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COLLAPSIBLE DISPENSING TUBE

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Fig. 1

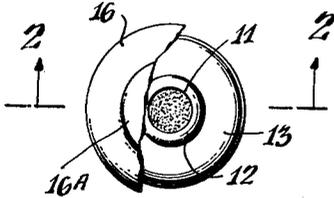


Fig. 2

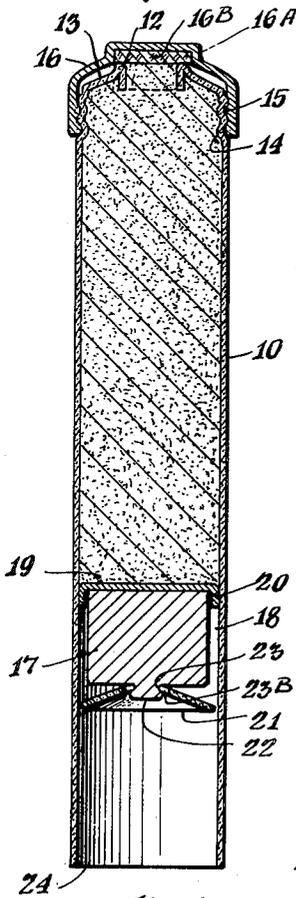


Fig. 3

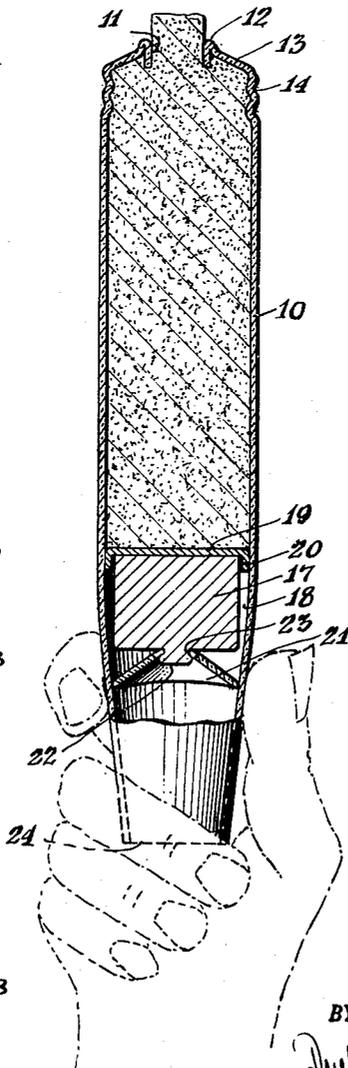


Fig. 4

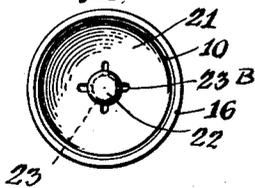


Fig. 5

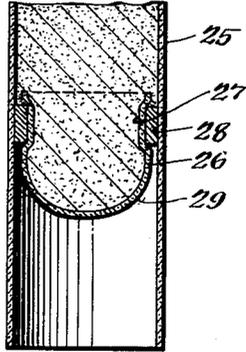


Fig. 6

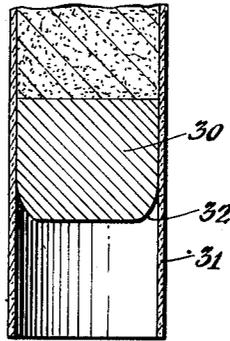
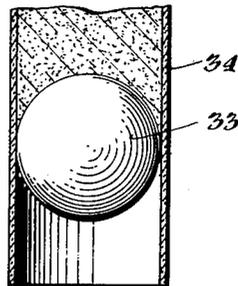


Fig. 7



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# UNITED STATES PATENT OFFICE

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## COLLAPSIBLE DISPENSING TUBE

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4 Claims. (Cl. 221-60)

This invention relates to a dispenser of the tube type used largely in the dispensing of such products as toothpaste, shaving cream, salves, and other similar substances, which may generally be referred to as cream-type products.

Due to present conditions creating a scarcity of certain materials, a great need has arisen for a dispenser capable of dispensing such products and to take the place of the well-known metal tube dispensers of the deformable type which have been so extensively used.

A major object of my invention comprises the combination of a flexible container together with an internal piston movable upon a flexing of the container and adapted to force the contents towards the opening.

It is a further object of my invention to provide such an internal piston capable of wiping clean the interior surfaces of the flexible container in which it rides, thereby preventing any waste of material being dispensed.

In carrying out my invention, a major object has been the utilization of materials other than metal and the provision of a structure which is simple and durable and composed of relatively few parts, each of a design adapted for quantity production.

The achievement of these and numerous other objects will be readily apparent by reference to the following specification and accompanying drawing, in which:

Fig. 1 is a top plan view of a container embodying my invention with the cover or cap portion broken away;

Fig. 2 is a vertical cross section of the container of Fig. 1 taken along the line 2-2 and looking in the direction of the arrows;

Fig. 3 is a vertical cross section similar to that shown in Fig. 2 but wherein the cap is removed and wherein the manner of operation of the container, is also illustrated;

Fig. 4 is a bottom view of the container shown in Fig. 2.

Fig. 5 is a cross section of a portion of a container showing an alternative form of my invention;

Fig. 6 is a cross section of a portion of a container and showing a further modified form of my invention; and

Fig. 7 is a further cross section of a portion of a container showing still another modified form of my invention.

Referring now to the drawing, it is observed that I have provided a container body 10 preferably tubular in shape and fabricated from a flex-

ible material of a type adapted to the specific contents which it is desired to dispense in the container. I have found, in certain respects, that it is desirable for the container body to be made of a transparent material and, in this aspect as well as the flexible quality, material such as cellulose acetate or other flexible transparent materials have proven desirable. Treated paper or cardboard may also be used, although care, of course, must be exercised so that the type selected is suitable for use with the products to be dispensed.

This container is preferably formed with a dispensing opening 11 at its top, formed by surrounding flanges 12 which extend above the top wall 13 of the container. While in certain forms of containers the flanges 12 might be threaded and a screw cap applied directly thereto, I prefer to provide a structure of a type wherein the cap or closure covers the entire top area of the container. Referring to Fig. 2, it will be seen that this structure is provided by having pressed threads 14 in the body of the container and near the top thereof, which threads cooperate with the threads 15 formed in the cap 16, which cap may be formed by pressing or drawing from paper, cardboard, plastic or other adaptable material. The flexibility of the top of the cap in conjunction with the portion of flanges 12 which extend above the top wall serves to provide a tight seal. If desired, cap 16 may be provided with raised flange 16A which provides a recess adapted to receive a suitable gasket or washer 16B formed of cork, plastic, etc., and adapted to seal against flange 12.

In the preferred embodiment of my invention, the mechanism for dispensing the material contained in the tube and which may generally be referred to as the piston or pusher means, comprises three simple parts as shown in the Figs. 2 and 3. A hollow or solid plug 17, preferably formed of a substance, such as wood, paper or plastic, is provided and is adapted to conform to the shape of the container body. The circumference of this plug is less than the inside diameter of the body, thereby providing a space 18 between it and the container walls.

Adapted to be placed over this plug and to ride therewith is a plunger cup 19 formed of a material suitable for use with the products to be dispensed. This cup has an overall size so that it fits snugly within the container body with its downwardly depending flanges 20 forming, in effect, a gasket and extending between the plug 17 and the side walls of the container. The

cup may be formed of paper, plastic, cotton or other suitable material capable of making suitable wiping contact with the walls of the container and not deteriorating by contact with the container contents. The downwardly depending flange 20 facilitates the assembly insertion of the piston into the container and is therefore to be preferred; however, if desired, different shaped gaskets or washers may be used.

To the under side of the plug 17 is secured a motivating flexible disc 21 shaped to conform to the container and which preferably in normal position assumes a concave shape with the convex side of the disc facing in the direction of movement of the piston. This disc is formed of a flexible material such as cellulose acetate, spring metal, treated paper or some other similar material, and is preferably of a diameter slightly less than the inside diameter of the tube thereby providing a clearance between its edge and the side walls of the container. In other words, the material of the disc is such that the latter may be flexed transversely of its body. However, the disc material has sufficient rigidity that thrusts in the plane of its body will be transmitted without that body's tending to collapse.

In the form shown in Figs. 2 and 3, the disc is attached to the plug by means of knob 22 integral with the plug and over which the central opening 23 of disc 21 is placed. To provide an easy press fit, the opening edge may have radial slots 23B extending from its periphery. While this form of attachment is desirable, other means of attaching the motivating disc to the plug, such as adhesive, screws, etc., may be used.

It is readily apparent that the tube and compressing structure may be easily assembled and then inserted through the open end 24 of the container 10. This open end 24 is of a width or size equivalent to that of the interior of the tube and, accordingly, in filling the container, the contents may be readily inserted through said opening. After the contents are placed in the container, the pusher mechanism is inserted in that opening and worked up a sufficient distance to allow the edge of the concave motivating disc 21 to be within the side walls of the container 10. Thereafter, the open end 24 of the tube may be left open or, if desired, may be covered in any suitable manner by a plug, cap or other means which preferably has an air vent so that no vacuum is formed as the piston is moved upward into the container.

The use of this container requires only a slight compression in the vicinity of, or below the motivating concave disc. The operation is best illustrated in Fig. 3 wherein the hand of the user is shown as it compresses or collapses the flexible tube or body adjacent the disc 21. Due to the normal flexibility as well as concavity of the motivating disc, this disc assumes, when pressure is applied to its edges, a more concave shape with the center portion being forced upward towards the container opening 11. This, of course, in turn serves to move the block 17 and the plunger cup 19 upward, thus forcing the material contained in the dispenser through the dispenser opening.

Upon release of pressure, the combination of the flexible side walls and the flexible disc enables the latter to assume its normal conical position. The plug 17 and the plunger cup 19

remain in approximately the position to which they were advanced while the edges of the motivating disc go upward along or adjacent the side walls of the container 10 to a new position. In this advanced position, the parts are again in normal shape and the pressing operation by the hand of the user may be repeated if it is desired to eject further material from the dispenser. Of course, it is noted that the forces tending to hold the plug and plunger cup in their advanced position are such that upon a release of pressure applied to the concave motivating disc, the plunger and cup remain in approximately their advanced position while the edges of the concave motivating disc, in effect, climb upwardly along or adjacent the walls of the container to a new position.

Due to the space clearance 18 provided between container 10 and plug 17, the flexibility of the container wall is maintained, thus allowing ready application of compressive force thereto for action upon the motivating disc 21. In addition, the clearance avoids any binding effect between the compressed side walls and the plug.

The initial concavity of disc 21 prevents the disc from flexing in the wrong direction, that is, away from the opening, and causes it to move in the same direction upon each application of pressure.

Fig. 5 shows an alternate form of piston for use in the dispenser. In this fragmentary view, 25 represents the side walls of a flexible container similar to that previously described. A hollow cup-shaped member 26 preferably formed of a flexible material, such as cellulose acetate, paper, etc., is provided, of such a size that it fits within the inside of the container body and has a clearance relative to the side walls thereof. This cup 26 is provided with a depressed annular ring 27 into which a packing member or gasket 28 is placed. This gasket is, of course, of a material suitable for the type of product to be dispensed and is adapted to ride in intimate contact with the side walls 25. The bottom of the cup-shaped member is formed with upwardly and outwardly inclined surfaces 29. The shape of these surfaces is such that, upon a collapsing of the tube adjacent them by means of the fingers of the user, the cup member is caused to ride upwardly along the interior of the collapsed surface, thus forcing the contents of the container toward the opening.

Fig. 6 shows an alternative form of the invention in which the piston 30 comprises a solid plug preferably formed of wood, pressed sawdust, plastic or other similar material and adapted to fit snugly within the flexible container 31. The plug is formed at its lower end with bevelled surface 32 having an inclination of sufficient degree so that applied manual pressure to collapse the tube adjacent the inclination will force the plug 30 upwardly, thus acting to push the ingredients of the container through the top opening of the tube.

In the modification shown in Fig. 7, the piston 33 comprises a spherical plug whose diameter is such that a snug fit with the inside of the container 34 is provided. Due to the normal shape of the sphere, applied pressure to the container 34 on either the upper or lower side of the sphere will motivate the sphere one way or the other; that is, applied pressure at the bottom will push the sphere upward, while applied pressure at

the top will push the sphere downward. By its motion, the contents of the container will be ejected.

In each of the modifications, the manner in which the tube is filled parallels the manner shown in the structure of the Figs. 1, 2, and 3 with the material to be dispensed being inserted in the bottom or wide opening of the container and then the piston pushed into position within the container.

To those skilled in the art, it will be apparent that certain changes may be made in the structure without in any manner departing from the spirit of my invention as described in the specification and the appended claims and, accordingly, it is my intention to cover any of these variations permissible within the spirit of my invention and the scope of the claims.

I claim:

1. A container comprising a flexible body for containing and dispensing cream substances, a piston adapted for insertion in said container and to slidably contact the side walls thereof, a conical, resilient and flexible motivating disc associated with said piston and having its outer edges lying adjacent the side walls of said container whereby, upon compression of said side walls, the inner faces of the latter will engage the outer edge of the disc and move such outer edges towards each other, thereby moving said piston.

2. In combination, a collapsible tube presenting a dispensing opening adjacent one of its ends, its body being adapted to receive material to be expelled through such opening, a piston movable within said tube and to be positioned between such material and the other tube end, and a piston-feeding means comprising an element connected to said piston and upon the side of the same opposite to the material, said element extending at an angle to the tube axis to a point adjacent the inner face of the tube wall, whereby, as said wall is collapsed inwardly by exteriorly applied pressure, the end of said element will be positively engaged by the inner tube face to initially prevent piston movement in a direction away from the dispensing opening, further collapsing pressure upon the tube subsequently causing portions of said element to be swung towards the axis of the tube to thereby

move the piston towards the dispensing opening.

3. In combination, a collapsible tube presenting a dispensing opening adjacent one of its ends, its body being adapted to receive material to be expelled through such opening, a piston movable within said tube and to be positioned between such material and the other tube end, and a piston-feeding means comprising a disc having portions adapted to be flexed towards each other, said disc being secured to said piston upon the side of the same opposite to the material, said disc extending at an angle to the tube axis to a point adjacent the inner face of the tube wall and being formed of a material such that it is substantially inflexible responsive to thrusts in directions parallel to its body portions, whereby, as said tube wall is collapsed inwardly by exteriorly applied pressure, the edge of said disc will be positively engaged by the inner tube face and thus prevent piston movement in a direction away from the dispensing opening; further collapsing pressure upon the tube causing said disc to flex and exert a thrust against said piston to shift the latter within said tube and in a direction towards the dispensing opening.

4. In combination, a collapsible tube presenting a dispensing opening adjacent one of its ends, its body being adapted to receive material to be expelled through such opening, a piston movable within said tube and to be positioned between such material and the other tube end, and a piston-feeding means comprising a flexible, conical member, means for securing the apex of said member to that side of the piston opposite to that on which said material is located and with the body of said member flaring rearwardly within the tube to points adjacent the inner face of the latter, whereby, as said tube wall is collapsed inwardly by exteriorly applied pressure, the edges of said member will be positively engaged by the inner tube face to prevent piston movement in a direction away from the dispensing opening; further collapsing pressure upon the tube subsequently causing portions of the body of said member to be flexed towards the tube axis whereby said piston will be projected towards said dispensing opening.

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