June 3, 1958 I. TASH 2,837,093

HYPODERMIC SYRINGE

Filed June 1, 1954

Fig. 2.

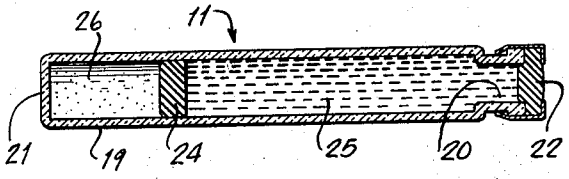


Fig. 1.

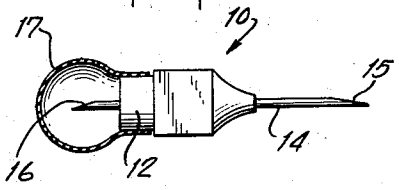
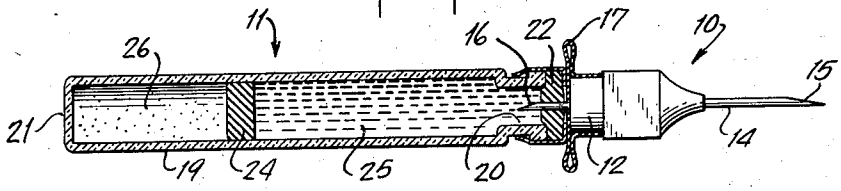


Fig. 3.



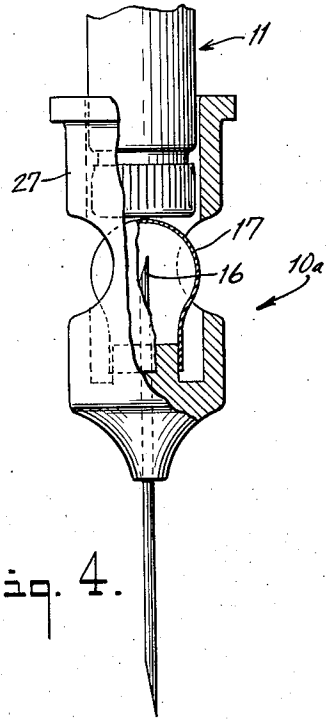
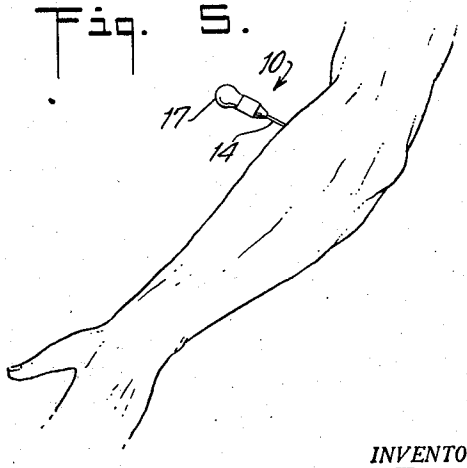


Fig. 4.

Fig. 5.



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HYPODERMIC SYRINGE

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4 Claims. (Cl. 128—218)

The present invention relates to hypodermic syringes and, more particularly, to an improved syringe and a needle assembly for the syringe primarily adapted for multiple injections, although suitable for single injections, and a method of administering such multiple injections.

Accordingly, an object of the present invention is to provide a hypodermic syringe including a needle having a point adapted to be inserted into the patient which point is permitted to remain in the patient while successively administering a plurality of injections, thereby eliminating the necessity of inserting a needle for each injection and sparing the patient of the shock, pain, and anxiety experienced with each needle insertion.

Another object is to provide such a syringe which facilitates detecting the insertion of the needle into a vein.

Another object is to provide such a syringe which greatly reduces the time required to administer multiple injections, this being an important factor where a large group of persons, such as school children or military personnel receive the injections.

Another object is to provide such a syringe which is simple and economical in construction.

A further object is to provide such a syringe which is constructed of cooperating parts which are expendable in whole or in part, whereby sterilizing of syringes or having on hand a large supply of more costly non-expendable syringes is eliminated or the sterilization of parts when intended to be re-used can be postponed after the entire group has been treated.

Other and further objects will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

In the drawing:

Fig. 1 is a longitudinal sectional view of a needle assembly in accordance with the present invention.

Fig. 2 is a longitudinal sectional view of a sealed package used in connection with the needle assembly.

Fig. 3 is a longitudinal sectional view of the needle assembly and the sealed package, illustrating the same as used to provide a syringe.

Fig. 4 is a side elevational view of a syringe, illustrating another embodiment of the invention.

Fig. 5 is a fragmentary perspective view illustrating the needle of the needle assembly inserted in the arm of a patient before applying the receptacle for the first injection or between successive injections.

Referring to the drawings in detail and, more particularly to Figs. 1, 2 and 3 thereof, a hypodermic syringe and the parts thereof are shown comprising a needle assembly **10** and a sealed package **11**.

The needle assembly (Fig. 1) comprises a body portion or plug **12**, and a hypodermic needle **14** extending through the plug and having points **15** and **16** at the respective ends thereof. The section of the needle formed with the point **15** extends outwardly beyond the plug a greater distance than the section of the needle formed with the point **16**, and serves as the portion of the needle which is inserted into a patient. The section of the needle within the plug is hermetically sealed therein, the plug being formed of rubber, rubber-like material, or other plastic material which facilitates forming such a seal.

As shown herein, a compressible bulb **17** has its skirt secured and hermetically sealed to the plug **12**, and encloses the section of the needle formed with the point **16** with its end wall closely adjacent the point **16**. The bulb is constructed of a relatively thin, flexible material, such as rubber or the like, which is adapted to be pierced by the point **16** and adapted to self-seal the passageway formed by the needle point when the needle is withdrawn. The advantages of this arrangement will be set forth herinafter.

The sealed package **11** (Fig. 2) comprises a receptacle **19**, herein shown as a tubular glass cartridge having an opening **20** at one end and an end wall **21** at the opposite end, a closure **22** for the opening constructed of a rubber-like material adapted to be pierced by a needle and self seal the passageway formed by the needle when the needle is withdrawn, a piston **24** slidably disposed in the cartridge, a liquid **25** to be injected disposed in the cartridge between the piston and the closure, and compressed gas **26** in the cartridge between the piston and the end wall **21**.

The needle assembly and the sealed package cooperate as a syringe (Fig. 3) when the needle point **16** is caused to pierce the bulb and the closure and extend into the cartridge, whereby the compressed gas acts on the piston to cause the latter to expel the liquid through the bore of the needle. When the needle point is withdrawn from the closure and the bulb, the bulb self-seals and encloses the point **16** to maintain the same sterile for further use.

The needle assembly shown herein is so inexpensively constructed that it may be advantageous to discard the same after an injection or a series of injections administered to one person, rather than to sterilize the same. The sealed package shown herein is of the type which contains a measured quantity of liquid sufficient for a single injection and thus is discarded after use thereof. However, other types of sealed packages are adapted to be used in connection with the needle assembly shown herein, for example, the sealed packages shown and described in my copending application for United States Letters Patent, Serial No. 433,579, filed June 1, 1954, which matured into Patent No. 2,794,437 on June 4, 1957, are suitable for such purpose.

In Fig. 4, a needle assembly **10*a*** is shown, which differs essentially from the needle assembly **10**, previously described, in that the body portion thereof includes a tubular end section **27** formed with a cup-like bore for receiving the closure end of the cartridge **11** and aligning the closure with respect to the needle point **16**, whereby manipulation of the syringe is facilitated. This tubular section may be formed integral with the plug **12** or may be a separate part secured thereto.

Preferably, the tubular section has recess means for receiving portions of the bulb **17** when the bulb is more or less flattened while the needle point extends through the closure. Such recess means are illustrated herein as side openings through which portions of the bulk are adapted to extend, whereby manual access to the bulb is made possible for the purpose to be described hereinafter.

The hypodermic syringe in accordance with the invention is adapted to be utilized to administer injections by inserting the needle point **15** into the patient, for example, into the arm of the patient, as shown in Fig. 5, prior to connecting the needle assembly to the sealed

package. Since in many cases it is imperative that the liquid be not injected into a vein, a quick determination to avoid such condition can be made by lightly compressing the bulb before inserting the needle into the arm and then allowing the bulb to expand to its original state after the needle point 15 has been inserted into the arm. If the needle has been inserted into a vein, blood will appear in the bulb 17, which is transparent and, accordingly, the needle must be inserted elsewhere into the patient. If the bulb 17 is free from blood, the point 15 has been properly inserted and the injection can be administered. Alternatively, in some cases it is desirable to inject the liquid into the blood stream, whereby a similar determination can be made to assure proper insertion of the point 15 by noticing blood or the lack of it at the transparent bulb 17.

The cartridge is then applied to the needle assembly, as shown in Figs. 3 and 4, and liquid is caused to be injected by the compressed gas acting on liquid through the piston. When the cartridge has been emptied or a desired amount thereof has been injected, the needle point 16 is withdrawn from the cartridge closure and the bulb, thus causing flow of the fluid to cease and enclosing of the point by the bulb.

In administering multiple injections, the needle point 15 is permitted to remain inserted as shown in Fig. 4 and another cartridge is applied to the needle assembly. While changing cartridges, the bulb encloses the needle point 16 and maintains the same sterile for further injections. The foregoing method of administering the liquid is extremely advantageous where two or more injections are performed in succession because time is saved by the single insertion of the needle and only one sterile needle is required for the series of injections. Also, this method is more comfortable to the patient because the fear, pain, shock and anxiety attendant with numerous insertions of the needle are eliminated.

After the injection or a series of injections has been completed, the needle is withdrawn from the patient.

From the foregoing description, it will be seen that the present invention provides an improved hypodermic syringe including a needle assembly therefor, which is simple and economical in construction, and a practical, less costly and time saving method of administering injections therewith.

As various changes may be made in the form, construction, and arrangement of the parts herein, without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matters are to be interpreted as illustrative and not in any limiting sense.

What is claimed is:

1. A hypodermic needle assembly comprising a body portion, a hypodermic needle extending through said body portion and having a point at each end thereof, a compressible bulb secured to said body portion and enclosing one of said needle points, said bulb being constructed of a flexible, transparent material adapted to be squeezed and released so as to aspirate fluid when the other of said needle points is injected into a patient, and a tubular section in said body portion adjacent said bulb.

2. A needle assembly according to claim 1, wherein said tubular section has side recess means adjacent said bulb for receiving portions of said bulb.

3. A hypodermic syringe comprising, in combination, a receptacle for containing a liquid under pressure to be dispensed therefrom and having an opening, a closure for said opening constructed of a material adapted to be pierced by a needle and self-seal the passageway formed by the needle when the needle is withdrawn, a needle assembly arranged for abutting engagement with the closure of said receptacle including a body portion, a hypodermic needle extending through said body portion and having a point at each end thereof, a compressible bulb secured to said body portion and enclosing one of said needle points, said bulb being constructed of a flexible material adapted to be pierced by said needle point it encloses and adapted to self-seal the passageway formed by the needle when the needle point is withdrawn, whereby, when said needle point enclosed by said bulb is caused to pierce said bulb and said closure, liquid is forced through said needle and the flow of liquid is stopped by withdrawing the needle point from said closure and said bulb, and a tubular section in said body portion adjacent said bulb formed with a cup for receiving the end of said receptacle provided with said closure.

4. A syringe according to claim 3, wherein said tubular section has side recess means adjacent said bulb for receiving portions of said bulb.

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