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INTRAVENOUS STYLET CATHETER

Filed Oct. 25, 1963

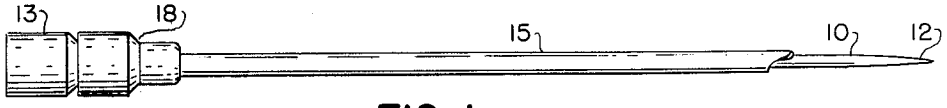

FIG. 1

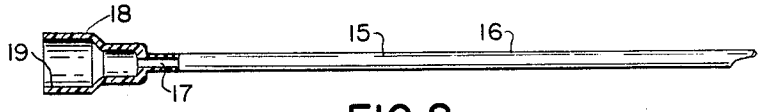

FIG. 2

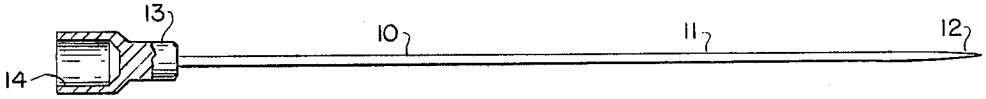

FIG. 3

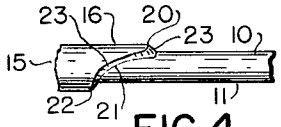

FIG. 4

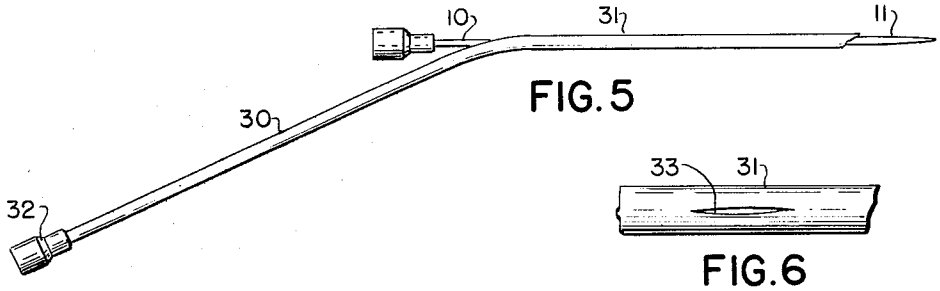

FIG. 5

FIG. 6

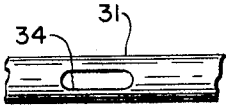

FIG. 7

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INTRAVENOUS STYLET CATHETER

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This invention relates in general to devices for administering intravenous therapy and, more particularly, to intravenous catheters.

Conventional intravenous catheters generally consist of an administration needle of large bore through which there is partly passed a flexible plastic tube. After the needle is inserted into a vein, the tube is further passed through the needle and advanced into the vein. The needle is then withdrawn leaving the catheter in place. This conventional device requires the use of a very heavy guage needle since the plastic tube must pass through the bore of the needle and must have a lumen of its own sufficient in size to dispense fluids, often of high viscosity, into the vein. The insertion of this large guage needle is most painful particularly since patients in need of repeated transfusions are usually debilitated. In such a condition, their tissues lack flexibility and their skin elasticity since it is depleted of subcutaneous fatty tissue. This renders the insertion of a large bore needle very difficult.

More recently a conventional needle containing a beveled opening at one end has been available with the needle portion having a short catheter disposed about it. This needle and the catheter are inserted into a vein whereupon the needle is withdrawn leaving the short catheter in the vein. This device is disadvantageous in that, as soon as the needle penetrates a vein, blood flows through the bore of the needle and out of its hub much to the distress of a patient. Further, the conventional needle with its bevel opening does more damage than necessary to the wall of a vein and is harder to insert.

A main object of this invention is to provide a more easily and less painfully inserted intravenous catheter.

Another object of this invention is to provide a more easily and less painfully inserted intraveneous catheter which may be of any desired length.

A further object of this invention is to provide an intravenous catheter having a stylet extend through its bore for insertion into a vein, the end of the catheter about the stylet having a configuration which more easily facilitates its entry with the stylet into a vein.

Many other objects, advantages and features of invention reside in the particular construction, combination and arrangement of parts involved in the embodiments of the invention and its practice as will be understood from the following description and accompanying drawing wherein:

FIGURE 1 is a side view of an intravenous catheter containing a stylet for insertion into a vein according to a first embodiment of this invention;

FIGURE 2 is a side view of the catheter of FIGURE 1 with the hub portion broken away in section;

FIGURE 3 is a side view of the stylet of FIGURE 1 with the rear end of the hub portion broken away in section;

FIGURE 4 is a side view of a fragment of the stylet and the end portion of the catheter disposed about it;

FIGURE 5 is a side view of a stylet and an intravenous catheter assembled according to a second embodiment of this invention; and

FIGURES 6 and 7 are top views of fragments of an intravenous catheter which may be used in the second embodiment of this invention.

Referring to the drawing in detail, FIGURE 3 shows a stylet **10** having a shaft portion **11**. Shaft portion **11** is fine boreless round rod that terminates in a gradually tapering completely rounded tip **12** having a sharp lance-like point. Stylet **10** has a hub portion **13** containing an opening **14** fixed to it so that the stylet **10** may be fitted on the male luer tip of a syringe for easier insertion into a vein. Stylet **10** may be of stainless steel with a metal or plastic hub **13**.

FIGURE 2 shows an intravenous catheter **15** having a tubular portion **16** containing a longitudinal lumen **17**. A hub portion **18** is fixed to or formed integrally with one end of tube **16** and the hub contains an opening **19** to receive the tip of a syringe or any other equivalent apparatus for administering intraveneous therapy. The intravenous catheter tube is formed from any of the plastics conventionally used to make intravenous catheters.

FIGURE 1 shows the first embodiment of this invention assembled for use. In a sterile condition, the catheter **15** is slipped over the stylet **10**. The stylet **10** is then inserted into a vein with its lance like tip **12** easily penetrating the wall of the vein as it stretches about the round cross section of the stylet. As may be seen in FIGURE 4, the end of tube **16** has a particular configuration. The end of tube **16** is cut across in a curve **20** which slopes away on each side **21** to come together at **22** below and behind the front portion **20**. This particular configuration enjoys a twofold advantage. It does not have the entire diameter of the tube **16** enter a vein as an annular shoulder, but it enters considerably more gradually as front portion **20** first enters the vein followed by the side portions **21** and then the rearmost portion **22**. If front portion **20** was formed in to a V-shaped point or apex, it has been found in practice that it will be flexed backward away from stylet **10** to interfere with the easy entrance of tube **16** in to a vein. The particular configuration shown not only easily enters a vein, but also holds the front portion **20** against stylet **10** for safe, easy insertion. The actual cut end surface **23** of tube **16** may be beveled backward to ease its insertion into a vein. After insertion of the stylet **10** and the tube **16** into a vein, the stylet is removed and therapy is carried out through the catheter **15**.

Referring now to FIGURES 5–7, the second embodiment of this invention has a stylet **10** substantially identical to that shown in FIGURE 3. An intravenous catheter having a tubular portion **31** of much greater length than the shaft portion **11** of stylet **10** has a hub **32** fixed to it. Hub **32** is substantially identical to hub **18** and the front end of tube **31** is substantially identical to that shown in FIGURE 4. A short distance from the front of tube **31**, preferably about one and one half inches, the side of tube **31** contatins a longitudinal slit **33** as shown in FIGURE 6. The shaft portion **11** of stylet **10** enters tube **31** through slit **33**.

In use, the second embodiment of this invention has the tube **31** of catheter **30** inserted into a vein with the stylet **10**. The stylet **10** is then removed from tube **31** which is then manually advanced into the vein as far as desired. When fluids are administered through catheter **30**, any slight leakage through slit **33** will be dispensed into the vein. If desired, as shown in FIGURE 7, an elongated opening **34** may be formed in tube **31** to accommodate stylet **10**. Slit **33** is generally preferable as it will tend to close completely upon the removal of stylet **10**. This embodiment of this invention allows the insertion of a catheter of any length desired. The length of the catheter is no longer limited by the stylet **10** or other device used to insert it.

While I have shown and described my invention in the best forms known to me, it will nevertheless be understood that these are purely exemplary and that modifications may be made without departing from the spirit and scope of the invention except as it may be more limited in the appended claims wherein.

I claim:

1. An intravenous catheter comprising, in combination, a flexible tube having a wall containing a bore and having front and back ends, the front end of said tube forming a first opening, the wall of said tube contatining a second opening behind said front end, a hub on the back end of said flexible tube, and a round rigid pointed member of substantially the same diameter as the bore of said ube extending into said tube through said second opening and emerging through said first opening to extend beyond the front end of said tube so that said member and the front end of said catheter may be inserted into a vein before said member is removed from said tube and said tube is advanced further into the vein.

2. An intravenous catheter comprising, in combination, a flexible tube having a wall and front and back ends and containing a first opening at said front end and a second opening in the wall of said tube behind said front end, a hub on the back end of said flexible tube, and a stylet extending into said tube through said second opening and extending through said first opening beyond the front end of said tube, the front end of said tube having a transverse front portion which is rounded with rearwardly sloping sides which come together behind and on the opposite side of said tube from said transverse rounded front portion, said stylet and the front end of said catheter being inserted into a vein before said stylet is removed from said catheter and said catheter is further advanced into the vein.

3. The combination according to claim 2 wherein said second opening in said tube is a longitudinal slit.

4. An intravenous catheter comprising, in combination, a flexible tube having a wall and front and back ends and containing a first opening at said front end and a second opening in the wall of said tube behind said front end, a hub on the back end of said flexible tube, and a rigid fine boreless round stylet having a gradually tapering completely rounded tip with a sharp lance-like point, said stylet extending into said tube through said second opening and extending through said first opening beyond the front end of said tube so that said stylet and said catheter may be inserted into a vein before said stylet is removed from said catheter and said catheter is further advanced into the vein.

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