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M. L. LOCKHART

2,586,068

SYRINGE ASSEMBLY

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Fig. 1

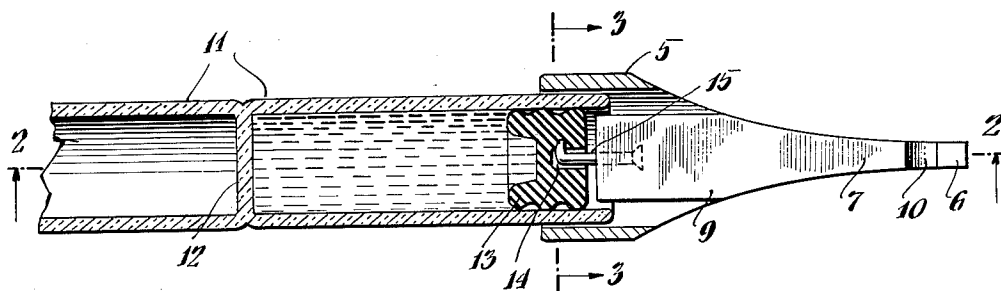


Fig. 2

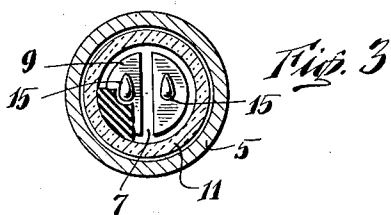
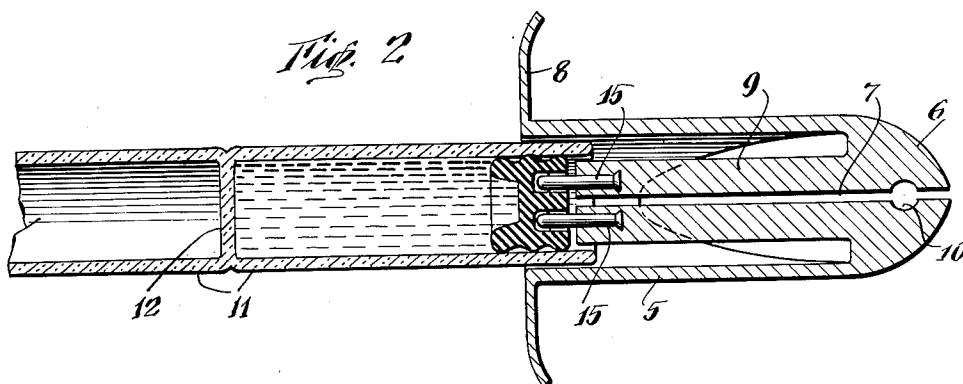
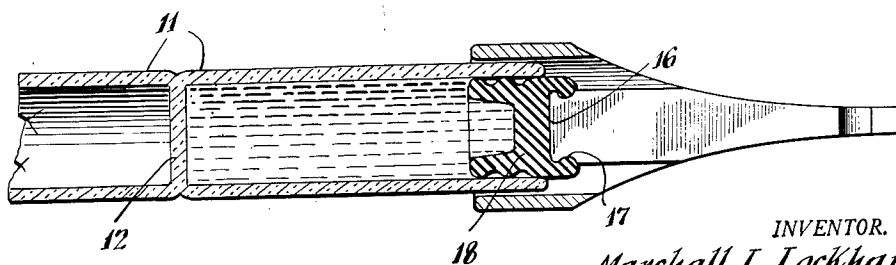


Fig. 4



INVENTOR.
Marshall L. Lockhart
BY Duell and Kane

ATTORNEYS

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SYRINGE ASSEMBLY

Marshall L. Lockhart, Rutherford, N. J.

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4 Claims. (Cl. 128—220)

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This invention relates to a structurally and functionally improved syringe assembly and in its more specific aspects aims to provide an assembly for use in hypodermic injections and by means of which it will be possible to provide for an aspirating function.

This application is a continuation in part of my prior application for United States Letters Patent, Serial No. 658,670 entitled "Closure" and filed in the Patent Office on April 1, 1946, now Patent No. 2,556,331, dated June 12, 1951.

Among objects of the present invention are those of providing a structure by means of which aspiration may be accomplished and which structure will embody relatively few parts each individual, simple and rugged in design and capable of manufacture and assembly at nominal cost; the syringe functioning with freedom from all difficulties and requiring in its use no special skilled technique.

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

Fig. 1 is a sectional side view of a syringe assembly;

Fig. 2 is a longitudinal sectional view taken along the lines 2—2 and in the direction of the arrows as indicated in Fig. 1;

Fig. 3 is a transverse sectional view taken along the lines 3—3 and in the direction of the arrows as also indicated in Fig. 1; and

Fig. 4 is a view similar to Fig. 1, but showing an alternative form of structure.

In these views the numeral 5 indicates a holder for an ampule and which in the embodiment illustrated is conveniently formed of metal. This holder may be provided with a nose portion 6 defined by a pair of similar sections separated by a slot 7. The rear of the holder may have associated with it a finger rest 8. Extending inwardly of the tubular body is a thrust portion 9. As will be understood, a needle (not shown) which is double ended, is disposed in the slot 7 with, for example, a manipulating portion positioned within recess 10 in order to prevent axial displacement of that needle. The outer needle end will, in the usual manner puncture the epidermis. The inner needle end will extend beyond the surface of thrust portion 9.

The medicament to be injected is contained within an ampule conveniently formed of glass. This ampule as shown may embrace a double ended body 11, the center of which is closed by a partition 12 and the outer ends of which are

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closed by stoppers 13 of the piston type. It is apparent that only one end or compartment of the ampule need be filled with medicament; the opposite end serving as a manipulative portion. If both compartments are filled, then upon the exhausting of one compartment and the disassociation of that end of the ampule from the holder, the former may be reversed to permit of an expulsion of the medicament within the second compartment. This is accomplished by inserting that end of the ampule which is to be discharged into the bore of the barrel until the inner end of the needle or cannula penetrates the adjacent stopper 13 and extends in communication with the body of the medicament. Thereupon, if the ampule is projected into the holder the thrust portion 9 will bear against the stopper and move the latter inwardly of the ampule bore. Under these circumstances the stopper functions as a piston and the medicament is expelled through the bore of the needle.

In certain circumstances it is necessary for the physician or operator to know whether the epidermis-penetrating end of the needle has been lodged in a vein or not. To obtain this result in the present assembly, it is necessary that the piston stopper 13 be moved outwardly of the ampule bore. This will result in a decrease of the pressure within the compartment of the ampule adjacent the thrust portion. In certain instances this aspiration may even result in the creation of a sub-atmospheric pressure condition within that compartment. In either event, blood will be free to flow through the bore of the cannula (if the needle is lodged in the vein) and the physician or attendant will observe that one or two drops of the blood are discharged from the inner end of the needle.

According to the present invention, the desired results are achieved by providing structures which will effect an automatic coupling between the thrust portion and stopper as the ampule is inserted into the holder. In Figs. 1 to 3 the structure embraces a pair of recesses 14, formed in the outer face of the stopper and a pair of hook shaped projections 15 extending from the inner face of the thrust portion and of a size such that they may enter the recesses. Accordingly, it is apparent that such stopper is brought to a position adjacent the thrust portion and with the entry of the projections 15 into the recesses, an engagement of the surfaces of the latter occurs. This engagement will couple the stopper with the thrust portion. Accordingly, the physician using this assembly and effecting venal penetration with

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the outer end of the needle may confirm that penetration. He will do this by simply retracting the ampule 11 with respect to the holder to reduce the pressure within the ampule compartment. If the needle is in the vein, a drop or two of blood will discharge from the inner needle end.

The same result is achieved by the structure shown in Fig. 4 in which the inner end of the thrust portion is grooved as indicated at 16 to furnish a headed portion 17. The stopper 18 has its outer face formed with a recess which is undercut and of a size such that it will firmly embrace the head 17 of the thrust portion and bore within the groove 16 at the base of the same. With the ampule inserted the parts will automatically couple. That coupling will be effective to permit of the retraction of the ampule from the holder with consequent retraction of the piston stopper towards the outer ampule end to accomplish the desired result.

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. In a syringe assembly in combination a tubular holder, a thrust portion forming a part of said holder and extending into the bore thereof, an open ended ampule of a diameter such that it is insertible into the holder bore, a stopper sealing the open ampule end and engageable with said thrust portion to be projected thereby as a piston into the ampule and means forming a part of said stopper and thrust portion to automatically couple the former for withdrawal by the latter from the ampule as said thrust portion engages said stopper.

2. In a syringe assembly in combination a tubular holder, a thrust portion forming a part of said holder and extending into the bore thereof, an open ended ampule of a diameter such that it is insertible into the holder bore, a stopper sealing the open ampule end and engageable with said thrust portion to be projected thereby as a piston into the ampule, a coupling element forming a part of said thrust portion and extending beyond the end of the same, said element including an axially extending inner portion and a laterally extending outer portion and the outer face of said stopper being formed with a recess the base of which is enlarged to provide a cou-

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pling element cooperating with said laterally extending portion whereby said elements will automatically couple to allow withdrawal of the stopper from the ampule as said thrust portion engages said stopper and the coupling elements automatically engage.

3. In a syringe assembly in combination a tubular holder, a thrust portion forming a part of said holder and extending into the bore thereof, an open ended ampule of a diameter such that it is insertible into the holder bore, a stopper sealing the open ampule end and engageable with said thrust portion to be projected thereby as a piston into the ampule, a hook shaped projection extending outwardly from the end of said thrust portion and the outer face of said stopper being formed with a recess into which said projection will extend as said stopper engages said thrust portion.

4. In a syringe assembly in combination a tubular holder, a thrust portion forming a part of said holder and extending into the bore thereof, an open ended ampule of a diameter such that it is insertible into the holder bore, a stopper sealing the open ampule end and engageable with said thrust portion to be projected thereby as a piston into the ampule, a relatively enlarged headed portion at the end of said thrust portion and said stopper being formed with a recess in its outer face which recess has its base portion enlarged to receive and couple with said headed portion.

MARSHALL L. LOCKHART.

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