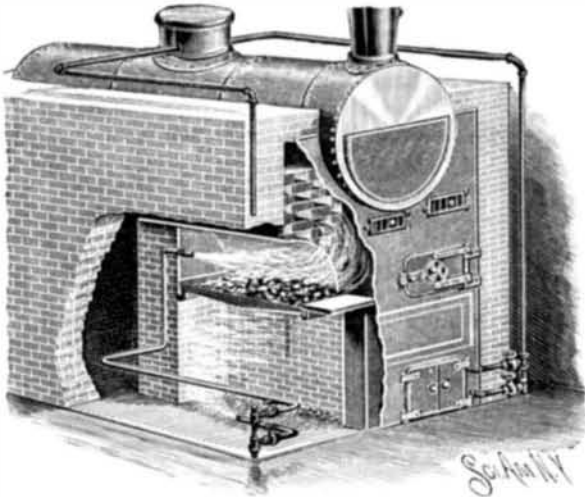


AN IMPROVED BOILER FURNACE.

The furnace shown in the accompanying illustration has a novel form of checker brickwork forming flues over the firebox and under the boiler, and is arranged for the discharge of steam in the firebox and under the grate to promote perfect combustion and insure a very high temperature. This improvement has been patented by Mr. Walter Hurdley, of Youngstown, Ohio.

**HURDLEY'S BOILER FURNACE.**

Although only one furnace is shown, any number of fireboxes may be arranged side by side in the brickwork, each of the fireboxes having a closed rear end and a semicircular top, the front open end of the firebox discharging into a space whose front portion is closed by the usual front of the boiler, while the top of the space communicates with the brickwork flues, which extend the length of the firebox. Behind the rear wall of the latter is an open space under the boiler, and to the rear of this space is a bridge wall, at the top of which are other similar checker brickwork flues leading to the rear of the boiler, whence the gases and products of combustion travel forward in the draught flues of the boiler to the chimney or smokestack. At the front of the furnace, directly above each filling opening, are draught openings closed by suitable dampers, and steam pipes from the boiler, controlled by valves at the side of the ashpit door, are arranged to discharge into the ashpit and firebox as shown. In starting the fire the ashpit doors are open, but when the firebox, which is preferably of metal, has reached a cherry-red heat, the ashpit doors are closed and the upper damper doors opened, at which time also the valves are opened for the discharge of steam under the grate and over the burning fuel. This style of boiler furnace is designed to be very effective for a wide variety of purposes, for use in connection with marine and stationary engines, etc.

A SALT SPRINKLER FOR TABLE USE.

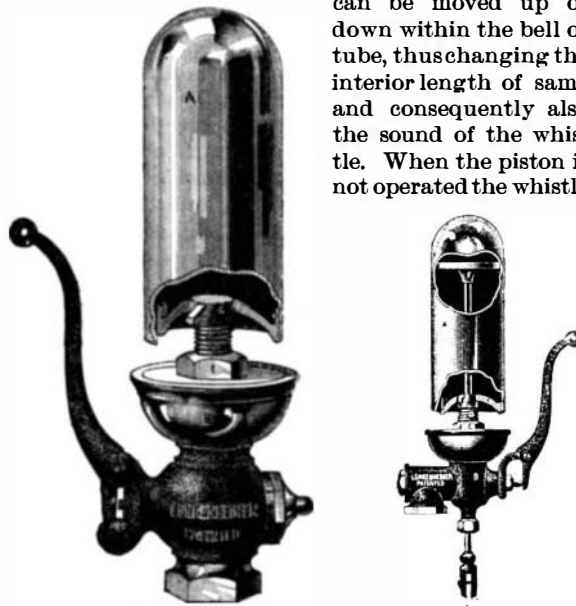
A salt sprinkler designed to obviate the difficulty so frequently experienced in use from the salt becoming damp and caking is shown in the accompanying illustration. The improvement has been patented by Mr. F. N. Dixon, of No. 1611 Brown Street, Philadelphia, Pa. As shown in the sectional view, a follower and a spiral spring are contained within the holder. The spring is secured to the bottom and a follower respectively, and operates to force the follower upward, to support the mass of salt, whatever its quantity, against and in contact with the cap. The cap is permanently swiveled upon the body so as to freely rotate upon it,

having in the form illustrated a circumferential flange engaging a similar flange on the body. The cap may also be provided with small downwardly turned cutting edges. To operate the device, it is inverted and held with one hand, and the cap rotated backward and forward with the thumb and finger of the other hand. In such rotation or working the cap perforations and edges exert a positive grinding or shearing action upon the surface of the mass pressed against them, so that each movement of the cap compels a given quantity of salt to drop through the perforations. The bottom is secured to the body by a screw thread, and may be removed, together with the connected spring and follower, to fill the sprinkler.

IMPROVED STEAM WHISTLES.

In the steam whistle shown in Fig. 1 the central stem is done away with, and instead of the usual square top with acorn, is a dome-shaped top. The bell or tube is securely fastened at its lower end to a three-armed prong or spider, the stem of which is threaded to admit of being screwed into the base and there held secure by a jam nut. Owing to this construction the lower edge of the bell is always exactly in line with the slot in the base through which the stem escapes, insuring the best results and a perfect, clear, and loud tone. The bell can be raised and lowered to suit the steam pressure by screwing it up or down, and when properly set is fastened by the jam nut. It has been proved by practical tests that the prongs to which the bell is fastened do not interfere with the volume or quality of the sound.

In the combination or fire alarm whistle, shown in Fig. 2, a valve is already attached, making it very compact and simple. It is provided with a piston that can be moved up or down within the bell or tube, thus changing the interior length of same and consequently also the sound of the whistle. When the piston is not operated the whistle

**Fig. 1. IMPROVED STEAM WHISTLES.**

gives but one sound like any ordinary one, but when pulled up or down a series of howling, penetrating sounds is produced. When placed above the roof of a building, an extension rod should be attached to the piston and a rope or wire to the whistle valve lever. These whistles are manufactured by the Lunkenheimer Brass Manufacturing Company, of Cincinnati, O., U. S. A., under their own patents.

IMPROVED METHOD OF HANDLING NITRO-GLYCERINE.

The dangers incident to the handling of nitro-glycerine in the manufacture of various grades of dynamite, giant powders, etc., have led to the introduction of the improved method shown in our illustration, which

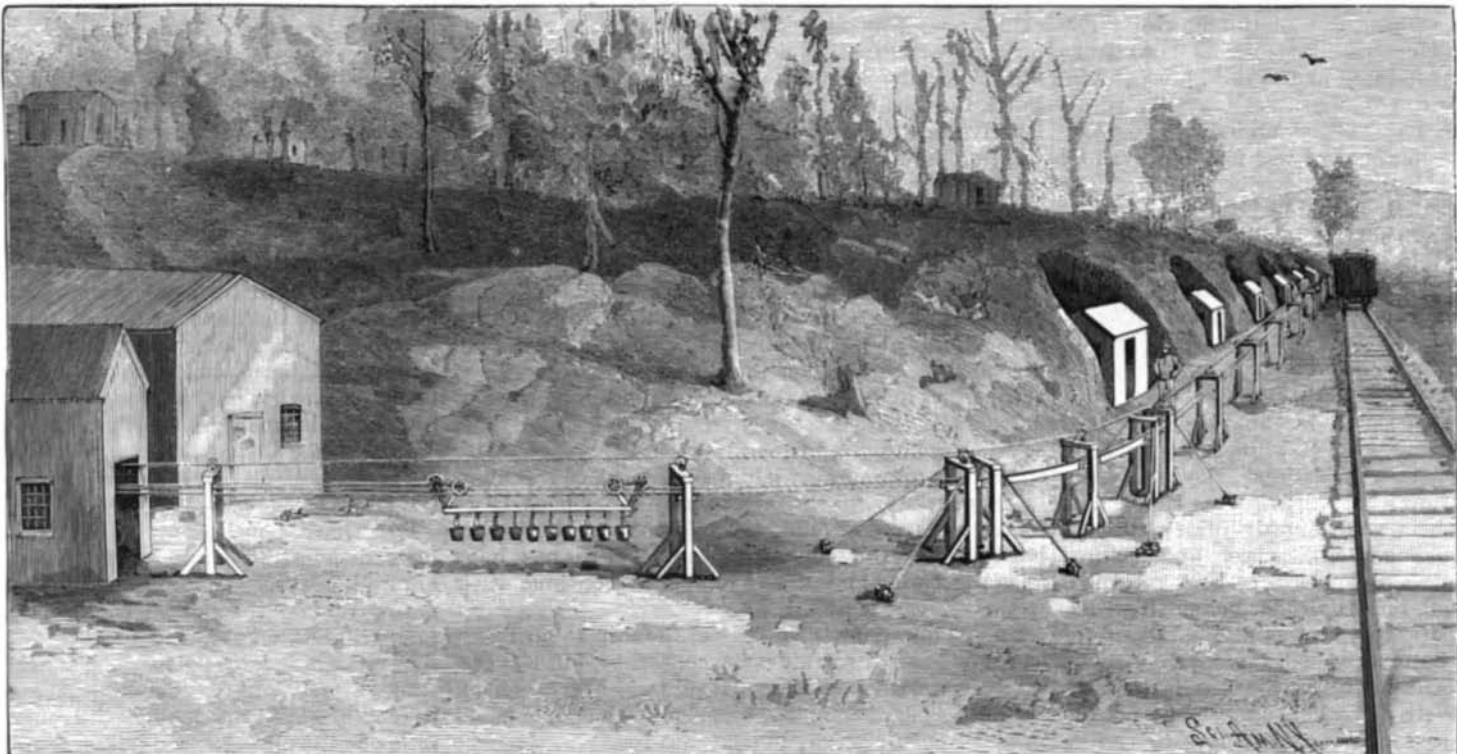
**DIXON'S SALT HOLDER AND SPRINKLER.**

has been adopted at the Giant Powder Works, Hopatcong, N. J. The nitro-glycerine tank or storehouse, it will be seen, is situated some distance from the mixing houses, five in number. As formerly worked, the liquid was carried by lead piping from the tank house to the several mixing houses, but this method endangered the whole property in case of an explosion taking place at any point, as there was a chance of the piping communicating it to the different places about the works. In erecting a new plant, and in search of a safer method of carrying the nitro-glycerine, this matter was suggested to the Union Wire Rope Tramway Co., 117 Liberty Street, New York, who designed the arrangement shown in the view, the work being specially devised by Mr. S. A. Cooney, an engineer who has several patents on this method of conveyance.

A double wire rope tramway is supported on framed towers, at sufficient height above the ground to allow a man to conveniently take off and put on the carriage the pails containing nitro-glycerine. The tramway is worked from an engine house close to the tank house, as follows: The engineer, or a man for the purpose, fills the different pails and hangs them on the carriage, which is started on its way to and stops at the first mixing house, the man in charge of which takes off two full pails, replacing them by two empties. On signal, the carriage goes on to the second mixing house, where the same operation is performed, and so on until it reaches the last, when all the empties are carried back to the starting point, and the operation is again gone over.

The tramway consists of two $\frac{5}{8}$ inch steel wire ropes, supported every 50 feet on brackets attached to the frames. The curved portion of the line, about 40 feet long, is made with two wrought iron rails, the ends pointed and clamped with the ropes in special cast iron brackets to make the line continuous and prevent jars, special guide sheaves being placed at intervals around the curve to carry the hauling rope.

The carriage, specially designed for this plant, consists of two carriers connected by a $\frac{3}{8}$ inch rod above and a bar below on which the pails are suspended.

**TROLLEY SYSTEM OF CONVEYING NITRO-GLYCERINE—GIANT POWDER WORKS, HOPATCONG, N. J.**