POPULAR MECHANICS MAGAZINE

WRITTEN SO YOU CAN UNDERSTAND IT

Electric Oil Can Lights Its Own Way

Popular Mechanics Magazine

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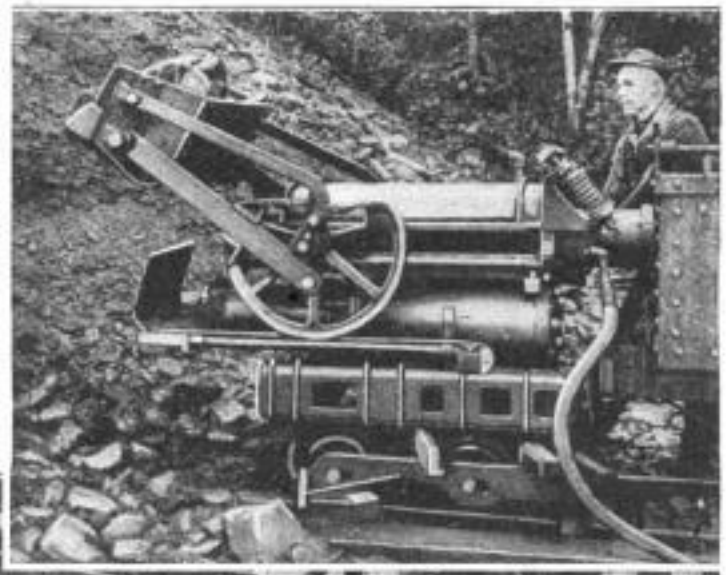
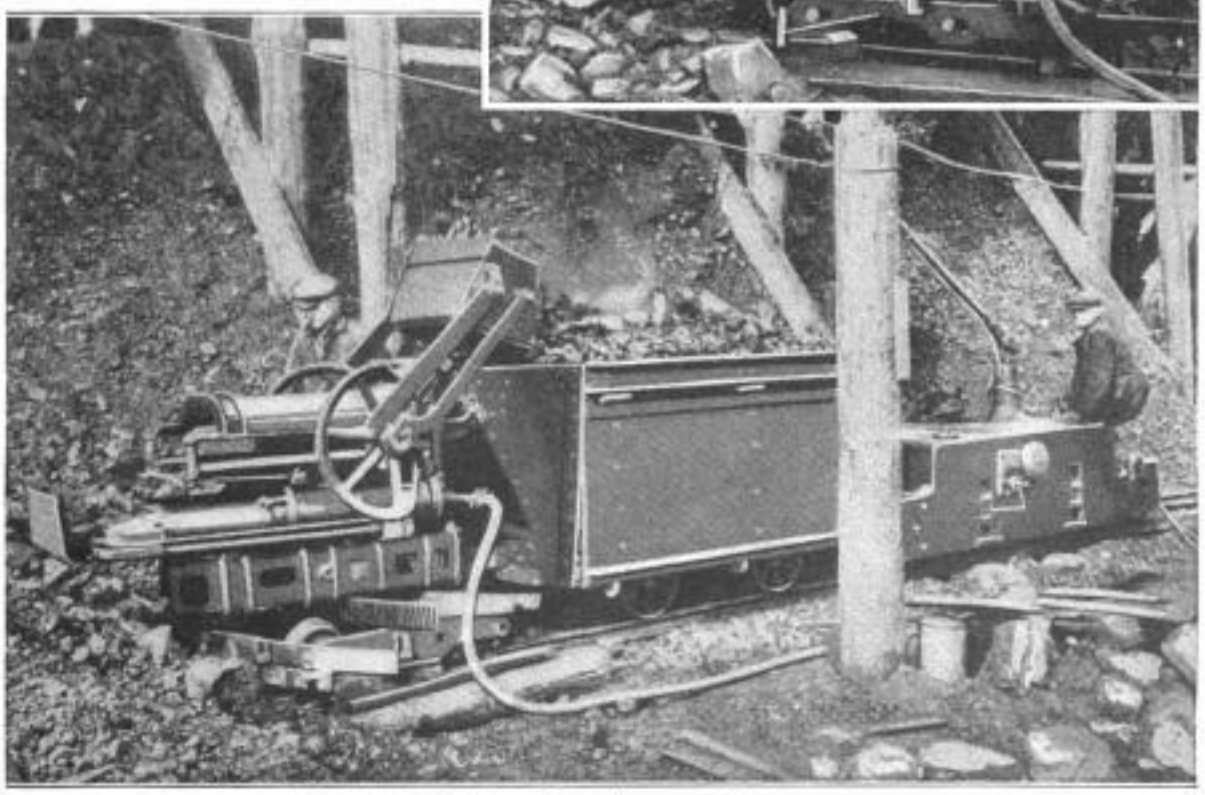
Pneumatic Mine Shovel Is Rapid Muck Loader

AS a means of keeping pace with the rapid work of the modern rock drill, and saving labor and time in removing the fast-growing muck piles, a form of shoveling machine operated by compressed air is now doing interesting work. The machine, rolling on the usual mine tracks, is 6 ft. long by 4 ft. wide and high, and weighs 4,300 lb. It will work in a tunnel, or drift, 5 ft. wide and 7 ft. high, and the shovel swings to reach 5½ ft. to either side, loading 45 tons an hour into cars not over 50 in. high. Three hand levers control it, admitting air first to the bottom cylinder, which forces the shovel into the pile, then to two center cylinders that raise it, and finally to a top cylinder that carries the load up and back into the car. The whole mechanism is very simple and sturdy, and the loading movement is quite interesting. Two steel cables at each side are fixed to a segment of a wheel, on which the shovel arms are mounted. When the top cylinder pulls the wheel segments back, they are turned over by the strain of the cables, taking the shovel with them.

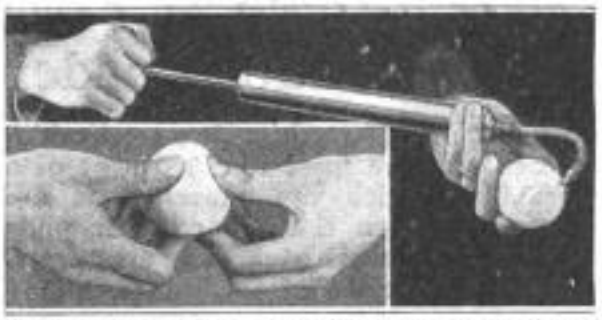




Top: The Pneumatic Shoveling Machine Lifting a Load from the Muck Pile in Front of It, as the Operator Moves the Levers. Bottom: The Shovel, Swung Over by the Air Cylinder, Delivers Its Load into the Car

PUMPING UP TENNIS BALLS TO KEEP THEM ROUND

A tennis ball equipped with a bladder and an air-entry duct to permit reinflation, is the latest development of the popular



Above: Needle of Air Pump Inserted through Outer Ball to Bladder. Below: Assisting Bladder Valve to Close by Squeezing with Fingers

sporting accessory. A pump with a needle-like point at the end is used for the inflating process. The needle is placed in the inner ball through an aperture indicated by markings on the outside ball and the air is pumped in. When the injector of the pump is withdrawn, a soft-rubber knot that serves as the bladder valve, curls up and closes the opening, leaving the ball hard and round.

PLANTS ARE MADE TO BLOOM EARLY BY SIMPLE PROCESS

Two acknowledged authorities on plant culture have succeeded in forcing poinsettias to mature and bloom as early as August by shortening their daily exposure to light. This information will be enthusiastically received by florists, as the inducing of the plants to flower in time for Christmas has always been a vexatious problem. So satisfactory have the results been that attempts are now being made to make chrysanthemums blossom in spring and iris in December. Carrying the idea further, it may be possible so completely to alter the habits of plants that all the different varieties can be made to bloom at the same time.

BATHING CAP IS BLOWN UP TO FIT WEARER'S HEAD

Experience with ordinary bathing caps, that are either tight enough to cause a headache, or loose enough to be of little value, has prepared a welcome for a new form of pneumatic cap that fits all heads. The rim of the new head protector is an annular tube, with a valve permitting it to be inflated by way of the mouth, assuring just the right pressure for water-tightness and comfort. Several fancy-color combinations are offered to tempt the beach habitués.

PANTOGRAPH REPRODUCES STATUES IN HEROIC SIZE

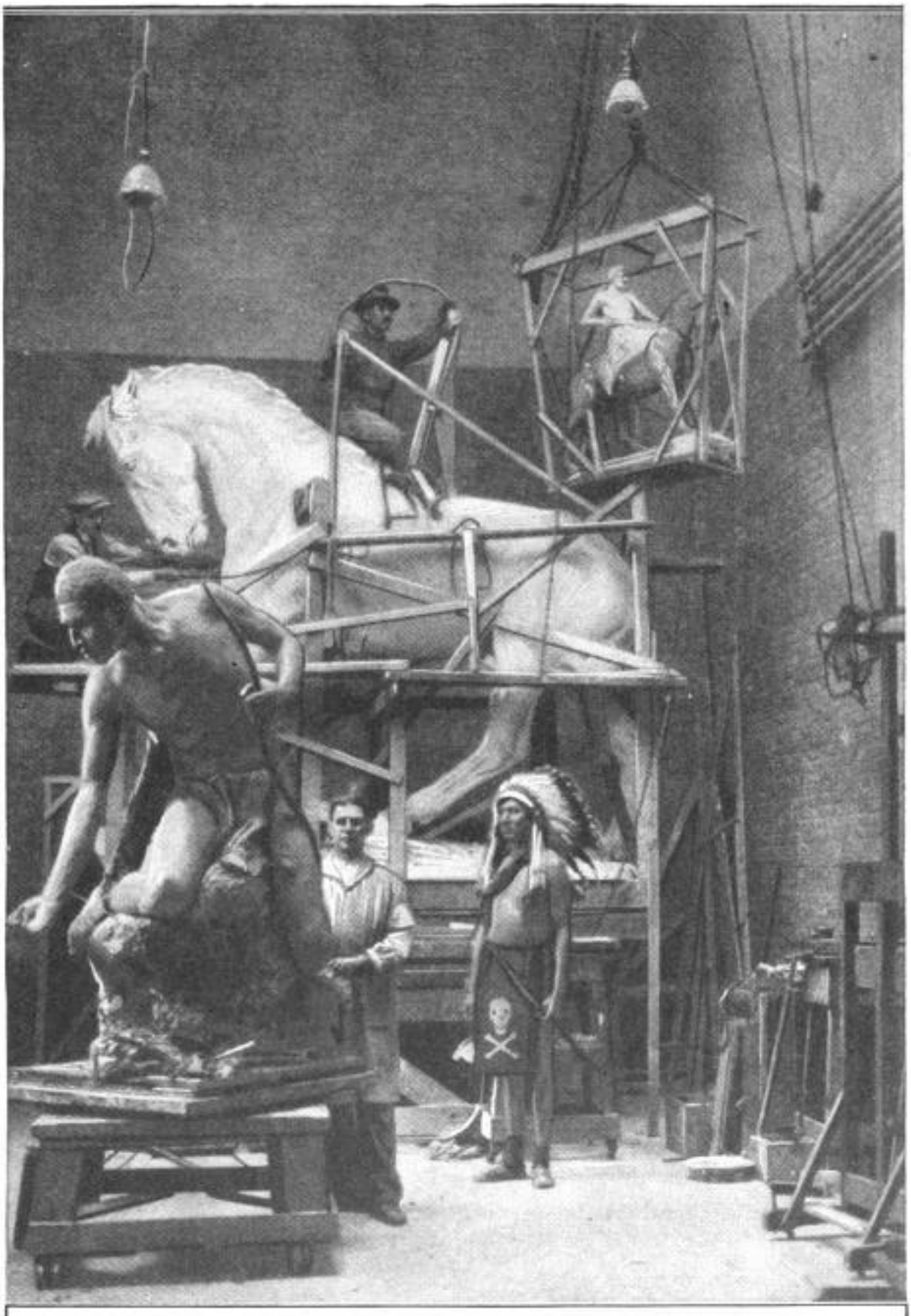
Through the use of the three-dimension pantograph or "pointer," the expert sculptor is able to save much time by turning over a great deal of his work to less skilled men who understand the operation of the apparatus. It works on the same principle as the ordinary pantograph used in enlarging or reducing maps and drawings according to scale.

The main feature of the pointer, invented to eliminate much exacting work in enlarging from smaller figures, is a movable metal shaft swinging from a fixed point. Attached to this shaft are two arms moving in unison. Each ends in a sharp point, hence the name pointer. The shaft and arms are so joined that no matter how they may be moved, they remain extended in a straight line with the fixed point. From this point the shaft moves by means of a pivot.

The sculptor makes the small model, which usually is the painstaking work of many months. The reference points are marked off on this model. After the enlarged piece has been roughly cut along the lines of the smaller perfect model, the pantograph is assembled. The pointer on the shaft nearest the model is placed on a marked spot of the model. The other arm then marks at once the corresponding point on the enlarged figure.

The model and the figure to be enlarged are mounted on vertical axes. They are so mounted that all parts of both pieces can be reached by the pointer arms.

The accompanying photograph shows an experienced pantograph man enlarging to life-size a horse modeled by the hands of A. Phimister Proctor, an American sculptor. The small horse required months to create. The reproduction in full life-size by means of the pantograph is the work of only a few days.



How the Three-Dimension Pantograph is Used to Reproduce Small Statues in Heroic Proportions or Vice Versa: The Man on the Back of the Horse is Setting Up the Pantograph for a Day's Work. While the Small Model may Take Months to Complete, the Reproduction Is the Work of Only a Few Days. The American Sculptor, A. Phimister Proctor, is Seen Working on an Indian Statue. His Model, Big Beaver, a Blackfoot Indian from Idaho, is Posing in the War Regalia of His Tribe

SMALL BOATS OF WAR SERVICE ROT AND DRIFT AWAY

Under the Williamsburg bridge in New York are large numbers of rowboats, lifeboats, and rafts, that formed, not long ago, the life-saving equipment of transport ships and the miscellaneous vessels engaged in America's war service. Now they lie in heaps on the wharves, suffering the ravages of dry rot, or swing idly on the river at the end of decaying ropes that finally fall apart, letting the little craft drift away to be lost at sea. The boats were offered at public sale at one time, but there were few takers at the prices asked, and so the stranded fleet is gradually going to waste and ruin.

Rowboats, Lifeboats, and Rafts Going to Ruin under the Williamsburg Bridge in New York, or Drifting, Unhindered, Out to Sea

COLORED LINES ON FLOOR AS GUIDE TO OFFICES

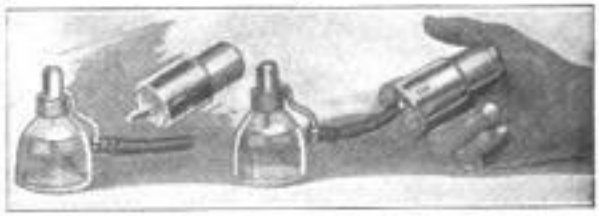
Because Los Angeles has a complicated city-hall building, with two annexes of differing floor level, and other structural peculiarities, persons unfamiliar with its arrangement have difficulty in finding the particular departments they seek, even when carefully directed by the information official. So, now it is proposed that lines of different colors be painted on the floors and stairways, running all the way from the front entrance to the various offices and departments. Using a distinctive color for each department, visitors would be enabled to trace the guide line to their destination with ease.

CEYLON HYDROELECTRIC PLANT WILL WORK WITH HIGH HEAD

Plans are under way for the construction of a hydroelectric plant on the island of Ceylon that will have an immediate output of 24,000 hp., with a possible later development of 100,000 hp. Water from the Kehelgomu Oya and the Maskeli Oya will be diverted by canals to a point where the remarkable working head of 2,000 ft. will be made available. To equalize the flow, which under natural conditions is quite unreliable in the island streams, large storage reservoirs will be built, similar to the ancient "tanks" of the country's early civilization. Local railways and the principal cities, Colombo and Kandy, will absorb much of the output, the rest going to factories, tea plantations, pumping stations, and miscellaneous consumers in the hill country.

METAL BULBS FOR CAMERAS AND ATOMIZERS

Rubber bulbs, of the type generally used on atomizers and cameras, get hard with age and weather conditions and soon find themselves in the wastebasket because of leaks. A very light bulb made of aluminum is now furnishing compressed air in good quantity. The bulb is constructed in two parts, one telescoping in the other, and when the hand presses the two together, the air is forced out. An internal spring then restores the telescoping part to its normal position. It is extremely practical in that it will not rust, tarnish, corrode, or crack because of weather conditions.



Telescoping Aluminum Cylinder That Takes the Place of Rubber Bulbs for Atomizers and Cameras

At the Left: A Guard Using the New Door-Control and Announcing Equipment on a Six-Car Elevated Train. All the Doors of the Six Cars are Opened and Closed Electrically by Operating the Hand Lever on the Wall, and the Telephone Transmitter is Connected to Loud-Speaking Receivers in the Cars, Which Repeat the Lone Guard's Announcement of Station Names, and His Admonitions to "Watch Your Step." Above: The Flexible Cord on Which the Telephone is Hung Permits the Guard to Step Out onto the Station Platform, Before He Signals the Motor Man to Go Ahead

WITH NEW CAR-DOOR CONTROL ONE GUARD HANDLES TRAIN

All the doors of a six-car elevated or subway train are opened and closed by one guard, with the aid of a new electrical-control system recently tested in New York City. A simple lever mounted on the wall at the guard's hand actuates the door mechanism. To complete the elimination of the individual car attendants, a loud-speaking telephone receiver is mounted in each car, and connected to a transmitter hung on a flexible cord in the guard's compartment. With this he can announce the stations, repeat suitable warnings, or even step outside at the stations to give information from the platforms, and be heard throughout the train.

¶Sugar-cane waste, after the extraction of sirup, is now being converted into a coarse, heavy form of board, suitable for lining building walls, by a process which virtually inaugurates a new industry for the South.

ILLINOIS' HIGHWAY MARKERS TO BE OF CONCRETE

Markers now being prepared by the state of Illinois for the Dixie and Lincoln highways and the Peoria-Springfield road are original and interesting in many ways. They are made, post and all, of reinforced concrete. The lozenge-shaped head is 25 by 12½ in., on a 4 by 7-in. post, extending 5 ft. above ground and 3 ft. below. On the face, a ¾-in. black line draws the outline of the state, within which 6½-in. figures designate the route number. Beneath them, where necessary, a 4-in. letter, "R" or "L," indicates an impending right or left turn. On the post, below the head, a mileage figure appears in red. The state outline is carried on the back also, but as it appears at the autoist's left, it contains only the route number.

REVOLVING WOOD TRIMMER MAKES NEAT CUT

By pushing the lever of the revolving knife of a new type of wood trimmer, power necessary for the cut and turning of the knife is furnished. The piece to be cut is laid on the flat bed of the trimmer, and the end protrudes over the edge, on the knife

By Pushing the Hand Lever to the Opposite Side, the Cutting Knife is Rotated and Moved. Upper Right: Sharpener

side. The lever is then operated, bringing the knife into action and cutting the wood to the required size. The sides or housings are adjustable and can be set to permit a board 90 in. wide to enter, for cutting. It is capable of trimming pieces up to 2 in. in thickness.

NEW ASPHALT-PAVING PROCESS PREHEATS ROADBED

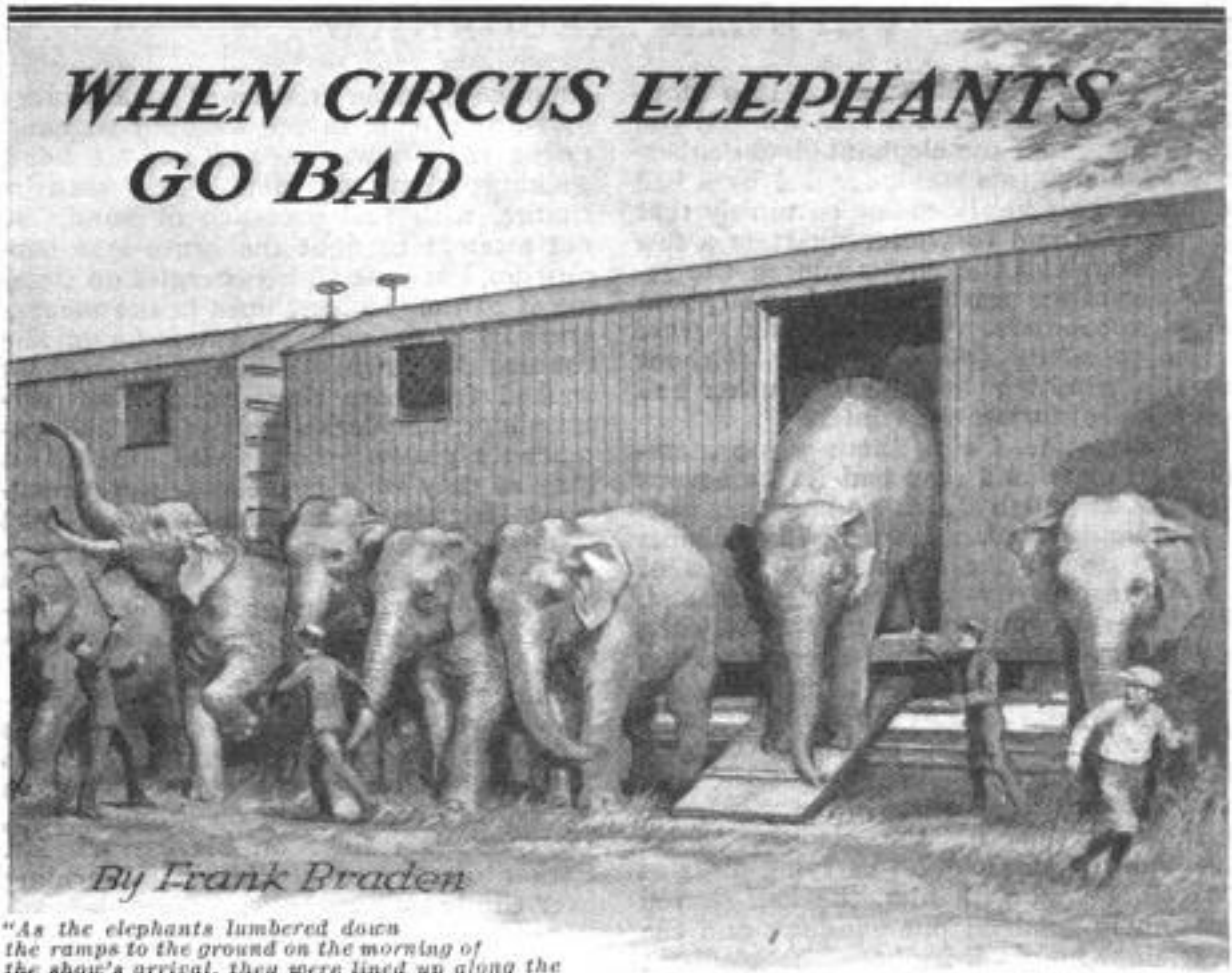
In an improved road-building process boiling asphalt is made to penetrate the small spaces in the crushed-stone foundation and top layers, and completely envelop each stone. In this way what has been called an "asphalt concrete" is formed. Heating the asphalt is only one part of the process. The departure from standard methods, used heretofore, consists in preheating sections of the roadbed, after the crushed stone has been applied, to temperatures as high as 350° F., by means of special devices, and applying the boiling asphalt immediately. This prevents the chilling of the tarlike fluid before it has time to penetrate even the smallest crevices and sink completely through the top layers to the subgrade.

NEW YANKEE BALL PARK A WORLD BEATER

Sometime in 1922, the new ball park of the New York American League, to be located on the east bank of the Harlem River, will be completed, and judging from the published plans, it will be one of the best appointed athletic stadiums in the world. It will occupy a plot 700 ft. in its longest dimension east and west, and nearly as wide north and south. Instead of the usual oval bowl, the new ball park will have a roughly triangular shape, entirely surrounded by a solid three-story structure. The park will be opened for use as soon as accommodations for 50,000 fans have been installed, but the ultimate object is to seat 75,000. Every seat will have an unobstructed view of the playing field, and there will be 5,000 bleacher seats for the lovers of mixed sunshine and baseball. The finest quality of materials will be used in the construction of this baseball palace, the total cost of which will be about $2,000,000.

The Monster Yankee Ball Park will Have Three Floors Which will be Fitted with 75,000 Seats. Concrete and Steel of the Best Quality Obtainable will be Used in the Construction

WHEN CIRCUS ELEPHANTS GO BAD



By Frank Braden

"As the elephants lumbered down the ramps to the ground on the morning of the show's arrival, they were lined up along the track...As the last elephant set foot on the ground, the big herd struck out on the lope for the open country."

IN the circus menagerie wild animals are always held to be dangerous. In the performing arena, this assumption is the first rule of training. No animal can be trusted. The most tractable and obedient beast will turn and attack at any time the mood seizes it. Trainers know this well, and the successful ones are always prepared for a sudden spring or a sweeping stroke of unsheathed claws. But, until an animal has once rebelled successfully —broken down man's mastery temporarily —it is not "bad" in the sense that trainers use the term.

A "bad" lion, tiger, puma, jaguar, leopard, or any other cat animal, can be banished from the performing arena and caged. Its value for exhibition purposes is not decreased. With elephants, however, such is not the case, for elephants, with the circus, must be moved about. They must be led from the trains to the show lot and back, and, on the lot, they can only be chained to stakes for safety. Hence, an elephant gone bad is a mighty serious proposition, and killing must come sooner or later—sooner, if the animal is in the hands of capable and experienced men. For a bad elephant is ever biding his time to kill, or watching for a chance to lead other elephants into a stampede. And nothing in circus life is so fraught with terrifying possibilities as an elephant stampede. It reflects great credit on American animal trainers' efficiency that the few elephant stampedes on record have been headed without the loss of a single life, although several trainers have suffered frightful injuries in their efforts to regain control of the rampant herds. And in each stampede it has been a bad elephant that led the mad rush.

There have been three serious stampedes within the last 10 years. Twenty-one elephants were unloaded from a circus train at Danville, Ill., several years ago. As the elephants lumbered down the ramps from their cars to the ground on the morning of the show's arrival, they were lined up along the track. Attendants were standing at intervals in front of the line. As the last elephant set foot on the ground, the big herd struck out on the lope for the open country. Through the residence streets of the town they raced, the "bull" men frantically striving to stop them. When the animals reached the country, they scattered, knocking down fences, trampling gardens and corn fields. In their wake the country looked as though a small hurricane had passed. It took the circus men two days to corral

the herd, and the damages ran into thousands of dollars. Circus men will tell you to this day that the elephants had deliberately planned this stampede, led by a bad tusker. This herd became so unruly that it was returned to winter quarters a few days later, and the circus toured the remainder of the season without an elephant in its menagerie. These elephants were taken out the following year without trouble resulting, but the bad tusker had been killed during the winter.

In Riverside, Calif., there was a stampede of elephants that had its humorous aspects, although it was no laughing matter while it lasted. A herd of 10 elephants raced through the streets and alleys of this beautiful city for over an hour, and, hundreds of short cuts were taken by the pachyderms through yards, fences, sheds, stables, and one barber shop. One of the largest elephants in the country elected to alter its course sufficiently to carry it through the front door and out the rear door of the shop, where three men were being shaved. As the elephant burst through the street door, carrying most of the front wall with him, the half-shaved customers tumbled out windows and the rear door in wild fright. The elephant then charged into a livery stable, and alert townspeople, seizing their chance, rushed to close the two big sliding doors at the ends of the building. "Now we've got him" they exulted. One can imagine their consternation when the big bull calmly burst out through the side of the structure. The circus men finally rounded up the herd. Here, too, the circus had to pay heavy damages. Two of the menagerie men were injured in fighting the ring leader, a huge elephant named "Alice," to her knees with bull hooks. Alice escaped death only because a western zoo offered to take her in. Naturally, the zoo was able to keep her where she could do no harm.

This same herd, frightened by a playful kitten, stampeded a short distance in Winnipeg, Can., five years later. The animal men stopped the rush on the circus lot, but not before the herd had flattened 200 ft. of circus seats, for the course of the elephants' rush was through the "big top." A young elephant led in that stampede, but he was not considered bad, for all pachyderms are easily frightened by small animals, if they are not used to them. Anything strange in the way of animals is apt to startle them. At the Coliseum in Chicago, last year, this young elephant, which in a few years had developed into a performer without equal in America, became frightened at a strange four-horse team in the opening pageantry of the show. It got out of hand, walking from the ring. The man in charge, with real presence of mind, did not attempt to fight the brute into submission, but bent all his energies on steering it to the elephant lines in the menagerie part of the building, where he quickly chained it down. When this elephant walked from the ring, eight other performing pachyderms followed, their attendants gladly letting them proceed so long as they were headed for the menagerie. Had the leader once swerved, there is no telling what might have happened, for the stands were filled with people. As it was, nobody in the great audience suspected that anything unusual had happened.

Albert E. Parker, director of the Lincoln Park Zoo, Chicago, examined this elephant, known the country over as "Snyder, the tusker, the only elephant in the world ever to walk on his hind legs, carrying his trainer on his tusks." Mr. Parker discovered a white film forming over the beast's eyeballs. "This elephant is going bad one of these days," he remarked. "You had better leave him with me." The zoo expert's offer was discussed, but, as Snyder was a feature on the big-show program, it was decided to take him on the road. That decision was greatly regretted before the season was over, but that's a story that will be told later on.

The third serious stampede was unique in that the danger element was restricted to the animals themselves and to the purse of the show's owners. It occurred at Idaho Falls, Ida., on a Sunday some eight years ago. The elephants had been taken to the Snake River for a bath. As is the usual way, the animals were kept close to the bank, where they enjoyed themselves hugely, spraying their backs with water they sucked up with their trunks as they stood shoulder-deep in the stream. Suddenly, they all turned and struck out for the center of the river, despite the efforts of the animal men to turn them. Now the Snake is a treacherous stream, deep, with swift undercurrents. A mile below the herd was a fall. The elephants, feeling the strength of the current and swimming desperately, realized they could make no headway, and they began trumpeting for help. There were no boats about, and the men could only run along the bank, calling to their respective charges. The elephants fought fiercely to make the shore, and succeeded

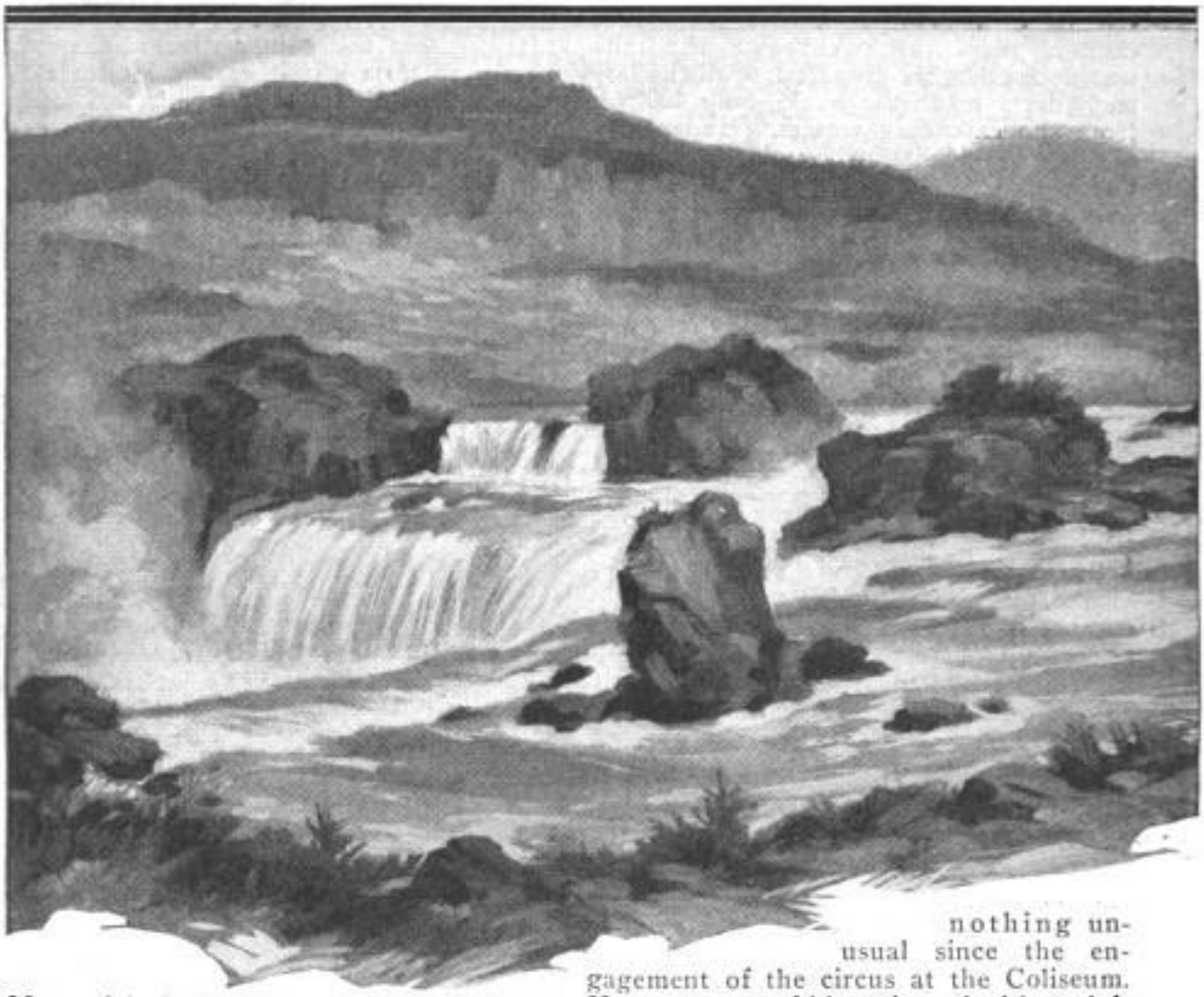
one by one. The men, who knew that each elephant that went over the falls was doomed, were desperate until the last pachyderm made the bank—only 400 yd. from the cascading waters. Had all or any of the elephants been lost, the men would have been held to blame, for the Snake was no river in which to give elephants a bath. As it was, a $50,000 herd was in great danger of being wiped out. This also was one stampede not led by a bad elephant. In fact, that herd was the most chastened group of pachyderms in captivity for the balance of the tour.

One of the most famous bad elephants ever in this country was "Rajah," 2¾ in. taller than "Jumbo," although not so heavy as the celebrated Barnum pachyderm. Rajah was a man killer, but because of his great height, he had been spared, when Frank Lemon, owner of Lemon Brothers' circus, agreed to buy him from the show that had brought him to America. Lemon had handled the animal, and it was known that he was the only man that the big brute seemed to like. But Lemon literally had "an elephant on his hands" when he acquired Rajah, for he had to take the elephant from the cars each morning, lead him to the lot, chain him, care for him, and return with him to the cars at night. Now the owner of a circus has plenty to do without caring for an elephant, and Lemon kept to his task only because the towering Rajah was a marvelous attraction. One day Lemon had to leave the show on business. Rajah celebrated by picking up the boss animal man in his trunk and hurling him to the ground with tremendous force. The man was picked up with his ribs, arms, and a leg broken. At Argentine, Kan., the winter quarters of the circus, Rajah killed an attendant by hurling him against a stanchion. It was decided to kill him.

So, in the yard of the quarters the elephant was chained. Seven shots were fired into him, when he broke loose and ran into a stream close by. He could not be gotten out and charged everyone that tried to approach in boats. At last, volley fire from the bank ended his outlawry.

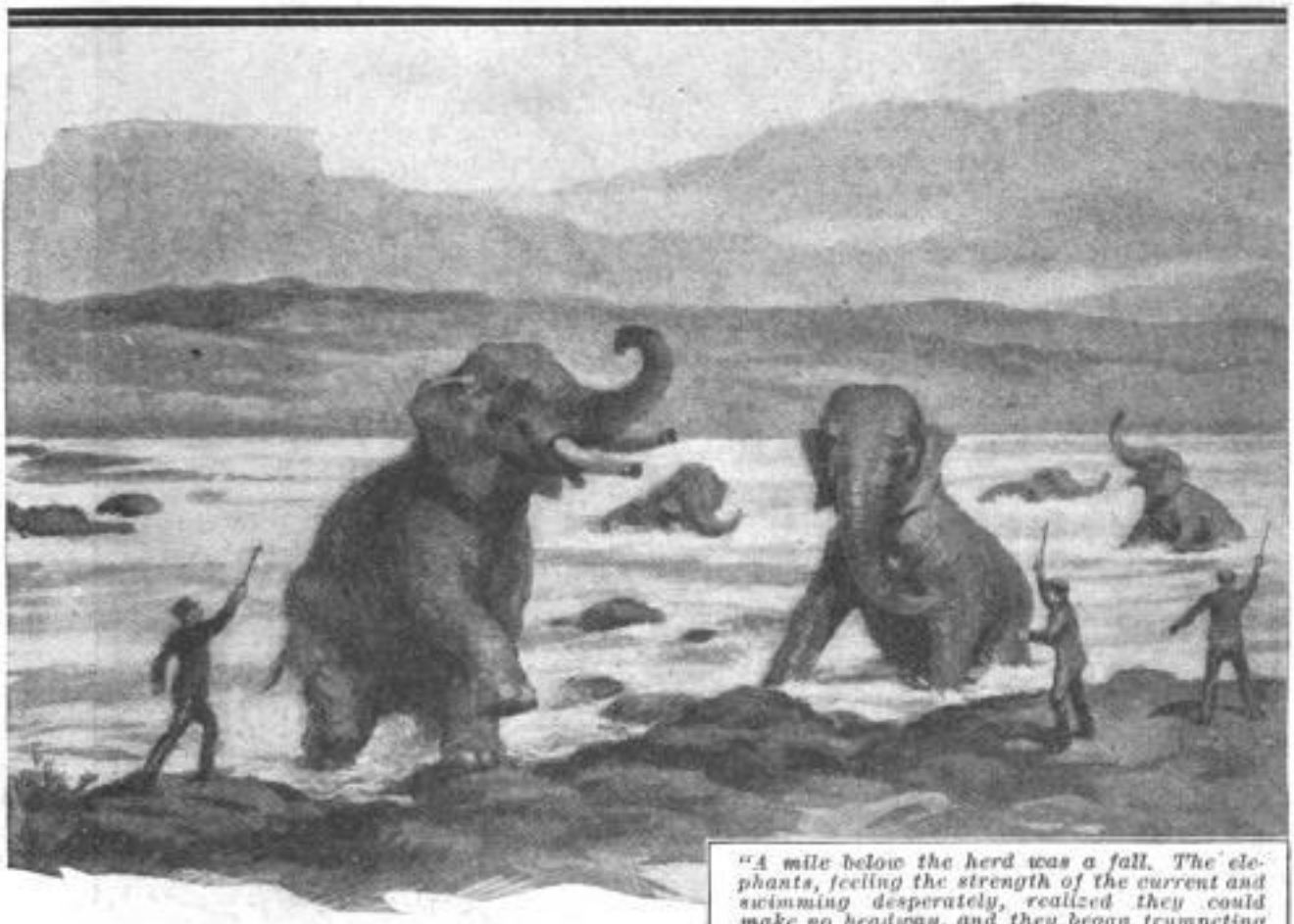
Four years ago a bad circus elephant, named "Mary," finished a string of wild escapades by killing an attendant. The man was new at his work and had the bad judgment to strike the animal with a pitchfork.

"Snyder," with Henry Boucher, Trainer, Guiding: His Most Renowned Trick Was to Carry His Trainer on His Tusks While Walking as Shown; Later This Elephant Became Mad and Had to be Shot



Mary picked him up with her trunk, laid him on the ground, and kneeled on him. It was the work of an instant, and the man was crushed to death before attendants, 30 ft. away, could reach the enraged beast. Mary was condemned to die. She was taken to the railroad yards in Dyersburg, Tenn., where the circus was exhibiting that day, and hanged from the crane of a wrecking car. Everybody in Dyersburg and the surrounding country attended the execution, which received nation-wide publicity. Huge chains constituted the "rope" that choked Mary to death. This incident was described in Popular Mechanics Magazine at the time.

But of all the bad elephants ever in America, "Snyder, the tusker," came nearest to dying "in character," as theatrical slang has it. For Snyder died with "his boots on." It was at Salina, Kan., Monday, Sept. 13, 1920, that Zoo Director Parker's prediction came true. The white film over Snyder's eyes, which Mr. Parker knew by long observation meant madness, had disappeared. Snyder had done nothing unusual since the engagement of the circus at the Coliseum. However, one of his trainers had been left ill in a hospital along the route. The boss elephant man was the day before called home on urgent business. This left a trainer in charge who had not been with the herd for three years. This change made the herd restless, especially Snyder. After parade that Monday forenoon, the general manager of the show ordered a rehearsal of the middle-ring elephants, among which was Snyder, the preëminent feature. No sooner had Snyder reached the ring than he turned and raced out, with two attendants clinging to him with bull hooks jabbed deep into his trunk. Out of the big top into the menagerie loped the big tusker, the men fighting him at every stride. Through the wall of the menagerie tent Snyder plunged and shook off the attendants, striking at them with his trunk. The tusker's small eyes were red with blood lust, and circus men, forming a line of skirmishers, headed the crowds on the lot onto the streets outside the fences. Others, led by the elephant men, formed a great circle about

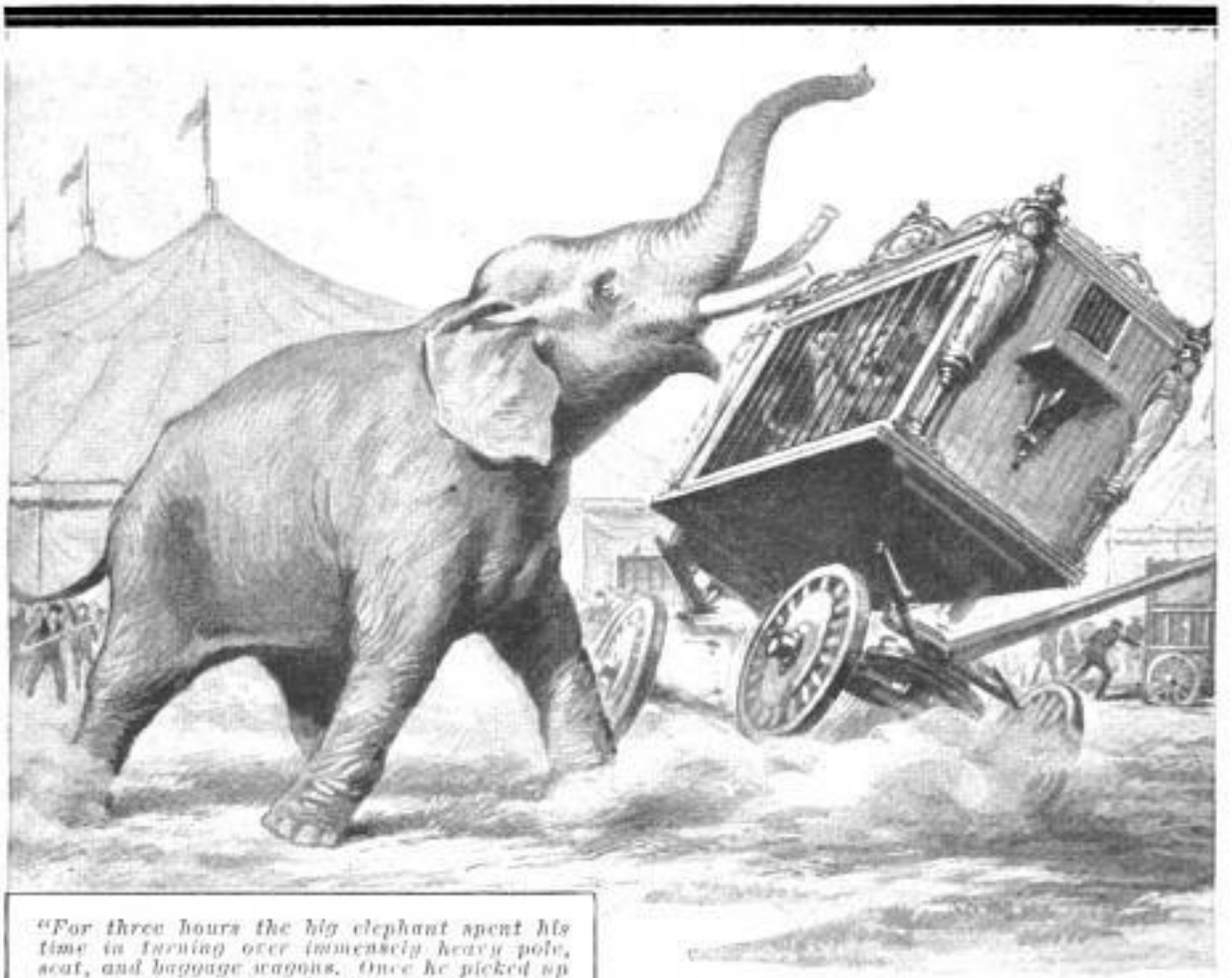


"A mile below the herd was a fall. The elephants, feeling the strength of the current and swimming desperately, realized they could make no headway, and they began trumpeting for help. There were no boats about, and the men could only run along the bank, calling to their respective charges. The elephants fought fiercely to make the shore, and succeeded one by one."

the elephant in order that he might be headed if he turned toward the townspeople. For three hours the big elephant spent his time in turning over immensely heavy pole, seat, and baggage wagons. Back and forth he ran from the menagerie to the open lot. Once he picked up a cage of lions and hurled it 30 ft. He started for a den of leopards, but the snarling cats, rearing against the bars with their claws extended, scared him off. Seven or eight thousand people outside the fences did not realize that the elephant was utterly beyond control, for it looked as though he were playing as he upset wagons. All during the excitement, the elephant heeded his name. So, as he would start a charge, the circus men would divert him by calling to him. Thus, the field of his activities was restricted. Outside the menagerie was a small tent in which the elephant men were wont to rest between shows. This the elephant knocked over, stamping upon every square foot of the flattened canvas in the apparent hope that some one of the men was underneath. Now and then Snyder would work along the elephant lines in an effort to loose some of the herd. Always he was driven off by the circus forces. Time after time the tusker charged after certain of his tormentors, but the men escaped his rushes by leaping quickly to one side as Snyder neared them, for no elephant can turn quickly.

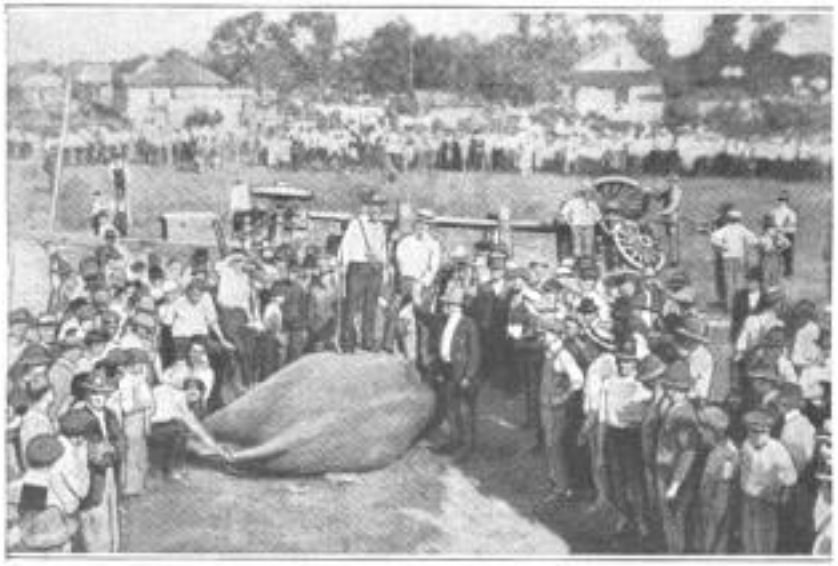
Once he rushed for the great six-pole top in which 300 of the show's finest draft stock were stabled. As the elephant approached, a quick whistle from the boss hostler brought 60 drivers and grooms with pitchforks into line in front of the tent. There were men in that line who had driven and nursed their six and eight-horse teams for years. They were there to die rather than see their pets harmed. The sun glinted on the thin line of pronged steel. Snyder, charging with long, lumbering strides, saw and understood. He came to a full stop, turned and went back to the menagerie tent, where he wrecked the candy stands.

Meanwhile Henry B. Gentry, the general manager, had sent for rifles. He also had prepared apples with cyanide of potassium. These were thrown to the elephant. He ate one and then tossed the

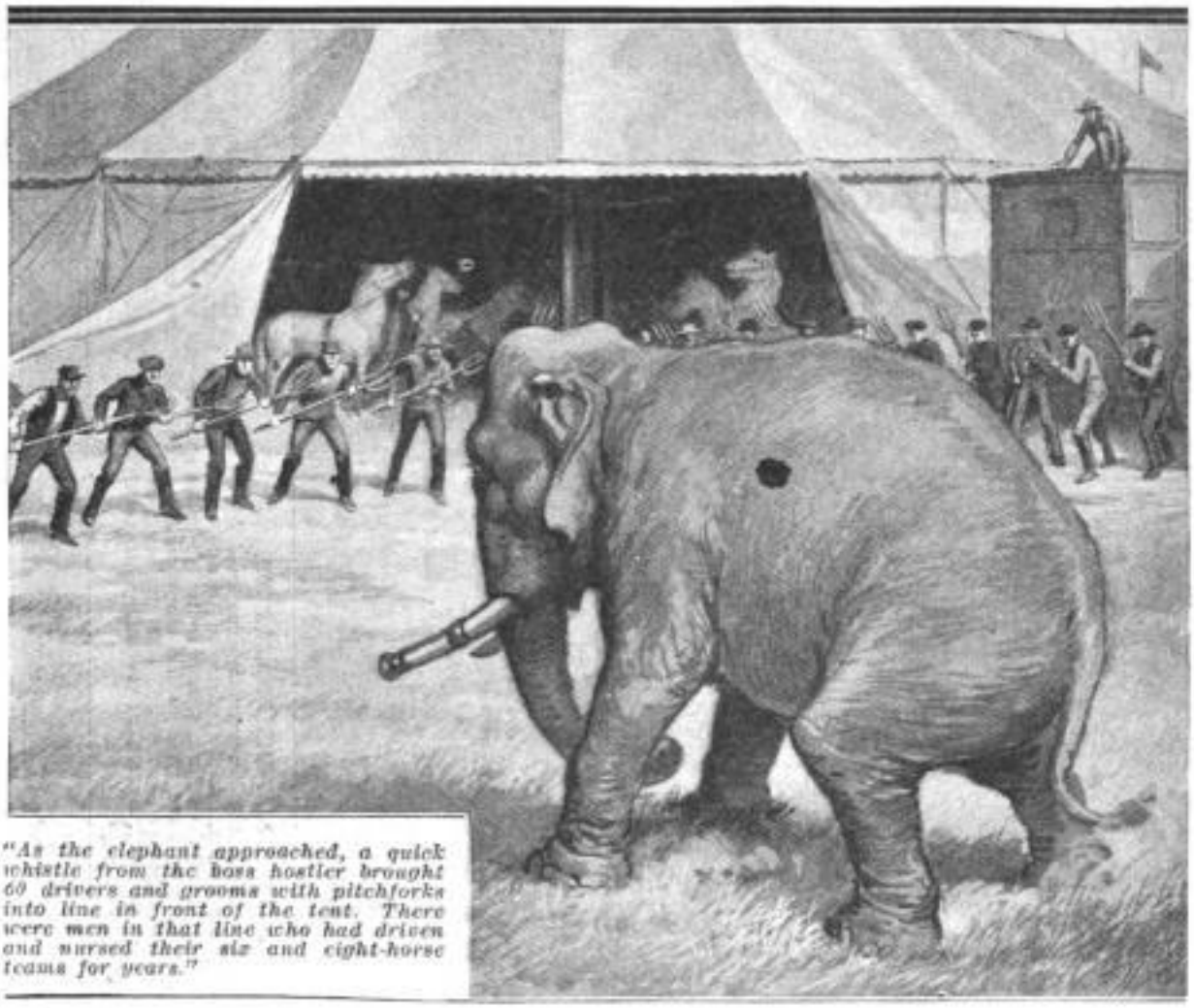


"For three hours the big elephant spent his time in turning over immensely heavy pole, seat, and baggage wagons. Once he picked up a cage of lions and hurled it 50 ft. He started for a den of leopards, but the snarling cats scared him off."

others aside. It is likely he detected the poison. That contained in the one apple had no effect on him. Mr. Gentry had managed to get "Trilby," Snyder's mate, chained at one side of the show lot where people would not obstruct the line of fire, if he should decide to shoot the mad brute. When the poisoned apples failed to slow up Snyder's rushes, Mr. Gentry gave the word. It was then a matter of luring or driving the elephant to a point where he could see Trilby, for it was almost certain that he would attempt to loosen her when he sighted her. Such proved to be the outcome. But, as Snyder neared her, Frank Gentry, assistant manager, armed with a 45-90 rifle, fired. The bullet caught the tusker in the hollow over the right eye, piercing the brain. Three ex-officers of the army also opened fire, but unnecessarily, for Gentry's shot was fatal. Slowly, without a sound or a struggle, the elephant sank to his knees and stretched out on his right side. So ended the only elephant hunt ever held in the heart of Kansas.



"At Salina they no longer point out the spot where the last buffalo was killed. Instead they say, 'There's where the elephant was shot.'"



"As the elephant approached, a quick whistle from the boss hostler brought 60 drivers and grooms with pitchforks into line in front of the tent. There were men in that line who had driven and nursed their six and eight-horse teams for years."

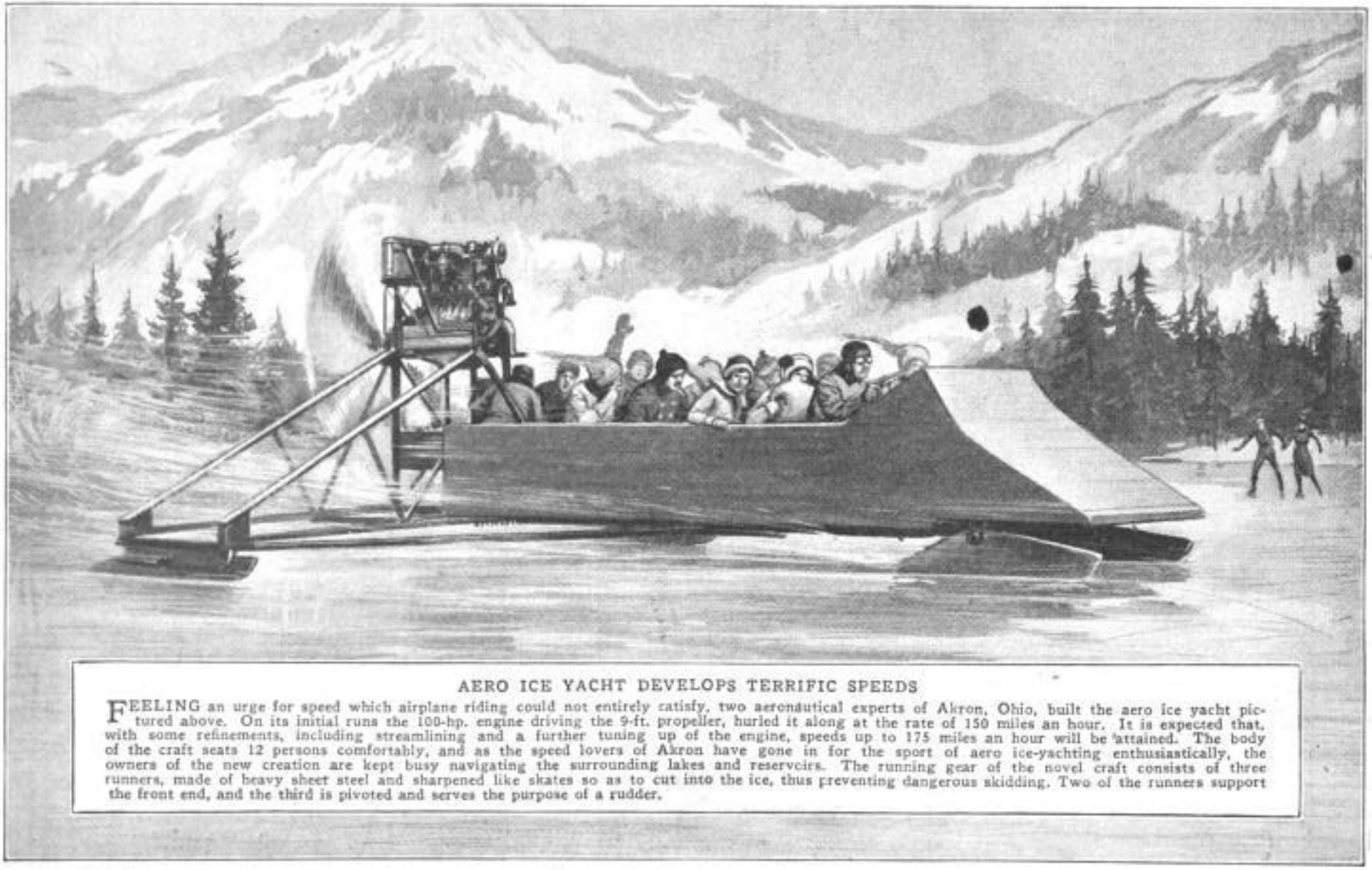
Snyder was only 19 years of age. He was the largest performing elephant in the world, and, had he lived, would have undoubtedly grown to be the largest elephant ever in captivity, Jumbo and Rajah not excepted. Also, he was a perfectly formed pachyderm, while Jumbo and Rajah had freakish conformations. Snyder was growing at the rate of three inches a year. Twelve years ago he came to the circus from India in a crate. He could then walk under the extended arm of an average-size man.

That the circus management did not turn the tusker over to the Lincoln Park Zoo is their greatest regret. However, they are grateful that the huge brute did not succeed in his murderous quest that day. Had Snyder managed to loosen any of the herd, the worst stampede in the history of the circus would have resulted. For that would have been one rush led by a really bad elephant.

But, at Salina, they no longer point out the spot where the last buffalo was killed. Instead, they motor visitors to the circus lot on the edge of the town and point to the sward on which Snyder sank into the long sleep. "There's where they shot the elephant," they explain.

"PEG MODELS" OF OIL FIELDS ARE OFFICIALLY ADOPTED

The platting of oil-bearing localities by means of "peg model" maps, such as were described in the May, 1917, issue of Popular Mechanics, has been adopted by the Bureau of Mines as the official index of the depths at which oil should be found in any particular field. The novel maps show the location of every producing well in a locality by means of shallow holes. Standing upright in each hole is a peg with various colored bands painted upon it. Each band represents a certain earth stratum. For instance, if the pegs for a locality showed that oil was found at the 1,000-ft. level, it would be a waste of time and money to continue an unsuccessful drilling operation to a greater depth.



AERO ICE YACHT DEVELOPS TERRIFIC SPEEDS

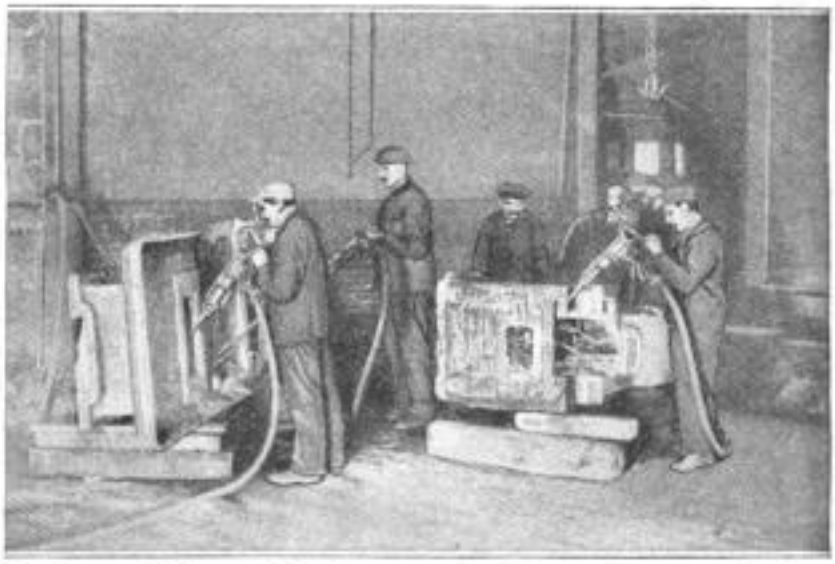
FEELING an urge for speed which airplane riding could not entirely satisfy, two aeronautical experts of Akron, Ohio, built the aero ice yacht pictured above. On its initial runs the 100-hp. engine driving the 9-ft. propeller, hurled it along at the rate of 150 miles an hour. It is expected that, with some refinements, including streamlining and a further tuning up of the engine, speeds up to 175 miles an hour will be attained. The body of the craft seats 12 persons comfortably, and as the speed lovers of Akron have gone in for the sport of aero ice-yachting enthusiastically, the owners of the new creation are kept busy navigating the surrounding lakes and reservoirs. The running gear of the novel craft consists of three runners, made of heavy sheet steel and sharpened like skates so as to cut into the ice, thus preventing dangerous skidding. Two of the runners support the front end, and the third is pivoted and serves the purpose of a rudder.

SOUTHERN PINE AND RED GUM MAKE GOOD-QUALITY PAPER

As the outcome of some intensive research work by the Forest Products Laboratory at Madison, Wis., the southern forests of loblolly pine and red gum may be called upon to supply the paper needs of the country in the next few years. The former of these woods is excellent for the making of wrapping papers, its long fiber fitting it for the purpose admirably. However, all species of pine are rich in resin, which is very difficult to bleach out. For this reason they have not heretofore been considered as practicable sources of white-paper pulp. The recently evolved process has changed this, and has demonstrated that one cord each of loblolly pine and red gum will produce one ton of good-quality white paper. It is said that the cost will permit the new papers to compete in price with those made of spruce.

COMPRESSED-AIR TOOL BREAKS SAND CORES IN FOUNDRY

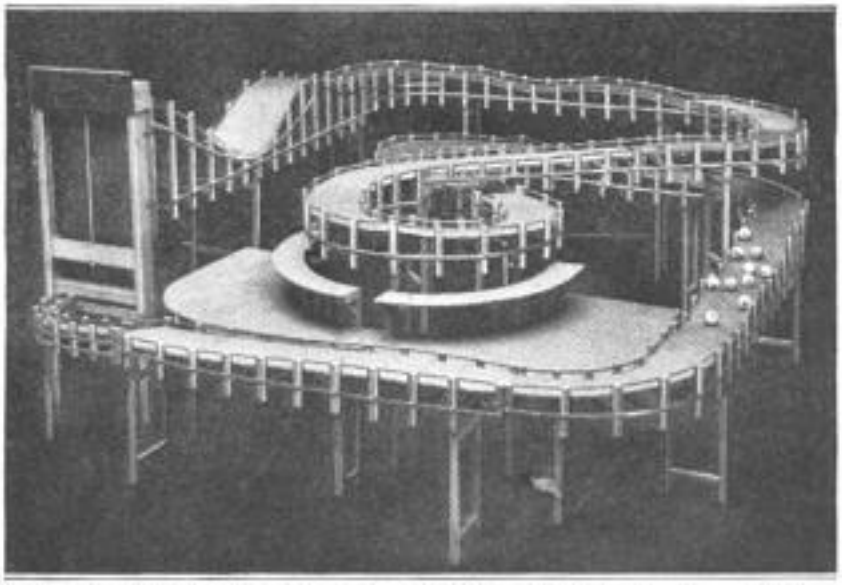
Compressed air is the motive power of a new type of foundry tool, use of which in breaking up cores in castings results in a 50-per-cent saving of labor. The tool resembles a rotary-hammer drill. It weighs 38 lb., operates on a ¾-in. hose line, and uses ⅞-in. solid hexagonal-steel breaker bars from 2 to 6 ft. long.



Foundrymen Using the New Compressed-Air Tool for Breaking Up Cores in Castings, One Operator Doing Work Formerly Requiring Two Men with Hand Bars and Hammers

POOL-BALL RACING APPEALS TO GAMING INSTINCTS

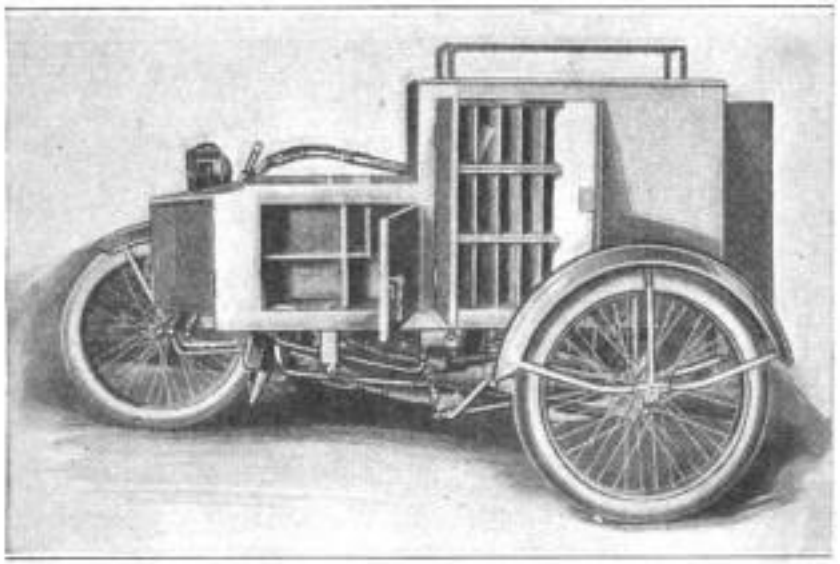
A new amusement-park game of chance, in which every player literally "gets a run for his money," is played with 10 or more numbered pool balls, which are made to run a race over a 100-ft. inclined course, laid out with hills and dales, curves and straightaways. Each player selects a ball, after which all balls are raised to the starting point of the incline by a small elevator, and given an even, fair start. The first ball "under the wire" at the finish is declared the winner, and the holder of the lucky number draws first prize. As in the time-honored "sport of kings," three prizes may be awarded for "win, place, and show"—first, second, and third places. However, unlike horse racing, the races cannot be "fixed," and as no way has ever been found of "doping" a pool ball, the "best ball" wins.



In the Pool-Ball Racing Game Every Ball Is a "Favorite." Here is Shown an Ivory Thoroughbred "Leading the Field" in a Fast Finish, Scoring a Sensational Win for Its Backer

RURAL-MAIL CARRIERS IN JAVA USE MOTORCYCLE SIDECAR

The postal department of the island of Java, feeling the need of efficiency, has fitted a motorcycle sidecar chassis with a light box body, divided into compartments for the accommodation of the various classifications of mail matter. Mounted on this machine the postman makes his rounds rapidly. It is reported that the innovation has received a generous welcome and that the inhabitants of the island are enthusiastic in their praise of the improved service.



An American Sidecar Chassis, Fitted with a Light Box Body, is the Mount of the R. F. D. Mailman in Far-Off Java

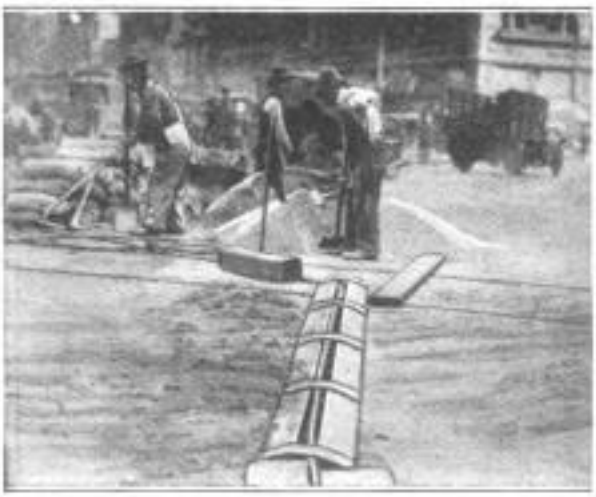
WOOD DESTROYERS AND MOLD APPEAR ALIKE BUT ARE NOT

Although mold and wood-destroying fungi on trees have a very similar appearance, there is really a great deal of difference in them. The characteristic feature of mold growth on wood, according to the United States Forest Products Laboratory, is the fact that the minute threads which enter the wood do not bore into the wood fibers nor dissolve them. They take advantage of the space between the fibers or enter through the natural openings or pits. Molds feed on the starches and sugars present in the wood. The wood destroyers, on the other hand, are able to send their threads right through the fibers so that they become entirely decomposed. The resultant matter is then consumed as food. This produces rot or decay, and the wood becomes spongy and useless.

Unfortunately there seems to be no simple means for lumbermen and others connected with the lumber industry quickly to detect the difference in the two growths, so close is their similarity.

STREET TRAFFIC UNHAMPERED BY ROAD-HOSE PROTECTOR

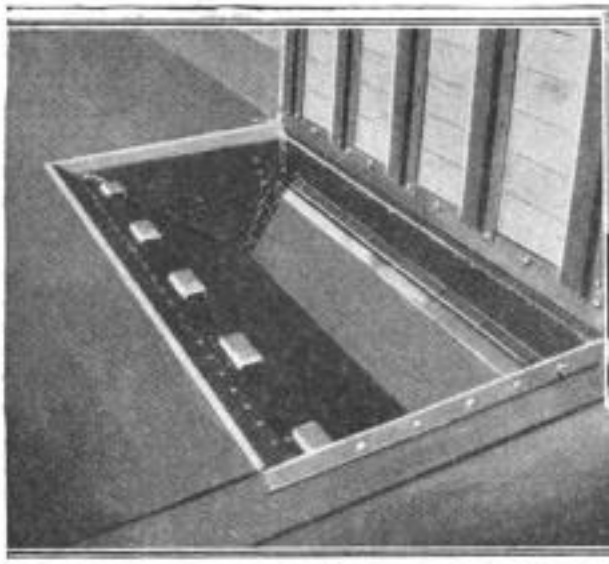
Contractors have difficulty in laying hose across streets because of objections due to traffic blockades, and frequent damaging of valuable lengths of hose. A California corporation is now using a protector which is built of two wrought-metal strips, tied together with bowed straps that are also made of drawn material. The straps are curved to bring the long metal strips into an arch. Vehicles can run over the protector without jarring and without injuring the hose.

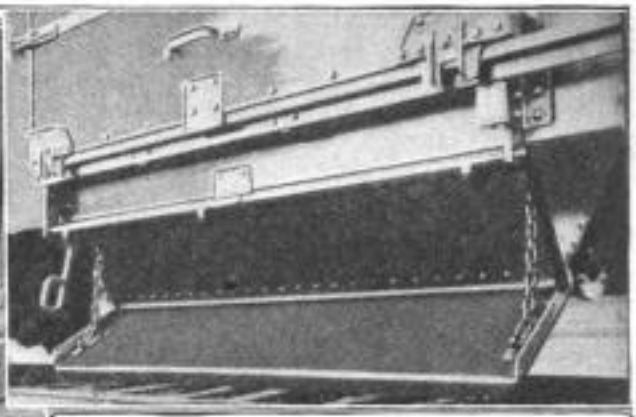


The Hose, Crossing the Street under a Metal Shield, is Protected from Injury without Hampering Traffic

HOPPER-BOTTOM BOX CAR FOR COAL AND GRAIN

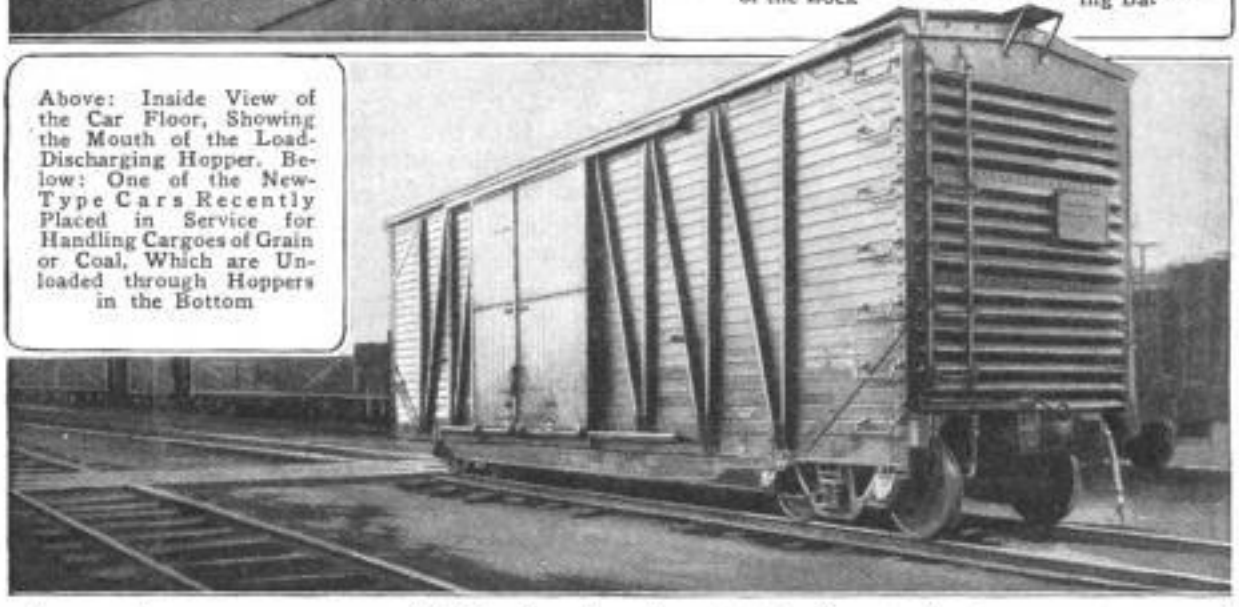
Box cars of a new type, with hoppers in the bottom that open and discharge the load when a pin is withdrawn, have recently been placed in service on the Canadian Pacific Railway. The new cars are intended for the handling of grain, coal, and similar cargoes, and are expected to save much labor in unloading, as well as do away with the necessity for the special car doors that are commonly employed





A Close View of One of the Car-Bottom Hoppers as It Opens When the Fastening Pin is Removed: At the Left End is Seen the Handle of the Lock ing Bar

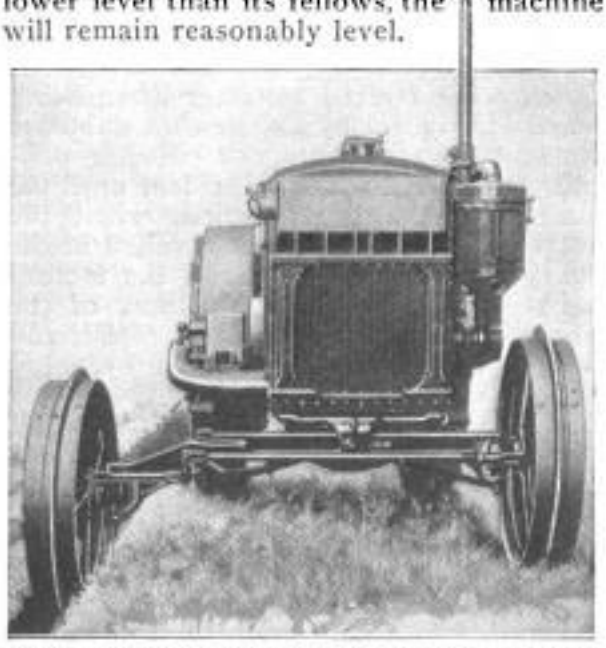
Above: Inside View of the Car Floor, Showing the Mouth of the Load-Discharging Hopper. Below: One of the New-Type Cars Recently Placed in Service for Handling Cargoes of Grain or Coal, Which are Unloaded through Hoppers in the Bottom



when such cargoes are carried in closed cars. The hopper doors, opened by gravity, are closed by hand with a locking bar. If the car is to be used for other forms of cargo, not readily discharged by this method, the bottom is easily converted to a solid floor.

NOVEL FITTING WIDENS TREAD OF TRACTOR FRONT AXLE

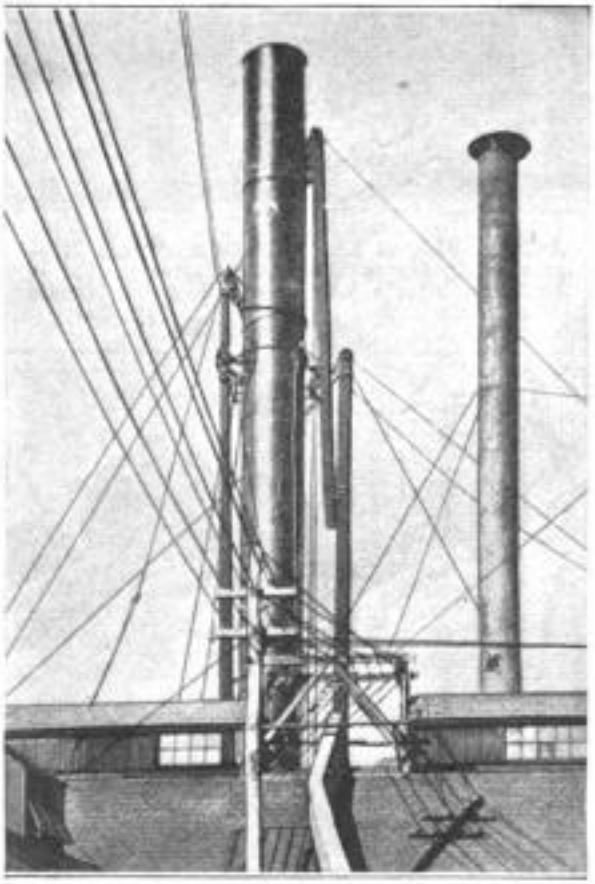
An attachment for tractor front axles which has the effect of lengthening them, thus increasing the distance from center to center of the front wheels, is supplied as stock equipment with a popular make of machine. The device bolts to the axle and extends outward for several inches and also downward at an angle of about 15°. It carries a steering-knuckle yoke at its outer end and is, in effect, a half axle. The object of the fitting is to permit one front wheel to run in a furrow, while the other wheels travel over the solid unplowed ground, and also to insure that, though the front wheel runs at a much lower level than its fellows, the machine will remain reasonably level.



Axle-Extension Device for Tractors, Which Permits Running with One Wheel in a Furrow and the Others on the Unplowed Ground

LARGEST STEEL SMOKESTACK IS ERECTED IN NEW JERSEY

Newark, N. J., boasts what is asserted to be the largest steel smokestack in the world. The big boiler-plate tube



Workmen Painting the World's Largest Steel Smokestack: Quickly Applied Emergency Rigging Prevented the Heavy Top Section from Falling When a Rope Broke during Installation

towers 128 ft. into the air and is 5 ft. 8 in. in diameter. It was made in sections which were riveted together after being hoisted into place by a somewhat elaborate tackle system. The work, though difficult, progressed without incident until the placing of the final section, when the breaking of a rope almost resulted in the heavy part crashing through the factory roof. Quick action on the part of the workmen prevented the catastrophe, and the job was completed successfully.

TREASURY ACCOUNTS ACCURATE TO TWO-THIRDS OF A CENT

For the first time since 1913, cash and securities in the national treasury have been checked up, and found to total $13,883,819,826.36⅔. The queer item of two-thirds of a cent is occasioned by the presence of a Tennessee state bond for $1,666.66⅔, part of the Indian trust fund. Cash amounts to $97,410,283.02 of the whole, and of the securities more than $10,000,000,000 represents the debts of the allied nations to the United States. The total is nearly ten times that of the previous count, though the cash is less than half, because of the sale of 100,000,000 silver dollars to Great Britain.

FIND AMERICAN CLAY GOOD FOR SURFACING PAPER

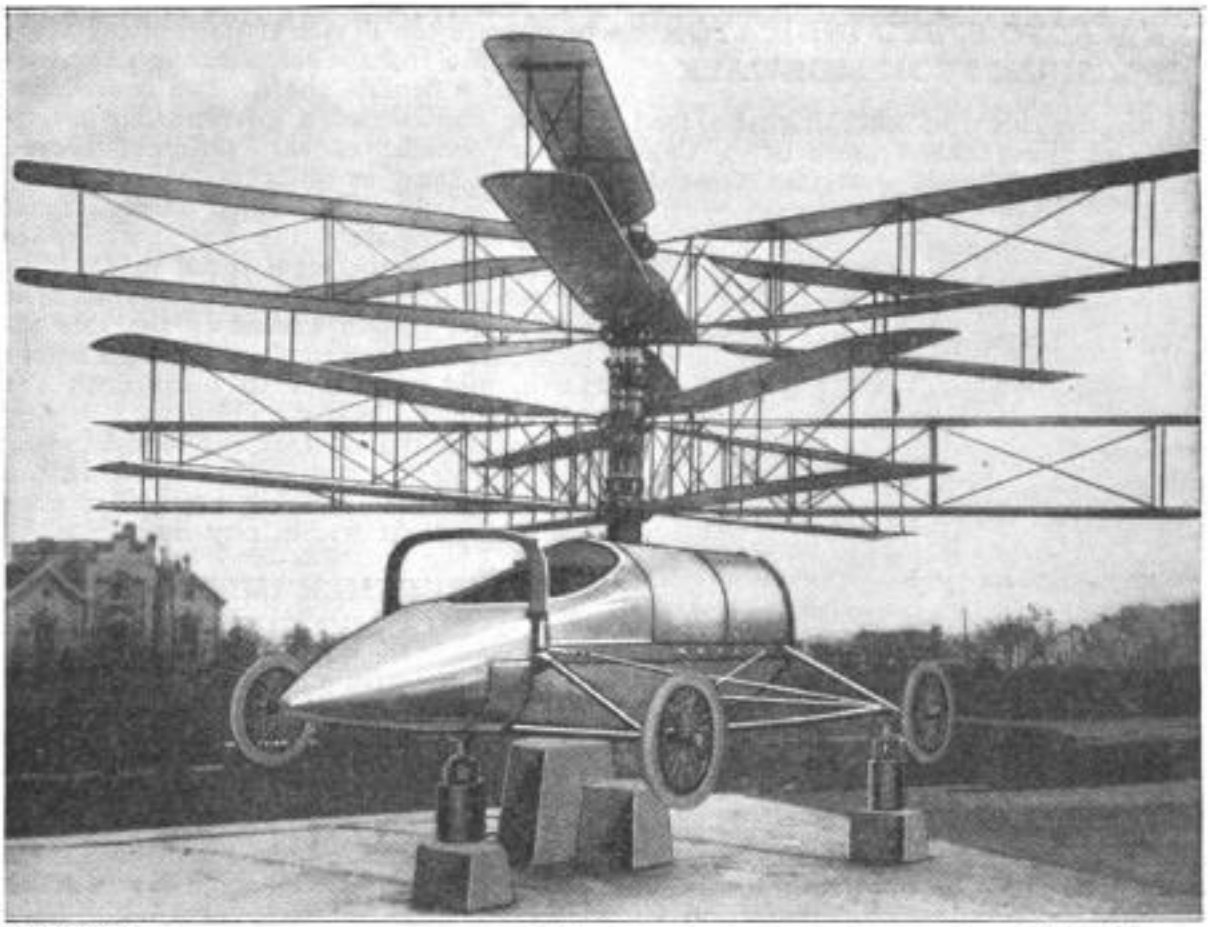
A form of clay capable of unusually fine suspension in liquids, and highly valuable for surfacing high-grade book papers, has been found to exist in large quantities in the intermountain regions of this country. Used with other paper fillers, such as English China clay, it improves both their retention and finish. Experiments of the Forest Products Laboratory indicate that the new clay's power of suspension makes possible its distribution from a central mixing plant to the beaters of a paper mill by means of fairly long pipes, without danger of clogging or settling.

MORRIS-CHAIR FIRE ESCAPE LAST WORD IN SAFETY

A morris-chair fire escape which has been introduced recently, comprises a comfortable piece of furniture and ready means of safety in case of fire. By extending two brackets attached to the back of the chair out of a window and stringing a rope, wound on a spool

The Hooks on the Back of the Chair Extend Out of the Window and Rest on the Sill; the Rope is Threaded over the Pulley

under the chair seat, over a pulley located on a rod between the two bracket ends, a quick descent to the ground is accomplished. A brake, controlled by the fire victim, regulates the speed of the descent.



WIDE WORLD PHOTOS
The Hovering Flying Machine: The Inventor Claims That It has Performed Quite Successfully, Rising and Descending in Straight Lines, Flying Horizontally or Hovering over One Spot. The Propellers Revolve in Opposite Directions and, on Account of Their Large Area, Exert a Great Lifting Force

HOVERING FLYING MACHINE RISES STRAIGHT UP

An Argentine inventor claims to have solved the problem of constructing a heavier-than-air flying machine which is capable of rising or descending in a straight line, flying forward at any angle, or hovering over one spot. The secret of the machine is in the propellers, of which there are two. They are built up of 12 small biplanes, six to each propeller, which are attached by their ends to the propeller hubs. Although the propellers are independent and revolve in opposite directions, they are mounted, one above the other, at the top of a common column, inside of which is the driving shaft. The body of the machine looks like a torpedo-type automobile speedster, having four wheels and the conventional automobile hood and radiator. The engine occupies the hood, and the driveshaft and column rise directly from it. The apparatus has been called a flying motor car and is correctly classified as a helicopter. The French government has shown interest in the novel flier and may conduct extensive experiments with it.

NOVEL TIRE AD GATHERS BRISK BUSINESS

An automobile wheel, mounted on a pedestal of pipe and serving the purpose of advertising the sale of tires, has been set up on the sidewalk in front of a supply store in a mid-western city. Unmistakably suggesting its connection with the automobile trade, this wheel-and-tire sign will constantly remind the passer-by of the presence of a tire agency. In neighborhoods of close competition, this ad has attracted much business.

NEW AUTO SPEED INDICATOR IS VISIBLE FROM SIDEWALK

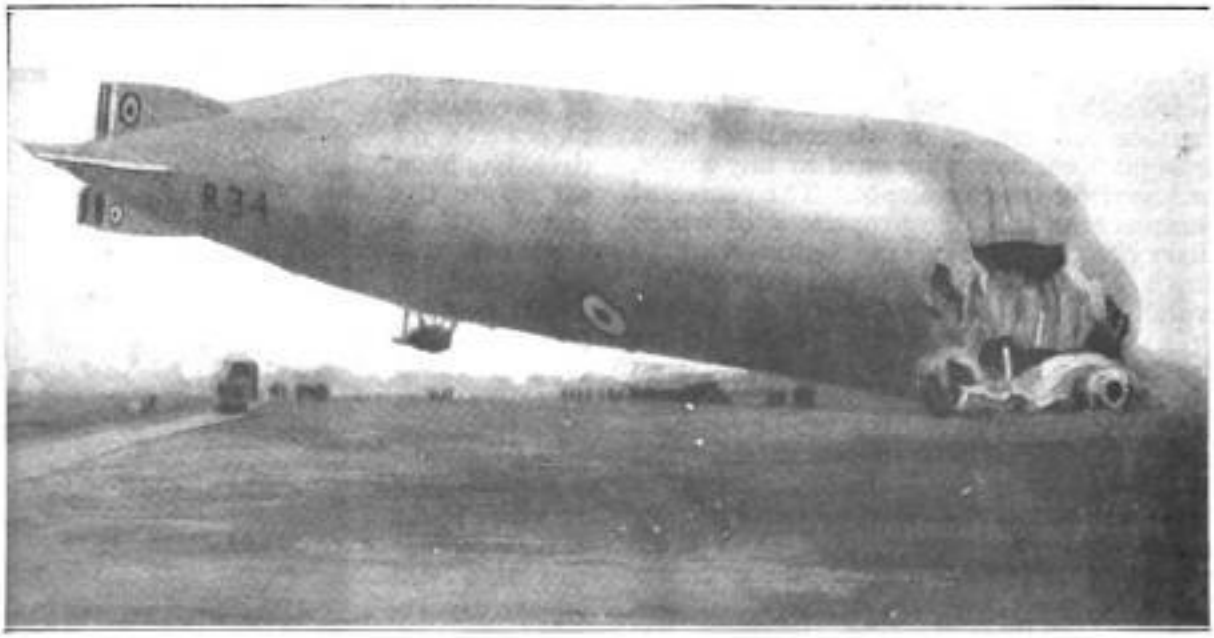
With the idea of checking the mad career of the reckless motorist, a California inventor has brought out a speed-

The Speeder "Telltale" Installed on a Car. Insert: A Close View of the Instrument, Showing the Three Lights and the Control Switch

indicating device, designed to be attached to the front of the radiator or to one of the front fenders, which will inform all other users of the thoroughfare whether or not the car is being driven at a rate of speed within the legal limit. Power to operate the device is transmitted from one of the front wheels through the medium of a flexible shaft. The instrument proper consists of a governorlike mechanism which causes different-colored lights to show as different rates of speed are attained. The white safety signal lights immediately the car gets under way. Should the legal speed rate within corporate limits be exceeded, a green light will shine. Upon exceeding the rate allowed for country roads, a red light blazes forth, and continues to burn until the driver stops the car and turns a switch built into the instrument body. Any peace officer is justified in arresting the driver of a car showing any other than the white light within city limits.

PLAN FURTHER IMPROVEMENT OF CHICAGO BOULEVARDS

With the traffic on Michigan Avenue in Chicago already demanding expansion since the famous link across the Chicago River was opened a short time ago, further improvements, to cost $200,000, are announced. For about a half mile, between Pearson and Oak streets on the city's north side, the roadway will be widened from 45 to 75 or 78 ft. Lake Shore Drive from Bellevue Place to North Avenue, and in Lincoln Park, will also be widened.



STORM WRECKS BRITAIN'S "R-34," TRANSATLANTIC DIRIGIBLE

MADE famous in July, 1919, by its remarkable 11-day round trip across the Atlantic Ocean, the great British dirigible "R-34" now lies a shattered ruin on the field at Howden, England. Returning in a heavy gale of wind after a service flight a short time ago, the huge 665-ft. ship resisted all efforts to get it into its shed, and was finally moored in the open field. In its exposed position, the buffeting of the storm soon reduced it to a condition practically beyond repair.

TESTS FOR DANGER POINTS OF X-RAY OPERATION

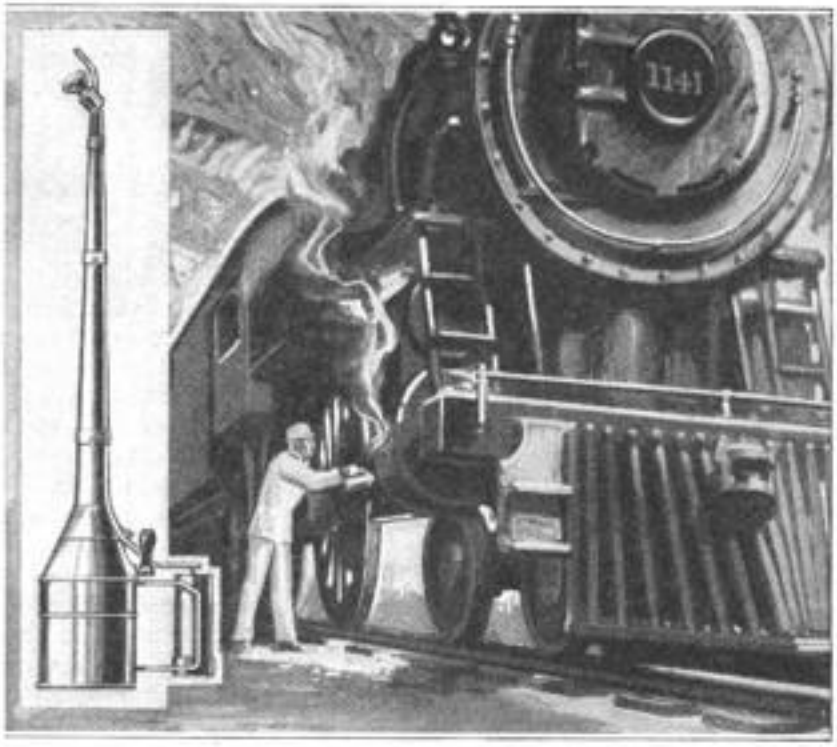
Persistent exposure to X-rays often results in serious disease, and physicians, dentists, tube makers, and others who habitually handle radiographic tubes, are safe only when adequately shielded. Screens of sheet lead .1 to .25 in. thick, or lead linings for booths and even for rooms, with windows of thick lead glass, are specified for proper protection, and for fluoroscope work the operator should wear coverings of lead-impregnated fabric over head, body, arms, and hands. All these shields should be tested periodically for leakage. A photographic film, with a pattern cut from thin sheet lead laid on it, is exposed against the wall to be tested while the tube is operated, and if the wall is safe, development shows no pattern on the film. A similar film carried on the person will indicate whether or not the operator is being unconsciously exposed. Examination of walls and screens with the fluoroscope while the tube works often reveals nail holes and other defects, which may be a source of serious danger to the operator.

THIRD ALL-METAL MAIL PLANE KILLS CREW IN CRASH

Death by fire, trapped in the fuselage of an all-metal mail plane, was the fate of Pilots W. L. Carroll of Minneapolis, Arthur Rowe, Chicago, and Mechanician Robert B. Hill, Havana, Ill., just as they were descending at Salzer Field, LaCrosse, Wis., the evening of February 9, after having flown the first leg of the course from Chicago to the Twin Cities. Witnesses of the accident differ in their testimony, some declaring that the machine burst into flames while at an altitude of about 600 ft., while others as stoutly maintain that the crash to earth preceded the fire. Although the result of the official investigation has not been made public at the present writing, the Post Office Department has announced that no more of these metal planes will be used in the service.

LOCOMOTIVE OILED AT NIGHT WITH ELECTRIFIED CAN

The remarkable success of the small battery flashlight for a thousand unclassified purposes is leading to its adoption for certain specific applications. The whole assembly of battery, lamp, reflector, and lens occupies so little space that it may readily be built into a hand tool or instrument, without adding materially to its bulk or weight. An excellent example of such use is the locomotive oilcan which forms the motif of the cover picture this month. In this ingenious implement, the handle is the battery container, and the thumb lever in one movement switches on the lamp at the spout tip and opens the valve. Inasmuch as the light flashes only while the oil flows, and may be disconnected entirely for day use, no current is wasted, and doubtless much oil is saved.



Using the Flashlight Oilcan for Lubricating a Locomotive at Night: An Excellent Example of the Tiny Battery Lamp's Application as a Built-In Part of a Hand Tool. Insert at the Left: The Lamp-Tipped Oilcan with a Battery in Its Handle

HOUSES IN MODEL VILLAGE ARE ELECTRICALLY HEATED

Seventy-three all-electric houses have been built for the workers in a large English electric-power plant. The equipment includes heating and cooking stoves, laundry apparatus, and other common household articles. Emergencies are provided for by one chimney, so that coal stoves may be used if necessary.

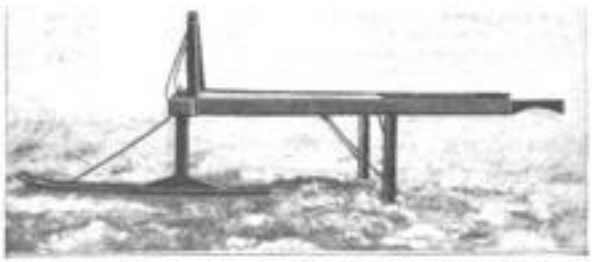
SUITCASE LIMOUSINE USED TO TRANSPORT SHOW DOGS

Small show dogs were carried to their places in the kennel exhibits of an eastern city, in a suitcase upholstered and windowed like a limousine. The carriers, built somewhat pyramidal in shape and fitted with a carrying handle, make a very convenient and safe means of transporting the little canines. Passers-by get a casual glance at the prize winners when the window of the suitcase is turned in their direction in passing on the street, and the safe conduct of the little dogs is always in the hands of their owners.

The Dog Case is Carried with the Window Side Turned Forward to Give the Passer-By a Glance at the Little Creatures

WHEELLESS WHEELBARROW HAULS MAIL IN WINTER

The wheel of a barrow, used in East St. Johnsbury, Vt., for transporting mail from the railroad station to the post office, is detached in snowy weather, and a runner is applied in its place. Two wooden supports are bolted in the brackets designed to hold the wheel shaft. These supports extend downward and come together at the bottom, forming a triangle, at the apex of which is applied the iron-shod runner. Needless to say, this contrivance is more easily propelled than a wheelbarrow.



This Wheelbarrow, with the Wheel Replaced by a Runner, is Used in a Vermont Town for Carrying Mail in the Winter

POISON GAS TO BE USED ON BOLL WEEVIL

Poison gases will be tried as a means of eradicating the boll weevil, the great enemy of cotton. A heavy barrage of the military gas will be laid over the cotton fields of the South, with which it is calculated to exterminate the pests. These gases already have been used to good advantage in the extermination of rats on seaport wharves, and it is said that after a 15-minute application, every rat in the gassed area was killed. The toxic-gas treatment is also to be applied to the locusts of the Philippine Islands, according to the present arrangements of the Department of Agriculture.

EXPERIMENT TO DETERMINE STANDARD WHITE LIGHT

A definite standard for white light is necessary for accurate color study, yet none ever has been established, because white is properly not a color, but a combination of colors. It is customary to accept sunlight as white, and Bureau of Standards experimenters find a practically white optical effect in the average noon sun at Washington, D. C. Flames and incandescent filaments, however, produce a perceptibly yellow light because of their lower temperature. It is theoretically computed that a temperature of about 9,000° F. would be required to produce a pure white light, and that a still higher temperature of the luminous body would introduce a blue tint.

AUTO ATTACHMENT IS CAMP CHAIR, BED, AND TABLE

Threefold are the uses of the automobile camping device originated by a Pacific-coast designer, for it is a combination of bed, chair, and table. The attachment consists of a series of foldable sections, at the end of which is a table having legs on the inside only. The table stands on a little higher plane than the rest of the

Showing Combination Camping Outfit When Folded and Carried at the Rear of the Car

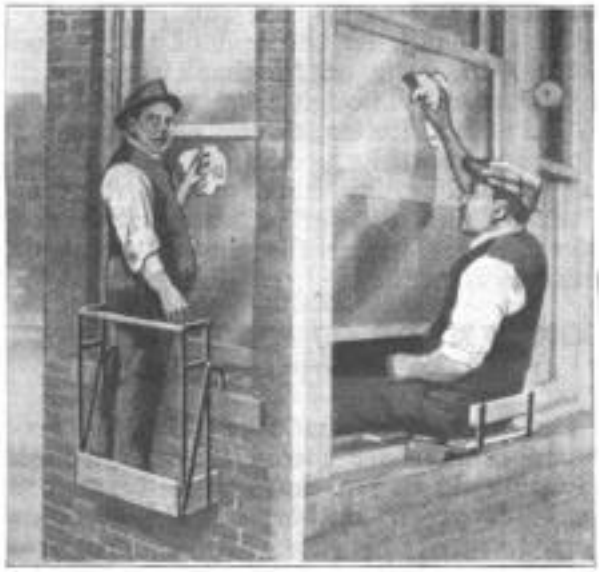
Bed Stretched Out and Seat Cushions in Place: The Table Is the Foot End of the Bed

By Sliding the Wooden Slats Back, the Combination Becomes a Comfortable Seat and a Table

sections, and when used as a bed, the difference in space is made up by placing auto cushions on the lower part, which thus serve as a soft mattress. The table is used as the foot end of the bed and the two sections next are laid across with wooden slats, which may be moved back far enough to make a good seat at the table. The head end is slightly raised to provide a good resting position for the sleeper. A box is suspended beneath the bed frame, in which can be stored clothing, etc. The outfit, when folded, is completely out of the way and view of the autoists. The box carrying the clothing, etc., is reinforced and held in place by two triangular-shaped brackets. Thus the heavy box does not cause the frame to sag.

SAFETY PLATFORM AND SEAT AID WORK ON WINDOWS

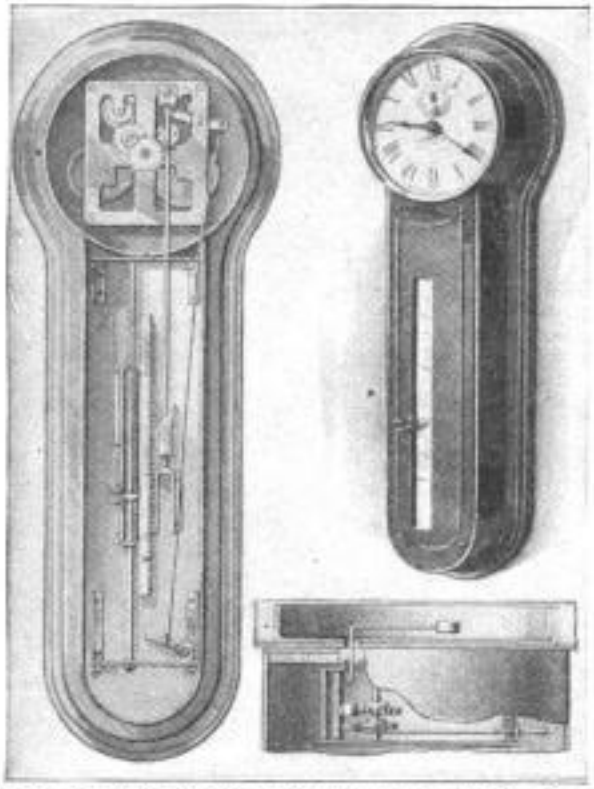
The usually unpleasant task of washing, painting, or puttying the outside of windows is made both safe and comfortable by two new accessories. One is a small boxed platform that hangs from an extension bar set into the window sash, with a high skeleton frame of iron that protects the worker standing inside it. A board placed through the top of the frame makes a higher platform for reaching the top of the window. One of these platforms, in a test, supported over 1,100 lb. without giving. The second attachment is a window-sill seat, 16 in. deep, with a low back, which fastens in place in the same way as the platform. Both the attachments are adjustable to the window width, and are quickly set in place, or as quickly detached and shifted.



Left: The New Working Platform Hung from a Window Casing. Right: The Window Washer's Seat, Made on the Same Principle

NEW CLOCK IS TIMEKEEPER FOR SHORT OPERATIONS

Boiling eggs, developing photographs, or any other operation that requires short but accurate account of time, may be allowed



Left: The Clockworks, Showing Alarm Mechanism. Right, Top: The Clock Complete. Bottom: Section, Showing Gong

to proceed without attention through the use of a novel clock recently patented. The 4-in. dial is at the top, and in the lower part of the case is a vertical scale, reading up to 90 minutes in one-minute divisions, and carrying a small slide that is set by hand. At the end of the period set, a 4-in. gong on the back rings until it is shut off. Though a valuable addition to the home kitchen, the new timekeeping clock is intended especially as a labor-saving accessory for hotel and restaurant kitchens, photo galleries, laboratories, and other places where the measurement of minutes is needed.

BOXES MADE OF GREEN LUMBER LOSE STRENGTH RAPIDLY

Packing boxes made of properly seasoned lumber are found to resist rough handling six to ten times as well as those made of green lumber. The reason, as demonstrated by the Forest Products Laboratory, is that the fibers of the moist wood shrink away from the nails as the stock dries, and so lose their grip.

DISHWASHING-MACHINE BUYER PROVES ITS EFFICIENCY

As proving the very real efficiency and desirability of the mechanical way of washing dishes, a series of tests recently conducted by a resident of White Plains, N. Y., are extremely interesting. The electrical dishwasher was placed in this particular home on trial, and the skeptical "prospect" started his tests with a determination to prove the general worthlessness of the device. Count was made of the number of pieces of tableware used by the family of two adults and two small children, for each meal, and the operations of handling and washing, both by hand and by machine, also were counted and timed. The tables below indicate the remarkable results obtained:

OPERATIONS

Required for one meal in a family of four:

1 large platter	4 large side dishes	4 forks
4 large dishes	4 knives	4 glasses
8 spoons	2 milk and cream bottles	4 dessert dishes
2 bowls		2 pots
1 small pitcher	1 large pitcher	1 teapot
2 pot covers	2 kitchen forks	2 kitchen knives
2 large silver spoons	2 large kitchen spoons	2 bread and cake dishes
2 small side dishes		

Total 56 separate pieces

Taking each from closet or sideboard	56	operations
Setting table	56	"
Taking back to kitchen after use	56	"
(1) Total	168	handlings

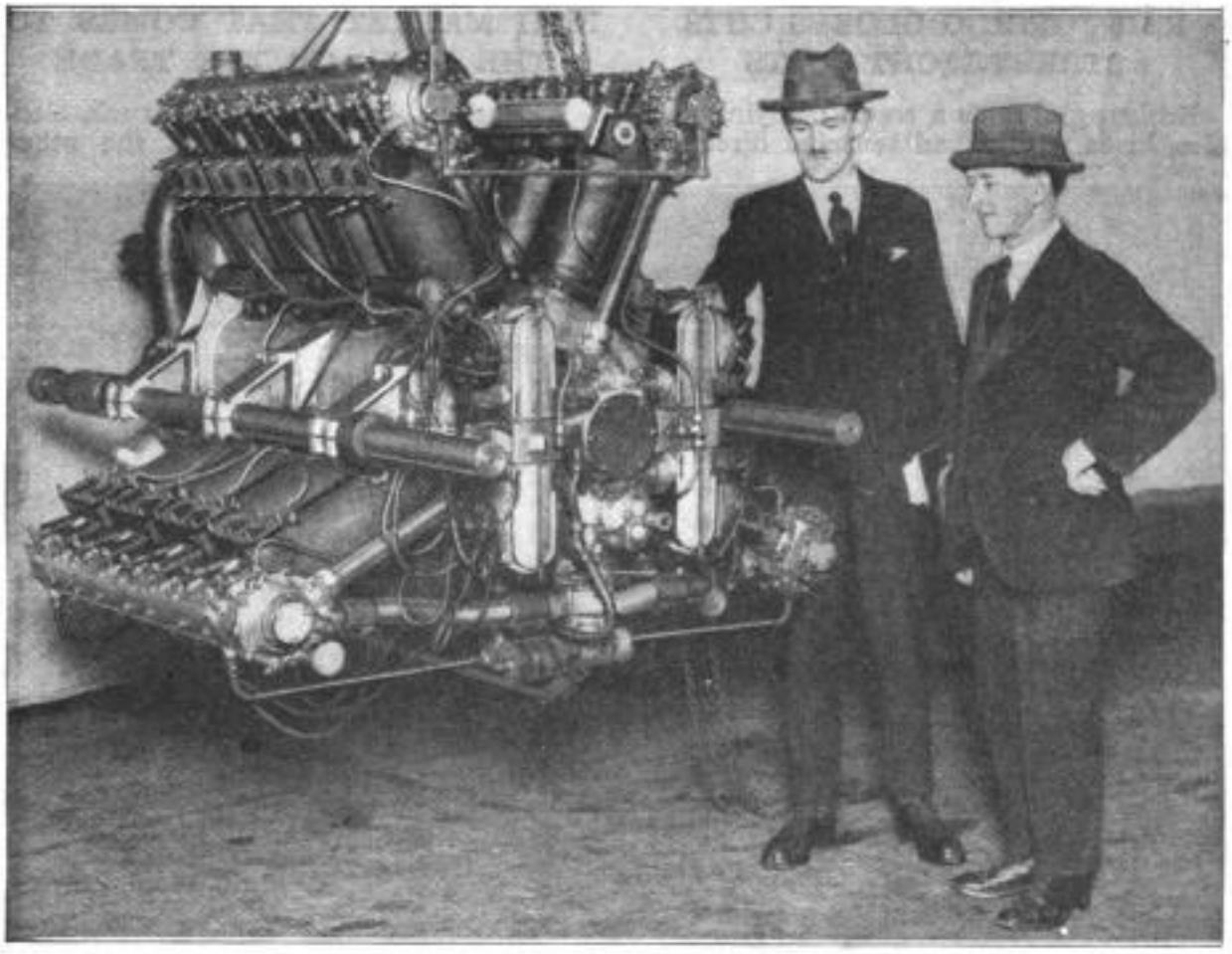
WASHING AND DRYING BY HAND

Filling dishpan with water	1	operation. Time,	1 min.
Placing dishes in pan	56	" "	3 "
Washing each dish, spoon, etc.	56	" "	20 "
Drying each dish, spoon, etc. (Includ. taking out of dishpan)	56	" "	15 "
Washing and drying dish cloths, etc.	1	" "	5 "
(2) Total	170	" "	44 "
Add (1)	168	"	
Grand Total	338	"	

MACHINE WASHING AND DRYING

Filling machine with water	1 operation.	Time, 1 min.
Placing dishes in machine	56 "	" 3 "
Machine washes and dries while housewife reads paper, etc.		No time taken
No dish cloths, sink, or machine to wash		No time taken
Dishes are left in machine until table is set again (after they have been thoroughly dried). This makes 56 operations less (by not setting back in closet).		
Total	57 operations.	Time, 4 min.
(3) Add for dishes taken out again and put on table	56 operations.	
	113 operations.	
Total operations saved, one meal	234	
Total time saved in minutes, one meal	40	

It was found, furthermore, that the machine's capacity for washing the inside of bottles was more than human, and that greasy pots and pans, with the aid of a washing powder supplied with the apparatus, promptly became spotless without any of the usual unpleasant effort. As the machine's capacity was sufficient for the dishes of two meals, it was a simple matter to reduce the number of operations still further. As a result, the housewife's total gain amounted to two hours a day, or even more.



The 16-Cylinder 1,000 Horsepower British Aerial Engine "Cub," Viewed from the Timing-Gear End: The Valves are Operated by Overhead Cam Shafts Which are, in Turn, Driven by Bevel Gears and Shafts Connecting with the Timing Gears

BRITISH TEST 1,000-HORSEPOWER AERO ENGINE

What may be regarded as the biggest advance of recent years in aero engines is the new British Air Force "Cub" engine. The design is entirely new; it has 16 cylinders in four groups of four each in an X-formation, the "V" at the bottom being wider than the one above. On its testing on the bench it developed 1,057 hp., and ran for 20 consecutive hours, this being the standard running test.

The engine weighs just under one ton, thus giving one horsepower for every two pounds in weight. The cost of this experimental model was around £5,000, or about $25,000. Ten of the engines have been ordered by the British air ministry. It is proposed to fit two of them to the flying boat "Titania," a huge air destroyer now nearing completion, in place of four 600-hp. engines, as originally intended. The "Titania" will have a range of 1,500 miles and would carry 50 passengers easily. The total cost will be about $125,000.

Probably as a result of the success of this engine and the recent accidents with airships, the ministry has decided to suspend experiments with lighter-than-air machines for war purposes. Experts are already talking about 5,000-hp. flying boats, carrying 250 passengers for transatlantic flights. It is estimated that the new engine will make travel by airplane as cheap as ground transport.

DANGER IN OPENING POWDER KEGS WITH WOODEN TOOLS

Opening a wooden keg of black blasting powder with a wooden tool might appear to be the safest of methods, yet the U. S. Bureau of Mines calls attention to a number of serious accidents resulting from the practice. The habit in many places has been to drive a hardwood spike through the head of the keg, and in several instances the ignition of the powder has directly followed. The cause remains unexplained, though any one of a number of actions may be responsible. Because of the demonstrated danger, it is recommended that powder be extracted from its kegs only by way of the bunghole, even if more time is required.

REINFORCING GLOBES CUTS STREET-LIGHT COSTS

Broken globes as a result of flying pebbles, birds with a bad sense of direction, and numerous other causes, have led the city of Oakland, Calif., to reinforce the glass on their electric street-light fixtures. A hole is drilled through the top of the globe and a threaded rod is inserted in such a way as to make the threaded end of the rod engage the threads of a tapped hole in the globe base, leaving the opposite end protruding through the hole in the top, thus effecting a reinforcement. An art knob ornaments the visible end of the reinforcing rod. Maintenance costs have been reduced materially since the reinforcing began.

FISH MARKET THAT COMES TO THE DOOR OF THE TRADE

A spacious, pneumatic-tired truck, electrically lighted, and with all the other necessities of an up-to-date fish market, now carries the choice foods of the sea to the people in Atlantic City. The traveling market is equipped with display windows and is capable of carrying 2,000 lb. of fish. Five or six patrons can be waited upon, for the sales floor is large and deftly arranged. This form of marketing will find great favor among those who reside in the suburbs and outlying sections, as it will supply fresh products direct to the home without the necessity of trips to town.

The Traveling Fish Market Gives the Buyer an Opportunity to Look Over the Wares. It is Equipped with Regular Show Windows and the Entrance Is at the Front End

Counter Room is Provided for Five or Six Patrons at a Time. The Market is Also Equipped with Cash Register and Scale. The Window Arrangement Provides Plenty of Light and Air

¶Two huge gold stars, formed with 1,600 yellow tulips, will decorate a plot of ground in Schenley Park, Pittsburgh, this spring, in honor of the city's lost fighting men. The Service Star Legion Mothers of Democracy of Allegheny County, Pennsylvania, is planting the symbolical flowerbeds.

COMMENT AND REVIEW

[These pages were printed February 24, 1921]

IN these latter days not all the czarism has been confined to Russia. Technically, the original line of czars is no more, but their ambition to wield self-conferred powers has fallen like a blighting mantle on others, less royal, but who share the same egotistic, and frequently as senseless, desire to show their authority. The public are—and to their sorrow—fairly familiar with the fiats of the Post Office Department. They are not so well acquainted with the autocratic condition into which the Patent Office has fallen during the past two years. It is to be most earnestly hoped the new administration will, as speedily as possible, afford relief in both departments.

Ruling by Rules

It is perhaps difficult to establish the line where a Postmaster-General, or a Commissioner of Patents, may be said to exceed the utmost authority which it was ever intended he should exercise. It would not be so rankly unjust even, if those who find themselves under a ban due to the personal whim of an official, only had some chance of appealing from his "ruling"; but both the Post Office Department and Patent Office are virtually a law unto themselves; wielding the power both to make the rules, which practically are laws, to administer these laws, making their own interpretation of them, and to enforce peremptory and extreme penalties, also of their own selection. There is technically a right of appeal in some cases, but even this is so limited and surrounded by so many barriers, costs so much in money, and can be prolonged so many years, that the patient seldom can hope to survive the ordeal. As an actual matter of fact, there is now practically no relief from the whim of the monarch who sits upon the throne of either of these two departments.

Of late, the Commissioner of Patents, ostensibly to purge the bar of his department of alleged unscrupulous patent lawyers, whom for short he classes as "sharks," has assumed to decide who are sharks and who are the elect. Failing in all other ways to satisfy his own mind, he autocratically ruled that the patent lawyer who advertised in any way whatever, immediately became a suspect in the shark class, and, conversely, those who did not advertise were entitled, for that reason if no other, to a clean bill of health. *The fact that during the past 15 years only one patent lawyer who advertised has been disbarred, and that in the same period nine were disbarred who did not advertise,* seems not to have meant anything to him. Indeed, it is a grand tribute to the hundreds, probably several thousand, patent lawyers in this country that so few, less than a paltry dozen, in all the 15 years, for all causes combined, were deemed unworthy to continue practice. How many other occupations of trust—doctors, bankers, editors, and so on—can show any better, or as good a record? But now any patent lawyer who wants to advertise, automatically becomes a candidate for the rack and guillotine. Fair-minded people will be glad to have the facts revealed. Here are a few samples:

First, the commissioner takes the position that all patent lawyers who advertise are dishonest, and all who do not advertise are honest. A high-school boy knows better. The commissioner has the power to disbar any attorney guilty of "gross misconduct." Until now this meant dishonesty, neglect of duty toward a client, breach of trust, etc. Now it also means *any* practice on the part of an attorney that does not meet with the commissioner's own particular fancy. He has power to change the rules from day to day—and some of these rules *are not* directed against dishonesty, breach of trust, misrepresentation, willful neglect, etc.—and then to bring these rules within the limits of the statute, he decreed that a violation of these rules would be considered "gross misconduct," but having made these rules, he applied them only to those attorneys who happened to use printed letters, pamphlets, advertisements in periodicals, or printed matter of any kind in soliciting business. Even the use of a self-addressed return envelope was forbidden. An advertising patent lawyer, having replied to a letter of inquiry, however important, and not hearing from the prospective client, must not write him a second time. With all the letters which the post office missend, delay, or lose, this is a preposterous rule and an unwarranted denial of the rights of any citizen. Nor must the advertising attorney send out to clients and prospective clients any likeness of the members of the firm, nor use any cut of the building he occupies, unless the entire building is used exclusively for the patent business

of the attorney. One firm in Washington erected a building for their own use, and occupied it all for patent work, except a small portion of the first floor, which was rented as a candy store. They must not use a picture of their building in any publicity matter. A nonadvertising attorney may make a search of the Patent Office records, for a prospective client, free of charge; but if an advertising attorney does so for the same man, at the same time, for the same device, it is "gross misconduct," punishable with disbarment.

Services which *must not* be advertised in any way are: secrecy of the inventor's idea; to promise the services of all the staff necessary or desirable; to offer to suggest mechanical improvements (a large proportion of devices patented in the last 30 years would have been failures but for this help). An attorney must not refer to specific instances of this kind of service rendered; must not publish names of clients to whom fees were returned when the lawyer found the patent when issued would be worthless (I know one firm which alone refunded $11,160.20 in two years in this way, and they were advertising attorneys—but they must not mention the fact); must not offer the services of the private printing plant, which some attorneys have, even though the cost is less to the client; must not offer to pass on to inventors, nor mail them, copies of hundreds of letters constantly received from established manufacturers anxious to purchase patents for use; nor to publish any letters of recommendation.

As this discrimination is specifically directed against advertising lawyers only, the natural question arises, "Then why advertise?" The answer is that, unless employed by the year by some manufacturer, the volume of patent business is too small to support a patent lawyer except in the large cities. This provides the inventor in such places with the opportunity to confer at any time. But what of the thousands of inventors scattered on farms, in mines, in small towns all over the land? Are they to be deprived of their rightful chance, simply because they happen to be 3,000 miles from Washington, or 300 miles from any patent lawyer? Those who have had occasion to do business with Washington quickly found out they needed a lawyer who usually went there himself, or employed a Washington lawyer to really do the work. There is only one place where complete and absolutely dependable information regarding a patent can be obtained and that is in the Patent Office at Washington. There are no branches like mints and revenue departments; it is all there and nowhere else. And the Patent Office affords no service to the intending patentee. Hence a struggling inventor in the mountains of Tennessee or Idaho can seldom afford the cost of sending a lawyer to Washington. The logical, economical, even the only thing he can possibly afford is to employ a reputable patent lawyer living within walking distance of the Patent Office—and what opportunity has such an inventor to know the address of such an one? Morals aside, no reputable mechanical periodical, such as inventors read, can afford, and so far as I know, none of them do, carry the advertisement of any patent lawyer they would not unhesitatingly trust with their own business. In the realm of patents it is a relic of blue-law days and an absolute absurdity that there should be anything unethical in advertising one's equipment in the line of talent, his previous history in the business, his record in assisting inventors to sales of their patents, the distribution of news of inventions actually needed and wanted, or the promise to refund unearned fees. This last is heresy to lots of lawyers, but at least it is *honest*. These things are precisely what the inventor wants to know, ought to know, is entitled to know, and the Patent Commissioner says to all this, "No."

That grand document, the Constitution of the United States, particularly intended not only to encourage inventors but also to provide facilities which would afford even the humblest inventor of the most insignificant device, all the protection a great government can provide. We are now a long way from the Constitution when a Patent Commissioner recently announced his policy that applications for patent are to be filed by inventors of known ability and that others would be discouraged. Fortunately, Bell patented his telephone before the present policy was announced. It is to be hoped the new administration will promptly introduce some common sense and justice into a bureau months behind in its work and millenniums ahead with its red tape and childish notions.

H. H. WINDSOR

BRITISH RETURNED-SOLDIER PROSPECTORS FIND RICH ORE

Headed by a practical prospector and with the backing of the provincial government of British Columbia, 15 parties of returned-soldier prospectors are searching the western Canada hills for gold and other rich ores. The chief aim of the government is to develop the resources of her western domain and also develop a good type of prospector. Much valuable information is gleaned by the amateur prospectors, and many ore specimens containing promise of rich reward have been brought back by them. The men making discoveries will share their strikes with the government, and many claims already have been staked.

CAN USE CONVERTIBLE TABLE FOR DRAFTING OR WRITING

Students especially will be interested in a recently invented table that can be used for either drafting or writing. Arranged as a writing desk, the top is horizontal, and the height is standard. For drawing, the cross legs re adjusted, by means of notched supporting bars, until the top is raised and inclined at the proper angle for a drafting board. A flange at the front edge of the top holds the board in place, and another at the back edge forms a groove for pens.

The Table Arranged as a Level-Top Writing Desk of Regular Height. Above: Raised and Inclined to Receive a Drafting Board, Held by Folding Flanges

BIG SMOKING CIGAR ON TRUCK ADVERTISES TOBACCONIST

A huge cigar, made of painted sheet metal with papier-mâché ashes, mounted on legs in the box body of an Iowa tobacconist's auto, attracts more curious attention than is usually given to an advertising novelty by reason of the stream of smoke that issues from it at intervals. One of the supporting legs is hollow, and connected through a cut-out valve to the auto's exhaust pipe. By adjusting the gasoline feed to produce a smoky exhaust, the driver is able to make the big counterfeit weed puff away at will.

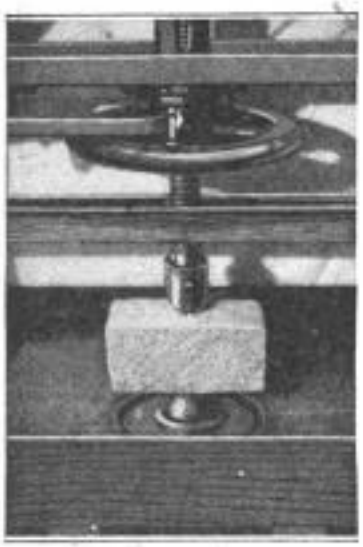
The Big Sheet-Metal Cigar in the Back of the Auto is Connected to the Engine-Exhaust Pipe, and the Driver Makes It Smoke at Will

GERMAN CITIES TO BUILD SKYSCRAPER DWELLINGS

A project aimed toward the solution of the vexing dwelling-shortage puzzle by the city government of Munich is the erection of enormous buildings, on city-owned property, surrounded by spacious plazas, in thinly populated neighborhoods. They will be decorative as well as massive, and are expected to be the show places of their particular centers. With this in mind, building restrictions in the vicinity will prohibit the erection of buildings other than homes. The first of the huge structures will be of reinforced concrete with a main portion, 12 to 13 stories in height, surmounted in the center by a round turretlike tower of an equal additional height, giving the whole an elevation of 25 stories. While not to be compared with the Woolworth, Metropolitan, or Singer buildings for height, the new German structures will be remarkable in that they will be for dwelling purposes and for the further fact that they will stand alone.

ROCK-BREAKING PRESS TESTS ROAD-MAKING MATERIALS

Testing the resistant qualities of rock used in road building has heretofore held an element of inaccuracy because of the difficulty of producing sample pieces of uniform size and shape. The government's road bureau now has adopted a simple forcing press, in which the granite or other block is squeezed between two vertical conical jaws with a pressure up to 20,000 lb. With this machine, a test block weighing 5,000 grams (11 lb.) is readily divided into 50 approximate cubes, of 85 to 115 grams each. Using these pieces for abrasion tests, the resistance to wear may be ascertained with an accuracy of .3 per cent. With the former method of breaking the blocks by hand, deviations as great as .8 to .9 per cent were the rule.

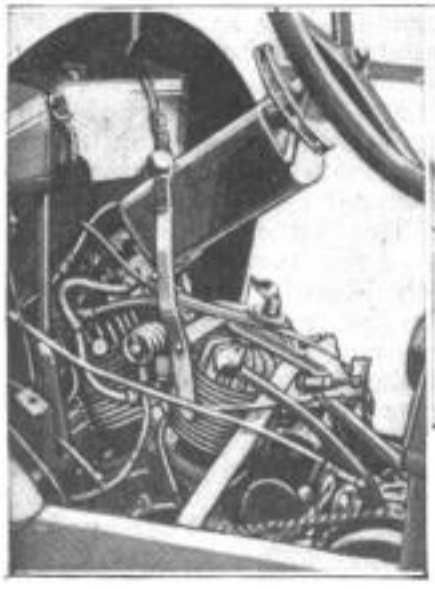


HOT CARBON-POINT IGNITER STARTS OIL ENGINES EASILY

A carbon-pencil heating unit, designed to be used in the hot-bulb combustion chambers of semi-Diesel engines when starting them, is calculated to take the place of the resistance-coil type of igniters used heretofore. Owing to the high resistance of the pencil, it becomes white-hot very quickly when an electric current is passed through it. The heat then radiates to the bottom of an inclosing metal casing, forming a hot spot which fires the fuel almost instantly. The inventor of the new igniter claims that it will start a semi-Diesel engine in 30 seconds from the dead-cold state. As the carbon is not damaged by heat, it is not necessary to withdraw the device from the hot bulb.

THREE-PASSENGER AUTO SLED HAS MOTORCYCLE DRIVE

An enterprising motorcycle dealer in Indiana has demonstrated the year-round practicability of the two-wheeled vehicle by equipping one with two runners in place of the front wheel, and a body which seats two passengers comfortably. The driver's seat occupies the usual location. A stock motorcycle engine supplies the power through the medium of the conventional chain to the rear wheel. From the engine forward, the design is distinctly original. A quite heavy frame replaces the regular member, and is equipped at the front end with a standard-width automobile front axle and steering knuckles, to which the runners are attached. The regulation linkage connects the knuckles to an automobile steering gear and wheel. A hoodlike extension of the body toward the front carries out the motor-car idea, but is hollowed out to form a wind tunnel which, passing between the seats, directs a cold-air blast directly onto the engine. Current for a searchlight on the dash is supplied by a small generator and storage battery. Speeds of 45 to 50 miles an hour are claimed for the contrivance.



A Three-Passenger Auto Sled Which Attains Speeds of 45 to 50 Miles an Hour: The Runners Are of Standard Tread and are Mounted on Regulation Steering Knuckles. Sections of Chain around the Rear Wheel Insure Traction. Left: The Power Plant, Fuel and Oil Tanks, Gear-Shift Lever, and Steering Wheel. Note That the Throttle and Spark-Control Levers are Placed Directly under the Wheel

Army Representatives, Giving an Endless-Tread Attachment for Light Autos an Official Trial: In the Background Is One of the Huge Land Battleships with the Same Sort of Tread

BELT DEVICE MAKES ENDLESS-TREAD TRACTOR OF AUTO

By means of a recently invented belt, to be applied around the wheels, any automobile can be converted into a tractor of the endless-tread type. Spaced at equal intervals along the belt are metal cleats, which reach completely around it so that it is kept spread to its full width at all times. These are made with smoothly curved surfaces on the sides next to the tires in order that the latter may not be damaged. Two supplementary axles, each mounting two standard wheels, are attached to the car frame, midway between the regular axles, the four extra wheels serving to distribute the weight equally over the entire length of the belt.

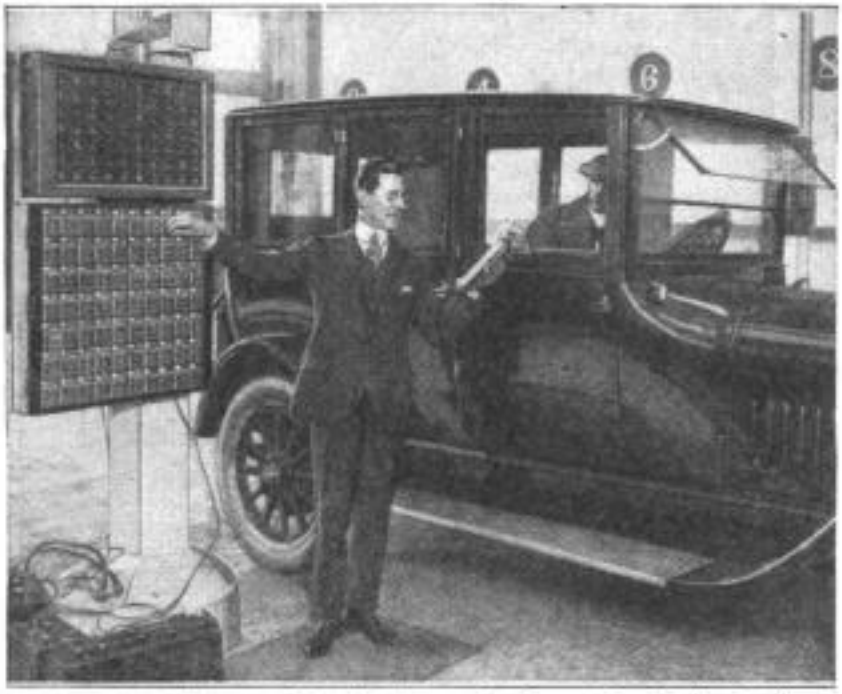
BATHTUB OF NEW SHAPE HAS NUMEROUS ADVANTAGES

By designing a bathtub in such form that its occupant takes a sitting instead of a reclining position, a plumbing-supply manufacturer is able to offer a new article possessing a number of advantages. The entire tub measures only 44 in. long and 30 in. wide, with a well at one end 24 in. deep, and a ledge at the other end forming a seat, above which the depth is 15 in. The well may be used alone for children or as a foot bath, the seat ledge remaining dry.

In the New Bathtub the Occupant Takes a Sitting Position; the Foot Well may be Used Alone

SIGNAL BOARD SPEEDS BATTERY SERVICE

BY JOHN ANSON FORD



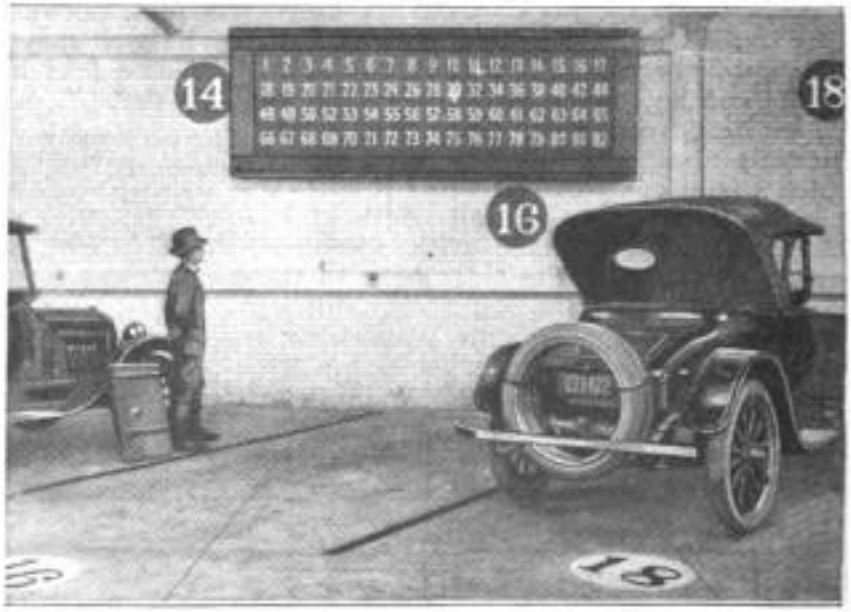
The Attendant Lights a Colored Bulb on the Lower Board That Indicates the New Customer's Needs, and the Upper Board Shows Which Stalls in the Station are Empty, so That One may be Promptly Assigned and the Newcomer Given His Ticket

AN especially designed electric-signal board which notifies the staff of the kind of service wanted by arriving customers has been installed in a new battery-service station in Los Angeles. The new apparatus has been one of the principal factors in speeding up the service so that now the patrons can be taken care of at the rate of about one a minute. All noise and confusion and errors in waiting on the wrong persons, are eliminated by reason of this signal board. Before the same force of men moved into the present quarters, 375 cars a day was their best record. Now they have waited on as many as 500 cars a day.

When a man drives into a battery-service station his wants fall within one of three classes: He will want his battery tested, or changed, or he will want the services of an ignition expert to attend to faulty wiring or some related trouble. This classification of customers has been recognized in the establishment, and accordingly the force of men is divided into three corresponding groups.

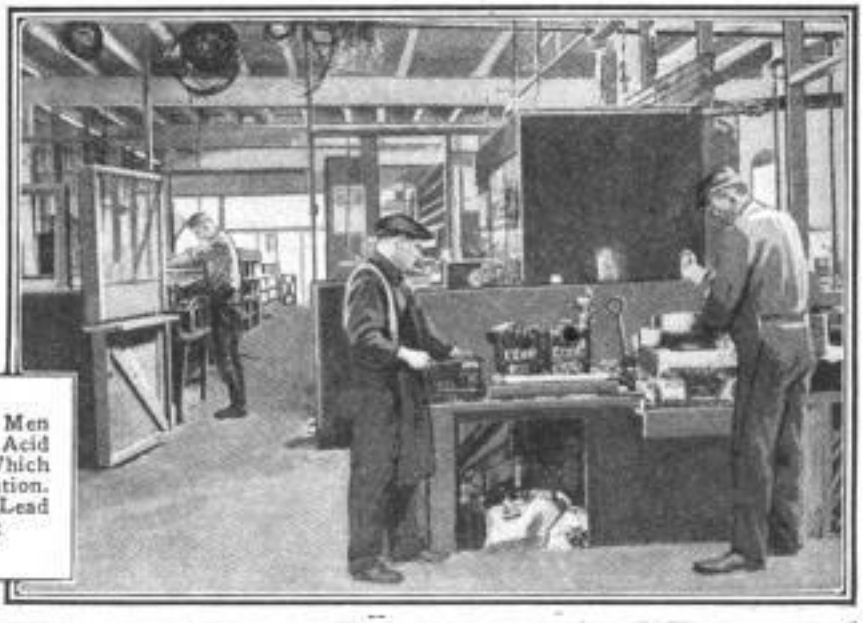
The manner in which the signal board is used in connection with this system can best be explained by following a customer through the station. As he enters the "horseshoe" driveway that runs through the building, he is greeted by an attendant who inquires his needs, and makes an entry in duplicate, or triplicate, on a tab. This shows the customer's need, and has blanks on which charges later are to be entered.

If the patron wishes his battery tested, this is noted on the tab and also the number of one of the vacant stalls. There are 82 stalls in the station, all ranged around the "horseshoe." The customer is then handed one copy of this memorandum and asked to drive his car into stall 31, for instance; the attendant's duties, so far as this customer is concerned, are finished by pressing one of three buttons under number 31 on a rectangular panel close by. Pressing this button causes a red light to shine on the large signal board, hung high on the wall of the garage in sight of the entire service staff. Men awaiting assignment occupy a central area railed off for the purpose.



Three Bulbs of Different Color, under Each Number on the Wall Board, Tell the Kind of Service Required by the Car in the Corresponding Stall

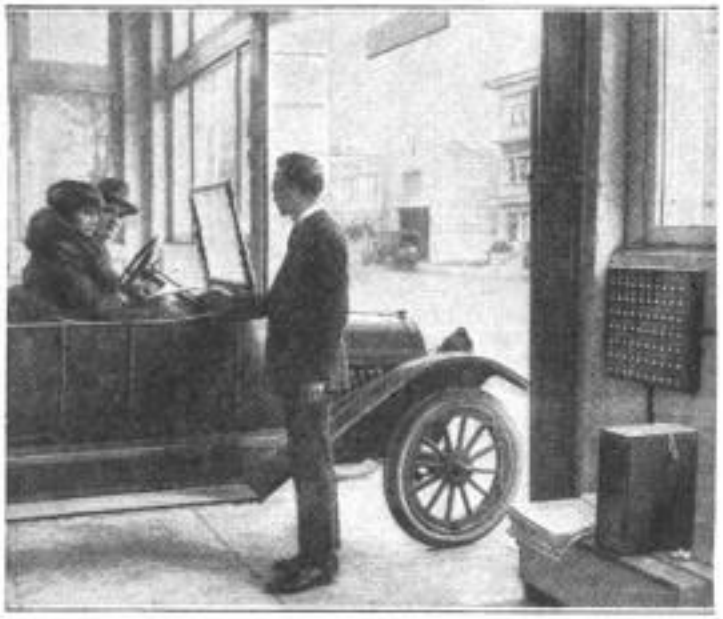
Inspection Booths Where Customers are Shown the Insides of Their Batteries and Defects are Pointed Out by the Rubber-Gloved Salesman: The Battery Covers are Steamed Off in the Room Just Beyond, and the Cells Brought In, after Which the Communicating Window, Seen Open, is Closed to Exclude Fumes



The Big Tank behind the Two Men in the Foreground Contains Acid Solution for the Batteries, Which is Piped to All Parts of the Station. The Furnace for Melting Old Lead Plates is Seen at the Right

The Big Force of Service Men, Ignition Experts, and Battery Changers, Three Distinct Groups, Are under the Direction of the "Service Dispatcher," Who Watches the Signal Board and Assigns Men from the Bench at the Left Foreground, or from Other Parts of the House. In the Booth behind the Dispatcher are Kept the Cards Which Show the History of Every Battery Received for Repairs, Recharging, or Other Attention

The color of the light indicates that a customer in stall 31 is waiting to have his battery tested. If a yellow light had appeared under that number on the board, it would have indicated that an ignition expert was wanted. The lighting of a green bulb indicates that the customer wants his battery changed.



Above: The Attendant Deposits the Outgoing Car's Memo Card in the Box, Presses a Button to Clear the Stall Signal, and If Necessary, Calls a Mechanic to Rectify Errors. The Ignition Expert's Workbench-Truck, Carrying Instruments and Tools

Systematization of the work is carried still farther by having all the men in charge of a "service dispatcher." None of the men go onto a job until directed by this man. At all times the board shows him how many cars are waiting to be attended to. As soon as a service man starts on a job he pushes a button at the head of the stall (one of three corresponding to the three signal lights), which extinguishes the light shining under the number in the wall signal. This informs the dispatcher that the customer is being waited on.

This extinguishing of the colored light does not mean that the stall is empty, however. The board beside the attendant at the entrance is so constructed that it shows every stall that is occupied until the occupants check out at the exit. When 31's battery has been tested, or some other service rendered, the man on the job makes the notation on the customer's slip and directs him to pay the charges at the cashier's window, located near the center of the horseshoe. After paying the bill, the patron returns to his car and drives out. As he approaches the exit, he stops his car and delivers his receipted memorandum to another attendant. The latter drops this completed memorandum into a box, and at the same time presses a button on a signal panel close beside him, the particular button in this case being No. 31, which will "clear" stall 31 on the entrance attendant's board. As stated above, largely because of this remarkable system, the station is able to care for one customer every minute, on the average.

Another important, though quite simple, feature which promotes timesaving is the use of especially designed trucks by the service attendants. The ignition men, for example, take with them on each assignment a rubber-wheeled truck containing practically everything that they will need for the ordinary ignition job. Here is apparatus for making tests of the wiring, an electric soldering iron, voltmeter, etc. Drawers beneath the top of the truck contain screws, nuts, bolts, fuses, etc.—everything that an electrician will need for any job that can be done without removing the parts from the car.

In case the customer's battery is in such condition that he needs a new one, the station's inspection division is utilized. This consists of booths of special design, each

containing a table and seats where the customer and salesman can inspect the battery. While the customer is being shown to a booth, his battery is wheeled to an inclosure behind a partition which separates it and the inspection booths. Here, by the application of live steam from a boiler, the wax holding the top of the battery in place is melted, and the contents of the various cells are lifted up for examination. Then the dismembered battery is placed on a zinc-top tray, mounted on a track, which leads through a small doorway in the partition mentioned above and terminates on the table at which the customer is seated. After the battery has been rolled into place for inspection, the doorway through which it passed is closed, leaving the customer and the salesman entirely to themselves to discuss the terms of sale or the cost of repairs.

The benches where the rental batteries and batteries of individual customers are charged have a capacity for nearly 1,000 batteries. These are kept separate from new batteries, which are handled in large quantities on the second floor.

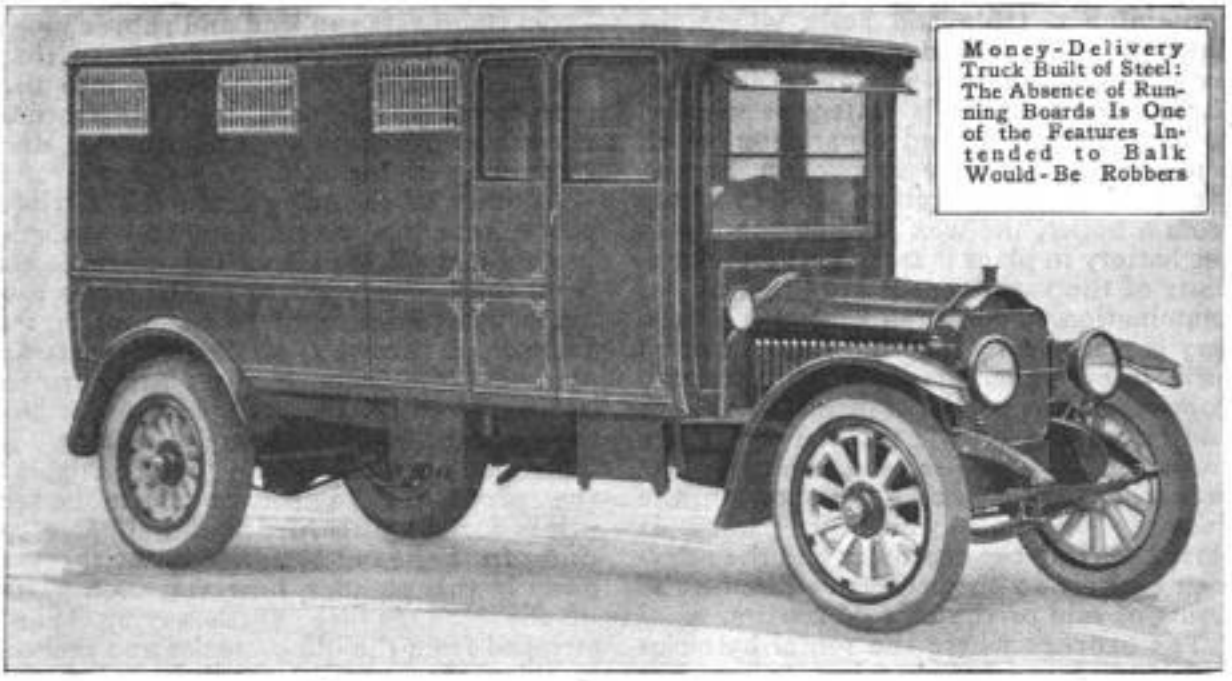
In many cases batteries need a supply of acid. In the handling of this liquid, this service station has introduced a set of three vats of 100-gal. capacity in which the station's entire supply of acid is kept. From these vats run lead and rubber pipes to various parts of the building, so that the fluid can be drawn directly into the receptacles which need it. This feature eliminates much waste and damage due to spilling of the acid.

Another labor-saving feature is a triple chute from the second floor to a walled-in area just off the alley. This chute leads from the benches where old batteries are taken apart to be sent to the junk heap. Instead of throwing all the old parts in one pile, the wooden cases are thrown down one chute, the lead parts down another, and the terminals down a third. This classification of the "junk" enables the proprietor to secure much better prices for his discarded material. Everything from the old batteries is not thrown away in this manner, however, such parts of the lead as are worth saving being stripped from the old batteries and melted in a furnace provided for the purpose.

Systematic handling of customers' needs has also been extended to the matter of keeping accounts. At a booth in the center of the main floor a clerk keeps track of each battery brought into the house, and as fast as work progresses on it, entries are made on the proper card, enabling a patron to ascertain at any time just the condition his battery is in.

STUDENTS IN CITY COLLEGE INSPECT MUNICIPAL WORKS

ALL of Chicago—a city in many ways a monument to the genius of the engineer—is a textbook for the engineering pupils of the free municipal college now maintained by the Board of Education as an offshoot of one of the great technical high schools. In the photograph, for example, the "Engineer's Club," formed of honor students, is seen on a recent visit of inspection to the canals which drain the rivers of the vicinity into the Mississippi system. Membership in this student organization is open to both sexes.



Money-Delivery Truck Built of Steel: The Absence of Running Boards Is One of the Features Intended to Balk Would-Be Robbers

RELAY PROTECTS VACUUM TUBE OF WIRELESS DETECTOR

Not infrequently the filaments of vacuum-tube wireless detectors are burned out by excess current allowed to flow through them, making expensive renewals necessary. It is possible now to do away with this loss and annoyance by the use of a new form of cut-out relay which acts, as soon as too much current flows, to shut off the detector filament and substitute a common small lamp bulb, whose light warns the operator to reduce the current. The instrument consists of a simple electromagnet, hung vertically in an iron frame, with a gravity armature pivoted below its core. A spring in the path of the armature makes contact for the detector when it is down, and when it is drawn up, breaks the contact and connects in circuit the small lamp, mounted on top of the frame. The device may be used to protect other kinds of circuits besides wireless.

MONEY-DELIVERING TRUCK ARMED LIKE A WAR TANK

A truck built with floors and walls of steel, and made without running boards, in order to prevent attempts to hang on and ride, has been specially built for a Cleveland bank for the purpose of carrying money. To make the carrier more nearly burglar-proof, a steel screen has been laid between the panes of the driver-cab windows, which are double-ply. Special locks and keys, as well as a special selection of artillery including a sub-machine gun, make the truck a veritable tank. The car may be stopped by those in the rear should the driver become disabled.

MORE PENETRATING X-RAYS RIVAL RADIUM FOR CANCER

Recent discoveries by Dr. William Duane, professor of biophysics at Harvard University, while conducting research experiments with X-rays, are expected to bring about far-reaching changes in the treatment of cancer. Although the rays have been used for years in this work, latterly they have given way to radium for the reason that this substance, in very small containers, can be applied directly to the deadly tumor, while the slower X-rays are largely absorbed by the body tissues before they can reach and act upon the growth. It is believed that this objection has been overcome, as a result of the research work, by the production of a ray of vastly greater penetra-

tive power than any hitherto available. The voltage used in generating the powerful new rays is quite close to the 150,000-volt limit which the X-ray tube is capable of withstanding without breaking down.

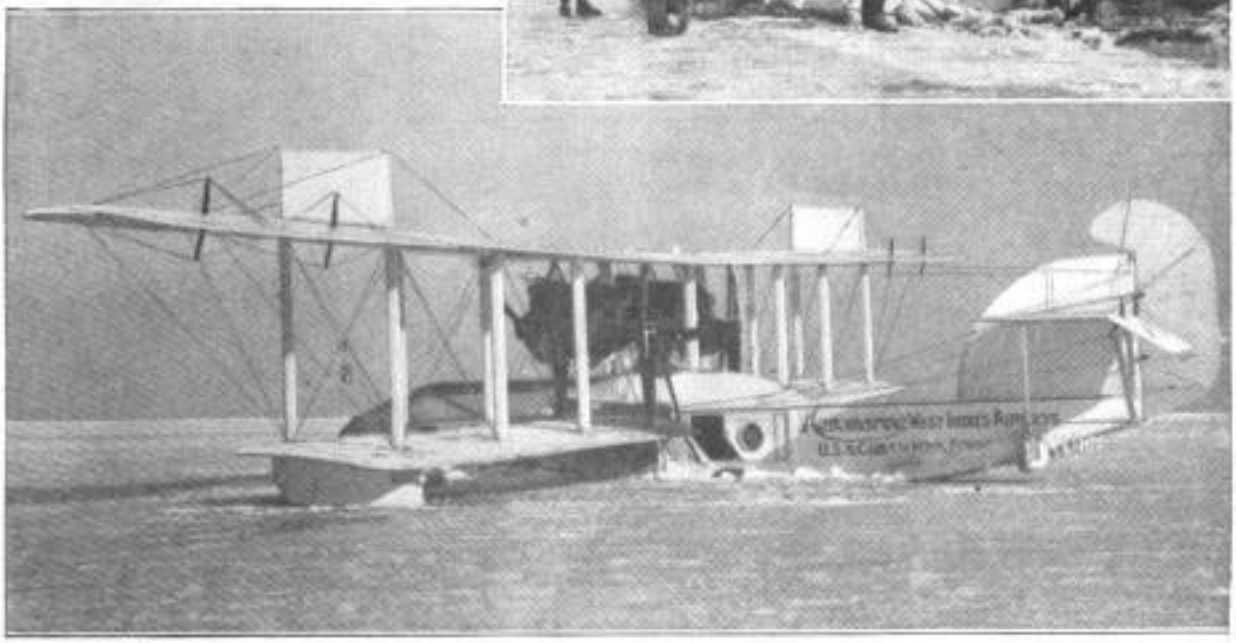
ICEBOUND SEAPLANE MAROONS CREW FIFTEEN HOURS

Being marooned for 15 hours within sight of land, but as effectually as though they were a thousand miles away, was the novel experience of a seaplane crew of seven men when their big machine settled among the ice floes of Raritan Bay, off Key Port, N. J., one day last winter. After a two-hour flight in preparation for a run to Miami, Fla., the pilot attempted to descend, but found the fairway choked by great ice floes which would have been certain to wreck the frail craft. However, the descent was unavoidable, and was made without mishap in the clearest space that could be found. Then ensued the battle to reach shore, which was given up when the helpless machine became frozen in immovably.

A rescue boat put out to assistance but was driven back by damage to its rudder. Finding themselves hopelessly cut off for the night, but in no immediate danger, the crew slept in the fuselage. Late the next day a motorboat succeeded in breaking a way to the luckless plane with a load of provisions and axes. After being freed from its ice moorings, the big flier was towed to safety.

FIG-EATING ANTS DROWNED IN MOAT AROUND TREE

After having tried poisons, sticky flypaper, and other means to eradicate the pests, a California fig grower has resorted to the use of a small concrete moat in which to drown the fig-eating ants of that section. A ditch is dug around the base of the fig tree. Its depth is not so important as long as it holds a sufficient quantity of water. The ditch is therefore made rather wide in proportion to its depth, and is lined with cement mortar. Before the attacking ants can reach the figs, they are drowned in the water filling the miniature moat.



WIDE WORLD PHOTOS

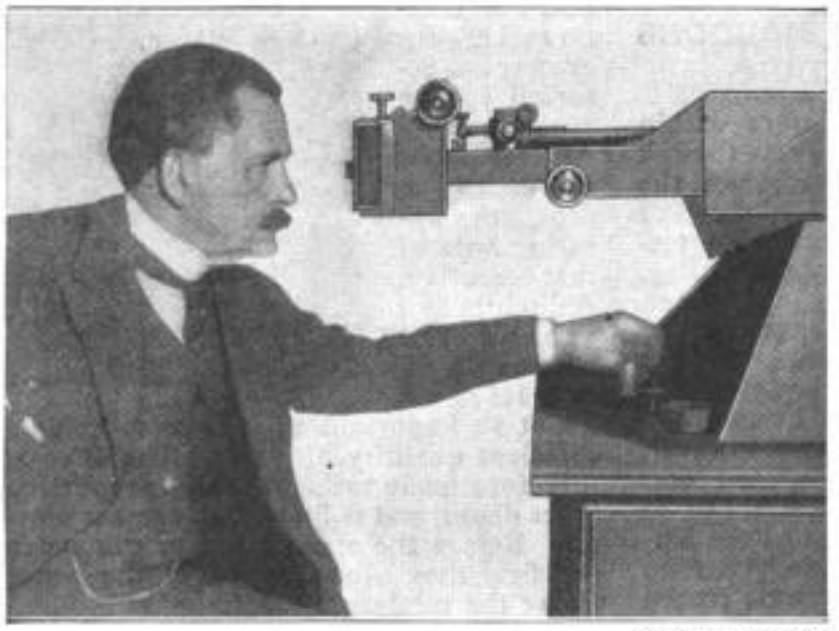
The Big Seaplane in the Grip of the Ice Floes: After Spending an Uneasy 15 Hours aboard the Helpless Craft, the Crew Chopped It Loose with Axes Brought by a Rescue Party. Above: Chopping the Machine Free, Preparatory to Towing It Ashore

MEASURING STAR DIAMETERS IN REMOTE SPACE

BY PAUL H. WOODRUFF

IT is a curious circumstance that the diameters of the most remote stars, expressed in millions of miles, should be successfully measured with the same ruler that is used to determine millionths of an inch in laboratories. The phenomenon of interference of light is the principle used in the instruments for both purposes, and with its aid Prof. A. A. Michelson recently discovered that the star Betelgeuse, in the constellation Orion, is 260,000,000 miles in diameter, or as broad as 300 suns, with a mass equal to 27,000,000 suns!

Students of physics know that a beam of light, passing the edge of an opaque screen, is slightly deflected, the extent depending on the wave length. To use this diffraction principle, the telescope is closed by a cap with two slits, adjustable in width and separation. If the two beams through the slits differ by a half wave length when they meet below the cap, they interfere, producing "fringes" of light and darkness. By separating the slits until the fringes disappear and measuring the separation, the minute angle of the heavens covered by the disk of a star may be computed. Knowing the star's distance, obtained by triangulation, calculating its diameter is simple.



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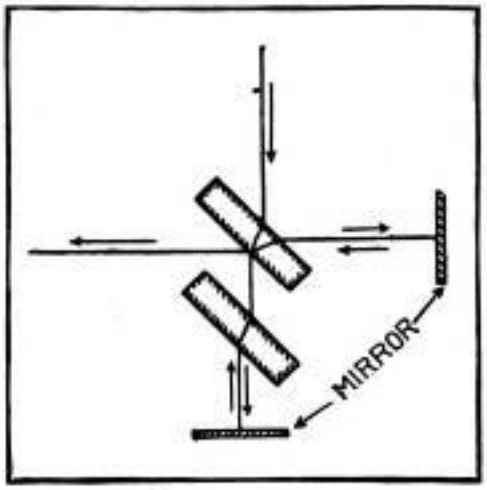
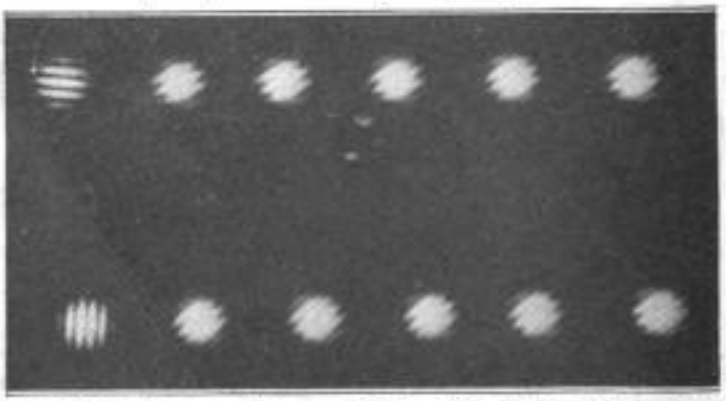


Above: Professor Michelson Using His "Interferometer" for Measuring the Diameter of Stars. At the Right: A Diagram of the Instrument's Optical System. The Incoming Beam of Light at the Top First Strikes the Upper Inclined Glass, Which is Slightly Silvered, and Reflects Half the Beam to the Right, Transmitting the Other Half Down through the Second Inclined Glass to the Bottom Mirror. This Returns It, and It is Reflected to the Left. The Mirror to the Right Also Returns Its Half Beam to the Left, Where They Join, but Are Half a Wave Length Apart Because of the Adjustment of Glasses and Mirrors

Professor Michelson improved upon the slit method by using two mirrors and two reflecting glasses at an angle, one of them slightly silvered to reflect half the light and transmit the other half. This apparatus measures small angles with an accuracy of .0001 of a second of arc, roughly equivalent to 1/22 in. at 1,000 miles. This is the instrument with which Betelgeuse, 180 light years or 1,070,000,000,000,000 miles away, was measured.

Using the new "interferometer" with the 8-ft. reflecting telescope at Mt. Wilson observatory, interesting discoveries have been made concerning the distant star Capella, which is really two stars so close together that they appear as one. These celestial twins are found to be about 80,000,000 miles apart, a space so small



Typical Interference Patterns Obtained by Photographing Two Artificial Stars of the Same Magnitude, with Optical Slits or Interferometer Openings Rotated to Different Angular Positions

compared with their distance that its angle of .045 second corresponds to 5 ft. on the earth as viewed from the sun. They revolve around each other in an orbit of about 160,000,000 miles in 104 days, and in size they are roughly equal to 4½ and 3½ times the sun.

DOUBLE-CHAIN DRIVE SAVES COTTON-MILL TROUBLE

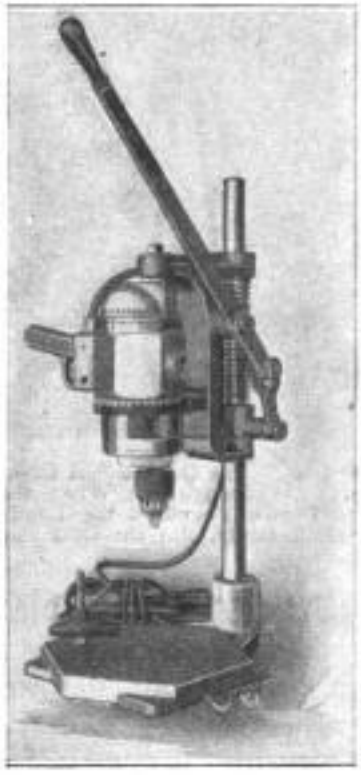
Chains used to drive the traverse mechanism of spinning frames in cotton mills are prone to break occasionally, causing loss of production, damage to rolls and rails, and waste of material. In a newly patented system the driving chain is double. Breakage of the chain carrying the load automatically causes the second chain to slip to the center and continue the work without interruption. Practical mill men have estimated that an average of one broken chain a month means a total production loss of $108, without considering other damage. The new protective device already is installed in a number of southern cotton mills.

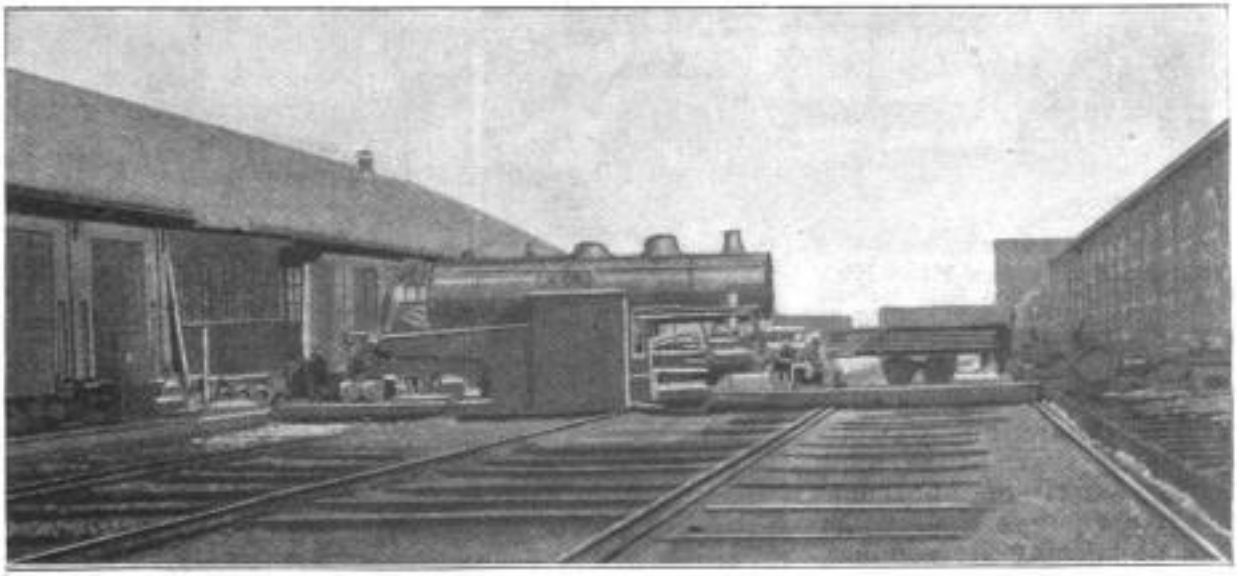
LOCOMOTIVE TRANSFER TABLE SHIFTS ENGINES QUICKLY

The repair shops of the Chicago, Milwaukee and St. Paul Railroad are using a motor-driven transfer table to move engines to different points in the shop in fast time. The table is operated like a street car, having a trolley and running on four rails. The engines are pulled onto the transfer car by a winch, provided for the purpose, and are conveyed to the desired point for removal.

DEVICE CONVERTS PORTABLE DRILL INTO DRILL PRESS

A new workbench fitting, to which a portable drill may be attached to make a combination that serves all the purposes of a medium-weight drill press, even to drilling into the ends of 4-ft. lengths of shafting, is offered to the metal-working trades. Ascending from a heavy cast-iron base, bolted solidly to the workbench, is a strong shaft upon which is a vertically sliding member, forming a bracket for the portable-drill body. The latter is attached to it by means of one bolt and a light quick-action clamping band. The device is installed at one end of the bench in order that, when the bracket is rotated on the shaft, the drill body may project several inches beyond the bench end, thus allowing a wide clearance between the drill and the floor.





The Locomotives are Pulled onto the Transfer Table by Means of a Winch. The Table Then Moves to the Designated Point and the Locomotive Is Removed. The Transfer Table Runs on Four Rails

CAST-STEEL ORANGE-PEEL GRAB NONSPRINGING

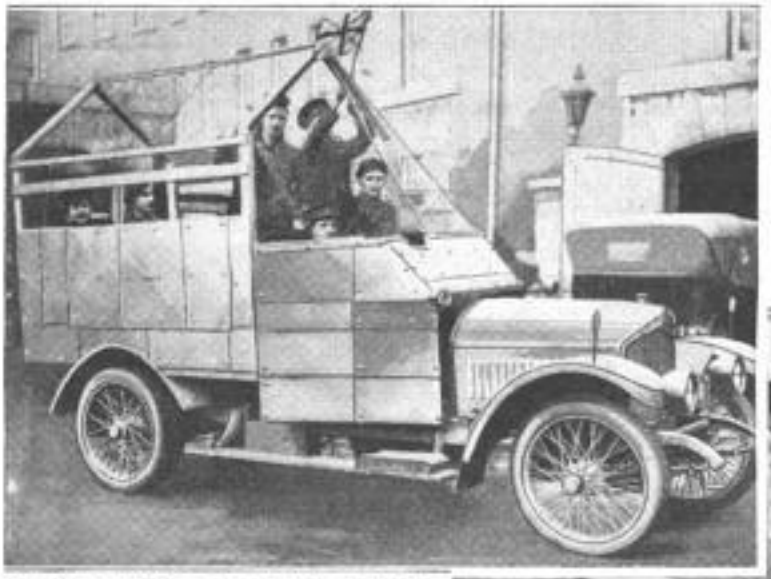
Many orange-peel grab buckets are discarded by contractors and construction engineers because of the fact that they have become sprung and do not hold a load of fine material. A cast-steel bucket is now being marketed which cannot be sprung. The segments, or the orange-peel parts, from which it gets its name, are of cast steel and are rigidly affixed to the hinges, or the upright connections, which are also made of channel-shaped cast steel. The closing chain does not cross as it winds, and thus the full closing pressure is always maintained. The tips of the segments are of manganese steel and can be removed for sharpening. Most orange-peel grabs have been made of rolled metal products up to the present time.

The Orange-Peel Grab Bucket Is Cast Steel Throughout. When the Orange-Peel Parts are Drawn Together, the Load of Fine Material is Held Securely, For the Cast Parts cannot be Sprung

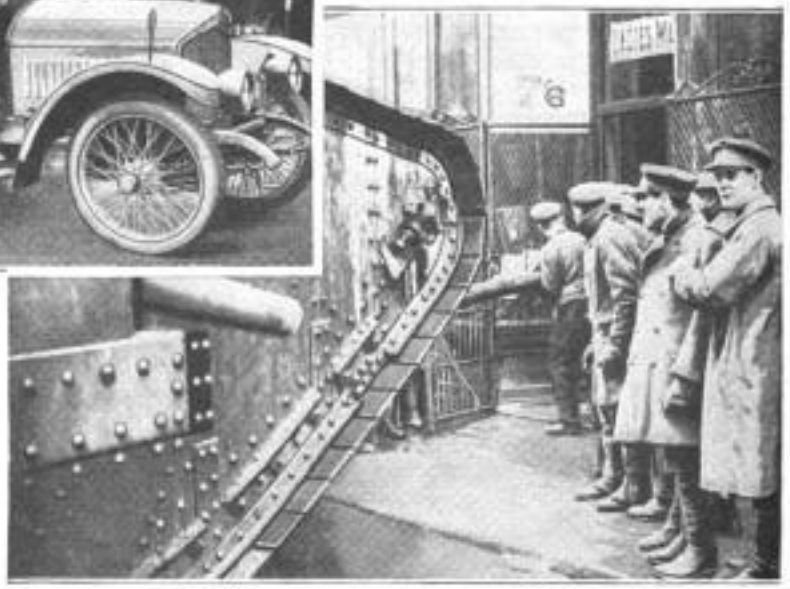
¶Stereopticon slides to the number of 2,000, depicting animal, insect, and plant life, are now available for use in Chicago schools, through an arrangement with the curator of the Museum of Natural History of the Chicago Academy of Sciences, whose life work is represented in the collection.

USE TANKS AND ARMORED CARS ODDLY IN IRELAND

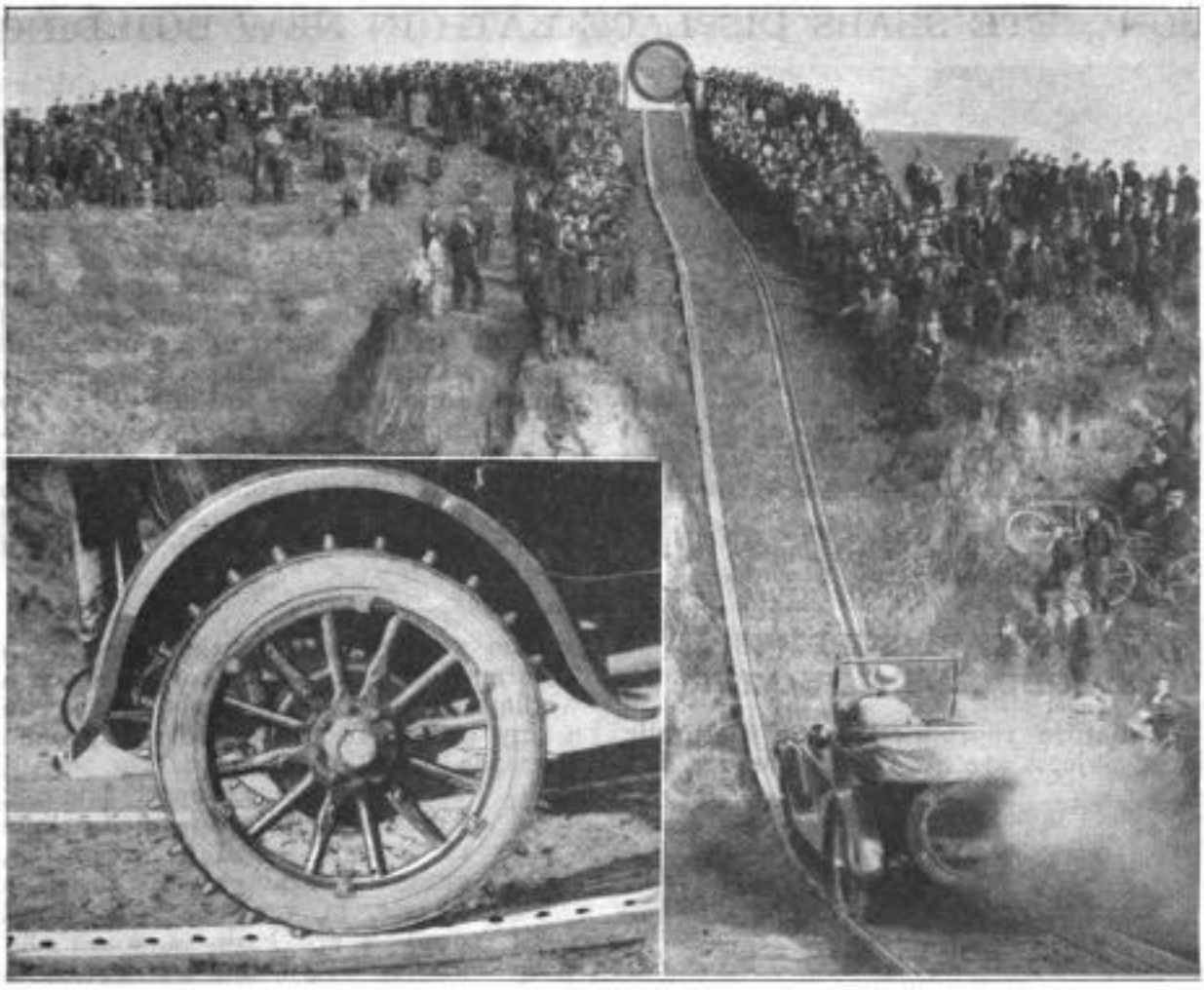
Strife-ridden Ireland, where guerrilla warfare goes on day and night, is the scene of many a curious military procedure unknown to the World War. Huge, lumbering tanks of enormous power are put to the strange task of opening store doors, and armored cars go about covered with poultry netting. The doors are forced, in the process of search for arms, by allowing a tank to push gently on a timber held against the lock, which invariably gives way immediately. The armored cars are covered with steel plate, high enough to afford cover from bullets, and the netting over the top serves to fend off any bombs thrown by misguided enthusiasts.



The Armored Cars, Steel-Plated High Enough for Protection from Bullets, are Covered with Poultry Netting to Fend Off Any Possible Bombs Thrown at Their Occupants



Opening a Store Door with a Tank: A Timber Ram is Placed against the Lock, and a Gentle Push of the Big Machine Breaks It



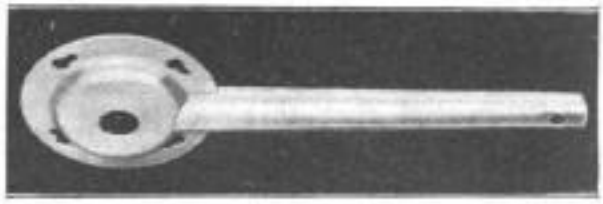
The Light Touring Car, Converted Temporarily into a Cog-Rail Locomotive, Starting up the 70-Per-Cent Grade of Signal Hill. Insert: The Rear Wheels Equipped with Toothed Steel Tires to Fit the Wood Rails

LIGHT TOURING CAR CLIMBS SEVENTY-PER-CENT GRADE

Autoists generally like to talk about the steep hills their cars have climbed, but the actual inclination of the grades surmounted seldom is known. It is commonly held that a grade of 50 per cent or more will not afford traction to rubber tires, and the recent performance of a light touring car at Long Beach, Calif., in climbing a grade of practically 70 per cent, is therefore remarkable not only in itself, but for the tractive method used as well. A route up Signal Hill, which rises 60.6 ft. in 114.75 ft., and has a grade of 69.97 per cent for nearly its first half, was provided with a pair of plank rails, in which holes were bored at short intervals. Steel tires, with round teeth fitting the holes, were then placed over the auto's rear wheels, and held in place by the tire inflation. Thus made into a cog-rail locomotive, the little car, in low gear, shot up the steep acclivity with little apparent effort, at a speed of 15 miles an hour.

SWITCH EXTENSION CARRIES CORD CLEAR OF FIXTURES

To keep the button cord clear of the light fixture and its chains, a little extension has been designed which can be applied over a ½-in. conduit. A dish-shaped piece of sheet brass is placed on the conduit and applied flush with the ceiling. Projecting from one side of the round piece is a little metal trough which is also



A Fitment for the Electric-Light Conduit Which Keeps the Switch-Button Cord Free of the Lamp Fixture: The Dish-Shaped Disk is Placed over the Conduit, Flush with the Ceiling, and the Cord is Threaded through the Hole in the Extension

applied flush to the ceiling and through which the pendent wire is strung. The trough is long enough to keep the button cord well clear of the fixture.

CONCRETE SLABS DISPLACE LATH IN NEW BUILDING

The Concrete Slabs are Used in Place of Lath, and Have the Appearance of Gigantic Bricks. The Method of Application is Shown Here

Concrete slabs reinforced with chicken wire and long enough to reach from the middle of one building stud to the center of a third, are being used in place of the conventional lath in the construction of a California home. These slabs, being only 1 ft. wide, are applied lengthwise, and when the house has received its complete coat, it resembles a building made of gigantic bricks. When in the process of manufacture, the slabs are carefully stacked for seven days and allowed to dry to prevent warping. A sprinkling is administered occasionally, and the nail holes are made before the concrete has set too solidly. Washers are used on the nail head at the joints to offset slipping out of the end.

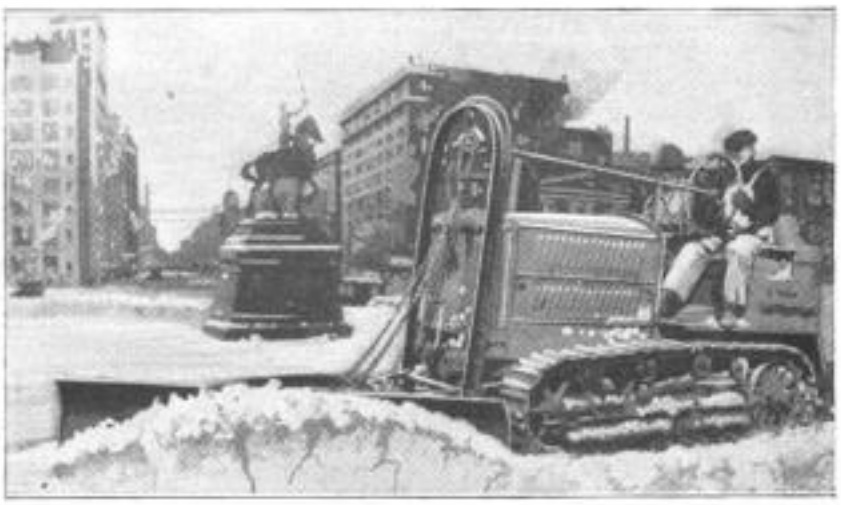
REAL-ESTATE SUBDIVISION REPRODUCED IN MINIATURE

Miniature reproductions of naturally large objects are always fascinating, but seldom as ambitious as that used by a Colorado real-estate operator, in which a whole residence subdivision is built up on a tiny scale. The base and background are made of wallboard, with all the streets, alleys, and lawns properly laid out. Trees, with foliage formed of bits of sponge dipped in green ink, grace the parkings, while the little houses, of various architectural designs, are built of wood and plaster board, and hand-painted. The completed work, executed by a returned soldier, is used to show prospective buyers the lay of the land, thus making selection of a house or lot easy.

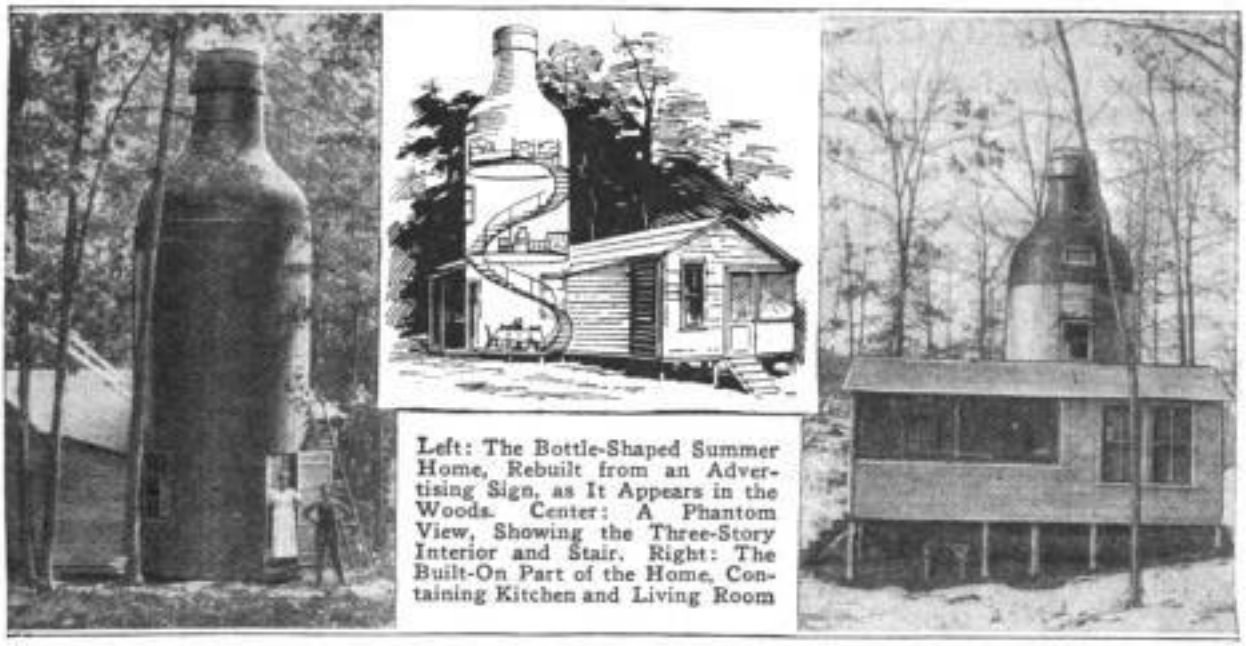
A Miniature Model of a Real-Estate Subdivision, Made of Wallboard, with Wooden Houses and Trees Made of Sponges

TANK-TREAD TRACTORS PLOW SNOW FROM STREETS

Snow fighting in the city of New York had become such a stupendous problem last winter that extraordinary means were resorted to in combating it. Exhaustive experiments with plows attached to heavy motor trucks proved that this system was a failure for the reason that the trucks could get no grip on icy streets. An endless-tread type of five-ton tractor was finally tried and performed so satisfactorily that a fleet of these machines was purchased. By reason of the powerful traction of the wide, cleated steel tracks, the heavy apparatus easily piled a very heavy snowfall into windrows at the street sides.



One of a Fleet of Endless-Tread Five-Ton Tractors Used to Remove Snow from the Streets of New York City



Left: The Bottle-Shaped Summer Home, Rebuilt from an Advertising Sign, as It Appears in the Woods. Center: A Phantom View, Showing the Three-Story Interior and Stair. Right: The Built-On Part of the Home, Containing Kitchen and Living Room

HUGE WOODEN BOTTLE FORMS THREE-STORY HOME

Strangers wandering about the shores of Pine Island Lake, in New Hampshire, are likely to receive something of a shock upon encountering suddenly, in the woods, the apparition of a huge bottle, competing with the trees themselves in height. The giant flask, 35 ft. in height and 10 ft. in diameter, is made of wood, and forms the main part of a summer home. Inside it is three stories high, containing a circular dining room on the first floor and sleeping chambers of similar form on the second and third, with a stairlike ladder connecting them. Doors and windows have been cut in the curved sides, and an addition of bungalow shape has been built on at one side, to afford a conventional kitchen and living room.

Despite its odd shape, the queer summer camp is well furnished and provided with such conveniences as electric light and telephone service. The bottle was formerly an amusement-park advertising sign for a popular soft drink, and was taken over and converted into a home by the present owner.

MAIL PLANE MAKES 33-HOUR COAST-TO-COAST FLIGHT

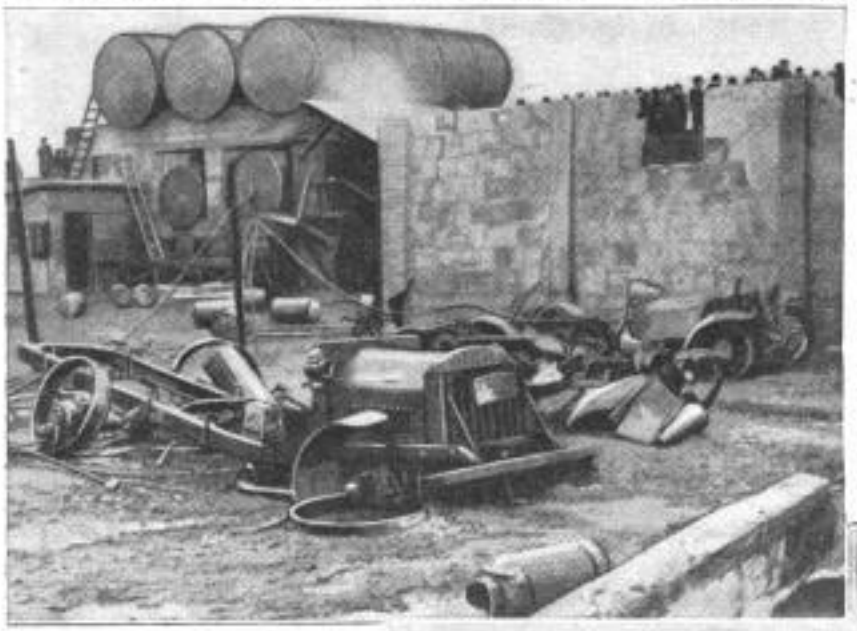
The landing of a DeHaviland mail plane at Hazelhurst Field, Mineola, L. I., on February 23, by Pilot Robt. E. Allison, marked the termination of another achievement by American planes and fliers, as it was the same machine that 33 hours 20 minutes earlier had hopped off at San Francisco on the first lap of what was to be the first transcontinental aerial relay flight. During the 3,191-mile journey, the one plane was handled by seven pilots with no damage other than a broken tail skid, which was quickly replaced. All honors are due to the members of the first aerial-relay team, whose names follow: Pilots Farr Nutter, John L. Eaton, J. P. Murray, Frank Yager, James H. Knight, J. O. Webster, and E. M. Allison. The most daring individual performance was that of James H. Knight, who flew from North Platte, Neb., to Iowa City between the dark hours of 10:44 p. m. and 4:45 a. m. battling every mile of the way with blinding snow and sleet blizzards, depending upon his compass and sense of direction, thus demonstrating the practicability of 36-hour aerial-mail service.

CHEMICAL DEMONSTRATION FOR GRADUATION PROGRAM

The technical high school of Providence, R. I., gave an unusual commencement program in the way of a chemical demonstration. The story of radium was told by one of the graduating members of the class, and a demonstration was made to illustrate the points of the story. Iron was burned brilliantly in pure oxygen, and an explosive mixture blew the cork of a bottle used in the experiment high in the air. The effect of hard water on soap was shown, and a chemical fire extinguisher made on the stage put out a blaze started for the experiment. These practical demonstrations, along with the usual music and essays of the graduation, made a very interesting entertainment.

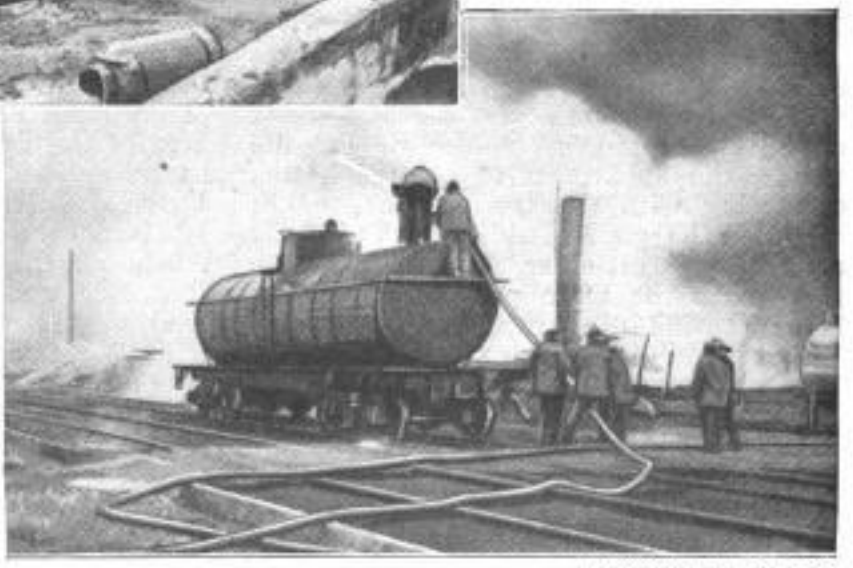
EXPLODING GASOLINE TANKS SHAKE WHOLE CITY

Persons whose familiarity with gasoline has left them still without sufficient appreciation of its tremendous explosive force, may profit by a study of a recent accident in Memphis, Tenn. Two huge gasoline-storage tanks in the plant of a local oil concern suddenly blew up without apparent cause. The blast was felt in all parts of the city, and when the flying débris had settled, it was found that the plant had been wrecked, houses were shattered for a block around, and the casualties among the workmen amounted to 15 dead and 50 injured. Fire followed the explosion, and firemen were forced to risk their lives on burning oil tanks to prevent a still greater disaster. Trucks and autos parked inside the plant were reduced to almost unrecognizable masses of scrap.



Interior of the Plant after the Explosion: Autos and Trucks Parked Inside were almost Dismembered, Becoming Mere Masses of Scrap, While the Plant Itself Was Wrecked

¶ Wireless messages from New York and other large centers are now being received by the huge station recently opened at Tomioka, Japan, whose long-distance sending is also declared to be successful.



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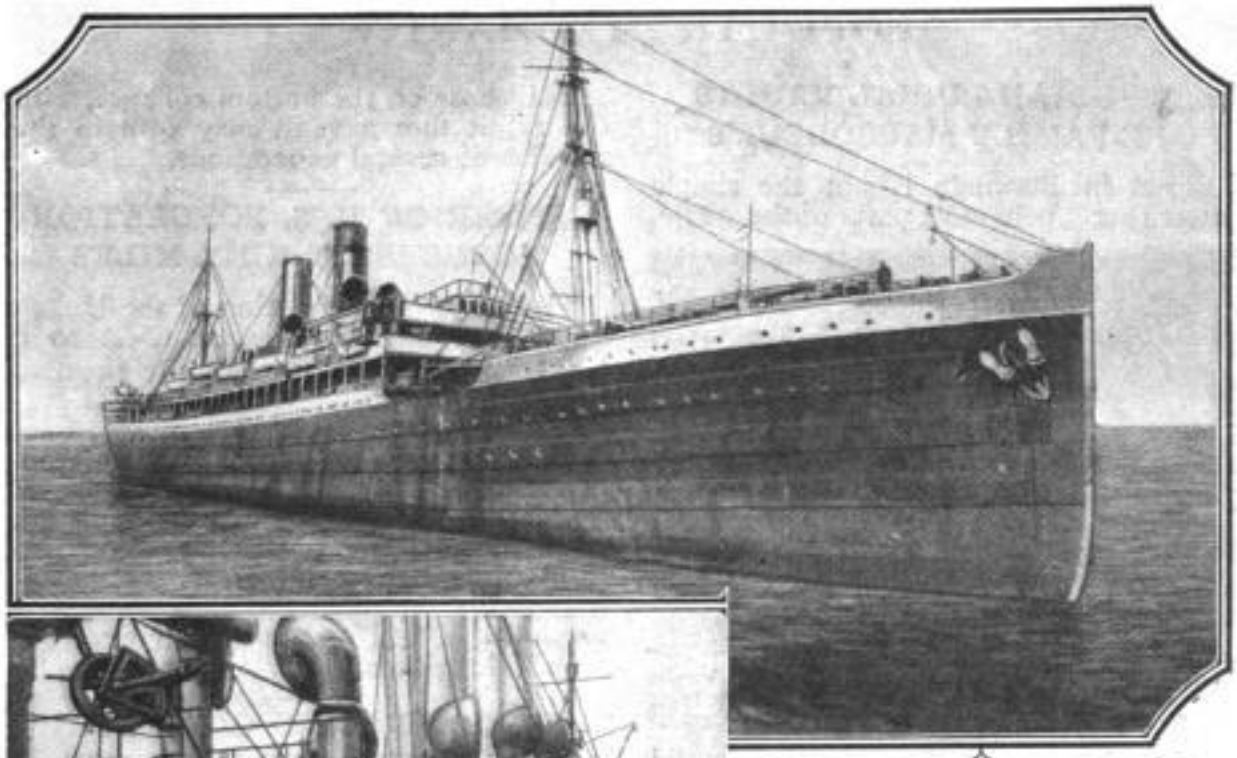
One of the Extra Hazards of Oil-Plant Explosions: Firemen Risking Their Lives on an Imperiled Tank Car to Prevent a Still Greater Disaster

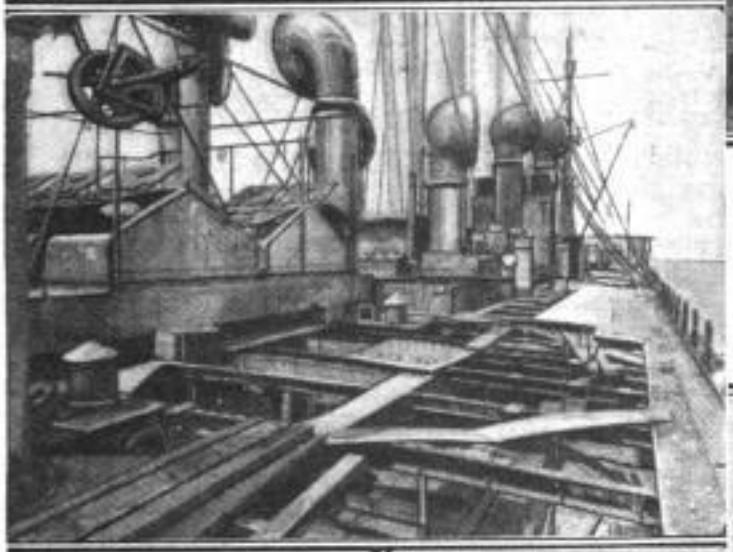
REBUILT LINER SPECIALIZES IN STEERAGE PASSENGERS

Third-class, or steerage, passengers are to enjoy all the comforts of second and first class on the newly rebuilt liner "Mount Clay," which was originally the German "Prinz Eitel Friedrich," and served America in the war as the transport "DeKalb." All the repulsive features of the old-time steerage are completely eliminated by the simple but original system of placing the whole passenger list in a single class, with access to all parts of the ship, and use of the entire main, promenade, and boat decks. Two large dining rooms served by stewards are provided, as well as comfortable lounging and smoking cabins, while 90 sleeping cabins accommodate two or four passengers each, and metal cots are supplied for the remainder. Other features are hot and cold baths and showers, and a separate kosher galley for Jewish passengers.

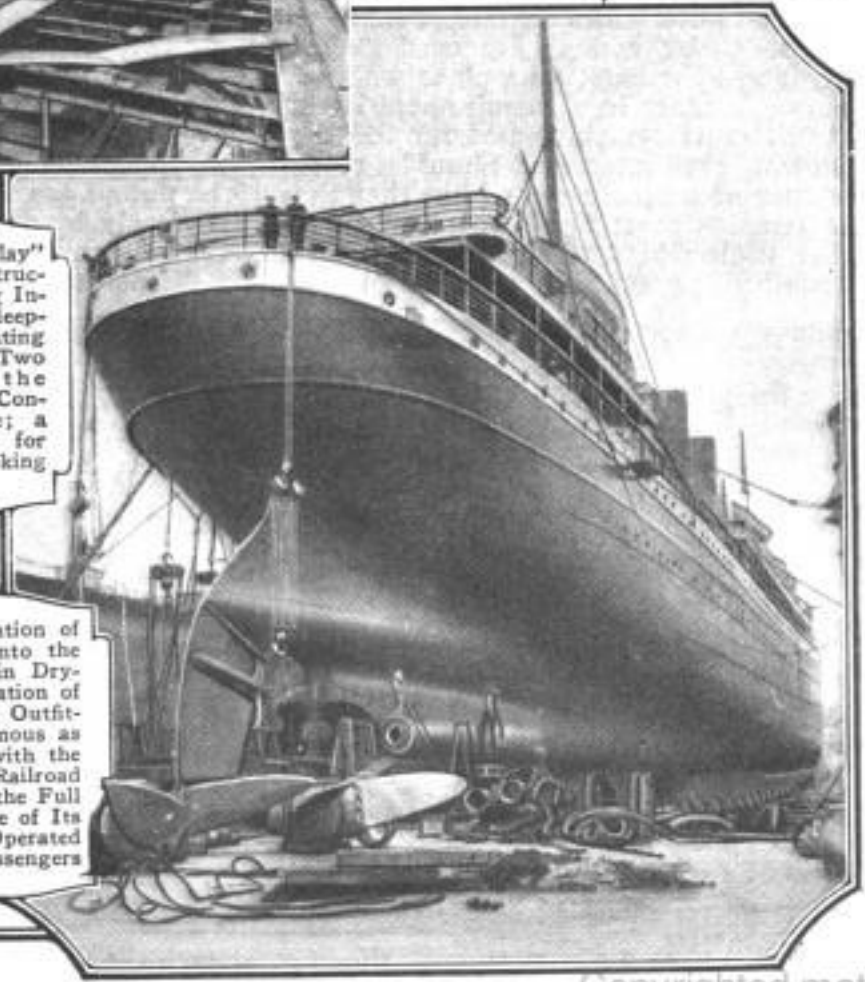
¶ Perforation around the return address of an envelope, enables the receiver of the letter to use the corner card as the address for a return letter. By tearing on the perforation, the name and address of the sender may be taken from the envelope and pasted on the answering letter. Such practice will insure correct addressing.



The Rebuilt Passenger Liner "Mount Clay," Originally the German Cruiser "Prinz Eitel Friedrich," Used in the War as the American Transport "DeKalb": Its New Peculiarity Is That It will be Used Exclusively for Steerage Passengers, Who will Have All First-Class Privileges



A Deck View of the "Mount Clay" during the Process of Reconstruction: Its Thorough Rebuilding Included the Installation of 90 Sleeping Cabins, Each Accommodating Two or Four Passengers; Two Large Dining Rooms on the Promenade and Main Decks, Connected by a Wide Staircase; a Well-Furnished Rest Room for Women, and a Similar Smoking Room for Men



The Final Stages in the Operation of Transforming the "DeKalb" into the "Mount Clay": The Vessel, in Drydock, Is Ready for the Installation of Its Propellers and the General Outfitting Destined to Make It Famous as the First Passenger Steamer with the Social Policy of an American Railroad Train, All Passengers Having the Full Run of the Public Decks. One of Its Features Is a Properly Operated "Kosher" Galley for Jewish Passengers

BERMUDIAN BURIAL VAULTS ARE FAMILY MAUSOLEUMS

Burial in Bermuda is not the simple matter that it is in most parts of the world,

A Somewhat Pretentious Bermudian Burial Vault: Most of Them are Covered Level with the Surface; Dug 15 Feet Deep, They Accommodate Many Caskets

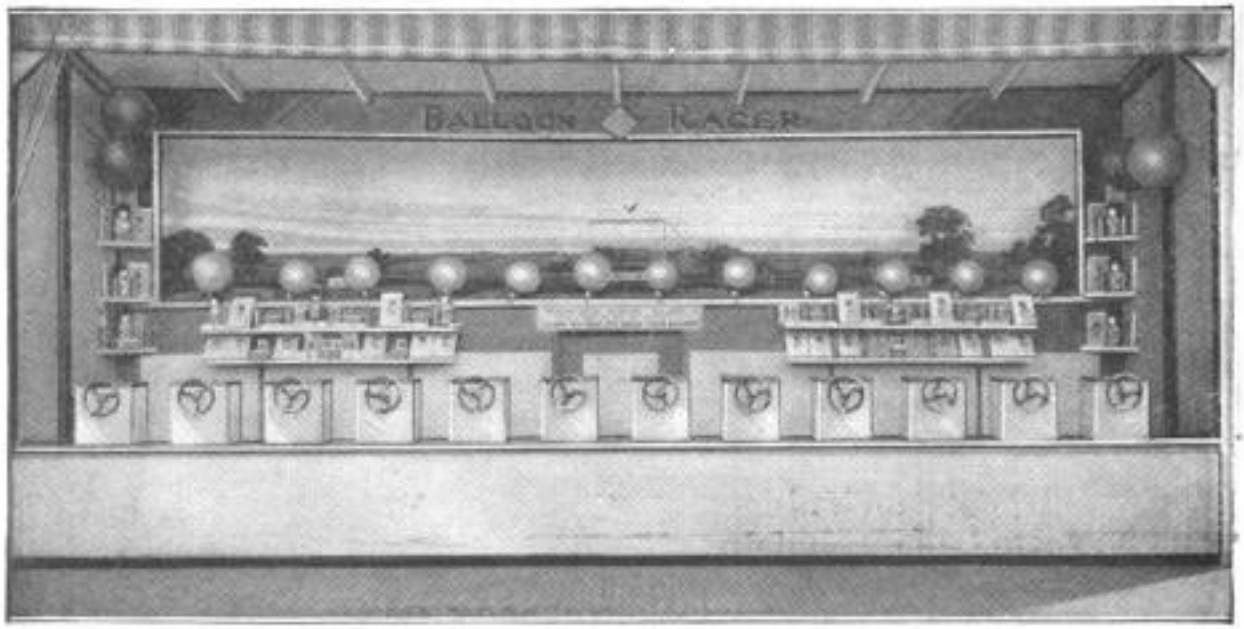
due to the fact that the island is of solid coral and limestone formation with a very shallow top soil. As digging a grave is something of an engineering feat and, consequently, expensive, one must be made to serve for the interment of many bodies instead of only one. Accordingly the excavation is sunk to a depth of 10 to 15 ft. and lined with concrete or limestone blocks. Cedar caskets are used and, by law, interment must take place within 24 hours. Another legal requirement is that a vault must remain sealed for 366 days following each interment. Should a second member of a family die within that time, the remains must be disposed of in another vault which is kept sealed for the prescribed period. As new caskets are added, those on the bottom collapse, with the result that a vault may contain the remains of several generations.

CENTER OF U. S. POPULATION MOVES WEST NINE MILES

The center of population of the United States has moved 9.8 miles west to a point 8.3 miles southeast of the town of Spencer, Ind., according to the 1920 census. The former center was located one-fifth of a mile north from Bloomington, in the same state, but mainly because of an increase of 1,000,000 in the population of California, the point has made this rather long movement westward. Geographically located, the new center is north 39° 10′ 21″ latitude, and west 86° 43′ 15″ longitude.

BALLOON-RACING GAME TESTS BOTH SKILL AND PATIENCE

Bursting toy balloons holds a fascination for most people, regardless of age. This odd twist of human nature is turned to advantage by the manufacturers of a new amusement-park game which represents the start of a balloon race. Twelve persons may play at one time, the winner being the one who first explodes the balloon assigned to him. Each balloon is connected by tubing to a pump, operated by a player. On signal, each player begins pumping at only a moderate speed as, if the pumps are worked too rapidly, the air is simply by-passed and does not inflate the balloon. This makes the game one of skill instead of strength and endurance.



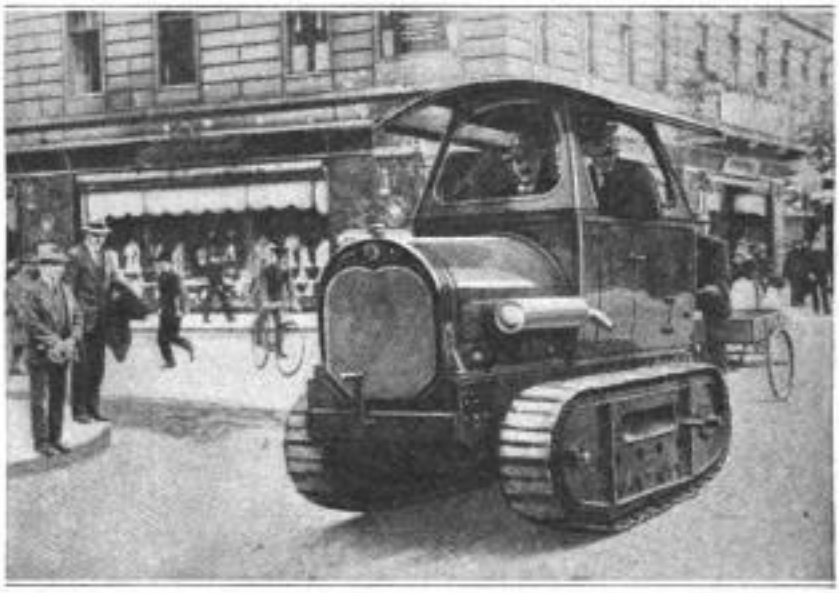
The Balloons in the Balloon-Racing Game Never Sail, as "Disaster" Overtakes Each One the Instant It is Fully Inflated. The Players Do the Inflating by Means of Pumps Concealed in the Boxes in the Foreground

NEW COTTON VARIETY WITHSTANDS PESTS

A 70,000-bale drop in the sea-island cotton yield within the last two years, has led the Department of Agriculture to make some tests with a cotton variety commonly known by the name of "Meade." This cotton is better able to withstand the onslaughts of parasites which are ravaging the sea-island brand, and its fiber has stood up in good shape under much close examination. Strength tests recently made disclosed the fact that in the coarser yarns, sea-island made the better showing, but the difference was attributed to the fact that the Meade cotton was cultured under very adverse conditions. The newly developed variety is the only plant that shows any promise as a substitute for sea-island because of its early maturity, fiber of about 1⅝ in. in length, and fine texture. Despite its possibilities, however, the fact remains that the sea-island grade is of superior strength and quality. Meade seeds do not offer any difficulty in the way of extraction, for they are easily handled by the sea-island gins. The boll of the Meade cotton is more substantial than the variety it is expected to displace, and although it yields 3.5 per cent more waste, is considered a keen competitor. Port markets on the southeastern coast draw premium prices for Meade, and late seasons have seen as many as 3,000 acres of it under cultivation. The demand for the seed grows apace with the demand for cotton, and there seems to be no reason why the new species should not become a standard crop.

GERMANS CARRY PASSENGERS IN WAR-TIME TANKS

Some of the military tanks, which were left in the hands of the German government by the allies' reparations commission after the conclusion of peace, are now being converted to civilian purposes. Recently Berlin pedestrians have been treated to the sight of a passenger-carrying tank which has been equipped with a specially built and finished body, with a regular automobile shape, and carrying a glass-inclosed top, for passengers to whom speed is secondary to certainty.



German Military Tank, Converted for the Carriage of Passengers in Berlin by the Addition of a Special Top and Body

HAIR CLIPPER AND MOTOR IN ONE PIECE

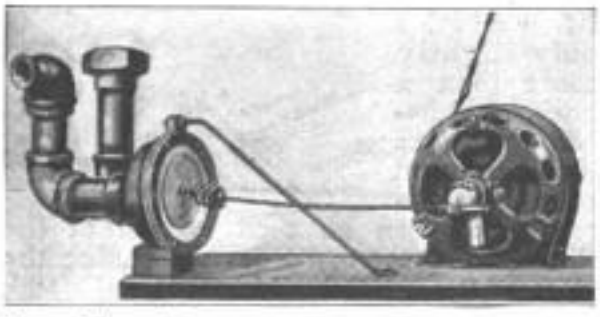
A power-driven hair clipper without the use of stand or flexible cable, has recently been introduced. The motor for operating the clipper is held in the hand and the drive to the oscillating knife is direct. It weighs only slightly more than a pound and because of its small size and compact arrangement, can be used instead of the shear in a great many cases. Taking the place of the usual flexible cable and stand, is a cord connection to the power. This cord is provided with an attachment plug that can be fitted to any socket.

HIGHWAY LIGHTHOUSES SAFEGUARD TRAFFIC

A system of highway lighthouses has been installed in Virginia, which will safeguard autoists and pedestrians when attention is paid their warnings. They are placed at hazards in the roads, such as curves, railroads, bridges, etc., and acetylene gas is used in them for the purpose of throwing the necessary light. The light scheme is the standard used by most safety guardians, being red for danger, and green for caution, while yellow indicates an ordinary curve to which the motorist is guided by an arrow. The signal structure is built large enough to hold carbide and water to furnish gas for a year. The flashing mechanism is identical with that used by government lighthouses at sea.

PUMP MAINTAINS PRESSURE OF NATURAL GAS

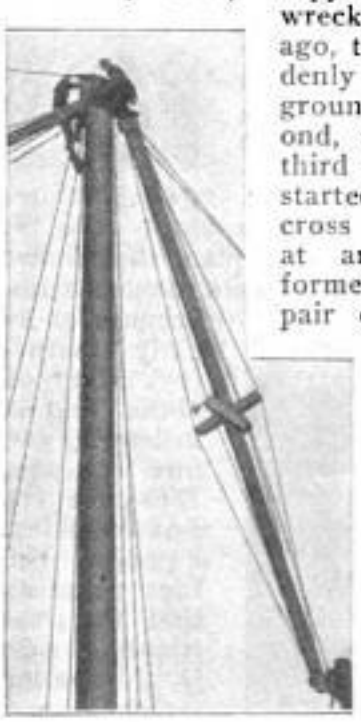
Natural gas will not flow regularly during cold weather, and many people have found themselves at a great disadvantage when their gas has ceased to flow under boiling water or frying eggs. With the aid of an electrically driven pump, designed with a regulating diaphragm of sheet rubber, a constant pressure is maintained. When the gas pressure gets below that required, the diaphragm recedes and draws the motor control rod with it. This in turn starts the motor, which pumps the gas back to normal pressure. When this is reached, the diaphragm again expands, pushing the control rod of the motor out and stopping the motor. The machine occupies little space and is intended for hotels, restaurants, and other heavy consumers of gas.



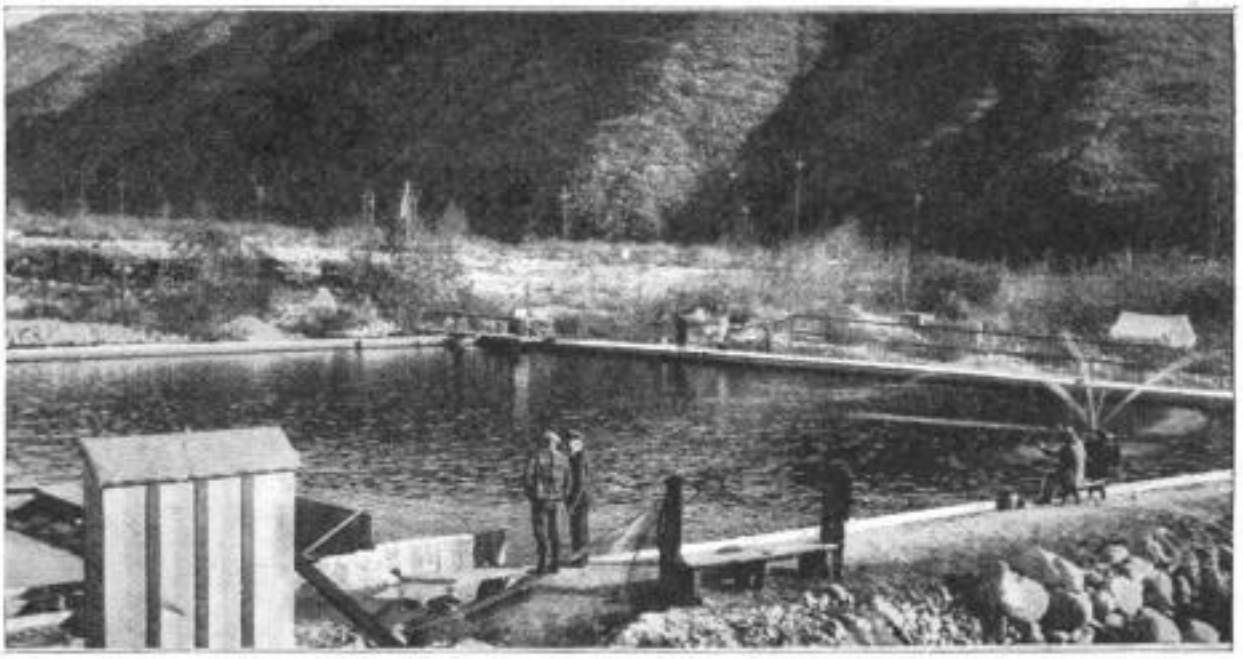
Motor-Driven Pump That Automatically Maintains Suitable Pressure of Natural Gas for Heating Purposes

WORKER PINNED TO TALL MAST RESCUED BY DARING FEAT

While four 130-ft. aerial masts in a Portland, Ore., shipyard were being wrecked a short time ago, the end one suddenly crashed to the ground, and the second, attached to the third by a crossarm, started to follow. The cross timber, turned at an acute angle, formed a mammoth pair of pincers with the third mast, and a rigger working on the pole top was caught by the leg in the great jaws, and held helpless. A hastily requisitioned fire ladder reached only to an inadequate 90 ft.; but from its top, a second rigger went hand over hand up a steel guy cable to the tip of the mast, carrying a rope with him. Workers below eased the pressure of the leaning pole, and the released rigger and his dexterous rescuer were lowered safely to the ground.



¶ Domestic production of chaulmoogra oil, long used in Asia for the treatment of leprosy, is made possible through a consignment of seeds of the Hydnocarpus tree, sent from Siam to the Bureau of Plant Industry. They will be experimentally propagated in Florida, Porto Rico, and Hawaii. The oil formerly was obtained only from seeds of another tree grown in Burma.



General View of the Main Concrete Angling Pool: It Is Literally Alive with Big Hungry Brook Trout That the Visiting Anglers are Permitted to Take with Fly Rods

TROUT ANGLING AT FIFTY CENTS A FISH

BY JOHN EDWIN HOGG

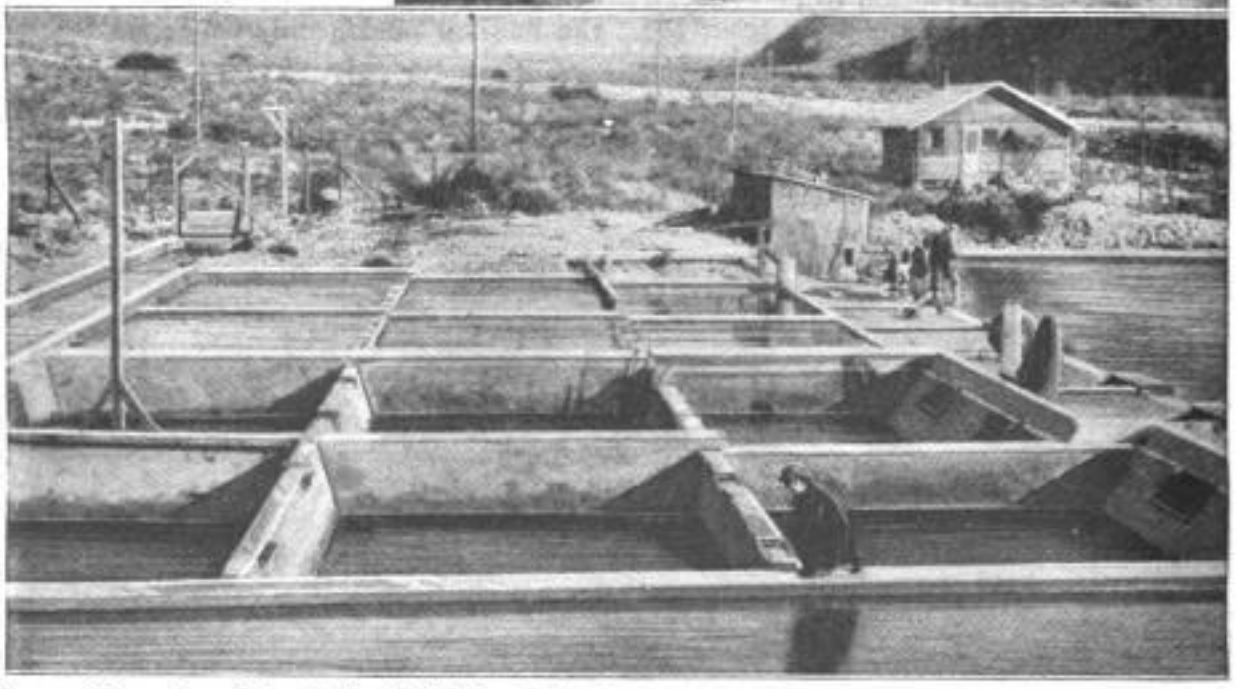
WHEN the average angler goes to the mountains for trout fishing and figures the expense of his trip against the number of fish caught, he usually finds he has paid a dollar or more for every fish, or possibly, many dollars for fewer fish than it takes to odorize a frying pan. That every sportsman desires actually to catch fish, and is willing to pay a reasonable price for his pleasure, is the idea that has been capitalized by an enterprising Californian in the creation of an artificial fishing ground, where mountain trout are reared in captivity and retailed to the sporting angler at 50 cents a fish for as many as are taken with rod and fly.

The artificial trout fishery combines the progressive ideas of the modern fish hatchery with facilities for angling that make it a distinct innovation in the field of outdoor sports. The institution is located at the mouth of a large mountain cañon where the roaring waters of Mill Creek pour down from the eternal snows of the San Bernardino Mountains, through the angling pools, and thence on to the

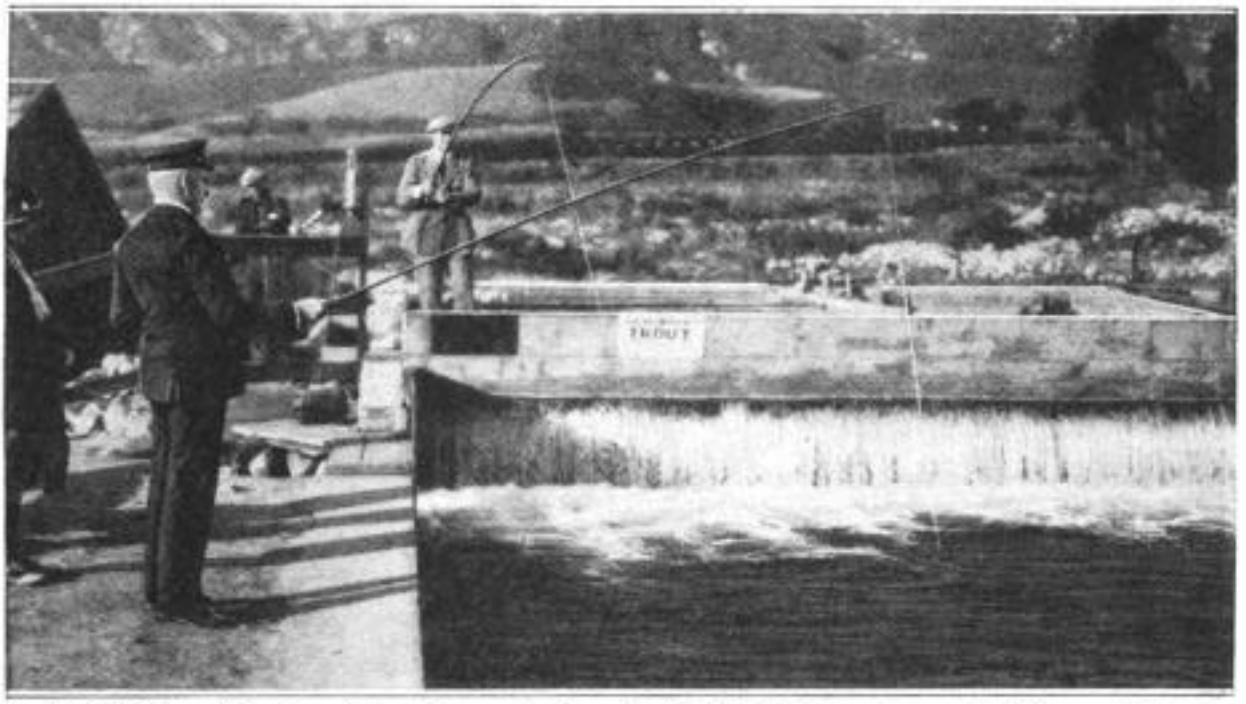
The Fish Hatchery Wherein Millions of Trout are being Developed for the Angler's Fly, to be Later Fished from the Angling Pools at Fifty Cents per Fish

irrigated agricultural districts of the Santa Ana Valley. At one end of the property there is a large barnlike structure housing a fish hatchery. This is not particularly different from similar institutions maintained for fish propagation at various points about the country by state authorities. Its purpose, however, is not that of stocking public streams and lakes, but to provide the trout which swarm through a series of artificial angling pools to be caught and creeled by visiting fishermen. Some of the fishing pools are of concrete, and upon the brink of these, patrons may fish standing up, or seated upon comfortable rustic benches provided for their convenience. Trout of different sizes and variety are transferred from the fish hatchery to the various pools, according to the requirements of angling activity. If one wishes to catch small eastern brook trout, he has but to cast his fly in a designated pool. If rainbow trout are desired, the angler fishes in a different pool. For him

One of the "Willow Pools" Where One may Enjoy Angling in an Artificial Pool under Conditions Simulating Those of a Natural, Thicket-Bordered Trout Stream

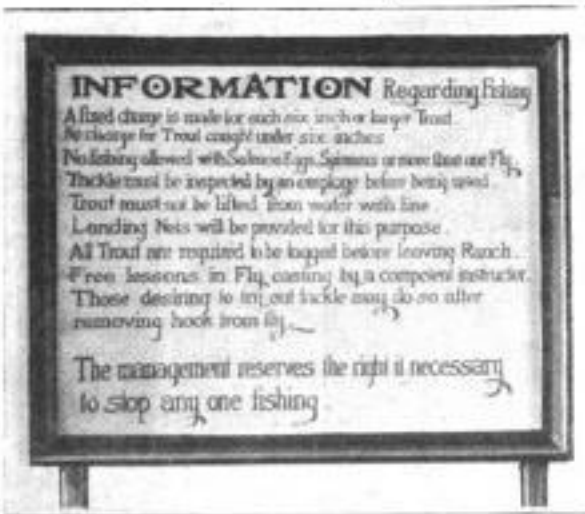


Center View: One of the Semirustic Fishing Pools Teeming with Big Rainbow Trout. Bottom View: These Concrete Pools Contain Trout of Various Kinds and Assorted Sizes, for Restocking the Angling Pools as Their Population is Depleted by Successful Fishermen



An Artificial Cascade in One of the Concrete Angling Pools, Which Helps to Aerate the Water and Give the Angler a Semblance of Fishing in a Natural Fishing Ground

who feels that fishing for trout in a concrete tank smacks too much of the artificial, there are a series of "willow pools," where one may angle to his heart's content amid surroundings simulating those of nature. The willow pools are artificial lengths of mountain stream surrounded by heavy growths of willows, to give them the wild aspect ordinarily to be found about a natural mountain-trout pool. The waters of Mill Creek contribute torrents of frothing icy liquid to these pools, but the entrances and exits, of course, are carefully screened to prevent the impounded trout from swimming away.

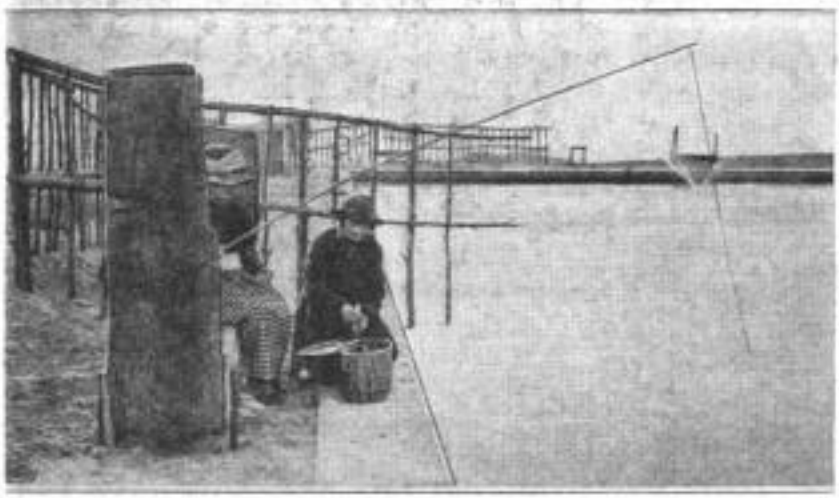


The Rules of the Game at the Commercialized Trout Fishery Are Comparatively Few and Easy to Comply With

The visiting angler does not pay for the privilege of casting his fly. He merely goes in and fishes. There is no closed season nor bag limit. If he catches no fish, it costs him nothing. Neither does he pay for any fish caught which is less than six inches long. If he creels a number of speckled beauties, six inches or more in length, he owes the management 50 cents for each fish taken. For those who visit the fish farm without the necessary fishing tackle, the management keeps a supply of suitable equipment, which may be rented for a nominal sum. He is not even troubled with the unpleasant task of dressing his own fish. After making a catch he has but to turn his trout over to an attendant who gives him a receipt for his fish. When the fisherman is ready to leave, he presents the receipt at the office, and his fish are delivered to him, dressed, iced, and carefully packed in a neat wooden box, ready for transfer to the frying pan. When the dressed fish are turned over to the angler, the bill for catching them is due and payable.

To one who has never fished for trout in their native haunts, angling in a pool where a fairly good catch is almost assured, and at the rate of half a dollar per fish, might seem rather expensive sport. But in reality it is not, compared with the cost, time, and effort of a fishing trip to any good natural fishing ground. Such trips frequently cost a hundred dollars or more, and catching a dozen or, maybe, 50 fish would be the

net result. At this rate 50 fish would cost $2 each, to say nothing of the investment of time and equipment required for such a journey. A visit to the trout farm can hardly fail to be productive of a fine string of fish even for an unskilled angler, and the total cost of fishing there and the expense of the journey are probably much less than the cost of a similar catch from some distant natural pool.



For Those Who Wish to Fish in Luxurious Comfort There Are Rustic Benches About the Concrete Fishing Pools

The artificial trout fishery is located on a paved motor highway, at a point that is within three hours of easy touring from Los Angeles, and connecting motor highways make it readily accessible to visitors from nearly every community in southern California. It is an easy and inexpensive motor journey that may be taken on a single day's holiday, and $10 invested in fishing means a string of 20 fine trout.

The habits of the "civilized trout" at the "ranch" are not at all different from those of native fish. They are "temperamental" about taking the fly, and seem to be pretty well educated in all the tricks of skillful angling, just as all trout seem to be. It is usually the skilled angler who pays the biggest bill at the conclusion of a day's sport. For the amateur fisherman, the management employs several expert anglers who give free lessons in the art of fly casting. The institution is thus an excellent training ground for persons contemplating more costly and extensive excursions to natural fishing grounds.

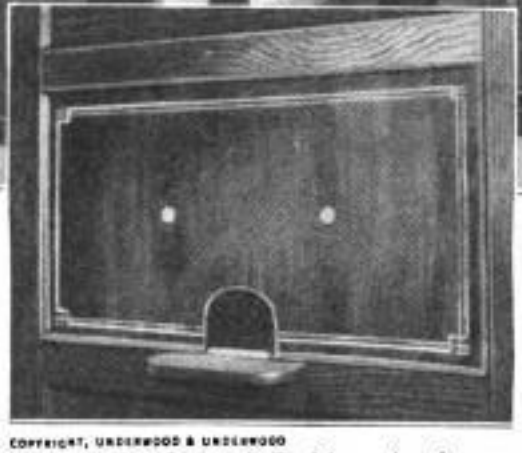
The Commercial Trout Fishery Maintains a Dressing Station Where the Angler's Catch is Dressed, Iced, and Packed in a Neat Wooden Box, Ready for Transfer to the Frying Pan

Obviously the creation of the commercialized trout fishery represents a considerable investment. Heavy expense was involved in acquiring title to the property and water rights, building the fishing pools, stocking them with fish, and establishing the fish hatchery. The enterprise was launched a little more than a year ago, but has only in recent months developed a suitable stock of trout to attract anglers from afar. At the present time there are approximately half a million trout six inches or more in length, in the several fishing pools. Millions more are in process of development in the hatchery. With these fish eventually to be worth half a dollar each, the financial future of the undertaking seems well assured.

¶A shoe-hobnailing machine, which is said to do the work better than it can be done by hand, is being tested by the mobile shoe-repair unit of the Quartermaster Department, at Fort Sam Houston. The apparatus is the product of an eastern factory.

STEEL DROP CURTAINS PROTECT CASHIER'S BOOTH

The Cashier's Booth, in Ordinary Use, Gives no Indication That It is Equipped with Bulletproof Steel Curtains Ready to Descend



Seen in Its Lowered Position, the Armor-Plate Curtain is Observed to Have Two Portholes, Giving the Cashier a Chance to Shoot at the Robber without Any Risk of Return Fire

The Steel Shutter is Partly Lowered to Show Its Arrangement, but in Use It Drops All the Way in a Fraction of a Second

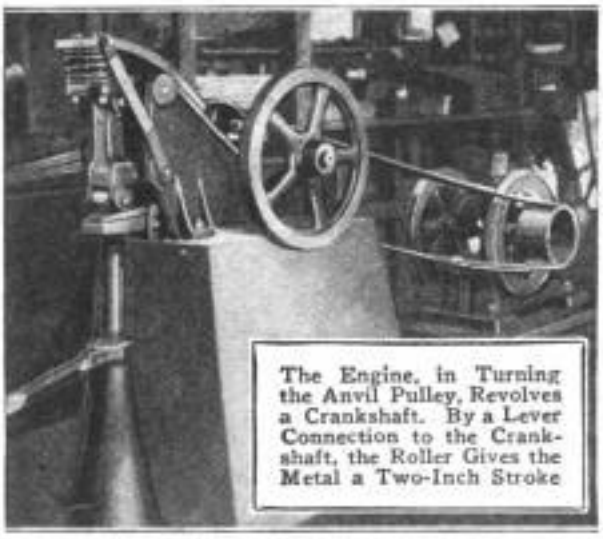
Shutters of solid, bulletproof steel, that drop instantly to cover the openings of a cashier's booth on the pressure of a button, constitute a new solution of at least one phase of the holdup problem. The system of armor-plate curtains is designed for banks, movie theaters, and similar locations whose exposure is likely to tempt the criminally inclined. One of them recently was installed in an Illinois drug store. The metal sheets are hung in a concealed position above the booth windows, and may be released by a button at the cashier's hand, or by other buttons outside, so that even an unoccupied booth is protected. Small portholes permit the sheltered cashier to open fire upon the intruder if opportunity offers, and the electrical connection of the drop also sets an 18-in. alarm gong to ringing with noisy vigor. With a telephone in the booth, the cashier is master of any situation that may arise, and the disappointed bandit who lingers is sure to be captured.

FRANCE IS BUILDING WORLD'S GREATEST RADIO PLANT

Upon completion of a mammoth radio installation, now under construction at Sainte-Assise, near Melun, France will boast undisputed sovereignty of the air so far as communication is concerned, as she will possess the world's two largest plants in the Lafayette station, described in the March issue of Popular Mechanics, and the new station, which will far surpass the former. The conspicuous features of the Sainte-Assise station will be the 17 great towers, each about 820 ft. high, which will support over 130 miles of wire making up the antennæ and grounding connections. One tower will be reserved for European communications, while the remaining 16 will serve to liberate the 5,000 hp. used in signaling the Americas, Africa, India, China, and Japan. Almost 700 acres will be required to accommodate the forest of towers, the power houses, and other buildings of the huge installation.

CLEVER ANVIL SHARPENS PLOWSHARES AND DISKS

Instead of hammering earth-working blades, the idea of rolling for the purpose of sharpening them is now employed.



The Engine, in Turning the Anvil Pulley, Revolves a Crankshaft. By a Lever Connection to the Crankshaft, the Roller Gives the Metal a Two-Inch Stroke

Plowshares, disks, and cultivators are placed between a roller and a wedge-shaped anvil where, by a back-and-forth motion of the roller, their edge is renewed. The anvil is set on an elevating screw, and should one share or disk be a little thicker than the last, the screw may be adjusted for the proper thickness. The blades are put between the roller and the anvil hot, and the roller, operated by a crankshaft, makes rapid sweeps over the hot metal. By tightening the lower adjustment screw, the roller is given a squeezing effect, and the metal is thus drawn to as fine an edge as desired. Also, a smoothness of surface results which is much to be desired in this kind of blade.

PROJECTED EXTENSION OF U. S. TO ORIENT CABLE SYSTEM

That the submarine cable will not be driven from the field by the wireless telegraph for some time to come, is proved by a project which contemplates the laying of two lines from Seattle to oriental points; one, 4,254 nautical miles in length, to Yokohama, and the other, 6,011 nautical miles long, to Manila. It is calculated that the cost of the undertaking will approximate $6,000 per mile. Vast as these distances seem, they are shorter than those covered by the present cables, which are, San Francisco-Yokohama, 6,993 miles, and San Francisco-Manila, 7,141 miles. Also, by the present routes it is necessary to relay a message three times, while, it is expected, only two relays will be needed on the Manila line and one on the Yokohama branch. This will have the effect of speeding up the service materially. Strange as it may seem, the projected route is via the Aleutian Islands, the survey showing that the distance is shorter this way than it is straight across the Pacific Ocean.

FREEZING POINTS OF FRUITS ARE MEASURED ELECTRICALLY

In an attempt to evolve methods of preventing the spoilage of fruits and vegetables by freezing while in transit or storage, the Department of Agriculture is conducting thousands of experiments at the Arlington, Va., laboratories, to determine at what temperatures these products freeze. The experimental apparatus consists of a large tank in which freezingly cold brine is circulated, and extremely sensitive devices, known as thermocouples, which possess the peculiar property of generating weak and variable currents of electricity when they are subjected to changes in temperature. These variations are registered by delicate meters, marked to read in terms of degrees, Fahrenheit or Centigrade. So sensitive are the thermocouples that they will detect a difference of temperature of .0001°. In service, a test specimen of fruit and a thermocouple are placed in one of 12 cups in the lid of

Apparatus Used by the Department of Agriculture to Determine at What Temperatures Fruits and Vegetables Freeze

the brine tank. By watching the specimen and the meter closely the exact temperature at which freezing begins is determined with great accuracy.

VAAL RIVER, AFRICA, TO WATER FAMOUS RAND REGION

Work is well under way on a dam across the Vaal River at a point 23½ miles downstream from Vereeniging, Transvaal Colony, which, when completed, will impound 13,633,000,000 gal. and form a lake 39 miles long by one mile wide, at the widest point. The structure will be over 1,300 ft. long by about 25 ft. deep, built up of 36 concrete piers and two abutments. Between the piers will be steel valve gates, 30 ft. wide by 25 ft. deep. The Rand Water Board will be allowed a daily ration of 20,000,000 gal., which will be pumped to a total height of 1,580 ft. This great lift will be accomplished in three stages: from river level to Vereeniging pumping station, 80 ft., where the water will be sterilized; to Zwartkopjes, 480 ft., and to Turffontein, 1,020 ft. From this point the water will be distributed by gravity to Johannesburg and the whole central and eastern Rand region.

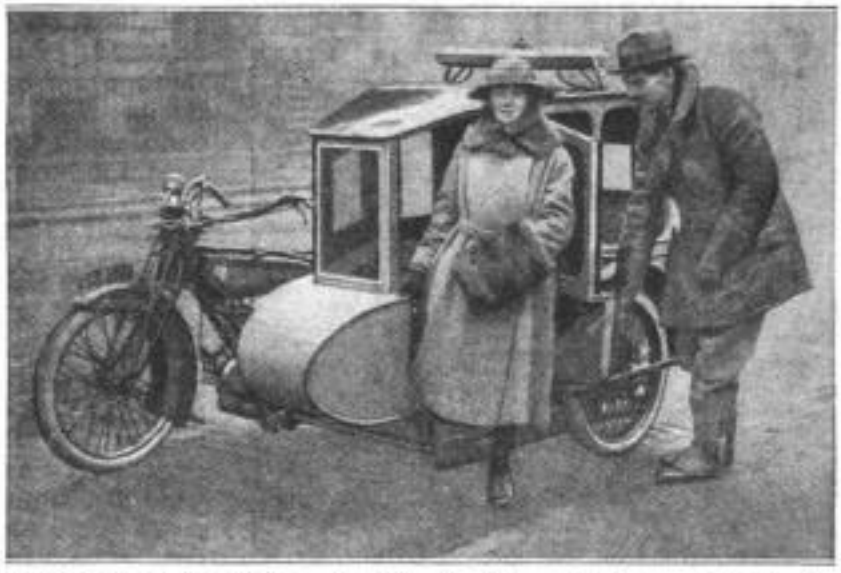
CARVES BILLIARD BALLS INTO USEFUL ARTICLES

Out of the ivory billiard-ball collection of the Cincinnati police force, George Ell, a disabled policeman, carves medallions, miniatures, cigarette holders, and other things useful and pretty. His work competes very favorably with that of the professional artist, although he has never taken a lesson.

Tool tempering was one of the first trades Ell learned, and to this he attributes most of his success as a carver of ivory, for it is necessary to know how to keep a keen edge on a tool to get satisfactory and artistic results.

ENGLISH SIDECAR TAXICAB GIVES ECONOMICAL SERVICE

Sidecar coupés have recently made their appearance upon the streets of English cities in the rôle of taxicabs. The weather-tight bodies of the trim little vehicles are fitted with staggered seats, which arrangement is said to accommodate two average-size persons and their hand luggage comfortably. Delays on account of tire trouble are guarded against by having all wheels quickly detachable and interchangeable, and by carrying a spare wheel and tire on the body roof. Owing to much lower cost of operation and upkeep, the three-wheelers should be able to give a high-speed service at a lower rate than regular cabs.



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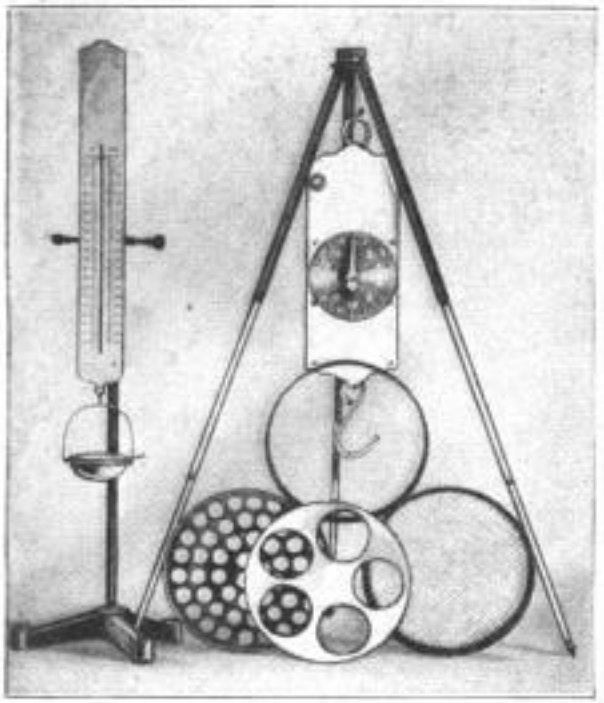
The Sidecar Taxicab Gives Fast Service Cheap. Pull-Down Curtains Instantly Convert the Body from an Open to a Weatherproof Coupé Type

PLAN TO SAVE OLD BUILDING OF CHICAGO MUSEUM

Regret, whose expression is not confined to Chicago, has been caused by the gradual decay of the beautiful building that originally housed the exhibit of fine arts of the World's Columbian Exposition, in Jackson Park, on the city's south side, and has since functioned as the Field Columbian Museum. Now that the latter institution has a new home of its own, Illinois architects have proposed methods for saving the splendid structure, by the expenditure of an estimated $1,640,000 to give it a new roof, a coat of waterproof cement, a modern heating plant, and a general overhauling and repair. It would then become a highly valuable community recreational and art center.

PORTABLE LABORATORY USED BY HIGHWAY ENGINEERS

To enable building engineers to analyze materials on the site of operations instead of being compelled to carry samples to



Some of the Apparatus Composing the Portable Road-Material Testing Laboratory: The Four Screens Measure the Fineness of Crushed Stone, Gravel, Sand, and Cement

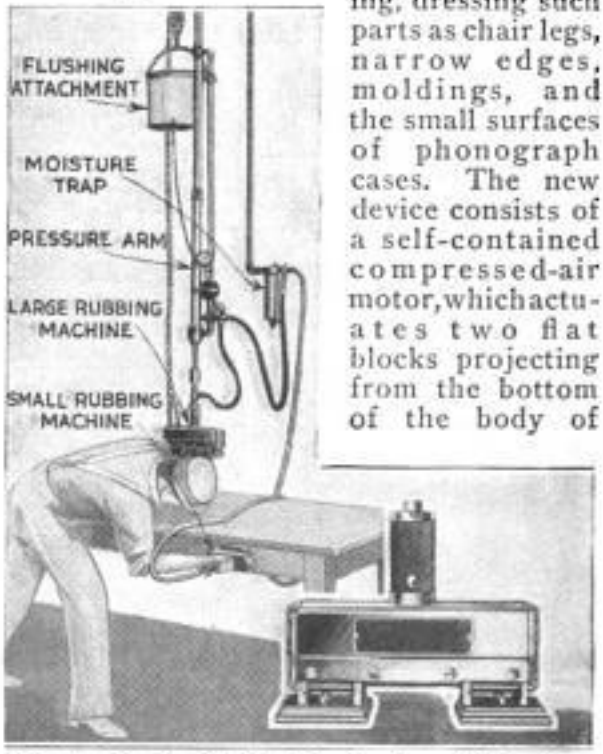
the laboratory, a simple portable outfit has been devised, which is said to be extremely accurate. Crushed-stone sizes are measured by circular screens perforated by holes ranging in size from ¼ in. to 3 in. Other screens for sand, cement, etc., are of fineness of from 10 to 200 meshes to the inch. Three scales determine the weights of materials over a range of from one gram to 30 lb. The only breakable piece in the outfit is a graduated glass beaker used in measuring silt settlings. Scale tripods and various standardized dry-measuring units complete the apparatus.

NOVEL AUTO-LICENSE NUMBER CODE IS PROPOSED

A resident of Buffalo has worked out an automobile-license number code in which letters and figures to the left of a vertical line designate the make of the car, while numbers only to the right serve as ownership identification. Starting with A-1, the code progresses to Z-999, or higher. However, as the object of the code is to hold the number of characters to be quickly read and remembered as low as possible, the digits to the right should not exceed three. After having used all the letters in the alphabet in a simple series, they are next combined with figures up to 99, so that the last tag of a two-series code would have the letter Z over the figure 99 in the left-hand division, and the final identification figure, 999, to the right. As hundreds of millions of distinct combinations can be made by various arrangements of a few letters and figures, the code could be extended to identify every automobile in the United States.

AIR-DRIVEN VARNISH RUBBER SAVES MUCH HAND LABOR

One of the time-honored industrial methods which is rapidly becoming obsolete, due to the evolving of labor-saving machinery, is that of hand-rubbing in applying the high finishes to furniture. Power-driven rubbing machines have been used for some time in the finishing of large plane surfaces, such as piano panels, desk tops, etc. An Illinois manufacturer is now producing a small air-driven rubbing machine which, it is claimed, serves admirably in the field of small-part finishing, dressing such parts as chair legs, narrow edges, moldings, and the small surfaces of phonograph cases. The new device consists of a self-contained compressed-air motor, which actuates two flat blocks projecting from the bottom of the body of



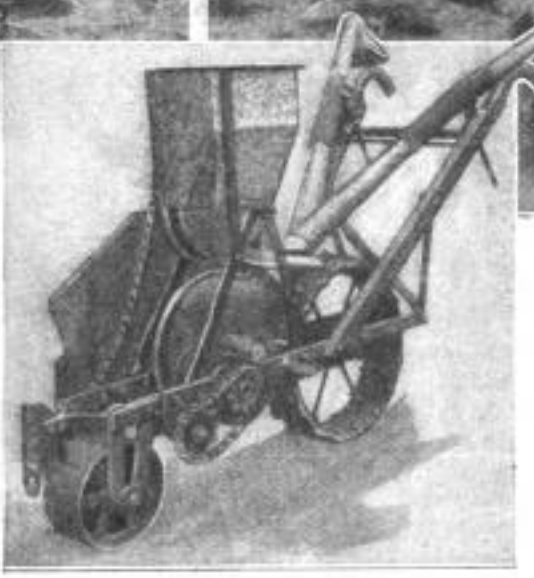
A Pneumatic Varnish-Rubbing Machine, Which Economizes Hand Labor. Needs Only to be Guided over the Surface being Polished

the apparatus. Sandpaper sheets or pads of felt can be attached to the bottoms of the blocks to form the polishing elements. When the latter are used, mixed pumice stone and water does the actual polishing.

TOBACCO PEST FOUGHT WITH POISON-DUST SPRAYER

Spraying Machine for Tobacco Plants: The Two Flattened Nozzles Spread the Powder Blast into a Broad Cloud Form

The Poison-Dust Sprayer in Action: It is Made Light-Running So That One Horse can Pull It



How the Centrifugal Blower is Driven by the Bull Wheel, and the Rotary Brush by the Front Roller of the Apparatus

The hornworm is to the tobacco grower what the boll weevil is to the cotton planter, and the problem of exterminating the pests presents many similar aspects. In both cases practically the same methods have been tried and found to fall far short of the requirements. Hand picking, while certain, is slow and expensive. Various poisoning methods have had their innings and have been partly or entirely abandoned for the reason that, up to the present, there has been no efficient apparatus available for the application of the chemicals either in the wet or dry form. What promises to be a solution of the problem is a simple apparatus recently constructed by the Bureau of Entomology at its Clarksville, Tenn., station.

In general appearance and manipulation the implement somewhat resembles a plow in that it has the conventional plow handles. The object aimed at in the design is the wide scattering of dry poison powder by an air blast. This is accomplished by connecting a centrifugal blower, of the same pattern as those used in blacksmiths' forges, with a cleated bull wheel by means of a system of chains. Another chain gearing, driven by a broad roller which forms the front wheel of the machine, transmits power to a rotary brush feeding the powder uniformly from a large hopper into the path of the air blast. The poison cloud can be directed at various angles by means of nozzles attached to hose lengths. This provision permits the streams to be directed higher as the plants grow. As the nozzles project well to the rear of the operator, he is not compelled to breathe much of the powder. With one horse, or mule, supplying the motive power, 15 acres per day can be treated with the new implement. It has been constructed as narrow as possible, so that it may be used without injury to the plants until they reach a considerable height, and is made in two patterns, for spraying either single or double rows. The poisons generally used with the various makes of hand sprayers are calcium arsenate and arsenate of lead in a fine dust form. It is said that the new apparatus will spray these satisfactorily in either the pure chemical or in a weakened form.

¶Three submarine telephone cables are now being laid between Key West, Fla., and Havana, a distance of about 100 miles, providing the first wire-telephone connection from the great system of the United States to the island of Cuba. Plans for the new line were announced in this magazine as early as May, 1916.

LOGGING MOVIES TAKEN FROM TOP OF SPAR TREE

The movie-camera man cares not if there is "nothing new under the sun." He has covered practically every subject in the industrial line—some of them several times—but succeeds in getting novelty by working out new angles. To get a new angle on logging in the Pacific Northwest, a camera man of one of the moving-picture concerns had himself and his camera hoisted in a sling to the top of a 225-ft. spar tree, from which elevation he took action pictures of logging on the ground below.

Left: The Tall Spar Tree with the Camera Man Seen as a Mere Dot at Its Very Top, below Him the Logging Scene He is Photographing from a New Angle. Above: The Adventurous Operator with His Movie Camera, Perched in His Sling and being Hoisted to the Top of the 225-Foot Spar Tree

The spar tree is the lead upon which the main block or pulley is hung for yarding logs with a donkey engine, the steel cables passing from the drum of the engine up through the roof of the donkey and functioning through a several-thousand-pound block on the top of the spar tree, which is guyed with bracing wires from every side, to resist the enormous strain.

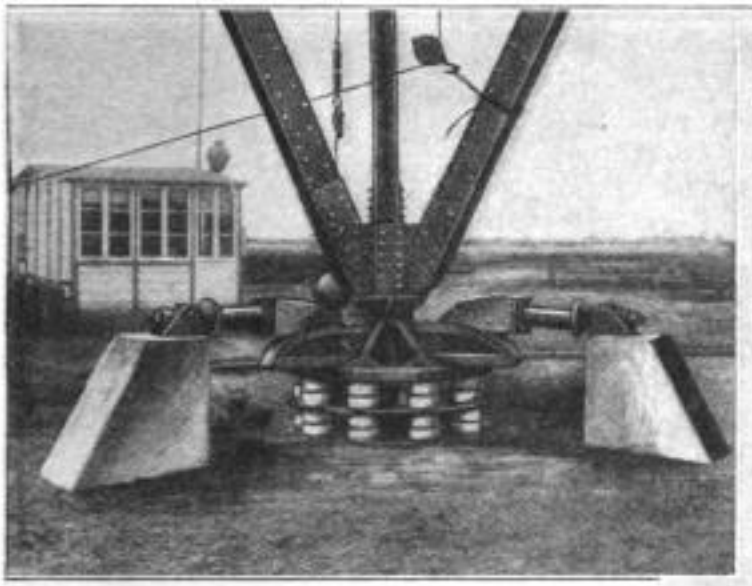
GOVERNMENT SHEEP RANCH DEVELOPS NEW BREED

The government reservation of 28,000 acres, located near Dubois, Ida., and devoted to experimental sheep raising, is the biggest undertaking of its sort in the United States. Two thousand head of sheep are being maintained at an elevation of between 7,000 to 8,000 ft. above sea level, summer pasturage and sunflower silage being their principal sources of sustenance. Thirty acres of sunflowers were cultivated in 1920, and although numerous plots of sorghum were included in the experimental feeding investigations, this flowering plant proved its superiority by intrenching itself under cultural conditions at high altitudes.

The development of a true breeding type of sheep, adapted to range environments of the West, from crossing the Lincoln and Rambouillet breeds, is the major aim of this range. Five years of crossbreeding has definitely fixed a desirable type of range sheep. The usual methods were discarded, and instead of going back to one or the other of the parent breeds, the crossbred progeny were interbred in each succeeding generation. The effort to establish a breed of larger animals by this novel procedure is a fresh contribution to sheep husbandry. It has never been attempted before, if we are to accept the seasoned opinion of the office of sheep investigation of the Department of Agriculture. "Columbia" is the adopted name of the offspring.

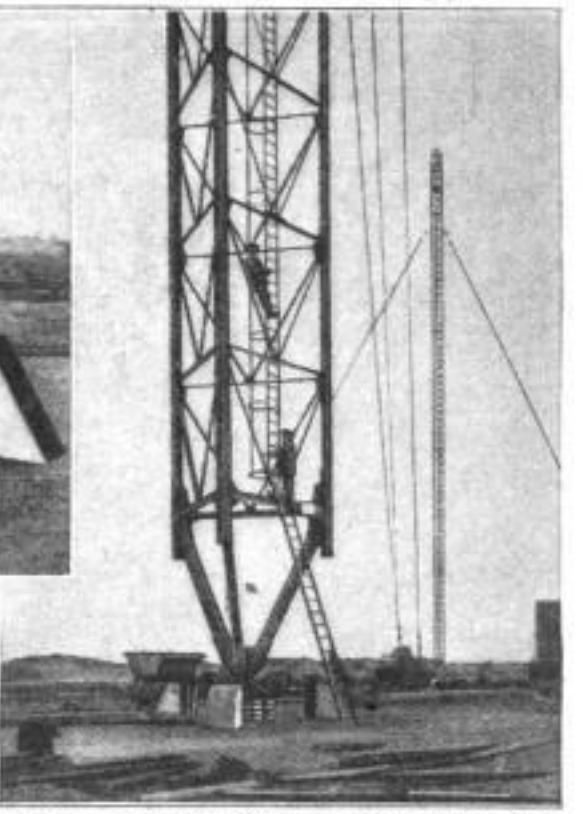
HOLLAND'S NEW RADIO STATION HAS INTERESTING TOWERS

Holland's newest and largest wireless station, in the Veluwe district, is interesting for its use of straight steel-skeleton antenna masts, 689 ft. high, each literally balanced on a point at the foot. The point, converged from the three vertical



The Pointed Foot of the Tower, Insulated by Porcelain Drums, and Centered by Concrete Piers

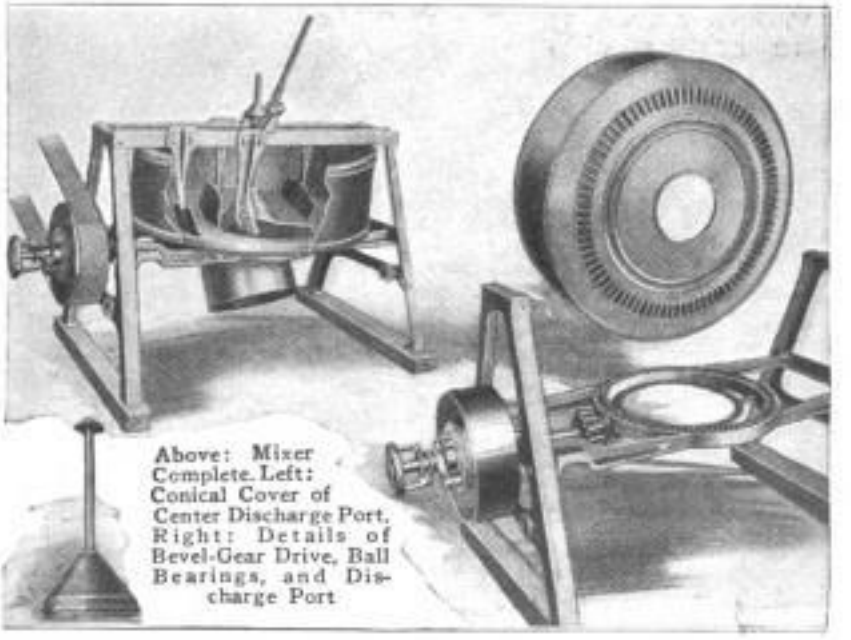
beams of the triangular mast, rests on a heavy iron disk supported by circles of stout porcelain insulators. A triangle of three concrete abutments, with thrust beams held by adjusting screws, keeps the pointed foot centered. As illustrating the significance of the height figure, it is stated that workmen at the mast top do not come down for lunch, as the long climb on the iron ladder would take a half hour.



In the Foreground Is the Lower Part of One of the Triangular Towers on Its Pointed Foot. A Second Tower in the Distance Shows the Guying System

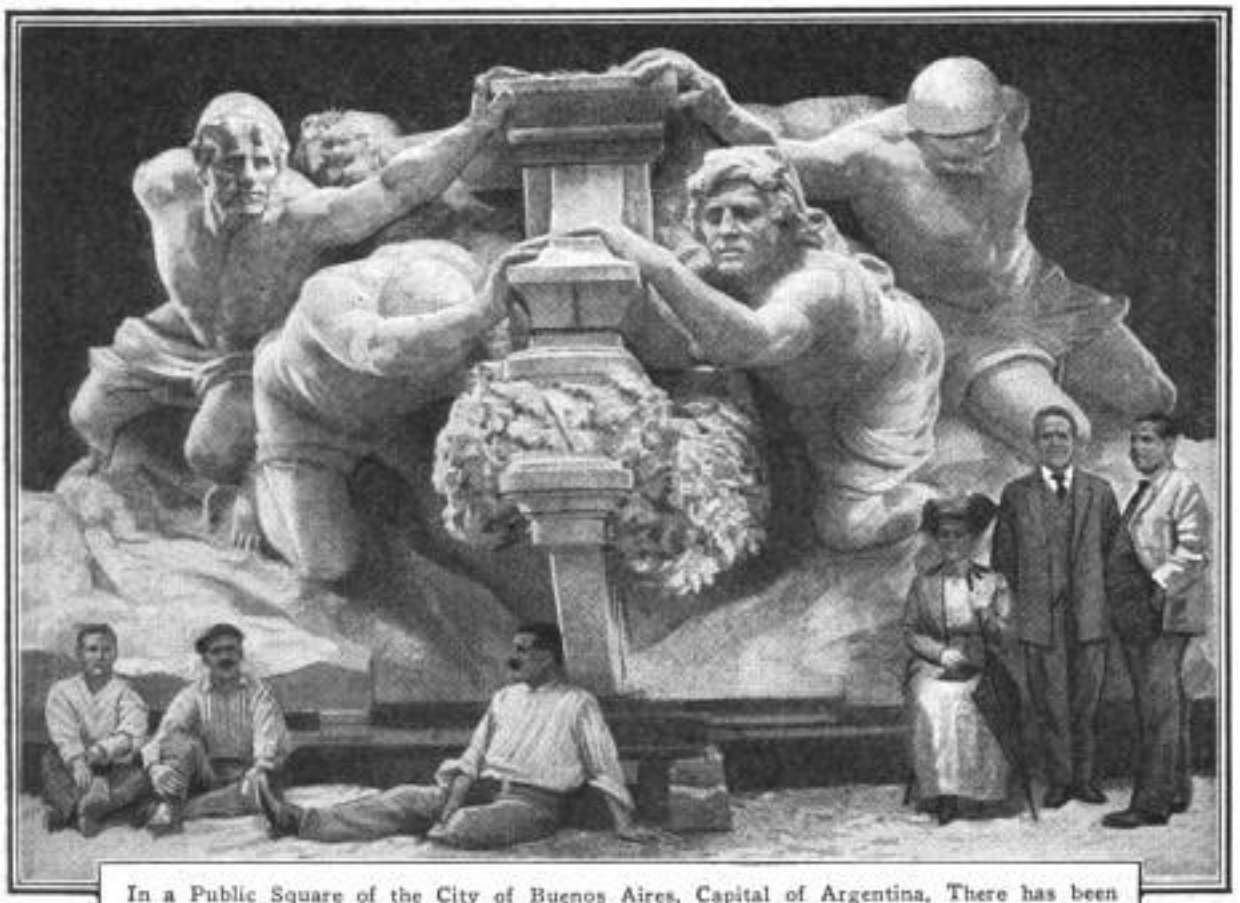
HORIZONTAL REVOLVING TUB FEATURES CONCRETE MIXER

The moving element of a new concrete mixer, somewhat simpler in design than the familiar barrel or tumbler type, is a heavy metal tub which revolves horizontally, carrying the material with it. To reduce friction as much as possible, the tub is supported on a circular ball race. Fixed to the bottom is a large bevel-ring gear which meshes with a bevel pinion attached to the horizontal driveshaft. A discharge hole through the bottom of the tub is closed by a cover having a cone-shaped top, which, projecting upward on the inside, prevents the mixture from accumulating in the center of the apparatus. To dump the mixed contents, the cover can be raised by a lever without interrupting the continuous working of the machine. Four stationary scoops, spaced about the interior of the tub, are so arranged that two of them constantly shovel the mixture toward the outside and the other two push it back. The scoops are curved, somewhat like a plowshare, so that each one turns the contents over, thus doubling it on itself and thereby thoroughly mixing it. The wide-open construction permits loading from any convenient angle.



Above: Mixer Complete. Left: Conical Cover of Center Discharge Port. Right: Details of Bevel-Gear Drive, Ball Bearings, and Discharge Port

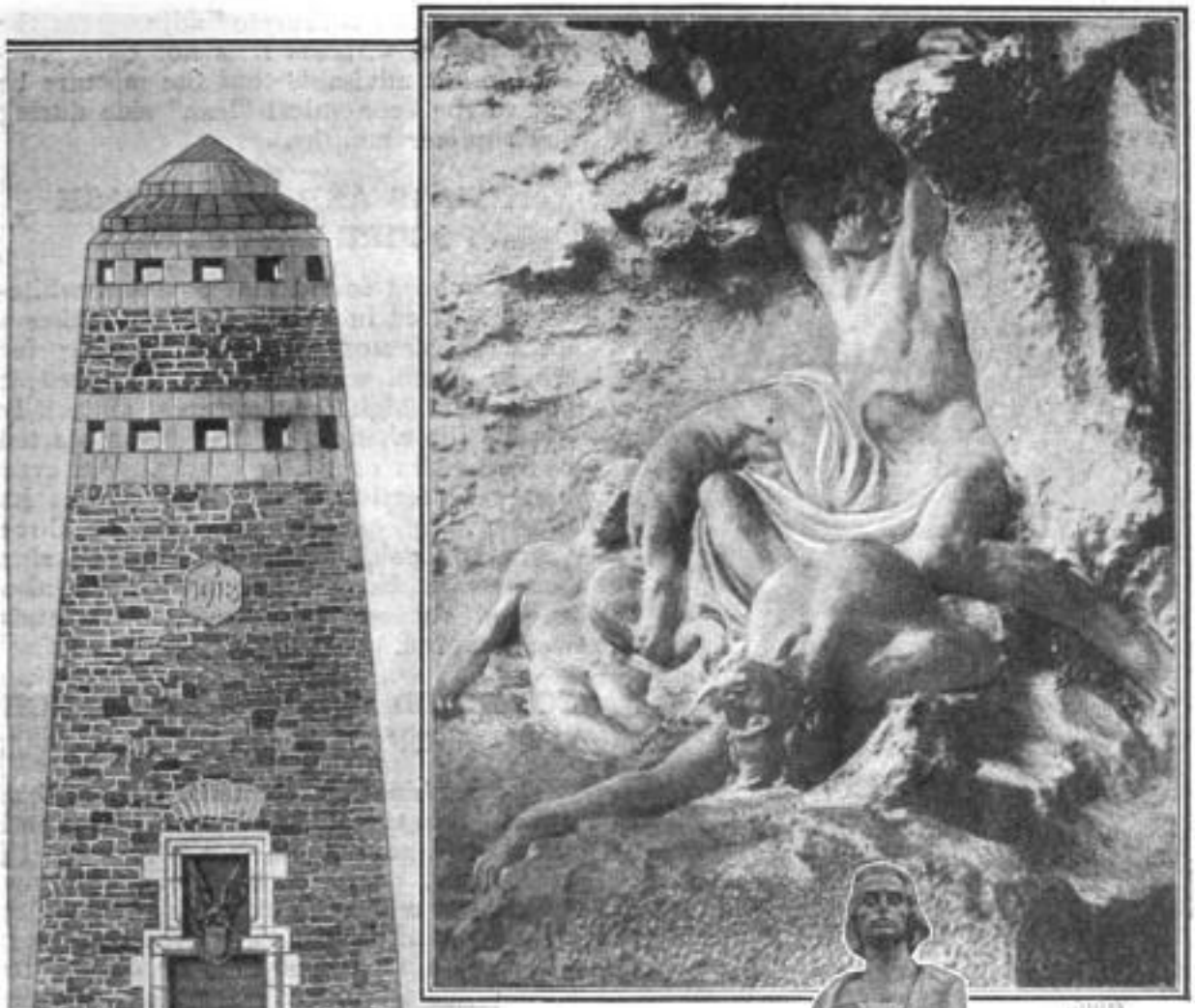
HEROIC FIGURES OF PAST AND PRESENT ARE



In a Public Square of the City of Buenos Aires, Capital of Argentina, There has been Erected an Enormous Statue Representing Christopher Columbus and His Bold Crew, Breaking the Ocean Trail to a New Civilization. Amalde Zocchi, Italian Sculptor, Wrought upon the Great Marble for Ten Years at Rome, and Both the King of Italy and the President of Argentina Were His Interested Visitors. The Impressive Memorial Formed the Sole Cargo of the Ship That Carried It to South America, and an Italian Battleship Gave It Ceremonious Escort

So Quickly do Even the Greatest of Events Pass into Oblivion, There may Be Some Who have Forgotten That American Soldiers Died in the World War Long Before the United States Joined the Allied Forces. That These Eager Heroes of a Premature Fate may be Immortalized, a Monument of Simple Arch Form has been Erected, and was Recently Unveiled, at Souain, France, near Sainte Ménehould, on the Edge of the Argonne Forest. The Memorial Pays Tribute to Those American Fighting Men Who Fell on September 30, 1915, with the French Foreign Legion

IMMORTALIZED BY NEW WORK OF SCULPTORS



To the Memory of the Victims of the Earthquake at Messina, Sicily, in 1908, When Over 76,000 Lives were Lost, is Dedicated a Monument Recently Erected in the Cemetery at Messina. Vito Pardo, Italian Sculptor, Worked Five Years upon the Memorial

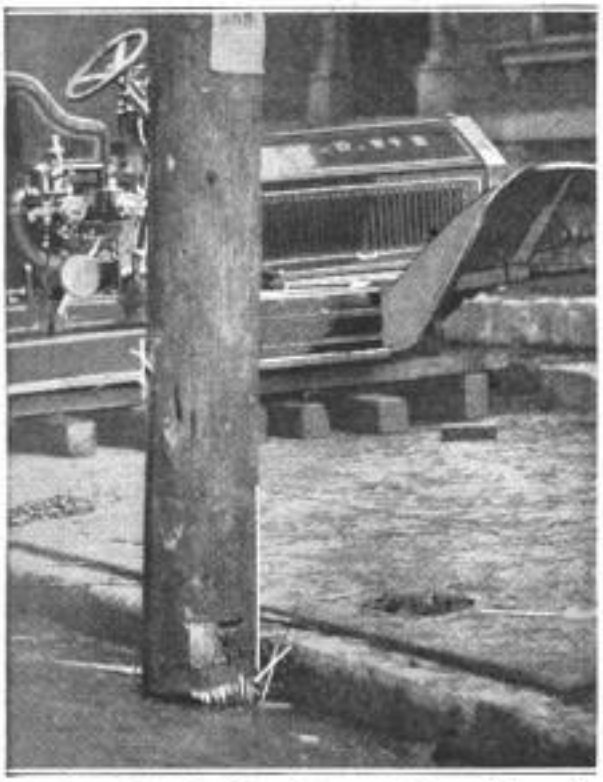
PHOTO BY AMERICAN RED CROSS

On a Rocky Promontory of the Mull of Oa, on Islay Island, Scotland, a Granite Shaft, 60 Feet High, has been Erected by the Red Cross to the Memory of Those Lost When the "Tuscania" and the "Otranto" were Sunk

A Gift to the State of Indiana from the Italian Citizens of Indianapolis, Kokomo, Richmond, and Logansport, a Granite Statue of Christopher Columbus, 11 Feet High, with an Allegorical Bas-Relief around Its Pedestal, was Recently Unveiled on the Plaza at the State Capitol

FIRE TRUCK HITS HEAVY POLE AND SEVERS IT SMOOTHLY

The tremendous force developed by a heavy motor vehicle traveling at high speed was strikingly illustrated in Cincinnati the other day, when a fire truck, running more than 40 miles an hour, swerved to avoid a small car. The big auto, out of control, went over the curb and squarely into a 13-in. yellow-pine lighting pole, newly set in the cement sidewalk. The impact sheared the stout pole off at the surface of the concrete in a clean, straight break, and left it dangling from its wires. The truck was badly damaged by the collision.



The Heavy Electric-Light Pole was Sheared Squarely Off and Left Dangling from Its Wires by the Impact of the Truck, Which was Badly Damaged

AUTO ENGINES WASTE THIRTY PER CENT OF GASOLINE

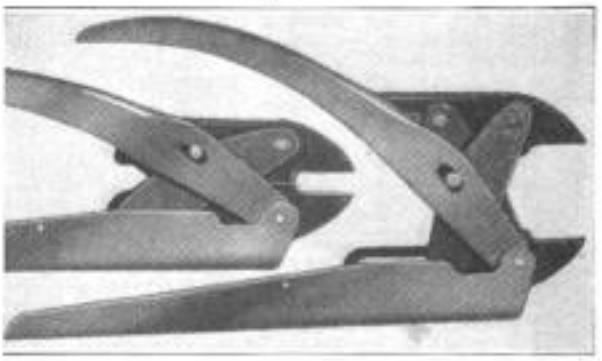
It is somewhat startling to learn that 30 cents of every dollar's worth of gasoline used in motor cars or trucks in the United States serves no other purpose than that of polluting the atmosphere, this percentage of fuel being wasted on account of faulty carburetor adjustment. The finding is the result of careful observations and experiments conducted by the Bureau of Mines. It was found that the majority of vehicles are being operated with the same carburetor adjustment the year round, whereas it is not only practicable but advisable that the mixture be cut to the economical "lean" side during the summer months.

PAINTS AND WHITEWASH AS FIRE PREVENTERS

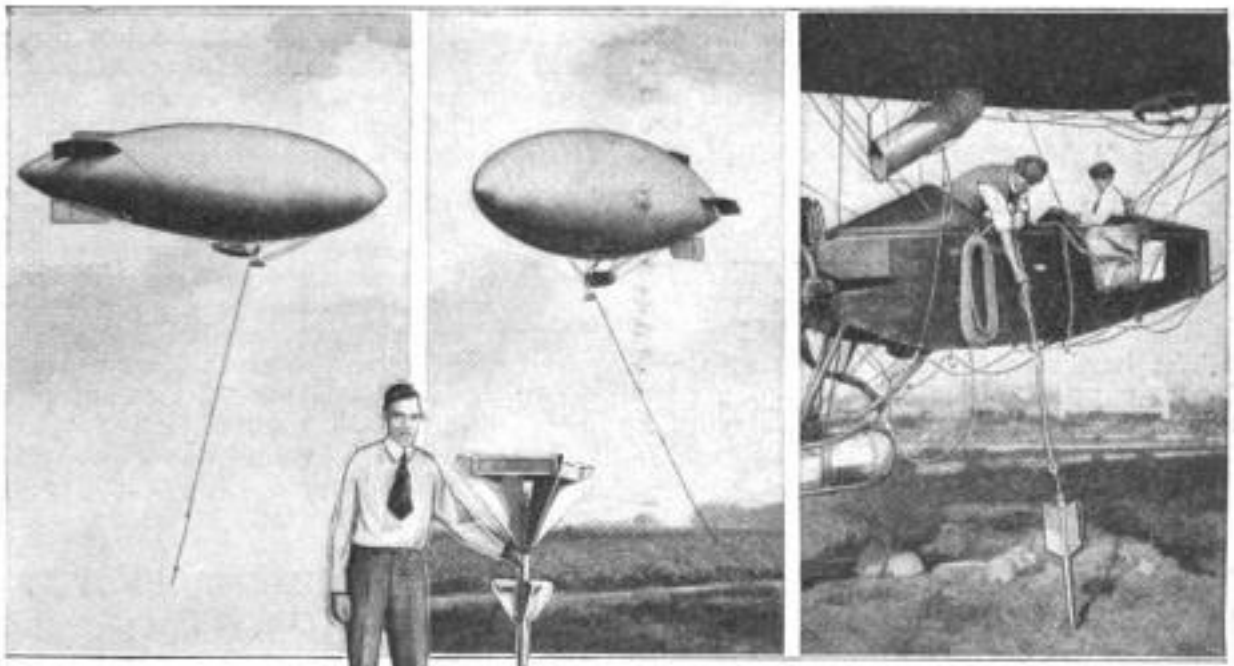
It has been found that common whitewash, applied in generous coats, makes a quite satisfactory fireproof coating for wood, which, while it does not prevent burning at high temperatures, materially lessens the chances of fires being started by cigarettes or flying sparks. An even better protection, one which retains its fire-resisting qualities for two or three years, is a paint made of linseed oil, zinc borate, and chrome green. This is also a good outdoor paint, as it withstands weather well.

COMBINED PLIERS AND WRENCH OF NEW DESIGN

The combination pliers and wrench that can reach in the out-of-the-way places and maintain a good hold, is a tool much to be desired. Such a mechanism is now introduced which, by pressure of the palm and fingers of the hand against its handles, will maintain a locked hold on a nut. In appearance it closely resembles an ordinary pair of pliers, but it differs in that it has a series of crossbars attached to the handles and jaw bases. These crossbars are fitted with bosses and camways, in such a manner as to bring about a locking action when the bosses come into contact with the sides of the camways. This contact is maintained by the pressure of the hand against both handles. The jaws of the tool have a spread of from ¼ to 1 in. and are thin enough to get into tight places. No locking takes place when the device is used as a plier.



Combination Wrench and Plier with a Spread of One-Fourth to One Inch: As a Wrench It Locks Automatically



Above: The Elastic Anchor Line Let Out to Its Full 150-Foot Length. It Will Stretch to 300 Feet

Center: The Dirigible Stopping and Swinging Head-On to the Wind. Left: View of the Anchor Showing Folding Barbs. Right: The Airman Pulling the Ship Down to the Firmly Imbedded Anchor, Which, in This Case, Is One of Experimental Form

DIRIGIBLES EASILY LANDED WITH ONE-MAN ANCHOR

Landing dirigibles anywhere without the assistance of a ground crew is claimed to be made possible by the invention of a barbed anchor, which penetrates the soil and becomes solidly imbedded even in sand or mud. The device is made on the order of a dart with a steel shaft and four aluminum flanges, or wings, at the upper end, which act as air guides, keeping the anchor right end up in its fall, so that it always strikes point down. The barbs fold upward against the shaft until a pull on the anchor rope causes them to move outward and dig into the soil. Another ingenious part of the outfit is an elastic rope which will stretch from its normal length of 150 ft. to a limit of 300 ft. before it exerts its full power. The use of this line prevents the sudden shocks which often break anchor ropes and damage machines. In effect it is as though a powerful brake were applied which gradually slows the craft and, at the same time, heads it into the wind. After having come to a stop, it is an easy matter for the pilot to reel the line in and thus bring the ship gently and easily to earth.

¶All passenger tickets sold by the Pennsylvania railroad system now have the price and the war tax printed on them as two separate items.

BUOY WITH NEW GAS MANTLE GIVES LIGHT FOR A YEAR

Designed for use on light buoys that are stationed in rough seas, a new form of gas mantle of diminutive size is remarkable for an economy of consumption that enables it to operate for six months to a year on a single charge of fuel, and without attention. Though it uses only 5/8 cu. ft. of oil gas an hour, and emits but

The New Gas Mantle for Use on Light Buoys, Mounted on the Reservoir That Holds a Year's Supply of Fuel

22 cp., its rays of light are so concentrated in its diameter of 7/16 in., that the brilliant spot is visible for nine miles in clear weather. The mantle and its burner are mounted on a panlike reservoir in the buoy, and the mantle itself, sturdy in its smallness, has an effective life of more than a year.

HARDNESS-TESTING MACHINE GIVES DIAL READINGS

The hardness of such metals as steel, brass, copper, and some of the harder alloys, is commonly tested by forcing a steel ball of known diameter at a known pressure into the material to be tested. The diameter of the concave impression is measured and the hardness thereby calculated. The hardness is expressed in numerals varying from 100 to 1,000, the latter representing the maximum hardness. The machine quite frequently used is one which measures the diameter of the impression under a microscope.

New Direct-Reading Hardness-Testing Machine, with Several Interchangeable Anvils for Work of Different Shapes, and a Number of Samples for Testing

A hardness tester, recently designed, indicates the hardness by means of a dial, making a microscope unnecessary. The steel ball is smaller than that heretofore used, having a diameter of only 1/16 in. With this, wire of smaller diameter can be tested, and a lighter impressing load is used. Thin sheet stock, clock springs, and tubes with walls as thin as 1/32 in. can be tested on this machine, the latter without the insertion of a mandrel.

It is known as a portable direct-reading machine, its weight being 57 lb. Six tests can be made a minute. When making the test for hardness on this new machine, an initial pressure is applied by turning the wheel, thereby raising the test piece until an index mark shows that the initial pressure has been applied. This insures that the test piece is held to a firm seating and that the ball breaks through dirt, rust, or other superficial matter. The dial of the index is then turned to the zero position, and the push button at the base of the machine is touched, thereby releasing a greater load. This load is then withdrawn, the initial pressure being still left. The dial indicates the depth of impression made by the major load. The indentation is small and hardly noticeable.

The machine is supplied with several tables to accommodate various shapes of work.

LOOM ATTACHMENT WEAVES SIX-COLOR WEFT

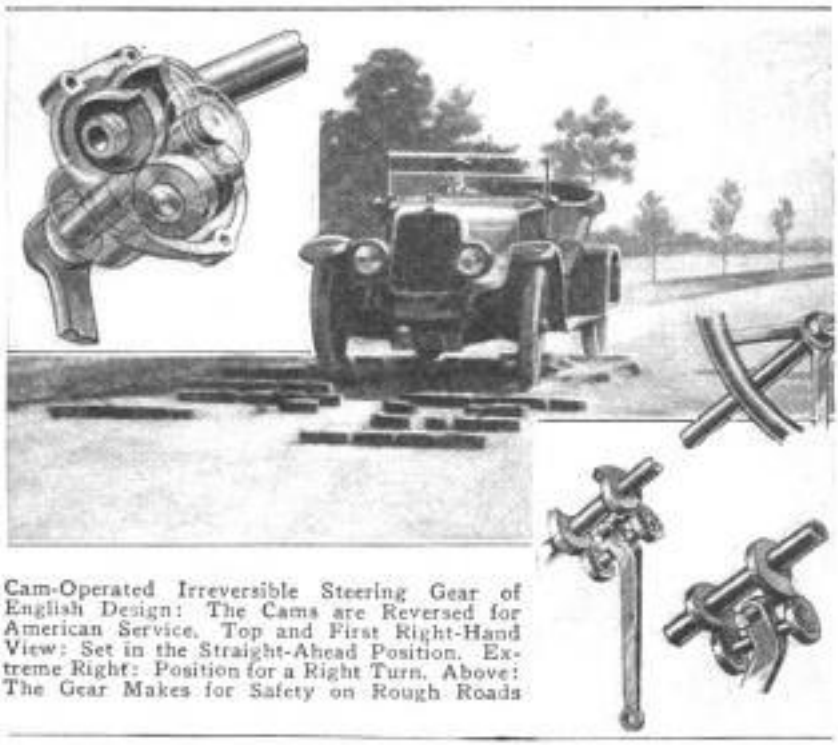
A new attachment for automatic looms, brought out by a French inventor, makes practicable the use of six colors of weft and also changes shuttles when these become exhausted. The selection of the colors is accomplished by a spring-driven needle which follows the pattern on the pattern cylinder, and causes the shuttle carrying the required color to come into proper alinement to be shot through the warp. Just before the contents of a shuttle is exhausted, an electric circuit is made, which, acting through another part of the mechanism, throws out the empty shuttle and replaces it with a full one.

ALL-METAL JOINT FITTINGS STRENGTHEN STAKE BODIES

An addition to the field of vehicle-body hardware consists of three small steel fittings offered by a Michigan manufacturer. They are self-locking devices, two of which, when applied to stake-body corners and joints, hold them solidly together, but do not allow the wooden parts to touch and rub. The third is designed to clamp the body securely to the wagon bed. Inbuilt springs maintain a steady pressure on the parts, thus preventing excessive movement.

COMPOUND-CAM STEERING GEAR CANNOT BE REVERSED

In an automobile steering gear, recently evolved by an English inventor, all gear segments, sectors, worms, and other wearing parts are eliminated, their duties being performed by two hardened compound-contour cams bearing against two rollers made of ball bearings of the annular type. These rollers are placed, one each, on the ends of a short shaft which runs through and projects from the upper portion of the steering-gear drag arm. The cams are solidly keyed to the lower end of the steering column, in such a way that when the high side of one is presented to one roller, the low side of the other is presented to the remaining roller. The result is a fore-and-aft movement of the lower end of the drag arm and the drag link when the steering column is turned. The claims made for the device are that it is more nearly frictionless than other types of gears, that it is almost wear-proof, and that it cannot be reversed. This last claim is based on the fact that any shock sustained by either of the front wheels, such as that caused by striking a rock or brick, will be stopped by the flat face of one or the other of the cams, and will not have the effect of imparting a twisting strain to the steering column. The value of this need not be emphasized.



Cam-Operated Irreversible Steering Gear of English Design: The Cams are Reversed for American Service. Top and First Right-Hand View: Set in the Straight-Ahead Position. Extreme Right: Position for a Right Turn. Above: The Gear Makes for Safety on Rough Roads

AUTOS CROSS COLORADO RIVER ON MAKESHIFT FERRYBOAT

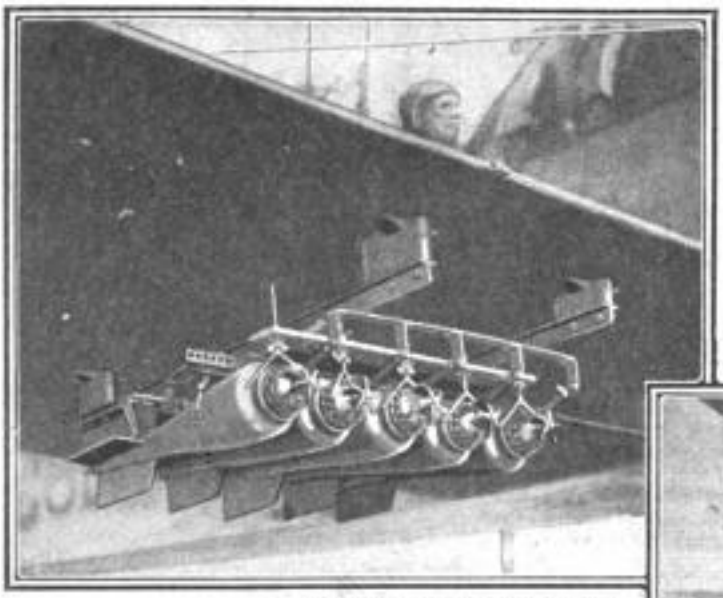
The absence of a wagon bridge across the Colorado River, at a spot known as Bush's Ferry, has lately been netting one enterprising boatman a tidy sum in the course of every motoring season. Considering that many automobiles, sometimes 50 a day, cross from California to Arizona, or vice versa, at this point, and that every one of them is carried by this ferryman for a fee of $2.50, one deduces that his profits are nothing if not handsome. His craft is a steam launch; athwart the deck he has laid a plank platform long enough to accommodate the largest touring car. The railroad bridge, which spans the river not far below the ferry route, may be used by automobiles, it must be explained, only in the most pressing emergency.

An Automobile has Just been Driven aboard the Makeshift Ferryboat That Plies the Colorado River between the California and Arizona Shores. The Railroad Bridge is Seen in the Background

NEW TYPES AND METHODS IN WAR MACHINERY

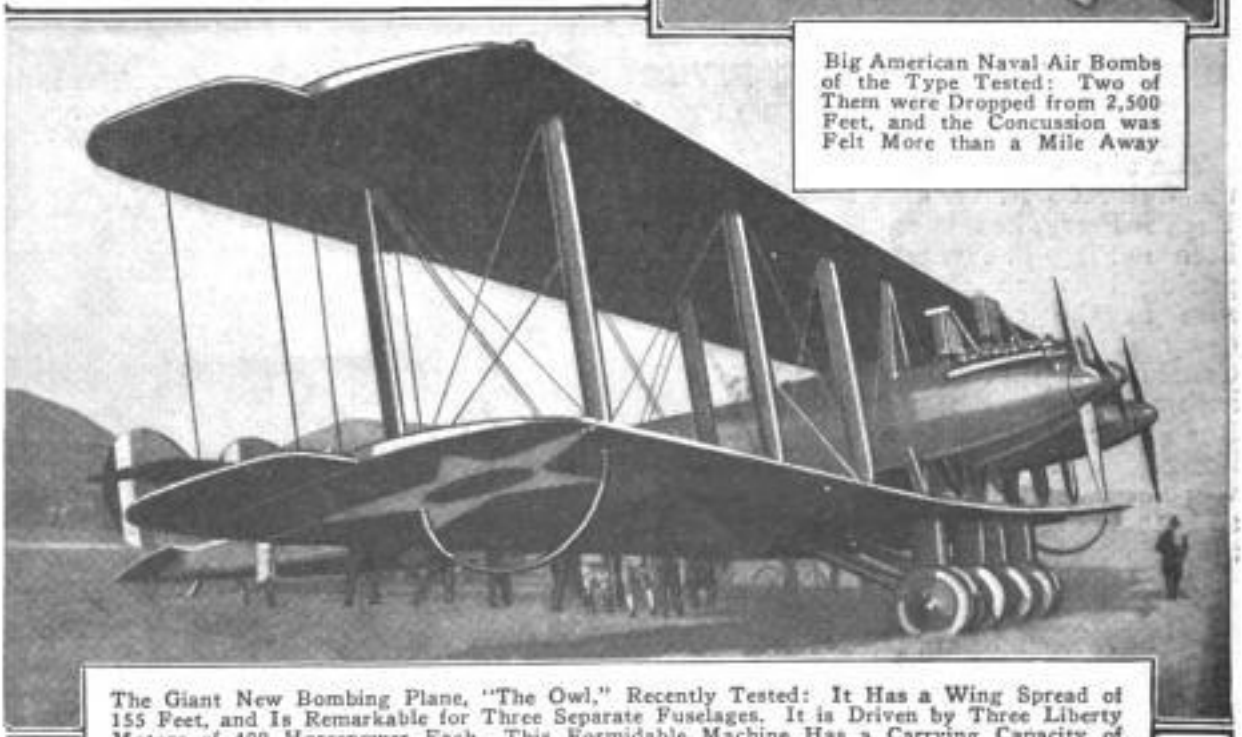
THAT the development of improvements in military machines and methods is not lagging is shown by the number of interesting tests and demonstrations staged during the past few months. The scope of the experiments ranged from bullets to biplanes, including the trials, at Mineola, L. I., of the new bombing plane, "The Owl," a remarkable craft of 155-ft. wing spread, with three separate fuselages and three 400-hp. Liberty motors, which drive it at 105 miles an hour with a load of 8,000 lb. of bombs. An innovation in methods of carrying aerial bombs was demonstrated at Aberdeen Proving Field, in Maryland, in the form of a rack fixed beneath the wings of the plane, and holding a number of bombs side by side. To test the actual damage done by such bombs, some interesting experiments were conducted with the obsolete battleship "Indiana," which was anchored in Chesapeake Bay. The bombs were not dropped, but placed at various selected points, inside and out, above and below the water line, and the resulting wreckage carefully studied.

At the Aberdeen field a curious mechanism was disclosed in the shape of a 1.4-in. gun mounted in the "V" of a Liberty motor's en-

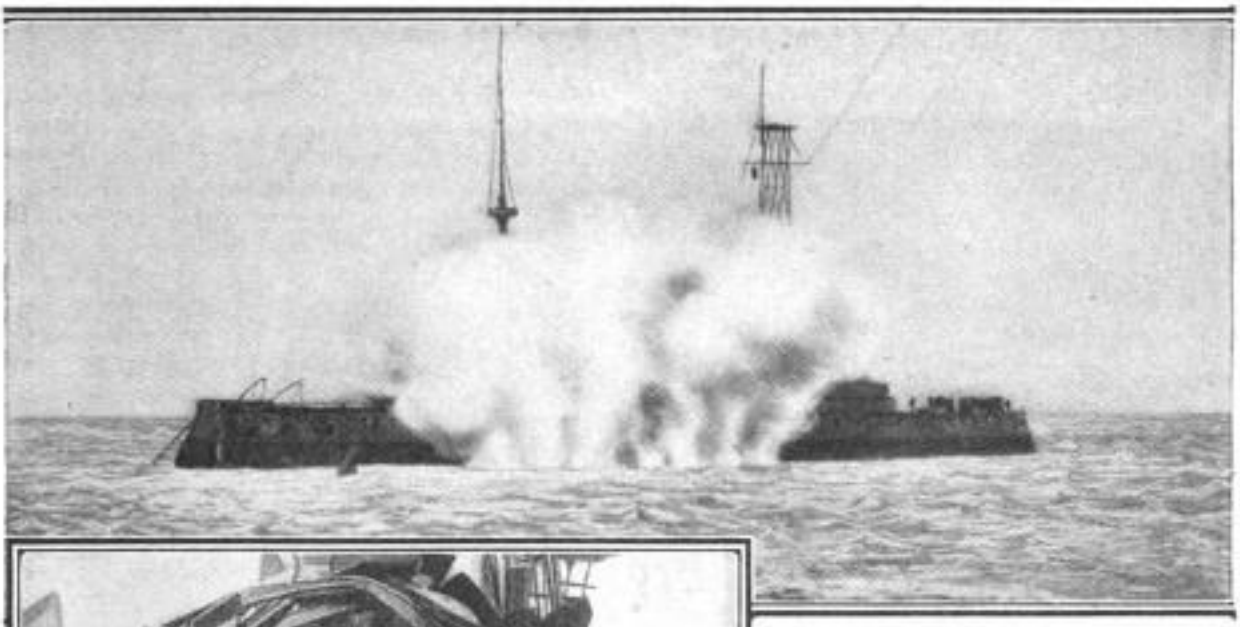


The New Bomb Rack for Airplanes: By Its Use the Bombs are Hung in Rows under the Wings of the Plane, Where They Occupy No Useful Space, Are Out of the Way in Landing, and Yet may be Released with Ease and Precision

Big American Naval Air Bombs of the Type Tested: Two of Them were Dropped from 2,500 Feet, and the Concussion was Felt More than a Mile Away

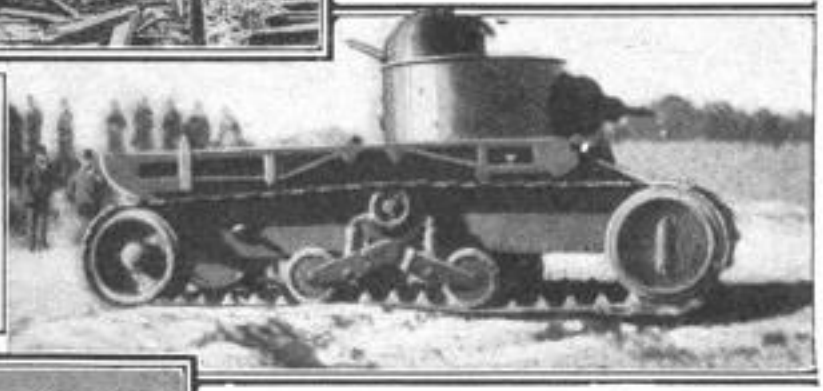


The Giant New Bombing Plane, "The Owl," Recently Tested: It Has a Wing Spread of 155 Feet, and Is Remarkable for Three Separate Fuselages. It is Driven by Three Liberty Motors of 400 Horsepower Each. This Formidable Machine Has a Carrying Capacity of 8,000 Pounds of Bombs, and When Fully Loaded, with the Three Engines Running, Develops a Speed of 105 Miles an Hour

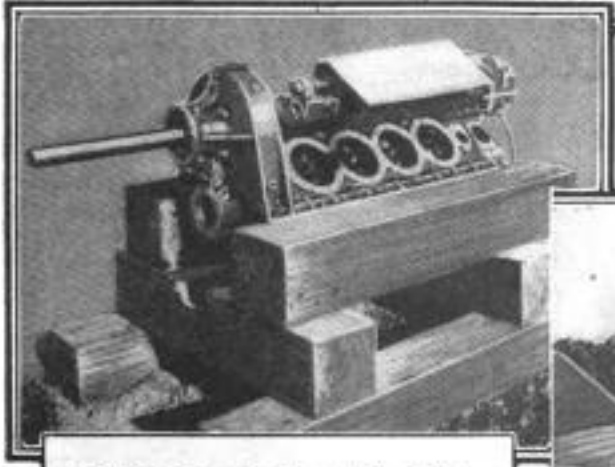


The Obsolete Battleship "Indiana," Subjected to the Explosions of Aerial Bombs, to Determine the Possible Amount of Damage That can be Inflicted by Airplane Attack: The Bombs were Not Dropped, but were Placed at Various Points inside and outside the Vessel, above and below the Water Line, the Bursts Seen Here Being under Water alongside the Hull

Looking Aft along the Main Deck of the "Indiana" Just after a Bomb Test: The Extensive Damage Indicated was Caused by a Single Bomb. Such a Hit with a Bomb Dropped from a Plane would Be Practically a Matter of Pure Luck, as a Ship's Anti-Aircraft Guns would Prevent the Approach of a Bombing Plane to a Position Close Enough for Accuracy



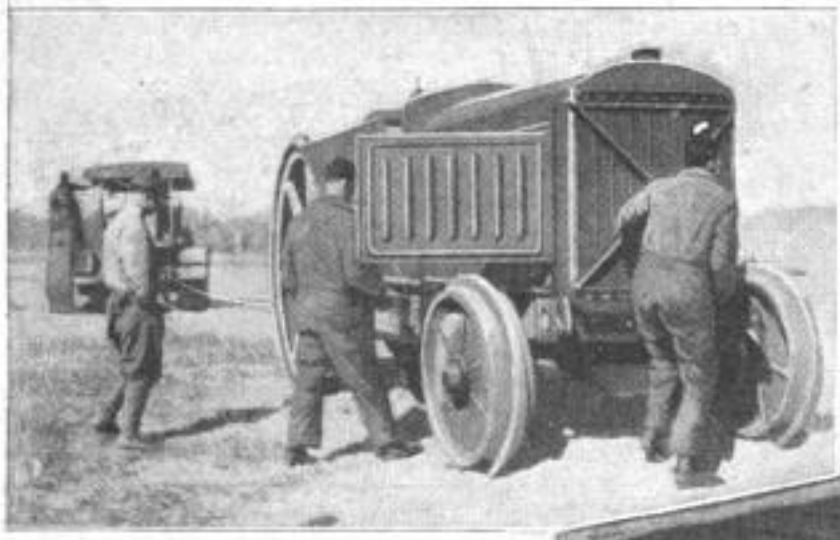
The New Military Tank Has Light Cannon and Machine Guns Mounted in a Turret. Not Only can It Perform the Usual Tank Maneuvers, but by Removing the Endless Treads, It is Converted into an Armored Car, Capable of 15 Miles an Hour on the Road



A Queer Mounting for a 1.4-Inch Gun, in the "V" between the Cylinders of a Liberty Motor: It Fires through the Hub of the Propeller, Which is Driven by Gearing from the Crankshaft Below. The Method of Mounting is Declared to Solve the Recoil Problem, and the Gun Shoots Accurately Either a One-Pound Shell, or a Solid Shot

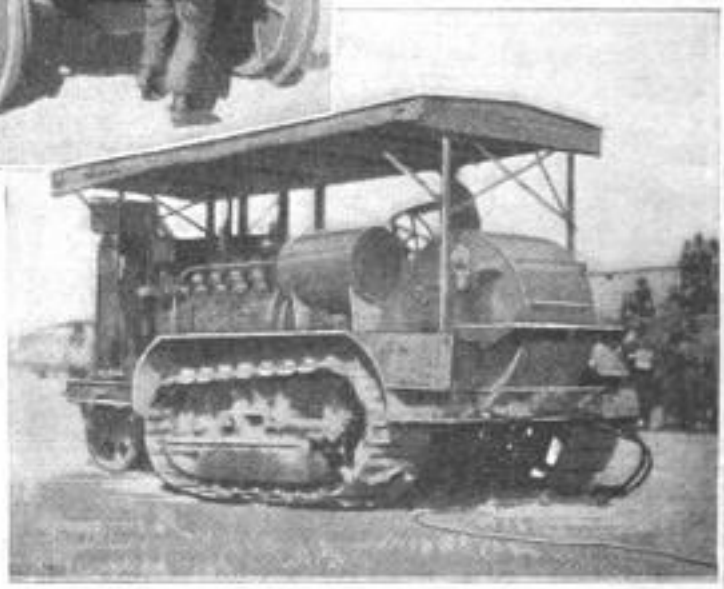
Four Machine Guns Fired from an Airplane, with the Engine Racing at Top Speed: Two of the Guns Shoot through the Propeller, Their Position being Fixed, While the Other Two are Swivel-Mounted behind the Wings. The Plane is Blocked to Keep It from Starting down the Field

gine block. This arrangement is declared to solve the recoil problem. It shoots a 1-lb. explosive shell or solid shot through the hub of the airplane propeller, which is driven by gearing from the crankshaft below. Four machine guns on an airplane, two adjustably mounted behind the wings, and two fixed to fire through the propeller, formed the subject of another interesting test.



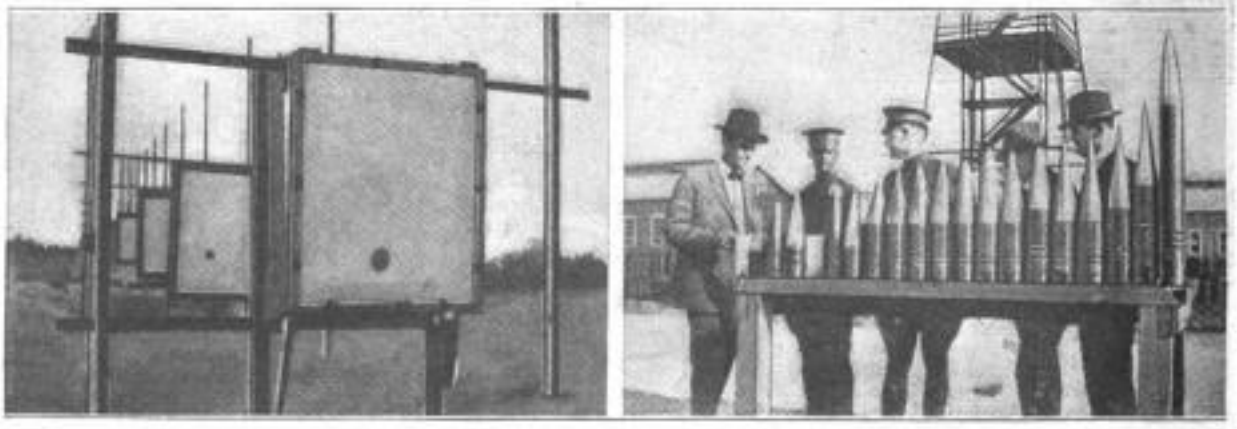
An Extraordinary Tug of War between an American Artillery Tractor and a Huge Six-Cylinder German Tractor: The Big German was Pulled Backward Easily

A particularly striking demonstration was that of a new tank which can be converted into an armored car, capable of 15 miles an hour, by removing the endless treads. This formidable war vehicle mounts both machine guns and light cannon. A tug of war between a regular 20-ton American artillery tractor and an enormous six-cylinder German machine proved quite entertaining, as the German monster was pulled backward, despite its utmost effort. The firing of experimental shells through a series of cardboard screens, placed at close intervals for 1,000 ft., provided an interesting study of projectile behavior in flight, as did also the test of a new rubber-tired machine-gun mount, from which tracer bullets were fired at toy balloons in the air, usually scoring a hit, thanks to the line of smoke.

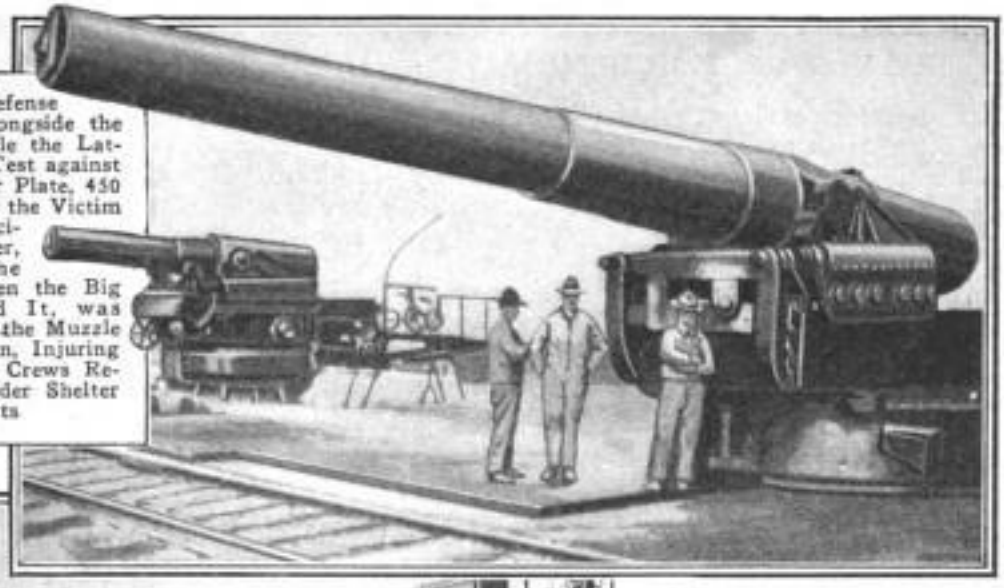


The American Winner of the Tug of War, a Six-Cylinder Machine of 40,000 Pounds' Weight, Which Demonstrated the Superior Traction of the Endless Tread

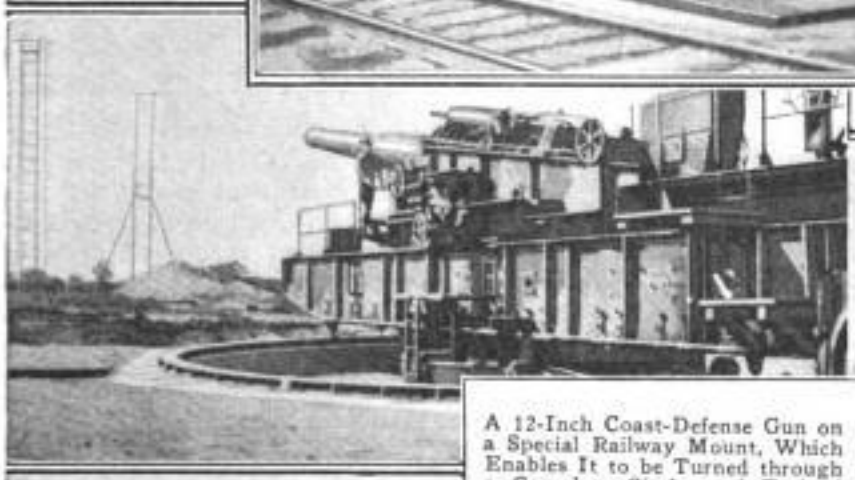
A gun mount of the railroad type known as the "sliding mount," with no recoil mechanism, was fired to show the action of a series of brakes that rest on the track rails and check the backward movement



Left: A 1,000-Foot Row of Cardboard Screens, Arranged for Testing the Behavior of a Projectile. A 3.3-Inch Shell has Just been Fired through Them. Right: Experimental Shells Made by Combining Sections of Various Shapes, for Testing Shell Design and the Rifling of Guns



A 12-Inch Coast-Defense Gun, Mounted alongside the 14-Inch Gun While the Latter was Fired in Test against a Target of Armor Plate, 450 Yards Away, Was the Victim of a Peculiar Accident. A Splinter, Broken from the Armor Plate When the Big Shell Perforated It, was Thrown Back into the Muzzle of the Smaller Gun, Injuring the Rifling. Gun Crews Remain Carefully under Shelter during Tests



A 12-Inch Coast-Defense Gun on a Special Railway Mount, Which Enables It to be Turned through a Complete Circle, and Trained upon Ships or Other Moving Targets, on Land or Sea, No Matter What Their Position

An Experimental Tripod Mounting for an Anti-Aircraft Machine Gun: The Gun can be Moved in Any Direction with the Utmost Freedom, but in Action It Proved Rather Difficult for the Gunner to Hold It Firmly on the Target

A Machine Gun Mounted on a New Rubber-Tired Carriage, Designed for Rapid and Easy Movement over the Ground: In Firing Position, the Tripod Stand Comes into Use, and the Wheels Are Clear of the Ground

of the car. At an elevation of 15°, the car slid back 4 ft., while at 54° elevation, the recoil was only 4 in. Most spectacular of all was the test firing of a 14-in. coast-defense rifle against heavy armor plate, which was cleanly perforated at a range of 450 yards.

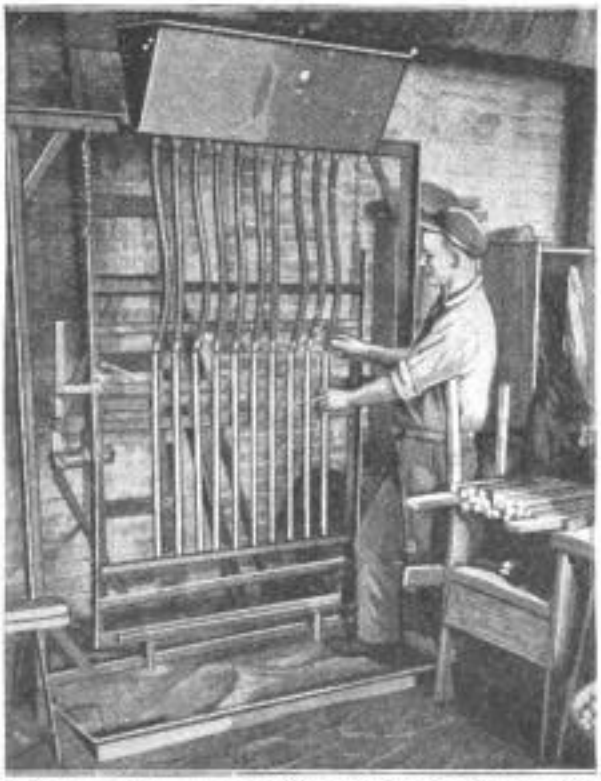
¶After four years of experiments, French railway engineers announce that the wood of the mangrove tree is rot-proof, due to a density almost twice as great as that of oak and to the presence of tannin.

BAD CHECKS ON EXHIBITION STOP REQUESTS FOR CASH

Beside the cashier's desk in a certain western store is a bulletin board on which is mounted a small but significant collection of bank checks, all bearing the sinister mark "N. S. F." Above them, in sizable lettering, is the legend, "Why we cannot afford to cash checks for strangers: They all had honest faces." This silent but conspicuous protest is declared to have reduced requests for similar favors.

MACHINE PACKS METAL TUBES WITH SAND, FOR BENDING

The filling of lengths of metal tubing, or pipe, with sand to prevent crushing while being bent, is usually done by hand, and is a slow job at the best. To speed up this work, an eastern factory has installed an apparatus which feeds the sand from a hopper, filling the tubes rapidly and packing it more solidly than can be done by hand. The device is extremely simple, consisting of an angle-iron main frame in which a swinging frame is suspended by chains; a sand hopper, and a number of lengths of hose, which serve to conduct the sand from the hopper to the tubes. These are clamped in the second frame, which is kept vibrating from side to side by the blows of an electric or compressed-air riveting hammer.



The Inner Framework is Vibrated by the Blows of an Electric or Air Hammer, Packing the Sand Solidly

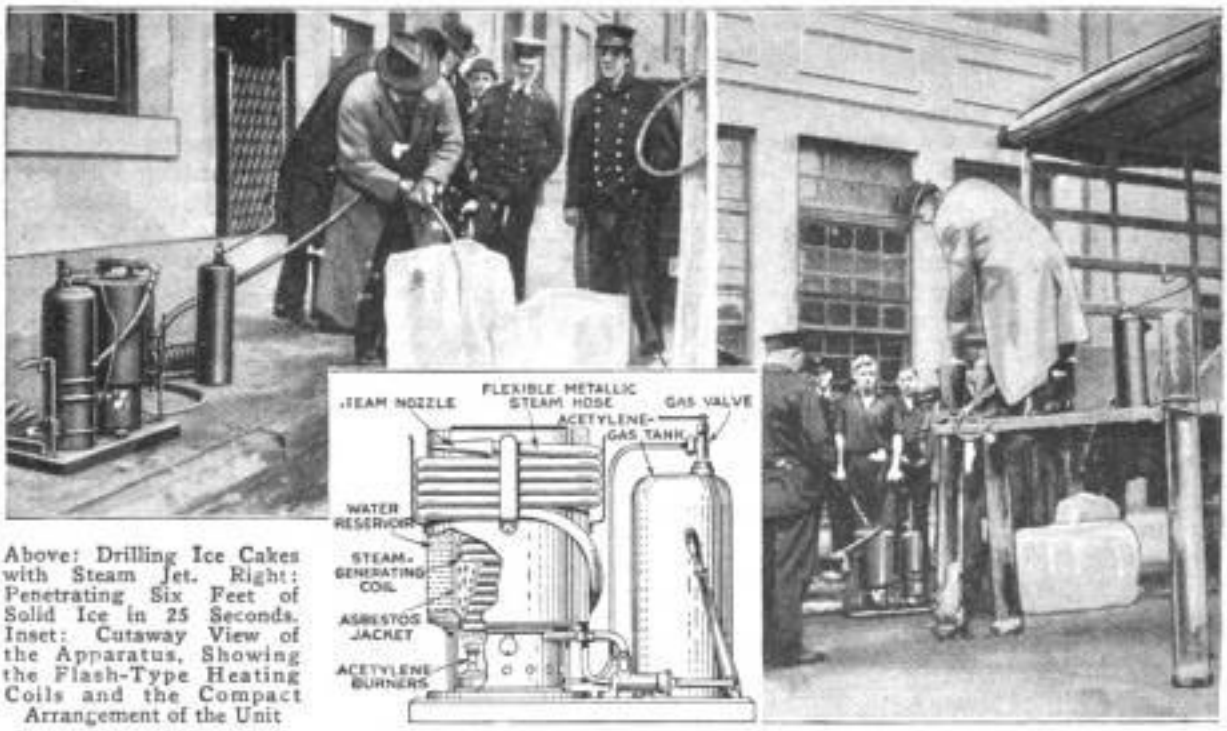
FELT-LINED CEILINGS ELIMINATE ECHOES

A remarkable example of the extent to which nerve-racking sounds, such as those emitted by typewriters, telegraph instruments, etc., can be muffled by finishing walls and ceilings with panels composed principally of felt, is furnished by a large room in a recently erected office building in the city of Chicago. Formerly the din created by a battery of typewriters caused such a nerve strain that the stenographers tired much more quickly than could be accounted for by the volume of work they were performing. Soundproofing the room deadened the millions of echoes and resulted in creating a restful atmosphere and in a greater efficiency of the stenographic force. Now, with all the machines in action, a conversation in ordinary tones can be carried on without effort, the sound of the voice seeming to be intensified and confined within an area about 6 ft. square. Another odd effect is that a signal gong in the room gives out a sound as though the bell were muffled with cotton or cloth.

TINY CHILD DIRECTS TRAFFIC AS SYMBOL OF SAFETY NEED

Of all the efforts to promote the safety of public places, the child is the nucleus—the central thought that energizes the war on reckless driving, and gives emphasis to the need for stringent control of traffic. There can be little doubt that the image of helpless childhood, if it could be impressed permanently on the mind of the thoughtless type of driver, would serve as an effective brake on the mania for speed and the spirit of chance taking. With something of this in mind, Harry Park, a safety worker of Portland, Ore., recently staged a striking tableau. At one of that busy city's busiest crossings a tiny girl of five years was set at the difficult task of directing the heavy traffic, with the aid of a 5-ft. semaphore made for the occasion. Not only was the experiment a distinct success in the performance, but it is safe to say that every motorist passing that way absorbed the symbolical significance of the figure—childhood, represented by little Virginia Elizabeth Olsen, appealing to all drivers of the world.

The Symbol of Childhood's Appeal to the Motorists—a Little Girl Directing the Traffic of a Busy Crossing in Portland, Oregon



Above: Drilling Ice Cakes with Steam Jet. Right: Penetrating Six Feet of Solid Ice in 25 Seconds. Inset: Cutaway View of the Apparatus, Showing the Flash-Type Heating Coils and the Compact Arrangement of the Unit

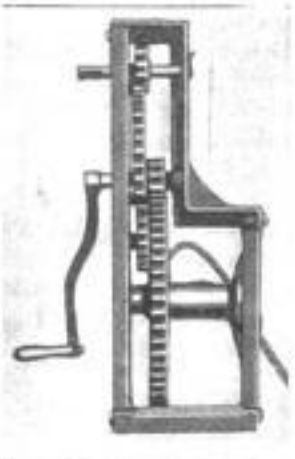
HIGH-PRESSURE LIVE-STEAM JET THAWS FROZEN PIPES

Many conflagrations, which, in their beginning, would have been easily controlled, have grown to disastrous proportions because frozen hydrants delayed getting water. To combat this, a pipe-thawing apparatus has been developed by an eastern inventor, which applies a jet of superheated steam, at a temperature of 1,000° F. and at high pressure, to the inside instead of the outside of the frozen pipe. The boiler of the device is what is known as a "flash-type," in which coiled tubes are raised to a red heat by an acetylene flame and the water then injected in a small intermittent stream. This system results in an instantaneous supply of superheated steam. Surrounding the tubes is a chamber containing the feed water. A ten-jet burner, a hand pump, and a length of rubber hose complete the apparatus. Portable tanks contain the compressed acetylene gas. During a recent demonstration to members of the New York fire department, holes were melted through 6 ft. of solid ice, contained in 6-in. pipes, in exactly 25 seconds, the steam jet eating its way through very much as a sharp stick would penetrate a stiff jellylike mass.

¶Belgian workers who have served long in one occupation are being given "industrial decorations" by the government, first-class for 35 years' service, or 30 years of office work, and second-class for 25 years.

HAND-POWER STUMP PULLER OPERATED BY ONE MAN

A very simple hand-power appliance for pulling stumps, but also adapted for any heavy hoisting or traction job, is made up of a steel framework containing a drum connected, through single and double-reduction gearings, to two power shafts, by either of which the drum can be turned by means of a crank. The single reduction is used for the hoisting of comparatively light objects, while by using the double reduction any effort, up to the 20,000-lb. capacity of the ½-in. cable, may be exerted. Special multiplying attachments are supplied, when desired, which increase the power of the apparatus to a maximum of 100,000 lb. When pulling stumps or trees, a high tripod, built of heavy timbers, again multiplies the leverage to 150,000 lb., which has the effect of removing the stump by a straight upward lift instead of the usual side pull. The device is equipped throughout with roller bearings and, with 100 ft. of cable wound on the drum, is light enough to be easily carried.

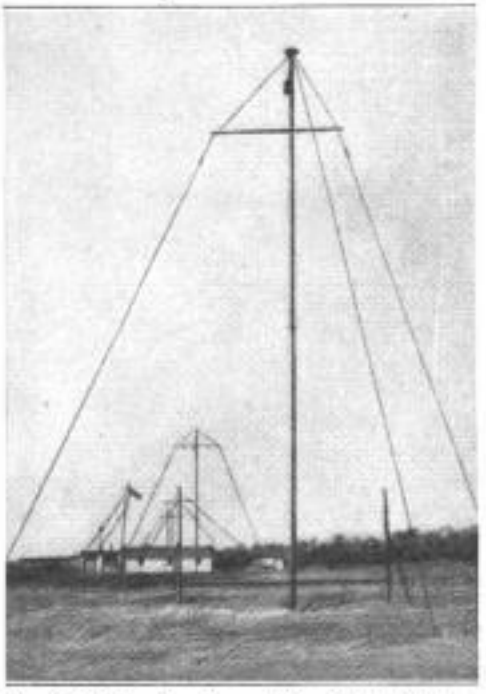


AIR-MAIL DELIVERIES FACILITATED BY POSTAL RADIO STATIONS

By S. R. WINTERS

STRETCHING some 2,700 miles across the country, and operating in conjunction with the coast-to-coast air-mail service, a line of 15 radio stations had been completed and was functioning on November 1, last year. This exploitation of wireless as an aid in the transmission of letters and parcels, was authorized by the Post Office Department at a cost of $26,000, because telephone and telegraph companies could not render uninterrupted service imparting information as to inter-station traffic, the distribution of meteorological data, and as a medium for transcontinental relays from Washington.

The fact that 65 airplanes are used in the transportation of 200,000 first-class letters daily suggests the magnitude of the coast-to-coast air route, involving the use of wireless. The department established outright 10 of the 15 radio stations which interlock with an equal number of flying fields maintained for relieving the railways of their postal burdens. Army and navy wireless stations are used where practicable, in order to avoid duplication of construction and to eliminate working interference. Similarly, the radio station of the Signal Corps, at Dayton, Ohio, is shared by the Post Office Department. Other government stations used are those at Cleveland, Chicago, San Francisco, and Sacramento.



The Wireless Station of the United States Post Office Department at College Park, Maryland

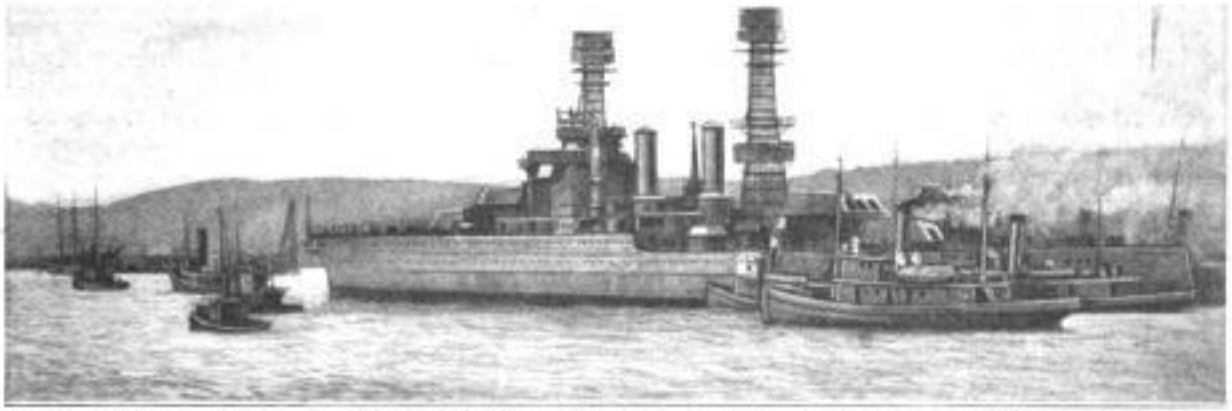
The actually new postal radio stations thus are 10 in number. The first one was established at College Park, Md. The others are at Bellefonte, Pa.; St. Louis, Mo.; Omaha, and North Platte, Neb.; Cheyenne and Rock Springs, Wyo.; Salt Lake City, Utah; and at Elko and Reno, Nev. The work of establishing this wireless system, begun in August, 1920, was fraught with many difficulties. Personnel and equipment were nonexistent; sites for the stations had to be determined, and to do the work only $26,000 was available. Efforts to obtain apparatus from manufacturers resulted in promises of uncertain delivery in from 12 to 14 months; however, by searching electrical-supply shops, sufficient apparatus was assembled, the U. S. Shipping Board contributing a major portion of the equipment. Considerable difficulty was also experienced at various points in securing masts, and in the extension of desired power. Then, too, transportation facilities had to be coaxed in hauling materials from isolated points. The sites, for the most part, are located on government property.

This chain of 15 radio stations will be used instead of a transcontinental telegraph line, headquarters being maintained at the post-office building, at Washington. The enrollment of wireless as an aid in the conveyance of postal matter by the air route, is claimed to speed delivery by from 24 to 48 hours. Sixteen radio men are in the employ of the department, and it is planned, when sufficient personnel is obtained, to equip all air-mail planes with direction finders. If funds are available, ground and airplane radio telephones will likewise be installed.

The station located at College Park, Md., offers some novel construction features. Being situated directly on the flying field, an antenna differing radically from the standard type had to be found. After some experimenting, a satisfactory form of aerial was found, consisting of a 500-ft. antenna supported on a number of 25-ft. masts. In place of the regulated ground, a tuned counterpoise is used.

STOCK FARM GROWS ANIMALS TO SUPPLY LABORATORIES

A stock farm remarkable for the fact that its only market product consists of guinea pigs, rabbits, and other animals used for scientific experiment, has just been established in Texas by a former member of the U. S. Medical Corps. The owner, a student of pathology and biology, is supplying a number of large hospital and other laboratories in the Southwest.



The United States Battleship "California" Launched without a Propeller, being Towed down San Francisco Bay by Seven Tugs, Two at the Bow, Four at the Stern, and One Running at Large

PROPELLERLESS BATTLESHIP TOWED BY SEVEN TUGS

An interesting problem in marine towing presented itself just after the recent launching, in San Francisco Bay, of the U. S. battleship "California," which took the water without a propeller, and with 30 miles of narrow channel separating it from the nearest adequate drydock. Amid much skeptical comment, seven tugs were engaged, two being hitched to the bow and two to each side of the stern, while the remaining one ran at large, ready to help at any point. The unusual fleet, directed from the warship's bridge, performed with remarkable harmony, and in less than 24 hours had delivered its big charge safely to its berth.

AUTO SPARK INTENSIFIER IS ALSO A TELLTALE

An oddity of automobile ignition, known to many motorists, is that if the spark is made to jump a short gap before reaching the spark plugs, the latter, though badly fouled, will fire the gas quite satisfactorily. This fact is turned to advantage in a cowl-board instrument, in which there are as many gaps as there are spare plugs in the engine with which it is used. The ignition wires, instead of being connected directly to the plugs, are first run to the instrument. This puts a gap in series with each plug. As the sparks can be seen jumping the gaps of the device, it not only acts as an intensifier, but also indicates which plug circuit may be at fault, in the event of a failure of ignition resulting in missing.

EASILY WORKED CHECK WRITER MAKES INDELIBLE FIGURES

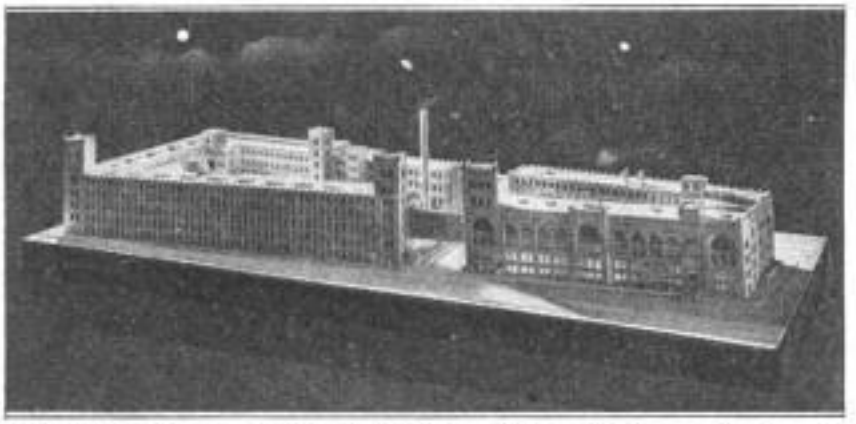
Bank checks for any desired amount are written with two motions of the hand by a new office appliance invented in

The Check Writer Discharging a Filled-In Check: The Figures are Set with a Motion of the Keys, and Printed with a Pull of the Lever

Minnesota, which looks like an adding machine, but is much simpler. The blank check is inserted in a slot at the front; the amount keys on top are pressed with one motion; a handle at the side is brought forward and back, and the check comes out with the amount line neatly filled in. The figures and characters are printed by special type which perforates the paper, preventing subsequent tampering. The method of setting up the desired line is interesting. The printing-cylinder shaft always turns the same distance, but the cylinders are mounted frictionally upon it, and stops, actuated by the various keys, keep them from turning farther than the correct distance.

PLASTER MODEL OF A FACTORY BUILDING IS A WORK OF ART

An exhibition piece which is attracting a great deal of attention at the various cycle shows is a small-scale reproduction of a large eastern bicycle factory. The model is so faithful to minute details, such as the glass panes in every window and skylight, the railroad and trolley tracks,



This Replica of a Large Bicycle-Factory Building has Been a Feature of Recent Cycle Shows. It Weighs 800 Pounds, Cost $5,000 to Build, and Travels in Its Own Compartment, a Special Packing Case

and the small figure standing in front, molded to exact scale, that six weeks of painstaking effort were required to construct it. Spectators are surprised when informed that the structure weighs 800 lb. and cost $5,000. A special lighting arrangement throws the pure white of the building up in strong contrast against a dark background, and gives the effect of bathing it in a flood of soft moonlight.

PLAN RADIO-COMPASS SYSTEM FOR SOUTH ALASKAN COAST

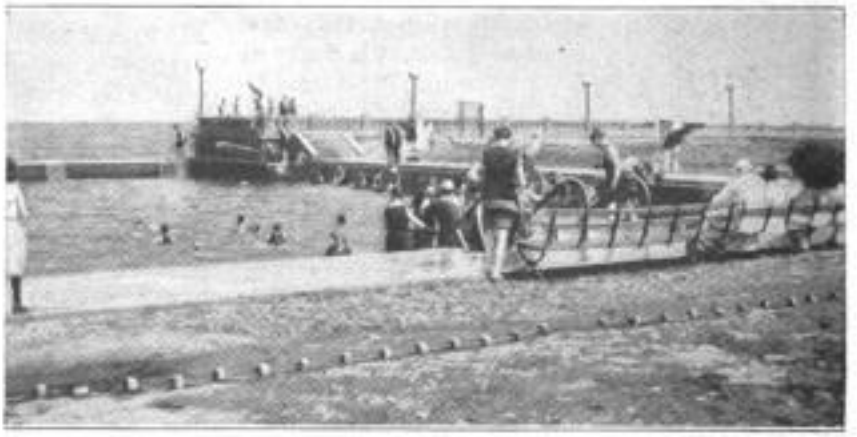
Seven prominent points of land that jut from the southern coast of Alaska are to be provided with radio-compass stations, according to present plans of the Navy Department. The sites selected are Rugged Island, near Seward; Tonki Point, and capes Chugatch, Hinchinbrook, St. Elias, Spencer, and Ommaney. When they are installed, ships in the north Pacific will be able to get their bearings at any time from the nearest two stations, by the familiar triangulation method. The stations, with quarters for five men, will cost from $34,000 to $45,000 each. They will handle no regular radio business, but will relay calls for help to the nearest wireless station.

TITANIUM FROM IRON ORE IS WHITE-LEAD SUBSTITUTE

Large percentages of titanium, which have prevented the economical working of certain iron ores found abundantly in Sweden and Norway, may prove now to be a blessing in disguise. By a new electrolytic process, the intruding element is separated as titanium oxide, which is pure white in color and has all the desirable properties of white lead as a base for paint making. Its great virtue for this use is that it is nonpoisonous, while its durability is high, and it is not dissolved by acids or alkalies. So promising a by-product will doubtless encourage the working of a vast neglected source of iron.

WALLED-IN BATHING BEACH FOILS MAN-EATING SHARKS

The waters in the vicinity of the Panama Canal Zone are so thickly infested by sharks, and so bold do these terrors become in their hunting, that it has become a risk for bathers to take a dip at an open beach. To overcome this, the waterfront at Colon has been walled in, for a sufficient distance, to afford protection. Small openings, placed at intervals in the concrete wall, permit of a free circulation of the sea water.



A Substantial Concrete Seawall, Erected along the Waterfront at Colon, Canal Zone, Protects Bathers from the Menace of the Dreaded Man-Eating Sharks

STUDYING VESUVIUS IN ITS LATEST ACTIVITIES

At the Left: A Stream of Molten Incandescent Lava Pouring down the Slope of Vesuvius from the New Eruptive Cone. It has Melted a Bed for Its Current through the Old Solid-Lava Floor. At the Right: The New Cone, Photographed from the Floor of the Great Crater during a Comparatively Quiet Interval in the Eruptive Activity

Members of the Scientific Party Directed by Frank A. Perret, Volcanologist of Washington, District of Columbia, Measuring the Temperature of the Stream of Molten Lava with an Electric Pyrometer: The Instrument's Reading Was 1,850 Degrees Fahrenheit, and the Operator was Forced to Turn His Face Away from the Fierce Radiation While Holding the Contact Member in the Torrent

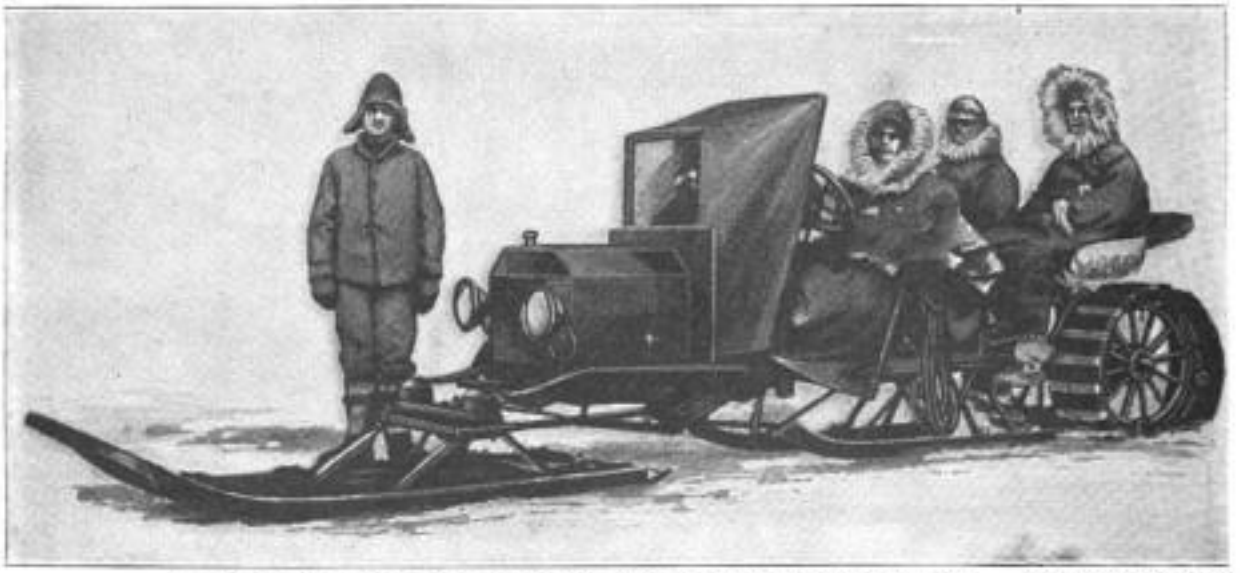
WIDE WORLD PHOTOS

GAS BLOW-OUT IN OIL WELL CREATES HUGE PIT

Sudden release of the pressure in a subterranean gas pocket, when it was penetrated by an oil-well drill in a recent California operation, resulted in an explosion that threw hundreds of tons of earth high in the air. The pocket was struck at about 900 ft., and when the flying soil had settled, the drill derrick was found to be buried in a chasm 50 to 60 ft. deep, and some 30 ft. across, around which the ejected earth had formed a crater rim, 25 ft. high. Gas continued for several hours to issue from fissures within 100 ft. of the well. About $25,000 loss was caused by damaged equipment and extra labor to clear away the big pile of dirt, so that drilling operations could be resumed.

The Shattered Remnants of the Derrick, Partly Buried in the Chasm Created by the Sudden Blow-Out of Gas

Clearing Away the Crater Rim, 25 Feet Deep, Formed When the 60-Foot Pit was Opened by the Gas Explosion



ALASKANS SKIM THE FROZEN TRAILS VIA MOTOR SLED

THE picturesque dog team and Eskimo sledge may be driven from the far northern trails by the unhandsome but businesslike and efficient motor sled. A resident of Nome, deciding that he wished to use his car during the season when the roads are buried under several inches, or even feet, of snow and ice, stripped it down to the chassis to eliminate weight, and mounted it on runners. One broad, tobogganlike runner supports the weight of the front end of the chassis, and is connected to the steering link so that it is easily turned by the steering wheel. Two more runners, placed in the middle, carry their part of the weight and give rise to the smooth, gliding sensation peculiar to sleigh riding. The rear wheels perform their regular driving function, and, that they may have ample traction, each is equipped with a wide tread, to which are attached transverse traction cleats. The vehicle develops high speed, and is operated with great ease and smoothness.

Amateur Voyagers Exploring the Upper Reaches of the Snake River, in Idaho, with the Aid of a Big Raft That was Built for the Purpose at a Wilderness Sawmill, and Sold for Its Lumber after Making the Trip

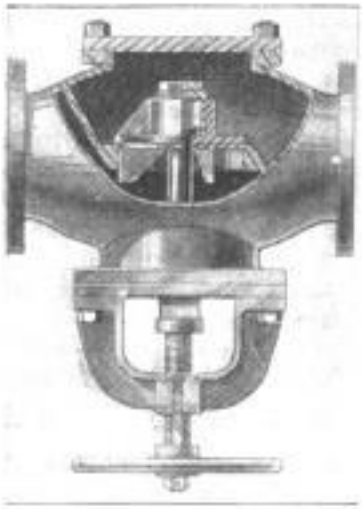
BIG RAFT CARRIES EXPLORERS DOWN WILD SNAKE RIVER

For a river trip that is all downstream, through currents and rapids of unknown turbulence, it cannot be denied that a raft is the safest and most comfortable means of navigation. That was the kind of craft decided upon by a party of adventurers who recently set out to explore the upper reaches of the Snake River, Idaho's famous but only partly known scenic stream. The amateur argonauts, eight in number, selected the Wyoming state line as their going-in point, and there became patrons of a primitive sawmill to the extent of 7,300 ft. of red-pine lumber.

With this material they constructed, of two thicknesses of 3-in plank, a raft, 80 ft. long and 16 ft. wide, with two 20-ft. sweeps at each end for steering, a raised deck for the dry storage of camping equipment, and a shallow hold near the stern fitted with bunks especially for the comfort of the ladies in the party. So sturdy a craft made easy work of the swift stream's erratic vagaries, and on it the voyagers, guided by an experienced pilot, floated for 200 miles through magnificent mountain scenery accessible in no other way, and enjoyed such hunting and trout fishing as is to be found only in unexplored country. And at the end of the unusual journey the raft was sold, as lumber, for a sum that practically paid the expense of the trip, making the unusual adventure a very inexpensive one.

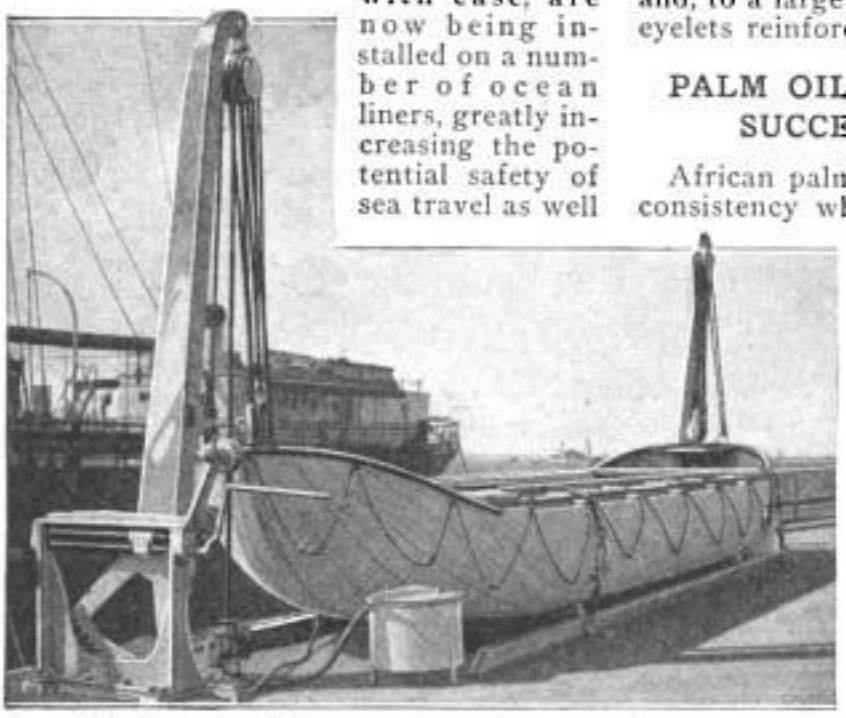
INVERTED SHUT-OFF OR CHECK VALVE IS A NEW DESIGN

In many pipe-line systems it is necessary, or advisable, to have both shut-off and check valves, the latter to allow an uninterrupted flow in one direction only. Heretofore, when such installations have been needed in overhead horizontal lines, the practice has been to use two distinct valves for the reason that there has been no single device available. An eastern inventor now announces the development of an inverted combination shut-off and check valve, which, it is claimed, functions equally well as either. In appearance the new valve closely resembles the conventional type of globe stop valve, but, in construction, differs in that the valve disk is not rigidly attached to the stem, but is free to move upon it vertically when it is screwed in or, in other words, when the valve is in the open position. This gives the check-valve effect.



NEW LIFEBOATS AND DAVITS INCREASE SEA SAFETY

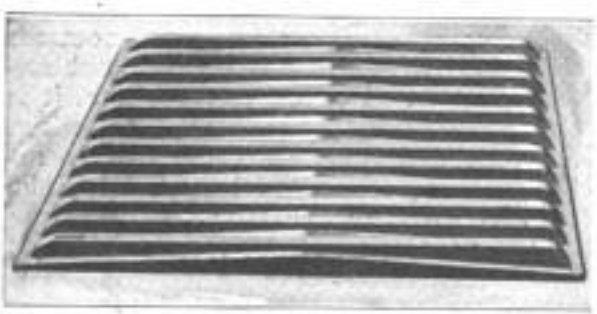
Lifeboat davits so designed that one man, by turning a crank, can lower a boat with ease, are now being installed on a number of ocean liners, greatly increasing the potential safety of sea travel as well as the comfort of passengers, if use of the boats becomes necessary. The one crank operates both the outward swing of the davit and the falls. Because of the improvement in ease of lowering, larger lifeboats can be used, with more commodious storage space for fresh water and provisions. The new boats are nonsinkable, less sharp of bow and stern than the older models, and designed to ride well in the heaviest seas.



One of the New-Type Lifeboats, and the Tackle by Which One Man can Lower the Boat Easily by Turning the Crank

AUTO RUNNING-BOARD MAT IS SELF-DRAINING

A ribbed-rubber nonskid running-board mat for automobiles is molded in such a way that the bottoms of the spaces between the ribs are pitched from the center toward the ends, so that the surfaces slope like a roof. As a result, the device offers a firm foothold under most any weather condition, it being self-draining and, to a large extent, self-cleaning. Metal eyelets reinforce the attachment holes.



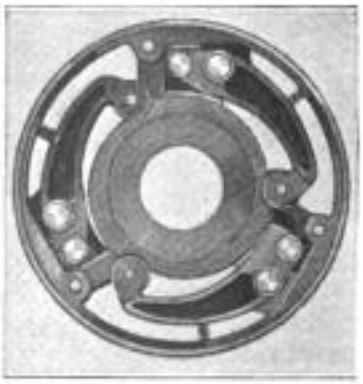
The Spaces between the Ribs of the Self-Draining Running-Board Mat for Autos are Pitched from the Center toward the Ends

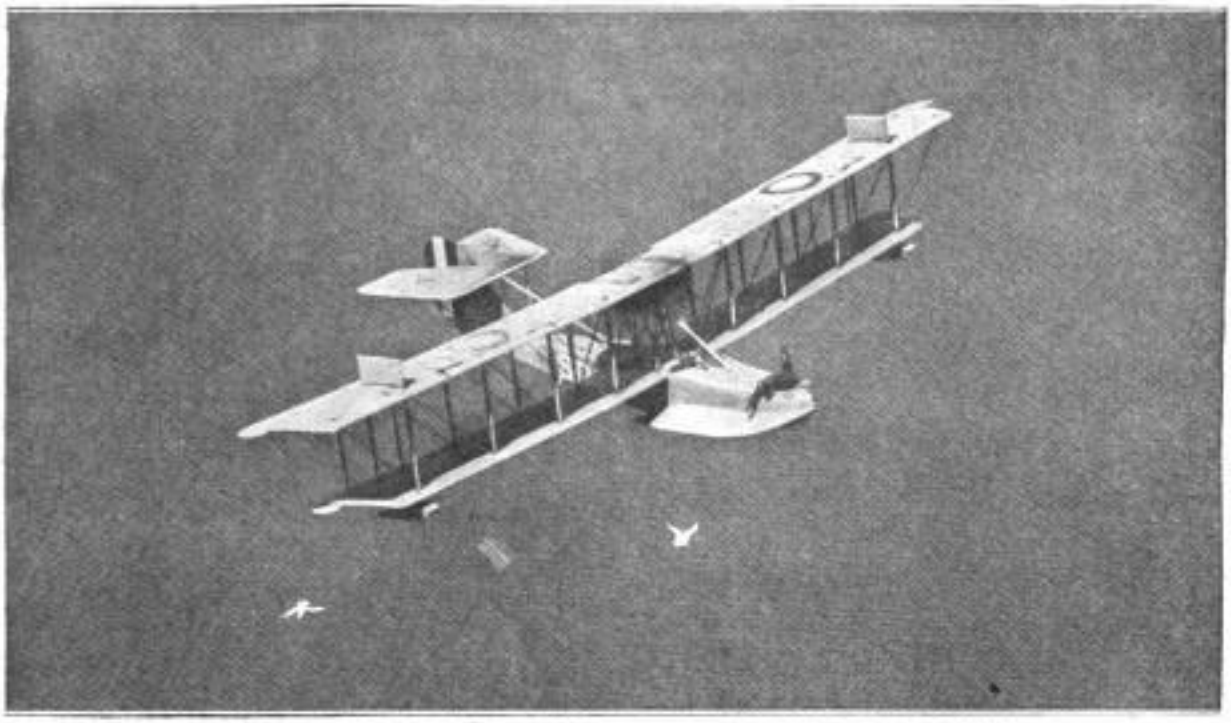
PALM OIL FOR MOTOR FUEL SUCCESSFUL IN TESTS

African palm oil, which is of a buttery consistency when cold, does not superficially recommend itself as a fuel for internal-combustion engines, but recent tests conducted in Brussels, Belgium, have shown it quite successful for that purpose. A Swedish engine of two-cycle semi-Diesel type was used, with a fuel tank containing two wire-screen partitions. The oil, which liquefies at about 98° F., and ignites at 415°, was heated by jacket water or other means, passing then through the screens to the injection pump. The engine was started, in the tests, with crude oil, but in the temperature of the African Congo, where it is desired to use it, it is thought the starting oil will not be needed.

CHUCK WITH INCLOSED CAMS TIGHTENS AUTOMATICALLY

No wrench, or other tool, is needed for tightening the jaws of a new and ingenious form of chuck upon its work. Utilizing a self-contained cam action, the appliance, designed by an Illinois inventor, is wholly automatic. The three usual sliding jaws are pivotally connected to three rocker arms inside the casing, the opposite ends of the arms carrying rollers that bear upon a three-way cam in the center. When the hub is turned in the casing, the arms operate to move the jaws inward with great force.





HOMING PIGEONS PART OF U. S. AIR-SERVICE PERSONNEL

CONSIDERABLE attention is being devoted to the training of homing pigeons by naval airmen. As soon as a bird becomes old and strong enough to train, it is assigned a number which is entered on the muster sheet of the station to which it belongs and also imprinted on a light aluminum band fastened about its leg. Thus is the feathered auxiliary sworn into the service as a full-fledged emergency flier. Planes are not allowed to leave their stations without a full complement of pigeons, as, in emergency, they can be depended upon to return to their lofts in a straight line, carrying messages tied to their legs. During recent maneuvers at Pensacola, Fla., 32 pigeons carried important messages a total distance of 700 miles at an average speed of 32 miles an hour. The illustration shows two white homing pigeons, liberated from a seaplane, circling to get their bearings for a straightaway home flight.

BOY SCOUTS BUILD AUTO OF JUNKED PARTS

A damaged stationary engine which the owner parted with for the sum of $10, the gear set, frame, and the front and rear axles from as many different makes of cars, plus considerable ingenuity and plenty of hard work, resulted in a perfectly serviceable motor truck, owned and built by Boy-Scout Troop No. 2 of Maxwell, Ia. The engine, mounted directly on the front of the car, is belted to an old auto wheel, which transmits the power to a central transmission by way of a long shaft. From here to the rear wheels the drive is by the conventional propeller shaft and live rear axle. Speed was sacrificed in favor of reliability, in the design, with the result that while the vehicle has a maximum speed of only 10 miles an hour, it can be depended upon to keep running at that rate for hours on end. The scouts use it to carry their bed rolls, tents, etc., on long hikes, and, possibly, to ride on during the return trip. The homemade car recently made the round trip to the Iowa State fair, where it created a sensation.

A Homemade Car Built by a Boy-Scout Troop from Odds and Ends of Wrecked and Damaged Machines: The Power Plant and Muffler Are Prominent Features

LARGE MAP-SUPPORTING FRAME HAS ILLUMINATED CANOPY

Business concerns, schools, and other institutions using large wall maps, will be interested in a fixture in which a canopy, equipped with light bulbs, reflects the light downward upon the maps, which are attached to panels and the latter hung in the apparatus in a booklike arrangement. The outfit needs no anchoring to the floor or walls, as four widely spaced legs form an ample support. A fifth leg sustains the center of the top and bottom rails upon which the map panels are suspended by pivots in their ends. The maps supplied with the device are finished with a waterproof film and may be marked with water colors, ink, or pencil, and also washed without injury.

This Self-Supporting Map Rack Has an Electrically Illuminated Canopy Which Reflects the Light Where Needed

SELLING OLD AUTO FOR NEW IS PUNISHED BY COURT

Selling a used auto under the representation that it was new was adjudged a breach of the law by a jury in an Illinois court the other day, and the defendant in the case, a dealer, was found guilty of operating a confidence game. Though the car in question had not been long used, a chattel mortgage, executed and recorded by the previous owner, was accepted as evidence that it was second-hand. The decision, the first of its kind in the state, is regarded as a new assurance of protection to car buyers, enabling them to hold dealers to the letter of their statements, and to accept only the kind and condition of car agreed upon.

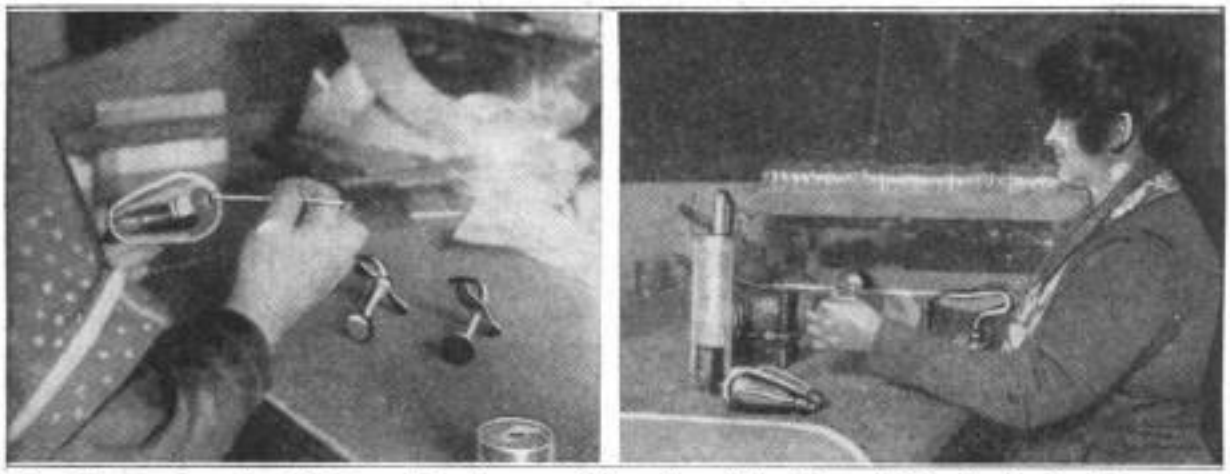
NEW GAME OF "TEAM GOLF" HAS PLAYER FOR EACH CLUB

Golf played by competing teams of specialists, like baseball or cricket, is an interesting innovation that is gaining popularity in England. The conventional number of players is six to each team, but the arrangement is flexible. Each player uses only one club, the captain of the team determining the circumstances under which it is played. Thus the driver, brassie or cleek, iron, mashie, niblick, and putter are not merely different clubs, but represent separate players, each, when the niceties of the game are observed, selected for his or her ability and dexterity in that particular play. By this means the aristocratic but exclusive game is given all the sociable advantages that make other athletic sports so interesting and popular.

CHEMICAL ELEMENTS SHOWN AS IMAGES ON SCREEN

The projection method of ascertaining the elements in a given sample, is now being used by chemists in laboratory practice throughout the country. A carbon-arc light is arranged in such a way that, with a reflecting hood, a screen in a dark room is made to record the elements present in images of color and by light changes. The samples are placed in a cup-shaped cavity in the positive-carbon pole. A 110-volt current of 25 amperes passes into the carbon, and an arc action takes place in the compound. Flame-tip color as well as other characteristics of the elements present in the sample are recorded on the screen, and a comprehensive analysis of the compound is obtained by this simple process.

¶A course in automobile maintenance and repair, inaugurated at Wellesley College, includes not only theory but actual work in the dismantling, assembly and repair of the various car parts. The women students also master the electrical system, which is explained in the laboratory of the physics department.



Left: Cleaning Out the Old, Burned-Out Tungsten Wire through the Reamed Hole in the Tip, Preparatory to Relacing with New Wire. Right: The Reaming Table, Where, after Warming the Glass, the Tip is Removed, and the Opening Enlarged to a Half Inch

RENEWING TUNGSTEN LAMPS

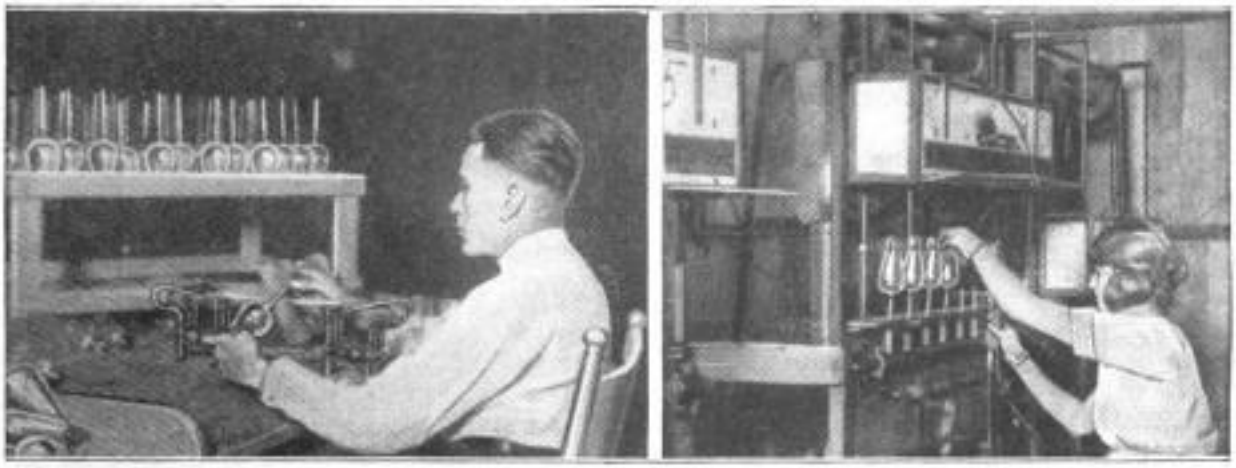
BY FRANK B. HOWE

A NEW western firm has succeeded in making commercially practicable the renewing of tungsten electric lamps, after they have been burned out in use.

The old globes are first put through a special glass-cleaning bath, in a tub washer. Then they are warmed in a flame stand, so that sudden heat will not cause them to explode, and the tip is broken off. After the tip is removed, they are "reamed," which consists in burning a large hole, about ½ in. in diameter, in the glass at the tip end.

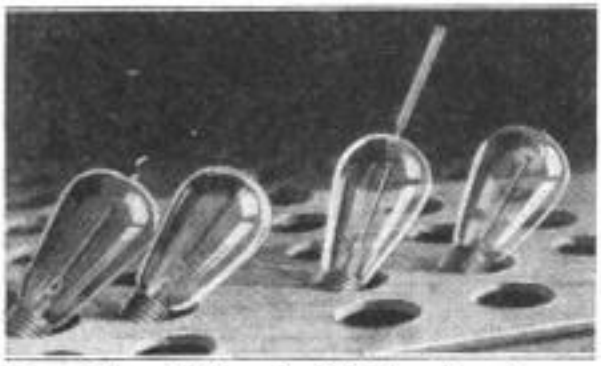
Lacing New Tungsten Wire into the Old Lamps: Using a Special Tool, the Wire is Clamped to One of the Terminals, Laced around the Hooks, and Made Fast

Another special washing bath is then used to remove the deposit inside the lamp that is characteristic of burned-out globes. Following this, the lamp goes to the "lacing table," where girls, working through the reamed hole in the end of the lamp, clip the terminal wires and remove all the old tungsten wire from the little hooks. New-drawn wire is then clamped to the negative terminal (the "leading-in" wire) and then laced around the old hooks and clamped to the positive terminal. For this lacing, an instrument resembling the device used to remove olives from a narrow bottle at the table, is used. After this rather delicate operation has been completed, an acid that absorbs any old gas that may be left in the lamp is placed on the leading-in wire, and the lamp is ready



Left: Fusing Short Glass Tubes onto the Open Ends of the Refilled Bulbs, Ready for the Vacuum Pumps. Right: Pumps Exhausting the Air from the Refilled Lamps, While the Vacuum is Electrically Tested

to be sealed up again. It goes first to the "tubulator," who welds a piece of glass tubing, 4 in. long, to the reamed hole. It is then put in the vacuum pump to be exhausted, which takes about eight minutes. The degree of vacuum is then tested by means of a spark coil. With the pumps still at work, a gas flame is applied to the glass tube on the end of the globe, and as there is a sucking tendency, the softened glass is drawn inward, forming the tip. The rest of the glass tube breaks off. The lamp finally goes to a testing table, where current is passed through it, at a voltage slowly increased from zero to 110. It is now completely restored, and after another cleaning, to remove grease and dirt, is ready for packing.



From Left to Right: An Old, Burned-out Lamp, a Bulb Cleaned and Reamed, One That has been Refilled and Tubulated, and a Finished Lamp

The renewed lamps are equal to new ones; hence, the enormous saving that is made possible by this process is self-evident.

EQUIPMENT IS ALL ELECTRIC IN BIG CANADIAN CAFÉ

Electrical cooking is now common practice, but the recent electrification of a large cafeteria in a city of western Canada is remarkable in more than one way. Current is used not only for operating the mammoth range, and the big bake oven in the display window, but for general heating, lighting, ventilation, and refrigeration as well. An interesting feature of the installation is the provision for receiving current from either the city lines or the local railway system by simply throwing a switch, so that uninterrupted service may be assured. For reducing the railway voltage from 2,300 to 220 and 110, two 50-kva. transformers are installed in a fireproof basement vault. From them, heavily insulated and running in iron conduits, three cables of 100 wires each carry the heavy current to a distributing box, to which all equipment is connected.

Above: The Type of Electric Oven Used for Baking Breads and Pastries in the Newly Equipped Cafeteria. Right: The New Electric Range, Declared to Be the Largest in Canada

One of the Street-Car-Less Streets of Bowling Green, Conveying a Good Idea of the Local Automobile Density: There is Reported to Be One Car to Every Three Inhabitants, and Strict Traffic Rules are Needed

AUTOMOBILES DISPLACE TROLLEY LINE IN OLD SOUTHERN CITY

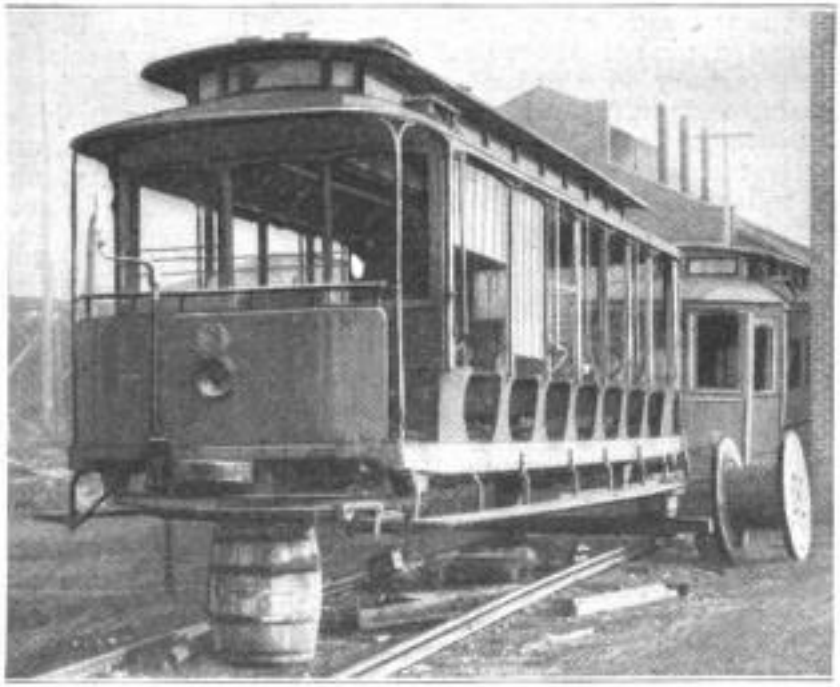
By CHARLES E. MACE

AUTOMOBILES are slowly but surely crowding the tram cars off the streets of scores of American cities, but Bowling Green, Ky., is perhaps the first community where the traction company has shouted "Kamerad," and given up the fight.

This thriving little municipality, with a population of 15,000, claims the distinction of issuing more automobile licenses than any other city of its size in the country. It is said that there is an automobile to every three inhabitants. Traffic regulations and parking rules, ordinarily necessary only in very large cities, are rigidly enforced here.

This condition is due largely to the fact that Bowling Green is the center of activities in the western Kentucky oil fields, and an automobile is a necessary piece of equipment in operations for oil. Those of the inhabitants who are not engaged in some way in the oil business — and these are hopelessly in the minority — have become prosperous through supplying the oil men with the necessities of life, and with it all, the number of automobiles has increased daily, and the tramway has consequently suffered, until recently it "gave up the ghost" completely.

The final blow came when one of the cars met one of the few remaining pedestrians "head-on" at a street intersection. The victim brought suit against the traction company and won his case. The company, being unable to pay the damages awarded, turned over the entire equipment to the thankless plaintiff. The latter rightly considered the further operation of the tram cars an unprofitable venture and promptly junked it. Rails and wire were removed from the streets and sold as scrap metal, and the automobile now holds full sway on all the highways and byways of Bowling Green, an early example of the future motorized city.



The Last of the Bowling Green Street Cars, Driven Out of Business by the Autos, and Ready to be Sold for Scrap

MINIATURES IN COLORED WAX REVIVE ANCIENT ART

Lacking the Color of the Originals, the Wax Miniatures Give an Idea Only of ing Work. The Artist Uses a Metal line of the Subject and Then Build Colored

Photographic Reproductions of Fom the General Character of the Interest- Plate as "Canvas," Tracing the Out- ing the Picture with Particles of Wax

Successful revival of a lost art reflects more credit on the artist than the mere improvising of a new one, for real art does not take kindly to novelty. By the execution of a series of charming miniatures done in colored wax, an American artist, Miss Ethel Frances Mundy, has made available to contemporary connoisseurs a mode of portraiture that flourished in ancient Greece and Rome, appeared sporadically up to the 18th century in England, France, Italy, Spain, and even America, and then disappeared. It was the study of these ancient works, still existent by the grace of collectors and museums, that gave the American worker her inspiration.

With few technical data to guide her, and a confusing variety of method evident among the old masters, the devotee engaged a chemist to devise a wax that would not melt after its application, and began a search for colors that were permanent and without chemical interaction. A steel scapula and a set of improvised orangewood tools composed the working outfit, and metal plates coated with a film of wax became the "canvas." On such a plate the outline of the subject, generally in profile, is first traced with a sharp point. Then begins the real work of building up the miniature image with particles of wax, into each of which has been kneaded a special color, some of the tints being brought from China. The finished portraits, besides the interest of their unusual technique, are remarkable for a delicacy, a fidelity, and a warmth of detail that would do credit to the better-known, and seemingly more flexible, mediums of artistic expression.

¶It has been found that spoilage of apples from scald, while in transportation or storage, can be almost entirely prevented by wrapping them in oiled paper.

NEW HOG-CHOLERA VACCINE SEEMS SUCCESSFUL

Recent experiments with a new hog-cholera vaccine by the Bureau of Animal Industry, while not absolutely conclusive, seem to indicate that it will be quite possible to protect hogs by inoculation as soon as the new method is somewhat further perfected. Although no details of the composition of the vaccine have been published, it is understood that it is based upon the discovery that ammonia solutions, even weak ones, are fatal to the cholera germ. With this finding as a basis, the vaccine is prepared by mixing specially prepared blood, drawn from infected hogs, with an ammonia solution. The method of use of the resulting mixture is that of injection. Test animals treated with various strengths of the vaccine in varying doses, at intervals of a week between injections, have shown a most encouraging resisting power, though

kept in pens in close contact with hogs in various stages of the practically fatal disease. Another conclusion reached is that gnats and flies do not spread the disease to nearly so great an extent as has been commonly supposed.

VEST-POCKET CASH REGISTER KEEPS PERSONAL ACCOUNTS

A personal-expense accounting system, which keeps a written record of receipts, outlay, and balance of funds on hand, and which is compact enough to be carried in a small pocket, is offered by an eastern novelty manufacturer. A paper tape, wound on rollers contained in the device, is ruled with lines which divide it into columns, showing date and amount of transaction, item for which money is paid out or received, and the remaining cash balance. The rollers are turned by knurled thumb wheels, which project through the metal sides of the

The Vest-Pocket Accounting System: A Statement of Cash on Hand Is Shown in the Space to the Right

device. When a tape is used up it can be quickly and easily replaced with a new one.

COAL-MINE FATALITIES SHOW DECREASE DURING 1920

Although coal production reached 585,000,000 tons for the first 11 months of 1920, as compared with 501,000,000 tons for 1919, fatal accidents in the industry fell from 2,146 for the earlier period to 1,983 for the later, a decrease of 163, or about 7.6 per cent. This, calculated on a basis of fatalities per quantity of production, works out to a life loss of 4.28 per million tons in 1919 and 3.39 for the same quantity in 1920. Though indicating an improvement in conditions, it would seem that these figures still show an unnecessary sacrifice of human life and place the miner's calling in the classification of extra-hazardous occupations.

DANGER SIGNAL REFLECTS AUTO LIGHTS WITH A RED GLARE

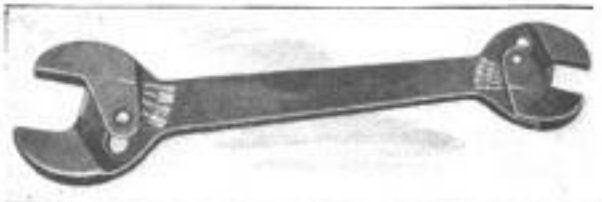
A novel railway danger signal, which, though lightless, has the warning effect

A Novel Railway-Crossing Warning: At Night the Reflector Returns the Light from Auto Headlamps in a Bright, Red Beam

of a red light, has been erected at a dangerous crossing in Indiana by the Hoosier Motor Club. The device, fastened to the upright bearing the worded warning sign, attracts attention in daylight on account of its oddity. At night, a red reflector, in the body of the contrivance, catches and returns the light from automobile headlamps in a broad, crimson ray which has an unmistakable meaning.

TEN SIZES HANDLED BY ONE DOUBLE-ENDED WRENCH

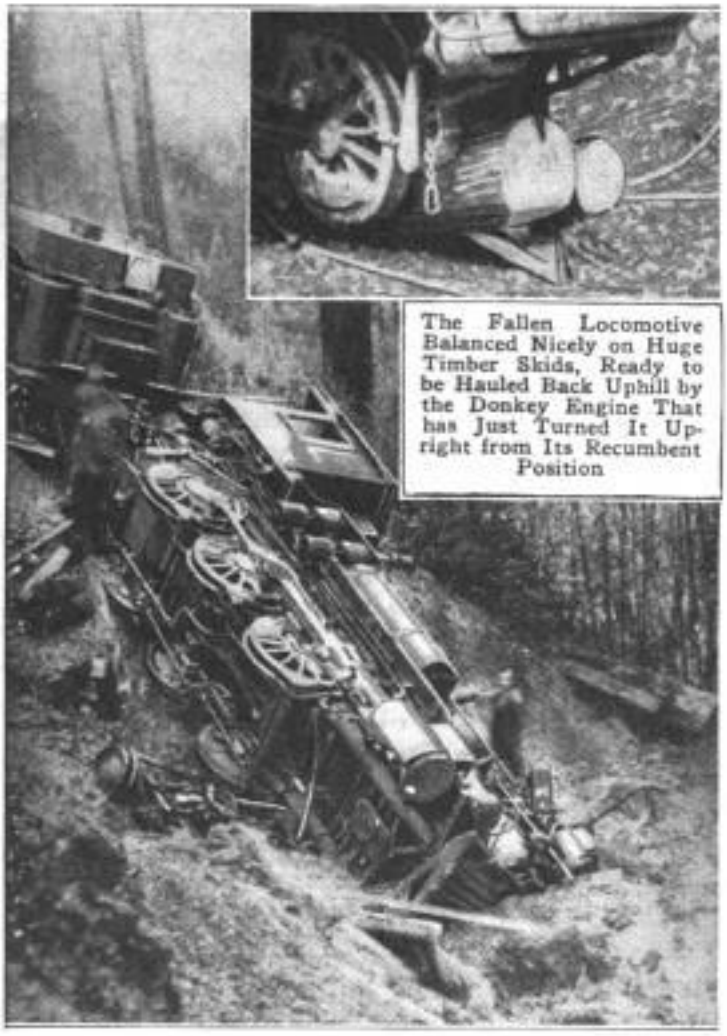
Double-ended wrenches are popular, especially among autoists, for their sturdy simplicity, as compared with the awkwardness of the ordinary monkey wrench. Even the latter's advantage of adjustability now has been conferred upon the former, for a two-ended wrench that handles 10 sizes of nuts has been placed on the market. One jaw at each end is slidably mounted, with a pin moving in a slot, and locks in place against a ratchet edge. The body, which is 7¾ in. long and ⅜ in. thick, has positions for the various sizes, from ¼ to ⅞ in., marked upon it.



Double-Ended Wrench Adjustable for Ten Sizes, between ¼ and ⅞ Inch, by Sliding the Jaws

RIGHTING A WRECKED ENGINE WITHOUT A CRANE

Getting a locomotive back on the track after it has capsized, or gone over an embankment, as a rule offers no particular difficulties if wrecking cranes can be used.



The Fallen Locomotive Balanced Nicely on Huge Timber Skids, Ready to be Hauled Back Uphill by the Donkey Engine That has Just Turned It Upright from Its Recumbent Position

A Discouraging Problem: The Locomotive on Its Side on the River Bank, after a 20-Foot Downhill Plunge, and No Wrecking Crane Available

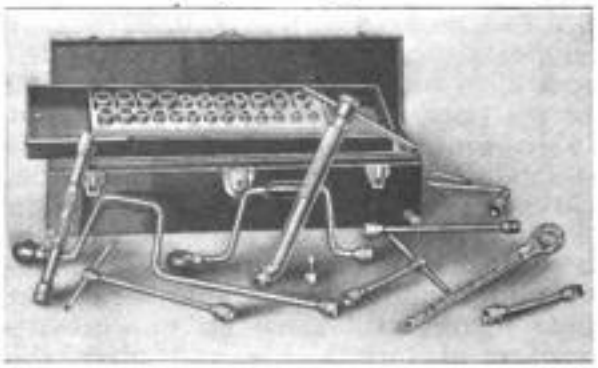
But when no such equipment is available, and the work must be done quickly, opportunity is given for the display of much ingenuity.

Recently, on a railroad running through the timber district of the Pacific coast, the dirt of a fill became so softened by heavy rains that it slid out from under the track, causing a locomotive to fall to the river bed below, a distance of some 20 ft. It being impossible to procure the use of a wrecking crane at once, other means of doing the work had to be devised.

A powerful donkey engine, used for logging work, together with necessary wire rope and blocks, was brought to the job, and the tackle set for righting the locomotive. Two long timbers were placed beside the engine, running its full length, and against the inside of the left-hand wheels, in such a position that, when the locomotive was righted, the right-hand wheels dropped over on the opposite side of the timbers. These timbers were of such diameter that the driving axles rested on them, carrying all of the weight, while the wheels were held about 6 in. clear of the ground. The locomotive was then made fast to the timbers by means of wire ropes passed around both; a tackle from the donkey engine was attached, and the whole dragged up the bank, the timbers playing the part of sled runners or skids. Another set of wire ropes, operated by the donkey's second drum, served as guy lines, keeping the locomotive from capsizing while making the trip. So accurately was the rigging set, that the engine was brought directly to the roadbed and exactly in line with the new track that was being laid around the washout. Then the engine was jacked up, the timbers pulled out, and the track laid under it. This being done, the jacks were lowered, and the engine was on the rails again.

WIDE-RANGE SOCKET-WRENCH KIT SPEEDS AUTO REPAIRS

Every automobile mechanic is keenly aware of the difficulty of performing high-speed repair work without socket wrenches. To fill a widespread demand for these tools, a manufacturer has recently placed on the market a most complete set of 24 interchangeable square and hexagon



With 24 Interchangeable Sockets and 10 Extension Handles and Fittings, This Kit Forms 768 Distinct Socket-Wrench Combinations

sockets and an offset screwdriver, which, when used in connection with the 10 different holders, extension handles, etc., furnished with the set, permit hundreds of distinct wrench combinations. The master holder of the outfit consists of a strong cylinder with the lower end arranged at a slight angle to the main body. Inside is a shaft, fitted with a universal joint at the lower end and a cross handle at the upper. Every bolt and nut on a car, it is claimed, can be easily reached and turned with this outfit.

ALARM-CLOCK ATTACHMENT OPERATES FURNACE DRAFTS

A simple device which will open the draft door and also close the check draft of a heating furnace at a predetermined time, is so arranged that it may be attached to any standard alarm clock, the reverse motion of the alarm key supplying the small amount of power needed to operate the contrivance. The principal parts of the apparatus are a small drum with reduction gearing, and a trigger with its tripping mechanism. A light cable connects the chain of the draft door with the drum, while the check draft is operated by the trigger. When preparing the furnace for the night, the check draft is opened and the trigger set. The alarm is also wound and the clock set for any time desired. When the time arrives the trigger is tripped. This allows the check draft to close. At the same time the drum winds up the cable, thus opening the draft door.

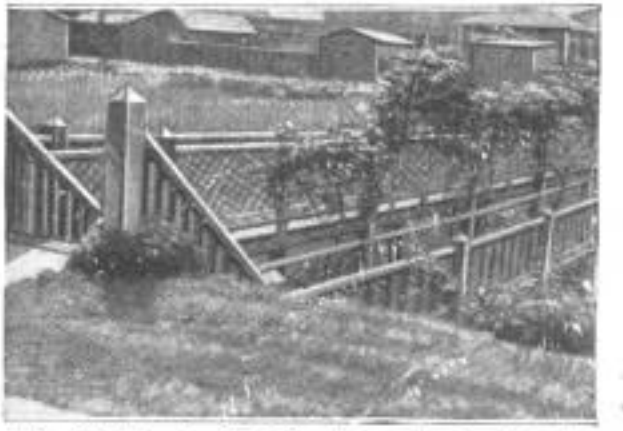
MOTOR-DRIVEN SHEARS SAVE BARBERS' TIME

The time of the Saturday-night barber-shop wait will be reduced by about one-third when the electrically operated barbers' shears come into general use. This tool, evolved by a resident of West Virginia, is made up of a somewhat complicated internal gearing, which causes the blades to open and shut, a flexible shaft, and a small electric motor. The hand grip of the shears proper is provided with the customary finger and thumb loops, which are stationary. It is claimed that the device saves two-thirds of the time usually required to trim hair, as the blades work continuously and at very high speed, cutting very smoothly and evenly.

Above: Electrically Driven Barber Shears in Operation. Left: The Outfit Is so Small and Light that It is Easily Packed in a Small Case

ODD DOUBLE BRIDGE SPANS SUNKEN GARDEN

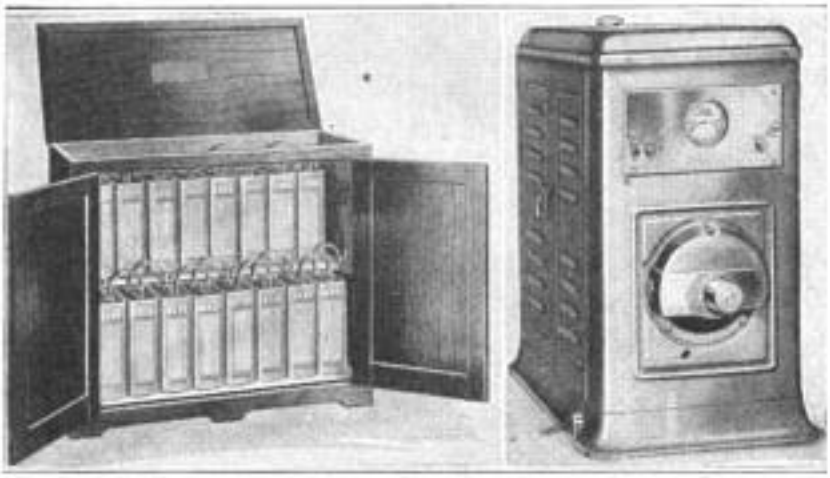
Many residences in one western city are separated from the street by small, carefully tended sunken gardens. One of these is conspicuous for the odd double bridge that spans it. There are two levels; the upper takes one directly to the porch, the other, reached by a flight of descending steps, leads one to the path on the garden bottom. The structure is built of wood, and is half hidden by climbing vines.



This Odd Two-Level Bridge Spans the Small Sunken Garden That Separates House and Street

LIGHTING PLANT IN CABINET LOOKS LIKE PHONOGRAPH

That even machinery may be made to harmonize with esthetic surroundings is demonstrated by a new form of home-lighting set, all of which is contained in an enameled-steel cabinet that resembles a modern phonograph. For the battery, another closed cabinet of equally pleasing finish is provided. All the control mechanism of the generating set is carried in a drawer that slides in the upper face of the first-mentioned cabinet, with automatic contacts on its back, and the only parts that appear on the surface are the switch buttons and a battery-charging meter. Because of its appearance, the outfit is particularly suitable for yachts, but will doubtless prove equally popular in country homes of the better class.



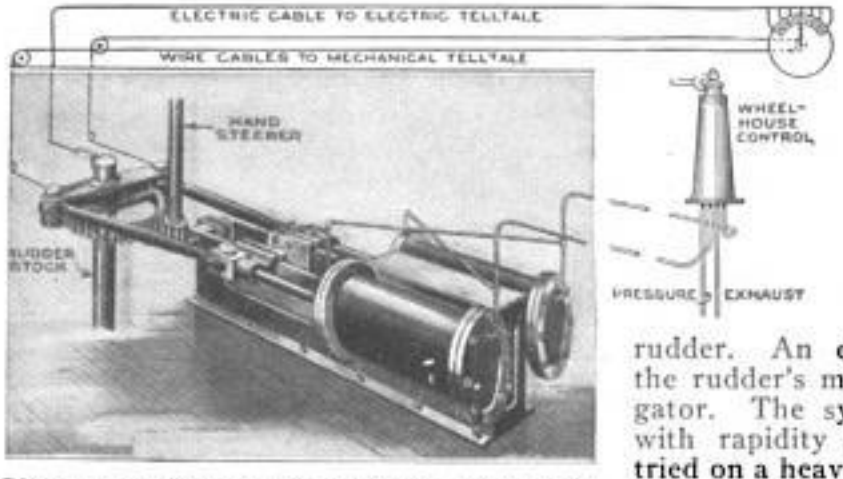
Left: The Separate Cabinet That Contains the Storage Battery. Right: The Phonographlike Steel Cabinet for the Lighting Set, with Its Switch Drawer, in Which the Instruments are Mounted, at the Top

ELEPHANT BUTTE DAM IN NEW HYDROELECTRIC PROJECT

By building three new hydroelectric plants on the Rio Grande, one at the Elephant Butte dam, N. M., and the others at Tortugas and Canutillo, it is estimated that 33,000 hp. can be produced in electric energy for distribution through the neighboring region. The farmers propose to finance the undertaking for $4,000,000 and sell current at cost to the government, if it will build a canal to double the area of the irrigated district. The canal would be extended to El Paso, Tex., at the city's expense. The project, it is calculated, would pay for itself in 10 years, and thereafter return about $500,000 a year. About $5,000,000 was spent in building Elephant Butte dam.

PNEUMATIC SHIP-STEERING SYSTEM HAS ADVANTAGES

Compressed air, already with a long list of mechanical successes to its credit, now has found a new field of usefulness in the steering of ships. The mechanism used, designed by two Oregon inventors, consists of a pair of horizontal cylinders with their pistons connected to the ends of a cross yoke on the rudder stock. In the wheelhouse is a simple hand lever on a pedestal, which is moved to right or left for steering, actuating valves that admit air, at 130 to 175 lb., to the front of one and the back of the other cylinder, opposite ends being connected to an exhaust pipe. In neutral position, the air in the cylinders acts as a cushion for the thrust of the rudder. An electrical indicator reports the rudder's movement back to the navigator. The system is declared to work with rapidity and precision, and when tried on a heavy towboat with six rudders, it turned from hard aport to hard astarboard in nine seconds.



Diagrammatic View of the Pneumatic Ship-Steering Equipment: The Control Valve Connects Air and Exhaust Pipes to Opposite Cylinder Ends

HARVESTING HOPS MECHANICALLY

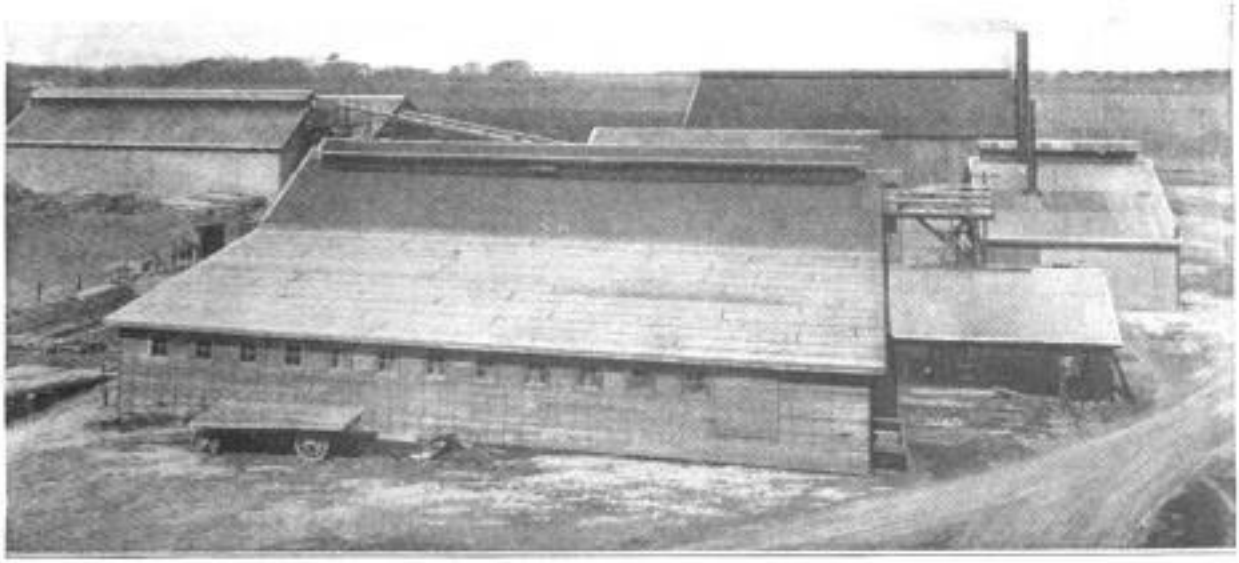
BY ARTHUR L. DAHL

THE hop fields of the Pacific coast have been the Mecca to which thousands of wandering laborers have journeyed each harvest season, for hops were picked by hand and required a large army of workers during the few weeks when the fields were ripe. The hop cones are small and soft when ripe, conical in shape, and grow on vines 15 to 18 ft. long, surrounded by many green leaves, and no device had been perfected to supplant hand labor until a large grower invented the first hop-picking machine, of which a number have been in successful operation on the hop ranches in California, Oregon, and British Columbia for several years. Lately they have been so perfected that it is now possible to pick by machinery the entire output of the largest ranches, and do the work better, quicker, and more cheaply than by the old system of hand picking.

A Scene in a Pacific-Coast Hop Field during the Picking Season: Until Recently, All Picking was Done by Hand, the Work Attracting Thousands of Migratory Workers

The latest machine is quite complicated, and performs a number of separate functions designed to carry the hop vines through the machine, while the cones and leaves are removed, separated, and cleaned, so that the hops are conveyed to one part of the plant, while the leaves, twigs, and trash are deposited elsewhere. Very few workers, however, are required to operate it, and a 25-hp. electric motor will provide sufficient power to run the entire machine.

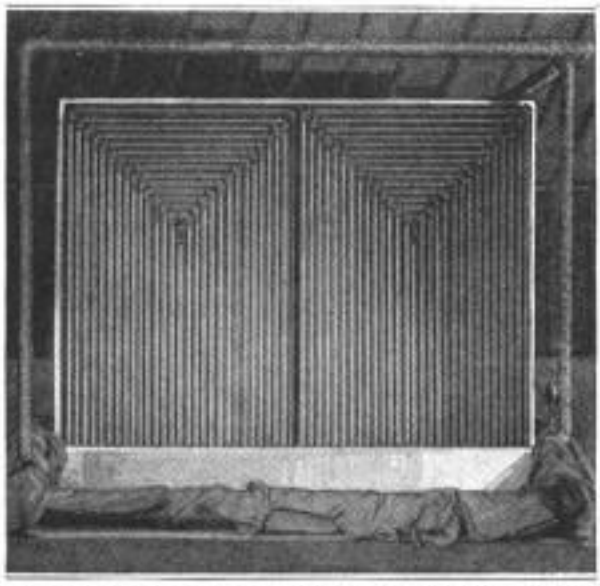
Hops to be picked by the machine are brought to the plant by wagons, and the vines unloaded, one at a time, and fastened at the receiving station to a revolving conveyor that carries them through the picking machine until all the cones are



General View of a Typical Hop-Drying Plant, with Its Picking Building, Drying Kilns, Cooling Room, and Baling Department, Handling the Crop from Field to Market: In the Distance Are the Trellises of the Hop Fields

detached, when the naked vine is automatically released. Two men work at the receiving platform, inserting the vines in the claspers attached to the conveyor, as fast as they appear. By this means a steady stream of vines goes through the machine at all times, and as one wagon is unloaded another drives up.

The vine carried along by the conveyor is pulled to the top of the machine, where it passes over a series of revolving drums, attached to which are a large number of V-shaped picking fingers of wire, placed close together. These drums revolve in a direction opposite to that of the vine, and as the cones and leaves come in contact with the fingers, they are gently pulled off, singly or in clusters. The single cones drop down through the machine and fall on moving belts running upward, which give a whirling motion to the cone, so that it rolls to the bottom, onto another moving belt, which carries the clean hops to the delivery chute. The leaves and twigs, being flat, are caught on the upward-moving belt and carried to the separator. The broken branches and clusters are carried by moving belts to a machine which breaks up the latter and separates the individual cones from the leaves and stems. The vine, in passing through the machine, makes a return journey through the picking drums, so that cones not coming in contact with the picking fingers above will be caught by those below, and by the time the vine passes the last picking drum, it is bare of both hops and leaves, and is automatically detached from the conveyor just before the vine graspers reappear at the receiving station for another load.

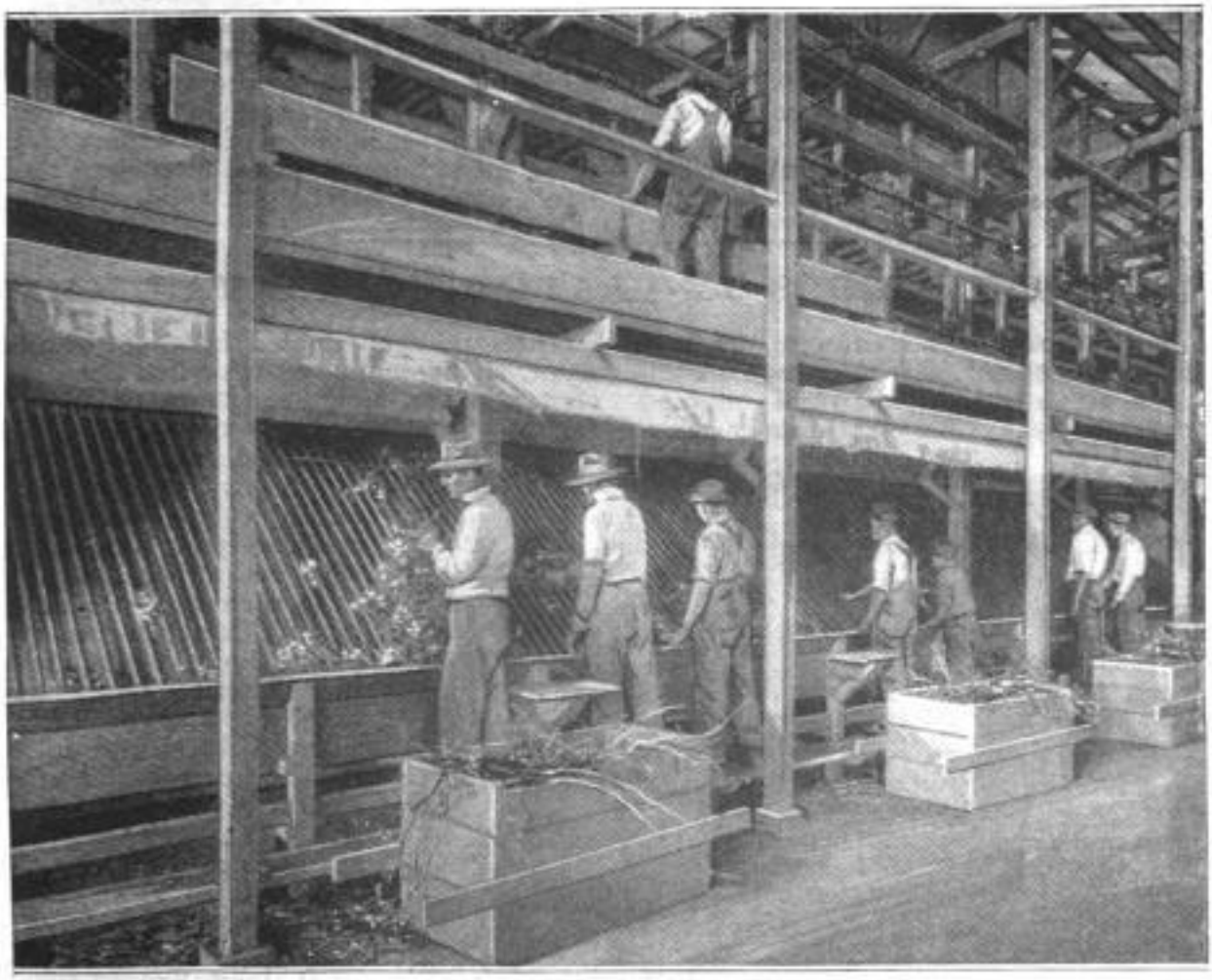


The Air Intake for the Drying Room: All the Air must Pass through the Heated Pipe Coils in Entering, the Process being Continued for Eight to Ten Hours for Each Charge of Hops

The uncleaned hops, leaves, and twigs are then carried by moving belts to the top of the second part of the machine, which consists of a long cylinder, containing perforations of various sizes. This cylinder is inclined toward the rear and revolves slowly, so that the material deposited in it is tossed about and gradually works through the perforations. The perforations in the first third of the cylinder are so small that only the cones and petals can go through, and the material falling on the moving belt under this part of the cylinder always consists of clean hops, ready for the drier, and the belt carries it to the delivery chute. The material falling through the larger perforations, how-

The Trellis System Used for Growing Hops in the Fields of California: The Vines, Trained on These Structures, Grow 15 to 18 Feet Long, with Heavy Clusters of Leaves; and a Stout Support Is Necessary

The Ripe and Loaded Hop Vines are Carried to the Plant on Wagons, and Placed, One at a Time, on a Conveyor, Which Passes Them into the Picking Machine to be Stripped of Their Cones and Leaves



The Huge Picking Machine in Action: Revolving Drums Overhead, with Wire Fingers, Strip the Vines and Pass the Leaves and Cones to a Separating Conveyor. The Cones Go to a Delivery Chute, and the Leaves and Twigs are Carried Away by a Moving Belt behind the Bars Seen in the Lower Part of the Picture

ever, is made up of larger cones, leaves, and twigs, and separator belts are necessary to handle the different materials. These belts are inclined, and all move upward, so that the hop cones striking the belt are given a whirling motion and roll to the bottom onto the clean-hop belt, while the flatter leaves, and the stems, adhere to the belt and follow it to the waste pile.

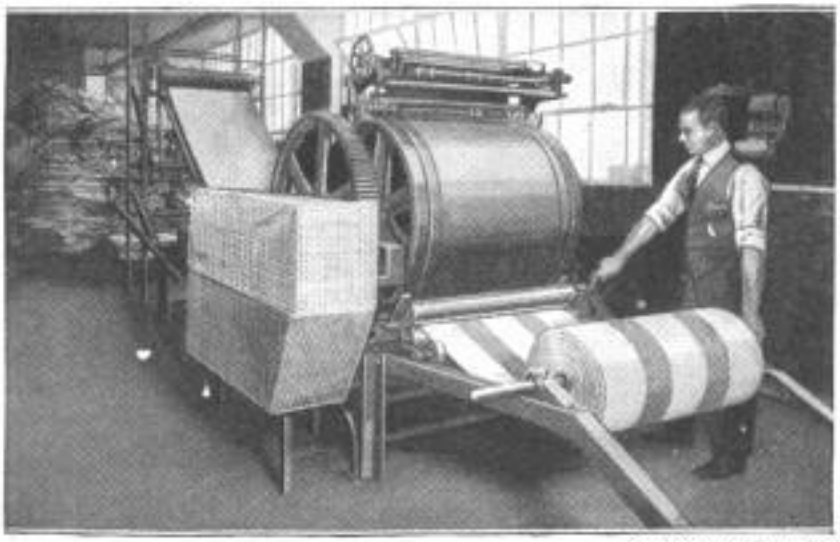
The cleaned hops from the machine are conveyed to a chute, fitted with doors at the bottom for the loading of sacks, and so fast does the machine work that a 95-lb. sack is filled in less than a minute. A single-unit picking machine will turn out hops ready for the drier at the rate of about three tons every hour, and a machine of this kind can be run by fewer than 20 workers, most of them women or children. Men are required to attach the vines, load the sacks, and look after the machinery, but women, or even children, are used in watching the conveyor belts, to prevent clogging, and to pick out any foreign matter that might pass through the screens. In an actual test made on a California hop ranch during the 1920 harvest, one of the picking machines handled more hops in a day than 100 experienced hand pickers, and the latter were being paid from $5 to $6 per day. With the picking machine it is possible to work in two or three shifts, running constantly until the hops are all picked, while hand pickers, of course, can work only during daylight hours.

Hops must be dried before they can be prepared for the market, and this drying is done in kilns, two stories or more in height. The hops are spread out on the drying floor to a depth of about 3 ft. The floor is made of metal or wooden slats, covered with burlap, through which hot air is circulated. The warm air is introduced from below, and, rising through the mass of hops, extracts the moisture and carries it off through the ventilators above. It takes from 8 to 10 hours to dry hops in a modern kiln, and just before the heat is turned on full blast, the green hops are exposed to sulphur fumes, which improve their appearance and color, and destroy any microörganisms present.

From the drying room the hops are taken to the cooling, or sweating, room, and here they are piled loosely on the floor and stirred frequently to allow the surplus heat to escape, and the remaining moisture in the hops to be equalized throughout the mass. After sweating, the hops are taken to the baling room, in huge movable bins, and dumped into a machine, where they are compressed into bales, which are wrapped in burlap and sewed. Hops intended for export are often made into cakes and fitted into tin-lined, air and water-tight wooden boxes.

MACHINE PREPARES CANVAS FOR MAKING MAIL BAGS

In the enormous activities of the Post Office Department, new mail bags are required at the rate of several hundred thousand a year. To facilitate their manufacture, now conducted by the government, an ingenious machine has been installed in the equipment shops at Washington. Canvas, in rolls of 600 to 1,500 ft., is fed in from a rack at the end, passing first under a huge printing cylinder that marks it with the proper insignia. It is then cut to length by an adjustable cam-operated knife blade, and the severed piece goes onto a conveyor table, where a rising arm folds it in the center and projects it between two rollers. These place it on an inclined belt, which carries it to a stacking cradle, ready for finishing. The big machine is 20 ft. long, weighs 8,000 lb., and does the work of eight men.



Machine for Cutting, Stenciling, Folding, and Stacking Canvas for Mail Bags: With Two Attendants, It Does the Work of Eight Men

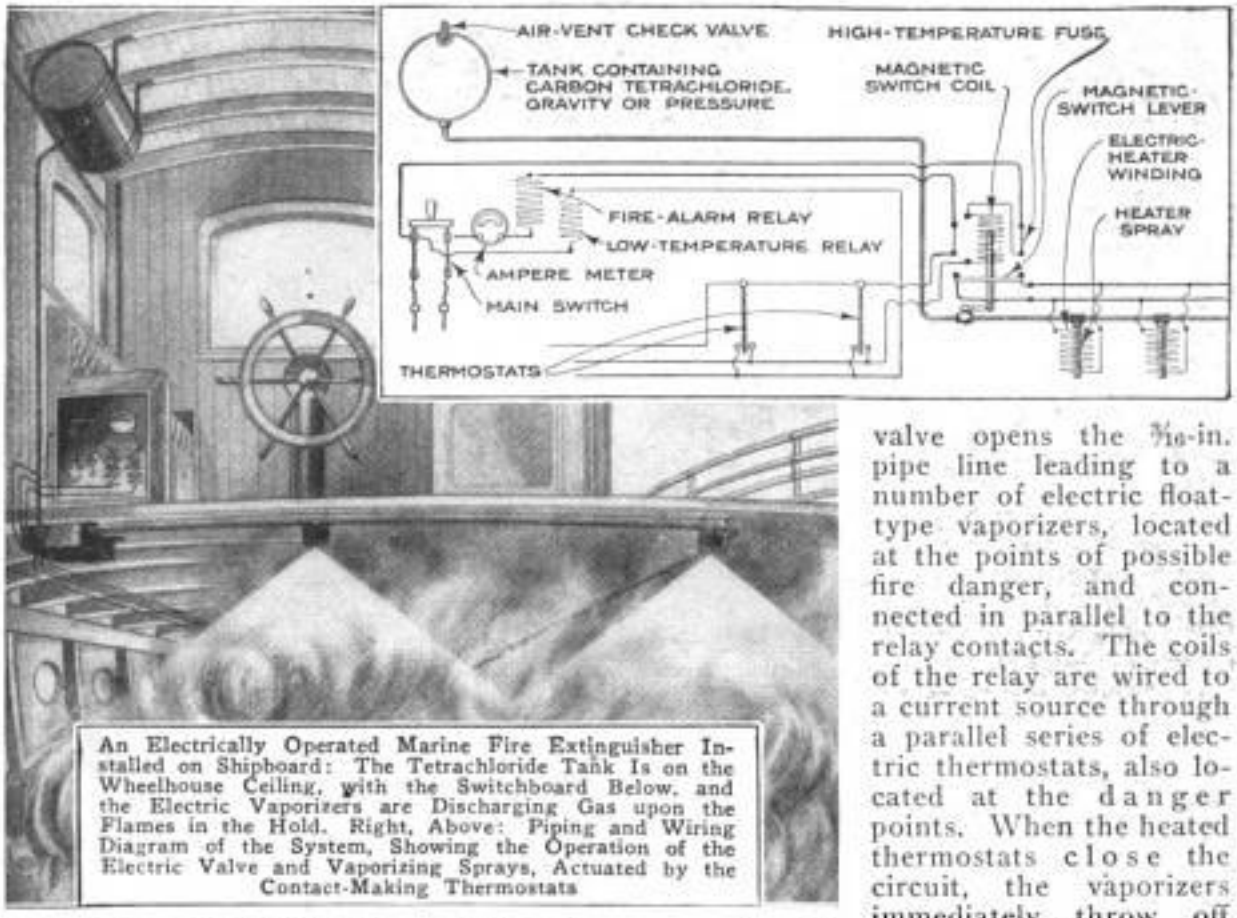
SCULPTOR REVIVES ROMANTIC TYPES OF HUMANITY

Dwight Franklin, Noted Creator of Historical Statuettes, Putting Finishing Touches to a Group Depicting Viking Scouts Spying Out the Lay of the Land Preparatory to a Raid

A Norse Ship and Crew of Fierce Viking Adventurers upon an Expedition of Discovery or Conquest: It may Well Represent Leif Ericson Sighting the Shores of America in the Eleventh Century

Barbary Pirates Hurrying with a Heavy Treasure Chest, Possibly Filled with Golden "Pieces of Eight," to Some Safe Hiding Place. Brutality and Suspicion are Expressed in Every Detail of the Figures

The Famous Sculptor Makes a Specialty of Clay Statuettes Illustrative of Human Types throughout the World's History. Most of His Work is to be Seen Only in the Large City Museums. The Figures are Characterized by an Extreme Correctness of Detail and Action, And Seem Really to be Charged with the Tremendous Vitality of the Types



An Electrically Operated Marine Fire Extinguisher Installed on Shipboard: The Tetrachloride Tank Is on the Wheelhouse Ceiling, with the Switchboard Below, and the Electric Vaporizers are Discharging Gas upon the Flames in the Hold. Right, Above: Piping and Wiring Diagram of the System, Showing the Operation of the Electric Valve and Vaporizing Sprays, Actuated by the Contact-Making Thermostats

PRECIOUS STONES FORM SPOTS OF LUXURIOUS DICE

Dice, the little gaming implements whose origin is lost in the unrecorded antiquities of the Orient, are to be had now in forms that surpass in luxury the crystal and gold cubes used by the titled gamesters of ancient Rome. Modern jewelers are finding, and meeting, a demand for specially constructed dice whose spots consist of inset diamonds and other precious stones.

MARINE FIRE EXTINGUISHER ELECTRICALLY OPERATED

Electrical operation through thermostatic controls is the feature of a new fire-extinguishing system intended especially for shipboard use, which has successfully met recent tests. Vaporized carbon tetrachloride is the extinguishing medium, stored in tanks of 10 to 50-gal. capacity with suitable empty-alarm connections. An electromagnetic relay and valve opens the 3/16-in. pipe line leading to a number of electric float-type vaporizers, located at the points of possible fire danger, and connected in parallel to the relay contacts. The coils of the relay are wired to a current source through a parallel series of electric thermostats, also located at the danger points. When the heated thermostats close the circuit, the vaporizers immediately throw off gases that, in the tests, extinguished a large fire in less than 30 minutes. Back contacts on the thermostats indicate when the fire is out, and a switchboard equipped with instruments and indicators accurately reports the location of an incipient fire, and the current consumed in extinguishing it.

GRAPHITE BEDS OF GREENLAND TO BE MINED COMMERCIALLY

Though it has long been known that graphite exists in abundance in Greenland, particularly near Upernivik on the Baffin Bay coast, little attempt at its commercial recovery has been made. A Danish explorer, recently returned from the southern part of the icebound island, reports the presence of some 3,000 shiploads of graphite available and ready for working. A centrifugal method of cleaning the mineral gives promising results, and the systematic operation of the mines is soon to be undertaken.

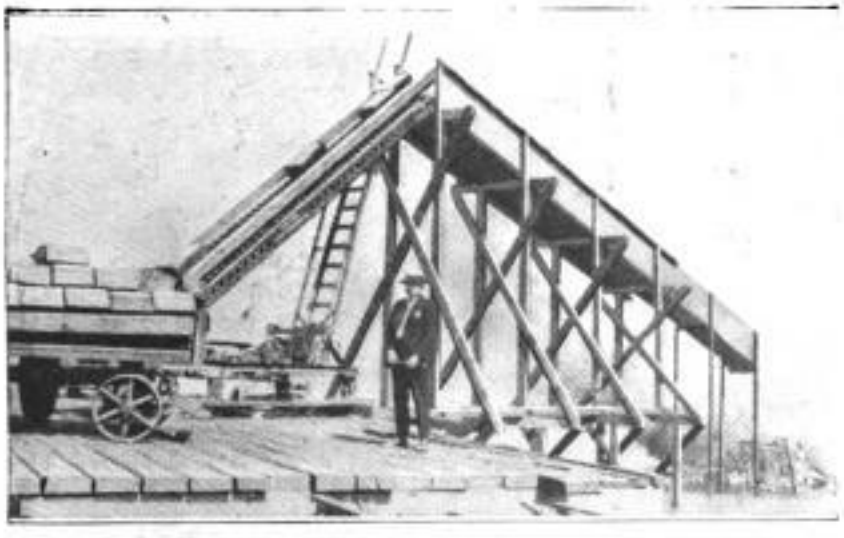
¶Residents of Beaver Falls, Pa., are enabled, by a curious local custom, to set their household clocks by the factory whistles, which blow three times at six o'clock, twice at 6:30, and once at seven every morning.

PLANS TO SHOOT OIL SHELLS TO CALM ANGRY WATERS

Recent successful experiments with the use of relatively small quantities of oil for quieting stormy seas have inspired a proposal that oil shells be designed to fit the life-line guns employed in the coast-guard service. A head made to explode on contact with the water would be fitted to each shell, its ignition firing a light charge of powder that would scatter about a gallon of oil abroad. A barrage of such shells laid down well to windward of a ship in distress would, it is calculated, smooth out the breakers enough to afford a reasonably safe passage to a lifeboat, even in the most severe storms.

OIL-SOAKED PACKING BOXES BURNED AT WATER'S EDGE

Hundreds of thousands of cases in which oil has been shipped from the Orient are systematically burned at the San Francisco docks. The cases are carried to the top of a chute by a conveyor. They burn during the downward slide, the harmless ashes falling into the bay. As the cases are oil-soaked, they constitute a constant fire hazard, and it is deemed better to destroy them promptly than to attempt to store them for future use, since it is cheaper to buy new cases than to pay excessive insurance rates.



Oil-Soaked Packing Cases being Hauled to the Top of the Disposal Chute Where They are Fired: They Burn during Their Downward Travel

HOLLY-DECKED MAIL TRUCKS HOLIDAY SUBSTATIONS

Owing to the increase in the number of packages mailed during the last holiday rush, the Washington, D. C., post office became so badly congested that it was necessary to provide emergency stations. These were regular mail trucks converted into fully equipped substations. Several of these were posted throughout the city and did much to speed up the service. Decorations of holly and evergreen, draped over the machines, preserved the holiday atmosphere.

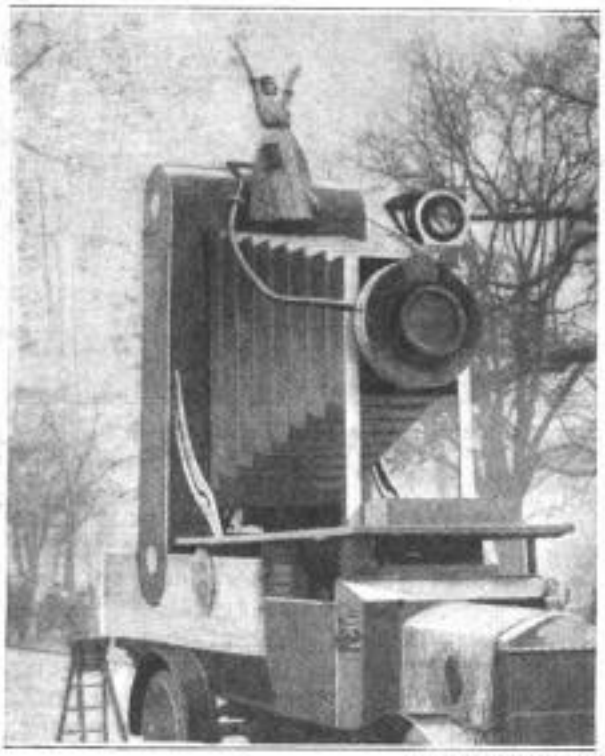
One of the Festively Decorated United States Mail Trucks Which Served as Emergency Postal Substations, in Washington, during the Last Christmas Rush

RADIO INTERCONNECTS ALL CHICAGO HIGH SCHOOLS

Intercommunication between all of the 22 high schools in Chicago, for business or other purposes, will soon be accomplished almost entirely by wireless telephone or telegraph. Stations at five of the schools already are equipped, and the remaining 17 installations are in preparation. The complete system, declared the first of its kind, will cost approximately $50,000, all the apparatus being of the most modern type. The telephone transmitting instruments used have a clear range of about 100 miles in daytime, and the telegraph senders work with a day radius of some 200 miles, making possible communication with stations in other cities. Working at night, a still greater range may be obtained.

FAMILIAR POSTERS VITALIZED IN ADVERTISERS' PARADE

Billboard figures known around the world in their two-dimensional form were given substance and motion in a big "living-poster pageant" held during the recent International Advertising Exhibition in London. One of the most striking of many ingeniously vitalized trade-marks in the mile-long parade was a gigantic folding "pocket" camera, which rode its motor-truck mounting with a girl passenger perched upon its high, extended top.



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The Giant "Pocket" Camera and Its Girl Passenger, in a Recent Advertisers' Parade in London

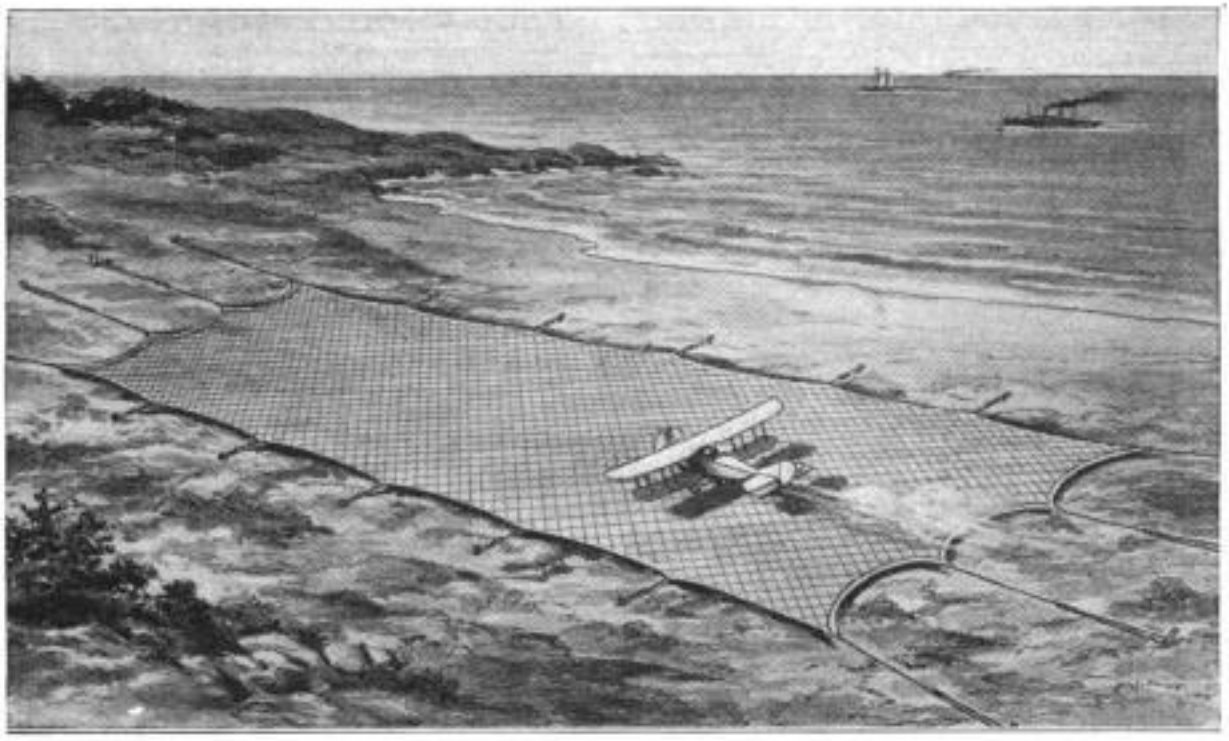
BIG SWEDISH PASSENGER SHIP TO HAVE DIESEL ENGINES

Four six-cylinder Diesel engines of 4,000 hp. each are to supply the motive power for a Swedish passenger liner, 590 ft. long and 72 ft. wide, recently designed for the North American trade. The huge engines, running at 90 to 100 r.p.m., are expected to develop a speed of more than 20 miles an hour, with four screws mounted in tandem sets on two shafts. Oil for each round trip will be loaded in New York, the consumption being estimated at 50 tons a day, as against 120, or more, a day for an oil-burning vessel of similar size.

SPORT-TYPE BREECHES BUOY GIVES FUN IN WATER

Floating around in the water, with one's head and shoulders projecting from the bell of a flower-shaped buoy like a statue of Buddha in a lotus blossom, is a new aquatic sport made possible by an ingenious invention. The novel float, designed for use at bathing beaches, has an upper part of ornamentally shaped metal, with an annular air chamber at its bulging water line. From this superstructure hangs a pair of trousers made of waterproof fabric, on the outside of which are series of vanes that act as paddles when the occupant propels himself along by a walking motion. As the interior remains dry and cool, the beach enthusiast is enabled to enjoy the surf even in his street clothing if he wishes, and may roam about the watery surface at will. The buoyancy of the air chamber is great enough to support a number of swimmers.

Left: The Flower-Shaped Buoy Supports a Veritable Crowd. Right: The Body in Action, Indicating the Use of the Vanes on the Trouser Legs to Assist Propulsion



Airplane Making a Landing on the New Patented Net, Spread Out to Cover a Rough Sand Beach: The Net, Closely Woven of Fabric or Wire, is Declared to Make an Effective Artificial Field

ARTIFICIAL AIRPLANE FIELD MADE WITH WOVEN NET

Mastery of the air is practically complete, but landing and taking off remain as weak factors in the use of airplanes, demanding fields of prepared smoothness. To remove this restriction, and make it possible for a plane to land or take off on sand, bog, or rough country, is the purpose of a new and very simple invention. It consists merely of a long net of close mesh, woven of fabric or wire, which is drawn taut over the unimproved field, and staked down at ends and sides. This is declared to make a highly efficient artificial field, which may be quickly laid out at a signal from the incoming flier, if not already in place.

AUTO-TIRE SPREADER AIDS IN MAKING REPAIRS

A time and labor-saving article of equipment for the automobile-service shop is a tire spreader which grips each bead in five equally spaced places and opens the casing to its limit for its full diameter. Radially movable arms, which carry the bead hooks, make the apparatus instantly adjustable to casings of all diameters. Spreading is done by turning a handwheel attached to a threaded shaft, which acts upon the radial arms and causes them to move away from the operator, carrying one set of hooks with them. As the other five hooks are stationary, the extent to which the casing is spread depends upon the distance by which the two sets of hooks are separated.

An Auto-Tire Spreader: The Large Handwheel Moves the Arms Radially; the Smaller One Actuates the Movable Bead Hooks

¶Hog Island, the world's greatest shipyard, is out of business. Its last ship, the 13,400-ton army transport "Aisne," was delivered to the Emergency Fleet Corporation January 27, and early in February the yard itself was turned over to the U. S. Shipping Board for disposal.

HOMEY COTTAGE IS BUILT IN CITY'S BUSINESS SECTION

The building of a $6,000 cottage on a $106,000 business corner in the heart of the busiest section of his city, in the record-breaking time of nine days, was a Des Moines, Ia., real-estate dealer's method of arousing in people the desire to own homes. The house is ideally complete in all particulars and appointments, a local department store having furnished it throughout as an advertisement. Although occupying one of the busiest corners and surrounded by large retail stores, the builder was not quite satisfied with the unusual effect but heightened it by placing the house at an angle with the street with the front door facing the corner.

This House, a Real-Estate Office, Occupies a Business Site Worth $106,000, in the Heart of a City's Mercantile Section

NEW BRITISH SILVER COINS WORTH LESS THAN OLD

The advance in the price of silver increased the actual worth of British coins to a value higher than that shown by their face, until $1.81 worth of the metal was required to produce $1.34 worth of currency. To remedy this condition a new coinage has been issued in which the silver content is reduced to 500 parts from the 925 parts formerly required. The new coins weigh about as much as the old, the difference being made up by a higher percentage of nickel. As rapidly as the older coins are deposited in the banks, they are turned over to the government.

RECEIVE WIRELESS MESSAGES BY SENSE OF TASTE

Reception of wireless messages by means of the sense of taste, rather than that of hearing, was the subject of a recent series of interesting experiments. Two forms of receiving instruments were used. One was a pair of No. 16 gauge silver wires, about ½ in. long, held in a small lump of insulating material, with their exposed ends ⅛ in. apart. This was placed on the tongue. The other form slipped over the teeth, making contact with the inside of the upper lip and the end of the tongue. Used with a vacuum-tube receiver and a single-wire antenna, 180 ft. long and 150 ft. high, it was found possible to "read" about five words a minute, 10 being regarded as the possible maximum because of a certain inertia of the taste sense. The minimum "tastable" electromotive force was discovered to be about two volts.

SIMPLE DEVICE PUTS PASTE ON MAGAZINE WRAPPERS

The dexterity with which mailing-room workers paste magazine wrappers is hampered only by the difficulty of keeping the paste moist and evenly spread, and now that trouble is overcome by a simple mechanism, recently invented. The paste is carried in a hopper which slides on two vertical rods. It is placed across one

Paste Applier for Magazine Wrappers: Each Wrapper in the Stack beneath the Hopper Has a Film of Paste across One End When Drawn Out

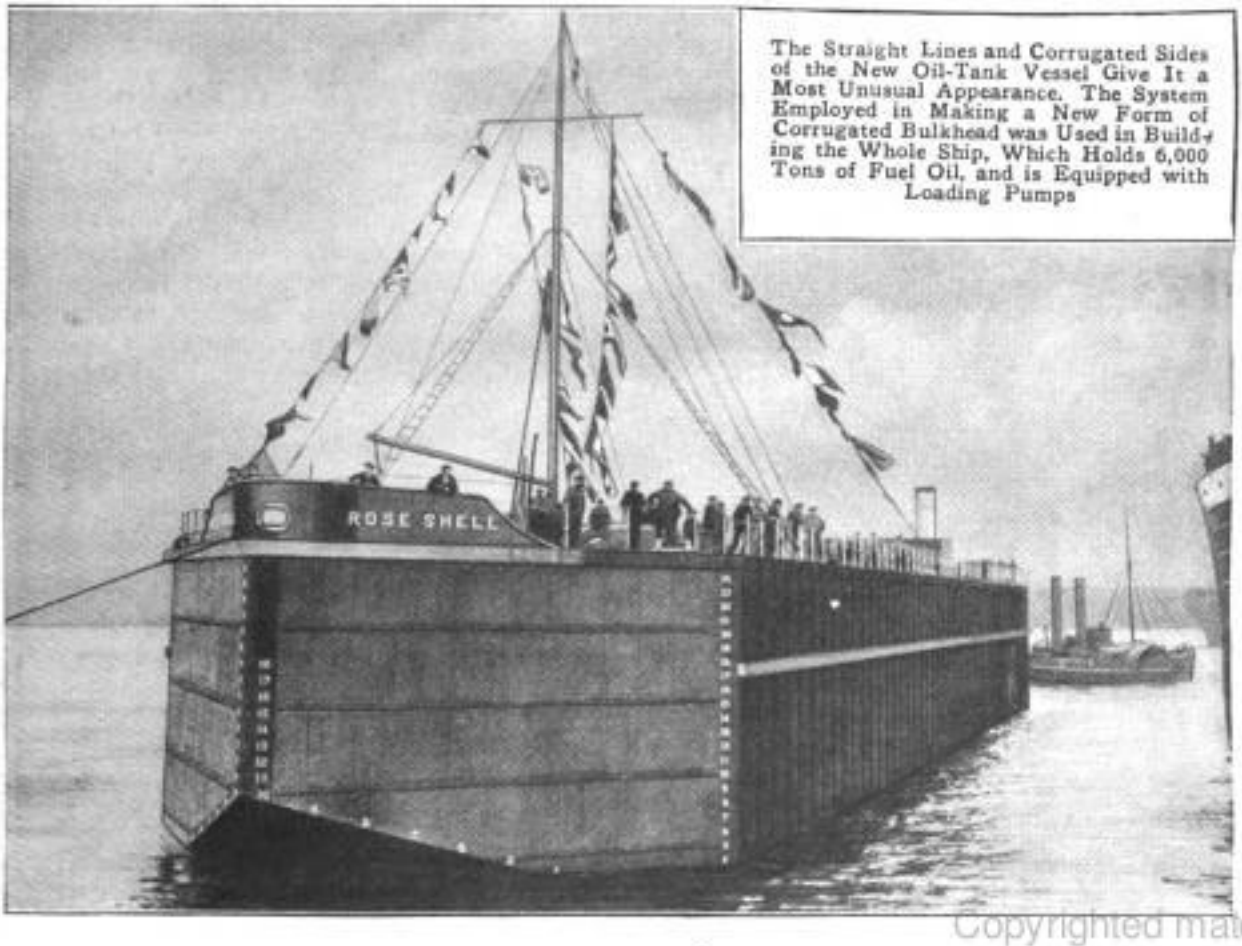
end of a stack of wrappers, and the valve-like bottom opened. Each wrapper, when drawn out, then has a thin film of fresh paste spread smoothly across the end, and is ready for flat or round wrapping. It is said to save both time and paste.

BIG OIL-TANK VESSEL MADE OF CORRUGATED PLATES

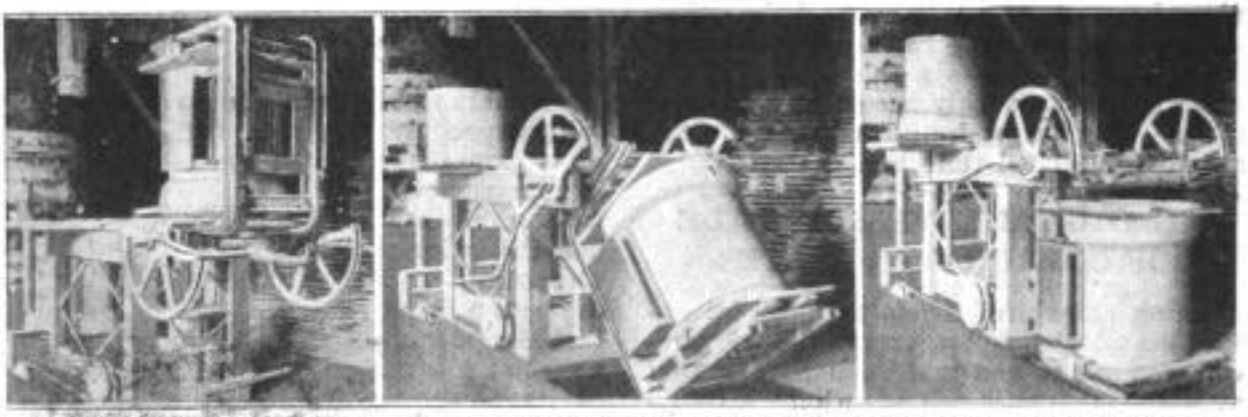
Using ships' bulkheads to build an entire vessel seems an extraordinary proceeding, yet it has just been successfully accomplished in England, where a 6,000-ton tanker was so constructed with nearly 400 tons less material than would ordinarily be used. The secret lies in the curious form of the newly invented bulkhead plates, which are made with vertical corrugations, so strengthening them that the usual horizontal and vertical stiffening brackets are dispensed with. The oil ship built in this manner, with its straight lines and corrugated sides, naturally offers a most peculiar appearance, and its launching also was unusual, as it was built in a drydock in the River Tyne, and simply floated out. It is to be used as a floating reservoir at Las Palmas, Canary Islands, for supplying oil-burning ships with fuel, and is equipped with pumps that have a capacity of 200 tons an hour.

NEW AUTO-ENGINE MANIFOLD GIVES HOT-SPOT EFFECTS

A combination intake and exhaust manifold, especially designed for application on a popular make of light automobile, is constructed with the exhaust portion surrounding the ascending intake pipe for a short part of its length. Thus the red-hot exhaust gases very quickly heat that small area, and the inrushing mixture is preheated and more completely gasified. The device is also fitted with a butterfly valve, by which hot or cold air can be admitted to the carburetor inlet, and a priming valve, which permits raw gasoline to be drawn directly into the junction of the inlet-manifold branches.



The Straight Lines and Corrugated Sides of the New Oil-Tank Vessel Give It a Most Unusual Appearance. The System Employed in Making a New Form of Corrugated Bulkhead was Used in Building the Whole Ship, Which Holds 6,000 Tons of Fuel Oil, and is Equipped with Loading Pumps



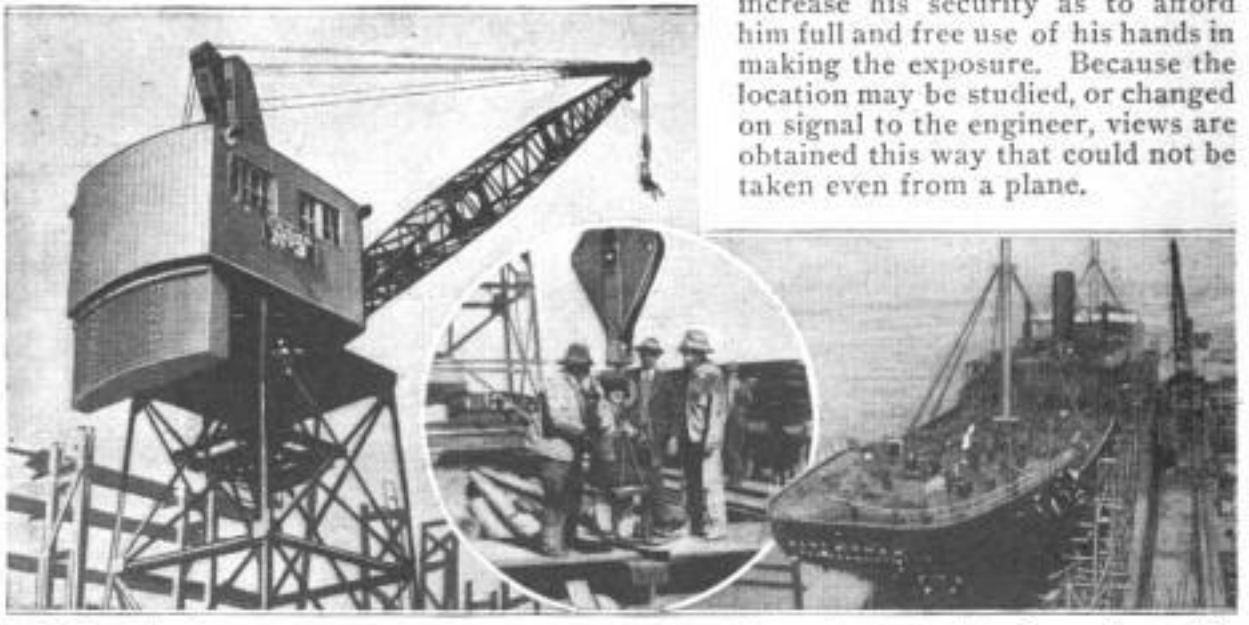
Three Stages in the Upending of a Soft, Unfired Tile. Left: Tile in Place in the Frame. Center: Frame with Tile Swinging Downward. Right: Movement Completed. The Tile is Reversed

HEAVY SEWER-PIPE SECTIONS ARE TURNED BY NEW MACHINE

A newly developed machine handles soft, unburned sewer-pipe sections easily, turning them end for end without deforming or breaking them. The apparatus consists, principally, of a strong steel framework, attached, by means of a cross shaft, to one end of the top of a sturdy table, and free to swing through a vertical semicircle. At the other end of the table is a small elevator which acts as a counterbalance for the frame and is actuated by it by means of cables which run to segments of pulley wheels attached to the ends of the cross shaft. To use, the frame is swung to the top position, and a tile, held securely in a cradle, is loaded upon it. Pressure on a hand lever swings the frame and load to the lower position, and, of course, the tile is inverted at the end of the travel. As the frame swings down, the elevator, carrying another tile, is raised to the level of the table top. Formerly several men were required for this task, while one man can do it alone with the aid of the machine.

AERIAL PHOTOS OF SHIPYARD TAKEN FROM CRANE HOIST

Aerial photographs of ship's decks, and bird's-eye views of the whole construction plant, are being taken at a western shipyard without the aid of either airplanes or balloons. A board seat slung from the hook of a big crane constitutes the photographer's base of operations, and in this meager cockpit, armed with a good hand camera, he is swung aloft to any altitudinous viewpoint he may select. In further resemblance to a flier, he is fastened in, the function of the stout rope around his body being not so much to increase his security as to afford him full and free use of his hands in making the exposure. Because the location may be studied, or changed on signal to the engineer, views are obtained this way that could not be taken even from a plane.



Left: The Big Crane Swings the Photographer to His Selected Viewpoint in the Air. Center Insert: The Photographer is Roped into His Seat. Right: Deck View of a Ship under Construction, Taken from the Crane Hook

ANCIENT CALIFORNIA MISSION GETS NEW CONCRETE FRONT

A picturesque mingling of the old and the new is now to be seen in the mission district of San Francisco as a result of the recent rehabilitation of the Mission Dolores. Built a few years after the establishment of the local church, in 1776, the ancient structure has, in general, resisted decay surprisingly well. Lately, however, the adobe brick of the front wall has crumbled badly, making extensive repair necessary. In consequence, the entire front — arches, columns, and all—have been done over in concrete. While this work was in progress, incidentally, the tiles of the roof were lifted from the timbers on which they have rested for a century and a half, to be relaid later on new sheeting, but without changing the outward appearance.

The Crumbling Adobe Front of This Ancient California Mission was Reinforced, Recently, with Concrete. This Is Doubtless the Most Extensive Repair Made in the Church's Century and a Half of Existence

MILITARY TANKS USED FOR LOGGING IN FRANCE

One type of military machinery that is proving a distinct asset to post-war performance is the small tanklike tractor of endless-tread form. In France, these sturdy little hauling machines, with their ability to traverse rough ground and do the work of many horses, have been found particularly useful in logging, and are being employed for that purpose at Velizy, near the Villacoublay airdrome. With the usual form of log wagon, the heaviest "sticks" are easily hauled by one machine, while two of them, hitched in tandem, make light work of the job.

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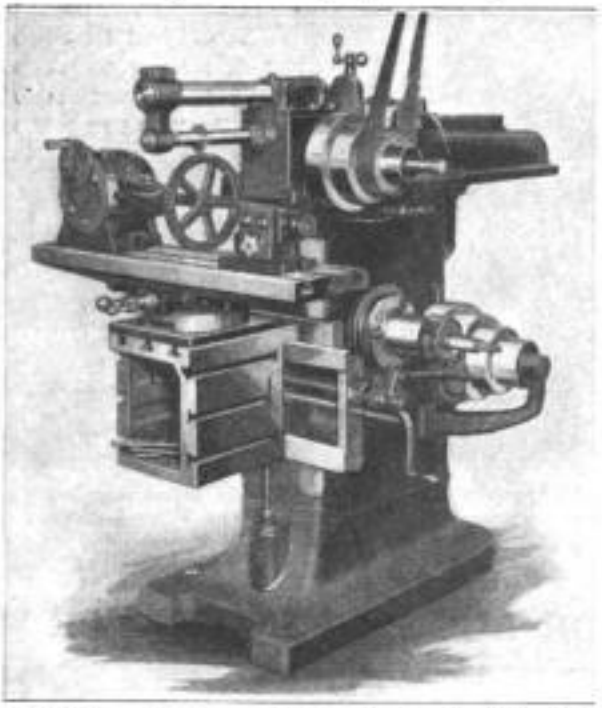
Top: Two Tractors Hitched in Tandem for Hauling Big Logs Out of the Rough Timber Lands. Bottom: Military Type of Tractor being Used to Haul a Heavy Stick of Timber on a Road at Velizy, France, near the Villacoublay Airdrome

MILLING ATTACHMENT MAKES SHAPER DO TWO JOBS

A milling attachment that is now coming into use and which can be placed on the ram way of a shaper, makes possible



The Milling Attachment Fits in the Track of the Sliding Head of the Shaper

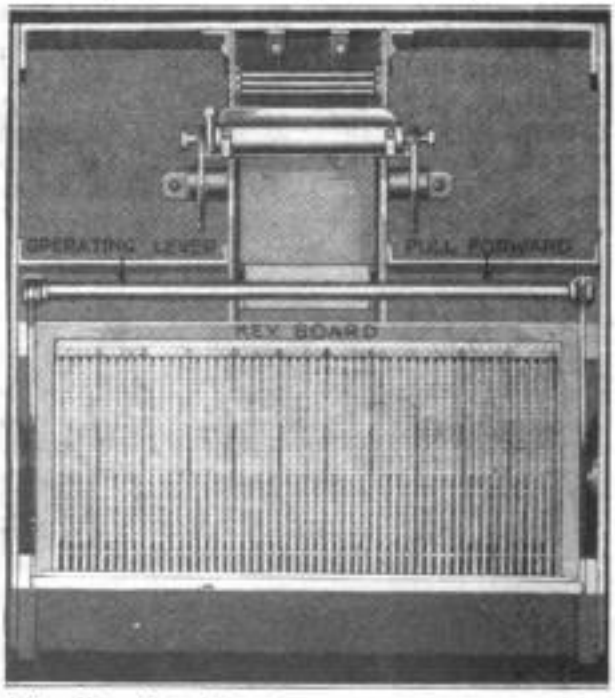
two different operations with the one machine. It has been found that with this device on the shaper, even a helper is able to handle such work as cutting of spur gears and keyseating. The attachment is not connected up in any way to the operating mechanism of the shaper, and so it is only a matter of a few moments before the milling machine is again a shaper, for with its individual drive, it is easily loosened and removed. The rod carrying the cutting tool drives by a worm-and-wheel arrangement, which runs in oil. To insure rigidity, the cutting bar is supported by a heavy overarm. It is of solid construction and simple design, and tends toward unification of mechanical operations.

MAGAZINE ADVERTISING PAGES AS STORE-WINDOW DISPLAY

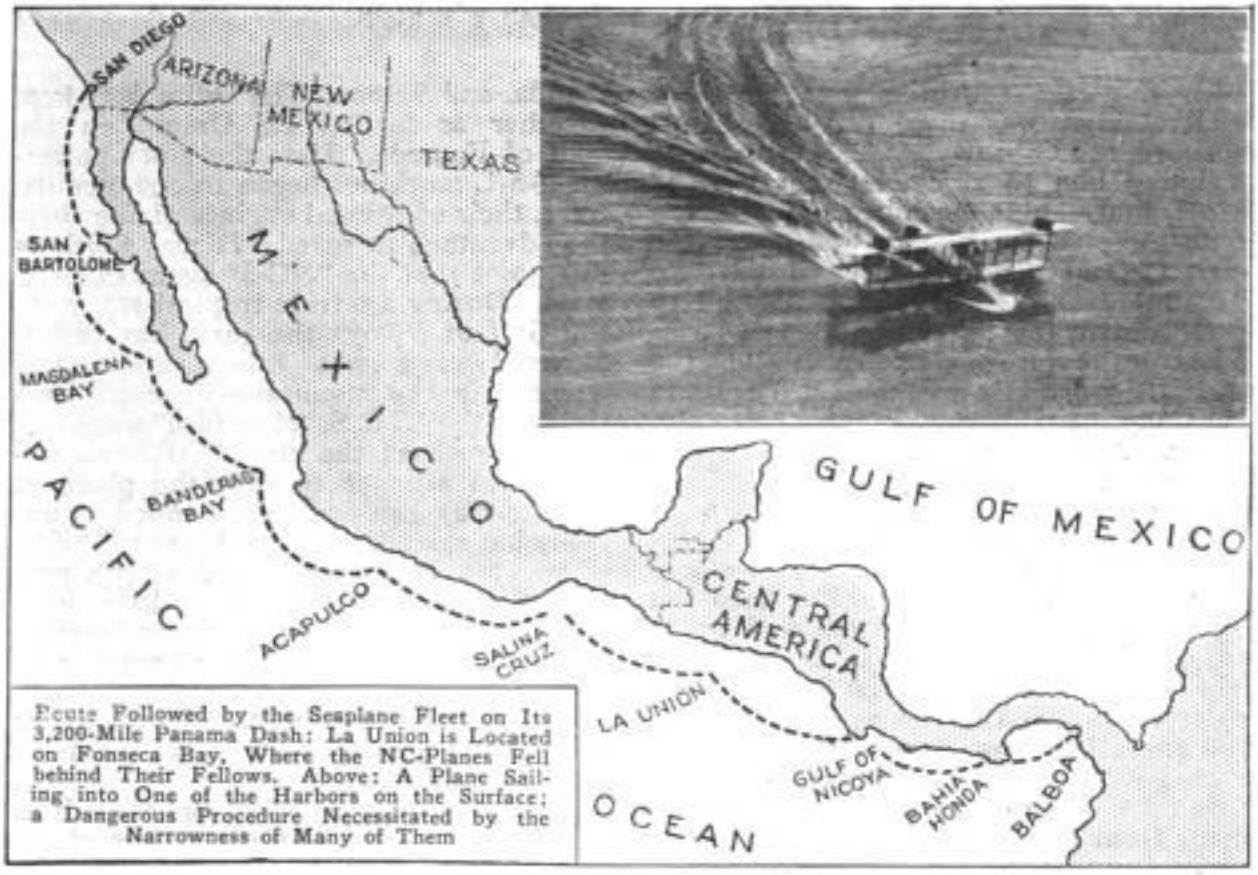
By arranging advertising pages clipped from current magazines as an attractive window display, the proprietor of an Indiana drug store not only has increased his sales to a marked degree, but has contributed a valuable idea to the whole operation of publicity. Advertisements used, of course, are those of goods carried in stock, and those smaller than page-size are mounted on cards of easel form. In some cases samples are displayed with the printed matter. The originator of the novel plan estimates that attention to his windows has doubled since its adoption, and it is evident that the advertisers and the publications themselves are benefited as well as the local trade.

TYPEWRITER SETS FULL LINE OF TYPE BEFORE PRINTING

An entirely new idea in typewriter construction is embodied in the invention of an attorney who was formerly a court reporter. Like a linotype machine, the new instrument sets up a whole line of type before printing. The impression is made directly from the inked type, without a ribbon, and the operation is practically silent. For a 55-letter line, there are 55 perpendicular rows of keys, each containing 40 characters, making a keyboard 28 by 10 in. The operator works from left to right, depressing one key in each column about ⅛ in., and sometimes setting whole words with one motion. The line finished, a lever is pulled, which inks the type and presses the platen and paper against it, the lever's return restoring all parts to neutral. Sliding bars, brought forward by the lever and stopped in the correct position by the depressed keys, carry the printing type. Despite the large number of keys, the mechanical assembly is simple, and the operation rapid.



Plan View of the New Typewriter: The Operator Sets Up a Line by Pressing a Key in Each of the Perpendicular Columns and Prints It by Pulling the Back Lever



Route Followed by the Seaplane Fleet on Its 3,200-Mile Panama Dash: La Union is Located on Fonseca Bay, Where the NC-Planes Fell behind Their Fellows. Above: A Plane Sailing into One of the Harbors on the Surface; a Dangerous Procedure Necessitated by the Narrowness of Many of Them

SEAPLANES MAKE 3,200-MILE FLIGHT TO PANAMA

BY WM. H. HUNT

"THE greatest flight ever attempted by seaplanes—far more dangerous, much more difficult, and vastly more important than the flight across the Atlantic." It is in these words that one of the world's leading authorities on naval aviation, a member of the crew that made the famous transatlantic flight, pays high tribute to the stamina of the craft and the courage of the personnel of the seaplane fleet which, on January 15, roared triumphantly into Balboa, C.Z., harbor, on time as per prearranged schedule, after 17 days of the most terrific battering seaplanes were ever called upon to endure; thus bringing to a successful termination the greatest aerial adventure ever embarked upon. This statement must not be construed as in any manner detracting from the glory earned by those recklessly courageous airmen who, alone and unattended, braved the terrors of the treacherous Atlantic in the first nonstop-flight attempts. The Panama flight is remarkable from the standpoint of an extensive fleet maneuver, individual exploits not entering into the consideration. The object of the 3,200-mile cruise—from San Diego, Calif., to Balboa — was, to a great degree, experimental, the Navy Department desiring to learn just what results might be expected from a sudden seaplane-fleet movement in war time. For this reason the time allowance for preparation, instead of being weeks or months, as had

One of the Machines of the Seaplane Squadron That Made the Record-Breaking Panama Cruise, in the Remarkable Time of 19 Days Following the Receipt of the Sailing Order

been the case in other great aviation undertakings, was disconcertingly short. The order to Capt. Henry C. Mustin, commanding him to assemble a fleet of 12 F-5-L four-engine machines and two NC-type three-engine planes, and make the start December 30, was received only two days in advance. That it was possible to comply with the order at all, speaks volumes for the state of efficiency in which the craft are constantly maintained. The route lay along the western coast of Mexico and Central America, where most of the harbors are narrow and rock-bound. Conflicting ocean currents, driving into these narrow inlets with the momentum gathered during thousands of miles of movement across the broad Pacific, keep the waters in a constant turmoil and break them into thundering surfs, in which, it was predicted, no seaplane could live. Add to this the fact that no aerial survey of the route has ever been made, and that, therefore, the region is uncharted so far as air lanes are concerned, and also that, aside from two tenders and supply boats and a few minor craft, which would have been useless in the event of a serious accident, there was no help to be had—and a hazy idea of the nearly insurmountable obstacles overcome may be formed.

Of these hazards the airmen only knew that they existed. How best to minimize them was absolutely unknown, but being, as ever, "ready for a fight or a frolic," the selected crews rushed the final preparations and on the morning of December 30 the majestic fleet skimmed the waters of San Diego Harbor and, quickly climbing above the fog banks into the brilliant sunshine, assumed a perfect formation and headed southward.

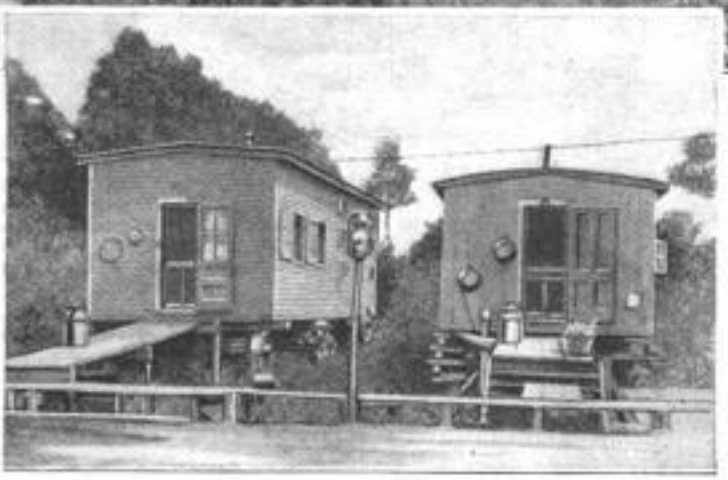
It was during what was expected to be a perfect start that the first mishap occurred. This was to the "NC-5," and seemed to be a harbinger of the further ill luck which dogged the unfortunate craft. When about to take off, an exceptionally boisterous wave crumpled the hull, which necessitated putting back for repairs. Nothing daunted, the plucky crew performed a miracle in straightening the tangle and, in a few hours, thundered forth on what was to be another record-breaking achievement — a straightaway, nonstop flight of 702 miles to Magdalena Bay. The distance was covered in 9 hr. 15 min., or at the rate of 72 miles per hour, thus establishing a new international record for a seaplane carrying six persons. From Magdalena Bay the route followed by the fleet was Banderas Bay, Acapulco, Salina Cruz, La Union, Nicoya, Bahia Honda, and Balboa. The entire fleet kept together as far as La Union, on the Gulf of Fonseca. Here the more powerful F-5-L machines began to distance the NC's, their additional engines giving them the advantage in speed. It was south of this point that the "NC-5" again came to grief. During a terrific tropical storm off the Gulf of Nicoya the game but underpowered craft was driven down and wrecked in the mountainous seas. Fortunately the U. S. S. "Mumford" was close by, and rescued the crew. After an unsuccessful attempt to save the plane, it was sunk by gun fire. Thus ended an unlucky but splendid career. Later the "NC-6" was reported missing and, after a prolonged search, was found to have been driven ashore in a tiny cove. So inaccessible was its position that attempting to launch it was considered useless. Accordingly, after having been stripped of its engines, propellers, and other valuable parts, it was burned.

Accidents were expected and that there were so few is one of the wonders of the cruise. The only fatality marring the great achievement was the death of Chief Radio Electrician Cain, who was struck by a propeller while at Fonseca Bay. Offsetting this was the saving of the life of Commander J. H. Towers, who, while aboard a supply ship, which did not carry a surgeon, was stricken with a severe attack of appendicitis. A radio command to one of the planes sent it scurrying away to another vessel, whence a surgeon was quickly carried to the suffering officer. At last reports he was making a satisfactory recovery.

An amusing incident, serving to convey an idea of the severity of the storms encountered, was the seasickness of Captain Mustin, and several others of the seasoned fliers, who, it would appear, should have been so accustomed to upside-down and other abnormal positions as to be immune. The officer states that it was a novel, though unpleasant, experience in his nine years of flying.

Much valuable knowledge was acquired during the long cruise. For one thing it demonstrated that machines of the F-5-L class can be trusted to hold their own under the most adverse conditions and when far removed from their bases. On the other hand, the fallacy of expecting grueling long-distance performance from the NC-type was shown. These findings vindicated the judgment of the naval authorities who were in doubt of the ability of the NC-craft to keep pace with the superpowered F-5-L ships.

PENAL EXPERIMENT RESULTS IN SPLENDID ROADS

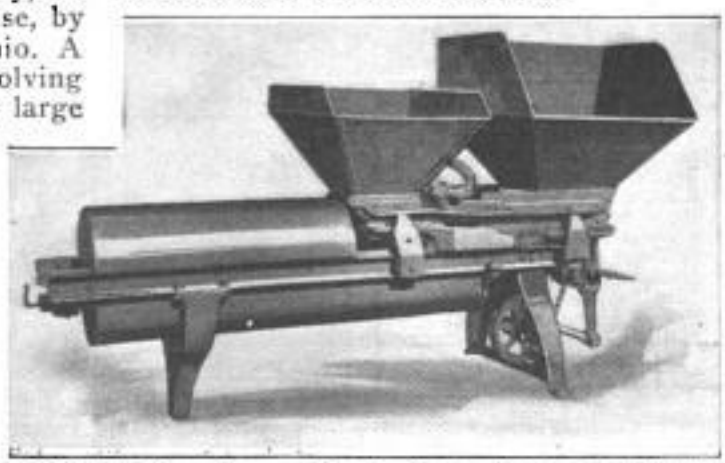


At the Top: The Movable Prison Camp Temporarily Established at the Roadside While Its Inmates Work on the Road. Bottom: Two Units of the Wheeled Camp, the Cell Bunk House at the Left, and the Cookhouse at the Right

A perambulating prison camp was instituted by the Salem County, New Jersey, authorities a few years ago as an experiment and has shown such excellent results that it has been retained. It is a veritable jail on wheels as the cookhouse, cell house, in this case a bunk house, administrative offices, and supply department are mounted on wagons and are hauled by horses or tractor to any point in the county where the roads may need attention. As the highways of this section of the state are surfaced with gravel, camp is usually made closely adjacent to a gravel pit. Culprits sentenced for from ten days to one year serve the time in the camp. Although not closely guarded, very few have attempted escape. However, one sentence is usually enough, and few offenders return, showing that the outdoor life and exercise have a more beneficial effect than confinement and idleness.

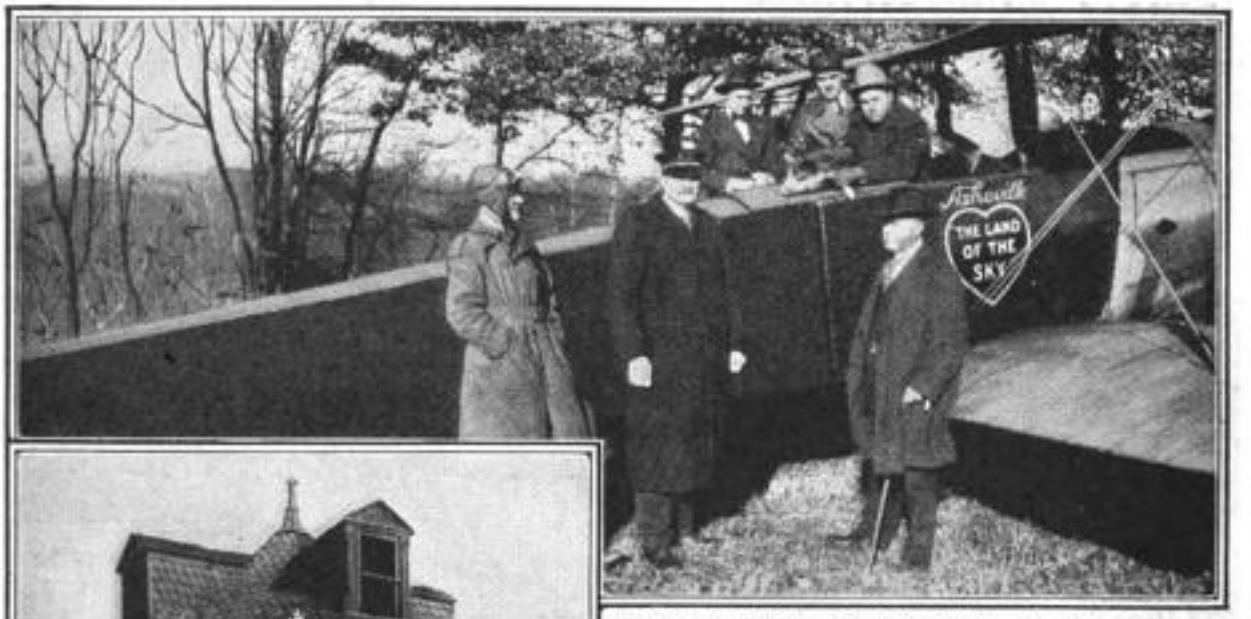
AUTOMATIC CARBURIZING-COMPOUND MIXER

Used carburizing compound is automatically mixed with a new supply, in the right proportion for steelmill use, by a machine recently developed in Ohio. A long closed mixing trough with revolving mixing paddles is surmounted by a large hopper for the used compound, and a smaller one for the new, an adjustable gate at the mouth of the latter, provided with an indicating pointer, determining the proportion. A feed plate, reciprocating under the hoppers, drops the compound into the trough, and the supply is readily arranged to provide just enough mixture for one heat. The mixer may be driven by belt or direct-connected motor, and the action of the paddles in the trough assures an intimate and uniform mixture.



Used Carburizing Compound in the Large Hopper, and New in the Small One, are Automatically Mixed in the Right Proportion

CIVIC FEATURES THAT PROMOTE THE COMFORT



Pork Went Up to 7,500 Feet When the Police Department of Asheville, North Carolina, Recently Delivered a 50-Pound Duroc Pig to Waynesville, 30 Miles Away, by Airplane, the Trip being Made in 16 Minutes. The Occasion Was a Distribution of Food to the Poor, an Annual Event

The Grounds of the Department of Agriculture in Washington, District of Columbia, are Now Graced by the Upstanding Section of a Giant Redwood Tree from California, Whose 30-Foot Diameter Gives Visitors an Idea of the Girth, If Not the Height, of the Original. A Pagoda Roof Ornaments the Top

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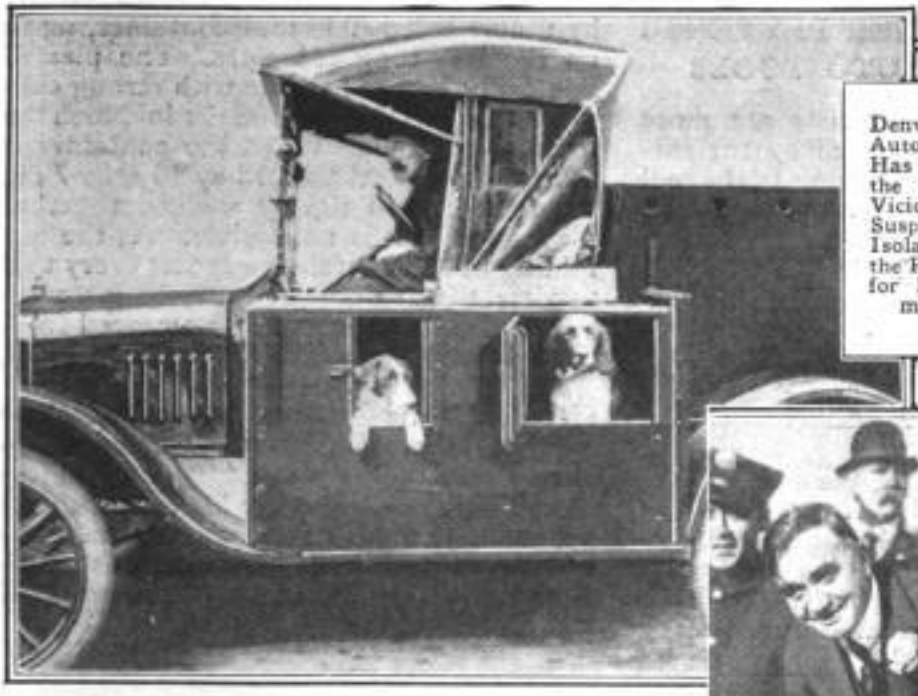
New York City's New Automobile Label, Required This Year on Every Car in the City: It Signifies That the Mechanical Parts of the Vehicle have been Examined by the Police Inspector, and Found in Safe Condition

A Traveling Billboard, Made by Placarding the Sides of a Street Car, Is a Feature of Portland, Oregon, through Whose Streets It Moves on a Regular Schedule. The Signs are Largely Devoted to Promoting Safety, and Other Worthy Causes

AND ENJOYMENT OF VISITORS AND RESIDENTS



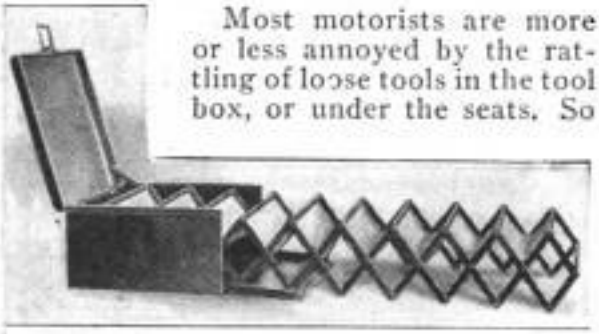
Denver's New Dog-Catcher's Auto, besides the Usual Cage, Has a Compartmented Box at the Side, in Which Dogs of Vicious Disposition, or under Suspicion of Rabies, may be Isolated While on the Way to the Pound. A Pulley and Hoist for Handling Intractable Animals Is Another Feature

The Great Bass Drum of the Los Angeles Lodge of Elks Rides the Parades in Its Own Rubber-Tired Cart, Saving the Drummer's Energy for Pounding. The Cart Resembles a Wheelbarrow, Except That It is Pulled, Instead of Pushed, by a Colored Gentleman, the Drummer Walking behind It

The Mayor of Portland, Oregon, Planting the First of 40,000 Rose Slips for "the Roseway," a Three-Mile Stretch of Profuse Floral Beauty, from the City to Rose City Park, the Gateway to the Columbia Highway. Residents are Helping in the Undertaking

Suburban Electric-Railway Stations in Southern California have been Provided with Interesting and Picturesque Thatch-Roofed Stations. A Framework, a Floor, and a Lattice Compose the Building, and the Palm-Leaf Thatch is Nailed to the Frame by the Stems

FOLDING CONTAINER PREVENTS RATTLING OF AUTO TOOLS



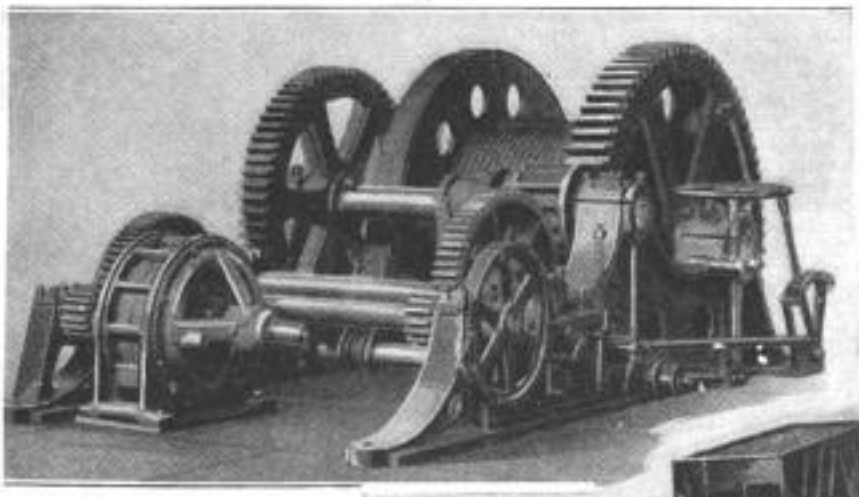
The Antirattling Tool Rack: When Folded the Device Fits Snugly into the Running-Board Tool Box

Most motorists are more or less annoyed by the rattling of loose tools in the tool box, or under the seats. So common is this, that it is the practice to wrap little-used tools in cloths or to pack the boxes tightly with rags or waste. Both these expedients are rendered unnecessary by a new collapsible tool container, made on the lazy-tong principle. The pleated side of the device is made with strong canvas which forms nine troughs in which the tools are packed. When the container is folded into a steel box, 12 by 10½ by 7 in., the tools are so tightly wedged together that movement is impossible. As the unfolding of the container exposes every tool to view, the one required may be instantly selected. The device may be removed from the box and carried to the work in hand.

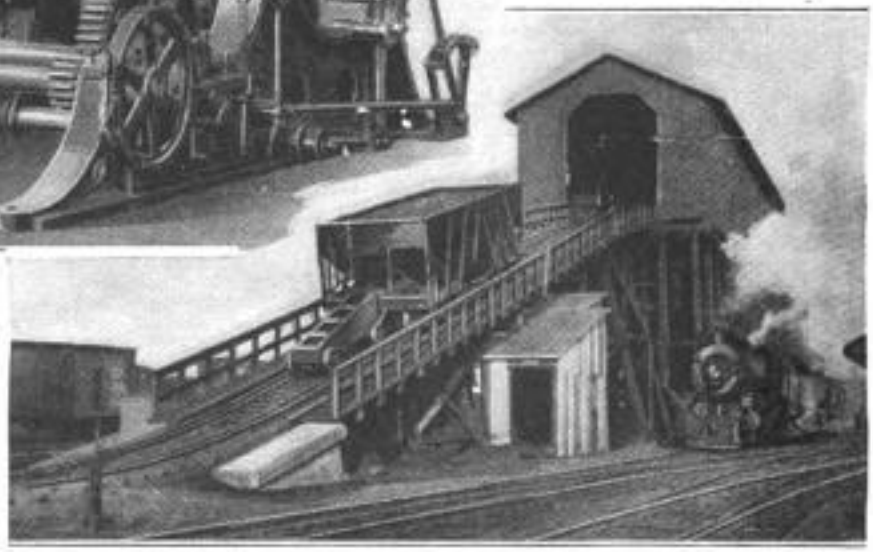
¶A 1,686-mile transcontinental airplane trip of Australia, from Melbourne to Perth, was recently made by a privately owned machine. Despite head winds during the last stages of the journey, an average speed of 120 miles an hour was maintained for the 13 hours 47 minutes of actual flying time.

EFFICIENCY IN COALING OF RAILWAY LOCOMOTIVES

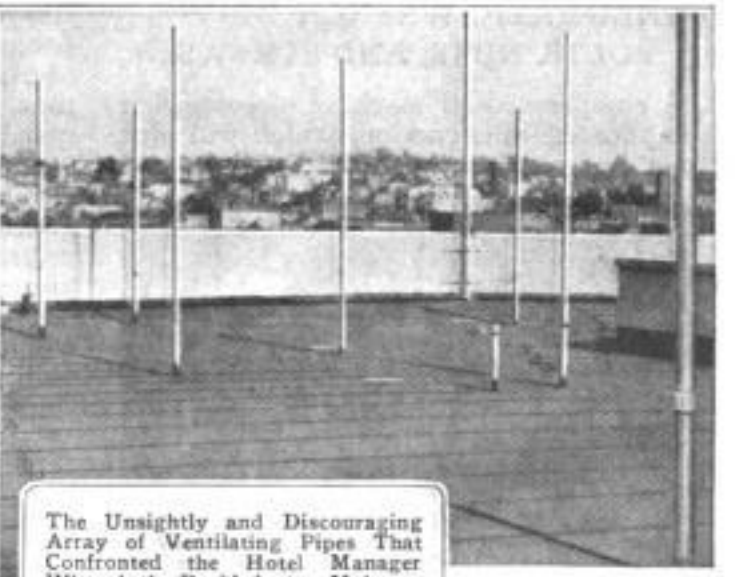
The management of the Boston and Albany railroad company has installed an improved method of filling the coal bunkers from which the coal is supplied to the locomotive tenders. The familiar elevated bunker house is retained, the improvement being in the method of hauling the gondola cars up the steep incline. Between the rails of the track running up the incline is another track, of narrow gauge, upon which runs a peculiarly constructed car to which the name "billy goat" has been given, for the reason that it gets behind the loaded cars and literally "butts" them up the slope. The little car is pulled by a 1½-in. steel cable wound upon the drum of a powerful hoisting winch. In lowering an empty car the "billy goat" restrains the speed until the bottom of the incline is nearly reached. Then it suddenly speeds up and, running away from the gondola, retires into a deep, concrete trench placed between the rails of the main track. The gondola, acquiring momentum over the short remaining part of the slope, makes a "flying switch" to a track reserved for empties.



Electrically Driven Winch Used to Pull the "Billy Goat" Car up the Bunker-House Incline

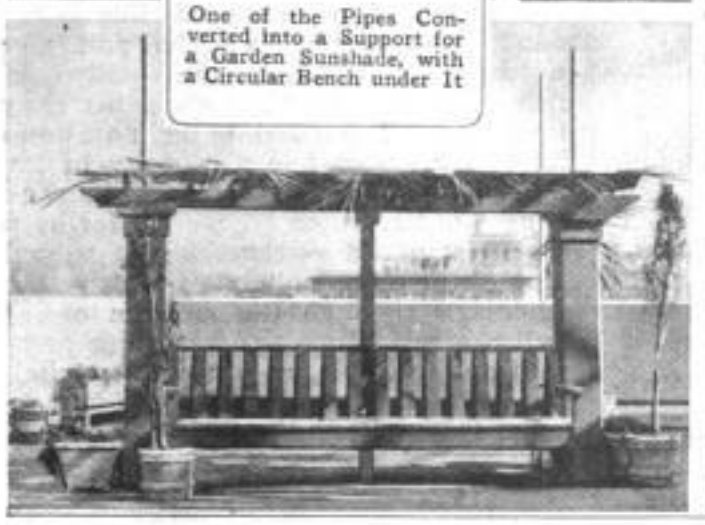


The Narrow-Gauge "Billy Goat" Car Pushing a Loaded Gondola up the Incline: It is Also Used to Let the Empty Cars Down Slowly



The Unsightly and Discouraging Array of Ventilating Pipes That Confronted the Hotel Manager Who had Decided to Make a Roof Garden

One of the Pipes Converted into a Support for a Garden Sunshade, with a Circular Bench under It



Left: An Ornamental Pergola and Bench That Not Only Conceals the Pipes, but Uses Them in Its Structure. Right: One of the Offending Pipes That Now Leads Upward through a Box of Growing Flowers, Concealing Its Point of Contact with the Roof

UNSIGHTLY PIPES SUPPORT ROOF-GARDEN FURNISHINGS

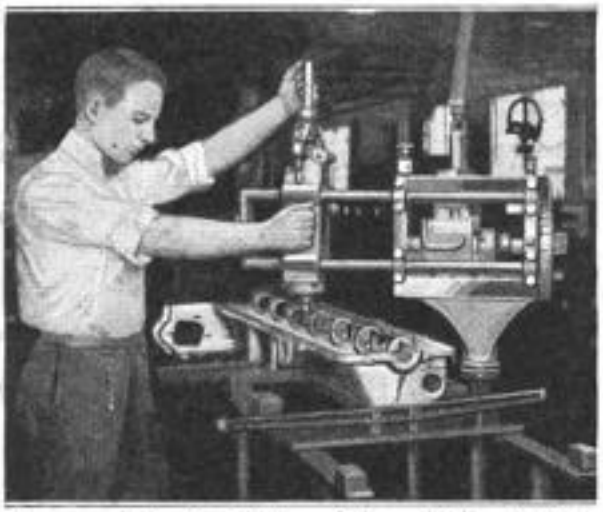
On deciding to add a roof garden to the attractions of his establishment, a western hotel manager was nonplused, at first, by the presence of many ventilation pipes, whose unsightliness threatened to make the roof anything but a garden spot. The problem finally was solved, however, not by simply cloaking their ugliness, but by putting them to a very real decorative use. Some now support sunshades and pergolas; others rise from tubs of earth where grow climbing plants of heavy foliage. The pipes that remain unadorned are so few that they fail to offend the eye, and the finished garden is remarkably attractive for so unpromising a beginning.

AUTO COWL-BOARD FITTING SERVES THREE PURPOSES

A neat nickelplated fitment, designed to be installed on the motor-car cowl board, serves as a primer, decarbonizer, and auxiliary air inlet. The barrel body of the device contains a three-division piston by means of which additional air, in graduated quantities, may be admitted to the intake manifold through a connecting tubing. Pulling the piston to its full-out position offers a clear passage to the manifold for priming. To use it as a decarbonizer, kerosene, water, or any of the decarbonizing solutions is injected.

PNEUMATIC WRENCH DRIVES BOLTS, NUTS, AND SCREWS

A compressed-air machine of somewhat complicated construction, which will pick up a nut and screw it onto a bolt, and



Compressed-Air Nut, Bolt, and Screwdriving Machine, Applying Crankshaft-Bearing Nuts at a Rate of 60 per Minute

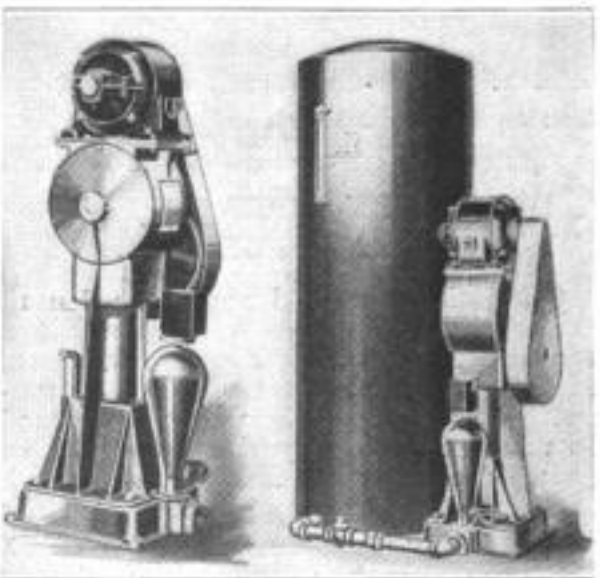
also screw or unscrew various sorts of bolts and screws, is in use in one of the leading automobile factories in the East. It is said that the apparatus will pick up, apply, and drive home a ½-in. nut in one second, or, if the nut is already in place, will screw it down in one-twentieth second. Although of great power and operating at a speed of 1,250 r.p.m., the machine may be so delicately adjusted that nuts can be applied to any tension desired. This feature is particularly valuable in auto-engine assembly, in applying the crankshaft bearing-cap nuts, as these should be set at exactly the same tension on each bearing. Another claim is that the sockets fit the nuts and the bolt heads so accurately that they are not marred.

NEW ESTIMATES FOR LOSSES OF GERMANS AT JUTLAND

From a careful study of both German and British reports of the naval battle of Jutland, an English observer reaches the conclusion that the German losses were considerably higher than announced. The facts that fragments of 15-in. shells were found, though none of the listed ships carried such armament, and that separate observers noted the appearance of ship types not accounted for, are bases for the argument that the Germans lost 122,000 tons of fighting ships, comprising two battleships, one battle cruiser, one pre-dreadnaught, six light cruisers, ten destroyers, and two submarines. This figure compares with an admitted German loss of 61,000 tons, and a British loss of 113,410 tons. In addition, it is deduced that the casualties, listed as 3,300 men, must have been much higher, the crews of the destroyed ships doubtless having suffered great loss. The assumption that these unlisted vessels were the new and unknown product of war-time shipyards, not so efficiently handled as the others, would account for both their loss and the ability to conceal it. Several other German ships were badly disabled, it is asserted.

ELECTRIC WATERWORKS SYSTEMS FOR FARMS

The complete electrification of the farm is only a matter of a short time, as the manufacturers of electrical machinery are rapidly adapting it to rural requirements. A late development along this line is the production of electrically driven pumps in five sizes and capacities, the smallest of which will raise 840 gal. of water per hour from a depth of 35 ft., while the most powerful of the series has a capacity of 200 gal. per hour from a depth of 300 ft. The driving motors, which are wound for both low and standard voltages, are mounted on top of the pump columns and drive the mechanisms through the medium of inclosed chains. When the water-line pressure drops to 25 lb., an automatic switch starts the motor, which runs continuously



Electric Waterworks for Rural Homes. Left: The Self-Contained Motor-and-Pump Assembly without Storage Tank. Right: A Complete Unit

until the pressure is raised to 40 lb., when the switch opens and cuts off the power. Current consumption is said to be about one kilowatt per hour.

Raining Cats and Dogs will Be No Mere Figure of Speech When Aerial Advertising, by Means of Parachutes and Other Forms of Air Floats—As They are Called—Becomes Common. In Fact, These Tissue-Paper Devices are Made in All Manner of Shapes. When Dropped from Airplanes They Inflate and Float for Long Distances before Settling to Earth

TOY-PARACHUTE SWARMS MAKE GOOD ADVERTISING

Dropping flocks and swarms of gayly colored toy parachutes from low-flying airplanes is the latest method of advertising devised by a publicity expert. Any object dropped from a plane is certain to attract attention and arouse curiosity which results in friendly interest and, sooner or later, a sale of the advertiser's merchandise, if the object bears a message bidding for patronage. This is the reasoning followed by a central-western publicity concern which is making a specialty of aerial advertising, using tissue-paper parachutes and other forms, such as giant dragon flies, animal shapes, grotesque and comical human figures, etc., all so designed that, when dropped from a plane, they inflate and float gently to earth. The rate of descent is so slow that the wording on banners or pennants borne by them can be easily read by spectators. A concrete example of a successful method of using these ideas is that adopted by a Michigan merchant during the holidays. Hundreds of the gaudy parachutes, each bearing a gift—doll, drum, tin trumpet, or other light-weight plaything—were liberated over the merchant's home city. As the juvenile population had been warned to be on the lookout for them, and as the rule of "finders are keepers" had been instituted, the affair was voted a huge success by donor and recipients. Special parachutes, made for the U. S. Air Recruiting Service, are colored red, white, and blue, and bear an invitation to "enlist in the air service and learn while you earn." This form of advertising will, doubtless, become quite popular.

¶Wool is being woven into blankets and sold in that form by farmers of North Carolina, through arrangements with local manufacturers, made with state and government assistance. Growers expect, as a result, to realize more than 50 cents per pound for wool that was finding no acceptable market.

SOME NOVEL AND LITTLE-KNOWN ACCESSORIES

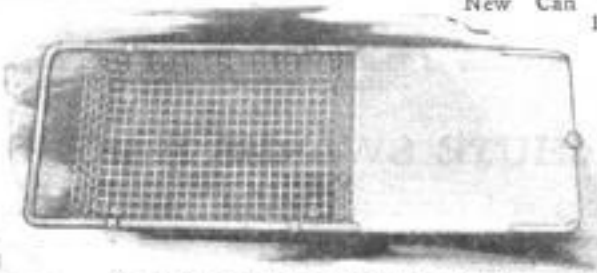
A Milk-Bottle Cap Remover and Replacer That may be Hung Up or Laid Down without Soiling the Cap: Its Simple Construction is Shown Below

Shoes Hang by the Heels from a New Closet-Door Rack of Metal, Which Holds Them Securely Even When the Door is Slammed, and Does Not Collect Dust

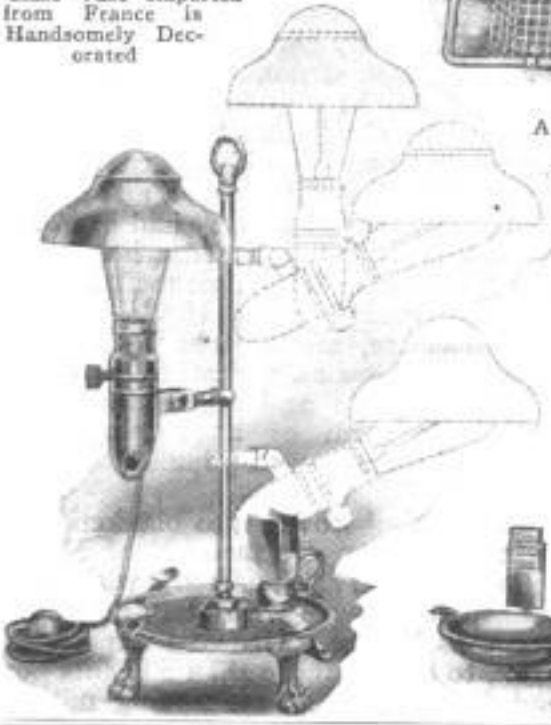
For the Smoker's Stand: A Little Electric Cigar Lighter, with Rubber Feet to Save the Table Top, Operated from the Lighting Circuit

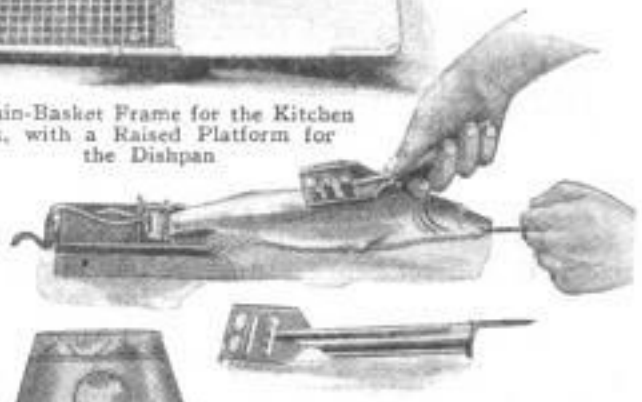
The Ragged Edge of the Can is Turned Up and Smoothed by a New Can Opener That Cuts like Scissors

Designed Especially for Growing Bulbs, a Glass Vase Imported from France is Handsomely Decorated



A Drain-Basket Frame for the Kitchen Sink, with a Raised Platform for the Dishpan

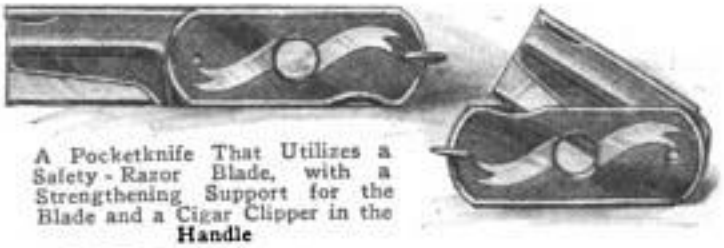




The Slipperiest Fish is Easily Held Firmly and Scaled with a Novel Combination of Tail Clamp, Mouth Hook, and Scaling Tool

Now the Smoker is Accommodated with a Reading Lamp of His Own, Which Includes an Ash Receiver and Match Holder, and is Made in Different Designs, One Adjustable

Beauty and Safety are Both Conserved by a New Electric-Light Fixture with a Portable-Lamp Connection in a Metal Tassel at the Center



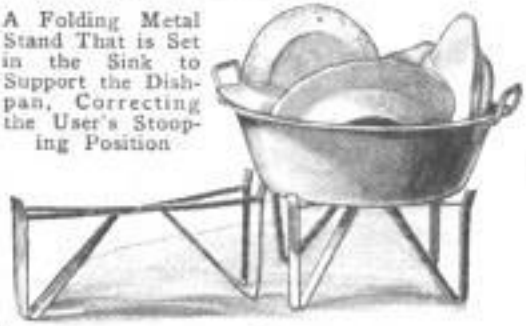
A Pocketknife That Utilizes a Safety-Razor Blade, with a Strengthening Support for the Blade and a Cigar Clipper in the Handle

A Curious Ornamental Lamp for Burning Perfume, in a Limousine, as Above, or in the Boudoir

A Portable, Ornamental Heater That Looks Electric, but Works with a Gas Mantle in the Center of Its Copper Reflector, Which Is Adjustable

For Saving Hospital Patients the Discomfort of a Wrinkled Sheet, Four Newly Invented Sheet Straps are Used. They are Fastened to the Bed Springs

A Nonskid Rubber Heel That Revolves and Wears Evenly, Saving Rubber and Preventing Run-overs



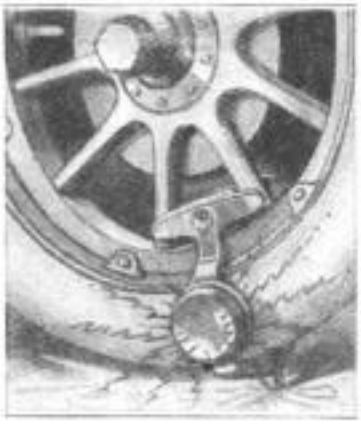
A Folding Metal Stand That is Set in the Sink to Support the Dish-pan, Correcting the User's Stooping Position

Any Bundle may Now Acquire a Regular Suitcase Handle, Which Clips on with Strong Fasteners, as at the Left

A Simple Double Connector for Flat Iron and Lamp, or Similar Combinations: It Fits between the Halves of a Two-Part Plug

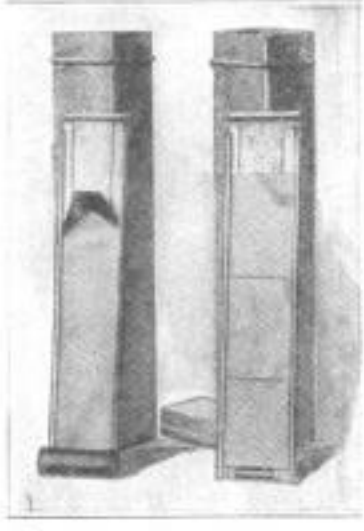
AUTO-THEFT ALARM "SHRIEKS" AT EVERY TURN OF WHEELS

An auto-thief discourager, which produces a shrill, penetrating din every time the wheel to which it is attached makes a turn, is so designed that it locks in position around the tire and felloe. A button, projecting from the tread portion of the device, actuates a vibrating mechanism which emits a sharp, far-reaching note, whenever it comes in contact with the roadway. No thief has the hardihood to drive a car which is advertising the theft to all and sundry within a radius of several blocks. Unlike other theft-alarm devices of the same general design, this one cannot be turned sidewise by deflating the tire, as rubber-protected arms, projecting from the sides, clamp to the spokes and hold the apparatus in the operative position.



SMALL DEVELOPING TANK IS SIMPLE AND CAPACIOUS

Small size and large capacity constitute the chief feature of a new form of developing tank, which takes either plates or films, the latter in rolls or cut. One model, only 3 by 2 in., and 15 in. high, has room for three holders, each of which holds six plates or films. A strip of metal the length of the tank, with removable flanges along the edges, composes a holder. Films or plates, on both sides of the strip, are held flatly in place until development is completed, and then quickly removed by taking off the flanges.

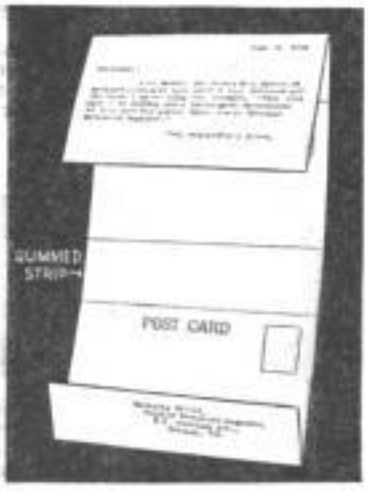


STUDY OF DRY-KILN METHODS INTERESTS LUMBERMEN

All branches of the lumber industry are represented by men who come from near and distant states to attend the short courses in kiln-drying held monthly at the Forest Products Laboratory in Madison, Wis. Each course covers a period of two weeks, and consists of a series of lectures, exercises, tests, inspections, and discussions. An important feature of the work is a short individual conference with each member of the class, on the subject of improving the conditions of the plant with which he is associated. No special class of lumber, or type of kiln, is emphasized in the studies, which are intended to be as broad and fundamental as possible.

NOVEL POST CARD IS EASY TO USE IN TYPEWRITER

Annoying and time-wasting difficulties in using ordinary post cards in a typewriter have suggested an entirely new form of card to a western inventor. Six cards are prepared in a single sheet, with tear-off perforations, each card being of regulation length but considerably wider than usual. This extra width is creased for folding, and gummed on the front side. The sheet is inserted in the typewriter, the address written on the creased strip, and then the message written on the body of the card below. When the card is torn off, the strip is folded forward and pasted down, bringing the address on the face.



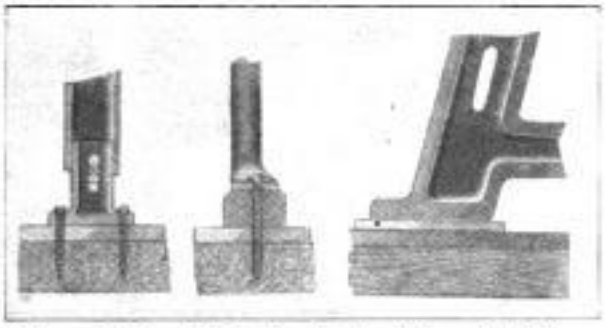
DANISH SHINGLE DEPOSIT IS EXPLOITED ON LARGE SCALE

A beach-shingle deposit, approximately 1,000 ft. wide and 10 to 13 ft. deep, stretching along the southern coast of Kjöge Bay, Denmark, is being worked on an extensive scale, as there is a strong demand for the small and medium-sized pebbles for concrete making and road-

building purposes. A very difficult transportation situation, presented by the shallow water of the bay, was overcome by constructing a large shiploading silo, about 1,000 ft. off shore, and conveying the assorted pebbles to it by means of ropeways. The silo is divided into two compartments of 300 cu. yd. each, which discharge their contents directly into shipholds by way of wide chutes, this operation requiring only 15 to 20 minutes for the average shipload. Including the operation of the sorting breaker, the entire handling process is mechanical.

HEAVY MACHINERY FASTENED TO FLOORS BY CEMENT

A Swiss engineer has introduced a new system of installing heavy machinery by the use of which bolts, lag screws, spikes, etc., are eliminated, their place being taken by a very strong cement which is applied, hot, to felt pads of the proper size and thickness. After heating the spots upon which the machine is to stand, and also the feet of the machine, the pads are laid in position and the machine placed upon them. It is claimed that this

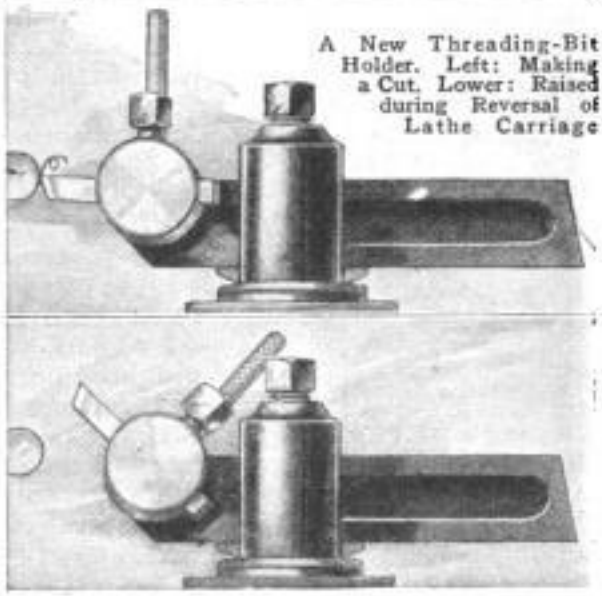


Old and New Methods of Anchoring Machinery. Left: Lag Screws, Laboriously Driven. Right: Cement-Saturated Felt Pads Save Labor and Floors, and Deaden Vibration

not only equals bolting for security, but permits greater flexibility and greatly decreases vibration and noise. Other benefits are the avoidance of the labor of drilling anchorage holes in hard cement floors, and that the machinery cannot be classed as being part of the building, as it is in no manner permanently attached to it.

NEW SCREW-THREAD CUTTING TOOL IS EASY TO USE

Screw-thread cutting on the lathe is simplified by a new threading tool recently offered by an eastern manufacturer. The high-speed steel cutter is clamped in a barrellike fitting, which is built into the end of the tool holder. The barrel can be turned toward or from the operator by means of a short lever which projects from it. The threading cut is made in the usual way with the exception that when the end is reached, the lathe crossfeed is

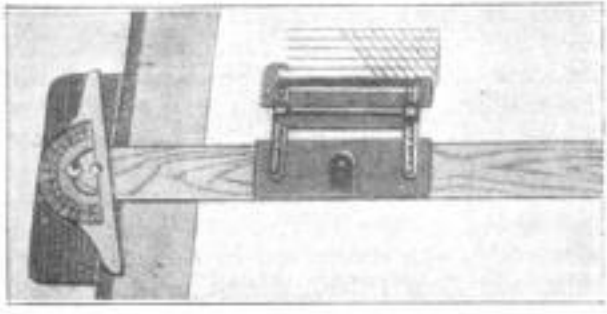


A New Threading-Bit Holder. Left: Making a Cut. Lower: Raised during Reversal of Lathe Carriage

not backed off, but the cutter is brought out of engagement with the work by pulling the small lever toward the operator. During the reverse travel of the carriage, the crossfeed is moved the proper distance inward to make the next cut. As the forward movement again begins, the tool is brought into engagement with the work by moving the lever forward, away from the operator.

DRAFTSMEN'S HATCHING TOOL SPACES LINES EVENLY

Drawing evenly spaced crosshatching lines is relieved of much of its labor by an Ohio man's invention. This device, sliding longitudinally on the T-square, carries a short straightedge with a small perpendicular sliding movement. An adjustable pointer on one end is placed opposite each line drawn, before drawing the next one, by turning a graduated roller in contact with the paper, assuring even spacing.



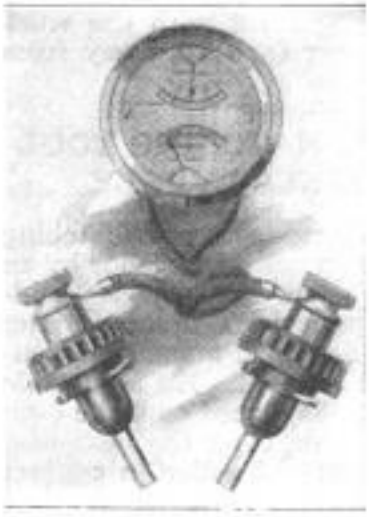
Evenly Spaced Lines are Easily Made by Sliding the Straightedge, with the Aid of the Pointer and Graduated Roller

STEEL STOOL ON ROLLERS IS BOON TO FILE CLERKS

Filing clerks who work on their feet all day, according to the custom of the occupation, will welcome a new form of stool offered for their benefit by an Ohio manufacturer. This specialized piece of furniture, built entirely of steel, is mounted on a set of easy-running casters of large diameter, so that the stool rolls in any direction at a touch. Its height is calculated to promote the comfort of the user while working at a filing cabinet of average size.

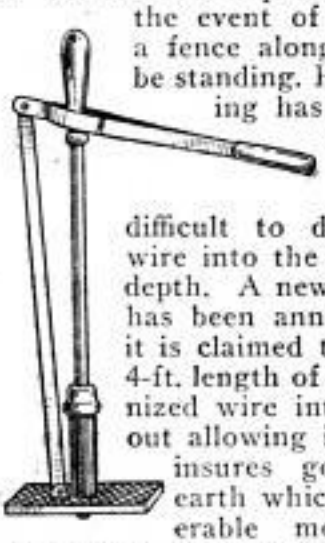
COWL-BOARD METER INDICATES AUTO-BATTERY WATER LEVEL

Although car owners are instructed to replenish the supply of distilled water in storage batteries at intervals of 12 to 14 days in winter and 7 to 10 days in summer, they are forgetful and usually neglect the matter. A reminder, in the form of a neat combination volt-ammeter, to be mounted on the cowl board, has recently been placed on the market. The voltmeter, instead of the usual calibration, is marked with the words "low" and "high," which indicate the level of the battery fluid. Two filler caps, fitted with lead electrodes, which protrude into the cells but do not touch the plates, are used to replace those in the end cells of the battery, and are connected to the meter. So long as the electrodes are immersed in the fluid, current will flow through and be registered by the meter, the pointer swinging to the high side. Immediately either electrode becomes uncovered by the falling of the fluid, the circuit is broken, and the pointer swings to the word "low." This occurs 24 hours in advance of the exposure of the tops of the plates, allowing time to replenish the water before damage occurs.



PLUNGER TOOL DRIVES FENCE GROUNDING WIRE INTO EARTH

It is the practice to ground wire fences at intervals as a protection to cattle in the event of lightning striking a fence along which they may be standing. Heretofore grounding has been a somewhat laborious undertaking for the reason that it is difficult to drive a grounding wire into the soil to a sufficient depth. A new plunger-type tool has been announced, for which it is claimed that it will drive a 4-ft. length of No. 9 gauge galvanized wire into the earth without allowing it to buckle. This insures good contact with earth which contains considerable moisture the year round and, for this reason, forms a perfect ground connection.



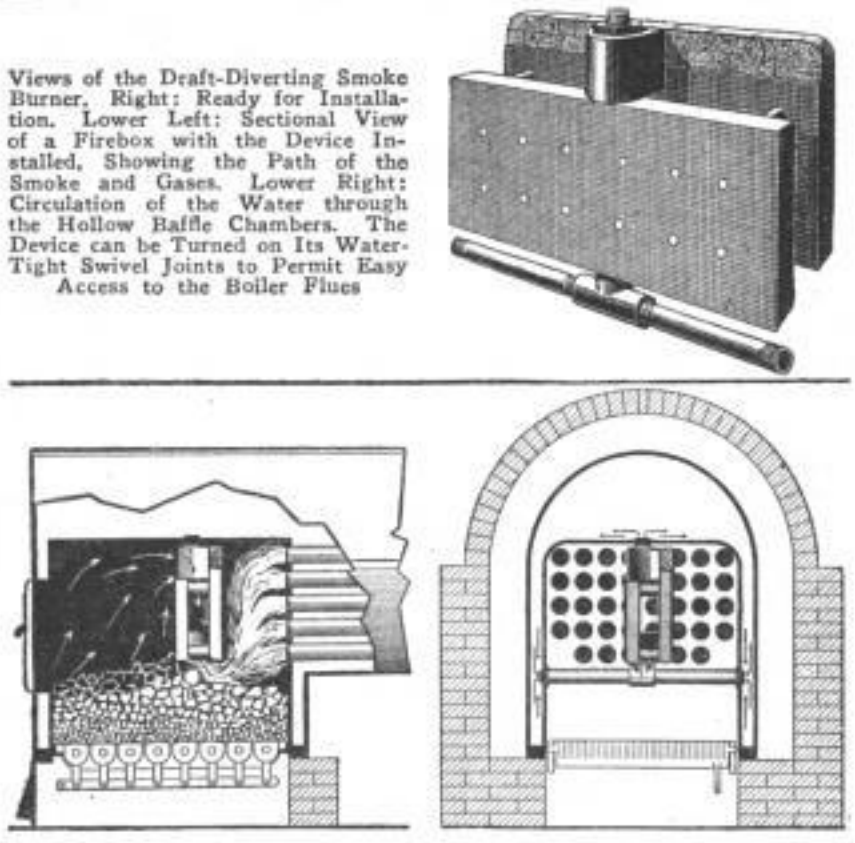
SNARE-DRUM MUFFLING LEVER HAS THREE POSITIONS

For the production, with a snare drum, of tom-tom and other effects that call for the use of a muffler, an Illinois manufacturer has devised a small attachment of marked convenience. It consists of a clamp for the ends of the snares, fixed to the lower hoop of the drum, and having a spring tension adjustable by means of a thumbnut on a plunger. Under the nut is pivoted a camlike lever, which can be raised and lowered, loosening or tightening the snares. This lever is so mounted that it can be turned to face either way, against the side of the drum, or project straight out, at the drummer's convenience.

Muffler Attachment on the Lower Hoop of the Drum: Dotted Lines Show Different Lever Positions

SMOKE-BURNING DEVICE ADDS TO FURNACE EFFICIENCY

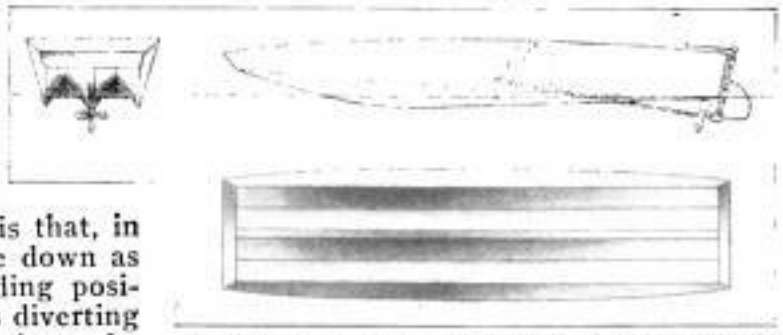
A new water-cooled baffle-plate device for installation in the firebox of a conventional up-draft furnace has the effect of converting it into one having some of the characteristics of the down-draft type. It is simple in construction, consisting of two hollow steel compartments, of different heights, arranged crosswise of the firebox, at a point somewhat to the rear of the center, with the higher one at the back, thus dividing the firebox into two distinct combustion zones. Pipe connections between the sections of the device and the boiler lead the water through the former and make it part of the boiler area. As the two chambers are separated by a few inches and the higher one reaches to the boiler crownsheet, the gases and smoke liberated by the forward portion of the fire are forced to pass over the top of the low forward section, down between it and the rear section, under the latter, and over the hottest part of the fire, where they are consumed. It is estimated that the gases constitute 35 to 45 per cent of the heat value of the fuel. Taking this estimate as a basis, the manufacturers claim the device will effect a coal economy of 10 to 15 per cent. An important feature of the installation is that it is so mounted on swiveling pipe joints, placed at the top and bottom centers, that it may be turned lengthwise of the firebox to allow easy access to the flues for cleaning.



Views of the Draft-Diverting Smoke Burner. Right: Ready for Installation. Lower Left: Sectional View of a Firebox with the Device Installed, Showing the Path of the Smoke and Gases. Lower Right: Circulation of the Water through the Hollow Baffle Chambers. The Device can be Turned on Its Water-Tight Swivel Joints to Permit Easy Access to the Boiler Flues

SPEEDY HYDROPLANE BOAT HAS DOUBLE V-SHAPED BOTTOM

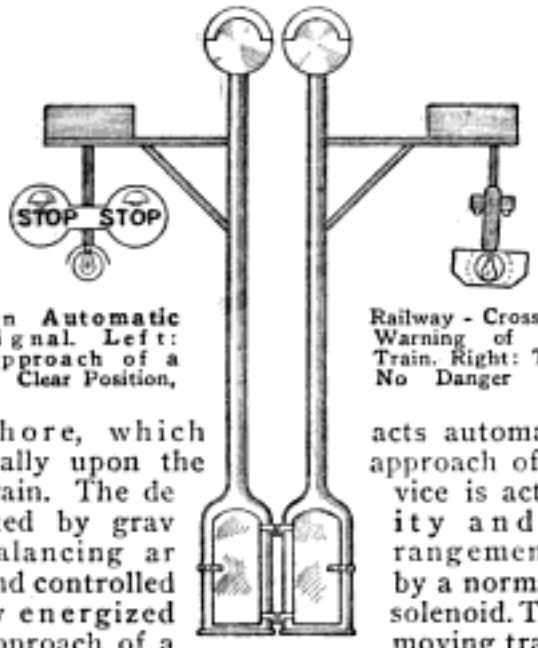
A newly patented hydroplane speed boat, that is attracting some attention just now, is chiefly remarkable for the shape of its bottom, which, viewed longitudinally, is of double V-shape or like an inverted "W." The grooves are deepest at the square bow, and taper gradually to a flat stern. The result of this unusual formation is that, in action, the stern does not settle down as the bow rises, but takes a gliding position on the surface, the grooves diverting from the propeller any air taken in at the bow. There are two rudders, one at each side of the stern, inclined a little toward each other at the top. When either is turned inward, the tendency is to raise the boat a little higher in the water, and increase the buoyancy as it turns. The fact that the craft virtually rests upon three keels contributes to its steadiness.



Front, Side, and Bottom Views of the New Hydroplane Speed Boat, Revealing the Shape of the Double V-Grooves, Which Turn Away from the Propeller Any Air Taken in at the Front, and Keep the Hull in Gliding Position

RAILROAD CROSSING SIGNAL IS AUTOMATIC IN ACTION

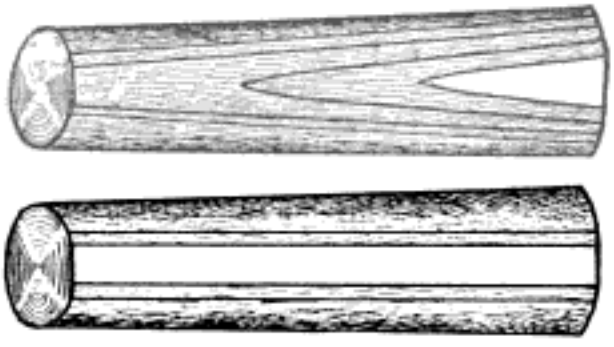
A railway-crossing signal recently patented is on the order of the familiar semaphore, which acts automatically upon the approach of a train. The device is actuated by gravity and a balancing arrangement, and controlled by a normally energized solenoid. The approach of a moving train has the effect of deënergizing the solenoid, which allows a "stop" signal, consisting of two conspicuous disks attached to a crossarm, to swing crosswise of the roadway. Fog-piercing semaphore lights, also mounted on the crossarm, give ample warning at night.



An Automatic Signal. Left: Approach of a Clear Position, Railway - Crossing Warning of the Train. Right: The No Danger

PATENTED METHOD OF CUTTING TAPERED LOGS SAVES WOOD

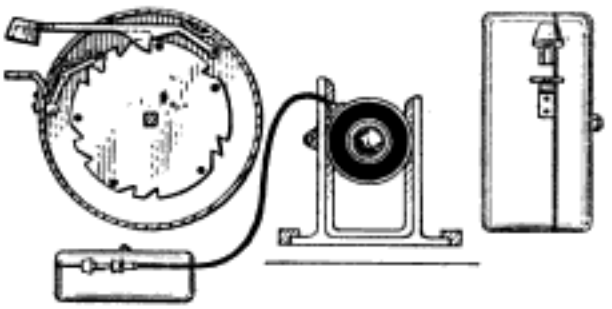
By a system of cutting tapered logs parallel with the sides, instead of to a center line, an Oregon lumberman, who has obtained a patent on the method, claims a considerable gain in both quantity and quality of the lumber. By the old method, all the boards are tapered, and the outside cuts greatly shortened, making much waste. None of the boards is tapered by the new system, and the wedge-shaped center is cut into useful short lengths. It is calculated that 100 board feet are saved by cutting a 16-ft. log, of 30-in. top and 36-in. butt, the new way. For demonstration, the inventor uses a dummy log built up of veneer.



Top: The Common, and Wasteful, Method of Cutting Tapered Logs. Bottom: The New Patented Method

DELAYED-ACTION SHUTTER RELEASE FOR CAMERAS

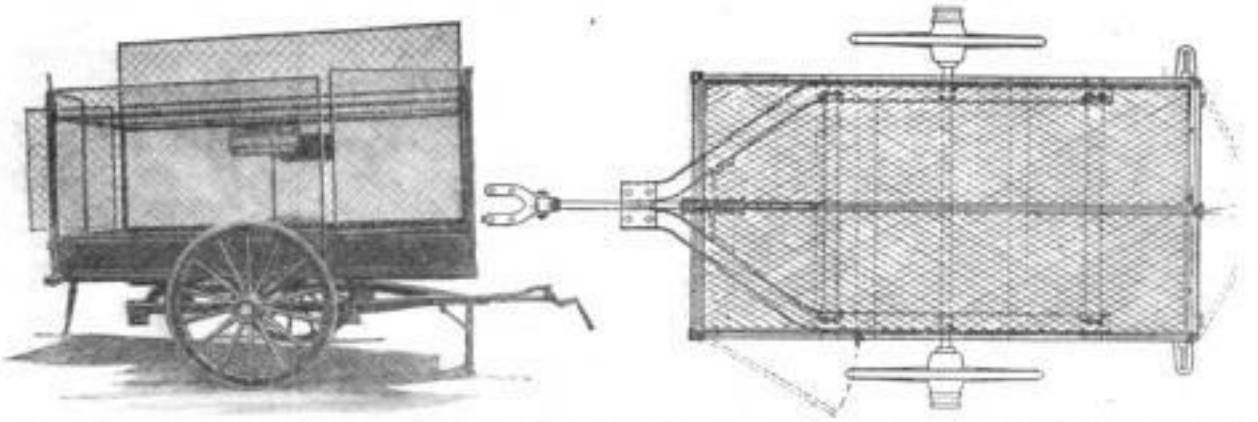
The amateur photographer will have plenty of time in which to assume a becoming pose in the group picture, if he equips his camera with an improved delayed-action device recently placed on the market. The device is actuated by a spring motor which is wound up by turning a small bell on the outside of the case. The other purpose of the bell is to sound a warning just before the shutter is released. After winding and setting the clockwork, the operator attaches the end of the shutter-release cable to the device, starts the apparatus, and assumes his place in the group. At the expiration of 15 seconds, the device operates the camera shutter at whatever speed it may be set for.



Details of the Delayed-Action Camera-Shutter Release. Left: Ratchet-and-Pawl System Which Operates the Shutter Cable. Center: Attached to Camera. Right: Enlarged View Showing Starting Button

IMPROVED AUTO TRAILER HAS GREAT VERSATILITY

A Colorado inventor has improved upon the conventional type of auto trailer in a vehicle which has, among other features, a channel-section chassis, underslung to the axles. The body is supported on the chassis by front and rear transverse springs. Strong grill sections are supplied with the outfit, which can be quickly applied to convert the open box body into one suitable for the transportation of chickens, hogs, sheep, or even cattle and horses. When on tour, light luggage, such as suitcases, is stowed in the lower part of the body, leaving the upper portion, which projects slightly



Two Lattice-Body Designs Used on a Newly Designed Trailer. Left: With the Half Covers Closed, Roomy, Double-Deck Sleeping Accommodations are Furnished. Right: A Slightly Different Design with a Hinged Side Panel besides the Regular End Gate

above the lids when these are closed, for the disposition of larger articles, such as the tent, blankets, etc. The double-deck arrangement also lends itself to the making of individual sleeping quarters, a full-length bed being made on each deck. The drawbar is equipped with a compression spring to absorb the shocks of sudden starts. Two and four-wheel trailers are supplied. The latter may be used as a horse-drawn vehicle by attaching a singletree to the drawbar coupler.

FLEXIBLE ELECTRIC CONDUIT HAS PORCELAIN INSULATION

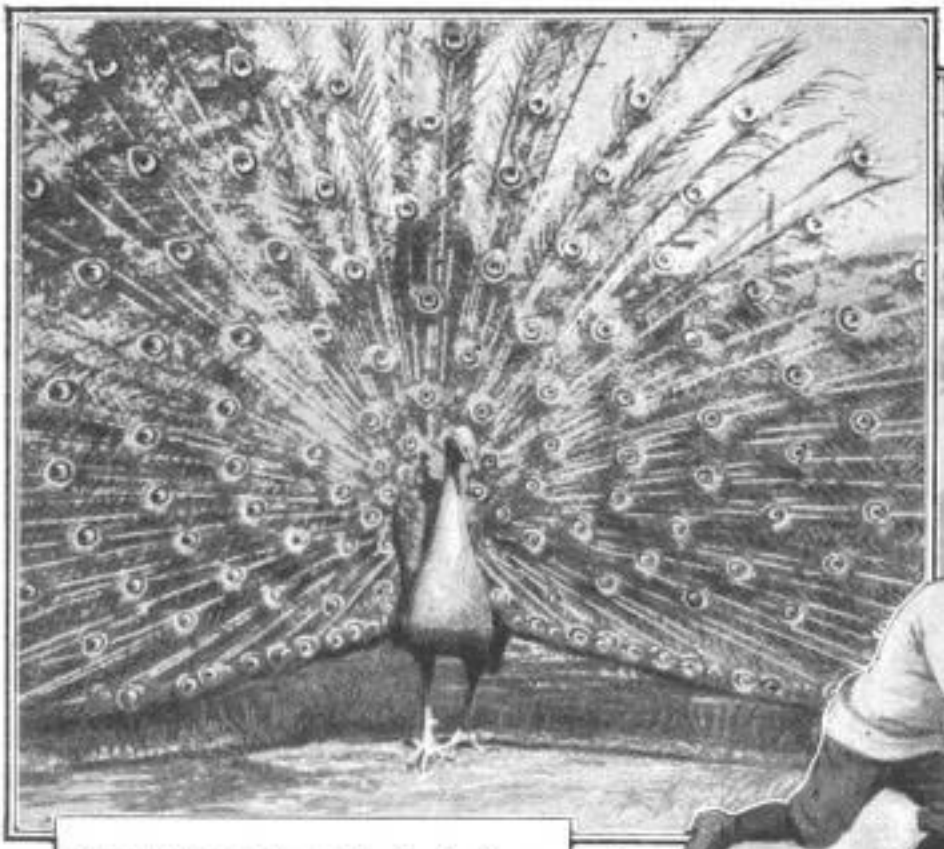
An improved form of flexible conduit, or cable, has been produced for use in bakery ovens, or other places where excessive heat quickly burns out insulation of the ordinary kinds. In the new type the principal insulation is made up of a number of porcelain bushings, pierced by two holes through which the wires are threaded. The bushings are concave on one end and convex on the other, so that they are free to move easily sidewise without binding, as would be the case if they were square on the ends. This, and the fact that they are quite short, accounts for the surprising flexibility of the cable. Additional protection is afforded by an armor of asbestos-packed flexible metal tubing.

VENDING MACHINE FOR STAMPS SELLS BLOCKS OF FIVE

Postage stamps of one or two-cent denomination are delivered in blocks of five by a new form of vending machine, which, being designed for the convenience of plant employes, takes no profit in the transaction. Depositing a nickel in one slot, or a dime in another, and turning a key on the side half a revolution cause a six-sided drum to engage five stamps by their perforations, and eject them through the top window. Both the coins and the rolls of stamps are visible through the glass sides of the case.

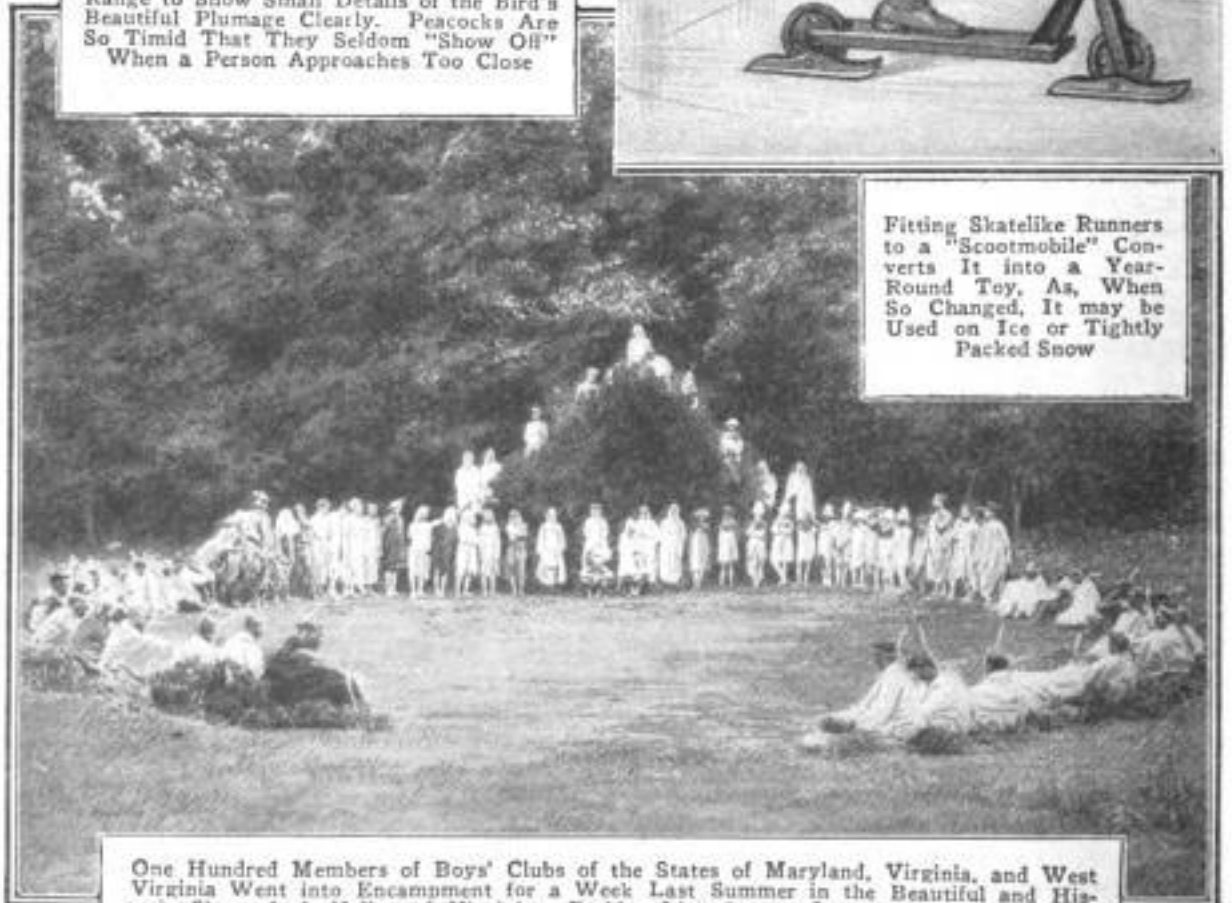
COFFEE CONSUMPTION HEAVY IN UNITED STATES

The coffee consumption of the United States, for the year ended June 30, last, showed an increase over any previous year, according to figures of the Bureau of Foreign and Domestic Commerce. The increase over the preceding year was 399,000,000 lb., the entire amount consumed being 1,358,000,000 lb. At the rate of 40 cups per pound, which is a fair average, the increase would be about 16,000,000,000 cups. The consumption rate per capita is 12.7 lb., or about 500 cups.



This Picture Is Remarkable for the Reason That It was Taken at a Close Enough Range to Show Small Details of the Bird's Beautiful Plumage Clearly. Peacocks Are So Timid That They Seldom "Show Off" When a Person Approaches Too Close

Fitting Skatelike Runners to a "Scootmobile" Converts It into a Year-Round Toy, As, When So Changed, It may be Used on Ice or Tightly Packed Snow



One Hundred Members of Boys' Clubs of the States of Maryland, Virginia, and West Virginia Went into Encampment for a Week Last Summer in the Beautiful and Historic Shenandoah Valley of Virginia. Besides Listening to Lessons on Farming and Playing Games, They Gave a Pageant Based on an Old Indian Legend

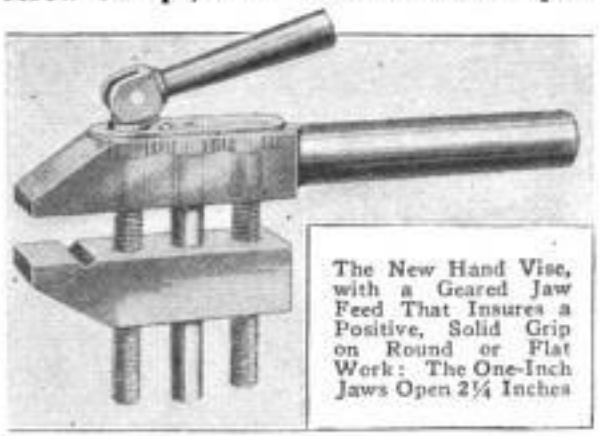
Children of America are Doing Their Part in Helping the Thousands of Starving Children of Europe. A Part of the Relief Program in Portland, Oregon, in Which 1,800 School Children Joined, Was a Drill Ending with the Formation Known as the Patriarchal Cross

What might be Called an "Eskimo Kiddie Car" Has Sled Runners in Place of Wheels. The Front Runners Turn So That It Steers Just like a Bobsled

Rear Admiral Newton A. McCully Did His Adopting of Homeless Russian Children on a Wholesale Scale, Finding Room in His Heart and Home for Five Boys and Two Girls, Ranging in Age from Three to Twelve Years. Above are Pictured the Admiral, Six of the New Family, and a Nurse. The Seventh Tot is Hiding behind the Child at the Right

SMALL, POWERFUL HAND VISE IS USEFUL IN MANY WAYS

Hand vises are usually little more than screw clamps, for use where a more positive grip is needed than pliers will give. A form recently placed on the market, however, is made with such care and mechanical skill that it finds an entirely new field of usefulness. The square, polished 1-in. jaws open 2¼ in., traveling on two screws and a smooth guide rod, all three of which are geared together and operated by a pivoted handle on one side. An accurate groove across one jaw enables round as well as flat work to be firmly held. The tool, which is 9½ in. long, may be held by the handle in a bench vise, or in a special ball-and-socket holder adjustable to any angle.



The New Hand Vise, with a Geared Jaw Feed That Insures a Positive, Solid Grip on Round or Flat Work: The One-Inch Jaws Open 2¼ Inches

SIMPLIFIED BOTTLE CAPPER FILLS A HOUSEHOLD NEED

The application of crimped metallic caps to bottles is a simple matter with a new tool designed for home use. The bottle is supported in a sheet-metal frame which rocks backward and forward on a section of steel tubing at the bottom, mounted upon a U-shaped rod which supports a crosspiece of steel at the top in which a crimping socket is centered. To use, a bottle is placed in the frame and a cap applied to the neck loosely. Upon rocking the frame toward the operator a cam action occurs which has the effect of shortening the distance between the crosspiece and the bottom of the frame. As the action is continued, the crimping socket is finally brought against the cap, forcing it onto the bottle neck with a pressure of about 300 lb., when a 30-lb. forward pull is exerted, crimping it securely in place.

Right: Capper Open; Bottle and Cap in Position. Left: Closed; Cap Crimped

NEW MOTOR-TRUCK JACK HAS DOUBLE LIFTING SCREWS

A compound screwjack, especially designed for motor-truck and tractor service, has two concentric screws as the lifting element. After the main inner screw has been extended to its limit, the secondary outer screw, which is threaded internally and externally, begins to extend by turning in the iron housing body. This arrangement results in a very compact tool which may be extended from a 9½-in. collapsed dimension to a total height of 19½ in. The double-lift feature makes the jack of exceptional value as part of the tractor equipment, as it compensates for the distance which the bottom of the tool is certain to sink into soft ground.

DISK CHART GIVES FIGURES FOR MIXING FERTILIZER

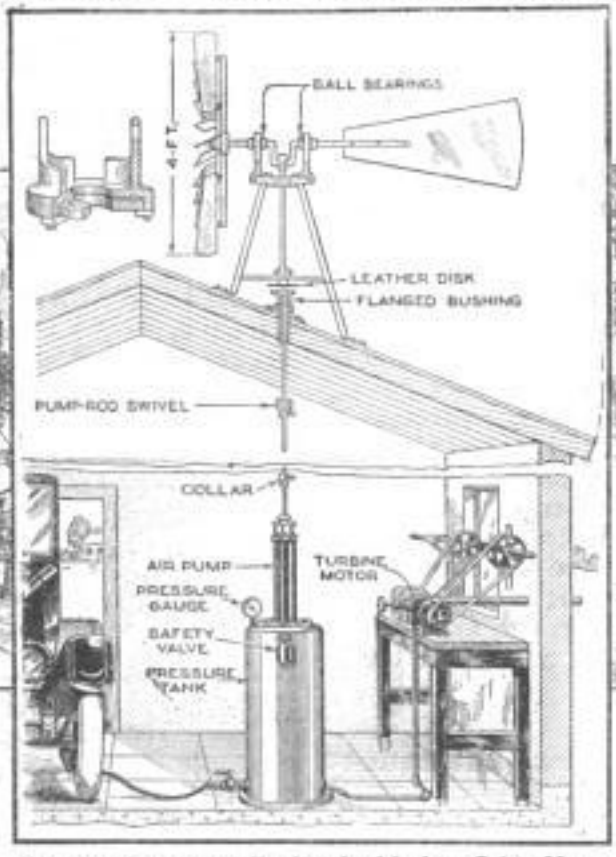
In mixing fertilizers to contain certain percentages of active material, a considerable amount of figuring is saved by the use of a disk chart prepared by a southern agricultural college. Two cardboard disks are eyeleted together at the center, the front one carrying tables of materials with the percentage of phosphoric acid, nitrogen, potash, or all three, and containing a radial slot with numbers, from 1 to 12, along its sides. The rear disk is turned until the percentage figure desired for the mixture appears in the slot, and below it, opposite the number corresponding to the tables, is found the correct proportion of material, in pounds per ton.

Air Compressor for Isolated Garages

By S. E. FREW

THE owner of a garage that did not handle any heavy machine work, and who did not, therefore, possess a power plant, desired to install an air compressor for such work as inflating tires, etc. Electric-power service was not available, neither was there any water power to be had, and he did not wish to use a gas or oil engine, but the difficulty was finally solved as shown in the illustration.

A small windmill, the shaft of which runs in ball bearings, is fastened to the roof, and, through a crank of suitable throw, drives an ordinary tire pump. This is mounted on top of, and connected to, the air-storage tank, from which the air is taken to supply the needs of the shop.



For the Garage Not Equipped with Any Other Means of Driving the Air Compressor, the Outfit Shown will Provide an Excellent and Cheap Method of Obtaining "Free Air"

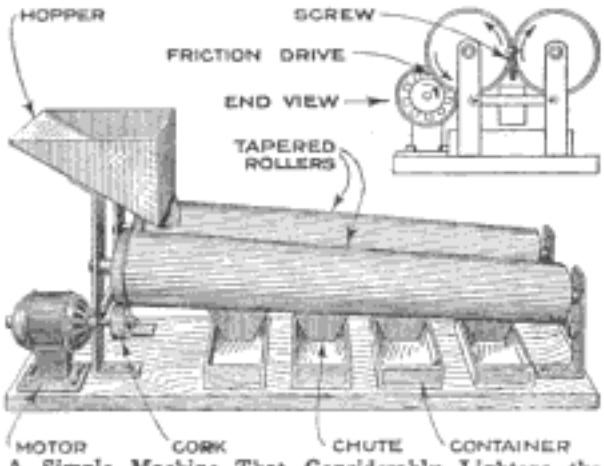
While the tire pump is suitable for a great deal of ordinary work, it may be necessary, in some cases, to use a different type of compressor; this point, however, like the selection of the size of the windmill, and its mounting, must be determined by individual requirements, as no rule can be laid down to suit all cases. In localities where the winds almost invariably blow from one direction, it might be advisable to fasten the windmill rigidly, but usually the mill must be mounted so as to turn readily, a very good mounting for this purpose being shown in the small detail drawing. It is also advisable to fit a loose leather, or rubber, disk to the shaft over the guide bushing on the roof, to exclude dirt and dust from the bearing.

The mill may be disconnected from the pump, when necessary, by loosening the setscrew in the collar on the pump shaft. On the air tank, a pressure gauge and a properly set safety valve are indispensable; the latter in particular should never be left off. In addition to furnishing air for inflating tires, various other uses for this unit will occur to the alert garage owner.

For instance, as indicated in the drawing, the air may be used to drive a small turbine, furnishing power for driving small grinders, buffers, or the like.

A Screw-Sorting Machine

A concern that used large quantities of machine screws found that a number of



A Simple Machine That Considerably Lightens the Work of Sorting Machine Screws: It may be Constructed with Very Little Labor, and will Amply Repay the Time Spent upon It

separate sizes had become mixed in the stockroom bins. Sorting by hand was out of the question, on account of the large number of screws involved, so the machine shown in the illustration was built, proving very satisfactory for the task. No dimensions are given in the drawing, as these depend upon the range of sizes to be sorted.

A pair of tapered steel rollers are mounted, as shown, on a wooden bedplate, a sheet-steel hopper being fastened centrally between them. A rubber band is cemented to the larger end of each roller, one of the rollers being driven through a small cork pulley, mounted on the shaft of a fractional-horsepower motor. This roller, in turn, drives the other, through the rubber bands. The various sizes of screws drop into chutes leading to the containers. The rollers turn in an outward direction, as indicated by the arrows, and are preferably casehardened.—P. L. Shee, Oak Park, Illinois.

Welding Castings without Preheating

In welding large or peculiarly shaped castings of very thin metal, such as steam radiators, large pulleys with thin rims, and similar pieces, it is often difficult and expensive to preheat them before making the weld with the oxyacetylene torch.

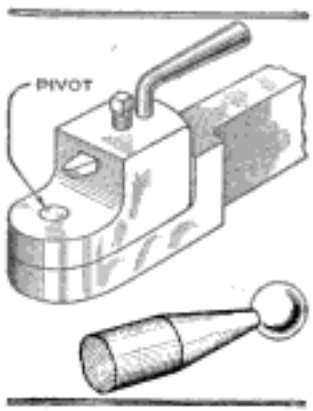
To eliminate the necessity of preheating, I place the casting on a welding table, or block, the broken parts being brought into proper alinement. A quantity of wet fireclay, just heavy enough to daub well, is applied thickly on all parts of the casting adjacent to the weld, care being taken to allow none on the break. The weld is then started, and if the fireclay dries out too much, it is knocked off, and a fresh cold batch is applied.

The object is to keep the casting cool so that there will be no rush of heat from the extreme hot part of the weld, and thus avoid undue strains on cooling.

In the case of a pulley, make a wooden or cardboard template of the perimeter of the wheel. Use screw jacks set on the hub, and apply the template to tell when the rim is in the correct position for welding.—Lester C. Land, Greenfield, Ind.

A Ball-Turning Lathe Tool

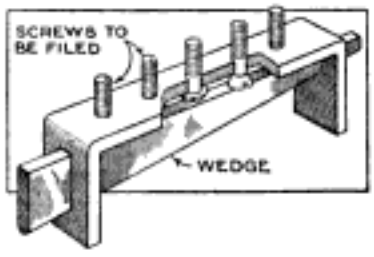
Many devices for forming balls in the lathe have been made and used, but the one shown in the drawing has the merit of simplicity and cheapness, and is particularly applicable to production work.



The tool bit is revolved in an arc by means of a handle in the top of the holder, the latter being pivoted to the shank. This makes it possible to form the ball as desired. The drawing shows one kind of work possible with a tool of this kind, but it can be adapted to any style of spherical work.

Clamp for Filing Screws

When it is desired to shorten a screw, the usual method of holding it in the vise, in addition to damaging the head, often tries the patience of the machinist. The simple tool shown in the drawing greatly facilitates the shortening of screws, holding them firmly during the process.



A piece of flat cold-rolled steel is bent and slotted to take the wedge that locks the screw heads. The holes in the steel need not be threaded, the screws being merely dropped into place and the wedge tapped home.

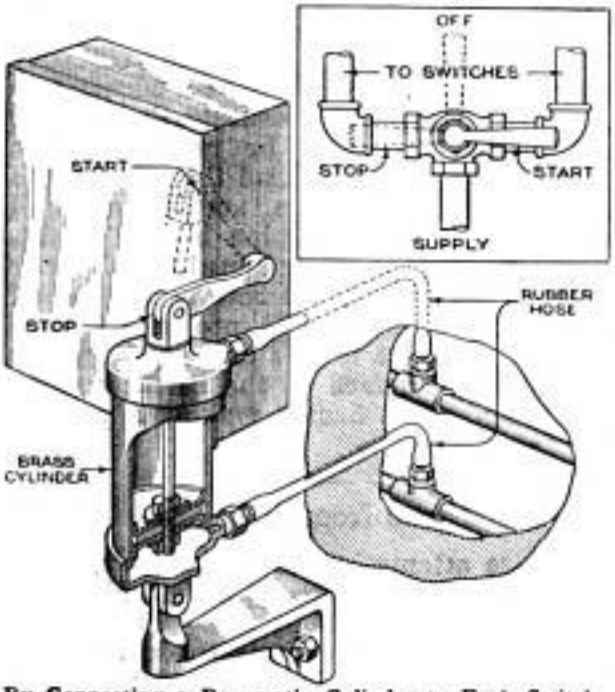
Pneumatic Remote Control for Motors

A factory manager arrived at the conclusion that too much time was lost by the practice of having the electrician walk through the various departments, located on separate floors, to start and stop the electric motors. Inasmuch as it was not deemed wise to break the rule that this man only was to perform this duty, some form of remote control was suggested.

All of the motor-starting switches were of the same inclosed safety type, with a lever on the side; several methods of operation were considered, but finally it was decided to open and close the switches mechanically, from a valve in the engine room, by using compressed air at 90-lb. pressure, this being already available.

A brass cylinder, closed at both ends, and swiveling on a bracket, was attached to the column on which the starting switch was mounted. A piston, fitted with a double cup leather, was linked to the switch lever. The cylinder had air inlets at both top and bottom, and these were connected to the air line by short lengths of rubber hose.

By connecting the air lines with a standard three-way valve, all the motors are started and stopped at the same time by the mere turn of a lever. The engine-room valve has a relief port that releases

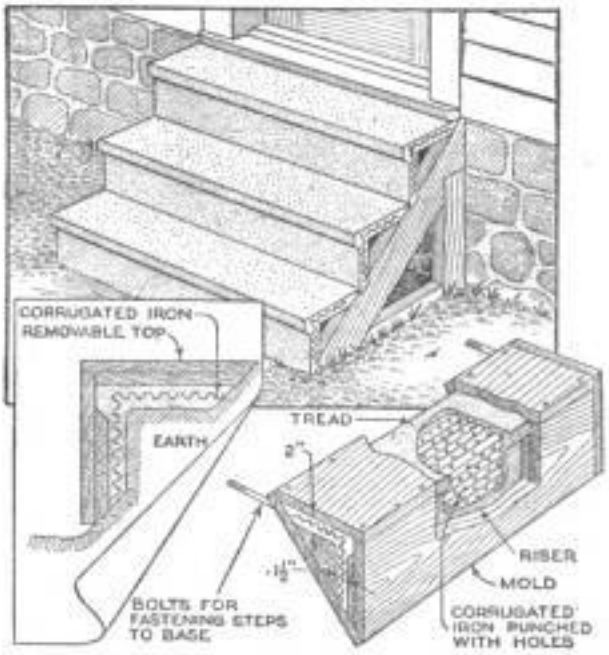


By Connecting a Pneumatic Cylinder to Each Switch Lever, All Motors in a Factory may be Started or Stopped Simultaneously

the air in the line, so that there is no pressure on one side of the piston when air is admitted on the opposite side.—W. Burr Bennett, Honesdale, Pa.

Steps Reinforced with Corrugated Iron

The type of concrete step shown in the drawing can be molded individually and attached to wooden stringers with bolts



Concrete Steps Molded Individually, Reinforced with Corrugated Sheet Iron and Bolted to Wooden Stringers, Make a Light but Durable Flight of Steps with a Considerable Saving in Cement

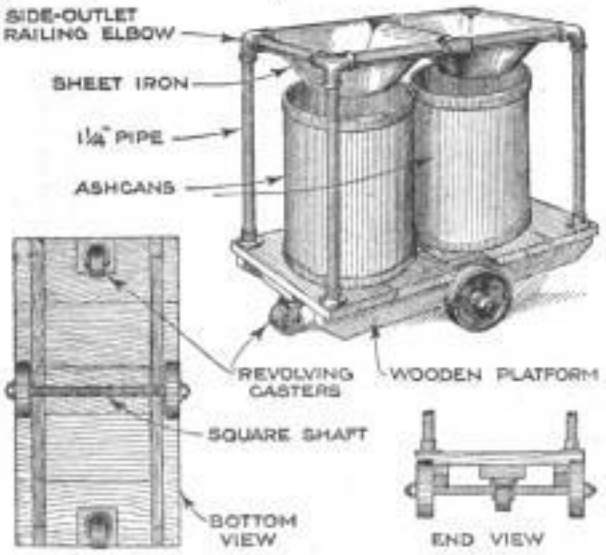
to make a light but durable flight of steps. Each step is reinforced with corrugated sheet iron, which is liberally punched with holes and bent at right angles. The L-shaped wooden form is stood on one end, and the concrete poured into the opposite end. Bolts of the proper diameter and length are inserted into the form so that the completed step can be attached to the stringers. The same form can be applied to the molding of steps in a solid unit, only in this case the concrete is poured from the top of the form, which should be made removable. By either method a considerable saving in concrete work is effected, and the finished job is much lighter, but sufficiently substantial for the purpose intended.

Protecting Spark-Plug Porcelains

If spark-plug porcelains are allowed to rattle around in the tool box with a collection of tools, they are very likely to become cracked. However, if the insulators are inserted into short sections of garden hose, about 3 in. long, and a cork is placed in each end, little or no damage can be done to them. If the hose is small enough to fit the plugs snugly, no corks will be needed.—Forrest Benson, Boulder, Colorado.

Ash Truck for Power House

One of the problems of the small power plant, the handling of ashes, has been solved by a Seattle engineer by building the truck shown in the illustration.

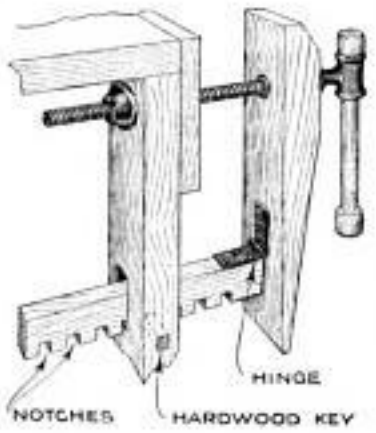


Dragging Ash Cans over the Floor is Eliminated by the Use of the Truck Illustrated, to the Benefit of Both Cans and Floor

This truck carries the ash cans from the pit to the elevator that lifts them to the street level. The funnels over the cans catch the ashes as they are raked or shoveled from the ash pits, and prevent their being scattered over the floor. The truck is light and easily stowed away when not in use, and the saving in wear on both ash cans and floor more than pays for its construction.—B. W. Brintnall, Seattle, Wash.

Keeping the Vise Jaws Parallel

A simple device for keeping the jaws of the woodworker's vise parallel, is made from a piece of hard wood, 1 by 3 by 20 in. Notches, 1 in. square, are cut on the narrow face of the bar, leaving about 1 in. of stock between notches, and the piece is hinged to the outer jaw, as shown. A slot, 4½ in. high by 1¼ in. wide, is cut in the bench leg, directly opposite the jaw, and a ⅞ by ⅞-in. hardwood key is fitted across the bottom of the slot. The bar is set, by means of the notches, to approximately the same thickness as the piece to be held in the vise. The harder the wood used for the bar, the nearer together the notches may be cut, thus giving a closer adjustment.—J. Alexander, Lincoln, Neb.

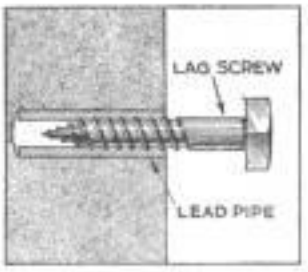


Making a Vent in the Exhaust Pipe

When fitting a muffler cut-out to the exhaust, trouble is usually met in getting a clean-cut job. A V-shaped opening, aside from being an unsatisfactory vent, interferes with the butterfly valve used in some cut-outs. First make two transverse cuts, at the proper distance apart, with a hacksaw, cutting the pipe halfway through. Then make a diagonal cut from one corner to another so that the metal between the two cuts is divided triangularly; these triangle-shaped points are bent back and cut off, leaving a rectangular opening that will neither interfere with the passage of the exhaust gases nor with the operation of the cut-out.

Securing Lag Screws in Cement or Brick

The practice of securing lag screws in brick or concrete work by means of a wooden plug driven into a hole drilled in the wall is usually unsatisfactory, owing to the tendency of the wood to shrink and drop out. A more satisfactory method consists in drilling the hole in the usual manner, and then driving in a section of lead pipe having an internal diameter smaller than the lag screw used. When the lag screw is screwed into such a lead-bushed hole, the lead is expanded against the uneven surface of the brick or concrete, and grips firmly, making a permanent fastening.



Tools from Old Files

Before attempting to make tools, such as punches, drifts, etc., from old files, see that the temper is properly drawn, by someone who knows how to do it. The steel used for files is tempered too hard to be used without annealing, especially for tools that are struck with a hammer.

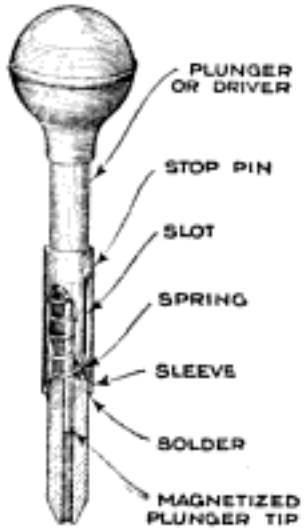
If the temper is not drawn, the steel flakes off, and the small pieces fly with great velocity, and may imbed themselves deeply in the eye or flesh.

Marking Irregular Curves

To save time when inking in duplicate lines by the aid of an irregular curve, the draftsman usually places marks along the edge of the instrument to designate that portion matching the first line drawn. As a rule, the irregular curve is made of celluloid, on which it is difficult to make a mark. Also, the marks are easily rubbed off. These faults can be overcome by roughening the face of the curve with fine sandpaper. The surface obtained by this treatment will readily take a pencil mark.—C. M. Vaiden, San Francisco, California.

A Useful Brad Driver

The accompanying drawing shows a part-sectional view of a tool that is very convenient for driving brads in close quarters where a hammer cannot be used.

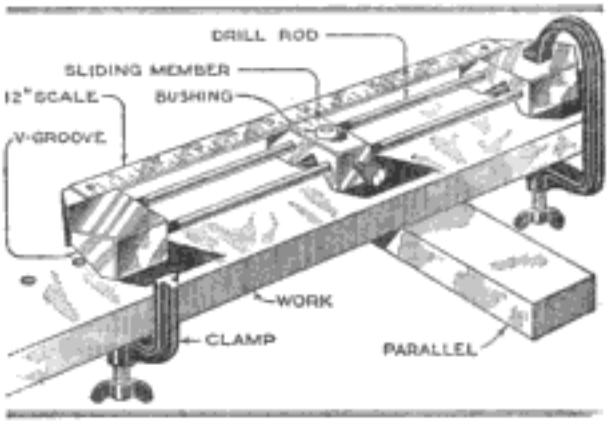


The plunger, or driver, is made of steel, the tip being hardened and tempered, and then magnetized. This plunger works in an outer sleeve, which consists of a piece of brass tubing, either soldered or brazed to a brass plug, the plug being drilled a few thousandths larger than the plunger tip. A hole is drilled through the plunger, just above the shoulder, to take the stop pin that slides in a slot in the outer sleeve. The return motion of the plunger is obtained from the spring fitting between the shoulder on the plunger and the bottom plug. A convenient length for the tool is about 4¼ in., making it adapted to the woodworker's tool chest.—Ernest Schwartz, Brooklyn, New York.

An Adjustable Drilling Jig

Anyone who has had the job of marking off and drilling a long series of holes knows how slow and, usually, inaccurate the work is, when done by ordinary methods.

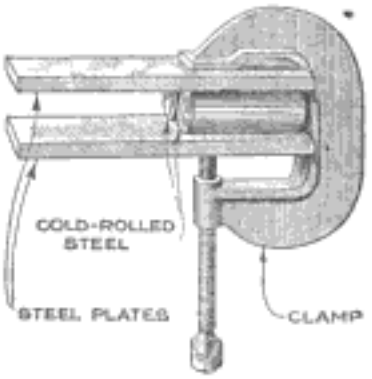
The adjustable jig shown in the drawing saves much time and assures accuracy. The device consists of three machine-steel blocks, each drilled with two ⅜-in. holes, to take two pieces of drill rod. The two endpieces fit tight, and the center piece is made a sliding fit, and should have a clearance of a few thousandths at the bottom, in order to slide freely when the end blocks are clamped to the work in the manner shown. The sliding center block is drilled to take standard bushings, and a line is scribed through the center of the hole on top. A 12-in. steel scale, fastened to the end blocks, makes it possible to space the holes accurately by moving the central block until the mark on it lines up with the desired measurement on the scale, a setscrew being provided to hold the block stationary. V-grooves may be cut into the blocks in order to use the jig on round stock.



An Adjustable Drilling Jig by Means of Which a Number of Holes can be Accurately Lined Up and Spaced: By Using Standard Bushings, Holes of Any Size may be Drilled; V-Grooves Permit the Device to be Used on Cylindrical Work

An Emergency Snap Gauge

A serviceable snap gauge for use in emergency may be formed as illustrated. A piece of flat steel is clamped on each side of two short sections of round cold-rolled steel. The round pieces should, of course, be selected carefully, as near the required size as possible, and all burrs should be removed before assembling. For work where great precision is not essential, a gauge of this kind will be better than calipers.



Anchor Nails for Heavy Loads

Nails and spikes that will carry heavy loads, and, where there is ordinarily danger of their pulling loose, can be anchored in such a way that it will be almost impossible to remove them without tearing the wood, can be made as shown in the drawing, by drilling a hole through the center of the spike, the hole being carried out through the side, near the point, at a slight angle. The method of drilling the curved hole is shown in Fig. 1. The drilled spike is then straightened and driven home, and a long, thin wire nail is driven into the bored hole. This is forced out through the side in a curve and securely anchors the spike, as in Fig. 3.—Harry Hertzberg, Brooklyn, N. Y.

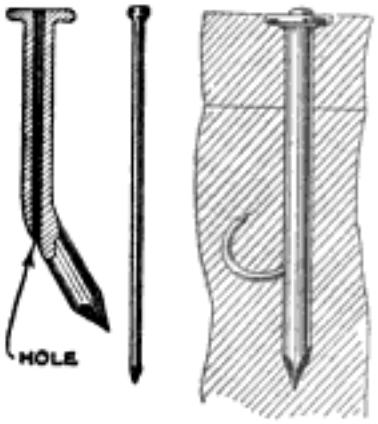
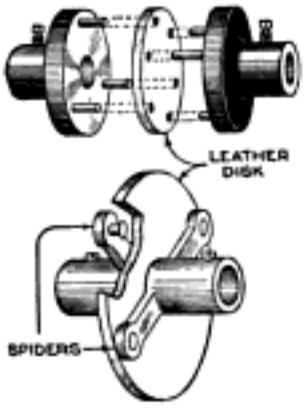


Fig. 1 Fig. 2 Fig. 3

Light-Duty Flexible Couplings

A simple form of flexible coupling, one that is noiseless, requires no lubrication, and can be turned out easily and cheaply, makes use of a disk made of sole leather, or similar material.

The most common method of making a coupling of this type is to make two flanged collars, drilling or boring them to fit the shaft, and providing them with suitable setscrews or keys. Each disk has three pins, or dowels, inserted near the edge, 120° apart; these are permitted to project beyond the face of the disk just a trifle less than the thickness of the disk used. Some tough, resilient material, like sole leather, or the substitutes that are on the market for this purpose, should be used for the disk, which is cut to the same diameter as the flanges. Six holes, 1/64 in. larger than the pins, are drilled near the edge to take the driving pins.

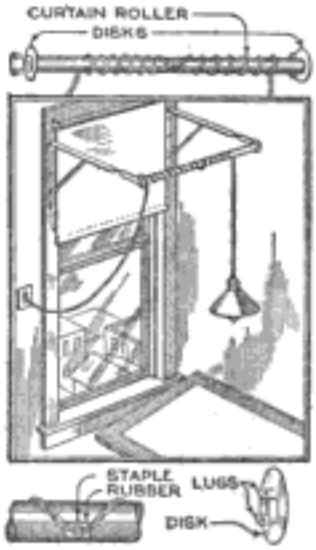


The flanged collars are attached to their shafts so that their faces will be separated about 1/16 in. more than the thickness of the disk.

By making use of a two or three-armed spider, and attaching the disk rigidly to it with bolts or rivets, a coupling for heavier duty is obtained. In both styles, the turning movement of one shaft is positively transmitted to the other, and at the same time any irregularities in alinement are automatically taken care of without imposing a bending action on the shafts and their supports.—H. S. Trecartin, Waltham, Mass.

Spring Roller Holds Extension Light Cord

Instead of being obliged to coil up the electric-light cord and hang it on a hook each time it is used, a spring curtain roller can be arranged to wind up the cord so that the lamp is always ready and at the same time out of the way.



A roller having a strong spring should be used, the wire being attached to it at the center by an insulated staple. The cord is then wound on the roller in the manner shown. Two tin disks, about 3 in. in diameter, are fastened to the ends of the roller to prevent the cord from running off. The cord should be fastened only at the center, and plenty of slack should be left at the wall end of the line. The roller is attached to the wall or ceiling as shown.

Replacing Axle Assemblies

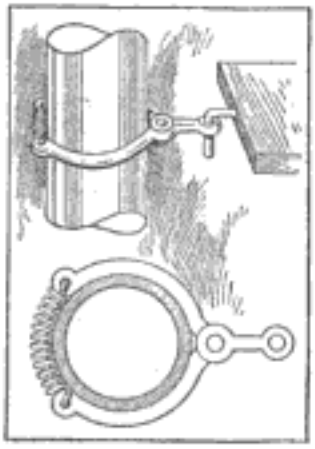
A simple method of replacing or removing an automobile rear-axle assembly makes use of an empty carbide can, which is used as a roller for supporting the unit. By resting the assembly on the drum and pushing forward until the axle is about balanced, it can be moved back or forth as may be necessary, with a minimum of effort. By filling the cavity about the universal joint in its housing with heavy cup grease, the shaft will be held rigid.

An Improvised Attachment Plug

Needing an extension line to reach into a corner of the shop that was not wired, and having no attachment plug, an excellent substitute was made from a burnt-out fuse plug. The mica window was dug out, and the ends of the fuse wire were pulled out. A ⅛-in. hole was drilled through the brass bottom of the plug, and one of the wires was inserted through this and soldered to the outside; the other wire was thrust through a similar hole drilled in the brass shell, where the fuse had been fastened, and soldered. The interior of the plug was then filled with melted sealing wax; plaster of Paris may also be used, but it must be thoroughly dried out before using, to avoid the possibility of a short circuit.

Detachable Clamp for Round Columns

The clamp shown in the drawing will repay the cost and trouble of its manufacture in a multitude of cases where a shelf or tool holder is to be temporarily attached to a column or support.



The arms are hinged, as indicated, and the outer ends are drilled to take the stiff spring which holds the device to its support. The drawing shows the clamp used in connection with a small table for tools. The holder can be attached to pipes, square or round posts, ladders, or anything within its capacity. If the inside surfaces of the arms are made rough, a firmer grip will be obtained.

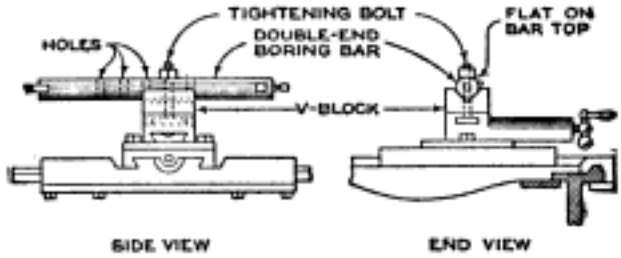
Mixture for Waterproofing Cement

A formula that has been used quite generally and with satisfactory results for waterproofing cement is a solution of lye and alum. Five pounds of powdered alum and 1 lb. of lye are dissolved in 10 qt. of water. Use ½ pt. of this solution to each bucketful of water used in mixing the cement.

For outside waterproofing, add ½ pt. of this mixture to a bucket of water, and thicken with pure cement to the consistency of a heavy wash.

Double-End Adjustable Boring Bar

A handy boring bar for medium-sized lathes, that is capable of standing up under the heaviest cuts and is rigid and stiff, is made as shown in the drawing.

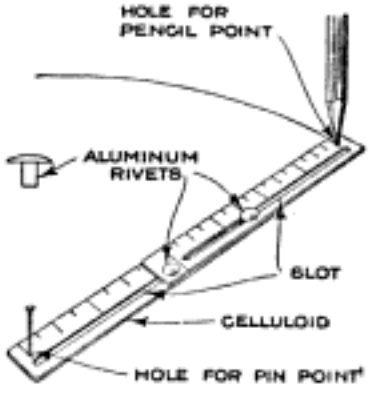


A Double-Ended and Adjustable Boring Bar for Use on Medium-Sized Lathes: It Possesses Extreme Rigidity and will Stand Up under Heavy Cutting

A piece of cold-rolled steel, about 15 in. long, is used for the bar, and this has a flat shape on its top to form a seat for the washer and clamping nut. Holes are drilled at 2-in. intervals along the center, to take the clamping bolt. Tool slots are cut at each end of the bar, one at right angles and the other at any desired angle less than 90°, thus making the tool double-ended. A cast-iron or steel V-block, having a tongue to fit into the slot of the compound rest, forms a support for the bar.

A Vest-Pocket Beam Compass

The accompanying drawing illustrates a beam compass that is light in weight, and, as it folds into a small space, convenient for the pocket. Two strips of transparent celluloid, 1/32 in. thick, are cut to any desired length and width, both strips being identical in size. A narrow slot is cut in each, into which fit tightly the small aluminum rivets shown. Small holes are made at each end, after assembly, and the edges of the strips are marked off in inches, with subdivisions as fine as desired. The method of operation may be clearly seen from the drawing.—C. Nye, New York, N. Y.

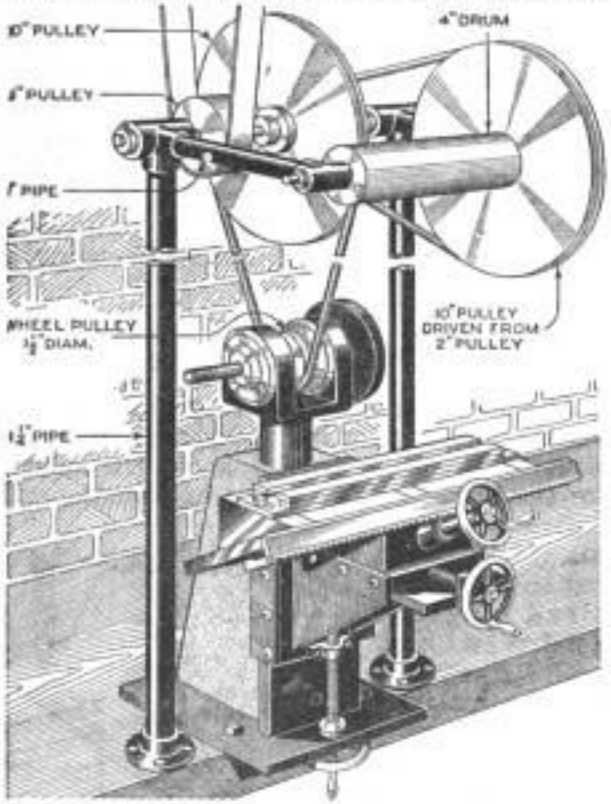


Broken spade and shovel handles, cut down and sharpened at the ends, make good "dibbles," to use in planting seed.

A SMALL BENCH GRINDER

By J. V. Romig

THE grinding machine, as an authority on machine tools has said, is "an exception to the otherwise universal tendency toward deterioration of workmanship, the grinding machine being the only machine tool that produces work of the same quality as its own parts." To the man in the experimental and similar small shops, the machine described in this article will open a field that has been heretofore closed, unless he wishes to invest in an expensive commercial machine, or



The Countershaft Arrangement Illustrated Is Merely Suggestive. Many Modifications Are Possible, Though the Pulley Sizes should be Preserved

be content with a makeshift rigged up on a small lathe.

This machine is a companion to the miller described on page 449 of the March issue, and, in this design also, the number of castings is kept down to the minimum, standard cold-rolled steel, flat and round, being used wherever possible.

Accuracy is the most desirable feature of any grinder, and this can only be attained by its having a good wheel head, accurate slides and bearings, and weight correctly placed.

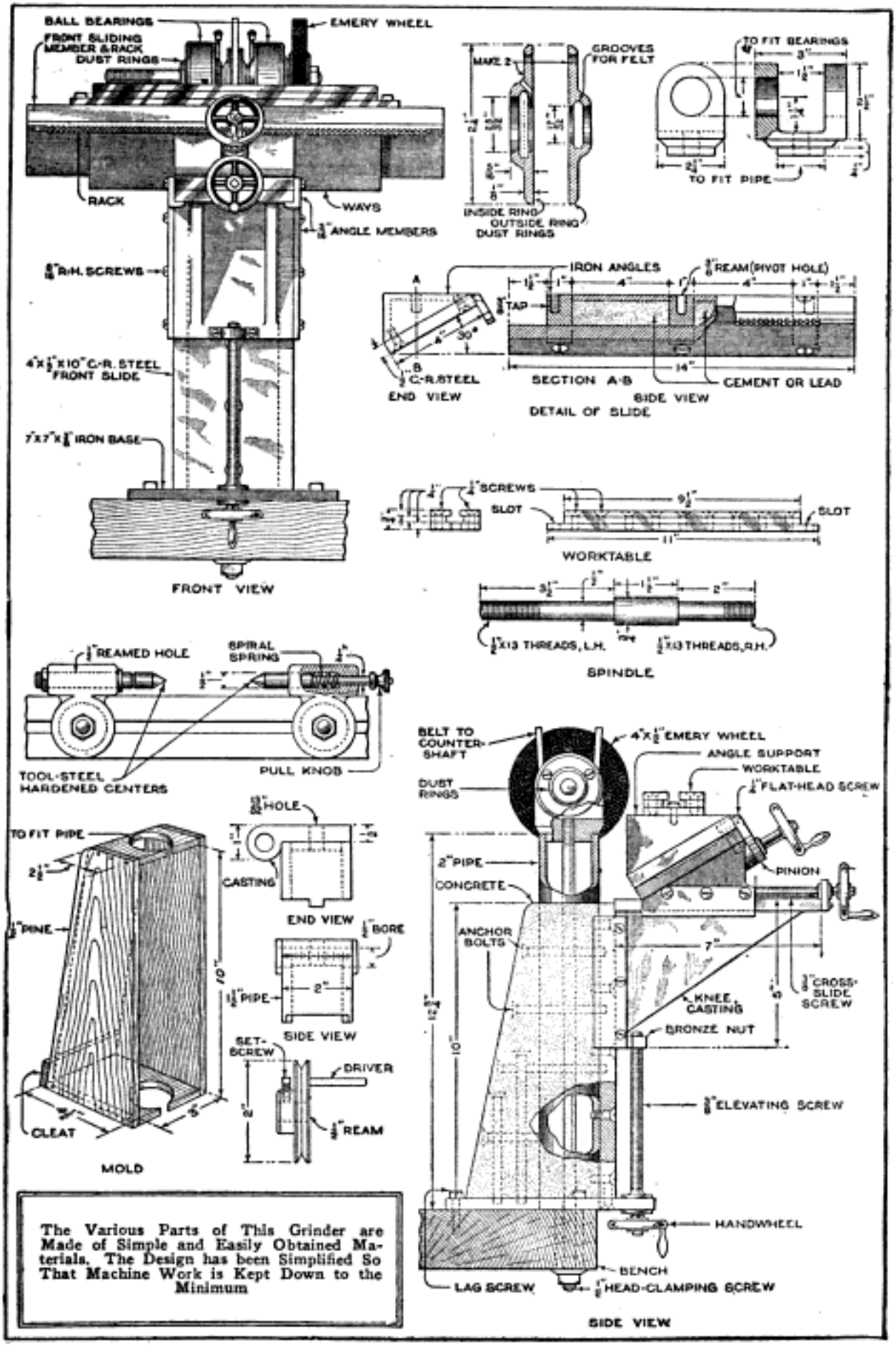
The wheel head of this machine is cast, from a simple pattern, in soft gray iron, and machined as shown in the upper right-hand corner of the large drawing. The boss on the bottom is turned to fit the 2-in. pipe column, and the wings are bored an easy push fit for the ball bearings used. A hole is drilled and tapped through the bottom, to take the upper end of the clamping screw.

The inner edges of the inside races of the bearings butt against the shoulders on the spindle, the outer races being lightly clamped by means of the dust flanges. These flanges are machined as shown, and are fitted with felt rings to exclude the grinding dust. The wheel spindle is turned from cold-rolled steel, and threaded with a right and left-hand screw; the inner wheel flanges are tapped to fit the spindle, the outer ones being a loose fit on it. The spindle pulley is 1½ in. in diameter and is grooved for a ⅜-in. round belt. Any material on hand may be used for the pulley, which should be pinned to the spindle.

The main frame of the machine is built up of 2-in. pipe, a ½ by 4-in. cold-rolled steel slide, and a base of ⅜-in. iron plate, the whole being knit together by a casting of cement. The 2-in. pipe forms the column upon which is mounted the wheel head, and on its front face, filed or shaped flat, is fitted the front slide.

This pipe screws into the base, the latter being tapped with a standard 2-in. pipe thread; the pipe is bored and faced square at the top to receive the head. The front slide is secured to the pipe by flat-head screws. Care must be taken in assembling, to see that the pipe, slide, and base are perfectly square with each other.

Holes are drilled and tapped in slide and base, for the ¼-in. stove bolts that anchor the assembly to the cement; these bolts are of varying lengths, and may be interwoven with soft-iron wire to provide a better bond with the cement. The mold is made of soft pine; after the anchor bolts are screwed in place, it is put in position and clamped firmly. Fill it with



The Various Parts of This Grinder are Made of Simple and Easily Obtained Materials. The Design has been Simplified So That Machine Work is Kept Down to the Minimum

a mixture of 1 part cement to 3 parts clean, sharp sand, mixed with water to a quaky consistency, tamping it down well and poking into every corner and along each edge with a sharp-pointed tool, to insure that the cement reaches all parts. To season the cement, keep it well wetted for a week, and the result will be a strong, rigid column.

The knee is made of soft gray iron, machined carefully to the dimensions shown; it is carefully fitted to the vertical slide and held by means of members made of angle iron, 3/16 in. thick, fastened to the knee with round-head screws. On the upper face of the knee runs the casting that holds the table slide; this is also made of soft gray iron, and its width is the same as that of the knee face, to which it is also held by angle members. The upper face of this casting is machined at an angle of 30°, and on this face, the piece that forms the ways is fastened, using flat-head screws. The ways, or shears, are made of a piece of cold-rolled steel, ½ by 4 by 9 in.; it is shaped out in the center as indicated, leaving two narrow bearing faces.

The table slide is also a piece of ½ by 4-in. cold-rolled steel, 14 in. long, the bottom being scraped to a perfect bearing on the ways; on its front edge is fastened a piece of ¼ by 1-in. cold-rolled steel, also scraped to fit on the ways, the upper edge being machined off at a 30° angle. This construction gives the advantages of a V-bed, without the difficulty encountered in machining that type.

This front piece must be fitted accurately, and fastened securely, as it carries most of the weight of the table assembly and work. On the lower edge of the front slide is mounted a fine-pitch rack, which, with a small pinion to match, can be purchased from any machinery-supply house.

On the table slide are fastened three angular pieces of cast iron, the tops of which are exactly in line, and on these pieces is mounted the worktable, built up as shown in the detail, of flat steel. The worktable pivots on a stud working in the center cast-iron support, and is clamped in position by cap screws tapped into the end supports. The slot in the table will accommodate ⅜-in. bolts.

Between the supports, anchor bolts similar to those used in the column are placed, and the spaces are filled with lead or cement to a level slightly below the upper edges of the supports; this increases the weight of the slide.

After assembling this unit, the table is squared with an indicator, and zero lines are scribed on the worktable and end supports.

The construction of the swiveling center heads may be easily seen from the drawing; the bodies are made of 1½-in. pipe, the heads being castings, turned to fit into the bored pipes. A grooved pulley, 2 in. in diameter, is fitted to the fast center, and is held in position, when running, by the V-pointed setscrew in the groove in the center. The setscrew should be fitted with a locknut.

The countershaft arrangement needs but little description, as the smaller drawing shows it very clearly. The height is optional, as it must be governed by conditions existing in the shop. By raising it high enough, it will be possible to swing the head through 90°, thus bringing the wheel over the table, and adapting it to surface grinding. The rear countershaft should run at about 540 r.p.m., the front one at 108 r.p.m., and the wheel at from 3,500 to 3,800 r.p.m., 4-in. wheels of various shapes being used.

If any difficulty is experienced in procuring the small handwheels, wheels taken from valves can be substituted.

Building Concrete Silos

When constructing a silo, the concrete should be well spaded next to the form faces, so that the coarse-pebble aggregate will be worked away from the face, and the sand-cement mortar come in contact with the form surface. If pockets form in the surface as a result of air bubbles, or because some particles of the coarse aggregate were not forced back, they may be "pointed up" with a rich cement mortar, and gone over with a grout paint wherever necessary, while the concrete is still "green."

Engine Stand Made of Old Tire Rims

Two old automobile-wheel rims of uniform diameter, and two short lengths of light steel rail, make a good stand for holding an automobile motor while working on it. The two pieces of rail, which should be about 4 ft. long, are riveted at right angles to the rims, and diametrically opposite each other. The engine is attached to the rails, and the whole stand can then be rolled along like a cart, so that the engine may be tilted to any desired angle.—Edward J. Calhoun, Chicago, Ill.

A Curved Vise Block

When relining brake bands or removing dents from fenders, a vise block having a curved surface is a valuable shop accessory.

A piece of large-diameter steel shafting, of the proper length to fit between the jaws of the vise, is obtained; slots are milled in each end to fit over the vise jaws, so that the block cannot work loose, or drop out of the vise.—Lowell R. Butcher, Newton, Ia.

Removing Broken Taps

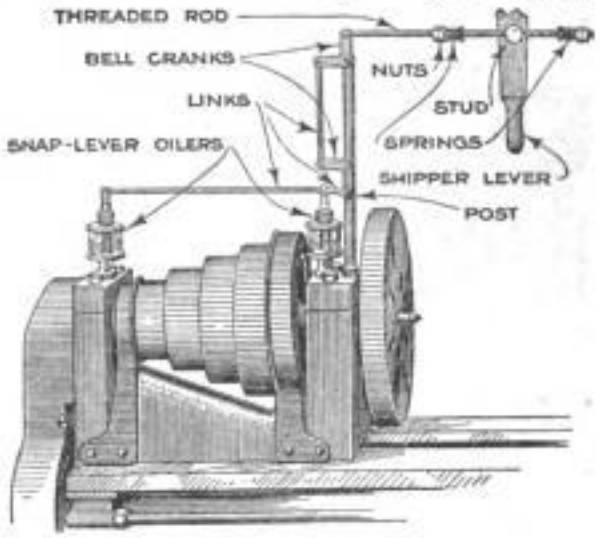
Anyone who has used a tap knows the situation that arises when a little additional force causes the tap to break off flush with the top of the hole. The drawing shows a simple tool, that can be made from a piece of steel tubing, for backing out the broken piece. The tubing is bent at one end and slotted to enter the flutes in the tap, with either three or four slots to fit the particular tap. Another method of removing a broken tap, which requires no special tool, consists in striking against the sides of the tap flutes with a punch.

Conserving Oil on Lathes

The drawing shows how a pair of standard oil cups were rigged up on a lathe so that the machine would be lubricated automatically, without wasting oil. The feed levers of the cups were slotted to take the links connected to the bell crank at the right. The post which supports the system of bell cranks is a stiff steel rod, fitting into a tapped hole in the front headstock-bearing cap. A locknut prevents the post from turning.

The upper rod, that is connected to the shipper lever, is threaded for part of its length and provided with two sets of locknuts and two springs, as shown, the springs absorbing shocks that would otherwise strain the oil cups. A stud, having a hole large enough to permit the rod to slide through it freely, is mounted on the shipper lever.

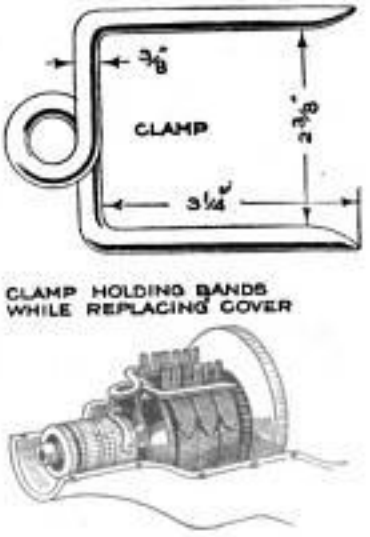
As the operator moves the lever to throw on the power, the system of cranks and links acts so as to bring the feed levers on the tops of the oil cups to the "on" position, permitting the oil to flow into the bearings. When the lever is shifted to throw off the power, the flow of oil ceases. It should be noted that the feed levers on top of the cups must be connected so that they do not drop down entirely, and that the edges of their cams are slightly rounded off.



An Automatic Arrangement That Supplies Lubricating Oil to the Lathe Headstock Only When It is Operating: Shifting the Belt to Throw Off the Power Closes the Oil Cups and Stops the Flow of Lubricant

A Transmission-Band Clamp

To facilitate the replacing of the cover on the auto engine transmission after repair work, the clamp shown in the drawing will be found very convenient. Usually the transmission bands are tied with string, which is cut after the cover is replaced; failure to remove all the particles of string will sometimes result in clogging the oil-feed tube, with the attendant risk of damage to the engine. The clamp is made of ⅜-in. steel rod, bent as shown, and may be slid through the handhole in the case, after the cover is bolted on.

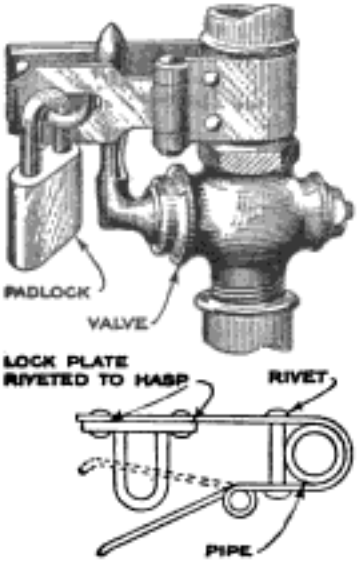


CLAMP HOLDING BANDS WHILE REPLACING COVER

¶A coarse-tooth mill should be used for removing much stock and for taking roughing cuts on milling machines.

Locking an Exposed Valve

Where a cock is located at an exposed place, as on an oil, gasoline, or other pipe line, and it is desired to prevent unwarranted use or theft, the simple and inexpensive lock shown in the drawing can be applied either as a temporary or permanent fixture. As indicated, an ordinary hasp and lock plate are riveted on the pipe on a line with the cock handle in the closed position, the cock being secured against operation by an ordinary padlock.

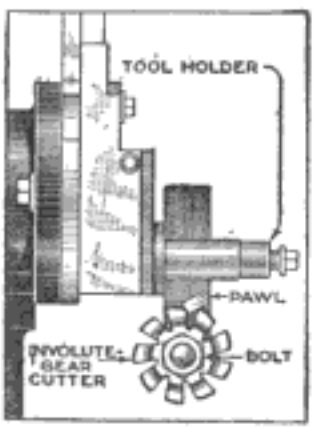


Finding Length of Rolled Belts

To find the number of feet of belting in a roll without unrolling it, add to the diameter of the roll, in inches, the diameter of the hole at the center. Multiply this sum by the number of coils or layers of belting and multiply the product obtained by 1.32. The three figures at the left of the resulting product will represent very closely the number of feet in the roll.

Cutting Racks on a Shaper

By using a shaper instead of a milling machine for cutting racks it is not only possible to cut a rack almost as fast as on a miller, but racks longer than the capacity of the milling machine can be made by this method. As shown in the drawing, an involute-gear cutter is held in the shaper tool holder at right angles to the work, and a pawl is provided for using a single tooth at a time, so that when one of the cutting teeth becomes dull, another can be used.

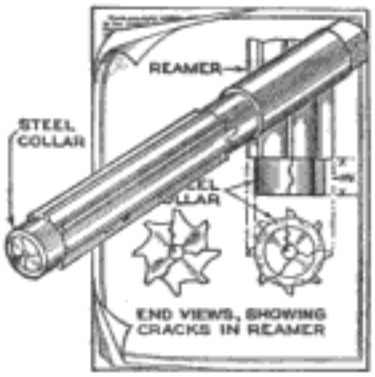


Correcting Blueprints

Legible and permanent markings on blueprints are readily made by attaching gummed stickers, such as are used on packages and boxes for price and identification markings. Marks of black or colored pencils can be seen on the print only by careful inspection, but when the stickers are placed on the blueprint, any records or changes are conspicuous enough to prevent error in the shop or drafting room.

Salvaging a Cracked Reamer

A large-sized reamer, which was to be used on a rush job, cracked in three places during hardening, the cracks being parallel with the flutes. Rather than suffer the delay of making a new reamer, it was decided to repair it. Light, strong wire was wrapped around the cracked portion to prevent further opening of the cracks, and the end of the reamer was then ground down to a diameter slightly less than the root diameter of the flutes. A steel collar was made and shrunk onto the ground seat. The temper was then drawn and the reamer ground to size. The repair was entirely successful.



Drafting-Room Short Cuts

In laying out complicated cam or link motions, the different parts can be drawn on scraps of tracing cloth. Parts which revolve or swing on fixed centers, such as cams, or the fulcrum points of levers, are held to the layout by pins through their centers so that they will revolve or swing. Links and similar parts are held together with thumbtacks with the points up. If the pieces give trouble by coming off the tacks, small corks may be stuck over the points. This method has some advantages over cutting out the pieces, as it is much easier to make minor changes if the motion is not correct.

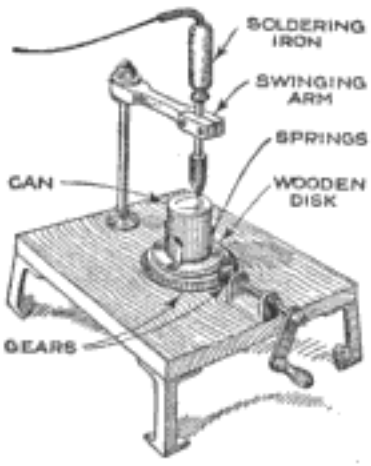
Another drafting-room kink which deserves a wider application is used in making layouts for the installation of machin-

ery. The floor plan is first drawn, to show the location of all posts and other permanent obstructions, and paper templates of the different machines are drawn to scale, cut out, and arranged until the best possible layout is obtained. Then cover this with a piece of tracing cloth, dull side up, and draw the ceiling plan, showing the lineshafts, countershafts, belts, etc. If any of these are found to interfere, the machines can be rearranged to suit.

If a piping layout is desired, this is drawn on another sheet of tracing cloth over the floor or ceiling plan, or both, as may be necessary, while still another to show the electric wiring may be made. When the templates on the floor plan have been arranged to suit, everything is in readiness to make a tracing by drawing around them. Using a set of tracings made in this manner, the clearance at any point may be checked by placing one tracing over another. At the same time the blueprints for different workmen will be clear, and not confused with the lines used in another branch of the work.—R. P. Deane, Holyoke, Mass.

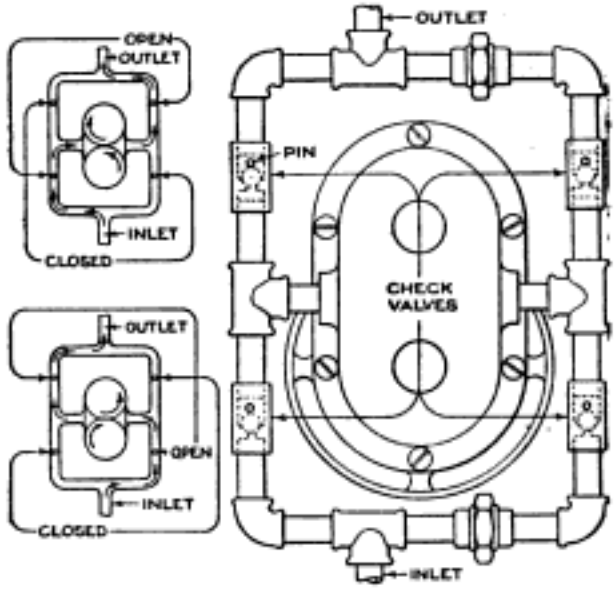
A Simple Can-Soldering Machine

Having a number of cans to solder, and the operators not being familiar with the use of the soldering iron, the simple machine illustrated was built, performing very satisfactorily. The iron itself, an electric one, is held vertically in a wooden or fiber clamp, which swings laterally on a post fastened to the back of the wooden baseboard. The cans are slipped into a clamp composed of four spring-steel clips, mounted on a wooden disk, which, in turn, is attached to a bevel wheel, journaled through the base. A handle, on the end of which is a small bevel pinion meshing with the larger gear, provides means for rotating the cans under the bit. With inexperienced help, this speeds up the soldering operation considerably, while doing away with the probability of burns, due to careless handling of the soldering iron.—Otto Dorthen, Stillwater, Minn.



Piping System for Gear Pumps

The gear pump insures an ample flow of water to the water jackets of a marine engine—if primed. Some small boats, not



Any Gear-Driven Pump can be Made to Produce a One-Directional Flow Regardless of Whether the Pump is being Driven Backward or Forward, Thus Eliminating the Necessity of Frequent Priming

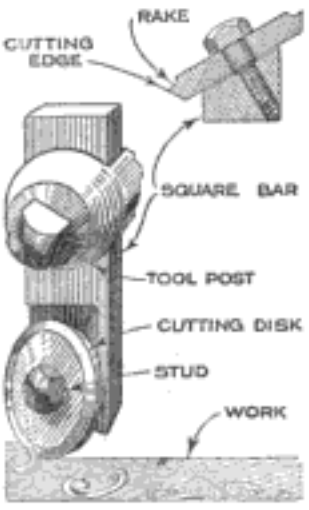
equipped with a gear for the purpose, reverse the engine when backing into or out of a dock, although this practice is not good for the engine; and in such cases the pump immediately empties the water jacket and itself. The same condition obtains in the lubricating system of some of the large Diesel-engined freighters. This is also true in the case of turret lathes and automatic screw machines equipped with a gear pump supplying cooling fluid. When the machine is reversed to run the die off a thread, the pump runs dry, and not being air-tight, fails to start a flow without priming.

The drawing shows an arrangement of check valves that was improvised to meet the conditions described, and to give a one-directional flow of liquid, no matter in what direction the pump runs. After the pump has once been primed, further priming is unnecessary. Standard check valves should be used, and installed as shown, to regulate the flow of the pump according to the arrows.

¶Grease in contact with oxygen under pressure may cause spontaneous ignition. Great care should be used not to handle threads or valves on oxygen tanks with oily hands or gloves, and gauges should not be tested with oil or any other hazardous carbon. If a lubricant must be used, only pure glycerin is permissible.

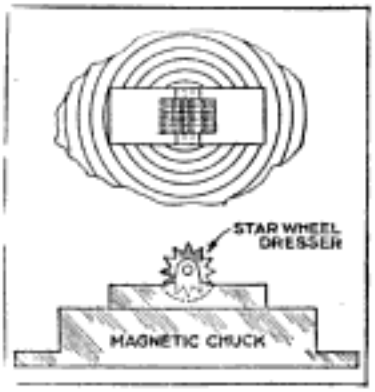
Revolving Planer Tool

A planer tool, that was found capable of taking very heavy roughing cuts, was made as follows: A square bar was cut so that one face formed an angle of about 45° with its opposite face. A hole was drilled and tapped to carry a stud. This stud carries a hardened-steel disk, which is free to revolve with a minimum of play. The disk is given clearance on the edge, and cutting rake on the face. When in operation, the disk will automatically revolve slowly, constantly presenting a new cutting edge to the work. This tool is useful for taking long and heavy cuts, where the usual form of planer tool would soon lose its sharp edges.



Emery-Wheel Dresser for Use with Magnetic Chuck

The drawing shows a simple star-wheel emery-wheel dresser for use on a magnetic chuck. The device consists merely of a steel plate, machined to provide bearing lugs for a shaft, on which the wheels are mounted, and a clearance space underneath. In use, the arrangement is placed in the desired location on the chuck; the current is turned on and the grinding wheel is moved across the dresser until the face has been dressed.—John Homewood, Ontario, Calif.

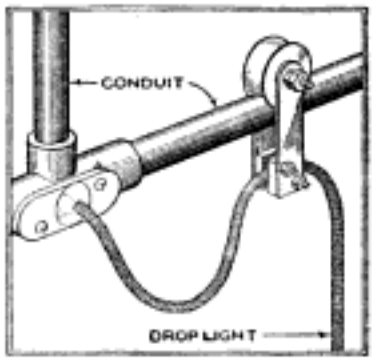


Relining Automobile Brake Bands

Buckled spots in automobile brake bands, which drag against the drums and cause heating, can be prevented when relining the bands. Insert the new lining inside the band to be lined and fasten it over the drum of the wheel with a small clamp. Split rivets are used, and these are driven in from the outside of the band, the smooth surface of the drum serving to spread the ends apart. The transmission bands of light automobiles may be similarly relined by clamping them about an old drum, or a metal disk of the same diameter. Before installing the relined bands, they should be inverted, and a ball-peen hammer used to drive the split ends of the rivets below the surface of the lining.

An Adjustable Droplight

In a large drafting room, where much work was done at night, the lighting of the drawings, many of which were over 6 ft. long, was a problem. One droplight over each table did not provide a sufficient area of illumination, and two or three lights would have been a needless expense. The problem was solved as follows:



Above the upper edge of each table, conduit pipes were fastened, being dropped from the ceiling about 6 in. On each length of conduit, a small pulley runs, carrying a clamp to hold the droplight. The light can thus be moved so as to illuminate any desired portion of the drawing.—Wm. Melas, Philadelphia, Pa.

Old Pistons as Shaft Hangers

Old automobile-engine pistons can be made into shaft hangers for line or countershafts used to drive small grinders, sensitive drills, and similar machines, where the load is not too heavy.

The pistons selected should be as large as possible, and the wrist-pin bearings, or bushings, should be in good condition. The shaft must be turned to the same diameter as the bushings. Two holes are drilled through the head of each piston to take the lag screws used to fasten it to the wall, floor, or ceiling. The shaft is locked in place by means of collars placed between the wrist-pin bosses, and fastened with setscrews. The bosses may be drilled for oil holes, or drilled and tapped to take grease cups.

Preventing Fence Posts from Heaving

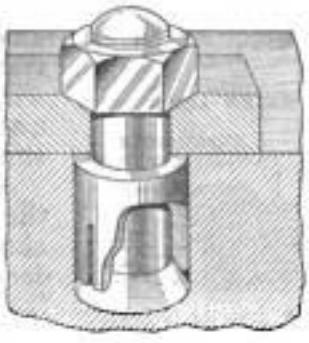
To prevent fence posts from heaving after a thaw, dig the post hole about 8 or 10 in. deeper than usual, and fill the extra space with broken stones or clinkers; then place the post in position. At opposite sides, ordinary rough 1-in. boards are set against the post, and the hole is filled with earth. If there is any tendency toward heaving, the boards will rise, the post remaining stationary. The boards can be driven back into position with a maul as soon as the frost is out of the ground. This method can be used for either round or square posts.

Prolonging Life of Gas Mantles

Upright gas mantles, that have become broken and ragged around the bottom, can be given a new lease of life very simply. Place a hatpin underneath the loop at the top of the mantle, and carefully remove it from its support. A short piece is cut or snapped from the lower end of the support, while an assistant holds the mantle. The mantle is then replaced so that the broken part comes below the top of the burner.

A Threadless Stud

When installing some heavy machinery, it became necessary to fasten parts to the heavy metal base by means of studs. The studs were of large diameter, and no bottom tap of the size was to be had. To get around the difficulty, a bolt was turned up with a tapered head, somewhat resembling a plow bolt. A bushing, the inside diameter of which was a sliding fit on the body of the bolt, was also turned down on the lathe. One end of the bushing was beveled off at an angle corresponding to that of the bolt head, and four slots, 90° apart, were sawed in it, as shown. The bolt and bushing were assembled and placed in the hole in the base. As the nut was tightened the bolt head was drawn up into the bushing, expanding it and clamping it tightly in the base. If the bolt has a tendency to turn when the nut is being tightened it may be doweled to fit the base at the bottom of the hole.



Cotter Pin Used as Ruling Pen

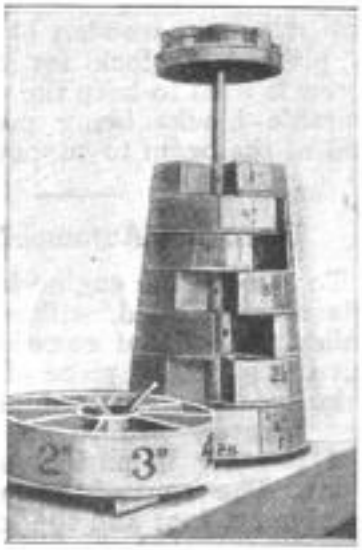
A ⅛-in. cotter pin, about 2 in. long, and the nut from a dry-cell terminal can be used to make a serviceable ruling pen. The points of the pin are filed off to a round, tapering point, with the inside of the points perfectly flat; the points must both be of the same length and size. The sides of the cotter are bowed outward, at the center, so that the points will spring about ¼ in. apart. The dry cell terminal nut is slid over the pin and by moving it nearer or farther from the point the width of the line is varied. If desired, a thread to fit the nut may be cut on the cotter pin, thus making the adjustment secure against possibilitiy of slipping.

A Compact Container for Small Parts

A singularly compact container for such small stock as screws, nuts, bolts, and the like, for the shop or store, can be easily made by the worker in sheet metal.

Seven flat trays, each slightly tapering toward the top, and 3 in. deep, are divided into seven sections, making, with the round shelf at the top, 50 different compartments; the entire container is 3 ft. high and occupies a square foot of floor or counter space.

The trays are made with the sides cut and soldered, so that the entire series will taper from 1 ft. at the bottom to 9 in. at the top. The center of each tray is made hollow by soldering a cylinder of sheet metal to the bottom; this cylinder also serves as a support to which the inner ends of the partitions separating

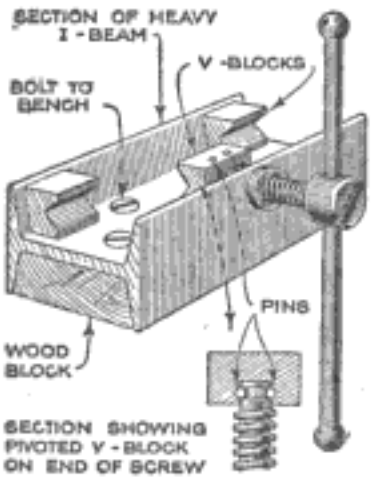


the compartments are soldered. The hole at the center is bushed with a hardwood plug which is drilled to fit the ½-in. rod on which the container is mounted. Washers are placed between the individual trays to provide sufficient clearance.

One section of each tray is cut out, access to the different compartments being obtained through these openings by turning the trays. The vertical shaft is screwed into a floor flange, which may be permanently attached to the counter, or fastened to a suitable wooden base, so that the device can be moved about.

Straightening and Bending Fixture

In the repair shop or garage, a straightening or bending fixture can be frequently used to advantage, particularly for such work as taking the kinks out of axles, connecting rods, and other parts of an automobile.



The base of the fixture is a section of heavy I-beam. The flange of the beam is bushed to take the screw, as shown, and the beam is bolted over a wooden block to a bench. A pivoted V-block for the end of the screw is used to keep the pressure central, suitable blocks being provided at each end of the beam to support the work.

Removing Automobile Engines

To remove the engine from an automobile single-handed, without the aid of a pulley or hoist of some sort, is difficult, but if a jack and piece of rope are available it can be easily done. The rope is first securely tied to an overhead beam and the car is pushed underneath this point. The front of the car is then jacked up about a foot and the lower end of the rope is securely lashed to the engine. By lowering the car and rolling it out of the way, a bench can be slid underneath the engine. Replacement of the engine in the chassis is accomplished in a similar manner.—G. A. Luers, Washington, D. C.

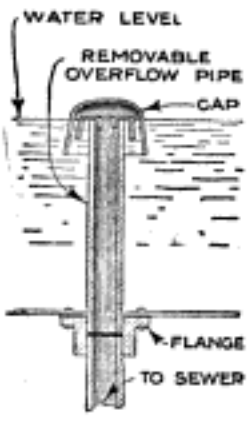
Making Large Letters on Signs

Amateur sign writers often experience difficulty in making large signs on account of their inability properly to space the words and letters on a large scale, to obtain the best effect.

If one undertakes to outline large letters directly upon the surface, the erasure and spacing marks will prove confusing when trying to follow the letter margins with the brush. It is best in such instances to map out the sign on heavy paper, making the necessary corrections with a pencil, and then go over the outlines of the characters with a dressmakers' tracing wheel; this will produce a perforated pattern which can be laid upon the surface on which the sign is to be painted. The outline is transferred to the sign surface by using a pouncing bag, which is merely a cloth bag filled with finely powdered graphite, charcoal, or French chalk, according to whether it is desired to transfer the design in white or black. The pouncing bag is lightly pounded along the perforated lines, so that sufficient of the powder will sift through the perforations to leave an outline on the board or surface to be painted that can be easily followed with the brush. Should the sign be larger than the paper at hand, the copy may be made in sections, if care is used in placing them in their relative positions before pouncing.

Eliminating Sewer Gas from Water Tanks

A simple and inexpensive method of protecting water tanks against the entrance of sewer gas, without the use of the customary trap, is shown in the drawing.



At the point where the customary flange connection is made, a deep-shouldered flange is fastened, into which screws the removable overflow pipe, the length of this pipe determining the water level in the tank. A bell-shaped cap, with a fairly long skirt, which can be made of sheet metal, makes an effective seal against the gas. The cap is held in place by short strips of metal soldered or riveted to it and bent at their inner ends to fit over the pipe, to which they are fastened.—L. H. Georger, Buffalo, N. Y.

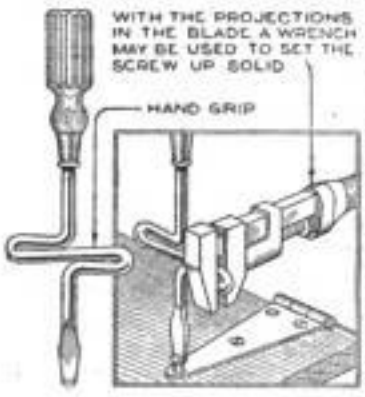
Neutralizing Sulphuric Acid

When the electrolyte from a storage battery, or undiluted sulphuric acid, which is used in making the electrolyte, is spilled on any clothing, it will burn a hole entirely through the fabric unless its action is promptly arrested.

Ammonia will neutralize sulphuric acid, and for that reason a bottle of household ammonia should be kept handy when working with storage batteries. The ammonia is simply poured over the acid spots.

Getting a Firmer Grip on the Screwdriver

There are times when it is impossible to obtain sufficient grip on a screwdriver to back out a rusted screw or start a burred thread, as when turning screws into hardwood, for instance, and on other occasions. By taking a long-bladed screwdriver and bending it into the shape shown, a gripping surface is provided that can be used by the idle hand or, in extreme cases, with a wrench, as indicated.

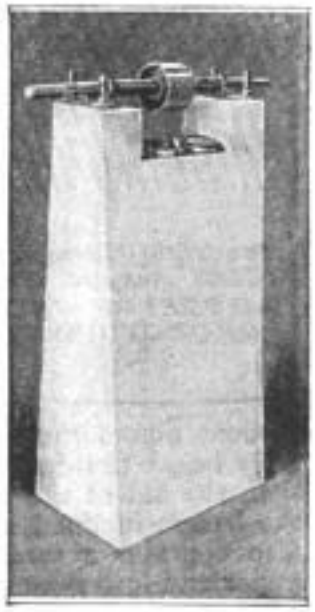


Improvised Letter and Figure Dies

Some time back I needed a set of letter and figure-stamping dies, and found that commercial ones were not obtainable without considerable delay. In the emergency I made up four dies that will make any letter or figure. The characters made by the individual dies consisted of a long and a short straight line, a small circle, and a crescent slightly less than a half circle. By combining the marks made by the separate punches, it is possible to form the letters and figures as shown.—W. F. Boast, Casper, Wyo.

Concrete Support for Emery Grinder

When an emery grinder is to remain permanently in one location, it can be mounted to advantage on a concrete standard, as shown in the photograph. The support shown is sunk 3 ft. below the surface, and is built to a convenient height. Scrap lumber was used for the form, the pieces being cut to fit and held in place by cleats on the outside and nails at the corners; pieces of iron rod and wire-mesh netting were used for reinforcing. The concrete should be mixed to a quaky consistency and should be well tamped down.—Dale R. Van Horn, Lincoln, Nebraska.



Converting a Timer Roller into Sliding Contact

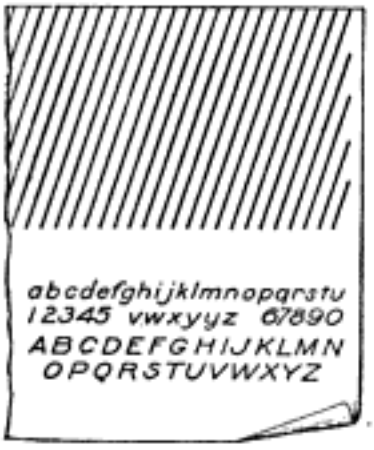
The brush roller on the light automobile can be improved by securing the hardened steel roller in the timer in such a manner that it will slide, or wipe, across the contact seats instead of revolving. As commonly experienced with timers of this type, the path of the roller becomes humpy and wavy in time; this condition causes imperfect contact and consequent irregular ignition. Another difficulty, experienced when starting in cold weather, is due to oil and dirt rolling down on the seat and holding the brush out of contact.

To convert the roller brush into a sliding contact is a simple operation. The roller is prevented from turning in its bracket by means of a ⅛ or 5/16-in. stove bolt, inserted between the roller and bracket. This is screwed down tight, jamming the roller so that it cannot turn.

With this sliding contact, a wavy and irregular timer seat will gradually true itself, and any dirt or grease on the seat will be cleaned off by the scraping action of the contact. Starting will be easier on account of the more positive contact and regular firing of the cylinders. A fresh contact may be obtained when necessary by loosening the screw and turning the roller so that a new surface is exposed.

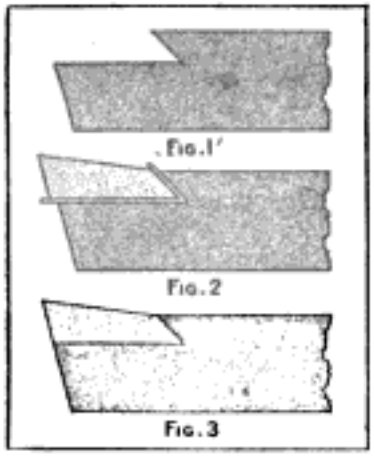
A Draftsman's Lettering Guide

As an aid in drawing the alphabet used by its students in drafting and engineering, a mid-western university has distributed printed forms similar to that shown in the drawing. The form contains a series of parallel lines at the proper angle of 72°, spaced ¼ in. apart. When lettering, the student places the printed form immediately below the drawing, and is thus able, with the aid of the parallel lines, to keep the letters inclined uniformly. The form also contains a sample alphabet of both upper and lower-case letters, and a full set of numerals.



Brazing High-Speed Steel Tips to Soft-Steel Shanks

The mechanic in the small shop is usually obliged to content himself with the ordinary carbon tool steel for lathe tools, etc., due to the cost of high-speed steel, and his attempts to weld high-speed tips to soft-steel shanks do not always prove successful. It is, however, perfectly feasible to secure a good union between the two by means of brazing.

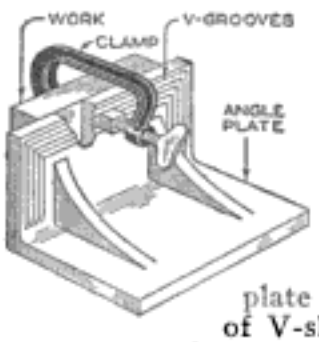


Cut the nose of the shank to the shape shown in Fig. 1, which is a side view. The nose and sides should be ground to the same taper as the intended clearance on the tool. Bevel the back end of the high-speed steel tip to the same angle as the cut in the shank, and allow the tip to project about 3/16 in. in front and about 1/16 in. on each side of the shank. Cut a piece of 1/32-in. sheet copper slightly longer than the length of the bottom and beveled end of the tip, and slightly wider than the shank, and polish copper, tip, and shank; then coat liberally with borax.

Tie the tip tightly in position with wire, the copper being placed between tip and shank, as shown in Fig. 2, and heat over a clear fire, or in the gas forge, until the tip is at a white heat, or near it, being guided in this by the steel maker's directions. Quickly hammer the front end of the tip so as to force it into its seat, then give the top a couple of moderately heavy blows. Quench the tool as directed by the makers, and grind to shape. Figure 3 shows the completed tool.—W. S. Standiford, Youngstown, Ohio.

An Improved Angle Plate and Clamp

Angle plates remain pretty much as they have been since the first one was originated, and machinists from that time to the present have been up against the annoyance of having their clamps slip off the flat surface with resulting damage to tools and temper. The drawing shows an angle plate that has a number of V-shaped grooves cast in the back of the plate, parallel with the top and sides; the clamp screw used with this angle plate is provided with a tapering swivel block which fits into the grooves of the plate and prevents shifting.—M. E. Duggan, Kenosha, Wis.



"Burning In" Engine Bearings

Scraping crankshaft and connecting-rod bearings is a long and tedious process, requiring much labor and skill if a perfect job is to be produced. The most expeditious method, if a lathe is handy, is to burn the bearings in. This operation consists in removing shims from the bearing caps, or filing the cap down, drawing the cap bolts up tight, without placing any lubricant between the bearing and its shaft. The surface should be wiped dry of any oil before the cap is screwed up. The crankshaft bearings should be "burnt in" or "run in" first.

Place the motor block in the lathe ways, blocking it up and securing it so that the flywheel can be bolted to the lathe faceplate. Start the lathe, throwing in the back gear and reducing the speed, if necessary, to obtain sufficient power to turn

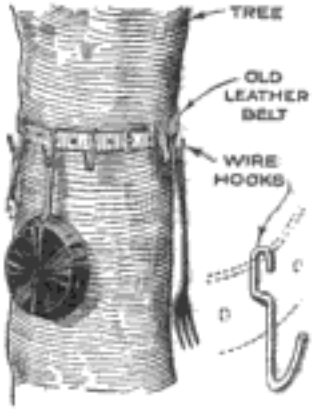
the crankshaft. The bearings will squeal and get smoking hot, but no oil or water should be applied to them; this is essential to the burning-in process. The inner surface of the babbitt actually flows around the bearing and the surplus is pushed out at the edges. After 10 or 15 minutes of running at comparatively high speed, the lathe can be stopped.

Do not loosen the caps after the burning in, as this disturbs the seat. Next, tighten the connecting-rod caps in the same manner, without oil, and drive these, applying a little oil to the shaft bearings which have already been fitted.

It will be found that bearings treated in this manner have the greatest obtainable area, and the bearing obtained is much more accurate than those fitted by handscraping.

Camp Hanger from Old Belt

The camp hanger, shown in the drawing, is easily made by attaching hooks to an old leather belt. The hooks are made of stout wire and fastened to the belt by punching holes at intervals of 3 or 4 in. along its length. The wires are then run through the holes and bent over the top from the back side. This hanger is simply strapped to a convenient tree and will be found quite a convenience for hanging clothing and utensils used around the camp.

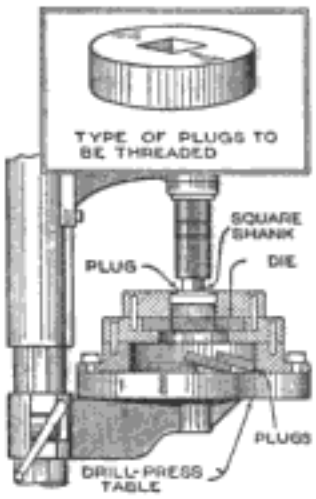


Prolonging Life of Elevator Belts

A method that more than doubles the life of elevator belts consists in applying strips of old belting between the buckets and belt. Old belting is cut into strips, about 1¾ in. wide and 5 in. long, and a hole is punched at each end, through which the bucket bolts pass. Three or four of these strips, depending on the number of bolts used, are inserted behind each bucket. The leather strips prevent cracking of the belt along the line of the upper bucket edge. When the belt begins to show wear, the buckets are all set in new positions; this operation may be repeated several times.—Franklin R. Mundorff, Kansas City, Mo.

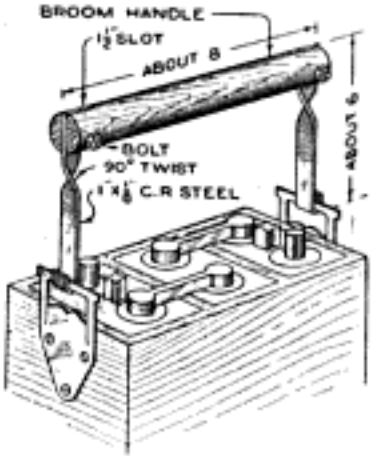
Threading Plugs in a Drill Press

Having an order for a large number of threaded plugs, the management of a shop was "up against it" to find a rapid and economical method of doing the work until the fixture shown in the drawing was developed; this was bolted to the table of a back-geared drill press. A thread-cutting die of the proper size was mounted as indicated, and a square shank was fitted into the drill spindle, to fit the openings in the plugs. The blank plugs were inserted at the top of the fixture, and the square shank was brought to bear in the hole, pressure on the feed lever of the machine being used to run the plugs through the die; the threaded plugs dropped into the opening in the base of the fixture, in which a slot was provided for their removal.—J. H. Moore, Toronto, Can.



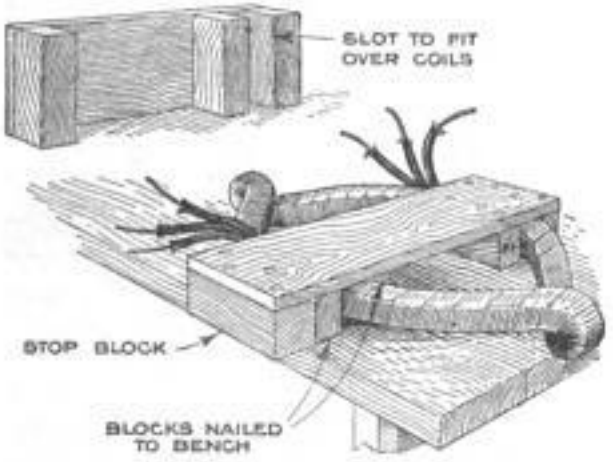
A Handle for Storage Batteries

The common method of carrying storage batteries requires the use of both hands and involves the risk of spilling acid on the clothing. The accompanying sketch shows how an easily made grip, or handle, can be made from flat cold-rolled steel and a piece of round wood. Using a handle of this character, it is possible to carry a battery comfortably with one hand, and it also prevents the possibility of mashed or bruised fingers when inserting or withdrawing the battery from its box or cradle. The handle slots are long enough to allow the hooks to swing inward.—C. Nye, Bronx, N. Y.



Forming Armature Coils

Many electricians are puzzled when it comes to forming an armature coil that will look well on the armature and still go into the slots easily. The methods illustrated in most books involve too much work, or the use of expensive formers. The method described here is one that has proved its value in practice.



A Forming Tool for Uniformly Spreading Armature and Stator Coils: A Piece of Board and a Few Blocks Are the Only Materials Needed to Make It

Straighten into a loop one of the old coils from the armature or stator. Lay it on a board and drive a spike inside each end. Remove the coil and wind a loop from new wire, laying on the turns in the same manner as in the old coil. Tape the loop to keep it from loosening, and it is ready for forming.

The simple forming tool is made from a piece of board, the width of the armature core. Two blocks are nailed across one end to form a slot into which one side of the new coil should fit snugly enough to prevent easy sliding. Two similar blocks are nailed to the edge of a table or bench, as shown in the drawing. The distance between the outer edge of the slot in the tool and that on the table should be equal to the span of the coil. Mark the position of the outer block on the table or bench, and nail a stop block to the end of the board.

To use the forming tool, place one side of the loop or newly wound coil in the slot between the blocks on the board, and the other side in the slot on the bench, leaving the stop end of the former projecting over the edge of the bench. Grasp the ends of the loop firmly with the forefinger and thumb of each hand and, with the body, push the former forward, until the stop prevents further spreading of the coil. All the coils are spread in this manner and then each end is placed over the edge of the bench and bent a trifle to conform to the curve of the armature neck. Care should be observed to have the leads of all the coils to the left or right, as the winding may require, otherwise some of the coils will be uesless.—Edwin M. Love, Alhambra, California.

Clamping Pieces for Welding

The oxyacetylene process of welding broken metal parts requires that the broken pieces be held together in their proper position. This is simple if the parts are of such shape as to make clamping easy. Some parts, however, are very irregular, and much time is spent trying to adjust the clamps.

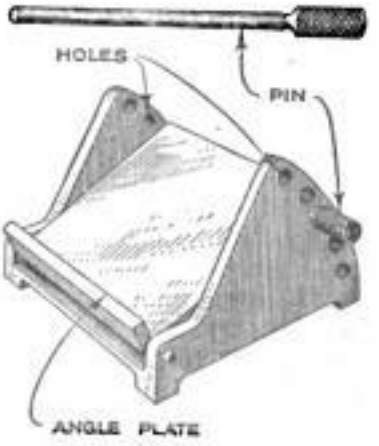
A very convenient accessory for this purpose is a box of molding sand, about 2 ft. square by 1 ft. deep. The fractured edges of the part to be welded are beveled or scarfed, and the separate pieces are pressed into their proper relative positions in the sand. Welding the fracture with melted metal is then a simple matter, and the pieces are little likely to warp.

Screens Made of Old Shutters

The old-fashioned Venetian blinds can be easily made into fly screens. A saw is run along the sides of the slats, which are then removed. Over the frames thus obtained is stretched wire mesh, the raw edges of which are concealed under strips of quarter-round molding.—Lewis Edwards, New York Mills, N. Y.

An Adjustable Angle Plate

The angle plate shown in the drawing differs from the fixed angle commonly used, in that it can be adjusted to meet varying requirements. Holes are provided in both end members of the base, and a pin, having a knurled head, is inserted into the hole, giving the desired angle. This plate can be used on any class of drilling or boring work, and is a valuable timesaver.



A Roller Track for Canoes

BY CURTIS RALSTON

A CANOE club has built a cement stairway from its clubhouse leading down to the landing. The center of the stairway is provided with a roller track which does away with all the hard work of moving a canoe to or from the water's edge.

The rollers are set at such a height above the cement steps that it is easy for a person, walking on either side, to push the boat along the rollers, either upward or downward.

Mortises on the inner edges of the steps were made by inserting wooden blocks into the forms before the concrete was poured, and it is into these that the roller assemblies are inserted so that they can be easily removed. The bottom cross-piece, which may be ordinary 2 by 4-in. material, fits into the slots in the steps and supports the vertical roller supports, which are of 1-in. iron pipe. The wooden rollers are about 2½ in. in diameter and are held in place with ⅜-in. axles running in holes drilled in the upper ends of the pipes. The topmost and the lowest rollers are elevated but a slight distance above the concrete work, and their supports are imbedded in the cement.

An alternative arrangement that may be used in the construction of a roller track of this kind, is to imbed the roller supports in the concrete before it has set. This method is very substantial, but, should any of the supports become broken or should their presence be undesirable, they could not be replaced or removed without considerable work. This, however, is the simplest method, and if permanence is sought, is to be preferred, particularly if the iron roller supports are made of 1½ or 2-in. pipe. In this case it is best to cut the pipes to length and set them into the wet concrete to the proper depth, as sawing off the pipes to length afterward involves considerable work. The entire mounting of the rollers can be done after the cement has set. After cutting the rollers to length, both ends are drilled for the axles, and holes are drilled through the pipes at the points previously marked with a punch, the axles being driven into place through the holes in the post. By making the steps in two sections, the labor and material cost of building them the entire width is considerably reduced. The same set of forms can be used for both sections by taking them apart carefully after the concrete has hardened. The exposed surface is finished off smooth with a mixture of 1 part cement and 2 parts sand.

A Roller Track, Built by a Canoe Club in the Center of a Stairway, Removes Most of the Effort in Moving the Members' Boats to and from the Water

Tool for Skinning Fish

Skinning fish is a difficult and disagreeable job and scaling is also an unpleasant task, but the skinning is simplified, and scaling eliminated, by using the simple

A Simple Tool for Skinning Fish without the Necessity of Scaling, is Made from a Round Hardwood Stick and a Few ⅜-Inch Brads

tool shown in the drawing. This tool may be made from a piece of round hardwood, provided with a handle at one end, brads being driven through the stick so that their points project about ¼ in. The skin is slit along the back and belly, and a cut is made with the point of a sharp knife directly behind the gills. Start the skin back from behind the gills, enough to get the projecting points of the brads caught in it, then turn the stick, and the skin will be wrapped around it, until the tail is reached, when it is cut off. The opposite side is then skinned in the same manner. Should the flesh begin to tear away with the skin, scrape the knife between the two, and the skin will come away whole.—J. A. Stevens, East Boothbay, Me.

Easily Handled Clothesline

By attaching harness snaps to the ends of the clothesline and providing the posts, or other supports to which the line is attached, with rings, as shown in the drawing, the line may be easily stretched and taken down without the necessity of tying and untying knots. This idea is of particular value, because, when a shower comes up suddenly, or when the clothes have frozen to the line, one end can be loosened and both clothes and line taken into the house by rolling them into a bundle as they are taken down.

Killing Weeds with Nitric Acid

To kill weeds in a lawn and at the same time grow grass by the application of nitric acid appears contradictory to all reason, but the practicability of the method has been successfully demonstrated by a chemist who is given to agriculture in a scientific sense. All trash and litter was raked up from the area to be treated, which also served to slightly loosen the soil. A 5-per-cent solution of nitric acid and water was liberally applied by using an ordinary sprinkling can. After the acid solution had been permitted to stand for about half an hour, the treated spot was sprinkled with water from the hose; this served to drive the acid through and under the grass roots. Then the spot was sprinkled with sodium carbonate, which was scattered broadcast, and a second application of water was given to wash it into the ground and neutralize what acid was left about the roots. This treatment left the earth bare of vegetation within the limits of its application. Within a short time the grass reappeared and grew with added vigor, but the weeds were missing.

Explanation of the treatment is simple; the nitric-acid solution had at once killed everything above ground and wiped out the weed roots close to the surface, and the water carried the surplus down through the soil below the grass roots, where no harm would be done. Then the sodium carbonate, which was sprinkled on, neutralized the action of any remaining acid, and this reaction formed sodium nitrate, a common chemical fertilizer, which was washed into the grass roots by the second application of water.

Making Whitewashes

Ordinary whitewash is made by slaking 10 lb. of quicklime in 2 gal. of water. The lime is placed in a pail, the water added, and the bucket covered with a piece of old carpet, or an old bag, and allowed to stand for about an hour; the whitewash is then ready for application.

For exterior use, a weatherproof limewash is made by slaking 1 bu. (62 lb.) of quicklime in 15 gal. of water. A solution consisting of 2 lb. of ordinary salt and 1 lb. of zinc sulphate, dissolved in 2 gal. of boiling water, is prepared, and 2 gal. of skim milk is provided. The salt and zinc-sulphate solution is added to the lime and water, the skim milk being put in last.

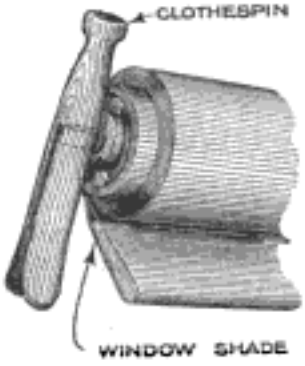
A whitewash used by the government, in the lighthouse service, is made by slak-

ing 1 bu. of lime in 12 gal. of water. In a separate container, dissolve 12 lb. of rock salt in 6 gal. of water. The salt solution is poured into the lime and water mixture, and 6 lb. of Portland cement is added and thoroughly stirred.

Alum added to whitewash will prevent it from rubbing off, the proper proportion being about 1 oz. of powdered alum to each gallon of whitewash. Molasses makes the lime more soluble, and causes it to penetrate absorbent surfaces to which it is applied. A pound of cheap bar soap dissolved in 1 gal. of boiling water and added to about 5 gal. of thick whitewash, will give it a gloss.

Clothespin Makes Shade-Roller Wrench

When the spring in a window-shade roller becomes loose, it is rather hard on the fingers to attempt to tighten it without a tool. In such a case, a common clothespin makes a practical wrench, and one always available. As shown in the drawing, the cleft in the clothespin is placed over the ratchet end, and the pin is rotated until the spring is rewound to the proper tension, and the ratchet set.

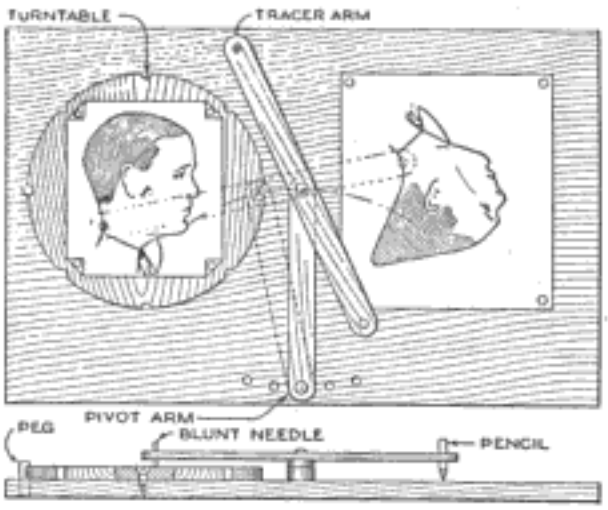


A Caricature Pantograph

A simple little device that will afford endless amusement to the youngsters, and to the elders also, is the caricature pantograph illustrated.

For the base, a piece of soft wood, about 18 in. square, is selected. The tracer and pivot arms may also be of soft wood, and should be about 10 in. long. The turntable should be laid out on a piece of thin soft wood, and eight equidistant holes, about ¼ in. in diameter, drilled around the line marking the circumference. The table is then cut out, leaving eight semicircular notches on the periphery, as shown. The turntable being mounted on the base with a flat-head screw, countersunk flush, a ¼-in. hole is drilled in the base, in line with one of the notches in the table, and a peg fitted. This holds the table firmly. At the front of the baseboard, five holes are drilled to fit the pin on which the pivot arm swings. These holes are laid out on a 10-in. arc.

Before screwing down the pivot arm, place one or two small washers between it and the tracer arm, and between pivot



Very Ludicrous and Mirth-Provoking Pictures are Made With the Simple Pantograph Illustrated. Try It on a Profile Picture of One of Your Friends

arm and base, so that the tracer arm will be about ½ in. above the turntable.

Tack a profile, or silhouette picture, to the turntable, and a sheet of blank paper to the other end of the base. Trace the profile by means of the blunt needle; a comical picture will be produced by the pencil on the other end of the tracer arm.

It is possible to obtain five different pictures from one copy by merely moving the pivot successively from one of the holes in the base to another, while, by removing the peg, turning the table until another notch registers with the hole, and reinserting the peg, many other transformations are produced.

A Handy Lap Table

A table that can be supported on the lap is particularly desirable for seamstresses and, under some circumstances, for camping and other purposes. The table may be made from light lumber, or heavy wallboard, with a semicircle cut from one edge to fit against the body as shown. A setscrew is attached to the rear of the board for holding a supporting leg of heavy wire, as indicated in the drawing.—A. B. Smith, Santa Fe, N. M.

TOURING IN THE AUTO

BY H. F. JOHNSON

Part I—Inexpensive Attachments for the Car

ABOUT this season of the year the auto owner begins to think longingly of the joys of the open road. More and more people are using their cars for long-distance trips every year, and, while many of them depend for sleeping and eating accommodations upon the hotels and restaurants en route, many more tourists like to rely entirely upon their own resources. It is for the latter class that this series of articles is written.

For the man who owns a certain popular light automobile and who does not care to go to the trouble and expense of building a special body for his car, there are numerous ways in which he may add to his own and his fellow travelers' comfort, with very little expense.

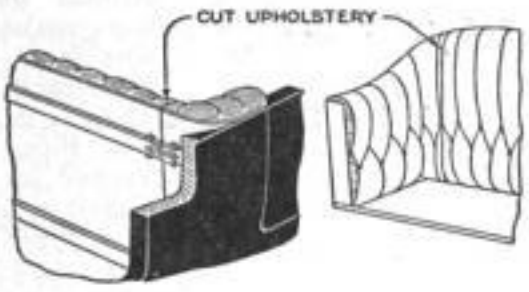
The first question to decide is that of sleeping accommodations. Figs. 1 and 2 show how comfortable beds may be rigged up with a minimum of trouble.

In Fig. 1 the back of the front seat of the touring car is cut and hinged so as to fall back, thus making a bed practically the full length of the car. Cut the back, at the point indicated, with a hacksaw, holding the saw at an angle, so that it will not catch in the sheet metal. The upholstery, of course, should be carefully cut first, before any sawing is done. When the back has been cut, two pieces of wood should be cut to fit between the walls of the back, and firmly nailed to it, from each side. Before nailing, the upholstery may be tacked back into place, or if a better finished job is desired, cut a piece of leather substitute, matching the seat covering, and tack it over the exposed edges of the metal. The seat back is hinged to the seat proper, at the bottom, and, when allowed to fall back, rests on a bracket screwed to the bottom board of the rear seat. On the inner side of the front doors, two brackets are secured, upon which rests a luggage carrier and cushion; this forms the front of the bed. The luggage carrier may be built up of ½ by 1-in. wooden slats, somewhat similar to that shown in Fig. 2, but cut to suit the width of the car. With the illustrations given, no difficulty will be experienced by those who desire to construct this type of "Pullman."

In Fig. 2, a combined bed and luggage carrier is shown. It is built up of stout wooden slats, and is made in two parts, hinged in the middle. The inner half is hinged to the running board, and, as shown in the detail drawing, both parts drop outward to form a substantial couch. Pieces of 1 by 1-in. stock, attached to the outer half, form legs for the bed when extended. A pneumatic mattress may be used with this type; this has the additional advantage of not taking up much space when packed, although, of course, this is a matter of individual preference.

A bed of this kind should only be used with a tent like that shown in Fig. 5; and for comparatively short distances, where a tent is not desired, the first type is the more suitable, as, when the side curtains are drawn tight, no tent is needed. On the other hand, a tent such as the one shown may be used to shield the tourist from sun and rain when cooking, and, besides, the bed used with the tent does not demand so much care in construction.

After the sleeping accommodations have been provided for, the tourist will probably turn his attention to the preparation of his food and how he will equip this important part of his outfit. First and foremost will be the question of a stove. Just what kind to use depends altogether on the "cruiser" himself, and whether or not he wants to build a fire at every stop. For those who do not, the gasoline stove in Fig. 3 is recommended. A stove of this type may be bought, but by judiciously rearranging the fuel tank of a small gasoline stove, and inclosing the whole in a metal case in the manner shown, a surprising economy in space is obtained. An alternative



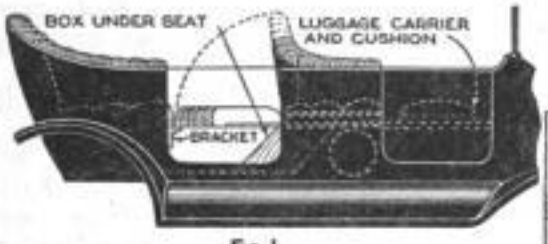


Fig. 1

Fig. 3

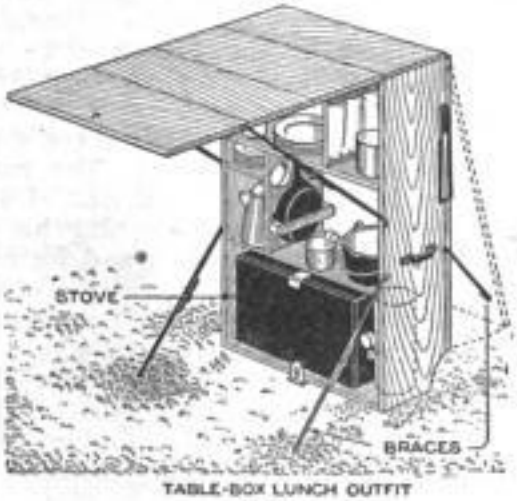


TABLE-BOX LUNCH OUTFIT

Fig 4

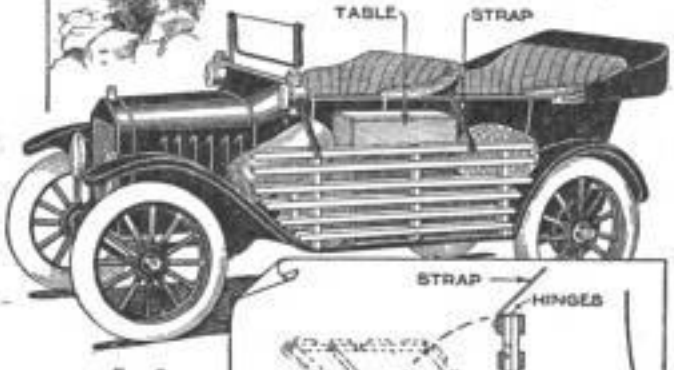
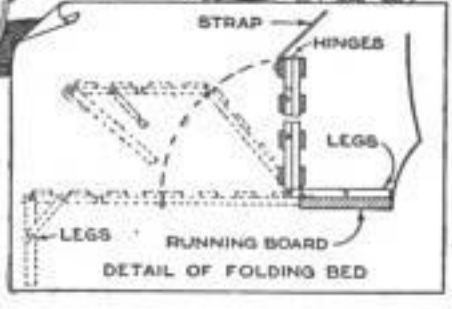


Fig. 2



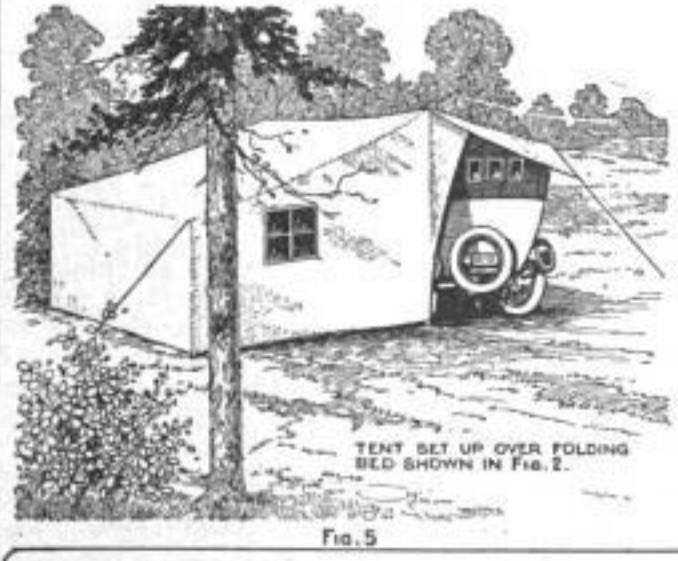


Fig. 5

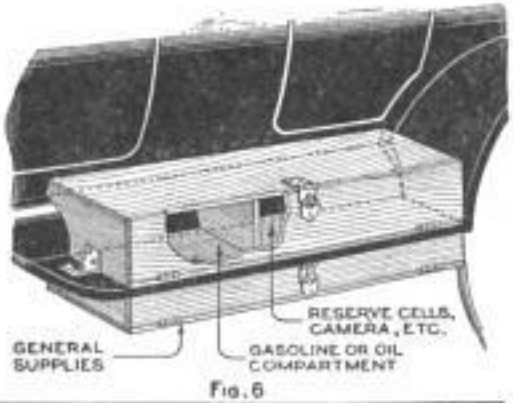


Fig. 6

No One Gets More Joy Out of Life than the Automobile Tourist, Especially If He Elects to Avoid Hotels and Their Expenses, and Camps Wherever He Happens to Find Himself. Attachments That will Enable the Owner of the Light Car to Do This are Illustrated Above

suggestion is the use of acetylene gas in connection with an ordinary stove burner, the two being connected by a rubber hose. To keep the stove and the cooking utensils together, as they should be, a combination table and box, such as that shown in Fig. 4, may be used. The covers of the box are hinged at the top and provided with braces for holding them horizontal when raised, a similar set of braces being provided at the bottom to prevent its being overturned. Such a table enables the tourist to keep insects from his food, which he generally cannot do when he eats with his food on the ground. By inserting partitions of the proper size in the upper part of the box he can stow all his cooking utensils so that they will be protected against damage. The underside of the hinged sides can be provided with pockets to hold various small items, such as knives, forks, and spoons. The whole arrangement, when closed, is strapped down to the running board, from which it is always readily removable.

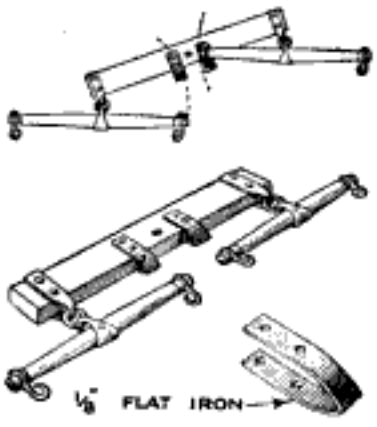
Figure 5 shows a method of using a tent over the car at night. Generally, a degree of skill that the average person does not possess is required to make a tent, and consequently no description of how such a tent should be built is given. However, any ordinary wall tent as long as the top when raised, will answer. The tent is thrown over the top of the car, and the corners guyed down in the regulation manner with or without poles. Where more than two persons make up the party a tent of some sort is an absolute essential, and if a trunk rack can be attached to the rear of the car it can be carried easily; at the same time, the bedding material can be wrapped up inside of it, where it is protected against dust and dampness. Various types of tents for this particular purpose are to be obtained on the market, but the seasoned tourist prefers the ordinary tent, even if it involves the necesssity of carrying a set of tent poles.

There are various places about the light automobile that can be utilized for the stowage of a variety of articles, for which no provision was made by the builder, such as the box underneath the rear of the front seat in Fig. 1 and the running-board boxes in Fig. 6. Owing to its triangular shape, the box in the former drawing can best be utilized for carrying tire chains, jack, towrope, and accessories of a similar character, for which there may not be room in the tool box. The running-board boxes can be fastened either above or under the metal running board with angle irons at the ends, and form a convenient receptacle for reserve batteries, photographic supplies, emergency supplies of oil and fuel, and the like.

The building of a special body for the car, for the ambitious "land yachtsman," and the question of suitable supplies, etc., will be taken up in succeeding articles.

Preventing Locking of Singletrees

To overcome the locking of singletrees that occurs when two horses are used which do not pull together, two pieces of flat iron can be attached to the doubletree in such a manner that the singletrees cannot catch. Two pieces of ⅛ by ¾ by 12-in. flat iron are bent at the center, and the ends are spread apart to fit over the doubletree, in line with the inner ends of the singletrees. The irons are attached to the doubletree by bolts.—Mrs. Ruth Darling Shultis, Lansing, Mich.



A Felt-Pad Silver Cleaner

One of the most effective methods of cleaning silver is to use a felt-covered block. Several layers of felt are stretched over a block of wood, about 2 by 4 by 6 in., and tacked at the ends. A quantity of whiting is then rubbed into the felt, and the pad is moistened with ammonia before using. It is used in the same manner as the old-style scouring brick, but the results are much more satisfactory. It will not be necessary to renew the whiting frequently, but a few drops of ammonia added each time it is used is advised.

Keeping Fence Wires Taut

To keep the separate strands of a wire fence taut, bore holes through all corner posts to take long threaded eyebolts, to which the wires are fastened. When the fence is built, nuts and washers should be placed on the extreme ends of the bolts. —J. Sterling Bird, Poughkeepsie, N. Y.

A Compact Pastry "Board"

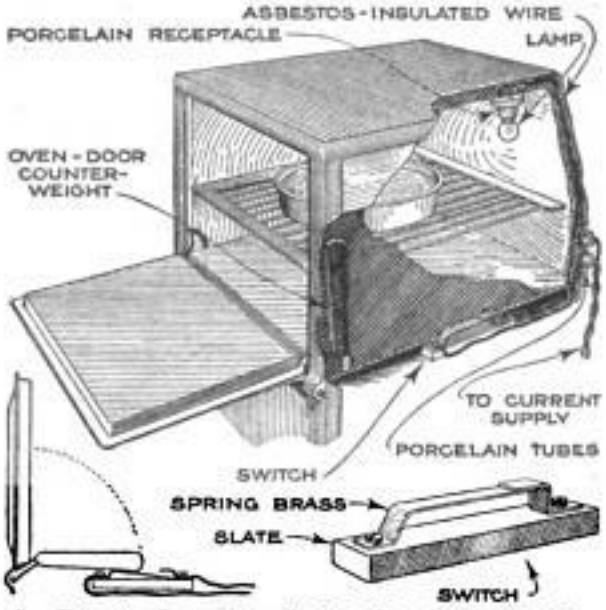
A piece of white oilcloth, about 24 in. square, makes a compact pastry board for the cook of the kitchenette. A 1-in. hem is stitched around the oilcloth square and a strip of tape is sewed across the center so that it will not break when folded. For rolling pastry or doing anything for which the old-fashioned bread board was used, the oilcloth is fastened to the table with brass thumbtacks; after it has been used and washed off, it is folded in the center and wrapped around the rolling pin, to which it is fastened with two of the thumbtacks, the other two being stuck into the end of the pin.—Mrs. Jennie E. McCoy, Philadelphia, Pa.

A Simple Rain Gauge

A rain gauge, by which one can ascertain with fair accuracy the precipitation over a certain period, is made from a graduated bottle and two tin funnels. The spout of the larger funnel is removed and that of the smaller one is inserted into the opening and soldered, as indicated. The spout of the smaller funnel is placed in the neck of the bottle. In order to determine the amount of precipitation, the bottle must be graduated in fractions of an inch, and this may be done by marking the bottle with a file, or by making a scale on paper and gluing it to the glass, afterward coating it over with varnish. In use, the gauge should be set in the open.—T. C. Dyer, Collinsville, Conn.

Illuminating the Stove Oven

A small electric lamp inside the oven of the ordinary kitchen range, so arranged that it is automatically turned on and off with the opening and closing of the oven door, will be welcomed by the user. A porcelain lamp receptacle is bolted to the interior of the oven so that the lamp will not interfere with the insertion of dishes and pans. The drawing shows how the light is operated on ranges equipped with a counterweighted door. All the wires used in an installation of this character must be asbestos-covered, and care should



An Electric Lamp Installed Inside the Range Oven is Lighted and Extinguished by the Opening and Closing of the Oven Door

be taken to have all parts so insulated, or concealed, that there will be no liability of shock if current from the lighting circuit is used. However, for all practical purposes, a miniature lamp operated by two or three dry cells will give sufficient illumination, and is to be preferred.—Kenneth Coggeshall, Webster Groves, Mo.

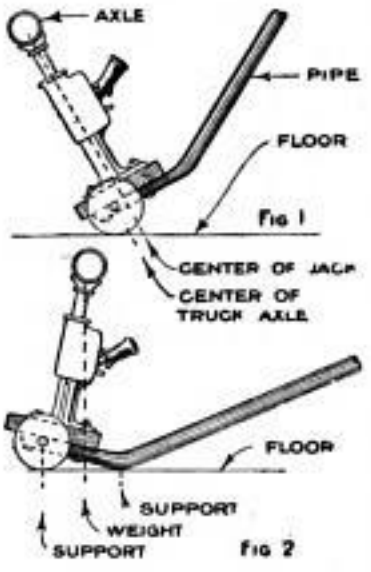
A Simple Bench

A bench, substantial enough to hold a machine vise, and of sufficient strength to stand the rough usage incident to this duty, is a necessity around the farm or home workshop.

A very simple and cheap bench is shown in the illustration; it consists of a stout barrel, in the center of which is set a heavy post, firmly packed with gravel. A board of the desired dimensions is fastened to the post top, and the vise is mounted thereon. A bench of this character does not occupy much space, and is unusually well suited for this purpose.—A. W. Andrews, Long Island, N. Y.

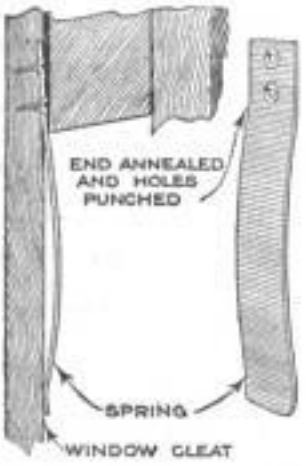
A Wheel Jack for the Private Garage

Applying chains to the car before leaving the garage is often neglected because of the inconvenience of jacking up the car, and the possibility of soiling one's clothes. The wheel jack shown in the drawing will make this operation simplicity itself. The jack is bolted to a wooden block, and this in turn is attached to a pair of small iron wheels, as indicated, and to a substantial handle, to gain leverage. To raise the wheel from the floor, wheel the jack into position so that it engages the axle, as in Fig. 1, then bear down on the handle until the bent portion touches the floor, as in Fig. 2. The weight of the car will then fall between the axle of the truck and the bend of the handle, providing a solid and stationary support for all practical purposes. After the jack has once been adjusted to the axle height of the car it will not be necessary to change it, if always used for the same car.—G. E. Hendrickson, Argyle, Wis.



A Silencer for Rattling Windows

Winds can blow in vain without rattling the windows of a house equipped with the antirattler shown in the drawing. A piece of flat spring steel, ¼ in., or more, wide and about 2½ in. long, is annealed at one end and punched, after which the strip is bent as shown.



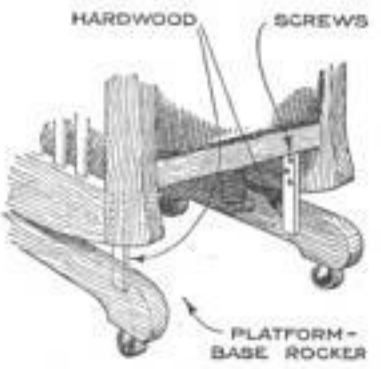
The springs are screwed to the window frame with small flathead wood screws, so that there will be no play between the sash and frame of the window that is responsible for the rattle.—Carl H. Spatz, Nutley, N. J.

Hooks Hold Dry Measures

A simple device for holding dry measures when filling, consists of a hook permanently fastened to the top of the measure. A U-shaped hook of flat iron is made with one end a trifle longer than the other. The long end is drilled with two holes, so that it can be fastened to the measure with screws, bolts, or rivets, as may be desirable. In use, the measure is hooked over the container instead of being placed on the floor or held between the knees, thus eliminating the necessity of bending, and permitting the free use of both hands.

Guide for Platform Rocker

To prevent the rockers of a platform-base chair from working out of line with the base and upsetting the occupant, guides can be attached, as shown in the drawing. A strip of hardwood, about ¾ by 2 in., and of a suitable length, is screwed to each rocker; the strips are beveled off on the edges, to make a neat appearance, and are placed sufficiently back from the end so that they will always bear against the sides of the base when the chair is in use.—Roy E. Kingsley, Melrose, Mass.



A Horseshoe Door Knocker

A neat and effective door knocker may be made from a small-sized horseshoe. A bracket is made of 1½-in. flat stock, which is split, and the ears forged, as shown, to take the pins carrying the horseshoe. The heel calks are drilled to correspond with the ears on the bracket, the pins inserted, and heads formed on them. If desired, a round-head rivet may be driven into the bracket for the horseshoe toe to strike against, although this is not essential.—C. C. Spreen, Warren, Ohio.

MAKING READING-LAMP BASES

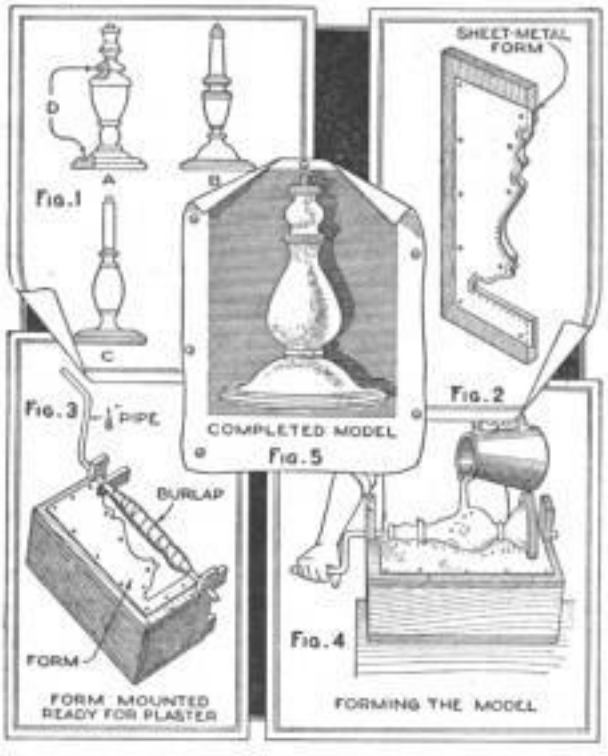
By Edw. Atkinson

NO home is now considered complete without its reading lamp, the soft, shaded light of which is not only restful to the eyes, but introduces a note of cozy comfort in the simplest surroundings. Many more people would use these lamps were it not for their comparatively high cost. With a little care, however, lamp bases may be made from plaster of Paris or cement, which, when finished and fitted with an appropriate shade, can barely be distinguished from the most expensive wooden ones.

Obtain a piece of sheet metal, galvanized iron being perhaps the best, about 2 in. longer than the desired height of the lamp base, and 1 or 2 in. wider than its greatest radius. Choose a design like B or C, Fig. 1, or like Fig. 5, and avoid a design that is undercut, as shown at D, Fig. 1; undercut parts in the design make it impossible to withdraw a simple sheet-metal form, when making the original, or to extract the piece from the mold, when making duplicates.

One edge of the sheet metal is trued up, and half of the design laid out on the surface of the metal, using the trued edge as the center line. The design is then cut out with shears and chisel, and finished with fine half-round files; the form is next placed on a piece of board, ¾ in. thick, and the outline transferred to the wood, which is cut out somewhat larger than the design. Tack the metal to the wood as shown in Fig. 2, allowing it to project over the wood about ⅛ in.; this backs up the metal, while leaving a sharp edge. The next operation consists in nailing the form, with its wooden backing, to a stout box, as shown in Fig. 3; the box must be deeper than the largest diameter of the finished base. Two supports are nailed to the ends of the box, as illustrated, the supports being drilled for a piece of ⅛-in. pipe, the center of which must be level with the top edge of the form and about 1 in. distant from it. One end of the pipe is bent, as illustrated, to form a handle. Everything is now ready for making the original.

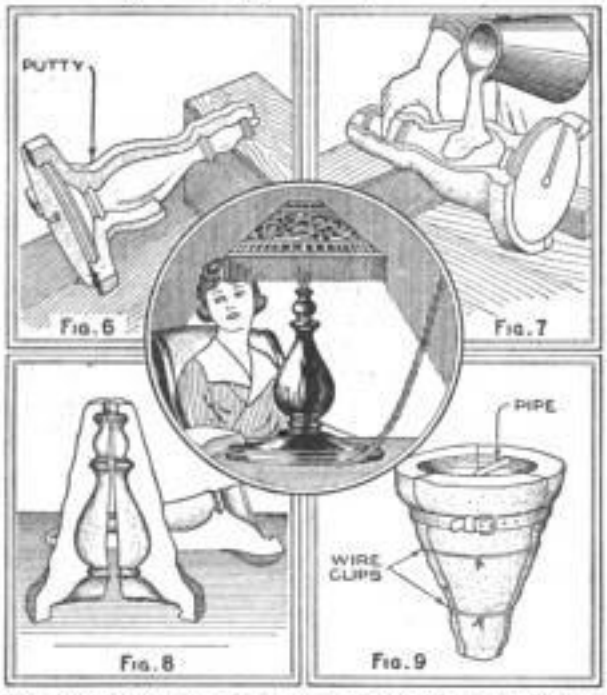
Mix the plaster or cement with water to a thick cream. Obtain a square piece of burlap, 1 in. shorter than the length of the design, and dip it in the plaster until it has taken up as much as possible, then wrap it around the pipe, as shown in Fig. 3, securing it with one or two pieces of string if necessary. The burlap provides a foundation for the plaster when pouring is started and also strengthens the model somewhat. Commence turning the pipe, while pouring the plaster over the burlap; the form will shave off the excess plaster, until the piece at last takes shape; this operation is shown in Fig. 4. If the plaster sets too quickly, add a little glue size to the water when mixing. If only



The Various Steps Necessary in Making Plaster Lamp Bases are Here Shown in Detail. Few Materials, and These of the Simplest, Are Necessary; If Many Bases are to be Made, It Is Best to Construct a Mold. This is Readily Done, and the Casting of the Bases is Then Very Easily Performed

one base is required, this piece may now be set aside to harden. When it is perfectly hard, cut off the projecting ends of the pipe, at top and bottom, leaving enough at the top to cut a thread on, so that a lamp socket, or a two-light bracket, may be screwed onto it. A groove may

be cut across the bottom, as shown in Fig. 7, to lead in the wires, a circular piece of felt being then glued on, to hold them,



The Mold is Built Up on the Model Made as Shown in the First Illustration, Further Bases being Cast in the Mold

and to prevent the base from marring the furniture.

If more than one base is required, the first one may be used as a model, and a mold made from it, in which any number of bases may be cast.

Shellac the model and support it as shown in Fig. 6; build a dam, or wall, of putty along the longitudinal axis, the dam being about 1 in. high and rather irregular on the sides. One-third of the way around the base, build a similar dam, then fill the space between with plaster or cement, first, however, coating both dams and the exposed surface of the model with olive oil, or any similar lubricant. When this plaster coating has set, strip off one putty dam and build it up again as illustrated in Fig. 7. Oil the exposed edge of the first plaster coat, the model surface, and the dam, and again pour on cement or plaster. When this in its turn has set, strip off both dams, oil, and pour the remaining third of the mold. When completed, and parted from the model, the three pieces of the mold will appear as in Fig. 8, each piece being an exact replica, in reverse, of one-third of the model surface, and, when assembled, as in Fig. 9, forming a complete mold.

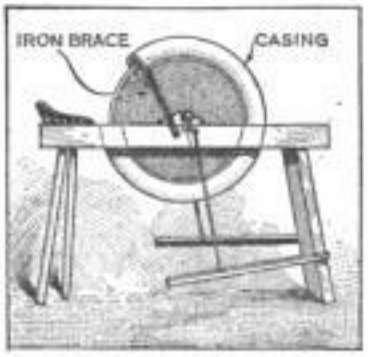
Making duplicate bases is simplicity itself. A piece of ⅛-in. pipe is bent at right angles and inserted into the mold, as shown, one leg of the pipe being long enough to pass through the bottom of the mold and the shorter leg just touching the edge. Oil the mold, and pour in the cement; when this has set, remove the mold. The plaster or cement can readily be stained to match the furniture, first filling in any small blowholes which may be observable, with a fairly thick paste of the material used for the piece. A good finish can be secured by using wood dye and then applying one or two coats of good varnish. The shade is readily obtainable at any department store.

Window Display Uses Spark Coil

An ordinary vibrating-type induction coil, such as is used on light automobiles, can be combined with a set of batteries and a piece of glass to make an attention-compelling electric window sign. The name of the product, or other message, is painted on the sheet of glass with shellac, preferably in script, so that all the letters will be connected together. While the shellac is still sticky it is dusted with fine brass filings. When the induction coil is connected in the circuit with the metallic letters, the current will pass through the characters in a blue sheet as the spark jumps from one minute particle of metal to another. Such a sign can be changed as often as desired by removing the shellac with wood alcohol. A circuit interrupter, or other means for applying the current intermittently, will prolong the life of the batteries and contact points.

Grindstone Pan Made from Old Tire

The water pan of a grindstone became so badly rusted that it was worthless for the purpose intended, and while casting about for a substitute, the idea of using an old automobile tire, as shown in the drawing, occurred. The upper end of the tire is supported by a brace made of flat iron. The result was not only a satisfactory water pan but a shield that prevented excessive splashing, thus contributing considerably to the comfort of the user.



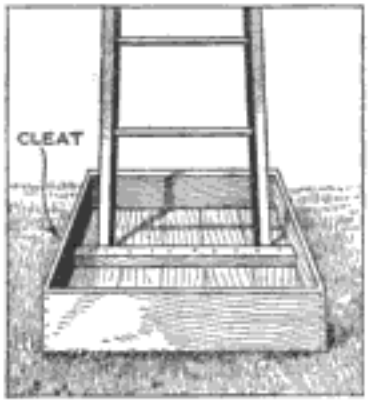
Blue Spots on Sepia Prints

Photographic prints that are "toned sepia" by the redeveloping method, frequently come out of the solution marked with small blue spots. This is due to the use of impure potassium ferricyanide in the bleaching solution. The impure chemical contains small particles of iron in a more or less free state. The spots may also be caused by using enameled trays, from which the enamel has chipped enough to expose the iron base. Naturally, by using chemically pure ferricyanide and avoiding iron trays, the spots will be avoided.

Sodium sulphide, if allowed to grow old while exposed to the air, will give yellowish-brown tones rather than the desired sepia.—A. C. Cole, Chicago, Ill.

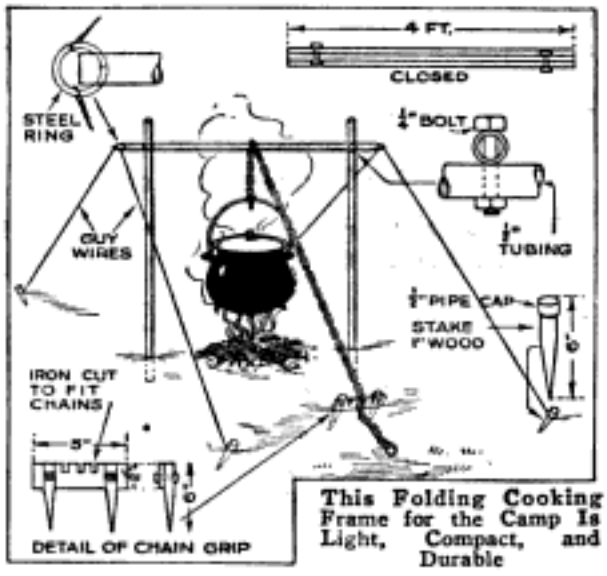
Protecting the Lawn When Using Ladders

Roofers and painters, who must use ladders, know how often complaints are heard about the marks their ladders have made in lawns and flowerbeds. All such damage can be avoided by setting the ladder in a shallow box, as shown in the drawing. The box should be slightly wider than the lower end of the ladder, and a cleat across the bottom, on the inside, will furnish all the support necessary for the ladder. The box also is highly desirable for furnishing a firm support in soft soil.—R. F. Hamill, Elkins, West Virginia.



A Cooking Frame for the Camp

Three pieces of pipe or tubing are required for this simple cooking arrangement for the camp. The upright pieces of tubing, which are inserted into the ground, are bolted to the crosspiece about 3 in. from each end, and on opposite sides, as shown, so that the whole may be folded up. The horizontal crosspiece is drilled about 1 in. from each end, and a metal ring is inserted for attaching the guy wires. Similar rings are attached to the outer ends of the guy wires, through which a stake may be driven. The cooking utensils are suspended from the cross-



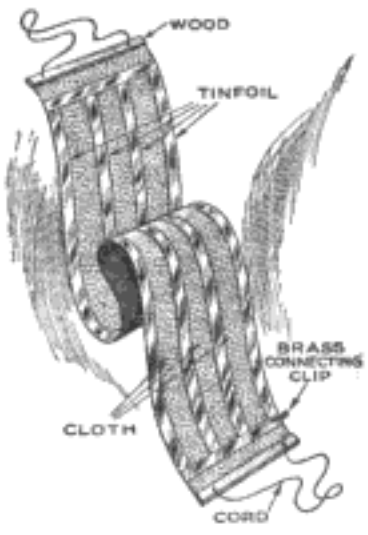
This Folding Cooking Frame for the Camp Is Light, Compact, and Durable

piece, with pieces of sash chain provided with a hook at one end. A notched block, with short stakes at each end as shown, serves for a chain grip. In this manner several containers may be suspended over the fire at the same time.—Clifford M. Lawrence, Philadelphia, Pa.

A Compact Indoor Aerial

An indoor aerial that can be rolled up and stowed away, and that will give excellent results, is made from a length of cloth and some tinfoil strips.

A piece of some lightweight cloth, about 10 in. wide and 15½ ft. long, is glued to a wooden stretcher at each end. Four tinfoil strips, ½ in. wide and 15 ft. long, are attached to the fabric with glue as shown, and connected at each end by cross strips.

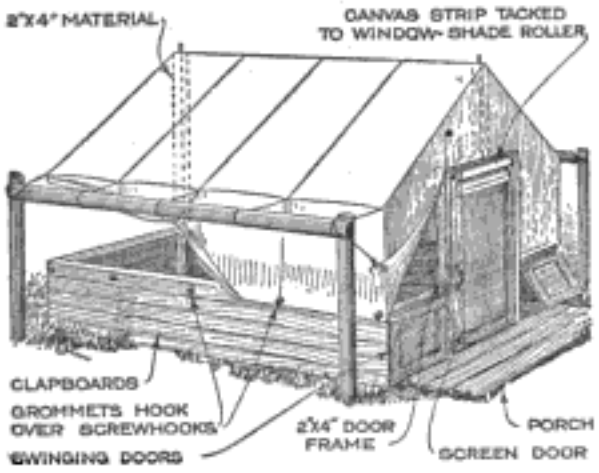


The foil strips may be made up of any number of short pieces, which should not be glued, but sewed together with a needle and thread, the stitches being taken through the cloth. A brass connecting clip is sewed at one end so that one of the

cross strips is underneath and in contact with it. The thread should be drawn as tightly as possible with each stitch, to insure a good contact. The entire aerial is then given a light coat of shellac, and after this has dried, another coat is applied along the edges of the tinfoil strips. —H. H. Schneckloth, Omaha, Neb.

Tent for Permanent Camp

The interior of an ordinary wall tent may be made more comfortable by setting



The Interior of an Ordinary Wall Tent May be Greatly Enlarged by Setting the Tent on Top of Wooden Walls; a Screen Door Keeps Out Insects

the tent over a wooden wall, 2 or 3 ft. high, and fastening the guy ropes to a raised railing at the sides, as shown in the drawing. The front end of the wall is provided with a door frame to which a screen door is attached. A short tent pole is attached over the center of the door frame to support the front end of the ridge pole; a longer pole will be required at the rear to allow for the height the tent is elevated. Additional ventilation may be obtained by fitting smaller doors in the wall, at each side of the entrance. A window-shade roller to which a strip of canvas is tacked may be fitted at the top of the door to prevent rain from blowing in, and for additional privacy. The tent is attached to the wooden wall by hooking the grommets, or eyelets, on the bottom edge of the canvas over screw-hooks.

Blackboard-Cleaning Compound

The school-teacher who serves as his or her own janitor can clean blackboards more easily and quickly than by washing them if the boards are wiped off with a cloth to which sweeping compound has been applied.

Keeping Trees Straight

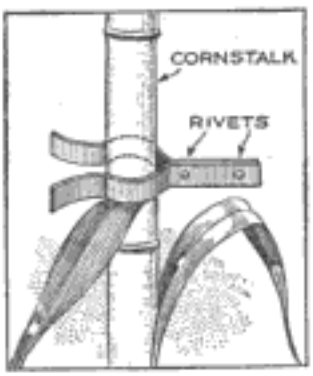
"As the twig is bent," so runs the proverb, "the tree inclines," and any observation of an orchard will show a surprisingly large number of trunks that are not perfectly upright; the trees were planted upright, but nevertheless some slope one way and some another.

After the planting process, young trees are often made to lean by unequal settling. If they are puddled in, tree by tree, or if irrigation is used in settling, the trees should be inspected when the earth has subsided, and if the trunks are not upright, the trees should be straightened, pressing more earth about them to maintain the new position. More than one orchard is made to look ill-kept by trunks sloping in all directions, because the planter did not observe this precaution. In regions where the prevailing winds blow from a certain quarter, more sloping trunks will show in an unprotected location, than where the trees are partly or entirely protected from the clear sweep of the wind. Trees planted in very shallow holes are particularly sensitive to natural influences and soon lose their erectness.

The most attractive orchards are always distinguished by clean, straight trunks, and the thing to remember is that the time to insure such results is during the early life of the tree. Most trees get "bent" in the period directly following their setting out. — Oscar C. Place, Boulder, Colo.

An Efficient Corn Stripper

For stripping the ears and foliage from cornstalks, as well as for removing the leaves from sugar cane, sorghum, and other stalks from which sirup is to be made, the stripper shown in the drawing will be a great convenience. The device is made from two pieces of flexible steel which are bent to the shape shown, riveted together, and provided with a handle for convenience in using. In use, the stripper is snapped over the stalk or ears, and then drawn downward, thus severing the leaves from the stalk.—G. A. Tibbans, Galena, Kan.



Kerosene-Emulsion Spray

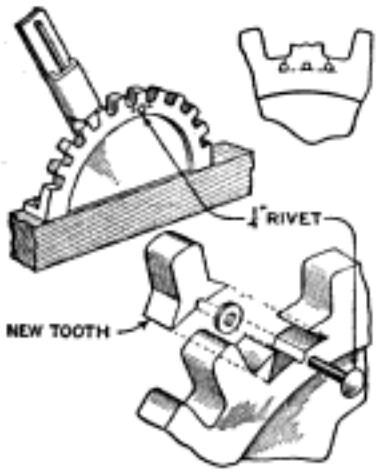
A kerosene emulsion for combating the ravages of scale insects, woolly aphis, and various sucking parasites, is made by mixing 10 lb. of hard-soap chips with 20 gal. of kerosene and 20 gal. of water.

The soap chips are dissolved in the water under moderate heat, and the kerosene is added gradually as the soap dissolves, mixing thoroughly. When the soap has entirely dissolved, the mixture should be churned for about 15 minutes.

For use against plant lice, and other sucking insects, during the growing season, the emulsion is diluted with about 20 gal. of water and applied with a spray; against scale insects and woolly aphis it is diluted with about 10 gal. of water.

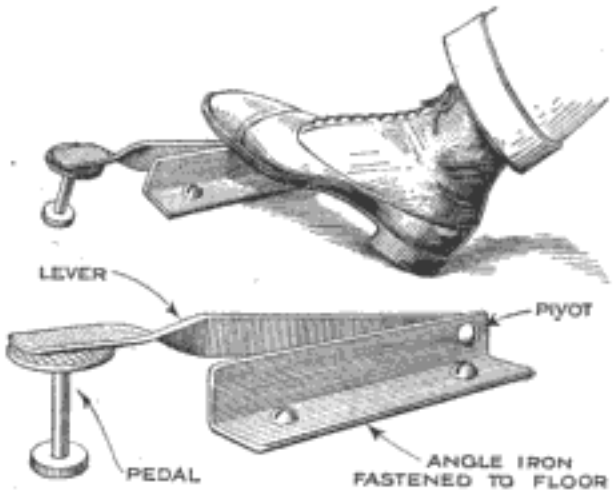
Repairing Broken Lever Sector

While using a corn cultivator for listed corn, one of the teeth on the shovel-regulating lever sector was broken off. The broken tooth, as usually happens, was the one most used, and the tooth ahead or back of the broken one did not permit the shovels to be regulated properly. The root of the broken tooth was filed off flush with the sector, and a dovetailed groove was made to accommodate a new tooth, formed from flat stock with a hacksaw and file. A ¼-in. hole was drilled through the tooth and its dovetail groove, countersinking the hole on one side, so that the rivet used for holding the parts together would clear the lever. After the rivet had been upset, the new tooth was as firm and rigid as the original.—George G. McVicker, North Bend, Neb.



Improving the Accelerator Pedal

Anyone who has driven an automobile is familiar with the strained position in which the foot must be held to operate the accelerator pedal. A pedal requiring a downward pressure of the foot permits road shocks to jolt the foot and gives a jerky action to the engine. The usual accelerator will be greatly improved by the addition of the simple device shown in the drawing. It consists of a 4-in. piece of angle iron, fastened to the floor of the car with two bolts. Pivoted to the upright section of the angle is a length of flat iron twisted at the end to fit over the accelerator pedal.

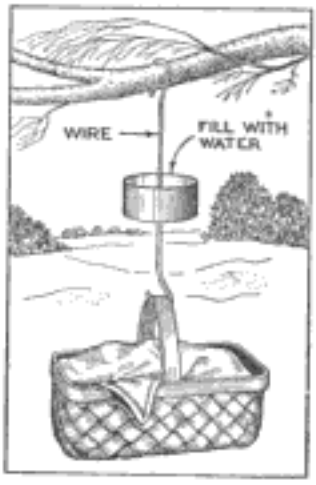


Attachment for the Accelerator Pedal of an Automobile That Assures Foot Comfort to the Driver and Complete Control of the Engine at All Times

In use, the foot rests on the edge of the angle iron and as it is moved to the left the accelerator is depressed. The foot is in a comfortable position and the engine is under complete control at all times.—Thomas W. Benson, Philadelphia, Pa.

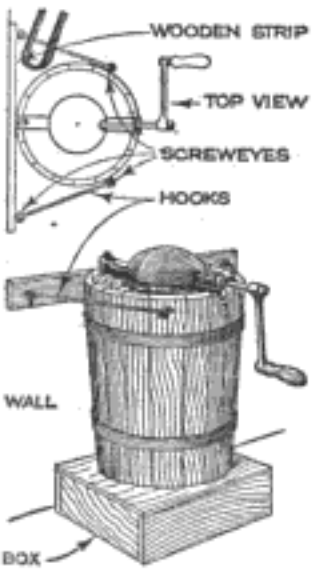
Keeping Ants from Food

One of the inevitable difficulties of picnic parties is the separation of ants from the food, which is usually necessary if the members have any scruples against ants as garnishing. The insects may be prevented from gaining access to the lunch by suspending the baskets from the limb of a tree, using the hook shown in the drawing for the purpose. Such a hook is easily made from a piece of stiff wire and a can lid. A hole is made in the center of the lid, the wire is passed through and soldered, and hooks are bent at each end. In use, the can lid is filled with water, which forms an effective barrier against any creeping or crawling insect.



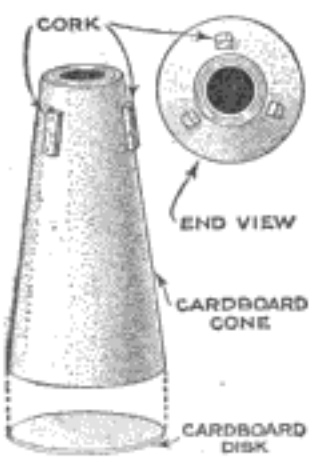
Ice-Cream Freezer Held Stationary

Those who have struggled with an ice-cream freezer will appreciate the value of this simple idea, which provides a sure means of holding the freezer in place as the cream is frozen. Two hooks, about 7 or 8 in. long, are fastened to opposite sides of the wooden tub about 2 in. from the top, as shown. After the freezer has been placed on a strong box, or chair, at the proper height for turning the crank, a 2-in. wooden strip is fastened to the wall at the same height as the hooks on the freezer. In this strip are placed two screweyes for holding the hooks. With the screweyes properly spaced, the freezer will be held against the wooden strip and all slipping and turning, during the process of freezing, will be prevented.



Making a Mute for a Cornet

To diminish the tone of a cornet for practice purposes, or for producing the popular saxophone effect, a mute is necessary. Such an article can be made from the conical cardboard cores that wrapping string is wound on. These cores may be easily obtained from almost any store. For a cornet mute this should be about 6½ in. long, although any size may be used with varying results. Three small strips of cork are glued equidistantly around the small end of the cone, to hold the mute inside the bell of the instrument. A cardboard disk glued over the open end completes the mute, which is ready for use after it has been given two coats of shellac.—Philip A. Wall, Bedford, Mass.

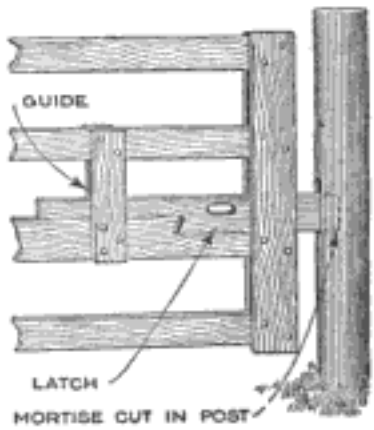


Couplers for Toy Trains

For toy railroads, small tractors with trailers, and similar toys, a coupler is generally needed which must be so simple that "a child can operate it." One way of making them is this: The parts of snap fasteners are separated and soldered to short lengths of flexible wire, the wires being attached to the toys. To connect two cars or toys, it is only necessary to snap the two parts of the fasteners together. The snap fasteners are readily obtainable at any notion counter.—Geo. E. Perkins, S. Bound Brook, N. J.

An Animal-Proof Gate Latch

One of the farmer's worries is the possibility of his stock opening the gates of their pasture, and gaining access to his own or his neighbor's crops. Horses and cattle speedily learn to open gates fitted with an ordinary latch, and when they do this, it is usually a case of hunting up the stock — and paying for the damage.



A simple latch, that is proof against such animal intelligence, consists of a notched wooden bar, fitting against a similar notch in one of the rails of the gate. This bar is provided with a handhole, and the end slides into a mortise cut into the gatepost. The latch is held in position by guides fastened to each side of the gate.—G. A. Tibbans, Galena, Kan.

Healthful Poultry Roosts

Opinions differ on this, as on other points, but investigators discover a growing number of commercial poultry men who have eliminated dropping boards, under one plan or another. Some do it to save labor, others because they believe it to be more healthful. The arrangement herewith described is effective, gauged by either consideration.

The perches, or roosts, are placed at the usual height from the floor. On the floor, in front of the outermost roost and parallel with it, a 12-in. board is set on

edge, a similar board being nailed to the back wall. At 3-ft. intervals, 2-in. cross strips are nailed to the front and rear boards. The whole is then covered with 2-in. poultry netting.

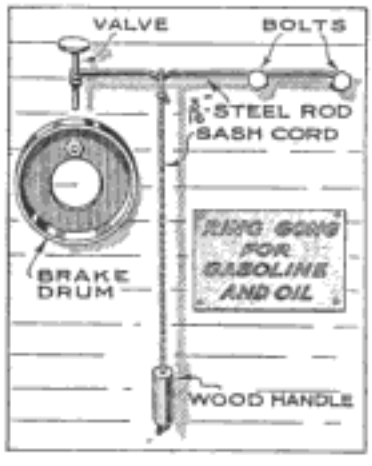
Under the dropping-board system, the roosting fowls are exposed to the ammoniacal fumes rising from the droppings. The boards also provide breeding and lodging places for various parasitic pests; these disadvantages are overcome when the droppings accumulate on the floor underneath. The accumulated droppings are removed only as required or convenient.

The special object of the poultry netting deserves mention. Unless the droppings are covered in some manner, the fowls will scratch more or less under the roosts; if any of the flock happen to have worms, this condition is communicated to the rest of the flock, as the droppings will contain eggs, which the fowls will find and eat. The wire covering prevents this.

The main objection to allowing droppings to accumulate is, that moisture is collected and held; this can be overcome somewhat, by covering with dry dirt or ashes from time to time.

Gong Made from a Brake Drum

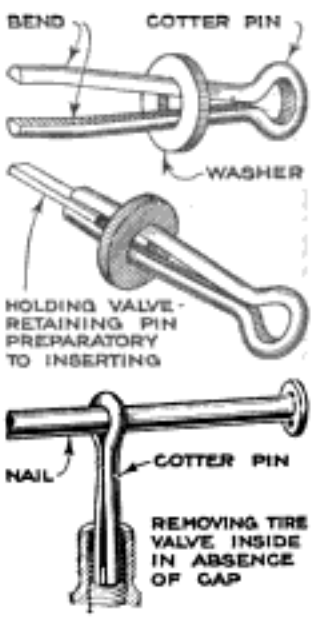
A call bell, or gong, suitable for use in the shop or garage, can be made from a discarded automobile brake drum. A single bolt is used to attach the drum to the wall. For the striker, a piece of light steel rod, about 5/16 in. in diameter, with an old valve, or similar piece of metal, fixed to the end, in line with the drum, is used. A piece of rope and a handle are provided for bringing the striker into contact with the drum. The spring of the steel rod, of course, pulls the striker back again.



¶Men using welding apparatus should wear suitable goggles for eye protection, having frames that are nonconductors of heat (not celluloid), side shields, and lenses of proper color.

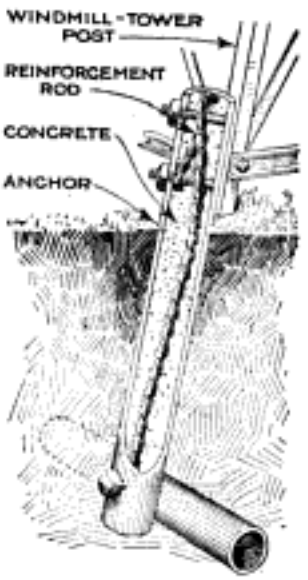
Wrenches and Pliers from Cotter Pins

When inserting the valve-retaining pin that holds the spring seat to the valve stem, it is rather difficult to prevent the pin from dropping. For holding these pins and for inserting pins, screws, and other parts in close places, an ordinary cotter pin can often be used to advantage. The points of the cotter are bent as shown, and a small washer, to hold the ends together, is slipped over it. In the absence of a valve cap, a cotter pin and nail can be used as shown for removing the inside from a tire valve.—G. A. Luers, Washington, D. C.



Reinforcing Windmill Anchor Posts

When a windmill was built, about 15 years ago, 3½-in. pipe was used for the anchor posts, in the belief that it would last as long as the wooden tower. However, the anchors gradually rusted until they were no longer safe. In order to replace them with a minimum of trouble, ¾-in. reinforcing rods were placed in each post at one side of the anchor bolts. The pipes were then filled with a free-running mixture of sand and cement, which was thoroughly tamped. Now, even though the metal may rust entirely away, the anchor posts will be as strong as new ones. The concrete filling should be mixed in the proportion of two parts sand to one part cement, and should be of a quaky consistency.—Geo. F. HcVicker, North Bend, Nebr.



Number of Feet in Pound of Insulated Wire

Amateur electricians will welcome the handy table shown below.

B & S GAUGE	SINGLE COTTON-COVERED	DOUBLE COTTON-COVERED	SINGLE SILK-COVERED	DOUBLE SILK-COVERED
20	311	298	319	312
21	389	370	403	389
22	498	461	503	493
23	612	584	636	631
24	762	745	800	779
25	957	903	1005	968
26	1192	1118	1265	1202
27	1488	1422	1590	1543
28	1852	1769	1972	1917
29	2375	2207	2570	2485
30	2860	2536	3145	2909
31	3800	3768	3943	3683
32	4575	3737	4950	4654
33	5390	4697	6180	5689
34	6500	6168	7740	7111
35	8050	6737	9600	8834
36	9820	7677	12000	10039
37	11860	9309	15000	10666
38	14300	10636	18660	14222
39	17130	11907	23150	16516
40	21590	14222	28700	21333

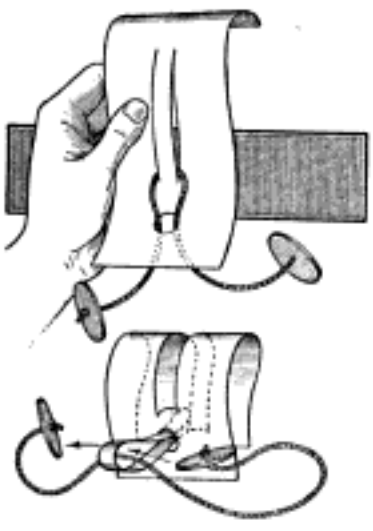
This Table Gives the Number of Feet per Pound of Insulated Magnet Wire Used in the Construction of Radio and Other Electrical Apparatus

Doorstops Elevate Child's Chair

When a child must sit at a table with his face level with his plate and his arms below the table he learns table manners slowly. By screwing wooden doorstops, such as are used to prevent doorknobs from digging holes in the plaster, into the bottoms of the legs, the chair is elevated sufficiently, in most cases, to bring the child to a position where he can dine comfortably.

A Simple Paper Puzzle

An entertaining and clever puzzle can be made from a piece of paper and some string. It will give the puzzle fan something to worry about in getting the large cardboard disks seemingly to pass through a very much smaller hole.

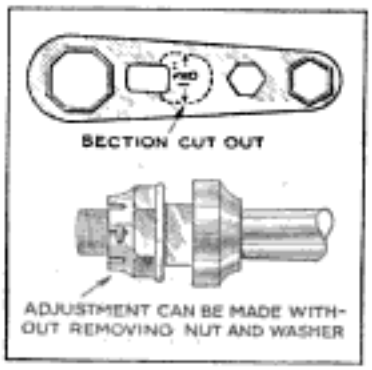


A piece of strong paper, about 3 by 6 in., has two slits cut in the center about 3 in. long and ½ in. apart, so that the paper between the cuts can be pulled up like a loop. About ½ in. below the slits, a hole a little over ½ in. in diameter is made; this hole should be wide enough to permit the paper loop to pass through it as shown in the lower drawing. A cardboard disk, about 1 in. in diameter, is tied to each end of a short piece of string.

The puzzle apparently consists of passing the twine through the loop in the paper and the pasteboard disks through the round hole, which, it should be remembered, is only half their diameter. The trick is easily accomplished by pulling the loop of paper formed by the slits through the smaller hole as far as it will come, passing one of the disks through it, as indicated in the lower drawing, and then allowing the loop to go back to its original position.—S. Leonard Bastin, Bournemouth, Eng.

Wheel-Bearing Wrench for Light Car

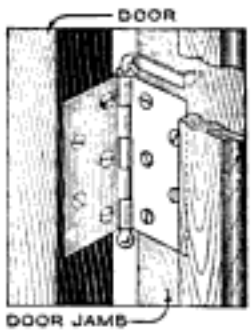
The wrench used for tightening and adjusting the front-wheel spindle cones of a popular light car, may be improved by cutting out a section at one side of the spindle slot.



This opening should be cut to the shape and dimensions illustrated, and will permit adjustment of the cones without first removing the outside spindle nut and washer, which must be done if the wrench is not altered.

Making Loose-Pin Hinges Tamper-Proof

A locked door, fitted with loose-pin hinges, can sometimes be opened by taking out the hinge pins. A simple kink that will prevent this is to make a pin as shown in the drawing. One end of the pin is flattened, bent at right angles, and countersunk in the jamb. A point is turned on this flattened portion and driven into the jamb, thus making it impossible to remove the pin when the door is closed.—L. E. Brundage, Norwood, Colo.



CANVAS-ROOFED BUNGALOWS FOR CALIFORNIA TOURISTS

SOUTHERN California has an even greater housing problem, in the present shortage, than most communities, because of the increasing influx of tourists who must be accommodated. A suburb of Los Angeles has adopted, as a temporary way out of the difficulty, a form of frame house with tentlike canvas roof, familiar to many summer resorters in other parts of the country. In place of windows, the entire upper part of the walls is left open and provided with weatherproof curtains. These makeshift dwellings are being erected in groups on vacant plots of ground, one in each group serving as the common bathhouse.

OPPORTUNE ANNOUNCEMENTS

Whenever prize competitions mentioned on this page are conducted by a public institution, the name and address will appear with the announcement. Industrial addresses will not be published, but may be obtained from our Bureau of Information by request, mentioning the title of the article and date of publication.—Editor.

THOUSAND-DOLLAR PRIZE OFFERED FOR REAL NONSKID HORSESHOE

Motives both humane and economic actuate the search for a horseshoe that will not slip on wet or icy pavements, for aside from the animal suffering caused by such everyday accidents, it is estimated that the losses resulting from the insecure footing of horses total millions of dollars a year. To encourage inventors to further effort, a number of societies have contributed a total of $1,030 to be offered as a prize for the design of a practical nonskid horseshoe.

The American Humane Association, William O. Stillman, president, 287 State Street, Albany, N. Y., is handling the prize and caring for inquiries. Models or drawings of the proposed devices, with full typewritten description, including probable cost of manufacture, are to be sent, however, to the American Society for the Prevention of Cruelty to Animals, Madison Avenue and 26th Street, New York City, before 6:00 p. m., July 1. The competitor's name is not to appear on any of the matter submitted, a private symbol being used instead. A sealed envelope bearing the same symbol, and inclosing the inventor's name and address, must accompany the package.

EX-SERVICE MEN ASKED TO APPLY FOR THEIR "VICTORY MEDALS"

Despite the beauty and general desirability of the bronze Victory Medals designed for award to ex-service men of the American Army and described and illustrated in Popular Mechanics Magazine in March, 1920, very few applications for them have been received. Officers in charge of the distribution in the Chicago recruiting area have planned a drive to induce those who saw service to make application for their medals, and officers will tour the district for that purpose, addressing meetings of war organizations. The ex-soldier's army-discharge certificate, or a certified copy of it, is all that is needed to obtain the medal, and the next of kin of those who have died are also entitled to it. Besides the medal, clasps to be worn on its ribbon are awarded for participation in battle engagements or foreign service. The Victory Medal Section, 111 West Washington Street, the Navy Recruiting Station, 619 South State Street, and the Marine Corps Recruiting Station, 454 South State Street, all in Chicago, handle the applications.

MANY GOVERNMENT EXAMINATIONS FOR TECHNICAL WORKERS

There are interesting vacancies just now in many of the government's technical departments, and a number of excellent opportunities are offered by way of civil-service examinations. Until April 5, applications will be received for positions as metallurgist at $3,000 to $3,600 a year; assistant metallurgist at $2,000 to $3,000; radio engineer at $3,000 to $4,800; assistant radio engineer at $2,000 to $3,000; radio-laboratory assistants in two grades at $800 to $1,200 and $1,200 to $2,000, and Bureau of Mines laboratory assistants at $1,320 to $1,500 for senior, $1,200 to $1,320 for intermediate, and $1,080 to $1,200 for junior grades.

April 13 and 14 an open competitive examination will be held at various places for a junior engineer and deck officer for the U. S. Coast and Geodetic Survey, with an entrance salary of $2,000. Until May 3, applications will be received and promptly rated for a master computer, Ordnance Department at large, with a salary of $1,800 to $2,400, and computers in two grades, at $1,400 to $1,800 and $900 to $1,400, as well as for a valuation aid in oil and gas, for internal-revenue work, at $1,200 to $2,500, an assistant valuation engineer at $2,500 to $3,600, and a valuation engineer at $3,600 to $4,800, or more. And until further notice, applications will be received and immediately rated for an associate physicist at $2,000 to $2,800, and an assistant physicist at $1,400 to $1,800, for the Bureau of Standards.

Metallurgists and radio engineers and assistants should apply to the Civil Service Commission for Form No. 2118. All the other positions call for Form No. 1312, and in all cases the name of the examination desired should be specified. The junior engineer and deck officer is the only one required to report at a government office for examination, the others being rated on the usual records of education, training, experience, and general fitness.

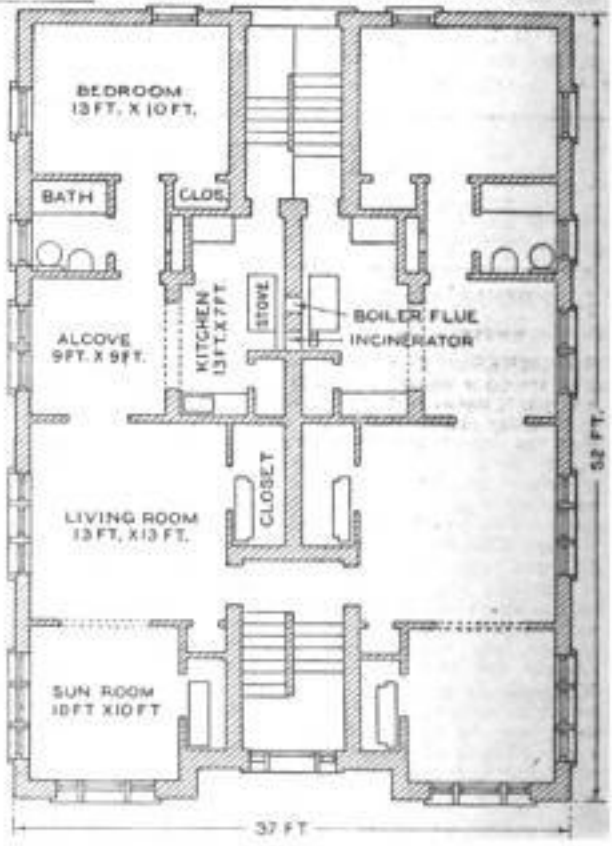
FLAT BUILDING DESIGNED TO MEET HIGH COSTS

THOUGH rents have risen to correspond with the soaring costs of building construction, the assurance of immediate return on the multiplied investment required has not tempted builders to undertake very much new work. An apartment house, the only kind of residence investment property, must yield a reasonable return plus a properly apportioned depreciation reserve for a considerable term of years, and no such promise is conveyed by the present situation. Those builders who are bold enough to attack the problem therefore are forced to rely upon architectural ingenuity to provide buildings that will still pay their way when rental rates inevitably turn downward.

Front View of the Modern Four-Flat Building That Promises Good Future Returns Even on Present Costs

Answering this description is a type of four-flat building recently erected in Alton, Ill. Externally it is of strictly modern and conventional form, of brick on a stone foundation, with heavy brick entrance posts and an ornamental roof over the doorway. The outside dimensions are 37 by 52 ft., the walls being 13 in. thick below and 9 in. above the second floor. Each of the four flats contains five rooms, which are made equivalent to seven by an arrangement of closet beds. At the front is a sun room, 10 ft. square, with a living room, 13 ft. square, back of it, then a dining alcove, 9 ft. square, connected by a cased opening with a kitchen, 13 by 7 ft., and at the rear a 13 by 10-ft. bedroom. The bathroom is 5 ft. 3 in. by 6 ft., with a good grade of plumbing and fixtures installed.

Large closets convert the sun and living rooms into full-fledged bedrooms, and provide ample storage space besides. In addition to these beds, the built-in fixtures include a range and a refrigerator in the kitchen, which also has a large closet, while the bathroom hall contains another one for linen storage. A convenience unusual in buildings of this class is a garbage and refuse incinerator in the basement, with a wall chute opening to the kitchen of each flat. Hot-water heat is used. The single floor is of yellow pine, as is all of the woodwork, and the walls are rough-finished and tinted. It is estimated that the building may be constructed this spring for $12,000 to $15,000, and the apartments rent for $52.50 a month, giving a gross revenue of $2,520 a year.



Floor Plan, Showing the Arrangement That Converts Five Rooms into Seven, by Closet Beds in the Living and Sun Rooms

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