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2,870,765

HYPODERMIC NEEDLE MOUNT

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Fig. 1.

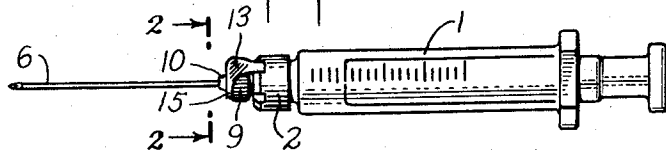


Fig. 2.

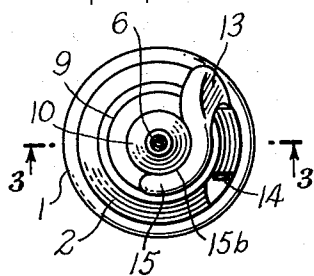


Fig. 3.

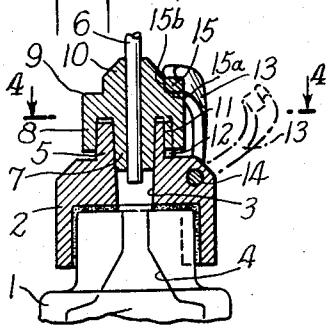


Fig. 4.

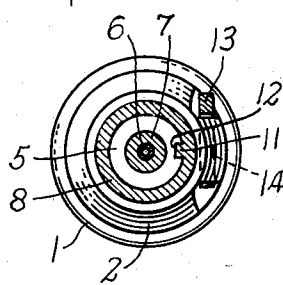


Fig. 5.

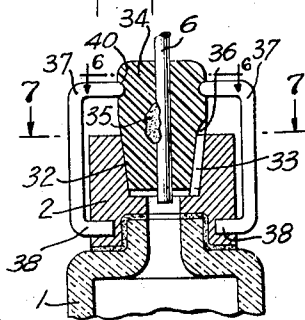


Fig. 7.

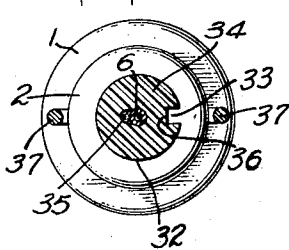
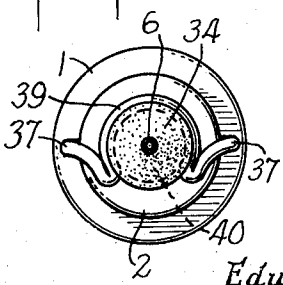


Fig. 6.



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HYPODERMIC NEEDLE MOUNT

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4 Claims. (Cl. 128—215)

The present invention relates to improvements in needle mounts for releasably attaching hypodermic needles to the barrel of a syringe or the like.

Commonly known hypodermic syringes include, among others, three general types in wide use. In one, the discharge end of the glass barrel carries a metal tip or nipple upon which a needle supporting hub is maintained entirely by frictional engagement of the hub with the tip. In another type, the barrel carries at its discharge end a metal fitting or tip providing a nipple and means whereby the needle supporting hub is attached to said tip by rotation of the hub when interfitted with the nipple. In another of said devices, the glass barrel is formed with its open end portion providing a tip or nipple and the needle supporting hub is maintained thereon by friction.

These various known types of syringes have been designed to utilize needles including those with their inner or butt ends secured by swaging in an outer reduced end portion of a metal hub.

Long experience with hypodermic devices as above described has revealed various disadvantages in their use. For example, it is a common occurrence for a needle hub to come loose from the nipple or barrel tip when held thereon only by friction. Also, where the swaged joint between needle butt and the outer end of the hub is defective or becomes impaired in use, the needle easily breaks loose from the hub. In either case removal and recovery of needles so detached while in use can involve serious risks for the patient.

More recently, needles with swaged-on hubs have been supplied in sterile containers which, when opened, give access to the open inner end of the hub so that a syringe nipple may be inserted therein and frictionally engaged with the hub quickly and with minimum likelihood of contamination of the needle. As appears above, this kind of joinder by friction alone is too easily impaired or broken; and the rotative or cam type of connection involves holding with the fingers both the needle hub and the syringe barrel to effect operative locking engagement between them.

An object of the present invention has been to provide a hypodermic needle assembly in which the needle is attachable to the barrel without rotation and which, in normal use, precludes accidental detaching or release of the needle from the hub and of the hub from the syringe barrel.

A further object of the invention has been to provide a quickly operable and reliable needle mount construction which may be employed advantageously with conventional types of syringe barrels, so that the desired clinical advantages of my invention can be realized without radical changes in design involving excessive cost over that of widely used but less satisfactory devices now available.

A needle mount incorporating the contemplated advantages of my invention above pointed out and others and wherein the connection between needle hub and the

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barrel is effected without rotation of one in relation to the other comprises broadly a tip forming part of or attachable to the barrel and with its longitudinal bore communicating with the interior of the barrel and a needle carrying hub having the needle butt secured coaxially therein. Said tip has tapered surface portions coaxial with said bore and engagable with correspondingly tapered portions of the hub to effect fluid sealing engagement of the hub with the tip; and said hub and said tip are provided with interengaging parts which prevent rotation of the hub in relation to the tip or barrel when these parts are assembled in operative position for use. A latch for locking the tip and hub in operative position includes an arm mounted for movement toward and from the hub and provided with a detent having a hub engaging and retaining portion arranged and adapted for biasing engagement against said hub to retain the latter positively in fluid transmitting connection with a syringe barrel.

The various aspects of my invention will be more fully described in this specification by reference to the appended drawings wherein:

Figure 1 illustrates a conventional form of hypodermic syringe barrel carrying one form or embodiment of a needle mount according to my invention;

Figure 2 is a transverse sectional view on the line 2—2 of Figure 1;

Figure 3, a central longitudinal sectional view on the line 3—3 of Figure 2;

Figure 4 is a transverse sectional view on the line 4—4 of Figure 3;

Figure 5, a central longitudinal sectional view of a further modification wherein the needle is mounted in a non-metal hub which seats in the tapered end opening of a fitting secured to the syringe barrel;

Figure 6, a transverse section on the line 6—6 of Figure 5; and

Figure 7, a transverse section on the line 7—7 of Figure 5.

The embodiment of my invention shown in Figures 1 through 4 is carried at the discharge end of a syringe barrel 1. A fitting or tip 2 is mounted with its tapered central axial bore 3 coaxial and in communication with discharge bore 4 of the barrel 1.

Fitting 2 is provided with an annular outwardly extending flange forming a neck 5 having its outer lateral surface tapered at an angle corresponding to that of the inner surface of bore 3 which opens through the outer end of said neck, or other suitable angle.

As seen in Figure 3, a hub 9 carries needle 6 the butt or inner end of which, is closely engaged in the longitudinal central axial bore of said hub 9. To provide more secure anchorage of the needle butt in the hub, the latter has an inwardly extending tapered portion or core 7 which is spaced from and forms a tapered annular channel with an outer tapered flange 8, and an outwardly longitudinally extending collar 10 of less diameter than the main part of said hub. Where the hub is of malleable metal, needle 6 is retained in the axial bore thereof by swaging collar 10 around an intermediate portion of the needle butt and by swaging at least an end portion of core 7 around an inner end portion of said butt. These parts are arranged and proportioned to prevent or limit rocking and loosening by needle 6 in relation to hub 2 when said needle is subjected to laterally deflecting forces applied to outer end portions of the needle.

As seen in Figure 3, the tapered annular recess between outer flange 8 and core 7 of hub 9 is dimensioned to receive and sealingly engage the outer tapered surface of neck 5 of fitting 2. Hub 9 is prevented from turning on neck 5 by an inwardly extending rib 11 on flange 8

and a longitudinal groove 12 in neck 5, said rib being received in said groove 12 when the hub 9 is pushed longitudinally inwardly to move core 7 into the tapered bore of fitting 2.

Endwise displacement or accidental removal of hub 9 in relation to fitting 2 is prevented by suitable releasable locking means shown in Figures 1 to 4, inclusive, as an arm 13 pivoted to fitting 2 at 14 and having a detent hook 15 at its free end, Figure 2. Said arm 13 and hook 15 are so arranged and adapted that, when in latching position, Figure 3, an under surface of hook 15, as 15a, Figure 3, bears yieldingly upon an outer surface portion or shoulder of butt 9 to prevent endwise displacement and maintain it in operative position on said fitting 2; and a laterally exposed surface of said hook 15, as 15b, Figure 2, bears yieldingly against an outwardly or laterally exposed surface of collar 10 with a clamping or camming effect or in a manner to retain the hook releasably in locking or latching position, for example, as shown in Figure 2.

It is contemplated, in respect to the above described embodiment, that the danger of a needle coming loose from a metal hub of the kind described is minimized where, as here, the swagings are spaced and thus prevent rocking or angular tilting movement of the needle out of its true coaxial position in the hub. This security feature is enhanced when hub 9 is in place on fitting 2 because the wall of neck 5 then closely embraces core 7. Also, the needle 6 and hub 9 are prevented in applicant's mount from accidental turning as well as from accidental endwise displacement such as can happen under some conditions of use where only friction holds the hub on the fitting. This embodiment also favors maintaining the sterile condition of the needle assembly when the latter comes in a sterile container because the fitting neck 5 may be slid into the annular groove or recess of the hub without finger contact thereon and secured in engaged position by thumb pressing hook 15 into operative position, as shown in the drawings.

In a modification, Figures 5, 6, 7, a fitting 2 is secured firmly to syringe barrel 1 and has a tapered bore 32 provided with a longitudinally extending rib 33. Needle 6 is secured coaxially in a plastic hub 34, or the like, being specially anchored against endwise and twisting displacement therein by a shear resisting protuberance 35, or equivalent, extending into the mass of plastic hub 34; and hub 34 is prevented from twisting when engaged with tapered bore 32 by engagement of rib 33 with a longitudinal groove 36 in hub 34.

A bail 37 pivoted to fitting 2 at 38 is provided at its free end with a hub gripping and pressing portion or detent in the form of a loop 39 having a normal opening dimension less than the diameter of said hub through the peripheral groove 40 thereof. Where the bail is of spring wire stock, for example, it is arranged and adapted to be swung by finger pressure toward and from latching position wherein the opposed ends or corners at opposite ends of the opening of loop 39 press yieldingly against the bottom surface of groove 40; and other portions of said loop press against said groove in a direction to bias said hub toward engaged position in relation to fitting 2.

Needle mounts, as shown, provide maximum security against accidental displacement of the needle in use. In addition this construction permits the user to initially engage the barrel with the hub by a simple endwise or longitudinal movement of one toward the other and then to releasably lock the parts together without impairing the sterile condition of the needle because said latching or locking can be effected without touching the needle and in some cases without a finger touching even the hub.

In view of the critical conditions under which hypodermic needles are commonly employed, the advantages

heretofore pointed out as stemming from my improved mount are actually of prime importance, in some instances representing the saving of life. In addition, my invention may be readily and economically adapted to known manufacturing methods and practice, and in some cases with little change so far as overall designs are concerned.

I claim:

1. In a needle mount for releasably attaching a hypodermic needle to the barrel of a syringe, or the like, without rotation of either in respect to the other, the combination of a syringe barrel and a tip mounted thereon and having a longitudinal bore communicating with the interior of said barrel, a hub having a needle secured coaxially therein, tapered surface portions coaxial with said needle and a shoulder presenting a transversely disposed bearing surface, said tip having tapered surface portions coaxial with said bore and arranged and adapted for fluid sealing frictional engagement with said tapered surface portions of said hub when said hub and said tip are operatively assembled in interfitting coaxial telescoping relation, said hub and said tip being provided with a longitudinal extending rib and groove joint interposed between them to thereby permit endwise sliding movement of the hub on the tip when the needle is being attached to or detached from the barrel and to prevent rotative displacement of the needle and hub in relation to the barrel when the needle is in use, and a latch for releasably and positively locking said tip and said hub together in said assembled relation including an arm pivotally mounted on said tip and arranged and adapted to be rocked toward and from said hub, and a detent extending at an angle to said arm and presenting a hub retaining surface arranged and adapted for biasing engagement against said shoulder whereby said hub and needle are positively and releasably retained in fluid transmitting connection with the syringe barrel.

2. Needle mount according to claim 1 and wherein said detent bears against surfaces of said shoulder of said hub located at opposite sides of a plane passing through the central longitudinal axis of said hub and extending in the direction of movement of said detent as said arm is rocked toward and from operative locking position.

3. Needle mount according to claim 1 and wherein said hub is provided with a laterally disposed shoulder and the latch has an end portion arranged and adapted to frictionally engage said shoulder.

4. Hypodermic needle mount comprising in combination a needle supporting hub having in inwardly extending tapered end portion and an outwardly exposed shoulder presenting a bearing surface disposed transversely of the hub axis, a barrel having a tapered end portion arranged and adapted for telescoping connection with the tapered end of said hub, means interposed between the hub and the barrel for retaining said hub against rotative displacement of the hub in relation to the barrel, and a latch pivotally connected at one end to said barrel and having at its free end a detent arranged and adapted to swing with the latch into and out of engagement with said bearing surface of said shoulder whereby said hub is held against endwise displacement in relation to the barrel.

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