

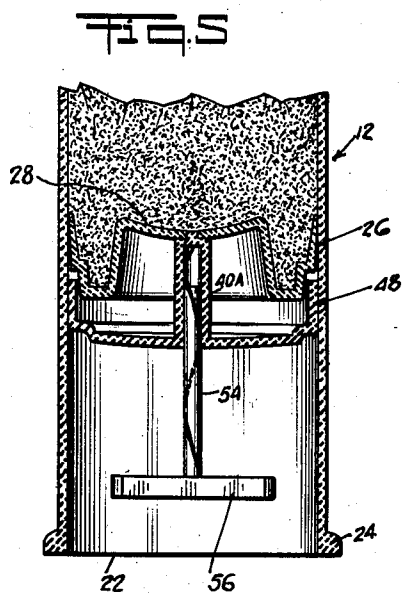
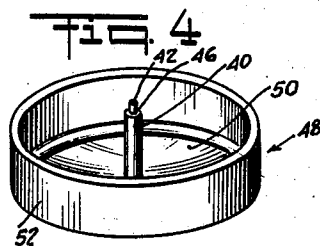
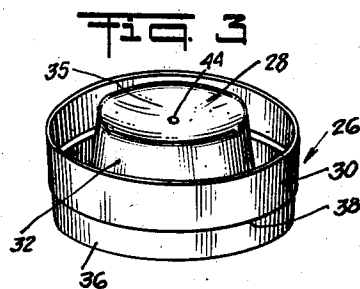
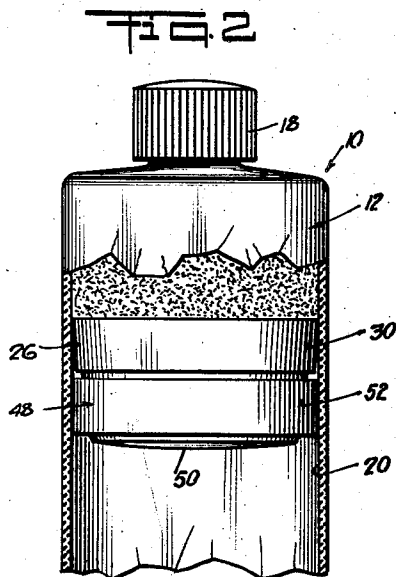
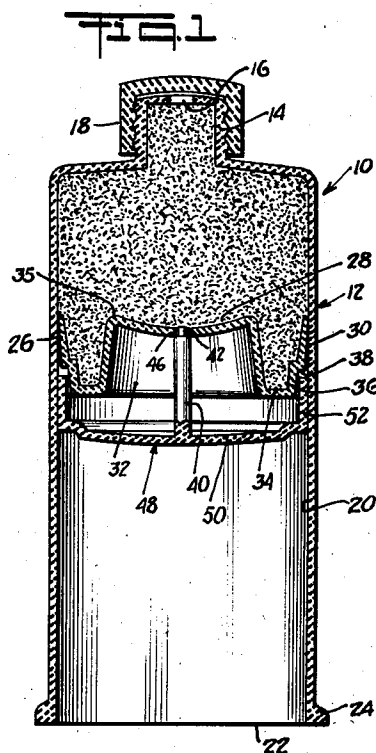
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2,371,332

DISPENSING CONTAINER

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2,371,332

DISPENSING CONTAINER

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4 Claims. (Cl. 222-386)

This invention relates to dispensing containers. One object of the invention is to provide a container which is well adapted to be used instead of collapsible metal tubes for packaging and dispensing various substances, for example, tooth paste, shaving cream, other products of paste or cream-like consistency, oils or other liquids, etc., the dispensing container being further characterized in the respect that it is provided with a plunger for ejecting the contents of the receptacle and which is constructed and arranged to provide a fluid-tight seal with the inner surface of the receptacle without requiring the use of separate packing rings or the like.

Another object of the invention is to provide a dispensing container of the above indicated character and which can be formed of a plastic whereby to produce a suitable and advantageous dispensing and packaging container without the use of metal.

A further object of the invention is to provide a dispensing container which can be readily converted into a spraying or atomizing device by attaching a spraying or atomizing nozzle or device to the outlet opening of the container.

A yet further object of the invention is generally to provide an improved dispensing and packaging container.

The above mentioned and other objects, features and advantages of the invention will be more fully understood from the following description, reference being had to the accompanying illustrative drawing.

In the drawing:

Fig. 1 is a vertical sectional view of a dispensing container embodying the present invention;

Fig. 2 is a view of the container, partly in elevation and partly in section, the receptacle being broken away and showing the plunger in elevation;

Figs. 3 and 4 are perspective views of two elements of the preferred form of the plunger;

Fig. 5 is a fragmentary vertical sectional view of the container, illustrating a modification.

Referring now to the drawing in detail, the dispensing container 10 embodying the present invention comprises a receptacle 12 having at one end thereof a threaded neck 14 provided with an outlet opening 16 which is normally closed by a threaded cap 18. The inner surface 20 of the receptacle is preferably cylindrical and terminates at the bottom of the receptacle in an opening 22 which is of the same diameter as that of said inner surface. Also, as here shown, the base of said receptacle is provided with a bead or rib

24. Said receptacle is preferably formed of a plastic, but can be formed of glass or other suitable material.

In accordance with the present invention the container is provided with an ejector plunger for dispensing the contents of the receptacle through the outlet opening 16 thereof, and an important feature of the invention resides in the construction of this plunger whereby it maintains a fluid-tight seal with the inner surface 20 of the receptacle in order to prevent leakage of the contents and to seal the receptacle against the admission of air. Another important feature and advantage is the construction of the plunger whereby it can be made of a plastic and does not require any packing rings or the like for obtaining the fluid-tight seal with the receptacle. The plunger constructed in accordance with the present invention for accomplishing these results will now be described.

Said plunger comprises a member 26 which is molded or otherwise formed in one piece of a suitable plastic and which comprises a central part 28 and a substantially cylindrical peripheral part 30 which preferably tapers in thickness toward the delivery end or outlet opening 16 of the receptacle. Said parts 28 and 30 are connected by a peripheral part 32, annular portion 34 and by the peripheral part 36 which is offset radially inwardly from peripheral part 30 providing the peripheral shoulder 38. Thus parts 28 and 30 are spaced from each other radially of the plunger and are connected to each other by means constituted by parts 32, 34 and 36. It will be understood that the upper surface of member 26 forms a complete barrier to the passage of the contents of the receptacle.

Part 30 has a sliding fit with inner surface 20 of the receptacle and the construction of member 26 as above described and as presently to be further described is such that said part 30 forms a fluid-tight seal with the inner surface 20 of the receptacle whereby to prevent leakage of the contents of the receptacle between part 30 and the adjacent surface 20 of the receptacle during the dispensing operation of the plunger and at all other times. For this purpose the close fit between part 30 and the inner surface 20 of the receptacle is maintained and augmented during the dispensing operation by constructing member 26 so that part 28 thereof is expansible in diameter in response to a force exerted on said part for moving the plunger in its dispensing operation. More particularly, as here shown, part 28 is of concavo-convex form, its upper surface being

concave and its lower surface being convex, so that when a force is applied at the center of said convex surface in a direction axially of the receptacle and toward the delivery end thereof, said part 28 becomes increasingly flatter, thus increasing in diameter or expanding radially outwardly whereby its periphery is moved radially toward inner surface 20 of the receptacle and forcing peripheral part 30 more tightly against said inner surface of the receptacle by reason of the connection of said part 30 with part 28 through parts 32, 34 and 36. It will be understood that only a slight increase in the diameter of part 28 is required and that due to the fact that the expansive force of part 30 is communicated thereto continuously therearound by the portions 32, 34 and 36, peripheral part 30 is caused to engage inner surface 20 of the receptacle as tightly as may be necessary to maintain a leakproof joint between part 30 and the inner surface of the receptacle. However, it will be understood that due to the force exerted on the contents of the receptacle by member 26 during the dispensing operation, a force is exerted by the contents on the inner surface of the tapering portion of part 30 transversely and aids in maintaining said leakproof joint. Peripheral parts 30 and 32 being formed of plastic, together with the other portions of member 26, is sufficiently stretchable in response to the increase in diameter of part 28 whereby to enable the above described action to take place, it being understood, however, that said plastic is non-elastic and for that reason any slight inwardly radial movement of part 30 which might possibly occur following the release of pressure from the center of the convex surface of part 28 on the completion of the dispensing operation does not impair the fluid-tight seal of part 30 with the inner surface of the receptacle, especially since at that time the pressure exerted upon the contents of the receptacle is simultaneously released.

Provision is made for facilitating the operation of member 26, both in applying the force on part 28 for expanding the latter and for moving part 26 longitudinally of the receptacle toward outlet opening 16 in the dispensing operation of the plunger. For this purpose a stem 40 is connected to part 28 of member 26 and extends downwardly therefrom. More particularly, as here shown, stem 40 is provided with a reduced end portion 42 which fits within a central opening 44 in part 28, being tightly secured therein, and the peripheral shoulder 46 formed near the end of said stem abuts the central portion of the convex surface of part 28. Said stem 40 is, as here shown, fixed to a piston member 48 centrally of the piston head 50. Said piston member 48 is provided with a continuous upwardly directed peripheral part 52 which has a sliding engagement with the inner surface 20 of the receptacle. Piston member 48 and stem 40 are also preferably formed of a plastic.

It will be understood that when it is desired to dispense the contents of the container through outlet opening 16 of the receptacle, one or more fingers of the user may be projected through opening 22 of the receptacle for pressing on the head 50 of piston member 48 and that this force is communicated by stem 40 to the disk or part 28 of plunger member 26, causing said part 28 to expand in size radially outwardly to the extent permitted by the engagement of peripheral part 30 with surface 20 of the receptacle and substantially simultaneously causing plunger mem-

ber 26 to move longitudinally of the receptacle toward the outlet opening 16 thereof. The relative longitudinal movement which might occur between plunger members 26 and 48 is limited by the initial space provided between shoulder 38 and the upper edge of peripheral part 52. Further, said space may receive any small quantity of the contents of the receptacle which might possibly pass between part 30 and the inner surface of the receptacle, thereby forming an additional seal to afford added protection to the contents of the receptacle against the admission of air. It will be noted further that the peripheral part 52 of plunger 48 and the peripheral part 30 of plunger member 26 form a structure of sufficient axial extent to prevent canting or tilting of the plunger in the receptacle, even when pressure is applied to the piston head 50 at a point spaced from the center thereof. Further in this connection it will be noted that the upper portion of peripheral part 52 of member 48 overlaps the outer surface of part 36 of member 26, and is spaced slightly radially outwardly of part 36 of member 26.

The dispensing container of the present invention can be readily converted into a spraying device. This can be easily accomplished by attaching to neck 14 any suitable spraying nozzle or head (not shown) through which a liquid contained in receptacle 12 can be forced under pressure by operation of the ejector plunger. It will be understood that the spraying nozzle or head can be attached to the neck 14 of the container by screwing the nozzle or head onto the neck when closure cap 14 is removed.

In the form of the invention illustrated in Fig. 5, the dispensing container and plunger are substantially as described above, with the exception that the stem 40A which corresponds to the stem 40 and has the same function as the latter, is hollow or tubular and is provided with an extensible rod 54 which is in threaded engagement in said hollow stem 40A. The outer end of rod 54 is provided with a head 56 for rotating said rod. By the construction thus provided, and more particularly by means of the threaded engagement of rod 54 in stem 40A, head 56 can be positioned near enough to opening 22 of the receptacle to facilitate movement of the plunger by the user, especially when the contents of the receptacle approaches depletion. It will be understood that the screw thread of rod 54 has a low pitch whereby to reduce as much as possible the turning of said rod for moving head 56 thereof in a direction toward opening 22.

It will be understood that the invention may be embodied otherwise than as herein shown or described. Accordingly, I do not wish to be limited to the specific construction herein disclosed except to the extent which may be required by the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A dispensing container comprising a receptacle having an outlet opening, and an ejector plunger mounted for sliding movement in said receptacle toward said opening for dispensing the contents of the receptacle through said opening, said plunger comprising a substantially cylindrical peripheral part in slidable, fluid-tight engagement with the inner wall of said receptacle, a central part spaced radially inwardly of said peripheral part, said central part being expandable in diameter in response to a force exerted thereon for moving the plunger toward said

opening, and means connecting said central part to said peripheral part and movable radially toward said inner wall by the expansion of said central part for forcing said peripheral part radially against the inner surface of said receptacle, continuously therearound, during the dispensing movement of said plunger, and a piston member operatively connected to said central part for expanding the same and having a cylindrical part in sliding engagement with said inner wall.

2. A dispensing container comprising a receptacle having an outlet opening, and an ejector plunger mounted for sliding movement in said receptacle toward said opening for dispensing the contents of the receptacle through said opening, said plunger comprising a substantially cylindrical peripheral part in slidable fluid-tight engagement with the inner wall of said receptacle, a central part being expansible in diameter in response to a force exerted thereon for moving the plunger toward said opening and connected to said peripheral cylindrical part for forcing the latter radially against the inner surface of said receptacle, continuously therearound, during the dispensing movement of said plunger, and means connected to said central part for expanding the same radially and for moving the same toward said opening, said last mentioned means comprising a member having a substantially cylindrical peripheral part in sliding engagement with said inner wall of the receptacle.

3. A dispensing container comprising a receptacle having an outlet opening, and an ejector plunger mounted for sliding movement in said receptacle toward said opening for dispensing the contents of the receptacle through said opening, said plunger comprising a substantially cylindrical peripheral part in slidable fluid-tight engagement with the inner wall of said receptacle, a

central part expansible in diameter in response to a force exerted axially thereon for moving the plunger toward said opening and connected to said cylindrical peripheral part for forcing the latter radially against the inner wall of said receptacle, continuously therearound, during the dispensing movement of said plunger, and a piston member operatively connected to said central part for expanding the same and having a cylindrical part in sliding engagement with said inner wall.

4. A dispensing container comprising a receptacle having an outlet opening, and an ejector plunger mounted for sliding movement in said receptacle toward said opening for dispensing the contents of the receptacle through said opening, said plunger comprising a peripheral part in slidable fluid-tight engagement with the inner wall of said receptacle, a central part spaced radially inwardly of said peripheral part, said central part being concavo-convex whereby it is expansible in diameter in response to a force exerted thereon for moving the plunger toward said opening, means connecting said central part to said peripheral part and movable radially toward said inner wall by the expansion of said central part for forcing said peripheral part radially against the inner surface of said receptacle, continuously therearound, during the dispensing movement of said plunger, a stem engaging said central part and extending axially of said receptacle and operable therein for applying said force to said central part, and a piston member operatively connected to said stem and slidably engaging said receptacle, said piston member having a limited movement in relation to the peripheral part and engageable therewith to limit the expansion of said central part by said stem.

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