Sept. 7, 1948. M. L. LOCKHART 2,448,898

HYPODERMIC NEEDLE

Filed April 21, 1945

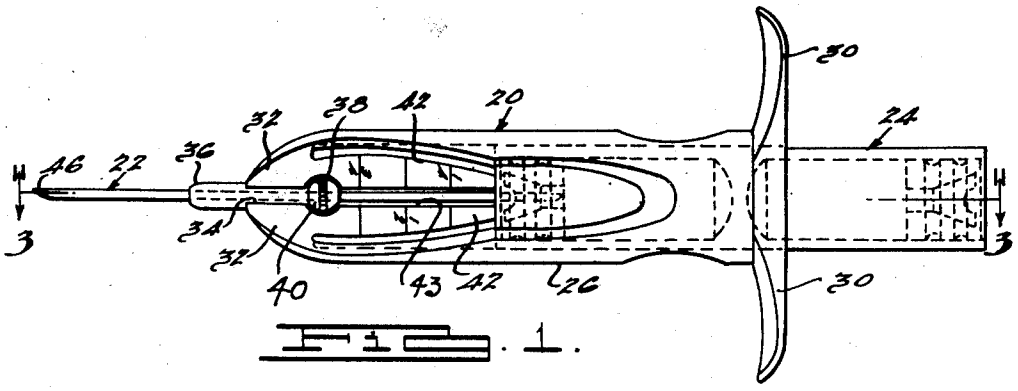


Fig. 1.

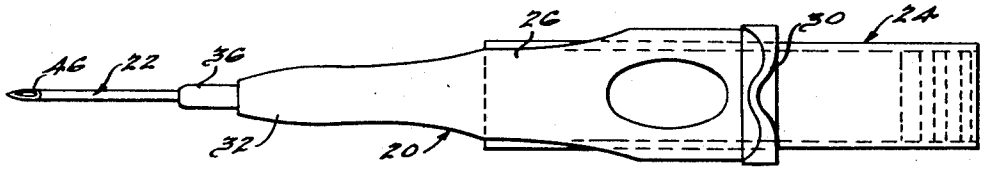


Fig. 2.

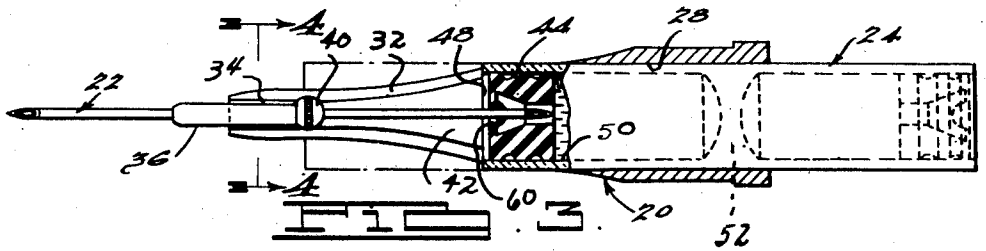


Fig. 3.

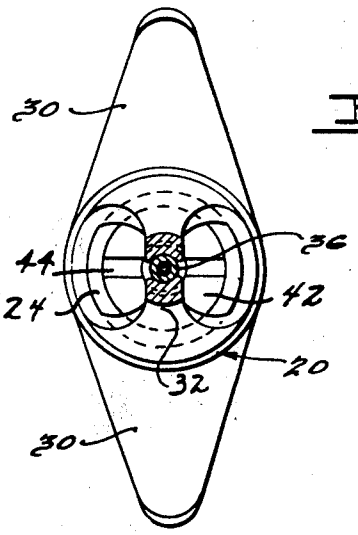


Fig. 4.

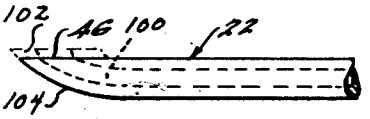


Fig. 5.

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HYPODERMIC NEEDLE

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Application April 21, 1945, Serial No. 589,563

1 Claim. (Cl. 128—215)

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This invention relates to hypodermic needles and has particular reference to a needle useful in the hypodermic syringe disclosed and claimed in my prior copending application Serial No. 556,737, for "Hypodermic syringes," filed October 2, 1944, of which the present application constitutes a continuation in part.

Principal objects of the invention are to provide:

A new and improved hypodermic needle;

A double-ended, hollow hypodermic needle;

A hypodermic needle which is of such construction that it may be inexpensively made on a production basis and sold at a price which makes it economically feasible to discard a needle after a single use so as to eliminate the necessity for resterilizing used needles.

Other and further objects of the invention will be apparent from the following description and claim and will be understood by reference to the accompanying drawings, of which there is one sheet, which, by way of illustration, show a preferred embodiment and the principles thereof and what I now consider to be the best mode in which I have contemplated applying those principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claim. I also contemplate that of the several different features of my invention, certain ones thereof may be advantageously employed in some applications separate and apart from the remainder of the features.

In the drawings

Fig. 1 is a side elevational view illustrating an embodiment of the invention and the manner of using the same in the hypodermic syringe;

Fig. 2 is a side elevational view of the device as illustrated in Fig. 1;

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 1;

Fig. 4 is a cross sectional view taken along the line 4—4 of Fig. 3; and

Fig. 5 is an enlarged fragmentary view of one end of the needle.

Referring now to Figs. 1 to 4 wherein there are illustrated a hypodermic syringe including an ampule and a needle embodying the invention, the syringe comprises in general a holder 20, a needle 22, and an ampule 24. The holder comprises a body including a tubular part 26, the interior of which forms a guide and holder 28 in which the ampule 24 is received and in which it is axially slidable, the guide 28 being open at its back or upper end so as to permit the convenient insertion of the ampule therein and removal therefrom.

Wings 30 project laterally from the tubular

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part 26 at the rear thereof so as to provide finger rests and form a means by which the holder may be held by the fingers with the part 26 arranged therebetween. The tubular part 26 is relieved at its sides as illustrated in Figs. 1 and 2 and bifurcated so as to form a pair of fingers or arms 32.

The holder preferably is made of metal having a certain amount of spring to it so that the fingers or arms 32 may be displaced relative to each other in order to insert and mount the needle 22 therein. The opposed faces 34 of the fingers 32 are appropriately curved to form a seat for receiving the cylindrical shank 36 of the needle 22 the diameter of the shank 36 being slightly greater than the normal clearance between the cylindrical faces 34, it follows that the spring tension of the fingers 32 will clamp the shank 36 of the needle firmly between the faces 34. The shank 36 comprises a tubular sleeve having a knurled ball-shaped head 40 suitably affixed to the tube of the needle, such for example as by a press fit or by staking.

Rearwardly of the faces 34 the arms 32 are notched as indicated at 38 to form a space for accommodating the head 40 on the shank 36. The head 40 forms a thrust member which cooperates with the edges of the notch 38 on the arms 32 so as to take the thrust of the needle 22.

The arms 32 have projecting toward the rear end of the holder thrust members 42 which cooperate with the stopper 44 in the ampule 24 for displacing such stopper into the ampule as the same is telescopically moved relative to the holder 20 toward the needle end thereof. The space between the thrust members 42 and the sides of the holder 20 is shaped so as to accommodate the tubular wall of the ampule 24 as it is pushed toward the needle end of the holder 20. The thrust members may be provided with graduations for indicating the percentage of the contents of the ampule which have been discharged therefrom as the same is moved toward the needle end of the holder. The thrust members 42 and the faces 34 are separated by a slot 43 so that when the ampule 24 is separated from the holder, the needle 22 may be arranged in the holder without contaminating either end of the needle.

The needle 22 may be formed of hollow stainless steel tubing and is provided with a passage therethrough and has its ends 46 pointed so as to facilitate the penetration of the needle into the skin and also through the stopper 44 of the ampule. The end of the needle 22 which projects rearwardly toward the back end of the holder 20 extends beyond the ends of the thrust members 42 so that it may penetrate the stopper 44 of an ampule, as illustrated in Fig. 3, when the ampule is advanced toward the needle end of the holder 20. The back ends 48 of the thrust

members 42 are flat and adapted to form a seat for the outer face of the stopper 44. Further movement of the ampule 24 to the left (Fig. 3) will engage the outer face of the stopper 44 with the seat 48, and further movement of the ampule 24 toward the needle end of the holder 20 will cause the stopper 44 to function as a piston and slide within the bore 50 of the ampule so as to displace the contents of the bore 50 through the needle 22.

The ampule 24 as shown comprises a cylindrical body which may be formed of a suitable material so as to provide bores or chambers 50 separated by integral partition 52, the bores or chambers 50 being closed by stoppers 44. The stopper 44 preferably comprises a body of wax-impregnated rubber or other suitable resilient material. This material, as well as that of which the ampule 24 is made, must be such so that it will not chemically react with the medicament with which the bores 50 are charged nor permit the deterioration thereof therein.

The stopper 44 is hollow so that the end of it forms a membrane having a thick central portion 60 at the center through which the end of the needle 22 extends. The membrane forms a flexible end wall for the stopper 44 while the thick central portion 60 provides for a good frictional grip around the needle as well as a good seal between the needle and the stopper 44. Upon withdrawal of the needle from the membrane, the frictional grip between the part 60 and the needle will cause the membrane to bulge outwardly, so to speak. With this construction, after the inner end of the needle 22 has penetrated the membrane part 60, an aspirating effect may be obtained by withdrawing the ampule 24 slightly toward the back of the holder 20. This construction also insures that the needle will be cleaned out or cleared when the needle is withdrawn from the stopper 44 due to the flexing of the membrane and the consequent reduction in pressure in the cylinder bore 50.

When the ampule 24 is removed from the holder 20, the needle 22 may be removed from the holder 20 for sterilization or other purposes. This may readily be accomplished by pressing laterally on the shank 36 of the needle which projects forwardly of the arms 32 so as to tilt the needle 22 and its shank transversely of the holder so as to remove the shank 36 from its seat in the faces 34. Thereafter, the needle may be readily slid out from between the faces 34.

Particular attention is directed to the fact that the shank 36 of the needle provides a means by which the needle may be held when it is inserted in and removed from the holder 20. Since the thrust members 42 and the arms 32 are spaced by the slot 43 therebetween, the end of the needle which penetrates the stopper 44, as well as the end of the needle which penetrates the skin, may be maintained in a sterile condition as the needle can be inserted in the holder 20 without contaminating either end of the needle 22.

The needle may embody the construction as illustrated more partcularly in Fig. 5 in which it will be seen that the passage 100 through the needle opens at the side of the needle rather than at the end thereof. This construction is made by bending the tubing out of which the needle is made as indicated in dotted lines at 102 and then grinding or cutting off that part 102 which projects beyond the periphery of the main part of the needle 22 so that the opening in the end

of the needle is in the side thereof, rather than in the end thereof. This also provides a curved surface 104 on the end of the needle opposite the opening at the end of the passage 100 which facilitates the penetration of the needle into the skin. In other words, the side of the needle in which the end of the passage 100 terminates is cylindrical in nature, while the opposite side has a surface corresponding generally with the segment of a torus which merges into the cylindrical side in which the opening at the end of the passage is provided.

While I have illustrated and described a preferred embodiment of my invention, it is understood that this is capable of modification and I therefore do not wish to be limited to the precise details set forth but desire to avail myself of such changes and alterations which fall within the purview of the following claim.

I claim:

In combination a hypodermic syringe including a holder comprising a pair of substantially parallel and spaced jaws connected to each other to yieldingly resist separation, adjacent inner faces of said jaws being transversely curved to present longitudinally extending channels and each of said faces being interrupted by a notch which, in the different jaws, are aligned to provide a common opening, a needle including a straight cannula and a manipulating and mounting portion therefor disposed intermediate the ends of said cannula, said cannula having a piercing point at least at one of its ends, said portion including a cylindrical shank of constant diameter and which shank is of greater diameter than the distance between the inner faces of said jaws whereby it may be received and retained between the same with the curved inner jaw faces yieldingly engaging the outer shank face, a head adjacent one end of said shank and disposed within said notch, the diameter of said head being such that it extends beyond the plane of said jaws to provide a portion by means of which said cannula may be rotated to cause the piercing point thereof to extend in a desired direction with reference to said holder, the curved surface of said shank providing a rotatable bearing with the holder jaws and also providing a surface acting as a cam to spread said jaws as said cannula is rocked through an arc with respect to said holder, whereby with such spreading the needle may be removed from between said jaws.

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