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F. E. BELL ET AL

SYRINGE

Filed April 20, 1925

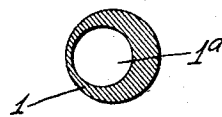
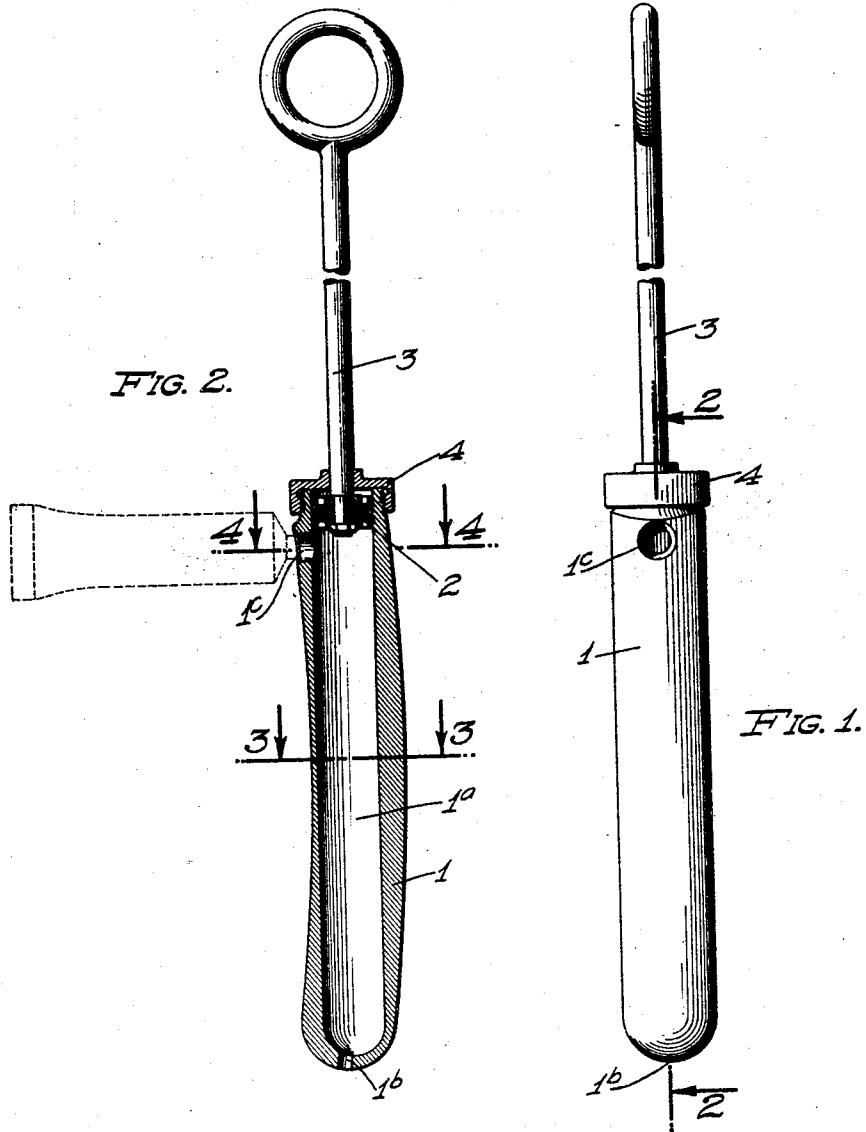


FIG. 3.

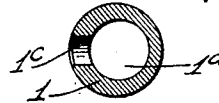


FIG. 4.

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## UNITED STATES PATENT OFFICE.

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## SYRINGE.

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Our invention relates to syringes, particularly to curved syringes.

Heretofore longitudinally curved syringes have been made with longitudinally curved bores, the bores being concentric with the circular outlines of the cross-sections of the barrels. This construction necessitated making the plunger rods curved to conform with the curves of the bores of the barrels. The plungers of syringes of this class were made of ordinary straight construction causing poor seating against or engagement with the walls forming the bores of the barrels. With this construction also, the plungers and plunger rods were required to be positioned into the bores in a certain manner to prevent binding of the plunger rods against the removable heads or caps or distorting of the yieldable plungers and of the plunger rods.

The objects of our invention are: First, to provide a longitudinally curved syringe barrel having a straight bore extending therein from one end thereof and adapted to receive a plunger having a straight plunger rod with which it may be easily assembled and hereby the usual binding or cramping of the plunger and plunger rod in syringes of this class is reduced to a minimum; second, to provide a syringe having a filling opening in the wall of its barrel near the removable cap end thereof, whereby the barrel may be filled without removing the cap at the normally open end thereof and without the provision of considerable auxiliary apparatus; third, to provide a syringe having a filling opening in the wall of its barrel near the normally open end thereof, whereby the barrel may be readily charged with plastic substances without removing the removable cap from the normally open end of the barrel; fourth, to provide as a whole a novelly constructed syringe, and fifth, to provide a syringe of this class which is particularly simple and economical of construction proportionate to its functions, durable, and which will not readily deteriorate or get out of order.

With these and other objects in view, as will appear hereinafter, our invention consists of certain novel features of construction, combination and arrangement of parts and portions, as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had

to the accompanying drawings and to the characters of reference thereon, which form a part of this application, in which:

Figure 1 is a fragmentary side view of our syringe; Fig. 2 is a longitudinal sectional view thereof, taken through 2—2 of Fig. 1, showing certain parts and portions thereof in elevation to facilitate the illustration, and Figs. 3 and 4 are transverse sectional views thereof, taken respectively through 3—3 and 4—4 of Fig. 2.

Like characters of reference refer to similar parts and portions throughout the several views of the drawings.

In the particular embodiment of our invention, as shown in the drawings, the barrel 1, made of any suitable material such as hard rubber, is longitudinally curved from end to end and is provided with a longitudinally straight bore 1<sup>a</sup> extending therein from one end thereof and communicating with the opposite end of the barrel through an orifice or discharge opening 1<sup>b</sup>. In the bore of the barrel 1 is reciprocally positioned a plunger 2 secured to the one end of the plunger rod 3 extending into the bore 1<sup>a</sup> through a cap 4 screwably secured over the open end of the barrel. The plunger 2 may be of any suitable construction, such as a pair of oppositely disposed, cupped leather or rubber washers, as shown in Fig. 2. The externally threaded open end portion of the barrel 1 is concentric with the bore 1<sup>a</sup> and the rod 3, thus requiring no particular skill in securing the cap 4 to the open end of the barrel.

In the wall of the barrel 1 and near the open end thereof is provided a filling opening 1<sup>c</sup>, providing an opening at all times from the outside to the interior of the barrel. This opening 1<sup>c</sup> is spaced from the open end of the barrel a distance slightly greater than the thickness of the plunger 2, so that the barrel may be readily filled without interference. This filling opening 1<sup>c</sup> permits the barrel to be filled without removing the cap 4 from the open end of the barrel, as is usually done in syringes now in use; and the opening 1<sup>c</sup> provides a far simpler means of filling the barrel without removing the cap 4 than other cumbersome apparatus now in use for this purpose. The filling opening 1<sup>c</sup> near the normally open end of the barrel also permit plastic substances to be

discharged into the barrel from tubes, as shown by dotted lines in Fig. 2, without removing the cap 4.

Though we have shown and described a particular construction, combination and arrangement of parts and portions, we do not wish to be limited to this particular construction, combination and arrangement, but desire to include in the scope of our invention the construction, combination and arrangement substantially as set forth in the appended claims.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a syringe structure, a longitudinally curved barrel provided with a substantially straight bore.

2. In a syringe structure, a longitudinally curved barrel provided with a substantially straight bore extending therein from one end thereof to near the opposite end of said barrel and communicating with the outer side of said opposite end through a small discharge opening.

3. In a curved syringe structure, a longitudinally curved barrel provided with a straight bore extending therein from one end thereof to near the opposite end, a cap for the open end of said barrel, a yieldable plunger reciprocally mounted in the bore of said barrel, and a straight plunger rod secured to said plunger and extending through said cap.

4. In a syringe structure, a longitudinally

curved barrel provided with a substantially straight bore extending therein from one end thereof to near the opposite end of said barrel and communicating with the outer side of said opposite end through a small discharge opening, the open end of said barrel being externally threaded and concentric with the bore of the barrel, a cap positioned over the open end of said barrel, said cap being provided with a central hole concentric with the bore of the barrel, a straight, substantially rigid plunger rod extending through the hole in said cap, and a plunger secured to the one end of said rod and reciprocally mounted in said barrel.

5. In a syringe structure, a longitudinally curved barrel having a corresponding longitudinally curved axis and provided with a straight bore having a discharge opening at its one end.

6. In a syringe structure, a longitudinally curved barrel having a corresponding longitudinally curved axis and provided with a straight bore having a discharge opening at its one end, and a plunger reciprocally mounted within the bore of said barrel and provided with a straight, substantially rigid plunger rod extending beyond the opposite end of said bore.

In testimony whereof, we have hereunto set our hands at San Diego, California, this 4th day of April, 1925.

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