

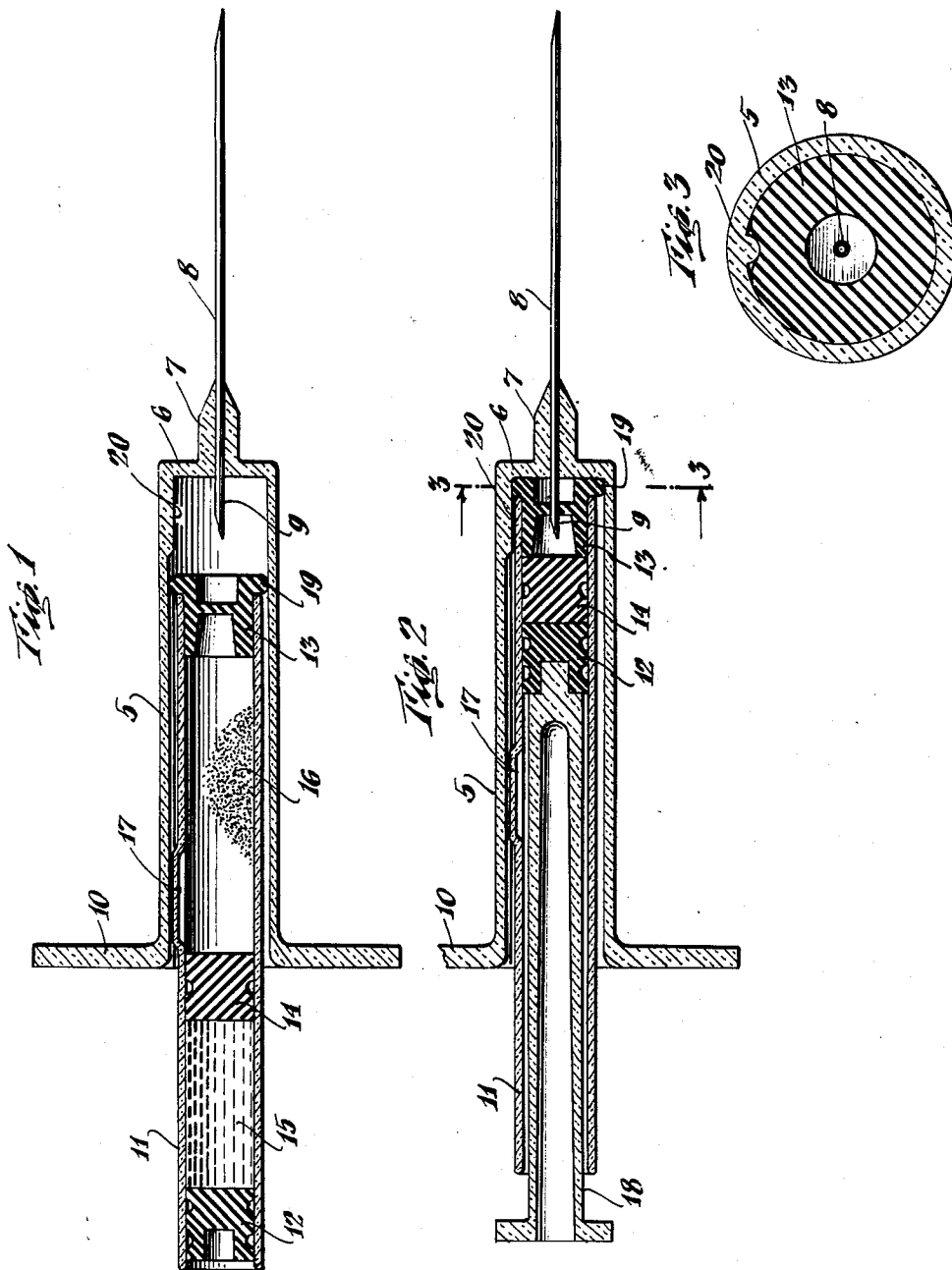
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SYRINGE ASSEMBLY

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## SYRINGE ASSEMBLY

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6 Claims. (Cl. 128—218)

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This invention relates to a structurally and functionally improved hypodermic syringe assembly.

It is an object of the invention to provide a structure of this nature in which, without difficulty, air may be vented from a syringe barrel as an ampule is fully projected into that barrel.

A further object is that of providing a structure by means of which this result may be accomplished and which structure may readily be furnished in an economical manner under quantity production procedure.

With these and other objects in mind reference is had to the attached sheet of drawings illustrating one practical embodiment of the invention and in which:

Fig. 1 is a sectional side view of an assembly in its initial position;

Fig. 2 is a similar view of that assembly showing the parts in their final position; and

Fig. 3 is a transverse sectional view in enlarged scale taken along the lines 3—3 and in the direction of the arrows as indicated in Fig. 2.

In these views the numeral 5 indicates the barrel of a syringe which may be formed of any desired materials such as a suitable plastic. This barrel has one end closed by a wall 6 from which a nose piece 7 may extend. A needle 8 which is double pointed is mounted by wall 6 and nose piece 7. Its inner end 9 extends within the bore of barrel 5. The opposite end of the barrel is open and may mount outwardly extending flanges 10 suitable for engagement with the fingers of the operator.

An ampule for use with this barrel may be formed of a piece of glass tubing 11. One end of this tube is closed by a piston type stopper 12. The opposite end may be closed by a pierceable stopper 13. Intermediate its ends ampule 11 mounts a stopper 14. Thus its body is divided into compartments, the rear one of which may receive a diluent of fluid 15 and the front one of which may receive medicament as indicated at 16. A by-pass in the nature of a groove 17 may be provided at a point beyond the initial position of stopper 14. The length of this by-pass is greater than the width of that stopper. All three stoppers of the assembly are conveniently formed of rubber or similar material.

As will be understood with an assembly of this nature a cap 18 may be initially mounted on nose piece 7 and enclose needle 8 to maintain the sterility of the latter. When the assembly is to be used an ampule 11 is introduced into the bore of the barrel as shown in Fig. 1. When needle

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end 9 has pierced cap 13 then stopper 12 is projected. Such projection occurs by the use of a suitable actuator which may comprise cap 18. In any event with stopper 12 moved to the right as viewed in Fig. 1, then stopper 14 will be similarly shifted to the zone of the by-pass 17. Therefore fluid may flow through that by-pass into the compartment containing the medicament 16. With all of the fluid transferred, stopper 12 will be adjacent stopper 14. The assembly may now be agitated to provide a proper medication solution between stoppers 13 and 14. Thereupon the epidermis may be punctured by needle 8 and under continued projection of the stoppers 12 and 14, the medicament will be injected.

In a unit such as this it is desirable that an aspirating action may occur. Such action will be useful, for example, in determining whether the needle is lodged in a vein or not. To secure an aspirating function there is provided adjacent the inner end of the ampule 11 a packing or piston which slidably contacts the inner face of the bore of barrel 5. Conveniently this piston may comprise an outwardly extending flange portion 19 of stopper 13. It is apparent that by simply withdrawing the ampule 11 to a slight extent from within barrel 5 a condition of sub-atmospheric pressure will be created within the space intervening stopper 13 and needle 9. Under these circumstances if the needle is lodged in a vein this will be evidenced by a drop or two of blood discharging from the inner end 9 of the needle. With such a construction it is, of course, apparent that as the ampule is projected within the barrel air will be vented through the bore of the needle. However, when the inner end 9 of the latter once embeds within stopper 13 then continued inward movement of the ampule will cause a condition of pressure between the stopper and wall 6.

In order to relieve this a by-pass structure is provided in proximity to wall 6 and the adjacent bore face of the barrel. This by-pass structure may take one of several different forms. However it is preferred that it embrace an inwardly extending rib 20. That end of the rib which extends toward the open end of the barrel presents an inclined edge portion. Thus as the ampule is projected to a point at which the inner end 9 of the needle penetrates stopper 13, the flange 19 or head of the stopper will ride onto this rib in the manner indicated in Fig. 3. This will furnish a space between the edge of the stopper head and the adjacent barrel surfaces. Through these spaces air may vent during the final stage

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of projection of the ampule. Therefore a simple structure is furnished which will prevent all difficulties incident to a pocketing of the air at the inner end of the barrel.

Thus, among others, the several objects of the invention as specifically aforementioned are achieved. Obviously numerous changes in construction and rearrangement of the parts might be resorted to without departing from the spirit of the invention as defined by the claims.

I claim:

1. A syringe assembly including in combination a barrel formed with an open end, a wall closing the opposite end of said barrel, a needle extending through said wall into the bore of said barrel, an ampule insertable through the open end of said barrel, means providing a piston carried by said ampule adjacent its end and having wiping engagement with the face of the barrel bore and means forming a part of said barrel in proximity to said wall and the adjacent bore portion to provide a passage for fluid flow past said piston as the latter is projected into the zone of said end wall.

2. A syringe assembly including in combination a barrel formed with an open end, a wall closing the opposite end of said barrel, a needle extending through said wall into the bore of said barrel, an ampule insertable through the open end of said barrel, means providing a piston carried by said ampule adjacent its end and having wiping engagement with the face of the barrel bore and means forming a part of said barrel in proximity to said wall and the adjacent bore portion to provide a passage for fluid flow past said piston as the latter is projected into the zone of said end wall; the length of the needle portion extending into said bore being less than the length of said passage.

3. A syringe assembly including in combination a barrel formed with an open end, a wall closing the opposite end of said barrel, a needle extending through said wall into the bore of said barrel, an ampule insertable through the

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open end of said barrel, a headed pierceable stopper having its peripheral edge extending outwardly from said ampule adjacent the end of the latter and having wiping engagement with the face of the barrel bore and means forming a part of said barrel in proximity to said wall and the adjacent bore portion to provide a passage for fluid flow past said piston as the latter is projected into the zone of said end wall.

4. A syringe assembly including in combination a barrel formed with an open end, a wall closing the opposite end of said barrel, a needle extending through said wall into the bore of said barrel, an ampule insertable through the open end of said barrel, means providing a piston carried by said ampule adjacent its end and having wiping engagement with the face of the barrel bore and a rib extending inwardly of said barrel bore in proximity to said wall, said rib engaging said piston means to provide a passage for fluid past the same as the latter is projected into the zone of said end wall.

5. In a syringe assembly a barrel formed with an open end, a wall closing the opposite end of said barrel, a needle extending through said wall into the bore of said barrel, and means forming an integral part of said barrel and disposed in proximity to said wall and the adjacent bore portion to provide a passage for fluid past a piston projectible into the barrel bore towards said wall.

6. In a syringe assembly a barrel formed with an open end, a wall closing the opposite end of said barrel, a needle extending through said wall into the bore of said barrel, and a rib forming an integral part of said barrel and extending into the bore of the same at a point adjacent said wall, said rib providing an edge portion to engage with piston material as a piston is projected through said barrel bore towards said wall.

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No references cited.