United States Patent

[11] 3,602,397

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[54] **FILLING AND EMPTYING MEANS FOR A FLEXIBLE SAC FOR HOLDING A PRODUCT TO BE DISPENSED**
11 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **222/95,** 222/193
[51] **Int. Cl.** **B65d 35/28**
[50] **Field of Search** 222/94, 95, 193, 386.5

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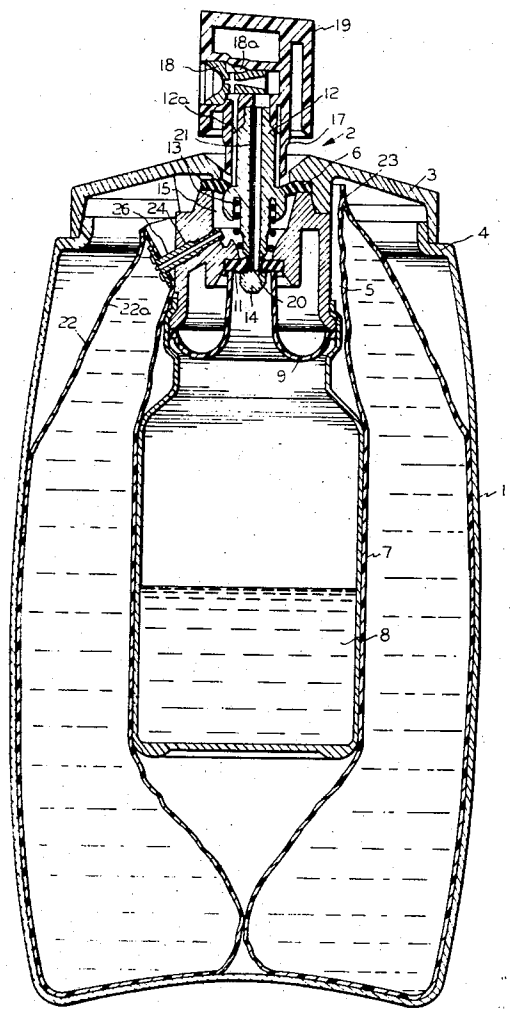
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ABSTRACT: A filling and emptying means for a flexible sac for holding a product to be dispensed. The means comprises a nozzle having a tubular member with a flange on one end. Said tubular member extends through the wall of said flexible sac with said flange in sealing engagement against the inside of the wall of said flexible sac. The tubular member has a bore therethrough and has an outer end portion with a smaller diameter and an inner end portion having a larger diameter and a beveled shoulder between said smaller and larger diameter portions. A body with which the sac is associated has a bore therein having portions for receiving the smaller and larger diameter portions of said tubular member and has a complementary shoulder between said bore portions which is complementary in shape to said tubular member shoulder against which said shoulder is seated for positively positioning said tubular member in said bore. A collar is preferably provided on the end of the tubular member for preventing withdrawal of the tubular member from the bore in the body.



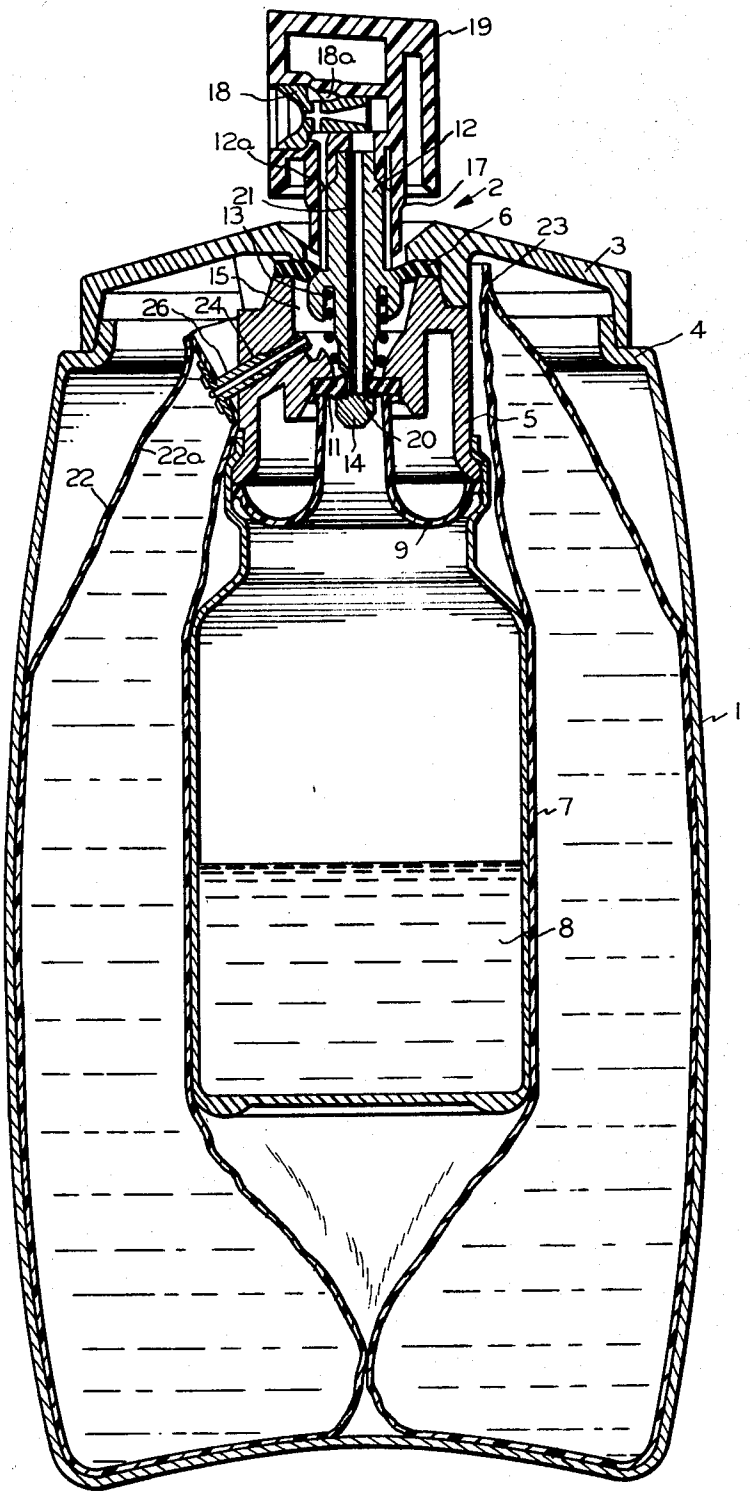


FIG. 1

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FIG. 2

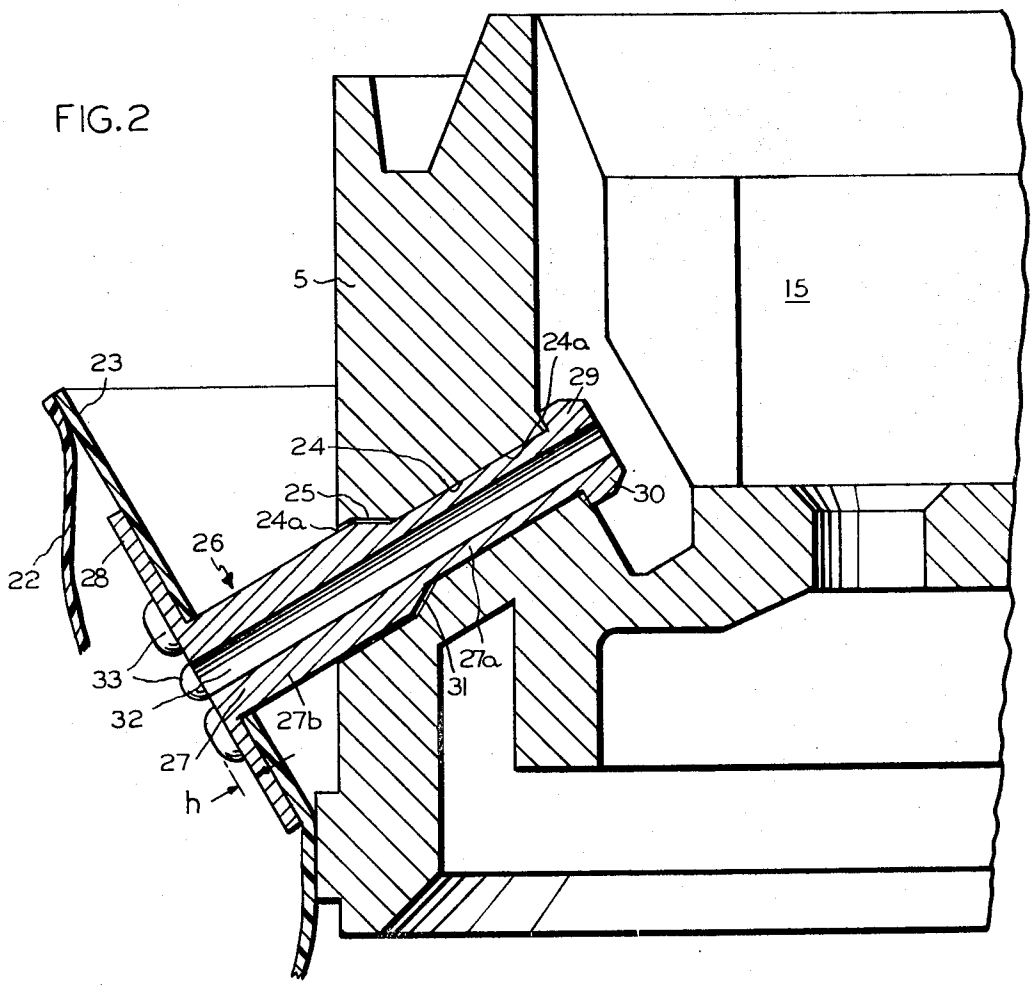
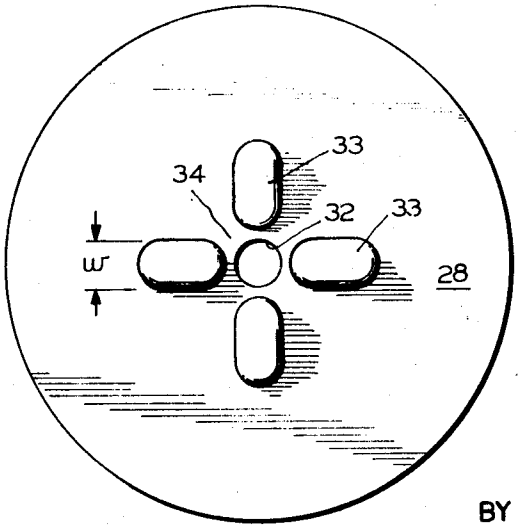


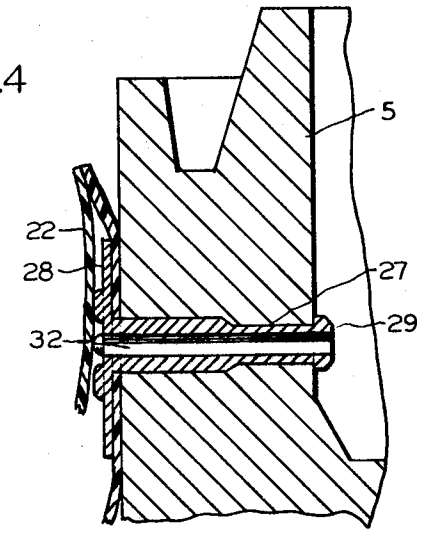
FIG. 3



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FIG.4



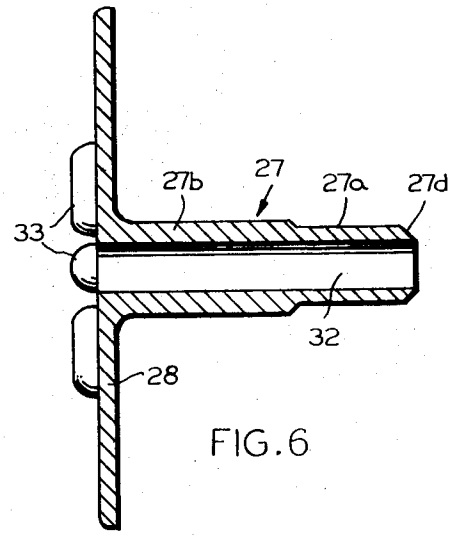


FIG.6

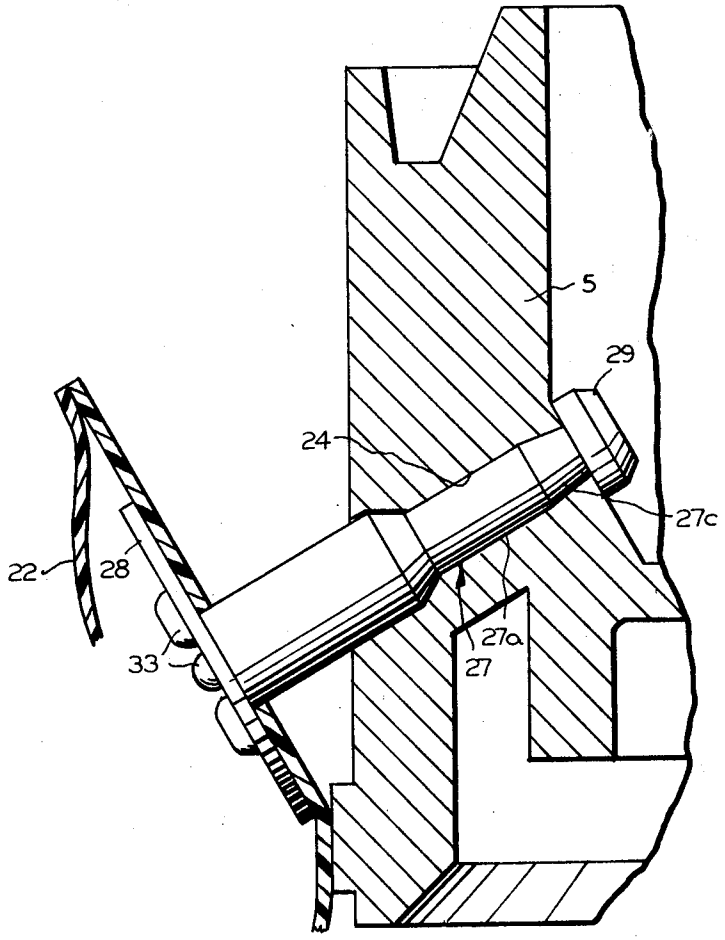


FIG.5

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FILLING AND EMPTYING MEANS FOR A FLEXIBLE SAC FOR HOLDING A PRODUCT TO BE DISPENSED

This invention relates to means for filing and emptying flexible collapsible receptacles, for example receptacles of flexible sheet material such as plastic or laminated sheet material such as is used for inner bags for other more rigid containers, such as aerosol cans or paperboard cartons.

In the manufacture of the collapsible receptacles from plastic sheet material, the most economical way to form the receptacle is to fold the sheet of plastic to form one edge of the receptacle, and then seal the free edges of the folded sheet to form the remaining edges of the receptacle. When this is done, it is necessary to provide a nozzle through which the receptacle can be emptied and filled. Such nozzles are known, for example from U.S. Pat. No. 3,087,518 to Scholle. Such nozzles can be inserted through the plastic sheet before the free edges are sealed to complete the receptacle. A flange around the inside of the end of the tube forming the nozzle prevents the nozzle from being torn out of the receptacle when any force is exerted on it.

Such a nozzle is shown in copending application, Ser. No. 766,549 filed Oct. 10, 1968, and is described as a coupling 41. In that application, which describes an aerosol dispenser having a flexible collapsible product containing sac out of which said nozzle projects, the outer end of the nozzle is inserted into a bore in an annular body having a hollow interior through which extends a valve stem extending to a valve cartridge containing a propellant. The bore opens into the hollow interior of the body, and the hollow interior is obturated by obturating means which opens the hollow interior to a product passage extending to a nozzle through which propellant is caused to flow. Thus, a product to be dispensed which is contained in the flexible sac is aspirated through the nozzle and the hollow interior in the body through the nozzle.

However, in commercial assembly and filling of such an aerosol dispenser, it is necessary to force the product to be dispensed through said hollow interior of the body and through the nozzle and into the flexible and collapsible receptacle. This is preferably done under pressure in order to reduce the time it takes to fill the receptacle. When this is done, pressure is exerted on the nozzle tending to force it out of the bore in the body. Naturally this is undesirable, since if the nozzle is forced even partly out of the bore, the connection of the nozzle and hence the receptacle to the body is unsatisfactory for the proper operation of the aerosol dispenser.

It has also been found that it is desirable, from the standpoint of quick and sure assembly of the aerosol dispenser, to be able to insert the nozzle into the bore in the body so that it is seated firmly and positively in the bore. To this end it is desirable to have some way of indicating that the nozzle is fully inserted and firmly seated in the bore.

A further desideratum is to provide on the end of the nozzle within the flexible receptacle means for keeping the wall of the receptacle opposite the wall through which the nozzle extends away from the base of the nozzle in order that the entrance to the nozzle within the receptacle does not become obstructed when a product within the receptacle is aspirated therefrom. While the above-mentioned application discloses one means for doing this, it has been found that this means is not very satisfactory.

It is, therefore, one object of the present invention to provide a means for filling and emptying flexible collapsible receptacles which can positively engage a valve body or the like so as not to be forced out of the valve body during filling of the receptacle with a fluid product under pressure.

It is a further object of the invention to provide such a means which can be inserted into a bore in a valve body or the like and will seat firmly and positively in the bore.

It is a still further object of the invention to provide such a means which will keep the wall of a flexible collapsible container away from the mouth of the means which is within the container in such a way that free flow of a fluid product to the mouth of the means is always insured.

These objects are accomplished by providing a nozzle for a flexible collapsible receptacle which comprises a tubular member having a generally radially extending flange at the base thereof adapted to engage against the inside surface of the receptacle when the tubular member extends through the wall of the receptacle. The free end of the tubular member has a collar thereon having a beveled outer free end. Intermediate the ends of the tubular member is a shoulder which is preferably beveled. On the face of the flange opposite the face from which the tubular member extends are a plurality of narrow projections which extend substantially radially of the bore of the tubular member. The collar is adapted to engage over the surface of the interior of the valve body into which the tubular member is inserted around the bore through which the tubular member extends so as to prevent withdrawal of the tubular member from the valve body, and the shoulder is adapted to abut a corresponding shoulder in the bore and to seat against it.

The invention will now be described in greater detail in connection with the accompanying drawings, in which:

FIG. 1 is a sectional elevation view of an aerosol dispenser with a flexible collapsible sac having a filling and emptying means according to the present invention;

FIG. 2 is an enlarged sectional view of a portion of FIG. 1 showing a first embodiment of the filling and emptying means of the present invention;

FIG. 3 is a bottom plan view of the filling and emptying means shown in FIG. 2;

FIG. 4 is a sectional view similar to that of FIG. 2 showing an alternative method of assembling the flexible sac, the filling and emptying means and the valve assembly;

FIG. 5 is a sectional elevation view of another embodiment of the filling and emptying means of the present invention; and

FIG. 6 is a sectional elevation view of still another embodiment of the filling and emptying means of the present invention.

One particular embodiment of the dispenser with which the filling and emptying means according to the invention is especially useful is shown in FIG. 1. This dispenser has an outer container 1 made of plastic, metal or other suitable material which has a valve means 2 mounted on the top thereof. The valve means includes a cap 3 mounted on upper edge 4 of container 1. At its center, the cap 3 has an annular body 5 depending therefrom which has mounted therein flexible annular gasket 6 just below a central opening in cap 3. Attached to body 5, for example, by having the upper edge formed tightly around a flange on the lower end of body 5, is a propellant cartridge 7 containing propellant 8 under pressure. A generally cone-shaped retaining ring 9, held between cartridge 7 and body 5, retains a high-pressure annular gasket 11 provided for obturating the flow of the propellant.

Slidably mounted in a bore along the axis of valve means 2 is a hollow stem 12 which has an enlarged portion 13 about in the middle thereof which cooperates with gasket 6 to form a low-pressure obturator for the liquid product to be dispensed. In addition, stem 12 has a second enlarged portion 14 at the lower end thereof which cooperates with gasket 11 to form a high-pressure obturator.

A hollow interior 15 is provided in body 5 in which stem 12 and enlarged portion 13 move up and down. The upper end of stem 12 projects through the opening in cap 3 and has groves therealong formed between splines 12*a* annular tube 17 depends from pushbutton 19 and covers the groves. The groves open into a space 18*a* around nozzle 18 housed in pushbutton 19. The hollow center 21 of stem 12 conducts propellant to the rear end of nozzle 18 from radial openings 20 normally closed by gasket 11. This valve means is a type which itself is known and is not part of this invention.

The fluid product to be sprayed, here shown as a liquid, is contained in a liquidtight flexible sac 22 which is placed in container 1. Flexible sac 22 is preferably a thin-walled type and has great flexibility. This sac can be made of any flexible material, such as plastic or laminated material which will allow the sac to collapse when the liquid is aspirated from it and

which is compatible with the product contained therein. The sac is preferably formed from a folded over sheet of material and has the free edges sealed to each other as shown at 23.

The valve body 5 has a bore 24 therein extending into the hollow interior 15, and the bore has two portions 24*a* and 24*b* separated by a shoulder 25, the larger diameter portion 24*b* being on the outer end of the bore.

Positioned in the upper end of the sac 22 is a filling and emptying means in the form of a nozzle generally indicated at 26. The 88 is comprised of a tubular member 27 and a radially extending flange 28 at the base thereof. The outer surface, that is the surface facing the direction in which the tubular member 27 extends, bears against the inner surface of the wall of the sac 22, and seals the opening in the sac through which the tubular member 27 extends. This seal is created by adhesive, welding or heat sealing the inner surface of sac 22 to the surface of flange 28, that is the surface facing the direction in which the tubular member extends. The free end of the tubular member 27 has a collar 29 thereon which has a beveled outer free end 30. The outer end portion 27*a* of the tubular member 27 has a smaller diameter than the inner end portion 27*b*, and between these portions is a shoulder 31 which is also beveled, and which has a bevel complementary to that of the internal shoulder 25 in the bore 24.

The tubular member 27 has a bore 32 therethrough, and extending radially from the opening of the bore 32 in the flange 28 is a series of narrow projections 33. It is preferred, as shown clearly in FIG. 3, to have the ends of the projections 33 which are toward the bore 32 spaced from the edge of the bore 32, and to give them a width *w* which is about the same as the diameter of the bore 32. The projections should be rounded so that they do not damage the material of the sac 22 which may rest against them when the sac is aspirated, and the height of the projections and their spacing from the bore 32 should be such that together the openings 34 between them will have a total cross-sectional area which at the least is equal to the cross-sectional area of the bore 32. In this way, when the wall of the sac lies against the projections, there will always be sufficient cross-sectional area to allow enough fluid to pass the projections to fill the bore 32.

It is necessary to have at least the nozzle made of a material which is sufficiently soft so that the collar can be deformed so that it can be forced through the bore. The actual practice usually only the nozzle will be made of a slightly resilient and deformable plastic material, but it is possible for both the body 5 and the nozzle to be of resilient and deformable material.

In assembling the dispenser, the flexible material in sheet form has the nozzle 26 inserted through it at an appropriate position and the surface of the flange 28 resting against the inside surface of the sac 22 is sealed thereto as described above. Then the flexible material is folded over, and the free edges are secured to each other, by adhesive, welding, heat sealing or other methods common in the art. After the valve means, including the cartridge 7 and cap 3 is assembled, the tubular member 27 is inserted into the bore 24 in the valve body 5 until the shoulder 31 on the tubular member bears against the shoulder 25 in the bore 24. At this point, the collar 29 will have passed the surface of the wall defining the interior 15 of the valve body, and the under surface of the collar will be engaged against this wall, thereby preventing the tubular member from being withdrawn. Thus, the shoulders limit the inward movement of the nozzle at the proper point when the collar is accurately positioned. Thereafter, the assembly is placed in the outer container 1, and the propellant and the product to be dispensed are supplied to the cartridge and the flexible collapsible sac through the valve stem and the valve body. Thereafter, the pushbutton 19 is placed on the end of the stem, and the assembly is complete.

In the embodiment shown in FIGS. 1–3, the flange 28 of the nozzle is spaced from the outside surface of the valve body 5. In FIG. 4, the tubular member 27 can be forced through the sheet of flexible material and then when the tubular member is forced into the bore 24 in the valve body, the length of the tubular member 27 from the flange to the bottom of the collar 29 is the same as the length of the bore 24, so that the material of the flexible sac 22 is tightly engaged between the flange 28 and the outside of the valve body 5. This engagement can be made sufficiently tight so that no other sealing of the material of the sac to the flange is necessary.

The embodiment of the nozzle shown in FIG. 5 is the same as that of FIGS. 1–3, except that at the end of the tubular member 27 just under the collar 29 the outer surface of the tubular member is tapered inwardly at 27*c*, and the inner periphery of the the bore 27 is tapered with a complementary taper 24*c* at the inner end thereof. The purpose of this arrangement is to increase the area of contact of the under surface of the collar 29 with the inside surface of the valve body 5, and consequently increase the resistance of the tubular member to withdrawal from the bore.

The embodiment of the nozzle shown in FIG. 6 is the same as that of FIGS. 1–3 except that it has no collar 29 thereon. The frictional force between the outer surface of the tubular member 27 and the surface of the bore 24 is the force resisting removal of the nozzle from the bore. The free end of the tubular member 27 is beveled to a relatively sharp edge at 27*d* in order to enhance the ability of the tubular member to pierce the sheet material of the sac 22.

It will be seen that there has been provided a filling and emptying means for an aerosol type container with a flexible sac, which emptying means can be quickly and surely inserted into the valve body of the aerosol dispenser, and which seats firmly in the valve body. The construction prevents removal of the means from the valve body under the force of the pressurized product being filled into the sac through the filling and emptying means. The means also has a simple structure for keeping the wall of the sac away from the entrance to the tubular member forming a part of the filling and emptying means, so that the product to be dispensed can be aspirated from the sac.

I claim:

1. A filling and emptying means for filling and emptying a flexible sac for holding a product to be dispensed, said filling and emptying means comprising a nozzle having a tubular member with a flange on one end of the tubular member and a bore through the tubular member, said tubular member having an outer end portion with a smaller diameter and an inner end portion having a larger diameter and a beveled shoulder between said smaller diameter and larger diameter portions, said shoulder being adapted to seat against a complementary shoulder in a bore in the body with which the flexible sac is to be associated for positively positioning the nozzle in said bore, said flange having on the surface thereof opposite the surface from which said tubular member projects a plurality of projections extending radially from the opening of said bore in said flange, said projections having the ends which are toward the bore spaced from the edge of the bore and having a width about the same as the diameter of the bore and having a height such that the openings between said ends together will have a total cross-sectional area at least equal to the cross-sectional area of the bore.

2. A filling and emptying means as claimed in claim 1 in which said tubular member has a collar on the end thereof opposite the flange, the under surface of said collar being adapted to engage the wall of the body to prevent withdrawal of the nozzle under the pressure of a fluid being filled into a flexible sac through said tubular member.

3. A filling and emptying means as claimed in claim 2 in which said tubular member has an inwardly tapered portion at the outer end thereof just beneath said collar.

4. A filling and emptying means as claimed in claim 1 in which the end of said tubular member opposite said flange is tapered inwardly to a relatively sharp edge.

5. A filling and emptying means as claimed in claim 1 in which the tops of said projections are rounded.

6. In combination, a flexible sac for holding a product to be dispensed, a body with which the flexible sac is associated, and a filling and emptying means for said sac comprising a nozzle having a tubular member with a flange on one end, said tubular member extending through the wall of said flexible sac with said flange in sealing engagement against the inside of the wall of said flexible sac, said tubular member having a bore therethrough and having an outer end portion with a smaller diameter and an inner end portion having a larger diameter and a beveled shoulder between said smaller and larger diameter portions, said body having a bore therein having portions for receiving the smaller and larger diameter portions of said tubular member and having a complementary shoulder between said bore portions which is complementary in shape to said tubular member shoulder against which said shoulder is seated for positively positioning said tubular member in said bore.

7. The combination as claimed in claim 6 in which said tubular member has a collar on the end thereof opposite the flange, the under surface of said collar engaging the wall of the body to prevent withdrawal of the nozzle under the pressure of a fluid being filled into a flexible sac through said tubular member.

8. The combination as claimed in claim 7 in which said tubular member has an inwardly tapered portion at the outer end thereof just beneath said collar, and said bore in said body has a complementary taper therein.

9. The combination as claimed in claim 6 in which the end of said tubular member opposite said flange is tapered inwardly to a relatively sharp edge.

10. The combination as claimed in claim 6 in which said flange has on the surface thereof opposite the surface from which said tubular member projects a plurality of projections extending radially from the opening of said bore in said flange, said projections having the ends which are toward the bore spaced from the edge of the bore and having a width about the same as the diameter of the bore and having a height such that the openings between said ends together will have a total cross-sectional area at least equal to the cross-sectional area of the bore.

11. The combination as claimed in claim 10 in which the tops of said projections are rounded.