R. BERRYMAN.

Improvement in Feed-Water Heaters.

No. 132,518. Patented Oct. 29, 1872.

Fig. 1.

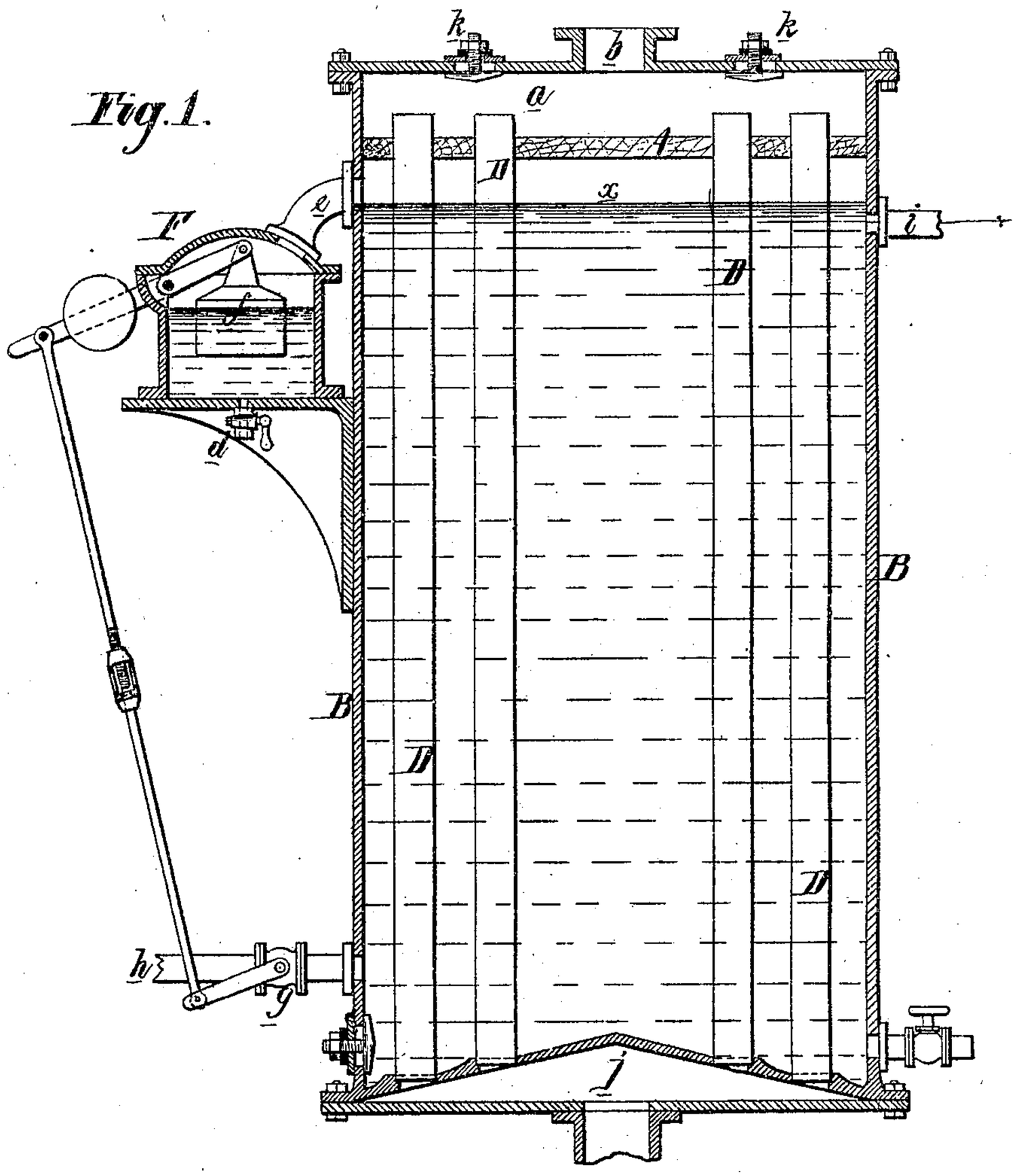
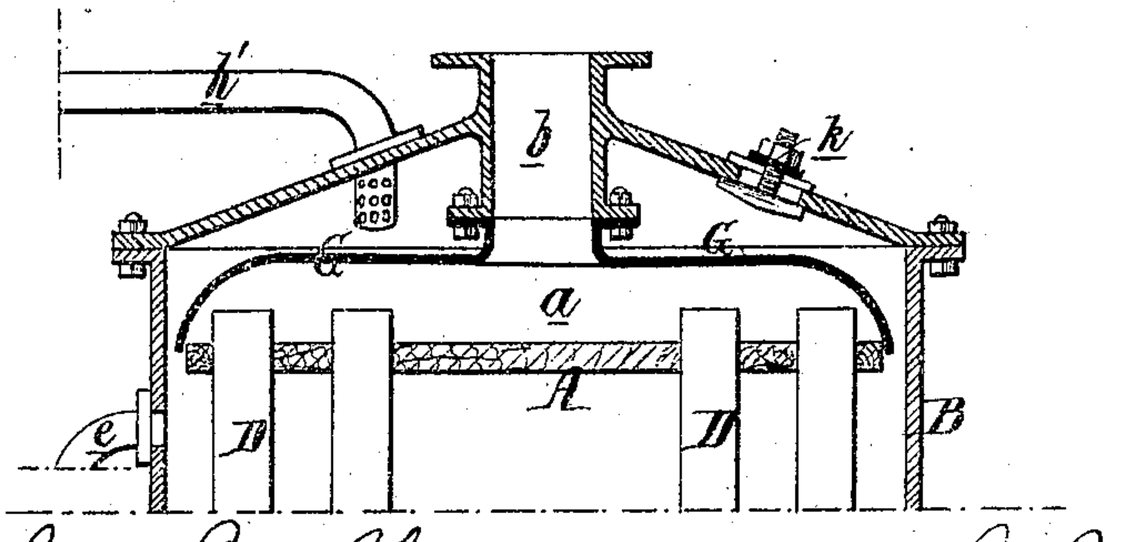


Fig. 2.



Witnesses.

Thomas McElwain

Harry Smith

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By his Attys.
Howson and Sons.

UNITED STATES PATENT OFFICE.

ROBERT BERRYMAN, OF HARTFORD, CONNECTICUT.

IMPROVEMENT IN FEED-WATER HEATERS.

Specification forming part of Letters Patent No. **132,518**, dated October 29, 1872.

To all whom it may concern:

Be it known that I, ROBERT BERRYMAN, of Hartford, county of Hartford, State of Connecticut, have invented an Improved Water-Heater, of which the following is a specification:

The object of my invention is, first, to prevent contact of boiler feed-water with exhaust steam used for heating the same, and consequent charging of the said water with grease and other impurities carried off by the exhaust steam from the engine in what are known as open-tube feed-water heaters; and the second object of my invention is to maintain the feed-water at a nearly uniform level in the heater in order to prevent it from rising above and flowing into the open ends of the exhaust-steam tubes.

The first of these objects I attain by the use of a plate, A, Fig. 1, fitted into the casing B of the heater at a short distance above the proper water-level *x*, and maintained in such position by the tubes D, which pass through holes in the said plate and terminate at a short distance above the same. The exhaust steam from the open upper ends of the tubes passes into the space *a* above the plate, and thence to the outlet *b*, the said plate preventing the steam from being brought into direct contact with the water and receiving upon its surface the grease and other impurities from the exhaust steam which would otherwise be received by the feed-water. I attain the second object of my invention (the maintaining of a uniform water-level and the prevention of any flooding of the tubes) by the use of a regulator, F, Fig. 1, having a discharge-opening, *d*, at the bottom, which remains constantly open. This opening is of smaller area than the pipe *e*, so that when the water rises above its proper level in the heater and flows through the said pipe the regulator will be filled. This will raise the float *f* and close the valve *g* in the pipe *i*, and when, in consequence of the feeding of water to the boiler through the pipe *i*, the level descends to a point below the mouth of the pipe *e*, the regulator will be emptied through its discharge-opening *d*, which will permit the float to descend and the inlet-valve *g* to be opened in consequence. In this way the required level will be automatically maintained. In Fig. 1 the exhaust steam enters at the bottom of the apparatus, and, after circulating in a chamber, *j*, passes upward through the tubes; and the feed-water inlet-pipe *h* is arranged close to the bottom of the heater and the outlet *i* adjacent to the top of the same. In Fig 2, however, the feed-water is admitted through a pipe, *h'*, at the top of the heater, and in order to prevent the same from being brought into contact with the exhaust steam a bell or deflector, G, is used in combination with the plate A, said deflector directing the water to the edges of the plate, whence it escapes into the body of the heater, and serving, also, to heat the water thus spread out in a film as the space *a* beneath the deflector is constantly filled with exhaust steam.

The plate A is not secured to the sides of the heater, and will, therefore, yield with and accommodate itself to the movements of the tubes caused by expansion and contraction; and I prefer that the said plate should be of wood, although metal would answer the purpose.

The accumulation of grease and other impurities from the exhaust steam upon the upper surface of the plate A can be scraped off and removed, from time to time, through the hand-holes *k* in the top of the heater.

I claim as my invention—

1. The combination, substantially as described, of a plate, A, with an open-tube feed-water heater.

2. The combination, substantially as described, of the plate A and deflector G with an open-tube feed-water heater.

3. The combination of a regulator, F, having a discharge-opening at the bottom, with an open-tube feed-water heater, for the purpose specified.

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

ROBERT BERRYMAN.

Witnesses:

WM. A. STEEL,

HARRY W. DOUTY.