J. ECKERSLEY.

FEED-WATER HEATER.

No. 190,567. Patented May 8, 1877.

Fig. 1

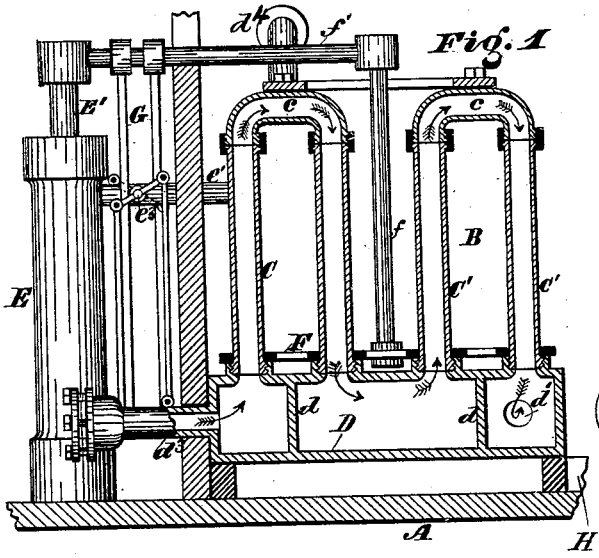


Fig. 2

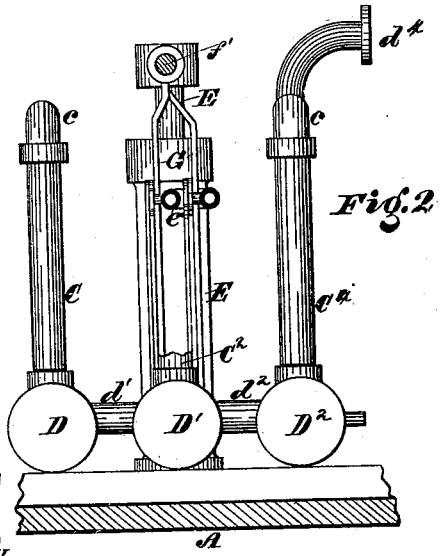


Fig. 3

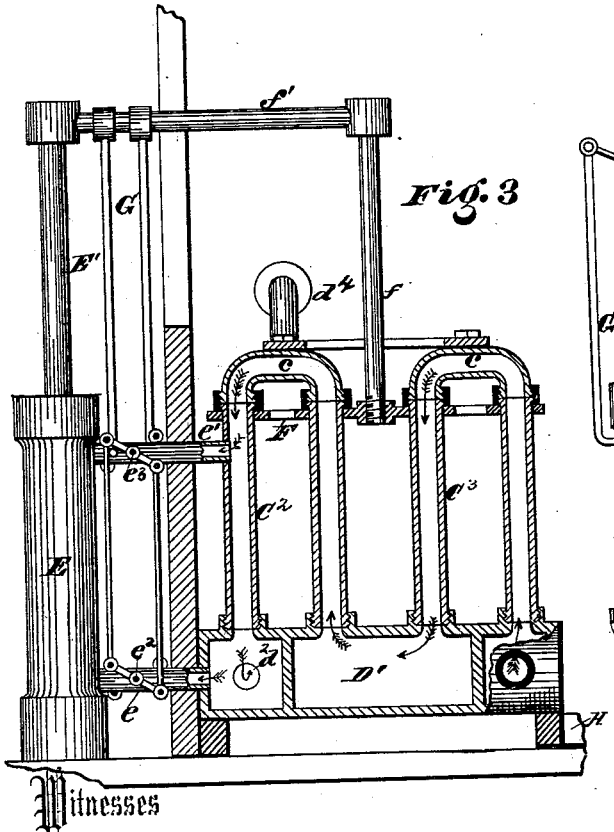
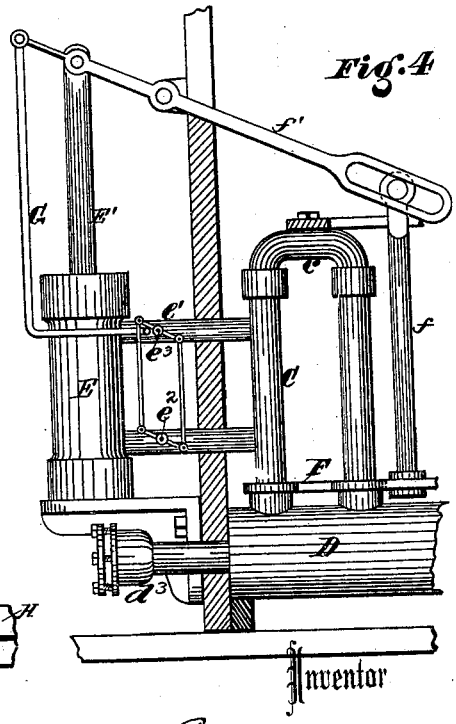


Fig. 4



Witnesses

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UNITED STATES PATENT OFFICE.

JAMES ECKERSLEY, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN FEED-WATER HEATERS.

Specification forming part of Letters Patent No. **190,567**, dated May 8, 1877; application filed February 27, 1877.

To all whom it may concern:

Be it known that I, JAMES ECKERSLEY, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Feed-Water Heaters for Steam-Boilers; and I do hereby 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 it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figures 1 and 3 are longitudinal vertical sections; Fig. 2, an end elevation; Fig. 4, side elevation of modification.

The primary object of my invention is to provide a feed-water heater having a perfect circulation, and so constructed that the sediment will be caused to settle in bases, from which it may be blown off from time to time.

My improvements consist, therefore, in the peculiar construction of the feed-water heater, as hereinafter described and claimed.

Referring to the accompanying drawing, A designates the furnace-floor, over which is to be placed the boiler. B shows the chimney or flue, through which are carried off the waste products of combustion. C C^1 C^2, &c., are feed-water pipes, connected with or springing from transverse cylinders D D^1 D^2, said pipes and cylinders constituting the feed-water heater, and being located in the chimney or flue, so as to receive the full effect of the waste heat from the furnace. Each of the cylinders D D^1 D^2 is divided into separate chambers by transverse diaphragms *d d*. The pipes C C^1, &c., are united in pairs by short curved pipes or couplings *c c*, each pair of said pipes thus forming an inverted **U**, the legs thereof being on opposite sides of the diaphragms *d*. The cylinders D D^1 D^2 are united with one another by branches or communicating pipes d^1 $d.^2$

The effect of this construction and arrangement is, that water introduced at d^3 (the feed end) will pass, as indicated by arrows, up one leg of the pipe C, and down the other, on the opposite side of the diaphragm *d*, and into another chamber of the cylinder D. Thence it passes, in like manner, up and down the pipes C^1 C^1, and so on through each of the pipes which spring from the cylinder D. From this latter it passes through the connecting-pipe d^1 into the cylinder D^1, and having, in the same manner, circulated through the latter, and through the pipes C^2 C^3, springing therefrom, it proceeds through the branch d^2 to the cylinder D^2. The circulation continues through this latter cylinder and its pipes C^4 C^5 until the outlet or connection with the boiler d^4 is reached.

The sediment in the water, as the latter circulates, will be deposited in the bases D D^1 D^2, whence it may be removed by blow-off pipes introduced at any proper point. I do not restrict myself to any precise location of these blow-off pipes, but would suggest that one may be used for each cylinder D, and be placed at the end of said cylinder opposite to that where the water enters the latter, so that the blow-off current will proceed in the reverse direction to that in which the water circulates.

The boiler feed-pipe d^4 communicates with the heater at the upper part of the latter, so as to avoid the withdrawal of sediment accumulating in the bottom of the heater.

H represents a side flue, through which the products of combination are caused to pass, whenever it is desired to obtain access to the feed-water pipes for repairs or other like causes. Usually this passage is closed by a damper.

The accompanying drawings illustrate certain devices for cleaning the heater, which I do not claim in this application, but reserve the right to make them the subject of a separate application.

What I claim as my invention is—

The combination, with the feed-water heater herein described, composed of the bases or cylinders D D^1, &c., and pipes C C^1, &c., said bases having transverse diaphragms *d d*, and connecting branches d^1 d^2, and the pipes C C^4, &c., being united in pairs, having their legs arranged with reference to the diaphragms *d d*, of the boiler feed-pipe d^4, communicating with the upper part of the heater, substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 23d day of February, 1877.

JAMES ECKERSLEY.

Witnesses:

M. DANL. CONNOLLY,

CHARLES F. VAN HORN.