

[54] **SQUEEZE TYPE DEVICE FOR DISPENSING LIQUID MEDICAMENTS OR THE LIKE TO A BODILY ORGAN**

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[51] Int. Cl.² **A61M 1/00**

[58] Field of Search 222/402.19, 207, 215, 205, 222/533, 189, 108; 128/249

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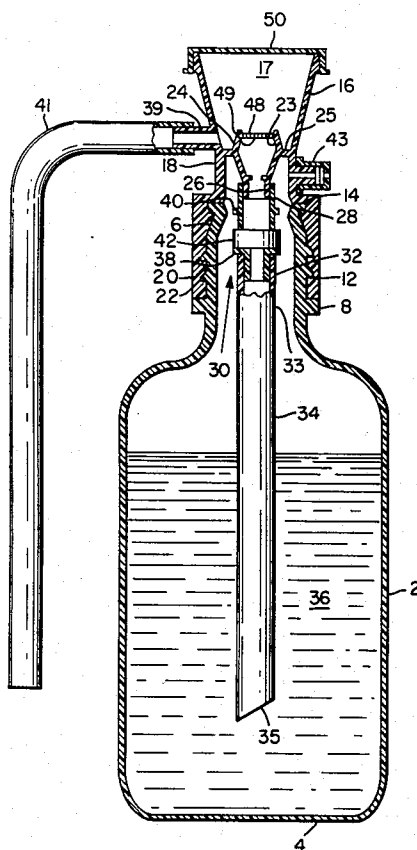
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[57]

ABSTRACT

A squeeze type device for dispensing liquid medicaments or the like to a bodily organ of a patient, and which device includes a gravity actuated valve so that the liquid may be dispensed irrespective of the position of the patient.

8 Claims, 4 Drawing Figures



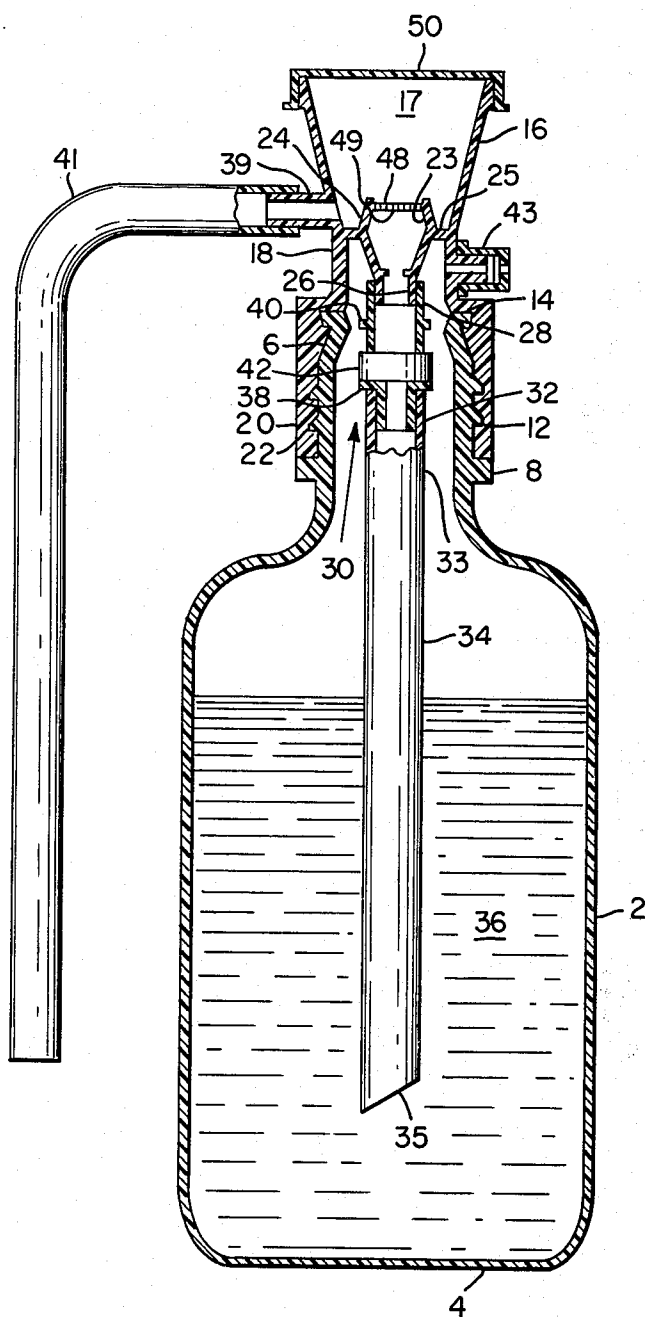


FIG. 1

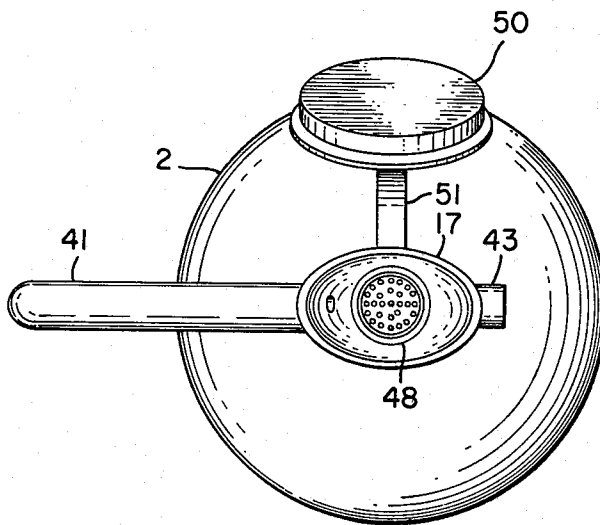


FIG. 2

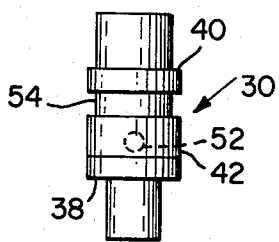


FIG. 3

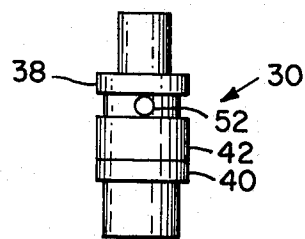


FIG. 4

SQUEEZE TYPE DEVICE FOR DISPENSING LIQUID MEDICAMENTS OR THE LIKE TO A BODILY ORGAN

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to squeeze type devices for dispensing liquid medicaments or the like to a patient and, particularly, to devices of the type described for dispensing said liquids to a bodily organ such as the eye. More particularly, this invention relates to a device which may be used to dispense the liquid irrespective of the position of the patient.

2. Description of the Prior Art

Squeeze type devices for dispensing liquid medicaments to a bodily organ such as the eye are in wide use in factories and other industrial installations where the danger of injury to the eye exists due to splashing of chemicals, dust, dirt and other irritants which may be present. Prior art devices have generally included a resilient container for the liquid and a cap for the container including an adapter for the eye such as an eye cup, and supporting a removable liquid delivery tube extending nearly to the bottom of the container. Upon squeezing the container the liquid is forced through the tube to the eye cup for rinsing, flushing, cleaning or otherwise relieving the eye of the irritant. The prior art devices are disadvantageous in that they must be used while substantially upright, i. e. when the patient is sitting or standing. When the patient is in the supine position the container must be tilted or sometimes inverted to dispose the eye cup in intimate contact with the eye. This may cause the liquid to flow beyond the end of the delivery tube near the bottom of the container so as to be trapped within the container without a path to the eye cup, unless the container is opened for removing the delivery tube or for adding liquid to increase the liquid level within the container as the case may be. Such a procedure could conceivably cause considerable delay which is detrimental in an emergency situation as is readily understood.

SUMMARY OF THE INVENTION

The invention as herein described overcomes the disadvantages of the prior art devices. The invention contemplates a resilient container for the liquid, and which container has an adapter such as an eye cup integral with a screw-on cap for closing the otherwise open neck of the container. A gravity actuated valve is supported within the cap intermediate the eye cup and a delivery tube which extends nearly to the bottom of the container. The valve carries an opening and means for maintaining the opening closed when the container is in the upright or slightly tilted position as used when the patient is sitting or standing. When the container is substantially tilted or inverted so as to accommodate a patient who may be in the supine position, or nearly so, said means is gravity actuated to expose the hole, whereby the liquid enters the valve through said hole and flows therefrom the eye cup.

The main object of this invention is to provide a squeeze type device for dispensing liquid medicaments or the like to a bodily organ of a patient irrespective of the position of the patient.

Another object of this invention is to provide a device of the type described which may be used irrespec-

tive of the position of the patient without time consuming disassembly of the device and/or refilling thereof with liquid.

Another object of the invention is to provide a device of the type described which is available for immediate use in emergency situations as are likely to occur.

Another object of this invention is to provide a device of the type described including a gravity actuated valve which is operable when the device is used in a substantially tilted or inverted position so as to insure dispensing of the liquid irrespective of the position of the patient.

These and other objects and features of the invention are pointed out in the following description in terms of the embodiment thereof shown in the accompanying drawings. It is to be understood, however, that the drawings are not a definition of the limits of the invention, reference being had to the appended claims for this purpose. Although the invention will be described for illustrative purposes with reference to a squeeze type device for use with the eye, it will be understood that the scope of the invention is not limited thereby and the principle of the invention is applicable for use with other bodily organs as well.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a partially sectioned plan view of the device of the invention and showing the novel arrangement of the components thereof.

FIG. 2 is a top view of the invention, with reference to the plan view of FIG. 1.

FIG. 3 is a plan view of a gravity actuated valve used in the invention, and which valve is shown when the device of the invention is in the upright position.

FIG. 4 is a plan view of the valve of FIG. 3, but shown when the device of the invention is in the inverted position.

DESCRIPTION OF THE INVENTION

With reference to FIG. 1 and 2, the device of the invention includes a substantially cylindrical container of a suitable resilient plastic such as polyethylene or some other such similar material, and which container is designated by the numeral 2. Container 2 has a closed bottom end 4 and a top end terminating in a neck portion 6. Neck portion 6 carries a shoulder 8 near the bottom thereof and carries a plurality of external threads designated by the numeral 12. Neck portion 6 has a flange 14 at the top thereof and is otherwise open as shown in FIG. 1.

A container cap designated by the numeral 16 has an adapter such as an eye cup 17 which terminates at its bottom portion in a hollow cylindrical member 18. Cylindrical member 18, in turn, terminates in a hollow cylindrical member 20 of substantially larger diameter than cylindrical member 18. Cylindrical member 20 carries a plurality of internal threads designated by the numeral 22. Threads 12 of neck 6 and threads 22 of member 20 are in screw-thread engagement when the cap is placed over the neck of the container and rotated so that the bottom portion of member 20 is adjacent flange 8 of neck 6 to secure cap 16 to container 2 to close the container.

Cap 16 includes a tubular member 24 therewithin which extends above and below a wall 25 separating eye-cup member 17 and cylindrical member 18. Tube 24 has a discharge end 23 and an end 26 which receives an outlet portion 28 of a gravity actuated hollow, re-

movable flow valve which may be substantially cylindrical in shape and designated generally by the numeral 30, and the operation of which flow valve 30 will be hereinafter described with reference to FIGS. 3 and 4. Flow valve 30 includes an inlet portion 32 which receives an outlet end 33 of a removable cylindrical tube 34. Tube 34 extends into container 2 and through a liquid medicament solution or the like such as may be contained therein and designated by the numeral 36. Tube 34 has an inlet end 35 disposed near the bottom of container 2.

Valve 30 includes a flange 38 and another flange 40 disposed above flange 38 as shown in FIG. 1. A ring 42 is arranged to rest on flange 38 when container 2 is in the upright position or slightly tilted and to rest on flange 40 for exposing an aperture when container 2 is tilted beyond a predetermined degree or is in the inverted position as will be hereinafter more fully described with reference to FIGS. 3 and 4.

Eye-cup member 17 includes near the bottom thereof a tubular member 39 communicating therewith and extending substantially normal and external thereto. Tubular member 39 receives a removable, substantially right angular drain tube 41 which extends external to container 2 for discharging used liquid 36 as will also be further described. Cylindrical portion 18 of cap 16 includes a check valve member 43 extending normal and external thereto. Check valve member 43 allows rapid air intake to restore container 2 to its original shape after it has been squeezed for dispensing liquid 36 without drawing back contaminated liquid into the container as will be understood.

Tubular member 24 within cap 16 may have a screen 48 extending across a discharge orifice 49 communicating with eye cup 17. Screen 48 serves the purpose of breaking up the pressurized stream of liquid effected upon squeezing container 2 to allow a gentle dispensing of liquid 36 to the eye or such other bodily organ with which the device of the invention may be used. In this connection it is noted that wall 25 prevents a rush of liquid from the container to the eye cup upon tilting or inverting the container which would prevent the gentle dispensing of liquid desirable for the purposes described.

A captive flip type cap 50, best shown in FIG. 2, may be arranged to snap over the top of eye cup 17 when the device of the invention is not in use to maintain the portion of the device which is in contact with the eye in a non-contaminated condition as is desirable. Cap 50 is secured to member 18 through a leader member 51.

OPERATION OF THE INVENTION

In operating the invention heretofore described, eye cup 17 is gently disposed against the periphery of the eye so as to be in intimate contact therewith. While the patient keeps the eye open, container 2 is gently squeezed by an operator to dispense liquid from container 2 through tube 34, valve 30, tubular member 24 and through orifice 49 covered by screen 48 to the eye to irrigate or cleanse the eye of foreign matter as the case may be.

As long as container 2 is held in the upright position or slightly tilted to accommodate a patient who is sitting or standing ring 42 of valve 30 will be in the position as shown in FIG. 3; that is, against flange 38 to block or close an aperture or hole 52 extending through the portion of valve 30 near flange 38 as shown

in FIGS. 3 and 4; so that the invention operates as just described.

A difficulty exist when the patient is in the supine position or nearly so. Under these circumstances container 2 must be substantially tilted, and in the extreme case inverted, so that eye cup 17 may be intimately disposed against the patients eye to dispense the liquid thereto. Under these conditions liquid 36 flows toward neck 6 of container 2 and beyond inlet end 35 of tube 34. If it were not for the novel operation of valve 30 as will next be described, there would be no outlet for the liquid to eye cup 17, unless cap 16 were to be removed from container 2 to remove tube 34 or to refill container 2 with liquid 36 to increase the liquid level so that the liquid would not flow beyond tube end 35 upon the aforementioned tilting or inverting. The delay in thus dispensing liquid 36 would be detrimental in an emergency situation as is likely to occur.

However, upon tilting container 2 beyond a predetermined angle, as may be selected as a matter of design, or by inverting container 2, such as may be necessary to accommodate the position of the patient, the gravitational force involved displaces ring 42 so that it rest against flange 40 of valve 30, thus exposing hole 52 as shown in FIG. 4. Upon squeezing container 2, the liquid will flow toward neck 16, through hold 52 and therefrom through valve 30, tubular member 34 and orifice 49 to eye cup 17 for being disposed to the patient as is desired.

It will be appreciated that the device according to the invention saves valuable time in an emergency situation in that even a small amount of liquid in container 2 can be adequately dispensed to the patient if the container has to be tilted or inverted as heretofore noted.

It will be seen from the aforementioned description of the invention that a device has been provided which will quickly and adequately dispense liquid medicaments or the like to a bodily organ of a patient irrespective of the position of the patient. Gravity actuated valve 30 permits use of the device in either the upright, tilted or inverted positions, and the device is therefore available for use in an emergency situation. Screen 48 is provided so that a gentle stream of liquid is applied to the organ upon squeezing container 2. Drain tube 41, which, as heretofore noted, extends external to container 2, serves the purpose of releasing residual liquid in eye cup 17 which has been contaminated by contact with the eye. The tube can be rotated about member 39 for drainage independent of the position of the container. This constant draining of used liquid keeps fresh liquid in contact with the eye and thereby insures that no further contaminants will be applied thereto. Flip top cap 50 is provided so that all internal parts of the device are kept clean when the device is not in use. Check valve 43 serves the purpose of quickly restoring container 2 to its original position as is necessary and desirable for immediate re-use.

As heretofore noted, container 2 may be constructed of a resilient plastic material such as polyethylene or the like. Adapter 17, valve 30 and tube 34 may be constructed of a similar material. The device of the invention and its component parts may be fabricated economically as by conventional molding methods. Container 2 may take on various sizes and shapes and adapter 16 may likewise take on various sizes and shapes depending upon the organ with which the device is to be used as will now be understood. Ring 30 may be of metal or other suitable material, wherein the

5

coefficient of friction with the material of valve 30 provides easy sliding upon tilting of container 2 to expose hole 52 as heretofore noted.

Although a single embodiment of the invention has been illustrated and described in detail, it is to be expressly understood that the invention is not limited thereto. Various changes may also be made in the design and arrangement of the parts without departing from the scope and spirit of the invention as the same will be understood by those skilled in art.

What is claimed is:

1. A squeeze type device for dispensing a liquid to a bodily organ, comprising:

a resilient container for the liquid having a closed bottom end and an open neck;

a cap engaged with the neck for closing the container and including an adapter for being in intimate contact with the organ, said adapter having an opening through which the liquid is dispensed upon the resilient container being squeezed;

a valve member supported within the cap and communicating with the adapter opening;

a tube communicating with the valve member and extending into the container through the liquid, and having an end near the bottom of the container:

the valve member including an aperture and means for blocking said aperture when the container is in the substantially upright position, with the liquid thereupon flowing through the tube and the valve member and through the adapter for being dispensed to the organ when the container is squeezed;

the aperture blocking means being gravity actuated when the container is tilted beyond a predetermined angle, whereupon the liquid flows beyond the end of the tube near the bottom of the container, for unblocking the aperture, with the liquid flowing through said aperture into the valve member and through said valve member and adapter opening for being dispensed to the organ when the container is squeezed;

a tubular member near the bottom of the adapter and communicating therewith, and extending substantially normal thereto; and

a substantially right angular drain tube communicating with the tubular member and rotatable about

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said member for draining residual liquid from the adapter independent of the position of the container.

2. A device as described by claim 1, wherein: the valve member is substantially cylindrical and includes a pair of shoulders in spaced relations; the valve member aperture extends through said member near one of the shoulders;

the blocking means includes a ring disposed between the shoulders and adjacent the one shoulder for blocking the aperture when the container is in the substantially upright position; and

the right is gravity actuated when the container is tilted beyond the predetermined angle for being adjacent the other of the shoulders and for thereupon unblocking the aperture.

3. A device as described by claim 1, wherein: the cap and neck are in screw thread engagement for closing the container.

4. A device as described by claim 1, including: a check valve member arranged with the cap for allowing air intake to the container to restore the container to its original shape after it has been squeezed.

5. A device as described by claim 1, including: a screen member covering the adapter opening for breaking up the pressurized stream of liquid effected upon squeezing the container.

6. A device as described by claim 1, wherein: the cap includes a tubular member therewithin; one end of the tubular member therewithin; adapter opening and the valve member communicates with the other end; and

a wall extends external to and between the ends of the tubular member, and connects said member with the cap for preventing a rush of liquid from the container to the adapter when the container is tilted.

7. A device as described by claim 1, including: a captive cover arranged for snapping over the adapter.

8. A device as described by claim 1, wherein: the valve member, the tube communication with the valve member and the drain tube are removable.

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