

ROBERT BERRYMAN.

Improvement in Feed Water Regulators.

No. 125,527.

Patented April 9, 1872.

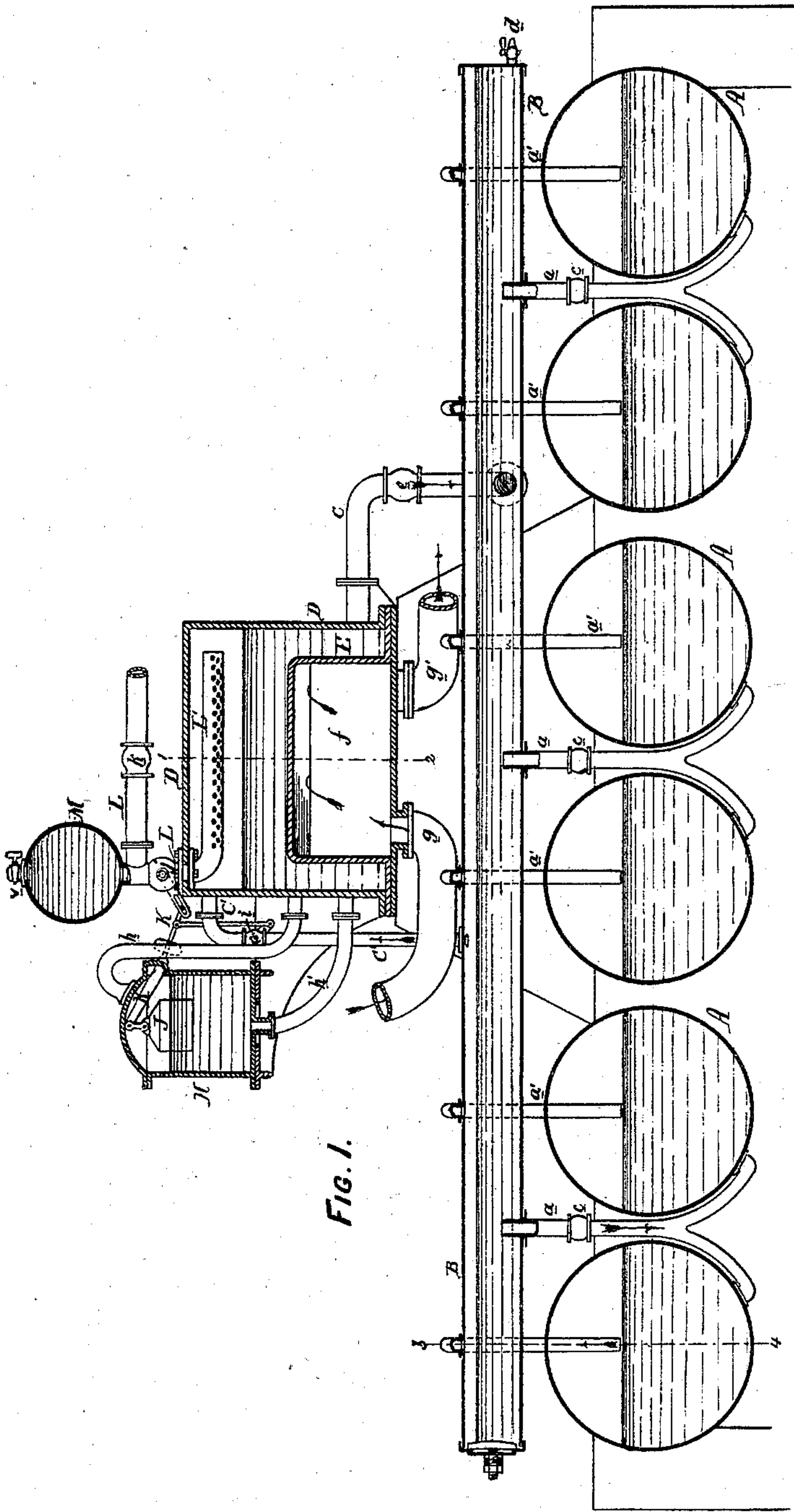


FIG. 1.

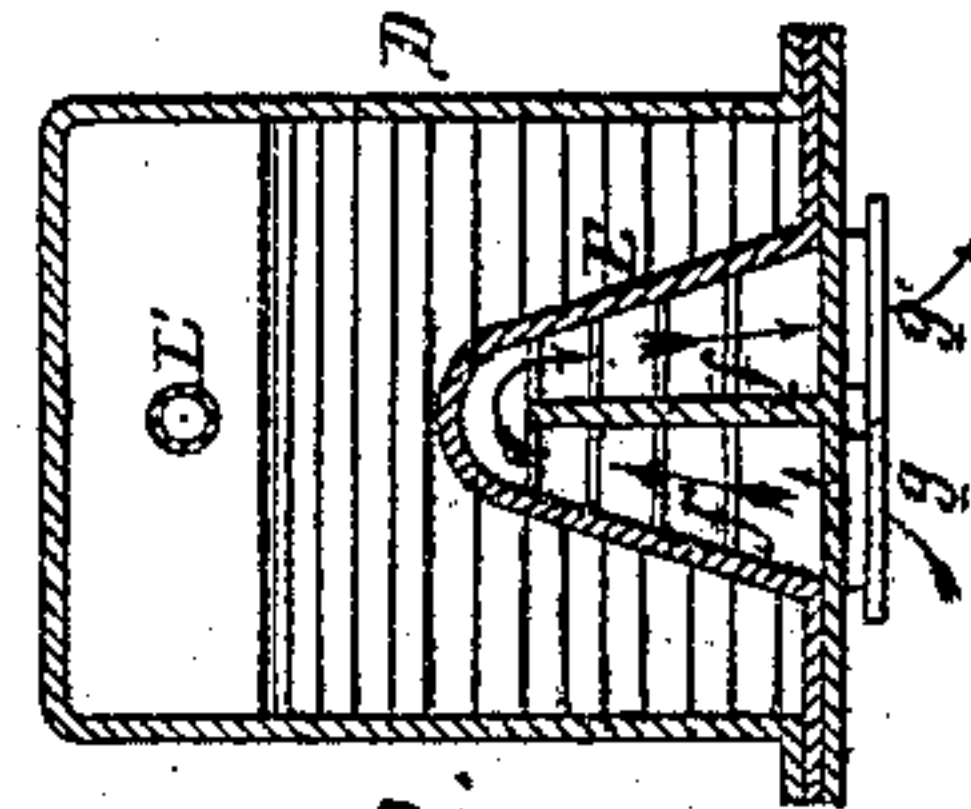


FIG. 2.

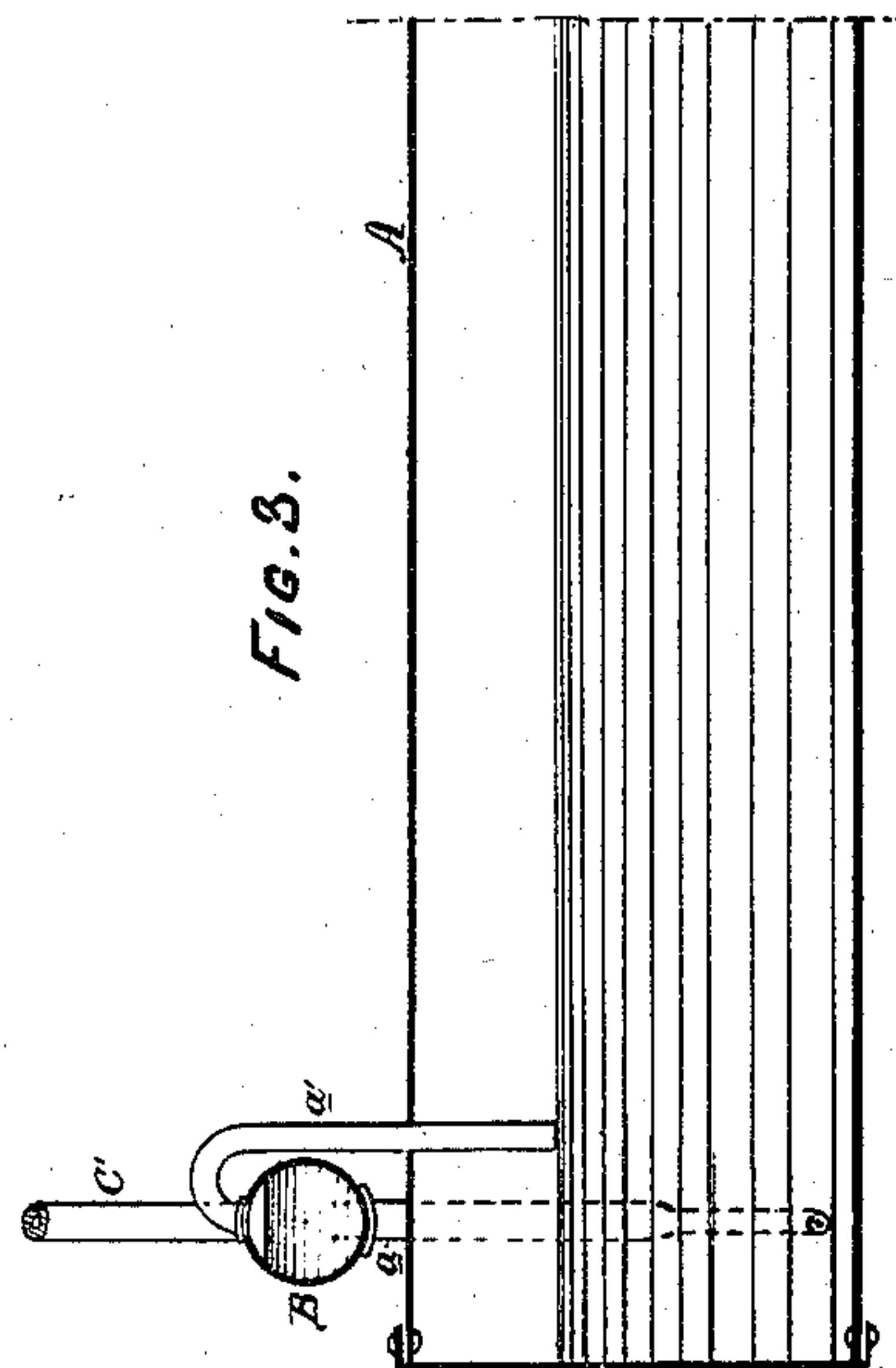


FIG. 3.

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

IMPROVEMENT IN FEED-WATER REGULATORS.

Specification forming part of Letters Patent No. 125,527, dated April 9, 1872.

SPECIFICATION.

I, ROBERT BERRYMAN, of Hartford, county of Hartford, State of Connecticut, have invented certain Improvements in Feed-Water Apparatus for Steam-Boilers, of which the following is a specification:

Nature and Object of the Invention.

My invention consists of the combination, with a series of boilers, of a tank communicating with each boiler above and below the water-line, and operating substantially as described hereafter, to maintain the water in all the boilers at a nearly uniform level. My invention further consists of the combination, with the tank, of a feeder for supplying it with hot water; and of an arrangement whereby sediment is retained within the tank.

Description of the Accompanying Drawing.

Figure 1 is a vertical sectional view of a complete feed-water heating, filtering, and regulating apparatus for steam-boilers; Fig. 2, a transverse section of a heater on the line 1 2, Fig. 1; and Fig. 3, a sectional view of one of the boilers and of part of the apparatus on the line 3 4, Fig. 1.

General Description.

A, A, A, &c., represent a series of boilers, of which there are six in the present instance. Extending transversely across the top of these boilers, adjacent to one end of the same, is a long horizontal tank or drum, B, kept constantly filled with hot water by a pipe, C, as hereafter described, and communicating with the interior of each boiler through two pipes, *a* and *a'*. Each of the pipes *a* extends from the bottom of the tank B to the point at which it is desired to feed the water into the boiler, and is furnished with a check-valve, *c*, opening downward, so as to prevent back pressure from the boiler; and each of the pipes *a'* extends from the top of the tank, through the shell of the boiler, to whatever point it is desired to make the feeding-line, or what may be termed the true water-level of the boilers. The feed-pipes *a* all extend upward into the supply-tank to a point sufficiently above the bottom of the same to enable deposits and sediment to collect and remain upon the bottom of the tank below the

mouths or openings of the said pipes. The tank is provided at one end with a blow-off cock, *d*, and has also man-hole plates, which can be removed when it is desired to obtain access to the interior of the tank for the purpose of removing deposits.

The operation of the tank in feeding water into the boiler is as follows: When the water in any boiler evaporates sufficiently to permit steam to enter the mouth of the pipe *a'*, such steam will immediately pass up into the tank, and act upon the surface of the hot water in the same. This will so nearly equalize the pressure in the boiler and tank that the water will immediately flow from the latter by its own gravity through the pipe *a* into the boiler, the flow only ceasing when the water has been raised in the boiler to a point above the mouth of the pipe *a'*, and thus cut off the steam from the tank. The supply of water will thus remain cut off until evaporation again reduces the water-level in the boiler and permits steam to again enter the pipe *a'*, when the above operation will be repeated until the boiler has been again filled to the proper level. In this way a single boiler, or all the boilers simultaneously, may be supplied with water from the tank, the water in all of the boilers being maintained at nearly an uniform level, even when there is an unequal evaporation, as there is a free communication and circulation between all of the boilers and the tank, and an equalization of pressure whenever water is to be supplied to the boilers. The hot water which is fed into the boilers is almost entirely free from sediment and impurities, which are deposited or settle upon the bottom of the tank before the water is fed into the boilers; this settling or precipitating process being considerably facilitated by the direct contact of the steam and hot water from the boiler with the water in the tank. The deposits upon the bottom of the tank are prevented, as before described, from passing into the boiler by slightly elevating the mouths of the feed-pipes *a* above the bottom of the said tank.

The apparatus, which it is preferred to employ for heating the water to be fed to the tank B, is shown in Figs. 1 and 2, and consists of a casing, B, elevated above the tank, and communicating with the same through two pipes,

C and C', the pipe C, through which the water is fed, extending from the bottom of the heater to a point close to the bottom of the tank, and being provided with a check-valve, *e*, opening downward to prevent water from being forced back into the heater from the tank; and the pipe C', through which steam is conducted from the tank to the heater to equalize the pressure in both, extends from the top of the said tank to a point close to the top of the heater.

One alarm attached to the drum will answer for all the boilers, for should the supply of water be cut off the alarm would be sounded while the water in the boilers still remained at a proper level, and while there was still a quantity of feed-water in the drum.

It is not absolutely necessary that the drum B should be arranged above the boilers, as it could be extended across the ends of the same, and connected to each boiler by two pipes, communicating, one with the steam-space on the water-level, and one with the water-space of the boiler.

The most important advantages of the invention, taken as a whole, are that the boilers are kept constantly filled with water at an uniform level; that such water is introduced at a temperature nearly as great as that in the boiler, so that fuel is economised, and the usual unequal contraction and expansion avoided; and that the water is filtered or settled, and deprived of the greater portion of its impuri-

ties before being introduced into the boilers. It will be seen that any suitable heater may be used in connection with the tank.

Claims.

I do not here claim the construction and relative arrangement of the feed-water heater and the regulator, which will form the subject of a separate application for Letters Patent; but—

I do claim—

1. The combination of a series of boilers and a single water-tank B, communicating with each boiler above and below the water-line, substantially as and for the purpose set forth.

2. The combination of the tank B, the boilers A, steam-pipes *a'*, and feed-water pipes *a*, communicating with the tank B at a point above the bottom of the latter, substantially as specified.

3. The combination of the tank B, supplying a series of boilers automatically as described, and a heater or reservoir, D, communicating with the said tank through pipes *c c'*, and operating to maintain a constant supply of water in the tank, 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.