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A. E. SMITH
DISPOSABLE SYRINGE
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2,478,844

Fig. 1.

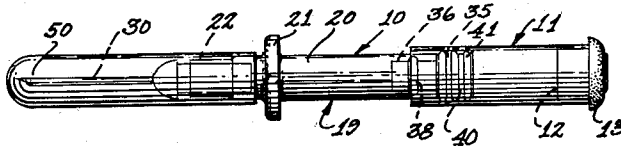


Fig. 2.

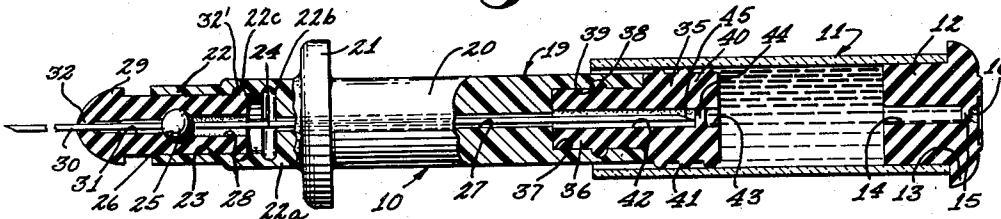


Fig. 3.

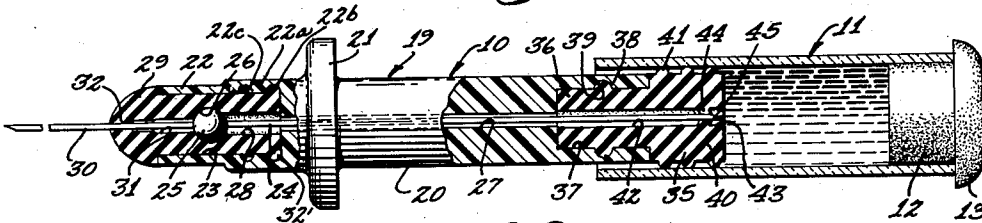


Fig. 4.

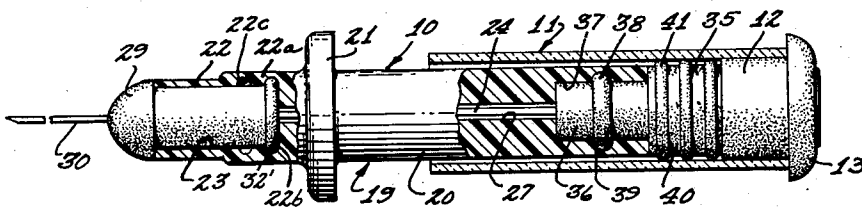
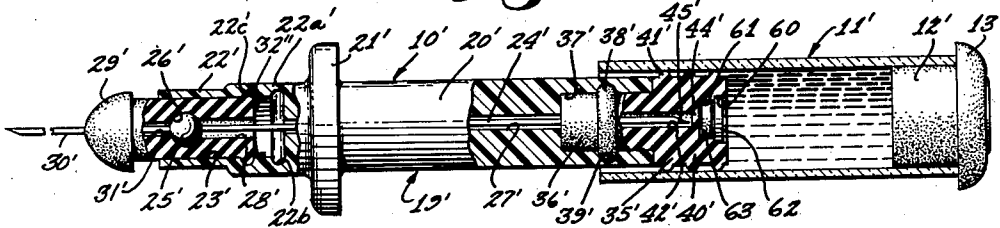


Fig. 5.



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DISPOSABLE SYRINGE

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4 Claims. (Cl. 128-215)

1

This invention relates to a disposable syringe. The general object of the invention is to provide a novel, simply constructed, highly efficient syringe of the disposable type.

A more specific object of the invention is to provide a syringe including an ampule or barrel having a novel plunger thereon.

Another object of the invention is to provide a syringe including a plunger having a novel piston stopper thereon.

A further object of the invention is to provide a hypodermic syringe including a needle which is slidably mounted in a novel manner on the syringe.

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

Fig. 1 is a side elevation showing a syringe embodying the features of my invention;

Fig. 2 is a central, enlarged sectional view, partly in elevation, showing the syringe before it has been prepared for use;

Fig. 3 is a view similar to Fig. 2 showing the syringe prepared for use;

Fig. 4 is a view similar to Fig. 2, showing the syringe after the contents have been discharged, and,

Fig. 5 is a view similar to Fig. 2, showing a modification.

Referring to the drawing by reference characters, I have shown my invention as embodied in a syringe which is indicated generally at 10. As shown the syringe includes a barrel 11 which is cylindrical and at the rear end includes a closure 12 which may be made of rubber and is seated within the barrel. The stopper has an enlarged flanged bead 13 at the outer end thereof. The stopper includes an axial, inwardly opening recess 14, closed at the outer end by a diaphragm 15. An axial dent or indentation 16 serves to mark the location in which an ampule filling needle may be inserted.

The syringe includes a plunger 19 which comprises a cylindrical body 20, having an outwardly directed finger engaging flange 21 intermediate its length and having forwardly extending end tip 22^a from which a reduced end tip 22 extends. The end tips have an axial recess 23 which communicates with an axial hole 27 in the plunger. The inner end of a hypodermic needle 24 is disposed in the recess and hole. The end tip 22^a has a pair of internal grooves 22^b and 22^c.

The outer end of the needle is provided with

2

a bulbous portion 25 which is seated in a substantially hemispherical seat 26 at the end of a recess 28 in a closure member 29. The closure member recess 28 is of less diameter than the diameter of the bulbous portion 25. The outer end 30 of the needle is arranged in an axial recess 31 and extends through a diaphragm 32 at the outer end of the recess 31.

The closure member 29 has an outwardly directed bead 32'. Normally the bead 32' engages in the groove 22^c. When the closure member 29 is moved axially into the plunger, the needle, due to engagement of the protuberance 25 with the closure, will be moved inwardly. The bead 32' will then enter the groove 22^b.

The inner end of the plunger is provided with a piston stopper 35 which has a reduced outer end 36 seated in a recess 37 in the plunger. Engagement of a bead 38 on the piston in a groove 39 in the plunger holds the piston stopper in place. At its inner end the piston stopper is provided with an enlarged portion 40 which has piston beads 41 thereon engaging the inner wall of the ampule 11. The piston stopper includes an outwardly directed axial recess 42 and a second axial recess 43 which opens inwardly, the two recesses being separated by a diaphragm 44.

The ampule may be made of glass or plastic. The plunger may be made of rubber or plastic while the closure 29, the stopper 13 and the piston stopper 35 are preferably made of a good grade of rubber.

In use the parts are assembled and shipped as shown in Fig. 1 and Fig. 2, with a semi-flexible protective cap member 50 over the outer end 30 of the needle, the inner end of which is supported by the reduced portion 22^a of the plunger. For use the operator moves the closure 29 inwardly so that the closure assumes the position shown in Fig. 3 and in this position the inner end tip 45 of the needle, which is sharpened, has pierced the diaphragm 44, thus placing the needle in communication with the contents of the ampule.

The insertion into the body of the patient is then made, after which the operator slightly withdraws the ampule from the plunger. If the needle has been inserted into a blood vessel, blood will be aspirated into the ampule, thus warning the operator of the location of the needle and he can withdraw the needle and make a fresh insertion. When the needle has been properly inserted, the injection may be made by pressing on the closure 12 with the thumb while the fingers engage the flange 21.

In Fig. 5 I show a modification of my invention wherein parts similar to those previously described are designated by single primed reference numerals. In Fig. 5 a closure member 29' has an outwardly directed bead 32'' thereon. Normally the bead 32'' engages the groove 22^c. When the closure member 29' is moved axially into the plunger the bead 32'' will then enter the groove 22^b. The modification is intended for use in the preparation of a fresh solution and its injection, and the modified form differs from the form previously described in that the inner end of the piston stopper is provided with an axial recess 60 which communicates with a second axial recess 61. The recess 60 is closed by a disc 62 while in the recess 61 I place a medicinal pellet 63.

In using the modified device the front closure 29' is moved inwardly, causing the needle tip 45' to pierce the diaphragm 44' and then cause dislodgement of the disc 62, causing the pellet 63 to be discharged into the ampule, whereupon a fresh injection is made as previously described.

From the foregoing description it will be apparent that I have invented a novel syringe which can be economically manufactured and which is highly efficient for its intended use.

Having thus described my invention, I claim:

1. A disposable syringe including a barrel having a closure at one end and being open at the other end, a plunger slidable in said barrel, said plunger having a recessed portion at its inner end, said recessed portion including an inwardly directed groove, a piston having a reduced end disposed in said recess, said piston having a bead fitting said groove, said piston having an axial recess and having a diaphragm closing said recess, said plunger having an axial hole therethrough and aligned with said recess, a tip on the front end of said plunger, said tip having a recess, an end closure slidable in said tip recess and a needle arranged in said tip and movable with the tip and having a sharpened inner end normally adjacent to, but not piercing, said diaphragm.

2. A disposable syringe including a barrel having a closure at one end and being open at the other end, a plunger slidable in said barrel, said plunger having a recessed portion at its inner end, said recessed portion including an inwardly directed groove, a piston having a reduced end disposed in said recess, said piston having a bead fitting said groove, said piston having an axial recess and having a diaphragm closing said recess, said plunger having an axial bore therethrough and aligned with said recess, said plunger having a finger engaging portion, a reduced tip on the front end of said plunger, said reduced tip having a recess, an end closure slidable in said reduced tip recess, a needle arranged in said plunger axial bore and having a sharpened inner end normally adjacent to, but not piercing, said diaphragm, said needle having a protuberance thereon, said end closure having a hole through which said needle extends, said end closure including a seat engaging the protuberance on said needle.

3. A disposable syringe including a barrel having a closure at one end and being open at the other end, a plunger slidable in said barrel, a piston on said plunger, said piston having an axial recess and having a diaphragm closing said recess, said plunger having an axial bore therethrough and aligned with said recess, said plunger having a finger engaging flange thereon, a reduced tip on the front end of said plunger, said reduced tip having a recess and having spaced inwardly opening grooves therein, an end closure slidable in said reduced tip recess, said end closure having a bead thereon, said bead normally being engaged in one of said grooves, said closure being movable so that the bead is engaged in the other groove, a needle arranged in said plunger axial bore and having a sharpened inner end adjacent to, but not piercing, said diaphragm, said needle having a protuberance thereon, said end closure having a hole through which said needle extends, said end closure including a seat engaging the protuberance on said needle.

4. A disposable syringe including a barrel having a closure at one end and being open at the other end, a plunger slidable in said barrel, said plunger having an axial recessed portion at its inner end, said recessed portion including an inwardly directed groove, a piston having a reduced end disposed in said recess, said piston having a peripheral bead fitting said groove, said piston having an axial recess and having an intermediate diaphragm closing said recess, a medicinal preparation in the inner end of said recess, a disc closing the inner end of the recess beyond the preparation, said plunger having an axial bore therethrough and aligned with said recess, said plunger having a finger engaging flange integral therewith, a reduced tip on the front end of said plunger, said reduced tip having a recess and having spaced inwardly opening grooves thereon, an end closure slidable in said reduced tip recess, said closure having a bead thereon, said bead normally being engaged in one of said grooves, said closure being movable so that the bead is engaged in the other groove, a needle arranged in said plunger axial bore and having a sharpened inner end adjacent to, but not piercing, said diaphragm, said needle having a protuberance thereon, said end closure having a hole through which said needle extends, said end closure including a substantially hemispherical seat engaging the protuberance on said needle.

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