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A LIQUID DISPENSING APPARATUS



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Field of Invention

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This invention relates to a liquid dispensing apparatus for dispensing liquid in a measured quantity or dosage. It can also be used for dispensing liquid so that wastage can be minimized or eliminated. Such a dispensing apparatus, for example, can be used in the medical industry to provide patients with liquid
10 medicine so that exact dosage of medicine is consumed without the need for a further measuring device such as a spoon. It is portable, disposable and reusable if it has not been hygienically contaminated.

Background of the Invention

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There are many forms of liquid dispensing apparatus that are known. One type of prior art dispenser typically dispenses liquids such as soap, liquor and beverages in indeterminate amounts or in rough amounts comprises a compressible bottle which is squeezed to pressurize the contents so as to
20 cause pressure differential at the spout end which is open to atmospheric pressure. The pressure difference causes the liquid to be dispensed but in an indeterminate amount. The dispensed amount is dependent on the squeeze pressure applied and the time for which it is applied. The main disadvantage is that a measured amount or dosage is not possible unless a further measuring
25 means is provided to measure the dispensed amount of liquid

Another prior art form of dispenser comprises a device with an internal cavity attached releaseably to a reservoir using spring-loaded means to dispense a predetermined amount of liquid. Such dispensers usually involve two
30 mechanical valves, one located at the dispensed end and the other at the dispensing end to achieve a desired liquid amount. An example of this is an automatic distilled water filler for topping up lead batteries in the automobile industry. A similar apparatus exists in the beverage industry for dispensing pegs of liquor. The disadvantage of such dispensers is that they are not simple

to construct as the present invention and have parts that can corrode with certain liquids. They are expensive and therefore not disposable.

According to the present invention, a gravity fed liquid dispensing apparatus is provided to overcome the above disadvantages. Further it is cheap and may be disposable after a specific use and is therefore hygienic.

Summary of the Invention

10 The object of the invention is to provide an inexpensive liquid dispensing apparatus to dispense liquid such that the liquid can be dispensed from a reservoir in measured amounts. For instance, in liquid medication a measure is usually a teaspoon or a tablespoon.

15 According to the invention a liquid dispensing apparatus for dispensing a measured quantity of a liquid comprising a tubular body consisting of a reservoir portion telescopically received within a dispensing portion and valve means arranged between the reservoir portion and the dispensing portion, said valve means being arranged to be opened to allow liquid to pass from the
20 reservoir portion to the dispensing portion by telescopically sliding the reservoir portion away from the dispensing portion.

The dispensing portion and, preferably, also the reservoir portion each have a removable closure means.

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In use of the apparatus, with the reservoir portion, which contains liquid, uppermost, the valve is opened to allow liquid to flow into the dispensing portion under the influence of gravity. When the prescribed or desired amount of liquid has been transferred, the valve is closed and the apparatus is inverted
30 so that the dispensing portion is uppermost. The closure member is removed from the dispensing portion and the measured amount of liquid can be drunk or used in some other way.

Preferably, the valve is a two part valve comprising a first, slidable part attached to the end of the reservoir portion within the dispensing portion and forming a sliding seal against the inner wall of the dispensing portion and a second, fixed part forming a seal against the inner wall of the dispensing
5 portion. Communication between the reservoir portion and the dispensing portion is preferably by way of a bore in the slidable part, a space between the two parts, when the valve is open, and a bore in the second part.

In order to ease flow between the two parts, an air vent preferably connects the
10 interior of the dispensing portion with the air space above the liquid in the reservoir portion.

Preferably, the air vent protrudes into the dispensing portion so that the amount of liquid that flows into the dispensing portion, and which stops flowing when
15 the liquid level therein reaches the end of the air vent, does not completely fill the dispensing portion so that when the dispensing portion is uppermost the liquid level lies below the rim and the closure member can be removed with reduced risk of spillage of the liquid in the dispensing portion.

20 In order that amounts that are less than the full capacity of the dispensing portion can be transferred, the reservoir portion and/or the dispensing portion may be provided with calibration marks indicative of the measured quantity and/or aliquots thereof.

25 By use of the invention, the measured liquid is flowed into a separate and sealed compartment and can be consumed without spillage. The need for a separate measuring apparatus is eliminated.

A further advantage is that the liquid dispensing apparatus minimizes wastage.
30 For example, a patient can be given a day's dosage in the apparatus without any excess. The said reservoir in the apparatus will contain that day's course of medication. Accidental spillage may occur during conventional pour and consume methods in which case an entire course of liquid medicine given in a

conventional medicinal bottle could be wasted. The invention is user friendly, especially to children.

5 Use of the invention also prevents accidental use of the liquid. If the apparatus is calibrated in the reservoir body and if, for instance, liquid medicine is to be consumed four times a day, then by midday, the user would have consumed half the reservoir and the calibrations would show that two doses have been taken. The level drop in the reservoir is cumulative for that day.

10 The invention provides a portable, reusable and disposable apparatus. A user, for instance, could take the apparatus to school or office with a day's supply of medicine. The apparatus is therefore within easy reach of the user. After the use has successfully administered a course of liquid medicine, the apparatus can be safely disposed without fear of contamination to others. Preferably, the
15 apparatus is constructed from biodegradable plastic material.

The invention provides a hygienic dispensing apparatus that is airtight and reduces liquid leakage from the apparatus or outdoor air contamination when not in use.

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Brief Description of the Drawings

The invention will now be described in greater detail, by way of example with reference to the drawings, in which:

25 Figure 1 is the general perspective view of the apparatus.

Figure 2 is a vertical section of the apparatus of Figure 1 with the valve opened.

Figure 3 is a vertical section of the apparatus of Figure 1 with the valve closed.

Figure 4 is a cross section of the apparatus of Figure 1 showing detail of valve
30 mechanism.

Figure 5 is a plan view of the apparatus of Figure 4 sectioned from X-X.

Detailed Description of the Invention

With reference to the drawings in one form the apparatus comprises a reservoir
5 (10) and a dispensing compartment (20), the reservoir (10) being telescopically
received to the dispensing compartment (20). The reservoir (10) comprises a
lateral cylindrical wall (11) and closure means (14) usually in the form of an
airtight reusable screw cap. Affixed rigidly, and preferably moulded integrally to
the lateral wall (11) is a plunger (17) having a first bore (12). The lateral wall of
10 this first part of apparatus can be calibrated with markings (19) to indicate, for
instance, 4 or more measures. The first plunger (17) is slideably attached to
the central air vent shaft (15) and extends slightly above that of the first
calibration marking (19) at the distal end of the vent shaft (15). The diameter of
the plunger (17), which is usually in a flat disc shape on its top end and convex
15 at its base end, is larger than the inner wall (11) diameter of the reservoir (10)
and forms a sliding seal on the inner wall of compartment (20).

The dispensing compartment (20) consist of lateral wall (25), and sealing
means (21), usually in the form of an airtight reusable cap. To the one side of
20 lateral wall (25) is rigidly affixed but preferably moulded as an integral piece of
a plunger seat (23) having a second bore (22). The plunger seat (23) has a
concave top surface corresponding to the convex surface of the plunger (17)
and a convex bottom surface. The plunger (17) and plunger seat (23) together
form a valve assembly. A further aperture is provided centrally through the
25 plunger seat (23) to allow the air vent shaft (15) to be rigidly attached to the
plunger seat (23). The distance this shaft protrudes into the dispensing
compartment (20) at its proximal end when the valve is open is exactly in line
with calibration marking (24) to indicate a single measure. The first bore (12) is
diametrically opposite to the second bore (22) in the preferred embodiment but
30 can be rotateably adjusted to an intermediary value, if desired, to speed up the
discharge of the liquid (16). To the top end of the lateral wall (25) is rigidly
affixed but preferably moulded to the wall, a stopper ring (13). The linear
length of the wall between calibration (24) and the stopper ring (13) determines
the size of the fluid aperture (26) between bore points (12) and (22) and is

usually fixed for a given apparatus. However, it can be made larger for higher viscosity liquids. Apparatus with a range of a fluid apertures (26) may be manufactured industrially. Alternatively, the stopper ring (13) may be raised or lowered by grooved locators (not shown) in preferred increments located along
5 the wall (25) to vary the aperture (26).

The method of operation will now be described. As shown in Figure 4, the first position of the apparatus is a sealed position whereby no liquid can flow between the reservoir (10) and dispensing compartment (20). Seal rings (not
10 shown) inserted between the contact surfaces of the plunger (17) and the plunger seat (23) can further augment the sealing. Other forms of surface sealing are also possible. The apparatus is activated to a second position, when the reservoir (10) is slideably retracted from the dispensing compartment (20) to the position shown in Figure 2. The liquid (16) flows under gravity
15 through the first bore (12), and fills up aperture (26). The liquid (16) then passes through second bore (22) into the dispensing compartment (20). As the liquid (16) fills up the said compartment (20), the air from this compartment is forced upward into the reservoir (10) via air vent shaft (15). The filling process proceeds until the liquid (16) reaches the proximal end of air vent shaft (15)
20 upon which the liquid (16) will stop flowing. When this equilibrium is reached, the reservoir (10) is slideably pushed back into the dispensing compartment (20) to its first position and the apparatus (1) is inverted. When the apparatus (1) is inverted, the now concave bottom surface of the plunger seat (23) facilitates a small amount of the liquid (6) to flow into the depressions at the
25 outer circumference and thus prevents spillage during dispensation. The liquid (16) remaining in aperture (26) will be drained back to the reservoir via bore (12). The closure means (21) is then removed and the dispensed liquid of one measure is now ready to be consumed or used. After consumption of the dispensed liquid, the apparatus is inverted back to its original position and
30 stored for future use.

The liquid (16) can be any forms of liquid such as medication, liquor, concentrated beverages, or liquid soap, but the amount measured will be

altered to a practical measure for the particular liquid used, for example, a teaspoon, or peg measure.

CLAIMS

1. Apparatus for dispensing a measured quantity of a liquid comprising:
5 a tubular body consisting of a reservoir portion telescopically received within a dispensing portion;
valve means arranged between the reservoir portion and the dispensing portion, said valve means being arranged to be opened to allow liquid to pass from the reservoir portion to the dispensing portion by telescopically sliding the
10 reservoir portion away from the dispensing portion; and
an air vent arranged to extend, in use, from the dispensing portion into an air space above the liquid level in the reservoir portion.
2. Apparatus according to claim 1, wherein the valve is formed in two parts; a first
15 slidable part being attached to the end of the reservoir portion within the dispensing portion and forming a sliding seal against the inner wall of the dispensing portion and a second fixed part forming a fixed seal against the inner wall of the dispensing portion.
- 20 3. Apparatus according to claim 2 wherein communication between the reservoir portion and the dispensing portion is made through a bore in the slidable valve part, a space that is formed between the two valve parts when the valve is opened and a bore in the fixed valve part.
- 25 4. Apparatus according to claim 3, wherein the end of the air vent in the dispensing portion is positioned at a level such that when the measured quantity of liquid has entered the dispensing portion, the liquid closes the air vent to stop flow of liquid.
- 30 5. Apparatus according to any one of claims 1 to 4, wherein the reservoir portion is fitted with a removable closure member.

6. Apparatus according to any one of claims 1 to 5 which is made of a biodegradable polymer material.

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7. Apparatus according to any one of claims 1 to 6, wherein the reservoir portion and/or dispensing portion carries calibration marks corresponding to the measured quantity of liquid and/or aliquots thereof.