

(Model.)

M. C. HAWLEY & M. KEARNEY.

FURNACE FOR BOILERS.

No. 247,190.

Patented Sept. 20, 1881.

FIG. I.

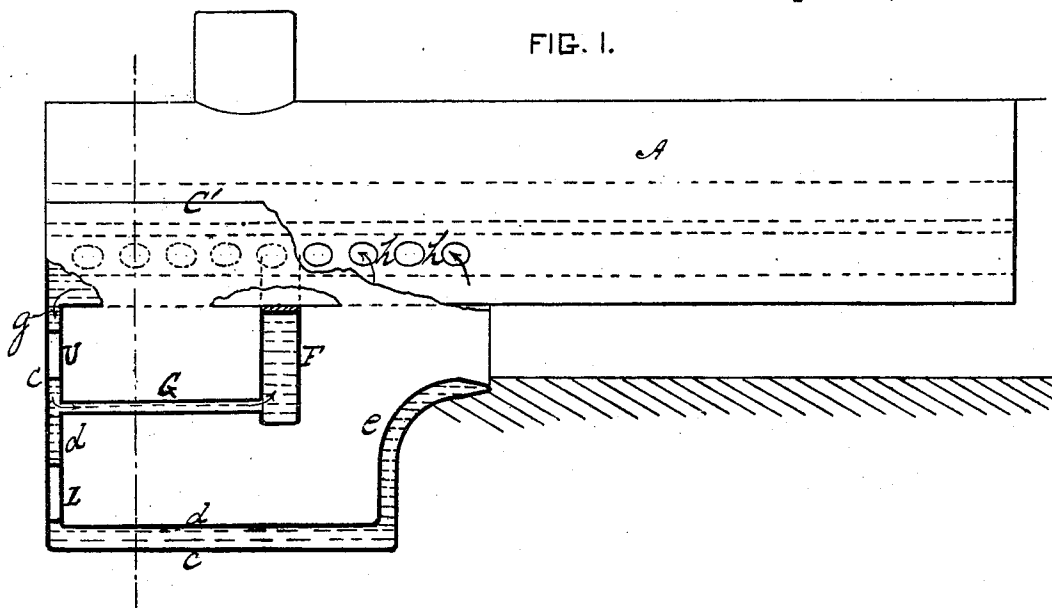
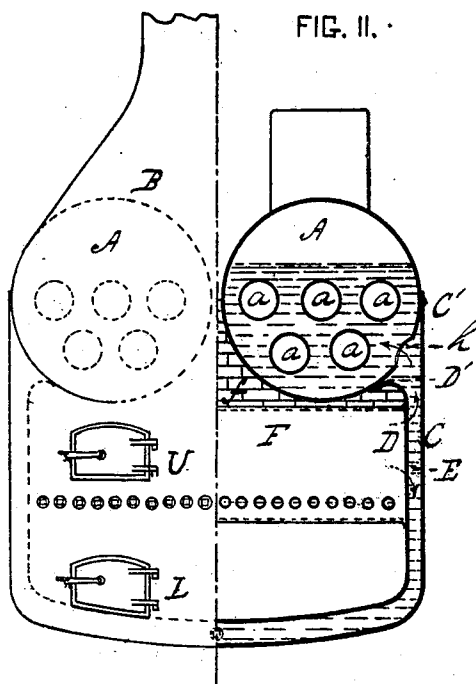


FIG. II.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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FURNACE FOR BOILERS.

SPECIFICATION forming part of Letters Patent No. 247,190, dated September 20, 1881.

Application filed July 19, 1881. (Model.)

To all whom it may concern:

Be it known that we, MELVILLE C. HAWLEY, residing at St. Louis, and MICHAEL KEARNEY, residing at North Springfield, Greene county, both in the State of Missouri, citizens of the United States, have invented certain new and useful Improvements in Furnaces for Return-Flue Boilers, applicable to steam-vessels, stationary engines, &c.; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure I is a side elevation, partly in section, of a return-flue boiler and furnace embodying our invention. Fig. II is a front elevation of the boiler and furnace, partly in section.

Like letters refer to like parts wherever they occur.

Our invention relates to the construction of that class of boiler-furnaces wherein the air for supporting combustion and the gases generated pass through the incandescent fuel; and it has for its object to adapt such furnaces to return-flue boilers, whether marine or stationary, and especially to the class of boilers in most common use.

To this end it consists, mainly, in the construction of the pendent partition or water-table, tubular grate, and water-spaces inclosing the fire-box, and the relative arrangement and connection of the several parts, whereby the circulation from the boiler through the water-spaces, grate-bars, and table is maintained, and a downward draft through the fuel in the fire-box is effected, all as will herein-after more fully appear.

We will now proceed to describe our invention more particularly, so that others skilled in the art to which it appertains may apply the same.

In the drawings, A A indicate boilers, having return-flues *a a* and suitable breeching, B.

CD are the plates constituting the side walls of the furnace, and are connected in parallel lines to the boiler, as indicated at O' D', sufficiently far apart to form a suitable water-space at the sides of the furnace. From the front of the boilers, to which they are attached, extend plates *c d*, passing under and around the fire-box, and thence curving upward, as at *e*, to

form the throat of the furnace. These plates also are such distance apart as will give the desired water-space, and are connected with the plates of the side walls, CD, so that a continuous water-space is formed around the fire-box. In order that this front water-space may communicate with the boilers, openings *g* are made in the bottom of the boiler, at its front, near the head, and a current is thus established from the boiler into the front water-space. A horizontally-arranged series of openings, *h*, are formed in the sides of the boiler, between the points of attachment of the parallel plates CD, so that a return-current is established from the water-space E into the boiler.

F indicates a pendent partition or water-table, upon which the lower portion of the boilers rest, the spaces between the top of the pendent partition or water-table and the boilers and the curves between the boilers being filled with iron plates or with brick-work, as shown at *f*, to prevent any draft between the pendent partition or water-table and bottom of the boilers. This pendent partition or water-table F extends entirely across the fire-box, communicates with the water-space on each side of the furnace, and may be provided with a plug for cleaning out the sediment, &c.

G indicates the grate, composed of a series of tubular bars which connect at one end with the pendent partition or water-table F and at the opposite end with the front water-space, so as to establish communication between the front water-space and pendent partition or water-table. These bars are arranged sufficiently far below the boilers to give the desired fuel-space, and sufficiently far apart to admit of a free draft-space for the passage of products of combustion, ashes, &c.

U indicates the upper door, through which the fuel is introduced and the draft admitted to the furnace; and L is the lower door, by means of which access is had to the ash-pit for the removal of ashes, cleaning out the fire-box, &c.

Near the bottom of the front water-space a blow-off cock may be provided.

The operation of the furnace is as follows: Fire having been started and fuel supplied through door U, this door is left open the de-

sired distance to admit sufficient air to properly support combustion, while the lower door, L, is kept closed to prevent the entrance of cold air. The air to support combustion, and the gases generated, pass downward through the bed of incandescent fuel, thence around the pendent partition or water-table, under the boilers, and into the return-flues *a* to the stack. The water from the boilers descends through bottom openings, *g*, into the water-space in the front walls of the furnace, passes thence through the tubular bars into the pendent partition or water-table, through the pendent partition or water-table into the water-spaces *E* of the side walls of the furnace, and thence through the steam and water openings *h* in the sides of the boiler, completing the circulation, as indicated by the arrows in the drawings.

Among the advantages of our invention are that, owing to the direction given to the circulation, the coldest of the boiler-water is brought in contact with the hottest heating-surface, and the accumulation of sediment in the grate-bars and pendent partition or water-table is prevented.

The advantages of the special construction shown are, that it is readily applied to return-flue boilers of the ordinary or cylindrical form, is compact, occupying little space, and the communications between the boilers and water-spaces of the furnace are readily made.

Having thus described our invention, what

we claim, and desire to secure by Letters Patent, is—

1. The combination, with a return-flue boiler, of a fire-box having the continuous front and side water-spaces which communicate with the boiler by the openings in the shell thereof, a transverse pendent partition or water-table which communicates with the side water-spaces, the space between the boiler and pendent partition or water-table being closed to insure a downward draft, and a series of tubular grate-bars which connect the front water-space and the pendent partition or water-table, whereby a circulation from the boiler through the front water-space, grate, pendent partition or water-table, and side water-spaces is maintained, substantially as specified.

2. The combination, with the boilers *A A*, having return-flues *a a* and openings *g h*, of a furnace having side water-spaces, *E*, the front water-space, the pendent partition or water-table *F*, the tubular grate *G*, and the curved water-throat *e*, substantially as and for the purpose specified.

In testimony whereof we affix our signatures, in presence of two witnesses, this 13th day of July, 1881.

MELVILLE C. HAWLEY.
MICHAEL KEARNEY.

Witnesses:

E. G. CHADWICH,
E. D. KENNA.