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ASPIRATING HYPODERMIC SYRINGE

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Fig. 1

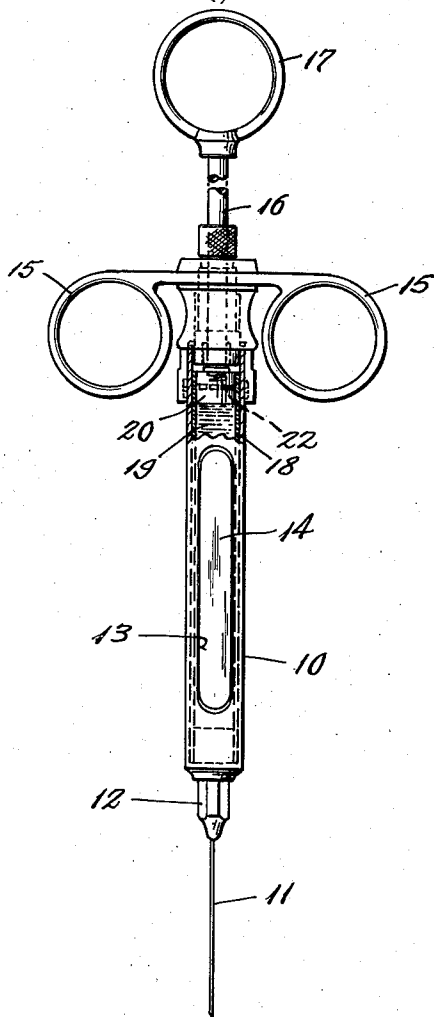


Fig. 2

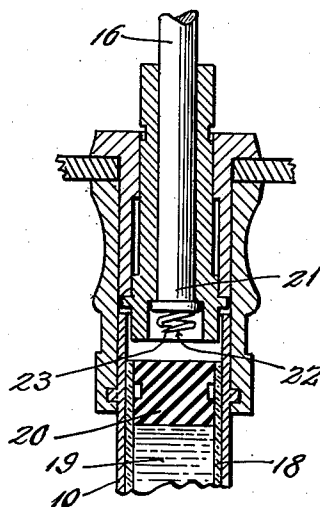
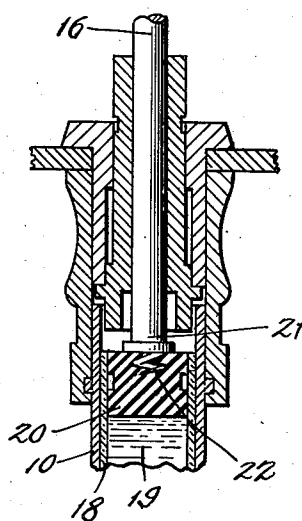


Fig. 3



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ASPIRATING HYPODERMIC SYRINGE

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1 Claim. (Cl. 128—218)

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This invention relates to hypodermic syringes. Syringes of this type which employ cartridges or ampules, have been so constructed as to enable them to aspirate as well as inject. In these aspirating syringes, the plunger rods were provided with threaded ends, and the ampules were constructed with special plungers having threaded recesses to receive the threads of the plunger rods. In the operation of such a syringe, an ampule is first inserted in the syringe tray or barrel, and then the plunger rod is moved forward and turned to cause the threaded end to be screwed into the ampule plunger. After this is done, the syringe can be used for either injecting or aspirating at any time, as desired. While these aspirating syringes are advantageous, they have a serious drawback in not being able to use any standard type of ampule to carry out the aspirating function, but instead require ampules having plungers with recessed and threaded central metal inserts.

The present invention overcomes this objection, and an object of the invention is to provide an improved hypodermic syringe of the type employing cartridges or ampules, which is operable with ordinary ampules having non-recessed and non-threaded rubber plungers to aspirate as well as inject, therefore not requiring the special ampules provided with the recessed and threaded plungers, but which is at the same time capable of using such ampules, when necessary, in spite of their usual central metallic inserts.

Another object of the invention is to provide an improved hypodermic syringe as above characterized, which is simple and sturdy in construction and economical to fabricate.

In accomplishing the above objects I provide, in accordance with the invention, an improved syringe structure having the usual means for receiving and holding an ampule or cartridge, as for example a tray or barrel. Operatively connected with said means is a plunger rod for engaging and operating the rubber plunger in the ampule, and I provide on the plunger-engaging end of the rod a hollow, centerless, pointed helical extension somewhat in the form of a short corkscrew. This extension is so arranged and constructed that it may be made to pierce and screw into an ordinary solid soft rubber plunger of a standard ampule, thereby to become attached to the plunger by a simple, quick and convenient operation.

To effect such attachment it is merely necessary to insert the ampule in the syringe and move the plunger rod forwardly while at the

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same time turning it. This will cause the pointed helix to enter the rubber plunger of the ampule in the manner that a corkscrew enters the cork of a bottle. Due to the hollow, centerless structure, only a slight amount of pressure and turning is necessary, whereupon the helix will become completely embedded in the plunger and the rod thereby attached securely enough to the plunger for withdrawing the same or aspirating. Thereafter the operator may either inject or aspirate as desired.

Other features and advantages will hereinafter appear.

In the accompanying drawings:

Figure 1 is a plan view of a syringe made in accordance with the invention, a portion being broken away and shown in section to reveal the helix-carrying end of the plunger rod.

Fig. 2 is an enlarged detail, in section, showing the inner end of the plunger and the helix carried thereby, and showing the adjacent end of an ampule, together with adjacent portions of the syringe, and

Fig. 3 is an enlarged detail in section showing the helix carried on the end of the plunger rod being embedded in the plunger.

As shown, the improved syringe of the present invention comprises a tray or barrel 10 having at one end a needle 11 secured in place by the usual threaded nut 12, and having the usual sight opening 13 for viewing the contents of an ampule 14 carried in the barrel.

The syringe may have finger grips 15 as shown, attached to the barrel 10, and may have a plunger rod 16 insertable in the barrel and operable by a finger grip 17.

It will be noted that the ampule 14 may be of the standard or ordinary type comprising a transparent cylindrical vessel or tube 18 carrying fluid 19 which is to be injected, the tube being closed by a solid, soft rubber stopper 20.

In accordance with the present invention the inner end 21 of the plunger rod 16 adjacent the stopper 20 of the ampule is provided with a pointed, helical extension 22. The extension 22 is preferably formed of metal wire, of sufficient thickness to be generally rigid and inflexible, and to withstand bending or deformation under ordinary conditions of use. The helix or extension has a very sharp, gradually tapered entering point 23, and is so arranged that when the plunger rod 16 is pushed inward and turned in a clockwise direction, as viewed from the handle end of the syringe, the extension will easily snag the rubber of the plunger 20, and screw itself into

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the same, and will thereby become embedded and attached to the plunger to provide for aspirating as well as injecting.

During this process of making the connection, the sharp tapering entering point 23 proceeds to form a passage into which the remainder of the helix 22 exactly fits, and the total volume of the helix is so small that the swelling of the plunger occasioned by the additional helix material will be negligible, although the extension 22 has a firm grip on the plunger due to its helical configuration. This factor is important since plungers are normally tightly fitted in the ampules to protect the contents thereof and insure sterility. For this reason any significant expansion thereof would tend to bind the plunger in the ampule tube and prevent proper operation of the device.

The advantages of an aspirating syringe are well known and need not be elaborated on here, it being understood that by the aspirating operation it is possible to determine whether or not the needle 11 has struck a vein or other large blood vessel prior to giving the injections. By the present invention it is not necessary to employ ampules having special recessed or threaded plungers in order to provide for aspirating, and therefore the usual type of ampules with solid soft rubber plungers and which are readily obtainable from local sources of supply may be used, without sacrificing the aspirating feature. If, however, the only ampules on hand happen to be of the type in which the plunger is provided with a central embedded threaded metallic connecting element, the syringe of the present invention may still be used, for the centerless helix will surround the central metallic insert and engage only the rubber material of the plunger proper.

Variations and modifications may be made within the scope of the subjoined claim and por-

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tions of the improvements may be used without others.

I claim:

A hypodermic syringe having means for receiving and holding an ampule; a plunger rod slidably connected with said means and having an inner end positioned for engaging and operating a plunger in the ampule; and a wire helix extension mounted at one end on the inner end of said rod, said helix being of substantially constant diameter along its axis, having a hollow center and being free of support except at its end mounted on the rod, and said wire being gradually tapered to a sharp point at its free end, whereby said extension will dig readily into the surface of an ampule plunger in response to rotary movement of the rod, will grip the plunger securely without creating any substantial wedging action against the walls of the ampule, and whereby the extension is also capable of engaging and holding ampule plungers of the type having a centrally embedded connection member, by engaging the plunger portions surrounding such member and receiving the member within its hollow center.

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