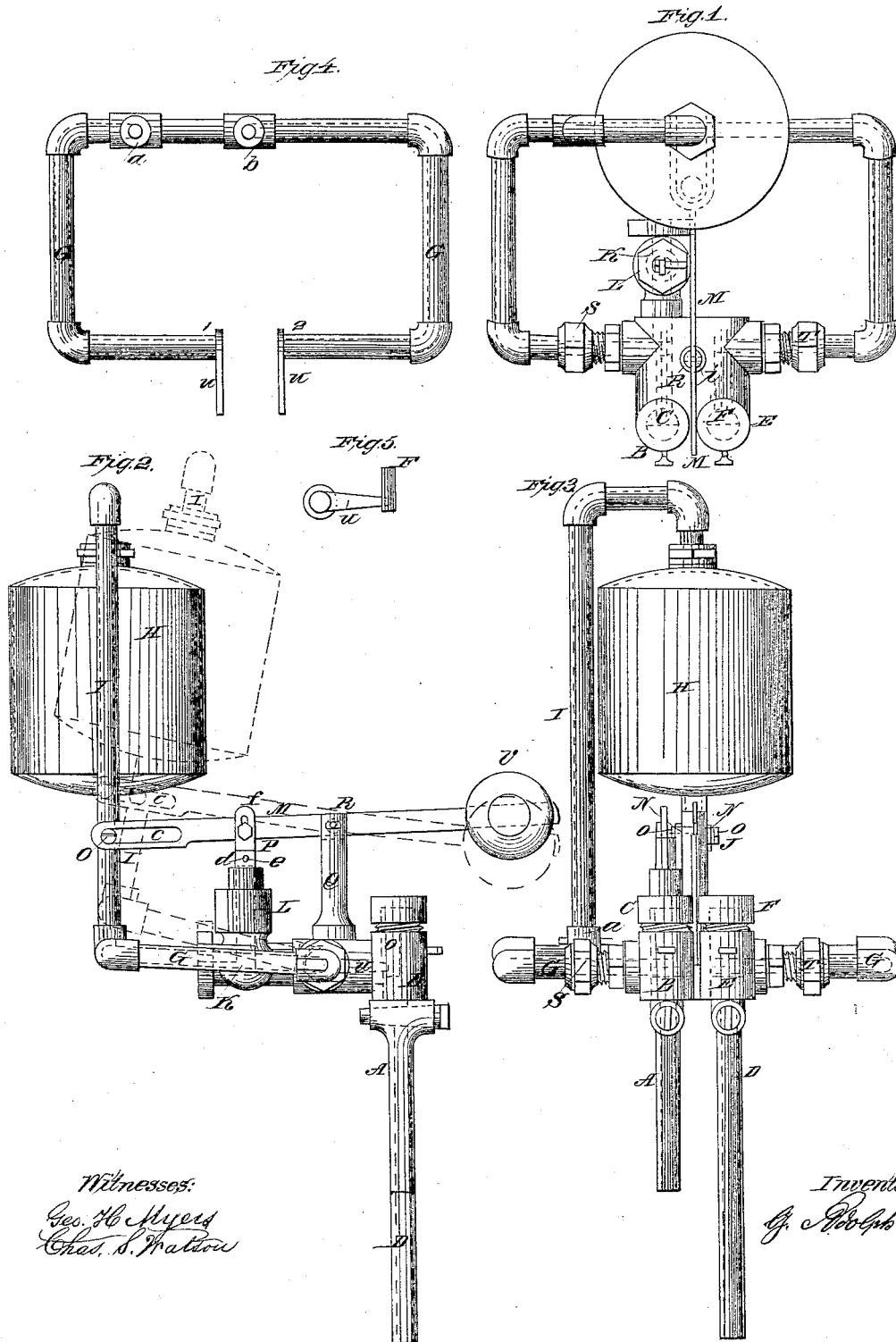


*G. A. Riedel,*  
*Steam-Boiler Water Feeder,*

*N<sup>o</sup> 50,034,*

*Patented Sep. 19, 1865.*



*Witnesses:*  
*Geo. H. Myers*  
*Chas. S. Watson*

*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. **50,034**, dated September 19, 1865; antedated July 26, 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 new and Improved Self-Regulating Oscillating 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 plan or top view of the feeding apparatus. Fig. 2 is a side elevation of the same. Fig. 3 is a front view of the same. Fig. 4 is a top view of the pipe G detached. Fig. 5 is a side view of one of the arms U on a pivot and of the pipe G, but shown in the figure only in connection with one of the valves C or F.

Like letters in all the figures represent the same parts.

The nature of my invention consists in an automatic feeding apparatus for steam-boilers constructed, arranged, and operating substantially as follows:

A is a vertical pipe, which is secured by means of a flange or otherwise with the top surface of the boiler, its lower end terminating with the water-line. The upper end of the pipe is connected with the chest B, that is provided with the valve C.

D is a pipe similarly arranged as the pipe A, but its lower end terminates near the bottom of the boiler. Its upper end is connected with the chest E, which is provided with a valve, F.

G is a partially-inclined quadrilateral pipe, whose ends 1 and 2 communicate respectively with the pipes A and D by means of the said chest B and E above described, so as to form a communication between the receiver H and the water-line in the boiler by means of the vertical pipe I, which is connected with the said pipe G by means of the fitting *a*, and also a communication with the water at the bottom of the boiler and the said receiver by means of the vertical pipe J, connected at its upper end with the bottom of said receiver, and at its lower end with the pipe G by means of the fitting *b*, the pipe G being permanently closed between the fittings *a* and *b*, so that the two ends of the pipe have no communication with each other. There is a chest, K, which has communication with the end 1 of the pipe G

and the feed-pipe. The latter is not shown in the drawings. The chest K is provided with a valve, L, for opening and closing the communication between the receiver H and the feed-pipe, the valve being actuated by the lever M in the upward and downward motions of the receiver H, as will be hereinafter described, the said lever being connected with the vertical pipe J beneath the receiver by means of friction-wheels N N, which turn on pins O O secured in the opposite sides of the pipe, the end of the lever being forked, so as to come on each side of the pipe, and having slots *c*, which move freely on said friction-wheels.

The lever is connected to the stem *d* of the valve L by means of the strap P, the said strap turning freely on the pin *e* at its lower end, and having a slot, *f*, in its upper end, through which the wrist-pin *g* passes of the lever M, there being a nut, *h*, on the outer end of the pin to keep the strap in its place. There is a standard, Q, which has a fulcrum-wheel, R, in the slot *i* in its upper end, the said wheel turning freely on the pin *j*. The lever is connected with the said fulcrum-wheel by means of the elongated opening *k*, so as to allow the lever to have a backward and forward play in the upward and downward motions of the valve L to favor a vertical movement of the strap P.

For opening and closing the communication between the feed-pipe and the receiver H, and between the latter and the boiler, so as to keep up a constant supply of water to the boiler, the receiver has an oscillating up-and-down motion, the ends 1 and 2 of the pipe G turning freely in the stuffing-boxes S T, and being provided with arms U, which are connected with the valves C and F by means of suitable openings in the latter for opening and closing the communication with the boiler.

The connection of an arm with one of the valves is shown in detail in Fig. 4. V is a counter-weight on the lever M.

The operation is as follows: The receiver H being in its lower position, as represented in Figs. 1, 2, and 3, at which point it is full of water, the valve L has closed the communication between the feed-pipe and the receiver, and the valves C and F being up, there is an open communication between the receiver and the water in the boiler until by the generation

of steam the surface of the water in the boiler descends below the water-line. Then the steam in the boiler, acting through the pipe A, presses upon the water in the receiver with the same force as upon the water in the boiler, which causes the water in the former to seek its level, and it consequently passes down the vertical pipe J and through the end 2 of the quadrilateral pipe G, and down the pipe D into the bottom of the boiler, the valve F being open. This allows the steam to take the place of the water in the receiver H. The receiver, being thus lightened by the difference between the weight of water and the weight of steam, is forced upward by the weighted lever M into the position indicated by red lines in Fig. 2. In the upward movement of the receiver the arms U U of the pipe G close the valves C and F, so as to cut off the communication with the boiler, and the lever M opens the valve L, thereby opening the communication between the feed-pipe and the receiver. This allows the water in the feed-pipe to condense the steam in the receiver and to fill the space thereby created. The receiver being thus increased in weight overcomes the force of the lever M and regains its former position, by which action a

reverse movement is given to the valve C, F, and L, by which a communication by means of the pipes A and D is effected with the water in the boiler and the receiver, and is cut off between it and the feed-pipe, and so on successively the receiver H rises and falls automatically and keeps up a regular supply of water to the boiler.

What I claim as new, and desire to secure by Letters Patent, is—

1. The oscillating receiver H for opening and closing the communication between the feed-pipe and boiler, combined and arranged with the valves C, F, and L, substantially upon the principle and in the manner above set forth.

2. The lever M, constructed substantially as described, and combined and arranged with the receiver H and valve L, as and for the purposes above set forth.

In testimony that the above is my invention I have hereunto set my hand and affixed my seal this 20th day of July, 1865.

G. ADOLPH RIEDEL. [L. s.]

Witnesses:

LEWIS GODBUE,

STEPHEN USTICK.