

UNITED STATES PATENT OFFICE

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MANUFACTURE OR TREATMENT OF TEXTILE PRODUCTS

No Drawing. Application filed October 3, 1928, Serial No. 311,263, and in Great Britain November 2, 1927.

This invention relates to a new or improved process for dividing, parting, trimming or perforating woven, knitted or other fabrics (but especially woven fabrics) made of or containing threads or yarns of thermoplastic material such as cellulose acetate or other organic derivatives of cellulose, and to the products obtainable by the process.

Processes are described in U. S. patent applications Serial Nos. 151,023, 206,120, 224,287 and 227,629 filed on November 26th 1926, July 15th, 1927, October 5th, 1927 and October 20th, 1927, respectively, for utilizing the thermoplastic property of thermoplastic materials such as cellulose acetate or other cellulose esters or ethers to effect the sealing against fraying or ravelling of the fabrics when severed, hot knives or other cutting devices being employed to sever the fabrics and simultaneously to seal the severed edges by melting or softening the threads or filaments of the cellulose ester or ether.

We have now found that the operation of dividing, parting, trimming, or perforating such fabrics may be assisted by providing for the presence on or in the fabric of a small quantity of a solvent or softener of the cellulose ester or ether, the solvent or softener serving to reduce the melting or softening point thereof thus enabling the knives, blades, wires, dies or other tools to be employed at lower temperatures, and thereby to avoid disadvantages arising from the use of tools at too high a temperature, such as scorching and discoloration. The fabrics may be treated with the solvents or softeners prior to the dividing, parting, trimming or perforating operation or the presence of the solvent or softener in or on the material of the fabric may be otherwise provided for. The solvents or softeners should be of relatively high or high boiling points. For instance, high boiling solvents such as diacetone alcohol, cyclohexanone, tetrachlorethane, di-ethyl citrate and acetic acid may usefully be employed for fabrics made of or containing yarns or threads of cellulose acetate.

The invention is applicable for a large number of industrial processes involving

dividing, parting, trimming or perforating operations.

We indicate below a number of industrial applications which, and the products thereof, are particularly included in the invention, but it is to be understood that the invention is in no way confined to these particular applications.

As an example, a length or piece of woven fabric of the character referred to (and especially a fabric made wholly of threads or yarns of cellulose acetate or other cellulose ester or ether) after being treated, as by spraying the fabric with a suitable solvent or softener, such as diacetone alcohol, may be divided or parted into any number of widths, strips, ribbons or pieces by drawing or passing the fabric in contact with one or more circular or other knives, blades or the like heated to the required temperature, whereby the cellulose ester or ether yarns are melted along the line or lines of contact with the knife or knives, blade or blades or the like; the heated surface or surfaces seals the edges by melting the threads, at the same time cementing them together. This constitutes a simple form of binding to the edges of the pieces. Alternatively of course the heated knife or knives, blade or blades or the like may be drawn across the stationary or moving fabric. The dividing or parting may be performed in any direction of the fabric, for instance transversely or longitudinally, or both transversely and longitudinally. If a number of suitably disposed knives, blades or the like are employed a number of bands, strips or ribbons may be severed simultaneously. The binding formed by the fusion of the filaments or threads during the dividing or parting of the fabrics may replace selvages in the resulting bands, strips, ribbons or pieces of fabric. The sealing of the edges by the heat as referred to in the case of ribbons and the like constitutes a marked advantage over ribbons, etc., with glued edges, in that no deterioration of the ribbon, etc., takes place when the edge sealed by heat gets wet.

If desired the position, pressure and temperature of the heated knives, blades or

other tools may be so arranged that complete scission of the fabric does not occur, but only part of the threads in the line of the knives, blades or tools are severed, for instance the position, temperature and pressure of the knives, blades or the like may be so adjusted that only the upper face threads at the points of intersection of the warp and weft are severed, by which means a line or lines of perforations may be produced in the fabric.

As another example the invention may be applied to the production of woven labels, tabs or the like by severing them from a suitable fabric. For example a fabric may be woven from threads of cellulose acetate (or other cellulose ester or ether) with a number of repeats of the label or tab across the width (for instance 20 repeats), the lettering or design of the label or tab being formed from similar or dissimilar threads to that of the fabric. After the fabric has been treated with a suitable solvent or softener, such as diacetone alcohol, the labels may then be severed entirely or by a line or lines of perforations longitudinally and transversely from the fabric with a heated knife or knives, blade or blades or the like in a manner similar to that above described.

As another example of application of the invention a heated die or dies or like tools may be employed to cut or stamp out pieces of any desired shapes, such as rectangular, circular, elliptical, or any fancy shape from a fabric of the character referred to, the fabric having been treated with a suitable solvent such as diacetone alcohol in order to reduce the temperature required in the die or dies or other tools. This method may be used to produce decorative or other open-work effects in the fabric itself as well as to produce desired shapes in the form of labels, tabs and so forth. In this case also the melting of the threads of the cellulose ester or ether in contact with the die or dies forms a useful and simple binding around the edges of the pattern or of the pieces stamped or cut out by the heated die or dies.

As another example the invention may be applied in the trimming off of yarn used in figure work where floating tissue on the back of the fabric is woven in but has to be removed in finishing. Thus for instance a figured or like fabric may be woven with a floating weft of threads of cellulose acetate (or other cellulose ester or ether) and with a ground of silk, wool, cotton or other vegetable or animal fibre or artificial silk of the "cellulosic class" (e. g. cuprammonium, viscose or denitrated nitrocellulose artificial silk); and, after the fabric has been treated with a solvent or softener as described in the previous examples, the floating tissue on the back of the fabric may be removed by a heated knife, blade, or the like. The presence of the solvent or softener enables the knife,

blade, or the like to be used at a lower temperature. The severed ends of the floating tissue become sealed together and the looseness which frequently characterizes such figure work is largely or entirely prevented.

It is to be understood that the above applications of the invention are given only by way of illustration and that I in no wise limit myself thereto.

The knives, blades, wires, dies or other tools employed may be heated to the desired temperatures by any suitable means. Conveniently they may be heated electrically, by which means the temperature may readily be controlled.

In the case of the application of the invention to "mixed" fabrics comprising thermoplastic yarns or threads of cellulose acetate or other cellulose esters or ethers and yarns or threads or other silk, wool, cotton, artificial silks of the cellulose type or other textile fibres, the present invention can be applied by arranging for the presence of thermoplastic yarns or threads located where the dividing, parting, perforating or the like is to take place; such threads should run across the line or lines of scission or perforation.

What I claim and desire to secure by Letters Patent is:—

1. A process of cutting woven, knitted, or other fabrics in dividing, parting, trimming, or perforating operations, said process comprising treating a fabric containing yarns of a thermoplastic material with a substance that lowers the softening point of the thermoplastic material, and effecting at least a partial scission of the fabric by means of heated cutting means.

2. A process of cutting woven, knitted, or other fabrics in dividing, parting, trimming, or perforating operations, said process comprising treating a fabric containing yarns of organic derivatives of cellulose with a high boiling solvent for the organic derivatives of cellulose, and effecting at least a partial scission of the fabric by means of heated cutting means.

3. A process of cutting woven, knitted, or other fabrics in dividing, parting, trimming, or perforating operations, said process comprising treating a fabric containing yarns of cellulose acetate with a substance that lowers the softening point of the cellulose acetate, and effecting at least a partial scission of the fabric by means of heated cutting means.

4. A process of cutting woven, knitted, or other fabrics in dividing, parting, trimming, or perforating operations, said process comprising treating a fabric containing yarns of cellulose acetate with a high boiling solvent for the cellulose acetate, and effecting at least a partial scission of the fabric by means of heated cutting means.

5. A process of cutting woven, knitted, or other fabrics in dividing, parting, trimming, or perforating operations, said process comprising treating a fabric containing yarns of cellulose acetate with diacetone alcohol, and effecting at least a partial scission of the fabric by means of heated cutting means.

6. A process of cutting woven, knitted, or other fabrics in dividing, parting, trimming, or perforating operations, said process comprising treating a fabric containing yarns of organic derivatives of cellulose with a high boiling solvent for the organic derivatives of cellulose, severing the fabric by means of heated cutting means whereby the severed edges are at least partially fused, and then permitting the edges to solidify.

7. A process of cutting woven, knitted, or other fabrics in dividing, parting, trimming, or perforating operations, said process comprising treating a fabric containing yarns of cellulose acetate with a high boiling solvent for the cellulose acetate, severing the fabric by means of heated cutting means whereby the severed edges are at least partially fused, and then permitting the edges to solidify.

8. A process of cutting woven, knitted, or other fabrics in dividing, parting, trimming, or perforating operations, said process comprising treating a fabric containing yarns of a thermoplastic material with a substance that lowers the softening point of the thermoplastic material, and removing shapes from the fabric by means of heated cutting means, whereby the severed edges of the shapes and the fabric are at least partially fused, and then permitting the edges to solidify.

9. A process of cutting woven, knitted, or other fabrics in dividing, parting, trimming, or perforating operations, said process comprising treating a fabric containing yarns of cellulose acetate with a high boiling solvent for the cellulose acetate, and removing shapes from the fabric by means of heated cutting means, whereby the severed edges of the shapes and the fabric are at least partially fused, and then permitting the edges to solidify.

10. A process of cutting woven, knitted, or other fabrics in dividing, parting, trimming, or perforating operations, said process comprising treating a fabric containing yarns of cellulose acetate with diacetone alcohol, and removing shapes from the fabric by means of heated cutting means, whereby the severed edges of the shapes and the fabric are at least partially fused, and then permitting the edges to solidify.

In testimony whereof I have hereunto subscribed my name.

WILLIAM ALEXANDER DICKIE.