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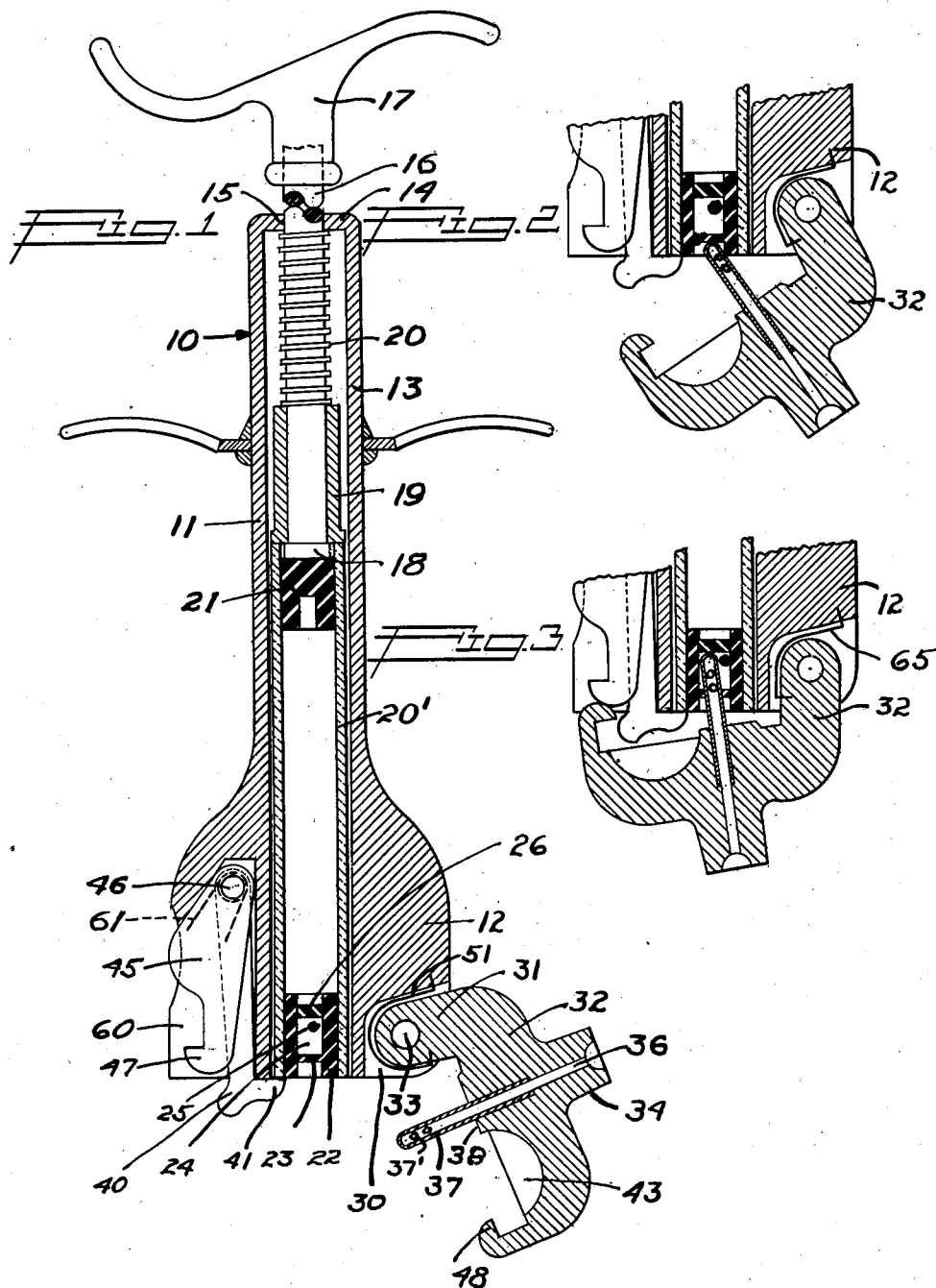
A. E. SMITH

2,392,196

SYRINGE

Filed Feb. 24, 1945

2 Sheets-Sheet 1



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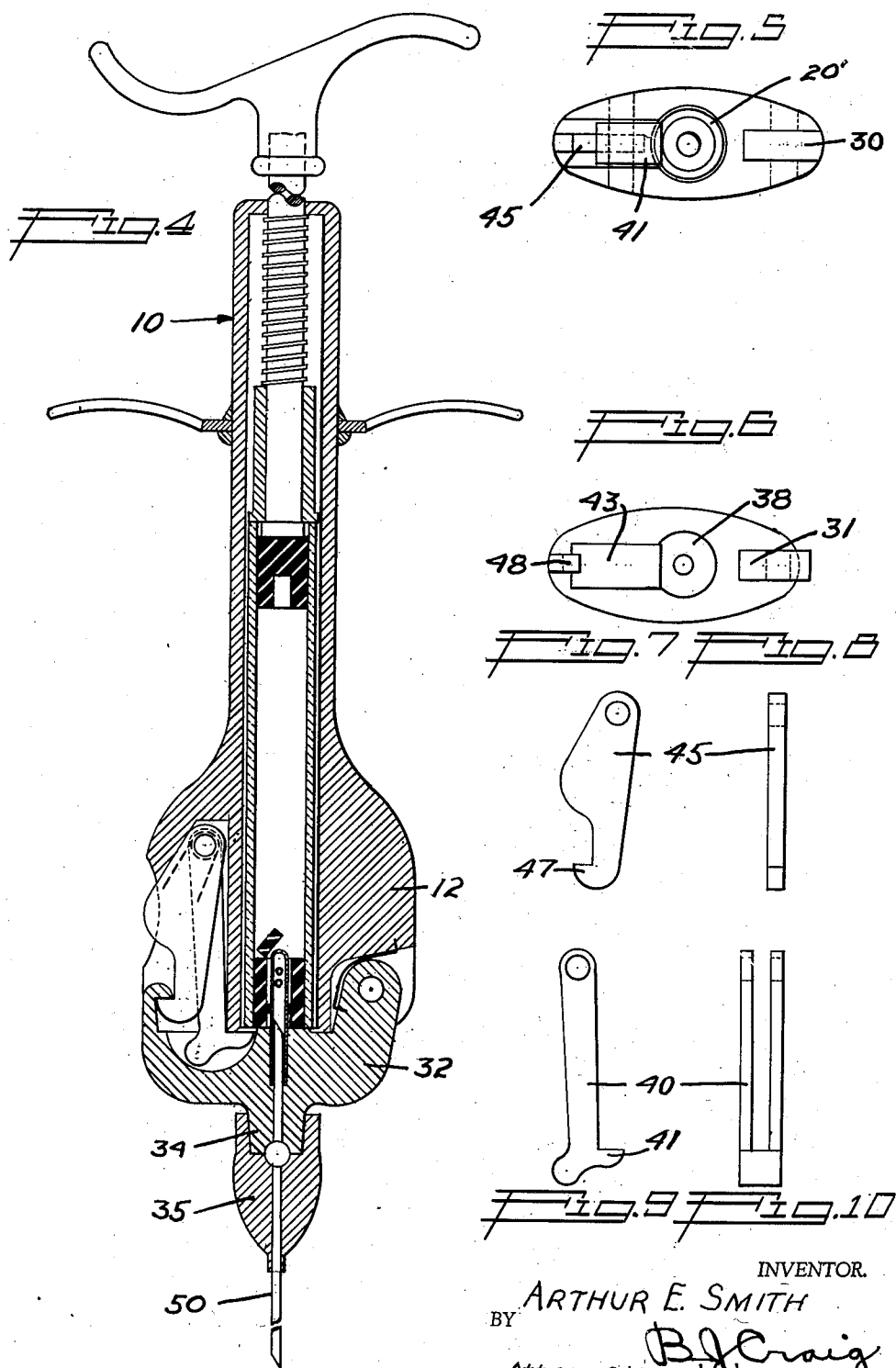
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2,392,196

SYRINGE

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Application February 24, 1945, Serial No. 579,663

1 Claim. (Cl. 128—218)

This invention relates to a syringe.

The general object of the invention is to provide a compact, easily loaded, ampule type, hypodermic syringe.

A more specific object of the invention is to provide a syringe including a barrel having a novel front member thereon.

A further object of the invention is to provide a syringe including a barrel and having novel means for holding an ampule in the barrel.

Another object of the invention is to provide a syringe including a barrel and including a pivoted closure wherein novel means is provided for holding the closure in closed position.

A further object of the invention is to provide a syringe with a barrel having an ampule therein with a cork in the ampule which contains a drug, and wherein the barrel includes a novel pivotally mounted front member which is movable to cause release of a drug in the ampule cork.

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

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

Fig. 2 is a fragmentary view of the syringe similar to Fig. 1, showing the front member partly closed;

Fig. 3 is a view similar to Fig. 2, showing the front member in more fully closed position;

Fig. 4 is a view similar to Fig. 1, showing the front member in fully closed position;

Fig. 5 is an end view of the barrel, with the front member removed;

Fig. 6 is an end view of the syringe front member removed from the barrel;

Fig. 7 is a plan view of the front member holding dog;

Fig. 8 is a side elevation of the front member holding dog;

Fig. 9 is a plan view of the ampule holding dog, and

Fig. 10 is a front elevation of the ampule holding dog.

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 an enlarged elliptical front end 12 and a cylindrical portion 13. The rear portion 13 is closed as at 14 and the closed end is provided with a hole 15 through which a plunger 16 extends.

The plunger 16 is provided with a hand engaging portion 17 at its outer end and at its inner

end includes a head 18. A sleeve 19 is slidable on the plunger and is engaged by the inner end of the spring 20. The outer end of the spring 20 engages the inner wall of the end 14 of the barrel.

My improved syringe is particularly adapted for use in the preparation of fresh anaesthetizing solutions and is adapted for use with ampules which may be the type shown in my prior Patent No. 2,337,354, granted December 21, 1942. In the disclosure the ampule designated at 20' has a piston stopper 21 at the inner end which is adapted to be engaged by the plunger head 18 and to be forced inwardly along the ampule to expel the contents thereof.

At the forward end of the ampule I provide a stopper 22 which is provided with a diaphragm 23 and with a cavity 24 in which a medicinal tablet 25 is arranged. The inner end of the cavity 24 is closed by a closure 26 which is in the nature of a disc and which normally seals in the drug 25 so that it will not be reached by the liquid vehicle within the ampule 20 until the closure 26 is dislodged.

The forward end of the front portion 12 is provided with a slot 30 in which a finger 31 on a front member 32 is inserted and is pivotally mounted by means of a pin 33. The closure 32 includes an outer end portion 34 which is adapted to be engaged by hypodermic needle support 35. The front member includes a hole 36 which communicates with a tube 37 which projects inwardly beyond a shoulder 38 on the closure 32.

The construction is such that when the closure 32 is moved towards closed position it first assumes the position shown in Fig. 2, wherein the diaphragm 23 is engaged by the tube. As the closure moves towards completely closed position the diaphragm will be broken and the tube will engage the closure 26 as shown in Fig. 3. Further movement of the closure will cause the disc closure 26 to be unseated as shown in Fig. 4. This act allows the drug to enter the vehicle and prepare a fresh solution.

To hold the ampule 20 in the barrel while the closure is being moved to closed position, I provide a dog 40 which has a projection 41 at the front end and this projection is positioned to engage the forward end of the ampule 20' as shown in Figs. 1, 2 and 3. When the closure 32 is moved to fully closed position the projection 41 is received in a recess 43 in the closure 32 and the projection 38 on the closure 32 engages the end of the ampule 20' and causes it to move slightly inwardly. In this way there is a large contacting area for the front end of the ampule

and the latter is not likely to break as would be the case if only the dog portion 41 engaged the ampule during the time the piston cork 21 is moved forwardly.

To hold the closure 32 in closed position, I provide a dog 45. The dogs 40 and 45 are coaxial and are mounted on a pivot pin 46. The dog 40 is U-shaped, as shown in Fig. 10, while the dog 45 is of a single thickness and fits between the sides of the U-shaped dog. The dog 45 includes a tongue 47 which engages a tongue 48 on the front member 32 when the latter is closed.

In the use of my improved syringe an ampule is inserted in the barrel and is moved to the position shown in Fig. 1, where it is held by the dog 40. The closure 32 is then moved to closed position and as it moves the tube 37 moves inwardly and engages the diaphragm 23 (Fig. 2). Then the tube breaks or pierces the diaphragm (Fig. 3). Then the tube dislodges the closure 26 to cause the drug 25 to be exposed in the stopper cavity to prepare the fresh solution.

The front member 32 is then held in position by the dog 45. Either before or after the front member is moved to closed position the needle support 35 with the needle 50 is mounted. The injection may then be made. The tube 37 has holes 37' therethrough through which the solution passes.

To discharge the ampule and reload the syringe the dog 45 is first depressed. This causes the closure 32 to be moved by a spring 51 to open position. Thereupon the dog 40 is moved outwardly and the ampule is ejected by action of the spring 20.

The dog 40 is arranged in a slot 60 which is slightly wider than the thickness of the dog so that a spring 61 may be arranged about the pin 46 at one side of the dog 40. One end of the spring is bent to fit in a hole in the dog 40 and the other end of the spring is bent to fit in a hole in the dog 45 and the spring normally urges the dog 45 outwardly and the dog 40 inwardly.

A spring 65 normally urges the front member to open position.

It will be noted that the dog 40 cannot be moved outwardly so long as the front member is in closed position and this dog cannot therefore be released until the front member is open. Thus premature ejection of the ampule from the barrel before the tube 37 has moved from the ampule is prevented.

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

Having thus described my invention, I claim:

1. A syringe including a barrel, a plunger in said barrel, a head on said plunger, an ampule engaging sleeve slidable on the plunger, spring means normally urging the ampule engaging sleeve forwardly in the barrel, a pivoted dog on the front end of said barrel, said dog having a projection thereon, an ampule in said barrel and engaged by said projection, said ampule having a cork therein adjacent said dog, said cork having a drug holding cavity therein, a closure for said cork cavity, a front member pivotally mounted on said barrel, said front member having a tube projecting therefrom and movable into the barrel for the purpose of shifting said cork cavity closure when the front member is moved to closed position, a second dog pivoted on said barrel, said front member having a projection thereon engaging said second dog, said front member having a recess therein receiving said first dog when the front member is closed, said front member having a shoulder portion thereon which engages the end of the ampule and forces the ampule into the barrel and away from the first dog when the front member is closed, and spring means urging said dogs to engaging position.

ARTHUR E. SMITH.