July 11, 1950 M. L. LOCKHART 2,514,883

HYPODERMIC SYRINGE

Filed Oct. 24, 1946 2 Sheets-Sheet 1

Fig. 1.

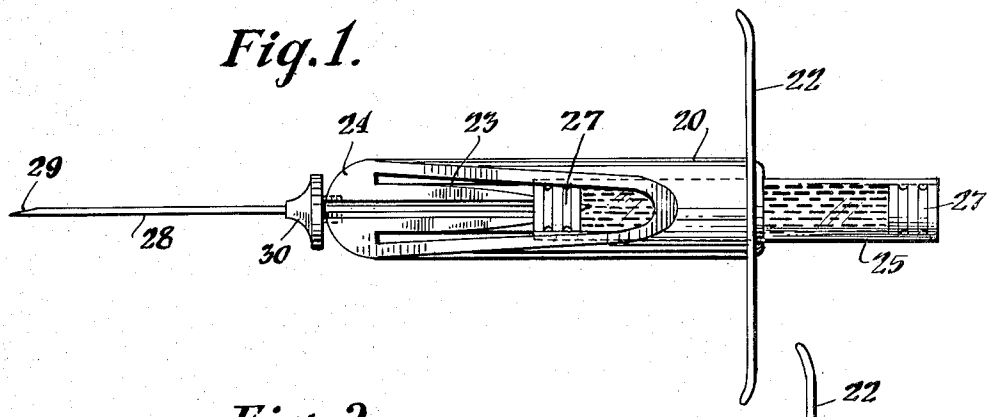


Fig. 2

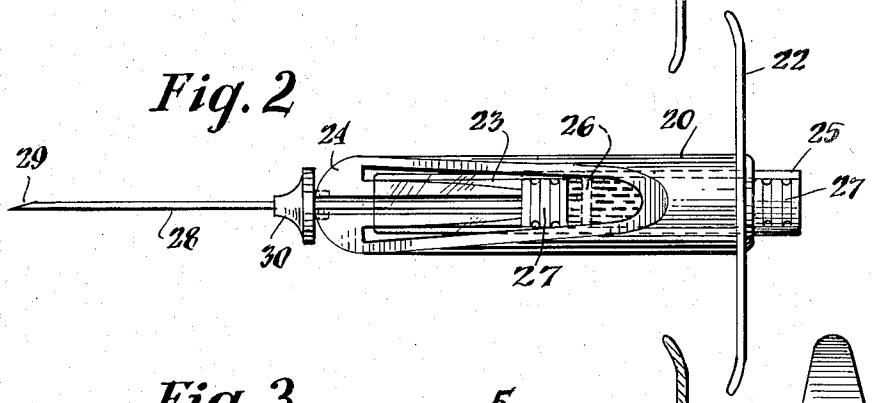


Fig. 3

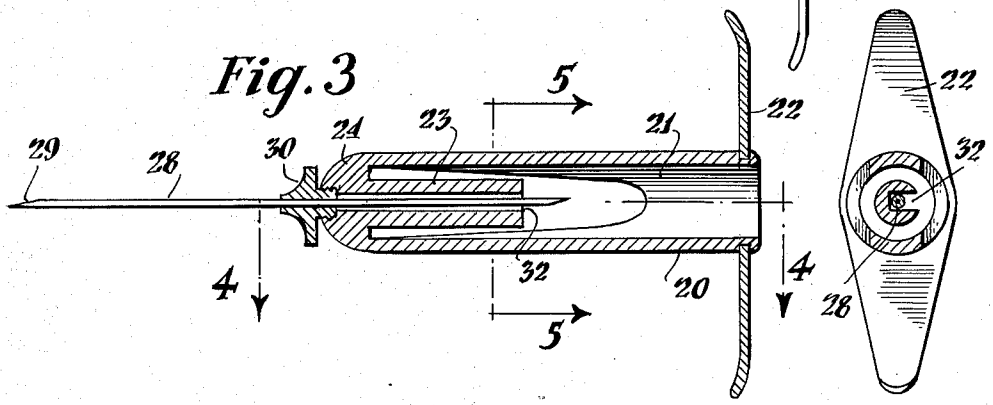


Fig. 4.

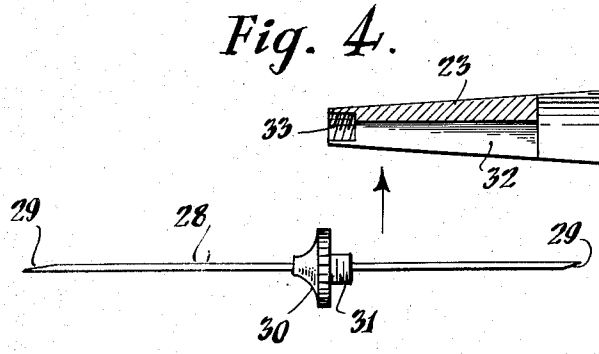


Fig. 5.

INVENTOR.
Marshall L. Lockhart
BY Duell and Kane

ATTORNEYS

July 11, 1950 M. L. LOCKHART 2,514,883

HYPODERMIC SYRINGE

Filed Oct. 24, 1946 2 Sheets-Sheet 2

Fig. 6

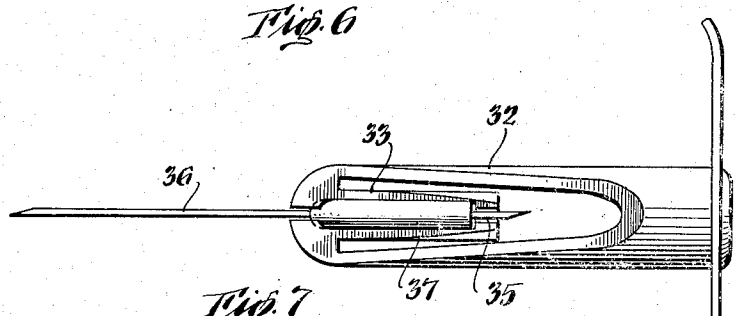
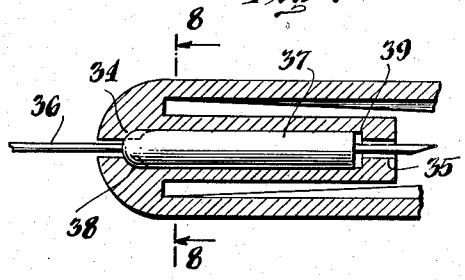


Fig. 7



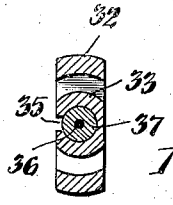


Fig. 8

Fig. 9

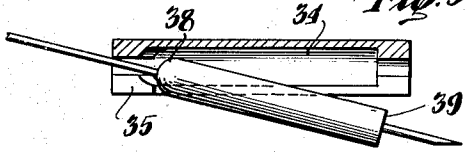


Fig. 10

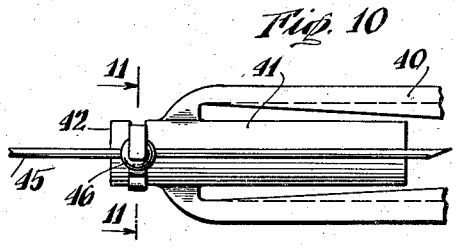


Fig. 13

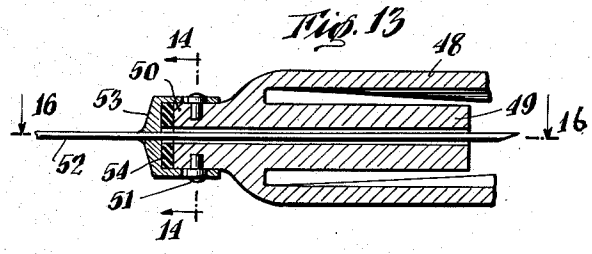


Fig. 11

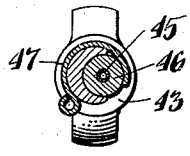


Fig. 12

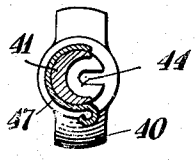


Fig. 15

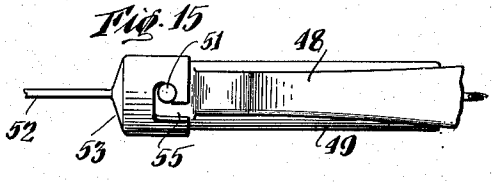


Fig. 14

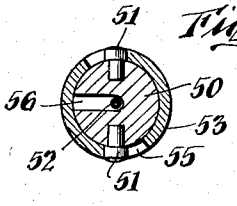
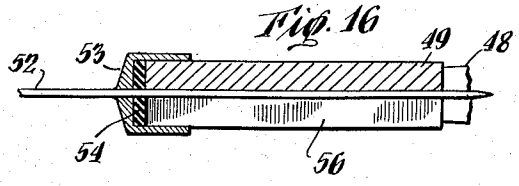


Fig. 16



INVENTOR.
Marshall L. Lockhart
BY Duell and Kane

ATTORNEYS

Patented July 11, 1950 2,514,883

UNITED STATES PATENT OFFICE

2,514,883

HYPODERMIC SYRINGE

Marshall L. Lockhart, Rutherford, N. J.

Application October 24, 1946, Serial No. 705,299

2 Claims. (Cl. 128—220)

1

This invention relates to a structurally and functionally improved hypodermic syringe and in its more specific aspects aims to provide a unit of this character which is used in conjunction with an ampule acting as a medicament container.

It is an object of the invention to provide an apparatus of this type embracing a holder and needle of improved design, which are constructed in a manner such that—with the use of only simple skill—they are readily capable of proper cooperation. When connected, an extremely rigid and desirable unit will be provided and in which any danger of an accidental detachment of the parts occurring will be substantially precluded.

Another object is that of providing a hypodermic syringe assembly with which a medicament-containing ampule may readily cooperate to permit of an expressing of all or part of the contents of the ampule through the cannula of the syringe.

Still another object is that of providing an apparatus embracing both a hold and needle and which parts will be capable of quantity manufacture and will operate over long periods of time with freedom from all difficulties.

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

Fig. 1 is a side elevation of a hypodermic syringe showing an ampule in association therewith;

Fig. 2 is a similar view showing the ampule in fully projected position;

Fig. 3 is a sectional side view of the syringe as illustrated in Fig. 1;

Fig. 4 is a longitudinal section taken along the lines 4—4 and in the direction of the arrows as indicated in Fig. 3, such figure moreover showing the needle separated from the holder proper;

Fig. 5 is a transverse sectional view taken along the lines 5—5 and in the direction of the arrows as indicated in Fig. 3;

Fig. 6 is a view similar to Fig. 1 but showing an alternative form of construction;

Fig. 7 is a somewhat enlarged fragmentary sectional view of the unit as shown in Fig. 6;

Fig. 8 is a transverse sectional view taken along the lines 8—8 and in the direction of the arrows as indicated in Fig. 7;

Fig. 9 is a longitudinal fragmentary section showing the needle partially dismounted;

Fig. 10 illustrates an alternative form of construction; showing the forward portion of the holder and a part of the needle;

2

Fig. 11 is a transverse sectional view taken along the lines 11—11 and in the direction of the arrows as indicated in Fig. 10;

Fig. 12 is a view similar to Fig. 11 but showing the parts adjusted to a different position;

Fig. 13 is a view similar to Fig. 7 but showing a still different form of construction;

Fig. 14 is a transverse sectional view taken along the lines 14—14 and in the direction of the arrows as indicated in Fig. 13;

Fig. 15 is a fragmentary elevation of the device as shown in Fig. 13; and

Fig. 16 is a sectional view of the parts as shown in Fig. 15, the section being along lines 16—16 and in the direction of the arrows as shown in Fig. 13.

Primarily referring to Figs. 1 to 5, it will be seen that the reference numeral 20 indicates the body of the holder which may be formed of suitable metal and presents a cylindrical ampule-receiving chamber or space 21. A finger-contacting portion in the form of a wing plate 22 may be disposed at the rear end of the body 20. A thrust portion 23 extends into the chamber 21 and merges with the body adjacent its outer end in the form of what might be termed a nose portion 24. As is apparent, from a consideration of these views, the thrust portion is spaced from the inner face of the body 20 to a substantial extent. Accordingly, a wall of an ampule may be received in this space.

As illustrated in Figs. 1 and 2, the ampule may conveniently take the form of a cylindrical body 25 having a central partition 26. Stoppers 27 close the outer ends of the compartments thus formed in the ampule. The body 25 may be formed of any suitable material such as plastic or glass but the stoppers are preferably formed of rubber. The bore of the ampule receives the medicament to be expressed or expelled from the syringe. The external diameter of the body 25 is such that it may readily be received and projected within the bore of the holder 21. Its internal diameter is in excess of that of the thrust portion 23.

A tubular needle body 28 as shown in Fig. 4 has its opposite ends pointed as indicated at 29. A knurled nut 30 is firmly affixed to the needle body 28. A screw-threaded boss 31 conveniently extends from the nut 30 in the direction of the rear point of the needle. The nose portion 24 of the holder as well as the thrust portion 23 thereof are longitudinally grooved as indicated

at 32. The width of this groove is substantially in excess of the diameter of the needle 26. Adjacent its outer end, the groove is interrupted by a threaded socket portion 33, the threads of which correspond to the threads of the element 31.

Thus, it is obvious when the parts are to be connected, the needle is moved laterally as indicated in Fig. 4 in the direction of the holder and the rear portion of this needle is disposed within the groove 32. Thereupon, the needle is rotated and axially shifted by turning, for example, the knurled portion 30. This will have the result that the threads of the element 31 will engage with the threads in the socket 33. Consequently, the needle will be shifted axially. With such shifting the pointed rear or inner end 29 of the needle will be brought to extend to a position beyond the thrust portion 23. Simultaneously, the parts will be locked against movement.

Now, if an ampule is introduced into the holder as shown in Fig. 1, an initial projection of the same will cause the inner pointed end 29 of the needle to pierce the left-hand stopper 27 as shown in that figure. Under such circumstances, the thrust portion 23 will engage the outer face of this stopper as also shown in this figure. Continued projection on the part of the ampule will result in the plug or stopper 27 engaged by the thrust portion moving inwardly of the ampule to, for example, the position shown in Fig. 2. Under such movement, it is obvious that the plug will function as a piston to express the medicament contained within the ampule through the bore of the needle. With the medicament discharged from one end or compartment of the ampule, the latter may be withdrawn from the holder and reversed so that the entire operation may be repeated.

In the form of construction shown in Figs. 6 to 9 inclusive, the numeral 32 indicates a holder substantially identical in construction with the holder heretofore described. However, in this holder the thrust portion 33 is formed with a recess or channel 34 of a substantial diameter. This channel is in communication with a laterally extending groove or slot 35. A needle 36—double pointed as in Fig. 4—carries an enlargement 37, the outer end of which may be rounded as indicated at 38, its rear end extending in a plane perpendicular to the needle axis as indicated at 39. The overall length of the enlargement 37 should be just less than the overall length of the chamber 34.

Assuming that the needle is detached from the holder and it is desired to associate these parts one with the other, it will be understood that the needle is generally moved in a lateral direction towards the holder as shown in Fig. 9. To this end, the body 36 of the needle will pass through the groove or slot 35 until the rounded forward end 38 of the enlargement rests within the chamber 34. Thereupon, by swinging the rear or inner end of the needle towards the holder, it will be found that the rounded end portion 38 will enter the countersunk outer end of the recess or chamber 34. Under such circumstances, the squared or equivalent end portion 39 of the enlargement may be swung to the position shown in Figs. 6 and 7. Thus, the rear face 39 will lie adjacent the corresponding end wall of the chamber 34. Therefore, the needle will, in effect, be locked against lateral displacement with respect to the holder. As will be appreciated, an ampule may be associated with this holder in the same manner as heretofore described in connection with

the structures of Figs. 1 to 5. The dispensing of medicament through the bore of the needle will also follow the procedure heretofore outlined.

The hypodermic syringe illustrated in Figs. 10, 11, and 12 also functions in the same manner in so far as dispensing of medicament is concerned as the heretofore described structures. However, as will be noted in these views, the holder which has been indicated by the numeral 40 is formed with a thrust portion 41 projecting as at 42 beyond the nose proper or outer end of the holder. The abutment and holder are formed with a longitudinally extending groove in their side faces, which groove is enlarged to provide a recess portion 44. A hollow needle 45 may mount a spherical enlargement or similar portion. This needle is shifted laterally toward the holder so as to occupy the afore-mentioned groove and the enlargement 46 is positioned within the recess 44.

In line with the recess 44, the projecting portion 42 is formed with a groove 43. A locking element or ring-shaped member 47 rides within this groove. It will also be observed that the enlargement 46 is preferably of a larger diameter than the recess 44. Therefore, and as shown in Fig. 11, if the enlargement is disposed within that recess to full extent, a portion of its body will extend into the groove 43. Therefore, as the split locking ring 47 is rotated the latter will ride over the enlargement as again indicated in Fig. 11. Consequently, a yielding restraining force will be exerted upon the enlargement which will serve to maintain the portion of the needle 45 disposed within the groove formed in the holder and thrust portion 41 against displacement. Thus, the needle is maintained as a fixed unit with respect to the holder. At the same time, a ready detachment or separation of these parts may be effected.

The same is true of the structure shown in Figs. 13 to 16 inclusive. In these views, the numeral 48 indicates the holder provided with a thrust portion 49. This thrust portion is continued in the form of a projecting part 50 beyond the outer end of the holder proper. Such extended part may carry pins 51 or otherwise present equivalent projections which may be received within openings of a cap 53 carried by the needle 52. These openings, as shown especially in Fig. 15, may be in the nature of bayonet slots 55. A liner or cushion of resilient material 54 is preferably disposed in the inner face of the cap portion 53.

Again in this form of construction, the thrust portion 49 and the holder parts adjacent thereto are formed with a laterally extending slot or groove 56. Therefore, a needle to be associated with the holder may be moved inwardly and laterally of the same. After such movement and with the cap 53 in line with the extension 50, the slots 55 may be brought into registration with the pins or projecting portions 51. Thereupon, the entire needle assembly is shifted axially. Consequently, the cap will embrace the outer end portion of the extension 50 and the outer face of that extension will be engaged by the resilient liner 54. The latter will compress slightly and therefore the projections 51 will ride within the slot and, in effect, lock the cap against accidental displacement. As is apparent, the technique of associating an ampule with a holder of the latter type and in dispensing the medicament will be the same as heretofore described.

It will be observed that by means of the constructions herein illustrated and described, a

hypodermic syringe assembly is provided in which a holder and thrust portion are each provided with a continuous passage which may, if desired, intersect somewhat enlarged recesses. This passage is in the form of a slot or groove within which the needle may be disposed by lateral movement with respect to the holder. Substantially simultaneously with such disposition an axial movement of the parts with respect to each other, as in Figs. 1 to 9 and 11 to 16 inclusive, results in such parts, in effect, being secured against further and accidental movement. Therefore, a structure is provided in which the operator need have no fear that an accidental detachment of the parts will occur. At the same time, a deliberate manipulation of these parts will permit of ready separation of the same.

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

I claim:

1. A hypodermic syringe including a base formed with an opening through which an ampule may be longitudinally inserted, an open-sided body presenting an ampule-receiving chamber aligned with said base opening, a needle-mounting portion forming a part of said body at the end thereof opposite said base, said mounting portion being formed with a screw-threaded recess in its outer end whereby a similarly threaded portion mounted by a needle may be received within said recess to retain the needle against movements with respect to said portion, a thrust portion extending from said mounting portion towards said base, inwardly of said chamber, and in spaced relationship to the adjacent inner faces of said body, and said screw threaded recess and thrust portion being formed with communicating aligned slots whereby a needle may be moved laterally through the open side of said body to occupy a position within said slots and may thereafter be axially shifted and rotated to cause its threaded portion to enter and engage with the threads of said recess.

2. A hypodermic syringe including in combination a tubular body formed with an open side face, a single nose portion closing one end of said body, the opposite body end being open, a thrust portion extending within the bore of the body from said nose portion in the direction of the open body end and being spaced from the inner face of said body, said nose and thrust portions being formed with a slot in line with the open side face of said body and which slot extends substantially to the body axis, said nose portion terminating in an outwardly extending screw-threaded socket having its wall interrupted by said slot, a nut, a screw-threaded boss extending from said nut, a double ended needle extending through said nut and boss and said needle being laterally movable into said slot and thereafter axially rotatable and shiftable to cause the thread of said boss to engage with the thread of the socket to support the needle by the nose portion with the nut and one needle end extending beyond said nose portion and the opposite end lying within said slot and extending beyond said thrust portion.

MARSHALL L. LOCKHART.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,008,078	Schroeder	Nov. 7, 1911
1,623,403	Friel	Apr. 5, 1927
1,624,327	Friedman	Apr. 12, 1927
1,848,711	Hall	Mar. 8, 1932
2,153,594	Saffir	Apr. 11, 1939
2,410,351	Lockhart	Oct. 29, 1946
2,448,898	Lockhart	Sept. 7, 1948