

W. S. PAYNE.
BOILERS FOR STEAM-HEATERS.

No. 171,844.

Patented Jan. 4, 1876.

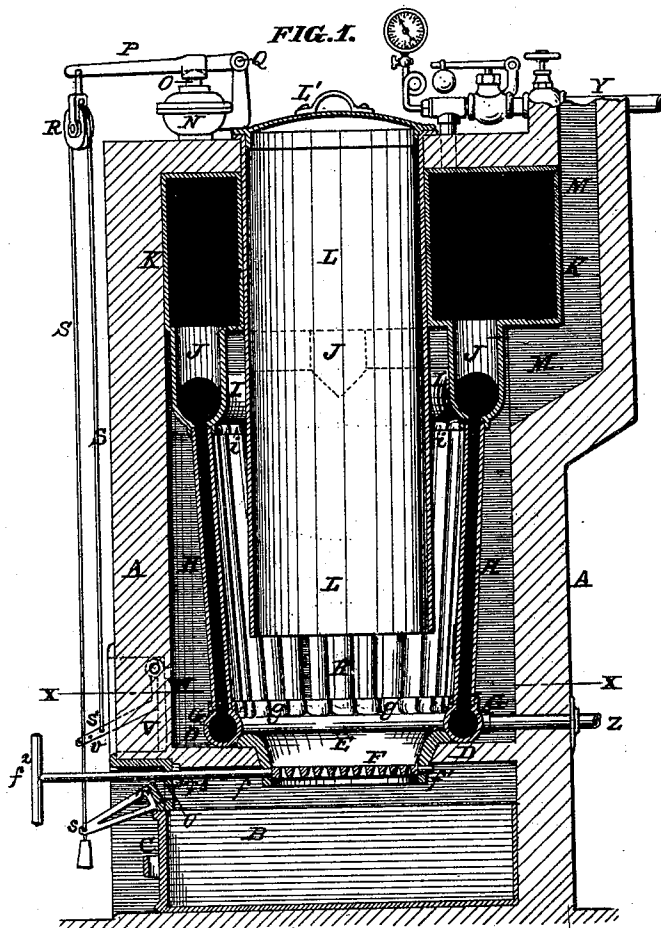
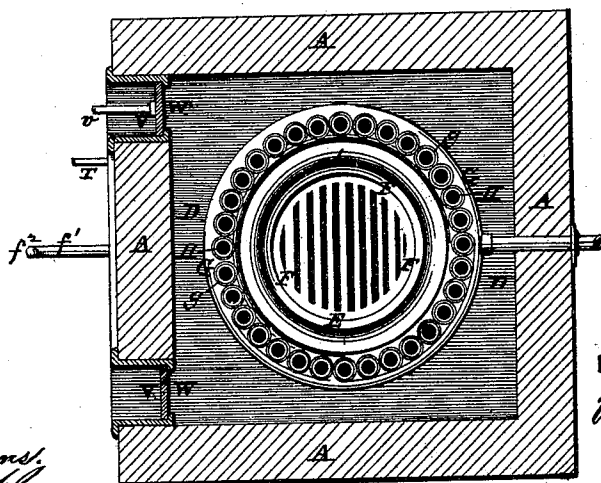


FIG. 2.



ATTEST:

Robert Burns.
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Atty.

UNITED STATES PATENT OFFICE.

WALTER S. PAYNE, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN BOILERS FOR STEAM-HEATERS.

Specification forming part of Letters Patent No. **171,844**, dated January 4, 1876; application filed December 11, 1875.

To all whom it may concern:

Be it known that I, WALTER S. PAYNE, of the city and county of St. Louis, and State of Missouri, have invented a new and useful Improvement in Boilers for Steam-Heaters, which improvement is fully set forth in the following specification, reference being had to the accompanying drawing.

My improvement consists, first, in the construction of the boiler proper; secondly, in the combination of such boiler and a base-burning fuel-trunk; and, thirdly, in a device for regulating the fire by the steam-pressure.

The boiler consists of an upper and a lower annular tube, connected by upright tubes, and the upper one of these circular tubes is connected to a water-reservoir above, whose upper part forms the steam-chamber. The water and steam chamber has a central orifice, in which is supported the fuel trunk or cylinder, whose lower end is elevated the proper distance above the fire-grate to constitute an ordinary base-burning arrangement.

At the top of the steam-chamber is a steam-vessel, divided horizontally into two chambers by a flexible spring-diaphragm, upon whose center rests a piston-rod connected to a lever, whose outer end carries a pulley, with a cord passing over it. The ends of the cord are fastened, respectively, to the dampers of apertures communicating between the outer air and the ash-pit and fire-chamber, respectively; the arrangement being such that a pressure of steam above that desired first closes the ash-pit damper, and shuts off the supply of air beneath the grate, and a further increase of pressure opens the fire-chamber dampers, admitting cold air into the fire-chamber above the fire.

Figure 1 is an axial fore-and-aft section. Fig. 2 is a horizontal section at *xx*, Fig. 1.

A shows the furnace-casing. B is the ash-pit; C, the ash-pit door. D is the hearth. E is the fire-pot, and F is the circular fire-grate, supported upon pivots *f f'* in the pot. One of the pivots is extended outside the casing, and ends in a cross-bar, *f*², to give means for tilting or shaking the grate, which has, besides its tilting movement, a capacity for horizontal oscillation as it is shaken, by movement of the hand-rod *f*¹, from side to side. To allow

this movement of the grate and rod the latter passes through a horizontal slot in the case A, which slot is closed by a sliding plate, *f*³, through which the rod passes. G is the lower ring-tube of the boiler, resting upon the hearth outside the fire-pot. The ring *g* is cast with sockets *g*, for the reception of the lower ends of the upright pipes H, connected at the upper ends by similar sockets *i* with the upper ring-tube I. This latter tube has vertical branches J leading upward to the water-reservoir and steam-chamber K. In the central part of the reservoir K is a vertical circular opening, through which passes the fuel cylinder or trunk L, provided with a cover, *L'*. The fuel-cylinder extends the proper distance downward, to leave space for the fire at its lower end.

Supposing the duty required of the boiler to be light, the bottom of the cylinder L would be made to extend low down in the boiler, leaving small height of fire-space between it and the grate; but supposing the duty to be large, a greater height of fire-space would be required.

This adjustment of fire-space would usually be made by casting the cylinder longer or shorter, as might be required; but the cylinder L may be made adjustable vertically, to accomplish the above object.

M is the chimney. At top of the water and steam chamber K is a steam vessel or cylinder, N, containing a piston or a flexible spring-diaphragm, upon which the piston-rod O rests, the arrangement being such that the piston-rod O is raised by the steam pressing beneath the diaphragm or piston.

When a piston is used in place of a spring-diaphragm, a spring would be required to check the ascent of the piston-rod, so that its ascent would be proportionate to the steam-pressure. The piston-rod rises against the under side of a lever, P, fulcrumed at Q. The moving end of the lever P carries a pulley, R, over which passes a cord or chain, S. One end, *s*, of this chain is attached to the arm *t* of the hinged damper T, which, when raised, closes the air-opening U, leading into the ash-pit. The other end, *s'*, of the cord is attached to the arm *v* of the damper V, that closes the air-opening W when it is down. The open-

ing W leads into the fire-chamber above the hearth.

The arrangement is such that the upward movement of the lever P first closes the damper T, so as to check the fire by shutting off its supply of air beneath, and a further rise of the lever will open the damper V to cool the fire-chamber.

There may be two or more of each class of dampers T and V so connected together as to be operated by the same chain S or S', respectively. The lever P is not a necessary part of the device, as the pulley R may be attached directly to the piston O.

I have shown my preferred arrangement, in which I use a lever, P, to get an increased movement of the pulley, and to locate it in a suitable position over the damper-arms.

Y is the steam-pipe leading to the steam-

heaters in the building, and Z is the return-pipe, through which the water of condensation returns to the boiler. The pipe Y or the reservoir K may have a safety-valve.

I claim as my invention—

1. The boiler composed of a lower and an upper annular tube, G and I, with connecting-pipes H, steam and water chamber K, and connecting-pipes J, substantially as set forth.

2. The combination of boiler G H I J K and fuel-cylinder L, substantially as set forth.

3. The combination of piston-rod O, rising with the steam-pressure, pulley R, cord or chain S, and dampers T and V, operating substantially as set forth.

WALTER S. PAYNE.

Witnesses:

SAML. KNIGHT,
H. HUTCHINS.