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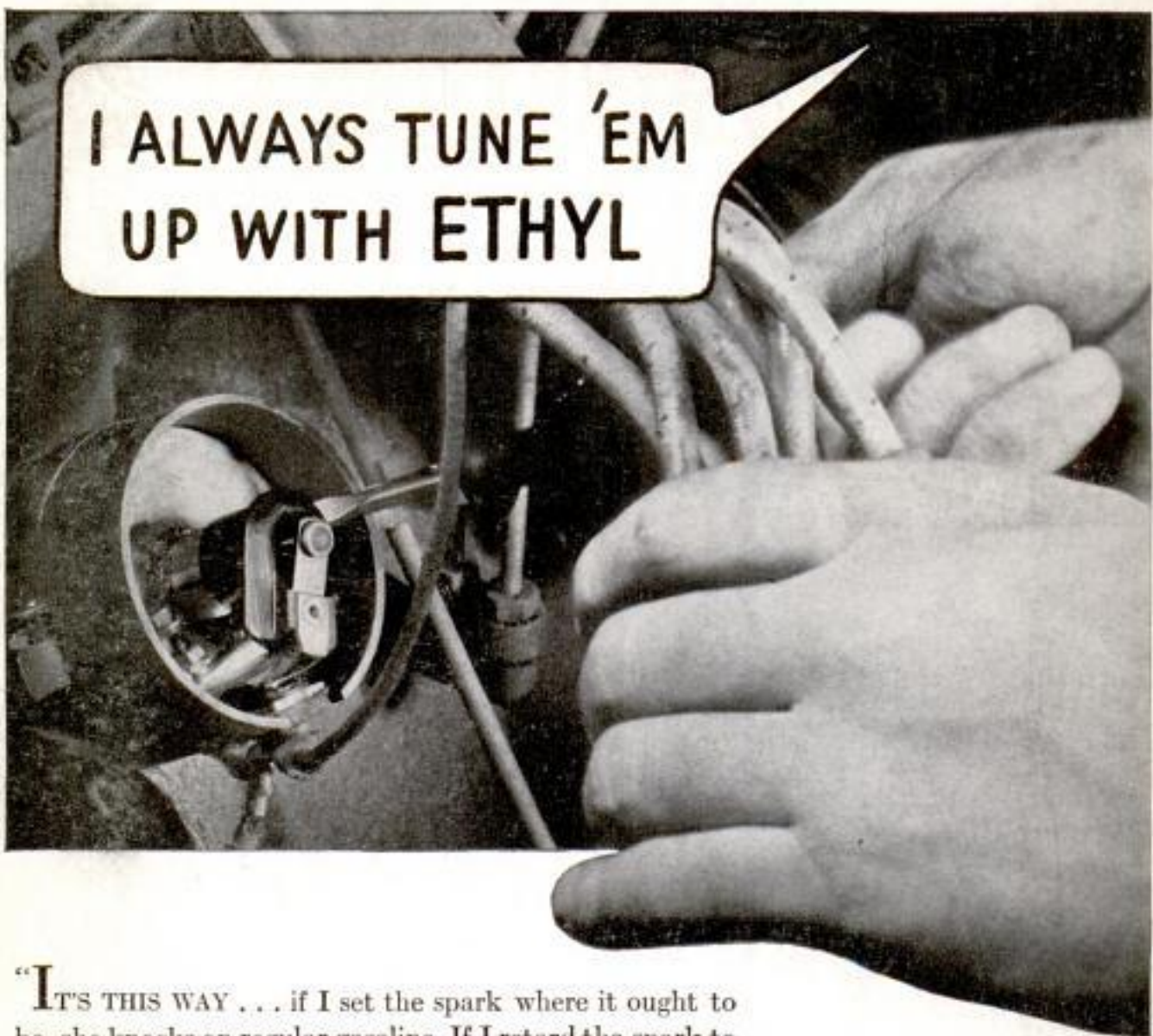
WRITTEN SO YOU CAN UNDERSTAND IT

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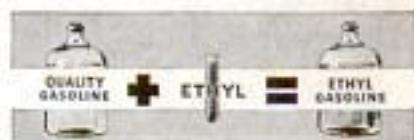


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THIS is among the first public announcements of what is undoubtedly the most amazing money-making opportunity ever offered to the readers of this—or any other magazine. It tells how any ambitious, level-headed man can establish—practically overnight—a remarkable new kind of business that can pay a steady net cash profit of \$25 a day for full time operation—\$40 to \$50 a week for spare time—a business that offers unlimited opportunity for rapid expansion—a business in which you can employ others to work for you or in which your family can help—a business that is destined to give many men an independent daily or weekly income far in excess of any salary or wage they could ever hope to earn.

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

1. An utterly new kind of food product with a natural, staple demand and big repeat business, yet one that has all of the appeal of a novelty.
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5. Absolutely no experience needed to be successful.
6. No expensive equipment needed. Your whole investment will be less than your first week's potential income.

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Today, it is a reality with every detail perfected—complete with tested plans of operation worked out—all necessary equipment ready to turn over to those who are prepared to develop this new "gold mine."

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*Editorial Note
June 15, 1933 Bulletin of the National Association of Cost Accountants*

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State of Illinois, County of Cook, ss.
 Before me, a notary public in and for the state and county aforesaid, personally appeared Willis S. Brown, who, having been duly sworn according to law, deposes and says that he is the business manager of the Popular Mechanics Magazine and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 4111, Postal Laws and Regulations, printed on the reverse of this form, to-wit: First. That the names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, Popular Mechanics Co., 200 East Ontario St., Chicago, Ill.; Editor, H. H. Windsor, Jr., 200 East Ontario St., Chicago, Ill.; Managing Editor, L. K. Weber, 200 East Ontario St., Chicago, Ill.; Business Manager, Willis S. Brown, 200 East Ontario St., Chicago, Ill.; Second. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Popular Mechanics Company, 200 East Ontario St., Chicago, Ill.; L. H. Windsor, 200 East Ontario St., Chicago, Ill.; H. H. Windsor, Jr., 200 East Ontario St., Chicago, Ill.; Third. That the known bondholders, mortgagees, and other securities holders owning or holding one per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None. Fourth. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, bond or stock and securities in a capacity other than that of bona fide owners; and that affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him. Willis S. Brown, Business Manager, Sworn to and subscribed before me this 25th day of September, 1933. J. GRAHAM, Notary Public. (My commission expires June 16, 1934.)

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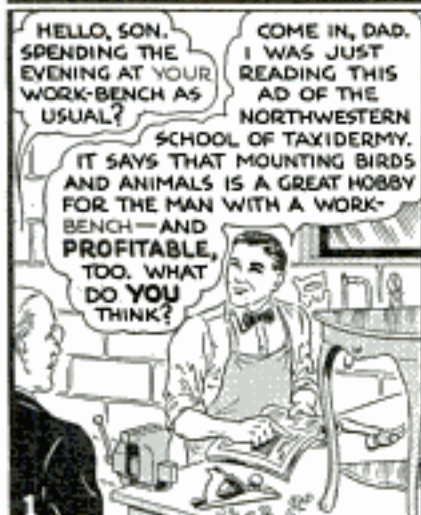
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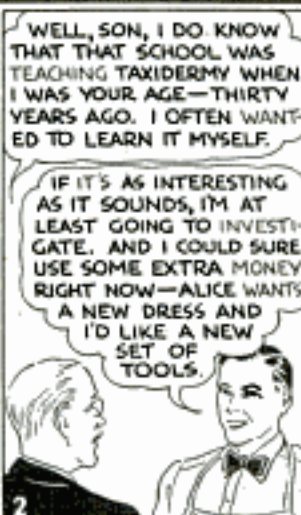
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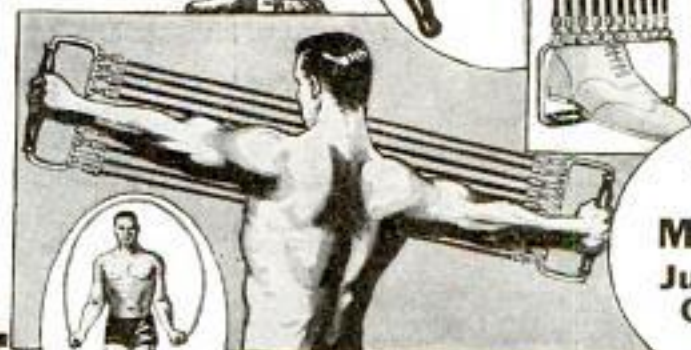
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FLAVORING Extracts—Bottle yourself! Labels furnished. 600% profit! Whirlwind money-makers! Repeaters! Free offer. Thomas Manufacturing Company, Indianapolis, Ind.

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.

FREE literature describing many money-making plans. Belfort, 4042 N. Keeler, Chicago.

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

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., 393 Degraw St., Brooklyn, N. Y.

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

AGENTS. Smash go prices. Santos coffee 12c lb. 4 oz. vanilla 8 1/2c; \$1.00 size tonic 14c; razor blades 5 for 8 1/2c; 100 sticks chewing gum 12c; Christmas cards, 21 in box, 13c. 150 other bargains. Experience unnecessary. Write Carnation Co., P.O. St. Louis, Missouri.

SELL Men's neckwear—wonderful proposition. Actor M, 39 East 28th, N. Y.

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

NAME Plates, number plates, signs, etc., hand engraved, easily sold with large profit. Beett 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. Gum Metal Co., Attn. H. Deratur, Ill.

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

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DON'T Be a job hunter—start your own business on our capital; no hard times, no lay-offs, always your own boss; hundreds average \$5,000 annual sales year after year; we supply stocks, equipment on credit, some 235 home necessities; selling experience unnecessary; wonderful opportunity to own pleasant, profitable, dignified business backed by \$17,000,000 world-wide industry; for complete information write Rawleigh Co., Dept. LU-PPM, Freeport, Ill.

WANTED Machinery salesman to sell South Bend lathes to automotive and general repair shops in your own community. Territory four or five counties. Man about 35 having had practical machine shop experience preferred. Write South Bend Lathe Works, South Bend, Ind.

STRANGE Foot cushion fits in shoe. Ends tired, aching feet. Delightful sensation. Sells on sight. Sample outfit free. Kristee Mfg., Box 1442, Akron, Ohio.

WONDERFUL Opportunity. \$20.00 daily can be earned. No experience necessary. You can start at once. Showing latest thing out. Self protection and home protection at cost. Ages 1 to 80. Not insurance but provides benefits up to \$1000.00 natural or accidental death. \$20.00 per week if sick or injured. Address National Aid Society, Dept. B, Springfield, Illinois.

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SALESMEN: Sell new carded specialty. Big demand. 100% profit for you and dealer. Sanger, 2103-F South Michigan, Chicago.

NEW Unique plan—free testing display cabinet enables you control flashlight battery and lamp business your territory. Big profit. Chicago Battery Products, 1701-B South Clark, Chicago.

BUSINESS Stationery: Largest line. Highest quality. Quickest delivery. Biggest commissions. Free copyrighted cuts. Experience unnecessary. Outfit free. Lionel, 312 South Hamilton, Dept. 10, Chicago.

BANDAGE Distributors: Represent original Band-Tex manufacturers. Lowest prices. 8 fast sellers. 3 color display cards. Sample, particulars free. Band-Tex, 443 S. Dearborn, Chicago.

NEW Roosevelt calendar. Sells on sight! Every home and business a prospect. Fleming, 6541 Cottage Grove, Chicago.

AT Last—Orange peeler. Fast 25c seller. Has many other uses; cutting corn from cob, peeling fruits, vegetables; scaling fish, etc. Sample 25c. Peelorall Co., 417 Market, San Francisco.

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PENNY Each, any size! Non-tarnishable Window sign letters. 2500% profit! Free working equipment. Samples. Record breaking offer. Atlas Sign Works, 7941 Halsted, Chicago.

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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.

OILMETER Gear-Shift ball with mechanical change oil reminder inside sells complete \$1.00. Salesmen make 100% profit. Oilmeter Sales Corporation, Saint Paul, Minnesota.

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

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PANTOGRAPHS, Two styles. 50c and \$1.25 postpaid. Details free. Pantographs, Escanaba, Mich.

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

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

NAME, Address, two lines 25c, three lines 35c. Newman, Storer, Mo.

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SWEET Oronoko chewing tobacco. Choice 4 lbs. \$1.25, 8 lbs. \$2.35. Select 4 lbs. \$1.75, 8 lbs. \$3.25. We pay the postage. Belmont Farms, Chatham, Va.

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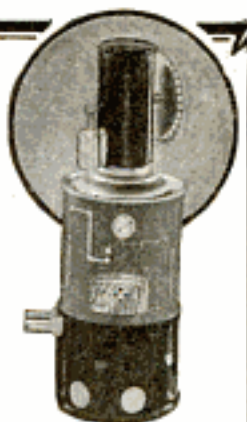


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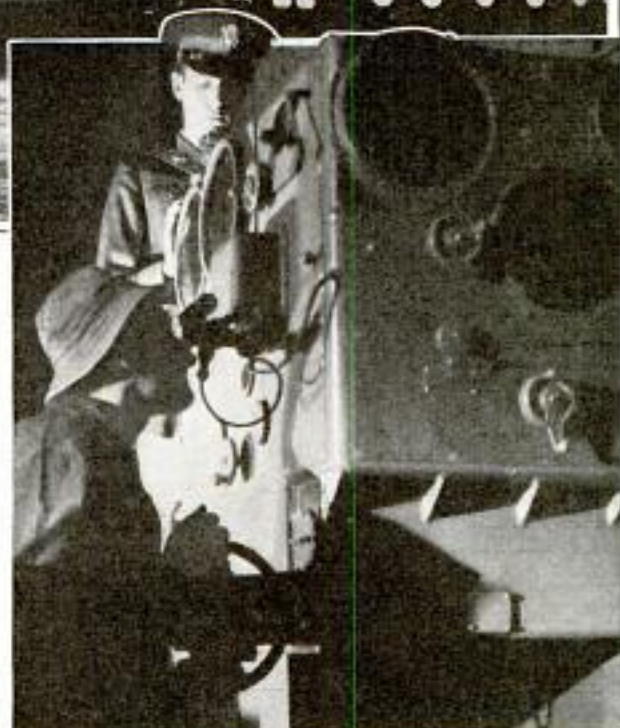


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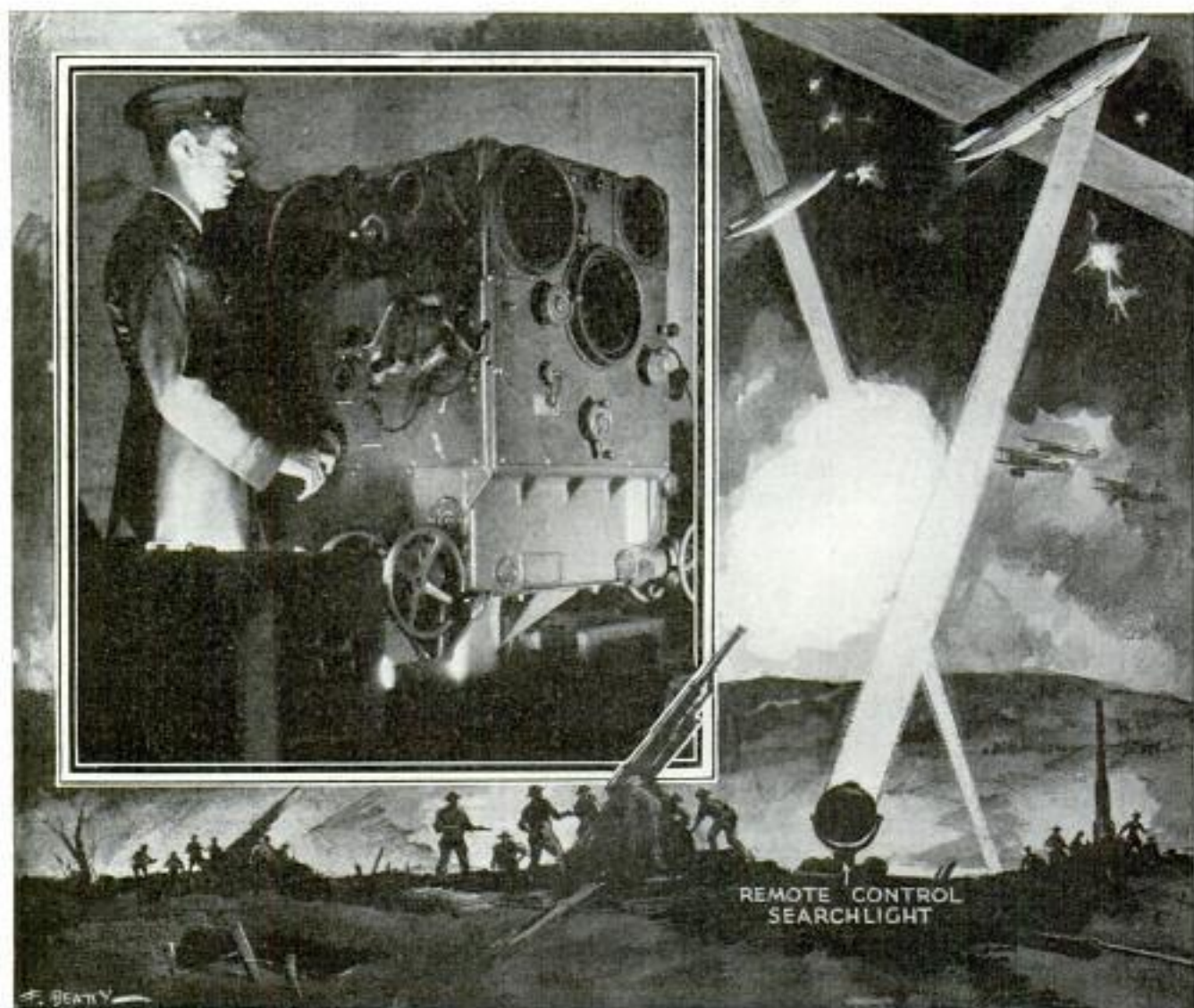
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miles. This force is one of the most modernized of the nation's fighting units, in that it has the best equipment yet devised for dealing destruction to flying enemies.

A three-inch gun is used by the anti-aircraft artillery. A most formidable weapon, it is as far ahead of the equipment used in the World War as the modern automobile is ahead of the wheezing "horseless carriage." The latest gun of this caliber is mounted on four rubber-tired wheels which are removable. Within twenty minutes after the commanding officer issues the order, the wheels may be removed and the gun set up, ready for firing. Back in 1918, the same operation required fully three hours.

This three-inch gun can be elevated to eighty degrees for firing at enemy planes, or lowered to minus ten degrees below the

horizontal, ready for action against tanks of the infantry. And the gun may be swung in a complete circle.

A hand lever is used to open the breech for the first shell, but after that the breech opens and closes automatically. The gunners load and fire the gun but do not concern themselves with the target in the air nor the shells bursting around it.

The job of aiming the gun is done indirectly by a large fire-control machine mounted on a rubber-tired trailer. This instrument is located near the four three-inch guns composing the battery and transmits to each gun by electricity the elevation angle, the direction angle and the range. The latest type of "data computer," as this machine is known, is the Sperry Director. It is an expert mechanical mathematician, capable of plotting



Top, Horizontal Direction Finder Plots Altitude of Target to Aid Gunners; Bottom, Drawing Shows Sperry Director as It Would Appear in Anti-Aircraft Firing; at Front Are Reels on Which Are Stored Hose Lines Used in Establishing Electrical Connections between Director and Each Gun; Power Plant Is at Rear of Trailer

the course of the target in miniature and of predicting the point in the sky where the bursting shell will meet the target. It is equipped with two telescope sights through which the trained eye of the operator follows the target. It also has two telescopes through which the observer may watch the result of each shot and determine the correction necessary to bring the succeeding shot upon the target.

As the director plots the course, the gunners swing pointers on data receiver dials to the position indicated. Then the shell is inserted and the gun fired.

That the machine does its work well is proved by recent firing in which fourteen

hits were scored out of fifty-nine shells fired at a sleeve target towed by an airplane 5,000 yards in the air, some three miles. The three-inch guns are effective at an altitude of five miles.

For night firing, a battery of searchlights is part of the equipment of the anti-aircraft regiment. A beam of eight hundred million candlepower illuminates the target eight miles away. This giant searchlight is operated by remote control, being elevated, lowered and turned by electricity supplied by a generating plant

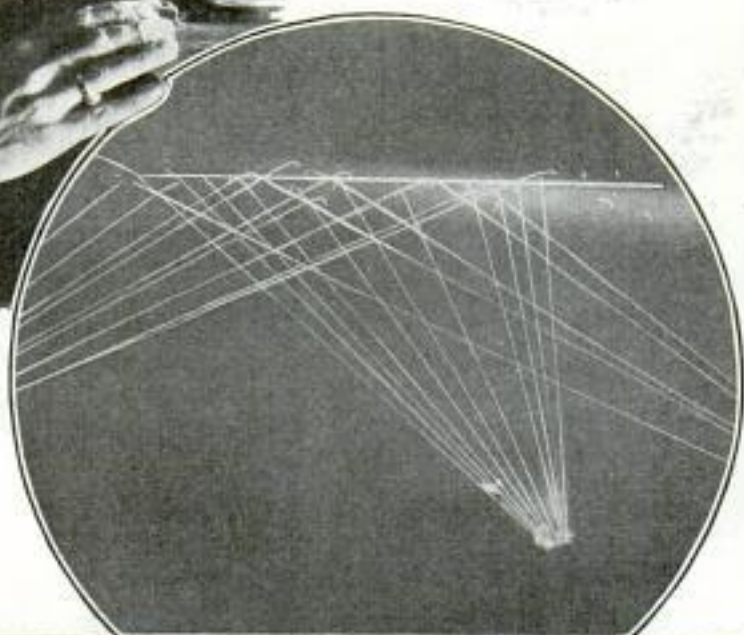


flight of the 500 shots per minute leaving the gun. At night, these tracer bullets are luminous, being coated with phosphorus, and resemble fireworks as they speed toward the target.

Sound receiver horns detect the presence of enemy planes at night. The location having been determined, it is transmitted to the searchlight battery and the eight-mile beam quickly puts its finger of light on the target. Immediately the anti-aircraft guns go into action, filling the air about the enemy planes with high explosive.

How each three-inch gun in the battery shall be placed is determined by mathematical calculation, the area to be pro-

on the truck which carries it. When an enemy discovers the location of anti-aircraft batteries, he sends out attack planes to zoom down and spray them with machine-gun fire. However, the batteries are ready for just such



LUMINOUS BULLETS FIRED BY MACHINE GUN AT TOWED TARGET

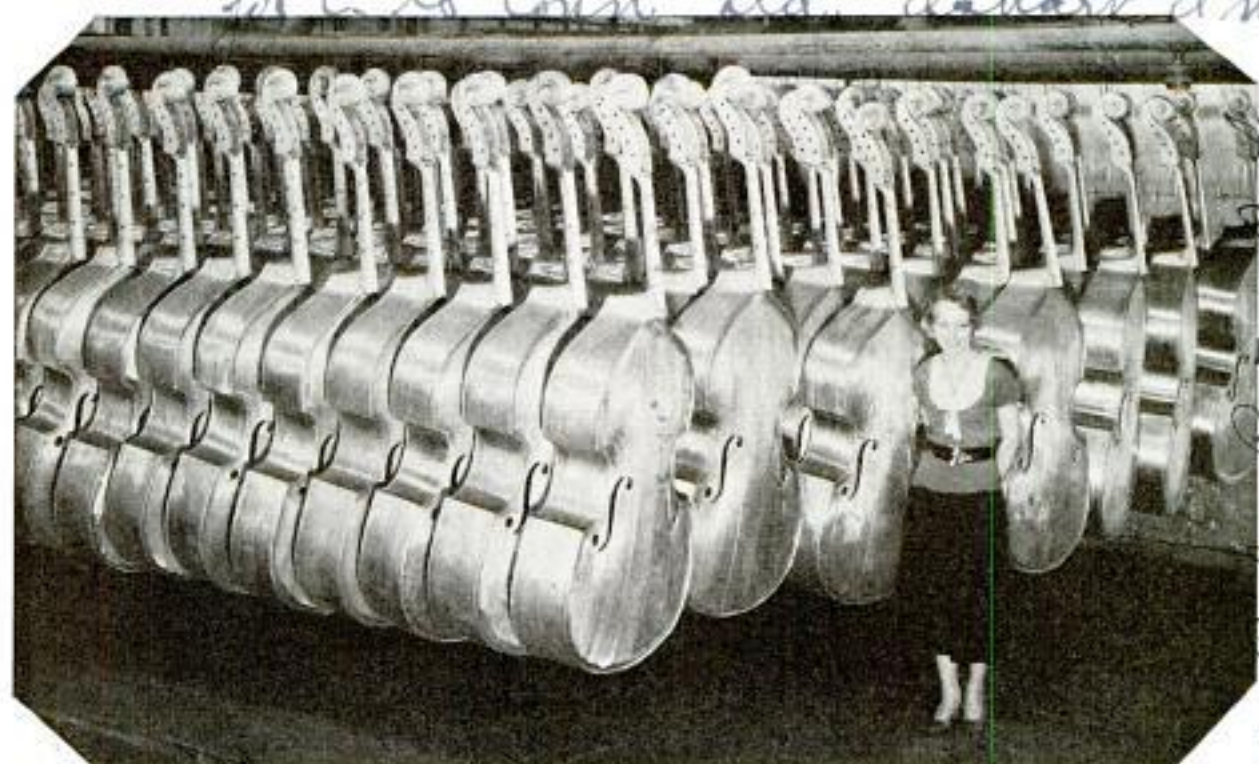
Top, Officer Following the Target through Sights on Top of the Machine Directing Fire of Four Guns; Center, How Tracer Machine-Gun Bullets Appear at Night; Bottom, Plane Towing the Target

an attack. Their fifty-caliber machine guns go into action, placing a band of steel bullets in the path of the attacking planes. These guns are equipped with special sighting devices by which the machine gunner can keep the planes in the center of his vision constantly. By the use of tracer ammunition, the gunner sees the

tected being divided into several sectors, each containing one gun. The Sperry director then is stationed at a point best suited for directing the fire, as well as for making the hose-line connections to all four guns. Two power plants on the director trailer produce electrical current for operations, one running at a time.

©1511 Made by Aluminum Company of America, 2449 Oliver Bldg
 POPULAR MECHANICS 805
 & Pittsburgh Pa.

Aluminum Bass Violins Are Moisture-Proof



Scores of Bass Violins Made of Aluminum Instead of Wood; the Metal Instruments Are Impervious to Moisture and Their Tonal Quality Compares Favorably with Wood Bases

Bass violins are now being made of aluminum and the metal instruments have a tonal quality comparing favorably with the finest wood basses. In addition they have the advantage of being impervious to moisture. They are made of light-aluminum alloy sections, welded together without the use of screws or rivets. The instruments are finished in aluminum, gold bronze or natural-wood colors.

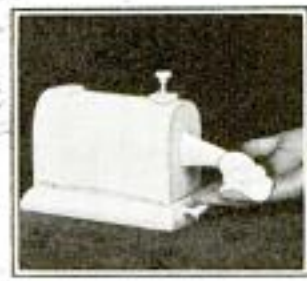
largely of linen and are in good condition after several hundred years. The so-called "silk" paper of the Arabs is said to have been made of linen fiber. The Arabs learned paper making from Chinese paper makers, captured in 704 A.D.

WAY TO MAKE BETTER PAPER SOUGHT BY SCIENCE

How to produce paper with the lasting qualities of ancient manuscripts is the goal of government scientists. Manuscripts dating from the year 1000 A.D. to 1749 A.D. are being examined to determine the relative lasting properties of different types of paper. The permanence of paper is an important factor in connection with government archives and other records intended for posterity. In examining records found in cornerstones of dismantled buildings, it has been found that in many cases they are valueless because the paper has crumpled or otherwise deteriorated. The ancient manuscripts are composed

TIME FOR SHAVING SHORTENED WITH LATHER DISPENSER

Both time and materials used in shaving are saved by utilizing a compact lather dispenser which enables the person wielding the razor to get enough lather to cover the face by holding a hand or brush under a funnel and pressing a lever. The lather is produced by a motor-operated brush which revolves against a shaving stick, while the water mixed with the soap is heated automatically as it is delivered from a reservoir. The flow of water can



be regulated to obtain a lather of any desired consistency.

Sold by C. L. Corn to Sta. Elkhart, Ind.

U.S. Navy 9/23/37

Bureau of Standards
 Washington D.C.

Kato Engineering Co.
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 Kato

DISTANCE SHIP PILES UP MILES BY ULTRA-STREAMLINING

So constructed that the pilot has no view ahead, the monoplane in which two Frenchmen recently established a world's record for non-stop flight is taken off and landed with the aid of mirrors. Images directly ahead of the ship are reflected by mirrors set out on arms from the port and starboard forward windows onto a V-shaped mirror on the instrument board. In actual flight, the pilot relies entirely upon the very complete set of instruments with which the craft is equipped. Pilot and navigator sit tandem, each at one set of the dual controls. The navigator is provided with a platform upon which he stands to take "sights" on the stars through a trap in the top of the cockpit. The fuel is carried in wing and fuselage tanks which have a capacity of more than 1,400 gallons. On their flight from Floyd-Bennett airport, New York, to Rayak, Syria, the pilots, Codos and Rossi, covered a distance of approximately 5,725 miles. The previous record was held by the Englishmen, Gayford and Nicolettes, with 5,309 miles. The French plane is a high-wing monoplane especially designed for long-distance non-stop flying. It was built about four years ago. A 500-horsepower twelve-cylinder engine with a four-blade air screw of wooden construction drives the ship. The unusual fuselage design offers minimum resistance to wind.



How Internal Sun Bath Is Administered to Patient by Means of Tiny Ultraviolet Lamp

LAMP FOR INTERNAL SUN BATHS IS SWALLOWED BY PATIENT

Internal sun baths are made possible by a device produced by Dr. Joseph Mandelbaum, bronchoscopist. It is a tiny gas lamp, radiating ultraviolet rays after it has been swallowed painlessly by the patient. The sun rays may be directed exactly upon the diseased spots for periods up to three minutes. Treatment of this type is expected to be of aid to the medical world in its fight on tuberculosis.

DRAFT REGULATOR ON FURNACE WORKS AUTOMATICALLY

Automatic and entirely self-contained, a new heat regulator for the furnace meters air in exact amounts to the fire so that the temperature may be kept at a desired point. A tube with finlike projections is inserted into the furnace. A special fluid in the tube expands or contracts as room temperature changes, activating mechanism that opens or closes the dampers. When the temperature dial is set, the device requires no further attention. It operates without any outside power, weighs four pounds and can be installed in less than an hour.



POLLEN PROTEINS ARE BLAMED FOR HAY FEVER

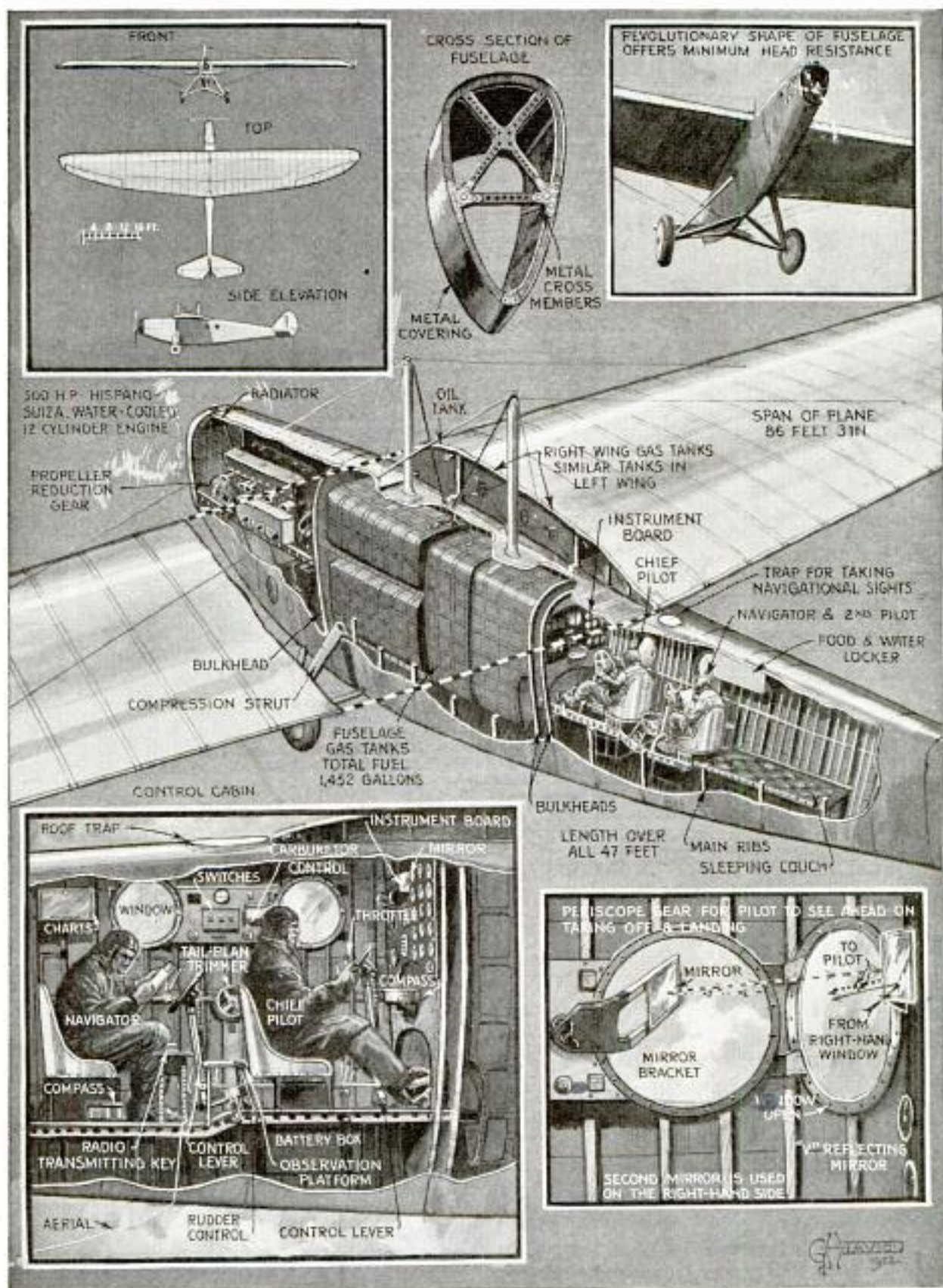
Blame for hay fever may be pinned on the proteins in the sneeze-producing pollens, rather than on their sugary or starchy constituents. This is indicated by investigations reported by Dr. Marjorie B. Moore, of the Abbott laboratories, and Dr. Leon Unger of Northwestern University medical school. There has been some difference of opinion over the ultimate cause of hay fever, part of the investigators tracing it to pollen proteins while others blamed certain sugar or starch-like bodies. Doctors Moore and Unger exposed pollens causing hay fever to the action of pepsin which digested away most of the protein. The pollens treated lost most of their mischief-making powers.

27 W. 72nd St.
How Internal Sun Bath Is Administered to Patient by Means of Tiny Ultraviolet Lamp
LAMP FOR INTERNAL SUN BATHS IS SWALLOWED BY PATIENT
Automatic and entirely self-contained, a new heat regulator for the furnace meters air in exact amounts to the fire so that the temperature may be kept at a desired point.
Thermatic appliances
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Thermatic appliances
Detroit Mich

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Mirrors Help Record Ship Take Off and Land



Here Are Several Photos and Drawings of the French Monoplane Which Was Flown "Blind" across the Atlantic to a Non-Stop Record of 5,725 Miles; Center and Bottom, Left, Note Arrangement of Seats and Controls; Bottom, Right, How Mirrors Enable Pilot to Take Off or Land without Seeing Ahead of the Craft

*Cmt. to H. Davis, Esq. Timmers
Hillside Road, Ewell, Surrey, Eng*

C148

Sculptor Beautifies and Saves Road Slopes



Two Views of Roadside Art; Bottom, "The Stampede"; Note Small Figure of Artist at Center Dressed in White

By modeling the moist dirt of sloping vacant lots into sculptured figures, a Hollywood artist is beautifying California roadsides and preserving the sloping banks

during heavy rains. The figures are covered with stucco for permanency. Parts of the figures extending from the main body are wired. In wet weather, the roadside slopes are saved from washing by the art, in the manner of terracing. Among the decorative art which the sculptor has produced is "The Stampede," which contains forty head of cattle, two cowboys and the figure of a woman, the spirit of the stampede.

POLICE USE TWO-WAY RADIOS IN AMERICAN CITIES

Two-way radio communication has been established for the police departments of Bayonne, N. J. and Eastchester, N. Y., the first two installations of their kind in the United States. The Bayonne system consists of a central headquarters sending and receiving station and nine radio-equipped police automobiles. Police officers cruising the streets in squad cars are able to talk with headquarters or other police cars. All radios in the system are tuned and locked on a wavelength of 8.6 meters. Messages transmitted on this band can be

heard only by persons having specially constructed sets and are not heard outside of the cities where they originate. The two systems were built and installed by the Radio Engineering Laboratories, Inc., of Long Island City, N. Y., at half the cost of the average one-way system operating on the ordinary frequencies.

LIGHT BULLET FIRED FROM GUN AT ELECTRIC-EYE TARGET

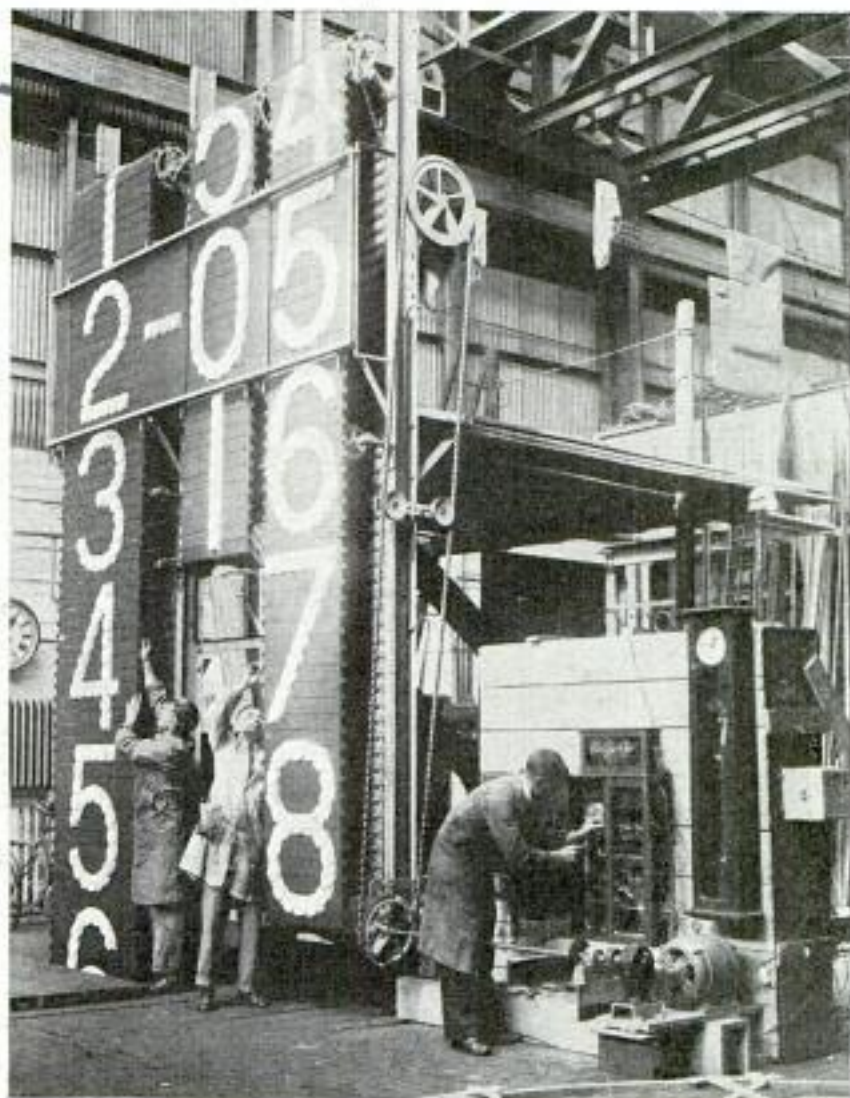
Bullets of light were fired from a nine-gauge shotgun at an electric-eye target in a recent demonstration of the versatility of the photo-electric tube, or electric eye.

Jeese - Oct Anderson, Box 604,

Allied Engineering
division

Using Universal
Expansion material
at National Electric
Expansion material
on Square Board, N.Y.

The shotgun, rebuilt by engineers of the General Electric research laboratories, contained a small but powerful light source in the breech. When the trigger was pulled, the light was turned on for a set length of time and the gun was trained on the target which was painted on a box containing a photo-electric relay. The bull's-eye was a narrow slit in the face of the box, behind which the electric eye was placed. When the projected light "bullet" hit the electric eye, contact was made by the relay and a large lamp was lighted. The light bullets were measured in dimensions of time, it being possible to predetermine their length from zero to thirty seconds. Thus, the longer the bullet, the greater the chance of hitting the mark because, after the trigger was pulled, it was possible to correct the aim within the time length of the bullet. Thus with the light gun it was possible actually to alter the trajectory of the bullet in flight, so even a poor marksman had a chance of making a good score. Of course, the light



Large Numerals at Left Move into Place to Tell Time; Device Is Controlled by Master Clock Shown at Right in the Photograph

JUMPING NUMBERS ON ROLLER TELL TIME AT STATION

Large moving numerals attached to an endless belt or roller tell the time at London railway station. The numeral on the right-hand side changes every minute, the center numeral every ten minutes and the number on the left every hour. In eight seconds, the roller moves far enough to bring another numeral into position to show the change. Operations of the jumping-number clock are controlled by electricity. A master-clock transmits periodic impulses to the electric gear, tripping a release lever at one-minute intervals so that a new number may move into place. The numerals are three-foot silvered glass reflectors. The roller on which the figures are shown is thirty-seven feet long and weighs three-fourths of a ton.



Shotgun Equipped to Fire a Ray of Light at Electric-Eye Target Which Lights Lamp to Show a Hit

bullet did no damage since a beam of light is anything but fatal.

©1340

Chas. J. W. Falconer
607 Main St
Essex, N.Y.

Quick Starting

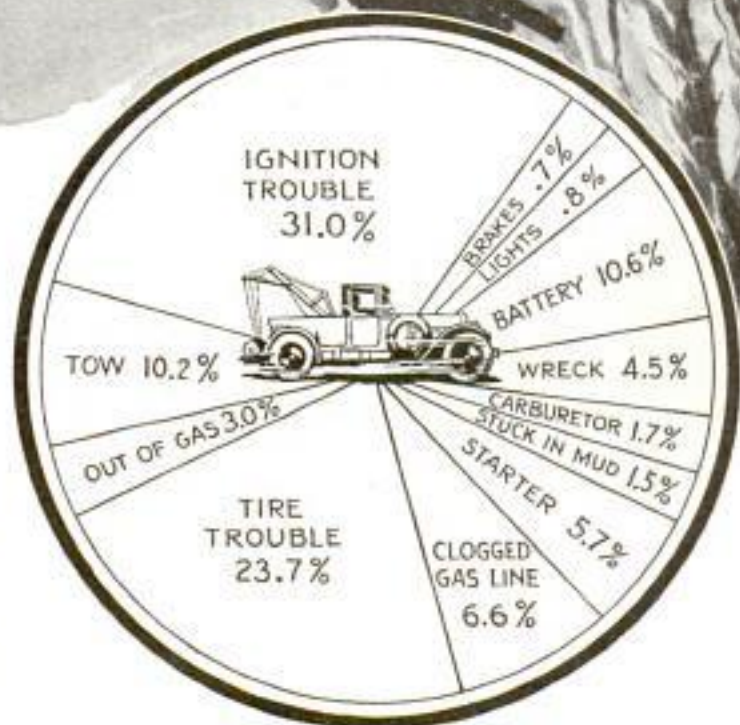
Franklin D. White
Battery Charger



By JAY WILLEFF

ALL automobile engines are harder to start in winter than in summer for several reasons. Gasoline does not vaporize as quickly. The oil does not flow as easily. Your storage battery is not as efficient because it depends on chemical action which lack of heat retards. Added to these are little electrical troubles which are magnified with cold weather.

By a little care you can eliminate eighty-five per cent of the electrical troubles that make your car hard to start. First, considering the storage battery as similar to a bottle, we know we can put water into it and take water out. If we take more out than we put back in, we will soon have an empty bottle, or with a storage battery, a dead battery. So have the charging rate of the generator set higher for winter. When adjusting the generator, clean the commutator with a strip of "00" sandpaper with the engine



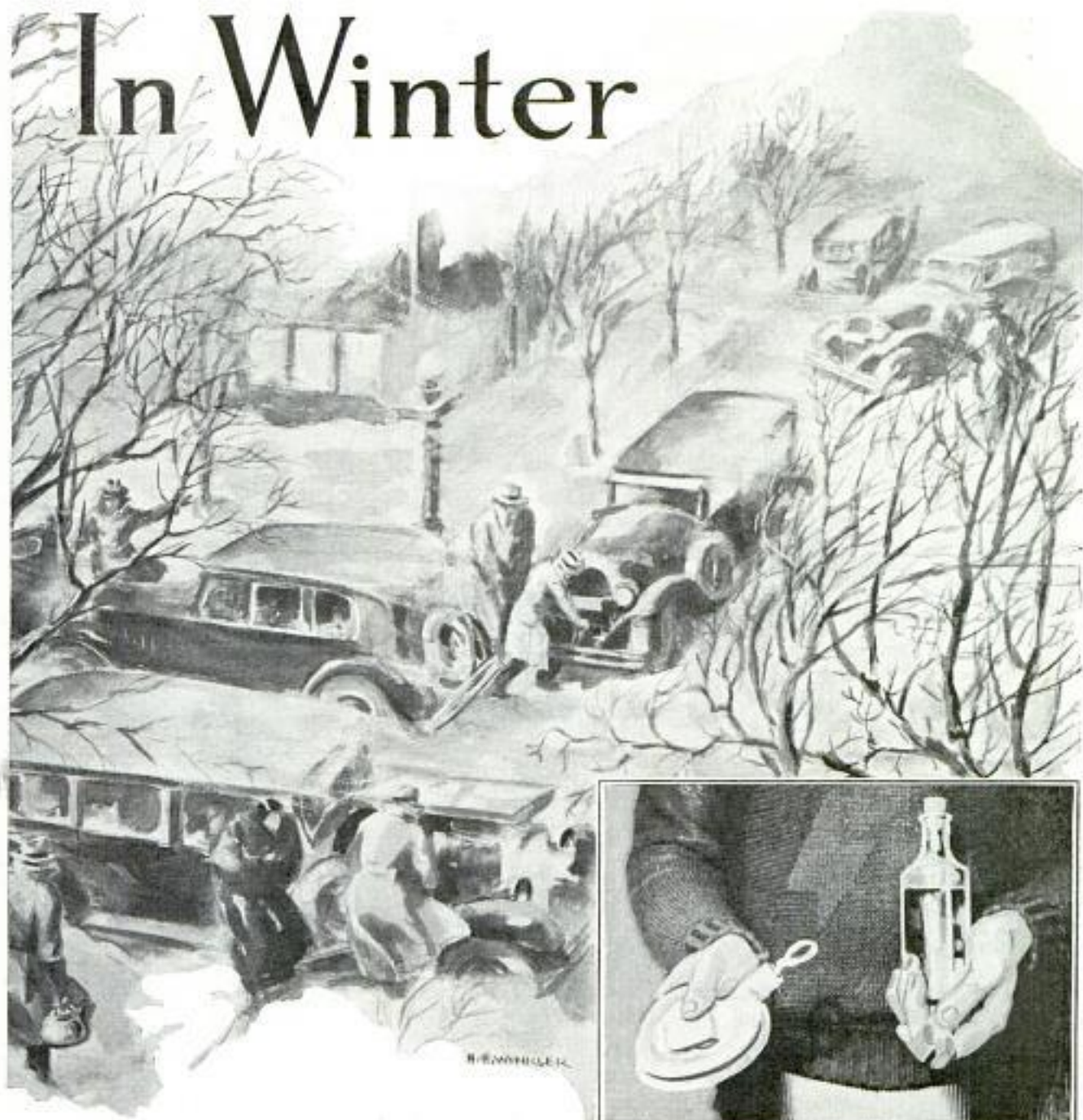
Road Trouble Chart Prepared by Automobile Club of New York; Note High Percentage of Ignition Trouble

running. The state of charge in your battery can be determined with a hydrometer, but most hydrometers read accurately only when used in a solution of about eighty degrees temperature.

The electric fan on your hot-water heater, electric defroster, and the radio all

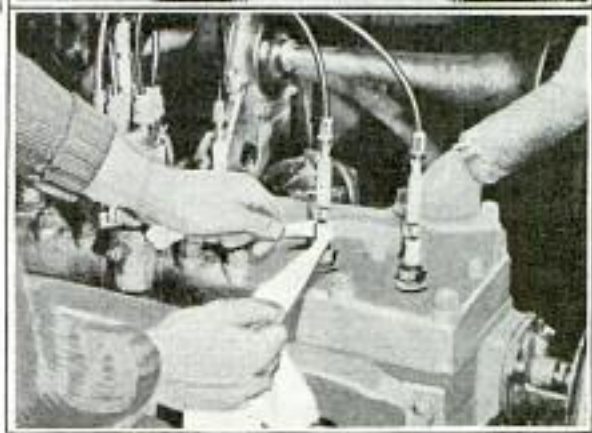
Franklin D. White
221 W. Chicago Ave.
Chicago

In Winter



increase the heavy winter load on the battery. Most radios are connected so the current they take does not show on the ammeter, yet they draw three to eight or more amperes.

An up-to-date edition of the familiar trickle charger of battery-radio days, is invaluable in winter. The unit hangs on the wall and is connected to the car through a clamp-on socket fastened to the dash. The charging rate starts at two and one-half amperes and tapers down as the battery is charged. If left on all the time it uses less current than the ordinary light bulb and, because of its design, cannot



Above, Motorists Should Carry a Spare Condenser, Fuel-Pump Diaphragm and Bottle of Kerosene; Below, Cleaning Top of Spark Plug



Above, Depressing Clutch in Cold Weather When Starting the Car Saves the Battery; in Circle, Cleaning the Battery with Soda and Water; Right, Polishing the Battery Terminal with Steel Wool

harm the battery. A fully charged battery with a gravity of 1.285 will not freeze until ninety-six degrees below zero. A half-charged battery reading 1.200 will not freeze until sixteen degrees below zero. A discharged battery will freeze at sixteen degrees above zero.

Care should be taken in adding water in winter. Keep the plates covered, because only the part in the solution is active and will deliver power. Add the water before starting on a drive or before charging, otherwise, the water being lighter than the acid, will remain on top, not mixing, and may freeze.

Use only distilled water because the impurities of hydrant water accumulate until they cause damage. Do not fill the battery more than three-eighths of an inch above the separators because, if higher, the gassing action while charging will tend

to spill the surplus out of the vent hole, reducing the acid in the battery and making the top of the battery wet and subject to leakage.

Clean the top of the battery by wetting it and sprinkling baking soda on the surface to neutralize the acid. Wash it off with the garden hose. Be careful that the vent plugs are tight and do not get the soda into the cells. If acid has been spilled on the top of the battery, it absorbs moisture from the air and re-



mains wet, gathering dirt. This wet acid-soaked dirt forms a short circuit which drains the battery of power when standing idle and "shorts out" part of the charging current from the generator while the car is being driven.

Many motorists have had the experience of having the starter crank the engine several times without the engine starting, then are surprised to have it start with the first turn of the crank. This is an indication of dirty connections which cause a relatively high-voltage drop due to the heavy starter current, with the result that the voltage supplied the coil is so low the

C1370

B. L. Electric Mfg Co

POPULAR MECHANICS

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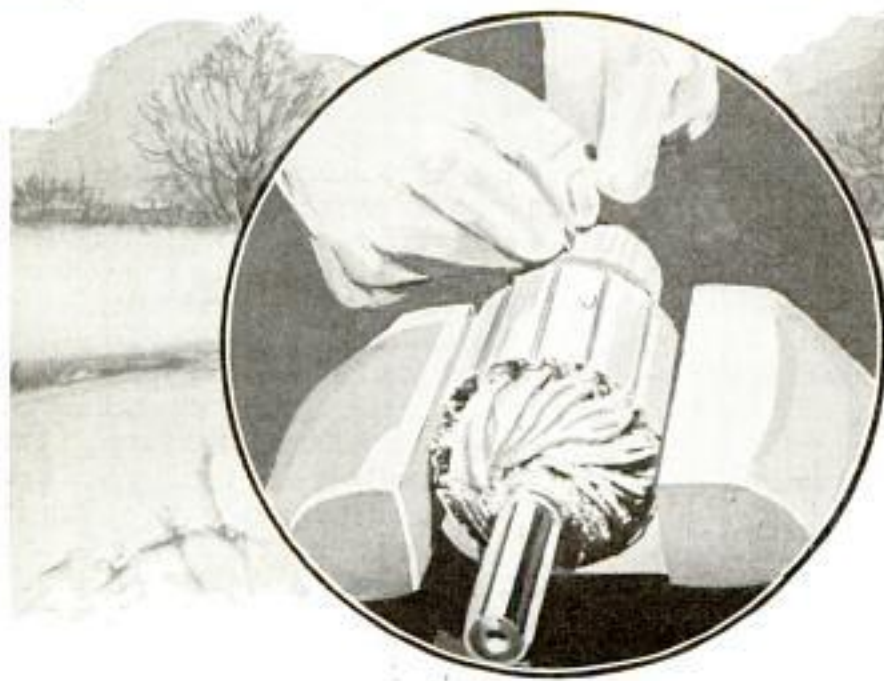
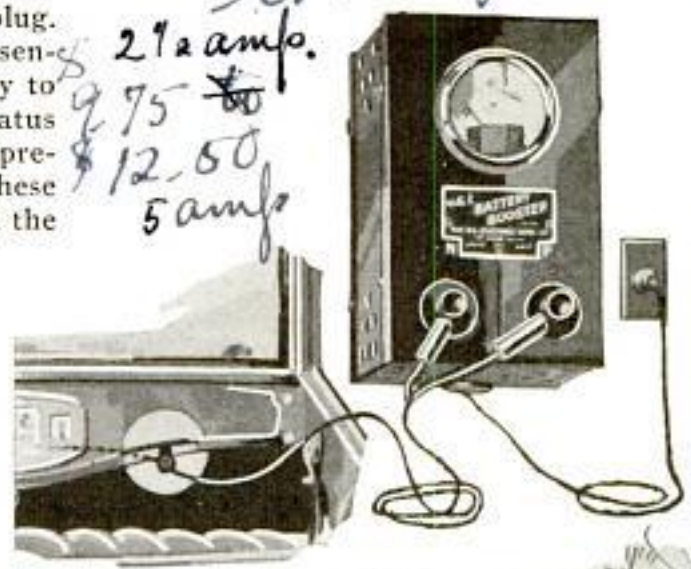
St. Louis, Mo

spark does not jump the gap in the plug.

If we consider the current as a messenger taking the power from the battery to the starter motor and all other apparatus and connections, like gates, we will appreciate the importance of keeping these gates clean and in working order. All the tools needed are an adjustable wrench, screwdriver, a pair of pliers, and a handful of medium steel wool.

Polish the battery terminals with the steel wool, until they are bright. Roll some of the wool into a cone and clean the inside of the cable terminal loops. Remove the ground connection and clean

2 1/2 amps.
9.75
\$12.50
5 amps



Above, Battery Charger Which Can Be Attached to Car as It Stands in Garage; Left, Dressing Up Commutator Spark

both the frame and the end of the ground strap until they are both bright, then clean the nut, bolt and washers in the same way before replacing. After cleaning, paint or coat with grease to keep the air and moisture from oxidizing them again.

If the contacts in the starter switch are badly burned, it is better to buy a new one. Clean the connections to the starter motor. Remove the cover band of the starter and inspect the brushes; if badly worn, put in new ones, being careful to fit the face of the brush to the face of the commutator. This can be done with a strip of fine sandpaper looped half way around the commutator, with the back next to the copper commutator and the cutting side under the brush. By pulling

it back and forth a few times, the end of the brush will be cut to the same curvature as the commutator. If the insulation between the copper segments is above the level of the copper commutator, it will tend to raise the brushes as they pass from segment to segment. High mica can be removed with a piece of hacksaw blade. On many of the later cars there is a ground strap connecting the engine to the frame to avoid a poor connection through the bolts of the rubber mountings now used. Both ends of it should be cleaned.

Oftentimes the connection at the mounting of the starter motor on the engine is the cause of hard starting. Both the face of the starting motor and the corresponding place on the engine should be cleaned

19th and Washington
6 amps
12.175

with steel wool and the surface nicked in a number of places with a chisel to improve the contact. It is well to check the wires, contacts and lugs in the ignition circuit and lighting system. Polish them with steel wool and put them back together tightly. If any of the wires are worn, put in new ones.

Be sure to keep the distributor cap and the outside of the spark plugs clean. A thin film of moist dirt can cause a short circuit. On a dark night look at your plugs and distributor while a helper accelerates the engine and see if any sparks jump on the outside of the plugs, distributor cap and ignition wires. The spark plugs should be cleaned and the gap properly set to the specifications of your car. When easy starting is more important than extreme speed, it is well to set the gap .005 closer, than specified.

If the ignition wires leading from distributor to the spark plugs are cracked or otherwise in bad order, you can install new ones yourself but to avoid the possibility of getting the wires twisted, remove only one wire at a time, replacing it completely with the new one. In this way, even if you are not familiar with the proper timing of your car, you should have no trouble.

A bad condenser, or the connections to it, show up by hard starting and rapid pitting of the distributor points. A new one can usually be installed quite easily. Have it checked when you buy it by an elec-

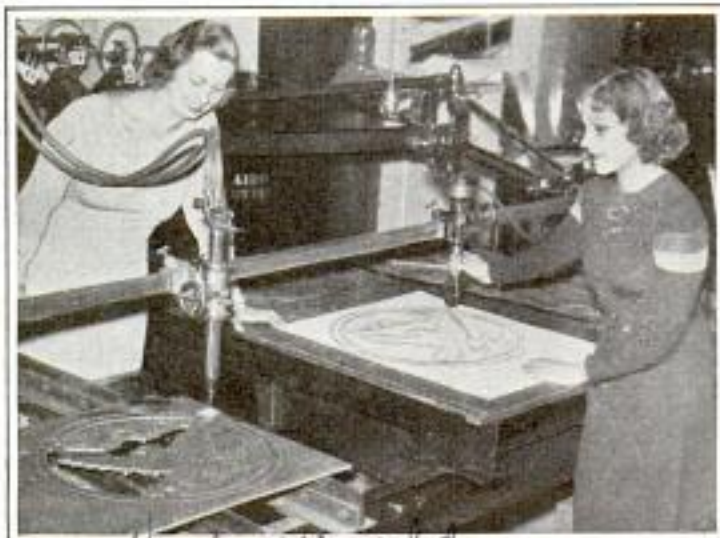
trical shop so you are sure of its quality. With the high-compression motors now used, many motorists are carrying a spare condenser so as to have the proper type available in an emergency.

In localities where extreme low temperatures are encountered, it is worth while connecting a hot-shot battery so that the power for the coil can be supplied from this battery when starting the engine. After the engine is running, switch the coil to the regular battery.

If you are caught in a heavy storm and your ignition system is drowned out, a bottle of kerosene in the pocket of your car is invaluable. Soak a rag and wipe off the distributor cap, spark coil, wires and plugs. This will often prove a means of getting started.

During cold weather, hold your clutch pedal down while starting. This relieves the starting motor of the heavy drag of turning over the clutch and transmission gears in their heavy grease.

A short circuit in the electrical system can be detected by removing one connection from your battery and inserting a voltmeter with one contact to the battery and one contact to the connection just removed. If a voltmeter is not available, a dash-light bulb will serve the purpose but will not be as sensitive to slow leakage circuits. Remember that every switch is like a valve, and unless it shuts off completely, power will leak through which gradually runs down your battery.



Cutting Torch Burning NRA Design into Metal Slab, Using a Paper Drawing as a Guide in the Process

DESIGNS CUT IN METAL AS TORCH COPIES PAPER DRAWINGS

Even the most intricate designs can be burned into metal slabs with the aid of a cutting torch which is guided over the slab by means of a pilot. The torch is mounted on one end of a parallel bar and the pilot on the other end. When the pilot is moved over a drawing on paper, the torch executes the same design in the metal. Any steel slab, up to twenty-five inches in thickness, can be cut in this manner in a very short time.

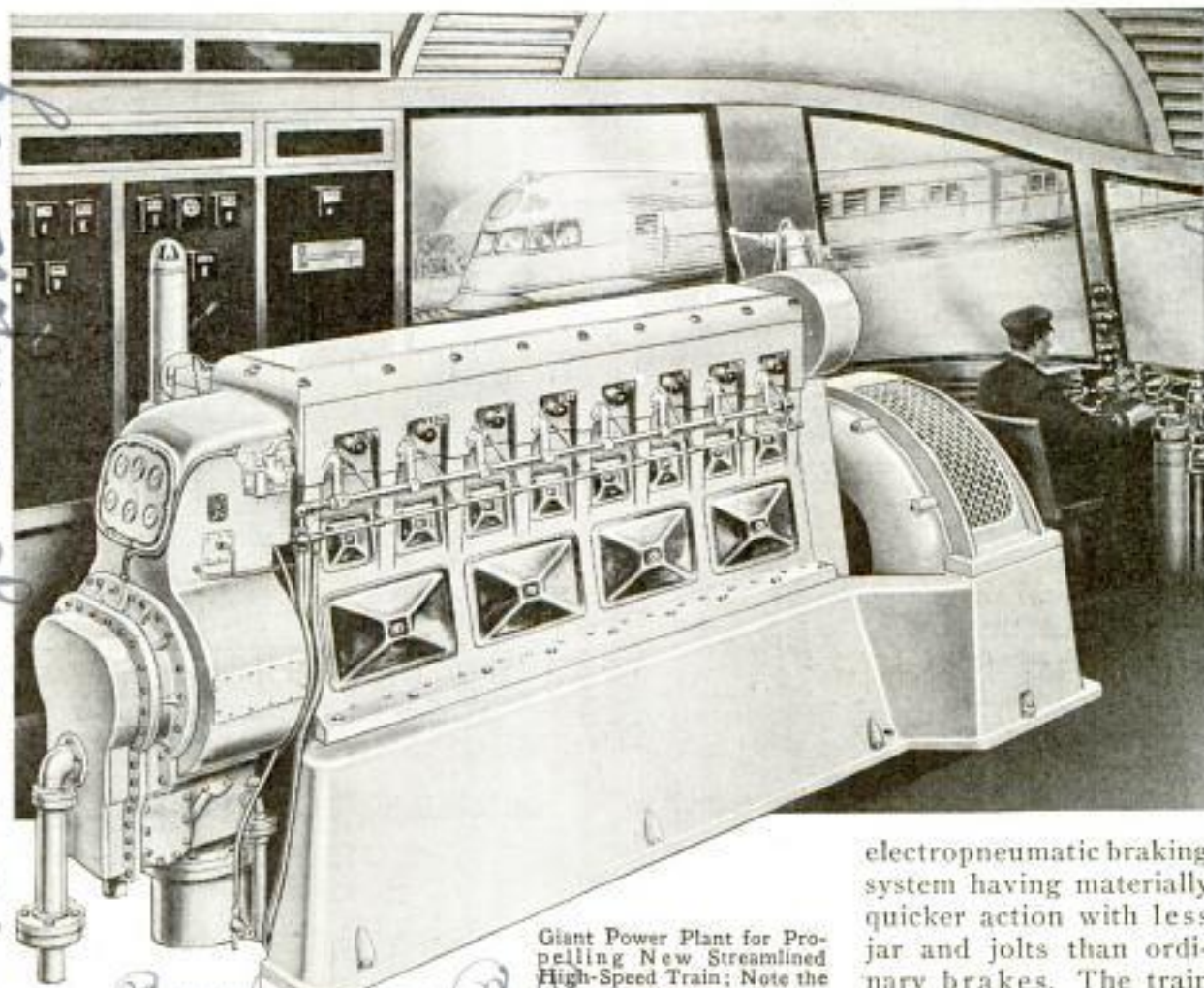
at National Metal Exposition
 Detroit, Mich.
 1/15/42
 9-11-42

no further data

C1479

Built by Budd Mfg. Co.
25th and Hunting Park
POPULAR MECHANICS 815
Av. Philadelphia

Oil Engine to Drive Fast, Streamlined Train



Giant Power Plant for Propelling New Streamlined High-Speed Train; Note the Controls

U.S. Steel Corp 71 Broadway New York City

Under the Penn. Crest. The
Baltimore and Potomac

Powered by a 600-horsepower oil-burning engine, a stainless steel train designed along aerodynamic lines is expected to attain speeds above 100 miles per hour. The eight-in-line engine has no carburetors, being of the Diesel type. Its power is turned into electricity by means of generators for operation of the train and illumination. The train will be a three-section articulated unit, operating on four four-wheel trucks instead of the normal size trucks. Its weight will be less than half that of a steam train of the same capacity. The latest air-conditioning equipment will be installed for the comfort of passengers. Every pane of glass will be shatterproof. The center of gravity of the train will be fifty-one inches above the rails, or twenty per cent lower than the typical railroad car. This means, of course, that the train will "hug the rails," in spite of its light weight. A major safety factor will be the

Burlington R. Co.

electropneumatic braking system having materially quicker action with less jar and jolts than ordinary brakes. The train will replace more expensive steam service on the Burlington. At first, it will be used on daylight runs.

GREEN PLANTS LESS NUMEROUS THAN DESTRUCTIVE ONES

Plants that tear down are more numerous than plants that build up. This appears from a survey of the fungi made by Prof. G. R. Bisby of the University of Manitoba. Comparative counts of plant lists from large geographical areas showed fungus species at least as prominently as species of green plants, and when the lists from smaller regions, in which the plants are more completely known, are compared, the fungi rise to majorities which sometimes are top-heavy. Fungi are divided into two classes, those which live by devouring dead and decaying plant and animal material, and those which are parasitic, like the most common diseases of plants. The former outnumber the latter.

Journal of Botany
Baltimore, America

Wharton's Copying Corp
2160 W. 196
Cleveland, Ohio

Taxidermy Art Draws Eye to Show Window



Top, Rabbit Group; Center, Mounted Frog Troubadour; Bottom, the Artist Is Preparing Duck Display

Skilled taxidermists have found a new field for their art, as the result of experimenting with mounted specimens as attention-getters for display windows. Merchants have discovered that the mounted birds and animals are particularly effective in arousing the interest of the passer-by, drawing his attention to goods offered for sale. Some of these displays are unique. At the beginning of the duck-shooting season, a sporting-goods merchant whetted the desire of prospective hunters for new equipment by displaying a group of



ducks, carefully mounted in natural flying position and suspended in front of an appropriate background. Other taxidermy window displays that have attracted attention were made by mounting specimens in caricature of human activities or attitudes, such as the rabbit family group, the crow, the frog and others. Frogs are particularly adaptable to this type of mounting, because they may be posed in man-like positions. Frog mounting provides opportunities for unusual window displays and also a fascinating hobby for the amateur taxidermist.

BIRD COLLIDES WITH AIRPLANE AND INJURES FLYER

Birds usually give airplanes a wide berth, but a buzzard nearly caused disaster to an army plane recently. The ship was flying in a four-plane formation when it collided with the bird. The buzzard struck and broke the windshield and the pilot suf-

fered severe lacerations about the face and the loss of three teeth. The flyer landed at an emergency field and was given first aid by his companion. Another ship of the formation also landed and carried the pilot to a hospital where more than twenty stitches were required to sew up his wounds. The buzzard did not live to boast of the trouble it caused.

*Northwestern... taxidermy...
 C/54...
 Que... 9/20/53*

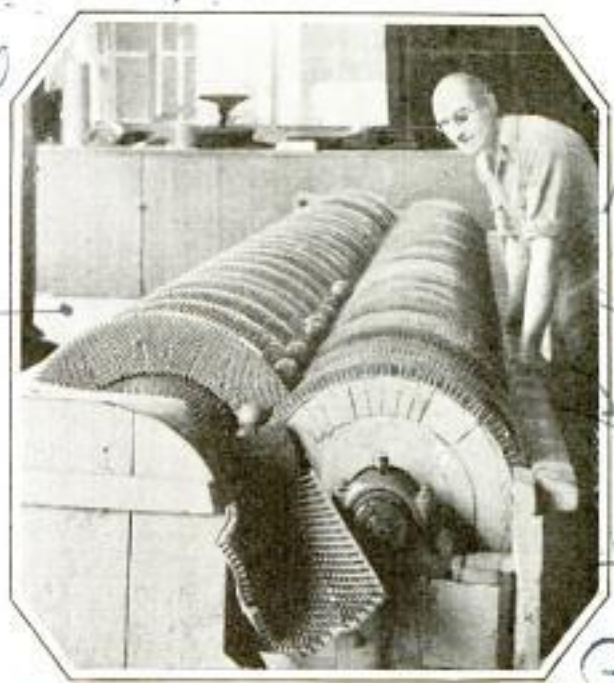
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 ...*

*Lieut. Jerald W. Massey, Air Corps
 Ft. Rame Field, Carlisle, Pa.*

221 N. La Salle C1420

CABIN OF PLANE PRE-COOLED WITH DRY ICE AND FAN

When transport planes are being "warmed up" at airports in hot weather, the cabins become excessively hot while exposed to the full glare of the sun, and passengers frequently are uncomfortable until the ships reach high altitudes and cooler temperatures. United Air Lines has been experimenting with dry ice for pre-cooling the cabins before the ships take off, and in a recent test the temperature of the cabin of an all-metal air liner was reduced from 104 degrees to twenty-nine degrees in ten minutes. A louvered container coordinated with a powerful electric fan was placed in the cabin and filled with dry ice. The stream of air blowing across the dry ice reduced the temperature from above 100 to below freezing and the temperature inside the cabin remained below seventy degrees for twenty minutes after the pre-cooler was removed. This is adequate time for loading passengers and cargo and dispatching a ship.



Dry Cleaning of Oranges Is Easy with This Twin-Roller Machine; Rubber Tips Remove Dirt

"DRY CLEANER" FOR ORANGES PREPARES FRUIT FOR SALE

Oranges are cleaned and polished for the market by a dry-cleaning machine devised for the fruit grower. It consists of two cylinders which revolve side by side. Each is fifteen feet long. On the outside of each cylinder are spirals covered with rubber matting. Soft rubber, flexible piles about three-quarters inch high extend from the matting. As the cylinders revolve, the spirals turn toward each other and intermesh. The oranges are dumped onto the drums and as they work toward the outlet, are turned over and over, the rubber piles removing dust and grit and polishing the fruit.

WOODEN ANIMAL HOBBY TAKES SPARE TIME OF ARTIST

One commercial artist in New York who specializes in pictures for children has combined his professional talents with his hobby of woodworking. In his leisure time he cuts out and joins together the



figures of wooden animals, then decorates the toys with colored paints. He has also made small pieces of furniture and similar toys, using the skill acquired in his hobby in fashioning the pieces, and the deftness of his profession in decorating them.

U. S. DEATH RATE LOWEST SINCE CENTURY BEGAN

That the health of citizens of the United States is improving steadily is indicated by a declining death rate, now at its lowest point since the turn of the century. The census bureau first began to keep a record of deaths in 1900. Last year, 10.9 out of every 1,000 persons died. In 1931, the figure was 11.08 and in 1930, 11.30. Fewer persons died last year from intoxication, tuberculosis, infectious diseases and poisonings.

Mr. Kalam E. 17th. Portland Ore. C. M. P. 934

Vernon Sprunt 44 Washington Square

U.S. Daily 9/23/33

© 1394.

Cont. Elton Glassman
55 W. 86 St. New York

The Temple



dition rooms and numerous offices and specialized apparatus, is now in operation and is effecting profound changes in the art of broadcasting. With the world as its theater and English as its medium, the Radio City studios become mankind's principal focal point of sound entertainment. Every human activity which finds its expression in sound will be thrown to the four winds by Radio City's super-power transmission system. The new temple of broadcast-



WHEN men, like gods of thunder, speak to the peoples of the earth as to one assembly, and all faces turn in one direction and hear one voice, that is scarcely less than a miracle.

Daily international radio broadcasting is not a prediction but a reality. The dedication of a temple to glorify the radio voice, the new home of the National Broadcasting company in Radio City, welds mankind into a common family and carries American voices to the remotest ends of the earth.

This gigantic cathedral of sound containing eleven acres of floor space, twenty-seven hermetically sealed studios, six au-

Above, Sculpture over Main Entrance to Studios; Below, Operating the Air-Conditioning Control Panel

ing is part of the seventy-story R.C.A. building, but on account of the peculiar requirements of broadcasting it was not possible to build the studios into the main structure of the building. It occupies an

New York City

of Sound

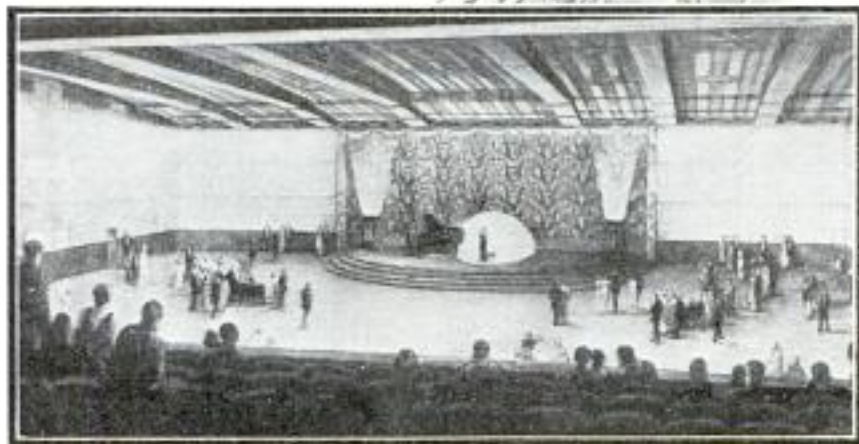
eleven-story wing in which the large studios are located on the fourth, seventh and ninth floors. Parts of the ninth, tenth and eleventh floors are occupied by a master studio eighty by 130 feet and having accommodations for 500 spectators in its observation gallery. The remaining twenty-six studios are designed to take care of the varying demands made on a national system.

The design and equipment of this eleven-story building are the result of a world-wide study of broadcasting technique, under the direction of Henry Hofmeister and Andrew Reinhard, the senior architects. In addition to large studios for handling unusual productions, there are a number of small studios designed to handle individuals or small groups. Child artists have a special

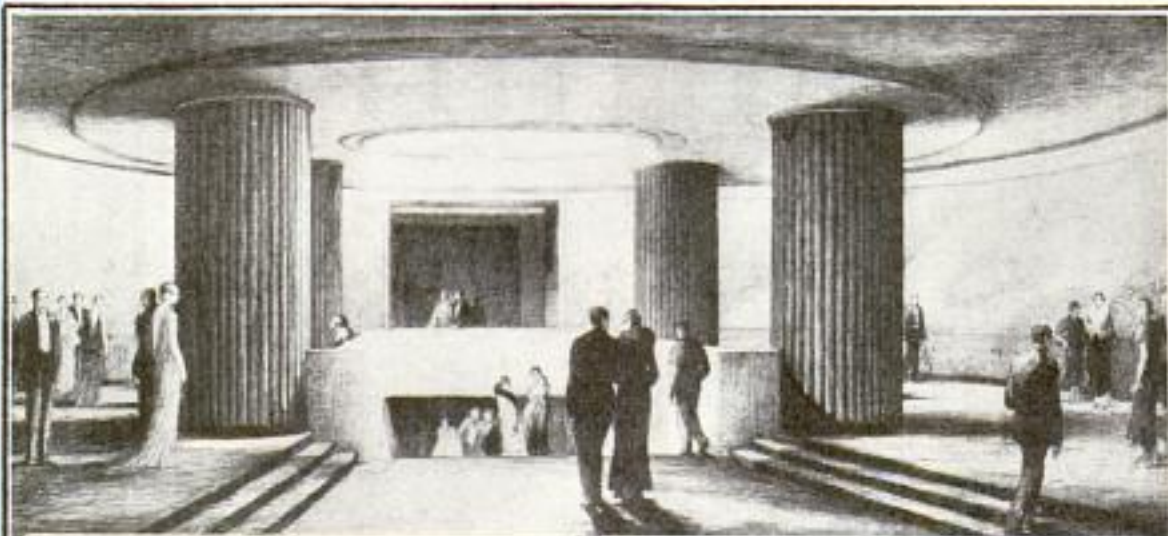


reception and lounge room in connection with a studio for juvenile productions.

On the tenth floor, four studios are grouped around a central control room, designed especially for television broadcasting. Four individual scenes can be set up here, making it possible for the television camera, or scanner, in the control room to shift instantly and focus on any of the four. Because the control-room engineers can look directly into any of the studios, the broadcasting of group productions can



Above, Working on the Maze of Inter-Connections to the Control Racks; Below, View of Broadcasting Studio from Spectators' Gallery

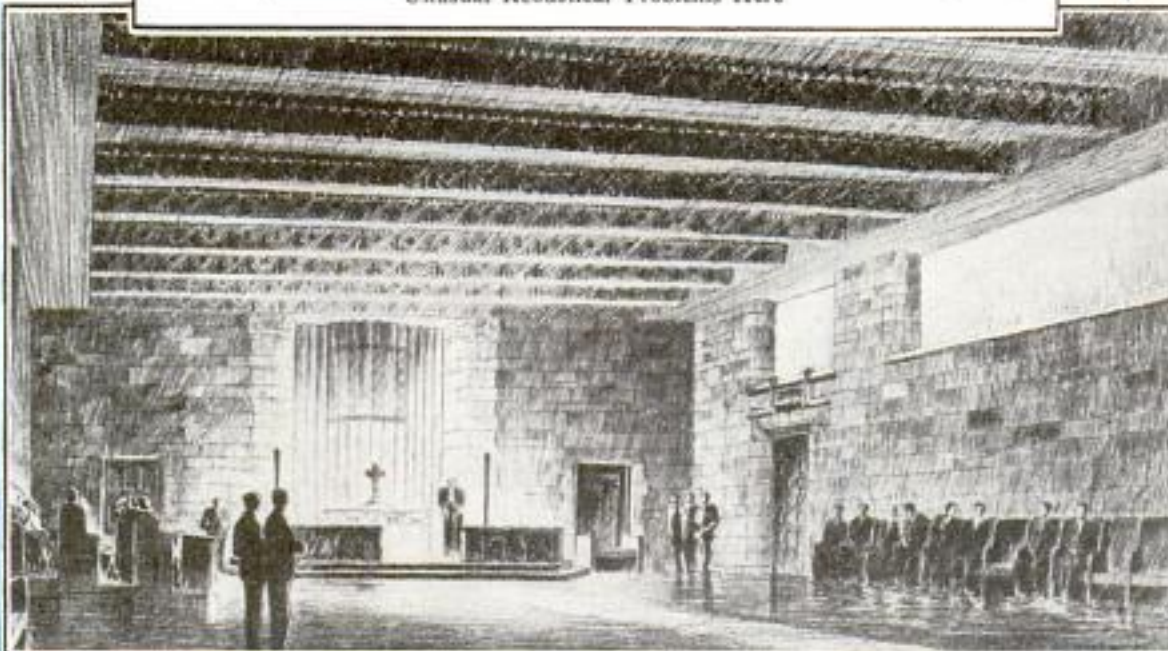


Above, a View of the Main Foyer of the New National Broadcasting Company Studios Occupying a Section of New York's Radio City, a Seventy-Story Structure

Below, Part of Huge Life-Size Mosaic over an Entrance to the Studios; It Shows How Thoughts Are Transmitted by Radio to Free Man of His Enemies



Below, the "Church" of Radio City; This Studio Will Be Used Principally as a Chapel in the Broadcasting of Religious Services; New Materials Solved Unusual Acoustical Problems Here





Enamel Plaque in Decorative Scheme, the Microphone Depicting Man's Mastery of Communication

be managed with ease and efficiency. It is possible to place an orchestra in one studio, the principal actors in another, group scenes in the third, and sound effects in the fourth, mixing these four pick-ups electrically in the control booth and obtaining the desired effects.

Of course, one of the salient problems confronting the designers was sound-proofing. Each of Radio City's twenty-seven studios floats free from the building skeleton and most elaborate sound-proofing systems were installed in walls, floors, and outlets.

An air-conditioning system is second in importance only to sound-proofing. The only windows allowed are those opening into observation galleries and control booths. This large and complicated air-conditioning plant, costing \$1,000,000, ventilates the windowless rooms in the broadcasting center. Special precautions were taken to prevent the transmission of sounds from one studio to another through ventilating ducts and streamlined air-supply outlets eliminate the noise of air rush. The system not only changes air but washes, cools, and dehumidifies it.

How do the new studios affect reception in the home? O. B. Hanson, chief engineer of the National Broadcasting company, answers the question.

"Transmission," he said, "has been greatly improved. Our transmitters make available to every home receiver 10,000 cycles,

while the average transmitter cannot broadcast more than 8,000. Telephone lines have 8,000 cycles. Many receivers have a range of 4,000 cycles in their circuits, but their loud speakers deliver only 3,000 cycles to listeners. The R.C.A. bi-acoustic receiver gives more than 5,000 cycles.

"From this it is plain that our broadcasting range is a long jump ahead of the receiving range. But I am confident that manufacturers will soon increase the tonal ranges of receivers in order to reproduce voices and music even more faithfully than at present. I hope a way will soon be found to widen the present side bands of broadcasting. We should have 20,000-cycle separations instead of a 10,000-cycle allocation.

"It is obvious that the public demand for television is such that it will be met immediately after the apparatus becomes practical and economical. Television is an elusive thing to talk about, but I am certain that more research is necessary before it is made practicable.

"Radio has only begun its great history in human affairs. We have traveled at high speed and we intend to develop radio into one of the fine arts as quickly as possible. Suppose we had a great unified educational program on the air, under great teachers? That may come within five years. Broadcasting is the ideal method of improving cultural relations and international understanding."

C 1420.
822

Fast Passenger Plane Is Quiet Like Pullman



Giant Transport Ship at California Airport; Note the Smoothly Flowing Lines That Reduce Resistance to Wind; Landing Gear Is Retractable

Quiet like a Pullman car, a new giant transport will be placed in service soon on an American air line for high-speed travel. Its top pace is above 200 miles per hour, while the cruising speed with seventy-five per cent of its power is 185 miles per hour, rating the ship as the fastest multi-motored passenger plane in the United States. The plane has an unusual seating arrangement so that it will carry from twelve to twenty-one passengers. By rearranging the locating of the radio equipment, the twelve-seat ship may be changed to fourteen. If desired, the capacity may be increased to twenty-one by putting in one seat for two passengers on one side of the wide fuselage and a single seat on the other, with seven rows of seats. The twin-motored ship is unusually quiet, having a sound level of seventy to seventy-two decibels at full cruising speed, or about that of a Pullman car. Conversation in ordinary tones can be heard from one end of the cabin to the other. Geared controllable-pitch propellers, packing between the outer and inner shells of the plane and decorations and drapes of soft porous materials are responsible for the low sound

level. In a test of lifting power, the plane's pilot switched off one motor in a take-off at an Arizona airport. The plane lifted from the runway and flew 298 miles to Albuquerque, N. Mex., on only one motor with a full load. The two motors develop 1,400 horsepower. While the landing gear is retractable, the wheels protrude far enough to provide an emergency landing surface. Built by the Douglas Aircraft company of California, the transport will be used on regular routes of Transcontinental and Western Air, Inc.

BIGGER, FAST-GROWING TREES BRED BY SCIENTISTS

With the aid of X-rays and hypodermic needles, scientists are breeding bigger and faster-growing trees. By cross-breeding special types of trees, they are seeking to produce timber that will grow to saw-log size of eighty feet long and sixteen inches thick in twenty-five years, just half the time it now takes. The new trees are being developed at the Institute of Forest Genetics, in California. It is estimated that it will cost only one-third as much to grow

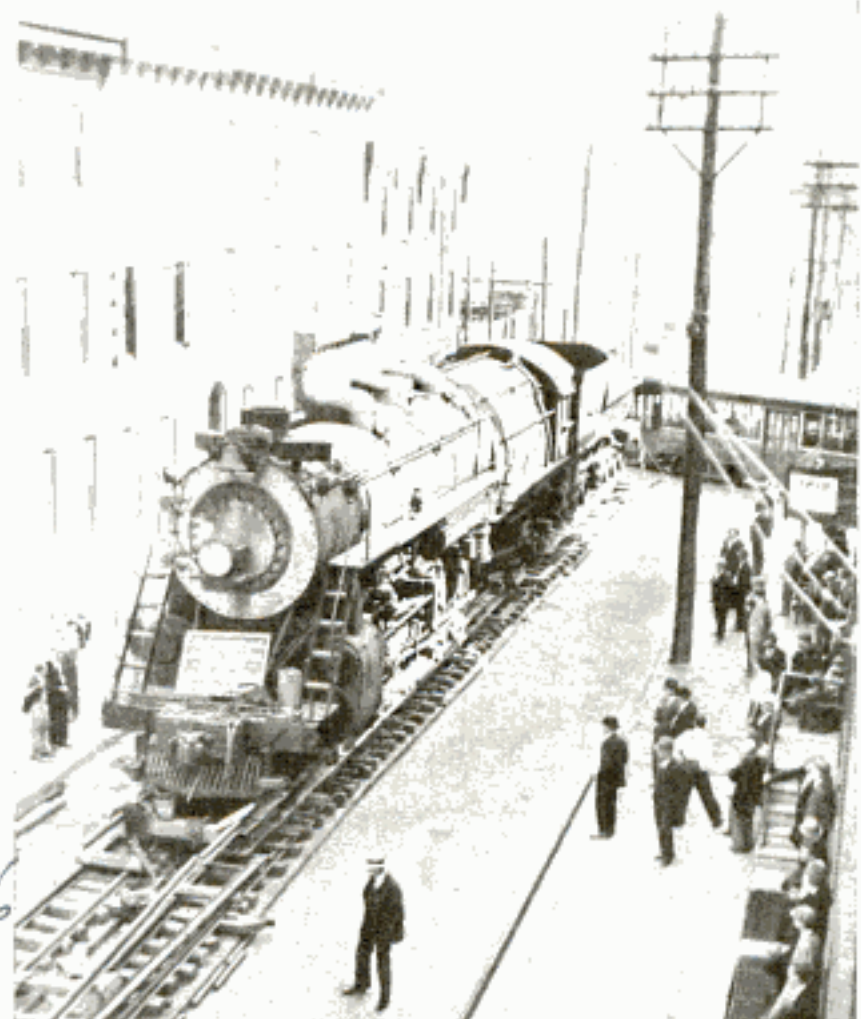
Douglas Aircraft Co
Santa Monica
Calif.

Transcontinental
Western Air Lines

Municipal Airport
Kansas City Mo

Placerville
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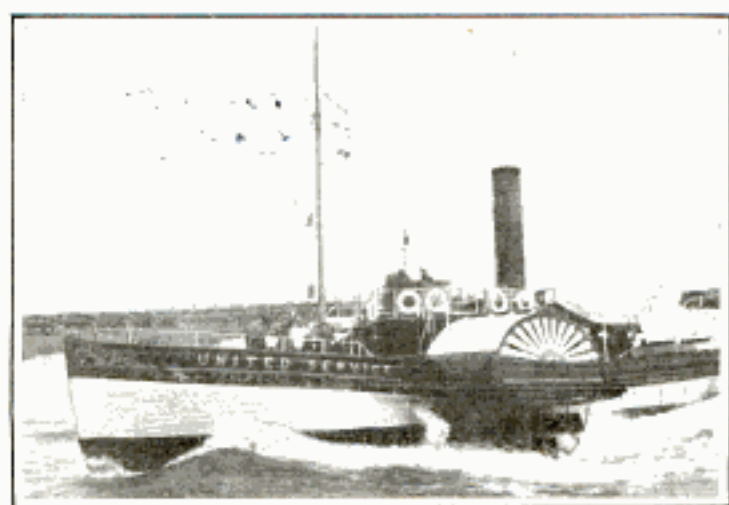
a crop of trees maturing in twenty-five years as it does to raise a fifty-year crop, initial costs being equal. The new trees are produced by artificial mating, controlling the pollination process. A hypodermic needle is used for sprinkling the pollen from one tree on the flower of another, canvas covering the flower being pierced by the needle. Seeds developed in this way produce a tree with the best qualities of both its parents, such as speed of growth and straightness of grain. Experiments also are being conducted with X-rays in an effort to cause seed changes that will result in the seeds growing into better trees.



Here is How Giant Locomotive, the 60,000th Produced by an American Manufacturer, Moved through a City on Temporary Tracks

e/446
**SIDE-WHEEL SHIP
 IN USE OVER
 SIXTY YEARS**

Built in 1872, an old side-wheeler, the "United Service," is still in use in England. This boat today is used to carry parties of sight-seers out into the North sea to view the Soroby sands, which are above water at low tide and have caused many wrecks.



British Side-Wheeler Built More Than Sixty Years Ago Which Is Still Carrying Passengers in the North Sea

**ENGINE MOVED THROUGH CITY
 ON TEMPORARY TRACKS**

How to move a giant locomotive through city streets to the Franklin Memorial in Philadelphia was the problem undertaken by a moving company. It was accomplished by laying special tracks, pulling the massive engine a few feet, removing the tracks and relaying them ahead of the locomotive, repeating the operation over the five city blocks between the railway yards and the museum. The job required six days. The locomotive was the 60,000th built by the Baldwin Locomotive works.

Ⓜ A process has been developed for extracting oil from soy beans, using alcohol as a solvent.

Board St. Phila.

*Comr. H. J. Sturley, Islethorn,
 Pitsea Road, Pitsea
 Essex, Eng.*

*Scene was
 Letter 9/20/33*

C1410. Cmt. Frank S Reynolds

615 W. 9th St. Ark

Harl Morgan Cal C1451



Interior and Exterior Views of a Two-Room Restaurant Constructed by Hollowing Out Two Sections of a Giant Redwood Tree

LUNCH ROOM INSIDE HUGE TREE ACCOMMODATES MANY GUESTS

Near Seattle, Wash., stands a lunch room built by hollowing out two sections of a giant redwood tree which was at least 2,500 years old and stood more than 300 feet tall when cut. The tree was twenty feet in diameter at the stump and produced more than 160,000 board feet of lumber. Two sections of the trunk compose the lunch room. One log stands upright and contains a round room twenty feet in diameter fitted with several tables and other furniture. The second log lies on the ground and contains a dining room eighteen by thirty feet. Even the shingles covering the round room were made from the giant tree.

ELECTRIC EYE UNIT FOR THE HOME IS INEXPENSIVE

So simple and inexpensive that it may be adapted to many uses in the home, a new "electric-eye" unit is on the market, ready for installation. It employs a dry-disk photo cell, a small battery and a sensitive relay with accessible adjustment. The equipment provides the basic unit for simple set-ups to control lights, bells, doors, fire, smoke and burglar alarms, advertising and window-display signs, traffic signals and for many other purposes. A typical application is the garage-light control which is operated by the automobile spotlight. The electric-eye unit is installed on the front wall, possibly under the eaves. At night when the spotlight of the approaching auto is turned on the unit, the eye turns on the lights within the garage, illuminating the premises as a protection against prowlers. These lights

remain on when the spotlight is switched off. With the use of an auxiliary relay, the unit can be adapted to bigger jobs, such as automatically opening doors when someone approaches or flood-lighting an entire store from the outside when a flashlight is turned on the eye. It will operate on infrared or invisible light beams. Invisible light beams can be produced from ordinary light bulbs with a special filter.



less than \$10.00

L. Shog. Phametine
578 E. Woodbridge
electronic music

Handwritten notes at the bottom left of the page.

General Motors Bldg
Detroit Mich

Builders of Coach Models Devise Own Tools



Staff of Experts at Work Judging Model Coaches; in Foreground, on Table, the Many Instruments Used for Measuring More Than 200 Dimensions; Note How Faithfully the Builders Reproduced Each Part

Exceptional ingenuity in developing the tools with which they work is characteristic of entrants in the annual coach-building contest of the Fisher Body Craftsman's Guild. An exact scale model of a coach adopted from two of Napoleon's famous coaches, the coronation coach and the wedding coach constructed for Marie Louise, is required. In the 1933 competition, watch springs were cut down to make door springs, piano wire was found adaptable to leaf veins, window glass was constructed from discarded photographic plates and, in one case, a silk guitar string was used in making tassels for the coach. Often the workshop consists of the kitchen table and a sewing machine. Nut picks make excellent burnishing tools. A dentist's drill and burrs constitute the milling machine, and a sewing machine is used as a jigsaw. A jewelers' saw is a handy tool, while files are made into engraving instruments. Membership in the Guild is limited to boys between the ages of twelve and twenty. Upon enrollment, each boy is furnished with a set of plans and specifications for building the Napoleonic coach

model. The plans call for strict adherence to the construction in vogue in Napoleon's day, even to the fabrication of old-fashioned carriage bolts in use on the continent at that time. The job calls for a high degree of skill in several different kinds of handicraft, wood-working, metal-working, leather-working, textile-working, painting and trim. The winning models are determined by adherence to plans, perfection of detail and skill of workmanship. Experienced craftsmen are the judges, working with a special set of templates, gauges and calipers, checking 230 different dimensions on each model. These are recorded on a score sheet for each entry. Two or three hours are required to judge each coach. In the 1933 contest, the seven winners of national and Canadian awards averaged more than 1,000 hours each in constructing their miniature coaches. There are more than 500,000 entries in each contest.

After government tests with fifty-six varieties of peaches, nine kinds have been rated excellent for freezing.

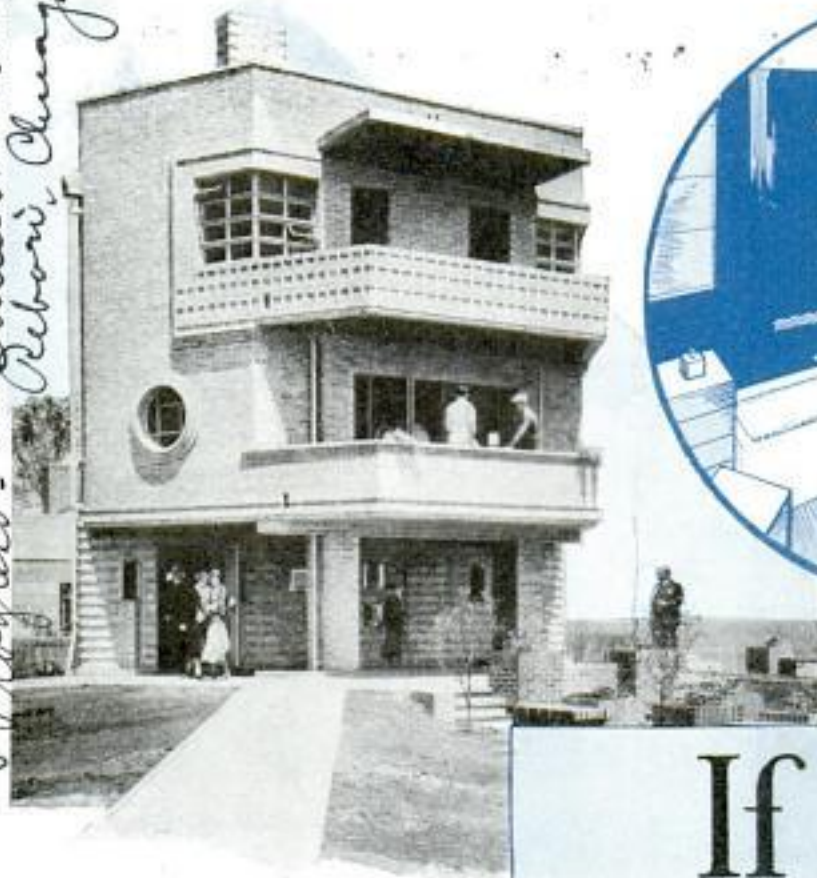
Science News Letter
9/9/33

Office of Informal Matter
U.S. Dept of Agr. Culture
Mrs. S. S. S. S. S. 8/26/33.

Vertical handwritten notes on the right margin, including "Office of Informal Matter" and "U.S. Dept of Agr. Culture".

C1269

House built by Common Brick
Mfg. Co. for Mrs. Andrew
Rebori, Chicago



Drawing by W. V. Matthews
Conveniently Arranged Bathroom
with Micarta Walls; Complete
Even to Electric Clock

If I Were

By H. D. JAMES

Consulting Engineer
Westinghouse Electric & Manufacturing Co.
Pittsburgh, Pa

HOW would you like to have a home that has a constant inside temperature at all seasons of the year, that will keep free from dust and dirt, with no outside noise, that will require few repairs and no redecorating? A home where there will be no window sills to varnish, no fly screens to obstruct vision, no coal to shovel or ashes to remove, no housecleaning in the ordinary sense of the word? Many of these improvements are available for residences today.

Our grandfathers considered running hot and cold water and sanitary plumbing real improvements. Our fathers regarded the electric light and telephone as luxuries. These conveniences are now taken for granted. Our children will look back on the houses of today and consider them obsolete, crude and inconvenient.

The type of dwelling is changing rapidly. Where it once required months to con-

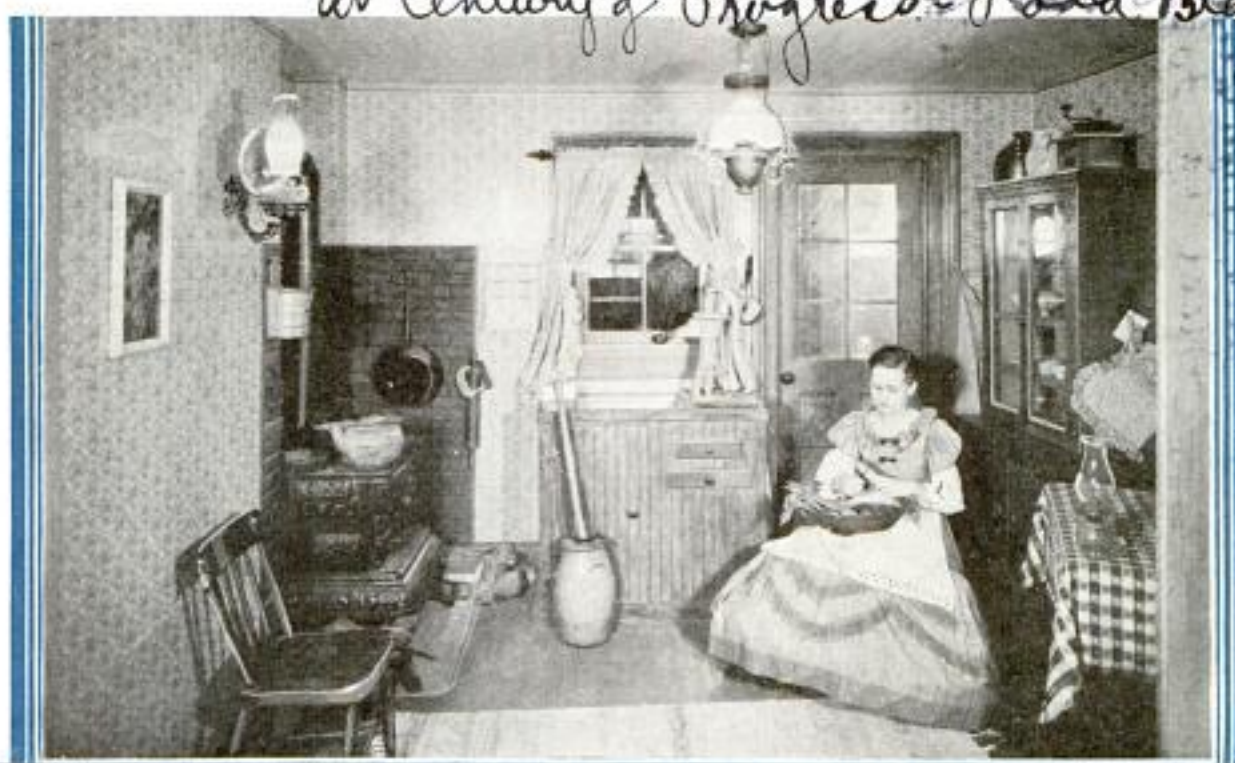


Top, Left, Brick House with Floors, Walls, Ceilings and Roof as Unit Held in Place by Steel Rods; Bottom, Florida House

struct a house from brick and stone and plaster with wooden frames and floors, it is now possible to erect a house of metal and synthetic materials in a few days. This new construction is better adapted to the mechanical improvements which add greatly to our comfort and convenience. The saving in cost of the structure itself will, in a large measure, compensate for the added cost of the equipment. The fu-

Peraval Goodman,
Architects, New York
28 E 55th

Prepared by Home Economics 1269
 Mrs. H. J. Henry
 at Century of Progress - Food Bldg



Building a House



ture house will be better to live in and should cost no more than the old one.

The building structure primarily protects the occupants from the

pose in view. In buildings with brick and plaster walls, we often see cracks, due to the uneven settling of the foundation, which let in cold air. Cracks can be avoided by using a welded steel frame sufficiently rigid to prevent distortion even if the foundation happens to yield unevenly.

When the building is more than one story in height, the upper floor should be of a material that does not transmit noise. Various mastic materials, linoleum and rubber compounds are available for this purpose. Wood flooring is preferred by many people. When it is laid on sound insulating material it is reasonably quiet.

The modern house probably will have a flat roof which affords many possibilities for recreation purposes and often is connected with the ground level by an outside staircase through a gate. A portion of the roof can



Top, American Kitchen of 1869; Bottom, Sketch of Living Room with Canvas-Covered Walls, Micarta Sliding Doors and Modern Furnishings

weather and provides an enclosure for the rooms in which they live. The roof and walls should be constructed with this pur-

tion purposes and often is connected with the ground level by an outside staircase through a gate. A portion of the roof can

Westinghouse Electric & Mfg. Co.
 E. Pittsburgh, Pa.

I just received this book from the
 library of the University of
 California at Berkeley
 1932
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C1269

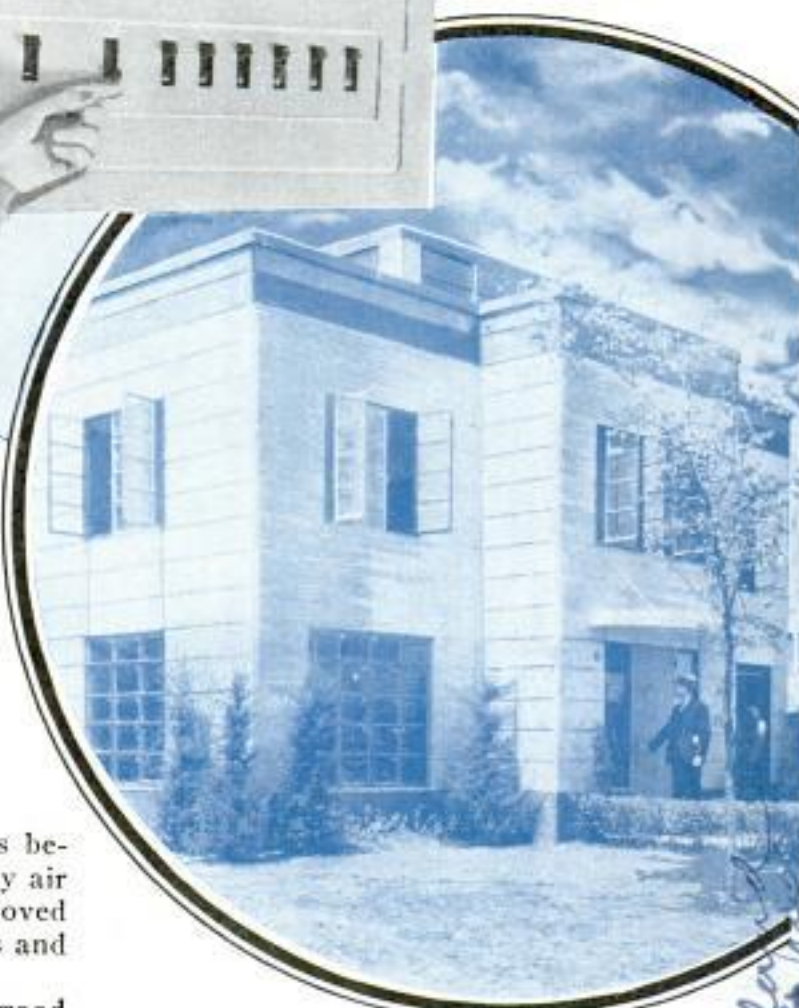
see Nov. 1932-689

see Sept. 1932-563 American Rolling Mill Co
May 1932-453 and Mills & Clark Insulated Steel for 30' and 40' are Cleveland Ohio



it. When insulating the walls to prevent the transfer of heat through them it is not difficult to select a material that will be sound-proof so that the occupants of the building will not be annoyed by outside noises.

Left; Circuit-Breakers Eliminate House Fuses; Right, Armco-Perco Enamel House



be enclosed for use in cold weather and protection against the sun on hot days. Other portions of the roof can be used for a sun bath or gardens. The flat roof can take the place of a large porch as it will be more comfortable on warm evenings because it is exposed on all sides to any air that is stirring and it is further removed from the heat radiated by pavements and other buildings.

The walls and roof should have good insulating qualities similar to those of a refrigerator, but, of course, not exactly like



Sketch of Bedroom: Note Headboard Built into Wall Has All Electrical Conveniences

The air in the house should be cleaned, given the proper amount of moisture and kept at a comfortable temperature the year around by means of heating and cooling equipment. Some outside air should be added to the recirculated inside air to supply the necessary oxygen. The air should be circulated at the normal room temperature and individual heaters provided in each room to adjust the temperature and supply the heat lost to the outside by radiation and minor leakage. Provision should be made to exhaust the air in a room to the outside, if necessary, instead of recirculating it. Sickness, tobacco smoke or cooking might make this necessary. The air inside the house can be

7 Armco Enamel Cleveland
4, 50 & 56 ft.

C1269



Top, Modern Electrified Kitchen Is Well Lighted; Bottom, Sketch of Living Room; Note Radio Loud Speaker in Center of Mirror over Fireplace; Remote Control in End Stand



maintained at a pressure a little above the outside so that any leakage will take place from the inside to the outside.

Since the windows are usually kept closed, fly screens are not necessary and the interior will not be damaged by rain or heavy winds. Burglars will find no ready means of entrance as the house is normally closed up tight. Double windows are necessary for efficient heat and sound insulation.

In addition to power wires, the house should be wired for radio and telephone connections. Extensions should be provided for lighting the entrance to the

grounds. Outside lights may be controlled by an electric eye.

When rooms are correctly designed and finished under the direction of a person skilled in the art, it is probable that the occupants will not feel the desire to change the fundamentals of the room any more than they become tired of a good picture or other work of art. Thus, the fundamentals of our interiors may be definitely fixed at the time the house is built. There should be round corners between the walls of the room and between the ceiling and the walls and, as far as possible, the line where the wall joins the floor should be broken. The absence of these sharp lines gives a sense of spaciousness to the interior. Some of the larger pieces of furniture should be built into the room; for example, a davenport and bookcase in the living room; a buffet and china closet in the dining room. Try to arrange the dining room as an extension of the living room so that it can be utilized for other purposes than meals. The table and dining chairs may be designed so that they can be folded into a compact unit and moved over to one side of the room. The buffet and other dining-room equipment

in steel house at Solon, Ohio



cold by the internal development of heat. When walls and ceiling of a room are cold, the body radiates heat to them which makes the person feel chilly. If these walls are heated by imbedding electric wires in them, their temperature can be raised to control the radiation of heat from persons so that each individual will retain sufficient body heat to be comfortable. The most common form of interior heating consists in warming the air in the room to assist the body temperature to keep the person comfortable. This method requires a higher room temperature than when the walls of the room are directly heated to reduce the radiation from

Top, Micarta and Metal-Finish Fireplace; Center, Emphasis of Lines Between Panels by Means of Curved Joint for Decorative Effect; Bottom, Dining Room with Sliding Door; Table Is Micarta and Aluminum



should harmonize with the living room and yet serve their purpose when needed as a part of the dining room. The buffet should be built with a series of electrical outlets, connected to a single supply circuit, eliminating long, unsightly connections common today. Sliding doors have important advantages over the swinging door. They do not obstruct wall space when open and there is no danger of striking another person in opening the door. They have been objected to because many of the doors with which we are familiar are hard to operate, but these objections can be overcome by a proper design. Some of these doors can be operated by small motors, opening and closing in response to a light ray.

The human body protects itself from

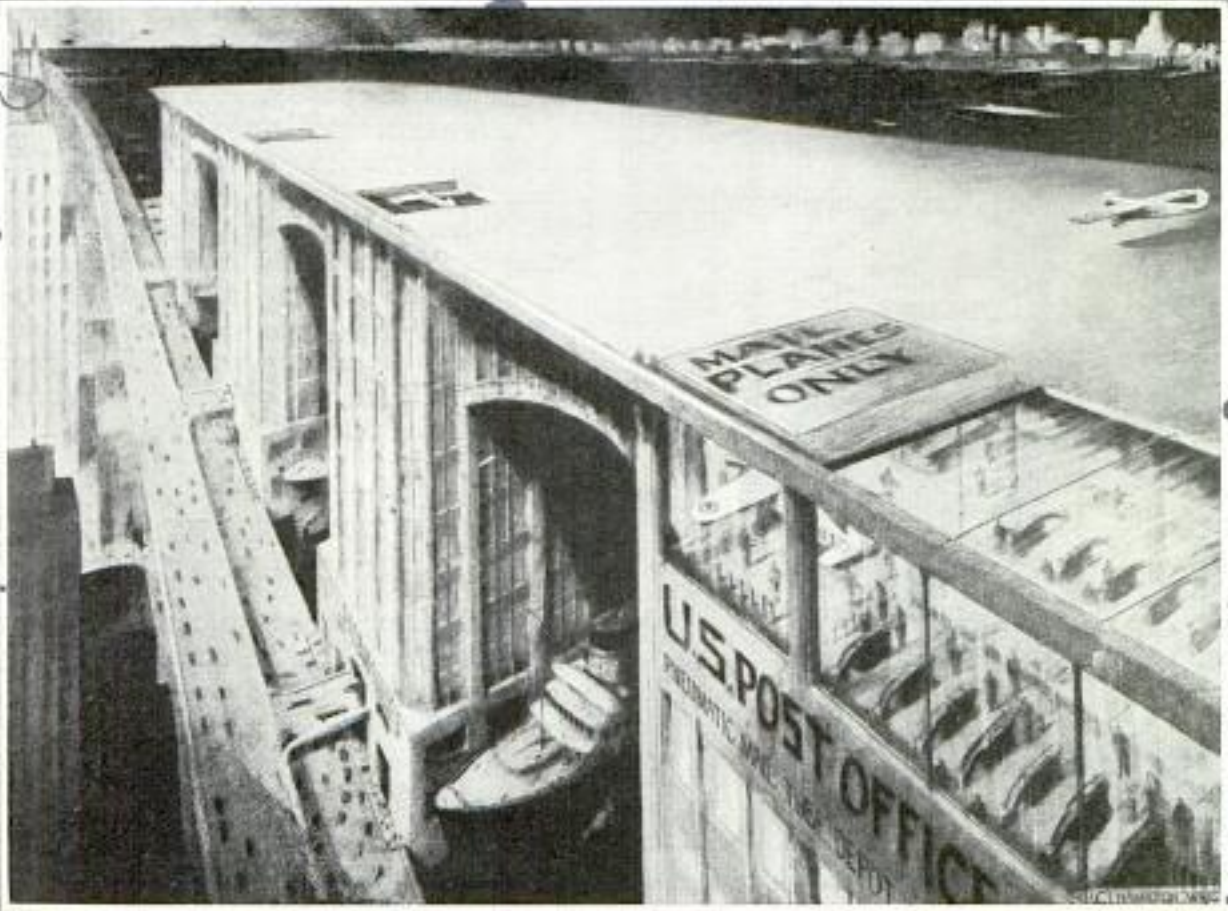


persons. When the conditioned air in the house is maintained at room temperature by the central conditioning plant, it will

(Continued to page 132A)

C1455 Architects L. Andreco
Reinhard and Henry Hofmeister
POPULAR MECHANICS 831
senior architects, Buffalo, N.Y.

Super-Terminal for Planes, Trains and Ships



Design for a Super-Terminal for Ocean Liners, Airplanes, Trains and Motor Vehicles Which Is Planned for the North River in the Heart of New York; Note Use of Roof as Landing Field

Plans for a huge super-terminal for railroads, busses, airplanes and ocean liners to be located in the North river, in the heart of New York, have been drawn after the scheme had been considered for several years and endorsed by the New York port authority. Aside from the great convenience, the concentration of transports at one great terminus would eliminate the time and expense of transferring passengers and cargoes from place to place. The terminal would be in the nature of a massive table with its legs in the water. The largest boats would be able to dock beneath the roof and the roof itself, 2,000 feet long and 800 feet wide, would provide a landing field for aircraft. The ground floors would give entrance and exit to railroad spurs and an elevated highway would admit trucks, busses and private automobiles. In this manner passengers using one form of travel would be able to transfer to another without leaving the terminus, and if they are forced to wait

for connections, hotel rooms in the huge structure would be available. Every part of America and many foreign points, as well, would be touched by the transportation agencies using the terminal facilities. In a like manner, the air, rail and sea mail carriers would be united, thus facilitating the rapid transfer of mail from boats to trains or planes. Pneumatic tubes would carry mail between the terminus and outlying stations. It would also be possible for ships and trains to transfer their cargoes at dockside with the aid of moving mechanical belts and without trucking. At present thousands of trucks are engaged in transferring merchandise to and from trains and ships.

Popular Mechanics Magazine does not publish the name of the maker, 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.

Cmh in Massman 55 W. 86th Street

Collaborating with Clarence Chamberlain and
Commander F. Ward Shaw

C 1464 *Emk Hill W. Ayer*

832

POPULAR MECHANICS

Washington Square

SCAFFOLD HUNG FROM DERRICK AID MARBLE WORKERS



Swinging Scaffold Suspended from Derrick Which Saves Much Time and Labor in Setting Marble Columns

Marble setters working on the United States supreme court building in Washington are using a hanging scaffold in setting the drums of marble columns supporting and adorning the structure. The scaffold is suspended from a derrick and is slipped over the column and raised with the stone. When the column is lowered into position, the scaffold is also lowered, bringing the frame on which the workers stand within easy reach of the joint. This method saves the expense and time of constructing a scaffold around each column.

ELECTRICITY LOST IN PIPE LINE BLIGHTS WATER SUPPLY

Stray electricity from the house wiring system or some other source has been found to discolor and to change the taste of water delivered to the consumer. Frequently, such a condition will prevail in the house piping, yet be absent in water in the street main. An investigation by the Hackensack Water company of New Jersey tends to show that alternating cur-

Hackensack, N.J.

rent may change the quality of water. It already had been established that direct current disintegrates water mains. The wayward current arises from "promiscuous grounding." The primary function of a ground wire is safety. It is an avenue of escape for current diverted from its normal course by a leak or a defect in insulation. The simplest ground is the water pipe. When the current, instead of dissipating itself harmlessly in the earth, continues its activity, the water and the pipe containing it are damaged. The stray current sometimes makes water blue, green or red and frequently creates disagreeable odors and metallic tastes suggestive of tin, lead or rust.

C 1466 SAND "SHOES" FOR AUTOMOBILE MADE FROM BURLAP SACKS

Motorists expecting to make a desert trip can avoid delay in traversing sandy roads by taking along sand "shoes" for the car which support the automobile like webbed snowshoes support the human wearer in soft snow. The shoes consist of nothing more than a few burlap sacks and some strong cord to bind them to the tires. The sacks are overlapped about the tire and bound tightly in place with rope, the cross ridges of rope preventing wheel-spinning while the rolls widen the tread about two inches and stop the tendency of the wheels to "dig in." The sacks are much easier to transport than boards which some desert motorists employ to make a movable roadway through sand.



Sand "Shoes" for the Automobile Made by Tying Burlap Sacks around Front and Rear Tires

Emk. George Clewood Jenks, 444 Christie St. Los Angeles

directed by Nicholas S. Hill, President of Company

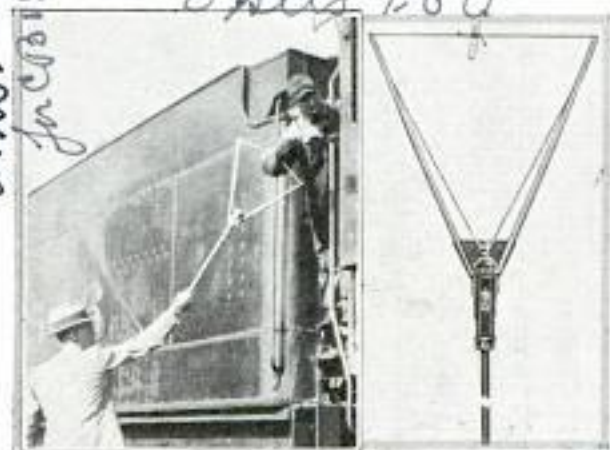
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2 repair all C/49

FORK DELIVERS ORDER TO TRAIN TRAVELING AT HIGH SPEED

Replacing the hazardous method of delivering messages to moving trains by means of a hoop, a delivery fork is being used by several American railroads. Under the old method, a hoop containing a message or train order was fastened to a long rattan. As the train passed, an engineman would thrust his arm through the hoop, remove the message and throw the hoop back on the ground. Many trainmen suffered broken fingers and other injuries through this method. A cord is substituted for the hoop, in the new delivery system, the cord holding the message and being held by the sides of the fork. When the trainman thrusts his arm through the triangle formed by the cord, it becomes disengaged and clings to his arm, ready for removal of the message. The telegrapher or station agent retains the fork. Two hundred delivery cords cost about thirty cents, making the method an economical way of delivering the messages. Trainmen may return the cords for repeated use. In contrast, 200 hoops cost more than \$40. Another advantage is that the messages may be transferred while the train moves at higher speed than was possible when hoops were used.

Wm. C. S. Shepard, telegrapher at 7 repair all



Left, Handing Message to Trainman as Locomotive Speeds By; Right, the Delivery Fork

TELESCOPE MADE FROM JUNK BY HIGH SCHOOL BOY

Odds and ends found around the house furnished the material for a homemade telescope constructed by an Oakland, Calif., high school boy. The mirror was

Havara Baker Baker.



Telescope Constructed of Parts of Old Auto, Discarded Phonographs and Other Odds and Ends

made of discarded porthole glass, three old phonographs furnished parts for a motor to turn the instrument automatically, and a few boards, some cement and an old automobile axle were used in the base. The entire telescope cost less than forty dollars but the builder spent more than a year in completing it, nine months being needed to grind, polish and shape the mirror. The motor is geared down to one seventy-two thousandth of the speed of the phonograph motors from which it was made, and turns the telescope once every twenty-four hours to compensate for the movement of the earth, so an observer can follow a particular star without moving the instrument itself.

GOLD BULLION GOES BY PLANE ACROSS OVERLAND TRAIL

During the exciting gold rush days of the last century, six days were required to transport gold bullion by overland stage from the district near Rock Springs, Wyo., to western mints. Today gold is still being produced in the same mines, but it travels by plane instead of stage coach. It is now flown by air express to the San Francisco mint in six hours.

Air Graph Sept 1933 United Airlines 221 N La Salle

C/47 8

1483

© 1469.

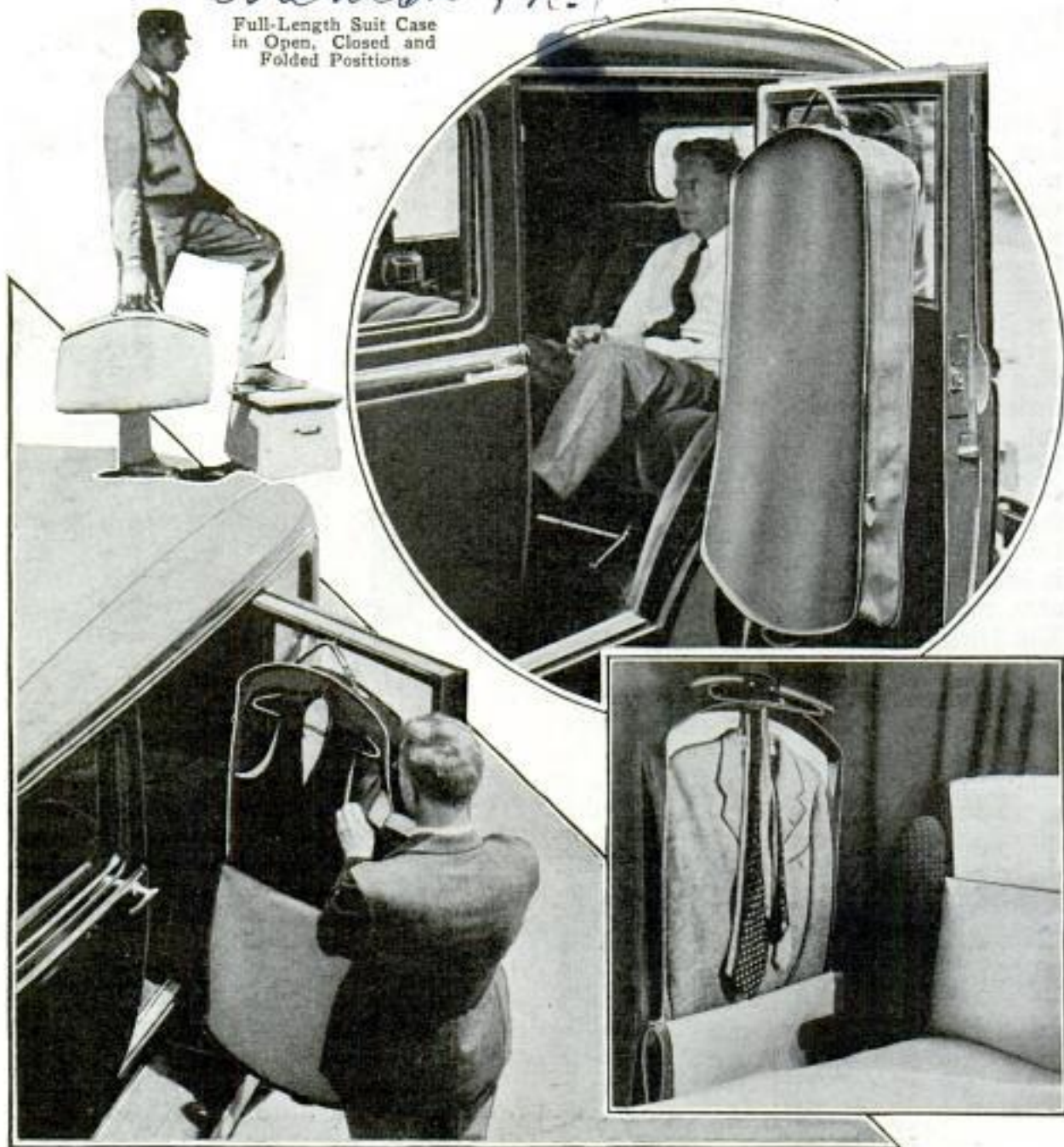
Atlantic Products Co

834

POPULAR MECHANICS

Trenton, N.J.

Full-Length Suit Case in Open, Closed and Folded Positions



FULL-LENGTH SUIT BAG CARRIED LIKE A GLADSTONE

Three suits of clothes may be carried in a new bag without folding them more than if they were hung in the clothes closet. With the suits placed in the bag, it may be folded end to end at the center and carried by its two handles like an ordinary Gladstone. The fold at the center is smooth and leaves no permanent creases or folds in the suits. In the automobile or Pullman-car berth, the bag is hung, unfolded, on a convenient hook. A zipper on the upper half of the front permits remov-

al of the suits from the bag. Shoes and other small articles in the traveler's wardrobe may be carried in several pockets in the bag.

©1505 ROAD ROLLERS MADE OF STONE USED BY ANCIENT BUILDERS

What is believed to have been a prehistoric American road roller, forerunner of the steam roller which levels out modern highways, has been discovered in Yucatan. It is a piece of stone thirteen feet long and more than two feet in diameter. Presumably slaves, captives or willing

Handwritten signature or mark

workers pushed it over the roads to smooth them out. The Mayan road on which it is believed the roller was used leads from Coba, once an important city, to Yaxuna, more than sixty-two miles distant. At one time it was a magnificent highway from thirty to thirty-four feet wide and raised several feet above the surface level of the ground. Today it is obscured by wild vegetation so that an expedition sent out by the Carnegie Institution of Washington spent three weeks getting over it.

C1463

MOTOR-PROPELLED CHAIR FOR INVALID USES GASOLINE AS FUEL

Seventy-five miles to one gallon of fuel at a speed up to sixteen miles per hour are claimed for a motorized invalid's chair propelled by a two-cycle gasoline engine. It is a three-wheeled vehicle and is guided by a steering handle on which is mounted the throttle. All controls are hand-operated, the transmission's two forward speeds and one reverse being governed by a lever while a second lever operates the brake. The starter likewise is hand-operated and is accessible from a seated position. The body is of steel and the dimensions are such that the 280-pound chair can be driven through the average door.

Motorized Invalid's Chair Which Is Propelled by a Small Gasoline Engine



420 Linden Ave

Custer Specialty Co.
119 Franklin St
Searon, Mass



Steaming Teakettle in Front of a New Hampshire Lunch Room Which Uses the Device to Attract Customers

COFFEE SHOP ATTRACTS TRADE WITH STEAMING KETTLE

West Shoreline N.H.

One New Hampshire coffee shop and lunch room attracts the attention of customers on cool mornings by means of a huge steaming teakettle suspended from a pole in front of the place. It was discovered that the combination of the kettle and the steam attracted much more notice than the big kettle alone.

C1529

RUBBER-SPIKED GINNING BELTS

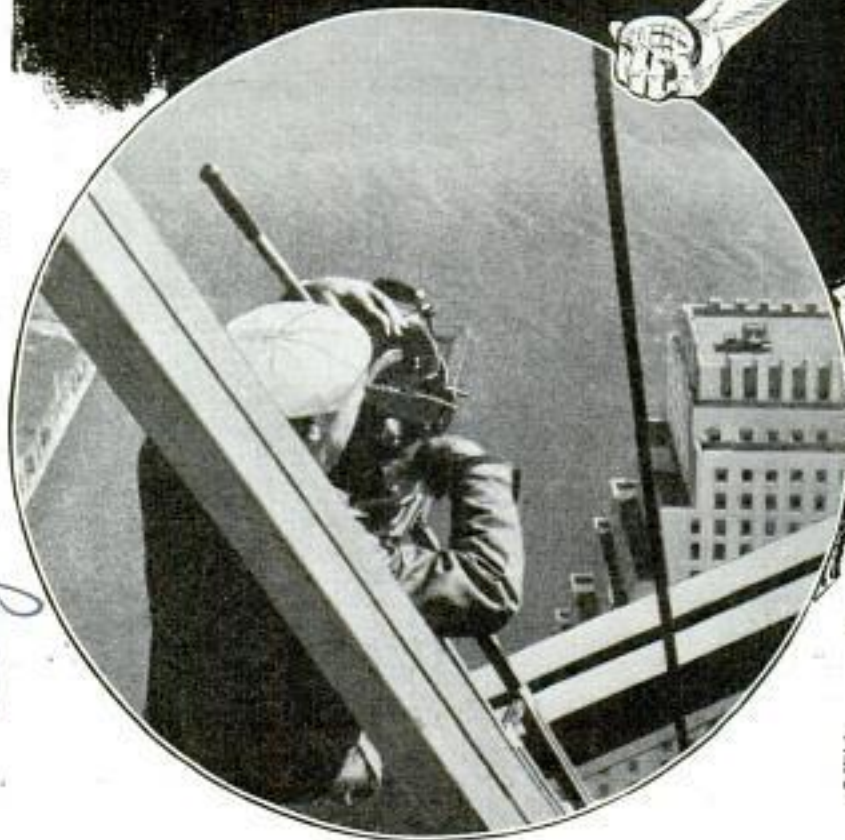
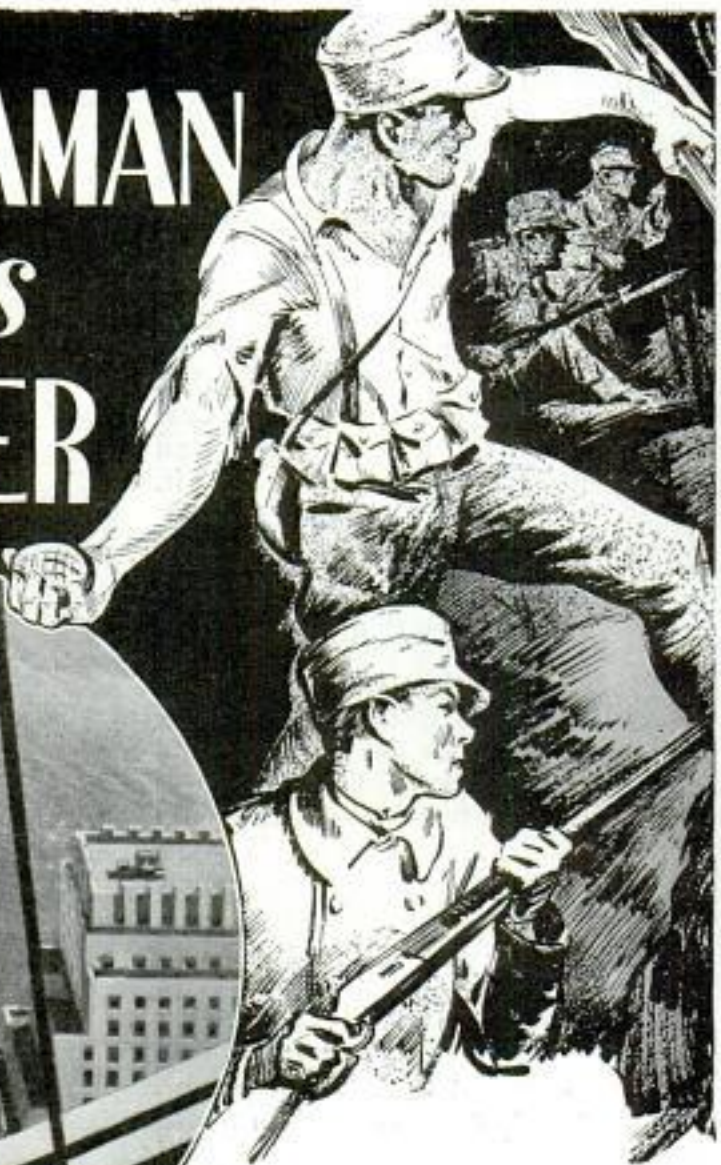
Rubber-spiked distributor belts are simplifying cotton-ginning operations since the spikes are firm and heavy, yet flexible. They are integral with hard-rubber bars which are attached to the belt with safety bolts, washers and clamps. If spikes are detached they do not harm the saws or cause a spark and their use decreases the weight of the belt about fifty per cent, thus relieving bearings of a heavy load.

20, Leiswood Ave.
Rubber Akron, Ohio

Emb. Edward White, 1 Fox Block, Plymouth, N.H.

C1429

The CAMERAMAN foretells DISASTER



Left, Newsreel Cameraman Risking His Own Neck to Obtain a Good Shot of Some Other Daredevil Performing a Stunt

By EMILE C. SCHNURMACHER

STRUNG out at irregular intervals for more than a mile, twenty racing cars roar around a curve on the Indianapolis track. Suddenly, to the accompaniment of the excited murmur of tense thousands, a car skids, interlocking a rear wheel with that of the car on its right.

A split second of suspense and one of the colliding cars goes hurtling through the upper rail, plunging its driver to certain death, while the driver of the other car is thrown almost straight up into the

air, falling to the track like a limp sack of flour. Seemingly unmindful of the disaster, the eighteen remaining cars continue their mad pace around the track while a short distance from the inner rail of the fatal curve, a newsreel cameraman stops cranking, picks up his tripod and prepares to seek a new vantage point to film the winning cars.

Four hours later, after he has filmed the end of the race, the cameraman's negative will be in the developing solution of the film laboratory. That same night a "talking reporter" will add a running descrip-

228694 M
New York



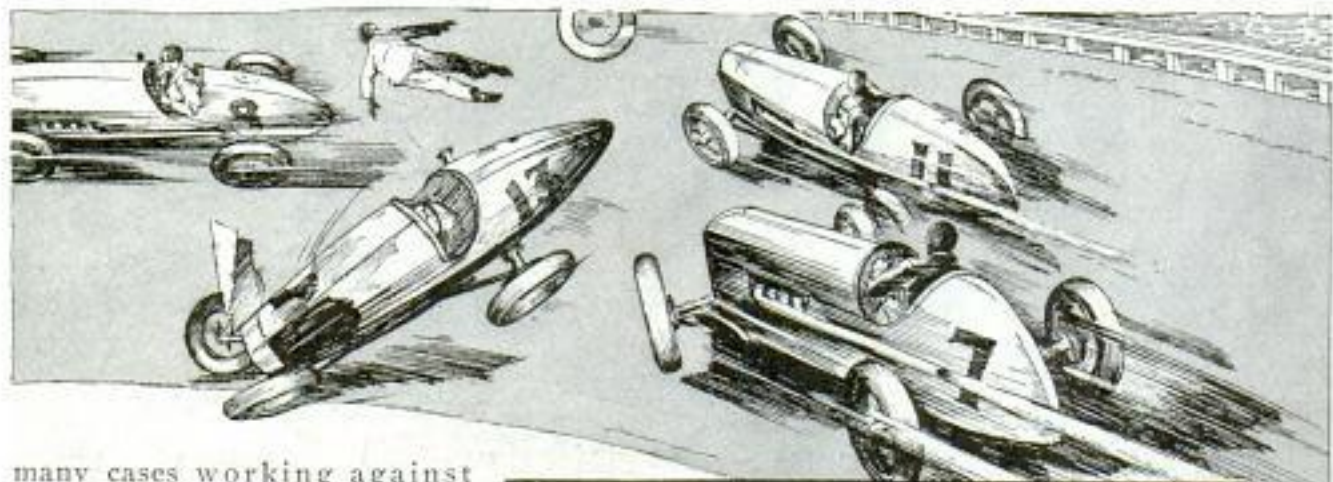
Battle Pass Issued to American Cameraman, Enabling Him to Take Pictures of Actual Fighting in China

day that strip of celluloid recording a visible and audible story of drama and death will be screened before thousands of movie goers in a metropolitan theater.

"They don't walk out on the newsreel," is the boast of every newsreel cameraman. If a thrilling newsreel story breaks, the experienced newsreel cameraman can be depended upon to ignore the nonessentials and photograph the most dramatic incidents. When twenty cars are racing, spread out over a mile or more of track, the cameraman generally will pick out the car that will turn turtle or collide, before the accident actually takes place. What is more, he is very likely to be near the scene of the accident when it occurs, instead of being in a place that the less experienced would consider a better observation point.

This is seemingly the most uncanny part of the newsreel cameraman's training. The studio motion-picture cameraman may demand a "retake" or there may be more cameras recording the scene. The newsreel cameraman, with a limited amount of film because of the necessity for swift transportation, and in

tion of the race while incidental sound effects, such as the roar of racing motors, the screeching of brakes and the crash of the collision will be "dubbed in." Next



many cases working against competing cameramen, must be prepared to make his shots of the news drama as it unfolds. Frequently he must pick out the most dramatic incident of several that are happening simultaneously over a wide territory.

How does he do it? Is he endowed with a sixth sense or some supernatural means of foretelling disaster? Or does he trust to luck that something spectacular will occur while his camera is grinding? The answer is to be found in none of these. The ability of the newsreel cameraman to accurately foretell disaster reveals him as a keen psychologist, an amateur scientist and an observer of unusual perception.

"This ability," states Mervyn Freeman, Universal cameraman on the west coast, "is what the newsreel man calls his 'thrill sense.' In newsreel work, this thrill sense must become second nature. The cameraman must be able to sense things in advance if he wishes to remain in the business. This is particularly true where there are a large number of participants in an event.

"Speed accidents happen so rapidly that it is seldom possible to focus a camera and start grinding in time to film an accident that has actually begun to happen. The thrill must be sensed or 'felt' before it actually occurs."

Mr. Freeman tabulates six distinct human traits which the newsreel man observes in his subjects as guides to his thrill sense before filming the action. These guides are overconfidence, carelessness, nervousness, anger, hopelessness and lack

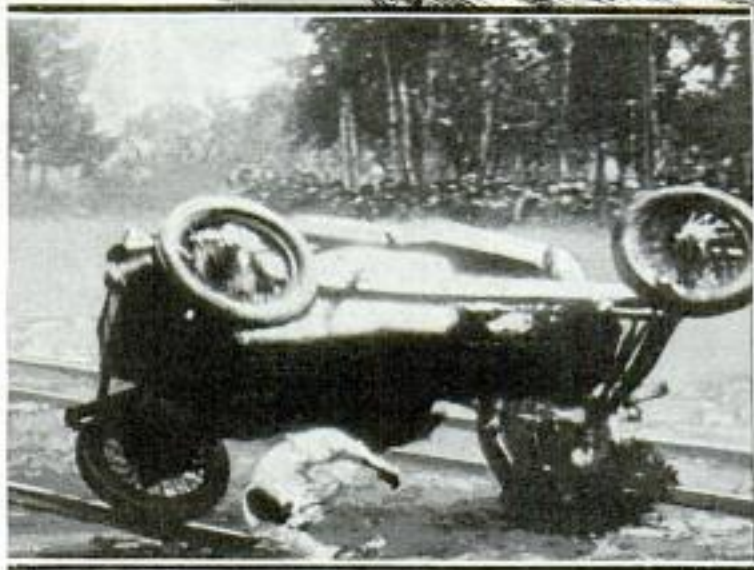


Photo Courtesy J. Jay Herz

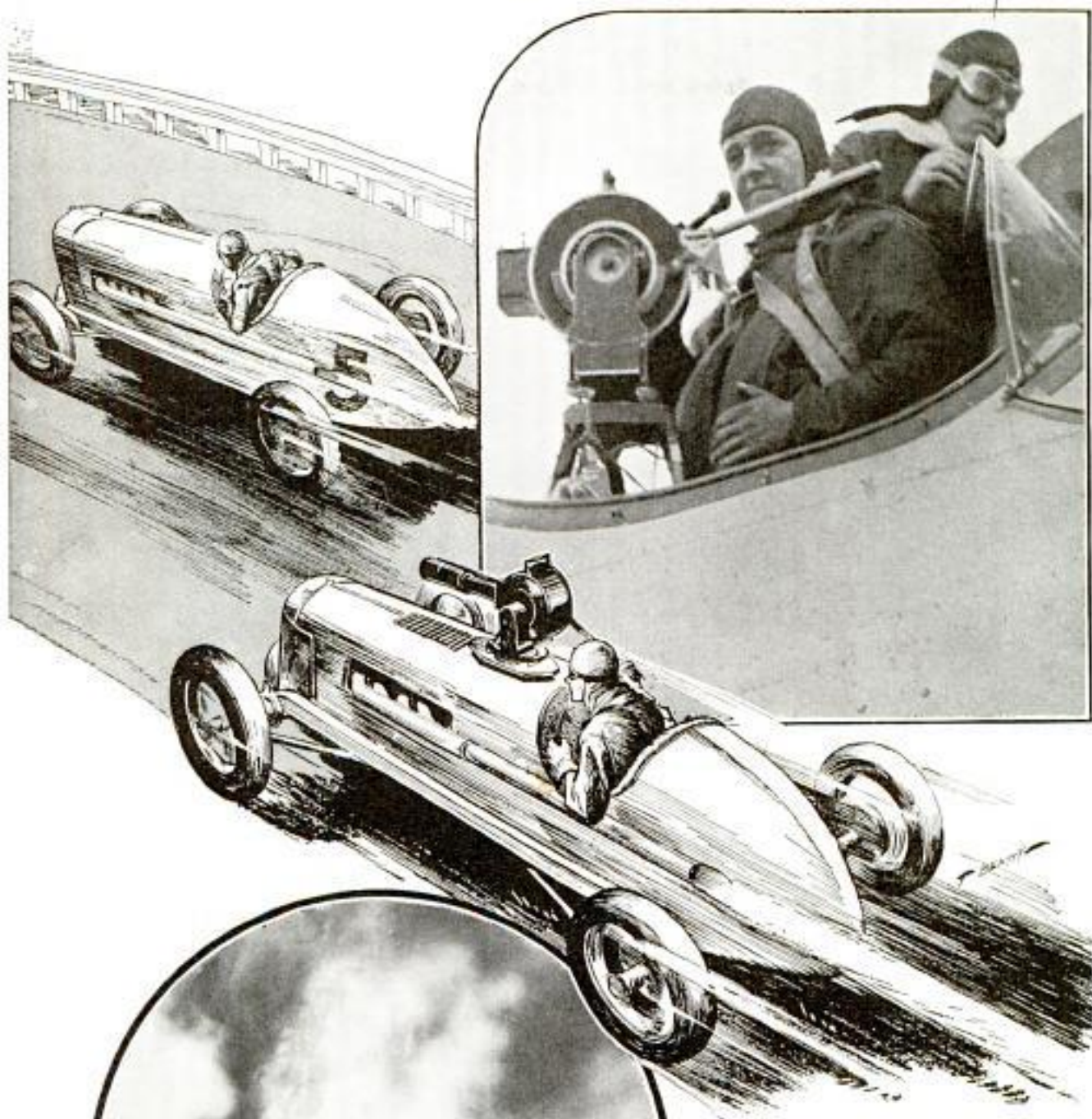
Above, Drawing Depicting Accident Filmed by Newsreel Man; Below, Accident Snapped While It Was in Making

of experience or judgment. "Take carelessness as an example," he says. "This trait has been responsible for some of the most dramatic automobile-racing films ever screened. The cameraman hunting carelessness in a race looks for a car that is leaking oil, for he knows that sooner or later, a car coming up behind that one will skid badly.

"He looks for a car with a partially deflated tire, for he knows that if the car is not promptly flagged by the pit crew, it will cause trouble for the driver and perhaps others as well. Both of these possible accidents are most liable to occur on a curve and the newsreel man places his camera accordingly.

"Then checking through the other guides, such as nervousness evident in one driver, and overconfidence or recklessness in another, the thrill sense is put to work enabling the cameraman to foretell disas-

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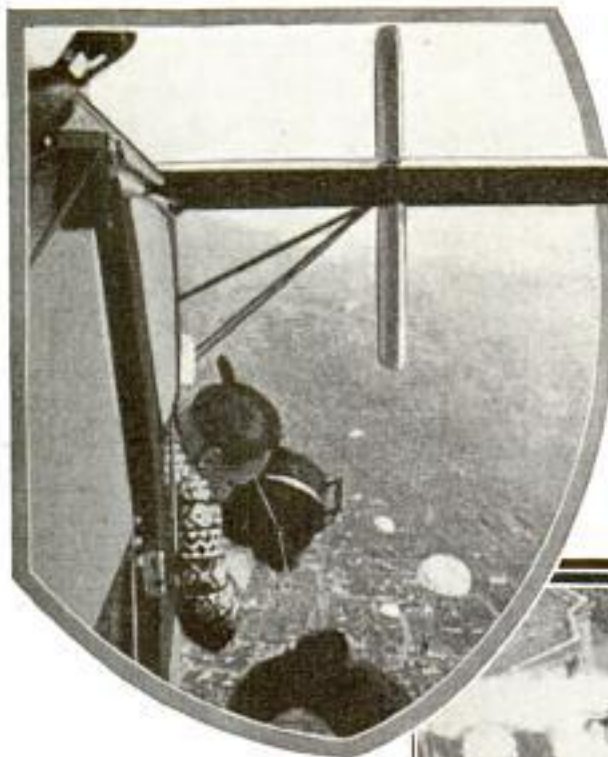
Photos Courtesy J. Jay Herz

Above, Cameraman in China Ready to Fly over a Battle in Progress in Order to Obtain Pictures of Actual Fighting; Below, a Cameraman's "Thrill Sense" Caused Him to Keep Turning the Crank and Get This Plane Crash

ter. When the accident does occur, he is ready for it as a result, for, instead of watching twenty or more participants he is concentrating his attention on two or three, and his camera is focused on the most probable victim of that small group."

Freeman's detection of nervousness in a glider pilot with a consequent stirring of his thrill sense resulted in a scoop. In this case the thrill sense was responsible for his camera continuing to grind after recording the takeoff in

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840



apparently deciding to stop, General de Pinedo resumed trying to lift his airplane off the ground with fatal results, Mr. Gibson obtaining a picture so gruesome that parts of it had to be eliminated before it could be shown.

In making a dramatic newsreel sequence, it is not necessary to have a fatal ending, for the actual death scene is generally deleted by the newsreel editor. The ability to foretell disaster, in fact, is many times used in the reverse sense, being invoked by newsreel cameramen and editors to prevent accidents to stunt men. Never a week passes that some daredevil or would-be daredevil does not make the

which the glider was towed by an airplane. Suddenly with only Freeman's camera recording the scene, the glider pilot seemed to climb vertically into the air, his glider upset and he pitched forward to death.

At Floyd Bennett field, New York, Joe Gibson, another veteran newsreel cameraman was assigned the task of filming the takeoff of General de Pinedo on an endurance flight.

"It looked like a routine take-off," said Mr. Gibson, "yet the many months which he had waited to hop off, being balked each time for one reason or another, gave the General what I would call a do-or-die spirit—what I sized up as a determination to stake all on the one try. For that reason I kept right on grinding. Had I stopped when it seemed as if he was going to stop his plane and make another attempt, I would have had just about enough film to cover the second try completely. Instead, instinct made me keep on grinding."

The result of the attempt was that after



Top, Filming Group Parachute Jump; Center, a Cameraman Risked His Neck to Get This Stunt Picture; Left, Filming a Fire

rounds of the newsreel offices, offering to perform unusual feats for monetary return or as a spectacular way of attracting attention.

Depending upon their ability to foretell disaster, the experienced newsreel cameramen and editors quickly sift through these movie stunt men with such effective results that tragedies of this sort during the last few years have nearly disappeared together with stunt shots of jumps from high bridges and other risky exploits.

While suspense and not tragedy is the dominant theme sought by the newsreel

While suspense and not tragedy is the dominant theme sought by the newsreel

man, and actual death scenes are left behind in the cutting room, Allyn Butterfield, Universal Newsreel editor, believes that, in the public interest, gruesome scenes might well be left in.

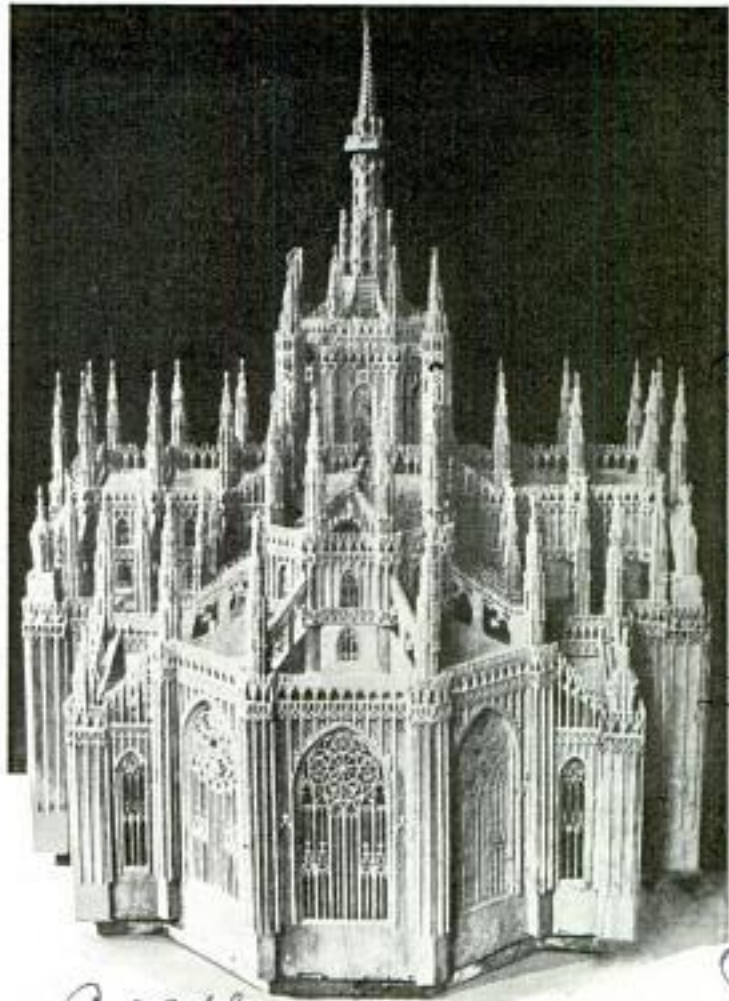
"Countless feet of newsreel film every year offer a startling indictment of the average human being's inability or unwillingness to employ those guides which a cameraman calls his thrill sense to personal advantage," he says. "If the average person felt that the newsreel camera is making a record of his actions during the entire working day, waiting for a tragic incident to occur, he would exhibit far less recklessness and overconfidence in his daily life.

"He would not be so apt, for example, to casually dodge speeding traffic, as he crosses the street. He would inspect his own automobile tires more frequently, make sure beforehand of the depth of the water into which he dives, and cultivate the newsreel cameraman's ability to foretell disaster for his own personal benefit."

In spite of the veteran newsreel cameraman's ability to foretell disaster where other people are concerned, he shares with them the inability or unwillingness to apply that ability to foretell disaster to himself. Freeman is a typical example of this. In order to secure an under-water scene, he insisted on donning a diving suit and took a watertight camera to a depth that would tax the ability of a trained diver. Deeply engrossed in making the picture, he fouled a line and finally, to save his life, was hauled to the surface so rapidly that he was deafened.

Other newsreel cameramen, even less fortunate and unable to foretell disaster to themselves, have met death under dramatic circumstances, while, unmindful of personal danger, they filmed thrilling sequences that qualified for their credo "They don't walk out on the newsreel!"

A rubber mill uses a 1,000-horsepower motor which can be brought from full speed to a dead stop in about two seconds.



Milan Cathedral in Miniature Is Complete to the Last Tower, Window and Statue; It Is Made of Three-Ply Wood

MODEL OF MILAN CATHEDRAL HAS HUNDRED TOWERS

Reproduced in detail, even to the more than 100 towers, a model of the cathedral at Milan, Italy, has been built by a Belgian mechanic. Made of three-ply wood, the miniature cathedral contains more than 150 windows and 300 statues.

ELECTRIC-PLUG SCREW LOCKS TO PREVENT LOOSENING



For eliminating the loosening of screws in electrical appliance plugs, a screw with a lock washer is made fast permanently by bending a finger of the lock washer into the screw slot.

Lodge Electric Co
245 S. State St.
Salt Lake City, Utah

C 1424

Pierre Henner, Brussels
C 1456

Science News
Feb 10 1936

Es. Co. motor
with plug

Hand Lab

Streamline Hood on Bicycle Increases Speed



Top, Head-On View of Streamlined Bicycle; Right, Side View Showing How Rider Mounts

Streamlining, which is the art of designing an automobile, an airplane, a steamship, speed boat or any other means of transportation so that its resistance to the air may be reduced, has been extended to the bicycle industry. Marcel Berthet, French cycling champion, claims that he can attain a speed of thirty-two miles per hour on his bicycle by covering it with a streamlined hood. Already he has tested the hood on the race track and found it satisfactory, not only from the point of attaining higher speed but also because it enables him to wheel his bicycle at a fast pace without the expenditure of effort required on an ordinary racing cycle. The hood fits over the bicycle and the back of its rider. A door in one side enables the rider to mount or dismount. A slight conning-tower effect in the hood has slots through which the rider watches the track. This form of streamlining provides for air to flow smoothly over and

beside the bicycle, but ignores cross currents which are regarded as unimportant after a certain speed has been reached. Anyone who has had the experience of stepping behind a moving automobile and feeling the strong wind can appreciate the value of streamlining. It is the reduction of air currents behind the moving vehicle that experts are striving to attain, since the friction of air moving past the surface of the automobile represents only about one-tenth of the total resistance. By providing his bicycle with a cover that reduces air currents behind the cycle, the French champion reduces the "drag" of the air and gets more speed. Air resistance



is determined experimentally by means of models in a wind tunnel, a device for producing an artificial wind. With suitable arrangements for representing the effect of the ground, the air resistance is the same when the model is held at rest and the air moves as when the model moves and the air is at rest. At thirty-five to forty miles per hour in an automobile, air resistance represents about one-half the total resistance. A saving of sixty per cent of the air resistance represents a saving of thirty per cent of the total resistance and hence thirty per cent of the power. Therefore about thirty per cent less fuel need be burned. At lower speeds the saving will be less and at higher speeds more, according to experts working on the problem.

Bicycle made by Caudron 52 Rue

Prof. St. Pierre Cure France

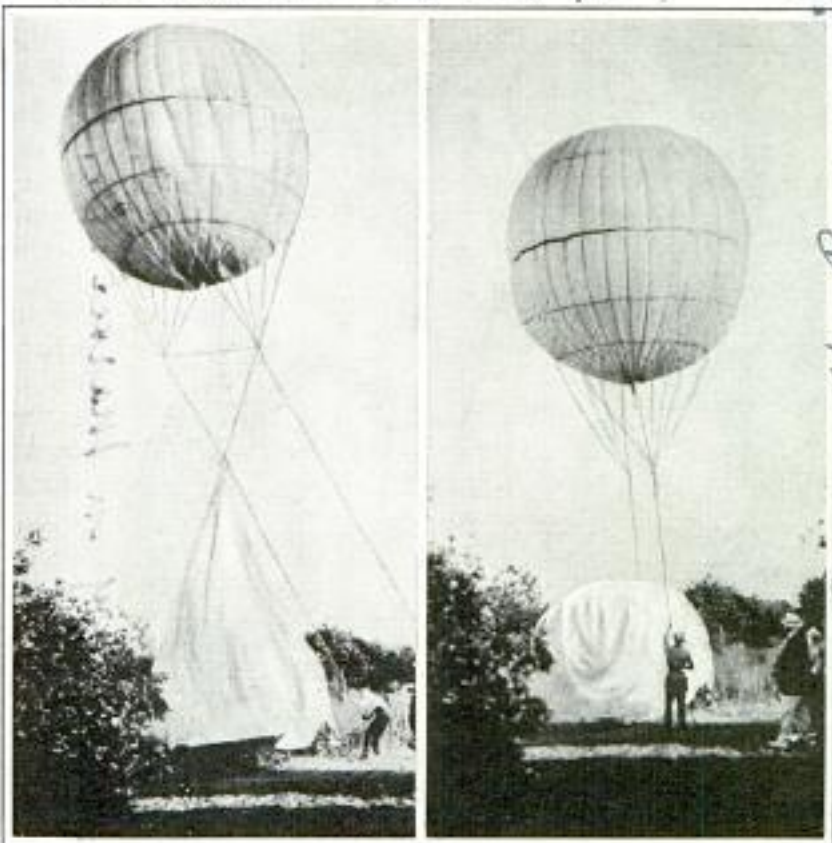
France deinde. Issay. Raymond

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C1499
**GRATING OF STEEL
USED IN ROAD
BUILDING**

Germany is experimenting with steel grating as a material for roads. Iron, re-enforced with concrete, has long been used in road construction, but not in the form now under test. In Germany large "bricks" of steel grid are prepared, each about twenty feet long and three feet wide. These sections can be screwed or welded together to cover the entire road. The grating, zigzag in shape, is filled in with tar, asphalt or similar materials, and it is claimed it is not necessary to make either a special foundation or to roll the binding material heavily as normal traffic is sufficient for this purpose. As a result, such roads can be constructed much more rapidly than the ordinary kind because much of the work is done in the factory beforehand. Also, the steel-grating roads can be laid at almost any season of the year.

Christian Science number 9/30/32



Two Views Showing How Balloon Helps to Lower Tarpaulin over Fruit Tree without Damaging the Branches; Only Two Workers Are Needed

**BALLOON HELPS FIGHT INSECTS
IN FRUIT ORCHARDS**

Chemical warfare on fruit-tree insects is being waged by means of a hydrogen-filled balloon. In fighting the orchard pests, it is necessary to stretch a tarpaulin over and around each tree to confine the poison gas used in killing the insects. The gas is deadly to human beings. Under old methods, the work of getting the tarpaulin into place required a large crew of men. It was almost impossible to complete the job without damage to the tree. By using a balloon, the tarpaulin is raised directly above the tree, then lowered quickly into place by a sudden pull on the balloon's retaining cables. The sudden swirl of air beneath the tarpaulin puffs up the canvas, making it encompass the tree. A special release hook permits the balloon to be freed for use in placing the canvas over another tree while the poison gas is being applied to the first tarpaulin-covered tree by means of a hose carried through a hole in the canvas. Lifting the tent from the tree is more simple. Thus, the trees are undamaged and time is saved.

Belvidere Aircraft Co. Los Angeles. Calif. C1465

C1465
**BREAD SERVER EXPOSES SLICE
WHEN BUTTON IS PRESSED**



Lunch counters and restaurants are using a bread dispenser which serves a slice of bread when a button is pressed. The server accommodates one loaf of sliced bread which is covered by a lid. When the button is pressed, the lid opens and the bread is raised so that the top slice is exposed. When the button is released, the bread is lowered and the lid closes. The dispenser rests on a revolving base and is easily turned.

Bread Server Co. 245 Main St. Clinton, Iowa

C1097

C. Coy Hinzaker

131 W. 22nd St. Philadelphia

844



The Girl Is In a Machine Which Induces Artificial Fever by Splitting Water Drops into a Very Fine Spray

FEVER PRODUCED ARTIFICIALLY BY WATER SPRAY

For treating certain diseases, an artificial fever must be induced and maintained, and a relatively simple type of machine for this purpose is now offered. It is known as a hydro eneciator and operates by splitting water drops at any heat control so that the water sprayed on the body is almost vaporized. In this manner the apparatus can produce a body-surface temperature of 110 degrees or a temperature by mouth of 102 degrees. To induce a similar fever in some types of cabinet machines would require a cabinet temperature of 150 to 165 degrees.

SELF-OPERATING AUTO CLUTCH IS LIKE BALL GOVERNOR

All clutch-pedal operation and about half of the manual operation of the gear-shift lever are eliminated by using a self-working clutch which is very simple in design and construction. It consists of a

housing containing a set of disks and centrifugal weights controlled by engine speed and by springs, and works on the familiar ball-governor principle. When the engine is idling, the weights are in neutral position and the clutch is disengaged. The gear-shift lever then can be moved into any speed position without touching the clutch pedal. As the throttle is opened, the increase in centrifugal force causes the weights to overcome the retractive force of the springs and travel outward. This action brings a revolving disk into contact with another disk which picks up the power and transmits it through the drive-line units to the wheels. There is no sudden shock as these disks come into contact, and as the engine speed grows the weights travel outward still further, forcing the disks into an engagement stronger than is possible in the clutch of ordinary design. When the throttle is released, the clutch remains engaged and the braking power of the engine is exerted until the car

slows down when the weights return to their neutral position and the clutch disengages itself. A modified vacuum control can be used with the automatic clutch, and arranged in such a way that the vacuum maintains the clutch engagement when engine speed has dropped below the normal point for disengagement as, for instance, when the car is climbing a hill.

AMPLIFIER FITS ON HARMONICA TO INCREASE SOUND

For amplifying the musical tones of the harmonica, a large megaphone has grooves into which the instrument is slipped. The spring metal grooves can be opened to accommodate various sizes of harmonicas.



The average length of ride taken by passengers on the air lines is 327 miles.

Hydro Eneciator
C. Coy Hinzaker
Philadelphia
C1498
Spacer Manufacturing Co.
Toledo, Ohio

Laboratory on Market St.

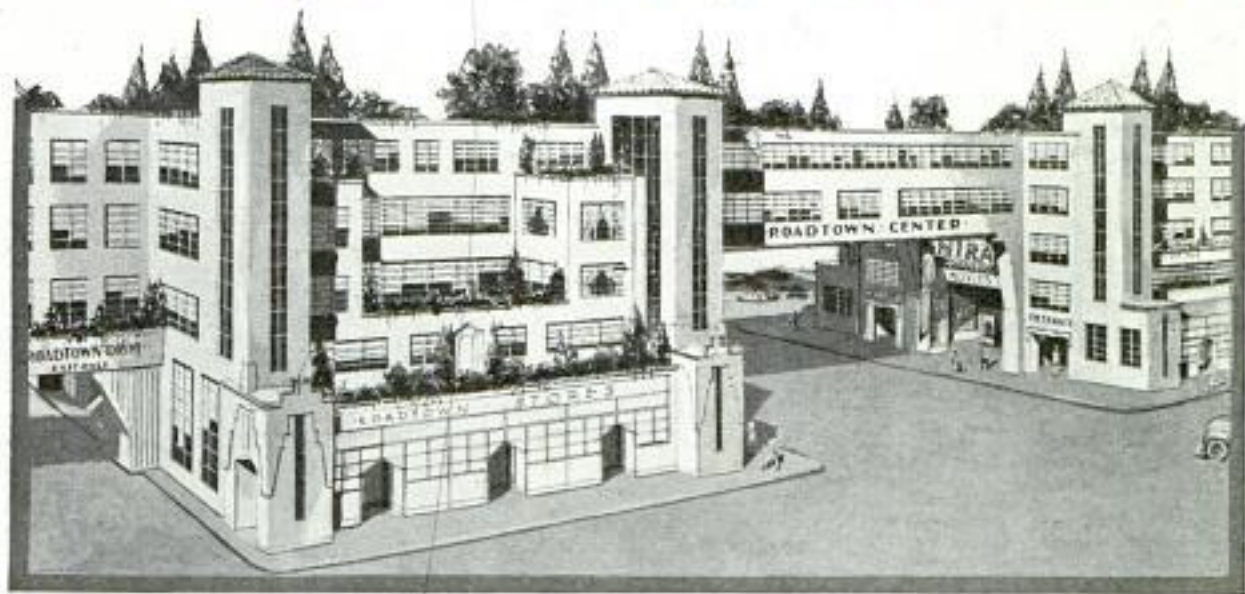
220 E 34th St
New York, N.Y.

See you Newsletter
9/19/33
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C1456

Director, Roadtown
Foundation, 101 Park
Ave New York

An Invention TEN MILES LONG



View of an Intersection in the Proposed Roadtown City Showing the Suggested Plan for Stores and Shops with Dwellings Above and a Landscaped Promenade on the Roof

FOR twenty-five years Edgar Chambless carried an invention ten miles long in his pocket. He had a vision of a "city in the country"; and waited a quarter of a century to lay Roadtown before the eyes of the world.

What is it? Suppose the Empire State building were ten miles high, and you could lay it flat on its side to form a roof over a concrete roadway. Then all the building's transportation would be along horizontal, instead of vertical, lines. That's Roadtown—an Empire State building stretched over ten, twenty, fifty or a hundred miles of highway.

Roadtown is not only an original and inexpensive community, but a concrete solution to many of the pressing problems which have overtaken people living in crowded cities. Roadtown has won the first prize offered by the American Institute of Architects for the best solution of America's housing problem, and the federal government is now studying the possibility of erecting the first Roadtown unit on a ten-mile stretch of beautiful country between Washington and Baltimore.

Roadtown has responded to changes of technique in the past generation. From the original plan of a line of detached homes over a tunneled roadway, it has grown into a continuous city which hugs the rises and valleys of a countryside,

swerves around steep hills, sweeps around rivers, and leaps over highways.

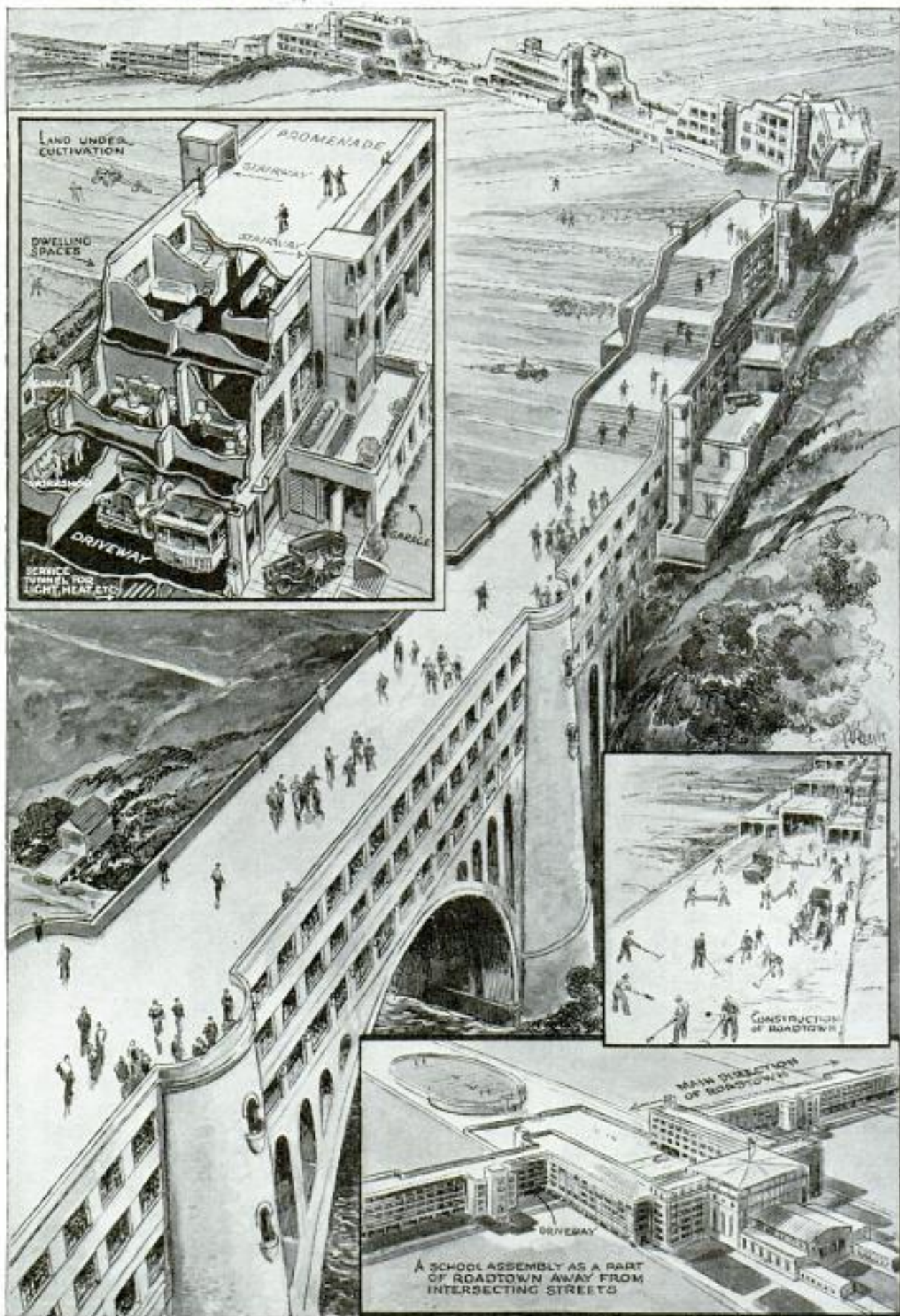
It would be built according to a systematic pattern, just as an automobile is assembled after a pattern. It is meant to be fabricated like a machine in a factory. The repetition of one design allows mass production methods, and therein lies economy. It is intended for the average man who thoroughly enjoys the healthful relaxation of country life with all the comforts of the city.

Construction along a straight or curved line allows a tremendous saving in wiring, plumbing, heating systems and in building material. Roadtown is intended to be constructed as one building from end to end. The builders will start with the foundation, then lay down the roadway, and finally erect the homes, stores, shops and community institutions over it.

Chambless' conception of Roadtown is a self-supporting community made up of wage-earners. Eight hundred families would be housed in each mile, and each would have the right to cultivate the rectangular plot of land directly in front of its property, having a depth of about one-half a mile. The plan also calls for light industry in the homes. Many homes would have small workshops in soundproof rooms, where the roadtowners manufacture their own furniture, clothes, and

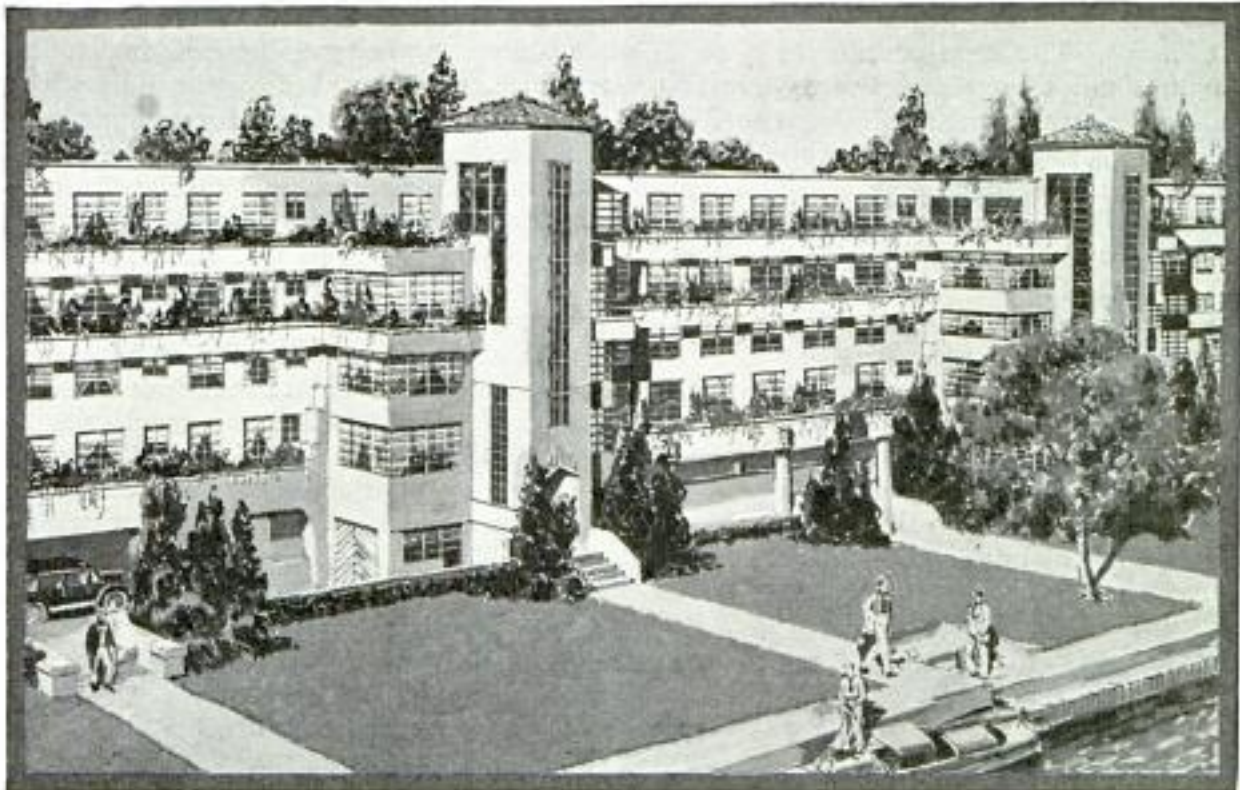
Cook Linn Ilassina
55 W. 86 St. New York

C1456
846



Looking Down on a Section of Roadtown and the Roof-Top Promenade; the Highway Follows the Ground Level with Homes and Shops Lining Each Side; Note Plan for School Unit

C/456



One of the Four-Story, Four-Room Apartment Units in the Roadtown Project; Each Family in Roadtown Would Have a Garden Plot or Yard and Plenty of Room for Recreation

household articles. The roadtowners would find stores, libraries, schools, assembly halls and theaters included in the building plans. At the same time, Roadtown would be easily accessible to non-residents by the existing system of cross-country highways. Communication within Roadtown would be carried on by a bus line running beneath the homes. The roadway would have fresh air and illumination from the open sides. In fair weather, pedestrians would use the landscaped promenade on top of the structure.

Because Roadtown is not confined between opposing walls, the problem of traffic noises is simple since there would be no echoes. The main-traffic artery would be hidden from view and the residents would see little besides open country when they looked out. The project is, therefore, designed to eliminate the evils of the city on one hand, and end rural isolation, on the other. It is a workable scheme for bringing the city into the country and allowing the average man to enjoy the advantages of both.

Every roadtowner would become affiliated with the maintenance and control of his community. He would be given the opportunity of engaging in agricultural

or industrial pursuits, with the full assurance that he would have sufficient income to maintain a high standard of living. According to estimates, the cost of living in Roadtown would be unbelievably low. For the average apartment of five rooms, the monthly rental is calculated at \$24, including electricity, gas, steam heat, hot water and transportation within the boundaries of Roadtown. This compares with about \$60, the average cost of a similar apartment and conveniences in present-day large cities.

Roadtown would be a self-supporting project, and the full cost of a ten-mile four-story unit, \$20,000,000, would be paid off within thirty-three years, from the income of rentals. Since all municipal services, such as police and fire protection, hospital services, schools, sewage disposal, gas, steam, and water supplies will be met from the flat monthly rental, there is no need for municipal taxes.

With the present four-story plan, Roadtown would house 200 home units per mile, each unit covering 865 square feet. The 2,000 units, extending for ten miles, would accommodate about 40,000 people, making Roadtown a community of no mean population. The building costs vary

from place to place, depending upon local conditions. The construction of a roadway ten miles long and twenty-five feet wide is figured at \$2,500,000; the 2,000 home units, at \$6,500 each, would cost \$13,000,000; the municipal plants, schools, and stores \$1,790,000, and the land, ten miles long and one-quarter mile wide, \$95,000.

The cost of building in established cities has raised rents to such a peak that many a man is looking for a way to get out from under the burden. Then there is the small home owner beset with problems of taxation and mortgages. Roadtown, says Chambless, offers a way out.

"The first city," he said, "was a chance aggregation of huts. The ideas that built Rome and Babylon are the ideas which continue to dominate our urban life. But as cities grow, the congestion and squalor increase. For such congestion, the cure sought has been the speeding up of transportation. To people who walked or drove to work, the street car promised a cure for over-population evils. But the street car only extended the radius from which people came to work. Likewise, subway systems only serve to increase congestion.

"Yet we go on, hoping through faster transportation to get away from ourselves, to solve our problem by running around and around one jump ahead of it. What can we do about it?

"We can do something fundamental. We can group population along lines in-

stead of around centers, and thus make transportation bring us benefits instead of troubles. Greater speed of transport within a circular city makes for congestion; but increased speed of movement in a city laid out in a straight line carries the city farther into the comforts of the country. With every improvement in transportation, we are carried closer to the open country, and instead of piling up in one small district, we are opening up new land. Roadtown is not a mere invention. It is a program of industrial reconstruction.

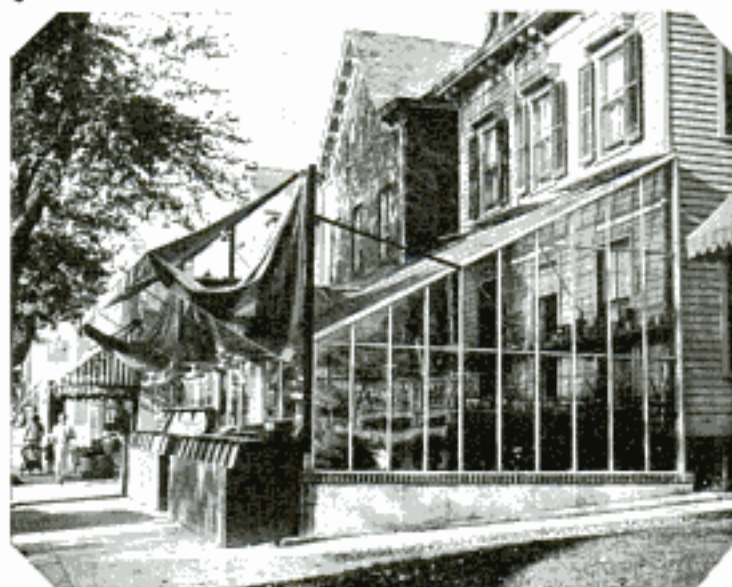
"In Roadtown, many things will be conspicuous by their absence. There will be no streets, no street cars, no 'subway air,' no coal bins, no back alleys, no brooms, no feather dusters, no ashes, no dust, no noise. There will be no need for umbrellas, rubbers, or overcoats in the daily routine of business; no icy streets, no street cleaners, no water wagons, no waiting in rain to catch a car, no traffic policemen, no sweat shops, no child labor, no exorbitant rentals, and no unemployment.

"Roadtown has local and express transportation and all the conveniences of modern shops. It also has the necessary public utilities; but such facilities run parallel to the ground, instead of at right angles, as in the skyscraper."

And so, Mr. Chambless' ten-mile invention, lying parallel to the ground, would carry the marvels of the modern city into the beauties of the country.

C1456

C1506



**GREENHOUSE ON LAWN
DRAWS CUSTOMERS**

In order to attract the attention of passersby, a Morristown, N. J., florist utilizes his front yard for a sidewalk greenhouse. His home set back from the street, so he used the building as one wall, and constructed the others and the roof of wood and glass. He has found that the idea draws customers because more people notice his wares.

☞ The phrase, "cool as a cucumber," is upheld by temperature tests which show a cucumber usually is one degree cooler than air temperature.

Greenhouse Erected on Front Lawn Where It Attracted the Attention of People Passing in the Street

Owner. Vito Ciprese

Science News Letter
9/28/33

C1440.

E. Pittsburgh Pa.

C1382 American Coach + Body Co 849 3809 Clark Ave

POPULAR MECHANICS

FORTUNES IN AIR CONDITIONING SAYS ENGINEERING EXPERT

Fortunes will be made in the air-conditioning field, according to R. E. Hellmund, chief engineer of Westinghouse Electric and Manufacturing company. In his opinion, the total potential business in this line runs into billions of dollars. In marketing a domestic refrigerator, the manufacturer is limited to a certain percentage of 20,000,000 homes. But in the case of air conditioning, the same number of homes represents a market for either a central system or for several room coolers. Business establishments also represent large potential markets. Offices, factories, schools and churches offer another broad market for room coolers and condensing units. Then, there is the transportation field in which air-conditioning equipment will be purchased for passenger coaches, refrigerator cars, busses and boats. Engineer Hellmund points out that the next step of the human race probably will be to direct its attention toward comfort and that the cost of air conditioning will be only a temporary handicap.

C1333

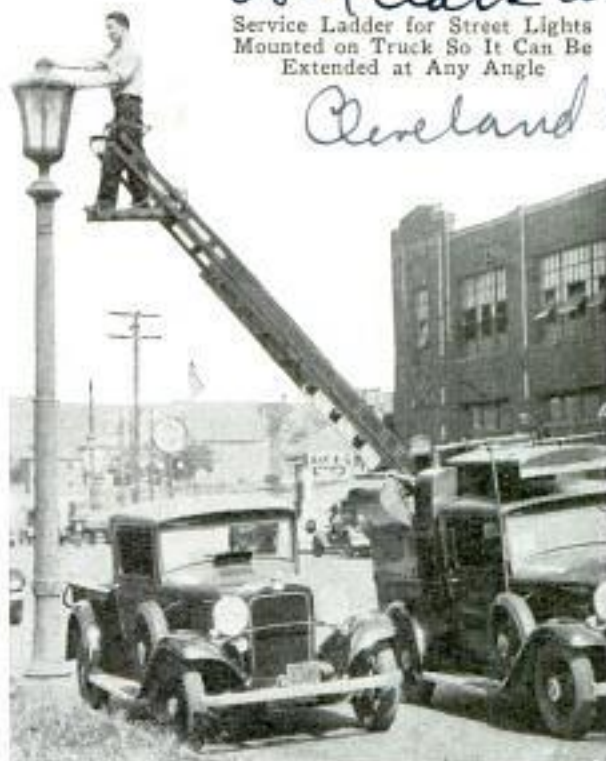
REVOLVING TRAYS FOR TRUCKS SPEED UP DELIVERIES

Loss of time in getting at parcels in light delivery trucks is avoided by using tiers of revolving wire trays which can be turned freely. The parcels are stacked in the circular trays and the trays are then rotated until the desired parcel is seen.



Revolving Tray for Packages in Delivery Truck

Weather Shields Bldg. 48 Moore St. Birmingham, Eng



STREET-LIGHT SERVICE LADDER EXTENDS OVER PARKED CARS

For servicing street lights or high signs, an extension ladder mounted on a truck is adjustable for both height and angle, so that the service man can operate over automobiles which may be parked at the curb. The ladder, when not in use, can be stowed compactly on the roof of the truck which carries it.

see April 1933 3-671

PROFIT IN CHEMICAL RARITIES PRODUCED CHEAPLY

Chemical curiosities that have become useful in scores of jobs may be produced cheaply, according to Dr. Charles R. Downs, chemical engineer. For instance, ordinary air can be combined with benzene and naphthalene to produce maleic acid, which speeds up the aging of wine. The acid also is used as a gas-mask ingredient for absorbing ammonia vapors. Maleic acid and related compounds prevent the development of rancidity in stored fats and oils, serve as new resins for lacquers and varnishes, aid the dyeing of textiles, replace acids commonly used in tanning, become a baking-powder ingredient and, in the form of little tablets, conveniently disinfect small quantities of water for drinking purposes through the release of free chlorine.

C1457 Science News 1/20/33

50 E. 41st St. New York

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Cleveland Director

Monticanto Chemical Works 1736 S. 2nd St. Louisville, Mo. 40
National Amine & Chemical Co.

W. A. Sargent, Inven.

401274

MONEY in FUR



By JAMES MONTAGNES

Harbour Commission Bldg Toronto, Ont. Case

FUR trapping is a big business in Canada, running into many millions of dollars and giving a livelihood to an army of hunters, trappers, traders and fur buyers. More than 400 years in existence, the industry is the oldest on the continent. Added to fur trapping has come fur farming. There are now more than six thousand fur farms in operation in the Dominion, yet an official handbook of the Canadian government states that there are no signs that the business is being overdone.

While 4,000,000 pelts are taken each year, the rampant slaughter of early days has been stopped. Today trappers must obey strict rulings as to closed seasons, traps used, and age of animals killed. Conservation of wild life by these rulings, while allowing trappers to make a living out of pelts, has also assured a steady fur crop, which would have been impossible if the unrestricted killing of animals had been allowed.

Left, Choice Pelts on Trapper's Cabin; Circle, Muskrat, Second in Importance for Value to Trapper; Bottom, White Fox, Which Is Third on List

Winter is the trapping season. Spring and summer are occupied by selling pelts, buying provisions and preparing to start for the trapping regions.

The trapper for the most part today still lives in a log cabin, set strategically in relation to his traplines. Modern luxuries, including a good stove, gas lamps and a radio, relieve the monotony of his life. A trapper's food supply usually consists of food that will keep for many months, as canned goods, flour, bacon, sugar. His variety is greater today than a few years ago, for canned, dried and pressed foods are available now. In the open hunting season this can be varied with fresh meat of deer, moose, bear and other animals. Only when one is in dire need may ani-

price list. Birds and Wild Animals.

Vertical handwritten notes on the left margin, including 'Bureau of Animal Industry' and other illegible text.

TRAPPING

mals be killed for food purposes during the closed seasons.

A trapper's transportation equipment depends to a large extent on the region in which he operates. A canoe is a necessity, for in the northland lake and river flow into each other so as to make the water routes the highways of the country. Many trappers have added to the canoe an out-board motor, speeding travel and saving strenuous paddling. The putter of these motors is heard on many an isolated lake. In winter, dog teams and sleds are used, especially in the more northern districts



and if the trapline is of any proportions. Snowshoes are found in all trappers' cabins.

A variety of steel traps is used by those who make their living gathering fur pelts. These differ in size for different animals. Snares and traps fashioned in the bush with stones, creepers and wood also are used. Poison bait is used some but is illegal throughout Canada, and punishable with heavy fines. Such trapping plays havoc with the wild life, and if allowed would soon wipe out fur-bearing animals.

Top, Bringing in a Wolf; Bottom, Silver Fox, Mink and Beaver, with Figures Showing Rating of Each in Value of Catch During Recent Trapping Seasons

Life in the north woods appeals to the adventurous. There are the dangers of the trail, of meeting big game in the bush, and of living alone many miles from the nearest neighbor. Trapping, hunting and trading appeal to those who want to get away from the crowded, noisy cities, and

C1274



Left, How Trappers Travel in Winter in the Northland; This Shows Trail in North Ontario; Right, Game Wardens and Royal Mounted Police Pictured as Guardians of Fur-Bearing Animals to Prevent Slaughter

those who have once been in the northland claim that there is always the call to go back. There are trappers today in the Arctic who visit trading posts, read the latest newspapers, follow the world by radio, but who have not been out of the country for thirty or forty years.

Nor is the fur business in the northland an exclusive industry for men. There are a number of women, some former school teachers, who have gone into the bush, have built a cabin in fertile trapping country, and have made good.

Indians, half-breeds and Eskimos, while accorded some privileges over the white trapper, have taken to commercial hunting for fur successfully, Eskimos especially showing their prosperity by owning many modern luxuries, including expensive motor-powered schooners. The fur industry is not exclusively one of trapping and hunting. There are trading posts throughout the northland, some operated as branches of the larger companies, others by independent traders. Some of the latter have expanded to such an extent as to have branch posts.

Then there are the fur buyers who roam the northland without operating a trading post, paying as a rule cash for pelts purchased. Tanners working with the smaller trading outfits form another class who make a living from the fur crop.

For all these classes operating with furs in Canada, licenses and permits are required. Every province has its own regulations as to those who may trap and trade. The Northwest Territories and Yukon have their own regulations, administered from Ottawa. Some require residence in the province for a certain length of time before trapping licenses are issued. All license fees, for hunting, trading, assisting at trading posts and fur buying, are higher for non-residents than for residents. Fees differ with the region and vary from a few dollars to as high as \$300, the sum required for trading and assistant trading privileges for non-British subjects in the Northwest Territories. As these fees are changed from time to time, up-to-date information can be procured from the parliament buildings in the capital of each province and from the department of the interior at Ottawa.

According to the value of the catches of recent years for all Canada, silver fox takes first place. Then come muskrat, white fox, mink, beaver, red fox, ermine and marten. Other fur-bearing animals trapped are otter, lynx, fisher, raccoon, skunk and wolverene. Wolves are caught frequently, and there is no closed season for this animal. Practically every province allows a bounty of \$10 or \$15 for each wolf pelt brought in and this sometimes



Right, Fur Shipment Reaches The Pas, Manitoba; Bottom, Trapper's Cabin Showing Unskinned Silver Fox Just Taken from Trap; Pelts on Stretching Board Are Canadian Lynx and Brush Wolf



helps a trapper or hunter to pay for some of his overhead expenses. Deer, moose, elk and caribou are game and food animals for which licenses are issued in season.

There are many other special regulations, differing in each province, pertaining to the catching of beaver and otter, the illegality of destruction of beaver

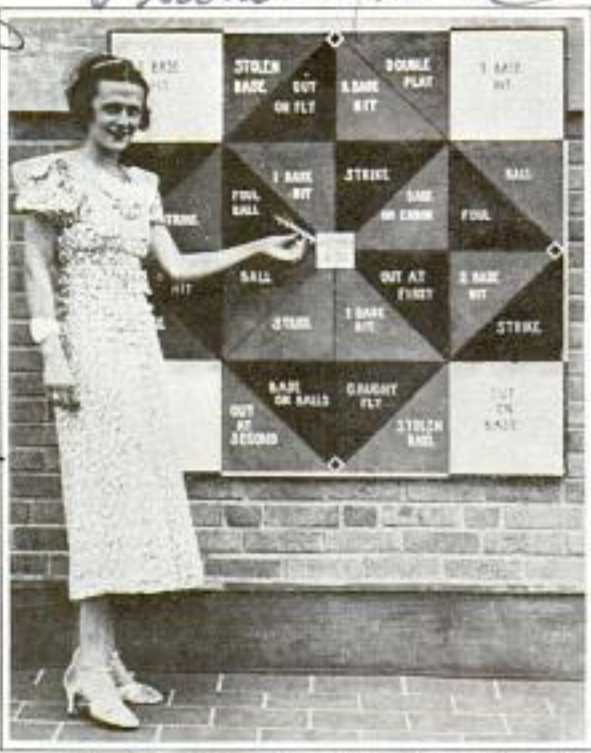
houses and lairs of fur-bearing animals, and the export of skins.

The growing industry of fur farming is largely confined to the breeding and raising of silver foxes, but farms are also operated for beaver, fisher, other types of foxes, lynx, mink, muskrat, raccoon, skunk, bear, marten and badger. Anyone may operate a fur farm on payment of the license fee in most provinces, the fee being much lower than for trapping and trading, being in Ontario \$5 for each fifty acres. Residence for any definite period is not necessary for anyone establishing a fur farm.

Much information on the running of these farms is available from the various provincial departments for game and fisheries, lands and forests. In the Maritime Province of Prince Edward island, fur farming has made the most progress.

C1364. Emb. Hill.
Ayer & Son.
Philadelphia

under supervision of
R. H. Stansel



Game Board for Indoor Baseball in Which Darts Are Thrown to Score Home Runs or Base Hits

BASEBALL PLAYED WITH DARTS OFFERS INDOOR GAME

Dart baseball offers an indoor game with many of the features of the outdoor sport. The game board consists of a piece of wood-fiber insulation four feet square. It is divided into squares and triangles painted with contrasting colors. A small square in the center indicates a home run and other sections are marked for various possible plays. The player throws a dart and is scored according to the space in which it strikes. He keeps his turn until he strikes out or gets on base, a man on base being indicated by placing a dart in the base position. Any number of persons can play on each team. All that is necessary in making such a board is to give it several coats of filler and paint in the spaces and lettering. A wood molding can be used to protect the edges of the board, or it can be bound with adhesive tape.

GREEN FIGS RIPEN IN TRANSIT

Figs which may be picked green and sent on their way to ripen while they travel to market are being developed by the Texas agricultural experiment station. Heretofore no variety of fig has been found that would not sour within one or

two days after ripening or that would ripen if picked green. The new fig, when perfected, is expected to expand greatly the market for fresh figs. It turns a purplish brown about ten days before ripening and continues to ripen if picked after this stage. One drawback is that the particular variety which can be picked green requires a long growing season, and it is hoped the growing season can be shortened to enable fig growers to get their crop on the market earlier.

VIBRATION OF BUILDING SHOWN ON PHOTOGRAPHIC FILM

Accurate records of the relative vibration to a modern building caused by dynamite blasts in a near-by excavation as compared to that caused by passing trucks have been obtained on photographic film. The owners of the building claimed the vibration from dynamiting was cracking the plaster but the contractor in charge of the excavating said this vibration was not as great as that caused by heavy trucks rumbling by in the street. To test the point a vibration recorder was set up in the building. The instrument consisted of a mirror set in such a way that it moved at the slightest vibration. With each motion a tiny ray of light was reflected from the mirror to the photographic film to give a record. The test showed the vibration caused by loaded trucks was many times greater than that caused by the blasting.



Above, Picture of Vibration Caused to Building by Truck; Below, Vibration from Near-By Dynamite Blast

Vertical note: *Windsdale N.Y. Co. & 157. S. B. Palmer, Chicago*

Vertical note: *see 588 Oct. 1932.*

Vertical note: *Science News Letter 9/20/33*

Angleton, Texas

Method used by
L. S. Campbell
Campbell and Rutherford

Vertical note: *McCall St. Quebec, Canada to Montreal*

484

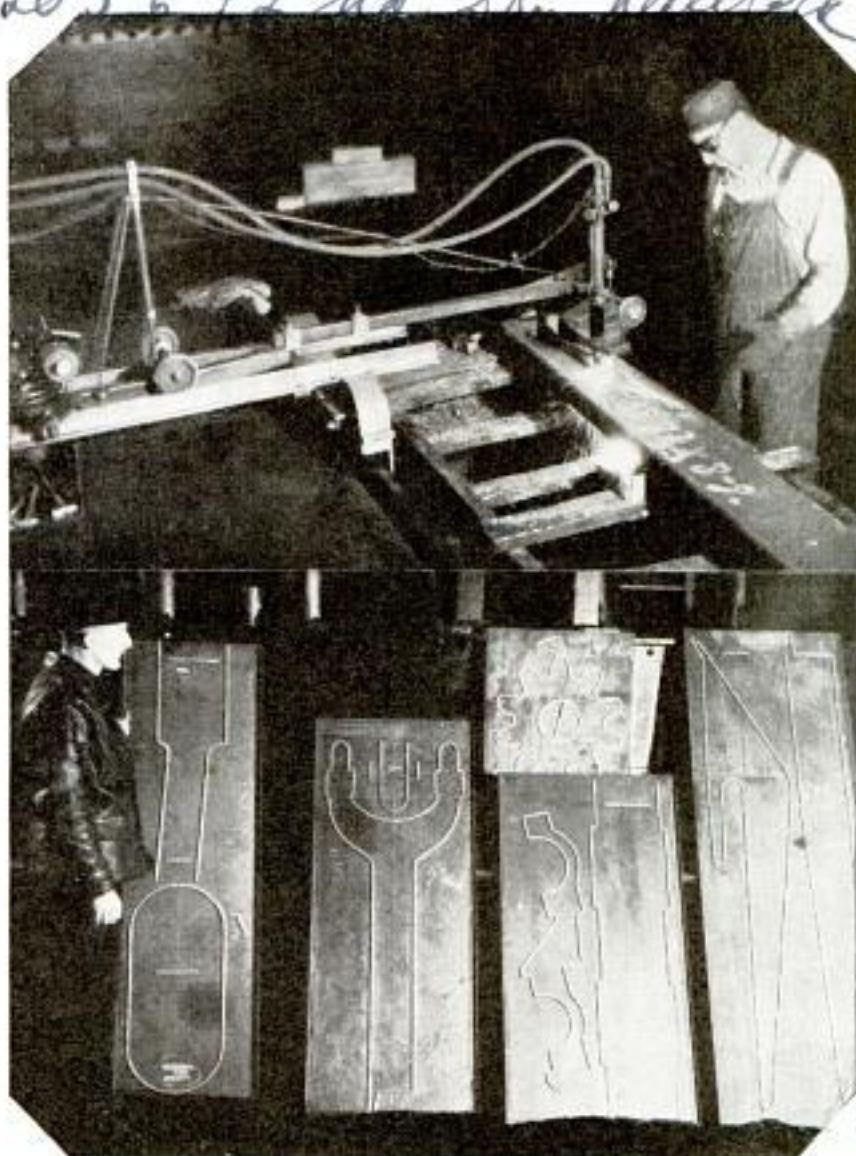
Oxy. acetylene forming machine. C1381

POPULAR MECHANICS
Linde Air Products Co.

"Flame Scissors" Cut Designs in Solid Steel

205842 no. 11 heater

Scissors or jackknives of flame are used to cut designs in sheet steel or to whittle odd pieces out of solid steel bars in the metal-working art. The work is done almost as easily as cutting out paper dolls. The operator of the shape-cutting machine merely guides the intense flame along line crayoned on the sheet or rod, or an ingenious templet automatically guides the flame in the case of volume production. Time, effort and money are saved. The device is an elaboration of the familiar oxyacetylene torch used on street-car tracks, in boiler and machine shops and in the wrecking of iron structures. The "flame scissors" machine has a torch mounted on an adjustable steel arm supported by levers, wheels and rails for easy movement. The frame is something like a pantograph, for manual operation on individual work or for templet guidance in volume production.



Top, Workman Watches "Flame Scissors" Cut Designs in Steel; Bottom, Templets Which Guide Series of Torches in Mass Production

All types of plain carbon steel and many varieties of alloy steels may be shape-cut. One feature in the operation of these machines is economy.

Layout and planning of the work provide for a minimum amount of scrap steel after the cutting.

RADIO STUDIOS SOUNDPROOFED BY "FLOATING" THE WALLS

Soundproofing of the broadcasting studios in New York's Radio City was accomplished by "floating" the walls, floors and ceilings, which are separated and insulated from the huge building itself. The studios actually are like boxes suspended in the steel and concrete construction. Each "box" is surrounded by tons of rock-wool which in turn is covered with other

insulating material. Heavy felt pads are placed at all points of contact between a studio room and the building, and sufficient "play" is allowed to take up any vibration in the steel frame. Several studios have sliding panels in the walls which can be operated mechanically from control rooms to vary the acoustical effect by changing the extent of hard surface exposed. All decorating was done with textile materials and a specially woven lining was used on all ceilings.

C1462

NBC studios

NBC. News Service
711. 5th Ave
New York

Q1338 Walker-Turner Co

856

1113 POPULAR MECHANICS

Designs on Wood for Jigsaw Aid Workman



sets. The designs facilitate cutting with the jigsaw, the operator simply following the lines with the saw. For instance, the furniture designs have key letters identifying them with the furniture to which they belong. The wood comes in sets, together with complete instructions.



Left, Cutting Out Designs from Special Wood Shown at Bottom; Right, Top, How Finished Figures Appear

For the home workman who desires to build toys with the aid of his jigsaw, wood carrying various drawn designs is being offered for making doll furniture, animals, soldiers or alpha-

HOW TO DETECT COUNTERFEIT FROM GOOD MONEY

Counterfeit money may be detected easily, in the opinion of the United States secret service, if you know what to look for. The surest way is by careful examination of all currency for defects. Genuine paper for small-sized currency has fine curly segments of red and blue silk scattered throughout the surface. The larger-size paper currency, which the present small note displaced, has two lines of silk on either side of the portrait. In the small bills, that is, small in size and not in denomination, the seal and serial numbers are printed in these colors: blue for silver certificates, yellow for gold certificates, red for United States bank notes, brown for national bank notes and green for federal reserve notes. The denomination of each note is indicated by the portrait on the face and the embellishment

on the back. The portrait chart provides: for \$1 bill, portrait of Washington; \$2 bill, Jefferson; \$5 bill, Lincoln; \$10 note, Hamilton; \$20 note, Jackson; \$50 note, Grant; \$100 note, Franklin; \$500 note, McKinley; \$1,000 note, Cleveland; \$5,000 note, Madison; and \$10,000 note, Chase. The check letter is always used in describing counterfeits. If not correct, the currency is bogus. The check letter is found inside the panel in the lower right-hand corner on the face of each note. Beside it is the plate number in small numerals. These letters and numbers are not to be confounded with letters preceding and following the color-printed serial numbers. Check letters on genuine currency run from A to L. They are synchronized, on all but national bank notes, with the serial numbers. By dividing the entire serial number by six, the remainder will indicate the check letter. If the remainder is one, for example, the check letter is A or G;

Handwritten notes: U.S. Secret Service, 2/23/38, 1113, 1113, 1113

if two, B or H; if three, C or I; if four, D or J; if five, E or K; if nothing, the check letter is F or L.

C1389

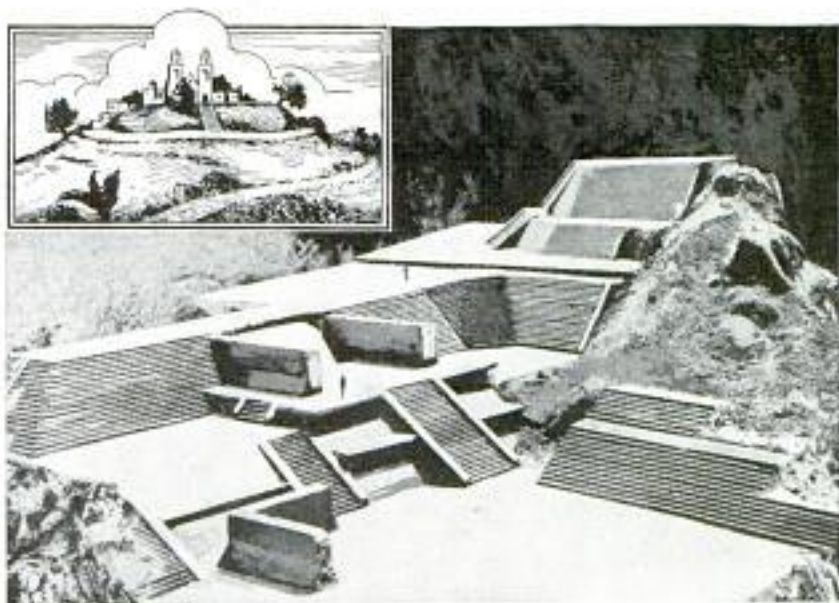
AIRPLANE COMPASS IS TESTED WITH PLUMB LINE

Due to the fact that airplane compasses must be tested in the ship in which they are to be used with the motor running at flying speed, this task has always offered difficulties, but a simple system has now been developed. The only equipment needed is a plumb line and a piece of chalk. With the chalk, a large circle is made on the airport runway and, starting at the north, lines are drawn through the circle each thirty degrees. The plumb line is suspended from the ship directly below the compass and the plane is then rolled into such a position that the line is directly over one of the degree lines on the circle. The motor is raced and the compass reading taken. If the instrument is two degrees off, the flyer allows for that amount of correction. The ship is then moved to each of the segments in turn and similar readings are noted.



Using a Plumb Line to Test Compass of Airplane as Ship Is Turned in Segments of Circle

Cont. H. Muller,
Box 21, Station C
Portland, Ore



Part of the Huge Structure Which Is Being Excavated in Mexico and Which Rivals Pyramids in Size; Note Figure of Man in Comparison

RIVAL TO PYRAMIDS OF EGYPT FOUND IN MEXICO

Mexican archaeologists, working underground like miners, are gradually uncovering a huge structure near Cholula which was larger in volume than the famed pyramids of Egypt. A church stands today at the top of the mound covering the ancient structure, and the diggers must tunnel cautiously beneath the church. To keep track of their progress, they are making a plaster model of the wrecked and buried buildings as various sections are uncovered. So complex is the hidden maze of buildings that it is difficult to visualize them, due to the fact that the great pyramid appears to have been enlarged several times, the Indians each time building a new layer over the old one, using the old stairs and walls for foundations.

C1459

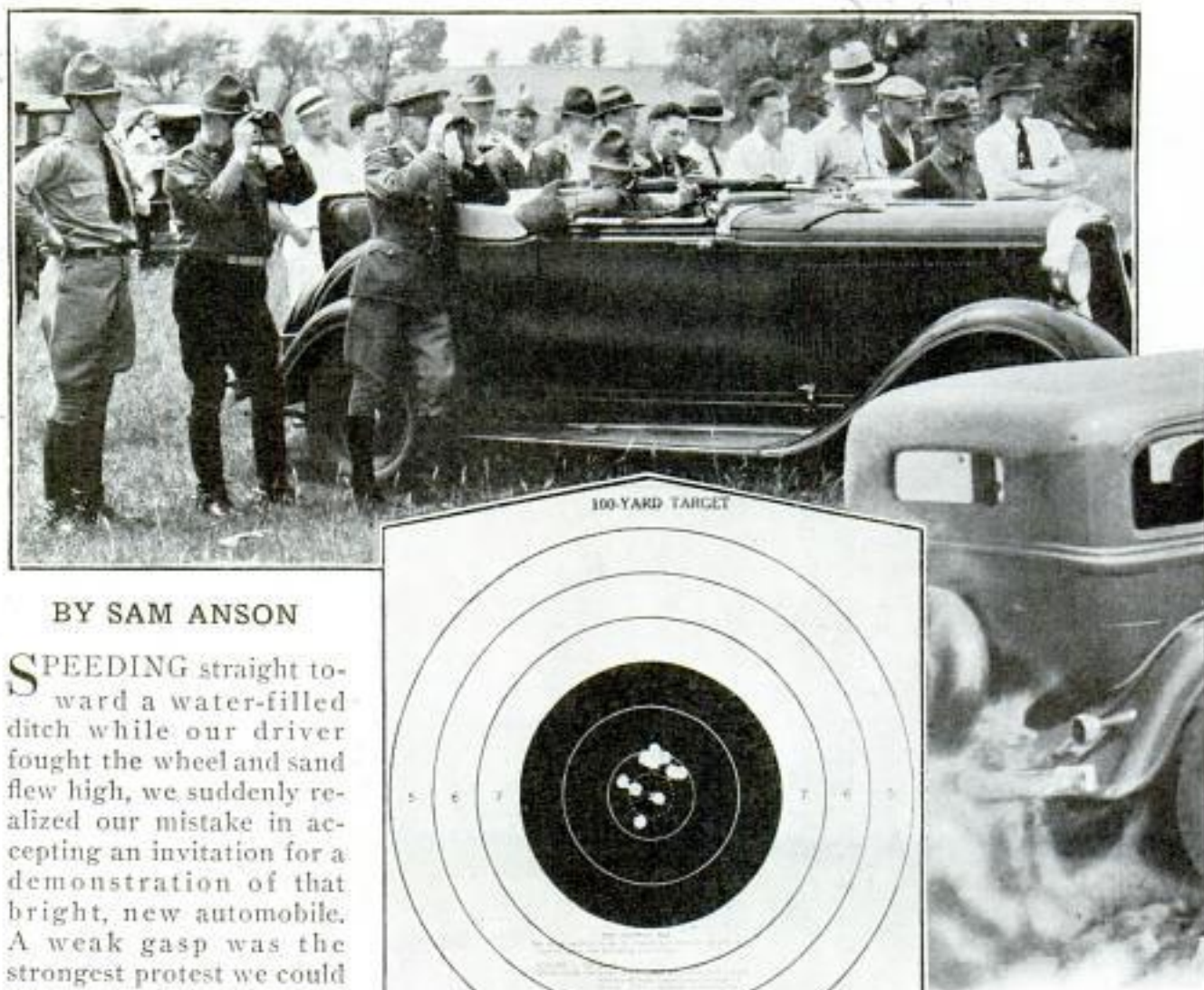
MORNING WORK FOUND EASIER THAN AFTERNOON TASKS

Less energy is expended on work performed in the morning than in the afternoon. That has been determined in experiments conducted by Dr. G. L. Freeman of Northwestern University. Subjects were required to do the same amount of work at different hours of the day and their energy output measured. The most energy is used in the late afternoon. The energy used during rest is greater in the early morning and least after lunch.

Evanston, Ill.
reported to American
Psychological Assn

Science News Letter 9/9/33

TORTURE *makes*



BY SAM ANSON

SPEEDING straight toward a water-filled ditch while our driver fought the wheel and sand flew high, we suddenly realized our mistake in accepting an invitation for a demonstration of that bright, new automobile. A weak gasp was the strongest protest we could utter as the driver ignored the fact that the car was equipped with brakes. Instead, he "stepped on it," sending the car careening over the edge, splashing through a shower of water and up the opposite side. Our driver grinned as he headed for a large sandy hole and shouted unnecessary advice to "hold on!" Right across we plunged, the car bouncing, twisting and straining to tear itself from the control of this man whom we had begun to think mad because he was doing everything with a car that we had been told no sane person should do.

While we clung to anything that seemed secure, that car dashed back and forth and around the sides of a sort of pit, bucking sand drifts, bounding over ridges and



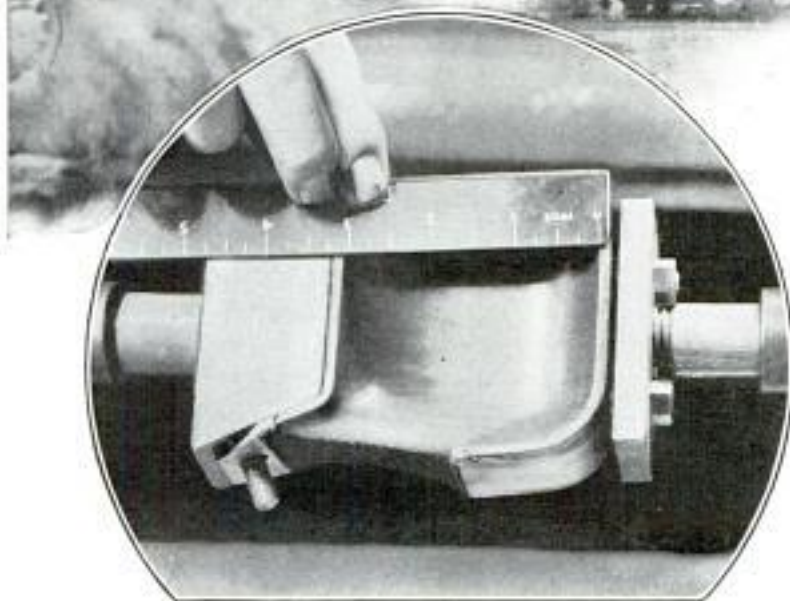
Top, Firing at Target While the Motor Runs; Bottom, Official Record of the Test, Showing Ten Hits Closely Grouped at Center of the Target

almost shaking loose our teeth as its wheels dipped in and out of countless holes. The minutes passed like hours. It seemed impossible that any piece of machinery could withstand such punishment. But that car did, and finally the driver brought it flying over the rim of the pit and to a stop as the motor purred quietly.

Moving carefully in the fear of discovering broken bones, we stepped out, glad to feel solid ground beneath our feet as well as anxious to learn why man should so torture a machine.

them SAFER!

George B. Allen, chief engineer of Dodge Brothers corporation, gave us the answer. This pit in which we had been riding is a new type of automobile proving ground, actually a "punishment pit" that is regarded as



Top, Examining Target; Center, Car Coming Out of "Punishment Pit"; Bottom, Measuring Rubber Mounting under Severe Test

the quickest and most satisfactory way of finding out how an automobile can stand up under treatment of the most severely abnormal sort. That demonstration firmly convinced us that no owner ever would be called on to torture his car in such a manner, no matter how bad the roads.

As we talked beside the pit, another new car was being tested under even more rigorous conditions. All that we had gone through and more was being applied, even to the point of rolling the car head over heels down hill. If that had happened a few years ago, the test crew would have found only a jumbled mass of wreckage, but now, the car plunged to the bottom, there to be righted and the motor started. Much to our surprise, it moved off under its own power, a convincing demonstration of the new safety which American manufacturers are building into the modern automobile.

In punishment pit, Engineer Allen says, the shifting sand constantly piling up in front of tires makes every revolution of the wheels a hill climb and a task that brings the very last ounce of engine power into play. It subjects clutches and gears to terrific strains that cannot possibly be duplicated in any other way. The



Photo of a Plymouth against Which a Truck Overturned; Note How Steel Body Resisted Impact

loads on springs, bearings and on each and every part of the car are increased so greatly and imposed with such suddenness that flaws and weaknesses show up immediately. This, of course, enables the manufacturer to replace weak parts with strong, to produce an automobile that not only will transport its owner but actually will protect him. In an accident, the driver may escape death if the body of his automobile is constructed of materials which will not collapse under severe impact.



Dodge Bucks the Sand in "Punishment Pit"

After thousands of miles on all kinds of roads, the driver's life may depend on the ability of one small part to resist wear and tear.

Before Dodge introduced its latest models, some of the test cars were tortured in punishment pit for as long as 600 hours. In these trials, every stunt resulting in mechanical agony to all parts was employed to furnish the engineers and builders with proof of the car's sturdiness and safety, with its ability to "take it."

What we thought to be a form of madness in our driver was nothing more



Test of Rubber Engine Mounting Proves It Strong Enough to Support Weight of the Plymouth

than an exhibition of exceptional skill and training. Where the owner-driver would steer around chuck holes, dams and other obstacles, the punishment-pit driver hunts the obstacles, steps on the throttle and tears right into them. He is exceedingly

C1310

nimble-footed and can let the car turn over without being injured himself.

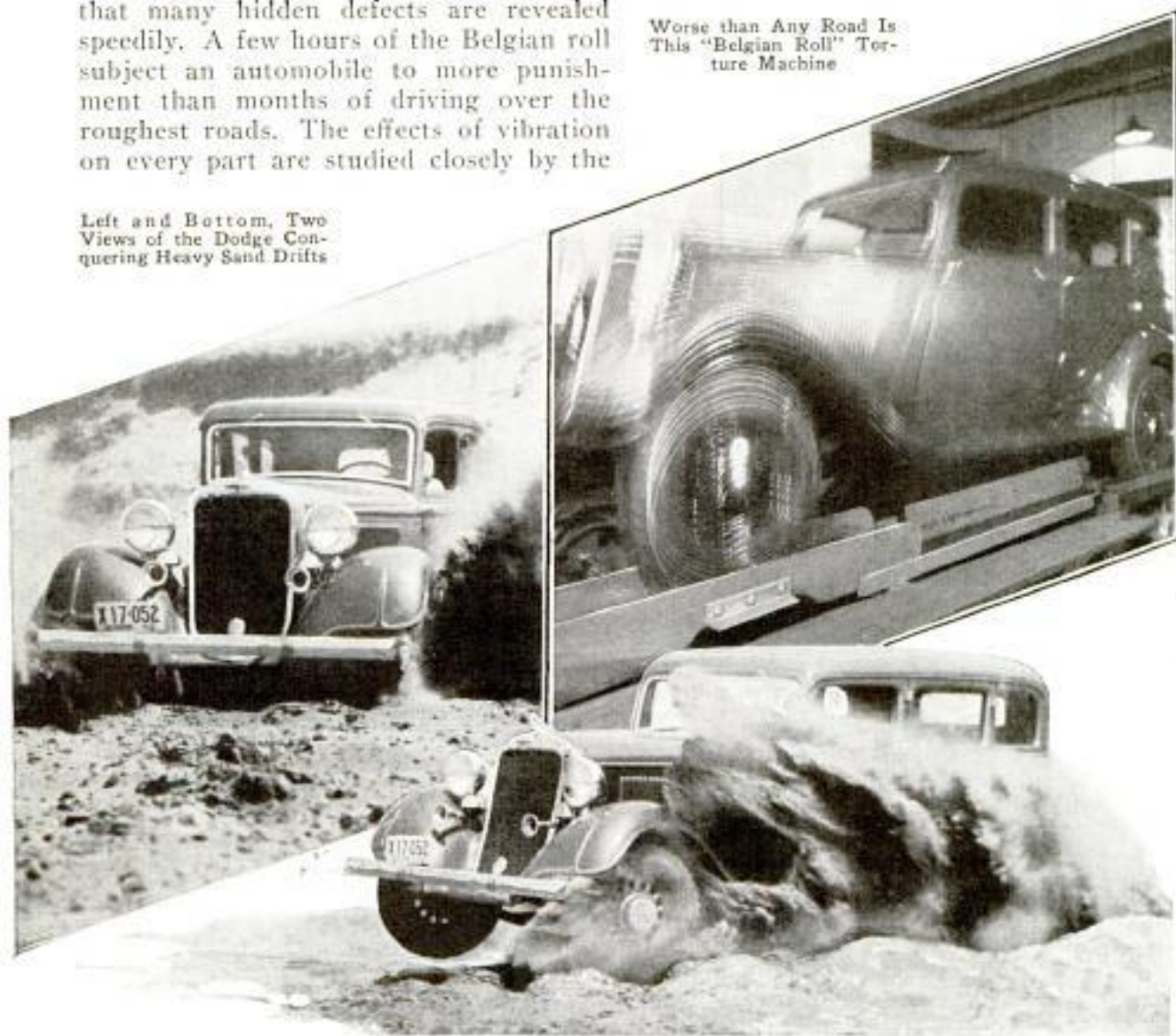
Not only in the pit is torture applied to the new models. An ingenious device called the "Belgian roll" is almost as cruel to an automobile as punishment pit. This machine shakes, rattles and vibrates a car placed upon it in such a vigorous manner that many hidden defects are revealed speedily. A few hours of the Belgian roll subject an automobile to more punishment than months of driving over the roughest roads. The effects of vibration on every part are studied closely by the

firing, the rifle rested on the windshield. The result was a 100x100 target score.

Col. E. M. Lubeck, judge of the test, pointed out that if, during the test, any vibration of the engine had caused the body of the car, and with it the marksman and the muzzle end of the rifle, to move as little as one-thirty-second of an inch, the

Worse than Any Road Is
This "Belgian Roll" Tor-
ture Machine

Left and Bottom, Two
Views of the Dodge Con-
quering Heavy Sand Drifts



engineer, changes made here and there, and to the public goes the result of torture—

A quiet, safe, smoothly riding automobile that will give years of service.

One unusual test of motor quietness was conducted recently by Dodge engineers under military supervision. While the engine was running, an expert rifleman sitting in the front seat fired ten shots with a United States army rifle at a regulation target 100 yards away. During aiming and

ten consecutive hits could have shown a maximum dispersion of ten inches. On the actual target, the ten hits were grouped within a circle only one and three-eighths inches in diameter. Had the shots been fired from a solid-concrete platform, the result probably would not have been better, according to Colonel Lubeck.

Unusual as these tests may appear, they are the means to a common end, that of producing faster, safer and more comfortable automobiles.

C1388

Air Commerce Bulletin
U S Dept. of Commerce

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POPULAR MECHANICS

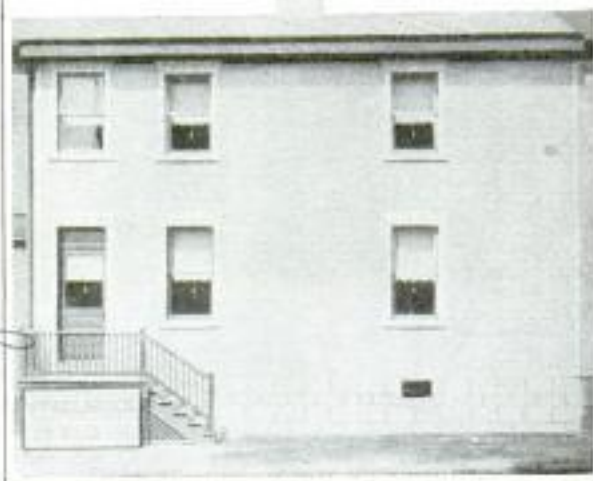
U.S. Pittsburgh Pa

C1439

9/15/33

SAFETY OF PASSENGER PLANES PROVED IN SIX-MONTHS' RUN

During the first six months of 1933, American-operated air lines carried 235,139 passengers with only two passenger fatalities. Scheduled transport ships flew 25,862,120 miles. In only one of the forty-eight accidents on the air lines during the six months was a passenger killed, both of the fatalities occurring in the same crash. Total passenger miles, a passenger mile being the equivalent of one passenger flown one mile, were 76,642,393, with passenger miles flown per passenger fatality, 38,321,196. That American transports are safe is proved by analyzing the causes of the forty-eight accidents. Only the undercarriage, wheels, tires and brakes contributed to these accidents from the standpoint of structural failures. Power-plant failures were charged to the fuel system and the propeller and accessories. On the other hand, the weather is blamed for 9.90 per cent of the accidents and the airport and terrain for 5.21 per cent.



Old House Repaired by Applying Covering of Brick Veneer, Which Is Nailed to Walls

BRICK-VENEER WALL COVERING IS EASY TO APPLY

Almost any frame house can be converted into a brick one in appearance and at the same time protected with an extra outer wall covering by applying slabs of brick veneer, made to resemble face brick. The veneer covering consists of three bricks and the surrounding mortar cast on a sheet of twenty-six-gauge galvanized steel which is twenty-six inches long. Each brick weighs only eleven ounces, and all that is necessary to convert a frame building into one simulating a brick structure is to nail on the strips, since there is no need of mortar or a special foundation.

Names and addresses of manufacturers and dealers in articles described, and any other details in our possession, will be furnished by our Bureau of Information upon request, accompanied by postage.

C1360

SCREENS READY TO ASSEMBLE ARE PUT UP IN PACKAGES

Packages containing enough materials to assemble a full-size window screen are on the market. Each carton has complete frame material, wire cloth, molding, hangers, hook and eye, tacks, brads, corner braces, yard stick, molding miter and instructions for making.



How Window Screen May Be Assembled

By Lock Co. Ltd
San Leandro Calif

Joseph Brown's New Brick Home
Improvement Co 733 E Ohio St

Copyrighted material

OYSTER GIVEN AID
 IN PRODUCING
 MORE PEARLS

My Herald Tribune 9/24/33

Stepping in with tweezers, knives and other paraphernalia, the Japanese are helping oysters to produce a greater number and more perfectly shaped pearls than those formed entirely by the accidental working of nature. In forty years of experimentation, the Japanese have developed methods of culturing perfect pearls which cannot be distinguished from other natural pearls without cutting the gems in two. They are genuine pearls, but are grown through artificial stimulation. The pearl-planting season in Japan in 1933 was the largest in years. More than 3,000,000 pearl-producing mussels were scattered over 40,000 acres of calm waters along the Pacific shores of central Japan. Into each shell was placed a tiny seed pearl covered with live-oyster membrane. Then the oyster was placed in a wire cage and suspended by means of rafts in the waters of the bays. Twice a year, the oyster is taken from the water for the removal of barnacles and other accumulations. The cages keep marauders from destroying the oysters. Seven years hence, the 3,000,000 mussels will be opened and the pearls removed. Approximately twenty per cent will have no pearls, twenty to twenty-five per cent will have practically perfect pearls of varying sizes, while the rest will produce only imperfectly colored or irregularly shaped pearls of little value.

C1301

MODEL SHIP AND SAILS CARVED WHOLLY FROM WOOD

Even the sails are carved of wood in the model of "Old Ironsides" made by an Oregon man, who spent a year at the task. The ship is made of Oregon white pine

Morris Peterson
 Cherryville, Ore



Model of "Old Ironsides" Carved Entirely from Wood; the Sails Are Carved from Blocks of White Pine and the Hull Is Oregon Cedar

and cedar, is forty inches long and the tallest mast is twenty-eight inches. Each sail is carved from a block of white pine and more than 300 deadeyes and blocks are contained in the model.

STROPPER ROLLER FOR RAZOR
 C1351 KEEPS BLADE SHARP

Many shaves per blade are offered by a razor equipped with a stropper roller so the wafer blade can be sharpened on the palm of the hand. Back of the blade is a roller to which a spiral of leather is attached. When run back and forth over the hand, the blade turns so that each side is stropped in turn.



The stropping process is said to be aided by the natural oil of the skin which is transmitted to the leather spiral.

Nota: Keep razor
 sharp
 Montreal, Quebec, Canada
 Grand Hand

Wm. J. Turnbull, 47 Belmont Ave
 Ottawa, Ont. Canada

Memphis Airport, Kansas City, Mo



Note Rubber over Hub and Extending along Edge of Propeller; Arrangement Prevents Ice from Forming and Interfering with Flying

RUBBER BONNET ON PROPELLER SHAKES ICE FROM PLANE

Rubber bonnets for the propeller help to keep mail planes of the Transcontinental and Western Air, Inc., free from ice. Attached to the propeller hub and blades, the elastic bonnet vibrates, cracking and shaking off ice forming on the screw. Rubber boots attached to the leading edge of the wings also aid in the fight against ice. Compressed air forced through rubber tubes within the boot, creates a pulsating action that cracks ice formations.

SPEEDING AUTO EASIER ON ROAD THAN CAR TRAVELING SLOWLY

Automobiles traveling at a fast pace are easier on the road than those going at ordinary speed. Movie cameras show that bumps on normal roads are less aggravated by a speeding auto than one moving at the present average road speed. When an auto goes over a bump, there are two separate impacts. The first is when the car actually hits the bump and when it returns to the road. This second impact was

found to be more destructive to the road. Further, the camera shows that over everything except large obstacles, the impact is reduced when the speed is increased beyond ordinary touring speeds. Other tests confirmed the claims of superior smoothness made for low-pressure tires. It was found that overloading does not increase the force of impacts because the extra spreading of the tires makes up for the extra load.

SHUTTER CLOSES VENTILATOR IN FIRE DOOR

To protect the United States capitol from fires, a system of fire walls and doors has been installed to isolate different sections

and thus confine a blaze to the particular part of the building in which it originates. Each fire door is equipped with a steel shutter, controlled by a fusible link which melts from heat and allows the shutter to drop and close a ventilating panel in the metal door.



Sliding Shutter in Steel Door Which Closes Ventilator Panel in Case Fire Breaks Out

Report of Ministry of Transport Committee London, Eng

Wide
Installed by David
Lynn - Architect

Vertical handwritten notes on the right margin, including the number '1334'.

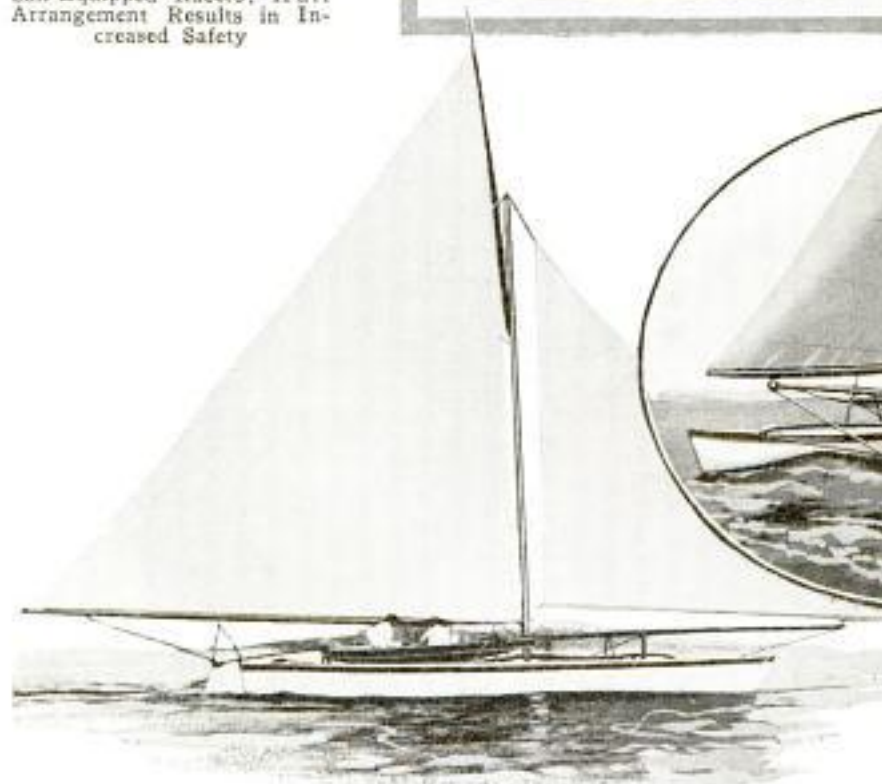
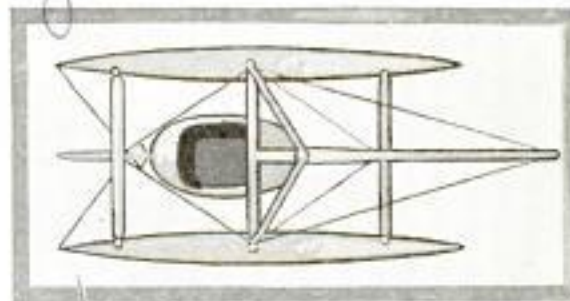
8/45 J. Herreshoff, Mystic, C.

Bristol, R.I.

Twin-Hull Windjammer Has High Speed

Amaryllis

Two Photos and Drawing of Catamaran-Type Racing Craft; Top, How the Twin Hulls with Cockpit Between Appear from Above; Bottom, Boat under Sail; Circle, How the Craft Appears from the Front; Note the Hulls and Cross-Member Construction; This Boat Is Said to Be Much Faster Than Conventional Sail-Equipped Racers; Hull Arrangement Results in Increased Safety



*Herreshoff
Mystic Co
Bristol
R.I.*

*cost about
five thousand
dollars.*

Something new in sail-fitted racing craft has been introduced at Detroit in the form of a catamaran whose main feature consists of two pontoonlike hulls joined by cross members terminating in ball-and-socket joints that give the hulls a certain latitude of movement. Between the two hulls, which are thirty-three feet over all, an iceboatlike overwater cockpit is mounted, accommodating a crew of six. With a depth of thirty inches and a draft of twelve inches, the hulls are twenty-eight inches beam at their widest point. The center-to-center distance between hulls is sixteen feet. Each hull is equipped with center board and rudder and the two rudders are rigged to swing simultaneously with a single tiller. The extreme length of the craft from the forward end of the jib club to the after end of the main boom is fifty-

seven feet. The sail area is 900 square feet, with 600 square feet in the mainsail and 300 in the jib. In preliminary tests, the boat was found extraordinarily seaworthy and very fast in rough water. Speeds well above twenty miles per hour have been attained. This type of racing craft, designed by Nat Herreshoff for H. T. Keller, president of Dodge Brothers corporation, heading a syndicate of sportsman owners, is regarded as practically upset-proof. Herreshoff is the builder of many fast-sailing craft, including those victorious defenders of the America's cup, the "Vigilant," "Defender," "Columbia," "Reliance" and "Resolute."

☐The number "pi," which children learn as 3.1416, has been carried out to 707 decimal places by one calculator.

*Science News Letter
8/19/23*

*Insulation - Pacific Lumber Co
Scotia and San Francisco
also handles: ^{Super} Calif*

GLASS and FOOD

*5500 Golden Gate Blvd
Oakland, Calif*



GRAMOPHONE RECORDS



ROPE AND TWINE

By CLARENCE EBEBY

WOOD, which has long been regarded as valuable mainly for building houses and furniture, is now the basis of many products that would have seemed ridiculous and impossible a few years ago.

Not only are cattle food and a transparency that becomes a part of glass derived from wood or its resultants, but also sugar, imitation leather, perfume, incense, an inhalant for treating asthma and catarrh, parts of shoes, rayon, linoleum and a host of chemical products.

The department of agriculture maintains a forest products laboratory at the University of Wisconsin. A long list of "forest specialties," products of wood, issued by that laboratory, includes, in addition to those mentioned: cascara, alcohol, dyes, balsam, rubber, turpentine, lime, phonograph records, ropes and twines,

vald.
Products Made from Wood and. Top, Laying Redwood-Bark Fiber-Insulation Material; in Circle, Molding and Pressing Pieces of Redwood

surgical dressings and sausage casings. These are merely examples of many products seldom credited to the forest.

And not only have research, ingenuity and scientific investigation given to humanity these many servants for its use and pleasure, but continued investigation is under way and no doubt the future will witness even more startling developments. A Californian, for example, claims to have discovered a process whereby he can cre-

*at Redwood
Chemical Co Plant
Eureka Calif*

Libby, Avenue ^{Fort} ~~St. Louis~~ C1262
 Nicholas Bldg., Toledo, Ohio

made from WOOD



at Santa Rosa
 Calif.

Church Made from One Redwood Tree; Top,
 Inspecting Transparent Plastic Used Be-
 tween Plates of Glass



LINOLEUM



SAUSAGE
 CASINGS

generally known that the forest products laboratory is developing a process which will restore in large measure that industry to the United States. It involves the removal of resins from pine, thus making this wood available for white paper.

Various extractives come from trees, such as cedarwood oil, dyes, quinine, galactan, pinite, sequoyite and tannin. The redwood tree produces a pulp that often is used to make paper, but it is also rich in extractives. One chemical company uses the redwoods for making a perfume extracting the fragrance from the extreme tips of very young trees. From the same tree the company makes an inhalant for treating asthma, sinus and other head affections. A redwood incense also is made in the form of candles.

ate silk from the massive redwood tree. It is well known that paper is manufactured from wood pulp and that the supply of trees in the United States has so diminished that much of the paper for newspapers, magazines and books has come of late years from abroad. But it is not so

Cattle food from wood is a product of sawdust. The treatment consists of cooking the sawdust under pressure with dilute sulphuric acid, which converts a portion of the cellulose and allied substances into sugar. The resulting liquor, together

Ernest Mueller
 ureka, Calif.

Redwood Chemical Co
 ureka, Calif.



Above, De-Inking Old Newspapers; Right, Coating Plywood in a Glue Spreader

Above, Testing the Moisture Content of Lumber with the "Blinker" Machine

with the washings from the undigested sawdust residue, is neutralized with lime and evaporated to a thick sirup. This is mixed with the dried residue for feeding. The meal is dark brown, rather powdery and has a slightly sweet, woody odor and flavor. It came into favor during the World War, when the scarcity and high price of grain made it valuable. Animals will not eat it unless mixed with grain and some of them not even then. It is only partly digestible, but experts believe that if the preparation process could be modified to convert a larger part of the cellulose into sugar and more completely dissociate the cellulose from the lignin, its food value would be increased.

Sawdust is used for quite a number of purposes besides floor coverings for butcher shops and packing material for ship-

ping merchandise. It is used in the manufacture of gas for both heating and illuminating, briquettes for fuel are made by compressing it with the aid of cohesive agents and it is used for softening leather by dampening, cleaning metal products, wire novelties, aluminum utensils and tubing, conditioning of furs, insulating material, cement curing and meat smoking. Sawdust is used, with other wood substances for manufacturing

producer gas, and illuminating gas may also be made by distilling the sawdust in retorts similar to those used for distillation of coal.

In California a big industry has grown up in the manufacture of insulation from redwood-bark fiber, which is particularly adapted to this purpose since it resists fire. Another strange quality of this bark is that it will not absorb water, or moisture from the air. Also, there is no insect life or predatory germ in redwood and it is said that rats and other rodents never have been known to frequent a wall insulated with this redwood-bark fiber. Another queer feature about this bark fiber

is that instead of settling and contracting, after packing, it is so resilient and springy that it has a tendency to expand slightly. And the chlorophyll, that destroys the germs in the bark, prevents rot.

Wood flour is wood products ground to an extreme fineness, sixty per cent of it being made from sawdust and shavings. At least three-fourths of that made in the United States comes from white pine. More than half the wood flour made in the United States enters into the manufacture of linoleum, where it is used chiefly as a filler.



Left, Articles of Dress in Which Wood Is Used; Above, Making Redwood Perfume



Girls Picking the Redwood Tips from Which Chlorophyll Is Extracted



HAT

PERFUME

HANDKERCHIEFS

PURSE

DRESS

HOSE

SHOES

Redwood Chemical Co.

into sugar is mainly for the manufacture of ethyl alcohol. Europe is now making sugar from wood extensively. Germany has it almost on a commercial basis and a Swedish professor estimates it should be possible to extract from Swedish forests not less than 1,000,000 tons of wood sugar. The proposed use for the sugar is to convert it into ethyl alcohol.

One of the most interesting uses of wood has been in the manufacture of safety glass. The form of glass in which wood is used consists of two thin sheets of plate glass, with a plastic made from a wood product in between, fastened together with an adhesive. At first the plastic was made from cellulose nitrate, which is from cotton. Now it is made from cellulose acetate, which is from wood pulp.

The plastic which comes from the cellulose acetate in wood pulp is made into a thick, starchy substance which hardens into a stiff sheet that seems semi-metallic and is at first glazed and entirely opaque. But it is subjected to heat and strong pressure and in this process the glaze

(Continued to page 126A)

California
Curba
Idaglund
199
199
199

C1407
870

Automator Laboratories
844 POPULAR MECHANICS
Chicago

Chicago Herald
News
C1473 9/21/33

motor sparks
Columb

Agent - Alvin Radio
833 W. Jackson Blvd.
Chicago, Ill.
\$32.50 up
Cable of info.



Chicago Daily News 9/21/33

ENGINEER OF TRAIN RUNS BLIND AS HE NEARS CROSSING

When a motorist foolishly attempts to cross a railroad track in front of an approaching train, he probably believes the engineer sees him and, if the worst comes to the worst, the man in the locomotive will apply the brakes. As a matter of fact, the man in the engine cab of a long locomotive is running "blind" as he bears down on the crossing. All any automobile driver needs to do to prove this to his own satisfaction is to climb into the cab of one of the larger engines and peek out the window. The long body of the engine obscures his view of the track for a considerable distance ahead. If the engineer is seated on the

Generator for Supplying 110-Volt Current Is Easily Installed in Auto; Drawing Shows Some Uses of Electricity Generated by the Device

PORTABLE GENERATOR IN AUTO GIVES STANDARD VOLTAGE

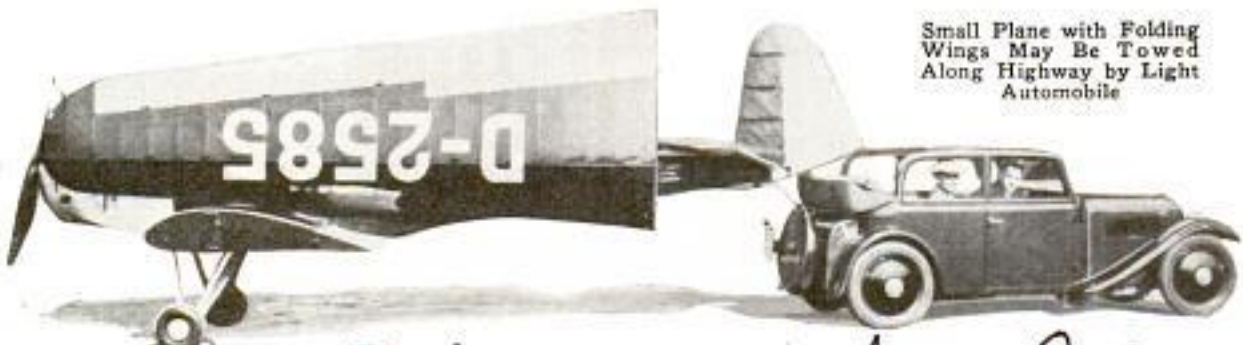
Capable of supplying standard 110-volt current, a portable generator may be installed in any automobile. It operates from the fan belt and takes no current from the auto battery. There are no brushes, collector rings, commutator or wire-wound armature. The generator furnishes 110 volts, alternating current, for operating portable sound systems, neon signs, electric lights, searchlights, radios and other appliances. A device regulates the voltage at all speeds. Sizes available are fifty, 100, 150, 250, 350 and 450 watts.

right side of the cab and the car driver is approaching the crossing from the engineer's left, it is possible that the man in the cab cannot see the motorist even a quarter of a mile from the crossing.

WINGS OF SMALL PLANE FOLD FOR TOWING BY AUTO

Constructed so that its wings may be folded, a new light plane produced in Germany is easily towed by automobile if the weather is unfavorable for flying. The craft is capable of sixty-five miles per hour. It sells for less than \$700.

C1415



Small Plane with Folding Wings May Be Towed Along Highway by Light Automobile

Erla Flugzeugwerke
Erla
Ernteburg, Germany

Copyrighted material

C1414

Special Hydroplane Enters American Racing



Here is the Latest Craft to Invade American Racing Circles; Judge Turnbull is Shown at the Wheel; Note Big Outboard Motor Which Drives the Boat; It is a Class X, 1,000-Cubic Centimeter Hydroplane

American speed-boat racing has been invaded by a special type of hydroplane. Entered by Judge Rupert B. Turnbull in various events, it is known as class X, 1,000-cubic centimeter, and is said to be capable of high speed. Judge Turnbull is the father of Loretta Turnbull, known in racing circles as "queen of the outboards." She has captured national and international championships.

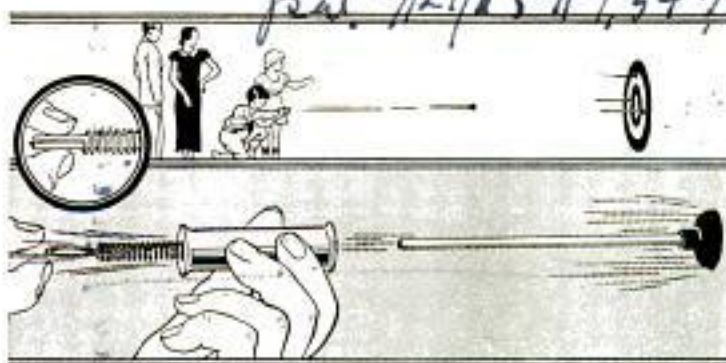
sudden moves. This set of rules is the advice of Robert C. Graham, of Graham-Paige Motors corporation, a campaigner for safe automobile driving.

WINTER DRIVING MADE SAFER BY SIMPLE PRACTICES

By following a few simple rules, the automobile driver may eliminate much of the danger of winter driving. First, keep in gear, because rear wheels are less likely to skid if they are kept turning by the motor. Second, apply brakes gently and don't give it to the rear wheels harder than they can take it or they will slip and probably go into a skid. Third, don't shift unless you must because trouble may follow if you have to shift on a hill and the road is icy. Fourth, put on chains all around if it's icy and be sure to have them tight; put them on with car jacked up and tires partially deflated, then fill up the tires. Fifth, pay full attention to the business of driving; handle everything with gloves, gently—gas, steering wheel, brakes; ease it along, no

SPRING "GUN" SHOTS ARROWS WITH VACUUM CUP TIPS

Arrows with vacuum cup tips which stick where they strike are fired by a small spring "gun," providing a safe form of indoor archery for both children and grown-ups. The gun consists of a short wooden barrel containing a coil spring with a loop in one end to receive the shaft of the arrow. The arrow is placed in the barrel and



Spring "Gun" Which Shoots an Arrow with a Vacuum Cup Tip; the Tip Causes Arrow to Adhere to a Smooth Surface

inserted in the loop, then the spring is pulled back and released. The arrow will remain on the spot where it hits the target, as the vacuum cup adheres to any smooth surface.

C1488

pat. 7/21/25 #1,547,104

Robert C. Graham
Graham-Paige Motors
8505 W. Wacker Dr

Robert C. Graham
Graham-Paige Motors
361 W. Superior
Chicago

and Color Corp

WASHABLE PAPER FOR WALLS
HAS SOFT FINISH

Essex Falls, N.Y.



Soap and Water or Other Cleaning Materials Do Not Damage This Wall Paper

Even the softest finishes and most delicate pastels of a new wall paper may be washed with soap and water without damage. Or, the paper may be cleaned with alcohol, benzine, cleaning gasoline, naphtha, turpentine and carbon tetrachloride. The papers do not resist water. Instead, they become wet and darken like cloth, but dry out, leaving the original unpuckered surface. No lacquer or varnish is used to make the paper washable.

YOU CAN READ WITH EYES SHUT
WITH AID OF X-RAY

Reading with the eyes shut is made possible by an X-ray apparatus developed recently for treating eye ailments. It was invented by Dr. A. H. Picie, of Montreal, who explains that it enables a person to locate exactly any foreign body in the eye and also discloses the affected area of vision in cases of cataracts or brain tumors affecting the sight. In addition it shows whether a nerve in the eye is dead. The subject is left in darkness for twenty minutes before a test is made. He is then placed in front of the portable X-ray set which is set so the eyes of the patient are

level with a small tube protruding from it. The tube ends in a projection similar to an eye cup against which the eyeball is placed with the lid closed. On a plate inserted farther back in the tube is a diagram of lead, a circle divided into four parts. The X-ray is turned on, and if a foreign body is present in the eye, the ray will reflect it in one of the four divisions of the diagram which can be plainly seen and designated by the patient. With this information, the doctor knows where to look for the particle. When lead letters are used as a text on plates inserted in the tube, the patient can read them easily as they are reflected on the retina of the eye, even through the closed lids.

C1447
SIGN MADE OF FURNACE PIPING
USED BY PLUMBING SHOP

One heating and plumbing shop in Omaha advertises its business and its adherence to the national recovery act by displaying above the sidewalk a big N.R.A. sign constructed of furnace pipe. It is made of sections of galvanized pipe joined together to form the three letters.



N.R.A. Sign Constructed of Furnace Pipe Which Is Displayed by an Omaha Plumbing Shop

Chicago Tribune 9/30/37

Emb Roy Plast, dental office of Dr. S. M. ...

12/12/37 ...

Victoria Hospital

C1308. Cont. Walter E. Burton
10 32 Florida Ave
Akron, Ohio

Turning Junk into Money



AFTER you have driven an automobile tire for 20,000 miles, you probably decide it has reached the end of its useful days. However, the tire, converted into crude but durable shoes, may pile up additional mileage almost as great as that already traveled.

Used automobile tires are in demand for shoes in India, Spain, Mexico, several other Latin American countries, and the Near East, and there are companies which make a business of collecting old tires and converting them into footwear. A single casing may provide three pairs of sandals or shoes that will outwear the purchaser's feet. Styles vary with locality, from a simple Oriental sandal having straps running up between the toes and around the ankles, to heavy footwear resembling Dutch wooden shoes. The process of manufacture may involve peeling off the inside fabric layers of the tire and cutting them to form straps; or simply cutting the material to a pattern, bending and riveting with hand-made staples. The tread invariably forms the sole. Even in America, shoes or soles made from old tires have been used to a limited extent by men whose work involves walking over surfaces which are rough.

The department of commerce has assisted many manufacturers to find foreign



Lower Photo Courtesy B. F. Goodrich Co.

Above, American Flour Being Conveyed to Market in China; the Sacks Later Will Be Used for Other Purposes; Below, Sandal Made from Auto Tire

markets for outmoded merchandise—products unsalable in domestic markets because of style changes or new inventions. For example, not long ago the urge to go hatless swept the United States. Hat



The shipping of second-hand American clothing to foreign countries is in the class of big business. India today is the biggest customer, buying every year about \$750,000 worth

Above, Using American Oil Cans for Carrying Water in the Celebes Islands, Dutch East Indies; Right, Steamer Being Loaded with Bananas Carried in Slings Made from Rubber-Conveyor Belting Which Does Not Bruise the Fruit



manufacturers sent anxious queries to Washington. A world-wide study revealed that in China, modern-minded men were clipping off their queues and demanding hats. Turkey, by official action, had banned the fez, thereby opening a market for American caps and hats. Likewise, in Egypt the tarboosh had begun to decline in popularity. As for derbies, travelers in certain parts of South America have, during the past few years, encountered Indians wearing, with much dignity, typical American hard-shells.

of old clothes—everything but men's pants, because trousers are not worn much in that country. For a dollar or two a resident of India may obtain an overcoat that cost you fifty to one hundred dollars a few years before. He will get a dozen more years of service from it, for style doesn't bother him at all.

Dr. Julius Klein, former assistant sec-

retary of commerce, tells of a clock manufacturer who had on hand more alarm clocks than he could sell to regular markets, so he called for help. South American Indians, the same ones who favor derbies, were found to possess a weakness for noisy clocks. They readily bought the time-pieces, not for keeping informed of the hours, but for entertainment. The trader who sold the clocks kept the keys, and then charged customers five cents for each rewinding!

Mexicans seem ingenious in developing new tasks for rubber goods. One concern found an unexpected market for garden hose in a Mexican town which never had known a public water system. The hose was being cut into three-foot lengths and thrust down the throats of cattle so that medicine could be administered more conveniently! Another hose market was found at Mexican race tracks. This time the article in demand was pure-gum tubing such as is manufactured for hospital uses. The tubing was stretched across a race track as a barrier in front of the line of horses. Then one end was released. In parts of Mexico there is a demand for thousands of pounds of rubber thread. Natives purchase the thread and use it for sling shots of no little power. Rubber-conveyor belts are used in mining districts of Mexico for carrying ore. An enterprising peon found that a piece of belting could be made into serviceable shoes. He told other peons, and soon an epidemic of belt-stealing broke out. Finally armed guards had to be posted to stop the practice. The conveyor belt has found another and more favored job in the tropics. Thousands of feet of new belting have been purchased by shipping companies for making banana slings. A length of the material, perhaps a yard in width, is pierced at the corners for grommets through which ropes are run. The bunches of fruit are laid on the belt, the rope tightened, and the resulting sling used for conveying the burden from

Shoes Which Were Made in India from Old Tire Casings



wharf to ship's hold. Besides being extremely durable, the belting does not bruise fruit.

Even the familiar automobile tire works its way into some extremely odd jobs. Horse-drawn cabs in Warsaw, Poland, now sport pneumatic tires instead of iron-rimmed wheels. The use of old tires for buffers on wharves and boats is common, but it remained for someone to find that an old tire makes an excellent anchorage for growing oysters. In China, a coolie wheelbarrow has been equipped with a rubber-tired automobile wheel. An enterprising ice-cream vendor in the Dominican Republic fitted tubeless tires to his cart, and then poured in sand to take the place of the usual inner tube. Troops in Rio de Janeiro piled up truck tires to form a barricade for stopping bullets during a revolution.

South American women discovered a useful way to employ old inner tubes.

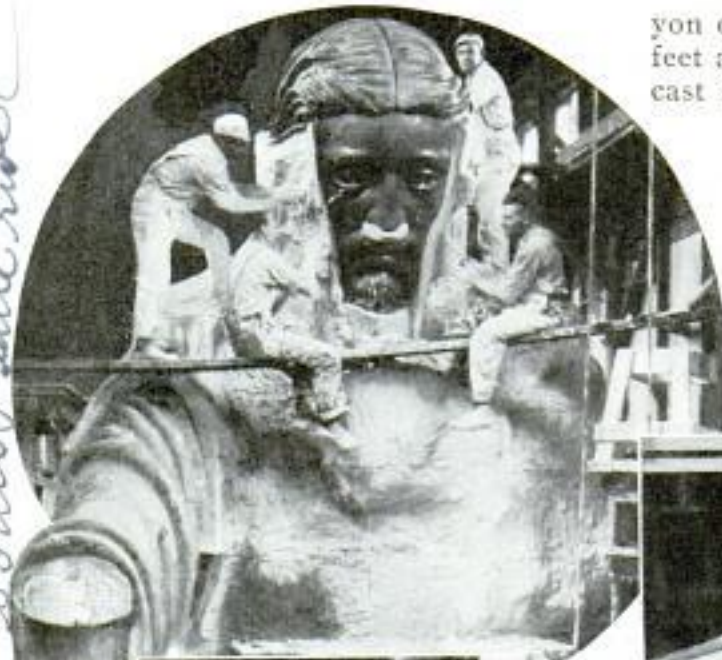
(Continued to page 130A)

C 1423

Auth. Frank Conroy
986 S. Pennsylvania
Denver, Colo
POPULAR MECHANICS

876

U. S. Statue of Christ Is Five Stories High



yon of the South Platte river, some 9,500 feet above sea level. Modeled in clay and cast in terra cotta, the statue consists of 200 blocks so fitted together that the jointing is almost invisible, even at close range. The base, which is twenty-two feet high, is hollow, permitting the construction of a shrine within. Flood-



Top, Casting Statue's Head; Bottom, Inset, Working on Giant Foot; Right, Huge Hand

High in the mountains of Colorado, a giant statue of Christ is being built of terra-cotta blocks and concrete. The huge figure, thirty feet high, weighs seventy tons. At completion, the base and statue will equal a five-story building in height and will be visible for miles. The site is on a 1,500-foot eminence above the can-

lights will illuminate the figure at night. The statue will be four feet higher than the famous Christ of the Andes, which stands atop a South American peak.

BALLOON SILK ON WING EDGES STOPS ICE HAZARD TO PLANE

Sleeves of balloon silk drawn over the front of wings and tail surfaces are now replacing the rubber "overshoes" formerly used to prevent ice forming on airplanes. When ice begins to form, the pilot turns a valve on an air pump, the sleeves swell up and the ice cracks and blows away. The original overshoe de-icer con-

sisted of rubber sheets mounted over the leading edges of wings and tail surfaces, and these were inflated when ice began to form. However, the overshoes had the disadvantage of excessive weight, for about 150 pounds of rubber were required to equip a large transport plane. By substituting balloon silk, the weight is decreased to forty-five pounds. When air is expelled, the sleeves flatten out against the curve of the wings.

Made for John L. and Mrs. Hoover,
by Genyzer
Above camp in South Platte river
Woodrich Rubber Co Akron Ohio

United Air Lines 221 N La Salle
Air Graph Sept 19 33 Chicago

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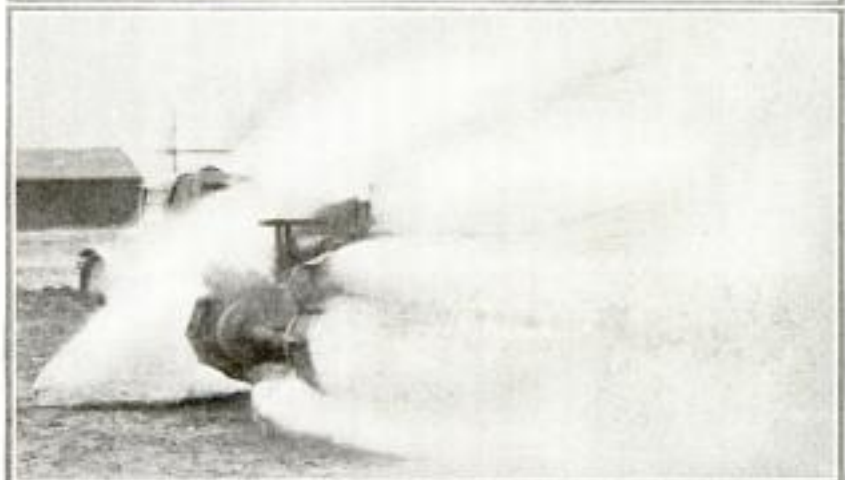
c 1235

Com. Robert W. Gordon
115. 17th St N.W.

Washington, D.C.

GAS-PROOF TANKS PROTECT CREWS FROM ATTACK

Because the wearing of gas masks by the operators of army tanks is impracticable on account of lessened visibility, these tanks are now being made gas-proof. Future tanks will have tops and sides so constructed that a gas bomb cannot be thrown into any opening, and all openings can be quickly closed to prevent the entrance of any liquid sprayed on them. These openings are so designed as to be virtually air-tight when closed, thus permitting a speeding tank to pass through a cloud of gas without injury to the crew. An air-tight cover is also to be provided for the motor so air used for cooling the engine will not draw gas into the crew's compartment. This may be opened for additional ventilation.



Above, Army Tank with Top and Sides so Constructed as to Be Gas-Proof; Below, Testing One of the Tanks by Running It through Gas Barrage

FINE SAND ON MODEL CHURCH GIVES STUCCO FINISH

By applying fine sand over a painted surface and then painting the sand, the

one-quarter inch to the foot, was built from a side-view photograph of the original church. Sugar-pine wood, copper, aluminum, cardboard, celluloid, sand, glue, sponge and paint were the materials used. The roof and gables contain more than 2,000 tiny shingles, each laid by hand. A fifteen-watt electric bulb illuminates the interior. The lamp may be removed through an opening in the bottom of the base. While the interior is empty, it is unnoticeable because of frosted windows.



Scale Model Church with Stucco Finish; Note Tiny Figure and Realistic-Appearing Lawn and Shrubbery

builder of a model church has produced an exterior finish closely resembling stucco. The model, constructed to a scale of

MOUNTAIN TUNNEL SEEN BY AIRPLANE PILOTS

For years western mountaineers have talked about a "hole in a mountain." They said the passage was large enough to accommodate a load of hay, and pilots for one of the air lines recently substantiated the reports. The flyers identified the tunnel as a hole in Needle rock, a peak about 10,000 feet high.

Thomas Mc Carthy
1237 West Chestnut St
Philadelphia, Pa

near Elko
Copyrighted material
Ruly Mountain

Model Airplane
2d & 1st Hall

Will Man Some Day Win a Race with Sun?

1402
 Jarmain audrom. Toussus. Le noble France

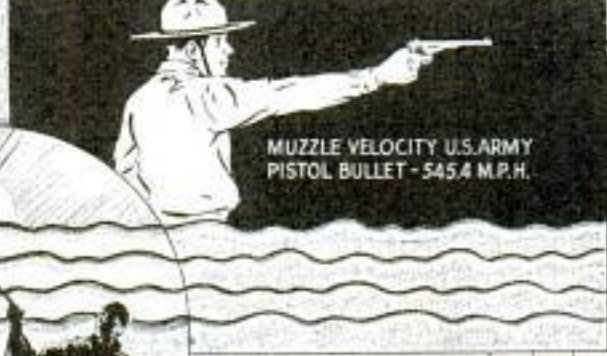
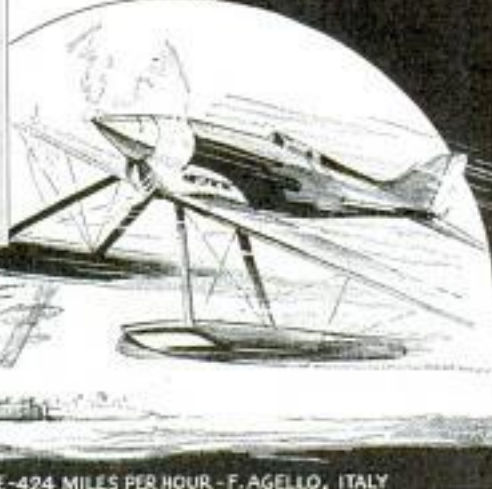
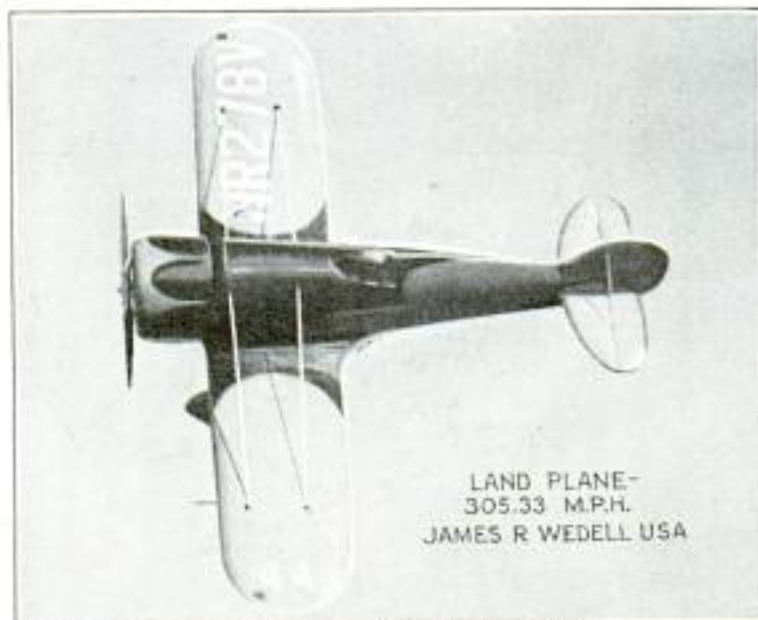


Photo and Drawings Comparing Highest Speed Man Has Attained in the Air, on Land and in the Water with Velocity of Bullets and of Sound, and Speed of Earth's Rotation

1402

Carl Elmer Glassman

POPULAR MECHANICS

55 W. 86th Street

1400

Carl Elmer Glassman

Deutsch

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879

Bronx, N.Y.

HUMAN BULLETS RAISE SPEED ON LAND AND IN AIR

When James R. Wedell flew his racing plane to a new world's record of more than 305 miles per hour at the Chicago air races a few weeks ago, he set a new mark for speed kings of the world to shoot at in their unceasing struggle to go faster and faster on land, in the air and on the water. Human speed today compares favorably with that of a bullet, and there are those who see man winning a race with the sun when he begins to fly in the stratosphere—and France is already building a plane for that purpose. The Italian seaplane which set a record of more than 424 miles per hour—over seven miles a minute—went as fast as some types of pistol bullets, but could hardly keep up with a bullet from a United States army pistol which has a muzzle velocity of 545 miles per hour. Sir Malcolm Campbell has traveled more than four and one-half miles per minute in his racing car and Gar Wood has driven his speed boat more than two miles per minute. If man succeeds in doubling the highest speed he has yet reached—that of the seaplane—he would be in a position to stage a race with the sun. The speed of the sun—actually the earth's rate of rotation—is something over 1,000 miles per hour. If man could approximate this speed, he might start from New York at noon and reach San Francisco at noon the same day—in nothing flat. With the French plane, the backers claim it should easily be possible to attain a speed of 500 miles per hour at an altitude of twelve to fifteen miles, and the more optimistic claim if such a speed is attained with the first stratosphere plane, there is no reason why it cannot be increased through changes learned by experience. Tests have indicated that there appears to be no limit to human endurance in straightaway speed so far as physical injury is concerned. For stratosphere flying, naturally, the pilot would be in a sealed compartment with an artificial supply of oxygen. Scores of problems are involved with the plane itself, however, such as lubrication at low temperatures, the tendency of gasoline or other liquid fuel to solidify, and the effect of extremely low temperatures on metal alloys, a subject now attracting much interest.



99 out of 100 have never seen
 life in a drop of water. **HAVE YOU?**

**SEE AN AMAZING INVISIBLE WORLD
 HUNDREDS OF LIVING MICROBES
 IN A DROP OF WATER—ALIVE**

*They Move, Feed, Divide, Multiply
 Before your very eyes.*

or

See how a Mosquito Stings, Human
 Blood, Plant Lice, Fly leg, etc.

Scientific, Interesting, Educational

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This Man Bought a Microscope, Set It Up on a Street Corner and Employs It to Earn a Living

MICROSCOPE AND WATER DROP AID MAN TO MAKE LIVING

One man has solved the unemployment problem as it affected him, with nothing more than a drop of water and an inexpensive microscope. He purchased the instrument, obtained a few slides showing life in a drop of water and other simple things which can be viewed through a microscope, and set up a sign inviting the public to look through the lens. He makes a small charge for this, and takes in fifteen dollars a week or more.

AIR IS NATURAL REFRIGERATOR FOR HIGH-FLYING PLANES

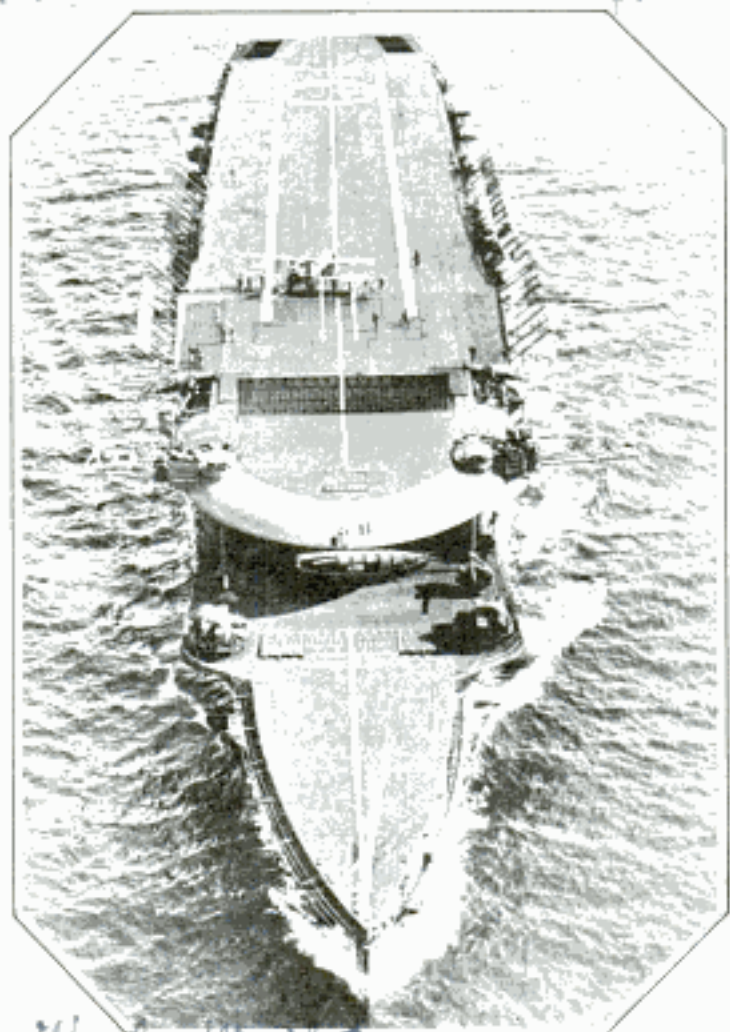
Transcontinental planes are taking advantage of the sub-stratosphere to obtain natural air conditioning and refrigeration. Shipments of salmon and caviar recently were sent by airplane to get the benefit of cooler altitudes. Both shipments traveled from the Pacific coast to the Atlantic and arrived in good condition without icing, due to the low temperatures at the altitudes at which the plane flew.

James R. Wedell

Chicago

Chicago

C1474



Looking Down on the "Furious," Great Britain's Plane Carrier with a Flying Deck 700 Feet Long

FLOATING AIRPORT HAS "FIELD" SEVEN HUNDRED FEET LONG

One of the most impressive aircraft carriers afloat is the "Furious," one of Great Britain's mother ships for planes. Its flying deck is seventy-five feet above the water and is nearly 700 feet long and eighty feet wide. The boat played an important part in the autumn maneuvers of the British aircraft.

NECK-WARMING ELECTRIC PAD RELIEVES SEA SICKNESS

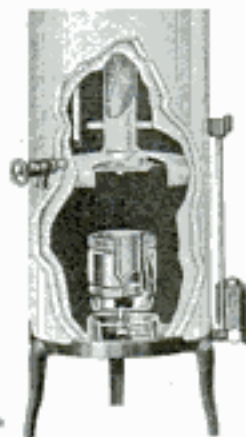
Electric neck heaters are being used to relieve sea and air sickness in experiments conducted by French scientists. An electric pad applies heat to the small bulb of nervous tissue called the medulla oblongata, inside the back of the neck at the junction between the spinal cord and the brain. In tests, gentle applications of heat

to the medulla relieved sea sickness, car sickness, air sickness and similar conditions almost at once. Observation by X-ray showed that heating the medulla immediately stopped the violent spasms of the diaphragm and abdominal muscles which make sea sickness so distressing. Even the kind of sick headache called migraine, often regarded as incurable, was improved. The scientists believe that electric heat for the medulla may prove to be a method for calming or regulating the entire nervous system.

C1443

KEROSENE USED AS FUEL IN SELF-OPERATING HOT-WATER TANK

Kerosene is the fuel used in an automatic hot-water heater for homes and offices, intended particularly for places which have water available under pressure but without gas service, or where gas rates are too high to be used for heating water. The kerosene heater uses no gas, no electricity and no motors but is completely automatic, odorless and quiet in operation. It requires no wicks, the fuel conductor being a molded ceramic which does not deteriorate with age or use. All controls are of the simplest construction and require no attention or adjustment, once the heater is operating. The burner, vaporizing the fuel, gives a clean blue flame without carbon or soot, and the heater is completely insulated to further reduce fuel costs, while the thermostat is equipped with a dial and temperature-adjustment indicator. An iron draft hood is designed to prevent down drafts and the heat baffle is in the flue way, utilizing the flue, which is surrounded by water, as additional heating surface.



Do not try to sell as in parts and

C1495

Bastian Sun 9/24/33

André Papier and René Pneur

Bastian-Morley Co 300 Franklin Ave

Corwallis, Ore. C1361 Vincent M.

POPULAR MECHANICS 881

Pittsburg, Burbank Calif.

New York Times 9/13/33

GROWTH-SPEEDING ACID FOUND IN ALL LIFE C1404

That growth is promoted by an acid found in all living things is the assertion of Dr. Roger J. Williams and Dr. Carl M. Lyman of Oregon Agricultural college. Its discoverers call it panthothenic acid. They report that it has been found in men and in worms, bacteria, oysters, plant molds, algae and milk. So potent is the substance that a single drop speeds up the growth of yeast even if diluted in 250 gallons of liquid. Actual composition of the acid has not been determined, but experiments indicate that it is composed of long chains of carbon, hydrogen and oxygen. It was taken from liver, but not in pure form.



How New Concrete May Be Shaped; Inset, Showing Mirrorlike Characteristics of the Finish

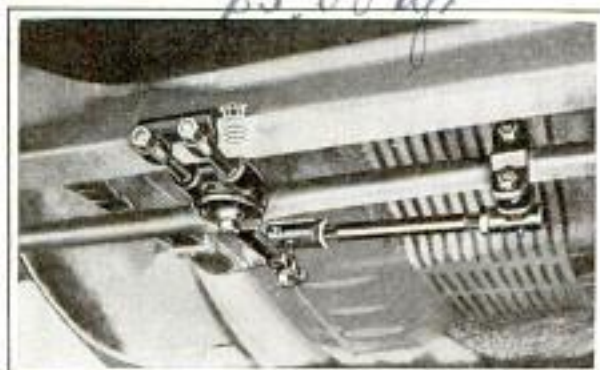


CONCRETE WITH GLAZED FINISH IS MADE IN COLORS

Concrete with a surface so smooth that it will reflect images like a mirror has been produced by the secret process of a California contractor. The method of mixing is said to result in the glazed finish. Concrete units of this type can be made and carried many miles to be placed in position, eliminating the old method of casting on the job. The units are light and strong, reinforced with steel, and can be made in any color. They fit together closely. Aqueduct pipes made of this concrete are said to offer little resistance to water flowing through them.

STABILIZER HELPS STEER AUTO OVER ROUGH ROADS C1384

Easy to install, an improved stabilizer for the automobile steering system stops oscillation, wheel wobble and shimmy, enabling the driver to keep the car in a straight forward direction, even when crossing car tracks, ruts and bumps. It is a combination of ball bearings, downward adjustable spring tension and scientific application of leverage. The device is said to eliminate excessive wear on front tires and the mechanical parts of the steering system and stop shimmy when low-pres-



Steering Stabilizer in Place; Note White Outlines of Spring That Improves Its Effectiveness

sure tires are used. Yet, it does not interfere with easy steering. On rough roads, the stabilizer makes it possible for the driver to relax.

Hoof Product Co.
162 N. Franklin
Chicago

EARTH FACING NEW "ICE AGE" SAYS BRITISH SCIENTIST C1407

Present haunts of man will be covered with an immense coating of ice, just as a vast glacier once blanketed a large part of the globe, says Lord Meston, British scientist. However, the new "ice age" will not come for many thousands of years. Lord Meston's prediction is in the form of geography by which he calls it only a "fraction of time" since the pleasant land of England was buried under the ice cap. That, of course, was hundreds of years ago.

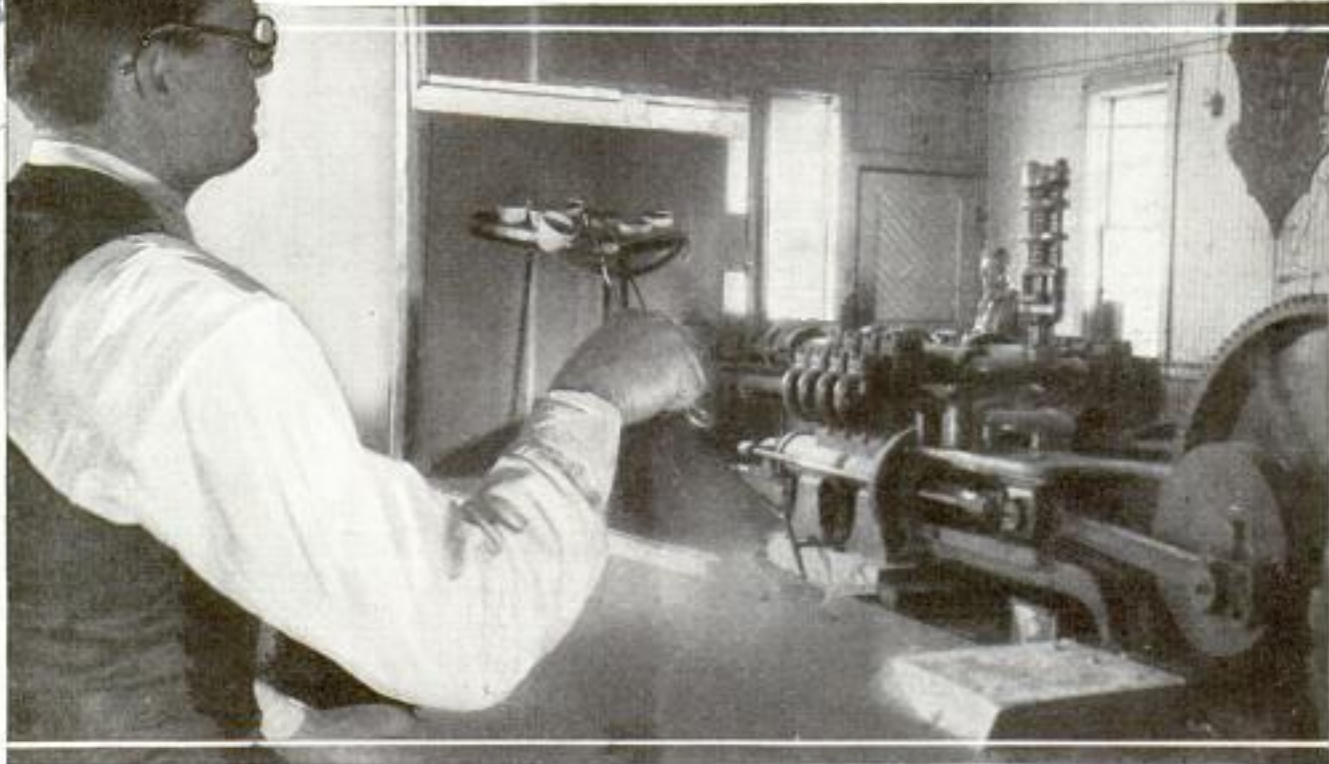
national Park Service
A recreation map of the United States, issued by the office of national parks, shows more than 1,000 federal and state reservations of interest to travelers.

Service News Letter
9/2/33

Christian Science Monitor 9/12/33

Service News Letter
9/2/33

The Latest



Left, Placing Fuming Sample in Drier Hood Which Carries Away Acid Vapors; Right, an Old-Type Pump Still in Service; Most Such Machines Have Been Replaced by Electric Pumps

By MAXWELL REID GRANT

A NEW gold rush of huge proportions is pouring a yellow flood into the markets of the world. Last year, American mines alone brought more than 2,500,000 ounces into channels of trade. This year, experts believe the total will rise to far higher levels.

The chief actor in this new drama of the west is not the old-time prospector, but the mining engineer, armed with new scientific methods that cut costs amazingly. Chemical processes now reduce ore to mud and leave no gold in the tailings. Steam exerts its giant force to explode hardest rock; tiny bubbles of oil capture grains of the heaviest metals and float them away to be saved.

Spurring mining engineers in their quest is a spectacular rise in the price of gold in world markets. When, by executive order, the United States called in all gold holdings of more than \$100, the price of gold in dollars soared by sensational leaps. From \$20.67 an ounce, it skyrocketed to

more than \$30.00. To thousands of miners, this news meant fortune. Almost overnight, twenty-dollar ore became thirty-dollar ore without a cent's added cost to mine. Hundreds of abandoned mines could now be worked at a profit.

Although smelted gold must be turned in to the mint at the old price, a new ruling from the attorney-general's office permits miners to ship gold ore and concentrates abroad to be refined and sold.

While government sleuths are pursuing the trail of the gold hoarder, mining engineers have launched a widespread drive to compel Mother Nature, greatest hoarder of all, to give up her treasure. The latest objects of their quest are great natural hoards where gold in huge quantities is known to exist. Not prospectors' will-o'-the-wisps, these lodes. They are earmarked deposits of gold-bearing tailings—great mounds of rock thrown out by mills in days gone by, when only the cream could be skimmed by crude mining methods. Relentlessly pressing their search for more efficient methods of treating ore,

C/2/2

GOLD RUSH



Top, Left, Using an Old-Type Jack Hammer; Right, Removing Crucible Containing Gold from Furnace; Below, Examining Ore Samples

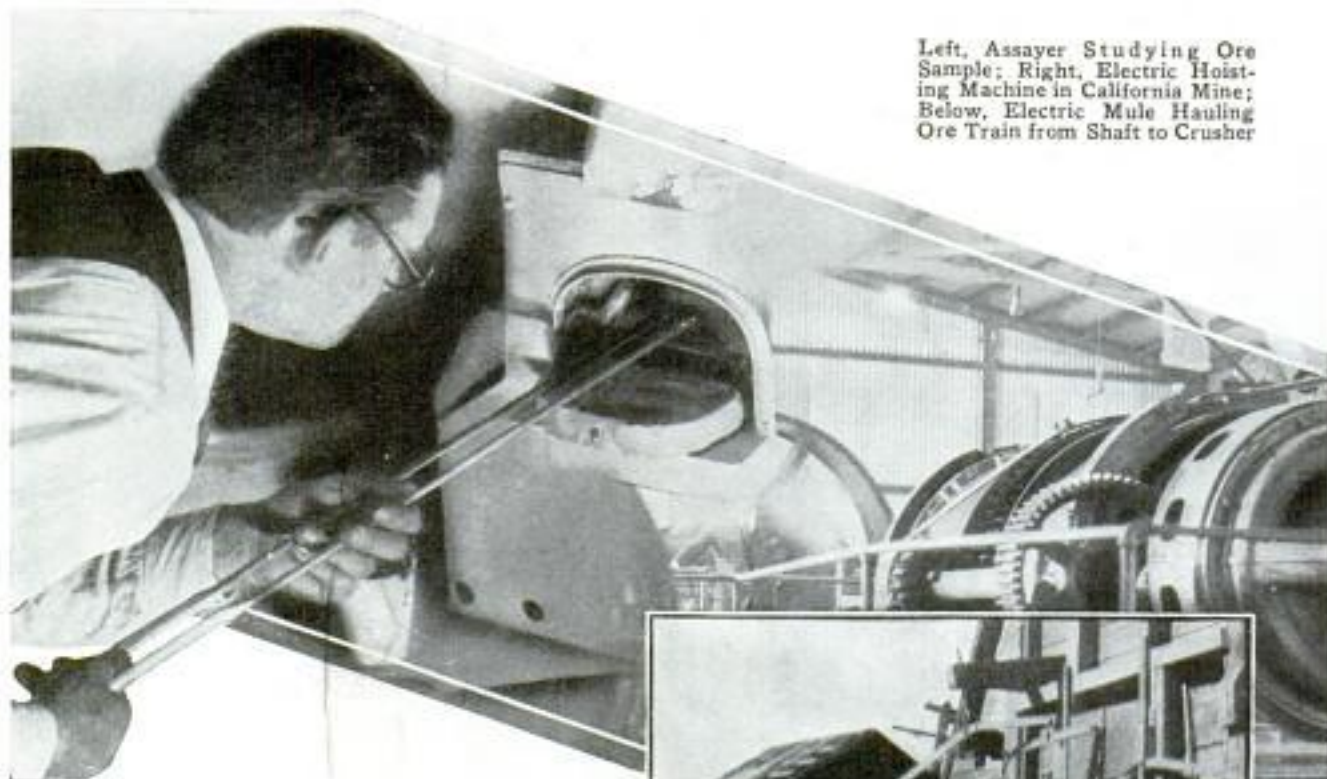


worthless now yields riches. Armed with modern methods of mining, men can go back to the old gold camps and wring new wealth from the leavings of the boom days.

Near Randsburg, Calif., yawns the huge "glory hole" of the Yellow Aster mine—a great

cavern eaten out of the side of a mountain honeycombed with twenty-seven miles of tunnels. Millions in gold have passed beneath the stamps of the mill, beside which has accumulated a mammoth dump. Here 2,000,000 tons of tailings are piled in a single heap, awaiting treatment by a new method. Across this drab mountain of shattered rock, a traveling shovel, propelled by steel drag lines, recently began to scoop broken rock fragments into oblong tanks that looked like a pair of huge swimming pools. A man turned a valve, allowing a stream of liquid to enter. The fluid was a solution into which had been dumped eight dollars' worth of cyanide. A

mining engineers have driven down costs until today, ore formerly thrown out as



Left, Assayer Studying Ore Sample; Right, Electric Hoisting Machine in California Mine; Below, Electric Mule Hauling Ore Train from Shaft to Crusher

few hours later, the pools were drained. The wealth of 200 tons of rock had been dissolved out as a muddy sludge. Baked in a crucible, this mud gave up its gold as yellow molten metal, ready to be cast into bars for shipment.

All through the west, similar plants are treating tailings. Near Goldfield, Nev., one plant is handling 1,000 tons daily. Another company has paid more than \$100,000 in dividends from this salvaged treasure. Nature herself is aiding the engineer in this work. Through the years these dumps have been accumulating, ceaseless action of the desert winds has blown away tons of the lighter, valueless material, leaving the heavy gold ore behind. Now the tailings assay more to the ton than originally. Engineers also enlist natural forces through the "heap leaching" method, whereby water, trickling down through the piled-up tailings, aids certain chemical reactions that break down the ore combinations, releasing the gold in forms more easily smelted.

The keynote of the modern mine is simplicity. Efficiency begins underground with breaking of the rock. Power shovels strip away surface earth to reveal shallow deposits. Scrapers and machinery move broken rock in huge quantities, doing away with shoveling by hand. Dynamite,



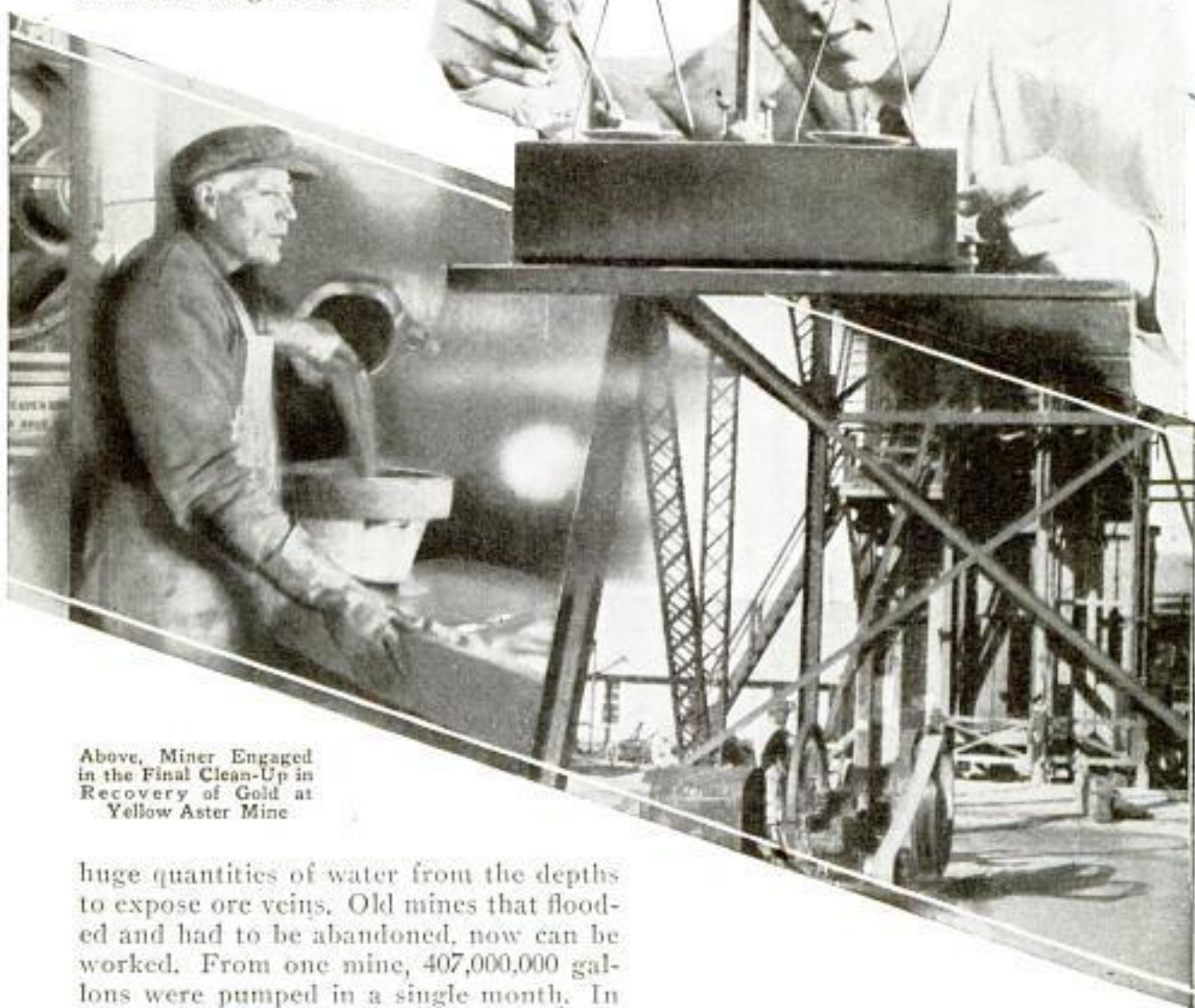
skillfully placed, shatters rock tons at a time. Rock-breaking drills, powered by compressed air, enable the miner to drive through a mountainside at record speed. Brainwork saves muscle in the tunnel. Often the rock wall is broken down, the high-grade ore stripped off, and the rock left in the stope. Thus the mine is strengthened, saving not only the cost of timbering to bolster up tunnel walls, but also the handling of many tons of barren rock. Such selective mining tremendously raises the per-ton value of ore sent to the mill. It also makes it possible to follow off-shoots of ore and extract them clean, completing the mining in one operation.

Chemical reagents also play their part in breaking the rock. One process uses

electrically ignited "bombs" which, exploding, give off vapors that dissolve out the metal. Water is added, and the mixture is sucked out by pumps to treating tanks, where the gold is reduced to bullion.

Important in deep mining is the removal of water. Today, giant pumps, powered by steam turbines, electric motors, or Diesel engines, suck

Assayer Weighing Sample of Ore Before Testing It for Gold, and, Below, Gallows Frame of Temporary Hoisting Machine to Lower and Raise Miners



Above, Miner Engaged in the Final Clean-Up in Recovery of Gold at Yellow Aster Mine

huge quantities of water from the depths to expose ore veins. Old mines that flooded and had to be abandoned, now can be worked. From one mine, 407,000,000 gallons were pumped in a single month. In another, pumps sucking from three levels lifted almost 7,000,000 tons of water while 99,000 tons of ore were mined.

Yet even waste waters thus removed today yield wealth. Old mines are now being flooded with water, to which have been added chemicals to help dissolve the ore. Precipitating the minerals from the water releases valuable metal, recovering the last bit of wealth from worked-out shafts. In a large copper mine in the west, waste water is run through ditches into which old tin cans and scrap iron are dumped.

The iron dissolves, precipitating out copper to form a mineral-laden mud, which gives up its copper under treatment.

Above ground, machinery of improved design helps drive down costs to record low levels. Electric motors whirl to lift hoists silently from the depths at dizzy speeds. Electric mules drag heavily laden trains of ore to the surface. Ball mills in which flint pebbles pound the ore to powder, do the work of huge thundering stamp

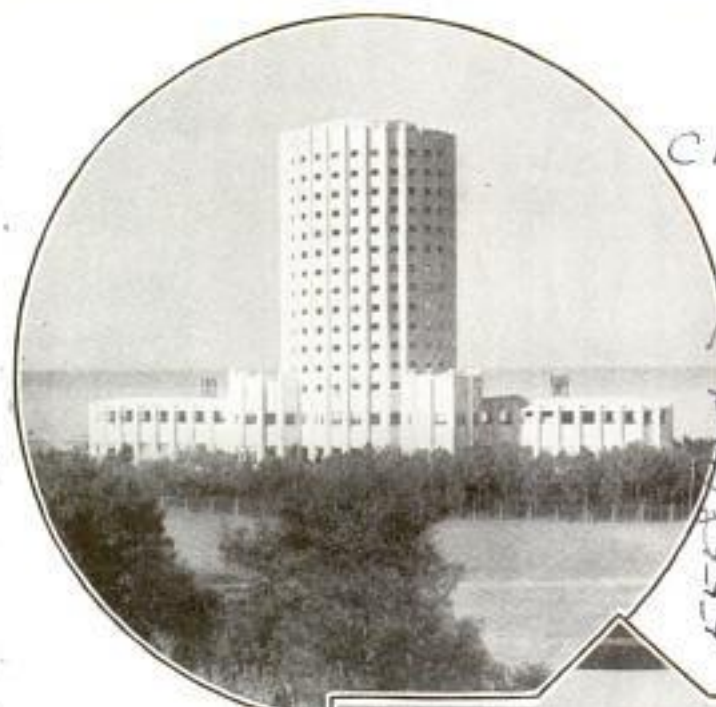
(Continued to page 124A)

*Resaving equipment - Denver Fire Clay Co
1742 Champa St Denver, Colo*

C1396

Cont. Wilkins

Seaside Castle for Children Has No Stairs



space surrounds the tower and the sandy beach offers numerous forms of recreation.

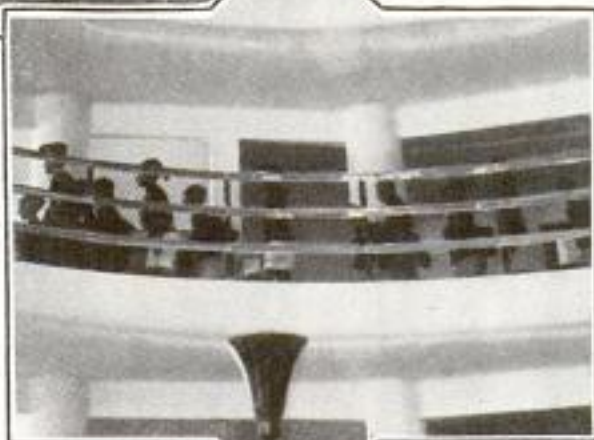
C1387

SECRET OF "LIQUID FIRE" SOUGHT IN TESTS

Chemical experiments have been undertaken to reveal the secret of "liquid fire" with which the Byzantines defeated an Arab fleet of 1,800 vessels in 717 A.D. Dr. Nicholas D. Cheronis, of the Synthetic Laboratories, Chicago, has tested three theories and found the last, the saltpeter theory, to be possible. Discovery of liquid fire is credited to Kallinikos, called the best "pyrochemist" of the

Middle Ages. Doctor Cheronis says that it seems reasonable that Kallinikos discovered that the addition of saltpeter to the known incendiary mixtures increased their combustible power, and the method by which it could be ejected in sea combat is reconstructed as fol-

Top, Castle by the Sea; Center, Children Passing along the Ramp; Bottom, Looking Upward to the Dome; Note Ramp Leading to Top Floor



Stairs are eliminated in a seaside castle for children, inclined passages or ramps leading from bottom to the top of the twelve-story structure. The castle is a mammoth round tower built by an Italian motor company as a holiday home or nursery for the 3,200 children of its employees. Resembling a lighthouse, the tower can be seen for miles at sea. Each floor has quarters for thirty children. Large windows admit plenty of fresh air and light. On the ground level are halls used for refectories, playrooms, kitchens, store rooms, servants' quarters, infirmary and showers. One hall contains a half-mile shelf and cupboard for the children's sand pails and shovels. Ample playground



lows: A man called a "siphonator" stood on the bow of a fast boat holding a tube

Lorin (Lorin)

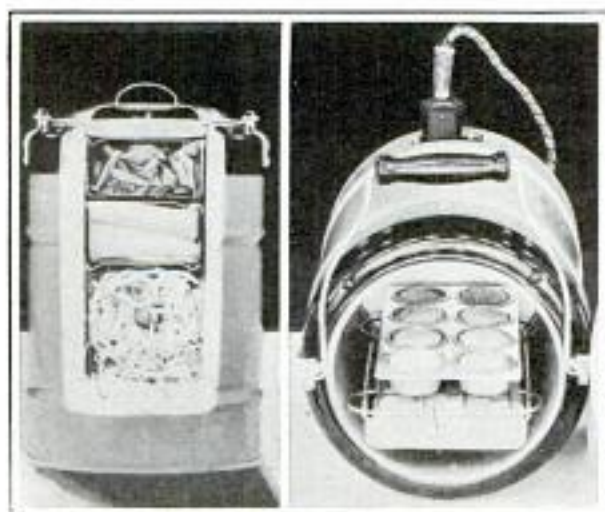
5558 Wood St

covered with copper on the outside. The tube led to a pump such as has been described by Heron of Alexandria, and was used to put out fires. The pump was connected also by hose to a tube which contained the semi-liquid composition. When the boat was a few feet from the enemy's boat, the pump went into action, while the siphonator directed the siphon, and the liquid was ignited as it was shot.

C1372

STORED HEAT IN ELECTRIC OVEN COOKS AT LOW COST

Working somewhat like a fireless cooker, a new portable electric oven cooks all kinds of foods at low cost because of the stored heat it employs to finish the process. Its outer shell, shaped like a pail and equipped with a handle, is formed from sheet steel. Its inner lining is made of heavy aluminum. Between the two shells is a thick wall of insulation that stores heat given off by an electrical heating element. A vent in the cover permits steam to escape. The handle locks the cover so that the container may be placed on its side. The oven bakes, roasts, boils, stews and steams. Enough food for a family of six may be prepared at one time. Three separate aluminum pans fit into the oven for cooking different foods at the same time. For baking biscuits and bread, the oven is placed on its side. The cooker, op-



Two Views of Electric Oven; Left, Cooking Three Vegetables; Right, Baking Muffins

erating from any light socket, starts on high heat and finishes on low heat so that the housewife may absent herself from the kitchen and return to find dinner cooked.



Hoop-Shaped Device Installed on Top of Plane Enables Pilot to Keep on Course

LOOP RADIO DIRECTION-FINDER ON PLANE GUIDES PILOT

By means of a new direction-finder, pilots may use the signals of any conventional radio broadcasting station to set their course over territory not equipped with radio beacons. A small loop antenna mounted on top of the plane is rotated until the desired station is located. A simple indicating device on the instrument panel helps the pilot to hold his course, even in the thickest weather. The device was developed by the United States bureau of standards.

radio direction

SHOES PREDICT WET WEATHER BECAUSE LEATHER SHRINKS

C1399

Because poorly tanned leather shrinks as the humidity increases before a rain, shoes are true prophets of wet weather. As the shoes shrink, they pinch the wearer's feet. Dr. John Arthur Wilson, of Milwaukee, says that the school of involuntary weather prophets, who predict the approach of a storm because their feet hurt, could be eliminated if the leather in their shoes was properly treated. When persons suffer bodily fatigue, mental irritability or general discomfort without apparent cause, their shoes may be to blame. Doctor Wilson suggests that it would be wise, in such cases, to investigate the properties of the leather in the victim's shoes.

Chicago Herald and Examiner 9/10/32

*Landers, Frary & Clark
New Bulletin Com*

C1369

888

Cont. Maxwell Reed Grant,

921 W. 5th St

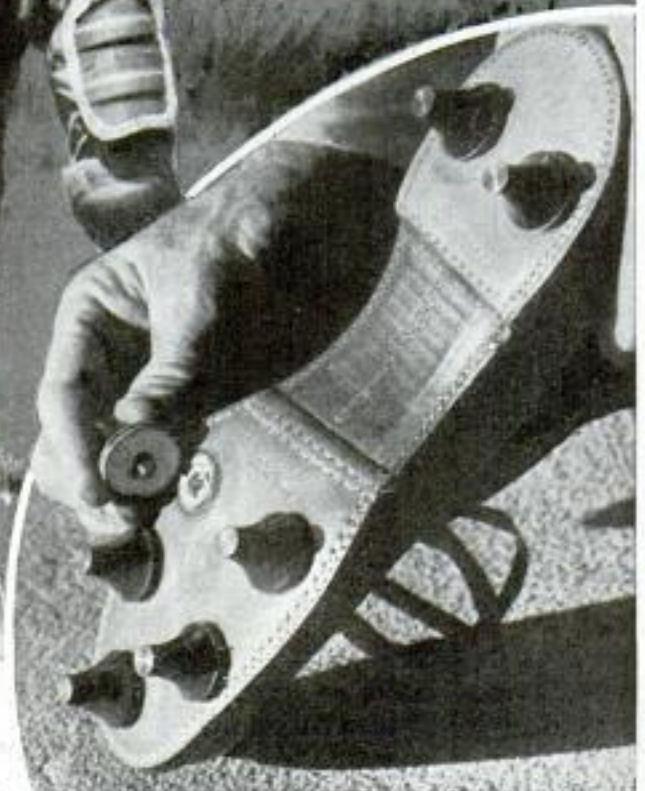
POPULAR MECHANICS

Los Angeles Calif

Football Players Don Featherweight Armor



Football Players Are Now Wearing Featherweight Armor of Scientific Design to Prevent Injuries, Cantilever Springs; Pneumatic Pads and Sheets of Foam Rubber Absorbing the Shocks of Line Smashes; at Left Is Shown the Protection Given to Various Parts of the Anatomy by the Latest Gridiron Equipment



Shock-Protected from Head to Foot by Light Equipment, the 1933 Football Player in His New Armor Makes Greater Speed Than Was Possible in the Days of Cumbersome Bags of Padding and Rattan Thigh Guards; Upper Right, the Basic Units in the Shock-Absorbing Armor; Center, Cup-Shaped Pieces of Leather of Cantilever Construction Protect Shoulders and Hips; Right, Removable Shoe Cleats of Bakelite, Leather or Canvas Can Be Changed Quickly as Field Conditions Warrant; Molded Fiber Guards, Semi-Pneumatic Leather Pads, Steel Springs and Hair Cushions Protect Knees, Thighs, Hips, Shoulders, Kidneys, Spines and Shins While Foam Rubber of Incredible Lightness Guards Joints from Bruises; Hard Portions of Equipment Are Padded Outside also, to Protect Opposing Players from Injury

see Vol. 1934 - 659

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Brantton Brothers

C.1369

814 W. Jefferson

POPULAR MECHANICS

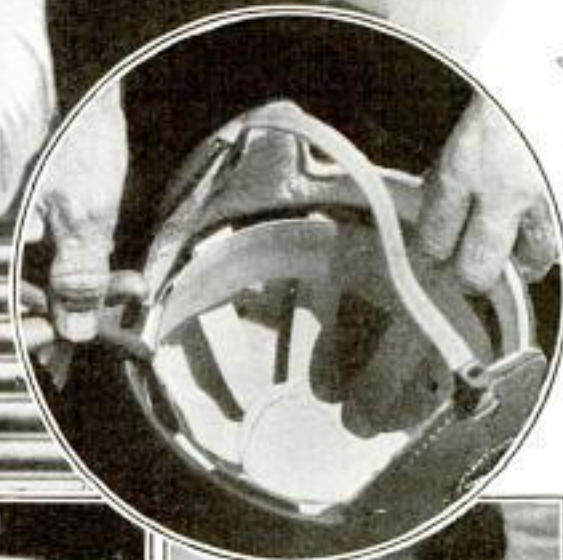
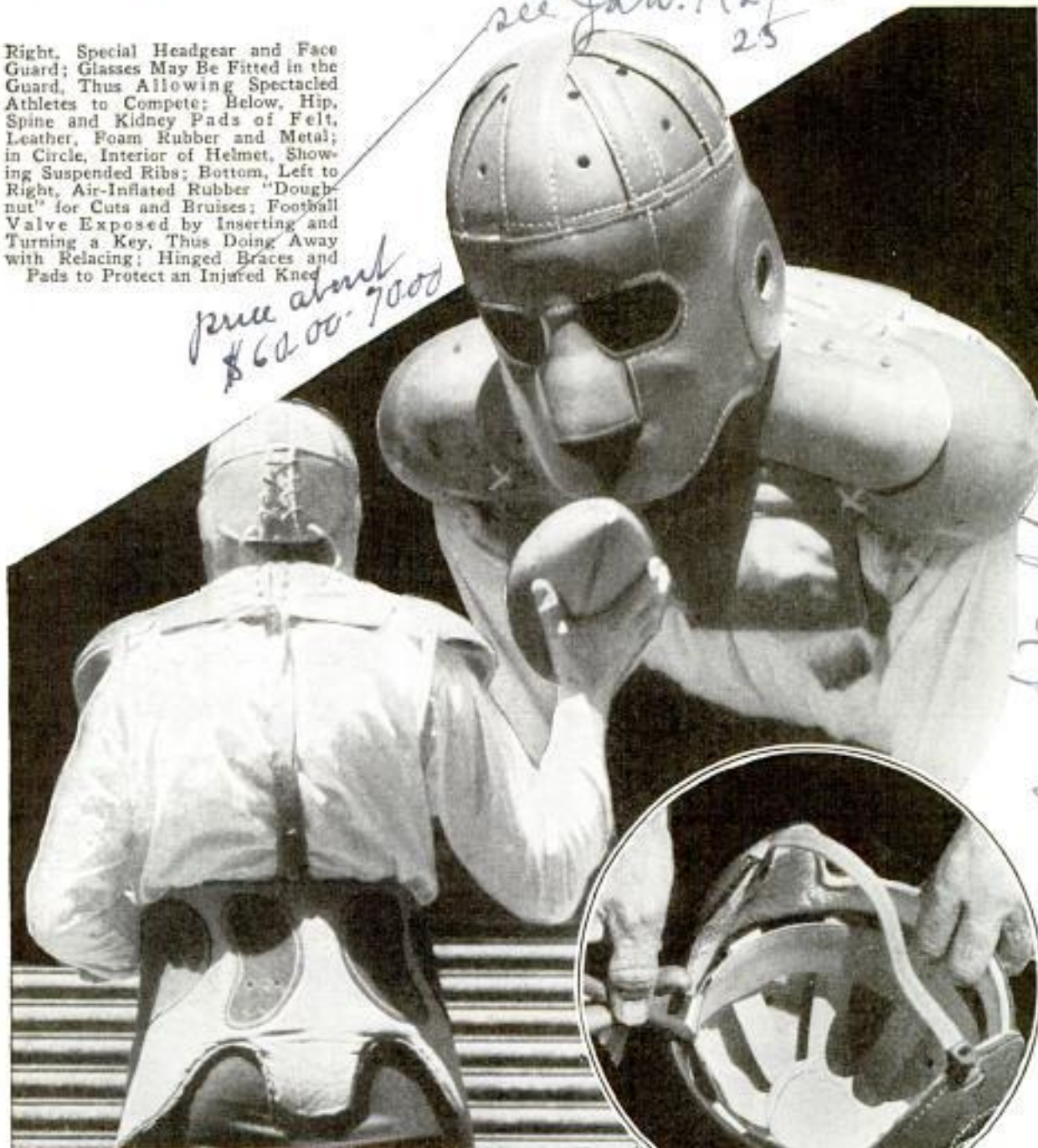
889

Los Angeles Calif

Springs, Air Pads and Rubber Absorb Shocks

Right, Special Headgear and Face Guard; Glasses May Be Fitted in the Guard, Thus Allowing Spectacled Athletes to Compete; Below, Hip, Spine and Kidney Pads of Felt, Leather, Foam Rubber and Metal; in Circle, Interior of Helmet, Showing Suspended Ribs; Bottom, Left to Right, Air-Inflated Rubber "Doughnut" for Cuts and Bruises; Football Valve Exposed by Inserting and Turning a Key, Thus Doing Away with Relacing; Hinged Braces and Pads to Protect an Injured Knee

see Jaw. 1929 25
price about \$60.00-70.00



*also R. L. Spalding, 100 Nassau, New York
211 S. State, Chicago*



Ladder without Rungs Which Is Climbed by Manipulating Foot Pedals Shown in Insert

RUNGLSS LADDER IS CLIMBED WITH FOOT PEDALS

Consisting essentially of two metal tubes on which foot pedals are mounted, a ladder without rungs offers several features not available in the ordinary kind. Its main framework consists of the two tubes spaced about one foot apart and held together at the base by a metal crosspiece. Near the top is a U-shaped rod connecting the tubes, the arms of the "U" extending to the wall to hold the ladder upright and parallel to the wall. A pair of pedals are hinged to U-straps around the tubes in such a manner that when weight is placed on the pedal, a hinged end is forced against the tube, causing the U-strap to grip it firmly. A striking plate between pedal and tube protects the latter from compression. To climb the ladder, the user, with his back to the tubes, inserts his feet in leather toe holds on the pedals, then raises first one foot and then the other. Raising the foot loosens the U-strap and the pedal is pulled several inches up

its supporting tube, the weight of the body meantime being supported by the second pedal. A seat and an arm to hold paint or other materials are attached to the tubes and can be raised and lowered in a similar manner. Since this ladder is perpendicular and close to the building at any point along its length, it can be used for close work near the ground or high above it. One model has wheels on the base which run on a track so that a workman can move himself along a building without leaving the ladder. In a third model the U-bar is replaced by a third tube which supports the ladder like an artist's easel. It is free-standing and is intended particularly for shops or orchards.

C1408

SLIDING WINDSHIELD FOR GUN USED IN POLICE SQUAD CAR

Police squad cars in Los Angeles are equipped with sliding windshields which can be opened instantly to form ports for the officers' guns in firing on fugitives during a chase. The windshield is divided in the center so that the right half can be slid to the left. The driver of the police car pulls the windshield over while his companion reaches for a gun in an overhead rack, and tests have shown that the section can be opened and a gun aimed and fired in three seconds. The non-shatterable glass windshield protects the driver while his companion is firing. There is



Sliding Windshield for Police Car Which Can Be Moved Back to Form a Port for Firing Gun

Chas. A. Brown, of the
Howard Co. Los Angeles

C1359 Joro Hugg Co.
3042 S. Mill Ave
891
Minneapolis
Minn.

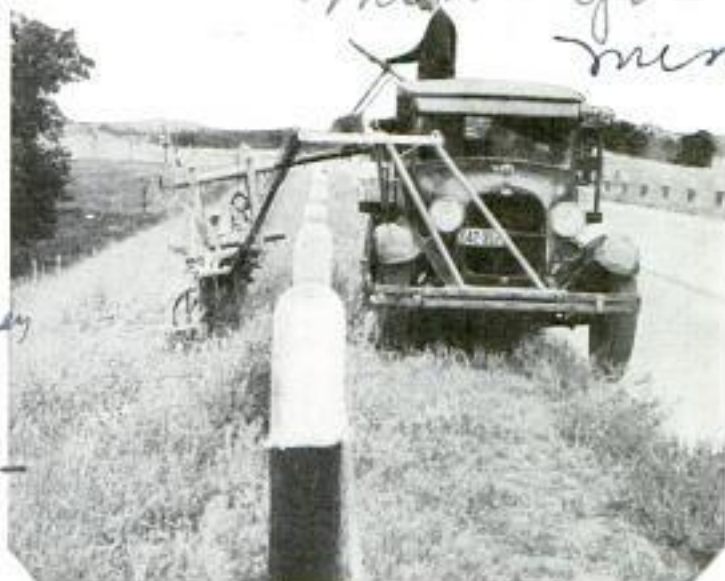
also a shelf sliding from beneath a locked compartment in the dash, affording a small desk for writing and a place to keep broadcast data, since all the cars are equipped with radio receivers.

My James 9/15/33

C1416
COSMIC RAYS CAUSE AGE BY BOMBARDING MAN

Constant bombardment of the human body by cosmic rays is the cause of age, according to a theory advanced by Prof. Paul Kunze in the periodical, "Research and Progress." The professor points out that cosmic rays travel at almost the speed of light and are loaded with electrical energy. Able to penetrate the thickest walls and metal plates, the rays are inescapable. While the thick armor of air around the earth and the natural resistance of living beings enable man to resist the bombardment, it is inevitable that some of the high-powered rays penetrate the human body in time and leave traces of their passage in the shape of destroyed cells. Progressive destruction of this sort, Professor Kunze believes, constitutes advancing age.

Hosstock Germany



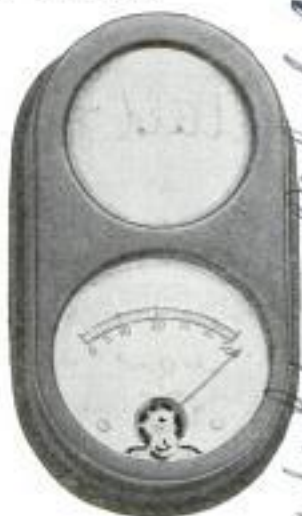
Mowing Bar Shown Extended over Fence to Cut Grass; Apparatus Trims Up and Down Slopes and Bottom of Ditches

GRASS IS CUT INSIDE OF FENCE BY MOWER ON OUTSIDE

Grass on both sides of the fence along the highway may be cut by the same mowing machine. The mower may be attached to any truck. It travels on two wheels, pneumatic or steel shod, set tandem style. The cutting bar may be extended over the top of a fence to operate at all angles. It has a telescopic extension with which down slopes, bottom of ditches and upward slopes may be cut. When not in use, the mower is brought in close to the side of the truck, the cutting bar is raised and the entire outfit occupies less than one-half the road.

C1358
LIGHT FOR ANY NEED MEASURED BY SIGHT METER

Measuring the amount of light needed for any purpose, a new device protects eyesight by properly gauging artificial illumination. The meter is an adaptation of a battery-less photo-electric cell and is simple to read. In the home, office, store, school and factory, the device has many uses. It checks intensities of artificial light, checks the usefulness of present lighting installations, checks the maintenance of fixtures and may even prescribe a washing of shades and reflectors, and tells when lamps should be replaced.



Made by Levanne Pregele

C1445
PRETZEL BENDER MAKES LOOPS FASTER THAN HUMAN HANDS

Operating three times as fast as human hands, a pretzel bending machine has recently been built and tested. For years it was believed that no machine could replace the human pretzel bender, but this one not only twists the pretzels in the approved manner, but also spreads out the dough, cuts it into the proper lengths and rolls it into strips. It can also give to pretzels a few twists to lend individuality. The bender turns out about sixty finished pretzels per minute.

Subanin, Pa.

Science has Letter 9/2/33
So far no earthquake centers have been located near the north or the south pole.

*Sight Light Corp
Meriden Conn*

*Jus Claude & Reed
and Russell R. Stein*

C138

John Magarini 420-53rd St.



Miniature Hangar Built to Scale with the Aid of Old Packing Boxes and Discarded Tin Cans; All the Work Was Done by Hand

PACKING BOXES AND TIN CANS MAKE MINIATURE AIRPORT

Unable to buy the materials for his hobby, a Brooklyn boy has built a miniature airport out of packing boxes, tin cans and other odds and ends. The hangar and model planes are complete in detail and all were built entirely by hand. Packing boxes supplied the material for the hangar which is lighted by electricity as is a searchlight made from tin cans and a lens from a bicycle lamp. The airplane models have a wingspread of thirty inches.

HYDROGEN PROTECTS METALS AGAINST CORROSION

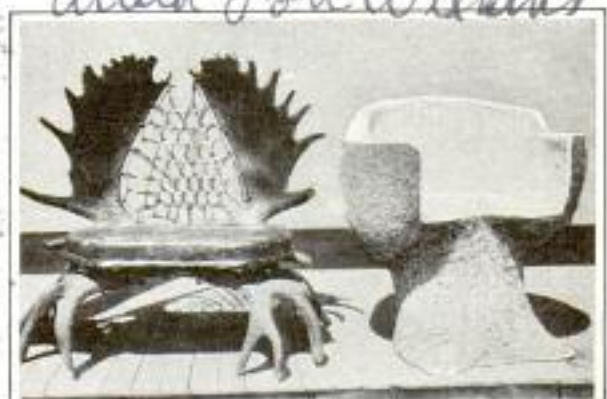
Hydrogen, the lightest gas known to man, is the sole defender against the ravages of corrosion. Prof. Oliver P. Watts, of the University of Wisconsin, has decided that only hydrogen is the limiting factor in preventing the wholesale corrosion of metals exposed to dampness. Thirty years ago, Dr. R. W. Whitney, now vice-president of the General Electric company, announced that the corrosion of metals is an electrochemical process, and this view is still generally accepted. When a metal is in contact with an acid solution, corrosion takes place by the chemical process of the metal-replacing the hydrogen in the acid. The acid dissolves the metal and hydrogen is released,

coating the metal surface with an electrically charged layer which prevents the chemical reaction from continuing at the initial rate. If the hydrogen layer is built up to a sufficient thickness the reaction is virtually stopped, but, under natural conditions, the hydrogen combines with the oxygen of the air to form water and the dissolving of the metal proceeds, limited by the amount of oxygen available to remove the protective hydrogen coat. Impure metals are corroded more quickly than pure ones and it is believed this is

due to the impurities taking up the hydrogen. Contrary to popular belief, pure metals are subject to corrosion under the action of certain acid solutions. It has been shown, however, that if oxygen is absolutely excluded, copper will not corrode in a solution of sulphuric acid.

CHAIRS MADE OF TREE STUMP AND MOOSE HORNS

Chairs made of materials to remind the visitor of the outdoors are in use at one of Michigan's state parks. One such seat is constructed from a tree stump followed



Two Rustic Seats, One Made of a Hollowed-Out Log, the Other of Moose Horns Tied Together

out to form a comfortable resting place somewhat like an office chair. Another is built of moose horns, the parts of the back being lashed together with leather strips.

Science Dept. Letter 9/19/03

at old Fort Wilkins
Mrs. O. Beatty, Copper Harbor, Mich.

Vertical handwritten notes on the right margin, including 'C1380' and '888 X 1000'.

01363

Paul S. Otto

1647

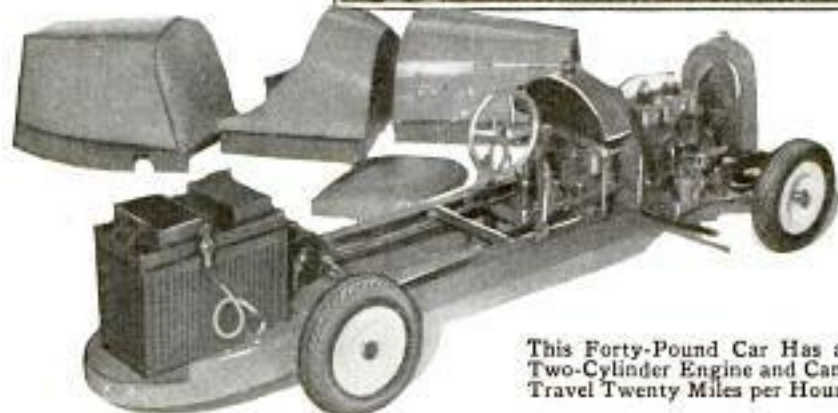
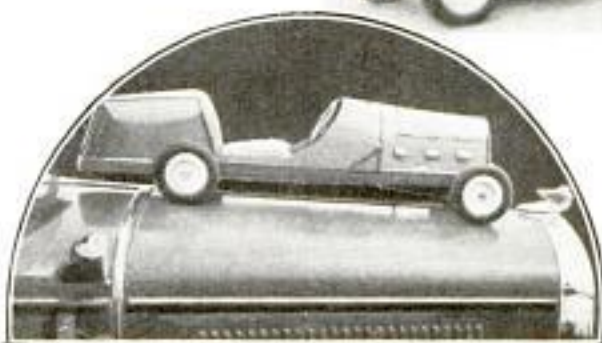
Morningguide
Irvine

893

POPULAR MECHANICS

Tiny Auto with Motor Weighs Forty Pounds

Weighing only forty pounds, a tiny automobile which is complete in every detail and carries its child driver at speeds up to twenty miles per hour, has been built in 2,000 hours of spare time by a resident of Iowa City, Iowa. The car is thirty-seven inches long, has a wheelbase of twenty-five inches and contains a two-cylinder gasoline engine. All parts are working parts from the three-jet carburetor, miniature spark plugs, water pump, fan and distributor to the little storage battery which furnishes current for the car. There is also a small siren which engages the motor fly wheel by means of a lever, spring and steel wire. The transmission is complete with clutch, gear-



This Forty-Pound Car Has a Two-Cylinder Engine and Can Travel Twenty Miles per Hour

cause it is extremely quiet, yet creates so little back pressure that it is negligible. The steering gear is regular in all respects, the frame is of channel iron shaped and brazed and has X-sections for strength and rigidity. Gas tank and sediment bulb are under the cowl. The body is built up of hard copper in three sections, the radiator is made of copper tubing with brass fins and the radiator shell is sheet copper and copper screen. It is painted in two tones of brown

shift and two universal joints, while the rear end housing is cast from bronze. The muffler is a little out of the ordinary be-

with ivory wheels and the seat is upholstered in brown leather. The wheels are walnut with steel bushings for bearings.

Paul S. Otto 1647 Morningguide Irvine, Iowa City, Iowa

01412

RADIO DIRECTS WORK ON SPAN OVER SAN FRANCISCO BAY

Engineers in charge of construction of the bridge over San Francisco bay are prepared to direct work by means of a radio telephone system which will permit two-way conversation between all points on the seven-mile span. The radio phones operate from batteries on frequencies of four to six meters and use a six-foot aluminum rod for an antenna. Twenty-two of the sets have been constructed. Stand-

ard and telephone receivers and transmitters of the monophone type are attached to small boxes resembling an ordinary receiving set and containing transmitting equipment. The transmitters are portable. Each unit of the bridge is included in the system so that engineers in San Francisco and Oakland may direct work without traveling to remote points.

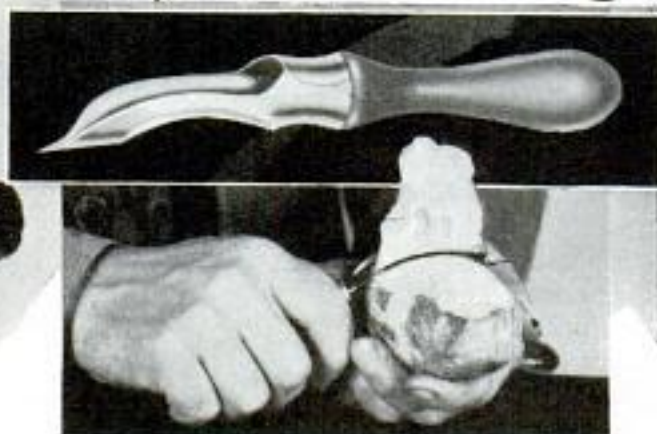
(Not all snails are slow, for the ear-shell snail of the Channel islands can travel six yards a minute.

Science News Letter 8/19/33

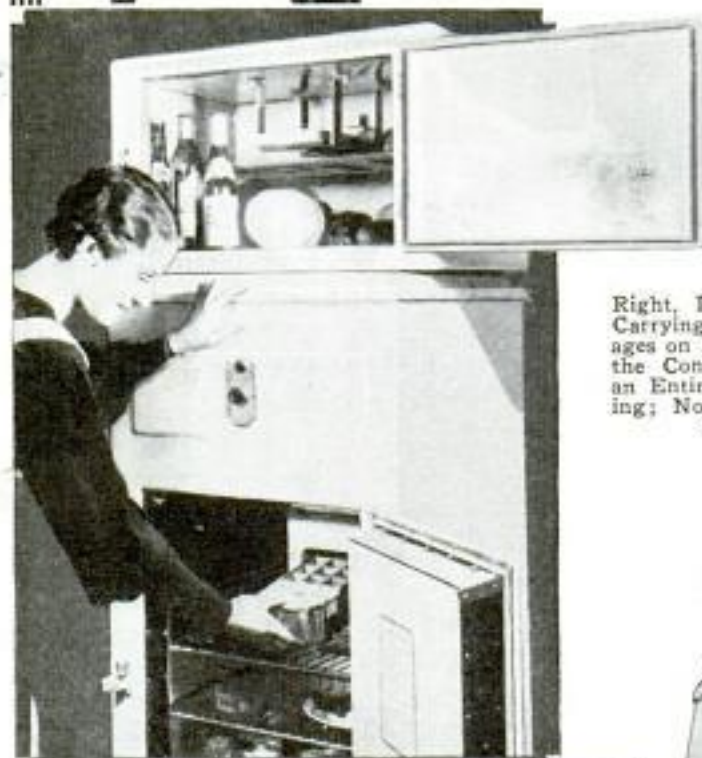
developed by H. Reginald Tibbitts
student, U. of Calif. Berkeley

Copyrighted material

Making



Above, Left, a Washer within a Washer; the Agitator of This Washing Machine Contains a Compartment in Which Small Batches of Clothes Can Be Washed without Using the Main Tub or Heating a Large Amount of Water; It Can Also Be Used for Dry Cleaning and in Regular Large Washings, Provides a Space for Flimsy Materials; Right, Paring Knife with a Curved Blade Which Fits the Shape of Vegetable or Fruit and Cuts a Section Wider than a Straight Knife



Right, Ice Container for Carrying Bottled Beverages on Picnics; It Keeps the Contents Chilled for an Entire Day of Motoring; Note Bottle Opener in Cover

Above, Ice Chest for the Top of the Overloaded Refrigerator; It Uses the Surplus Trays of Ice Cubes Made Incidentally by the Modern Refrigerator and Furnishes Extra Space for Foods Which Need Only Be Cooled without Being Chilled; Right, Electric Room Heater in Cabinet Form with a Fan behind the Heating Coils to Blow the Warm Air Out into the Room; Cold Air Enters at Back



Home Tasks a Pleasure



Above, Juice Extractor Which Is Inserted in Fruit to Be Squeezed; It Is Self-Straining, Easy to Clean and Gets the Juice without the Seeds or the Pulp



Above, Electric-Iron Cord with a Bracket for Attaching It to Ironing Board; This Holds the Cord Up Out of the Way While a Coil Spring Permits the Full Reach of the Iron on the Board; Below, Metal Grid, Made of a Special Alloy, Which Is Slipped under the Ice-Cube Tray in the Electric Refrigerator and Keeps Tray from Freezing to the Shelf



Left, Electric Mixing Bowl Which Revolves on Vertical Shaft above the Motor, Preventing Tipping and Making It Impossible for Dirt from Motor to Drop into Bowl; Various Attachments, Such as Beater, Grinder and Reamer, Fit over Top of Shaft Which Projects Up through Bowl; Above, Electric Toaster Built into Back of Gas Range; Note also Electric Light, Clock and Monogram, All Part of Stove

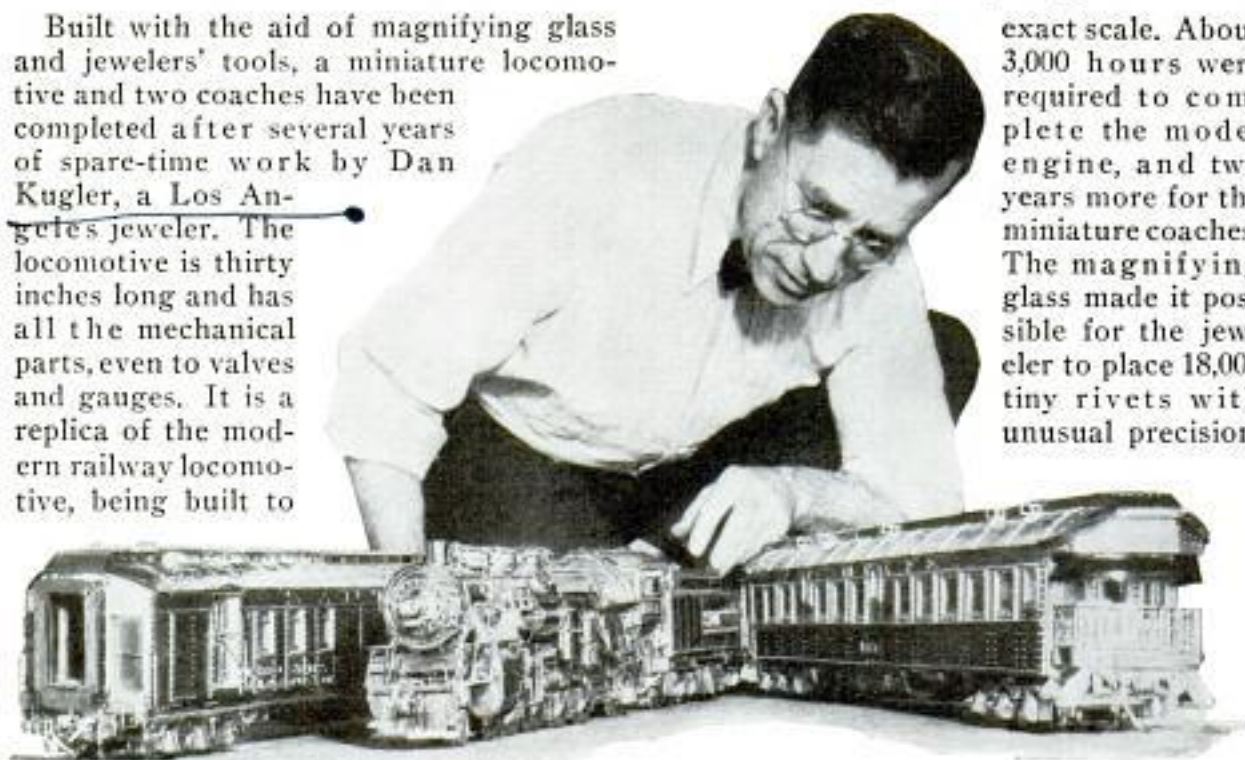


C1391

Model Train Built under Magnifying Glass

Built with the aid of magnifying glass and jewelers' tools, a miniature locomotive and two coaches have been completed after several years of spare-time work by Dan Kugler, a Los Angeles jeweler. The locomotive is thirty inches long and has all the mechanical parts, even to valves and gauges. It is a replica of the modern railway locomotive, being built to

exact scale. About 3,000 hours were required to complete the model engine, and two years more for the miniature coaches. The magnifying glass made it possible for the jeweler to place 18,000 tiny rivets with unusual precision.



Model Builder Is Shown with Miniature Locomotive and Cars Which He Constructed with Aid of Magnifying Glass and Tools for Handling Small Objects; Mail Car Is at Left and Passenger Coach at Right

502 W. 5th St

DEEP SEA LIKE REFRIGERATOR IN PRESERVING FISH FOOD

More than three-fourths of the bottom of the Atlantic ocean is like a refrigerator. The temperature is practically uniform, zero to three degrees centigrade, oxygen is present and currents flow very slowly. That is the picture of the depths as drawn by Dr. August Krogh of the University of Copenhagen. Such low temperatures preserve bodies of dead fish that sink from upper levels, giving those creatures on the bottom a food supply. Many animals at great depths are adapted to require food at rare intervals. Several deep-sea fish can swallow prey of their own size or larger, and for such fish, food once a year might be sufficient, according to Doctor Krogh. Even at fifteen degrees centigrade, many fish and other creatures can live without food for six months, while at lower temperatures, this period would be extended. Thus, the food supply need not be very great at this depth, about three miles. Doctor Krogh says that a dead whale might sink to the bottom in two days, while

plankton probably would take a year. It is pointed out that there may be micro-organisms on the sea floor capable of living on the dissolved material from plankton.

ALL-RUBBER CORD FOR LAMPS STANDS HARD USAGE

Lamp cords made entirely of rubber do not kink or ravel and withstand more hard



usage than the extension cord covered with silk or cotton. The all-rubber cords developed by the General Electric company maintain an appearance of newness since dust does not accumulate on the rubber surface and they can be wiped with a damp cloth. The flexible, tinned copper conductors are insulated with thirty-percent rubber compound, and the outer covering contains pure rubber.

C1431

Copenhagen Denmark

Detroit Free Press 9/16/33

Schenectady, NY Copyrighted material

Prophet helix. C-1198

**MORE VITAMIN C
IN PEPPER THAN
ORANGE**

That green peppers contain almost twice as much vitamin C as oranges is the discovery of Dr. Victor Levine of Creighton University. He also has found that cabbage, eaten raw in the form of coleslaw, contains ten times as much vitamin C as lettuce and that sweet potatoes are better than Irish potatoes for nutritional purposes. Green peas are better than beans. Chicken in any cooked form, says Doctor Levine, is only about one-tenth as nutritious as liver and hardly one-fourth as nutritious as ordinary meat.

c/367

**CHICKEN SINEWS
EXTRACTED BY
WHEEL CLAW**

Sinews that cannot be eaten may be pulled from the legs of a chicken by using a new device. It consists of a claw mounted on a wheel which is turned by a long handle. The base has a stationary claw which holds the leg of the chicken and presses against the hip bone. The foot of the fowl is placed in the movable claw and the handle is pulled toward the operator, breaking the shin bone and pulling the sinews from far up within the leg. The device is intended chiefly for dealers in dressed chickens.



The world now has more than 500 cities with a population of 100,000 or more.

*George Salter & Co Ltd.
West Bromwich, Eng.*



Apparatus for Recording Sights and Sounds of Nature; Cameraman Stand for Hours in Water Waiting to Photograph Baby Bird, Inset at Top

**NATURE RECORDED IN TALKIES
AFTER YEAR'S WORK**

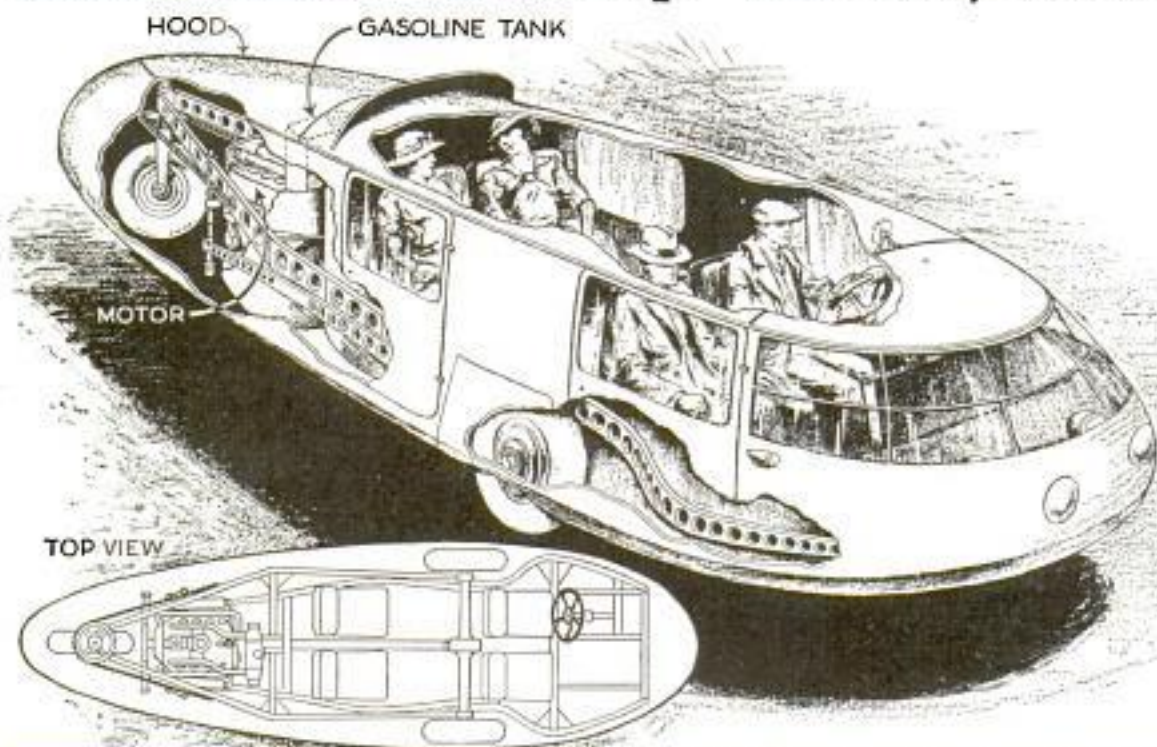
Requiring one year to complete, a nature sound film is being produced in Germany under the direction of Herr Arnold Kuhnemann, Reich food minister. The purpose of the talking picture is to acquaint Germans with the workings of nature without any of the scenes being set for the camera. Covering the whole biology of the creature from the mating of the parents until it is fully grown, the film is being made in two versions, one for scientific study at the universities and the other for instruction of the public at motion-picture houses. Only fifteen minutes will be necessary to show the film. To be able to photograph a one-day-old dwarf diver, the producers were forced to stand in water for twenty-seven hours, illustrating the difficulty of photographing animals.

Chicago Tribune 9/10/33

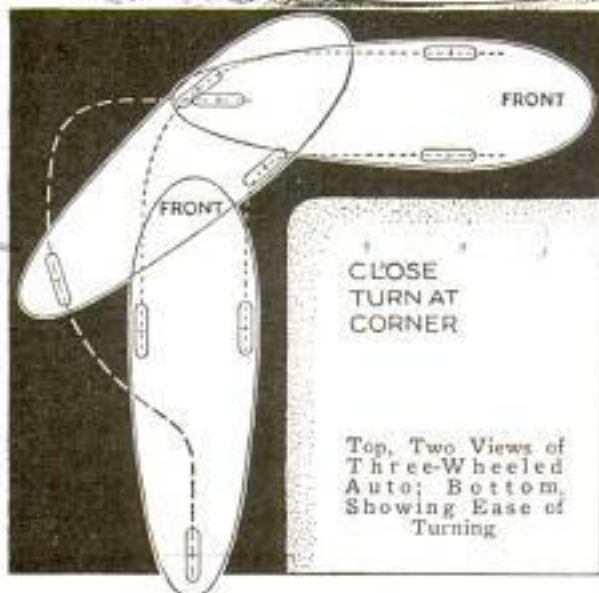
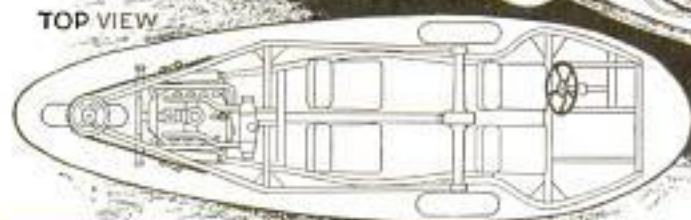
W. H. Sagen & Co

Science Letter 9/1/33

Three-Wheel "Teardrop" Car Easy to Drive



TOP VIEW



As easily maneuvered as a wheel chair, a new three-wheel, streamlined automobile is being tested under all traffic conditions. Two front wheels provide traction and braking and carry seventy-five per cent of the total weight, while the rear wheel serves as a rudder. The three-wheel design reduces resistance to the wind by seventy-five per cent, so that a smaller power plant may be used. The average American car requires about sixty-two horsepower to attain a road speed of seventy miles per hour, while the new car

attains that with twenty-five horsepower. With ninety horsepower, it can make 125 miles per hour, whereas a car of standard design would require about 300 horsepower. The engine of the three-wheel auto is located at the rear. For parking, only one foot more than the length of the car is required, the three-wheeler heading straight in and then swinging on its one rear wheel. Reduced space for turning corners also is claimed.

DIAMONDS HELP AUTO MAKERS BUILD PRECISION PARTS

Industrial diamonds of the gray, brown and black varieties are being used by the automotive industry in the building of precision parts for the modern car. They are set in instruments for cutting, boring, penetrating and testing. When the bearing surface of a connecting rod is finished with a diamond-pointed instrument, it is smoother and will wear longer than when the job is done with a steel tool. A crankshaft, a camshaft, gears, axles and all hardened wearing surfaces are placed under a diamond penetrator to test the hardness. In most instances, the diamond is forced into the steel to a depth of about two-thousandths of an inch. Easy penetration results in the part being discarded.

Watson Dry Press
 9/10/33

C1325

Hydraulic

Source de gear 11/19/33

Source de gear 11/19/33

*©1366 Robert L. Isould
4841 Croquette
Detroit Mich*

**MODEL OF TSETSE FLY
STUDIED IN WAR
ON EPIDEMIC**

©1309

In the battle to halt the epidemic of sleeping sickness which has caused more than 150 deaths in the United States recently, scientists constructed a model of the tsetse fly for research purposes. The tsetse fly is native to central and southern Africa and its bite is the means by which a disease-carrying parasite is conveyed. The fly has been known as a carrier of sleeping sickness, a malady which produces in the victim a comalike condition from which he may never arouse. Whether the numerous cases of sleeping sickness, or encephalitis, in the United States were caused by the tsetse is a disputed question, some experts pointing out that this illness is unlike that conveyed by the fly's bite. These authorities blame the disease on an unfilterable virus, too small to be seen in microscopes or to be caught in the smallest filters. German scientists who have conducted exhaustive research into the subject say that the tsetse could not have caused the American epidemic, although the African fly, or one resembling it, has been reported seen in one stricken community. Encephalitis is an infection in certain parts of the brain, its coverings and in the spinal cord. The attack is sudden and the most pronounced symptom is the lethargic condition of the patient. As the brain is affected, there often is delirium and great restlessness. Nerves controlling eye movements are often affected.

Weds World



Close-Up of Tsetse Fly in Model Form



Gummed Letters Placed on Cardboard for Casting into Metal; Right, How Advertisement Appears after Printing

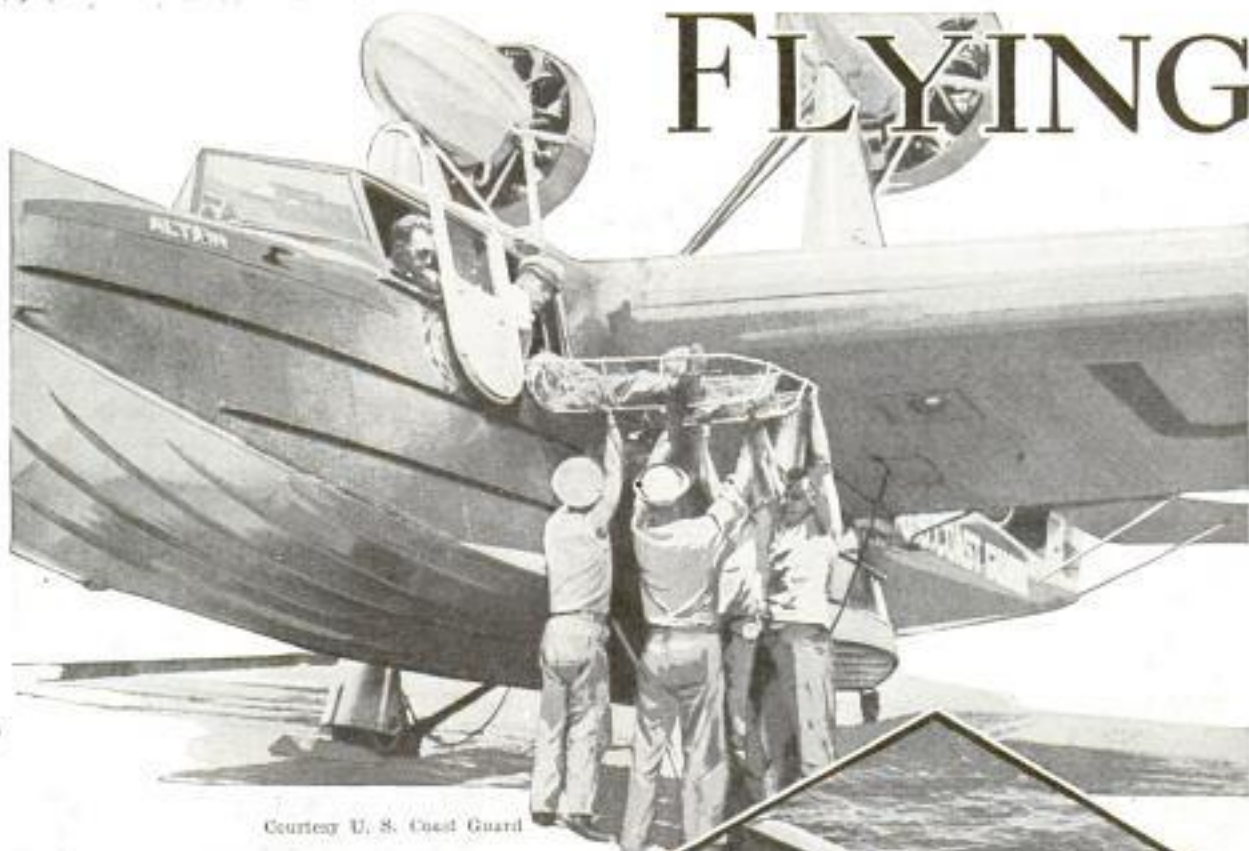
**GUMMED LETTERS AID PRINTER
IN WHITE-ON-BLACK WORK**

Inexpensive plates for printing with white letters on black background may be prepared by using gummed letters and other designs. These letters are stamped from special cardboard which has been gummed on the back. They are stuck on a sheet of mat cardboard in the design or lettering desired in white and a metal plate is cast, just as when a regular mat illustration is used. Openings appear on the plate where the letters and designs are pasted to the cardboard and print from the plate as white on black. The process is less costly than engraved plates and much faster. Any kind of design that will

show up better when printed with white letters on black can be used. The shell of the letters can be used as they are or trimmed with scissors or razor blade to the desired size. Circles, diamonds, scrolls and other geometric figures are available. Mat paper with various designs to furnish variety in the backgrounds also may be obtained by the printer or advertiser.

C1196

FLYING



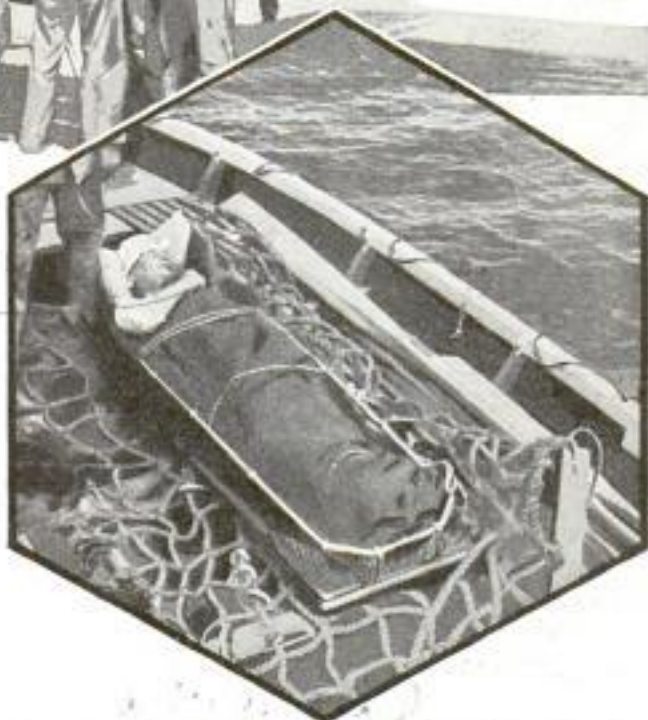
Courtesy U. S. Coast Guard

By JULIAN LEGGETT

WINGED ambulances are helping the United States coast guard to write new chapters in the annals of American sea rescues. Life-saving operations have been extended far out over the ocean to ships carrying sick or wounded persons.

Within a few minutes after the coast guard's radio station receives a call for help, one of these flying hospital boats takes off. Two-way communication is quickly established between the plane and the ship by means of radio telegraph and telephone and the pilot sets his course from bearings taken with radio direction-finding devices. At frequent intervals, messages are exchanged to guide the rescue plane or to advise the ship's officers how to administer emergency treatment.

When the flying boat reaches the ship, it settles on the water and sends over a collapsible rubber boat for the injured or sick man. Sometimes the ship's lifeboat makes the transfer, particularly if the sea is too rough for smaller craft. During the return flight to shore, the patient is given all the medical attention possible



Top, Removing Patient from Flying Boat Upon Reaching Shore; Bottom, Injured Man Being Taken from Ship to Plane in Lifeboat

and, upon landing, is rushed to a hospital.

Recently, the Miami coast-guard station received a call for medical assistance from the motorship "Potter," 320 miles off the Florida coast. In spite of a choppy sea, the flying boat "Acamar," commanded by Lt. Com. C. C. von Paulsen, took off and contacted the "Potter" within a short time, taxiing through rough water to the ship's side. The patient, a victim of pa-

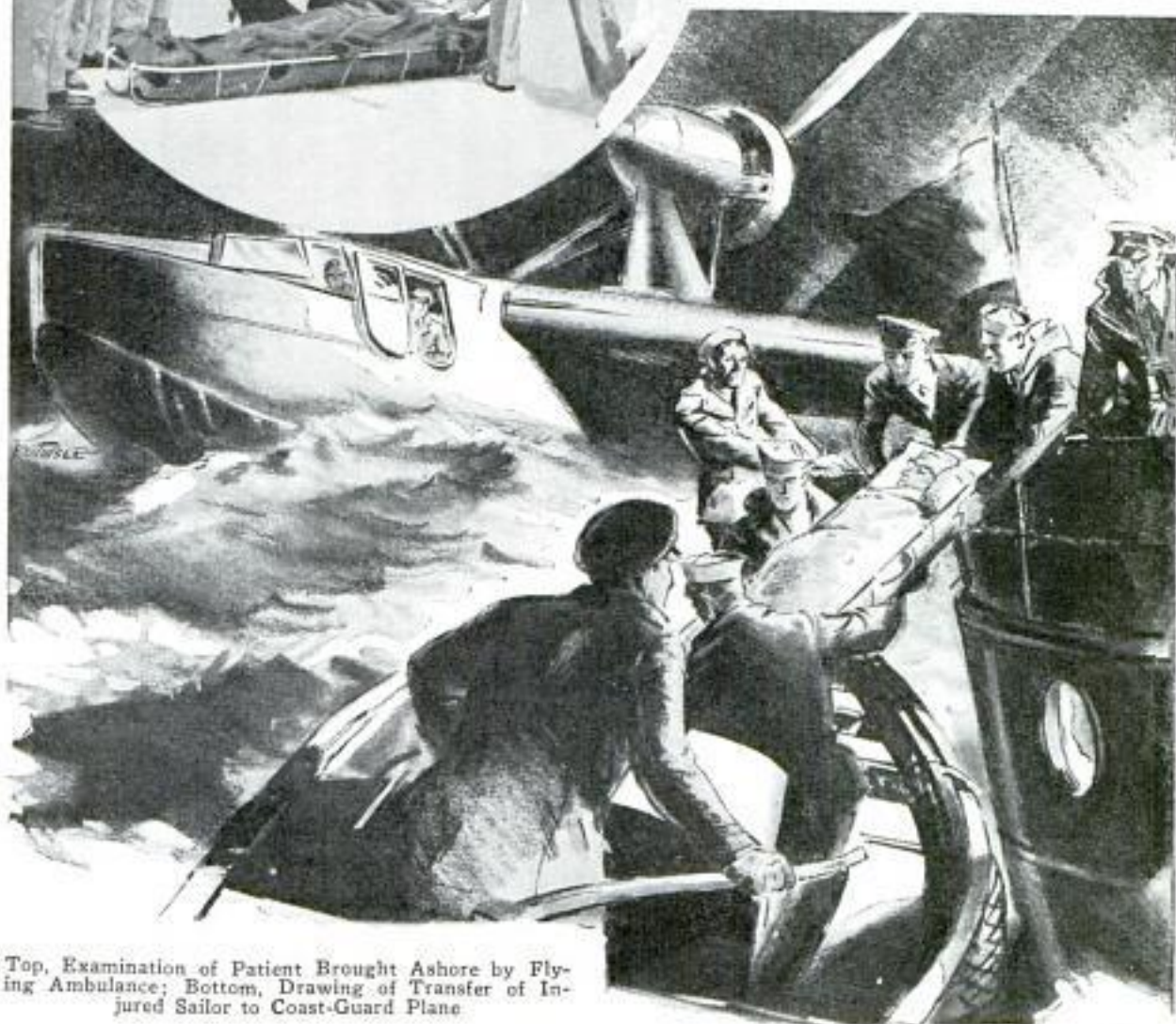
Washington, D. C.

c1196

LIFE SAVERS



er conditions. When the coast guard went into the air, in 1920, at Morehead City, N. C., its aviation branch lost none of its sea-going tradition. Through the courtesy of the navy, six HS-2 flying boats were transferred to the new branch. Later, congress voted appropriations for the pur-



Top, Examination of Patient Brought Ashore by Flying Ambulance; Bottom, Drawing of Transfer of Injured Sailor to Coast-Guard Plane

ralysis, was placed in the plane's basket stretcher and transferred to the "Acamar" for a fast flight to Miami and a hospital.

The coast guard always has been a sea-going service. Its problems have been those of the sea and the handling of cutters and small boats under adverse weath-

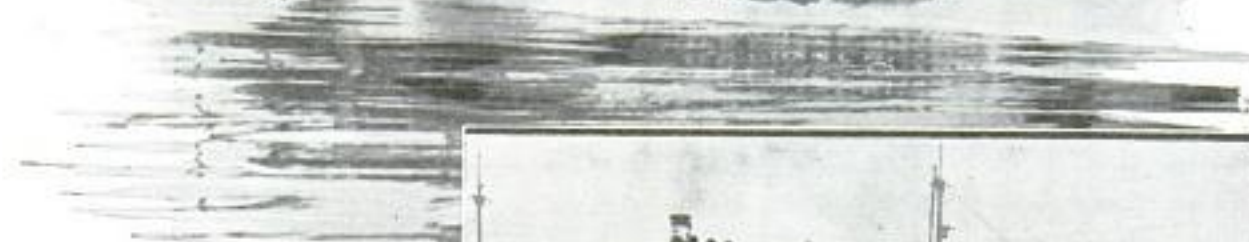
er conditions, and in the chase of planes and equipment, and in the spring of 1932, the coast guard had in active operation three Douglas amphibians, five General Aviation seaplanes and several smaller seaplanes especially adapted for inshore work.

Easy to maneuver and remarkably sea-



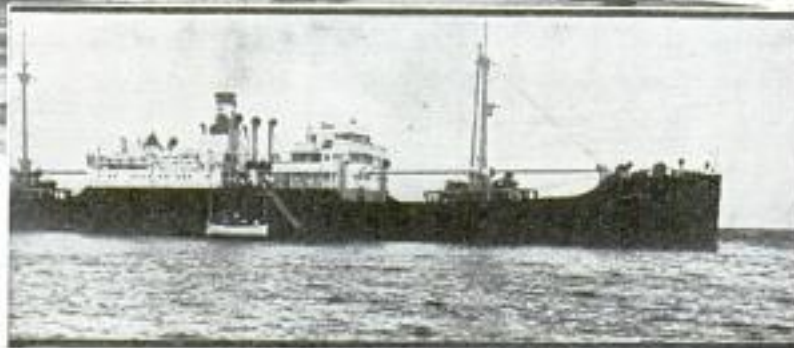
hospital. The following extract from the flight report demonstrates how important the system of co-operation between coast-guard planes and the navy radio-compass stations is to the coast guard in locating vessels in need of help.

"Took off in light rain squall and headed for Cape Cod light. Established radio communication with trawler 'Shawmut' immediately upon taking off. Requested trawler to ask for navy radio bearings, plotted them and flew straight out on the bearing obtained by Cape Cod navy radio-compass station. Encountered rain and thick fog



worthy, the General Aviation craft are veritable ambulances of the air. They are fitted to give patients emergency treatment and careful transportation to the nearest hospital. Powered by two Pratt and Whitney engines, these ships have a speed of 125 miles per hour. The wing spreads seventy-four feet two inches and the aluminum alloy hull is fifty-one feet long, eight feet eight inches high and seven feet two inches in beam.

Another instance of life-saving occurred off the New England coast. Responding to a radio message, the coast-guard amphibian "Adhara," flew from its Gloucester, Mass., base to the steam trawler "Shawmut," 150 miles southeast of Cape Ann and removed an injured member of the crew for a speedy transfer to a Boston



Courtesy U. S. Coast Guard
Top, Lowering Injured Man from Rescue Plane; Center, Typical "Mercy Ship of the Air"; Bottom, Lowering Lifeboat Carrying Patient

bank just prior to making contact with 'Shawmut.' Flew around and over fog bank. Took bearings on trawler 'Shawmut' with aircraft direction finder and located vessel in haze on edge of fog bank.

"Landed alongside 'Shawmut.' Injured man brought over to plane by own ship's boat. Rather heavy swell prevailing at time of landing. Requested trawler to lay out an oil slick to assist plane in taking off. Encountered succession of rain squalls off Cape Cod on return flight." The injured

Vapo Spray

man was placed in the hospital three hours after aid was summoned.

As the result of the installation of improved radio equipment in the flying ambulances, hours have been reduced to minutes in the time required to get in contact with a ship calling for help. In rain or fog, no matter how dark the night, it now is possible to establish communication and to make direct contact for rescue within a very short time. Formerly a plane felt its way along a given course by keeping in touch with a network of beam transmissions from stations along a given airway. This plan had its limitations. But now, with a radio direction finder of the rotating-loop type, a means is available to the pilot for plotting his own course, any radio or transmitting station within reasonable distance and wavelength range serving as a radio beacon.

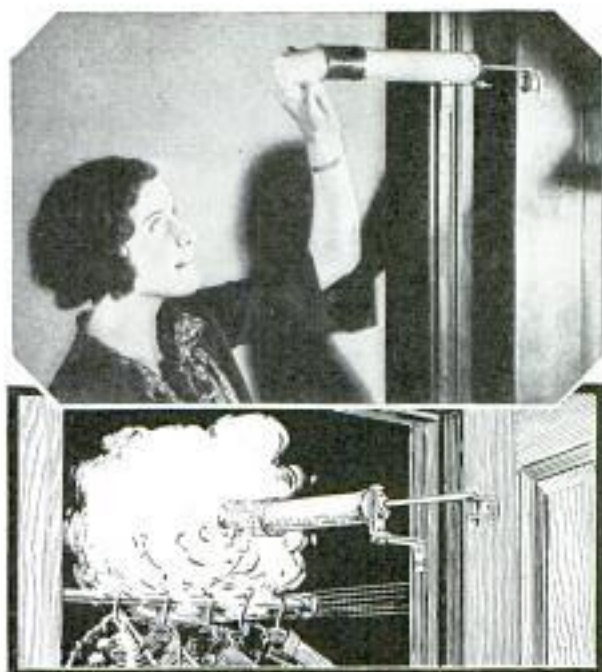
Frequently the flying life-savers lend assistance to ships caught in fog or disabled by storm, locating the stranded craft and directing coast-guard cutters to the scene. In emergencies the crew may be taken off in small boats and transported to shore. Many fishermen carried off shore by heavy wind in the Delaware bay area owe their lives to the Cape May, N. J., coast-guard air station, which renders assistance to the fishing fleet.

At the present time, there are three active coast-guard air stations, Gloucester, Cape May and Miami. There also is an inactive station at Fort Lauderdale, Fla., from which coast-guard planes were operated for a short time.

This relatively new humanitarian service, always rendered promptly, is possible only by the use of aircraft, and the field of usefulness of the airplane in the coast guard is constantly increasing.

DRY-GAS MOTH GUN HAS SPRING TO CLOSE CLOSET DOOR

Equipped with a powerful spring for automatically closing the door of the clothes closet, a dry-gas moth gun has been produced to prevent the destruction of clothing by the insects. When the door is opened, the spring is compressed. Releasing the door knob permits the spring to pull the door shut, as well as to force the dry moth-killing vapor into the closet.



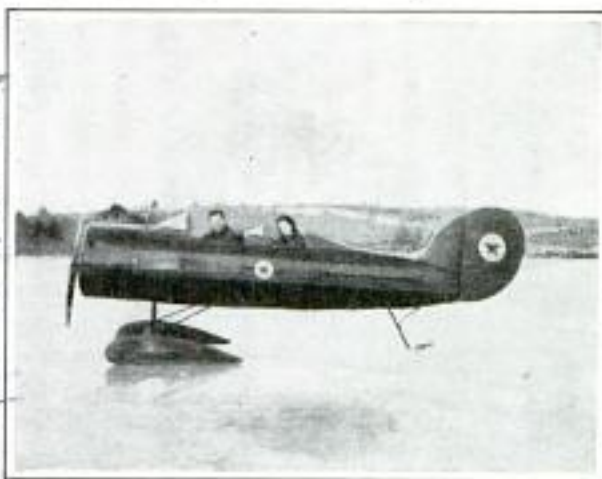
Top, Refilling Moth Gun; Bottom, How Device Expels Dry Gas into Closet to Kill Moths

The gas leaves no odor on clothes protected by this method. Attachment of the gun to the inside of the closet door requires no tools except a screwdriver.

Chicago Field.

ICE BOAT RESEMBLING A PLANE IS PROPELLER-DRIVEN

Driven by a small auto engine connected to a five-foot propeller, a two-place ice boat resembling an airplane has been developed in Massachusetts. Speeds of sixty to seventy-five miles per hour have been attained in tests. The craft is steered by rudder, with the help of brakes at slow speeds. It is seventeen and one-half feet long and weighs about 650 pounds.



This Ice Boat Attains High Speed; Note Propeller and General Resemblance to Airplane

©1327

*Arrow Mfg Co.
1155 Lunt Chicago*

Built by Nelson A. Cloutier, Leicester Mass

C1355
904

Modern Trail-Blazers Set Up Airway Lights

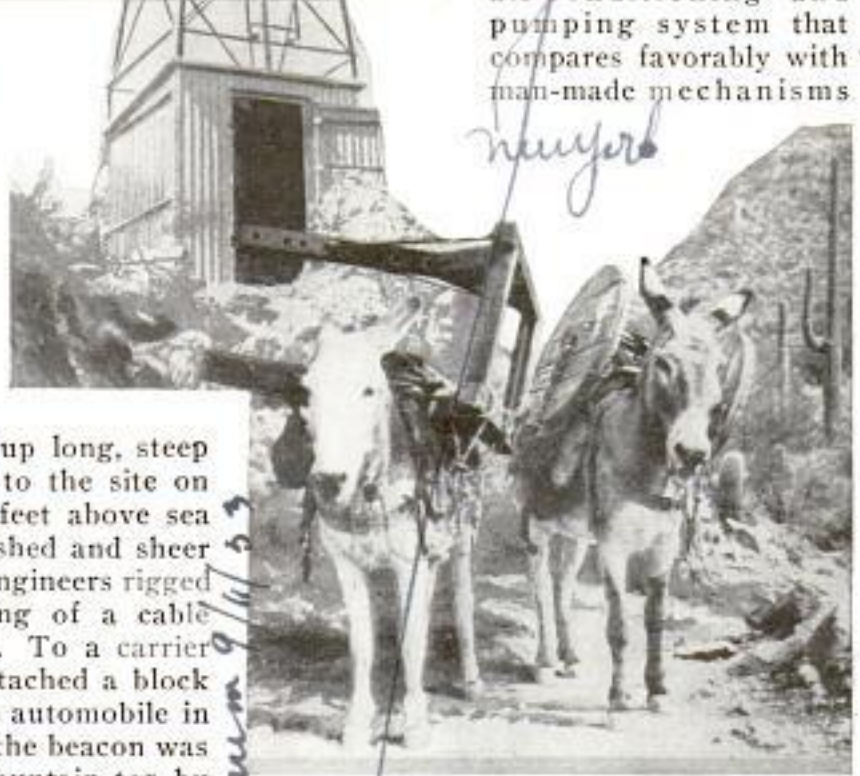


Top and Bottom. How Burro Aids in Building Beacons in Almost Inaccessible Places; Center, Station on Mountain Peak Guides the Airplane Pilot

west, the modern trail-blazers battled blizzards as they erected poles for power transmission. In spite of these hazards, however, the transcontinental beacons were erected in record time to protect pilots and passengers on the airways.

C1403
"AIR-CONDITIONER" AIDS WHALE ON DEEP DIVES

After a five-year study, scientists of the American Museum of Natural History have found that the whale has an efficient air-conditioning and pumping system that compares favorably with man-made mechanisms



Trail-blazing like that of America's pioneer days has been an aid in setting up the nation's airways system. In building a beacon to guide pilots in the west, it was necessary for government engineers to carry equipment up long, steep stretches of mountainside to the site on Thanksgiving Peak, 2,300 feet above sea level. When the trail vanished and sheer cliffs blocked the way, the engineers rigged up a trolley line consisting of a cable strung between two poles. To a carrier pulley on the cable was attached a block and tackle operated by an automobile in the valley below. Gear for the beacon was lifted and hauled to the mountain top by this primitive hoist, aided by a guide rope. The engineers reached the top by climbing up the mountain face, lashed together. On Newman's Peak, also in Arizona, dynamite was used to dress off the top so that the beacon might be erected. Between New Orleans, La., and Atlanta, Ga., the engineers conquered swamp lands by driving piles for tower rests. In the north-

of similar type. This system is said to explain why whales can go down as far as a mile under water without coming up for air. The pumping system, the scientists explain, enables the whale to purify its air and lock oxygen in its lungs against the high pressures of deep-sea waters. Through the nose of the whale run two

San Diego Jan 9/11/33

See William K. Gregory

*not on market, made first
listen false face
sold in candy and
stationery stores*

gigantic nasal passages, the right one very large and capable of being expanded. It has a far smaller aperture leading into the wind-pipe funnel. The apertures leading from the nasal passages to the throat can be closed by two enormous plugs which function like the stopper in a bathtub. When the whale submerges, the scientists believe that it uses its nasal passages to re-condition the air in its lungs.



Ready for Race with Faces Protected

Conh Halbran

PROFILES GAUGED BY ADJUSTABLE METAL STRIPS

Constructed entirely of metal, a gauge that adapts itself to irregular surfaces has been produced to aid workmen. It is made of a large number of duralumin strips held together by a long bolt passing through slots in the strips. Each strip is about one-half inch wide and four inches long. One end is cut off squarely, the other coming to a point along one side. To use the tool, the strips are loosened by slightly unscrewing the nut on the long bolt. Then the gauge is placed against a molding, carving, shoe form, rail or other irregular surface and the strips are pushed into every turn and bend. Thus, the strips take on the outline or contour of the surface. Tightening the nut holds the strips in this shape so that the gauge may be used as a guide for cutting out an object which will fit perfectly in the curved or angular outline. The instrument is useful in woodworking, copying blueprints, checking wear on objects, gauging profiles on statues, checking curvature on shoes and the like.



Individuals differ so in keenness of smell that some flowers seem fragrant to some people and odorless to others.

MOLDED MASK PROTECTS FACE OF MOTORCYCLE RACER

Motorcycle racers now are wearing false faces and football helmets as protective coverings for the face and head, particularly when racing on cinder tracks where small particles of dirt and grit may be thrown into the air with great force. The mask is dipped in water and pressed against the face, becoming molded to fit the features as it dries.

JIGSAW OPERATED BY A CAM IS SAFE FOR CHILDREN

Operated by a cam which produces three cutting strokes at each turn of the handle, a compact jigsaw is safe for children, yet capable of turning out fine work. It cuts to the center of a sixteen-inch circle. A triple-throw cam and roller give high speed. The short grip stiffens thin blades, and broken blades may be used.



Stockton Profile Co. Salem Mass.

*Scene New Letter
8/19/33*

*Barth Stamping
Machine Works
3815 W. 34th Cleveland*

C13.48 Campbell Metal Window Corp

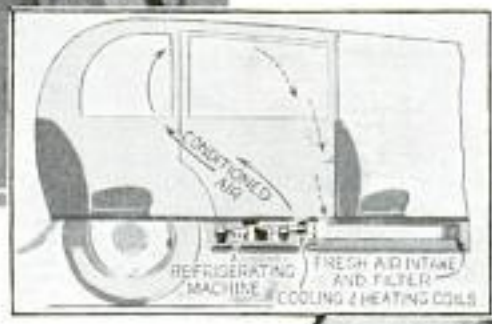
906

POPULAR MECHANICS

Bush and Hamburg Baltimore Md



Top, Air-Conditioner Register in Rear of Auto; Center, How Unit Works; Bottom, Experimental Installation



case and a hand bag. It may be installed beneath the floorboards, with a grill in the floor, or the heating and cooling coils may be placed behind and under the front seat in large automobiles. While the unit is in operation, it is unnecessary to open any window in the car. John Sargent, son of the president of the Campbell Metal Window corporation, is the inventor.

C1405

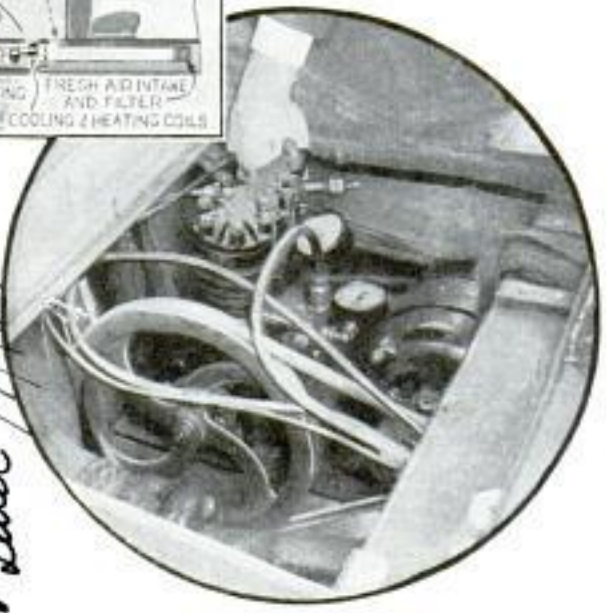
COTTON SEED GIVEN ACID BATH TO SPEED ITS GROWTH

Soaking cotton seed in concentrated sulphuric acid for a few minutes not only removes the bothersome coat of lint, but abates the danger of infection by various plant diseases and helps the seed to sprout earlier and grow faster. These and other benefits of the acid treatment are listed by Miss Auval Hester Brown, graduate student of the University of Chicago.

Sulphuric-acid soaking was used first to rid the seed of bacterial and fungus diseases. The machine finally developed for the

AIR-CONDITIONING UNIT IN CAR INCREASES COMFORT

Installation of air-conditioning equipment in a test automobile shows the possibilities for increasing the motorist's comfort. Carrying a group of engineers through city streets while the outside temperature was around ninety degrees, the auto was delightfully cool inside. All exterior noises and traffic fumes were excluded. The device can be applied to any auto, new or old. It consists of an air-intake tube provided with a filter which cleans the air and a refrigeration unit which cools the air to any required temperature. The generator of the auto supplies current for the electric motor to operate the compressor. The filtered air passing over coils is cooled in summer and heated in winter. Motorists may turn the unit on and off at will. The whole apparatus could be placed in a large-size suit-



purpose is expensive but is economically practicable when used co-operatively by cotton farmers. Miss Brown's studies were aimed especially at the effects of the acid treatment on the germination and growth of the seeds. She found that it encouraged earlier growth to such an extent that earlier cultivation was made possible, keeping the crop ahead of the boll weevil.

Science News Letter 7/19/33

Botanical Gazette 575 Q. Ellis are Chicago

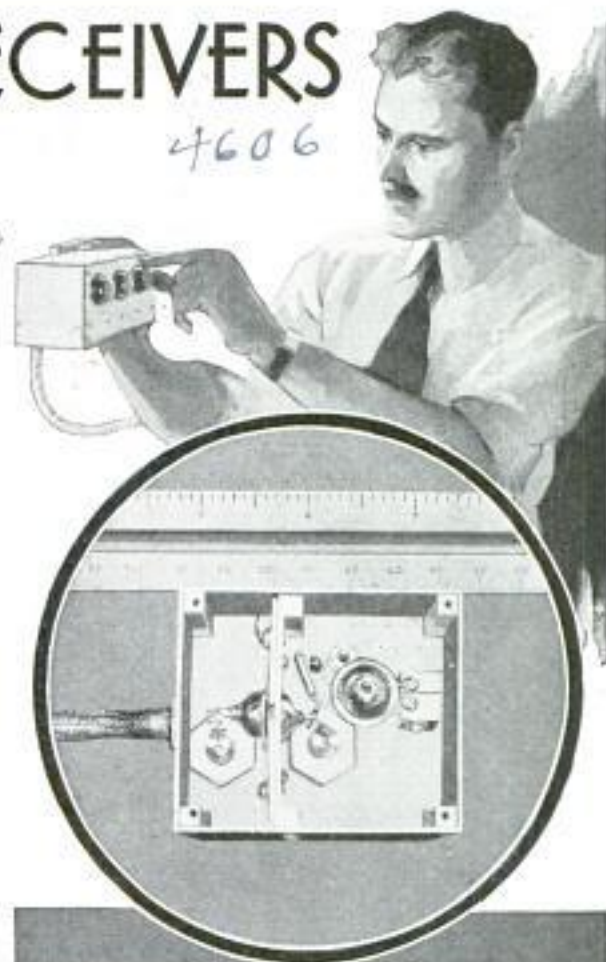


MIDGET-TUBE RECEIVERS

for Extremely Short Waves

MINIATURE radio tubes designed to work on one-meter wavelengths, and even less, have recently been described by B. J. Thompson and George M. Rose, Jr., of the R.C.A. Radiotron laboratories. Although designed for purely experimental purposes, these little tubes actually work in the same manner as ordinary tubes, and the circuits used for their operation follow the usual methods. The various parts employed in the receivers and transmitter, shown in the photos, are reduced in the same proportion.

The small two-tube receiver in the insert photo is designed to operate at 75 centimeters, three-fourths of a meter, and consists of one stage of r.f. amplification



Below, 100-Centimeter Transmitter Complete with Antenna; the Plate Power Supplied to the Oscillator Is 68 Milliwatts; the Receiver Was Located About 200 Feet from This Transmitter



and a grid-leak detector. As the tubes are but one-tenth the usual size, the result is a completely shielded set about 3 in. square. Tuning condensers were eliminated in this receiver and the initial tuning necessary to line up the amplifier and detector circuits, at approximately three-fourths of a meter, was accomplished by

(Continued to page 118A)

RCA Radiotron Laboratories 907
 Copyrighted Material
 Harlem, N.Y.



MODULATOR

From One to Six Part 1

tubes. Schools, or other institutions, will find it very useful where a small public-address system is required. It may also be used to modulate the 5-meter phone described in the August issue, or any amateur phone.

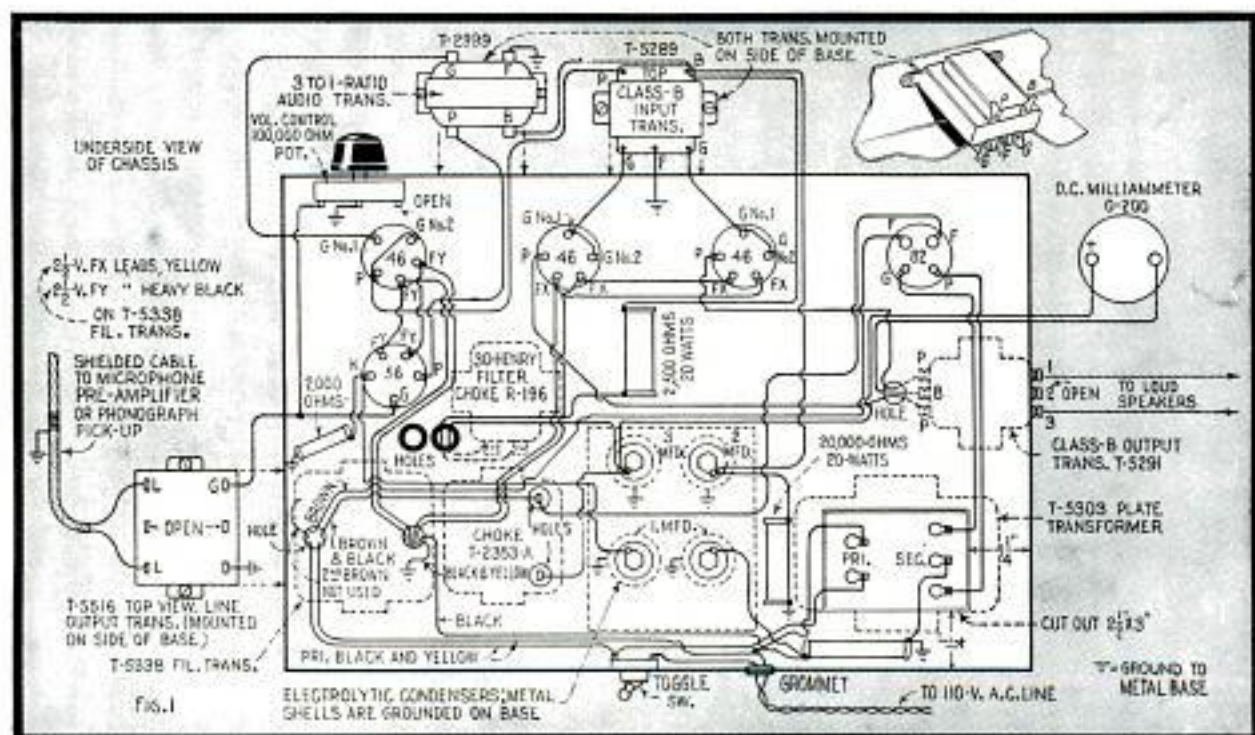
In order to make the device as flexible as possible, it is constructed in two separate units, the

By R. O. LUND and R. E. DAVY

ALTHOUGH this modulator unit uses no tube of greater size than those employed in modern radio receivers, it will furnish 20 watts of audio power with excellent quality for voice or phonograph pick-up. There is nothing difficult about its construction, in fact it is easier to build than a receiver of the same number of

modulator unit and a microphone pre-amplifier. The microphone is a double-button Universal type and the pre-amplifier requires two 45-volt B-batteries and a 6-volt storage battery for its operation. However, if a type-30 tube is used in the pre-amplifier, a 4½-volt C-battery may be substituted for the 6-volt storage battery.

The modulator unit operates on the regular 110-volt a.c. house line and is de-

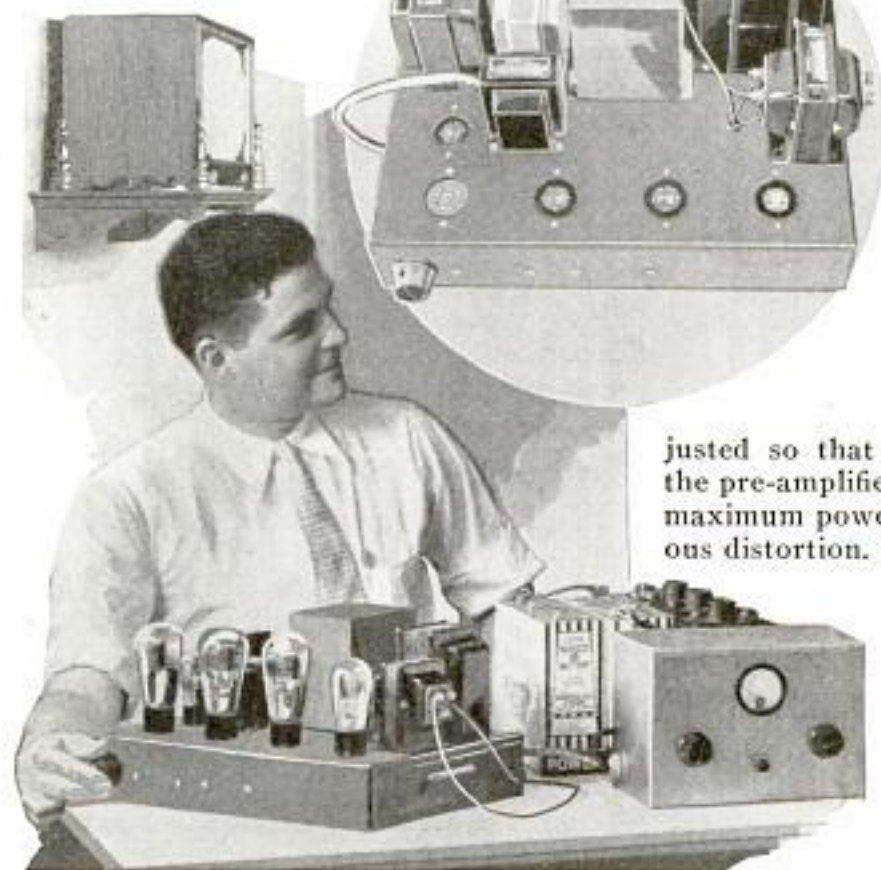


UNIT OPERATES

Remote Speakers

scribed in detail in this first article. The cost is quite low although nothing but high-grade parts are used. A complete material list for both units is available upon application.

The sheet-metal base, or chassis, for the modulator unit is 10½ in. wide, 15½ in. long and 3¼ in. deep. A simplified wiring diagram is shown in Fig. 1, which is an underside view. The power-supply apparatus and tubes are mounted on top, as shown in Fig 3, and all coupling transformers, with the exception of the class-B output transformer, are mounted under the base to minimize a.c. hum. A 2-wire shielded cable is used for the 200-ohm line connecting the two units. The wires go to the pre-amplifier from the line-output transformer, which is really the input of the modulator unit,

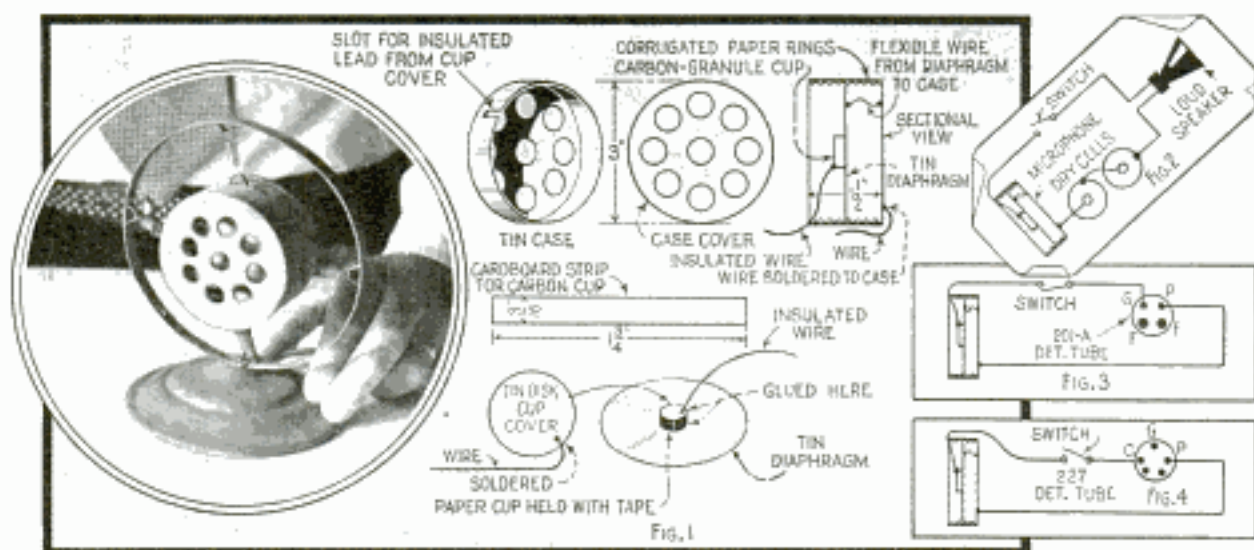


and the cable shield is used as the ground connection for both units. If phonograph pick-up is used, it should be of the low-impedance type and is connected directly to posts L and L in Fig. 1, instead of the pre-amplifier.

The 100,000-ohm volume control is to be adjusted so that with the gain control of the pre-amplifier all the way out for voice, maximum power is obtained without serious distortion. The operator in the photo at lower left on this page is adjusting the volume control. All wiring above and below the base is clearly shown in Figs. 1 and 3 and the schematic diagram, Fig. 2. The 0 to 200 d.c. milliammeter

(Continued to page 122A)

Single-Button Carbon "Mike" for Beginners



You can build this home broadcasting microphone at practically no cost. It will enable you to talk through the loud speaker of your broadcast receiver from an adjoining room, or it may be used to operate a speaker independent of the receiver with dry cells in series, as shown in Fig. 2. The diagrams in Fig. 1 are self-explanatory. The case and cover are cut from two Carnation milk cans. The bottom of one can is removed with a soldering iron and the other is cut $1\frac{1}{2}$ in. from the bottom and slotted as shown. The perforations are made with a $\frac{3}{8}$ -in. drift punch by placing the cover and case on a block of wood clamped in a vise. A circular piece is cut from a flat tobacco can to form the diaphragm. This piece should fit snugly inside the can in the position shown. The small paper cup, for the carbon granules, is held together with a strip of adhesive tape and a rubber band. The cup is then glued to the center of the diaphragm and filled three-fourths full with carbon granules obtained from a piece of carbon taken from the center of an old flashlight cell. Clean the carbon by filing and then gather clean filings on a piece of paper so that they will not be touched with the hands when transferring them to the cup. The small tin disk, with the insulated wire, is then glued to the top of the cup and, when the glue has set firmly, the diaphragm is ready for mounting in the case between the two strips of corrugated paper. The short length of

flexible wire is then soldered to the rear of the diaphragm and case cover. The base of an old desk lamp was used for the stand, and the metal ring for this stand is $5\frac{1}{2}$ in. in diameter. Loops are soldered to the inside of the ring, and in corresponding positions on the case, for the supporting springs. The final connecting lead may be soldered to the outside of the case or on the ring at any convenient point. To use the microphone with your receiver, remove the detector tube and wind a turn or two of the bared ends of the flexible insulated leads around the bases of the tube prongs indicated in Figs. 3 and 4, according to the type of detector tube used, and replace the tube in its socket. Small round-hole lugs, that will fit over the prongs, may be soldered to the ends of the connecting leads if preferred. In either case care should be taken that the bare wire does not come in contact with any of the other prongs or touch the receiver chassis. Tune the set off the program when the switch is thrown for the microphone and leave this switch open when the microphone is not in use. The tube prongs are easily identified as the sketches show their positions looking down on the tube sockets in your receiver.

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.

*General Radio Co
Cambridge Mass*

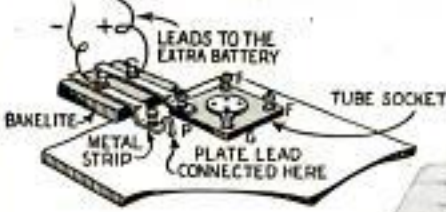
EASY SOLUTIONS

for Radio Problems

Electrod. chm. 175 Cambridge Mass.



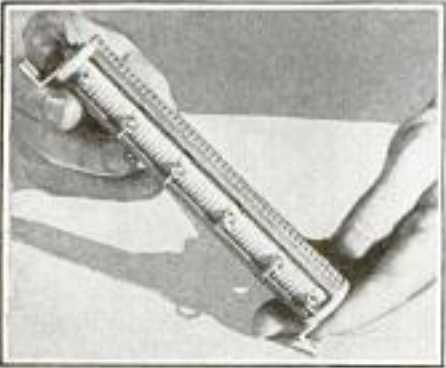
Terminal Connector for Screen-Grid Tubes Made from Small Battery Clip, Handy for Testing and Experimental Hook-Ups



Extension Binding Posts Provide an Easy Method for Adding Batteries or Resistors in Any Circuit



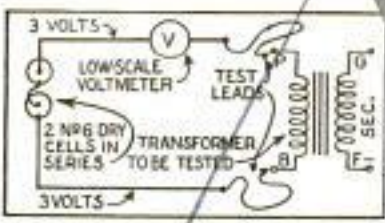
Left, Sheet-Metal Bases for Receivers and Power Units Can Be Easily Formed by Clamping the Material between Two Blocks of Wood in a Vise; the Bend Is Made as Shown; a Few Taps with a Mallet Will Insure Good Straight Edges; Above, Using Tapered Reamer to Enlarge the Holes for Water-Type Sockets



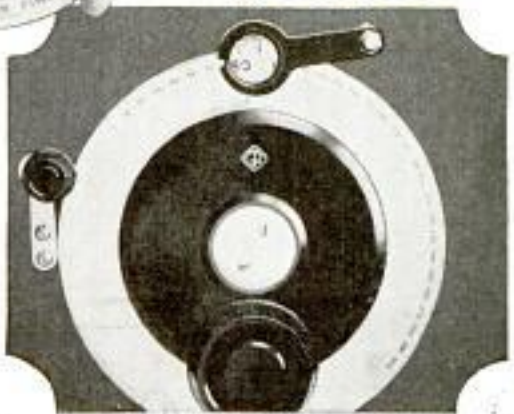
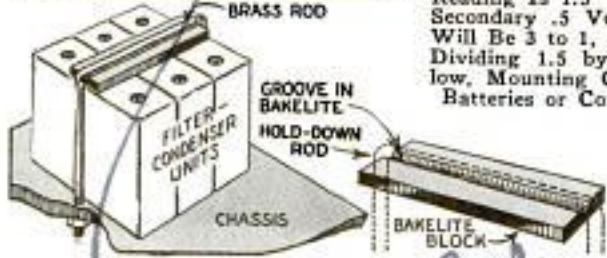
Above, Shielded Truvalt-Type Voltage Divider Has Several Adjustable Taps for Accurately Selecting Various Plate and Screen Voltages; Right, Chart for Quickly Identifying Tube-Base Connections



Above, Plugs and Jacks for Plug-In Transmitter Coils; 1/4-In. Copper Tubing May Be Sweated into the Plug at Right; Below, Magnifying Glass for Accurate Dial Reading
Vernier.



Left, Test to Determine Ratio of Unmarked Audio Transformers; if Primary Reading Is 1.5 Volts and Secondary .5 Volt, Ratio Will Be 3 to 1, Found by Dividing 1.5 by .5; Below, Mounting Clamp for Batteries or Condensers



*National Radio Co
Cambridge Mass*

National Radio Corp. 408 Madison Ave. N.Y.C.

Compact Short-Wave Converter for A.C. Sets



Short-Wave Converter That May Be Used with Any A.C. Broadcast Receiver

Easily connected to any a.c. broadcast receiver, this little short-wave converter covers the amateur, police and aircraft bands without additional plug-in coils. It employs a type-227 tube and is provided with a tuning knob. The broadcast receiver should be tuned to a quiet spot, at about 600 kilocycles, and the small tuning knob on the converter is turned slowly up and down through its entire range. The amateur band can be located when the control is out. Aircraft and police signals are tuned in when the control is screwed almost all the way down. Power for the 227 tube is obtained from the receiver by means of a simple adapter for one of the 5-prong sockets and does not interfere with the operation of the receiver.

Pocket-Size Resistance Indicator

This resistance indicator may be substituted for a burned-out resistor in circuits suspected to require less than 100,000 ohms resistance. The exact value of resistance in ohms necessary for the best operation of the set is quickly found with the small indicator knob. A pair of 24-in. test cords, with spring clips and plugs, fit the pin-jacks mounted in the bakelite box. Another instrument of similar appearance is available for indicating



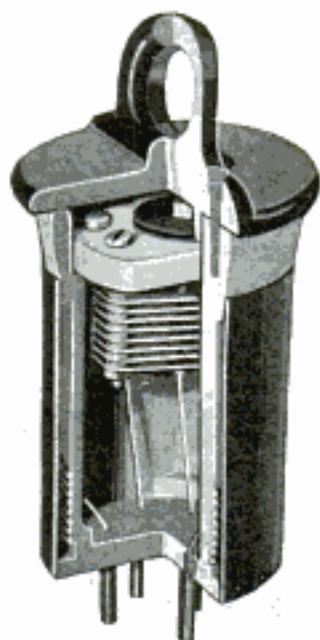
resistance values up to 1 megohm. This is a decade type with ten steps of 100,000 ohms each. These instruments are inexpensive and very useful to the experimenter and service man. They also may be used as multipliers for voltmeters of the 1,000-ohms-per-volt variety.

Low-Drain Two-Volt Tubes Improve Old Battery Sets

You can improve your old receiver by merely substituting the new type-230 tubes for the old 201-A type. The power tube was probably a 112-A; use the 231 tube instead. If the set sockets are of the old UV variety, change them to flat-top UX sockets and replace wiring as before. Clip the A-battery leads to a single cell of the storage battery, to obtain the necessary two volts, and shift to the next cell as required. The C-battery for the 231 is 22 1/2 volts; detector B-battery, 45 volts; amplifier tubes, 90 volts and power tube 135.

Plug-In Coil of Advanced Design for Short-Wave Supers

Single-control superheterodyne receivers for short waves require specially designed plug-in coils for maximum sensitivity and the suppression of image, or harmonic, interference. This coil is fitted with an adjustable air-type variable condenser that may be set to the best position under actual operating conditions. A small screwdriver can be inserted through a hole in the top for making these adjustments. The winding is protected by an insulating sleeve, and a strong handle is provided.



Troublesome hum in a.c. receivers can often be reduced by reversing the supply-line plug at the wall socket.

Handwritten notes at the bottom of the page, including 'Radolek Co', '601 W', and 'Copyrighted material'.



CRAZY TOP *battles pins*

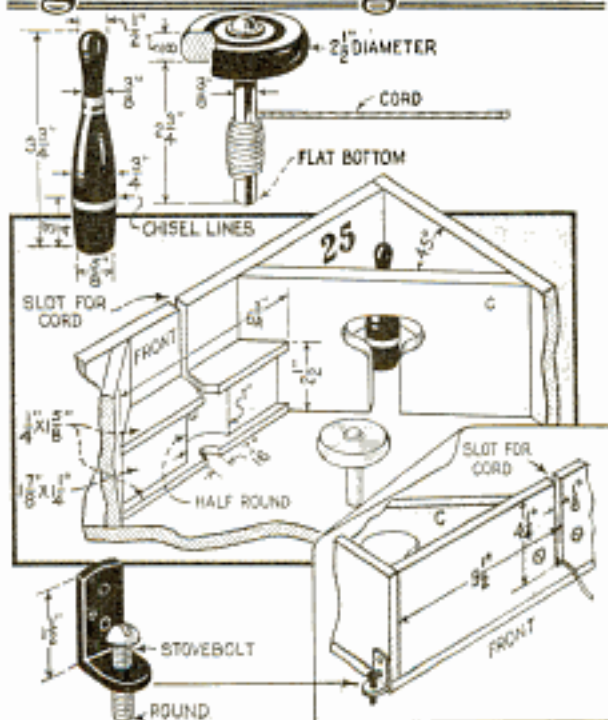
By R. O. BUCK

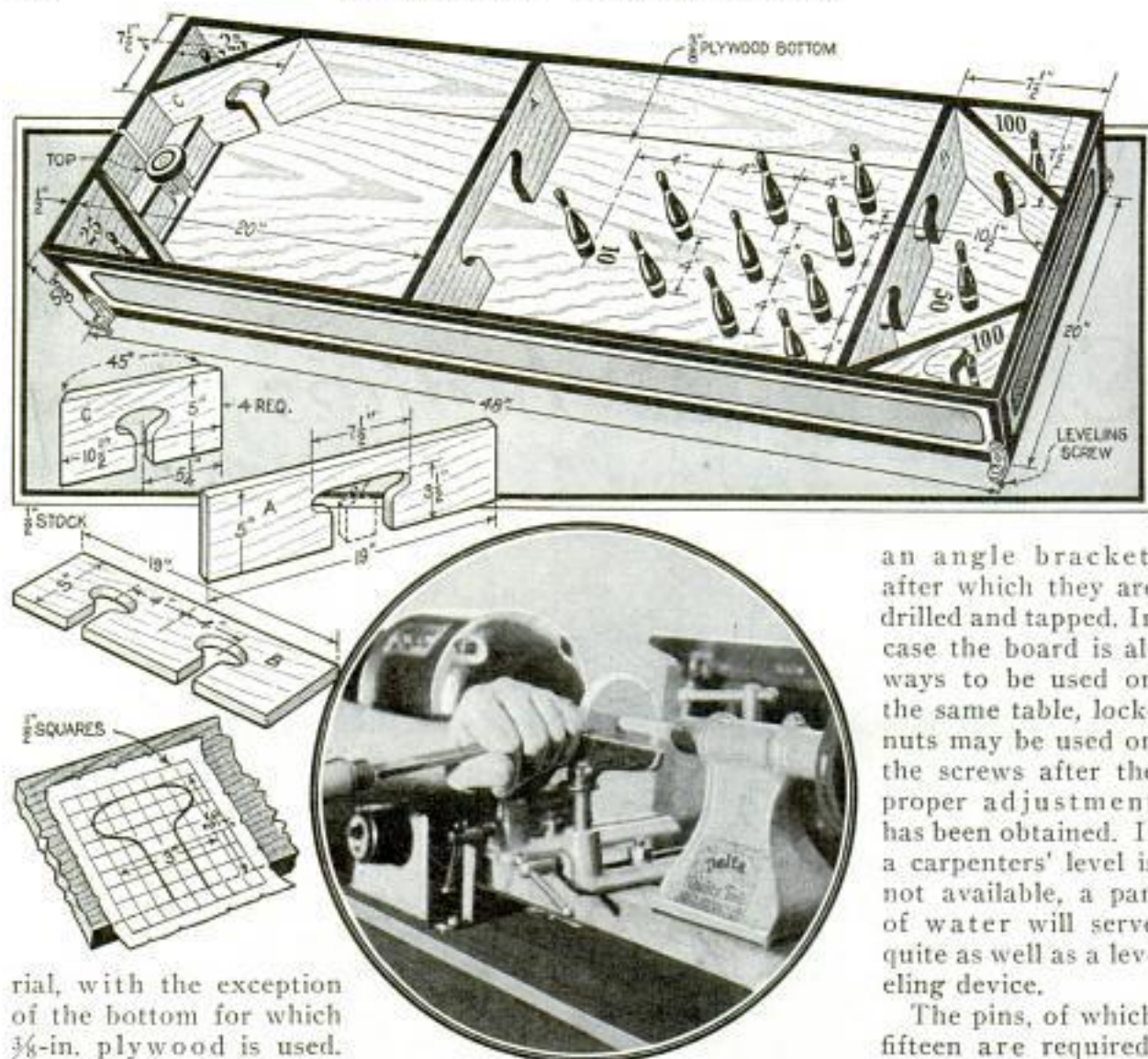


in amusing table game

SPINNING at high speed, a specially turned top moves about in a haphazard, uncertain path, knocking down pins that are in its way, each one of which adds to the score of the player. The pins in the center section each count for ten points, while the pins in the enclosures count 25, 50 and 100, the latter being more difficult to reach as the top must pass through small doors to get inside the enclosures. Naturally, the object of the game is to manipulate the top so that it will strike the greatest number of pins, particularly those having the highest count. While chance plays a great part in the game, considerable skill can be acquired in spinning the top so that it will travel rather than spend its energy in rotating at one spot. The player first scoring 100 points wins the game.

The board is made of any ½-in. mate-





rial, with the exception of the bottom for which $\frac{3}{8}$ -in. plywood is used. After the sides and ends are finished, make the partition pieces. A cardboard pattern for the doors is first made, from which the design is traced on the wood. The spots and numbers on the bottom board should be laid out and painted before the partitions are nailed in place. Black drawing ink is used for paint so it is necessary to give the piece a coat of thin shellac beforehand to prevent the ink from creeping. At the front end of the board, a rack holds the top while the player spins it by means of a cord, which is slipped through a slot as shown. The rack consists of three pieces of $\frac{1}{2}$ -in. stock, glued or nailed together, after the slots have been cut in them, while the ends are mitered to fit the partition pieces. Screws run up through the bottom to hold it in place. In order to level the board, six adjustment screws are required. The brackets holding these screws are made by bending up some $\frac{1}{8}$ -in. flat iron to form

an angle bracket, after which they are drilled and tapped. In case the board is always to be used on the same table, lock-nuts may be used on the screws after the proper adjustment has been obtained. If a carpenter's level is not available, a pan of water will serve quite as well as a leveling device.

The pins, of which fifteen are required, are turned in groups of three, sanded and waxed on the lathe. Care must be taken to have them square on the bottom so that they will stand. An old maple broom handle provides good material for these pieces. Two or more tops should be made so that succeeding players may be winding their tops while the player's top is still rotating on the board. If properly made and spun, the tops will rotate about 5 min. Wind the cord evenly, leaving a $\frac{1}{2}$ -in. space at each end of the shaft to fit into the grooves of the rack. Heavy, braided fishing line, about $\frac{3}{16}$ in. thick and 46 in. long, is used to spin the tops. One end should be frayed out so that it can be pinched under the first wind, while the other should be knotted to form a 3-in. loop for a hand-hold. Close-grained, heavy hardwood should be used for making the tops, which are also turned on the lathe. As it is difficult to center the dowel for the shaft exactly, a $\frac{1}{2}$ -in.

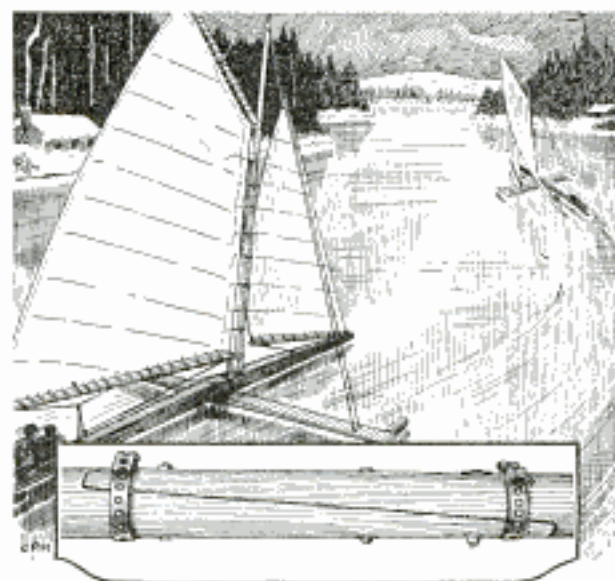
dowel should be used, to be turned down to $\frac{3}{8}$ in. The dowel is glued into the disk with about 2 in. extending at one end and 3 in. at the other, in order to provide for mounting in the lathe. Rounding off the top of the shaft should be the last operation after the shaft has been well waxed. An element of interest is added to the game by painting the disk of each top a different color so that each player may use his favorite top. The order of play may be also established by this method, just as in croquet.

Removing Dents from Ping-Pong Balls

Dents in ping-pong balls can be removed by placing them in boiling water for a few minutes. This causes the air inside the ball to expand and push out the dent. The ball should be removed from the water as soon as the dent disappears.—Irving Sherman, Plainfield, N. J.

Splicing Broken Masts and Booms

Rigid splicing of broken mast and boom poles on boats is easily done by using bolts and plumbers' strap-iron hangers. The broken ends of the pole are tapered and fitted together as shown, after which they are drilled and bolted together. If the nuts and bolt heads are countersunk, a neater job will result. The hangers are



Broken Ends of Mast or Boom Poles Cut at a Taper and Bolted Together

then fitted over each end of the repair and pulled up tight.

Tool to Straighten Crimped Ends of Conductor Pipe



Corrugations in Conductor Pipe Straightened with Tool Made from Wood Block

With this tool you can straighten bent ends of conductor pipe. Get a wood block and slot one end so that a length of $\frac{1}{2}$ -in. pipe will just slip through it nicely. Then round the edges to fit the corrugations. Lay the slotted end of the block inside the conductor, and with the pipe slipped in the position shown, the corrugations will be quickly forced into shape.

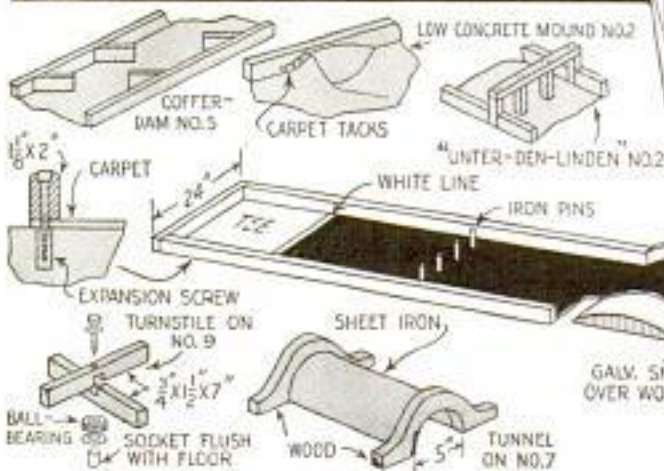
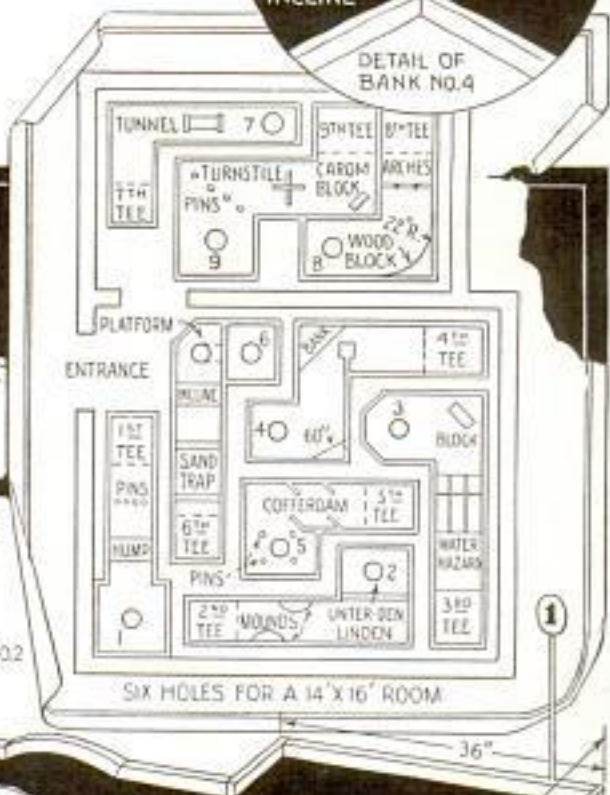
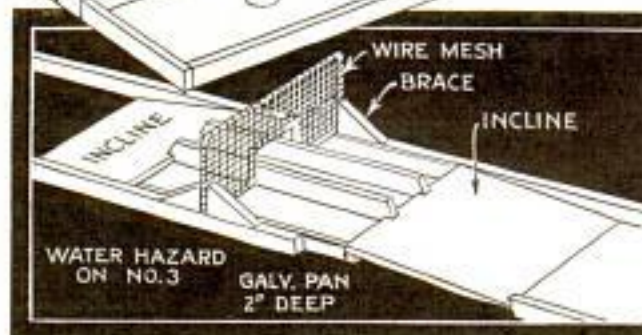
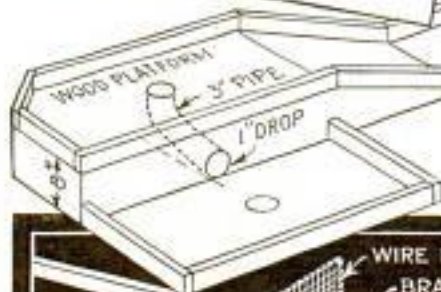
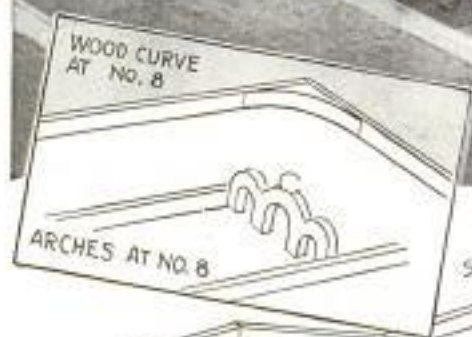
Fogged Panchromatic Roll Film Caused by Camera Shutter

Many users of panchromatic roll film who have found their negatives fogged after developing them will probably find that the trouble is caused by the camera shutter. Shutters having blades made of hard rubber or other organic material sometimes allow enough light to filter through them to fog panchromatic film. A good test for this is to hold the shutters in front of an electric light with the back of the camera removed and all other light excluded. If the shutters are at fault, you will see a red glow filtering through the blades.—A. W. Dreyer, St. Louis, Mo.

☞ If the white of an egg is used to seal an envelope, which has no mucilage on the flap, it cannot be opened by steaming it.

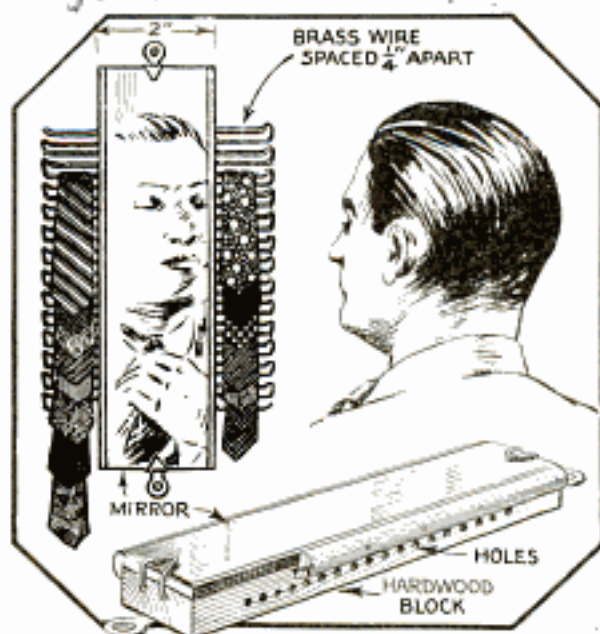
GOLF PRACTICE

in your
BASEMENT



Golf Practice in Your Basement

With careful planning a tricky little golf course can be built in a fair-sized room in the basement, although six holes are about the limit of a 14 by 16-ft. floor space. If a nine-hole course is desired, the extra three holes can be laid out in a smaller adjoining room. Strips of old carpets or rugs make good "turf" for fairways and greens, and should be cut with as few seams as possible. If convenient, No. 1 tee should be near the entrance to the room. This hole is made comparatively easy so as not to discourage the novice. The hazards of No. 1 consist of a row of pins and a hump. The former are short lengths of $\frac{1}{2}$ -in. pipe cemented in holes in the floor, and the hump is simply a sheet of galvanized iron rounded over two wood end pieces as shown. A hole is chipped in the floor for the cup, which is a 4-in. section of $4\frac{1}{4}$ -in. (inside dia.) wrought-iron pipe, held in place with cement. See that the rim of the cup does not extend above the floor level. On No. 2 the ball must pass between two low mounds of cement, not over an inch high and having a gradual slope so that the carpet will lay smoothly. An interesting hazard on No. 3 is the water trap. A galvanized pan, 2 in. deep, the full width of the fairway and about 20 in. long, is approached by an incline and is surmounted by a bridge about 4 in. wide. On No. 5, four baffle boards, forming a dry "cofferdam," are set on the fairway at a 45° angle, the open space between them being about 5 in. Four pins, forming corners of a square, are set around the cup. No. 6 is an especially tricky hole, having a sand trap and a raised platform with a tunnel leading to the green. The tunnel set in the middle of No. 7 fairway is a semicircular section of galvanized sheet, about 5 in. wide, supported by wood end arches. No. 8 is distinguished by a wood curve, cut on a 22-in. radius from 2-in. material. A novelty is provided by the turnstile on No. 9. This is a four-arm affair, 7 in. in diameter, and turns on a long screw. The weight rests on a ball thrust-bearing taken from an old bicycle. Markers for the holes are made of galvanized disks riveted to $\frac{1}{2}$ -in. iron rods set in holes in the side frame. They should be removable to permit free play in close quarters.



Mirror and Tie Rack Assembled in One Unit Make a Neat Addition to Your Toilet

Combination Tie Rack and Mirror for Your Bedroom

Here is a neat little tie rack and mirror that may be hung on the wall of your bedroom. Any small mirror you have on hand can be used, or an auto rear-view mirror will serve the purpose nicely. Drill several small holes in a $\frac{3}{4}$ -in. hardwood block, spacing them $\frac{1}{4}$ in. apart, and thread brass wire through them as shown, bending the looped ends upward slightly to keep the ties from falling off. Strips of molding nailed to the sides of the block and wire clips at the ends hold the mirror in place, while brass picture hangers are screwed to the back of the block at both ends for hanging the assembly on the wall.

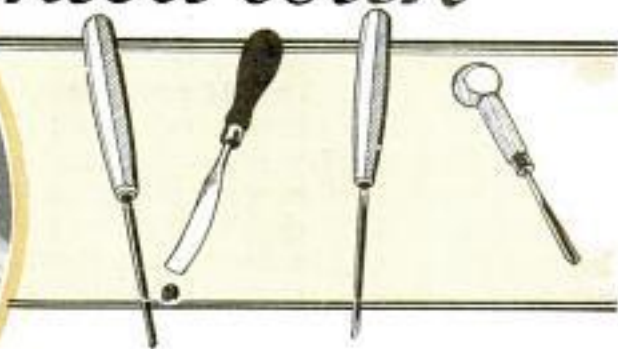
Fuller Balls Protect Polished Floors against Pail Bottoms



To keep a water pail from leaving a dirty ring when set down on a polished floor, take three $\frac{1}{2}$ -in. fuller balls, cut a slit through one side of each one with a sharp knife and slip them over the rolled edge of the pail bottom, spacing them equal distances apart. When washing polished floors, the pail can be pushed along without scratching the finished surface.

Supplies. S. Weber &
1230 Burtwood Philadelphia

Artistic CHRISTMAS CARDS printed with



By ELMER D. KRUSE

ANYONE can print distinctive Christmas and greeting cards from linoleum blocks, an increasingly popular craft, in which only a few simple and inexpensive gouges are needed. No more than average skill is required to do this work as the pictures can be copied from newspapers and magazines, although those who are more artistically inclined may create their own designs. The printing can be done on paper, cardboard, wood, fabric and other material, in one color only, or in several colors, as desired, by a simple process of inking the linoleum block and then, with a sheet of paper laid over the inked surface, passing it through your washing-machine wringer. As a medium for carving, linoleum yields so easily to the sharp edge of a knife or gouge, that there is practically no end to the clever, interesting and pleasing effects possible.

For your first trial you will need a small piece of battleship linoleum, a piece of tracing paper, a knife with a sharp thin blade, and three or four gouges such as wood carvers use. Although linoleum blocks may be carved with a knife alone, the process is much quicker and easier if you use gouges. See Figs. 7 to 10 inclu-

sive, in which the most useful types of gouges are shown and the kind of work for which they are used. A large V-shaped gouge is of general utility while a small V-shaped gouge is handy for outline work. The V-shaped gouge is useful for making short cuts having rather abrupt ends, as those used to simulate leaves. For removing the large areas of the design not to be painted, a broad, slightly curved gouge, as shown in Fig. 10, is used. These may be obtained at a hardware or art-supply store and must be sharpened to a very sharp edge, at a slight angle extending back into the hollow part of the blade. This is essential to making a clean cut in the linoleum. The tools must be kept sharp at all times, as a dull gouge or knife will make a rough and unsatisfactory cut.

Clip the pages of a newspaper or magazine for some design or picture that will be suitable. It should be a simple one for your first effort, containing solid areas and strong lines. A silhouette picture is ideal, or it may be a simple design of a ship, tree, bird, or some object that is not too intricate. Or, if you like, you may use your own initials worked into an interesting monogram. Having chosen the design, trace it on a piece of thin tissue paper as in Fig. 2, and then, holding this up in front of a window or light, trace it in reverse on the back of the tissue paper as it is necessary to reverse the design when making a linoleum block, because the block prints the reverse of what has been carved upon it. This is particularly im-

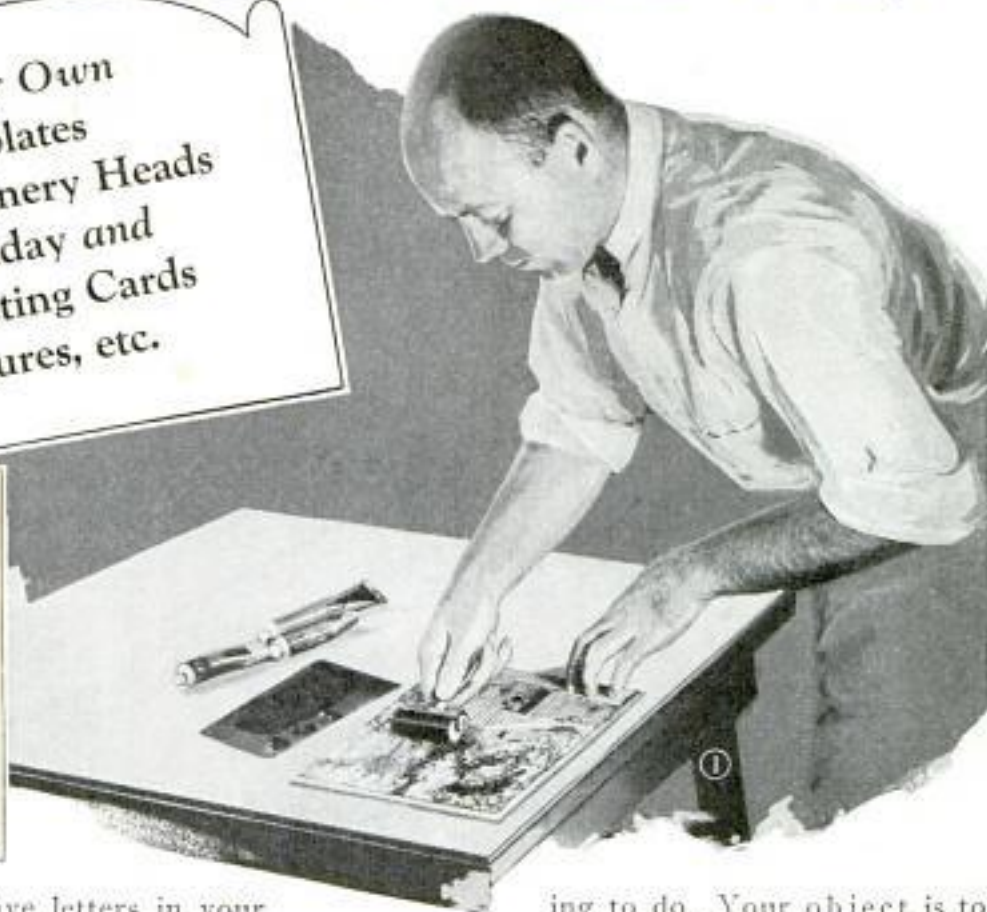
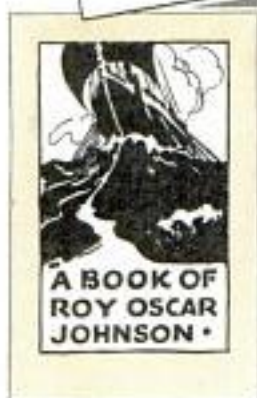
also Cattaraugus Cutlery Co
Dep't. Phil Little Valley, N.Y.

Craftsman Wood Service
2927 Mary Ave Chicago



LINOLEUM BLOCKS

Make Your Own
Bookplates
Stationery Heads
Birthday and
Greeting Cards
Pictures, etc.



portant if you have letters in your design; if they are not carved in reverse on the linoleum, they will appear backward on the print. Next, the surface of the linoleum block is given a coating of Chinese white, obtainable at any art store. This is applied liberally as in Fig. 3, after which the block is set aside until the whitened surface is thoroughly dry. Then the design on the tissue paper is to be transferred to the whitened surface, using a sheet of carbon paper between the two as in Figs. 4 and 5. After you have traced your design on the linoleum, go over the lines with a sharp pencil to strengthen any of them that are not sharp and distinct, as you will want strong guide lines to follow when carving.

Now the fun begins—the actual carving of the linoleum. With your knife and gouges at hand, consider what you are go-

ing to do. Your object is to carve away everything except the lines or areas that you want to print, and these are to be left in relief. If you are familiar with the ordinary zinc engravings that are used by printers, you will realize that you are making a similar type of engraving out of linoleum. Start carving with the knife. Holding it to cut outward and away from the relief portion of your design, make a fine cut all around the parts that are to be left. Having done this, reverse the slant of the knife and complete the cut into a V-shaped groove around the design, carefully removing the sliver of linoleum that results from this cut so that all edges are sharp. The part that is to be kept in relief is now outlined with the groove that you have just made, and it is a simple matter to clear away or rout out with your gouges all those parts



② COPYING A DESIGN ON TRACING PAPER



③ WHITENING THE SURFACE OF LINOLEUM BLOCK

that are not to be printed, as in Fig. 6. Be sure that these "dead" areas are well cleared, so that when the block is being printed later there will be no possibility of these portions coming in contact with the paper. After you have become more experienced in carving, you may find it quicker and more interesting to carve the entire block with the gouges, working with the gouge right along the outline of the parts that are to be left. This affords a style of carving that is more spontaneous and adds to the artistry of your work; but it is better to proceed as outlined above until you have become fairly proficient in the craft.

With your design completely carved in relief on the linoleum, you are ready for the next step—the printing of the block. Here a thrill awaits you, for the printing will show you how effective your carving has been. The most satisfactory way of printing linoleum blocks is by means of a small press, such as a letter press, al-

though a washing-machine wringer has been found satisfactory. For printing you will need some ordinary printers' ink and some paper which is fairly absorbent. The ink can be purchased from your local printer who has it either in large cans or in small tubes. It is advisable to get the primary colors, red, blue and yellow, besides black and white, so that you can

make up any other color or shade by mixing them on a slab of glass or marble as in Fig. 11. The ink is then rolled out on the slab by means of a rubber-covered roller, and after the ink has been well distributed on the roller, the latter is run

over the linoleum block as in Fig. 1, first one way and then the oth-



④ THUMB TACKS USED TO HOLD TRACING PAPER AND CARBON SHEET ON WHITENED LINOLEUM BLOCK



THE DESIGN WHICH IS NOW REVERSED IS TRANSFERRED TO THE WHITENED SURFACE.



PARTS NOT TO BE PRINTED ARE CAREFULLY CUT AWAY

er, taking care not to apply the ink too heavily or the print will be smudgy. The paper is laid on the linoleum block and both are then passed between the rolls of the wringer as in Fig. 12, the pressure being adjusted to suit the work. After making a few prints you can determine just how much pressure is needed. If no wringer is available, prints may be made by hand as follows: Lay a sheet of paper on the inked linoleum block and then with the back of a tablespoon, rub the paper evenly until you have applied enough pressure all over the surface for the ink to adhere uniformly. You will be surprised at the sharp clean prints that can be obtained in this simple

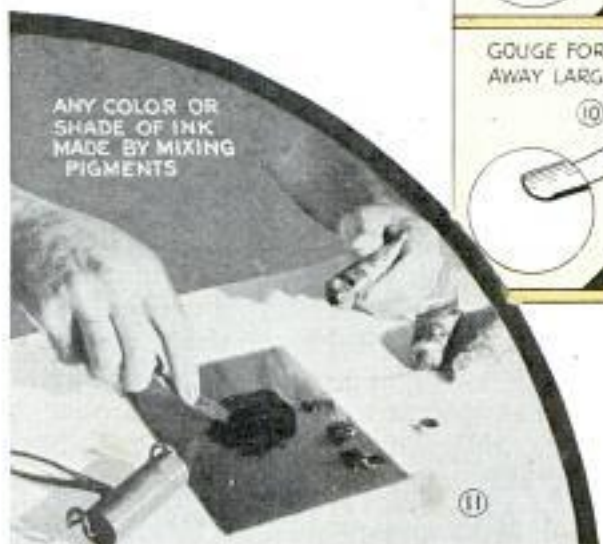


LARGE V-SHAPED TOOL FOR GENERAL WORK

U-SHAPED TOOL USED FOR CUTTING LEAVES AND GETTING WOOD-CUT EFFECTS

SMALL V-SHAPED TOOL USED FOR OUTLINE WORK

GOUGE FOR CUTTING AWAY LARGE AREAS



ANY COLOR OR SHADE OF INK MADE BY MIXING PIGMENTS

way if you use care in the inking and in applying even pressure with the spoon.

The first print that you make may be good or bad, depending upon the skill you have used both in carving and printing, but it should prove a novel experiment, indicating the many possibilities of this craft. Do not be discouraged if your first effort is not a complete success, as there is a knack in making and printing a linoleum block that is acquired after a certain amount of experience. If you find your interest stimulated by the results you have obtained, you can enlarge upon your technique by making prints in several colors. You are not limited to just one impression in a single color; you can carve other blocks in accordance with your design, to provide for the printing of each additional color. These are carved, of course, so that the portions left in relief hit at

other places than your original carving. Many beautiful colored prints are the result of using three or four separate blocks. When additional color blocks are used, it will be necessary to get each additional color impression in register, that is, each block must come in contact with the paper



Fig. 12, Washing-Machine Wringer with Rollers Adjusted to Suit the Work Can Be Used as Press for Printing

at exactly the right spot so that the design is clean and sharp and not obscured by overlapping of the various colors. This can easily be arranged by making a simple frame for holding each block in the same position with respect to the paper.

There are many practical uses to which linoleum blocks may be put in addition to those shown. For example, attractive monogram designs may be printed by this means on personal stationery. Other uses include menu cards, posters, advertising cards, illustrations for handbills, letter-heads, silhouette pictures for framing, and scores of other interesting things.

Friction-Tape Grips Help in Pointing Wires and Iron Rods

When pointing short lengths of wire or small iron rods on a grinding wheel, wrap friction tape around the work to form



grips for the fingers, as shown in the photo. This enables you to turn the work easily while it is being ground, and keep the fingers from being burned by the hot rod.

Copying Photos without a Camera

With a photo printer and some sensitized printing paper you can copy photographs without using the original negative. If the picture to be copied is mounted, remove the mounting by soaking it in water and then let it dry. Be sure that the back of the picture is clean. Place the photo in the printer face up, and put a piece of sensitized paper over it, with the emulsion side down. Any single-weight printing paper may be used for this purpose. The time of exposure will vary, of course, with pictures of different intensity. After exposing them, develop the prints in the usual way and the result will be a paper negative. After this has dried, a positive print can be made in the same manner as just described. Faded pictures and sepia tones that cannot be copied with a camera without re-

touching can be copied in this way with pleasing results.

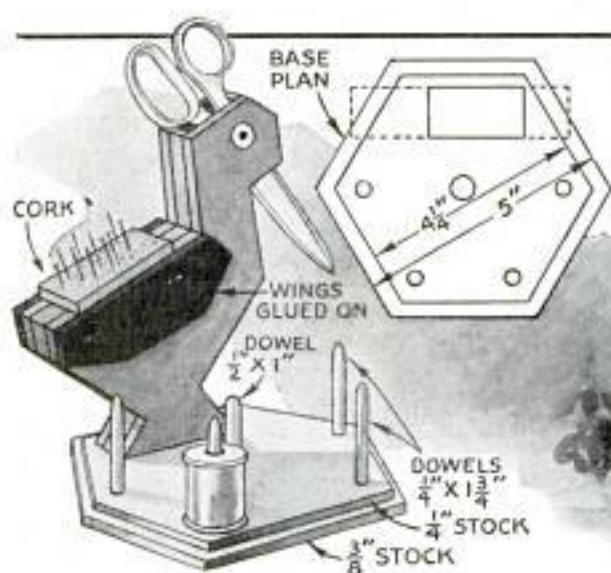
Paper Clip an Aid in Duplicating Measurements with Yardstick

As an aid in duplicating measurements with a yardstick, a paper clip makes a good indicator. A V-notch is filed in one of the jaws of the clip directly in line with the center of the hole in the handle. In use, the clip is moved along the edge of the stick to the measurement desired at the point of the notch. By making a mark through the handle hole with a scribe or lead pencil, exact measurements can be duplicated without reading the scale each time on the yardstick.



☞ To save wear on buttons and garments, and avoid cutting wringer rolls with broken buttons, button each garment and turn it wrong side out before putting it into the washing machine.

Needlework Pelican Has Scissors for Beak



Here is an accommodating little bird that will be greatly appreciated by the women, because he keeps needle, thread and scissors conveniently at hand and in orderly array. The body is built up of two side pieces of $\frac{1}{4}$ -in. white pine or similar material cemented to a $\frac{1}{2}$ -in. piece with case-in waterproof glue. Use also a few brads. Make a pasteboard pattern like the squared diagram and transfer to the wood, cutting outlines with a coping or jigsaw. Bear in mind that the part in the head where shears are inserted is to be cut away before gluing up the wood. A recess is cut in the back, as shown, and wings of $\frac{1}{4}$ -in. material are glued on. In this recess glue a rectangle of yucca or pith, or other fibrous material, into which pins and needles can be thrust. The base consists of two hexagons of $\frac{1}{4}$ and $\frac{3}{8}$ -in. material glued together, with the grain running at right angles. The bird is nailed on from the underside and dowels are inserted, as shown, to hold spools. Finish in blue and black paint, or brushing lacquer, with eye white and dowels varnished, and you have a very acceptable gift.

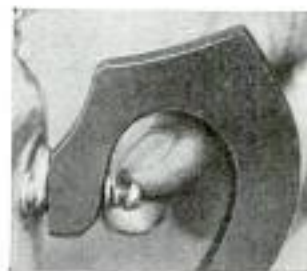
To Prevent Liquid Glue from Hardening

When not in use, liquid glue may be kept from hardening by setting the bottle inside a rust-proof container, in which a little water is kept. Both containers should be covered, the outer one to retain the moist air, and the inner one to prevent the

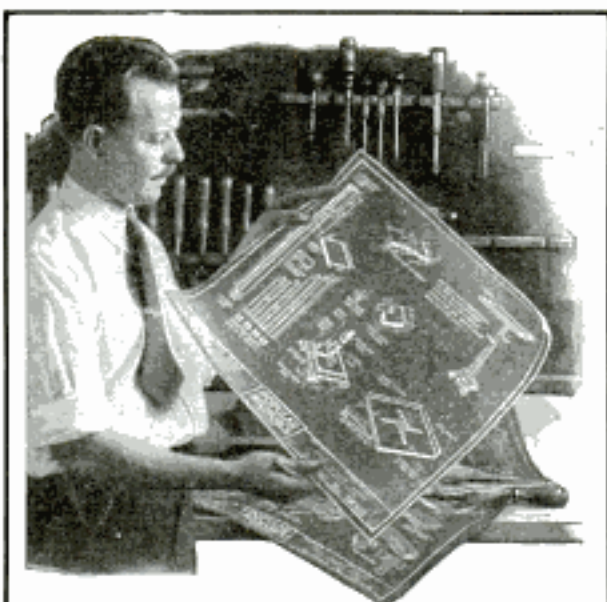
glue from absorbing too much moisture. I have also found that wire is better for spreading glue than a brush or paddle. Use a wire about $\frac{7}{32}$ in. in diameter for heavy work and a smaller one for light work. When the wires are not being used, they are kept in a glass of water to prevent the glue from hardening on them.—John Gowdey, Philadelphia, Pa.

Lock Washers Prevent Loosening of Percolator Handle

If you have trouble in keeping the handle of your coffee percolator from loosening, try this trick. Remove the bolts from



the handle, put a small lock washer and an iron washer under each bolt head, placing the latter next to the handle. Tighten the bolts and the tension provided by the lock washers will prevent them from turning and allowing the handle to loosen.—Frank W. Bentley, Jr., Missouri Valley, Ia.



380 BLUEPRINTS *for* Home . . . Craftsmen

Iceboats, skis, snowshoes, all kinds of models, toys, simplified furniture, bric-a-brac shelves, garage, four-room bungalow and numerous other practical things to build. Complete list 3c postage. Price of prints are 25c each, or six for \$1.00 postpaid. Address Blueprint Department.

(See list of blueprints in advertising section)

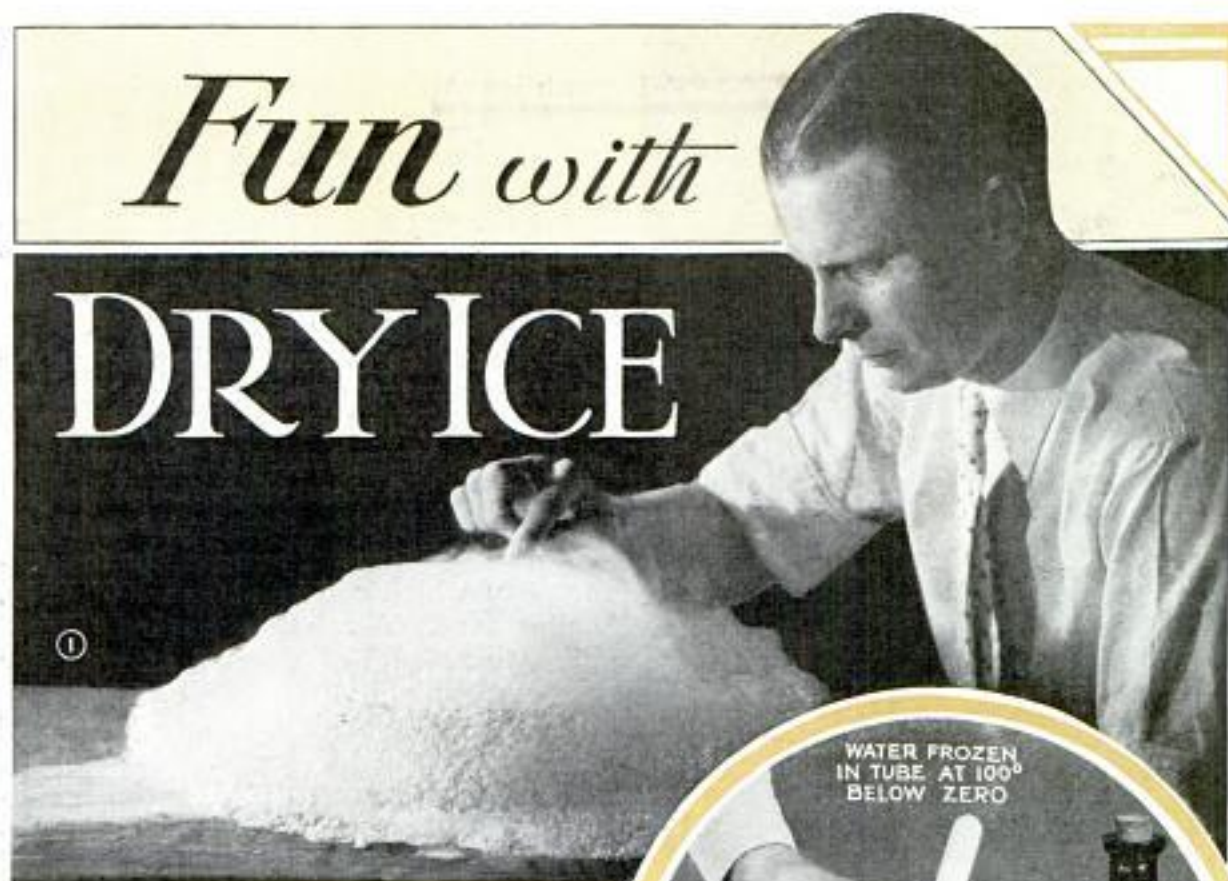


Using Aluminum in the Home Workshop

Aluminum can be put to numerous practical uses in the home workshop, especially in making things in which light weight is an important feature. The working of aluminum differs but little from the working of copper or soft brass. It is readily hammered, stamped, spun and riveted, and may be sawed, filed or drilled with comparative ease. In commercial work, aluminum is usually joined by welding, which requires special equipment, and for this reason the home workman had better confine his activities to riveting, and in a few cases, soldering. An ordinary hacksaw will be found satisfactory for rough sawing on aluminum, while a jewelers' saw will serve for fine work on intricate designs. If files are used, it is important that the teeth be comparatively coarse, as the cuttings have a tendency to clog finer files. Aluminum sheet is available in a number of tempers: soft, half-hard and hard. If the work is to be formed or hammered, employ the soft grade. Where no forming or bending is necessary, hard or half-hard sheet will give satisfactory results. Sometimes hard sheet is annealed to soften it for greater ease in working. Pure aluminum has a melting point of 1220° F., while aluminum alloys melt at slightly lower temperatures. It is impossible to judge the heat by appearance, as the color does not change when the metal is heated. Workers have found that, by rubbing the surface with a pine stick, the maximum temperature to which the metal should be heated is reached when the wood starts to char. The bright, silvery appearance of aluminum makes it suitable for many objects without additional finishing. If a polished surface is desired, a fine emery cloth or a piece of steel wool may be used. A satin finish is obtained by rubbing with a fine wire brush. Frosted effects are obtained by dipping the aluminum in a hot solution of caustic soda, 3 tablespoonfuls, and water, 1 pt., for a period of 5 to 10 minutes, then following with a wash in clear water and a dip in a cold solution of equal parts of concentrated nitric acid and water. After the acid dip, wash thoroughly and dry. Lye and acid solutions are dangerous to the skin and clothing, and should be handled with care, the acid always being added to the water in dribbles.

Fun with

DRY ICE



By C. A. Crowley

"DRY ICE," or solid carbon dioxide, may be used instead of liquid air to perform a large number of spectacular but harmless chemical demonstrations. This frozen gas, which may be obtained from almost any soda fountain, is used in place of ice and is only slightly more expensive. If a piece of it is dropped into a tumbler of water it will boil vigorously and give off large quantities of the gas from which it is made. A lighted match held over the glass will be put out, because this gas is a fire extinguisher. Dry ice may be handled with the bare hands, if it is not squeezed, because a film of carbon-dioxide gas forms on the ice. The hands are thus protected by this insulating film against the intense cold. If the ice is squeezed so that the film is destroyed, a blister very much like that caused by a burn will result. Dry ice, Fig. 5, may be kept for a long time in an ice box, or it may be wrapped in paper and stored in a cardboard box. Because it contains no water it will cause no damage as it melts.

The intense cold of dry ice may be demonstrated in a very interesting manner as



shown in Fig. 6. A small porcelain dish is placed in a pan containing cotton or scraps of wool cloth to act as insulation. A piece of iron wire having a bent end is held in the dish and then the mercury is poured over the bent end. It will be necessary to hold the end of the wire under the surface because iron will float on mercury. Over the mercury pour a slushy mass of dry ice and denatured alcohol, made by pouring alcohol over small lumps of the ice. In a few minutes the mercury will be frozen and will resemble lead or tin more than the familiar liquid metal. If the frozen mercury is lifted from the dish



with the wire and quickly immersed in a jar of water, its surface will become coated with ice as the water is frozen around it. In a few minutes the mercury will start to melt and run out of its ice enclosure. The hollow ice enclosure may then be lifted from the water and displayed. To freeze water in a test tube, set it in a tumbler containing pieces of dry ice on which a little alcohol is poured, as in Fig. 2.

With dry ice you can easily produce the low temperatures necessary to convert many gases into liquids and solids. Fig. 8 shows the arrangement of apparatus for generating colorless sulphur-dioxide gas and freezing it into a clear liquid and finally into a solid, snowlike mass, the temperature of which will be almost 100° Fahr. below zero. The bottle marked "A" is filled to a depth of about 1 in. with dry sodium bisulphite. The stem of the funnel should extend almost to the bottom of the bottle. The glass tubing is arranged so that the gas must bubble through concentrated sulphuric acid in bottle "B" before it reaches the test tube where it will be liquefied. This is to remove water vapor from the gas. Small lumps of dry ice should now be packed around the test tube to a depth of 2 or 3 in. In milk bottle "C," denatured alcohol is poured over the ice and the whole assembly loosely covered with a piece of cardboard or paper. After giving the test tube a few minutes to cool, pour a few drops of concentrated sulphuric acid into the funnel of the generator. The gas should immediately start bubbling through the acid in the wash bottle. Acid in small quantities may be added as necessary to generate more gas; however, it should not be added too rapidly. From time to time the test tube should be inspected by lifting the cover. When a small quantity of the gas has liquefied in the tube, you may stop adding acid to the generator and remove the glass tube from the test tube. While the liquid sulphur dioxide is freezing, the gas generator should be taken apart and rinsed with cold water under a faucet, being careful to avoid burns from the strong acid. Acid in bottle "B" may be saved for future use. After 5 or 10 min., the liquid sulphur dioxide will be frozen to a solid snowlike mass, which will rapidly vaporize when it is removed from the freezing mix-



ture, and the odor of burning sulphur will be noticed. The gas is irritating and should not be breathed. If water is added to the frozen sulphur dioxide it will combine with it, forming sulphurous acid.

In Fig. 1 is shown a glass vessel filled to a depth of about an inch with soap solution to which has been added about an ounce of glycerine. When a few pieces of dry ice are dropped into the solution a large number of bubbles are blown. If the soap container is placed on a table which will not be injured by soapy water more ice may be added until the table top is entirely covered with bubbles.

Another mystifying bubble experiment is shown in Fig. 9. Several pieces of dry ice are placed in the bottom of a bucket or box. As it vaporizes carbon-dioxide gas will fill the box and eventually run over the sides, because it is heavier than air. Soap bubbles blown from a pipe and dropped down, will not enter the bucket but will mysteriously float. The bubbles, being blown from air, are lighter than the carbon dioxide in the box, therefore they float just as easily as a cork on water.

An experiment that shows an interesting electrical result of a simple chemical reaction of carbon dioxide is shown in Figs. 3 and 4. The glass jar is filled with lime water, made by shaking quicklime with distilled water and allowing it to settle until clear. Two lengths of bare wire connected to the light circuit through a 60-watt lamp, as shown, are dipped under the surface of the lime water. The lamp will light up almost to full brilliancy. Some dry ice is now dropped into a bottle containing water and fitted with a cork and

tube. The carbon-dioxide gas generated, will, when bubbled through the lime water, cause it to become milky and the lamp will go out. If the gas is allowed to continue, the solution will again become clear and the lamp will again light to full brilliancy. Although this experiment is baffling when watched, the explanation is simple. Lime water is calcium hydroxide and it is a fairly good conductor of electricity. Carbon dioxide first changes it into insoluble calcium carbonate, which gives the milky color. Because it is insoluble, the solution no longer conducts electricity. As more carbon-dioxide gas is passed, the insoluble calcium carbonate is changed into soluble calcium bicarbonate which is a good conductor, thus again lighting the lamp.



9
 DRY ICE IN
 BUCKET GENERATES
 CARBON-DIOXIDE GAS,
 ON WHICH SOAP
 BUBBLES WILL
 FLOAT

Dry ice may be used for a large number of practical purposes as well as for a substitute for ordinary ice. If a small lump of it is placed in a bottle of beverage just before capping, the beverage will be carbonated. Soda water may be made by bottling distilled or filtered water with dry ice. When it is used for carbonating, care should be taken not to use too much, as the caps will be blown off or the bottles broken. A piece the size of a cube of sugar is about right for an 8-oz. bottle. An air space of an inch or so should be left above the liquid in the bottle.

To show how this material may be used as a fire extinguisher, place a little gasoline or alcohol in a can lid out of doors and light it. If a piece of dry ice is thrown into the lid the flame will be smothered. A simple fire extinguisher, which will throw a long stream of water, is shown in Fig. 7. The bottle is filled with water and dry ice dropped in. The stopper with its tube and hose are next inserted and the bottle is inverted so that the gas pressure will force the water out in a long stream.

☛ If white window sills are waxed, they will always look clean and will be protected from dirt and water.

Starting Balky Outboard Motors

Two-cycle motors used on outboard boats are very sensitive to carburetor adjustments and are sometimes hard to start. One useful method that seldom fails in getting a quick start consists of opening the needle valve and choking the carburetor until the motor is flooded with fuel, after which the throttle is opened wide and the needle valve is almost completely closed. If the needle valve is opened to its normal operating position as soon as the motor starts, it usually continues to run.

Sanding with Your Jigsaw

After trying many devices for sanding delicate work on a jigsaw, I found that small emery boards used for trimming finger nails were highly satisfactory for this work. The boards are obtainable in various lengths and grades, and, when split in two thin widths, can be easily fitted into the blade vises of the jaw.—David Montgomery, Chicago.

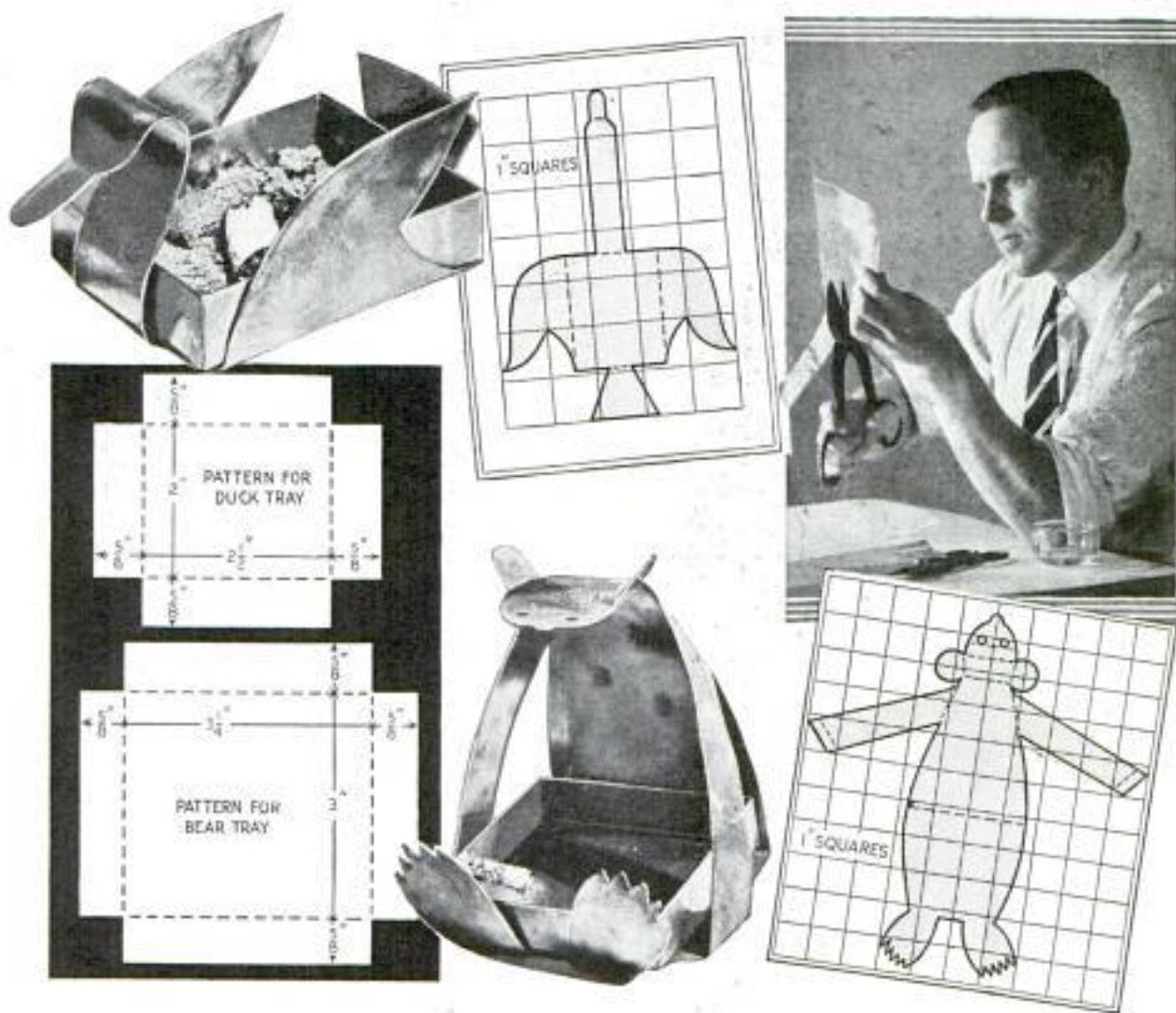
Inner Tubes Hold Straw on Flower Bed in Winter

When straw is spread over a flower bed to protect bulbs during winter, strips of old inner tube stretched over it and tacked to weighted boards placed around the edge of the bed will prevent the wind from blowing the straw away. This makes a neater job than when the boards are laid on the straw, and also uses less lumber.



Straw on Flower Bed Kept from Blowing Away by Strips of Inner Tube Tacked to Weighted Boards

Animal Ash Trays Cut from Sheet Metal



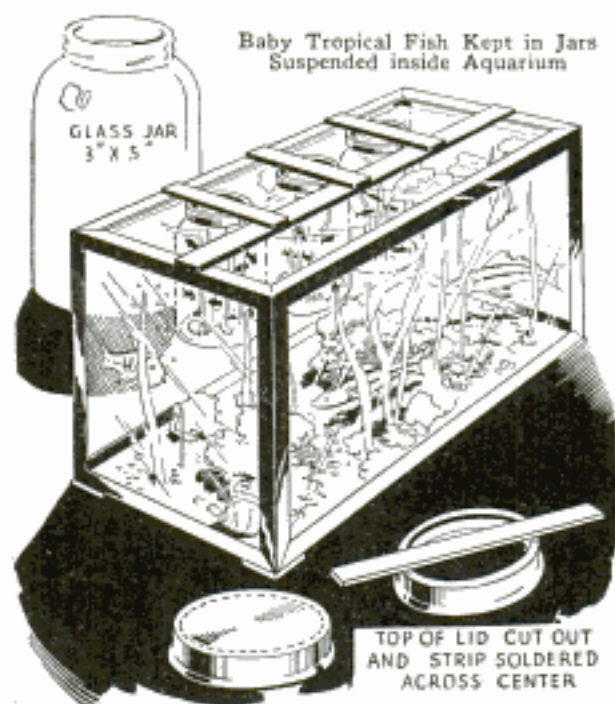
Equipped with a sharp pair of metal-cutting shears and a piece of light brass, copper, aluminum or tin, you can make any number of pleasing ash-tray novelties, two of which are shown above. No. 22-ga. metal is preferable although thinner stock may be used satisfactorily. First transfer the pattern onto the metal with the aid of a piece of carbon paper, and cut out the design with the shears, or if a thin material is used an old pair of ordinary scissors will do. File all the edges to remove the burrs and sharp corners, and drill holes for eyes in the little bear. Bend the metal in the vise at the places marked with dotted lines. The duck's neck is curved and the bear's arms and back are slightly rounded, the ends of the arms being bent under the bottom to hold them in place. The dishes, which are separate, are cut according to the design shown in

the squared details. Solder the corners, trimming off any surplus and sanding the surface smooth. The ash trays can be polished with powdered pumice applied with a damp cloth.—B. Livings, Batavia, Ill.

Vaseline Keeps Gluing Brush Soft

In making up a number of scrap books, I found that the glue dried on the brush when it was laid down while clipping more material. To eliminate this trouble, I rubbed some vaseline into the bristles of the brush each time it was not used, which kept the glue from drying on them. The vaseline also prevents the glue from dropping off the brush onto the work.—Eugene Ake, Jr., Houston, Tex.

☐ Wire mesh is useful for drawer bottoms in tool cases where dirt may accumulate.



Nursery for Baby Tropical Fish

In order to maintain the correct temperature for baby tropical fish, I kept them in small glass salad jars suspended inside the aquarium. To do this, the top of each jar lid was cut out and a brass strip was soldered across the center as shown in the detail. When the jars are hung in the aquarium, one end of each strip rests on the edge of the aquarium and the other end rests on a bar placed lengthwise across the center of the aquarium. Both the strips and the bar should be as thin as possible so that the aquarium lid can be put in place.—R. G. Bullard, Monterey Park, Calif.

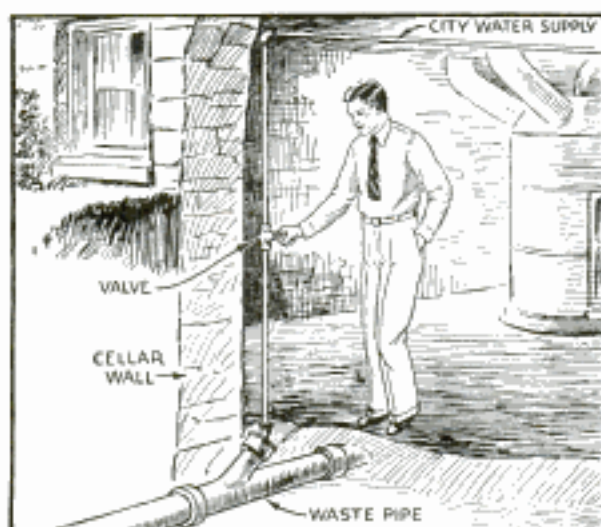
Simple Tricks for Trapping Raccoon

An old trapper says that raccoon are easy to catch if a few tricks are remembered. They feed principally on fish, and in hunting for food, never step in water if there are any rocks or tree branches projecting above the surface for them to walk on. With this in mind, find where a raccoon travels along the shore of a stream, wade out in the water along the bank until a place is found where a shallow trench can be scooped out in the sand. The trench should be about 18 or 20 in. wide and should run back from the water's edge about two-thirds the width of the shore. At the far end of the trench, make a deep circular pond to be filled by

water flowing in from the stream. Then in the center of the trench, build up a base with firm white clay to support a No. 1 steel trap. Lay a flat stone on the base and place the trap on it, first securely fastening a piece of green sod to the trigger so that when the trap is set, there is just room for the jaws to work freely. Fasten the trap chain to a piece of wood about 4 ft. long and bury it in the sand. If your set has been properly made, the trap will have the appearance of a rock covered with a piece of sod resting in the trench, and when a raccoon comes along, it will step on the sod and spring the trap.

Cleaning Waste Pipe with Pressure from City Water Supply

In order to clean out the sewer waste pipe, when it became clogged between the basement and the trap outside, one home owner made the installation shown to force out the obstruction with city water pressure. A Y-fitting was installed in the waste pipe at the basement wall so that one outlet projected upward flush with the floor. This was plugged with a cap, which was drilled and tapped to take an elbow for attachment of a pipe line leading to the water supply in the basement, a



Sewer Waste Pipe Kept Free of Obstruction by Pressure from City Water Supply

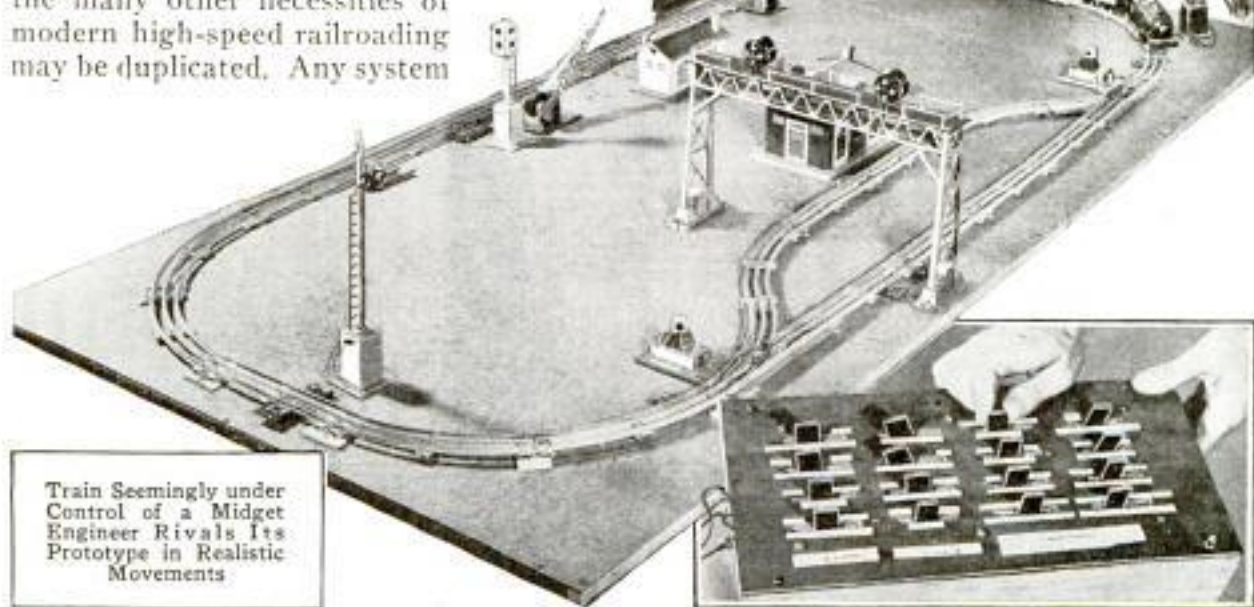
valve being installed in the line.—L. A. Georger, Buffalo, N. Y.

☐ Broom handles make good rollers for moving heavy boxes and other flat-bottomed articles.

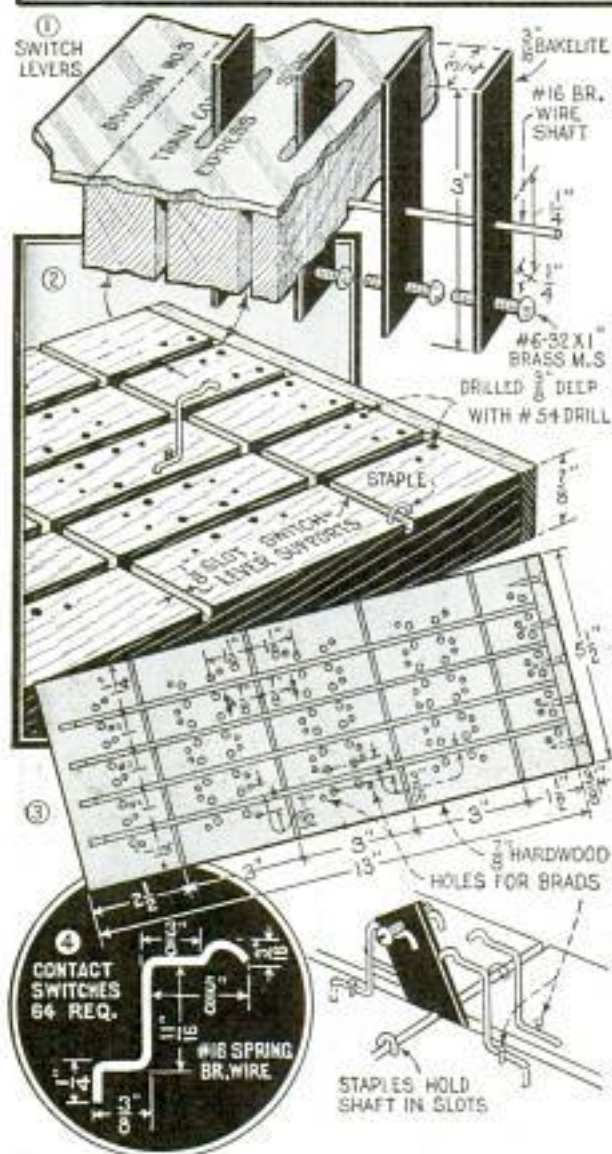
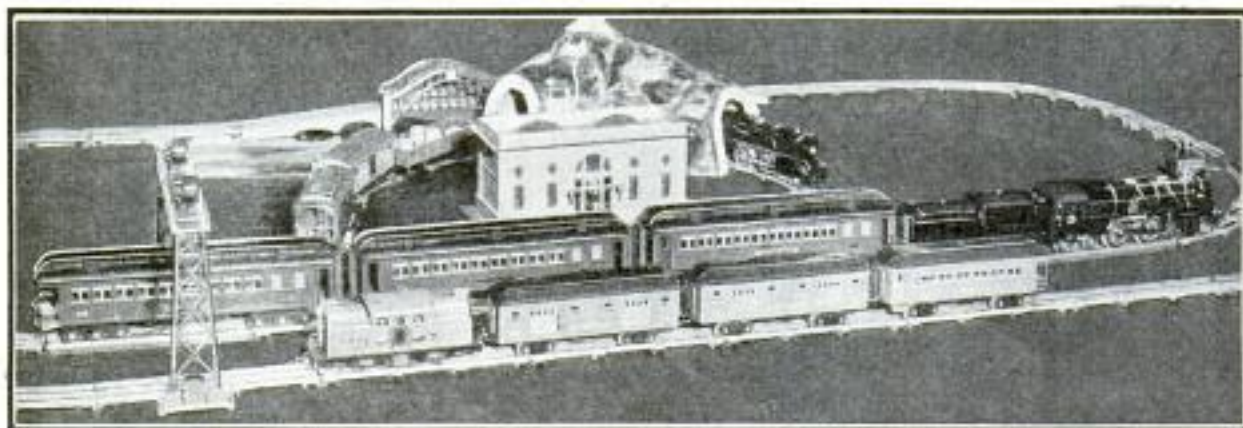
ELECTRIC TRAIN *run by* TOM THUMB

ANYONE can become a model railroader and enjoy the thrills of controlling the precise movements of powerful locomotives, fast express trains, and realistic modern-railway signal lights and semaphores which stop, start, and switch trains to sidings or give them the right of way for swift travel over main-line tracks. All of this can be done at little expense and without hours at tedious labor constructing long tracks, track switches and locomotives if standard narrow-gauge or wide-gauge toy track and rolling equipment are used. These parts are available everywhere and they are so accurately designed and beautifully built that the model railroader may well spend his time in the construction of modern types of remote-control equipment, electric-signaling systems and numerous other accessories. With this type of equipment, block signaling systems, automatic train controls and the many other necessities of modern high-speed railroading may be duplicated. Any system

Starting,
Stopping,
Switching,
Bell-ringing and
other train movements
controlled from
remote switchboard
behind wall



Train Seemingly under Control of a Midget Engineer Rivals Its Prototype in Realistic Movements



of control which can be applied to a regular railway system may be easily added to your miniature system and it can be made just as elaborate and precise in its operations as its full-grown brother.

In this article we are going to give complete information for the construction of a remote-control system that will com-

pletely control your model railroad from any distance. If automatic semaphores, signals and train controls are used, automatic operation of the system is also possible by merely setting the remote controls to the stop positions indicated on the panel, Fig. 7. This remote-control system may be used with any toy-railroad system by simply omitting unneeded connections or making changes to suit your set-up.

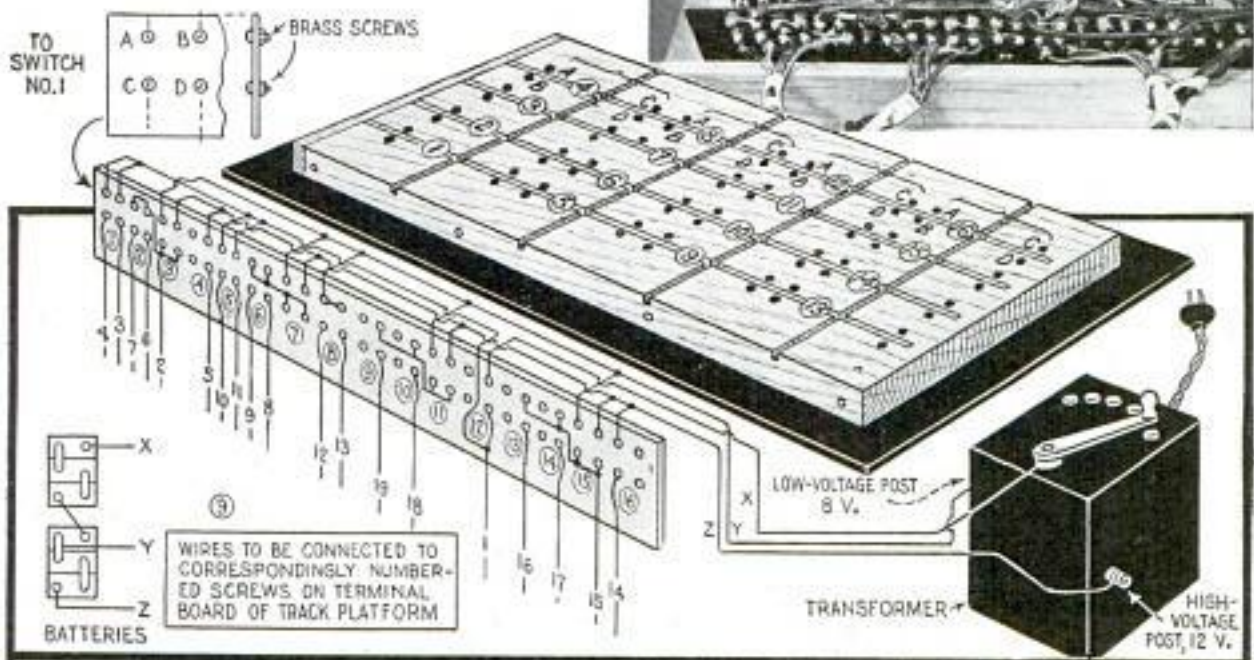
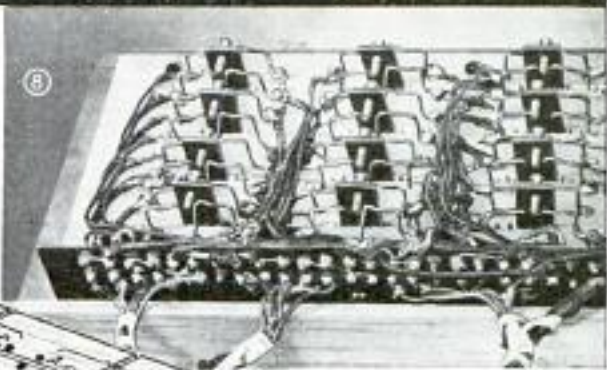
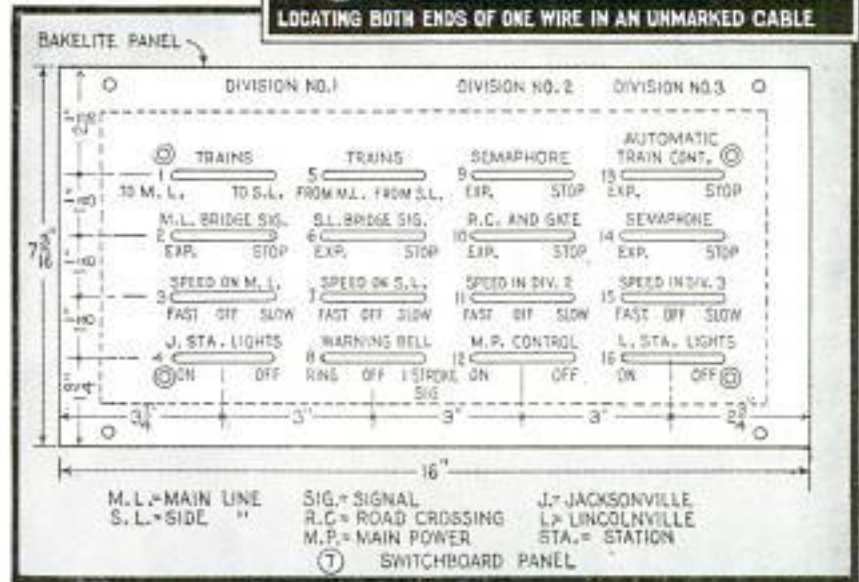
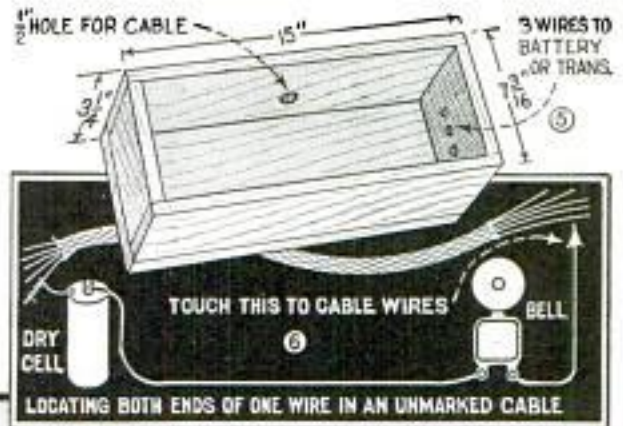
If the track is mounted on a large piece of plywood or wall board it may be hinged to the wall and lifted out of the way when not in use. The exact shape of the track does not matter as long as the electrical connections to the third rail and the insulating pins are placed at the ends of the sections of track as indicated in the diagram, Fig. 10. If semaphores and automatic signals are used, they should be connected according to the instructions furnished with them. The signaling equipment shown is of standard make and the connections are typical; however, you can make whatever changes that may be necessary for the operation of the signals you use without in any way interfering with the remote-control system to be described.

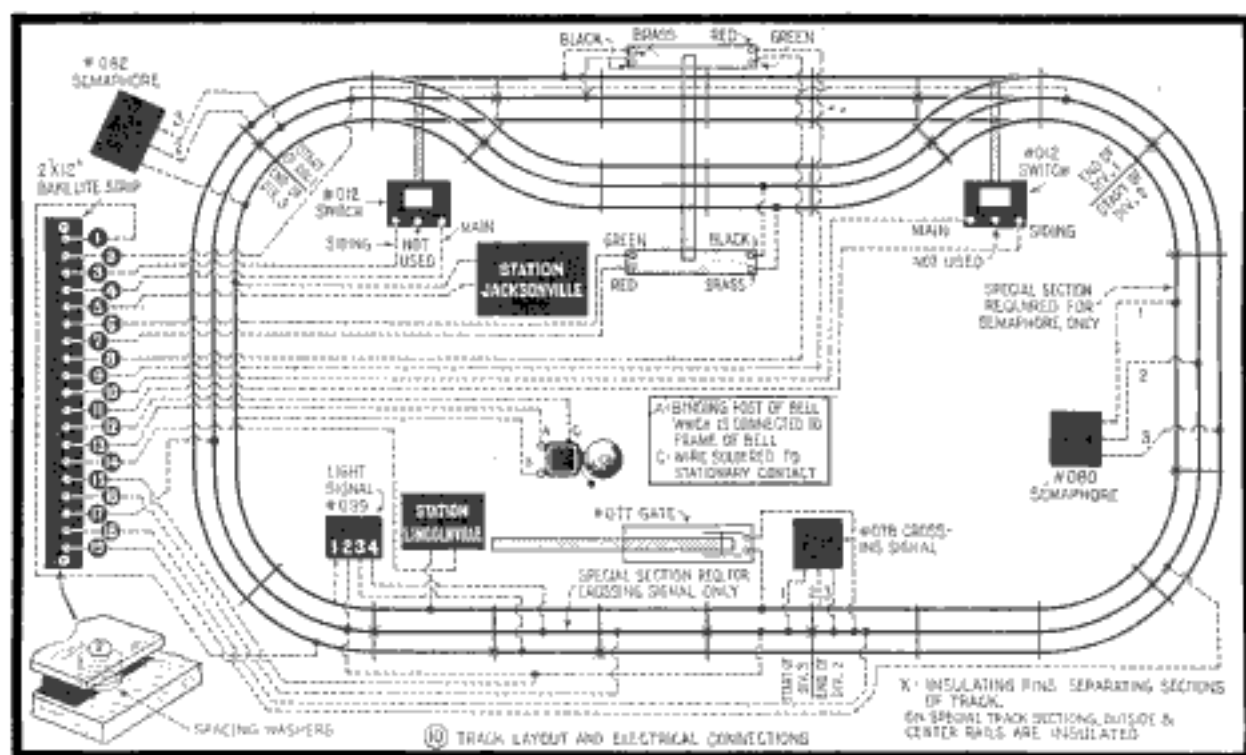
After the track has been put together and fastened to the road bed with screws, wires should be run under the board upon which the track is laid to a bakelite terminal strip fitted with nineteen machine-screw contacts. The wires from the track to the strip should be soldered to the heads of the screws numbered as shown. If other apparatus, more lights or any other type of equipment is to be used, the terminal board and the remote-control switch, to be described later, may be made larger. The railroad system pictured here was divided into three divisions. Flags or

sign posts may be set up at these division points and labeled on both sides to indicate the beginning and end of divisions. The remote-control panel containing the switches for controlling the train is correspondingly divided so that all of the controls for each division are arranged together.

When the track layout and wiring are complete you are ready to build the remote-control box. Figs. 2 and 3 show details for sawing slits and slots in a piece of well-seasoned hardwood, the mounting board for the switch levers and contacts. The slits should be about $\frac{1}{32}$ in. wide or the width of an ordinary circle saw cut.

The mounting board should next be fastened with screws to one side of a panel of bakelite, $7\frac{3}{16}$ by 15 in. in size. Holes are drilled through the panel to facilitate cutting the sixteen slots for switch levers. These are made from strips of bakelite as shown in Fig. 1, and are assembled on $\frac{5}{16}$ -in. shafts of No. 16-ga. spring-brass wire. The shafts are placed in slots cut across the mounting board, and small wire staples are used





to hold them in position. The same size spring-brass wire is used to make the sixty-four switch contacts required. See Fig. 4. The contacts are put in place by pressing the ends into holes drilled in the mounting board. When pressed in place each contact will be adjacent to and in contact with a brass nail. Sixty-four 10-in. lengths of bell wire are used to connect the contacts to the terminal strip, which is screwed to one edge of the mounting board, as shown in Fig. 8. The wires are soldered to the contacts where the brass nails hold the latter down. The contacts may now be adjusted by bending them with a pair of pliers so that the brass screw in each of the switch levers makes good contact and has an off position in which the screw is not touching either set of contacts.

The bakelite terminal strip is fitted with sixteen sets of brass machine-screw contacts, four to each switch, Fig. 9. Small numbers with circles around them indicate the switch to which each set of screws is to be connected and the switches are also numbered. Each set of contacts is lettered A, B, C and D in the order shown, so you will have no trouble in wiring them to correspondingly numbered switch contacts. The wire connected to A contact of switch 1 should be connected to the screw A-1; wire B of switch 1 to

screw B-1, etc. The wires should be run as straight as possible and any excess wire cut off so as to make a neat compact job, as in Fig. 8. Prevent solder from running from one post to another as this would cause a short circuit, which would prevent proper operation.

When the switch connections have been made, wires numbered one to nineteen are run from the front of the strip to the terminal strip on the train table. The wires marked X, Y and Z are to be connected to correspondingly marked posts of a toy transformer or to batteries as shown. For convenience a cable, such as is shown in Fig. 6, should be used to connect the remote-control switches with the train terminal strip. A good cable may be constructed by stretching nineteen suitable lengths of bell wire between two supports and binding them together with strong cord. Fig. 6 also shows a simple method of locating the ends of each piece of wire in the completed cable. The control unit is completed by housing it in a box, as shown in Fig. 5.

To operate the train from the control box, which may be placed in an adjoining room, first throw on the main power switch and set the four-speed control switches to "fast" or "slow" to control the speed in each division. Other switches may be set for "express" or "stop," to suit. The

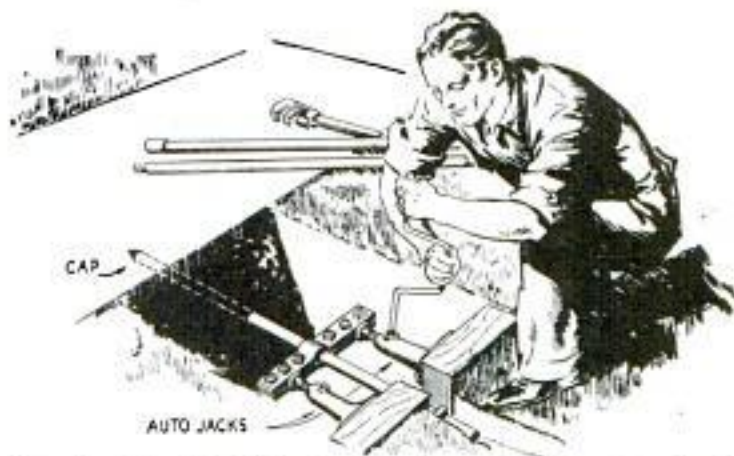
switches may be changed while the train is operating, thus making it possible for you to stop the train either at its regular stations or at any intermediate point. When the speed-control switch for any division is set in the "off" position, the entire division will be dead and, accordingly, a train coming into that section of track will stop until the control switch is moved either to the fast or slow position.

A warning bell, connected as shown in Fig. 10, may be made to ring continuously by throwing the switch to the left, or it will sound any number of single strokes for signaling purposes if it is repeatedly thrown to the right. The warning-bell switch should not be left in the right-hand position as it consumes current continuously when in this position. It may be necessary to bend the clapper of the bell to make it sound clear single strokes.

If the throwing of a switch causes signal lights to become dim and the train does not move, this indicates a short circuit, and the switch should be opened immediately. The third-rail wiper on the locomotive or cars, if they have lights, sometimes gets bent so that it causes a short circuit on curves. Correct by bending it back to its proper position. If this is not the cause of the trouble, make certain that you have not made a mistake in the wiring and see that a drop of solder has not lodged between bare wires or contacts. A careful inspection of the system will usually reveal the cause of the trouble. If the short is not found quickly and you know that it is not in the train or track, open all of the remote-control switches and then turn them on, one at a time, till the short shows up. In this way you can trace the trouble to its source and correct it.

Driving Pipe with Auto Jacks

When a pipe is to be laid underneath a sidewalk or must be laid in a narrow width of ground, where it is not convenient to dig a trench, or space is too restricted to drive it with a sledge, two auto jacks can be used to force it through the ground. If



Pipe Pushed under Sidewalk with Auto Jacks When Restricted Space Makes Digging Difficult

the pipe is to go under a sidewalk, it will be necessary to dig a hole at one side to provide a solid footing for the jacks, or if you are working in a basement, it may be possible to rest them against a wall. A pointed cap is screwed on one end of the pipe and two pieces of heavy flat iron are clamped around it by means of bolts for the jacks to push against. In driving the pipe, the jacks are worked alternately until their limit is reached, after which the clamp is moved back and the work is repeated.—A. H. Waychoff, Phoenix, Ariz.

Opening Boxes of Photographic Paper with Empty Film Spool

An empty film spool is handy for cutting the paper tape that seals boxes of photographic print paper and cut films. The spool has the advantage over the regularly used razor blade as there are no sharp edges to cut the fingers. Either end of the spool can be used, the remaining part serving as a handle.—Roland Swedlund, Boulder, Colo.



Empty Film Spool Used to Cut Paper Tape Sealing Boxes of Photographic Films and Print Paper



Refrigerator Set on Cabinet Makes It Easy to Reach Lower Shelves and Provides Extra Storage Space

Making It Easier to Reach Low Shelves of Refrigerator

If your refrigerator is raised by mounting it on a small, strong cabinet, you can reach the lower shelves with less stooping than necessary when the refrigerator is set on the floor. Also, extra storage space will be provided in which to keep kitchen supplies. The cabinet has a frame of 2 by 4-in. hardwood, or heavier, depending on the weight of the refrigerator, and is fitted with two paneled doors.

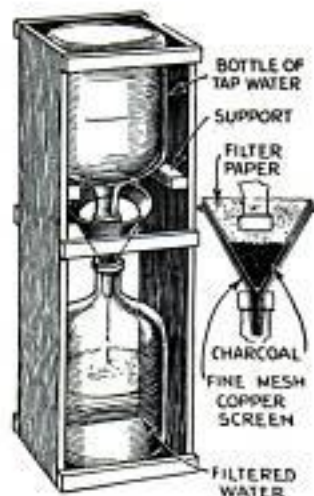
Lacquer-Coated Screens Make Storm Doors and Windows

By applying two coats of transparent lacquer to your door and window screens, filling up the screen with a solid coating that prevents air from coming through, efficient storm doors and storm windows can be provided. Obviously this method of closing the screen is much better in appearance than tacking on tar paper, which is sometimes done for the same purpose. Another advantage of using lacquer is that it does not shut out the light and thus provides a translucent, yet weatherproof protection against the cold wintry blasts.

The lacquer should be heavier for this purpose than for ordinary use and can be thickened by leaving the can uncovered to allow some of the thinner to evaporate. Lay the screen on a flat surface over some oiled paper and apply a coat of the lacquer. Let this dry thoroughly, then turn the screen over, remove the paper and coat the other side. This makes a tough, flexible coating that is easily removed with lacquer thinner.

An Inexpensive Water Filter

Water can be purified and made palatable for drinking by means of a simple filtering device consisting of two large glass bottles of equal size, some filtering paper, a glass funnel and some powdered charcoal. The rack for supporting the bottles, one above the other, may be made of box wood in the manner indicated. Arrange the cleats that support the upper bottle so that the opening is well down in the funnel. In this way, the flow of water from the upper bottle will be regulated by the height of the water in the funnel and the apparatus will require no attention after starting. The filter is started by placing the empty bottle in the bottom of the rack with the funnel in place. Inside the funnel, place a piece of filter paper, which has been formed into a cone, and put in two or three tablespoonfuls of charcoal, first placing a disk of copper mesh inside



the paper cone to hold the charcoal. Then fill the upper bottle with water to be filtered, cork and place it in the rack. Remove the cork and quickly insert the neck of the bottle in the funnel. About two hours are required to filter a gallon of water.

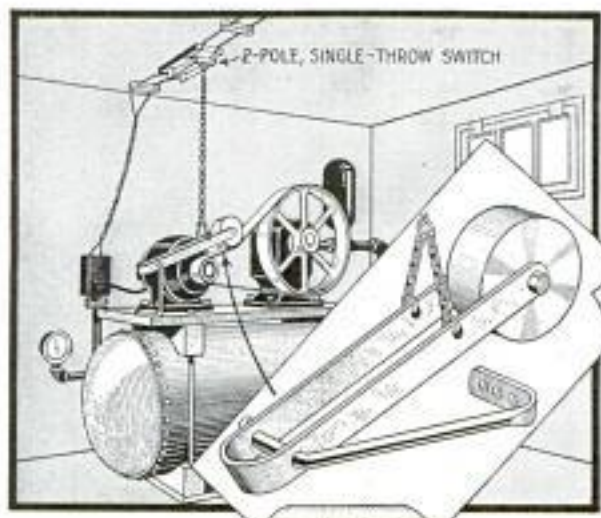
☞ Rubber doilies cut from inner tubes and placed under flower pots will keep them from staining window sills.

Simple Repair for Worn Threads in Fountain-Pen Cap

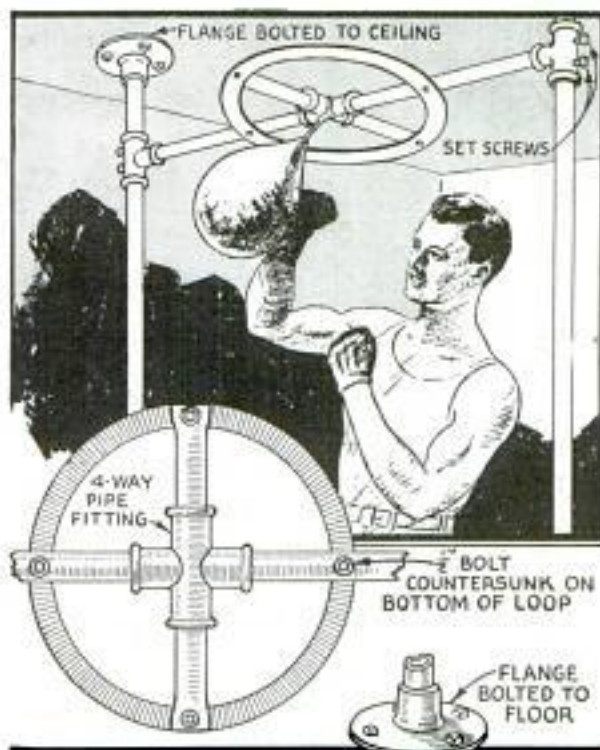
When the threads inside the cap of my fountain pen became worn, I repaired them as follows: Cotton thread was wound tightly on the outside of the cap directly over the threads inside. The cap was then placed in hot water for a few seconds, after which it was removed and immediately plunged into cold water. The hot-water treatment softened the composition, from which the cap was made, and the wet thread shrank, pinching the cap enough to cause the worn threads to engage those in the barrel of the pen.—Emil J. Novak, Omaha, Nebr.

Safety Switch and Belt Tightener for Automatic Water System

Several times upon returning home, I found the belt off the pump on my automatic water system and the motor running idle. To prevent this, I rigged up a switch to stop the motor when the belt came off the pump. An idler pulley to run on the belt and serve as a tightener, was pivoted between the ends of a U-shaped rocker arm, which was in turn pivoted to an iron-rod bracket bolted to the pump base. The pulley was connected by means of a light chain to the handle of the switch, which was cut in the power line and screwed to the ceiling directly above the motor. When the belt comes off the pump, the idler pulley drops down and pulls the switch open.—E. L. MacFarlane, Frederickton, N. B., Can.



Belt Tightener Opens Switch and Stops Motor When Belt Comes Off Automatic Water Pump



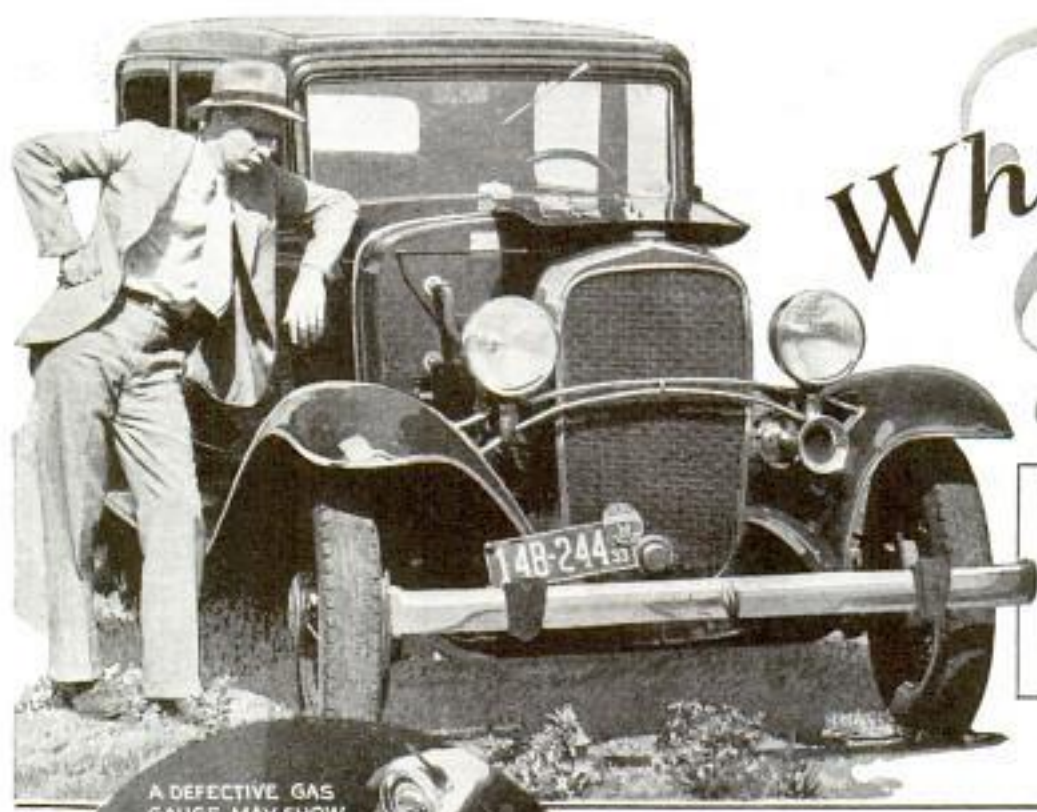
Punching Bag Suspended from Pipe Frame Bolted to Floor and Ceiling of Basement

Support Frame for Punching Bag Made of Pipe

With this support, you can mount your punching bag in the attic, basement or in a spare room. Two pipes, over which tees slide loosely, are supported vertically by means of floor flanges fastened to both the floor and ceiling. The tees are fitted with setscrews to permit adjustment, and carry a horizontal pipe having a four-way fitting in its center into which two pipe nipples are screwed. To this assembly, a pipe ring is bolted for the bag to strike against and to keep it from swinging over the horizontal pipe. The bag is fastened to the center of the four-way fitting by means of a short rope and a swivel.—Geo. Pica, Chicago.

Uses for Shaving Brushes

Ordinary ten-cent shaving brushes can be put to a variety of uses around the home or shop. They are handy for applying auto-top dressing, or for touching-up enamel, and, when the bristles are squared off at the ends, they make excellent stencil brushes. They are also useful for dusting off models, cleaning typewriters and getting into corners that are inaccessible with other brushes.



What?

by
**Jim
Ward**



I WAS rolling along a country road when Old Faithful coughed apologetically and quit.

A hasty glance at the gas gauge was reassuring, but repeated stabs at the starter produced only a sickly whir. Peeking under the hood with many misgivings, I saw only an assortment of spark plugs, wires, a carburetor and other parts, all apparently in their accustomed places. A search through the manual of instructions yielded a section devoted to "What to Do When Motor Won't Start." There was a formidable array of ailments with which Old Faithful might be suffering—but how was I to diagnose her trouble?

I was fretfully wondering why this couldn't have occurred five miles back where there was a garage, when a mud-spattered roadster chugged alongside.

"Having trouble," grinned the tanned fellow behind the wheel. I assured him he had guessed right the very first time and suggested a lift to the nearest telephone or garage to get some help.

"Oh, maybe that won't be necessary," he remarked cheerfully and lifted himself over the top of the door to land at my side.

"What happened?" he inquired.

"Nothing," I told him, "she just quit."

"Well, that's easy," he chuckled. "When a car has been running satisfactorily and suddenly stops for no particular reason, it's either the gasoline supply or the ignition system."

I glanced dubiously at the long list of possible motor ailments that were explained in the instruction book and handed it to him, but he waved the book away.

"That says the same thing, only in a different way," he maintained. "It's gasoline or ignition when you quit on the road. Now we'll see which ails this one."

And while I watched, he poked into this, turned that and squinted at something else. Then he climbed in and stepped on the starter and Old Faithful purred like a top.

TO DO *when your* CAR QUILTS



"What did you do?" I asked, after expressing my thanks, and found he had made a series of simple checks which I could have made myself if I had known the procedure. Here's what happened.

First he made sure there was gas in the tank. Then he pulled the choke all the way out and turned the motor over a few times with the starter. Gasoline dripping from the carburetor proved that the gas line was not plugged up. Then he checked the carburetor air-intake pipe and found it to be clear.

Pointing to the connection between the copper gas line and the carburetor, he remarked that if the carburetor had not flooded he would have disconnected this and looked for sediment in the strainer, or dirt in the line itself. "Dirt in the gas line can usually be removed by pushing a piece of soft-iron wire into the tubing and twisting it around until the gasoline flows through freely," he added.

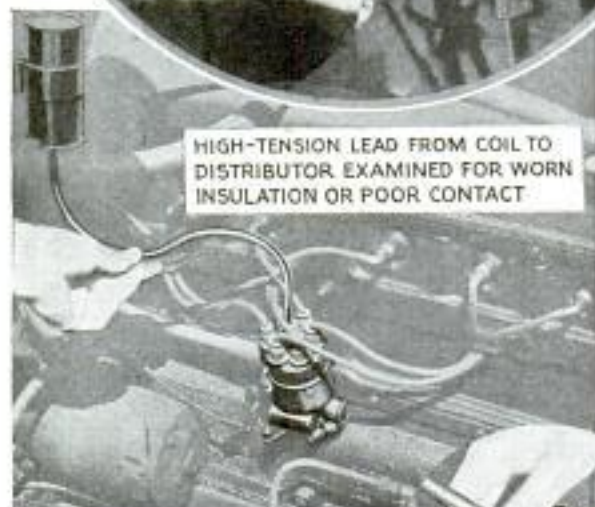
His attention was next directed to the ignition system. He said, "This car was having brain trouble, its thinking mechanism was out of order. When anything happens to that distributor head or to any of the parts connected to it by wires, which serve the same purpose to a motor as nerves do to human beings, the motor



lets you know it by either acting abnormal or stopping completely."

Feeling the heavy high-tension wires from the distributor to the spark plugs, he made certain that all of them were pressed firmly into their sockets in the top of the distributor, next that they were tightly connected to the plugs and finally that their insulation was intact. He examined the wire running from the center of the distributor cap to the coil because this wire is the one most likely to be at fault when a motor suddenly stops as it carries the high-tension current to the spark plugs. One or two bad spark-plug wires will cause a motor to miss, but several of them must be shorted to kill it, he explained. He also checked to see if the main high-tension lead to the coil was making good contact at each end.

He next removed the distributor cap and turned over the motor slowly with the crank until the breaker points, which were



separated, came together. With the breaker points together he turned on the ignition switch and made the most important, but the simplest, test for a stalled motor. He pushed the contact point, which is mounted on a pivoted arm, away from the stationary point. When he did this there was a blue spark popping between the points. He said that this showed the con-

denser was in good shape, because if it had been "open," the spark would have been of the flaming kind somewhat similar to an arc instead of the quick popping variety.

"If there had not been a spark when the points were opened," he said, "I would have first disconnected the wire from the condenser and opened the points again. If any kind of a spark was produced by this it would mean that the condenser was short circuited. The best thing I could do for you if you had either kind of condenser trouble would have been to take you to the nearest town where you could buy another one, unless you carry a spare. If there was still no spark after disconnecting the condenser, the trouble would be in the coil, ignition switch, or in the wiring. After reconnecting the condenser, the next step in locating the trouble would have been to remove first one and then the other of the small wires from the coil, to locate one which would make a spark when it is rubbed against the metal of the car frame while the ignition switch is turned on. If neither of them would produce a spark, the trouble would be in the switch which would have to be examined for a loose connection or a broken wire."

He took a look at the surfaces of the breaker points, the rotor arm and the inside of the breaker head. The breaker points were slightly rough but looked as though they would work until I could get to a garage to have them dressed or replaced. The metal edge of the rotor arm was smooth and seemed to be in good shape but the metal points projecting on the inside of the breaker head were a little dirty and slightly pitted so they were lightly scraped to remove the thin film of burned metal.

This eliminated everything except two possibilities, first, that the coil was defective and, second, that the wire from the coil to the distributor was worn and was shorting against some metal part of the car. Apparently this wire was in good shape, but he explained that the high-tension current flowing through it can jump

through an invisible pin hole in the insulation and ground to any metal part of the car. As coil trouble is rare, he bent the coil-to-distributor wire so that it would not touch anything and tried the motor, which started at once, but would not accelerate well. Tiny sparks could be seen jumping from this wire to a rod close to it. When the wire was allowed to drop back to its old position it fell against the rod at the point where the sparks had been jumping, and the motor stopped almost at once. Having no new wire to replace this one, he supported it with a piece of tape until I could get to a garage.

Burned-Out Electric Lamps Used as Hanging Aquariums

By removing the threaded cap and filament from a large burned-out electric lamp, you can utilize it as a hanging aquarium for small fish. A wire may be fastened around the neck of the lamp for suspending it from a wall or ceiling.

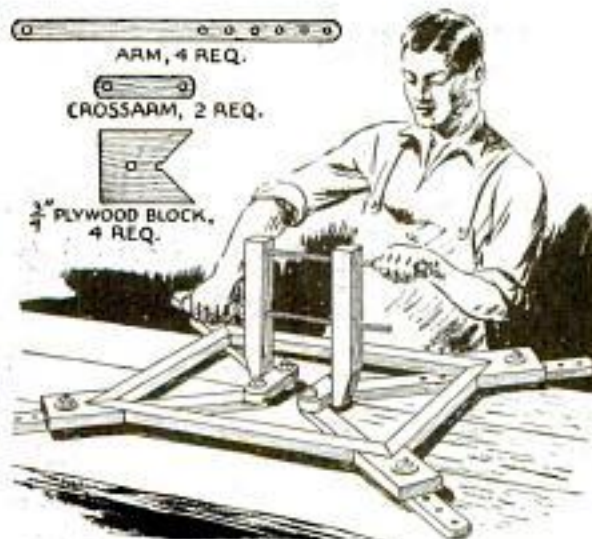


As many of the smaller tropical fish have cannibalistic tendencies, it is imperative to separate them from the adult fish. A bowl of this kind, with a little gravel in the bottom in which to anchor seaweed, will accommodate

many young fish until they are large enough to be returned to the aquarium.

Increasing the Usefulness of Small Slip Stones

Small slip stones, of the type used for honing the inside edges of gouges, can be used for other purposes if one end is ground to a wedge shape on an emery wheel. This end may then be rounded and used to sharpen the small gouges used in wood and linoleum carving, or brought to a knife edge and used on the inside of veining tools. When grinding the stones, plunge into water frequently to keep them from getting hot and cracking.



Glued Joints of Mitered Frames Held Tightly in Perfect Alinement with This Clamp

Clamp for Gluing Up Picture Frames

Gluing mitered picture frames is an easy job with this simple clamp, which pulls the joints tightly together and holds them in perfect alinement until the glue dries. To make the clamp, you will need four plywood blocks having 90° notches cut in one side, two short crossarms and four longer arms, the lengths of which depend on the size of the work. A row of holes in the latter permits adjustment of the clamp to the work. In use, each corner of the frame to be glued is placed in the notched blocks as shown, after which it is pulled tight with a clamp placed over the crossarms, taking care not to crush the corner of the frame.

A Non-Blotting Straightedge for Inking Lines on Paper

Inking lines without blotting the paper is a simple job with a thin celluloid straightedge, which has a double row of impressions along one edge made with the period punctuation mark of a typewriter. This raises the surface of the straightedge on one side so that it does not lie perfectly flat when placed on the paper or a drawing.





LARGE, SMOOTH
ROCK

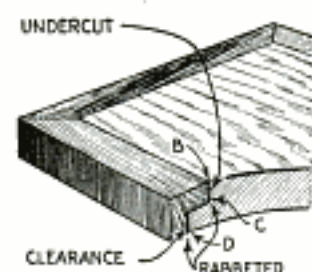
Large, Smooth Rock inside Dog's Pan Keeps It from Eating Prepared Food Too Fast

Feeding Dog Prepared Food

If your dog eats prepared food too fast for its own good, put the food in a fairly deep pan and place a smooth rock on top of it as shown. This makes it necessary for the food to be taken out in small amounts, and at the same time, prevents the pan from being easily upset.—Norman V. Davidson, San Diego, Calif.

Rabbeted Borders Improve Appearance of Table Tops

In making table tops, chest lids and other woodworking projects, it is often desirable to put a border around the edge in wood of a different color and figure to bring out the beauty of both pieces by contrast. Many find this work difficult because they attempt to join the two parts together squarely. If you have a circular saw and jointer, you will find it quite easy to rabbet both the border stock and the part to which it is to be applied. The two rabbets may be made to exactly fit together



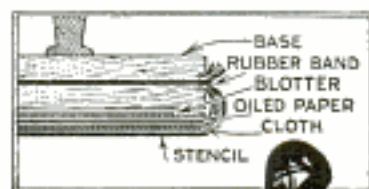
ly. To this end, the edge of the border is undercut at C, and a small amount of clearance is left at D. Thus, in clamping, the corner at B will be driven into place.

Drainage System Keeps Surface Water from Entering Basement

For basements that take surface water during a storm, in cases where the condition cannot be remedied by banking dirt up around the foundation, a drainage system made of square-wood conduit may be used to carry the water away. The conduit is made of either heart cypress or creosote-treated lumber, and has small slots cut in the top and the upper part of the sides to permit water to enter freely, the slots being undercut on the inner side to prevent small stones and gravel from getting through the conduit. After assembling the conduit with copper nails, it is laid in a trench dug in the ground two feet from the house foundation. The trench should slope slightly toward lower ground, or should terminate in a cesspool or sewer opening to permit good drainage. Cover the conduit with a layer of coarse broken rock, of a size somewhat too large to pass through the slotted top and sides of the conduit, then a layer of finer rock, and finish filling the trench with gravel. After covering the conduit, bank up around the foundation so that the ground surface slopes slightly toward the trench.—John E. Hyler, Peoria, Ill.

A Homemade Signature Stamp

Considerable time can be saved in signing papers by using this signature stamp, which utilizes the base of an old rubber stamp.



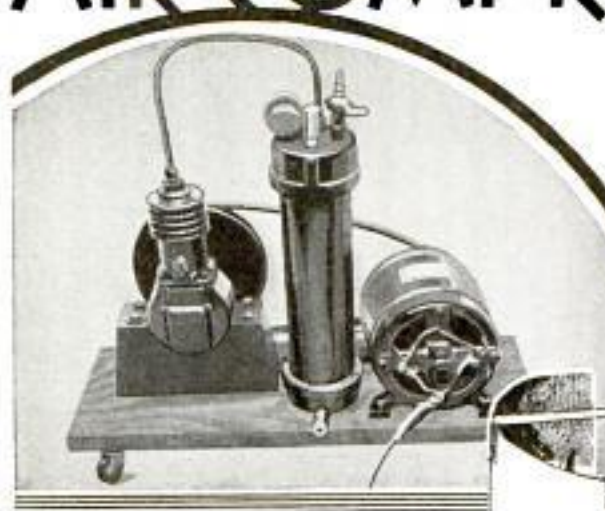
First get a piece of stencil as wide as the stamp base and long enough to fold up against the ends. Write your signature on the stencil with a stylus. Then over the bottom of the stamp, place a blotter, a piece of oiled paper and a piece of cloth, binding them to the base with a rubber band as shown. Ink the cloth with mimeograph ink and place the stencil over the assembly, slipping the ends under the rubber band.





Making a SMALL AIR COMPRESSOR

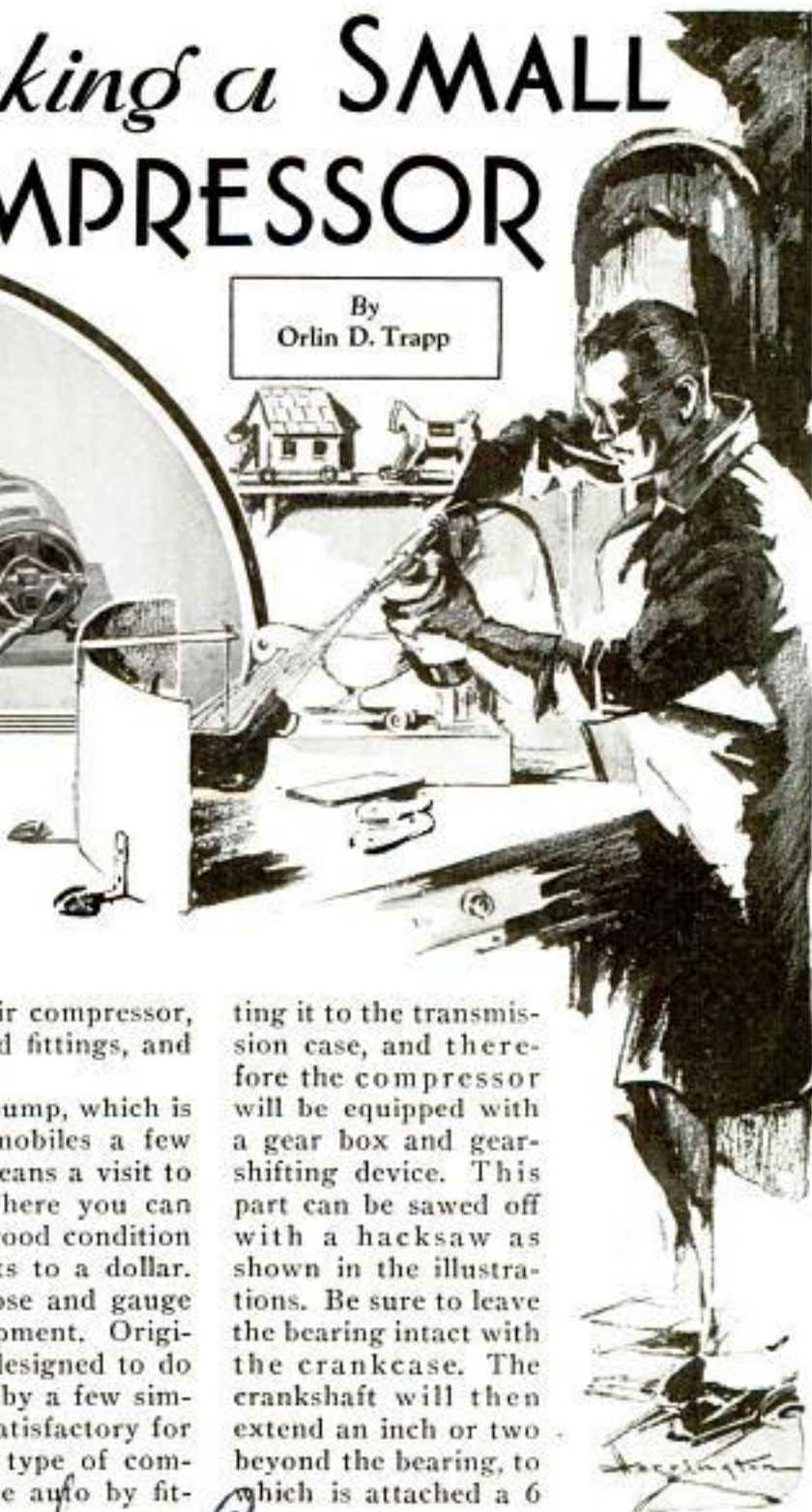
By
Orlin D. Trapp



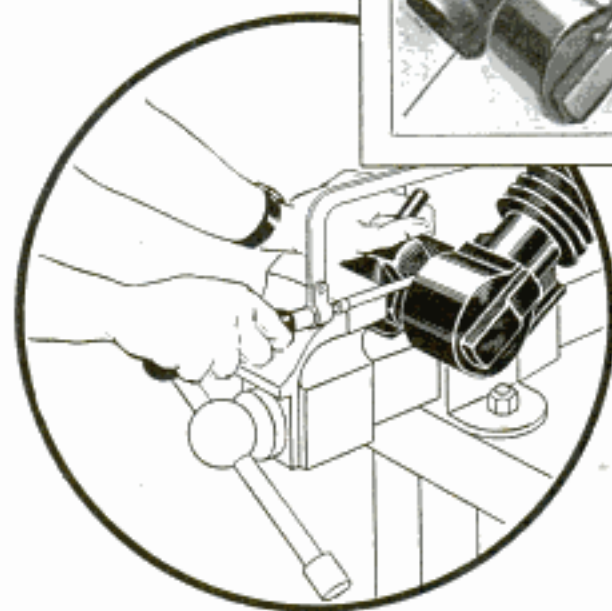
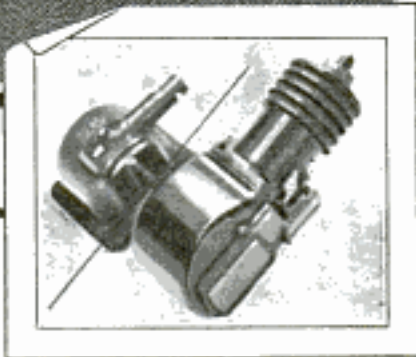
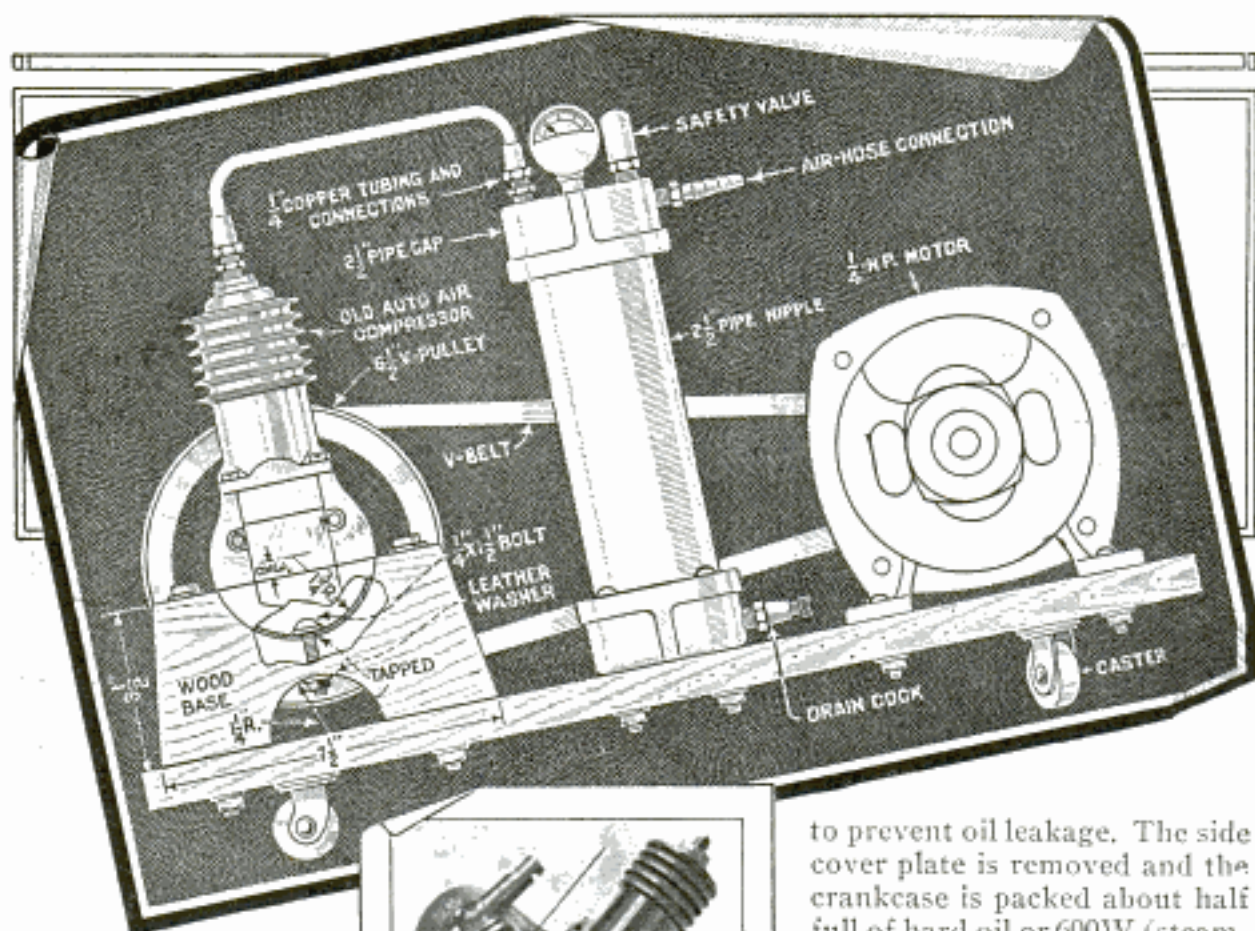
MANY small shops, where a small air compressor is frequently needed for such jobs as spray painting, can have one that costs very little, by making it from a discarded motor-driven auto air compressor, some odd pieces of pipe and fittings, and a 1/4-hp. electric motor.

The first requisite is the pump, which is of the type used on automobiles a few years ago. Naturally this means a visit to the auto wrecking yard, where you can undoubtedly locate one in good condition at a cost of from fifty cents to a dollar. Also, if possible, get the hose and gauge that were part of the equipment. Originally, the compressor was designed to do intermittent duty only, but by a few simple changes it will be very satisfactory for constant use. Usually this type of compressor was installed on the auto by fit-

ting it to the transmission case, and therefore the compressor will be equipped with a gear box and gear-shifting device. This part can be sawed off with a hacksaw as shown in the illustrations. Be sure to leave the bearing intact with the crankcase. The crankshaft will then extend an inch or two beyond the bearing, to which is attached a 6



Warshawsky & Co.
1915 State Chicago



or 7-in. pulley. The crankcase is fastened to a wooden base about $2\frac{1}{2}$ by $3\frac{1}{2}$ by $7\frac{1}{2}$ in. in size, with stovebolts, which project through both the crankcase and base, the former having been drilled and tapped for this purpose. Leather washers are slipped on the bolts so that they will be located **between the bolt heads and the crankcase,**

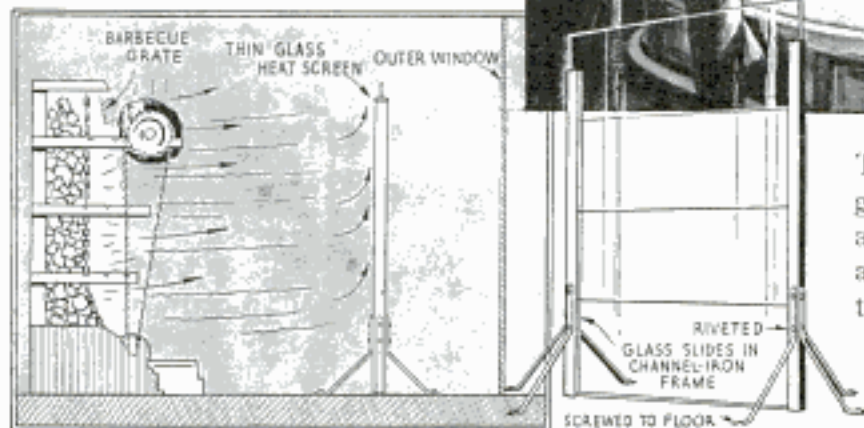
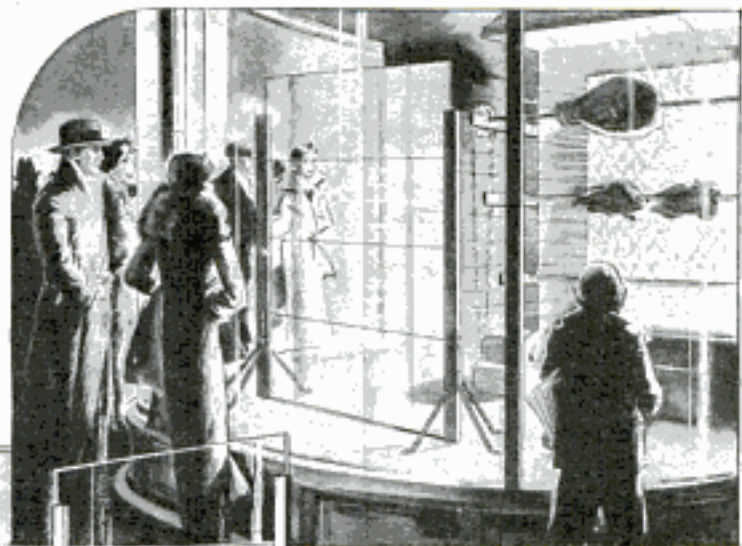
to prevent oil leakage. The side cover plate is removed and the crankcase is packed about half full of hard oil or 600W (steam-cylinder oil). Before replacing the cover plate cut a gasket to seal it in order to prevent the leakage of oil.

The compression tank is made from a pipe nipple 8 or 10 in. long and $2\frac{1}{2}$ in. in diameter, and closed at both ends with pipe caps. The bottom cap is drilled and tapped for a drain cock. Two $\frac{1}{4}$ -in. holes are drilled in the edge of the cap rim for screws to hold the compression chamber to the base. The top cap is drilled and tapped to receive the air inlet and outlet, the safety valve and pressure gauge. A $\frac{1}{4}$ -hp. electric motor will easily operate your compressor. A $1\frac{1}{2}$ or 2-in. pulley is fitted on the motor shaft. If possible, get V-pulleys and V-belting. Running at 500 or 600 r.p.m., a compressor having a $1\frac{3}{4}$ -in. bore and $1\frac{3}{4}$ -in. stroke is sufficient to operate satisfactorily many of the spray guns on the market.

❏ Chopped cork is better to sprinkle over icy sidewalks to prevent slipping than ashes as it will not adhere to the shoe soles and be tracked into the house.

A Glass Screen to Protect Barbecue Windows

To attract trade, many barbecue restaurants place their cooking grate and spits on display in plate-glass "pits" opening on the street. Often the glass is broken by too-rapid expansion or contraction, induced by excessive heat from the grate or by an extremely low temperature outside. The too-rapid contraction usually occurs just after a fire has been put out. To protect the plate glass, curved



This stands between the grate and the outer window, absorbs the excessive heat and reduces the strain on the more expensive plates, yet does not interfere with the view from the sidewalk. This screen is formed of several small panes, so that in case of breakage only one pane, not the entire screen, need be replaced.—V. E. Barnes, Chicago.

in his case and therefore doubly expensive to replace, a Chicago proprietor uses a simple heat screen of cheap thin glass.

the usual container, as the paste can be applied to the work without using a paddle.

A Handy Portable Seat

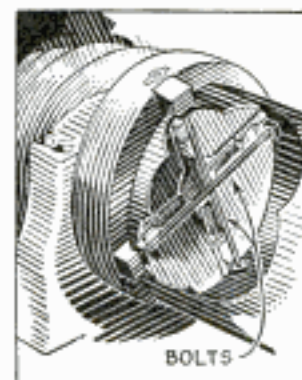


Portable seats for use around the shop are easily made from old auto steering wheels and metal seats taken from discarded farm machines. The wheel is inverted and the seat is fastened to it by means of a carriage bolt, as shown.

the usual container, as the paste can be applied to the work without using a paddle.

Bracing Cylindrical Work in Lathe Chuck to Prevent Buckling

To prevent a large cylinder from buckling under pressure from the chuck jaws when turning it in a lathe, brace it inside with two bolts and nuts as shown. The



bolts should be just long enough to permit the nuts to be turned up tightly against the work under the jaws. With this method, you can clamp the work firmly in the chuck.—John Serafin, Chicago.

Soldering-Paste Containers Made from Toothpaste Tubes

Convenient containers for non-corrosive soldering paste can be made from toothpaste tubes. Cut off the closed end of the tube, wash out the inside and fill it with the paste, closing the filled tube by crimping the end in a vise. This is better than



Wooden Stops Pivoted to Wall Hold Ends of Rope Pulled Up through Floor of Store

Stops Aid in Dispensing Rope

For convenience in dispensing rope in his store, one dealer pivoted notched wooden stops to the wall where the rope was pulled up through holes in the floor to hold it from slipping back. This has the advantage over the usual method of tying knots in the ends of the rope as it cannot accidentally slip out of the hands and fall into the basement. The stops raise as the rope is pulled up, but immediately drop into position and hold the rope securely when the latter is released.

Cellophane Helps When Writing Signatures on Stencils

Many operators of stencil duplicating machines find it difficult to write signatures or make closely ruled lines on stencils without tearing them. To eliminate this trouble, simply hold a strip of cellophane over the part of the stencil on which you are working, and write directly on it. The result will be highly satisfactory and the stencil will not be damaged.—G. E. Hendrickson, Argyle, Wis.

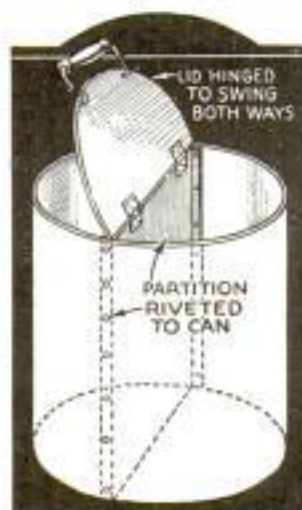
Crossbars of Drag Harrows Utilized for Fence Posts

Excellent posts to support woven or barbed-wire fencing can be made from crossbars of old drag harrows. Take them apart and knock out the teeth, leaving only one about 6 in. from one end. Then

drive another tooth back into the bar about 4 in. above, and on the opposite side of the end tooth. If the bars are metal, the two end teeth can be left in place and are adjusted so that they project on opposite sides. Drive the end of the post containing the teeth into the ground. Although they may drive hard, the extra work will be found worth while, as it is almost impossible for stock to push them out of the ground.—I. W. Dickerson, Charles City, Ia.

Partitioned Feed Measure Saves Many Steps

By having two compartments in your feed measure so that different kinds of feed can be carried on one trip, you will save many steps. A partition in the center



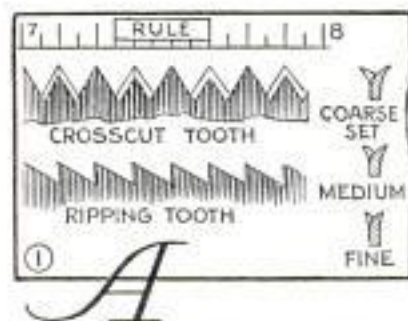
center is riveted to the sides and a half lid is hinged to swing both ways so that one compartment can be covered when the other is being emptied. A small handle fastened to the lid provides a handy means of carrying the measure.—A. S. Wurz, Jr., Rockford, Alta., Can.

Numbering Stamp Improvised from Wood Block and Rubber Bands

In a Wisconsin canning factory it was found necessary to mark certain shipments of cases with Roman numerals for identification purposes. As no changeable stamp was available, a practical substitute was quickly improvised from a wood block and flat rubber bands. The bands were snapped around the block and arranged to form the various numerals across one face of the block.



SAW-FILING

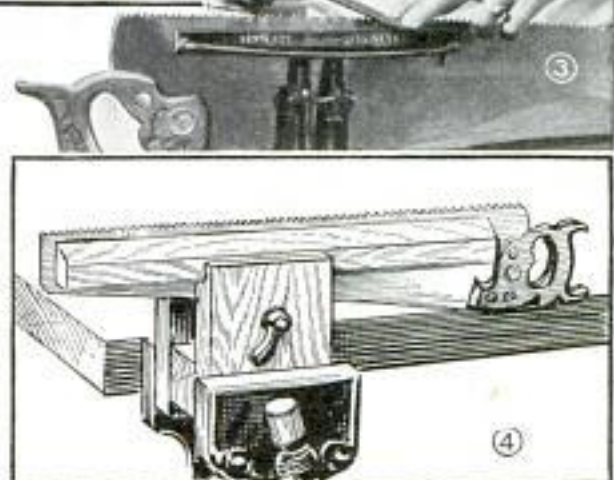


workshop requisite

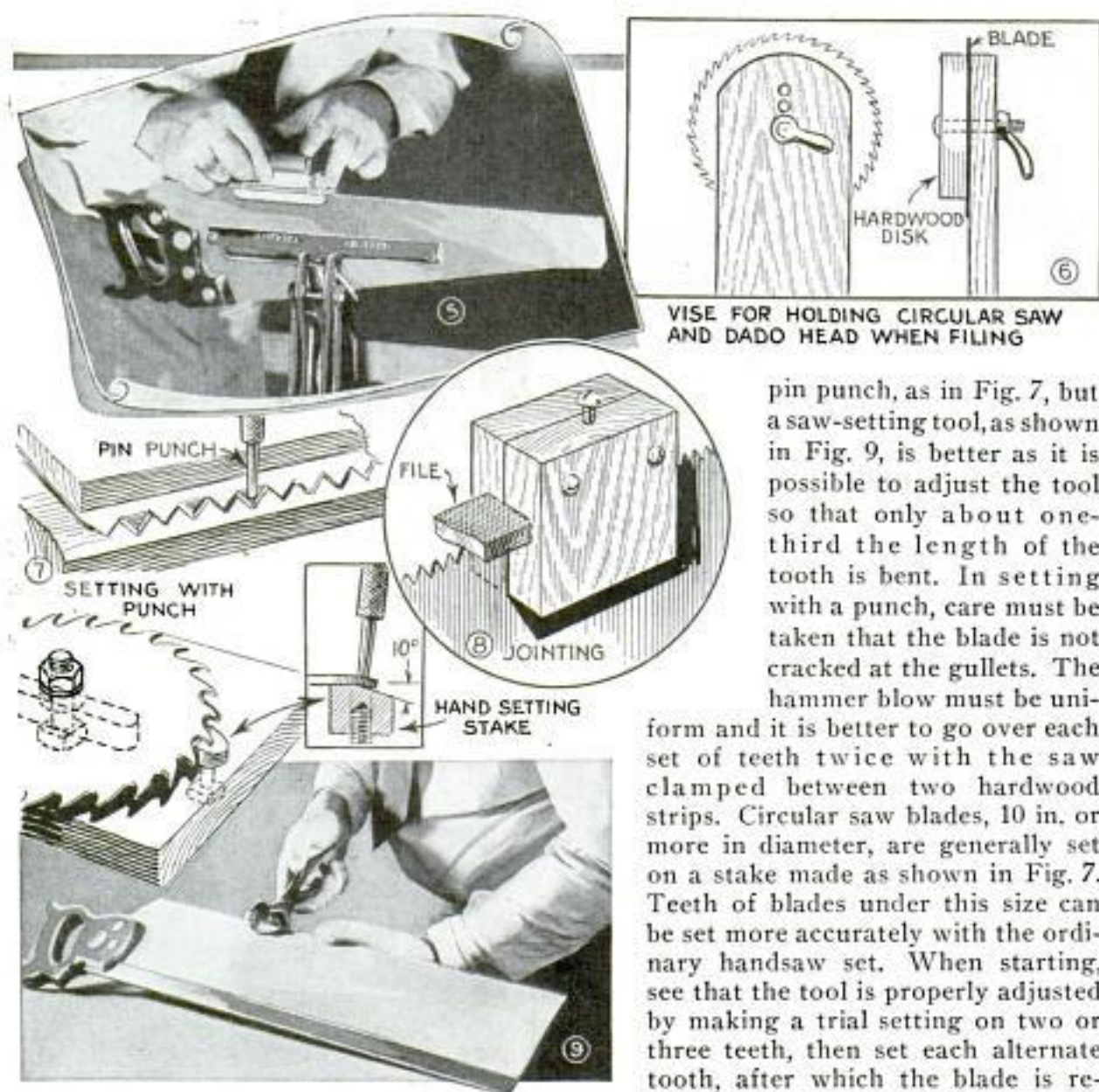
SHARP saws, kept in good shape, are as necessary to the workshop owner as a sharp knife is in the kitchen. The work is not difficult and nearly every small shop has the facilities needed for doing it. Handsaws, small circular blades, dado heads, back and dovetail saws are easily jointed, set and filed by hand.

In filing various types of blades the procedure must be governed to a certain extent by the condition of the tool. If the saw is being filed for the first time, and has not been damaged in any way, it is likely that a mere touching up of the points is sufficient. Setting the teeth should be done only when necessary. In filing a new saw the first time, every effort should be made to preserve the original shape of the tooth as this is the best guide in filing. The size of the file must suit the teeth, particularly on the crosscut saw, as the number of points to the inch varies with the size of the teeth. A single-cut three-cornered file is most commonly used in filing handsaws and the smaller-diameter circular blades. The points per inch are equal to one more than the number of teeth per inch, as will be seen from Fig. 1. This designation is used only on straight blades.

If the teeth of a handsaw have been damaged by running accidentally onto a



nail or other metal object, most particularly if the teeth have been damaged only on one side of the blade, as frequently happens, it is best to joint the blade lightly before setting. This is done by making a simple holder from part of an old file as in Fig. 8, although a small jointer, as shown in Fig. 5, can be obtained at almost any hardware store. The object in jointing is to bring all the teeth to the same length before filing. Damaged teeth should be given only a light jointing; then they should be set and afterward finished to length by a second jointing. This avoids taking off too much at first which would necessitate undue filing to shape the teeth properly. As a rule, a saw in good condition should be only lightly jointed, then



set and filed, but if the set is nearly out of the teeth it is better to set the teeth first, then lightly joint and file them. In every case the procedure must be determined by the condition of the blade. The degree of the set depends largely on the work to be done. If the saw is to be used exclusively on soft wood the set should be sufficient to form a slight space or valley between the alternate teeth. In hardwood, and for average use, the set should be medium. If the saw is to be used exclusively in hardwood, the set should be very light. Fig. 1 shows the approximate degrees of set to meet various conditions. The same is true of both crosscut and ripping blades.

Handsaw blades may be set by using a

pin punch, as in Fig. 7, but a saw-setting tool, as shown in Fig. 9, is better as it is possible to adjust the tool so that only about one-third the length of the tooth is bent. In setting with a punch, care must be taken that the blade is not cracked at the gullets. The

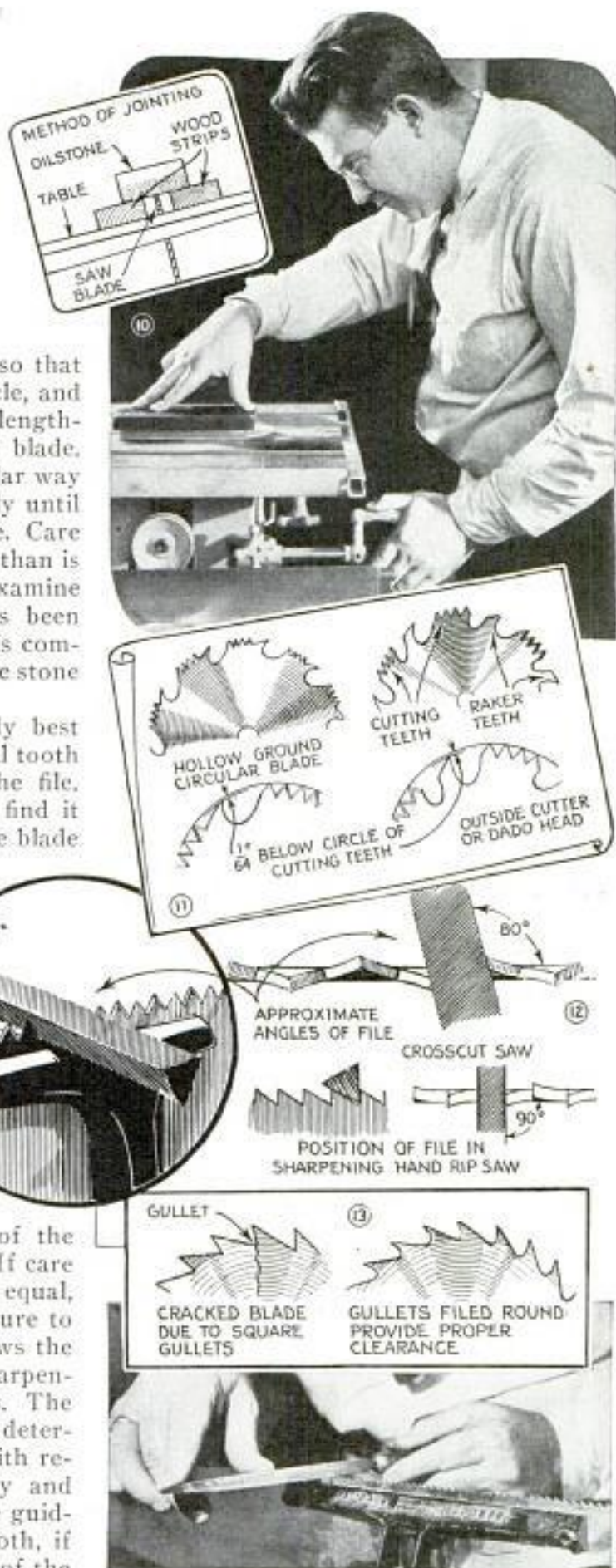
hammer blow must be uniform and it is better to go over each set of teeth twice with the saw clamped between two hardwood strips. Circular saw blades, 10 in. or more in diameter, are generally set on a stake made as shown in Fig. 7. Teeth of blades under this size can be set more accurately with the ordinary handsaw set. When starting, see that the tool is properly adjusted by making a trial setting on two or three teeth, then set each alternate tooth, after which the blade is reversed and the rest of the teeth finished.

Fig. 11 shows a hollow-ground, smooth-cutting or planer blade and the outside cutter of a dado head. Both blades are hollow ground and the teeth should never be set. It will be noticed that the teeth on the dado cutter are in sections consisting of four or more cutting teeth with a cleaner or raker tooth between and separated by deep gullets. On the planer blade the raker tooth precedes the four cutting teeth in the same section. On both types of blades the cleaner tooth is filed straight across and the best practice requires that its edge be very slightly below the cutting circle of the four crosscut teeth. The inside cutters of the dado head are filed the same as the cleaner tooth on the outside cutters. The cutting teeth on

the outside cutter of the dado head are generally in sections of four teeth each. These must be filed the same way, that is, alternate sections of four teeth are filed from opposite sides of the blade, as the teeth of any one section are beveled the same and from only one side.

The circular-saw blade is best jointed on the arbor as in Fig. 10. The blade is reversed so that it runs backward, the table is raised so that its surface is above the cutting circle, and in this position an oilstone is laid lengthwise on the slot directly over the blade. The machine is started in the regular way and the table is lowered very slowly until the teeth of the saw strike the stone. Care must be taken not to take off more than is necessary. Stop frequently and examine the blade. When every tooth has been touched by the stone the jointing is complete. If desired, a frame to hold the stone can be made as in Fig. 15.

In filing a handsaw it is usually best practice to disregard each individual tooth and adopt a uniform stroke of the file. Though this means that we shall find it necessary to go from one end of the blade to the other several times, the method will produce a job that is nearly perfect, provided, of course, it is done with care and attention to uniformity in the length and number of strokes on each tooth and the angle of the file with the blade. By this method the filing must be continued until the teeth have been brought to a sharp point, removing all traces of the flattened point caused by jointing. If care is used in keeping the file strokes equal, the alternate teeth are reasonably sure to be of the same length. Fig. 12 shows the common angles of the file when sharpening both ripping and crosscut saws. The angle of the bevel on each tooth is determined by the position of the file with relation to the blade, both vertically and horizontally. In this, one should be guided by the original bevel on the tooth, if filing a new saw. The same is true of the



*Boley Manufacturing Co.
11-15 Marshall St.
Minneapolis, Minn.*



Fig. 14. Teeth of Both Hand and Circular Saws Should Be Lightly Dressed Down on the Sides

circular blade. After filing, the teeth of both hand and circular saws should be lightly dressed with an oilstone as in Fig. 14, to true up any chance inequality in the set, and to make the blade cut more smoothly. The gullets of large diameter ripping blades should be rounded occasionally with a small round file. See Fig. 13. This is known as "gumming" and is not of any particular importance on blades smaller than 10 in. in diameter. In filing, care should be taken not to run the three-cornered file deeply into the gullet.

Figs. 4 and 6 show vises that may be made from pieces of hardwood to hold both the circular and straight blades for filing. In the case of both handsaw and circular blade vises, the edge of the vise should contact against the entire surface of the saw blade, just below the teeth. In the absence of suitable ready-made vises, as shown in Fig. 3, these homemade ones will serve very well.

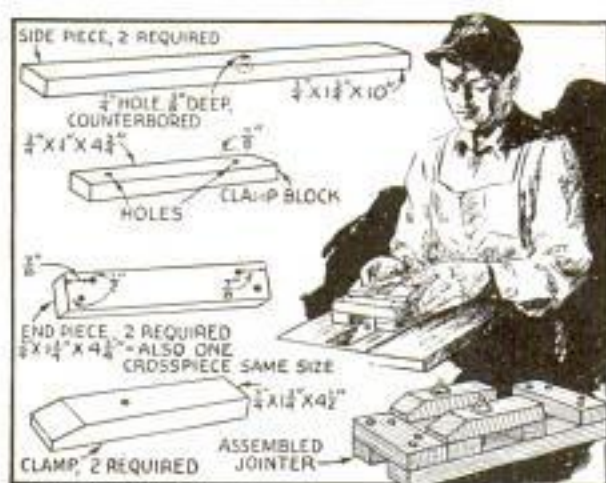


Fig. 15. A Frame for Holding the Abrasive Stone When Jointing the Teeth of a Circular Saw

For those who would like to start a small community repair shop and thus go into the matter of saw filing on a commercial basis, investment in a saw-filing machine will soon repay one for its cost by the saving in time. Such a machine, driven by a 110-volt motor, automatically files and joints rip, crosscut, back, miter, meat and all other types of handsaws, besides circular saws from 3 to 24 in. in diameter, with 3 to 16 points per inch. It is also provided with an attachment for filing band saws from 1/8 to 4 1/2 in. wide. Either a bench or pedestal-type machine can be obtained to best suit the space requirements of your workshop.



An Automatic Motor-Driven Saw Filer for Circular, Band and All Handsaws

Homemade Electric Plant from Old Auto-Truck Chassis

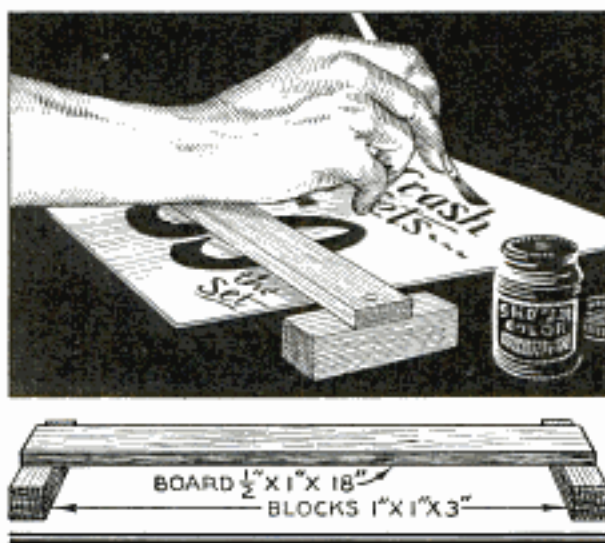
Owners of a filling station and general repair shop, where electricity was used extensively, found that the cost of the current was too high and installed their own generating plant, the main part of which was an old auto truck. They set the truck chassis on blocks and fastened a multiple V-pulley on the driveshaft. Just above this, a 20-amp. generator was mounted on the frame and was belted to the driveshaft pulley by means of five V-belts, which decreased belt slippage to a minimum. The motor was altered to run on natural gas by enlarging the air vent in the carburetor. With this plant, electricity was produced at a cost of about one cent per kilowatt hour.—N. Kuchner, Bexley, Ohio.

Useful Information on Fire Bricks

To obtain the best results from fire bricks, they should always be kept in a dry place, and only the best quality of fire clay used in the construction work. Apply the clay thinly and dip the joints, rubbing the bricks together to make a tight joint. After the work is completed, warm it up slowly to drive out the moisture. Under high temperatures, fire-clay bricks contract and silica, chromium and magnesia bricks expand. For this reason, all furnaces in which silica bricks are used should be heated and cooled slowly and uniformly. Finely ground fire clay should be used in laying fire-clay bricks, and silica cement for silica bricks. From 250 to 300 lb. of fire clay or silica cement are enough to lay up one thousand bricks. Walls $4\frac{1}{2}$ in. thick require seven bricks for each square foot of wall; a 9-in. wall, fourteen bricks, a 13-in. wall, twenty-one bricks, and 1 cu. ft. of brickwork requires seventeen 9-in. straight bricks.

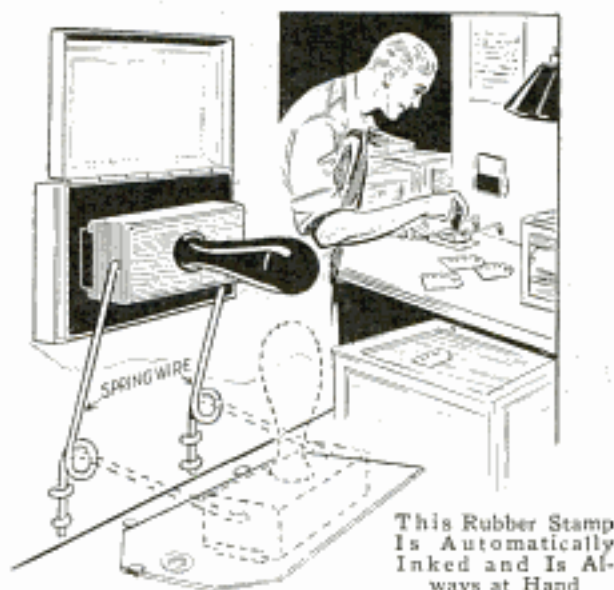
Arm Rest for the Show-Card Writer

An arm rest for the show-card writer, which forms a bridge over his card while it is being touched up, or when adding a second color to the sign, is easily made by nailing two blocks to the ends of a wood strip as shown in the detail. This allows the writer to reach any part of the sign by



Show-Card Writers' Arm Rest Helps in Touching Up Work or When Adding a Second Color

bridging the card to prevent the hand from touching the lettering.



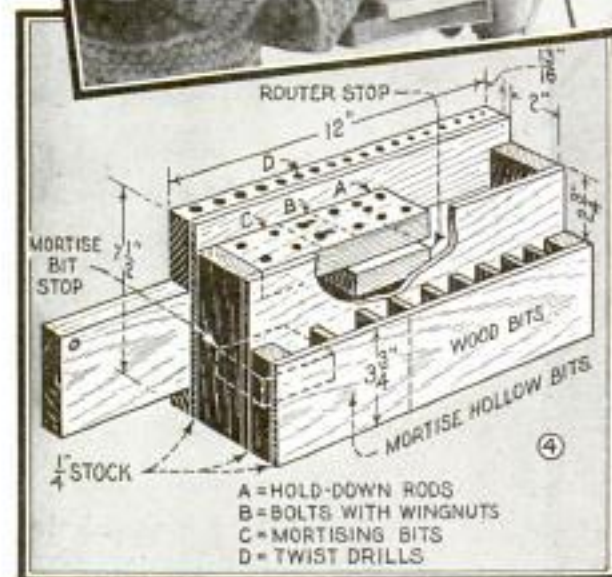
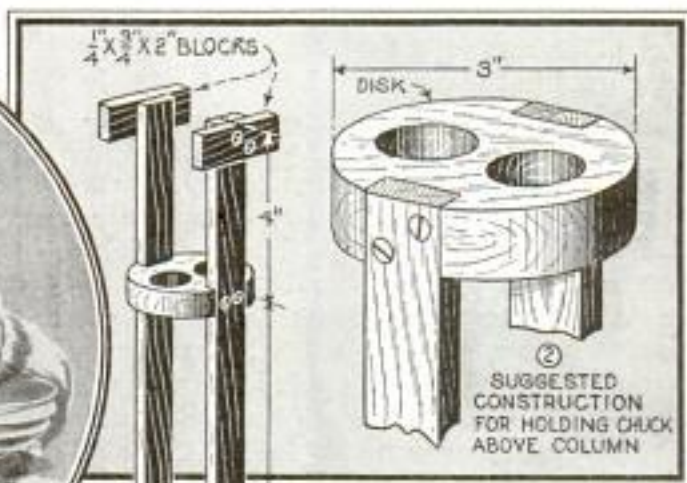
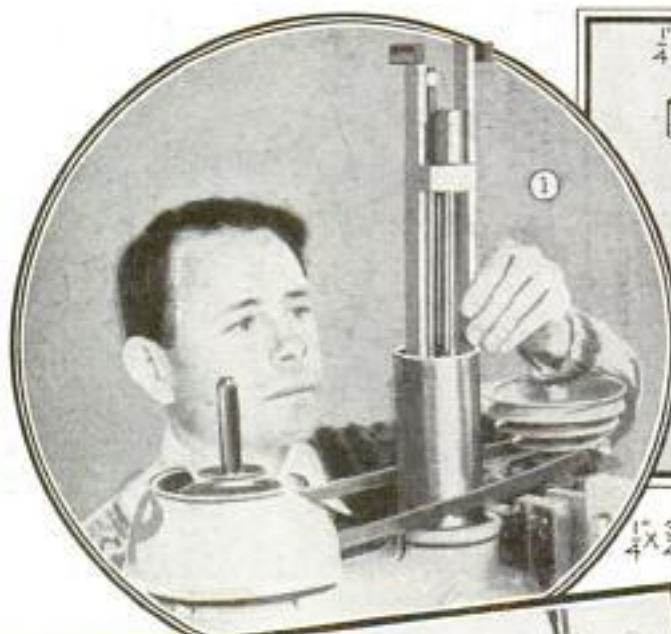
Rubber Stamp and Pad on Wall Always Ready for Use

To eliminate the inconvenience of looking for his rubber stamp every time he needed it, a shipping clerk used the method illustrated. An ink pad was tacked to the wall just above the top of his bench and the rubber stamp was hinged below it by means of spring wire, which held it against the face of the pad when not in use. Tags to be stamped are held against a guide made by driving small nails into the bench top, and the stamp is then swung down.

Cure for Auto-Generator Trouble in Cold Weather

Cold weather often causes a generator trouble that may be noticeable in either of two ways: The generator may fail to charge the battery, or the charging rate may be excessive until the generator warms up from the heat of the engine. In either case, the trouble is probably due to oil working out of the generator bearing and getting on the commutator where it forms a gum and causes the brushes to stick. Sometimes the trouble can be remedied by applying gasoline to the gummed parts with a brush, through the vent holes in the housing. However, if the parts are gummed badly, it may be necessary to remove the cap from the end of the housing and wash the brushes and the commutator. Be sure that all of the gasoline has evaporated before starting the motor.

Tool and Spindle Racks for Your Drillpress



Extra spindles for a drillpress can be hung inside the hollow column as in Fig. 1. Two circles are scribed on 1-in. hardwood, and holes, large enough to receive

the spindles, are centered so that the chucks will not interfere with each other or project outside the circles. The disks are notched to receive wooden strips. Blocks are screwed across the upper ends to catch the post. If the spindle chucks require more room

than is afforded inside, the rack may be designed as in Fig. 2. The upper disk is large enough to rest on top. Fig. 3 shows a small rack which is bolted to the head unit to hold four sizes of mortising bits, eight wood drills, five router bits, hold-downs and fence, twist

drills, and has space for carving bits and shaper cutters as well. Three partitions or vertical members of $\frac{1}{4}$ -in. plywood are assembled so that the center, B, has a bottom and bit partitions of $\frac{1}{4}$ -in. stock, with ends $\frac{3}{4}$ in. thick. Before nailing on the front, A, shellac the inside faces. Make the top of the center section to extend only part way, leaving a large opening for hold-downs and similar pieces. To keep bits from dropping too low, nail blocks beneath. The back section is merely a strip of 1-in. stock with holes drilled in the upper edge for twist drills, etc. For a bracket, screw to the back a piece of stock to clamp to the drillpress. If the drive motor is mounted on the head assembly, there is generally an opportunity to slip a bolt through an adjustment slot into the bracket.—Ed. M. Love, Arcadia, Calif.

Proper Care Increases Life of Belts

Given the proper care, leather belts will last a surprisingly long time. They should be run as slack as possible; just tight enough to prevent slipping. If a leather belt is covered with dust and oil, clean it with a solution of benzine, naphtha, or gasoline, 3 parts, and turpentine, 1 part. This solution is inflammable and should be used accordingly, preferably outdoors. Apply the solution with a piece of cloth or burlap. After the belt has been cleaned and dried, it is given a light coat of belt dressing, castor oil, or tallow. The cleaning solution is intended only for leather belts. Rubber belts may be cleaned with a little soft soap and water. Boiled linseed oil rubbed on rubber belts will make them more pliable, or special dressings can be purchased for this purpose.

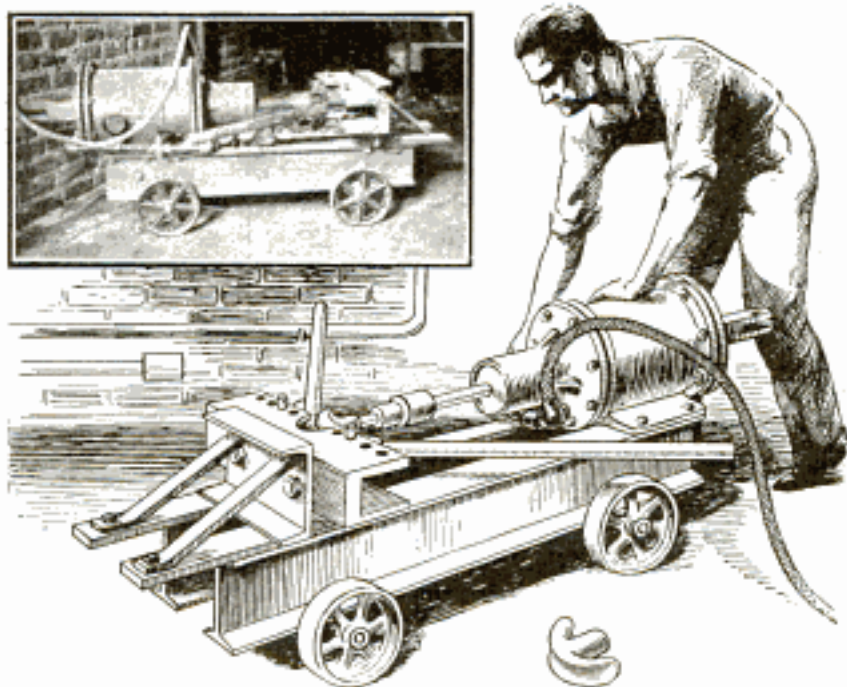
Lead-Pencil Grips from Rubber Tubing

Slipped over a lead pencil, a short length of corrugated rubber tubing, obtainable at most hardware and 10-cent stores, makes a good grip when using a pencil while wearing gloves. This is especially handy where checking of stock or sketching is done outside.



Old Air Brake Bends Pipe

To bend heavy pipe, a contractor in Pocatello, Idaho, utilized an old Westinghouse air brake, which he mounted horizontally on a steel truck. A crosspiece of heavy channel iron was fastened to the forward end of the truck as shown, and two curved shoes were mounted in the crosspiece by means of heavy steel pins, which pass vertically through the sides,



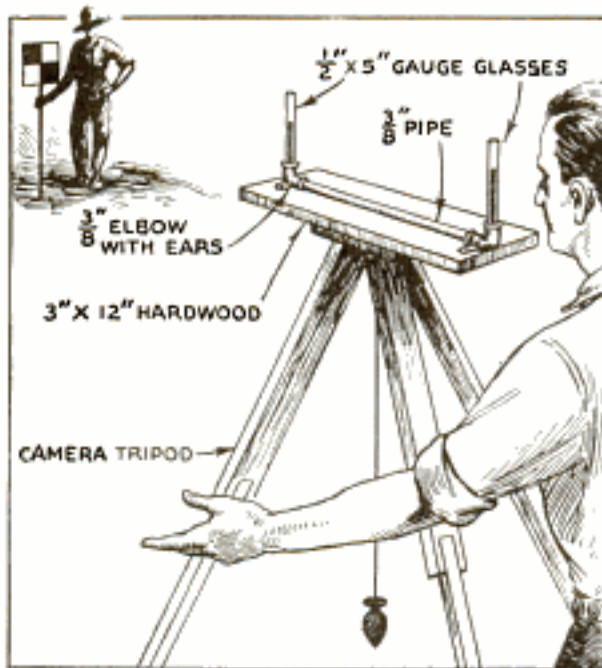
Lengths of Large Pipe Bent by This Improved Machine, Consisting Mainly of an Air Brake from a Junked Railroad Car

several holes being drilled for the pins so that they could be spaced to make long or short bends. A third shoe, curved to fit flush against the other two, was fastened to the end of the piston rod of the brake. In use, the pipe to be bent is held against the shoes on the crosspiece and the piston rod is moved forward against the pipe by admitting compressed air into the brake cylinder.—H. W. Young, Portland, Ore.

Simple Water Heater for Poultrymen

Experts at Cornell University have developed an inexpensive heater to warm drinking water for poultry. A carbon-filament electric lamp is placed inside a metal tube, which is closed at the lower end. The lamp is then covered with fine gravel, after which the tube is filled almost to the top with dry sand. In use, the heater is lowered into the water and the lamp is connected to the nearest outlet.—Allen P. Child, Kansas City, Mo.





Surveyors' Level Improved from Pipe, Gauge Glasses and Camera Tripod Used in Measuring Elevations

An Improved Surveyors' Level for Measuring Elevations

For measuring elevations, a practical surveyors' level can be made from two gauge glasses, a length of pipe and two elbows of the type that have ears for screwing them to a flat surface. The elbows are screwed onto the ends of the pipe and the assembly is fastened to a hardwood base. The glasses are then cemented into the elbows with a thick paste made by rubbing litherage into glycerine. First cover the elbow threads with the paste. Then wrap the ends of the glasses with string that has been saturated with the paste, and set them in place, packing more of the paste around them to make a tight liquid-proof fit. When mounted on a camera tripod and equipped with a plumb bob as shown, the level is completed by pouring colored water into one of the glasses until it extends about 3 in. into each glass. If the plumb bob is adjusted so that its point just touches the ground, it is a simple matter to measure the elevation of the level water columns above the ground.

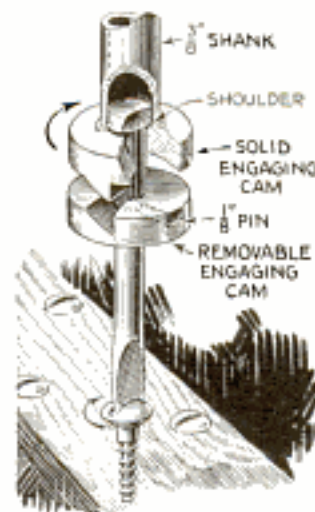
Meat Smoked with Corncobs

According to tests made on the experimental farm at the University of Nebraska, either hickory wood or corncobs make the best fire for smoking meat, while ma-

ple or apple wood are fair substitutes. If a smokehouse is not at hand, a barrel set on a bank and connected with a fire box by means of a drain tile will do. The barrel should be as high as possible so that the meat will not be affected by the fire, and the pieces to be smoked should be spaced well apart and high above the fire. In smoking meat, a smudge is better than a fire, which is likely to fry out the grease and crack the meat.

Attachment for Driving Screws with Electric Drill

Driven by an electric drill, this screwdriver attachment has two friction collars, made so that the weight of the drill causes them to engage to drive a screw, and automatically disengage, or slip, when the screw is driven home. One cam is integral with the shank, which is turned from a piece of round stock, and the other is



pinned to the screwdriver bit. The latter has a shoulder turned on the top end to fit into a hole drilled lengthwise through the shank, the cam end of which is slightly smaller in order to keep the shoulder from dropping out when the screwdriver is moved.

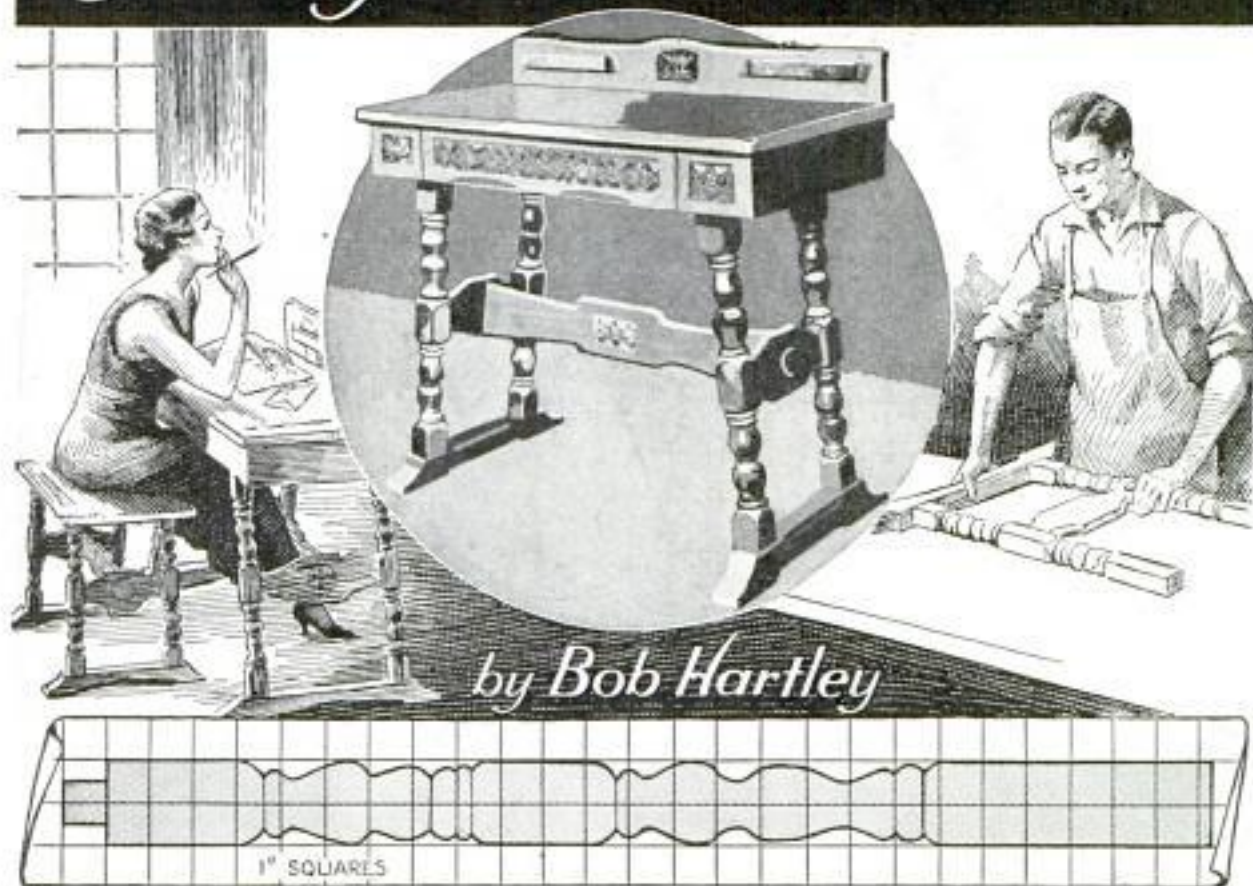
Steel Strips Hold Papers on Desk

Contractors and engineers working in field or outdoor offices will find curved strips of spring steel or brass bolted to the tops of their desks handy for holding blueprints and order sheets so that they will not be blown away. The free ends of the strips should be curved upward slightly so that the papers can be pushed under them.—Jos. C. Coyle, Los Angeles, Calif.



OLD MONTEREY DESK

You Can Build

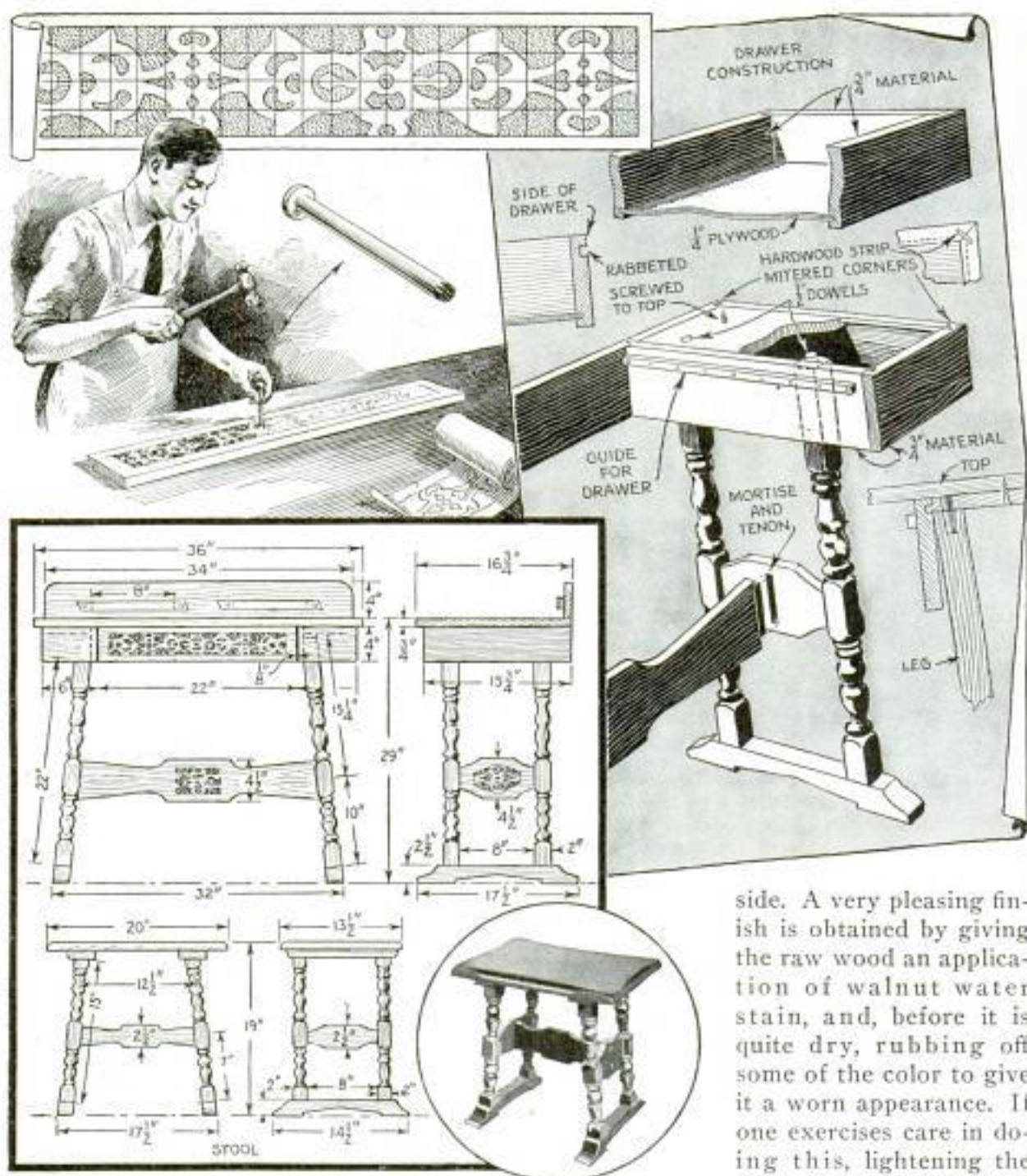


by Bob Hartley

ALL along the Pacific coast and particularly in California, the Monterey motif is very popular, and adaptations of furniture, as well as architecture, which is characteristic of the old California capital, are finding a ready demand. Here is an attractive design in a writing desk which will appeal to the home craftsman because of its simple construction. The legs are turned on a lathe according to the pattern, which can be duplicated on 1-in. squares, although a rough job can be done by touching up the square stock with plane, drawshave or rasp.

The choice of material depends largely upon the kind of wood available in your locality. The original was made of "Bataan" or Philippine mahogany, but white oak, gum or other woods can be used. First make the legs, using full 2 by 2-in. surfaced stock about 27 in. long. On the lower ends, turn a $\frac{3}{4}$ -in. dowel to set into

the feet, the latter being cut to shape from 2 by $2\frac{1}{2}$ -in. material. Legs are assembled parallel in pairs on the feet, with a crosspiece about midway, which is secured with a mortise-and-tenon joint. The top ends of the legs are held in place with $\frac{1}{2}$ -in. dowels as shown. Note that the framework of the desk top is made in a complete rectangle, $15\frac{3}{4}$ in. by 34 in., with a section sawed out for the drawer front. Front, back and ends of the top frame are mitered and slotted to receive a strip of hardwood which, when glued in place, holds the corner joint snug and firm. The crossbrace between the two pairs of legs is held with dowels as well as mortise-and-tenon joints. Before assembling the desk frame, the embossed or carved woodwork should be finished. An attractive design is shown in the detail. For a very simple job, trace this to the drawer and desk front, and stipple the areas indicated



by using a spike having the end filed in a sort of crisscross design with a three-cornered file. A hand-carved job would be attractive if you have had experience with carving tools, but, of course, it would be more difficult.

Envelope racks on the backboard are made of flat iron about 1 in. wide and hammered to give a handmade effect. The desk top is built up of $\frac{3}{4}$ -in. material in suitable widths, glued together and sandpapered until the joint is not visible. It is screwed to the frame from the under-

side. A very pleasing finish is obtained by giving the raw wood an application of walnut water stain, and, before it is quite dry, rubbing off some of the color to give it a worn appearance. If one exercises care in doing this, lightening the tone just where one's arms and elbows would naturally rub the wood, an effect of age is easily attained. When the staining is completed, apply white wood filler, which works into the grain and still further increases the effect of being aged. Finish with three coats of thin shellac, sandpapering after the first two coats are dry with a fine grade of sandpaper. Furniture wax may then be applied, if you desire. The stool that matches the desk is essentially the same construction and should, of course, be given a similar finish.

Quick Method of Sharpening Disk Harrows



One farmer sharpens his disk harrow at home in less than an hour at practically no cost by belting it to a small gasoline engine. A pulley is first attached to one end of a short length of pipe, which serves as a shaft that slips snugly over the end of the disk axle. Two lengthwise cuts are made in the end of the pipe with a hacksaw. These should be at right angles to each other and about 3 in. deep to permit the pipe to spread enough to slip over the disk axle. Next place a U-shaped piece of fairly heavy flat iron, drilled in the center to slip over the axle, and bolt it to the pipe, leaving enough space between the end of the pipe and the iron to take the axle nut. Now remove the latter, put it in the space provided and slip the assembly over the end of the axle. As the nut is driven up tightly against the disk, the end of the axle is forced into the pipe, which tends to hold the pulley assembly from wobbling. In use, the harrow is jacked up clear of the ground by setting blocks underneath the axle bearings and the disks are sharpened individually by holding an emery stone against them as they revolve. —Clifford H. Kelty, Urbana, Ia.

Masonry-Drill Guides Made from Pipe and Fittings

Here are two guides that will be found helpful in drilling vertical and horizontal holes in masonry. The vertical guide consists of three pieces of pipe, three tees, one elbow, a nipple and a floor flange assembled as shown and mounted on a plank,

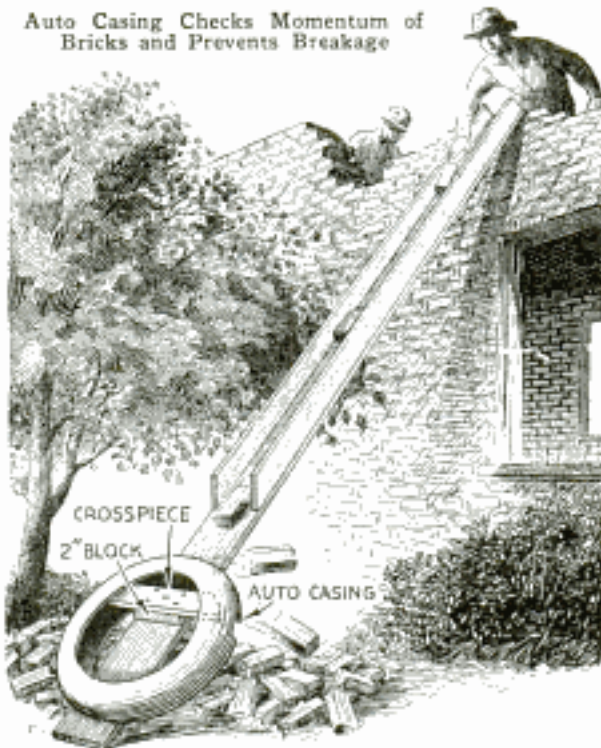
which serves as a base. The plank has a hole cut directly under the vertical pipe to allow for visibility and free working of the drill. The horizontal guide embodies the same principles. The base is extended so that the operator may stand upon it, and the guide has two standards. For best results with these guides, take a standard star drill and butt weld it to the end of a steel shaft; you will then have the superior cutting qualities of the standard



Two Guides That Help in Drilling Vertical and Horizontal Holes in Masonry with Star Drills

tool, plus the true guiding values of the guides.—John E. Hyler, Peoria, Ill.

Auto Casing Checks Momentum of Bricks and Prevents Breakage



Old Auto Casing Serves as Bumper on Brick Chute

In tearing down a building, the wrecking crew fastened an old auto casing near the bottom of the brick chute, which served as a resilient bumper that bounced the bricks off on both sides of the chute and prevented them from breaking. This also helped the man who piled them on the ground as they could be picked up with little risk of getting his fingers mashed.—W. W. Dryer, St. Louis, Mo.

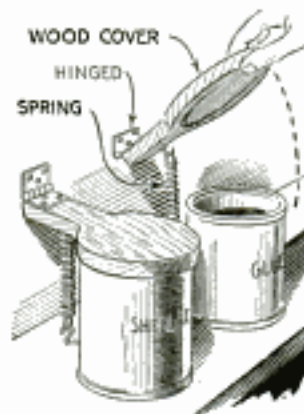
Air Blast Has Many Uses

Tools that become too hot in service may be cooled by keeping a blast of air trained upon them, while certain steels, especially high-speed steel, are sometimes quenched in a blast of cool air during the heat treatment instead of using liquids for the purpose. For the removal or transfer of small parts, a blast of air is very convenient. In ejecting small parts from machines into a chute or container or onto a conveyor, timed blasts of air are often used, while dies and other tools are often cleared of scrap or trimmings in the same manner. In one instance, a blast of air was used to return a burnishing ball to its top position after it had been forced through the holes being burnished, the valves for providing the blasts being cam

or lever-operated in order to time them properly. Blasts of air are also used for quick mail delivery in inter-plant systems, and in some instances, for carrying mail between airports and city post offices. In these systems, the mail to be transported is put in a cylindrical container, which is placed inside a smooth airtight tube buried underneath the ground between the points, and a blast of air is released behind it, conveying it to the other end of the tube. This idea has also been adapted for use in threading wire through long, curved conduits, a length of cord first being blown through the pipe and then used to pull the wire through the conduit.

Hinged Wood Covers for Paint Cans Save Time in Workshop

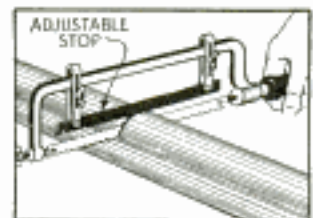
When small amounts of glue, shellac and paint are used frequently in the workshop, these quick-acting covers for the cans will save time. They are blocks of wood sawed to fit over the tops of the



cans and have short extensions to permit hinging them to a wall or to the back of the workbench. Coil springs fastened to the underside of the covers and the top of the bench, as shown, hold them snugly on the cans.

Adjustable Stop for Hacksaw Made of Flat Iron

Mechanics who desire a stop on a hacksaw to assure uniformity in depth of duplicate saw cuts, will find this stop handy. It consists of two U-shaped pieces of flat iron clamped over the saw frame to carry a third piece, which acts as the stop. The U-shaped pieces are slotted for bolts, which are fitted with wingnuts to make adjustments.—A. H. Waychoff, Phoenix, Ariz.

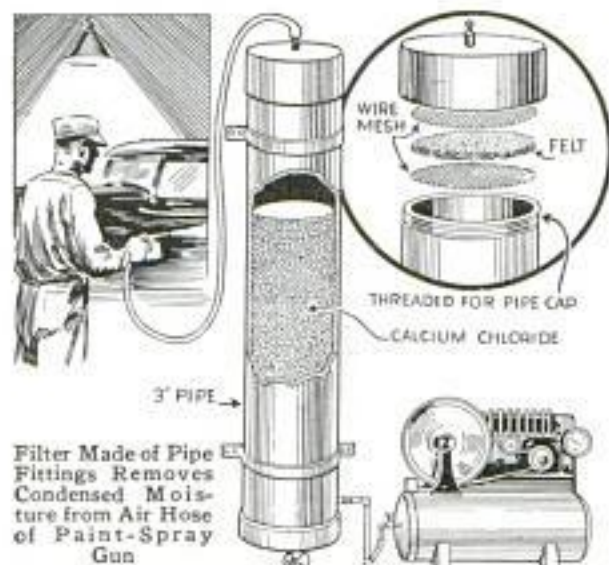


Cellophane Prevents Broken Drum Heads

Any drummer who has been in a parade during a shower knows the outcome—usually a broken drum head. This can be avoided by removing the counter hoop of the drum and placing a piece of cellophane over the head, after which the hoop is replaced and the cellophane is stretched as the drum is tensioned.

Moisture Filter for Your Paint Spray Gun

Condensation of moisture in the air hose of a paint-spray gun can be prevented by using this filter in the hose between the gun and the compressor. It consists of an 18-in. length of 3-in. pipe, capped at both ends and filled about two-thirds with calcium chloride. The upper cap is fitted with a pipe nipple and the lower one with a pet cock for draining off the condensed moisture. A filter pad, made by sandwich-



Filter Made of Pipe Fittings Removes Condensed Moisture from Air Hose of Paint-Spray Gun

ing a felt disk between two wire-mesh disks, is placed between the upper cap and the pipe to keep foreign particles from getting into the hose. Attachment of the hose is made by means of the nipple screwed into a tapped hole in the upper cap and one in the pipe just above the lower cap.—V. L. Anderson, Maryville, Missouri.

☛ A test-tube brush, obtainable at wholesale druggists or laboratory-supply houses, has been found to be satisfactory for cleaning chips and dirt from the hollow spindle of a small lathe.



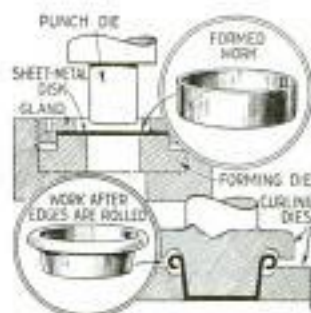
This Chisel Is Made of High-Speed Steel and Will Cut Through Most Materials Easily

Chisels That Really Cut

You can make a chisel that really cuts by inserting a length of high-speed steel rod, ground to shape and properly hardened, into a soft-steel handle. The chisel shown in the photo has a handle made from a piece of $\frac{1}{2}$ -in. steel rod. A hole was drilled in one end to a depth of about $\frac{5}{8}$ in. to hold a piece of $\frac{1}{4}$ -in. high-speed steel rod, larger than the hole so that it is held tightly. The chisel should be sharpened on a soft grinding wheel.

Dies for Forming Sheet Metal

You can easily make dies for forming sheet metal in your own shop. The ones shown in the drawing are used to form sheet-metal cups and indicate the method used to obtain more elaborate drawn-metal shapes. A punch is used for the inside of the cup and a die with a screw gland holds the disk. The cupping die is placed in a press and, with the metal in place, the flat disk is pressed through the circular opening in the die. To curl the upper edge, similar tools are used. The punch in this instance has a concave recess, which engages the upper edge and forces it over.



Improved Equipment for Tracing on Mimeograph Stencils



Tracing Drawing on Mimeograph Stencil with Equipment Improved from Glass and Picture Molding

When regular equipment is not available for tracing drawings on mimeograph stencils, you can use a picture frame. As this is already rabbeted at the edges, a piece of glass can be fitted in it on which to do your tracing. A clearance of $\frac{1}{4}$ in. should be left at one end between the frame and glass. Place the drawing on top of the glass and over this lay your stencil. Push the paper backing of the stencil through the space between the glass and the frame, folding it back out of the way. Now put an electric lamp inside one of your desk drawers, lay the frame on top of it and start tracing. When the lamp is turned on, the light will shine through the drawing and make the tracing job easy.—Theodore Zeitz, Cleveland, Ohio.

In Our Next Issue

IDEAS FOR MAKING MONEY ON THE ICE

Includes miniature lighthouse on a sled, large enough to shelter one person, who serves coffee and hamburgers to skaters.

HOME AIR CONDITIONER FOR HEALTH

Humidifier for use in homes and offices works automatically with an electric control attached to a hygrometer.

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Handy workbench and other homemade items as a Bunsen burner, distillation condenser, test-tube rack, and stands for heating flasks.

TYPEWRITING NAMES ON TOOLS

Typewriter lettering transferred to your tools with aid of mimeograph stencil, without the use of acids or electricity.

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Shows just what you can do with the improved motor-driven machines available for home workshop owners.

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Accurate reproduction of an antique spinning wheel having a pleasing design; largely a wood-turning project.

FOR THE MODELMAKER

Midget model of U.S.S. "Pensacola," a recent 10,000-ton treaty cruiser. This ship model is complete in one issue.

WOODEN PICTURES

Assembling little squares of various kinds of wood for wall plaques, serving trays, table tops, boxes, etc.

Stanley Ketchel

had a

FIGHTING HEART

So has the **1934**

HARLEY-DAVIDSON



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Davidson live up to its marvelous motor. Sweeping Air-Flo lines and striking color combinations give it rare beauty and "class". Mechanical improvements set new standards of comfort, easy-handling, ruggedness, and economy.

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1/25 second at f.4.5. 3 Photoflood lamps
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lens. You will find any of the three new models at the right ideal.

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...WITH THESE NEW PANCHROMATIC FILMS



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...WITH THESE FINE, FAST KODAKS

KODAK SIX-16 (left), equipped with the famous *f*.4.5 Kodak Anastigmat, has ample lens speed for indoor photography. Beautifully designed, it is the world's most compact camera making $2\frac{1}{2} \times 4\frac{1}{4}$ pictures. Has Diodak shutter with speeds up to 1/100 second, and secondary shutter and focusing scales which are clearly visible in picture-taking position. Kodak Six-16 ($2\frac{1}{2} \times 4\frac{1}{4}$), with *f*.4.5 lens, \$30. With *f*.6.3 lens, \$17.

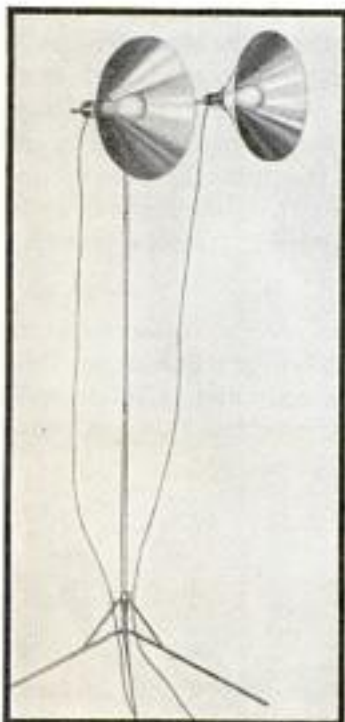
Kodak Six-20, for $2\frac{1}{4} \times 3\frac{1}{4}$ pictures, with *f*.4.5 lens, \$28; with *f*.6.3 lens, \$15.

KODAK VOLLENDIA is an ideal camera for both indoor and outdoor shots. It is precision-built, compact, easy to use.

The model at the right has an *f*.3.5 anastigmat lens, 8-speed Compur shutter, and eye-level finder. It takes 16 pictures on a vest-pocket roll of Panatomic Film, the new fine-grain film which makes beautiful enlargements. Price of *f*.3.5 Vollenda, \$27.50. Vollenda *f*.4.5, with Pronto shutter and built-in self-timer, \$19.50.



KODAK RECOMAR (left) is equipped with a fast *f*.4.5 Kodak Anastigmat lens and a precise Compur shutter with speeds from 1 to 1/200 of a second. A fine picture-taking combination for all occasions. Has ground-glass focusing back, brilliant and direct view finders, double extension bellows adaptable to long-focus and wide-angle supplementary lenses, and built-in self-timer. Uses either film packs, cut film, or plates. Recomar "33" ($3\frac{1}{4} \times 4\frac{1}{4}$), \$48. Recomar "18" ($2\frac{1}{4} \times 3\frac{1}{4}$), \$40. Supplementary lenses, \$3.50.



Kodaflector, with stand, \$5

...AND WITH KODAFLECTOR

With the Kodaflector, shown at left, it is an easy matter to get light enough for snapshots anywhere indoors.

Especially designed for the use of low-cost Photoflood lamps, the Kodaflector makes two lamps do the work of nine—furnishes an intense light of high photographic

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P.M.-12-33

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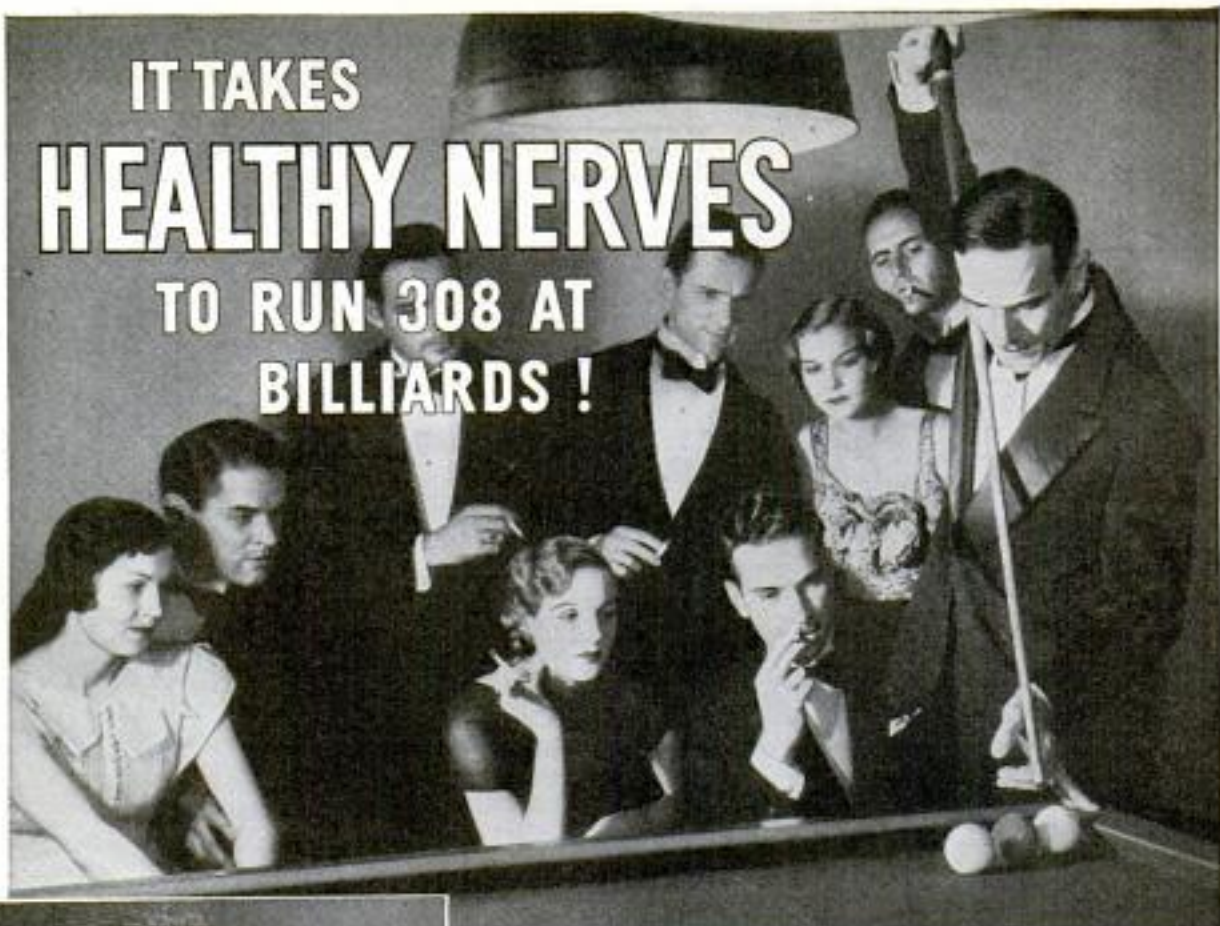
Please send me your latest camera catalog and booklet telling how to make indoor snapshots.

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● BELOW — TALKING IT OVER calls for more Camels. Steady smoking reveals the true quality of a cigarette. Camels keep right on tasting mild, rich and cool...no matter how many you smoke.



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NEVER TIRE YOUR TASTE**

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P.M. 12-33

MIDGET-TUBE RECEIVERS FOR EXTREMELY SHORT WAVES

(Continued from page 907)

changing the turn spacing of the tuning coils which are about $\frac{1}{8}$ in. in diameter. The frequency of the transmitter was adjusted by means of a variable condenser to bring it into tune with the receiver.

A four-tube set consists of two stages of tuned r.f. amplification, a detector and one audio stage. This is shown directly below the two-tube receiver and is housed in a brass box 7 in. long, 3 in. high and 3 in. wide. The coils are tuned with very small variable condensers and the battery leads are inclosed in metal shielding. Screen-grid tubes were used in the r.f. stages and triodes, three-element types, in the detector and audio stages. It will be noted that these small tubes are without bases, some being supported by their terminal leads while others are mounted in holes cut in the metal stage shields. The tuning range of this receiver was from about 95 to 110 centimeters.

The engineers point out that the tubes which have been described were made in the laboratory for demonstrating fundamental principles, rather than for producing a commercial design. However, it is hoped that these experiments will be of value in the future development of special short-wave tubes.

Automatic Line-Voltage Regulator Saves Tubes



In appearance much like an ordinary radio tube fitted with flat-prong connections, this self-adjusting amperite regulator may be used in public-address systems and receivers fitted with flat-prong ballast sockets. With a suitable adapter, it will regulate unstable line voltage to any a.c. set for longer tube life and better reception.

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The same safe, all-winter anti-freeze sold last year for \$4.45. Concentrated—not diluted or cheapened in any way.

TWO MINUTES OF YOUR TIME in reading the facts on this page may save you many hours of driving-discomfort this winter. Do not wait until the first freezing day comes to decide the kind of anti-freeze you want. Learn the facts *now*.

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Boil-away anti-freezes smell up the car. They are inflammable. They evaporate in warm weather, and leave your car unprotected against the next cold snap. Their one appeal in the past has been their low initial cost. But today, at the new low price of \$2.95 per gallon, Eveready Prestone is within the reach of all. And, of course, in *all-season cost* it offers real economy. That's because one filling of Eveready Prestone gives you complete protection all season long. No replacements, no costly repairs for frozen engines, no rust.

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Many so-called "just-as-good" anti-freezes are being offered. Some give protection for a *limited time*; others are immediately harmful to your car. To bring you the truth, "permanent" anti-freezes have been subjected to exhaustive tests.

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Don't buy water when you can get it out of the spigot

Don't be fooled by "tricky" prices. Laboratory measurements show that many "permanent" anti-freezes are nearly *half plain*,

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This Chrysler 6 (Model 1933) can be protected to 10° above zero with 1 gal. of Eveready Prestone at a cost of \$2.95.



This Willys (Model 77, '33) can be protected to zero with ¾ of a gal. of Eveready Prestone at a cost of \$2.22.

ordinary water. Eveready Prestone is concentrated — all anti-freeze. Here's a little revealing arithmetic:

For a Model "A" Ford

Suppose an anti-freeze which is one-half water sells at \$1.50 a gallon, requiring 2 ¾ gallons to protect a Model "A" Ford to 10° below zero... \$4.31
Amount of Eveready Prestone needed to protect to 10° below zero is 1 ¼ gallons at \$2.95 a gallon... 3.72

Saving \$.59

plus safe protection from rust and corrosion

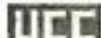
Do not confuse Eveready Prestone with either alcohol or glycerine

There is no other anti-freeze "the same as Eveready Prestone" or anything like it. Eveready Prestone is a distinctive, patented product. It protects your car not only against freezing, but also against rust and corrosion in the cooling-system. Its use reduces the corrosive action of water on cast iron 95%; on other metals of the cooling-system, 75%.

Eveready Prestone is approved by every car-manufacturer in America, as well as by all leading radiator makers. It is fully guaranteed by National Carbon Co., Inc. Have it put in now. It won't evaporate, or heat up your motor. With Eveready Prestone in the car, the anti-freeze question is off your mind for the entire winter.

Tested  Approved 

NATIONAL CARBON COMPANY, INC.
General Offices: New York, N. Y.

Unit of Union Carbide  and Carbon Corporation

now **\$2.95** a gallon

The important thing in buying an anti-freeze is to figure cost to a definite protection point, not the price per gallon. See how reasonably you can get all-winter protection against freezing and rust with Eveready Prestone.

GALLONS OF EVEREADY PRESTONE NEEDED TO PROTECT TO THESE TEMPERATURES

CAR	MODEL	10° above	Zero	10° below	CAR	MODEL	10° above	Zero	10° below
Buick	32-50, '32; 33-50, '33	¾	1	1½	La Salle	340, '30; 345, '31	1½	2	2½
	40, '30; 32-60, '32	1	1½	1½		345, '32; 345-C, '33	1½	2½	2½
	50, 60, '30; 33-60, '33	1½	2	2½	Nash	6-60, '31; 960, '32	¾	1	1½
	33-80-90, '33	1½	1½	2		880, '31; 980; 1130, '33	1	1½	1½
	32-80, 32-90, '32	1½	1½	2		8-90, '31; 990, '32	1½	2	2½
Cadillac	370, '32; 370-C, '33	1½	2	2½	1170, 1070, '33	1½	1½	1½	
	355, '32; 355-C, '33	1½	2½	2½	Spec. 8, Twin Ign. '32	1½	1½	2½	
	452, '32; 452-C, '33	1½	2½	2½	Amb. 8, Twin Ign. '32	1½	2	2½	
Chevrolet	'29, '30; Stand. '33	¾	1	1	Oldsmobile	F32, 6, '32; F33, 6, '33	1	1½	1½
	'31, '32, '33	¾	1	1½		L32, 8, '32; L33, 8, '33	1½	1½	1½
Chrysler	6, '31; 8, '31; 6, '32, '33	1	1½	1½	Packard	1001-2, 1003-4, '33	1½	1½	2
	C.Q., C.L., '33	1½	1½	2		826, 833, '31; Std. '32	1½	1½	2
	Imp. Custom, '32, '33	2	2½	3		845, '31; Del. '32	1½	2½	2½
De Soto	6, '31, '32	1	1½	1½		1005-6, '33	2½	3½	4
	8, '31, '32; 6, '33	1	1½	1½	Pierce-Arrow	54, '32; 836, '33	1½	2	2½
Dodge	6, '33	1	1½	1½		51, 52, 53, '32	2½	3½	3½
	8, '33	1½	1½	2		1236, 1242, 1247, '33	2½	3½	3½
Essex	'29, '30, '31, '32	1½	1½	2	Plymouth	'31, '32 Fltg. Power	1	1½	1½
Essex Terraplane	6, '33	¾	1	1½		Six; De Luxe '33	1	1½	1½
	8, '33	1	1½	1½	Pontiac	'29, '31; 6, '32; 8, '33	1	1½	1½
Ford	A, '28, '29, '30, '31, '32	¾	1	1½		8, '32	1½	2	2½
	V-8, '32, '33	1½	2	2½	Studebaker	Diet. '31; 82, '33	1½	1½	1½
Hudson	8, '30; 8, '31, '32, '33	1½	1½	1½		6, '32	¾	1	1½
	SS, '33	1	1½	1½		Diet. 8, '32; 6, '33	1	1½	1½
Hupmobile	H, U, '30; H, '31, '32	1½	2½	2½		Com. 73, '33	1	1½	1½
	L8, '31, '32; 321, '33	1	1½	1½	Pres. 8, '32	1½	1½	2½	
	226, '32; 326, '33	1½	2	2½	92, '33	1½	2	2½	
	222, '32; 322, '33	1½	1½	2½					

← COST OF EVEREADY PRESTONE →

½ gallon .. \$1.50	1¼ gallons . \$3.72	2 gallons ... \$5.90	2¾ gallons . \$8.12
¾ gallon .. 2.22	1½ gallons . 4.45	2½ gallons . 6.67	3 gallons ... 8.85
1 gallon ... 2.95	1¾ gallons . 5.17	2½ gallons . 7.40	3¼ gallons . 9.62

FIND YOUR OWN CAR ON THIS CHART. If your car is not listed, see your dealer. He has a complete chart showing every car made. The amounts of Eveready Prestone required, as shown here, do not allow for the capacities of hot water heaters. If you have a hot water heater, or if you need to protect your car to any lower temperature, down to 60° below zero, consult your dealer.

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LOVING HANDS AND
SHARP TOOLS CREATE
MANY HOME-BUILT

Christmas Gifts



You can do better work quicker when edge tools really are keen. Christmas gifts call for any man's best effort, and sharp tools kept sharp on the Carborundum Brand Combination Stone help the project to success.

This "double duty" sharpening and finishing stone is made of Carborundum Brand Silicon Carbide—the manufactured abrasive. With one side coarse grit to take out nicks and bring the tool to an edge, the other side fine grit for finishing the edge.

Every stone guaranteed uniform in grit and grade. Does not readily fill nor glaze over. Wears evenly. Lasts a lifetime. Use it dry or with oil.

CARBORUNDUM COMBINATION STONE

THE CARBORUNDUM COMPANY
Niagara Falls, N.Y.
CANADIAN CARBORUNDUM CO. Ltd
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Please send me free your 48-page Booklet on "How to Sharpen Wood-Working Tools," with absolutely no obligation to me.

Name.....

Address.....

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MODULATOR UNIT OPERATES SEVERAL REMOTE SPEAKERS

(Continued from page 909)

will show up to 130 milliamperes on strong signals when working properly.

The power-supply transformer should have very good regulation and furnish 400 volts d.c. out of the filter. The toggle switch is placed in the primary of the

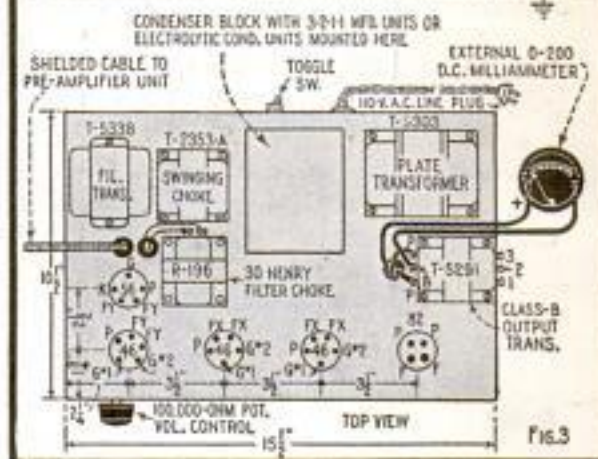
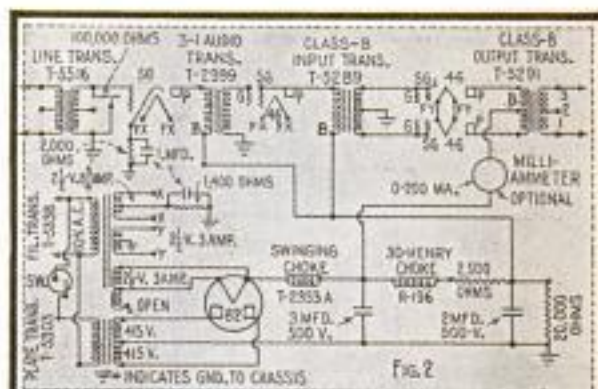
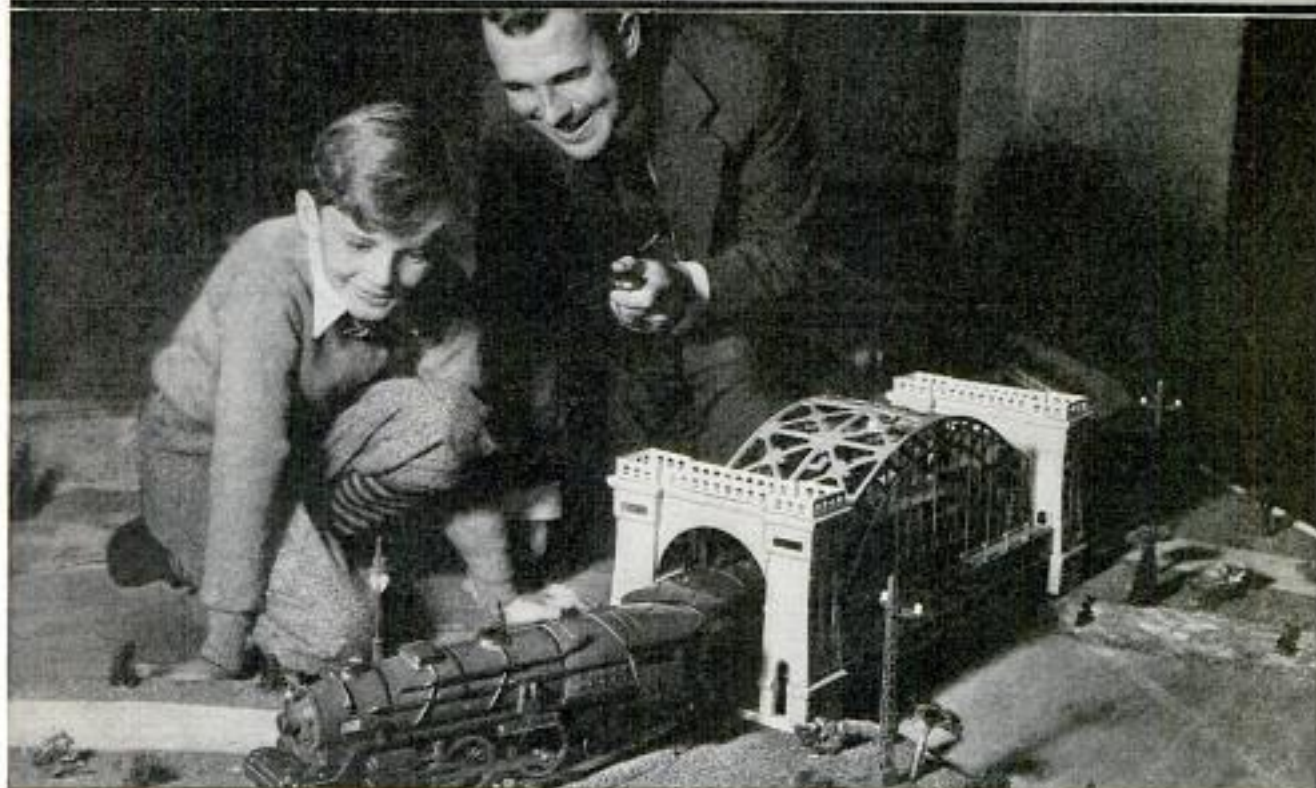


plate transformer so that the tube filaments may be kept lighted at all times and the plate voltage turned off when it is not required.

If the unit is to be used for public address, or as a phonograph amplifier, the output transformers in the various dynamic speakers should be used. All speakers are connected in series across posts 1 and 2 of the class-B output transformer. The speaker fields, of course, must be supplied with current from a separate source. A large blueprint of all diagrams will be available at the time this article is concluded. When used to modulate a phone transmitter, a choke and condenser couple the output of the modulator to the amplifier tubes in the transmitter. These connections will be shown in Part 2 of this article, in the January issue.

To the luckiest men in the world

A FATHER AND SON WHO ARE PALS



THIS Christmas give your son a present that will cement the partnership between you—and do more—help him to become quick-thinking and resourceful. Such a gift is a Lionel Electric Train. For Lionel Trains are more than toys. They teach boys how to develop skill with their hands and brains. They help boys form the habit of thinking problems out for themselves. Your boy will not only have the fun of building and operating a model railroad, but the opportunity to tackle actual problems of railroad operation.

Help him learn as he plays

Take the coupon below to a Lionel dealer and get, **FREE**, the new 52-page *Lionel Model Railroad Planning Book* that shows (1) how to plan and build a model railroad system, (2) what to get to make it true to life to the last detail. Note: If it is not easy to go to a Lionel dealer—mail the coupon and we will send this expensive book if you send 10¢ to cover handling and mailing costs.

Chug! Chug! Chug!

Now Lionel Electric Trains sound as well as look like real trains . . . they chug like actual locomotives. This "CHUGGER" device is an exclusive Lionel feature. And for the first time all Lionel Electric Trains have **REMOTE CONTROL**, which enables you to start, stop or reverse the locomotive from any distance. Lionel Electric Trains can be bought for as little as \$7.95. . . Lionel-Ives Electric Trains with Transformer-Station from \$5.75. . . Lionel-Ives Mechanicals (for junior) as low as \$1.50. (Prices subject to change.)

Tune in on Lionel's thrilling "True Railroad Adventures." Every Wednesday at 5:00 P. M. and Sunday at 4:00 P. M., E. S. T., over NBC-WJZ Network starting November 5th. Look in your newspaper under "True Railroad Adventures."



FREE
at your
dealer's

LIONEL CORPORATION, Dept. O-2, 15 East 26th St., N. Y. C.

I enclose 10¢ to cover handling and mailing costs for my copy of the new Lionel Railroad Planning Book.

Name _____

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City _____ State _____

LIONEL *Electric* TRAINS

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A NEW WORLD for his XMAS

There's a
Real Gift

HIGH school boys and their granddads get equal delight and amazement from exploring the secret realms of Nature with the wonderful Wollensak Microscope. By the hour they glory in viewing the marvelous miracles of germs and pond-water animalculæ—living creatures that swim, eat, battle, split themselves into two separate beings, each alive and perfect. Endless fun and instruction. Wollensak Microscopes are simplified especially for amateurs. Ideal for making photomicrographs.

Model 425—Magnifies 100 to 425 diameters.....\$18.50
Model 150—Magnifies 70 to 150 diameters.....\$12.50
Model 100—Magnifies 100 diameters.....\$5.00
Slide Set—Material for slide-making at home.....\$3.50
At dealers or direct, shipped prepaid. Or C. O. D. Money-back guarantee. Catalog of Microscopes, Telescopes, Binoculars, free. Order today.
WOLLENSAK OPTICAL CO., 868 Hudson Ave., ROCHESTER, N. Y.

\$18.85 Now buys a genuine
MEAD Bicycle

RANGERS cost a few dollars more. Do not buy until you get our astonishing new prices and terms.

30 Days' Trial We ship on approval. If not satisfied after trial return the bicycle at our expense.

Tires lamps, wheels, equipment at half usual prices. Write for marvelous new prices and terms.

Mead CYCLE COMPANY Write us today for free catalog
DEPT F-112, CHICAGO



Only \$1.50
a pair, C.O.D.
plus postage.

Make Moccasins

Use Dugan's Moccasinkit to make real Indian moccasins. Thick waterproof steechide and leather thong. Full instructions. Used by thousands of boys and men. Send shoe size with order (brown or black?). Free folder.

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WITTE ENGINES

Operate on Gasoline, Kerosene, Distillate or Natural Gas
2 H-P to 30 H-P

Own an improved Witte, the finest engine built. Enclosed, Self-Oiling, Timken Roller Bearing. Modern as a 1934 Automobile. Cash or Terms. Direct from Factory to You.

Write for FREE CATALOG

WITTE ENGINE WORKS
1749 Oakland Avenue 205P Carson Street
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ELECTRIC FUN!
Make things spin, buzz, shoot, flash, mystify with electricity! Book of 200 stunts with 110 volts. Postpaid, \$1.
CUTTING & SONS, 123-M Street, Campbell, Calif.



**3 DIMES WILL BUY THIS
UNIQUE TYPEWRITER!**
A REAL SURPRISE. SIZE 4 1/2 x 7 1/2. WELL BUILT.
METAL TYPE. SEND 3 DIMES WELL WRAPPED.
FOR BOYS AND GIRLS
GEO. W. MOORE • 44 Fairview St., Boston, Mass.

THE LATEST GOLD RUSH

(Continued from page 885)

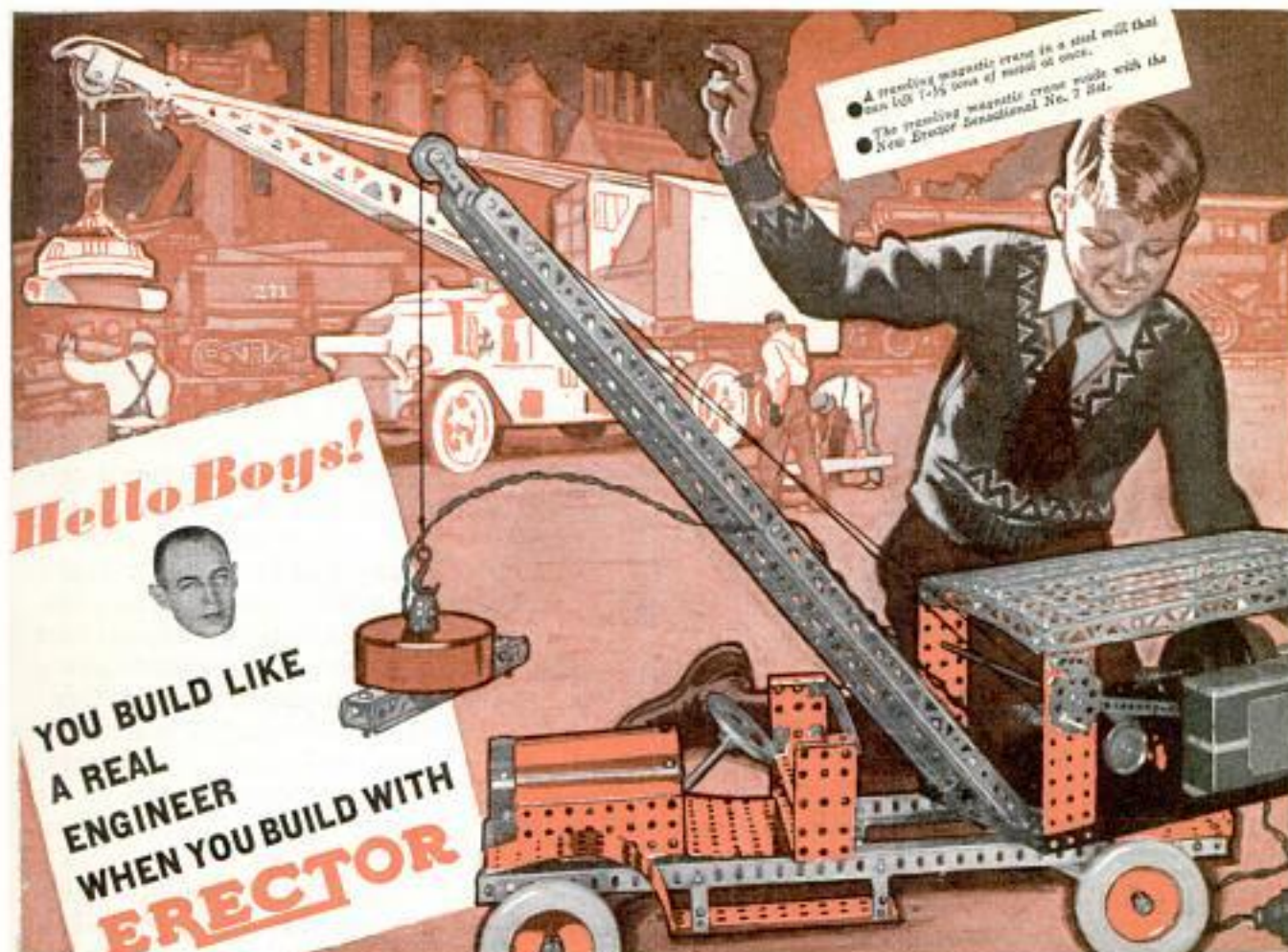
hammers with far greater efficiency. Fine gold is trapped by sheets of ridged cloth from whose corrugations the gold is later laundered in giant washing machines. Much of the economy results from the harnessing of new forces to eliminate heavy machinery. For instance, water is forced into crevices. Heated, it expands to steam, and when the pressure is suddenly removed, shatters the rock.

One of the greatest forward strides in the field of milling is the oil-flotation process. Experimenters discovered that if oil was injected into a mass of muddy, pulverized material and beaten to a froth, a strange thing happened. Grains of certain metals, having an affinity for a certain oil, attracted to themselves tiny bubbles and floated to the top to form a scum. By the use of different oils, the process may be made selective so that any desired metal can be picked out and skimmed off.

By today's methods, gold sources that for years have tantalized miners, may be commercialized. For example, on the beaches of California, Alaska, and other portions of the United States, lie countless tons of gold-bearing black sand. Most of the particles are too small to be seen without a microscope, yet there are present, in addition to gold, many other rare minerals. The idea has grown that the gold in black sand exists in some peculiar form not recoverable by any known means. This is not true, however, according to a well-known mineralogist, who recently stated that the gold may be reclaimed by cyanidation or chlorination. He thinks that oil flotation may prove the clue to commercial treatment of the sand.

A cool billion dollars in gold lies locked in gravels of northern California. This vast fortune was placed out of reach of miners by a law passed in 1893, which wiped out the \$100,000,000 hydraulic-mining industry of that region. Before that time, gold was flowing from this region. Terrific streams of water, directed on the gravel banks, ripped the soil open and washed out the gold, leaving behind a wilderness of upturned rock and sand. Great dredges walked overland like huge monsters, literally turning the soil upside down. Behind them, the land, stripped of

(Continued to page 128A)



HOW would you like to be an automobile engineer and build a big motor truck? Put it together — piece by piece — with your own hands. How would you like to construct a giant steam shovel, with a real electric motor — a drawbridge that actually opens and closes — a towering ship crane such as used in Uncle Sam's Navy Yards — an aeroplane — and other thrilling engineering marvels?

Boys, being an engineer is the most exciting thing in the world. And that's just what you are when you have a New Erector. My New Erector is twice as much fun as ever before. You can make more realistic models. You can make them easier and quicker.

TUNE IN — "Engineering Thrills" — True stories about real engineers and their hair-raising adventures in digging the Panama Canal, building bridges and skyscrapers. WJZ Network — Sundays, 6:45 P.M. E.S.T. See local program listing.

When writing to advertisers please mention Popular Mechanics

THE NEW ERECTOR

Sensational No. 7 Set



Contains the powerful Gilbert 110-volt motor, all-purpose gear box, girders, gears and other real engineering parts for building magnetic crane, fire engine, automatic elevator and over 160 action models.

Erector Sets start at \$1.00. Be sure to see the Famous No. 4 — the "Super-6" Erector — and the Sensational No. 7.

My Great Erector Prize Contest — Free Automobile — Grand Total of

1,021 PRIZES!

Here's the greatest metal-model prize contest ever held. First prize is a free trip to Panama Canal, or Boulder Dam or Empire State Building, or any other engineering project in the U. S. you want to see. Second prize: Chevrolet automobile. And over 1,000 other prizes.

Mail coupon today for illustrated "Look-Em-Over" Book and entry blank for prize contest. Then go to the nearest toy store and select your Erector. Take your Dad along. And good luck in my big prize contest.

Your friend,

A.C. Gilbert

FREE — CLIP THE COUPON

Mr. A. C. GILBERT, The A. C. GILBERT COMPANY,
380 Erector Square, New Haven, Conn.

Send me the big colored Erector "Look-Em-Over" Book and entry blank for the Erector prize contest — both free.

Name.....Address.....

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

In a coma from that aroma



TEMPORARY asphyxiation from bad tobacco in a bad pipe." That's what the doctor said. And this remorseful husband learned that it isn't only apples that keep the doctor away.

Here's a prescription for keeping wives not only conscious, but happy. Ask the tobacco store man for Sir Walter Raleigh Smoking Tobacco. It's that mild, flavorful blend of rare Kentucky Burleys. When it's packed in a well-kept pipe, it will give you more satisfaction than heavier tobacco, and you could smoke it in a submarine without upsetting the white mice.

Brown & Williamson Tobacco Corporation
Louisville, Kentucky, Dept. P-312



It's 15¢
—AND IT'S
MILDER

GLASS AND FOOD MADE FROM WOOD

(Continued from page 869)

clears and the sheet becomes transparent. The glass that this plastic helps to form conducts heat and cold much more slowly than ordinary glass. It is calculated that its ultimate use in windows will mean a big reduction in the cost of heating a home. The glass from wood also is susceptible to violet rays. Tremendous strides have been made in the development of the "wooden-glass" art, but the end apparently is not yet.

The big department and women's apparel stores throughout the country today are showing and selling hand bags made from wood. They are in browns, grays and other tones, with beautiful effects due to the preservation of an appearance like the grain of the wood in the outer covering. The material employed is called flexwood, or wood that bends. It is an outgrowth of the use of plywoods, or veneers. Wood for pianos and other fine work is built up, with ordinary wood in the center and veneer on both sides.

Someone conceived the idea of gluing this thin sheet of wood to cloth, instead of to other wood. It worked and wooden hand bags were achieved. While the wood would bend only in certain directions, that was no deterrent, for the only bend needed was in the flap. Formerly plywood could be used only on the inside of houses because the rain loosened the glue. But now waterproof glues have been made.

Rayon, formerly called artificial silk, is another of the forest's gifts to humanity. It is simply a multifilament textile fiber, the product of plant cellulose, either from cotton or wood pulp, mainly the latter. In manufacturing rayon a high-grade pulp must be used and all impurities removed by dissolving the cellulose. The solution then is forced through minute apertures corresponding to the spinnerets of the silk worm. It emerges as fine threads or filaments, which are coagulated either in a fixing bath or by evaporation, several of them formed simultaneously being twisted into the strand or yarn for spinning. Finally it goes through chemical processes to give it the luster of silk.

The art of staining the wood of living trees by inserting dyes into their stumps

(Continued to page 128A)

The new G. P. A. can take it!

On warm days as well as on cold ones

WARM DAYS. G. P. A. won't evaporate even on the warmest days.



Weather Bureau figures show that in the majority of U. S. cities, winter's warmest days are at least 70° warmer than the coldest days—in some cases as much as 117° warmer.

COLD DAYS. Absolute safety. No doubt or uncertainty.

★ **Won't evaporate**

One filling of G. P. A. lasts all winter. It won't evaporate. It's safe to fill **EARLY**.

★ **Stays put—causes no leakage**

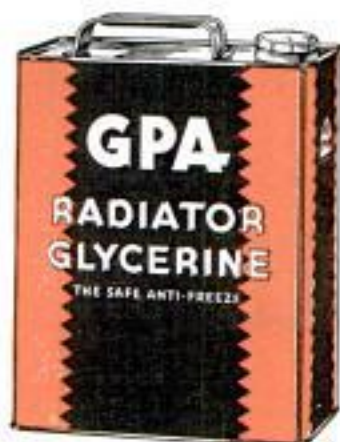
G. P. A. will stay put in any radiator that is water-tight. Flush out the cooling system, check it for leaks, and fill her up. And get *enough* for complete protection.

★ **Stops rusting and corrosion**

G. P. A. stops corrosion of *all* metals in the cooling system, and retards the disintegration of rubber.

★ **Will not clog or gum**

The new G. P. A. in no way interferes with the efficiency of the motor. Won't cause overheating.



Forget about your thermometer! Get that worried look off your face! Life's too short to bother with fickle, fade-away anti-freezes that vanish whenever the weather or the motor gets a little too warm.

No need worrying this year—not with G. P. A. Radiator Glycerine prices so low! G. P. A. won't evaporate no matter how warm the weather. One filling lasts all winter. No refills required. And G. P. A. prices are **DOWN**. Lowest in G. P. A. history.

Read the advantages listed at the left. Remember, too, that G. P. A. has no unpleasant odors; that it won't injure Duco.

Stop at the nearest garage or filling station and get your G. P. A. And be sure you get *genuine* G. P. A.—in the red and black can. Glycerine Producers' Assn., 386 Fourth Ave., New York.

★ **1933's BIGGEST ANTI-FREEZE BARGAIN** ★

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TAKE THE GRIEF OUT OF EMERGENCY REPAIRS

A sudden leak in the heating boiler—the hammer handle flies off—water squirts from a dent in the auto radiator—a drawer knob pulls out—screws strip from and loosen the door lock—a water pipe freezes and cracks—one caster won't stay in the table leg—your favorite pail starts to leak—a persistently loose nut puts the vacuum cleaner out of business—etc., etc.

Possibilities like these are ever present to the householder, but invite no delays, repair bills or expensive new purchases if you have a copy of the Smooth-On Home Repair Book, and a can of Smooth-On No. 1 on the shelf and like to prove yourself equal to the emergency.

Hundreds of repairs similar to the above are made quickly, easily and cheaply with Smooth-On No. 1, which stops leaks of steam, water, gas, oil, gasoline, smoke, etc., anchors loose screws, bolts, nuts, handles, machinery, etc., and holds equally well in metal, masonry, bath room tile, and wood.

Smooth-On No. 1 expands in hardening and when metallized holds as tightly as the metal to which it is attached. Power plant engineers, shop foremen and professional repair men prefer Smooth-On repairs because the simple cold application avoids fire risk and extra labor and a dependable finished job is ready in a hurry.

Mail the coupon for the Smooth-On Repair Book and get Smooth-On No. 1 in 7-ounce or 1 or 5-pound can from any hardware store.



Boiler Crack



Radiator Leaks



Cracked Fire Pot



Cracked Ovens



Stove Pipe Leak



Write for FREE BOOK



Do it with SMOOTH-ON

SMOOTH-ON MFG. CO., Dept. 37,
574 Communipaw Ave., Jersey City, N. J.

Please send the free Smooth-On Repair Book.

Name.....

Address.....

12-33.....

GLASS AND FOOD MADE FROM WOOD

(Continued from page 126A)

or roots has been practiced for many years, but now it has been developed until patents have been issued in America and Canada on the process and dyes used. There is said to be a wide market for such stained wood, especially where ordinary surface-stained wood is exposed to continuous wear. Also, many colored novelties are produced from pieces left in cutting out bigger articles.

The forest products laboratory has even conducted experiments in de-inking old newspapers by a washing process that reduces them to pulp, using a clay found in Wyoming to carry off the carbon. One ton of pulp can be recovered from 2,500 pounds of old newspapers. In Chicago, alone, it is stated, 325 tons of waste newspapers can be collected daily and converted into about 260 tons of de-inked pulp. This would mean a daily saving of 300 cords of wood and annually would equal the cut on 4,000 acres of 100-year-old spruce-fir forest.

THE LATEST GOLD RUSH

(Continued from page 124A)

its top soil and strewn with huge boulders, was useless. Enraged farmers succeeded in stopping this desolation by an injunction prohibiting hydraulic mining, unless great dams were erected to prevent tailings from washing into navigable rivers and destroying agricultural lands below.

Miners now are backing a new scheme whereby the government would build such dams, the cost to be repaid by storage fees charged the miners. If this measure is adopted, at least \$600,000,000 in gold will be placed within the reach of economic mining methods in this one district alone. In the present gold crisis, some believe the government will open up this vast storehouse of the badly needed metal.

The demand for the yellow metal should also bring out much gold left by miners in the ground because they thought it safer there than in the bank. One Washington miner, for instance, scooped out about \$10,000 worth of gold from his claim, then decided to leave the rest of it there so as not to be bothered with too much money at a time!

For real Thanksgiving snapshots TRY THIS NEW LAMP

*.. makes indoor
picture-taking
easy*

only **15^c**



Approximately 1/2 actual size



TO TAKE PICTURES LIKE THE ONE ABOVE, SEE DIRECTIONS BELOW



Think of the thrill of snapping a picture of Grandpa carving the turkey. . . of Jerry digging into a plate heaped high with "trimmin's" . . . and of many other precious indoor scenes! And all you need to make it EASY is some of the new G-E MAZDA Photoflash lamps!

These magic new 15c lamps make it as easy to take vivid, lively pictures indoors as snapshots in sunlight. They eliminate noise, smoke and dust, and can be operated from either light socket or batteries. For best results use them in the new style, inexpensive reflectors.

Photograph the joyous events of Thanksgiving and other occasions — with these new G-E MAZDA Photoflash lamps. Your druggist or camera dealer has them. General Electric Company, Nela Park, Cleveland, Ohio.

FREE—write for an interesting new booklet on INDOOR picture-taking.

**GENERAL  ELECTRIC
MAZDA PHOTOFLASH LAMPS**

When writing to advertisers please mention Popular Mechanics



Set the camera for "time" and place on a table or tripod. Focus, if necessary. Then insert a G-E MAZDA Photoflash lamp in the reflector. You do not need to put out room lights.



When ready to take the picture, open the camera shutter, flash the lamp by pressing the reflector button and close the shutter. It is as easy as taking snapshots outdoors.

RADIO TOURS

LET'S **GO** PLACES
AND **HEAR** THINGS!

Replace weak, limping tubes with tubes made by RCA...and come on along!



A million dollars worth of radio talent—yours on a Radio Tour!

DON'T be a stay-at-home... limited to the few stations near at hand! Come on a Radio Tour! Get the thrill of a "first night" in Hollywood...the Hill Billy "Shindig" in Asheville... those German comedians in Milwaukee...the "Tent Show" in Des Moines...your own college football game back home... "The Kingfish" speaking in Louisiana... Rhumba players down in Havana. A million dollars worth of radio entertainment is waiting for you... Go places, hear things! With new, powerful tubes, with a good radio set thoroughly in order you can bring in stations beyond the reach of tubes that are worn and old.

Have your dealer test your tubes

To go on a great radio tour every night—your ticket is simply a good radio set plus a new set of Cunningham Radio Tubes or RCA Radiotrons to replace weak and limping tubes. Only RCA Radiotrons and Cunningham Radio Tubes are actually made and guaranteed by RCA. Built to give you full, complete tone, wide range, sure performance and long life. A remarkable free booklet, "Radio Tours" tells you whether your set is giving you all it should. It lists all stations in the U. S., Canada, Mexico; it provides a "radio yardstick" and a map that shows your own locality and all the stations you *should* get. Ask your nearest dealer for "Radio Tours"—or mail the coupon below.



Cunningham Radiotron

Without any obligation please send me your illustrated folder "Radio Tours" with station map and "radio yardstick." I am enclosing 10c in stamps for postage and handling.

Name.....

Address.....

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

(Coupon must be sent to RCA Radiotron Co., Camden, N. J.)



TURNING JUNK INTO MONEY

(Continued from page 875)

They cut it in two, remove the metal valve, and slit the rubber from one end to the other, producing a flat strip. Then, after trimming to the desired length, they punch holes across the ends and insert laces. The result is a reducing girdle.

Hundreds of old-time phonographs have been sold in the South American oil fields and Far East rubber plantations where no one cares particularly about the quality of music. And, already, radio manufacturers have met with considerable success in disposing of old battery models in far away lands.

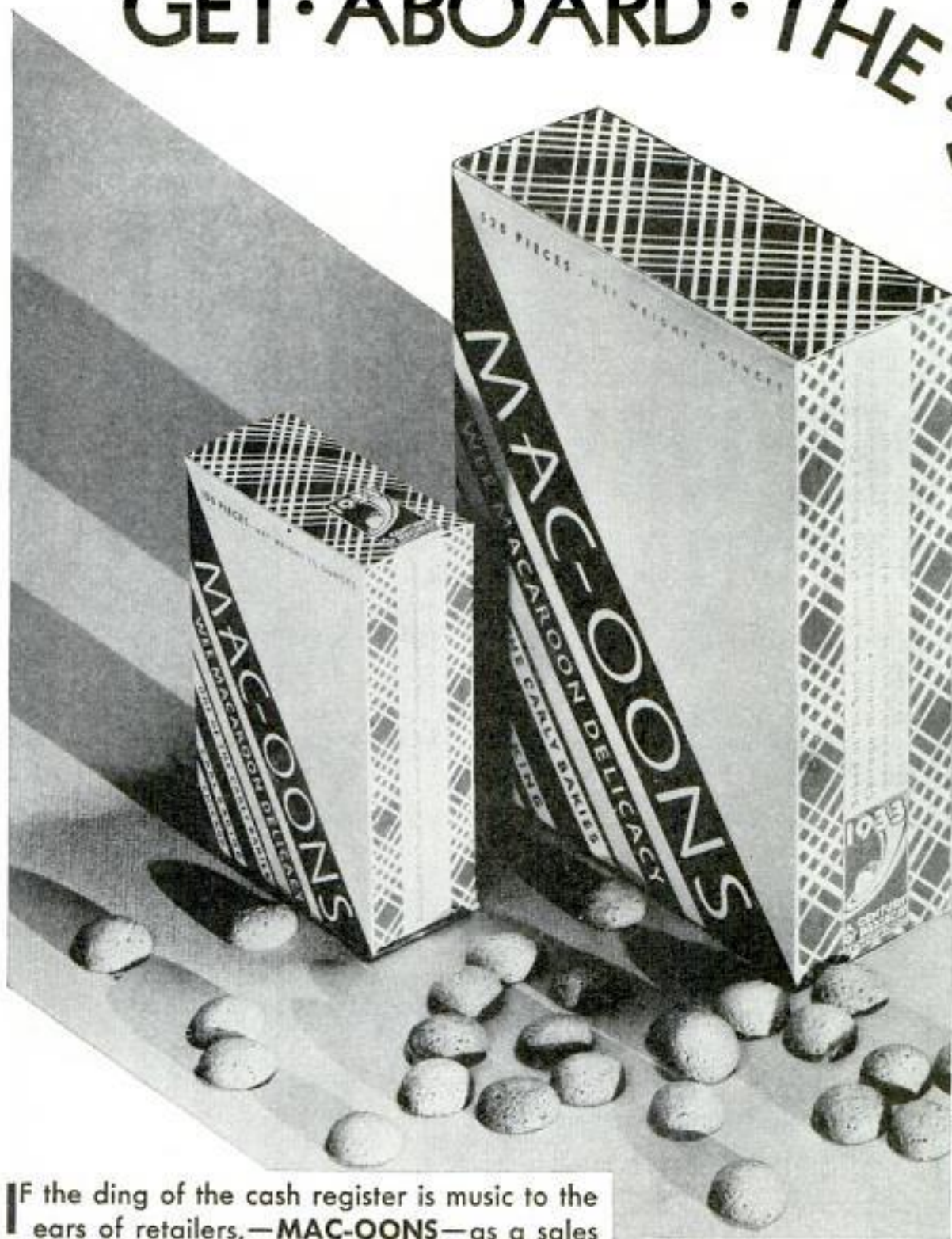
The oil can has done almost as much as the movies to carry the name of American business into far corners of every country. The oil tin has been used for everything from frying pan to roofing material. Often a can will leave the United States full of fuel, return filled with vegetable oil, go out again as a fuel container, and finally wander back as a tin soldier manufactured in Japan where scrap tinplate is used extensively.

Flour barrels, like oil cans, also have many uses. That is a principal reason why barreled American flour is more in demand in the Amazon region than an equally good product from Argentina, which is shipped in sacks that are not particularly useful for anything else, and which last only a year or two in the tropical climate.

However, there are two sides to the story of selling things to unusual markets. Foreigners consider with amazement the funny things exported to the United States. Camel's teeth are used for making charms for fraternal organizations and the popularity of snake-skin shoes, pocket-books and other articles probably left many foreigners wondering why Americans would go to such trouble to hunt reptile coverings. Among other items are porcupine quills from India, for making fish-line floats; walrus whiskers for tooth-picks, and live wasps from Smyrna, for pollinating fig blossoms.

And so it goes. The Yucatan Indian who buys rubber thread so he can enjoy bird meat now and then, is helping the American rubber worker earn money with which to buy a chicken fattened on poultry food containing dried flies imported from Mexico.

GET·ABOARD·THE· BANDWAGON·NOW



If the ding of the cash register is music to the ears of retailers,—MAC-OONS—as a sales stimulator thru-out 1933-34, will provide all with an entire symphony . . . AND WHAT MUSIC

Did YOU write in . . . The Melody Lingers On

CARL BAKING CORPORATION, Dept. P.M.-12
1514 Fulton Street, Chicago

Gentlemen: Please send full details of the Carly Bakesales opportunity in my locality.

CLIP AND *Mail Now!*

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Address _____

City _____ State _____

County _____

SEND 15c (commerc)
FOR SAMPLE.

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You'll get better and longer service from all workshop equipment when you start protecting it with 3-in-One—the oil that is specially-blended to do three jobs at one time. While it lubricates, it cleans working parts and prevents rust. Use it regularly and you'll save many a repair bill. All stores; handy cans and bottles.

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for Every Workshop Use

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CAMERA is an engineering triumph. Takes clear, brilliant pictures. Uses 60 ft. roll 16 mm. film.
PROJECTOR has precision movement. At 10 feet distance shows picture 20 inches by 26 inches clear and lifelike. Automatic threading. Operation from any socket.
We also have a complete list of film subjects for any projector. Write NOW for big, FREE catalogue of Movie Supplies.
PARAMOUNT MFG. CO.
Dept. G-64, Boston, Mass.

COMPLETE OUTFIT
Only **13.75**

IF I WERE BUILDING A HOUSE

(Continued from page 830)

materially reduce the amount of electrical energy required to maintain the walls at the necessary temperature.

Many interesting materials have been developed for the interior walls of the building to replace plaster and wallpaper. These boards or coverings are sometimes attached to a steel back to give them mechanical strength, or may be made entirely of composition materials. The surface can be covered with metal foil and various colored papers or fabrics. One such material, known as micarta, has many remarkable properties. It will not be injured by holding a lighted cigaret in contact with it or by alcohol or similar liquids. For this reason it is suitable for table tops, shelving and portions of the wall which receive the hardest usage, such as doors, door jambs, window sills, etc. It can have some very striking designs laid in the surface. Materials of this kind are expensive and should be combined with less expensive materials for inside finish.

The kitchen is the workshop of the house and it should be given the full advantage of modern engineering. It should have a "U" shaped arrangement. On the wall next to the dining room a combination unit consisting of a range, a refrigerator and the kitchen cabinet should be built. This unit would be continuous from the ceiling to the floor and be sealed in all around. It would constitute the wall space between the two rooms. On the dining room side of this unit should be located the buffet with a slide between the two which could be opened to permit food to be passed from the kitchen to the dining room with minimum handling. Cabinet machinery should be installed for preparing food, such as a meat grinder, vegetable slicer, juice extractor, dough mixer, and machinery for whipping cream and salad dressing. A single motor-operated unit with suitable attachments would serve this purpose.

The bathroom is the next most important room in the house. The floor and the walls, at least part way up, should be covered with material that has some inherent warmth, such as linoleum or rubber tile on the floor and micarta wainscoting. The upper part of the walls could be covered

(Continued to page 134A)

SKY RIDES

THE OUTSTANDING ELECTRIC TOY OF THE YEAR

Model C \$7.95. 1 car, single rail span 64". Towers 25" high.

Model B \$14.50. 2 cars, double rail span 64". Towers 25" high. Remote control for each car.

Model A \$19.75. 2 cars, double rail span 64". Towers 35" high. Elec. searchlights atop towers. Remote control for each car.

Our monorail railways pictured below are fascinating and educational. Your wishes can be satisfied in every way as we make all parts standard so that you can purchase a complete set as low as \$8.85 and add equipment to it as you desire. Of course they operate on 6-8 volt current (no danger to children) and the highest standards of quality and workmanship are maintained. Agents' inquiries solicited.

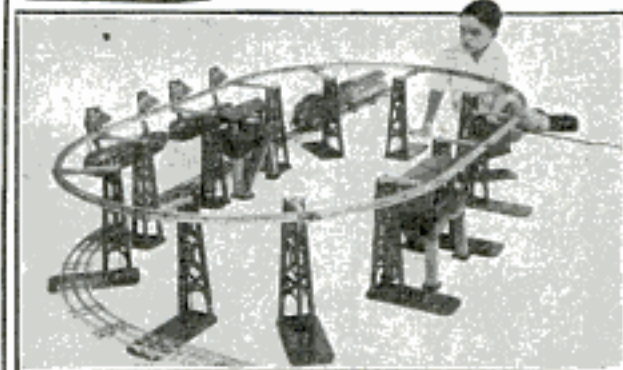
All sets beautifully finished in attractive enamel colors and operate on 6-8 V. A. C. or D. C. All cars illuminated and equipped with individual motors with automatic control that stops and starts them at the towers. Model B and A sets will operate continuously under automatic control. Extra sections 32" length rail for increasing span between the towers \$1.00 ea. Special patented monorail having great structural strength and carrying the complete electrical circuit is used.

The finest toy power motor on earth. Operates on 6-8 V. A. C. or D. C. current. Equipped with geared reduction to 2" pulley. Has plenty of power and reverse control. Motor is mounted on base 9"x3".

\$1.98

Send 10c coin for complete literature

AERO MONORAIL COMPANY
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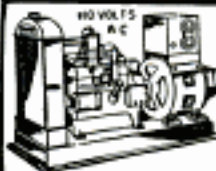


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ONAN A. C. PLANTS furnish the same current as city service—110 volt, 60 cycle A. C. Operates Radio, Water Systems, Refrigerators, all Household Appliances. Sizes 300 to 10,000 Watts Available from stock. No battery used except to start the engine. Ideal for farms, camps and lake homes.

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PROTECT YOUR TOOLS FROM THEFT Write with electricity any name or design on the hardest and finest tools and instruments, or any metal, like writing on paper with pen or pencil. Complete Outfit \$3.50—Free! Send for interesting illustrated circular free. Write today. Agents wanted.

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SHAW Announces LOWEST PRICES in HISTORY



SAVE 1/4. Write for lowest prices ever offered! The SHAW DUAL Tractor is a real year-round money-maker for farms, truck gardens, nurseries, etc. Plows, seeds, cultivates, mows, rakes, hauls, runs belt and shop machinery. New Gear Shift Model. 4 gears, 1 to 8 H. P. Costs but 2c to 4c per hr. to run. Write for 10-page Tractor Offer and New Low Prices. SHAW MFG. CO., 4512 Frost St., Galesburg, Kansas.



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INTERNATIONAL MODELS CO. 1785 Broadway, New York



MACHINISTS—TOOLMAKERS Patternmakers—Die-makers—Choose gifts for yourself and for your friends from Free Catalog of **GERSTNER TOOL CHESTS** 424 Columbia St. Dayton, Ohio

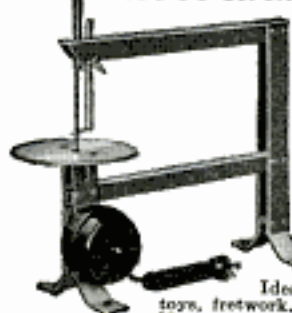
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Cuts 900 strokes per minute

ONLY

\$3.45

COMPLETE



The sensation of the year! A full-sized Jigsaw with motor attached and two saw blades—for only \$3.45. Stands 15 1/2" high, 15 1/4" long. Made of sturdy, channelled steel. Has 12" throat. Work table is 6 1/4" round. Motor operates on AC current only, 105 to 110 volts, 50 or 60 cycles. Direct cam drive gives maximum power. No belts to break or slip. Handles wood up to 1 1/2" thick. Cuts 900 strokes per minute. Comes complete with cord, ready to plug in light socket. Ideal for making Jigsaw puzzles, statuettes, toys, fretwork, etc. Jigsaw guaranteed for one year. Never before such an amazing bargain.

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PLAY SAFE . . .
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WHEN IT'S AN



YOU PAY twice for some batteries. First, with the purchase; and later, in rental charges, charging fees, etc. Play safe. Get a battery you *know* will do its job in any weather. Get an Exide. It costs no more, and exceeds rigid starting standard of the S. A. E.

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Please send me your free book No. 1369 on battery care, etc.

Name _____

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IF I WERE BUILDING A HOUSE

(Continued from page 132A)

with canvas and the ceiling with aluminum foil which can be dyed any suitable color. Heating wires in the ceiling may provide radiant heat which the aluminum cover will help to distribute through the room. A radiator should provide heating during severe weather with the radiant heat from the ceiling used as an auxiliary. The shower and built-in tub can be enclosed with micarta and provided with a sliding glass door and connected with an outside vent provided with a small fan to carry off the steam when hot water is used for bathing. The shelving can be made of aluminum and micarta which is unbreakable and in other respects as durable as glass or porcelain. In the ceiling a sun light may provide an ultraviolet bath when desired. Towel racks may have low-wattage electric heaters located in the wall back of them for drying towels, stockings or other wet objects.

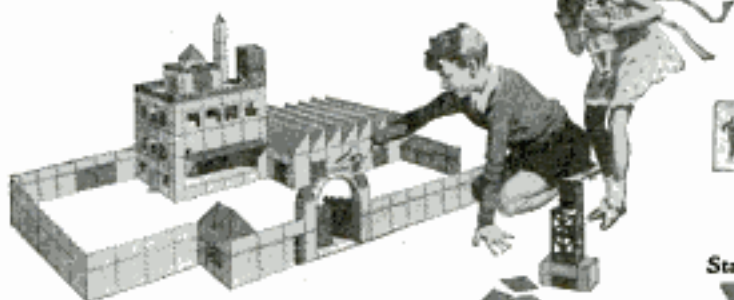
The living room is used more perhaps than any other part of the house. It should be as plain as possible with a neutral color of walls and trim to give a restful effect. The fireplace might be finished from the floor to the ceiling with micarta and above the mantel could be located a decorative panel of this material. The furniture could be of metal and micarta. The radio loud speaker may be built in the wall with the control for it in one arm of the davenport.

The furniture in the bedroom could have novel features. The beds and dressing table should be wired up for electrical attachments. The dressing table should be equipped with the various electrical appliances useful in making a toilet, and have individual lighting.

A modern two-story house with a flat roof probably will not look very well when built between two old-type houses unless the lot is sufficiently large to permit landscaping to screen it from the adjacent houses. One solution would be to build a group of modern houses around a central court. It requires considerable courage to build a modern type of house among neighbors who still cling to the old type of structure. They will all appreciate the convenience and pleasing arrangement of the interior, but may not agree with the flat roof and exterior appearance because of the contrast with old-type homes.

MAKE IT WITH

STANLO

THE NEW METAL CONSTRUCTION TOY
IN BRILLIANT COLORS

● Automobiles, houses, trolley cars, boats, bridges, forts, steam shovels, factories, doll furniture and hundreds of other things—build them with STANLO. And, best of all, every piece in a STANLO set is finished in brilliant colors so that you can obtain almost any color combination. ● An entirely new principle is used in fastening the pieces together and the finished project is absolutely rigid. There are no nuts or

bolts to lose. ● A 24 page Instruction Book comes with each STANLO set. It shows over 125 different things to make and suggests many others. ● There are seven different STANLO Sets. (They cost—\$1.00, \$2.50, two at \$5.00, \$7.50 and two at \$10.00.) Ask your toy dealer to show you STANLO—it's entirely new. Write us for descriptive circular. ● If the set you want is not obtainable in your local store, we will send it, fully prepaid, upon receipt of price.

Three of the seven Stanlo Sets

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Mahogany finished
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SCALE MODELS

YOUR CHOICE OF 10
DIFFERENT MODELS

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MONOCOQUE	SPARROW HAWK	PUSS MOYH
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HEATH PARASOL		

60¢

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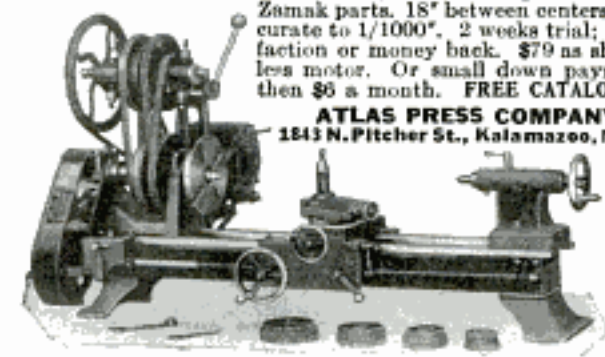
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Buy it for your shop for Christmas. Up-to-the-minute design... V-belt drive, built-in countershaft, runs from light socket, 45 Zampak parts, 18" between centers. Accurate to 1/1000". 2 weeks trial; satisfaction or money back. \$79 as shown, less motor. Or small down payment, then \$6 a month. FREE CATALOGUE.

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Model \$100
Only \$39.90
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Send Underwood No. 5 (F. O. B., Chicago) at once for 10-days' trial. If I am not perfectly satisfied I can return it express collect. If I keep it I will pay \$3.00 a month until I have paid \$44.90 (term price) in full.

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Write for additional information on the WinnerSet Values—FREE of obligation.



CONTENTS \$4.00

80 POWER "CLEAR-FLEX" MICROSCOPE

Dissecting Scissors
Dissecting Blade
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11 Thin Professional Slides
Concave Center Slide
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SPECIAL OFFER—The above outfit (without microscope)... \$2.00
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SALESMEN! Sell Tear Gas Fountain Pens. Every Home, Store, Bank, etc., prospect. Sample furnished.

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THIRTY TYPES OF BLUE FLAME PRESSURE AND VAPOR BURNERS

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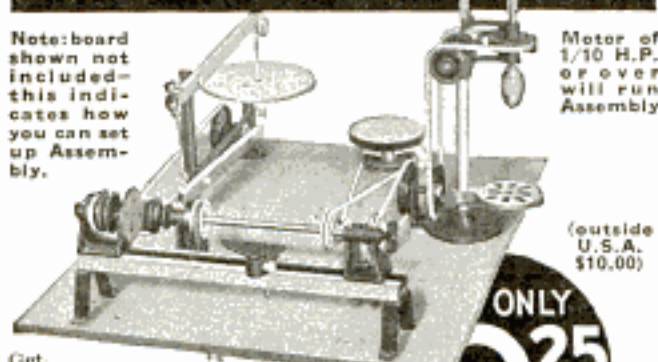
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The Crosman Silent .22 Single Shot and the Crosman Silent .22 Repeater pneumatic rifles are a decided improvement over the noisy old-fashioned powder guns because of their absolute and unflinching accuracy.

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They, uh!—stay hooked

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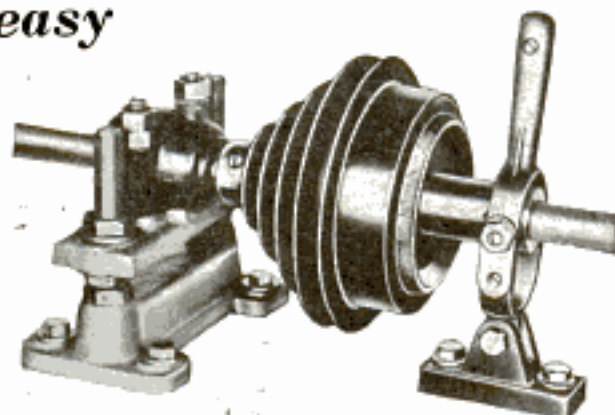
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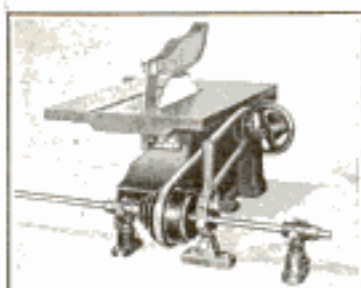
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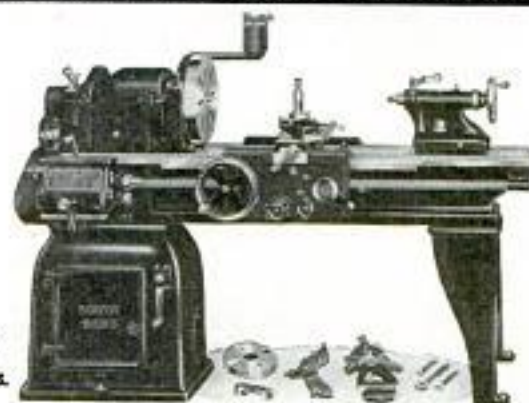
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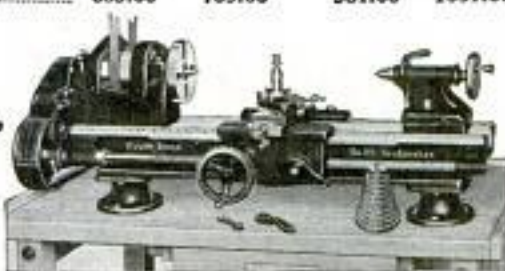
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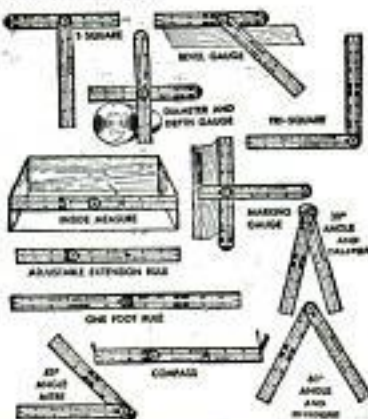
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