

Nov. 13, 1956

G. D. UTLEY ET AL
SURGICAL NEEDLE AND METHOD FOR BLOOD
TRANSFUSION OR INTRAVENOUS FEEDING

2,770,236

Filed Dec. 31, 1954

2 Sheets-Sheet 1

FIG. 1

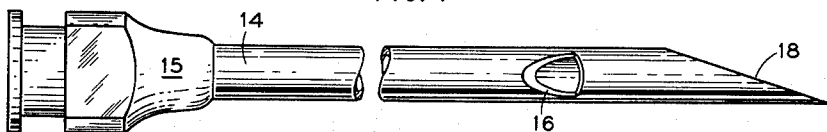


FIG. 2

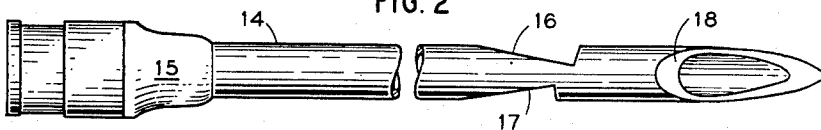


FIG. 8

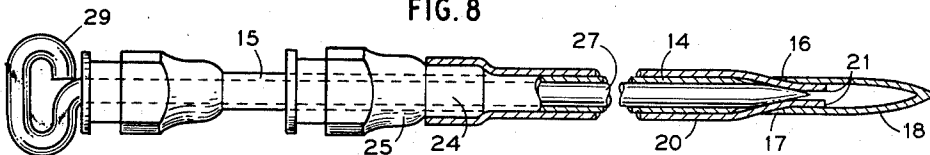


FIG. 9

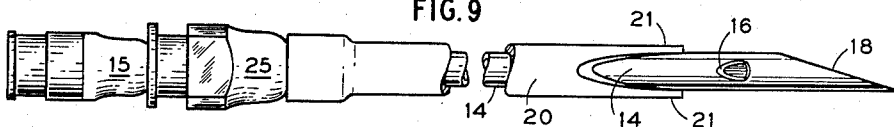


FIG. 12

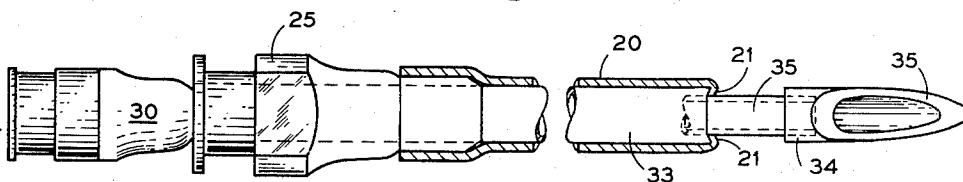
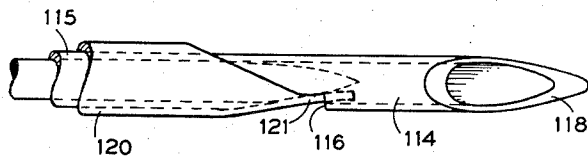


FIG. 13



INVENTOR
GEORGE D. UTLEY
SIDNEY HIRSCH

BY
Irving Seidman
ATTORNEY

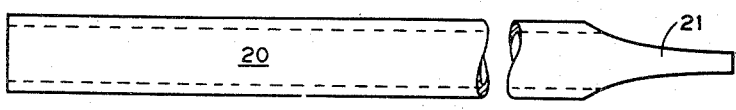
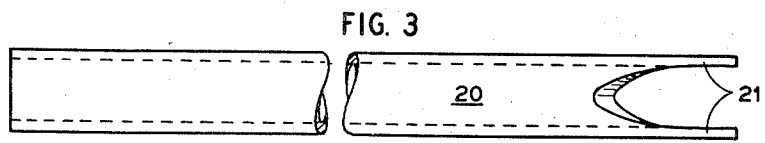
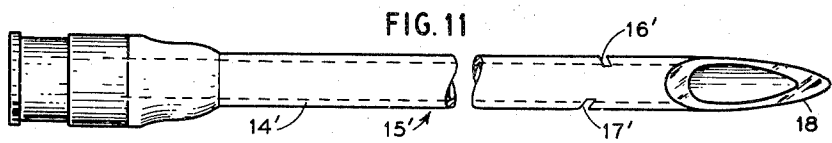
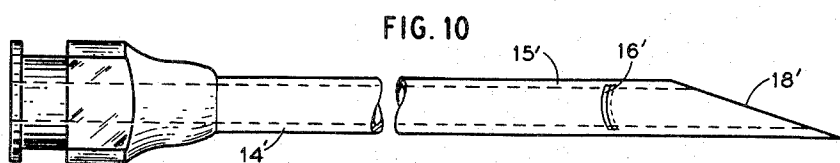
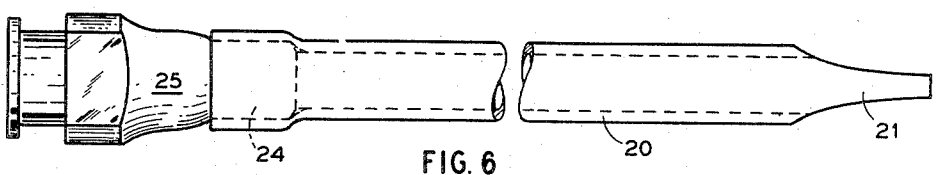
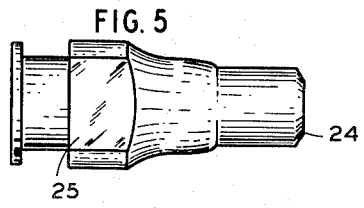
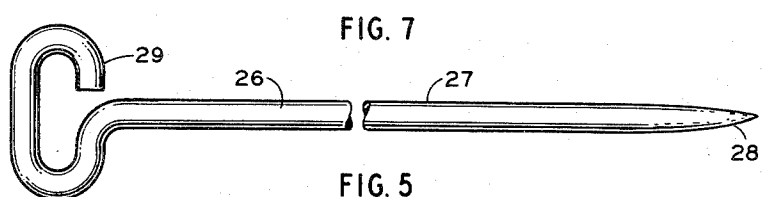
Nov. 13, 1956

G. D. UTLEY ET AL
SURGICAL NEEDLE AND METHOD FOR BLOOD
TRANSFUSION OR INTRAVENOUS FEEDING

2,770,236

Filed Dec. 31, 1954

2 Sheets-Sheet 2



INVENTOR
GEORGE D. UTLEY
SIDNEY HIRSCH
BY
Irving Seidman
ATTORNEY

1

2,770,236

SURGICAL NEEDLE AND METHOD FOR BLOOD TRANSFUSION OR INTRAVENOUS FEEDING

George D. Utley, Forest Hills, and Sidney Hirsch, Cedarhurst, N. Y.

Application December 31, 1954, Serial No. 478,985

9 Claims. (Cl. 128—221)

This invention relates to surgical apparatus and, more particularly, to improved surgical apparatus for establishing an exterior connection to a small diameter vein or blood vessel for intravenous feeding, blood transfusions and the like.

Present operative technique for establishing an outside connection to a blood vessel such as a relatively large vein or artery involves the use of a medium or large diameter hollow surgical needle to enter the blood vessel to permit the entry of a hose or tube of inert material through the large needle into the blood vessel, and then the needle is withdrawn leaving the hose or tube in place. A connection device is attached to the outer end of the hose or tube. The necessary exterior connections are made to the connection device on the outer end of the hose.

However, when a small diameter needle is used, as with smaller blood vessels, it is difficult if not impossible to effectively insert the hose into the blood vessel through the needle, due to the small diameter of the latter. Consequently, the needle must be left inserted in the vein and the external connections made to the outer end of the needle.

While such surgical needles are usually made of stainless steel or other non-corrodible metal, nevertheless considerable irritation occurs at the puncture when the needle is left inserted in the vein, which is not the case when a hose of inert plastic material remains inserted into the vein.

The present invention is directed to a novel combination of surgical devices whereby a modified very small diameter hollow surgical needle may be used to insert the end of a plastic hose into a small diameter vein as the needle punctures the vein, the modified needle being easily disengaged from the hose and withdrawn from the vein through the hose connection device after the puncture is made. To this end, a small diameter hollow surgical needle is cut laterally adjacent its point, and may be provided with a pair of substantially diametrically opposed lateral cuts. The inner end of the plastic hose is suitably cut to form at least one relatively narrow tab extending from its inner end, and the connection device is secured to the outer end of the hose. The modified needle is then inserted through the connector and hose, and the tab or tabs on the hose are flexed inwardly into the cut or cuts of the needle and suitably clamped therein.

The needle is then inserted in to the vein to a depth sufficient to carry the uncut portion of the hose into the vein. After this, the hose tabs are unclamped and the needle is suitably manipulated to disengage the hose tabs from the needle to permit the latter to be withdrawn from the hose through the connector, leaving the hose inserted into the vein. The exterior connections are then made to the hose connector or coupling.

In a preferred embodiment of the invention, the needle cuts are formed at an acute angle to the needle axis and sloping inwardly toward the needle point. After the

2

hose tab or tabs are inserted into the cuts, a pointed stilet is inserted into the needle to clamp the hose tabs. This stilet is withdrawn after the vein is punctured, and the needle is rotated to release the tabs from the cuts for withdrawal of the needle.

In another embodiment, the needle is severed adjacent its point and a small diameter tube is secured in the point portion and slidably extended through the body portion. The hose tabs are clamped between the cut ends by telescoping contraction of the needle portions and released, after the vein is punctured, by telescopic separation of the cut ends followed by inward movement of the body portion to close the peripheral gap. The needle portions are then withdrawn as a unit.

For an understanding of the invention principles, reference is made to the following description of typical embodiments thereof as illustrated in the accompanying drawing. In the drawing:

Figs. 1 and 2 are, respectively, greatly enlarged top plan and side elevation views of a small diameter surgical needle modified in accordance with one embodiment of the invention;

Figs. 3 and 4 are, respectively, greatly enlarged top plan and side elevation views of a plastic hose cooperating with the needle of Figs. 1 and 2;

Fig. 5 is a greatly enlarged side elevation view of the hose connector or coupling;

Fig. 6 is a greatly enlarged side elevation view of the hose assembled to the coupling;

Fig. 7 is a greatly enlarged side elevation view of the stilet;

Fig. 8 is a greatly enlarged side elevation view, partly in section, of the surgical device as assembled before making a vein connection;

Fig. 9 is a greatly enlarged side elevation view of the device showing the relation of parts just prior to withdrawal of the needle from the vein;

Figs. 10 and 11 are views, corresponding respectively to Figs. 1 and 2, of a needle having a modified form of cuts therein;

Fig. 12 is a greatly enlarged side elevation view, partly in section, of a further embodiment of the invention; and

Fig. 13 is a greatly enlarged partial side elevation view of yet another embodiment of the invention device.

Referring to Figs. 1 and 2, in accordance with the invention the stem 14 of a small diameter hollow surgical needle 15 is formed with a pair of substantially diametrically opposed cuts 16 and 17 adjacent the pointed end 18 of the needle. It will be noted that cuts 16 and 17 are at an acute angle of less than 45° to the needle axis and slope forwardly and inwardly toward the needle point. For a purpose to be described, the cuts are preferably slightly staggered lengthwise of the stem 14.

The needle 15 of Figs. 1 and 2 is arranged to cooperate with the plastic or synthetic resin hose 20 of Figs. 3 and 4. This hose, which is a small diameter, thin-walled hose of inert flexible material, has its inner end cut, as shown, to provide narrow tabs 21 projecting from its inner end. The outer end of the hose is arranged to be stretched over a nipple 24 on the hose connector or coupling 25 (Fig. 5) to form the composite assembly shown in Fig. 6. Coupling 25 is a standard surgical item. The remaining element of the surgical appliance is a stilet 26, shown in Fig. 7 as including an elongated stem 27 having a pointed inner end 28 and a handle 29.

To make a connection to a vein, needle 15 is inserted through coupling 25 and hose 20, assembled to the coupling, until cuts 16 and 17 are beyond the tabs 21 of hose 20. Needle 15 is then retracted to the position of Fig. 8 with openings 16, 17 longitudinally aligned with tabs 21. Needle 15 is then retracted and tabs 21 are "led" into cuts 16, 17. Due to the staggering of the

3

cuts, this "leading" can be effected with one tab at a time, facilitating the manipulation of the relatively small parts.

When tabs 21 are fully inserted into needle stem 14, stilet 26 is inserted into needle 15 so that its pointed end 28 clamps the tabs 21 against the inner surface of stem 14. The needle 15 is then inserted into a vein, in the usual manner, to an extent sufficient to carry the uncut body portion of hose 20 into the vein.

Stilet 26 is then withdrawn, and needle 15 is pushed further into the vein with coupling 25 held stationary. This withdraws tabs 21 from cuts 16, 17, and needle 15 is then relatively turned to the position of Fig. 9. In this position, tabs 21 are no longer longitudinally aligned with cuts 16, 17 so that needle 15 may be withdrawn through hose 20 and coupling 25, leaving the inner end of hose 20 in the vein. The external connections for intravenous feeding, blood transfusion, or the like are then made to coupling 25.

Figs. 10 and 11 illustrate a modified form of needle 15' in which the cuts 16' and 17' in stem 14' are at a greater acute angle, more than 45°, to the needle axis. Needle 15' is used in the same manner as needle 15.

In the embodiment of Fig. 12, a small diameter hollow needle 30 has its stem severed in a diametric plane adjacent its point 32 to provide a stem portion 33 and a point portion 34. A very small diameter tube 35 is then secured in the cut end of portion 34 and telescoped through stem portion 33.

To use needle 30, the needle is inserted through coupling 25 and hose 20, and portions 33, 34 axially separated. The hose tabs 21 are then turned inversely inwardly against tubing 35 and point portion 34 moved toward stem portion 33. This clamps the tabs in position. Needle 30 is then inserted into a vein, as previously described, portions 33, 34 are axially separated to "straighten" tabs 21, the portions 33, 34 are re-engaged, and needle 30 is withdrawn leaving the inner end of hose 20 in the vein.

Fig. 13 illustrates a modification similar to that of Figs. 1 through 9 in which the stem 114 of needle 115 is formed with a single cut 116 adjacent its pointed end 118. In this case, hose 120 is cut to form a single tab 121. This arrangement operates in the same manner as those of Figs. 1-9 and 10, 11.

While specific embodiments of the invention have been shown and described in detail to illustrate the application of the invention principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. Surgical apparatus for establishing an external connection to a small diameter blood vessel comprising, in combination, a thin-walled small diameter hose of inert, flexible material having its inner end cut to form at least one narrow elongated tab extending therefrom; a coupling secured to the outer end of said hose; a surgical needle having a small diameter hollow stem pointed at its inner end, said stem being cut inwardly adjacent its pointed end whereby, when said stem is inserted through said coupling and hose, the tab on the hose may be engaged in said cut; and clamping means movable in said stem relative to at least the main portion thereof and constructed and arranged to clamp said hose tab to said stem to draw the end of said hose into a blood vessel as the latter is punctured by the pointed end of said needle;

4

said clamping means and at least the main portion of said stem being relatively manipulable to disengage the hose tab from said stem to provide for withdrawal of said stem from said hose and coupling while leaving the inner end of said hose inserted in said blood vessel.

2. Surgical apparatus for establishing an external connection to a small diameter blood vessel comprising, in combination, a thin-walled small diameter hose of inert, flexible material having its inner end cut to form at least one narrow elongated tab extending therefrom; a coupling secured to the outer end of said hose; a surgical needle having a small diameter hollow stem pointed at its inner end, said stem having a transverse cut adjacent its pointed end extending through the wall thereof whereby, when said stem is inserted through said coupling and hose, the tab on the hose may be inserted through said cut into the stem; and clamping means extending in said stem to engage the hose tab and clamp it against the inner surface of said stem to draw the end of said hose into a blood vessel as the latter is punctured by the pointed end of said needle; said clamping means being retractable to release the hose tab for withdrawal from said cut upon relative longitudinal movement of said stem and said hose to provide for withdrawal of said stem from said hose and coupling while leaving the inner end of said hose inserted in said blood vessel.

3. Surgical apparatus as claimed in claim 2 in which said clamping means comprises a stilet having a pointed stem insertable through the needle stem.

4. Surgical apparatus as claimed in claim 2 in which said cut slopes inwardly toward the needle point at an acute angle to the needle axis.

5. Surgical apparatus as claimed in claim 2 in which said needle stem has a pair of substantially diametrically opposed cuts and said hose has a pair of diametrically opposite tabs.

6. Surgical apparatus as claimed in claim 5 in which said cuts are offset longitudinally of said needle stem.

7. Surgical apparatus as claimed in claim 2 in which the angle between said cut and the needle axis is less than 45°.

8. Surgical apparatus as claimed in claim 2 in which the angle between said cut and the needle axis is greater than 45°.

9. Surgical apparatus as claimed in claim 2 in which said stem is severed transversely adjacent its pointed end to form a point portion and a stem portion; and a small diameter tube is secured in said point portion and telescoped in said stem portion whereby, when said stem is inserted through said coupling and hose, the tab on the hose may be bent inwardly for clamping between said point and stem portions to draw the end of said hose into a blood vessel as the latter is punctured by the pointed end of said needle; said stem and point portions being movable apart to disengage the hose tab from said stem and then re-engaged to provide for withdrawal of said stem as a unit from said hose and coupling while leaving the inner end of said hose inserted in said blood vessel.

References Cited in the file of this patent

UNITED STATES PATENTS

1,248,492	Hill	Dec. 4, 1917
2,541,691	Eicher	Feb. 13, 1951