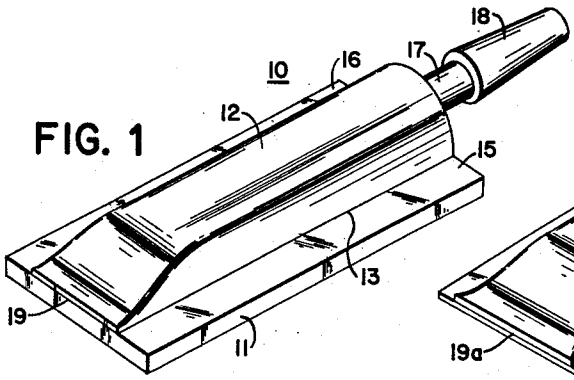
Dec. 17, 1963 V. C. HALL 3,114,369

DISPOSABLE AMPUL

Filed Aug. 10, 1961 3 Sheets-Sheet 1

FIG. 1



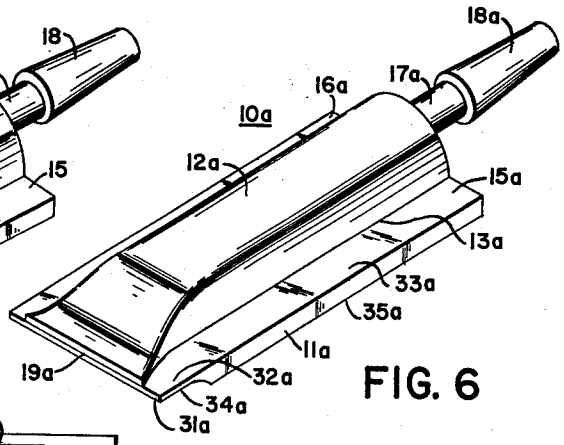




FIG. 6

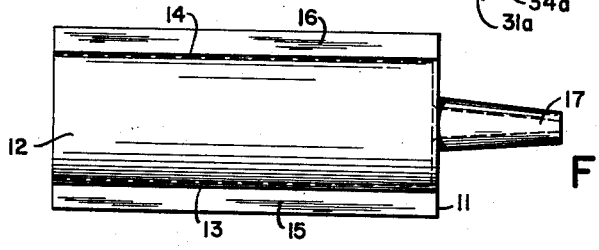



FIG. 2

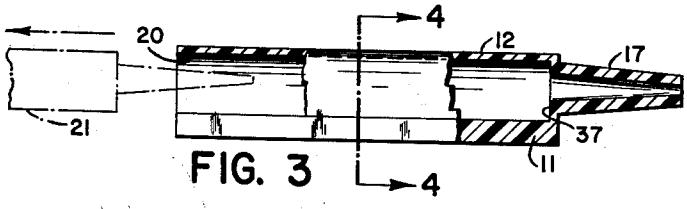



FIG. 3

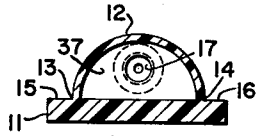



FIG. 4

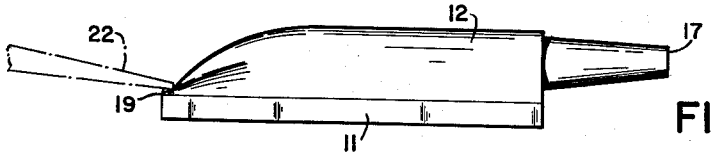



FIG. 5

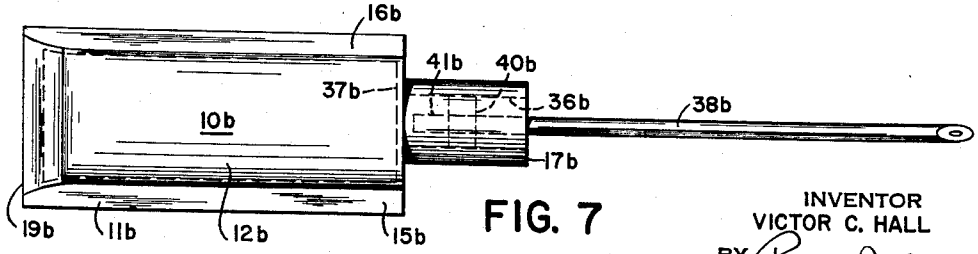



FIG. 7

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Dec. 17, 1963 V. C. HALL 3,114,369

DISPOSABLE AMPUL

Filed Aug. 10, 1961 3 Sheets-Sheet 2

FIG. 8

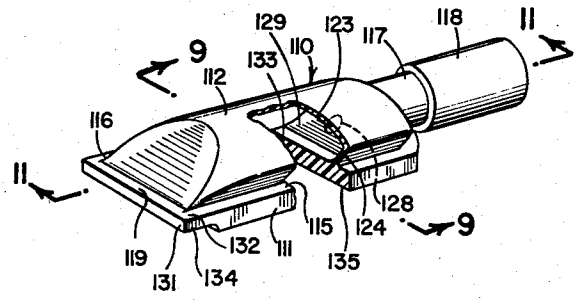



FIG. 9

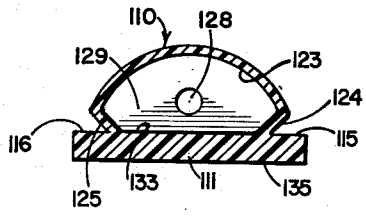



FIG. 10

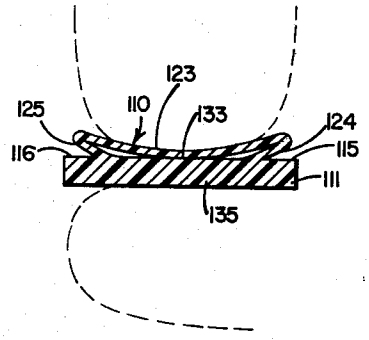



FIG. 13

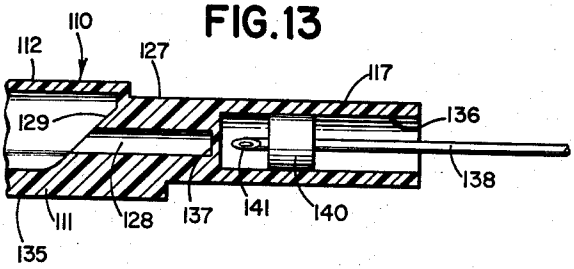



FIG. 11

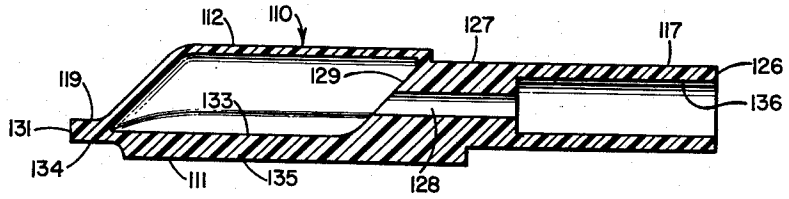
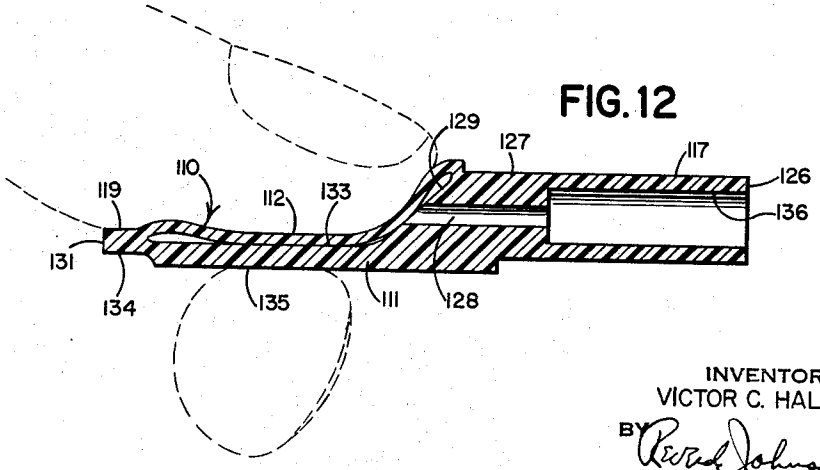



FIG. 12

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Dec. 17, 1963 V. C. HALL 3,114,369

DISPOSABLE AMPUL

Filed Aug. 10, 1961 3 Sheets-Sheet 3

FIG. 14

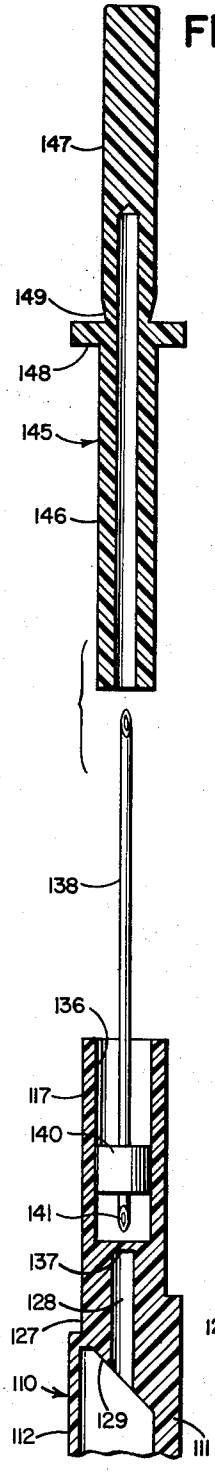



FIG. 15

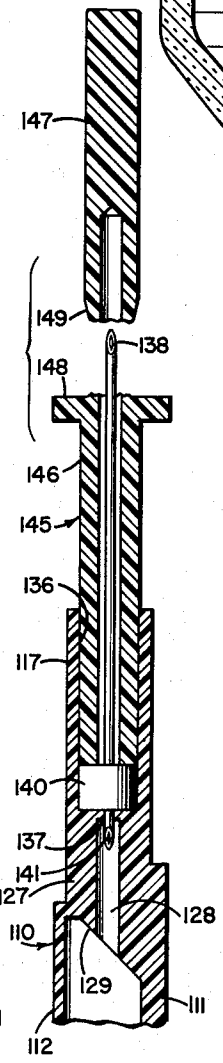



FIG. 16

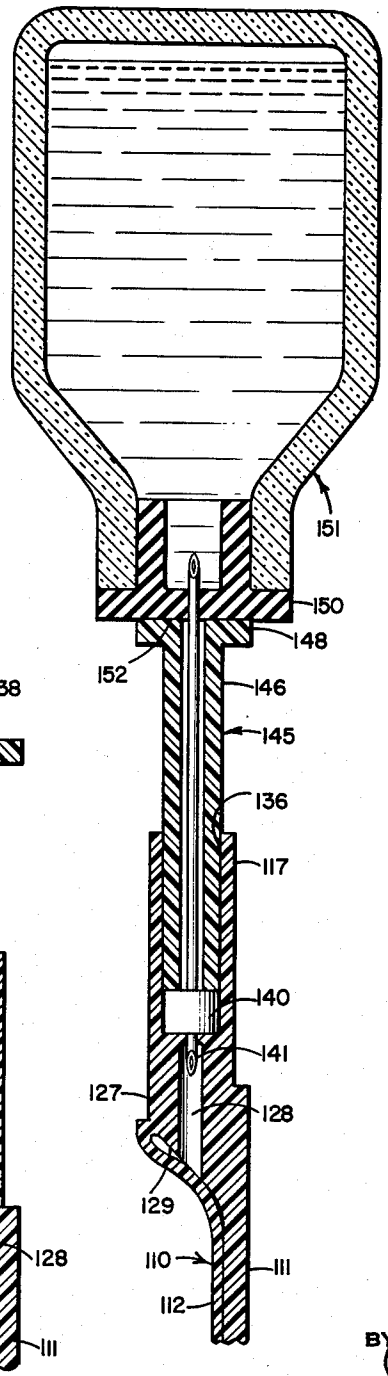
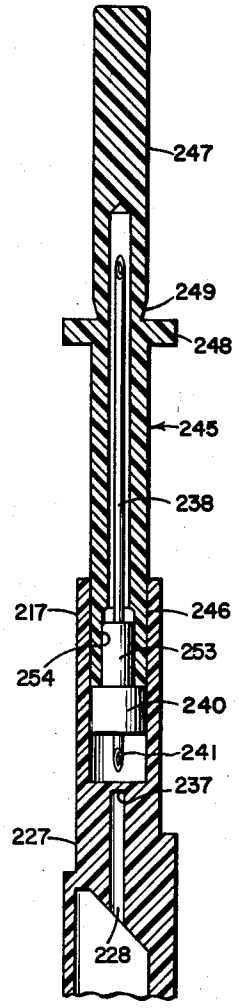



FIG. 17

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United States Patent Office 3,114,369 Patented Dec. 17, 1963



3,114,369

# DISPOSABLE AMPUL

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Filed Aug. 10, 1961, Ser. No. 128,645
8 Claims. (Cl. 128—216)

This invention relates to squeezable containers for liquids, and also for liquid-like materials such as creams and ointments; in other words, to containers which discharge their contents when the container is squeezed.

More particularly, the invention is concerned with providing an improved squeezable container for a small volume of material that is simple and easy to pick up and hold without discharging the contents of the container, and yet is simple and inexpensive in construction.

Other features of the invention will become apparent as the description proceeds.

In the drawings:

FIGURE 1 is an isometric view of a container embodying this invention, with a removable cap in position on the spout of the container so that together they form a package and sales unit for the material within the container;

FIGURE 2 is a plan view of the container as made by an injection molding machine;

FIGURE 3 is a side elevation of the container of FIGURE 1, with parts in section, and showing diagrammatically one manner of removing the molding core;

FIGURE 4 is a sectional view along the line 4—4 of FIGURE 3;

FIGURE 5 is a side elevation of the container, as in FIGURE 3, showing one manner of closing the end of the container through which the molding core was removed;

FIGURE 6 is a view similar to FIGURE 1 showing a modified construction for the container at the end opposite the spout;

FIGURE 7 is a plan view of a container having a modified construction at the spout end, and showing a hypodermic needle mounted in the spout to produce a combination container and needle unit;

FIGURE 8 is an isometric view similar to FIGURES 1 and 6 showing another modified construction for a container embodying this invention, with a portion broken away to show a detail of construction;

FIGURE 9 is a sectional view along the line 9—9 of FIGURE 8;

FIGURE 10 is a view similar to FIGURE 9 showing the position of the parts when the container is squeezed to discharge the contents thereof;

FIGURE 11 is vertical section along the line 11—11 of FIGURE 8;

FIGURE 12 is a view similar to FIGURE 11 showing the position of the parts when the container is squeezed to discharge the contents thereof;

FIGURE 13 is a view similar to FIGURE 11 showing a modified construction for a combination container and needle unit;

FIGURE 14 is a view similar to FIGURE 13 showing an improved needle cover for the needle, the cover being in position to be moved to protect the needle;

FIGURE 15 is a view similar to FIGURE 14 showing the needle cover after it has been depressed to cause the base of the needle to puncture the end wall at the bottom of the needle recess, and after the outer end of the needle cover is broken off at its weakened area and removed, as diagrammatically shown by the arrows;

FIGURE 16 is a view similar to FIGURE 15, showing, in addition, the outer end of the needle inserted through the stopper of a vial so that the flange of the needle cover engages the outer surface of the vial stopper, in



which position the contents of the container of the combination container and needle unit have been discharged into the vial and mixed with the contents of the vial, and before the mixture is withdrawn from the vial back into such container, preparatory for injection into a person or animal; and

FIGURE 17 is a view similar to FIGURES 14 and 15 showing a modified construction for the needle unit, for the passageway connecting the cointainer portion with the needle recess, and for the needle cover.

Referring to FIGURE 1, the container generally designated 10 has a rectangular piece or base 11 which is flat or substantially flat. Positioned on top of rectangular base 11 is a thin-wall 12 which joins the rectangular base along the lines 13 and 14, which are parallel to, but spaced inward from, the long edges of the rectangular base. The thin-wall is spaced from the rectangular base in-between lines 13 and 14, so that the thin wall 12 and the enclosed portion of the rectangular base 11 form the side walls of the container 10, which is roughly tubular in shape. The thickness of the rectangular base 11 is considerably greater than the thickness of wall 12, being at least two times thicker, so that, while wall 12 is thin and readily deformable by pressure upon it, the rectangular base 11 is much less readily deformable and, by comparison with wall 12, is relatively stiff.

Rectanguar base 11 preferably has portions 15 and 16 which do not serve as a side wall of container 10 but extend laterally beyond the thin side wall 12 of the container. These serve as a ready means for picking up the container without squeezing the thin side wall 12.

The container 10 has a discharge spout 17 the base of which closes the space between the thin wall 12 and the rectangular base 11 at one end of the rectangular base. The wall spout is thicker than the thin wall 12 in order to impart some rigidity to the spout, but need not be as thick as the rectangular base 11. The spout 17 may be tapered, as shown in FIGURE 1, and a cap 18 with a tapered interior may be fitted over the end of the spout 17, and retained in place by frictional engagement.

At the other end of the container 10 the thin wall 12 engages the rectangular base 11 along the line 19, between the ends of the junction lines 13 and 14.

The material of which the container 10 is made is a plastic or other suitable material which may be used in standard injection molding, casting or forming equipment to produce a flexible container. This material at normal room temperature must be readily deformable when in the thickness used for the thin wall 12. An example of such a plastic is polyethylene. Plastics of the polyethylene group or vinyl group are particularly suitable.

The size of the container 10 is variable, but this invention is of particular value when the container is small, for such a container may be picked up and handled by grasping the projections 15 and 16 between the thumb and forefinger without squeezing out the contents of the container. Illustrative of what is meant by small is a container holding a medicament such as a liquid, cream or ointment which is to be applied in small quantities, such as drop by drop, and whose total capacity is 5 cc. or less.

The necessary labeling for the contents of the container 10 may be readily applied to the rectangular base 11 on the side thereof opposite to that which cooperates with the thin wall 12 to form the container. This flat rectangular surface greatly facilitates the labeling of the container, particularly for small containers.

A method of making this container 10 is shown in FIGURES 2, 3, 4 and 5. The container is preferably formed in one piece at one time in an injection molding apparatus, the form of the container as produced by such apparatus being shown in FIGURES 2, 3 and 4. In

this form the container is open at the end opposite the spout 17, as indicated by the reference number 20 in FIGURE 3, and through this opennig 20 the interior die 21 may be withdrawn at the end of the molding operation. The opening 20 is then closed by pressing the adjacent end of the thin wall 12 down against the rectangular base 11 and sealing the thin wall 12 to the rectangular base 11 along the line 19, by the application of heat and pressure, as indicated in FIGURE 5 by the outline 22 of the end of a sealing iron.

The container 10 may be filled in a variety of ways. One way is to place a number of these containers in a closed chamber with each container having its spout fitted over a hollow pin. The base of these pins communicates with the medicament or other liquid or liquid-like material to be put into the containers. The entire assembly is placed under vacuum in the closed chamber, which thereupon removes the air from inside each container 10, by sucking it out through the spout 17 and through the medicament to the exhaust pump. When the air is removed, the vacuum is released, and the pressure differential forces the medicament into the container 10. Each container 10 is then removed from its pins and the tight fitting cap 18 placed over the end of the spout 17 of the container.

Another method of filling the containers 10 is to fill them through their openings 20, preferably by automatic filling equipment, the spouts 17 having previously been fitted with their caps 18. The filled containers then have their openings 20 closed and sealed, preferably by the application of heat and pressure, to seal the thin wall 12 of each container to its rectangular base 11.

The modified container 10*a* shown in FIGURE 6 is similar to container 10 shown in FIGURE 1, except that the base 11*a* is formed with its end area 31*a* (at its end opposite spout 17*a*) thinner than the thickness of base 11*a* throughout the remainder of its area. This is preferably achieved by maintaining the upper surface 32*a* of the area 31*a* flush with the upper surface 33*a* of the remainder of base 11*a*, and by displacing the undersurface 34*a* of the area 31*a* upwardly from the plane of the lower surface 35*a* of the remainder of the base 11*a*. The thickness of the end area 31*a* is made less than that of the remainder of the base 11*a* to facilitate the sealing of the end of the thin wall 12*a* to the base 11*a*, along the line 19*a*, by automatic sealing apparatus that grips the parts between two heated members.

In such case the flattened end of the thin wall 12*a* extends frontward of the line 13*a* (as the container is shown in FIGURE 6) so that the seal of the thin wall 12*a* to the sealing area 32*a* of base 11*a* along line 19*a* extends onto the projection 15*a*. In the same manner the seal also extends onto the projection 16*a* at the back of the container (as the container is shown in FIGURE 6).

In the form of container shown in FIGURE 7, the body of the container 10*b* is similar to the body of container 10*a* of FIGURE 6, except that the spout 17*b* is not tapered, but is of uniform inside diameter along its axis, thus forming a cylindrical opening 36*b*. In addition, the end wall 37*b* at the base of the spout (by which the spout connects with base 11*b* and thin wall 12*b*) also extends over the entire area of the spout opening 36*b*. As a consequence, the contents of container 10*b* cannot pass out into spout 17*b* until the end wall 37*b* opposite spout opening 36*b* is punctured.

Inserted in the cylindrical spout opening 36*b* is the base of a hypodermic needle 38*b*. The base end of this needle extends through a metallic needle cylinder 40*b* to which the needle is secured, and this needle cylinder 40*b* fits snugly into the cylindrical opening 36*b* of container 10*b*. A portion of the base end of the needle 38*b* extends inwardly beyond the needle cylinder 40*b*, as shown at 41*b* in FIGURE 7, but this base end 41*b* of the needle does not extend through the end wall 37*b* at any time until the contents of the container unit 10*b* are to be injected into a patient. At that time the doctor or nurse pushes the needle inwardly so that the base end 41*b* of the needle punctures the end wall 37*b* of the container 10*b*. The container and needle unit may then be grasped by the projections 15*b* and 16*b* and the needle inserted into the patient without squeezing out the contents of the container, after which the thin wall portion 12*b* and the base 11*b* of the container are squeezed between the thumb and forefinger to eject the contents of the container 10*b* through the needle 38*b* into the patient.

During the manufacture of the container-needle unit a suitable cylindrical protective cover (not shown) is applied over the needle and frictionally held in the open end of spout 17*b*. This is removed by the doctor or nurse at the time the unit is to be used, after it has been used to push this needle cylinder 40*b* inwardly and so puncture the end wall 37*b* of the container 10*b*.

Illustrative of the dimensions of a container embodying this invention is a container conforming to that shown in FIGURE 6 wholly made of polyethylene thermoplastic resin by injection molding equipment, where the thin wall 12*a* is 0.015 inch thick, the base 10*a* is 0.075 inch thick, 1 1/16 inch wide and 1½ inches long on its upper side, the sealing area 31*a* of the base 10*a* is 0.025 inch thick and recessed ¼ inch from the end of the base, the exterior height of thin wall 12*a* above base 10*a* at the spout end is ¼ inch, and the exterior width of thin wall 12*a* at the spout end, next to base 10*a*, is ½ inch.

With the modified container 110 shown in FIGURES 8–12, (in which parts corresponding to those described in FIGURES 1–7 bear the same numbers with the addition of one hundred thereto), a complete discharge of the contents of the container is obtained more readily than in the constructions shown in FIGURES 1–7. The thin, deformable wall 112 is flatter than a semi-circle, the arcuate portion 123 having a center well below the substantially rectangular, non-deformable base 111. This arcuate portion subtends less than 180 degrees of an arc and preferably subtends from 90 degrees to 150 degrees of an arc.

The ends of the arcuate portion are joined to the base 111 by substantially straight portions 124 and 125, each inwardly directed in relation to the arcuate portion 123 and of relatively short length in comparison to the length of the arcuate portion 123 (preferably less than one-fifth that length). Straight portion 124 of wall 112 intersects the plane of base 111 to form an acute angle between the straight portion 124 and the outwardly projecting portion 115 of base 111, this angle preferably being from 30 degrees to 45 degrees. In the same manner straight portion 125 of wall 112 intersects the plane of base 111 to form a similar acute angle between the straight portion 125 and the outwardly projecting portion 116 of base 111.

Thus, when the deformable thin wall 112 is compressed to discharge the contents of the container 110 out of the spout 117, the arcuate portion 123 of the wall 112 collapses so that there is very little, if any, space left between the interior of the arcuate portion 123 and the opposite portion 133 of the base 111, as shown in FIGURE 10.

The discharge spout 117 of the modified container 110 has a substantially cylindrical exterior surface with a substantially cylindrical opening 136, as shown in FIGURE 11. The thickness of the spout wall 126 is thinner than the deformable wall 112 but preferably not as thick as the major part of base 111, between surfaces 133 and 135.

The base of the cylindrical spout opening 136 is removed a substantial distance from the interior of the container 110, the distance therebetween being filled by a substantially solid piece of plastic 127 having an elongated passageway 128 therein, which provides the communication from the container 110 to the opening 136 of the spout 117.

The container end 129 of the solid plastic portion 127 is slanted from the nozzle end of the container, at the point furthest from upper surface 133 of base 111, down-

wardly and inwardly into the container, as shown in FIGURE 11. Consequently, when the deformable thin wall 112 of the container is compressed, as shown in FIGURE 12, to discharge the contents of the container out of the spout 117, the part of this wall at the spout end of the container collapses against the wall end 129 of the plastic portion 127, so that there is very little, if any, open space at the spout end of the container.

Hence, as a result of the construction of the container on its transverse cross section, as shown in FIGURES 8–10, and on its longitudinal axis, as shown in FIGURES 11 and 12, very little, if any, of the original contents of the container 110 remains in the container at the completion of the squeezing action.

The modified container 110 of FIGURES 8–12 can be readily adapted for use with a hypodermic needle, in the manner shown in FIGURE 13. The cylindrical spout opening 136 has inserted therein a needle unit consisting of a hypodermic needle 138 to which is tightly fitted a metallic needle cylinder 140. The needle cylinder fits snugly into the spout opening 136, with a portion of the base end of the needle extending inwardly beyond the needle cylinder 140, as shown at 141 in FIGURE 13.

The passageway 128 between the interior of the container 110 and the base of the opening 136 has an end wall 137 closing this passageway at the base of the opening 136, so that the contents of the container are not dischargeable until that end wall 137 is punctured.

When the needle unit is pushed inwardly, the base end 141 of the needle 138 punctures the end wall 137, thereby readying the combination container and hypodermic needle unit for use in discharging the contents of the container through the needle.

FIGURES 14, 15 and 16 show the combination container and hypodermic needle unit of FIGURE 13 in use with an improved needle cover, generally designated 145. The cover consists of a long plastic tube 146 the outside diameter of which is such that it just fits inside the cylindrical opening 136 of spout 117. The inside of the tube 146 is large enough to accommodate the needle 138 as the tube is slid down over the needle, as shown in FIGURE 15. The top end of the needle cover 145 is a solid plastic cylinder 147.

When the combination container and needle unit is manufactured and filled, the needle cover 145 is inserted over the needle and slid into the opening 136 sufficiently to secure the cover to the unit, but not so far as to cause the base of the needle to puncture the wall 137.

When the doctor wishes to use the unit, he pushes the needle cover 145 further inward toward the container 110 so that the lower end of tube 146 engages the needle cylinder 140, and then the doctor pushes the needle cover still further inward so that the wall 137 is punctured and the needle cylinder engages the base of the opening 136. The parts described are then in the position shown in FIGURE 15.

The tubular portion 146 of the needle cover 145 has a flange 148 positioned thereon a short distance 149 below the end of the needle 138 when the parts are in the position shown in FIGURE 15. This tubular portion 146 is scored or otherwise weakened at the top surface of the flange 148 (this scoring being depicted by the reduced diameter area 149 in FIGURE 14), so that the outer portion of the needle cover may readily be broken off at the top surface of flange 148 and removed (as shown in FIGURE 15). This will leave the end of needle 138 projecting above the top of flange 148, the amount of that projection being distance 149.

The function of flange 148 is illustrated in FIGURE 16. Here the end of needle 138 that projects above the top of flange 148 has been inserted through the center puncturable area 152 of stopper 150 which closes a vial 151 containing a medicament. The contents of the container 110 are then discharged into the vial 151 by squeezing the wall 112 against the base 111, and the mixture shaken up to obtain a complete solution or suspension in the vial. The contents of the vial 151 are then withdrawn back through the needle 138 into the container 110, by releasing the pressure on wall 112.

When the flange 148 engages the outer surface of stopper 150 as the needle 138 is inserted through the stopper, further insertion of the needle is prevented. At this position of the parts, shown in FIGURE 16, the needle aperture at the point of the needle 138 is just inside the inner surface of the center puncturable area 152 of the stopper. Consequently, when the contents of vial 151 are withdrawn back through the needle into the container 110, all of such contents are so withdrawn. There is no wastage of such contents, and no inaccurate dosage administration that would be caused if the needle aperture were positioned substantially above the inside surface of the center puncturable area 152 of the stopper. To avoid such wastage and inaccurate dosage the doctors are aware of the need to insert the needle through the stopper no more than is necessary, but this improved needle cover, with its separable outer end and its flange on the retained inner end, is positive insurance that such wastage and inaccurate dosage cannot occur. Hence the doctor can prepare the medicament for administration more easily and quicker, when he makes use of this improved needle cover, than when he does not use this improved needle cover. In addition, the doctor with this improved needle cover, can have full confidence that there is no wastage of medicament or inaccurate dosage administration due to inability to withdraw all the medicament from the vial.

The length the end of the needle projects above the top of flange 148—in other words, the length of the distance 149 of FIGURE 15—is determined by the thickness of the stopper 150 at its center puncturable area 152. This is a fairly uniform figure, as the stoppers 150 for vials holding medicines for injection are fairly well standardized.

FIGURE 17 shows a further modified construction for the combination container and needle unit, with a modified construction for the needle cover as well. Parts which are the same as in the constructions shown in FIGURES 13, 14, 15 and 16 are designated with the same numbers; parts which are somewhat similar but not identical are designated with numbers which are one-hundred larger than they are in FIGURES 13–16.

The solid plastic portion 227 positioned between the container 110 and the spout 117 has, instead of the relatively large diameter passageway 128 shown in FIGURES 11, 12, 13, 14, 15 and 16, a passageway 228 of very small diameter, meaning a diameter about the diameter of the end 241 of the needle 238. As a result, the doctor, upon making an injection of the needle 238 into a patient, can readily aspirate to determine whether he has injected into the proper area, for the withdrawal of only a very small amount of fluid from the patient will fill the needle and the passageway 228. This passageway 228, being long, small, and capillary like, and being in a transparent, or at least translucent, block of plastic, produces, when so filled by such withdrawn fluid, a readily visible indication to the doctor of the location of the end of the needle. To attempt such aspiration with a unit in which the passageway has the diameter of passageway 128, necessitates the withdrawal of an undue amount of fluid from the body.

When the passageway 228 is of such small diameter, it is therefore imperative that the base end 241 of the needle is accurately directed to puncture the wall 237 which closes the passageway 228 at the spout end of the passageway. This is achieved by providing the needle unit, consisting of the needle 238 and the metallic needle cylinder 240 tightly fitted thereon, with a supplemental needle cylinder 253 that is preferably integral with needle cylinder 240. (This supplemental needle cylinder 253 has a diameter smaller than that of cylinder 240.) The

inside diameter of the lower end of the tube portion 246 of needle cap 245 is about the same as the outside diameter of the supplemental needle cylinder 253, thereby providing a recess 254 in such needle cap that fits over this supplemental needle cylinder. As the outside diameter of the tube portion 246 fits snugly within the inside diameter of the opening 136 in spout 117, cocking of the needle unit as it is depressed to puncture the closure wall 237 is minimized. Also minimizing cocking of the needle unit at this time is the upper end of tube portion 246 of the needle cap, for in this modification the inside diameter of the tube 246, above the recess 254, is not significantly larger than the outside diameter of the needle 238.

In other respects the needle cap 245 is similar to the needle cap 145 of FIGURES 14, 15 and 16.

It is evident from all the foregoing that the squeezable container of this invention is simple in construction, inexpensive to make, and effective in use, particularly when the container is small. It is also evident that the container is readily adaptable to serving as part of a container and needle unit, and that such a unit, as shown and described, has several valuable features.

This application is a continuation-in-part of application Serial No. 57,919 filed September 23, 1960, now abandoned.

What is claimed is:

1. A squeezable container of relatively small size for use between the thumb and forefinger of the hand having a relatively non-deformable base portion, a deformable wall portion and a relatively non-deformable spout portion, characterized by the fact that the design and construction of the parts are such as to enable the container to be made readily and inexpensively in an injection molding apparatus with all portions made of thermoplastic material and, excepting only the rear end area opposite the spout portion, made so that all portions are integral at their junctions with the adjacent portions of the container, the deformable wall portion and the non-deformable base portion at the rear end area being made with an opening therebetween for the withdrawal of the interior forming die, after which the opening is closed by thermoplastically sealing the rear end of the deformable wall portion to the rear end of the relatively non-deformable base portion, said design and construction including; a generally rectangular, substantially flat shape for the base portion with one of the two short sides of the rectangle positioned at the spout end of the container and the other short side positioned at the rear end of the container; a bowed-out shape for the deformable wall portion that, in cross-section transverse to the long sides of the rectangular base portion, is substantially uniform from the spout end of the container to near the rear end, and initially, before the rear end of the deformable wall portion was thermoplastically sealed to the rear end of the base portion, was substantially uniform in such cross-section all the way to the rear end of the container; the junctions of the long sides of the deformable wall portion with the base portion being positioned along two substantially straight lines parallel with the long sides of the base portion with each such junction positioned inwardly a short distance from the adjacent long side of the base portion, thereby forming a projection along each long side of the base portion by means of which the container may be grasped and handled without squeezing the deformable wall portion and so without discharging the contents of the container; the spout portion of the container closing the container at the spout end except for the spout opening, and being made of the same thermoplastic material as the base portion and the deformable wall portion; the thickness of the base portion being such that, at room temperature, the base portion is relatively non-deformable; and with the thickness of the deformable wall portion being substantially less than the thickness of the base portion so that said wall portion is readily deformable.

2. A squeezable container as described in claim 1 in which the rear end of the base portion is substantially thinner, for a relatively short distance forwardly of the short side at that end, than the thickness of the remainder of the base portion, so as to facilitate the heat sealing of the rear end of the deformable wall portion with the rear end of the base portion.

3. A squeezable container as described in claim 1 in which the bowed-out shape for the deformable wall portion, in cross-section transverse to the long sides of the rectangular base portion, is arcuate, with its center below the base portion, with the arc subtending an arc between 180 degrees and 90 degrees, and with the ends of the arcuate portion joined to the base portion by relatively short, substantially straight wall portions that intersect the plane of the upper surface of the base portion at acute angles, one on each of the long sides of the container with the open sides of these angles facing exteriorly of the container, and with these angles being less than about 45 degrees, so that, when the deformable wall portion is squeezed toward the base portion to discharge the contents of the container, the deformable wall portion may readily be pushed into engagement with the surfaces beneath it through substantially the width of the container to minimize the amount of material left within the container.

4. A squeezable container as described in claim 3 in which the inner surface of the spout end of the container, starting at the junction of the spout portion with the deformable wall portion, is sloped at an angle downwardly and inwardly to the base portion so that the deformable wall portion, when squeezed to discharge the contents of the container, may readily be pushed substantially into engagement with this inclined inner surface of the spout portion to minimize the amount of material left within the container, the communication between the interior of the container and the spout discharge opening being by way of a relatively long passageway within the resulting solid thermoplastic block between the interior of the container and the discharge opening of the spout.

5. A container as described in claim 1 in which the discharge spout portion includes a tube-like spout with a substantially uniform inside diameter to form a cylindrical discharge spout opening the axis of which is parallel to the long sides of the base portion of the container and also includes a puncturable wall at the base of such opening closing the passageway between the interior of the container and such spout opening, and in which a hypodermic needle is mounted in such spout opening so that the end of the needle for injection into the patient projects outwardly from the front end of the discharge spout portion, said needle having a metallic needle cylinder tightly fitted thereon around the exterior of the needle near the base end thereof, and the exterior of said needle cylinder fitting snugly into the cylindrical opening of the discharge spout portion, but being movable axially toward the base of such opening by the application of force to the forwardly facing end of the needle cylinder, such movement causing the base end of the needle to puncture the puncturable wall at the base of the spout opening and thereby enable the contents of the container to be discharged through said needle when the deformable wall of the container is squeezed against the base portion.

6. A combination container and needle unit as described in claim 5 in which the inner surface of the spout end of the container, starting at the junction of the spout portion with the deformable wall portion, is sloped at an angle downwardly and inwardly to the base portion so that the deformable wall portion, when squeezed to discharge the contents of the container, may readily be pushed substantially into engagement with this inclined inner surface of the spout portion to minimize the amount

of material left within the container, the combination between the interior of the container and the base of the nozzle discharge opening being by way of a relatively long passageway within the resulting solid thermoplastic block between the interior of the container and the base of the cylindrical discharge spout opening of the spout portion, with the thermoplastic material of which the various parts of the squeezable container are made being at least translucent if not transparent at room temperature, and with the diameter of said long passageway in the thermoplastic block small and at most not significantly larger than the outside diameter of the needle at its base end, with the result that the combination container and needle unit, after injection of the needle into the patient to be treated with the contents of the container and before the contents are discharged into such person, may be used to withdraw a small amount of the body fluid of the patient, sufficient to fill the needle and the long passageway, whereupon the character of the body fluid so withdrawn is readily visible in said long passageway without withdrawing a large amount of body fluid.

7. A combination container and needle unit as described in claim 6 in which the hypodermic needle has a supplemental needle cylinder surrounding the needle at the front end of the primary needle cylinder and secured to said needle, with the diameter of said supplementary needle cylinder smaller than the diameter of the primary needle cylinder, and in which said unit includes a needle cover in the form of a cylinder having an axial recess the inside diameter of which is only slightly larger than the outside diameter of the needle, and having the outside diameter of the needle cover about equal to the inside diameter of the cylindrical opening of the spout portion of the container so that the container end of the needle cover slidably fits in said cylindrical opening, the needle cover also having an axial recess enlarged at its container end so that the inside diameter of the enlarged recess is about equal to the outside diameter of the supplemental needle cylinder, with the result that the needle cover prevents the needle from cocking as the needle cover is pushed axially toward the container to cause the base end of the needle to puncture the puncturable wall at the base of the cylindrical opening of the discharge spout, and thus insures that the base end of the needle will not miss the relatively small area of such puncturable wall.

8. A combination container and needle unit as described in claim 5 in which said unit includes a needle cover in the form of a cylindrical tube with a closed outer end, the outside diameter of the cylindrical tube being about equal to the inside diameter of the cylindrical opening of the spout portion of the container so that the container end of the needle cover slidably fits in said cylindrical opening, said needle cover having a flange thereon projecting radially outward from the cylindrical tube and forming, for the part of the flange furthest from the container end of the needle cover, a shoulder in a plane perpendicular to the axis of the cylindrical tube, such shoulder being at such a distance from the container end of the needle cover that the plane of such shoulder intersects the needle a short distance below the outer end thereof when the container end of the needle cover abuts against the needle cylinder, said cylindrical tube having its area just above such shoulder scored circumferentially so that the portion of the cylindrical tube beyond the flange may be broken off and removed while the remainder of the needle cover is left in place, thereby leaving the outer tip of the needle exposed above such shoulder, such shoulder of such flange thus serving to prevent the needle from being inserted through a vial stopper more than enough to penetrate through the stopper, with the result that all the contents of such vial may readily be withdrawn through the needle into the squeezable container.

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