April 23, 1946. C. E. GEORGE, SR 2,399,111

TRAP

Filed March 23, 1943

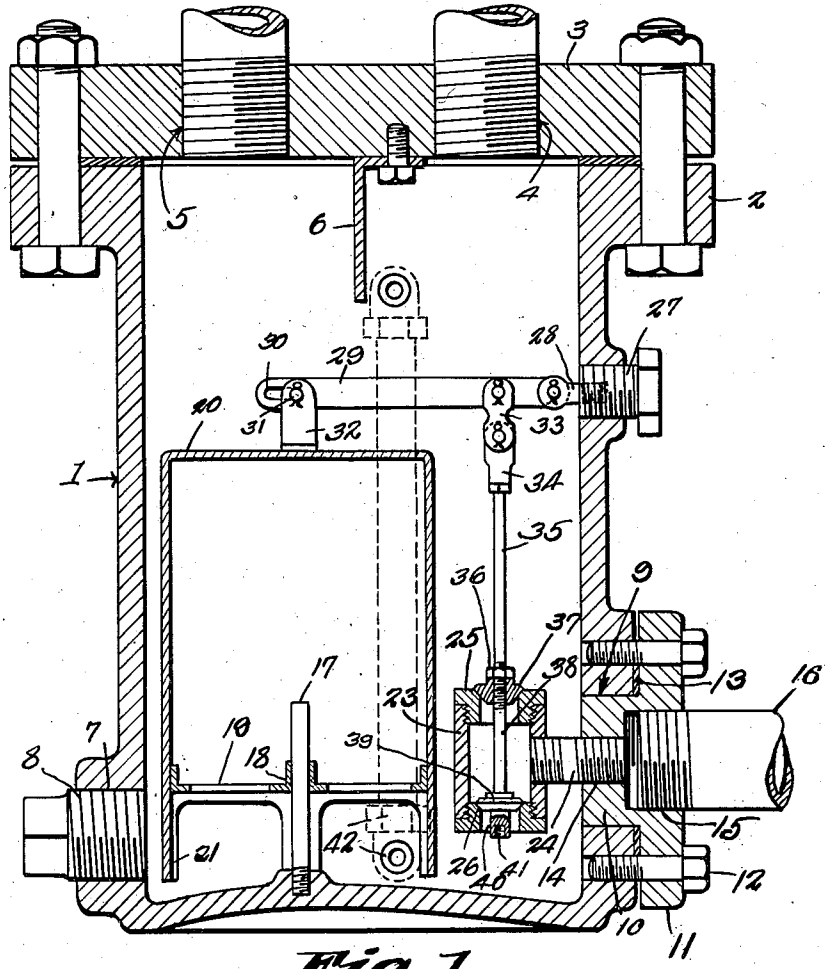


Fig. 1.

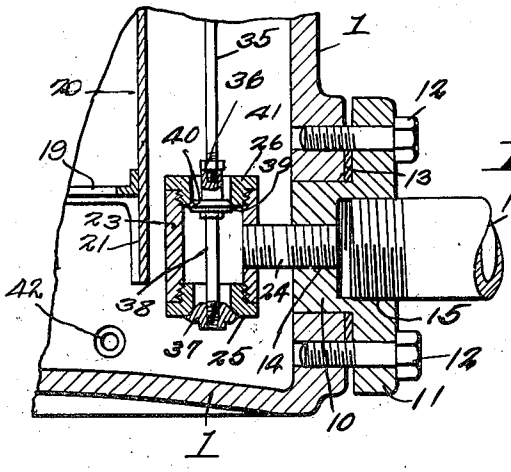


Fig. 2.

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TRAP

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Application March 23, 1943, Serial No. 480,231

1 Claim. (Cl. 137—103)

This invention relates to a trap for use in separating liquid from steam although, by rearrangement of some of the parts, it can also be employed for regulating the level of liquids in containers.

An object of the invention is to provide a simple, compact but very efficient mechanism formed of few parts which will operate automatically to release accumulated moisture when it reaches a predetermined level, the mechanism being controlled by a buoyant member constructed to resist high pressures and at the same time designed to actuate the parts controlled thereby only when the liquid level reaches a predetermined point and not prematurely, as by accumulations of released steam from within the trapped moisture.

A still further object is to provide a mechanism which, by a simple adjustment, can be used as a means for controlling the level of a liquid in a container.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claim, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

In the accompanying drawing the preferred forms of the invention have been shown.

In said drawing:

Figure 1 is a central vertical section through the trap, the parts being shown in their normal positions.

Figure 2 is a similar view through a portion thereof and showing the balance valve reversed to permit use of the trap as a means for regulating water level.

Referring to the figures by characters of reference, 1 designates the hollow body of the trap the flanged top 2 of which is provided with a closure 3 tightly clamped thereto but removably mounted. This closure has spaced openings 4 and 5 between which is arranged a depending plate 6 constituting a combined stop and baffle. Adjacent to the bottom of the body 1 in that side thereof remote from the opening 4 is another opening 7 and, in the structure illustrated this latter opening is closed by a plug 8. Diametrically opposite the opening 7 is another opening 9 in which is seated a plug 10 having a flange 11 held to the body 1 by bolts 12 and having a sealing gasket 13 between the flange and the body. Plug 10 has a bore 14 extending therethrough, the outer portion of the same being counterbored as at 15 for the reception of an outflow pipe 16.

A guide post 17 is secured to the bottom of the body and is extended upwardly therein and slidably mounted on this post is the central portion 18 of a spider 19 located within a buoyant member in the form of a bell 20. This member has supporting legs 21 normally spaced from the bottom of the body and spaced apart to permit free flow of fluid therebetween and under and into the bell. A small vent opening 22 is provided in the bell and is for the purpose hereinafter explained.

The casing 23 of a balanced valve is located between the bell 20 and the plug 10 and is connected to the plug in any suitable manner. For example a nipple 24 can be seated in the bore 14 and also can open radially into the middle portion of the casing 23. A ring 25 providing an external valve seat is removably seated in the upper end of the casing 23 while another ring 26 providing an internal valve seat is removably mounted in the lower end portion of the casing 23.

A plug 27 is removably seated in the wall of body 1 and has a pin 28 extending into the body therefrom. This pin is pivotally connected to one end of a lever 29 the other end portion of which has a slot 30 in which is located a pivot pin 31 carried by a bracket 32 extending from the top of the bell 20. A link 33 is pivotally connected to and extends downwardly from lever 29 and is also pivotally connected to the head 34 of a depending valve stem 35. This stem has its lower end screw-threaded as at 36 for engaging in a threaded recess or opening in an external valve 37 which normally engages the seat 25. A rod 38 connects valve 37 to an internal valve 39 which normally engages the seat 26 and this internal valve in turn has an extension 40 provided with a socket 41. The two valves are so located as to engage their seats simultaneously when the bell 20 is in its lowermost position, they being held to their seats by the weight of the bell transmitted to them through lever 29, link 33 and stem 35.

The threaded rod 28 permits adjustment of the valves relative to each other and to their seats.

Where the trap is to be used for separating moisture from steam, the moisture-laden steam is admitted to the body through the opening 4 and the steam flows outwardly through the opening 5. In flowing from one opening to the other the steam strikes the baffle 6 and because of this and the further fact that the interior of the body acts as an expansion chamber, the moisture will

be precipitated within the body and gradually accumulate therein. As the level of the liquid thus accumulated rises in the body, trapping a certain amount of air within the bell 20, said bell ultimately will be lifted from its normal position, causing lever 29 to lift valves 37 and 39. Consequently the accumulated liquid will fall and flow outwardly by way of the valve casing 23, nipple 24 and pipe 16. After the level has dropped to a predetermined point, the bell will resume its normal position and the valves 37 and 39 will close. Thereafter the operation will be repeated.

Should it be desired to utilize this trap as a means for controlling the level of liquid in a container, the body is placed at a point intersecting the level to which the liquid in the container is to be brought and plug 8 is then removed and a pipe connection provided between opening 7 and the bottom of the container. Valve casing 23 is then reversed as shown in Fig. 2, the stem 35 being disconnected from the threaded recess or opening in valve 37 and inserted into the threaded socket 41. Thus when lever 29 is lifted by the bell, the valve will close, thereby cutting off a supply of liquid which, under these conditions, would be supplied through the pipe 16. Under these conditions the openings 4 and 5 could be used as vents.

Although the valve casing 23 has been shown connected to the plug 10 by means of a nipple, it is to be understood that any other suitable means capable of permitting reversal of the valve casing, can be used.

For the purpose of readily determining at any time the level of liquid in the body 1, a gage 42 can be used.

The valve seats should be as nearly the same size as possible so that differences in pressure thereagainst will be reduced to the minimum and the leverage required to open and close the valves correspondingly reduced. If the mechanism is operated under high pressure working conditions the seats can be made exactly equal.

If the apparatus is used as a liquid level controller, it should not be operated under a vacuum.

What is claimed is:

A trap including a body having an inlet opening and an outlet opening, a lever fulcrumed in the body, bouyant means for operating the lever, a balanced valve including an invertible casing, opposed valve seats in the casing, opposed valves for engaging the respective seats to simultaneously open or close the same, a rod adjustably connecting the valves, a stem actuated by the lever and detachably connected to the valves, said valves being invertible with the casing and relative to the lever to either of two positions and being detachably connected to the stem when in either of said positions, and means for maintaining communication between one of the openings and the balanced valve at a point between the valve seats.

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