United States Patent [19]

Spatz

[11] **3,768,705**

[45] **Oct. 30, 1973**

[54] **DISPENSERS FOR FLUENT MASSES**

[75] Inventor: **Walter B. Spatz**, Santa Monica, Calif.

[73] Assignee: **Spatz Corporation**, Venice, Calif.

[22] Filed: **Sept. 13, 1971**

[21] Appl. No.: **179,651**

[52] **U.S. Cl.** **222/213**

[51] **Int. Cl.** **B65d 37/00**

[58] **Field of Search** 222/1, 206, 207, 222/215, 386, 387–391, 209–214

[56] **References Cited**

UNITED STATES PATENTS

2,143,661	1/1939	Schrader	222/207
2,361,647	10/1944	Nyden	222/214
2,732,978	1/1956	Oakland	222/215
2,898,007	8/1959	Gassaway	222/387 X
3,066,833	12/1962	Hershenson	222/209
3,081,006	3/1963	Land	222/212
3,088,636	5/1963	Spatz	222/213
3,215,320	11/1965	Heisler et al.	222/391
3,451,597	6/1969	Watson, Jr.	222/214 X

Primary Examiner—Samuel F. Coleman
Attorney—Bernard Kriegel

[57] **ABSTRACT**

A pliant, elastic container for toothpaste, cream, or other fluent materials has a forward outlet or discharge portion, a one-way follower in the container being disposed at the rear of the fluent material and sealingly engaging the container wall, the one-way follower being moved automatically by ambient air pressure toward the outlet after each dispensing of the material, but gripping the container wall to prevent its retrograde movement during dispensing of the material, such dispensing occurring as a result of squeezing or deflecting the container at any point, including the region forwardly of the follower, directly at the location of the follower, the region rearwardly of the follower, and at the discharge portion of the container, the deflecting force at such discharge portion being applicable in a direction axially or transversely of the container.

4 Claims, 10 Drawing Figures

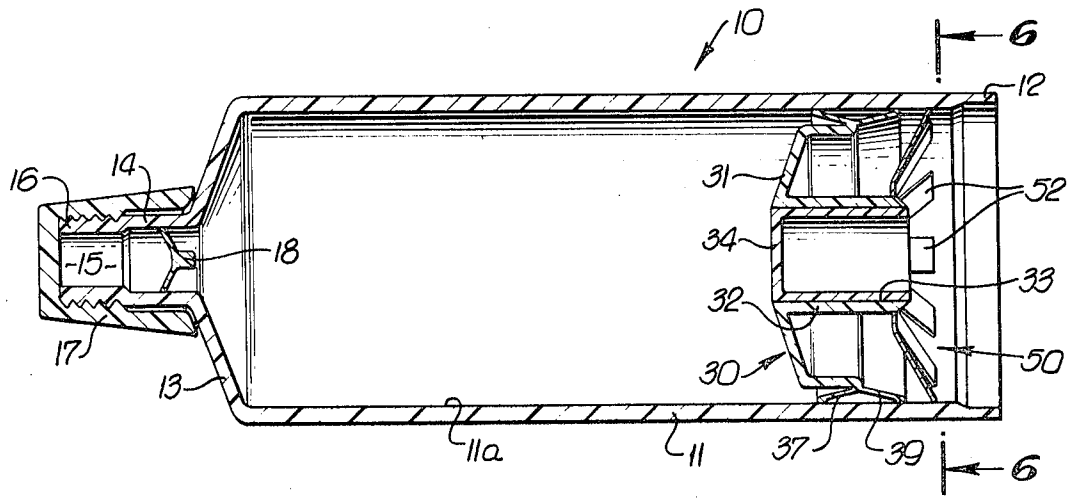


FIG. 1.

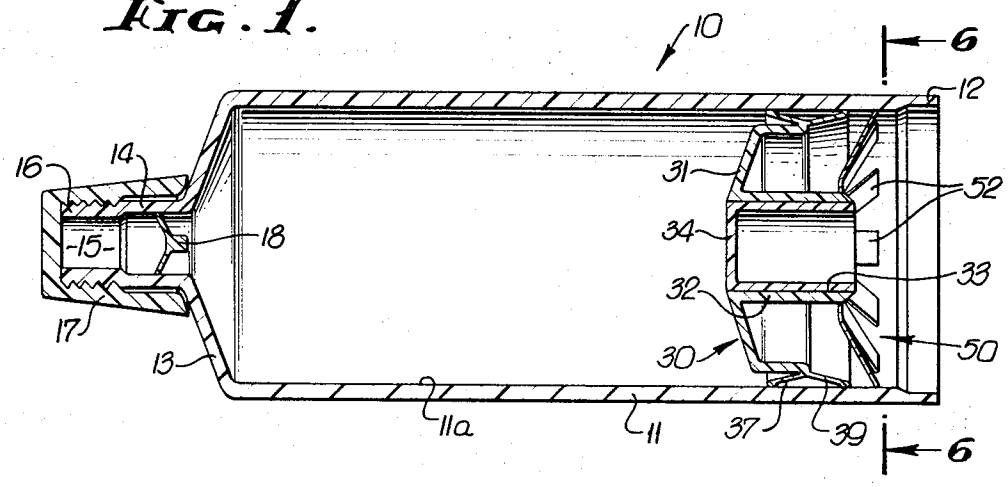


FIG. 2.

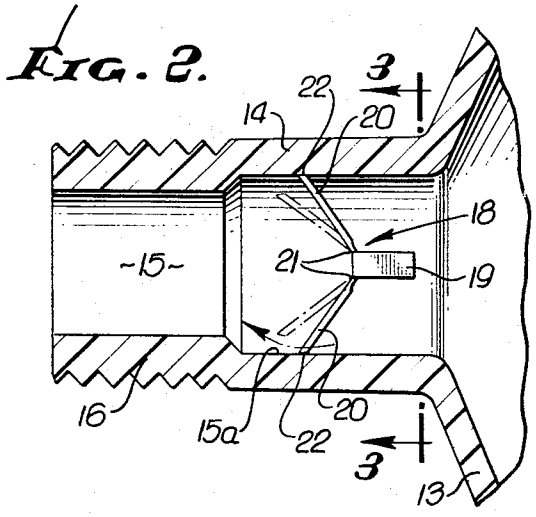


FIG. 3.

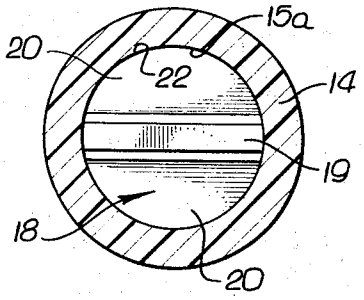


FIG. 4.

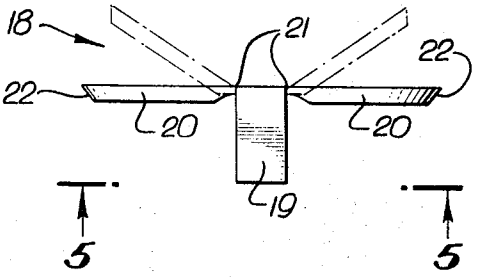
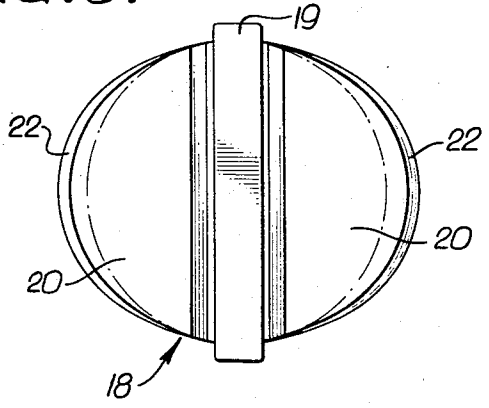


FIG. 5.



INVENTOR.
WALTER B. SPATZ
BY
Bernard Kriegel
ATTORNEY.

FIG. 7.

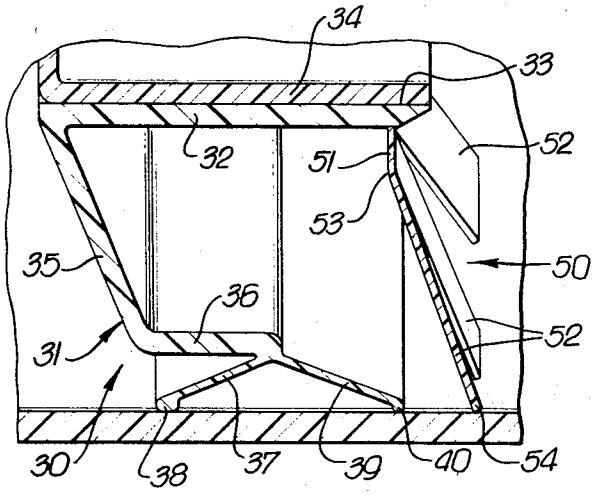


FIG. 6.

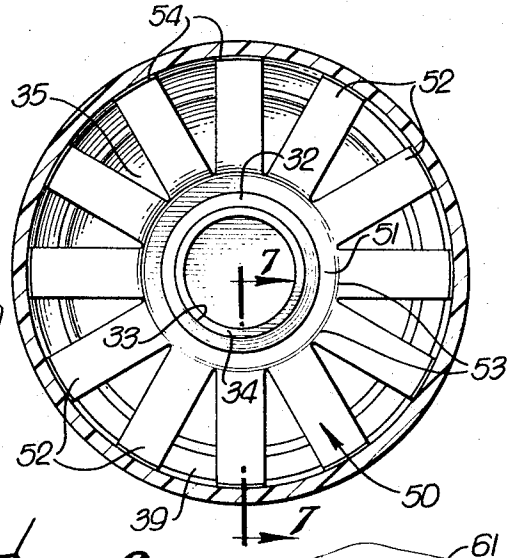


FIG. 8.

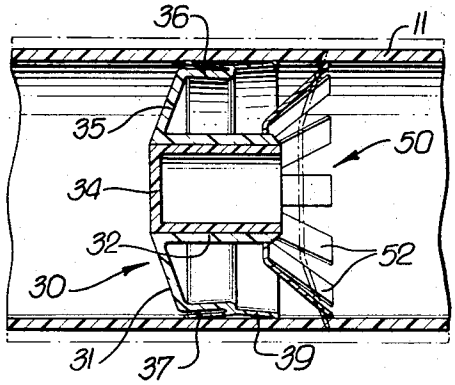


FIG. 9.

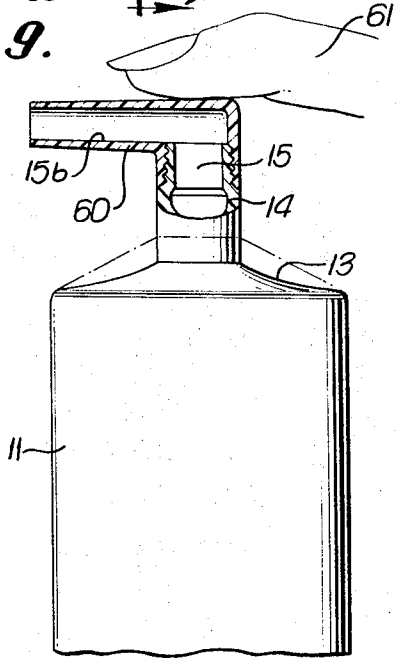
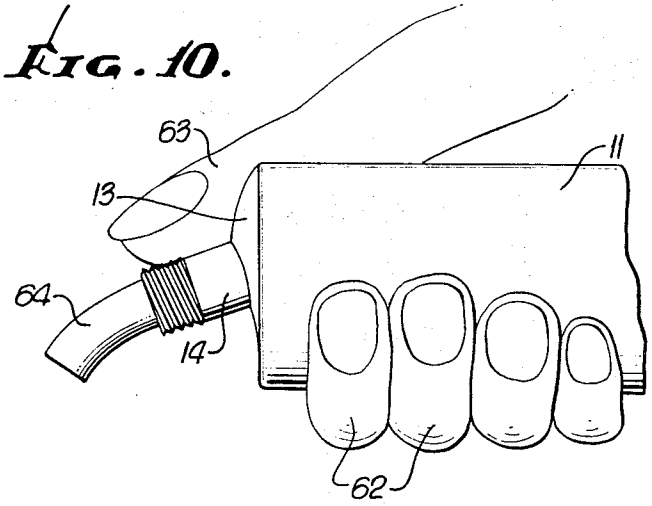


FIG. 10.



INVENTOR.
WALTER B. SPATZ
BY
Bernard Kriegel
ATTORNEY.

DISPENSERS FOR FLUENT MASSES

The present invention relates to dispensers for fluent materials, and more particularly to dispensers including containers from which the fluent materials are dischargeable and in which the effective volume of the containers decreases in accordance with the volume of the material dispensed.

In U.S. Pat. No. 3,088,636, dispensers are disclosed in which a rigid container for a fluent mass has a pliant, elastic head, or forward portion, adapted to be squeezed to effect discharge of a desired part of the mass through a forward outlet, a one-way follower or piston device being disposed in the rigid portion of the container and bearing against the rear of the fluent mass. The follower device embodies a one-way latch gripping the wall of the container to prevent retrograde movement of the follower device in the container when the elastic portion of the container is squeezed. When the squeezing force is released, the elastic portion reassumes its initial shape, producing a partial vacuum in the container forwardly of the follower device and causing air at atmospheric pressure rearwardly of the follower device to move the latter forwardly in the container and against the mass in accordance with the volume of the mass dispensed through the outlet, the latch automatically releasing in the container and allowing such forward movement to occur.

The rigid container type of dispensers performs effectively. However, they possess the limitation of requiring squeezing at a particular location to produce dispensing of the mass, as at the head or forward container portion only. With dispensers embodying the present invention, the containers can be squeezed or deflected at any portion along their length to dispense the fluent mass, and regardless of the location of the one-way follower in the container. Thus, the container may be squeezed at any portion forwardly of the location of the one-way follower in the container, immediately at the location of the one-way follower in the container, and rearwardly of the location of the one-way follower in the container. Deformation of the container at any point and in any direction, such as transversely or axially, results in discharge of a desired portion of the fluent mass through the container outlet. Accordingly, the squeezing action can be performed at any location on the container, since there is no wrong place for such squeezing action to occur.

A further object of the invention is to provide a dispenser embodying a one-way follower device within an elastic container, deformable within the elastic limit of the container, in which the application of a squeezing force on the container at the location of the follower device, or rearwardly thereof, will cause the follower device to advance in the container and dispense the fluent mass in the container through its outlet.

An additional object of the invention is to provide a dispenser of the type above described, which is simple in construction, easy to assemble, economical to produce, and easily filled with fluent material.

This invention possesses many other advantages and has other objects which may be made more clearly apparent from a consideration of several forms in which it may be embodied. Such forms are shown in the drawings accompanying and forming part of the present specification. These forms will now be described in detail for the purpose of illustrating the general principles

of the invention; but it is to be understood that such detailed description is not to be taken in a limiting sense.

Referring to the drawings:

FIG. 1 is a longitudinal view through a dispenser apparatus embodying the invention;

FIG. 2 is an enlarged longitudinal sectional view through the forward portion of the dispenser illustrated in FIG. 1, with the cap removed;

FIG. 3 is a section taken along the line 3—3 on FIG. 2;

FIG. 4 is a side view of the butterfly valve forming part of the apparatus, in an unrestrained condition;

FIG. 5 is a view taken along the line 5—5 on FIG. 4;

FIG. 6 is an enlarged section taken along the line 6—6 on FIG. 1;

FIG. 7 is an enlarged section taken along the line 7—7 on FIG. 6;

FIG. 8 is a somewhat diagrammatic view of a portion of the apparatus in the region of the piston follower;

FIG. 9 is a side elevational view, partly in longitudinal section, of the forward portion of a modified dispenser apparatus;

FIG. 10 is a side elevational view of the forward portion of yet another modification of the dispenser apparatus.

A dispenser 10 is disclosed in FIGS. 1 to 8, which includes a container 11 of generally cylindrical shape having an open rear end portion 12 and a forward end wall 13 terminating in a nozzle 14 having a discharge passage 15 establishing communication between the interior of the container and the exterior of the nozzle. The outer portion 16 of the nozzle may be threaded to receive a suitable screw-type of removable cap 17.

A check valve 18 is disposed in the nozzle passage 15 to permit ejecting of a fluent mass disposed within the container through the nozzle passage, but to prevent its return movement therethrough. As specifically disclosed, the check valve is in the form of a butterfly valve, including a cross member 19 adapted to frictionally fit within the nozzle passage 15, there being forwardly diverging wings 20 integral with and extending from the cross member, the wings being deflectable about hinge lines 21 where they join the cross member. The outer portions or perimeters 22 of the wings 20 are elliptical in shape to sealingly engage the cylindrical wall 15*a* of the passage when engaged therewith in a divergent condition, as disclosed in FIG. 2. However, pressure applied to the fluent material within the container will cause such fluent material to deflect the wings 20 toward each other about their hinge lines 21 to permit passage of the fluent material around the wings, for continued movement through the passage 15 and for discharge therefrom (broken line position in FIG. 2). The relieving of the pressure on the fluent mass will allow the wings 20 to inherently return to their initial position in sealing engagement with the wall 15*a* of the cylindrical nozzle passage.

The entire butterfly valve 18, which, as stated above, is a one-piece integral structure, can be made of a suitable pliant, elastic material, such as polypropylene, polyallomer, or polyvinyl chloride. Other suitable materials can be used which are semi-rigid, but adequately deformable within their elastic limits.

The container 11 itself is made of a suitable pliant, elastic material, such as those mentioned above in connection with the butterfly valve 18. Thus, the container is deformable throughout its length, as well as its for-

ward end wall 13 and nozzle 14, within its elastic limit to change the volume within the container, relieving of the deforming force resulting in the container inherently returning to its initial shape.

The fluent material, which, for example, may be toothpaste, cosmetic cream, mayonnaise, or a similar substance, is retained within the container by a one-way follower or piston 30 mounted initially in the rear of the container (FIG. 1). This one-way follower or piston includes a relatively rigid body 31 having a central hub 32 providing a passage 33 through which the fluent material can be disposed within the container forwardly of the follower; ordinarily when the one-way follower device is mounted in the rear portion of the container. After filling, the passage 33 is closed by a plug 34 disposed within the central portion or hub 32 and frictionally engaging its wall, so as to be retained therewithin.

The piston body 31 includes a forward transverse wall 35 integral with a rearwardly extending skirt portion 36 that has an external diameter substantially less than the diameter of the inner wall 11*a* of the container. Integral with and extending from the rear portion of the skirt 36 is a forwardly facing divergent lip seal 37, the free end 38 of which is in slidable sealing engagement with the container wall 11*a*. Extending rearwardly from the rear end of the skirt is a rearwardly facing lip seal 39 that diverges in a rearward direction, with its free end 40 sealingly engaging the inner wall 11*a* of the container. The lip seals 37, 39 are deformable through the application of a squeezing force on a portion of the container 11 at or near the location of the one-way follower 30, the lip seals inherently returning to their initial shape and condition when the squeezing force is removed. Although the piston body 31 is relatively rigid, when compared with the pliant, elastic characteristics of the forwardly facing and rearwardly facing divergent lip seals, the application of an abnormal deforming force to the container 11 and to the follower 30 will result in deformation of the piston body itself within its elastic limit, the body 31 returning to its initial shape and condition when the deforming force has been removed. Ordinarily, the squeezing force applied to the container in the region of the lip seals will merely deflect the lip seals inwardly, and without the end portion 38 of the forwardly facing lip seal 37 being brought into engagement with the skirt 36 of the piston body.

As described hereinbelow, the follower device 30 is movable in a forward direction after dispensing of the fluent mass or material from the container, being caused to shift in the container a distance corresponding to the volume of the fluent material discharged through the nozzle passage 15. However, return or retrograde movement of the follower device in the container is prevented by a one-way gripper or latch device 50 forming part of the follower 30. As disclosed, the one-way gripper or latch includes a central portion 51 press-fitted upon the periphery of the central portion or hub 32 of the piston body, this central portion being integral with flexible, radial fingers 52 extending therefrom, the fingers deflecting about hinge lines 53 where they join the central portion 51 as the latch device 50 is inserted in the container through its rear end 12, to assume positions inclined in a transverse and rearward direction, and with the outer ends 54 of the fingers or arms engaging the container wall 11*a*. The arrangement is such that the fingers 52 merely slide along the inner wall of the container when the follower device 30 moves in a forward direction within the container 11, but any tendency of the follower device to move rearwardly in the container causes the outer ends 54 of the fingers to grip or latch against the inner wall 11*a* of the container. In other words, the one-way follower device can move forwardly within the container, but is prevented from moving rearwardly therewithin.

As is true of the piston body 31, lip seals 37, 39, and hub portion 32, the one-way latch device 50 may also be made of a suitable elastic material, such as steel, phosphor bronze, acetal, and the like, deflectable within its elastic limit, but which will return to its initial position within the container 11 when the deflecting force is removed.

Prior to filling of the container 11, the butterfly valve 18 is inserted through the rear 12 of the container and placed within the rear portion of the nozzle passage 15. The follower device 30, including the piston body 31, lip seals 37, 39, and latch portion 50, are then mounted within the cylinder 11 at its rear portion, after which the fluent material is inserted through the filler passage 33 to substantially completely fill the volume of the container forwardly of the one-way follower device 30. The plug 34 is then inserted within the filler passage to close the same.

The container 11 can be squeezed at any portion and the fluent mass will be discharged past the butterfly valve wings 20 and from the nozzle passage 15. The pressure imparted on the fluent mass cannot shift the follower device 30 in a rearward direction in view of the gripping action of the fingers 52 against the container wall 11*a*. When the deforming force on the container is relieved, it will inherently return to its initial shape, the butterfly valve 18 closing to prevent atmospheric air from entering the container through the nozzle passage 15, the reassuming by the container of its initial shape creating a partial vacuum in the container forwardly of the follower device 30, which then causes the ambient air at atmospheric pressure to act upon the follower piston device and shift it forwardly within the container 11 and against the fluent mass therewithin. The action just described will occur as a result of applying a deforming or squeezing force against the pliant, elastic container 11 forwardly of the follower device 30.

The dispensing action will occur if the squeezing force is applied to the container 11 at the location of the follower device 30. Thus, such squeezing action will cause the fingers 52 of the one-way latch to move transversely toward each other (FIG. 8), resulting in a forward shifting of the piston body 31 and its seals 37, 39 along the container (as indicated by the movement of the latch from the dotted line position to the full line position in FIG. 8), causing the fluent material to deflect the valve wings 20 inwardly, or to an open position, and discharge through the nozzle passage 15. The removal of the deforming force will result in the piston body 31 and lip seals 37, 39 remaining in the position in the container to which they have been shifted, the fingers 52 inherently assuming their initial shape and sliding forwardly along the inner wall of the cylinder and to a position in which all fingers may again grip the cylinder wall 11*a* to prevent retrograde movement of the entire follower device 30.

If it is assumed that a substantial portion of the fluent mass has previously been discharged from the container and that the follower device **30** is at a mid location along the length of the container, the squeezing of the container at a location rearwardly of the follower device will result in the deforming force on the container again being transmitted to the deflectable fingers **52**, as illustrated in FIG. **8**, shifting some of them transversely toward each other and causing the follower device **30** to be positively shifted forwardly within the container to discharge a desired portion of the fluent mass past the butterfly valve **18** and through the nozzle passage **15**.

It will be apparent that the squeezing of the container forwardly of the follower device **30** will result in the latter remaining within its position within the container, a part of the fluent mass being discharged past the check valve **18** and through the passage **15** to the exterior of the nozzle **14**, the relieving of the deforming force allowing the container forwardly of the follower to reassume its initial shape, creating the partial vacuum therewithin and causing air at atmospheric pressure to automatically shift the follower **30** in a forward direction within the container **11**. On the other hand, the squeezing of the container at the location of the follower device or rearwardly thereof will cause the inward deflection of the fingers **52** to mechanically shift the follower device **30** in a forward direction against the fluent mass and cause discharge of the latter past the butterfly valve **18** and through the nozzle passage **15** to the exterior of the latter. Regardless of where the elastic container **11** is squeezed, the result will be the forward movement of the follower device **30** within the container, the follower device being prevented from moving rearwardly within the container.

The container may be deformed forwardly of the follower through application of force in a variety of directions. Thus, exertion of endwise or axial pressure against the nozzle **14** will cause the forward end **13** and, perhaps, an adjacent cylindrical portion of the container **11** to reduce the container volume forwardly of the follower device **30** and result in discharge of the fluent mass through the nozzle. To facilitate this action, a side spout member **60** (FIG. **9**) may replace the cap **17** on the nozzle, so that axial pressure can be exerted upon the side spout member, as by a person's finger **61**, resulting in the fluent mass being discharged through the passage **15***b* of the spout member.

The container may be kinked, as by exerting lateral pressure upon the nozzle **14** (FIG. **10**) through use of a person's fingers **62** and thumb **63**, resulting in the inward deflection of part of the forward end wall **13** and a decrease in the internal volume of the container forwardly of the one-way follower **30**, which is prevented from moving rearwardly by the one-way latch or gripper device **50**, the decrease in volume causing discharge of the fluent mass through the nozzle passage **15**. To facilitate the kinking action, and the control of the direction of discharge of the fluent mass, a tubular extension **64** may be mounted on the nozzle **14**, as illustrated in FIG. **10**.

It is apparent that a dispenser apparatus has been provided which will result in dispensing of the fluent mass therewithin regardless of where the deforming force is applied to the container, whether the squeezing force occurs transversely of the container **11**, forwardly of the follower **30**, at the location of the follower, or rearwardly of the follower. In addition, the required decrease in the internal volume of the container **11** forwardly of the follower **30** may be effected by the exertion of an axial force against the container or nozzle, or by its kinking or other type of deflection.

I claim:

1. In a dispenser for a fluent mass: a pliant, elastic container for the mass and having a discharge outlet, said container being adapted to be deformed by squeezing at all locations throughout its length; pliant, elastic laterally deformable piston follower means in said container movable toward the outlet and against the mass in the container, said follower means having seal means thereon slidably and sealingly engaging the inner wall of said container to prevent rearward leakage of fluid past said seal means and forward leakage of air past said seal means; said follower means including one-way latch means engageable with the container wall for preventing substantially all movement of said follower means in said container in a rearward direction away from said outlet while permitting movement of said follower means in the container in the forward direction; squeezing of any portion of said container forwardly of said follower means reducing the volume of said container forwardly of the follower means to dispense a portion of the mass through the discharge outlet, said container portion then returning to its initial shape to create a partial vacuum in said container forwardly of said follower means, whereby said one-way latch means releases and said follower means is moved by air at atmospheric pressure forwardly in said container toward said outlet, squeezing of said container in the region of said follower means and rearwardly of said follower means deflecting said follower means and latch means and causing said latch means to move said follower means in a forward direction within said container; and means for closing said outlet against flow of fluid therethrough into said container.

2. A dispenser as defined in claim **1**; said latch means comprising rearwardly diverging deflectable fingers engaging the inner wall of said container.

3. A dispenser as defined in claim **1**; said latch means comprising rearwardly diverging deflectable fingers engaging the inner wall of said container; said closing means comprising a one-way valve that automatically opens to permit discharge of the fluent mass through said outlet and automatically closes to prevent flow of fluid through said outlet into said container.

4. A dispenser as defined in claim **1**; said closing means comprising a one-way valve that automatically opens to permit discharge of the fluent mass through said outlet and automatically closes to prevent flow of fluid through said outlet into said container.

* * * * *