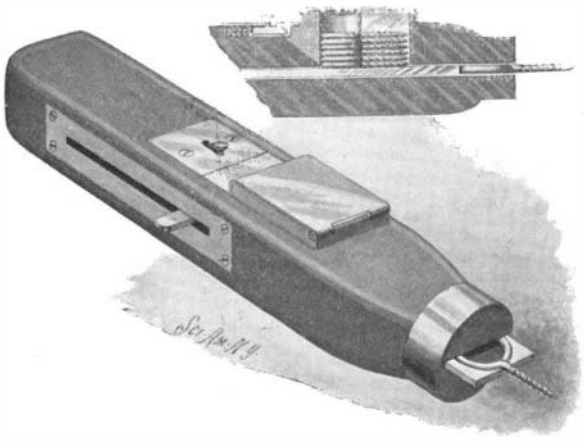
A TOOL FOR DRIVING SCREW-EYES.

The subject of the illustration presented herewith is an ingenious tool for driving screw-eyes patented by Edmund Sather, of 16 Second Place, Brooklyn, New York city.

The tool has a two-part body which serves as a handle and contains a magazine for screw-eyes, open at its bottom and provided with a hinged cover for its top. Beneath the magazine a carrier slides by which the screw-eyes are conveyed to the end of the tool, the carrier for that purpose being provided with an opening to receive the head and shank of a screw-eye. The carrier is shifted back and forth by means of an arm projecting through a slot in the handle. Adjacent to the slot a latch-lever is pivoted, having an



A TOOL FOR DRIVING SCREW-EYES

inclined head and an offset, both of which are adapted to be engaged by the arm of the carrier.

In using the device, the carrier is brought directly beneath the magazine to receive a screw-eye. The projecting arm is forced to the front end of the tool until it has passed the offset of the latch-lever and bears against the forward end of the offset. At this time the carrier will have reached the front of the body; and the shank of the screw-eye will project beyond the forward end of the handle, as shown in our sectional view. The screw-eye can now be driven into position into places which would otherwise be reached with difficulty. The tool can easily be withdrawn from the screw-eye by taking the carrier a sufficient distance beyond the front end of the handle to expose the head of the screw-eye by turning the tool to one side to disengage the carrier.

In driving a screw-eye in a wall, the head of the screw-eye is within the casing and the carrier-arm is in front of the latch-lever offset, so that the necessary pressure to be exerted on the screw portion of the eye will not move the carrier-arm. When the eye has been screwed in, the arm is shifted forward, forcing the inclined head of the latch-lever to one side against the pressure of a spring, whereupon the carrier and screw-eye are correspondingly brought forward, as shown in our perspective view. By turning the tool, the carrier and eye are disengaged.

AUTOMATIC FROST VALVE FOR WATER-PIPES

One of the simplest devices which we have yet seen for preventing the bursting of water-pipes during cold weather is a combination which includes a fragile cartridge readily broken by the expansive force of freezing water and an automatic valve mechanism. The device is the invention of Mr. Daniel W. Troy, of Montgomery, Ala., and has demonstrated its usefulness in actual work. Indeed, the success of the system has been such that the manufacture of the cartridges and valves has been undertaken on a large scale.

The cartridge itself is a small glass vial, flattened centrally (Fig. 3) and provided with a flanged foot, and with a flanged, cork-lined screw-cap. The water-filled cartridge is held between the U-shaped jaws (Fig. 1) of a weighted lever, which bears on a valve stem. The valve (Fig. 2) is essentially a ball, which, when depressed, closes the supply-pipe and opens the waste-pipe. Although strong enough to uphold the weighted lever, the cartridge is nevertheless weak enough to break at its flattened central portion when the water contained therein freezes. (Fig. 4.)

From this brief description and our illustration the operation is evident. During ordinary weather the cartridge will distend the jaws to hold the weighted lever up and to maintain the valve in its nominal raised position, in which water can readily flow from the supply to the service-pipes of the house. When the weather becomes so cold that the water-pipes are in danger of bursting, the expansive force of the freezing water in the cartridge will burst the central flattened portion, thereby causing the weighted lever to fall and the ball-valve to descend and close the supply and simultaneously open the waste-pipe. The insertion of a new cartridge is simple enough. The valve portion can be safely buried in the ground at any desired depth, the cartridge being located at the surface and exposed to the cold.

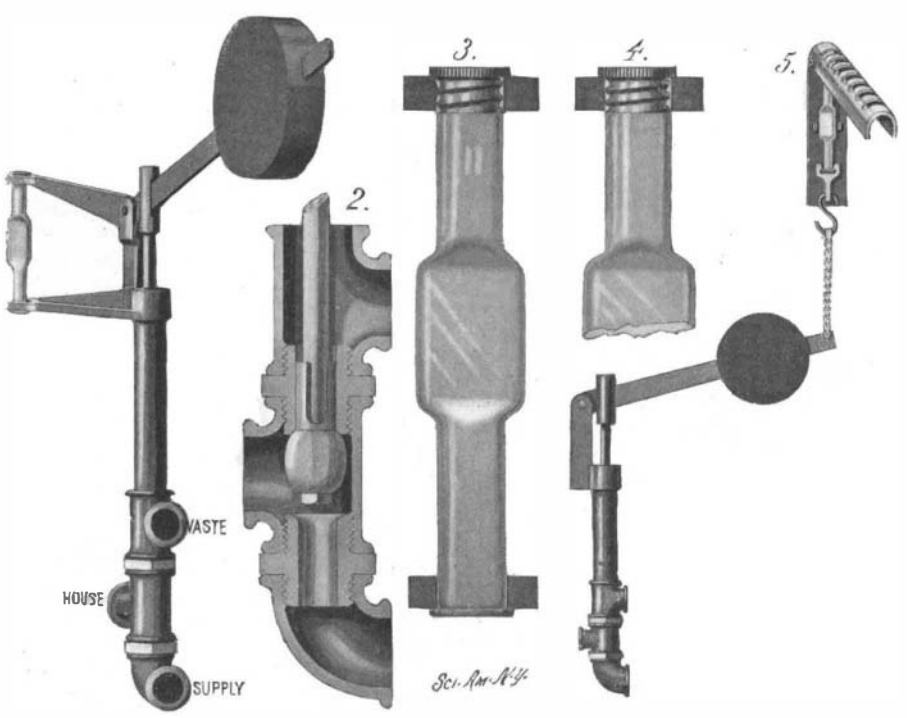
A modification of the invention is shown in Fig. 5, in which the cartridge is shown held in a special holder having a fixed U-shaped jaw and a similar movable jaw from which the lever is supported by a chain. The holder can be screwed on a wall. A ventilated cover protects the cartridge. The valve can be located in the cellar and the cartridge and holder in any convenient exposed place.

Velocity of Earthquake Waves.

The earthquake waves due to the Japanese shock of June 15, 1896, were recorded on the self-registering tide-gages at Honolulu, Hawaii, and at Saucelito, in the bay of San Francisco, California. The center of the shock was located, from Japanese observations, about 240 kilometers southeast of Mikayo at a depth of 4,000 fathoms, and the time of the shock is known. The usual formula for calculating the speed of such waves is $v =$ square root of $g.h$ where v is the speed, g a known constant and h the depth of the ocean assumed to be constant. Dr. Charles Davison has recently compared the calculated velocity of the earthquake waves with the velocity calculated from the foregoing formula. At Saucelito, for example, the first crest of the waves reached the tide gage ten hours and thirty-four minutes after the shock, having traversed in this time the distance of 4,787 miles at an average velocity of 664 feet per second. The formula gives the mean depth of the ocean in the track of the wave as 13,778 feet. The actual depth is certainly more than 17,000 feet, so that the calculated is only some four-fifths of the observed value. A corresponding result was reached in the discussion of another shock, so that for the present it is necessary to correct the accepted formula by multiplying its result by the constant multiplier 5-4. Other discussions of this character are much needed.

Traffic on Great Eastern Railway.

At the International Congress of Railroads, M. Drury, one of the chief officials of the Great Eastern Railway, brought out some interesting figures relating to the suburban traffic in London from the Liverpool Street station, which is the head of the system and located near the Bank of England. This station has 18 tracks. According to notes made during the day of October 9 the total number of passengers, counting those going each way, amounted to more than 150,000. The greatest number of trains entering the station in one hour was 41. The number of trains entering or leaving the station during 24 hours exceeded 1,100. On week-days about 75,000 passengers came in, of which 52,000 were between 6 and 10 A. M. The suburban trains are generally made up of 15 cars, and take about 650 passengers; they include first-class compartments of 8 places each, and second and third-class of 10 places each. The company has lately adopted a type of large cars, and these have given very satisfactory results; the new cars have first and second-class compartments, the latter having 12 places. The average speed of the suburban trains is 15 to 21 miles an hour, and the suburban traffic is provided for by 1,300 to 1,400 passenger cars and 120 locomotives.

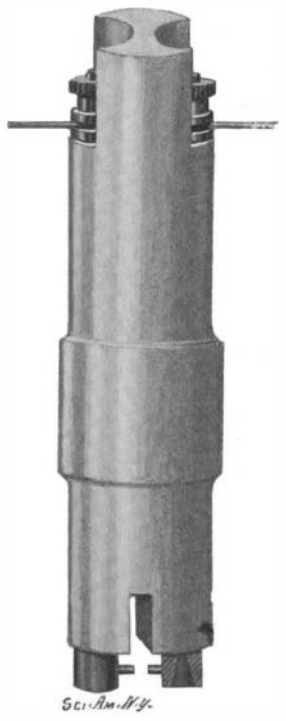


GLASS CARTRIDGE AND AUTOMATIC VALVE TO PREVENT THE BURSTING OF WATER-PIPES.

A NEW IGNITER FOR EXPLOSION-ENGINES.

The tendency of the ordinary gas engine igniters to spark where sparking should not occur is only too frequently evinced. An intelligent attempt to obviate the difficulty is to be found in an invention for which William Roche, of 42 Vesey Street, New York city, has taken out a patent.

The body of the new igniter is made of porcelain and is provided at the end fitting into the explosion chamber of the cylinder with a central notch, forming two distinct lugs or projections. Extending from the lugs through the body are divergent passages for the reception of wires, the inner ends of which fit into tapering openings in the conducting caps which carry the platinum spark points, and the outer ends of which are threaded to receive nuts. The nuts are located in segmental recesses separated by an insulating partition and serve the purpose of forcing the conductor caps against the lugs of the porcelain body.



THE ROCHE IGNITER FOR EXPLOSION-ENGINES.

By reason of the divergent arrangement of the conductors. their inner ends will be close to each other, so that there is small danger of the production of sparks within the body. The insulating partition between the segmental recesses of the outer end of the body prevents the passage of sparks between the adjacent edges of the nuts. The central notch which forms the lugs of the inner end of the body prevents the bridging of the space between the two caps by the electrical deposition of matter on the lugs.

Igniters have invariably been made with the insulating center piece flush with the metallic receptacle, for which reason bridging occurred internally only too often. When the porcelain broke down or ceased to retain the high insulating qualities it should possess, the receptacle as well as the insulator had to be thrown away. When the porcelain in the Roche igniter breaks down, the old porcelain can be taken out and the new one set in without removing the receptacle.

Electric Railways of Canada.

The statistician of Canada has compiled some interesting figures regarding the 34 electric railways of the Dominion. During the year ended Dec. 31. 1899, 630 miles of tracks were used and the total number of miles run by cars was 29,646,847. Passengers carried numbered 104,033,659, which was equal to carrying every man, woman and child in the Dominion 20 times. Compared with the previous year, the number of passengers increased nearly 9,500,000, and the number of miles run over 1,000,000. The amount of paid-up capital invested in electric railways is $21,700,000.

Ammonium Amalgam.

According to Nature, the much-debated question of the existence of an ammonium amalgam appears to be finally settled in the affirmative as the result of recent researches. The investigation of the electrolytic tension of decomposition of the ammonium salts with a mercury cathode, by Coehn and Dannenberg (Zeitschrift für anorganische Chemie) has given results perfectly analogous to those obtained with salts of the alkali metals, and experiments carried out under varying conditions, to ascertain the possibility of reducing the heavy metals from their solutions, show that the negative results previously obtained are due to the great instability of the ammonium amalgam. By preparing the amalgam electrolytically at low temperature (0° C.) it appears to be much more stable and does not exhibit, to any great extent, the spongy appearance peculiar to the amalgam prepared under ordinary conditions; if then allowed to act on cold solutions of copper, cadmium and zinc salts, the formation of the corresponding heavy metal amalgams is easily observed.

The first cargo of Russian pig iron has been dispatched to Marseilles. The cost of the transport by sea from the port of Kertch is very low.