

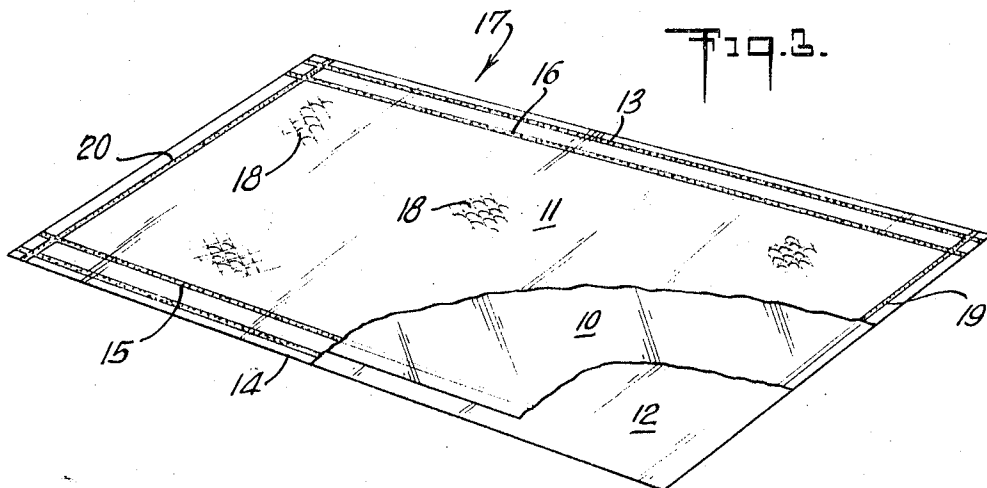
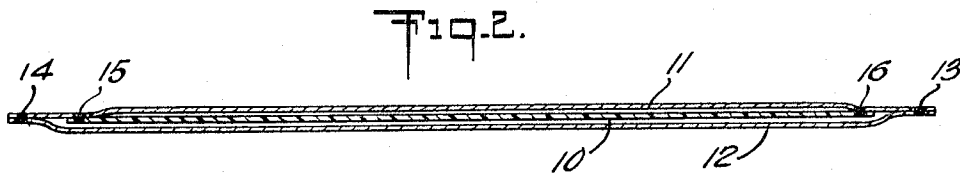
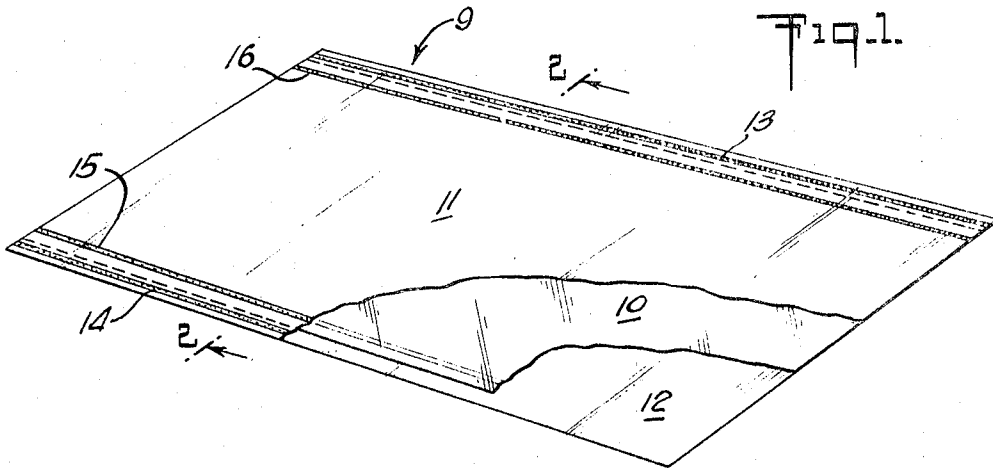
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G. J. LILOIA ET AL

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SURGICAL DRAPE

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INVENTORS:
GERALD J. LILOIA
LOUIS F. MAY JR.
BY *Harold L. Warner*
ATTORNEY.

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SURGICAL DRAPE

Gerald J. Liloia, North Brunswick, and Louis F. May, Jr.,
Old Bridge, N.J., assignors to Johnson & Johnson, a
corporation of New Jersey

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ABSTRACT OF THE DISCLOSURE

A surgical drape is constructed of two outer layers of absorbent facial quality paper and an intermediate layer of thin, flexible fluid impermeable plastic film. The three layers are bonded together only along two opposed edges so that the drape construction is extremely limp and drapable.

The present invention relates to absorbent disposable drapes and, more particularly, to absorbent disposable drapes impermeable to the passage of bacteria and particularly suitable for use in hospitals and the like.

In surgical practice in hospitals, clinics, doctors offices etc., the doctor or surgeon, while working on the patient, needs a sterile area on which to lay instruments, dressings, and such other items with which he may be working. The present invention is drawn to disposable surgical drapes which are suitable for providing such areas. The surface over which the drape for supplying the sterile area is placed is not necessarily always flat.

For example the drape may be laid on a portion of the patient's bed or over a part of the patient, adjacent the area being treated. Also the drape may be laid on only a portion of a dressing cart or some other surface smaller than the drape with the result that the drape extends beyond the surface. In all such situations, it is important that the drape be sufficiently limp or drapable to conform to the underlying surface or to hang down over the edge of the support where larger than the support.

Besides being sufficiently limp to drape properly the drape should be absorbent. The surface of the drape should also provide sufficient friction that it does not slide off of the supporting surface over which it has been placed and the drape surface should be free of lint or loose fibers that may adhere to articles placed thereon.

By having the surface of the drape absorbent, the drape will absorb any medication or other liquid that may be spilled on it. Also, the drape may be used as a towel or the like where desired to wipe instruments, hands, etc. However, one of the disadvantages of absorbent sheet material is that once a sheet of conventional absorbent material has been wetted, even though the surface of the sheet was previously sterile, bacteria from an underlying non sterile supporting surface can then readily pass through the wetted sheet to the upper surface thus contaminating the same. It is accordingly an object of the present invention to provide absorbent sur-

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gical sheets which are water and alcohol impermeable and are sufficiently limp to have good draping characteristics. Another object of the present invention is to provide bacteria impermeable absorbent drapes which because of their inexpensive structure are readily disposable and which can also be used as absorbent towels or wipes where needed. A still further object is to provide bacteria impermeable absorbent surgical drapes, which are relatively nonskidding.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings wherein are set forth by way of illustration and example certain embodiments thereof.

Referring to the drawings:

FIG. 1 is a prospective view of a drape made in accordance with the present invention in which a portion of the drape has been broken away to show its respective parts;

FIG. 2 is a cross sectioned view taken along line 2—2 of FIG. 1; and

FIG. 3 is a prospective view of a modification of drape made in accordance with the present invention.

Referring to FIG. 1, drape 9 contains a water and alcohol impermeable film 10 disposed between absorbent sheets 11 and 12. In the construction shown film 10 is bonded by an adhesive or the like to the upper absorbent sheet 11 on each side along bond lines 15 and 16 spaced slightly in from the edge of the film. The film 10 as shown is slightly less in width than is absorbent sheet 11 leaving narrow margins of absorbent sheet materials extending beyond the side edges of film 10. Absorbent sheet 12 is of the same dimensions as absorbent sheet 11 and is adhesively bonded to absorbent sheet 11 in the film free marginal areas along adhesive bond lines 13 and 14. This construction is preferred as it provides no bond area wherein film is bonded on each side to the absorbent sheet material the edges thus formed are somewhat more flexible than where the film is of the same width as the absorbent sheets 11 and 12 and an edge bond is provided in which the same portion of the film is bonded on each side to the adjacent absorbent sheet material. However, this latter construction, although not the preferred form, is also included in the present invention. The insertion of the plastic film 10 which may be of polyethylene or other suitable water and alcohol impervious film 10, provides both a fluid impermeable barrier and a bacteria barrier in the drape. The barrier film 10 is bonded only along its edge portion to provide maximum drapability as overall bonding of the film 10 to either one or the other of the absorbent sheets 11 or 12 results in a substantially stiffer and less drapable product.

The film 10 should be formed of a material that has substantially no rigidity in the thickness of film used and which in itself drapes readily over any objects over which it may be placed. Accordingly, very thin films should be used. The film, however, should have sufficient strength to avoid rupture or tearing in use and should be free of pinholes and the like through which moisture can seep with possible resulting passage of bacteria through the drape should the same be laid on a bacteria containing surface and then wetted. Polyethylene films, for example, have been found to make

excellent water and alcohol impermeable and bacteria impermeable barriers for the drapes of the present invention, particularly where used in film thicknesses of about 0.3 to 1 mil.

It is found that as long as the absorbent sheets 11 and 12 are bonded to the film barrier 10 only along the edge that the inclusion of the barrier film has substantially no adverse effect on the drapability of the composite sheet material. However, if the barrier film is bonded to either one or both of the absorbent sheets 11 and 12 over its entire surface a substantially stiffer product results with the drape of the product being substantially impaired.

As previously indicated the barrier film 10 is maintained quite thin to avoid adding any stiffness with resulting impairment of drapability. Accordingly there is always danger in the bonding process of rupturing or breaking the film in the bonded area. Also, where the film is formed of a thermoplastic material such as polyethylene, and heat and pressure bonding are employed because of the thinness of the film, some fibers from the absorbent sheets 11 and 12 may penetrate through the film barrier 10 in the area of bonding and act to wick fluids with any bacteria contained therein through the surgical drape. By limiting the bonding of the barrier film 10 to the absorbent sheets 11 and 12 along the edges of the drape any contamination which might result from a breakdown of the barrier film 10 in the areas of bonding is limited to the edges of the surgical drape and the center part of the drape remains free of any possible contamination which might result from its being wetted when lying on a contaminated surface. In order to insure that those using the drape will avoid the bonded zones or areas in which the barrier film is not contained, guide lines are preferably provided marking off the unbonded center area from the zones of bonding. These guide lines may either be separate lines marked on the absorbent sheets or may be provided by using a colored adhesive for the innermost bond areas such as 15 and 16. As the colored adhesive shows through the absorbent sheet it acts to point out the bonded area which is to be avoided when placing articles on the drape.

Plastic films, particularly thin plastic films, tend to develop a substantial static charge which is highly objectionable in operating rooms and the like where inflammable anesthetic gases are used. It is found that by enclosing the thin plastic film between two absorbent sheets, as is done in the present surgical drape, any charge which may otherwise tend to build up on the plastic sheet is dissipated through the absorbent sheets between which it is contained. This avoids any chance of a buildup of static charge with possible resulting formation.

The absorbent sheets 11 and 12 are preferably formed of a facial quality paper. The crease retention of the paper should preferably be at a minimum to avoid unnecessary creases where the drapes are packaged in folded form rather than as unfolded drapes. Also, the absorbent sheets should have a relatively high friction to avoid slipping where laid on bed coverings and the like or, for example, laid on the lap of a patient. The friction or nonskid characteristics of the drape can be improved by embossing the surface of the absorbent sheets 11 and 12 as illustrated for example at 18 in FIG. 3 of the drawings. The absorbent sheets should also be lint free to avoid lint from the drape clinging to any of the instruments that may be laid thereon. Furthermore, any absorbent paper used as the absorbent covering sheets 11 and 12 should preferably have a wet tensile strength in the machine direction of at least about 150 grams per inch to avoid tearing while in use.

Although any absorbent sheet material may be used which has the characteristics indicated we have found, to be particularly useful in practicing the present invention, highly absorbent, finely creped facial quality papers of sufficient dry and wet strength to prevent tearing during normal use.

In FIG. 3 is shown a modification of the surgical drape in which the absorbent outer sheets 11 and 12 are bonded

to each other around the entire drape. The bond lines 13 and 14 bond absorbent sheets 11 and 12 together along the side edges and the bond lines 15 and 16 show where the barrier film 10 is bonded to absorbent sheet 11 as in the drape of FIG. 1. However, the drape of FIG. 3 also contains end bonds, along bond lines 19 and 20 where the absorbent sheets 11 and 12 are both bonded directly to film 10. As with the drape of FIG. 1, there is a central unbonded area which is adapted to receive surgical instruments and the like. The drape of FIG. 2 also has the absorbent facing sheets 11 and 12 embossed with a fabric-like pattern 18. This not only adds to the appearance of the drape but as previously indicated, improves its friction characteristics.

The drape is sterilized prior to use. Where the barrier film is polyethylene, sterilization should be carried out at temperatures below 185° F. which is the softening temperature of polyethylene. Accordingly, sterilization is preferably done through the use of ethylene oxide sterilization in accordance with conventional practices. Prior to sterilization the drape is packaged in a wrapper or other sealed container impervious to bacteria but pervious to the sterilizing gases. The sterilized drape thus remains sterile until used.

In order to further illustrate the practice of the present invention the following example is given. The example, however, is given for illustrative purposes only and the invention is not limited thereto.

EXAMPLE

A drape is prepared having a structure such as that illustrated in FIG. 1. The absorbent sheets are formed of dry creped facial quality paper sheets having a fine crepe, a stretch of about 15 to 20%, good drape, an absorbency time of 11 seconds, an absorbency capacity of about 13 times its own dry weight, a dry tensile strength in the machine direction of about 1000 grams per inch, a wet tensile strength in the machine direction of 250 grams per inch and a weight of about 20.5 pounds per 500-sheet ream of 24 by 36 inch paper. The outer absorbent sheets are 17 by 29 inches and the inner barrier film is of the same length but has a width of 16¼ inches. For the inner barrier film a 0.4 mil thickness sheet of polyethylene film is used. The absorbent sheets and film are secured together with adhesive in thin lines as illustrated, the width of the adhesive lines being approximately ⅛ inch. A polyvinyl acetate emulsion adhesive is employed. After formation the drape is folded and then packaged by placing between two panels of bacteria proof paper pervious to sterilizing gases and then sealing the panels together around the area occupied by the drape. The package is then sterilized by subjecting to ethylene oxide sterilization under standard sterilizing technique.

Drapes so formed, packaged and sterilized, on removing from their containers have excellent hand, good conformability and, although being absorbent, show no contamination of the upper surface by bacteria passage therethrough either when wetted or dry when placed on a bacteria infected surface.

Having thus described our invention, we claim:

1. An absorbent but bacteria impermeable surgical drape which is readily conformable to the contour of the body of the patient, comprising: a first absorbent sheet; a second absorbent sheet; and a thin water and alcohol impermeable and bacteria impermeable plastic film disposed between most of said first and second absorbent sheets to prevent the passage of fluid borne bacteria from the surface of one absorbent sheet to the surface of the other absorbent sheet, said film being free of said absorbent sheets in the main body of said drape to preserve the flexibility of the drape, and said film having a width less than said absorbent sheets, which sheets are, in turn, of substantially the same dimensions and in which said film is bonded to said first absorbent sheet along lines spaced inwardly from the edges of said first absorbent sheet, there being an edge portion of said

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first absorbent sheet over which said film does not extend, said first absorbent sheet and said second absorbent sheet being bonded together along a line extending along said edge of said first absorbent sheet not covered by said film.

2. A drape of claim 1 in which there is a visible marking to designate the unbonded area of said drape from the bonded area.

3. A drape of claim 2 in which said film is bonded to said first absorbent sheet with a colored adhesive, the colored adhesive being visible through said absorbent sheet to form said visible marking and to designate the bonded area of said drape from the unbonded area.

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ROBERT F. BURNETT, Primary Examiner

W. A. POWELL, Assistant Examiner

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