

[54] SEMI-AUTOMATIC DISTRIBUTOR OF DOSES OF VISCOUS PRODUCTS

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[58] Field of Search ..... 222/181, 207, 209, 95, 222/96, 105, 107, 340, 450, 494, 285, 286, 319; 239/320-322, 329, 331, 350, 337, 534, 535

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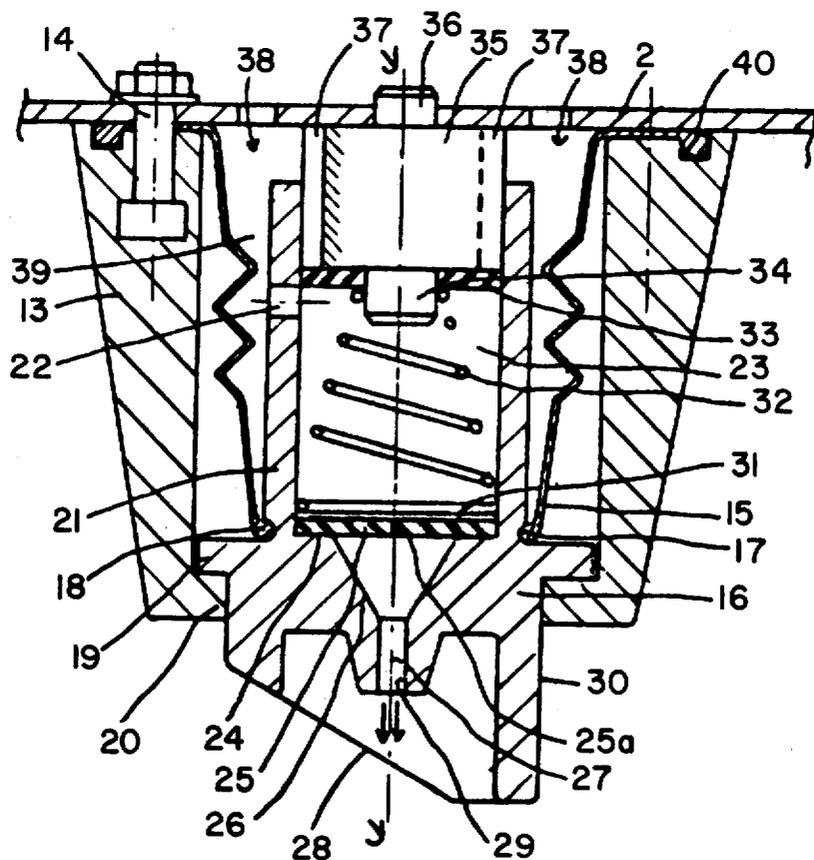
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[57] ABSTRACT

This invention relates to an apparatus in which a viscous substance, taken automatically from a tank, is expelled outside the tank in doses whose volume can be made adjustable as a function of the need.

The dose is obtained by the action of a vertical thrust from the bottom to the top upon a distributing member, placing pressure on the substance in a container with a variable volume and expelling it through an opening formed through an elastic member. This invention applies to the distribution of doses of liquid substances having various viscosities.

15 Claims, 4 Drawing Figures



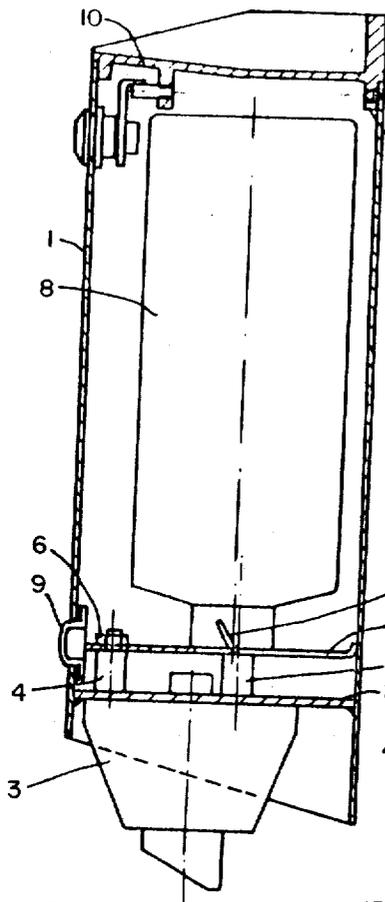


FIG. 1

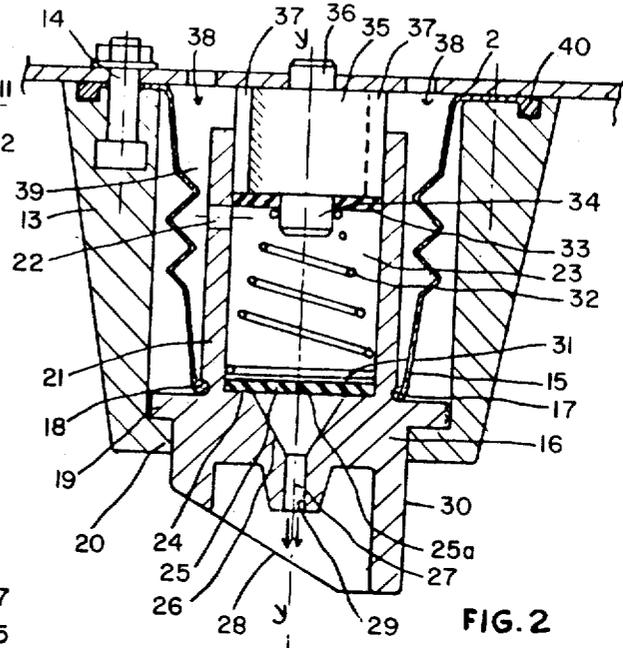


FIG. 2

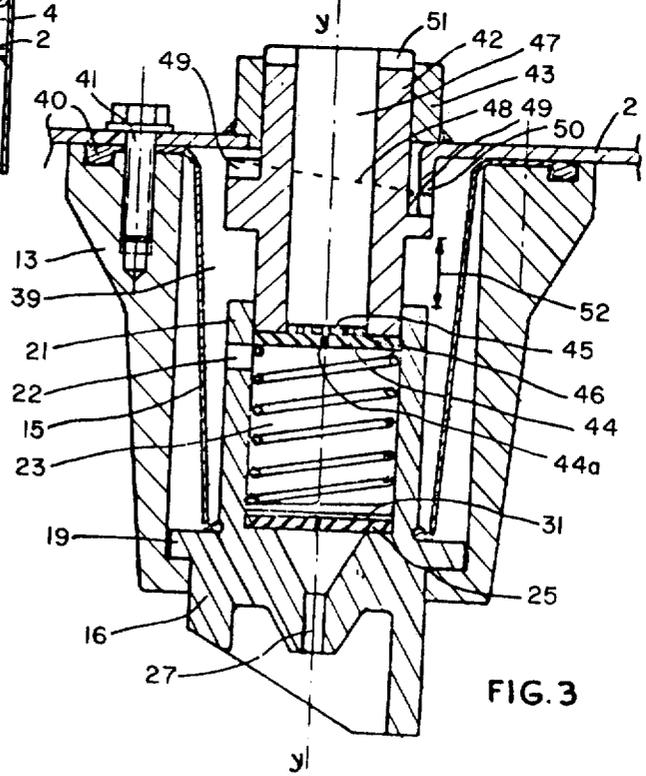
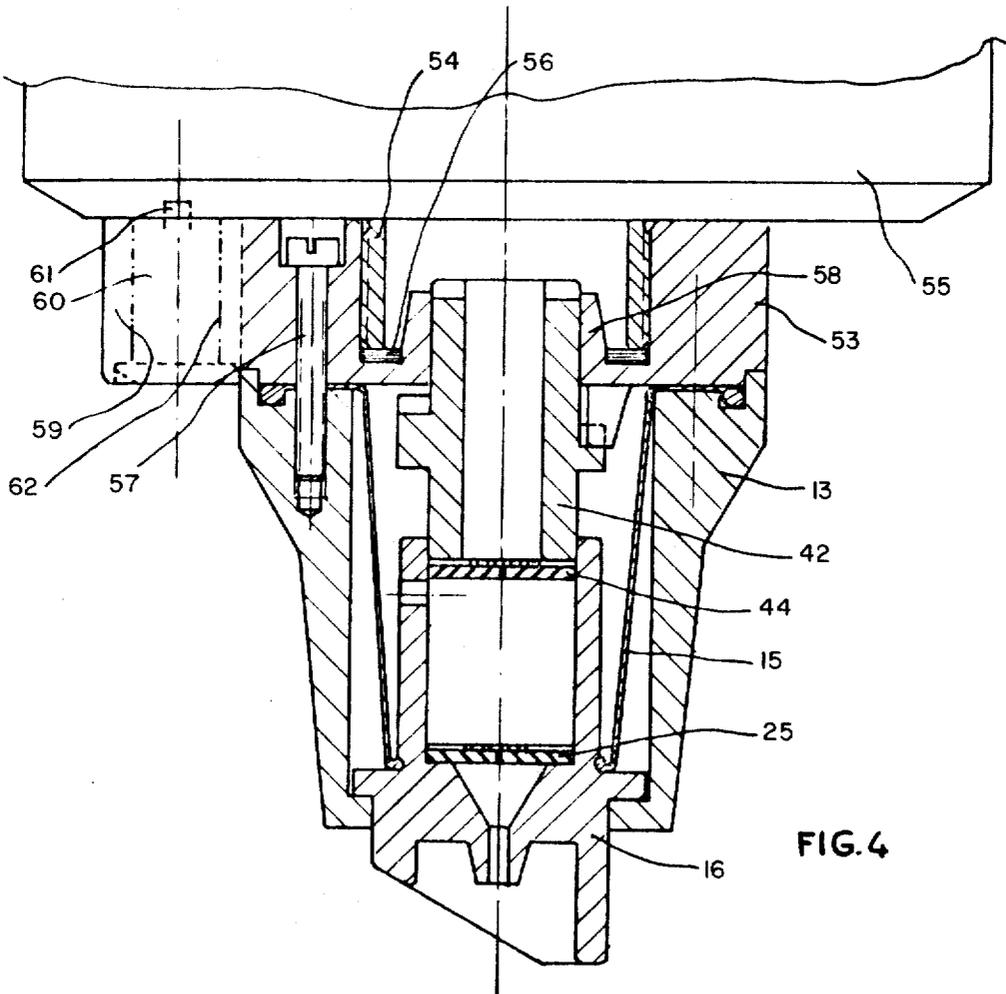


FIG. 3



## SEMI-AUTOMATIC DISTRIBUTOR OF DOSES OF VISCOUS PRODUCTS

This invention relates to the distribution of viscous liquid products, such as, for example, liquid soap and other detergent products, toiletry articles, etc.

This invention involves an apparatus in which a substance, taken from a container, is expelled outside the container in a dosed quantity, which can be regulated as a function of the need.

In known devices, the liquid product is expelled in doses by means of dosing distributors or the like, whose chief inconvenience resides in the fact that, after the ejection of each dose, a certain quantity of the product remains suspended on the edge of the doser outlet opening, accumulates there, and then runs out, soiling the area situated below. Also, most of these apparatuses employ complicated and expensive dosage devices. The distributor according to the invention is intended to remedy these inconveniences.

According to a first embodiment of the present invention, the container holding the substance to be distributed is equipped, at its base, with a distributor made up of a body in which slides a cylindrical piece which defines an opening in its center, in which is arranged an opening, allowing the passage of the doses of product put under pressure by the action of a thrust exerted vertically, in an upward direction.

According to a second embodiment of the invention, the receptacle, in which the product is placed under pressure in order to bring about its ejection, is made adjustable in terms of volume in a continuous fashion or according to several specific positions, thus assuring a variable dose volume. When it is to be used by groups of persons, the container may have a large capacity and may have several distribution devices in order to simultaneously distribute the product to several users. This container may be either filled directly with the product or it may be reloaded from throwaway or reusable containers.

The distributor can also be so arranged that it will screw directly upon the opening of a container with the products to be distributed. The device can be provided with a theft-proof safety means of a known type on which the body of the distributor is threaded in order to ensure tight screwing. It may have a boss in which is arranged a lock which causes the protrusion of a finger which is placed in an appropriate notch of the container, thus making removal impossible. The tank is attached to its support by known means which are inaccessible to unauthorized personnel.

Other purposes, features, and advantages of this invention will be better understood in the light of the following description, given with respect to the drawings of nonrestrictive examples in which:

FIG. 1 shows a general arrangement of a distributing assembly of the present invention.

FIG. 2 shows a first version of the distribution device of the present invention.

FIG. 3 shows a second version of the distribution device of the present invention.

FIG. 4 shows the distribution device of the present invention directly screwed on a container receptacle.

As shown in FIG. 1, the distributor assembly includes the body of receptacle 1, in which is welded in a tight fashion a base 2 on which is attached the distribution device 3. Three crossbars 4 extend from the base 2 and

support and secure a plate 5 by means of screws 6. Plate 5 is equipped with a means 7 permitting, when container 8 is used, the breaking of the container's closing lid. A level control window 9 is kept in a tight fashion inside the wall by virtue of the fact that plate 5 is braced against its opposite inside face. A removable lid 10, which can be used as a place for putting objects, watches, rings, etc., or an ash tray, is supported on the side of the rear face of the receptacle on at least one member 11 extending in corresponding holes in a boss 12 of lid 10, with the latter resting on the top of the receptacle 1.

The first embodiment of the distribution device in FIG. 2 has a body 13 attached to the base 2 of the receptacle 1 by a series of pins 14 which are secured to body 13 and are bolted to the base. A toric joint 40 of a tubular membrane 15 is compressed between the base 2 and the body 13. The joint 40 is made of flexible material which is deformable under very small stresses, comparable to the BELLOFRAM membranes of the LE JOINT FRANCAIS Company (REFAC-USA) and insures tightness between the static and the moving pieces. A cylinder 16 having a seat 17 receives, in a tight-fitting manner, a torus 18, which is molded to the membrane 15. The cylinder 16 also includes a shoulder 19 resting upon shoulder 20 of body 13 and a tubular portion 21 provided with holes 22 for the introduction of the liquid product into a chamber 23 formed within the cylinder 16. An inside shoulder 24 is formed in the cylinder 16, on which rests a member 25 made of elastic material, having symmetrically in its center at least one slot 25a with a short length, made in its thick portion, to form a discharge opening. One variant of this slot, or opening, can be equipped with cross-shaped edges. From the shoulder 24 a conical part 26 is formed which terminates in a cylindrical hole 27 whose diameter and length are a function of the viscosity of the liquid product to be distributed; i.e., they are selected so that the product continues to stick to the wall of hole 27 through capillary action which prevents the formation and fall of drops. In case of the gelation of the product, the jellified portion is ejected at the moment the apparatus is operated.

Piston 16 has a slanted cut 28 to make it possible to visually determine the dose of the product distributed. As an alternate, the cylinder 16 may be made of transparent material. The extremity 29 of the tubular portion surrounding the capillary hole 27 is preferably set back from the lower portion of cylinder 16 to prevent any possibility of soiling the hole 27. A flat part 30 of cylinder 16 cooperates with the corresponding part of body 13 to prevent the rotation of cylinder 16 which could lead to the destruction of membrane 15.

The opening 25a is covered by a washer 31 which may either be perforated or which may be made of a rigid metal sheet. A spring 32, with a conical shape, at one end rests on washer 31 and at the other end on an elastic washer 33. Spring 32 and washer 33 are centered and rest upon the cylindrical shoulder 34 of a fixed solid cylindrical member 35 disposed on vertical axis YY of body 13, by means of a cylindrical boss 36 extending through and secured to the base 2. Member 35, on which slides the tubular portion 1, is equipped with grooves 37, arranged radially according to the generatrix of the cylinder feeding the dosing chamber 23.

The distributor 3 works in the following manner: the product to be distributed flows by force of gravity through the holes 38 formed through the base 2 of the receptacle 1, and fills the chamber 39 defined by the interior of membrane 15 and the exterior of the tubular portion 21 and the member 35. Spring 32 keeps the shoulder 19 of cylinder 16 resting against the shoulder 20 of the body 13. In this position, holes 22 are clear and the product spreads into the dosing chamber 23 until it is full. At that moment, the distributor 3 is ready for use. To take out a dose, it suffices to exercise pressure upon portion 28 of cylinder 16, from the bottom to the top, by means of the fingers or the palm of the hand. The tubular portion 21 then rises until the holes 22 pass the elastic washer 33 which is applied in a tight fashion upon the shoulder of member 35. The pressure then increases in the dosing chamber 23, deforms the elastic member 25 and enlarges the opening 25a which allows the passage, along axis YY, of a product dose whose volume corresponds to the remaining movement of the tubular portion 21 between the position when chamber 23 is placed under pressure and the position when tubular portion 21 engages the bottom of base 2. Then, due to the action of spring 32, elastic washer 33, working like a check valve, is deformed and allows the penetration of the product through the grooves 37 into the dosing chamber 23. In this version, the volume of the dose is defined in advance, and the movement of the dosing cylinder is not adjustable. Ejection may be provided so as to be accomplished through a point that is eccentric with respect to the axis YY by offsetting the opening 25a from the latter axis.

FIG. 3 shows a second model of the distribution device in which the volume of the product dose is adjustable. The same reference figures refer to the same members as those used in FIG. 2.

In this version, the body 13 is attached by a series of screws 41, extending from the base 2 and fixed in the corresponding tap holes of body 13. Membrane 15 is glued upon shoulder 19 of piston 16 or is retained as in FIG. 2. The fixed member 35, in FIG. 1, is replaced by a piston 42 which can slide in a bore of boss 43 secured to the base 2 of receptacle 1. The tubular extremity of piston 42, extends in tubular portion 21 of cylinder 16 and engages a second elastic member 44 having a slot or opening 44a extending therethrough which is fed through a series of holes 45 punched in the base 46 of the piston 42. Piston 42 is equipped on the outside with a ramp 48, having several notches 49 in which is engaged a retaining finger 50, obtained by folding the sheet constituting the base 2 of the receptacle 1 or by any other means. The upper portion of piston 42 is equipped with a screwdriver slot 51.

The distributor works in a manner similar to the one in FIG. 2 although in this embodiment the product dose volume can be adjusted by means of piston 42. To make this adjustment, one of the notches on the ramp corresponding to a given volume defined in advance is selected and pressure is exerted, for example, by means of a screwdriver engaged in slots 51, until the finger 50 is disengaged from its notch. Piston 42 is then turned until the finger 50 is opposite the notch selected and engages its bottom. Receptacle 1 is filled with the product and the apparatus is then ready for service. The movement of dosing cylinder 16, defined by the notch 49 selected, determines the volume of the dose to be distributed, with the maximum range of movement

being shown by the reference numeral 52. As in the example in FIG. 2, when pressure is exerted upon the dosing cylinder 16, pressure is also placed on the product in chamber 23. The base 46 prevents the elastic member 44 from being deformed toward the interior of the chamber 23 and a dose is expelled through the deformation of the lips of the elastic member 25 defining the opening 25a. When pressure upon the dosing cylinder 16 is released the spring 32 — which rests upon member 44 and upon washer 31 — pushes the cylinder 16 back into its low position, the member 44, constituting the upper check valve, is deformed, the opening 44a is enlarged, and the product is aspirated into chamber 23 in order to distribute a new dose.

It is understood that the forms of implementation shown here are not restrictive. For example, one can replace membrane 15 with a toric joint ensuring tightness between cylinder 16 and body 13. The ramp 48 of piston 42 may not necessarily have a notch; in this case, the finger 50 defines a continuous variation of the capacity of the dosing chamber and it suffices to add a means for immobilizing the piston in the position selected.

FIG. 4 shows the distributing member directly screwed upon a container. The same reference numbers designate the same members as in the earlier figures. In this view, the entire distributing portion is identical to the one in figures 2 and 3. An intermediate piece 53, screwed upon the screw thread 54 of container 55 (shown partially) and resting upon a sealing joint 56, receives the distributing member. The body 13 is first fixed by screws 57 upon intermediate piece 53 which involves a boss 58 ensuring the maintenance and guidance of fixed piston 42. A boss 59 of piece 53 receives a lock 60 of a known type, whose barrel pushes out a finger 61 which cooperates with a seat 62 of the container to immobilize the distributor upon the container.

I claim:

1. An apparatus for discharging doses of liquid comprising a receptacle containing the liquid to be distributed, at least one guide member attached to said receptacle and defining a passage for receiving said liquid from said receptacle, a dispensing member movably mounted on said guide member, said members defining a chamber for receiving said liquid from said passage, means responsive to movement of said dispensing member in one direction relative to said guide member for pressurizing the fluid in said chamber, and an elastic member disposed in said chamber and having a slot formed therethrough, said slot enlarging in response to said pressurizing of said fluid for defining an outlet opening through which said liquid discharges, said slot closing upon movement of said dispensing member in a direction opposite said first direction.

2. The apparatus of claim 1 further comprising means responsive to the discharge of said liquid for permitting a predetermined dose of liquid to be passed from said receptacle to said chamber.

3. The apparatus of claim 2 further comprising means to vary the quantity of said predetermined dose of liquid.

4. The apparatus of claim 1 further comprising a spring disposed in said chamber and urging said dispensing member in said opposite direction.

5. An apparatus for discharging doses of liquid comprising a receptacle containing the liquid to be distrib-

uted, at least one guide member attached to said receptacle and defining a passage for receiving said liquid from said receptacle, a dispensing member movably mounted on said guide member, said members defining a chamber for receiving said liquid from said passage, means responsive to movement of said dispensing member in one direction relative to said guide member for pressurizing the fluid in said chamber and means responsive to said pressurizing of said fluid for defining an outlet opening through which said liquid discharges, said outlet opening closing upon movement of said dispensing member in a direction opposite said first direction, said dispensing member defining an outlet passage in communication with said outlet opening, the dimensions of the walls of said passage being selected to attract said liquid by capillary action after discharge from said opening and before discharge from said dispensing member.

6. The apparatus of claim 5 further comprising means responsive to the discharge of said liquid for permitting a predetermined dose of liquid to be passed from said receptacle to said chamber.

7. The apparatus of claim 6 further comprising means to vary the quantity of said predetermined dose of liquid.

8. The apparatus of claim 5 further comprising a spring disposed in said chamber and urging said dispensing member in said opposite direction.

9. An apparatus for discharging doses of liquid comprising a receptacle containing a liquid to be discharged, a guide member secured relative to said receptacle and having an opening therethrough communicating with said receptacle, a hollow dispensing member mounted on said guide member and defining a chamber therewith for receiving liquid from said opening, said dispensing member being movable relative to said guide member to vary the volume of said chamber, a compression spring disposed in said chamber and urging said dispensing member to a normal position in which the volume of said chamber is at a maximum, an outlet passage extending through said dispensing member in communication with said chamber, an elastic member disposed in said chamber and normally blocking fluid flow through said outlet passage, said dispens-

ing member being manually movable relative to said guide member in a direction to reduce the volume of said chamber and pressurize the fluid in said chamber, said elastic member having a slot therethrough which opens in response to said pressurizing of said fluid in said chamber to permit said liquid to discharge from said outlet passage, said slot closing upon movement of said dispensing member to said normal position under the action of said spring.

10. The apparatus of claim 9 wherein the dimensions of said outlet passage are a function of the dampening capability of said liquid and are designed so that said liquid, following discharge from said slot, adheres to the wall of said passage by capillary action to prevent the formation and fall of drops.

11. The apparatus of claim 9 further comprising means to adjustably mount said guide member relative to said receptacle to adjust the range of movement of said dispensing member and therefore the volume of liquid discharged.

12. The apparatus of claim 11 wherein a helicoidal ramp is formed on the periphery of said guide member, said ramp being provided with a series of notches which are selectively engaged by a member extending from said receptacle to adjust the position of said guide member relative to said receptacle.

13. The apparatus of claim 9 further comprising a flexible tubular membrane extending between said receptacle and said dispensing member to prevent linkage of said liquid.

14. The apparatus of claim 9 further comprising a housing extending over said members, an intermediate mounting member extending between said housing and said receptacle, first securing means for securing said housing relative to said mounting member and second securing means for securing said mounting member relative to said receptacle while preventing access to said first securing means.

15. The apparatus of claim 9 further comprising means responsive to movement of said dispensing member to permit passage of fluid from said receptacle, through said opening and into said chamber.

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