

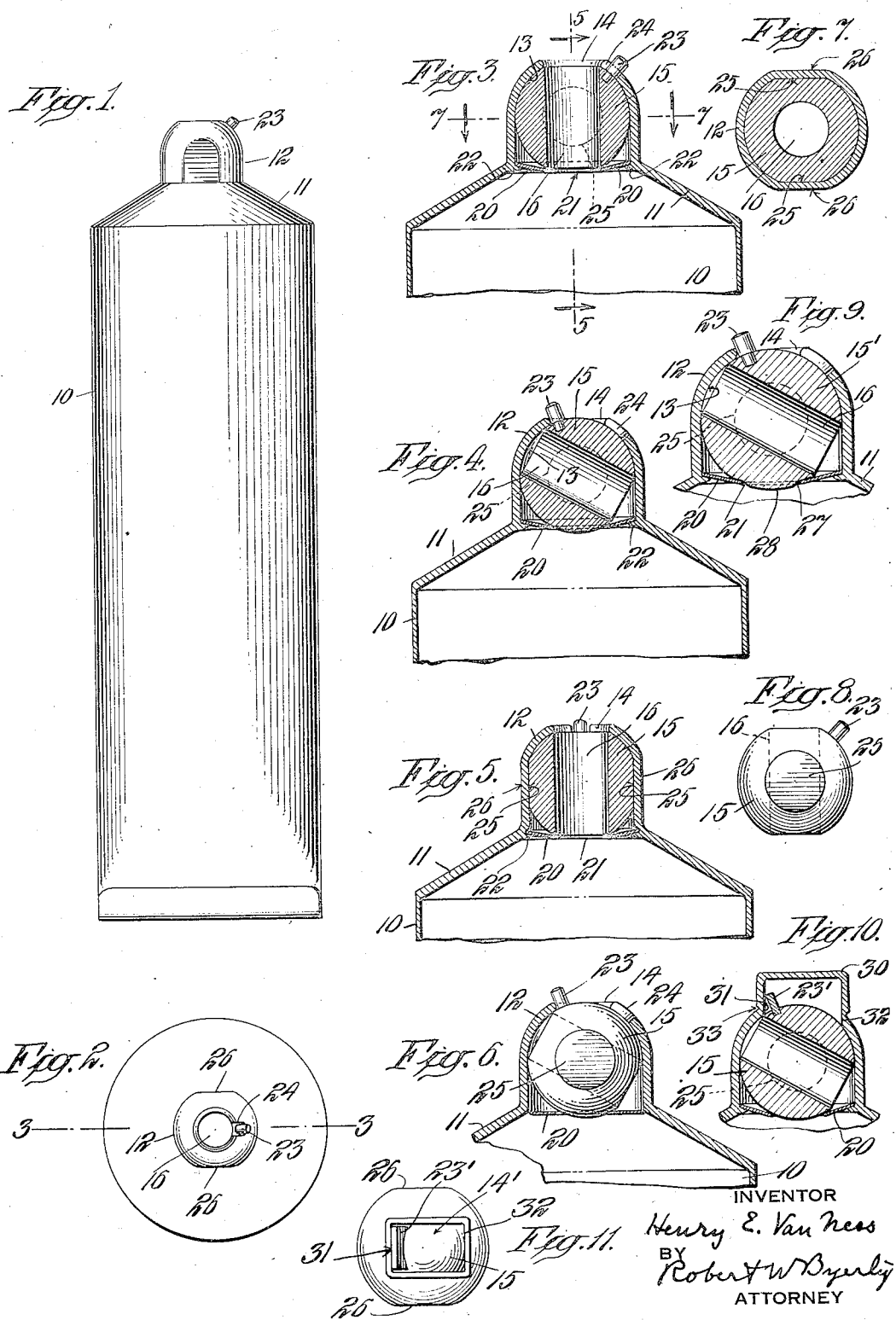
March 3, 1936.

H. E. VAN NESS

2,032,776

DISPENSING CONTAINER AND CLOSURE THEREFOR

Filed Feb. 8, 1934



INVENTOR
Henry E. Van Ness
BY
Robert W. Dyerly
ATTORNEY

UNITED STATES PATENT OFFICE

2,032,776

DISPENSING CONTAINER AND CLOSURE
THEREFOR

Henry E. Van Ness, Elmira, N. Y.

Application February 8, 1934, Serial No. 710,225

10 Claims. (Cl. 221—60)

This invention relates to dispensing containers and closures therefor. It is particularly directed to providing a secure and convenient closure for dispensing tubes such as those in which shaving cream, toothpaste and the like are supplied.

The threaded caps customarily used on such tubes have the advantage of effecting a tight closure, but the disadvantage of being inconvenient in use and easily mislaid. Various types of valve closures have been proposed, usually in connection with screw caps, but they have proved unsuccessful because they have been expensive to manufacture and have failed to effect a tight closing after wear.

The closure which I have invented overcomes these disadvantages. It includes a ball valve with the ball seated in the tube itself so that no cap or separate part is required. The ball is constantly urged into its seat by resilient pressure, so that a tight closing is secured even after wear. The closure may be manufactured at a cost no greater than that of the common screw cap, and is much more convenient in use.

In order that my invention may clearly be understood, I will describe the specific embodiments of it which are shown in the accompanying drawing, in which:

Fig. 1 is a side elevation of a dispensing tube provided with my closure showing the closure in open position;

Fig. 2 is a top view of the tube shown in Fig. 1;

Fig. 3 is an enlarged vertical section of the closure taken on the line 3—3 of Fig. 2 and showing the valve in open position;

Fig. 4 is a similar section of the view showing the valve in closed position;

Fig. 5 is a vertical section on the line 5—5 of Fig. 3 showing the valve in open position;

Fig. 6 is a view similar to Fig. 4 showing the position of the resilient valve seat before it is forced into contact with the ball in the manufacture of the device;

Fig. 7 is a horizontal section on the line 7—7 of Fig. 3;

Fig. 8 is a side view of the valve ball showing the flats which serve as trunnions;

Fig. 9 is a view similar to Fig. 4 showing a modification in which the valve ball is resiliently locked in closed position;

Fig. 10 is a view similar to Fig. 4 showing a modification providing a seal for the tube; and

Fig. 11 is a top view of the form shown in Fig. 10 with the seal cut off.

The tube is formed by extrusion from a single piece of metal to provide a tube body 10, a conical top 11 and a projecting boss 12 at the middle of the top. The boss 12 has straight sides and a rounded end, that is, it has the general shape of a hollow cylinder surmounted by a hollow hemisphere. It provides an upper spherically curved

seat 13 for a valve ball 15. In the center of the seat 13 is a circular discharge opening 14 communicating with a diametrical bore 16 in the ball 15 when the ball is turned to place this bore vertical as shown in Fig. 3.

A resilient disc 20 provides a lower seat for the ball and urges it against its upper seat 13. The disc 20 is most desirably made of stainless steel, but may consist of other resilient material. It contains a central opening 21 which registers with the bore 16 when the bore is vertical.

In making the tube, the lower end of the tube body is left open until the closure is made in the following manner: First, the ball 15 is placed against its seat 13. Then, the disc 20 is placed against the lower side of the ball in its normally flat condition as shown in Fig. 6. Then, a swaging die is introduced through the bottom of the tube body to force the peripheral part of the disc 20 towards the seat 13 and to form an internal annular projection 22 at the inner end of the boss under the disc to hold the disc in a deformed curved condition in which the edge of the opening 21 in the disc is forced by the resiliency of the disc against the ball 15 so as to urge the ball against its upper seat 13. After the withdrawal of the swaging die and the filling of the tube, the bottom of the tube body 10 is closed in the usual manner by folding it over as indicated in Fig. 1. The ball is thus resiliently clamped between its two seats so that it affords a tight closure when its bore is out of alignment with the openings 21, 16, and the tightness of the closure is maintained even after wear on the ball or its seats from repeated opening and closing. The resilient disc automatically takes up for such wear.

To facilitate opening and closing the valve, the ball 15 is provided with a handle 23 which projects through the discharge opening 14. When the handle is at one side of the discharge opening 14, the bore 16 is out of alignment with the opening (Fig. 4), and when the handle is in a notch 24 at the other side of the opening 14, the bore is aligned with the opening (Figs. 2, 3). A feature of the invention consists in guiding the movements of the handle between open and closed position by limiting the turning movements of the ball to a single plane. For this purpose the ball 15 is provided with opposite, parallel, flat surfaces 25, which engage corresponding flat surfaces 26 at the sides of the boss 12. The flat surfaces 26 may be formed by swaging in opposite sides of the boss after the ball has been placed in position in the boss. The center points of the flats, which are the ends of the axis about which the ball turns may be regarded as the poles of the ball, so that the ends of the bore 16 and the handle 23 are located on the equator of the ball and the centers of the openings 21 and 14, as

well as the notch 24, are located in the equatorial plane of the ball.

In the modification shown in Fig. 9, a resilient lock is provided to prevent accidental opening of the valve. The ball 15' is similar to the ball 15 used in the first form except for the fact that it contains a shallow, rounded, circular groove 27 of the same diameter as that of the hole 21 in the disc 20. The center of this groove lies on the "equator" of the ball in such position that it engages the periphery of the hole 21 in the disc 20 when the bore 16 is out of alignment with the openings 21, 14. The ball thus has a short projection 28 (constituted by the portion of its surface surrounded by the groove 27) which lies in the hole 21 when the valve is closed. Consequently, in order to open the valve, the spring disc must be forced slightly downward. The inherent resiliency of the disc resists this movement sufficiently to guard against accidental opening of the valve.

In the modification shown in Figs. 10 and 11, a seal for the tube is provided. In this case, the discharge opening 14' is made rectangular and the material of the boss is extended upward from the edges of this opening and across the opening to provide an offset, integral, sealing cap 30. The sealing cap is offset sufficiently to provide space within it for a flat handle 23' projecting from the ball 15, and adapted to lie against one side 31 of the rectangular opening 14' when the valve is closed, and against the opposite side 32 when the valve is opened. The handle is kept parallel to these two opposite sides 31, 32 of the opening by the engagement of the flat surfaces 25, 26, which are perpendicular to the handle and to the sides 31, 32 at the opening. The sealing cap 30 is severed or broken along a groove 33 when the contents of the tube are first to be used. After this has been done, the handle 23' is accessible, and the valve may be opened and closed by moving it across the discharge opening between the sides 31 and 32 thereof.

The references to the "top" and "bottom" of the tube and its various parts and to "upward" and "downward" movements are used in this specification and the claims which follow to facilitate description of the parts in the position in which the tube is shown in the drawing, and are not intended as limitations or as indicating that the tube need be, or ordinarily is, in this position during either the making or the use of the tube.

What I claim is:

1. A closure for dispensing containers comprising a straight-sided, rounded-end, hollow boss projecting from a wall of the container and providing at its outer end a spherically curved valve seat, a valve ball in said boss, and a metal spring secured in said boss engaging said ball and urging it against the end of the boss.

2. A closure for dispensing containers comprising a straight-sided, rounded-end, hollow boss projecting from a wall of the container, a valve ball in said boss, and a spring disc having its periphery secured in said boss and its inner portion engaging said ball and urging it against the end of the boss.

3. A closure for dispensing containers comprising a straight-sided, rounded-end boss projecting from a wall of the container and having a discharge opening in its end, a valve ball in said boss, and an annular spring disc having its outer periphery secured in said boss so that its

inner periphery bears against said ball and urges it against the end of the boss.

4. A dispensing container having a wall containing a circular hole and having a straight-sided, rounded-end boss projecting from said wall at the periphery of said hole and providing a spherically curved valve seat containing a discharge opening in its end, a valve ball in said boss, and a perforated spring disc in said boss engaging said ball and urging it against the end of the boss, said boss having a retaining projection for said disc struck up on its inner surface after the ball and disc have been placed in it through said hole.

5. A dispensing device, comprising a valve casing containing two seats, one of which is formed of spring metal and tends to move under its own spring action toward the other seat, and a valve ball resiliently pressed between the two seats.

6. A dispensing device, comprising a valve body providing a valve seat and containing a discharge opening, a perforated spring disc secured in said valve body opposite said seat, a valve ball having a projection adapted to fit into the perforation in said disc and containing a passage whose end is spaced from said projection so that it is out of alignment with the discharge opening when the projection is in engagement with the perforation of the disc.

7. A dispensing device, comprising a valve body providing a valve seat and containing a discharge opening, an annular spring disc secured in said valve body opposite said seat, and a valve ball having a shallow, rounded, circular groove adapted to engage the inner periphery of said disc and containing a passage whose end is spaced from said groove so that it is out of alignment with said discharge opening when the groove is in engagement with the inner periphery of the disc.

8. A one-piece dispensing tube having a projecting hollow boss containing a discharge opening in its outer end and having an integral offset sealing cap covering said opening, a valve ball in said boss containing a dispensing passage movable into and out of register with said discharge opening, and a handle on said ball projecting through said discharge opening into the space enclosed by said sealing cap so that it is accessible when the sealing cap is cut off.

9. A closure comprising a valve body providing a spherically curved valve seat containing a rectangular discharge opening of less width than the diameter of the casing, a valve ball in said valve body containing a passage therethrough, a flat handle projecting from said ball into the discharge opening and adjacent to one end of the passage in the ball, and cooperating engaging means on the ball and the valve body limiting the turning movement of the ball to rotation about an axis parallel to the long dimension of said handle and to two opposite ends of the rectangular discharge opening.

10. A self-adjusting dispensing device which comprises a valve body containing a seat, a ball in said valve body, a perforated normally flat spring disc having the edges of its perforation in contact with the ball, and means for securing the periphery of the disc to the valve body in a plane displaced from the plane of the perforation in the disc so that the disc maintains a resilient pressure against the ball.

HENRY E. VAN NESS.