Sept. 27, 1932. D. M. GUNN 1,879,205

VALVE CLOSURE

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Fig. 1.

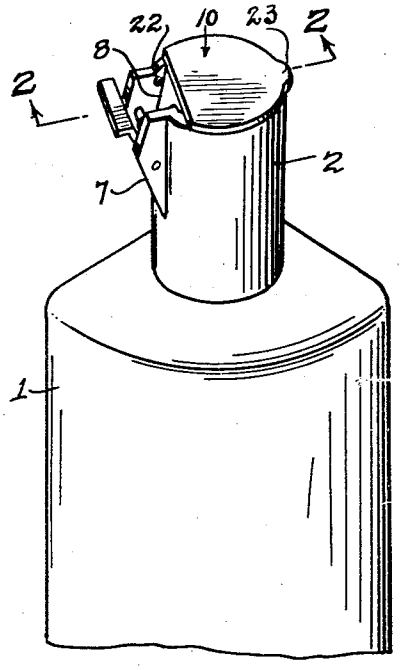


Fig. 3.

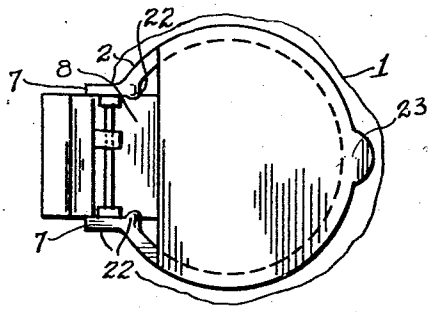


Fig. 2.

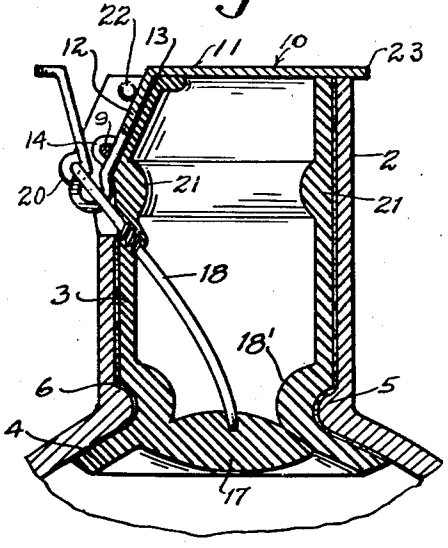
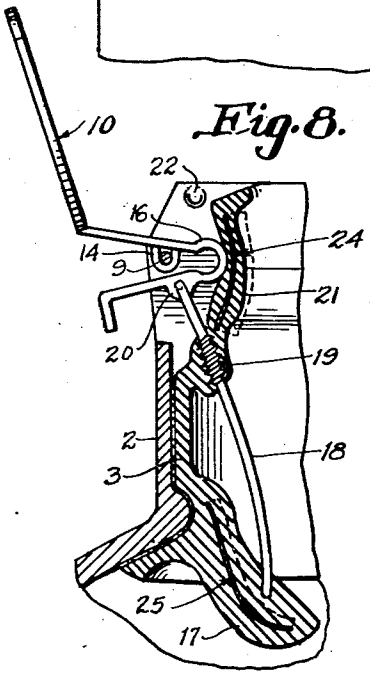


Fig. 8.



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Fig. 6.

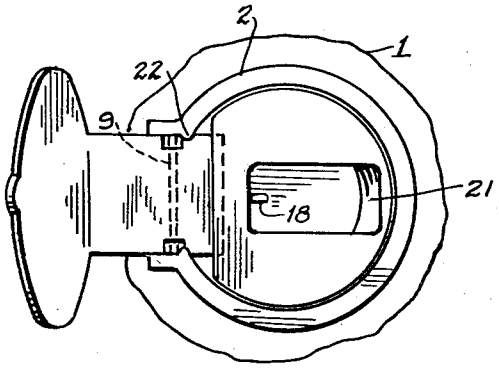


Fig. 7.

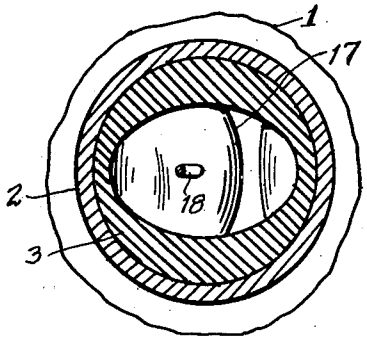


Fig. 4.

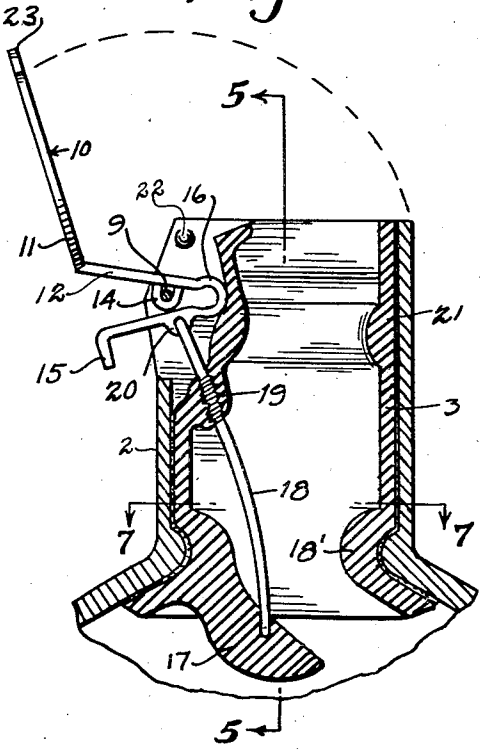
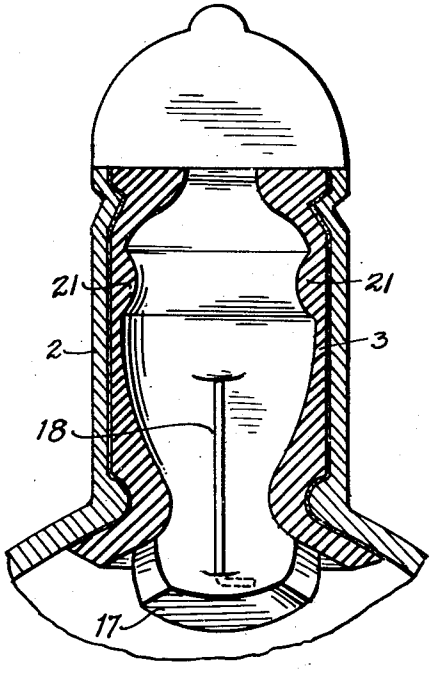


Fig. 5.



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UNITED STATES PATENT OFFICE

DAMON MOTT GUNN, OF FORT WILLIAMS, MAINE

VALVE CLOSURE

Application filed December 8, 1931. Serial No. 579,778.

This invention relates to valves and while in the illustrative embodiment embraced in the following specification, it is shown applied to a collapsible tube in which toilet creams are ordinarily vended, it is equally applicable in any relation or situation wherein its employment may be advantageous or desirable.

One of the objects of the invention is to provide a valve closure including a chamber having simultaneously opening and closing valves at its inner and outer ends, the walls of the chamber being so constructed as to reduce the volume of the chamber during the opening movements of the valves and to hold it so reduced until near the end of the valve closing movement, but to expand said volume just as the closing movement is about to be completed, creating a partial vacuum within said chamber that will tend to draw in any cream, liquid or other matter that may have remained on the outer valve seat, permitting the valve to fit close and true on its seat.

Another object of the invention is to provide a double valved closure for conduits or receptacles, constructed to form a chamber, and the valves and chamber walls functioning as above described, the inner valve being of yielding material whereby it may readily conform to its seat, and the outer valve being metallic and preferably seating flat on the flat end of the chamber structure.

Still another object of the invention is the provision of a hollow tubular structure adapted to be molded and to conform to the inside of a conduit, or the neck or discharging portion of a container and having the valves and functions as above described.

Other objects of the invention relate to the specific construction of the parts, and will appear as the following description of a preferred and practical embodiment thereof proceeds.

In the drawings which accompany and form part of the specification and throughout the several figures of which the same characters of reference have been employed to designate identical parts:

Figure 1 is a perspective view of a container having the invention applied thereto;

Figure 2 is a vertical section taken along the line 2—2 of Figure 1 showing the valves closed;

Figure 3 is a top plan view of the neck of the container, embodying the device of the invention;

Figure 4 is a vertical section showing the valves in open position;

Figure 5 is a vertical section taken along the line 5—5 of Figure 4;

Figure 6 is a plan view with the parts in the position shown in Figure 4;

Figure 7 is a section taken along the line 7—7 of Figure 4; and

Figure 8 is a vertical fragmentary section showing a modified form of the invention.

Referring now in detail to the several figures, the numeral 1 represents the container which by way of example is a collapsible tube of the type ordinarily used in packaging tooth paste and facial creams. It has a neck 2 to which the present invention is applied. The invention comprises a generally cylindrical casing or lining 3 preferably formed of flexible rubber. It is designed to be inserted within the neck 2 and to conform to the inner wall of said neck. The lower part of the casing is preferably flared as indicated at 4 and in order to prevent seepage of the fluid contents between the casing 3 and the wall of the tube it is preferred to cause the flared portion 4 of the casing to adhere in any suitable manner to the inner wall of the tube.

The casing may be molded separately from the tube but by reason of its flexibility it may be deformed to permit its insertion and allocation. The tube may be provided adjacent the base of its neck with a bead 5 fitting a groove 6 which may be molded in the casing. The upper end of the flexible casing 3 ends preferably in a plane common with the upper edge of the neck 2. The rearward part of the neck 2 is formed with ears 7, stamped out from the material of said neck and leaving a space 8. A pin 9 bridges the space between said ears and forms a fulcrum for the outer closure 10. This closure is preferably metallic and includes a flat valve or lid 11 adapted to seat upon the flat end of the casing 3, and a downwardly inclined portion 12 which

engages the adjacent portion of the casing and normally deflects it inwardly as is indicated at 13 in Figure 2.

The closure 10 is also provided with suitable lugs 14 journalled on the pin 9 and beyond said lugs the closure is bent to form a thumb piece 15, utilized in opening and shutting the closure. Between the fulcrum and the thumb piece the closure member is formed with a cam 16 which while normally out of engagement with the flexible side of the casing 3, pushes in on said casing as the closure opens, deforming said casing inwardly as shown in Figure 4.

The lower end of the casing is formed with a preferably integral valve 17, of flexible characteristic which seats against the adjacent portion of the casing 3. The material of the casing against which the valve 17 seats is preferably reinforced by being molded relatively thick as can be seen at 18' in Figure 2.

A rod or wire 18 is, at an intermediate point 19 in its length, threaded or otherwise suitably fixed in that part of the wall of the casing 3 which is subject to deformation by the cam 16. One end of said rod or wire is imbedded in the valve 17. The other end is pivotally connected through an eye 20 formed in the closure member adjacent the thumb piece.

In the opening movement imparted to the valve 11 by the finger piece, the rod 18 is thrust downwardly, simultaneously opening the valve 17 and at the same time assisting the cam 16 in deforming the wall of the casing 3 by pushing it inwardly as shown in Figure 4, thus reducing the volume of the chamber. A reinforcing collar 21 is preferably molded within the casing 3, the purpose of which is to cause the wall of the chamber to spring back into its original form when the pressure of the cam 16 and the thrust of the rod 18 are relieved as the valve 11 assumes its closed position as seen in Figure 2.

Just as the valve 11 closes, and the wall of the casing springs back to its normal shape, the volume of the chamber is increased, creating a partial vacuum by the valves 17 and 11, drawing in any of the contents of the tube or container, which may have remained on the seat of the valve 11. This assures that the valve 11 will close tightly, preventing evaporation and hardening of the material which may be within the neck of the tube.

The lugs 7 may be provided with slight elevations 22 past which the closure 10 snaps in the closing movement of the valve 11, and said valve may be provided as found desirable or necessary with an auxiliary finger piece 23 which may be employed to assist in opening or closing said valve.

While I have shown and described a device of relatively small size, adapted for a collapsible tube container, it is within the purview of the invention to make it larger so as to adapt it for use in larger containers or in conduits generally. In the larger sizes it may be desirable to reinforce the deformable portion of the casing wall with an imbedded resilient metallic insert 24 shown in Figure 8 and in order to give stiffness to the valve 17 it may also be provided with a metallic skeleton 25.

It is to be understood that the details of construction as shown and described are merely by way of example and not as limiting the scope of the invention as claimed.

What I claim is:

1. Valved closure comprising means forming a chamber including valves adjacent opposite ends of said chamber, and means for simultaneously actuating said valves to open or close them, a wall of said chamber being responsive to the actuation of said valves to contract the volume of said chamber when the valves are opened and to expand it when the valves have become substantially seated, creating a vacuum to draw in any matter which may have deposited on the seat of one of said valves.

2. Valved closure comprising means forming a chamber including valves at the outer and inner ends of said chamber, the inner valve being of yieldable material adapted to conform said valve to its seat, and means for simultaneously actuating said valves to open or close them, a wall of said chamber being responsive to the actuation of said valves, to contract the volume of said chamber with the opening of said valves and to expand it when the valves have become substantially seated, creating a vacuum to draw in any matter which may have deposited on the seat of the outer valve.

3. Valved closure comprising means forming a chamber, including valves adjacent opposite ends of said chamber, the outer valve being flat and seating on a planar seat, the inner valve being of yielding material and adapted to conform to a seat, and means for actuating said valves to open or close them, a wall of said chamber being responsive to the actuation of said valves to contract the volume of said chamber when said valves open and to expand it when the valves have become substantially seated, creating a vacuum to draw in any matter which may have deposited on the seat of the outer valve.

4. Valved closure comprising a yielding casing, valves at the ends of said casing cooperating with said casing to form a chamber, the outer valve being flat and seating on a planar seat at the outer end of said casing, the inner valve being made of yielding material so as to adapt it to conform to a seat at the inner end of said casing, means for simultaneously actuating said valves to open or close them, said means comprising an element for deforming the wall of said casing when the valves are opened to contract the volume of said chamber, and to release the deforming

pressure on said casing to permit expansion of the volume of said chamber when the valves have become substantially seated, creating a vacuum to draw in any matter which may have been deposited on the seat of one of said valves.

5. Valved closure for conduits comprising a casing having a deformable wall, an outer closure comprising a valve in the form of a lid, pivotally mounted adjacent said casing, adapted to seat on its outer end, a valve of deformable material adapted to seat on the inner end of said casing, a rod anchored in the deformable wall of said casing, connected at one end to said deformable valve and at the other to said outside closure, for effecting synchronous opening and closing of said valves, a handle on said closure for operating said valves, said closure having a cam bearing against the deformable wall of said casing adjacent the point of anchorage of said rod, and cooperating with said rod to deflect said casing inwardly when the valves are opened, contracting the chamber defined by said casing, and relieving pressure on said casing when said valves are in substantially closed position, restoring the volume of said chamber thereby creating a partial vacuum for drawing in matter that may have been deposited upon the seat beneath said outer valve closure.

6. Valved closure for conduits as claimed in claim 5, the casing being of yielding molded material.

7. Valved closure for conduits as claimed in claim 5, the valve of deformable material being integral with said casing.

8. Valved closure for conduits comprising a rigid surrounding member having an open discharge end and having a slot extending longitudinally from its open end, a flexible molded lining fitting within said surrounding member, extending to the upper end thereof and occluding said slot, a closure pivotally supported by lugs at the sides of said slot, forming a lid seating on the upper end of said lining, a valve of flexible material integral with said lining and finding a seat adjacent the lower end thereof, a rod anchored in the portion of said lining which occludes said slot having one end connected to said lower valve and the other to said closure, for effecting synchronous opening and closing of said closure and said lower valve, said closure being formed with a cam entering said slot and engaging said lining, cooperating with the point of anchorage of said rod for deflecting said lining inwardly when said closure and lower valve are opened, and relieving the pressure upon said lining when said closure and lower valve have become substantially seated, enlarging the volume of the chamber defined by said lining, closure and lower valve thereby producing a partial vacuum within said chamber for drawing in matter which may have become deposited on the end of said lining against which said closure seats.

9. Valved closure for conduits as claimed in claim 8, including a handle for operating said closure and said valve.

10. Valved closure for conduits as claimed in claim 8, the lower valve, and the wall of the lining, in that portion which occludes the slot in said surrounding member, being provided with metallic reinforcement.

In testimony whereof I affix my signature.

DAMON MOTT GUNN.