

(No Model.)

2 Sheets—Sheet 1.

R. LEARMONTH.  
FEED WATER HEATER.

No. 459,585.

Patented Sept. 15, 1891.

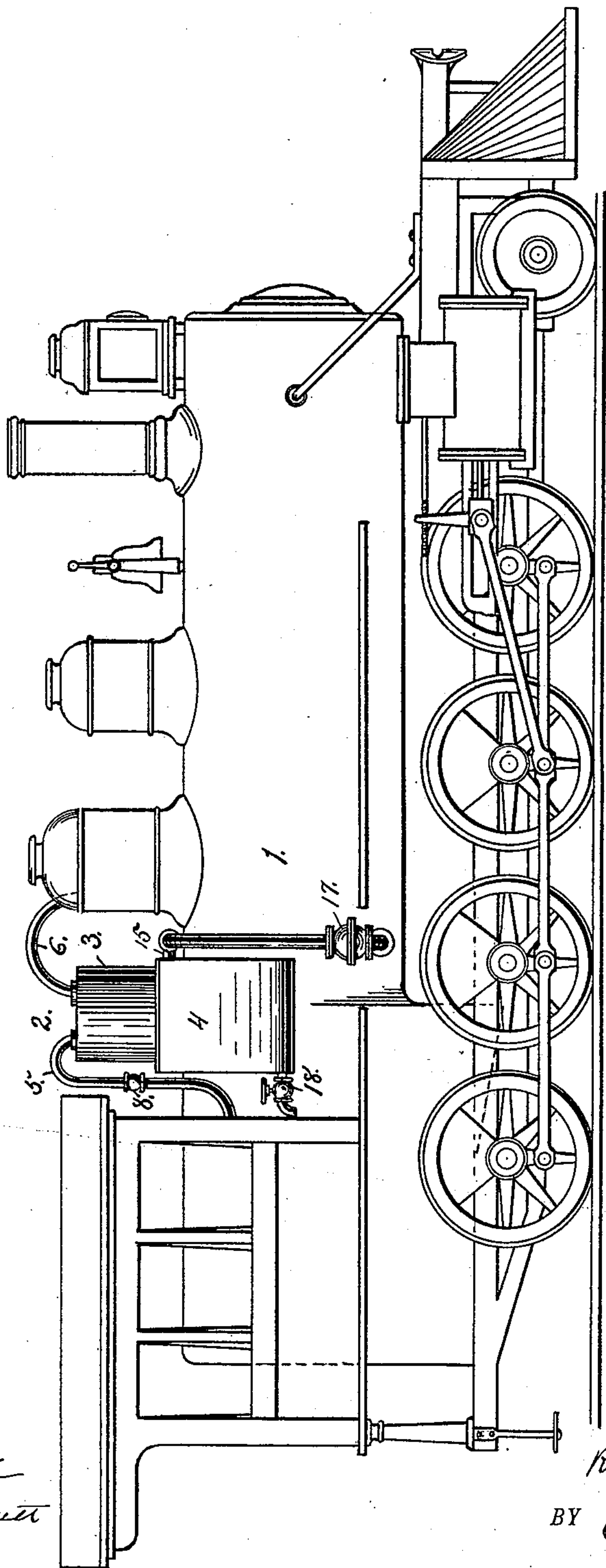


Fig. 1.

WITNESSES:

*Chas. M. Harrington*  
*George B. Bassett*

INVENTOR

*Robert Learmonth*

BY

*Otto E. Hoddick*

ATTORNEY

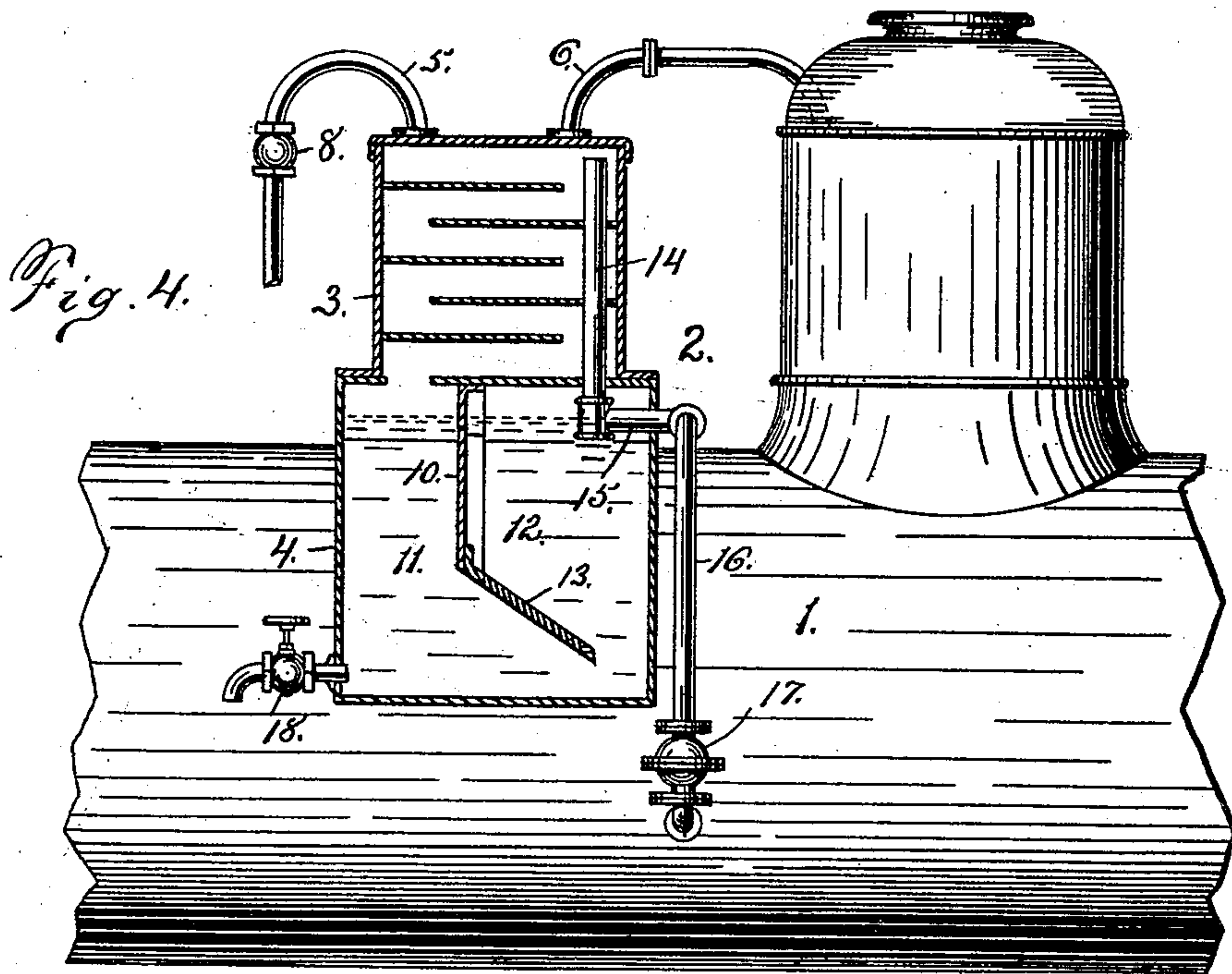
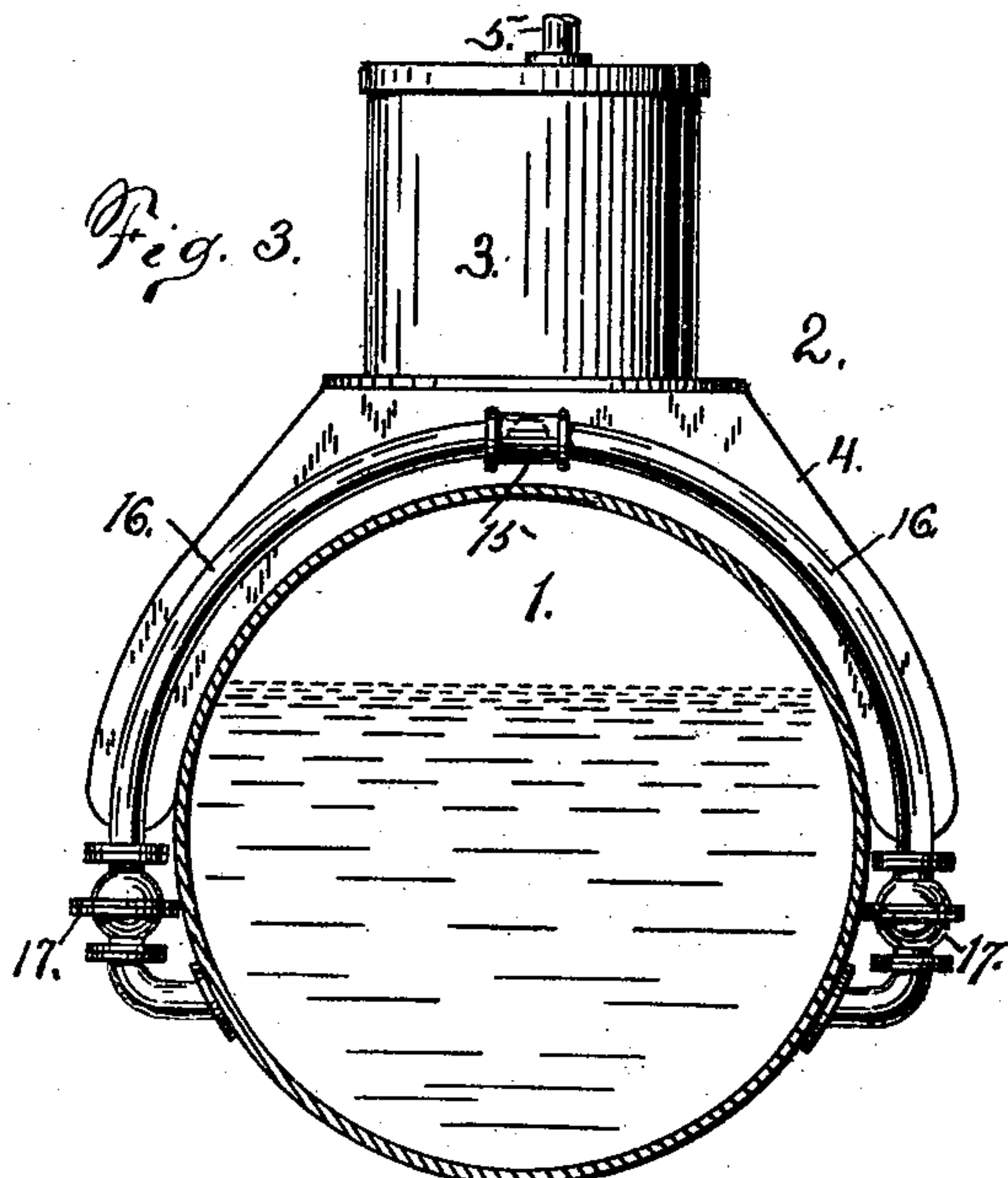
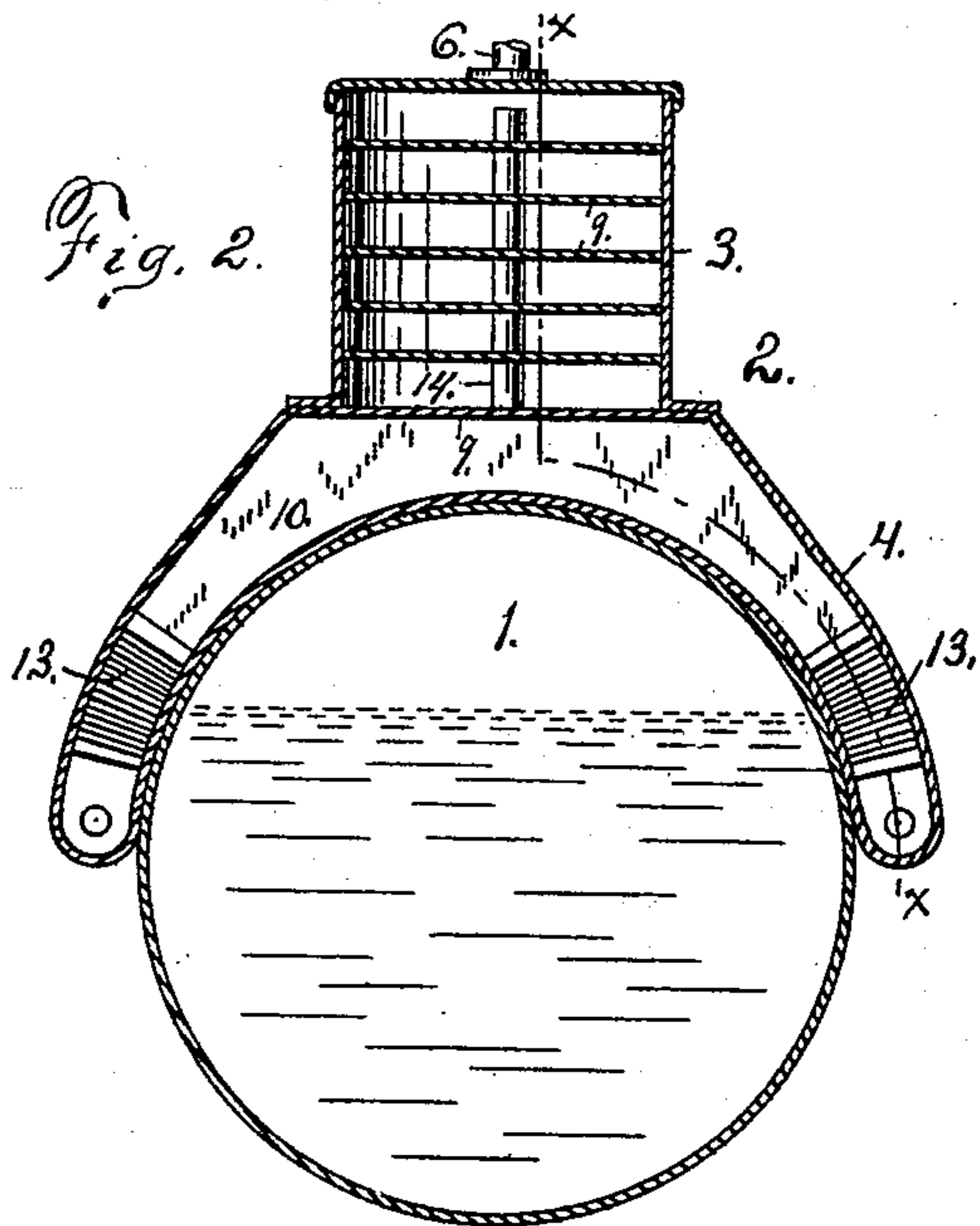
(No Model.)

2 Sheets—Sheet 2.

R. LEARMONTH.  
FEED WATER HEATER.

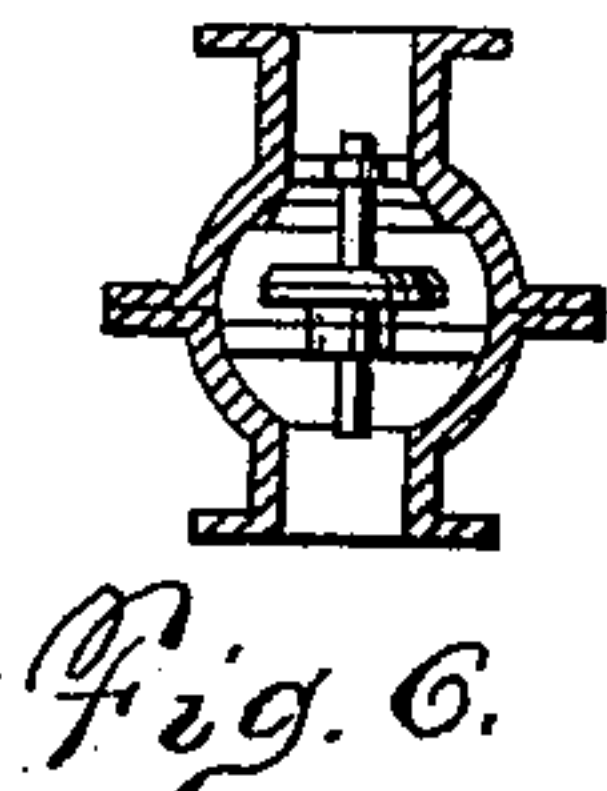
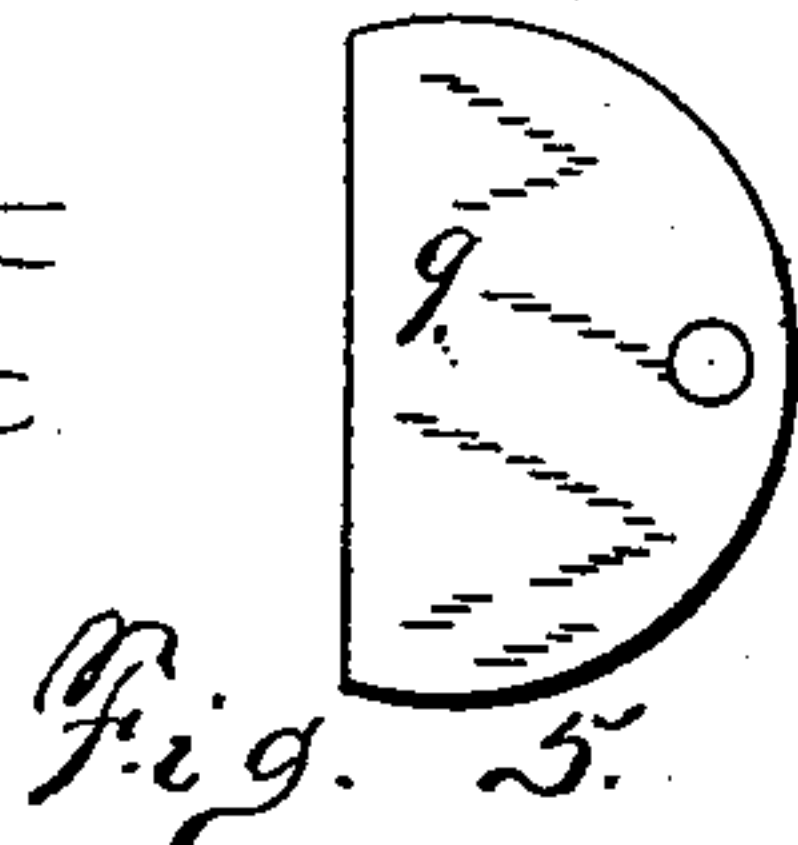
No. 459,585.

Patented Sept. 15, 1891.



WITNESSES:

Chas. W. Stawington  
George B. Bassett



INVENTOR  
Robert Learmonth  
BY Otto E. Hoddick.  
ATTORNEY



# UNITED STATES PATENT OFFICE.

ROBERT LEARMONTH, OF BUFFALO, NEW YORK.

## FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 459,585, dated September 15, 1891.

Application filed February 28, 1891. Serial No. 383,247. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT LEARMONTH, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Feed-Water Heaters and Purifiers for Locomotive-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 appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in feed-water heaters and purifiers, and more particularly to that class of feed-water heaters and purifiers employed in connection with locomotive-boilers.

Its object is to construct a feed-water heater and purifier apart from the boiler, but so arranged that it in no way obstructs the view of the engineer.

It consists of a short vertical cylinder opening into and resting upon a horizontal semi-cylindrical chamber or jacket which is fitted over and rests upon the boiler.

My invention further consists in a deflector or retaining-plate arranged within the purifier, all of which I will now proceed to definitely describe and claim.

In the drawings, Figure 1 is a side elevation of a locomotive equipped with my improvement. Fig. 2 is a cross-section of my improved feed-water heater and purifier. Fig. 3 is an end view of the same. Fig. 4 is a longitudinal section taken through the line *xx* of Fig. 2, and Figs. 5 and 6 are detail views.

Referring to the drawings, 1 is the locomotive-boiler, to which I have connected my improved feed-water heater and purifier.

2 is the body of the purifier, consisting of the chambers or compartments 3 and 4. The chamber 3 is a short vertical cylinder opening into and resting upon the compartment or jacket 4. To the upper end of the chamber 3 are connected the water-supply pipe 5 and steam-pipe 6. The water-supply pipe 5 leading from the injector is provided with a check-valve 8 to prevent the steam or supply-

water from passing back to the injector and the steam-pipe 6 being connected to the steam-dome of the boiler, as seen in Fig. 4, thus giving open communication between the feed-water heater and purifier and the live steam of the boiler.

Within the chamber 3 is arranged a series of spraying-plates 9, (a detail view of which is shown in Fig. 5,) which are so placed as to have the water pass over them successively as it enters the purifier from the pipe 5, as seen in Fig. 4. Upon leaving the last or lower disk 9 it falls into the chamber or jacket 4. This jacket 4, which forms the base of the purifier and settling-chamber for the water, is of particular configuration, so as to enable it to be placed upon the boiler 1 of the locomotive, as seen in the drawings, thus partially dividing the settling-chamber into two parts, which extend downwardly on either side of the boiler.

A dividing wall or partition 10 is arranged within the settling-chamber, dividing it into two compartments 11 and 12, and at the end of the partition 10 is secured the deflector 13. This deflecting-plate 13 (which is placed at an angle, as shown in the drawings) consists of a series of metallic bars or strips set at suitable distances apart and through which the water is made to pass in rising to its level on the opposite side of the plate 10. This deflector 13 materially assists in separating the foreign matter from the water and forms an important feature to my invention.

Arranged within the compartment 3 and projecting into the settling-chamber 4 below the water-level into the compartment 12 is the equalizing-tube 14. To this equalizing-tube 14 is connected the feed-water-supply pipe 15, which is divided after leaving the purifier into the supply-pipes 16 16, as seen in Fig. 3. These supply-pipes 16 16 lead to the bottom of the boiler and are equipped with automatic shut-off valves 17, located in close proximity to the boiler, a detail of which is shown in Fig. 6.

It will be seen that my feed-water heater and purifier, having its settling-chamber or base constructed in conformity with the upper section of the boiler, and the chamber 3 being centrally located thereon, will not obstruct the view of the engineer any more



than it would otherwise be obstructed by the steam-dome.

When it is desired to cleanse the purifier, the valves 18, located at the lower ends of the settling-chambers, are opened, thus reducing the pressure in the purifier and causing the shut-off valves 17 17 to close automatically by the increased pressure of the boiler, and the live steam passing from the dome is forced down through the purifier, striking against the upper side of the deflecting-plate, releasing all the foreign matter which may have accumulated there and carrying it out through the valves 18, together with the water and sediment in the base of the settling-chamber, as the valves 18 are closed and the pressure in the purifier being again equal to that of the boiler the shut-off valves 17 open by their own gravity.

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

1. A feed-water heater and purifier for locomotive-boilers, consisting of a chamber having open connection with the live steam of the boiler and having arranged in its upper portion a series of spraying-plates and its lower portion consisting of a settling-chamber, which is fitted over the upper section of the boiler, dividing it into two sections, and a dividing wall or partition 10, which partially subdivides each section of the settling-chamber, and having secured at the lower ends of

the partition 10 the deflectors 13, through which the water passes on its way to the boiler.

2. A feed-water heater and purifier for locomotive-boilers, consisting of the spraying-chamber 3, centrally located upon and opening into the chamber or jacket 4, said jacket having the subdivided wall 10 and deflectors 13, the equalizing-tube 14, extending from the chamber 3 to a point below the water-level in the jacket 4, the feed-supply pipe 16, having shut-off valve 17, leading from the equalizing-tube to the bottom of the boiler, the steam-supply pipe 6, and water-supply pipe 7, all arranged substantially as and for the purpose stated.

3. In a feed-water heater and purifier, a deflecting-plate consisting of a series of metallic strips or bars so arranged within a frame as to form a lattice-work through which the water is made to pass in such a manner as to deflect the sediment to the bottom of the purifier, substantially as shown and described.

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

ROBERT LEARMONTH.

Witnesses:

OTTO E. HODDICK,  
CHAS. M. HARRINGTON.