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HOT WATER HEATING FURNACE.
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HOT-WATER HEATING-FURNACE.

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To all whom it may concern:

Be it known that we, STEPHAN LINDNER and MARSHAL G. ROBERTS, citizens of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Hot-Water Heating-Furnaces; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to hot-water heating-furnaces.

It has for its object an improved furnace for effecting the distribution of heat through the medium of circulating water.

The invention relates more especially to the magazine and to the parts related and adjacent thereto.

In the drawings, Figure 1 is a front elevation of the furnace. Fig. 2 is a vertical section. Fig. 3 is a plan of the grate in position in the furnace-casing. Fig. 4 shows in plan a half-section of the grate. Fig. 5 shows in plan the removable grate, and its support. Fig. 6 is a perspective showing the support of the grate-ring. Fig. 7 is a vertical section showing a magazine employed with furnaces of large size.

I indicates the inner shell of a casing, tubular in form, within which is located a coil of pipe 2, closely adjacent to the inner surface of the shell. The shell 1 is surrounded by a second external shell, spaced from it by a thin air-space 31. Both shells extend to the base-section 3, which contains the ash-pit. The base-section 3 is provided with a door 4. Immediately above this door there is an orifice in the outer wall of the furnace through which the dumping-grate 5, the shaking-grate ring 6, and the parts which support the shaking-grate may be inserted above the ash-pit or withdrawn therefrom. The shaking-grate 6 is circular and is provided with a flange which rests on roller-bearings 32 on journals that are held by ring 33. The dumping-grate 5 is made in two sections, each of which is semicircular and provided at its rear quarter with an extending arm 34, on which there is a gear-wheel 7, and is provided at its front quarter with a projecting arm 8, terminating with a wrench-hold 9. The projections are journals on which the grate-sections rock, and the two gear-wheels 7 and 7a mesh, so that the rocking of either produces a similar rocking effect upon the other, with the motion of oscillation, however, in the opposite direction. Through both inner and outer 60 shells at a point about midway between the top and bottom of the cylindrical portion is a clean-out door 10.

Above the cylindrical portion of the furnace-body is a conical portion or dome portion 11, the front of which is preferably a plain surface provided with the door 12. Above the door is an air-damper 13. A magazine 14 hangs from the door-surface of the dome, curving back into the furnace until it reaches a position concentric to the walls of the furnace and then extending straight down to the combustion-chamber above the ash-pit, leaving a sufficient combustion-chamber above the ash-pit and the grate thereover and below the lower end of the magazine. The furnace is fed through the magazine, making it a base-burner in action.

Within the magazine is located an air-duct 15, which extends from the damper 13 to near the bottom of the magazine. The air-duct is provided throughout the most of its extent with air-feed holes, through which air may enter the magazine from above. This air-duct may be a pipe-like duct, as shown at 85 in Fig. 2, or an annular duct within the magazine and surrounding the fuel-space, as shown in Fig. 7. In either case the bottom end of the air-duct is closed by a suitable closure, (18 in Fig. 2 and 19 of Fig. 7.) The shaking-grate 6 is provided with a projecting handle 6a, by means of which it may be oscillated. Both the dumping-grate and shaking-grate are supported by the ring 21, and the entire system of grates, with its supporting-rings, is held in place by bolts 24.

A supply of air to the outer surface of the burning mass in the combustion-chamber is furnished through numerous small holes 29 in the duct. These holes discharge the air in such close proximity to the adjacent portion of the coil, which extends nearly to the top of the casing, that the course of the infed air is frequently interrupted and turned thereby, so that it is quickly and beneficially mingled with the unconsumed gases which has risen into that portion of the chamber.

Two forms of air-inlet ducts are shown in Figs. 2 and 7. The form shown in Fig. 2 is used with small furnaces. The form shown in Fig. 7 is used with furnaces of larger size. Water circulates through the coil 2, which
projects from its upper turn through the casing and communicates through the upright pipe 25 with the small tank 26, through which the water is introduced into the system of piping. At the tank 26 provision is made for a pressure-gage 34. At the bottom of the coil the pipe 36 emerges from the casing and connects with or is continuous with the return-pipe 37 from the service portion of the pipe. The hot water in its outflow passes through the tank 26, and thus to the service-pipe 38. The tank 26 is provided with both an inlet-funnel 39 and safety-valve 41.

What we claim is——

1. In combination with a cylindrical casing and a water-heating coil therewith and closely adjacent to the walls thereof, the lower portion thereof surrounding the fire-chamber and forming the fire-pot therefor, a magazine provided with a perforated duct and depending within the upper portion of said coil said perforations being closely adjacent to said coil and adapted to automatically feed fuel into the fire-chamber, a base portion beneath the fire-pot, an ash-pit within the same, and a removable grate-supporting frame located within the base portion and over the ash-pit, substantially as described.

2. In combination with a water-heating coil and an inclosing casing, a dome thereover, a magazine suspended on one side of said dome with its body portion curved to present its main portion substantially concentric with the casing and with the surrounding upper portion of the coil, a feed-door hinged to said dome at the upper end of said magazine, an annular duct within said magazine, the walls of the duct being perforated with air-holes adapted to deliver air into the casing adjacent to the upper portion of the coil, substantially as described.

3. In a hot-water furnace, in combination with an inclosing casing, a coil for water circulation therewithin, the lower portion of said coil serving as a fire-pot and to encircle the combustion-chamber, a dome closing the top of said furnace, a magazine suspended from one side of said dome, having its body portion fashioned to extend into said casing substantially concentric therewith and with the upper portion of said coil, a door closing the upper end of the magazine, and an air-duct within said magazine and opening at its top into the outer air, its walls being provided with air-holes adapted to deliver air into the upper portion of the casing closely adjacent to the upper portion of said coil, substantially as described.

In testimony whereof we sign this specification in the presence of two witnesses.

STEFAN LINDNER.
MARSHAL G. ROBERTS.

Witnesses:

MAY E. KOTT,
CHARLES F. BURTON.