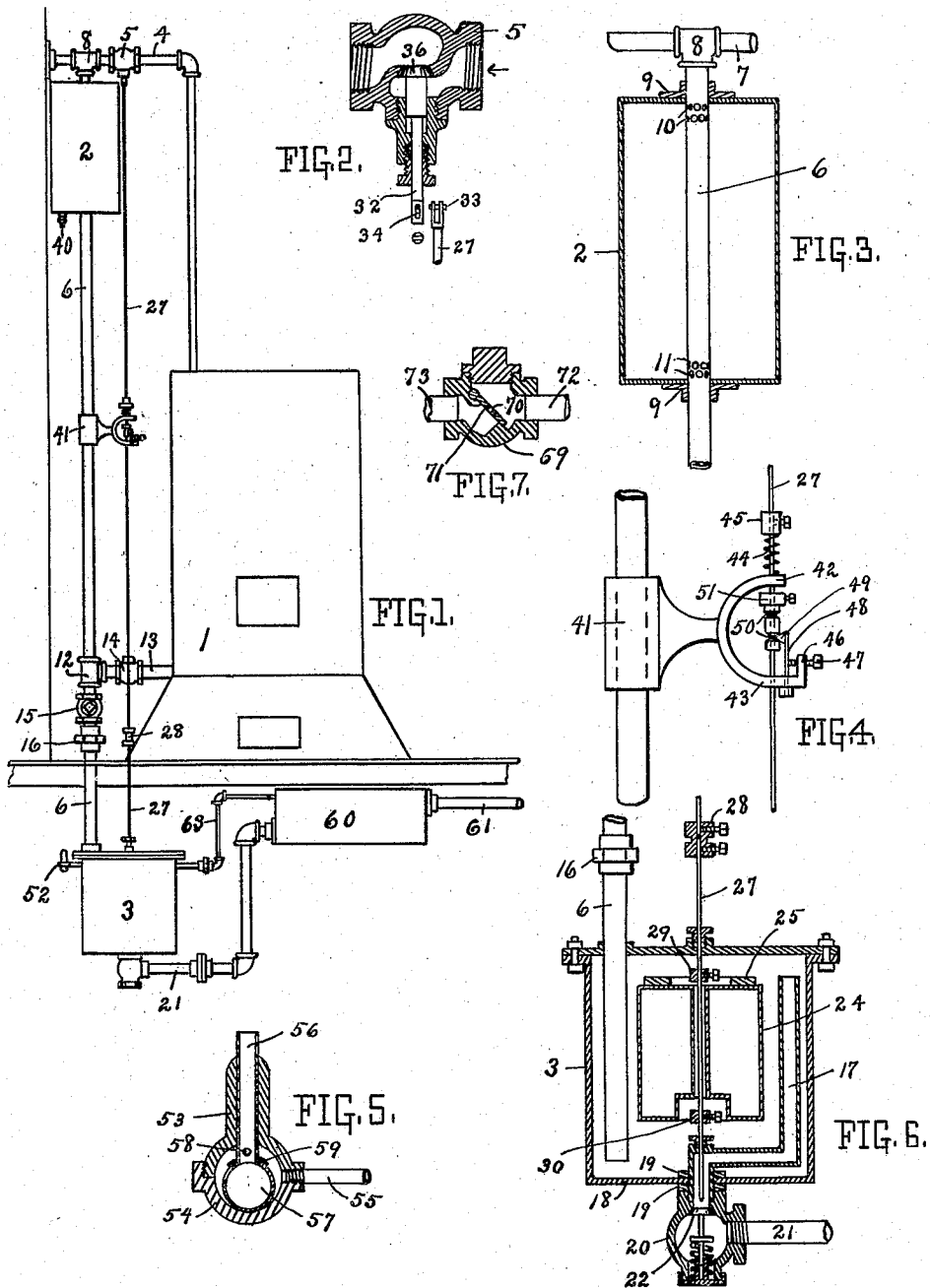


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BOILER FEEDER.  
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933,461.

Patented Sept. 7, 1909.



Witnesses:

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# UNITED STATES PATENT OFFICE.

CHARLES A. JESSOP, OF DETROIT, MICHIGAN.

## BOILER-FEEDER.

933,461.

Specification of Letters Patent.

Patented Sept. 7, 1909.

Application filed December 17, 1908. Serial No. 467,987.

*To all whom it may concern:*

Be it known that I, CHARLES A. JESSOP, a citizen of the United States, and residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Boiler-Feeder, of which the following is a specification.

My invention relates to automatic means for periodically introducing a quantity of water into a boiler, and its object is to provide a simple and efficient device which shall continuously return the condensed water of the heating system to the boiler.

My invention consists in two receptacles, one set below the radiators of the heating system and the other above the boiler, so connected that atmospheric pressure will cause the water to flow periodically from the lower receptacle into the upper, and from the upper into the boiler.

It further consists in combination with said receptacles, a series of controlling valves and a float, whereby the rapidity of the periodic discharges shall be regulated.

In the accompanying drawings Figure 1 is a view of my complete device. Fig. 2 is a vertical cross section of the valve which controls the admission of the steam to the upper receptacle. Fig. 3 is a vertical cross section of the upper receptacle. Fig. 4 is a view of the retarding mechanism of the valve operating rod. Fig. 5 is a vertical cross section of an air valve. Fig. 6 is a vertical cross section of the lower receptacle. Fig. 7 is a vertical cross section of another type of air valve.

Similar reference characters refer to like parts throughout the several views.

In the drawings 1 is a boiler of any usual type, 2 is the upper receptacle of my feeding system and 3 the lower receptacle. A pipe 4 connects to the boiler and to the valve 5, which connects to the vertical pipe 6 by means of a nipple 7 and T 8. Flanges 9 form tight joints around the pipe 6 at the ends of the receptacle 2, while holes 10 permit steam to flow into the receptacle, and holes 11 permit water to flow into and out of the same. A T 12 connects into this pipe 6 and from this T a pipe 13 branches off which forms the feeding pipe of the boiler. A check valve 14 prevents the return of the feed water. Below the T 12 is a check valve 15 preventing flow down the pipe 6, a union 16, and a continuation of the pipe 6 which extends into the receptacle 3 as shown in Fig. 6. In this

receptacle 3 is a bent pipe 17 having its lower end screw threaded and extending through the bottom 18 of the receptacle. Jam-nuts 19 insure a tight joint. A valve body 20 screws onto the end of this pipe 17 and receives the pipe 21 through which the condensed water of the heating system enters this feeding device. A spring-held valve 22 normally closes the passage to the pipe 17. A vertically movable float 24 has a counter-weight 25 of such proportions that the weight of the float and the counter-weight will be about the same as the lifting power of the float when submerged.

Vertically movable in the lower receptacle is a rod 27 which may be formed of two parts connected by a coupling 28 so that its length can be properly adjusted. On this rod are collars 29 and 30 which are engaged by the float 24 as it rises and falls and by means of which the rod 27 is moved up and down. The position of the collars determines the distance the float rises and falls and thereby the amount of water lifted at each stroke. The upper end of this rod connects to the valve stem 32 by means of the pin 33. The valve stem has a slot 34 so that this pin may have a slight movement before it moves the valve 36 from its seat in the body 5.

The operation of the different parts thus far described is as follows: With both receptacles empty, the float 24 will rest on the collar 30 and the lower end of the rod 27 will move the valve 22 from its seat and thus permit water to flow in through the pipes 21 and 17 into the receptacle 3. The pipe 17 passes up along the wall of the receptacle so that the flow of the water into the receptacle 3 will not disturb the float 24. When the float is in its lower position it will rest on the collar 30, and the float and the rod 27 will have moved the valve 22 from its seat, the rod also holding the valve 36 from its seat, thus permitting steam from the boiler to enter the receptacle 2. A small valve or pet-cock 40 may be opened to permit the escape of any air that happens to be in the receptacle 2 at the beginning of the operations, and is then closed. The water flowing into the receptacle 3 will finally raise the float 24 until it contacts with a collar 29, pressing up the rod 27, and permitting the valves 22 and 36 to close. As soon as this valve 36 is closed, the steam in the receptacle 2 condenses, a vacuum is

formed, and the water in the receptacle 2 rushes up the pipe 6. The float 24 then settles as the water escapes from the receptacle 3 and again pushes down the rod 27 by means of the collar 30. The valve 36 is again opened and steam will flow into the receptacle 2 through the holes 10 and the water in the receptacle will flow down the pipe 6 through the holes 11. As the check valve 15 prevents the water from going back into the tank 3, and as the pressure in the receptacle 2 is the same as in the boiler, the water from the tank 2 will flow into the boiler through the pipe 13. To prevent the rod 27 from moving except under pressure of the float, a bracket 41 may be secured to the pipe 6, which bracket has two arms 42 and 43 through holes in which the rod 27 is freely movable. A spring 44 between the arm 42 and collar 45 carries the weight of the rod 27 and the parts connected thereto. The extensions 46 of the arm 43 carries a set screw 47 that regulates the tension of the spring 48, which has a lug 49 at its free end. This lug is adapted to engage in either one of the circumferential grooves 50 of the sleeve 51, which is secured to the rod 27. The sleeve and rod are by these means held in position until the stress on the rod is sufficient to overcome the grip of the spring. To permit the air in the receptacle 3 to escape while the receptacle is filling and to enter while it is empty, any desirable air valve 52 may be employed. In Fig. 5 is shown a valve consisting of a body formed by two parts 53 and 54 secured together, into which the pipe 55 may be screwed, which pipe connects the valve to the receptacle 3. A light tube 56 connects to the float 57 and is formed with holes 58. So long as air alone passes through the pipe 55 the parts will remain in the position shown in Fig. 5 and the air will pass into the valve through the holes 58 and out through the top of the tube 56. As soon as any water enters, the float will rise and the rubber washer 59 will close the passage around the tube 56 thus sealing the passage.

Another type of air valve is shown in Fig. 7 which is the usual swing check valve 69 with a small hole 70 in the valve disk 71. This permits air or steam to slowly pass from the lower receptacle through the pipe 72, valve 69 and pipe 73 to the sewer; while opening and permitting a rush of air into the receptacle 3 when the vacuum in the receptacle 2 causes the water to flow up the pipe 6. Any water that may pass through the hole 70 will flow to the sewer. Normally a tank 60 should be interposed between the receptacle 3 and the return pipe 61 of the system, but this tank 60 is not absolutely necessary with "pressure" systems. Where a pressure system is employed, that is, where the pressure of steam is above that of the at-

mosphere, the air valve 52 will be used, but with a vacuum system, where the pressure of the steam is less than that of the atmosphere, the air valve cannot be used. In that case a small pipe 63 should be used to connect the top of the receptacle 3 with the top of the tank 60. This pipe 63 can also be used with the pressure system. Under the usual arrangements of boilers and radiators it is necessary that the boiler be placed at a lower level than the radiators so that the condensed water can return to the boiler by gravity. This commonly necessitates the radiators in basements to be secured to the ceilings which of course is very undesirable. But with this system just described the boiler can be placed at any desirable location, all that is necessary being that the receptacle 3 be so far below the radiators that the condensed water will flow thereto by gravity, and that the receptacle 2 be so far above the boiler that the water will flow to the boiler. Under all except the most unusual conditions, the distances between the two receptacles need not be above ten feet.

Having now explained my improvements what I claim as my invention and desire to secure by Letters Patent is:—

1. In a boiler feeder, the combination of a receptacle, a second receptacle above the same, pipes connecting the receptacles and the boiler, a float in the lower receptacle, a steam pipe connecting the upper receptacle and the boiler, a valve operable by the float to admit water into the lower receptacle, and a second valve operable by the float to admit steam to the upper receptacle.

2. In a boiler feeder, the combination with a boiler of a heating system, of two receptacles for water, one above the other, the upper receptacle being located above the boiler, pipes connecting the two receptacles and the boiler, a check valve in the pipes preventing the return of water to the lower receptacle, a second check valve preventing the flow of water from the boiler, a valve to admit water of condensation to the lower receptacle, a pipe to convey steam from the boiler to the upper receptacle, a valve in said pipe, and a float in the lower receptacle to operate said valves.

3. In a feeder for boilers of heating systems, the combination of two receptacles, one above the other and above the boiler, pipes connecting the same and the boiler, valves to admit water to the lower receptacle and steam to the upper receptacle, and a float in the lower receptacle to actuate the valves.

4. In a feeder for boilers, the combination of two receptacles, one above the other and above the boiler, a valve to admit water to the lower receptacle, pipes connecting the receptacles and the boiler, a steam pipe connecting the boiler and the upper receptacle,

a valve in said pipe, a rod to operate both valves, and a float in the lower receptacle to actuate the rod.

5 5. In a feeder for boilers, the combination of two receptacles, one above the other and pipes connecting the same and the boiler, a steam pipe between the upper receptacle and boiler, a valve in said pipe, a valve to admit water to the lower receptacle, a rod to operate said valves, a grooved sleeve on said rod, a spring to engage in said grooves to retain said rod in one or the other of two positions, and means to actuate the rod.

10 6. In a boiler feeder, the combination of two receptacles, one above the other, pipes connecting the same and the boiler, a steam pipe between the upper receptacle and boiler, a valve in said pipe, a stem for the valve, a rod to operate the valve and having a pin-and-slot connection therewith, a float in the lower receptacle to actuate the rod, and a valve under the control of the rod to admit water to the lower receptacle.

7. In a boiler feeder, the combination of two receptacles, one above the other, a tank, 25 a pipe to conduct water from the tank to the lower receptacle, a valve in said pipe, a second pipe connecting the tank and receptacle, an air valve connected to the lower receptacle, a float within the lower receptacle whose 30 lifting power is equal to its weight, a vertical pipe extending down to near the bottom of the lower receptacle and up through the upper receptacle and provided with holes within the same, a steam pipe connecting the upper 35 end of the vertical pipe and the boiler, a valve in the pipe, and a rod actuated by the float for operating both valves.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses. 40

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Witnesses:

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ELIZABETH M. BROWN.