Nov. 5, 1935. L. EISELE 2,020,111

DETACHABLE LOCKING MEANS FOR HYPODERMIC SYRINGE NEEDLES

Filed June 16, 1934

Fig. 1.

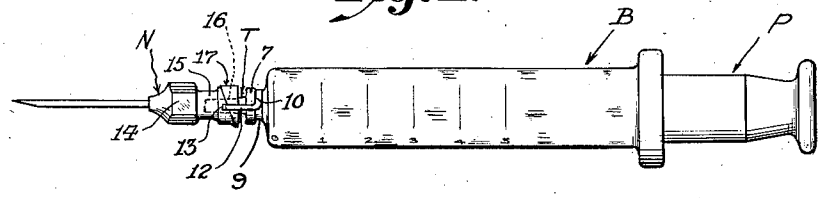


Fig. 2.

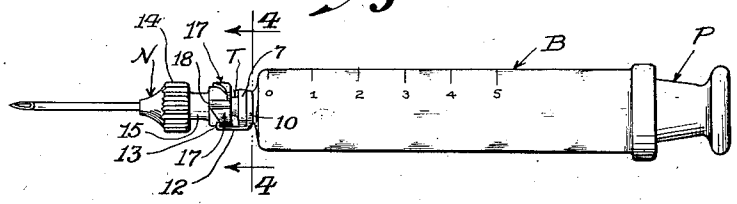


Fig. 3.

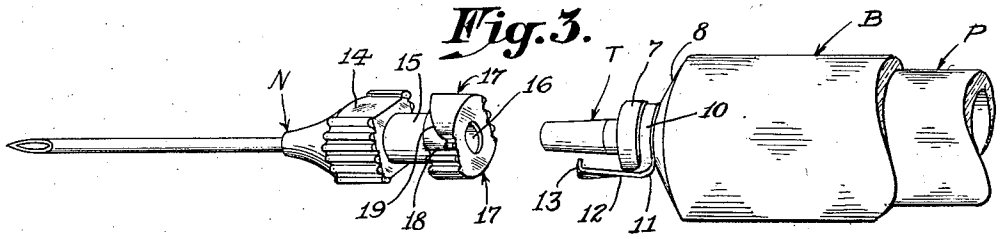


Fig. 5.

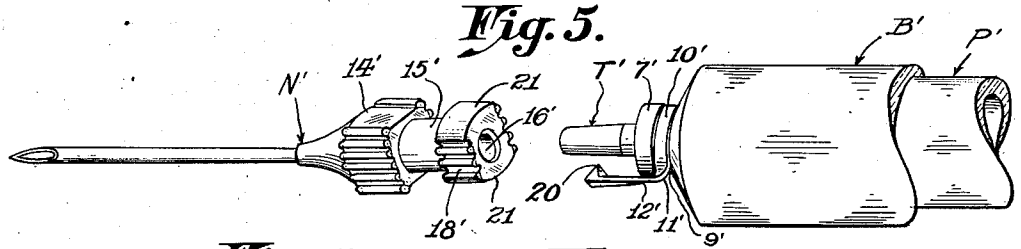


Fig. 4.

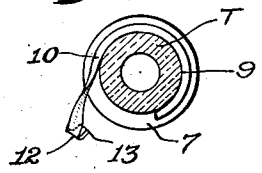
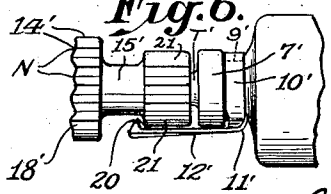


Fig. 6.



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2,020,111

DETACHABLE LOCKING MEANS FOR HYPODERMIC SYRINGE NEEDLES

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4 Claims. (Cl. 128—221)

My invention relates to improvements in hypodermic syringes, and particularly to means for detachably locking needles to the barrels of the syringes.

The principal general object of the present invention is to provide quick and effective means for detachably locking needles to the barrels of syringes, said means embodying a construction and arrangement of elements which can be easily produced, assembled and operated.

Another important object of the invention is to provide locking means embodying the foregoing features operable during assembly of the needle and barrel to firmly lock the needle to the barrel without placing any strain or stress on the tip of the barrel, which is highly desirable in the case of glass barrels and tips.

The foregoing and other objects and advantages of the invention will become more apparent and will be pointed out during the course of the following detailed description of the accompanying drawing, in which

Fig. 1 is a plan view of an assembled syringe, needle and the means locking the same together;

Fig. 2 is a side elevation of the parts shown in Fig. 1;

Fig. 3 is an enlarged exploded perspective view of the needle locking means and a portion of the barrel;

Fig. 4 is an enlarged sectional view taken on the line 4—4 of Fig. 2;

Fig. 5 is a view similar to Fig. 3 showing a modification in the locking means; and

Fig. 6 is a fragmentary enlarged side elevation of the parts shown in Fig. 5 in a position similar to that of the locking means in Fig. 2.

Referring to Figs. 1–4, the letter B indicates generally the barrel of the syringe into which the fluid is drawn and from which it is expelled as usual by the plunger P. The barrel is provided with a reduced tip T which receives the hub of the needle N, it being understood that as usual the tip, hub, and needle have communicating bores through which the fluid is drawn into the barrel and expelled therefrom according to the movement of the plunger.

As shown very clearly in the enlarged view of Fig. 3, the tip T is provided with an annular lateral flange or projection 7 spaced from the end 8 of the barrel B, and providing in conjunction therewith, a groove or channel 9 (to which the reference character is applied in Figs. 1 and 4). As will become more apparent hereinafter, it is not absolutely necessary to have the projection 7 continuous all the way around the tip T, because separated projections could also be provided to serve the same purpose as the continuous flange or projection 7. A metal strip is curved or bent or looped as at 10 around the groove or channel 9 and is seated in the groove or channel between the end 8 of the barrel and the inner face of the flange or projection 7, so that the loop has no appreciable longitudinal movement relative to the tip. The metal is then bent as at 11 and extended substantially parallel with the tip T to form an arm 12, the outer end 13 of which is bent in toward the tip T and spaced therefrom a distance less than the space between the arm 12 and the tip T.

It is not necessary to provide against relative rotative movement between the loop 10 and the tip T, and, in fact, I deem it preferable to provide a frictional fit which allows such relative movement for a reason hereinafter pointed out. The needle may be provided with a finger grip formation 14 on the hub, and the shank 15 of the hub is provided with a bore 16 which receives the tip T. The outer end of the shank 15 is formed with one or more cam formations, designated generally by the numeral 17, separated by a groove or grooves 18. Face or edge 19 of the cam formation 17 is curved from adjacent the end of the hub and the groove 18 upwardly or outwardly. In the embodiment of the invention shown in Figs. 1–4, there are two cam formations 17, but, of course, one would suffice for the purposes of the invention, and there may even be more than two such formations for convenience in applying the needle to the tip and locking the parts together.

To assemble the needle and syringe barrel and lock the same together, the barrel is held with one hand and the needle in the other hand with the fingers preferably gripping the part 14. They are approached in substantially the relative position shown in Fig. 3, so that the end 13 of the arm 12 will move along a groove 18, and as soon as the end 13 has passed the lower end of the cam face 19, the needle is rotated so that the end 13 engages the face 19 drawing the parts tightly together during such rotative movement and preventing separation of the needle and barrel until it is desired to separate them. The separation is obviously accomplished by turning the needle reversely to the direction previously mentioned when locking the parts until the end 13 is in alinement with the groove 18, which permits the needle to be moved off of the tip.

As previously mentioned herein, it is not necessary to have the looped end rigidly secured within or to the surface of channel 9, as I deem it prefer-

able to provide for relative rotative movement between the loop 10 and tip. Of course it is preferable to have a frictional fit between the loop 10 and the groove 9, such that the frictional engagement will prevent the arm 12 from swinging freely as the parts are brought together. A good frictional engagement is sufficient to facilitate the relative positioning and interlocking of the parts, while the permitted relative rotative movement between the loop 10 and groove 9 prevents imparting a stress or strain on the tips T, during the interlocking of the parts.

In Figs. 5 and 6, I have shown a modification of the invention, wherein the primed numerals and letters designate the same parts as in Figs. 1–4, and wherein the metal strip is made the same with the exception of the locking end of the arm 12'. In this modification of the invention, the end of the arm 12', which corresponds in location to the end 13 of the arm 12, is formed with a cam face 20. The outer end of the shank 15' of the hub of the needle is provided with a flange 21 instead of the cam formation or formations 17. The flange 21 may be provided with grooves 18' at opposite sides thereof, through which the end 20 of the arm 12' may pass as the needle hub is moved on to the tip T. When the end 20 has passed through any one of the grooves 18' beyond the inner face thereof and into the channel on the shank 15' between the grip 14' and flange 21, the needle and/or the barrel may be rotated to bring the cam face of the end 20 against the substantially straight edge of the flange 21, as shown in Fig. 6, to draw and hold the parts together.

From the foregoing, it should be obvious that this invention provides a simple arrangement for interlocking a needle and syringe barrel, and wherein the cooperating parts are easily made, assembled, and operated without placing a stress or strain on the glass tip during assembly. Although I have spoken of the tip T as being of glass, I wish it to be understood that the invention may be applied to other types of syringes than those made of glass, but for the reasons above given the invention is particularly adapted and useful in connection with glass syringes.

I claim:

1. In a hypodermic syringe including a barrel provided with a tip and a needle provided with a hub having a bore to receive the tip, a flange on the tip spaced from the end of the barrel and providing in conjunction therewith an annular channel around the tip, a metallic strip curved at one end around the tip within said channel whereby it is retained on the tip, said strip being bent along the tip in spaced relation thereto toward the end of the tip and having its outer end bent inwardly toward the tip, a flange on the end of the hub of the needle having its inner edge curved to form a cam surface and terminating at one end in a groove to receive said bent in end of the metallic strip, whereby when the tip enters the bore of the needle said bent in end may enter said groove and pass therealong after which when the tip and barrel are rotated relative to each other said bent in end of the strip engages said curved edge of the flange on the hub to draw the needle and barrel tightly together and to prevent separation thereof by longitudinal movement.

2. The structure of claim 1 wherein the portion of the strip which is coiled about the tip has frictional engagement therewith permitting relative movement between said portion and tip during the relative rotative movement between the needle and barrel to avoid a twisting stress on the tip as the parts are drawn together.

3. In a hypodermic syringe including a barrel provided with a tip, and a needle provided with a hub having a bore to receive the tip, a projection on the tip spaced from the end of the barrel, a locking element around the tip in the space between said projection and end of the barrel, an arm on said element extending toward the end of the tip, a part on the end of the arm extending in toward the tip, a flange on the end of the hub of the needle, and a groove in said flange to receive said part and along which said part passes as the tip moves into the bore to position said part beyond the inner edge of said flange so that the needle and barrel may then be rotated relative to each other to position said part behind said inner edge with said arm extending across the flange to hold the needle on the tip against longitudinal movement, the portion of said locking element around the tip and in the space between said projection and end of the barrel being secured to the tip by frictional engagement permitting relative movement between its portion around said tip and the tip when the needle and tip are rotated relative to each other to avoid placing a twisting stress on said tip during said relative rotational movement.

4. In a hypodermic syringe including a barrel provided with the tip and a needle provided with a hub having a bore to receive the tip, a projection on the tip spaced from the end of the barrel, a metallic strip curved at one end around the tip in the space between said projection and end of the barrel whereby the strip is retained on the tip, the portion of the strip which is curved around the tip in said space having frictional engagement with the tip permitting relative movement between said portion and tip to avoid a twisting stress on the tip, said strip being bent along the tip in spaced relation thereto toward the end of the tip and having its outer end bent inwardly toward the tip, a flange on the end of the hub of the needle having its inner edge curved to form a cam surface and terminating at one end in a groove to receive said bent in end of the metallic strip, whereby when the tip enters the bore of the needle said bent in end may enter said groove and pass therealong after which when the tip and barrel are rotated relative to each other said bent in end of the strip engages said curved edge of the flange on the hub to draw the needle and barrel tightly together and to prevent separation thereof by longitudinal movement.

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