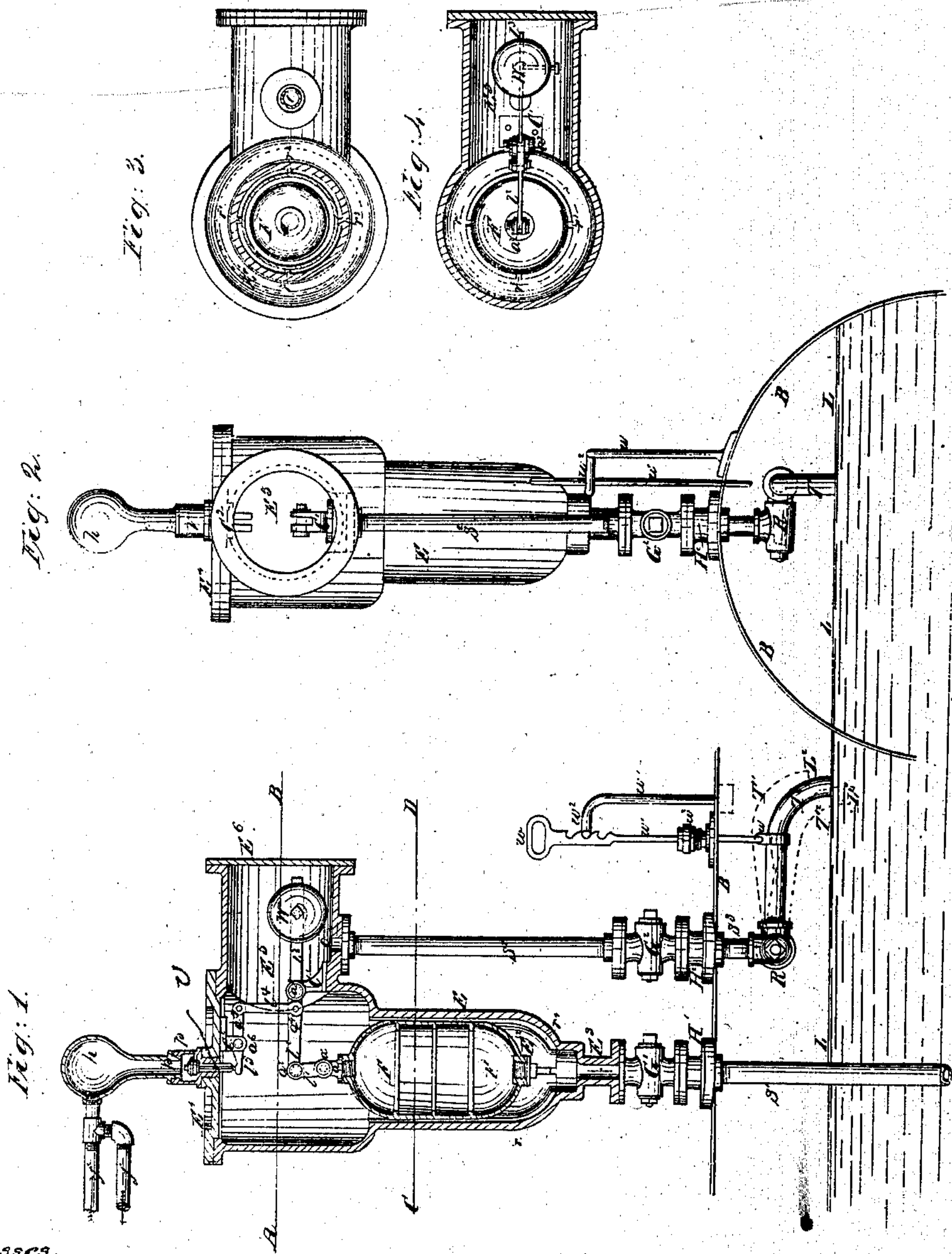


*Doughty & Olmsted,*  
*Steam-Boiler Water-Feeder,*  
*N<sup>o</sup> 62,258,                      Patented Feb. 19, 1867.*



Witnesses:  
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# United States Patent Office.

JOHN W. DOUGHTY AND B. F. OLMSTED, OF NEWBURGH, NEW YORK.

*Letters Patent No. 62,258, dated February 19, 1867.*

## IMPROVEMENT IN BOILER-FEEDERS.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that we, JOHN W. DOUGHTY and B. F. OLMSTED, of Newburgh, in the county of Orange, and in the State of New York, have invented a new and useful Improvement in Siphon Feed-Water Regulators for Steam Boilers; and we 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 drawing, making a part of this specification, in which—

Figure 1 is a vertical longitudinal section, of the whole apparatus.

Figure 2 is a front view of the same.

Figure 3 represents a cross-section and bottom view in line C D.

Figure 4 is a cross-section and top view in line A B.

B B, in figs. 1 and 2, represent the shell of a steam boiler. Two nozzles, H<sup>1</sup> and H<sup>2</sup>, are riveted to the top of the boiler for the reception of the stop-cocks G<sup>1</sup> and G<sup>2</sup> on top of them, and for tubes below on a hub projecting inside the boiler. One of these tubes, S<sup>1</sup>, is a long one, and projects down in the water to within near the bottom of the boiler; the other tube, S<sup>2</sup>, is a short one, and is connected with another tube, T, by a joint-piece, R, which is so constructed as to allow the lower end of the tube T to be lowered or raised by means of a rod, w<sup>1</sup>, which is accessible from the outside of the boiler, and which is made stationary in any position by a standard, w<sup>1</sup> w<sup>2</sup>, fastened to the boiler, as shown in figs. 1 and 2, or which motion can be brought by means of levers or ropes to the fireman's room in the front of the boiler, to make it handier yet, if required. On top of stop-cock G<sup>1</sup> is fastened a casting, E, which may be considered as a prolongation of the tube S<sup>1</sup>, but which is widened to such an extent as to allow a hollow cylindrical float, F F, of considerable capacity, to move easily a few inches up and down. This widened part, E<sup>2</sup>, has on the inside some ribs, r<sup>1</sup> r<sup>2</sup> r<sup>3</sup> r<sup>4</sup>, running vertically to guide the float in the centre and to allow sufficient space between the float and the side of the chamber E<sup>2</sup> for free passage of water, at least the same area as the area of tube S<sup>1</sup>. The upper part of E<sup>1</sup> of chamber E is made larger yet to give sufficient room for some levers and connections belonging to the apparatus; for the same reason is put on the extension-nozzle E<sup>3</sup>. The float F F is cast hollow and filled with air, the core-holes on top and bottom being stopped up air-tight by brass plugs. Ribs are cast inside to strengthen it against steam pressure from outside. In the centre of the cover E<sup>4</sup> is a small valve, v, fitted well to its seat in a brass case, V, to which is attached a small air-chamber, h, and the discharge pipe f f' of the feed-pump which is to supply the boiler with water. The valve v is to be opened from the inside of the chamber E, and is kept to its seat by the pressure of the feed-water on top of the valve. The top of the float F is connected by two links l<sup>1</sup> l<sup>2</sup> to a lever l<sup>2</sup> l<sup>3</sup>, the fulcrum of which is in the centre a<sup>3</sup>, supported by a bracket, b'. On the same arm with the float another pair of links, l<sup>4</sup> l<sup>5</sup>, are fastened to lever l<sup>2</sup> l<sup>3</sup> in a<sup>4</sup>, and connect this lever with another one, l<sup>5</sup> in a<sup>5</sup>, the one end of which, l<sup>5</sup>, is the point to lift the valve v from its seat and to let the valve come down again to its seat. This operation will be done as soon as the float F is descending in the chamber E<sup>2</sup>, or rising. The arrangement in the levers is made so that the float F, descending three inches, will raise the valve v one-half inch from its seat. A large solid ball, W, is put on the other arm of the lever l<sup>2</sup> l<sup>3</sup> to counterbalance and regulate the float F F. It can be shifted to different positions on the lever, and fastened by means of a set-screw accessible by the cover E<sup>6</sup> being taken off from the opening of the pipe E<sup>5</sup>. At the bottom of this pipe E<sup>5</sup> the second tube S<sup>2</sup> from the boiler enters the chamber E, bringing the chamber E in double connection with the boiler, establishing in this way a siphon, the one leg of which is the tube S<sup>1</sup>, and represents the long siphon leg, the other leg of which is the tube S<sup>2</sup> S<sup>3</sup>; T representing the short siphon leg.

The operation of this apparatus is as follows: Lower the movable leg T inside the boiler to the position as shown in dotted lines T<sup>2</sup>, fig. 2, that the end may come down to L provided the water in the boiler is standing at L L. The existing steam pressure in the boiler will soon fill the whole apparatus with water through the tubes S<sup>1</sup> and T. The float F F, made and regulated to have sufficient buoyancy, will rise to its highest position, as shown in fig. 1. The levers, also, will be in the same position, as shown in fig. 1; the valve v will be shut; no water can enter the boiler through the valve v, but the feed-pump, which has to supply the boiler with water, is working continually, and the feed-water is carried off by a side pipe, f', or is forced through a safety-valve, which is placed between the feed-pump and the check-valve, and brought back to the suction pipe or to the tank.



By using steam from the boiler for running an engine, or for any other purpose, the water will go down in the boiler until the level of the water reaches the point L' or the end of the tube T. At this moment steam enters the tube T and will fill the apparatus. The water, by its own weight, falls back through chamber E<sup>2</sup> E<sup>3</sup> and tube S<sup>1</sup> to the level of the water in the boiler. The float F at the same time is descending in the chamber E<sup>2</sup> with the water, pushing, by this operation, the valve v open by its connections with the valve, through which now the feed-water will be forced by the pressure from the pump into the chamber E<sup>1</sup> and pass around the float through tube S<sup>1</sup> into the boiler, until the level of the water rises high enough to bring the end of the tube T under water again and fill the apparatus with water, when the float F will rise and close the valve v. When the tube T remains stationary at a certain point the apparatus will be filled by steam or by water successively at short intervals as often as steam or water enters the tube T, the float F admitting water through the valve v as long as steam enters the tube T at the water line.

It will be seen that in this way the level of the water in the boiler can vary but very little, or it is kept at the same height by this self-regulating siphon feed-water apparatus. The water line in the boiler can be raised or lowered by only altering the position of the movable tube T.

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

1. The combination and arrangement of the float F with the leg of the siphon S<sup>1</sup> links l<sup>1</sup> l<sup>2</sup>, lever l<sup>3</sup> l<sup>4</sup>, weight W, links l<sup>5</sup> l<sup>6</sup>, lever l<sup>7</sup> and valve v with the chamber E and tube S<sup>2</sup>, substantially upon the principle and in the manner as herein set forth.
2. The arrangement of the short siphon leg T whereby to lower or raise it, substantially in the manner as herein set forth.

Witnesses:

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