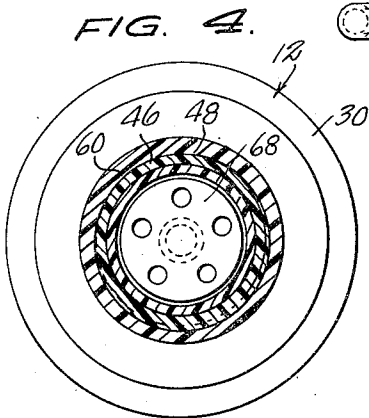
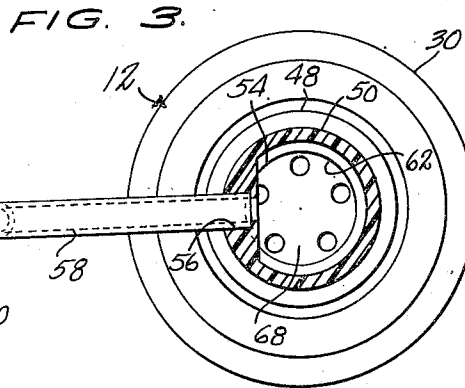
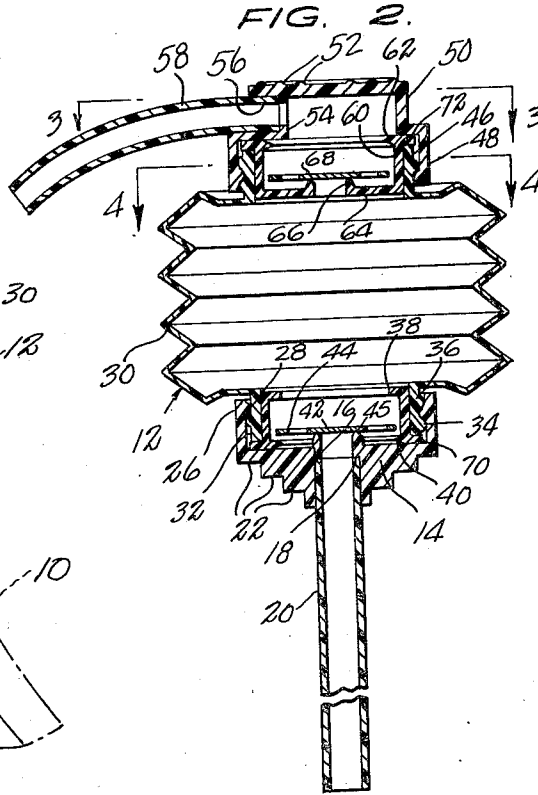
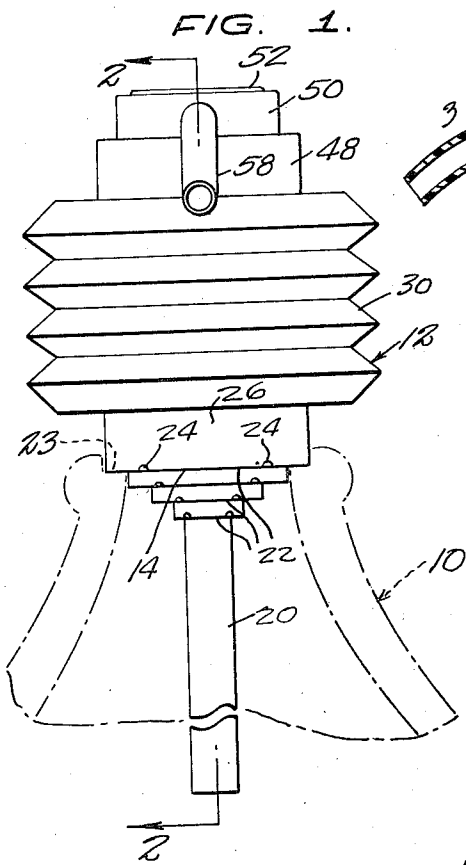


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J. A. WERSCHING
LIQUID DISPENSING PUMP
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INVENTOR.
JACOB A. WERSCHING,
BY

McMarow, Bertram & Davidson
ATTORNEYS

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LIQUID DISPENSING PUMP

Jacob A. Wersching, Chicago, Ill.

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The present invention relates to dispensers for liquids, of the type adapted to be applied to the open end of containers such as wine jugs, large milk bottles, etc.

Many containers are so designed that the pouring of the contents therefrom presents considerable difficulties. This is true, for example, of milk bottles of half gallon and gallon sizes, and also, for that matter, of the more usual quart sizes. The same is true with respect to large bottles containing wine, and, in fact, difficulties are presented in pouring liquids from many other types of containers used in the household, factories, pharmaceutical laboratories, etc.

The main object of the present invention is to provide a compact, easily operable, pump type dispenser which can be seated upon the mouth end of any of various liquid containers, and which can be readily operated for the purpose of dispensing liquid from the container without the necessity of tilting, lifting, or otherwise handling the container. In this way, it is proposed to insure to the maximum extent against accidental spillage of the container, or dropping of the same. For example, in many families, from an economical standpoint it is desirable to buy milk in gallon or half gallon sizes. However, the necessity of lifting and tilting the bottle to pour each glass of milk is a hardship and a considerable inconvenience for adults, and is almost impossible for small children. The invention, in this regard, is so designed as to permit the dispensing of the milk from the container with maximum ease and facility, by a practical, relatively inexpensive pump type dispensing means, and, in fact, the device is so fashioned as to provide enjoyment for small children arising from the operation of the dispenser, thus encouraging the drinking of greater amounts of milk by the children than has heretofore been the case.

A more specific object of the invention is to provide a pump type dispensing means for containers which will be so designed as to fit on any of various containers, the mouths of which differ in diameter.

Still another object is to provide a dispensing means of the nature referred to that will be particularly designed for fabrication at relatively low cost, considering the benefits to be derived from use of the device.

Yet another object is to form the dispensing means in a manner such that it will be adapted to be cleaned easily, due to a design thereof facilitating assembly and disassembly, with the relative formation and arrangement of the parts being such as to insure against loss of small components of the device, such as valve discs.

Still another object is to provide a device of the nature referred to which will be adapted to reduce to a minimum the displacement of the liquid within the bottle occurring when the device is seated upon the bottle or other container, so that there will be no overflow of the bottle contents, even when the same is full.

Still another object is to provide a dispensing pump as stated which will add only a relatively small amount of height to the bottle, thus providing a compact, neat,

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appearance with the device being adapted to remain upon the bottle when the same is stored in a refrigerator or elsewhere, without the device taking up any more than a small amount of space.

Other objects will appear from the following description, the claims appended thereto, and from the annexed drawing, in which like reference characters designate like parts throughout the several views, and wherein:

Figure 1 is a front elevational view of a dispensing device formed according to the present invention, a portion of the inlet tube being broken away, a container on which the device is seated being illustrated fragmentarily and in dotted lines;

Figure 2 is a longitudinal sectional view through the device on line 2—2 of Figure 1;

Figure 3 is a plan sectional view on line 3—3 of Figure 2; and

Figure 4 is a transverse sectional view on line 4—4 of Figure 2.

Referring to the drawings in detail, the reference numeral 10 has been generally applied to a container, the contents of which are to be dispensed by use of the pump 12 constituting the present invention. The container can be of any size or type, and can hold any liquid the dispensing of which, without lifting or tilting of the container, is desired.

The pump 12 includes a lower end cap 14, which can be molded of various materials, although it is presently preferred that all components of the device, with the exception of a pair of valve discs to be described hereinafter, be formed from a flexible type of plastic, such as polyethylene. Plastic of this type, wherever thickened to a predetermined extent, tends to hold its shape, and is well adapted for use in the invention.

The lower end cap 14 includes a vertical center bore 16, the lower end portion of which is counterbored to define a downwardly facing, internal shoulder 18 against which bears the upper end of an elongated inlet tube 20 the length of which is selected to cause the same to extend well into the bottle, preferably to the lower end thereof.

Externally formed upon the lower end cap are downwardly facing, concentric, annular shoulders 22, in a stepped series. The provision of the shoulders permits the device to seat upon the mouth or neck end of any of various containers 10 having different diameter mouths. Thus, in the illustrated example, the uppermost shoulder 22, that is, the shoulder of greatest diameter, seats upon the annular recess 23 conventionally formed upon the neck of a milk bottle, for the purpose of receiving the closure cap of the bottle. On removal of the closure cap, the inlet tube 20 is extended into the bottle, with shoulder 22 bearing against the shoulder 23 of the container. If the mouth of the bottle is of smaller diameter, one of the other shoulders 22 would seat upon the upper end of the bottle.

Formed in each shoulder is a series of radially extending recesses 24 opening upon the side wall of the lower end cap. In a preferred embodiment, but not necessarily, three recesses 24 can be provided in each shoulder, extending fully from the outer to the inner periphery of the shoulder, said recesses of each shoulder being angularly spaced 120 degrees from each other. The recesses of the several shoulders can be aligned radially of the lower end cap although this is not essential.

The recesses provide vents, to allow air to enter the bottle during the pumping operation, to replace the liquid drawn from the container by operation of the invention.

Formed upon the outer periphery of the lower end cap is an upwardly projecting, annular flange 26, having coarse or quick internal threads 28.

A bellows has been designated at 30, and includes a cy-

lindrical, depending neck 32 at its lower end formed with external threads 34 engaging threads 28. Removably fitted into the neck 32 is a cylindrical valve retainer insert 36, the inner end of which is formed with a continuous, inwardly directed, circumferential flange 38. An inwardly directed retaining lip 40 is extended circumferentially of the lower or outer end of the insert 36, and freely movable axially of the insert between flange 38 and lip 40 is a flat, circular, thin, plastic valve disc 42, having a circumferential series of apertures 44 to facilitate passage of liquid therethrough when the disc is unseated. The disc has an imperforate center portion seating upon an upwardly projecting annulus 45 integrally formed upon the inner surface of the lower end cap to provide for a valve seat that will permit the valve disc to be properly disposed, when in its bore-closing position, above the lower end of the insert 36.

The valve disc 42 constitutes an inlet check valve means for the pumping device, which means, when the disc is unseated, permits its flow of the liquid through the inlet tube 20 into the bellows 30, but prevents return flow.

At its upper or outer end, the bellows 30 has a cylindrical neck 46 externally threaded to engage internal threads of a depending, circumferential flange 48 formed upon an upper end cap 50. Cap 50 has a top wall formed with a series of concentric, annular ribs 52, and integrally formed within the cap 50 is a thickened portion 54 (see Figure 3), having a radial opening 56 communicating with the interior of the cap 50 and receiving the inner end of a spout or outlet tube 58.

An outlet check valve retainer insert 60 is formed at one end thereof with an inwardly directed, circumferential lip 62. At the other or inner end of insert 60 there is formed an inwardly directed flange 64 centrally apertured and having an annulus 66 surrounding the center aperture thereof, on which annulus there is seated a valve disc 68 formed similarly to the disc 42. Disc 68 provides an outlet check valve, which permits flow of liquid out of the bellows into the spout 58, while preventing return flow.

In use of the device, the pump is seated upon the container 10 in the manner previously described, and it is then merely necessary that one exert downward pressure upon the ribbed end wall of the upper cap 50. The downward pressure compresses bellows 30, and this will tightly seat valve disc 42 against annulus 45, since initially, air tends to compress within the bellows 30. At the same time, valve disc 68 is unseated, permitting escape of the air that would otherwise be compressed within the bellows 30, through the spout 58. On release of the cap 50, the resiliency of the material of the bellows causes the same to expand to its normal position. As air rushes through the spout 58, valve disc 68 seats tightly against the annulus 66. Therefore, to replace the air previously drawn out of the bellows 30, the valve disc 42 lifts, causing liquid to be drawn up through the inlet tube 20 into the bellows.

On the next compression stroke, the liquid within the bellows 30 will be forced upwardly, unseating valve disc 68 and flowing out through spout 58, with said compression stroke resulting, in the manner previously described, in seating of the inlet check valve disc 42.

The operation is continued until a selected amount of the liquid is dispensed, and it will be seen that a rapid, easy dispensing of the liquid is achieved without tilting or lifting of the container. In actual use, the repeated downward pressures exerted by the user against the upper end cap follow in comparatively rapid succession, so as to cause a speedy dispensing of the desired amount of the liquid.

The device can be left upon the container, awaiting its next use, without occupying any more than a relatively small amount of space in a refrigerator or other storage area. Further, the device can be swiftly disassembled for cleaning, since the end caps unthread from the necks of the bellows, permitting relative separation of the end caps, bellows, and valve inserts, the valve inserts being so

designed as to fall out of the necks of the bellows whenever the end caps are removed.

In this connection, as shown in Figure 2, the valve inserts 36, 60 are respectively formed, at their outer ends, with outwardly directed flanges 70, 72 respectively, which are tightly engaged between the necks of the bellows and the end caps.

It will be seen that the device provides for a considerable saving in time, accompanied by ease of dispensing, and this is particularly desirable in households, since relief of the time-consuming task of pouring milk, fruit juices, etc. is afforded. The device also has general utility, being usable in industries, laboratories, etc., for the dispensing of chemicals and even acids.

Further, the device is particularly designed to eliminate the possibility of overflow of the bottle contents, due to the relatively minute quantity of liquid displaced by the wall thickness of the inlet tube 20.

In a commercial embodiment, the inlet tube would be of a length such that it will reach the bottom of the deepest bottle for which the normal use of the device is contemplated. For bottles of less depth, the flexible inlet tube can be cut to the proper length easily, with a knife or scissors.

It is believed apparent that the invention is not necessarily confined to the specific use or uses thereof described above; since it may be utilized for any purpose to which it may be suited. Nor is the invention to be necessarily limited to the specific construction illustrated and described, since such construction is only intended to be illustrative of the principles, it being considered that the invention comprehends any minor change in construction that may be permitted within the scope of the appended claims.

What is claimed is:

1. A pump type device for dispensing liquids from containers, comprising: means supportable on the container including a lower end cap adapted for seating on the mouth end of the container, an upper end cap, and a bellows connected between said caps; an inlet tube projecting from the lower end cap for extension into said container; a dispensing spout extending from the upper end cap; and inlet and outlet check valves within the lower and upper end caps, respectively.

2. A pump type device for dispensing liquids from containers, comprising: means supportable on a container and including a lower end cap adapted for seating on the mouth end of the container, an upper end cap, and a bellows detachably connected to and extending between said caps; an inlet tube projecting from the lower end cap for extension into said container; a dispensing spout extending from the upper end cap; and inlet and outlet check valves within the lower and upper end caps, respectively.

3. A pump type device for dispensing liquids from containers, comprising: means supportable on a container and including a lower end cap adapted for seating on the mouth end of the container, an upper end cap, and a bellows detachably connected to and extending between said caps; valve retainer inserts removably engaged in the respective caps; an inlet tube depending from the lower end cap, for extension into said container; a dispensing spout extending from the upper end cap; and inlet and outlet check valves within the respective valve retainer inserts.

4. A pump type device for dispensing liquids from containers, comprising: means supportable on a container and including a lower end cap adapted for seating on the mouth end of the container, an upper end cap, and a bellows detachably connected to and extending between said caps, said bellows being under tension tending to normally expand the same, and being manually compressible against the restraint of said tension, responsive to downward pressure exerted by a user on the upper end cap; valve retainer inserts removably engaged in the respective caps; an inlet tube depending from the lower end cap, for extension into said container; a dis-

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dispensing spout extending from the upper end cap; and inlet and outlet check valves within the respective valve retainer inserts.

5. A pump type device for dispensing liquids from containers, comprising: means supportable on the container including a lower end cap adapted for seating on the mouth end of the container, an upper end cap, and a bellows connected between said caps; an inlet tube projecting from the lower end cap for extension into said container; a dispensing spout extending from the upper end cap; and inlet and outlet check valves within the lower and upper end caps, respectively, said lower end cap being formed with downwardly facing, concentric, annular shoulders a selected one of which seats upon said mouth end of the container according to the particular diameter of said mouth end.

6. A pump type device for dispensing liquids from containers, comprising: means supportable on the container including a lower end cap adapted for seating on the mouth end of the container, an upper end cap, and a bellows connected between said caps; an inlet tube projecting from the lower end cap for extension into said container; a dispensing spout extending from the upper end cap; and inlet and outlet check valves within the lower and upper end caps, respectively, said lower end cap being formed with downwardly facing, concentric, annular shoulders a selected one of which seats upon said mouth end of the container according to the particular diameter of said mouth end, each of said shoulders being formed with a series of radially extending recesses, to vent the interior of the container to atmosphere.

7. A pump type device for dispensing liquids from a container having an open mouth end, comprising: means supportable on a container and including a lower end cap adapted for seating on the mouth end of the container, an upper end cap, and a bellows detachably connected to and extending between said cap, said bellows being under tension tending to normally expand the same and being manually compressible against the restraint of said tension, responsive to downward pressure exerted by a user on the upper end cap; valve retainer inserts removably engaged in the respective caps, said inserts each including a pair of inwardly directed flanges spaced axially of the insert; an inlet tube depending from the lower end cap for extension into said container; a dispensing spout extending from the upper end cap; and inlet and outlet check valves discs freely movable axially of the respective valve retainer inserts between said flanges.

8. A pump type device for dispensing liquids from a container having an open mouth end, comprising: means supportable on a container and including a lower end cap adapted for seating on the mouth end of the container, an upper end cap, and a bellows detachably connected to and extending between said cap, said bellows being under tension tending to normally expand the same and being manually compressible against the restraint of said tension, responsive to downward pressure exerted by a user on the upper end cap; valve retainer inserts removably engaged in the respective caps, said inserts each including a pair of inwardly directed flanges spaced axially of the insert; an inlet tube depending from the lower end cap

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for extension into said container; a dispensing spout extending from the upper end cap; and inlet and outlet check valves discs freely movable axially of the respective valve retainer inserts between said flanges, the lower end cap having an annular valve seat projecting interiorly of the bellows, on which seat the valve disc of the associated retainer insert is normally supported, the insert of the upper end cap having an annular seat for the other valve disc, projecting exteriorly of the bellows.

9. A pump type device for dispensing liquids from a container having an open mouth end, comprising: means supportable on a container and including a lower end cap adapted for seating on the mouth end of the container, an upper end cap, and a bellows detachably connected to and extending between said cap, said bellows being under tension tending to normally expand the same and being manually compressible against the restraint of said tension, responsive to downward pressure exerted by a user on the upper end cap; valve retainer inserts removably engaged in the respective caps, said inserts each including a pair of inwardly directed flanges spaced axially of the insert; an inlet tube depending from the lower end cap for extension into said container; a dispensing spout extending from the upper end cap; and inlet and outlet check valves discs freely movable axially of the respective valve retainer inserts between said flanges, the lower end cap having an annular valve seat projecting interiorly of the bellows, on which seat the valve disc of the associated retainer insert is normally supported, the insert of the upper end cap having an annular seat for the other valve disc, projecting exteriorly of the bellows, each of said valve discs having an imperforate center portion adapted to engage against the associated valve seat, each disc having a marginal series of apertures to permit the passage of liquid through the valve disc in the unseated position thereof.

10. A pump-type device for dispensing liquids from containers, comprising: a bellows having axially aligned inlet and outlet openings at its opposite ends; hollow end caps connected to the respective ends of the bellows in communication with the interior of the bellows through said openings, said caps respectively having intake and discharge openings; an inlet tube and a dispensing spout connected to the respective end caps in communication with the respective end cap openings, said tube, spout, end caps and bellows forming a continuous flow passage for liquid to be dispensed, the end cap to which the inlet tube is connected being formed to seat on the mouth end of the container; and inlet and outlet check valves seated in the respective end caps to control flow of liquid into and out of the bellows through the inlet and outlet openings, respectively, of the bellows.

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