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LEVEL ALARM SWITCH

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14 Claims. (Cl. 200—83)

This invention relates to liquid level alarms, and more particularly, that type shown in the patent to Sandburg, No. 2,199,677.

In order that a clearer perception of the present invention may be had, it is to be noted that in bottling machinery there is usually a main tank supply, a feed line and the bottling equipment which comprises means for turning on and off a valve as a bottle is being filled. With present equipment, a great many bottles may be filled an hour which results in a periodic fluctuation of pressure in the feed line. In other words, when the valve is closed there is a backward surge of pressure, and when the valve is opened, the pressure in the feed line decreases. When mixed drinks are being bottled with a combination of syrup and carbonated water for example, it is highly important that the filling fluid tanks are not allowed to empty, for obviously if one or the other fails, then that bottle must be discarded as it contains either nothing but carbonated water, or nothing but a small quantity of syrup.

The present invention is directed to a liquid level indicator which will give the operator ample warning before the main supply tank is empty, whereby steps may be taken immediately to replenish the supply or stop the bottling mechanism. It is also highly important that the signal mechanism must be so constructed as to compensate for the fluctuation in pressure in the feed line without actuating the alarm. For example, we may assume that with the supply tank filled there is a considerable head of pressure which will keep the alarm contacts out of engagement, and they will not engage on fluctuations in pressure until substantially the last half gallon of liquid is about to be withdrawn.

It is, therefore, one of the objects of the present invention, to provide a practical liquid level alarm of the above general character which may be inexpensively manufactured and assembled, and in which the contacts have a less range of movement than the actuating member.

A further object is to provide a simple mechanism of the above general character which will be highly reliable, and efficient in use and operation.

A further object is to provide a valve mechanism of the above character which will be strong and durable, and have relatively few parts which may be easily assembled, and capable of a wide range of adjustment as circumstances may require.

Other objects and purposes will appear from the more detailed description of the invention following hereinafter taken in conjunction with the accompanying drawing, wherein:

Fig. 1 is a semi-diagrammatic elevational view partly in section showing one complete installation;

Fig. 2 is a plan view of the parts shown in Fig. 1 with certain parts removed or broken away for the sake of clearness;

Fig. 3 is a diagrammatic view showing the certain parts in Fig. 1 with the contacts in separated position; and

Fig. 4 is an exploded view of one of the end supports of the switch actuating member.

Referring now to the drawing in detail, and more particularly to Fig. 1, 10 indicates a supply tank of any desired size and shape, but preferably one of greater depth than width whereby changes in pressure head will be more easily conveyed to the signal apparatus. A pipe 11 leads from the bottom of this tank and thence to a conventional bottle filling mechanism (not shown) associated with the pipe 12. The short horizontal section of pipe 13 shown in Fig. 1 is desirable but not essential, and is provided with a connection 14 upon which the switch mechanism for the alarm is mounted. This switch mechanism comprises an upright pipe 15 in communication with the main supply pipe 11, and has mounted thereon a diaphragm casing of any desired shape, the conventional form comprising two cooperating members such as 16 and 17 between which is positioned a flexible diaphragm 18 in such a manner that it may be moved up and down within a chamber 20 as fluctuations in the pipe line pressure occur.

Mounted on this diaphragm is a central stud or stem 21 which is preferably secured in place by a water-tight gasket and nut assembly indicated at 22. The upper part of this stud 21 cooperates with a durable flat resilient steel spring member 23, one end of which is supported or mounted in a slotted block 24 and secured in place by means of set screw 25, as more clearly shown in the exploded view (Fig. 4). A pivot pin 26 extends transversely through the side walls 27 of the switch housing as shown in Fig. 1, and is locked in place by means of cotter pin 28. Thus, the spring arm 23 is free to move relatively up and down about its pivotal support 26 under the action of the diaphragm.

The opposite end of this spring 23 normally rests on a second support formed by an adjusting screw 30 shown at the right of Fig. 1, this screw being held in any desired adjusted position

pivotally mounted on said casing at one end, a free support adjustably mounted on the diaphragm casing, cooperating with the other end of the said spring arm whereby said spring arm may move bodily upwardly if and when necessary, spring means normally urging said spring arm into engagement with the diaphragm stem, and contacts mounted respectively on the diaphragm casing and the spring arm, said free support being adjustable relatively towards and from the contacts and relatively horizontally with respect to one end of said spring member.

6. In an apparatus according to claim 5, including means normally urging said spring member downwardly into engagement with the diaphragm stem.

7. In an apparatus according to claim 5, including means normally urging said spring member downwardly into engagement with the diaphragm stem, and means for varying the tension exerted upon said spring arm by said last-mentioned spring.

8. A switch member including an elongated flat steel spring, pivotally supported at one end and having an adjustable support for the other end, a diaphragm actuated stud engaging said spring for flexing the same between its end supports, a contact carried by the spring, and a cooperating contact adjacent thereto adapted to engage the other when the diaphragm is subjected only to substantially atmospheric pressure.

9. A switch member as set forth in claim 8, in which one end support is adjustable in the direction of length of said spring to vary the moment of contact with respect to the pressure on said diaphragm.

10. A switch member as set forth in claim 8, in which a coiled spring urges said first-mentioned spring towards said stud.

11. A switch member as set forth in claim 8, in which a coiled spring urges said spring towards said stud, and means for varying the tension on said coiled spring.

12. A switch member as set forth in claim 8, in which a coiled spring urges said spring towards said stud and its end supports, and means for adjusting the contacts relatively towards and from each other.

13. A switch member as set forth in claim 8, in which a spring urges said first-mentioned spring towards said stud, and means whereby one of the end supports may be moved towards and from the other.

14. A switch mechanism including an elongated resilient member supported at each end, a contact carried thereby near one end, a relatively fixed cooperating contact adjacent thereto, and actuating means for flexing said member whereby maximum movement of said actuating member will produce much less movement of the contact carried thereby, one support for said resilient member being adjustable in two directions at right angles to each other to vary the ratio of movement of the movable contact with respect to the movement of said actuating member.

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MACHINE FOR MOLDING GLASS ARTICLES

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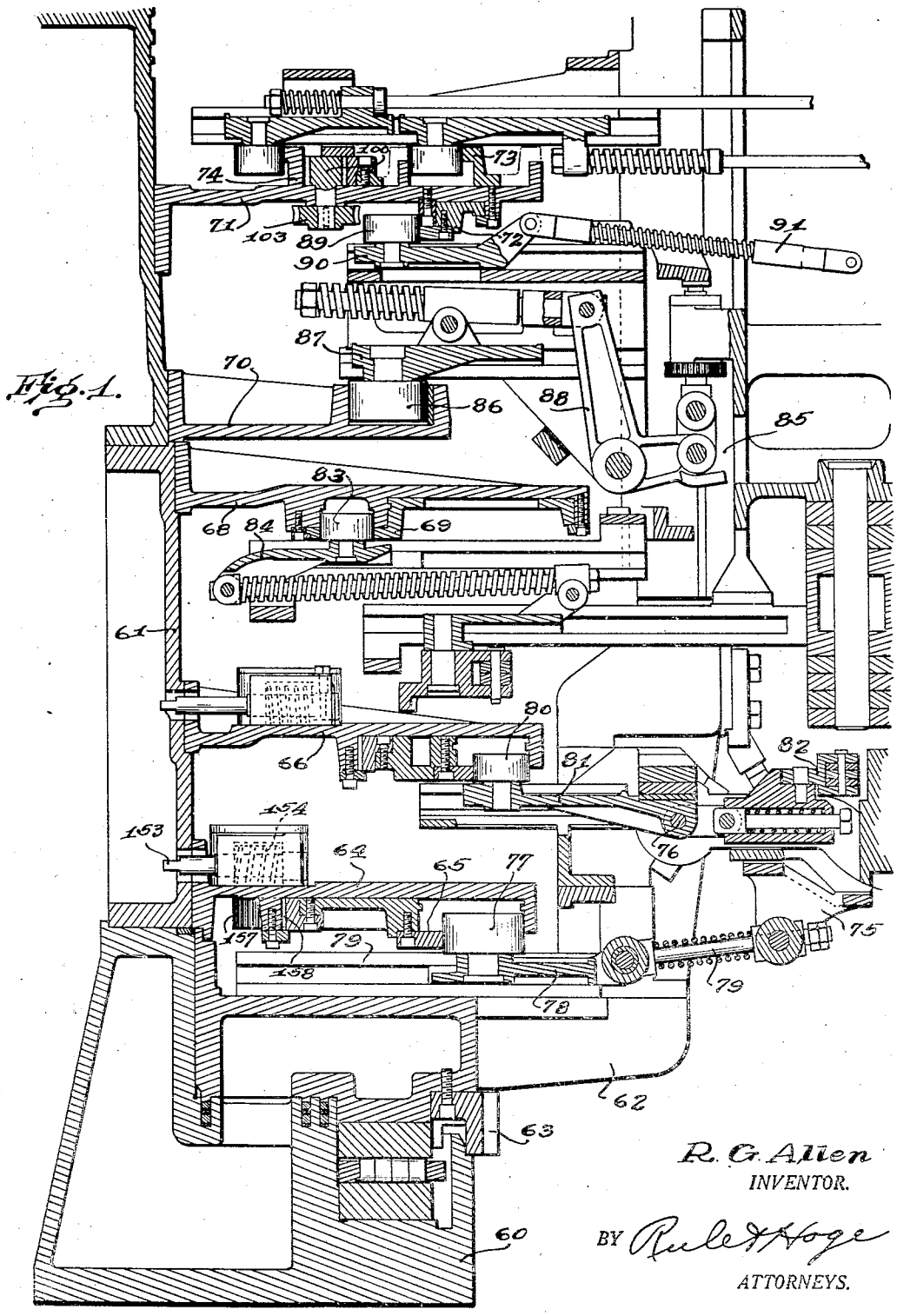


Fig. 1.

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