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H. MEYER ETAL

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FABRIC

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FIG. 1.

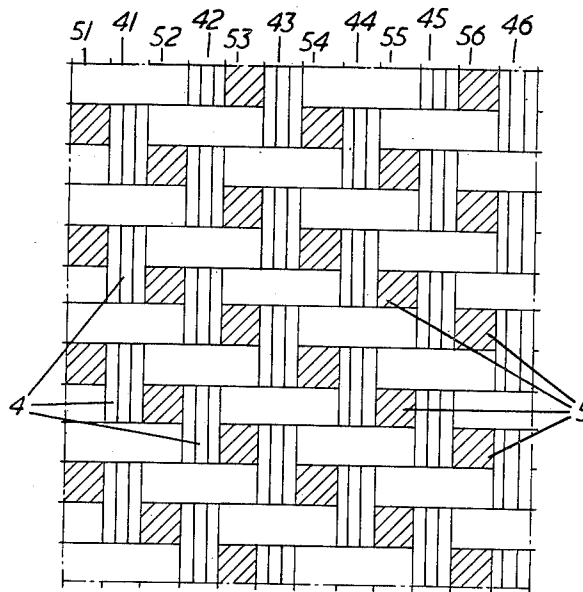


FIG. 2.

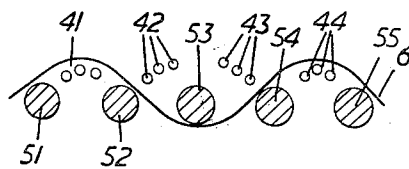
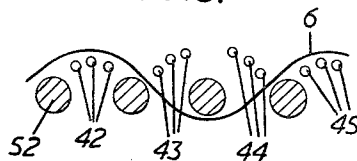


FIG. 3.



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The present invention relates to an improved fabric having a different appearance or different properties on its two faces, particularly to a fabric comprising a thermoplastic component and adapted to be caused to adhere to other articles under the action of heat and pressure.

Such fabrics may be used for various purposes; for example broadly in the art of labelling for various purposes or for the production of two- or multi-ply fabrics, such as stiffened fabrics, or more specifically in the production of interlining fabrics for such articles as collars or cuffs.

As applied to the art of marking textile articles the invention is concerned in particular with the provision of a tab or label fabric comprising a thermoplastic component, from which tabs or labels can be formed adapted to be attached to textile articles by the action of heat and pressure so that the tabs or labels can be used for price marking or for the temporary marking of articles to be cleaned by aqueous or non-aqueous media, in which case they remain adherent to the article to be marked throughout the treatments to which the article may be subjected, but which tabs or labels can be peeled from the marked article when required and for which purpose one edge part of the tab or label does not become adhered to the article and thus forms a finger grip to permit or assist the removal of the tab or label.

Such tabs or labels have been described for example in U.S. Patents Nos. 2,639,255, 2,639,256 and 2,828,779 and methods of marking articles based on the use of such tabs or labels have been described in said Patents while apparatus for affixing such tabs or labels has been described in British Patent No. 644,119 and in U.S. Patents Nos. 2,654,495 and 2,654,496.

In order to meet the requirements of such cleaning operations a tab or label material capable of being caused to adhere to a textile article under the action of heat and pressure, must include a thermoplastic component which fulfils the following requirements:

(a) It must be inherently resistant to a range of cleaning operations and specifically to any of the solvents commonly employed in dry cleaning, such as trichlorethylene, perchlorethylene, white spirit and hot water.

(b) It must have a softening point, which on the one hand is sufficiently low to enable it to be made adherent to a textile article by the application of heat and pressure but without causing damage to the article by scoring, and on the other hand is sufficiently high so that pressing or calendering operations do not have any effect on the tab or label. Further, it must be possible to apply it without using a solvent for the thermoplastic material since such solvent might well affect many types of articles likely to be handled in cleaning operations. In some cases it may be possible to bring the softening point to the required value by incorporating a suitable plasticising agent.

(c) It must not be a substance, in common use in textile materials used for clothing and household purposes since otherwise there would be the danger of the tab or label becoming permanently welded to such textile materials; the fulfilment of this requirement ensures that the tab or label can be applied to any type of textile article likely to be received for treatment.

Apart from the requirements of being capable of being

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firmly attached to a textile article, but, nevertheless, capable of being peeled off when required, a tab or label for temporary marking of textile articles must fulfil other requirements which will be readily apparent; for example the tab or label must not stick to the presser surface by which it is applied to the article, it must not leave a residue of thermoplastic material or frayed particles on the marked article, and it must be capable of receiving a clear and legible identification marking, generally by printing identification letters and/or numerals thereon, which marking must be resistant to the afore-said cleaning operations.

As above indicated, the present invention also relates to fabrics for use in the production of two- or multi-ply laminates where the above requirements *a* to *c* also apply, and is concerned in particular with a novel fabric which may in some cases be suitably stiffened, and is intended to form part of a two- or multi-ply laminate, and more specifically to a material capable of being caused to adhere to another fabric by the action of heat and pressure.

These composite sheet materials may be used for various purposes in the clothing trade for example, and for the so-called interlining materials adapted to be placed in contact with other sheet materials and to be adhered to such a material on one or both sides.

The known interlining materials used for this purpose have not, however, been found to fulfil all the requirements for such materials, for example in many cases they are not resistant to all dry-cleaning solvents, or have other disadvantages, for example they are liable to shrink during application by heat and pressure. One object of the present invention is to provide an improved fabric component (or interlining) for use in the production of two- or multi-ply materials or laminates, and which is adapted to be caused to become bonded to a sheet material on one or both sides thereof by the application of heat and pressure, but without the use of a solvent for the thermoplastic component.

The object of the present invention is to provide a novel fabric suitable for the purposes referred to, and more specifically a fabric consisting in part of non-thermoplastic yarns and in part of thermoplastic yarns.

A further object is to provide a fabric in which thermoplastic yarns are exposed substantially only on one face of the fabric, the other face being substantially free from exposure of the thermoplastic yarns.

In accordance with this invention the fabric comprises a series of fabric elements consisting alternately of single larger diameter yarns and groups each of not more than four smaller diameter yarns woven as one yarn, and fabric elements interlaced with the series of fabric element to form a fabric structure, each interlacing element crossing over a plural but uneven number of said series of elements and under a plural but uneven number of said elements and so on in succession.

Conveniently the fabric is in the form of a twill weave in which the said series of fabric elements comprise the warp and the interlacing elements comprise the weft, the weft tension being substantially lower than the warp tension and each weft crossing alternately over and under three warp elements, that is over two larger yarns and a group of smaller yarns between them, and then under two groups of smaller yarns with a larger yarn between them.

In the preferred arrangement the larger yarns consist of a multi-filament thermoplastic material of comparatively low twist, and the smaller yarns and the interlacing elements consist of non-thermoplastic material.

By virtue of this arrangement the group of smaller non-thermoplastic yarns on each side of each thermoplastic yarn run parallel to and directly adjacent to the latter and thus protect and cover them on one face of the

fabric, while on the other face two thermoplastic yarns on each side of a group of non-thermoplastic yarns overlie the latter and thus permit substantially complete exposure of the thermoplastic yarns.

In these new fabrics the thermoplastic yarns, in general, consist of polyvinyl chloride or other fiber-forming polymers such as nylon. Thus, they may consist specifically of polyvinyl chloride or a co-polymer of vinylidene chloride with acrylates, acrylonitrile or vinyl chloride; the yarn sold under the trademark Saran has been found to be suitable for this purpose. In the case of a vinylidene chloride co-polymer the vinylidene chloride content is over 50% and preferably lies between 70 and 95%. Such fabrics may alternatively utilize multi-filament yarns made of relatively low melting point nylon such as those sold under the trademark Rilsan. In a modification a monofilament flat tape can be used instead of any of the above multifilament yarns.

The structure of new fabrics of the present invention is illustrated on the accompanying drawings in conventional form in which:

FIG. 1 is a weaving plan as seen from the non-thermoplastic bearing face, and

FIGS. 2 and 3 are views of the fabric taken in cross section in the direction of the weft yarns and illustrating the manner in which the non-thermoplastic yarns spread out over and protect the thermoplastic yarns.

As indicated on FIG. 1 a twill fabric is shown in which fabric elements providing the warp are interlaced with other fabric elements 6 providing the weft yarns. The warp consists of non-thermoplastic yarn groups 4 (successive yarn groups being marked 41, 42, 43, etc.), and thermoplastic yarns 5 (successive yarns being marked 51, 52, 53, etc.), in alternating sequence, there being, in sequence, one group 4 followed by one yarn 5 and so on. Each group 4 may consist of not more than four individual yarns each smaller than the yarns 5, and all woven as one and accordingly shown on the drawing as a single element.

On one example a woven fabric is composed of a warp consisting of:

(a) 60 ends per inch of 500 denier multifilament yarn spun from a co-polymer of 85% vinylidene chloride and 15% vinyl chloride, known as Saran 843, and containing 9 or more filaments twisted together with a minimum twist.

(b) 180 ends per inch of 30s count cotton, three ends being woven as one and alternating with the Saran ends. And the weft consists of:

(c) 52 picks per inch of 45s count cotton.

The warp is kept relatively taut whereas the weft is woven at a substantially low tension, i.e. substantially lower than the warp tension.

The weft yarns 6 (FIGS. 2 and 3) are not shown or indicated on FIG. 1, but it will be apparent from the latter that the weft yarns pass alternately over and under three sets of warp elements (consisting of the groups 4 and the yarns 5) according to a twill pattern.

It will be seen from FIG. 1 that every set of three warp elements crossed under by each weft yarn comprises a thermoplastic yarn with a group of non-thermoplastic yarns on each side thereof. Conversely every set of three warp elements crossed over by each weft yarn comprises a non-thermoplastic yarn group with a thermoplastic yarn on each side. It has been found that the result of this arrangement of the yarns and the manner of weaving adopted is that on one face of the fabric (the non-thermoplastic bearing face seen on FIG. 1) the component non-thermoplastic yarns spread out over the cover the thermoplastic yarns as indicated by the upper face of the fabric in FIGS. 2 and 3, ensuring that there is substantially no exposure of the thermoplastic yarns on that face.

The structure of the other face of the fabric (the thermoplastic bearing face) will be evident from study of FIG. 1. Thermoplastic yarns on each side of the non-

thermoplastic yarn group concerned are exposed on the face of the fabric and the non-thermoplastic yarns of the yarn group concerned are covered by the thermoplastic yarns as indicated by the lower face of the fabric in FIGS. 2 and 3.

It will be seen that considering a series of warp elements 4, 5, 4, 5 etc., in which successive elements are denoted by 40 (not shown on drawings), 41, 42, 43, etc., and 51, 52, 53, etc., one weft pick will cross under and over warp elements as follows:

Over 51:41:52, then under 42:53:43 and so on, while the following pick will cross under and over warp elements as follows:

Under 40:51:41; then over 52:42:53 and so on.

It will be apparent from FIGS. 2 and 3 that such fabric provides substantially complete exposure of the thermoplastic component on the thermoplastic bearing face of the fabric, and substantially no exposure of such component on the non-thermoplastic bearing face, offering highly desirable properties for a tab or label which is to be caused to adhere to an article to be marked and which is to bear a printed identification marking on the exposed face.

Heretofore a fabric has been described in which the weft yarns 6 cross alternately over and under three warp elements but it should be understood that substantially similar results are obtained where the weft yarns cross alternately over and under an uneven number of warp elements, although in general the most useful results are obtained with the arrangement specifically described with the weft yarns crossing three warp elements in each case.

In the production of tabs or labels for marking textile articles intended to be subjected to dry-cleaning or like operations, it is preferable for the tab to be attached in such manner that there is a non-adherent edge part to provide a finger grip to assist any subsequent removal of the tab or label.

It is not possible to form a finger grip with a non-adhering edge part as explained in U.S. Patents Nos. 2,639,255 and 2,639,256 because, firstly a solvent for the thermoplastic material cannot be used, and, secondly, because it cannot be excluded that the treatment operations to which the article being cleaned is subjected may include, possibly accidentally, a heating and pressing operation at a temperature approaching or lying above the softening point of the co-polymers; accordingly the finger grip is formed in the present case by folding under an edge part of the tab or label, for example by the means described in British Patent No. 668,305 or in copending U.S. application Serial No. 821,298, this folded under portion being incapable of adhering to the marked article by the application of heat and pressure.

Tab or label fabrics according to the present invention are particularly suitable for marking articles to be subjected to cleaning operations using the normal types of solvent as well as when using aqueous cleaning media at comparatively low temperatures, but it may be desirable to modify the conditions of application under heat and pressure according to the nature of the article to which the tabs or labels are to be applied. The temperature of application, the pressing time and the specific pressure can all be varied or one or more of these factors can be varied.

The foregoing examples may further be regarded as typical of fabrics intended to form part of two- or multiply materials; they may be caused to adhere to a ply on one side thereof by means of heat and pressure higher than that outlined above and/or such pressure may be maintained for a longer period, so that the resulting adhesion is of a more permanent nature and the fabric is not so easily removable from the ply to which it has been attached.

What we claim is:

1. A fabric comprising a series of fabric elements con-

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sisting alternately of single larger diameter yarns and groups each of not more than four smaller diameter yarns, and fabric elements interlaced with the series of fabric elements to form a fabric structure, every interlacing element crossing over a plural but uneven number of said series of elements and under the same plural but uneven number of said elements and so on in succession.

2. A fabric according to claim 1 in the form of a twill pattern in which the said series of fabric elements comprise the warp and the interlacing elements comprise the weft, the weft tension being substantially lower than the warp tension and each weft element crossing alternately over and under three of said warp elements.

3. A fabric according to claim 1 wherein the larger yarns consist of thermoplastic material and the smaller yarns and the interlacing elements consist of non-thermoplastic material.

4. A fabric structure adapted to be caused to adhere to other articles by the application of heat and pressure and formed in part of non-thermoplastic yarns and in part of thermoplastic yarns, in which each non-thermoplastic yarn is substantially smaller than the thermoplastic yarns and several of the former yarns form a group between adjacent thermoplastic yarns and the fabric is produced with interlacing yarns in such manner that at every crossing of an interlacing yarn the group of non-thermoplastic yarns on each side of each thermoplastic yarn run parallel to and directly adjacent to the latter on one face of the fabric and thus protect and cover the thermoplastic yarns, while on the other face two thermoplastic yarns on each side of a group of non-thermoplastic yarns overlie the latter and provide substantially complete exposure of the thermoplastic yarns.

5. A fabric structure as claimed in claim 4 comprising a woven fabric in which the warp consists of thermoplastic yarns alternating with groups of not more than four comparatively small non-thermoplastic yarns, each group being woven as a single yarn and the weft consists of non-thermoplastic yarns woven at a comparatively low tension which is less than the warp yarn tension, each weft pick crossing alternately over and under three warp elements, in the form of a twill weave so that on one face of the fabric the non-thermoplastic yarns substantially protect the thermoplastic yarns and result in a low degree of exposure of the thermoplastic yarns, whereas on the other face where there are two thermoplastic

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yarns and one group of non-thermoplastic yarns, the thermoplastic yarns are substantially exposed.

6. A fabric structure according to claim 4 wherein the thermoplastic yarns consist of a co-polymer of vinylidene chloride in which the vinylidene chloride content lies above 50% and preferably between 70 and 95%.

7. A fabric structure according to claim 4 wherein the thermoplastic yarns consist of a fibre-forming polymer.

8. A fabric structure according to claim 7 wherein the thermoplastic yarns consist of polyvinyl chloride.

9. A fabric structure according to claim 7 wherein the thermoplastic yarns consist of nylon.

10. A method of marking articles which comprises cutting a tab from a fabric strip, said strip comprising a series of fabric elements consisting alternately of single larger diameter yarns of thermoplastic material and groups of not more than four smaller diameter yarns of non-thermoplastic material, said alternating yarns being interlaced with a series of non-thermoplastic yarn elements to form a fabric structure, each interlacing element crossing uniformly over and under an odd number of elements in said alternating series that is greater than one, said method including folding under one edge part of said tab to form a non-adherent finger grip, applying an identification marking to one face of the fabric, said face consisting predominantly of non-thermoplastic material, and applying the tab so marked under heat and pressure to an article to be marked with the other face of the fabric in contact with the article.

11. A method of stiffening textile fabrics which comprises applying to the textile fabric to be stiffened a portion of fabric, said portion consisting of a series of fabric elements consisting alternately of single larger diameter yarns of thermoplastic material and groups of not more than four smaller diameter yarns of non-thermoplastic material, said alternating yarns being interlaced with a series of non-thermoplastic yarn elements to form a fabric structure, each interlacing element crossing uniformly over and under an odd number of elements in said alternating series that is greater than one, said method including the step of adhering to the textile fabric by the application of heat and pressure.

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