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A. E. SMITH
SYRINGE CONSTRUCTION
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2,505,307

Fig. 1.

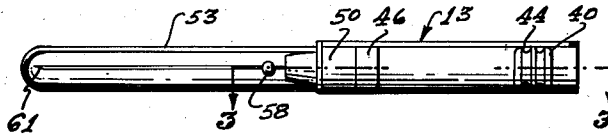


Fig. 2.

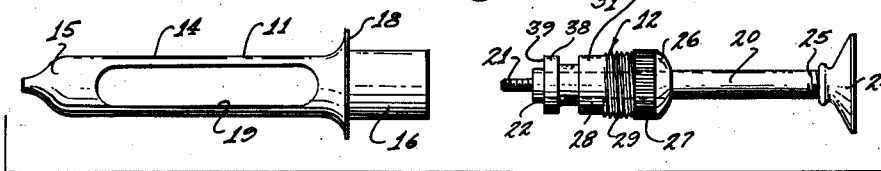


Fig. 3.

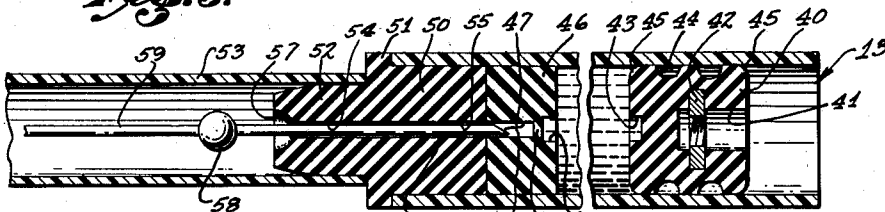


Fig. 4.

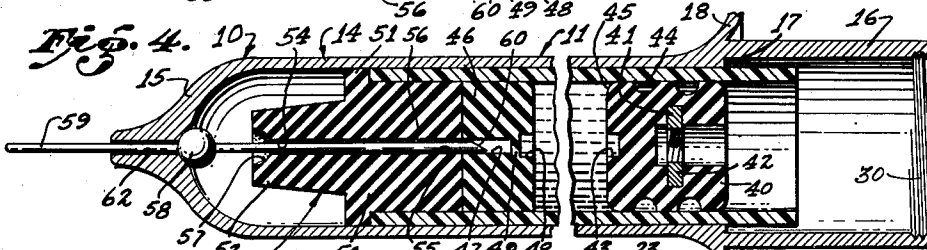


Fig. 5.

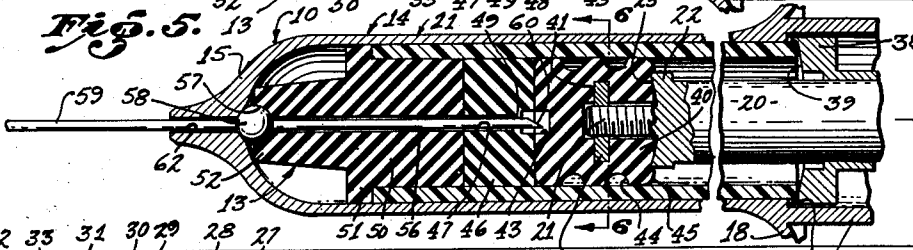
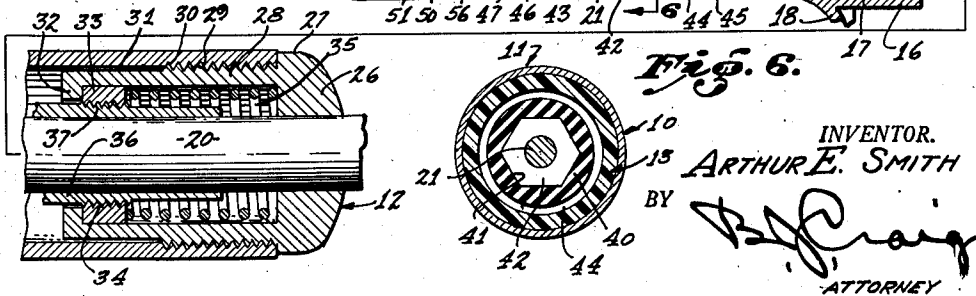


Fig. 6.



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SYRINGE CONSTRUCTION

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3 Claims. (Cl. 128-218)

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This invention relates to syringe construction. The general object of the invention is to provide a novel syringe construction wherein a re-useable barrel is employed in conjunction with a disposable needle carrying ampule.

A more specific object of my invention is to provide a novel ampule holder for a disposable hypodermic syringe ampule.

A further object of the invention is to provide a novel disposable needle supporting medicament containing ampule.

Another object of the invention is to provide a novel rear closure member for an ampule barrel.

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 an ampule embodying the features of my invention;

Fig. 2 is an extended side elevation of the ampule barrel and closure member;

Fig. 3 is an enlarged section taken on line 3-3, Fig. 1;

Fig. 4 is a fragmentary central sectional view showing the barrel with the ampule therein;

Fig. 5 is an extended longitudinal sectional view showing the barrel with the ampule seated therein and with the parts in the position taken after the contents of the ampule have been discharged, and

Fig. 6 is a section taken on line 6-6, Fig. 5.

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, a rear member 12 and a disposable ampule 13. The barrel 11 may be made of suitable material such as metal, plastic, et cetera. The barrel is generally cylindrical, as at 14, with a rounded and tapering front end 15 and with an enlarged rear end 16 which provides a shoulder 17. On the barrel I provide a finger engaging flange 18, which may be hexagonal in shape so that it will not roll when laid down. The barrel is provided with aligned viewing apertures 19 as shown.

The rear member 12 includes a plunger 20 which has a reduced threaded front end 21 and an enlarged shoulder 22 at the inner end of the threaded portion. The forward face of the shoulder 22 is cupped as at 23 (Fig. 5) so that it will more tightly engage a piston cork to be later described. The rear end of the plunger 20 is provided with a thumb piece 24 which may be threaded to engage threads 25 on the plunger.

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The rear member 12 includes a closure 26 which has a knurled periphery 27 and a forwardly extending sleeve 28. The sleeve 28 has a threaded portion 29 which engages a threaded portion 30 on the interior of the barrel. The sleeve 28 is reduced as at 31 in advance of the threads thereon and the reduced portion 31 includes an internal flange 32. A sleeve 33, having internal threads 34 thereon, is arranged to slide within the sleeve 28 and is engaged and normally urged to the position shown in Fig. 5 by a spring 35. A centering member 36 has threads 37 thereon which engage the threads 34 on the sleeve 33. The centering member slides along the plunger 20 and extends forwardly and rearwardly of its threads and at its forward end includes an ampule centering head 38 which slides within the barrel and is provided with a tapering forward end 39 which centers and holds the ampule 13 in the barrel against lateral movement.

The ampule 13 is made of transparent material such as glass or plastic and is preferably cylindrical throughout. It has a piston 40 therein which is preferably made of rubber. The piston has a recess 41 therein and has a threaded nut 42 cast in the piston in alignment with the recess 41. The front end of the piston includes a recess 43 and the body of the piston includes peripheral grooves 44 which may contain lubricant if desired. The front and rear peripheries of the piston are rounded as at 45.

The ampule is provided with a stopper 46. The stopper has front and rear coaxial recesses 47 and 48 with a diaphragm 49 therebetween. In advance of the stopper I provide a rubber closure which comprises a body 50 within the ampule, having a shoulder 51 thereon and having a tip 52 which is engaged by an elongated flexible cap 53. The closure includes coaxial recesses 54 and 55 with a diaphragm 56 therebetween. The recesses 55 and 47 are aligned.

The tip 52 includes an end semi-hemispherical recess 57, adapted to receive a sphere 58 on a needle 59. The needle 59 in normal position before use has its inner end 60 disposed in the recesses 54 and 55 and passes through the diaphragm 56. The extreme inner end of the needle is disposed in the recess 47. The outer or forward end of the needle is sharpened as at 61 and the needle is protected against contamination by the flexible sterile cap 53.

In use the rear member 12 is moved from the barrel and the ampule inserted, the outer end of the needle being arranged in a hole 62 in the front end of the barrel. The closure 12 is then

moved into place thus advancing the ampule so that the needle is moved into the ampule by engagement of the sphere 58 with the barrel. This causes the inner end of the needle to pierce the diaphragm 49, thus placing the inner end of the needle in communication with the contents of the ampule. The threads 29 and 30 are then engaged, the spring 35 having pushed the centering member head 23 into engagement with the end of the ampule to center the ampule.

The plunger 20 is then rotated so that the threads 21 thereon engage the threads in the nut 42 so that the plunger is locked to the piston. The operator then inserts the needle in the patient and moves the piston slightly forward and then withdraws the piston. If blood appears in the ampule he will know that a blood vessel has been penetrated and the needle will be withdrawn and reinserted, as injections should not be made in a blood vessel. After the needle is correctly inserted the plunger 20 is gradually moved forward until the desired injection has been made. When the piston is fully advanced the inner pointed end of the needle will be disposed in the recess 43 of the piston.

In seating the ampule in the barrel the taper on the interior of the front member serves to guide the needle 59 into the hole 62.

From the foregoing description it will be apparent that I have invented a novel syringe construction, the parts of which can be economically manufactured and which are highly efficient for the intended purpose.

Having thus described my invention, I claim:

1. A syringe including a reusable barrel and a disposable ampule, said barrel comprising a tubular body having a tapering front end and having an open rear end, a closure engaging the barrel rear end, a plunger slidable through said closure, said plunger having a threaded front end and having an enlarged, cupped shoulder adjacent to the threads thereon, said closure having a forwardly projecting sleeve threaded to receive internal threads on said barrel, the forward portion of said sleeve being cylindrical and of a reduced diameter and being slidable within the barrel, said sleeve having an internal flange on the inner end thereof, a collar slidable within said sleeve, said collar having internal threads, a spring engaging said collar and said closure to urge the collar forwardly along the sleeve, a tubular centering member having threads intermediate the length thereof and engaging the threads on said collar, said centering member having a cupped forward end adapted to engage an ampule in the barrel, and an ampule in said barrel, said ampule being cylindrical and having a piston cork in the rear thereof, said piston cork having a recess therein and having a threaded member in said recess engageable by the threaded end of the plunger, a stopper in the forward portion of said ampule, said stopper member having outer and inner axial recesses with a diaphragm between said recesses, a closure at the forward end of said ampule, said closure having aligned inner and outer axial recesses, a diaphragm between said closure recesses, a needle having a protuberance thereon and having an outer portion and an inner end portion disposed in said closure recesses and extending through said closure diaphragm, said needle extending into said outer recess on said stopper and being spaced from the diaphragm on said stopper, said closure having a projecting tip adapted to receive a needle protecting cap.

2. A syringe including a reusable barrel and a disposable ampule, said barrel comprising a tubular body having a tapering front end and having an open rear end, a closure engaging the barrel rear end, a plunger slidable through said closure, said closure having a forwardly projecting sleeve threaded to receive internal threads on said barrel, the forward portion of said sleeve being cylindrical and of a reduced diameter and being slidable within the barrel, said sleeve having an internal flange on the inner end thereof, a collar slidable within said sleeve, said collar having internal threads, means to urge the collar forwardly along the sleeve, a tubular ampule holding member having threads intermediate the length thereof and engaging the threads on said collar, and an ampule in said barrel, said ampule being cylindrical and having a piston in the rear thereof, said plunger being adapted to engage the piston, a stopper in the forward portion of said ampule, said stopper having an axial recess, a closure at the forward end of said ampule, said ampule closure having aligned inner and outer axial recesses, a diaphragm between said ampule closure recesses, and a needle having a protuberance thereon and having an outer portion and an inner end portion disposed in said ampule closure recesses and extending through said closure diaphragm, said needle extending into said outer recess on said stopper and being spaced from the diaphragm on said stopper.

3. A syringe including a reusable barrel and a disposable ampule, said barrel comprising a tubular body having a tapering front end and having an open rear end, a closure engaging the barrel rear end, a plunger slidable through said closure, said closure having a forwardly projecting sleeve threaded to receive internal threads on said barrel, the forward portion of said sleeve being cylindrical and of a reduced diameter and being slidable within the barrel, said sleeve having an internal flange on the inner end thereof, a collar slidable within said sleeve, said collar having internal threads, a spring engaging said collar and said closure to urge the collar forwardly along the sleeve, a tubular centering member having threads intermediate the length thereof and engaging the threads on said collar, said centering member having a cupped forward end adapted to engage an ampule in the barrel, and an ampule in said barrel, said ampule being cylindrical and having a piston in the rear thereof, said piston being engageable by the plunger, a stopper in the forward portion of said ampule, said stopper member having outer and inner axial recesses with a diaphragm between said recesses, a closure at the forward end of said ampule, said ampule closure having aligned inner and outer axial recesses, a needle having a protuberance thereon and having an outer portion and an inner end portion disposed in said ampule closure recesses, said needle extending into said outer recess on said stopper and being spaced from the diaphragm on said stopper.

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The following references are of record in the file of this patent:

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