Oct. 6, 1942. G. FULLER 2,297,881

METHOD OF AND MEANS FOR REMOVING DRAW-STRINGS FROM LACE WEBS

Filed Feb. 12, 1941

Fig. 1

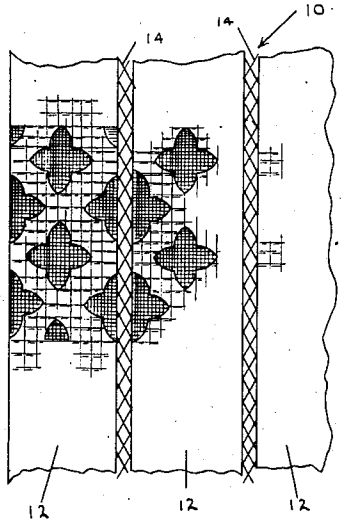


Fig. 3

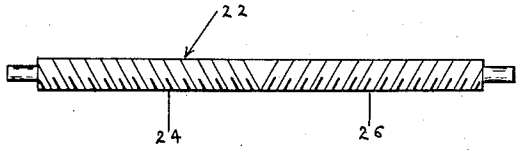


Fig. 2

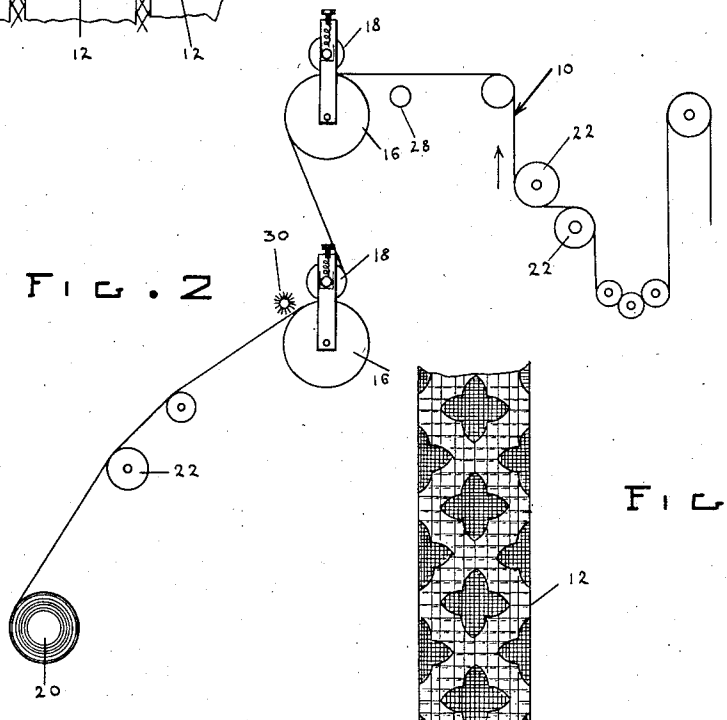


Fig. 4

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Patented Oct. 6, 1942 2,297,881

UNITED STATES PATENT OFFICE

2,297,881

METHOD OF AND MEANS FOR REMOVING DRAWSTRINGS FROM LACE WEBS

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Application February 12, 1941, Serial No. 378,558

7 Claims. (Cl. 28—73)

This invention relates to the manufacture of lace.

In the commercial production of lace it is customary to produce on the lace-making machine a lace web composed of a plurality of lace strips connected to each other by draw-strings which are removed from the web after the web is dyed or otherwise processed. The present invention is concerned primarily with the character of the draw-strings and the method of removing the same in order to separate the lace web into the desired individual lace strips.

More particularly, in accordance with the present invention the draw-strings which connect the several adjacent lace strips to each other in the lace web as the same is produced on the lace-making machine are composed of threads which can be readily removed by the application of heat thereto and substantially without leaving a residue which would interfere with the operation of the apparatus of which would impair the lace itself. By utilizing threads of the designated character which will be more specifically hereinafter referred to it is possible to eliminate the use of a solvent or other liquid for removing the draw-strings.

I have discovered that if the lace strips are connected to each other in the lace web by draw-strings composed of vinyon, they can be readily removed from the lace web by the application of heat to said draw-strings. More specifically, by passing the lace web over a drum heated to a temperature of about 300° F., the vinyon threads are fused and thereby eliminated from the web. The vinyon threads when subjected to the action of heat at a suitable temperature disappear from the lace web without leaving any residue which might collect on the heat drum of the apparatus or which would impair the quality or appearance of the lace strips. The vinyon threads are composed of vinyon yarn or filaments derived from a vinyl resin, known chemically as a co-polymer of vinyl chloride and vinyl acetate, by forming a dope of the resin dispersed in acetone and by extruding the filaments from the dope by a process well known to those skilled in the art.

The invention will be more specifically described in connection with the accompanying illustrative drawing.

In the drawing:

Fig. 1 is a plan view of a lace web comprising a plurality of lace strips attached to each other by draw-strings composed of vinyon threads;

Fig. 2 is a diagrammatic view of the apparatus employed in removing the vinyon draw-strings;

Fig. 3 is a view of a spreading device employed in the apparatus illustrated in Fig. 2;

Fig. 4 is a plan view of one of the lace strips removed from the web.

Referring now to the drawing in further detail the lace web 10 illustrated in Fig. 1 comprises a plurality of lace strips 12 disposed in adjacent side by side relation and extending longitudinally of the web, the adjacent strips of the web being connected to each other by removable sections 14 formed of draw-strings. The method of making the lace web 10 provided with the draw-strings is well known in the art of lace making and, therefore, requires no further description. It will be understood that the lace in the several strips 12 of the web can be made according to any lace-making method, for example, knitting or braiding. The removable sections or draw-strings 14 are composed, as stated above, of vinyon threads which can be fused and thereby removed from the web at a temperature sufficiently low to avoid impairment of the fabric of the lace strips. The lace strips are, accordingly, formed of cotton or other threads which are not injuriously affected by the temperature required for fusing and thereby removing the vinyon draw-strings.

The method of removing the vinyon draw-strings 14 from the lace web 10 is illustrated more or less diagrammatically in Fig. 2, which likewise diagrammatically illustrates the apparatus utilized in said method. Said apparatus comprises a plurality of heated drums 16 over which the web is drawn under tension. Said drums 16 can be heated electrically or by steam or in any other suitable way to the temperature necessary to fuse the vinyon threads. Drums 16 can be stationary, as here shown, or can be mounted for rotation. Suitable adjustable pressure rollers 18 are provided for holding the lace web in contact under suitable pressure with said heated drums 16. A driven take-up roller 20 is provided at the delivery end of the machine for drawing the lace web under tension over the heated drums and for winding the separated lace strips. One or more spreading devices 22 are provided in the apparatus in position to engage the lace web 10 for tensioning the same laterally prior to the engagement of said web with the heated drums. Said spreading device 22 comprises as here shown a rod having in integral relation sections 24 and 26 which are threaded in opposite directions so that when the rod is

rotated in engagement with the lace web the latter is tensioned laterally, that is, in a direction axially of rod 22. Another tension device for spreading rod 22 may be and as here shown is disposed at the delivery side of the apparatus between the second heated drum 16 and the take-up roller 20. Spreading rods 22 are preferably positively driven. Also, as here shown, the lace web 10 before engaging the heated drums is caused to pass over a perforated pipe 28 through which steam is passed for subjecting the web to the action of steam prior to the engagement thereof with the heated drums 16.

Thus, the lace web 10 comprising the vinyon draw-strings is easily and efficiently separated into the individual lace strips by subjecting said web as described above to the action of heat applied to the web by causing the latter to engage the heated drums 16. As vinyon threads have a high tensile strength they can be very fine or of low denier. The vinyon threads are thus eliminated from the web and rapidly disappear therefrom during the process. For the most part, said threads appear to be vaporized by the heat applied thereto, although a slight residue remains but this is in the form of a fine powder which is harmless as it does not adhere to the drums or to the other parts of the apparatus or to the lace and in no way impairs the latter. Any deposit of the removed vinyon can be removed from the lace strips by providing a rotary brush at the last drum 16 in contact with the lace web, as illustrated at 30 in Fig. 2, or at each drum if desired. The temperature to which the drums 16 are heated may be varied and to some extent will depend upon the speed of movement of the web over said drums. A suitable temperature range is from about 250° F. to about 350° F., the preferred temperature being about 300° F.

While I have described the preferred embodiment of my invention and the mode of practicing the same, it will be understood that various changes may be made therein without departing from the spirit and underlying principle of the invention. It will be understood also that while the invention is especially valuable for separating a lace web into individual lace strips, other fabrics can have portions thereof removed in accordance with the present invention by forming said removable portions of vinyon. Therefore, I do not wish to be limited specifically to the above described embodiment of the invention except to the extent which may be required by the scope of the appended claims.

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

1. The method which comprises producing a web composed of a plurality of fabric strips the adjacent edges of which are connected together by vinyon threads, tensioning said web laterally and while thus tensioned passing said web over a heated drum to fuse said vinyon threads, and thereby separate said strips from each other.

2. A machine for separating a lace web into individual lace strips, said web comprising a plurality of lace strips connected by fusible threads, said machine comprising a heated drum, a take-up roll for drawing the lace web over said drum in engagement therewith, and means for tensioning said web laterally.

3. A machine for separating a lace web into individual lace strips, said web comprising a plurality of lace strips connected by fusible threads, said machine comprising a heated drum, a take-up roll for drawing the lace web over said drum in engagement therewith, and a rotatable spreader engageable with said web prior to the engagement thereof with said drum for tensioning said web laterally.

4. A machine for separating a lace web into individual lace strips, said web comprising a plurality of lace strips connected by fusible threads, said machine comprising a heated drum, a take-up roll for drawing the lace web over said drum in engagement therewith, and a rotatable spreader engageable with the strips of said web after the engagement thereof with said drum.

5. The method of separating a web into a plurality of strips, said web comprising a plurality of fabric strips the adjacent edges of which are connected by vinyon threads, which method comprises removing said vinyon threads from said web by subjecting said vinyon threads to the action of heat at a temperature at which said threads are reduced to a disintegrated form in a solid state.

6. The method of separating a web into a plurality of strips, said web comprising a plurality of fabric strips the adjacent edges of which are connected by vinyon threads, which method comprises steaming said web and passing the same over a surface heated to a temperature at which the vinyon threads are reduced to a disintegrated form in a solid state.

7. The method of separating a web into a plurality of strips, said web comprising a plurality of fabric strips the adjacent edges of which are connected by vinyon threads, which method comprises removing said vinyon threads from said web by subjecting said vinyon threads to the action of heat at a temperature at which said threads are reduced to a disintegrated form in a solid state, and tensioning said web laterally while subjecting said vinyon threads to said action of heat.

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