

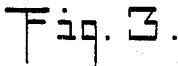
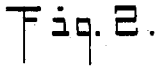
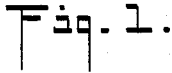
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ASPIRATING SYRINGE

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2,904,044

ASPIRATING SYRINGE

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This invention relates to syringes such as are employed for the parenteral administration of medication, and, more particularly, is directed to such syringes which enable the setting up of suction or "aspiration" at any point during the injection. If the injection is being made into a blood vessel, such aspiration will withdraw blood, the appearance of which will indicate to the operator that the needle must be withdrawn and re-located before completing the injection.

Such aspiration is accomplished by retraction of a piston stopper of an ampoule. To do this, it is necessary that the operating plunger have some means at its forward end for interlocking with the piston stopper so that withdrawal of the operating plunger will effect withdrawal of the piston stopper.

In prior syringes various means have been employed for interlocking the syringe's operating plunger and the piston stopper of the ampoule. In some cases, the stopper is specially formed to receive a key on the forward end of the plunger. In other arrangements, the plunger has a cork-screw at its forward end or has hooks or claws to grasp the stopper and a rod or other means for operating the hooks or claws. In all prior structures, the interlocking between the piston stopper and the plunger to make aspiration possible has required some turning of the plunger or some operation of a part associated with the plunger.

An important object of this invention is the provision of a syringe in the use of which injection and aspiration may be attained without any turning of the plunger or operating of any claws or hooks associated with the plunger, i.e., by merely pushing the plunger forwardly for injection and merely pulling it rearwardly for aspiration.

Another important object is the provision of means for interlocking the piston stopper of the ampoule and the operating plunger of the syringe, which interlocking means are in rigidly fixed relation to said plunger and function without turning of the plunger.

The foregoing and other more or less obvious objects are accomplished by the present invention of which one embodiment is shown for illustrative purposes in the accompanying drawing without, however, limiting the invention to that particular embodiment.

In the drawing:

Figure 1 is a side elevational view of a syringe according to a preferred embodiment of this invention.

Fig. 2 is a longitudinal sectional view of said syringe, substantially on line 2—2 of Fig. 1.

Fig. 3 is a detail sectional view of an interlocked operating plunger of the syringe and a piston stopper of an ampoule in the syringe.

As the present invention relates primarily to the means for interlocking the plunger and the stopper, the syringe as a whole is not described herein in detail. It should suffice to note that the syringe, as illustrated, consists of a generally cylindrical magazine 10, a needle head 12, at the forward end of the magazine, within which head is rigidly held an injection needle 14, a plunger guide assembly 16, at the rearward end of the magazine, and a

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plunger 18 which is manually reciprocable within the assembly 16.

The magazine has a large opening 20 at one side thereof to permit insertion of an ampoule 22 laterally into the magazine. The latter may have an additional side opening 24 affording the operator of the syringe a more complete view of the ampoule.

The ampoule 22 is shown as a glass tube 26 having a needle stopper 28 at its forward end and a reciprocable piston stopper 30 at its rearward end, medicament 32, of course, being normally confined within the tube, between said stoppers.

The device, as thus far described, is not novel. In use, plunger 18 is first completely retracted, thereby compressing the spring in guide assembly 16. While the plunger is held thus retracted, the ampoule 22 is inserted laterally, rear or stopper 30 end first, into the magazine through the opening 20. Then, upon complete insertion of the ampoule into its coaxial position in the magazine with the rear end of the ampoule against the forward end of the plunger, release of the plunger will enable said spring to force the ampoule forwardly to cause the needle 14 to pierce the needle stopper 28 and extend into the medicament 32 so that the latter can be expelled through the needle. Such expulsion is accomplished by forward, manual movement of the plunger 18 which pushes the piston stopper 30 forwardly within the tube 26 with a piston action which causes the medicament to be expelled through the needle.

The improved means which permit aspiration according to this invention comprise an aspirator hook member 34 which is rigidly secured to the forward end of plunger 18 by any suitable means as, for example, a retaining cap 36 which embraces a part of a base portion 38 of the hook 34 therewithin and is screwed to or otherwise secured upon the forward end of the plunger.

The hook 34 preferably is flat and has opposite side faces which are approximately parallel to the line of reciprocal movement of the plunger 18. The hook has a sharp leading end 40, a neck portion 42 and a lateral barb 44 which advantageously, although not necessarily, extends rearwardly and is provided with a preferably sharp end 46.

The stoppers 28 and 30 of the ampoule are ordinarily of a relatively soft, resilient material such as rubber which is stiff enough to function as a stopper, in the case of stopper 28, and as a piston as well as a stopper in the case of stopper 30. The rubber or equivalent stopper material should be such that the inner end of the needle 14 and the aspirator hook 34 can readily pierce it and should be of such resiliency that after being pierced by the needle and the aspirator hook, the two latter parts are securely grasped by the reaction of the rubber against the sides thereof and about the barb 44.

When a syringe including aspiration means according to this invention is employed for injection of medicament 32, there is no need for the operator to turn the plunger 18 or to operate any adjunct mechanism associated with said plunger. All that the operator need do beyond the hereinbefore described operation of a prior form of syringe is to push the ampoule 22 rearwardly, upon its insertion in the magazine, until the piston stopper 30 engages the aspirator hook 34 on the completely retracted plunger; then, while the ampoule is manually held against sliding, the plunger is pushed forwardly to embed the hook 34 completely within the stopper 30. After this has been done, release of the ampoule and the plunger will enable the spring in the guide assembly to drive the ampoule forward to set the needle 14 into and through the needle stopper 28. At this point the operator may verify that the ampoule is in its forward-most position with the needle extending into the medicament.

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With the hook 34 completely embedded within the piston stopper 30, as just described, the said stopper is constrained to move either forwardly or rearwardly in response to forward or rearward movements of the plunger 18. Hence, the operator may effect one or more rearward or aspiration strokes of the stopper 30 at any stage of the injection of the medicament to make certain that the needle is properly located at the point of injection. After the desired injection has been completed, complete retraction of the plunger 18 causes the hook 34 to become disengaged from the stopper 30, whereafter the used ampoule may readily be removed from the syringe.

Without attempting to set forth all possible variations, it will be understood that the barb 44 need not necessarily be formed of flat material as shown in the drawing but may be round in cross-section in most parts thereof; also, that the portion 42 may be centrally located rather than offset as illustrated. Also, within the invention, more than one barb may be provided, and the barb or barbs may be smaller or larger than illustrated in relation to other parts of the hook 34. Thus, it will be realized that the concept disclosed herein may be availed of in various ways without, however, departing from the invention as set forth in the following claims.

We claim:

1. An aspirating syringe comprising a generally cylin-

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drical magazine, a plunger reciprocable longitudinally within said magazine, and a substantially flat aspirator hook rigidly fixed to the forward end of said plunger; said magazine being adapted to receive therein a cylindrical ampoule having a piston stopper slidable forwardly therein to expel a medicament therefrom and retractable to afford aspiration, said hook having substantially similar opposite side faces approximately parallel to the line of reciprocal movement of the plunger; said hook being adapted to become embedded in said stopper without turning rotatively thereto, and having a portion opposing its withdrawal from said stopper upon a retraction stroke of the plunger.

2. An aspirating syringe according to claim 1, said hook having a neck portion, and said withdrawal-opposing portion of the hook being a barb extending laterally from said neck portion.

3. An aspirating syringe according to claim 2, said barb having a rearwardly pointing end.

References Cited in the file of this patent

UNITED STATES PATENTS

2,660,168	Pontius	Nov. 24, 1953
2,693,804	Pontius	Nov. 9, 1954
2,789,559	Breitenbach	Apr. 23, 1957

Notice of Adverse Decision in Interference

In Interference No. 94,738 involving Patent No. 2,904,044, B. F. Jalar and F. G. Nordstrom, **ASPIRATING SYRINGE**, final judgment adverse to the patentees was rendered June 25, 1965, as to claims 1, 2 and 3.
[*Official Gazette September 28, 1965.*]