

[54] **HYPODERMIC NEEDLE WITH
DISTORTABLE HUB LINER**

[76] Inventor: **John J. Glowacki**, 335 Hotchkiss
Rd., Orange, Conn. 06477

[22] Filed: **Mar. 21, 1973**

[21] Appl. No.: **343,564**

[52] **U.S. Cl.** **128/221**

[51] **Int. Cl.** **A61m 5/32**

[58] **Field of Search** 128/215, 221, 348, 218 N,
128/214.4; 206/63.2 R

[56] **References Cited**

UNITED STATES PATENTS

1,961,490	6/1934	Hein	128/218 N
2,855,927	10/1958	Henderson.....	128/218 N
2,989,053	6/1961	Hamilton	128/221
3,035,616	5/1962	Hamilton	128/221 X
3,186,408	6/1965	Jacob.....	128/221
3,333,682	8/1967	Burke	128/221

3,344,787	10/1967	Maclean	128/221
3,472,227	10/1969	Burke	128/221
3,542,024	11/1970	Burke	128/221
3,721,231	3/1973	Hubert.....	128/348

FOREIGN PATENTS OR APPLICATIONS

336,365	10/1930	United Kingdom.....	128/221
316,516	6/1930	United Kingdom.....	128/221
649,918	10/1962	Canada.....	128/221

Primary Examiner—Richard A. Gaudet

Assistant Examiner—J. C. McGowan

Attorney, Agent, or Firm—DeLio and Montgomery

[57] **ABSTRACT**

A hypodermic needle which comprises a cannula and metal hub together with a plastic insert which is non-rotatably fitted within the hub and interlocked therewith to prevent axial movement. The liner is heat-distortable during an attempted sterilization so as to render the needle non-reusable.

8 Claims, 11 Drawing Figures

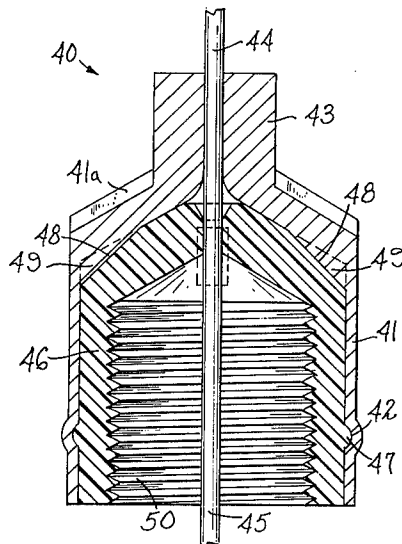


Fig. 1.

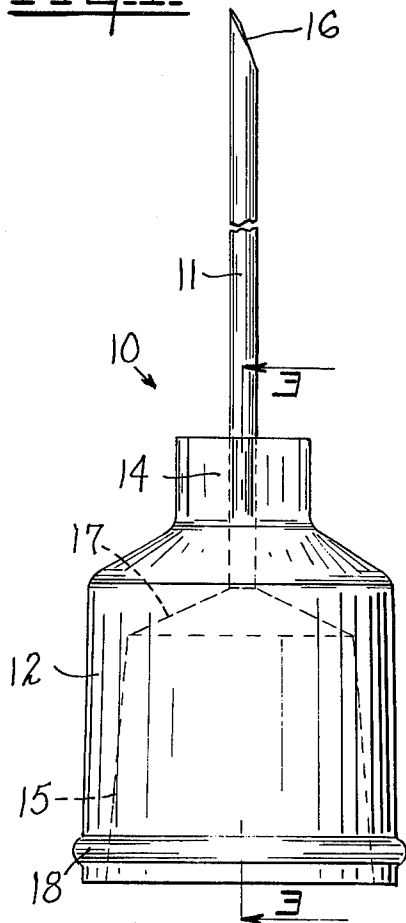


Fig. 2.

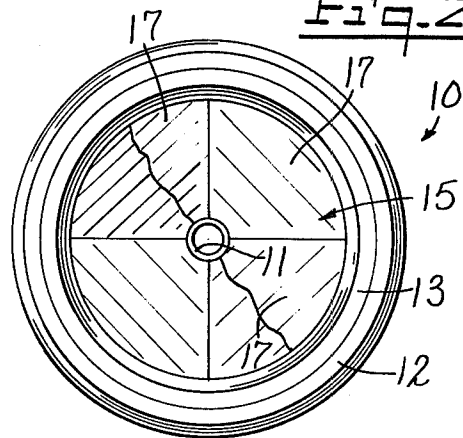


Fig. 4.

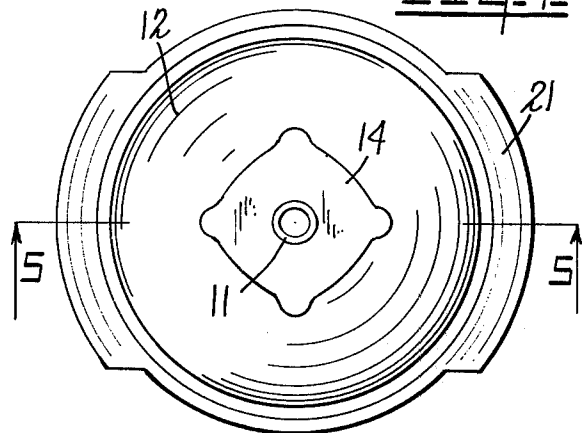


Fig. 3.

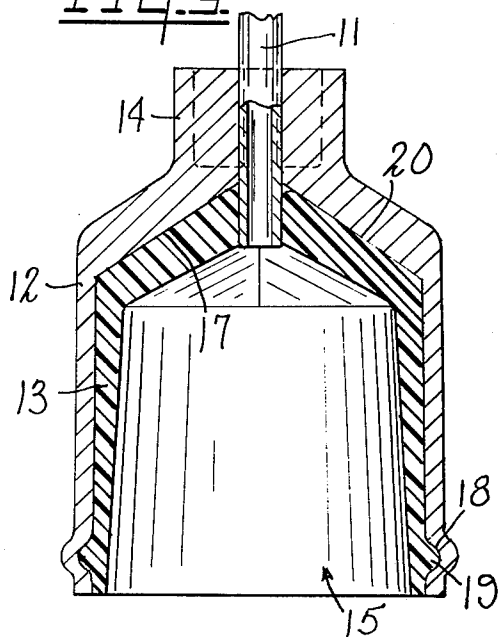


Fig. 5.

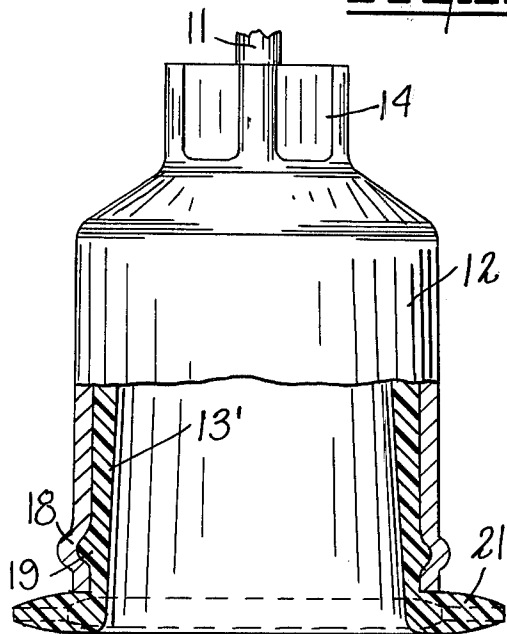


Fig. 6.

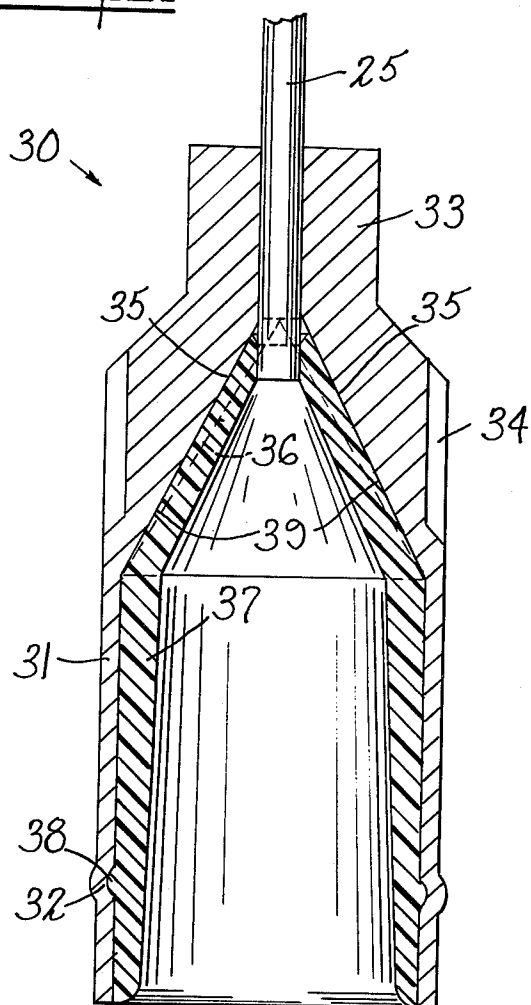


Fig. 7.

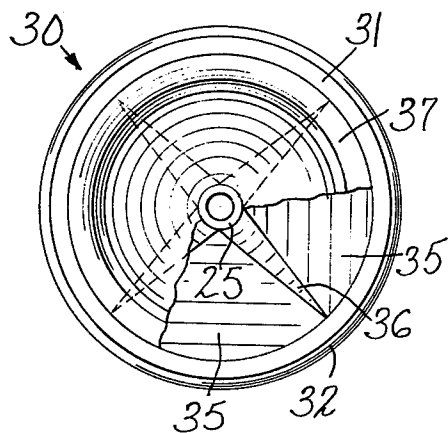


Fig. 8.

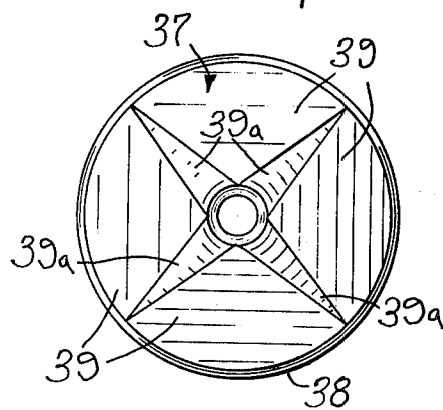


Fig. 9.

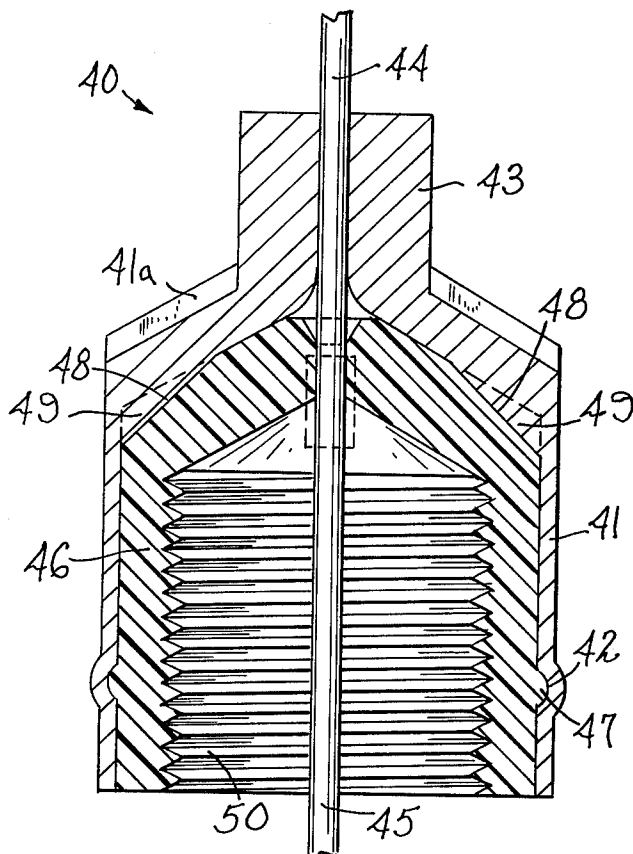


Fig. 10.

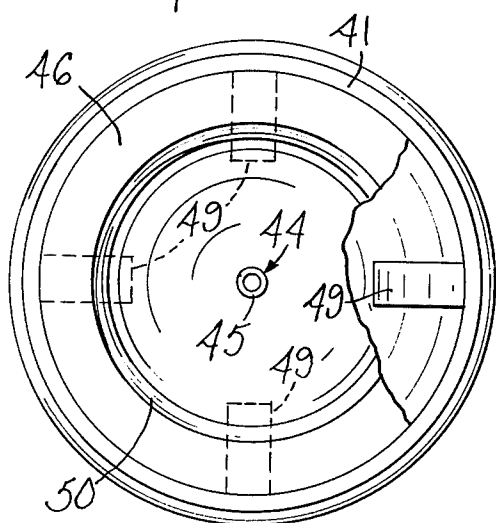
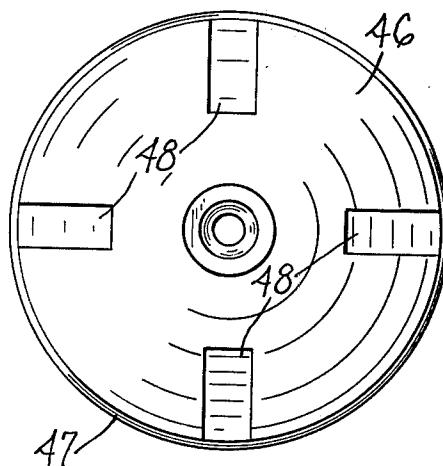


Fig. 11.



HYPODERMIC NEEDLE WITH DISTORTABLE HUB LINER

This invention relates to hypodermic needles.

A hypodermic needle generally comprises a cannula which is the tube and piercing point, together with a hub to which the needle is attached. The hub is then adapted to receive a syringe for either injection or medication to a patient or possibly used for blood collecting.

Conventionally, the hub includes a nose piece which is crimped about the periphery of the needle at a plurality of points to produce a liquid tight fitting and to secure the cannula to the hub. A seal may be included between the hub and the cannula. Hubs are primarily made of aluminum while the cannula is made of stainless steel. It has been determined, in many cases, that medications to be injected into a patient should not contact aluminum. As a result, efforts have been made to produce a hypodermic needle with a plastic hub. However, secure joining of the cannula to plastic hubs has not always proven successful due to the inability to obtain a tight fit of the cannula in the plastic hub.

Additionally, in some cases, needles which have been manufactured as so-called disposables have been attempted to be used again, and in fact used again after being sterilized primarily through a process known as autoclaving.

The present invention, accordingly, presents a hypodermic needle construction which while utilizing a metal hub for attachment to the cannula further utilizes a plastic insert construction which prevents contact of medication with the metal hub, and further which will heat distort upon sterilizing so that a disposable needle can not be reused.

Briefly stated, the invention in one form thereof comprises a cannula which is received through the nose portion of a metal hub and the nose portion crimped or swaged thereto. Within the metal hub is a plastic insert which is so fitted therein that it will not have any rotational or longitudinal movement therein, and further which is so chosen that it will heat distort upon autoclaving or sterilizing so as to render the needle unusable.

An object of this invention is to provide a new and improved hypodermic needle.

Another object of this invention is to provide a disposable hypodermic needle which will be rendered unusable should an attempt be made to sterilize it.

A further object of this invention is to provide a hypodermic needle having all the desirable properties of attaching a metal hub to a metal cannula but which prohibits contact between medication and the material of the hub.

The features of the invention which are believed to be novel are particularly pointed out and distinctly claimed in the concluding portion of this specification. However, the invention both as to its organization and operation, together with further objects and advantages thereof, may best be appreciated by reference to the following detailed description taken in conjunction with the drawings, wherein:

FIG. 1 is a side view of a hypodermic needle embodying the invention;

FIG. 2 is a view of the needle of FIG. 1 seen looking into the open end of the hub thereof and with the liner partially cut away;

FIG. 3 is a view seen in the plane of lines 3—3 of FIG. 1;

FIG. 4 is a view of a hypodermic needle with a Luer lock flange seen from the piercing end of the needle;

FIG. 5 is a partial longitudinal half section of the needle of FIG. 4 as seen in the plane of lines 5—5 of FIG. 4;

FIG. 6 is a view in longitudinal half section of another needle embodying the invention and having an insert within the hub;

FIG. 7 is a view of the needle of FIG. 6 looking into the hub with the insert partially cut away;

FIG. 8 is a view of the liner of the needle of FIG. 6 as seen from the nose end;

FIG. 9 is a longitudinal half-section of another needle embodying the invention;

FIG. 10 is a view of the needle of FIG. 8 looking into the hub with the insert partially cut away; and

FIG. 11 is a view of the needle of FIG. 10 seen from the nose end thereof.

A construction embodying the invention as shown in FIGS. 1—3 comprises a needle 10 including a cannula 11, a metal hub 12, and a plastic insert 13 within the hub. The hub 12 has a nose portion 14 which is crimped or swaged about cannula 11. The hub defines a well 15 adapted to receive a syringe. The cannula is preferably made of stainless steel and one end is ground to a piercing point 16. The hub is formed of aluminum.

The bottom of the well 15 of hub 12 is formed with a series of planar surfaces 17 shown as four in number, which surfaces are mutually inclined to the axis of the needle. The wall of hub 12 is formed with an annular indentation or groove 18 in the inner periphery thereof. Insert 13 has a mating exterior annular bead 19 which is received in groove 18. Insert 13 has four planar surfaces 20 which are complimentary to the surfaces 17 and in contact therewith. The liner is received within the hub in substantially full surface contact along its outer periphery.

With this construction, bead 19 mating in recess 18 prevents axial movement of the insert while the engagement of the inclined surfaces 17 with surfaces 20 prevents any rotational movement of the insert in the hub. The insert also provides a further seal about the cannula.

The insert is chosen to be of a plastic material which has a substantially rigid defined shape but which has some resilience to allow it to be snapped into hub 12.

If desired, the hub may be formed with the well-known Luer lock flange thereon. As shown in FIGS. 4 and 5, insert 13' is provided with Luer lock flanges 21. Otherwise, the construction is the same as shown in FIGS. 1—3.

The insert 13 is formed of a material which heat distorts at normal sterilizing temperatures. In this regard, the normal technique of sterilizing medical instruments is autoclaving which is accomplished at 230°F. A suitable plastic material is polyethylene which may be easily molded to any desired shape and which will heat distort at 150°F.

The surfaces which prevent rotation may be in any convenient form but for purposes of simplifying manufacture, it is preferred that there be four surfaces or six to prevent the rotation of the plastic liner.

Any type of convenient interlocking means may also be utilized to prevent relative axial movement of the

hub and liner, and the annular recess and bead exemplified is merely illustrative.

If an attempt should be made to sterilize or autoclave the liner it will heat distort and lose its predetermined shape, shrivel up and probably fall out of the hub. In the embodiment shown in FIGS. 1-3 this would render the hub too large for the tapered fitting syringe and in the embodiment shown in FIGS. 4 and 5 would remove the Luer lock flanges so that a second syringe could not be fitted to the hub. In either case, the needle then becomes truly disposable because it can not be reused again.

FIG. 6 exemplifies another construction embodying the invention. A needle 30 comprises a metal hub 31 having an annular groove or recess 32, a nose portion 33 which is crimped or swaged about a cannula 25. Defined on the outside of the hub 31 are a plurality of ribs 34 which may be grasped when the syringe is inserted or rotated with respect to the hub, either by hand or by engagement with abutments on a casing covering the cannula. The bottom of the well of the hub is defined with four flats 35 separated by sections of an otherwise conical shape 36. The opposed flats are preferably formed at an angle of about 54° or at 27° to the axial center line of the needle. A plastic liner 37 is formed with an annular ridge 38 adapted to be received into the recess or groove 32 of the metal hub 31.

The liner 37 is further formed with mating flats 39 complimentary to the flats 35 and portions 39a complimentary to the otherwise conical surface portions 36.

The mating groove and ridges 32 and ridge 38 prevent relative axial motion of the hub and liner, while the mating flats prevent relative rotation.

FIGS. 9-11 exemplify another needle construction of the type wherein the syringe is threadably received in the hub. A needle 40 comprises a hub member 41 having an annular recess 42 located toward the open end of the well and a nose 43 which is crimped or swaged about a cannula 44. In this embodiment the cannula is of the type in which the rear end 45 may extend outwardly to pierce a seal on the syringe. The hub further includes a plurality of outstanding ribs 41a designed to interlock with a needle guard (not shown) to provide a wrenching function. A plastic liner 46 has an annular ridge 47 adapted to be received in annular recess 42 and is further provided with a plurality of slots or recesses 48 in the bottom outer wall thereof (FIG. 11) adapted to receive complimentary ribs 49 defined on and outstanding from the bottom of the well of hub 41. The inner periphery of the liner 46 is threaded as indicated at 50 to receive mating threads on a syringe. The mating ribs and slots will prevent any turning of the liner within the hub well while the annular groove and ridge will prevent any axial movement between the two. The mating ribs and recesses may be reversed with respect to the hub and the liner.

The location of the complimentary flats, and the complimentary ribs and recesses may be defined anywhere on the hub and liner. As a practical matter, it is more convenient to form the hub with a round side wall and locate the hub flats, recesses, or ribs on the bottom of the hub well during machine forming operations on the hub.

The embodiment shown in FIGS. 9-11 permits a

more economical construction for needles of this type in that no threading is required on this metal hub. This relatively costly operation is avoided by the provision of the plastic liner molded with the threads therein.

The constructions embodying the invention provide additional advantages. The metal hub member offers a conventional technique of cannula-hub attachment which has been proven over many years of use. It is esthetically sound and acceptable to doctors. The plastic liner insures that medication will not contact the metal hub, only the stainless steel cannula and the plastic liner.

It may thus be seen that the objects of the invention set forth as well as those made apparent from the preceding description are efficiently attained. While preferred embodiments of the invention have been set forth for purposes of disclosure further embodiments of the invention as well as modifications to the disclosed embodiments which do not depart from the spirit and scope of the invention may occur to others skilled in the art. Accordingly, the appended claims are intended to cover all embodiments and modifications of the invention which do not depart from the spirit and scope of the invention.

What is claimed is:

1. A hypodermic needle comprising a cannula, a metal hub having walls defining a well and a smaller nose portion, said nose portion receiving said cannula and securing said hub to said cannula, a plastic liner received within said hub well and having walls defining an inner well and covering the walls of said hub, said cannula extending into said liner, and means defined on the interior of said hub and the exterior of said liner in interlocking engagement to prevent rotational and axial movement of said liner with respect to said hub, said liner being of a material which is heat distortable at normal sterilizing temperatures.

2. The needle of claim 1 wherein the means preventing rotation are a plurality of surfaces defined on said hub wall and disposed at an angle of less than 90° to the center line of the needle, and a like plurality of complimentary surfaces defined on said liner and in contact with said hub surfaces.

3. The needle of claim 1 wherein the means preventing rotation are a plurality of outstanding ribs defined on one of said hub and said liner and a plurality of rib-receiving slots defined in the other of said hub and said liner.

4. The needle of claim 1 wherein said means preventing axial movement comprise an annular recess defined in said hub walls and an annular ridge on said liner received in said recess.

5. The needle of claim 1 further including a locking flange defined on said liner and extending radially outwardly from said liner beyond said hub.

6. The needle of claim 1 wherein said liner is internally threaded.

7. The needle of claim 2 wherein said surfaces are disposed at an angle of substantially 27° to the center line of the needle.

8. The needle of claim 3 wherein said ribs are on the hub.

* * * * *