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LIQUID DISPENSING DEVICE

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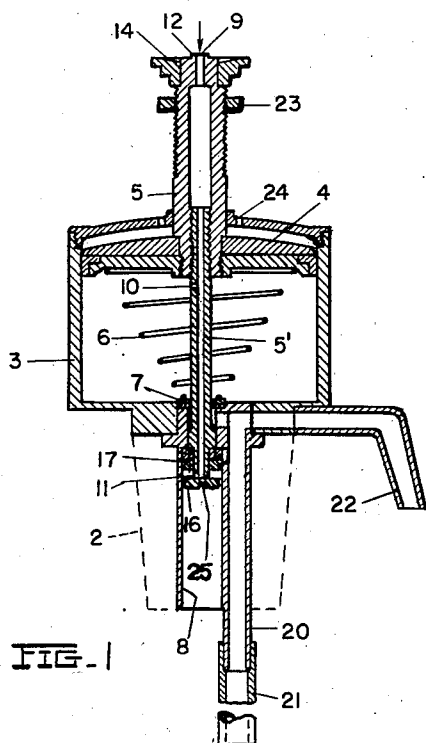


FIG. 1

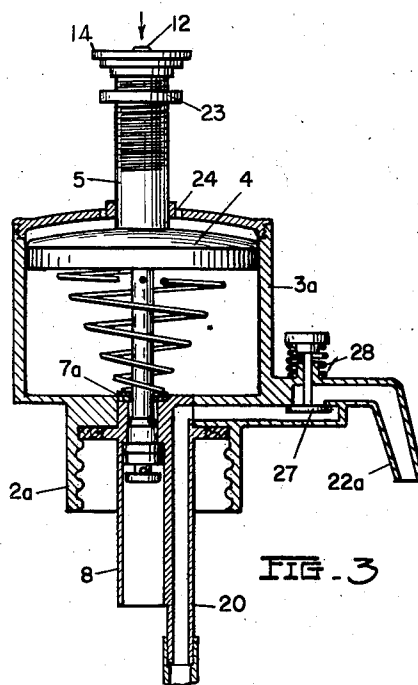


FIG. 3

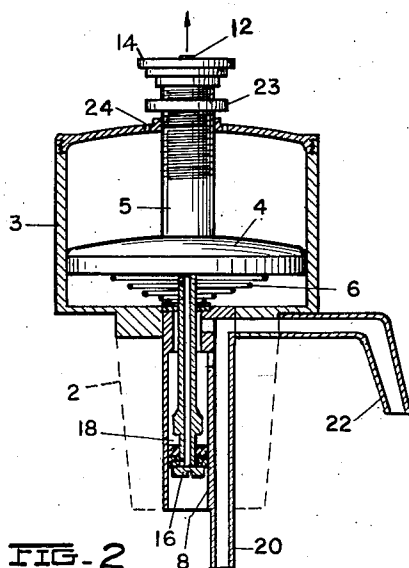


FIG. 2

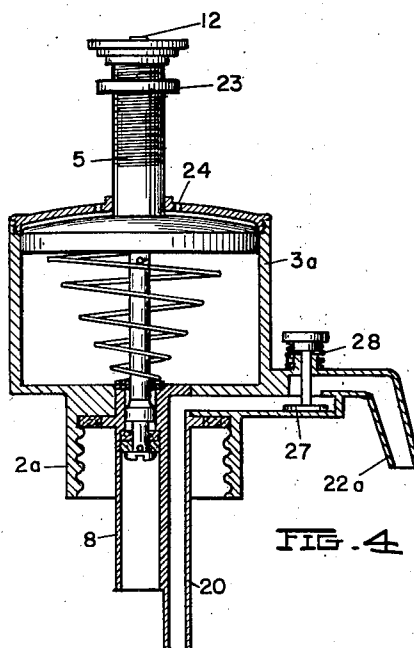


FIG. 4

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LIQUID DISPENSING DEVICE

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10 Claims. (Cl. 221-147)

For dispensing liquids, as beverages, flavoring extracts, etc., the known practice involves a device on the top of the container from which the liquid is to be dispensed, the structure being such that the device discharges liquid with the container in normal position. A different size of dispenser has been required for different sizes of containers, and even where the size of the dispenser has been properly adapted to the size of the container, it has not always been possible to attain a uniformly even charge of liquid as drawn from the container. In accordance with the present invention however, it now becomes possible to provide a dispenser which is equally applicable to large and small containers, and the discharge may be controlled with precision, as desired.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described, and particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail certain illustrative embodiments of the invention, these being indicative however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawing:

Fig. 1 is a vertical sectional view showing an embodiment of the invention, the working parts being shown in a position just after the plunger is started on its downward excursion; Fig. 2 shows a similar view with the working parts in a position just after the plunger has started on its upward excursion; and Figs. 3 and 4 are analogous views respectively of a modification.

The device is arranged to be secured to the opening of a container of the liquid which is to be dispensed, and the same device may be applied to a wide range of containers, by having the cork 2, Fig. 1, which fits over the central tubular extensions of the device, and by an appropriate size of outside diameter of the cork 2, applied with respect to the size of the opening of the container to be fitted, the device may be interchanged from one container to another as desired; or where the container is of screw-threaded form at the opening, a screw-threaded sleeve 2a is analogously fitted to the dispensing device, the attachment being attached thereto by its upper end for interchangeability, or it may be more simply cemented until removed, the sleeve 2a in every case being of a size in view of the chosen container with which it is to be assembled. On the stopper as indicated,

is a cylinder 3, within which a piston 4 is reciprocable, as carried by a manually-operated plunger 5 and being normally in raised position by a spring 6. The lower end of the plunger extends on through the bottom of the cylinder, through a suitable packing 7, and is reciprocable in a duct 8 which is open into the top of the container. Through the plunger an air pass-way extends from a port 9 at the upper end, and a port 10 just below the piston communicates with the interior of the cylinder, while a port 11 at the lower end of the plunger communicates with the space above the liquid in the top of the container. The port 9 is preferably surrounded by a raised margin 12, such that when the finger or thumb of an operator is placed thereagainst to push the plunger down, a tight seal or valve action is assured, and preferably also the top of the plunger surrounding the raised margin 12 is recessed or depressed as at 14, thus further facilitating fit and accurate closure of the port as the plunger is pushed down by the operator's thumb or finger; and the release thereof as necessitated to permit the spring 6 to again raise the plunger inherently provides the opening of the port on upward stroke. The port 10 below the piston 4 is always open to the cylinder. The port 11 at the lower end of the plunger however is alternately opened and closed. A feature of the present invention, obviating complication of structure, is the provision of operating means for this port valve controlled by the same plunger. Thus, the port 11 may be directed laterally just above an expanded head 16 forming the lower end of the plunger, and a valve sleeve 17 may be carried on the plunger to uncover and cover the port in appropriate timing. With an upper shoulder 18 on the plunger spaced from the head 16 in dimension sufficiently greater than the thickness of the valve 17 (which may be in one or more parts as desired) there is sufficient lost-motion to allow the valve when it is in its upper position against the upper shoulder 18 to entirely uncover the port 11 as shown in Fig. 1. When the valve is in its lower position against the head 16 the port 11 is closed, Fig. 2. Thus, by the frictional drag of the valve sleeve against the walls of the duct 8, when the plunger is pushed downwardly the valve 17 is not moved until the shoulder 18 of the plunger catches up with it, and the lost motion allows the port 11 to travel out below the valve and open, and through the remainder of the down stroke the port 11 remains open. When the reverse move-

ment starts however, the frictional drag of the valve against the walls of conduit 8 allows the plunger to first move through the range of lost-motion permitted until the head 16 of the plunger engages the valve and carries it along, the port 11 thereby being closed for the upward stroke.

Extending through the stopper from the liquid is a liquid conduit 20, and for adapting to containers of different depth, it is convenient to have a telescoping or interchangeable tube section 21 to extend to the lowermost portion of the liquid to be withdrawn. The liquid duct 20 communicates with a discharge nozzle 22 at the outside.

In using the device, with a cork 2 of appropriate size in view of the container, the device is secured to the opening of the container, and the operator by pushing the plunger down, the finger or thumb used therefor being necessarily placed over the port 9, escape of the air within the cylinder being thereby prevented, the air is forced by the piston 4 on through the port 11 into the container above the liquid, the port 11, as already seen, being automatically uncovered with the beginning of the down stroke of the plunger. Liquid is displaced from the container and flows out through the duct 20 and discharge nozzle 22 correspondingly. The amount of liquid discharged per stroke may be regulated as desired, by adjusting the length of stroke. This may be accomplished with precision by an adjustable stop 23, screw-threaded on the plunger 5. The inactive space above the piston 4 is in communication with the atmosphere by vents 24. Particularly conveniently, the plunger 5 may be made in sections, as 5, 5' which are assembled together by a screw-threaded joint, and a slot 25 in the head of the section 5a permits use of a screwdriver for the assembling and disassembling.

In some instances, instead of regulating the amount of liquid discharged by adjustment of the stroke, it is desirable to exercise control by a manually-operated valve 27 leading to the discharge nozzle 22a, Figs. 3 and 4. With this, a somewhat greater latitude of discharge may be permitted, where desired. Normally, the valve 27 is held in closed position by a spring 28. Downward pressure on the valve serves to open the same for discharge as desired.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims, or the equivalent of such, be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A liquid dispenser, comprising a stopper for a container, a cylinder thereon, a liquid duct leading from the lower portion of the container through the stopper to a discharge nozzle outside, a duct leading to the upper part of the container through the stopper, a manually-operated plunger extending through said cylinder into the duct, said plunger being in assemblable sections with a screw-threaded joint and having a screwdriver slot in the end of the lower section, an air passway through said plunger having an opening into the cylinder and a manually-controlled port at the outside end of the plunger and a port at the lower end of the plunger, said manually-controlled port having a raised margin and being surrounded by a depression, a valve sleeve at the lower end of the plunger having limited axial movement to uncover the lower port as the

plunger starts down and to cover the port as the plunger starts up, a piston operated by said plunger in the cylinder, and a screw-threadedly adjustable stop on said plunger for controlling the amount of liquid discharged.

2. A liquid dispenser, comprising a stopper for a container, a cylinder thereon, a liquid duct leading from the lower portion of the container through the stopper to a discharge nozzle outside, a duct leading to the upper part of the container through the stopper, a manually-operated plunger extending through said cylinder into the duct, an air passway through said plunger having an opening into the cylinder and a manually-controlled port at the outside end of the plunger and a port at the lower end of the plunger, said manually-controlled port having a raised margin and being surrounded by a depression, a valve sleeve at the lower end of the plunger having limited axial movement to uncover the lower port as the plunger starts down and to cover the port as the plunger starts up, a piston operated by said plunger in the cylinder, and a screw-threadedly adjustable stop on said plunger for controlling the amount of liquid discharged.

3. A liquid dispenser, comprising a stopper for a container, a cylinder thereon, a liquid duct leading from the lower portion of the container through the stopper to a discharge nozzle outside, a duct leading to the upper part of the container through the stopper, a manually-operated plunger extending through said cylinder into the duct, an air passway through said plunger having an opening into the cylinder and a manually-controlled port at the outside end of the plunger and a port at the lower end of the plunger, a valve sleeve at the lower end of the plunger having limited axial movement to uncover the lower port as the plunger starts down and to cover the port as the plunger starts up, a piston operated by said plunger in the cylinder, and a screw-threadedly adjustable stop on said plunger for controlling the amount of liquid discharged.

4. A liquid dispenser, comprising a stopper for a container, a cylinder thereon, a liquid duct leading from the lower portion of the container through the stopper to a discharge nozzle outside, a duct leading to the upper part of the container through the stopper, a manually-operated plunger extending through said cylinder into the duct, an air passway through said plunger having an opening into the cylinder and a manually-controlled port at the outside end of the plunger and a port at the lower end of the plunger having limited axial movement to uncover the lower port as the plunger starts down and to cover the port as the plunger starts up, a piston operated by said plunger in the cylinder, and a manually-controlled valve in the discharge nozzle outside said cylinder.

5. A liquid dispenser, comprising a stopper for a container, a cylinder thereon, a liquid duct leading from the lower portion of the container through the stopper to a discharge nozzle outside, a duct leading to the upper part of the container through the stopper, a manually-operated plunger extending through said cylinder into the duct, an air passway through said plunger having an opening into the cylinder and a manually-controlled port at the outside end of the plunger and a port at the lower end of the plunger, a valve sleeve at the lower end of the plunger having limited axial movement to uncover the lower port as the plunger starts down

and to cover the port as the plunger starts up, a piston operated by said plunger in the cylinder, and means for controlling the amount of liquid discharged.

6. A liquid dispenser, comprising a stopper for a container, a cylinder thereon, a liquid duct leading from the lower portion of the container through the stopper to a discharge nozzle outside, a duct leading to the upper part of the container through the stopper, a manually-operated plunger extending through said cylinder into the duct, said plunger being in sections screw-threadedly joined, an air passway through said plunger having an opening into the cylinder and a manually-controlled port at the outside end of the plunger surrounded by a raised margin and a depression, a valve-controlled port at the lower end of said plunger, including a lost-motion valve, a piston operated by said plunger in the cylinder, and means for controlling the amount of liquid discharged.

7. A liquid dispenser, comprising a stopper for a container, a cylinder thereon, a liquid duct leading from the lower portion of the container through the stopper to a discharge nozzle outside, a duct leading to the upper part of the container through the stopper, a manually-operated plunger extending through said cylinder into the duct, said plunger being in sections screw-threadedly joined, an air passway through said plunger having an opening into the cylinder and a manually-controlled port at the outside end of the plunger, a valve-controlled port at the lower end of said plunger, including a lost-motion valve, a piston operated by said plunger in the cylinder, and means for controlling the amount of liquid discharged.

8. A liquid dispenser, comprising a stopper for a container, a cylinder thereon, a liquid duct leading from the lower portion of the container

through the stopper to a discharge nozzle outside, a duct leading to the upper part of the container through the stopper, a manually-operated plunger extending through said cylinder into the duct, an air passway through said plunger having an opening into the cylinder and a manually-controlled port at the outside end of the plunger, a valve-controlled port at the lower end of said plunger, including a lost-motion valve, a piston operated by said plunger in the cylinder, and means for controlling the amount of liquid discharged.

9. A liquid dispenser, comprising a stopper for a container, a cylinder thereon, a liquid duct leading from the lower portion of the container through the stopper to a discharge nozzle outside, a duct leading to the upper part of the container through the stopper, a manually-operated plunger extending through said cylinder into the duct, an air passway through said plunger having an opening into the cylinder and a manually-controlled port at the outside end of the plunger and a port at the lower end, a lost-motion valve controlling said last-named port, and a piston operated by said plunger in the cylinder.

10. A liquid dispenser, comprising a stopper for a container, a cylinder thereon, a liquid duct leading from the lower portion of the container through the stopper to a discharge nozzle outside, a duct leading to the upper part of the container through the stopper, a manually-operated plunger extending through said cylinder into the duct, an air passway through said plunger having an opening into the cylinder and at its upper and lower ends, a valve controlling the port at the lower end, and a piston operated by said plunger in the cylinder.

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