

CIRCULATION MAINTAINING MEANS FOR WATER SUPPLY SYSTEMS.

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WITNESSES:

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CIRCULATION-MAINTAINING MEANS FOR WATER-SUPPLY SYSTEMS.

993,509.

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To all whom it may concern:

Be it known that I, IRVING COWLES, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Circulation-Maintaining Means for Water-Supply Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a novel construction in hot water supply systems such as are used in roundhouses of railroads to supply locomotive boilers with hot water or other supply systems, the object being to provide simple, efficient and economical means for maintaining water or other fluids at substantially the same temperature at all discharge points in the service pipes fed therefrom as the temperature in the source of supply for said pipes, and consists in the features of construction and combinations of parts hereinafter fully described and claimed.

In the accompanying drawings illustrating this invention: Figure —1— is a diagrammatic view illustrating my invention showing the pump, the reservoir supplied therefrom, the service pipe system connected with the reservoir and the connection between the latter and the pump for maintaining the water in circulation. Fig. —2— is a detail plan section on an enlarged scale on the line 2—2 of Fig. —1—. Fig. —3— is a plan section of a valve.

In hot water supply systems of the character referred to it is desirable that during idle hours, that is between the intervals of filling or washing out locomotive boilers, the water in the supply pipes leading from the source of supply of hot water shall be maintained at a substantially equally high temperature as the water in the reservoir or other source of supply so that upon effecting connection with a locomotive boiler in any one of the stalls of the roundhouse an immediate supply of hot water shall be assured instead of a primary supply of water which has been standing in the supply pipe and has cooled off. Such cold water is a source of danger to the boiler to be filled or washed out by reason of the fact that the boiler plates, etc., are hotter than the water which has been standing in the supply pipes

thus the first water entering the boiler should be hot so as to prevent sudden cooling of the latter and causing the sheets to crack by the sudden chilling thereof due to introduction of cold water.

Heretofore, so far as I am informed, in systems of this character two pumps have sometimes been used, one of which automatically maintains a given pressure in the water reservoir or heater and the other of which acts only to maintain the water in circulation. The first-named pump operates intermittently and the steam cylinder thereof consequently is alternately heated and cooled and the steam supply pipes, as well as the pump cylinder, are apt to fill up partially at least with water of condensation during the intervals of idleness of the pump. The opening of any outlet from the supply pipe to feed a boiler causes a sudden drop in pressure in the tank or reservoir and thereby causes the steam supply to the pump to be suddenly opened fully and the pump to instantly run at its full capacity. The sudden full head of steam to the pump starting the same with a jerk causes a pounding and strain on all parts which is quickly reflected in wear and tear on the same and should be avoided if it is desired to maintain the same in good condition.

The object of my invention is to provide means whereby the supply pump is maintained constantly in operation and the latter serves the double function of a supply and a circulating pump, these duties being automatically alternated in accordance with the variations in pressure in the system.

In my present apparatus I make use of the suction by-pass for pumps, described in a companion application of even date herewith Serial No. 556,146, varying the connection of the by-pass pipe to accomplish the objects aforesaid.

In the drawings illustrating this invention 1 indicates a tank, reservoir or water heater (all of which will be hereinafter included in the word "reservoir") which is connected with the supply pipes 2, 3 and 4 equipped with the valve controlled outlets at which connection is made with the locomotive boilers or other apparatus to be supplied, said supply pipe being preferably connected at its other end with said tank 1 by means of a pipe 6 in which a check valve 7 is interposed and which is adapted to prevent flow from the tank or reservoir 1

through said pipe 6 into said pipe 4. The steam cylinder 8 of the pump is supplied with steam through the pipe 9 in which a governing valve 10 is interposed which is connected by means of the pipe 11 with said tank or reservoir 1, the said valve being actuated by the tank pressure transmitted through said pipe 11 to control the steam supply to said pump. Said valve is of any of the well-known types in use and may be set to shut off the steam supply to said cylinder 8 when the tank pressure has reached a given point, as for example, one hundred pounds to the square inch. The water cylinder 12 of said pump is connected with the suction pipe 13 equipped with a foot valve 14 of any well-known design and delivers water to said tank or reservoir 1 through the discharge pipe 15 in which is interposed the casing 16 in which a vane 17 is pivotally mounted, the same being rigidly disposed upon a shaft 18 extending through the stuffing box 19 on said casing and suitably connected with the stem 20 of a valve or cock 21, the latter being interposed in, what I term, a by-pass pipe 22 connected at one end with said suction pipe 13 between the ends of the latter and at its other end with the pipe 6 between the check valve 7 and the pipe 4. A spring 23 coiled about said shaft 18 and engaging a collar 24 thereon at one end and a part of the casing 16 at its other end serves to maintain the vane 17 normally in the position shown in Fig. 2. The connection of said shaft 18 with said stem 20 of the valve 21 is such that when said vane 17 is in the position shown in Fig. 2 the valve plug 25 of said valve 21 is in the position shown in Fig. 3, that is, open.

The operation of the device is as follows: As soon as the pressure in the tank or reservoir 1 has attained the predetermined point, which in this instance we will assume to be 100 lbs. to the square inch, the valve 10 will be closed and the pump will cease operation. As soon as the pump ceases operating or its operation has slowed down to a given point the flow of water through the discharge pipe 15 will be insufficient to maintain the vane 17 turned against the action of the spring 23 and said vane will, therefore, be slowly turned by said spring to the position shown in Fig. 2. As soon as this occurs the said valve 21 will be open and consequently the pressure in the reservoir and the pipe system fed therefrom will slightly decrease thus serving to very slightly open said valve 10 and admit steam to the cylinder 8 of the pump in just sufficient quantity to maintain said pump in operation. Owing to the fact that the opening of said valve 21 serves to balance the pressures in the suction pipe 13 and reservoir 1 and the supply pipes, the pump will operate slowly but easily thus drawing water from the pipe 6 and suction

pipe 13 and returning the same through the discharge pipe 15 into the tank. The very small volume of water passed will be insufficient to cause a flow great enough to move the vane 17 against the action of the spring 23 and consequently said valve 21 will remain open until such time as the flow through said pipe 15 becomes sufficient to turn said vane 17. Owing to the interposition of said check valve 7 in the pipe 6 the water drawn from the latter through said pipe 22 must be taken from the reservoir 1 through the pipes 2, 3 and 4 and, therefore, the temperature of the water in said pipes will be maintained always substantially the same as that of the water in said tank or reservoir thus insuring an immediate supply of hot water at any of the supply openings 5 when connection is made therefrom to a locomotive boiler. As soon as one of the valves controlling said outlets 5 is opened the pressure in the tank or reservoir 1 would obviously suddenly decrease to a point sufficient to fully open the valve 10 thereby admitting a steam supply sufficient to cause said pump to work to a capacity necessary to supply water to the reservoir 1 as fast as it is withdrawn from the outlet 5. This will cause a sufficiently strong flow through the pipe 15 to turn said vane 17 against the action of the spring 23 thereby closing the said valve 21.

In a companion application filed of even date herewith I have shown and described a suction by-pass for pumps. The present invention is an adaptation of the said by-pass to perform an additional and important function, without, however, detracting from its performance of the function described in said companion application and reviewed herein. The same modifications in construction may be embodied in this apparatus and the same omissions made as are described in said companion application within the limits of the appended claims without departing from the invention.

I claim as my invention:

1. The combination with a hot liquid supply system including a source of supply and service pipes fed therefrom, a pump feeding the said system, said pump controlled by the fluid pressure in said service pipes, of a pipe connecting the suction end of said pump with said service pipes, a valve in said pipe, and means actuated by the flow of water delivered from said pump controlling said valve.

2. The combination with a hot liquid supply system including a source of supply and service pipes fed therefrom, a pump feeding the said system, and a fluid pressure actuated valve controlling the power actuating said pump, of a pipe connecting the suction end of said pump with said service pipes, a valve in said pipe, and means actu-

ated by the flow of liquid delivered from said pump controlling said valve.

3. The combination with a hot water supply system including a source of supply and
 5 a service pipe line fed therefrom, a pump feeding the said system, and a fluid pressure actuated valve controlling said pump, of a pipe connecting the suction end of said pump with said service pipe line at a point in said
 10 service pipe farthest from the connection thereof with said source of supply, a valve in said pipe, means maintaining said valve normally open, and means actuated by the water delivered from said pump for closing
 15 said valve against the action of said means maintaining the same normally open.

4. The combination with a hot water supply system including a source of supply, and
 20 a service pipe line fed therefrom, a pump feeding the said system, and a fluid pressure actuated valve controlling said pump, of a pipe connecting the suction end of said pump with said service pipe line at a point in said
 25 service pipe farthest from the connection thereof with said source of supply, a valve in said pipe, means maintaining said valve normally open, and means adapted to be actuated by the flow of water passing from
 30 said pump into said reservoir and operatively actuating said valve to close the same

against the action of said means maintaining the same normally open.

5. The combination with a hot water supply system including a source of supply, a
 35 pump delivering into the said system, a service pipe line fed from said pump, and means controlled by the pressure in said source of supply controlling the power actuating said pump, of a by-pass pipe connecting the suction end of said pump with said
 40 pipe line at a point in the latter substantially farthest removed from its connection with said reservoir, a valve in said pipe, a vane pivotally mounted in the discharge pipe of said pump and adapted to be turned in one
 45 direction by the water flowing through said pipe, connection between said valve and said vane whereby movement of said vane is transmitted to said valve to close the same,
 50 and means operatively engaging said valve to maintain the same normally open and move said vane against the action of the flow through the said pipe.

In testimony whereof I have signed my
 55 name in presence of two subscribing witnesses.

IRVING COWLES.

Witnesses:

RUDOLPH WM. LOTZ,
 M. M. BOYLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."