

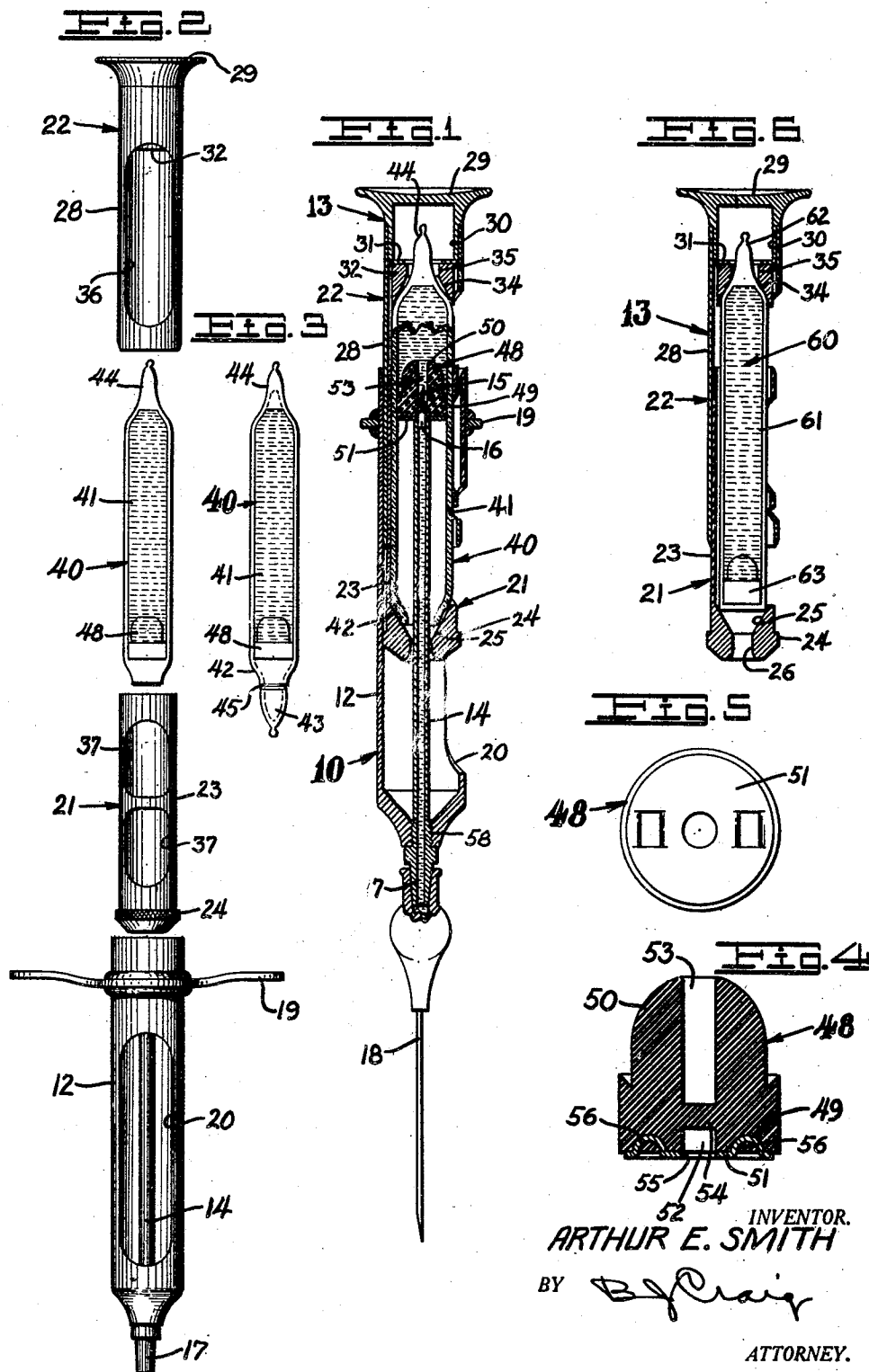
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SYRINGE

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SYRINGE

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This invention relates to syringes of the type which are particularly adapted for use with ampules.

The general object of this invention is to provide a syringe with improved means for automatically and correctly centering an ampule in the syringe.

Another object of the invention is to provide a syringe which is particularly adapted to automatically correctly center an ampule which is initially hermetically sealed at both of its ends.

A further object of the invention is to provide a syringe including an ampule holder in which an ampule is positioned and automatically correctly centered before it is inserted in the main body portion of the syringe.

Another object of my invention is to provide a syringe which includes a novel ampule holder which is movable into the main body portion of the syringe.

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

Fig. 1 is a central vertical section of a syringe embodying the features of my invention.

Fig. 2 is a side view of my improved syringe on a reduced scale showing the various parts thereof with an ampule in an extended position.

Fig. 3 is an elevation of an ampule before it is prepared for use in my improved syringe.

Fig. 4 is an enlarged central vertical section through the stopper of the ampule shown in Fig. 1.

Fig. 5 is a bottom plan view of the stopper shown in Fig. 4 and

Fig. 6 is a central vertical section of the movable element showing a modified form of ampule therein.

Referring to the drawings by reference characters I have indicated my improved syringe generally at 10. The syringe comprises a barrel or body portion 12 and an ampule holder indicated at 13. As shown the top end of the barrel 12 is left open and the opposite or lower end is tapered and is

adapted to support a discharge tube 14. The discharge tube is provided adjacent its upper end with a hollow needle 15 which includes an enlarged hub 16, having an aperture affording communication between the hollow needle 15 and the discharge tube 14.

The lower end of the discharge tube is provided with a hub 17 on which a hypodermic needle 18 is adapted to be positioned.

The barrel 12 is provided with a finger grip or cross bar 19 adjacent its upper end and a viewing aperture 20 is provided in the side.

The ampule holder 13 comprises a bottom member 21 and an upper member 22. The bottom member 21 includes a body portion 23 having its top end open and having an enlarged head 24 at its opposite or lower end. This head 24 is of approximately the same diameter as the inside of the syringe barrel 12. A conically shaped recess 25 is provided adjacent the lower end of the member 21. This recess 25 communicates with an aperture 26 in the head 24 of sufficient size to allow the discharge tube 14 to freely pass therethrough.

The upper member 22 of the ampule holder 13 includes a body portion 28, the interior diameter of which is approximately the same size as the exterior of the body 23 of the lower member 21 and the external diameter of which is approximately the same size as the internal diameter of the barrel 12 of the syringe. The lower end of the body 28 is left open and the top end is closed by a thumb piece 29 having a reduced flange 30 which fits within the body 28 and is secured thereto as by soldering.

The lower end of the flange 30 is provided with an inturned flange 31 to which a member 32 is secured as by soldering. The outside of the member 32 is spaced from the inner face of the body 28 to allow the end of the body 23 of the lower member 21 to be positioned therebetween.

The member 32 has a conically shaped recess 34 which communicates with an aperture 35. The body 28 of the upper member 22 is preferably provided with a viewing aperture 36 and the body 23 of the lower

member is preferably provided with viewing apertures 37.

An ampule such as is preferably used in connection with my improved syringe is shown in Fig. 3 and is indicated generally by the numeral 40. This ampule is preferably made of glass and comprises a tubular body 41 having a constricted end portion 42 which is closed by a tip 43. The opposite end of the body is closed by a constricted tip 44. The tip 43 may be rendered readily removable from the portion 42 by providing an etched, scored or molded notch 45 completely around the constricted portion 42. Adjacent the constricted portion 42 a stopper 48 is provided which is preferably made of a good grade of rubber and is slidable in the body 41.

As shown in Figs. 4 and 5 the stopper 48 includes a body portion 49 having a reduced tip 50 extending from one face thereof and having a metal disk 51 on the opposite face. A recess 52 extends inward from the plane face of the stopper and a recess 53 extends inward from the tip 49. The bottoms of the recesses 52 and 53 are spaced apart to form a partition 54 which is integral with the body portion 49.

The metal disk 51 has an aperture 55 therein which is adapted to register with the recess 52 and the disk is preferably secured to the body portion 49 by a plurality of depressed loops 56. These loops may be formed by slitting the disk 51 along spaced lines and then depressing the material between the slits. The loops 56 are then molded in the body portion 49.

When an operator desires to use my device the ampule holder 13 is removed from the barrel 12 of the syringe and the upper and lower members 21 and 22 are separated. The tip 43 of the ampule is broken therefrom and the ampule is inserted in the upper member 22 so that the tip 44 is positioned in the conical recess 34 of the member 32 as shown in Fig. 1. The lower member 21 is then positioned over the opposite end of the ampule and moved into the upper member 22 until the constricted end 42 of the ampule is positioned in the conical recess 25. As the wall of the conical recess 25 engages the end of the constricted portion 42 it automatically, in conjunction with the sides of the conical recess 34, correctly centers the ampule.

The ampule holder 13 is then positioned in the syringe barrel 12 and moved towards the closed end of the barrel until the needle 15 enters the stopper of recess 52 and contacts with the partition 54 of the stopper. Upon continued movement of the holder and ampule towards the closed end of the syringe the needle 15 will puncture and pass through the partition 52 into the recess 53 whereupon the end of the discharge tube 14 will abut the face of the metal disk 51 and the enlarged

hub 16 of the needle will be positioned in the stopper recess 52. Upon further movement of the holder and ampule the stopper 48 will remain stationary thereby forcing the contents of the ampule into the needle 15, through the discharge tube 14 and into the hypodermic needle 18.

The discharge tube 14 may be secured to the barrel 12 by soldering it thereto but I prefer to secure it by screw threads 58 as shown in Fig. 1. When the discharge tube is secured to the barrel by screw threads it may be readily removed should it become defective for any reason or other.

In Fig. 6 I have shown a modified form of ampule 60 positioned in the holder 13 and adapted for use in my improved syringe 10. This ampule includes a body portion 61 closed at one end by a constricted tip 62 and at the opposite end by a stopper 63 similar to the stopper 48. The ampule 60 is adapted to be inserted in the holder 13 so that the constricted tip 62 is positioned in the conical recess 34 of the member 32 and the opposite straight end of the ampule engages the face of the conical recess 25 of the lower member 21 thereby automatically and correctly centering the ampule therein.

From the foregoing description it will be apparent that I have provided a syringe embodying novel features and which may be readily loaded, easily operated and which is highly efficient in use.

Having thus described my invention, I claim:

1. In combination with a syringe adapted to discharge the contents of an ampule and including a barrel and means independent of said barrel to correctly position an ampule relative to said barrel, said means including independently movable members engaging opposite ends of the ampule.

2. A syringe comprising a barrel, an ampule having a stopper therein and an ampule holder slidable in said barrel, said barrel being open at one end and closed at the opposite end, a discharge tube supported by said closed end and extending towards said open end, a reduced hollow needle on the free end of said tube, said holder including a bottom section and a top section, means in said top section adapted to coact with means in said bottom section whereby when said holder is inserted in said barrel said ampule will be automatically correctly centered relative to said barrel and whereby upon inward movement of said holder said needle will puncture said stopper and hold it stationary whereupon on further inward movement of said holder and ampule the contents of said ampule will be discharged through said discharge tube.

3. A syringe comprising a barrel, an ampule having a stopper therein and an ampule holder slidable in said barrel, said barrel being

open at one end and closed at the opposite end, a discharge tube supported by said closed end and extending towards said open end, a reduced hollow needle on the free end of said tube, said holder including a bottom section and a top section, said top section comprising a hollow body open at one end and closed at the opposite end and slidable over said bottom section, said bottom section having a tapered recess terminating in an aperture, said top section including a portion having a tapered recess and an aperture therein, said ampule being positioned in said holder so that one end of said ampule is positioned in said tapered recess in said top section and the opposite end of said ampule is positioned in said recess of said bottom section whereby when said holder is inserted in said barrel said ampule will be automatically and correctly centered relative to said barrel and whereby upon inward movement of said holder said needle will puncture said stopper and the end of said discharge tube will engage said stopper and hold it stationary whereupon on further inward movement of said holder and ampule the contents of said ampule will be discharged through said discharge tube.

4. In combination with an ampule, a stopper in said ampule, said stopper being movable in said ampule body and including a body portion having a reduced tip extending from one face and having the opposite face plane, a metal disk on said plane face, an aperture in said disk, a recess in said body extending from said plane face towards said tip and a second recess extending from the end of said tip towards said disk, the bottoms of said recesses being spaced apart to form a partition.

5. A syringe comprising a barrel, an ampule having a stopper therein and an ampule holder slidable in said barrel, said barrel being open at one end and closed at the opposite end, a discharge tube supported by said closed end and extending towards said open end, a reduced hollow needle on the free end of said tube, said holder including a telescopic top and bottom section, said bottom section having a conical recess terminating in an aperture, said top section including a hollow body open at one end and closed at the opposite end by a thumb piece, said thumb piece being secured to said body, said thumb piece including a reduced collar positioned in said body and having an inturned flange thereon, a member in said holder secured to said inturned flange, said member having an aperture and a conical recess therein, said ampule being adapted to be positioned in said holder so that one end of said ampule is positioned in said conical recess of said member in said top section and the opposite end of said ampule is positioned in said conical recess of said bottom section whereby when said holder

is inserted in said barrel said ampule will be automatically and correctly centered relative to said barrel and whereby upon inward movement of said holder said needle will puncture said stopper and the end of said discharge tube will engage said stopper and hold it stationary whereupon on further inward movement of said holder and ampule the contents of said ampule will be discharged through said discharge tube.

6. In a syringe, a barrel, an ampule holder in said barrel and adapted to receive an ampule, means on said holder at one end to center one end of an ampule and other centering means movable on and relative to said holder to center the other end of an ampule.

7. In combination with a syringe including a barrel, an ampule holder slidable in said barrel, said holder including a bottom section and a top section, said sections being in telescopic engagement and being adapted to enclose an ampule.

8. In combination with a syringe including a barrel, an ampule holder slidable in said barrel, said holder including a bottom section and a top section, said bottom section being slidable in said top section and comprising a hollow body open at one end and having a conical recess terminating in an aperture at the other end, said top section including a hollow body open at one end and having a conical recess terminating in an aperture at the opposite end, an ampule being adapted to be positioned in said holder so that one end of said ampule is positioned in said conical recess of said top section and the opposite end of said ampule is positioned in the conical recess of said bottom section whereby when said holder is inserted in said barrel said ampule will be automatically and correctly centered relative to said barrel.

In testimony whereof, I hereunto affix my signature.

ARTHUR E. SMITH.