Sept. 5, 1967 C. BLOCK ETAL 3,339,810

DISPENSING APPARATUS

Filed Jan. 26, 1966

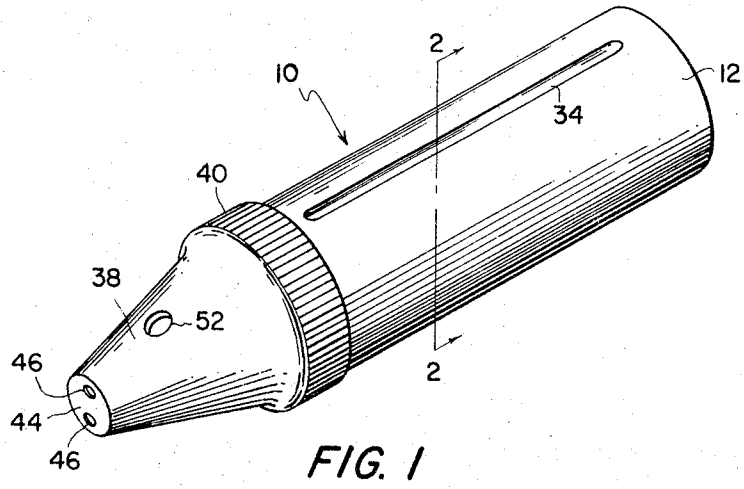


FIG. 1

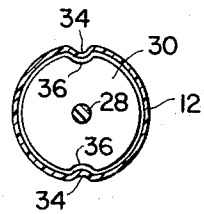


FIG. 2

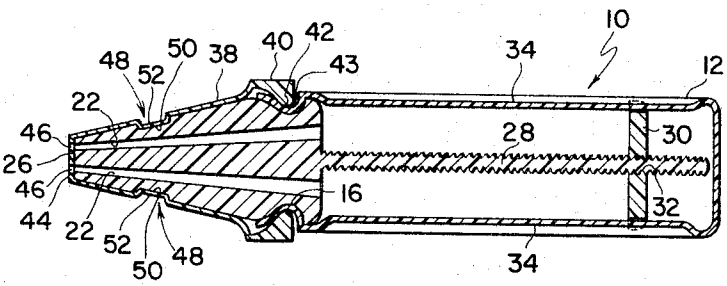


FIG. 3

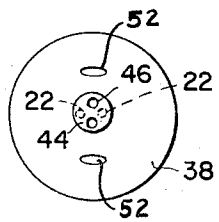


FIG. 6

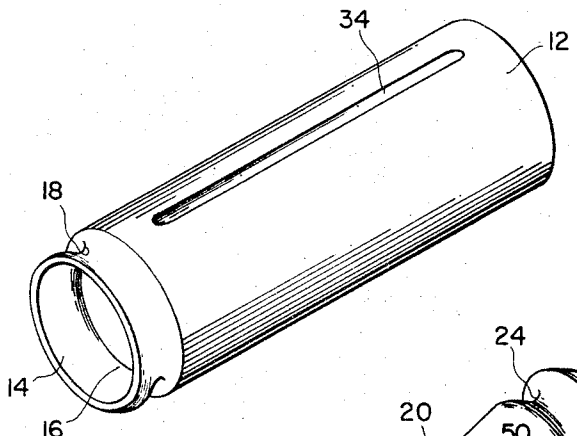


FIG. 4

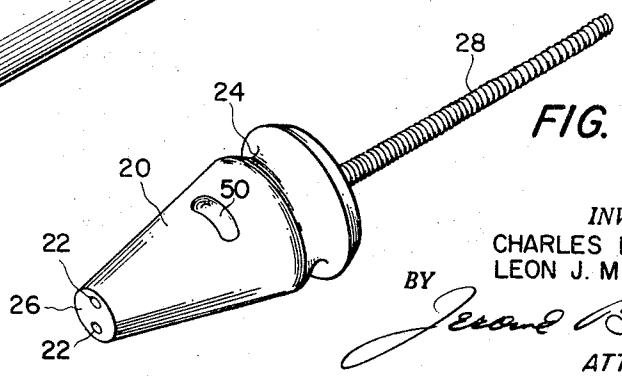


FIG. 5

INVENTOR.
CHARLES BLOCK
LEON J. MINTZ

BY Jerome Bauer

ATTORNEY.

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DISPENSING APPARATUS

Charles Block, 1129 Albert Road, North Bellmore, N.Y. 11710, and Leon J. Mintz, 7 Valley Road, Syosset, N.Y. 11791

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This invention relates generally to a dispensing apparatus for storing and dispensing viscous fluids such as shaving cream, tooth paste and the like, and more particularly pertains to a dispensing apparatus of the type that includes a movable piston for forcing the contents of the dispenser through a dispensing valve.

Dispensing apparatuses of the "piston" type which are used to dispense tooth paste or similar substances normally include a tube having a dispensing valve at one end and a piston movably received within the tube. The displacement of the piston toward the valve forces the contents of the tube through the valve. The movement of the piston is effected by a feed screw that threadedly engages the piston and causes axial movement of the piston upon rotation of the screw. Conventionally, devices of the above-described type are provided with removable closure members which seal the apparatus prior to its use and which are thereafter discarded. Under normal operating conditions, a portion of the contents of the tube remains in the valve after each use of the apparatus. Hence, this residue becomes susceptible to contamination and provides an environment for the breeding of bacteria. Moreover, the provision of a replaceable cap still leaves much to be desired. That is to say, because of the viscosity of the contents of the tube a flash of the material is normally deposited about the valve passages. When the cap is placed on the tube, the flash is compressed between the lower edge of the cap and the tube thereby again providing material wherein bacteria may multiply and present a health hazard, particularly where the material is tooth paste.

The desideratum of the present invention is to provide a dispensing apparatus of the movable piston type which includes means for effectively sealing the apparatus during periods of non-use and for eliminating contact of the material in the apparatus with sources of contamination, such as the atmosphere.

Another object of the present invention is to provide a dispensing apparatus of the movable piston type which includes a sealing cap that is permanently affixed to a tube to prevent its loss.

Other objects and features of the present invention reside in the novel details of construction which provide a dispensing apparatus having a cap thereon which is movable between a sealing position and a position wherein a passage is provided through the cap for the exit of the contents of the apparatus therethrough thereby preventing the build-up of material between the cap and the tube that may later become contaminated.

Other and further objects of this invention reside in the structures and arrangement hereinafter more fully described with reference to the accompanying drawings in which:

FIG. 1 is a perspective view of a dispensing apparatus constructed according to the present invention,

FIG. 2 is a sectional view of the dispensing apparatus taken along line 2—2 of FIG. 1,

FIG. 3 is a cross-section of the apparatus shown in FIG. 1 with the cap oriented to provide for the flow of the contents of the apparatus therethrough,

FIG. 4 is a perspective view of the tube portion of the apparatus shown in FIG. 1,

FIG. 5 is a perspective view of a head and screw shaft forming a portion of the dispensing apparatus shown in FIG. 1, and

FIG. 6 is a side elevation of the apparatus shown in FIG. 1 with the cap thereof oriented to seal the dispensing passages.

The present invention contemplates the use of a tube having a head rotatably mounted thereon. The head is provided with passages to provide a dispensing valve through which the contents of the tube may exit. A piston is axially movable within the tube and is selectively operable to force the contents of the tube through the aforementioned passages. Movement of the piston is effected by the rotation of the head. In accordance with the construction of the present invention, a cap is rotatably mounted on the tube and is connected to the head by a lost motion connection so that the cap has limited rotational movement with respect to the head. Thus, the cap is movable with respect to the head between a first position wherein the cap seals the passages in the head and separates the material in the tube from the material outside of the tube and a second position wherein the cap provides a path for the passage of the contents of the tube through the dispensing valve. Hence, during periods of non-use, this cap seals the dispensing apparatus to prevent air from contacting the contents to prevent contamination of the same. Moreover, a partial rotation of the cap unseals the apparatus and continued rotation of the cap in the same direction forces the contents of the apparatus out of the tube.

More particularly, the dispensing apparatus of the present invention is designated generally by the numeral **10** in the figures and includes a hollow tube **12** which is adapted to receive a viscous fluid to be dispensed such as tooth paste, shaving cream or the like. The tube **12** is provided with an open end **14**, see FIG. 4, an internal annular surface forming a bead **16** adjacent to the open end **14** that defines an external annular recess **18**, positioned adjacent to the open end of the tube. Received within the open end **14** of the tube **12** and sealing the same is a head **20** fabricated from a resilient material such as polyethylene. The head **20** is frusto-conical in shape and is provided with a pair of through passages **22** that taper forwardly and inwardly toward the axis of the head to provide a part of a dispensing valve. Adjacent to the enlarged end of the head **20** is an annular recess **24** that receives the bead **16** therein in rotatable engagement therewith so that the head **20** extends forwardly beyond the open end **14** of the tube **12**. Thus, the head **20** tapers inwardly from the open end of the tube **12** to provide a front end surface **26** of relatively small cross-sectional area.

Integral with the head **20** and extending longitudinally into the tube **12** from the rear surface of the head is a screw shaft or feed screw **28**. In practice, the screw shaft **28** and the tube **12** are coaxial. A piston **30**, having a central internally threaded aperture **32** is received within the tube **12** in sliding engagement with the walls thereof so its aperture **32** is in threaded engagement with the screw shaft **28**. Opposed longitudinally extending internal ribs **34** (FIG. 2) are provided on the interior wall of the tube **12** and are received in complementary formed opposed grooves **36** in the piston **30** to prevent rotation of the piston **30** relative to the tube **12** and to guide the piston for longitudinal movement along the length thereof. Accordingly, rotation of the head **20** will effect axial movement of the piston **30** in the tube **12** due to the threaded interconnection between the screw shaft **28** and the piston and the guiding engagement between the ribs **34** and the grooves **36**. Hence, the displacement of the piston **30** toward the head **20** will cause the piston **30** to apply a force against the contents in the tube **12** in front of it to force the contents out of the tube **12** through the passages **22** of the dispensing valve. If the contents of the tube is tooth paste, it may be applied to a tooth brush.

In accordance with the construction of the apparatus of the present invention, a hollow cap **38** is provided to seal the passages **22** when the dispensing apparatus **10** is not in use thereby to prevent the contents of the tube from becoming contaminated. More particularly, the cap **38** is frusto-conical in shape similarly to the head **20** and is provided with a rearwardly extending flange **40** having an internal annular bead **42** adjacent to open end **43**. The bead **42** is rotatably received in the external recess **18** of the tube **12** to non-removably and rotatably connect the cap **38** with the tube **12**. The cap **38** is sized to rotatably receive the head **20** therein with end wall **44** of the cap in sliding engagement with the front surface **26** of the head. Provided in the end wall **44** of the cap **38** are a pair of through apertures **46** which are adapted to be aligned with respective passages **22** when the cap **38** is in one position. However, the end wall **44** is adapted to seal the passages **22** when the cap **38** is in another position with respect to the head **20**.

A lost motion connection between the cap **38** and the head **20**, designated generally by the numeral **48** in FIG. 3, limits the rotational movement of the cap between the aforementioned first and second position relative to the head **20**. Thereafter, continued rotation of the cap **38** will cause the head **20** to rotate in the same direction as the continued rotation of the cap. The lost motion connection **48** comprises a pair of opposed circumferentially extending elongated recesses **50**, provided in the wall of the head **20**. Opposed projections **52** extend inwardly from the wall of the cap **38** and are slidably received in the respective recesses **50**. The projections **52** are of smaller circumferential extent or dimensions than the respective recesses **50**, so that when the respective projections **52** abut one end of the recesses **50**, the cap **38** will be in the second position whereby the apertures **46** are aligned with the respective passages **22** (FIG. 3). On the other hand, when the projections **52** abut the other end of their respective recesses **50**, the cap **38** will be in the first position and the end wall **44** will cover to seal close the ends of the passages **22**, as shown in FIG. 6.

In operation, the cap **38** is rotated relative to the tube **12** and the head **20** until the cap **38** is oriented in one of its positions with the apertures **46** aligned with the respective passages **22** in the head. During a portion of the rotative movement of the cap **38** from the sealing to the unsealing position, the head **20** remains stationary by virtue of the lost motion connection **48** between projections **52** in their recesses **50** of the cap **38** and the head **20** respectively. However, once the cap **38** is rotated to position the projections **52** such that they abut the opposite end walls of their respective recesses **50** in the head **20**, the apertures **46** are automatically aligned with passages **22** to enable material to be dispensed from the tube **12**. Further or continued rotation of the cap **38** in the same direction causes the head **20** to rotate with it. This continued rotation of the cap **38** causes a corresponding rotation of the screw shaft **28** which similarly effects axial displacement of the piston **30** toward the head **20**. This results in the application of a dispensing force on the contents of the tube **12** causing the same to exude through the passages **22** and the respective aligned apertures **46**.

When it is desired to seal the passages **22** of the dispensing apparatus **10**, the cap **38** is rotated in the reverse direction to the first position wherein the projections **52** abut the other end walls of the respective recesses **50**. During this reverse movement of the cap, the projections **52** move freely within their respective recesses **50** toward the other end walls thereof. In like manner, the end **44** of the cap also rotates relative to the end wall **26** of the head **20**. This causes a movement of the apertures **46** relative to the passages **22** so that in this orientation of the cap **38** relative to the head **20** apertures **46** move out of alignment with the passages **22** so the end wall **44** of the cap seals the open or exit ends of the passages **22**, as shown in FIG. 6, thereby closing the passages and preventing air from reaching the tube contents which remain in the passages **22**. Thus, the contents such as tooth paste are thereby prevented from becoming contaminated. Moreover, this results in a clean end **44** on the apparatus **10**. Thereafter, continued reverse movement of the cap **38** will cause a retraction of the piston **30** within the tube **12** that creates a suction on the contents to withdraw it from the ends **26** and **44**.

In practice, the outer surface of the flange **40** of the cap **38** may be knurled to facilitate the grasping thereof to effect rotation of the cap. Additionally, the elements comprising the dispensing apparatus **10** may be fabricated from a resilient plastic material so that the apparatus may be assembled easily. For example, the head **20** is inserted into the tube **12** so that the open end **14** is spread radially until the bead **16** is received in the recess **24** whereupon the tube **12** again contracts into its natural shape to provide a seal between the tube and the head which prevents the flow of the contents of the tube therebetween.

Accordingly, a dispensing apparatus has been provided which includes a cap that is permanently affixed to a tube and which is adapted to effectively seal the apparatus during periods of non-use.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment thereof, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art, without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the claims appended hereto.

We claim:

1. A dispensing apparatus comprising
a tube having an open end,
a head rotatably mounted in said tube and closing said open end,
at least one through passage in said head communicating with the interior of said tube,
means in said tube moving in response to the rotation of said head for causing the contents of said tube to move through said passage,
a hollow cap rotatably connected to and enclosing the open end of said tube and encompassing said head to receive the same therein, said cap being movable relative to said head and tube between a first position wherein said cap seals said passage in said head and a second position wherein said cap opens said passage to provide for the flow of the contents of the tube therethrough and to rotate said head with said cap, and lost-motion connecting means between said cap and said head to rotate said head with said cap when said cap is in said second position and providing free limited rotative movement of said cap relative to said head from said second position to said first position.

2. A dispensing apparatus according to claim **1**,
and an internal bead on said tube adjacent the open end thereof,
and an annular recess on said head adjacent the bottom surface thereof rotatably receiving said internal bead therein to provide a rotatable connection between said tube and said head.

3. A dispensing apparatus as in claim **1**,
wherein said tube is provided with an external annular recess adjacent to the open end thereof,
and an internal bead on said cap rotatably received in said external recess on said tube to provide a rotatable connection between said tube and said head.

4. A dispensing apparatus according to claim **1**,
wherein said connecting means comprises at least one circumferentially elongated recess in said head,
and a projection on said cap smaller than said recess

and received in said elongated recess for relative movement therein,

said projection abutting one end of said slot when the cap is in said first position,

and said projection abutting the other end of said slot when the cap is moved to said second position whereby further rotation of said cap in the same direction causes concomitant movement of said head to dispense the contents of said tube.

5. A dispensing apparatus as in claim **6**,

wherein said cap is provided with an end wall having an aperture therein,

said aperture in said end wall being adapted to be aligned with the passage in said head when the cap is in said second position,

said end wall being adapted to close said passage in said head when said cap is moved to the first position.

6. A dispensing apparatus as in claim **4**,

wherein said moving means comprises a screw shaft

extending longitudinally in said tube and connected to said head for rotation therewith,

a piston threadably mounted on said screw shaft and slidably received in said tube,

and means on said tube and said piston for preventing rotation of said piston relative to said tube whereby rotation of said screw shaft causes axial movement of said piston.

References Cited

UNITED STATES PATENTS

1,691,861	11/1928	Stout	222—390 X
2,064,308	12/1936	Hopkins	222—548 X
2,163,974	6/1939	Blett	222—390 X
2,765,954	10/1956	Wohlbier	222—548 X
3,027,052	3/1962	Marraffino	222—390 X

ROBERT B. REEVES, *Primary Examiner.*

F. R. HANDREN, *Assistant Examiner.*