May 7, 1940. A. F. SANDBERG 2,199,677

LIQUID LEVEL ALARM

Filed May 1, 1939

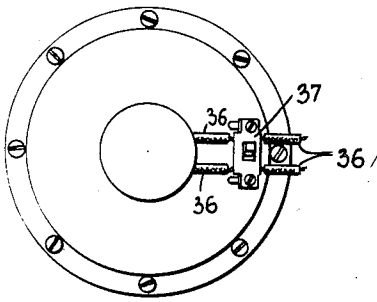
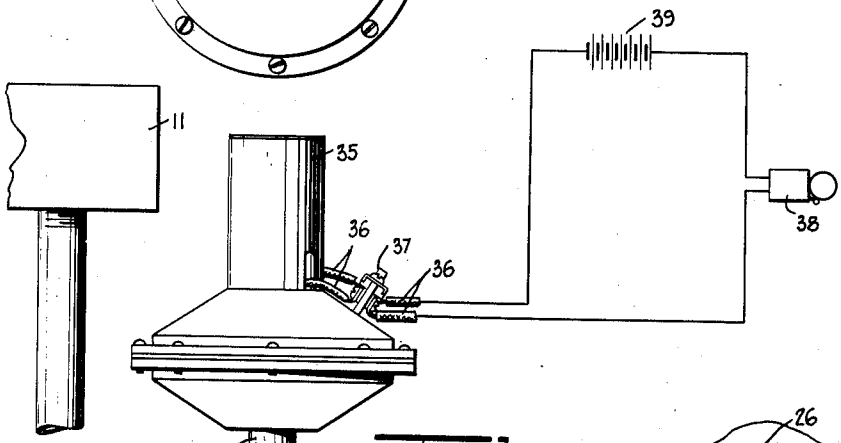


Fig. 2.



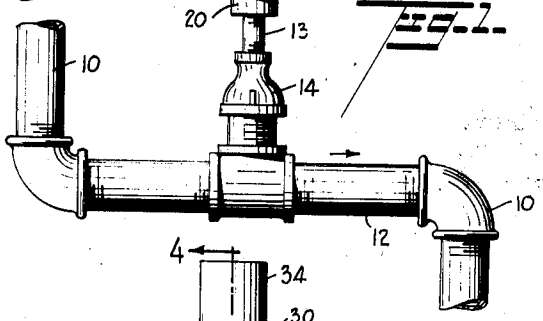


Fig. 1.

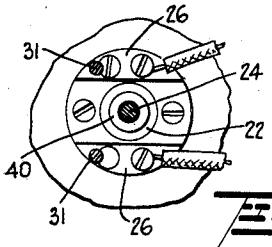


Fig. 5.

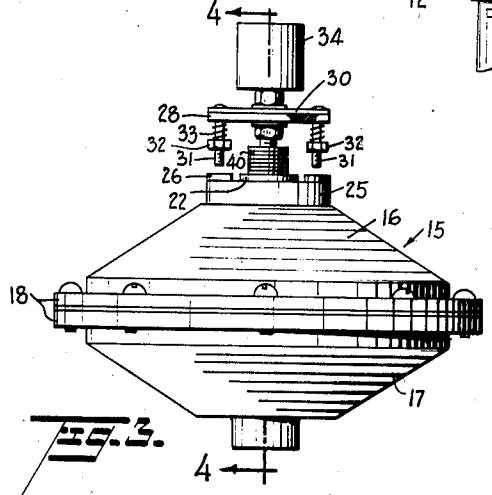


Fig. 3.

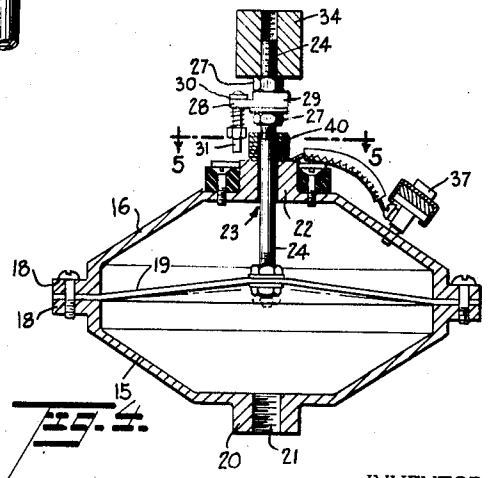


Fig. 4.

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LIQUID LEVEL ALARM

Arthur F. Sandberg, Jamaica, N. Y.

Application May 1, 1939, Serial No. 271,125

5 Claims. (Cl. 200—83)

This invention relates generally to machinery used to feed measured quantities of flavoring syrup to soda water bottles, and aims to provide a device in the form of an automatic alarm mounted in the syrup feed line, to warn the operator of the necessity of refilling the syrup feed source, the alarm being given a sufficient time in advance of complete evacuation of the feed line to enable the operator to refill the supply without interfering with the continued filling of the bottles with the desired mixture of syrup and water.

In the case of such machines, the bottles are passed along in regular succession and are automatically fed the desired amount of soda water and syrup, and in the event that the syrup line should suddenly run dry, a number of bottles will have passed on containing only the soda water without any syrup, before the operator has discovered the error, whereupon he must stop the machine, refill the syrup supply, and discard the bottles which have been filled with water alone. The present invention, as above-mentioned, overcomes these defects.

The above and other objects will become apparent in the description below, in which characters of reference refer to like-named parts in the accompanying drawing.

Referring briefly to the drawing, Figure 1 is an elevational view of the alarm device, illustrating its application to the syrup feed line, and containing also a wiring diagram.

Figure 2 is a plan view of the device.

Figure 3 is an elevational view of the device with the cover at the top removed.

Figure 4 is a cross-sectional view taken on the line 4—4 of Figure 3.

Figure 5 is a cross-sectional view taken on the line 5—5 of Figure 4.

Referring in detail to the drawing, the numeral 10 indicates a syrup feed line, either a pipe or a hose, which conveys syrup by gravity from a tank or the like 11 situated at a point above the bottling machine, not shown. The representation of the tank 11 is herein made for the purposes of clarification only, and is drawn relatively diminutively in comparison with the scale of the remainder of the drawings.

In the installation of the present invention, a T-union 12 is interposed in the hose 10, and to the intermediate nipple is attached the threaded stem 13, through the medium of a reducing coupling 14.

The device 15 itself consists of a pair of opposed complementary substantially conical shells 16 and 17, joined together by screws through their peripheral flanges 18. A disc or membrane 19, of rubber or any other suitable material, is clamped between the flanges 18 and is normally flat. A screw-threaded collar 20 surrounds the opening 21 through the bottom of the shell 15, and a collar 22 surrounds the smaller smooth opening 23 in the top of the shell 16. A stem 24 is anchored in the center of the membrane 19 and extends upward through the opening 23, in which it is slidable.

A ring 25 of composition or other insulating material, surrounds the collar 22, and has secured to its upper surface, in mutually opposed relation, a pair of metallic members 26. The upper portion of the stem 24 is threaded and has clamped thereon, between a pair of nuts 27, the projecting ear 29 of a yoke 28 of similar composition material. A metallic strip 30 is loosely mounted on the top of the yoke 28, and through the ends of the strip 30 and yoke 28, threaded pins 31 project downwardly, the upper ends of the pins 31 being fixed to the strip 30. Nuts 32 are threaded on the pins 31 and between these nuts and the yoke 28 coiled springs 33 surround the pins. The pins 31 are positioned above the members 26.

A plurality of loose spacer rings 40 are mounted on the stem 24 between the lower nut 27 and the collar 22. A weight 34 is screwed on the top of the stem 24, and a removable slotted cap 35 is adapted to cover the contacts and mechanism on top of the shell 16. Lead wires 36 lead, through a conventional circuit opening and closing switch 37 mounted on the shell 16, to an alarm 38 and a source of electric supply 39, as shown in the wiring diagram of Figure 1.

In operation, with the device mounted in the syrup line as above-mentioned, and assuming the supply line from the syrup source to be full, a certain amount of the flowing syrup will rise up into the stem 13, thus compressing the air enclosed under the membrane 19 and forcing the latter to bulge upward, as shown in Figure 4. In that position, the yoke 28 will be in elevated position, being held up by the stem 24, and the lower tips of the pins 31 will lie clear above the strips 26. Assuming that the supply tank 11 has become empty and the level of syrup in the pipe 10 is sinking lower and lower with respect to the T-union 12, the air pressure under the membrane 19 will correspondingly decrease. When the air pressure has decreased a sufficient amount, the stem 24 will have fallen a sufficient distance to bring the tips of the pins 31 in contact with the strips 26, thus closing the circuit through the alarm. If

the stem 24 falls further, after the circuit has thus been closed, the yoke 28 will separate from the strip 30 and will compress the springs 33, thereby both assuring an equalized and steady contact between the pins 31 and the strips 26 and at the same time preventing a strain on the membrane 19 as the falling pressure thereunder causes it to pull down on the stem 24. The alarm will obviously continue to ring, unless switched off, until the supply tank 11 has again been filled. It is obvious that by means of the nuts 27, the degree in variation of liquid level in the pipe 10 required to operate the alarm, may be varied at will. The weight 34 serves to aid the membrane to force the stem 24 downward at the instant the level in the pipe 10 begins to decline below the predetermined level.

Obviously, modifications in form and structure may be made without departing from the spirit and scope of the invention.

I claim:

1. A pressure operated circuit controller comprising a pair of opposed complementary shells joined together horizontally at their peripheries to form an upper and a lower shell, a membrane having its peripheral edge clamped between said peripheries, each of said shells having an opening therethrough, a stem anchored in said membrane and extending slidably through the opening in said upper shell, a yoke secured to said stem and having pins depending therefrom, contact strips on said upper shell adjacent the free ends of said pins, said membrane normally urging said pins downward against said strips, an increase in air pressure in said lower shell causing bulging of said membrane and consequent movement of said stem upward, said movement causing said stem to lift said pins clear of said strips, said strips forming the stationary contact poles of an electric circuit closer and said yoke and pins forming the movable contact element thereof.

2. A pressure operated circuit controller comprising a pair of opposed complementary shells joined together horizontally at their peripheries to form an upper and a lower shell, a membrane having its peripheral edge clamped between said peripheries, each of said shells having an opening therethrough, a stem anchored in said membrane and extending slidably through the opening in said upper shell, a horizontal beam secured to said stem and having vertical pins slidably mounted in the ends thereof, a metallic strip loosely mounted on said beam and having the heads of said pins rigid thereon, said pins being threaded and having nuts thereon, coiled springs surrounding said pins between said nuts and said beam, contact strips on said upper shell adjacent the free ends of said pins, said membrane normally urging said beam downward and consequently said pins downward against said contact strips, an increase in air pressure in said lower shell causing bulging of said membrane and consequent movement of said stem upward, said movement causing said stem to lift said pins clear of said contact strips, the latter forming the stationary contact poles of an electric circuit closer and said metallic strip and said pins forming the movable contact element thereof, said coiled springs serving to reduce the strain on said membrane as the pressure in said lower shell to fall after said pins have contacted with said contact strips during the descent of said stem.

3. A pressure operated circuit controller comprising a pair of complementary shells joined together horizontally at their peripheries to form an upper and a lower shell, a membrane having its peripheral edge clamped between said peripheries, each of said shells having an opening therethrough, a stem anchored in said membrane and extending slidably through the opening in said upper shell, a yoke secured to said stem and having pins depending therefrom, contact strips on said upper shell adjacent the free ends of said pins, said membrane normally urging said pins downward against said strips, an increase in air pressure in said lower shell causing bulging of said membrane and consequent movement of said stem upward, said movement causing said stem to lift said pins clear of said strips, said strips forming the stationary contact poles of an electric circuit and said yoke and pins forming the movable contact element thereof, and means for longitudinally adjusting the position of said yoke on said stem.

4. A pressure operated circuit controller comprising a pair of opposed complementary shells joined together horizontally at their peripheries to form an upper and a lower shell, a membrane having its peripheral edge clamped between said peripheries, each of said shells having an opening therethrough, a stem anchored in said membrane and extending slidably through the opening in said upper shell, a horizontal beam secured to said stem and having vertical pins slidably mounted in the ends thereof, a metallic strip loosely mounted on said beam and having the heads of said pins rigid thereon, said pins being threaded and having nuts thereon, coiled springs surrounding said pins between said nuts and said beam, contact strips on said upper shell adjacent the free ends of said pins, said membrane normally urging said beam downward and consequently said pins downward against said contact strips, an increase in air pressure in said lower shell causing bulging of said membrane and consequent movement of said stem upward, said movement causing said stem to lift said pins clear of said contact strips, the latter forming the stationary contact poles of an electric circuit closer and said metallic strip and said pins forming the movable contact element thereof, said coiled springs serving to reduce the strain on said membrane as the pressure in said lower shell to fall after said pins have contacted with said contact strips during the descent of said stem, and means for longitudinally adjusting the position of said beam on said stem.

5. A circuit closer comprising a base having a pair of spaced contacts fixed thereon, said base having an opening therethrough and having a stem slidably mounted in said opening, a beam on said stem, said beam having a metallic strip loosely mounted thereon and having openings through its ends, pins anchored in said strip and extending slidably through said beam openings toward said contacts, said pins being threaded and having nuts thereon between said beam and their free ends, coiled springs on said pins between said nuts and said beam, said stem being moved into said base to bring said pins into contact with said contacts to close the circuit therethrough, said springs enhancing the security of the electrical contact between said pins and said contacts while said stem is retained in said closed-circuit position.

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