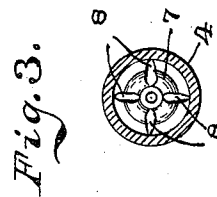
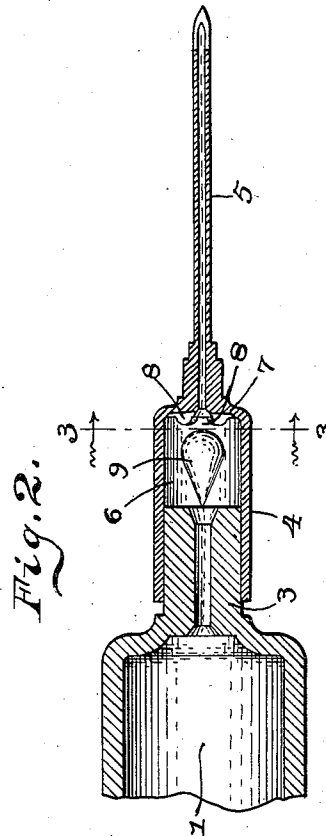
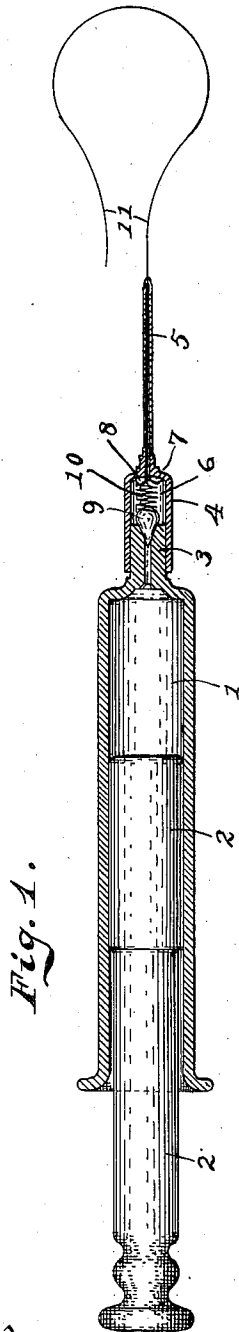


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HYPODERMIC SYRINGE.
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1,174,745.

Patented Mar. 7, 1916.



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UNITED STATES PATENT OFFICE.

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HYPODERMIC SYRINGE.

1,174,745.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ELI LILLY, a citizen of the United States, residing at Indianapolis, Marion county, and State of Indiana, have invented and discovered certain new and useful Improvements in Hypodermic Syringes, of which the following is a specification.

My invention relates to hypodermic syringes and its object is to provide means whereby a movable closure which is provided between the liquid containing body and the needle may be quickly and readily released to enable the immediate use of the syringe, such means being especially adapted to cooperate with a liquid containing body and a closure both made of glass or other aseptic and chemically resistant material, and the invention particularly aims to utilize the ordinary needle "stylus" as a means for retaining and for releasing the movable closure.

With these objects and others in view, my invention is embodied in preferable form in the device hereinafter described and illustrated in the accompanying drawings.

In these drawings Figure 1 is a longitudinal sectional view of a syringe embodying my invention, Fig. 2 an enlarged sectional view thereof, and Fig. 3 a cross section on line 3—3 of Fig. 2.

Referring to the drawings, 1 is a liquid containing barrel made of glass so as to be aseptic and incapable of being affected chemically and adapted to receive and hold a charge of medicinal liquid to be hypodermically injected.

2 is a glass plunger mounted within the barrel 1 and adapted to be reciprocated to force the liquid from the barrel. One end of the barrel terminates in a reduced neck portion 3 having an outlet passageway leading from the interior of the barrel. Fitting over this neck is a hollow cylindrical shell 4, preferably of metal, and adapted to be secured upon the neck by cement or other suitable means. The shell carries a hollow pointed needle 5. The shell and needle are preferably integral. The shell is longer than the neck and the latter is also preferably tapered in order to limit the projection of the shell upon the same so that the shell extends some distance beyond the outer end of the neck, providing a hollow chamber 6. The outer end of the shell is closed by a head 7 through which is formed an outlet

passageway with which passageway communicate radial grooves 8 formed in the head. This head is adapted to provide a seat for a movable closure member 9 which is also made of glass or other aseptic material and chemically resistant and which is adapted to normally close the other end of the opening in the neck 3. In order to hold this closure member in close contact with the wall of the neck so as to close the opening therefrom, preliminary to the use of the device, a spiral spring 10 is situated within the chamber 6, bearing at one end against the head at the outer end of the shell and at the other end against the glass closure member, thus forcing the latter into the opening so as to prevent the escape of liquid from the barrel. This spring, in the construction shown, is formed as a continuation of a pliable wire 11 of small diameter which is inserted through the needle at the time of assembly of the parts and is adapted to be pulled through the needle by the operator before use of the syringe in order to clear the needle of any particles that might have collected therein. This wire is known in the art as "stylus".

In assembling the device, the stylus is inserted through the passageway in the shell 4 and through the needle so as to project beyond the piercing end of the latter, the spring at end of said stylus being seated in the chamber 6 against the head. The plunger is then inserted in the barrel and the liquid charge supplied to the latter. The glass closure member is then inserted in the chamber 6 and then the shell is forced upon the neck of the syringe barrel and cemented thereto. The spring 10 will force the glass closure member tightly into the outlet opening in the neck of the barrel, thus closing the latter against the escape of liquid. When it is desired to use the syringe, it is merely necessary for the operator to pull the stylus through the needle as is customarily done, whereupon the spring being forced against the head of the shell 4 will be untwisted owing to the pliability of the metal composing the stylus and the latter may be readily withdrawn. As the spring is thus released from pressure against the closure member, said member is free to move in the chamber away from the end of the liquid containing barrel and the liquid can then be forced out of the barrel by the plunger into the cham-

ber and around the closure member through the radial grooves and out through the passageway leading from the shell and into the needle.

- 5 In the preferred construction illustrated in the drawings, the glass closure member 9 is shown as substantially egg-shaped, with a pointed end which is adapted to enter the lower end of the neck of the barrel in order
10 that a close fit may be obtained, but this member may be made of other forms, if desired.

With the above construction, it will be seen that the only parts of the syringe that
15 are in contact with the liquid before use are the liquid holding barrel, the piston and the closure member which are all made of glass, thus preventing contamination of the medicinal contents by metal or rubber cork or
20 other material likely to affect the contents by a chemical combination between such material and the contents.

Having thus described my invention, what I claim is:—

- 25 1. A hypodermic syringe having a liquid containing barrel formed with imperforate sides and of aseptic and chemically resistant material having an outlet, a plunger of aseptic and chemically resistant material in said
30 barrel, a hollow needle carried by the barrel, a closure member of aseptic and chemically resistant material between the needle and barrel outlet and a spring for pressing said closure member to its seat against said out-
35 let.

2. A hypodermic syringe having a single barrel formed of imperforate walls with openings only in its opposite ends, a plunger mounted in said barrel by being inserted
40 through its outer end, a movable closure member mounted over the discharge orifice in said barrel, a hollow needle mounted around said discharge orifice, the base of said hollow needle being formed with a chamber
45 adapted to provide for the movement of said closure member, and a spring interposed be-

tween said closure member and the hollow needle, substantially as set forth.

3. A hypodermic syringe having a liquid containing barrel formed with imperforate 50 sides and a plunger therein, said barrel having a reduced outlet end portion, a hollow shell fitting over said portion, a hollow needle integral with said shell, a movable closure member in said shell adapted to 55 close the said outlet and a spring in said shell bearing against said member.

4. A hypodermic syringe having a barrel, a plunger, a hollow needle, a movable closure member for said barrel, means providing a 60 chamber in which said member is mounted, a wire of pliable metal extending through the needle and having a spring formed at the inner end thereof, said spring being seated in said chamber and bearing against 65 said member and means against which said spring is forced to untwist the same when the wire is pulled through the needle.

5. A hypodermic syringe having a barrel provided with a discharge orifice in one end 70 and a plunger receiving orifice in its other end, a plunger therein, a hollow needle mounted around said discharge orifice, and secured to said barrel, a movable closure member mounted to seat in the discharge or- 75 fice of said barrel, a stylus passing through said hollow needle and formed with a spring on its inner end, which spring is interposed between said closure member and the inner end of said hollow needle, whereby said 80 closure member is normally held seated on the discharge orifice of said barrel, substantially as set forth.

In witness whereof, I have hereunto set my hand and seal at Indianapolis, Indiana, 85 this twentieth day of February A. D. nineteen hundred and fifteen.

ELI LILLY. [L. S.]

Witnesses:

A. C. RICE,
H. P. DOOLITTLE.