June 5, 1934. G. N. HEIN 1,961,489

RESILIENT REFLEX SYRINGE

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Fig. 1.

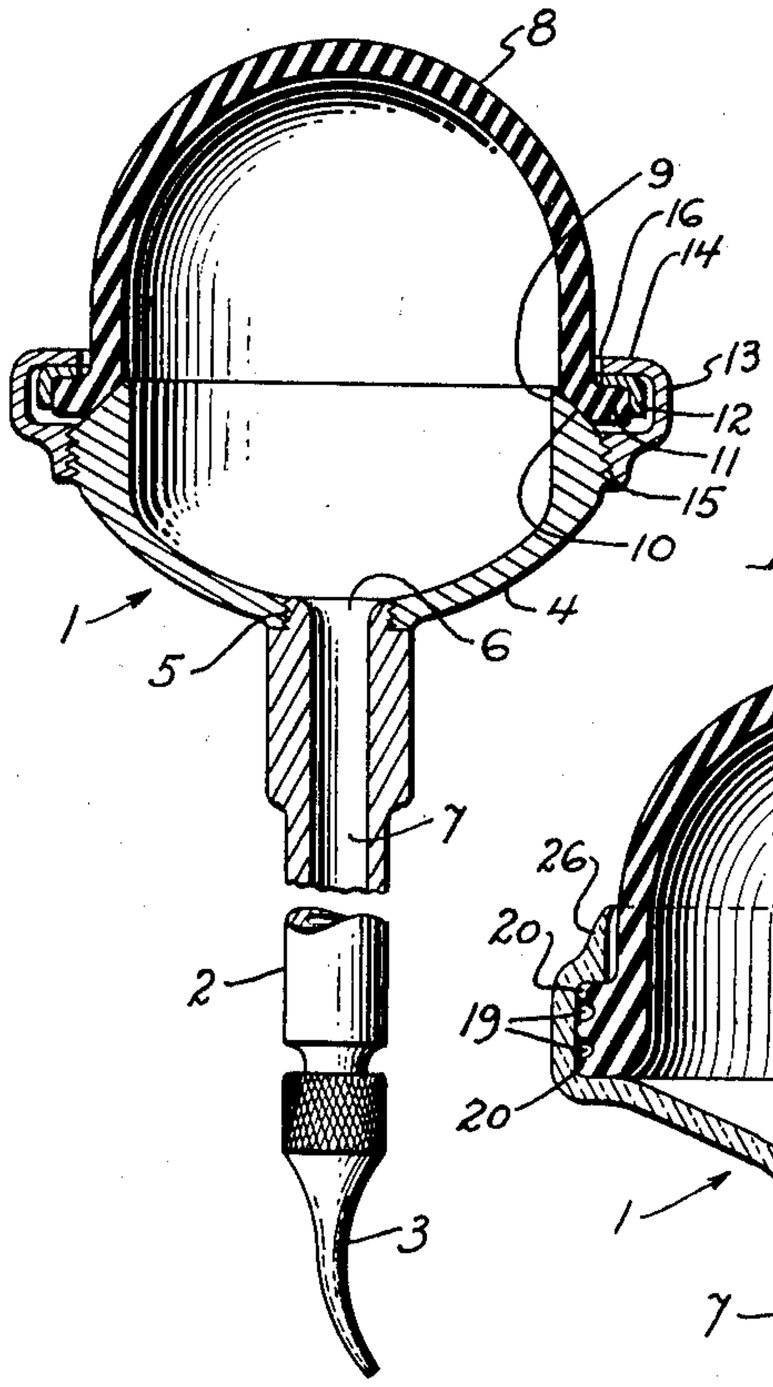

Fig. 2.

Fig. 3.

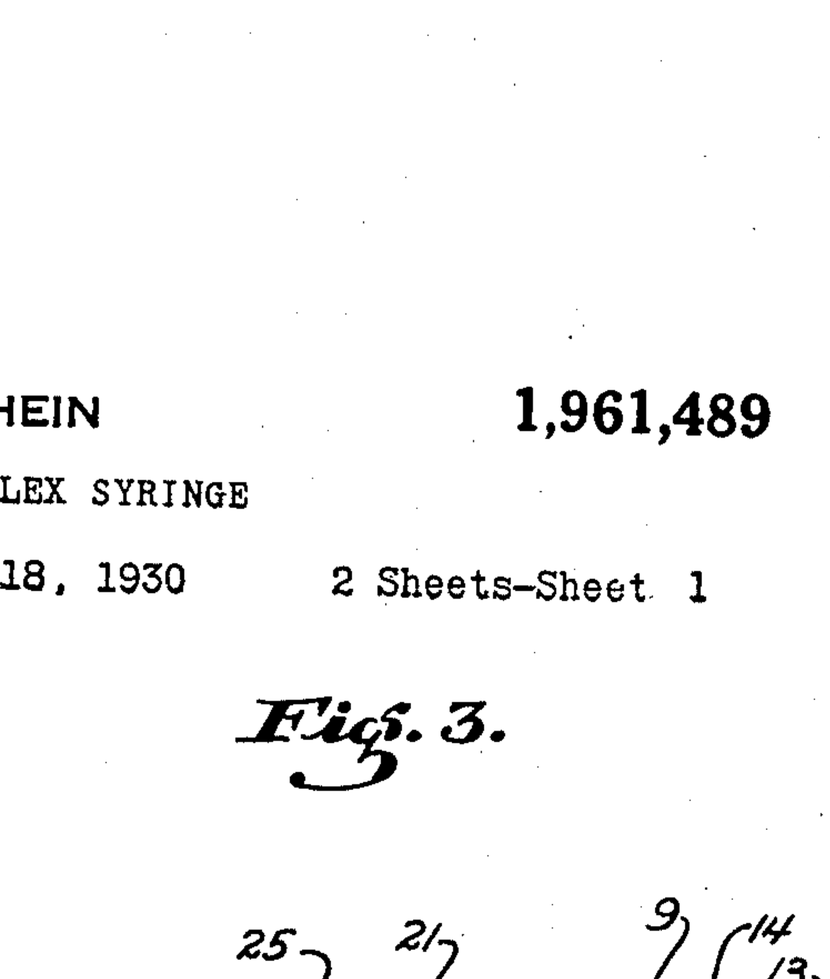

Fig. 4.

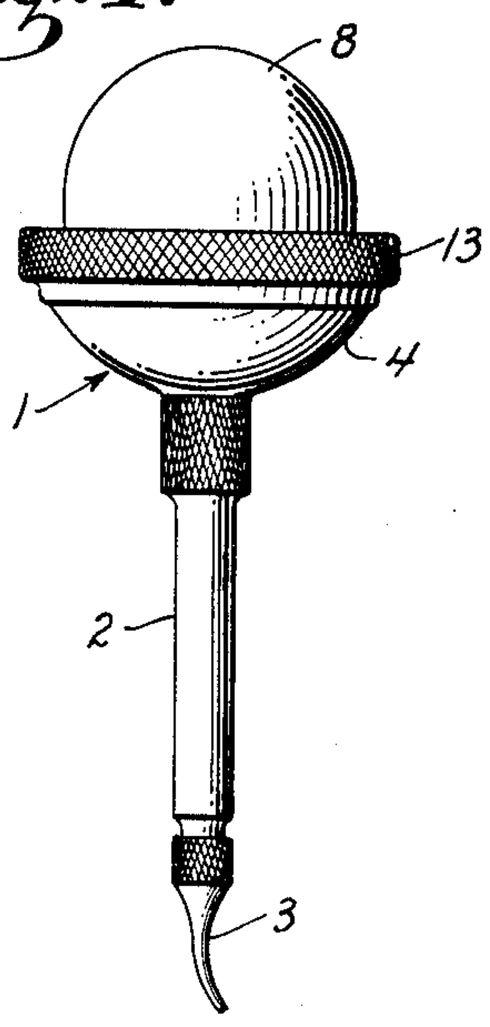

Fig. 5.

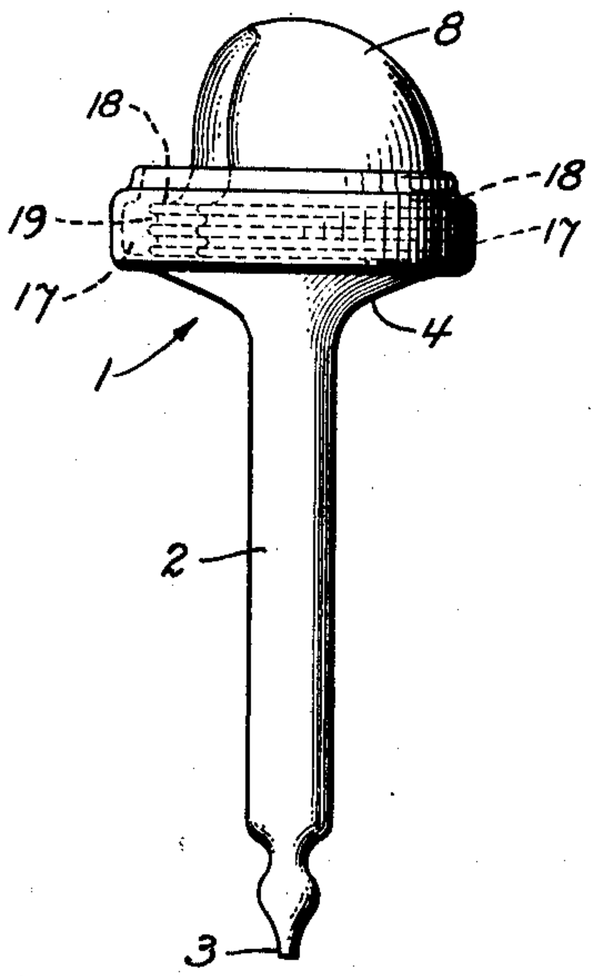

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Fig. 6.

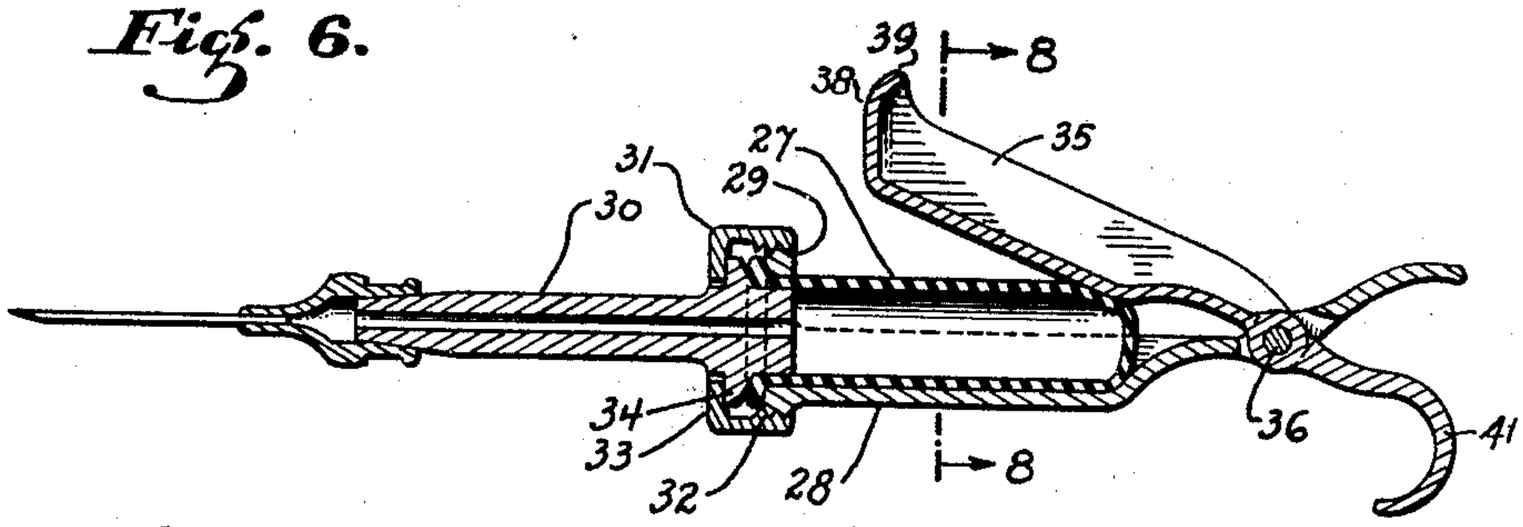

Fig. 7.

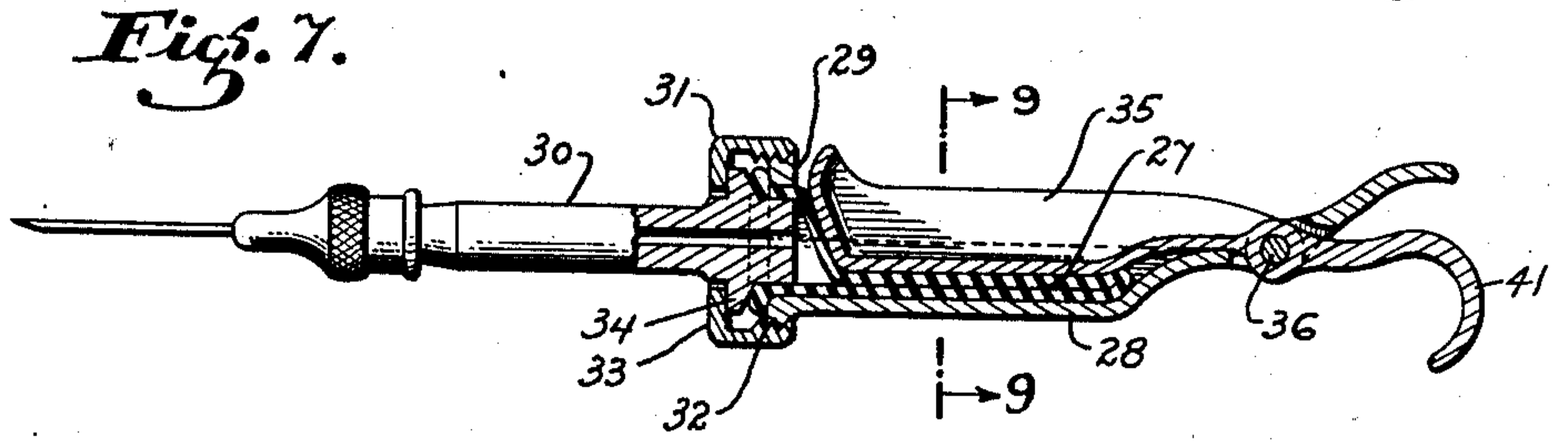

Fig. 8.

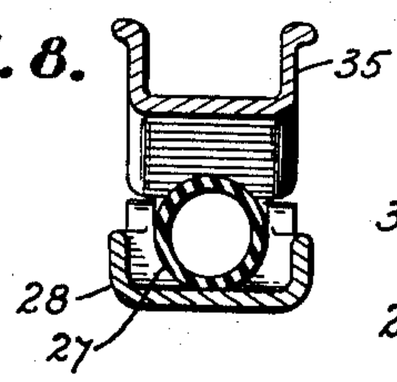

Fig. 9.

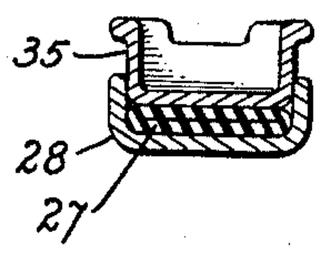

Fig. 10.

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RESILIENT REFLEX SYRINGE

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Application August 18, 1930, Serial No. 476,293

2 Claims. (Cl. 128—232)

This invention relates to resilient reflex syringes and to resilient members for use in connection therewith to expel the contents of the syringe, such as liquid, paste, gas, and the like.

The known type of syringe of this character is provided with a resilient expelling member usually rubber substantially spherical or spheroid in shape, usually termed a bulb, having a relatively small discharge orifice. Connected with the discharge orifice is a tubular spout or ejecting point, in some instances having an open end fitting within the orifice of the bulb and in some forms having the neck of the bulb fitting into the open end of the spout or ejecting point. The relatively small orifice in the bulb is the only opening through which the interior of the bulb may be cleansed, inspected and sterilized. Owing to the shape of this usual type of bulb it must in commercial production be formed by halves or at least more than one piece and, when the rubber is vulcanized, being formed so as to join the separate pieces into bulb-forming relation. To impart thereto proper commercial strength, it is necessary to vulcanize it by using an outer die only since the orifice is not of sufficient size to make the use of an inner die practicable. The compression on the inner side of the bulb in said die forming operation is gaseous, and this does not provide a wall of even and uniform thickness or a thoroughly compressed rubber because of lack of pressure from the inner side by positive pressure of an inner die. This results in the internal surface of the bulb having a rough internal surface which affords lodging places for undesirable and infectious materials, difficult to remove because of the inaccessibility of the interior of the bulb. Due to the lack of evenness of wall thickness and proper condensation of the rubber, the bulbs do not withstand frequent boiling in water for sterilization, as they soon crack internally on the seam where the pieces are joined together providing unsanitary pockets for secretion of infectious matter; and because of lack of proper treatment in manufacture they soon lose their elasticity and become worthless; also small chips of the rough inner surface pull off and are sometimes injected into a wound or infected area and carry with them the infectious matter theretofore attaching to such scaled off particles.

The object of this invention therefore is to produce a syringe having a resilient ejecting medium which can be taken apart quickly and replaced together; to provide a syringe which is leak-proof in action and is sterilizable by boiling or otherwise; which permits of thorough inspection both internally and externally; which is inexpensive to manufacture; and which can be made extremely quick in its rebound action.

A further object is to provide, in connection with this type of resilient ejecting medium, a convenient simple and safe syringe, which may be used by the patient as well as by the doctor as a prophylactic and toilet measure in rendering self-treatment or cleansing, especially of the oral, nasal, and phryngial cavities, teeth and tonsils. In such form my syringe enables the individual to apply proper medication, such as gases, powder, liquids, and paste, and the like, to inaccessible spaces found between the roots of the teeth and to pockets under the gum flaps, usually caused by the ravages of pyorrhoea, alucolaris, and other diseased and infected tissue. This type of syringe also enables the individual to apply proper medication to pockets created incident to the placing in the mouth of artificial dental appliances, such as crown and bridge work, and to pockets created by diseased tonsilar crypts, etc.

In my construction I use substantially semi-spherical resilient shell-like bodies, or in case the complementing portion of the spout or ejecting portion has a recess therein I may use diaphragms so formed that they permit vulcanization between dies, giving them the desired uniform wall thickness with proper condensation of the material, and resulting in smooth internal and external surfaces practically impervious to the various solutions normally used in like devices, and eliminating rough surfaces or the necessity of vulcanizing separate pieces together.

As will hereinafter be explained the use of my type of semi-spherical or diaphram member is usually in connection with a complementary portion to form an ejecting member which latter is made of any suitable material such as metal, hard rubber, or the like, and provides a bowl to grip between the fingers in use of the syringe. These types of material are conductors of heat or cold and permit the operator to know the temperature of the material being ejected.

A further object is to provide a syringe especially easy and convenient for an unskilled person to operate and keep clean and thus afford better co-operation between the doctor and patient in combating disease and educate the public in oral and other branches of sanitation and hygiene.

With the foregoing and other objects in view the invention consists in the novel construction and combination of parts hereinafter described,

illustrated in the accompanying drawings and set forth in the claims hereto appended, it being understood that various changes in the form, proportion, size and minor details of construction within the scope of the claims may be resorted to without departing from the spirit of sacrificing any of the advantages of the invention.

To more fully comprehend the invention reference is directed to the accompanying drawings wherein

Fig. 1 is a front elevation showing upper portion in section, and positive means for mounting the shell-like resilient member on the injector.

Fig. 2 is a front elevation showing upper portion in section and a shell-like resilient member mounted by its resiliency on an injector.

Fig. 3 is a front elevation showing upper portion in section and a resilient disc closing an opening of the bulbous portion.

Fig. 4 is a front elevation of the device of Fig. 1.

Fig. 5 is a front elevation of the device of Fig. 2, showing how, by pressure on the bulbous shell in this form, the syringe may be disassembled.

Fig. 6 is a modification showing a longitudinal side view section of the resilient bulbous member mounted on a syringe in a holder portion by which extrusion may be accomplished mechanically.

Fig. 7 is a longitudinal side view section of the structure shown in Fig. 6, showing the mechanical extrusion member closed upon the resilient bulbous member.

Fig. 8 is a transverse section on line 8—8 of Fig. 6.

Fig. 9 is a transverse section on line 9—9 of Fig. 7.

Fig. 10 is a general sketch view of manner of operating the device shown in Fig. 6 and Fig. 7.

Referring more particularly to the several views of the drawings wherein like characters of reference designate corresponding parts

1 indicates a syringe body in its entirety wherein tubular injector portion 2 is provided, having a discharge nozzle or member 3, and a bowl 4, the latter preferably being circular at an open portion 9. The ejector, discharge nozzle, and bowl may be formed in separate pieces as shown in Fig. 1, and cooperatively mounted by threaded joinder as at 5 or other suitable manner such as friction fit; or the ejector, discharge nozzle and bowl may, if desired, be an integral structure such as shown in Fig. 2, and this latter form is preferable where the material used is glass. From actual experience, it is believed that the dental profession prefers a metal or substantially unbreakable syringe body whereas the medical profession prefers a glass syringe body, but my invention is adaptable to either form.

The bowl 4 is of any usual receptacle form and is provided with an opening 6 connecting with the tubular portion of the ejector at the discharge end of which is mounted the discharge nozzle 3. The opening 9 of the bowl 4 is adapted to receive and mount in syringe forming relation a closure member 8 of suitable resilient material, such as rubber. This closure member may assume various forms largely dependent on the shape and capacity of the syringe bowl and the individual preference of the user, but my preferred forms are bulbous semi-spheroids as shown in Figs. 1 and 2 and discs such as shown in Fig. 3. These closure members have tight fit with the opening 9 of the bowl so that there will be no leakage of material at the juncture. As shown in Fig. 1 the bowl is provided with an annular bevel 10 adjacent the opening 9 providing a conical seat for the edge of the resilient closure member. The closure member is provided with an outwardly turned lip 11 which has fitted circumferentially therearound a snugly fitting ring 12 which preferably encompasses both the side and upper faces of the lip 11, and thereby provides a bearing surface for a threaded nut 13 which has a flange 14 and which is drawn into tight contact with the upper face of ring 12 by turning the nut 13 upon the annularly threaded portion 15 of the bowl. The inner circumferential face of the flange 14 is preferably spaced from the outer surface of the resilient closure member, as at 16, so that in turning the nut the closure member will not be crimped or mutilated.

In Fig. 2 the bowl is provided with an annular groove 17 and the resilient closure member is provided with a resilient integral annular lip 18, which preferably has annular grooves 19 therein providing a series of baffle rings 20 to prevent leakage of material from the syringe. In Fig. 3 the closure member 8 is formed in the shape of a disc 21 of resilient material and preferably having a lip or protuberance 22 extending from the surface thereof and adapted to tightly fit the outer wall surface of the opening 9 and into a recess 23. A ring nut having a flange 14 and having threaded connection with the bowl as at 15 clamps the edges of the resilient closure member to the edge of the bowl walls. This disc form of closure member has a very great advantage in that it permits the syringe to be stood vertically on its end when not in use.

Greater wall thickness may be provided at portions of the resilient closure member than at other portions as at 24, thus providing greater elasticity at the thinner wall portions 25 and providing a more solid portion for finger or hand pressure in operating the syringe, since the thinner portion of the resilient wall will depress and reflex more quickly than the thicker portion.

In Fig. 2 the resilient closure member may be removed for cleansing, sterilization or other purposes and replaced by pressure on the vertically arcuate outer wall thereof so that the bulbous shape is deformed as shown in Fig. 5 whereupon the member 8 may be readily rmoved and may be as readily replaced. In the structure of Fig. 4 it is preferred that the side walls of the bowl may extend upwardly for a substantial distance as at 26 parallel with the outer wall of the resilient closure member so that said closure member will not be inadvertently pressed from its seat in the annular groove during the operation of the syringe.

In Figs. 6 to 10 inclusive, a modification in the use of the resilient closure member has been shown and its adaptability for use in connection with a hypodermic dental syringe having mechanical means for collapsing the closure member. The closure member 27 here is preferably elongated in shape and lying in a trough 28 and having its opn end portion passing through a collar 29 and clamped upon the tubular syringe body 30 by a nut 31 threadedly engaging said collar at 32 and having a flanged portion 33 engaging a shoulder 34 on the syringe body. A lever handle 35 having a shape conforming generally to the inner depression of the trough 28 which lever handle is mounted at 36 so as to have pivotal movement relative to the trough member. It is preferred that this mounting shall be relatively tight so as to form a frictional resistance

so that when a portion of the contents of the bulb is discharged the lever handle 35 will maintain the deformity and no portion of matter will be sucked back into the tube of the syringe. As shown in Fig. 10 this form of syringe may be operated with one hand to extrude its contents and may be operated with the lever positioned above or below the closure member. For this reason a swivally mounted discharge tip may be provided whereby the ejection may be in any desired direction as indicated at 37. This form of syringe is adaptable to any form of collapsible container such as the resilient tubular member 27 shown therein or to collapsible tubes such as are made of thin lead foil and used for soft pastes.

The lever handle 35 preferably has a baffle 38 at its forward end and a lip 39 extending rearwardly therefrom so as to easily engage the end of the thumb as indicated at 40 in Fig. 10 and so as to enable the operator readily to release the lever 35 from pressure upon the closure member 27, which latter action may be further facilitated by providing a hooked portion 41 at the opposite end of lever 35 to fit around the little finger as shown in Fig. 10.

Having thus described my invention, I claim:

1. A syringe comprising a tubular ejector having a discharge end and provided at its opposite end with a bowl of rigid material having upwardly and outwardly formed walls providing an open end to said bowl and terminating in a rigid bevelled seat adapted to receive a closure member, a resilient bulbous closure member having an opening, the closure member at said opening being adapted for seating loosely on said beveled seat, and means whereby said closure member may be intimately contacted with said beveled seat and the body thereof deformed adjacent its opening to conform to the bevel of said seat.

2. A syringe comprising a rigid ejector member provided at one portion with a discharge opening and having an open end at another portion and provided adjacent the last mentioned opening with an annular bevel providing a rigid beveled seat, a resilient bulbous closure member having an opening, the closure member at said opening being adapted for removable mounting upon said beveled seat, and means for wedging the seated portion of said resilient closure member in a direction axial to the ejector member in close contact relation with said beveled seat.

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