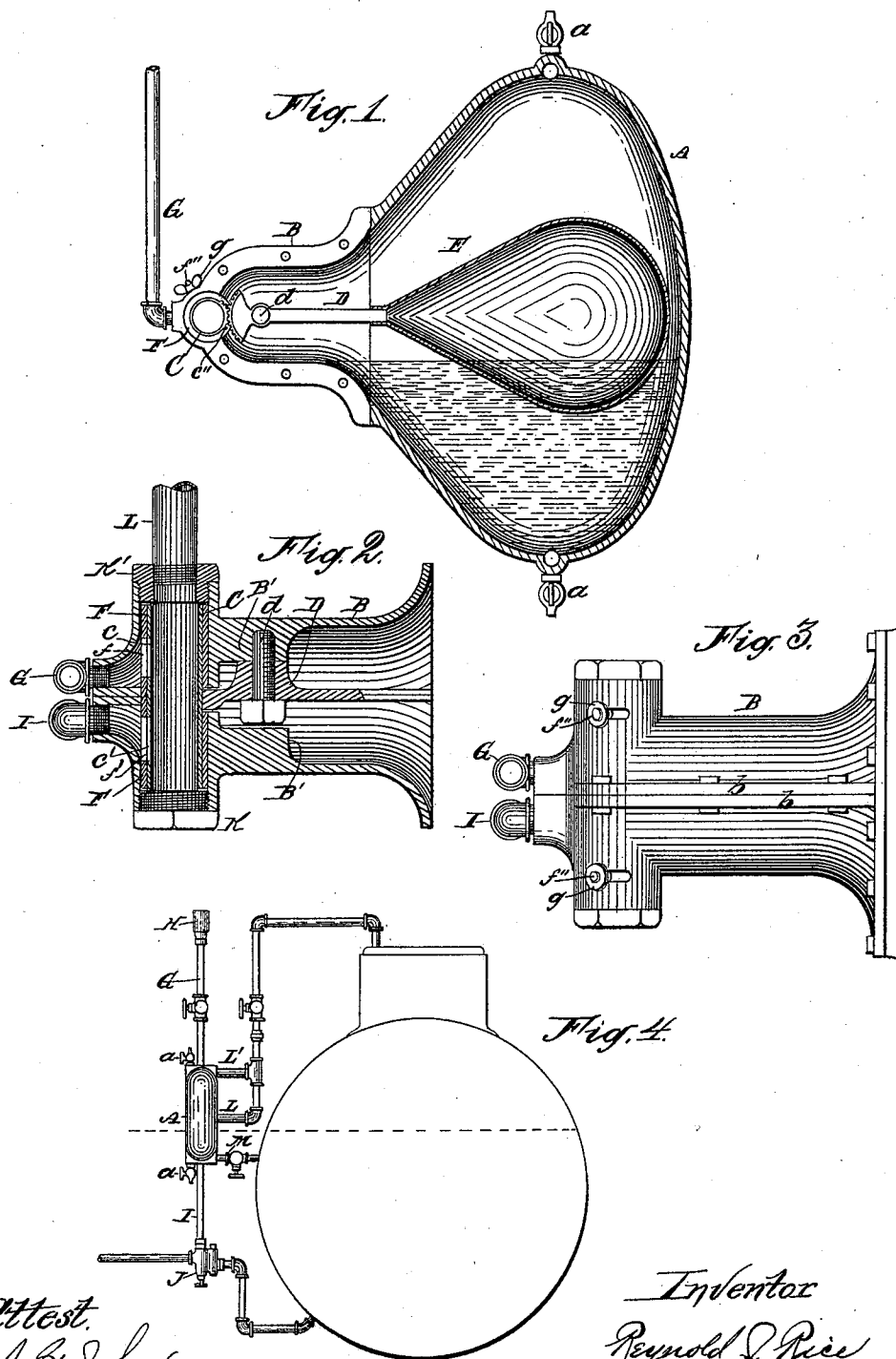


(No Model.)

R. J. RICE.
FEED WATER REGULATOR.

No. 581,369.

Patented Apr. 27, 1897.



Attest.
L. A. St. John.
J. B. Grant.

Inventor
Reynold J. Rice,
By J. M. St. John
Atty.

UNITED STATES PATENT OFFICE.

REYNOLD J. RICE, OF BELLE PLAINE, IOWA, ASSIGNOR OF ONE-HALF TO
FRANCISCO GUTHRIE, OF SAME PLACE.

FEED-WATER REGULATOR.

SPECIFICATION forming part of Letters Patent No. 581,369, dated April 27, 1897.

Application filed March 16, 1896. Serial No. 583,479. (No model.)

To all whom it may concern:

Be it known that I, REYNOLD J. RICE, a citizen of the United States, residing at Belle Plaine, in the county of Benton and State of Iowa, have invented certain new and useful Improvements in Feed-Water Regulators; 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.

This invention relates to apparatus for automatically regulating the supply of water for steam-boilers; and the object of the invention is to provide a simple and efficient device for this purpose adapted to be applied to a boiler externally and being capable of careful adjustment, so as to maintain the water at any desired level in the boiler, and to give warning in case the water falls below a certain level.

A device embodying the invention will be fully hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a central longitudinal section, in a vertical plane, of the regulator. Fig. 2 is a similar section, in a horizontal plane, of the regulator-valve and its connections. Fig. 3 is an external plan view of the valve and head of the float-receiver. Fig. 4 is a general rear elevation of the device as applied to a boiler.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A designates a strong case or receiver with plane sides and of an oval or elliptical outline preferably cast in a single piece. To the open end of this, which should be large enough to admit the float, is secured the part B, which may be called the "valve-head." The whole forms a tight vessel of an exaggerated pear shape, as shown in Fig. 1.

Near the outer end of the valve-head is fitted a valve C, which is a cylindrical tube provided with suitable outlet-ports *c c'*. On one side is a short segment of spur-gearing *c''*, engaging with a similar segment at the end of a lever D, pivoted at *d*, and at its inner end provided with a pear-shaped float E. This

float is adapted to swing from the top to the bottom of the receiver and is preferably made conoidal in form, so as to secure the greatest amount of buoyancy consistent with its smaller diameter and limited movement, that is to say, greater buoyancy than a spherical float operating in the same space. It will be seen that the movement of this float up or down serves to turn the valve C, and when in operative position the float is moved up or down, according as the water-level in the receiver rises or falls.

The valve C fits nicely in a shell F, seated in the valve-head B and having ports *f f'* communicating with the ports *c c'* of the valve. One of these ports leads through a hole in the casting B to a pipe G, terminating in a whistle H, by which an alarm is sounded to give notice of low water. The other leads to a pipe I in connection with any suitable injector J.

In practice the shell F is made in two parts, so as to be independently rotated a limited distance in the valve-head, whereby the level for the alarm may be either the same as for the feed or a different one, as desired. For the purpose of adjustment each section of shell is provided with a stem *f''*, passing through a slot in the valve-head and provided with a suitable nut *g*.

It will be readily understood that by rotating the shell in either direction the position of its port will be raised or depressed, and in order that the valve-port shall coincide with it the valve must be rotated a greater or less degree, thus necessitating a variation in the level of water in the receiver.

Both the valve C and the shells F F are held between plugs K and K', closing the holes in the valve-head, the abutting ends being so near as to prevent leakage, but not so tight as to prevent the rotation of the parts, as specified.

The plug K' is provided with a pipe L, which communicates with dry steam in the boiler. Another pipe L', which may be a branch, also communicates with dry steam from the highest point in the receiver A. From the lowest point therein a pipe M leads into the boiler below the low-water level, the receiver occupying relatively the same position with reference to a boiler as does the ordinary water-

glass. It will thus be seen that the water-level in the receiver is the same as in the boiler, as indicated by the dotted line in Fig. 4.

In the construction of the apparatus the valve-head B is made in two parts, bolted together by their flanges *b b*, and similarly secured to the part A. In a boss B' screws the pivot-screw *d*. The opposite boss lies close to the head of the screw and thus prevents its accidentally turning out and becoming detached.

Suitable petcocks *a a* are provided to blow out the receiver, when desired.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a feed-water regulator, the combination with the float-receiver communicating with the boiler above and below the normal water-level, of a vertically-swinging float on an arm pivoted therein, a geared connection of said arm with a rotating valve, a valve communicating with steam in the boiler, and provided with a suitable outlet-port, and a shell inclosing said valve provided with a suitable outlet-port, and adjustably rotatable, whereby the position of the outlet may be varied to vary the water-level at pleasure.

2. In a feed-water regulator, the combination of a pivoted float and its receiver, substantially as described, a valve having a geared connection with said float, and having

two outlet-ports, and a pair of adjustable shells fitted to said valve and provided with ports to communicate with those of the valve, the port of one shell leading to a whistle and the other to the feed apparatus, as described.

3. The herein-described valve for a feed-water regulator, consisting of the cylinder C having ports *c c'*, and the inclosing shells F F, having ports *f f'*, adjusting-stems *f'' f'''*, and retaining-nuts *g g*, combined with the valve-head B provided with slots for the said adjusting-stem, and a float connecting with said valve-cylinder, substantially as described.

4. In a feed-water regulator for steam-boilers, the herein-described float-receiver A and its connected valve-head B provided with inwardly-projecting bosses B' B', combined with the float-lever D the valve operated by the float-lever and the pivot-screw *d*, substantially as and for the purpose set forth.

5. In a valve for feed-water regulators, the combination with a valve-actuating float and a receiver therefor of the valve-head B, shells F F, valve C, and plugs K K', substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

REYNOLD J. RICE.

Witnesses:

J. F. GROAT,
FRANCISCO GUTHRIE.