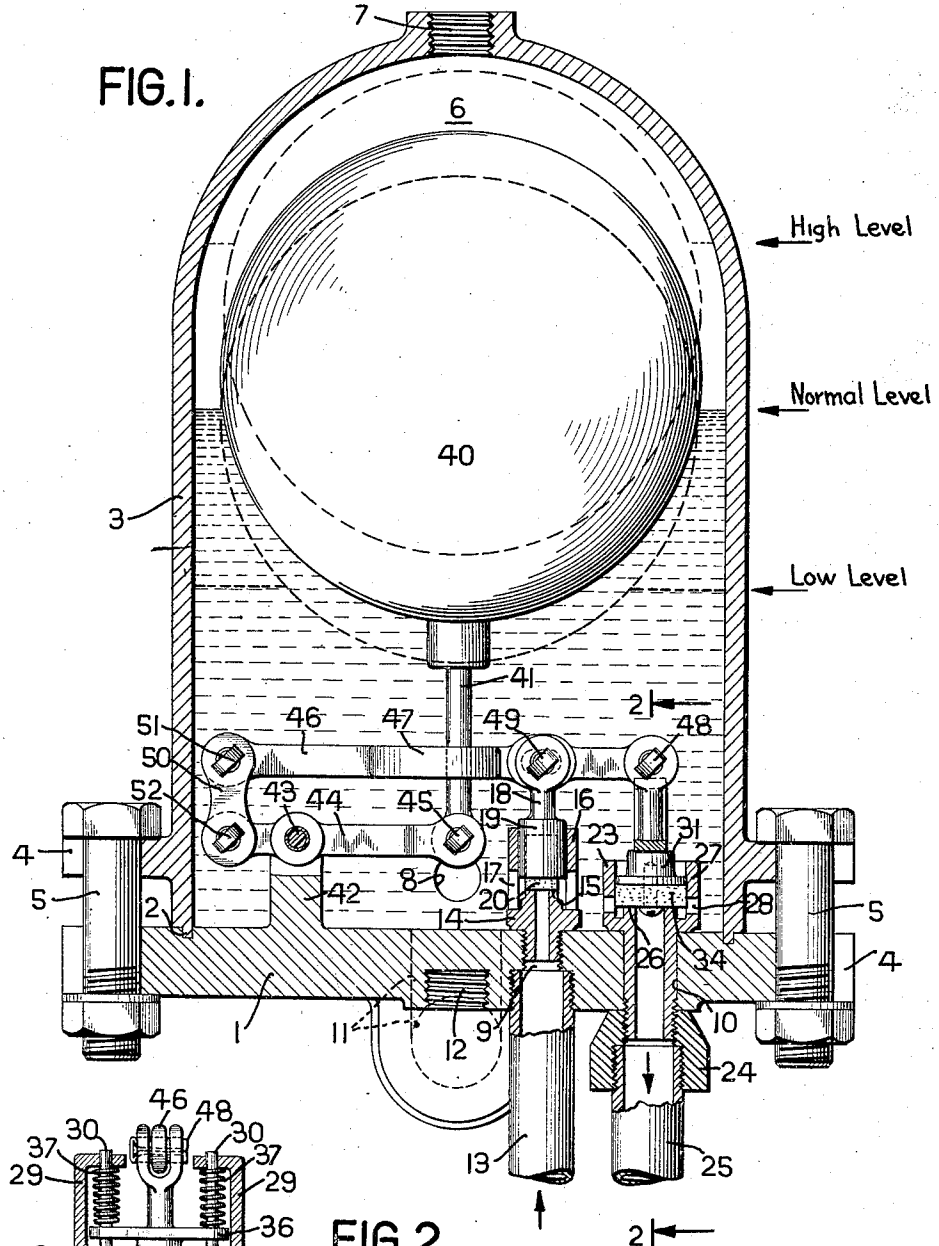
Dec. 16, 1930. L. P. FLOOD 1,785,547

DUPLEX FEEDER FOR LOW PRESSURE HEATING BOILERS

Filed June 8, 1928

FIG. 1.



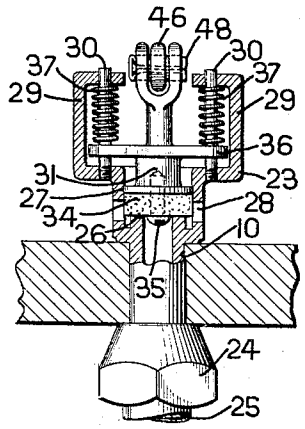


FIG. 2.

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UNITED STATES PATENT OFFICE

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DUPLEX FEEDER FOR LOW-PRESSURE HEATING BOILERS

Application filed June 8, 1928. Serial No. 283,876.

The invention relates in general to feed water controlling devices and, more particularly, to a duplex feeder for low pressure steam heating boilers.

In steam heating systems and other systems using low pressure steam, the water level in the boiler drops due to leaks and other losses. The water level may also rise at times due to discharge from the radiators or other heated devices. It is, therefore, necessary and desirable from the standpoint of safety and efficiency to provide means for maintaining the water level in the boiler substantially constant.

According to one form of the invention a so called duplex feeder for low pressure steam boilers is provided, which operates by a single float and automatically allows feed water to flow into the boiler when the level drops below a predetermined point and allows water to discharge when the water level rises above a predetermined point.

The invention also consists in certain new and original features of construction and combinations of parts hereinafter set forth and claimed.

Although the novel features which are believed to be characteristic of this invention will be particularly pointed out in the claims appended hereto, the invention itself, as to its objects and advantages, the mode of its operation and the manner of its organization may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part thereof, in which

Fig. 1 is a section through a duplex feeder according to the invention; and

Fig. 2 is a detail on the line 2—2 of Fig. 1 illustrating the construction of the discharge valve.

In the following description and in the claims parts will be identified by specific names for convenience, but they are intended to be as generic in their application to similar parts as the art will permit.

Like reference characters denote like parts in the several figures of the drawings.

In the drawings accompanying and forming part of this specification, a practical commercial embodiment of the invention is shown, but as such illustration is primarily for purposes of disclosure, it will be understood that the structure may be modified in various respects without departure from the broad spirit and scope of the invention as hereinafter defined and claimed.

Referring now to the drawing, the feeder comprises a base 1 having an annular groove 2 and a domed cylindrical body 3 having a flange fitting into the groove. The base 1 and body 3 are provided with forked projections 4 in which are disposed nuts and bolts 5 for clamping the members together, to make a water-tight joint therebetween. A gasket of lead wire (not shown) may be placed in the groove 2 under the flange to aid in making a tight joint.

The chamber 6 formed by the body and base is provided with suitable openings. The body 3 is provided with an opening 7 in the top for connection to the top of a water gage glass (not shown) and to a pipe (not shown) leading to the steam space of the boiler. The body is provided with a second opening 8 which may be connected to the bottom of the water gage glass. The base 1 is provided with an intake opening 9 and a discharge opening 10 and another opening 11 for connection to a pipe (not shown) leading to the boiler below the lowest allowable water level. The base 1 is also provided with a screw threaded recess 12 to which may be fastened a suitable support for supporting the feeder, if desired.

The intake opening 9 is screw threaded to receive a pipe 13 to which is connected a source of feed water under sufficient pressure to feed the boiler. A valve fitting 14 is also threaded in this opening, this fitting comprising an annular valve seat 15 and a cylindrical guide 16 having openings 17 in the side wall. The valve plunger 18 disposed in the guide is made up of a hollow holder 19 in which is placed a washer 20 made of suitable material, such as lead, hard fibre or the like.

The base is provided with a second fitting 23 disposed in the opening 10 and held there

by a nut 24 screwed on the bottom. This nut 24 has an enlarged recess to which is threaded a discharge pipe 25, through which the excess water passes, as will be hereinafter described. The fitting 23 is provided with an annular valve seat 26 and a cylindrical guide 27 having openings 28. The cylindrical guide has a pair of U-shaped standards 29, each standard having aligned openings in which are disposed suitable pins 30 threaded in the lower openings.

Disposed in the fitting 23 is a valve disc 31 having a flat washer 34 made of suitable material secured thereto, by a screw 35. Projecting ears 36 are provided on the disc 31 through which the pins 29 pass. Each pin 29 has a coil spring 37 operating between the upper part of the standard and the ear 36 to yieldably hold the valve disc on its seat.

Disposed in the chamber 6 is a ball float 40 having a stem 41 secured thereto. The base 1 is provided with an upstanding forked fulcrum 42 to which is pivoted, by a pivot 43, a lever 44. The stem 41 is pivoted to the lever 44 by pivot 45. A transverse member 46 having an enlarged portion 47 with an opening straddling the stem 41 is pivoted to the forked stem of the valve disc 31 by pivot 48 and to the forked stem of valve plunger 18 by pivot 49. The member 46 has an elongated slot disposed between the forked end of the valve plunger 18 to pivotally connect the member to the plunger and to allow a certain amount of relative lateral movement therebetween. A link 50 having forked ends is pivoted to member 46 by a pivot 51 and to the lever 44 by a pivot 52.

The water level in the chamber 6 is the same as the level in the boiler on account of the direct connection of the feeder to the steam space and water space of the boiler. When the water level in the boiler and feeder is normal, the float 40 is, for example, in the position shown in full lines and both intake and discharge valves are closed. If the water level drops, say to the low level indicated, the float also drops, and the system of linkage moves the member 46 about the pivot 48 opening the intake valve 18, allowing the boiler to receive feed water until normal water level is obtained at which time the valve 18 closes.

If the water level rises say, to the high level indicated, the additional upward pressure exerted on the float causes the member 46 to pivot now about the pivot 49, raising the discharge valve 31 against the springs 37 allowing water to discharge to reduce the level to normal at which time the valve closes.

Thus it will be seen that the springs 37 normally hold the valve 31 closed and, when the water level is normal the springs are strong enough to allow the intake valve 18 to seat with enough pressure to prevent influx of the feed water under pressure. When the float rises above normal, enough additional pressure is impressed on the float to overcome the tension of the springs 37 to open the discharge valve 31.

Thus a duplex feeder for low pressure steam boilers is provided which takes care of too high a level and too low a level by a single ball float. The arrangement consequently occupies but small space and may be made relatively inexpensively. At the same time the device is very reliable in operation and should have long life and require but small upkeep. The parts are few, they may be made rugged and the arrangement is such that there is nothing to get out of order.

While certain novel features of the invention have been shown and described and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes in the forms and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. A duplex feeder for low pressure heating boilers comprising a chamber adapted to have a certain water level therein corresponding to the water level in the boiler, the floor of said chamber having an outlet opening, a fulcrum in said casing, the floor of said casing having an inlet opening between said outlet opening and fulcrum, a float having a stem between said inlet opening and fulcrum, a lever pivoted between its ends to said fulcrum and at one end to said stem, said openings having valve guides, valves in said guides, a member pivoted to said valves, a link connecting the free end of said lever and adjacent end of said member, and spring means normally holding the valve for said outlet opening closed.

2. A duplex feeder for low pressure heating boilers comprising a base and detachable hollow top forming a chamber, said base having an outlet opening surrounded by valve seat, a fulcrum rising from said base, said base having an inlet opening surrounded by a valve seat and located between said outlet opening and fulcrum, a float having a depending stem, a lever pivoted between its ends to said fulcrum and at one end to said stem, said valve seats having upstanding guides, valves longitudinally slidable in said guides, a transverse member pivoted to said valves, a link connecting the free end of said lever and adjacent end of said member, said outlet valve guide having an abutment and a coil spring between said abutment and outlet valve to normally hold said outlet valve against its seat.

3. An article of the class described comprising a chamber, a single float for controlling the level of liquid in said chamber, said chamber having inlet and outlet openings, in-

let and outlet valves for said openings, a member pivoted to said valves, connection between said float and member, and means whereby each valve acts as a fulcrum for said member to open the other valve.

4. In combination, a first valve, a second valve, a lever pivoted to said valves, an actuating member responsive to change in water level, and means operated by said actuating member whereby said lever may open each valve using the other valve as a fulcrum, and additional elastic means for holding one of said valves closed, said actuating member holding said other valve closed at normal water level.

5. In apparatus of the class described, a chamber having an outlet opening and a fulcrum, said chamber having an inlet opening between said outlet opening and fulcrum, an operating member responsive to change in liquid level in said chamber, a first lever pivoted between its ends to said fulcrum and at one end to said operating member, inlet and outlet valves for said inlet and outlet openings respectively, a simple, transverse, second lever pivoted to said valves, a link connecting the other end of said first lever and adjacent end of said second lever, and givable means normally holding said outlet valve closed.

6. In apparatus of the class described, a chamber having inlet and outlet openings, an operating member responsive to change in liquid level in said chamber, inlet and outlet valves for said inlet and outlet openings respectively, a lever pivoted to said valves, connection between said lever and said operating member, and means whereby each valve acts as the fulcrum for said first lever to open the other valve.

7. In apparatus of the class described, a chamber having an outlet opening and a fulcrum, said chamber having an inlet opening between said outlet opening and fulcrum, an operating member responsive to change in liquid level in said chamber, inlet and outlet valves for said inlet and outlet openings respectively, a first lever pivoted to said valves, a second lever pivoted to said operating member, a link connecting said levers, and means whereby each valve acts as the fulcrum for said first lever to open the other valve.

In testimony whereof I have hereunto set my hand.

LEO P. FLOOD.