

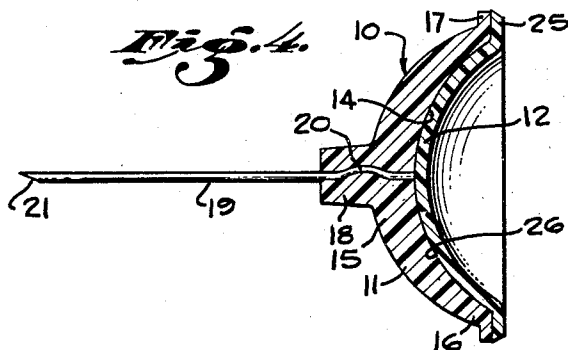
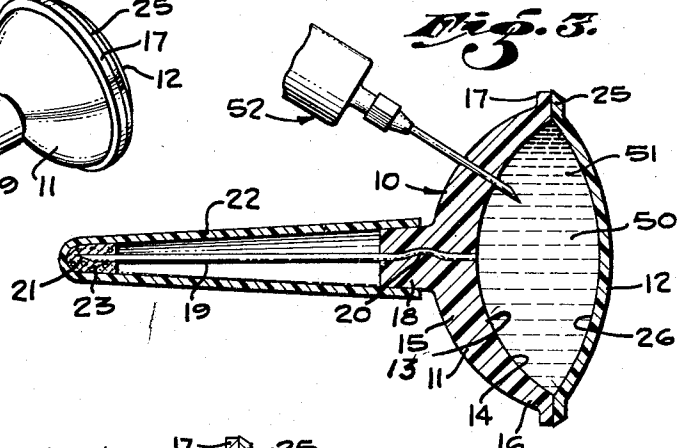
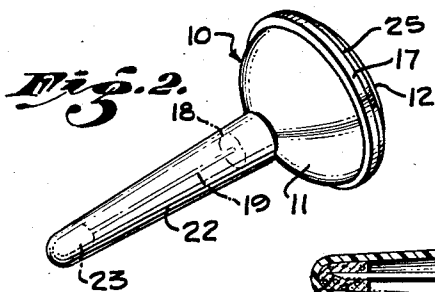
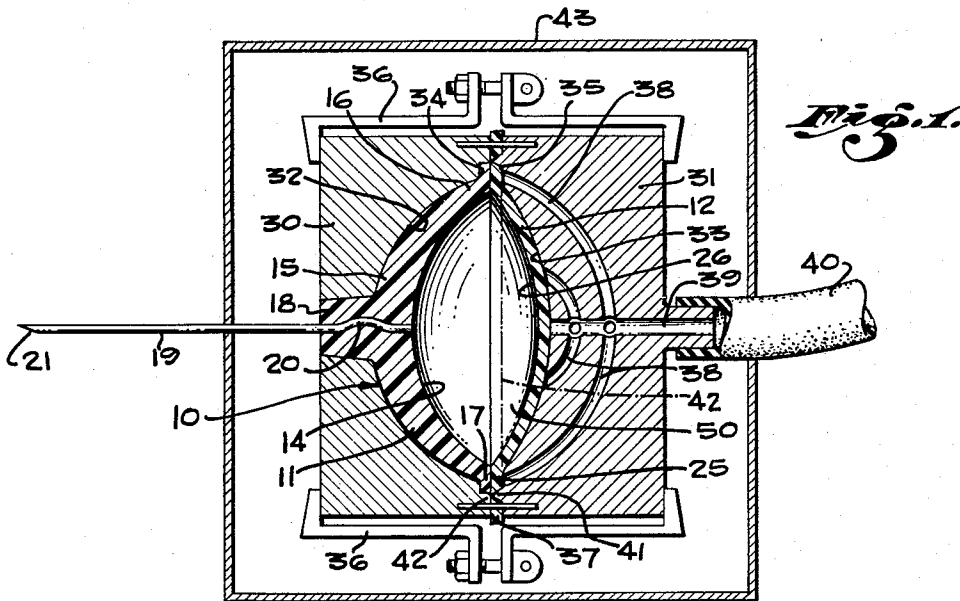
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2,688,964

SYRINGE

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SYRINGE

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1 Claim. (Cl. 128—216)

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This invention relates to a unitary syringe.

The general object of the invention is to provide an improved, highly effective, disposable syringe.

A more specific object of the invention is to provide a unitary syringe wherein a more or less rigid, recessed front member is employed as a needle support and wherein the recess is closed by a rear member integral with the front member.

Another object of the invention is to provide a novel disposable syringe which includes a front member and a resilient rear member with the two members integrally united in curing to form a chamber, the volume of which is reduced when the rear member is operated to thus produce an injecting effect.

An additional object of the invention is to provide a novel method of making a syringe.

Another object of the invention is to provide a novel mold device for use in making a syringe.

Other objects and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawings, wherein:

Fig. 1 is a central, sectional view through a mold member and syringe, showing my invention;

Fig. 2 is an isometric view of the completed syringe;

Fig. 3 is an enlarged, central, sectional view, showing the syringe, and

Fig. 4 is a fragmentary view similar to Fig. 3, showing the parts in the position they assume when the syringe has been discharged.

Referring to the drawing by reference characters, I show a syringe embodying the features of my invention which is indicated generally at 10. As shown the syringe includes a front portion 11 and a rear portion 12.

The front portion includes a body which is externally shaped substantially like a segment of a sphere, with the interior of the body having a recess 13 defined by an inner wall 14, with the inner wall 14 similar in shape to the outer wall of the body but having a shorter radius so that the body is thicker at the center 15 than at the edges 16.

As shown the body includes a planar peripheral flange 17 which is disposed in a plane perpendicular to the axis of the body. The body has a forwardly extending solid tip 18 which is tapered. A needle 19 is arranged in the tip and extends into the body. The needle is provided with an end portion 20 to prevent movement of the needle and the forward end of the needle at 21 is sharpened.

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A closure member 22 surrounds the needle and a cork 23 within the closure member protects the tip 21 of the needle and closes communication through the needle. The portions 11 and 12 are continuously curved along lines parallel to the axis of these portions.

The portions 11 and 12 of the syringe may be made of natural rubber, artificial rubber or plastic such as polyethylene.

The rear portion 12 of the syringe includes a projecting flange portion 25 which is co-planar with the flange portion 17 and is fused or vulcanized during manufacture, as will be later described, to the flange 17. The rear member 12 is shaped to form substantially a segment of a sphere and includes a recess portion 26 which is disposed opposite the recess portion 13 of the front member.

In order to manufacture the syringe, mold members 30 and 31, as shown in Fig. 1, may be employed. These mold members have mold cavities 32 and 33 which correspond to the outer surfaces of the front and rear members, respectively. The mold members also include peripheral grooves 34 and 35 which receive flanges 17 and 25, respectively, of the front and rear members. Clamping members 36 serve to hold the parts of the mold members together. Only one pair of mold members is shown but it must be understood that the mold members may be ganged if desired.

In making a syringe according to my new method, a front member 11 is pre-molded of material such as polyethylene in a suitable apparatus (not shown) and is then inserted in the mold member 30. A sheet 37 of suitable material such as polyethylene is then extended across the mold cavity 33. The mold 31 is provided with a series of ducts 38 which lead to a manifold 39 and this manifold is connected by a suitable conduit 40 to a vacuum line. The mold 31 includes a peripheral knife edge 41 which engages an anvil portion 42 of the mold member 30 when the clamps 36 are tightened.

With the front member 11 in place, as shown in Fig. 1, and with a sheet of plastic 37 extending across the mold, as shown in Fig. 1, the vacuum line 40 is opened and a partial vacuum in the space 42 draws the sheet 37 from the broken line position to the solid line position in Fig. 1, and slightly stretches the material as this action takes place. With the vacuum maintained the mold members are brought together and clamped. This causes the sheet 37 to be severed by the knife edge 41 and the two parts of the syringe and their meeting edges are united by pressure of

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the mold members. The parts are placed in a vulcanizing or other chamber 43 and vulcanization or curing occurs. After curing the clamps 46 are released and the syringe removed from the mold cavities.

A medicament 50 is placed in the chamber 51 of the syringe. The medicament may be inserted through a needle 52, as shown in Fig. 3; after filling the needle 52 is withdrawn.

Having thus described my invention, I claim:

A syringe including a front member and a rear member, the front member including a substantially hemispherical portion having a solid axially arranged tip extending therefrom, a needle having its inner end embedded in said tip throughout the entire length of the tip and communicating with the interior of the front member, the front end of said needle being sharpened, said front member having a peripheral rearwardly facing planar flange, said rear member including a cupped body portion coaxial with, and spaced from, the front member to provide a chamber and having a peripheral forwardly facing planar

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flange secured to the flange of the front member, said coplanar flanges being disposed in a plane which is perpendicular to the axis of the front member and tip, said rear member being flexible and depressible to decrease the volume of the chamber.

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