December

25 Cents

POPULAR MECHANICS MAGAZINE

WRITTEN SO YOU CAN UNDERSTAND IT

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Popular Mechanics Magazine

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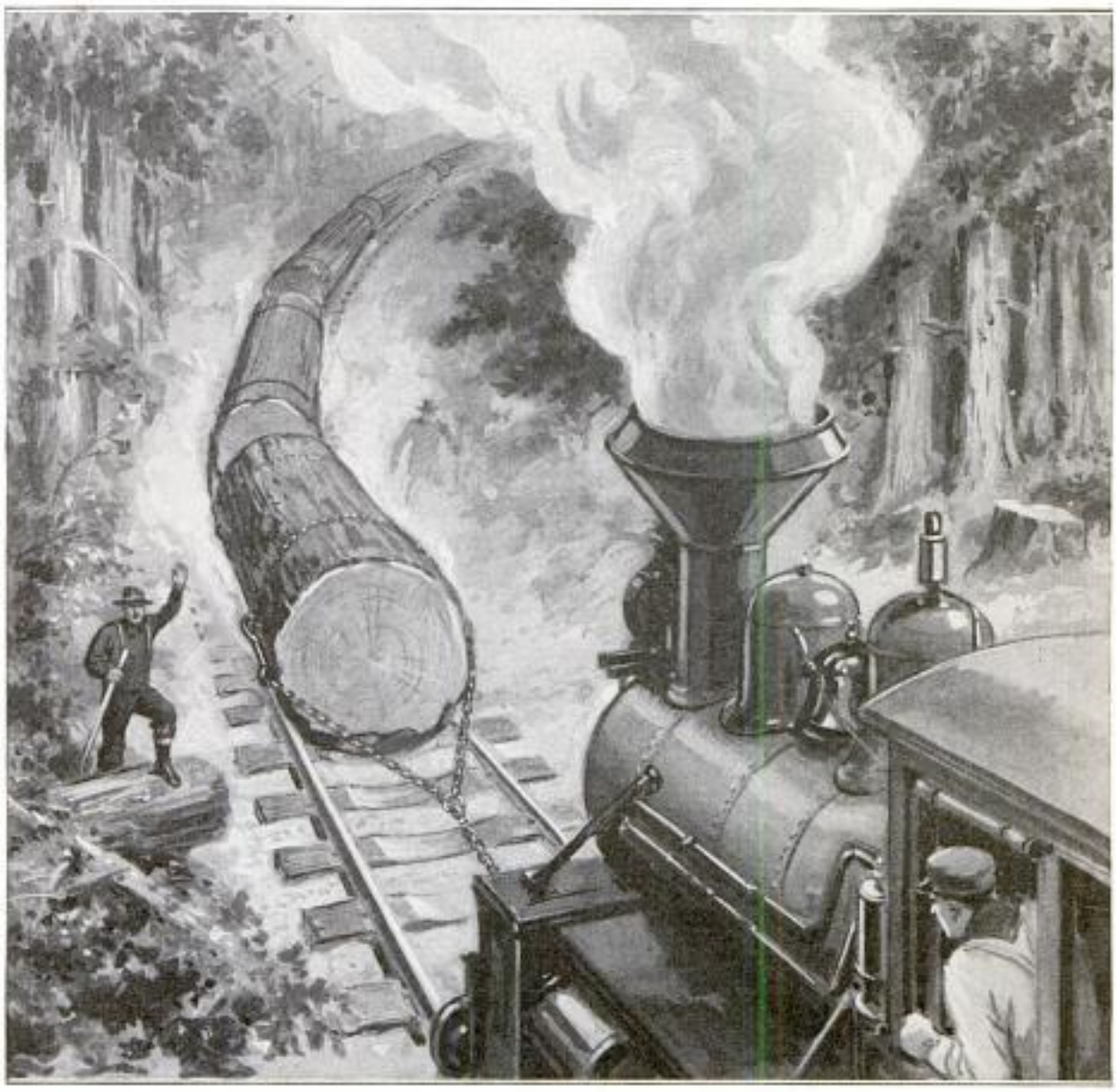
VOL. 36 DECEMBER, 1921 No. 6

Logs Skidded to Mill without Flumes or Cars

A LOGGING company in the mountains near Seattle, Wash., has adopted a novel method of skidding out logs without the use of flumes or railroad cars. A logging railroad runs from the point where the logs are cut, to a millpond several miles away. The ties have been hollowed out between the tracks and sprinkled with "skid grease," forming a track similar to the common skid road. The logs are rolled into the hollow between the rails and "dogged" together with chains in strings of as many as twenty. They are then hooked onto a logging engine and hauled to the millpond. A speed is often attained which



Skidding Logs to the Mill without Loading onto Cars: The Engine Hooks onto a String of 20 Logs and Hauls It along a Skidway between the Tracks. This Method Is Both More Rapid and More Economical Than the Usual Method of Hauling on Flat Cars, Especially in Rough Mountain Country

causes considerable smoke from the friction of the logs against the ties. At the millpond the logs are easily rolled by hand down an incline into the water.

NEW RIDING DEVICE IS USED ON THE DANCE FLOOR

An amusing sort of ride is obtained with a new device propelled as if dancing. A bicycle seat, for the gentleman, is mounted on a circular frame resting on rubber-tired wheels. In front of this is a high cushioned seat with a canvas backrest for his "dancing" partner. The man rests his feet on the floor and, by going through the movements of the dance steps, propels the car about the room. The device moves quite easily and cannot be upset. Several of these in a large hall, with suitable music, furnish considerable pleasure and amusement particularly with the type of crowd to whom the novelty show appeals.

This Dancing Car Moves Easily about the Floor on Its Rubber-Tired Wheels When the Man Propels It by Dance Steps

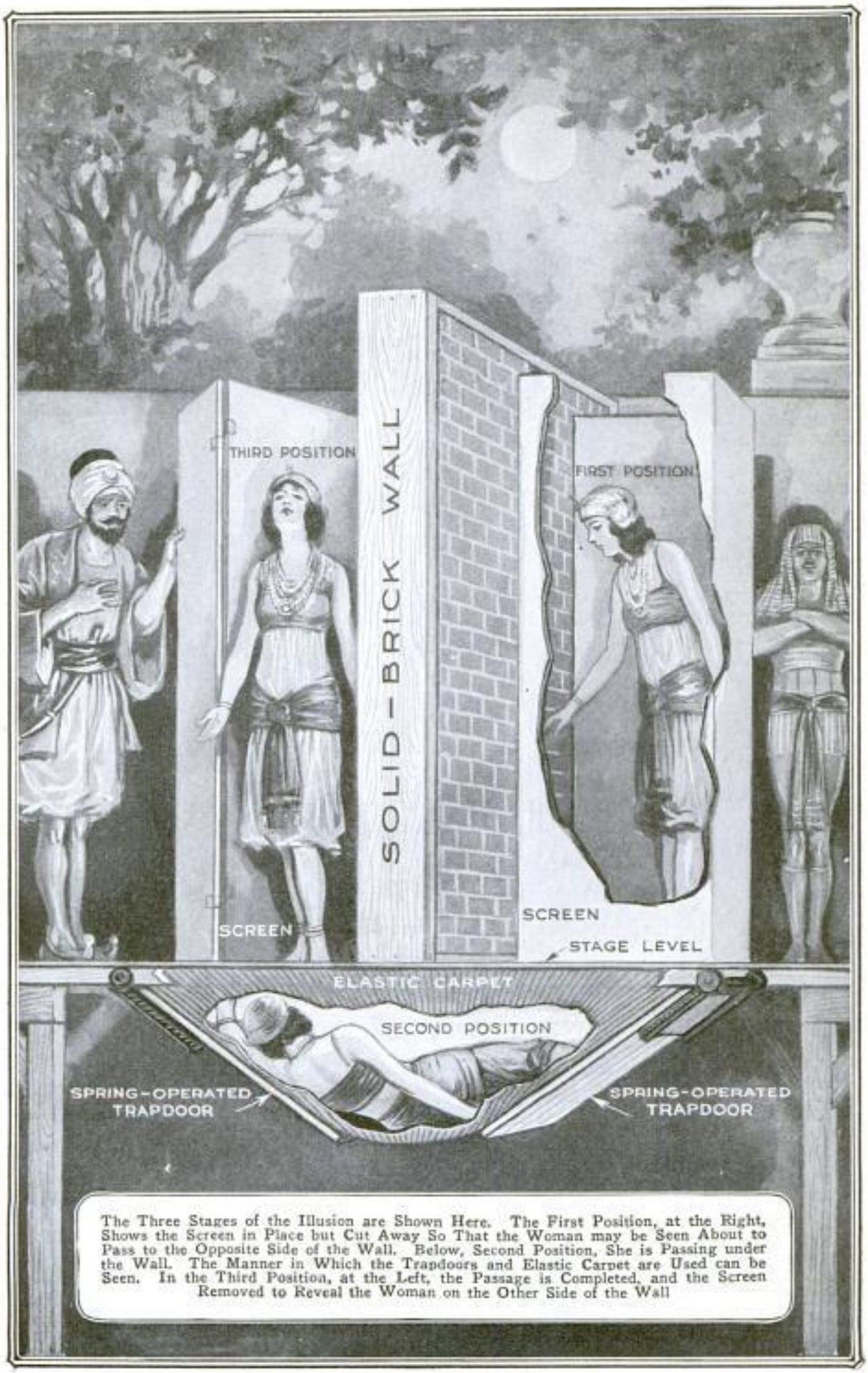
COLOR REMOVED FROM SUGAR LIQUOR BY LIGNITE CARBON

To remove the color from sugar liquor, so that white refined sugar may be obtained from it, the only substance heretofore used has been animal boneblack. Recent experiments have demonstrated that carbonated lignite will not only successfully take its place, but actually do the work better and more economically, because of the abundance of the material and its greater effect as a decolorizing agent. The carbonized lignite retains the porous structure of the original vegetable matter, and upon this fact its superiority over boneblack is derived. In using boneblack to decolorize the sugar liquor, a quantity equal in weight to the dry sugar contained in it has to be used, while only one-twentieth as much of the carbonized lignite is required.

WALKING THROUGH A WALL MYSTIFYING TRICK

At performances in England, a woman apparently accomplishes the impossible feat of passing through a solid brick wall. The wall is built on the stage, in the presence of the audience, by genuine bricklayers, secured through advertising. It is 8 ft. high, 10 ft. long, and 9 in. thick, and is built in a wooden frame to assist in holding it together and facilitate moving it about the stage. Several members of the audience are invited to the stage to inspect the wall and the floor covering. The latter is raised with ropes to aid inspection. Everything is normal, just as represented. The wall, standing on the carpet, is turned with one end toward the footlights so that both sides are visible. A screen is placed about the woman as she stands on one side of the wall, so that the exact method of passing through cannot be seen. A second screen is placed about the spot on the opposite side where she will emerge. Then the two screens are removed. The woman is standing on the other side of the wall. Otherwise nothing is changed. Like all well-executed illusions, it is simply accomplished.

A specially prepared carpet is used, the center of which is of material permitting considerable stretch. This center is directly under the wall and over a special trapdoor, in the stage floor. When the screen is placed about the woman, she merely sinks to her knees, forcing open the trap by the weight of her body, crawls under the wall, and rises to her feet on the opposite side. The trap is closed by the pressure of heavy steel springs, and the elastic portion of the carpet springs back into place.



The Three Stages of the Illusion are Shown Here. The First Position, at the Right, Shows the Screen in Place but Cut Away So That the Woman may be Seen About to Pass to the Opposite Side of the Wall. Below, Second Position, She is Passing under the Wall. The Manner in Which the Trapdoors and Elastic Carpet are Used can be Seen. In the Third Position, at the Left, the Passage is Completed, and the Screen Removed to Reveal the Woman on the Other Side of the Wall

UMBRELLAS OF OILED PAPER FOR EMERGENCY USE

Almost everyone has been caught unprepared by a sudden rain and has wished he might buy an umbrella, for the emergency only, without investing a dollar or more. An umbrella, which will meet that want, has recently made its appearance. The top is of heavy oiled paper, which sheds water effectively, and the handle is of cheap wood. Its cost is far less than the price for pressing a wet and wrinkled suit.

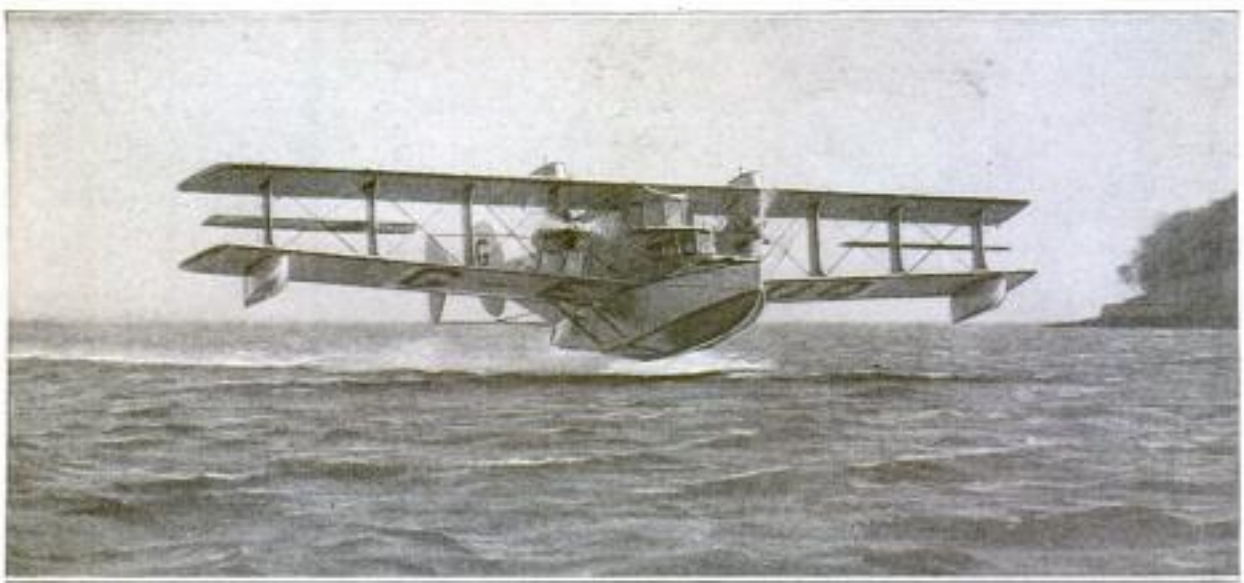
The Oiled-Paper Umbrella may be Used Several Times, but if Only Used Once, in an Emergency, It Is Worth Its Price of 25 Cents

PORTABLE GASOLINE PLANT TESTS CASINGHEAD GAS

Extracting gasoline from natural gas has become such an industry that a practical method for determining the gasoline content of a gas, before building a plant, has become necessary. As the laboratory method often is inconvenient and impractical, an Oklahoma man solved the problem by simply mounting a miniature extraction plant on an automobile chassis. The plant consists of a small two-stage compressor, vacuum pump, scrubber, intercoolers, and accumulator tank. Power is supplied by the automobile engine, through an auxiliary shaft. Results with this outfit compare very closely with those obtained from an actual plant, thus showing its practicability.

COMBINATION LAND AND SEA PLANE OF ORIGINAL DESIGN

A European-built seaplane, the "Kittiwake," equipped with landing wheels, follows entirely original ideas in flying-boat design. The hull is a V-bottomed hydroplane which can be removed and replaced if damaged. At each side it contains a box structure, closed by a trap-door, into which the landing gear can be raised. The body above the hull houses the pilot and mechanic and also contains a cabin accommodating five passengers. The wings are built up on two spars of normal box construction, with girder-type ribs between. A single row of bracing and I-form struts is used. Leading and trailing-edge ribs of duralumin are hinged to the front and rear spars, and are operated up or down simultaneously. Wind-tunnel tests indicate that this form of variable wing will permit a low landing speed, a quick take-off, and high speed. Lateral control is by balanced interplane surfaces. All parts, except the struts next the fuselage, which are of duralumin expanded into streamline mountings for two 200-hp. motors, are covered with a special plywood.



The New Type of Seaplane Rising from the Water: The Inclosed Cockpit for the Pilot and Mechanic can be Seen Just above the Hull and Well Forward. Above It Is the Main Cabin for Passengers

WORLD'S BIGGEST NAVAL GUN TESTED AT ABERDEEN

Ordnance Experts Examining the New 50-Caliber 16-Inch Rifle at the Aberdeen, Maryland, Proving Grounds: Tests Demonstrated It to Be the Most Powerful Gun in Existence. It is Mounted on a Barbette Carriage, and is Elevated and Turned Laterally by Electric Appliances. It Has a Calculated Range of 35 Miles

Ordnance experts, at the Aberdeen, Md., proving grounds, made the first tests, on October 7, of the new 50-caliber 16-in. naval rifle, that proved it to be the most powerful gun in existence. It has a calculated range of 35 miles, with a 2,300-lb. projectile. On account of the haze, the long-range tests could not be made, however, and the projectiles were fired only 20 miles. The gun is mounted on a barbette carriage that permits an elevation of 65°, which is necessitated by the trajectory, or curving course of the projectile, of such a long range. The huge weapon is operated electrically, and can be turned laterally and elevated by one man. During the tests a heavy block of armor plate was completely penetrated in three places. A great number of ordnance men and engineers witnessed the tests.

Crowd of Ordnance Experts and Others Viewing the Holes Made in a Heavy Armor Plate by Three Projectiles from the New 16-Inch Naval Gun: On Account of Hazy Weather It could Not be Tested for Its Extreme Range

COLLECTION OF CLIPPINGS PRESENTED TO MME. CURIE

Madame Curie, the famous woman scientist and discoverer of radium who was the recipient of many honors during her recent visit to the United States, has now been presented with a set of books containing press clippings concerning her visit. The set consists of 11 volumes. Each volume measures 21 by 14 in., is 3½ in. thick, and is bound in full levant morocco leather. The collection was compiled and presented by the United States Radium Corporation of New York.

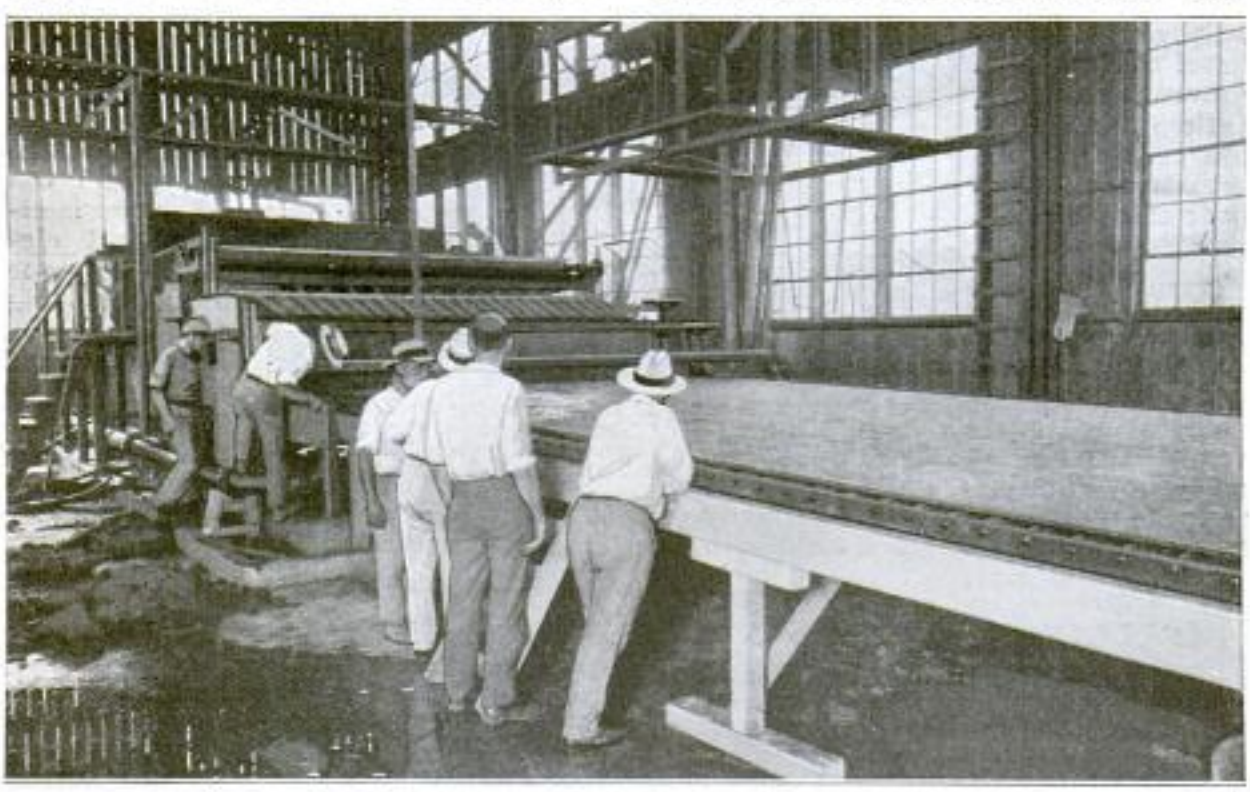
SUGAR-MILL WASTE YIELDS DURABLE BUILDING MATERIAL

By THOMAS EWING DABNEY

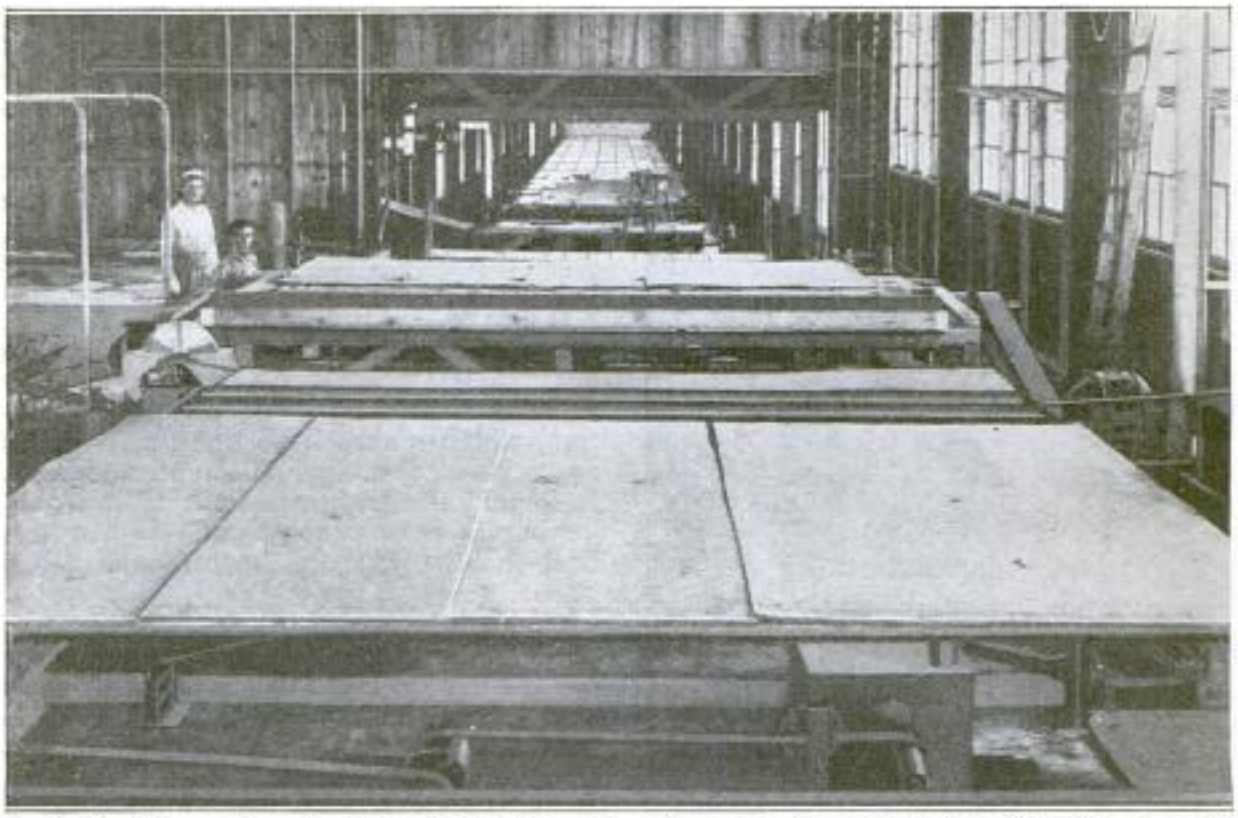
ONCE more science has turned a waste product into one of commercial value. This new achievement is the making of building board from the refuse of sugar cane after the juice has been pressed out at the sugar mill. The refuse, known as bagasse, is about 10 per cent of the weight of the entire sugar-cane crop and amounts to 250,000 to 500,000 tons a year. Its disposal has long been a problem, and the original practice was to burn it in great piles. During the grinding season the smoke of the burning piles clouded the whole countryside, in the sugar-cane regions. Mark Twain, in his "Life on the Mississippi," says that the bagasse "fog" was the bane of the river pilots. Later it was discovered that bagasse could be used as a fuel, to fire the boilers of the sugar mills. In this way it attained a certain value, but the more recent discovery materially increases that value. It is now being made into a substitute for lumber which possesses peculiar qualities, and for some purposes is superior to wood.

Baled Bagasse, the Waste Product of Sugar Mills, being Received at the "Lumber Factory" Where, by a New Process, It is Made into a Building Board Which Serves as a Substitute for Wood

The first plant for manufacturing bagasse "lumber" was built in New Orleans, at a cost of $500,000, and began operation late last August. It is the result of two years of experiments by experts in the fiber and insulation busi-



After Passing through the Cooking and Beating Processes, the Pulp is Subjected to Great Pressure and Rolled Out, between These Steel Rollers, into Continuous Sheets, 12 Feet Wide. It is Then Dried and Heated, to Harden It

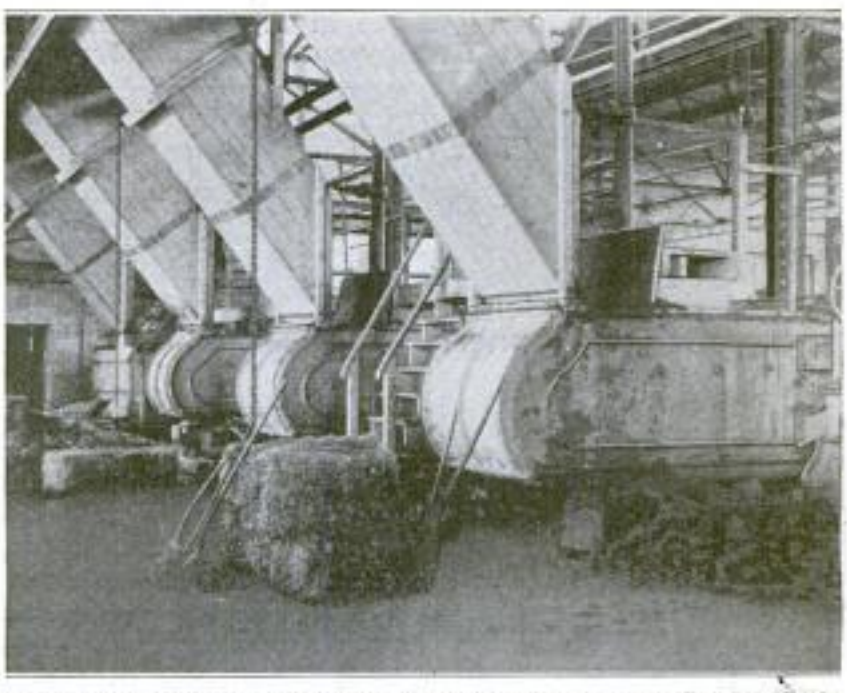


The Cutting Room Where the "Lumber" is Taken When Thoroughly Dry: Here Three Traveling Saws Cut the Sheets, in Exactly the Same Way That Lumber is Cut, into Pieces of Any Desired Size. The Standard Boards Are 12 Feet Long, 4 Feet Wide, and ½ Inch Thick

ness, and utilizes a patented process. The bagasse is baled, as it comes from the rollers of the sugar mill, and shipped to the "lumber factory." There it is first cooked to destroy the decay-producing spores and is treated with chemicals to make it waterproof. It then passes to beating machines, which pound it to a pulp. When thoroughly beaten, it is passed through rollers and compressed into a continuous sheet, 12 ft. wide. At this stage it is soft and must be dried.

The drying building is more than 1,000 ft. long. Here the product is subjected to intense heat by means of coiled steam pipes placed beneath the floor. The finished lumber comes out in sheets 12 ft. wide and 900 ft. long, sufficient material to build three or four five-room bungalows. It is sawed, in the same manner as ordinary lumber, into standard-size sheets, 4 by 12 ft., though of course it may be cut into any other sizes.

Small air cells between the fibers of the material make it very light, ½-in. lumber weighing only a little over ½ lb. per square foot. Handling it, in any sizes that can be shipped by rail, is simple. A man can carry an 8 by 24-ft. piece, containing 192 ft. board measure, but weighing less than 100 pounds.



From the Cookers, Where the Decay-Producing Spores are Destroyed, the Bagasse, Mixed with Chemicals, Passes to These Pulping Machines

One of These Standard-Size Boards, 4 by 12 Feet, Is So Light That One Man can Handle It Easily. It Weighs About 24 Pounds

The product is waterproof. As a test, a piece was left in water for 20 days and absorbed only .1 per cent moisture, by weight. The outside was barely permeated. Because of this, it can be used for exterior as well as interior work. In fact any part of a house may be built of the material, except uncovered floors, doors, millwork, and heavy timbering. It will not decay even if not painted, and has a pleasing color. It takes calcimine or paint quite readily, and plaster and stucco adhere to it tenaciously. It even can be used as a roofing. The cellular formation, which makes it so light, also serves as an insulation against sound and heat. It is said that a house built of it would be cooler in summer, and require less heat in winter, than the ordinary frame house.

One ton of bagasse is required to make 3,000 ft. of lumber, so the total possible production from the waste of Louisiana's cane land would be from 750,000,000 to 1,500,000,000 ft. a year, if there were sufficient manufacturing facilities to use it all, but this first factory can only handle a fraction of this total.

SMALL ROOFS PROTECT TROUT IN HATCHERY POOLS

The trout is naturally a cold-water fish. He lives in streams fed by cold spring water or, in mountain country, by melting snow. In hot weather he seeks the deep pools and the shelter of logs, rocks, or overhanging banks. These natural conditions are difficult to reproduce in the artificial pools of a fish hatchery and so a substitute must be provided. At the State Fish Hatchery, at Paris, Mich., miniature roofs have been built over part of the trout pools. In hot weather the fish stay close in the shade of these roofs and are well protected from the heat of the sun.

These Miniature Roofs are Built in the Trout Pools of a Fish Hatchery. In Hot Weather, the Fish Stay Close under the Roofs

SHEEP HERDS IN AUSTRALIA PROTECTED FROM WILD DOGS

Australia has long been troubled with animal pests. Sheepowners there have had to guard their pasture lands from the devastating droves of innumerable rabbits, and now they have to guard their sheep from the depredations of wild dogs, known as "dingoes." These pests are barred from the sheep lands by means of a fence which is dog-proof, and every owner of land is compelled by law to kill the dogs that appear in his territory. A law of this nature, it appears, is rigidly enforced in Australia, and there will be no possibility of one lax landowner disregarding its observance to the detriment of his neighbors.

The Automobile-Boat has Just Emerged from the Water. The Method of Mounting the Paddles upon the Rear Wheels can be Seen Clearly Here, as Well as the Mounting of the Front Wheel

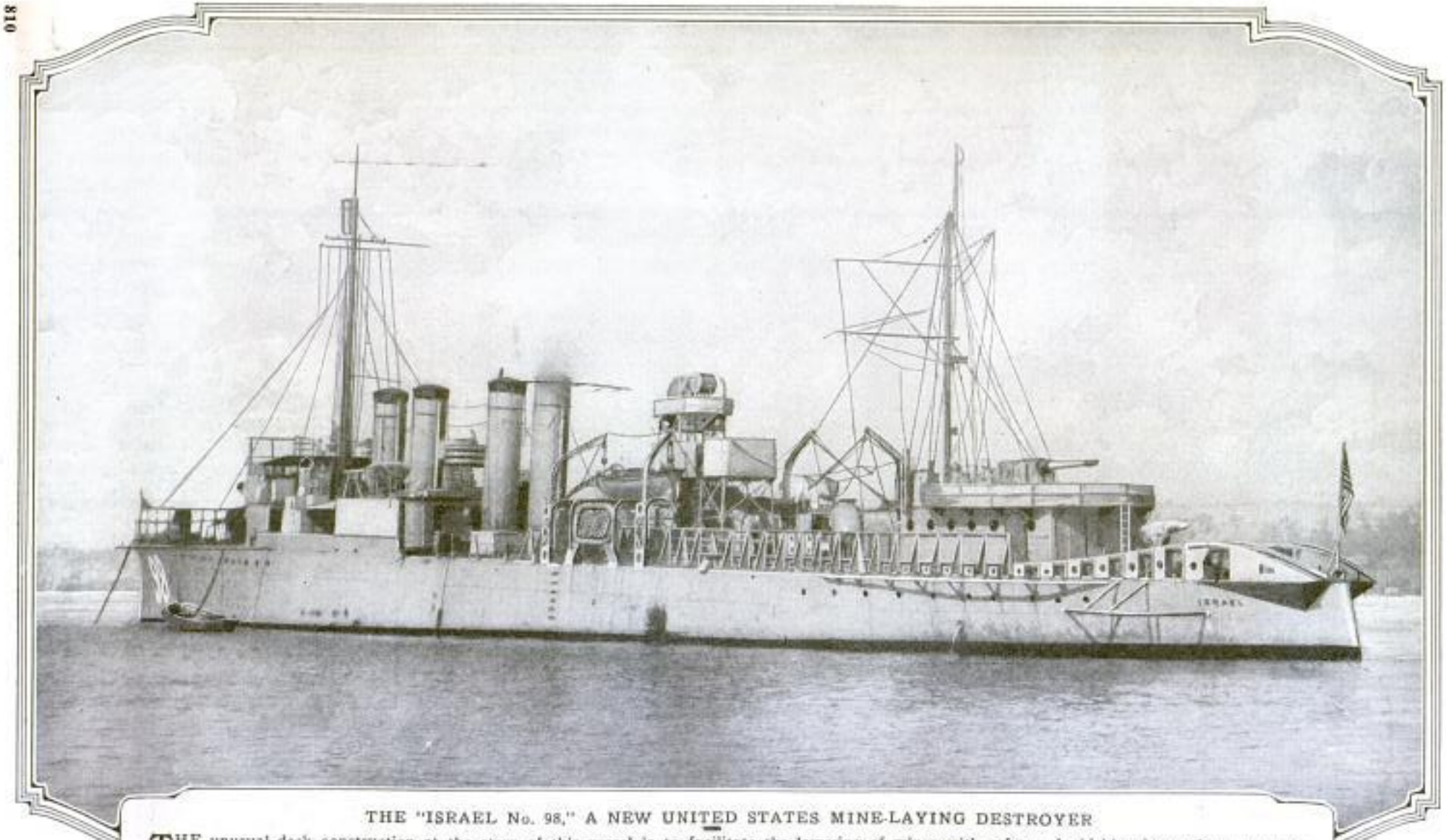
WHEELS PROPEL AUTO-BOAT ON LAND OR IN WATER

A combination automobile and boat, lately built in Europe, is propelled by the same wheels, whether traveling on land or in the water, no change of gear or power being required in going from one to the other. This is accomplished by means of paddles mounted on the inner surfaces of the two rear wheels and covered by broad "mudguards." The body resembles a boat hull. At the front is a single wheel mounted much like the front wheel of a motorcycle. This is a solid disk wheel, on which is mounted a rudder-like shield, and is used for steering both on land and water. It is controlled by means of a marine steering wheel. Should the engine become stalled, this odd vessel can be propelled by means of a pedal arrangement.

AUTOMATIC TRAFFIC CONTROL PREVENTS CONGESTION

By synchronizing traffic, the inventor of an automatic traffic controller claims that congestion will be largely averted. With the present system, traffic at one corner may be going north and south, while at the next corner it is going east and west. The result is congestion. With an automatic traffic controller at each corner, the same signal can be simultaneously flashed by all the controllers. The device consists of go, stop, and traffic-change signs on top of a small tower. The lights are operated by a small motor, 30 seconds being allowed for the traffic each way. Three seconds before changing, a traffic-change signal lights, warning the motorist. It has been successfully tried out in Milwaukee.

The Controller being Tried in Milwaukee: The Shutterlike Arrangement Is to Prevent the Light from being Seen from the Side

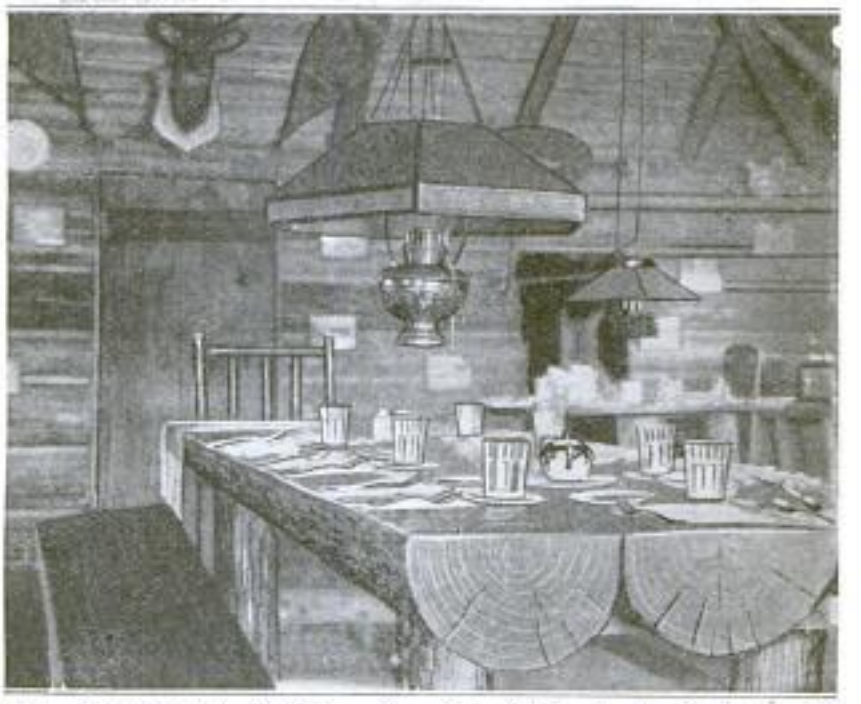


THE "ISRAEL No. 98," A NEW UNITED STATES MINE-LAYING DESTROYER

THE unusual deck construction at the stern of this vessel is to facilitate the lowering of mines with safety. Amidships is another construction characteristic of these new mine-laying destroyers, in the form of a high platform from which a very powerful searchlight is operated. The "Israel" is 314 ft. long, with a beam of 31 ft., and a speed of 41½ miles an hour.

DINING TABLE IS MADE FROM SPRUCE LOG

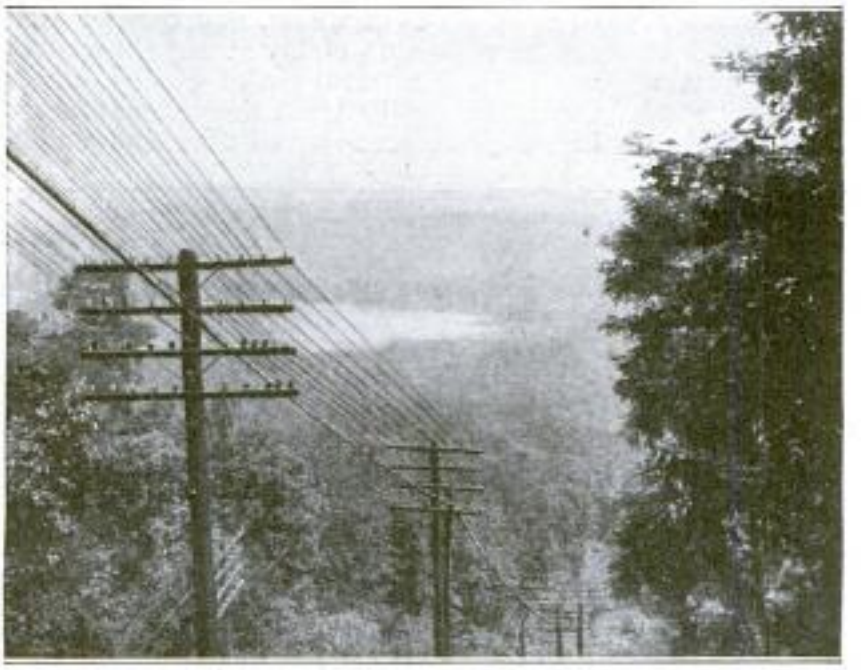
Two young women proprietors of a camp in northern Maine conceived the idea of making a table out of a single spruce log. The log was first cut in two and the halves milled down with a broadax until they were nearly alike in size. The flat sides were then planed until a smooth surface was obtained. The upper portion of the tree from which the log was taken formed the legs and underframe of the table. After placing the log sections side by side on the rustic underframe and with their flat surfaces upward, filler and varnish were applied until a bright finish was obtained, with a polish of high quality.



Dining Table Made by Splitting a Spruce Log, Trimming the Flat Faces with a Broadax, and Finishing Them with Filler and Varnish: The Legs and Underframe are Made from the Upper Part of the Same Log. The Table Is in a Rustic Camp Building in Northern Maine

NEW YORK-CHICAGO CABLE IS ENGINEERING FEAT

A continuous telephone-telegraph cable between New York and Chicago, in which all recent improvements of these means of communication have been applied, will be one of the notable engineering achievements of this age. The line is now well under way, but on account of the rough country encountered, construction methods were required which called for all the resourcefulness and ingenuity of the corps of skilled engineers.



The Section of New York-Chicago Cable between Harrisburg and Pittsburgh Passes through Some Rough Country. The Cable Is the Equivalent of Eight Open-Wire Pole Lines, Having from 220 to 290 Telephone Circuits, and from 175 to 200 Telegraph Circuits

The cable is not only remarkable because of its length and difficult construction, but also on account of the tremendous amount of material used. The portion now under construction between Harrisburg and Pittsburgh, Pa., consists of 2,000 sections, with a total weight of 4,000 tons. Splicing these sections, alone, has taken nearly 20 tons of solder, 15 tons of paraffin, and 7,000 sq. yd. of muslin, while the pole line required over 13,000 chestnut poles. The cable used will provide 220 to 290 telephone circuits, and 175 to 200 telegraph circuits, or the equivalent of eight open-wire pole lines.

FAMOUS PORTUGUESE MILITARY ORDER HONORS "NC-4" CREW

Because the United States flying boat, "NC-4," first landed on Portuguese soil after its transatlantic flight, the famous "Military Order of the Tower and Sword of Portugal" decided that it was appropriate for them to honor the members of the crew. A decoration for "Valor, Lealdade e Merito" (courage, loyalty, and merit) has been presented to each of the men. Those given to the officers are of gold, and those for the men of silver. The decoration is in the form of a chain of tower and sword emblems terminating in a star, to be worn on state occasions. A smaller star, hung on a ribbon, is provided to be worn on ordinary occasions.

TREASURE HUNTING POPULAR SPORT IN CORONADO ISLANDS

Hunting pirate caves has become a favorite sport on the Coronado Islands, which lie about 25 miles off the coast of Lower California. Late last August a party of visitors was exploring one of these islands when one of them, in sport, overturned a large rock in one of the numerous caves. To his surprise, he uncovered a cache containing 22 silver coins of early Spanish origin, a skull, grass garments, and other objects, indicating that the cave had been used by one of the pirate bands which preyed on ships bringing settlers to the Pacific coast in the early years of the nineteenth century. As a result of this discovery, parties are being formed to search the other caves of the islands in the hope of finding other caches. There are several hundred caves, scattered over this group of seldom-visited and little-known islands, which will be carefully explored.

NEW TIRE CHAIN IS QUICKLY AND EASILY ATTACHED

A new tire chain for trucks overcomes most of the weaknesses of ordinary chains. Two metal hoops are permanently attached to the spokes of each wheel, one on the inside and one on the outside of the wheel. When needed, short lengths of chain can be snapped onto these hoops without using any tools and without moving the truck. As many chains as desired can be used on each wheel, and broken links can be replaced quickly at any time. The method of attaching the chains allows them to creep between the spokes, resulting in great economy of tires and chains.

The Map Shows the Location of the Coronado Islands, Where the Pirate Cave was Found, Directly West of the Boundary between California and Lower California. At the Right: The Cave, One of Hundreds on These Islands, Which Contained the Treasure. An Old Spanish Coin, Part of the Find, is Shown in the Inset

SNAGGING DEADHEADS IN A LAKE

By A. B. Elliott

SOME 25 years ago, a lumber company in northern Wisconsin ceased operating, leaving behind several hundred thousand feet of deadheads which had sunk in the lake at the site of the mill. Broken and rotted timbers and piles of brick are the only remains of the old mill, but the lumber in the lake is in as perfect condition as when it went to the bottom.

Since then, there have been sporadic efforts by the former owners to salvage the timber, by various methods, with teams and grappling hooks, men in bathing suits, etc., all of which have proved costly and impracticable.

The old mill site and the surrounding cleared land were recently purchased by a master mechanic from Illinois, who, tiring of the factory, turned to the farm. The problem of the treasure in the lake interested him, and utilizing his mechanical knowledge, he devised a simple and ingenious method of raising the abandoned lumber.

Device for Snagging the Logs: It is Fastened to the End of the Lifting Cable. The Large Nail at the Bottom is Driven into the Log by Letting Fall the Sliding Weight on the Rod

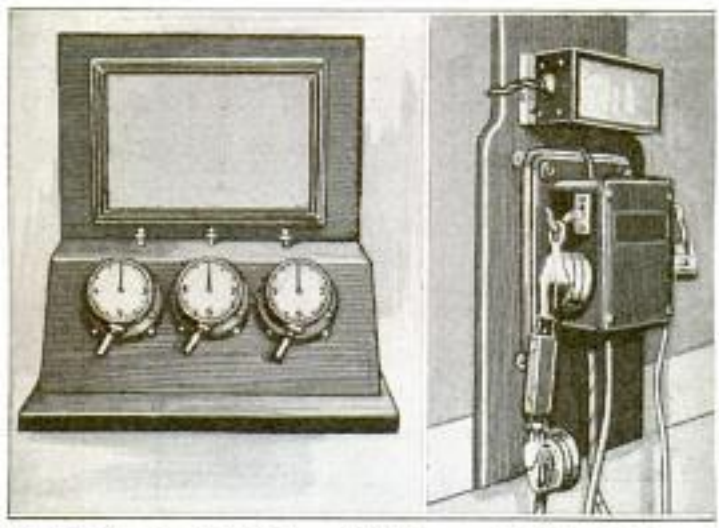
Constructing a raft of two barrels well braced, he fastened it with hinges to one of the rear seats of a rowboat, thereby taking all strain off the boat itself. A steel cable on a small hand winch is run out over a wheel fastened between the two barrels. The device for snagging the logs, which is fastened to the end of the cable, is a rod, at the bottom of which is a screw cap permitting a large nail to be inserted and fastened securely. A rope is fastened to a sliding weight upon the rod. Letting the weight fall upon the top of the cap drives the nail into the log. If it is caught in a jam, the nail may be released by pulling the weight upward against the head of the rod. After several logs have been secured, the nail having been bent and straightened several times, a new nail is inserted. After a deadhead has been raised to the surface, a wire snare tied to a rope held by the worker on the shore, is

placed over the end of the log, and the whole outfit is pulled to the shore, guided and helped by the man at the oars. The operation requires a minimum of effort, and some 40 to 60 logs are easily recovered in a day. As the logs in their normal condition would float, it takes only a small force to lift them, and the barrels provide sufficient buoyancy.

Upper View Shows Outrigger Which is Hinged to a Seat near the Stern of a Boat, and Which Carries a Winch for Winding Up a Line That Runs over a Sheave into the Water for Raising the Deadhead Logs, as Shown Below

LENGTH OF TELEPHONE TALK CONTROLLED BY TIMER

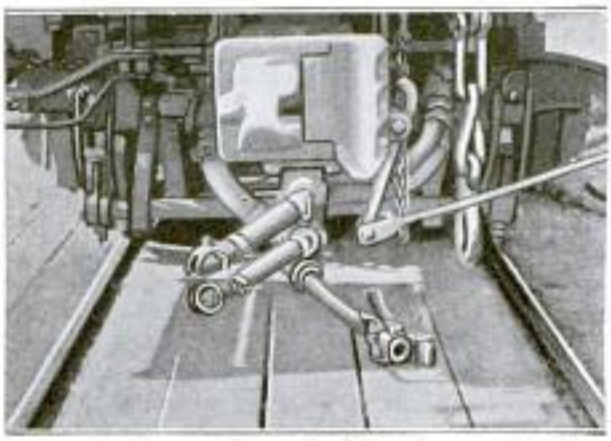
For party lines particularly, a telephone-conversation timer that is now in use in France, might be advantageously adopted elsewhere. In France the apparatus is applied to a wall telephone, and on the wall above it is a box with a ground-glass front. Inside the box is an electric light which becomes automatically incandescent when the conversation is within half a minute of its allotted time. This period is printed on the glass front, as for instance, "When Extinguished: 3 Minutes," the light warning the talker that in half a minute the allowable period of conversation will expire, and the light will go out, cutting off communication. At central is another box with a similar light. Underneath this box are clocklike timers which the operator watches. A handle on each clock starts and stops the communication. When desk telephones are used, the signaling light could be placed on the wall above the ringer box. In France it is used for telephone booths, the number of the booth being signaled to central on a pane of ground glass above the clocks.



At the Right Is the Telephone-Talk Timer: Behind the Ground-Glass Front of the Box above the Telephone Are the Timing Lights. At the Left Is the Timing Apparatus at Central, Started and Stopped by a Handle below Each Clock

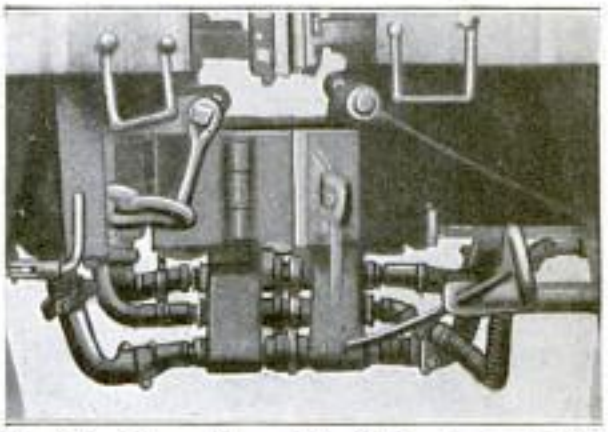
AUTOMATIC AND COMBINED CAR AND HOSE COUPLER

Automatic hose coupling is as desirable as automatic car coupling on railroads. After many years of experimenting with hundreds of different devices to accomplish the latter, finally a standard car coupler was adopted, which is now practically universal in this country. The hose coupler is going through the same course of experimentation, and, no doubt, of the very many different automatic couplers under exploitation, finally one will be selected as the standard. One such device that is now under trial, is a combined car and hose coupler; that is to say, the car and hose couplers are a unit. One impact couples both. The uncoupling is done by means of a release rod on one side of the car. The



Automatic Car and Hose Coupler Shown with Short Connections That are Provided for Interchange Service with All Makes of Standard Couplings Now in Use

surfaces engaged in this coupler are all beveled, so that it is impossible to fail to make the coupling on any curve. The vertical motion is taken care of in the same manner by the beveled points on the coupler face. The draft strain on the drawbar is distributed throughout the



Two Cars Shown Connected with the Automatic Car and Hose Coupler: The Safety Chains are Held Back So as Not to Obstruct the View of the Coupler

head by a system of interlocking lugs. There are provided short hose connections, by means of which the automatic coupler can be used with all makes of standard couplings now in use.

ENDLESS-CHAIN PROPELLER BOAT HAS SHALLOW DRAFT

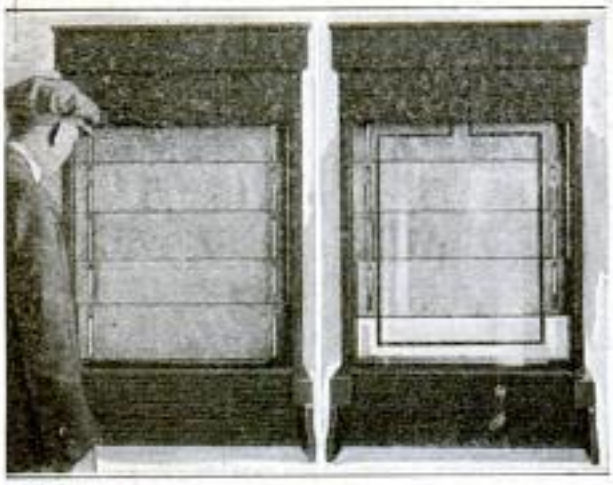
A novel boat, recently tested on the Willamette River, at Portland, Ore., has a draft of only 6 in. and can run over submerged logs or débris along the bottom without damage to its propelling mechanism. This boat is 29 ft. long and is equipped with a 20-hp. gasoline engine. A 44-ft. chain, carrying 22 blades which measure 12 by 4 in., passes around a sprocket wheel housed at the rear. Power is transmitted to the chain by a shaft through the sprocket wheel. The chain

This Odd-Looking Flat-Bottom Boat Has a Draft of Only Six Inches When Normally Loaded. It is Propelled by Blades Attached to an Endless Chain Running through a Housing in the Center of the Hull

is inclosed in a central housing and passes through the bottom of the boat and along a channel formed by a double keel. The keel projects 2 in. below the blades and thoroughly protects them. In tests, this odd craft attained a speed of 16 miles an hour.

STEEL CURTAINS TO MAKE WINDOWS BANDIT-PROOF

Several successful raids, in a western city, by elusive automobile bandits who, in each case, after hurling a brick

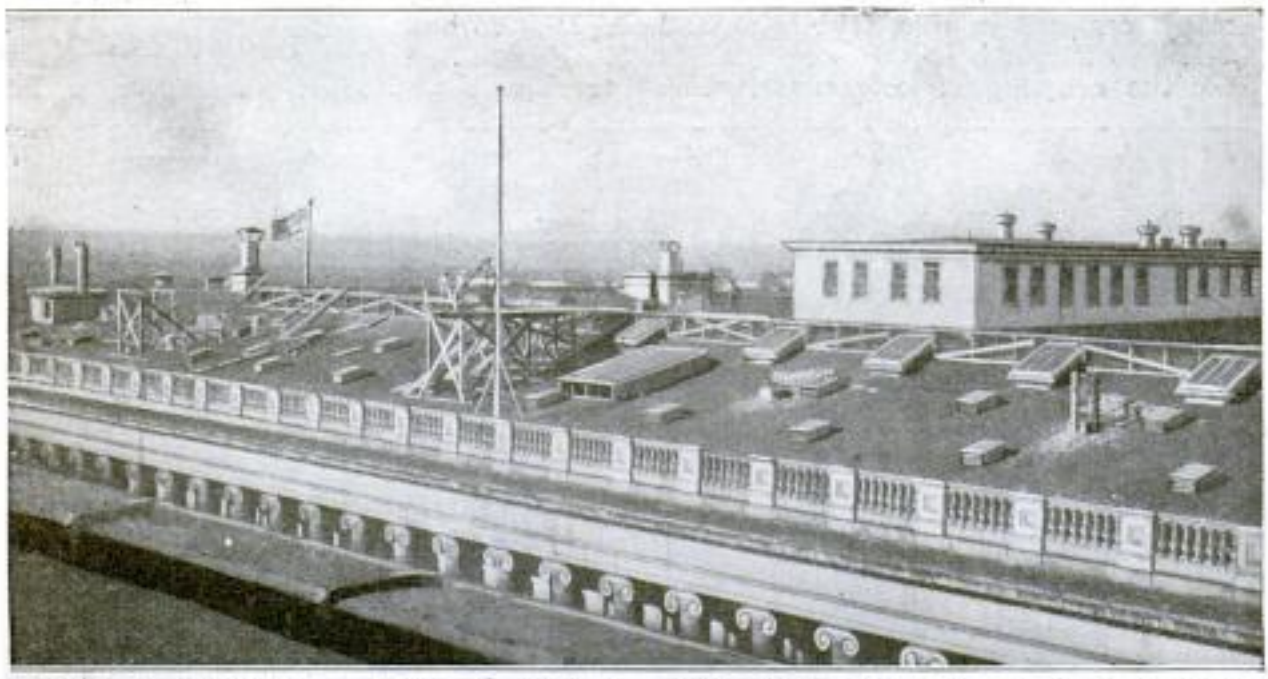


Models of the Bullet-Proof Steel Curtain That Protects Display Windows, Showing at the Right the Ribbon Foil, the Breaking of Which Causes the Curtain to Drop

through a store display window, grabbed thousands of dollars' worth of merchandise and got away with it, led to the production of a means of protection. It consists of a bullet-proof steel curtain, which drops automatically behind the display window, the instant the glass is broken. The curtain is made of a series of narrow, flat steel plates, linked together in much the same manner as in the old Venetian blind. This curtain is on a roller, contained in a box above the window. The roller is magnetically controlled, retaining the curtain in the box by an electric circuit. The moment this circuit is interrupted, the curtain falls automatically. The interruption of the circuit is caused by the cracking of the window pane, which breaks a frame of ribbon foil on the window, in the same manner as is now so common for setting off an electric alarm bell. This old standard alarm can be combined with the new protecting curtain. The appliance can also be used to protect bank tellers' cages.

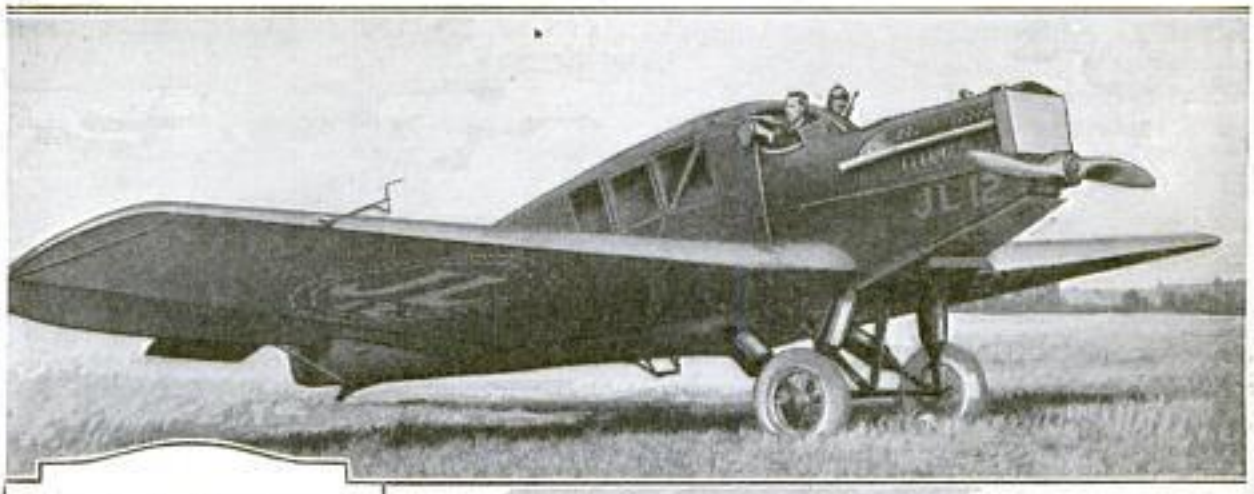
NEW STORY IS BEING ADDED TO U. S. TREASURY BUILDING

During the war, the requirements of the Treasury Department for office space were enormously increased, and temporary buildings were erected to take care of the overflow. Some time ago it was decided to add a story to the present treasury building, which is architecturally one of the conspicuous features of the city of Washington. Already the old roof is being broken through in preparation for the erection of structural-steel members that will form the framework of the new story.

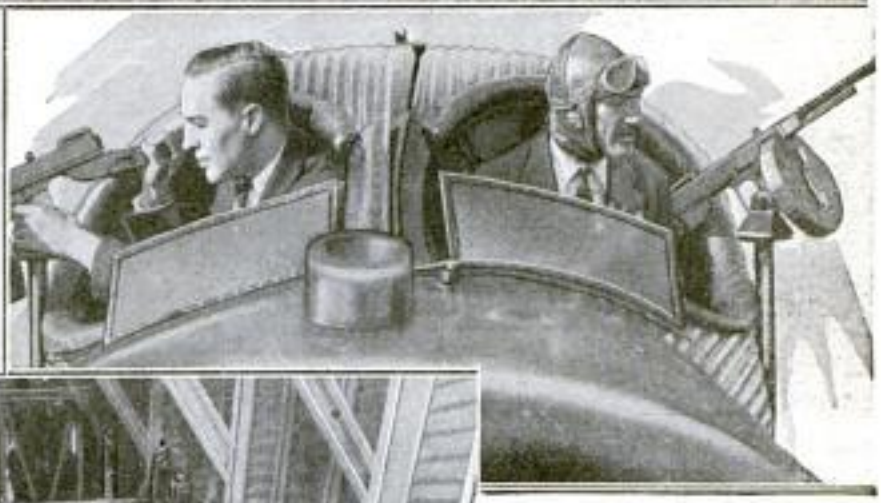


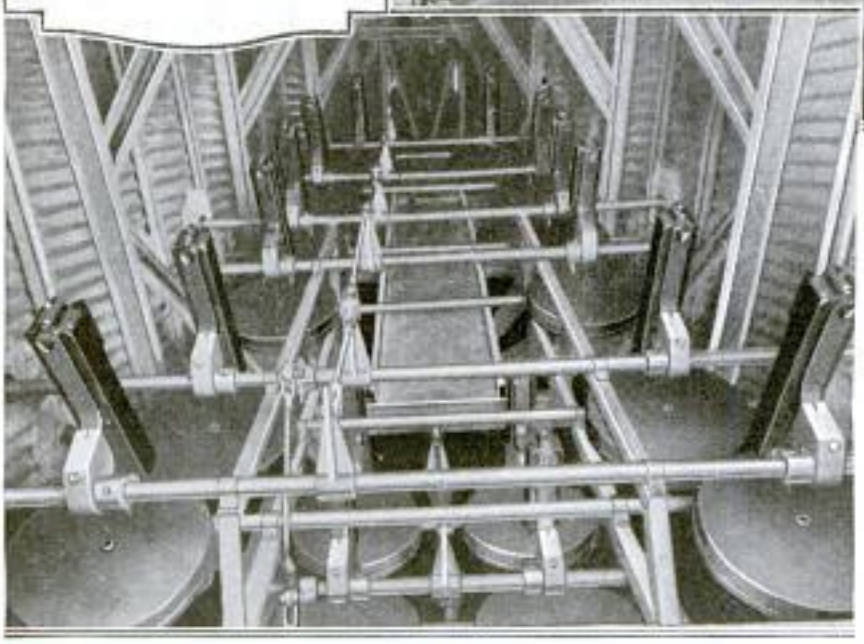
Part of the Roof of the Treasury Building, in Washington, Which is being Broken Through for the Erection of the Structural-Steel Framework of a New Story That is to be Added

ANTI-INFANTRY AIRPLANE CARRIES 30 GUNS



Above Is the New Armored Monoplane being Tested by the Army and Navy as a Weapon for Operations against Infantry. All Vital Parts are Protected from Rifle and Machine-Gun Fire. Being Built for Speed, the Plane Is Comparatively Small, Having a Span of Only 49 Feet and a Length of 32 Feet over All. The Cockpit, with Its Two Extra Machine Guns, Used by the Pilot and a Gunner, is Shown at the Right



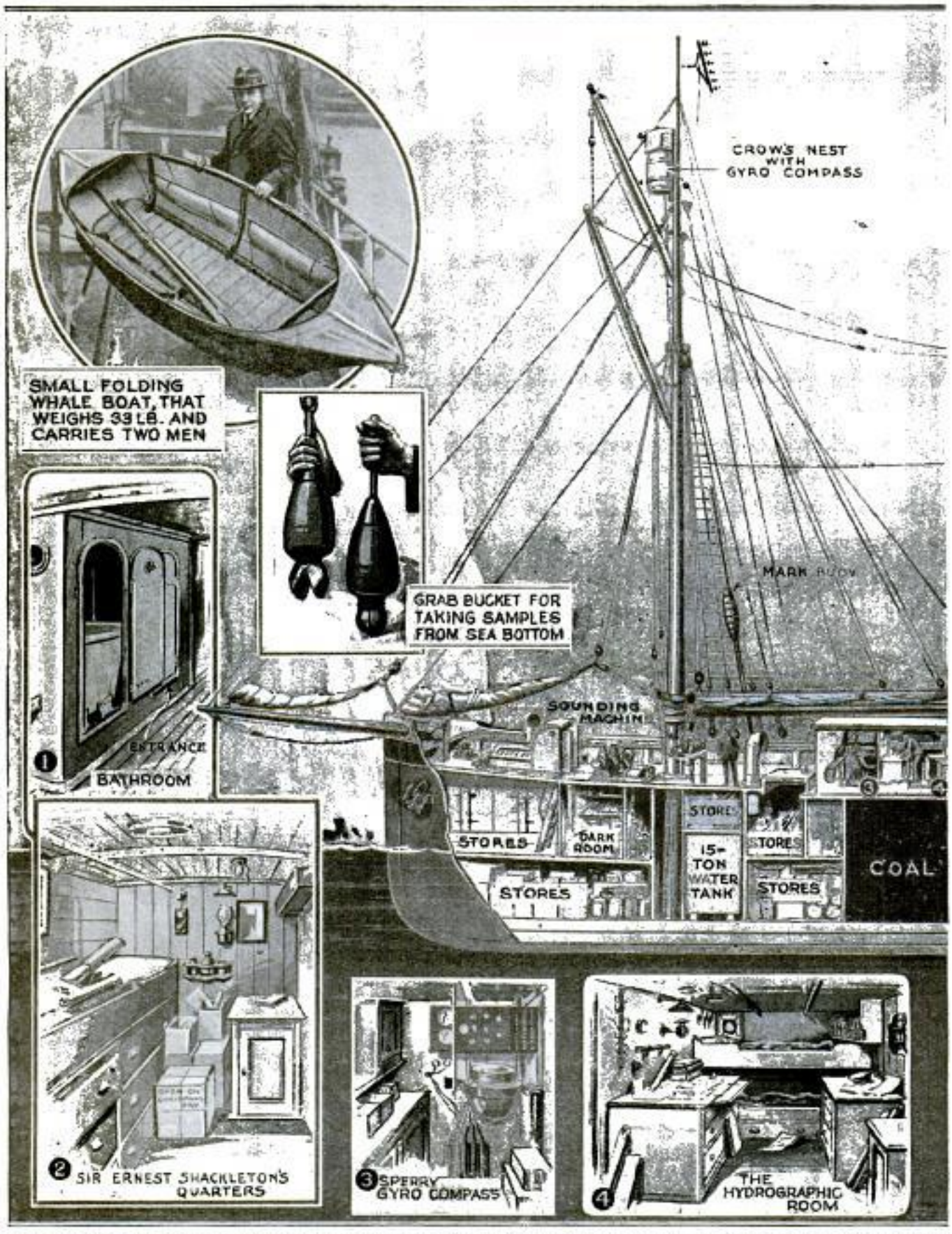


At the Left, an Inside View of the Fuselage Shows the Arrangement and the Method of Mounting the Machine-Gun Batteries So That They may be Fired through the Bottom of the Machine While Flying over Infantry

An armored monoplane mounting 30 machine guns was recently completed and sent to Washington for tests of its practicability by the army and navy. This plane is of the Junker type with cantilever wings and the fuselage built above the wing surface. It has a span of 49 ft., and 32 ft. over-all length. A cruising speed of 141 miles an hour and a radius of 400 miles are claimed for it, equipped with a 400-hp. Liberty motor. The construction is of duralumin, and vital parts are protected with 3/16-in. armor to deflect rifle and machine-gun fire. A main battery of 28 machine guns is carried in the fuselage in two sections, each fired by a lever, or both fired by a master lever. Two additional guns are superimposed on the forward part of the cockpit. The plane was designed to be used in attacking infantry and is said to be easily maneuverable in spite of its size, and capable of climbing 1,000 ft. in 49 seconds.

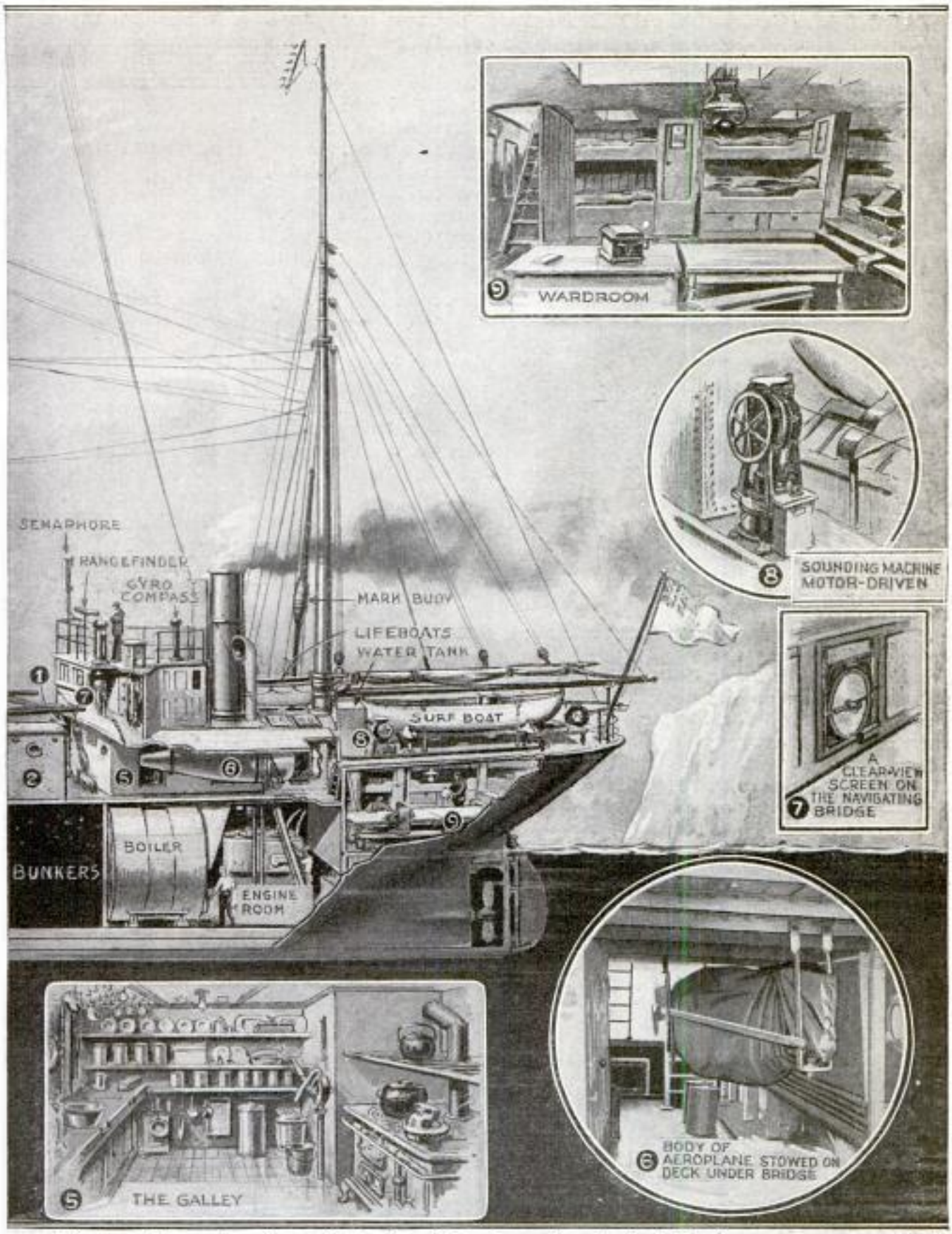
¶A yellow dye which renders wool mothproof, is a new product of the German chemical industry recently placed upon the European market, according to a consular report.

EQUIPMENT OF SHACKLETON'S ANTARCTIC



THE small sailing ship "Quest," that will carry the Shackleton expedition to the antarctic regions on a 30,000-mile voyage of exploration and research was briefly described in the November Popular Mechanics Magazine. There are now available more particulars of the construction and equipment of this little craft, and they are very interesting. The first thing to strike the eye on an outside view is the crow's nest, slung high up on the mainmast. This is electrically heated, and as the occupant's clothing will be similarly heated, he will be able to do his work in comfort, no matter how cold the atmosphere may be. Among the many ingenious objects packed aboard the little vessel, is a minute seaplane, known as the "Baby Avro," which is slung under the bridge, and which will be very much

SHIP FITS IT FOR HARDSHIP AND SERVICE



more effective in doing exploration work than the old-time dog trains. On the bridge is a gyro compass, which is nonmagnetic, and depends for its action upon the earth's rotation and the force of gravity, pointing always to the true geographical north. There are two sounding machines, one for stationary work and the other for taking soundings while the ship is in motion. Connected with each is a grab bucket that, when the sinker reaches the bottom, automatically closes and brings up specimens for scientific examination. Besides the lifeboats, there are two feather-weight whalers, of only 33 lb. each. They fold up and occupy very little space. Afloat they accommodate two men, and are given additional buoyancy by means of air bags extending along either side of the canvas hull.

PRACTICAL COOKING UTENSILS FIT ON AUTOMOBILE EXHAUST

A set of cooking utensils, to fit on the exhaust pipe of his automobile, has been devised by a motor-camping enthusiast

The Hood of the Car is Raised to Show How the Coffee Cooker Fits onto the Exhaust Pipe. This Was the First Utensil Made

of Kansas City, Mo. These utensils proved their practicability on a recent motor trip to Colorado. They were used each day for such purposes as making coffee, boiling eggs and potatoes, and heating water for washing dishes, and shaving. When on the road, a four-mile run was required for boiling, while the same could be accomplished in 15 minutes by running the motor with the car standing still.

GOLF HANDICAPPING DONE BY NOVEL TESTS

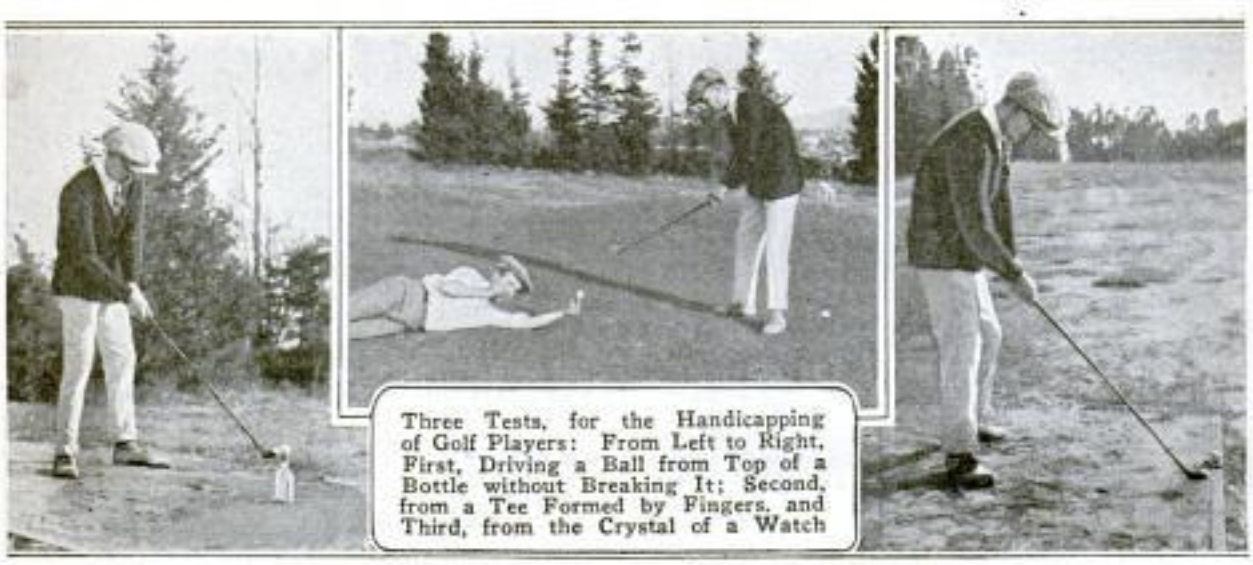
A golf instructor has introduced a new system of determining the ability of an unknown player, where such information is desired for handicapping.

The first test is to drive the ball off the cork of a bottle without breaking or knocking over the bottle. If this is successfully done, the player is given a cheap watch and told to drive the ball from the crystal of the watch without causing the watch to stop. A slight jar would stop the watch, of course, and the fact that a cheap timepiece is used, makes it a matter of little importance if the watch should be smashed. The final test of accuracy is to drive a ball from a tee formed by the fingers of a man lying on the ground. The player must furnish the nervy man who has sufficient confidence in his colleague's ability to make him willing to hold the ball.

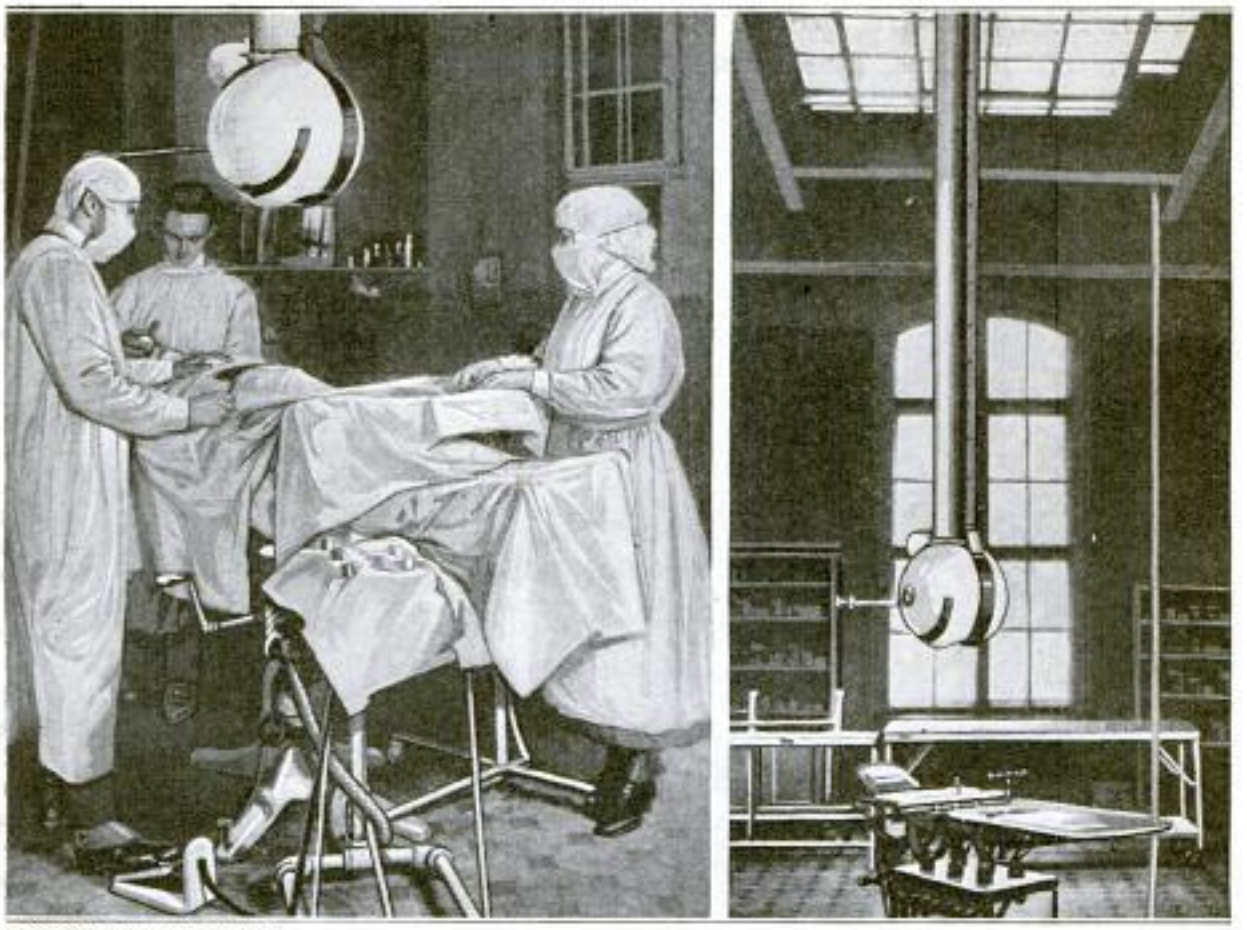
This novel grading system makes it possible for a handicap committee quickly to rate all players in a golf tournament, even though they have never watched any of them in action.

NEW MOVING-PICTURE CAMERA RECORDS OPERATIONS

Moving pictures of surgical operations have heretofore not been completely successful, owing to the liability of one of the surgeons getting in front of the camera. In November, 1916, Popular Mechanics described the method used at the Johns Hopkins Medical School, stating that thousands of feet of film were spoiled for this very reason. A recently developed camera is reported to have overcome this difficulty. The camera, which is of special design, is completely inclosed in a globular metal case, which is located in a tube projecting from the ceiling, directly over the operating table. By means of a motor located outside of the room, the camera may be raised, lowered, or turned at any angle. A telescope at-



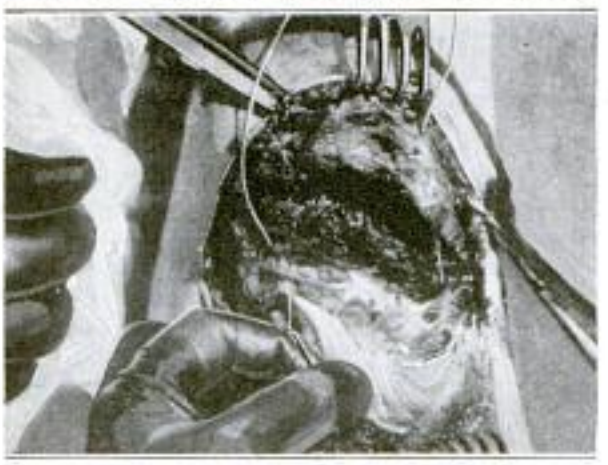
Three Tests, for the Handicapping of Golf Players: From Left to Right, First, Driving a Ball from Top of a Bottle without Breaking It; Second, from a Tee Formed by Fingers, and Third, from the Crystal of a Watch



PHOTOS COPYRIGHT, RADEL & HERBERT

The New Moving-Picture Camera, in Use Photographing an Operation, is Shown at the Left. At the Right Is the Camera and Tube for Suspending It from the Ceiling over the Operating Table

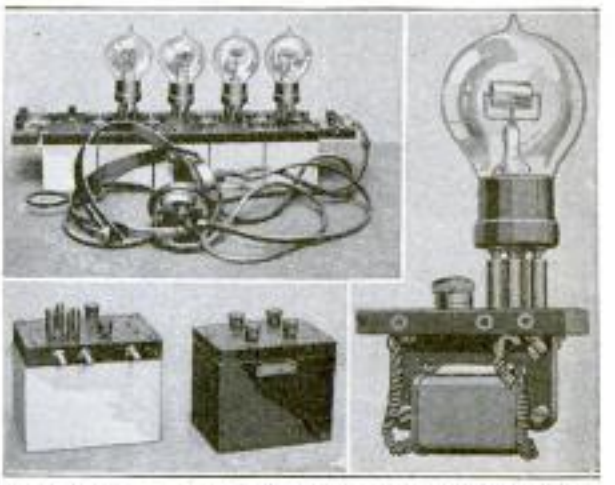
tachment makes it possible to adjust and focus the camera promptly. It has recently been tried out in a Berlin hospital with great success.



Photograph of an Open Wound Made by the Movie Camera While the Surgeon Worked

FRENCH WIRELESS RECEIVER MADE UP OF "RADIO BLOCKS"

The same development which resulted in the standardized-unit radio-receiving outfit in this country, described in the February issue of Popular Mechanics, has produced what is known as the "radio block" in France. These blocks are interchangeable and are provided with three plugs and a binding post, so that they may be coupled in series. There are four units: the high-frequency amplifier, the detector, the low-frequency amplifier, and the telephone block. Combinations otherwise difficult to obtain can be made with radio blocks without danger of error.



Upper Left: A Series of "Radio Blocks" Coupled. Below: Two Single Units. At the Right: A Unit with Amplifier Bulb Attached and Covering Removed

STUMPS QUICKLY CLEARED WITH POWER BORER

Throughout the southern states there are millions of acres of land which would be valuable for agriculture if it were not for the expense of clearing it of stumps before it is tillable. All sorts of methods have been used for the purpose, from dynamiting to pulling the stumps out by the roots, but the work has been discouraging at its best. This land may be made available, and the agriculture of the South, as well as other sections of the country, increased enormously, by a simple power stump borer which has been placed on the market. Extensive tests in the South have shown that the machine is entirely practical, and that by its use land can be cleared at a small expense. It consists of an auger mounted on a two-wheeled carriage and operated by a small motor using either gasoline or kerosene as fuel. The auger may be started or stopped at any time, with the motor running, by means of a clutch. It will bore a 2-in. hole through a 3-ft. stump in 30 seconds. The hole is started just above the surface of the ground and bored at a downward angle through the stump. The lower end of the hole is then uncovered with a spade, and when a fire is started the hole acts as a chimney. The entire stump, including the large tap roots, is consumed. Only a small hole is left in the ground and this is partly filled by the ashes from the stump. The slowness and expense of hand boring have practically prohibited this method of burning in the past. The borer is not only valuable in the South where it was tested, but through the northern states where great areas of "cut-over" land need only be cleared in order to be turned into fertile farms. It also offers the opportunity of employment in an entirely new vocation for a large number of men. The original cost and operating expense of the machine are small. A man equipped with one can bore stumps for others on contract, and earn from $10 to $15 a day in this way.

This Stump was Bored and Set Afire. It can be Seen Here How Effectively the Hole Creates a Draft and the Large Roots are Burned Out

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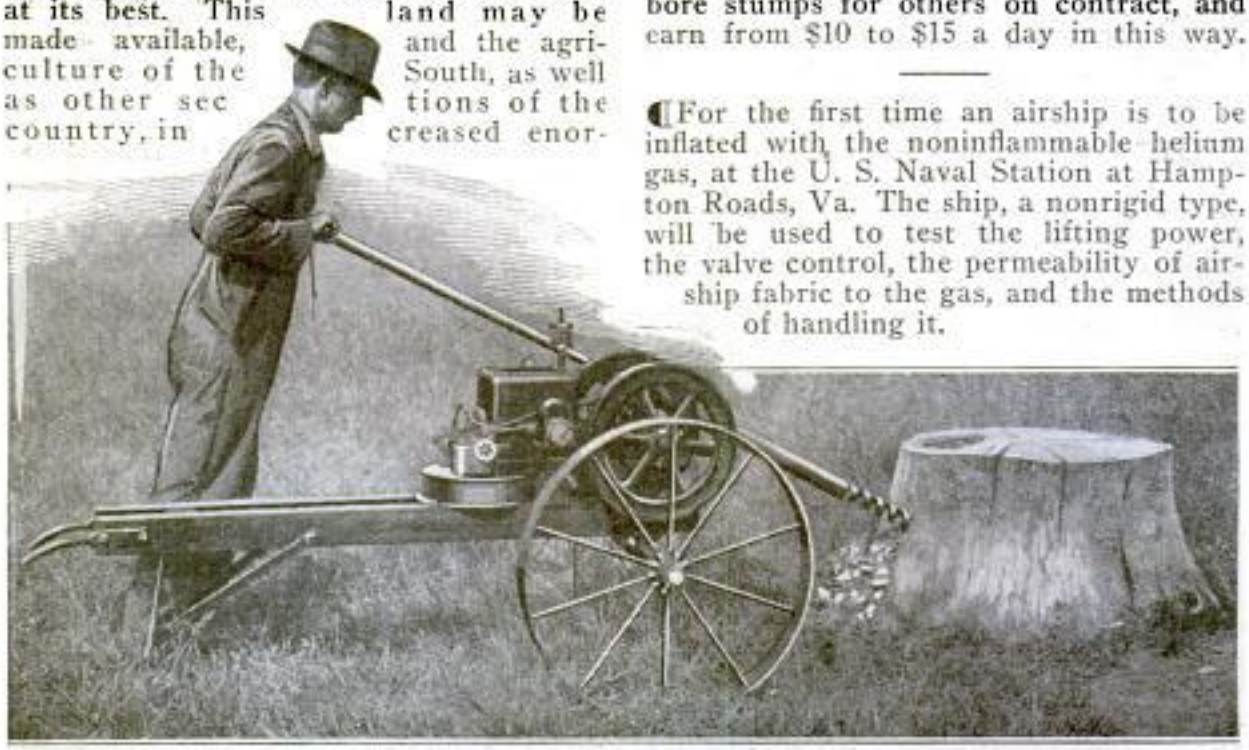
¶For the first time an airship is to be inflated with the noninflammable helium gas, at the U. S. Naval Station at Hampton Roads, Va. The ship, a nonrigid type, will be used to test the lifting power, the valve control, the permeability of airship fabric to the gas, and the methods of handling it.



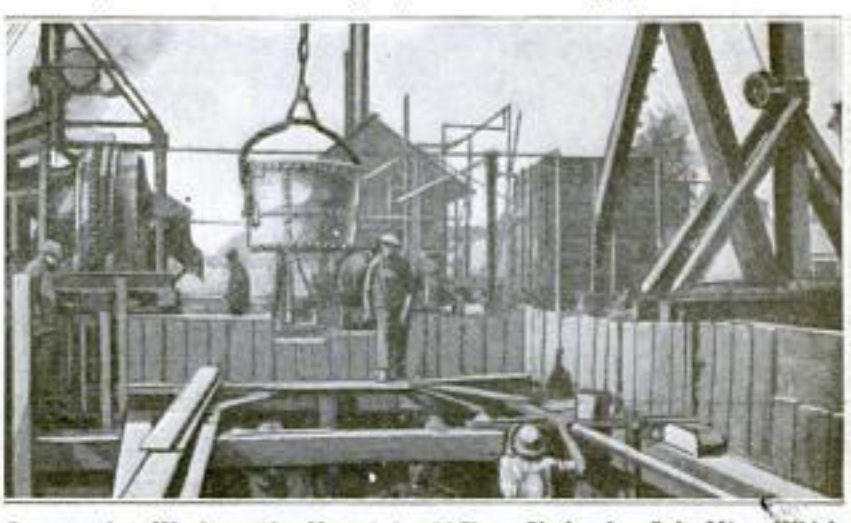
Portable Machine Equipped with a Kerosene Engine for Driving an Auger That Bores a Two-Inch Hole through a Three-Foot Tree Stump in 30 Seconds: The Auger is Started or Stopped at Will by a Lever-Controlled Clutch. The Handle Is Long, So as to Balance the Weight over the Axle

GIANT CHRISTMAS TREE IN YOSEMITE NATIONAL PARK

YOSEMITE NATIONAL PARK is becoming a popular winter resort as well as a summer resort, and each year a great Christmas tree is prepared for the visitors. This tree is said to be the only sequoia, or redwood, used for that purpose. It was planted in 1890 and from a seedling has grown to a height of more than 60 ft. From the point of view of photography, this picture of the giant Christmas tree, with its lights, is of unusual interest. Three separate exposures had to be made of the scene to provide for the different degrees of brilliance.

WORLD'S LARGEST SALT SHAFT NEARING COMPLETION

A salt shaft, said to be the largest in the world, has been sunk at Retsof, N. Y. The shaft is 9 by 28 ft., and contains three elevators by which the vein is reached, 1,000 ft. below the surface. The solid salt vein varies from 10 to 15 ft. in thickness and 50 miles of passageway have already been blasted through it. The operation of the mine is similar to that used in coal mining. Mules haul the salt underground, but the rest of the equipment is of the latest electrical type. When working at full capacity the mine will produce about 3,000 tons of rock salt a day. A railroad and a storage plant are being provided.

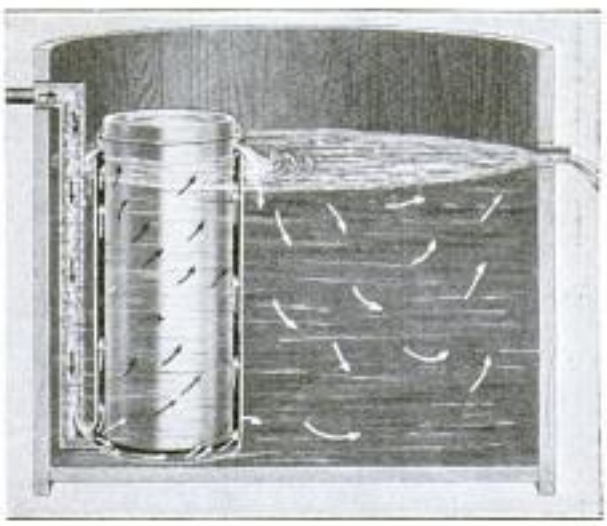


Construction Work on the New 9 by 28-Foot Shaft of a Salt Mine Which **will Have a Daily Output of 3,000 Tons**

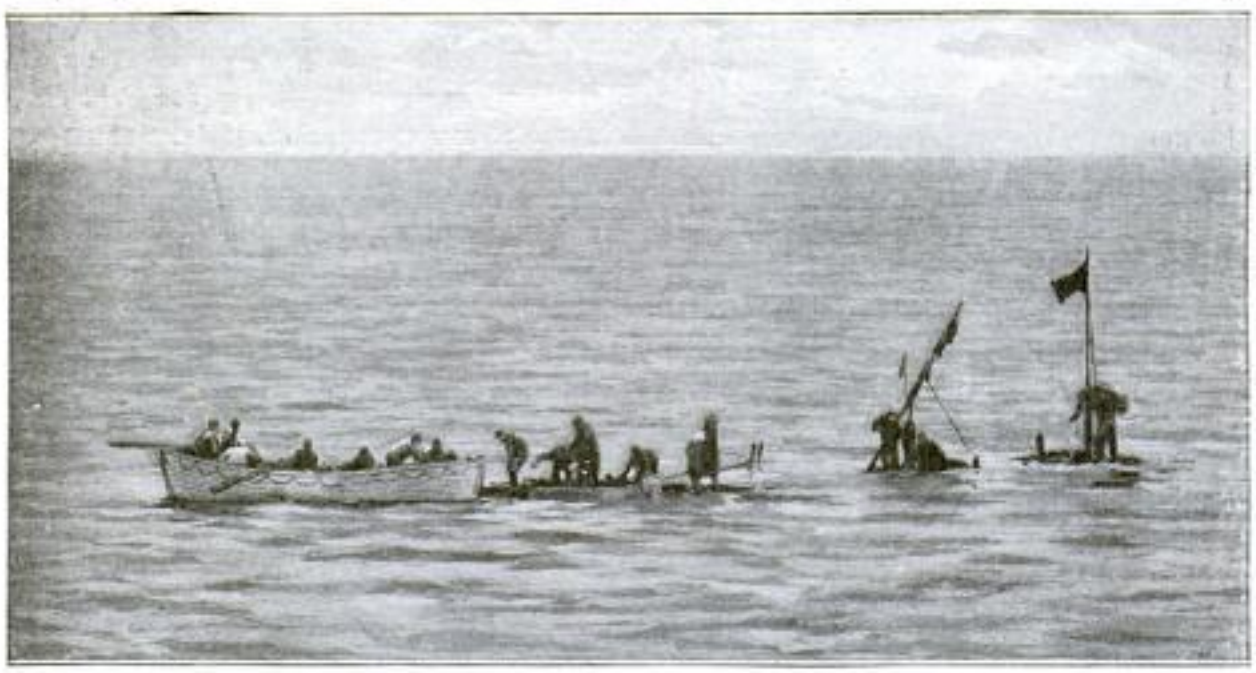
FRESH CREAM IS MADE COLD AND PRESERVED FOR DAYS

Most farmers are so situated that they can deliver their cream to the butter factory only twice a week. This necessitates a means of keeping the cream fresh for two, three, and sometimes four days. Such a means is the subject of a recent invention. In a water tank is an inlet pipe, entering near the top and elbowed down to the bottom, where it connects to a much smaller tank which is open at the top. Into this is placed a somewhat smaller closed can that is filled with the newly separated cream. Cold water flows into the smaller tank, around the cream can, out over the top and into the larger tank, in which it is kept at a suitable level by discharging from a bunghole. After being cooled in this manner, it is placed in storage cans in the water tank.

Newly Separated Cream is Cooled in the Closed Can inside the Open Galvanized Tank, and is Then Placed in the Storage Can beside It

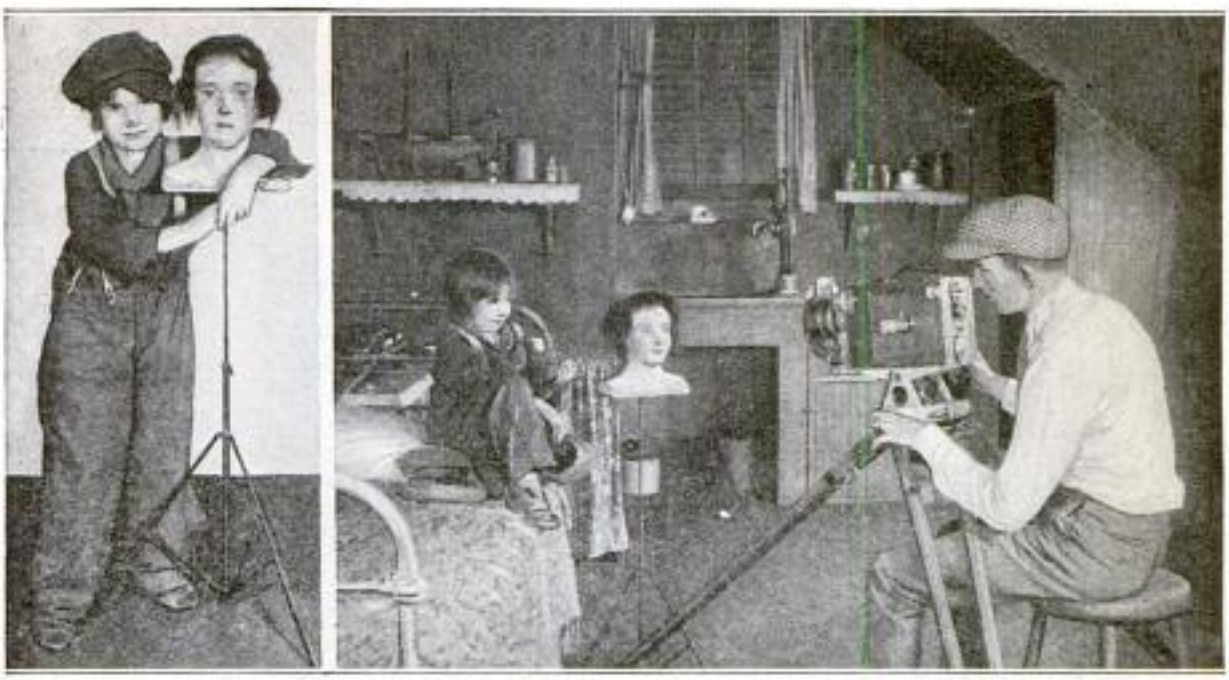


The Water Enters the Inlet Pipe, and Follows the Course Indicated by Arrows, Discharging from the Bunghole at the Right. There Is Room Besides for Two Storage Cans



LIFEBOAT RESCUES CREW OF WATERLOGGED JAPANESE SAMPAN

AFTER having floated for 16 days on a waterlogged sampan, with only parts of its deck awash, and most of it under water, ten Japanese fishermen were rescued by the crew of the steamer "Abercos," which was three days out from Yokohama. The Japanese crew had clung for dear life in these perilous circumstances so indomitably that only one had been washed away and drowned. But the others were all in the last stages of exhaustion.



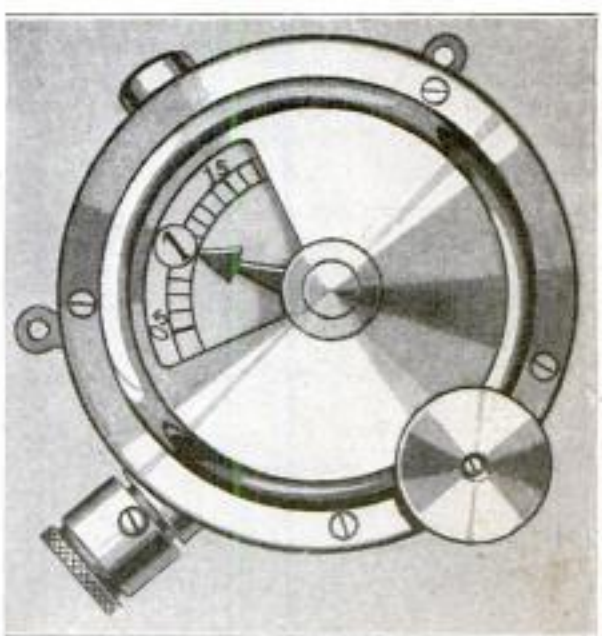
Jackie Coogan and His Dummy "Understudy" are Shown at the Left. At the Right can be Seen the Method of Using the Dummy, Set in Place to Pose for the Little Movie Star While the Camera is being Focused for Interiors

DUMMY POSES TO PROTECT JACKIE COOGAN'S EYES

Jackie Coogan, the diminutive moving-picture star, has an "understudy," which never appears in pictures but renders a valuable service in their preparation. This understudy is merely a dummy, of the same size as the boy. It is posed in his place during the long process of focusing which precedes the actual filming of interior scenes. In this way the youngster's eyes are not subjected to the intense light, used in such scenes, any longer than is necessary.

WING-LOAD INDICATOR KEEPS AIRPLANE PILOT IN SAFETY

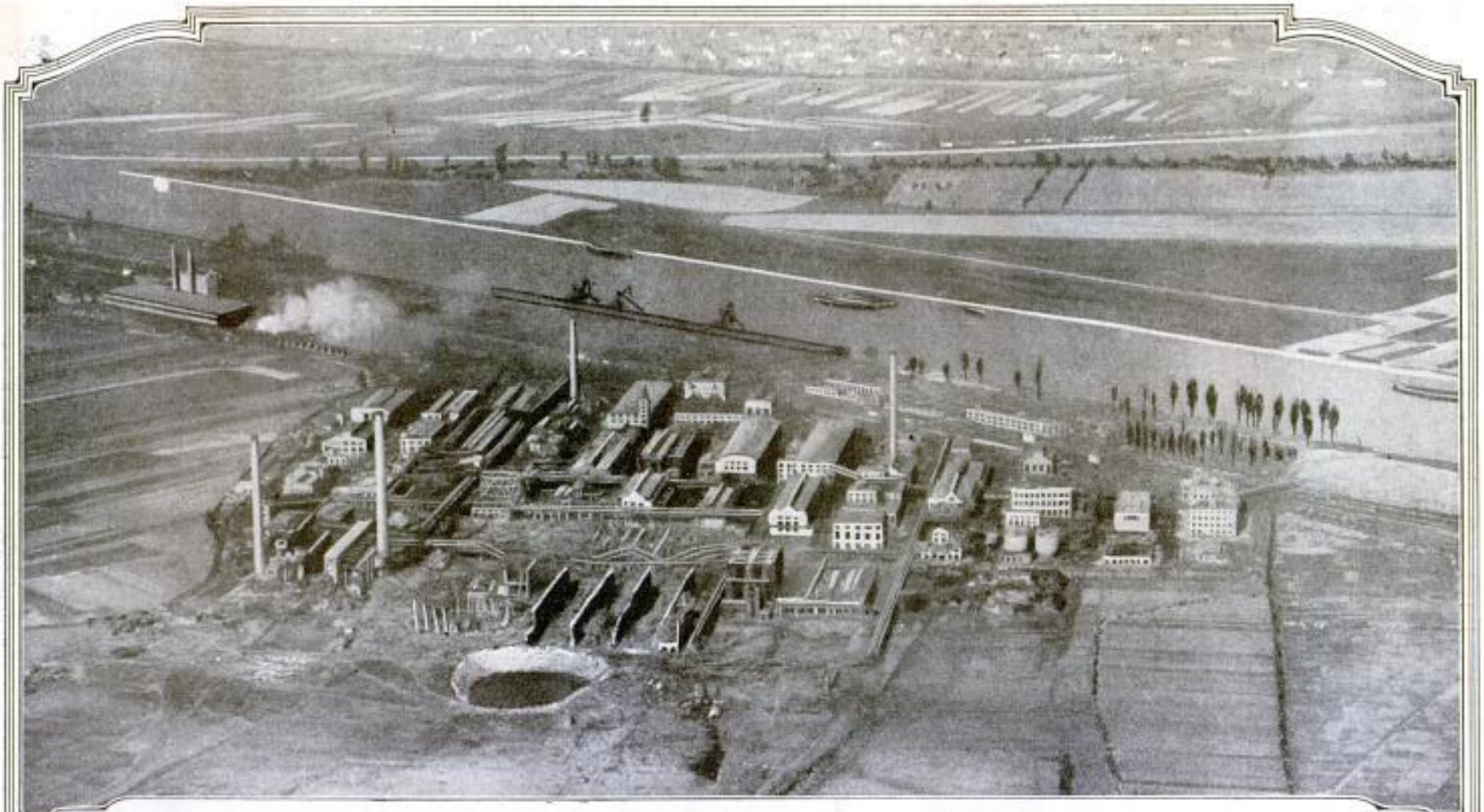
In maneuvering an airplane, stresses much higher than in straightforward flight may be transmitted to the wings of the plane. These added stresses may result in fracture and disaster. It is therefore of importance that a pilot should have some means of judging how nearly he is approaching these danger stresses. Up to the present he has mostly had to depend upon his experience, but now there is an instrument in the form of a wing-load indicator with which he can tell at any time the degree of safety that exists before the stress limit would be reached. It is clocklike in form, with a diameter of 2¾ in., and is mounted on the instrument board. Its needle points to graduations on its dial that show how much the stresses are in excess of those of normal flight. The highest graduation is 5, which represents the limit of the



Wing-Load Indicator That Shows the Airplane Pilot How Much Margin of Safety There Is Before the Stresses in the Wings would Reach the Breaking Point

safety margin, and indicates a breaking stress. It is the pilot's business never to allow the needle to reach this point.

¶ To provide fresh water, a sugar refinery on San Francisco Bay employs a barge of 500,000-gal. capacity. It is loaded by opening seacocks when going upstream, or by wharf connections when docked.

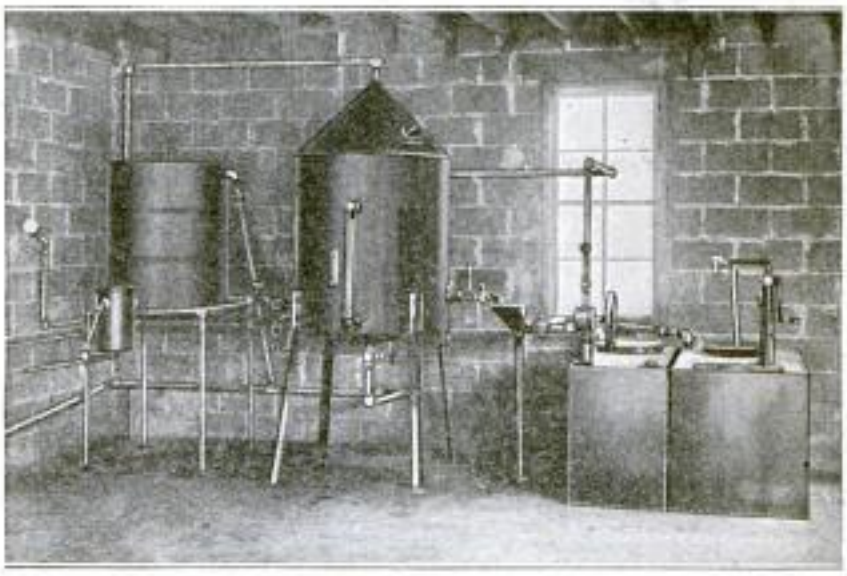


PART OF THE RUINS OF OPPAU AFTER THE DISASTROUS EXPLOSION

THE wreckage, September 21, by explosions, followed by fire, of the great dye works at Oppau, near Ludwigshafen on the Rhine, when several hundred persons were killed and thousands injured, was the greatest disaster of its kind that has ever occurred in Germany, and probably in the world. The entire plant was destroyed, as well as the greater part of the surrounding town. The first explosion occurred at the huge gas holders, and the above picture shows the resulting wreckage in their immediate vicinity. Seismographs at Stuttgart Observatory, some 85 miles away, registered the shock of the first explosion shortly after 7:30 a. m., and a second, more violent one, 22 seconds later. Damages to buildings were reported within a radius of over 50 miles from Oppau.

APPARATUS WILL RENEW USED CRANKCASE OIL

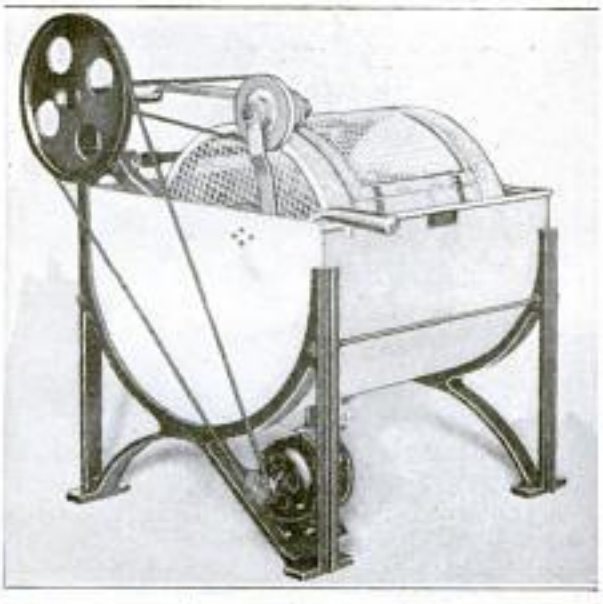
An oil-reclaiming outfit is now on the market, the special purpose of which is to cleanse the used crankcase oil of autos or trucks, so that it can be used over and over again. The essential part of the apparatus is the reclaimer, or still, in the form of a cylindrical tank, which removes all the gasoline and other volatile matter in the oil by the action of steam. All foreign solid matter is removed by precipitation. From the reclaimer the gasoline vapor passes into a condenser beside it, where the vapor is liquefied. On the other side of the reclaimer is first a funnel into which the reclaimed oil is drawn and piped into a tank. Beside this is another smaller tank for the used oil, from which it is pumped into the reclaimer. Actual tests of the apparatus have shown some remarkable results.



Apparatus That Reclaims Used Crankcase Oil: At Center Is the Reclaimer from Which Vaporized Gasoline Passes to Condenser at Left. One of the Two Tanks at Right Holds the Used Oil, the Other the Reclaimed Oil

PHOTOGRAPH WASHER HAS IMPROVED DRIVE

Photographers who do amateur finishing can now obtain a print-washing machine having the entire driving mechanism outside the tank. By a simple arrangement of belt-connected pulleys and countershafts, a small electric motor, mounted on the front leg of the tank, revolves the washing cage by means of a friction pulley that bears against the rim of the cage. The cage is of strong metal mesh with a rim at each end as a bearing surface for the pulley. It can be lifted with a lever for easy access, and prints are placed in it or removed through a door. The capacity of the washer is 200 prints of sizes up to 4 by 5 and postal-card size.



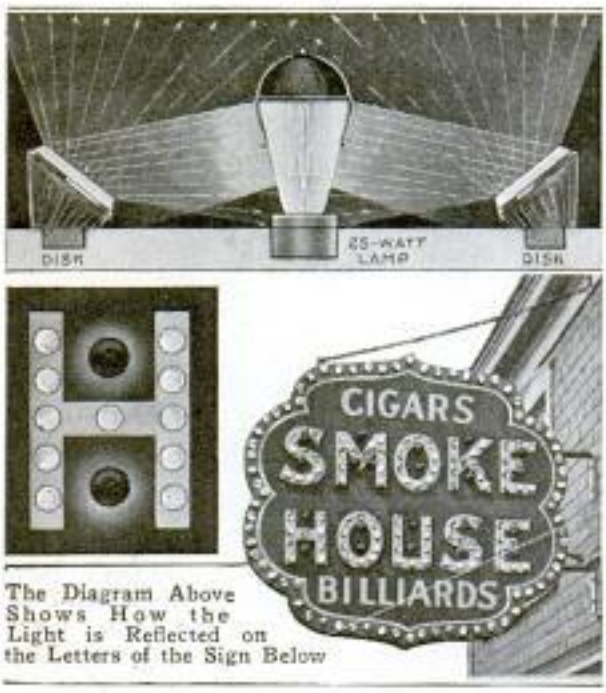
This Print-Washing Machine Does Away with the Difficulty of Leaky Stuffing Boxes by Having the Driving Mechanism Entirely Outside the Tank

LARGEST GERMAN GENERATOR HAS UNUSUAL PROPORTIONS

A 7,000-volt, three-phase generator, rated to produce 60,000 kilovolt-amperes at 1,000 r.p.m., but designed for 50 per cent overspeeding, has been built in Germany. This is, doubtless, one of the largest generators in the world, and some idea of its gigantic proportions may be gathered from the following figures: The cast-iron shell that supports the laminations of the stator weighs 99,000 lb. The laminations have a total weight of 139,700 lb., and the complete weight of the stator is 319,000 lb. The diameter of the rotor is 90 in., and finished it weighs 88,000 lb. It is built up of 26 steel disks, each nearly 4¾ in. thick, which are shrunk upon the shaft. This has a diameter at its largest point of 43 in., and weighs 79,000 lb. It is a hollow shaft with a bore of 11¾ in., and its length over all is a little more than 28 feet.

BRILLIANT ELECTRIC SIGN HAS FEW LIGHTS

Electric signs afford one of the most effective ways of advertising, but their cost and upkeep are often prohibitive.



The Diagram Above Shows How the Light is Reflected on the Letters of the Sign Below

A sign recently tried out with success replaces the individual lamps in the rim of the letter with small mirror reflectors. These reflect the light supplied by two 25-watt lamps, placed near the center of the letter and fitted with opaque caps, so as to be invisible from the front. An old sign can be converted to this economical type by simply replacing the lamps with the small reflectors, which have a screw shank to fit the lamp socket. It is claimed that an arrangement of this kind will save about 80 per cent in lamp renewals and 60 per cent in current.

WHY WE CAN PERCEIVE ONLY FEW COLORS

The sensation of color is due to the effect produced upon the eye by light of some particular wave length or frequency. Thus red, located at one end of the solar spectrum, has a very low frequency, while violet, located at the other end, has a very high frequency. The colors between these two are simply different wave frequencies, which gradually increase from red to violet. It has generally been assumed that the normal human eye could perceive any of these variations. However, experiments have proved that the normal human eye is capable of perceiving only from 16 to 20 distinct colors. Professor Joly, of the University of Dublin, proposes this theory in explanation: When a ray of light reaches the retina, it liberates a quantity of energy, depending upon the frequency of the wave. This energy acts upon the little rods and cones of the retina, causing them to send a stimulus to the brain. Each of the minute rods is connected to the brain by a very slender thread. Each of the cones, however, has a larger connection, consisting possibly of a number of threads. He suggests that when a quantity of energy is liberated, due to a light wave, the rods notify the brain of the presence of light only, without distinction as to color. But the cones, having several lines of communication, can use one or more of these, and thus send a variety of messages, depending on the kind of light received. As the number of combinations is limited, so the number of colors capable of being perceived is limited.

MINIATURE AUTOMOBILE BUILT LIKE A "SCOOTER" TOY

A novel miniature motor car has been built by Allen T. Hanscom, a motor enthusiast of Woonsocket, R. I., for his five-year-old son. In general appearance, it resembles a "scooter," and has three

This Tiny Three-Wheeled Motor Car Is Just Large Enough for the Five-Year-Old Boy for Whom It was Especially Built

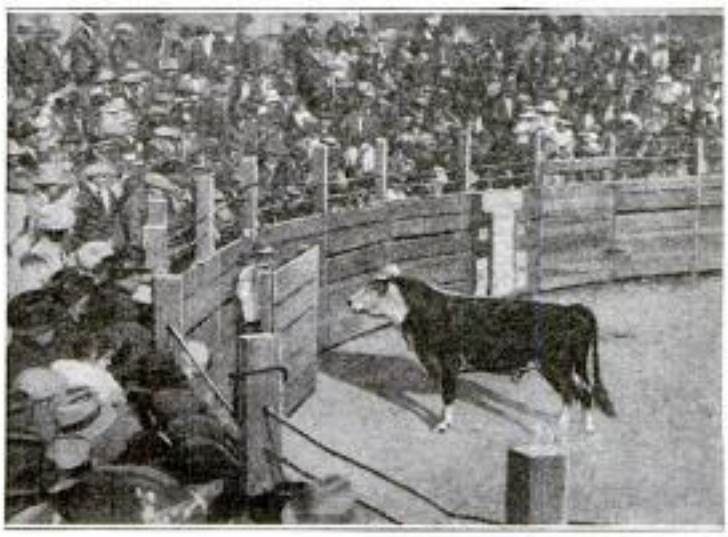
wheels equipped with 15 by ¾-in. tires. In place of the handlebar of a scooter it has a regular automobile steering wheel. Between the two rear wheels is the seat, and the car is supplied with a small horn and a searchlight. It is driven by a 2-hp. gasoline motor, properly geared for varying grades. The control is simple, and the boy has had no difficulty in learning to drive his tiny machine.

HUMANE BULLFIGHT IS NOVEL AFFAIR

BY FRANK B. HOWE

A BULLFIGHT, complete and thrilling in all the usual details, yet without cruelty, without revolting features, and without the shedding of a drop of blood! That seeming impossibility was recently staged with complete success in connection with the Mexican Independence Day celebration in Los Angeles, thanks to

Matching Wits against the Bull and Exciting Him with a Red Cape

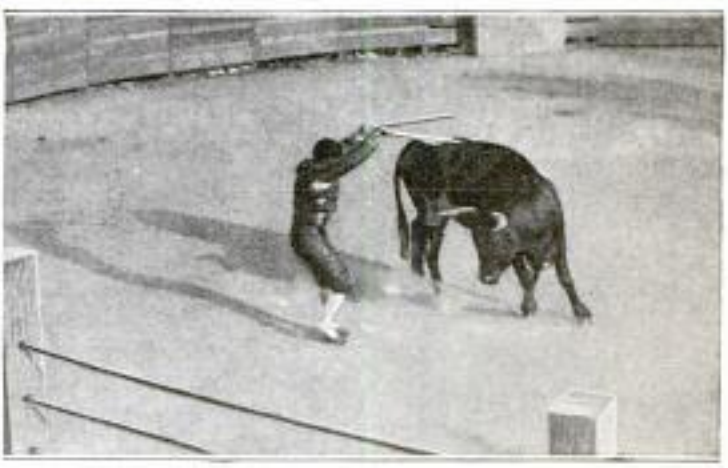


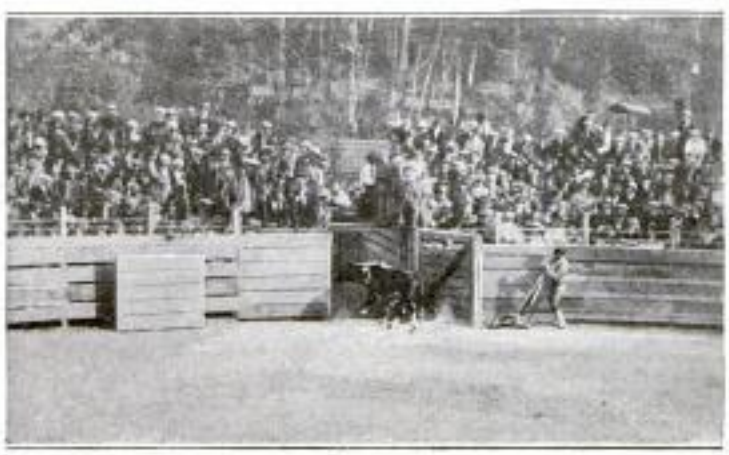
Little Shelters are Provided for the Fighters to Dodge Behind in Case of Extreme Danger

the inventiveness of a California man.

The bullfight was acted exactly as the ordinary Mexican bullfight except that, instead of the usual sharp-pointed blades which are thrust into the animal, blunt prods with a glue-coated base were used. With these sticky weapons the picadors charged the animals in the usual way and thrust their instruments against their bodies. The adhesive base, instead of penetrating the skin, held the lances firmly against the hide, giving the appearance of the reality without hurting the animals in the least.

In this manner, all the skill and excitement of a real bullfight were retained, but the barbarous features were eliminated. Instead of dragging off the dead bulls, they were herded out of a gate, and the crowd went home without the usual sickening impressions of the sight, yet with all the "thrill" that comes from the extreme skill required of the successful toreador.





Above: Sticking on the Glued Prods. Left: Sending the Bull Out of Ring after the Fight

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¶California has 130 mountains over 13,000 ft. high, and 12 above 14,000 ft., of which at least 60 have never been given names because, amid such a great and varied wealth of mountain scenery, they are not considered sufficiently noteworthy.

GREAT CHICAGO FIRE OF 1871 STARTED THE PUBLIC LIBRARY

The fiftieth anniversary of the great Chicago Fire of 1871, recalls that that disaster was, in a peculiar way, responsible for the establishment of the Chicago Public Library. As an expression of sympathy, the people of England presented a collection of books to the city for library purposes. The action originated with Thomas Hughes, the author of "Tom Brown's School Days," the appeal was signed by many notables, including Queen Victoria, and autographed collections were given by the entire literary world of England. The generous gift was prompted by the mistaken assumption that Chicago had possessed a library which had been destroyed in the fire. As a matter of fact, Chicago had never had a public library and had no legal authority to maintain one. When the books began to arrive, late in 1871—several thousand volumes of them—the city authorities were confronted with the problem of disposing of them. The city was still in ruins, there was no place to put them, and no funds to care for them. A great iron water tank, standing in what is now the heart of the business district, was finally obtained and turned into a shelf room. Steps were taken to secure the enactment of a law, by the Illinois Legislature, enabling municipalities to establish public libraries. The law was passed, and Chicago immediately organized its library with the fine English collection as a beginning.

BY COURTESY OF THE CHICAGO BOOK BULLETIN

An Iron Water Tank, 60 Feet in Diameter, 30 Feet High, and Standing on a 35-Foot Masonry Base, Which had Survived the Fire, was Provided with a Skylight, Bookshelves, and Tables, and This Became the First Chicago Public Library

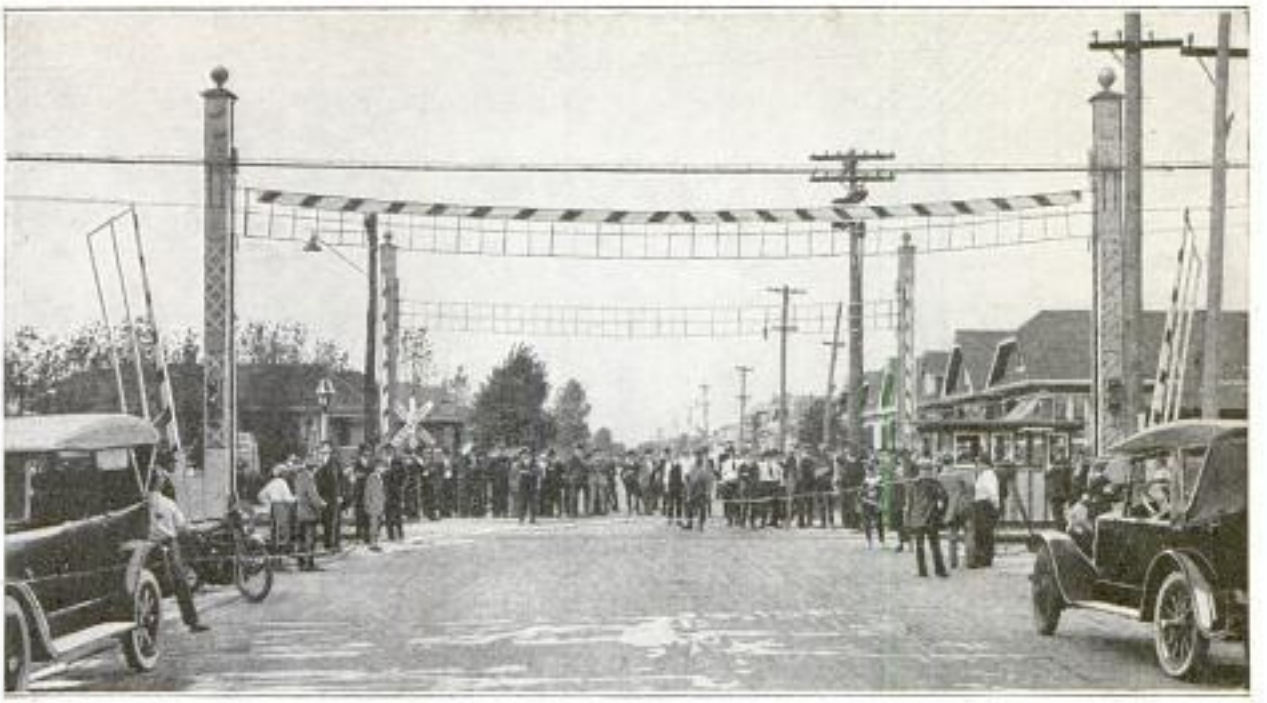
In 1874 the library was moved to more commodious quarters and the original collection of 3,157 volumes, with which it opened on New Year's Day, 1873, has since grown to 1,100,000 volumes.

The First Chicago City Hall, after the Fire of 1871: The Public Library was Started in the Water Tank Which Shows above the Roof

FEWER AUTO-TIRE SIZES WILL CUT MANUFACTURING COSTS

If the recommendation of the Tire and Rim Committee of the Society of Automotive Engineers is adopted, and there is no doubt that it will be, automobile rims will, in the future, be made in only five sizes, and tires in nine sizes, for pleasure cars, and the same number for trucks. By this action three rim sizes and six tire sizes will be eliminated, and two tire sizes, not previously considered standard, will be used. This will effect a reduction in the cost of manufacture, as less money will need to be tied up in machinery and finished products.

¶An electric landing sign marking the aerodrome at Croydon, England, said to be the largest sign in existence, measures a quarter mile in diameter.

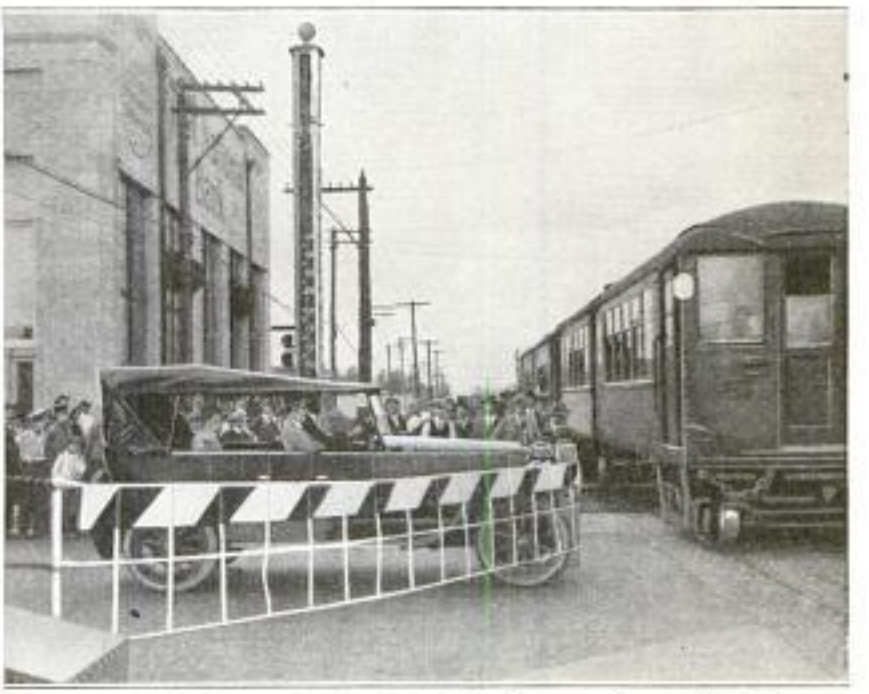


The New Flexible and Extensible Barrier Installed at a Railroad Crossing on Either Side of the Track: When Operative, the Barrier between the Two Posts is Lowered to Block the Traffic

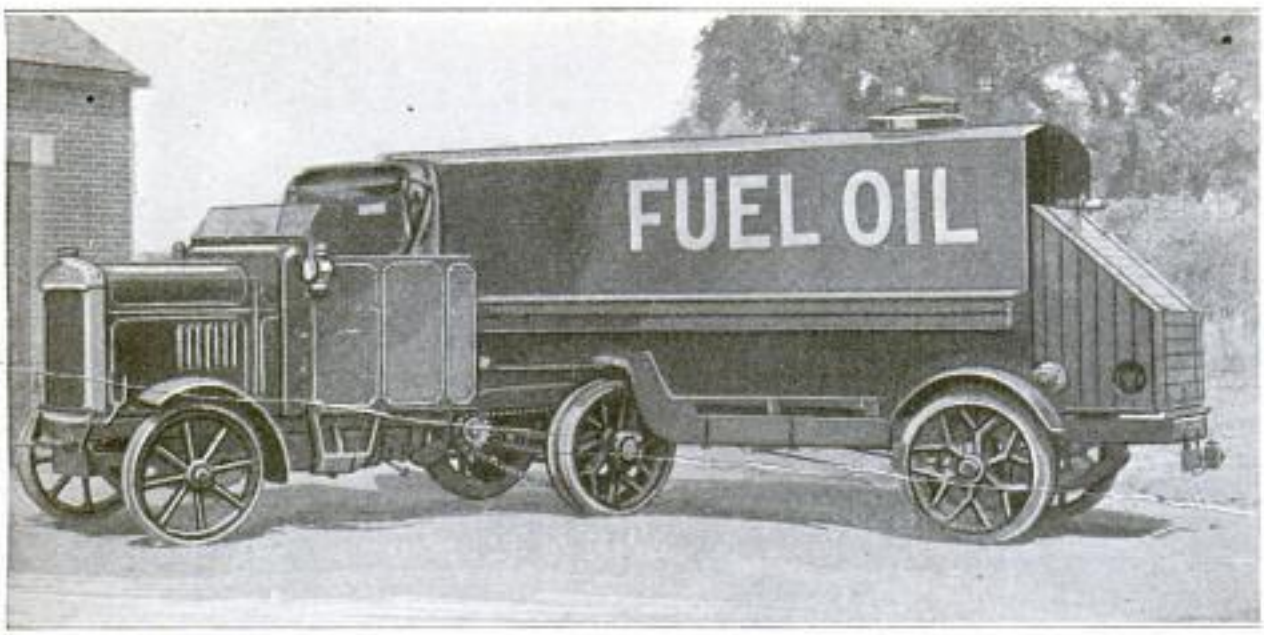
BARRIERS AT GRADE CROSSING SAFEGUARD VEHICLES

A flexible form of barrier for the protection of traffic at bascule and other bridges, and at railroad grade crossings, is now being installed at several points in both the East and the West. The barrier is extensible, as well as flexible, offering a yielding resistance to any moving vehicle that strikes it. This resistance increases gradually until the vehicle is brought to rest, thus acting in much the same manner as a spring buffer. The stoppage occurs at a safe distance from a passing train at a grade crossing, or the end of the road at a bridge opening.

The yielding element consists of three or four horizontal steel cables with vertical spacers at intervals and at each end. Each barrier is stretched between two concrete or steel posts, one on either side of the roadway. The cable network connects by means of a system of endless chains passing over sprockets at the top and bottom of the posts to counterweights within the posts. This connection is made with three chains which pass into the interior of the posts through a sliding head which travels vertically so that, by means of a train of gears driven by a 3-hp. motor, located at the bottom of each post, the barrier can be raised when the road is clear, or lowered to block the traffic. The chains that run through the sliding head allow the barrier to be extended when struck by a vehicle, and the counterweight is then raised to the top of the post, where it is stopped by a U-shaped brake. For ordinary blows the counterweight will suffice to check the movement, and heavy blows are checked by the brake.



Yielding Barrier Shown in the Act of Stopping an Automobile That was Traveling at Considerable Speed



The Oil Tank Mounted on the Trailer Portion of a Six-Wheeled Truck Unit, for Transporting Heavy Oils: The Mounting is So Arranged That the Truck can be Turned in an Even Smaller Radius Than Indicated by This Illustration. The Dropped Frame Gives the Unit Stability

NEW OIL TRUCK CARRIES TANK ON TRAILER

An unusual type of tank truck is being built in England for hauling heavy fuel oil. The tank is mounted on the trailer portion of a six-wheeled truck unit and

A Two-Cylinder Marine-Type Engine is Placed at the Rear of the Oil Truck to Operate a Gear Pump for Filling the Tank

is supported by a massive steel frame. This frame is dropped behind the turntable to give a low center of gravity. Welded steel plate is used in the construction of the 2,000-gal. tank, and two baffles are so placed inside as to permit the oil to flow under them. This construction is employed to resist the great stresses which are caused by the surging of heavy oil when the truck is in motion. At the rear an engine is carried, on an extension of the frame, to operate a gear pump, with teeth so formed as not to take up an excessive amount of oil. Unless a certain amount of slip is allowed, the viscosity of the fuel oil will stall the engine or break the pump. The engine has a direct drive and a 20-per-cent reduction on reverse. In loading oil from tank cars, which is cold and highly viscous, the reverse is used. The oil in the truck tank is warmed by means of the exhaust.

COMBINED KNIFE AND SAW USEFUL IMPLEMENT

A saw blade attached to the back of a butcher knife should prove a very useful arrangement. The saw blade is slightly thicker than the knife, to prevent binding, and has curved slots at either

The Saw Blade is Held Tightly against the Back of the Knife by a Thumbscrew, Placed at the Hilt of the Knife

end, by which it can be securely drawn against the knife.

¶World's-series baseball games were reported to fans, sick in the Roosevelt Hospital, New York City, in a novel manner. A code was devised to signal the reports by means of the bell system used to summon doctors and nurses.

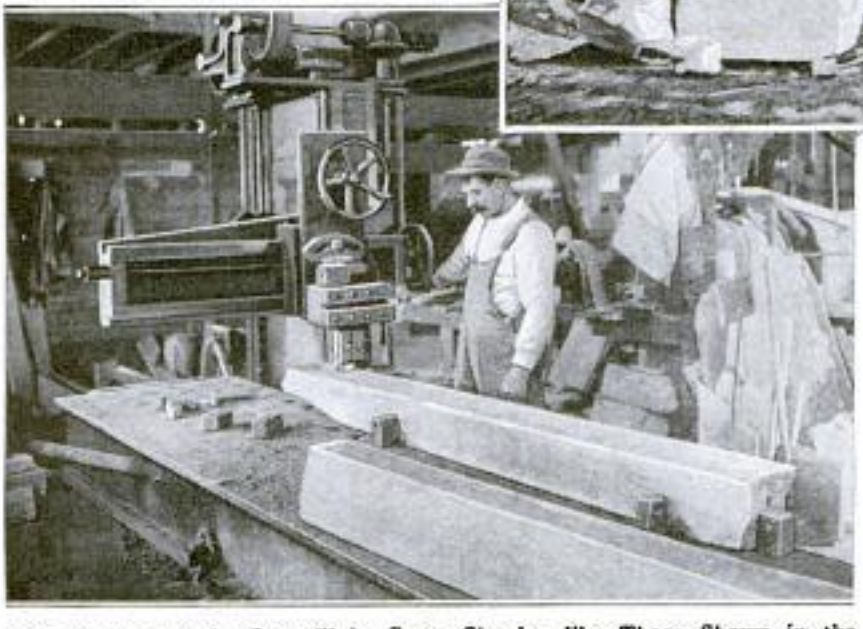
TUFA, VOLCANIC-ASH ROCK, IS HANDLED LIKE LUMBER

By HORACE E. THOMAS

TUFA, a volcanic-ash rock, with properties possessed by no other stone, is being quarried near the town of Mount Angel, Ore., the only place in the United States where it has been found in sufficient quantities for commercial use. Deposits in Italy and Germany have been used for building purposes for many years, but the Oregon tufa is lighter than the European, and has other special characteristics. The stone is first blasted out and is then hauled to a mill and handled like lumber. It is cut into blocks or "boards" of any desired dimensions. Saws, planers, and drills are used on it exactly as in a lumber or planing mill. The finished product closely resembles lumber, but is cut only in short lengths. It is a light-gray color, with spots of white running through it, and weighs only 80 lb. to the cubic foot, about one-half the weight of common building stone.

The Quarry Where Tufa is Blasted from a Bed, 15 to 35 Feet Deep, Covering More Than 1,000 Acres: This Part of the Work Is Similar to the Quarrying of Ordinary Stone, Though from Here on It is Handled in the Same Way as Lumber

A peculiar characteristic of the Oregon tufa is that it can be nailed. Nails are driven into it as easily as into oak and other hardwoods, but are harder to pull out. Tufa furniture, nailed together, has been made experimentally. It is regularly used for fence posts, moldings, sills, and many other purposes where nailing is required. Recently it has been discovered that when pulverized it makes a soft, velvety powder which is an excellent filler for rubber. It is predicted that it will supplant all other materials for this purpose, thus utilizing the refuse.



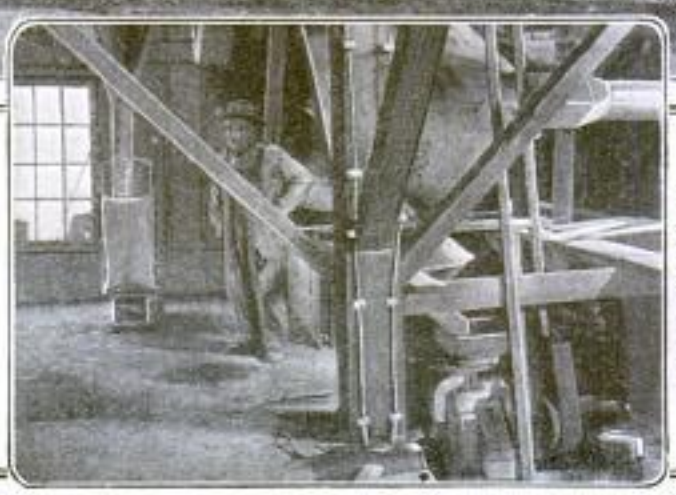
Tufa Arrives at the Sawmill in Great Chunks, like Those Shown in the Upper View. Below Is a Scene in the Mill. Here Window Sills, Made of the Solid Rock, are being Planed in the Same Way as Lumber

The Mount Angel tufa field lies at an elevation of 1,500 ft. and covers an area of over 1,000 acres,

At the Right a Building of Tufa is Shown under Construction. The Method of Laying the Blocks to Form a Hollow-Wall Structure, Similar to That of Building Tile, can be Seen Clearly

Stone Fence Posts of Tufa Are Quite Common. Nails and Staples for Fastening the Fence Wire can be Driven into Them without Difficulty, and are Imbedded More Firmly Than They would be in Hardwood

Above Is a Church Built Entirely of This Peculiar Stone. The Light-Gray Color, with Spots of White Running through It, Makes a Building of Pleasing and Artistic Appearance, While the Ease with Which It is Handled Materially Simplifies the Construction



Refuse from the Mill, Where the Tufa is Sawed into Various Forms, is Ground into a Soft, Velvety Powder and Sacked. This Powder has Proved to Be an Excellent Filler for the Manufacture of Rubber. It is Said to Be Superior to All Other Rubber Fillers

varying from 15 to 35 ft. in depth. It is covered with a layer of earth and basaltic rock. This peculiar stone is composed of pure volcanic ash, free from lava, which was thrown up by some early volcanic disturbance and solidified during the course of ages. The charred remains of trees are found imbedded in the rock, erect as they were when the ash fell about them. The source of the ash cannot be determined, though it is suggested that it may have accompanied the eruption which formed the bed of Crater Lake in Oregon.

Another Scene in the Tufa "Lumber" Mill: Here the Stone is being Cut into Timbers, for Building Construction, by Means of a Carborundum Wheel, Used in the Same Way as a Circular Saw. This Machine Shows the Greatest Variation from the Lumber-Mill Type Equipment

MISSOURI CENTENNIAL DEPICTS OLD TIMES

In celebration of the 100th anniversary of the admission of Missouri to the Union, a large parade and pageant were recently held in Kansas City. Over 30,000 persons saw the pageant, which depicted scenes from the history of the state. Children representing every school in the city marched in the parade and took part in the pageant. A feature of the parade was 20 auto loads of wounded soldiers. Many of the old prairie schooners and stagecoaches were also seen. The parade was headed by the Boy Scouts, who proved efficient in handling the crowds.

A Feature of the Missouri Centennial Parade, at Kansas City, Was the "Evolution of Transportation." Two of the Stages may be Seen Here, the Prairie Schooner in the Foreground, and the Stagecoach at the Left

SWEDISH INVENTION MAKES TALKING MOVIES POSSIBLE

Though "speaking films" were first made about 1900, their combination with picture films has just been successfully accomplished for the first time, by two Swedish scientists, and the talking movie seems about to become a reality. The method is closely related to telephony by light, and is said to employ the fundamental method of earlier developments, which makes use of the property of selenium for controlling a telephonic current when actuated by variable illumination. The novelty of this latest work seems to be in the successful combining of picture-bearing and sound-record-bearing films by running them on the same shaft, while taking and reproducing the double record, and in making selenium-controlled electric currents operate a loud-speaking telephone.

SMALL RUNWAY HELPS AUTO OVER CURBING

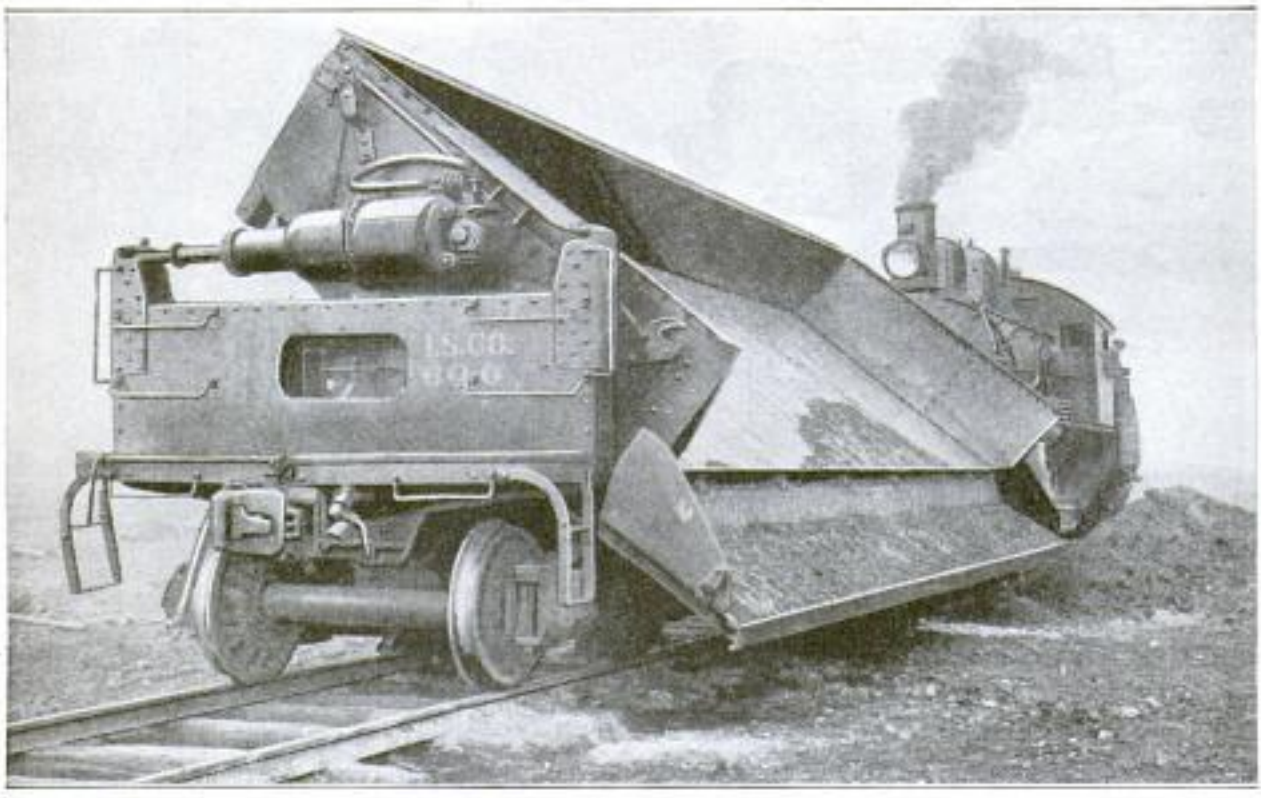
To do away with the often occurring necessity of running up over the curb to get into a garage or parking space, a

The Manner in Which the Portable Runway is Placed for Use: The Insert Shows Runway Folded in Middle, Which Permits It to be Carried in Car

Rhode Island man has invented a small portable runway. It consists of two wooden runs, connected by a strip of wood hinged at the middle to permit folding. The device weighs only 10 lb., and when folded is only 3 ft. long.

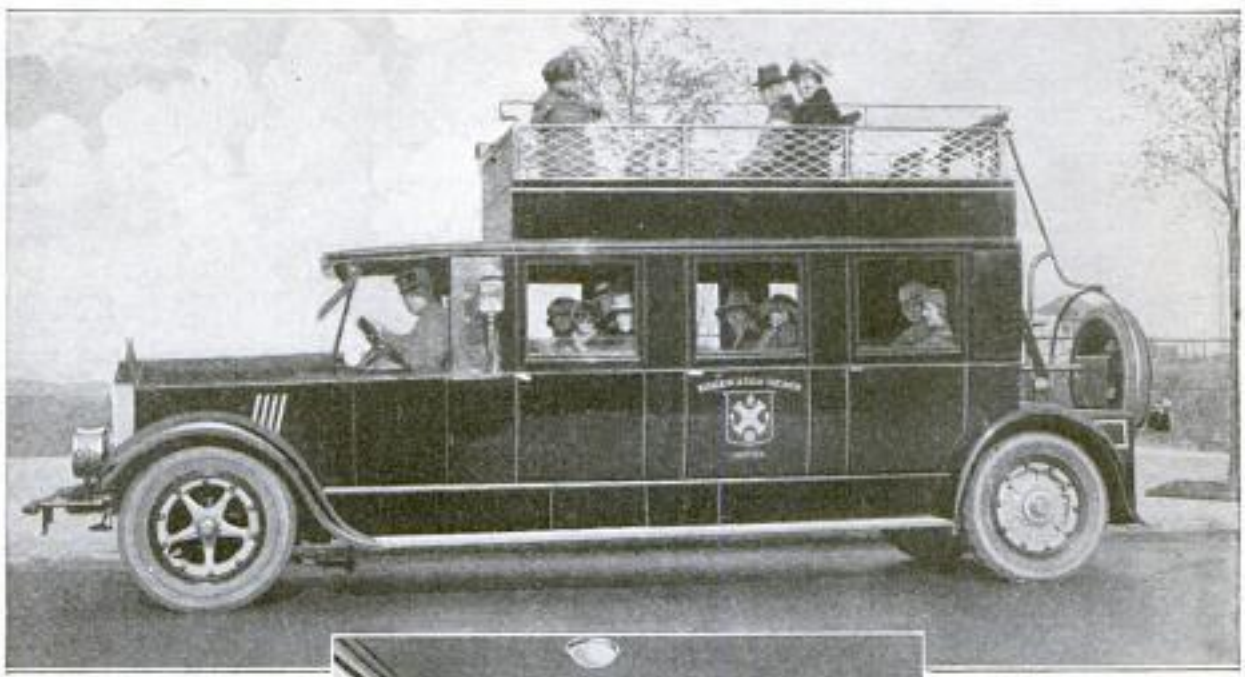
COMPACT AIR-DUMP CAR WITH EXTENSION SIDE

Of the many forms of dumping cars, few are so compact, and so devoid of top-heaviness, as a newly patented dump car that is operated pneumatically. The dumping portion of the car is pivoted on a frame that supports it on the wheel trucks. To one corner of this frame is connected the piston rod of an air cylinder, which is hinged on the dumping portion. There is one of these cylinders at each end of the car, pointed in opposite directions, one doing the dumping, while the other rights the car after it is unloaded. All that is necessary is to open a valve admitting air to the cylinder, which not only tips the dumping portion of the car, but also unlocks it. In righting the car, this process is reversed by the other cylinder, which then relocks it. At the end of the dumping process, the lower side of the car opens automatically, and remains extended so as to form an apron with its lower edge directing all the dumped material well clear of the track. The dump clears the ties as well as the rail, permitting the car to pass.

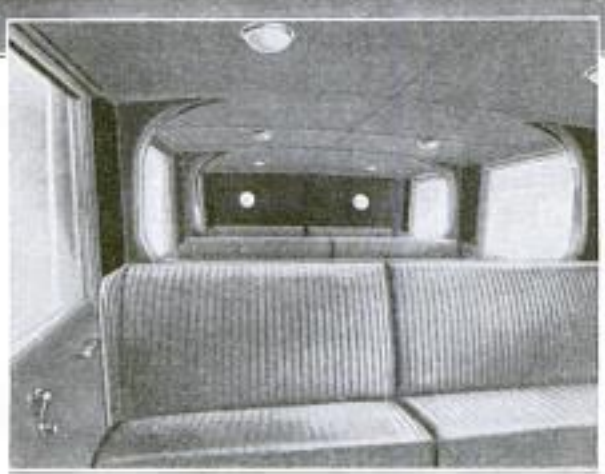


Compact Air-Dump Car with an Extension Side That Opens Out as Shown: The Car has been Pushed Forward, after Dumping, and It can be Seen That the Material has Fallen Some Distance from the Track

HOTEL BUS SERVICE HEIGHT OF COMFORT AND LUXURY



Above: One of the Busses Provided for the Guests of an Outlying Chicago Hotel, to Carry Them to the Business and Shopping District.



These Busses Represents Below: The Interior of the Height of Everything That Makes for Comfort and Luxury in Automobile Body Design

The specially built busses, operated by an outlying Chicago hotel, to meet the transportation problem for its guests, represent the height of luxury in motor design. A standard truck chassis is equipped with a hood, running board, and so forth, of the pleasure-car type. The body is of the limousine style and is finished in dark green with black and yellow trimmings. Limousine doors give entrance on the right side, and, to prevent accidents, are operated electrically by the driver. The interior seats are arranged in sections, four passengers to a seat, all facing forward. They are upholstered in the finest gray mohair and are trimmed in pillow style to insure cleanliness. A roof deck is provided with seats having comfortable curved backs, deep seat parts, and ample knee space between. At the rear, a winding stair, with brass railings, leads to the top, which is inclosed with a nautical rope effect, adding an appearance of lowness to the lines of the machines.

EARTHQUAKES RECORDED PHOTOGRAPHICALLY

An improvement in the seismograph—the instrument used for recording earthquake shocks—has been accomplished by the use of light-sensitive paper in place of the ordinary paper upon which the record is marked by a stylus or pen. A small mirror adjusted to record any earth movement by oscillations, receives a beam of light and reflects it onto the strip of sensitive paper. This reflected beam of light moves through an angle which is twice that of the angular motion of the mirror, and therefore the record of the oscillations on the paper is enlarged twofold. The recording paper, as in all such instruments, moves constantly, and registers the time and period of the oscillations.

¶An ordinary locomotive, driven by superheated steam, has satisfactorily replaced the rack system on gradients as high as 60 ft. in 1,000 on the line between Halberstadt and Blankenburg, in the Harz Mountains, Germany, and is to be tried on 80 in 1,000 gradients.

LARGEST BOMB IN WORLD MAKES HUGE CRATER

What is believed to be the largest aerial bomb ever made was tested recently by ordnance officials at the Aberdeen, Md., proving grounds. It had a total weight of 4,300 lb., was about 14 ft. long and 2 ft. in diameter, and contained 2,580 lb. of T. N. T. It was dropped by a Handley Page bomber from an altitude of 4,100 ft., hitting within the area marked off on the ground, and making a crater 100 ft. in diameter and 30 ft. deep. The bomb was colored red, with a yellow tail, to enable the observers to study its motion.

PHOTO BY GILLIAMS SERVICE

This Crater, Made by the Largest Aerial Bomb Ever Exploded, Was 30 Feet Deep and 100 Feet in Diameter

SHAVING-TUBE SQUEEZER SAVES CREAM

A shaving-tube squeezer, consisting of a roller mounted by spring tension on a small stand, is the latest addition to the shaver's equipment. By simply turning the small handwheel on the end of the roller, the proper amount of cream can be squeezed out. A wire holder attached to the stand for the brush keeps it from being misplaced.

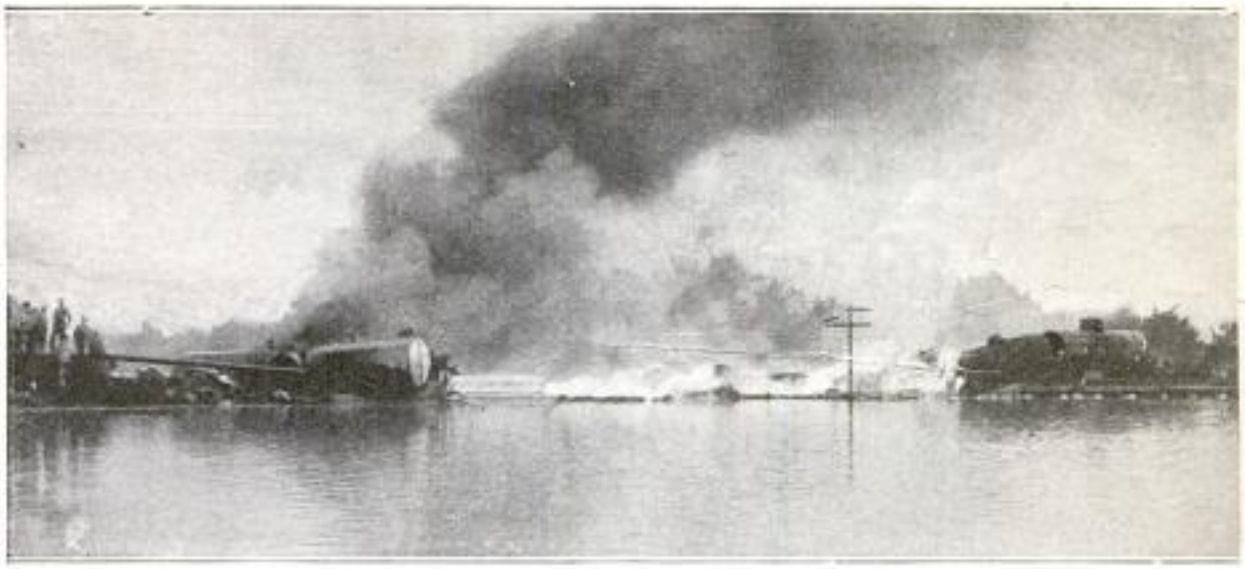
GAS-TURBINE DEVELOPMENT REMAINS EXPERIMENTAL

For many years it has been prophesied that turbines actuated by hot gases other than steam would be the ideal prime mover of the future. But in spite of countless attempts to perfect such a machine, there are very few that have shown any promise of surpassing even the reciprocating motor in efficiency. One of the latest attempts to develop a turbine utilizing directly the energy of hot gases is the result of the work of a German engineer, which began before the war, and which has been continued since the war with sufficient promise to encourage its promoters to believe that they may ultimately develop a prime mover that in efficiency will perhaps never equal the steam turbine, but will at least surpass the reciprocating gas engine. At Mulheim, in Germany, two experimental models have been built, which have functioned with success, but not quite well enough to show much prospect of ever competing with the steam turbine. These experimental machines are of 500 hp. each, one for using gas and the other for oil.

UNITED STATES NAVY ADOPTS A NEW FLAGSHIP POLICY

In the naval fleets of all countries it has been customary to use one of the largest and most powerful of the battleships in the fleet as the admiral's flagship. A new policy is about to be adopted in the U. S. Navy, and when Admiral Hilary P. Jones takes command at the next joint mobilization of the Atlantic and Pacific fleets, he will use the "Great Northern" as the flagship. The special features of this ship are not those of a capital battleship, but speed and commodiousness. It is an oil burner with a speed of 29 miles an hour. The idea is that an admiral in command of a fleet can control it more effectively from a fast ship.

¶A new civic center will be established in one of the most dilapidated sections of the city of Baltimore. It is to be improved with a group of buildings, of which the first unit will be a Memorial Hall. This will be in the style of a Greek temple, covering an area of 110 by 180 feet.



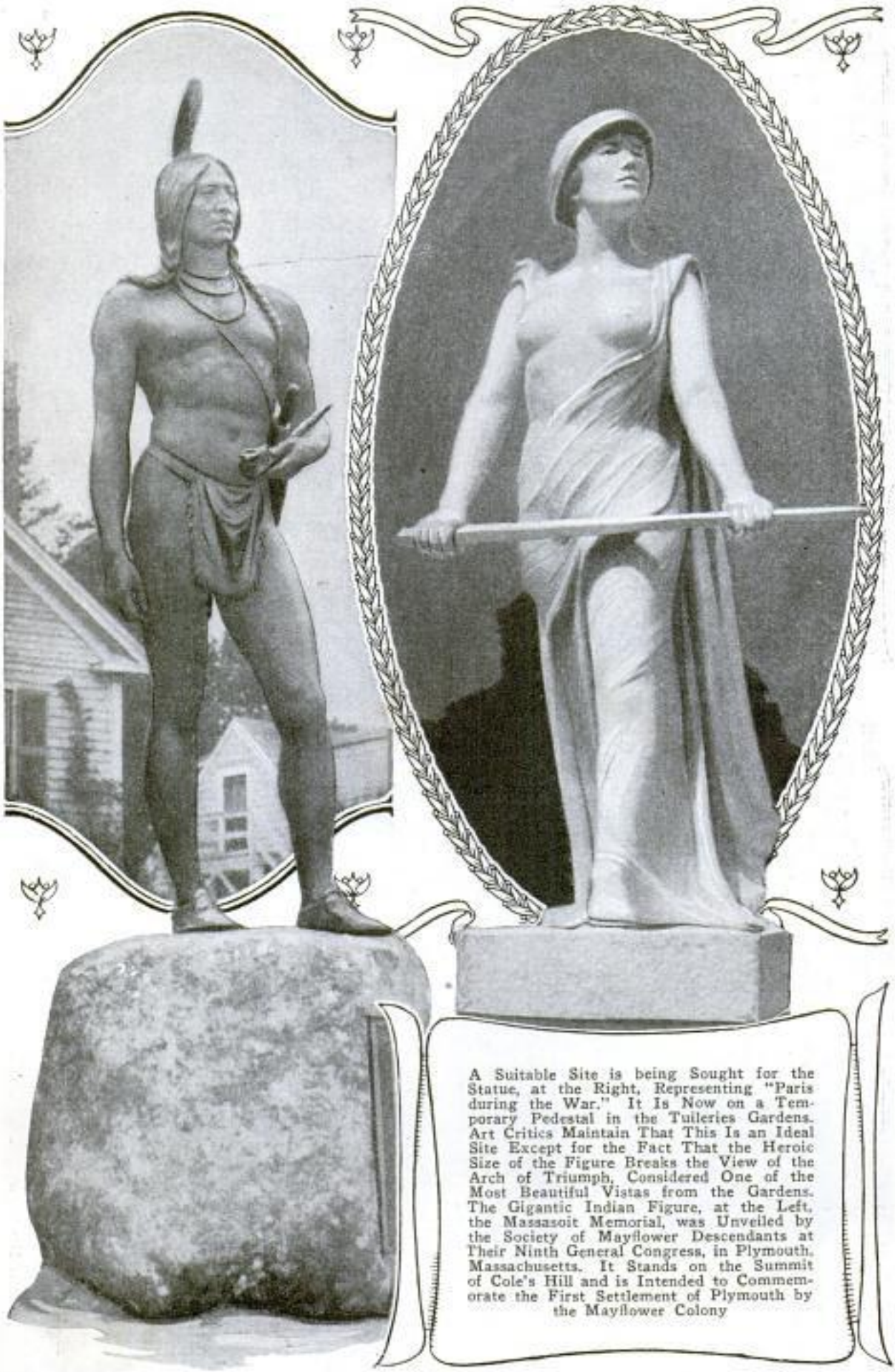
IGNITION OF OIL TANK DURING FLOOD SETS RIVER AFIRE

THERE is only one way that a river can be set on fire; that is, by the ignition of a mass of oil floating on its surface. A spectacular instance of these conditions occurred recently on a mid-western railway where it crossed a flooded river. While a train of oil-tank cars was passing slowly through the water, the oil in one of them, in some manner, became ignited. The result was that 17 tanks of oil and gasoline were wrecked, and the oil floated, in flames accompanied by heavy clouds of smoke, far down the river.

EIGHTEEN CARS PILED UP IN FREIGHT WRECK

A bad freight wreck recently occurred in Delaware, Okla., a small town near the Kansas boundary. The train was going at about 25 miles an hour, when the front trucks of one of the cars came loose. This hurled it against the station, piling up the remainder of the train, 18 cars, in a heap. Although the cars were very badly smashed up, fortunately no one was injured.

Wreck of a Freight Train at Delaware, Oklahoma, Which Collided with the Station Building Seen Above, and Piled Up 18 Cars, as Seen to the Left: In Spite of the Extent of the Wreck, No One was Injured

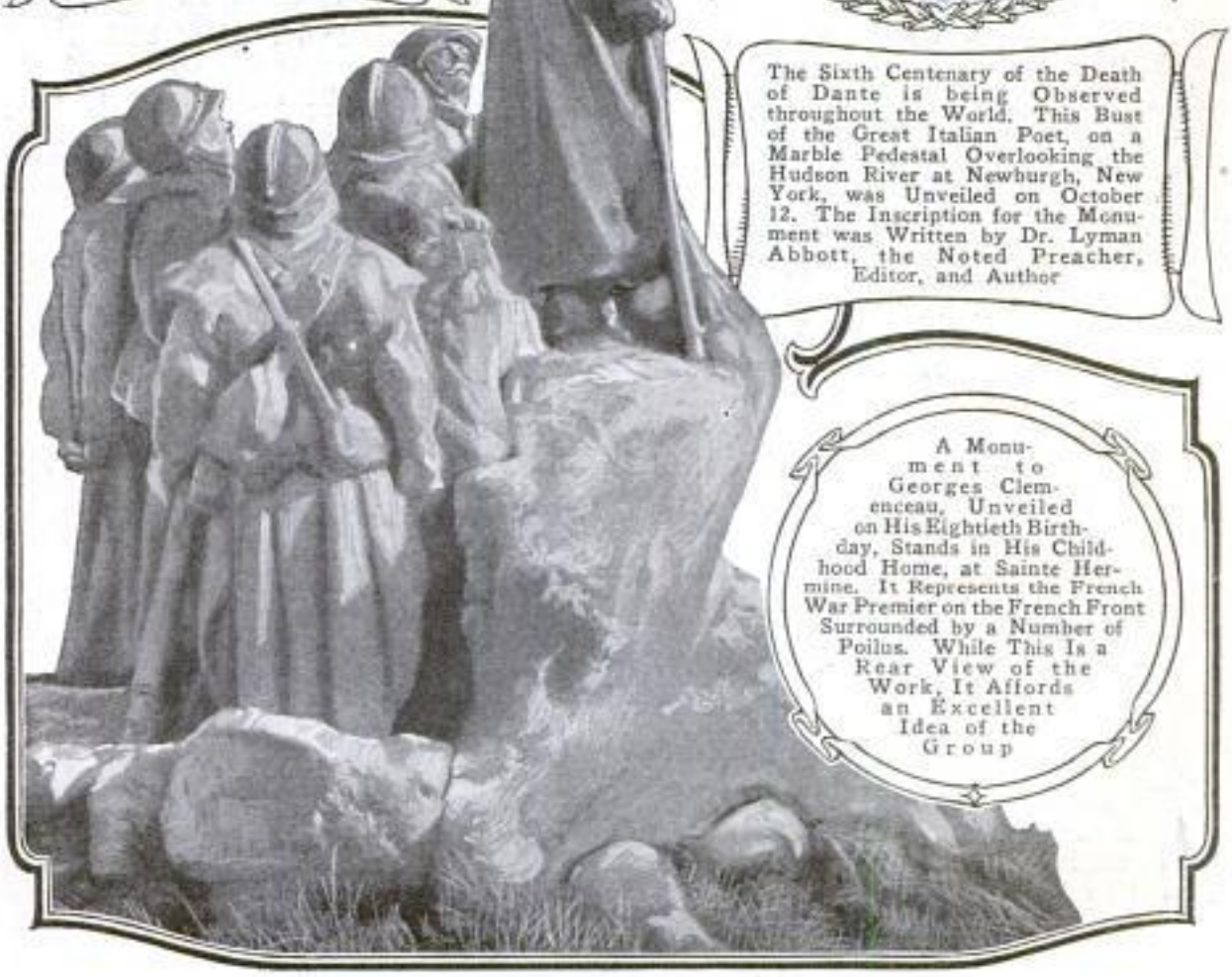


A Suitable Site is being Sought for the Statue, at the Right, Representing "Paris during the War." It Is Now on a Temporary Pedestal in the Tuileries Gardens. Art Critics Maintain That This Is an Ideal Site Except for the Fact That the Heroic Size of the Figure Breaks the View of the Arch of Triumph, Considered One of the Most Beautiful Vistas from the Gardens. The Gigantic Indian Figure, at the Left, the Massasoit Memorial, was Unveiled by the Society of Mayflower Descendants at Their Ninth General Congress, in Plymouth, Massachusetts. It Stands on the Summit of Cole's Hill and is Intended to Commemorate the First Settlement of Plymouth by the Mayflower Colony

COMMEMORATED IN PERMANENT SCULPTURE

This Bust of Cardinal Mercier, One of the Most Heroic Figures in Belgium's War Record, is to be Placed in the Gould Memorial Library of New York University. It will be Unveiled by the Belgian Ambassador

The Sixth Centenary of the Death of Dante is being Observed throughout the World. This Bust of the Great Italian Poet, on a Marble Pedestal Overlooking the Hudson River at Newburgh, New York, was Unveiled on October 12. The Inscription for the Monument was Written by Dr. Lyman Abbott, the Noted Preacher, Editor, and Author



A Monument to Georges Clemenceau, Unveiled on His Eightieth Birthday, Stands in His Childhood Home, at Sainte Hermine. It Represents the French War Premier on the French Front Surrounded by a Number of Poilus. While This Is a Rear View of the Work, It Affords an Excellent Idea of the Group

ONE-HANDED MUSICIANS AIDED BY NEW DEVICE

Maimed to the extent of the absence of only one finger, a musician could not play the old form of saxophone or piccolo and

Musician Using a Device That Enables Him to Play the Saxophone with His Left Hand and a String Tied to His Crippled Right Arm

allied instruments. Now there is a new form of these instruments that can be played by a cripple with only one arm. A scale of 36 notes can be played on a saxophone or a piccolo with one hand and a string tied to the foot, or to the stump of the missing arm. The device can be applied to any existing instrument, and the register or octave key can then be dispensed with. It operates by dividing the scale into semitones, a pair of such notes being apportioned to each finger, with a selective lever or master key, common to all of the pairs and adapted to

The Keys of a Piccolo Arranged with a Selective Lever, or Master Key, So That One Finger can Do the Work of Two: The Instrument can be Played with One Hand

determine which one of any pair is to be sounded. By this means the finger work is greatly reduced, and yet gives a chromatic scale of two octaves. The device is made in several forms which are adapted to be applied to the saxophone, the piccolo, flute, oboe, and similar instruments.

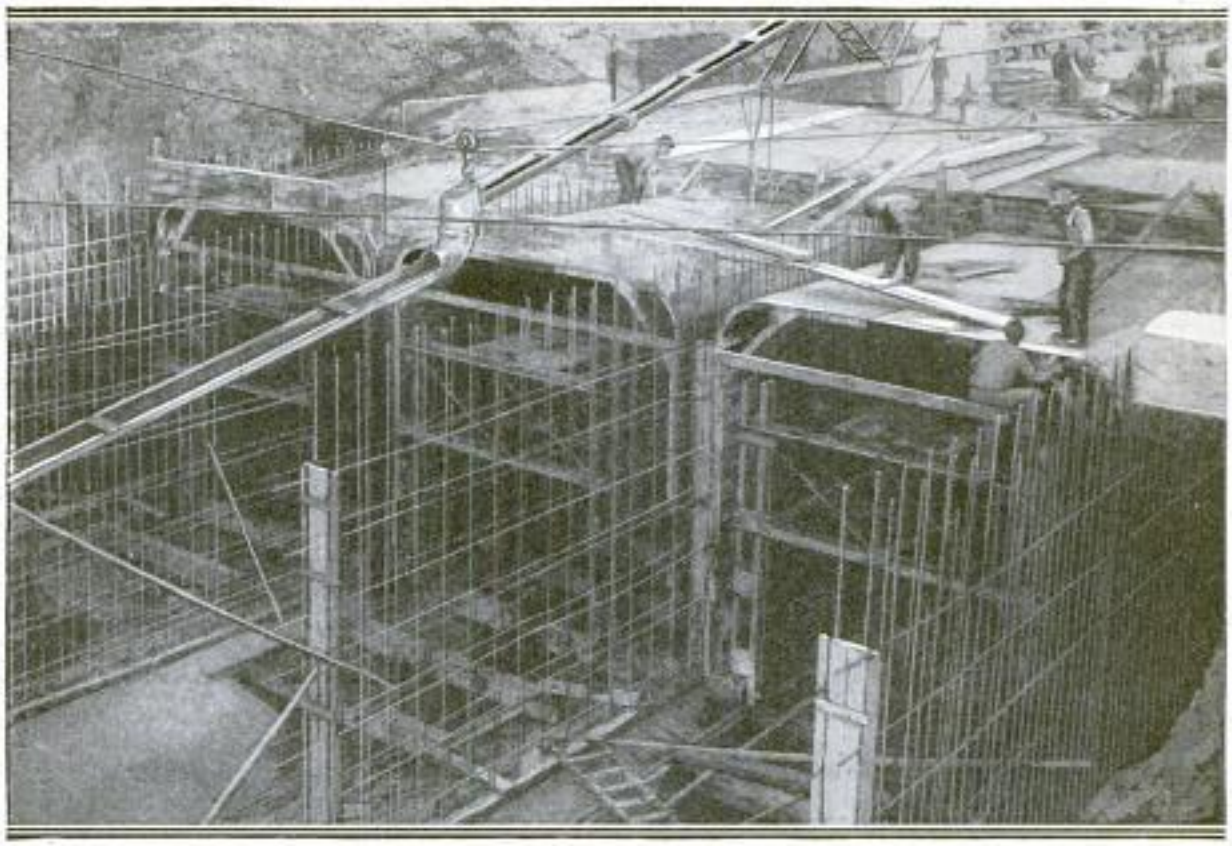
CATAPULT LAUNCHES AIRPLANE FROM BATTLESHIP

Catapults of various kinds have been built in the past 10 years in the attempt to devise a satisfactory means of launching airplanes from battleships. The development of a device, by the navy, which operates on the catapult principle and which is expected to meet all requirements, has just been announced. It consists of a carriage, moving on tracks, on which the plane is mounted. The carriage moves forward at increasing speed until it acquires sufficient velocity for the airplane to rise. At the end of the track the carriage is brought to rest by brakes and shock absorbers. This device is to be thoroughly tested and, if it meets expectations, it can be built into all battleships quickly, and in such a way that it will not interfere with gun turrets and other equipment, as have most previous devices.

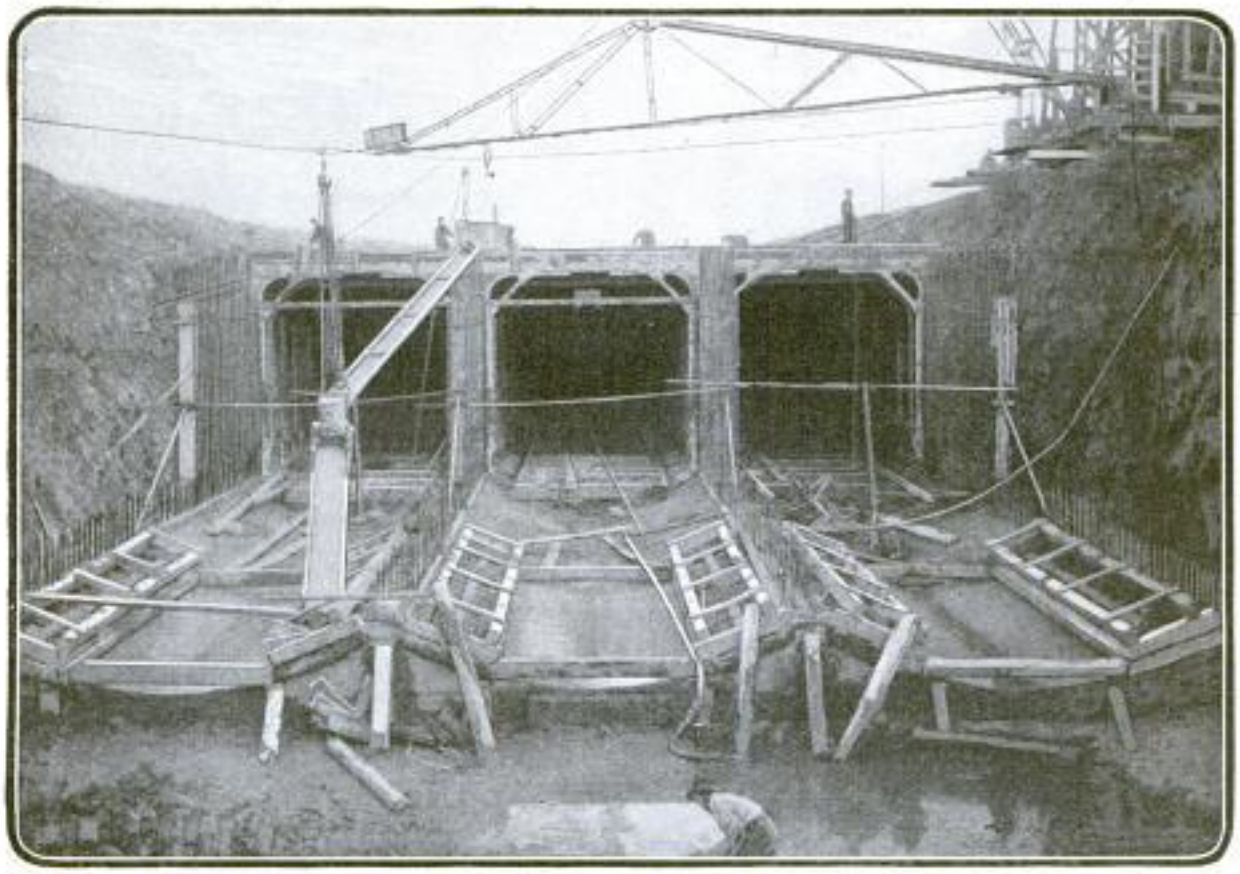
COLLAPSIBLE STEEL FORMS FOR GIGANTIC SEWER

In an open-cut sewer, now being built in Detroit, there are two remarkable features—one is its great size, and the other is the use of a novel kind of collapsible steel form for pouring the concrete. In size it is said to be one of the largest sewers in the world, and together with another similar one, known as the Lonyo Road sewer, will have capacity enough for a future population of 3,000,000 or more. It is composed of three adjacent tunnels, each with inside dimensions of 17 ft. high by 15 ft. 9 in. wide. The steel forms are in sections 20 ft. long. They are so constructed that after the concrete is poured, and has had time to set, the forms can be collapsed onto a steel carriage that runs on rails. While the first section is setting, a second one is poured, which takes about the same time as the setting of the first section, so that when the form of the first is collapsed on its carriage, it is pulled through the second section, and set up beyond it. This alternation goes on continuously, and there is no time whatever expended in erecting forms.

¶An American, seeking a Paris, France, apartment, for the winter, employed an airplane and pilot to drop 100,000 cards over the principal boulevards. The cards stated his needs and, it is said, he received 200 replies.



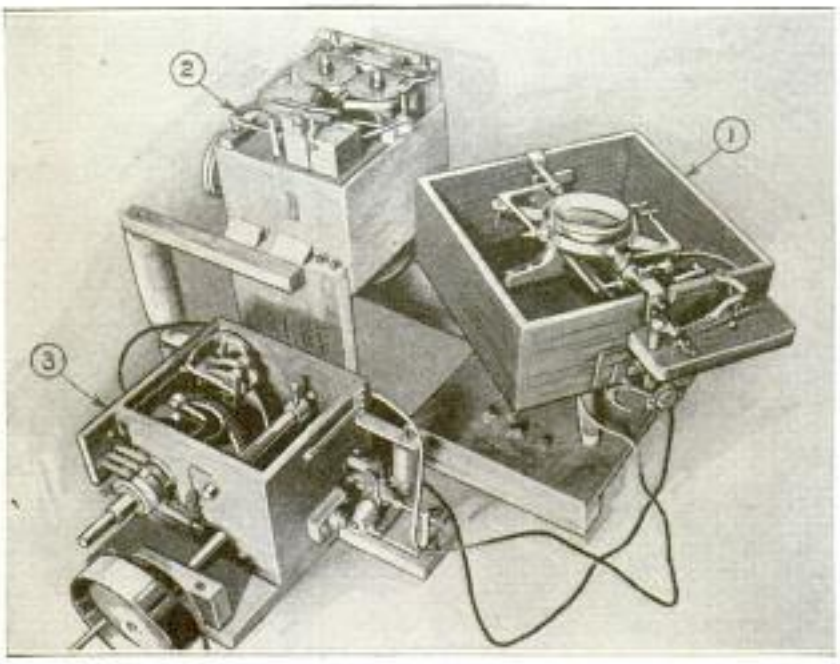
Partitioned Open-Cut Sewer Composed of Three Adjacent Concrete Tunnels Built with Collapsible Steel Forms in Sections 20 Feet Long: One Form Is Sufficiently Collapsible to Allow It to be Withdrawn on the Carriage, Seen on Wheels, from a Section in Which the Concrete has Had Time to Set through a Second Section in Which the Concrete is Setting. It is Now being Prepared to Form Another Section of the Tunnel. Note the Bars Already Set for Reinforcing the Concrete of the Partitions and Outside Walls. When the Forms are Expanded into Proper Position the Concrete will be Poured in This Section of the Three Tunnels



Triple Concrete Tunnel being Built in Detroit to Form an Open-Cut Sewer: The Tunnel Floors of an Additional Section Are Ready to Have Moved onto Them the Collapsible Steel Forms from a Finished Section in Rear of the Section Seen, Where the Concrete Is Still in Process of Setting. Each of These Sections Is 20 Feet Long, and There Are Two of the Collapsible Steel Forms in Each Tunnel

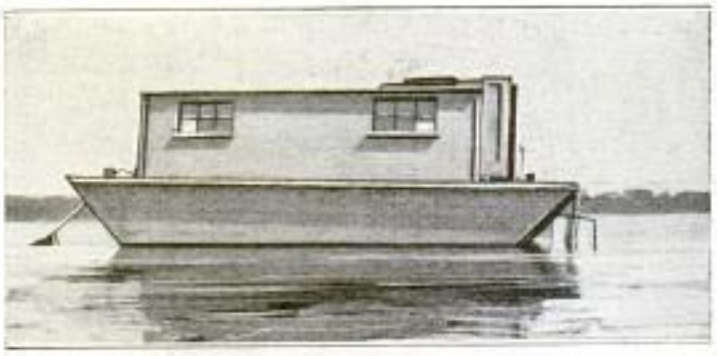
UNMANNED SHIPS CONTROLLED AND STEERED AUTOMATICALLY

Steering an unmanned ship by wireless has been considered one of the marvels of recent ingenuity. Now there is an invention that goes still farther, for it makes a ship absolutely self-steering without the intervention of any human agency whatever. A demonstration of the apparatus was made recently, at Great Bay, N. H., in a houseboat that was automatically steered over a predetermined course, having legs of different lengths and varying angles.

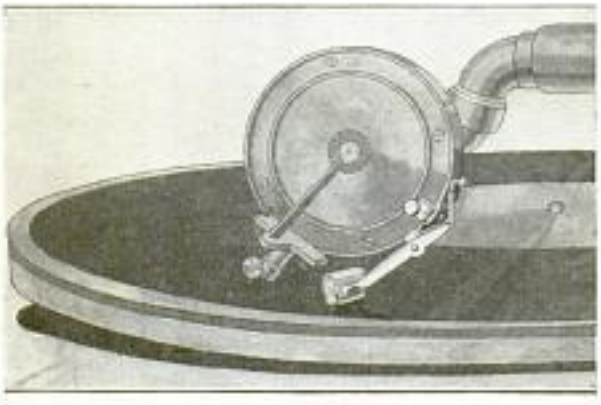


Group, Showing Mechanical Control and Steering Devices: The Compass Box "1" is Rotated and Timed by "2," So That, at the Proper Moment, It Causes "3" to Act upon the Steering Apparatus

The controlling feature of the apparatus is a box with three disks, by means of which the course of the boat is laid out. These have holes in them, in which pins are inserted to cause, by electrical means, a compass box to turn in the proper direction when the boat is to be brought upon a new leg. The turning of the compass box actuates the steering gear through a mechanism mounted in a third box. Only the first leg of the boat's course is regulated by setting the compass, which thereafter serves only to keep the boat from swerving from the course set for each leg. It is thought that the apparatus, in the same or some modified form, may be applied to the steering of airplanes, submarines, and perhaps even motor vehicles. It cannot be interfered with by outside influences as in wireless control.



Houseboat That was Steered by Means of an Automatic Apparatus over a Predetermined Course, Having Legs of Different Lengths and Varying Angles



The Coil Spring Keeps the Little Piece of Felt Pressed Lightly against the Record, Cleaning It Before It is Touched by the Needle

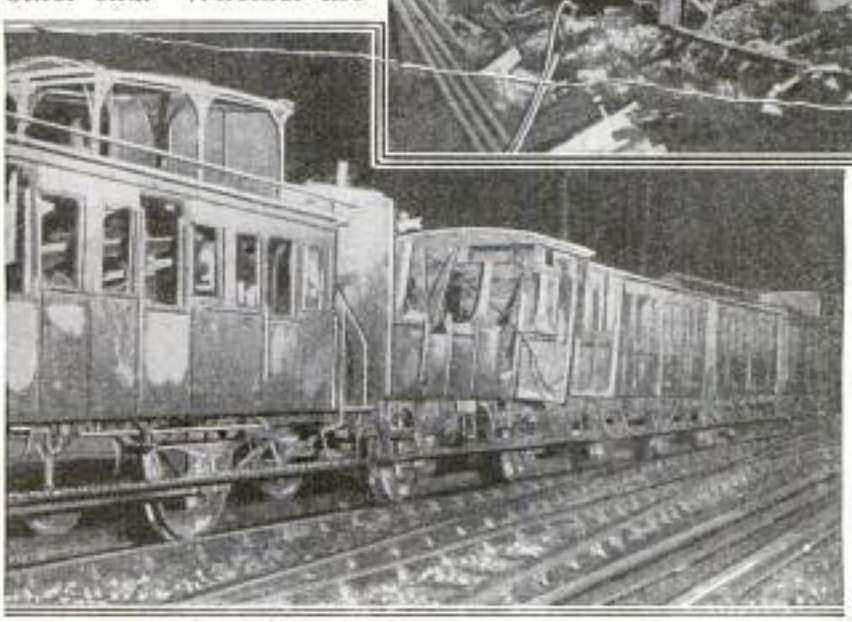
AUTOMATIC CLEANING DEVICE SAVES PHONOGRAPH RECORDS

Cleaning a phonograph record each time before it is played not only prolongs the life of the record, but also improves the music production. A simple little device does this automatically by keeping a small strip of felt pressed lightly against the record directly ahead of the needle. The felt strips are reversible and easily replaced. The device is quickly attached by a thumbscrew to the tone-arm of any standard machine. It is made of brass, nickelplated, and should last a lifetime.

PARIS SUBWAY WRECK CAUSED BY SIGNAL FAILURE

During the evening rush hour, on October 5, a subway train crashed into the train ahead of it, in the unlighted Batignolles tunnel near the St. Lazare Station, Paris, France, owing to a failure of signals. When trains enter this tunnel a signal drops automatically, stopping other trains until the tunnel is signaled clear from the other end. Whether the signal failed to drop or was prematurely raised has not been determined. The first train was compelled to stop in the tunnel and the second train, four minutes behind, struck it. A gas reservoir exploded and fire spread to the wreck. It is reported that about 40 persons were killed and 100 injured. Demolition of this tunnel had been authorized, but was postponed because of the war. The work of demolition has been ordered carried out immediately.

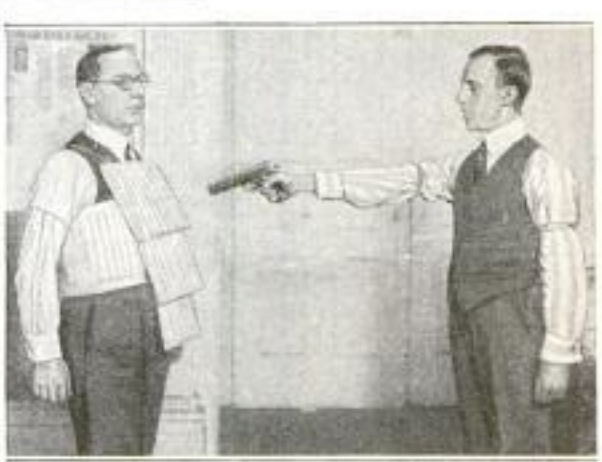
Some of the Burned Coaches of the Trains Wrecked in the Paris Subway Tunnel Where 40 Persons were Killed



Two Trains were Wrecked When One Crashed into the Rear of the Other Because of the Failure of Signals. An Exploding Gas Tank Set Fire to the Coaches and This Was Responsible for Many Deaths and Injuries

BULLET-PROOF JACKET PROVED EFFECTIVE BY POLICE TESTS

Armor, in the form of a bullet-proof jacket, has been adopted by the police department of New York City. This jacket, made of steel plate, silk, and canvas, and weighing only 6 lb., has deflected pistol bullets fired at close range in tests made in the shooting gallery at the department headquarters. A belt fits about the body from the armpits to the waist, and three plates extend from the throat to several inches below the belt in front, completely protecting all the vital parts of the body. It is supported by straps over the shoulders, which can be adjusted to fit the individual.



The Method of Wearing the Bullet-Proof Steel Jacket is Shown Here. It Protects the Vital Parts of the Body Perfectly, Even at Such Close Range as That Seen in This Case

FOOTBALL PLAYERS TRAINED WITH "BUCKING STRAP"

Something new in football-training apparatus has appeared on the practice field at Cincinnati University this season, in the form of a "bucking strap." Two long pieces of heavy leather are connected by two shorter straps, and the rectangular opening formed is thoroughly padded with heavy felt. The ends of the long straps are fastened to two wooden handles. By placing this harness over the shoulders of a candidate for the team, and assigning two of his teammates to hold back on the handles, he is given a thorough training in the tactics of smashing through the line and carrying the ball while dragging his opponents with him.

The Method of Using the New "Bucking Strap" is Well Illustrated Here. The Free Position and Sustained Effort of the Player Assist the Coach in Observing His Mistakes and Correcting Them

JAPAN TO HOLD LONG-DISTANCE OVERSEA AERIAL COMPETITION

The first Japanese long-distance oversea aerial competition is scheduled to be held between November 10 and 20 this year, under the auspices of the Imperial Aeronautical Association of Tokyo. The proposed course covers about 800 miles, with an all-night stop at Seoul, in Chosen, and the required flying time is estimated at about eight hours. Valuable cash prizes have been offered for first, second, and third places.

REMARKABLE RECORD MADE IN AIR-MAIL SERVICE

Little publicity has been given the remarkable record of Eddie Hubbard, of Seattle, Wash., who has been carrying mail under a special contract since October, 1920. He is required to make not more than 10 trips a month, and carry at least 600 lb., in all weather, between Seattle and Victoria, B. C. The letters are important correspondence for foreign ports. They are delivered to his hangar two hours before ships leave Victoria for Oriental ports. In this way important mail, which would otherwise miss the steamers, is saved eight or nine days' delay. On the return trip he brings similar mail, from the steamers, eight or nine hours ahead of the regular steamer mail. Hubbard has made a 100-percent record, making every trip in spite of weather conditions. It is estimated that he carries over 110,000 letters a month at a cost, to the government, that is more than met by the ordinary postage rate on the mail carried.

SHIPBUILDING FOR EMERGENCY FLEET CORPORATION ENDS

The last ship being built for the Emergency Fleet Corporation was launched, September 19, at Los Angeles. Thus ends the vast shipbuilding program of the corporation that was started under pressure of the war in August, 1917. Since then there have been launched on account of the corporation a total of 2,312 hulls of 13,636,711 tons. Of these, 1,309 were steel hulls of 8,927,695 tons; 384 were requisitioned steel hulls of 2,687,266 tons, under construction when the shipyards were taken over by the government; 18 composite hulls of 63,000 tons; 589 wood hulls of 1,885,250 tons, and 12 concrete hulls of 73,500 tons. In all cases the tonnage is deadweight. Of this grand total, all but 11, of 129,400 tons, have been actually delivered to the corporation, and it is expected that the last delivery will be made by the end of March, next year.

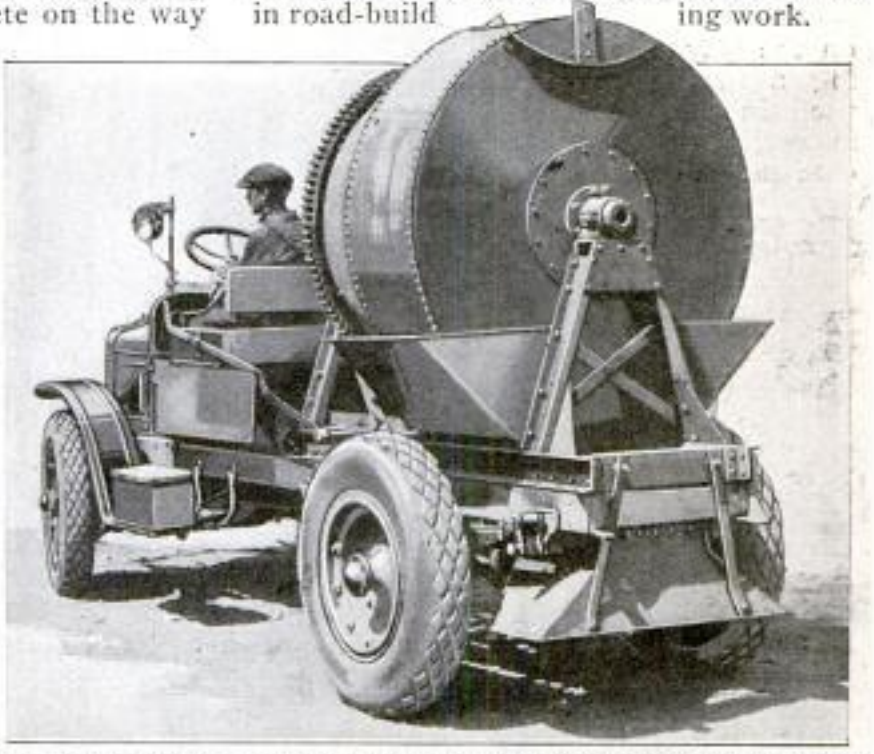
BY COURTESY OF THE STANDARD OIL BULLETIN

THRESHING WITH 10 INCHES OF SNOW ON THE GROUND

THRESHING is not ordinarily considered an occupation for winter nor associated with snow, but this case is one exception to the rule. The picture was taken on the Charles Abramson ranch near Lakeview, Ore. It is said that the work progressed without difficulty in spite of 10 in. of snow which covered the ground on the level, and there is not much ground in that country which is not level. The engine ran perfectly and the job was completed in a normal length of time.

TRUCK MIXES CONCRETE ON WAY TO WORK

Great economy of time is afforded by a truck which mixes concrete on the way to work. The ordinary truck body is replaced by a rotating concrete drum mounted on the chassis. Power to operate the drum is secured from the truck motor through a power take-off. The drum may be operated while the truck is moving at any speed, or when standing still. Stone, sand, and water are placed in the mixer before starting to work, and by the time the truck arrives at the job the concrete has been mixed ready for immediate use. It is discharged by gravity through a chute at the rear of the truck. As the truck moves forward the chute spreads the concrete so that only a small amount of hand spreading is necessary, which saves considerable time in road-building work.



This Concrete-Mixing Drum is Operated by the Motor of the Truck on Which It is Mounted. It can be Rotated While the Truck is Moving at Any Speed, or While It is Standing Still

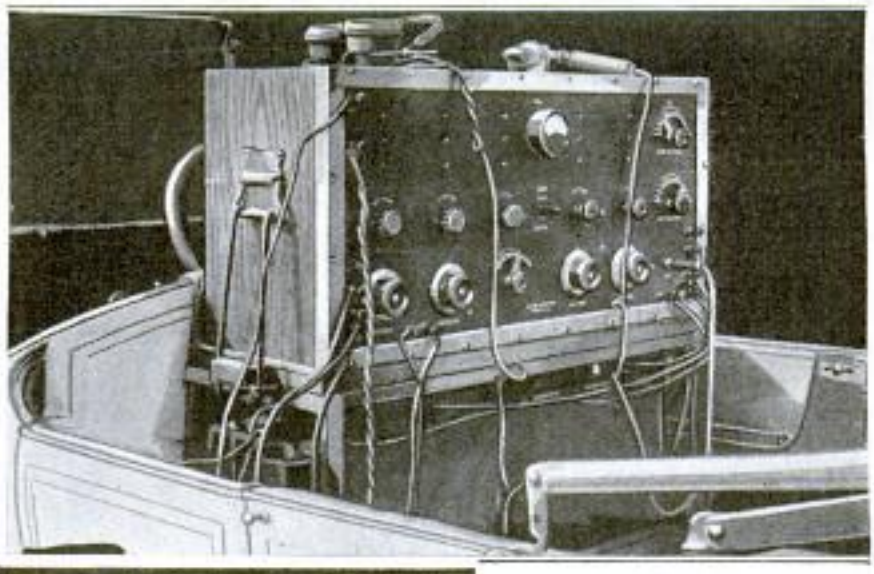
BICYCLE SIDECAR FOR BUNDLES IS SIMPLE AND INEXPENSIVE

A bicycle sidecar, for carrying bundles, is of simple and inexpensive construction. An L-shaped bar passes around one of the rear forks and is bolted to the seat-post bar. To this a second bar is attached by thumbscrews and extends to the side in a horizontal position. At the end a small rubber-tired wheel is mounted. A basket is attached to the horizontal bar. The spring-steel frame is sufficiently flexible to adjust itself to the swing of the bicycle and does not interfere with steering. When not in use, the horizontal bar may be detached and fastened in an upright position, out of the way.

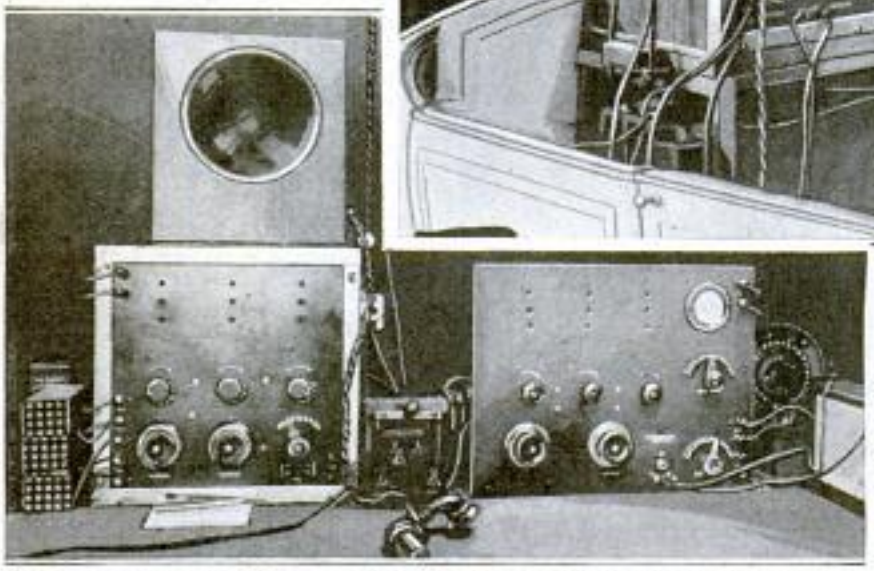
This Bicycle Sidecar Attachment, for Carrying Bundles, can be Folded Out of the Way, as Shown at the Right, When Not in Use

INSTALL WIRELESS TELEPHONE IN FIRE CHIEF'S CAR

The Trenton, N. J., fire department has installed a wireless telephone in the department chief's car as well as at department headquarters so that the chief can keep in constant communication with it on the way to and during a fire. The aerial used in the automobile is carried in a sliding case and can be extended to 18 ft. The car itself serves as a ground. The transmitting and receiving set consists of a 500-volt generator connected with a 110-volt motor, three five-watt power tubes, two two-step amplifiers, three audion bulbs, batteries, switches, and transformers.



Wireless Set Installed in the Motor Car of the Chief of the Trenton, New Jersey, Fire Department



At Department Headquarters, This Radio Set is Used to Keep in Communication with the Chief, through the Set on His Machine, When He Is at a Fire