

IMPROVED FEED WATER HEATER.

We illustrate herewith a new self-regulating feed water heater, the operation of which will be readily understood from the following description: Referring to the illustration, the cold water enters through its pipe to the valve, a little above the perforated plate. This valve rests upon levers connected with the float, seen below, which effectually controls it. The water escaping from the valve passes through the perforated plate in the form of rain or spray. The exhaust steam, entering from below through the large central pipe, strikes the deflecting disk at its top, and is directed against the rain or spray falling from the perforated plate, heating it, it is claimed, instantaneously to the boiling point. The steam then passes around the perforated plate to the steam and water separator on top, where it drops any water it may have taken up, and passes to the exit well dried. The water thus collected travels through a drip pipe to the bottom of the heater. The heated water in the bottom of the heater passes to the pump through the pipe on the right. It will readily be seen that whenever, from the shutting off of the main or from any other cause, the water is pumped down, it cannot fall below the line marked "lowest water line by pumping," as when that line is reached the pump draws air and steam through the air pipe. The object of this arrangement is to collect any oil or floating dirt above this outlet to the pump, where it can be drawn off nightly through this surface blow, and any heavy dirt below the outlet, where it can be drawn off weekly through the bottom blow. The float is substantially made, and gives no trouble; but as an additional precaution, a spiral drip pipe is used, which preserves its buoyancy unless it leaks more than the pipe can carry off. The float and the plate seen above it also act as pacificators, and prevent the constant turmoil of the water, so that in practical operation the level of the water does not vary over one half inch.

It is claimed that this apparatus, using exhaust steam only, will heat over three times the water needed for the purpose of making steam for power to an unvarying temperature of 210° Fah., no matter how fast the water may be pumped. It is also entirely self regulating and requires no attention. A thermometer for testing is attached to and furnished with each heater, and a trial of thirty days is allowed. We are informed that the apparatus has been in successful operation for the past eighteen months. The Brooklyn navy yard is using one, the government tests showing, it is stated, a gain of thirty per cent in heating power over their tubular heater. The engineer of the New York Post Office building testifies to a saving by the two in use there of twenty-two per cent by actual weight. One in the Equitable Life Insurance building shows a saving of about eighteen per cent, and others in use by private parties show like advantageous results.

For further information apply to the Green Feed Water Heater Company, 86 Liberty street, New York city.

IMPROVED FURNACE FEEDER.

Years ago Dr. Arnott taught us that the proper method was to light a fire from the top and let it burn downwards, consuming the gases as they were evolved; and in accordance with this view, he invented a domestic grate for charging

at the bottom. Mr. Frisbie's patent feeder, represented in the annexed engraving, which we select from the pages of *Iron*, is designed to accomplish the same object in furnaces and the fire grates of steam boilers.

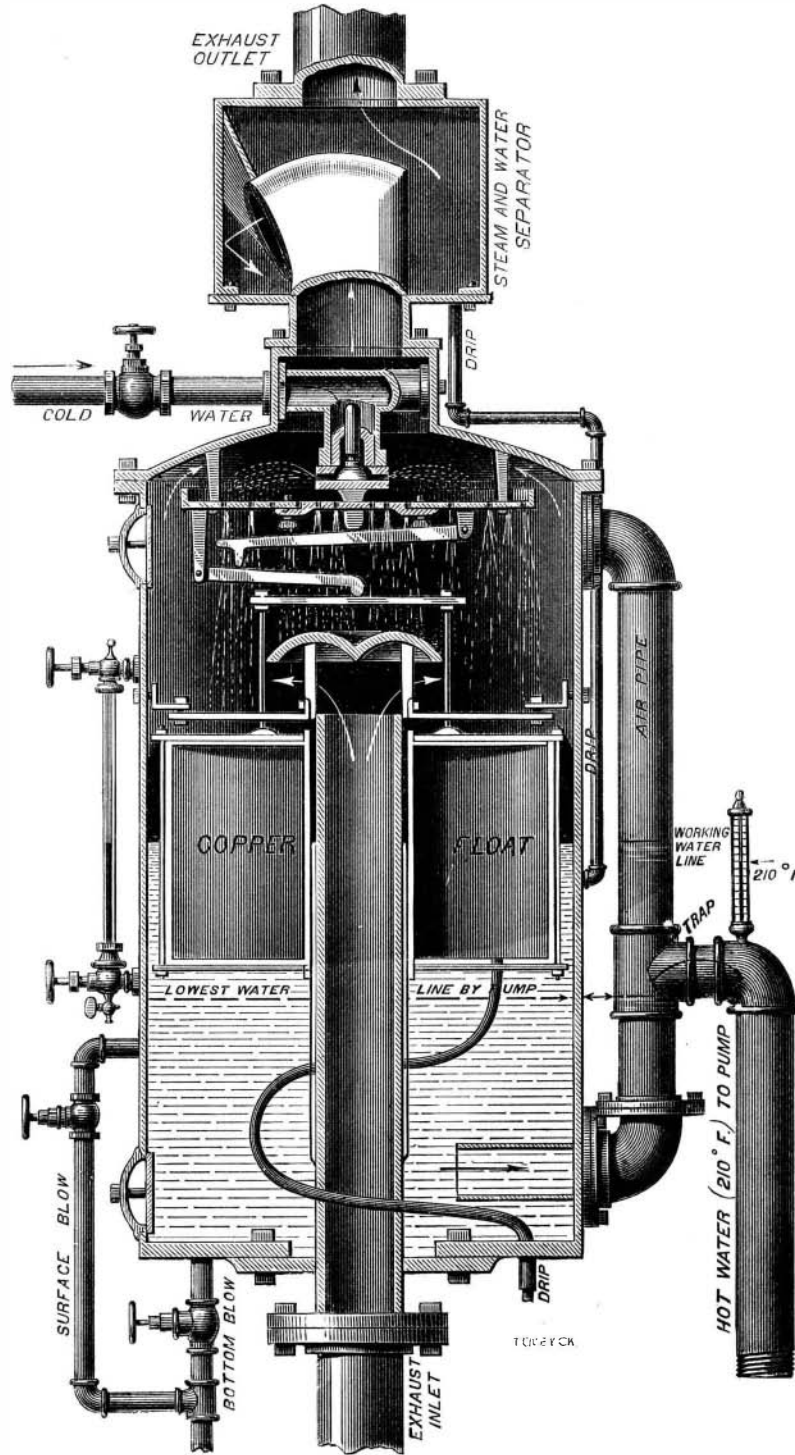
The accompanying engravings are longitudinal vertical sections, Fig. 1 showing the charging cylinder in a vertical position and with the piston raised; while Fig. 2 shows the

cylinder brought back to an inclined position and filled, with the piston at the bottom. This cylinder is supported by side plates working in bearings on the floor of the furnace; and, after being filled in the inclined position, is brought up to the vertical by one set of arms and crank pins on the crank shaft, taking into notches in links jointed to the supporting plates. The crank shaft is driven by means of the hand winch and bevel gearing; and when the cylinder has reached the full extent of its swing, which brings it directly underneath the central circular aperture, the crank pins leave the notches, and the links then rest upon the shaft, thus locking the hopper in a vertical position. By a continued turning of the winch handle, the crank of the shaft, which is provided with a friction roller, now comes into contact with another set of arms on the shaft, which raise the piston with its charge of fuel to the top of the cylinder, thus causing the fresh charge to displace the previous one (shown at Fig. 2), and propel it into the incandescent mass above. Turning the handle in the contrary direction has the effect of bringing the cylinder back to the inclined position, the crank pin of the first set of arms taking into the notches, and disengaging the links by raising them. A cast iron apron follows the cylinder up, so as to retain in its place the coal just charged into the furnace. The piston remains at the top of the cylinder until it has passed the opening in the center, when it is released by a catch coming in contact with a cross bar, and falls to the bottom of the cylinder, ready for a fresh charge of fuel.

It is claimed that, by this arrangement, the gases evolved from the coal cannot escape without being consumed; and so perfect is the combustion that nearly all the residuum forms a fine ash, which falls between the bars on their being moved round. Any clinker or incombustible substance contained in the fuel is continually lifted and loosened, and gradually carried to the circumference of the grate by the successive charges of fresh fuel forced up in the center, and may be removed from all portions of the grate by its being brought, in its revolution, opposite the fire hole door. Raking of the bars is entirely superseded, and the fire door need be opened only rare occasions. Again, the stoker is completely protected from the violent heat, and has a much less laborious task than in hand stoking. There is no fear, as might at first be supposed, of the cylinder being melted by the heat; the fact is that it does not come in contact with the fire itself, but only with fresh coals. The draft through the grating also tends to keep the gear cool. We learn that there are already over thirty of the feeders now in use in Birmingham, England.

Explosion of Benzolin.

Persons who have occasion to repair barrels which have contained naphtha, benzole, or any of the light petroleum oils should be careful how they use a light or even a hot iron about their work. A Mr. Bower, of Sheffield, England, had in his cellar an empty benzolin cask which needed to be repaired, and in doing it he, with singular indiscretion, applied a red hot solder iron to the inside. The spirit or gas which still remained in the barrel exploded with great violence. Mr. Bower escaped with a good fright; but the globes and glass in his shop were smashed, a skylight was blown out in the back kitchen, and other damage was done.

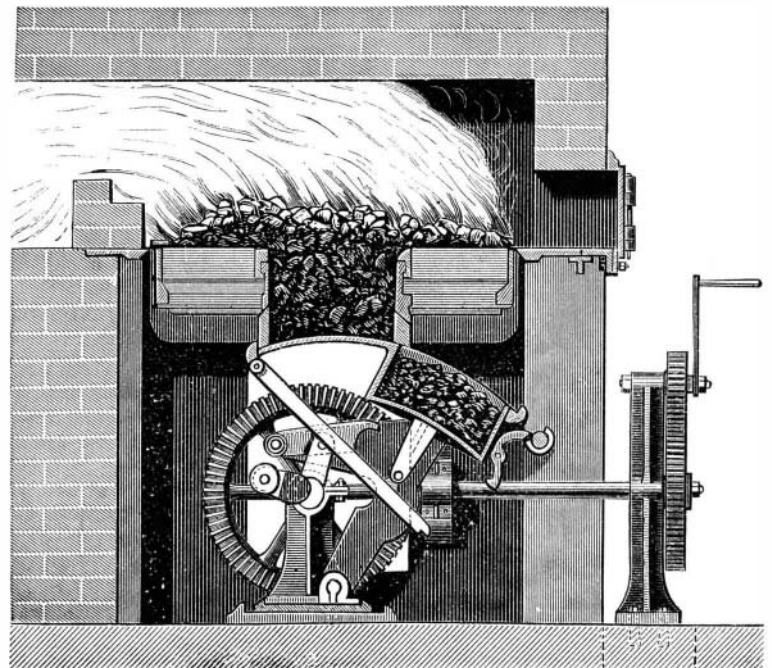
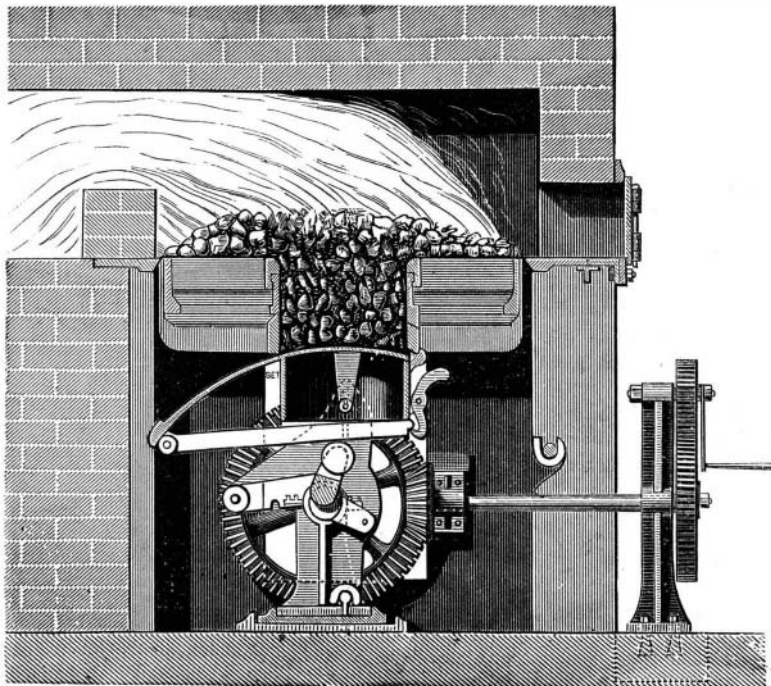


GREEN'S FEED WATER HEATER.

cylinder brought back to an inclined position and filled, with the piston at the bottom. In place of the usual fire bars is a central aperture, surrounded by segmental gratings, which are easily removable, while the whole annular arrangement of grate bars runs on friction rollers, like a turntable, and may be rotated by means of a crowbar inserted in the holes for that purpose. Underneath the central aperture is hung the cylinder or hopper, swinging on pivots, and provided

Fig. 1.

Fig. 2.



FRISBIE'S FURNACE FEEDER