

Dec. 27, 1966

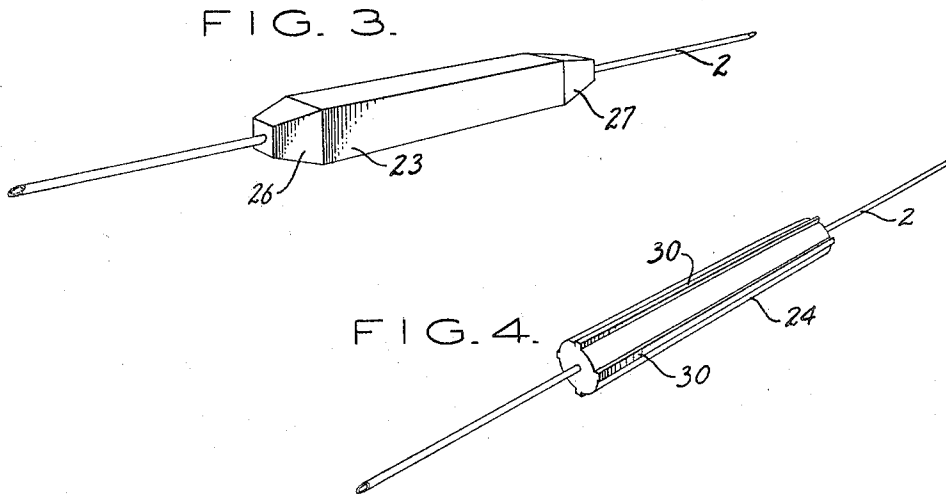
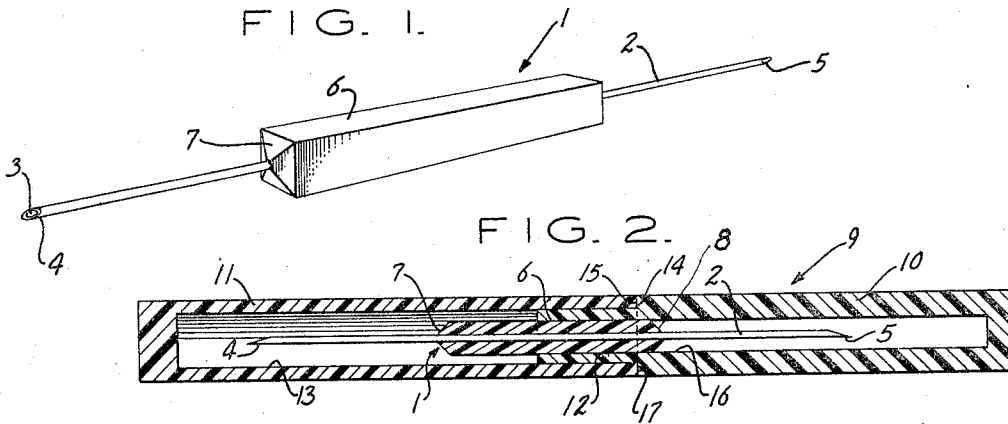
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3,294,089

HYPODERMIC NEEDLE

Filed Dec. 14, 1960

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

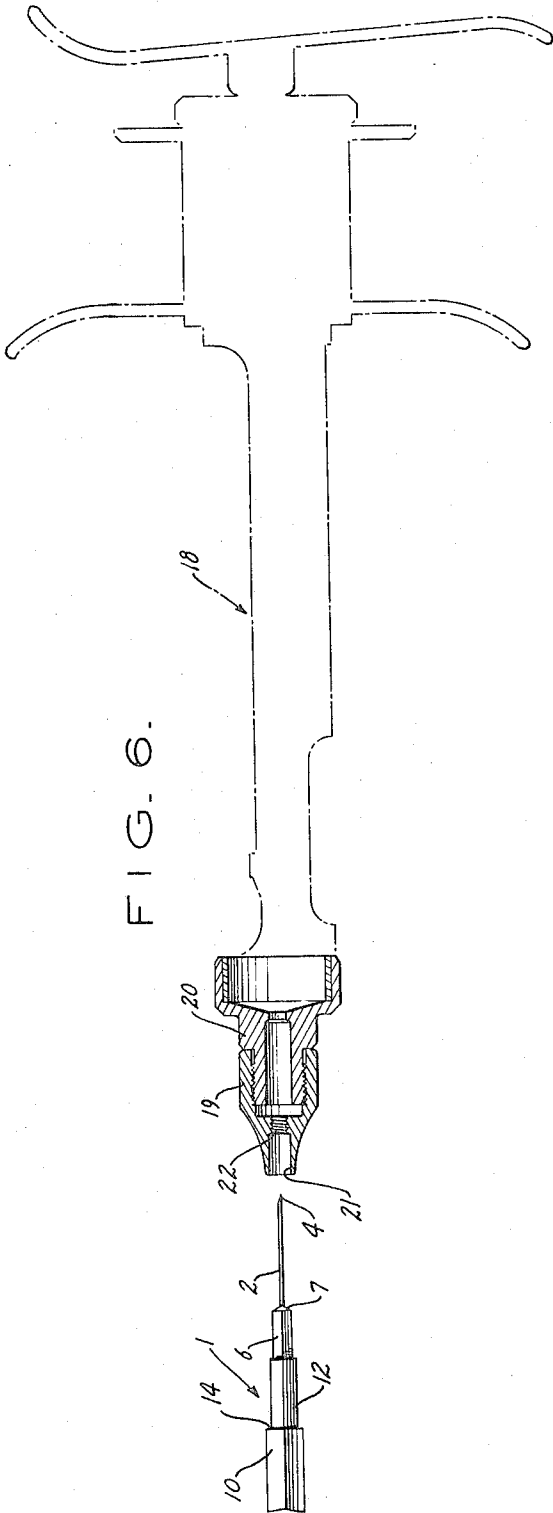


FIG. 6.

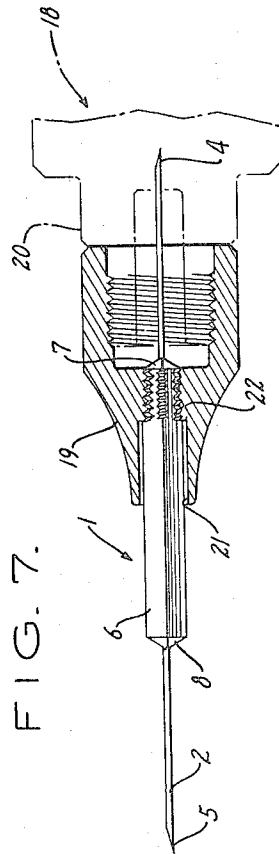


FIG. 7.

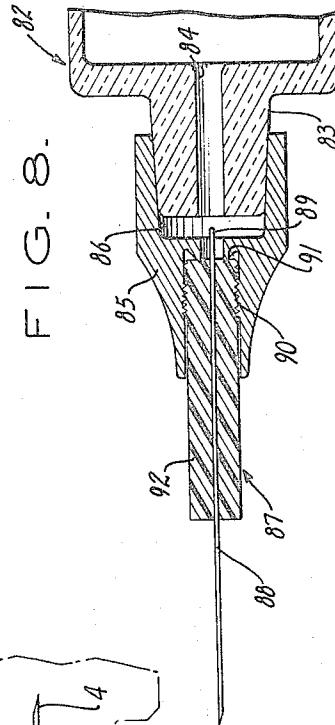


FIG. 8.

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HYPODERMIC NEEDLE

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6 Claims. (Cl. 128-221)

This invention relates to disposable hypodermic needles, particularly to a hypodermic syringe needle which is encased in a protective container of plastic material.

An object of the invention is to provide an improved disposable hypodermic syringe needle which is enclosed in a sealed container and maintained in a sterile condition after sterilization thereof until used with a syringe.

Another object of the invention is to provide a hypodermic needle of this character which may be made at relatively small cost so that it is feasible and economical to discard the needle after it is once used, thus eliminating the danger of a subsequent use without proper sterilization.

Still another object of the invention is to provide a hypodermic needle which is adapted to be readily connected to and removed from a conventional syringe without engaging the needle with the fingers, said needle having means for permitting quick and easy manipulation thereof for said purpose.

Yet another object of this invention is to provide a form of needle encasing container designed to maintain an isolated hypodermic needle in a sterile condition and permit of its convenient manipulation during its insertion into a syringe prior to use without likelihood of its contamination or infection.

With the foregoing and other objects in view, the hypodermic needle of the present invention is provided at an intermediate portion thereof with an elongated molded hub of plastic, nylon or similar composition which is adapted to be threaded into the needle mounting nozzle of a standard syringe. In such syringes the barrels are generally provided with an internally threaded nozzle adaptor, and the hypodermic needle of the present invention can be mounted in such syringe by means of a rotatable connection. The connection is formed by inserting one needle end through the syringe nozzle until the needle hub makes contact with the internal threads of said nozzle adaptor, whereupon turning of the needle and hub assembly or unit will cause threads to be formed into the needle hub, the nozzle adaptor functioning as a die, to make a firmly threaded connection. After being used, the needle may be screwed out of the syringe and discarded.

The needle and hub assembly is maintained in a sterile condition up to the time of use by encasing same in a two-part container which is heat sealed and then sterilized. When the needle is ready for use, the container is ruptured by twisting and one part thereof removed, leaving the needle firmly retained in the other part of the container, whereupon the exposed section of the needle and hub are inserted and threaded into the syringe as explained. The other part of the container is then removed, exposing the other end of the needle. Said other container part can be pushed over the needle hub after use to facilitate unscrewing the needle from the syringe.

The nature and characteristic features of the present invention will be better understood from the following description taken in conjunction with the accompanying drawings which illustrate by way of example preferred embodiments and in which:

FIG. 1 is a perspective view of one needle and hub unit;

FIG. 2 is a longitudinal section of the unit of FIG. 1 encased in a two-part container;

FIGS. 3, 4 and 5 are modified embodiments of the needle and hub units;

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FIG. 6 is a longitudinal section through a syringe nozzle, the barrel of the syringe being shown in outline, with the needle and hub unit of FIG. 1 positioned for insertion into the nozzle;

FIG. 7 is a similar view showing the needle hub in threaded engagement with the syringe nozzle; and

FIG. 8 is a view corresponding to FIG. 7 and illustrating a needle hub in threaded engagement with the nozzle of a standard syringe of the type using bulk material.

Referring to FIGS. 1 and 2, the needle and hub unit embodied therein, indicated generally at 1, comprises a relatively rigid tube 2, for example, of stainless steel, which has a uniform bore 3 extending uninterruptedly there-through. The tube is ground obliquely at each end to form the conventional puncturing and piercing points 4 and 5.

A hub and manipulating portion 6 is rigidly and permanently molded around the needle 2 along a portion intermediate the ends thereof, the hub 6 being generally elongated and square in section and of dimensions facilitating insertion into the threaded nozzle adaptor of a syringe, as will be described hereinafter. In this embodiment tapered or pyramidal ends 7 and 8 are provided on the hub 6, but this feature may be dispensed with and the hub 6 made with square ends. The hub material is preferably of nylon, plastic or similar composition capable of having threads cut easily therein; the hubs may also be made of a soft die-cast metal.

As may be seen from FIG. 2, the needle and hub unit 1 is maintained in a sterile, protected condition within a container, indicated generally at 9, comprising a hollow body portion 10 and a hollow closure or cap 11. The container body 10 is provided with a cylindrical integral extension or collar 12 of reduced diameter and adapted to be received within the complementary cylindrical recess 13 in the container cap 11 to effect a closure therewith. The body 10 and cap 11 are adapted to be heat sealed along the line of abutment 17 of their respective shoulder portions 14 and 15 to maintain the contained needle in a sterile condition.

An elongated recess 16 in container body 10 is substantially rectangular in cross-section and of a size to frictionally accommodate the correspondingly sized hub 6 of the needle unit 1. The container 9 as well as the needle and hub unit 1 should be sterilizable either by time or temperature treatment as in an autoclave or by electrical, electromagnetic or radiative treatment, or by atmosphere sterilization.

The needle unit 1 is readily prepared for use by rupturing the container at the juncture 17 of the container body and cap. This is accomplished by firmly grasping the container at each side of the juncture 17 and twisting the body 10 and cap 11 with respect to one another. The cap 11 may then be removed, leaving the needle and hub unit 1 firmly retained in the container body 10 for easy manipulation of the exposed end of the needle when inserting same into a syringe.

Referring to FIG. 6, the needle and hub unit 1 is shown protruding from the container body 10, the cap 11 having been removed as described, preparatory to inserting the needle into the body of a syringe, indicated generally at 18. The syringe is provided with a nozzle adaptor 19 which is coupled to the syringe nozzle 20. The adaptor 19 is provided with a longitudinal bore 21 which is internally threaded at 22 to threadedly engage the needle hub 6.

It will be seen that with the needle and hub unit 1 only partly exposed upon removal of the container cap, the remainder of the unit is securely held in the container body 10 whereby the person inserting the needle may perform his manipulation by gripping the container body

10, thus avoiding contamination of the needle. By inserting the exposed end 4 of the needle 2 into the syringe nozzle adaptor 19 until the hub 6 engages the internal threads 22 of the adaptor 19 and then simultaneously pushing and turning the hub 6 for several turns, the adaptor threads 22 will cut corresponding external threads on the hub 6, whereby the hub may be rotatably mounted in position in the syringe body. The tapered end 7 of needle hub 6 facilitates the start of this thread cutting and hub screwing operation. Thereupon, the container body 10 may be slipped off the needle hub 6 to leave the outer needle end 5 in exposed condition and ready for use, as shown in FIG. 7. Of course, the inner point 4 of needle 2 is adapted to pierce an ampule placed in the syringe body. It should be emphasized that, during the coupling of the sterilized needle to the syringe body, contamination of the needle is avoided because it is never touched. After the needle has been used, the container body 10 is slipped over needle hub 6 and the needle and hub unit 1 is screwed out of the syringe nozzle adaptor 19. The container cap 11 may then be replaced for safe disposal of the needle.

The needle and hub unit may be modified for use with standard syringes employed to administer bulk material, as shown in FIG. 8. The syringe 82 is usually made of glass and is provided with a ground tapered nozzle 83 centrally bored at 84 for passage of medicament or other liquid. The tapered nozzle 83 permits affixing of a standard needle having a hub with an internal mating taper.

A modified form of adaptor 85 provided with an internal taper 86 may be provided to accommodate a needle and hub unit 87 made according to the present invention. A hub 92 is molded closer to one end 89 of a needle 88 and is threaded at 90 into the adaptor 85 as in the previously described embodiment. Since the needle end 89 is merely disposed in alinement with syringe nozzle bore 84, the necessary seal between the syringe reservoir and the needle hub is effected by means of a sharp annular edge 91 provided within the adaptor, the edge 91 being of a diameter to accommodate the needle end 89 and to be tightly impressed against the end of the needle hub 92 as the latter is threaded into the adaptor.

The foregoing arrangement extends the use of the needle and hub unit to syringes other than the ampule type.

The hub of the needle and hub unit may be modified as desired. For example, in FIG. 3 the hub 23, square in cross-section, is provided with gradually tapered frusto-pyramidal end portions 26 and 27 to facilitate the start of the thread cutting operation when screwing the hub into the nozzle adaptor of the syringe; the gradually tapered frusto-conical ends 28 and 29 of the hub 25 shown in FIG. 5 serve the same purpose. The hub 24 illustrated in FIG. 4 is of a more modified construction, the hub being generally cylindrical and provided with arcuately spaced, longitudinally disposed radial extensions or lands 30. This reduces the frictional resistance when screwing hub 24 into the syringe nozzle, since only the lands 30 are cut by the internally threaded syringe nozzle adaptor. It should be understood that the container body for this particular hub construction is correspondingly modified to have a cylindrical hub receiving recess with longitudinal grooves adapted to receive the hub lands in sliding engagement.

Needle and hub units in accordance with the present invention are well adapted to be manufactured efficiently and economically. The heads may be molded on the blanks with the hubs interconnected to provide strips enabling the ends of the blanks to be conveyed through sharpening and finishing stations. The hubs may then be separated from each other and the individual, finished needles packaged and sterilized.

The several embodiments of the invention hereinbefore exemplified and described are illustrative only, as a person skilled in the art may resort to such modifications and equivalents as fall within the scope of the appended claims.

I claim:

1. In combination, a hypodermic needle and a container therefor, said needle being for use with a syringe having an internally threaded, needle receiving socket, said needle comprising a cannula provided with a bevelled point, at least at one end thereof, and a cannula supporting hub of the same cross sectional size and shape throughout its length, said container having a socket, said hub including first and second portions, the cross sectional size and shape of the hub being such as to establish a plurality of ribs lengthwise thereof and to enable said first portion to be entered in said syringe socket and become detachably attached thereto by being turned relative thereto as it is seated therein, said hub being of a material soft enough to have threads formed in the first hub portion by such seating and turning, the second portion being within the container socket, said container socket being dimensioned to accommodate the bevelled point when the second named hub portion is positioned in the container socket with the first hub portion exposed, and a closure attachable to the container to freely confine the exposed part of the needle, the second hub portion and the container socket including portions slidably engaging to hold the second hub portion against turning relative thereto whereby said container becomes a detachable tool for use in seating and turning the first named hub portion in the syringe socket and for detaching the needle from the syringe after the use thereof.

2. The combination of claim 1 in which the cross sectional shape of the hub is that of a regular polygon, the socket portions slidably engaging the sides thereof, and the threads being formed at least in the ribs defined by the adjacent sides thereof.

3. The combination of claim 2 in which the cross sectional shape of the hub is that of a square.

4. In combination, a hypodermic needle and a container therefor, and a syringe having an internally threaded needle receiving socket having an axial bow in communication therewith and defining a shoulder, said needle comprising a cannula provided with a bevelled point, at least at one end thereof, and a cannula supporting hub of the same cross sectional size and shape throughout its length, said container having a socket, said hub including first and second portions, the cross sectional size and shape of the hub being such as to establish a plurality of ribs lengthwise thereof and to enable said first portion to be entered in said syringe socket and being detachably attached thereto by having been turned relative thereto as it is seated therein until the end of said first unit seats against said syringe socket shoulder, said hub being of a material soft enough to have threads formed in the first hub portion by such seating and turning, the second portion being within the container socket, said container socket being dimensioned to accommodate the bevelled point when the second hub portion is positioned in the container socket with the first hub portion exposed, and the second hub portion and the container socket including portions slidably engaging to hold the second hub portion against turning relative thereto whereby said container becomes a detachable tool for use in seating and turning the first named hub portion in the syringe socket and for detaching the needle from the syringe after the use thereof.

5. The combination of claim 4 in which the socket of the syringe includes a threaded portion spaced from the open end of the socket by a plain, unthreaded portion of such length to enable a sufficient length of the first hub portion to be inserted therein to be supported and held thereby.

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6. The combination of claim 4 in which the syringe socket has a forward annulus in substantially line sealing contact with the end of the needle hub.

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