

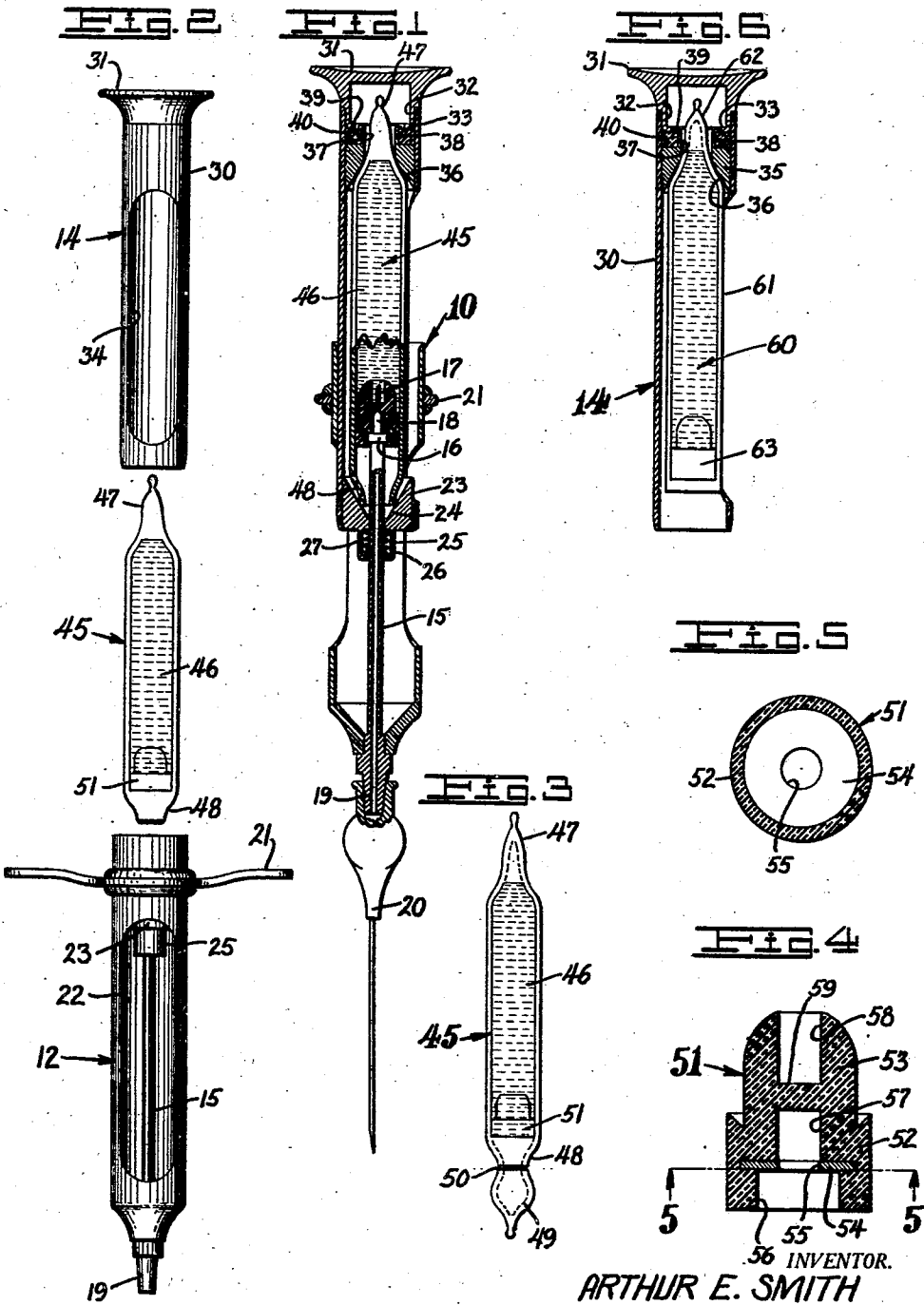
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AMPUL SYRINGE

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AMPUL SYRINGE

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This invention relates to syringes which are adapted for use with ampuls.

The general object of this invention is to provide an improved syringe in which an ampul may be automatically centered in the syringe.

Another object of the invention is to provide an ampul syringe with improved means for holding the ampul and for discharging the contents thereof.

A further object of the invention is to provide a syringe including an ampul holder in which an ampul is positioned before being placed in the syringe and having centering means therein which acts in conjunction with a centering member on the syringe to correctly center an ampul in the syringe.

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

Fig. 1 is a central vertical section through my improved syringe.

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

Fig. 3 is an elevation of an ampul such as used in my improved syringe.

Fig. 4 is an enlarged central vertical section through the stopper of the ampul.

Fig. 5 is a section through the stopper taken on line 4-4 of Fig. 3 and Fig. 6 is a central vertical section through the ampul holder and showing a modified form of ampul positioned therein.

Referring to the drawing by reference characters I have indicated my improved syringe generally at 10. As shown this syringe includes a barrel 12 and an ampul holder 14. The barrel 12 is open at its upper end and is formed closed at its opposite or lower end which supports a discharge tube 15.

Adjacent the top of the discharge tube an enlarged head 16 and a hollow needle 17 having an enlarged hub 18 are provided. The opposite or lower end of the discharge tube is provided with an enlarged hub 19 on which a hypodermic needle 20 is adapted to be positioned. The barrel 12 is provided adja-

cent the top thereof with a finger piece or cross bar 21 while viewing apertures 22 are provided in the sides of the barrel.

Surrounding the discharge tube 15 I provide an ampul centering member 23 which has a tapered recess 24 shown as conical, and a reduced hub 25 having a recess 26 therein larger than the outside diameter of the discharge tube.

Surrounding the discharge tube and within the recess 26 I provide a coiled spring 27 which engages the discharge tube with sufficient force to retain the centering member 23 in set position on the discharge tube while at the same time movement of the centering member is not prevented.

The ampul holder 14 includes a body portion 30 which is open at its lower end and is shown as closed at the top by a thumb piece 31. The thumb piece includes a reduced collar 32 having an inturned flange 33 therein and is adapted to be positioned within the body 30 and secured thereto as by soldering. A viewing aperture 34 is preferably provided in the body portion 30.

A member 35 is positioned in the body 30 adjacent the thumb piece 31. This member has a conically shaped recess 36 therein which communicates with an aperture 37 in a reduced hub 38. The hub 38 is provided with an outturned flange 39 which serves to retain a resilient washer 40 on the member 35. This resilient washer is preferably made of a good grade of rubber and is adapted to engage the inturned flange 33 of the thumb piece.

An ampul such as is preferably used with my improved syringe is indicated generally at 45 and shown in detail in Fig. 3. The ampul 45 is preferably made of glass and as shown comprises a body portion 46 closed at one end by a constricted tip 47 and adjacent the opposite end is provided with a constricted portion 48 which terminates in a closed tip 49. The tip 49 is rendered readily breakable from the constricted portion by providing an etched, scored or molded groove completely around the constricted portion as at 50. Adjacent the constricted portion 48 a stopper 51 is provided which is movable within the body 46.

The stopper 51 is preferably made of a good grade of rubber and as shown comprises a body portion 52 having one end plane and having a reduced tip 53 extending from its opposite face. Within the body portion 52 I provide a metal disk 54 having an aperture 55 therein.

Extending from the disk 54 to the plane face of the body I provide a recess 56 and extending from the disk 54 in the opposite direction I provide a reduced second recess 57 and extending inwardly from the end of the tip 53 I provide a third recess 58. The bottom of the recess 57 and the bottom of the recess 58 are spaced apart to form a partition 59 integral with the body.

To prepare the ampul 45 for use in my improved syringe 10 the operator breaks the tip 49 from the constricted portion at the groove 50, removes the ampul holder 14 from the barrel 12 and places the ampul therein so that the closed tip 47 is positioned in the conical recess of the member 36 as shown in Fig. 1. The ampul holder is then inserted in the barrel 12 and moved towards the hypodermic needle 20 until the needle 17 engages the stopper partition 59. As the ampul holder is moved towards the needle 20 the end of the constricted portion 48 will engage the faces of the conical recess 24 of the centering member 23, which, in conjunction with the member 35, will automatically and correctly center the ampul in the syringe and thereafter movement of the ampul towards the needle will move the centering member 23 against the friction of the spring 27.

Upon continued movement of the ampul holder the needle 17 will puncture the partition 59 and pass therethrough until the enlarged head 16 of the discharge tube engages the stopper disk 54 in which position the needle 17 is positioned in the stopper recess 58 and the enlarged hub 18 of the needle is positioned in the recess 57.

Upon further movement of the ampul holder and ampul towards the hypodermic needle 20 the stopper 51 will remain stationary thereby, as the ampul is moved, forcing the ampul contents into the needle 17, through the discharge tube 15 and thence into the hypodermic needle 20. After the operator has ejected the contents of the ampul he removes the ampul holder 14 from the barrel 12; removes the ampul from the holder and moves the centering member towards the open end of the barrel until the centering member engages the enlarged head 16 of the discharge tube, in which position it is again ready to be reloaded with a filled ampul.

In Fig. 6 I have shown a modified form of ampul indicated at 60 positioned in the ampul holder 14. As shown the ampul 60 comprises a body portion 61 closed at one end by a constricted tip 62 and left open at the opposite end which is adapted to be closed by a

stopper 63 similar to the stopper shown in Fig. 4. This ampul is inserted in the holder similar to the ampul 45 so that the closed tip 62 is positioned in the recess of the member 35.

When the holder and the ampul 60 is positioned in the barrel 12 the ends of the open end of the ampul will engage the surfaces of the conical recess of the centering member which in conjunction with the member 35 in the holder will automatically and correctly center the ampul in the syringe.

From the foregoing description it will be apparent that I have provided a syringe of novel construction which may be economically manufactured, and which is easily loaded and highly efficient in use.

Having thus described my invention, I claim:

1. In an ampul comprising a body portion, a stopper in said ampul body, said stopper being movable in said ampul body and including a body portion having a reduced tip extending from one face and having the opposite face plane, a metal disk in said stopper body spaced from said plane face, an aperture in said disk and an enlarged aperture in said body extending from one face of said disk to said plane face, a recess in said body extending from the opposite face of said disk towards said tip and a recess in said tip extending from the end of said tip towards said disk, the bottoms of said recesses being spaced apart to form a partition.

2. A syringe comprising a barrel and an ampul holder slidable in said barrel, said barrel being open at one end and closed at the opposite end, said closed end having means thereon for supporting a hypodermic needle and said closed end having a discharge tube extending therefrom towards the open end of said barrel, said discharge tube having an enlarged head adjacent its upper end and having a hollow needle extending therefrom, a centering member surrounding said discharge tube and slidable in said barrel, said member having a conical recess for the reception of one end of an ampul and a reduced hub spaced from said discharge tube and having one end closed, a coiled spring in said hub surrounding said tube and tightly engaging said tube, said ampul holder comprising a hollow body portion 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 barrel and having an inturned flange thereon, a member in said holder adjacent said thumb piece having an aperture therethrough and having a tapered recess therein to receive the other end of said ampul, a hub on said member, a resilient washer surrounding said hub, said resilient washer being in engagement with the in-

turned flange of said thumb piece, said member in said holder and said centering member in said barrel being adapted to automatically and correctly center an ampul in said syringe when said holder and an ampul are inserted in said barrel.

3. In combination with a syringe including a barrel having a single discharge tube therein including an enlarged head and a hollow needle at one end, an ampul, said ampul being adapted to be positioned in said barrel, said ampul comprising a body portion having a constricted closed tip at one end and having the opposite end constricted and open, a stopper in said ampul body adjacent said open end, said stopper being movable in said ampul body and including a body portion having a reduced tip extending from one face and having the opposite face plane, a metal disk in said stopper body spaced from said plane face, an aperture in said disk and an enlarged aperture in said body extending from said disk to said plane face, a recess in said body extending from the opposite face of said disk towards said tip and a recess in said tip extending from the end of said tip towards said disk, the bottoms of said recesses being spaced apart to form a partition, said discharge tube being adapted to enter said open end of said ampul, said discharge tube enlarged head being adapted to engage said stopper disk and said needle being adapted to puncture said partition and extend into said second recess whereby upon movement of said ampul in one direction said enlarged head will hold said stopper stationary thereupon forcing the contents of said ampul through said hollow needle and into said discharge tube.

4. A syringe comprising a barrel and an ampul holder slidable in said barrel, said barrel being open at one end and closed at the opposite end, said closed end having means thereon for supporting a hypodermic needle and said closed end having a discharge tube extending therefrom towards the open end of said barrel, said discharge tube having a hollow needle extending therefrom, a centering member slidable in said barrel, said member having a recess for the reception of one end of an ampul, said ampul holder comprising a hollow body portion open at one end, a member in said holder having an aperture there-through and having a recess therein adapted to receive the other end of said ampul, a resilient washer engaging said member, said member in said holder and said centering member in said barrel being adapted to automatically and correctly center an ampul in said syringe when said holder and an ampul are inserted in said barrel.

5. In a syringe, a barrel, an ampul having a stopper therein and an ampul holder, said holder being adapted to move said ampul in said barrel, a hollow tube in said barrel adapted to engage said stopper and having a

hollow needle thereon adapted to puncture said stopper whereby upon inward movement of said holder and said ampul the contents of said ampul will be discharged, a member movable on said hollow tube to engage the end of said ampul, said member having a tapered slot whereby upon insertion of said holder and said ampul in said barrel said ampul will be automatically correctly centered in said syringe.

6. In a syringe, a barrel, an ampul holder slidable in said barrel, means in said holder for engaging and centering one end part of an ampul, rigid means in said barrel for engaging a stopper in said ampul, said rigid means including means adapted to puncture the stopper and means to convey the contents of said ampul therefrom and other means slidable on said rigid means and movable in said barrel for engaging the other end part of said ampul.

In testimony whereof, I hereunto affix my signature.

ARTHUR E. SMITH.

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