

United States Patent

Scislowicz

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[54] RETAINING CLIP FOR CATHETER SHEATH

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- [52] U.S. Cl. 128/214.4, 128/221, 128/349
[51] Int. Cl. A61m 5/00
[58] Field of Search 128/214, 214.2, 214.4, 348,
128/349, 350, 276, 262; 206/63.2; 24/11 PP, 259
FF, 243 M, 11 CT, 257 R

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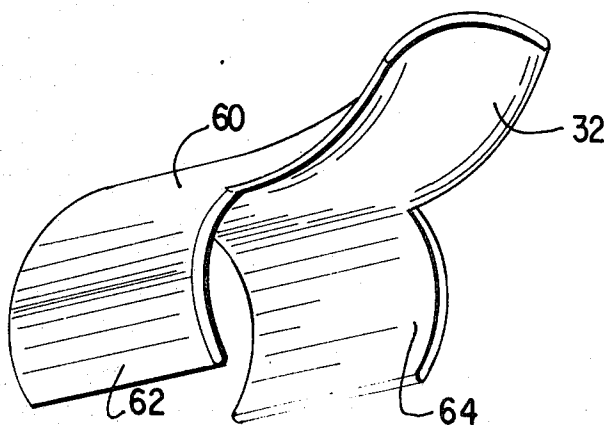
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[57] ABSTRACT

Disclosed herein is a retaining clip for the sheath used to protect a catheter tube from contamination during insertion of the guiding needle. The clip is designed to snap over the hub of the needle and at the same time clasp the mouth of the sheath about the hub. The clip includes a curved body portion and a pair of curved depending legs. An upturned neck extends from the body portion to facilitate removal of the clip after the needle has been inserted.

7 Claims, 7 Drawing Figures



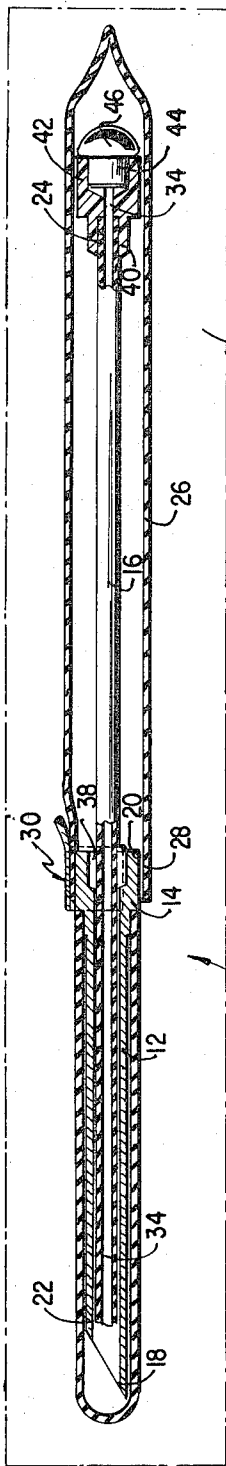


FIG. 1

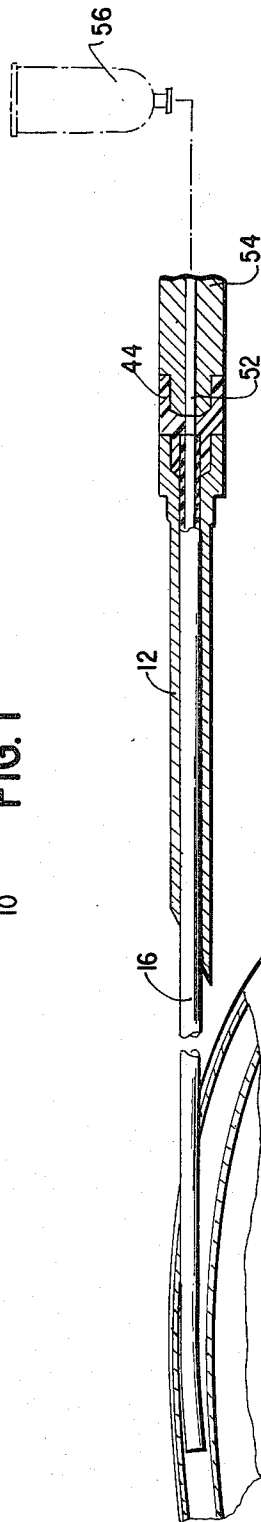


FIG. 5

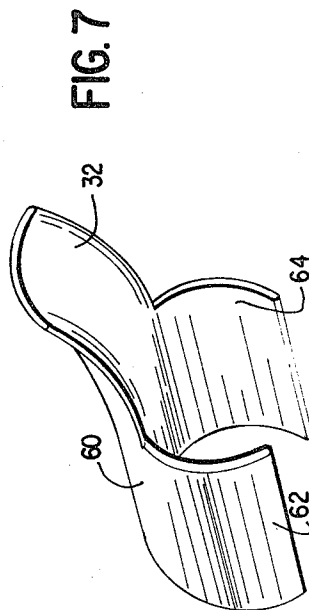


FIG. 7

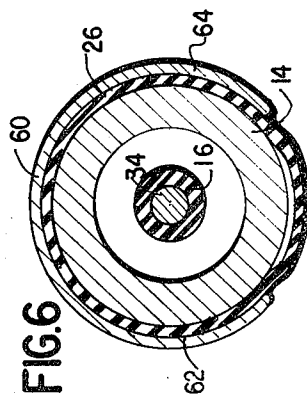


FIG. 6

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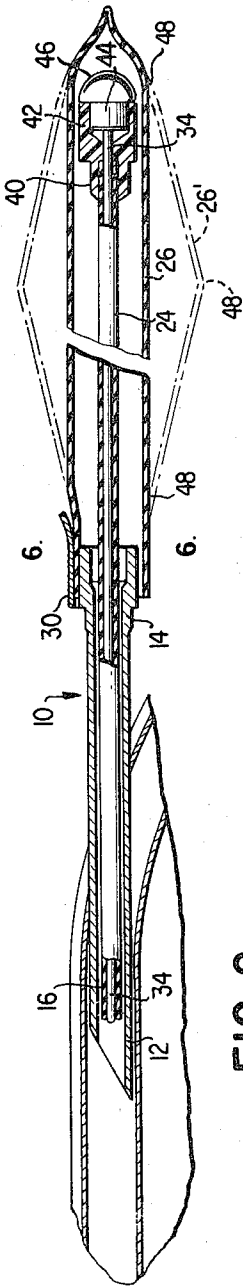


FIG. 2

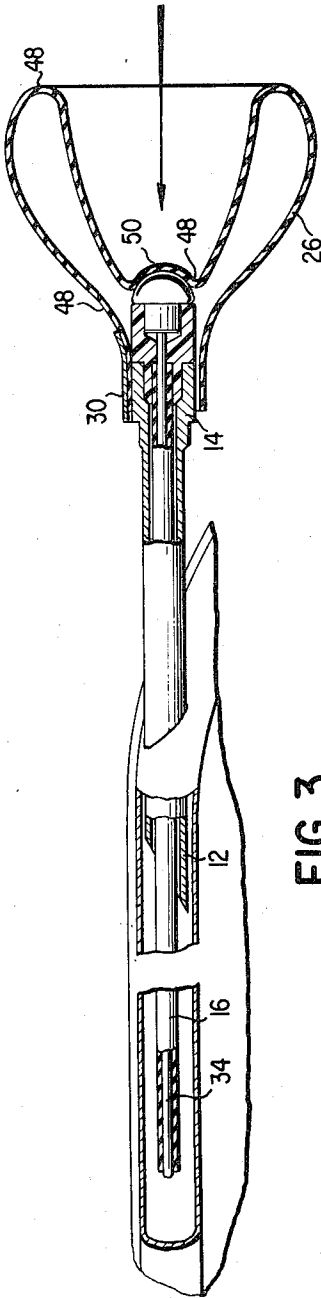


FIG. 3

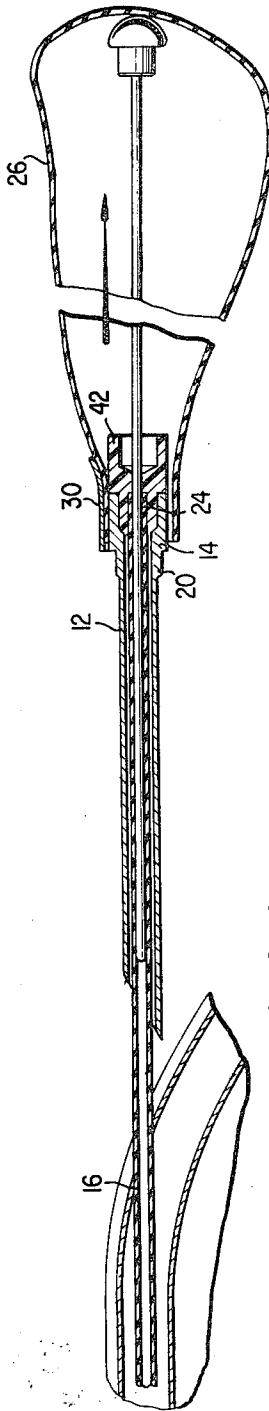


FIG. 4

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RETAINING CLIP FOR CATHETER SHEATH

This invention relates to an intravenous catheter and in particular to a clip structure for retaining a protective sheath over the catheter tube during venipuncture.

During the administration of parenteral liquids, as by intravenous feeding, one of the more standard procedures is to make a venipuncture with a cannula and then thread a sterile plastic catheter into the vein. During the venipuncture, the shank end of the catheter extends from the shank end of the cannula and may be exposed to contamination. It has been an accepted practice to protect the shank of the catheter from such contamination by maintaining the protective casing or envelope in which the device is packaged over the extension of the catheter during the venipuncture. However, this type of operation has proved awkward and provides basis for needed improvement in means to maintain the catheter free from contamination during its use.

After the venipuncture is complete and the catheter is threaded through the cannula into the vein, the cannula is then withdrawn and the catheter may be taped to the patient's body approximate the entry point. Subsequently, an administration apparatus is attached to the catheter and the intravenous feeding of the patient may commence.

The above-described basic operation is well known and a number of apparatus have been provided for the practice. A particularly suitable device has been described in U.S. Pat. No. 3,323,523 and reference may be made to that disclosure for a complete description of the background to which this invention relates.

By way of summary, the present invention provides an improved intravenous catheter unit which includes a protective sheath mounted over the shank end of the catheter tube and connected to the hub of the cannula needle. This sheath is loosely mounted on the hub of the cannula needle and serves to prevent contamination of the shank end of the catheter tube during insertion of the needle. A primary aspect of the present invention is directed to a clip for securing the sheath to the hub of the needle, but which permits a simple and quick removal of the sheath.

The catheter device of the present invention is packaged in a transparent casing or envelope and the entire assembly is sterilized in the envelope after packaging. Arrangements of this type have previously employed the envelope as a means for protecting against contaminating the shank end of the catheter tube. However, this arrangement has proved unsatisfactory in that a somewhat cumbersome and awkward manipulation of the device is required.

The present invention avoids these problems and has as its primary object the provision of a loosely fitting sheath over the shank end of a catheter tube with removable retaining means for holding the sheath in engagement with the shank of the cannula needle.

Another object of this invention is to provide a clip for holding the sheath on the hub of the cannula needle, which clip is constructed of a resilient flexible material which can be quickly snapped off the hub of the needle.

The primary object of the invention having been stated, other objects of the invention will become apparent to those skilled in the art when reference is made to the following detailed description of one embodiment of the invention.

This description is made in conjunction with the accompanying drawings wherein:

FIG. 1 is a side elevation view of the intravenous catheter of the present invention in assembled relation and enclosed in a transparent envelope;

FIG. 2 is a fragmentary perspective view showing the arrangement of the catheter device immediately after venipuncture;

FIG. 3 is a fragmentary perspective view showing the device immediately after placement of the catheter tube;

FIG. 4 is a fragmentary perspective view showing the catheter device after removal of the cannula needle;

FIG. 5 is a fragmentary perspective view showing the final arrangement of the device connected for intravenous feeding;

FIG. 6 is a cross-sectional view taken along the line 6-6 of FIG. 2; and

FIG. 7 is a perspective view of the clip of the present invention.

Referring now to FIG. 1, the packaged unit is illustrated. The catheter assembly is generally indicated at 10 and includes the cannula needle 12 having a hub 14 and the catheter tube 16 extending therethrough.

For convenience of description, the cannula needle is shown to include a pointed end 18 and the base end 20. The catheter tube includes a tip 22 and a shank end 24.

Extending about and surrounding the shank end 24 of the catheter tube is the sheath 26. The sheath 26 fits loosely over the hub 14.

Connecting the sheath 26 at its mouth portion 28 to the hub 14 is the clip indicated generally at 30. The relative sizes of the mouth of the sheath 26 and the outside diameter of the hub 14 are such that the sheath could be easily removed from the hub of the needle. This arrangement is important to recognize since, when it is time to remove the sheath 26 from the assembly, it is highly impractical to have any frictional engagement between the mouth 28 and the hub 14. Such a frictional engagement would require some twisting and manipulation of the sheath 26 to remove it. On the other hand, the arrangement and construction of the device as presently described permits the sheath to be readily removed and thus does not require any movement or twisting of the assembly which might result in an unnecessary injury to the patient. The clip 30 is designed to grip and hold the mouth 28 about the hub 14 and this relationship can be seen clearly in FIG. 6.

The clip 30 is constructed of a plastic or other spring type material which permits same to clasp the mouth of the sheath 26 firmly about the hub 14. When it comes time to remove the sheath 26 from the assembly, the clip 30 can be easily removed from the hub 14 by merely placing a finger under the neck 32 and snapping off the clip. At this point, the sheath may be easily removed.

Referring again to FIG. 1, it can be seen that the catheter tube 16 has telescopically fitted therein a flexible stiffener 34. The stiffener 34 is designed to assist in the guiding and insertion of the catheter tube in the patient's vein after the venipuncture is made. Finally, the entire assembly is shown enclosed in a transparent casing or envelope 36, which is made of a thin, flexible plastic material.

After the assembly has been completed, and the assembly is packaged in the envelope 36, the unit is sterilized in its packaged condition. By having the sheath 26 fitting loosely about the hub 14 of the needle, it is clear that the sterilization process permits sterilization of the entire unit, including the shank 24 of the catheter tube and that the primary purpose of the sheath 26 is to avoid contamination of the shank 24 once the envelope 36 has been removed and the device is being inserted in the patient's body.

As can be further seen from FIG. 1, the base end of the cannula needle 12 is counterbored at 38 for receiving adapter 40 mounted on the shank 24 of the catheter tube when the catheter is passed through the cannula needle into the patient's vein.

It can also be seen from FIG. 4 that the shank 24 includes an enlarged portion 42 which is counterbored at 44 for receiving the adapter 46 on the base end of the flexible stiffener 34.

Once the device has been inserted in the patient and the catheter tube is in the patient's vein, and the device is ready for connection to the administration set for the intravenous feeding, the counterbore 44 will receive an adapter provided on the end of the tube of the administration set (see FIG. 5).

Referring now to FIGS. 2-5, the use of the device employed in the present invention is illustrated. FIG. 2 shows the catheter assembly 10 after the envelope 36 has been removed and the venipuncture made. FIG. 2 clearly shows the protective sheathing 26 covering the shank 24 of the catheter tube to protect the shank from contamination by the user during venipuncture. As shown in phantom lines in FIG. 2, the sheath 26 may include a bulbous portion 26' as an alternative con-

struction of the sheath. The alternative construction employing the bulbous portion 26' may be molded to include the thinned portions 48 for a purpose which will be described shortly.

The clip 30 still retaining the sheath 26 securely about the hub 14 of the needle, the device now has the catheter tube 16 passed through the cannula needle 12 into the patient's vein, as can be seen in FIG. 3. This is accomplished by holding the needle hub securely in the position as shown in FIG. 2 and applying pressure to the base end 50 of the assembly. This pressure forces the cannula tube and the stiffener member 34 through the bore of the needle 12. The pressure also causes the sheath 26 to collapse and if a sheath construction of the alternative type illustrated in FIG. 2 is provided, the sheath will collapse in a predetermined pattern as defined by the thinned portions 48, which in effect constitute fold lines extending annularly about the sheath.

Referring now to FIG. 4, the device is illustrated with the parts in their relation after the cannula needle 12 has been withdrawn from the patient's body. The catheter tube 16 will remain in communication with the patient's vein, as is shown. The needle 12 is withdrawn by merely withdrawing the entire assembly a sufficient distance to disengage the needle from the patient. The initial insertion of the catheter tube 16 is of sufficient depth so that when the needle 12 is withdrawn, a significant portion of the tip 22 of the catheter tube is left within the patient's vein.

After the needle 12 has been withdrawn from the patient, the flexible stiffener 34 will be removed from the device by holding the enlarged portion 42 of the shank 24 of the catheter tube and grasping the base end of the stiffener through the flexible sheath 26 to withdraw the stiffener. This step has already been performed in the relation of the parts as shown in FIG. 4.

The next step of the procedure is to remove the clip 30 by holding the assembly adjacent the base end 20 and at the same time placing a finger or thumb under the neck 32 of the clip and springing the clip off the assembly. The sheath 26 is then free to be easily removed from the assembly and the assembly is made ready for connection to the administration set merely by grasping the stiffener 34 approximate its base end and the closed end of the sheath at the same time and applying a removing force. Since the sheath 26 fits loosely about the hub 14 at its mouth 28, there is no need for any twisting or other manipulation of the device to overcome frictional or other connecting forces. This step has been completed in the arrangement of the assembly shown in FIG. 5 and the device has been connected to the administration set by means of the adapter 52 fitted within the counterbore 44. The adapter 52 is provided on the end of the tube 54 which is shown schematically connected to an administration set 56.

Referring now to FIG. 7, one embodiment of the construction of the clip of the present invention is illustrated. This clip includes the body 60 having the upwardly curved neck portion 32 and the depending legs 62 and 64, the body and legs defining a gripping surface adapted to extend greater than 180° but less than 360° around the hub 14 of needle 12. The legs are curved and subtend the major portion of a circle with the concave segment of each of the curved legs facing each other. As will be readily understood, the clip 30 is of a highly resilient spring type material and may be readily snapped over or

snapped off of the hub 14 carrying the mouth 28 of the sheath 26. This arrangement can be seen in FIG. 6, which shows the clip 30 forcing the mouth 28 tightly about the hub 14.

The primary advantages of the assembly illustrated, including the clip of the present invention, are that the sheath 26 is secured to the needle 12 to avoid contamination of the catheter tube 16 during substantially the entire period of venipuncture and connection of the device to the administration set. Moreover, this protection against contamination does not provide any type of a hindrance when the initial sterilization of the assembly is accomplished after the device has been packaged in the envelope 36 since the connection between the mouth 28 and the hub 14 is discontinuous, as is shown in FIG. 6. The provision of thinned or weakened portions on the sheath 26 permits a controlled folding or collapsing of the sheath during the manipulation of the device so that no significant pressure will be applied to the clip 30. Finally, once the assembly has been inserted and just prior to the time for connection to the administration set, the clip 30 may be sprung from the assembly by a minimum amount of pressure applied under the neck 32. Removal of the clip 30 permits the sheath 26 and the flexible stiffener 34 to be readily removed from the device without the need for any twisting or significant manipulation of the assembly to overcome any frictional forces which might otherwise be connecting the sheath to the needle. This easy removal of the sheath 26 ensures that unnecessary injury to the patient can be avoided and at the same time simplifies the use of the catheter device over the procedures involved in the use of prior art structures.

A detailed description having been given of exemplary embodiments of the present invention, the true nature and scope of the invention is defined in the appended claims.

I claim:

1. In a catheter assembly including a needle having a hub on one end thereof, a passage extending through the entire length of said needle, a catheter tube within said passage and extending from said needle at the hub end thereof, and a sheath over the extension of said catheter tube, the improvement including: said sheath having a mouth fitted loosely about the hub of said needle and a clip removably securing said sheath to said hub, said clip having a configuration to mate with said hub and defining a gripping surface extending greater than 180° but less than 360° around said hub, said clip having a laterally extending portion to facilitate removal of said clip.
2. A catheter assembly as defined in claim 1 wherein said clip includes a body having a pair of depending curved legs with concave surfaces facing each other, the body and legs in combination defining the arc of a circle greater than 180° but less than 360°.
3. A catheter assembly as defined in claim 2 wherein said laterally extending portion includes an upturned neck extending from said body.
4. A catheter assembly as defined in claim 1 wherein said sheath is tubular and has a bulbous segment mediate its ends.
5. A catheter assembly as defined in claim 4 wherein said tubular sheath has weakened sections circumferentially thereabout at each end of said bulbous segment.
6. A catheter assembly as defined in claim 4 wherein said sheath is closed at an end opposite from said mouth.
7. A catheter assembly as defined in claim 3 wherein said clip is constructed of a flexible plastic material.

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