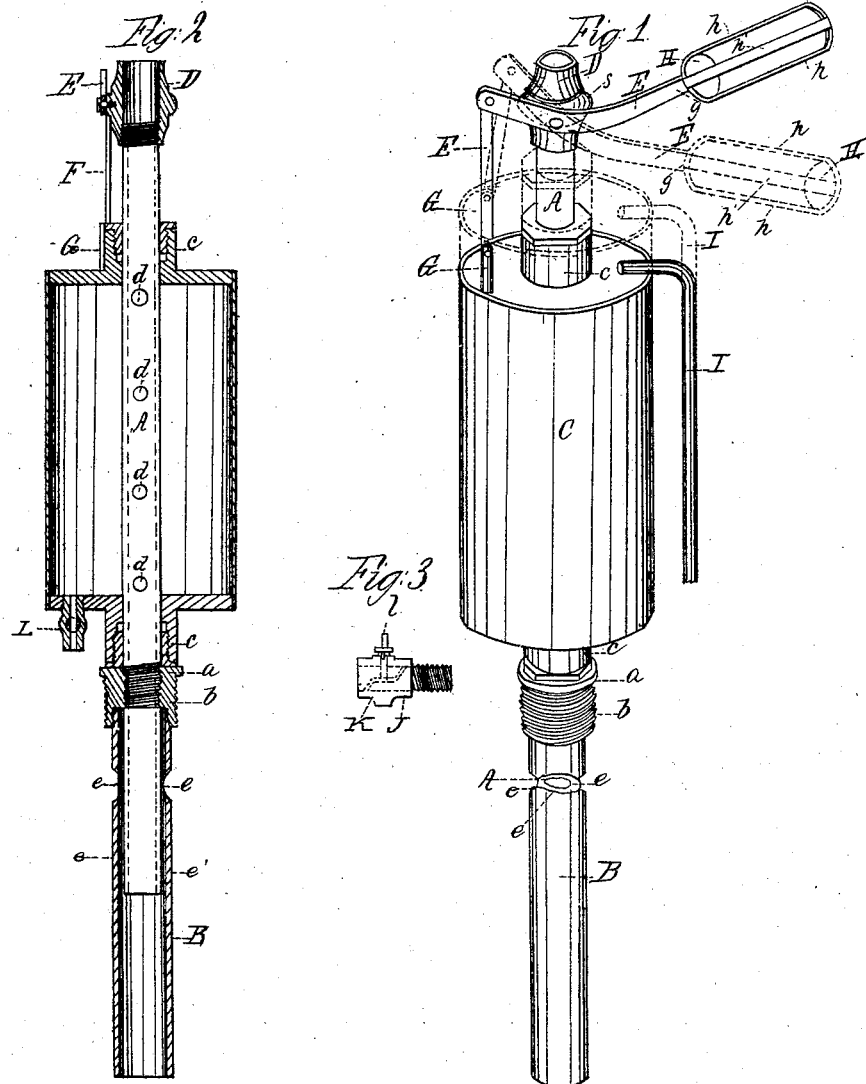


No. 50,033.

PATENTED SEPT. 19, 1865.

G. A. RIEDEL.
FEED WATER APPARATUS.



Witnesses:

Stephen Votick
W. W. Doughty

Inventor:

G. A. Riedel

UNITED STATES PATENT OFFICE.

G. ADOLPH RIEDEL, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN FEED-WATER APPARATUS.

Specification forming part of Letters Patent No. **50,033**, dated September 19, 1865; antedated May 11, 1865.

To all whom it may concern:

Be it known that I, G. ADOLPH RIEDEL, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improved Self-Regulating Water-Feeder for Steam-Boilers, with Pump or Injector; and I 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 drawings, making a part of this specification, in which—

Figure 1 is a perspective view of the feeder. Fig. 2 is a vertical section of the same. Fig. 3 is a side elevation of the valve-chest J.

Like letters in all the figures represent the same parts.

The nature of my invention consists of a self-regulating water-feeder for steam-boilers, with a pump or injector or other similar device, being an improvement on the low-water indicator for steam-boilers for which a Patent was granted to me April 18, 1865, by which I give a vertical instead of an oscillating movement to the receiver, and other improvements, which will be understood by the following description:

A is a vertical pipe, which is combined with an outer pipe or tube, B, near its lower end by means of the fitting *a*, the said fitting having a screw, *b*, on its periphery for the purpose of combining the said pipes with the boiler. The lower end of the pipe A is placed to the water-line in the boiler, and the end of the pipe B extends some distance below; so as to cause the water which falls from the pipe A to enter the water in the boiler near the bottom of the latter.

C is a receiver for the alternate reception of steam and water, as will be hereinafter described. The receiver surrounds the pipe A, and moves freely thereon by means of the stuffing-boxes *c c*. There are holes *d* through the pipe A, by which a communication is effected between said pipe and the receiver C, for the purpose of allowing steam and water to pass from the pipe to the receiver, and vice versa. There are holes *e* through the pipe B above the lower end of the pipe A for the admission of steam into the said pipe B.

D is a fitting on the upper end of pipe A, to which the lever E is attached by means of the

fulcrum-pin *f*. The said lever is connected to the receiver C by means of the jointed rod *K* and upright G. It has combined with its outer end, *g*, a ball or movable weight, H, which moves freely between the parallel bars *h*, above and below, and the side bars, *h'*, the same being permanently secured at one end to the extreme parts of the end *g* of the lever.

The movement of the weight H is for the purpose of varying the effective power of the lever, it having the least power, as will be readily observed, when the weight is up, and the greatest power when down and in the position represented by red lines in Fig. 1.

I is a rod attached at its upper end to the upper end of the receiver C, as represented in Fig. 1, yet it may be attached to any other convenient part of the same. The said rod is for the purpose of opening the communication between the feed-pipe and the pump or injector, opening it when the receiver is rising, and closing it when the same is falling.

J is a valve-chest, to be attached to the pipe A below the receiver C. It has a valve, K, within it, whose stem *i* is pressed upon by the lower end of the receiver when the latter is in its lower position, by which the valve is closed; but when the water is out of the receiver and the latter consequently moves upward, the valve, being thus relieved, is opened by the force of the steam in the pipe A, which then passes out of the opening in the end of the chest J, and blows a whistle or otherwise gives an alarm. The rod I and valve K may be used with one or more receivers, which have either a vertical or oscillating movement.

L is a blow-off cock for the receiver C.

A wire may be attached at one end to either the receiver C or lever E and at the other end to an index placed in an office or other convenient place, for the purpose of showing the condition of the water and steam in the boiler, the wire being operated by the upward and downward motions of the receiver or lever.

A steam or water pipe may be connected with the fitting D, to force the water down into the boiler or condense the steam in the receiver C.

The operation is as follows: The fitting *a* is screwed into a corresponding opening in the upper side of the boiler, so as to bring the

pipe A into a vertical position, and its lower end to the water-line in the boiler, and the lower end of the pipe B near the bottom of the boiler, as above described. When the water in the boiler is a little above the said line the pressure of the steam forces the water up the pipe A and through the holes *d* into the receiver C until it is filled. The receiver, which holds one or more gallons, being thus increased in weight to the amount of the difference between the weight of the water which it now contains and the steam which previously filled it and became condensed by the water, overcomes the force of the weighted lever E and descends into the position represented in Figs. 1 and 2; but when the water in the boiler gets below the water-line the water in the receiver passes down the pipe A into the boiler, entering the body of water at the lower end of the pipe B. As the receiver is thus emptied of the water it is filled with steam, which ascends the pipe A, first passing through the holes *e* of the pipe B and down the annular space *e'* to the lower end of the pipe A. The receiver, being thus lightened according to the difference between the weight of steam and the weight of water, is brought by the force of the weighted lever E to its upward position, (indicated by red lines in Fig. 1.) In the downward motion of the outer end of the lever the weight H passes to its extreme end, as represented, and increases the effective force of the same. In the upward movement of the receiver the rod I opens communication between the feed-pipe

and the pump or injector until the boiler has been refilled above the water-line. The lower end of the pipe A being again brought into communication with the water in the boiler by the action of the steam, the receiver is again filled with water in like manner, as before, and again descends to its former position. As it commences descending the rod I closes the communication between the feed-pipe and the pump or injector, and so on successively, by the reciprocal action of the receiver C, as before explained, the communication between the feed-pipe and the pump or injector is opened and cut off to keep a uniform depth of water in the boiler.

Having thus fully described my improved self-regulating water-feeder for steam-boilers, what I claim therein as new, and desire to secure by Letters Patent, is—

1. The vertical reciprocating receiver C, constructed, arranged, and operating substantially as described, and for the purpose set forth.

2. The combination of the rod I with the receiver, for the purpose of opening and closing the communication between the feed-pipe and the pump or injector, substantially as described.

In testimony that the above is my invention I have hereunto set my hand and affixed my seal this 8th day of May, 1865.

G. ADOLPH RIEDEL. [L. S.]

Witnesses:

STEPHEN USTICK,
W. W. DOUGHERTY.