

995,901.

Fig. 1.

Fig. 2.

Fig. 3.

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APPLIANCE FOR FEEDING BOILERS.

995,901.

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To all whom it may concern:

Be it known that I, WILHELM BARTHOLDT DIDRICK PONNINGHAUS, a subject of the King of Great Britain and Ireland, residing at 26 Nottingham street, Prahran, a suburb of the city of Melbourne, but previously of 30 Portland Place, South Yarra, a suburb of the city of Melbourne, in the county of Bourke, State of Victoria, Commonwealth of Australia, have invented certain new and useful Improvements in Appliances for Feeding Boilers, of which the following is a specification.

This invention relates to that class of boiler feeding appliance comprising a chamber into which feed water is drawn by a vacuum caused by the condensation of steam, the steam being alternately turned on and off from the chamber by the rising and falling of a float within it.

When the water level and float have fallen, by various mechanisms, the admittance of steam has been cut off and the steam within the chamber condenses forming a vacuum and drawing feed water into the said chamber. The float, rising with the incoming water, has caused steam to be turned on, the water within the chamber then gradually passing into the boiler and the float again descending has again cut the incoming steam off, the operation so continuing.

In the past a number of mechanisms and devices have been suggested whereby the float may cut off and admit steam to the chamber, but the parts of many of these have either been great in number, inaccessible for repair and renewal, complicated or costly. Hollow plugs have been proposed in conjunction with tappet plates and hammers, but these have been liable to stick and seize in addition to having only a restricted steam inlet area. Further, the floats have, if leaking, become waterlogged and inefficient in operation.

The object of this invention is to dispense with hollow plugs and the like, and to provide a reliable and cheap float actuated mechanism of but few, simple parts, easily accessible for repair and renewal. Also to prevent the float becoming inoperative should it leak, to render the float more active by such provision, to provide for the apparatus being used as an independent pump if desired without disconnection from the

boiler, and to render the apparatus as a whole positive in action and capable of being immediately started and stopped.

Other objects and advantages will be in part pointed out and in part obvious hereafter.

Referring to the drawings which form a part of this specification, Figure 1 is a side sectional elevation of this invention the chamber being charged with feed water, the float being up and steam being still admitted. Water is passing from the chamber into the boiler. Portions have been broken away for convenience of illustration. Fig. 2 is a plan, partly in section, of Fig. 1. Portions have been broken away for convenience of illustration. Fig. 3 is a sectional view of Fig. 1 looking in the direction of the arrow, the broken line X—X indicating the plane of section. Portions have been broken away for convenience of illustration.

This invention includes a steam boiler (not shown), adjacent to which is situated a casing 2 having a steam inlet valve 3, passing steam from the boiler into the casing. On the steam pipe leading from the boiler to the said valve 3 is a stop valve 4. Adjacent to and below the inlet valve 3 in the said casing is a steam escape valve 5, having above and integral with it an extension provided with a slot-way 6 open on one side. In the casing near the valves 3 and 5 is an inspection plug 7. Situated in each side of the said casing, between the valves 3 and 5, is a minor bearing 8 and near the center of each side of the casing is also a major bearing 9 having an elongated portion 10. Above the casing is an air escape cock 11. Around the casing bottom is a flange 12.

Inside the casing is a valve actuating lever having an outer end 15, and a bifurcated inner end 16. The said lever turns upon a minor pivot pin 17 resting in the minor bearings 8 and passes through the slotway 6. Across the inner end of the said lever is a bridge 18. Beneath the said inner end 16 is a limit stop 19. Inside the said casing is also a bifurcated tumbler. This has an inner end 20, and an outer end 21. Between the two members of the said tumbler extends an upper limit stop 22 and a lower limit stop 23. The outer end of the said tumbler has thereon a counterpoise 24. From near the middle of the said tumbler extend arms 25, each of which has a hole therein to accom-

modate a major pivot pin 26 resting in the major bearings 9. To the said major pivot pin 26, is also pivoted a lever having a lifting inner end 27 and a lifted outer end 28 to which latter is attached a hammer 29. This lever moves between the two members and arms of the tumbler.

To the inner end 20 of the bifurcated tumbler, by an upper pivot pin 30 is pivoted a bifurcated connecting rod 31 to the bottom of which is pivoted a lower pivot pin 32, supporting a float rod 33. Around this rod are upper and lower adjusting nuts 34. A float encircles the float rod 33 between the nuts 34 and is free to move up and down the said rod. The top 35 and bottom 36 of this float are dome shaped and the sides 37 corrugated for strength, as under pressure it has not, formerly, been uncommon for a float to be severely strained and rendered leaky. Within the float, and extending from the top near to the bottom of the same, is a tube 38. At the top of said float and controlling said tube is a non return valve 39.

Secured or joined by bolts or the like to the casing before referred to is a chamber 40 having an upper flange 41, a lower flange 42, and a door 43 covering said lower flange. Attached to the door is a drain cock 44. Attached to one side of said chamber is a gage glass 45.

Attached to the door 43 is a water pipe 46 from which extends a branch pipe 47 having thereon a stop valve 48. Attached to the branch pipe 47 is a valve box 49 provided with a valve 50. At the bottom of the outlet pipe 46 is a valve box 51 into which opens a non return valve 52 having a square seating 53 as shown and an annular recess 54 below said seating which in effect forms a water seal and acts as a cushion. Controlled by the valve 52 is a branch pipe 55 communicating with the boiler and provided with a stop valve 56. Within the valve box 51 and communicating from above to below the valve 52 is a by-pass passageway 57 controlled by a by-pass hand valve 58.

The object of the branch pipe 47 is to render the appliance usable as an independent water lifter or pump should it, for instance, not be required at any time for feeding the boiler to which it is attached. Normally, when the boiler is being fed, the valve 56 is open and the valve 48 is closed. By closing 56 and opening valve 48 the water is not fed to the boiler but to any other place desired through the branch 47. The valve 50 is to prevent the vacuum, formed in the chamber 40 each time the steam escape valve 5 is opened, being broken.

Controlled by the steam escape valve 5 is an exhaust pipe 59 leading into a condenser 60, consisting of a copper ball within which, and below the exhaust pipe 59, is a steam distributor 61. Supporting or partially sup-

porting the distributor within the condenser is a tube 62 having in its lower end escape holes 63. Opening outwardly from the condenser, beneath the tube 62 is an exhaust or escape valve 64. Surrounding the condenser is replenishing water within a feed water vessel 65. This may be of any desired character.

Within the feed water vessel 65 is also a nozzle or strainer 66 above and in communication with which is a valve box 67 having a valve 68 therewithin with a square seating 6. Connected to the valve box 67 and also the door 43 is a suction pipe 70.

The cycle of operations with this invention is as follows:—The branch pipe 55 and the steam inlet pipe above the inlet valve 3 are connected to the boiler within which a water level is to be maintained. Upon steam mounting in the boiler the air escape cock 11, the stop valve 56 and the by-pass valve 58, are opened and hot water flows from the boiler into the chamber 40. The float rises with the incoming water lifting the float rod 33 and connecting rod 31. The inner end 20 of the tumbler is thereby lifted and the counterpoise 24 lowered. Upon the tumbler turning, the upper limit stop 22 engages the outer end 28 of the lever pivoted to the major pivot pin 26, the hammer 29 of said lever over-balancing and falling leaving the inner end 16 of the lever pivoted to the minor pivot pin 17 free to fall. The outer end 15 by the falling of the inner end 16 is elevated opening the steam inlet valve 3 and closing the steam escape valve 5. The air escape cock 11 and the by-pass valve 58 are now closed and the stop valve 4 opened admitting steam from the boiler into the casing 2. As the water in the boiler decreases, that within the casing passes into said boiler through the valve 52 which has fallen open with the removal of the boiler water pressure. The float falling with the water level lifts the counterpoise 24, the hammer 29 being elevated by the rising of the lower limit stop 23. Upon the hammer over-balancing the inner end 27 of the lever it controls engages with the bridge 18, lifting the inner end 16 and depressing the outer end 15 of the valve actuating lever. As the outer end 15 is depressed the steam inlet valve 3 falls cutting off the admittance of steam, but the escape valve 5 opens. The steam within the casing 2 and chamber 40 now escapes through the valve 5 passing down the exhaust pipe 59 and entering the condenser 60. As it enters the condenser it strikes the distributor 61 and being thus dispersed rapidly condenses. Excess pressure is provided for by the valve 64. Upon the steam condensing a vacuum or partial vacuum is formed within the chamber 40 which draws water from the feed water vessel 65 through the strainer 66, past the valve 68, through the suction pipe 70 into the cham-

ber. The float rising with the incoming water the tumbler, valve actuating lever, and the valves are again operated.

It will be understood that water accumulating within the condenser escapes through the escape holes 63 and valve 64 on each successive incoming charge of steam.

Should the float become leaky after continuous use, it will be clear that steam entering the leak condenses into water which is forced up the tube 38 and out past the valve 39 by the further entrance of steam with each successive operation of the appliance. The float, therefore, cannot become loaded with water and inoperative.

To use the appliance for lifting water the stop valve 56 is closed and the stop valve 48 opened, thus cutting off the water from the boiler.

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

1. An appliance for feeding boilers, comprising a chamber, a water outlet pipe from said chamber a valve box in said outlet pipe, a check valve within said box, a branch pipe connected to said outlet pipe between the valve box and the chamber, a stop valve in said branch pipe, a by-pass passageway within said valve box, and a hand valve controlling said by-pass.

2. In combination, a closed chamber, a float therein, water supplying means connected with said chamber, a lever pivoted in said chamber, adjacent steam inlet and outlet valves connected with the upper part of said chamber above and below the lever, said lever being adapted to simultaneously open one valve and close the other, a condenser connected with the steam outlet, and means connected with said float for actuating said lever.

3. In combination, a closed chamber, a float therein, water supplying means connected with the lower part of said chamber, a lever pivoted in said chamber, steam inlet and outlet valves connected with the upper part of said chamber at opposite sides of the lever pivot, said lever being adapted to si-

multaneously open one valve and close the other, a tank, a condenser in said tank connected with the steam escape valve, a weighted lever adapted to control the movements of the valve lever, and means connected with said float for shifting said weighted lever.

4. In combination, a chamber, a water inlet and a water outlet at the lower portion of the chamber, a lever pivoted in the upper part of the chamber, a steam inlet pipe and valve and steam outlet pipe and valve connected with the upper portion of said chamber at opposite sides of the pivot of the lever, said lever being adapted to simultaneously open one steam valve and close the other, a tank, a condenser therein connected to the steam outlet pipe, a float in said chamber; a weighted lever pivoted beside the valve controlling lever adapted to operate the latter, a second pivoted lever for shifting the weighted lever, and connections between the float and the latter pivoted lever.

5. In combination, a tank, a chamber, a valved water inlet from the tank to the chamber, and a valved water outlet from the chamber, a lever pivoted in the upper part of the chamber, a steam inlet pipe and valve and steam outlet pipe and valve connected with the upper portion of said chamber at opposite sides of the pivot of said lever; a condenser in the tank connected with the steam outlet pipe, said lever being adapted to simultaneously open one steam valve and close the other; a float in said chamber, a weighted lever pivoted beside the valve controlling lever adapted to operate the latter, and a second pivoted lever for shifting the weighted lever, and connections between the float and the latter pivoted lever.

In testimony whereof, I have hereunto affixed my signature, in the presence of two subscribing witnesses.

WILHELM BARTHOLDT

DIDRICK PONNINGHAUS.

Witnesses:

CECIL W. J. SLESTRIER,
ALAN McEACHEN.