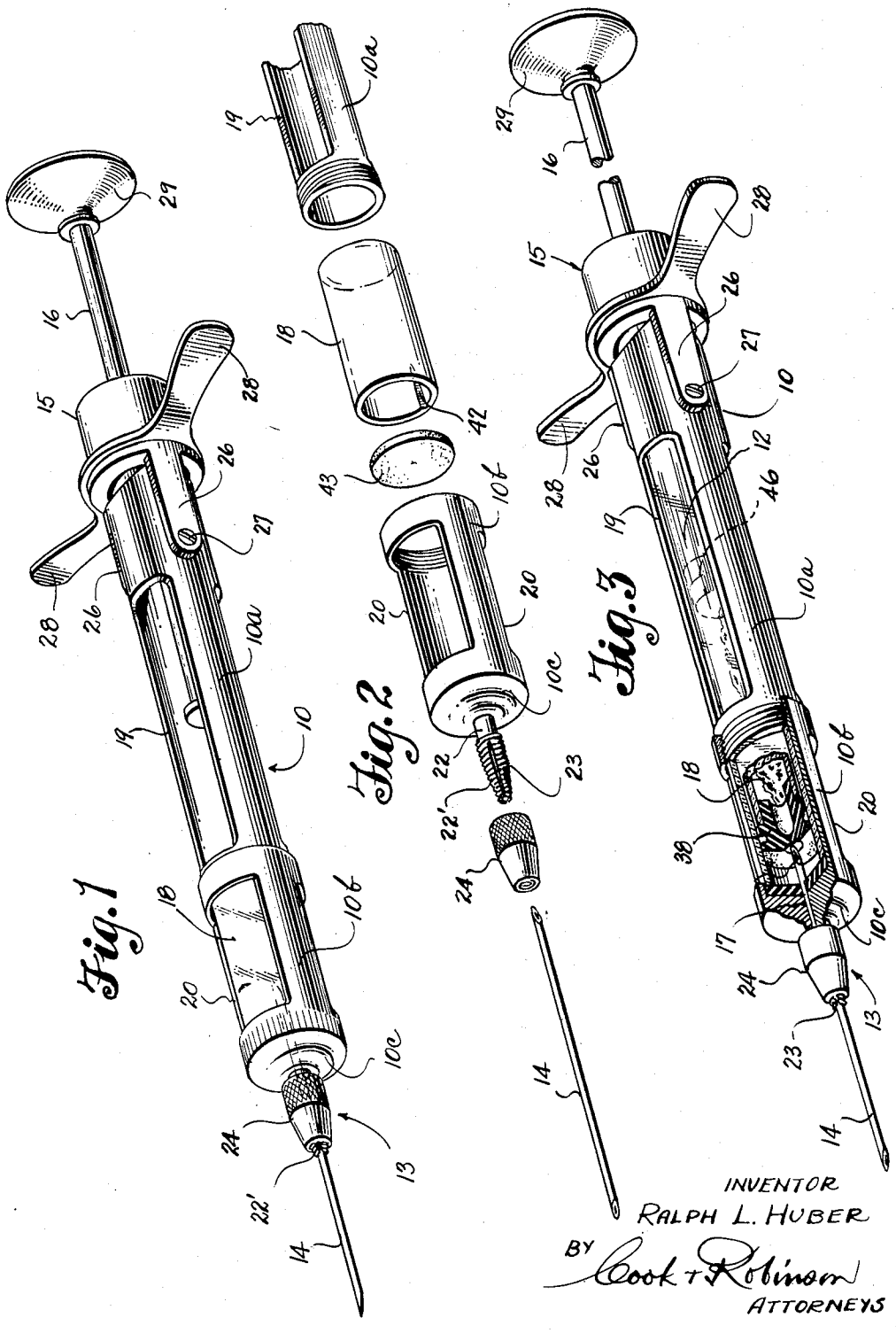
Sept. 14, 1954 R. L. HUBER 2,688,967

METAL ASPIRATING SYRINGE

Filed June 2, 1953 2 Sheets-Sheet 1



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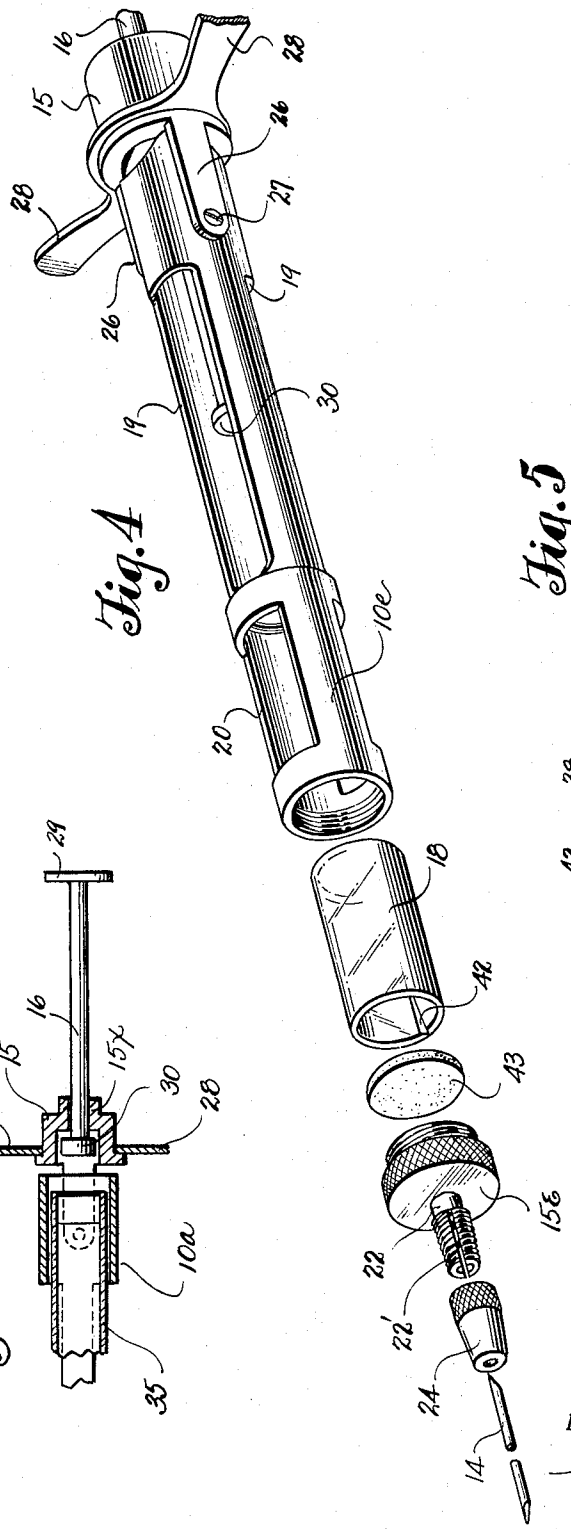

Fig. 4

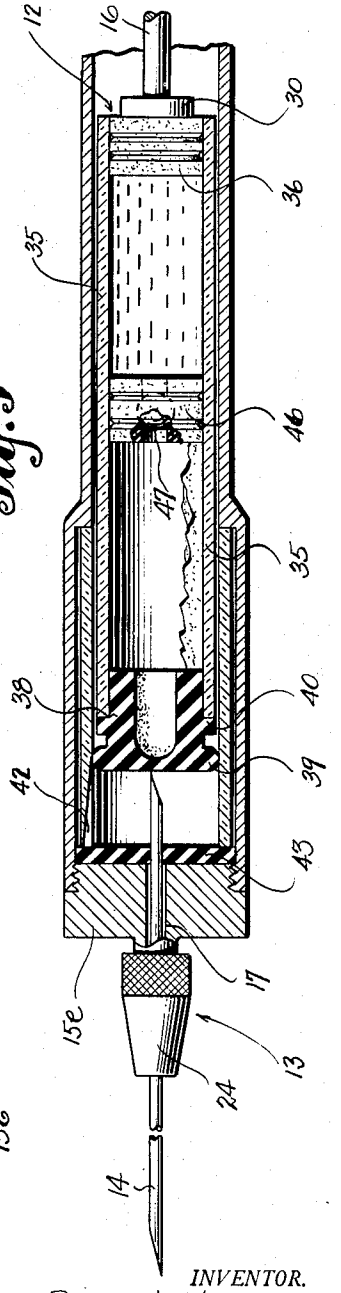

Fig. 5

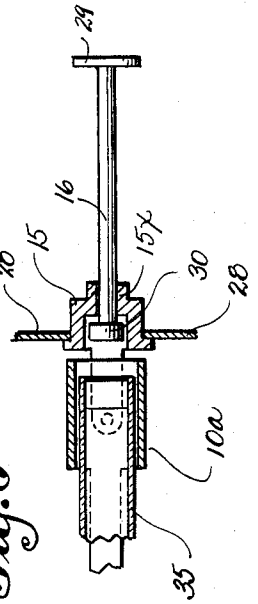

Fig. 6

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METAL ASPIRATING SYRINGE

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Application June 2, 1953, Serial No. 359,105

3 Claims. (Cl. 128—218)

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This invention relates to hypodermic syringes. More particularly, it has reference to improvements in instruments that are known in the medical profession as "aspirator syringes"; it being the principal object of this invention to provide an aspirator syringe that, after being loaded with an ampule containing the liquid medicament that is to be injected, and prior to the injection, can be used as an aspirator, and is so constructed that full view of any aspirated liquid may be had and furthermore the aspirated liquid cannot contact the medicament.

More specifically stated, the objects and advantages of the present invention reside in the provision of an aspirator syringe comprising a cylindrical barrel with a double pointed needle mounted in one end wall thereof, and the barrel being designed to contain a medicament holding ampule therein; the barrel further including a transparent section, at the needle mounting end thereof, and the ampule having a needle pierceable stopper at its inner end that fits within the barrel as a piston, thus to provide that, by a withdrawing movement of the contained ampule, aspirating suction will be created through the needle and any liquid aspirated will be disclosed at the inner end point of the needle as viewed through the transparent section of the syringe barrel.

It is a further object of this invention to provide an aspirator syringe as above recited wherein, after aspirating tests have been made, the full advancement of the ampule into the barrel causes the needle to pass through the closure stopple, thus to prepare for the injection of the medicament through the needle.

Yet another object of the invention is to provide a syringe having opposite side walls of the barrel formed with cut-outs that permit the ampule therein to be gripped for the manual manipulation thereof as required to effect aspiration.

Still further objects of the invention reside in the provision of an air venting means for the barrel that permits the full seating of the ampule therein, and in those details of construction and combination of parts that makes possible the present mode of use of the device.

In accomplishing the above mentioned and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings wherein—

Fig. 1 is a perspective view of an aspirator syringe embodying the improvements of the present invention therein.

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Fig. 2 is a perspective view of parts of the syringe, shown in disassembled relationship for better understanding of details of their construction.

Fig. 3 is a view of the syringe with ampule applied thereto; a part of the syringe barrel and ampule being broken away for a better showing of details of the piston stopple at the inner end of the ampule.

Fig. 4 is a perspective view of a syringe having a barrel of an alternative or modified form; parts thereof being shown in disassembled relationship for better understanding of details of construction.

Fig. 5 is an enlarged sectional detail of a part of the barrel of the device of Fig. 4, and an ampule as contained therein.

Fig. 6 is a sectional detail of the plunger mounting cap and finger hold on the syringe barrel.

The present drawings show the syringe somewhat enlarged and also illustrate the barrel in two practical forms of construction. The mode of use of the syringe, with either form or barrel, however, is like that of the other. In the applying of reference numerals, parts that are alike in the two forms of barrels will bear the same numeral.

Referring more in detail to the drawings—

In that form of construction shown in Figs. 1, 2 and 3, the syringe of this invention comprises a cylindrical barrel, designated in its entirety by reference numeral 10, designed to receive the medicament containing ampule 12. The ampule is of such diameter and length that it will fit in the barrel and will have limited endwise movement therein as later explained. One end of the barrel, herein designated as the outer end, is equipped with a chuck, designated generally by numeral 13, for adjustably securing a double pointed hypodermic needle 14 with its inner end portion extended into the barrel a predetermined distance as well shown in Fig. 3; the needle being co-axial of the barrel when so held.

At its outer end, the barrel 10 is equipped with a hingedly attached cap 15, reciprocally mounting a plunger rod 16 therein as shown in Fig. 6. This rod may be actuated inwardly from a retracted position, for forced injection of the medicament from the ampule, as will presently be fully explained.

The barrel, which is designated in its entirety by reference numeral 10, is made up of two cylindrical sections designated, respectively, as the body section 10*a* and the extending section 10*b*. The body section is cylindrical and of uniform

internal diameter and is open at both ends. The extending section 10*b* is about half the length of the section 10*a* and is of slightly greater diameter. It is internally threaded at one end and is threaded onto the outer end of body 10*a*, as well shown in Fig. 3. This section is closed at its outer end by an end wall 10*c*, formed with an axial bore 17 through which the needle 14 extends into the barrel.

Contained in the cylindrical extending section 10*b* is a transparent glass cylinder 18 having an inside diameter exactly equal to the inside diameter of the body section 10*b*, and is held in end to end abutment therewith, as will be noted by reference to Fig. 3. In effect, the glass cylinder 18 is a continuation of the body 10*a*, and the medicament containing ampule, when applied to the barrel through its inner open end, can be extended into the glass cylinder in the manner shown in Fig. 3.

As a feature of the present construction, the body section 10*a* is formed along opposite sides with cut-outs, providing elongated openings, as at 19 through which a finger hold can be obtained on a contained ampule for its endwise manipulation. Likewise, the extending section 10*b* is formed along opposite sides with cut-outs providing opening 20 through which the inner end of the needle and barrel contained ampule can be viewed to ascertain the effect of aspirating and note the location of the ampule.

It is shown in Figs. 2 and 4 that the needle 14 extends outwardly from the end wall 10*c* of the barrel through the chuck 13. The chuck comprises a neck portion 22 that is diametrically and longitudinally split, as at 22', along its outer portion and also is tapered toward its end and is externally threaded as at 23. Threaded onto the neck is a chuck collar 24, and as this is threaded inwardly to holding position on the neck 22, it contracts the neck to cause it to grip and hold the needle at any position of longitudinal adjustment.

The cap 15, which may be adjusted from and over the outer end of the body 10*a*, has two attaching arms 26—26, shown in Figs. 1 and 2 to extend along opposite sides of the body and to be attached thereto at their ends by pivot screws 27, about which screws the cap can be swung from a position over the end of the body as in Fig. 1, to a position at one side thereof for easy insertion or withdrawal of the ampule. Also, the cap 15 is equipped with outwardly extending finger holds 28—28 at opposite sides, and the plunger rod 16 is equipped at its outer end with a press button 29.

As shown in Figs. 5 and 6, the inner end of the rod 16 is equipped with a head 30 and the rod slides freely through a bearing 15*x* in the cap. The head 30 may be drawn into the cap, which is hollow, to permit the adjustment of the cap to and from a position over the end of the barrel.

The ampule used in the present syringe comprises a tubular body 35 fitted at one end with a piston stopple 36 and at its other end with a needle pierceable rubber stopple 38; this latter stopple having an extending annular flange 39 designed to fit in the syringe barrel as a piston and has a flange 40 designed to seat against the end of the ampule body 35. At its axial center, the stopple 38 is reduced in thickness to a thin diaphragm for easy piercing by the needle.

It is also a feature of this invention that the glass cylinder 18 is formed internally at its outer

end with a longitudinally extending V-shaped channel 42 to permit the escapement of air from the cylinder when the ampule is advanced to its inner limit in the extending section 10*b* after the needle has pierced the stopple 38. Also, a rubber gasket 43 is disposed inside the part 10*b* and against the end wall 10*c* to provide a cushioned joint between the inner end of the glass cylinder 18 and wall when the parts are assembled.

In the present instance the ampule is shown to be compartmented, that is, it is divided by a partitioning stopper 46 of piston type, fitted therein and equipped with a normally plugged by-pass 47. A dry medication is contained in one of the ampule compartments and a liquid solvent therefor is contained in the other. Inward movement of the stopper 36 by plunger 16 will create pressure on the liquid that will cause the liquid to be forced into the compartment with the dry medication. The resultant solution can then be injected through the needle 14 after the latter has been caused to pierce the stopple 38, by an inward movement of the piston stopper 36 as effected by plunger 16.

The construction shown in Figs. 4 and 5 differs from that of Figs. 1, 2 and 3 only in that the body section and extending section of the syringe barrel 10 are integrally formed instead of being threaded together, and the outer end wall of the section 10*b* is threaded into the extending section. In Figs. 4 and 5 the extending section is designated at 10*e* and the end wall is designated at 15*e*.

Assuming the parts of the syringe to be so constructed and assembled, the mode of use of the syringe is as follows:

First, the plunger 16 is fully retracted and the cap 15 is swung away from the open inner end of the barrel. The ampule 12 is then loaded into the barrel, the end containing the needle stopple 38 entering first; then the ampule is grasped between the thumb and finger through the longitudinal cut outs provided in the body 10*a*, and is adjusted inwardly to the approximate position in which it is shown in Fig. 5 relative to the inner end point of the needle. The end cap 15 is then adjusted to a position over the barrel end. The syringe is then held with needle end pointed upward, and pressure is applied against the plunger, causing it to engage and effect an inward movement of the piston stopple 36, thus to force the liquid of the ampule into the dry compartment. Shaking the syringe will then expedite the dissolving of the medication and prepare the solution for injection. Residual air is then expelled from the ampule through the needle and the needle is then inserted into the patient in the usual way. Aspiration is then effected by gripping the ampule through the body openings and pulling it away from the needle. Aspirating suction is thus created in the inner end of the barrel and needle. If a drop of blood appears on the inner point of the needle, this is an indication that the outer point is in a blood vessel. If a vein is to be the site for the injection, injection can follow, but if not, the needle should be partially withdrawn and slightly shifted before being pushed back to the desired depth. The aspirating test can be repeated without withdrawal of the needle from the patient to be sure of the injection site.

Injection is effected by the inward actuation of the stopple by the plunger in the normal manner of injecting.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is:

1. An aspirating syringe comprising a barrel with a closing wall at its inner end; said barrel including a transparent side wall adjacent said closing wall, a hypodermic needle mounted in the closing wall with the inner end of the needle extended into the barrel and terminating in a stopple piercing point that is visible through the transparent side wall, an ampule contained in the barrel for longitudinal movement and closed at its inner end with a needle pierceable stopple that fits the barrel walls as a piston and an air relief means on the inner surface of the transparent side wall permitting air to escape when the ampule is moved toward the inner end of the barrel.

2. An aspirating syringe as recited in claim 1 wherein the barrel portion is threaded at its inner end onto the said closing wall, and a rubber gasket is fitted in the barrel over the inner surface of the closing wall; and said barrel is formed with a cut-out adjacent its inner end, and the transparent side wall portion thereof comprises a glass tube that is fitted in the barrel and is engaged at its outer end against a sustaining shoulder in the barrel, and at its inner end is seated against said gasket and is pressed thereagainst in an air tight joint by the threading of the barrel onto the end wall forming member.

3. An aspirating syringe comprising a barrel having its inner end portion diametrically enlarged, a glass tube fitted in the diametrically enlarged portion thereof, an inner end wall member threaded into the inner end of the barrel, a sealing gasket fitted in the barrel over the inner face of the said end wall member and held thereby under joint sealing pressure against the end of the glass tube, a double pointed needle mounted through the end wall member and extending through said gasket into the glass tube; said enlarged portion of he barrel having cut-outs therein providing visibility of the inner end portion of the needle through the glass tube, a medicament containing ampule disposed in the barrel, and closed at its inner end with a needle pierceable rubber stopple formed with an extended peripheral portion fitted as a piston in the barrel, and means at the outer end of the barrel for moving the ampule endwise for aspirating through the needle and for causing the needle to pierce the end closing stopple of the ampule for injection.

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