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J. C. CHEZAUD ETAL
PROCESS FOR SEWING FABRICS

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FIG. 1

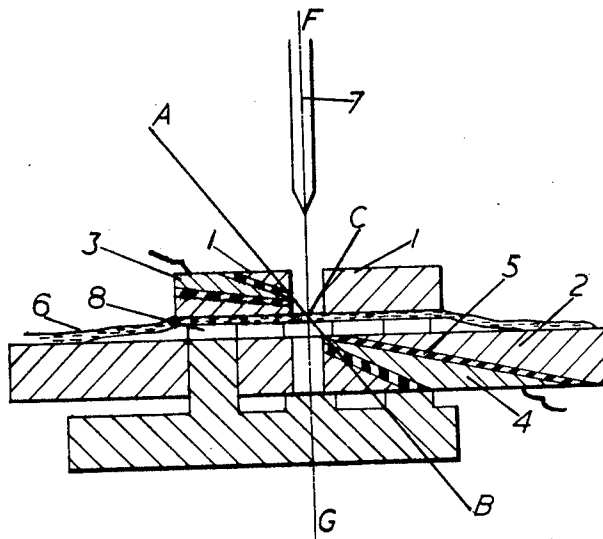


FIG. 3

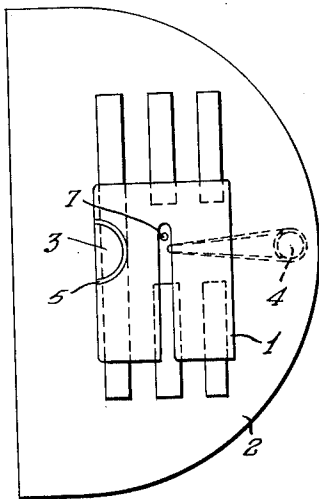
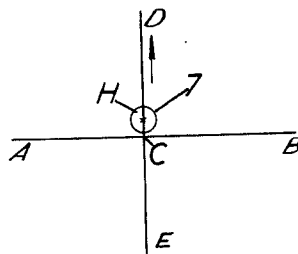


FIG. 2



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PROCESS FOR SEWING FABRICS

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881,694

1 Claim. (Cl. 112—262)

This invention relates to the sewing of fabrics comprising thermo plastic threads.

When fabrics based on thermoplastic threads are sewn together puckering generally occurs at the seams. This puckering is due mainly to the tension set up in the fabric structure by the presence of the sewing thread, and various process have been proposed for reducing these tensions.

It has been proposed to use sewing machine needles which have a sharp edge facing upstream during the sewing, relative to the direction of advance of the fabric.

The ease with which the various fabric layers slide one upon the other causes irregularities in the stitches in addition to the puckering. In order to obviate this disadvantage, special machines have been designed which are provided with driving means which operate simultaneously on the top and bottom of the fabrics, or are even provided with means which drive the fabric by the needle.

A further difficulty arises in the use of high-speed sewing machines with a thermoplastic thread, where the heating of the needle, due to friction with the fabric, sometimes causes melting and breaking of the thread. In order to avoid these breakages, it is for example possible to fix on the sewing machine a device comprising a heated piercing needle which operates simultaneously with the sewing needle, so that the sewing needle enters the holes previously pierced by the heated needle disposed in front of it, the spacing between the piercing needle and the sewing needle being at least equal to the distance which separates two adjacent stitches.

However, if such a device is used, the heated needle, in piercing the fabric, carries with it small quantities of the material constituting the threads, this material being carbonised.

The present invention is a process for sewing fabrics consisting of or containing thermoplastic threads, which comprises passing an electric spark through the fabric at the points through which a sewing needle is subsequently to pass. In a preferred embodiment of the invention the fabric is caused to advance through a sewing machine by a length smaller than one sewing stitch between the moment when the spark discharge passes through the fabric and that when the needle stitches the fabric in the hole thus obtained, the spark discharge and the movement of the needle being synchronised.

A further aspect of the invention is a sewing machine for carrying out above process wherein an electrode is positioned on either side of the plane of the fabric, the electrodes being adapted to pass an electric spark through the said fabric at the points through which the sewing needle is subsequently to pass.

Preferably one of the electrodes is mounted in the pressure foot and the other in the needle plate.

The discharge of sparks and the formation of the stitch may be synchronized by an electrical switching device controlled by the driving shaft of the sewing machine e.g. a centrifugal type of switch. There may also be present a means for preventing the supply of high voltage to the electrodes when the machine stitches the fabric.

A preferred embodiment of the invention is illustrated in the accompanying drawings, in which:

FIGURE 1 is a cross-section of a stitching device,

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showing the pressure foot and the needle plate of the sewing machine,

FIGURE 2 is a diagram to show the relationship between the spark and the sewing needle, and

FIGURE 3 is a plan view of the stitching device.

Referring now to FIGURE 1, a pressure foot 1 and needle plate 2 contain two electrodes 3 and 4 insulated by a dielectric material 5. The straight line AB joining the tips of these two electrodes 3 and 4 intersects the sewing line on the fabric at point C at a small distance from the needle axis represented by line FG. The fabric is sewn by needle 7 and moved by driving claws 8.

In FIGURE 2 the line AB and the point C have the same significance as in FIGURE 1; line DE represents the seam line of the fabric and H is the projection of the needle axis FG of FIGURE 1.

When the needle 7 is raised and the driving claws 8 of the machine cause the fabric to move forward, a potential difference sufficiently high to cause a spark discharge is set up between the two electrodes.

These sparks pass through the fabric and form a hole or line of weakness through the said fabric by melting or softening of the thermoplastic fibre in the zone traversed. The fabric is stopped by withdrawal of the claw and the needle 7 moves downwards passing through the hole thus formed.

The diameter of the hole may most conveniently be regulated by varying the potential difference between the two electrodes. The invention is further illustrated by the following example.

EXAMPLE

Two pieces of fabric with a taffeta weave comprising threads consisting of polyamide 66 poly (hexamethylene adipamide) are fitted together by stitching and with a stitch length of 2 mm. on a sewing machine substantially as described. The distance between the axis of the needle and the plane parallel to this axis and passing through the straight line AB is 0.6 mm.

A needle having a diameter of 0.8 mm. is used, with a polyester sewing thread with a metric number of 70.

A current of 25 milliamperes at 10,000 volts is fed to the supply circuit of the electrodes to cause the spark discharge.

The stitching is carried out at a speed 2,500 stitches per minute.

A seam without puckering is obtained, without breakage of the thread.

We claim:

The method for sewing fabrics comprising thermoplastic fibres which comprises the steps of (a) forming a series of equally spaced holes in said fabric along the line to be stitched by the passage of an electric spark through said fabric, and (b) sewing said fabric through said holes, continuously with their formation.

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