

Dec. 9, 1952

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2,620,829

AUTOMATIC VALVE FOR FLUID CONTROL

Filed June 4, 1949

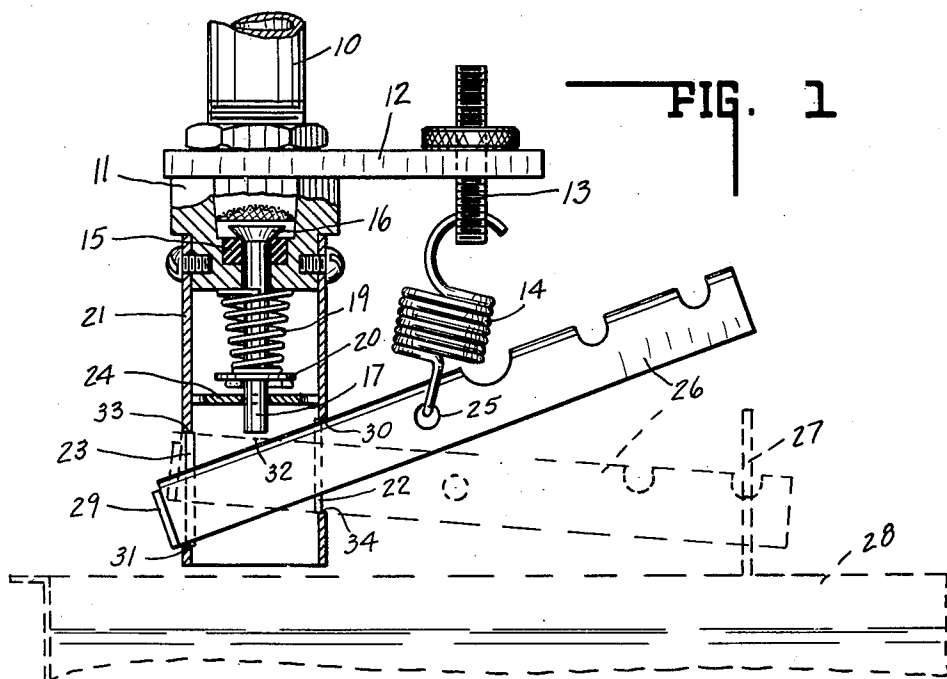
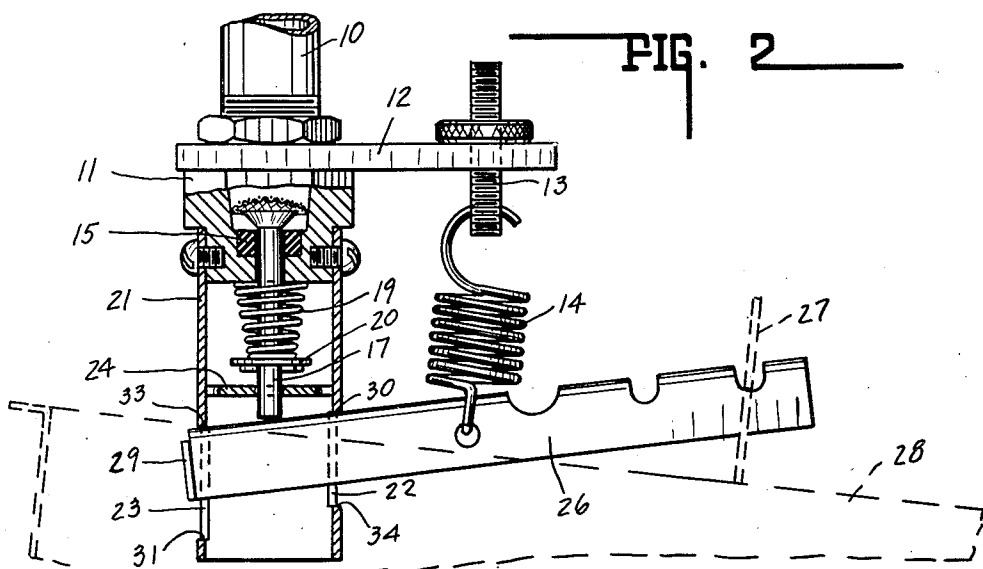
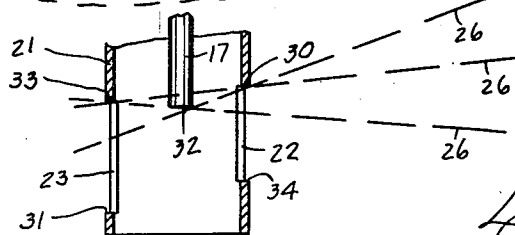


FIG. 3

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2,620,829

AUTOMATIC VALVE FOR FLUID CONTROL

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Application June 4, 1949, Serial No. 97,115

7 Claims. (Cl. 137-750)

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This invention relates to an automatic valve for fluid control, and while applicable to various uses, is herein shown as applied to a water trough or chick fount for maintaining a controlled water level therein.

It is the object of the invention to provide a simply constructed valve control adapted to be secured to the end of a depending fixed water pipe or the like for controlling the liquid discharge therefrom into a suitable container suspended therefrom to control the valve through variations in liquid weight.

The particular feature of the invention resides in the arrangement herein disclosed wherein the valve will be automatically closed upon being relieved of the weight of the container or upon the container receiving a predetermined quantity of liquid, the valve being moved to open position through the weight of the container when mounted thereon and maintained in open position to permit flow of fluid into the container until the fluid reaches a predetermined level, whereupon its weight will act to close the valve.

The above is accomplished by so arranging a valve control lever fulcrumed intermediate its ends by a calibrated control spring, one end to receive the container and the other end movable in a valve housing in such manner as to permit the valve to remain closed when the supporting end of the lever is in its uppermost position free of the weight of the container or in its lowermost position subjected to the weight of the container and the predetermined quantity of liquid, the intermediate position of the lever subjected to the weight of the empty container and a lesser quantity of liquid, being such as to move the valve to open position.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

Fig. 1 is a side elevation of the valve structure with portions thereof broken away and shown in section and with the valve in closed position.

Fig. 2 is the same as Fig. 1, showing a portion thereof with the valve in open position.

Fig. 3 is a schematic illustration of the several positions of the control lever.

In the drawings there is shown a fixed downwardly extending liquid supply pipe 10 connected to a suitable source. Secured to the lower end of said pipe there is a valve fitting 11 which includes a laterally-extending bracket arm 12 carrying a weight compensating screw 13 from which a coiled load spring 14 is suspended. The fitting 11 carries a valve seat 15 in which a valve head

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16 is adapted to seat in closed position, said valve head having a depending valve stem 17 slidably extending through said seat and fitting. The usual protective screen 18 is mounted over the valve head and seat. Surrounding the valve stem there is a coiled compression spring 19 bearing against the bottom of the fitting at its upper end and at its lower end against a bearing washer and lock pin indicated at 20 and secured to the stem.

Secured about the fitting and extending downwardly therefrom there is a tubular valve sleeve 21 having in its lower portion opposed slots 22 and 23 as hereinafter more particularly described. Pressed into said sleeve to extend transversely thereof there is a guide plate 24 centrally apertured to provide a bearing and guide for the lower portion of the valve stem 17 which extends outwardly therefrom. Said guide plate is suitably cut away at its sides to permit of fluid passage.

Fulcrumed intermediate its ends at 25 on the lower end of the load spring 14 there is a valve lever 26 suitably notched at its far end to receive the bale 27 of a suspended liquid container 28. The opposite or near end of said lever extends through the slots 22 and 23 of said sleeve with the adjacent end thereof flanged or otherwise treated at 29 to prevent its escape therefrom. The upper edge of that portion of the lever extending within the sleeve is aligned for bearing point engagement with the lower end of the valve stem, such that when said portion of the lever is raised the valve will be elevated from its seat to open position, but when lowered will permit spring 19 to move the valve head to its seating and closing position.

For the functioning of the valve control the length and relative locations of the slots 22 and 23 with respect to the width of the lever 26 and the lower end of the valve stem is critical so that when the lever is drawn to its uppermost position upon removal of the container, as shown by full lines in Fig. 1, the valve stem will be relieved from effective engagement thereby to permit the valve to close. When the container is suspended from the lever, its weight will affect the adjusted load spring 14 to draw the lever downwardly to its intermediate position, as shown in Fig. 2. In this position the lever will engage the valve stem to raise it, open the valve and permit the flow of liquid into the container. Upon the container being charged with a predetermined quantity of liquid, the weight thereof will so affect the adjusted load spring

14 as to further lower the lever to the position shown in dotted lines in Fig. 1, it will again relieve the valve stem to permit closing of the valve and the shutting off of further liquid supply.

For accomplishing the above the lever fulcrums about its connection with the load spring at 25, its uppermost position being limited by engagement of its upper edge with a bearing member serving as a fulcrum point provided by the upper end of the slot 22 at 30, its lower edge being brought into engagement with the lower end of the slot 23 at 31. In this position its upper bearing point at 32 will be at or below the lowermost position of the valve stem for permitting the valve to close. Upon the container being suspended from the lever, the load spring will yield so that the fulcrum point 25 drops downwardly about the bearing member at 30 which serves as a secondary fulcrum point until the near end of the lever engages the opposed bearing member provided by the upper end of the slot 23 at 33. In this position the upper edge of the lever extends directly between the upper ends 30 and 33 of said slots with the consequent raising of the bearing point 32 thereof and elevation of the valve stem to valve open position. Upon a predetermined quantity of liquid entering the container, its weight will further depress the lever to its lowermost position, as shown by dotted lines in Fig. 1. Since the near end of the lever is restrained from further upward movement through engagement with the upper end of the slot at 33 that portion extending through the slot 22 will be lowered from engagement at its upper end 30 into engagement at its lower end 34. Thus, the upper edge of the lever is caused to slope downwardly from 33 with the consequent lowering of its bearing point 32 at or below the lowermost position of the valve stem to permit the valve to close.

From the foregoing it will be observed that without manual manipulation complete automatic control of the valve is provided for effecting its closing in event of either removing the container or loading it, while automatically causing the valve to open when the container is in place for receiving the liquid.

The invention claimed is:

1. In an automatic fluid valve, the combination with a fluid supply pipe, of a valve in the discharge end thereof having a projecting stem, a pressure spring on said stem for biasing said valve to closed position, a sleeve on said valve having oppositely disposed slots with their upper ends adjacent the end of said valve stem, a valve control lever extending through said slots having a bearing point positioned for engagement with the end of said valve stem, and a tension spring connecting said lever to said sleeve normally positioning it with the end of the adjacent slot serving as a fulcrum therefor and its bearing point free from operative engagement with said valve stem, said lever being movable about said fulcrum to an intermediate position to cause its bearing point to be displaced into valve opening position, and to a third position fulcrumed against the end of the far slot to again displace its bearing point free of operative engagement with said valve to permit closing thereof.

2. In an automatic fluid valve, the combination with a fluid supply pipe, of a valve in the discharge end thereof provided with a valve stem, a pressure spring for biasing said valve to closed position, a fulcrum mounting on said valve hav-

ing spaced fulcrum points arranged adjacent and on opposite sides of said valve stem, a valve control lever extending from said mounting having one end portion thereof adapted to fulcrum on one or the other of said fulcrum points with an intermediate bearing point engageable with said valve stem, and a tension spring connecting said lever intermediate its ends with said mounting for biasing said lever into fulcrum engagement with one of said fulcrum points with its bearing point free of operative engagement with said valve stem, said lever being movable about said last-mentioned fulcrum point under tension of its spring to raise its bearing point into operative engagement with said valve stem to open said valve, and further movable against increased tension of its said spring to disengage said last-mentioned point and engage the point on the opposite side of said valve stem to thereby remove its bearing point from operative engagement with said valve stem to permit said valve to close.

3. An automatic fluid valve normally biased to closed position, a control lever for said valve having a spring suspension intermediate its ends, said lever being adapted to receive a weight adjacent one end and its other end having a bearing point engageable with said valve, and a control element associated with said valve embracing the bearing point of said lever provided with a plurality of spaced fulcrum points, said fulcrum points being so spaced and arranged relative to the bearing point of said lever and valve to cause said lever to be fulcrumed about one of said fulcrum points with its bearing point out of operative engagement with said valve when free of weight, moved thereabout into operative engagement with said valve for opening it upon application of an intermediate weight, and be swung about the oppositely spaced fulcrum point free of operative engagement with said valve for permitting closure thereof upon a greater predetermined weight being applied thereto.

4. In an automatic fluid valve having a mounting including a valve and valve stem normally biased to closed position, a normally inoperative valve control lever suspended intermediate its ends from a weight compensating spring connected with said mounting, and a fluid directing lever control sleeve on said mounting provided with perforations in the wall thereof through which the valve control end portion of said lever extends to provide spaced fulcrum points therefor, the near fulcrum point being first effective to direct said lever into valve operating position to open said valve upon a weight being applied to its free end, and the opposed fulcrum point being thereafter effective to direct said lever away from valve operating position to permit said valve to close upon said weight being increased.

5. In an automatic fluid valve, the combination with a fluid supply pipe, of a valve in the discharge end thereof having an elongated valve stem, a pressure spring on said stem for biasing said valve to closed position, a sleeve carried by said valve extending beyond the end of said valve stem, a guide plate secured transversely of said sleeve apertured to provide a guide and bearing for said stem and permit fluid passage through said sleeve, said sleeve having diametrically opposed slots with their upper ends terminating adjacent the end of said valve stem, a valve control lever extending through said slots having a bearing surface intermediate thereof engageable with the lower end of said valve stem, and an adjustable load spring connecting the inter-

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mediate portion of said lever with the supply pipe, the upper ends of said slots providing fulcrum bearings for said lever and respectively so related to the end of said valve stem as to cause said lever when free of load to extend at such angle that its bearing point will not affect the position of said valve and upon a load being applied thereto will fulcrum on said sleeve to move its bearing point to valve opening position, and upon a greater load being applied thereto change its fulcrum point on said sleeve to remove its bearing point from effective engagement with said valve to thereby permit it to close.

6. In an automatic fluid valve, the combination with a fluid supply pipe, of a valve at the discharge end thereof having an elongated valve stem, a pressure spring on said stem for biasing said valve to closed position, a sleeve carried by said valve extending beyond the end of said valve stem, said sleeve having diametrically opposed slots with their upper ends terminating adjacent the end of said valve stem, a valve control lever extending through said slots having a bearing surface intermediate thereof engageable with the lower end of said valve stem, the upper ends of said slots providing spaced fulcrum bearings for said lever and respectively so related to the end of said valve stem as to cause said lever when free of load to be fulcrumed on one of said fulcrum bearings at such angle that its bearing point will not affect the closed position of said valve and upon a load being applied thereto will fulcrum thereon at a lesser angle to move its bearing point to valve engaging and opening position, and upon a greater load being applied thereto will fulcrum about the spaced fulcrum bearing at such angle as to remove its bearing point from effective engagement with said valve to thereby permit it to close.

7. In an automobile fluid valve, the combina-

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tion with a fluid supply pipe, of a valve fitting connected thereto, a valve in said fitting having a spring pressed valve stem biased to closed position, a fulcrum member secured to said fitting having fulcrum points positioned in diametric spaced relation to the end of said valve stem, a valve control lever positioned for alternate engagement with said fulcrum points and having an intermediate bearing point engageable with said valve stem, and a load spring connecting the intermediate portion of said lever with said fitting for biasing said lever about one of said fulcrum points when free of load at such angle that its bearing point will be free of operable engagement with said valve stem and moved against the tension of said load spring under an intermediate load to swing said lever about said last-mentioned fulcrum point to move its bearing point into operative engagement with said valve stem for opening said valve, the application of a greater load to said lever further expanding said load spring to disengage said lever from said last-mentioned fulcrum point and cause it to engage the opposed spaced fulcrum point for moving its bearing point out of operable engagement with said valve stem to permit said valve to close.

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