Dec. 29, 1959 J. C. JANQUART ET AL 2,919,052

DETERGENT DISPENSER WITH CONSTANT HYDROSTATIC HEAD

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FIG. 1

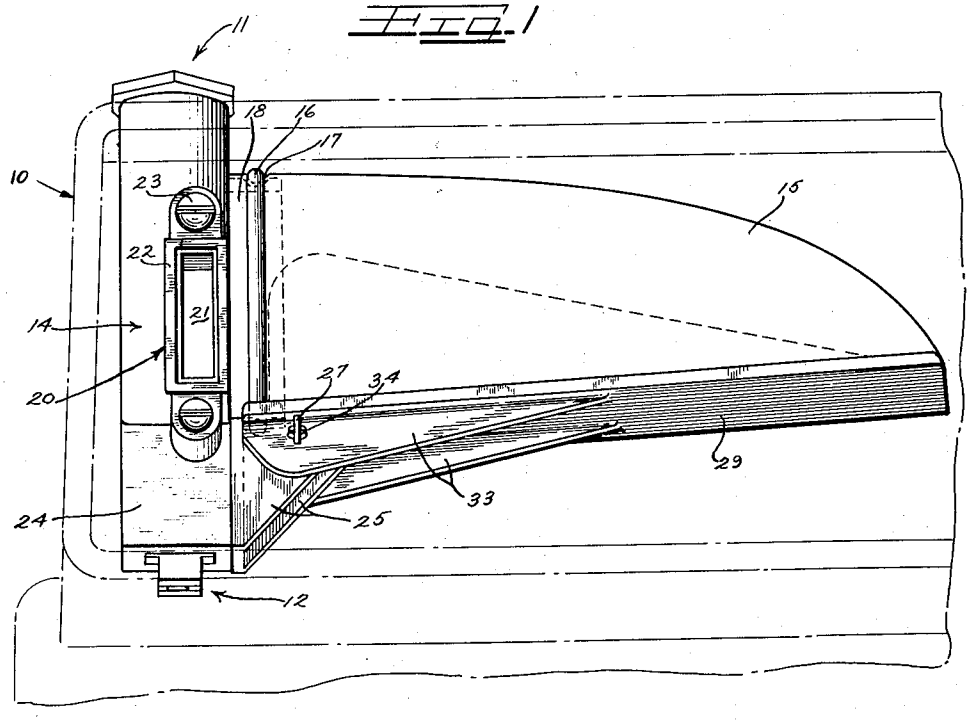
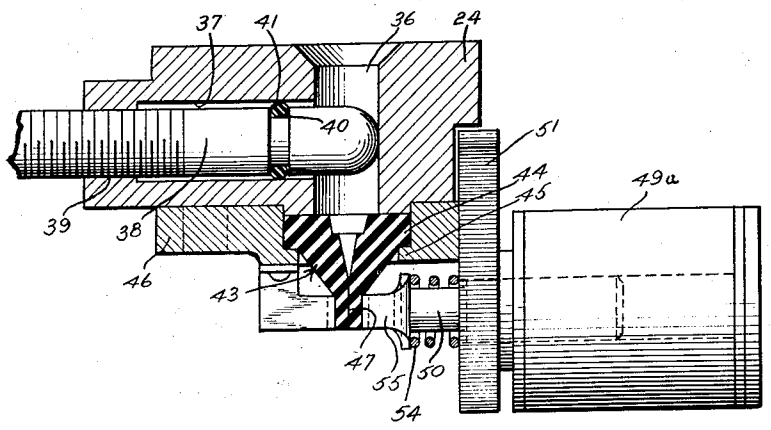


FIG. 4



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Fig. 2

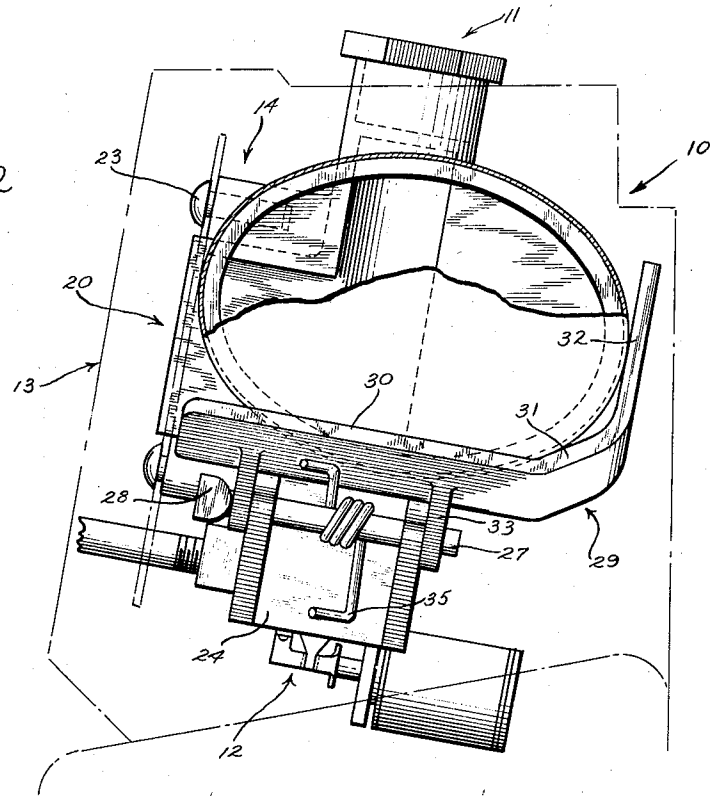
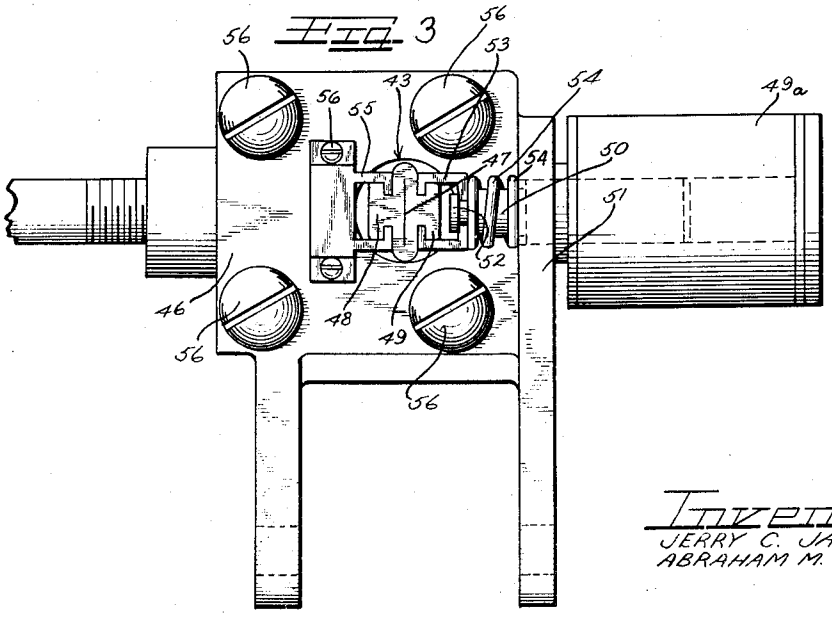


Fig. 3



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DETERGENT DISPENSER WITH CONSTANT HYDROSTATIC HEAD

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Application October 17, 1957, Serial No. 690,789

4 Claims. (Cl. 222—64)

This invention relates to methods and apparatus for dispensing liquids, such for example, as detergents and the like. The invention particularly relates to a device especially suitable for use in automatic washing machines.

Dispensers of various types have heretofore been used to add detergents, bleach, fabric conditioners, and the like to the wash water of an automatic washing machine under the cyclic control of the machine. It has since been found that if air can be excluded from the cleansing agent or the like during storage and if the cleansing agent is dispensed from an air tight container the normal deterioration and gumming up of the cleansing agent in the dispenser can be avoided. Hence, an air tight collapsible cleansing agent storage container has been developed to effect this improvement.

It has been found that in detergent dispensers having an outlet exposed to the atmosphere a crust of solidified cleansing fluid often forms thereon with the result that it interferes with the operation of the dispensing device. It has also been found that gravity feed type dispensers are quite inaccurate in dispensing a measured volume of liquid due to the fact that the static head constantly changes as the level of the liquid in the dispenser is lowered.

It is an important object of the present invention to provide a novel method and means for dispensing liquids.

It is a further object of this invention to provide a novel liquid dispenser having means for maintaining a substantially constant hydrostatic head, irrespective of the amount of fluid remaining in said dispenser.

A still further object of the invention is to provide, in a novel gravity feed type detergent dispenser having a collapsible container for containing liquid to be dispensed, and a means for compensating for the change in static head when the liquid level is lowered in the collapsible bag.

A still further object of the invention is to provide a novel and improved form of gravity feed type detergent dispenser having a liquid container mounted on a support which is hinged at one end and provided with means to swing the container upwardly as the liquid volume decreases, thereby compensating for the change in the fluid head in the container.

These and other objects of the invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

Figure 1 is a fragmentary view in side elevation of a dispenser constructed in accordance with the present invention shown mounted in the control panel of an automatic washing machine;

Figure 2 is a bottom view of the outlet to the dispenser shown in Figure 1;

Figure 3 is a front elevational view of the dispenser shown in Figure 1; and

Figure 4 is a view of the outlet to the dispenser constructed in accordance with the present invention showing some parts in section and others in side elevation.

In the embodiment of the invention illustrated in the drawings there is shown a dispenser 10 having a fill inlet 11 and an outlet 12 mounted in the control panel 13 of an automatic washing machine. The dispenser comprises generally a valve body 14 having a collapsible container 15 for containing liquid to be dispensed attached thereto as by a sealing ring 16 securely fitted into an annularly grooved portion 17 of the boss 18 of the dispenser body 14.

Referring now particularly to Figure 1, the valve body 14 is shown as having the hollow boss 18 in open fluid communication with the interior of container 15 and as having a liquid level indicator 20 over the front end portion thereof comprising a viewing glass 21 and a mounting bracket 22 mounted on the valve body 14 as by screws 23.

A second hollow boss 24 on the underside of the valve body 14, comprises an outlet chamber having legs 25 formed integrally therewith. Each of the legs 25 has openings bored, or otherwise fashioned therein, for receiving a pivot pin 27 therethrough. The pivot pin 27 has enlarged portions 28 on either end thereof to maintain the position of the pin in its proper location.

A liquid level compensating bar 29 is shown fragmentarily as comprising a substantially horizontal portion 30 terminating in diagonally upwardly extending portion 31 which in turn terminates in substantially vertical portion 32. The horizontal portion 30 of the liquid level compensating bar 29 is shown as having two protruding lugs 33 on the underside thereof, bored as indicated at 34 in Figure 1 to receive pivot pin 27 therethrough to enable the bar 29 to rotatably move about the pivot pin 27. A spring member 35, one end of which rests against the hollow boss 24 and the other end of which rests against the underside of the substantially horizontally extending portion 30 of the liquid level compensating bar 29, serves to urge the bar 29 in a substantially counterclockwise direction for reasons to be hereinafter explained in detail.

Referring now particularly to Figures 3 and 4 of the drawings a fluid passageway 36 is shown as extending in a substantially vertical position through the boss 24 and as being in open communication with an adjustment port 37 through which slidably protrudes an adjustment member 38. The adjustment member 38 is threadedly mounted in the port 37 of the boss 24 as indicated at 39 for reciprocal longitudinal movement within the port 37 and is shown as having a circumferentially grooved portion 40 adapted to receive an O ring seal 41 to prevent the seepage of cleansing fluid or the like therepast. The adjusting member 38 has an adjusting knob (not shown) on the outer end thereof arranged to provide a means for shifting the portion of the adjustment member 38 in the port 37.

The lower end of the outlet passageway 36 is normally closed by a cutoff valve 43 having an annularly flanged portion 44 adapted to abut the flanged portion 45 of the end plate 46.

As may be clearly seen in Figures 3 and 4 the cutoff valve comprises a member of rubber, plastic or other resilient material having a flange portion 44 on one end thereof and having a slit opening 47 at the opposite end thereof and having two knobs 48, 49 on opposite sides thereof, arranged so that upon opening of the slit 47 fluid may pass through the outlet passageway 36 and the valve 43.

A solenoid 49*a* is shown as having an armature 50 and as being suitably connected to a mounting bracket 51 connected to the valve body 14 by screws or the like. The armature 50 is shown as having a button 52 fastened on the outer end thereof by any suitable means adapted to receive and retain a C member 53 and as having a spring member 54 to extensibly bias the armature from

the solenoid 49. The C member 53 engages the valve 43 by the knob 49. On the opposite side of the valve member 43 a stationary C member 55 is fitted by means of a mounting screw 56 to the end plate 46. The C member 55 like the C member 53 engages the knob 48 on the valve 43.

In practice the valve functions as follows: The adjusting knob (not shown) is turned to the desired position by the operator thus turning the member 38 in the threaded portion 39 on the boss 24 and varying the position of member 38 within the outlet passageway 36. Then, under the cyclic control of the washing machine the solenoid 49 is actuated to retractably move the armature 50 toward the solenoid thus opening the slit 47 in the cutoff valve 43 so as to allow the passage of liquid therethrough. It may be seen that since the C member 55 is rigidly connected to the end plate 46 of the boss 24, when the armature is retractably moved the C clamp 53 encircling the knob 49 will cause the slit 47 to be open.

As the cleansing fluid flows from the dispenser, the volume and hence the weight of the fluid in the collapsible container 15 acting down on the liquid level compensating bar 29 is reduced thus causing the spring member 35 to raise the liquid level compensating bar and hence the container 15 so as to compensate for this change and maintain a constant hydrostatic head. Hence, it may be seen that it is possible to maintain a relatively constant hydrostatic head within applicants' device thus insuring that a relatively accurate volumetric dispensing of fluid may be maintained although the volume of liquid within the container is variable. Furthermore, applicants' cutoff valve means for dispensing fluid from the device insures that any crust of solidified cleansing fluid which may form at the outlet will be broken up by the very opening of the outlet.

The novel construction of the valve mechanism, per se, is described and claimed in a separate application of Abraham M. Samuels, Serial No. 690,773, which is assigned to the same assignee as the present invention.

It will be understood that modifications and variations of the present invention may be effected without departing from the spirit and scope of the novel concepts thereof.

We claim as our invention:

1. In a gravity feed liquid detergent dispenser, a support, a valve body mounted on said support and having an inlet and an outlet, a liquid level compensating member pivotally mounted on said support for movement with respect thereto about a transverse axis, biasing means acting on said compensating member to urge said compensating member upwardly with respect to said support, a liquid detergent container mounted on said compensating bar and balancing said biasing means when full, to lie in a substantially horizontal position, said detergent container being in fluid communication with said inlet and said outlet, valve means in said valve body operable to dispense a measured volume of liquid through said outlet, said biasing means vertically moving said container upon the dispensing of liquid therefrom by operation of said valve means, to maintain a substantially uniform hydrostatic head at said outlet as said container is emptied.

2. In a gravity feed liquid detergent dispenser, a support, a valve body mounted on said support, an inlet to and an outlet from said valve body, a liquid level compensating support member pivotally mounted on said support for movement with respect thereto about a transverse axis, a collapsible container for containing said liquid detergent to be dispensed, mounted on said compensating member and having communication with said inlet to and said outlet from said valve body, valve means in said valve body associated with said outlet and operable to dispense a measured volume of said liquid detergent from said container through said outlet, and means operable to raise said compensating member bar and said container as liquid is discharged from said container, to maintain a substantially uniform hydrostatic head at said outlet as said container is being emptied.

3. In a gravity feed liquid detergent dispenser, a support, a valve body mounted on said support, an inlet to and an outlet from said valve body, a collapsible liquid detergent container having communication with said inlet and said outlet, valve means associated with said outlet and operable to dispense a measured volume of detergent from said container, a liquid level compensating member transversely pivoted to said support and forming a mounting for said collapsible detergent container, and biasing means acting against said compensating member and operable to raise said compensating member with respect to said support upon the dispensing of detergent from said container, to maintain a substantially uniform hydrostatic head at said outlet as said container is being emptied.

4. In a dispenser for liquid detergents and the like, a support, a valve body mounted on said support and having an inlet at an upper portion thereof and an outlet at a lower portion thereof and a side opening, a flexible collapsible liquid detergent container sealed to said side opening and having communication with said inlet through said opening to accommodate filling of said container through said inlet and also having communication with said outlet through said side opening to accommodate the dispensing of said liquid detergent therefrom, a valve in said valve body associated with said outlet for controlling the dispensing of said liquid detergent from said detergent container through said outlet, electrically energizable means for operating said valve to accommodate the flow of liquid detergent through said outlet, and means for maintaining the hydrostatic head of liquid available at said outlet substantially constant, as liquid detergent is dispensed from said liquid detergent container, to assure substantially equivalent amounts of liquid detergent to be dispensed under the influence of gravity as said valve is successively opened, said last-named means comprising a compensating bar transversely pivoted to said support for movement with respect thereto about a transverse axis and maintained in a substantially horizontal position by said liquid detergent container when full, and spring means biasing said compensating bar upwardly and vertically moving said compensating bar as detergent is dispensed from said container.

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