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Weiss

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[54] **FITTED CONTOUR NO-IRON SHEET CONSTRUCTION**

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[51] **Int. Cl.** **A47g 9/00,** A47c 23/00

[58] **Field of Search**..... 5/334 R, 334 C, 335; 26/76, 26/18.6

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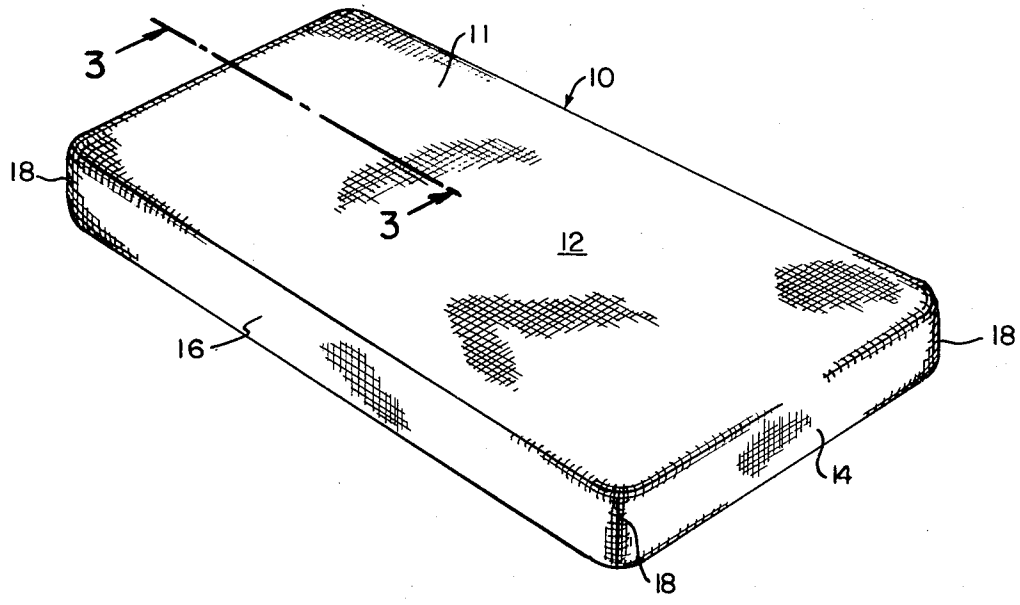
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[57] **ABSTRACT**

A fitted contour no-iron sheet is provided for mattresses, studio couches and the like, comprised substantially of cotton knitted fabric, having balanced two-way stretch characteristics. The sheet is made from a single piece of fabric, devoid of any separate pieces or elastic additions and is formed after cutting by four simple corner stitches. In addition, a conventional border stitching of the rolled edges of the sheet may be provided. The formed contour sheet will conform to several size mattresses and can be fitted without raising the mattress edges. The sheet of the invention is particularly appropriate for hospital beds because the stretch characteristics eliminates strain on corner construction and the usual failure thereof by the raising and lowering of hospital beds to a variety of positions. Furthermore, the sheet conforms to the mattress in its various raised positions.

6 Claims, 3 Drawing Figures



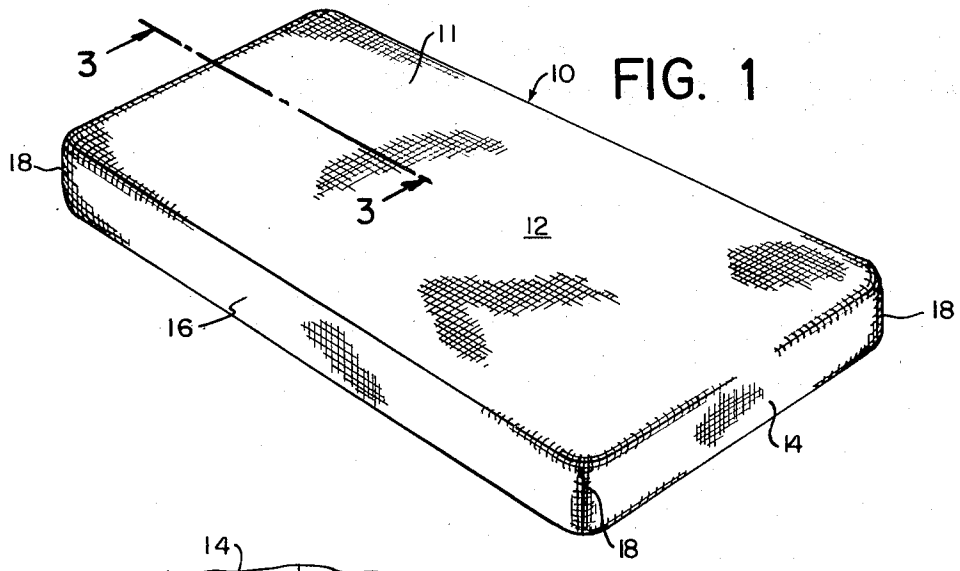


FIG. 1

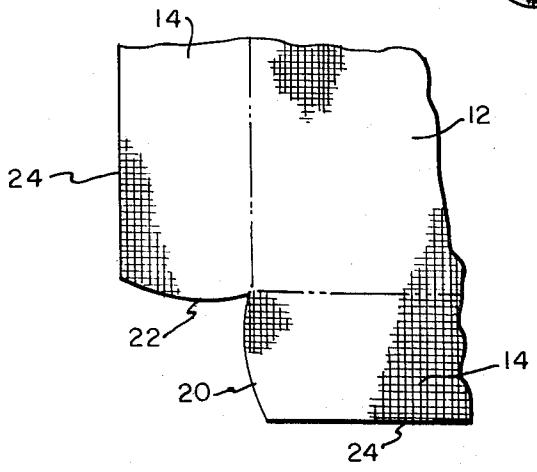
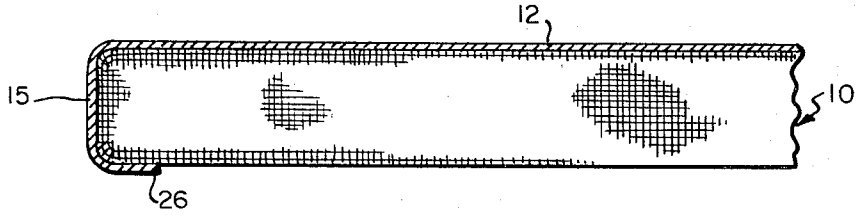


FIG. 2

FIG. 3



FITTED CONTOUR NO-IRON SHEET CONSTRUCTION

Generally speaking, this invention relates to fitted contour sheets for application to bed mattresses, studio couches, and so forth. More particularly, this invention relates to such fitted contour sheets comprised substantially of a balanced and stabilized two-way stretch knitted fabric in the form of a single piece of material which will conform to a variety of different size mattresses, or couches, and with such sheets being devoid of any separate elastic inserts or tapes, etc., otherwise normally required in order to make the sheet conform to the mattress to which it is applied.

As is well known, a wide variety of contour type bed sheets have been developed in recent years for application to the mattresses of beds, which sheets conform substantially to the lines of the mattress to which they are applied. In order for these sheets to conform adequately to the surfaces of the mattress, in order to eliminate wrinkles and so forth after they are put on the mattress, the size of the sheet must be such and the construction thereof must be such that a certain degree of tension is applied to the edges and corners of the contour sheet.

Furthermore, in order to get the sheet on the mattress in the first place, it is necessary to raise the mattress corners, at least on one side thereof in order to slip the mattress, so to speak, into the pocket formed by the contour of the sheet. Certain developments have been devised in order to slip the sheet onto the mattress more easily, including separate elastic inserts at the corners of the sheet, which will give to a certain extent so that the sheet may be more easily slipped onto the mattress. Other arrangements include the incorporation of elastic or other stretch type tapes along the dividing lines between the sides and the top of the sheet, or along the edge of the sheet so that it will more readily conform to the contours of the mattress to which it is applied. Desirably, the stretch characteristics of these various inserts will act after the sheet is put on the mattress to help retain the sheet in a non-wrinkled condition over the mattress surface.

Other advances included in the development of contour sheets in recent years include no-iron type fabrics utilized in fitted contour sheets. These fabrics are usually comprised of part cotton and part synthetic fibers, which are impregnated with "permanent press" type resins, so that upon washing and drying, the sheets will have relatively little wrinkles, and when applied to mattresses and conformed to the surfaces thereof will be substantially non-wrinkling in appearance.

However, certain disadvantages may arise from these various prior art constructions. For example, when contour sheets are made from the so-called permanent press type fabrics, they have very little shrinkage characteristics. Generally, if stretch characteristics are applied, they are only in a single direction stretch, or width-wide stretch. Accordingly, on subsequent use over a period of time, and because of the stretch characteristics only in one direction of the sheet, the degree of tension applied to the corner construction in putting on and taking off the sheets sequentially over a period of use causes the stitchings in the corners of the sheet to fail. In addition, elastic inserts applied to the sheets have a tendency to fail after a plurality of washings because the hot water and detergents utilized for washing

such sheets have a tendency to break down the elastic characteristics.

These disadvantages are particularly apparent in hospital use where the mattresses are continuously being deformed when the hospital beds are cranked in order to raise and lower the head and/or foot portion of the mattress repeatedly for various reasons relating to the treatment of a patient. It has been found that conventional contour, woven sheets have a use span of approximately one-half that of flat sheets because of corner tear. Accordingly, most hospitals have found it desirable to use regular flat sheets because they last longer and because they're more easily applied to the comparatively rigid mattresses utilized on hospital beds. In this connection, it should be noted further, that conventional woven sheets, because of their comparative non-stretch characteristics, do not conform appropriately to hospital mattresses when they are in their "cranked-up" position, thus making the patient more uncomfortable because of the wrinkles formed.

By contrast, and quite unexpectedly, it has been found in accordance with this invention that by utilizing two-way stretch knitted fabric, fitted contour sheets are provided, having the desired no-iron characteristics when fitted onto a mattress, and which are made from a single piece of fabric, with the corners being mitered and stitched with a single stitch at each corner. With such an arrangement, and because of the two-way stretch characteristics of both the side panels as well as the top surface panel of the formed sheet, the sheet will conform to a variety of different size mattresses. For example, a sheet constructed to fit conventional twin size mattresses will also fit a studio size mattress from a studio couch as well as single bed mattresses. A second size will fit conventional double size mattresses, as well as three-quarter size mattresses.

Furthermore, because of the two-way stretch characteristics of each panel of the sheet, in accordance herewith, no excessive tension is applied to the corners of the sheet because not only will the adjacent side panels give in both directions, but also the top panel in the area adjacent the corner will also give in two different directions. Accordingly, failure in the corner stitching is substantially eliminated and need for separate elastic insert pieces and/or tapes at the corner areas along the line between the top surface panel and the side panels, or at the bottom edges is eliminated.

The ability of the contour sheets, made in accordance herewith, to conform to a variety of different size mattresses, and the fact that those sheets are made from a single piece of material requiring no further additional pieces or inserts, makes the invention herein highly advantageous from a commercial standpoint.

The two-way stretch material which may be utilized herein is a knit fabric such as jersey, for example, and preferably first knitted in tubular form which is subsequently slit and opened. Furthermore, the length of the knit fabric herein is compressed mechanically approximately 20 percent. This serves to render the fabric virtually shrinkage-free in the length direction, thus guaranteeing less than 1 percent shrinkage, even after repeated washings. In addition, the length direction is provided with stretch characteristics when stress is applied in the lengthwise direction, in contrast to conventional single knits which have little or no flexibility in the length direction. Furthermore, it should be noted that the fabric, in accordance herewith, returns to its

original compressed size after laundering, thus not only controlling shrinkage as noted above, but also maintaining its original flexibility and stretch capabilities.

One method for obtaining such stabilized and balanced two-way stretch fabric includes knitting the fabric into tubular knitted form, and then spreading the tubular knitted fabric in the widthwide direction to a predetermined tension and steaming it to set and maintain the width. Subsequently the fabric is compressively shrunk lengthwise in a sequence of steps including acting primarily upon one surface of the fabric, controllably lengthening the fabric and then acting on the opposite surface, with a final application of tension widthwise. Subsequent to this series of treatments, the stabilized and balanced tubular two-way stretch fabric is slit and opened.

In any of its principal forms, the contour fitted bed sheet, in accordance herewith, may advantageously be constructed of plain cotton fabric, while simultaneously providing the "no-iron" characteristics noted above, with the latter being provided because of the compressed nature of the two-way fabric utilized. That is, there is no need to utilize more expensive cotton-synthetic fabric combinations because the sheet of the invention fits the mattress snugly with no wrinkles. Furthermore, the cotton knitted fabric discussed herein has been found to be a substantially more "comfortable" material for this purpose than synthetic fabrics or fabrics treated with significant amounts of permanent press resins. Also, the sheets herein provide better soil release, freedom from yellowing and high moisture absorbancy, simultaneously with the "no-iron" characteristics.

Accordingly, it is one object of this invention to provide fitted contour sheets for use on mattresses, studio couches and the like, which sheets possess two-way stretch characteristics while being devoid of impregnated permanent press resins. In addition, it is a further object of this invention to provide such contour sheets comprised of a single piece of knitted fabric, eliminating the need for any additional elastic inserts or tapes.

It is a further object of this invention to provide such contour sheets in which a single size will be appropriate for fitting on a variety of different size mattresses; and it is an additional object of this invention to provide such contour sheets eliminating the usual stresses applied to the corner construction of such sheets, thus giving them substantially longer life prior to any corner tear failure.

It is a still further object of this invention to provide such contour sheets which have incorporated therein, "no-iron" characteristics simultaneously with elimination of shrinkage during the laundering thereof.

Accordingly, with the foregoing and other objects in view, this invention will now be more particularly described, and other objects and advantages hereof will be apparent from the following description, the accompanying drawings, and the appended claims.

In the drawings:

FIG. 1 is a perspective view of a bed mattress having installed thereon, the fitted contour bed sheet including construction aspects embodying and for practicing this invention;

FIG. 2 is an enlarged fragmentary plan view, illustrating construction details of a typical bed sheet according to the invention; and

FIG. 3 is an enlarged fragmentary cross-sectional view taken generally along line 3—3 of FIG. 1.

Referring to the drawings, in which like reference characters refer to like parts throughout the several views thereof, FIG. 1 illustrates the invention as employed in conjunction with a conventional bed mattress **10**, having a contour sheet **11** of the invention fitted thereon. The contour sheet has a top surface panel **12** and side panels **14** and **16**, with side panels **15** and **17** not showing in the view of FIG. **1**.

As can be seen in FIG. **1**, the side panels **14** and **16** are joined by a single seam **18**, with no separate inserts or elastic tapes included at the corner joining these two side panels together.

As shown in FIG. **2**, the side panels **14** and **16** are provided with arcuately cut end edges **20**, **22** which, when joined together by a corner seam **18**, serves to draw the lower edge extremities **24** of the side panels inward under the bottom of the mattress. This is particularly true at the corners of the mattress and will be true to a lesser extent between the corners, as reflected at **26** in FIG. **3**. This configuration causes the sheet to be "self-holding" on the mattress, and because of the two-way stretch characteristics of the fabric utilized, in accordance herewith, the sheet readily conforms to the contour of the mattress to which it is applied without any wrinkles. Preferably, the lower edges **24** of the side panels will be rolled into several layers and stitched to prevent ravelling of the cut edges, all in well known manner.

The preferred material utilized in accordance with this invention is 100 percent cotton, having the stretch characteristics noted above. That is, fabric utilized will be a stabilized and balanced two-way stretch material compressed lengthwise mechanically approximately 20 percent, thus giving it appropriate stretch characteristics in both directions in all five panels of the contour sheet in its fitted position on a mattress. Because of this, there is appropriate "give" in all directions of the contour sheet, particularly at the corner seam areas, thus reducing substantially failure of the corner construction. In addition, because of the one-piece construction, in accordance herewith, requiring only four stitches at the four corners of the one-piece of material forming the sheet to join the mitered edges together, construction costs are substantially reduced.

Furthermore, because of the simultaneous built-in control of shrinkage, together with the maintenance of the original flexibility and stretch capabilities of the constructed sheets, they are not only long lasting in use, even after repeated launderings, but they are substantially easier to use for institutional application. Also, because of the 100 percent cotton construction which may be utilized in accordance herewith, the material is substantially more comfortable, particularly for institutional use or for infant care, and reduces substantially the incidence of sheet burn experienced from extended bed confinement.

Because of the increased stretch characteristics of the sheet produced in accordance herewith, a substantial reduction in the number of sizes can be made thus reducing inventory requirements. Also, because of the simple construction, the sheets are quickly, cheaply, and easily produced in large quantities, preferably with 100 percent cotton, for use in such places as hospitals, rest homes, and the like, as well as for private consump-

tion, thus making the contour fitted sheets herein highly advantageous commercially.

While the constructions and forms herein described constitute a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise construction and form, and that changes may be made therein without departing from the scope of the invention, which is defined in the appended claims.

What is claimed is:

1. A contour fitted sheet for application to a mattress comprised of one piece of two-way stretch knitted 100 percent cotton fabric devoid of separate pieces or elastic inserts and mitered at each of the four corners thereof to form a surface cover area and four side panels, each pair of cut edges forming the said mitered corners being joined by a single stitch to form adjacent side panels of said sheet, and said fabric forming said sheet being pre-shrunk in the length direction.

2. A sheet as recited in claim **1** in which said fabric is mechanically compressively pre-shrunk in the length direction.

3. A sheet as recited in claim **2** in which said fabric is mechanically compressively pre-shrunk about 20 percent.

4. A sheet as recited in claim **1** in which said pairs of cut edges forming the said mitered corners are arcuate.

5. A sheet as recited in claim **1** in which the bottom edges of said one-piece sheet are rolled and stitched to form a binding devoid of elastic inserts.

6. A contour fitted sheet for application to a mattress comprised of one piece of two-way stretch knitted 100 percent cotton fabric devoid of separate pieces or elastic inserts, and mitered at each of the four corners thereof to form a surface cover area and four side panels; each pair of cut edges forming the said mitered corners being arcuate and joined by a single stitch to form adjacent side panels of said sheet; and said fabric forming said sheet being mechanically compressively pre-shrunk in the length direction about 20 percent.

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