Dec. 4, 1956 W. A. LINEHAN, JR 2,772,698

REVERSIBLE WOVEN FLAT FABRICS

Filed Sept. 17, 1954 2 Sheets-Sheet 1

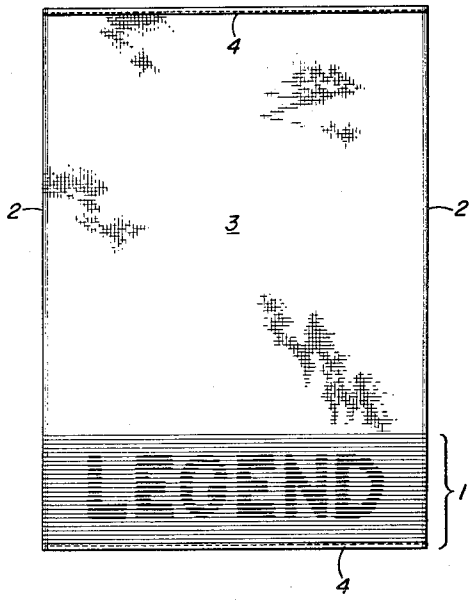


FIG. 1

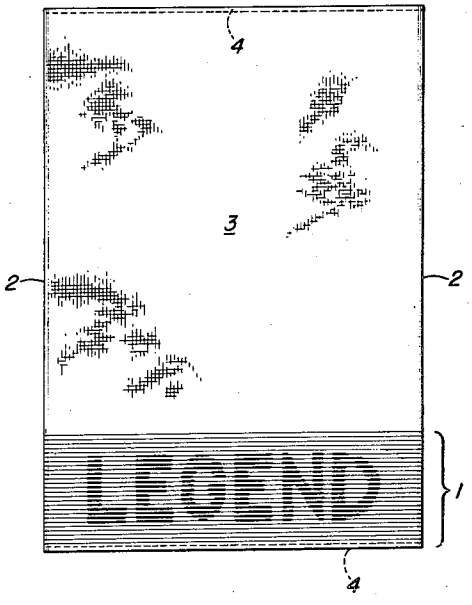


FIG. 2

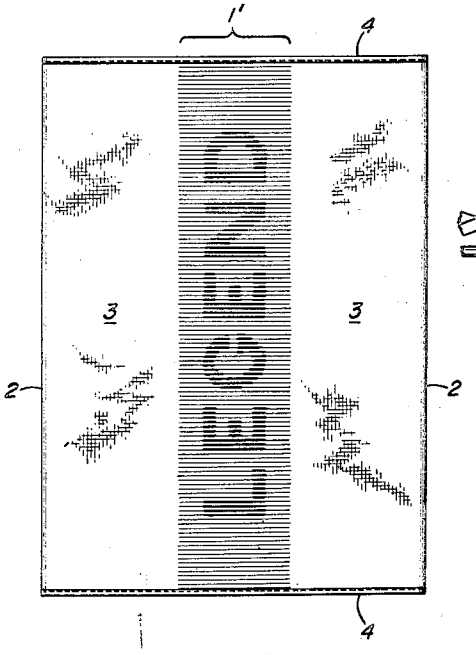


FIG. 3

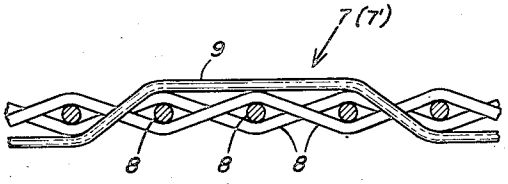


FIG. 7

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REVERSIBLE WOVEN FLAT FABRICS

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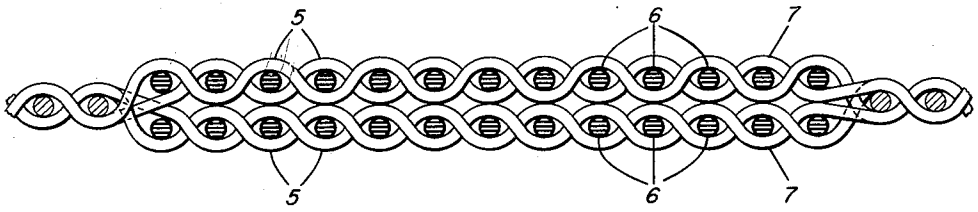


FIG. 4

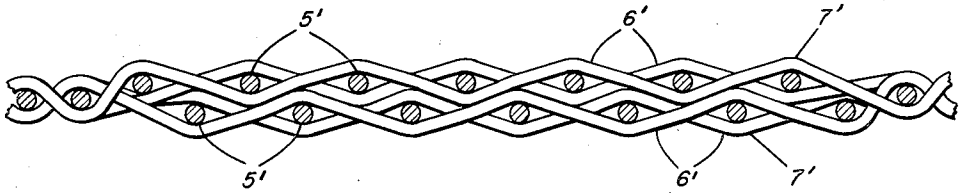


FIG. 5

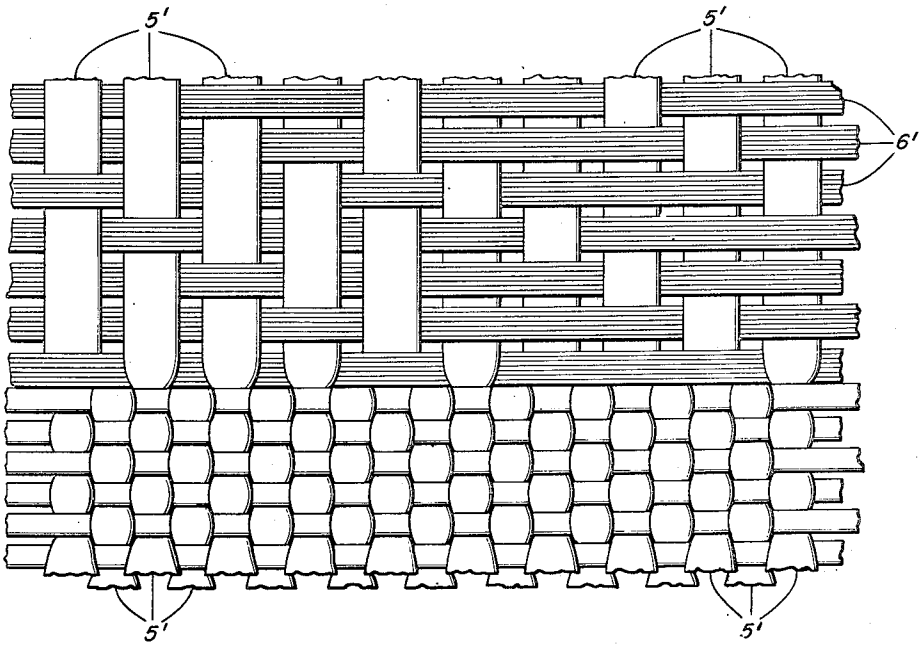


FIG. 6

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REVERSIBLE WOVEN FLAT FABRICS

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Application September 17, 1954, Serial No. 456,824

4 Claims. (Cl. 139—384)

This invention relates to reversible woven flat fabrics bearing designs and is a continuation-in-part of my copending application Serial No. 243,215 filed August 23, 1951, now abandoned.

In weaving flat fabrics bearing designs, it has heretofore been the practice to weave the entire fabric of single thickness with the result that a design woven into the fabric appears in obverse on one face and in reverse on the other. Although of no consequence in many applications of fabrics, this aspect of woven designs is of moment in reversible fabrics, whether one face is exposed at a time, as in table- or headcloths, or both faces are normally used, as in toweling, since the reversal of the fabric is immediately discernible. Among woven designs, legends, such as usually are employed on the towels and other linens of public establishments and common carriers, present a particular problem, since when reversed, they are comparatively illegible. It has therefore been proposed in my patent application, Serial No. 174,285, filed July 17, 1950, now abandoned, to weave identical legends into spaced portions of a fabric, one upside down, so that, when the portions are folded and stitched back-to-back, the fabric will have identical legends on both faces. Although a solution for special purposes such as the head rests to which that application is directed, the field of use of such fabrics is limited, they having the disadvantages that the folded portion is relatively bulky and the design is limited in location to the borders of the fabric. It has now been found that a design in obverse may be obtained on both faces of a flat fabric by weaving the design portion or portions of a flat fabric in a plurality of layers (normally two) and weaving a design into each of the outer layers. A fabric so woven not only may have a design in obverse on either face and at any desired location, for complete reversibility and unlimited variety, but differs little in bulk from fabrics woven entirely of single thickness.

It is therefore the primary object of the present invention to provide a reversible woven flat fabric wherein a design in obverse appears on each face of the fabric and at any desired location, without appearance of the reverse of the design on the opposite face.

Another object of the invention is to provide a reversible woven flat fabric wherein the fabric is woven predominantly of single thickness, the design portion, continuous with the predominant portion, is woven of a plurality of thicknesses, and a design is woven into each of the outer thicknesses, whereby only the obverse of a design will appear on either face of the fabric and at any desired location.

A further object of the invention is to provide a reversible woven flat fabric wherein the fabric is woven predominantly of single thickness, a design portion woven of a plurality of thicknesses and either lengthwise or crosswise of the fabric, and a design is woven into each outer thickness, either with or superimposed upon the basic threads of that thickness or both, whereby any design adaptable to

weaving may be woven into the fabric and will appear only in obverse on either face of the fabric.

An additional object of the invention is to provide a reversible woven flat fabric wherein the fabric is woven predominantly of single thickness and a strip continuous with and extending lengthwise or crosswise of the predominant portion is woven of double thickness with a design woven into each thickness, whereby only the obverse of a design will appear on either face of the strip.

Other objects and advantages of the invention will appear hereinafter in the detailed description, be particularly pointed out in the appended claims, and be illustrated in the accompanying drawings, in which:

Figure 1 is a plan view on a reduced scale of a reversible woven flat fabric in accordance with the present invention and bearing a crosswise design;

Figure 2 is a plan view of the opposite face of the fabric of Figure 1;

Figure 3 is a plan view on the scale of Figure 1 of a reversible woven flat fabric in accordance with the present invention and bearing a lengthwise design;

Figure 4 is a fragmentary longitudinal sectional view on an enlarged scale of a flat fabric, such as that of Figure 1, in which the design extends crosswise of the fabric;

Figure 5 is a fragmentary transverse sectional view on an enlarged scale of a flat fabric, such as that of Figure 3, in which the design extends lengthwise of the fabric.

Figure 6 is a fragmentary view on an enlarged scale of one face of the fabric of Figure 5; and

Figure 7 is a fragmentary sectional view of one of the layers of the design portion of the fabric of Figure 4 or 5 in which superimposed ornamentation is woven into the layer.

Conventionally, flat fabrics bearing woven designs have on one face or surface the obverse of the design and on the opposite face or surface its reverse. However, in a reversible woven flat fabric of the present invention, the design appears only in obverse on each face or surface of the fabric. The fabric of the present invention, in essence, comprises a predominant portion woven in a single layer or thickness and, at the place or location where a design is desired, incorporating a tubular or design portion or section extending warp-wise or weft-wise of the predominant portion and woven of a plurality of layers or thicknesses, the tubular portion having a design woven into each of its outer layers. Such a flat fabric may bear on each of its faces or surfaces any design within the capabilities of a Jacquard loom and will bear on neither face the reverse of the design, thus rendering the fabric reversible and its reversal indiscernible.

The variations in flat fabrics made possible by the method of this invention are practically limitless. Thus, where a conventionally woven flat fabric must always expose the obverse and reverse of a design on its opposite faces, a fabric of the present invention may bear a design on one face and be plain on the other, or may bear designs on both faces, whether the same or different a matter of choice, and the designs may be back-to-back or at different locations. In any case, it is only necessary that the portion of the material on which the design is to appear be woven in a plurality of thicknesses, so that the reverse of the design woven into an outer thickness will be hidden between the thicknesses and not appear on the opposite face of the fabric.

Several of the numerous possible variations in the reversible woven flat fabrics of the present invention are illustrated in the accompanying drawings, in which like reference characters designate like parts. Thus, in Figure 1 there is shown a flat fabric in which the multi-thickness design portion, designated as 1, extends cross-

wise of the warp threads to the selvage 2 at either edge of the fabric, the design portion here forming the border of the fabric and being bounded on its inner or side edge by the single thickness body portion 3 of which the fabric is predominantly formed and on its outer edge by one of the hems 4 at either end of the fabric. In the fabric of Figure 3, the design portion 1' extends lengthwise of the warp threads the full length of the fabric, terminating with the fabric at either end in a hem 4. Here spaced inwardly from the sides of the fabric, the multi-thickness design portion is bounded on both sides by the predominant single-thickness body portion 3. In the fabrics of both figures the design has been represented by the term "Legend," as indicating that it may be entirely pictorial, or a name, such as that of a hotel or common carrier, or both, as desired.

The complete reversibility of flat fabrics of the present invention is illustrated in Figure 2, wherein is shown the opposite face of the fabric of Figure 1. It will be noted that the design, depicted by the term "Legend," appears in obverse on this face of the fabric, as well, and that nowhere does there appear the reverse of the design on the opposite face of the fabric. Since the design portion 1(1') of each of the two illustrated forms of flat fabric is of multiple thickness, reversal of the fabric of Figure 3 will also show only the obverse of any design woven into its design portion. Too, one face of the flat fabric may be plain or bear a different design from the opposite face. And, as will be understood, the design portion 1(1') need not extend the full length or width of the fabric but may cover a small portion thereof, it only being necessary that the fabric be woven of multiple thickness over whatever portion a design is to appear on one or the other of its faces.

As mentioned, the reversible woven flat fabric of the present invention is made on a Jacquard loom by which the warp threads are liftable individually to vary their height relative to the plane of travel of the shuttle carrying the weft or filling thread, so that the shuttle will pass under or over each warp thread, depending on the setting of the loom. Figure 4 is indicative of a fabric having its design portion 1 extending crosswise of the fabric and the warp threads 5 and Figure 5 of a fabric having its design portion extending lengthwise of the fabric in the direction of the warp threads, these figures thus corresponding to the fabrics of Figures 1 and 3, respectively. In weaving the fabric of Figure 4 the warp threads 5 and weft or filling thread 6 are woven in single thickness over the predominant body portion 3 of the fabric. Then, at the location where a design is to appear on one or both faces of the fabric, the warp threads are divided or separated into a plurality of groups or layers, the warp threads in the illustrated embodiment being substantially equally divided into two groups with alternate threads in one layer and the intervening threads in the other layer. The weft thread, which may be the same as or a different color than that used in weaving the body portion 3, depending on the background desired over the design portion, is then interwoven with the warp threads of each of the plurality of layers, in such manner that the design portion 1 of the fabric will contain the same number of layers or thicknesses 7 of woven material. For the illustrated two layers of warp threads, this will normally be accomplished by so lifting the warp threads relative to the plane of the shuttle that the weft thread will be interwoven with one layer as the shuttle travels away from its box and with the other layer as the shuttle returns. As will be understood, the particular design woven into either of the outer layers so as to appear on the face or faces of the fabric, and here woven with the same basic warp and weft threads forming the background, will depend on the shifting in height of the warp threads of each layer as determined by the setting of the Jacquard attachment.

In the fabric of Figure 3 the design portion 1', as mentioned, extends lengthwise of the fabric, the warp threads 5' (Figure 5), as in the fabric of the preceding figure, being separated into a plurality of layers over the portion of the fabric on which a design is to appear on one or both faces and the weft thread being interwoven with the warp threads of each layer. However, since the weft thread 6' in this form is the same as that used in the body portion of the fabric and its picks are divided between the layers, only a corresponding portion of the picks of the weft thread will appear in each layer. In Figure 4 the same division is made of the warp threads 5, with the result that the design portions 1(1') of the fabrics of both figures are in actuality but little thicker or bulkier than their body portions 3. The fabrics of these two figures are also similar in that the basic threads of the design portion are employed for weaving the design. While characterized in the figure description as a plan view of the fabric of Figure 5, it will be apparent that Figure 6 is illustrative equally of the fabric of Figure 4 the position of the warp and weft threads would be transposed.

Figure 7, showing a part of the upper or lower of the layers 7(7') of the design portion 1(1') of either of Figures 4 and 5, is illustrative of the fabric of the present invention when part or all of the ornamentation is superimposed on the basic warp and weft threads of the design portion. Here, the basic threads of the layer are both designated as 8, since either may be the warp and the other the weft, depending on the direction relative to the fabric in which the design portion extends. The thread 9 used for the superimposed ornamentation, which also may be either warp or wept, is so interwoven with the other threads of the layer as alternately to appear on the surface of one of the layers 7(7') of the design portion 1(1') and to float between the layers, its appearances being determined by the setting of the Jacquard attachment to produce the particular design desired. Also, depending on the interrelation between the designs on the opposite faces, the superimposed thread 9 may be interwoven with both layers and appear on both faces of the fabric during travel of the shuttle in one direction, in which case the thread will serve to tack the several layers together at the points at which it extends between the layers. If desired, the same tacking may be obtained even when the design is woven of the basic threads of the design portion, by so weaving the weft thread in the weaving of one layer that it will interlace with unexposed portions of the warp thread of the other layer at selected points.

From the above detailed description it will be apparent that there has been provided an improved woven reversible flat fabric, wherein both faces have a design woven thereinto at any desired location and the design will appear in obverse and only on the face of the fabric into which it is woven. It should be understood that the described and disclosed embodiment is merely exemplary of the invention and that all modifications are intended to be included which do not depart either from the spirit of the invention or the scope of the appended claims.

Having described my invention, I claim:

1. A reversible woven flat fabric comprising a predominant portion of single thickness, a tubular portion of a plurality of thicknesses and extending in one of the longitudinal and transverse dimensions of said fabric, and a design woven into each of the outer thicknesses of said tubular portion.

2. A reversible woven flat fabric comprising a predominant portion of single thickness, a tubular portion of a plurality of thicknesses and extending longitudinally of said fabric, and a design woven into each of the outer thicknesses of said tubular portion.

3. A reversible woven flat fabric comprising a predominant portion of single thickness, a tubular portion of a plurality of thicknesses and extending transversely of

said fabric, and a design woven into each of the outer thicknesses of said tubular portion.

4. A reversible woven flat fabric comprising a predominant portion of single thickness, a tubular portion of a plurality of thicknesses and extending on one of the longitudinal and transverse dimensions of said fabric, and a super-imposed design woven into each of the outer of said thicknesses of said tubular portion using a thread different from the threads basic to said thickness.

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