United States Patent [19]

Wagner

[11] **3,900,026**

[45] **Aug. 19, 1975**

[54] **DEVICE FOR HOLDING AND PROTECTING INTRAVENOUS INJECTION NEEDLES**

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[22] Filed: **Aug. 19, 1974**

[21] Appl. No.: **498,254**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 417,111, Nov. 19, 1973, abandoned.

[52] **U.S. Cl.**..... **128/133;** 128/214 R; 128/DIG. 26

[51] **Int. Cl.**[2]..... **A61M 5/00**

[58] **Field of Search**..... 128/132 R, 133, 214 R, 128/214.2, 215, 221, 348, DIG. 26

[56] **References Cited**

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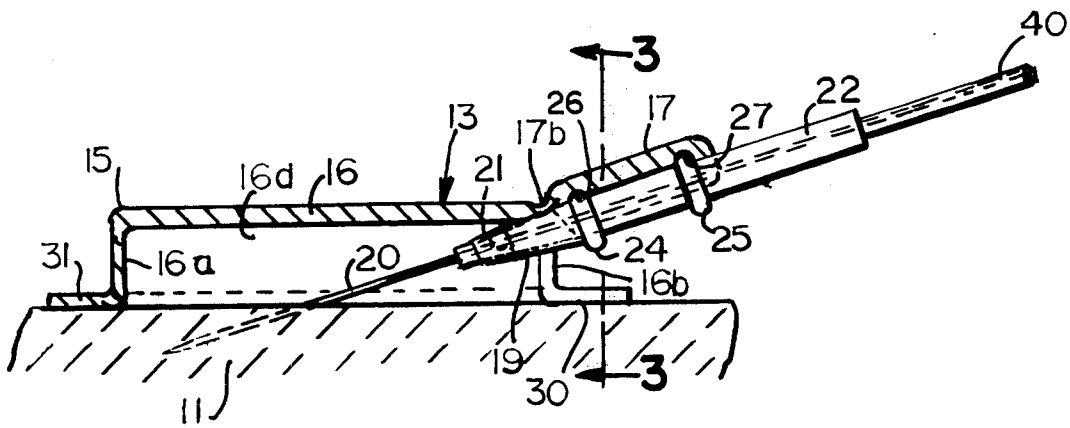
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Primary Examiner—Dalton L. Truluck

[57] **ABSTRACT**

A guard for intravenous needles and their connections comprises a transparent cap or cover, formed of fairly rigid but somewhat conformable plastic material, having peripheral skin-contacting flanges. The latter can be attached or secured to the patient's arm or other body part to cover and protect the inserted needle. For needles detachable from the supply line, the device includes means secured to or integral with the cap or cover formed to surround or embrace the connecting joint between line and needle. This positively locks the joint against inadvertent separation and consequent spilling of fluid. While thus protecting the needle and its connection, the transparent cover permits visual inspection at all times of the needle and the area being treated. The guard device is made rigid enough, structurally, to give needed protection over and around the needle but at least its base parts will yield sufficiently to conform reasonably well to body parts or surfaces of various contours. The flanges which contact the skin may be self-adhesive or may be secured to the patient by supplemental means such as tape. For use with "butterfly" type needles, the cap comprises flaps or hook elements turned under to engage the wings or side elements thus helping to lock the needle securely in place.

1 Claim, 5 Drawing Figures



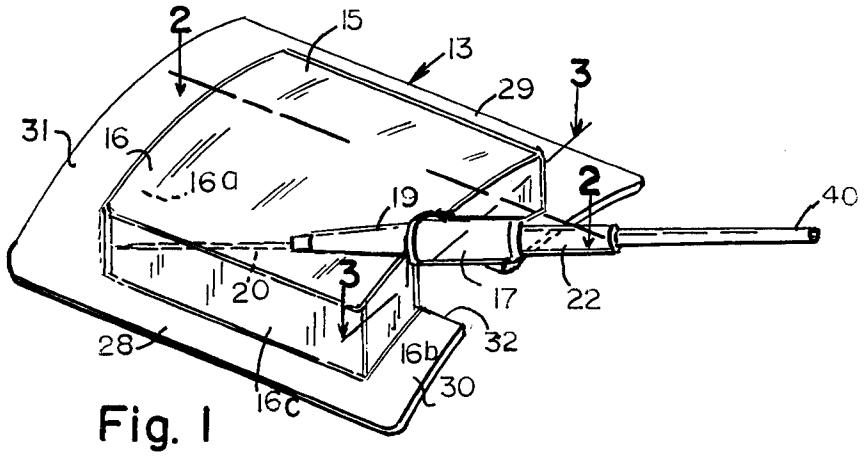


Fig. 1

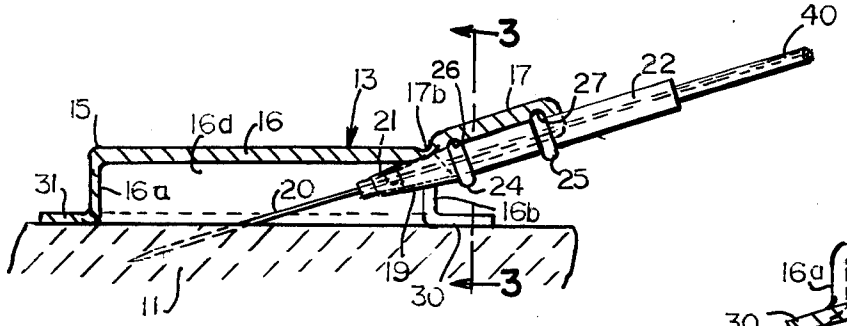


Fig. 2

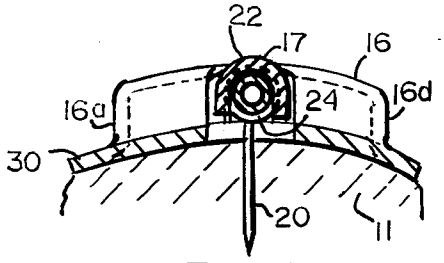


Fig. 3

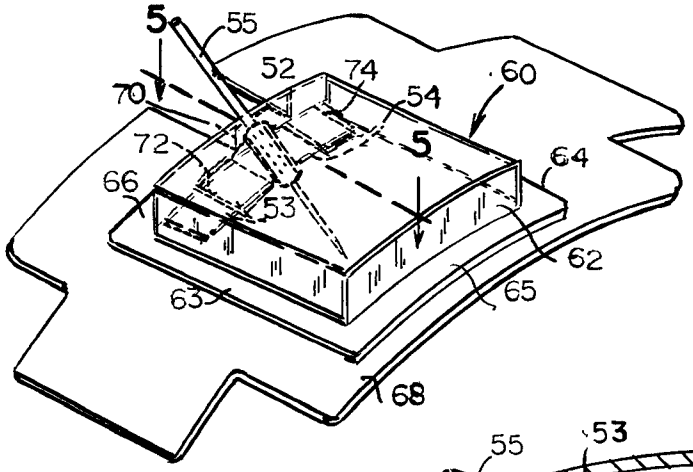


Fig. 4

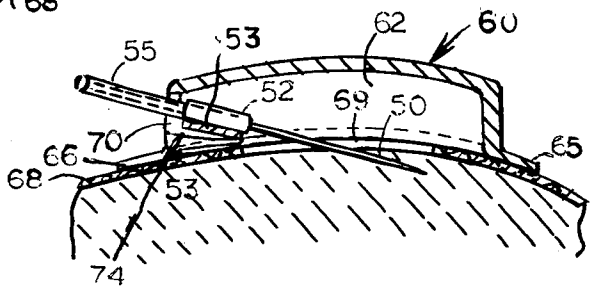


Fig. 5

DEVICE FOR HOLDING AND PROTECTING INTRAVENOUS INJECTION NEEDLES

This application is a continuation in part of Ser. No. 417,111, filed Nov. 19, 1973, now abandoned.

BACKGROUND AND PRIOR ART

Needles of various sorts are used for intravenous injections, as for administering blood transfusions, giving sera or plasma to patients, and/or for feeding liquid nutrients to patients who cannot be fed by mouth, etc. For these purposes, the needles most widely used are connected to their liquid supply lines by means of separable frictional tapered parts. Such needles may be detached and sterilized after each use. Other types are known such as the "butterfly" type used for feeding or treating children, wherein the needle is permanently attached to a short length of supply line by a small molded body which bears side flaps or wings; these may be adhesively attached to the patient's skin during the transfusion or feeding operation.

Frictional joints of the type first mentioned sometimes become detached so that blood or other liquid is lost; the patient may be seriously affected when this happens, aside from the value of the liquid lost. The "butterfly" needles do not ordinarily separate but both types, and other types of needles not mentioned here are subject to inadvertent displacement or withdrawal unless given protection. For this purpose, some devices have been proposed in the prior art for immobilizing the arm or other body part where the injection is being given; various types of restraining devices have been proposed. Examples are shown in U.S. Pat. Nos. 2,266,230 and **3,439,673.** There are many others.

In some cases, of course, physical restraint may be necessary but in most cases these devices produce discomfort that is not necessary. It is desirable, obviously, to give the patient as much freedom and as little discomfort as possible, consistent with proper treatment. For this reason, many simpler devices such as special bandages or other holding devices have been proposed to keep the needle in place and/or to prevent its detachment from the supply line. Examples are shown in U.S. Pat. Nos. 3,288,137 and 3,630,195. The first mentioned describes a two part device for anchoring an intravenous needle, the parts being lockable together by means of interengaging fibers. An upper part comprises a small piece of wire screening which can be crimped around the needle base, plus a pad element having downwardly extending interlocking fibers to lock it to the base part. Such a device of course makes it impossible to observe the needle and its connections. The other patent shows a two-point tube-gripping element taped or strapped to the patient's arm. In this case the needle itself is not held, at least not held directly. A restless patient could easily cause the needle to become dislodged from the arm, with possibly disastrous results.

Various other arrangements and devices for similar and related purposes are known, examples being given in U.S. Pat. Nos. 2,266,231, 2,449,882, 2,533,961, **2,670,735,** and 3,439,673. Most of these are subject to one or more of the objections pointed out above. They may interfere too much with the patient, add to his discomfort, or they may fail to hold the needle and/or its supply tube securely.

An object of the present invention is to prevent, primarily, dislodgement of the needle from the patient's arm or other body part and to prevent separation of the needle from the supply tube. Secondarily, an object is to make the condition of the needle and its connections immediately and clearly visible to the nurse, doctor, or other attendant and, preferably, to the patient himself. Other objects are to make the device reliable, sturdy, reusable, and economical. By its use supplemental bandaging may be eliminated or at least greatly reduced while still giving adequate securing and protection of the needle and its essential connections.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a perspective view of one form or embodiment of the invention.

FIG. **2** is a transverse vertical sectional view, taken substantially along the line **2 — 2** of FIG. **1.**

FIG. **3** is another vertical sectional view, taken substantially along the line **3 — 3** of FIGS. **1** and **2.**

FIG. **4** is a perspective view of still another modification or embodiment.

FIG. **5** is a vertical sectional view, on a somewhat larger scale, taken substantially along the line **5 — 5** of FIG. **4.**

DESCRIPTION OF PREFERRED EMBODIMENT

FIGS. **1** to **3,** inclusive, show a first modification of the invention devised for holding and protecting a standard intravenous needle **20** which is inserted into an arm or similar body part of a patient. Needle **20** is secured by means of a conventional tapered frictional connection to a liquid supply line **40,** as will be explained more fully below. The protective device, shown as a whole at **13,** comprises a box-like cap or enclosure **15** molded or otherwise formed of transparent plastic material, thin enough to be somewhat flexible and conformable to the arm **11** or other body member but strong and rigid enough to give adequate protection to the needle and its connections, as will be more fully discussed below.

As seen in FIGS. **1** and **2,** the box or cap member **15** has a slightly curved top **16** and more or less vertical side wall elements **16***a*, 16*b*, 16*c* and **16***d* formed integrally with the top **16.** Each of these side walls is turned out at its bottom to form a more or less flat flange or support element which rests on the surface of the patient's arm **11** or other body part. The flanges **28, 29,** 30 and **31** are thin and reasonably flexible so they conform suitably to the surface on which they rest.

To accommodate the needle **20** and its connection to the fluid supply tube **40,** one of the side walls **16***b*, at the right in FIGS. **1** and **2,** and its extension flange **29,** is cut or notched at **32** to form a flap or semi-tubular neck portion **17** which can be swung upwardly about a thin flexible hinge-like portion **17***b* where it joins member **15.** Neck element **17** is molded or otherwise shaped to give it in cross-section the shape of a channel or an inverted U; see FIG. **3.** It can thus be raised up to a suitable angle to accommodate the needle **20** which is inserted at an angle into the patient's flesh; the angle shown in FIGS. **1** and **2** may be somewhat exaggerated to show certain details of locking means more clearly. Member **17** incorporates these locking means as will be more fully described, to prevent the needle being separated from the supply tube.

Tube **40** has a terminal connection or ferrule **22** of somewhat larger diameter than the tube itself. Terminal **22** has a tapered outlet end **21** which fits neatly and

is held by friction in the tapered female socket of the shank **19** of needle **20.** Such means, for connecting the needle to its supply tube, are well known and widely used. Under ordinary circumstances such a joint is liquid tight and reasonably secure, but it can be pulled apart to remove the needle. It can be pulled apart also by accidental or unintentional application of external forces to the tube or to the needle itself. An uncomfortable patient, moving about, can and often does cause the connection to come loose and spill blood or other fluid. To prevent this, the neck or shank element **17** is formed with two internal circumferential grooves **26** and **27,** so shaped and spaced apart the right distance to receive and snugly hold respectively the annular rim or flange **24** on the outer end of the needle shank and an annular collar or flange **25** of similar shape and size, conventionally formed around the middle part of terminal **22.** When the terminal is properly connected to the needle shank socket, grooves **26** and **27** engage and securely hold by friction the elements **24** and **25,** thus firmly locking the terminal and the needle against relative movement. They cannot be pulled apart without first lifting the part **17** off the connecting parts, that is, pulling it up off the respective flanges or collars **24** and **25.**

As pointed out above, the flange elements **28, 29,** etc., are flexible enough to conform quite well to most body surfaces to which they are likely to be applied. They may bear a pressure-sensitive adhesive on their lower surfaces, so that they will adhere to the skin or such a holding means may be supplemented or replaced by using adhesive tape strips to overlie the flanges, as will be obvious. Preferably, such tape, if used, will be applied in such a way that it will not obscure the view of the needle through the transparent cover **13.**

While the type of needle and connection shown in FIGS. **1** to **3** is probably the most widely used, there are other arrangements to which the device of the present invention can be applied, with or without modification, as will readily be apparent to those skilled in the art. FIGS. **4** and **5** show an alternative arrangement adaptable for use with a so-called "butterfly" type needle **50.** Such a needle has a permanent connection to a short length of fluid supply tubing **55.** This connection consists of a molded body portion **52** which bears on either side a flap or "wing" **53, 54.** Normally, the wings are coated on their under sides for adhesion to the skin of the patient, to hold the inserted needle in place. Such devices are widely used for giving intravenous injections to children. With active patients, the butterfly sometimes is pulled loose from the skin and the needle pulled out of its properly inserted position. The device of FIGS. **4** and **5** is designed to prevent this positively.

Thus the device of FIGS. **4** and **5** comprises a transparent cap or bubble-type cover member **60,** quite similar to the device of FIGS. **1** to **3,** except that it has no part corresponding to element **17** of the first embodiment. Separate needle and terminal parts and their connections are not needed here. In other essential respects device **60** is like device **13,** having marginal flanges **63, 64, 65** and **66** which may be attached to the skin by means of adhesive. However, an alternative and preferable arrangement is as shown in FIGS. **4** and **5** where the flanges are all secured to a relatively large mounting sheet of surgical adhesive plaster or tape **68.** Sheet **68,** in turn, is secured to the patient's arm or other body part, thus holding the whole assembly securely by adhesion. A central area **69** is cut out of sheet **68** and the needle is inserted into the arm through this opening, so it is always visible through the cap **62.** To accommodate the needle and butterfly a notch **70** is cut through the wall of cap **62.** To hold the butterfly firmly in place and thus to prevent inadvertent withdrawal of the needle from the patient, this same wall is formed with a pair of underturned flaps **72** and **74.** These underlie or hook under the side wings **53** and **54,** respectively, of the butterfly, so that the needle cannot be pulled to the left, FIG. **5,** without first releasing the member **60** or the mounting sheet **68** from the patient's skin. The underturned flaps or hook-like members **72** and **74** underlie only a minor part of the area of the wings **53, 54** and the latter are still quite well attached by their own adhesive to the skin.

In use, the needle is inserted in the patient's arm or other body member; the feed line is drawn through the notch or opening **70** of the protector device **60,** and the latter is firmly secured to the patient's skin through the adhesive member **68.** In this way the device does not interfere with the angle or place of inserting the needle. The hooks or flaps **72, 74** are set under the butterfly wings **53** and **54** before the latter are pressed down onto the skin to adhere and assist in holding the needle in proper position. With this arrangement, the patient, usually a child with this sort of needle, is not likely to disturb the setting of the needle or to pull it out if he should inadvertently pull on the line **55** outside the cap **62.** In FIG. **5,** the front edge of the rear hook or flap **74** is seen in elevation while the front wing **53** of the butterfly is seen in section.

As in the first example, of FIGS. **1** to **3,** the transparent cap or cover **62** makes it easy to inspect the needle and its position visually at any time.

As noted above, the cap **62** may be directly attached, through its marginal flaps, to the skin of the patient in the same manner that the devices of FIGS. **1** to **3** are attached, i.e., directly by adhesive on the flaps or by tape (not shown) overlying the flanges **29, 30,** etc. Obviously, if desired, the device **13** of FIG. **1** may also be mounted on a sheet of surgical tape such as sheet **68** of FIGS. **4** and **5,** and mounted on the patient's body to protect and cover the needle in the same manner as the latter modification. In either embodiment, the needle is firmly supported and protected against accidental or inadvertent pulling out or displacement from the patient and is protected from contact with external objects by the transparent cover or cap. Through the latter, the needle and its connection to the supply tube as well as its insertion and placement are clearly and continuously in view, not being obscured by the usual wrappings or bandages. Normal movements of the patient are not interfered with and his involuntary movements are not likely to affect the needle and/or the proper intravenous procedure.

As compared with devices of the prior art with which the present inventor is familiar, in either of the forms illustrated and described above, the device of this invention has the following advantages: The needle is firmly secured against accidental or careless displacement from the person's body and, in the case of the first embodiment especially, from disconnection to the liquid supply line. The needle, its connections, and its place and manner of insertion into the patient's arm or other body part are freely and fully visible at any time.

The cap or cover member is light and inexpensive while having adequate strength and rigidity to protect the needle area. It is also flexible or resilient enough that it can, as a whole, conform reasonably to almost any body surface where an intravenous injection may be given. By assuring that the needle will not be disturbed by movements of the patient, he is given confidence that sharp pains will not be produced by relative movement of the inserted needle.

As suggested above, the flanges around the cap or cover may be self adhesive, or the device may be secured by tape overlying and extending beyond these flanges, or an adhesively coated carrier sheet, such as shown at **68,** FIGS. **4** and **5,** may be used to mount the device on the patient's body. If desired, the flanges may be coated with adhesive and supplemental strips of tape may be used, for additional security; supplemental tapes may of course be used with the device of FIGS. **4** and **5** if desired.

It will be obvious to those skilled in the art that various of the parts and their details described above may be modified in various ways without departing from the spirit and purpose of the present invention. Also, the materials used to form the device may be varied considerably. A moldable transparent plastic material is presently preferred although sheet materials that can be deformed and secured or set in the desired form and arrangement may be used if desired. A suitable material is one of the polyolefins, such as polyethylene, polypropylene and analogous materials; vinyl or styrene polymeric materials may be used, or acrylates, etc., as will readily be apparent to those skilled in the art.

Although not shown in the drawings, it may be desirable to loop the supply line back over or around the cap or cover and/or secure it to the cover to further reduce chances that undesirable pulls will be applied directly to the needle. Such arrangements are known in the prior art and need not be described here in further detail.

It is intended that the modifications described above, and the various changes in detail, along with all others that would be apparent to those skilled in the art are to be considered as included in the scope of the invention. The claims which follow are to be construed as broadly as the state of the prior art properly permits.

What is claimed is:

1. A device for securely holding and protecting an intravenous injection needle when said needle is inserted in a body part of a patient, said device being substantially transparent to permit visual inspection of said needle and its condition of insertion at all times and comprising a moderately rigid cover or bubble cap member of resilient plastic material adapted to overlie and cover a said needle inserted at a proper angle into said body part, said cover or cap member including integral needle locking means for securing a separable tapered friction joint between said needle and a conventional supply tube therefor, said locking means comprising a neck or extension element of channel section integrally connected to said cap or cover through a flexible hinge, the channel section being shaped to snugly engage and hold both a flange or collar on the needle and a flange or collar on the supply tube to prevent relative movement and inadvertent separation of said needle from the tube, said flexible hinge being formed to permit angular movement of said neck or extension to accommodate said proper angle of needle insertion into the body part, and flange elements on said cover for resting on the surface of said body part.

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