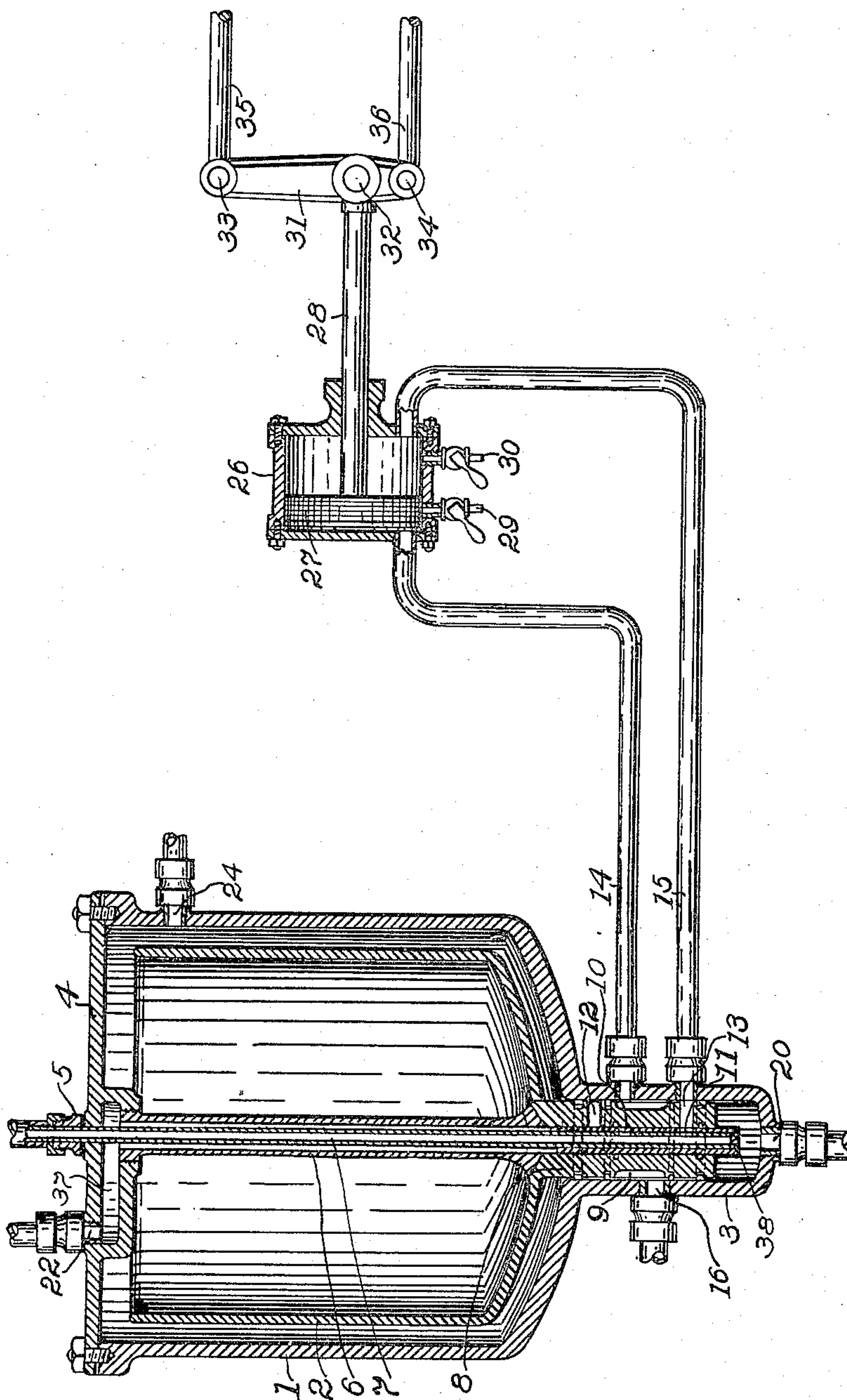


J. LEE.
 DEVICE FOR REGULATING THE WATER LEVEL IN BOILERS.
 APPLICATION FILED OCT. 27, 1913.

1,155,327.

Patented Sept. 28, 1915.



Witnesses:
 Pearl Stanton
 M. L. Jennings.

Inventor,
 John Lee, by
 G. C. Kennedy,
 Attorney.

UNITED STATES PATENT OFFICE.

JOHN LEE, OF STUART, IOWA, ASSIGNOR OF ONE-HALF TO PETER J. BASTEN, OF OELWEIN, IOWA.

DEVICE FOR REGULATING THE WATER-LEVEL IN BOILERS.

1,155,327.

Specification of Letters Patent.

Patented Sept. 28, 1915.

Application filed October 27, 1913. Serial No. 797,532.

To all whom it may concern:

Be it known that I, JOHN LEE, a citizen of the United States of America, and a resident of Stuart, Adair county, Iowa, have invented certain new and useful Improvements in Devices for Regulating the Water-Level in Boilers, of which the following is a specification.

My invention relates to improvements in devices for regulating the water-level of boilers, and the object of my improvement is to provide intermediate mechanism between a steam boiler and its injector, operated by pressure of water or steam received from the boiler to either close or open the steam and water valves of the injector to regulate the water level in the boiler. This object I have accomplished by the means which are hereinafter described and claimed, and which are illustrated in the accompanying drawings, in which: the figure is a vertical longitudinal section of my improved device for regulating the water level in boilers, with parts of the communications thereto broken away.

The numeral 26 denotes a short cylinder containing a reciprocatory piston 27, whose piston-rod 28 projects externally in the usual manner, and has its outer end connected at 32 to an arm 31. Connecting-rods 35 and 36 pivoted at 33 and 34, respectively, to the extremities of the arm 31, connect said arm to the steam-valve and the water-valve of an injector adapted to supply water to a steam-boiler (said injector and boiler not shown). The numerals 29 and 30 denote drain-cocks placed in the bottom of a cylinder 26 at opposite ends thereof, and adapted to drain the water of condensation from the same on opposite sides of the piston 27. The numerals 14 and 15 denote pipes leading from opposite heads of said cylinder to convey steam into opposite ends of said cylinder.

The numeral 1 denotes a vessel or other hollow chamber, with open top closed by a disk-shaped cover 4 detachably secured thereon by screws. Said cover 4 has a depending integral part spaced therefrom, and having a central vertical threaded opening in said cover, the opening being adapted to receive the threaded upper end of the hollow depending structure or tube 6, whose lower end is somewhat widened in diameter and made convex downwardly. A steam-pipe 7 is extended down through the open-

ing in said cover 4 and centrally through the tube 6 in spaced relation thereto to extend a distance below the lower end of said tube. The projecting end of the said pipe 6 above the cover 4 is in communication with the upper part of the boiler or the steam-dome thereof.

The chamber 1 has an overflow pipe 22 inserted in its cover 4, and into the small inclosed chamber 37 thereof which opens into the tube 6. Said chamber 1 also has at its upper end a pipe 24 inserted in its side wall in communication with the water in said boiler. The pipe 24 and the chamber 1 are suitably located with relation to the boiler, so that the water-level in the latter will be just above the pipe 24, while the pipe 24 will be but a little below the level of the top of the float 2. Said chamber 1 has a central hollow stem 3, closed at its lower end but provided with a drain pipe 20.

The inner wall of the stem part 3 is cylindrical, and adapted to receive the fitting cylindrical valve-body 8, whose upper end extends into the hollow of the chamber 1 and has its top concaved to fit the convex lower end of the tube 6, and alined therewith. The numeral 2 denotes a relatively large open-top cup-shaped body or float, integral and concentric with the upper part of the valve-body 8. The lower part of the steam-pipe 7 extends down centrally into the diminished stem 3, and is closed by a cap 38. The body 8 has a central bore alined and registering with the communicating bore or channel of the tube 6. The said cap 38 fits the bore in said valve, permitting the valve to move up and down thereover. The pipe 7 and its cap 8 have the two openings 10 and 11, in one side, which are adapted to effect communication alternately between the inside of said pipe 7 and the transverse openings 12 and 13 in said valve. Said valve is provided with a relatively wide annular groove 9 between the orifices 12 and 13, adapted to communicate at all times with an exhaust-pipe 16 in the diminished part or stem 3. The wall of the diminished part 3 is provided with ports in communication with the pipes 14 and 15, respectively, which ports are adapted to be placed alternately in communication with the openings 12 and 13 in said valve as the latter is moved up or down.

When water passes from the boiler

through the pipe 24 to the chamber 1, filling the latter, the cup 2 is filled and drops, aided by its weight, and opens an annular passage between the lower end of the tube 6 and the part 8. The port 12 then delivers into the port 10, while the port 11 registers with the exhaust-channel 9 and port 16. Steam passes from the pipe 7 through the ports 12, 10 and pipe 14 to the left-hand end of the cylinder 26 to push the piston 27 to the right, causing the rod 28 to rock the pitman 31 to cause the rod 35 to shut off water from the boiler. When the water in the boiler falls below the level of the pipe 24, steam will pass from the boiler through the pipe 24 into the chamber 1. The entering steam will blow out most of the water from within the float 2 through the small chamber 37 and pipe 22, but enough will remain in the chamber 1 to buoy up said float, which in rising, will close the port 12—10 to the pipe 14, and open the port 11—13 to the other pipe 15, so that steam will enter the right-hand side of the cylinder 26 to shift the piston 27 to the left, causing it to act upon the injector to admit water to the boiler. Since the distance from the pipe 24 to the top of the float 2 is so small, the operation of the device in reestablishing the water-level in the boiler is very quick and automatic, and so allows but a small amount of water to escape by way of the pipe 22 each time. The figure shows the positions of the parts of the device at this time.

It will be seen that the action of my improved devices is, therefore, entirely automatic, and governed by the water and steam pressure in the boiler, to actuate upon said intermediate mechanism to cause the injector to alternately supply water to, or to cut off communication with the boiler.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is:

1. A device for regulating the water-level in boilers, comprising a cylinder containing a piston whose rod extends externally thereof, an arm to which said piston is pivotally connected intermediate its ends, connecting-rods from the ends of said arm to the steam and water admission valves of an injector, a closed vessel having a diminished basal portion, the latter provided with spaced exit-ports and an exhaust-port out of line therewith, a valve movable in said diminished end past said ports and having a central longitudinal hollow closed at the lower end, and also having orifices adapted to effect occasional communication between the said hollow and said exit-ports alternately, communications between said exit-ports respectively, and opposite ends of said cyl-

inder, a float in said vessel connected to said valve, said vessel having a valve-controlled communication with a boiler, and a conduit in communication between the steam-dome of the boiler and the hollow of said valve, said float when moved down by water entering from the boiler being adapted to move the valve to shift the steam from one of said exit-ports to the other, and when caused to rise by steam entering the vessel from the boiler, to reestablish communication between the hollow of the valve and the other exit-port.

2. A device for regulating the water-level in boilers, comprising a cylinder containing a piston whose rod extends externally thereof, an arm to which said piston is pivotally connected intermediate its ends, connecting-rods from the ends of said arm to the steam and water admission-valves of an injector, a closed vessel having a diminished basal portion, the latter provided with spaced exit-ports and an exhaust-port, said vessel having a water overflow port, a valve movable in said diminished end past said exit and exhaust ports and having a central longitudinal hollow closed at the lower end, and also having orifices adapted to effect occasional communication between the said hollow and said exit-ports alternately, communications between said exit-ports respectively and opposite ends of said cylinder, a steam-pipe leading centrally through said vessel and extending into the hollow of said valve, and in communication with the steam-dome of a boiler, and having orifices adapted for occasional communication with the valve-orifices respectively when said valve is moved past them, said vessel being in communication with the water-containing interspace of said boiler, a cup-shaped float fixedly connected with said valve and seated about said steam-pipe, a fixed hollow tube in communication with the overflow-port of said vessel and with the interior of said cup-shaped float, the lower end of said tube detachably fitting the inner part of said float fittingly when the float is in its uppermost position, said tube being seated about and spaced from said steam-pipe, and said float, when moved down by water entering the vessel from the boiler, lowering said valve to cause communication through the valve to one side of said cylinder, and when lifted, to shift communication from the steam-pipe to the opposite end of said cylinder.

Signed at Oelwein, Iowa, this 11th day of Oct. 1913.

JOHN LEE.

Witnesses:

T. C. GAITLEY,
LEO STEFFEN.