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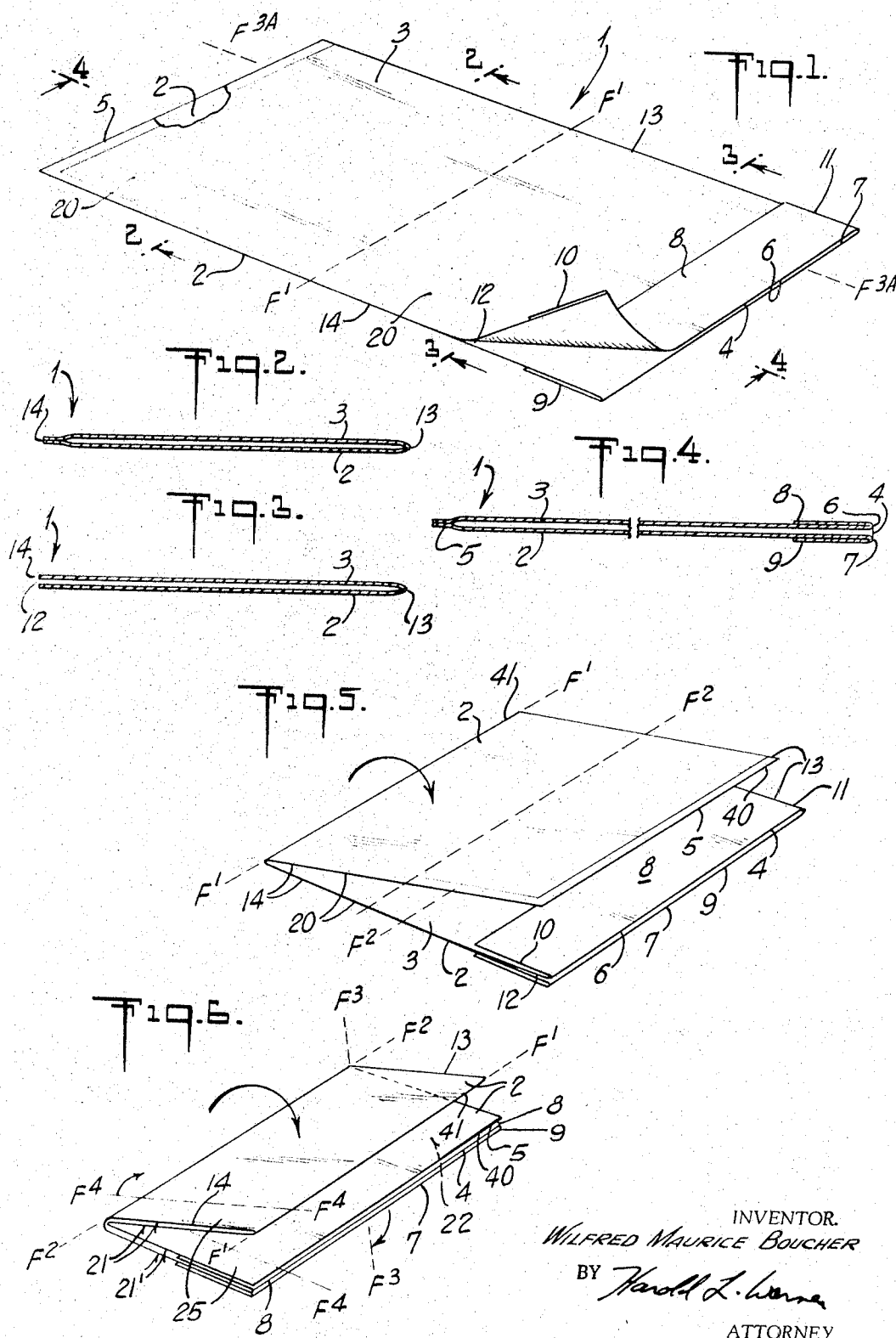
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3,335,719

SURGICAL DRAPE

Filed Dec. 17, 1965

4 Sheets-Sheet 1



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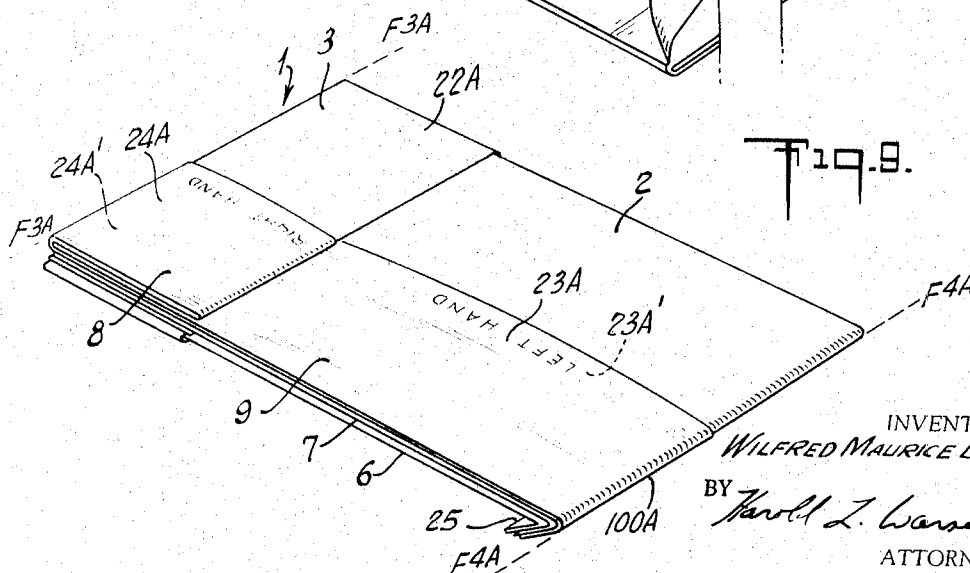
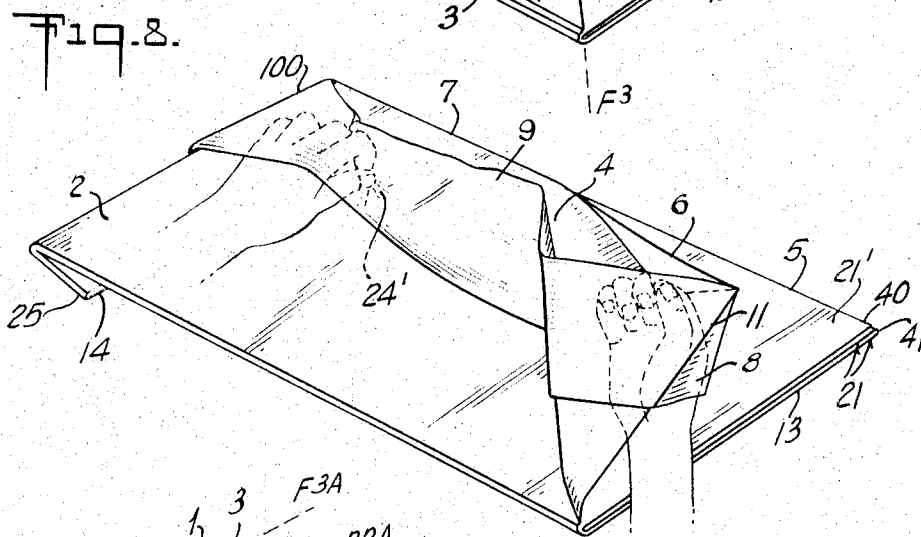
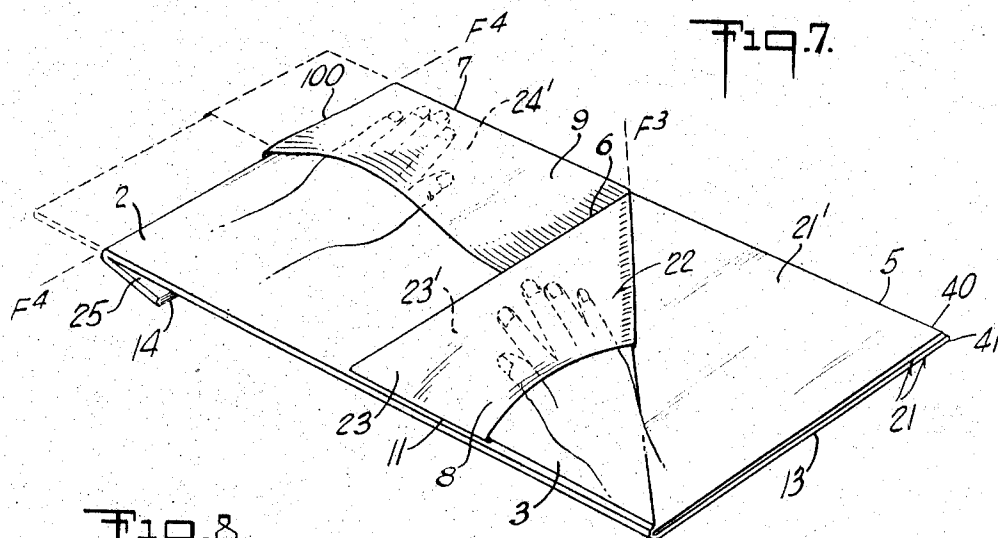
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## SURGICAL DRAPE

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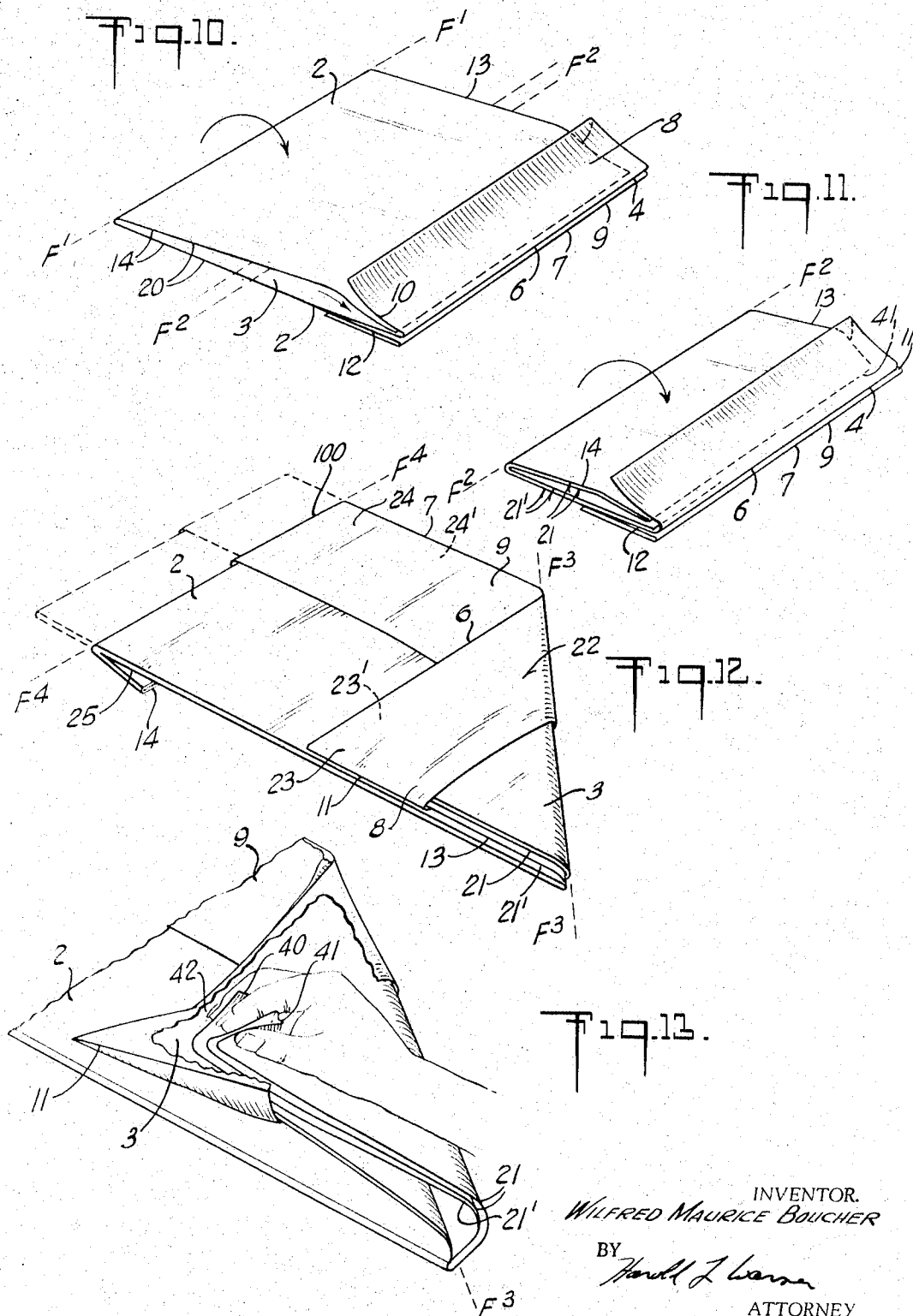
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SURGICAL DRAPE

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4 Sheets-Sheet 3



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SURGICAL DRAPE

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Fig. 14.

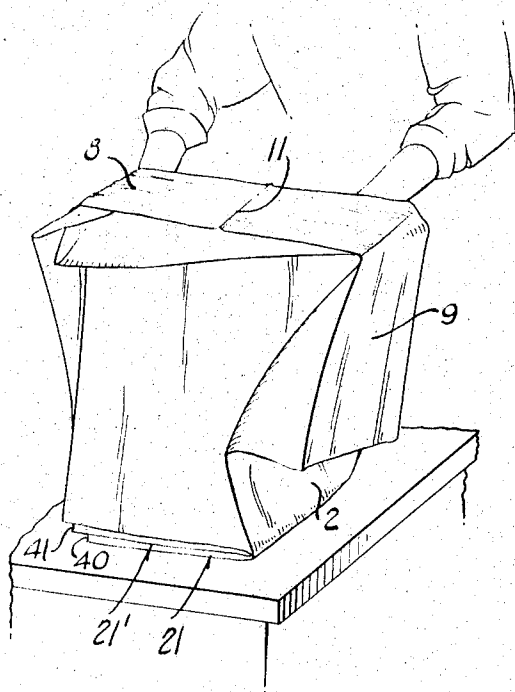


Fig. 15.

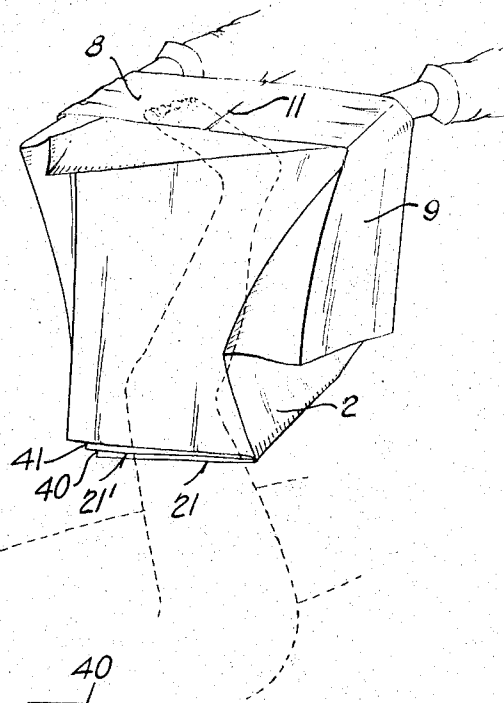
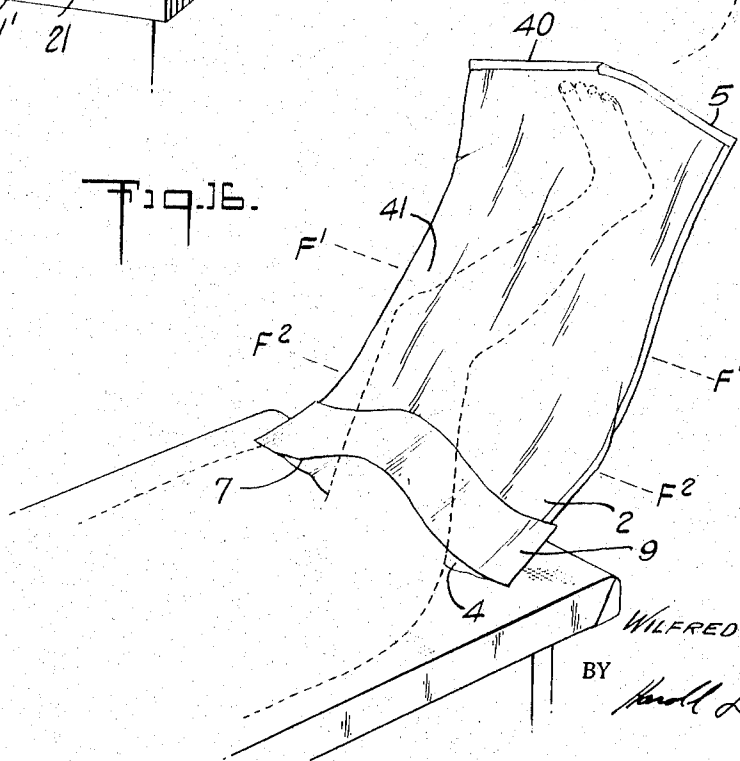


Fig. 16.



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## SURGICAL DRAPE

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### ABSTRACT OF THE DISCLOSURE

Disclosed herein are surgical leggings of the type having a cuff surrounding the open end of the legging which are, according to this invention, provided in a uniquely folded form so as to facilitate aseptic application of the same to a patient. A corner of the legging at the cuffed open end thereof is folded forward to define a left hand receiving pocket and a right hand receiving pocket. These pockets are present on the outer surface of the folded legging but are on opposite sides of the drape when the drape is in its position on a patient. The bottom of the drape is folded upward a number of times to form a series of folds and provide a compactly folded drape and the upper edge of each of these folds is tucked under the cuff so that when a nurse inserts her hands in the hand receiving pockets, she will also grasp the top edges of these folds and will thus be better able to manipulate the drape during its application.

This invention relates to surgical drapes and, more particularly, to surgical drapes designed for the draping of legs and the like and the manner of folding the same to avoid contamination during handling.

The draping of the patient is an important step in any surgical or obstetrical procedure. The surgical drape not only protects surgically prepared areas of the skin from contamination, but, in addition, the drapes protect the gowns of the surgeons and nurses against contamination through contact with unprepared or contaminated areas of the skin which may be a source of infection.

The drapes must be carefully arranged, not only to prevent their becoming disarranged during the operation, but to avoid contamination of the nurse or of the drapes themselves during their application. When positioning a surgical drape on a patient, the gloved hands should not come in contact with the skin. In addition, contact between the hands and portions of the surgical drape which will be in contact with the skin or which may come in contact with the gowns of the surgical team should be kept at a minimum. For this reason, a cuff is suitably provided at the edges of the surgical drape outward of the central operative field under which the nurse may place her hands. The cuff provides a barrier between the skin of the patient and the hands of the nurse and when the nurse removes her hands the cuff, by overlying the area of the drape touched by the nurse, provides a barrier between these areas and the surgical team.

For certain types of operative procedures, it is necessary to separately drape the arms or legs. When applying a drape to an extremity it is preferable to position the hands on opposing sides of the covering to facilitate the proper positioning of the drape. However, it is often difficult to position the hands under the cuff on opposing sides of the drape without first searching through the folded drape to determine the proper points to grasp with the hands. This procedure results in inefficient allocation of the nurse's time and may result in contamination of the central portion of the drape.

Only the central front area of a person's gown is usually considered sterile; and, therefore, the drape should not come in contact with the lower half of the gown. The drape should not be held so high as to touch the lights

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or so low as to touch the floor and, preferably, no part of the drape should fall below the level of the operating table. Since these drapes for the extremities are usually relatively long, it is difficult to open and apply them without permitting a portion of the drape to drop below the level of the operating table or touch the lower portion of the nurse's gown. One nurse may hold one end of the surgical drape to prevent its falling below the level of the operating table while a second nurse positions the drape on the extremity of the patient; however, this means that the additional nurse must be diverted from other duties.

According to this invention, a uniquely folded surgical drape suitable for draping arms, legs or surgical equipment, such as Mayo stands or the like, is provided which may be easily and rapidly applied to the patient by one nurse with little risk of contamination of the patient, nurse or drape. In particular, these folded drapes comprise a back cover sheet and a front cover sheet overlying and superimposed upon the back cover sheet. The front cover sheet and the back cover sheet are secured together along at least one side and an edge of the back cover sheet and an edge of the front cover sheet define an open end of the drape. A front cuff is joined to and extends across the outer face of the front cover sheet in proximate relation to the open end of the drape and a back cuff is joined to and extends across the outer face of the back cover sheet in proximate relation to the open end of the drape. Both of these cuffs open away from the open end of the drape. A portion of the front cover sheet and front cuff and of the back cover sheet and back cuff is folded essentially congruently, forward, either diagonally or longitudinally, to define a flap-like fold overlying a portion of the outer face of the front cover sheet and only a portion of the front cuff. The overlying portion of the back cuff and the back cover sheet constitute the outer face of the flap-like fold. A folded unit is thus provided in which the back cover sheet and back cuff and front cover sheet and front cuff and the fold line formed by the forward, essentially congruent fold cooperate to define a left hand receiving pocket and grasping area and a right hand receiving pocket and grasping area on an outer surface of the folded surgical drape.

When it is time for the draping procedure to begin, the nurse may position her hands in the receiving pockets and grasp the area of the surgical drape within the pocket underlying the cuff. By bringing the hands apart, the surgical drape is easily opened, and when the drape is in its normal open position, the left hand and right hand of the nurse will be on opposing sides of the drape under a cuff in position to drape the extremity. The hand receiving pockets which served to initially position the hands and which existed by virtue of the forward, essentially congruent fold, no longer exist and the hands may, therefore, be shifted beneath the cuff to any desired position.

The inventive concept may be more easily understood by reference to the attached drawings and the following descriptions, wherein,

FIG. 1 is a schematic representation in perspective of a cuffed, stocking-like surgical drape;

FIG. 2 is a cross section of the surgical drape illustrated in FIG. 1 taken along line 2—2;

FIG. 3 is a cross section of the surgical drape illustrated in FIG. 1 taken along line 3—3;

FIG. 4 is a cross section of the surgical drape illustrated in FIG. 1 taken along line 4—4;

FIG. 5 illustrates the first step in folding the drape of FIG. 1;

FIG. 6 illustrates the second step of folding the drape of FIG. 1;

FIG. 7, which is of the reverse side of the drape as folded in FIG. 6, illustrates the final step of folding the

drape of FIG. 1 and the initial positioning of the nurse's hands just prior to opening;

FIG. 8 shows the first step in the opening of the drape prior to application to a patient;

FIG. 9 illustrates a different manner of folding the surgical drape of FIG. 1;

FIGS. 10, 11 and 12 illustrate three progressive steps in obtaining a further fold in accordance with the present invention.

FIG. 13 illustrates a nurse properly grasping the various folds of the drape illustrated in FIG. 12 in preparation for applying the drape to the patient;

FIGS. 14, 15 and 16 illustrate the application of a drape folded in the manner illustrated in FIGS. 10 through 12 to the leg of a patient.

Referring now to FIGS. 1 through 4, a surgical drape 1, suitable for draping arms, legs or a variety of surgical tables and stands, such as Mayo stands or the like, comprises a back cover sheet 3 and a front cover sheet 2 overlying and superimposed upon the back cover sheet 3.

The front cover sheet and the back cover sheet are secured together along left side 14 and right side 13, and edge 6 of the back cover sheet and edge 7 of the front cover sheet define open end 4 of the drape. A front cuff 9 is joined to and extends across the outer face of the front cover sheet 3 in proximate relation to open end 4 of the drape. A back cuff 8 is joined to and extends across the outer face of the back cover sheet 3 in proximate relation to open end 4 of the drape. Both of these cuffs open away from the open end of the drape. As is illustrated, the front cuff and back cuff preferably extend essentially transversely across substantially the entire width of the front cover sheet and back cover sheet respectively.

Since surgical drapes for the arms and legs are, in general, relatively long, the cuffed drape should be folded upward upon itself to form a plurality of folds and thus provide a compact unit. Any number of these folds of any size may be formed. Referring to FIG. 1 and FIGS. 5 and 6, the surgical drape 1 is folded approximately in half upward upon itself along transverse fold line  $F^1$ , thus forming the two folds 20 substantially equal in size. The folded unit shown in FIG. 5 is again folded approximately in half upward upon itself along transverse fold line  $F^2$  to form the folds 21 and folds 21' substantially equal in size underlying back cuff 8.

As best illustrated in FIG. 7, a portion of the front cuff and front cover sheet and of the back cuff and back cover sheet are folded forward, essentially congruently, along diagonal fold line  $F^3$  so as to form a flap-like fold 22 overlying a portion of the front cover sheet and only a portion of the front cuff. The portion of the back cuff and back cover sheet thus constitute a portion of the outer face of the flap-like fold. The front cover sheet 2 and front cuff 9 and the back cover sheet 3 and back cuff 8 and essentially congruent fold line  $F^3$  cooperate to define left hand receiving pocket 23 and left hand grasping area 23' and right hand receiving pocket 24 and right hand grasping area 24' on the outer surface of the folded unit. Fold line  $F^3$  defines a side of both the left hand pocket and right hand pocket. Top edge 6 and top edge 7 form a second side of the left hand and right hand pockets respectively, and right cuff side edge 11 defines a third side of the right hand receiving pocket.

While in the particular embodiment illustrated, a portion of the upper right hand corner of the drape is folded forward to form the overlying flap-like fold, the inventive concept is equally well satisfied by the diagonal folding forward of a portion of the upper left corner of the surgical drape. One or the other form may be desired by an individual nurse or operating room attendant. A particularly neat and compact folded unit is formed in the case of the rectangular drape illustrated when the diagonal fold line  $F^3$  is disposed at a 45° angle to vertical.

When the time has come to drape the patient, the nurse

may insert her hands into the right hand receiving pocket and left hand receiving pocket as illustrated in FIG. 7 and grasp a portion of the front cover sheet and back cover sheet, respectively, which underlies the cuff within the pockets as shown in FIG. 8. By bringing the hands apart, the front cover sheet is separated from the back cover sheet at the end 4 of the drape. In this open position the left hand and right hand of the nurse are now holding opposing sides of the drape and are, therefore, in an advantageous position for applying the drape to a body member. The hand receiving pockets which existed by virtue of the congruent diagonal fold and which served to orient the nurse's hands, no longer exist and the hands may be freely shifted to another position beneath the cuff if, for some reason, this is desired. This method of properly orienting the hands and opening the drape is relatively efficient and eliminates the need for the nurse to search through the folded drape to find the proper hand grasping areas.

When, as in all of the embodiments illustrated, the front cuff, 9, is detached from the back cuff, 8, and from the front cover sheet, 3, along a substantial portion of a cuff side edge, 10, which would, if the cuff were attached, define a side of one of the pockets, a marginal side portion of the front cuff and the front cover sheet is preferably folded backward, along fold line  $F^4$  shown in FIGS. 6 and 7, so as to form a fold, 25, underlying the front cover sheet, 3, and so that the fold line,  $F^4$ , defines a side edge, 100, of one of the pockets. Such a fold is preferable whenever a side edge of one of the pockets would otherwise be open. When the back cuff is detached from the front cuff and from the back cover sheet along a cuff side edge which would otherwise define a side of the pocket in the flap-like fold, a marginal side portion of the flap-like fold may be folded so as to underly itself and to thus form a fold line which defines a side of the pocket.

A second embodiment of the invention is illustrated in FIG. 9, wherein a marginal portion of the front cover sheet 2 and front cuff 9 and of back cover sheet 3 and back cuff 8 is folded forward along a longitudinal fold line,  $F^{3A}$ , also shown in FIG. 1, to form the overlying flap-like fold 22A; and the drape then folded transversely upward upon itself as previously described with reference to FIGS. 5 and 6. The folds and cuffs thus cooperate to define a left hand receiving pocket 24A and grasping area 24A' and right hand receiving pocket 23A and grasping area 23A'.

The particular drape illustrated in the drawings is a stocking-like surgical drape by which it is meant that it is fabricated to form a closed outer surface at some point along the length of the drape. Because of the closed surface, the member to be draped must be passed into the drape rather than merely covered. While the invention is particularly useful in conjunction with stocking-like drapes, the inventive concept is not limited thereto.

The drape 1 may be of any shape or size, and drapes of the type illustrated can, for example, be conveniently formed from a single sheet of material by folding the sheet in half upon itself to form right side edge 13, and sealing the side edges of the sheet of material together to form left side edge 14 and thus form a stocking-like drape. The bottom edges of the drape can then suitably be sealed together to form a closed bottom end, 5. The drape may be passed over the body member or piece of equipment by virtue of the open end, 4, of the stocking. While the other end, 5, may be closed as described above to provide a member enveloping drape, this end is suitably open when surgery is to be performed on the hand or the foot or when otherwise desirable. In addition, slits may be provided at some point in the surgical drape in anticipation of an incision being made at that point. A slit 12 is provided along the upper portion of left side edge 14 in the particular embodiment illustrated in order to facilitate the draping of the patient.

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The cuffs may be any shape or depth. While they need not be immediately adjacent to an open end of the drape as illustrated, they should be reasonably proximate thereto so that an open end of the drape may be properly guided into place by the nurse. These cuffs may, of course, constitute a separate panel of material joined to the cover sheet at suitable points by gluing or other appropriate means. The front cuff and the back cuff may be, but need not be, joined either to each other or the front cover sheet or the back cover sheet, respectively, at points along cuff side edges 10 and 11.

When the drape is made from one sheet of material, as previously described, the cuffs may be conveniently formed by folding a top portion of the sheet downward upon itself. Thus, in the embodiment of the invention illustrated, the front cuff 9 is joined to the front cover sheet 2 by virtue of the folded top edge 7, and the back cuff 8 is joined to the back cover sheet 3 by virtue of the folded top edge 6. The front cuff is joined to the back cuff along right cuff side edge 11, but the front and back cuff are detached from each other and from the cover sheets along left cuff side edge 10 by virtue of the slit 12.

In addition to the features thus far described, additional advantages may be provided by virtue of a modification of the fold described wherein the surgical drape is folded upward essentially transversely upon itself to create the plurality of folds, and the top edge of some of the folds, and preferably all of the folds, are tucked under one of the cuffs as shown in FIGS. 10 and 11. One edge of the drape as folded is then folded over on itself along fold line F<sup>3</sup> to provide hand receiving pockets similar to those illustrated in FIG. 7.

When the nurse places her hands in the hand receiving pockets of the modified fold illustrated in FIG. 12 in preparation for draping a patient, with her right hand she may grasp not only the back cover sheet, but also the top edge of each of the tucked folds. This is illustrated in FIG. 13 where the nurse is shown grasping the back cover sheet 3 between her 3rd and 4th fingers at point 42 and grasping the top edge 40 of fold 21' between her 1st and 2nd fingers and top edge 41 of fold 21 between her thumb and 1st finger. The left hand of the nurse is grasping the portion of the front cover sheet in the manner illustrated in FIG. 9.

When the hands are brought apart to open the mouth of the stocking-like surgical drape and the drape is lifted from its supporting surface, as illustrated in FIGS. 14 and 15, the entire drape remains firmly under the nurse's control, and the nurse's hands are on opposite sides of what was formerly right cuff side edge 11.

The nurse is now prepared to begin the draping procedure. As the leg is passed deeper into the drape, the nurse may release her grip on the top edge 41 of the outermost fold 21, but retain her grip on the top edge 40 of the adjacent fold 21'. This increases the "effective" length of the drape, and the leg may be passed deeper into the stocking. Since the releasing of the fold is more or less simultaneous with the passing of the leg deeper into the drape, the top edge 41 of the released fold 21 will not fall into a nonsterile zone. The nurse then releases the top edge 40 of the last fold 21' while passing the leg still further into the drape, and the draping is thus completed.

While some control of the modified drape can be obtained by folding the drape transversely upward upon itself in any manner to form folds and then tucking the top edges of the folds under a cuff, it is preferable to fold the drape from the bottom upward in half upon itself a plurality of times, as in the embodiments illustrated in the drawings, until the desired degree of compactness is obtained. All of the folds may then be tucked under a cuff. As the outermost fold at any moment is, in turn, released by the nurse, the effective length of

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the drape which is available for penetration by the body member doubles. This is shown most clearly in FIGS. 14 through 16. Originally when the nurse holds the top edge 40 and 41 of folds 21' and 21 as in FIG. 14, the effective length of the drape available for leg penetration is the distance from top front cover sheet edge 7 to fold line F<sup>2</sup> as shown in FIG. 16. When top edge 40 of fold 21' is released, the effective length of the drape is the distance from top front cover sheet edge 7 to fold line F<sup>1</sup>, which was top edge 40 of the released fold. When the last fold is released, the full length of the drape may be utilized. While any folding and subsequent tucking of folds under the cuff may result in the nurse being able to easily prevent the surgical drape from initially falling into a nonsterile zone, the particular fold described is advantageous in that complete control is retained over the surgical drape until the application to the patient is complete.

While in the modification described and illustrated all of the top edges of the folds are tucked under the back cuff, they may, of course, be equally as well tucked under the front cuff, or some may be tucked under the back cuff and some under the front cuff. While all the folds need not be tucked under a cuff, the invention is most useful when all of the folds are so tucked.

Although specific embodiments of the inventive concept have been presented, they have only been presented to better describe the inventive concept and should not be construed to limit the invention. The invention is only limited by the scope of the following claims.

What is claimed is:

1. A folded surgical drape comprising a back cover sheet and a front cover sheet overlying and superimposed upon said back cover sheet, said front cover sheet and said back cover sheet being secured together along at least one side, and an edge of said back cover sheet and an edge of said front cover sheet defining an open end of said drape; a front cuff joined to the outer face of said front cover sheet in proximate relation to said open end of said drape; and a back cuff joined to the outer face of said back cover sheet in proximate relation to said open end of said drape, said cuffs opening away from said open end of said drape, a portion of said front cover sheet and front cuff and of said back cover sheet and back cuff being folded essentially congruently, forward to define a flap-like fold overlying a portion of the outer face of said front cover sheet and only a portion of said front cuff, said portion of said back cuff and of said back cover sheet constituting the outer face of said flap-like fold, by virtue of which a folded surgical drape is provided in which said back cover sheet and said back cuff and said front cover sheet and said front cuff and the fold line formed by said forward essentially congruent fold cooperate to define a left hand receiving pocket and grasping area and a right hand receiving pocket and grasping area on an outer face of said folded surgical drape, and in which said right hand grasping area and said left hand grasping area are on opposing sides of said surgical drape when said surgical drape is in its normal open position.

2. The folded surgical drape of claim 1 in which said drape is a stocking-like surgical drape.

3. The folded surgical drape of claim 2 in which said front cuff extends essentially transversely across substantially the entire width of said front cover sheet and in which said back cuff extends essentially transversely across substantially the entire width of said back cover sheet.

4. The folded surgical drape of claim 2 in which said surgical drape is transversely folded upward upon itself to form a plurality of folds and to form a more compactly folded drape.

5. The folded surgical drape of claim 2 in which said front cuff is detached from said back cuff and from said front cover sheet along a substantial portion of a side

edge of said front cuff and in which a marginal side portion of said front cover sheet and said front cuff adjacent to said side edge is folded backward to underlie the front cover sheet, and in which the fold line formed by said backward fold defines a side of one of said pockets.

6. A folded surgical drape of claim 2 in which said back cuff is detached from said front cuff and from said back cover sheet along a substantial portion of a side edge of said back cuff and in which a marginal portion of said flap-like fold adjacent said side edge is folded backward to underlie the flap-like fold, and in which said fold line formed by said backward fold defines a side of one of said pockets.

7. A folded surgical drape of claim 4 in which the top edge of at least one of said folds is tucked under one of said cuffs, by virtue of which a tucked top edge of a fold underlies a cuff defining a hand receiving pocket and overlies a grasping area associated with said pocket.

8. The folded surgical drape of claim 7 in which the surgical drape is folded transversely from the bottom upward approximately in half upon itself at least once, and in which said top edge of each uncuffed fold is tucked under a cuff.

9. The folded surgical drape of claim 8 in which said front cuff is detached from said back cuff and from said front cover sheet along a substantial portion along a side edge of said front cuff and in which a marginal side portion of said front cover sheet and said front cuff adjacent to said side edge is folded backward to underlie said front cover sheet, and in which said fold line formed by said backward fold defines a side of one of said pockets.

10. The folded surgical drape of claim 8 in which said back cuff is detached from said front cuff and said back cover sheet along a substantial portion of a side edge of said back cuff and in which a marginal portion of said flap-like fold adjacent to said side edge is folded backward to underlie said flap-like fold, and in which said fold line formed by said backward fold defines a side of one of said pockets.

11. A folded surgical drape comprising a back cover sheet and a front cover sheet overlying and superimposed upon said back cover sheet, said front cover sheet and said back cover sheet being secured together along at least one side, an edge of said back cover sheet and an edge of said front cover sheet defining an open end of said drape, a cuff joined to at least one of said outer face of said front cover sheet and said outer face of said back cover sheet in proximate relation to the open end of said drape, the said surgical drape being transversely folded upward upon itself to form a plurality of folds, the top edge of at least the most outward of said folds being tucked under said cuff by virtue of which a tucked top edge of a fold underlies a cuff and overlies a hand grasping area associated with said cuff.

12. A folded surgical drape of claim 11 in which the surgical drape is folded transversely from the bottom upward approximately in half upon itself at least once and in which said top edge of each uncuffed fold is tucked under a cuff.

13. A method of folding a surgical drape of the type comprising a back cover sheet and a front cover sheet overlying and superimposed upon said back cover sheet, said front cover sheet and said back cover sheet being

secured together along at least one side and an edge of of said back cover sheet and an edge of said front cover sheet defining an open end of said drape; a front cuff joined to the outer face of said front cover sheet in proximate relation to the open end of said drape and a back cuff joined to the outer face of the back cover sheet in proximate relation to said open end of said drape, said cuffs opening away from said open end of said drape comprising:

10 folding a portion of said front cover sheet and front cuff and of said back cover sheet and back cuff essentially congruently forward to define a flap like panel overlying a portion of the outer face of said front cover sheet and only a portion of said front cuff, and so that said portion of said back cuff and of said back cover sheet then constitute the outer face of said flap like fold,

15 by virtue of which a folded surgical drape is provided in which said back cover sheet and said back cuff and said front cover sheet and said front cuff and the fold line formed by said forward essentially congruent folding cooperate to define a left hand receiving pocket and grasping area and a right hand receiving pocket and grasping area on an outer face of said folded surgical drape and in which said right hand grasping area and said left hand grasping area are on opposing sides of said surgical drape when said surgical drape is in its normal open position.

14. The method of folding a surgical drape of claim 13 additionally comprising folding the bottom of said surgical drape upward upon itself to form a plurality of folds and to form a more compactly folded drape and tucking the top edge of at least one of said folds under one of said cuffs by virtue of which a tucked top edge of a fold underlies a cuff defining a hand receiving pocket and overlies a hand grasping area associated with said pocket.

15. A method of folding a surgical drape of the type comprising a back cover sheet and a front cover sheet overlying and superimposed upon said back cover sheet, said front cover sheet and said back cover sheet being secured together along at least one side and an edge of said back cover sheet and an edge of said front cover sheet defining an open end of said drape; a front cuff joined to the outer face of said front cover sheet in proximate relation to the open end of said drape and a back cuff joined to the outer face of the back cover sheet in proximate relation to said open end of said drape, said cuffs opening away from said open end of said drape comprising:

50 folding said surgical drape transversely upward upon itself to form a plurality of folds and tucking the top edge of at least the most outward of said folds under said cuff by virtue of which a tucked top edge of a fold underlies a cuff and overlies a hand grasping area associated with said cuff.

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