

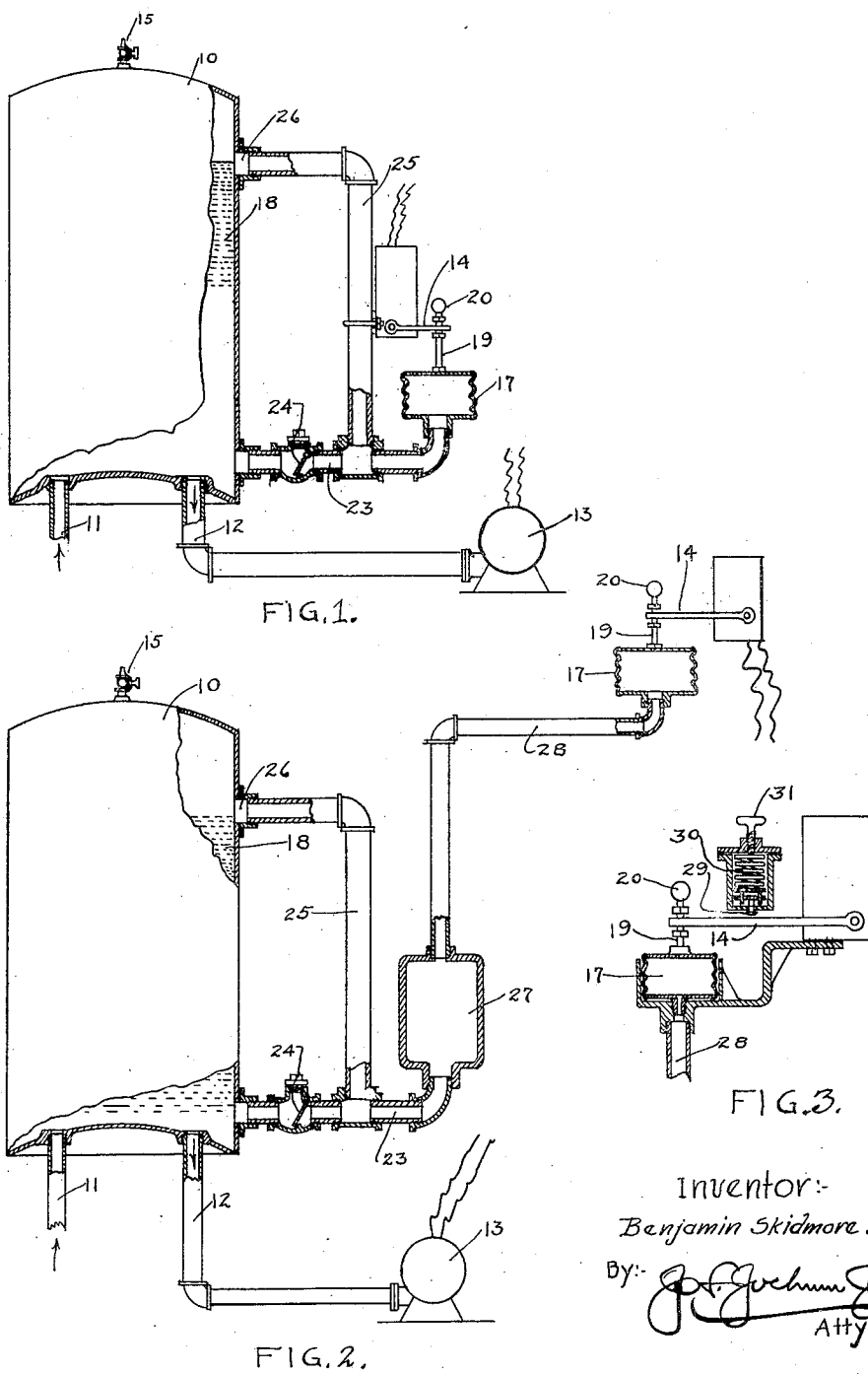
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B. SKIDMORE, JR

MEANS FOR AUTOMATICALLY ACTUATING CONTROL DEVICES

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UNITED STATES PATENT OFFICE.

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MEANS FOR AUTOMATICALLY ACTUATING CONTROL DEVICES.

Application filed October 26, 1922. Serial No. 596,965.

To all whom it may concern:

Be it known that I, BENJAMIN SKIDMORE, Jr., a 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 Means for Automatically Actuating Control Devices, of which the following is a specification.

This invention relates to improvements in means for automatically actuating a control device particularly adapted, though not necessarily limited in its use, with steam heating systems, and in which systems there is employed a tank or receiver which communicates with the return pipe of the system, and is adapted to receive air and water of condensation, the liquid being removed from the tank or receiver by means of a suitable pumping apparatus, and one of the objects of the present invention is to provide improved means whereby the control device may itself be automatically controlled by the water line or pressure in the tank or receiver.

A further object is to provide improved means whereby the height of the liquid or the pressure necessary to actuate the control device may be varied at will.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawings illustrating this invention and in which

Figure 1 is a diagrammatic view of a portion of a tank or receiver, having a control device constructed in accordance with the principles of this invention, applied thereto.

Figure 2 is a view similar to Figure 1 of a modified form of the invention.

Figure 3 is a view of still another form of the invention.

Referring more particularly to the drawings, the numeral 10 designates generally a tank or receiver having an inlet 11, which is connected with the return line of a heating system whereby the water of condensation from the system will be delivered and allowed to accumulate in the tank or receiver. The numeral 12 designates a discharge outlet from the tank, which leads to a suitable pumping apparatus diagram-

matically illustrated at figure 13. A suitable switch or control device 14 is provided for controlling the operation of the pumping apparatus 13, all of which may be of the ordinary and well known construction. The tank 10 is a closed tank and may be provided with an air vent 15.

The tank is provided with an outlet pipe 23, leading therefrom and having communication therewith at a point preferably adjacent the bottom of the tank. Connected with the pipe 23 is a bellows like element 17, which is adapted to be operated by pressure created in the tank and by the fluid. The pipe 23 is provided with a valve 24 therein opening in a direction toward the tank 10, and a pipe 25 leads from a liquid outlet 26 located at the water level of the tank and constitutes a by-pass for the liquid and has communication with the pipe 23 on the side of the valve 24 opposite to the side which communicates with the tank 10. When the fluid, indicated as at 18, accumulates to a predetermined level some of the fluid from the tank will flow into the pipe connection 23 through the by-pass 25 and will create a pressure in the bellows like element 17, to cause the latter to expand and in expanding, the switch or cut off device 14 will be operated through the medium of a connection 19 between a portion of the bellows like element 17 and the cut off device.

If desired a weight or element 20 may be provided which is connected with the element 19 and this element 20 is of a predetermined weight so as to cause a predetermined pressure to be created in the element 17 before the latter will expand. The element 20 also serves as a means for assisting in returning the bellows like element 17 to its normal position after the pressure has been reduced.

In the form of the invention shown in Figure 2, the control device 14 is located at a point remote from the container or tank 10 and interposed between the element 17 and the pipe 23 is a pressure creating chamber 27, of any desired size and has communication with the element 17 through the medium of a pipe connection 28, of a suitable diameter, so that the pressure created in the chamber 27 will be manifested in the element 17, through the pipe connection 28.

It will be manifest from the forms of the

invention thus far described that the water of condensation may be allowed to accumulate in the tank 10 and as it accumulates in the tank a portion of the fluid will flow into the pipe 23 and pressure creating chamber 21. When a predetermined pressure has been created in the chamber 21 in the form of the invention shown in Figure 2, and in the pipe connection 23 as shown in Figure 1, behind valve 24 such pressure will be manifested in the element 17 to actuate the control device 14. When this pressure is relieved by the withdrawal of the water of condensation from the tank 10 the weighted element 20 will assist in returning the element 17 to its normal position, and in so doing will actuate the control device in the opposite direction.

As the water of condensation accumulates in the tank 10, the liquid will exert a pressure upon the valve 24 through the outlet at the bottom of the tank, to close the valve. The valve 24 will remain closed and the water of condensation 18 will accumulate in the tank until it reaches the liquid level 26. The liquid in the tank 10 will then overflow through the outlet 26 into the by pass 25 and into the pipe 23 on the other side of the valve 24. The pressure created by the fluid will be manifested in the element 17 to operate the control device 14.

When a sufficient amount of water has accumulated in the by pass 25 and pipe 23 on the side of the valve 24 opposite to the side which communicates with the tank 10, the valve 24 will be counterbalanced and when the pressure of the fluid in the by pass 25 and pipe 23 is greater than the pressure upon the valve on the tank side of the valve, the latter will open and permit the water of condensation, which has passed into the by pass and pipe 23 to flow back into the tank to be removed therefrom by the pumping apparatus, after which a further accumulation of the water of condensation in the tank 10 will operate to close the valve 24. When the pressure is relieved in the element 17 the control device 14 will be operated in the opposite direction through the assistance of the weighted element 20.

In the form of the invention shown in Figure 2, the control device 14 is located at a point remote from the tank 10 and communicating with the pipe 23 is a pressure creating chamber 27, and a pipe connection 28 leads from the chamber 27 to the element 17.

The operation of this form of the invention is similar to that as described in connection with Figure 1, with the exception that when the liquid flows from the by-pass 25 into the pipe 23 it will create a pressure in the chamber 27 and from the chamber 27 the pressure will be manifested in the

element 17 through the pipe 28. This pressure operates the flexible element 17 to move the control device 14 in one direction and when the pressure is relieved in the chamber 27, the element 17 will operate in the opposite direction through the medium of the weighted element 20 for moving the control device in the opposite direction.

Obviously when it is desired to vary the pressure at which the element 17 will operate, the weighted element 20 may be removed and another element of a different weight may be substituted therefor or an additional weight may be connected with the element 20.

In Figure 3 there is shown another means whereby the pressure necessary to operate the control device 14 may be varied and in this form of the invention there is shown a spring controlled stop 29, which is arranged within the path of movement in one direction of the control device 14. The stop 29 is arranged with respect to the control device 14 so as to permit the latter to move a short distance before its movement is arrested by the stop 29. This stop 29 is yieldingly controlled by means of a spring 30 and the tension of the spring 30 may be varied by means of an adjustable device 31. It will be manifest that with this form of the invention and in order to vary the pressure at which the control device is to be operated, all that is necessary is to adjust the device 31 to increase or decrease the stress of the spring 30 upon the stop 29.

With this improved construction it will be manifest that the device is well adapted in connection with return line systems and at predetermined periods and as the water of condensation is delivered into the tank it will be removed therefrom by the pumping apparatus and at other intervals it is possible to permit the water of condensation to accumulate in the tank to a predetermined level before the pumping apparatus is started in its operation so that there will be an intermittent control of the pumping apparatus influenced by the accumulation of the water of condensation or the pressure created by such accumulation.

While the preferred forms of the invention have been herein shown and described, it is to be understood that various changes may be made in the details of construction and in the combination and arrangement of the several parts, within the scope of the claims, without departing from the spirit of this invention.

What is claimed as new is:—

1. In combination a receiving tank having an inlet, said tank also having an outlet for liquid, a control device for controlling pumping mechanism, means embodying fluid pressure actuated mechanism controlled in its operation by the liquid level in

the tank for controlling the said control device, a pipe connection between the said element and the tank, a fluid pressure chamber included in the said connection, a valve in said connection, and means for counterbalancing the valve.

2. In combination a receiving tank having an inlet adapted to be connected with the return line of a steam heating system, said tank also having an outlet for liquid, a control device for controlling pumping mechanism, means embodying fluid pressure actuated mechanism controlled in its operation by the liquid level in the tank for controlling the said control device, a pipe connection between the said element and the tank, a fluid pressure chamber included in the said connection, a valve in said connection, and means for automatically counterbalancing the said valve.

3. In combination a receiving tank having an inlet adapted to be connected with the return line of a steam heating system, said tank also having an outlet for liquid, a control device for controlling pumping mechanism, means embodying a bellows like element controlled in its operation by the liquid level in the tank for controlling the said control device, a pipe connection between the said element and the tank, a fluid pressure chamber included in the said connection, a valve in said connection, and means whereby the fluid from the tank will automatically operate to counterbalance the said valve.

4. In combination a receiving tank having an inlet and an outlet for liquid, a control device for controlling pumping mechanism, means embodying fluid pressure actuated mechanism controlled in its operation by the liquid level in the tank for controlling the said control device, a pipe connection between the said element and the tank, a fluid pressure chamber included in the said connection, a valve in said connection, and means whereby the fluid from the tank will automatically operate to counterbalance the said valve, the last recited means embodying a by-pass leading from the tank adjacent the water level to the side of the valve opposite to the side which is connected with the tank.

5. In combination a receiving tank having an inlet and an outlet for liquid, a control device for controlling pumping mechanism, means embodying a bellows like element controlled in its operation by the liquid level in the tank for controlling the said control device, a pipe connection between the said element and the tank, a valve in said connection, and means for counterbalancing the said valve.

6. In combination a receiving tank having an inlet and an outlet for liquid, a control device for controlling pumping mechanism,

means embodying a bellows like element controlled in its operation by the liquid level in the tank for controlling the said control device, a pipe connection between the said element and the tank, a valve in said connection, and means for automatically counterbalancing the said valve.

7. In combination a receiving tank having an inlet and an outlet for liquid, a control device for controlling pumping mechanism, means embodying a bellows like element controlled in its operation by the liquid level in the tank for controlling the said control device, a pipe connection between the said element and the tank, a valve in said connection, and means whereby the fluid from the tank will automatically operate to open the said valve.

8. In combination a receiving tank having an inlet and an outlet for liquid, a control device for controlling pumping mechanism, means embodying a bellows like element controlled in its operation by the liquid level in the tank for controlling the said control device, a pipe connection between the said element and the tank, a valve in said connection, and means whereby the fluid from the tank will automatically operate to counterbalance the said valve, the last recited means embodying a by pass leading from the tank adjacent the liquid level to the side of the valve opposite to the side which is connected with the tank.

9. In combination a receiving tank having an inlet and an outlet for liquid, a control device for controlling pumping mechanism, means embodying a bellows like element controlled in its operation by the liquid level in the tank for controlling the pumping mechanism, a pipe connection between the said element and the tank, a fluid pressure container in said connection, and a valve in said connection, said valve being maintained closed by the pressure of the liquid thereupon until the liquid in the tank reaches a predetermined level.

10. In combination a receiving tank having an inlet and an outlet for liquid, a control device for controlling pumping mechanism, means embodying a bellows like element controlled in its operation by the liquid level in the tank for controlling the pumping mechanism, a pipe connection between the said element and the tank, a fluid pressure container in said connection, and a valve in said connection, said valve being maintained closed by the pressure of the liquid upon one side thereof until the liquid in the tank reaches a predetermined level, the pressure upon the other side of the valve when the liquid in the tank recedes, operating to open the valve.

11. In combination a receiving tank having an inlet and an outlet for liquid, a control device for controlling pumping mechanism,

nism, fluid pressure controlled means for
controlling the said control device, a pipe
connection between the said means and the
tank, a valve in said connection, said valve
5 being maintained closed by the operation of
the liquid on one side thereof and until the
liquid in the tank reaches a predetermined
level, and means for conveying liquid from
the tank at the liquid level to the other side
10 of the valve, the liquid on the said other side
of the valve operating to open the valve
when the liquid in the tank recedes.

12. In combination, a receiving tank hav-
ing an inlet and an outlet for liquid, a con-
15 trol device for controlling pumping mecha-
nism, fluid pressure means controlled in its
operation by the liquid level in the tank for
controlling the pump controlling mecha-
nism, a pipe connection between the said ele-

ment and the tank, a fluid pressure con- 20
tainer in the said connection, and a valve in
said connection, said valve being maintained
closed by the pressure of the liquid there-
upon until the liquid in the tank reaches a
predetermined level. 25

13. In combination a receiving tank hav-
ing an inlet and an outlet for liquid, a con-
trol device for controlling pumping mecha-
nism, fluid pressure controlled mechanism
for controlling the pump controlling mecha- 30
nism, a connection between the said fluid
pressure controlled mechanism and the tank,
a valve in the said connection, and means
for counterbalancing the valve.

In testimony whereof I have signed my 35
name to this specification, on this 17th day
of October, A. D. 1922.

BENJAMIN SKIDMORE, JR.