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A. E. SMITH

2,478,845

DISPOSABLE AMPOULE SYRINGE

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Fig. 1.

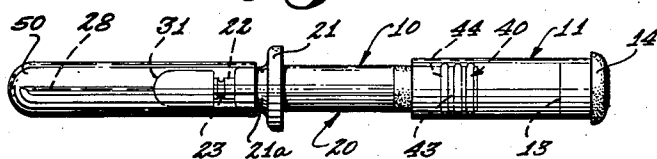


Fig. 2.

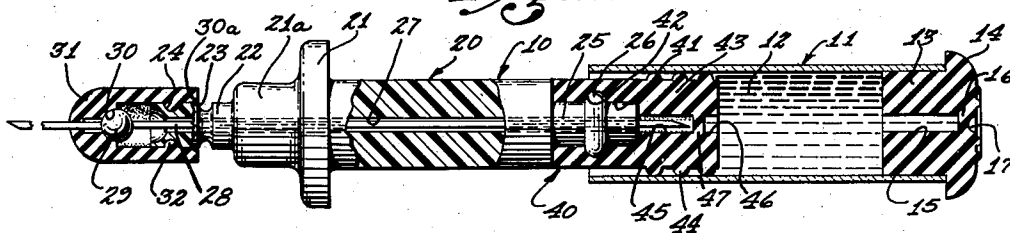


Fig. 3.

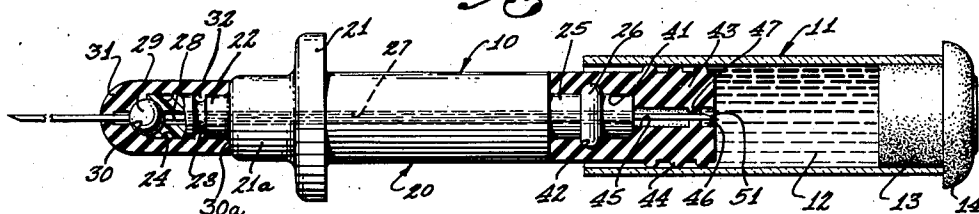


Fig. 4.

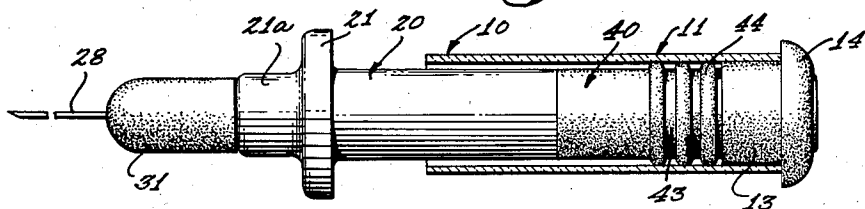
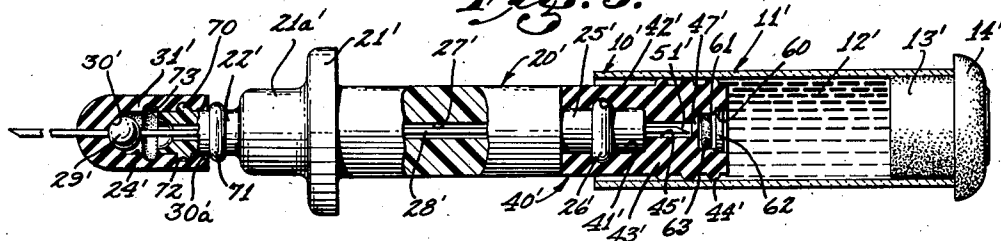


Fig. 5.



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DISPOSABLE AMPOULE SYRINGE

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4 Claims. (Cl. 128—215)

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This invention relates to a disposable ampule syringe.

The general object of the invention is to provide a novel ampule syringe which is simple in construction and efficient in use.

A more specific object of the invention is to provide a syringe including a novel piston plunger.

A further object of the invention is to provide a hypodermic syringe including a novel mounted needle.

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 my new syringe;

Fig. 2 is an enlarged central 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 modified type of plunger.

Referring to the drawing by reference characters, I have shown my invention as embodied in a disposable ampule syringe which is indicated generally at 10. As shown the syringe includes a barrel 11 in which a medicinal solution 12 is placed. The barrel is cylindrical and in the rear end includes a stopper 13, which may be made of rubber and is seated within the barrel. The stopper has an enlarged head 14 in the outer end thereof. The stopper includes an axial, internally opening recess 15, closed at the outer end by a diaphragm 16. An axial indentation 17 serves to mark the location in which an ampule filling needle may be inserted.

The syringe further includes a plunger 20 which includes a cylindrical body having an outwardly directed finger engaging flange 21 intermediate its length and having a reduced front end tip 22 which is provided with spaced circumferential grooves 23 and 24. The inner end of the plunger is provided with a reduced portion 25 which has a peripheral bead 26 thereon.

The plunger is provided with an axial hole 27 in which a hypodermic needle 28 is mounted. The outer end of the needle is provided with a bulbous portion 29 which is seated in a substantially hemispherical seat 30 in a cap 31 which is hollow and has a bead 32 normally seated in the groove 24. When the member 31 is moved along the plunger

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the bead 32 will pass from the groove 24 to the groove 23 and the needle, through engagement of the protuberance 29 with the closure, will be moved inwardly.

The inner end of the plunger is provided with a piston stopper 40 which has an enlarged outer recess 41 with a groove 42 in the outer wall thereof. This stopper is seated on the reduced portion 25 of the plunger and engagement of the bead 26 in the groove 42 holds the piston stopper in place. The piston stopper, inwardly of the plunger end 25, is provided with an enlarged portion 43 which has piston beads 44 thereon engaging the inner wall of the ampule body 12. The portion 41 of the piston stopper includes an outwardly opening axial recess 45 and a second axial recess 46 which opens inwardly, the two recesses being separated by a diaphragm 47.

The ampule may be made of glass or plastic. The plunger may be made of rubber or plastic while the cap 31, the stopper 13 and the piston stopper 40 are preferably made of a good grade of rubber.

The cap 31, at its end adjacent to the bead 32 is provided with a beveled portion 30^a which, when the closure is moved inwardly, prevents the rubber from jamming on the tip end 22.

In use the parts are assembled and shipped as shown in Fig. 1, the outer end of the needle 28 being enclosed by a semi-flexible closure cap 50, the inner end of which engages an enlargement 21^a on the plunger 20. For use the operator removes the closure cap 50 and pushes the cap 31 inwardly so that the cap assumes the position shown in Fig. 3 and in this position the inner tip 51, which is sharpened, has pierced the diaphragm 47, thus placing the needle in contact with the contents of the ampule. The bead 32 is then engaged in the groove 23 to hold the needle in forward position.

The insertion is then made into the body of the patient, after which the operator slightly withdraws the ampule from the piston. If the needle has been inserted in a blood vessel, blood will be aspirated into the ampule, thus warning the operator of the location of the needle and he withdraws the needle and makes a fresh insertion. When the needle has been properly inserted the injection is made by pressing on the closure 13 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. The modification is intended for use in the preparation of a fresh solution and its in-

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jection, 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 the modification the end tip 22' has a pair of beads 70 and 71 thereon, while the closure member 31' has grooves 72 and 73 therein, with the groove 72 normally engaging the bead 70.

In using the modified device the front closure 31' is moved inwardly, causing the grooves 72 and 73 to engage the beads 71 and 70. In this position the needle tip 51 pierces the diaphragm 47' and causes dislodgement of the disc 62, thereby causing the pellet 63 to be discharged into the ampule, whereupon a fresh solution is prepared. The injection is made as previously described.

The outer end of the tip and the cap thereon are identical in Figs. 1 and 5, the reference characters in Fig. 5 being primed with respect to the reference characters in Fig. 1.

From the foregoing description it will be apparent that I have invented a novel hypodermic syringe which is extremely simple in construction, economical to manufacture and highly efficient for its intended purpose.

Having thus described my invention, I claim:

1. A disposable syringe including a barrel having a closure in 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 an external finger engaging flange thereon, a reduced tip on the front end of said plunger, said reduced tip having spaced peripheral grooves therein, a cap slidable on said reduced tip, said cap having an internal bead thereon, the inner end wall of said cap being beveled adjacent to said bead, said bead normally being engaged in one of said grooves, said cap being movable so that the bead thereon is engaged in the other groove, and 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 cap having a hole through which said needle extends, said cap including a seat engaging the protuberance on said needle, the outer end of said tip having a recess receiving said protuberance.

2. A disposable syringe including a barrel having a closure in one end and being open at the other end, a plunger slidable in said barrel, said plunger having a reduced portion at its inner end, said reduced portion including an outwardly directed bead, a piston, said piston having a recess receiving the reduced portion of said plunger, said piston having a groove receiving said bead, said piston having an axial recess and having a pierceable diaphragm closing said recess, said plunger having an axial bore therethrough and aligned with said recess, said plunger having an external finger engaging flange integral therewith, a reduced tip on the front end of said plunger, said reduced tip having spaced peripheral grooves therein, a cap slidable on said reduced tip, said cap having an internal bead thereon, said bead normally being engaged in one of said grooves, said cap being movable so that the bead therein is engaged in the other groove, and a needle arranged in said plunger axial bore

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and having a sharpened inner end adjacent to, but not piercing, said diaphragm, said needle having a globular protuberance thereon, said cap having an axial hole through which said needle extends, said cap including a substantially hemispherical seat engaging the protuberance on said needle, the outer end of said tip having a recess receiving said protuberance.

3. A disposable syringe including a barrel having a closure in one end and being open at the other end, a plunger slidable in said barrel, said plunger having a reduced portion at its inner end, said reduced portion including an outwardly directed bead, a piston, said piston having a recess receiving the reduced portion of said plunger, said piston having a groove receiving said bead, said piston having an axial recess and having a diaphragm intermediate the length of said recess and closing said recess, a medicinal preparation in the inner end of said recess, a displaceable disc closing the inner end of said recess, said plunger having an axial bore therethrough and aligned with said recess, said plunger having an external finger engaging flange, a reduced tip on the front end of said plunger, said reduced tip having spaced peripheral grooves thereon, a cap slidable on said reduced tip, said cap having an internal bead therein, said bead normally being engaged in one of said grooves, said cap being movable so that the bead therein 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 cap having a hole through which said needle extends, said cap including a substantially hemispherical seat engaging the protuberance on said needle, and the outer end of said tip having a recess receiving said protuberance.

4. A disposable syringe including a barrel having a closure in 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 an external finger engaging flange thereon, a reduced tip on the front end of said plunger, said reduced tip having spaced peripheral beads thereon, a cap slidable on said reduced tip, said cap having an internal groove therein, said groove normally engaging one of said beads, said cap being movable so that the groove therein engages the other bead, and 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 cap having a hole through which said needle extends, said cap including a seat engaging the protuberance on said needle.

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