E. HUBER.

Feed-Water Heaters.

No. 212,936 Patented Mar. 4, 1879.

Fig. 1.

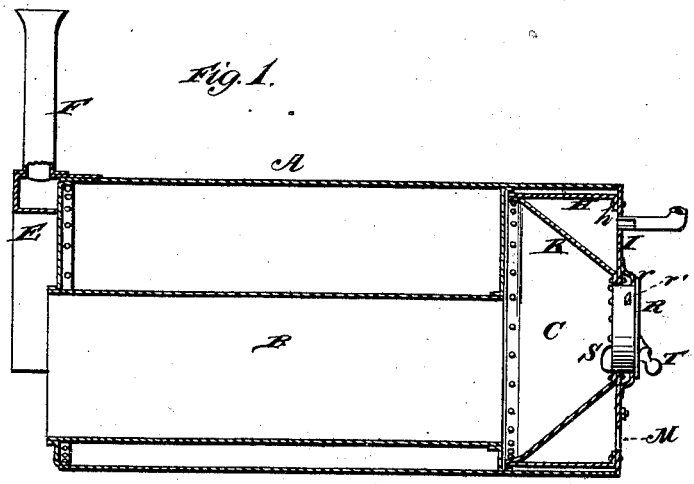


Fig. 2.

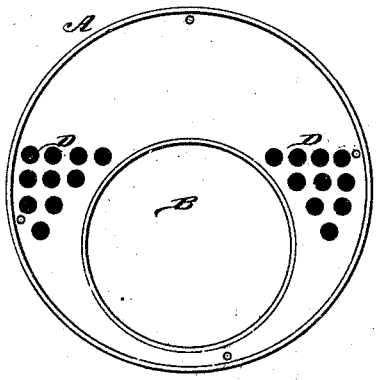


Fig. 3.

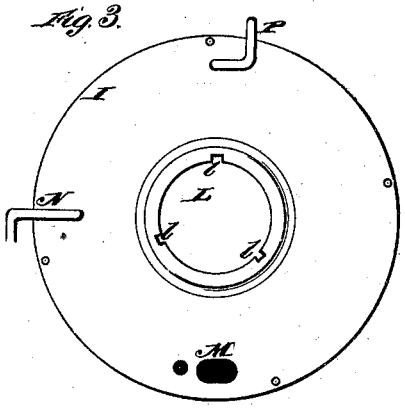
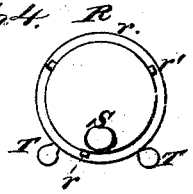


Fig. 4.



WITNESSES

Robt Everett.

H. Clay Smith

INVENTOR.

Edward Huber.

By Johnson, Smith & Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

EDWARD HUBER, OF MARION, OHIO.

IMPROVEMENT IN FEED-WATER HEATERS.

Specification forming part of Letters Patent No. **212,936**, dated March 4, 1879; application filed December 21, 1878.

To all whom it may concern:

Be it known that I, EDWARD HUBER, of Marion, in the county of Marion and State of Ohio, have invented a new and valuable Improvement in Feed-Water Heaters; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a longitudinal section of a steam-boiler, showing my device attached. Fig. 2 is a front view of the steam-boiler. Fig. 3 is a view showing the cover removed, and Fig. 4 is a detail view.

This invention relates to certain improvements in steam-boilers; and it has for its object, first, to furnish a feed-water heater for the same which shall possess the requisite strength without the use of the stay-bolts ordinarily employed, and which will be compact in construction, and can be secured in a boiler of ordinary description, without materially altering the same, in such position as to utilize the heat, or a greater portion of the same, which is usually absorbed by the walls of the smoke-box and wasted; and, secondly, to provide an automatically-operating door for closing the opening at the front of the smoke-box.

To these ends my invention consists, first, in a feed-water heater constructed of boiler-iron, and consisting of a cylinder of suitable length and diameter to fit snugly in the smoke-box of the boiler, inwardly flanged at its forward end and bolted to the head of the smoke-box, said cylinder having bolted to its rear end and extending into the same a frustum-shaped interior shell, which is also bolted to the head of the smoke-box at the aperture through the same, said head being provided with a properly-closed hand-hole, and with a pipe leading from the water-supply to the interior of the heater, and also with a pipe leading from the interior of said heater to the boiler, as and for the purposes more fully hereinafter specified; and, second, in the combination, with the head of the smoke-box, of a circular door, provided with lugs and adapted to sit in the aperture in the smoke-box, the aperture, at its edge, being provided with a series of slots, corresponding in number to the lugs on the door, to admit the same, the door being heavily weighted at its lower side, whereby it will be caused by gravitation to assume its proper position and become locked in the aperture when placed therein, as more fully hereinafter specified.

The letter A represents an ordinary horizontal cylindrical boiler, and B a flue extending longitudinally through the same, and terminating in the smoke-box C at the front of the boiler. The letter D represents a series of return-flues passing longitudinally through the boiler at each side of the flue B, extending backward from the smoke-box C, and terminating in a curved chamber, E, at the furnace end of the boiler, the smoke-stack F extending upwardly from said chamber. The fire-box of the furnace is located in the end of the flue B.

The letter H represents a cylindrical shell, of boiler-iron, which forms the outer wall of the feed-water heater, and which has an internal flange, *h*, at its forward end, which is bolted to the head I of the smoke-box. Said shell is of such diameter and length as to fit snugly in the smoke-box.

The letter K represents a frustum-shaped shell, of boiler-iron, extending inwardly into the shell H, and bolted to said shell at its rear end, and to the head of the smoke-box at the aperture L in the same. The said shell K forms the interior wall of the feed-water heater, which is thus constructed with an annular water-space which is angular in cross-section.

The letter M represents a hand-hole, extending through the head of the smoke-box into the feed-water heater, which may be closed by a screw of ordinary construction.

The letter N represents a pipe leading from the water-supply into the feed-water heater, passing into the same through the head of the smoke-box, and entering about midway between the top and bottom of said feed-water heater.

The letter P represents a pipe extending through the upper part of the head of the smoke-box into the feed-water heater, and communicating with the boiler at any desired point.

The letter R represents a circular door, pro-

vided with a flange, *r*, at its edge, and with a series of lugs, *r'*. Said door is also provided with a heavy weight, S, at its lower edge, the object of which will be presently explained, and with handles T, by which it may be manipulated.

The aperture L is provided with a series of slots, *l*, at its edge, corresponding in number with the lugs on the door, and the door is of such diameter as to fit snugly in the aperture, the flange preventing it from entering too far, and the slots *l* serving to admit the lugs, the weight automatically causing the door to assume a locked position.

The operation of my invention will be readily understood in connection with the above description. The products of combustion pass forward from the furnace through the large flue into the smoke-box, abutting directly against the interior wall of the feed-water heater, the heat usually absorbed by the head of the smoke-stack being absorbed by the feed-water in the heater and thus utilized. The inclined internal wall of the feed-water heater deflects the products of combustion directly back to the return-flues at each side of the large flue, and from thence they pass out through the chamber into the smoke-stack.

The hand-hole leading into the feed-water heater provides for removing sediment and accumulations, which all collect in the heater and do not pass to the boiler.

What I claim as new, and desire to secure by Letters Patent, is—

1. A feed-water heater consisting of a cylindrical external shell and frustum-shaped interior shell, bolted together and to the head of the smoke-box, the said head being provided with a hand-hole, and with pipes leading from the water-supply to the heater and from the heater to the boiler, substantially as specified.

2. In combination with the aperture in the head of the smoke-box, having slots, as described, a rotary door provided with lugs and weighted at its lower side, whereby said door is caused to automatically assume a locked position when placed in said aperture, substantially as specified.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

EDWARD HUBER.

Witnesses:
JOHN F. MCNEAL,
JOHN A. WOLFORD.