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PROCESS OF CUTTING FABRIC
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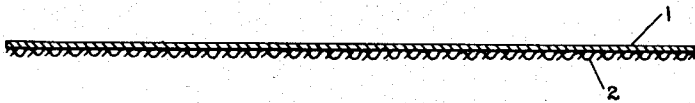


Fig-1

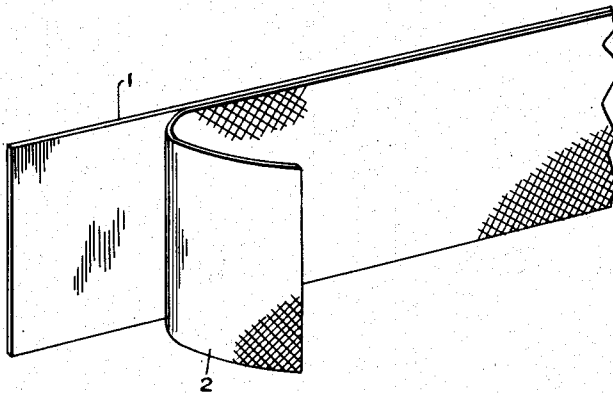


Fig-2

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UNITED STATES PATENT OFFICE

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PROCESS OF CUTTING FABRIC

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2 Claims. (Cl. 18-48)

This invention relates to the cutting of fabrics, and relates more particularly to the cutting of fabric made of yarns of non-thermoplastic filaments or fibers in such a manner that the cut edges will not fray or ravel.

It is an object of this invention to provide a novel process for cutting fabric made of yarns of non-thermoplastic filaments or fibers whereby the cut edges will be sealed against fraying or raveling.

Another object of this invention is the provision of a process for producing novel effects in ribbons by cutting a plurality of superposed fabrics of different characteristics into strip or ribbon form in such a manner that the co-extensive edges of the strips or ribbons are cemented together.

Other objects of this invention will appear from the following detailed description.

In the accompanying drawing, wherein an embodiment of my invention is shown,

Figure 1 is a cross-sectional view showing a layer of fusible material 1, such as a film or foil of a thermoplastic material superimposed on a layer of textile fabric of non-thermoplastic filaments or fibers indicated by reference numeral 2, and

Figure 2 is a perspective view showing layers of fusible material 1 and the textile fabric layer 2 being stripped from each other.

In Patent No. 1,773,967 to Camille Dreyfus there is described a process for cutting fabrics containing at least some thermoplastic filaments or fibers by means of a hot cutting tool. The fabric employed in carrying out the patented process had to be made in whole or in part of a material which fused under the action of heat. Examples of materials which fused under the action of heat are organic esters of cellulose, such as cellulose acetate, cellulose propionate and cellulose butyrate, and cellulose ethers such as ethyl cellulose and benzyl cellulose. The hot cutting tool melted the fusible material of the fabric along the freshly cut edge and upon cooling the melted material sealed the cut edges against fraying or raveling. Accordingly, this process obviated the necessity of hemming or sewing the cut edges to prevent fraying or raveling. This process, however, could not be employed to prevent fraying or raveling in cut edges of fabric made from yarns of non-thermoplastic materials, so that it was still necessary to hem or sew the cut edges of such fabrics in order to prevent fraying or raveling.

I have now found a novel process for cutting

a fabric of yarns of non-thermoplastic filaments or fibers and simultaneously sealing the cut edges against fraying or raveling. The fabric to be used in accordance with this invention may be made of yarns of any non-thermoplastic filaments or fibers, such as cotton, wool, linen, natural silk, regenerated or reconstituted cellulose, or mixtures of these. The fabric, moreover, may be of any desired configuration and may be woven or knitted in any manner.

In carrying out my invention, a sheet of fabric made of yarns of non-thermoplastic filaments or fibers is covered on one or both sides with a sheet made of or containing fusible material and the superposed layers are simultaneously cut into the desired configuration by means of a hot cutting tool. The cutting action of the hot cutting tool, which is of a temperature sufficiently high to melt the fusible material, seals the cut edges of the superposed layers together due to the melting of the fusible material present in at least one of the layers, which melted material runs into the filament or fiber ends of the cut edge or edges and when cool solidifies and thereby seals the same against fraying or raveling. Any suitable cutting tool may be employed in accordance with this invention. For example, the cutting tool may be a die, a knife or a bank of stationary or rotary knives, which cutting tools may be heated in any suitable manner as by gas or electricity.

While this invention is particularly applicable to the use of fusible covering sheets of cellulose acetate, it may be used with sheets of other organic derivatives of cellulose, such as cellulose propionate and cellulose butyrate, and cellulose ethers such as ethyl cellulose and benzyl cellulose. My process also contemplates the use of fusible covering sheets of mixed esters such as, for example, cellulose aceto-propionate and cellulose aceto-butyrate, and also synthetic linear polyamide condensation products such as the polyamides derived from amino acids or from the condensation of diamines with a carboxylic acid, e.g. polyhexamethylene adipamide. Sheets made of vinyl acetate, methyl methacrylate and other fusible synthetic resins may also be employed. However, this invention will be described in connection with cellulose acetate which is at this time commercially the most important of the fusible materials which may be employed in my invention.

In one form of my invention, a fabric made of yarns of non-thermoplastic material, say cotton, is covered on one or both sides with a thin film

or foil of cellulose acetate and the layers of the film or foil and fabric are then simultaneously cut into strips or ribbons, or into any other desired configuration with a hot knife. This cutting action causes the fabric and the film or foil to adhere to each other along the cut edges. Upon cooling, which is effected in a very short period of time, the film or foil is peeled off the fabric and it is found that the cut edge or edges of the cotton fabric are sealed against fraying or raveling, the fusible cellulose acetate having melted under the action of the hot cutting knife, flowed in between the ends of the cut cotton fibers and sealed the same.

If desired, the film or foil of cellulose acetate may contain a plasticizer therefor. Any suitable plasticizer for the cellulose acetate may be employed, such as, for example, ethyl paratoluene sulphonamide, monomethyl xylene sulphonamide, dimethyl phthalate, diethyl phthalate, triphenyl phosphate, dibutyl tartrate, dimethoxyethyl phthalate or mixtures of two or more of these.

In another form of my invention, a fabric of yarns of non-thermoplastic filaments or fibers, say regenerated cellulose, is covered on one side with a fabric made of yarns of cellulose acetate filaments or fibers and the two layers are then simultaneously cut by means of a hot knife, or the two layers may be passed through a bank of heated rotary knives, to be cut into the form of strips or ribbons. The cutting action causes the two fabrics to adhere to each other along the cut edges thereof and the edges of both fabrics are sealed against fraying or raveling. The two layers of fabric may be of different colors to produce ribbons having desirable decorative effects.

As stated, the fabric used in my process may be of any desired weave or it may even be a knit fabric. The application of this process to circular knit fabrics composed of the material as set forth above presents great advantages, since ordinary methods of cutting this material cannot be used because of its pronounced tendency to ladder or "run." However, when the cutting is done by a knife blade or spatula heated to the proper temperature as above set forth, the melting of the covering material along the edge will serve to coalesce the adjacent threads or filaments to effectively prevent any laddering at the edge. This is especially valuable, since it makes possible the use of circular knit fabric in a manner heretofore impossible.

This method of cutting fabric is of general application and may be used to cut fabrics into any desired shape or form. Among the many uses may be suggested the making of bias tape by

cutting fabric on the bias into strips. Such tape need not be folded as is necessary with ordinary bias tape.

The invention is useful in making garments, since the sealed edges act as selvages and therefore it is not necessary to make any hem. In the making of garments with fabric cut in accordance with my invention, the only sewing necessary is the making of a mere simple seam where pieces of fabric are to be joined. Moreover, where flat articles of any shape whatsoever are to be made, such as table covers, doilies, strips, etc., no sewing whatever is necessary by the use of my invention since when such articles are cut by my process, no hemming is necessary to avoid fraying or raveling. Likewise, in the making of shoulder straps for feminine wearing apparel the straps may be made with varying width without any bulky hems. By the use of my invention, not only is the time and labor of sewing avoided, but articles of greater beauty and less bulkiness may be made.

While I have described my invention in detail, it is to be understood that many variations may be made therein without departing from the spirit of this invention.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. Process for cutting fabric containing yarns of filaments or fibers of non-thermoplastic material whereby the cut edges are sealed against fraying or raveling, which comprises applying to an assembly of layers, at least one of which is a textile fabric of non-thermoplastic filaments or fibers and at least one of which is a thin film or foil of thermoplastic material, localized heat and pressure on the line of desired severance by means of a hot cutting tool so as to cause the textile fabric to be cut and the cut edges of the layers to be sealed and united while the layers remain separate elsewhere than at the cut edges, and removing the film or foil from the fabric.

2. Process for cutting fabric containing yarns of filaments or fibers of non-thermoplastic material whereby the cut edges are sealed against fraying or raveling, which comprises applying to an assembly of layers, at least one of which is a textile fabric of non-thermoplastic filaments or fibers and at least one of which is a thin film or foil of cellulose acetate, localized heat and pressure on the line of desired severance by means of a hot cutting tool so as to cause the textile fabric to be cut and the cut edges of the layers to be sealed and united while the layers remain separate elsewhere than at the cut edges, and removing the film or foil from the fabric.

FREDERICK G. DODGE.