April 7, 1931. J. C. BLUNDON 1,799,453

CONDENSATION FLUID TRANSMISSION DEVICE

Filed April 3, 1928 2 Sheets-Sheet 1

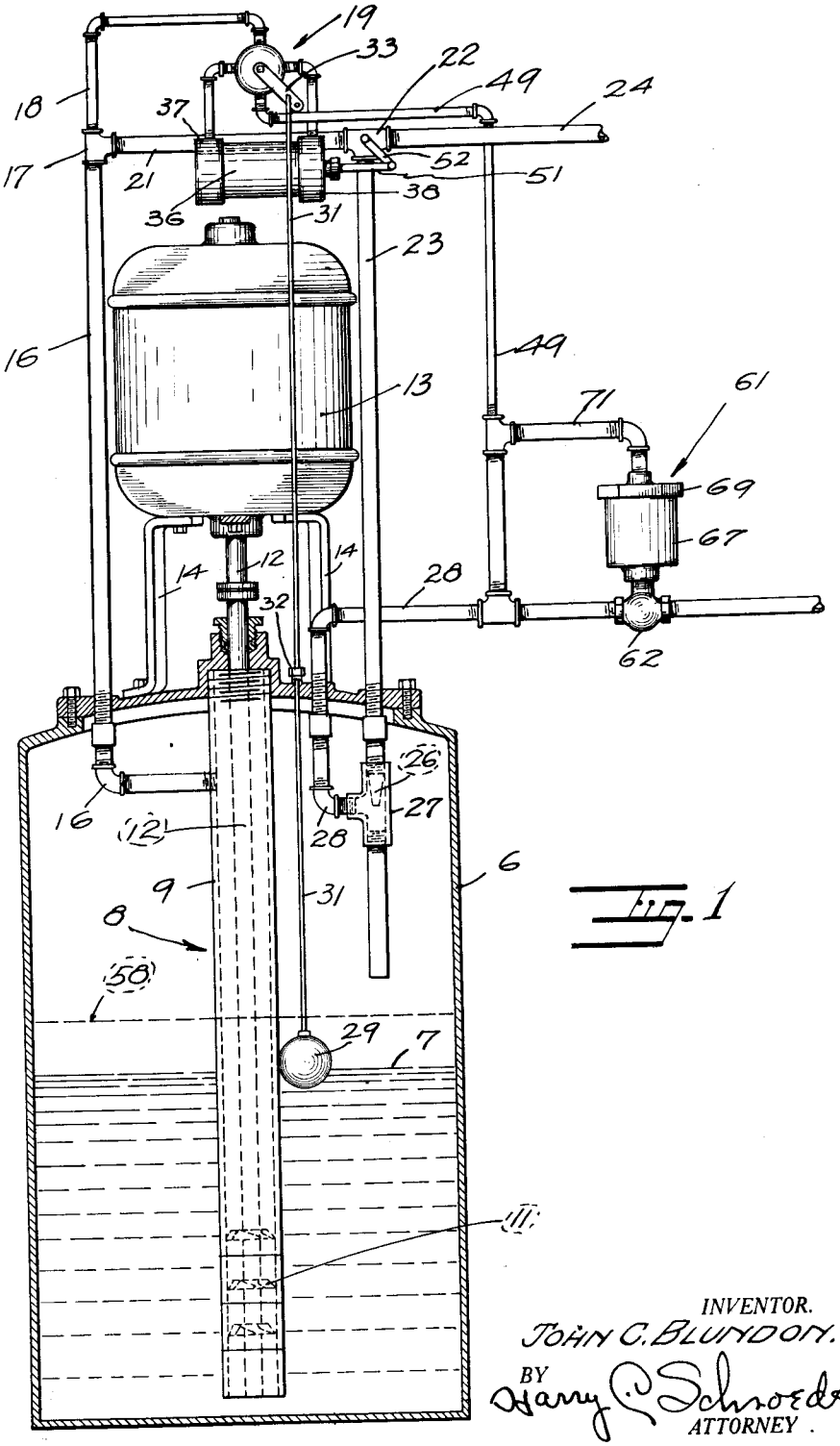


Fig. 1

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Fig. 2

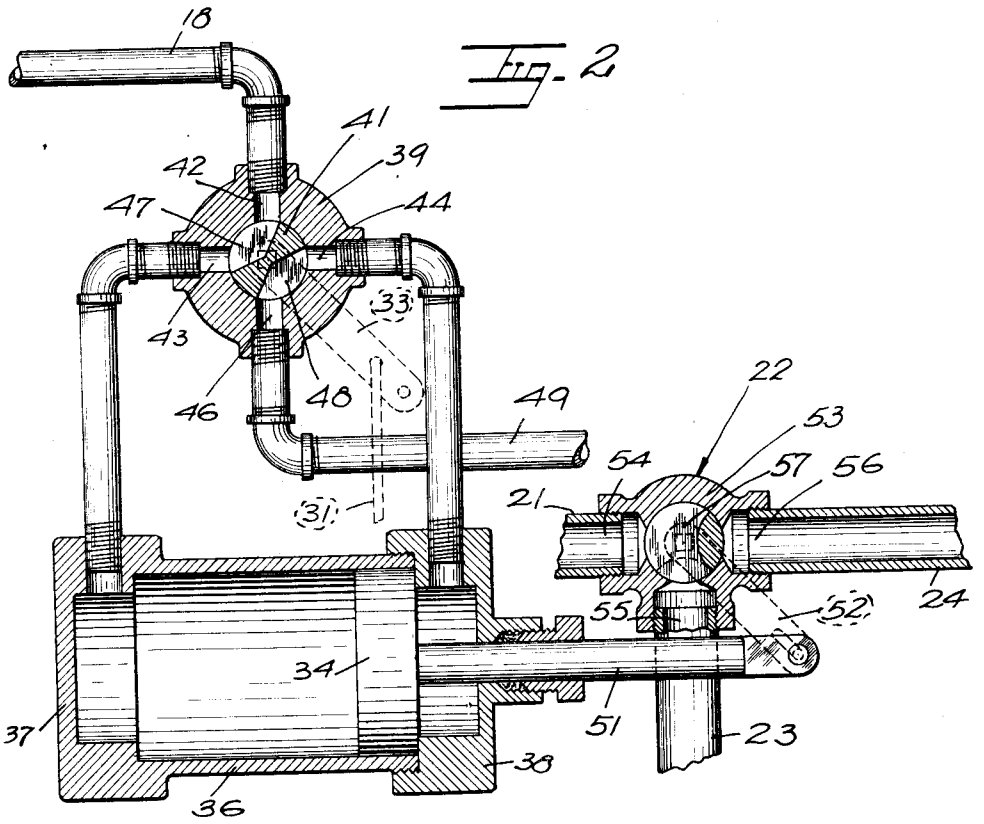
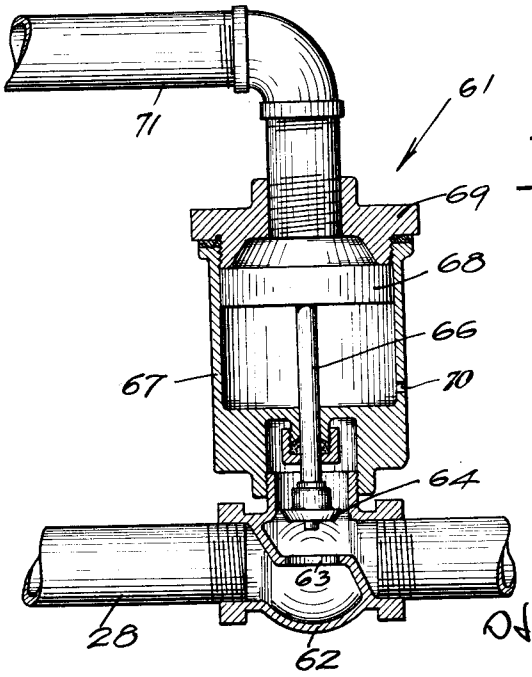


Fig. 3



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UNITED STATES PATENT OFFICE

JOHN C. BLUNDON, OF OAKLAND, CALIFORNIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO BLUNDON STEAM ECONOMIZER, INC., LTD., A CORPORATION OF CALIFORNIA

CONDENSATION-FLUID-TRANSMISSION DEVICE

Application filed April 3, 1928. Serial No. 267,087.

The invention forming the subject matter of this application relates to a system for freeing steam piping from water of condensation and for delivering said water to the boiler.

The primary object of the invention is to provide a system connected to the steam piping and adapted to pump the water of condensation from the steam piping and to convey the same to the boiler feed piping. Thus, while freeing the steam piping from water pockets, the system also provides feed water of higher temperature to the boiler.

Another object of the invention is the provision of a system for pumping a definite amount of water of condensation from the steam piping and to provide means actuated by the water of condensation withdrawn from the steam pipe, to automatically direct the pumping device to force the water of condensation, withdrawn from the steam pipes, into the water feeding system of the boiler.

A further object of the invention is the provision of a pumping system to be used in connection with the steam piping and the water heating piping of a steam boiler, in which means are provided so to actuate the pump as to alternately pump a certain amount of water of condensation from the steam piping and to pump the same amount of water of condensation into the boiler feed piping, said actuating means being controlled by the water level in the system.

A further object of the invention is the provision of a container having water therein at a constant level. A pump in the container is adapted to force the water from said container into an ejector, discharging into the same container, and operatively connected to the steam piping of a boiler, so that the action of the water pumped thru said ejector creates a suction which draws the water of condensation out of said steam piping; and means actuated by the water level in said container for directing the flow of water from said pump into said ejector when the water in the container is at its constant level and to direct the water pumped by said pump to the feed piping of the boiler when the water level in the container is raised to a definite extent by the water of condensation discharged therein. Said directing means also automatically connect the pump to the ejector when the water in the container again reaches its constant level.

A still further object of the invention is the provision of a system for alternately pumping the water of condensation from a steam piping and into a water feeding system of a boiler, in which a "shut off" valve is provided so as to disconnect said system from the steam line of the boiler when all the water of condensation is withdrawn and the steam flow therethru commences.

Other objects of the invention are to provide a device of the character described that will be superior in point of simplicity, inexpensiveness of construction, positiveness of operation, facility, and convenience in use and general efficiency.

In this specification and the annexed drawings, the invention is illustrated in the form considered to be the best, but it is to be understood that the invention is not limited to such form because it may be embodied in other forms; and it is also to be understood that in and by the claims following the description, it is desired to cover the invention in whatsoever form it may be embodied.

The invention is clearly illustrated in the accompanying drawing, in which—

Figure 1 is an assembly of my device showing the tank in cross section;

Figure 2 is an enlarged fragmentary detail of the plunger, the master valve controlling the plunger, and the direction valve controlled by the plunger; and

Figure 3 is a sectional detail view of a suction operated "shut off" valve.

Referring to the accompanying drawings, wherein similar reference characters designate similar parts thruout, the various figures described above adequately illustrate my invention, and the following detailed description is commensurate with the above mentioned drawings in enabling an artisan to construct and assemble the constituent parts of the same.

In carrying out my invention, I make use of a tank, denoted by the numeral 6, the tank

being about half full of water, the water level 7 constituting the constant water level when the system is not in operation. A pump, designated in its entirety by the numeral 8, is disposed so as to rotate in a horizontal plane; the casing 9 and the impellers 11 extending below the water level 7. The casing 9 is of the usual construction so as to permit the pumping of the water from the container 6. The impellers 11 are rotated by means of a vertically disposed shaft 12, suitably supported in bearings and packing boxes, and directly driven by an electric motor 13 which is spacedly supported above the top of the tank 6 by means of standards 14.

When the electric motor 13 is operated, water is pumped from the tank thru a conduit 16 to a point above the electric motor 13. The conduit 16 is provided with a T-joint 17, one opening of said joint being connected by means of a pipe 18 to a master valve 19, while the other opening of the joint 17 is connected by means of a pipe 21 to a direction valve 22, which direction valve 22 communicates selectively with an ejector pipe 23 or with a water feed conduit 24, which latter is connected to the boiler feed water system.

The ejector pipe 23 terminates in an ejector nozzle 26, which extends into a T-shaped ejector 27. The outlet end of the ejector 27 is in communication with the water tank 6, while the intermediate inlet opening of said ejector 27 is connected to a conduit 28, which latter communicates with a steam piping system of a boiler.

The steam piping systems now used are liable to contain more or less water of condensation, and this water is drawn out of the steam pipe line by starting the electric motor 13 which immediately begins to pump water thru the conduit 16, the outlets of which are so regulated, in a manner to be hereinafter described, as to convey the fluid under pressure from the conduit 16 into the ejector pipe 23, and force the water thru the nozzle 26 at such a speed that a suction is created in the ejector 27. Thus, the ejector 27 functioning in the customary manner pumps the water from the conduit 28 and from the steam piping to which the conduit 28 is connected. It is evident that any water of condensation collecting in the steam piping will be thus readily withdrawn therefrom by means of the suction created at the ejector 27 and conveyed thru the conduit 28.

The flow of water from the conduit 16 is directed in accordance with the water level in the tank 6. A float 29 moves a connecting rod 31 in accordance with the rising and sinking of the water level in the tank 6. The rod 31 is guided by a packing 32 which also prevents the escaping of the fluid or steam thru the tank. The rod 31 is connected to a handle 33 of the master valve 19. In accordance with the turning of the handle 33, the master valve 19 causes the reciprocation of a plunger 34 in a cylinder 36, the opposite heads 37 and 38 of the latter being so designed as to form an abutment at each end of the stroke of the plunger 34. The master valve 19 comprises a valve body 39 in which is rotatable a valve 41. The valve body 39 is provided with an intake opening 42, discharge openings 43 and 44, connected respectively to the heads 37 and 38, and a drain opening 46. The rotary valve 41 is so designed that passages 47 and 48 may connect two adjacent openings to each other, the openings being disposed in pairs at right angles to each other. The pipe 18 is connected to the intake opening 42, while the drain opening 46 is connected to the conduit 28 by means of a bent pipe 49.

The rotation of the valve 41 and the resulting reciprocating movement of the plunger 34 causes the reciprocation of a piston rod 51 which, in turn, operates the direction valve 22 by engaging and turning an arm 52 of said direction valve. The direction valve 22 comprises a valve body 53 having an intake opening 54 and two discharge openings 55 and 56. The pipe 21 connects the T-joint 17 to the intake opening 54 of the direction valve, while the ejector pipe 23 is connected to the discharge opening 55. The boiler water feed conduit 24 is in communication with the discharge opening 56. A valve 57 is rotatable in the valve body 53 in such a manner as to selectively obstruct either one of the discharge openings 55 and 56.

The operation of the device is as follows: When the motor 13 is started, it rotates the impellers 11, which pump the water from the tank 6 into the conduit 16. The float 29 is in the position shown in Figure 1 because the water in the tank is at a constant level 7. When the float is in this position, then the master valve 19 is in the position shown in Figure 2, viz: the water under pressure is conducted thru the pipe 18 and intake opening 42 thru the discharge openings 43, into the cylinder head 37, thus forcing the plunger 34 to the other end of its stroke, abutting against the head 38, as shown in Figure 2. While the plunger is forced to the end of its stroke, the water that may be in the cylinder and in the head 38 is forced out thru the opening 43 into the drain opening 46 and thru the bent pipe 49 into the conduit 28. The movement of the plunger rod 51 with the plunger 34 turns the arm 52 and the valve 57 therewith in the position shown in Figure 2, where the discharge opening 56 is obstructed, and the water under pressure is forced from the conduit 16 thru the pipe 21, thru the opening 54 out thru the opening 55, into the ejector pipe 23, and thru the nozzle 26, creating a suction in the ejector 27 in the manner heretofore described, thus pumping

the water out of the conduit 28 and from the whole steam piping system. When the water of condensation pumped by the ejector causes the water in the tank 6 to reach the level, indicated by a dotted line 58, it will also cause the raising of the float 29 which, by means of the rod 31, will turn the master valve handle 33 so as to bring the valve 41 in a position where the opening 48 in the valve 41 connects the opening 42 to the opening 44 and the opening 43 to the opening 46. Thus, the water under pressure enters the cylinders head 38, forcing the plunger 34 in the opposite direction to the one heretofore described, the water in the cylinder head 37 is discharged thru the openings 43 and 46 into the bent pipe 49 in the manner heretofore described. The movement of the plunger 34 causes the turning of the valve 57 so as to obstruct the opening 55 and permit the passage of the water from the opening 54, thru the opening 56, into the boiler water feed conduit 24. Now, while the pump is in operation, the water is forced thru the conduit 16, and it is conducted thru the direction valve 22 to the boiler water feed piping, thereby providing feed water for the boiler at a comparatively high temperature. At the same time, the opening 55 being obstructed, there is no flow thru the ejector pipe 23; therefore, there is no suction in the ejector 27, and during the period that the amount of water between the water levels 7 and 58 is being pumped into the water feeding system of the boiler, the pumping of the water of condensation from the steam piping ceases.

It is to be noted that while the water is being pumped out thru the pipe 24 out of the tank 6, the level of the water in the tank gradually lowers toward the constant level 7, thereby gradually lowering the float 29, which, in turn, operates the master valve 19. Thus, when the water level in the tank 6 reaches the constant level 7, the master valve 19 is in the position shown in Figure 2, thereby reciprocating the plunger 34 so as to actuate the direction valve 22, thus permitting the flow of water pumped by the pump 8 to the conduit 16 thru the ejector pipe 23 and the ejector 27. The suction thus created in the ejector 27 resumes the pumping of the water of condensation from the steam piping system thru the conduit 28, in the manner heretofore described, until sufficient water of condensation is pumped out of the steam piping to raise the water level to the line 58, at which time the float 29 causes the turning of the direction valve 22, so that the action of the pump again delivers the water of condensation to the boiler water feed piping, as heretofore described. The float prevents the lowering of the water level below the level 7. It will be recognized that when the water level in the tank approaches the constant level 7, then the water is directed back into the tank 6, thus maintaining a level on or above the level 7.

In order to obviate the possibility of pumping steam out of the steam piping thru the conduit 28, I provide a "shut off" valve, denoted by the numeral 61. The valve comprises a valve body 62 in the conduit 28, having a valve seat 63 therein, upon which is seated a valve 64. A stem 66 of the valve 64 extends thru the valve body 62 thru a suitable packing so as to prevent the seeping of the water or the steam from the valve body 62. A cylinder 67 is secured upon the valve body 62, in which cylinder reciprocates a piston 68. The stem 66 is centrally extending from the piston 68 so that when the piston 68 reciprocates, it carries the valve 64 therewith. A cylinder head 69 is connected to the pipe 49 by means of a conduit 71. An air vent 70 is provided in the cylinder 67, the air vent being disposed below the piston 68, as shown in Figure 3.

The "shut off" valve 61 operates as follows: When the ejector 27 is pumping water from the conduit 28, there is a suction created in the conduit 28, which suction also withdraws the water from the bent pipe 49. The suction thus created creates a vacuum in the conduit 71 and in the cylinder head 69, thus drawing the piston 68 into the uppermost end of the stroke as shown in Figure 3. It is to be noted that the ingress of air thru the vent 70 maintains an atmospheric pressure on the lower face of the piston 68. The piston 68 carries therewith the valve 64 and lifts the same from the valve seat 63, thereby permitting the passage of water thru the conduit 28. All the time while the ejector 27 is in operation, there is a suction created above the piston 68, thereby maintaining the valve 64 in the open, unseated position. When there is no suction at the ejector 27, then the vacuum in the pipe 71 breaks down and permits the seating of the valve 64 by the weight of the piston 68, the stem 66, and the valve 64 itself, the said weight being sufficient to cause the egress of air thru said vent 70.

When all the water is pumped out of the steam pipe thru the conduit 28 and steam begins to rush thru the pipe, it is apparent that the steam immediately will expand into the bent pipe 49 and into the pipe 71, thereby breaking down the vacuum therein, so that the plunger 68 in this instance will close, not only by its own gravity, but by the steam pressure exerted on the upper face of the piston 68.

The motor 13 is manually started and stopped. In the event of failure to stop the motor 13, the "shut off" valve may open periodically for a short while, but it will be immediately closed by the inrushing steam in the pipe 71, so as to prevent any material loss of steam from the steam piping. The noise

created by the repeated seating of the "shut off" valve calls the attention of the operator to the fact that all the condensation water is pumped out of the steam piping system. Now the operator shuts off the motor 13, whereupon the valve 64 remains seated upon the valve seat 63, completely sealing the steam piping line from the device heretofore described.

It will be recognized that a facile device is provided to accomplish the withdrawing of the water of condensation from the steam piping of any system, and to deliver the high temperature water of condensation to the feed water system of the boiler. The device is operated positively so as to withdraw a definite amount of water of condensation and to stop the withdrawal of water of condensation when it reaches a definite level in the tank 6, and then to automatically direct the operation of the device so as to pump said water of condensation into the water feeding system of a boiler and also automatically readjusting the device so as to direct the water into the tank 6 when all the water of condensation previously withdrawn from the steam piping was delivered into the feed water system of the boiler. Thus, the pump alternately actuates the ejector for withdrawing the water of condensation from the steam piping and pumps the water of condensation into the feed water system of the boiler. The "shut off" valve prevents the escapement of steam from the steam piping after all the water of condensation is withdrawn. The device combines facility and convenience in use with a ruggedness of construction and positiveness of operation, especially adapting it for its use.

I claim:

1. In a device of the character described, means for pumping the water of condensation out of a steam piping system; means to render said pumping means inactive after a certain amount of water of condensation is pumped from said system; and means to operate said first pumping means and to pump said certain amount of water of condensation into a boiler feed water conduit when said first pumping means is inactive.

2. In a device of the character described, a container partly filled with water, means for pumping the water of condensation out of a steam piping system into said container; means controlled by the water level in said container to render said pumping means inactive after a certain amount of water of condensation is pumped from said system into the container; and means to operate said first pumping means when rendered active, and to pump said certain amount of water of condensation into a boiler feed water conduit when said first pumping means is inactive.

3. In a device of the character described, a container partly filled with water, means for pumping the water of condensation out of a steam piping system into said container; floating means controlled by the water level in said container to render said pumping means inactive after a certain amount of water of condensation is pumped from said system into the container; and means to operate said first pumping means when rendered active, and to pump said certain amount of water of condensation into a boiler feed water conduit when said first pumping means is inactive.

4. In a device of the character described, a container partly filled with water, means for pumping the water from said container, a discharge conduit on said means; suction means actuated by the water discharged from said pumping means for pumping water of condensation from a steam piping system and discharging into said container; directing means connected to said pump discharge conduit, to said suction means, and to a boiler water feed conduit; and means controlled by the change of the water level in the container for actuating said directing means to alternately connect said pump discharge conduit to said ejector and to said boiler water feed conduit, in accordance with the height of the water level in said container.

5. In a device of the character described, a container partly filled with water, means for pumping the water from said container, a discharge conduit on said means; suction means actuated by the water from said pumping means for pumping the water of condensation from a steam piping system and discharging into said container; directing means connected between said pump discharge conduit and said suction means and connected to a boiler water feed conduit; and means controlled by the change of water level in the container for actuating said directing means so as to connect said discharge conduit to the boiler water feed conduit and to simultaneously render said suction means inactive after a certain amount of water of condensation is pumped into the container, and to connect said discharge conduit to said suction means, rendering the latter active after said certain amount of water of condensation is pumped out of the container thru said boiler water feed conduit.

6. In a device of the character described, a container partly filled with water, means for pumping the water from said container, a discharge conduit on said means; suction means actuated by the water from said pumping means for pumping the water of condensation from a steam piping system and discharging into said container; directing means connected between said pump discharge conduit and said suction means and connected to a boiler water feed conduit; means controlled by the change of water level in the container for actuating said directing means so as to connect said discharge

conduit to the boiler water feed conduit and to simultaneously render said suction means inactive after a certain amount of water of condensation is pumped into the container, and to connect said discharge conduit to said suction means, rendering the latter active after said certain amount of water of condensation is pumped out of the container thru said boiler water feed conduit, and a suction actuated valve connected between said suction pumping means and said steam piping system for sealing said steam piping system when steam escaping therefrom to said suction pumping means breaks down the suction actuating the valve.

7. In a device of the character described, a container partly filled with water, means for pumping the water from said container, said means having a discharge conduit thereon; an ejector connected to a steam piping system so as to pump water of condensation therefrom, said ejector discharging into said container; directing means connected to said discharge conduit, to the ejector, and to a boiler feed conduit; float controlled means for actuating said directing means so as to render said ejector inactive and connect said discharge conduit to the boiler feed conduit after a certain amount of water of condensation is pumped into the container, and to render said ejector active and disconnect said boiler feed conduit after said certain amount of water of condensation is pumped out of the container.

8. In a device of the character described, a container partly filled with water, means for pumping the water from said container, said means having a discharge conduit thereon; an ejector connected to a steam piping system so as to pump water of condensation therefrom, said ejector discharging into said container; directing means connected to said discharge conduit, to the ejector, and to a boiler feed conduit; float controlled means for actuating said directing means so as to render said ejector inactive and connect said discharge conduit to the boiler feed conduit after a certain amount of water of condensation is pumped into the container, and to render said ejector active and disconnect said boiler feed conduit after said certain amount of water of condensation is pumped out of the container, and a suction actuated valve connected between said ejector and said steam piping for sealing said steam piping when the steam pumped therefrom by said ejector breaks down the suction actuating said valve.

9. In a device of the character described, a container partly filled with water, means for pumping the water from said container, said means having a discharge conduit thereon; an ejector operated by a jet of water from said pumping means and connected to a steam line so as to pump water of condensation therefrom, said ejector discharging into said container; directing means connected to said discharge conduit, to the ejector, and to a boiler feed conduit; reciprocating means for operating said directing means; and means controlled by the change of the water level in said container for actuating said reciprocating means so as to cause said directing means to render said ejector inactive after a certain amount of water of condensation is pumped into the container and to connect said discharge conduit to said boiler feed water conduit, and to disconnect said boiler feed water conduit and render said ejector active when said certain amount of water of condensation is pumped out of said container.

10. In a device of the character described, a container partly filled with water, means for pumping the water from said container, said means having a discharge conduit thereon; an ejector operated by a jet of water from said pumping means and connected to a steam line so as to pump water of condensation therefrom, said ejector discharging into said container; directing means connected to said discharge conduit, to the ejector, and to a boiler feed conduit; reciprocating means for operating said directing means; means controlled by the change of the water level in said container for actuating said reciprocating means so as to cause said directing means to render said ejector inactive after a certain amount of water of condensation is pumped into the container and to connect said discharge conduit to said boiler feed water conduit, and to disconnect said boiler feed water conduit and render said ejector active when said certain amount of water of condensation is pumped out of said container, and a suction actuated valve connected between said ejector and said stem piping for sealing said steam piping when the steam pumped therefrom by said ejector breaks down the suction actuating said valve.

11. In a device of the character described, a container partly filled with water, means for pumping the water from said container, said means having a discharge conduit thereon; an ejector operated by a jet of water from said pumping means and connected to a steam line so as to pump water of condensation therefrom, said ejector discharging into said container; a two way valve having an intake opening thereof connected to said pump discharge conduit, and being adapted to direct water to said ejector and to a boiler feed water conduit; reciprocating means for operating said two way valve so as to alternately direct water from said intake opening to the ejector and to the boiler feed water conduit; and means controlled by the change of the water level in said container for actuating said reciprocating means.

12. In a device of the character described, a container partly filled with water, means for pumping the water from said container.

said means having a discharge conduit thereon; an ejector operated by a jet of water from said pumping means and connected to a steam line so as to pump water of condensation therefrom, said ejector discharging into said container; directing means connected to said discharge conduit, to the ejector and to a boiler feed conduit; reciprocating means for operating said directing means to alternately connect said discharge conduit to the ejector and to the boiler feed conduit; a master valve body having an intake opening thereof connected to said pump discharge conduit, and having discharge openings thereof operatively connected to said reciprocating means; a master valve in said valve body adapted to open communication from said intake opening to either one of said discharge openings so as to cause the reciprocation of said reciprocating means; and means controlled by the water level in said container for opening communication from said intake opening alternately to said discharge openings in accordance with the change of the water level in the container.

13. In a device of the character described, a container partly filled with water, means for pumping the water from said container, said means having a discharge conduit thereon; an ejector operated by a jet of water from said pumping means and connected to a steam line so as to pump water of condensation therefrom, said ejector discharging into said container; directing means connected to said discharge conduit, to the ejector, and to a boiler feed conduit; reciprocating means for operating said directing means to alternately connect said discharge conduit to the ejector and to the boiler feed conduit; a master valve for actuating said reciprocating means, a float in the container and operatively connected to said master valve for causing the latter to actuate the reciprocating means in accordance with the change of water level in said container.

14. In a device of the character described, a container partly filled with water, means for pumping the water from said container, said means having a discharge conduit thereon; an ejector operated by a jet of water from said pumping means and connected to a steam line so as to pump water of condensation therefrom, said ejector discharging into said container; a two way valve having an intake opening thereof connected to said pump discharge conduit, and adapted to direct water therethru to said ejector and to a boiler feed water conduit; reciprocating means for operating said two way valve so as to open communication from said intake opening alternately to the ejector and to the boiler feed water conduit; a master valve for actuating said reciprocating means, a float in the container and operatively connected to said master valve for causing the latter to actuate the reciprocating means in accordance with the change of the water level in said container.

15. In a device of the character described, a container partly filled with water, means for pumping the water from said container, said means having a discharge conduit thereon; an ejector operated by a jet of water from the pumping means and connected to a steam line so as to pump water of condensation therefrom, said ejector discharging into said container; a two way valve having an intake opening thereof connected to said pump discharge conduit, and adapted to direct water therethru to said ejector and to a boiler feed water conduit; reciprocating means for operating said two way valve so as to open communication from said intake opening alternately to the ejector and to the boiler feed water conduit; a master valve body having an intake opening thereof connected to said pump discharge conduit and having discharge openings thereof operatively connected to said reciprocating means, a master valve in said valve body adapted to open communication from said intake opening to either one of said discharge openings so as to cause the reciprocation of said reciprocating means, and means controlled by the water level in said container for opening communication from said intake opening alternately to one of said discharge openings in accordance with the change of the water level in the container.

16. In a device of the character described, a container partly filled with water, means for pumping the water from said container, said means having a discharge conduit thereon; an ejector operated by a jet of water from the pumping means and connected to a steam line so as to pump water of condensation therefrom, said ejector discharging into said container; a two way valve having an intake opening thereof connected to said pump discharge conduit, and adapted to direct water therethru to said ejector and to a boiler feed water conduit; reciprocating means for operating said two way valve so as to open communication from said intake opening alternately to the ejector and to the boiler feed water conduit; a master valve body having an intake opening thereof connected to said pump discharge conduit and having discharge openings thereof operatively connected to said reciprocating means, a master valve in said body adapted to open communication from said intake opening to either one of said discharge openings so as to cause the reciprocation of said reciprocating means; and a float in the container and operatively connected to said master valve for causing the latter to actuate the reciprocating means in accordance with the change of water level in said container.

17. In a device of the character described,

a container being partly filled with water, means for pumping the water from said container, said means having a discharge conduit thereon, a master valve, said master valve comprising a valve housing, having an inlet opening connected to said discharge conduit and two outlet openings thereon; a rotary valve adapted to connect two of said openings with each other, an arm on said rotary valve, a plunger mechanism, the opposite ends thereof being operatively connected to the outlet openings of said master valve, so as to be reciprocated in a direction corresponding to the position of said master valve, draining means operatively related to said plunger mechanism; a directing valve connected to said discharge conduit, an ejector discharging into the container and being connected to said directing valve; a boiler water feed conduit connected to said directing valve; an arm on said directing valve for operatively connecting the same to said plunger mechanism so as to be alternately moved in a position for connecting said discharge conduit to said ejector and in another position for connecting said discharge conduit to said boiler feed conduit in accordance with the reciprocation of said plunger; a float in said container operatively connected to said master valve so as to cause said master valve to effect the reciprocation of said plunger in such a manner as to turn the directing valve for connecting the pump discharge conduit to the ejector when the water level in the container is normal and for connecting the pump discharge conduit to the boiler water feed conduit when a certain amount of water of condensation raises the water level in said container; and a conduit for connecting said ejector to a steam piping system for withdrawing the condensate therefrom when said pump is discharging thru said ejector.

18. A device as described in claim 6, and a shut off valve mechanism comprising a valve body in said last mentioned ejector connecting conduit, a valve adapted to seat therein, a valve stem, a cylinder on said valve body, a plunger reciprocable therein, said valve stem being secured to said plunger, and a conduit connecting the head of the cylinder to said ejector connecting conduit, so that a suction created in said latter conduit maintains the plunger in a valve opening position.

19. A device of the character described comprising a container, a pump within the container for forcing water from a steam heating system into the container, a float within the container to render said pump inactive when the water within the container is at a predetermined level and to render the pump active when the level of the water within the container is below the predetermined level to pump the water from the container into a boiler for heating the steam system.

20. A device of the character described comprising a container, a pump within and extending through the top thereof, a motor in vertical alignment with the pump for operating the pump, a float for actuating the pump when the water within the container reaches a predetermined level and for rendering the pump inactive when the water within the container reaches a predetermined level above the first referred to level.

In testimony whereof I affix my signature.

JOHN C. BLUNDON.