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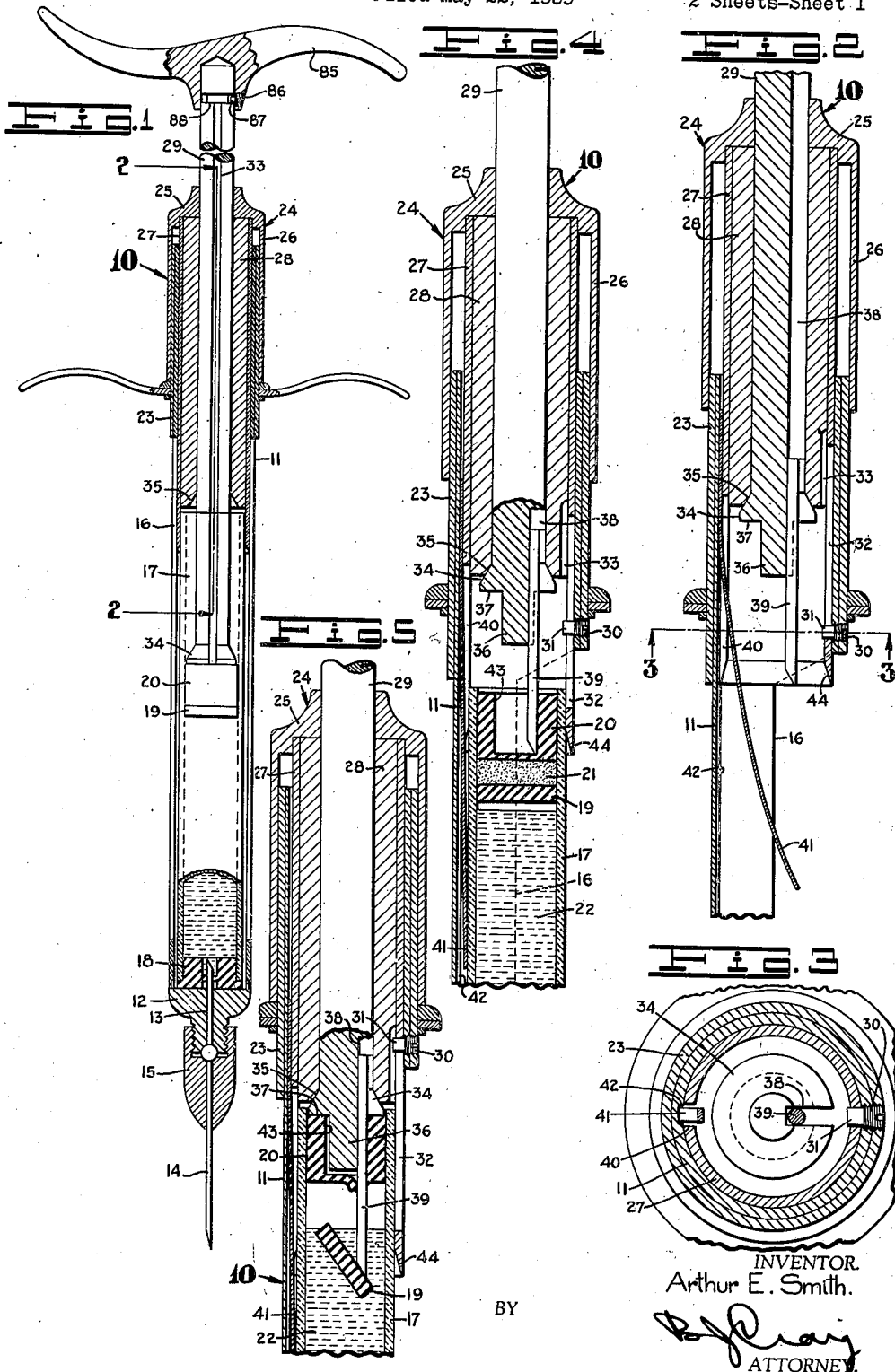
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SIDE LOADING SYRINGE

Filed May 22, 1939

2 Sheets-Sheet 1



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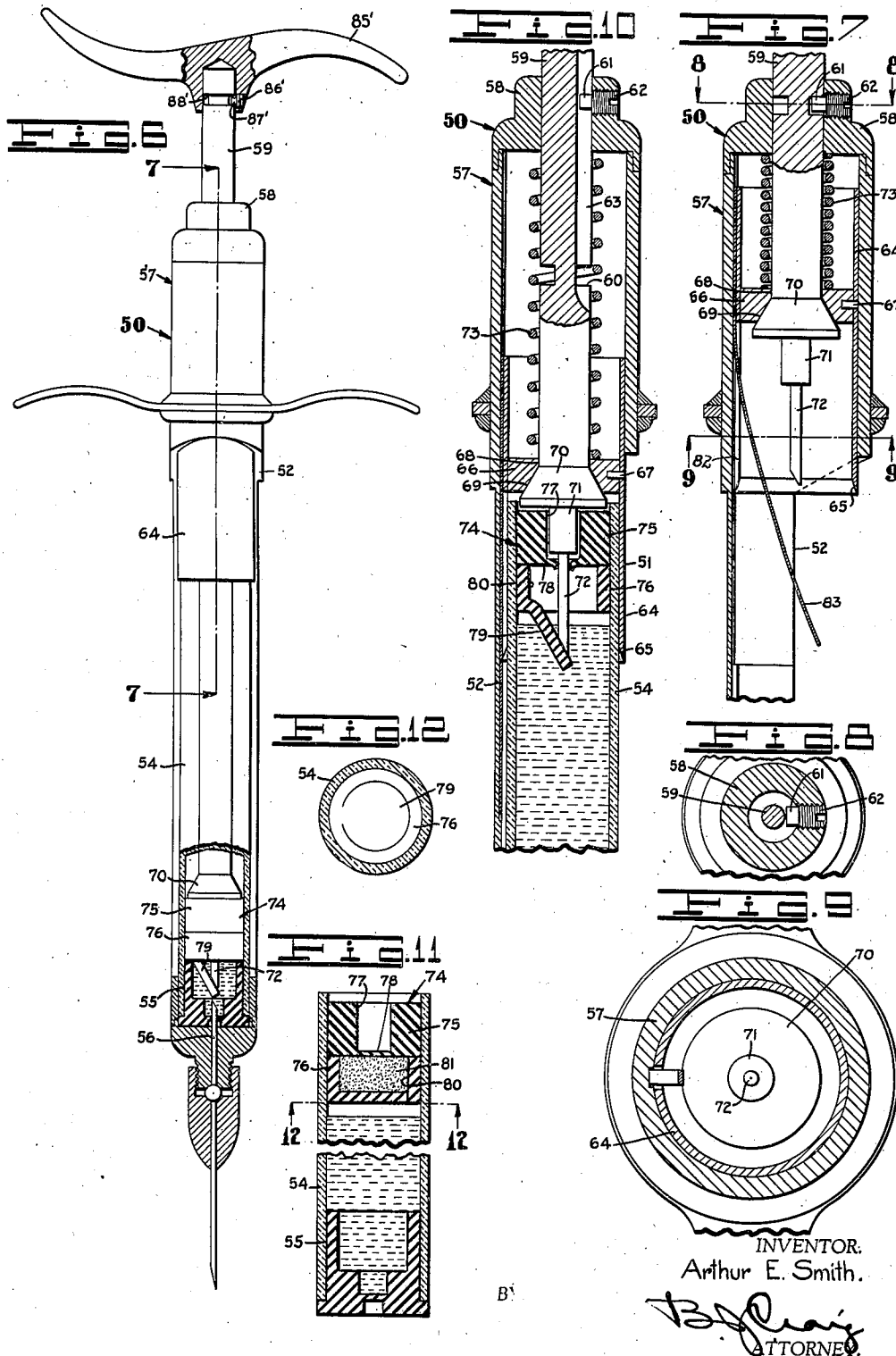
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UNITED STATES PATENT OFFICE

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SIDE LOADING SYRINGE

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3 Claims. (Cl. 128—218.1)

This invention relates to side loading syringe.

The general object of the invention is to provide an improved side loading ampule ejecting syringe.

A more specific object of the invention is to provide a syringe which includes a barrel for receiving an ampule and wherein the rear of the syringe includes a movable plunger member having means movable with the plunger for first centering and later ejecting an ampule from the syringe barrel.

A further object of the invention is to provide an improved ejecting means for a side loading ampule type syringe.

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

Fig. 1 is a central sectional view through a syringe embodying the features of my invention;

Fig. 2 is a fragmentary section taken on line 2—2, Fig. 1;

Fig. 3 is a section taken on line 3—3, Fig. 2;

Fig. 4 is a fragmentary central sectional view on an enlarged scale;

Fig. 5 is a view similar to Fig. 4 showing the parts in another position;

Fig. 6 is a side elevation, partly in section, showing my invention;

Fig. 7 is a fragmentary enlarged sectional view showing the rear end of the barrel;

Fig. 8 is a section taken on line 8—8, Fig. 7;

Fig. 9 is a section taken on line 9—9, Fig. 7;

Fig. 10 is a fragmentary sectional view showing the rear end of the barrel and ampule;

Fig. 11 is a central sectional view showing the ampule and corks; and

Fig. 12 is a section taken on line 12—12, Fig. 11.

Referring to the drawings 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 having a front member 12 secured thereto. The front member includes an aperture 13 through which a hypodermic needle 14 extends. The needle is held in place by a cap member 15.

The barrel 11 is cylindrical with the middle portion thereof cut away as at 16 to allow an ampule 17 to be introduced into the barrel. The ampule 17 is shown as a glass tube having a front closure 18 adapted to be pierced by the inner end of the needle 14 so that the contents of the ampule may be ejected. The rear of the ampule

includes spaced corks 19 and 20 with a medicinal preparation 21 between the corks and adapted to be discharged into the vehicle 22 in the ampule to form a fresh solution for injection.

The rear of the barrel 11 includes a collar portion 23 which extends some distance along the barrel and is suitably secured to the barrel. Mounted upon the rear end of the barrel I show a rear end member 24. This member 24 includes a cap 25 having a skirt 26 thereon and with a tube 27 mounted in the cap and spaced therefrom. Mounted in the tube I show a cylinder 28 through which a plunger 29 extends. The collar 23 on the barrel slides within the skirt 26 while the tube 27 slides within the barrel 11. In order to allow this sliding action a screw 30 is threaded through the lower end of the collar 23 and through the barrel with the inner end 31 of the screw projecting into a slot 32 in the tube 27. The lower end of the cylinder 28 is also slotted as at 33 to receive the screw when the parts are in the position shown in Fig. 5.

The lower end of the plunger 29 includes a bevelled flange 34 which engages a similarly bevelled portion 35 on the inner end of the cylinder 28 to thus limit the outward movement of the plunger. The plunger includes a projecting end 36 with a shoulder 37 adjacent the bevelled portion. The plunger and flange are slotted as at 38 to receive a pointed rod 39 which is secured to the cylinder 28 and which moves inwardly with the cylinder when the cap is urged inwardly. The lower end of the tube 27 is cut away at 40 to provide a slot through which a resilient tongue 41 extends as is shown in Fig. 2. The upper end of the tongue 41 is secured to the outer surface of the tube 27 and the interior of the barrel 11 includes a shallow longitudinal slot 42 which receives the tongue when the latter is forced from its normal position as shown in Fig. 1.

In use an ampule is placed in the barrel after the plunger has been withdrawn to the position shown in Fig. 2. This act straightens the spring 41. The cap 25 is then shifted along the barrel to the position shown in Fig. 4 where the rod 39 has entered a recess 43 in the cork 20. Further inward movement of the cap moves the parts to the position shown in Fig. 5 wherein the rod 39 has pierced the inner wall of the cork 20 and has dislodged the cork 19 allowing the medicament 21 to be brought into contact with the vehicle 22 thus preparing the solution. Further inward movement of the plunger from the position shown in Fig. 5 causes the hollow needle 14 to pierce

the cork 18 if such act has not already been performed during the previous steps.

Further movement of the plunger causes the cork 20 to act as a piston and to force the contents of the ampule through the needle 14.

After the ampule contents are discharged the plunger is withdrawn from the barrel. The plunger moves first to the position shown in Fig. 5 and then moves outwardly with the bevelled portion 34 engaging the bevelled portion 35 and moving the entire end assembly rearwardly, thus moving the lower end of the tube 27 (which is bevelled as at 44) from the ampule thus freeing the latter and allowing the spring 41 to dislodge the ampule from the barrel.

It will be noted that the rod 39 being fixed to the cylinder 28 does not move into the ampule with the plunger so that the rod is withdrawn from the cork 20 as the plunger moves inwardly and carries the cork along with it.

In Figs. 6 to 12, inclusive, I show a modification of my invention wherein the syringe indicated generally at 50 includes a barrel 51 having a cut away portion 52 permitting the insertion of an ampule. The barrel includes a front member 53 similar to the front member 12 previously described and the ampule 54 includes a closure 55 adapted to be punctured by a needle 56.

The barrel includes a rear end 57 on which a cap member 58 is suitably secured. A plunger 59 passes through the cap 58 and near one end includes a circumferentially disposed slot 60 in which the inner end 61 of a screw 62 on the cap extends. The slot 60 communicates with a longitudinally extending slot 63 which extends along the plunger to a location adjacent the outer end thereof.

Within the rear portion of the barrel I slidably mount a sleeve 64 which has a bevelled lower end 65 and which has a collar 66 secured intermediate its length by a pin 67. The collar 66 includes a central aperture 68 the lower portion of which is bevelled as at 69 to engage a bevelled portion 70 on the lower portion of the plunger.

Below the portion 70 the plunger includes a projection 71 and an extension rod 72. A spring 73 surrounding the plunger rod engages the collar 66 and normally urges the collar sleeve 64 and plunger 59 inwardly with the pin end 61 sliding in the slot 63. When the plunger is withdrawn from the barrel the end 61 of the screw 62 will be aligned with the circumferential slot 60 whereupon the plunger may be rotated to lock the plunger and its associated parts in retracted position.

The ampule 54 includes a rear piston cork assembly 74 which consists of an outer cork 75 and an inner cork 76. The outer cork 75 includes a recess 77 adapted to receive the projection 71 on the plunger. The bottom of the recess 77 is closed by a diaphragm 78 which is adapted to be punctured by the extension rod 72 and thus allow the rod 72 to strike a trap door 79 which is integral with the cork 76 and which normally closes the lower end of a cavity 80 in which a medicinal preparation 81 is arranged.

The lower inner surface of the sleeve 64 is slotted as at 82 to receive a resilient tongue 83 which is secured at one end to the sleeve. The other end of the tongue is free and normally projects into the barrel as shown in Fig. 2. The tongue 83 forces a used ampule from the syringe, the action being similar to that of the tongue 41 previously described.

In operation the plunger 59 is withdrawn and is locked with the pin end 61 in the slot 60. An ampule is then inserted in the barrel after which the plunger is turned to release the sleeve which is urged forward by the spring 73 so that it surrounds the outer end of the ampule.

When the plunger is pushed inwardly the rod 72 passes through the recess 77, pierces the diaphragm 78 and dislodges the closure or trap door 79 allowing the medicinal preparation to mingle with the fluid contents of the ampule to prepare a fresh solution.

The needle 56 having meanwhile pierced the closure 55 further inward movement of the plunger causes the latter to move the piston cork 75 inwardly thus discharging the contents of the ampule through the needle 56.

In Fig. 1 the upper end of the plunger is provided with a handle 85 which rotates on the plunger and which is prevented from leaving the plunger by a screw 86 having a head 87 thereon which fits in a circumferential groove 88 in the plunger.

In Fig. 6 the handle 85' is rotatably held in place in the same manner by a screw 86', the head 87' of which fits in a groove 88' in the plunger.

From the foregoing description it will be apparent that I have invented a novel syringe which is highly efficient for its intended purpose.

Having thus described my invention, I claim:

1. In a syringe, a barrel, said barrel having a lateral opening permitting the insertion and removal of an ampule, an ampule in the barrel, said ampule having a displaceable cork therein, a rear member including a cap having a portion slidable within the barrel, means to limit the movement of the rear member on the barrel, a plunger movable in the slidable portion and including a shoulder adapted to engage the slidable portion when the plunger is moved outwardly, said plunger including a forwardly projecting end portion, said end portion including a slotted part, a rod secured on the slidable portion and projecting beyond the inner end thereof, said rod being movable with the slidable portion to displace the displaceable cork, a resilient tongue mounted on the slidable portion opposite to said lateral opening and normally urged into the barrel, and a cork in said ampule and movable by said plunger.

2. In a syringe, a barrel having a front member thereon, said front member including a needle projecting into the barrel, said barrel having a lateral opening permitting the insertion and removal of an ampule, an ampule in the barrel, said ampule including a front cork with a pierceable portion receiving said needle, a rear member on the barrel and including a cap having a skirt portion slidable on the outside of the barrel, said cap including a tubular portion slidable within the barrel, means to limit the movement of the rear member on the barrel, a cylinder within said tubular portion, a plunger slidable in the cylinder and cap, said plunger including a shoulder adapted to engage the cylinder when the plunger is moved outwardly, said plunger including a forwardly projecting end portion, said end portion including a slotted part, a rod secured on the interior of the cylinder and projecting beyond the inner end of the cylinder and disposed in said plunger slot, a resilient tongue mounted on the lower portion of said tubular portion opposite to said lateral opening, said tongue being normally urged inwardly by its re-

siliency, the lower end of said tubular portion being slotted to receive said tongue, a cork in said ampule adjacent said plunger, a displaceable closure associated with the last mentioned cork, said cork including a portion adapted to be pierced by said rod, said cork being movable by said plunger said rod being adapted to move the displaceable closure when the cylinder is moved.

3. In a syringe, a barrel having a front member thereon, said front member including a piercing member projecting into the barrel, said barrel having a lateral opening permitting the insertion and removal of an ampule, an ampule in the barrel, said ampule including a front cork with a piercable portion receiving said piercing mem-

ber, a rear member on the barrel and including a cap having a skirt portion slidable on the outside of the barrel, said cap including a tubular portion slidable within the barrel, means to limit the movement of the rear member on the barrel, a cylinder within said tubular portion, a plunger slidable in the cylinder and cap, said plunger including a shoulder adapted to engage the cylinder when the plunger is moved outwardly, a resilient tongue mounted on the lower portion of said tubular portion opposite to said lateral opening, said tongue being normally urged inwardly by its resiliency, and a cork in said ampule adjacent said plunger, said cork being movable by said plunger.

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