Jan. 7, 1958 J. T. JONES 2,818,998

DISPENSER INCORPORATING AIR-EXHAUST MEANS FOR USE WITH SEMI-FLUID MATERIALS

Filed Jan. 26, 1956

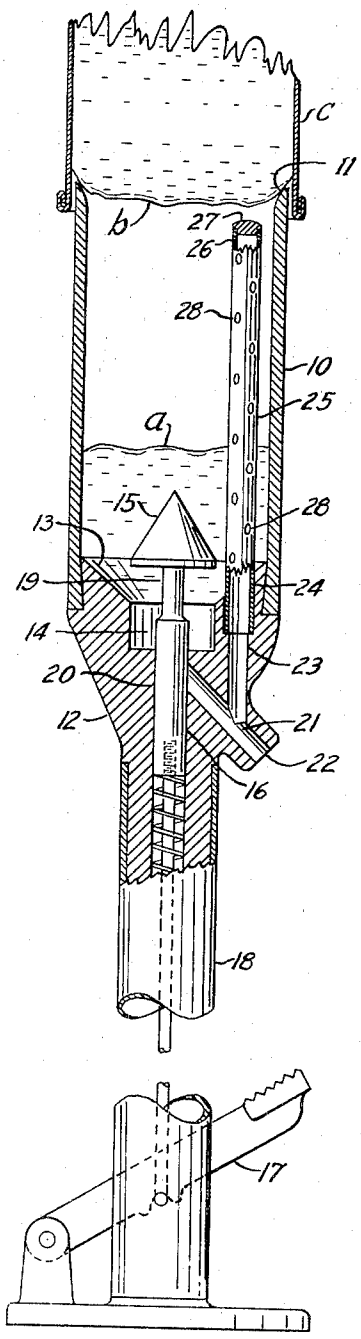


FIG. 1

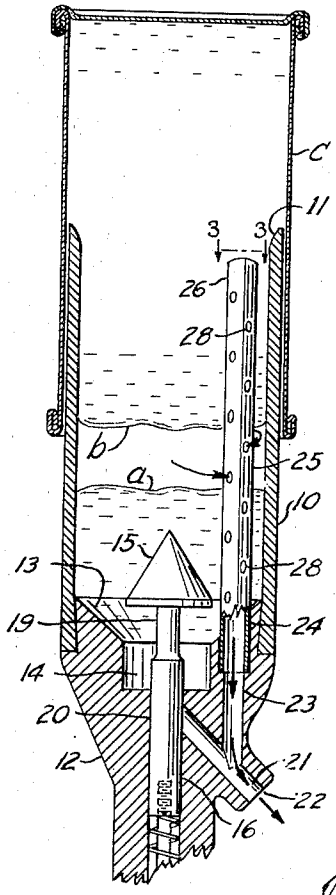


FIG. 2

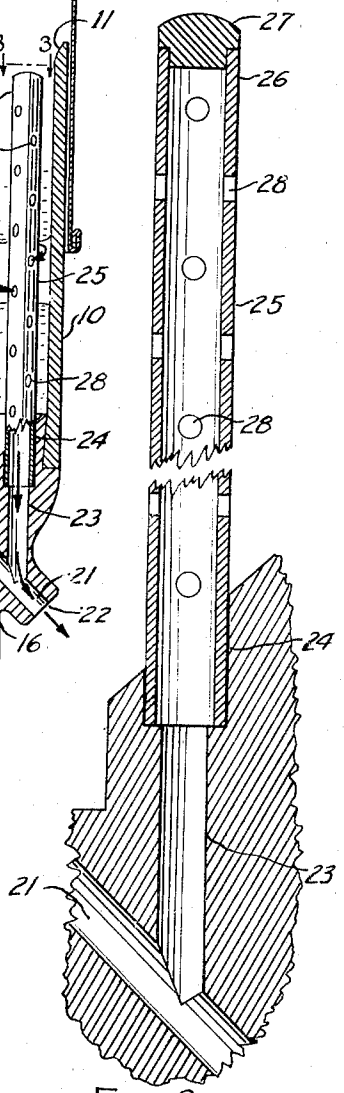


FIG. 3

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2,818,998

Patented Jan. 7, 1958

2,818,998

DISPENSER INCORPORATING AIR-EXHAUST MEANS FOR USE WITH SEMI-FLUID MATERIALS

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Application January 26, 1956, Serial No. 561,705

7 Claims. (Cl. 222—179)

This invention relates to dispensers for semi-fluid substances, particularly semi-fluid cream-like hand cleaners and soaps; and is directed particularly to providing improved air-exhaust means for a dispenser of the type shown in my co-pending application Serial No. 191,604 filed October 23, 1950, now Patent No. 2,751,124.

In this application the term "semi-fluid" refers to substances having the consistency of ordinary hand creams and ointments. Such substances, though they flow fluid-like under substantial pressure, do not flow under their own weight when handled in ordinary quantities at room temperature. Whether or not they are viscous, their essentially semi-fluid qualities prevent them from being handled in the same manner as ordinary fluids; for example, they cannot be poured into a dispenser.

In refilling a partly-full dispenser of the type described in my co-pending application, there is presented the problem of evacuating air between the level of the contents already present in the dispenser and the new quantity of material to be added thereto. Unless such air is evacuated, a dispenser of such type will not function uninterruptedly. Furthermore, certain creams of the semi-fluid nature heretofore described may be injuriously affected by the presence of air.

A commercially-desirable feature of the type of dispenser referred to is that it be refilled, regardless of the level of its contents, merely by inverting a new can of the substance over the dispenser and pressing it downward until the air above the existing dispenser contents has been evacuated. If the dispenser can be so refilled, an attendant who services such dispensers periodically need not wait until the contents of the dispenser drop to any selected level. However, the provision for the exhausting of air within the dispenser, shown in said co-pending application, has not been entirely satisfactory. In particular, if the dispenser contents have dropped to a very low level, there has been a tendency on refilling to discharge some of the newly-added contents through the air-exhaust vent.

It is therefore the purpose of the present inventon to provide improved air-exhaust means to avoid the entrapment of air between the contents of the dispenser and a newly-added charge of such substance to be filled therein.

In the accompanying drawings:

Figure 1 is a view, partly in elevation and partly in section, of a dispenser of the type mentioned employing the exhaust vent provisions of the present invention, shown partly filled with such substance, preliminary to refilling.

Figure 2 is a fragmentary view similar to Figure 1, the arrows showing the exhaustion of the air as an additional charge of contents are forced into the dispenser.

Figure 3 is an enlarged fragmentary sectional view taken along line 3—3 of Figure 2, rotated approximately 45° and showing the construction of my new air-exhaust vent tube.

The dispenser which is the subject of said co-pending application includes a generally cylindrical vessel 10 having an open top 11 and supported by a preferably cast

metal base 12 molded to provide a central tapering well 13 leading to a centrally-located small cylindrical sump 14. In the cylindrical sump 14 is an upward-pointed conical piston 15 mounted on an axially reciprocating piston rod 16 which passes through the center of the cylindrical sump 14 and is actuated by spring return pedal means 17 through a dispenser support pedestal 18.

The piston rod 16 has a necked-down valving portion 19 beneath the conical piston 15 to permit passage of a quantity of the dispenser's contents through the piston bore 20 and a slanting discharge bore 21 to a discharge opening 22.

In the dispenser base 12 and located adjacent the edge of the cylindrical sump 14 is a vent aperture bore 23, which passes into the base 12 and communicates therein with the slanting discharge bore 21, thence to vent to the atmosphere through the discharge opening 22.

The upper end of the vent aperture bore 23 has a counter-bore 24. In it is press-fitted an air exhaust vent tube 25 which is the principal subject of the present invention.

The vent tube 25 is formed preferably of some material unaffected by the substances for which the dispenser is to be used, in ordinary cases either corrosion-resistant steel or substantially pure aluminum. The tube extends from the counter-bore 24 nearly the entire depth of the cylindrical vessel 10, where its upper end 26 is filled by an upper end plug 27, whose upper surface is domed or rounded as shown.

At various levels between the upper and lower ends of the tube 25 its wall is penetrated by a plurality of lateral, substantially cylindrical vent apertures or ports 28. The diameter of these vent apertures 28 is chosen with reference to the viscosity and solidity at room temperature of the substance to be filled into the dispenser. For substances such as those described, and utilizing a tube 25 whose wall thickness is approximately 1/16", I find that this measurement also serves very well as the diameter for the apertures 28. There is no feasible way of defining such diameter save in empirical terms, in that it must not be so small as to permit clogging of the apertures 28 by such substance when a can thereof is pressed downward over the tube 25, nor yet so large that there will be any substantial tendency of the semi-fluid substance to flow into them. This will be discussed hereafter.

The problem met by the present invention is illustrated in Figures 1 and 2. In each, the level of contents of the dispenser prior to refilling is designated *a*, whereas contents newly being forced into the dispenser having an advancing surface designated *b*, which moves toward the level *a*. Such newly-added contents are furnished in generally cylindrical cans such as the can *c*, whose top has been removed as shown in the figures, and the can inverted and pressed over the open top 11 of the cylindrical vessel 10. The inner diameter of the can *c* is sufficiently greater than the outer diameter of the cylindrical vessel 10 to permit telescoping fit, as illustrated.

As the can *c* is pressed over the open top 11 of the vessel 10, the doomed upper surface of the end plug 27 makes a smooth indentation into the surface *b* of the contents of the can *c*; and as the can *c* is pressed downward, air between its contents and the pre-existing level *a* of the dispenser contents is driven out through the lateral vent apertures 28 of the vent tube 25. Since these apertures 28 extend in a direction substantially perpendicular to that in which the newly-added substance moves in being charged into the dispenser, and since these contents possess little tendency to flow under their own weight, little or none of the newly-added substance passes into the apertures 28. As the can *c* descends, the domed upper end plug 27 makes a substantially cleanly-indented impression in the surface *b* of the substance being newly

added, while air beneath the surface *b* and the level *a* of the pre-existing dispenser contents, is driven outward through those apertures 28 which lie between the two masses of semi-fluid substance. The air so driven passes downward through the vent tube 25 and through the vent apertures 28 in the dispenser base 12, to be discharged through the dispenser discharge opening 22.

Many substances, such as certain creams, ointments, and semi-fluid soaps, possess a slight tendency to flow under their own weight, depending upon variations of room temperature, but this flow tendency is not sufficient to permit mere pouring of the contents into the vessel 10. For such substances, which possess some extent of fluid-like characteristics, a certain amount of experimentation may be necessary to determine the most advantageous diameter for the lateral vent apertures 28.

The vent tube 25 has been described as being erected on the dispenser base 12; and ordinarily it will prove advantageous to orient the tube 25 so that it extends in a line parallel to the axis of the cylindrical vessel 10, thus reducing to a minimum the tendency of the apertures 28 to become clogged. However, if desired the tube 25 may be tilted slightly so that its upper end 26 is somewhat closer to the axis of the vessel 10. In case of pronounced tilt of the tube 25 the apertures 28 drilled therein may be disposed along the true horizontal, rather than perpendicular to the axis of the tube 25.

The air-exhaust vent described effects a substantial improvement in the charging of the dispenser over the means shown in my co-pending application, particularly in avoiding any tendency of substance to pass into the air-exhaust vent tube 25, thus giving the attendant who services the dispensers greater latitude into determining when to refill them.

Various modifications and changes may be made without departing from the principles of the present invention. Accordingly, it should be limited only by the scope of the claims which follow.

I claim:

1. In a dispenser for fluids of such stiff consistency as to flow only under substantial pressure, such dispenser incorporating a vessel and a base therefor through which such substances are dispensed, an air-exhaust charging vent comprising a passage through the base of such vessel and communicating with the atmosphere, and a substantially upright tube erected upon the base of such vessel in communication with said passage and extending for the greater part of the depth of such vessel, said tube having a closed upper end and a plurality of substantially horizontal lateral ports spaced vertically from each other whereby, on forcing a supply of such stiff fluid into the vessel's top, air is exhausted through the tube and the vessel base without any discharge of such fluid therethrough.

2. An air-exhaust charging vent as defined in claim 1, the lateral ports having cylindrical bores of such diameter, selected with reference to the consistency of the fluid, as to avoid horizontal flow of the fluid therethrough.

3. A dispenser for viscous semi-fluid substances and the like, comprising an open-top vessel having a base, controllable discharge mechanism in the base, a vent passage therethrough and communicating to the atmosphere, and an air-exhaust vent adapted to permit adding such substance into said vessel when partly full, regardless of the level of its contents, said vent including an air-exhaust vent tube erected on said base and having a lower end communicating with said vent, said tube extending upward to a level adjacent the upper margin of the vessel and having a closed upper end and lateral vent apertures through the wall of the tube at a plurality of levels spaced between its upper and lower ends, whereby on pressing such added substance into such partly filled vessel, air beneath such added substance and above the level of the existing contents is exhausted through the apertures between said level and the substance being added.

4. A readily filled dispenser for semi-fluid substances comprising a hollow, cylindrical chamber having an open end adapted to receive a charge of such substance and thereby substantially fill the chamber, side walls, a closed end opposite said open end and toward which such substance is to advance, discharge means in the region of said closed end, an air-exhaust vent passage to the atmosphere in said region, and a vent tube communicating with said vent passage and extending toward the open end of the chamber and having a plurality of apertures spaced along the tube length and penetrating the tube wall substantially perpendicular to the cylinder axis, the tube further having a closed end presented toward the open end of the chamber, whereby on inverting a cylindrical can of such semi-fluid substance and pressing it telescopingly over the open end of the chamber, such substance is driven into the chamber and the air in advance thereof is driven out through the vent tube apertures, without passage of any substantial quantity of such substance into the vent tube.

5. For use with semi-fluid substances, a readily refillable dispenser, including a vessel adapted to be substantially filled by a charge of such substance and to discharge same in small quantities, said vessel having an open end adapted to receive a charge of such semi-fluid substance, side walls, and a closed end opposite said open end and toward which such charge is to advance, the dispenser further having discharge means in said closed end, an air-exhaust vent passage located in the region of the closed end and venting to the atmosphere, and a vent tube communicating with said vent passage and extending therefrom the greater part of the length of the vessel toward the open end at which said vessel is filled, the tube having a closed surface presented in the direction of filling and a tube body portion extending substantially parallel to the direction in which such charge of substance moves on being filled into the vessel, the tube having a plurality of ports through the tube wall spaced along its length and communicating through the vent passage to the atmosphere.

6. A readily refillable dispenser as defined in claim 5, the ports being substantially perpendicular to the direction in which such charge of semi-fluid substance moves on being filled into the vessel, whereby to avoid flow of such substance into said ports.

7. A dispenser adapted to dispense semi-fluid substances from cylindrical cans which have been opened by removal of their tops, comprising an open-topped cylindrical vessel having an outer diameter less than the inner diameter of such can whereby such can containing such semi-fluid substance may be inverted and pressed telescopingly in place over the vessel, the vessel having a base, controllable discharge mechanism therein, and an air-exhaust vent passage through the base and communicating to the atmosphere, together with air-exhaust means including a vent tube erected on said base and having a lower end communicating with said passage, said vent tube having a body portion extending upward from the base to a level adjacent the upper margin of the vessel and terminating in a closed upper tube end, said body portion having air vent apertures extending through the tube wall at a plurality of levels spaced between the upper and lower ends thereof, whereby on pressing such inverted can of such substance telescopingly downward over said vessel, air within said vessel beneath the contents of such can is driven out therebeneath through one or more of said air vent apertures.

No references cited.