Sept. 17, 1940. O. KLOTZ 2,214,792

AUTOMATIC CONTROLLING MECHANISM

Filed Sept. 8, 1938 2 Sheets-Sheet 1

Fig. 1.

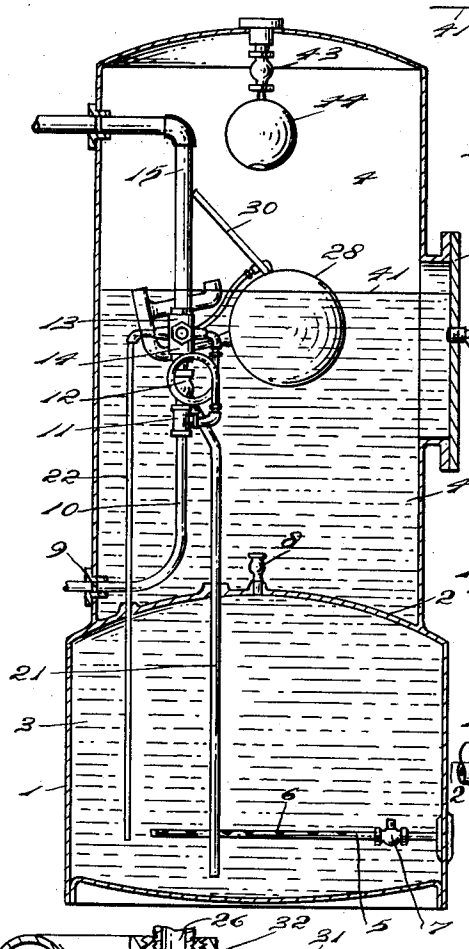


Fig. 3.

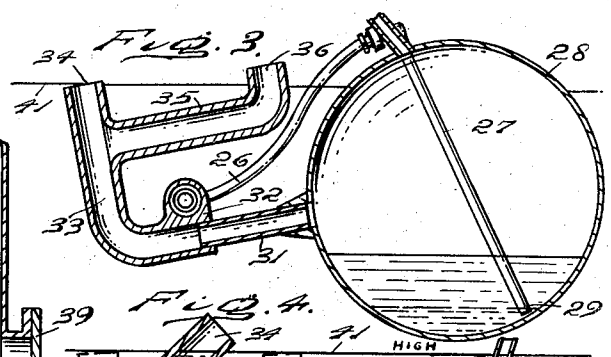


Fig. 4.

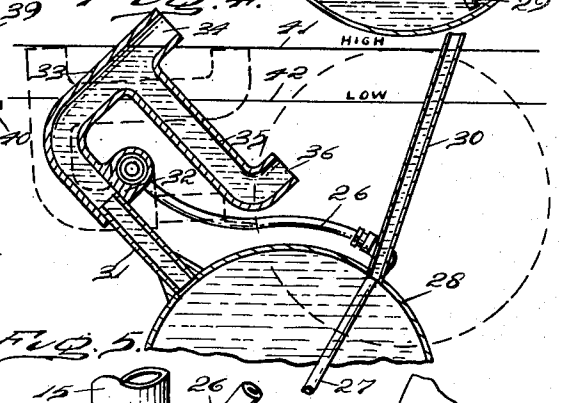


Fig. 5.

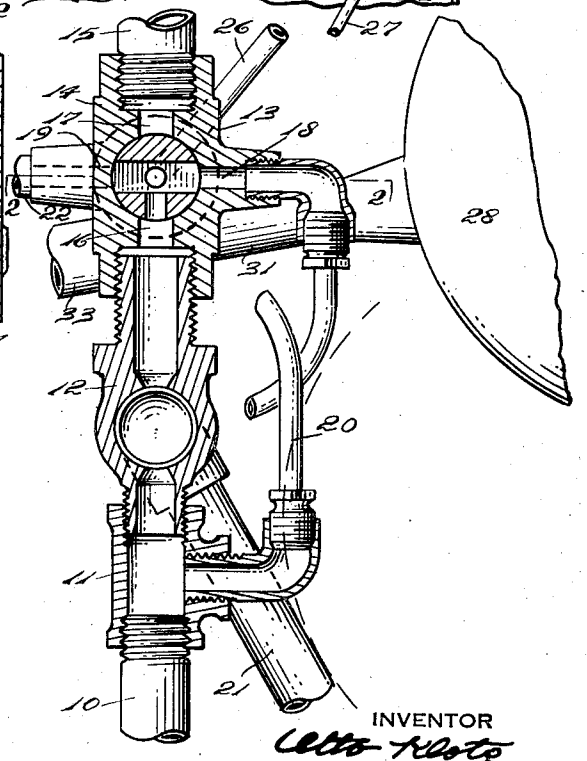
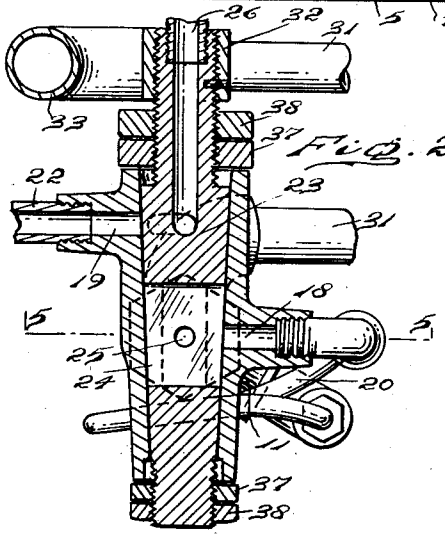


Fig. 2.



INVENTOR
Otto Klotz
BY
Herbert H. Fairbanks
ATTORNEY

Sept. 17, 1940. O. KLOTZ 2,214,792

AUTOMATIC CONTROLLING MECHANISM

Filed Sept. 8, 1938 2 Sheets-Sheet 2

Fig. 6.

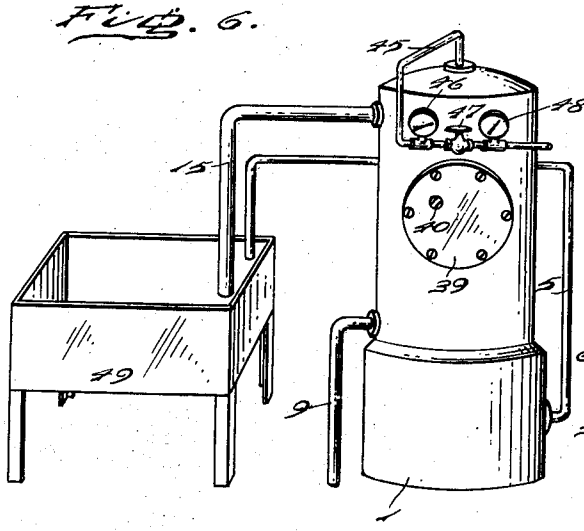


Fig. 7.

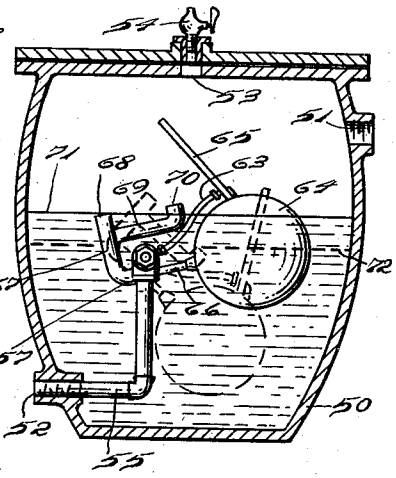


Fig. 8.

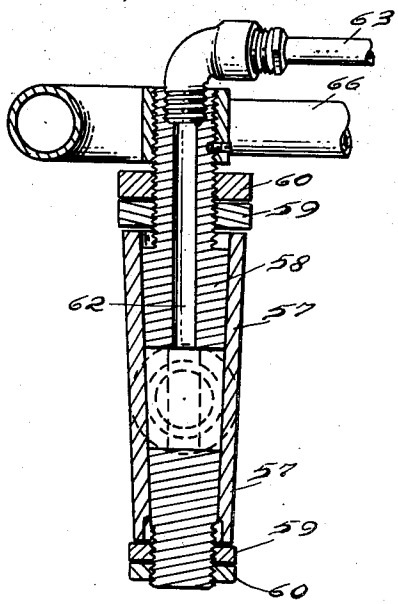


Fig. 9.

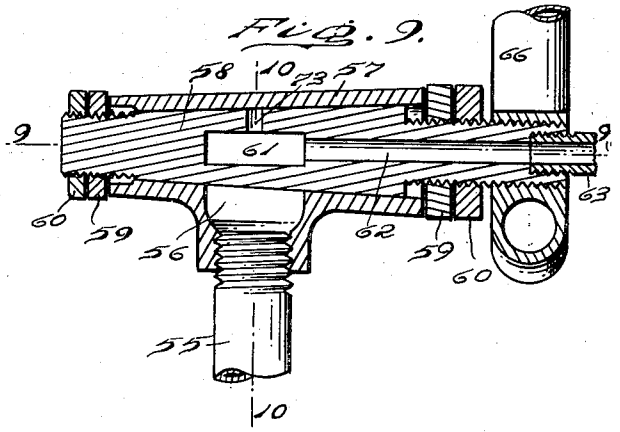
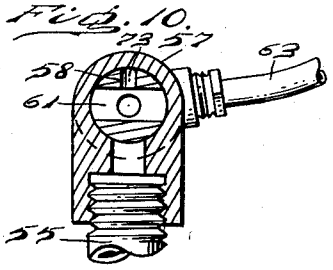


Fig. 10.



INVENTOR
Otto Klotz
BY
Herbert S. Fairbanks
ATTORNEY

Patented Sept. 17, 1940 2,214,792

UNITED STATES PATENT OFFICE

2,214,792

AUTOMATIC CONTROLLING MECHANISM

Otto Klotz, Philadelphia, Pa.

Application September 8, 1938, Serial No. 228,954

1 Claim. (Cl. 137—103)

The object of this invention is to devise a novel automatic controlling mechanism.

A further object is to devise a novel automatic controlling mechanism which when connected with a part to be controlled such as for example a valve, will retain the valve in a wide open or fully closed condition.

A further object is to devise a novel controlling mechanism having a hollow float into which and from which liquid passes in accordance with a high or low liquid level so that the varying weight of the float can be utilized to control any desired mechanism.

One application of this invention is the conditioning and compressing of air as in my prior Patent No. 1,956,390, of April 24, 1934, and I have also illustrated it in the form of a steam trap, it being understood that it may be employed for many other purposes.

A further object of the invention is to devise a novel hollow float having venting means, and novel means for controlling the entrance of liquid into the float and the removal of liquid from the float.

Other novel features of construction and advantage will hereinafter more clearly appear in the detailed description and the appended claim.

For the purpose of illustrating the invention, I have shown in the accompanying drawings preferred embodiments of it, which, in practice, will give satisfactory and reliable results. It is, however, to be understood that these embodiments are typical only and the various instrumentalities of which my invention consists can be variously arranged and organized, and the invention is not limited to the exact arrangement and organization of these instrumentalities as herein set forth.

Figure 1 is a sectional elevation of an automatic controlling mechanism embodying my invention.

Figure 2 is a section on line 2—2 of Figure 5.

Figure 3 is a sectional view through the float in its lightened position.

Figure 4 is a sectional view of the float in its weighted position.

Figure 5 is a section on line 5—5 of Figure 2.

Figure 6 is a perspective view of the controlling mechanism, showing the outlet discharging into a rinsing tank, and suitable gages with a regulating valve to control the amount of air for dispensing of beer.

Figure 7 is another embodiment of my invention, showing the controlling mechanism adapted to a steam trap.

Figure 8 is a sectional view showing more particularly the valve construction.

Figure 9 is a section on line 9—9 of Figure 8.

Figure 10 is a section on line 10—10 of Figure 8.

Similar numerals indicate corresponding parts.

Referring to the drawings:

1 designates a tank having a partition 2 which divides it into a lower liquid receiving chamber 3 and an upper liquid receiving and air compressing chamber 4. The chamber 3 has an inlet pipe 5 extending into the bottom portion of the chamber 3 with its upper wall having openings 6, the free end of the pipe being preferably closed. The pipe 5 is provided with a check valve 7 opening in the direction of the flow. The partition 2 has a check valve 8 which opens in the direction of flow from the chamber 3 to the chamber 4.

9 designates a liquid inlet in the wall of the upper chamber 4, leading from a source of liquid supply, such as for example water, to a pipe 10 connected with a T fitting 11 which latter is connected with a T fitting 12, the latter being connected to a valve 13, the casing 14 of which communicates with an outlet pipe 15. The valve casing 14 has an inlet 16, an outlet 17, a port 18 opening between said inlet and outlet, and a port 19. A pipe 20 connects the lateral branch of the fitting 11 with the port 18. The lateral branch of the fitting 12 is connected with a pipe 21 extending downwardly through and in sealed condition with the partition and having its lower open end terminating near the bottom of the lower chamber 3. A pipe 22 leads downwardly from the port 19 through the partition 2 and in sealed condition therewith and has its lower open end terminating in the bottom portion of the chamber 3.

The valve casing 13 has a rotatable, tapered valve 23 having an elongated port 24 therethrough and a port 25 at right angles thereto and opening into it and adapted to be brought into registry with the port 18.

The port 19 is out of line with the port 18 and communicates with a pipe 26 connected with a pipe 27, which latter extends into a hollow float 28. The inner open end of the pipe 27 terminates at the bottom portion of the chamber of the float, and is preferably restricted as at 29. A vent pipe 30 open at its ends is carried by the float and is in communication with the float chamber. The float 28 is connected by a pipe 31 with a tubular support 32 to which the valve 23 is fixed. The support 32 has an upwardly directed pipe 33, which, at a point below its upper open end 34,

communicates with a laterally extending pipe 35 having an upwardly directed open end 36.

In order to prevent sticking of the valve 23, the outer ends are threaded and provided with nuts 37 and lock nuts 38. The support 28 has a passage communicating with the pipes 26 and 27.

The tank has a removable closure 39 having a priming plug 40. The high water level is indicated at 41 and the low water level at 42.

The upper end of the tank 1 has a check valve 43 connected with a float 44 so that in case of failure of the system the float 44 will close the check valve when the water rises sufficiently and prevent escape of water through the check valve 43. The compressed air passes from the chamber 4 through check valve 43 to discharge line 45 having a pressure indicator 46 indicative of the air pressure in the chamber 4, a regulating valve 47 and a pressure indicator 48. The inlet end of the air inlet pipe 5 is above the water in a tank 49 into which the pipe 15 discharges.

Referring now to the embodiment seen in Figure 7, my novel automatic control is shown in conjunction with a steam trap having a casing 50 provided with a steam inlet 51, a water outlet 52, and an air vent 53 controlled by a petcock 54. A pipe 55 leads from the outlet port 56 of a valve casing 57 to the outlet 52, such pipe 55 serving as a support for the valve casing 57. A tapered valve 58 is retained in free turning position in the valve casing by nuts 59 and 60 engaging threaded portions at opposite ends of the valve. The valve 58 has an outlet port 61 to register with the outlet port 56 of the valve casing and also has a passage 62 leading to a pipe 63 connected with and turnable with the valve. The pipe 63 is connected with a hollow float 64 and communicates with its float chamber. The float 64 has a vent pipe 65. The float 64 has a pipe 66 communicating with it and with an upwardly directed pipe 67 having an open end 68 and a laterally extending branch 69 having an upwardly directed open end 70. The pipe 63 is fixed to the stem of the valve 58. The high water level is indicated as approximately at 71, and the low water level at 72.

The operation of my novel automatic controlling mechanism will now be clear to those skilled in this art and is as follows:

Referring first to the embodiment seen in Figures 1 to 6 inclusive, the air conditioner and compressor is first primed by removing plug 40, filling with water to the level of the plug, inserting the plug 40 and then turning on the water.

When the valve is in its raised position as seen in Figures 1 and 3, the valve is closed to outlet pipe 15 and pipes 22 and 26, and open to pipe 20.

When the float is down the valve is open to pipes 15, 22 and 26 and closed to pipes 20 and 21.

The float is hollow and vented so that the external and internal pressures will be equalized, thus preventing collapsing or leakage of the float.

As the water rises in chamber 4, the float rises which lowers the filling opening 34 so that water flows through pipes 33 and 31 partly filling the float ball. This brings the filling opening 36 below the level of the water and water passes through filling opening 36, pipes 35, 33 and 31 into the float causing it to move from the position seen in Figure 3 to that seen in Figure 4. This opens the valve to outlet pipe and the water level lowers from the high water level 41 to the low water level 42 and the water in the float chamber is siphoned out through pipe 26, port 19 and pipe 22. This siphoning action continues until the float becomes partly empty or light enough to float, whereupon it rises to the position seen in Figure 1 and closes the valve to outlet pipe 15.

The high and low water levels are governed by the height of the filling opening 34 and 36 above the pipe 35 and this also determines the timing of the stroke.

The air is taken in at a point above the water in the tank 6, passes through pipe 15, check valve 7, pipe 5 and ports 6 into the lower chamber 3, passes upwardly through check valve 8, through the water in chamber 4 and is compressed by the water in the upper portion of the chamber 4. As the compressed air is withdrawn through check valve 43 which is normally open, the water pressure will exceed the air pressure and water will pass from chamber 3, through check valve 8, into the upper chamber 4.

The float 44 prevents water escaping through check valve 43 since the rise of water, due to any failure or break down of the system, sufficient to raise the float 44 will cause such float to close the check valve 44 to prevent water passing therethrough.

The water passes from pipe 15 to the tank 49, see Figure 6, thus providing a supply of fresh, clean water for rinsing the glasses or other articles. The amount of water withdrawn through pipe 15 depends on the length of time the valve is open. When the valve is closed, water can pass through pipe 10, fittings 11 and 12, and pipe 21, into the chamber 3 to replenish the water in the system.

The purpose of the by-pass pipe 20 is to act as a silencer and prevents a gurgling noise which sometimes occurs when such by-pass is omitted.

Referring now to the embodiment seen in Figures 7 to 10 inclusive, the water of condensation of steam entering the steam inlet 51 raises the level of the water in the tank 50 to raise the float so that water enters the opening and passes into the float to partially weight it and the float sinks. This brings the inlet opening 70 below the level of the water and water passes through such inlet opening 70 into the float and the float sinks to its lowermost position seen in dotted lines in Figure 7. The valve 58 is now in its open position and the water is withdrawn from the float through pipe 63, passage 62 of the valve, ports 61 and 56 and pipe 55.

The float now rises, closing the valve and assumes its normal position with the inlet openings 68 and 70 above the level of the water.

It will thus be clear that the broad principle of the automatic controlling mechanism is the same in both of the embodiments of my invention as herein disclosed.

The variation in water level in conjunction with a hollow float and its adjuncts is employed to automatically control other mechanism.

The valve 58 in Figures 7, 8, 9 and 10 is provided with an opening 73 communicating with passage 61 to provide a means for sealing the valve by pressure of the steam against the upper wall of the casing 57.

In devices of this character as heretofore constructed, it was necessary to build them for a few pounds variation in pressure, whereas my device will operate satisfactorily on a very large range of pressure for example zero to one hundred and twenty-five pounds.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

In an automatic control mechanism, a liquid containing tank, a hollow liquid containing float in the tank, a substantially horizontally disposed pivot for the float, venting means for the float, a valve connected with the float to move with it and control discharge of liquid from the float, a main filling pipe for the float communicating with the interior of the float at one end and extending laterally and upwardly to provide an inlet at its other end, a branch filling pipe connected with the main filling pipe and extending laterally and upwardly therefrom to provide a second inlet disposed at the opposite side of a vertical plane through the axis of the pivot from the inlet of the main filling pipe when the float is in raised position, and the inlets of said main and branch filling pipes terminating at such heights that the liquid first flows into the main filling pipe causing the float to descend and thereby move the open end of the main filling pipe above the surface of the liquid and move the inlet of the branch filling pipe below the surface of the liquid, and the point of connection of the branch filling pipe with the main filling pipe determining the low level of liquid in the tank.

OTTO KLOTZ.