United States Patent [19]

Collins

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[45] **Dec. 11, 1973**

[54] **FOLDED SURGICAL DRAPE**

[75] Inventor: **Robert F. Collins**, Barrington, Ill.

[73] Assignee: **The Kendall Company**, Boston, Mass.

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[52] **U.S. Cl.** ..... **128/132 D**

[51] **Int. Cl.** **A61f 13/00**

[58] **Field of Search** 128/132, 292, 284

[56] **References Cited**

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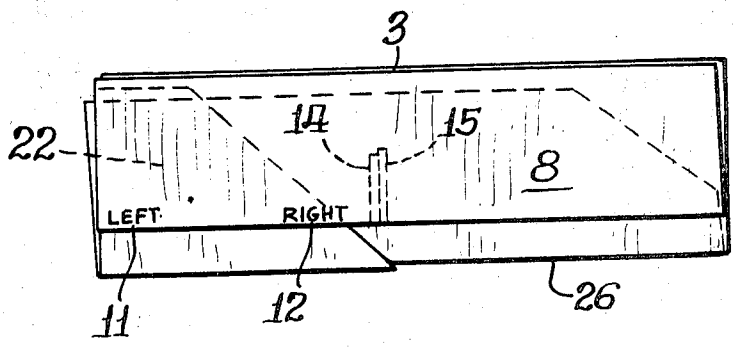
Primary Examiner—Lawrence Charles

Attorney—Robert D. Chodera and T. W. Underhill

[57] **ABSTRACT**

A disposable surgical drape folded in a fashion to facilitate aseptic transfer of the drape from a folded position to a position covering the body area of the patient to be draped. A cuff is provided around an open end of the drape which receives both hands of the person applying the drape, and facilitates unfolding and applying the drape by allowing either hand to grasp the drape's toe portion while it is positioned under the cuff.

9 Claims, 10 Drawing Figures



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SHEET 1 OF 2

Fig. 1.

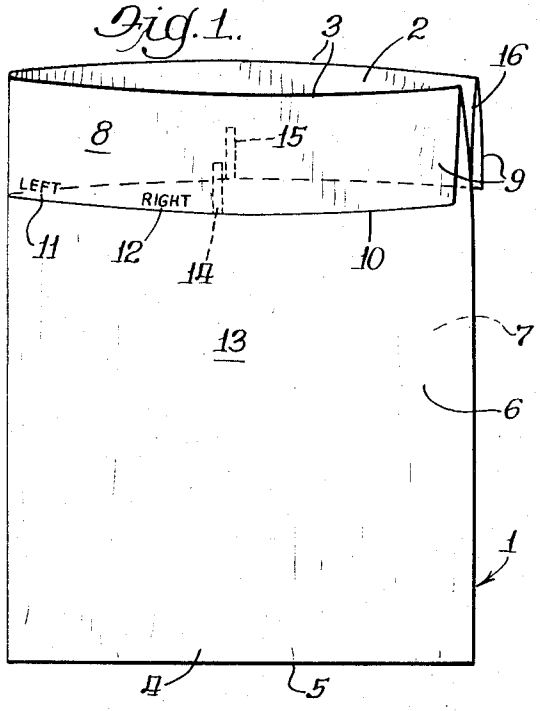


Fig. 2.

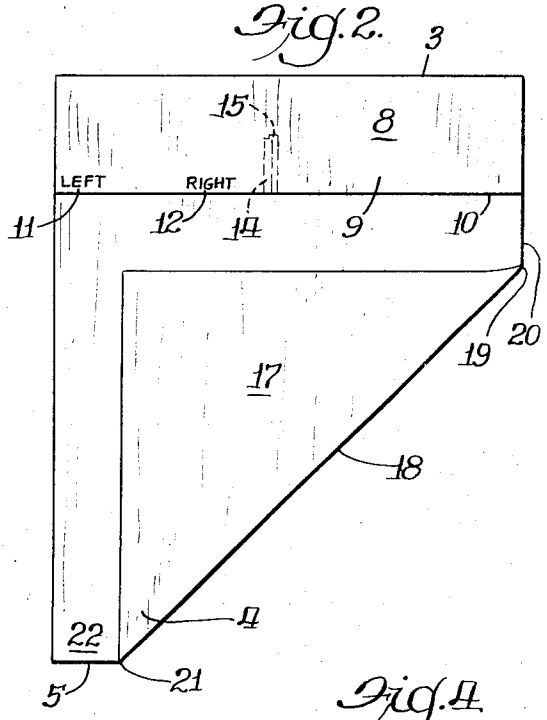


Fig. 3.

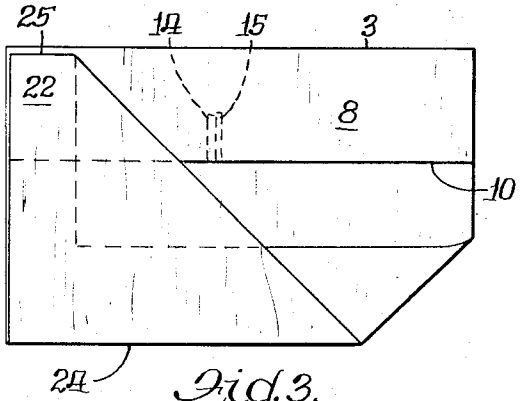


Fig. 4.

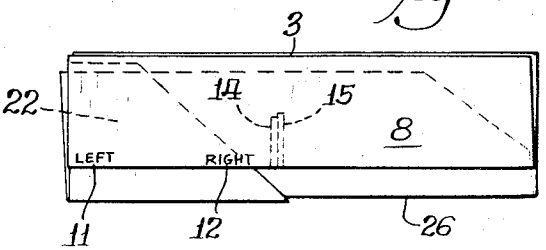
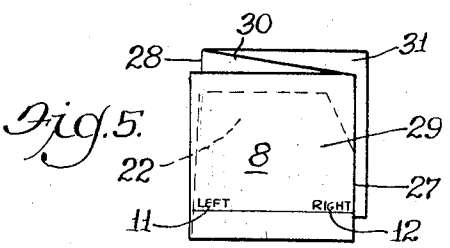


Fig. 5.



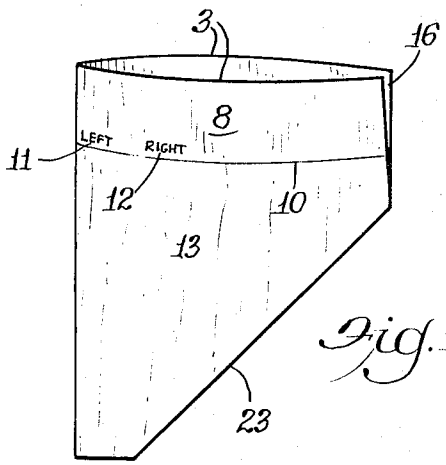


Fig. 10.

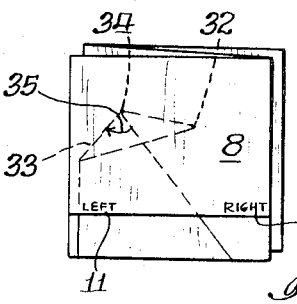


Fig. 9.

Inventor:
Robert F. Collins

By: Robert F. Cooley Atty.

Fig. 6.

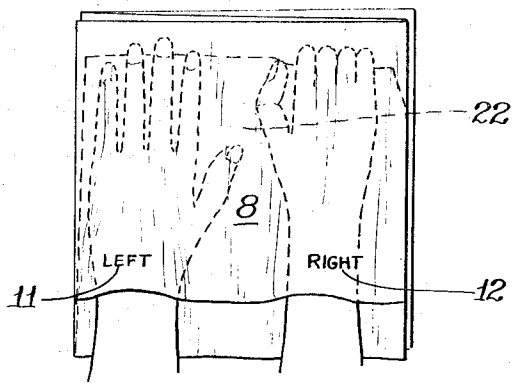


Fig. 7.

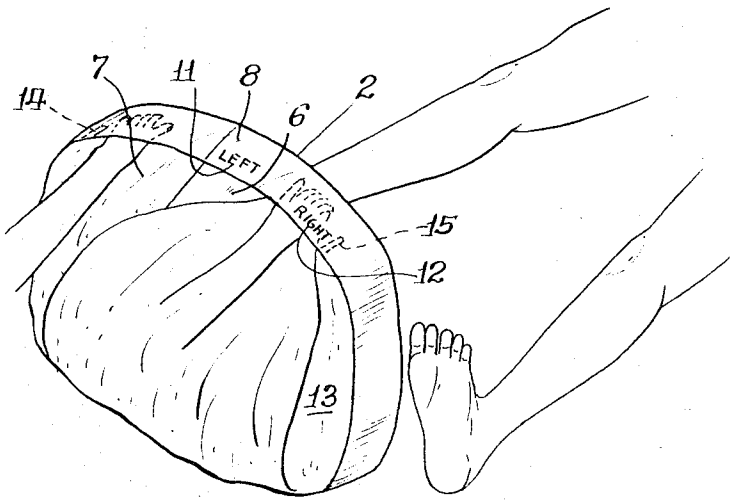
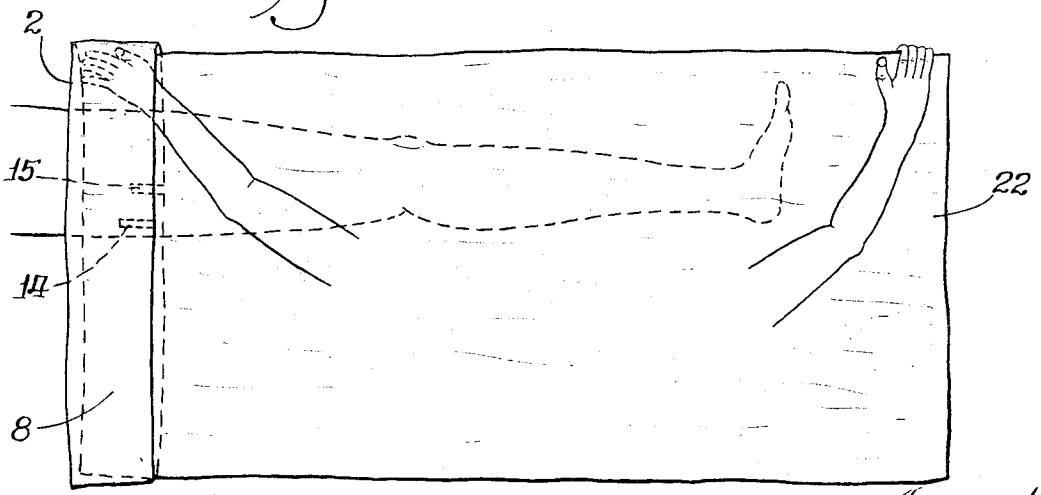


Fig. 8.



Inventor:
Robert F. Collins
By: Robert C. Cooper Atty.

FOLDED SURGICAL DRAPE

BACKGROUND OF THE INVENTION

This invention is concerned with a surgical or obstetrical drape, such as a legging drape, which is folded in a novel manner to facilitate aseptic preparation of a medical patient by being easily and aseptically opened, transferred, and spread over the body area to be covered.

An important element of any surgical procedure is the protection of sterilized or prepared areas against contamination from unprepared areas and unsterile materials or objects. This is commonly accomplished by covering such unprepared areas with sterile surgical drapes, thereby creating a completely sterile field in which to operate. It is extremely important that the drapes providing this protection be completely sterile throughout the entire draping procedure and operation at least on all surfaces which could contact a prepared area. Therefore, it is essential to proper surgical procedure that all parts of the drape which could contact prepared areas remain out of contact with non-sterile areas or objects during preparation, application, or use of the drape.

It is becoming increasingly popular to employ sterile, pre-packaged disposable items, such as surgical drapes, for hospital purposes. Important advantages may be obtained by using sterile disposable hospital items. Entirely new items are provided for each separate use. Operating room asceptic technique is improved. Cleaning and laundry requirements are reduced. To achieve maximum benefit from sterile disposable items, they must be neatly and compactly folded and packaged, with ready accessability for transfer from their packaged position to ultimate application without becoming contaminated in the process. Furthermore, since such items are often folded and packaged prior to sterilization, it is important that they be folded and packaged in a manner which allows subsequent efficient sterilization. In regard to pre-packaged surgical drapes, specifically, it is important that they be subject to easy removal from their package, unfolding and draping while all their surfaces which could contact a prepared area are maintained in a sterile condition. The invention described herein is particularly useful in the folding and packaging of single use, disposable surgical drapes. It should be noted, however, that this invention is equally applicable to both single use drapes and reusable drapes.

One type of surgical legging drape that has been utilized with some success is a rather roomy, sleeve-like drape having an open end and a closed end, and a cuff around the top perimeter of the drape's body. The cuff is designed to receive and protect the hands of the drape user, often a nurse. Also, the cuff facilitates manipulation of the drape into its desired position over the leg or limb to be covered. This type of drape has generally been folded for packaging so that at least a portion of its cuff faces outwardly from the folded drape and is available for insertion of nurse's hands. After insertion of her hands into the cuff, the nurse raises the drape and moves her hands apart from each other while keeping them under the protective cover of the cuff to unfold the drape widthwise. During application the cuff protects the nurse's hands from unsterile areas while the drape is manipulated over the limb to be covered.

Several folding patterns have been applied to this type surgical legging drape. With each of these patterns, however, certain difficulties have been encountered. A serious problem presented by many previous folds is that they are awkward to use and difficult to guide smoothly into proper position over the limb to be covered.

One type of folded surgical drape having a cuff around its open end with portions of the drape folded under the cuff is described in U.S. Pat. No. 3,335,719. A drape folded as described in that patent includes a diagonal, flap-like fold across a corner of its open end such that a back portion of the cuff constitutes part of the outer face of the folded drape. To unfold that drape, the nurse must insert one hand under the front panel cuff and the other hand in the flap-like folded-over portion of the back cuff. When so inserted under the cuff portions, the nurse's hands are positioned generally perpendicular with respect to each other.

Several serious drawbacks are encountered when one attempts to use the folded drape of U.S. Pat. No. 3,335,719. One probelm results from the fact that the cuff surrounding the open end of that drape, when folded to be used as described in that patent, must necessarily be of limited width. This limitation is necessary to permit hand insertion in the folded-over, flap-like back portion of the cuff. As a result, the depth of the hand-receiving pockets is reduced so that the nurse's hands may not be fully accommodated. This increases the danger that the nurse's sterile gloved hands may be contaminated by contacting an unsterile area or that the drape may slip off the nurse's hands during the manipulation required for application. A second difficulty one encounters while using the folded drape of U.S. Pat. No. 3,335,719 is that the hands must be inserted in their respective pockets at 90° angle with respect to each other. This procedure is awkward and adds to the difficulty of using the drape. Still another major disadvantage of the folded drape of U.S. Pat. No. 3,335,719 is that the portion of the drape which is folded and tucked under the cuff may be grasped by only one of the nurse's hands. The hand inserted in the pocket presented by the folded-over back portion of the cuff cannot grasp the tucked-under portion of drape, since the drape is tucked under only the front face portion of the cuff. This creates a serious problem when the situation dictates that the nurse must hold the tucked-under portion with a certain one of her hands but the fold permits grasping the tucked-under portion only with her other hand. Many nurses prefer to apply legging drapes to both of a patient's legs while standing between the reclining patient's legs. However, this draping technique cannot be employed without excessive hand shifting when using a drape folded according to the teaching of U.S. Pat. No. 3,335,719. Excessive hand-shifting is inconvenient. Also, it increases the danger of contamination from airborne bacteria by shaking the drape.

SUMMARY OF THE INVENTION

Accordingly, it is a major object of this invention to provide a novel folded surgical drape which may be aseptically removed from a sterile packaged position and unfolded for application.

Another object of this invention is to provide a surgical drape folded to present a cuff under which both the nurse's hands may be inserted, wherein the toe portion

of the drape's closed end is available for grasping by either of the nurse's hands.

A third object of this invention is to provide a folded surgical drape which may be lifted and unfolded for application without excessive shifting of the nurse's hands during unfolding and positioning.

Another object of this invention is to provide a folded surgical legging drape which, when properly unfolded, is held by the nurse, or other user, in a manner which facilitates guidance and placement of the drape in a covering position over a leg.

Another object of this invention is to provide a compactly folded surgical drape which may be conveniently packaged and may be sterilized before or after packaging.

Another object of this invention is to provide a drape folded such that a nurse can controllably handle its bottom end during the hand shifting required to unfold the drape.

Still another object of this invention is to provide a folded surgical legging drape which is not awkward to apply.

These and other objects may be realized according to this invention. The invention will be described in the following paragraphs with respect to a sleeve-like legging having an enlarged cuff adjacent an open top end which cuff permits the insertion of both hands of the nurse, or other user, in a flat, parallel, side-by-side relationship. When folded in accordance with this invention, the drape preferably is first angle-folded across one corner of its bottom end to form a somewhat pointed or truncated toe portion. If the width of the drape's bottom end is less than the length of that portion of the cuff available for insertion of the user's hands, this angle fold may not be required. The drape is folded across its mid-region parallel to its top end edge. The somewhat pointed or truncated toe portion is inserted under the cuff toward the open end of the drape. The drape is then folded parallel to its end edges below the cuff and toward the opposite side as the preceding fold. Finally, it is accordian-folded in three parts along fold lines perpendicular to its top end edge such that a portion of the cuff under which the toe portion is inserted faces outward from the top surface of the folded drape. To unfold and use the drape, both the left and right hands of the nurse are inserted side-by-side away from the nurse into the cuff between the toe portion and the cuff-forming flap. The toe portion is grasped by either the nurse's left or right hand. The nurse then raises the drape by the cuff and slides her hands apart under the cuff to unfold the drape widthwise. By retaining a grasp on the toe portion, the nurse initally prevents the drape from completely unfolding lengthwise and thereby avoids contamination of the toe portion through contact with lower non-sterile areas. By maintaining a hold on the toe portion with one hand during lengthwise extension of the drape as it is drawn over the limb to be covered, the nurse is able to lift and guide the toe portion into proper position.

The fold description of this specification has particular reference to applications with surgical drapes designed to cover limbs, such as arms or legs, during operating room procedure. The fold may be used in connection with any drape of the general design described above. Such drapes may be generally rectangular, trapezoidal, or triangular. They may or may not have one or more slits along a side or edge. The cuff may extend around the entire perimeter of the top of the drape or around only a portion thereof, it may be of equal or varying depth around the perimeter, and it may or may not be secured on its under side to the body of the drape at one or more points. Furthermore, the drape may be closed at one end and open at the other end or open at both ends. Also, the particular fabric of which the drapes are composed is not critical to the utilization of this invention.

The nature of this invention will be better understood by reference to the attached drawings and the following description, which illustrate only a few of the embodiments contemplated by this invention and are not intended to limit this invention thereby.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates one type of surgical drape in a completely unfolded state which may be folded in accordance with this invention.

FIGS. 2 through 5 illustrate the various stages in folding the drape of FIG. 1 according to this invention.

FIGS. 6 through 8 show the various stages of unfolding and applying a drape folded in accordance with this invention

FIG. 9 illustrates an additional step which may be included in the folding of a drape in accordance with this invention.

FIG. 10 illustrates another type of surgical drape in a completely unfolded state which may be folded in accordance with this invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

To better explain a preferred embodiment of this invention, reference is now made to FIG. 1 which shows a generally rectangular surgical drape 1 having an open top end 2 terminating in a top edge 3 and a closed bottom end 4 terminating in a bottom edge 5 and consisting of a front panel 6, a back panel 7, and an enlarged cuff 8 extending around the circumference of the top end 2 which cuff may be created by folding over a marginal portion 9 at the top end of the drape. The cuff is defined by said top edge 3 and a lower cuff edge 10. The cuff 8 is provided with suitable hand positioning indicia 11,12 and forms a pocket to receive the hands of a nurse or other drape user. Also, the flap portion 9 is fastened to the body 13 of the drape at points 14 and 15 to maintain the cuff 8 and retain the nurse's hands in correct alignment within the space between those points of attachment 14,15 during unfolding and application of the drape. It should be noted that the drape folded in accordance with this invention may be generally rectangular as described, or it may take any of a variety of shapes, such as trapezoidal or trianguler. The drape may or may not have one or more slits along a side or edge, such as illustrated at 16. Also, although the fastening points 14,15 are included in this description of the drape, such points are optional and may be spaced at a variety of positions or left off the drape completely. Hand positioning indicia 11,12 are also optional.

The initial step in folding the drape in accordance with this invention is illustrated in Fig. 2. An angle-fold 17 is created at a corner of the bottom end 4 of the drape by folding the drape along a diagonal line 18 extending from a point 19 located along a side edge 20 to a point 21 along the bottom edge 5, producing a some-

what pointed or truncated closed toe portion 22. The purpose of this initial step is to create a reduced unfolded edge portion at the bottom end. Where the drape is constructed so that the bottom edge is shorter than the top edge, such as where the drape is in the shape of a trapezoid or triangle, it might be unnecessary to include this initial step. A drape constructed with an angle edge 23 to include such a reduced edge is illustrated by FIG. 10. If desired, the drape may be folded or constructed so that the toe portion extends to a pointed tip, as shown at 32 of FIG. 9.

FIG. 3 illustrates the second step in folding according to this invention. The drape is folded along a line 24 running across the drape parallel to its top edge 3, so that the end 25 of the truncated toe portion 22 rests on the top end side of the lower cuff edge 10, as viewed in FIG. 3, preferably near the top edge 3. As shown by FIG. 4, the toe portion 22 is then inserted under the cuff 8. If attachment points 14,15 are included on the drape, they should be positioned so as not to interfere with the insertion of the toe portion under the cuff.

FIG. 4 also illustrates the next step, which is to fold the drape in the opposite direction as the fold of the second step along a second line 26 running across the drape parallel to the top edge 3.

FIG. 5 illustrates the final fold of this invention. The drape is accordian-folded along two lines 27,28 to form three panels 29,30,31. In its final folded form, the truncated toe portion 22 lies directly beneath that portion of the cuff 8 facing outward from the top surface of the folded drape as part of panel 29. Folded thusly, the hand positioning indicia 11,12 are properly situated to indicate where a nurse's hands should be inserted under the cuff 8 to lift, unfold, and apply the drape.

The appropriate manner of applying a surgical drape folded as described above is illustrated in FIGS. 6–8. As shown in FIG. 6, the nurse, or other user, should insert both hands under the cuff 8 as directed by the hand positioning indicia 11,12. The toe portion 22 should be grasped by one hand. The toe portion 22 may be grasped by either, but not both, of the nurse's hands. Determination of which hand should grasp the toe portion 22 is dependent upon the location of the nurse while applying the drape. As will be better understood by reference to FIGS. 7 and 8, the nurse should grasp the toe portion 22 with her left hand if she intends to apply the drape while standing to her right, as she faces from the foot to the head of the reclining patient, of the limb to be covered and with her right hand if she intends to apply the drape while standing to her left of the limb. When applying drapes to each of a patient's legs from a position between the patient's legs, the nurse would most conveniently grasp the toe portion of one drape with one hand to apply a drape to one leg but then grasp the toe portion of another drape with the other hand to apply the second drape to the other leg. The drape of this invention facilitates this procedure by making the toe portion available to either hand. After placing both hands under the cuff 8 and grasping the toe portion 22 with one hand, the nurse should lift the drape from its supporting surface by raising her hands and spread her hands an appropriate distance, being careful to retain her hands under the cuff 8, as illustrated in FIG. 7. When applying drapes equipped with points of attachment 14,15 between the cuff 8 and body 13, the appropriate distance for spreading the hands is determined by those points 14,15. By this action the nurse may raise the drape from its resting location, unfold its open end, and place the drape in a convenient posture for guidance to its desired position over the limb to be covered.

It should be noted that both the nurse's hands are initially positioned under the cuff 8 on the side of the drape's front panel 6. However, as the drape is lifted and oriented for application, one of the nurse's hands must slide around to a position under the cuff on the drape's back panel 7. When the hand sliding to the back panel 7 is the hand grasping the toe portion, the bottom part of the drape must be pulled along with the shifting hand. The above-described first angle fold reduces the length of the bottom area of the drape which must be shifted and, therefore, aids in controlling the bottom area while sliding the hand grasping the toe portion around to the back panel 7.

FIG. 8 illustrates how the drape is drawn to its desired final covering position while the toe portion 22 is still securely in the nurse's grasp. After the open end 2 of the drape is placed over at least an end of the limb to be covered, the nurse removes the hand holding the toe portion 22 from under the cuff 8, still keeping a firm grasp on the toe portion, and unfolds the drape longitudinally as she draws the drape over the limb. In the unfolded position shown by FIG. 8, the nurse is able to guide and place the drape in its desired final position covering the limb without permitting the toe portion 22 to fall or hang free. It should be noted that throughout the entire operation of unfolding and applying the drape, it is unnecessary to release the toe of the drape or to shake out the drape.

FIG. 9 illustrates an additional fold which may be included on a drape folded in accordance with this invention when the toe portion 22 inserted under the cuff 8 extends to a relatively sharp pointed tip 32. The toe portion may be folded along a line 33 which joins the diagonal line 18 at point 34. Where line 33 joins diagonal line 18 to form an angle 35 of less than 90°, the tip 32 points in the direction of the nurse's right hand. This additional fold provides a convenient tab readily available to whichever hand is selected for grasping the toe portion.

As emphasized above, this invention has particular applicability to legging type surgical drapes. However, it should be understood that it is equally applicable to various other types of drapes. Folding in accordance with this invention provides a neat package of convenient size and shape, in which the folded drape may be sterilized before or after packaging. The folded drape can be easily and aseptically unpackaged, unfolded, and applied.

The information contained in this disclosure should be understood as merely explanatory of this invention and not restrictive. Numerous variations of the described examples will be suggested by this disclosure to one skilled in the art. All such varieties are considered to be covered hereby, provided they fall within the spirit and scope of the following claims.

I claim:

1. A folded surgical drape wherein the drape comprises a flat sleeve of sheet material having a body with front and back panels, an open top end terminating in a top edge, a bottom end terminating in a bottom edge, side edges defining the perimeter of said flat sleeve between said top and bottom edges, and a cuff overlapping a portion of said front and back panels of said

body adjacent said top edge, said cuff being defined by said top edge and a lower cuff edge, the folds of said folded surgical drape comprising:

an angle fold across a corner of said bottom end along a diagonal line extending from a point on one side edge to a point on said bottom edge bringing said corner into flat contact with an intermediate area of said front panel of said sleeve and creating a reduced unfolded edge portion of said bottom end, and

a first fold along a line substantially parallel to said top edge placing said reduced unfolded edge portion of said bottom end on the top end side of a portion of said lower cuff edge on said front panel,

said reduced unfolded edge portion of said bottom end being positioned between said cuff and said front panel of said body adjacent the top edge.

2. The folded surgical drape of claim **1** wherein said point on said bottom edge is coincident with an end of said bottom edge providng a reduced unfolded edge portion which comprises a substantially pointed tip.

3. The folded surgical drape of claim **2** including a fold along a line extending across a portion of said bottom end of the drape positioned between said cuff and said front panel, said line intersecting said diagonal line under the cuff.

4. The folded surgical drape of claim **3** wherein said line extending across a portion of said bottom end of the drape positioned between said cuff and said front panel intersects said diagonal line to form an angle therewith of less than 90° such that said substantially pointed tip points toward said one side edge.

5. The folded surgical drape of claim **1** wherein said cuff is attached to said body along said top edge and in the region adjacent the lower edge of the cuff overlapping both the front and back panels, respectively, intermediate the side edges of each of said panels and spaced at a distance from an edge of the panels to provide an opening with sufficient space for the positioning of the unfolded edge portion of the bottom end of the drape between the front panel and said side edge of the panel.

6. The folded surgical drape of claim **1** including a plurality of further folds comprising:

a fold along a line substantially parallel to said top edge in the opposite direction of said first fold toward the cuff at the back panel of the drape, said line being on the bottom end side of said lower cuff edge, and

a fold toward the cuff at the back panel of said drape along a line substantially perpendicular to said top edge, said line being spaced from the intersection of the diagonal line of the angle fold with the bottom end of the drape so as to not intersect the unfolded edge portion of said bottom end,

to thereby reduce the outwardly facing surface area of the folded drape, the top surface of which comprises the portion of the cuff at the front panel under which the unfolded edge portion of said bottom end of the drape is positioned, whereby the unfolded edge portion of the bottom end of the drape is readily accessible to both the left and right hands inserted under said portion of the cuff in flat, parallel, side-by-side relationship.

7. The folded surgical drape of claim **6** wherein said fold toward the cuff at the back panel of the drape comprises an accordian fold along two lines substantially perpendicular to said top edge, both of said lines being spaced from the unfolded edge portion so as not to intersect the same.

8. A folded surgical drape wherein the drape comprises a flat sleeve of sheet material having a body with front and back panels, an open top end terminating in a top edge a bottom end terminating in a bottom edge shorter than said top edge, a first side edge extending between said top and bottom edges, a second side edge shorter than said first side edge extending to a lower end toward the bottom end of said sleeve from said top edge, a cuff overlapping a portion of said front and back panels of said body adjacent said top edge, said cuff being defined by said top edge and a lower cuff edge, and an angle edge extending from the lower end of said second side edge to an end of said bottom edge, the folds of the folded surgical drape comprising:

a first fold along a line substantially parallel to said top edge placing said bottom edge on the top end side of a portion of said lower cuff edge on said front panel,

said bottom edge being positioned between said cuff and said front panel of the body adjacent said top edge, and

a plurality of further folds producing a reduced outwardly facing surface area of said folded drape whereing a portion of the drape adjacent said bottom edge between said cuff and said front panel is readily accessible to both the left and right hands inserted under said cuff on said front panel in flat, parallel, side-by-side relationship, said plurality of folds comprising:

a fold along a line substantially parallel to said top edge in the opposite direction of said first fold toward the cuff at the back panel of the drape, said line being on the bottom end side of said lower cuff edge, and

a fold toward the cuff at the back panel of said drape along a line substantially perpendicular to said top edge, said line being spaced from the intersection of the diagonal line of the angle fold with the bottom end of the drape so as to not intersect the unfolded edge portion of said bottom end,

whereby the top surface of the outwardly facing surface area of the folded drape comprises the portion of the cuff under which the unfolded edge portion of said bottom end of the drape is postioned.

9. A folded surgical drape wherein the drape comprises a flat sleeve of sheet material having a body with front and back panels, an open top end terminating in a top edge, a bottom end terminating in a bottom edge shorter than said top edge, side edges defining the perimeter of said flat sleeve between said top and bottom edges, and a cuff overlapping a portion of said front and back panels of said body adjacent said top edge, said cuff being defined by said top edge and a lower cuff edge, at least one of said side edges tapering toward another side edge toward said bottom end, the folds of said folded surgical drape comprising:

a first fold along a line substantially parallel to said top edge placing said bottom edge on the top end side of a portion of said lower cuff edge on said front panel,

said bottom edge being positioned between said cuff and said front panel of said body adjacent the top edge, and

a plurality of further folds producing reduced outwardly facing surface area of said folded drape wherein a portion of the drape adjacent said bottom edge between said cuff and said front panel is readily accessible to both the left and right hands inserted under said cuff on said front panel in flat, parallel, side-by-side relationship, said plurality of folds comprising

a fold along a line substantially parallel to said top edge in the opposite direction of said first fold toward the cuff at the back panel of the drape, said line being on the bottom end side of said lower cuff edge, and

a fold toward the cuff at the back panel of said drape along a line substantially perpendicular to said top edge, said line being spaced from the intersection of the diagonal line of the angle fold with the bottom end of the drape so as to not intersect the unfolded edge portion of said bottom end,

whereby the top surface of the outwardly facing surface area of the folded drape comprises the portion of the cuff under which the unfolded edge portion of said bottom end of the drape is positioned.

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