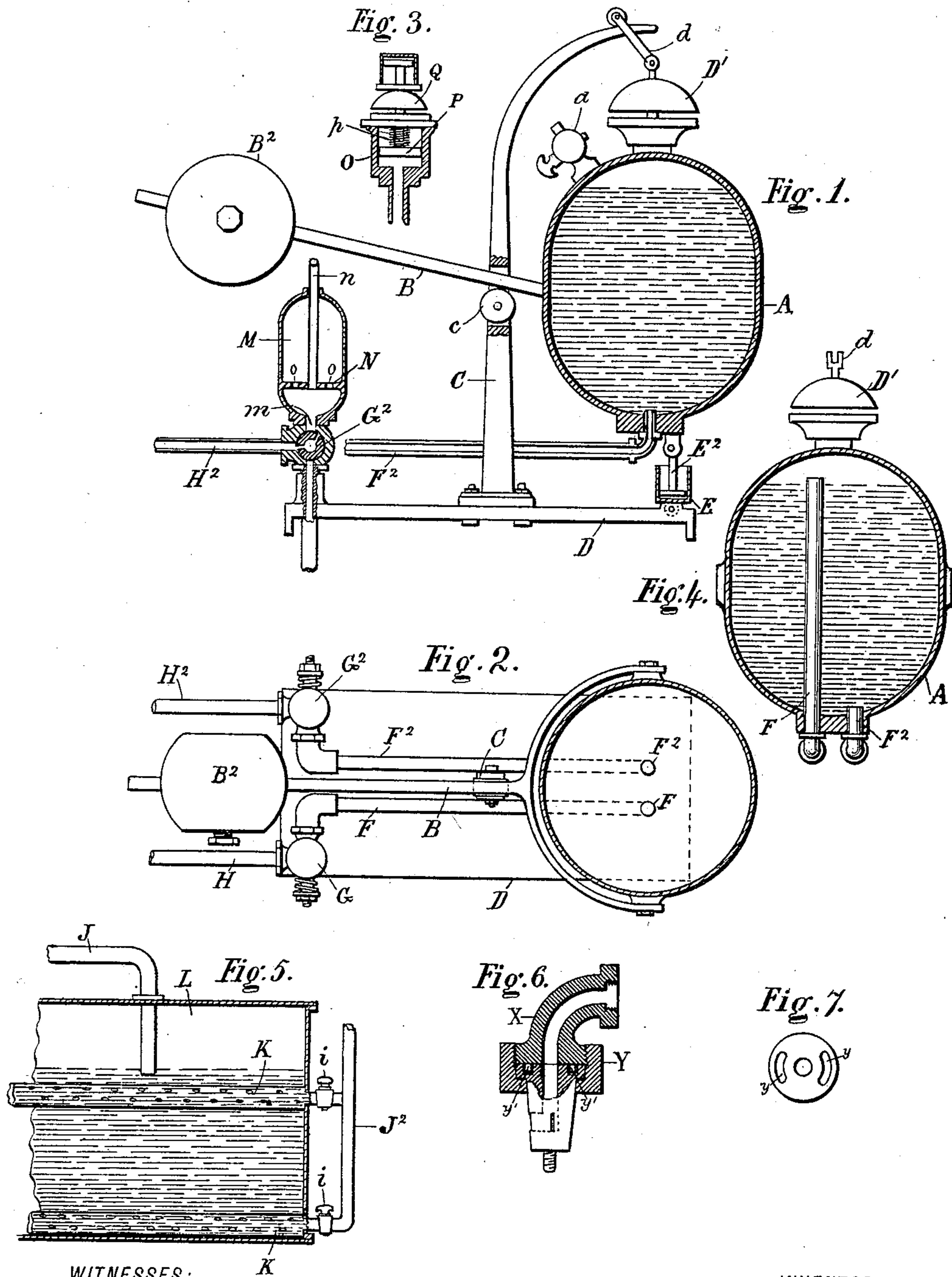


(No Model.)

G. A. RIEDEL.
BOILER FEEDER REGULATOR.

No. 379,776.

Patented Mar. 20, 1888.



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GUSTAV ADOLPH RIEDEL, OF CEDAR, TEXAS, ASSIGNOR OF ONE-HALF TO
FRANCIS B. FORSTER, OF NEW YORK, N. Y.

BOILER-FEEDER REGULATOR.

SPECIFICATION forming part of Letters Patent No. 379,776, dated March 20, 1888.

Application filed May 4, 1887. Serial No. 237,147. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV ADOLPH RIEDEL, a citizen of the United States, and a resident of Cedar, in the county of Fayette and State of Texas, have invented certain new and useful Improvements in Automatic Boiler Feeder, Regulator, and Discharger, of which the following is a specification.

My invention relates to certain improvements on those for which Letters Patent were granted to me April 18, 1865, No. 47,365; May 11, 1865, No. 50,033; July 26, 1865, No. 50,034, and July 3, 1866, No. 56,096.

The invention consists in certain novel details of construction, arrangement, and operation whereby a superior machine is produced for the purpose of regulating and supplying boilers with water, keeping the water at a uniform height, preventing explosions from low water, and automatically removing sediment, impurities, and foam as fast as it accumulates, as hereinafter more particularly described.

In the accompanying drawings, Figure 1 represents a sectional elevation of my improved apparatus. Fig. 2 is a top view of the same. Fig. 3 represents an indicator to be placed in an office or other position at a distance from the boiler. Fig. 4 is a sectional view of a portion of the apparatus. Fig. 5 is a sectional view of a steam-boiler connected with the apparatus by a steam-pipe and a water-pipe. Figs. 6 and 7 are detail views.

A represents a reservoir of approximate globular form, capable of holding about ten gallons, (more or less,) suspended by means of trunnions between the branches of a forked lever, B, which is provided with an adjustable counterbalance-weight, B², and has its fulcrum on a roller, c, journaled in a slot in a post, C, secured to a bed-plate, D. The upper end of the fulcrum-post C is curved and terminates over the center of the reservoir.

From this curved upper end is suspended by a link, d, a gong-bell, D', the stem of which extends upward from the upper axis of the reservoir A. Near this upper axis is a stop-cock or air-valve, a, leading out from the reservoir. Beneath the lower axis of the reservoir is an air cushion and guide consisting of

a cylinder, E, and a piston and stem, E², the bottom of the cylinder being hinged or linked to the bed-plate and the end of the piston-stem being hinged or linked to the reservoir. By means of this link-and-guide connection and the roller-fulcrum, which converts the lever B into a differential lever, the rising and falling of the reservoir proceeds in a vertical line without any oscillation.

To the bottom or lower axis of the reservoir are connected two pipes, F F². The inner end of the pipe F extends upward into the reservoir A to near the top thereof, and the inner end of the pipe F² terminates at or near the bottom of the interior of the reservoir. Both of these pipes, after leaving the reservoir, extend horizontally to a point near the opposite end of the bed-plate D, where they are connected to rotary valves or cocks working in suitable valve-seats. The pipe F is connected to a three-way cock or valve, G, to which is connected a steam-pipe, H, communicating with a steam-boiler, and also a pipe communicating with a condensing apparatus, hereinafter described. The pipe F² is connected to a three-way cock or valve, G², to which is connected a water-pipe, H², communicating with the same steam-boiler, and also a pipe leading to said cock or valve from a source of water-supply.

The steam-pipe H is suitably connected to a pipe, J, and is a continuation of the same, which enters the top of the boiler L and extends down to the water-line therein. The water-pipe H² is suitably connected to a pipe, J², and is a continuation of the same, which passes down outside of the boiler L as low as the bottom thereof, and has connected with it one or more perforated pipes, K, entering the end of the boiler and extending therein below the water-line. These pipes are provided with stop-cocks i between the pipe J² and the end of the boiler L.

The condensing apparatus consists of an air-chamber, M, connected with the cock or valve G by a tube or opening, m, in its lower end. In this air-chamber is a partition, N, from the center of which extends a tube or supply pipe, n, passing out of the top of the chamber M.

The office-indicator consists of a glass tube

or cylinder, O, in which works a piston, P, the stem of which extends through the top of the cylinder and is surrounded by a spring, *p*. Above the top of the cylinder is a gong-bell, Q.

5 In cleaning the boiler a three-way plug, as shown in Fig. 6, may be set by hand at the desired angle to cut off the passage of steam and water to or from the reservoir A, which is done by loosening the nut Y and setting the plug
10 Y' by hand, which plug has a movement equal to the length of the slots *y*, and which engages pins *y'* on the elbow X—as, for example, in cleaning the boiler of mud the plug Y' may be set to throw the sediment in the boiler L
15 through the pipes H² and F² into the vessel A, when empty, by opening the cock *i* in the lower part of the boiler and closing the upper cock, or to clean the surface of foam the upper cock *i* is opened and the lower one is closed.

20 When the machine is used as a discharger to regulate the taking of water or sediment from a boiler or out of pipes or tanks, the machine will automatically cut itself off from the boiler, as heretofore described. When the machine is filled and the reservoir falls down to
25 its lowest position, the communication between the reservoir A and the boiler L must be cut off to allow water to be discharged from reservoir A through the three-way cocks G G²,
30 and when the reservoir is empty the steam or air will force its way out through the three-way cocks G and G² either into the condenser M or in through the small pipe *n*, or it will escape into the air.

35 When the reservoir is empty and rising up, the communication will be opened again with steam and water by the movement of the reservoir N, heretofore described, and to allow the reservoir to fill again as fast as the regulating-pipe J will allow the machine to work.
40 As long as the opening J in the boiler is in contact with steam, the machine will work, and when the opening of the pipe J in the boiler is below the surface of the water the machine
45 will stop. The pipe J is a regulator, which may be raised or lowered in the boiler either for supplying the boiler with water or discharging water.

The operation is as follows: The reservoir
50 being empty, the weight B² will overbalance it and raise it to its highest position. The communication between it and the steam-boiler L is cut off by the valves G and G². The air-cock *a* is opened until the reservoir becomes
55 filled with water, and is then closed. Communication being established between the source of water-supply and the valves G and G², the water passes through said valves and the pipes F and F² and flows into the reservoir
60 A. When the reservoir is full, being then heavier than the weight B², it falls to its lowest position, and through the valves G and G² opens communication with the steam-boiler L. As the water flows into the reservoir A through
65 the pipes F and F² to fill it, the weight of the water will bring it down. The steam from the

boiler enters it above the water through the pipe F.

The apparatus being located lower than the source of water-supply and higher than the
70 water-level in the steam-boiler L, the water flows into the reservoir by its own gravity, and also from thence into the boiler, because the pressure of steam in the boiler and that above the water in the reservoir are equal. 75

The water passing through the perforated pipes K in the boiler has the effect of blowing out foam and muddy water.

When the reservoir is empty, the steam therein passes to the air-chamber M and
80 through the openings *o* in the partition N, thus rapidly condensing the steam, so as to drive a jet of water by the compressed air from the air-chamber M into the reservoir A through the pipes F and F², thereby making a vacuum in
85 the reservoir A, whereby the water will be drawn into the reservoir by the pipe *n*. The chamber M may be connected to the cylinder O to operate the piston P and force it up, so as to sound the gong Q, and thus indicate the
90 state of water to those in the office or other points distant from the boiler; or the state of the boiler is made known by the glass gage and its concomitants. (Shown in Fig. 3.)

As the empty reservoir rises, it carries the
95 gong-bell D' against the curved upper end of the fulcrum-post and sounds it, so as to indicate state of water to those near the apparatus.

The water-pipe *n* may be arranged to communicate with a well, or be connected to a
100 hydrant or tank, or a pipe, to return to the boiler from the reservoir the water condensed in the air-chamber.

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

1. In an automatic boiler-feeder, the combination of a rising-and-falling reservoir provided with a weighted differential lever, B, the steam and water pipes F F², the three-way
105 steam and water valves G G², each constructed with an adjustable rotary plug, Y', provided with slots *y y* and held in position by a nut, Y, the steam and water pipes H H² and J J², and a steam-boiler, for the purpose of feeding water to the boiler and regulating the same, substantially as herein described. 110

2. In an automatic discharging and regulating machine for taking water and discharging from the boiler, pipes, or tanks, the combination of the oscillating reservoir A, the
120 lever B, counterbalance-weight B², and fulcrum-post C, and the three-way steam and water valves G G², each constructed with an adjustable rotary plug, Y', provided with slots *y y* and held in position by a nut, Y, substantially as herein described. 125

3. The reservoir A, carrying on its upper part a gong-bell, D', in combination with the fulcrum-post C, having its upper end curved to operate the gong-bell D', substantially as
130 herein described.

4. The combination, with the reservoir A

and the water-pipe F² and valve G², of the air-chamber M and office indicator, substantially as herein shown and described.

5 In a discharger and boiler regulator provided with the regulating-pipe J, which extends to the water-line of the boiler, and the perforated pipes K, in combination with the

pipe J² and the cocks *i i*, arranged and operating substantially as and for the purpose herein described.

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Witnesses:

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