

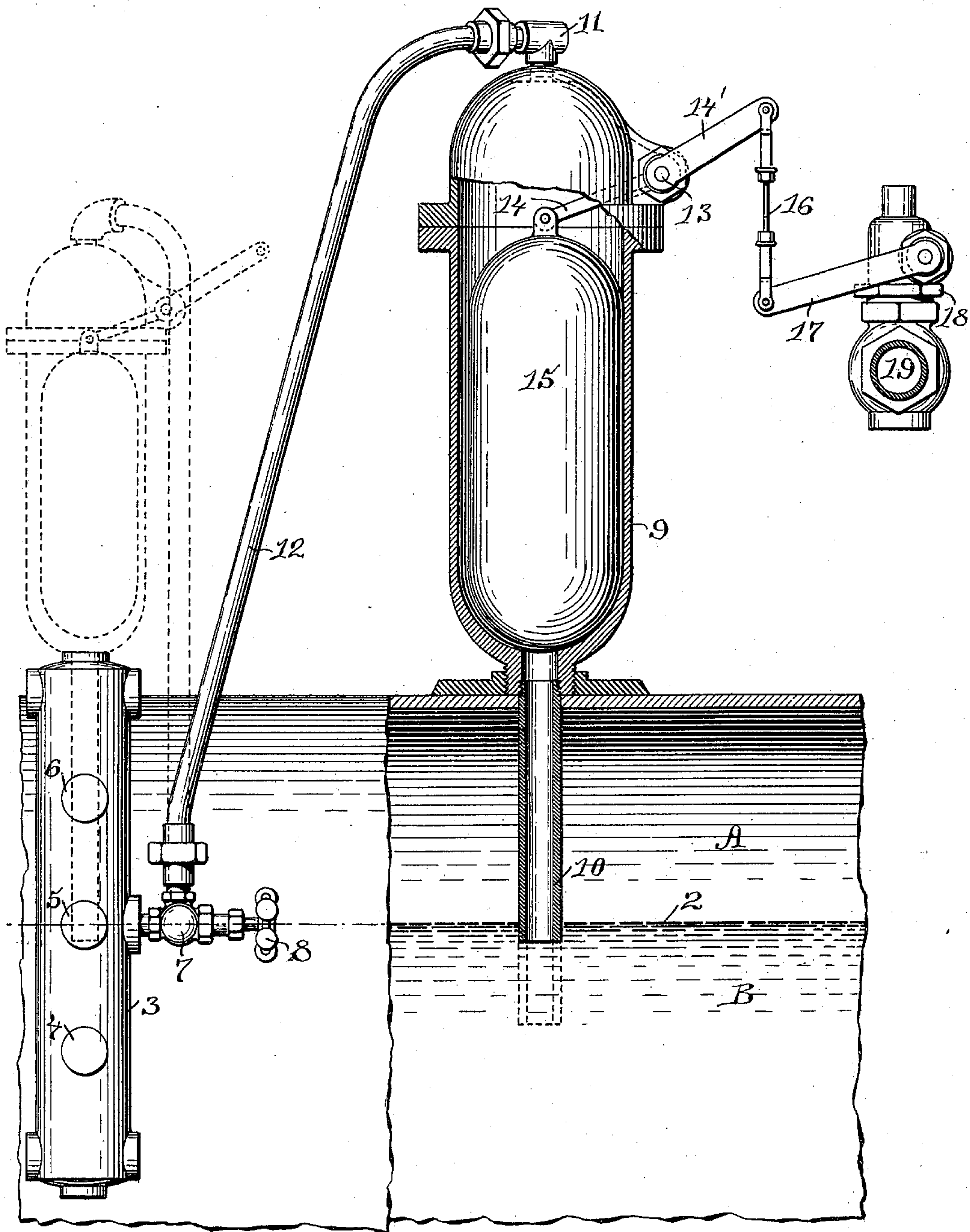
No. 617,517.

Patented Jan. 10, 1899.

D. ALMY.
FEED WATER REGULATOR.

(Application filed Oct. 25, 1897.)

(No Model.)



WITNESSES:

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UNITED STATES PATENT OFFICE.

DARWIN ALMY, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE ALMY
WATER TUBE BOILER COMPANY, OF SAME PLACE.

FEED-WATER REGULATOR.

SPECIFICATION forming part of Letters Patent No. 617,517, dated January 10, 1899.

Application filed October 25, 1897. Serial No. 656,247. (No model.)

To all whom it may concern:

Be it known that I, DARWIN ALMY, of Providence, in the county of Providence and State of Rhode Island, have invented a new and
5 useful Improvement in Feed-Water Regulators for Steam-Boilers; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part
10 of this specification.

This invention has reference to an improvement in devices for automatically controlling the water-supply for steam-generators. In all classes of steam-generators it is important
15 to supply the water as fast as it is converted into steam, so as to maintain the water-level at the required height. In water-tube or other steam boilers where a comparatively large heating-surface and a small quantity of
20 water is used an automatic and reliable feed-water-supply regulator is essential to the operation and durability of the boiler. Among the boiler feed-water regulators as heretofore constructed two classes have been used, one
25 having a float inclosed in a chamber connected by a pipe with the water at a point near the water-line. In this class the water enters the chamber and holds the float in the raised position until the water-level falls below the
30 open end of the pipe connected with the chamber. When the water runs out of the chamber, the float descends and operates the valve controlling the water-supply. In practice it is found that the steam acting on the water
35 in the pipe connecting the chamber with the water in the boiler retards the discharge of the water and the descent of the float, so that this class is found to operate too slow for use on quick-steaming boilers. The other class consists of a globe or chamber usually supported
40 on a counterweighted lever, the upper part of the hollow globe or chamber being connected with the steam-space of the boiler at the normal water-line and the lower part with
45 the water in the boiler. In these devices the globe or chamber is filled with water as long as the water in the boiler is above the pipe connected with the upper part of the globe and by its weight closes the water-supply
50 valve. When the water-level in the boiler is lowered below the pipe connected with the upper part of the globe, the steam enters the

globe and the water is quickly discharged, the globe rises, and the lever operates the water-supply valve. This class of regulators
55 require very long connecting-pipes, the spring of which forms an uncertain element in the proper regulation.

The object of this invention is to construct a simple and reliable water-supply regulator
60 which while it has the best features of both the classes of regulators above referred to has none of their disadvantages and secures the automatic control of the water-supply by the simplest possible means.

The drawing is a side view of part of a steam-boiler and the feed-water regulator, shown partly in section, and also indicating
65 in broken lines the regulator secured to a chamber connected with the steam-boiler.

In the drawing, A indicates the steam-space, and B the water in the boiler; 2, the normal water-line; 3, a chamber connected at the upper end with the steam-space of the boiler and at the lower end with the water-space of
70 the boiler. The chamber 3 may be and preferably is the usual gage-chamber and is so represented in the drawing. 4 indicates the lower, 5 the middle, and 6 the upper gage-cocks; 7, a valve secured to the chamber 3
75 on or just above the water-line; 8, the hand-wheel on the valve-stem; 9, a hollow chamber, preferably provided with semispherical ends, and 10 a pipe connecting the interior of the chamber 9 with the water in the steam-boiler. 85
This pipe is shown in the drawing to extend only a short distance below the water-line, as is the case in the preferred form; but the pipe may extend, and in marine boilers it preferably does extend, a greater distance
90 into the water, as is indicated in broken lines. The upper end of the chamber 9 is provided with the fitting 11, and this is connected with the valve 7 by the pipe 12, of smaller internal diameter than the pipe 10. 95
Unions may and preferably are used to connect the ends of the pipe 12 with the fittings. The rock-shaft 13 extends through a stuffing-box and has on the inner part the lever 14, pivotally connected with the hollow
100 float 15.

On the outside of the chamber 9 the lever 14' is secured to the rock-shaft 13, and the end of the lever 14' is connected by means of

an adjustable link 16 to the lever 17, the opposite end of which is connected with the rock-shaft of a suitable (preferably quick-acting) valve 18, placed in the water-supply mains 19.

In the drawing the parts are shown in the relative position occupied by them when the valve 18, controlling the water-supply, is open and water is being forced into the boiler. As the supply of water is greater than the evaporation of the water into steam, the water-level gradually rises until it extends above the inlet-opening to the pipe 12 and shuts off the steam-supply to the pipe 12 and to the upper part of the chamber 9. The steam in the chamber 9 now rapidly condenses, the pressure of the steam in the chamber is rapidly reduced, and the higher steam-pressure in the boiler, acting on the surface of the water, forces the water in the line of least resistance through the pipe 10 into the chamber 9, not slowly, but with a rush. The float is quickly raised, the lever 14 operates through the rock-shaft 13, the lever 14', and the valve-lever 17, and shuts off the water-supply. As the water is evaporated the water-level falls, and when it is below the inlet-opening of the pipe or nipple connecting the valve 7 with the chamber 3 sufficient to allow the steam to enter the steam passes through the pipe 12 into the upper end of the chamber 9 and quickly raises the pressure in the chamber to the pressure in the boiler. An equilibrium being established, the column of water in the chamber 9 and pipe 10 by its own weight rushes out of the chamber 9 and pipe 10 into the boiler. The float follows the water and assumes the position shown in the drawing, opening the valve 18, controlling the feed-water supply, as it descends.

This feed-water regulator is not only quick

in its action and simple in construction, but it has no parts or valves liable to stick and no parts or valves to be opened and closed. It acts on the valve controlling the feed-water supply through long levers and is operated in either direction by the rush of a considerable quantity of water acting on the float.

This feed-water regulator may be connected with any suitable chamber having open connections with the steam and water spaces of the boiler.

In the drawing the regulator is shown in broken lines as secured to the usual gage-chamber used to support the gage-cocks and usually the glass water-gage. When so secured, its action will be in all respects the same as when secured to the boiler as is shown in solid lines.

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

In a feed-water regulator in combination, the hollow float-chamber 9 located above the water in the boiler, the pipe 10 connecting the chamber with the water, the float 15, the levers 14, 14' and 17, the valve 18, and the adjustable link 16 connecting the float 15 with the valve 18, the gage-chamber 3, the valve 7 connected with the gage-chamber near the normal water-line, the pipe 12, and fittings for securing the pipe 12 with the valve 7 and the upper end of the float-chamber 9; whereby the rising or falling of the water-level automatically operates the float and controls the feed-water supply, as described.

In witness whereof I have hereunto set my hand.

DARWIN ALMY.

Witnesses:

JOSEPH A. MILLER,
A. E. HAGERTY.