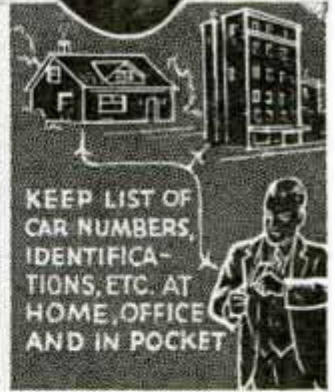
IRON PIPE BREAKS DOOR HANDLE



DOORBELL SIGNAL FRIGHTENS THIEVES



SAFETY GLASS



KEEP LIST OF CAR NUMBERS, IDENTIFICATIONS, ETC. AT HOME, OFFICE AND IN POCKET

An Automatic Signal Bell May Foil a Thief, Even after He Has Broken into Your Car; Safety Glass Protects the Valuables; Be Sure You Have Your Car Numbers Always Handy

are too many cars that are easy to get. Allowing the locks to be plainly seen will prevent much minor damage. If a thief sees in advance that a car is hard to steal he will not go to the trouble of twisting door handles off to get in. That is why some owners chain their steering wheels to the windshield frame, leaving the padlock in plain sight. Those who must leave sample cases or other articles in their cars should put heavy wiring over the windows unless they are of safety glass. An auto-

matic switch that sounds the horn when someone touches the car is also good protection against theft of the car or contents.

Everyone knows that a car should be locked whenever it is left alone. But some seem to think that this is too much trouble. There are two times when the auto thief can be defeated. Before he steals is the ideal time, of course. And that is done by keeping your car well locked whenever it is not in use, and securely garaged when through with it for any length of



time. The other time a thief can be defeated is after he has stolen your car. But that takes both capable police work plus cooperation on your part.

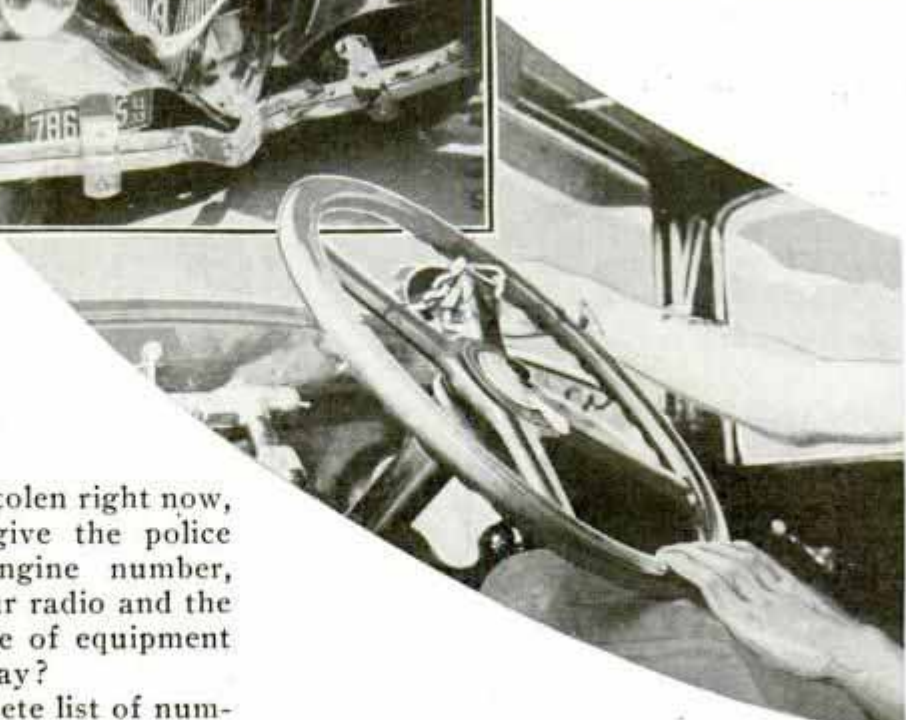
Suppose your car were stolen right now, Could you immediately give the police your license number, engine number, numbers of your tires, your radio and the number of any other piece of equipment that is identified in this way?

Inability to give a complete list of numbers and full description of your car plays right into the hands of the thief. If the car is stolen, it does no good to have the

list in the door pocket. It is good practice to keep a complete record of all the numbers in your pocket, at your office, and at home. Then there will be no delay if it becomes necessary to furnish a full description of your car.

The police departments of the larger cities post daily lists of stolen cars, and it is surprising how police officers can memorize descriptions and license numbers of wanted vehicles. The Chicago record of recoveries of stolen cars runs a little better than ninety per cent, but even though nine out of every ten cars stolen in that city are recovered, many are stripped or damaged so that the loss to the owner or insurance company is considerable.

Cooperation between the police departments of different cities and towns results in the return of many cars. Every day a list of cars stolen in Chicago is sent to 1,200 towns and cities from coast to coast. And these same places send their lists to Chicago. In this way the entire United States is covered with a cross listing of all wanted cars. And it is not at all unusual to find that a car stolen in Chicago



Stripped and Wrecked Cars Taken by Thieves; Bottom, Note Lock on the Steering Wheel in Plain Sight to Discourage Thieves

has been picked up in Los Angeles. Intuition and the playing of hunches lead to many stolen car recoveries. Sometimes a driver commits a minor traffic violation, due, perhaps, to lack of familiarity with the car. A policeman questions him. Possibly the officer's suspicion is aroused by the answers. So he takes car and driver to the station. Here he checks the lists of wanted cars. If the car is on the list, or if its numbers appear to have been altered, both car and driver are held. When numbers are punched into iron or steel the metal becomes crystallized. Then, even though the original number is filed off and a new number punched on, the old number can be brought out.

Whether a car is insured or not, every theft of an automobile is paid for by its owner. If not insured, the owner pays directly. If he is insured, he pays in the form of premiums, for no insurance company can afford to give something for nothing. So it means money in the pocket to park wisely and lock securely.

C1909
GOLF BALL ON SWINGING ARM PERMITS INDOOR PRACTICE

Indoor golf practice may be indulged in the year round by means of a device with a golf ball mounted on a swinging arm.



No net is required. The apparatus is fitted with an accurate triple-registering instrument that records yardage of each stroke, the accumulated

yardage between holes and the consecutive number of each hole, from one to nine. Regulation clubs are used to drive the ball as hard as desired. The ball is regulation size. The device may be used in playing nine or eighteen-hole "games," the players agreeing on a certain distance for each hole. The hole indicator is then set on this predetermined distance. The ball is driven until the distance indicator contacts with the hole indicator, showing that the hole has been made.

☞ Sugar is sugar to most people, but a journal of the food industries says there are fifteen grades of brown sugar alone.



Gun Employs Rubber Band to Propel Dart Fitted with Vacuum Cup; Inset, "Loaded" Gun

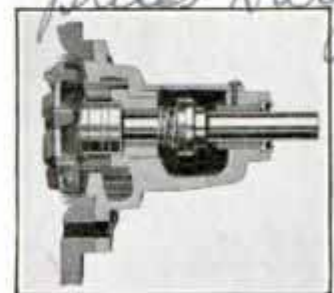
Imacer Isen
RUBBER-BAND GUN FIRES DART THAT STICKS ON TARGET

Vacuum-tip darts are "fired" by a toy rubber-band gun for use in target practice. The darts will stick on any smooth surface, so that the target may be painted on the wall, glass or heavy paper. While the original toys were made of wood, they will be produced commercially by pressing out of tin. A hole through the "barrel" of the toy makes possible more accurate shooting.

C1903

PACKLESS AUTO WATER PUMP* GIVES LONGER SERVICE

Four lapped sealing rings replace the packing in a water pump for automobiles now on the market. The rings are in the open end of the housing, where they stop all water before it reaches the pump bearings, thus preventing the lubricant from being washed away and protecting the bearings from grit. Since there is no packing, the impeller shaft is not subject to the wear found in other types of pumps. The housing is entirely closed by a steel plate which forms a tightly sealed grease reservoir fed by a single lubricating nipple. One charge of fibrous grease packed under pressure inside the reservoir feeds the three bearings for one year without attention.



Thompson Products, Inc.
2101 Elmwood Road

not in L.O. 4/26/70
Powell & Co. 809 W. Madison Chicago

see page 360-5 J E 39 61
4013 Ave. Portland
ere

Sucena Lites

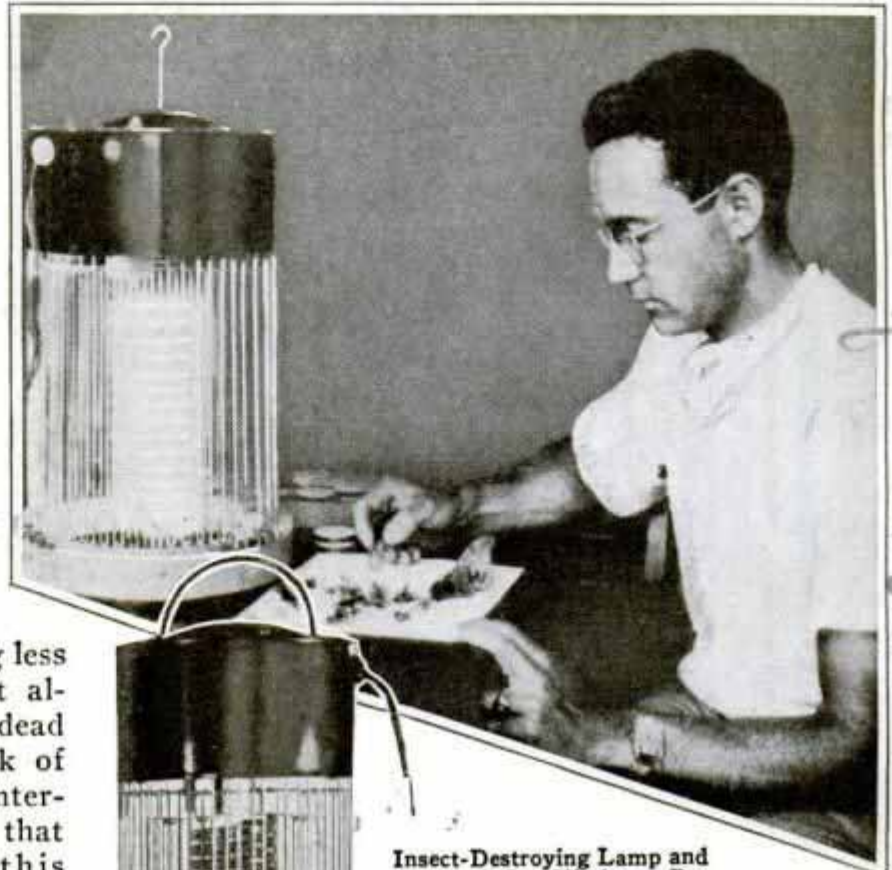
4204 Serrano St

Oakland Calif

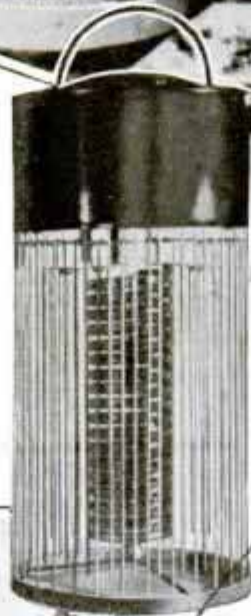
"Electric Chair" for Insects Helps Farmers

Out of the darkness flutters a moth toward the lighted entrance of a California dried-fruit packing plant. Up above the work tables glows a coil of glass inside a wire cage. It gives off a peculiar bluish-white glow that attracts the moth. Straight toward that glow it flutters. As its wings brush the bars of the cage around the light, there is the crackle of electricity and the moth drops to the floor—electrocuted. The bluish-white light has been burning less than twenty minutes, but already there is a mound of dead insects under it. The work of fruit packing continues uninterrupted. There is no fear that hidden larvæ will spoil this plant's pack. Science's newest weapon to battle the insect hordes of earth is on guard. It took Dr. W. B. Herms, profes-

Write



Insect-Destroying Lamp and Some of Its Victims; Below, Installing the Insect Killer in an Apple Orchard



sor of parasitology of the University of California, twenty-six years to produce the insect electrocutor. With crudely made devices, Dr. Herms found that when larvæ of blowflies were exposed to ordinary lamplight they retreated from food on which they were feeding, sometimes six inches. And their behavior changed for differently colored lights. Further experiments showed that each kind of insect reacts to its own particular light variation, its own special color, or a combination of the two. Dr. Herms built a fan-shaped central chamber, covered with a hood similar to a photographers' hood. Connected with the central chamber of the fan were a series of runways, radiating outward like the spokes of a wheel. The converging end of each runway was blocked with a piece of quartz glass. And behind each piece of glass was a light tube, each tube producing a differently colored light. When the current was switched on, a rainbow of lights appeared at the central end of the runways. After

Handwritten notes on the right margin, including "Berkeley Calif" and other illegible text.

Berkeley Calif

tests with all kinds of insect pests, it was found that the codling moth, harmful to apples and pears, was strongly attracted to a particular shade of blue, the California oak moth to still another shade of blue, salt-marsh mosquitoes to blue-green light, and fresh-water mosquitoes to the violet end of the spectrum. Then Dr. Herms, assisted by Joe K. Ellsworth and L. T. Jones, designed his insect destroying lamp. It consists of a glass coil, filled with gas designed to produce the particular color desired to attract the particular insect it is to destroy. Around this coil is a cage of closely spaced wires through which passes a powerful electric current. When the wings or body of the insect touch these wires the current instantly electrocutes the insect pest. One of Dr. Herms' lamps, designed to be used on night-flying gnats, trapped and killed eleven pounds of gnats in less than two hours. One pound is equivalent to 2,000,000 gnats. In California orchards and fields alone, the damage done by insect pests reaches the staggering annual total of \$26,000,000, or six per cent of the value of the state's entire fruit, vegetable, and field crops. Added to this loss is another \$10,000,000 spent annually for spraying, dusting, fumigating, and other more or less unsatisfactory control measures.

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HEAVY-DUTY FORESTRY PRUNER CUTS TWO-INCH WOOD

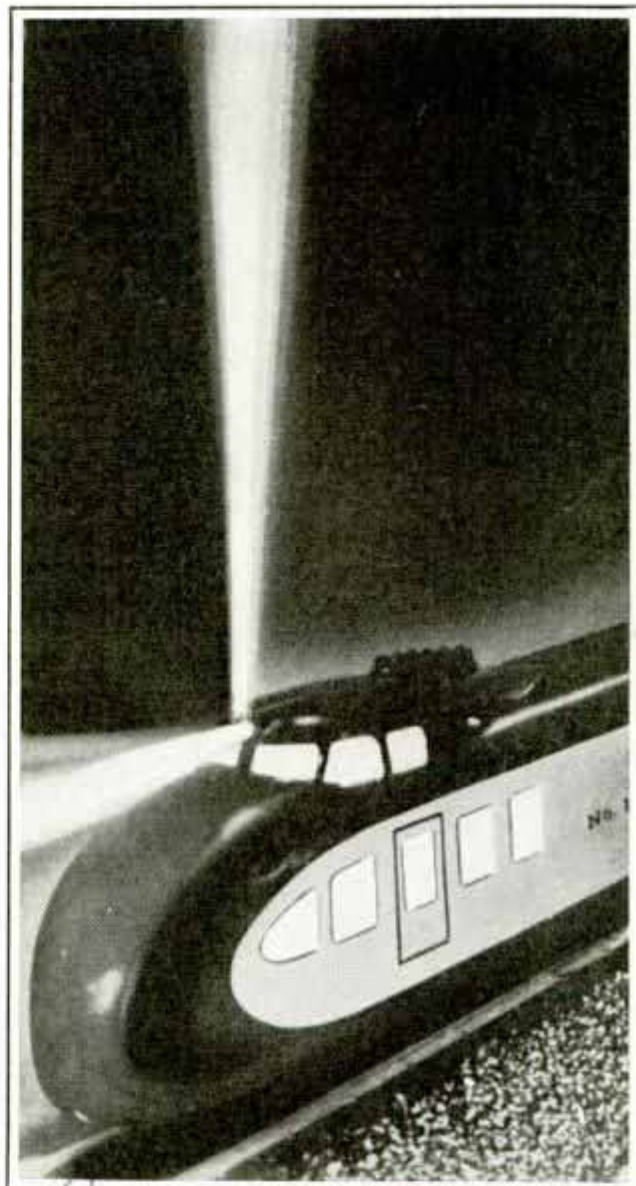
Capable of slicing through two-inch green wood, a new pruner saves time and labor in forestry work, roadside and line



clearing and trimming. The cut is clean, close and flat, leaving no sharp point and no stripped bark. The secret of the tool's power lies in the toggle joint, plus a three-point slide slot. On heavy work, a sharp pull lifts the pivot into the second or third

slot, giving a tremendous increase in power. A smaller companion pruner is available for general orchard work.

H. K. Porter, Inc.
500 California St.



Vertical Beam for High-Speed, Streamlined Train, Which Warns Motorists of Its Approach

VERTICAL LIGHT ON FAST TRAIN WARNS OF ITS APPROACH

One of the features of the new streamlined train built for the Union Pacific railroad is a vertical light in addition to the horizontal kind. This upright pencil of light is intended to write its story in the sky and warn motorists of the approach of the high-speed train, while the twin headlights can penetrate fog, dust and rain to a greater extent than most lights now used.

By placing a streamlined hood over his bicycle, Marcel Berthet, French cyclist, has been able to cover more than thirty miles in one hour and claims that he can average thirty-two miles per hour for a similar period.

see Dec. 1933
842

21665

East Pittsburgh, Pa



HOW to

ample light when departing guests are adjusting their hats.

As the room of major entertaining, the living room must be equipped with complete lighting. Floor lamps strategically located contribute to a subdued lighting effect while wall brackets, indirect

Top, Open-Top Lamp Gives Cheerful Glow and Illuminates Picture; Center, Poor Bridge-Table Lighting; Bottom, Approved Manner of Illuminating the Living Room



By D. W. ATWATER
Westinghouse Illuminating Engineer

GENERAL illumination in the home is primarily intended, to provide a maximum of ease in seeing. Perhaps the best way to view the problem is to take an imaginary visit through a home that is lighted in accordance with recommended practice.

A good level of illumination in the entrance hallway, or vestibule, is desirable both for convenience and for warmth at night or during inclement weather. Whether the light comes from a ceiling fixture or wall brackets, the hallway should be bright enough to allow ease in removing one's wraps. Usually a sixty-watt lamp in a ceiling unit will provide all the illumination needed.

A portable lamp with a twenty-five or forty-watt lamp, on a console table, provides a soft glow of decorative light, and, if resting below a mirror, gives



Light YOUR HOME



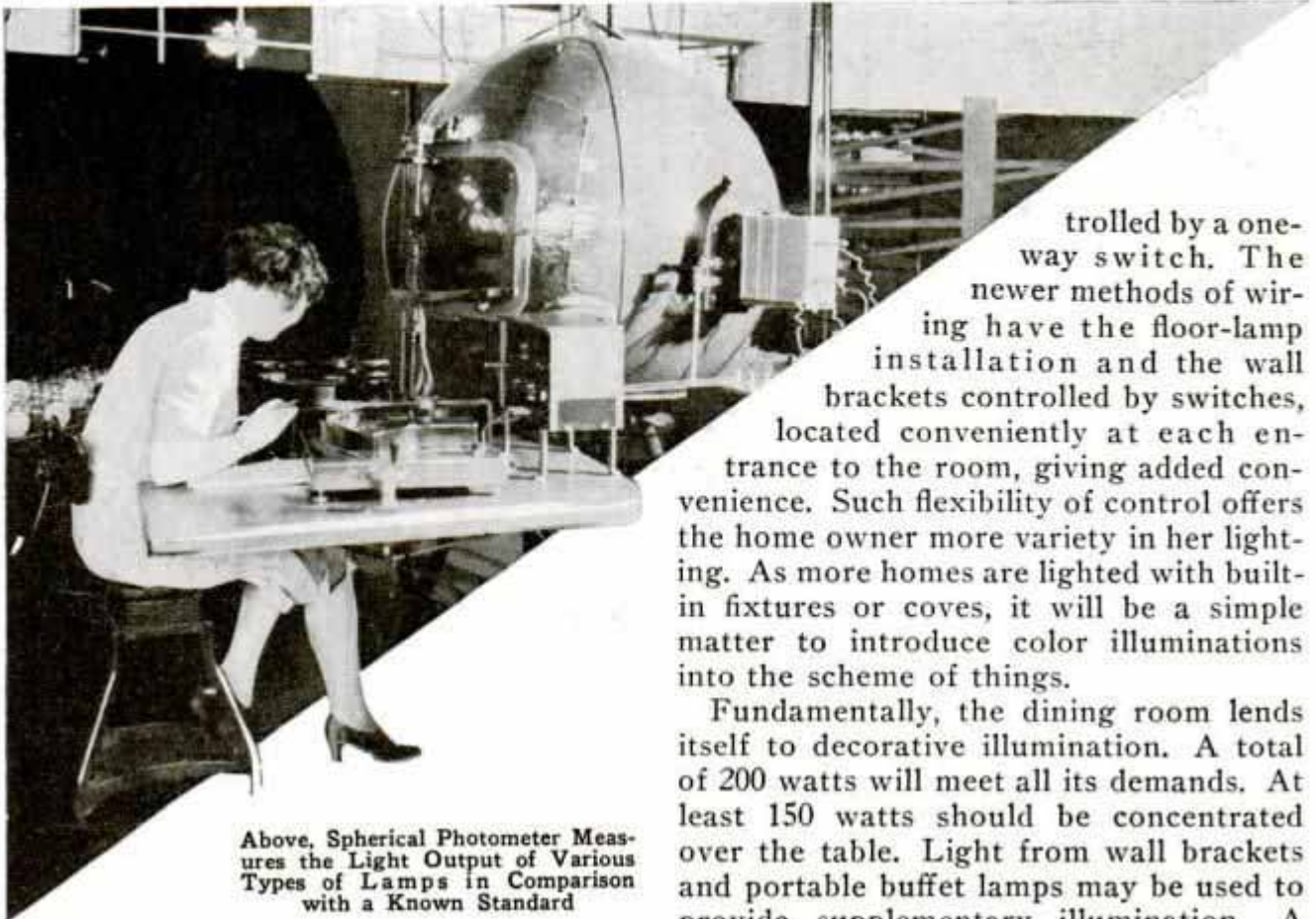
Top, How Proper Lighting Cheers Up Bridge Players; Right, Convenient Light Comes on as Closet Door Is Opened



portables and ceiling fixtures stand ready to provide a higher level of illumination for bridge and cocktail parties. Although the character of some living rooms permits the use of ceiling fixtures without marring the artistic setting, the trend toward lower ceilings in modern homes lends prominence to portable lamps as the sole source of light. Indirect portables with 300-watt lamps provide a good

source of general illumination and are growing in use. Where bracket lights are used the lamps should always be shaded as the direct light coming from the lamps, even though they be frosted, is undesirable from the standpoint of lighting decoration.

Meeting the demand of good illumination at bridge, the indirect portable lamp produces good diffusion of light by re-



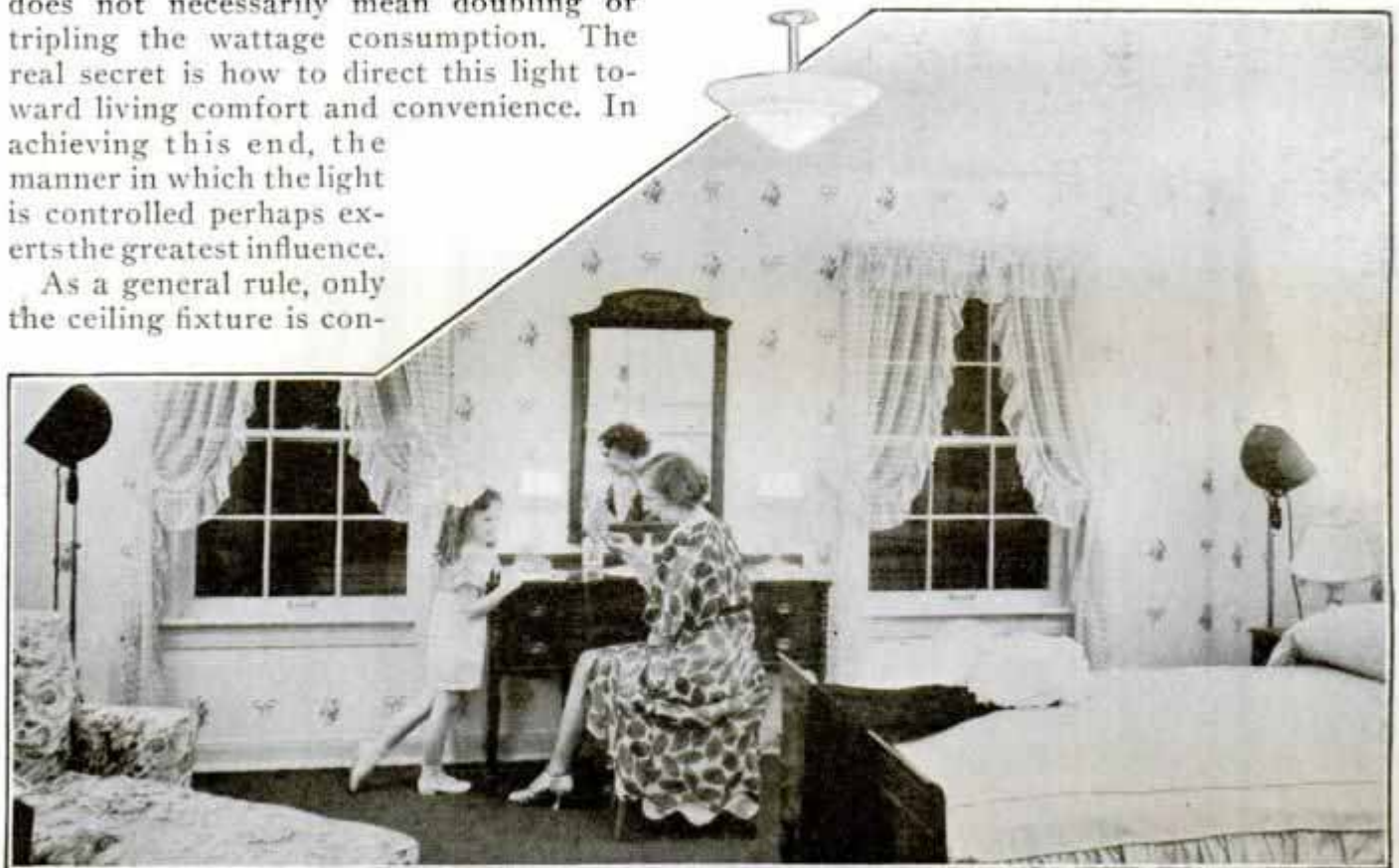
Above, Spherical Photometer Measures the Light Output of Various Types of Lamps in Comparison with a Known Standard

trolled by a one-way switch. The newer methods of wiring have the floor-lamp installation and the wall brackets controlled by switches, located conveniently at each entrance to the room, giving added convenience. Such flexibility of control offers the home owner more variety in her lighting. As more homes are lighted with built-in fixtures or coves, it will be a simple matter to introduce color illuminations into the scheme of things.

Fundamentally, the dining room lends itself to decorative illumination. A total of 200 watts will meet all its demands. At least 150 watts should be concentrated over the table. Light from wall brackets and portable buffet lamps may be used to provide supplementary illumination. A strictly modern touch is obtained by a switch near the head of the table, making

flecting it from the ceiling. To establish better living by means of better lighting does not necessarily mean doubling or tripling the wattage consumption. The real secret is how to direct this light toward living comfort and convenience. In achieving this end, the manner in which the light is controlled perhaps exerts the greatest influence.

As a general rule, only the ceiling fixture is con-

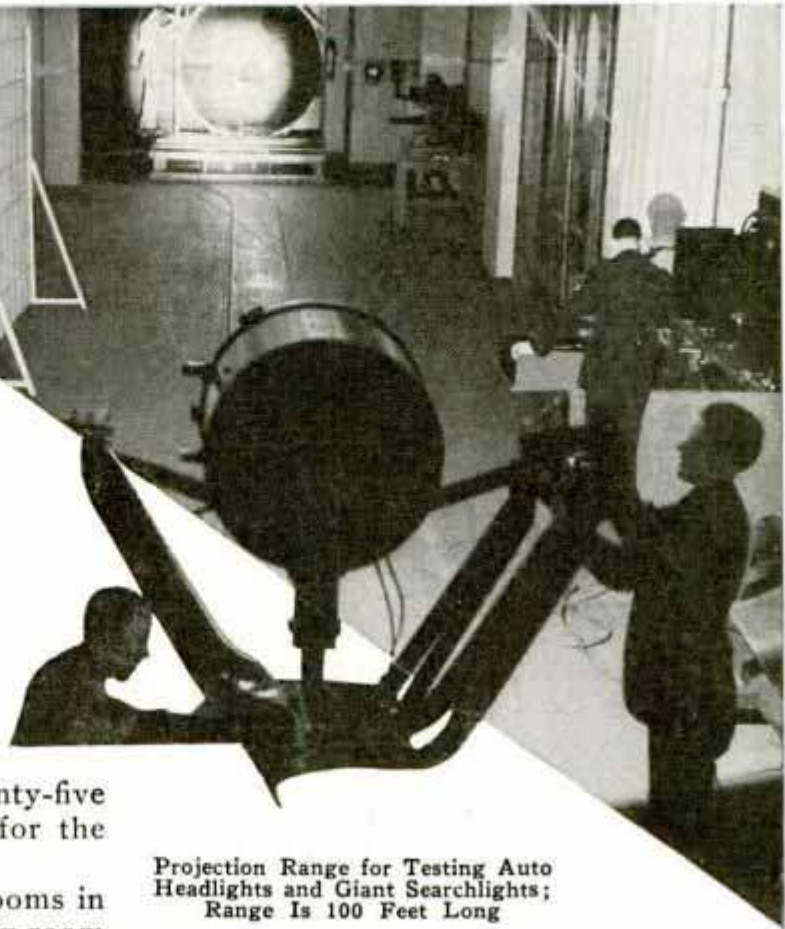


Example of How a Bedroom Should Be Lighted; Magnalux Fixture Throws Light to Ceiling from Which It Is Redirected to the Room, Giving Ideal Illumination; Note the Vanity Lamps on the Dressing Table

it possible to subdue bright illumination for the after-dinner smoke. In the boudoir, light may perform specific duties in many ways, besides giving general illumination from wall brackets or a central ceiling fixture. Vanity lamps for the dressing table are fast becoming a necessity. They should be tall enough so that the light sources are above the eye level of one sitting before the mirror and should carry shades to intercept the direct rays. Governed by the intensity of light that is desired, twenty-five or forty watts are recommended for the dressing table.

The modern bedroom is many rooms in one; it is a dressing room, a sewing room and a reading nook.

In order that one may read in bed with



Projection Range for Testing Auto Headlights and Giant Searchlights; Range Is 100 Feet Long

a minimum of eye strain, there should be lamps attached to the head of the bed, providing it is high enough to provide a downward throw of light over the shoulder. Otherwise the light sources should be mounted on the wall from two and one-half to three feet above the head of the bed.

The suggestion of living-room appointments often found in the bed-

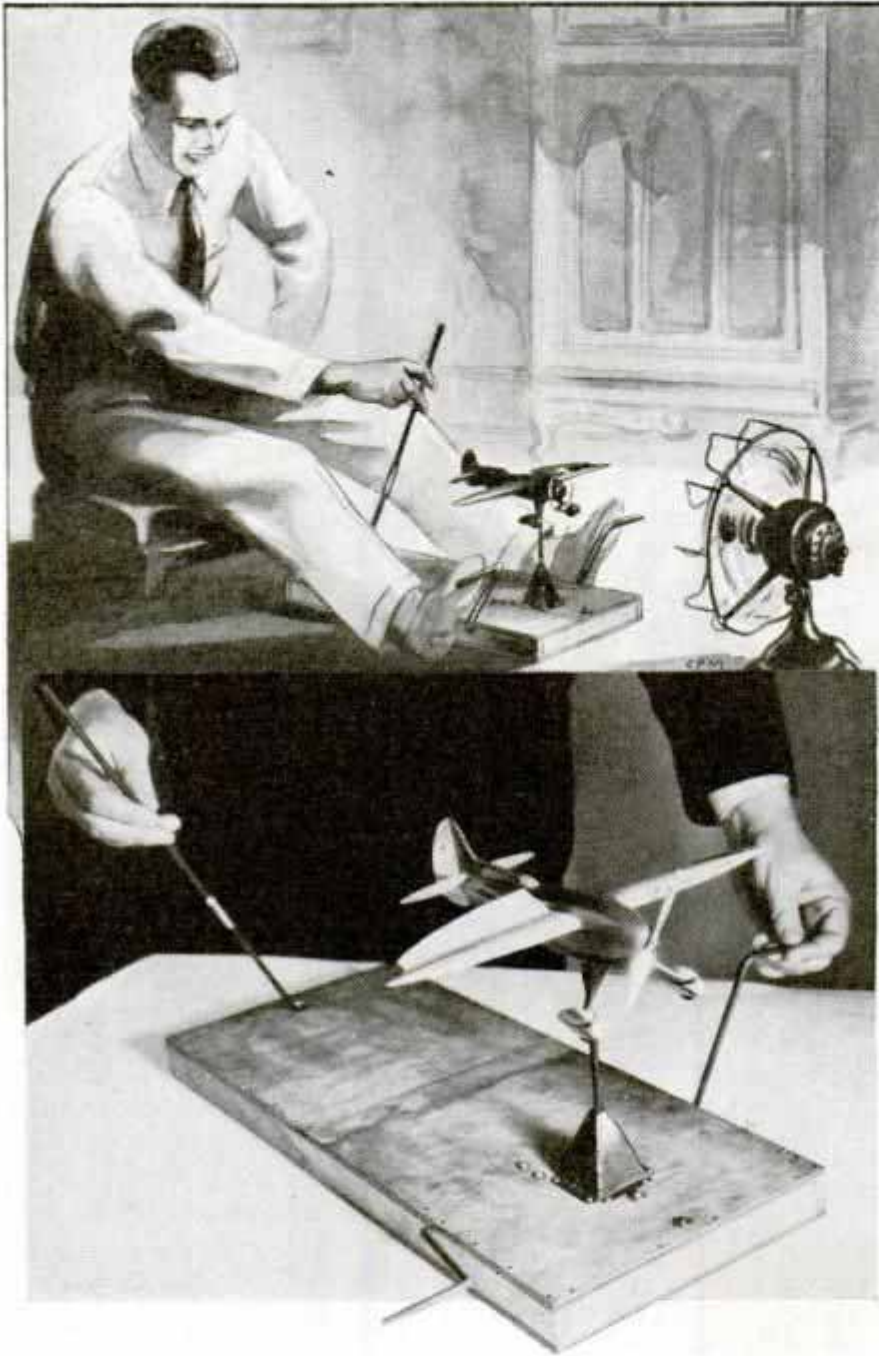
(Continued to page 122A)



Left, One Method of Lighting Bathroom: Note Powerful Sun Lamp over Tub; Shaded Brackets on Either Side of Washbowl Mirror Provide Illumination for Shaving; Right, Well-Lighted Dining Room

©1867
412

976 Nelson Ave



Top, Putting Model Plane through Its Paces; Bottom, Showing "Stick" and Rudder Control Which Operate the Miniature Aircraft

TESTER FOR MODEL AIRPLANES SIMULATES REAL FLYING

Actual flying conditions may be closely imitated in tests of model airplanes by means of a device produced by a group of aviation model builders. It consists of a miniature airplane mounted on a tiny pylon, with a "stick" and rudder bar to control ailerons, rudder and other movable parts. When an electric fan is turned on in front of the plane, the tiny propeller spins and the plane obeys the stick just as a full-size ship would do in actual flight. The plane is balanced perfectly and the

wings are calibrated. All the motions of flying may be demonstrated to aviation students by use of the device. Primarily, the equipment was designed by Bill Hilliard, of Chicago, for the testing of model planes. Different types of airplanes may be mounted on the pylon and subjected to most of the conditions which a full-size ship might encounter.

©1970

RAZOR SHARPNESS IS MEASURED BY ELECTRICITY

Sharpness of a cutting edge has always been difficult to measure in definite units and the opinion of the person using a safety-razor blade has been the big factor in deciding whether or not it was sharp. There are two types of sharpness. The cutting tools in industry operate more as a wedge than as an edge, but a razor blade must be free of any wedge effect. The sharpness of a razor's edge must also be measured in terms of personal comfort instead of in terms of force. The edge of a sharp razor blade is not a sharp angle, but a

smooth, uniform half-cylinder with a very minute radius of curvature. As long as this cylinder is uniform, the blade cuts with greatest comfort. If a wire edge, nicks or burrs develop, the blade pulls and drags. At present the sharpness of razor blades is measured by allowing a beam of light to play upon stacks of from 200 to 500 blades, and the edges are viewed at an angle of about forty-five degrees with the beam. Dull spots, wire edges and flattened places give variations in the intensity of reflected light. This is only a visual test, however. In the past several paper-cutting and thread-cutting tests have been at-

select method
5406 maplewood ave.

Cont. Eugene W. Nelson
P. & T. 1 &

tempted, but variations in the medium used made such tests inaccurate. The latest test depends on the fact that when an insulated electrical conductor with an irregular outline is charged to a certain potential, the charge is so distributed that its density at any point is inversely proportional to the amount of curvature at that point. When a razor blade is used and surface density is increased enough, there is a corona discharge across the air gap between the edge of the razor and a highly polished bar. If this discharge is smooth, the razor edge is smooth and sharp, but if it is irregular, the edge is rough. In this way, a quantitative measurement of sharpness can be made, and photographs of varying degrees of sharpness can be used as a standard.

C 1916

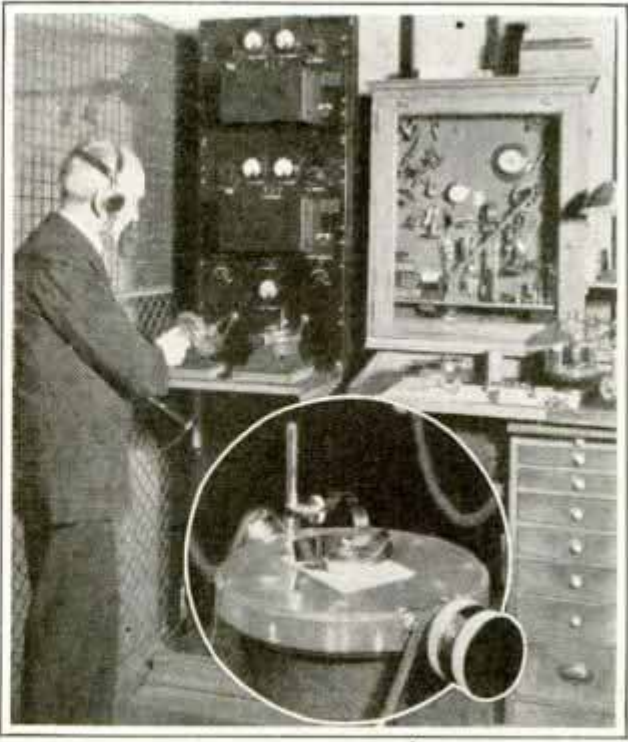
"LOG CABIN" PLAY HOUSE MADE OF CORRUGATED BOARD

One manufacturer is turning out "log cabin" play houses made of interlocking sheets of corrugated fiber board, printed in colors to imitate a real log cabin with chimney, fireplace and all the other equipment. The sheets come ready for assembling and the cabin is built by interlocking the sheets in a special way which imitates the manner in which the logs of a genuine cabin are interlocked. Doors and windows swing on hinges and the cabins will easily accommodate two or more children. They can be set up indoors or outside.

Muscle Shoals Log Cabin



Log Cabin Play House Made of Interlocking Sheets of Corrugated Fiber Board Printed in Colors



Apparatus Which Amplifies the Ticking of a Small Watch and Thus Simplifies Adjustment

TICKING OF WATCH AMPLIFIED TO MAKE ADJUSTMENT EASY

To the skilled watchmaker, the ticking of a timepiece betrays the condition of delicate bearings and moving parts, but when the watch is very small the sound is so faint as to defy analysis. To overcome this difficulty, the Bell Telephone laboratories devised an apparatus for amplifying the ticking of small watches, and thus facilitate repairs. In this apparatus, the metal case of the watch is made to act as one plate of an electric condenser, and is separated by a thin sheet of paper from the other plate. The plates are charged by a battery connected across them through a high resistance, and the stationary electrode is connected to the grid of a vacuum-tube amplifier. Thus, the minute movements of the watch case cause variations in condenser capacity and the fluctuations are amplified and reproduced in a receiver. By the use of a master watch and the amplifying equipment, it is possible to reduce the time required for regulation, each watch being placed on an amplifier so that both can be heard simultaneously.

Box 431

O. B. Andrews, Co

463 West St

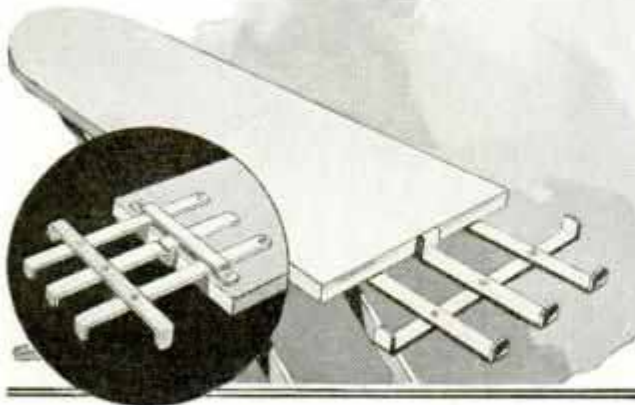
Making a



New Type Aquarium Heater for Tropical Fish Has Built-In Thermostat Which Is Set at 78-80 Degrees at the Factory and Is Non-Adjustable; by This Means, the Water May Be Kept for Years within One Degree of the Point for Which It Was Set; the Thermostat Will Not Buzz, Chatter or Cause Interference with the Radio or Other Electrical Equipment



Top, Lamp with Chromium Shade and Base Can Be Focused to Throw Its Rays to Any Point by Changing Angle of the Shade; the White Globe Gives Clear Light; Left, Center, Simple Time Switch for Operation in Connection with Ordinary Alarm Clock; the Switch May Be Used to Turn on Kettle, Lamp, Radio, Electric Cooker, and Other Devices; It Operates on Direct or Alternating Current



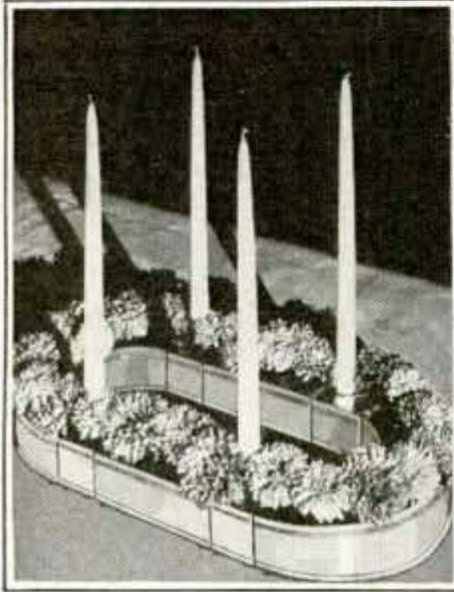
Top, Unbreakable Shelf for Attachment to Laundry Board to Hold the Iron; It Is Handy and Eliminates Danger of Burning the Board; Right, Portable Wall Lamp That May Be Fastened Almost Anywhere; Slot in Bracket Fits over Head of Needle-Pointed Pin That Is Pushed into Woodwork or Plaster



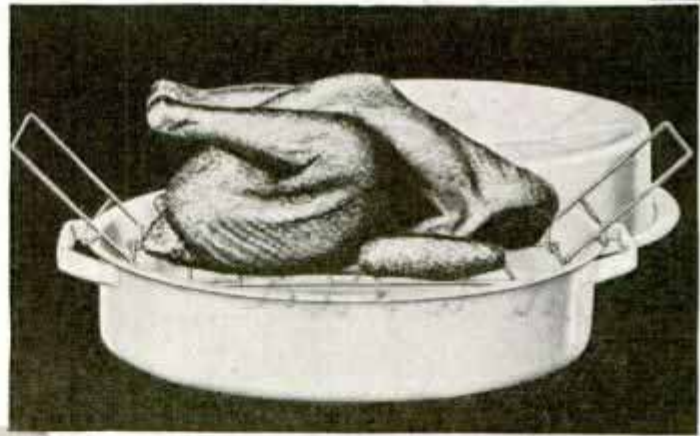
HOME TASKS

Pleasure

Right, Triangular-Shaped Pillow That May Be Converted into Book Rest by Attachment of Metal Shelf; It Is Adjustable for Softness; a Pocket Holds Handkerchiefs, Glasses and the Like; the Pillow Is Equipped with Handle for Carrying

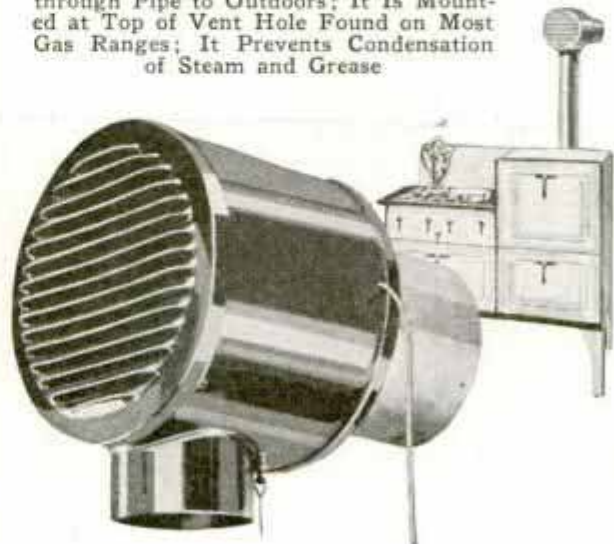


Above, Distinctive Centerpiece of Polished Chromium Consists of Six Flower Boxes and Four Candlesticks; the Various Pieces May Be Used Separately; Right, Rack in Roaster Permits Easy Turning or Removal to Platter; It Engages Edge of Roaster; Use of Fork in Handling Meat or Fowl Is Unnecessary; the Rack Prevents Sticking



Above, Chest with Secret Compound in Its Lining Keeps Silver from Tarnishing; the Chest Has Soft Flannel Lining Impregnated with Chemical; Various Sizes May Be Obtained; Hardwood Construction Is Used

Below, Fan Connected to Cook Stove Sucks Kitchen Odors, Blowing Them through Pipe to Outdoors; It Is Mounted at Top of Vent Hole Found on Most Gas Ranges; It Prevents Condensation of Steam and Grease



© 1911

12/16/33

© 1986

Strangely Costumed Workmen as They Fought Gas Fire; Suits and Masks Give Protection from Fumes and Flames

PERHAPS GRANDPA WAS RIGHT ABOUT COLD WINTERS

If you have been accustomed to smile tolerantly when grandfather told how cold the winters used to be, you should now give him a more respectful hearing. Recent statistical studies by the weather bureau lend support to the claim that winters have been growing milder for the past fifty or sixty years, and spring and fall weather has averaged warmer. In Washington, for example, eighteen of the last twenty-one winters have been warmer than normal. In contrast, the nineteen winters from 1854-55 to 1872-73 showed fourteen colder than normal. The figures are typical of those picked at random for various other parts of the country. The abnormally warm weather experienced in general for a long time does not mean

B. Kinsler



Wide World

FIREMEN IN GROTESQUE SUITS BATTLE GAS FLAMES

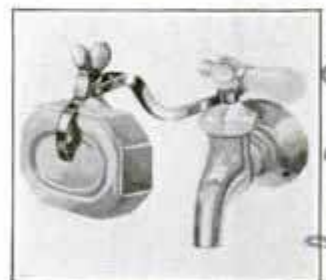
Resembling the mythical peoples of another planet, firemen battling gas flames in Berlin are equipped with asbestos suits and gas masks. The asbestos clothing protects the men against fire, while the masks guard against the fumes. On one occasion, employes of the Berlin Gas Works were called upon to extinguish a fire caused by a bomb explosion that destroyed pipe lines and set the gas afire. After donning their strange costumes, the fire fighters placed a pipe line in the hole torn open by the bomb, then filled the hole with dirt, thus localizing the fire and making it easier to extinguish.

that cold periods have been entirely absent, the records indicating that occasional brief spells of extremely cold weather are characteristic of prevailing high temperature trends. The cold winter of 1917-1918 is an example coming when the long-time trend was running comparatively high.

SOAP CLIP ON WATER FAUCET ELIMINATES DISH

© 1894

Instead of using a dish for soap, it can be kept where it is always handy by equipping the bathroom with a holder in the form of a clip. The clip attaches to the neck of the water faucet and makes reaching for the soap as simple as reaching for the faucet.



Louis, Mo

Names and addresses of manufacturers of articles described in this magazine will be furnished by our Bureau of Information upon receipt of return postage.

Master Tool Supply Co. 1148 N. Broadway

Science Service
11/29/33
C1901

"SAFE" DRY CLEANER EXPLODES AS RESULT OF EVAPORATION

"Safe" dry-cleaning fluids have been known to explode after being used several times. Laboratory experiments show why this happens. Dry-cleaning fluids of the safety type are made up of regular dry-cleaners' naphtha and enough carbon tetrachloride, an inert solvent, to make them non-flammable. One-half carbon tetrachloride and one-half naphtha is a suitable mixture. While in use, the carbon tetrachloride evaporates more rapidly than the naphtha, leaving a mixture rich in naphtha and therefore explosive. Fluids made up entirely of carbon tetrachloride remain safe indefinitely.

CP880

ELECTRIC DOORMAN FOR HOME SAVES HOUSEWIFE'S TIME

Time of the housewife in answering the door may be reduced by means of an electric doorman produced in Germany. It consists of a microphone and loud-speaker arrangement at the front door. When a caller rings, the housewife picks up her telephone receiver and asks the name of the visitor. The person at the door hears her voice distinctly and can state his busi-



© Presse Photo
Equipment on Post in Front of the Caller Is Electric Doorman; Inset, Parts of Device

ness. The microphone and loud speaker at the door are installed in a waterproof case above the nameplate.



Wide World
Various Types of Signal Lights Worn by German Troops When on the March at Night

TROOPS WEAR SIGNAL LIGHTS WHEN MARCHING AT NIGHT

Berlin
German troops now wear signal lights when marching on roads at night. The last man of each formation is equipped with a signal lamp on his cap, arm or back to warn approaching motorists that soldiers are on the road. The plan was tried after troopers had been injured by cars while traveling at night.

Asylerie
WOOD IS MADE FIRE-RESISTANT BY STEAM TREATMENT

Q. 191
Wood is being made resistant to fire by a method of steam treatment. It is first subjected to steam pressure in an air-tight cylinder after which an air pump is used to extract the water and air from the pores. It is then impregnated with a chemical solution, weathered in the open air and finally dried in hot-air kilns. Wood thus treated has been authorized by the British government for use in both ship-building and aircraft construction.

Names and addresses of manufacturers of articles described in this magazine will be furnished by our Bureau of Information upon receipt of return postage.

Advancement in British Ass'n. for Advancement of Science. Burlington House
W. C. London
W. C. R.
W. C. R.

Schuckert

ALL-RUBBER WINDOW WASHER
ALSO DRIES AND POLISHES



Drawing of All Window-Cleaning Operations Performed by Simple Rubber Washer

Washing, drying and polishing is accomplished with an all-rubber window cleaner which is little larger than the hand. A water reservoir on one side is filled by squeezing the chamber to expel the air and placing it under water. The cleaning edge is equipped with a rubber sponge which gets its water supply from the reservoir and washes and rubs off the dirt. On the same edge is a rubber wiper which dries and polishes in one operation. The motorist can carry the cleaner in the car, filled and ready to use on the car windows.

IMPROVEMENT IN LOCAL RADIO SEEN IN SUN SPOTS

Local radio reception—programs originating within an area of thirty or forty miles of the listener—may be expected to improve within the next few years. Sun spots, which will improve local reception, will cause long-distance reception to deteriorate for a few years. The recent announcement of a few high-latitude sun spots carries special significance for the radio fan, for it means the minimum in the present sun-spot cycle has been reached. Observations at Perkins observatory have revealed that field intensities for one Chicago station have remained about constant for the last two years, these intensities being about fifty times greater than

those five years ago during the sun-spot maximum. Long-distance reception has never been better than during the past two years, and this is due not only to improvements in radio technique, but also to the increase in intensity which in turn can be attributed to quieting activity in the solar disturbances, which are chiefly responsible for the ionization of the Kennelly-Heaviside layer. This rise in the ionized layer which improved long-distance reception has had the opposite effect on local reception, for the sky wave has come through so well as to interfere with the ground wave, thus producing interference and mushiness in receiving sets near the transmitting stations. It is expected that no material change from present radio conditions will be apparent until near the end of 1934, but from then local reception will grow steadily better for a few years while distance reception will deteriorate.

ODD VEHICLE FOR GOLF COURSE AIDS GREENSKEEPER

Saving the greenskeeper many steps, an odd three-wheeled vehicle has been built for use on a Pasadena course. It is light enough to pass over any part of the links without damage. Very little gas is used. The vehicle is driven through a friction clutch and its motor is muffled so that players will not be disturbed. The greenskeeper is saved about three hours time and sixteen miles of walking each day.



Three-Wheeled Vehicle Which Greenskeeper Uses on Golf Course in California

Contrary to popular belief, russet oranges are not sweeter than bright ones, government tests have shown.

Windshield best 69 cent

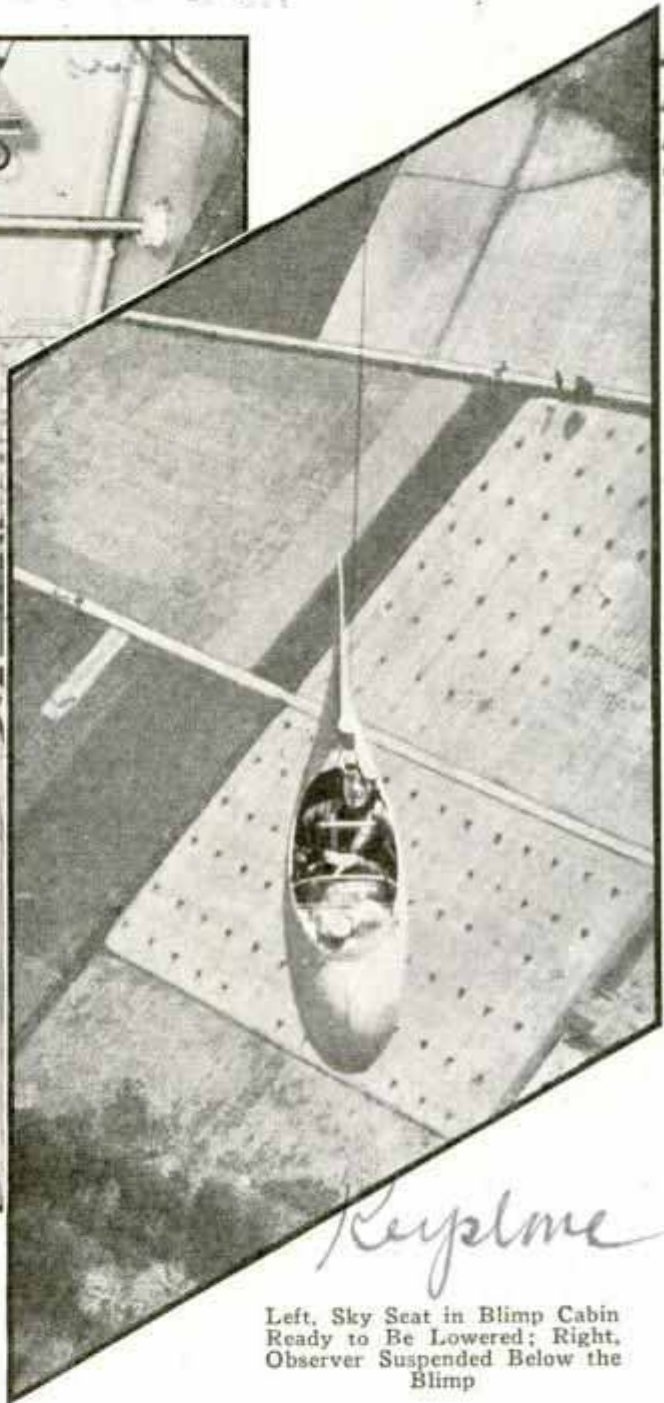
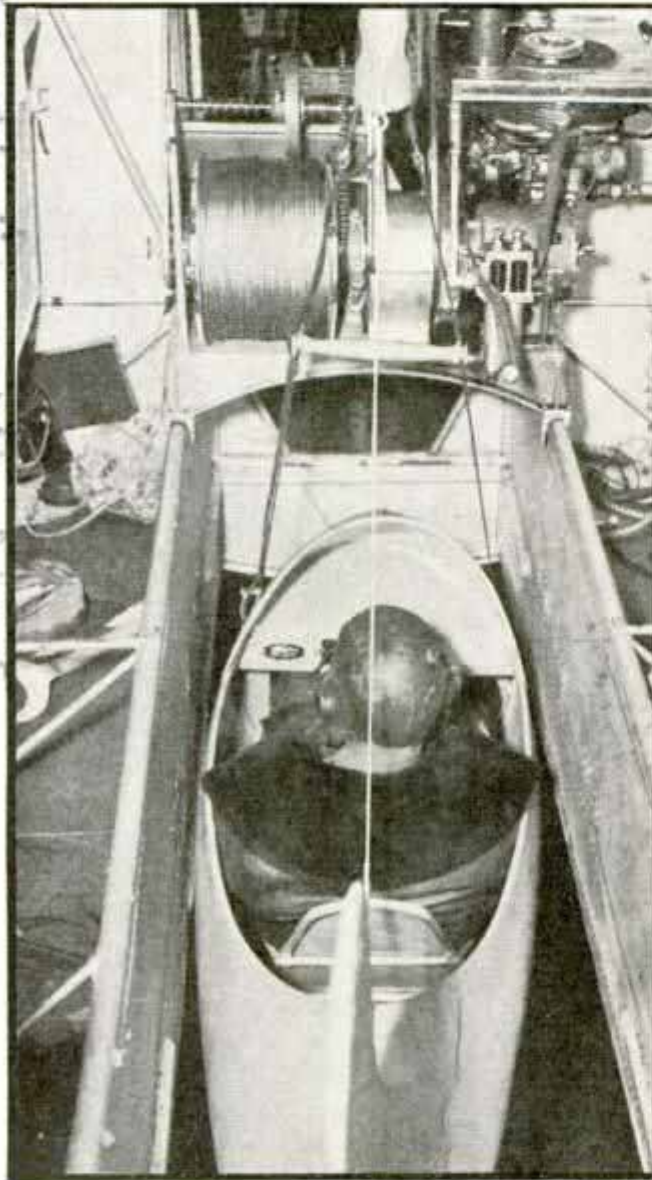
See same 11/27/33

Used by m. Deane Municipal

Chic Wesleyan Univ

Science Letter see 9/19/33

Streamlined "Sky Seat" Lowered from Blimp



Left, Sky Seat in Blimp Cabin Ready to Be Lowered; Right, Observer Suspended Below the Blimp

Attached to 1,500 feet of cable, a new streamlined "sky seat" may be lowered from U. S. army blimps for observation purposes, only the small sky seat being visible. The blimp flies above the clouds, dropping the observer through the concealing layers to view enemy operations, while the "mother ship" remains hidden. The sky seat has been subjected to extensive tests at Langley field, Virginia.

1947
**COLDEST DAY IN UNITED STATES
 SIXTY-SIX BELOW ZERO**

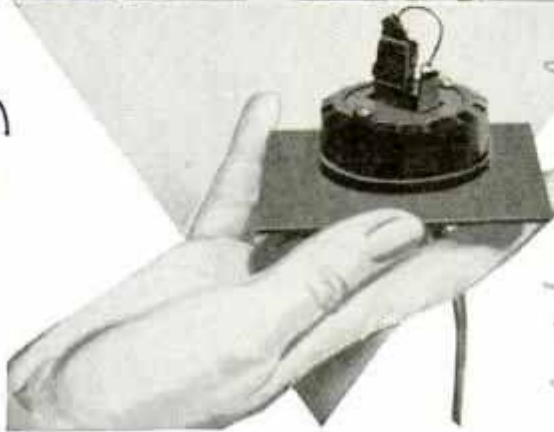
Sixty-six degrees below zero is the lowest temperature ever recorded in the United States. That point was registered on February 9, 1933, at a weather bureau station in Yellowstone Park, near the

Montana border. The previous record of sixty-five below was established in 1888 in Montana. The lowest temperature ever recorded in North Dakota and Minnesota is fifty-nine below zero. New England's record is forty-eight below in 1925, and northern New York's mark is forty-six below, set in 1904. During the winter of 1906-1907, Tamarack, at an elevation of 8,000 feet in Alpine county, California, reported a snowfall of seventy-three feet and eight inches, an all-time record. Two or three feet of snow during a winter is a large amount for most northern states.

with St. Paul Daily 12/11/33

Handwritten notes on the right margin, including "The sky seat of the blimp..." and "1947 - 1933..."

*See Also - Associated Metals Corp. 40 Recta St
and manuals*



Small Attachment for Radio Receiver Which Transforms the Signals into Flashes of Light

RADIO PROGRAM MADE VISIBLE BY FLASHING LIGHTS

Radio programs can now be seen as well as heard with the aid of a small attachment for the receiver which is activated by the radio signals and causes a light to flash off and on. This, in effect, gives the listener a picture of the sound he is hearing. The device utilizes the striking phenomenon of certain rectifying crystals, such as tinstone, to render visible the invisible. The crystal is mounted in a base which can be held conveniently in the hand while working the knob on the radio with the other hand. A wire is connected to the dynamic speaker and contact with the crystal is made by means of a "cat whisker." The program then gives a luminous glow to a small area on the crystal. The light produced portrays the incoming signal, a laugh, "ha-ha-ha," being seen as three flashes of light, the brilliance of each varying with the sound intensity. A program can be tuned in and its intensity gauged accurately by watching the crystal's glow, which responds to changes greater than 70,000 times per second, since it is a cold light. The presence

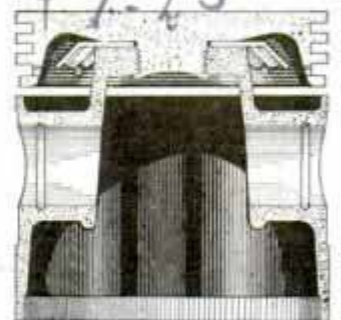
of an impurity in the crystal is necessary for the desired result, and the color of the light depends on the kind of crystal used. The principle is different from types of lights now used in television and the device may offer a new avenue of approach to this subject.

ARTIFICIAL SILK PLAYING CARDS ARE EASILY WASHABLE

Made of artificial silk, a new type of playing cards may be washed with soap and water without damaging. The cards are elastic and will flatten out after bending, a feature which gives them longer life. They are non-porous, proof against moisture and perspiration, and may be used out of doors. The material from which the cards are made is called cello in foreign countries.

ALLOY PISTON IS THREADED TO RETAIN SHAPE

Constructed to retain true roundness under all operating conditions, an aluminum alloy piston is offered for replacement use. Its close running clearance prevents piston "rocking" or slap, offering a full, reinforced bearing against the cylinder wall to keep down oil consumption, blow-by and cylinder wear. The head, which is completely separated from the outer diameter of the skirt, may change size independently and not pull the skirt out of shape or cause binding. The interior of the head is machined to uniform thickness, preventing buckling of ring grooves and reducing wear. The outside is threaded. Ring action is unhampered, lowering crankcase dilution and compression losses. A copper cooling element lowers operating temperatures, increases the life of the oil and reduces spark knock and carbon formation. Stiffening struts across the inside of the skirt and tied to the pin bosses maintain rigidity at the point most needed. Increased gasoline mileage is claimed.



Power Pack Piston

*Weyer Laboratories
402 S. Madison Ave
Norwood
Ohio*

*c 1959
Stephen M. Lobb
1568 N. Laramie
Chicago*

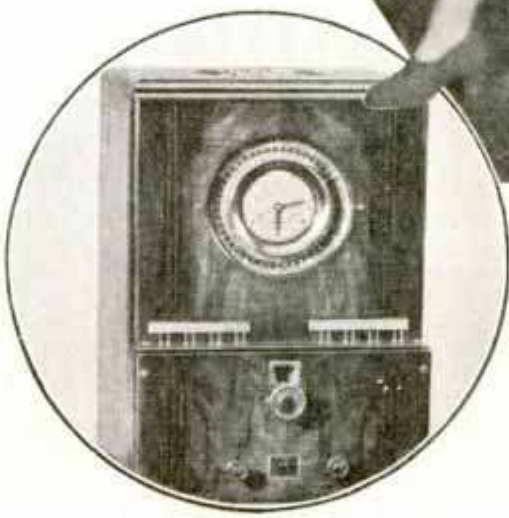
*Box 499
Pleasant Va*



SELF-TUNING RECEIVER

Works Twelve-Hour Shift

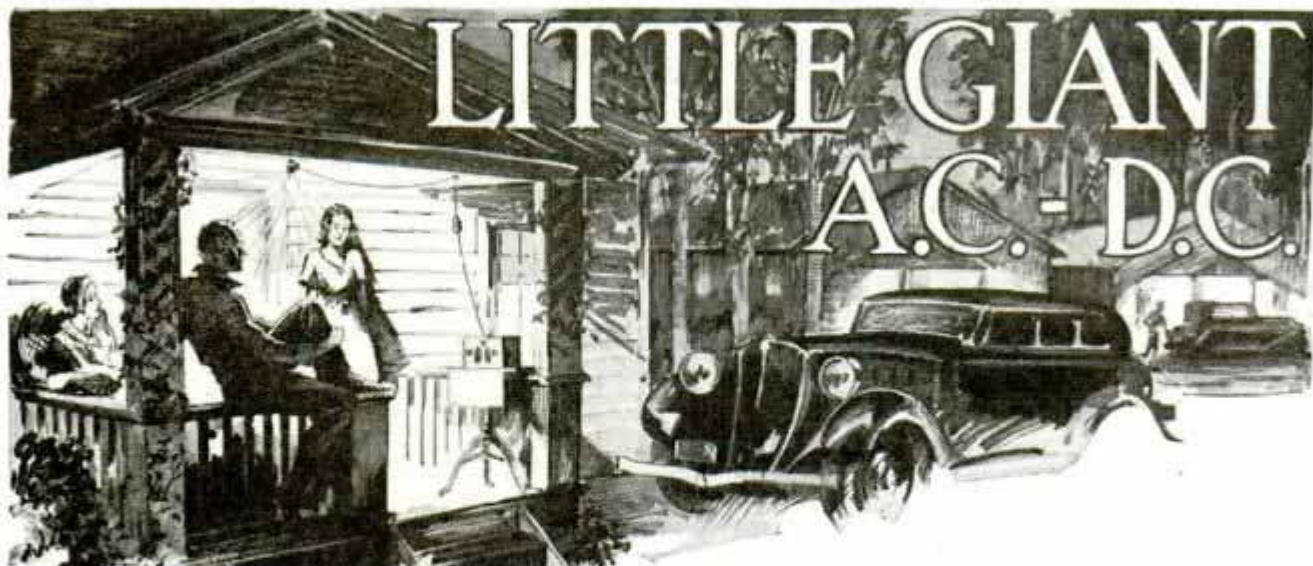
WITH this truly automatic receiver, seven stations can be pre-tuned and fourteen different broadcast programs pre-selected. It will provide for any combination of radio programs desired, for a period of twelve hours, without further attention. Each program comes in at the proper time and the set is automatically shut off at the end of the period. Also, after the desired number of stations have been heard the power to the receiver is cut off. Setting the programs is very simple; around the face of the clock, are holes, one for each fifteen minutes. Two cords and plugs are provided for each of the seven stations. The first is plugged in at the time the program is to come on the air, and the second at the period when it is to be shut off. The arrangement of the pre-selector cords is clearly shown in the insert photo. The stations are listed on the strips directly back of each set of plugs. The operator merely grasps a plug, unreeling the flexible cord, and inserts it in one of the miniature jacks arranged at fifteen-minute intervals around the clock above. It is possible to



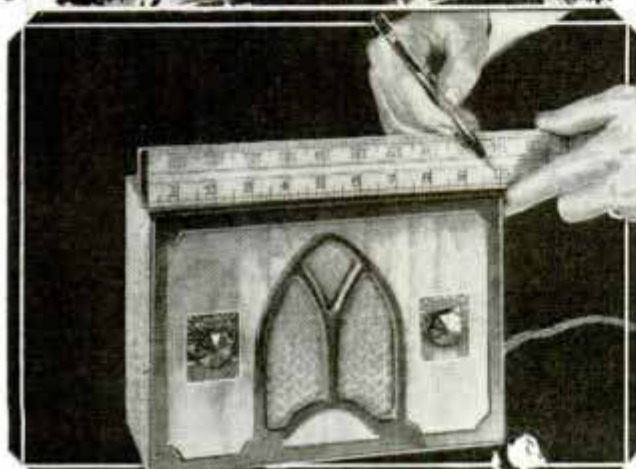
operate this "Tune-O-Matic" receiver manually, or reset it for automatic operation on any seven stations desired.

Should you decide to retire before the selected programs are completed, you can shut the set off, or continue as long as you wish and arrange to have the morning program come on and act as an alarm clock.

Tune-O-Matic Radio Co. 421



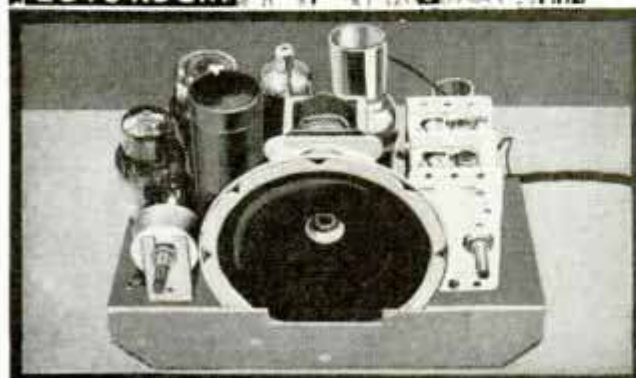
LITTLE GIANT A.C. - D.C.



HOSPITAL



BOYS ROOM



THE fact that this set is small subtracts nothing from its quality, it will outperform many of its larger brothers in volume, tone and distance-getting ability. It is simple and inexpensive to build, tunes in the police calls as well as the regular programs, and is just the type of receiver that a fellow wants in his room at home or in the school dormitory. Traveling men and tourists usually have access to a 110-volt supply, either alternating or direct current, and this little portable set will perform equally well on either type of power. The business man will find it useful for stock reports, and the housewife, in the nursery, sick room or in the kitchen, for the morning programs.

West coast stations have been received with good volume here in Chicago, using only a 30-ft. flexible antenna that may be quickly rolled up in a small coil when not in use. For local stations only, the antenna may consist of a thin copper sheet, $4\frac{1}{2}$ in. wide and $18\frac{1}{2}$ in. long, fastened to the bottom of the cabinet. This is folded over, with a piece of thin cardboard between. Holes are drilled at the corners for clearing the rubber-headed tacks. This arrangement is shown in the photo. Strips of black and white adhesive tape were used to hold it together, which accounts for what appears to be several separate sections taped together.

The sensitivity of the set depends on the use of Litz wire coils, and these coils are available ready for mounting. All parts are standard and the cost is about \$9.00 including the metal base; the tubes and cabinet are extra. The cabinet is $6\frac{3}{4}$ in. high, $9\frac{3}{4}$ in. long and 5 in. deep; it can

Easy Solutions for Everyday Radio Problems

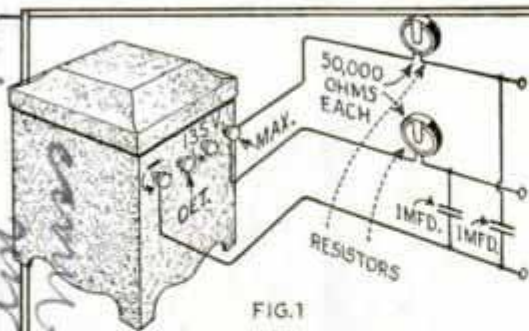


FIG. 1

Four-Terminal Potentiometer Used to Obtain C-Bias Voltage from B-Eliminator; By-Pass Condenser Required for Detector Control; Choke Coil Is Old Audio-Transformer Primary

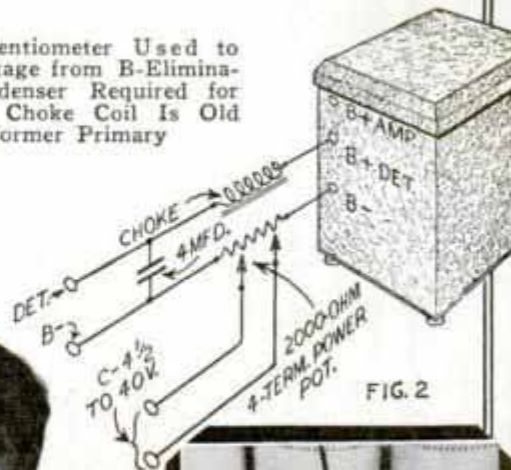
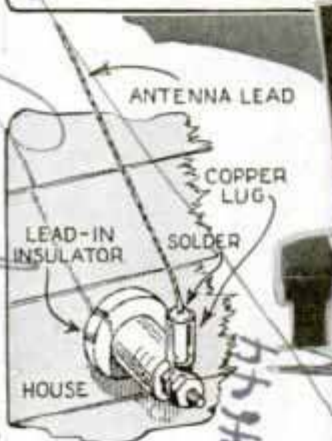


FIG. 2

Above, Two Variable Voltage Controls, Connected in the Output of a Standard B-Eliminator, Provide the Experimenter with a Simple Means of Voltage Regulation for Critical Circuits; Below, Antenna Lead-In Wire Soldered in Large Copper Terminal Lug for Best Possible Contact; Also Suitable for Heavy Ground Leads



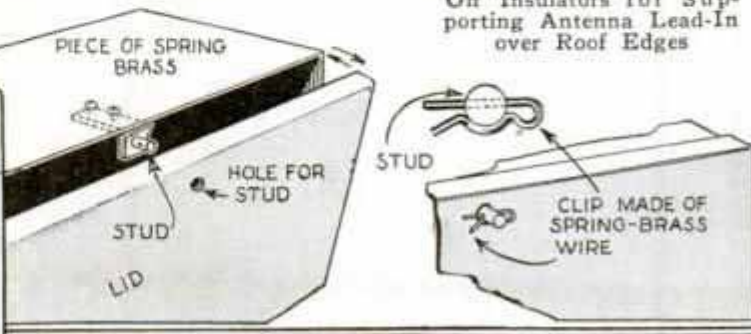
Right, Tube Adapters Now Available for Bringing Your Old Set Analyzer Up to Date; Lower Photo Shows Separate Socket Top and Base Sections for Making Your Own Combinations Suit All New Tubes



Above, Ten-Cent Aluminum Cups, with Handles Removed, Make Good R.F. Coil Shields; Mounting Plate Cut from Sheet Copper and Drilled for Coil Leads; Tabs Bend over Edge of Cup



Above, Inexpensive Stand-Off Insulators for Supporting Antenna Lead-In over Roof Edges



Above, Four Radio Instruments Are Combined in This Compact Device Which May Be Used as a Compensating Filter, Wave Trap, Volume Control and Antenna Eliminator with Any Type of Receiver; Right, Safety Catch for Shield Box or Portable Radio Equipment

Alden Products Co.
 715 Centre St.
 Brooklyn, N.Y.
 © 4644
 © 4666
 Master Laboratories,
 30 Main St., Brooklyn, N.Y.

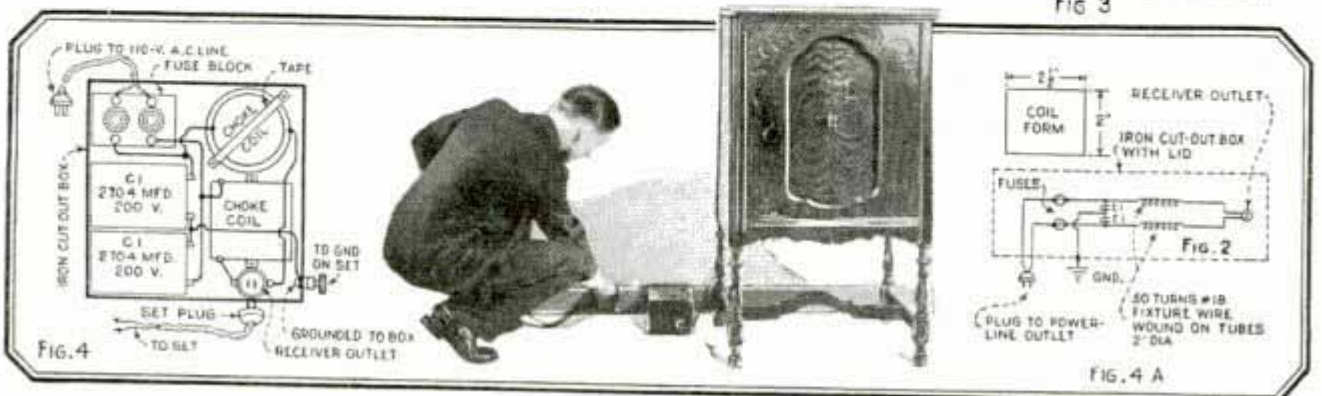
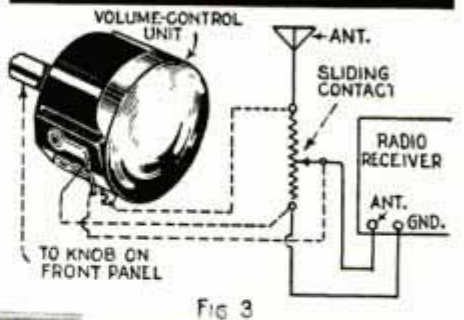
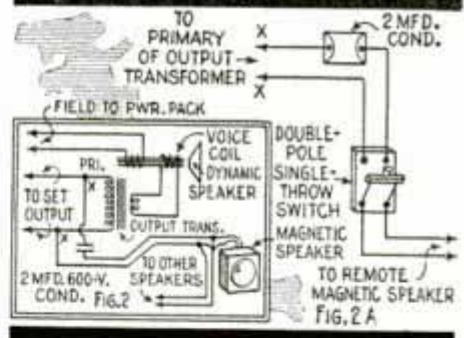
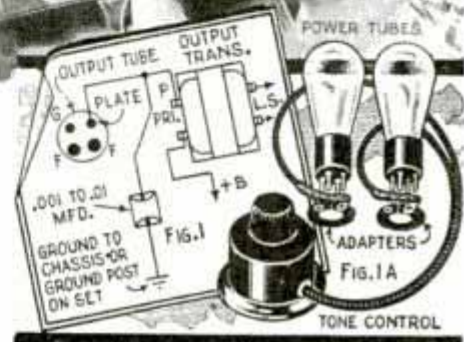
Practical SUGGESTIONS for SET OWNERS

By FRANK L. BRITTIN

YOUR old receiver may not sound as good, or bring in distant stations as does the later model owned by your neighbor across the street. However, there are a few things that you can do with your installation that may enable you to get the same results, or even better. Tone is often merely a matter of adding a gadget. Distant reception is not altogether dependent on the number of tubes or the model of a radio set. Good tubes, an efficient outside antenna, effective grounds and the elimination of man-made static have enabled many owners of comparatively old receivers to break DX records for their locality.

Any radio service man will tell you that three-fourths of his calls are for tube replacements only. No receiver is any better than its tubes and perhaps yours have been in service entirely too long. A spare tube, of each type employed in the set, should be kept on hand for emergencies. If you do not have a tube tester, substitute a new tube of the type indicated on each socket. Change one at a time and always turn the receiver off when making the exchange. The receiver is then turned on and the results noted; if there is no improvement, replace the old tube and continue the process until the defective tube, or tubes, are located. A noisy, or microphonic, tube can often be detected by touching the glass bulb with the finger. A few rubber bands around such tubes, or a rubber pad placed under each leg of the cabinet, will often

(Continued to page 114A)



©4649

*Amber microphone
Cu Ltd.
Centinela al Warren
Laurel*

*Colonial Radio Corp
420 Lexington Ave
New York City*



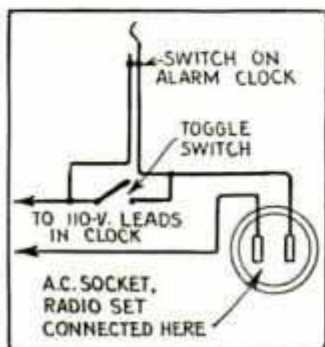
World Globe Receiver Showing Tuning Dial Arrangement, also Speaker Grill in the Base

Radio Receiver in Revolving World Globe

This unusual radio receiver is the result of many attempts to produce a practical and harmonious radio design that would justify a departure from the established lines of consoles and cabinets. It is the work of an industrial stylist, well known for his achievements in automobile body design. The set, housed in a globe of heavy molded bakelite, is 8½ in. in diameter, and a dynamic speaker is installed in the base. The globe is capped at the north pole with a device for determining relative time in various parts of the world. The receiver is a 5-tube, a.c.-d.c. model, firmly mounted, and all parts are easily accessible.

Radio Alarm Clock Turns on Programs

An ordinary electric alarm clock may be easily altered to turn on your radio receiver at any pre-determined time. These clocks have a buzzer that is operated by the 110-volt house-lighting current. The buzzer is disconnected and the leads from the switch, formerly



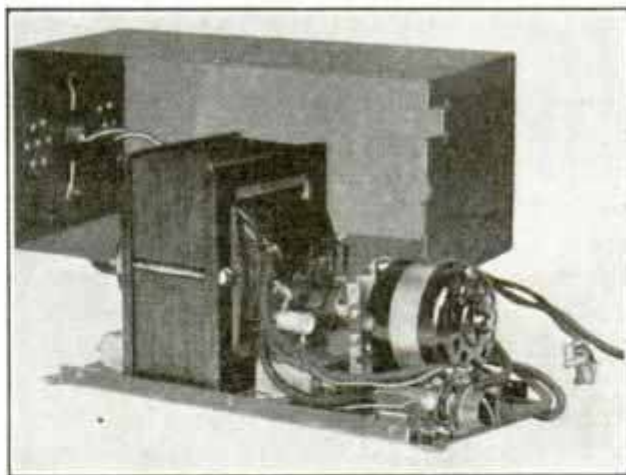
Chaplinwood, Calif.

connected to the buzzer, are fastened to an external a.c. porcelain socket. A small toggle switch is connected across the clock switch and mounted at any convenient point. To operate, set the alarm at the time desired and throw the toggle switch on. The radio receiver is then plugged into the porcelain a.c. socket, turned on, and tuned to the station desired. The toggle switch is now turned off, and this will shut off the radio until the time for which the alarm was set for the morning program. If the complete program is then desired, turn the toggle switch on.

©4552

Portable Converter Supplies A.C. Current from Storage Batteries

Two 6-volt storage batteries, connected in series, operate this converter, which has an output of 150 watts. A smaller type is available, for use with a single 6-volt battery, that can be used for operating mid-gut a.c. receivers. The larger converter is recommended for the operation of any 110-volt a.c. device, particularly sound amplifiers for trucks, and for all portable



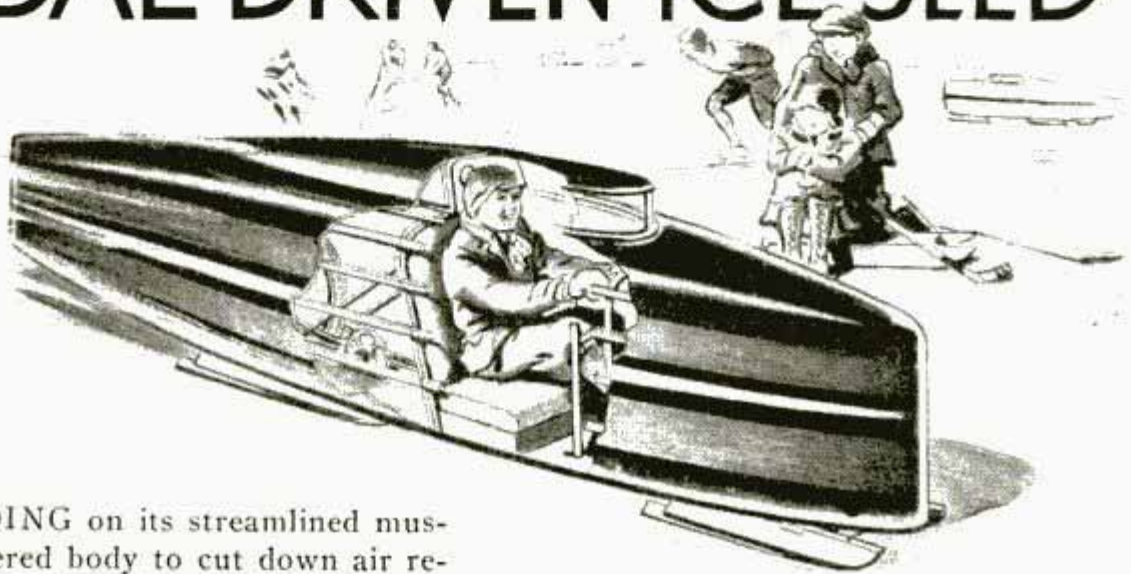
Portable Battery Converter with Cover Removed; the Spring Clips Are for the Battery Terminals

uses where commercial a.c. current is not available. Used with a 3-stage amplifier terminating in type-250 tubes push-pull, there is still sufficient current for a 20-watt phonograph turntable and dynamic speaker field-supply unit.

Blueprints covering radio construction articles in past issues can be obtained for 25 cents each; when material lists are not included in the articles, these are available without charge on receipt of postage.

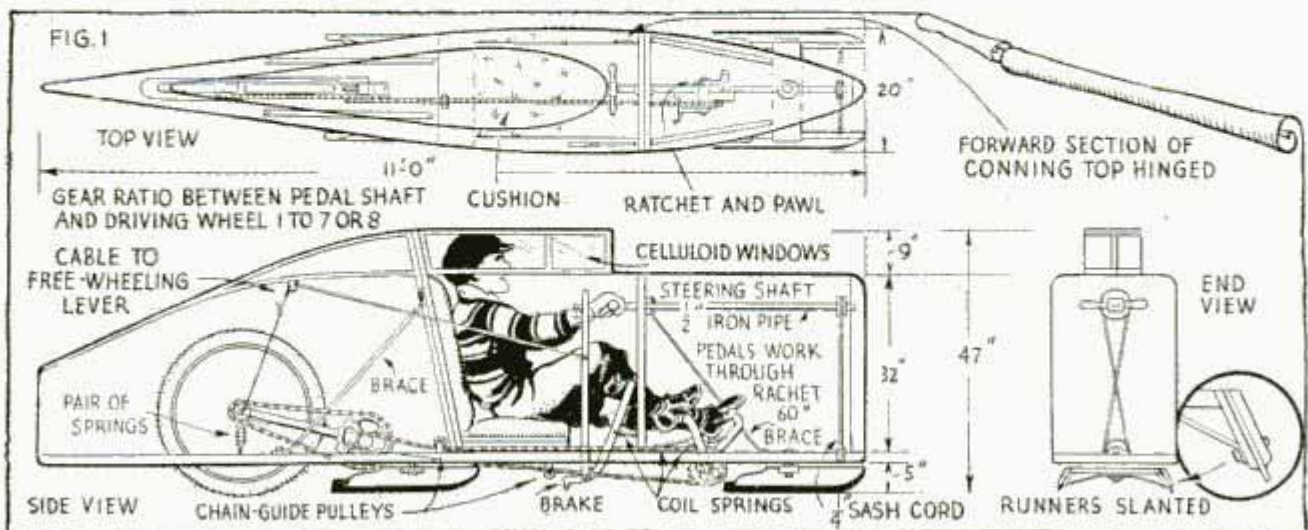
AMATEUR MECHANICS

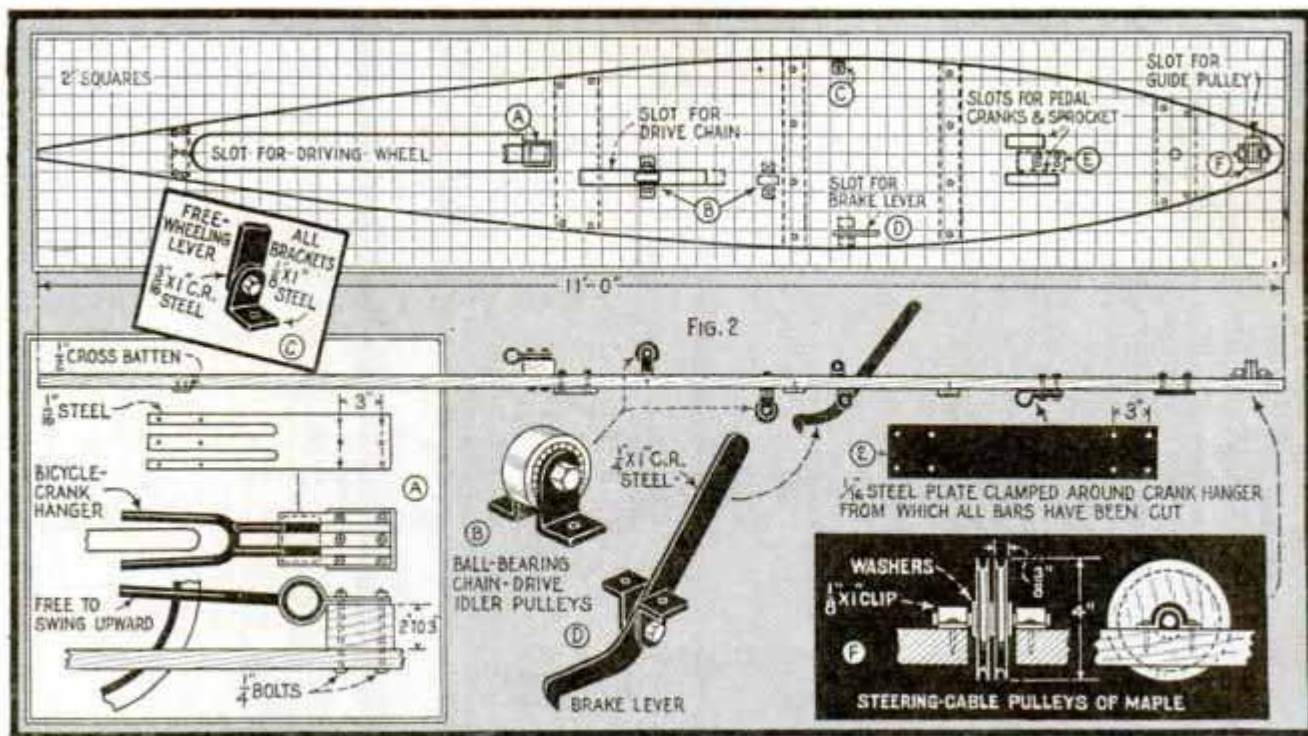
Build this fast PEDAL-DRIVEN ICE SLED



DEPENDING on its streamlined muslin-covered body to cut down air resistance, very little force is required to send this pedal-driven sled scooting over the ice. The ideal conditions are a wide expanse of smooth ice and a temperature just above the freezing point, as there will then be a film of water on the ice, which greatly reduces friction. Propelling power is exerted on the ice by means of a studded wheel, which is connected with chains to the pedals. These do not turn through

a complete revolution but work on a pawl and ratchet through a 60° arc. As only slight pedal pressure is needed to keep the sled moving, it is possible to gear the driving wheel very high. A lever, operated by the pilot's left hand, raises the driving wheel off the ice, which in effect is somewhat similar to free wheeling. Another lever operated by the right hand applies

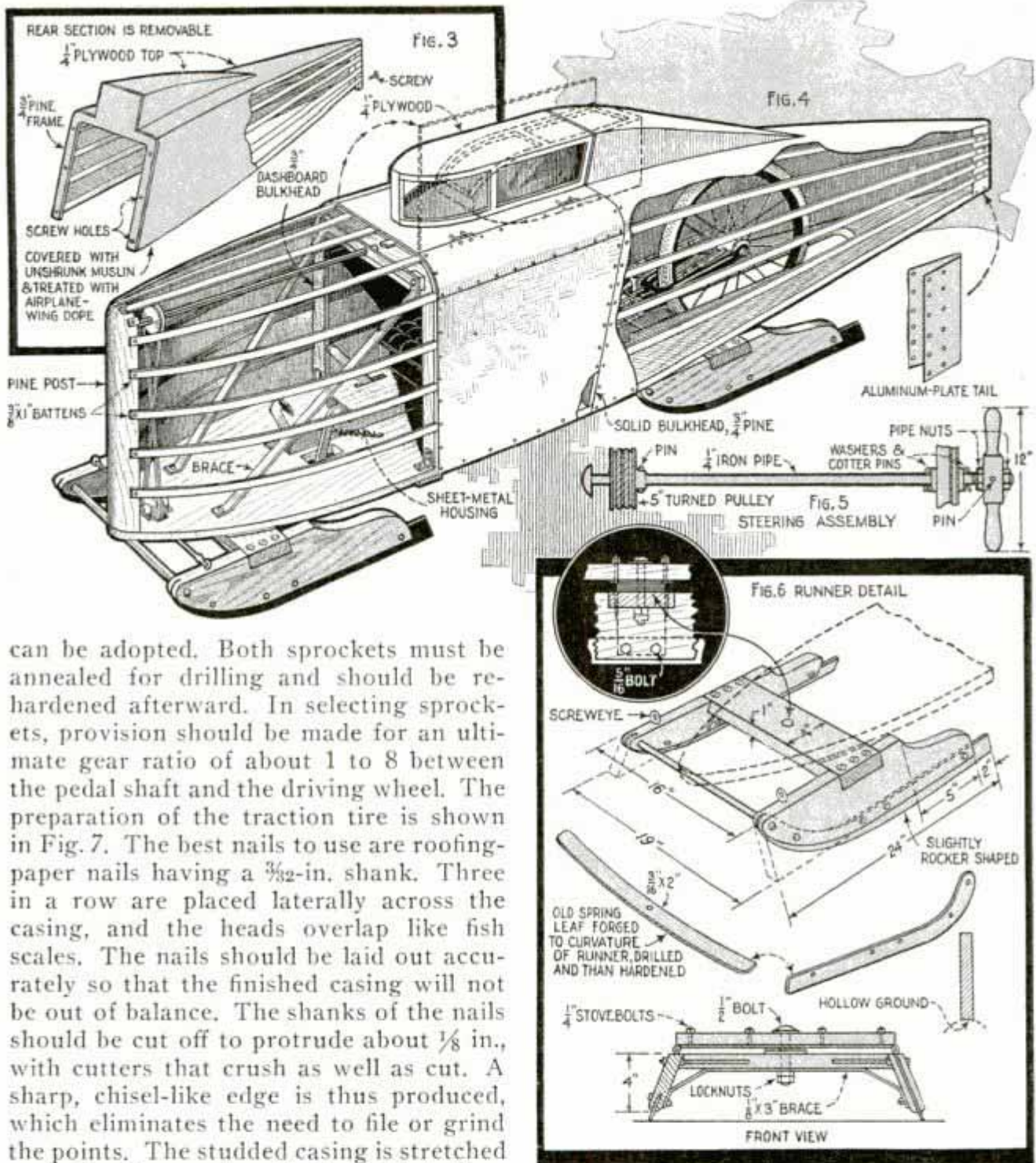




an effective brake. The conning top piece is hinged on one side in order to permit entry of the pilot.

The general makeup of this sled is shown in Figs. 1 and 4, while Fig. 2 shows the chassis board and the permanent fittings attached to it. A number of openings are cut in the board to receive the various fittings. Rather than confuse the drawing by giving the exact location and dimensions of all the fittings, the pattern of the board is laid out on 2-in. squares from which the builder can readily compute all dimensions. The sheet-metal strap, which wraps around the re-designed crank hanger of the driving wheel assembly, detail A of Fig. 2, must be a nice, true fit, free of side shake, but not so tight as to prevent up and down movement of the horizontal fork. Old ball bearings, acquired at any auto wrecking yard, are used for chain guides, detail B. One of these depresses the auxiliary chain where it passes under the pilot's seat while the other holds up the slack in the lower chain. Detail C shows a simple bracket which supports the free-wheeling lever, while detail D shows the brake lever, and detail E a sheet-metal bracket which is wrapped rigidly around the crank hanger. The guide pulleys for the steering cable are shown in detail F. Ready-made clothesline pulleys will serve, or the pulleys can be turned from hardwood, preferably maple. Each pulley turns individually on a $\frac{3}{8}$ -in. spin-

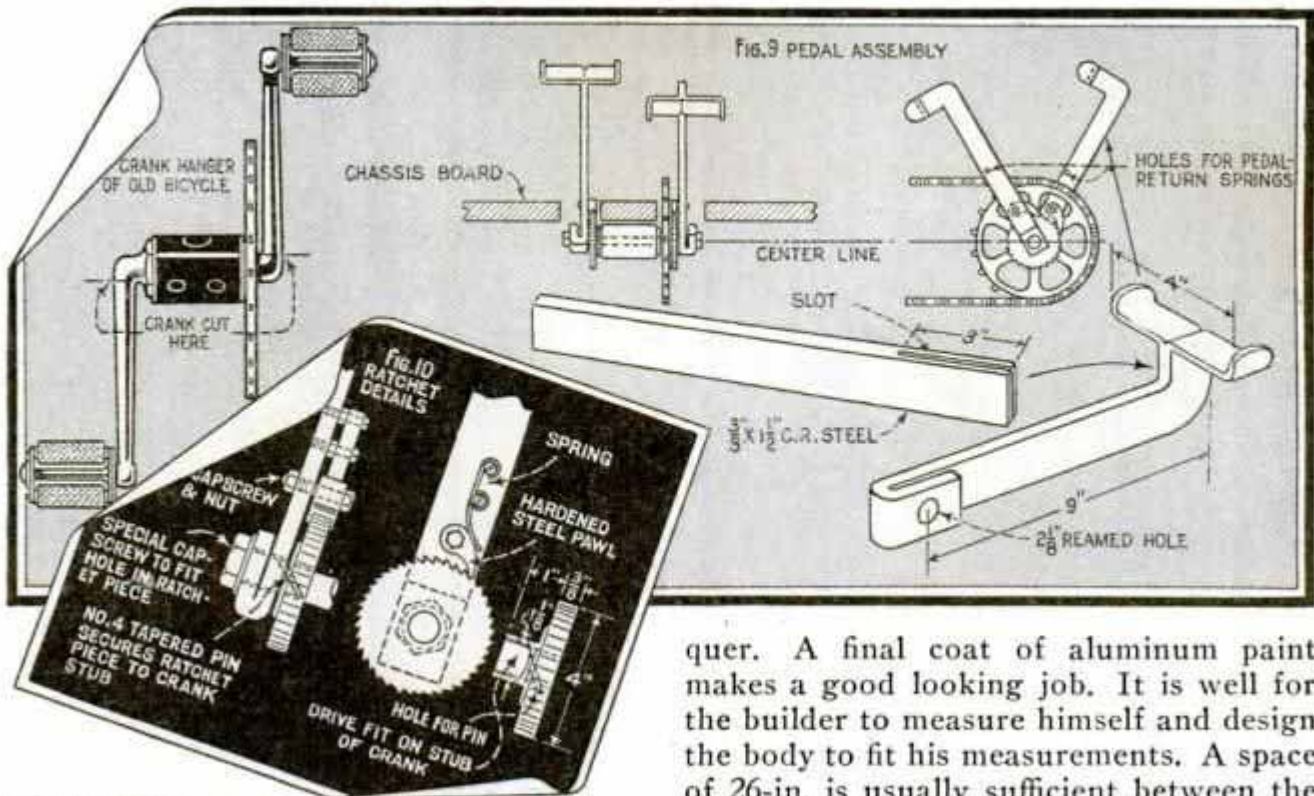
dle which is held rigid with simple sheet-metal clips. Details of the steering assembly are shown in Fig. 5 and its installation in Fig. 1. If desired, an auto steering wheel could also be used. The construction of the sleds is shown in Fig. 6. Note particularly the outward dishing of the runners which permits the hollow-ground edge to grip the ice. Old auto-spring leaves can be forged and tempered by any blacksmith at a nominal price. All holes must be drilled before hardening. The contact surface of the runners of the front sled are slightly rocker-shaped to facilitate steering, but the rear-sled runners have a flat contact surface. All contact surfaces are hollow ground. The runners of the rear sled should track exactly in the grooves made by the front runners. A $\frac{1}{2}$ -in. pivot bolt permits the front sled to turn, but the rear sled is bolted rigidly to the chassis board. Fig. 8 covers the construction of the drive-wheel assembly, made from old bicycle parts. All the frame members, except the rear horizontal forks, are cut off flush with the crank hanger. The original crank-hanger bearings are retained. This re-designed fitting is then held in the special strap bracket, detail A of Fig. 1. The most tricky job connected with this assembly is attaching the small, auxiliary sprocket to the crank-hanger shaft. If one can obtain the hanger shaft from a tandem bicycle, provision is made for an auxiliary sprocket. Otherwise the method shown



can be adopted. Both sprockets must be annealed for drilling and should be re-hardened afterward. In selecting sprockets, provision should be made for an ultimate gear ratio of about 1 to 8 between the pedal shaft and the driving wheel. The preparation of the traction tire is shown in Fig. 7. The best nails to use are roofing-paper nails having a $\frac{3}{8}$ -in. shank. Three in a row are placed laterally across the casing, and the heads overlap like fish scales. The nails should be laid out accurately so that the finished casing will not be out of balance. The shanks of the nails should be cut off to protrude about $\frac{1}{8}$ in., with cutters that crush as well as cut. A sharp, chisel-like edge is thus produced, which eliminates the need to file or grind the points. The studded casing is stretched over the tire on the wheel, which is then inflated so that the outer casing is securely held in place. The pedaling assembly is shown in Figs. 8 and 9. The basic part of this is also an old bicycle crank hanger from which all connecting bars have been removed. The fitting is held in the strap bracket shown in detail E of Fig. 1. The only point where difficulty may arise in building up this assembly is the preparation of the ratchet pieces, which will probably have to be made up at a machine shop. However, the cost of turning up the blanks is not excessive. Because great pressure can be brought to bear on the

pedal cranks, the auxiliary chain should be of the motorcycle type.

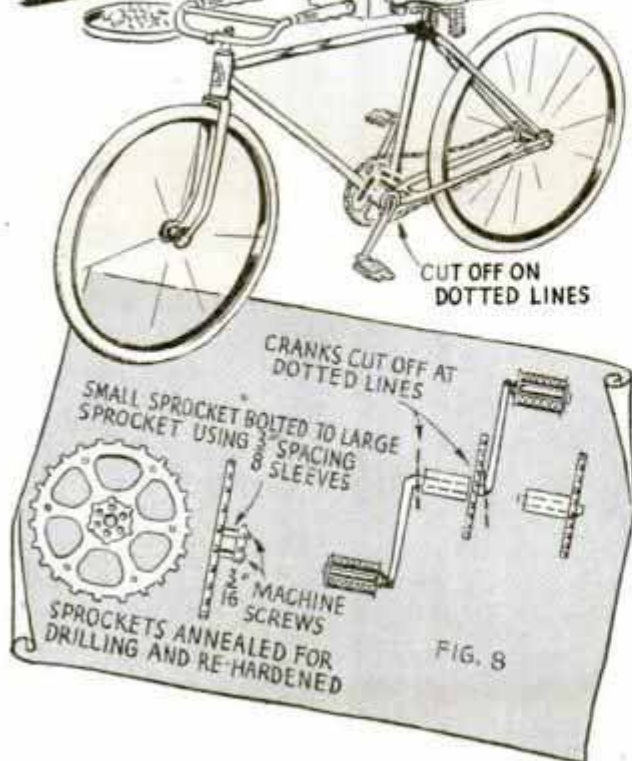
With the mechanical points of the auto sled covered, we come to building the streamlined body, Figs. 3 and 4. Obviously, the streamlined chassis board is the basis of the construction. Front and rear posts, and two bulkheads, rigidly braced, are built up on the chassis board. Longitudinal strips of $\frac{3}{8}$ by 1-in. white pine form the framework. Unshrunk muslin is stretched over the framework. This is water-soaked, allowed to dry and is then treated with airplane dope or clear lac-



quer. A final coat of aluminum paint makes a good looking job. It is well for the builder to measure himself and design the body to fit his measurements. A space of 26-in. is usually sufficient between the top of the seat cushion and the top of the sled not including the conning top, which should be 9 or 10 in. high. Although this sled was designed for manual operation it can readily be adapted for use of a motor. Any mechanically minded builder will see how to incorporate a small power plant into the basic construction.

Imitation Ebony Finish for Wood

Any close-grained wood may be given a good imitation ebony finish with a black stain made by pouring boiling hot water, 2 qt., over powdered logwood extract, 1 oz. After the extract has been dissolved, add a solution made by dissolving powdered potassium chromate, 1 dram, in the least possible quantity of hot water. The combined solutions are stirred and are allowed to cool before using. If the first coat does not give a sufficiently deep black a second and a third may be applied. In using a water stain there is a tendency for the grain of the wood to raise and, therefore, it is a good idea to sand the surface after each coat has dried. The last coat should cause no noticeable grain raising in most varieties of woods. The ebonized finish may be protected by applying a thin coating of shellac after the stain has dried. Rub lightly with worn, fine sandpaper to remove the gloss of the shellac.

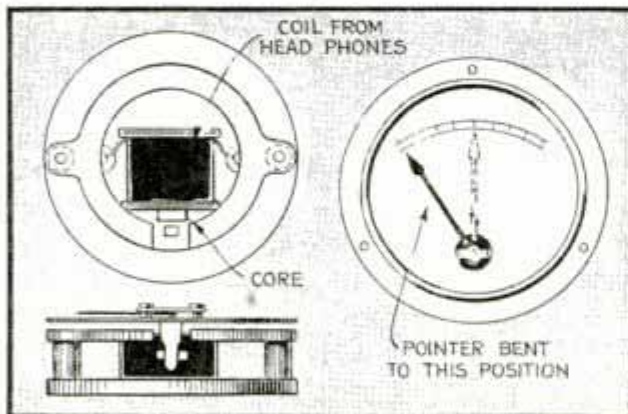


Paint Makes Wall Moisture Proof

A coating that will effectively stop moisture from coming through brick or other walls may be made by mixing boiled linseed oil, 1 part, turpentine, 1 part, and powdered rosin, 1 part. After the rosin has been dissolved, add precipitated chalk or whiting, 3 parts, and stir to produce a smooth paint-like consistency. The mixture is applied with a stiff brush and is allowed to harden, which will take longer than paint. The waterproofing preparation will last well if applied to a hard surface that is free from loose particles of disintegrating brick or stone.

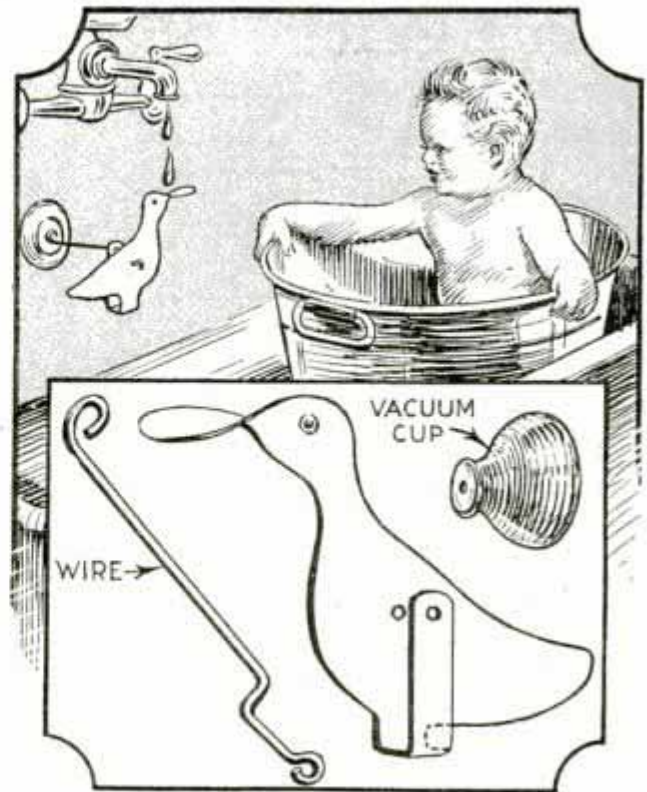
Direct-Current Voltmeter Made from Old Auto Ammeter

Small d.c. voltmeters can be made very easily from old auto ammeters and electro-magnet coils taken from high-resistance radio headphones. The left-hand detail shows how the coil is mounted inside the case of the instrument from which the current coil has been removed. The leads from the coil are run to the binding posts. The position of the coil is adjusted so that the end of the iron core is close to the shaft of the instrument, and the vanes on the shaft. The scale-and-pointer assembly is then placed in its original position and the needle is bent to the zero position, as in the right-hand detail. The lower detail is a bottom view of the assembled voltmeter showing relative positions of the coil, permanent magnet and the turning element. When calibrated, this voltmeter



Old Auto Ammeter Converted into D.C. Voltmeter by Using Coils from Radio Headphones

can be used for any purpose within its scale range where no precision measurements are to be made.



Animated by Water Dripping from a Faucet, This Duck Toy Entertains the Baby During Its Bath

Toy Entertains Baby During Its Bath

To entertain the baby during its bath, one parent made a duck toy that is rocked in a realistic manner by water dripping from a faucet. The toy is made of light sheet metal and the beak is given a half twist to provide a flat surface to catch the water. It is pivoted on a wire, which is fastened to a rubber vacuum cup.

Bluing Small Articles of Steel

Small steel articles may be given a permanent blue finish by heating them carefully while they are completely covered with a mixture consisting of equal parts of fine, clean sand and powdered charcoal. The container should be a metal pan or box sufficiently large to allow the work to be completely covered by the mixture while heating. Before the work is placed in the box, it should be polished. As the heating progresses the work should be inspected from time to time and it should be removed when the proper shade of color has developed. The colored work may then be dipped into an oil bath consisting of equal parts of light paraffin oil and lard oil. Rubbing the work with oil brings out the luster and makes the finish much more permanent.

Some Practical Suggestions That Will Help



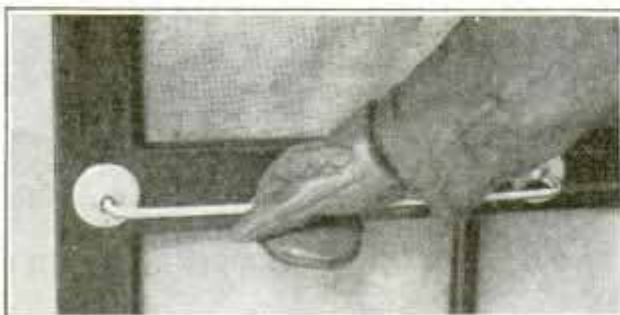
Louvers Fitted in the Door of Your Coal Bin Make It Easy to Remove the Coal

A Convenience for the Furnace Room

When the coal bin is filled, it is not necessary to board up the inside of the opening, as is usually done, if it is fitted with a number of slanting boards or louvers placed in grooves cut in the door frames, as shown in the photo. Before filling the bin, all the boards are placed in position, thus preventing the coal from rolling out on the furnace-room floor. When the coal is shoveled from the bin, just remove the bottom board.—Roger Moyer, Findlay, O.

Metal Towel Rack Provides Hand Grip on Storm Door

When screen doors are covered with tar paper to serve as a storm protection in winter, it is hard to take hold of the small knobs to open them when mittens are



Towel Rack Provides Hand Grip for Opening Storm Door When Wearing Mittens in Winter

worn. To eliminate this trouble, screw a metal towel rack to the door as shown. This will enable you to get a good grip without removing your mittens.

Removing Fruit-Juice Stains from Cloth

Practically all fruit-juice stains can be removed from cloth by washing it in warm water while the stains are still moist. Lemon juice will usually loosen a stain that has turned blue or gray so that it is soluble in boiling water. The stained cloth should be stretched over a bowl and boiling water should be poured over it from a teakettle held 3 or 4 ft. above the cloth. Alternate this treatment with a little rubbing followed by bleaching in sunshine. Sticky fly-paper stains are easily removed from cloth by immersing and rubbing the stained spot in turpentine, benzol, kerosene or carbon tetrachloride.

Holding Bucket to Scour Inside

To prevent a bucket or other tubular container from sliding around on top of a bench top while scouring the inside, roll up the ends of a strip of inner tube tightly and set the container on it as indicated in the photo. Friction between the rubber and the surface of the bench top holds the container securely.—Frank W. Bentley, Jr., Missouri Valley, Ia.



Simple Kink Assures Hot Water in Storage Tank

Under ordinary conditions of heating in a furnace, about 6 ft. of $\frac{3}{4}$ -in. pipe in the fire box are sufficient to heat the water required for a five-room house. If the piping from the tank to the furnace and water back is also $\frac{3}{4}$ -in., the water will

to Solve Many Problems Around the Home

circulate too rapidly and cause insufficient heating in the coil. To remedy this, punch a 1/4-in. hole in a bottle cap or a copper disk of sufficient size, and insert it between the ends of the pipes where a union gives access. This will retard the flow of water so that it will pass more slowly through the water back with the result that it will become as hot as needed. If a heater is used in the summer, it should be disconnected in winter, as it provides a secondary flow of water which is cold and may be drawn in and cool the hot water.—Wayne Buerer, Reno, Nev.

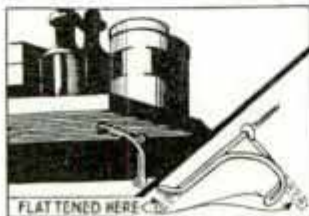
Adhesive Tape Holds Cork in Bottle

Strips of adhesive tape can be used to good advantage in keeping corks in bottles which contain fruits, preserves or beverages that gas slightly and tend to force the corks out. The tape is placed over the cork and the ends are stuck to the side of the neck as shown. This idea is also handy on trips, where the cap is removed and only part of the contents of a bottle are used, after which it is necessary to keep the bottle closed while traveling. However, the tape will not hold a cork if a great amount of gas is generated.—Peter P. Roccapiore, Middletown, Conn.



Shelf Brackets from Coat Hooks

If you need a couple brackets to support a small shelf, get two wire coat hooks, flatten the outer ends that are turned upward and screw them into the wall. Then put the shelf on top of the hooks and drive a couple of screws through the horizontal arm of each hook into the underside of the shelf so as to hold it securely in place.



Sewer Ventilator Set in Recess in Porch Step Makes Handy Shoe Scraper

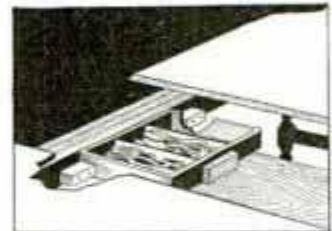
Shoe Scraper Made from Old Sewer Ventilator

Set in the front edge of a porch step, a sewer ventilator makes a good scraper for cleaning the shoes before entering the house. A recess should be provided in the step underneath the scraper so that it will not be clogged with dirt.

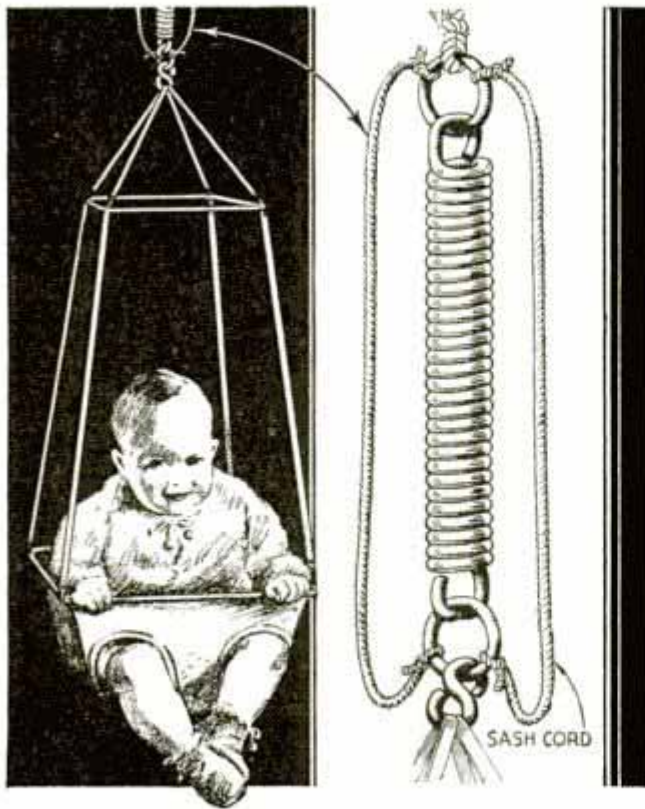
Hidden Compartment under Table Top Holds Silverware

Stored in a tray underneath a table top, silverware is always at hand when needed.

There is usually enough space between the cross-beam and the table top to accommodate a tray, which is held in place by three wood blocks. Two of these are screwed to the side of the table while the third one is screwed to the crossbeam as shown.



□ A sheet of Cellophane or transparent celluloid tacked above a sink protects the wall and is hardly noticeable.



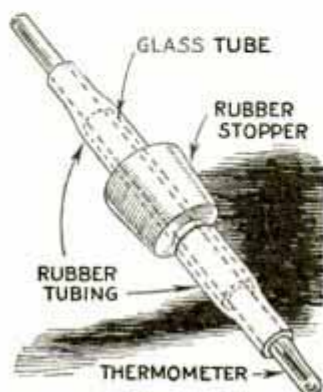
Two Lengths of Sash Cord Keep Child from Being Injured if Spring on Swing Breaks

Added Protection against Breakage of Spring on Baby Swing

As a precaution against breakage of the spring supporting a baby swing or jumper, tie a couple lengths of sash cord or light chain in the rings at each end of the spring. The cords should be long enough to permit free action of the spring, yet prevent the swing from dropping to the floor should the spring break.

Preventing Breakage of Thermometers When Inserted through Stoppers

When a thermometer is inserted through a hole in a rubber stopper for experiments in chemistry, the glass is sometimes broken in trying to remove the thermometer.



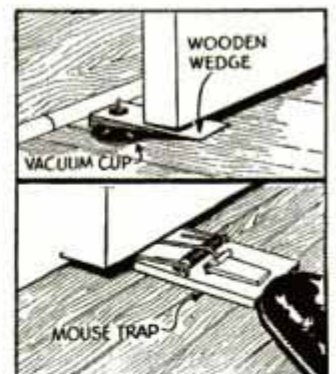
To prevent this, insert a piece of glass tubing into the stopper and slip the thermometer through it. Then slip short sections of rubber tubing over thermometer and glass tube at each end of the stopper.

Coating of Linseed Oil Makes Paint Adhere to Metal Surface

Cast iron and other metals are usually difficult to coat permanently with paint, as it will scale and fall off in a short time unless it is of a special quality intended for this purpose. Any kind of paint may be made to stick permanently if the metal is first coated with hot raw linseed oil. This may be heated over a burner if care is taken to prevent it from getting too hot and taking fire. As soon as the coating of oil becomes tacky the paint is applied in a thin coat as usual. When dry, another coat may be applied if required. Small articles that can be heated without damage may be painted with linseed oil while they are just hot enough to cause the oil to smoke when it is dropped on the metal surface. When cool, the oil-treated surface will take paint as well as wood or porous material. Objects made of wood or other absorbent material may be coated with hot oil in a similar manner before painting, and will then resist water and temperature changes much more effectively than they would if only coated with paint. The oil should be applied as nearly boiling hot as possible.

Doorstops That Never Slip

Here are two stops that will hold a door open and will not mar the surface of the floor. The upper one is a wooden wedge with a rubber vacuum cup bolted to the butt end. The cup grips the floor firmly and



at the same time presses the wedge against the bottom of the door. The lower detail shows a mouse trap that is being used for the same purpose.—G. E. Hendrickson, Argyle, Wis.

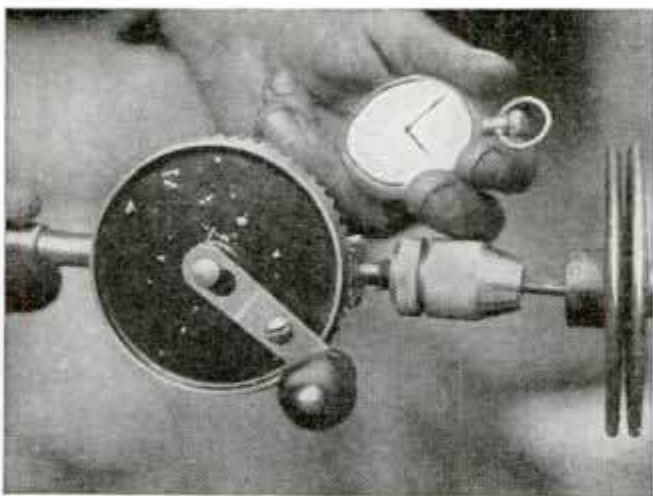
¶To save time when installing oil rings in Pontiac cars of models up to 1929, remove only the crankcase and drop each piston until the oil ring is below the cylinder wall, where the rings can be removed and replaced with ease.

Preventing Light Leakage in Film Packs

Amateur photographers who use film packs and remove one or more of the films for development before the entire pack has been exposed, often find that the last four or five are light struck. This is due to the fact that the remaining tabs in the pack are not thick enough to keep light from entering. To prevent this trouble, remove the top of the pack in a dark room and bring it into the light. The light trap will be found to consist of a flap of black velvet. Remove one of the velvet strips from a used pack and insert it behind the flap. When the top is replaced on the pack the additional strip will effectively seal the tab opening against light.

Using Hand Drill as a Speed Indicator

When you wish to know the speed of a shaft or pulley, and no speed indicator is available, a hand drill can be used to count the revolutions. First put a headless nail in the drill chuck and fit a small rubber tip on the pointed end. Then count the number of revolutions that the chuck makes for each revolution of the handle. Hold the rubber tip against the center mark in the shaft and count the number of turns the handle makes in one minute. Multiply this number by the number of turns the chuck makes for each revolution of the handle, and the result will be the speed of the shaft



Small Hand Drill Used as Substitute for a Speed Indicator in Counting Revolutions of Shaft and Pulleys

Windows covered with two coats of waterproof varnish permit light to enter the room, but are not transparent.



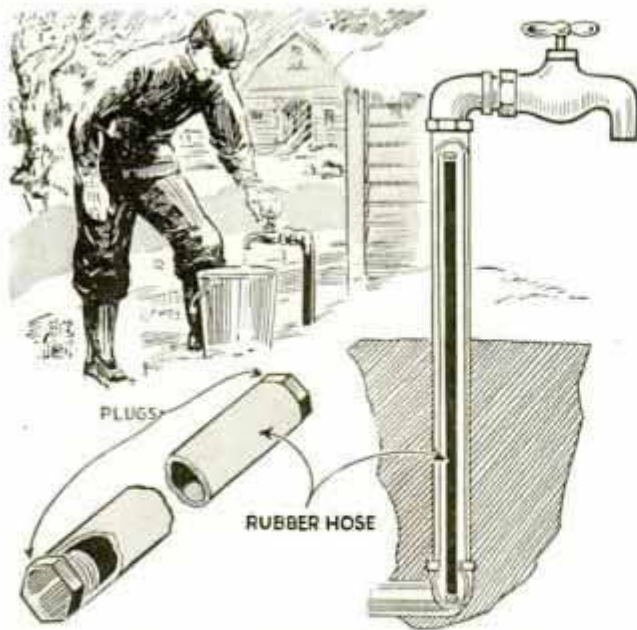
Slotted Ends of Rubber Strip Slipped over School Books Provide Good Carrying Handle

School-Book Carrier Made from Strip of Inner Tube

By cutting slots about 6 in. long near the ends of an 18-in. length of inner tube, a handy carrier for school books is provided. In use, the slotted ends of the strip are slipped over the books, which causes the center section to arch upward to serve as a handle.

Duplicating Paper for Scroll-Saw Designs

When duplicate patterns are to be cut on a number of pieces of wood with a scroll saw, a time-saver is to prepare sheets of hectograph duplicating paper. These are pressed against each piece, leaving the design directly on the surface of the wood without the necessity of bothering with paper patterns glued to the wood in the usual way. A simple formula for hectograph compound is dry glue, 2 oz., dissolved in hot water, 4 oz., after which glycerine, 6 oz., is added. Coat one side of sheets of heavy brown paper with the solution and allow it to set. Then trace the design to be copied with hectograph ink and press it against the coated side of the paper. Remove the design and press the coated side of the paper against the wood, using a roller. The design will be more distinct if the wood surfaces are smooth and slightly damp from the application of a moist sponge.



Inserted Inside of Water Hydrant, Rubber Hose Keeps Frozen Pipe from Bursting

Rubber Hose Keeps Water Pipe from Bursting When Frozen

When an outdoor hydrant cannot be protected against freezing, a length of rubber hose, plugged at both ends and inserted inside as shown, will keep the ice from bursting the pipe as the expansion of the water when freezing will compress the hose.

Simple Methods of Metal Shaping

Ornamental metal parts, such as candlestick bases, receptacle covers, legs for electrical appliances, and other similar articles, may be shaped with homemade dies and punches that are easily made. The punch and die are cast from soft metal and a vise is used as a press to form the parts. The first step is to make a piece, from soft sheet metal, of the exact size wanted. This pattern may also be hammered or spun from copper or aluminum. Next, a bottomless wooden box, at least four times deeper than the model, is made large enough to give 1-in. clearance all around it. The box is then sawed into two sections to make two boxes exactly alike. Strips should be nailed to both ends of each box so that the sections may be accurately registered. The pattern is now laid on a flat board, and one of the molding boxes is centered over it, after which molten zinc is poured in to cover the pattern. This forms the die. When the zinc has cooled, invert the box, and with the

pattern still in place, register the other box section onto the filled one. The surfaces of the zinc and pattern are now rubbed with graphite and the top box is filled with molten lead, which should be just at the melting point. After the metal has cooled, the boxes may be separated and the pattern removed. The surface of the zinc should then be filed away in an amount equal to the thickness of the metal to be punched. To reproduce the parts, cut pieces of sheet metal, copper or aluminum to the size required and lay them on the zinc die. The lead punch is registered in place and pressed into the metal with a vise to complete the operation. If the blanks are not cut to exact size, the finished parts can be trimmed. An old letter press may be used instead of the vise to work the die in an upright position. When only a small number of stampings are required, the process may be simplified by making the die from plaster of paris, the surface of which should be painted with water glass that has been diluted with an equal amount of water.

Milk-Bottle Caps Used as Small Specimen Holders

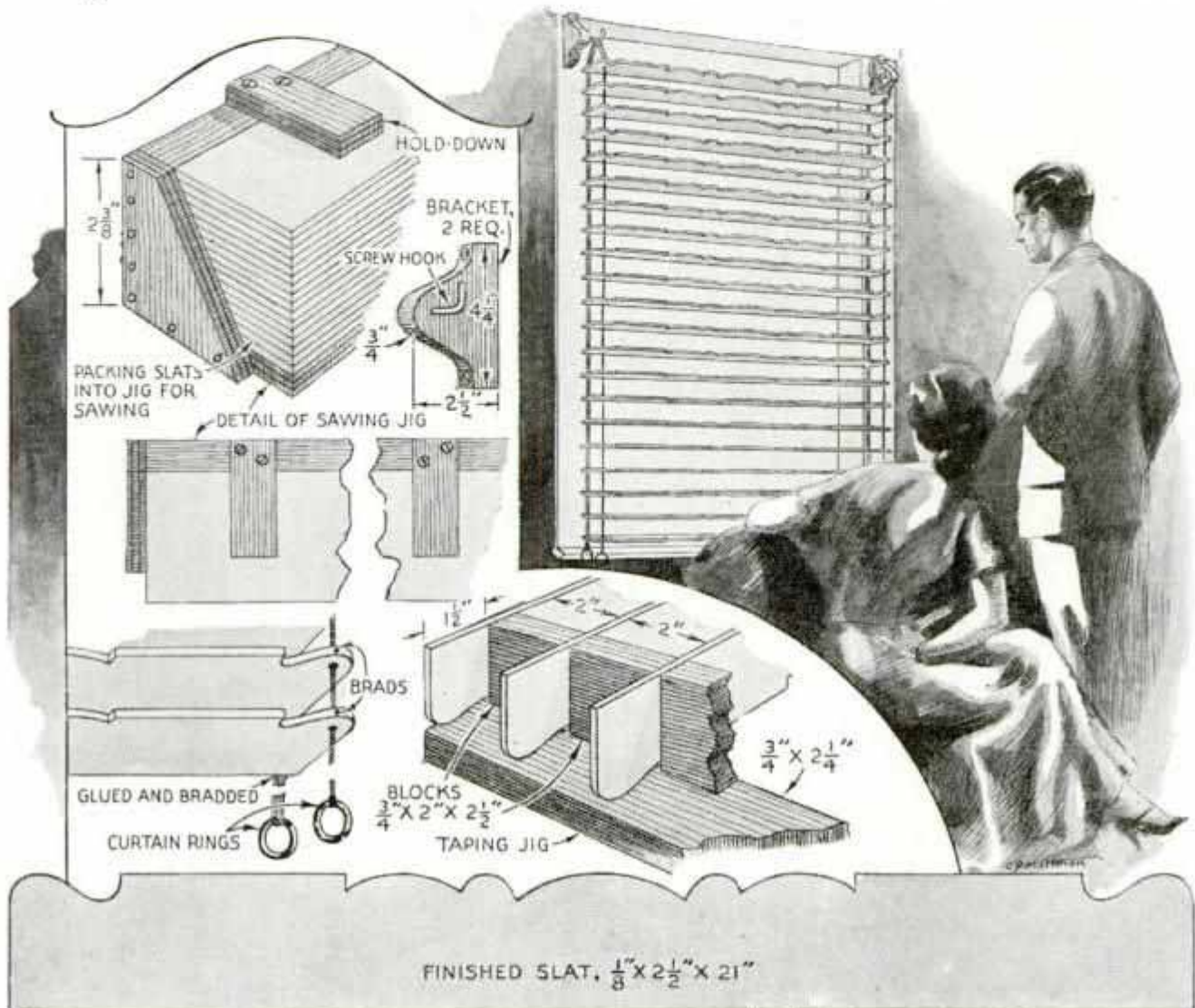
Metal milk-bottle caps are good containers for holding small specimens under a magnifying glass. The caps are dished just enough to keep the specimens from rolling off and the ears provide a means of holding the cap between the fingers.



Milk-Bottle Caps of the Metal Type Hold Small Specimens While Studying Them under Magnifying Glass

Ⓢ Tennis balls kept tightly sealed in a fruit jar during the winter months will retain their elasticity much longer than usual.

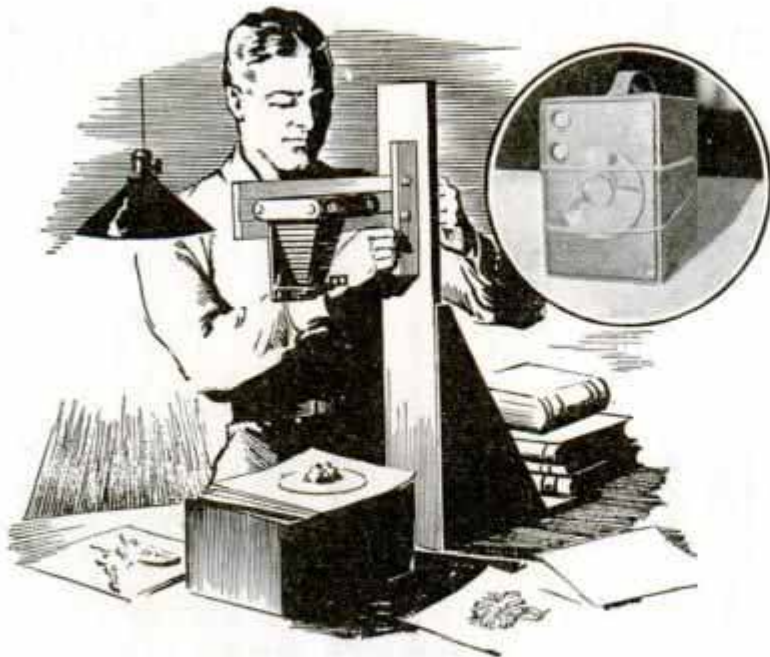
Improve Your Home with Venetian Blinds



Venetian blinds having gracefully curved edges, cut on a band or scroll saw, will do much to improve the appearance of your home. The slats should project about 1 in. over each side casing. They can be ripped to thickness on a circular saw, using $\frac{3}{4}$ -in. stock cut to width. Rip a strip, plane the sawed surface of the stock, and rip again, which will insure a straight guide for ripping, and will leave only one side of the thin slat to be surfaced. When enough pieces have been ripped, lay out a pattern on heavy paper. Cut out the design, and trace it on a strip by running a pencil along the edge. By the use of a simple jig, a number of slats can be sawed at once. For the jig back, cut a piece of 1-in. stock as long as a blind slat, and as wide as the height of the stack. Nail a $\frac{3}{8}$ -in. three-ply bottom to it, add triangular ends and hold-down strips loosely screwed, and stack the strips in. A special jig is also convenient

for assembling. It consists of a pair of base strips having blocks 2 in. long nailed along one edge of each, the spacing being slightly more than $\frac{1}{8}$ in., to permit the slats to be easily inserted or removed. Place a number of slats, back edges up, in the jig, and glue and tack $\frac{1}{2}$ -in. cotton tape to the edges. Leave plenty of tape loose at the ends. After all slats have been fastened, reverse them in the jig and thread $\frac{1}{8}$ -in. braided cord through the holes. Drive a fine brad into the cord through the front edge of each slat. Bring the tapes forward to the cords over the top slat, gluing them and riveting them with pins, leaving loops $2\frac{1}{4}$ in. long to rest on the bracket hooks. Cut the brackets from hardwood, fitting them with screw hooks projecting from the inner faces.

☞ If pincushions are filled with sand, they will keep pins bright and sharp.



Close-Up Photos Taken with Ordinary Camera by Using Vertical Support or Lenses Salvaged from Spectacles and Toy Projectors

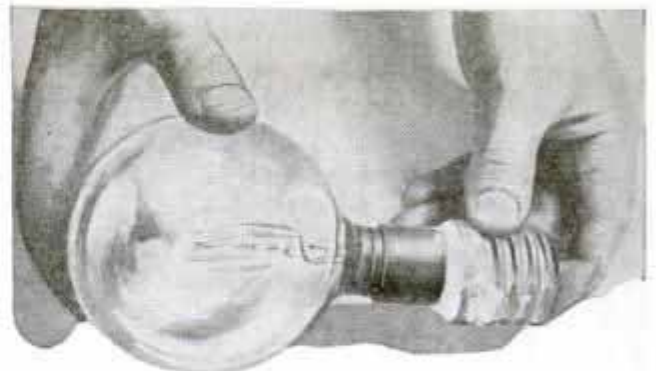
Ordinary Camera Equipped to Take Close-Up Photos

Close-up views can be taken with an ordinary double-lens camera that uses a film pack and has a ground glass, with the aid of a simple homemade holder. The latter is merely a piece of wood nailed and braced vertically to a base, and carries an adjustable arm to which the camera is attached. First the front lens is removed, the camera is placed on the holder and the object to be photographed is focused on the ground glass. However, in most cases, for real close work, the bellows will be depressed from their normal position so that it is necessary to make adjustments by hand. Close-ups can also be taken with a small hand camera by fastening old lenses taken from spectacles, toy projectors, etc., over the front aperture. With some of these lenses it is possible to get a focusing distance of only a few inches. For best results, however, three things must first be determined: the focusing distance, the relation of the camera finder to the attachment, and the maximum dimensions that can be photographed. In the first step, remove the back of the camera and fasten the lens to the front. On box cameras, heavy rubber bands are good for this purpose, while a simple wire holder can be made for folding models. Place a printed card in a strong light a short distance in front of the camera, open the shutter, and, over the

back of the camera, hold a ground glass or a piece of tracing paper. Now, with a dark cloth over your head, move the camera back and forth until the image is focused sharply. Next measure the distance of the object from the front of the camera and you have a focusing distance which can be used for any picture you wish to photograph with this particular lens. The second step is simple; carefully adjust the position of the camera and the object being photographed until the image takes exactly central location on the focusing surface at the back. Last, estimate from the focusing surface at the back, the greatest height and width that can be photographed. It is a good idea to keep each lens in an envelope with the above data printed on it for future use.

Reducing Large Electric-Lamp Sockets to Take Smaller Lamps

Large lamp sockets of the mogul size, and permanently built into many light fixtures, particularly to take 1,000 and 1,500-watt lamps, make it inconvenient to use a lamp of smaller wattage. If there is a burned-out 1,000-watt lamp available, its base can be removed and used as a reducer by installing a smaller socket inside of it. After soldering the necessary connections to the socket and base, fill the space between them with plaster of paris mixed to the consistency of paste with



Large Electric-Lamp Sockets Reduced to Take Small Lamps by Using Large Base and Small Socket

water glass. After the plaster has hardened, the reducing socket is ready for use. —Kenneth Murray, Sturgis, Mich.

Shaping Fancy Wire Scrolls

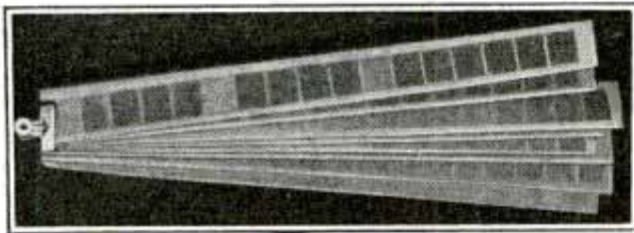
Small wire scrolls are easily shaped in a short time by using the following method: First trace the design of the scroll on a piece of plywood and then cut around the lines with a coping saw, using a blade that will make a slot slightly smaller than the diameter of the wire to be used for the scroll. Do not saw entirely around the design, but leave a small part intact at each end, otherwise it will fall out. Next, starting at one end, force the wire into the slot with the finger. A fairly soft wire should be used for this purpose, but stiff enough to hold its shape when finished.—C. G. Grover, Nephi, Utah.



Covering Radiator in Cold Bedroom Prevents Rapid Cooling of Hot-Water Heating System

Wax-Paper Containers for Your Miniature Movie Films

Water and dust-proof containers in which to file strips of miniature movie films for indexing the film rolls can be made from strips of waxed paper. The paper is folded double and the open edge



Transparent Envelopes Made of Waxed Paper Protect Index File of Home Movie Films

is then creased, after which the ends are also turned over. If desired, a strip of tape may be used to seal the envelope thus formed, along all edges except at the bottom, which is left open for easy insertion and removal of the film. In this way, any number of films may be filed together, and, as the paper is transparent, it is not necessary to remove the film for inspection. The strips may be fastened to the rolls or they can be clipped together and key numbers used to identify them with the rolls.—John Kelly, Brooklyn, N. Y.

Blanket on Hot-Water Radiator in Bedroom Saves Fuel

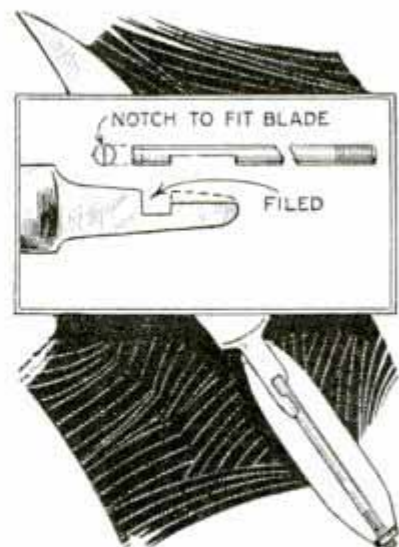
By covering the hot-water radiator in your bedroom with a blanket, when you sleep with a window open during winter months, you will effect a saving of fuel.

Without such an insulating cover, the cool air in the bedroom robs the radiator of so much heat that it causes an appreciable drop in temperature of the entire system, and to maintain the desired heat then requires more fuel. Turning the radiator off is risky as the water inside may then freeze, causing the radiator to burst.

Bolt Holds Handle on Knife Blade

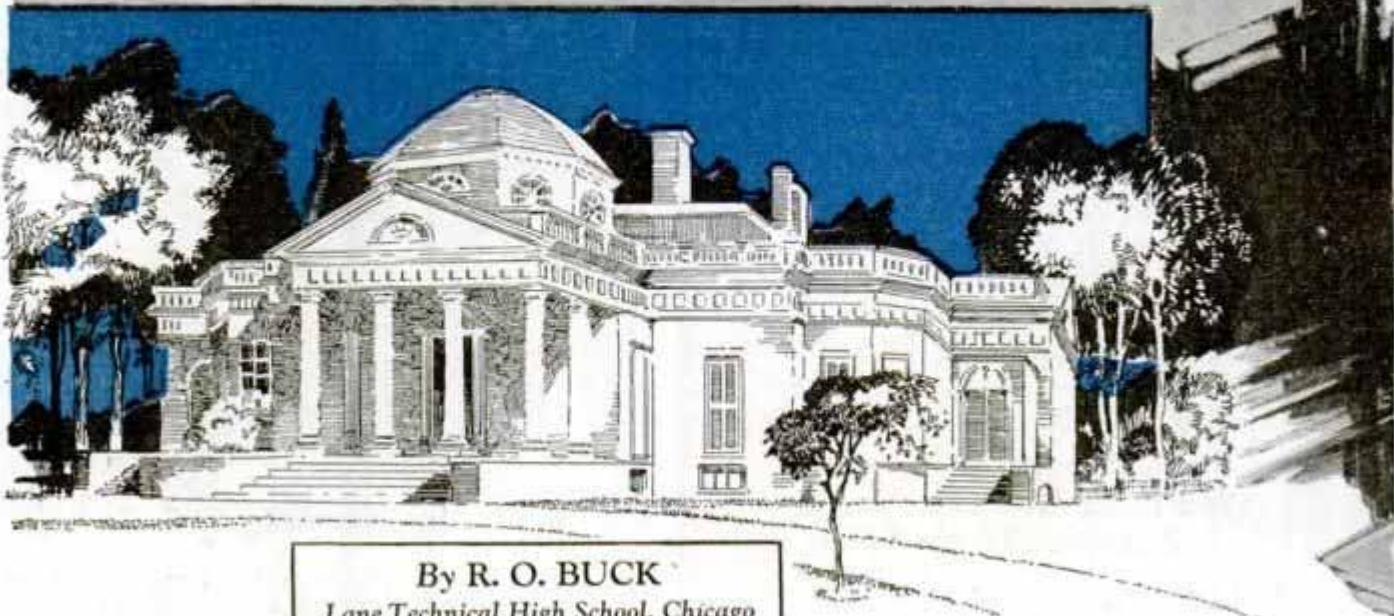
To fasten the stag-horn handle on a carving knife, I drilled a $\frac{1}{4}$ -in. hole through

the handle and filed a notch in the tang of the knife. Then, I took a $\frac{1}{4}$ -in. bolt of suitable length, cut off the head and shaped it to fit the tang, as indicated in the drawing. Both bolt and knife tang were then



slipped through the hole in the handle and the nut drawn tight. This method proved so effective that I fixed a fork the same way.—John Ayres, Buffalo, N. Y.

Famous MASTERPIECES



By R. O. BUCK
Lane Technical High School, Chicago

Thomas Jefferson's MUSIC

Second of a Series of Articles Giving Constructional Details Needed to Copy the Original Pieces

INTERESTING because of its historic and romantic background, the music stand of Thomas Jefferson ranks as one of the foremost pieces of American furniture. Thomas Jefferson, who penned the Declaration of Independence and was the third president of the United States, was, in private life, known for his talents in music, architecture and craftsmanship. Many of the pieces of furniture in his Monticello home were of his own design and executed by slaves and hired workmen under his direction. Like Monticello itself, his music stand is truly a masterpiece in design, original in idea, simple and without applied decoration, but remarkably graceful and beautiful as were all of Jefferson's designs. The photograph and measurements of the music stand, which were taken from the original piece at Monticello, were secured through the kind cooperation of The Thomas Jefferson Memorial Foundation. We are also indebted to Virginia Craftsmen, makers of Monticello reproductions, for certain structural information.

The original was made of Honduras mahogany and finished a reddish brown. As so little material is required, it would be unwise to make it up in a less beautiful wood. At the outset, a careful study of the pictures showing the assembled piece, Figs. 5 and 15, should be made to familiarize yourself with the general arrangement of the various members. The rails, which are only $\frac{3}{8}$ in. thick, are set near the outer edge of the posts though not flush as was the practice of the times. No moldings are used whatever and only a slight rounding of the top edges relieves the plainness of the pieces. The turning of the four corner posts is the first step. These pieces should be planed to a full $1\frac{1}{4}$ -in. square before locating the centers. The location of the latter must be very accurate or the turning will not meet the squared portions properly. The urn finial at the top is turned right on the pieces. While the turning is quite simple in type, it is good practice to cut a sheet-metal template so that the turnings on the four posts will be identical. The dimensions for these pieces

of AMERICAN FURNITURE



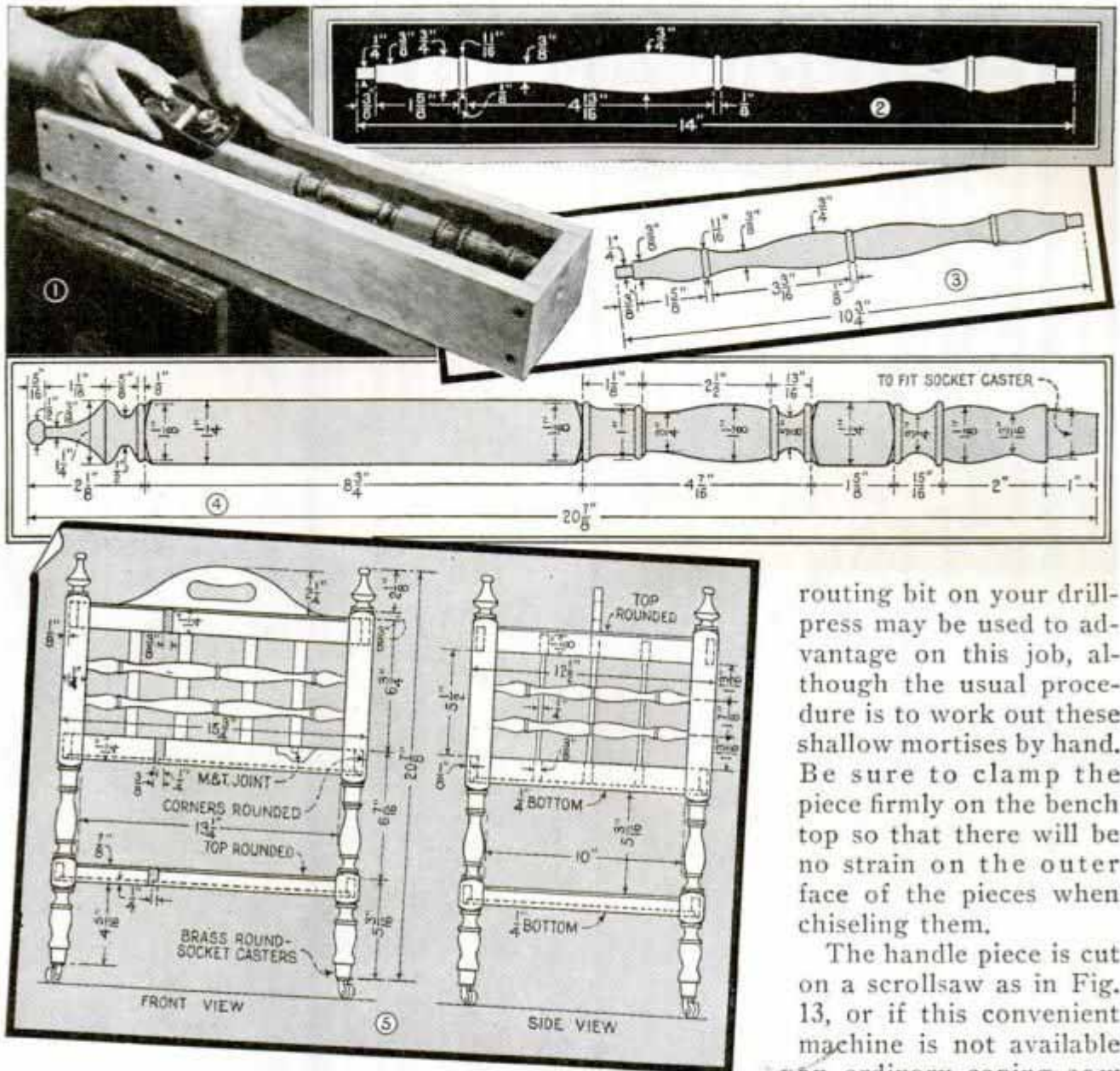
STAND

are given in Fig. 4. Brass socket casters are used on the bottoms of the posts. As the sizes produced by the various manufacturers vary somewhat, it is advisable to get these fittings before turning the tapered portions of the posts to size. Casters having sockets of approximately $\frac{7}{8}$ -in. inside diameter are required. After the posts are turned and sanded, they are ready to be rounded on the corners. Fig. 6 shows a section taken at the top of the center rail. Dimensions for rounding the edges are given. All of the squared portions of the posts are finished in this way. The problem of holding the posts while planing the edges is solved by the method shown in Fig. 1. A frame such as is used for reeding or fluting is just the thing to hold the posts firmly. Wood screws through the end pieces draw the post up snug against the frame ends. When necessary to turn the piece in the frame, the screws are loosened slightly, then re-tightened in the new position. Such a frame, if made adjustable,



like the one shown, will prove useful for a number of things.

While you are using your lathe you will find it convenient to turn up the eight spindles for the sides and ends of the stand. You will notice that one of the end spindles in the photograph of the original is missing, no doubt this has been broken out at some time so should not be omitted on your stand. The spindles for the sides and ends are not the same size but the

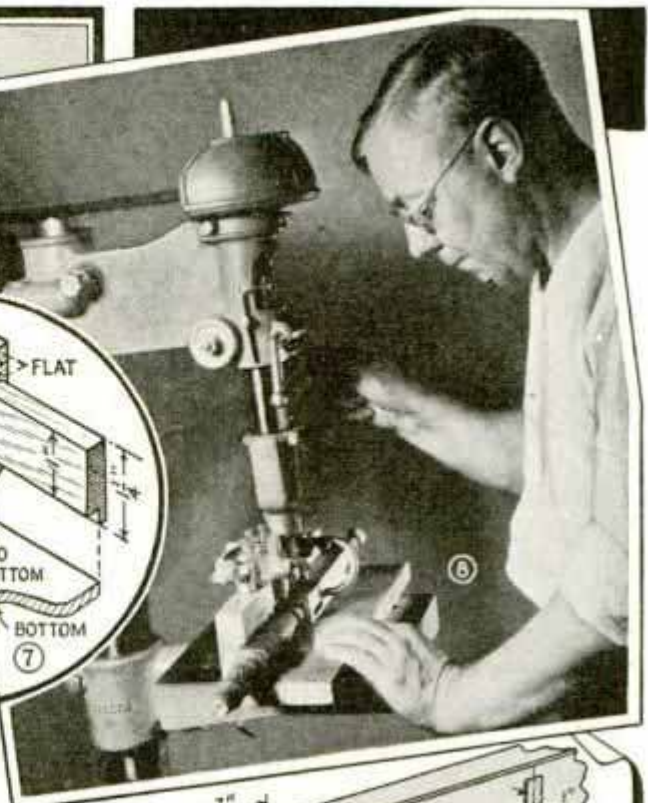
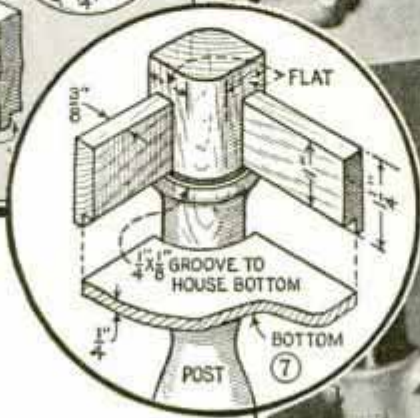
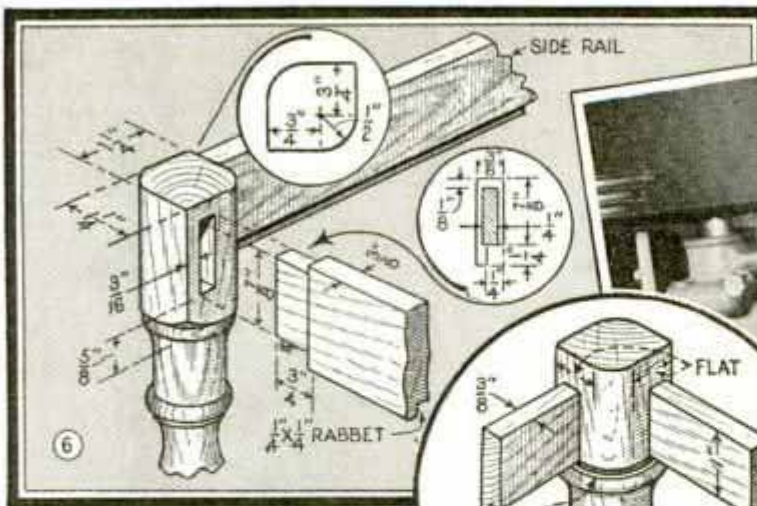


routing bit on your drill-press may be used to advantage on this job, although the usual procedure is to work out these shallow mortises by hand. Be sure to clamp the piece firmly on the bench top so that there will be no strain on the outer face of the pieces when chiseling them.

The handle piece is cut on a scrollsaw as in Fig. 13, or if this convenient machine is not available an ordinary coping saw

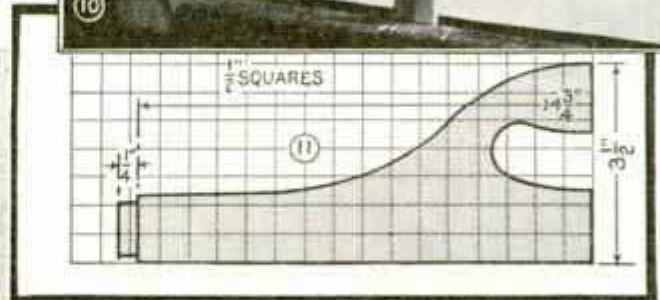
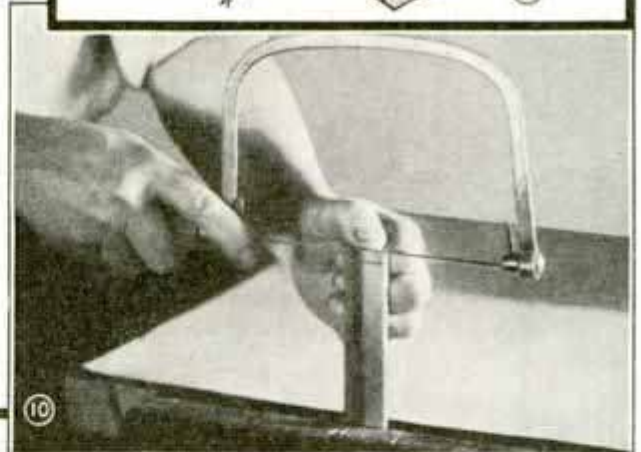
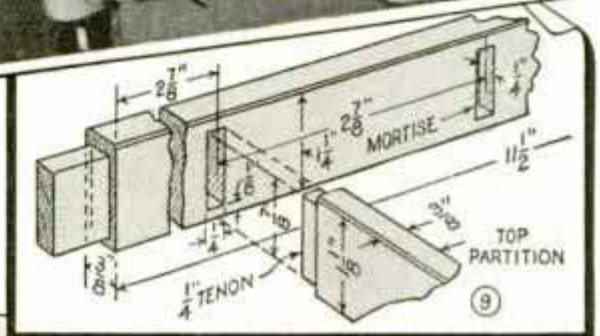
general design of the turning is similar. Figs. 2 and 3 give the dimensions for these pieces. Mortise-and-tenon joints are used to fasten the rails to the corner posts, Fig. 6. If you have a mortising attachment for your drillpress, this job is easy, as shown in Fig. 8. Even the hand method is not tedious as the mortises are short. The bottoms of both the rack and shelf are set into rabbets cut into the rails and also into grooves cut into the posts, as shown in Fig. 7. This necessitates cutting the corners of the bottom pieces to fit the grooves. The mortises for the partition rails, which are cut in the end rails, should be made next. Here is where the fine work starts, as the mortises in these pieces are cut into pieces only $\frac{3}{8}$ -in. thick and require the utmost care. Fig. 9 gives the spacing and sizes for these mortises. A

may be used. The handle piece does seem rather light and frail but evidently has adequate strength, for the piece has withstood the test of time. Perhaps the answer is that one does not lift the stand, it rolls easily on its casters, so the handhole is more in the way of ornamentation than utility. Fig. 11 is the squared portion for this piece. Each of the three partitions is made up of a top and bottom rail and four slats. Mortise-and-tenon joints are used on all of these pieces, requiring some really careful work. The twelve slats should be made from one piece, if possible, so that the shoulder cuts can be made before they are ripped apart. The advantage of this method is that all of the pieces will then be exactly the same length. The most convenient tool for cutting the cheek cuts is a coping saw, Fig. 10. A back saw

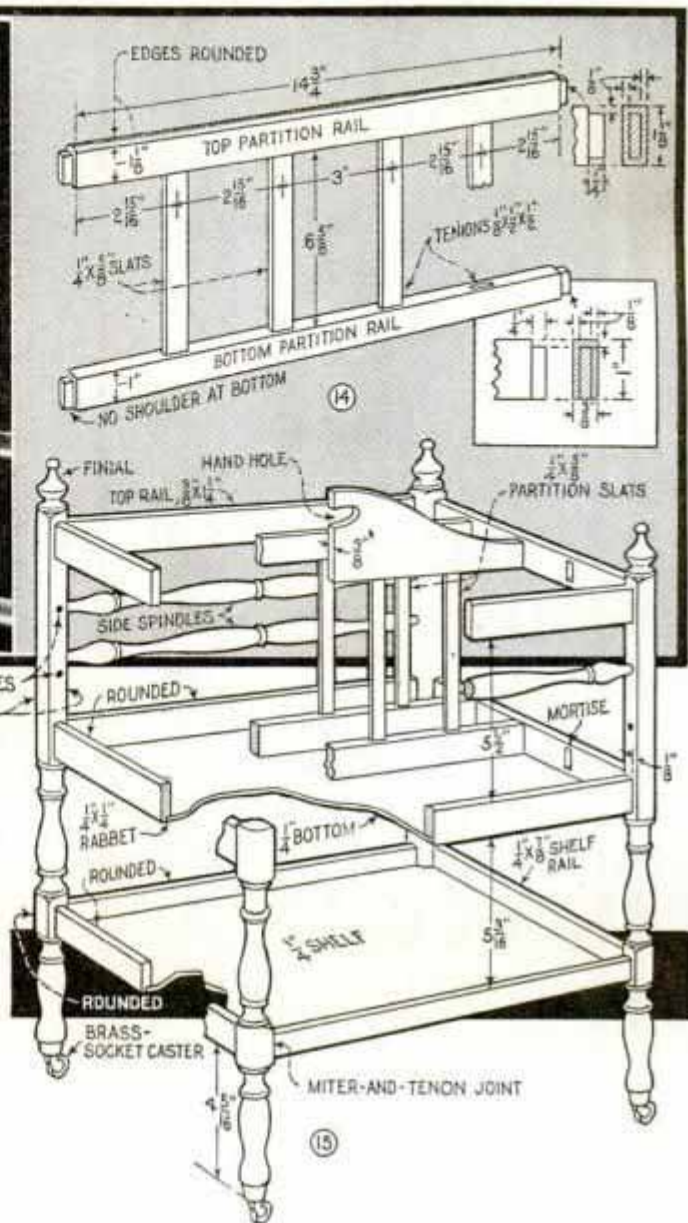


or any kind except a very fine circular saw would not make a clean and fine enough cut. The mortises in the rails are cut with a 1/8-in. chisel after drilling three or four holes to clear out most of the waste stock. Fig. 14 gives the dimensions and shows the assembly arrangement. Each of the partitions should be set up for a trial fit, as in Fig. 12, as care must be taken to have the assembly perfectly square and true before gluing and clamping.

A cut-away drawing of the complete stand is shown in Fig. 15. The procedure for assembling should be about as follows: Put the sides together first for the trial fit and, when you have all joints true and the assembly square, glue and clamp up these parts. After the side assemblies are dry and the glue cleaned up, the end rails, spindles, partitions and bottom are put in place for a trial fit, then glued and clamped as before. Casein glue is recommended for the gluing as it does not set



as readily as hot glue and thus permits more careful work. Do not leave the bottom boards to be placed last, as is the usual practice, as they must be inserted in the grooves in the posts, and this step would be impossible after the rails are



glued into place. Brads are used to fasten the bottom pieces as well as glue. These pieces will keep the frame square while the glue is drying, provided, of course, that they are set square.

All that remains to complete your reproduction of this famous piece is the sanding, cleaning up of the glue and the finish. The latter is produced by the use of a reddish-brown mahogany stain, filler, two wash coats of shellac and a "French" polish. This method of polishing, which was very much used at the time of this piece, consists of rubbing the surface with a pad which has been primed with a few drops of shellac and a small amount of boiled linseed oil. The rubbing should be in the form of a circular motion as far as possible and should be continued in the same way at each place until the frictional heat glazes the shellac.

Commercial copies of the music stand are often intended for magazine stands so

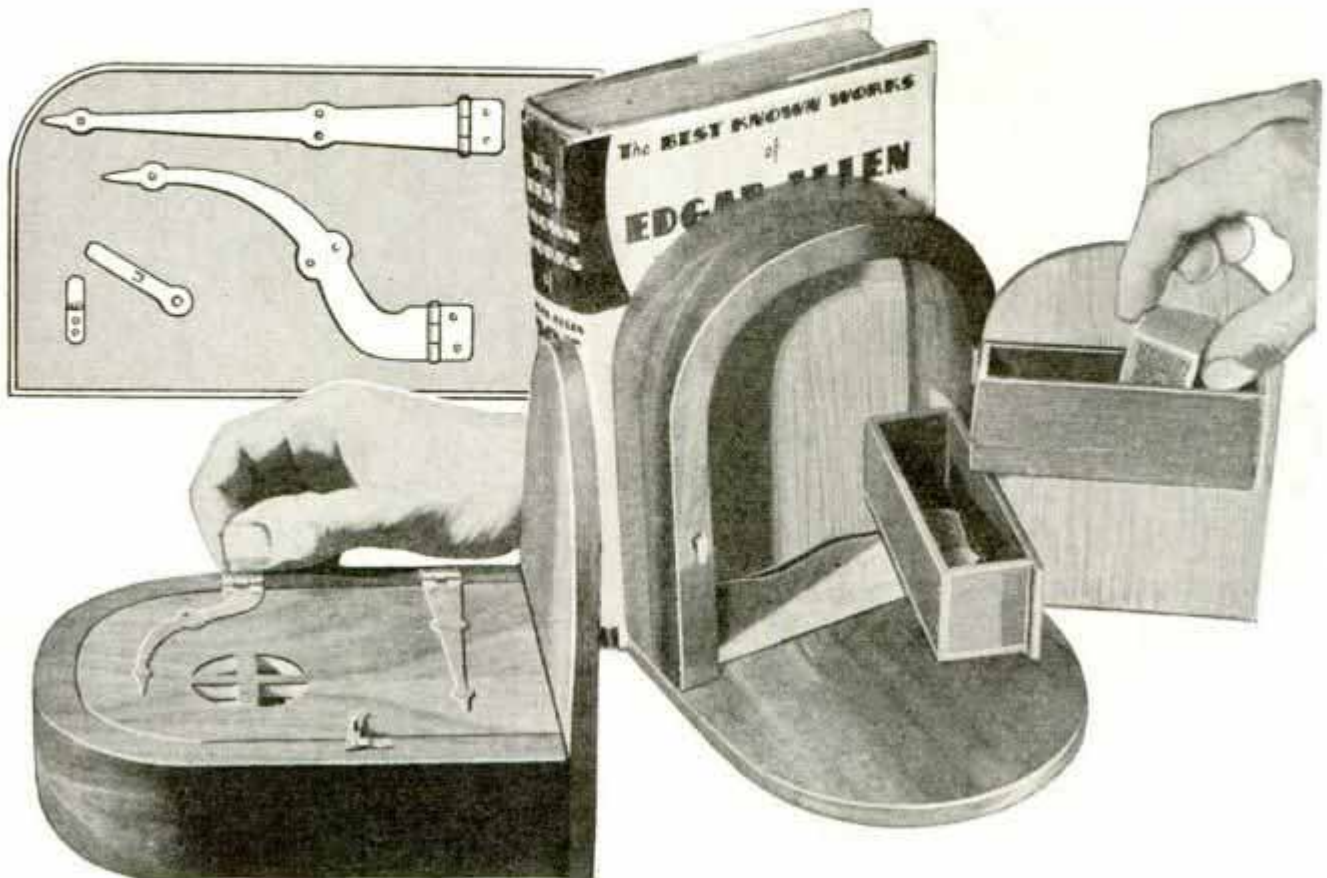
the sizes are increased somewhat to provide for the larger size magazines which will not fit the stand in its original size. If this is desired, it is suggested that you make the length 17 in., the width 15 in., and the depth of the top section or rack $8\frac{3}{4}$ in., varying dimensions of other parts accordingly. Making scale drawings of the altered parts is also advisable.

Removing Dents from Furniture

Small dents in furniture can usually be removed by repeatedly placing a few drops of warm water in them and evaporating it by holding a hot soldering iron over them. Care should be taken to remove the iron as soon as the water has been evaporated to avoid burning the wood. This treatment swells the wood fibers, which raises

the surface of the dents flush with the surrounding surface. In the case of larger dents, fold a piece of blotting paper into several thicknesses, soak it in water and lay it on the dent. Then run a hot flatiron over the blotter until the moisture has been evaporated, repeating the treatment until the dent has disappeared. It is advisable to use a filler in repairing unusually large dents.—Will Herman, New York.

A Book-End Trinket Box for Storing Stamps

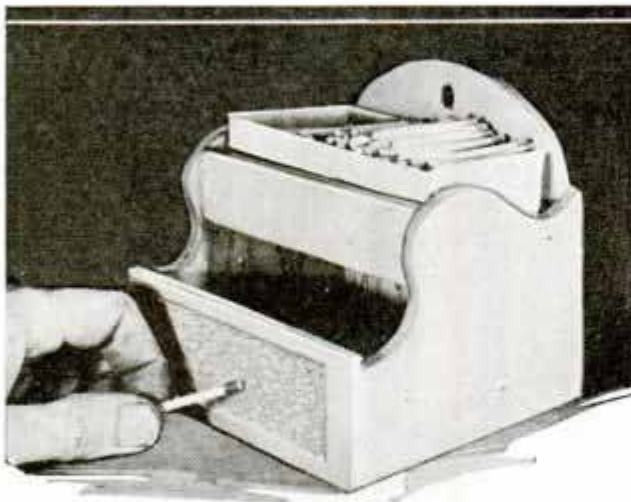


These book ends resembling arched doorways in miniature serve the additional purpose of holding smoking materials, stamps or other small objects. Each tiny door swings outward on rustic copper hinges. Materials needed include some $\frac{7}{8}$ -in. walnut, a small amount of $\frac{1}{4}$ -in. walnut plywood and a quantity of $\frac{1}{8}$ -in. plywood of any kind. Glue two $\frac{7}{8}$ -in. pieces together to form a block $1\frac{3}{4}$ in. thick and large enough to cut from it two arches $5\frac{1}{2}$ in. wide and $6\frac{3}{4}$ in. long. Stainless casein glue is suggested. Split some $\frac{7}{8}$ -in. stock board to give material for two base pieces measuring $5\frac{1}{2}$ in. wide and 6 in. long. From the walnut paneling cut arched doors that measure about $4\frac{1}{2}$ in. wide and 6 in. high. Saw out window openings as shown. Using the doors as patterns, lay out the arches on the $1\frac{3}{4}$ -in. stock, and cut them carefully to shape. The arch walls are about $\frac{5}{8}$ in. thick. Round one end of each base piece, and fasten an arch upright at the opposite end. The doors are hung on rustic hammered hinges that you can make from sheet copper or iron, and are held by a simple catch. Fasten these in place with small nails or common

pins cut to a length of $\frac{1}{4}$ in. The inside arrangement will be governed by the use to which you are to put the book ends. You can install racks for cigarets, matches and small ash trays. The book end shown has three compartments for stamps, erasers and other articles that can be kept conveniently on a library table. The compartments are made from $\frac{1}{8}$ -in. plywood held together by glue and cutoff pins. The center box swings on a pivot hinge made from sheet metal. When making the compartment boxes, allow space for a cardboard or plywood back that can be set in a rabbeted recess or pressed into the arch like the door, and held with glue. One of the simplest and best finishes for the walnut surfaces consists of rubbing with good quality linseed oil. This darkens the wood and, if repeated often enough, results in an excellent polish. Glue sheet felt to the bottom and back to prevent marring of books or table.

☛ A clean ice pick kept on the stove is handy for turning roasts and vegetables, and even cakes can be tested with the point of the pick.

Match-Box Holder Has Compartment for Burnt Matches



This Match-Box Holder Can Be Set on Top of a Stove or Hung on the Wall

Made of plywood, this holder will accommodate a full box of matches and has a compartment in which burnt matches may be placed. After enameling the holder, a piece of sandpaper on which to strike the matches is glued to the front. The holder may be hung on a wall near the stove or on the stove shelf.

Simple Test Detects Solvents in Thin Lubricating Oils

Light machine oils sometimes owe their thin consistency to the presence of alcohol or other solvents. Inasmuch as alcohol is not a lubricant, this type of oil is not satisfactory. After the solvent has evaporat-

ed, the thick oil remains. The presence of alcohol or other solvents that are more soluble in water than in oil, may be detected as follows: Pour some of the suspected oil into a test tube and carefully mark its level on the outside surface of the tube. Next fill it to within a half inch of the top with water and then shake it vigorously. The oil and water mixture should then be allowed to settle for several hours without disturbing. If alcohol or other solubles have been added, the line between the oil and water will be below the mark on the tube after it has settled.

Paper Holder for Enlarging Work

A convenient paper holder for use with horizontal enlarging cameras can be made from a picture frame by hinging it to a wood cleat screwed to a board which is placed vertically. Several thicknesses of black cardboard are cemented to the board in such a position as to fit snugly inside the frame when it is raised up in place. In use, the frame is pulled down and a sheet of print paper is inserted, after which it is lifted back, and the paper is held by the cardboard.



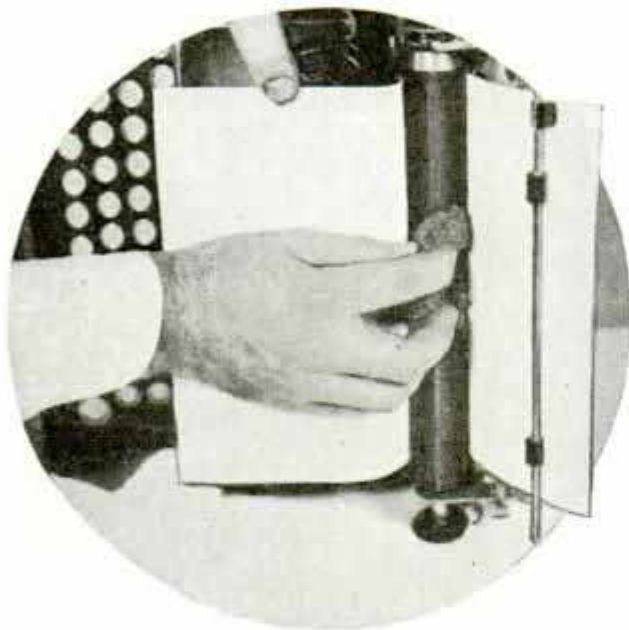
380 Blueprints for Home Craftsmen



Masterpieces of American Furniture, **Governor Winthrop's Desk**, Nos. SN 846 to 848, incl. (3 prints). **Thomas Jefferson's Music Stand**, SN 871 and 872 (2 prints).

Modelmaking Projects, **Sovereign of the Seas**, SN 828 to 835, incl. (8 prints). **Flying Cloud**, SN 709 to 714, incl. (6 prints). **DeWitt Clinton Train**, SN 800 to 809, incl. (10 prints).

Boats, **Roamer**, 16-ft. outboard cruiser, SN 765 to 770, incl. (6 prints). **Hi-Ho**, 14-ft. family outboard or inboard runabout, SN 840 to 845, incl. (6 prints). **Pop's**, Class-A outboard racer, SN 813 and 814 (2 prints). Also, many others to choose from. Complete list will be sent for 3c postage. Prints sell for 25c each or six prints (not projects) for \$1.00. Address Blueprint Dept.



Glazed Surface Removed from Typewriter Platen by Rubbing It with Steel Wool

Steel Wool Renews Typewriter Platen

After considerable use, the surface of a typewriter platen becomes glazed to the point where it begins slipping on the paper instead of turning it. To remedy this condition, the platen is rubbed lightly and uniformly with fine steel wool until the glazed surface disappears. As a precaution, turn the typewriter on its side so that none of the loose steel-wool particles will fall into the mechanism.

An Improved Light for Your Sewing Machine

A practical light for the sewing machine can be made from a double-contact auto-dash socket, a piece of sheet aluminum and a suitable bracket, the latter being adapted to your particular machine. A paper pattern is first made of the reflector to get the right shape. Projections are left



Light for Sewing Machine Made from Auto-Dash Light Socket and Sheet Aluminum

on the bottom to take a small bolt for fastening the reflector to the lamp. A special lamp for this purpose, having a bayonet-type base, can be obtained where sewing-machine supplies are sold.

Inexpensive Filling Compound for Repairing Cracks

For repairing wood, metal or stoneware articles, a durable filling compound that dries very hard is made by thoroughly mixing casein glue and quartz sand. First mix the glue powder with cold water to produce a glue of about the consistency used for cabinet work, and then add enough fine quartz sand to make a viscous paste. As this material will not keep, mix just enough for the job at hand. If a finer grained filler is needed, whiting, diatomaceous earth or other finely powdered filling materials may be substituted for the sand. Before applying the filler, roughen and thoroughly clean the surfaces to be repaired. Oil and gums in particular should be avoided.

Corks Pulled with Tobacco-Can Lid

When a cork is pushed down into the neck of a bottle so that it cannot be removed with the fingers, and a corkscrew is not at hand, try a tobacco-can lid. Grip it as shown, pressing the edge of the lid into the cork and pulling upward at the same time.

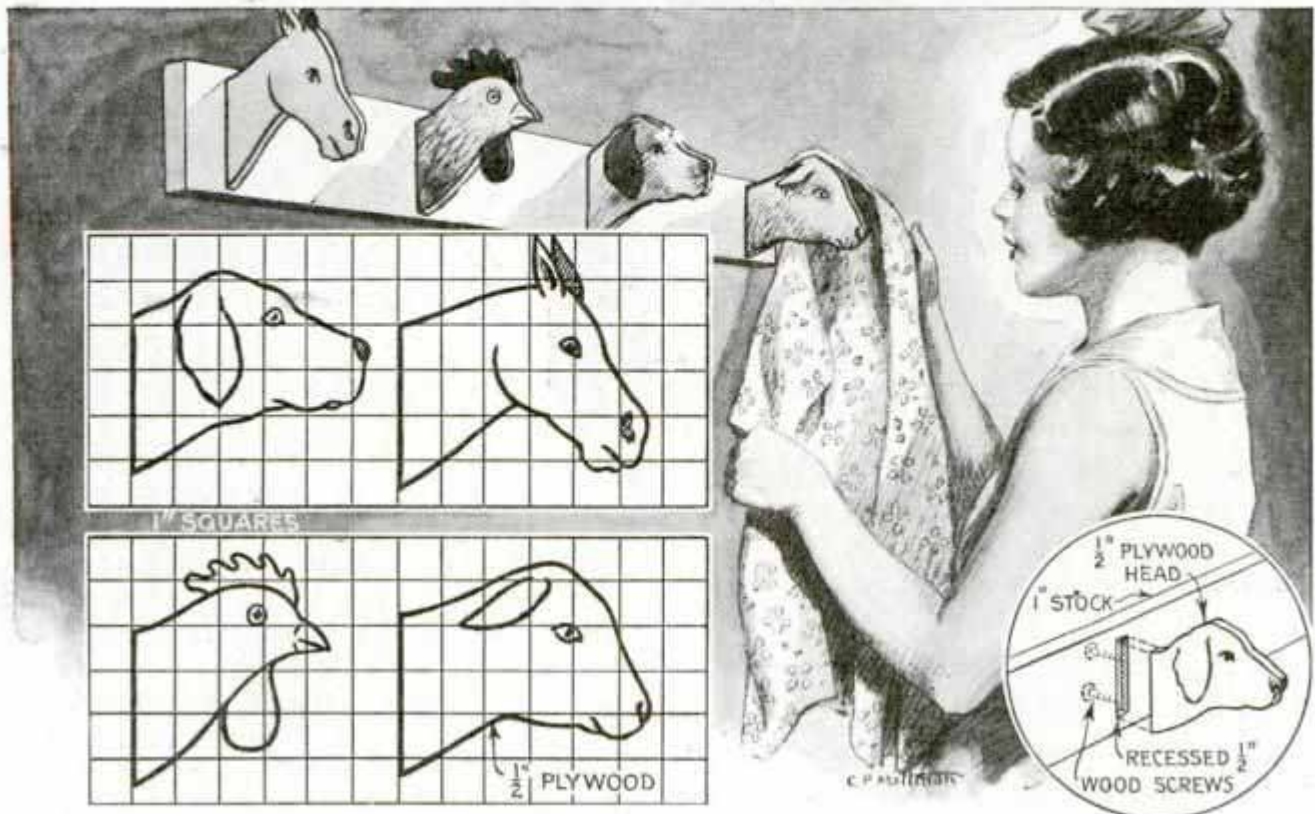


—F. W. Bentley, Jr., Missouri Valley, Ia.

Preparation for Making Dustless Mops

Dusting cloths and mops that pick up the dust instead of spreading it may be made by impregnating them with a preparation consisting of paraffin oil, 2 parts, and turpentine, 1 part. The ingredients are mixed and a small amount of oil of cedar is added to impart a pleasant odor. The cloth or mop should be hung up to dry. When it becomes too dirty, it may be washed and re-treated in the same way.

Animal Clothes Rack Keeps Nursery Tidy



Children are apt to be, at best, rather negligent about hanging up their wraps, but with this animal-head rack they will be more likely to remember this duty than otherwise. Made of soft wood, it has hooks resembling the heads of various animals and fowls. The back strip, to which the heads are fastened, is 1 by 4-in. stock. The designs may be easily duplicated on paper in 1-in. squares and then transferred to $\frac{1}{2}$ -in. plywood with carbon paper, after which they are cut out with a scrollsaw, and the edges smoothed down with a rat-tail file and sandpaper. They are then either glued into mortises cut to receive them or are screwed in place, as shown in the circular detail. When the rack is entirely assembled, the heads are painted with quick-drying enamel, outlining in black with a small water-color brush.

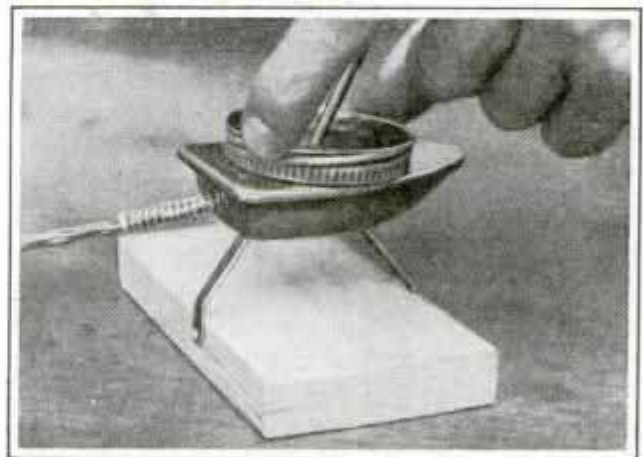
Patching Eave Gutters

Holes in eave gutters and downspouts can be effectively patched with a strip of canvas that has been thoroughly saturated with a plastic cement made by melting together equal parts of creosote and the black composition that seals the tops of dry cells. In applying the patch, first coat

the work liberally with the cement, press the saturated canvas firmly over it and then apply more of the cement.

Electric Iron Used as Hot Plate in Home Workshop

By removing the wood handle and screwing a toy electric iron to a wood block in an inverted position as shown, you will have an inexpensive hot plate for melting small quantities of wax. These irons can be obtained at novelty stores, and small can lids can be used as containers in which to melt the wax.



Small Quantities of Wax Melted in Can Lid Set on an Inverted Toy Electric Iron



Plaster-of-Paris Mold of Rotted Porch-Column Base Used to Form Permanent Base of Concrete

Rotted Porch-Column Bases Repaired with Concrete

If the wood bases under your porch columns have rotted, it is an easy matter to replace them with permanent concrete bases. First carefully clean the old ones, and from these make plaster-of-Paris molds in which to cast the new bases. After coating the base with cup grease to prevent the plaster from adhering to it, build a wooden frame around the outside to serve as a form. Then divide the frame into four equal parts with pieces of light cardboard cut out on the lower edges to fit the contour of the base, and fill it with a thin mixture of plaster of Paris. Allow this to set at least 20 hours, and then remove the form, carefully taking the four sections of the mold from the old base. Now reassemble the sections inside the form and it is ready for the concrete. This consists of fine gravel, 2 parts, clean fine sand, 2 parts, and cement 1 part. Tamp the concrete into the plaster mold and allow it to stand for approximately 48 hours. Minor imperfections in the surface of the base can be covered with a cement wash after it is placed in its final position. To do this, brace the roof over the column, and then, using the new base as a template, saw the column off level with the top of the base. Give the bottom end of the column at least two coats of paint. In some cases where the column rests on a cement floor, the new base may be left

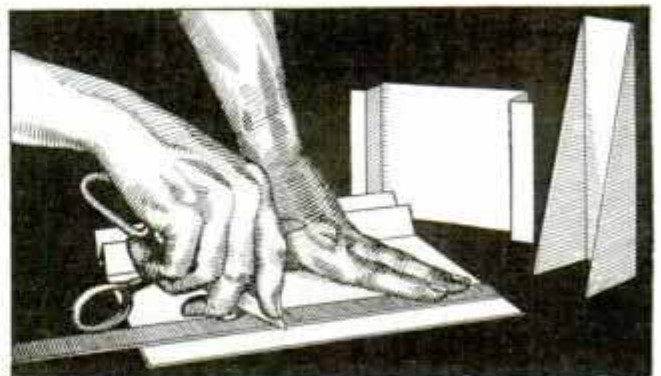
unpainted, but where it looks better painted, apply two or three coats of cement paint and then a coat of house paint to match the column. Be sure that the cement paint is thoroughly dry before applying the house paint.—Richard D. Hudson, Upper Montclair, N. J.

Accumulations of Debris Cause Sewer Trap to Leak Gas

Sewer gas sometimes escapes into the house through well made traps that normally offer complete protection from the dangerous gas. In some cases where the gas was detected it was found that the traps did not have enough water to seal them against the passage of the gas. This condition was caused by an accumulation of pieces of string, thread, etc., in the trap. The strings absorbed the water by capillary action and lowered the water level, which allowed the gas to enter the house. In view of the above, it is a good idea to clean out all sewer traps frequently, not alone by flushing them, but to remove all waste with a flexible wire.—Emil J. Novak, Omaha, Nebr.

To Fold Cardboard without Breaking

Folding heavy cardboard is easy if it is first scored with the back edge of the rounded point of a pair of scissors, using a straightedge as a guide. This breaks the fiber of the cardboard so that it can be



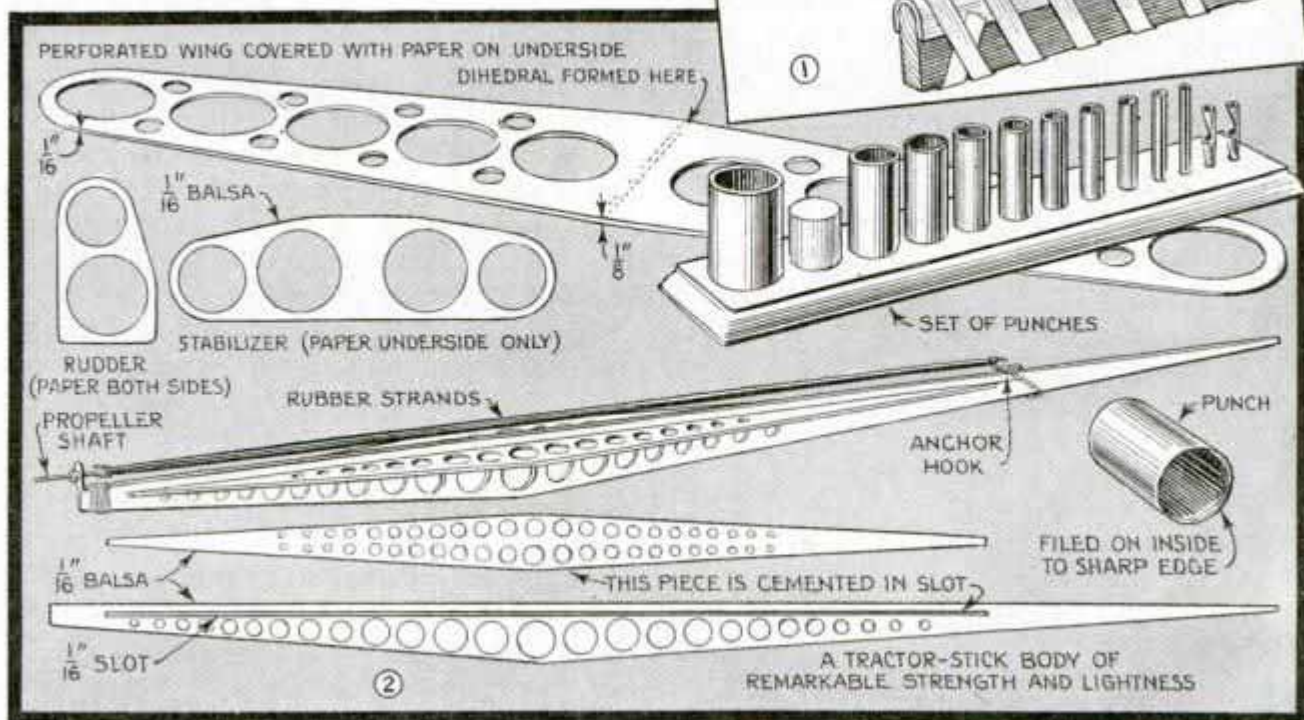
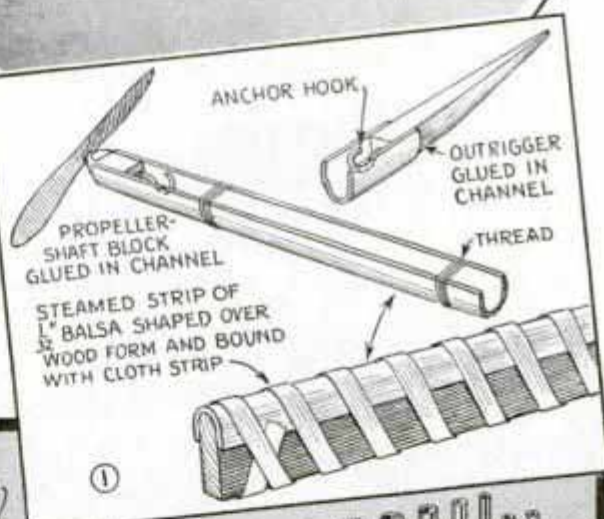
Heavy Cardboard Folded by First Scoring It with Point of a Pair of Scissors

folded for making such articles as boxes, card easels and display stands.—Ray J. Marran, Kansas City, Mo.

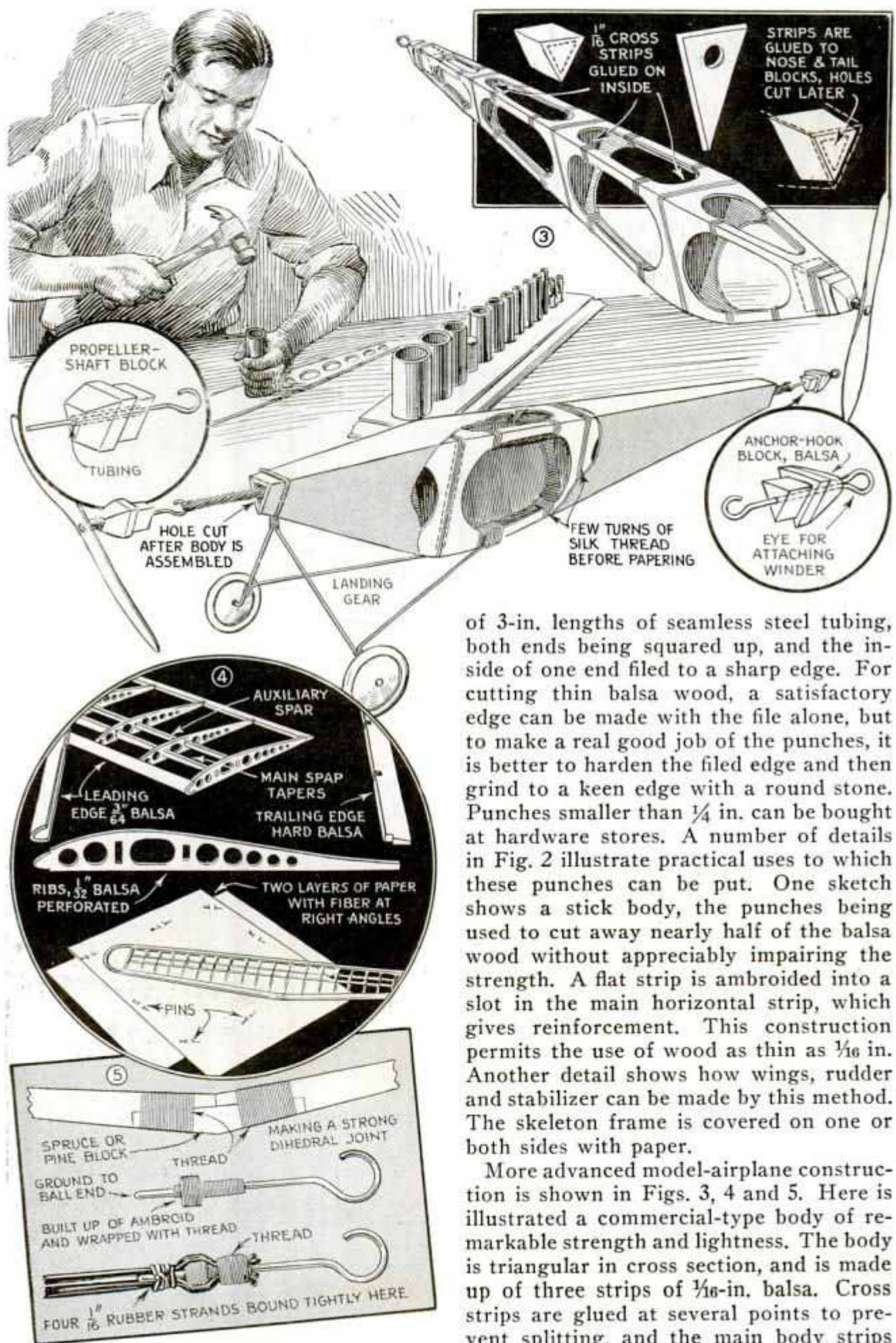
Ideas for MODEL-AIRPLANE Builders

GREATER strength and less weight in the construction of model airplanes go a long way in attaining more speed. Fig. 1 offers a suggestion for increasing the strength and lightness of the main unit of a "stick" body. In the usual design, the stick is solid, and the rubber-band motor is stretched above it, the stick having sufficient strength to withstand the tension of the rubber bands. In the improved design shown here the stick is U-shaped and the motor is stretched inside. In this way the tension is brought to bear directly against the ends, minimizing buckling and distortion. Steam a strip of $\frac{1}{32}$ -in. balsa and bend it over a form as is shown in one of the sketches. A strip of cheesecloth is wrapped around the form and balsa strip to hold it until thoroughly dry.

An innovation, which will be found very useful to model-airplane builders, is a set of hollow punches, Fig. 2. They are made



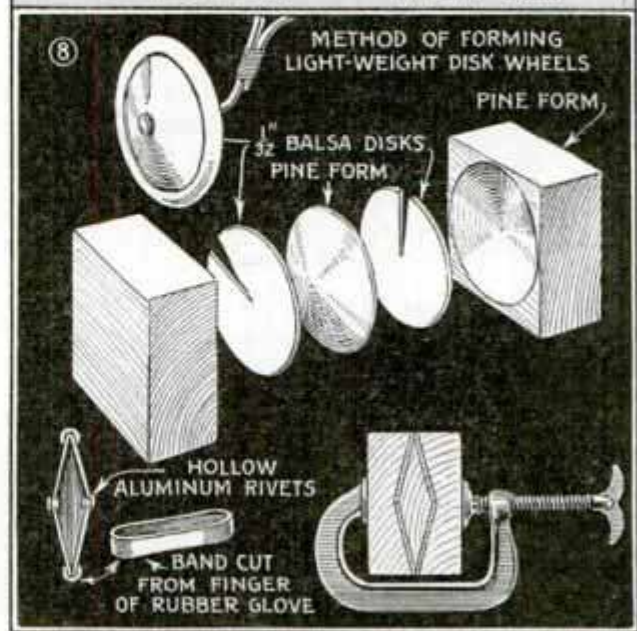
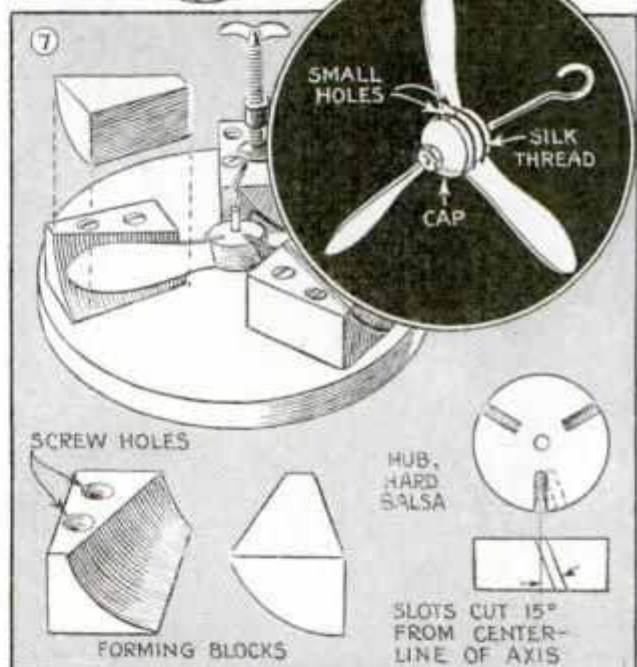
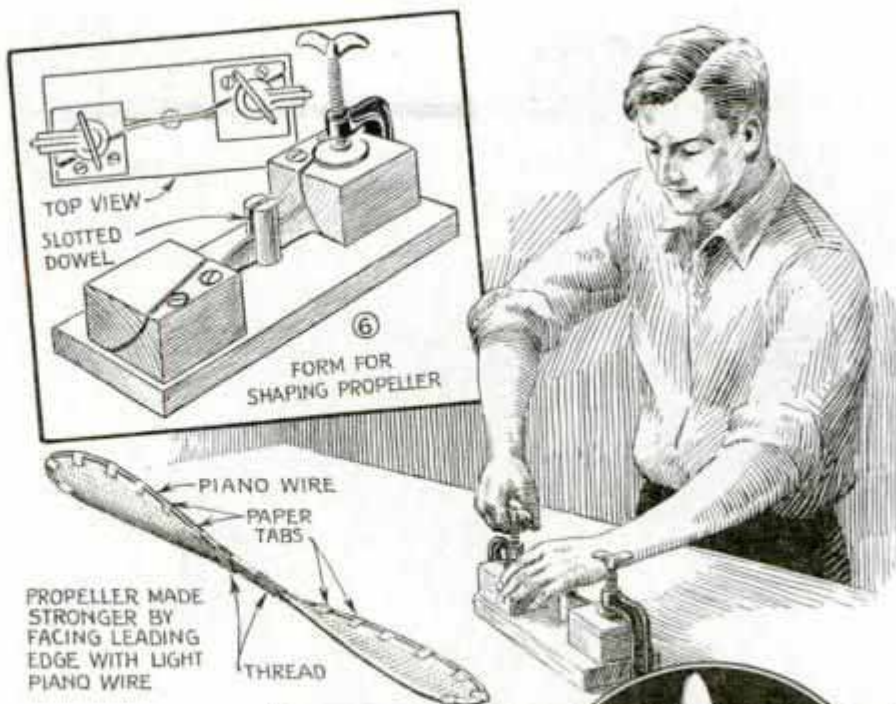
A TRACTOR-STICK BODY OF REMARKABLE STRENGTH AND LIGHTNESS

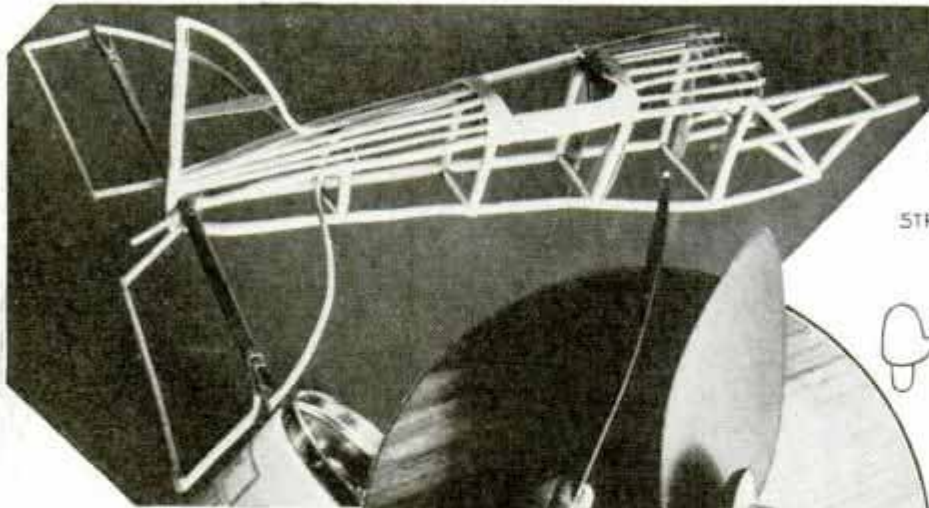


are glued to triangular balsa blocks at each end. Later these blocks are hollowed out to receive the prop shaft block at the front and the anchor hook block at the rear. Note how the side and the top strips are cut away. Covering the body with paper adds considerable strength. The rubber-band motor is put in place through the openings at the ends. When winding the motor with a mechanical winder, it is necessary only to remove the rear plug and fasten the winder to the extension hook, and turn plug and all to wind. When wound, the plug can be re-inserted easily. A number of these can be made up, fitted with propellers of different design, and the change from one to another can be made in a moment's time.

Fig. 4 shows a strong wing construction. The leading edge is a U-shaped piece made by steam-bending a strip of 1/2-in. balsa. The nose of the ribs fit within the U. This construction gives such additional strength to the wing skeleton that lighter spars can be used. As the better brands of airplane tissue have a very tough fiber in one direction only, it is a good idea to put two sheets of paper together with the fiber at right angles, in order to obtain more strength. The sheets can be pinned together while shaping over the wing skeleton, and when sprayed and doped, they will seal together as a single sheet, and will resist tearing in all directions. A means of making a very strong joint at the dihedral is shown in Fig. 5. Immediately below it is shown a method of attaching the rubber strands to the hooks. If the rubber is attached to the hooks as shown, the motor can be wound up as much as 10 per cent more than usual, which might be the deciding factor in an official contest.

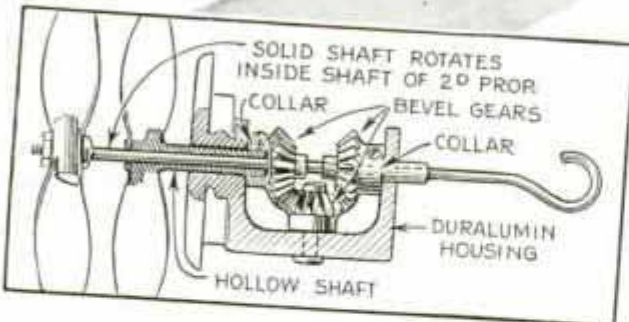
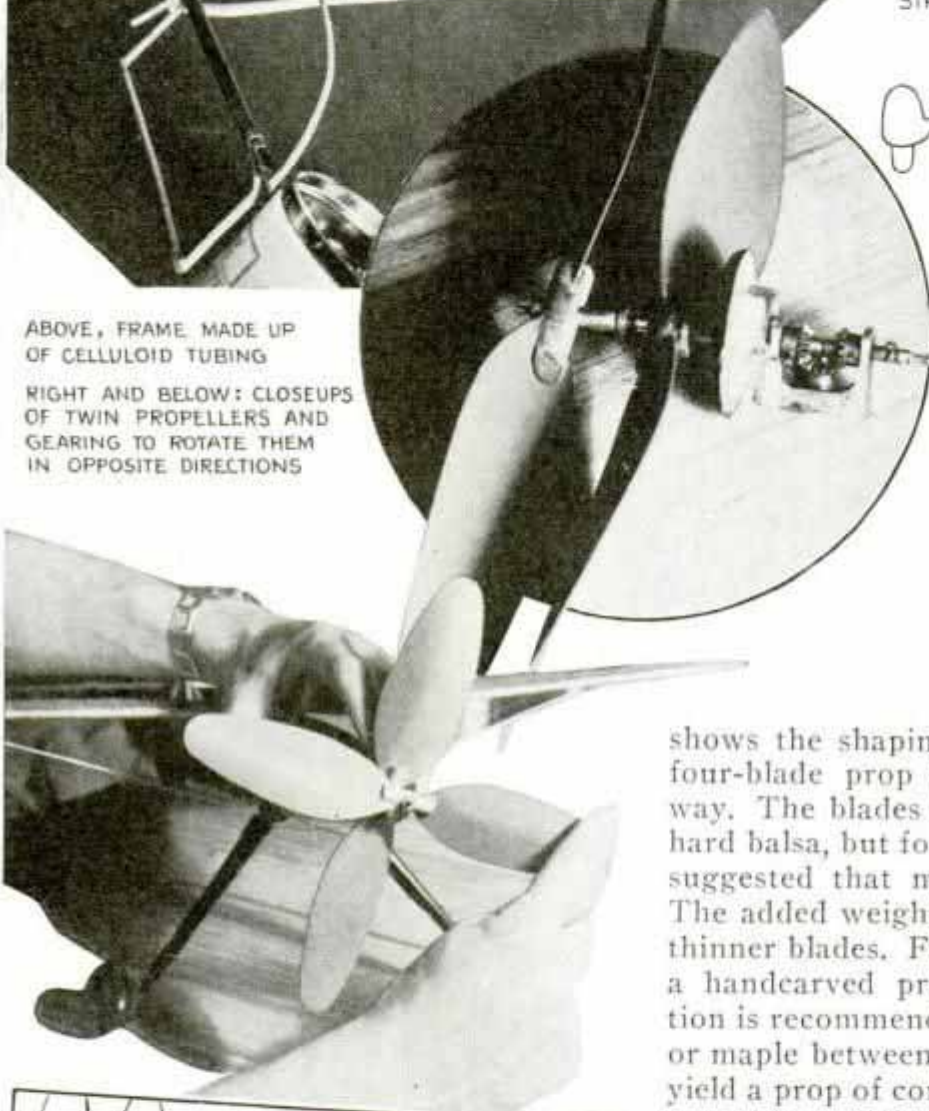
Figs. 6 and 7 show propeller construction. If shaped properly, there is no reason why steam-bent propellers should not be as efficient as carved ones. Fig. 6 shows a simple form for shaping a two-blade



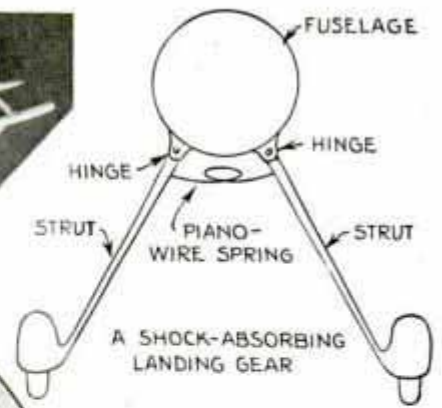


ABOVE, FRAME MADE UP OF CELLULOID TUBING

RIGHT AND BELOW: CLOSEUPS OF TWIN PROPELLERS AND GEARING TO ROTATE THEM IN OPPOSITE DIRECTIONS



prop. The form blocks, of course, can be shaped for a wide range of pitches. If the leading edge is reinforced with fine piano wire, many props will be saved from breakage. The wire can be put in place nicely by ambroiding the edge and putting on the wire when the ambroid is tacky. Little tabs of paper can be ambroided over the edge to make the wire more secure. After the prop is doped, the paper will be al-



most invisible. Note particularly that each length of piano wire extends beyond the center line of the prop and is bound with silk thread. A very thin propeller of this construction will withstand a considerable amount of abuse.

Multi-blade prop construction is shown in Fig. 7. While the drawing

shows the shaping of a tri-blade prop, a four-blade prop can be made the same way. The blades can be made of selected hard balsa, but for an ultra-speed job, it is suggested that maple or beech be used. The added weight can be partly offset by thinner blades. For those who insist upon a handcarved prop, laminated construction is recommended. Thin strips of beech or maple between layers of soft balsa will yield a prop of considerable strength without undue weight. The laminations should be glued with casein glue, not with ambroid, and should be submitted to a moderate, evenly distributed pressure. Wheel construction of strength and lightness is shown in Fig. 8. Again, the hollow punches come into use for cutting the disks. The small, hollow, aluminum rivets can be bought by the box or by the dozen at any hardware store.

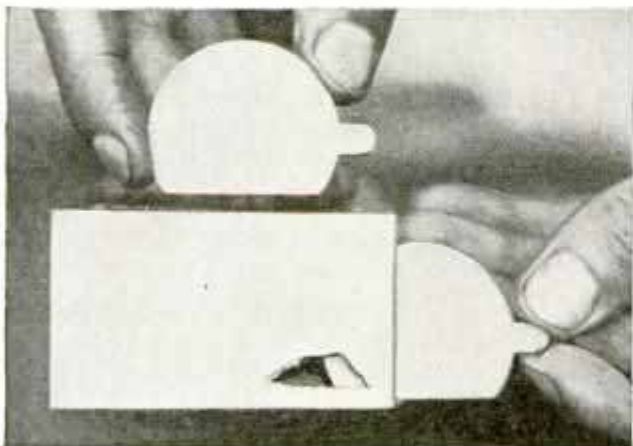
Two propellers rotated in opposite directions by the same rubber-band motor, drive an unusual model airplane designed by Glen Rymer and George Wilson, of Akron, Ohio. The propellers pull against each other, and do not produce a tendency of the body and wings to rotate, as when a single propeller is used. The heart of this double-propeller drive is a trio of

bevel gears mounted in a duralumin housing in the nose of the plane, just back of the propellers. One of the blades is connected directly to the single rubber-band motor by means of a slender steel shaft. The other propeller has a hollow shaft, through which the first one passes. One of the bevel gears is fastened to each shaft. The motor is wound by just turning the front propeller. Another feature is the landing gear. It consists of two struts carrying the wheels, mounted on hinges and connected by a light coil spring underneath in the fuselage. When the model lands, the wheels spread apart, the spring absorbing most of the shock.

Another builder has found use for celluloid tubing to get greater strength and rigidity in a model-airplane fuselage. The parts are cemented together by using acetone, which softens the celluloid. When softened, the abutting pieces are held against each other with clamps until they are again hard and adhere together firmly.

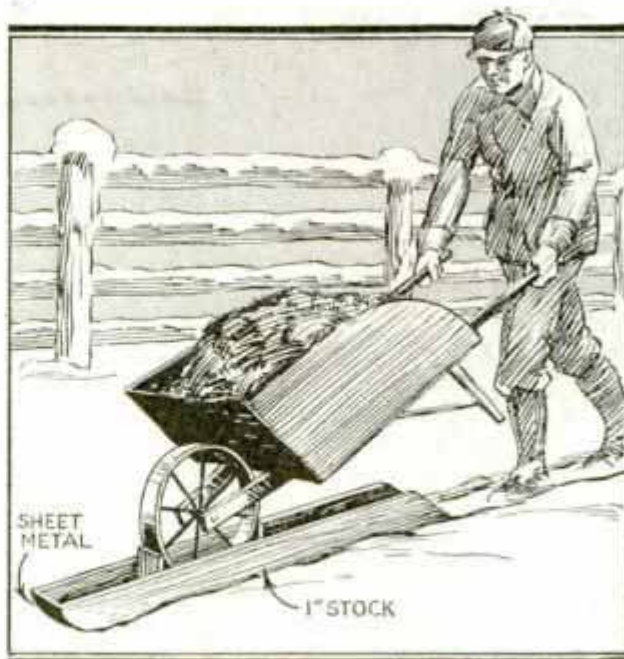
How to Make Sliding Valves for Salt and Sugar Containers

While some manufacturers pack household commodities, such as sugar, salt and other dry substances, in containers fitted with handy sliding valves for emptying the contents, there are many containers that are not fitted in this way. For these, valves can be made from cardboard milk-bottle caps. Merely cut a small hole in one corner of the top of the container and



Sliding Valves for Closing Openings in Sugar and Salt Containers Made from Cardboard Bottle Caps

slip the cap in from one edge, first squaring one side to provide a flat surface to fit against the inner side of the box.



Wheelbarrow Sled Runner Removed by Lifting Wheel from between the Blocks That Hold It

Sled Runner for the Wheelbarrow

Fitted with a sled runner as shown, a wheelbarrow can be used when the ground is covered with snow. The runner is made from a strip of sheet metal and two 1 by 6-in. boards, 4 ft. long, which are rounded at one end as shown. Two blocks are nailed between the boards to hold the wheel of the barrow. To detach the runner from the wheelbarrow, merely lift the wheel from between the blocks.—Martin G. Winterton, Ft. Lewis, Wash.

Hand Drill Aids in Putting Needle Points on Instruments

Pointing a needle or other instrument on a stone is easily done if the work is held in the chuck of a hand drill and rotated against the stone. In this way, the work can be moved back and forth over the surface of the stone and evenly revolved at the same time in such a manner as to produce a perfect point in a short time. Put sufficient pressure on the needle to bend it slightly while the grinding is being done, but not enough to break it. Any oil stone such as is used at the workbench will do for the job.

Wristbands of different colors, in accordance with the hour in which they are issued, are used by an open-air swimming pool at Hornsey, London, to check the time patrons have occupied the pool.

maker - Carron
409 S. Dearborn, Chicago
H. S. Wild & Co
510 & 11th St. N.Y.C.



Fun and Profit in ELECTRIC-PEN



By E. R. HAAN

BESIDES being a source of amusement and recreation, electric-pen etching in wood, leather, velvet and other suitable materials, has money-making possibilities, as there is practically no end to the number of useful household articles that can be decorated in this way and sold at a profit. A few of these items, which find ready sale at gift and novelty shops, are wall plaques, vanity boxes, trays, book ends, tie racks, waste-paper boxes, magazine racks and shelves for whatnots. Such articles are especially made for this kind of decoration with designs lightly printed on their surfaces. Thus, instead of making up these pieces of furniture yourself, it will be quite a saving of time to get them ready made so that you can concentrate your efforts on the decoration. Besides

producing artistic household articles, there are many other practical uses for electric pyrographic pens, such as addressing wooden boxes and crates, printing or writing names on wooden or composition tool handles, tennis rackets, golf clubs, also leather suitcases, heavy rubber goods and the like.

To get started in this fascinating work you merely need to get one of these pens, which costs from one to three dollars. Skill in handling the pen is acquired by practice on any close-grained softwood. Plug the pen into a convenient 110-volt electric outlet, wait until the tip becomes red hot and then write slowly but firmly, turning the point over to the thickness of the stroke desired. For making lines, always keep in mind that you pull the sharp edge over the surface like a sled over ice—gliding. Strokes should be made at a constant speed and pressure as variation here causes lines of varying depth and thickness. Practice until you are able to make straight lines of uniform shade, without any light and

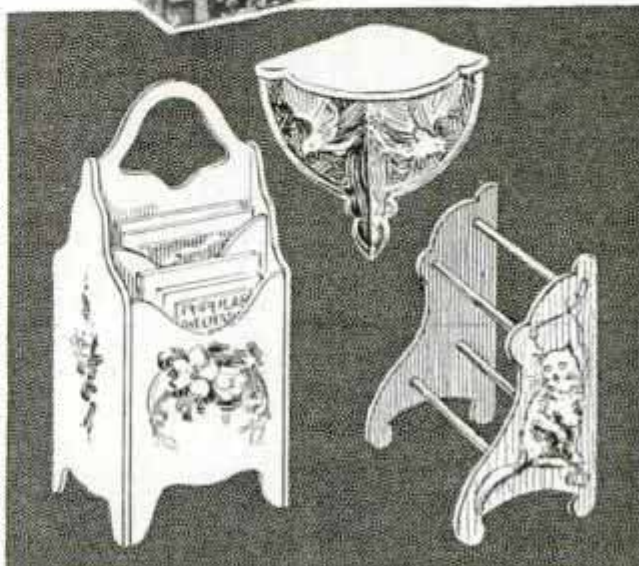
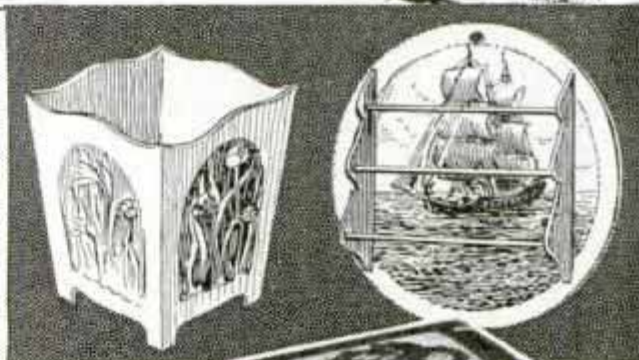
Electric pyrographic pens, available at low cost, enable anyone to decorate wood, leather, velvet, etc. Basswood plaques, boxes, shelves, magazine baskets, pier cabinets, bric-a-brac shelves and many other items, with stamped designs, are made especially for this purpose



ETCHING

dark divisions or breaks. After mastering straight lines, begin with large curves and keep on until you can make the small curves as well. Next comes shading, which is done with the flat side of the pen, drawing it very lightly over the surface of the wood. The movement should be faster than it is when making lines, as the surface is to be scorched rather than burned. After uniform shading has been mastered, try to vary the intensity from light to dark and vice versa. To do this, start the stroke rather fast and then keep moving slower as you go along, which results in the shading getting darker.

So far only the technique of handling the pen has been practiced on waste wood. For your first attempt at making a finished picture, it may be advisable to start on a candy-pail lid, which being circular, makes an acceptable wall plaque. Select one in which the pieces of wood are all of similar grain, shade and hardness. Then clip a relatively simple picture from a newspaper or magazine, which you want to reproduce, and transfer it to the surface of the wood with carbon paper. Use a large compass to scribe border lines or make any other border, according to your own taste. The work of burning in the picture is next. First go over the main outlines, keeping the strokes uniform. Then fill in the lighter detail lines and finish by shading various parts of the pic-





ture and burning in the background. For backgrounds a variety of effects can be obtained. As a rule it is best to make the backgrounds dark, using the flat side of the pen and burning rather deeply.

You can now proceed to decorate ready-made articles on which the pictures are stamped, and be reasonably certain that you will not spoil the work due to lack of ability in handling the pen. The beauty of these burnt etchings can be further embellished by coloring and shellacking, or waxing. Water colors may be used to give realistic touches to flowers and leaves. Soft tints are generally preferable to strong colors. A soft camel's-hair brush is used to apply them. When the color has thoroughly dried, a coat of white shellac is applied, and after twelve hours a second coat, sanding very lightly just before applying the latter. In this way you can give the work a beautiful luster. For a soft satin finish, it is best to use floor-polishing wax instead of shellac. The wax comes either in paste or liquid form and

is applied evenly with a piece of cheesecloth. When the wax is dry, the surface is rubbed briskly with another cloth.

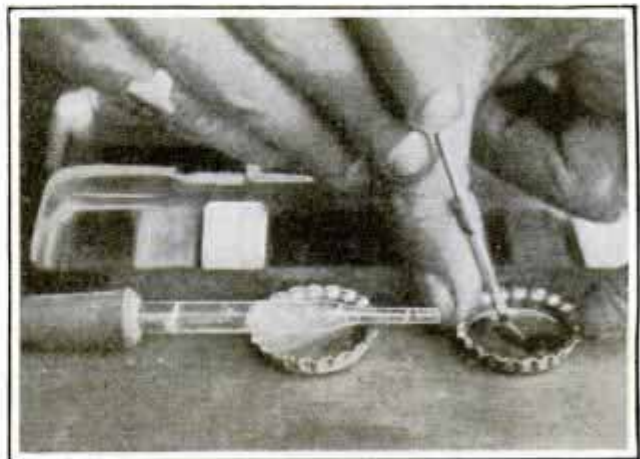
When working on basswood veneer, another pleasing effect can be obtained by recessing the background, which is done by removing the surface ply. First cut carefully along the edges of the background with a sharp carving tool having a beveled edge, after which a straight-edge tool is used to break out narrow pieces running with the grain. If the outlining cuts made first go through the first ply the wood will not break past the cut. After the top ply has been entirely removed, scrape the recessed portion smooth and then proceed to burn it to a suitable background shade. Finish is obtained by applying shellac or wax over the entire surface, as already described.

Cleaning Old Furniture

Old furniture that has become dirty or discolored may be greatly improved in appearance by cleaning it with a solution made by thoroughly shaking together equal quantities of vinegar, sweet oil and turpentine. The solution is applied by rubbing it vigorously on the work with a soft cloth. The polish should be shaken before using to assure an even mixture.

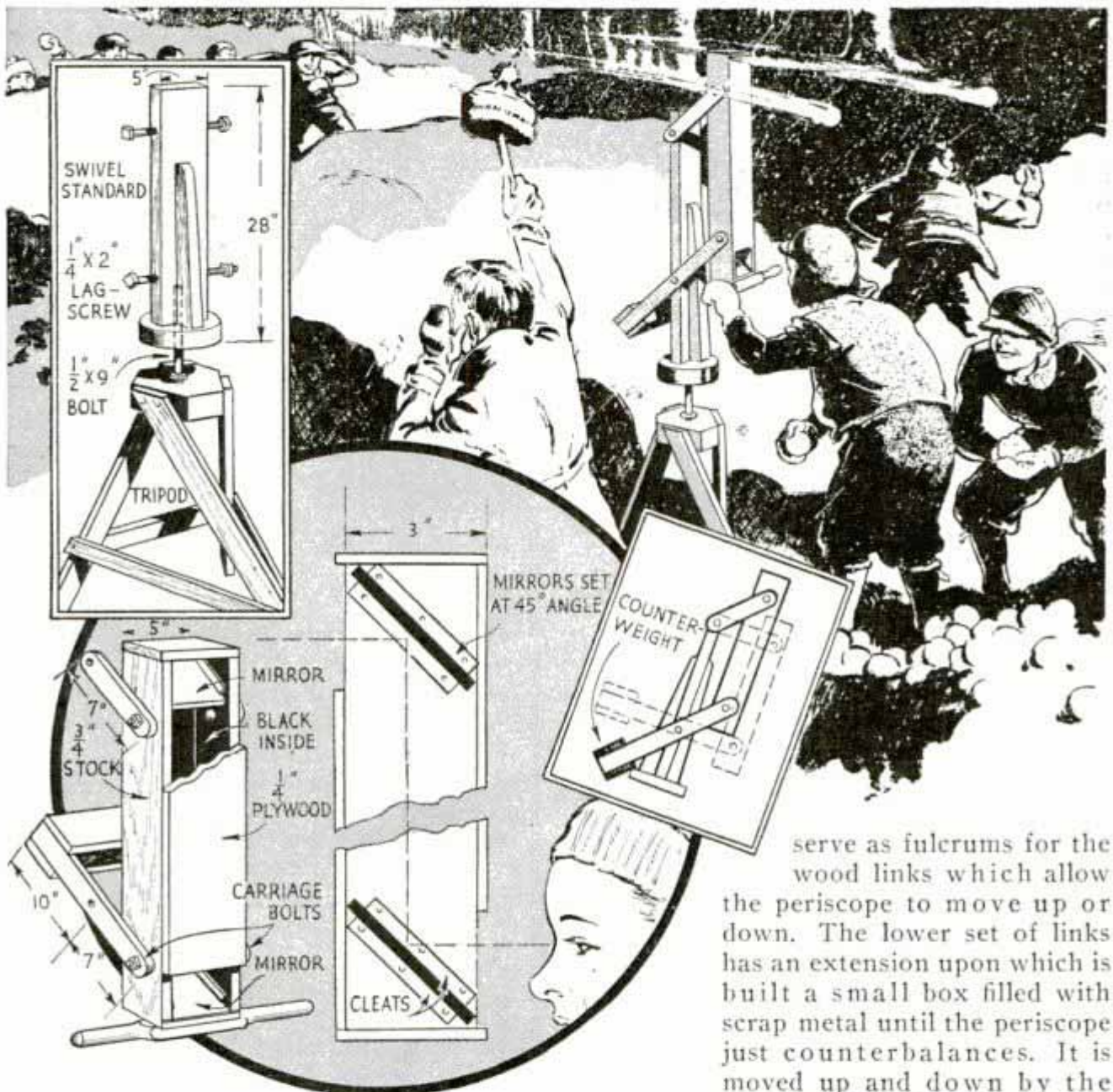
Water Colors Mixed in Bottle Caps

Bottle caps will be found excellent containers in which to mix small amounts of water colors. Remove the thin corks inside the caps and clean the metal. An eye dropper will be found convenient for adding just the right amount of water.



Bottle Caps with the Corks Removed Make Good Containers for Mixing Water Colors

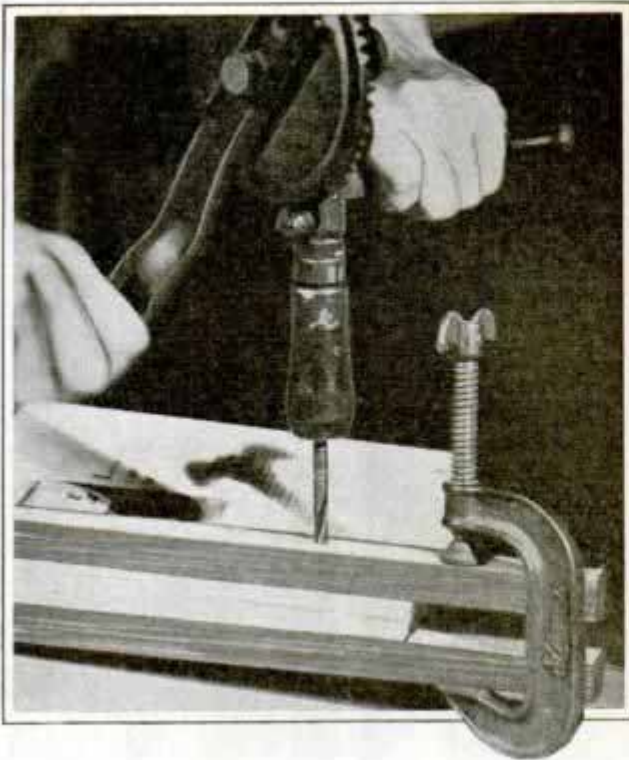
A Disappearing Periscope for the Snow Fort



This disappearing periscope will improve your snow-fight strategy and provide a lot of fun in hide-and-seek and other games. It is simply built, and mounted on a light tripod which supports a swivel standard. First get two mirrors, about 3 by 5 in., and build the periscope box to fit them. Sides of the box are made up of $\frac{3}{4}$ -in. wood while the front, back and ends are of thinner stuff, such as $\frac{1}{4}$ -in. plywood. Before assembling the box, install cleats, as shown, at exactly 45° angles. The inside of the box should be painted a dull black. Put the mirrors between the cleats and complete the box after having inserted the carriage bolts, heads inside, that

serve as fulcrums for the wood links which allow the periscope to move up or down. The lower set of links has an extension upon which is built a small box filled with scrap metal until the periscope just counterbalances. It is moved up and down by the hand grips, which also serve to turn it from one side to another. In the swivel standard bore a $\frac{1}{2}$ -in. hole about 6 in. deep for the swivel bolt, which is about 9 in. long with the head cut off. It should turn in the triangular piece in the top of the tripod. A nut is screwed on the bottom end. The periscope box should be painted an inconspicuous color in order to harmonize with the surroundings, such as white for snow, and green when it is to be used in foliage.

☛ A little lard or butter rubbed over the edge of the mouth or spout of a cream pitcher will prevent the cream from adhering to it and dripping on the tablecloth.



Holes Drilled through a Stack of Paper by First Clamping It Tightly Together

Drilling Holes through Paper

Holes are easily drilled through several thicknesses of paper if they are first placed between two wood blocks and clamped tightly together by means of a C-clamp. A hole in the top block to guide the drill is, of course, necessary.

Making Printed Pictures Resemble Oil Paintings

Printed or lithographed pictures can be made to resemble oil paintings by the following process: Take a piece of medium-weight canvas slightly larger than the picture to be treated, wet it thoroughly and then wring it as dry as possible. Place the picture face up on a smooth, flat surface, preferably wood that has been covered with two or three thicknesses of bed sheeting or similar cloth. Then spread the damp canvas over the picture, smoothing out all wrinkles, and press it heavily with a hot iron. This will force the weave of the cloth into the surface of the picture and give it the appearance of canvas. When the picture is thoroughly dry, mount it on stiff cardboard with thin mucilage and roll out all the bubbles and wrinkles with a round, unlettered bottle. Allow the picture to dry and then give the face a thin coating of clear varnish. This will bring

out both the coloring and the indentations made by the canvas. If done properly, it will take very close inspection to distinguish the picture from an oil painting.—L. S. Chester, Cleveland, Ohio.

Electric Baby-Bottle Warmer Heated by Car Battery

Plugged into a socket mounted on the instrument board of your car, this improvised electric heater will warm milk for the baby in six to eight minutes. Two aluminum cups, the inner one of which is of a size to take the bottle snugly, form the main part of the warmer. The outside of the inner cup is insulated with a piece of mica or thin sheet of asbestos over which $3\frac{1}{4}$ ft. of No. 18 nichrome wire is wrapped to form a heating element, spacing the turns evenly. A second layer of asbestos over the wire insulates it from the outer cup. Lampcord is then twisted on the ends of the coil and the connections are insulated by wrapping asbestos around them. A hole through the outside cup, fitted with a porcelain bushing, takes the cord. Loose asbestos makes an excellent heat jacket between the cups. The top is sealed by packing lead foil over the asbestos and running hot solder around the groove, being careful that none of it



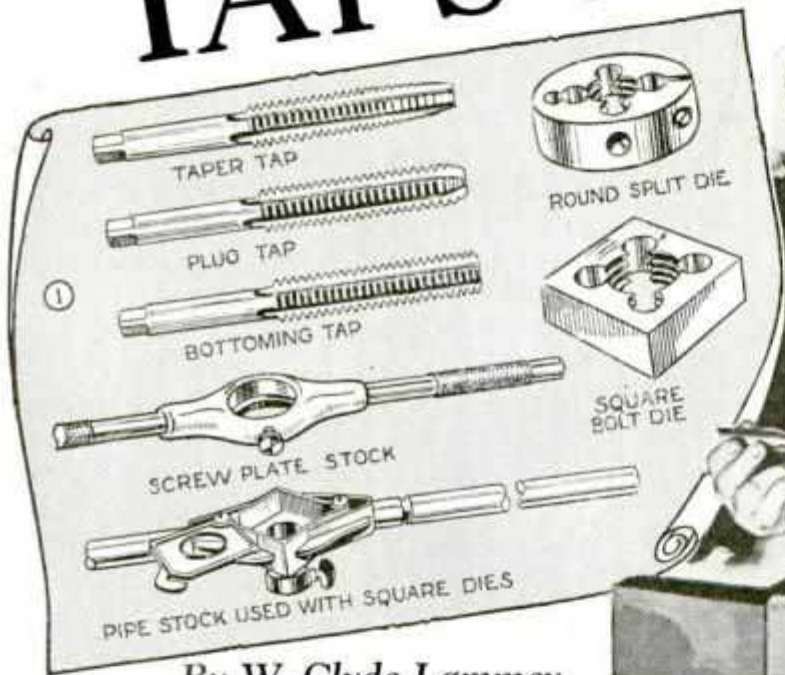
Electric Milk Heater for the Auto Is a Great Convenience When Making Long Trips

touches the wires. The lampcord has a plug that will fit a double-contact socket installed in the instrument board.—J. P. Kennedy, South Bend, Ind.

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Working with TAPS and DIES



By W. Clyde Lammey



SUCCESSFUL threading and tapping with the hand tools is not so much a matter of skill as it is of method. First of all, both taps and dies should be regarded as cutting tools. Yet the cutting action differs with the kind of metal, the lubricant used and the manner of handling the tool. Individually, the cutting edges of a die have the same action on the metal as a lathe threading tool. With the latter, however, the thread is formed by several passes of the tool, whereas the hand die must form the complete thread in one operation. Error in hand threading is frequently due to the difficulty in starting a tap or die, and the fact that the cutting speed is not uniform.

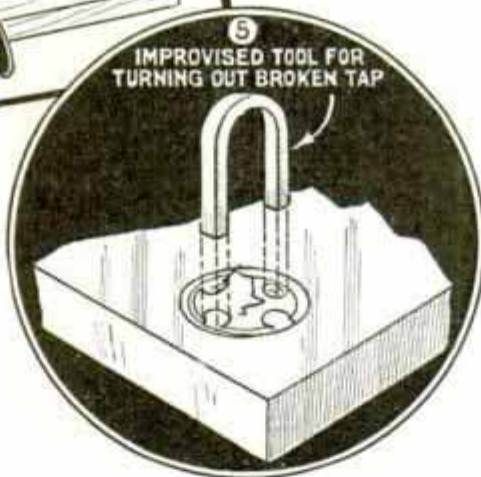
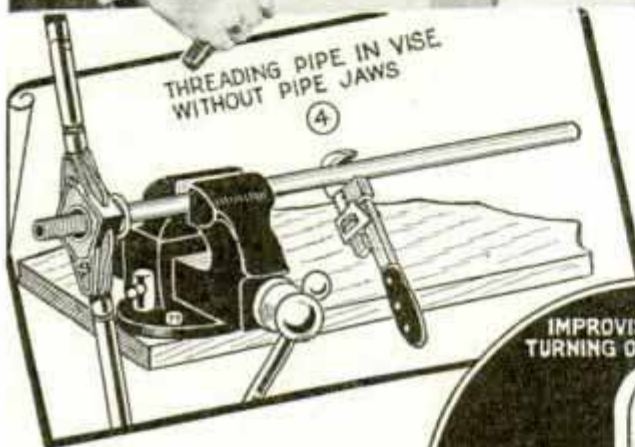
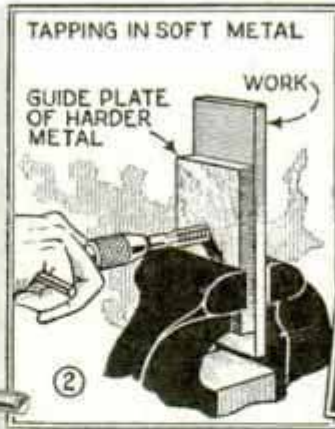
When taps and dies are used on common materials such as mild steel, drill rod,

cast iron, brass and bronze, the chips are lifted clear of the stock and break away clean. On these materials the tool can be turned down the distance required in one direction only, without backing off to clear the chips. On malleable stock it is necessary to back the tool a quarter turn at least once every revolution in order to cut off the chips, which do not break away but tend to roll and clog the cutters, causing breakage of the tool if it is forced. On aluminum and copper it is necessary to back a tap or die at least a quarter turn for each half revolution. Aluminum chips have a tendency to stick to the individual cutters and form in a solid, shapeless mass ahead of the cutters. If the chips are allowed to collect the thread will be ruined, due to the softness of the metal.

Taps and screw boxes.

1 of 11/14/35

222 S. Jefferson, Chicago. Have eyes when working.



Proper lubrication of the work while tapping or threading is important. Lard oil greatly eases the die or tap in mild steel and bronze. Turpentine as a lubricant results in a clean thread and less cutting strain when threading drill rod, while kerosene is effective in the same way for cutting malleable iron and aluminum. Threads in brass and cast iron are always cut or tapped dry.

Fig. 1 shows three types of taps made for use with a hand tap wrench. The first, known as the taper tap, is the most common and is intended only for tapping through holes in flat stock. Plug and bottoming taps are not so common in the individual tool kit but are easily obtained and are essential for running a thread to a given depth in drilled holes which do not pass entirely through the stock. The bottoming tap is used for running a full thread to the bottom of a drilled hole of limited depth. The taper tap is run in first

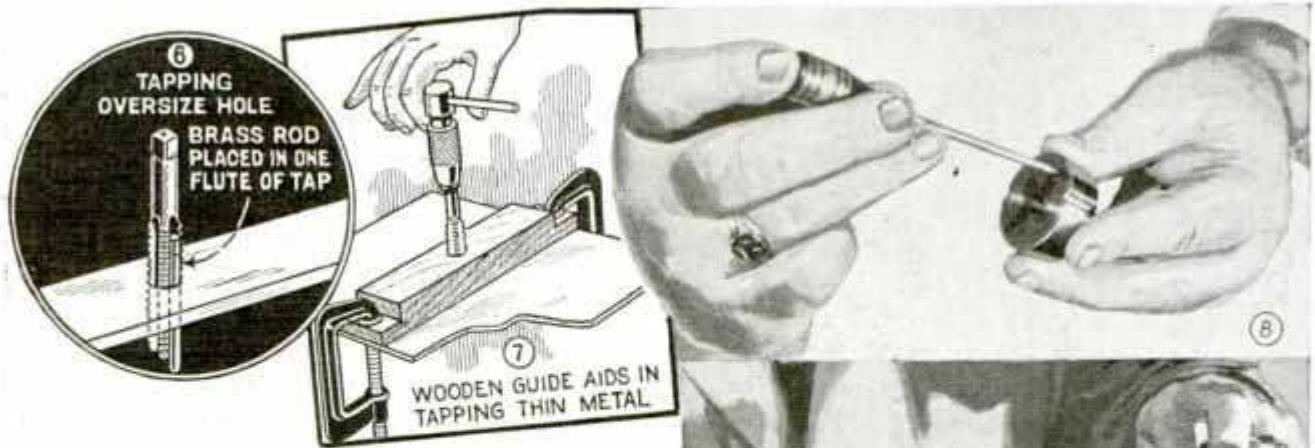
to start the threads, which act as a guide for the bottoming tap. Care is necessary when tapping stopped holes in any kind of material. It is best practice to run the tap only halfway in, then back it out and clear out the chips before finishing. If the tap is forced in a stopped hole it is practically certain to be broken. Always use a tap wrench which is especially made for the purpose. Grasp the wrench in both hands

and apply an equal pressure to the handles in a free, easy motion to avoid jerking or sidewise stress. Make sure before drilling holes to be tapped that you are using a drill of the correct size. Tap drill sizes are given in both numbers and fractions of an inch and charts which give this information are available at almost any hardware store.

The common types of dies and die stocks are also shown in Fig. 1. The square bolt die is non-adjustable and is used chiefly in rough work where close adjustment is unnecessary. The square die is made in a considerable range of sizes and standard threads and is held in a stock like that shown in the lower detail. The round split die is the more commonly used. It is adjustable to slight variations in pitch diameters by turning a setscrew, Fig. 8, and is held in what is generally known as a screwplate stock. The die sizes in this type run from the so-called button die to the larger sizes including those 1 in. in diameter, the designation being given in fractions of an inch for the larger sizes and the number of

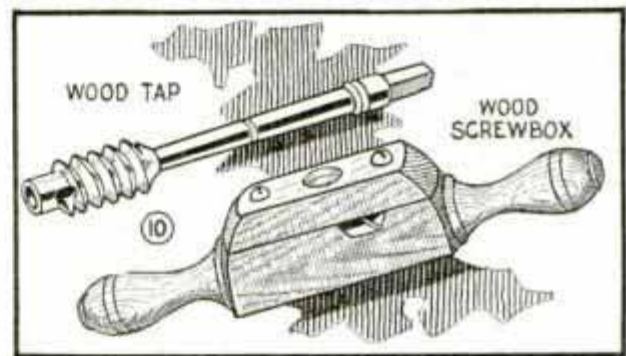
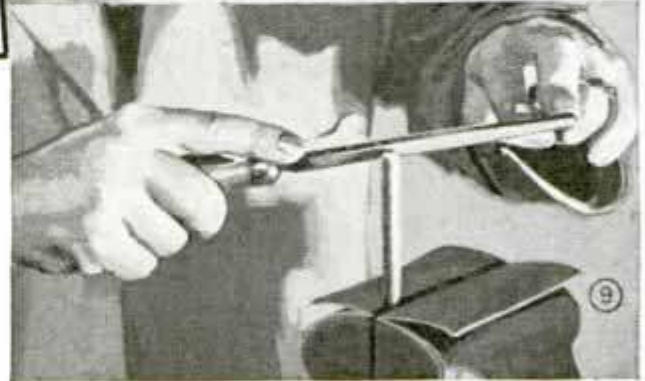
Handwritten notes in the left margin:
 1. Taper tap
 2. Plug tap
 3. Bottoming tap
 4. Square die
 5. Round split die

Handwritten notes at the bottom:
 1. Taper tap
 2. Plug tap
 3. Bottoming tap
 4. Square die
 5. Round split die



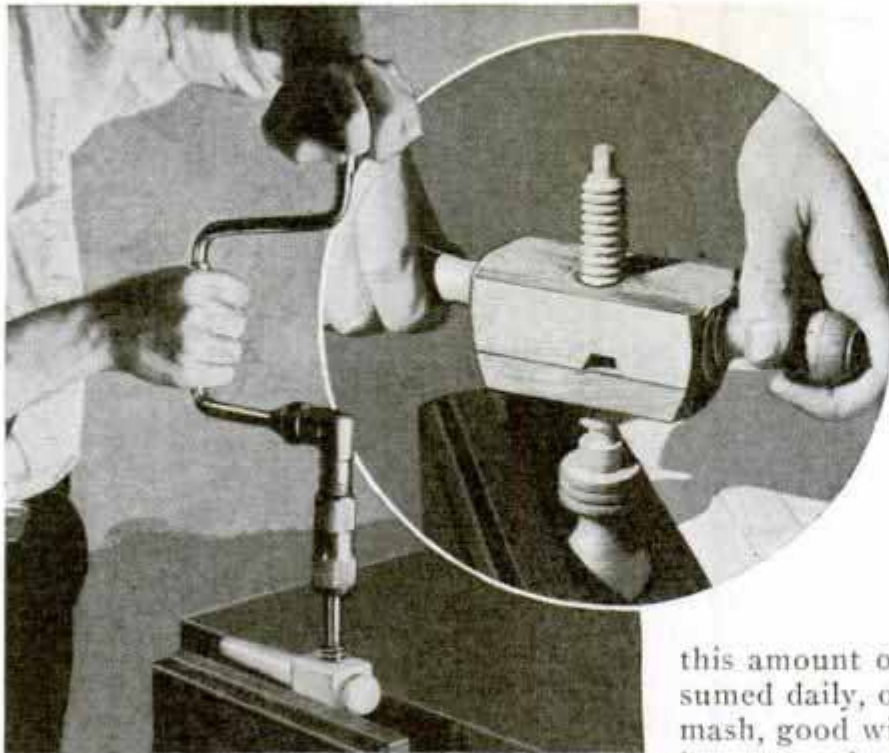
threads per inch in the smaller sizes, such as No. 6-32, 10-24 and so on. Most threads of hand pipe dies used at the present time are collapsible, that is, the die may be released and lifted clear of the work when the required length of thread has been cut. Once set, this type of die will remain in adjustment for any given diameter of work within its capacity. It is fitted with guide collars which insure an accurate thread if the tool is properly used.

Ends of rods, tubing and small pipe should always be slightly beveled with a file before starting the die, Fig. 9. Ends of rods that are bent or flattened should either be cut off or filed into round before threading. The same is true of a rod that has been upset by striking the end with a hammer. The work should be held in a vise in the vertical position if possible, as the chips will clear more readily. Any tendency of thin tubing to bulge out of round under pressure of the die may be overcome by plugging the open end with a short length of wooden dowel. Starting a die accurately on work $\frac{1}{4}$ in. or more in diameter is comparatively easy, but smaller sizes are likely to offer some difficulty. One simple method that will assure an accurate thread is detailed in Fig. 3. The die is fastened in a hardwood block which is clamped to the drillpress table with the die centering under the spindle. The rod is then tightened in the chuck, the spindle is lowered and the chuck is turned by hand to start the thread. For essentially the same reasons it is difficult to start a tap in thin soft metal such as aluminum. Fig. 2 shows a method of tapping a soft sheet by using a guide plate of harder metal. A tap hole is drilled through both pieces while the work is clamped in a vise, and the tap is started in the guide plate. A



piece of hardwood may also be used as a jig for tapping thin sheet as shown in Fig. 7. Occasionally it is necessary to thread a length of pipe when no suitable pipe vise is at hand. This may be done as in Fig. 4, using an ordinary pipe wrench to prevent the work from turning. When it is necessary to tap a hole that is larger than any tap size available it is possible to cut the thread with an undersize tap, using the method shown in Fig. 6. A short piece of wire is placed in one flute of the tap body. The wire rides on top of the thread and forces the tap to one side. Although the resulting thread will not be perfect, it will serve in an emergency. Fig. 5 shows a simple method of removing a tap that has been broken while threading.

Threads are easily cut in hardwood with the tool shown in Fig. 10, which is generally known as a screwbox. The tap differs from that used in metal in that it has only one cutter and the chips pass through a hole into the body of the tool, which is



Left, Wood Tap Held in a Brace; Right, Screwbox for Threading Wooden Rods and Spindles

hollow. When tapping hardwood, clamp two small blocks to the pieces to be threaded, one on each side, and bore the tap hole through all three. Plug one open end of the hole with a cork and fill with a half and half solution of turpentine and raw linseed oil. Allow to stand for an hour after which the hole may be tapped easily. If the part is to be stained the oil cannot be used. In its place a liberal coating of beeswax or ordinary soap on the inside of the hole will ease the tap and aid in forming a clean thread. When cutting threads on cylindrical stock with the screwbox, wrap the portion to be threaded with several thicknesses of cloth and soak for an hour or more with the solution raw linseed oil and turpentine. Keep the tap and screwbox clean and free from rust. This also applies to the metal-working taps and dies. Wash them frequently in gasoline to remove metal chips and dirt and keep them oiled to prevent rusting.

Winter Mash for Laying Hens

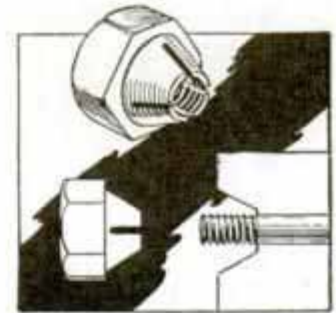
Recommended by the Nebraska College of Agriculture, the following dry-mash mixture will give good results in increasing the egg production of most poultry flocks during the winter: Yellow corn meal, 400 lb., ground oats, 250 lb., ground

wheat, 200 lb., and meat meal, 150 lb. Pulverized salt, 1 lb., should be added to each 100 lb. of the mash. Mix thoroughly and keep the mash before the hens at all times. When skimmed milk is available it may be used to supplement the grain ration, taking the place of both the meat meal and the water. Three or more gallons of skimmed milk daily is needed to meet the requirements of 100 hens when ordinary grain rations are used. Unless

this amount of milk is available and consumed daily, or meat meal is added to the mash, good winter egg production cannot be expected.

Self-Locking Nut Is Vibration Proof

If you have a machine on which it is impossible to keep some of the nuts from loosening because of vibration, try this trick. Turn a taper on the bottom of the nut and then slot it on four sides as shown. Next countersink the surface of the machine around the threaded end of the bolt to receive the tapered end of the nut and drive it up tightly.—C. W. Hinman, Vilal Park, Ill.



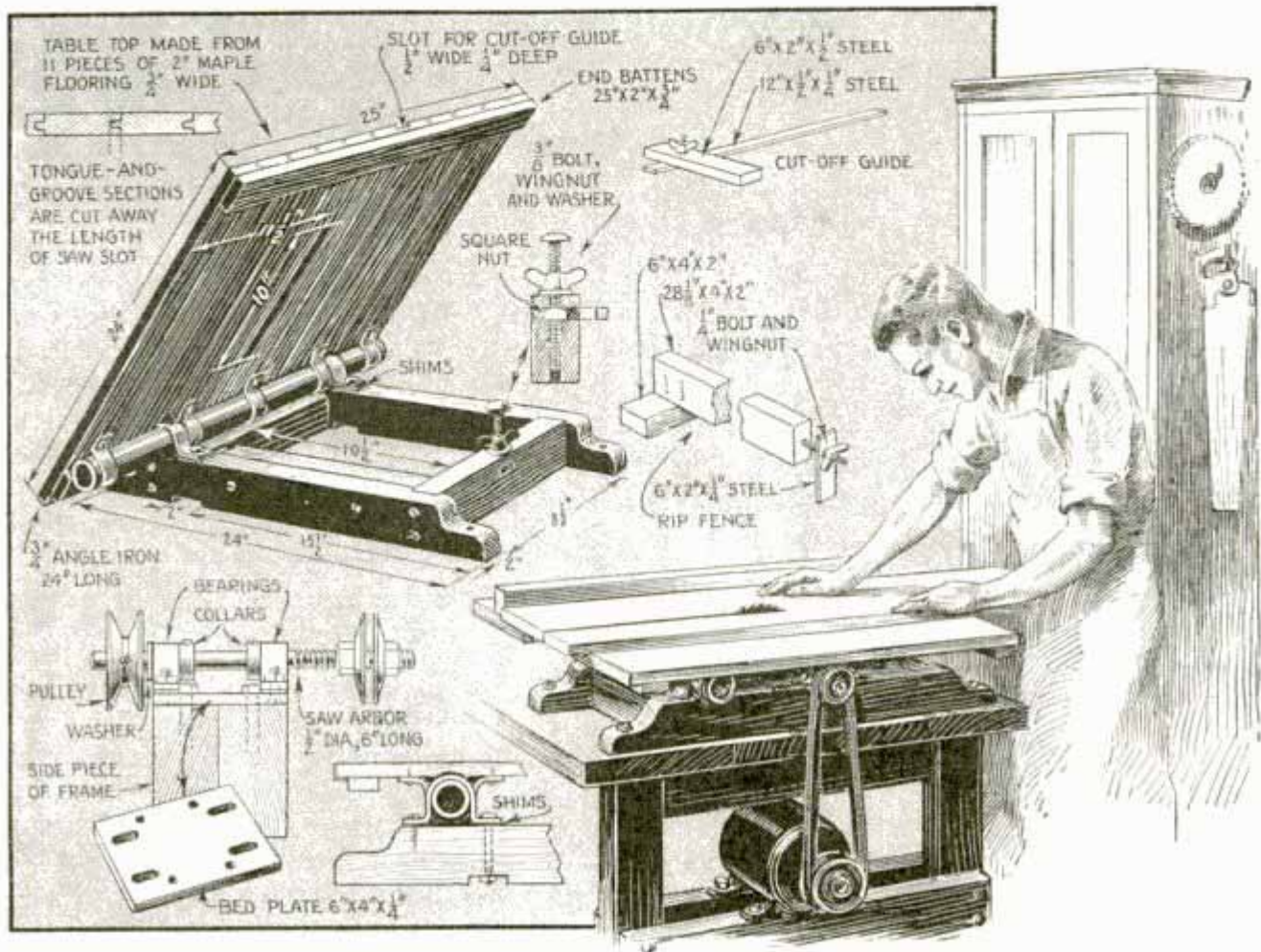
Washer Aids in Removing Thumbtacks



To facilitate the removal of thumbtacks from a drawing board, put a cardboard washer under the head of each one. This makes it easy to grip the tack with the finger nails.

The washer also holds the paper more firmly and prevents the tack head from leaving rings on the drawing paper.—John E. Serafin, Chicago.

Sturdy Hardwood Saw Table Is Adjustable

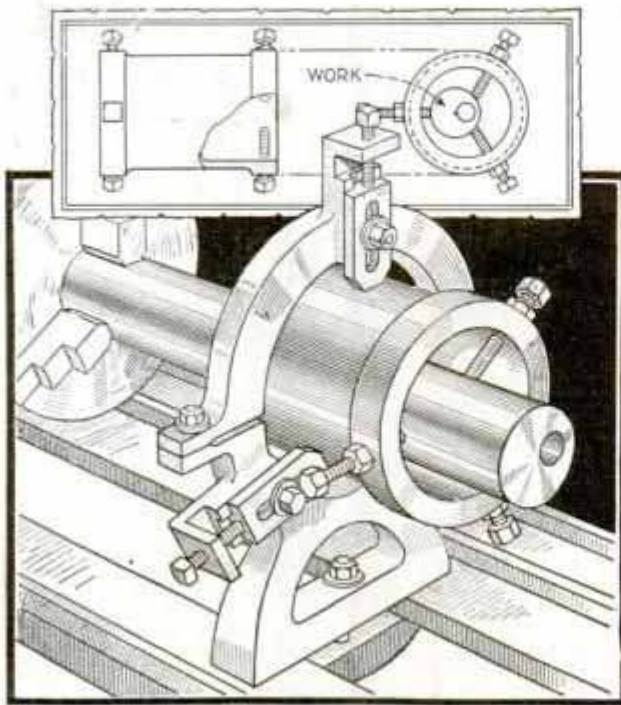


This sturdy, adjustable saw table can be built with common hand tools at a small cost. The bed frame is built up from yellow pine, the side rails being mortised to receive the crosspieces, which are glued and screwed in place to obtain the necessary rigidity. The crosspiece under the metal tube that serves as a table hinge, is only $2\frac{3}{4}$ in. deep in order to provide sufficient clearance for the straps that hold the tube. Notches are cut in the side rails about 1 in. deep, as seats for the tube. The table proper is made up of 2-in. strips of $\frac{3}{4}$ by 24-in. maple flooring, two pieces of the same stock being used as cleats across the ends. An accurate saw slot is made by simply cutting away the tongue-and-groove portions from adjoining pieces. The groove for the cut-off guide is made by cutting off the two top lips of adjoining grooved edges, the strips being placed in reverse position at this point. A piece of $\frac{3}{4}$ -in. angle iron is provided along the edge of the table to provide a bearing edge for the T-head of the ripping fence. The

straps that hold the table and frame to the tube are made from pieces of $\frac{1}{8}$ by $\frac{3}{4}$ -in. flat iron, cut to suitable length and formed around the tube while red hot. Those fastened to the bed are held with $\frac{1}{4}$ -in. bolts, the nuts coming flush with the underside of the rails. The notches for the nuts should be wide enough to permit turning them with a wrench. When finished, the saw table is bolted to a bench directly over a suitable saw mounting. One method of mounting the saw is shown in the lower left-hand detail. In this case the entire assembly is placed inside of the saw-table frame, and is bolted to the bench top. In other installations it may be found advisable to extend the saw arbor so that the pulley will be outside the frame, as shown in the right-hand detail. Careful alinement of the saw and the table slot is necessary.

Ⓞ Rivets should be cut off before being inserted into place, so that just enough metal is available for proper riveting.

Some Unusual Metal-Turning Suggestions



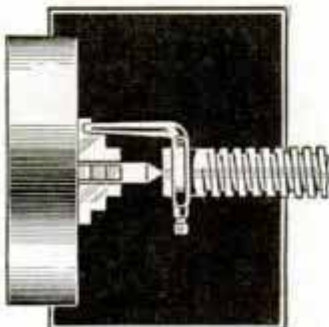
Steel Bushing in Lathe Steadyrest Supports Long Work for Boring Eccentric Holes

Boring Eccentric Holes in Long Shafts

When it is necessary to bore a true eccentric hole in the end of a short shaft, the work can be done in a lathe by chucking it in an independent chuck, then offsetting the jaws until the desired results are obtained. For long shafts, a steadyrest must be used to support the free end of the shaft. To offset the work at the steadyrest, an offsetting collar can easily be made. In use, it is slipped over the work and the steadyrest is adjusted so that the outside of the collar will run true with the center of the lathe, after which the adjusting screws are locked.

Work Mounted between Lathe Centers without Removing Chuck

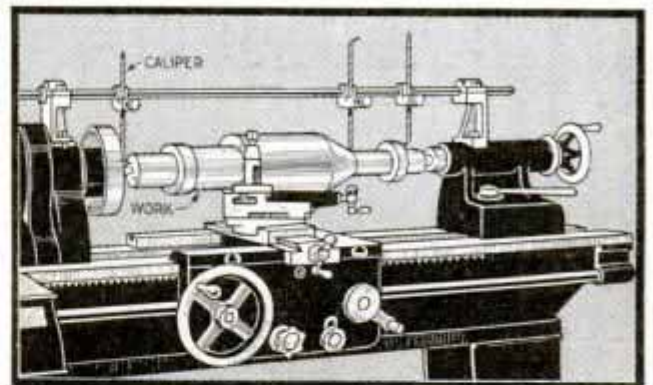
To eliminate removing heavy lathe chucks to turn a job between centers, the workmen in one factory leave the chucks in place and grip live centers, made from 1-in. drill rod, in them. It is but a short job to grip the rod in the chuck, swing the



compound rest around, and turn a standard 60° center. This idea also proved to be an aid in chasing multiple threads on work held between centers. To chase a double thread, using the improvised center gripped in a four-jaw chuck, the lathe dog is driven first by No. 1 jaw, after which the work is removed and is replaced so that No. 3 jaw drives the dog. With a quadruple thread, all four jaws are successively engaged, starting with No. 1 jaw. A triple thread can be chased in the same way by using a common three-jaw chuck. The spacing of the chuck jaws will be found accurate enough for average work.—Arthur F. Parker, Ann Arbor, Mich.

Device Takes Horizontal Measurements on a Lathe

In turning shoulders on long work in a lathe, three scales should be used if there is a large variation in the diameters of the work. The device shown was used for this purpose in a large machine shop. An iron rod supported in two brackets parallel to the center line of the lathe carries three sharp pointed rods such as surface-gauge pointers, which are held in steel blocks



Pointers Mounted on Horizontal Rod Measure Diameters in Turning Shoulders on Work in a Lathe

drilled and fitted with knurled thumb-screws. If desired, any one of the pointers may be moved out of the way without disturbing the others. Collars fitted with setscrews prevent any lateral movement of the legs. To set the pointers, a scale is laid on the ways of the lathe, the horizontal rod is removed from the brackets and the legs are set to the proper dimensions.—Chas. Kugler, Philadelphia, Pa.

Speedy Method of Tapping Blind Holes

When tapping a number of blind holes, and after breaking several taps, the idea of filling the hole with lard oil before starting to cut the threads was tried and found successful. In addition to lubricating the tap, the oil, being displaced by the tap entering the hole, carried along with it most of the chips, allowing a free cut practically to the bottom of the hole. Cold lard oil is best for this purpose. Although this method works well with any size tap, it will be found particularly valuable when a number of small holes are to be tapped.

"Cellophane" Preserves Leaves and Other Botanical Specimens

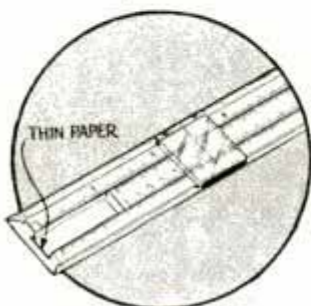
To aid his students in gaining the most from their botanical studies, one teacher directed the preservation of leaves and blossoms in note books as shown. With library paste, each specimen was attached to the page and was covered with Cellophane, which was sealed around the edges with gummed paper tape. The tape and Cellophane exclude air so that the specimen will be preserved in good condition for a much longer period of time than if it were completely exposed.



Adjusting Tension on Worn Slide Rule

Slide rules that have become worn and have no mechanical provision for taking up the wear, can be satisfactorily adjusted in the following manner: Remove the slide and glue a strip of very thin paper in the bottom of the groove, as shown. The paper should extend the entire length of the rule, otherwise the slide may catch on

the end of the strip when replaced. Use the glue sparingly and spread it out in a very thin coat. Be sure the glue is thoroughly dry before it is replaced in the slide.



Counterweighted Tray on Drawing Board Holds Ink and Instruments in Vertical Position

Weighted Trap on Drawing Board Keeps Ink Bottle from Tipping

Hinged to the lower edge of a drawing board, this counterweighted tray for pencils, ink bottle and drawing instruments remains level regardless of the angle of the board. The weight is a piece of lead or iron drilled and tapped through the center to screw onto a threaded rod, which projects from the underside of the tray. This permits adjustment of the weight to balance the tray.—B. Paschen, Concepcion, Chile, S. A.

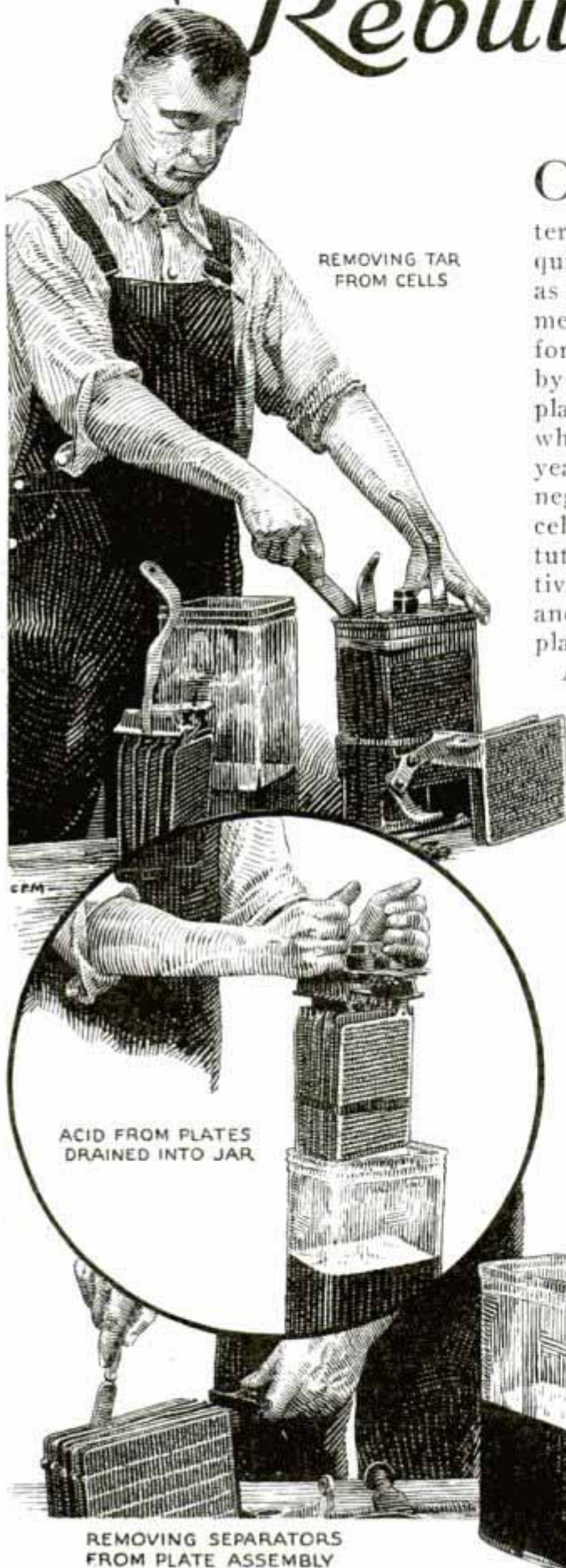
Ammonia Fumes Restore Color to Blue Litmus Paper

Many druggists find it almost impossible to keep blue litmus paper on hand, due to the fact that acid fumes from some preparations kept on their stock shelves cause the blue color to change to some shade of red. While this condition cannot be eliminated, the blue color can be restored to the paper by exposing it to ammonia fumes. This is best done by passing the paper over an uncorked bottle of ammonia at the time the sale is made. This method does not require wetting the paper and its appearance and usefulness will not be impaired in the least.—Erling P. Arnstad, Mandan, N. Dak.

☞ To close the sides of a used cotter pin, hold one of its legs on the edge of a vise and tap the head with a hammer.

Rebuilding Old

By RAYMOND BARKULOO



OWNERS of 32-volt electric-lighting plants can easily combine two old sets of batteries to make one good set, which will give quite satisfactory service, frequently as long as that given by the original set. The same method also applies to storage batteries used for other purposes. In rebuilding batteries by this method only the negative or grey plates are used. The positive or red plates, which crumble and fall to pieces after a few years of use, are discarded and replaced with negative plates taken from the extra set of cells. The negative plates, which are substituted for positives, are converted into effective positive plates by repeatedly charging and discharging the rebuilt battery as explained in detail at the end of this article.

After the battery jars have been cleaned outside to remove grease and dirt, the tops are freed from the jars by digging out the tar with a putty knife. The group of plates is next carefully lifted from the jar by the heavy lead connectors and is allowed to drain for a few minutes so that the acid may be saved. When working with batteries it is best to wear old woolen clothing, which is not attacked by battery acid. As the plates tend to dry out and then become difficult to charge, dismantle only two cells at a time and immediately assemble their parts into a new cell; or, when desired, all of the cells may be dismantled at the same time if the negative plates are kept under clean water until they are needed.

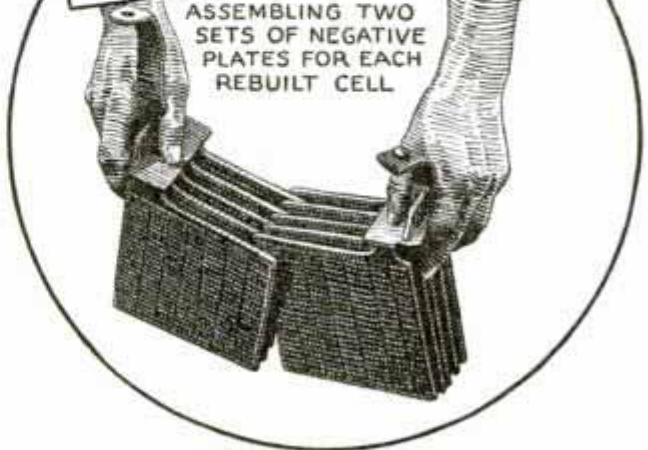
The well-rinsed plate assemblies are next laid on a table or board and a table knife is carefully passed between the plates and the wood separators to free them so that they may be removed without breaking. The separators are usually in such bad condition that only a few of them may be saved; however, they are inexpensive and it is advisable to purchase new ones from a local battery repair shop. If the old separators are

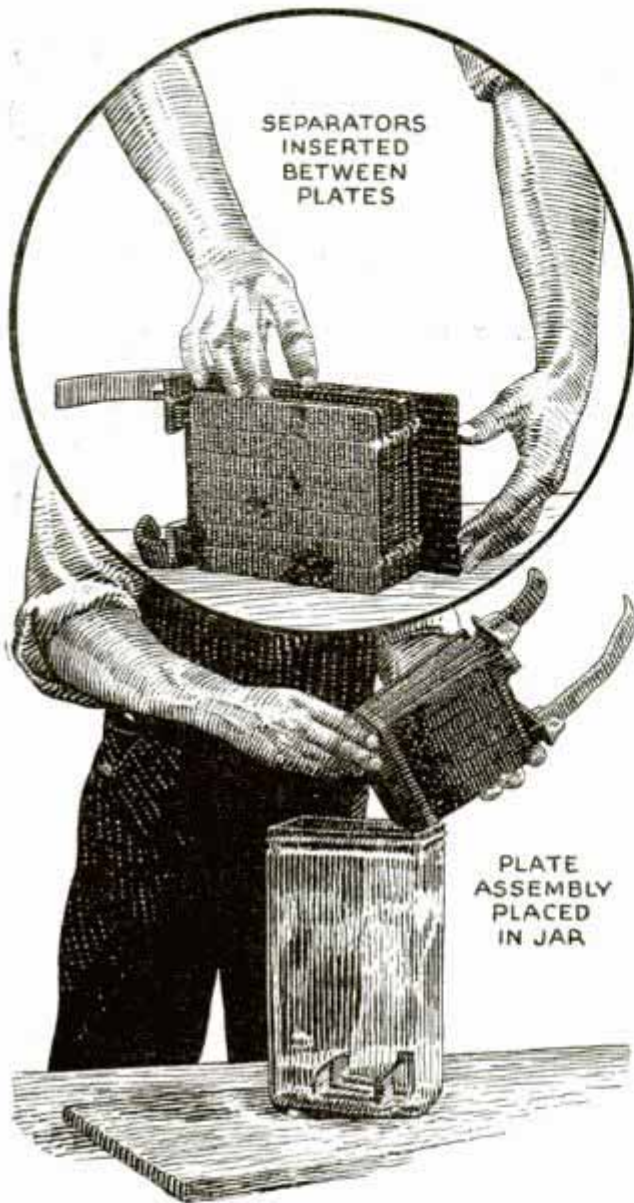
STORAGE BATTERIES

in good shape, the red lead peroxide from the deteriorated positive plates adhering to their surfaces may be removed by scraping with a knife. If the old separators are used they must be thoroughly washed and left under clean water until they are needed. Broken or damaged separators must not be used, as they will very likely cause the rebuilt battery to break down and be of little use.

After the deteriorated red positive plates have been removed and discarded, the group of negatives attached to the cross-piece and terminal is rinsed in clean water and straightened as shown. Boards of exactly the thickness of the space between the plates are used as spacers and extra boards are placed on the outside to prevent damage while pressing them straight with a clamp or vise. Should any of the plates break away from the support they should be lead-burned back into position. This work is best done by an experienced lead worker or battery repair man. It is not advisable for a person not accustomed to working with lead to attempt lead burning. The straightened plates are next assembled together in pairs after which separators are inserted between them. The separators should be soaked in water until they are pliable before being assembled. Before installing the separators, mark one set of plates which is to be made into positives, (it does not make any difference which set is chosen) and so place the separators that the ribbed side is in all cases next to a positive plate. When a separator has been installed between each plate the entire group is bound together with a heavy rubber band cut from an automobile inner tube. If another method of binding was used in the original batteries it may be better to follow that plan. This figure also shows the completed cell unit, with the cell cover replaced, being finally inspected before lowering it into a well-cleaned empty jar. Before lowering the cell into the jar, the terminal connected to the plates which are to be made into positives should be clearly marked with a plus sign to prevent a mistake when connect-

SEPARATORS ARE CLEANED AND WASHED



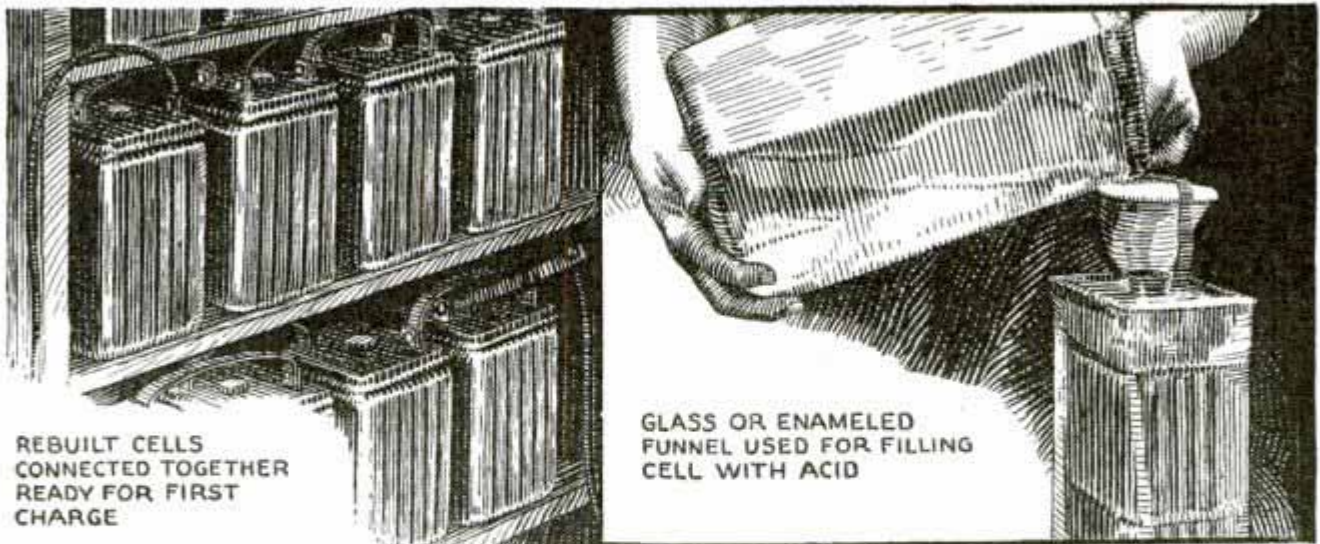


ing the cells for charging. The cells should be filled level with the tops of the plates with distilled water only, and about a half teacup of the old acid which has been allowed to settle added. The first several charges are made with this dilute acid because the old plates contain enough acid in chemical combination with the lead as lead sulphate to increase its strength.

The completed cells are now ready to be connected together and hooked up to the lighting plant as they were originally. Heavy lead strips are used for making the connections, being careful to connect the marked positive of the first cell to the negative of the following cell, etc. The remaining positive and negative should be connected to the lighting plant as they were originally, that is, the terminal marked positive should be connected to the positive terminal of the generator and the negative to the negative generator

terminal. If these leads were marked when the batteries were removed there will be no difficulty. In making all connections the lead should be scraped bright and clean and tightly clamped or bolted in place. If care is not used in making tight connections, heat will develop at the fault and cause trouble. The generator is next started and regulated so that the voltage is about normal for a heavy charge. The plant ammeter will show a much lower current at first than is usual; however, this is caused by the fact that dilute acid is being used. As the charge progresses the acid will become stronger and the current, as indicated by the plant ammeter, will increase. After an all-day charge the generator may be stopped and the batteries partly discharged by turning on the lights at night. The lights will probably not burn long before they dim. When lamp filaments start to look red instead of white the lights should be turned off to avoid completely discharging the batteries, and another charge should be made the following day. This procedure should be repeated ten or fifteen times to build up the batteries to full capacity. After several cycles of charge and discharge the batteries may store enough current to furnish light for two or three nights, but they should never be allowed to become completely discharged. The result of these repeated charges and discharges is the formation of positive plates. The sponge lead gradually changes to red peroxide of lead.

When the batteries have developed their full capacity, as indicated by free gassing of the cells at the end of two or three successive charges, and a long period of service before recharging is necessary, usually after about twelve charges, the batteries should be charged until the hydrometer readings, taken every fifteen minutes at about the end of the final charge, show no increase in reading in any cell, the generator may be stopped and the electrolyte dumped out of all of the cells. Fresh acid having a specific gravity reading with a battery-testing hydrometer of 1.25 should be made up, allowed to cool thoroughly and poured into the cells until the plates are completely covered. This standard battery acid is made by slowly adding pure concentrated sulphuric acid cautiously to the old well-settled electrolyte, if it is



REBUILT CELLS
CONNECTED TOGETHER
READY FOR FIRST
CHARGE

GLASS OR ENAMELED
FUNNEL USED FOR FILLING
CELL WITH ACID

clean and free from contamination. New acid can be made up by slowly and cautiously pouring 1 lb. of (C.P.) concentrated sulphuric acid of specific gravity of 1.84 into 2 pts. of distilled water. Do not pour the water into the acid. The strength of the diluted acid should be tested with a hydrometer after it has cooled and before it is poured into the cells. More acid is added to increase the specific gravity reading. The acid must be mixed in a glass or stoneware vessel and care should be taken to prevent its being spattered over clothing or on the skin, and particularly into the eyes. If acid of other strength is used

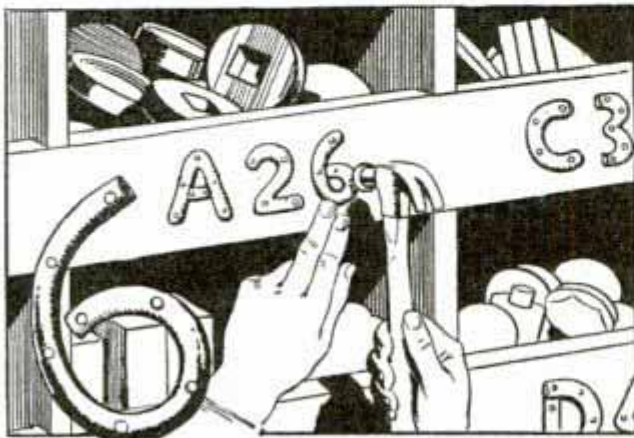
to make the electrolyte it should be carefully mixed, as explained above, and tested with a hydrometer until it is of the proper strength.

The batteries may now be put into regular service and looked after just like ordinary batteries. They should never be allowed to become totally discharged nor should they be left with a low charge for long periods of time. Distilled water should be added to the cells in sufficient quantity to cover the plates whenever it is low, due to evaporation. Unless a cell develops a leak, acid should never be added after the cells have been completed.

Wire Solder Makes Permanent Numbers for Stockroom Bins

In many factory and warehouse stockrooms where bins are provided with painted numbers to indicate their contents, the figures soon become soiled and illegible. To prevent this, one factory owner has the bins marked with numbers made from

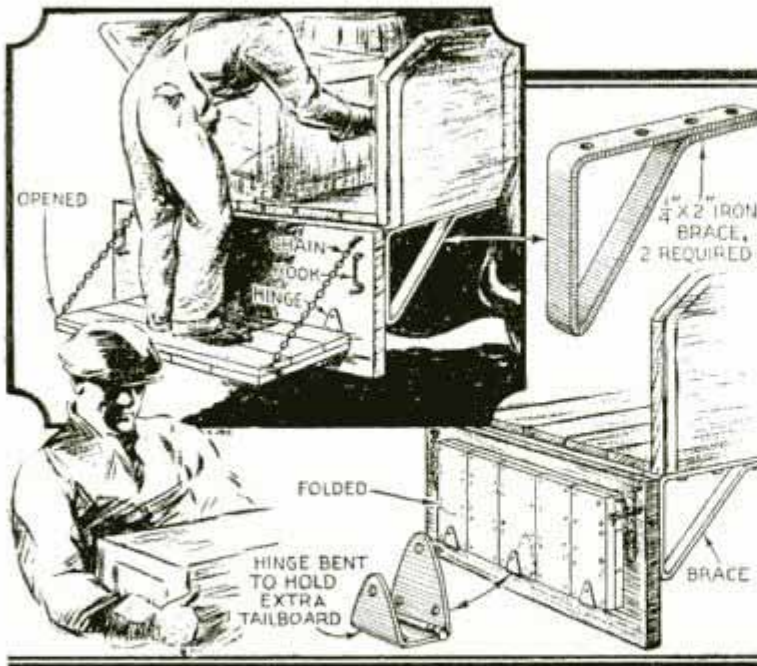
wire solder. The lengths of solder are easily bent to produce any desired letter or figure, and may be attached to the bins by means of small brads.



Letters and Figures Formed from Wire Solder Identify Bins in Factory Stockroom

Fixing Bath for Blueprints

A concentrated solution of peroxide of hydrogen mixed with water makes a good bath in which to fix blueprints. The proper mixture is peroxide of hydrogen, 1 or 2 oz., liquid measure, to a 4 by 5-ft. washing tank carrying a water level of about 4 in. The solution need not be drained off each day as it will be perfectly good as a fixing bath for two or three days. Its strength does not diminish but it must be drained off, due to sludge from the paper coating. Blueprints that have been fixed in this bath have a deep blue background and the lines are perfectly white. Also, it is unnecessary for the operator to use gloves.—L. H. Georger, Buffalo, N. Y.



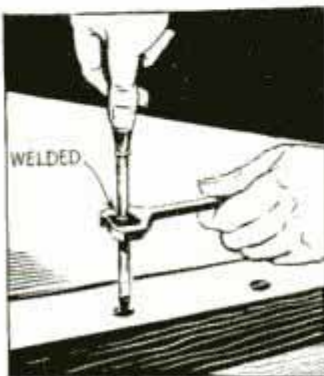
Folding Step Hinged to Truck Tailboard Makes the Load More Accessible to Worker

Hinged Step Aids in Loading Truck

Hinged inside the tailboard, this folding step greatly aids in loading or unloading boxes and barrels from a truck. The step is made up of two layers of 1-in. stock as shown. Three large hinges, bent to the shape shown to slip over the edge of the step, are used to attach it. Short lengths of stout chain attached to the tailboard support the outer edge of the step while a hook at each end holds it flat against the tailboard when not in use. A flat iron brace screwed to the underside of the truck body rests against the tailboard when it is folded down and prevents the assembly from swinging back when the weight is put on the step.

Nut Welded on Screwdriver Shank for Use with Wrench

Screws in auto-door hinges and other parts of a car are often so difficult to remove that a drill or punch is necessary to start them. By welding a nut on the shaft of the screwdriver, as shown, a wrench may be used to turn the tool effectively.—G. E. Hendrickson, Argyle, Wis.



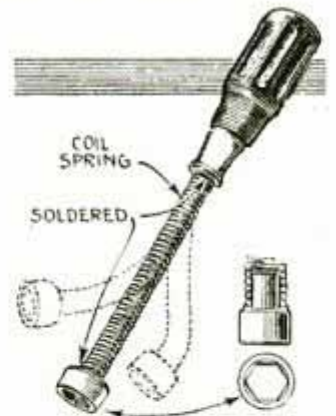
Inner Tubes Used as Mountings for Power and Hand Tools

Discarded inner tubes have been found valuable in different forms of tool mountings. One such case is where a standard honing tool of the floating type is used in connection with an electric drill for honing automobile cylinders. The drill is suspended above the motor block by means of an inner tube and the necessary up-and-down motion of the tool is easily given. All the operator need do is to pull downward and the tube automatically withdraws the hone from the work. Another interesting application of the tube is in felling trees with a crosscut saw, which usually requires the services of two men. A stake is driven

into the ground on one side of the tree and a piece of inner tube is fastened to the stake and to one end of the saw. With this arrangement, the operator pulls the saw toward him, and the tube returns it in the opposite direction.

Socket Wrench Has Flexible Shank

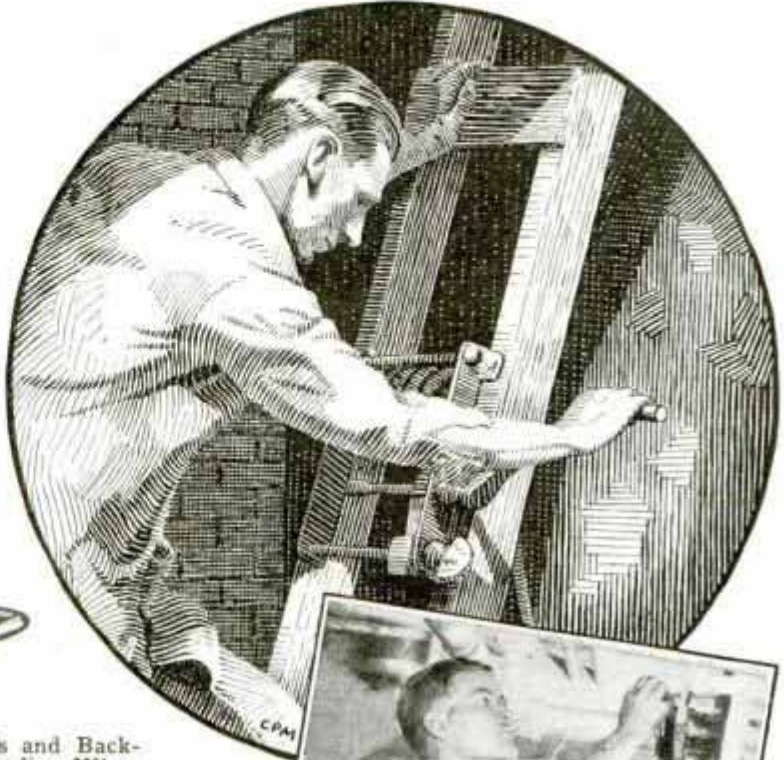
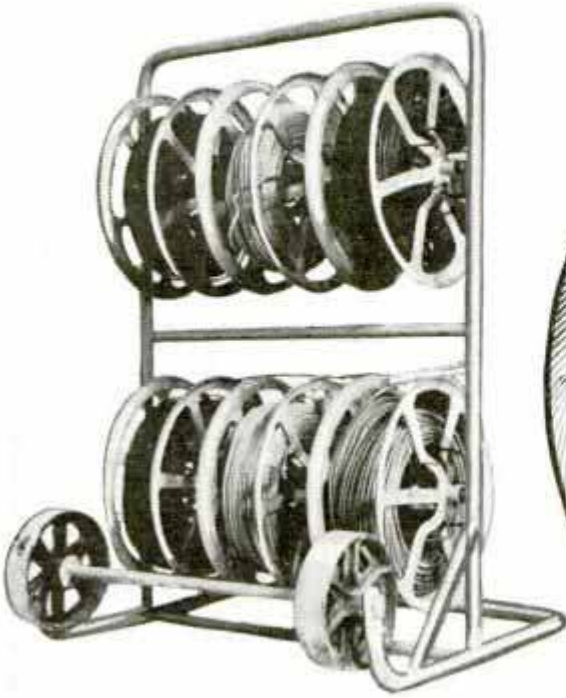
For light work in places that are hard to reach, this wrench has a flexible shank and can be made from a small socket wrench of the type commonly used in radio work. The socket end of the wrench is cut off and is soldered in the end of a heavy coil spring, the other end of which is soldered to the handle.



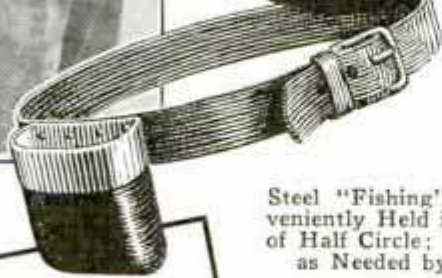
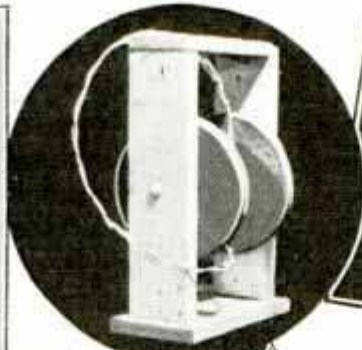
Preventing Tools from Rusting

When tools are stored for some time or are exposed to dampness, rust can be prevented by rubbing the bright surfaces with a good grade of furniture wax. Two coats of the wax are best. The first coat should be thoroughly dry before applying the second one. The wax is easily removed with a rag soaked in turpentine.

Serviceable Shortcuts to Aid the Electrician

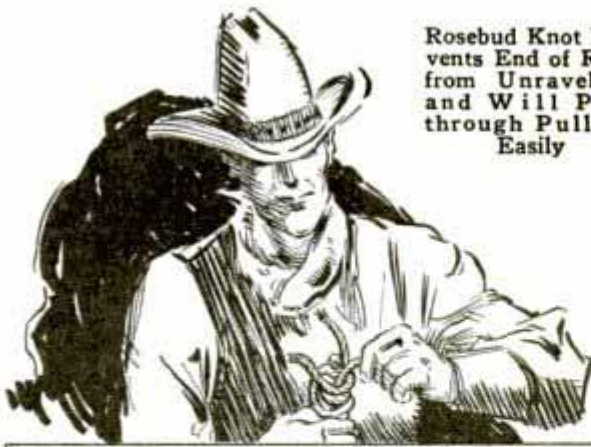


Above, Pipe Reel Holder, Fitted with Wheels and Back-lash Brake, Keeps Wire from Kinking and Tangling When Pulled through Conduit from Remote Point; Upper Right, Winch on Short Ladder Simplifies Job of Cable Pulling; Below, Leather Tool Holder Riveted to Belt Prevents Wear on Pockets; Center and Right, Small Reel Holder for Ladder Use When Dispensing Lampcord

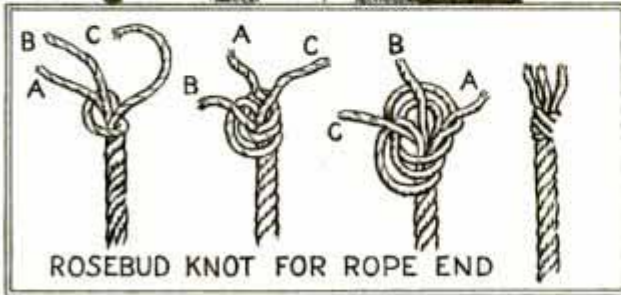


Steel "Fishing" Tape Can Be Conveniently Held in Pipe Bent to Form of Half Circle; the Tape Is Fed Out as Needed by Rotating the Coil





Rosebud Knot Prevents End of Rope from Unraveling and Will Pass through Pulleys Easily

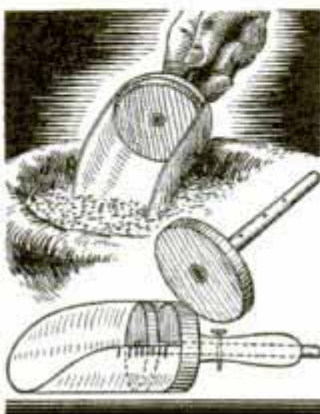


Rosebud Knot Keeps Rope End from Unraveling

Here is an easily made rosebud knot or crown for finishing a rope so that it will not unravel at the end. If made as shown and pulled up tightly and then rolled on the floor under the foot and again pulled up tightly, the knot will be scarcely larger than the original size of the rope. By carefully noting the position of the rope strand ends, A, B, and C, in the four details shown in the illustration, you can easily tie the knot.—I. W. Dickerson, Charles City, Ia.

Sliding Partition in Small Scoop Measures Feed

Dealers who sell small quantities of sugar, nuts, dry feeds, etc., will find that a sliding partition inside a small scoop will,



with a little practice, enable them to measure out exact quantities without making two or three trips to the scales. In fact, this idea enabled one dealer to be so accurate that the use of scales was unnecessary. The par-

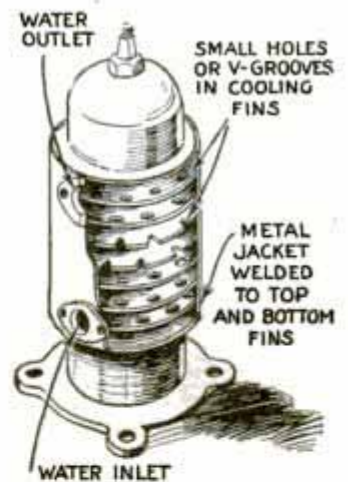
tion is a thin wood disk fastened to a short section of small pipe, which slides in a hole drilled lengthwise in the scoop handle. A scale on one edge of the scoop permits the disk to be quickly set for the quantity to be sold, the adjustment being held by a pin, inserted through a small hole in both handle and pipe. It is necessary to have several holes in the pipe corresponding to the divisions of the scale.

Preventing Paper from Sticking to Electrotypes

When printing from electrotypes that carry a great deal of ink, add a few drops of boiled oil to the ink and mix it well to prevent the paper from sticking to the form after the impression is made. The oil also eliminates some offsetting when the printed matter is placed in a pile before the press operator. The addition of the oil to the ink is especially helpful when running label work on plain or gummed paper.—H. C. Graves, Watertown, N. Y.

Small Air-Cooled Motor Converted to Water-Cooled Job

By brazing a copper jacket over the cooling fins of a small two-cycle air-cooled motor, you can convert it into a water-cooled job. First drill several holes through all of the fins except the top and bottom ones to permit circulation of water. The fins may be notched instead of drilled. Then braze $\frac{1}{2}$ -in. locknuts over holes cut through the jacket near the top and bottom edge for the inlet and outlet pipes. These nuts have standard pipe threads and couplings can be easily attached. Next, braze the jacket to the upper and lower fins and also the seam where the edges of the jacket meet.



Putty to be used for glazing should contain 10 per cent of white lead to withstand the weather.

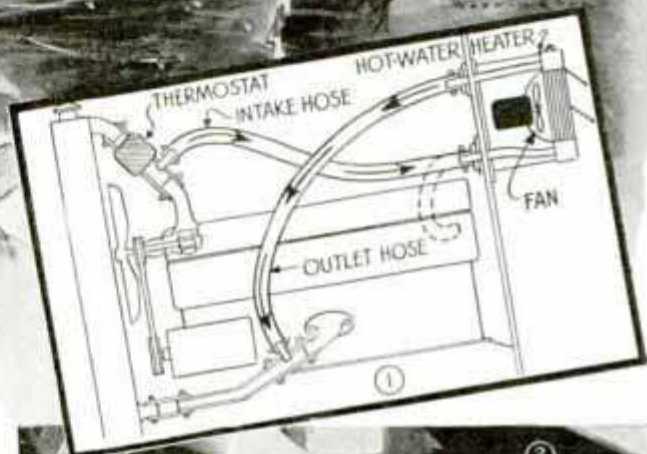
Getting the Most out of Your CAR HEATER



By JIM WARD

KEEPING comfortably warm inside a car on the coldest day is no problem with the modern hot-water heater, provided the car body is well insulated against cold drafts and the heater is operating at peak efficiency. Two methods of connecting a heater are shown in Fig. 1. It is fastened to the dash and the lower pipe is connected with a hose to either the upper radiator hose or to the temperature-gauge connection, as shown by the dotted lines, with a special adapter. Some manufacturers recommend that the hose be connected into the cylinder head directly over the valves, where the water is at the highest temperature and under the greatest pressure. The upper heater pipe is connected to the lower radiator hose. Regardless of the method used, a thermostat should be installed in the water system between the radiator and the inlet hose to stop water circulation until its temperature is at least 145° F. In this case, the thermostat is installed in the upper radiator hose, although some are available that replace the upper hose-connection casting in the cylinder head.

The temperature at which the thermostat opens is an important factor in the operation of a hot-water heater. The kind of anti-freeze solution used in the radiator



governs this to a certain extent. If alcohol is used, the temperature should not exceed 165° F. If the solution has a higher boiling point than alcohol, a thermostat opening at a temperature as high as 180 to 185° F. may be used. Temperatures above this are not advisable as the motor then runs too hot. Most late model cars come equipped with thermostats that open at about 140° F., which is hardly high enough for efficient heater operation. In this case, it is best to install

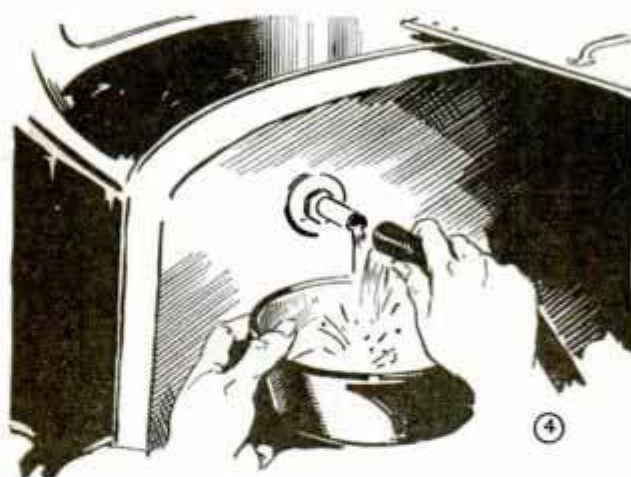


another one. A test to determine at what temperature a thermostat opens is shown in Fig. 5. It is placed in a pan of water set on a stove and the water is heated until the thermostat opens, at which time the temperature of the water is checked with a thermometer. If the thermostat opens at too low a temperature, adjust it by bending the thermal metal slightly.

When a heater is not giving maximum results, it may be air clogged. Most heaters have a capscrew, petcock or valve in the top for releasing trapped air. If this is not the case, it will be necessary to remove the outlet hose at the heater to free the air, Fig. 4, holding a bucket underneath to catch the anti-freeze solution.

Next make sure there are no kinks or sharp bends in the hose to stop or impede circulation. It is a good idea to examine the inside of the hose as some anti-freeze solutions have a tendency to rot the rubber, which may then loosen or swell and stop the passage.

The heater core, like the car radiator, may become partly clogged with sediment or scale, which should be loosened with a good commercial compound and then flushed out. This is best done by disconnecting at the car motor both the intake



and the outlet hose of the heater, and running water under pressure of 10 or 12 lb. through them. First drain the water system of the car. Then insert the end of a garden hose into the end of the outlet hose and run several gallons of water through the heater, letting it come out at the intake hose. This is, of course, opposite to the circulation of the water when the heater is in use, but is advisable, otherwise some of the larger particles of sediment may be driven tightly into the passages of the heater. When connecting the hose again, make sure that it does not touch the exhaust manifold as this may burn a hole and let the anti-freeze solution leak out.

It has been found that the efficiency of some of the early types of hot-water heaters is greatly improved by fastening fine wire mesh over the front. This retards the passage of air sufficiently to assure it being thoroughly warmed. Wrapping the intake hose with asbestos wicking and binding it in place with friction tape, Fig. 2, will aid in checking the loss of some heat through the hose. If your heater motor is controlled by a switch, it is a good idea to substitute an ordinary 6-ohm radio rheostat for it, which will enable you to control the fan speed to suit. To assure maximum fan speed, see that the electrical connections to the heater motor are tight and free of corrosion. Also, oil the motor bearings and clean the brushes and commutator with very fine sandpaper. Never use emery cloth for this purpose as some of the emery may get into the bearings.

Good insulation of the doors, windows and floor boards to keep out cold air is necessary, otherwise, no matter how efficient the heater may be, the car cannot

be kept warm inside. Felt or sponge-rubber weather stripping, available in various thicknesses, is good for sealing cracks around the doors, Fig. 3. Apply some shellac to the surfaces to be covered and when tacky, press on the weather stripping. If air comes in around the pedals, gearshift and steering column, fit rubberized cloth or pieces of inner tube around them. Insulating mats can be purchased to put underneath the floor mat and over the dash, or you can cut them out of felt.

Timer Governor That Sticks Causes Motor Failure

In one case, the occasional failure of a car motor to develop full power on hills was traced to sticking weights in the governor controlling the automatic spark advance. This was remedied by removing the upper part of the timer, thus exposing the advancing mechanism, and cleaning the weights and other moving parts with gasoline, after which they were lubricated with a good grade of light cylinder oil.

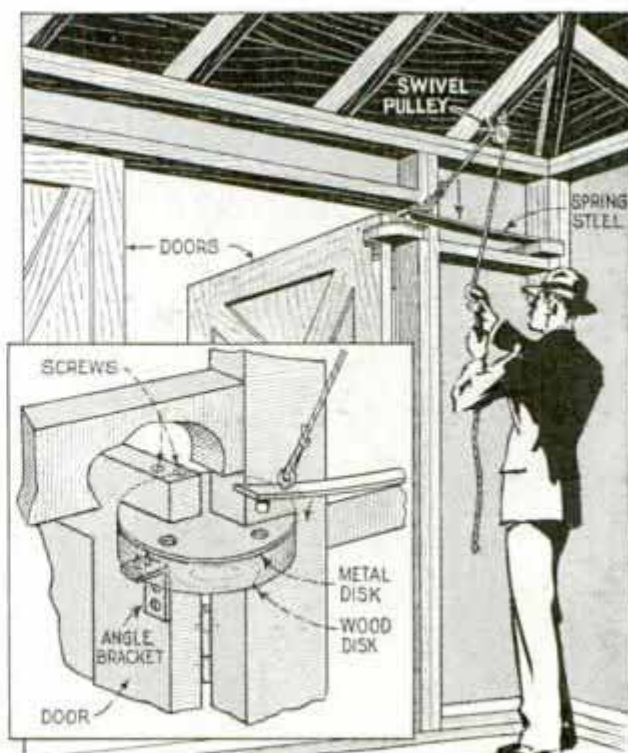
Deflating Inner Tubes with Short Piece of Wire

Bent to the shape shown, a short piece of heavy wire can be used to deflate an inner tube before patching it. A hook is bent on one end of the wire to depress the valve, while the other end is bent around so that it can be clipped on the valve stem. In this way, the tube can be deflated while preparations are being made to do the patching and thus save time.—John Skakandy, Isabella, Pa.



Simple Device Holds Garage Doors Open or Closed

Here is a neat little device that will hold your garage doors either open or closed, and, unlike the usual methods employed for this purpose, you do not have to stoop to operate it. A wood disk, with a metal disk screwed to the top side, is fitted into

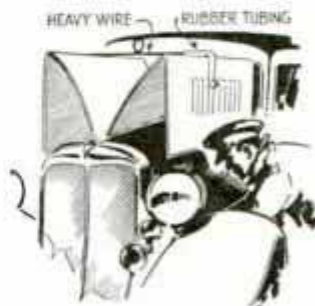


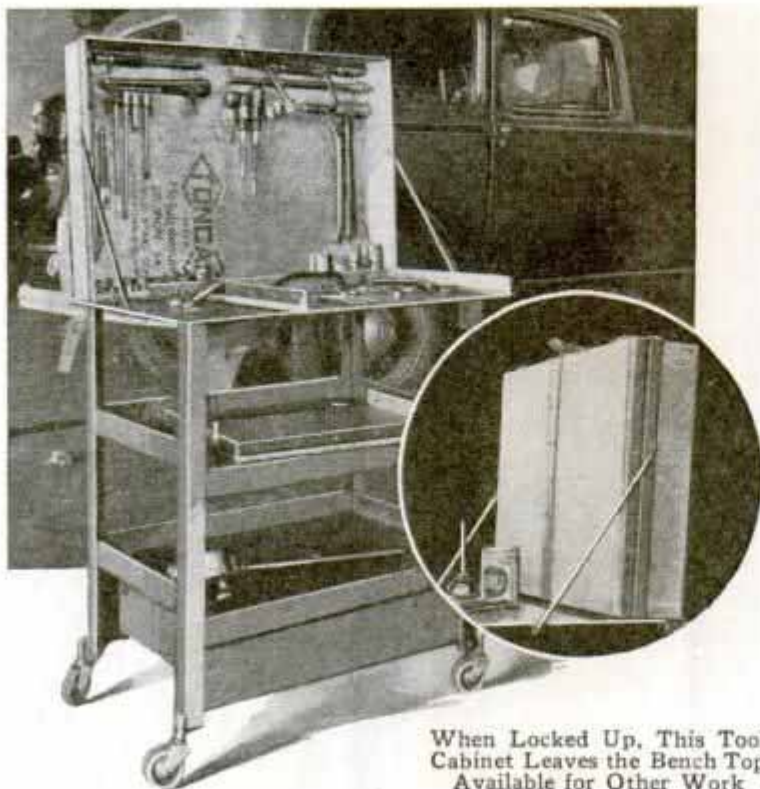
With This Device Garage Doors Are Locked in Either Open or Closed Positions

slots cut near the top of both the door and casing. It is fastened rigidly to the door by means of long woodscrews through the top and an angle bracket at the underside. The disk, of course, turns freely in the casing. A piece of spring steel, which has a short pin welded at one end, is bolted to a block nailed to the garage studs. When the doors are in either open or closed positions, the pin drops into holes which are drilled through the metal disk. A rope tied to an eyebolt in the spring steel and run over a swivel pulley fastened to a rafter, releases the pin.

Holder Keeps Motor Hood Out of the Way

For holding both sides of a hood up out of the way while working on the motor, a length of heavy wire bent to the shape shown will be found handy. The ends of the wire are covered with rubber tubing to prevent marring the finish. When not in use, the wire can be stored under a seat of the car or in the toolbox.





When Locked Up, This Tool Cabinet Leaves the Bench Top Available for Other Work

Sheet-Metal Tool Cabinet for Mechanics

Reinforced at the edges with angle iron, this cabinet is used by a mechanic to keep his tools locked up when not in use and is so arranged that, when locked, it does not interfere with the use of the bench. The cabinet is bolted to the rear of the bench top and is braced with two pieces of angle iron. The hinged front drops down on the bench top when the cabinet is opened. Loops of strap iron soldered to the inside of the top and back hold the tools. The lock was taken from a discarded tire carrier.—W. Edward White, Plymouth, N. H.

Flattened Bearing Surface of Crankshaft Trued Up with Emery Cloth

If you have an old car that has a flattened crankshaft and do not care to spend money for a new one, try this trick for truing up the bearing surface. Drop the oil pan, remove the connecting-rod bearing from the crank that has the flattened surface and put strips of medium emery cloth in each half of the bearing. The strips should be the same width as the bearing surface. Put the bearing back on the shaft, tighten it slightly and then turn the motor with the hand crank. It will be necessary to change the emery cloth frequently. After the flattened surface has

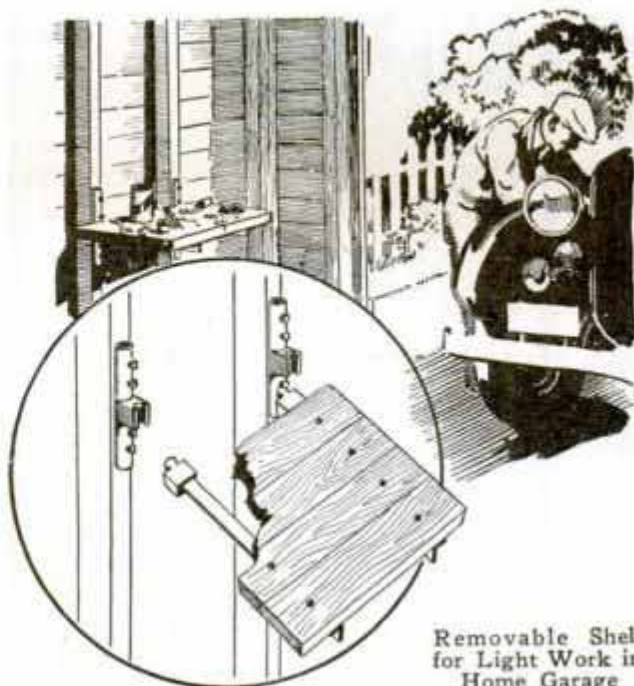
been removed, use fine emery cloth in the same way to smooth and polish the job. The work can be done quicker and better if the block is set on horses so that the connecting rod can be moved back and forth while the crankshaft is turned. After the job has been finished, flush the crankcase and block with gasoline to be sure that all emery particles are removed. While this method is satisfactory for old motors, it is not recommended for new cars.—Ray E. McEfee, Clemscott, Okla.

Locating Loose Connecting-Rod Bearings

Loose connecting-rod bearings on cars having pressure oil systems are sometimes difficult to locate as they knock at speeds around 35 m.p.h., but are quiet when the motor idles. This is because the oil pressure is great enough to cushion the knock at slow speed. By reducing the oil pressure at idling speed and checking all the cylinders you can easily locate the rod that is loose.

Removable Work Shelf in the Garage

In the home garage where space does not permit installing a permanent workbench, a handy removable shelf on which



Removable Shelf for Light Work in Home Garage

to do light work can be had by using part of an old bedstead. Sections of the legs, fitted with lugs that support the rails, are sawed out and are fastened with lagscrews to two studs in the garage wall. The shelf is made by bolting boards to two short sections cut from the ends of the rails, which fit in the lugs.

Checking Camshaft Bearings for Wear

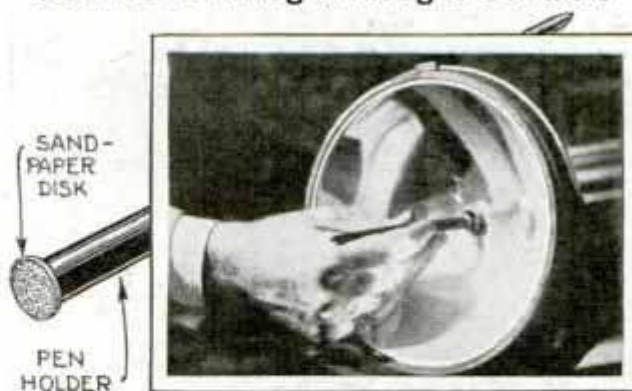
On motors in which the camshaft is not accessible by removing the valve-cover plates, a reasonably accurate check can be made to determine if the camshaft bearings are worn, without dismantling the motor. This operation is best done by determining the approximate location of the knock and then loading the camshaft while the motor is running by forcing a screwdriver blade or similar tool between the end of the exhaust-valve stem nearest the suspected bearing and its pushrod. Care should be taken to see that the valve spring does not compress completely, which would damage other parts of the motor. The additional load on the camshaft will cause the knock to disappear entirely or to be much less audible if it is due to worn bearings at this point.—A. H. Vance, Chicago.

Easy Method of Repairing Skid Chains



The usual hard job of removing worn cross links from skid chains and replacing them with new ones without a special tool, is easily done if a vise and claw hammer are at hand. Place the cross links in the vise with the end link projecting, and then, with the claws of the hammer, open the loop as shown. To close the loops of the new chain, place it in the vise in a similar manner and close them partly by striking lightly with the hammer. Then remove the chain, lay it on top of the vise and finish closing the loops with the hammer.—H. C. Wilcox, Leonia, N. J.

Tool for Cleaning Headlight Contacts



Keeping Contacts of Headlights Free from Corrosion Helps in Preventing Dim Lights

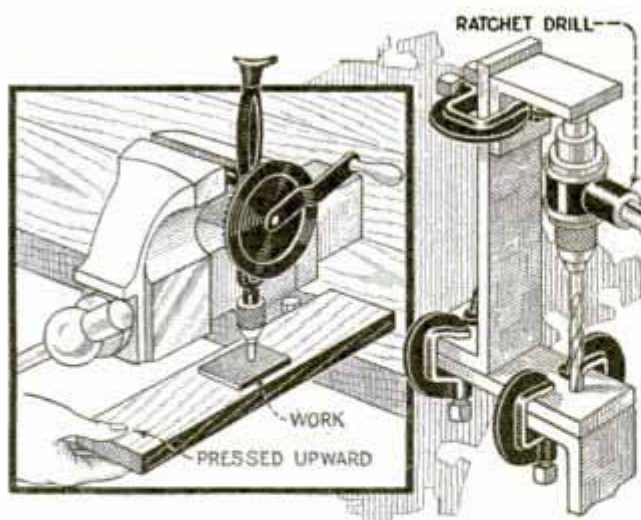
Carried in your kit, a cut-off penholder, with a small sandpaper disk glued to the large end, is handy for removing corrosion from the lamp contacts in your headlights. To use the tool, remove the lamp, insert the abrasive end of the tool into the socket and then turn it against the contacts. If the corrosion is not removed at regular intervals, a resistance is set up against the passage of current and causes the lights to dim.

Cover behind Car-Hood Ventilators Helps Keep Motor Warm

By covering the ventilators in a car hood, much of the heat from the motor will be retained, which helps to assure efficient motor operation in winter. Take a piece of fairly light cardboard and cut it to fit over the ventilators inside the hood, leaving a projection on one end. To the other end of the cardboard, rivet or staple a piece having a similar projection as shown in the drawing. The projections slip into the end ventilators and hold the cover tightly in place.—George A. Boswin, Chicago.



Paint containing compounds of lead should not be used on stables or outbuildings where fumes of decaying organic matter arise, as these gases are likely to darken the color of lead paints.



Two Simple Methods of Applying Pressure to Hand Drills to Force Them through Iron

Applying Pressure to Hand Drills

Here are two methods by which pressure can easily be applied to hand drills. In the left-hand detail, a breast drill is held in a vise by the handle and pressure is applied by placing the work on a board and raising it up against the drill bit. When using a ratchet drill, an adjustable support for holding the centering end of the ratchet can be rigged up as shown in the right-hand detail. The support is assembled from pieces of steel, which are bent at right angles, and are held by means of C-clamps.—George A. Luers, Washington, D. C.

In Our Next Issue

MASTERPIECES OF AMERICAN FURNITURE

Useful and ornamental, BENJAMIN FRANKLIN'S CHAIR, with its writing leaf, ranks among the outstanding pieces of furniture of special interest by virtue of their historic background. Third of a series, this article will give all construction details, enabling the home craftsman to make an accurate copy of the original.

PHOTOS ON CHINA, METAL AND WOOD

Process enabling amateur photographers to become proficient in applying photos on novelties—a spare-time hobby with money-making possibilities.

SCALE MODEL OF FAST AIR LINER

Small copy of a high-speed transport plane. The model is made of wood and is mounted on an attractive base for effective display on your mantel.

THE MENACE OF DANCING WHEELS

What every motorist should know about his car. Faults of wheel action and alinement explained so you can make simple check-ups to forestall trouble.

HOMEMADE PAINT-SPRAY GUN

Light spray gun, having a fruit-jar paint reservoir and a convenient air valve in the handle, distributes spraying paint and lacquer in a fine, even spray.

TUNING UP THE BANDSAW

Another workshop story giving bandsaw owners a number of practical suggestions on how to keep the bandsaw in proper shape for best results.

RACING GREYHOUNDS

Sportive game for party entertainment in which miniature dogs are sent scooting up an inclined race track—of interest to both young and old.

NEED OIL

EVERY FEW HUNDRED MILES

?

Is your car always begging for oil? Do you need a quart or two nearly every time you stop for gas? Then read this unsolicited letter from Milton Sammel of Bedford, Pa.:

"I drove my 1928 Buick 92,600 miles . . . never had the pan removed . . . ground valves only twice. Today, the motor does not require any more oil than when new, thanks to Quaker State."

The trouble with ordinary oil is that there's one quart, more or less, of thin, non-lubricating material in every gallon. This "light-end" oil breaks down in high compression motors. It burns up, blows away, vanishes. No wonder you keep adding oil!

If you want oil in which every drop lubricates . . . oil that lasts and lasts . . . ask for Quaker State. "Light-end" material is removed *at the refinery*. You get an "extra quart of lubrication in every gallon."

Look for the Quaker State sign. Most places will service your car from 1-quart and 5-quart refinery-sealed cans. Or, get Quaker State in the patented, double-sealed drum.

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a bottle lasts
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Try it!—See how easy it is to keep your hair combed—any style you like—whether parted on the side, in the center, or brushed straight back.

A bottle of Glostora can be bought for a trifle at any drug store and will last for months.



Glostora
FOR THE HAIR



PRACTICAL SUGGESTIONS FOR SET OWNERS

(Continued from page 425)

eliminate these noises caused by vibration. If the tone of your set is high pitched, or tinny, a small fixed condenser connected from the plate terminal of the output-tube socket to ground, as shown in Fig. 1, will give a more pleasing tone quality, especially in midget receivers. The condenser should be rated for 400 working volts or more. If this method seems too difficult, a simpler solution is shown in Fig. 1A. No soldered connections are necessary to install this standard portable tone-control unit, which may be used with any set employing either one or two output tubes. The adapters are merely slipped over the tube prongs before they are inserted in their sockets. Your output tubes are likely to be either 171-A or 245 types.

If you have difficulty in controlling the volume of strong local stations, a 10,000-ohm potentiometer may be connected as indicated in Fig. 3. This volume-control unit may be mounted on the front panel or at any convenient location on the receiver. Local interference, from electrically operated apparatus in the neighborhood, is often brought into a.c. receivers through the power line. This type of man-made static is the enemy of good reception for receivers both old and new. A good homemade line filter is shown in Figs. 4 and 4A. It is built into a common steel electrical cut-out box, 4 by 6 by 8 in., and the two choke coils are hand wound on either fiber, or heavy cardboard tubing. The coils are mounted at right angles and all details are given in the sketch. This line filter is merely connected in series with the wall-socket outlet and the power cord to the receiver.

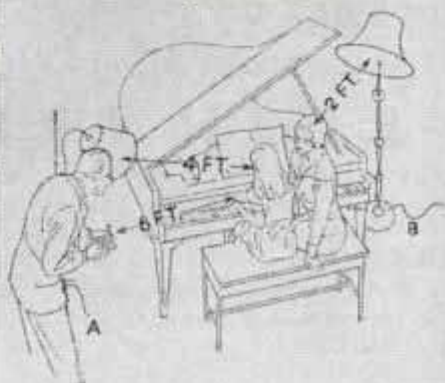
A good outside antenna may consist of a single No. 14 enameled-copper wire, 75 to 100 ft. long, as high as possible and at right angles to any power line. The lead-in to the set should be a continuation of this same wire so as to avoid soldered connections. A strong ground clamp on a cold-water pipe, or a rod in damp soil outside the building, will insure a good receiving ground. Grounds to steam or hot-water pipes are fair only; never ground to a gas pipe. In dry sandy localities, where a damp ground is not available, some set

(Continued to page 116A)

Snapshots at Night!



How to get this picture



LIGHTING: One Mazda Photoflood in lamp "A"; two Photofloods in lamp "B"; place white sheet over a high-backed chair at subject's left, to reflect light on shadow side. EXPOSURE: 1/25 second at *f.6.3*. FILM: Kodak "SS."

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"SS" Film has three times the speed of ordinary film under artificial light.

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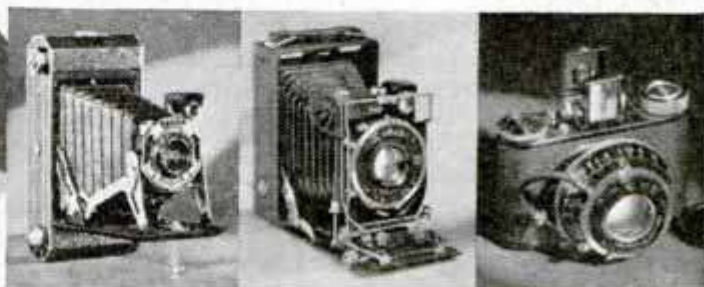
FINE CAMERAS ... ideal for Night Snapshots

KODAK SIX-20 (below at left), *f.6.3* lens, $2\frac{3}{4} \times 3\frac{3}{4}$ pictures, \$17.50. Kodak Six-16, $2\frac{1}{2} \times 4\frac{1}{4}$ pictures, \$20. Recomar 18 (center) ... a versatile camera. Ground glass back, self-timer,

double-extension bellows, 1/250 Compur shutter, *f.4.5* lens—\$46. Pupille (right) ... miniature camera. Ultra-fast *f.2* lens, speeds up to 1/300. 16 pictures each loading. With case, range finder, two filters, \$90.

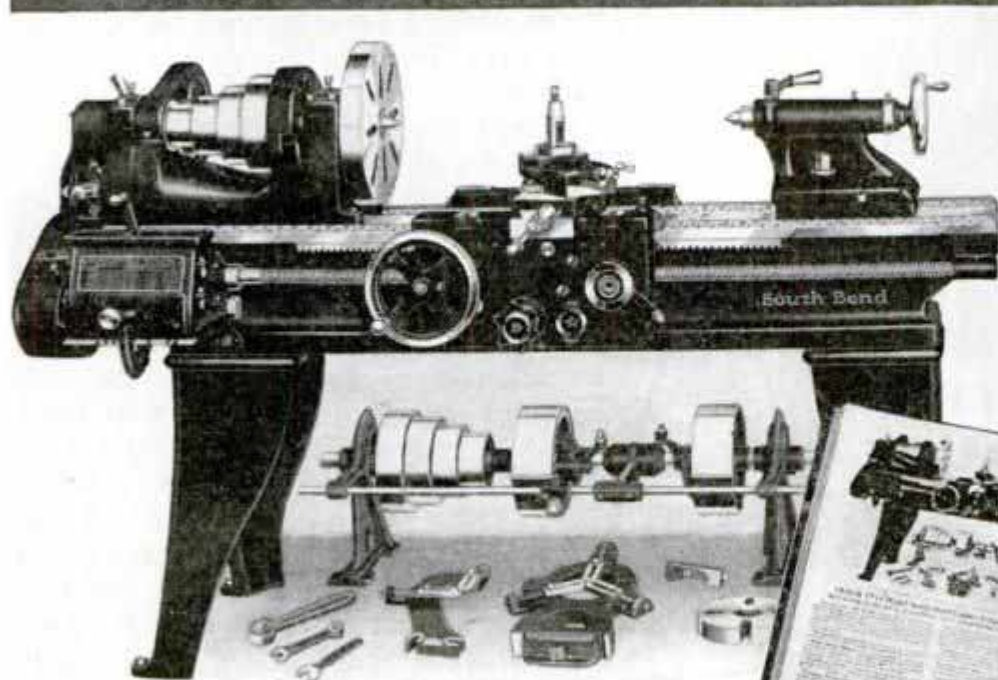
KODAK "SS"—the lightning-fast film, with green lightning flashes on familiar yellow box. PHOTOFLOODS (35 cents each) give intensely bright light for 2 hours or more, good for lots of pictures.

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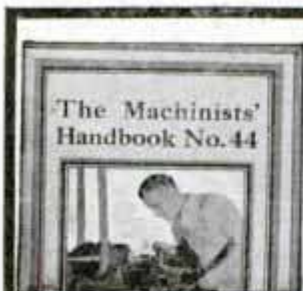
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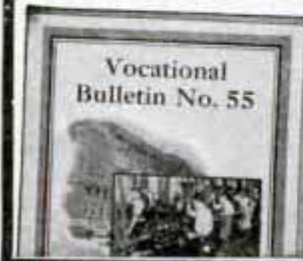
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13"x5' Quick Change	1510 lbs.	\$402.00	\$602.00
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18"x8' Quick Change	3290 lbs.	\$705.00	\$997.00

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TAMING ELECTRIC ARC RELEASES FLOOD OF INVENTIONS

(Continued from page 365)

half the size of former types was made.

And then Doctor Slepian got another idea. Instead of using disks with narrow cracks between them, why not use a material filled with tiny pores through which the lightning current could pass, but which would act as a closed valve when power current tried to follow? He broke a red building brick to a convenient size, mounted it between two electrodes, and shot a powerful voltage into it. The arc was snuffed out. He found the piece of brick absorbed several thousand volts for every inch in the arc's path. In the end, Doctor Slepian produced a porous block of material that looks like a piece of carbon. A disk of this substance one and one-half inches in diameter and one inch thick has a total surface area of 200 square feet! Then Doctor Slepian discovered that a piece of fiber is many times more effective than a piece of soapstone the same length in interrupting an arc. Why was this? One day he weighed a piece of fiber before and after it had acted as an arc-quencher. Some of it had disappeared. Here was a clue that led finally to the discovery that the action of the electric flame on the fiber produces gases that extinguish the flame.

For years an oil had been sought which, when used to drown arcs in large circuit breakers, would produce less vapor than that then in use. But Doctor Slepian now was able to explain that it is the gas or vapor that forms in the oil and churns about the breaker electrodes that extinguishes the arc, and that a method of producing more vapor instead of less was really what engineers wanted. Upon this discovery was built the development of grids which, attached to oil-immersed circuit-breaker electrodes, increase their efficiency many times.

It was known that, for protecting high-power circuits, a satisfactory device was the expulsion fuse, consisting of a fiber cartridge open at one end and having the fuse wire running lengthwise through the center. When this fuse blew, there was a loud report that suggested a gun shot, and a flash of flame. It worked well, even if noisily, but no one knew exactly why. Now

(Continued to page 120A)

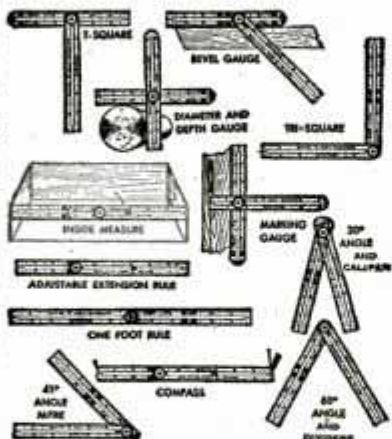
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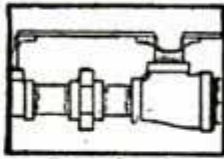
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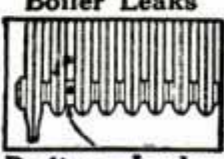
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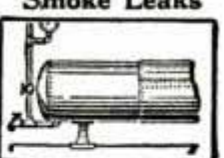
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TAMING ELECTRIC ARC RELEASES FLOOD OF INVENTIONS

(Continued from page 118A)

Doctor Slepian could give the answer. Gases produced by the fiber blew the arc out of the tube, extinguishing it by churning the ions into neutrality. It was obvious that a material that would vaporize more easily than the fiber would make better fuse casings. Boric acid, a white solid that can be pressed into various rigid forms, was selected as the most satisfactory. This acid gives off water vapor abundantly when heated. Today, fuses lined with boric acid are replacing the older fiber type. The boric acid is in a cartridge that slips into a container, the fuse wire running along its center. Renewals are inexpensive. By placing a closed metal chamber over the open end of the fuse casing, noise and visible flash are imprisoned.

An outgrowth of the fiber studies is another form of lightning arrester that is simplicity itself. It consists of nothing more than a fiber tube having a slender hole through its center. It is placed between discharge terminals connected to the ground and the equipment being protected. Lightning passes through the tiny hole, but gases generated by scorching of the fiber walls choke off any power current that might be inclined to follow.

An ordinary lead pencil played a part in solving the problem of finding a way of controlling huge current-carrying arcs so that they could be started when desired. The final solution was found in a lead pencil or "igniter." Tiny currents flowing through this pencil control with precision currents in the arc a million times greater. With the "ignitron" control, the engineer can make huge currents flow in a steady stream or in spurts, just as the driver of a car can control his engine with the accelerator pedal.

Discovery of this positive control for powerful arcs is expected to influence the design of all equipment employing the arc principle. Already electric welding machines using the control have been put into use. Rectifiers for changing alternating current into direct for battery charging have been equipped with it and it is probable that better equipment than any now available for changing direct current into alternating will be produced.

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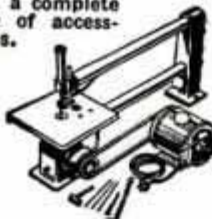
FRED E. ARMITAGE, home woodworker of Jamestown, N. Y., thrilled his granddaughter with this exquisite specimen of miniature craftsmanship—a colonial home, accurate down to the smallest detail—even to the 2,000 shingles on the roof! Mr. Armitage's home

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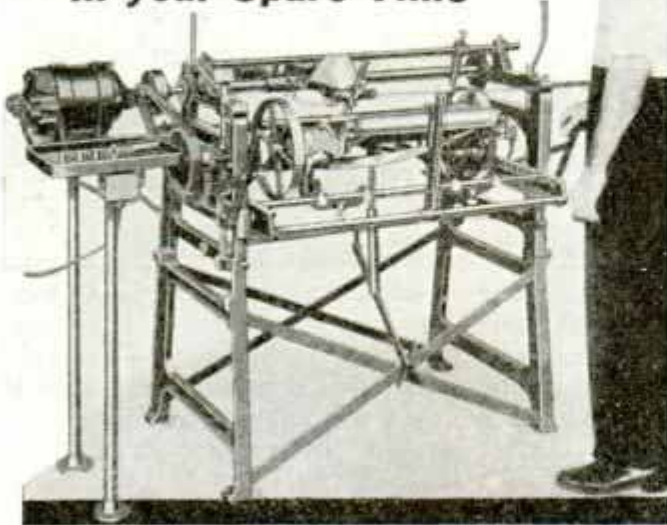
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HOW TO LIGHT YOUR HOME

(Continued from page 411)

room make floor lamps a pleasant addition, perhaps one alongside the chaise longue. Then, the sunlight lamp is becoming a regular thing in the bedroom.

In the work places of the home, such as the kitchen, laundry, furnace room, and the basement workshop, the prime function of light is to provide ease of vision.

A central ceiling fixture in the kitchen is desirable, but it should be supplemented with individual light sources at the various working points such as the stove, the sink, and the kitchen cabinet. Local lighting installations of this character are most helpful with forty-watt lamps, though the eighty-watt lamp is more desirable.

Special illumination for the stove is generally provided with a wall bracket and a sixty-watt lamp.

Clothes closets and kitchen storage closets may be equipped with interior lighting that comes on as the door opens. Small lights which may be plugged from convenient outlets and left burning all night provide light for dark hallways.

In the bathroom there should be separate light sources for the washbowl and mirror, for the tub, and for the dressing table, if one is located here. The washbowl and mirror light should come from two bracket units, one on either side of the mirror. Separate lighting for bathing may be provided with a unit above.

Little bits of light can contribute to greater comfort in the home if the subject is given careful attention.

ROBOT SLEUTH GETS HIS MAN!

(Continued from page 333)

of one camera to record the time and date, as well as the suspect's image.

A battery of three No. 6 dry cells for each relay in the supervisory circuit supplies sufficient current for one year.

Any police officer knows that the criminal's greatest fear is that his photograph may fall into hands of the authorities. Therefore, a simple sign, notifying the public that a bank is protected by the photo system, might prevent many robberies. Should the bandit ignore such a warning, the robot sleuth on guard in the bank will "get his man" by photographing him in the act.

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WINGS OVER THE OCEANS

(Continued from page 397)

great aim of aeronautical interests is the establishment of a round-the-world flight service operating on timed schedules. Led by American enterprise, a world-wide study of weather has been under way for more than four years.

In five years of active service, the "Graf Zeppelin" has proved the economy, safety and dependability of lighter-than-air craft for ocean travel. German interests have under way a new dirigible, described as the "LZ-129," the largest airship ever built. According to present plans, she will go into commission during 1934, and it is estimated that she will negotiate the east-bound north Atlantic passage in less than forty-eight hours. Westbound, the same crossing against head winds will require sixty to sixty-five hours.

The "LZ-129's" gas capacity is 7,070,000 cubic feet. Her length is 812 feet, and from gondola to "shell top" she measures 145 feet. This monster will have twenty-five staterooms with accommodations for fifty passengers, besides two groups of parlors and several promenade decks.

It is almost certain that the first scheduled Zeppelin routes will be established across the North Atlantic, followed shortly after by a similar line across the Pacific, between San Francisco and Los Angeles and the Philippines. The schedules of both Pacific and Atlantic dirigible service would coincide with the schedules of trans-American airplane travel, enabling passengers to make rapid changes from one form of transport to another.

From Manila, capital of the Philippines, to Batavia, capital of Dutch Sumatra, passengers will probably be carried by a fleet of fast clipper ships, such as those built by Sikorsky. Between Sumatra and Amsterdam, Holland, the Royal Dutch Lines now maintain a scheduled airplane service, which may be changed to a long-distance dirigible line, to avoid fuel stops on foreign soil.

The International Zeppelin Transport corporation, affiliated with the Pacific Zeppelin Transport, Ltd., has already prepared plans for two super-dirigibles to be constructed on American designs at Akron, Ohio. The specifications call for carriers capable of carrying 40,000 pounds of mail and 100 passengers.

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THE TRUTH ABOUT THE NEW GOLD RUSH

(Continued from page 350)

and a receptacle to catch and retain the heavier materials, including the gold. The sluice box is simply a long trough set at a slight angle. In the bottom are cleats to create an up-current as the water ripples over them, thus carrying away the lighter material. By sluicing, you can handle six or eight cubic yards a day.

What about your reward? Can you make day wages? Possibly, but probably not. Can you make expenses? The chances are still against you.

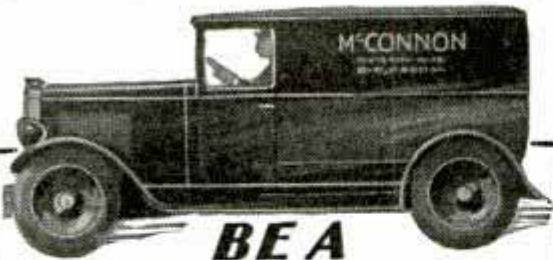
Nearly all the important gold camps were discovered by tracing placer gold to its source in the veins, so placer deposits have been gone over time after time by prospectors looking for veins. Since the days of '49, thousands of men have worked up and down the streams flowing from known gold-mining regions.

Besides this, hundreds of companies have been formed to recover the placer gold on a large scale by hydraulic methods, dredging or using drag lines. Placer prospecting should be undertaken with the distinct understanding that not one inexperienced person in fifty will make as much as one dollar a day, even at present prices for gold.

Undoubtedly many other deposits will be discovered. But most of them probably will be small and of low grade and the experienced prospector, not the novice, is likely to find them. Also, occasional pockets of placer gold, and even nuggets, will be found in ground which has been worked over many times. Such instances are legion, but the long chance is nothing to build hope on if you are prospecting to make day pay.

Yet, grizzled old sour-doughs never give up hope after spending years at the game, and if their reasoning is sound, you have at least a chance to make a strike. If you draw a number out of a hat, and there are 999 others also drawing numbers, you know your chance of holding a winning coupon is only one in a thousand. That's about your chance to make a strike in placer prospecting. But don't take the chance unless you have a grub-stake before you start out.

(Editor's Note—This is the first of two articles on gold mining by Professor Worcester. The second will appear in an early issue.)



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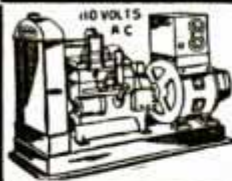
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IS THE SPARE TIRE DOOMED?

(Continued from page 381)

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The future of the trouble-proof tire is uncertain. Some experts think that the adhesive-gum type of inner tube will be adopted generally. Every tire expert considers sponge-rubber tires, various modifications of the solid type of construction, as impractical. But an inventor may appear any day with an idea that will revolutionize tire engineering.

While you are waiting for the inventor to appear, you probably will experience flats and blowouts, although more rarely than in the past. If you do have a tire failure while your car is in motion, remember one thing: To apply the brakes suddenly is to invite disaster in the form of an overturned car. Slow down gradually, even if you do ruin the tire or tube by letting it revolve around the wheel.



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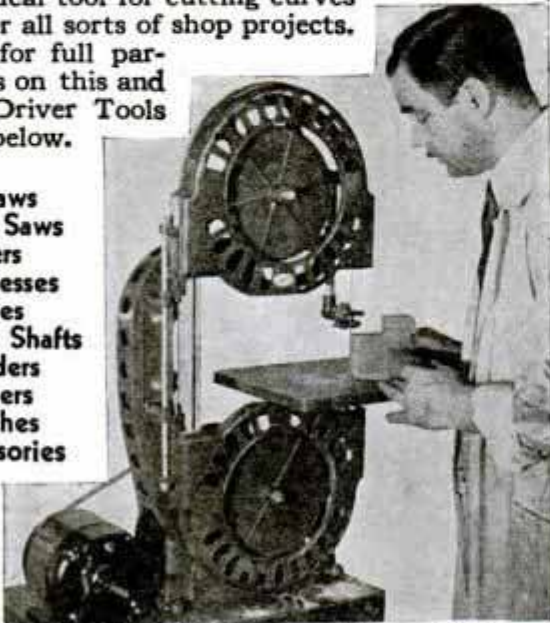
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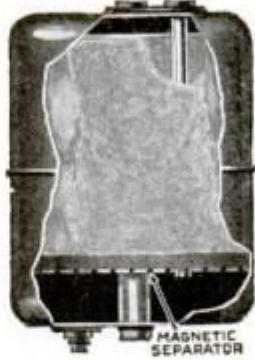
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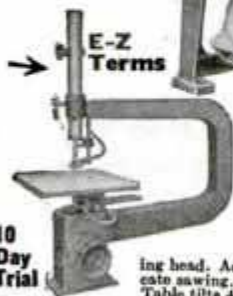
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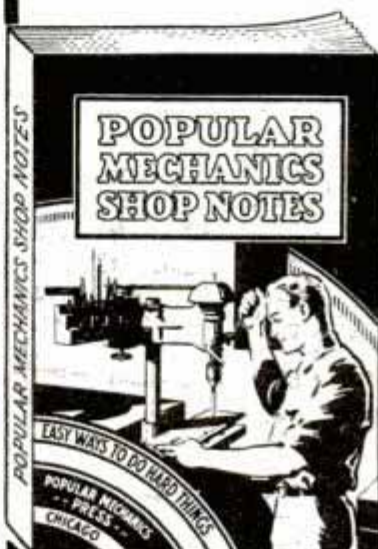
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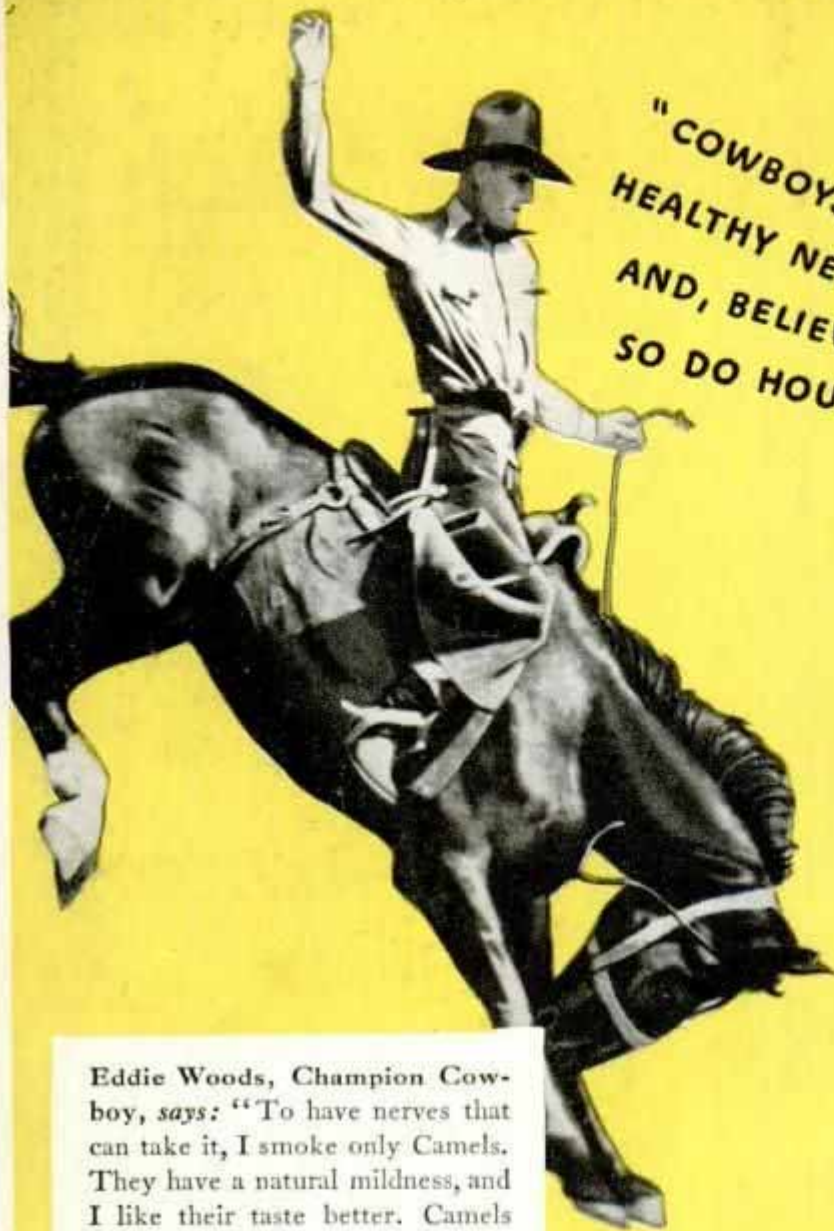
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