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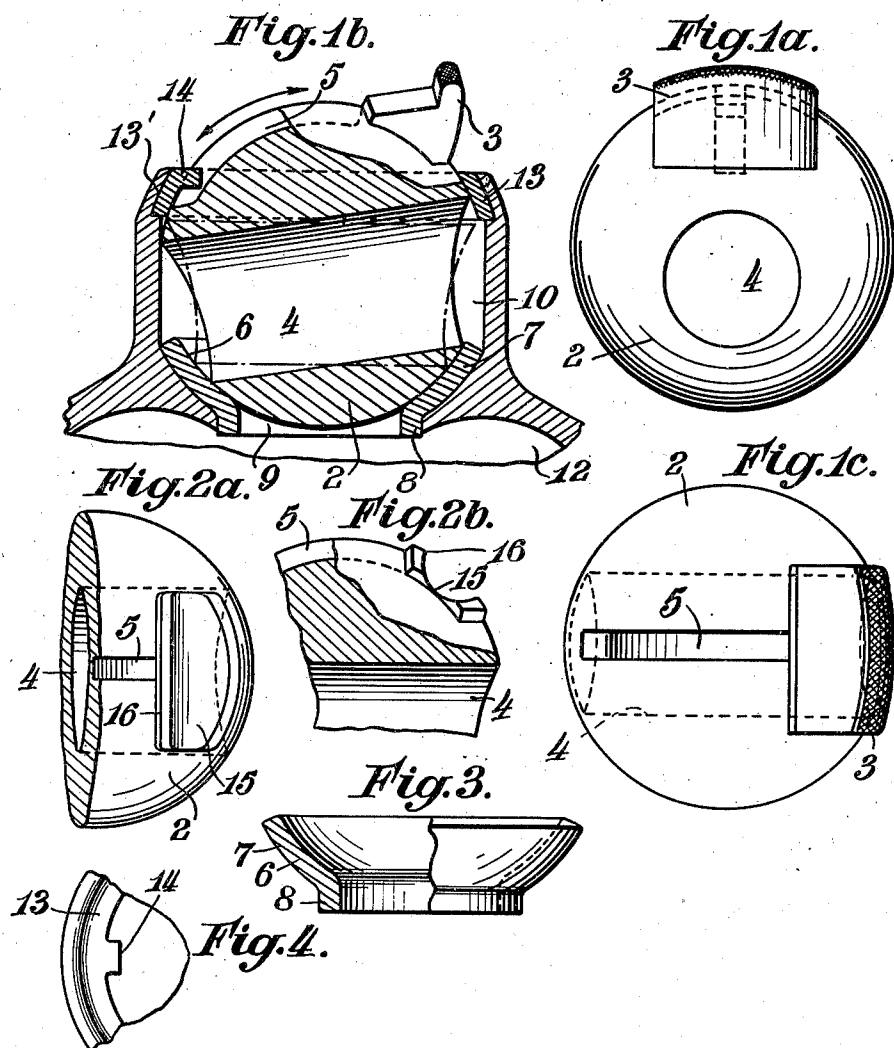
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CLOSURE FOR BOTTLES, COLLAPSIBLE TUBES, AND LIKE CONTAINERS

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2 Sheets-Sheet 1



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2 Sheets-Sheet 2

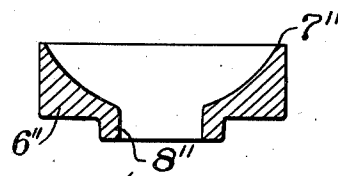
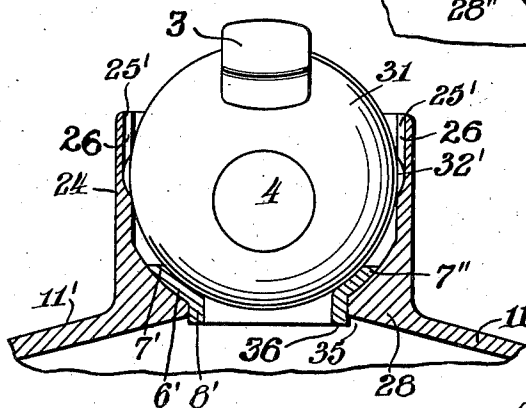
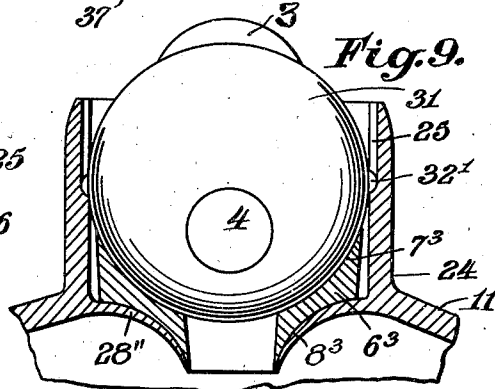
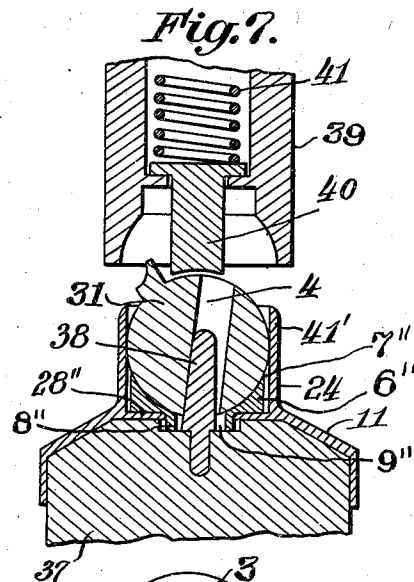
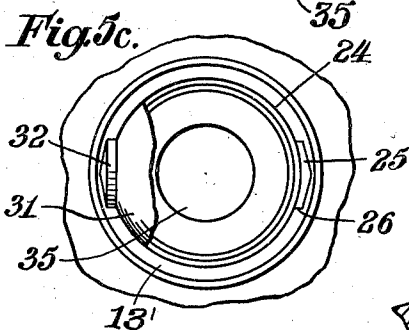
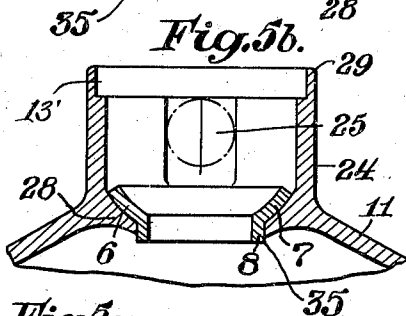
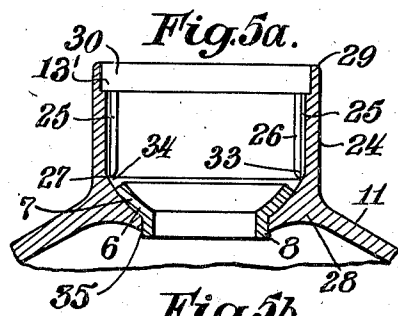


Fig. 6.

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CLOSURE FOR BOTTLES, COLLAPSIBLE
TUBES, AND LIKE CONTAINERSJames Rest, London, England, assignor to No-
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13 Claims. (Cl. 221—60)

This invention relates to closures for bottles, collapsible tubes and like containers and has for its object to provide improvements therein.

In accordance with this invention I provide a closure member for bottles, collapsible tubes and like containers constructed of suitable plastic material or of metal, the closure member being pierced with a conduit and provided with external means for manipulation and with means whereby the closure member is compelled always to rotate about one axis.

This means may be a projection and groove device coacting between the neck and the container and the closure member. The closure member may be provided with bearings in the neck of the container, the said bearings being formed of washers or eyelets of substantially spherical shape adapted to fit the closure member and a projection being disposed thereon adapted to fit with a groove in the closure member. The conduit with which the closure member is pierced may be axially off-set from the centre of the sphere and may taper towards the outlet.

The accompanying drawings illustrate the invention in various forms.

Figs. 1a, 1b, and 1c are respectively an elevation, a part section, and a plan of one form.

Figs. 2a and 2b are respectively a part elevation and a part section of a modified form.

Fig. 3 is a section of a washer.

Fig. 4 is a part plan of another washer.

Figs. 5a, 5b and 5c are respectively two sectional elevations of a modification at right angles to each other and a plan thereof.

Fig. 6 is a section of a further modification.

Fig. 7 is a diagrammatic sectional elevation of one form of tool for closing the container neck about the closure member.

Fig. 8 is a sectional elevation of a further form of washer.

Fig. 9 is a sectional elevation of a further form of my invention.

In the form of device illustrated in Figs. 1a, 1b and 1c I provide a closure member 2 of spherical shape having a protrusion 3 on the surface at a predetermined place. The closure member 2 is pierced with a conduit or hole 4, the axis of which does not pass through the centre of the spherical closure member 2. This conduit may have any desired form and be disposed in any predetermined place. A groove 5 is provided on the outside of the closure member extending in the same plane as the axis of the sphere and the conduit

4 from the projection 3 to within a short distance of the orifice at one end of said conduit.

A washer 6 in the form of an eyelet made of a suitable material is provided of such shape that the upper section 7 is of spherical shape adapted to fit the spherical closure member 2 and the neck 8 of the eyelet is of a size to fit the orifice 9 between the neck 10 of a container 11 and the body 12 of the said container as illustrated in Fig. 1b. I also provide another washer 13, disposed in an annular groove 13' in the upper part of the neck 10 of the container 11, made to fit the spherical closure member 2 in a predetermined place, and this washer I provide with a projection 14 protruding inwardly from the inner surface of the washer at right angles to the edges thereof and adapted to fit the groove 5 in the spherical closure member 2 as illustrated in Fig. 1b.

In use the closure member 2 can be rotated, by manipulation of the projection, into either the position adapted for discharge or the position adapted to cut off the discharge and the engagement of the groove 5 and the projection 14 on the upper washer 13 prevents the spherical closure member turning in other than one direction since the projection 14 in the washer fits into the groove 5 and anchors the spherical closure member so that it may rotate on one axis only. As there are no protrusions on the surface of the spherical closure member to bear on the neck 10 of the container 11 there is no possibility of the neck 10 of the container 11 being distorted with the consequence of a leak being caused.

In the modified form of the invention illustrated in Figs. 2a and 2b, the spherical closure member 2 instead of being provided with a protrusion as in the previous case, is indented at 15, the indentation having extended edges 16. As before, the closure member 2 is provided with a conduit 4 for discharge of the contents of the container 11 and with a groove 5 adapted to engage as before with a projection 14 in an upper washer 13. The indentation 15 is of oblong shape and the extended edges 16 are provided on the two longest sides so as to protrude above the surface of the sphere and form two lips with sharp edges to allow of the fingers obtaining friction grip for the purpose of rotating the spherical closure member. As described with reference to the previous example the spherical closure member 2 is adapted to be seated in the upper and lower washer contained in the neck of the container.

In a further modified form of device as illus-

trated in Figs. 5a, 5b, and 5c the neck 24 of the container 11 is provided with lateral grooves 25 on its inner periphery, said grooves 25, 25 running parallel with the axis of the container 11, the grooves 25 having flat sides as at 26, and tapered off at 27 about two thirds of the way down the neck of the container 11. The container neck 24 terminates at its lower end in an inwardly projecting flange 28 directed slightly towards the bottom of the container. The top 29 of the neck is recessed by an annular groove 30 round its inner periphery. A spherical or ball closure member 31 of the kind above described is provided with lateral trunnions 32 adapted to engage in the above described grooves 25, 25 in the neck 24 which runs parallel to the axis. The bottom 33 of the side grooves should be blended into the lower circular face 34 in such manner as to give free flow of metal when forming the tube. The blending out of bottom of groove must give clearance to the lower edge of trunnion 32.

In use an eyelet washer 6 is disposed at the bottom of the neck 24 of the tube with the neck 8 of the eyelet located through the orifice 35 between the body and the neck of the tube. The closure member 31 is then placed in position with the trunnions 32 located in the lateral grooves 25 in the neck 24 of the tube. It will be noted that the trunnions 32 project very slightly above the bottom of the groove 30 at the top of the neck of the tube. The annular washer 13 is disposed at the top of the neck the washer fitting closely around the closure member 31 at a point level with the bottom of the groove 30 at the top of the neck. On closing the top of the tube neck 24 around the washer 13 that fits the closure member at a predetermined place the closure member 31 and the washer 13 are pressed downwardly so that the closure member 31 is pressed into the bottom washer 6 and the top washer 13 is pressed onto the bottom of the groove 30 at the top of the neck and onto the top of the trunnions 32 on the closure member and this washer 13 then forms a sectional bearing for the closure member to rotate in, the lateral grooves 25 into which the trunnions are located forming a directional anchor for the closure member. It will be noted that the washers 6, 13 form a bearing for the closure member to rotate in, and the metal of the neck 24 of the tube only forms a means of seating the washers 6, 13, the washers 6, 13 alone forming the bearing for the rotation of the closure member. The lateral grooves 25 into which the trunnions 32 fit are a means of directional location.

In a still further modified form of the invention, as illustrated in Fig. 6, as in the previous example the spherical closure member 31 is provided with trunnions 32', but the interior of the neck 24 of the container is not grooved before the insertion of the closure member. The trunnions 32' cut their own grooves 25' or bearings, walled at 26, when forced down in to the neck of the container in the following manner. The interior of the neck 24 of the container or tube 11' being made truly cylindrical, the eyelet 6' is then placed in its seating, the closure member, stopper or valve 31 placed on the neck 24 of the tube will rest on the trunnions 32' and require pressure to seat on the washer 6'. On suitable pressure being applied the closure member or valve 31 will seat itself, the trunnions 32' cutting their own seating grooves in the wall of the neck 24 of the container or tube 11'. The trunnions 32' are of such a size that no malformation of

the neck of the tube takes place. By this means the spherical closure member or valve 31 is securely anchored so that it is able to rotate in one direction only. On the top of the neck 24 of the tube being closed around the closure member or valve 31 it is securely locked on its bearing. No pressure being applied to the external diameter of the neck 24 of the container or tube 11' to make an axis for the rotation of the valve, there is no possibility of malformation of the neck of the tube which might cause a leak. The eyelet 6' is moulded or pressed of a suitable material. The neck 8' or elongated part of the eyelet is located in the orifice 35 of the container or tube 11' formed between the neck 24 and the body 11' of the said container or tube. The flange or flared part 7' of the eyelet 6' fits on the bottom of the neck 24 of the container or tube and is of a similar shape to the bottom of the container or tube neck 24. The material on the internal face of the eyelet dwindles to a knife edge 7'', or if stamped is rounded on the larger diameter for the purpose that no sharp edge of the hole 4' through the closure member or valve 31 shall pass over the eyelet 6' when the said valve is rotated to the open and closed position. The eyelet 6' is moulded or pressed or stamped cup shape so that the spherical closure member or valve 31 fits into the eyelet 6' without pressure being applied. When pressure is applied to hold the closure member or valve 31 in place while the neck 24 of the container or tube 11' is closed around the valve the bottom 36 of the neck 8' of the eyelet will expand around the edge of the orifice 35 in the container or tube 11' riveting the said eyelet 6' in its place. This is not necessary as it is impossible for the eyelet 6' to move from its seating; also it is readily located in its bearing, the outside diameter being of such a size that it readily drops into the container or tube 11'. It will be noted that by the eyelet 6' fitting into the orifice 35 between the neck and the body of the tube considerably less metal is used in the tube.

In practice preferably the container is made by extrusion and the closure member then inserted and the container neck closed about the closure member, by suitable tools as illustrated in Fig. 7. The container or tube is disposed on an arbor 37 provided with a pin 38. The eyelet 6' is placed in position on the shoulder 28' of the container or tube 11 and orifice 4 of the closure member or valve 31 is threaded over the pin 38. A closing tool 39 provided with a sliding ram 40 spring loaded at 41 is then lowered onto the neck 24 of the container or tube 11 and closures its top 41' down around the closure member or valve 31. The assembly of washer and closure member is also preferably automatically performed by a suitable machine.

In Fig. 9 the stopper 31 is of substantially the same shape as that illustrated with reference to Fig. 1a. The trunnions 32' when forced through the walls 24 of the nozzle form grooves or bearings 25 for themselves to rotate in. The upper surface 7³ of the washer 6³ is formed so as to fit the stopper, and the lower surface 8³ of the washer is shaped to fit the shoulder 28'' of the neck.

It will thus be seen that I provide a ball valve which is a sphere having on its surface two projections to form an axis. These projections are substantially spear shaped and of such a size, that on the sphere being pushed into its bearing, the projections will cut grooves into the wall of the bearing or housing, without the projections

deforming the said bearing or housing, the said projections forming an axis for the rotation of the sphere to the open and closed position. I also provide a projection of a predetermined shape to form a lever or means to rotate the sphere to the open and closed position, having a hole through the sphere of the predetermined size and shape offset from the centre of the sphere. In addition I provide a washer of rubber or other suitable material shaped similar to an unclosed eyelet. The larger diameter of the washer or eyelet is slightly smaller than the diameter of the sphere, to enable the easy insertion and location of the washer in the neck or housing of the container which forms the bearing of the spherical valve. The external shape of the washer is similar to the bottom of the neck of the container or housing which forms the bearing for the ball valve. The neck or elongated portion of the washer or eyelet is of a diameter to fit into the orifice formed between the neck and the body of the container, and of a suitable length to cover the walls of the orifice. The interior of the top of the washer or eyelet, which has the larger diameter is of a similar radius to that of the sphere so that a portion of the surface of the sphere will be in contact with the whole of the upper surface of the washer or eyelet and enable the sphere to maintain such contact with the surface of the washer or eyelet during the rotating of the sphere to the open and closed positions. During the rotation of the sphere the surface of the washer or eyelet should, in one position, cover the hole in the sphere completely, thus allowing of no substance passing over the washer or eyelet as would be the case should the washer not cover the hole in the sphere when the said hole is passing over the washer to the closed position.

In the extrusion of tin coated lead tubes it is difficult if not impossible for the coating of tin to remain unbroken on the walls of the orifice between the body and the neck of the tube, and this is a very grave source of trouble to the users owing to contamination of the contents packed, as, when the materials pass over the uncovered lead in the neck of the tube, they are discoloured and contaminated. By using the washer or eyelet this disadvantage is overcome and widens the use of tin coated tubes very considerably, also considerably reducing the cost of production.

The manufacture of the tubes or containers having this closure is considerably simplified owing to the projections on the ball valve cutting their own bearing on applying pressure to insert the ball valve into its housing or bearing, the pressure also serving the purpose of holding the said ball valve in its position while the top of the neck of the tube or container which forms the housing for the ball valve is closed around the said ball valve. Owing to the side pressure having to be applied to the neck of the tube or the housing for the ball valve for the purpose of making a directional bearing for the ball valve, there is no possibility of deforming the bearing or housing, which may cause a leak.

It will be evident that the details of the invention may be varied in many ways without departing from the scope thereof.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Nozzle closure means for a container comprising a hollow nozzle member constructed of

coated metal having dispensing hole means in each end thereof the edge of which exposes said metal and an inner wall substantially comprising a substantially spherical valve seat and having a washer receiving annular channel at the upper end thereof, a substantially spherical closure valve member oscillatably mounted on said valve seat having a vent oscillatable to a position flush with said respective hole means or against said nozzle inner wall and a projection projecting outwardly from said nozzle to oscillate said closure valve member and an axis of oscillation forming circumferential groove extending substantially from said projection to said vent, a partially spherical annular washer member contained between the upper end of said valve seat and upper portion of said valve member having an axis of oscillation forming extension projecting inwardly within said valve member groove and a partially spherical washer member contained between the lower portions of said valve seat and oscillatable valve member having an annular skirt projecting downwardly within said container overlappingly sealing the edge of the dispensing hole means in the lower portion of said nozzle.

2. Nozzle closure means for a container comprising a hollow nozzle member having dispensing hole means in each end thereof and an inner wall substantially comprising a substantially spherical valve seat and having a washer receiving annular channel at the upper end thereof, a substantially spherical closure valve member oscillatably mounted on said valve seat having a vent oscillatable to a position flush with said respective hole means or against said nozzle inner wall and a projection projecting outwardly from said nozzle to oscillate said closure valve member and an axis of oscillation forming circumferential groove extending substantially from said projection to said vent, a partially spherical annular washer member contained between the upper end of said valve seat and upper portion of said valve member having an axis of oscillation forming extension projecting inwardly within said valve member groove and a partially spherical washer member contained between the lower portions of said valve seat and oscillatable valve member having an annular skirt projecting downwardly within said container overlappingly sealing the edge of the dispensing hole means in the lower portion of said nozzle.

3. Nozzle closure means for a container comprising a hollow nozzle member constructed of coated metal having dispensing hole means in each end thereof, the edge of which exposes said metal, and an inner wall substantially comprising a substantially spherical valve seat and having a washer receiving annular channel at the upper end thereof, a substantially spherical closure valve member oscillatably mounted on said valve seat having a vent oscillatable to a position flush with said respective hole means or against said nozzle inner wall and a projection projecting outwardly from said nozzle to oscillate said closure valve member, a partially spherical annular washer member contained between the upper end of said valve seat and upper portion of said valve member and a partially spherical washer member contained between the lower portions of said valve seat and oscillatable valve member, said washer member having an annular skirt projecting downwardly within said container overlappingly sealing the edge of the dis-

dispensing hole means in the lower portion of said nozzle.

4. Nozzle closure means for a container comprising a hollow nozzle member constructed of coated metal having dispensing hole means in each end thereof, the edge of which exposes said metal, and an inner wall substantially comprising a substantially spherical valve seat, an at least partially spherical closure valve member oscillatably mounted on said valve seat having a vent oscillatable to a position flush with said respective hole means or against said nozzle inner wall and a projection projecting outwardly from said nozzle to oscillate said closure valve member and a partially spherical washer member contained between the lower portions of said valve seat and oscillatable spherical valve member having an annular skirt projecting downwardly within said container overlappingly sealing the edge of the dispensing hole means in the lower portion of said nozzle.

5. Nozzle closure means for a container comprising a hollow nozzle member having dispensing hole means in each end thereof and an inner wall substantially comprising a substantially spherical valve seat and having a washer receiving annular channel at the upper end thereof, a substantially spherical closure valve member oscillatably mounted on said valve seat having a vent oscillatable to a position flush with said respective hole means or against said nozzle inner wall and a projection projecting outwardly from said nozzle to oscillate said closure valve member, a partially spherical annular washer member contained between the upper end of said valve seat and upper portion of said valve member and a partially spherical washer member contained between the lower portions of said valve seat and oscillatable valve member having an annular skirt projecting downwardly within said container overlappingly sealing the edge of the dispensing hole means in the lower portion of said nozzle.

6. Nozzle closure means for a container comprising a hollow nozzle member having dispensing hole means in each end thereof and an inner wall substantially comprising a substantially spherical valve seat and having a washer receiving annular channel at the upper end thereof, a substantially spherical closure valve member oscillatably mounted on said valve seat having a vent oscillatable to a position flush with said respective hole means or against said nozzle inner wall and a projection projecting outwardly from said nozzle to oscillate said closure valve member and an axis of oscillation forming circumferential groove extending substantially from said projection to said vent, a partially spherical annular washer member contained between the upper end of said valve seat and upper portion of said valve member having an axis of oscillation forming extension projecting inwardly within said valve member groove.

7. Nozzle closure means for a container comprising a hollow nozzle member having dispensing hole means in each end thereof and an inner wall substantially comprising an at least partially spherical valve seat and having a washer receiving annular channel at the upper end thereof, an at least partially spherical closure valve member oscillatably mounted on said valve seat having an open dispensing portion oscillatable to a position flush with said respective hole means or against said nozzle inner wall and a projection projecting outwardly from said nozzle to os-

cillate said closure valve member, and a partially spherical annular washer member contained between the upper end of said valve seat and upper portion of said valve member.

8. Nozzle closure means for a container comprising a hollow nozzle member having dispensing hole means in each end thereof and an inner wall substantially comprising a substantially spherical valve seat, a substantially spherical closure valve member oscillatably mounted on said valve seat having a vent oscillatable to a position flush with said respective hole means or against said nozzle inner wall and a projection projecting outwardly from said nozzle to oscillate said closure valve member and a partially spherical washer member contained between the lower portions of said valve seat and oscillatable valve member having an annular skirt projecting downwardly within said container overlappingly sealing the edge of the dispensing hole means in the lower portion of said nozzle.

9. Nozzle closure means for a container comprising a hollow nozzle member having dispensing hole means in each end thereof and an inner wall substantially comprising a substantially spherical valve seat and having a washer receiving annular channel at the upper end thereof, a substantially spherical closure valve member oscillatably mounted on said valve seat having a vent oscillatable to a position flush with said respective hole means or against said nozzle inner wall and a projection projecting outwardly from said nozzle to oscillate said closure valve member, a partially spherical annular washer member contained between the upper end of said valve seat and upper portion of said valve member and axis of oscillation means on said washer member and valve member comprising a projection from one of said members fitting in a groove in the other of said members.

10. Nozzle closure means for a container comprising a hollow nozzle member having dispensing hole means in each end thereof and an inner wall substantially comprising a substantially spherical valve seat, a substantially spherical closure valve member oscillatably mounted on said valve seat having a vent oscillatable to a position flush with said respective hole means or against said nozzle inner wall and a projection projecting outwardly from said nozzle to oscillate said closure valve member and axis of oscillation forming means on the upper end of said nozzle member and valve member comprising a projection from one of said members fitting into a groove in the other of said members.

11. A substantially spherical closure valve member having a dispensing vent therein, and a turning projection projecting outwardly therefrom and a circumferential groove on the periphery thereof extending substantially from said projection to said vent.

12. Nozzle closure means for a container comprising a hollow nozzle member having dispensing hole means in each end thereof and an inner wall comprising a substantially spherical valve seat having vertical grooves diametrically thereof and having a washer receiving annular channel at the upper end thereof, a substantially spherical closure valve member oscillatably mounted on said valve seat having a vent oscillatable to a position flush with said respective hole means or against said nozzle inner wall and a projection projecting outwardly from said nozzle to oscillate said closure valve member and having trunnions projecting outwardly therefrom dia-

metrically thereof registering in said vertical grooves, a partially spherical annular washer member contained between the upper end of said valve seat and upper portion of said valve member and a partially spherical washer member contained between the lower portions of said valve seat and oscillatable valve member having an annular skirt projecting downwardly within said container overlappingly sealing the edge of the dispensing hole means in the lower portion of said nozzle.

13. Nozzle closure means for a container comprising a hollow nozzle member having dispensing hole means in each end thereof and an inner wall comprising a substantially spherical valve seat having vertical grooves diametrically thereof and having a washer receiving annular channel at the upper end thereof, a substantially spherical closure valve member oscillatably mounted on said valve seat having a vent oscillatable to a position flush with said respective hole means

or against said nozzle inner wall and a projection projecting outwardly from said nozzle to oscillate said closure valve member and having trunnions projecting outwardly therefrom diametrically thereof registering in said vertical grooves, a partially spherical annular washer member contained between the upper end of said valve seat and upper portion of said valve member and a partially spherical washer member contained between the lower portions of said valve seat and oscillatable valve member having an annular skirt projecting downwardly within said container overlappingly sealing the edge of the dispensing hole means in the lower portion of said nozzle, the metal of the nozzle wall being pressed around said trunnions to substantially close said vertical grooves and cause said upper and lower washers to substantially form the bearing surface for said spherical valve member within said substantially spherical valve seat.

JAMES REST.