United States Patent

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Continuation of application Ser. No. 694,639, Dec. 29, 1967, now abandoned.

[54] **DISPENSER WITH LIQUID-IMPERVIOUS VENT**
5 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **222/478,** 128/222, 215/11
[51] **Int. Cl.** **B67d 3/00**
[50] **Field of Search** 222/478, 479, 490; 128/213, 222, 233, 260; 239/33; 215/6, 11, 56, 79; 220/44

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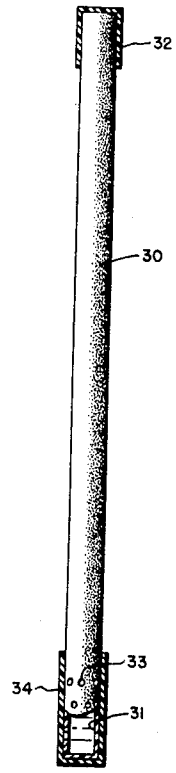
ABSTRACT: A dispensing device for liquid medication is formed in the shape of a straw. The device has a passage extending therethrough with the upper end closed by a removable cover. The lower end has means to permit the introduction of air into the passage whereby suction on the upper end of the passage results in the liquid medication within the passage being dispensed into the mouth of the user.



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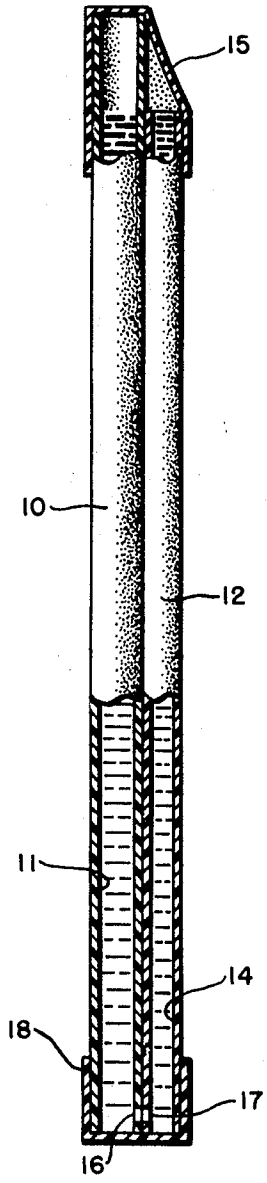

FIG. 1

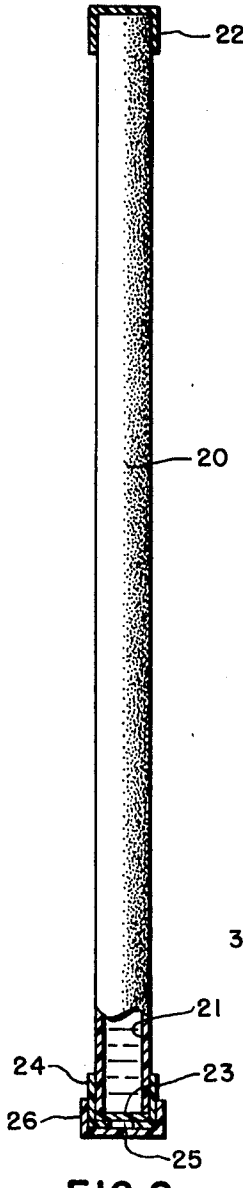

FIG. 2

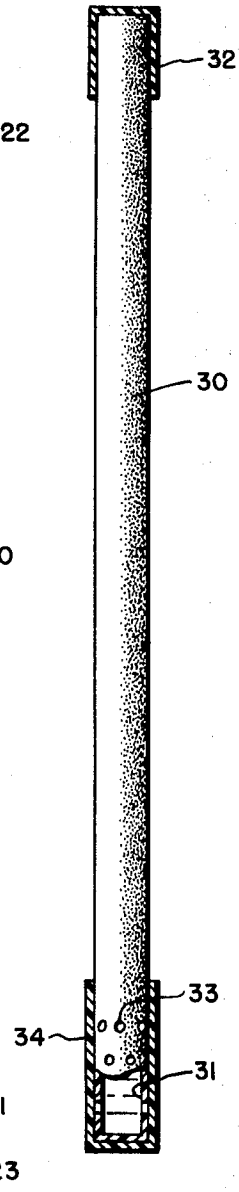

FIG. 3

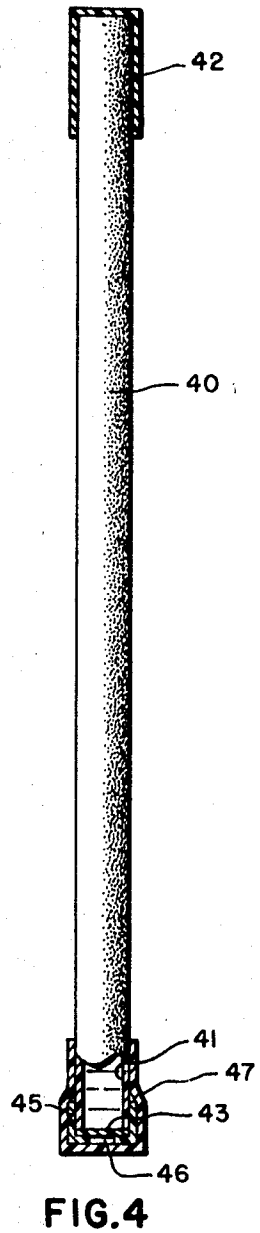

FIG. 4

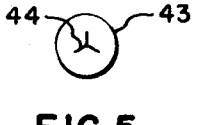

FIG. 5

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DISPENSER WITH LIQUID-IMPERVIOUS VENT

This application is a continuation of Ser. No. 694,639 filed Dec. 29, 1967, now abandoned.

Liquid medication is normally dispensed from a bottle. The amount of each dose is usually prescribed by a physician in terms of teaspoons or the like. Thus, whether a patient receives the desired dosage depends on how accurately the teaspoon is filled and whether the specific teaspoon being used is a correct teaspoon measure. Thus, a patient may not receive the desired dosage of liquid medication.

The present invention satisfactorily overcomes the foregoing problem by dispensing each dose of liquid medication from a separate member. Thus, the patient receives the exact quantity of liquid medication that the physician desired to be administered. Accordingly, precise control of each dose of liquid medication is available when using the dispensing device of the present invention.

In giving liquid medication to young children, there always exists the possibility of spilling some of the liquid medication due to a child's normal reluctance to take medicine. Therefore, when there is any spillage, the parent does not know the amount of spillage so no further dose is normally given. Thus, the child does not receive the desired dose of liquid medication when any spillage occurs.

The present invention satisfactorily overcomes this problem by packaging the liquid medication within a tubular member resembling a straw. This ensures that the desired dose of liquid medication is available. When a child sucks on the tubular member, the entire content within a passage in the tubular member will be received by the child. Thus, the child receives the desired dose of liquid medication.

In hospitals, the dispensing of liquid medication is normally by filling a paper cup or the like. This requires a substantial amount of time and highly skilled labor to perform this function.

The present invention satisfactorily overcomes the foregoing problem in packaging a predetermined amount of liquid medication within a tubular member resembling a straw. By removing appropriate closure members and sucking on the straw, the patient readily receives the desired quantity of medication. Thus, the present invention eliminates the time-consuming requirement of a highly skilled person to appropriately provide the desired dose of liquid medication in a hospital.

When using liquid medication packaged in a bottle, the opening of the bottle always presents the problem of contamination since the sterile seal is broken. The present invention satisfactorily eliminates this problem by preventing any infection since each dose of the liquid medication is disposed within a separate member.

When one is required to take liquid medication while one is working away from home or travelling, there exists the problems of both handling a bottle to carry the medicine and means for dispensing the medicine from the bottle such as a spoon, for example. The present invention satisfactorily solves these problems by packaging each dose of liquid medication in a separate member whereby no large bottle is required nor is any type of means for measuring or taking the liquid medication needed. Thus, the present invention is particularly useful for taking liquid medication by one who travels or works away from home.

In order for pharmaceutical companies to interest physicians in prescribing their medicines for patients, it is necessary for the pharmaceutical companies to supply the physician with samples. The physician normally gives some of these samples to one or more patients to determine the effectiveness and usefulness of the medicine.

It is a problem to supply samples of liquid medication to physicians. This is because a regular 3-ounce bottle would contain a substantial amount of liquid medication so as to render the cost of the sample relatively high while a plurality of separate bottles with small quantities in each also would render the cost of the sample relatively high. Furthermore, when merely providing a single bottle of liquid medication, the pharmaceutical company limits the physician's use to only one patient.

The present invention satisfactorily solves this problem by permitting doses of liquid medication to be contained in separate members with each of the members having a desired dose of the liquid medication. Thus, when using the dispensing device of the present invention, the pharmaceutical company may supply the physician with separate samples of the liquid medication at a reasonable cost and permit the physician to be able to determine the effectiveness and usefulness of the liquid medication through giving the samples to several of his patients.

An object of this invention is to provide a device for dispensing a predetermined quantity of liquid medication.

Another object of this invention is to provide a disposable device for dispensing liquid medication.

Other objects, uses, and advantages of this invention are apparent upon a reading of this description, which proceeds with reference to the drawing forming part thereof and wherein:

FIG. 1 is a side elevational view, partly in section, of one embodiment of the liquid-medication-dispensing device of the present invention.

FIG. 2 is a side elevational view, partly in section, of another form of the liquid-medication-dispensing device of the present invention.

FIG. 3 is a side elevational view, partly in section, of still another embodiment of the liquid-medication-dispensing device of the present invention.

FIG. 4 is a side elevational view, partly in section, of a further modification of the liquid-medication-dispensing device of the present invention.

FIG. 5 is a top plan view of a valve utilized in the dispensing device of FIG. 4.

Referring to the drawing and particularly FIG. 1, there is shown one form of the dispensing device of the present invention. The device includes a first or main tubular member **10** having a passage **11** therein. A second or auxiliary tubular member **12**, which has a passage **14** therein, is fixedly secured to the tubular member **10** to form a unitary device. The member **12** is preferably of shorter length than the member **10** and has its passage **14** of a smaller diameter than the passage **11** in the tubular member **10**.

The tubular members **10** and **12** are formed of any material that is capable of retaining liquid medication therein. The members **10** and **12** could be formed of a suitable transparent plastic, for example.

One end of each of the passages **11** and **14** is sealed by a removable closure member **15**. The closure member **15** is preferably of a shrink-fit type and may be formed of any suitable material such as that sold by Thatcher Glass Company, Muscatine, Iowa under the trademark "CELLO-SEAL," for example. It is desired that the force required to remove the closure member **15** be sufficient to prevent any child from removing the member **15**.

The other ends of the passages **11** and **14** are in communication with each other. The member **10** has an opening **16** therein communicating with an opening **17** in the manner **12** to connect the passages **11** and **12** to each other. The passages **11** and **14** are filled to a predetermined level with the liquid medication. The particular level of the liquid medication in the passages **11** and **14** will depend upon the desired dosage and the relative diameters of the passages **11** and **14**.

The ends of the passages **11** and **14** are sealed adjacent the openings **16** and **17** in the members **10** and **12**, respectively, by a cup-shaped closure member **18**. The member **18** is fixedly secured to the members **10** and **12**. With the members **15** and **18** sealing both ends of the passages **11** and **14**, a sterile container is provided for the liquid medication.

Considering the use of the dispensing device of FIG. **1**, the closure member **15** is removed from the upper end of the members **10** and **12**. When the patient sucks on the upper end of the tubular member **10**, air is introduced into the passage **14** in the member **12** whereby the liquid medication is sucked

through the upper end of the passage 11 into the patient's mouth.

This ensures that the entire and desired quantity of liquid medication will be received by the patient. If a child, for example, should cease to suck on the liquid medication before it is completely received by the child, the parent will recognize this when the members 10 and 12 are formed of a transparent material. Furthermore, by fitting the closure member 15 so as to require a substantial force for its removal from the members 10 and 12, a child cannot accidentally take the liquid medication.

The quantity of the liquid medication may be controlled by varying the diameter of the passage 11 in the member 10, the diameter of the passage 14 in the member 12, or the length of either member. Furthermore, while the auxiliary member 12 has been shown as a tubular member disposed on one side of the main member 10, it should be understood that the auxiliary member 12 could be an annular member surrounding the first or main member 10.

Referring to FIG. 2, there is shown a dispensing device comprising a single tubular member 20 having a passage 21 formed therein. The tubular member 20, which resembles a straw, may be formed of the same material as the members 10 and 12.

The upper end of the passage 21 in the tubular member 20 is sealed by a removal closure member 22. As with respect to the closure member 15, the closure member 22 is preferably fitted on the upper end of the tubular member 20 so as to not be capable of removal by a child. Furthermore, the closure member 22 is preferably formed of the same material as the closure member 15.

The lower end of the passage 21 is closed by a membrane 23. The membrane 23 is formed of a suitable material that will permit air to flow into the passage 21 when suction is applied at the upper end of the passage 21 while preventing the flow of liquid medication from the passage 21 through the membrane 23. One suitable example of member 23 is a silicone material sold by Dow Corning-Medical Products, Midland, Michigan under the trademark "SILASTIC."

The membrane 23 is retained on the end of the member 20 by a cup-shaped member 24, which is fixedly secured to the member 20. The cup-shaped member 24 has an opening 25 therein to permit communication of a portion of the membrane 23 with the atmosphere.

In order to prevent any accidental puncturing of the membrane 23 through the opening 25 in the cup-shaped member 24 and to seal the lower end of the passage 21, a cover or closure member 26 is removably mounted on the cup-shaped member 24. Thus, the removable closure member 26 ensures that the liquid medication remains within the passage 21 in the tubular member 20 until it is to be utilized and that there is no contamination of the liquid medication.

When the liquid medication in the passage 21 in the tubular member 20 is to be taken, the closure member 22 is removed and the closure member 26 also is removed. Then suction on the upper end of the passage 21 results in the liquid medication being sucked from the passage 21 due to the air flowing through the membrane 23. As previously mentioned, the membrane 23 prevents any flow of liquid medication therethrough.

Referring to FIG. 3, there is shown a dispensing device having a tubular member 30 with a passage 31 therein. The tubular member 30, which resembles a straw, may be formed of the same material as the members 10 and 12.

The upper end of the passage 31 is sealed by a removable closure member 32. The member 32 is preferably formed of the same material as the member 15 and requires a sufficient force for removal from the member 30 in the same manner as described for the members 15 and 22.

The lower end of the member 30 has a plurality of holes or openings 33 therein. The size of each of the openings 33, which provide communication between the atmosphere and the passage 31, is such that air may flow into the passage 31 but the liquid medication in the passage 31 will not flow through the openings or holes 33 due to the capillary action.

The holes 33 are sealed by a removable closure member 34, which is mounted on the tubular member 30 and preferably formed of the same material as the closure member 32. Furthermore, the tubular member 30 has its bottom end closed rather than being open as in the embodiments of FIGS. 1 and 2.

When the liquid medication within the tubular member 30 is to be taken, the closure members 32 and 34 are removed. Then, suction on the upper end of the passage 31 results in air being sucked through the holes or openings 33 into the passage 31. As a result, liquid medication is sucked through the upper end of the passage 31 into the mouth of the user. Because of the size of the openings or holes 33, the liquid medication will not flow outwardly therethrough during the short period of time in which the liquid medication is being taken.

Referring to FIG. 4, there is shown a dispensing device having a tubular member 40, which is preferably formed of the same material as the tubular members 10 and 12 and resembles a straw. The member 40 has a passage 41 extending therethrough.

A removable closure member 42 is mounted on the upper end of the tubular member 40 to seal the upper end of the passage 41. The member 42 is preferably formed of the same material as the closure member 15 and is not removable without sufficient force in the same manner as the member 15.

The lower end of the passage 41 is closed by a valve 43. The body of the valve 43 has slits 44 (see FIG. 5) formed therein to permit air to flow therethrough when suction is applied to the upper end of the passage 41. However, the slits 44 will not permit the flow of liquid medication from the passage 41 through the body of the valve 43.

A cup-shaped member 45 retains the valve 43 at the lower end of the passage 41. The cup-shaped member 45 is fixedly secured to the lower end of the member 40 and has an opening 46 therein to permit air to flow through the slits 44 in the valve 43 when suction is applied at the upper end of the passage 41.

A closure member 47 is removably mounted on the lower end of the tubular member 40. The closure member 47 seals the lower end of the tubular member 40 to ensure sterility of the liquid medication therein.

When the liquid medication in the passage 41 in the tubular member 40 is to be taken, the closure members 42 and 47 are removed. The, suction by the patient at the upper end of the passage 41 results in the liquid medication being sucked therethrough due to air flowing through the slits 44 in the valve 43.

The dosage of the liquid medication within the various dispensing devices of FIGS. 2 to 4 may be selected by varying the length of the tubular member or the diameter of the passage therein. In order that the tubular member resembles a straw, it is preferable to vary the diameter of the passage in the tubular member rather than the length of the tubular member. Furthermore, the concentration of the liquid medication may be varied to permit the desired dosage to be contained within the tubular member.

An advantage of this invention is that it ensures that the desired dose of liquid medication is administered. Another advantage of this invention is that liquid medication is easily administered to children and older persons. A further advantage of this invention is that the liquid medication remains sterile since there is no contamination thereof due to opening its container and using only a portion thereof. Still another advantage of this invention is that it provides a portable liquid-medication-dispensing device of relatively small size. A still further advantage of this invention is that it reduces hospital labor cost in dispensing liquid medication.

For purposes of exemplification, particular embodiments of the invention have been shown and described according to the best present understanding thereof. However, it will be apparent that changes and modifications in the arrangement and

construction of the parts thereof may be resorted to without departing from the spirit and scope of the invention.

We claim:

1. A device for dispensing a predetermined dose of liquid medication, said device comprising a member having a passage extending therethrough, said passage having a predetermined dose of liquid medication therein, removable means closing one end of said passage, second means at the other end of said passage permitting air to enter the other end of said passage when the user creates a suction at said one end of said passage to dispense the liquid medication from said member through said one end of said passage and preventing the escape of liquid medication from said other end of said passage, said second means being at all times pervious to air and at all times impervious to liquid, said predetermined dose of medication located between said one end of said passage and said second means and said predetermined dose of medication being in contact with said second means.

2. A device for dispensing a predetermined dose of liquid medication, said device comprising a tubular strawlike member having a passage extending therethrough, said passage having a predetermined dose of liquid medication therein, removable means closing one end of said passage and second means to permit air to enter the other end of said passage when the user creates a suction at said one end of said passage to dispense the liquid medication from said member through said one end of said passage, said second means preventing the escape of liquid medication from said other end of said passage, said second means including a second tubular strawlike member fixed securely to said first-mentioned member, said second member having a passage therein with one end communicating with the atmosphere, a cap simultaneously closing the other end of said passage in said second member and said other end of said passage in said first-mentioned member, means at all times connecting said passage in said second member with said passage in said first-mentioned member adjacent other end of each of said passages to permit air to flow from said passage in said second member to said passage in said first-mentioned member and said removable means also closing said one end of said passage in said second means.

3. A device for dispensing a predetermined dose of liquid medication, said device comprising a member having a passage extending therethrough, said passage having a predetermined dose of liquid medication therein, removable means closing one end of said passage and second means to permit air to enter the other end of said passage when the user creates a suction at said one end of said passage to dispense the liquid medication from said member through said one end of said passage, said second means preventing the escape of the liquid medication from said other end of said passage and said predetermined dose of medication between said one end of said passage and said second means, said second means including a plurality of openings formed in said member and connected with said passage adjacent said other end of said passage, each of said openings being of a size to allow flow of air into said passage while preventing the flow of liquid medication in said passage therefrom, and means removably mounted on said member to close said openings in said member.

4. A device for dispensing a predetermined dose of liquid medication, said device comprising a member having a passage extending therethrough, said passage having a predetermined dose of liquid medication therein, removable means closing one end of said passage and second means to permit air to enter the other end of said passage when the user creates a suction at said one end of said passage to dispense the liquid medication from said member through said one end of said passage, said second means preventing the escape of the liquid medication from said other end of said passage and said predetermined dose of medication between said one end of said passage and said second means, said second means including a valve disposed at said other end of said passage, means to return said valve at said other end of said passage, and means removably mounted on said member to prevent flow of air through said valve.

5. A device for dispensing a predetermined dose of liquid medication, said device comprising a member having a passage extending therethrough, said passage having a predetermined dose of liquid medication therein, removable means closing one end of said passage and second means to permit air to enter the other end of said passage when the user creates a suction at said one end of said passage to dispense the liquid medication from said member through said one end of said passage and said second means preventing the escape of the liquid medication from said other end of said passage and said predetermined dose of medication between said one end of said passage and said second means, said passage comprising a body having slits therein to allow airflow into said passage while preventing flow of the liquid medication in said passage therefrom.