ROBERT BERRYMAN.

Improvement in Feed Water Heaters for Steam Boilers.

No. 125,526. Patented April 9, 1872.

FIG. 1.

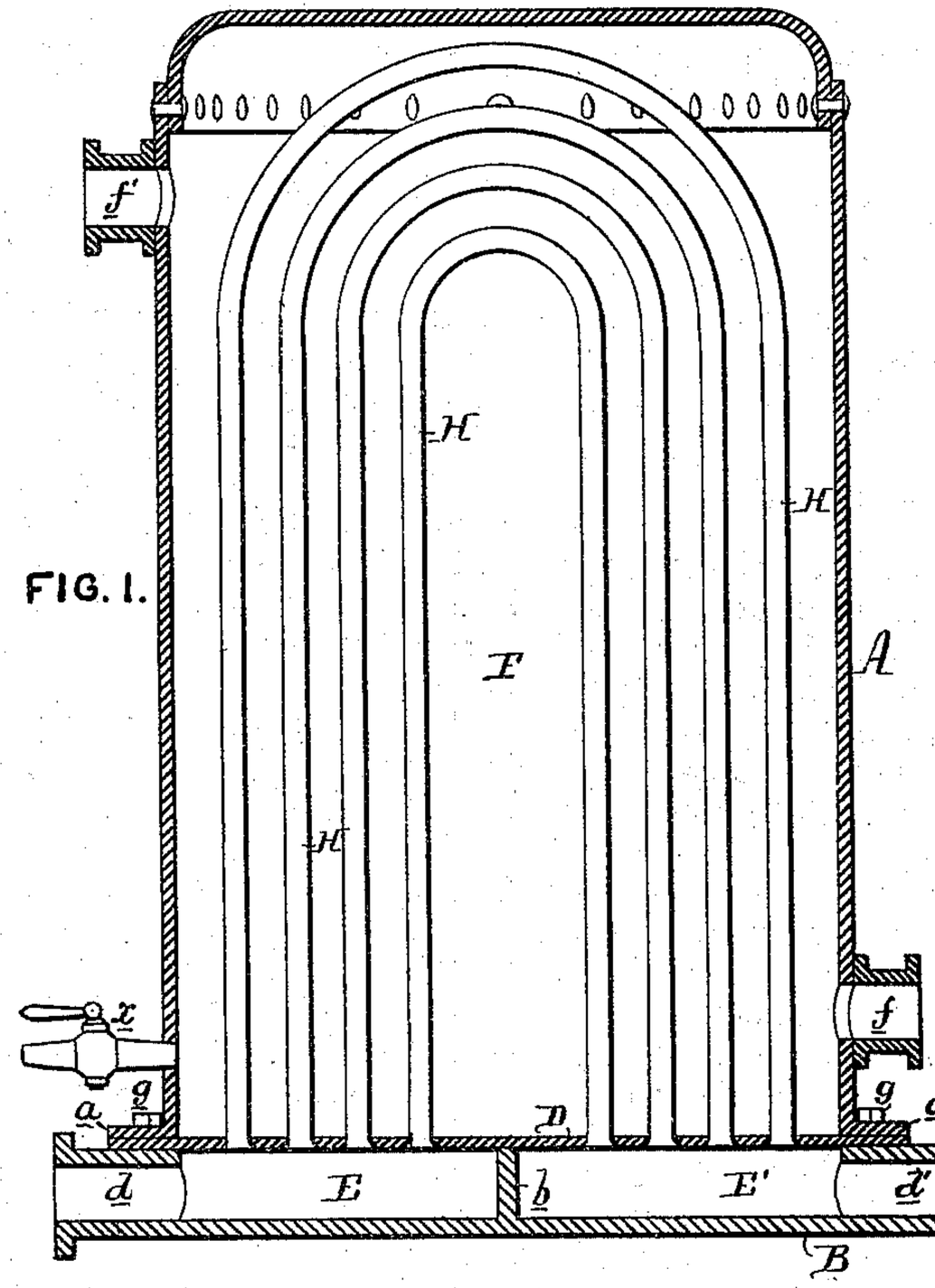


FIG. 3.

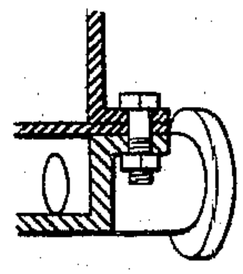
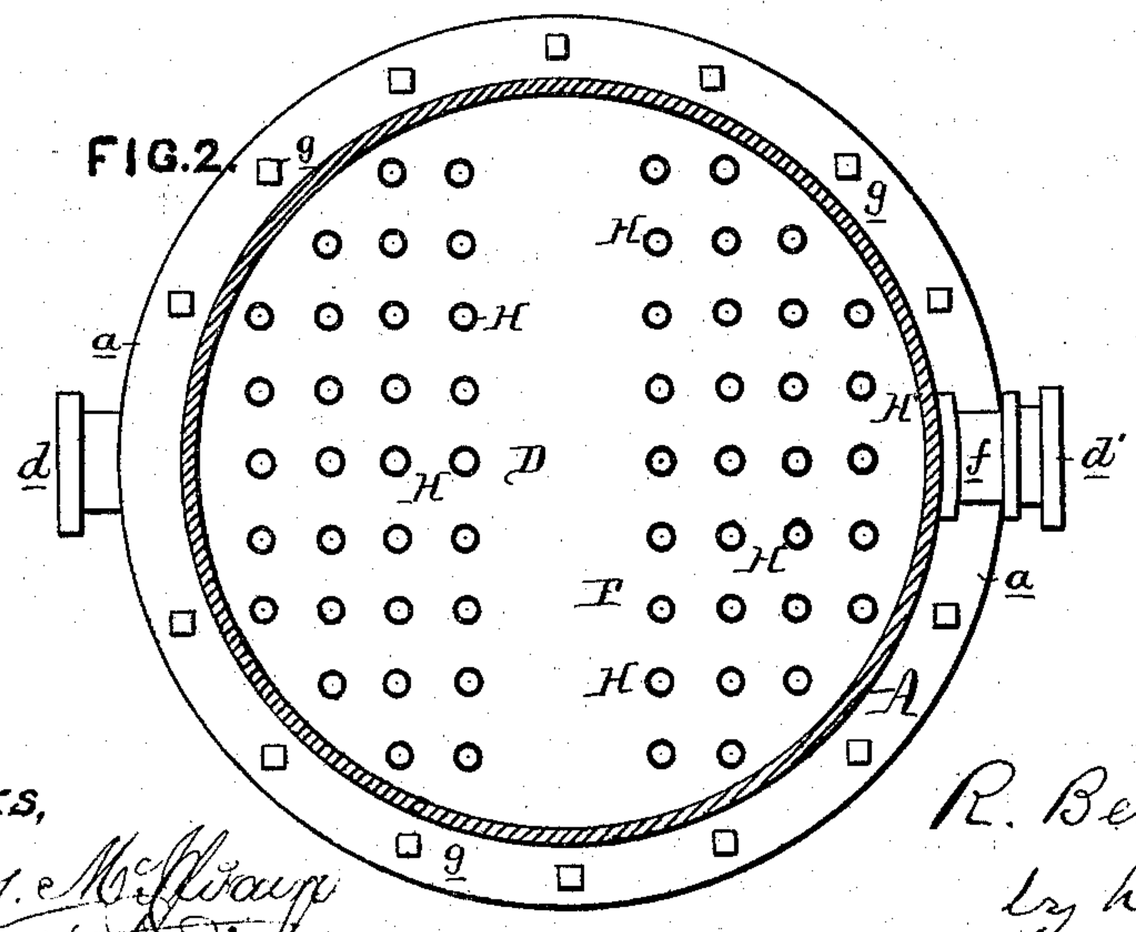


FIG. 2.



WITNESSES,

Thos. e McElwaye

Harry Smith

R. Berryman

by his Attys

Howson and Son

UNITED STATES PATENT OFFICE.

ROBERT BERRYMAN, OF HARTFORD, CONNECTICUT, ASSIGNOR TO BERRYMAN MANUFACTURING COMPANY, OF SAME PLACE.

IMPROVEMENT IN FEED-WATER HEATERS FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. 125,526, dated April 9, 1872.

Specification describing an Improved Water-Heater, invented by ROBERT BERRYMAN, of Hartford, county of Hartford and State of Connecticut.

Improved Water-Heater.

My invention consists of a water-heater, too fully explained hereafter to need preliminary description, and designed for the purpose of heating feed water for steam-boilers by means of exhaust steam, although it is applicable to the heating of water for other purposes.

In the accompanying drawing, Figure 1 is a longitudinal section of my improved water-heater. Fig. 2 is a transverse section on the line 1 2, Fig. 1; and Fig. 3 a detached view of part of the heating apparatus.

A represents a cylindrical steam-tight casing of cast or wrought iron, closed at the top and having a flange, *a*, at the bottom, to which is bolted a base, B, a tube-plate, D, intervening between the said base and the flange of the casing, and the joints being suitably packed to prevent leakage. The space between the base B and tube-plate is divided by a transverse partition, *b*, into two chambers, E and E′, with which communicate two branch pipes, *d* and *d′*, one for the admittance, and the other for the discharge of exhaust steam. The whole interior F of the casing constitutes a water-chamber, there being two branches, *f* and *f′*, for the admission of cold and discharge of heated water. Any suitable number of bent tubes, H, are arranged within the water-chamber in the manner plainly shown in the drawing, one end of each tube being secured to the plate D at one side of the partition *b*, and the other end at the opposite side of the partition, so that all the tubes may communicate with both of the chambers E and E′. These circulating tubes are secured to the plate D by swaging, in the same manner as the tubes of a locomotive or other tubular boiler, and are entirely disconnected from other portions of the apparatus, the whole of the said tubes being thus permitted to contract and expand freely, and are, therefore, not liable to leak at the joints. The whole of the tubes, together with the plate D, can, moreover, be removed bodily from the apparatus for purposes of cleaning or repairing, after simply withdrawing the bolts *q*, Fig. 3. By the use of a plate, D, and tubes connected at both ends to the said plate, the simple removal or unbolting of the casing A from the plate will serve to expose all the tubes, so that access may be had to any one or more for repairs, &c., while in heaters where the tubes are connected at opposite ends to different plates such a result is impossible.

The apparatus, although applicable to the heating of water for a variety of purposes, is intended especially as a feed-water heater for steam-boilers, and its operation is as follows: The water-chamber F having been filled from the branch *f*, exhaust steam is passed into the chamber E through the branch *d*, whence it will circulate through the tubes H into the chamber E′, and be finally discharged through the branch *d′*. The water in the chamber F will become quickly and thoroughly heated by contact with the tubes, of which there may be any number, and may be drawn off as required for use through the branch *f′*.

The apparatus should be made of such capacity that the water shall remain in the same a sufficient length of time, not only to become thoroughly heated, but to precipitate a great portion of its impurities, which, after having accumulated upon the bottom of a heater, can be blown off through a cock, *x*, arranged at the side of the casing for that purpose.

The water in my apparatus being free from direct contact with the steam, connot become impregnated with acidulated tallow, with which the exhaust steam from an engine is frequently charged, and which, if constantly introduced into a boiler with the feed water, is apt to injure or cause the burning out of the plates.

Although I have shown the apparatus in the drawing in a vertical position, it will operate if placed at an angle or horizontally.

I am aware that bent tubes have been connected at both ends to plates in condensers, radiators, and other apparatus, and I do not claim this, broadly; but

I claim—

The feed-water heater in which are combined the chambers E E′, bent tubes H, con-

nected to a plate, D, and each communicating with both chambers, and a steam-tight casing, A, inclosing said tubes and adapted to be connected with a water-reservoir and with the feed-water apparatus of a steam-boiler, all as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT BERRYMAN.

Witnesses:
WM. A. STEEL,
JOHN K. RUPERTUS.