May 15, 1962 J. C. JANQUART 3,034,761

ANTI-CAKING DISPENSER VALVE

Filed Dec. 31, 1957

Fig. 1

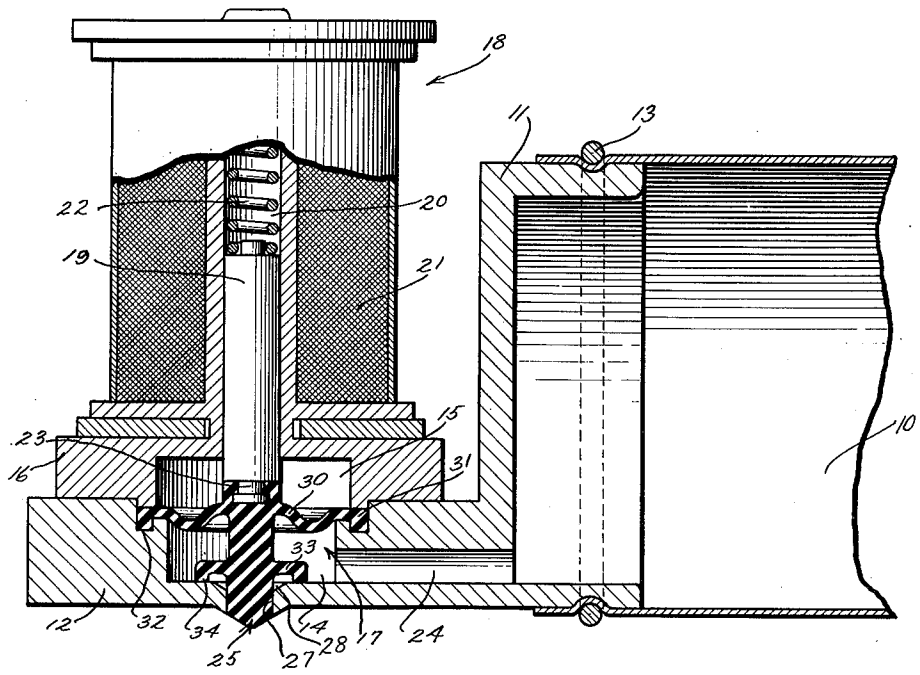
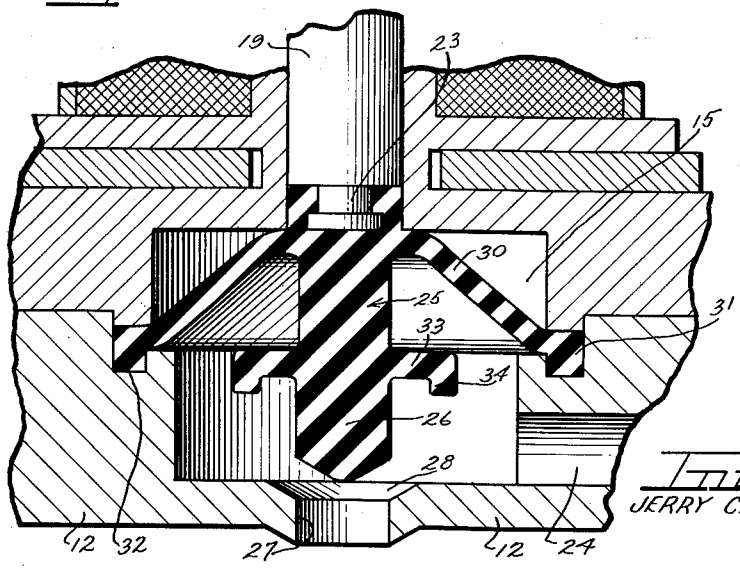


Fig. 2



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ANTI-CAKING DISPENSER VALVE

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

Dispensers of various types have heretofore been used to add detergents bleach, fabric conditions, 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 collapsable cleansing agent storage container has been developed to effect this improvement.

It has also been found that in liquid dispensers having an outlet exposed to the atmosphere, a crust of solidified fluid often forms thereon with the result that such encrustation interferes with the operation of the dispensing device. It has, as a result, been found advantageous to provide a means for breaking loose this encrustation, thereby enhancing the operation of the dispenser.

Accordingly, it is an important object of the present invention to provide a novel method and means for controlling the flow of liquids from a dispenser.

It is a further object of this invention to provide, in a liquid dispenser, a novel means for breaking loose the encrustation which may be formed at the outlet of the dispenser.

A still further object of the invention is to provide a novel and improved form of liquid dispenser in which the means operable to open and close the outlet to the dispenser is also arranged to break loose any encrustation of solidified fluid which may be formed at the outlet to the dispenser.

That type of device with which applicant's novel device may be associated is fully described in co-pending application Serial No. 690,789 now Patent Number 2,919,052 wherein the applicant is a joint inventor and which has been assigned to the same assignee as the present invention.

The foregoing and further objects of the invention will become apparent from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

FIGURE 1 is a fragmentary vertical sectional view through applicant's novel device showing some parts in section and others in side elevations; and

FIGURE 2 is a vertical sectional view through a portion of the structure shown in FIGURE 1 and showing the valve in an open position.

In the embodiment of the invention illustrated in the drawings, there is shown a container **10** for containing fluid to be dispensed mounted on an outlet boss **11** of a valve block **12** by means of a sealing ring **13**. A hollow chamber **14** in the valve block **12** and a second hollow chamber **15** in a solenoid block **16** are aligned with one another to form an outlet chamber generally designated at **17**.

A well known form of electrically energizable solenoid **18** is mounted on the solenoid block **16** and is rigidly secured thereto. The solenoid includes, of course, a longitudinally reciprocally movable armature **19** which is

arranged to be moved upwardly within the armature cylinder **20** upon electrical energization of the solenoid coil **21** and which is arranged to be moved longitudinally extensibly from the armature chamber **20** by a return spring **22**. Such a device is well known and old in the art and, as a result, will not be herein described further in detail.

A buttom **23** which may be formed separately or integrally with the armature **19** is arranged to be secured to the upper end portion of a flexible valve member **25**. The flexible outlet valve **25** includes a shank **26** the lower end portion of which is arranged to snugly fit the inner circumference of an outlet port **27** from the outlet chamber **17** which is formed in a slightly bowed out portion **28** of the valve **12**.

An annular flexible diaphragm **30** formed integrally with the shank **26** extends laterally therefrom and has a beaded portion **31** at its outer periphery which is arranged to be received within an annular channel **32** formed in the upper surface of the valve block **12**.

A second laterally extending flange **33** formed integrally with the shank **26** and having a depending ring **34** is arranged to seat against the lower surface of the outlet chamber **17** when the armature **19** is in the position shown in FIGURE 1.

It will now become apparent that the depending ring **34** is arranged to provide a fluid tight seal at the outlet from the valve body when the solenoid armature **19** is in the position shown in FIGURE 1 and that any encrustation of solidified fluid will be broken away from the outlet when the armature is in its retracted position and the valve member **25** is in the position shown in FIGURE 2.

Furthermore, the flexible diaphragm **30** will prevent any encrustation of solidified fluid from forming around the movable armature **19** and will protect the moving parts of the solenoid **18** from the fluid to be dispensed.

This novel device is, of course, advantageous in that it provides a simple and economical means for increasing the efficiency of a liquid dispensing device (particularly that type of liquid dispenser which is arranged to dispense detergents and the like) by breaking loose any encrustation of solidified fluid which may be formed at the outlet to the valve and thereby preventing any caking of solidified fluid at that outlet.

It should be understood that this embodiment of the invention has been used for illustrative purposes only and that various modifications and variations of the present invention may be effected without departing from the novel spirit and scope of the concepts thereof.

I claim as my invention:

1. In a liquid dispensing valve including a valve body having a chamber, an inlet and an outlet opening to said chamber, the improvement of means for preventing liquid solidification at said outlet and for controlling liquid flow therethrough comprising: a valve plug having an outer diameter substantially equal to the inner diameter of said outlet, an annular outwardly projecting resilient flange connected to and extending transversely to said plug and having an axially projecting annular surface thereon facing said outlet and engageable with the inner surface of said valve body adjacent but slightly radially outwardly spaced from said outlet to shut-off liquid flow through said outlet, and means for effecting axial movement of said plug into and out of said outlet to control liquid flow through said outlet.

2. In a liquid dispensing valve including a valve body having a chamber, an inlet and an outlet opening to said chamber, the improvement of means for preventing liquid solidification at said outlet and for controlling liquid flow therethrough comprising: a valve plug formed of resilient material and having an outer diameter substantially

equal to the inner diameter of said outlet, an annular outwardly projecting resilient flange formed integrally with said plug and extending transversely thereto and having an axially projecting annular surface thereon facing said outlet and engageable with the inner surface of said valve body adjacent but slightly radially outwardly spaced from said outlet to shut-off liquid flow through said outlet, a valve actuator connected to said valve plug for effecting axial movement of said plug into and out of said outlet to control liquid flow through said outlet, and means comprising an integral portion of said plug for sealing off said valve actuator from the liquid within said valve body to prevent malfunctioning thereof.

3. In a liquid dispensing valve including a valve body having a chamber, an inlet and an outlet port opening to said chamber, the improvement of means for preventing liquid solidification at said outlet port and for controlling liquid flow therethrough comprising: a valve plug having an outer diameter substantially equal to the inner diameter of said outlet port and positionable within said port so that it extends entirely therethrough, an annular outwardly projecting resilient flange connected to and extending transversely to said plug and having an axially projecting annular surface facing said outlet and engageable with the inner surface of said valve body adjacent but slightly radially outwardly spaced from said outlet port to shut off liquid flow through said outlet port, and means for effecting axial movement of said plug into and through and out of said outlet port to control liquid flow therethrough.

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