

United States Patent

[11] 3,522,800

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[21] Application No.: **567,329**
[22] Filed: **July 19, 1966**
[45] Patented: **Aug. 4, 1970**
Continuation-in-part of Ser. No. 467,859, June 29, 1965,
now abandoned.

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[54] **DISPOSABLE WOUND RETRACTOR AND
DRAPE AND METHOD OF USING SAME**
9 Claims, 10 Drawing Figs.

[52] U.S. Cl. 128/20,
128/132

[51] Int. Cl. 128/132
[50] Pub. No. A61b 17/02

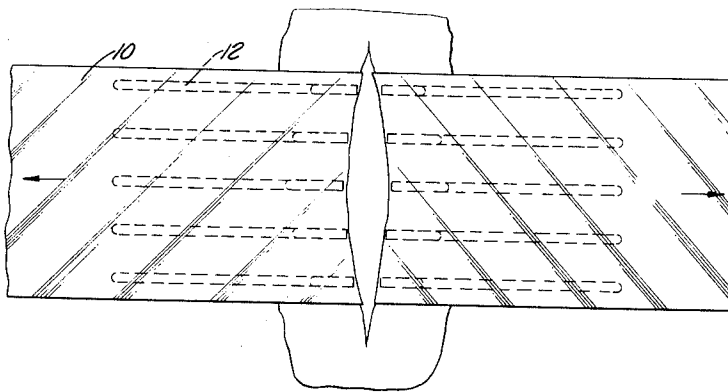
[50] **Field of Search** 128/20,
132, 132D, 155, 156, 82, 127, 133, 134, 477;
222/107; 128/20, 132, 132(P), 89, 91

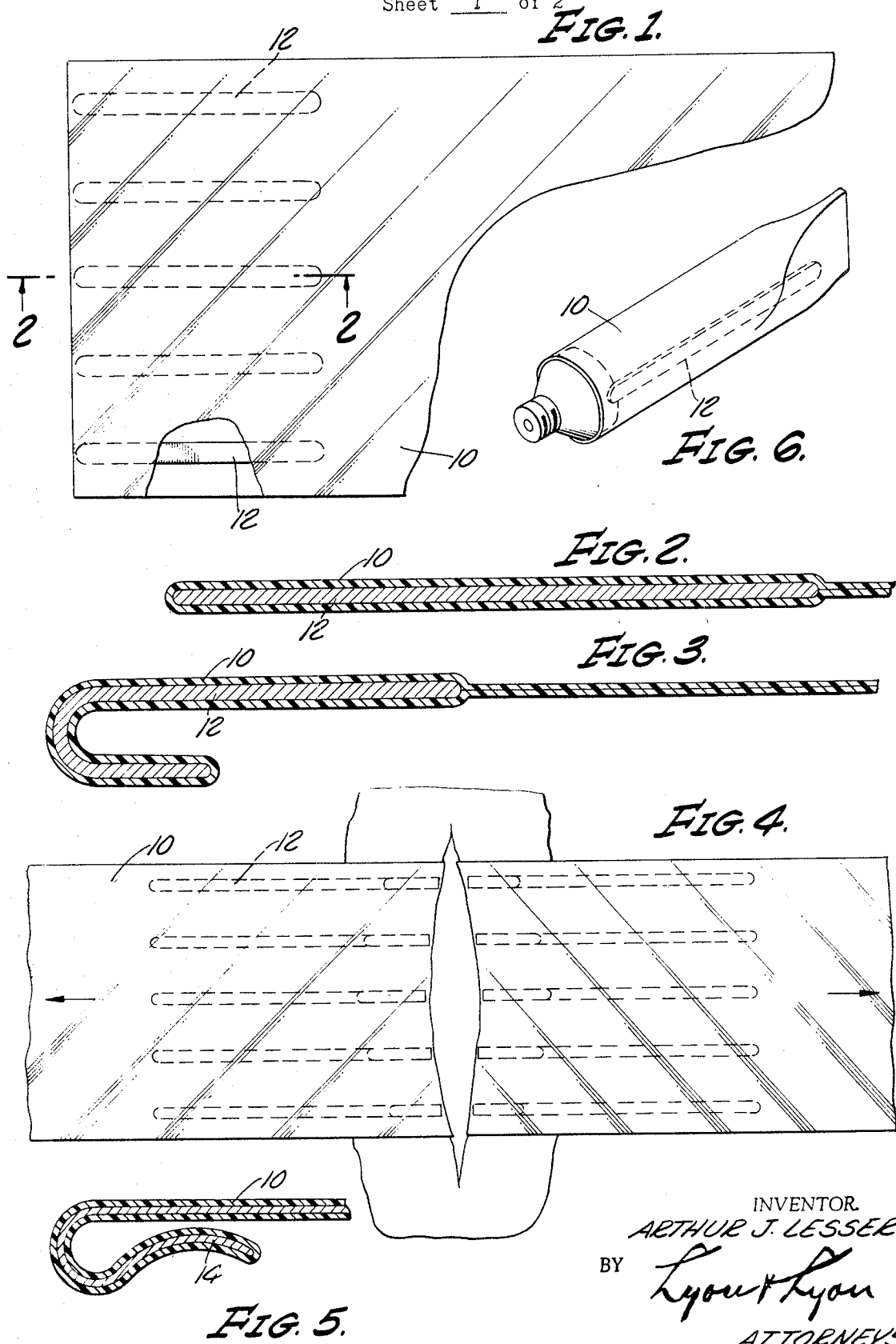
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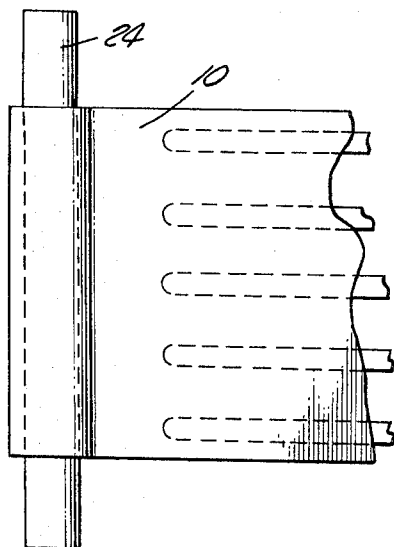
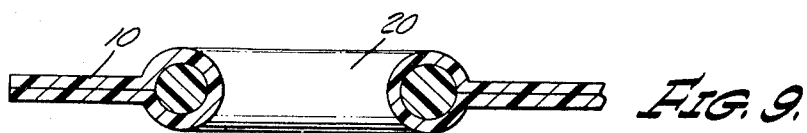
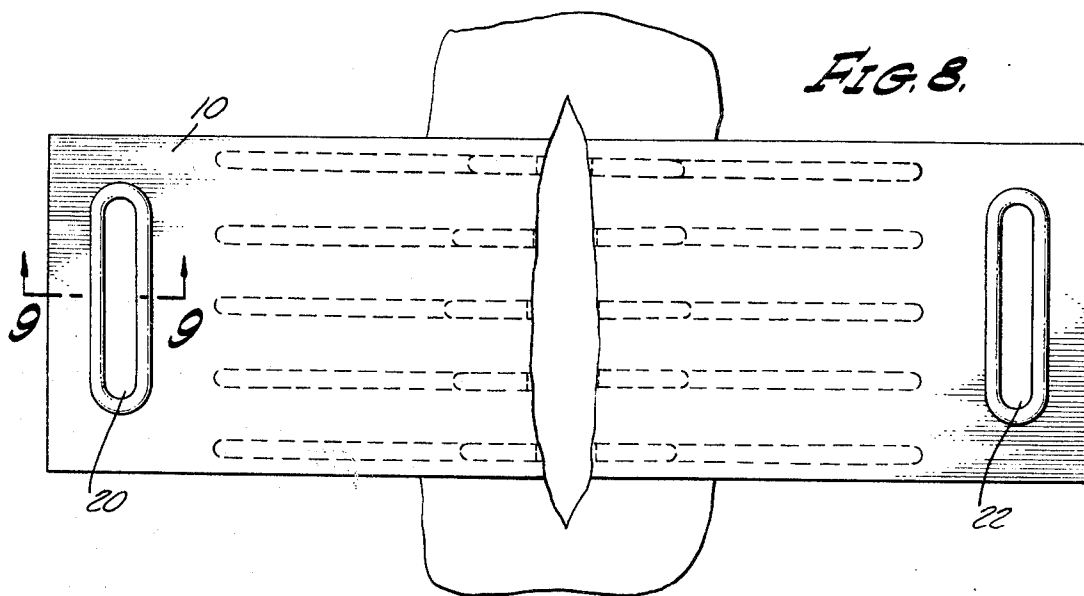
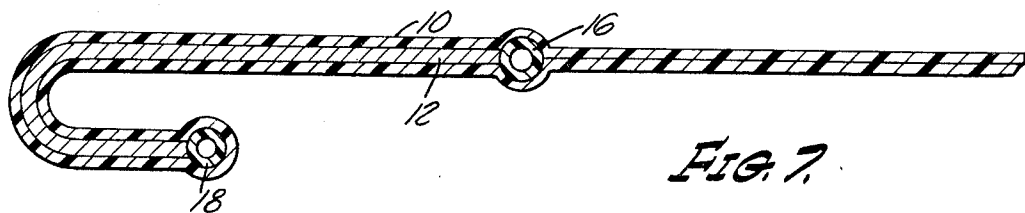
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ABSTRACT: A novel disposable wound retractor and drape comprising a thin plastic sheet having a length substantially greater than its width containing longitudinally thereof at one end a plurality of generally parallel transversely spaced thin elongated metal reinforcing stays of generally rectangular cross-section, one of the long dimensions of each stay terminating at the edge of the sheet and the length of the stays being less than the length of the sheet.





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U.S. PATENT 3,522,800
DISPOSABLE WOUND RETRACTOR AND DRAPE AND
METHOD OF USING SAME

The following specification is a continuation-in-part of Ser. No. 467,859, filed June 29, 1965, and now abandoned.

This invention pertains to a novel reinforced plastic sheet material containing long thin metal reinforcing stays particularly adapted for use as a surgical drape and in the construction of roll-up tubular containers for tooth paste, ointment, blood and the like.

Previously, there have been developed inexpensive surgical drapes which may be applied in the operating room directly to the skin of the surgical patient to form a surgically sterile field upon the patient with the immobilization of any residual bacteria of the patient's skin adjacent to the area where the incision is to be made.

However, I have found that a surgical drape of the foregoing type is not completely adequate in practice. The ordinary thin plastic surgical drape is not adapted to be wrapped around the edge of the wound or incision and thus does not effectively protect the deeper internal area of the wound from contamination with bacteria and/or tumor cells which may be present around the edge of the incision. Also, the conventional drape has a tendency to peel off, with the possibility of bacteria from the skin being free to enter the incision. The known thin plastic surgical drapes were also ineffective and of no value in keeping the incision open in order to permit the surgeon to perform the required movements inside the wound during the course of the operation. For this reason it is necessary to apply separate retractors in order to maintain adequate access to the interior of the incision.

Thus, it is a primary object of this invention to provide a novel reinforced plastic sheet material uniquely adapted for use as a surgical drape which possesses many advantages over the known surgical drapes of the prior art.

More particularly, it is an object of this invention to provide a novel surgical drape material which is adapted to be wrapped around the edges of an incision to reduce the possibility of contamination of the interior of the incision from bacteria and other matter from the edge of the incision.

It is a related object of the invention to provide a surgical drape material containing metal stay reinforcements which, upon being wrapped around the edge of the incision, possess sufficient strength in order that the surgical drape itself may be used as a retractor for the purpose of keeping the wound open during the course of the operation.

In yet another aspect of this invention it is an object thereof to provide a novel reinforced plastic sheet material particularly adapted for use in the construction of roll-up tubular containers for liquid and paste materials.

These and other objects of my invention will become apparent from the more detailed description which follows, and the accompanying drawings.

Briefly, the present invention comprises a novel reinforced normally non-tacky, thin plastic sheet, usually having a length substantially greater than its width, containing at one end at least one, and normally several, thin elongated reinforcing stays of a length substantially less than the length of the sheet and having a generally rectangular cross-section. The invention additionally comprehends a method of draping and retracting the edge of a wound employing this novel reinforced plastic sheet material. Also encompassed by the invention are tubular container bodies for containing liquid or paste materials, the walls of which are composed of the novel reinforced plastic sheet material.

Turning now to the drawings:

FIGURE 1 is a plan view of a form of reinforced plastic sheet material of this invention.

FIGURE 2 is a cross-sectional view taken along the line 2-2 in FIGURE 1.

FIGURE 3 is a cross-sectional line of the plastic sheet material of FIGURE 1 which has been folded over so as to be adapted to receive the edge of an incision within the fold.

FIGURE 4 is a plan view of an incision having on either side thereof lengths of the reinforced plastic sheet material and having applied thereto sufficient tension in order to spread the incision to permit access to the interior of the incision.

FIGURE 5 is a partial cross-sectional view of another embodiment of the reinforced plastic sheet material wherein the reinforcing stays are made of spring metal having a normal configuration such that the one edge of the sheet is folded and adapted to receive the edge of the incision.

FIGURE 6 is a plan view of a roll-up paste or liquid tubular container the walls of which are constructed of the reinforced plastic sheet of this invention.

FIGURE 7 illustrates another and preferred embodiment of the present invention wherein transverse flexible reinforcing members 16 and 18 are provided at each end of the stays 12. The members 16 and 18 are preferably hollow plastic tubes such as Tygon or other similar materials. The members 16 and 18 are generally, although not necessarily, perpendicular to the reinforcing stays and may be greater than, less than or equal to the width of the drape 10. Preferably the members 16 and 18 are at least as long as the width of drape 10 or longer since it has been found that this arrangement aids in the holding of the end of the drape in the incision.

FIGURE 8 shows yet another embodiment of the present invention in plan view. In this embodiment, reinforced openings 20 and 22 are provided in order to facilitate manual retraction of the wound by applying tension forces to the drapes.

FIGURE 9 is a sectional view taken along the line 9-9 in FIGURE 8.

FIGURE 10 is a plan view of another form of plastic drape within the scope of the present invention. In this embodiment the means for manual retraction is provided by the substantial rigid tubing 24 affixed to drape 10. The protruding ends of tubing 24 provide a convenient means for the application of the tension to the drape.

Referring now to the drawings in greater detail, it will be seen that in FIGURE 1 the plastic sheet material 10 contains a plurality of transversely spaced metal reinforcing stays 12 at one end thereof. These stays may be flat as shown in FIGURE 2. However, when it is desired to form the plastic drape material around the edge of an incision the stays are sufficiently malleable so that they may be folded over as in FIGURE 3 and thus fitted to the incision. Alternatively, the stays 12 may be formed of spring metal material 14 as shown in FIGURE 5, in which case the stays need not be folded over prior to or at the time of placing the plastic drape around the edge of the incision.

In using the reinforced plastic sheet material of this invention, for the surgical draping of the patient to provide a sterile draped covering around the operative field and extending around the edge of the incision, the sheet material is formed to the approximate contour of the skin and the edge of the sheet having the reinforced stays is folded around the edge of the incision. At times the site of the proposed incision is prepared by adhesively securing to the area a thin sheet of conventional surgical draping material. The incision is made through the drape material after which the novel reinforced plastic sheet material of this invention is applied and folded around the edge of the incision. Thereafter, tension may be applied to the sheet material to retract the edges of the incision and permit access to the interior of the wound. The tension necessary for retraction may be maintained by the use of towel-clips placed laterally through the drape toward the underlying drape, surgical table, or skin. The tension required for traction may also be provided by the use of weights attached to the ends of the drapes. The tension may also be applied and maintained manually. This technique is facilitated by the use of drapes having the features illustrated by FIGURES 8 through 10 as will be immediately apparent to those skilled in the art. The means for manual retraction shown in FIGURES 8 to 10 are merely illustrative and various other expedients may be utilized including handles, grips, tabs and the like. Once the tension has been applied to the drapes it may be maintained

manually or by weights as indicated above or by adhering the drapes to the underlying skin or dressing by the use of glue or other adherent material. For example, the underside of the drapes of the present invention may be provided with a Velcro material which can be adhered to the complementary Velcro material on the underlying dressing. In yet another way, the tension may be maintained on the drapes for retraction by the use of a belt running beneath the patient and connected at each of its ends to the free ends of the drapes.

Any number of drapes may be utilized in draping and retracting the edge of an incision according to the present invention. For example, a single drape may be arranged at either side of the incision as shown in the drawings. Alternatively, 3, 4, 5 or more drapes may be arranged around the incision to completely encircle it, and provide for overlapping flaps surrounding the edge of the incision. Many other applications of the surgical drape of this invention will be immediately apparent to surgeons and other persons skilled in the art.

The surgical drape can, of course, be manufactured in various sizes and shapes (rectangular, square, etc.) suitable for different sizes of incisions. In general, large, medium and small drapes are 25, 18 and 12 cm. long, corresponding to the different sizes of the incision. The stays are normally about 1/10 to 1/2 the length of the drape and measure from 5 to 15 centimeters in length and 1/2 to 3/4 centimeters in width. The thickness of the stays is sufficient not to yield to traction, on the order of 0.05 to 0.2 centimeters. The stays may be made of a spring metal or may be a tempered metal or other material, preferably of a malleable nature. The stays may be sealed within two or more layers of plastic film by heat sealing, or simply adhered to the surface of the film.

While the foregoing discussion has particularly dwelt on the use of the novel plastic sheet material of this invention as a surgical drape, it is emphasized that the invention additionally envisions other uses therefor, such as in tubular containers of the familiar shape shown in **FIGURE 6** for tooth paste, ointments and the like. The walls of such containers can be advantageously fabricated from the reinforced sheet material of the present invention. This may be accomplished by forming a length of the sheet material into a generally tubular configuration, and fitting one end thereof with an externally threaded conventional metal fitting adapted to receive an internally threaded closure cap. Through the other end of the tubing may then be inserted the paste or liquid and thereafter the end tightly sealed by conventional heat sealing techniques. When it is desired to use the material within the tubular container, the cap is then removed and wrapping force is applied to the other end of the container expelling the required amount of the liquid or paste contents from the tube. Since the reinforcing stays are generally longitudinally aligned along the length of the tube, the malleable material will retain the rolled up configuration and may be stored in a rolled up condition indefinitely after release of the wrapping force. The material is therefore as functionally suitable as the conventional metal roll-up containers while at the same time providing a substantial reduction in the cost of materials and also providing a transparent wall through which the contents may be observed for color, quantity and the like.

The materials employed in the sheet material can be varied, as will be apparent to those skilled in the art. Thus, the plastic sheet may be any normally thin transparent film such as Saran (vinyl chloride-vinylidene chloride copolymer), polyvinyl chloride, Mylar (polyethylene terephthalate), polyethylene and polypropylene. The metal stays are normally steel or aluminum, but other metals are also satisfactory.

Many other uses for the novel reinforced plastic sheet material of this invention will become apparent to those skilled in the art. Accordingly, the methods and products herein described constitute the preferred embodiments of the invention and it is to be understood that the invention is not limited to these precise methods and products. The monopoly afforded by this patent is that defined by the scope of the appended claims.

I Claim:

1. A novel disposable wound retractor and drape comprising a thin plastic sheet having a length substantially greater than its width containing longitudinally thereof at one end a plurality of generally parallel transversely spaced thin elongated malleable metal reinforcing stays of generally rectangular cross-section, one of the long dimensions of each stay terminating at the edge of said sheet, and the length of the stays being about one-tenth to one-half the length of the sheet, that end of said sheet having the stays being adapted to fold around the edge of an incision and the rest of the sheet being adapted to be disposed generally along the skin of the patient for applying tension to retract the edges of the incision.

2. The novel thin plastic sheet of Claim 1 wherein there is positioned proximate to each end of said stays and transversely thereof a flexible reinforcing member.

3. The novel thin plastic sheet of Claim 1 wherein there is positioned proximate to each end of said stays and transversely thereof a flexible reinforcing member comprising tubular plastic.

4. The novel plastic sheet of Claim 1 wherein there is provided therein a means for manually applying tension to said sheet.

5. A novel disposable wound retractor and drape comprising a thin vinyl plastic sheet having a length substantially greater than its width containing longitudinally thereof at one end a plurality of generally parallel transversely spaced thin elongated malleable reinforcing stays of generally rectangular cross-section, one of the long dimensions of each stay terminating at the edge of said sheet, and the length of the stays being about one-tenth to one-half the length of the sheet, that end of said sheet having the stays being adapted to fold around the edge of an incision and the rest of the sheet being adapted to be disposed generally along the skin of the patient for applying tension to retract the edges of the incision.

6. A novel disposable wound retractor and drape comprising a thin plastic sheet having a length substantially greater than its width having imbedded longitudinally therein at one end a plurality of generally parallel transversely spaced thin elongated malleable reinforcing stays of generally rectangular cross-section, one of the long dimensions of each stay terminating at the edge of said sheet, and the length of the stays being about one-tenth to one-half the length of the sheet, that end of said sheet having the stays being adapted to fold around the edge of an incision and the rest of the sheet being adapted to be disposed generally along the skin of the patient for applying tension to retract the edges of the incision.

7. A novel disposable wound retractor and drape comprising a thin plastic sheet having a length substantially greater than its width having adhered longitudinally thereto at one end a plurality of generally parallel transversely spaced thin elongated reinforcing stays of generally rectangular cross-section, one of the long dimensions of each stay terminating at the edge of said sheet, and the length of the stays being less than the length of the sheet positioned proximate to each end of said stays and transversely thereof, a flexible reinforcing member, that end of said sheet having the stays being adapted to fold around the edge of an incision and the rest of the sheet being adapted to be disposed generally along the skin of the patient for applying tension to retract the edges of the incision.

8. A method of draping and retracting the edge of an incision which comprises placing around the edge of the incision a novel thin plastic sheet having a length substantially greater than its width containing longitudinally thereof at one end a plurality of generally parallel transversely spaced thin elongated reinforcing stays of generally rectangular cross-section, one of the long dimensions of each of said stays terminating at the edge of said sheet, and the length of the stays being less than the length of the sheet, folding that end of said sheet material having the stays around the edge of the incision, and disposing the rest of the sheet generally along the skin of the patient whereby the same is made receptive to the application

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of tension forces for retraction of the edges of the incision.

9. A method of draping and retracting the edge of an incision which comprises placing around the edge of the incision a novel thin vinyl plastic sheeting having a length substantially greater than its width containing longitudinally thereof at one end a plurality of generally parallel transversely spaced thin elongated malleable metal reinforcing stays of generally rectangular cross-section, one of the long dimensions of each

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of said stays terminating at the edge of said sheet, and the length of the stays being less than the length of the sheet, folding that end of said sheet material having the stays around the edge of the incision, and disposing the rest of the sheet generally along the skin of the patient whereby the same is made receptive to the application of tension forces for retraction of the edges of the incision.

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