

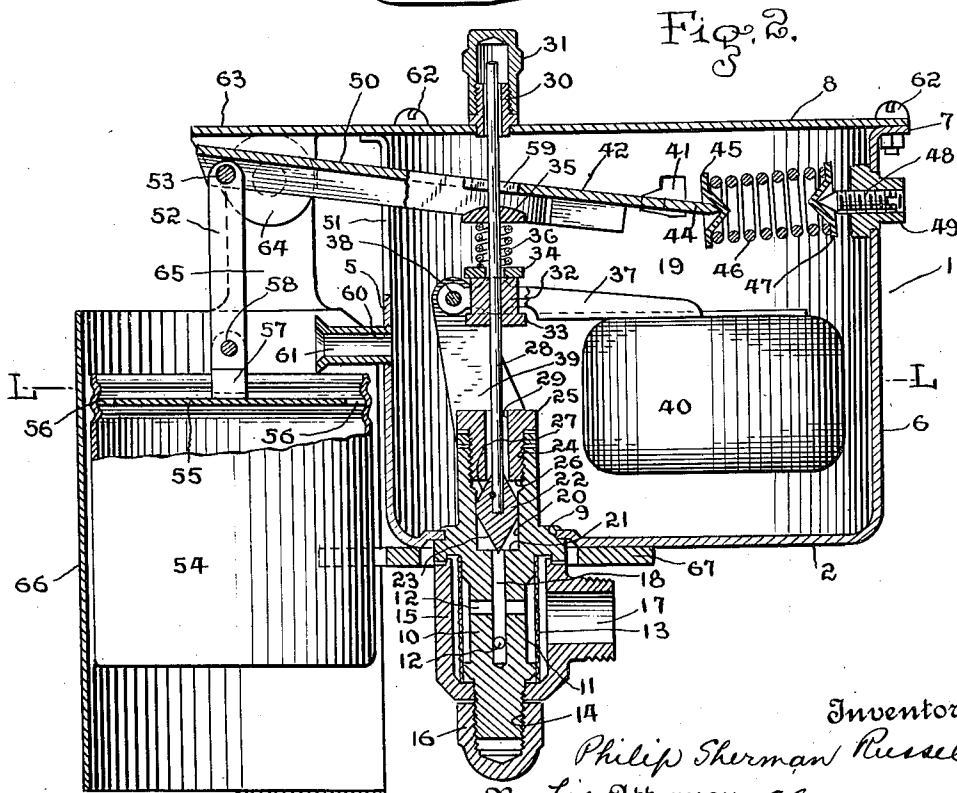
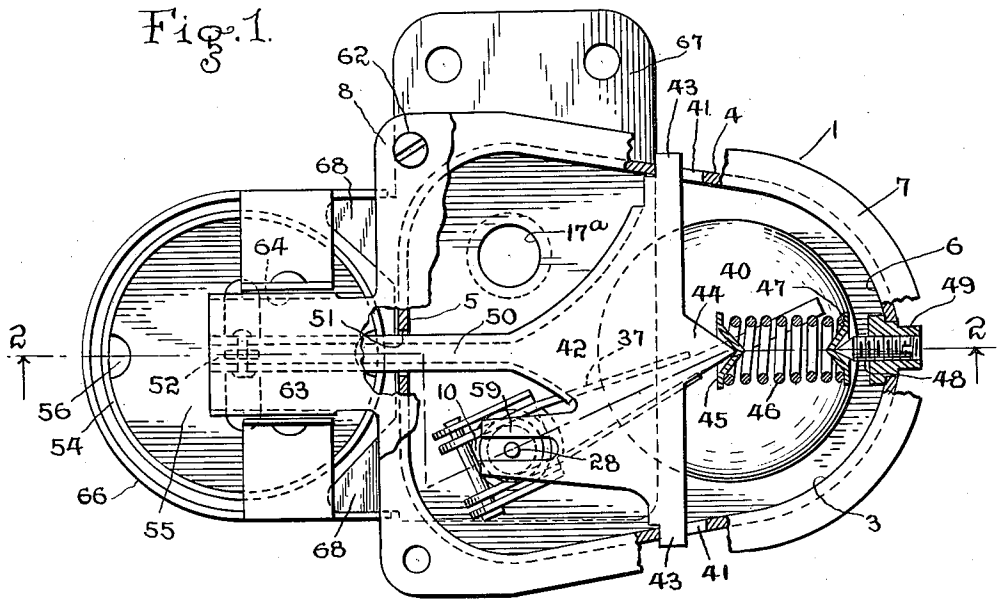
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CONTROL MEANS

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CONTROL MEANS

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18 Claims. (Cl. 137—68)

My invention relates to new and useful improvements in control means, and more particularly to a device for controlling flow of liquid, and which is adapted, among other uses, for regulating the supply of fuel to a liquid fuel burner.

An object of my invention is to provide a device for maintaining a constant head pressure of liquid at the point of delivery or use of the liquid.

Another object is to provide means for cutting off the supply of liquid to the point of use upon failure of the device to maintain constant the head pressure.

Another object is to provide a device of simple construction, which will be positive in operation.

The invention consists in the improved construction and combination of parts, to be more fully described hereinafter and the novelty of which will be particularly pointed out and distinctly claimed.

In the accompanying drawing, to be taken as a part of this specification, I have fully and clearly illustrated a preferred embodiment of my invention, in which drawing—

Figure 1 is a top plan view of a device embodying my invention, having a portion of the top cover or closure member broken away and having certain parts shown in section, and

Fig. 2 is a view in vertical section on the line 2—2 of Fig. 1.

Referring to the drawing by characters of reference, 1 designates, generally, a hollow casing or reservoir defining a constant level chamber having a bottom wall 2 from which rise substantially vertical side walls 3, 4 and end walls 5, 6.

The walls 3, 4, 5 and 6 terminate in an outwardly directed substantially horizontal flange 7 for receiving and supporting a top cover or closure member 8 for the casing. Through the bottom wall 2 adjacent the side and end walls 3 and 5,

there is an aperture 9 in which is secured and sealed a member 10 which projects above and below the wall 2. The member 10 has below the wall 2 and externally of the casing, a circumferential annular recess or groove 11, and transversely through member 10 are horizontal bores or passages 12 opening at their opposite ends into the recess 11. Overlying the recess and the bores 12, is a cylindrical screen or filter member 13, preferably of fine wire mesh. Below the screen member 13, the member 10 is of reduced diameter and screw-threaded, as at 14, to receive a hollow coupling member 15 which surrounds the member 10 and is secured and sealed thereto by a nut 16 threaded onto the threads 14. The coupling member 15 has a laterally projecting inlet nipple

17 opening thereinto, which is externally threaded to receive a conduit or the like from a liquid supply tank or other source of supply. Also through the wall 2, but adjacent the walls 4 and 5, there is an outlet port 17^a having a depending externally threaded nipple for connection to the delivery line or pipe. Longitudinally and axially of member 10, there is a passage 18 which intersects the passages 12 and opens at its upper end into the chamber 19 within the casing 1. The passage 18 is of enlarged internal diameter above the passages 12, to provide a valve chamber 20 above the upward facing annular shoulder 21 which defines a valve seat. Within the chamber 20 is a valve means or member 22 which is preferably polygonal in horizontal or transverse cross-section to permit flow through the chamber and around the valve member. The member 22 preferably has a substantially conical or downward tapered valve face 23 which cooperates with the valve seat 21 to close the inlet passage 18 upon downward movement of the valve member. Above the member 22 the passage 18 is internally threaded, as at 24, to receive a longitudinally ported plug or sleeve 25, which is sealed therein and has its bottom end or face 26 defining a downward directed valve seat. The valve member 22 is preferably somewhat elongated and has its upper end portion defined by an upward tapered or conical valve face 27 for engagement with the valve seat 26 to close passage 18 upon upward movement of the valve member. Secured to the member 22 is a valve stem or rod 28 which extends upward loosely through the bore 29 of plug 25 and into a guide sleeve 30 fixed in an aperture in the cover member 8. The upper free end of the rod 28 which projects through the cover member and sleeve 30 may be protected by a cap 31.

On the rod 28 is a two-part collar 32 having a bottom flange 33 projecting from the collar body and rigid with the rod and having an apertured plate 34 defining the top flange, and which is slidable on the rod. Above the collar 32 the rod has rigidly fixed thereto a button or annular abutment 35 for a purpose to be described, and which backs up and holds under compression a helical spring 36 surrounding the rod and acting on the plate 34 to resiliently and normally hold the plate in engagement with the body portion of the collar. Extending substantially horizontally and fitting between the flanges 33, 34, are the arms of a forked or bifurcated lever member 37 which is fulcrumed at its forked end in a pin 38 carried by and between upwardly extending spaced supporting arms 39, of which but one is shown, which

are preferably integral with the member 10. The free end of member 37 rigidly carries a float 40, which is preferably a hollow, air-tight metal shell or member.

Through the top portions of the side walls 34, there are opposite bearing apertures 41 above the float and in a substantially horizontal plane. Within the casing chamber there is a lever member 42 preferably in the form of a plate member of generally triangular outline having the ends of its base portion terminating in trunnions or bearing members 43 which extend into the apertures 41. From the mid-portion of the base a substantially V-shaped or pointed arm 44 extends, which receives a spring follower cup or plate 45. Bearing against the plate 45 is one end of a helical spring 46 held under compression thereagainst by a follower plate 47 seated on the conical end of an adjustable pin or screw 48 which is screw-threaded in a sleeve or nut 49 secured in an aperture in the end wall 6. From the apex of member 42 opposite the arm 44, an elongated arm 50 extends, which projects through a vertical slot or aperture 51 in the end wall 5. Pivotal support on the free end of arm 50 by a link 52 which is pivoted to the arm, as at 53, there is a receptacle or bucket 54. The top of the bucket is covered by a plate 55, which is secured at its periphery to the side walls of the bucket below the top edges thereof, and which has a plurality of apertures 56 therethrough. Centrally of the plate 55 there is a bracket 57 to which the free lower end of the link 52 is pivotally secured, as at 58. The lever member 42 is also provided with a bifurcated or slotted arm 59 projecting therefrom at one side of and substantially in the plane of and parallel to the arm 50 and which overlies the abutment 35 receiving the valve rod 28 within its slot. Below the aperture 51 and through the end wall 5, there is an aperture 60 which is slightly above the normal liquid level line L—L in chamber 19. The aperture 60 has secured and sealed therein an overflow spout or tube 61 which projects from wall 5 outwardly over the bucket 54.

The cover member 8 is removably secured to the flange 7 by nuts and bolts 62 or the like, and has thereon a substantially rectangular extension 63 which projects beyond the end wall 5. From the side edges of the extension 63 depend flanges 64 to which are pivotally secured the upward extending arms 65 of a guard casing 66 which cooperates with the end wall 5 to protect and laterally enclose the receptacle 54. Secured to the underside of wall 2 there is a supporting plate or bracket 67 for rigidly mounting the device in a desired position. On the plate 67 there are projecting portions 68 which fit snugly between and frictionally engage the side walls of the guard casing to hold it against lateral movement.

The operation of the device as employed, for example, in controlling the head pressure of liquid fuel supplied to a liquid fuel burner, not shown, from a source of supply, is as follows: The inlet nipple 17 is connected to the supply and the outlet nipple is connected to the burner or point of delivery. The head pressure will be determined by the height of the line L—L above the delivery point, and this pressure will be maintained constant so long as the chamber 19 is properly supplied. As the liquid is consumed at the delivery point from the chamber 19, the float will automatically lower to move valve member 22 away from seat 26 by engagement of lever 37 with flange 33. When the level again rises in cham-

ber 19 to line L—L, the rising of the float will act through lever 37 against the marginal edge of plate 34 and lift the rod 28 through the agency of the spring 36 and abutment 35 to thereby move the valve face 27 to its seat 26 to close the passage 18 and stop flow into chamber 19. Should it happen for any reason that the valve member failed to seat on shoulder 26 with a tight seal, so that liquid leaked therepast into chamber 19 faster than consumed, then as soon as the level reached the height of the overflow outlet 61, the leaking liquid would drain into the bucket 54. When the weight of the liquid draining into the bucket becomes slightly greater than the resistance offered by the component of force of spring 46 to downward movement of the bucket when empty, the bucket will start to move downward. When the toggle point between arm 44 and its spring cup 45 passes overcenter or above the line between the lever fulcrum and the pin 48, the force of spring 46 will act in conjunction with the force exerted by the weight of liquid in the bucket to move the valve face 23 against the bottom seat 21. It is to be noted that the arm 59 is positioned somewhat above the abutment 35, so that the lever 42 will deliver a sharp downward blow to the valve rod and valve member to drive the valve face 23 tightly to its seat on the annular shoulder 21. When the arm 59 engages abutment 35, the abutment 35 and flange 33 being fast on the rod 28, the resistance of the float to downward movement of rod 28 will be taken up by the compression of spring 36 acting against slidable plate 34. Downward movement of the valve stem or rod 28 relative to the float 40 is permitted by reason of the lost-motion spring connection between the float 40 and valve stem 28 so that the buoyant force of float 40 does not oppose movement of valve stem 28 by the safety lever 42. It is also to be noted that the valve member will be seated against the annular shoulder 21 with a snap action and an increasing spring force, due to the spring acting on the lever 42 at an acute angle and being fulcrumed for movement on the pin 48.

If the overflow valve closing means has functioned, the bucket may be emptied by swinging the guard casing 66 clockwise, or to the left of Fig. 2, when the link 52 will permit the bucket to be tipped and the liquid poured therefrom through holes 56. The ported plate 55 permits the body of oil or liquid which may collect in the bucket to be substantially covered, and thus reduce the fire hazard.

What I claim and desire to secure by Letters Patent of the United States is:—

1. A device of the character described, comprising a hollow casing defining a constant level chamber having an inlet passage and an outlet, oppositely directed valve seats in said passage, valve means in said passage, said means having oppositely directed valve faces cooperable with said seats, a float member responsive to liquid level in said chamber, a lever member operatively connecting said float member to said valve means and operable to move one of said valve faces into engagement with one of said valve seats to close said passage, and means cooperable with said valve means and operable to move the other of said valve faces into engagement with the other of said valve seats upon failure of said float member to close said passage.

2. A device of the character described, comprising a hollow casing having an inlet passage and an outlet, oppositely directed valve seats in

said passage, a valve member positioned in said passage between said seats and having oppositely directed valve faces cooperable with said seats, said valve member having means to permit flow through said passage when said valve member is unseated, a float operatively connected to said valve member and operable to move one of said valve faces into engagement with one of said valve seats, and safety means cooperable with said valve member and operable to move the other of said valve faces into engagement with the other of said valve seats upon failure of said float to close said passage.

3. A device of the character described, comprising a hollow casing having an open top and defining a constant level chamber having an inlet passage and an outlet, a valve member controlling flow through said passage and including means for closing said passage, a lever fulcrumed within said chamber and operatively connected to said valve member, a float carried by said lever and responsive to liquid level in said chamber to operate said valve member, a cover member closing said open top, a second lever fulcrumed in the walls of said casing and having one end projecting through the wall of said casing below said cover member, said second-named lever having a portion operable to move said valve member to close said passage, a receptacle carried by said one end of said second-named lever and positioned laterally adjacent the side wall of said casing, the side wall of said casing having an overflow aperture, a spout member extending laterally outward from said aperture and discharging into said receptacle, an abutment member positioned in said chamber and projecting from a wall of said casing, and a spring pivotally supported between said second-named lever and said abutment member, said spring normally resisting movement of said second-named lever by said receptacle, but being movable upon overflow of liquid into said receptacle to move said second-named lever thereby to move said valve member to close said passage.

4. A device of the character described, comprising a hollow casing having an open top and defining a constant level chamber having an inlet passage and an outlet, a valve member controlling said passage and including means for closing said passage, a float in said chamber, means operatively connecting said float and said valve member whereby to maintain a substantially constant liquid level in said chamber, a cover member closing said open top, the wall of said casing having an opening therethrough, a lever positioned in said chamber and having one end portion projecting through said opening, the side wall of said casing having an overflow portion above the constant liquid level, a spout member projecting laterally outward from said casing at said overflow portion, a receptacle carried by said lever end portion and positioned laterally of said casing and beneath the discharge end of said spout member, said lever having oppositely directed arms journaled in the side wall of said casing to pivotally support said lever, and means on said lever cooperable with said valve member to move said valve member to close said passage upon overflow of liquid into said receptacle.

5. A device of the character described, comprising a hollow casing having an open top and defining a constant level chamber having an inlet passage and an outlet, a cover member closing said open top, a valve member having a stem and controlling said passage, said valve member

including means for closing said passage, said cover member having an aperture receiving said stem, a float in said chamber, means operatively connecting said float and said stem whereby to actuate said valve member to maintain a substantially constant liquid level in said chamber, the wall of said casing having an opening therethrough beneath said cover member, a lever positioned in said chamber and having one end portion projecting through said opening, the side wall of said casing having an overflow portion above the constant liquid level, a spout member projecting laterally outward from said casing at said portion, a receptacle carried by said lever end portion and positioned beneath the discharge end of said spout member, said lever having oppositely directed arms journaled in the side wall of said casing to pivotally support said lever, an abutment member intermediate the ends of and on said stem, an arm portion projecting from said lever and cooperable with said abutment member to move said valve member to close said passage, and means operable to move said arm portion into engagement with said abutment member on movement of said lever by liquid overflowing into said receptacle.

6. A device of the character described, comprising a hollow casing having an open top and defining a constant level chamber having an inlet passage and an outlet, a cover member closing said open top, a valve member having a stem and controlling said passage, said valve member including means for closing said passage, a float in said chamber, means operatively connecting said float and said stem whereby to actuate said valve member to maintain a substantially constant liquid level in said chamber, the wall of said casing having an opening therethrough beneath said cover member, a lever positioned in said chamber and having one end portion projecting through said opening, the side wall of said casing having an overflow portion above the constant liquid level, a spout member projecting from said casing at said portion, a receptacle carried by said lever end portion and positioned beneath the discharge end of said spout member, said lever having oppositely directed arms journaled in the side wall of said casing to pivotally support said lever, an abutment member intermediate the ends of and on said stem, an arm portion projecting from said lever and overlying said abutment member, said arm portion being cooperable with said abutment member to move said valve member to close said passage, and a spring engaging said lever and operable to move said arm portion into engagement with said abutment member on movement of said lever by liquid overflowing into said receptacle.

7. A device of the character described, comprising a hollow casing defining a constant level chamber having an inlet passage and an outlet, a valve member controlling flow through said passage and including means for closing said passage, a cover member for said casing having an aperture therethrough, a stem carrying said valve member and projecting through said aperture, a float within said chamber and responsive to variation of liquid level therein, means operatively connecting said float and said stem, the wall of said casing having an overflow aperture therethrough, a receptacle positioned beneath said aperture to receive liquid overflowing from said chamber, a lever supported by said casing and fulcrumed intermediate its ends, means connecting said receptacle to and supporting said

receptacle from one end of said second-named lever, an abutment member on said stem and within said chamber, said second-named lever having a portion cooperable with said abutment member, an abutment member rigid with said casing and positioned adjacent the other end of said second-named lever, and a spring pivotally engaging said second-named abutment member and the other end of said second-named lever, the point of connection between said spring and said second-named lever being movable overcenter whereby said spring acts in one position to maintain said second-named lever out of co-operable engagement with said stem and acts in the other position to move said lever into cooperable engagement with said stem to move said valve member to close said passage.

8. A device of the character described, comprising a hollow casing having an inlet passage and an outlet, valve means controlling said passage and having a stem, said valve means including means for closing said passage, float means in said casing, lost-motion means operatively connecting said float means and said stem for moving said valve means to close said passage upon attainment of a predetermined liquid level in said casing, said casing having an aperture in its side wall above the predetermined level and defining an overflow outlet, a movably supported receptacle for receiving liquid from and positioned beneath said overflow outlet, a lever supporting said receptacle and operable upon flow of liquid into said receptacle to move said valve means to close said passage, and overcenter means acting on said lever and normally resisting movement of said receptacle, said overcenter means acting in conjunction with the weight of liquid in the receptacle upon movement of said lever, said lost-motion means permitting movement of said stem relative to said float means upon operation of said valve means by said overcenter means.

9. A device of the character described, comprising a hollow casing defining a constant level chamber having an inlet passage and an outlet, a valve member controlling flow through said passage and having a stem, said valve member including means for closing said passage, a float in said chamber and operatively connected to said stem to actuate said valve member to maintain a substantially constant liquid level in said chamber, a substantially horizontal plate member having oppositely directed arm portions, bearing means for said arm portions whereby said plate member is fulcrumed for pivotal movement, said plate member having an extension, a receptacle supported by said extension, means above the constant liquid level in said chamber for directing liquid overflowing from said chamber into said receptacle, said plate member having means cooperable with said stem to move said valve member to closed position, and overcenter means acting on said plate member and operable upon movement overcenter to urge said valve member to closed position.

10. A device of the character described, comprising a hollow casing defining a constant level chamber having an inlet passage and an outlet, a valve member controlling flow through said passage and having a stem, said valve member including means for closing said passage, a float in said chamber and operatively connected to said stem to actuate said valve member to maintain a substantially constant liquid level in said chamber, a substantially horizontal plate

member having oppositely directed arm portions, bearing means for said arm portions whereby said plate member is fulcrumed for pivotal movement, said plate member having an extension, a receptacle supported by said extension, means above the constant liquid level in said chamber for directing liquid overflowing from said chamber into said receptacle, an arm projecting from said plate member at one side of said extension and having an aperture there- through receiving said stem, overcenter means acting on said plate member and operable upon movement overcenter to urge said valve member to closed position, an abutment rigid with said stem and underlying said arm for engagement thereby, and means operable upon movement of said plate member to urge said arm into engagement with said abutment whereby to seat said valve member.

11. A device of the character described, comprising a hollow casing defining a constant level chamber having an inlet passage and an outlet, oppositely directed valve seats in said passage, valve means movable in said passage, said means having oppositely directed valve faces cooperable with said seats, a float member responsive to liquid level in said chamber and operable to move said valve means to engage one of said valve faces with one of said seats, and means cooperable with said valve means and operable to move the other of said valve faces into engagement with the other of said valve seats upon failure of said float member to move said one valve face into engagement with its seat.

12. A device of the character described, comprising a hollow casing defining a constant level chamber having an inlet passage and an outlet, oppositely directed valve seats in said passage, a valve stem extending into said passage and having oppositely directed valve faces cooperable with said seats to close said passage, a float member responsive to liquid level in said chamber and cooperable with said stem to move one of said valve faces into engagement with one of said seats to control flow through said passage, said chamber having an overflow outlet above the normal liquid level in said chamber, and means responsive to liquid overflowing through said overflow outlet to actuate said stem to move the other of said valve faces into engagement with the other of said valve seats upon failure of said first-named valve face to close said passage.

13. A device of the character described, comprising a hollow casing defining a constant level chamber having an inlet passage and an outlet, oppositely directed valve seats in said passage, a valve stem extending into said passage and having oppositely directed valve faces cooperable with said seats to close said passage, a float member responsive to liquid level in said chamber and cooperable with said stem to move one of said valve faces into engagement with one of said seats to control flow through said passage, a lever having a fulcrum support and cooperable with said stem to move the other of said valve faces into engagement with the other of said valve seats, a receptacle external of said chamber and supported by said lever, means resisting movement of said lever by said receptacle, and an overflow outlet from said chamber above the normal liquid level therein, said overflow outlet discharging into said receptacle whereby weight of liquid overflowing from said chamber into said receptacle will move said other valve face into engagement

with said other valve seat to close said passage.

14. A device of the character described, comprising a hollow casing defining a constant level chamber for liquid and having an inlet passage and an outlet, two valve seats in said passage, valve means in said passage cooperable with said valve seats to control flow through said passage, a float member responsive to change in the level of the liquid in said chamber and operable to move said valve means to engage one of said valve seats to stop flow through said passage to prevent a rise in liquid level in said chamber above a predetermined level, and means cooperable with said valve means and operable to move said valve means into engagement with said other valve seat to close said passage when the level of the liquid in said chamber rises above a second predetermined level.

15. A device of the character described, comprising a hollow casing defining a constant level chamber having an inlet passage and an outlet, two aligned valve seats in said passage, valve means in said passage and having two valve faces cooperable with said two valve seats to control flow through said inlet passage, a float member responsive to change in liquid level in said chamber, lever means operatively connecting said float member to said valve means and operable to move one of said valve faces into engagement with one of said valve seats to close said passage, and means cooperable with said valve means and operable to move the other of said valve faces into engagement with the other of said valve seats to stop flow of liquid through said passage upon a rise in liquid level in said chamber above a predetermined level.

16. In a liquid level control device, a casing having a chamber for liquid and an inlet passage therefor, a valve controlling said passage, a float in said chamber operable in response to changes in liquid level therein for actuating said valve to maintain the level of the liquid at a predetermined substantially constant level, a lost motion connecting means connecting said valve

and said float, said connecting means connecting said float and said valve without lost motion therebetween during the maintenance of said constant liquid level, and a safety cut-off mechanism operable in response to a predetermined increase in liquid in said chamber above said substantially constant level for moving said valve to close said passage, said lost motion connecting means permitting relative movement between said valve and said float when said valve is actuated by said safety cut-off means.

17. In a liquid level control device having a chamber for liquid and an inlet and outlet therefor, a valve member controlling said inlet, means operable in response to changes in liquid level in said chamber for actuating said valve to maintain said liquid level substantially constant, safety means operable upon a predetermined liquid level increase above said substantially constant level for causing said valve to close said inlet, and yieldable means connecting said valve and said first-named means and yieldable upon operation of said safety means whereby said valve will be moved to a closed position without transmission of such movement to said first-named means.

18. In a liquid level control device having a chamber for liquid and an inlet and outlet therefor, a valve member controlling said inlet, a float in said chamber operable in response to changes in liquid level therein for actuating said valve to maintain said liquid level substantially constant, a safety valve actuating means disposed in said casing and operable in response to a predetermined rise in liquid level above said substantially constant level for moving said valve to close said inlet, a lever member connected to said float and having a loose connection with said valve member, and a coil spring surrounding said valve member and maintaining engagement between said valve member and said lever member and for preventing transmission of movement of said valve member by said safety means to said float.

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