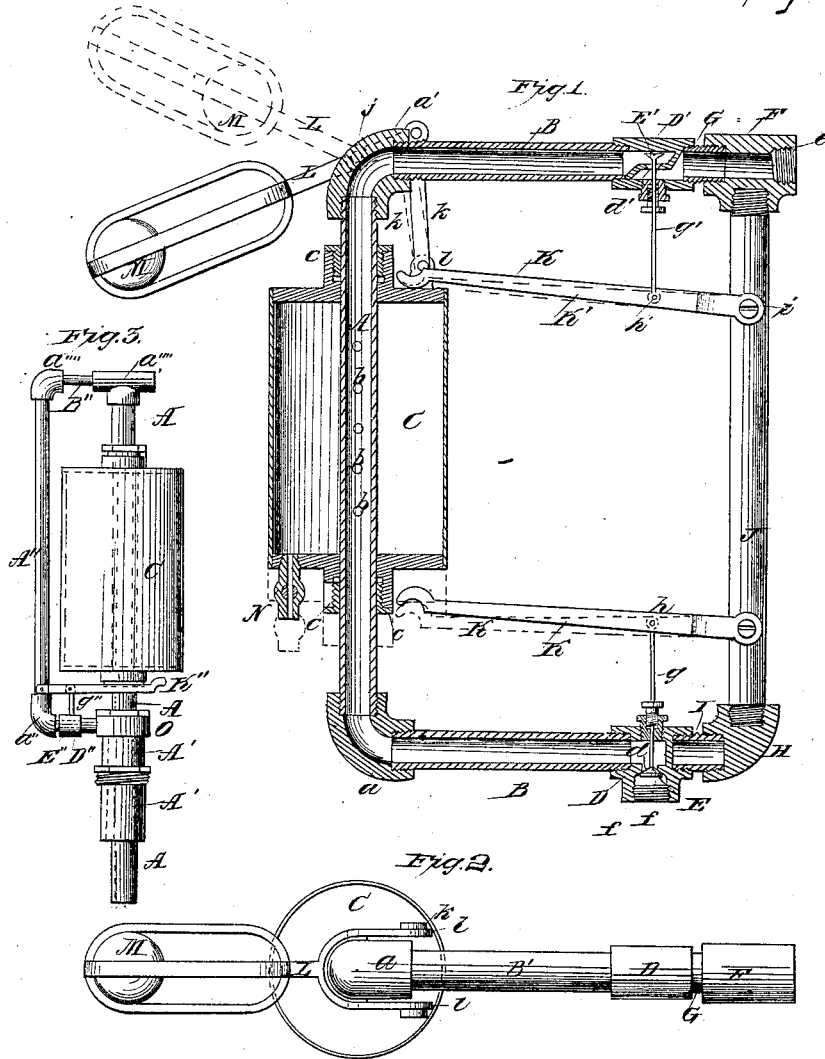


G. A. Riedel,
Steam-Boiler Water-Feeder,
No 50,035, *Patented Sep. 19, 1865.*



Witnesses:
Stephen V. V. V.
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Inventor:
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UNITED STATES PATENT OFFICE.

G. ADOLPH RIEDEL, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN AUTOMATIC BOILER-FEEDERS.

Specification forming part of Letters Patent No. 50,035, 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 a Self-Regulating Water-Feeder for Steam-Boilers without a 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 side elevation of the feeder. Fig. 2 is a top view of the same. Fig. 3 is a modified arrangement for forcing water into the boiler.

Like letters in both figures represent the same parts.

My invention consists of a self-regulating water-feeder for steam-boilers without a pump or injector, and is an improvement on the low-water indicator for steam-boilers for which a patent was granted to me April 18, 1865.

The nature of the invention will be understood by the following description.

A is a vertical pipe, which is connected at its lower end to the horizontal pipe B by means of the elbow *a*, and at its upper end to the horizontal pipe B' by means of the elbow *a'*.

C is a receiver, which holds one or more gallons. It is made to rise and fall by the alternate reception of steam and water from the boiler, the rising and falling being occasioned by the difference between the weight of the water and steam. There are holes *b* through the sides of the pipe A, by which an open communication is effected between the pipe and the receiver C. The said receiver is provided with stuffing-boxes *c c*, which connect it with the pipe A, and by means of which it has an easy movement thereon, as will be presently described. There is a valve-chest, D, connected with the right-hand end of the pipe B, and a similar chest, D', in connection with the pipe B', in a perpendicular line above the former. The chest D is provided with a valve, E, for opening and closing the opening *d*, and there is a similar valve, E', for opening and closing the opening *d'*. There is a fitting, F, connected with the outer end of the valve-chest

D' by means of the short pipe G, which is screwed into the chest and fitting. The said fitting has a screw, *e*, in its outer end for the purpose of forming a connection with a feed-pipe to supply the boiler with water. The elbow H is connected to the valve-chest D by means of the short pipe I, which merely serves as a connecting-piece. The upright shaft J, by means of screws on its ends, forms a connection with the fitting F and the elbow H. On the under side of the valve-chest D there is a chamber, *f*, which has a female screw, *f'*, by means of which a vertical pipe is connected with the said chest. The pipe is passed through the top of the boiler, and is secured thereto by means of bolts through an annular flange of the former, or in any other convenient manner. The lower end of the pipe is placed to the water-line, so as to form a connection between the receiver C and the water in the boiler.

K and K' are forked levers, connected with the stems *g* and *g'* of the valves E and E' by means of the pins *h* and *h'*. There are screw-bolts *i* in the opposite sides of the upright shaft J, which serve as fulcrums for the levers K and K'.

L is a forked lever, which has fulcrum-pins *j* in opposite sides of the elbow-pipe *a'*. The short and inner end of the lever is connected with the receiver C by means of the jointed strap *k* and uprights or studs *l*. The lever is provided with a counter-weight, M, for the purpose of bringing the receiver into its upper position when the water has been discharged from it, as will be hereinafter explained. The said weight is made to change its distance from the fulcrum of the lever, being guided by parallel bars, as represented in the drawings, to increase and decrease the power of the lever, it being farther from the fulcrum, as the lever descends to raise the receiver C, and nearer when the receiver is down, as represented by red lines. N is a blow-off cock for the receiver. The receiver, being thus arranged in relation to the boiler and feed-pipe, is made to rise and fall by means of the difference between the weight of water and the weight of steam, which it alternately contains, and by its rising and falling to open and close the communication be-

tween it and the feed-pipe in such a manner as to preserve a uniform depth of water in the boiler at all times.

The operation is as follows: When the water in the boiler gets below the water-line, which consequently cuts off the communication between it and the lower end of the vertical pipe connected with the boiler, and intermediately with the receiver C, by means of the pipes B and A, all the water in the receiver falls, by means of the said pipes, into the boiler. The receiver, being thus lightened, is forced upward by the weighted lever L into the position it assumes in Fig. 1, and in its upward movement the lever K is relieved of the pressure against it of the lower end of the receiver, and the steam, in flowing from the boiler to the valve-chest D, closes the valve E, and the upper end of the receiver, by pressing on the end of the lever K', opens the valve E', which causes the water to flow from the feed-pipe into the receiver and fill it. The receiver has then, by its increased weight, overcome the force of the weighted lever L, and descends until its lower end reaches the position indicated by red lines. As soon as the receiver commences falling, the lever K', being consequently relieved of its upward pressure, descends and comes into the position indicated by red lines, and by its downward course closes the valve E', and thereby cuts off the communication between the feed-pipe and the receiver. The lower end of the receiver, in coming into the position represented by red lines, bears against the outer end of the lever K, and thereby opens the valve E, which effects a communication between the receiver and the boiler for the replenishing of the latter with water, and so on successively the communication between the receiver and the feed-pipe and the boiler is opened and

closed, so as to automatically keep a uniform supply of water in the boiler without the use of a pump or injector or other similar device.

A modified arrangement for forcing water from the receiver C into the lower part of the boiler by means of steam from the water-line is represented in Fig. 3.

The lower end of the central pipe, A, is placed near the lower part of the boiler. The pipe A' is fastened on said pipe by means of the fitting O, the lower end of the pipe extending to the water-line, there being an annular space between the two pipes for the passage of steam from the boiler. There is a valve-chest, D'', connected with the pipes A' and A'' by means of the L-fitting O. The pipe A'' is connected with the pipe B' by means of the L-fitting a''', T-fitting a''', and short pipe B''. There is a forked lever, K'', connected with the pipe A'' and stem g'' of the valve E''. The said valve is opened and closed at the same time and in the same manner as the valve E.

Having thus fully described the construction and operation of my improved self-regulating water-feeder for steam-boilers without a pump or injector, what I claim therein as new, and desire to secure by Letters Patent, is—

The combination and arrangement of the receiver C, with the valves E E', pipes B B', and levers K K', with reference to the feed-pipe and boiler, substantially upon the principle and in the manner herein set forth.

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

G. ADOLPH RIEDEL. [L. S.]

Witnesses:

STEPHEN USTICK,
W. W. DOUGHERTY.