Jan. 5, 1971 S. J. CAVALIER ET AL 3,553,066

FILLED CUSHION MATELASSE FABRIC AND METHOD

Filed Sept. 5, 1967 3 Sheets-Sheet 1

FIG. 1.

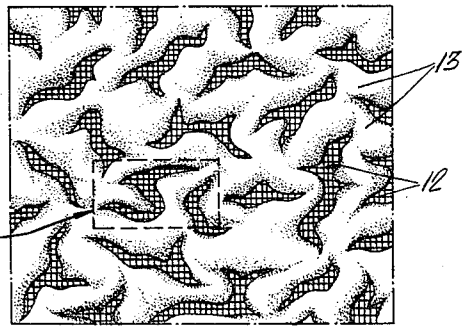


FIG. 2.

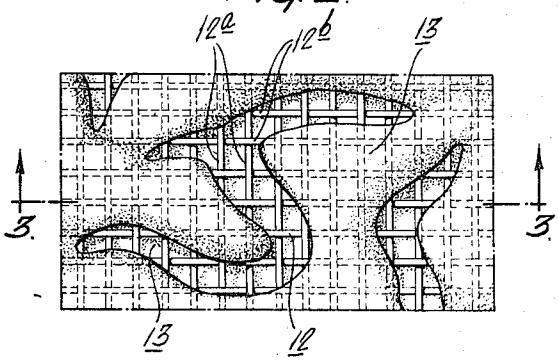


FIG. 3.

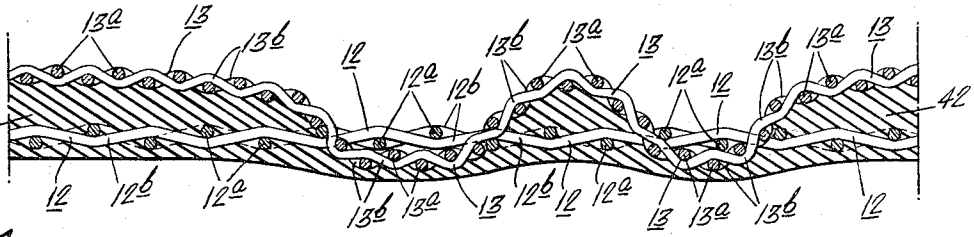


FIG. 4

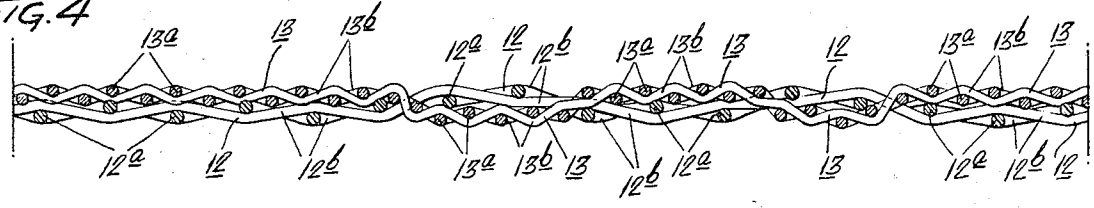


FIG. 5.

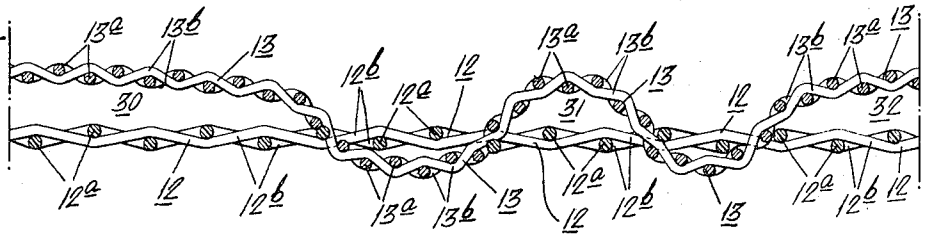


FIG. 7.

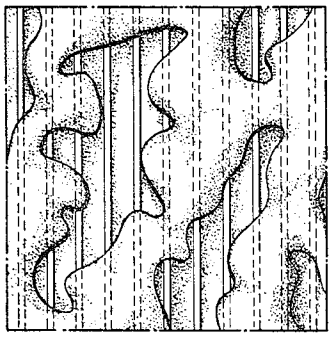
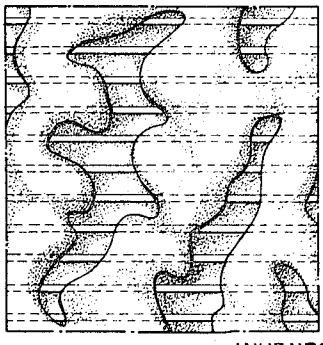


FIG. 8.



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FILLED CUSHION MATELASSE FABRIC AND METHOD

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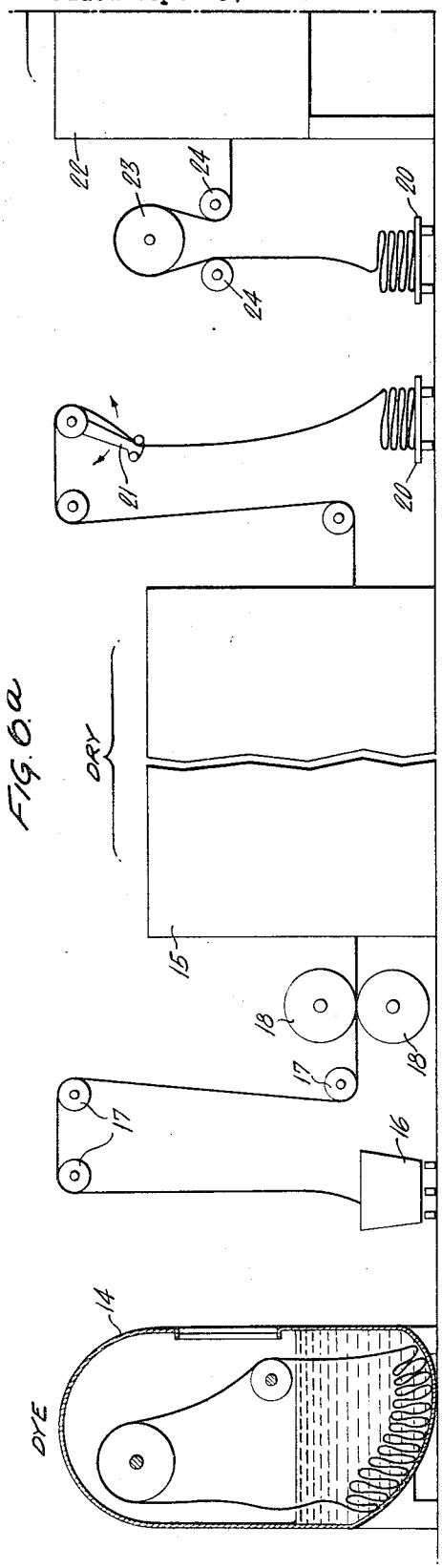

FIG. 6a

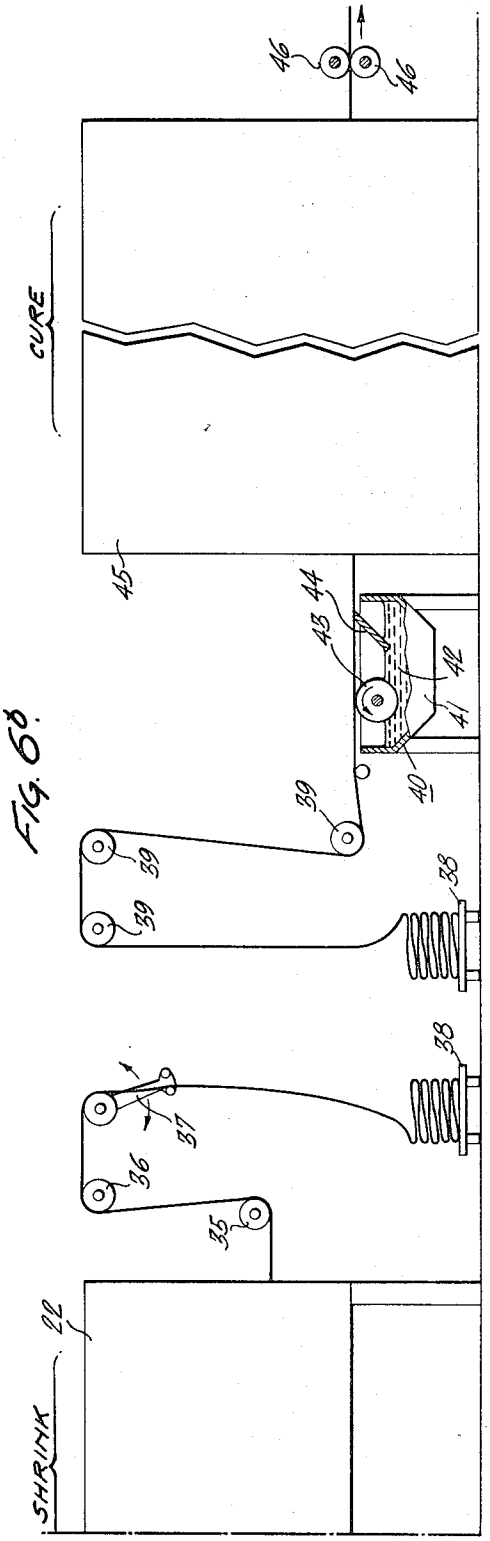

FIG. 6b

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FILLED CUSHION MATELASSE FABRIC AND METHOD

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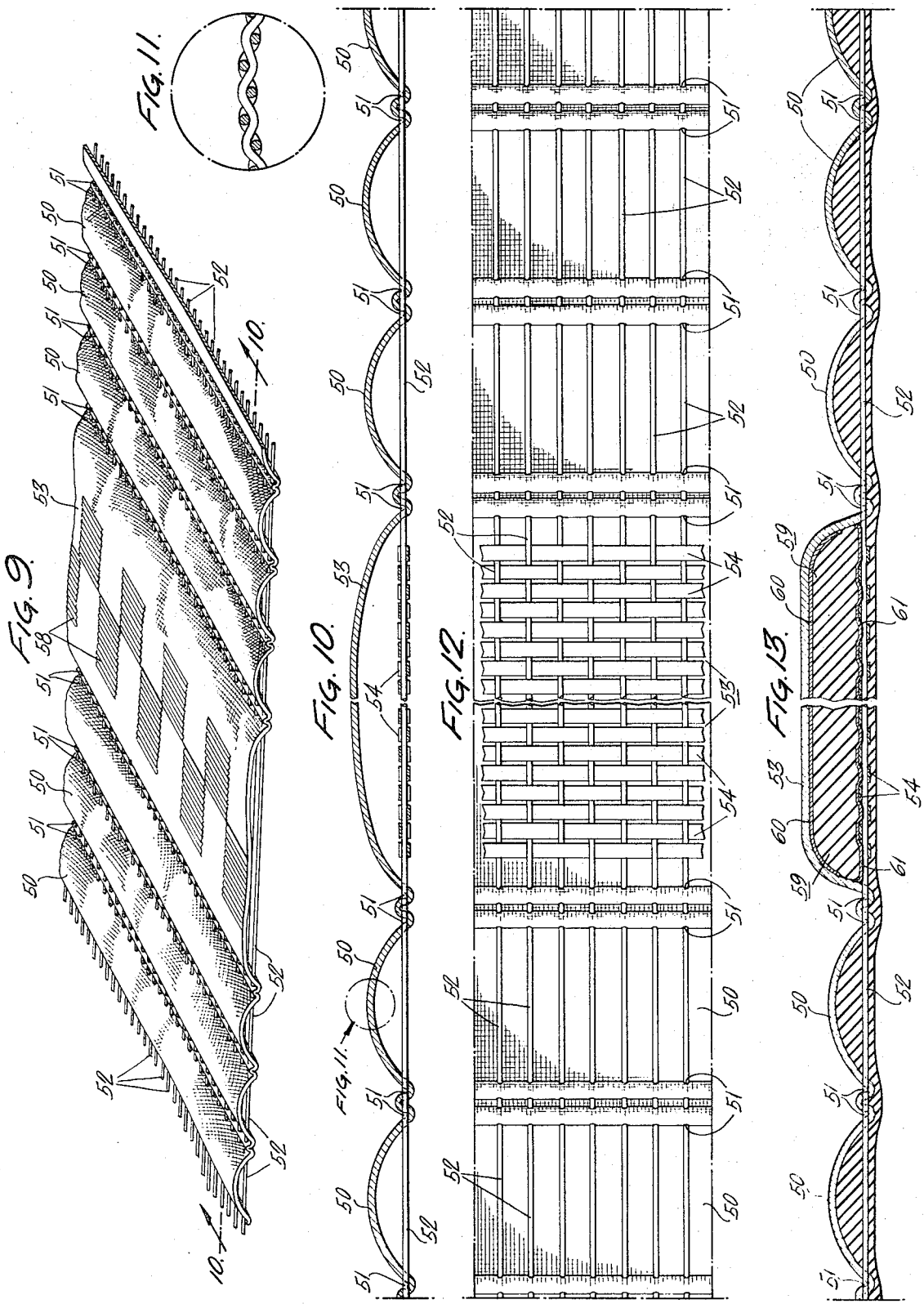

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FILLED CUSHION MATELASSÉ FABRIC AND METHOD

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Int. Cl. D03d 3/08, 11/02
U.S. Cl. 161—73 10 Claims

ABSTRACT OF THE DISCLOSURE

This invention relates to a matelassé, upholstery fabric and to the methods of producing an improved fabric of this type having superior design appearance and physical characteristics. A preferred form of the fabric is characterized by a ground of heat shrinkable yarns into which the face fabric is tied at selected points to form irregular pockets. The non-uniform and randomly spaced pockets as well as uniform parallel pleats between the face fabric and the ground fabric are filled with an elastomeric material, which is injected into the pockets or pleats through a foraminous backing.

BACKGROUND OF THE INVENTION

Matelassé fabrics woven on jacquard looms are well known in the art, but are characterized as relatively flat fabrics in which the floats or face threads did not form puffed or raised pockets. With the advent of heat shrinkable yarns, it is now possible to produce relatively deep pockets or voids between the face fabric and the backing yarns. This may be done in at least three ways: (1) The use of heat shrinkable yarns in both the filling and the warp of the ground fabric. (2) The use of heat shrinkable warp yarns only. (3) The use of heat shrinkable filling yarns only. The heat shrinkable yarns may be either multifilament or mono-filament and can be any one of the well-known thermoplastic materials including, for example, nylon, polyester, polyvinyl chloride, vinylidene chloride, acetate, saran, acrylic, modacrylic, etc. The terms yarn or threads used herein are intended to include the foregoing as well as staple, spun, or continuous filament. The face fabric is ordinarily woven of both warp and filling treads of a vegetable, animal or synthetic material, but preferably of substantially less heat shrinkable properties than the ground fabric and desirably with no shrinkage occurring on the application of the degree of heat required to shrink the ground fabric.

The desirable characteristics of such a fabric may be considerably enhanced if the voids formed between the face fabric and the ground fabric when subjected to the shrinking treatments are filled with a spongy elastomeric material such as a foam latex of natural or synthetic rubber.

DESCRIPTION OF THE INVENTION

Referring now to the drawings,

FIG. 1 is a view of a matelassé fabric constructed in accordance with the present invention,

FIG. 2 is an enlarged detail of the area shown at **2** of FIG. 1, in which both shrinkable warp and filling threads are utilized in the ground fabric,

FIG. 3 is an enlarged sectional detail as seen at **3—3** of FIG. 2,

FIG. 4 is a view of the fabric of FIG. 3 as originally woven,

FIG. 5 is a view of the fabric of FIG. 4 after weaving and the application of heat which may occur in the dye bath or otherwise,

FIGS. 6*a* and 6*b* are schematic showing the various steps in the method of preparing the fabric of FIGS. 1, 7, and 8,

FIG. 7 is a view similar to FIG. 2 of a fabric having heat shrinkable warp threads only,

FIG. 8 is a view similar to FIGS. 2 and 7 having heat shrinkable weft threads only, and

FIG. 9 is a perspective of a puffed upholstery fabric having linear pockets with generally parallel edges but before being filled with an elastomeric material,

FIG. 10 is a section as seen at **10—10** of FIG. 9,

FIG. 11 is an enlarged detail of the face fabric of FIGS. 9 and 10,

FIG. 12 is a bottom view of the fabric of FIG. 10, and

FIG. 13 is a view of the fabric of FIG. 10 after shrinking and filling with an elastomeric material.

The fabric produced in accordance with the present invention comprises a ground or base layer **12** which is preferably woven of threads or yarn having substantial shrinkage characteristics upon the application of elevated temperature. The ground fabric **12** may, if desired, be knitted but I prefer to use a 1 and 1 weave as shown in FIG. 2 to obtain maximum shrinkage in both the warp and filling directions of the fabric.

The face fabric **13** is preferably woven of yarn or thread, which is substantially less affected by heat than the ground fabric **12**. In order to achieve the matelassé design, selected warp and filling threads are carried or tied in under certain ground fabric threads as shown in FIG. 4 by means of a jacquard in accordance with well known weaving techniques. The completed initial weaving of the fabric is shown in FIG. 4, in which the threads **13***a*, **13***a* of the face fabric **13** are interwoven with filling threads **13***b* of the face fabric. The face fabric is carried over substantial areas of the ground fabric to form floats and is tied in or woven under one or two selected threads of the ground fabric as may be clearly seen at the center portion of FIG. 4. The ground fabric **12** likewise has filling threads **12***a*, **12***a* as well as warp threads **12***b*, **12***b* as shown in FIGS. 1–5.

After weaving, the fabric is subjected to a dyeing treatment in the dye kettle **14** (FIGS. 6*a* and 6*b*) from whence it is conveyed to a dryer **15** by means of a truck **16**, overhead rolls **17**, **17** and driven feed rolls **18**, **18**. From the dryer **15**, the fabric is gathered on a table or truck **20** by means of a folder **21**, which oscillates back and forth in a well known manner. The fabric is then fed into the heat treating zone or shrinking chamber **22** from table **20** by means of a feed roller or cylinder **23** and guide rollers **24**, **24**.

After passing through the chamber **22**, the fabric will have the appearance shown in FIG. 5 in which the ground fabric has contracted both warpwise and weftwise to form a series of pockets **30**, **31** and **32**, all on one side of the ground fabric **12**. The tension in the fabric while being fed to and through the shrinking chamber **22** as well as the pressure of the guide and feed rollers insure that the pockets **31** and **32** appear on the same side of the backing fabric **12**. The contracted fabric then feeds over guide rollers **35** and **36** to a folder **37** and thence to a table **38**. Whether from the same location or from a different location, the folded fabric is conveyed from table **38** over a series of rollers **39**, **39** to a coating zone **40**, which comprises a reservoir **41** of an elastomeric material **42**. An applicator roll **43** picks up the material **42** and applies it to the back of the fabric on the side opposite the pockets **30**, **31** and **32**. A doctor blade **44** over which the fabric passes forces the elastomeric material through the foraminous ground fabric and into all of the pockets **30**, **31** and **32** regardless of their shape and size. In addition, the doctor blade **44**

scrapes away any excess elastomeric material which is returned to the reservoir **41**.

After application of the elastomeric material, the fabric passes through a suitable curing chamber **45** from whence it is carried by rollers **46**, **46** to be further inspected, trimmed and shipped for final installation.

The elastomeric material **42**, which is used to fill the pockets **30**, **31** and **32** must have sufficient heat to maintain the puffed pockets in the fabric in a maximum raised condition, but at the same time, it should not be so hard as to render the fabric too rough or of such a poor hand that it would be undesirable from the standpoint of an upholstered material. The elastomeric material, therefore, that is preferably used in the invention may be natural rubber latex or a conjugated diene synthetic rubber latex or mixtures thereof. Suitable conjugated diene latices are those prepared by emulsion polymerization of dienes such as butadiene-1,3,isoprene, chloroprene or mixtures thereof with one or more ethylenically-unsaturated compounds copolymerizable therewith. Examples of suitable copolymerizable substances are vinyl aromatic compounds, such as styrene, divinyl benzene and d-methyl styrene, acrylic, acids such as acrylic and methacrylic acids, lower alkyl esters of acrylic acids, such as methyl methacrylate and butyl acrylate, nitriles and amides of acrylic acids such as acrylonitrile, methacrylonitrile, acrylamide N-alkylol acrylamides and halogenated monomers such as vinyl chloride and vinylidene chloride and the like. Dicarboxylic acids such as itaconic, maleic and fumaric acids are particularly suitable comonomers.

The latex is converted into a froth or foam by whipping in a beater to incorporate air, or by the evoluation of gas in the latex, such as by the decomposition of hydrogen peroxide or the reaction of a carbonate and an acid in the latex in the presence of a stabilizer. Such methods are, of course, well known in the art.

In addition to the usual latex compounding ingredients, such as emulsifiers, curing agents, fillers and antioxidants, the latex may also contain various foam-stabilizing materials such as conventional gelling agents (e.g. alkali metal silicofluoride or ammonium acetate) or water-soluble network resins (e.g. phenol-or melamine-formaldehyde resins). In general, these may be added either before or after the latex has been foamed. Freezing has also been used as a method for foam stabilization.

Gelling of the foam is usually facilitated by the application of heat such as from steam or hot air and the foam is permanently stabilized by curing which is likewise most frequently accomplished by the application of heat to effect crosslinking of the rubber.

In order to achieve various effects in the design on the face of the fabric, it may be indicated to use only heat shrinkable yarns in one direction rather than in both. FIG. 7 shows the use of heat shrinkable warp yarns only which will give maximum shrinkage in a warpwise direction with little or no shrinkage weftwise. Similarly, the heat shrinkable yarns may be used only in the filling directions as shown in FIG. 8 to accomplish maximum weftwise contraction with little or no contraction warpwise. It will be understood that the contraction of the ground fabric is such that sufficient interstices are present to permit passage of the elastomeric material when the fabric passes over the doctor blade. Also, it will be understood that the shrinking step may be provided independently as shown in FIG. 6 or concurrently with the dyeing step, depending upon the type of material in the fabric and the type of dye employed.

Referring now to FIGS. 9–13, the present invention is also useful in a raised or puffed fabric having substantially regular pleats or pockets which are formed between a face fabric and a shrinkable ground fabric. In FIG. 9 we show a fabric of this type having a series of parallel pockets or empty pleats **50** which are tied down at **51**, **51** to ground threads **52** which are thermoplastic or heat shrinkable. In the showing of FIG. 9 the filling threads are omitted, but as in the case of previously described embodiments, filling threads of a heat shrinkable nature may be supplied, and in the case of the wide pleat **53** the filling threads may take the form of relatively flat ribbons or yarns **54**, **54**. The face fabric may be of a relatively less shrinkable variety and preferably is of a woven textile material as shown in the enlarged sectional view of FIG. 11.

A particular feature of the fabric shown in FIG. 9 resides in the fact that a jacquard design indicated generally at **58** can be produced in any selected pleat and accurately centered in the pleat. The wide center pleat **53** may desirably be filled with a foam strip of elastomeric material **59** having retaining tapes **60**, **61** adhesively secured to each side of the strip. Apparatus for inserting such presently formed foam strips is described in Fahringer Pat. 3,229,443 but where the width of the pleats **50** is so narrow that the insertion of the strips **59** becomes impractical due to the ratio between the width, thickness and length of the pleats the present invention is admirably adapted to fill the narrow pleats with the elastomeric material described in connection with FIG. 3. This is applied in the same manner as shown in FIG. 6*b* so that the elastomer is injected through the open threads **52** of the ground fabric thus filling all of the narrow pleats **50** as shown clearly in FIG. 13.

It will thus be understood that the present invention supplies an extremely simple and efficient method for filling pockets in upholstery fabric where the shape and dimensions of the pockets are such that it is impossible or impractical to stuff them laterally as in the Fahringer patent above. The pockets may be completely irregular in shape to provide a matelassé effect or they may be regular but of such dimension that other means for filling the pockets cannot be utilized. The present invention can be employed if all of the pockets in the fabric are to be filled through the ground material and it is equally suitable to fabrics in which some of the pleats or pockets are filled with a pre-formed strip of foamed material and certain other of the pockets are filled by injecting the liquefied elastomeric material through the ground fabric into the pockets.

More specifically we have provided an improved upholstery fabric of the matelassé type having greatly enhanced characteristics and which provides an extremely wide latitude in the design ability. The fabric can be manufactured in large quantities at minimum expense and gives a very satisfactory product from a standpoint of upholstery fabrics for furniture, all types of vehicles, and interior decoration for walls and floors.

Having thus described our invention, we claim:

1. A double woven fabric comprising a face fabric having its surface free from elastomeric material, a ground fabric of heat shrunk threads, the face fabric being tied into the ground fabric in selected areas to provide face floats on one side of said ground fabric forming pockets between the face fabric and the shrunk ground fabric on one side thereof, and an elastomeric composition filling the interior of said formed pockets.

2. A double woven fabric in accordance with claim **1** wherein the elastomeric material in addition to filling the interior of said formed pockets also coats the shrunk ground fabric and fills the interstices thereof.

3. A fabric in accordance with claim **1** in which the elastomeric composition is selected from the group comprising a natural rubber latex, a conjugated diene synthetic rubber latex, and mixtures thereof.

4. A fabric in accordance with claim **1** in which the ground fabric is comprised of heat shrunk weft threads.

5. A fabric in accordance with claim **1** in which the ground fabric is comprised of heat shrunk warp threads.

6. A fabric in accordance with claim **1** in which the ground fabric is comprised of both heat shrunk warp and weft threads.

7. A fabric in accordance with claim 2 in which the face fabric is tied into the ground fabric in irregular areas to form a matelassé design.

8. The method of producing a puffed fabric which comprises the steps of weaving a double fabric having a face of relatively non-shrinkable threads and a ground of relatively heat shrinkable threads, tying in selected face threads under selected ground threads, subjecting the double fabric to elevated temperature to shrink the heat shrinkable ground threads thereby forming pockets between the face fabric and the shrunk ground fabric, and injecting an elastomeric material through the ground fabric to coat the ground fabric, fill the interstices thereof, and to fill the interior of the formed pockets.

9. The method of claim 8 in which the double fabric is dyed prior to subjecting the fabric to elevated temperature.

10. The method of claim 8 in which the double fabric is

dyed simultaneously with the elevated temperature treatment.

References Cited

UNITED STATES PATENTS

2,607,104	8/1952	Foster	161—75X
2,703,774	3/1955	Morrison	28—72
2,757,437	8/1955	Faris et al.	161—75X
2,977,664	4/1961	Grajeck et al.	161—75X
3,178,498	3/1965	Brannock	28—72X

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U.S. Cl. X.R.

28—72, 74; 117—47; 161—75, 89, 91, 92, 94, 97