United States Patent [19]

Norton

[11] **3,774,606**

[45] **Nov. 27, 1973**

[54] **ADJUSTABLE NEEDLE HUB**

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[73] Assignee: **C. R. Bard, Inc.,** Murray Hill, N.J.

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[21] Appl. No.: **232,546**

[52] **U.S. Cl.** **128/214.4,** 128/221

[51] **Int. Cl.** **A61m 05/00**

[58] **Field of Search** 128/214.4, 221, 347, 128/348

[56] **References Cited**

UNITED STATES PATENTS

3,406,687	10/1968	Moyer	128/221
3,506,007	4/1970	Henkin	128/214.4 X
1,248,492	12/1917	Hill	128/347
3,459,183	8/1969	Ring et al.	128/214.4

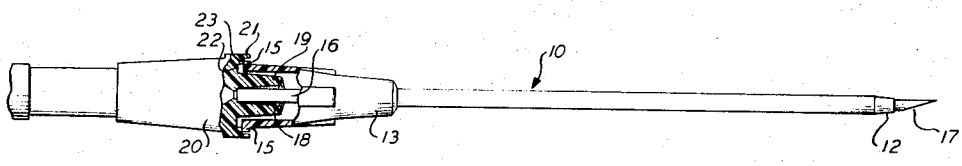
Primary Examiner—Dalton L. Truluck

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[57] **ABSTRACT**

An intravenous needle and catheter (or cannula) combination wherein the needle passes through the catheter, when assembled for venipuncture, the needle hub being formed distally in a plurality of steps adapted to support Luer lugs on the catheter hub in different positions, permitting determination of the distance the needle bevel tip projects beyond the catheter tip.

2 Claims, 7 Drawing Figures



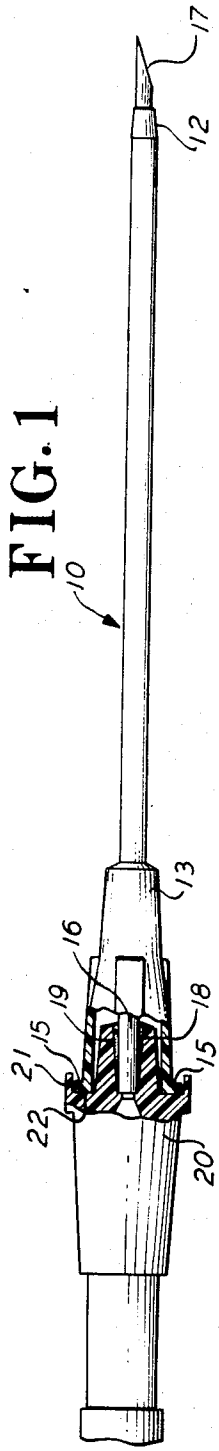


FIG. 1

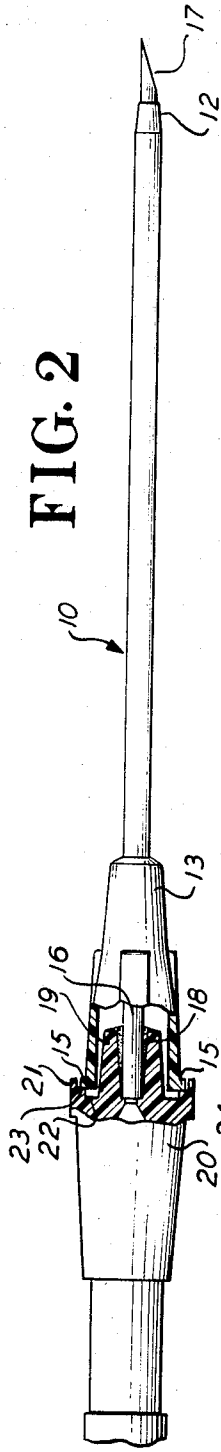


FIG. 2

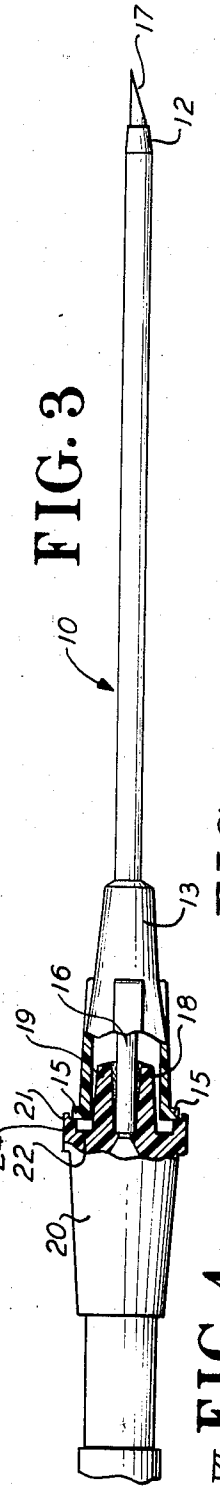


FIG. 3

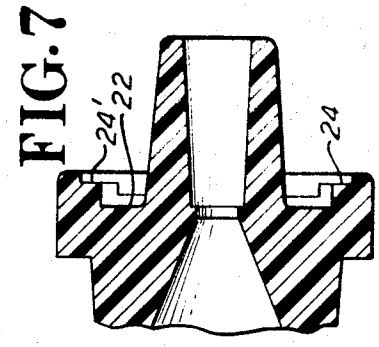


FIG. 7

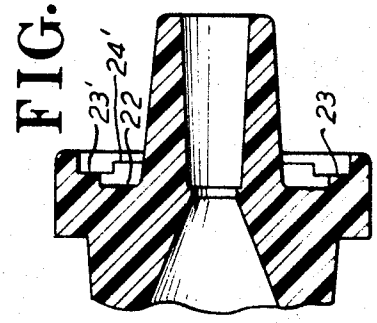


FIG. 6

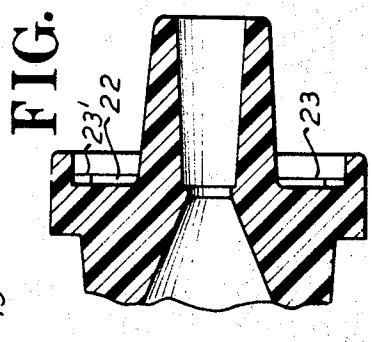


FIG. 5

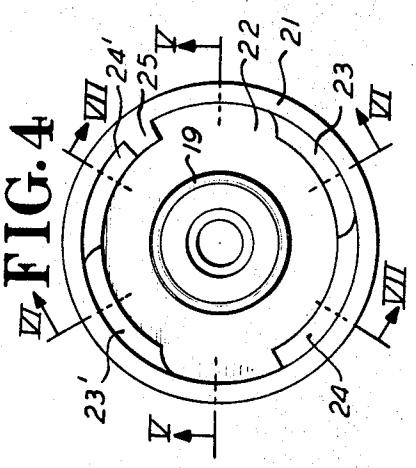


FIG. 4

ADJUSTABLE NEEDLE HUB

In an intravenous needle and catheter set of the type wherein the needle is within the catheter, as illustrated by Gauthier and Massa U.S. Pat. No. 3,094,122 and Braun U.S. Pat. No. 3,348,544, for example, it has been found that accurate control of the catheter length cannot practically be assured under normal manufacturing conditions, so that uniform projection of the needle bevel from the tapered distal end of the catheter is difficult to achieve. While some deviation from the optimum projection can be tolerated, a simple means to compensate for abnormalities is desirable and the present invention constitutes such a means. It also provides the user with a possibility of varying the needle tip projection as may be desired in special situations, not necessarily related to variations of catheter length. The adjustment is effected by providing the distal face of the needle hub with a plurality (shown as three) of pairs of diametrically opposite "steps" located at different distances axially from the needle tip. The catheter hub is normally provided with Luer locking lugs projecting from its proximal rim and the steps are located to stop the lugs, axially, in positions such that the needle tip will project varying distances from the catheter tip.

Hill U.S. Pat. No. 1,248,492 shows a pointed needle with a tubular cannula slidable thereon and means, in the form of a bayonet joint, for securing the cannula in retracted position to expose the needle point or in extended position to cover the needle point entirely. Henkin U.S. Pat. No. 3,506,007 shows a catheter-needle combination in which the catheter hub has a keyway to receive a key on the needle hub when the needle is advanced, the catheter hub surface stopping the needle in retracted position when the key is not in register with the keyway. Neither of these patented devices is intended or adapted to serve the purposes of the present invention.

A practical embodiment of the invention is shown in the accompanying drawing wherein:

FIGS. **1, 2** and **3** represent side elevations of the needle and catheter assembly, portions of the hubs being broken away and in section, showing three different adjusted positions of the parts;

FIG. **4** represents a distal face view of the needle hub;

FIG. **5** represents an axial section on the line V—V of FIG. **4**

FIG. **6** represents an axial section on the line VI—VI of FIG. **4**

FIG. **7** represents an axial section on the line VII—VII of FIG. **4** and

An intravenous set is shown as comprising the catheter (or cannula) **10,** the shaft **11** of which has a tapered distal tip **12** and is cemented in, or molded integrally with an adapter hub **13.** The proximal (open) end **14** of the hub is annular and is provided with diammetrically oppositely projecting Luer lugs **15** each extending arcuately no more than 60° and preferably somewhat less.

The needle **16** is of customary form with beveled cutting point **17** and is fixed at **18** in the slightly tapered distal end portion **19** of a hub **20.** At the base of the portion **19** the hub extends radially outward and is bounded by an annular rim **21,** within which the distally facing surface is partially flat, **23,** indicated at **22,** and partially stepped as shown at **22, 23'** and **24, 24'.** Each of the steps **23, 23'** and **24, 24'** is arcuate, extending around the margin of the flat surface **22** through an arc

of no more than 60°, the pairs of steps **23, 23'** and **24, 24'** being disposed diametrically opposite each other and a stop **25** extending inward from the rim **21** at a point between an end of a step **24'** and the adjacent flat surface **22.**

In the manufacture of I.V. sets of the character described it is customary to mount a group of needles in a jig with their proximal ends positioned against a stop, the bevels being ground on the distal ends in a highly accurate machine operation, and the needles being then mounted in hubs **20** with their ends seated in a recess and fixed, as indicated at **18,** by cementing or the like, the distance from the hub to the beveled tip **17** being uniform within established tolerances. The catheters **10,** however, being of flexible plastic material and tapered by various methods, including grinding, molding and/or drawing characteristically show greater variations in length. For purposes of illustration, the catheters **10** in FIGS. **1, 2** and **3** are shown as being identical, the one in FIG. **2** having its beveled tip located at the point which is generally preferred, close to but slightly proximal of the heel of the bevel **17.** This catheter, having optimal length, has its hub seated on the middle step **23, 23'.** When the same catheter has its hub on the lower step **22,** its tip is spaced too far from the bevel, as shown in FIG. **1,** and when it is on the upper step **24, 24'** its tip covers the heel of the bevel (FIG. **3**) which is also undesirable.

Assuming, however, that a number of catheters are made and found to vary slightly in length, it will be evident that those slightly longer than the one shown can have their hubs seated as in FIG. **1** so that their tips will be acceptably close to the needle bevel, while those slightly shorter than the one shown can have their hubs seated on the upper step **24, 24'** also in an acceptable relation to the needle. The range of tolerances in this critical dimension (catheter length) can thus be greatly enlarged with consequent reduction in the percentage of "rejects."

In effecting venipuncture with a needle and catheter set of the type disclosed herein the forces acting on the device are largely axial, so that there is little likelihood of the catheter hub being displaced from its adjusted position by rotation with respect to the needle. The frictional engagement of the needle in the catheter thus suffices to hold the parts reliably in their desired relative orientation.

While a three-step arrangement is shown and described, it will be understood that two steps or more than three steps could be provided, if desired. The reference to lugs **15** as being "Luer" lugs is intended to indicate generally a type of radially projecting lug, without limitation to those which could actually constitute a Luer lock.

It will be understood that various changes may be made in the form, construction and arrangement of the several parts without departing from the spirit and scope of the invention and hence I do not intend to be limited to the details shown or described herein except as the same are included in the claims or may be required by disclosures of the prior art.

What I claim is:

1. An intravenous needle and catheter set wherein a needle element is located within a catheter element with its point projecting from the distal end of the catheter element, comprising a needle fixed in a needle hub and a catheter fixed to a catheter hub, said needle hub

being provided with a plurality of axially-facing surfaces disposed at different distances from the distal end of the needle and the catheter hub being provided with at least one complimentary axially-facing surface disposed at a given distance from the distal end of the catheter and adapted to bear selectively against any one of said first-named surfaces, whereby the relative positions of said respective distal ends may be determined, the needle hub being provided with a distally-facing annular channel and said plurality of surfaces being disposed in said channel.

2. An intravenous needle and catheter set according to claim 1 wherein the catheter hub is provided with a pair of diametrically oppositely disposed lugs each having a proximally-facing surface extending through an arc no greater than each of said plurality of surfaces.

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