

Nov. 25, 1930.

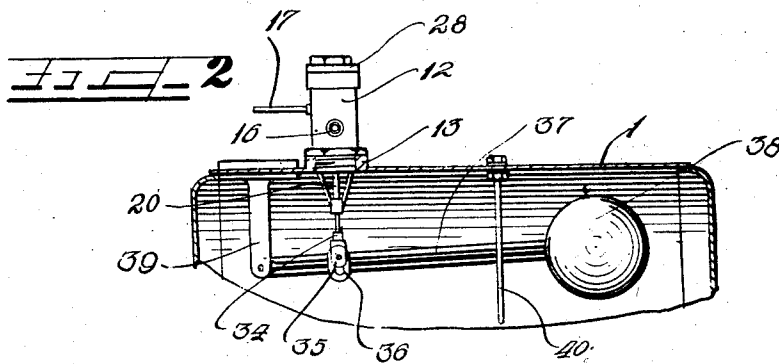
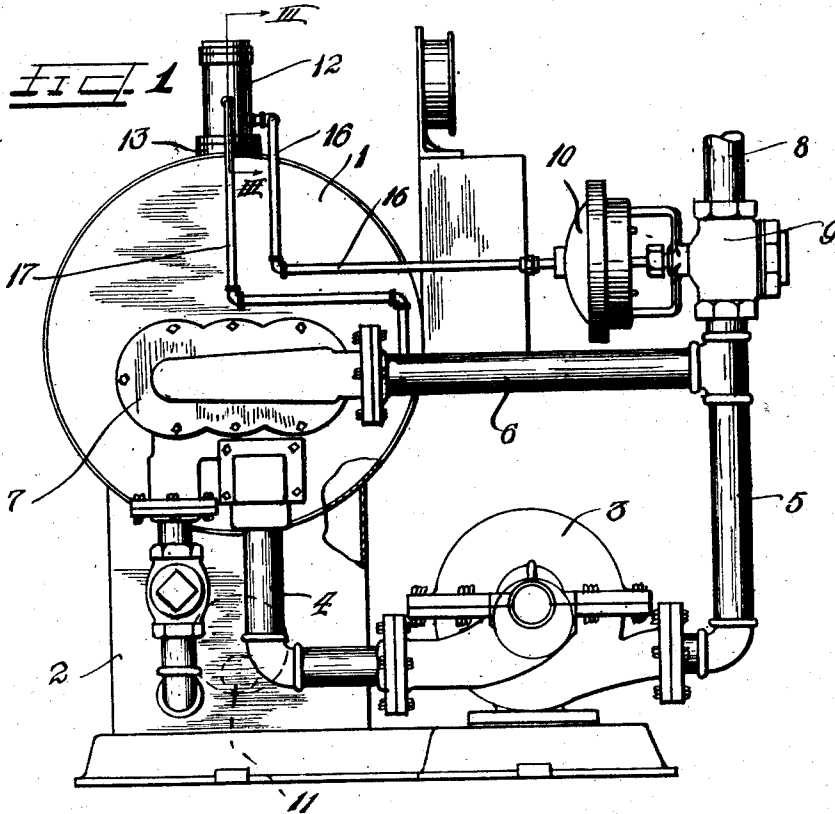
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1,782,489

AUTOMATIC CONTROL FOR HEATING PLANTS

Filed July 30, 1926

2 Sheets-Sheet 1



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FIG 3

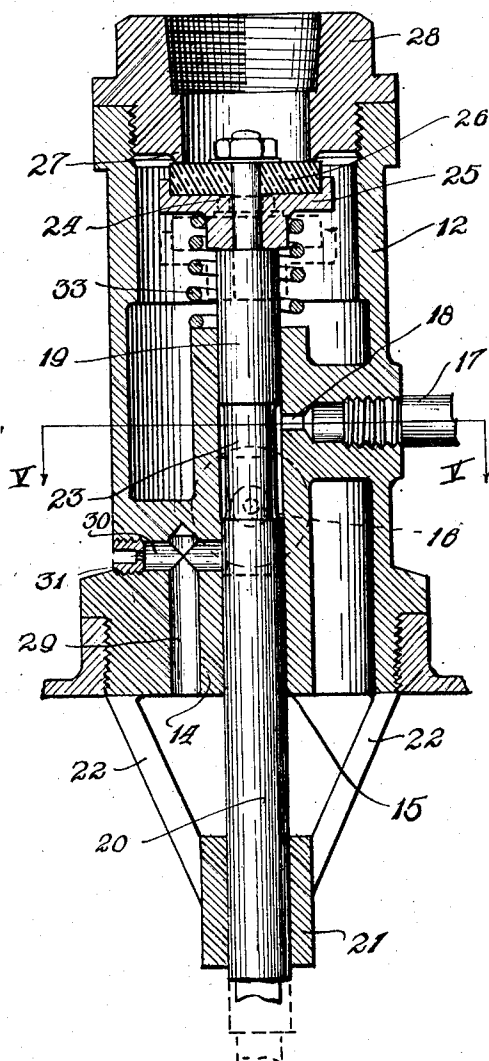


FIG -4

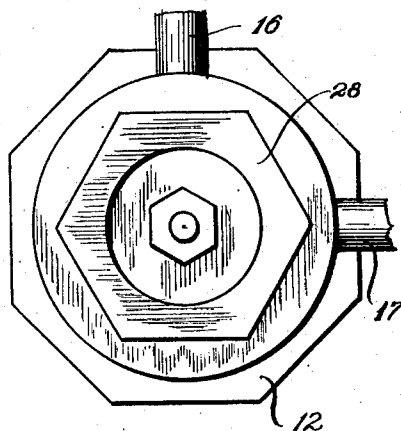
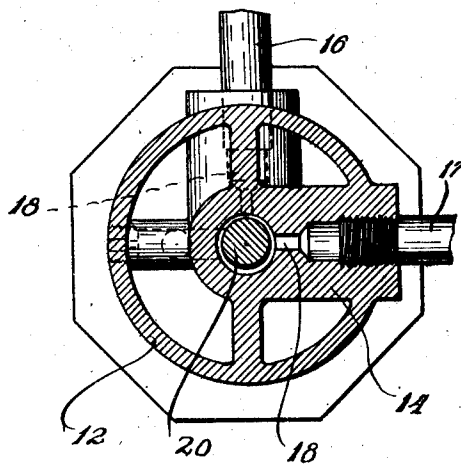


FIG-5



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EX

UNITED STATES PATENT OFFICE

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AUTOMATIC CONTROL FOR HEATING PLANTS

Application filed July 30, 1926. Serial No. 125,904.

This invention relates to an automatic control for a heating plant of the type disclosed in United States Letters Patent No. 1,576,687, and concerns itself primarily with a pilot valve which is automatically operated at pre-determined intervals to establish a communication between a pumping system and a boiler or the like.

In the aforementioned patent referred to, a diaphragm valve or the like located in the boiler feed pipe is adapted to be operated through the accumulation of sufficient pressure within the circulating tank. It is an object of this invention to provide a quicker and more positive action for operating the diaphragm valve. To this end the pump is directly connected to the diaphragm valve. The pilot valve is located in this connection and is operated by the rising water in the circulating tank. Consequently when the pilot valve is opened, the pump will force a stream or piston of water directly against the diaphragm valve for opening the boiler feed.

The invention comprises the novel structure and combinations hereinafter described and more particularly pointed out and defined in the appended claims.

In the accompanying drawings which illustrate a preferred embodiment of this invention and in which similar reference numerals refer to similar features in the different views:

Figure 1 is an end elevational view of the control for a heating plant.

Figure 2 is a fragmentary longitudinal sectional view through the circulating tank.

Figure 3 is an enlarged sectional view taken on the line III—III of Figure 1.

Figure 4 is an enlarged top plan view of Figure 3.

Figure 5 is an enlarged sectional view upon the line V—V of Figure 3.

In order that this invention may be better understood, I have illustrated one view of the automatic control as disclosed in the aforementioned patent and a brief description and operation thereof will be given in order that the function of the pilot valve may be thoroughly understood and appreciated.

In referring to Figures 1 and 2, it will be

noted that I have illustrated a circulating tank 1 which rests upon a vacuum tank 2. A centrifugal pump 3 is connected by means of a pipe 4 to the lower portion of the circulating tank. The pump 3 is also connected by means of pipes 5 and 6 with a casting 7 upon the end of the circulating tank. The casting 7 is adapted for containing one or more jet ejectors of the type illustrated in the aforementioned patent. The aforementioned pipe 5 has connected thereto a pipe 8 which may lead to a boiler or receiving tank or the like. A suitable valve 9 of any known type is located in the pipe 8 and is operated by a connection from a diaphragm 10 or piston or the like. It may be mentioned that the return pipe from a heating system is connected with the vacuum tank as indicated in dotted lines by the number 11 in Figure 1. The mechanism thus far described is similar to that disclosed in the aforementioned patent, to which reference may be had if necessary for a more thorough understanding of the apparatus.

The aforementioned pilot valve is indicated as a whole by the reference numeral 12. It consists of a housing that is attached upon a perforate boss 13 upon the top of the tank 1; the tank having a similar perforation. In the interior of the valve housing is provided a suitable bearing 14 having a central bore 15. A pipe 16 is threaded in this bearing and extends to the diaphragm as shown in Figure 1. A second pipe 17 is threaded in said bearing and is connected to the discharge pipe 6 of the pump. The pipes 16 and 17 communicate with the central bore by means of suitable passages 18. A valve 19 is adapted to be reciprocated in the central bore 15. This valve constitutes a portion of a cylindrical rod 20 which extends through the bore from a point within the circulating tank 1. The lower end of the rod 20 is supported in a bearing 21 which is cast with the valve housing to the connecting arms 22. It will be noted that the rod 20 in proximity to the ports 18 is provided with a reduced portion 23 which is of a sufficient extent to connect the two ports 18. The upper end of the rod 20 terminates in the form of a bolt 24 or reduced portion

upon which a circular seat 25 is mounted which supports a flexible air valve cushion 26, adapted to abut a seat 27 upon a hollow nut 28 which is threaded in the top of the housing and which serves as an air relief port, and to limit the upward movement of the valve rod 20.

The bearing 14 is also provided with a water relief port 29 which extends from the bottom thereof to a transverse passage 30 which extends from the central bore 15 to the exterior of the housing. The exterior end of the passage 30 is closed by a nut 31. This water relief port provides for leakage and for relieving the pressure on the diaphragm or piston valve after the same has been operated by a piston of water and the rod 20 has descended through the lowering of the float for shutting off the inlet port 18 to pipe 17 and for bringing the ports 30 and diaphragm pipe 16 into communication through the reduced portion 23 of rod 20 as shown in dotted lines in Figure 3 whereby the fluid can escape from diaphragm pipe 16 through the reduced port 23 of rod 20 to relief passages 30 and 29.

A coil spring 33 is confined between the aforementioned seat 25 and the top of the bearing 14. This spring is normally effective for elevating the valve 19 for opening the port 18 and bringing the same into communication with the diaphragm pipe 16. As shown in Figure 2, a suitable clevis 34 is attached to the valve rod 20 and this clevis is provided with a bolt 35 which extends through a slot 36 in a float lever 37 which is located in the circulating tank 1. A float 38 is secured upon one end of the lever 37 and the other end of the lever, it will be noted, extends beyond the slot 36 and is pivoted to a bracket 39 depending from the top of the circulating tank. If desirable, a guide rod 40 may extend into the circulating tank from the top thereof for guiding the movements of the float lever 37.

In the operation of this apparatus a certain amount of water is maintained in the circulating tank 1 for priming the pump. When the pump is operated it will draw water from the tank 1 through the pipe 4 and discharge it through the pipes 5 and 6 to the ejectors in the casting 7. The action of the ejectors will produce a vacuum which will draw the water of condensation from the tank 2 into the circulating tank. During this operation of the pump the float 38, providing, of course, that the circulating tank is not sufficiently full of water, will maintain the valve rod 20 in closed position as indicated by dotted lines in Figure 3 so that the pump cannot discharge any water through the pipe 17. As the pump continues to operate and the water level in the circulating tank rises, it will reach a point where it will elevate the float 38 allowing the spring 33 to open the

discharge port 18 which leads to the pump pipe 17. Obviously if the spring 33 should not function properly the float lever 37 may become effective for elevating the valve rod 20 for opening the said port 18.

As soon as the port 18 of the pump pipe 17 is opened the pump will pump water into the central bore 15 of the valve housing and this water will be forced into the pipe 16 which leads to the diaphragm 10 for opening the cut off valve in the pipe 8 whereby the pump will deliver water to the boiler or the like. When the water in the tank 1 recedes to a sufficient point the float will naturally drop and draw the valve rod 19 downwardly to close the pump port 18.

It will be appreciated that the stream or piston of water which acts on the diaphragm 10 is directly under the force or pressure of the pump affording a quicker and more positive action for operating the diaphragm.

I am aware that numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

I claim as my invention:

1. A control apparatus for a heating plant, comprising a water circulating system having a pump, a water delivery pipe extending from said circulating system, a valve in said delivery pipe, a diaphragm connected to said valve, a connection from said pump to said diaphragm, a valve in said last named connection, and means regulated by said circulating system for controlling said last named valve.

2. In a control apparatus of the character described, a circulating tank, a pump connected to said tank for circulating water therethrough, a boiler feed pipe connected to said pump, a valve in said boiler feed pipe, a valve connected to said tank, a diaphragm for operating the valve in said boiler feed pipe, a fluid conduit connecting said diaphragm and the valve on said tank, a fluid conduit connecting said valve with the discharge pipe of said pump, and a float in said tank connected to the valve thereon for the purpose set forth.

3. In a control apparatus of the character described, a water circulating system including a pump, a boiler feed pipe extending from said circulating system, means for controlling the flow through said boiler feed pipe including a fluid pressure line in which the fluid is actuated directly by the force of said pump, and automatic means controlled by the height of water in the circulating system for controlling the fluid pressure line.

4. In an apparatus of the class described, a circulating tank, a centrifugal pump, a connection between said tank and the inlet side of said pump, a discharge pipe connect-

ing said tank and pump, a boiler feed pipe connected to said discharge pipe, a valve in said boiler feed pipe, a diaphragm for controlling said valve, a conduit connection between said diaphragm and discharge pipe, a
5 valve in said conduit, and means controlled by the height of water in said tank for controlling said last mentioned valve for the purpose set forth.

10 5. In combination, a water tank, a jet ejector therein, a power driven pump for circulating water through said ejector and tank, a delivery pipe connected to said pump, a valve in said delivery pipe, and means for
15 periodically actuating said valve through the force of said pump, comprising a conduit through which water is forced by the pump, a valve in said conduit, and a float in said tank for controlling said last mentioned
20 valve.

6. In an apparatus of the class described, a circulating tank, a pump for circulating water through said tank, a valve secured to said tank, a connection between said valve
25 and pump, a water delivery pipe connected to said pump, a diaphragm valve in said delivery pipe, a connection leading from said diaphragm valve to said first mentioned valve, and a float in said tank for controlling
30 said last mentioned valve.

7. In an apparatus of the class described, a water circulating system, a water delivery pipe extending from said system for periodically delivering water to a remote point,
35 a diaphragm valve in said delivery pipe, and means including a fluid pressure line in which the fluid is actuated by said circulating system for controlling said valve, said means embodying a valve controlled by the
40 height of fluid in said system.

8. A control mechanism for a heating plant comprising a water circulating system having a pump and a water delivery pipe, a valve in said delivery pipe, a diaphragm
45 connected to said valve, a fluid connection from said pump to said diaphragm, a valve housing in said connection having an air relief port, and a reciprocating rod in said housing having a valve for controlling said
50 air relief port, and a reduced portion for controlling the flow of fluid through said connection.

9. In an apparatus of the class described, a water circulating system including a storage tank and a pump connected with said
55 tank, a water delivery pipe extending from said pump, a valve in said delivery pipe, a diaphragm for operating said valve, a fluid connection between said diaphragm and pump, a valve in said connection and means
60 operated by the height of water in said tank for controlling said last mentioned valve.

In testimony whereof I have hereunto subscribed my name.

65 LOUIS G. L. THOMAS.