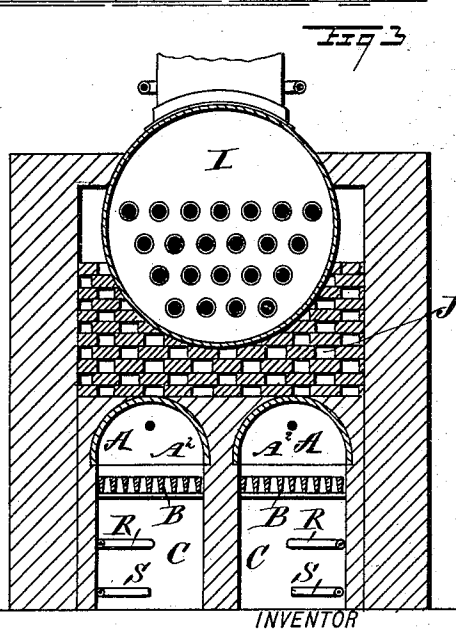
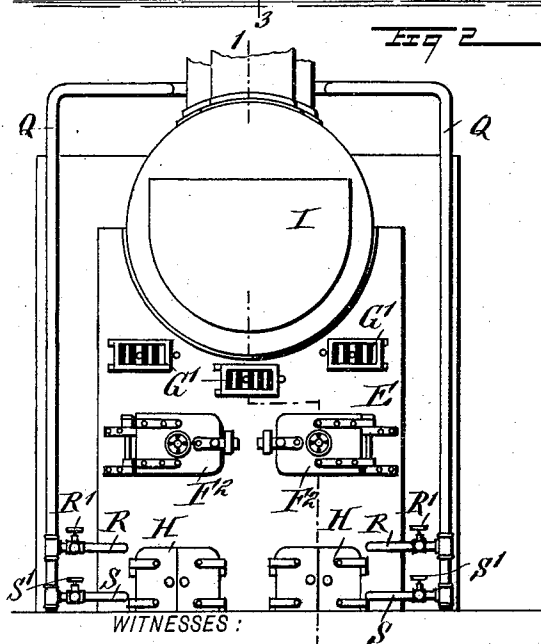
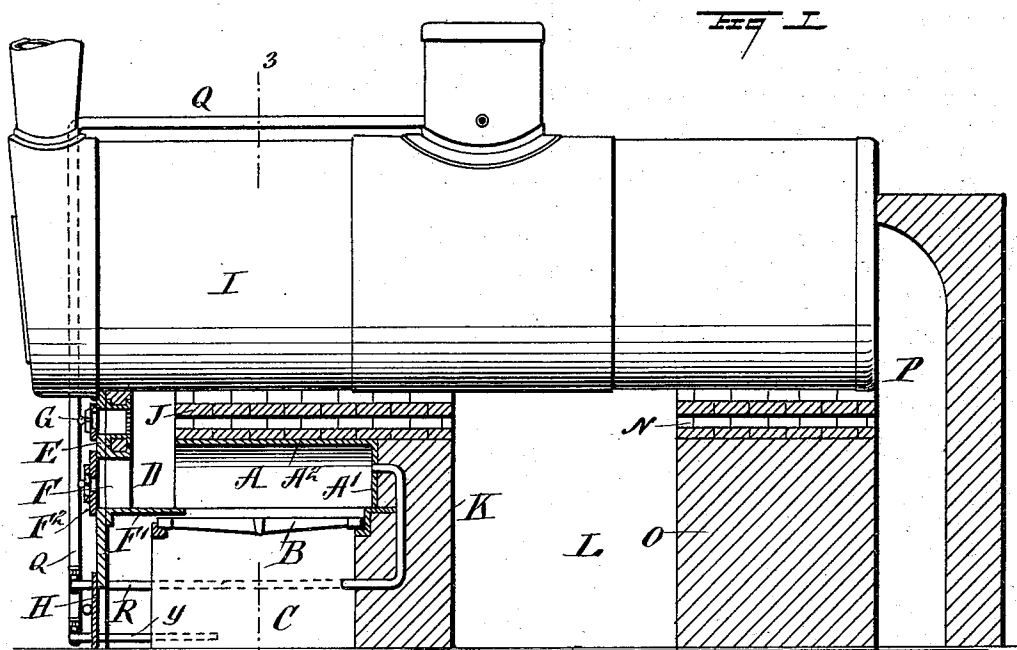


(No Model.)

W. HURDLEY.
BOILER FURNACE.

No. 478,433.

Patented July 5, 1892.



WITNESSES:
H. Walker
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The operation is as follows: In starting the furnace the grate B of each fire-box A is covered with fire-wood and coal, the material being introduced through the doors F². The latter and the damper-doors G' are then closed, after which the wood on the grates B is lighted with a torch or other device and coal or other fuel is added from time to time until the fire-box A attains a cherry-red heat. It is understood that the said fire-boxes are preferably made of metal. During this operation the ash-pit doors H are opened, so as to furnish the amount of air necessary for combustion. When the fire-box A has reached a cherry-red heat, then the damper-doors G' are opened and more coal or other fuel is introduced into the fire-box onto the burning fuel. The doors H leading to the ash-pit C are then closed, and then the valves R' and S' are opened, so that steam from the boiler I can pass into the ash-pit C to pass upward through the grate B into the fuel and also steam can pass over the burning fuel through the pipe R, the said steam entering the fire-box A at the rear end. The amount of steam used is regulated by the valves R' and S', according to the amount of heat required to keep the fire on the grates B burning, as desired, to generate the desired amount of steam in the boiler I. The fire is raked whenever necessary by opening the door H, so as to get at the burning fuel from underneath the grate B. The necessary fuel is introduced into the respective fire-boxes from time to time through the doors F². It will be seen that by this arrangement steam is utilized to very great advantage in connection with the burning fuel to quickly and economically generate steam in the boiler. The products of combustion pass through the space D and checker brick-work J to the rear of the boiler I, as previously described, so that all the heat is utilized to heat the water in the boiler I before it passes up the smoke-stack or chimney of the boiler.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with the horizontal boiler having its smoke-stack at its forward end, of the furnace having a fire-box beneath the front end of the boiler and closed at its rear end, an upward-extending passage D from the front end of the fire-box to the lower side of the boiler, and a series of flues extending from the passage D along the under side of the boiler to an intermediate chamber L, thence to the rear chamber P, the latter communicating with the rear ends of the boiler flues, substantially as set forth.

2. In a boiler-furnace, the combination, with a fire-box having an open front, a closed rear, and a curved top, and a grate arranged in the bottom of the said fire-box and leading to an ash-pit, of a wall extending in the

front of the said fire-box and forming a space with the latter at its open end, a firing-opening arranged in the said wall and having a door and a bottom extending from said front wall inwardly across said space and over the front end of the said grate, a checker brick-work arranged above the said fire-box and extending under the boiler and rearwardly, and damper-doors and openings arranged in the said wall above the said charging-opening, substantially as shown and described.

3. In a boiler-furnace, the combination, with a fire-box having an open front, a closed rear, and a curved top, and a grate arranged in the bottom of the said fire-box and leading to an ash-pit, of a wall extending in the front of the said fire-box and forming a space with the latter at its open end, a firing-opening arranged in the said wall and having a door and a bottom extending over the front end of the said grate, a checker brick-work arranged above the said fire-box and extending under the boiler and rearwardly, and a steam-pipe extending through the closed end into the rear end of the fire-box, substantially as shown and described.

4. In a boiler-furnace, the combination, with a fire-box having an open front, a closed rear, and a curved top, and a grate arranged in the bottom of the said fire-box and leading to an ash-pit, of a wall extending in the front of the said fire-box and forming a space with the latter at its open end, a firing-opening arranged in the said wall and having a door and a bottom extending over the front end of the said grate, a checker brick-work arranged above the said fire-box and extending under the boiler and rearwardly, a steam-pipe extending through the closed end into the rear end of the fire-box, and a second steam-pipe discharging into the said fire-box below the said grate, substantially as shown and described.

5. In a boiler-furnace, the combination, with a fire-box having an open front, a closed rear, and a curved top, and a grate arranged in the bottom of the said fire-box and leading to an ash-pit, of a wall extending in the front of the said fire-box and forming a space with the latter at its open end, a firing-opening arranged in the said wall and having a door and a bottom extending over the front end of the said grate, a checker brick-work arranged above the said fire-box and extending under the boiler and rearwardly, a steam-pipe extending through the closed end into the rear end of the fire-box, and a transverse wall arranged at the rear end of the said fire-box and ash-pit to support the rear end of the said checker brick-work, substantially as shown and described.

WALTER HURDLEY.

Witnesses:

WILLIAM MCCOMB,
HUGH ANDERSON.

UNITED STATES PATENT OFFICE.

WALTER HURDLEY, OF YOUNGSTOWN, OHIO.

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 478,433, dated July 5, 1892.

Application filed March 3, 1892. Serial No. 423,602. (No model.)

To all whom it may concern:

Be it known that I, WALTER HURDLEY, of Youngstown, in the county of Mahoning and State of Ohio, have invented a new and Improved Boiler-Furnace, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved boiler-furnace which is simple and durable in construction, very effective in operation, and arranged to utilize fuel to the greatest advantage.

The invention consists of steam-pipes connected with the steam-compartment of the boiler, and of which one discharges into the closed end of the fire-box and the other under the grate.

The invention further consists of certain parts and details and combinations of the same, as will be hereinafter described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement on the line 1 1 in Fig. 2. Fig. 2 is a front elevation of the same, and Fig. 3 is a transverse section of the same on the line 3 3 of Fig. 1.

The improved boiler-furnace is provided with one, two, or more fire-boxes A, arranged alongside each other in the brick-work of the furnace, each of the said fire-boxes having a closed rear end A' and a semicircular top A², as plainly illustrated in the drawings, especially with reference to Fig. 3.

In the bottom of each fire-box A is arranged a grate B, below which is located the ash-pit C, also built in the brick-work of the furnace.

The front open ends of the several fire-boxes A discharge or open into a space D, the front of which is closed by the usual front E of the boiler. In this front E is arranged an inlet or filling opening F, the bottom F' of which extends partly into the fire-boxes directly over the front end of the grates B. The opening F is closed in the usual manner by a suitable door F², which permits of filling or charging the fire-box A with the necessary fuel.

Directly above each filling-opening F is arranged a draft-opening G, opening into the space D and also closed at its front by a suit-

able damper-door G'. In the lower part of the front E are arranged the ash-pit doors H, through which access is had to the several ash-pits C of the fire-boxes A. The space D, arranged between the front E and the open ends of the fire-boxes A, extends under and to the sides of the boiler I, as plainly shown in Fig. 3, the top of the said space being closed by the usual top of the brick-work, as will be plainly understood by reference to the said Fig. 3.

Directly above the several fire-boxes A is arranged the checker brick-work J, extending throughout the length of the fire-boxes and built up under the boiler I, reaching at its rear end to a wall K, arranged transversely in the rear of the fire-boxes and the ash-pit C, as plainly shown in Fig. 1. A second checker brick-work N is arranged at the rear end of the boiler I and is supported on a transverse wall O, which forms, with the wall K, a draft-space L under the boiler I.

The rear end of the checker brick-work N discharges into a space P, built in the brick-work of the furnace and opening at its upper end into the rear end of the draft-flues of the boiler I. The chimney or smoke-stack is arranged on the front of the boiler I, as plainly shown, so that the smoke or gases arising from the fire-boxes A pass from the latter to the space D through the checker brick-work J, space L, and checker brick-work N to the space P to finally travel forward in the draft-flues of the boiler J to the chimney or smoke-stack of the latter.

From the steam-compartment of the boiler I leads a pipe Q for each of the fire-boxes A and corresponding ash-pit C. The pipe Q extends down the front E of the boiler-furnace, and is provided near its lower end with the two branch pipes R and S, each having a suitable valve R' and S' to regulate the amount of steam passing to the respective fire-box and ash-pit. The branch pipe R extends through one side wall of the brick-work of the furnace and up through the transverse wall K to finally pass through the rear end A' of the respective fire-box A to discharge into the latter at its rear end. (See Fig. 1.) The other branch pipe S terminates at or near the middle of the fire-box C, near the bottom of the same.