April 5, 1927. 1,623,811

H. D. POWNALL

LIQUID LEVEL REGULATING AND CONTROLLING APPARATUS

Filed Oct. 10, 1924

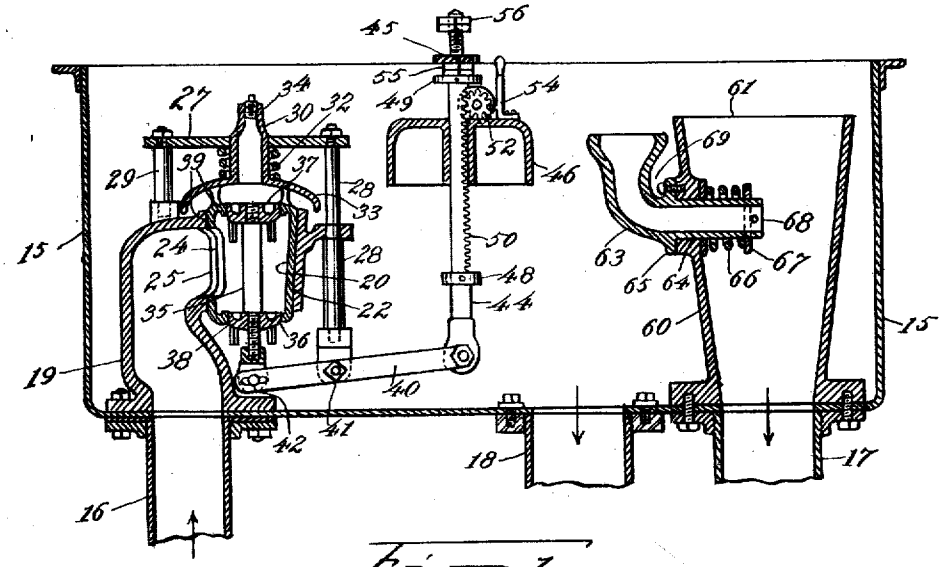


Fig. 1.

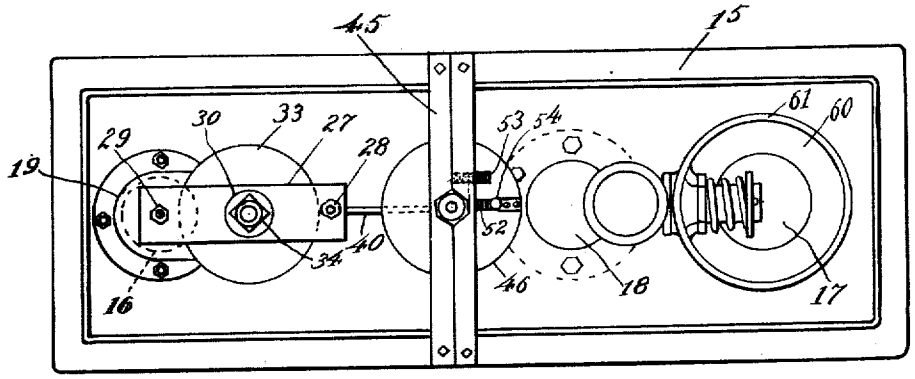


Fig. 2.

INVENTOR:
Henry D. Pownall,
BY C. W. Miles.
ATTORNEY.

Patented Apr. 5, 1927. 1,623,811

UNITED STATES PATENT OFFICE.

HENRY D. POWNALL, OF CANTON, OHIO.

LIQUID-LEVEL REGULATING AND CONTROLLING APPARATUS.

Application filed October 10, 1924. Serial No. 742,949.

My invention relates to liquid level regulating and controlling apparatus. One of its objects is to provide improved float controlled valve mechanism to automatically supply liquids at a uniform liquid level. Another object is to provide improved float and valve controlled liquid supply apparatus. Another object is to provide improved float controlled valve mechanism readily adjustable to vary the liquid level as may be required. Another object is to provide improved float controlled valve mechanism and adjustable overflow means to variably control a liquid level and supply. My invention also comprises certain details of form and combination and arrangement of components, all of which will be fully set forth in the description of the accompanying drawings, in which:

Fig. 1 is a central vertical section through a liquid container with my improved apparatus mounted therein.

Fig. 2 is a plan view of the apparatus shown in Fig. 1.

The accompanying drawings illustrate the preferred embodiment of my invention in which 15 represents a liquid container which is preferably open at the top and has connected to the bottom thereof a liquid supply conduit 16, a liquid overflow conduit 17 and a valve controlled liquid drain conduit 18. A valve casing 19 is mounted inside the container over the inner end of the conduit 16. A tubular tapered valve or cock 20 rests upon a tapered valve seat 22, and has a valve port 24 to resgister with a port 25 through the wall of the valve casing 19. A cross bar 27 is supported rigidly upon stud shafts 28 and 29 above and upon the valve casing. The stem 30 of the valve 20 journals in a bearing in the cross bar 27. A coiled spring 32 interposed between the cross bar 27 and a dome or hood 33 mounted upon the valve 20 serves to resiliently hold the valve 20 to its seat in the valve casing. A rectangular wrench seat 34 enables a hand wrench to be applied to the valve 20 to rotate it upon its seat 22 to either open or close a liquid passage through the ports 24 and 25.

A vertical valve stem 35 carries two valves 36 and 37, which are substantially balanced by the substantially equal pressure of the liquid upwardly and downwardly against the inner faces of the valves 36 and 37. The valves 36 and 37 may be variously seated. As illustrated the valves 36 and 37 closely fit into and close cylindrical valve seats 38 and 39 formed in opposite ends of the tubular valve 20, so as to open a passage for the escape of the liquid from the interior of the valve 20 at both ends of valve 20, when the stem 35 and valves 36 and 37 are elevated. A connecting rod or pitman 40 is pivotally mounted upon the center 41 carried at the lower end of the stud shaft 28. One end of the pitman 40 is slotted and is connected by means of a pin 42 to the lower end of the valve stem 35. At the opposite end of the pitman 40 is pivotally connected a vertically disposed rod or bar 44, the upper end of which passes through a recess in a crossbar or strap 45 attached rigidly across the top of the container 15. A float member 46 is mounted upon the rod 44, and is adjustable vertically thereon to enable the liquid level in the container 15 to be predetermined and adjusted, or to be changed at the will of the operator by adjusting the float higher or lower upon the rod 44. Various means may be employed to effect a vertical adjustment of the float upon the rod 44. As illustrated collars 48 and 49 on the rod 44 limit the range of adjustment of the float thereon. A rack 50 is formed on the rod 44 intermediate of said collars, which rack is engaged by a pinion 52 journaled in ears formed on the top of the float. A hand wheel 53 enables the pinion to be turned by hand to adjust the float endwise of the rod 44, and a spring actuated pawl 54 engages the teeth of the pinion to lock the pinion to any adjusted position. The upper end of the rod 44 has a limited movement endwise through the perforation in the strap 45, which movement is limited and may be adjusted by means of lock nuts 55 and 56 threaded to the rod above and below the strap 45.

A conical overflow tube 60 is attached over the inner end of the overflow conduit 17 to

lead any liquid which may overflow the upper edge 61 of said tube 60 down the conduit 17 to a waste conduit when the overflow tube is to be employed to prevent accidental overflow of the container 15. The overflow tube 60 is also provided with a supplemental overflow tube 63 to receive a normal or minor overflow which tube journals in a bearing 64 through the side wall of the tube 60. The shoulder or flange 65 of tube 63 is held against the end of the bearing 64 to provide a substantially leak proof joint by means of a spring 66, collar 67, and cotter pin 68. The supplemental overflow tube 63 is adjustable to a limited extent in its bearing 64 to variably adjust the liquid level in container 15, and to variably adjust the point of overflow through said tube 63. A screw or pin 69 seated in a recess or slot in the flange 65 serves to limit the adjustment of the tube 63. The spring 66 yieldingly holds the tube 63 to any position of adjustment.

The conduit 18 is designed to be provided with two branches and a three way valve of usual construction, not shown, or if desired with two independently valve controlled branches, one of which branches serves to lead the fluid from the container 15 to another container not shown in which an automatically controlled or variably controlled liquid level is to be usefully employed, while the other branch leads to a drain and serves to drain the liquid contents entirely from the container 15 when such is desired.

I am thus enabled to entirely cut off the liquid supply from conduit 16 to container 15 by turning the valve 20 on its seat so as to close the ports 24 and 25. When the ports 24 and 25 register the liquid flows into the interior chamber of valve 20, but is prevented by valves 36 and 37 from passing into the container 15, except when the valves 36 and 37 are opened through the action of the float. The dome 33 over the valve 37 deflects any liquid passing valve 37 and prevents jets thereof being thrown over the upper edge of container 15. The float is adjustable vertically at will upon its stem to adjustably predetermine the liquid level and the point at which the valves 36 and 37 will automatically open and close. The normal overflow is through the overflow conduit 63, which may be varied at will while any abnormal overflow due to defective action of the controlling valves, or to breakage takes place over the upper edge 61 of the tube 60, and serves to prevent the fluid overflowing the top of the container.

My improved apparatus is applicable to a variety of uses where an automatically controlled liquid level or an adjustably controlled liquid level are required.

The apparatus hereir shown and described is capable of considerable modification within the scope of the claims without departing from the spirit of my invention.

What I claim is:

1. Liquid level controlling apparatus comprising a liquid container, a liquid supply conduit leading to said container, a valve casing connected to the exit end of said supply conduit, a chambered valve seated in said valve casing and manually operable to open and close a port from said supply conduit to the interior of said valve, a pair of connected valves operable to open and close ports from opposite ends of said manually operable valve to the interior of said liquid container, and a float located in said container and operatively connected to said connected valves to actuate said connected valves through changes in the liquid level in said container.

2. Liquid level controlling apparatus comprising a liquid container, a liquid supply conduit leading to said container, a valve casing connected to the exit end of said supply conduit, a chambered valve seated in said valve casing and manually operable to open and close a port from said supply conduit to the interior of said valve, a deflector hood carried by and above said valve casing, a pair of connected valves operable to open and close ports from opposite ends of said manually operable valve to the interior of said liquid container, a float located in said container in position to be actuated by changes in the liquid level within said container, and means operatively connecting said connected valves with said float.

3. Liquid level controlling apparatus comprising a liquid container, a liquid supply conduit, a valve casing connected to the exit end of said supply conduit, a chambered valve seated in said valve casing and manually operable to open and close a port from said supply conduit to the interior of said valve, a float actuated valve operable by changes in the liquid level in said liquid container to open and close a port from said supply port to the interior of said liquid container, a float operatively connected to said float actuated valve, means to adjust said float vertically within said liquid container to variably control the liquid level in said liquid container, an emergency overflow to prevent accidental overflow at the upper edge of said liquid container, and an overflow member having an overflow lip adjustable vertically within said liquid container to conduct away from said liquid container a normal overflow incident to the operation of said apparatus.

4. Liquid level controlling apparatus comprising a liquid container, a liquid supply conduit, a valve casing connected to the exit end of said supply conduit, a chambered valve seated in said valve casing and manu-

ally operable to open and close a port from said supply conduit to the interior of said valve, a pair of connected valves operable to open and close ports from opposite ends of said manually operable valve to the interior of said liquid container and balanced against the pressure of liquid flowing into said valve casing, and a float operatively connected to said balanced valves, and operable automatically by changes in the liquid level within said liquid container.

In testimony whereof I have hereunto affixed my signature.

HENRY D. POWNALL.