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[54] **DETACHABLE GUIDE NEEDLE**
4 Claims, 6 Drawing Figs.

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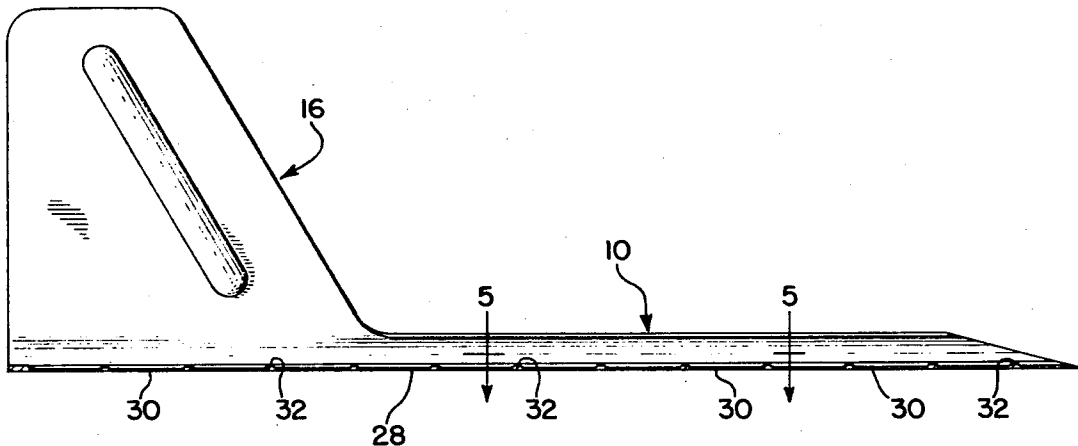
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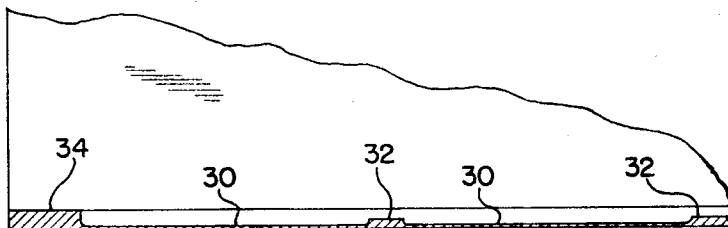
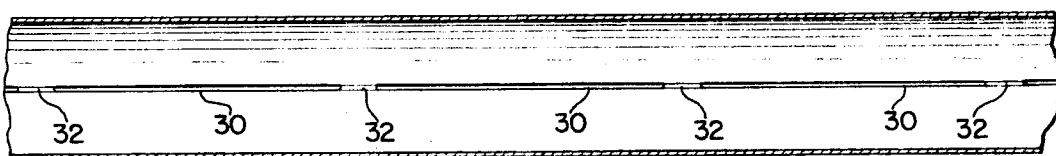
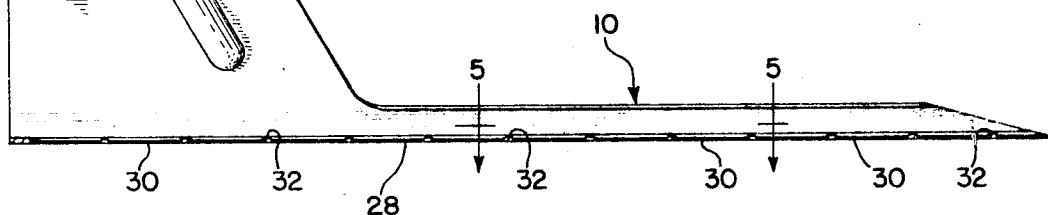
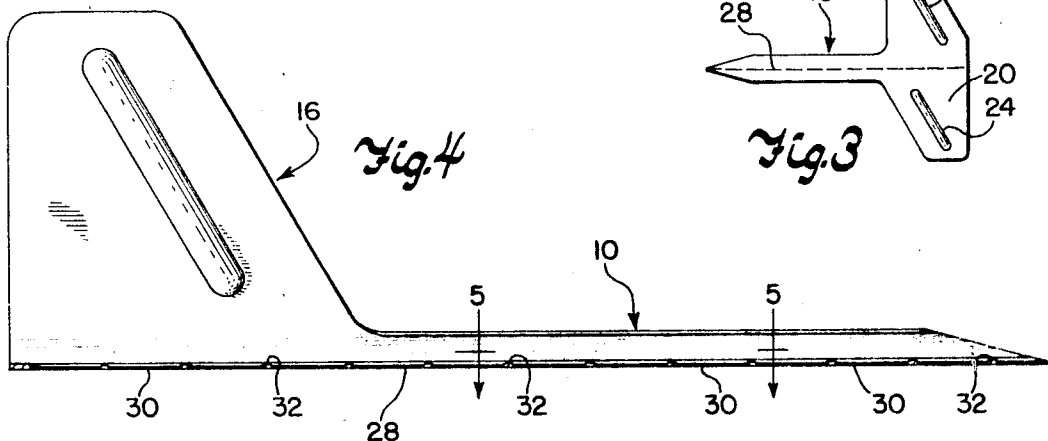
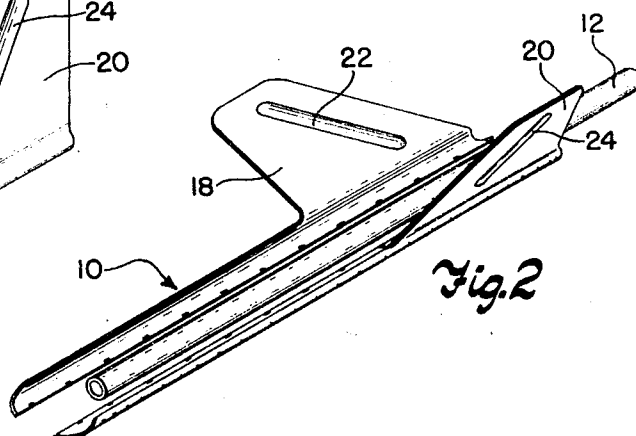
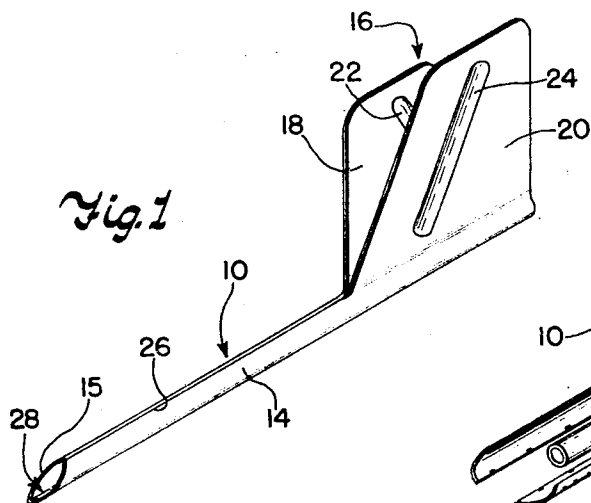
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ABSTRACT: A sheet material element is provided with a plurality of spaced scored portions along a predetermined path and frangible connecting webs are provided between the spaced scored portions. In the illustrated embodiment, detachable guide needle devices are utilized in conjunction with flexible catheters in withdrawing or introducing fluids relative to a body, have features incorporated therein which permit separation of the guide needle into detached sections after use thereof for complete removal from an associated flexible catheter.





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DETACHABLE GUIDE NEEDLE

The present invention is directed to detachable guide needle constructions which are used with flexible catheters in various types of surgical procedures such as intravenous feeding, the taking of blood samples, and other similar techniques where fluid is either withdrawn or introduced relative to a body. At present, guide needles have been retained on the flexible catheter after the venipuncture has been made and the catheter tube has been inserted in the selected vein; however, this not only creates potential hazards to the patient, but also, as is more likely, much discomfort is experienced by the patient. In an attempt to alleviate patient injury and/or discomfort, several makeshift approaches are currently utilized, and these have involved the taping of the needle to the arm or other member of the patient, shielding the needle in one fashion or another, or the contriving of various expedients by the nurse or doctor involved. It has been found that the above approaches not only have failed to solve the problems inherent in the use of guide needles, but also give rise to nonuniform surgical procedures for nurses and other attendants who aid the attending physician.

In the present invention, the detachable guide needles are capable of being completely removed from the flexible catheter tube after venipuncture has been made and the flexible catheter inserted into the selected vein. As so constructed, the detachable guide needle is an improvement over the removable guide needle constructions disclosed and claimed in U.S. Pat. No. 3,359,978 and copending Pat. application Ser. No. 814,977, filed Apr. 10, 1969.

One object of the present invention is to provide an improved detachable guide needle construction for use with a flexible catheter tube wherein the guide needle may be separated into detached sections for complete removal from the flexible catheter.

Another object of the present invention is the provision of a guide needle which provides ready insertion into and removal from a body with subsequent rapid disassembly relative to a flexible catheter with which the guide needle is initially associated.

Other objects of the present invention include the provision of a detachable guide needle of the type described above which is simple in construction, compactly configured, adapted for economical and mass-manufacturing techniques, affords great versatility in use, provides longer periods of installation, allows greater comfort to while obviating hazards to the patient, and is otherwise well adapted for the purposes intended.

These and other objects and advantages of the present invention are attained by the provision of a detachable guide needle for use with a flexible catheter in withdrawing or introducing fluids relative to a body, the needle comprising a hollow, one-piece, elongated sheet material element having handle means at one end and a sharpened configuration at the other end for insertion of said needle into said body, detachment means for removing said needle from said catheter after insertion into said body including a line of separation and break-apart hinge means each being generally opposed to each other and extending longitudinally throughout the entire length of said needle, said break-apart hinge means having an intermittently scored longitudinal portion with integral, frangible connecting webs therebetween, whereby the needle is capable of being opened along said line of separation and continued opening thereof causes severance of the integral, frangible connecting webs to provide detached sections of said needle facilitating complete removal from said catheter.

Reference is now made to the drawing wherein:

FIG. 1 is an enlarged perspective view of a detachable guide needle which is constructed in accordance with the teachings of the present invention;

FIG. 2 is also an enlarged perspective view of the detachable guide needle of the present invention, but illustrating the

manner in which the needle is separated for lateral removal and detachment from a flexible catheter;

FIG. 3 is a top plan view of the guide needle blank which is scaled approximately to the actual size of the blank initially formed in the guide needle manufacture;

FIG. 4 is an enlarged side elevational view of one of the detached sections of the detachable guide needle as illustrated in FIG. 2;

FIG. 5 is a substantially enlarged fragmentary sectional view of the break-apart hinge means of the detachable needle as viewed along lines 5-5 of FIG. 4; and

FIG. 6 is a further substantially enlarged fragmentary sectional view illustrating a portion of the break-apart hinge means of the detachable guide needle in the vicinity of the handle means thereof.

The detachable guide needle 10 in the drawing is of the type which is designed for use with a flexible catheter 12 depicted in FIG. 2 in withdrawing or introducing fluids relative to a body. The detachable guide needle 10 serves the functions of making the venipuncture as well as carrying the flexible catheter 12 which is then inserted into the opening in the vein. Thereafter, the needle 10 is removed from the body with the flexible catheter 12 left intact.

The present invention is concerned with the detachment or removal of the needle 10 from the flexible catheter 12 once it is removed from the body since it performs no further functions in the withdrawal or introduction of fluids relative to the body. In accordance with the teachings of the present invention, the needle 10 is completely detached or removed from the flexible catheter 12 so as to avoid the inherent difficulties that are present in keeping the needle mounted to or otherwise associated relative to the flexible catheter 12.

The detachable guide needle 10 comprises a one-piece, elongated element which is stamped or otherwise formed from sheet stock material. Preferably, the needle is formed in the shape as illustrated in FIG. 3 of the drawing by being stamped or blanked from stainless steel sheet stock having a thickness, for example, of 0.006 inches such that it has the characteristics of a rigid, but relatively thin noncorrosive and sanitary needle for use in puncturing the tissues, muscles and veins of the human body. After the initial stamping or blanking operation, the needle 10 is then formed to the shape best illustrated in FIG. 1 of the drawing.

The detachable guide needle 10 shown in FIG. 1 includes a hollow body section 14 with a sharpened configuration 15 at one end thereof which is preferably formed after the stamping or blanking operation. At the other end of the hollow body section 14, there is provided integral handle means 16 which includes a pair of juxtaposed wing elements 18, 20. Each of the wing elements 18, 20 are provided with reinforcing struts 22, 24 which are preferably grooves or depressions formed during the stamping or blanking operation which are arranged in noninterfitting relationship on the wing elements 18, 20 so that the reinforcing struts 22, 24 do not interfit one within the other. It will be noted that the integral wing sections 18, 20 include longitudinally offset portions from one another so as to permit rapid and simple manipulative removal of the guide needle 10 from the flexible catheter 12 as will be explained below. The handle means 16 of the detachable guide needle 10 thus not only provides controlled insertion of the needle into the desired vein of the body, but also facilitates removal of the guide needle 10 from the flexible catheter 12, all as more fully disclosed and claimed in U.S. Pat. application Ser. No. 814,977, filed Apr. 10, 1969.

The hollow body section 14 of the guide needle 10 includes a longitudinal line of separation 26 along the upper surface thereof and extending throughout the entire length of the hollow body section 14 including the integral wing elements 18, 20. The line of separation 26 is formed by positioning into adjacent relationship with one another the opposite sides of the stamped or blanked section illustrated in FIG. 3 which forms the hollow body section 14. This is accomplished by folding or otherwise shaping the guide needle from the stamped or

blanked condition shown in FIG. 3 to that illustrated in FIG. 1 of the drawings. The line of separation 26 is provided with a very small dimensional width such that it does not impede the needle's progress in making the desired venipuncture.

As an important feature of the present invention, the detachable guide needle 10 is further provided with break-apart hinge means 28 which extends along the lower surface of the needle in generally opposed relationship and extending longitudinally throughout the entire length of the needle in the same manner as the line of separation 26. The break-apart hinge means 28 serves the important function of separating the guide needle 10 into two detached sections when the needle 10 is opened up a predetermined amount by the wing sections 18, 20 of the handle means along the line of separation 26. This is illustrated in FIG. 2 of the drawing wherein there is shown the two detached sections which have been formed as the result of opening up the needle by the handle means 16 along the line of separation 26 after the needle has served its purpose in permitting venipuncture and in the positionment of the flexible catheter 12 within the opening of the punctured vein.

The break-apart hinge means 28, which is also preferably formed after the stamping or blanking operation of the guide needle blank shown in FIG. 3 includes, as best seen in FIGS. 4-6, an intermittently scored longitudinal portion, each score being identified 30 in FIG. 5 of the drawing. The scores 30 preferably extend substantially throughout the entire thickness of the guide needle so as to offer no resistance in separation of the needle into two detached sections therealong. In certain instances, it may be desirable to provide slits or openings of full thickness in place of the scores 30, if the slits or openings do not impair or damage the skin tissues when the needle is inserted.

Between each of the intermittent scores 30, there is provided integral, frangible connecting webs 32 which serve to hold the detachable sections of the needle together until separation or removal from a flexible catheter 12 is desired. It will be noted that the integral, frangible connecting webs 32 have a greater thickness than the scored portions 30 on opposite sides thereof as best illustrated in FIG. 6. This is achieved when the scored portions 30 are coined or otherwise impressed in the sheet stock material. This enables the connecting webs 32 to hold the detachable sections of the needle together while also enabling the connecting webs 32 to serve as hinges as the needle is opened up along the line of separation, until the point of maximum weakness of the connecting webs 32 is achieved whereupon fracture of the connecting webs 32 takes place to provide the separated or detached sections of the needle 10. The connecting webs 32 are made frangible by localized hardening thereof at the time the intermittent score is impressed in the stamped blank of material or by forming lightly scored or other small impressions in the connecting webs.

Uniform opening or substantial simultaneous separation of the needle into two detached sections is accomplished by means more specifically disclosed and claimed in U.S. Pat. application Ser. No. 826,970, filed May 22, 1969. In order to achieve uniform opening of the needle 10 along the line of

separation 26, the integral connecting web 34 at the rear or distal end of the needle adjacent the handle means 16 has a higher fracture level than the integral connecting webs 32, and thus is capable of maintaining the integral connecting webs 32 as hinges until sufficient force is applied to weaken and fracture the frangible, integral connecting webs 32. Continued application of the force will also result in the fracture of the connecting web 34 so as to provide the detached sections of the needle illustrated in FIG. 2 facilitating complete removal from the flexible catheter 12. It has been found that the integral connecting web 34 assures substantial simultaneous fracture of the connecting webs 32 and thereby provides positive separation of the detachable sections of the guide needle 10.

From the foregoing, it will now be appreciated that the present invention provides a new and improved detachable guide needle which facilitates controlled insertion and removal from the body of the patient, and once the flexible catheter with which the guide needle is associated is in place, the guide needle may then be positively removed and detached from the flexible catheter and discarded.

I claim:

1. A detachable guide needle for use with a flexible catheter in withdrawing or introducing fluids relative to a body, said needle comprising a hollow, one-piece, elongated sheet material element having handle means at one end and a sharpened configuration at the other end for insertion of said needle into said body, detachment means for removing said needle from said catheter after insertion into said body including a line of separation and break-apart hinge means each being generally opposed to each other and extending longitudinally throughout the entire length of said needle, said break-apart hinge means having a plurality of spaced scored portions along a predetermined longitudinal path with frangible connecting webs between the spaced scored portions, said frangible connecting webs being relatively thicker than the spaced scored portion along the predetermined longitudinal path and extending upwardly within the hollow material element whereby said detachable guide needle can be inserted into a body without damage to skin tissue and then withdrawn therefrom for opening of said guide needle along said line of separation to a position where the frangible connecting webs are severed providing detached sections of the needle facilitating its complete removal from the catheter.

2. The detachable guide needle as set forth in claim 1, wherein the relatively thicker, weakened portions of the integral frangible connecting webs are also scored.

3. The detachable guide needle as set forth in claim 1 wherein said handle means comprises integral wing sections disposed on opposite sides of said line of separation to facilitate opening of said needle along said line of separation.

4. The detachable guide needle as set forth in claim 3 wherein the integral wing sections are initially juxtaposed relative to one another with corresponding portions of each wing section overlapping one another and the remaining portions of the wing sections being longitudinally offset from one another by an amount sufficient to permit separation thereof and consequent opening of said hollow element along said line of separation.