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(54) **A web or fabric having a variable thickness, a loom and a method for obtaining said web or fabric**

(57) A web or fabric with variable thickness portions, formed with weft threads (14) and warp threads (4, 5, 6), wherein floating warp threads (6) appear sheared in the lower thickness portions (AB), while the maximum thickness portions (BC) are formed with weft threads (14) and warp threads (4, 5, 6) intertwined with each other. The invention concerns also the loom and the method used to obtain the webs or fabrics as described above.

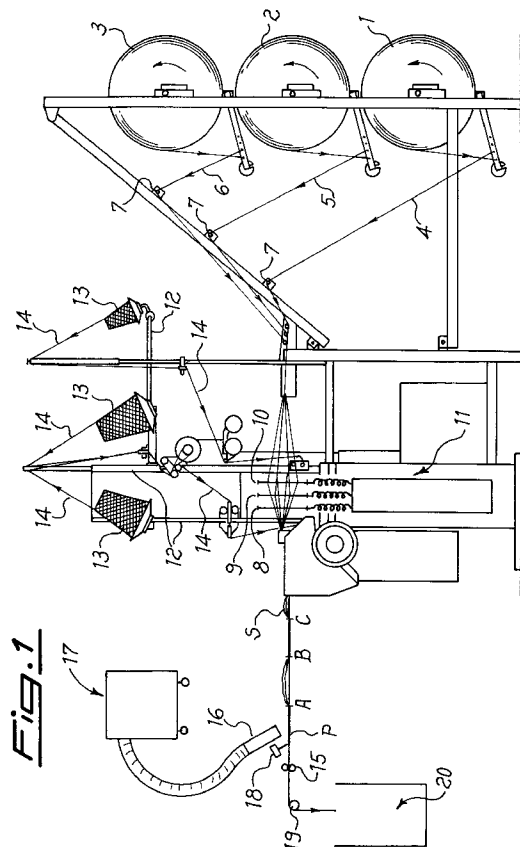


Fig. 1

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Description

This invention concerns a new type of web or fabric obtained by intertwining a weft and a warp, both extensible and stiff, comprising any kind of fibers, for instance natural, synthetic, artificial fibers, and a mixture of the above, the main feature of this web or fabric being that of having two different thicknesses, and therefore two different weights, for portions having a length chosen at will, obtained by varying at will the number of the fabric warp threads in the lower thickness portions. The length ratio between the two variable thickness portions depends upon the use the subject web or fabric will be assigned to, which may be plain or tubular shaped.

In the field of corsage items, constant thickness webs or fabrics are known, which do not include variable thickness stretches, or having different thickness stretches which are obtained by sewing some overlapping portions together. In other fields, for instance in the production of rucksack straps, handbag straps or the like, larger thickness stretches are obtained by gluing parts on top of each other. These known techniques have drawbacks which may be summarized in a longer manufacturing time and in the fact that the products obtained are not perfectly satisfactory as far as their use and their appearance are concerned.

Conversely, it is an object of this invention to provide extensible and stiff webs or fabrics suitable to be used for making corsage items, particularly in the field of ladies' underwear, and more precisely to be used for brassiere shoulder straps, in that the variable thickness allows for a larger thickness to be used at the support positions, for instance the shoulders, whereby a softness and comfort drastically improved compared to conventional articles may be obtained.

In addition, the use of the above may also be extended to other applications, like for instance automotive safety belts, or various types of shoulder-belts, for handbags and rucksacks.

In order to obtain such a web or fabric, a loom is used, and in particular a needle loom, with the implementation of a new system for shearing the warp threads that are floating in the areas which will take a lower thickness, while in the areas of maximum thickness said floating threads get intertwined with the other warp threads and with the weft threads, which make up the structure of the web or fabric.

Shearing, which is the operation of taking out all or a portion of the warp threads, is performed as soon as the fabric gets out of the loom, with the warps which have been made floating by means of the known loom dobby, and the warps sheared in this way are collected by a suction system, leaving the product clean, and with portions of variable thickness chosen at will, and ready to proceed to the following processing steps.

The advantages and the features of this invention will become apparent from the following detailed description concerning both the variable thickness web or

fabric, and the loom and the method for obtaining said web or fabric, reference being made to the accompanying drawings, wherein:

- 5 Figure 1 is a schematic cross-sectional view of a loom according to this invention;
- Figure 2 is a cross-section schematic of a strip of the web or fabric obtained;
- 10 Figures 3a, 3b, 3c, 3d show the several steps of the method used to obtain the subject web or fabric; and
- Figure 4 shows schematically a detail mounted on the loom according to this invention.

Referring now to Figure 1, the loom according to this invention includes yarn carrier beams 1, 2 and 3, for elastomeric warp threads 4, for plain-reverse warp threads 5, and for the floating warp threads 6 respectively; said threads, proceeding through guides 7, are set in motion by heddles 8, 9, 10 respectively, by means of dobby 11. Supports 12 carry conical bobbins 13 of the weft threads, which pass through the lead-in of the warp threads opened by the raising and the lowering of heddle frames 8, 9 and 10.

The web or fabric so formed is comprised of portions AB - BC. As it is shown in Figure 2, both portions are formed by upper fabric TS and by lower fabric TI, made up of the intertwining of elastomeric warp threads 4, of the plain-reverse warp threads 5, and of weft threads 14. Portion AB carries floating threads 6 above upper fabric TS, while portion BC carries floating threads 6 at an internal position, between upper fabric TS and lower fabric TI.

The web or fabric made up of portions AB - BC and of preceding portion P, and of following portion S, is gradually forwarded by cloth-pulling rollers 15, whereby point A gets, from the position shown in Figure 1, closer to the position shown in Figure 3a. As it is shown in Figures 1, 3a, 3b, 3c, 3d, upstream from rollers 15 there is provided suction tube 16 connected to exhauster 17, and between said suction tube 16 and said rollers 15 there is positioned a shearing device 18.

In particular, according to Figure 4, said shearing device may comprise a helical blade shearing machine. As it is shown in Figure 3a, floating threads 6 are drawn into suction tube 16 with the front end A fastened to preceding portion P while, as the web or fabric is forwarded by means of rollers 15, as it is shown in Figure 3b, shearing device 18 has cut floating threads 6 at the front end A, whereby floating threads 6 are freely drawn in by suction pipe 16. While web or fabric AB - BC keeps on moving forward, back end B of floating threads 6 approaches shearing device 18, as it is shown in Figure 3c, with floating threads 6 drawn into suction tube 16, even though said floating threads remain fastened to end B of portion BC. As web or fabric AB - BC moves forward even further, end B arrives at the position of shearing device 18, whereby floating threads 6 are sheared and eventually drawn by suction into suction tube 16 connected to ex-

hauster 17.

In this way, the sheared web or fabric which is fed forward by cloth-pulling rollers 15 and by guide roller 19, moves into collector bin 20.

Thus, the operation is repeated as described above, according to the steps shown in Figures 3a, 3b, 3c and 3d, with portions AB and BC of a variable length, according to the motions transmitted to heddles 8, 9 and 10 by dobby 11. Thus the thickness of portion AB, which is lower than the thickness of portion BC, may be suitably modified by changing at will the number of floating threads 6 making up the web or fabric, by the action of the heddles controlled by dobby 11.

It should be noted that the loom described above, with the steps of the method implemented to obtain the subject web or fabric, may be used for a plain or tube shaped web or fabric, as well as for an extensible web or fabric, by using the elastomeric warp 4, or for a stiff web or fabric obtained without using elastomeric warp threads 4.

Said two alternatives of extensible web or fabric, and of stiff web or fabric, will be exploited respectively in the first case for corsage articles, in particular in the field of ladies' underwear, and in the second case for the production of safety belts, or shoulder-belts for handbags and rucksacks.

Claims

1. A web or fabric with variable thickness portions, formed with weft threads (14) and warp threads (4, 5, 6), characterized in that floating warp threads (6), amounting to a number chosen at will, appear sheared in the lower thickness portions (AB), while the maximum thickness portions (BC) appear as formed in a normal fashion, with weft threads (14) and warp threads (4, 5, 6) intertwined with each other.
2. The web or fabric according to claim 1, characterized in that said portions (AB-BC) have a length modified at will.
3. The web or fabric according to the preceding claims, characterized in that said portions (AB-BC) have a thickness modified at will.
4. The web or fabric according to the preceding claims, characterized in that portions (AB - BC) are formed by an upper fabric (TS) and by a lower fabric (TI), and in that lower thickness portion (AB) appears to carry floating threads (6) sheared above upper fabric (TS), and maximum thickness portion (BC) carries floating threads (6) between upper fabric (TS) and lower fabric (TI).
5. A loom adapted to obtain webs and fabrics according to the preceding claims, and provided with the known means adapted to obtain weft and warp webs or fabrics, characterized in that it includes: means (11) which, at the exit of the web or fabric from the loom, untwine the warp threads (6), i.e. make them floating, limited to portions (AB); means (18 and 16) which respectively shear said floating threads (6) and draw them in by suction, whereby portions (AB) having a lower thickness and portions (BC) having a maximum thickness are formed.
6. The loom according to claim 5, characterized in that means (18) shear the web or fabric first at point (A) and then at point (B) of portions (AB).
7. The loom according to claim 5, characterized in that said means (11) comprise the dobby controlling heddles (8, 9, 10) of the loom, with the variation of the length and of the thickness of portions (AB).
8. The loom according to claims 5 and 6, characterized in that means (18) for shearing floating threads (6) comprise a helical blade shearing machine.
9. A method for obtaining webs and fabrics according to the preceding claims, characterized by including the following steps: web or fabric (AB-BC) formed with weft threads (14) and warp threads (4, 5, 6) is moved forward; portions (AB) having floating, i.e. untwined warp threads (6) along said forwarding direction are formed; floating threads (6) are sheared and removed by suction, with a gradual formation of portions (AB) having a lower thickness, adjacent to portions (BC) having a maximum thickness.
10. The method according to claim 9, characterized in that shearing is performed, as a consequence of the forward motion of web or fabric (AB - BC) at first at point (A) and then at point (B), whereafter untwined threads (6) are removed by suction.

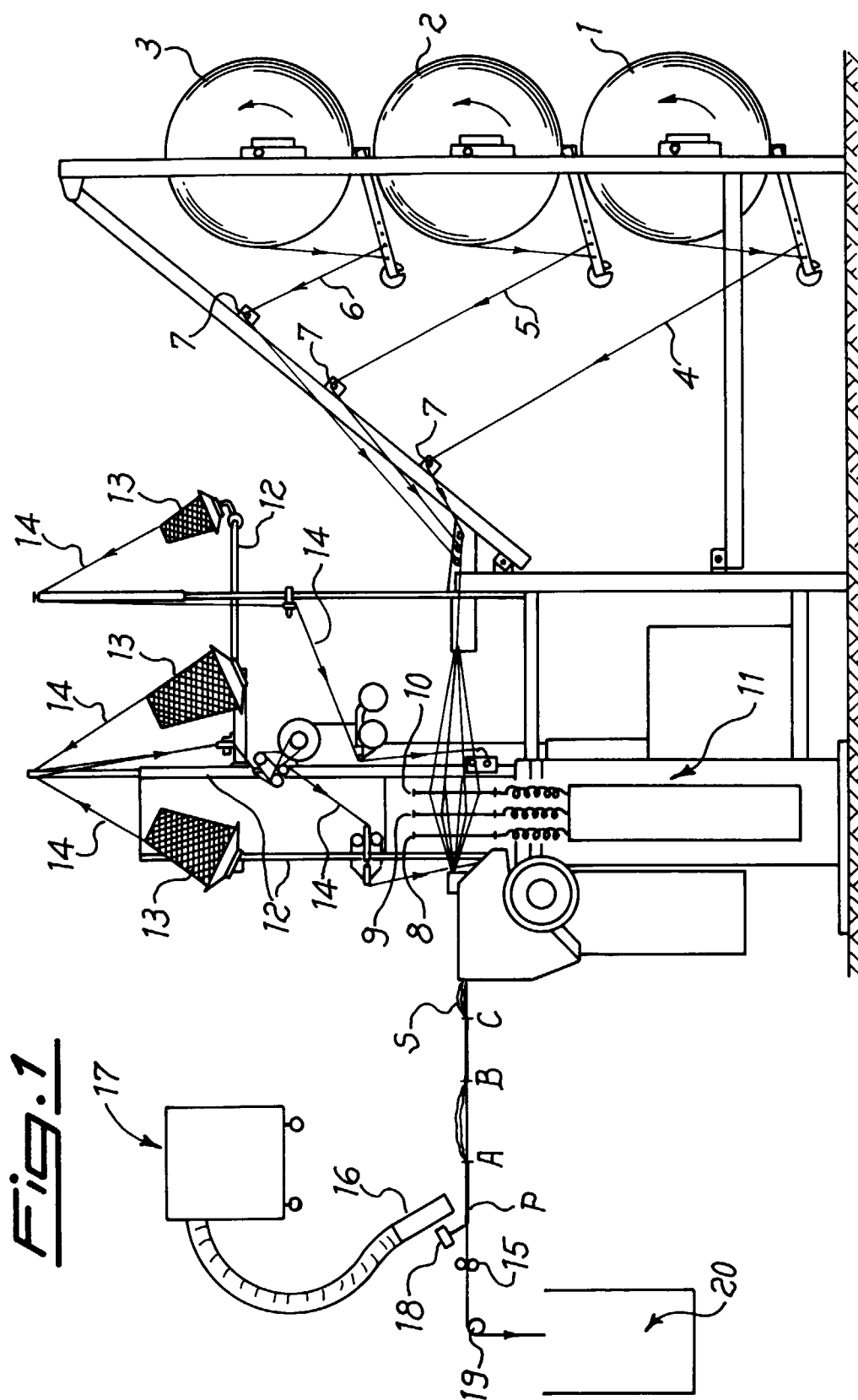


Fig. 2

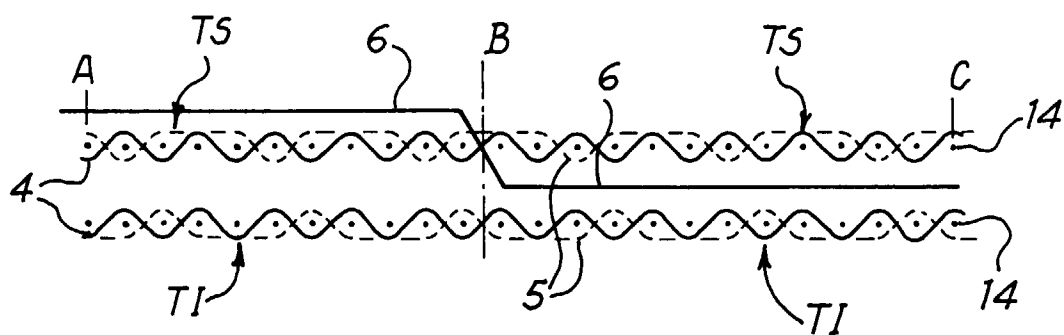
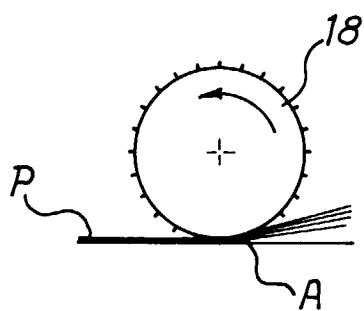
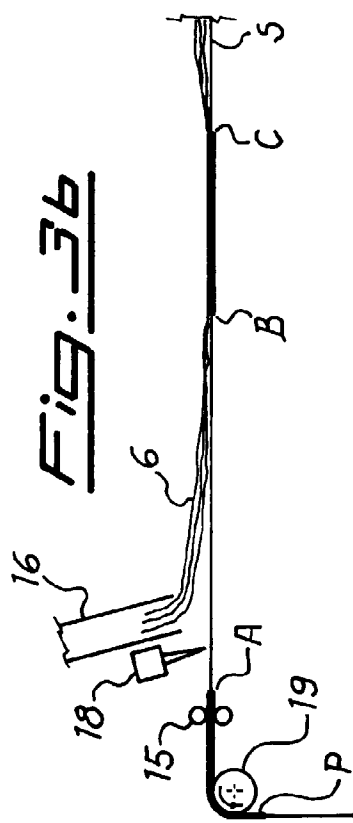
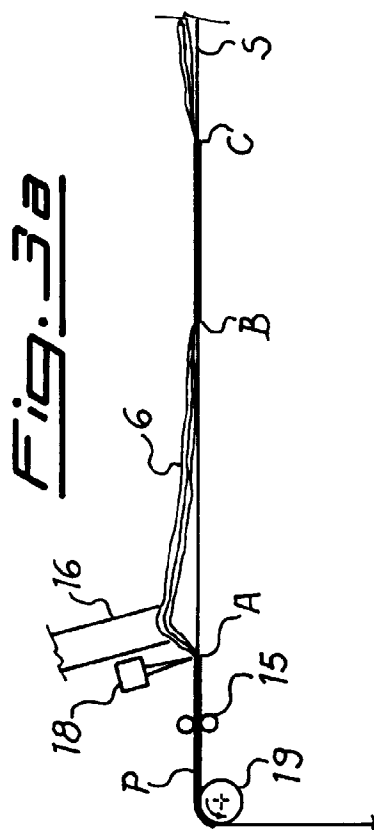
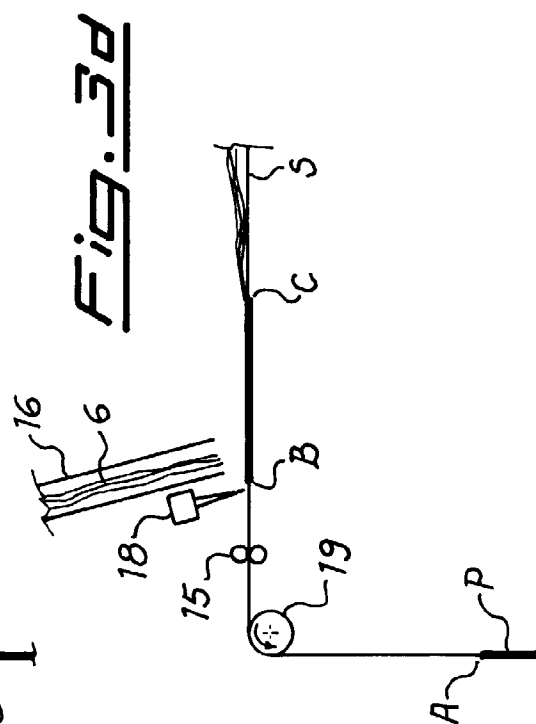
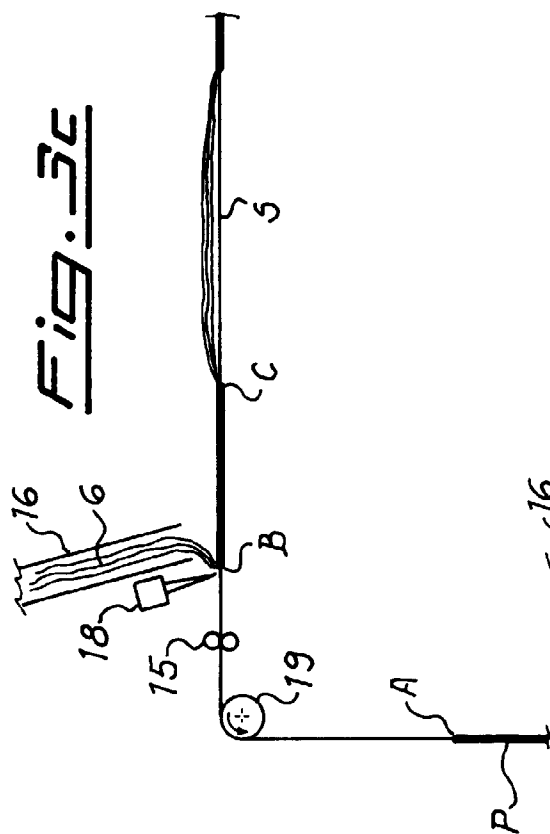


Fig. 4







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EUROPEAN SEARCH REPORT

Application Number
EP 96 83 0079

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	BE-A-866 687 (BALTA NV) 1 September 1978 * page 7, line 19 - line 22; figure * & DATABASE WPI Section Ch, Week 7837 Derwent Publications Ltd., London, GB; Class F03, AN 78-65348 * abstract *	1,5,9	D03D13/00 D03D15/06 D03D11/00 D03D27/06
X	--- DATABASE WPI Section Ch, Week 8551 Derwent Publications Ltd., London, GB; Class F03, AN 85-320935 XP002005575 & JP-A-60 224 835 (IWASADA KEORI KK) , 9 November 1985 * abstract *	1	
A	--- DE-A-41 15 800 (VAUPEL) * the whole document *	1,5,9	
A	--- EP-A-0 424 635 (VORWERK & CO.) * figure 1 *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.6) D03D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 13 June 1996	Examiner Rebiere, J-L
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