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(54) Stretcher for tubular knitwear

(57) A stretcher for tubular knitwear fabric, comprising: two arms (5, 6), the drive wheels (7a, 7b), with transmission belts (13) for advancing the fabric (4), two electric motors (21), said electric motors being each coupled to a drive wheel (7a, 7b), the latter respectively held by the arms (5, 6), and electric means for controlling the speed of motors (21).

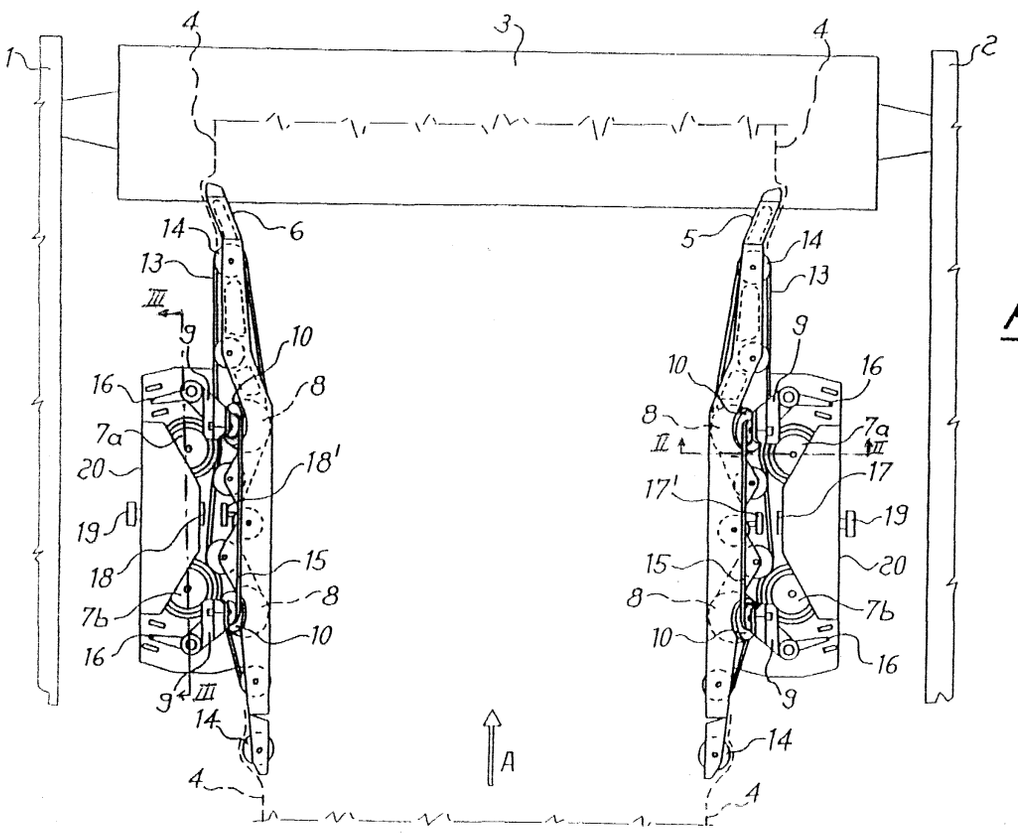

Fig.1

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Description

[0001] The object of the present invention is a stretcher for tubular knitwear fabric, to be applied in particular to calenders and other machines for the treatment of tubular fabric.

[0002] It is known that in the course of tubular knitwear fabric finishing stretchers are used to stretch and spread the tubular item in order to ease the finishing operations.

[0003] Thus in calendering, which is usually the last finishing operation, it is necessary to use a stretcher in order to achieve a uniform steaming and to adjust the width of the tubular item onto the desired value.

[0004] There are known, for example from patent PCT/IT99/00344 of the same proprietor as the present invention, stretchers for tubular fabric with two stretcher arms along which the fabric slides by means of advancement wheels that are coupled by transmission belts.

[0005] There is also known the European patent 0 298 176 concerning a stretcher for tubular fabric comprising a mechanical differential drive that is so coupled with the fabric advancement wheels, that the speed of the advancement wheels on an edge of the fabric can be increased or lowered as compared with the other edge, with the purpose of achieving a regular advancement of the fabric.

[0006] The object of the present invention is an improved electrical apparatus which is apt to cause the fabric to be advanced in a regular fashion, thereby obtaining the so-called "straight alignment" of the fabric edges with a highly accurate adjustment of the advancement speed for the two edges of the fabric.

[0007] The apparatus comprises two independent electric motors with fine speed control that are respectively coupled with the advancement wheels for the two fabric edges.

[0008] The features, advantages and the solution of the above-mentioned technical problem will be evident from the detailed description hereinbelow of a preferred, non limiting embodiment of the subject stretcher, said embodiment being illustrated in a merely exemplary, non limiting way in the accompanying figure, in which:

Figure 1 shows a front view of the stretcher;

Figure 2 shows an enlarged fragmentary horizontal cross-sectional view of a stretcher through line II-II of Figure 1; and

Figure 3 shows an enlarged horizontal cross-sectional view of a stretcher through line III-III of Figure 1.

[0009] Referring now to figure 1, the subject stretcher is comprised of stanchions 1 and 2 in which the various control and drive mechanisms are contained.

[0010] Said stanchions support the per se known steamer 3, through which the tubular fabric is caused to run after passing through the stretcher.

[0011] Said stretcher is comprised of the stretcher arms 5 and 6, which in turn are held on the hereinbelow described support devices.

[0012] Within stanchions 1 and 2, motor means hereinbelow described transmit the motion to the upper drive wheels 7a, and thus means not shown in the figure can determine the displacement in opposite directions of the stretcher arms 5 and 6, so as to possibly change the width of the tubular fabric.

[0013] The upper drive wheels 7a are coupled to the similar lower wheels 7b through means that are specified hereinbelow.

[0014] As can clearly be seen from figures 1 and 2, the stretcher arms 5 and 6 are provided with wheels or rings 8 that are suitably shaped and are arranged in front of the convex part the drive wheels 7a and 7b are provided with. The latter in turn exhibit the supports 9 that carry the inclined axis (12) wheel pairs 10 and 11. Said wheels 10 and 11 are spaced apart with their peripheral parts from the circumferential outlines 8' of rings 8, this being due to the magnetic attraction force, as will be described later on.

[0015] The transportation of the tubular fabric 4 is obtained by means of belts 13 that are wound around a set of idle pulleys 14 on arms 5 and 6 along the outlines of the drive wheels 7a and7b and of the rings 8.

[0016] As can clearly be seen from figure 1, both of the inclined wheels 10 are motor-driven as they are coupled to one another by means of an elastic belt 15 that is wound on drive wheels 7a and7b.

[0017] In a similar way, the inclined wheels 11 are motor driven as they are coupled by means of an elastic belt with the same drive wheels 7a and 7b.

[0018] Said motor drive has the advantage that the transportation of the fabric is markedly improved.

[0019] In particular, the supports 9 consist of fork shaped brackets 16 for the adjustment of the working angles of arms 5 and 6.

[0020] As shown in figure 2, wheels 10 and 11 are kept spaced apart from the rings 8 by means of magnets 17 and 18 that respectively attract arms 5 and 6 outwards as shown by arrows B. said rings 8 carried by arms 5 and 6 remain spaced apart from the inclined wheels 10 and 11, and are attracted against the drive wheels 7a and 7b by said magnets 17 and 18, and the fabric is advanced between belts 13 and the drive wheels 7a and 7b.

[0021] It is moreover to be pointed out that the attraction force of magnets 17 and 18 can be adjusted, thereby assuring that rings 8 are spaced apart from the inclined wheels 10 and 11.

[0022] Said adjustment is obtained by means of a mechanism that takes the magnets 17 and 18 closer to a farther from arms 5 and 6 respectively. In fact magnets 17 and 18 are coupled to said mechanism that is provided with an adjustment hand grip 19, which is adapted to move closer or farther the magnets 17 and 18 to and from the supports 17' and 18' that are fixed to bars 5 and 6.

[0023] Finally, guards 20 are provided above the mechanisms carrying the adjustment hand grips 19.

[0024] The apparatus is operated as follows: the tubular fabric 4, that usually consists of various tubular pieces that are sewn together, is introduced upwards, as can be seen from figures 1 and 2, between wheels 10 and 11 and ring 8 and between ring 8 and wheels 7a and 7b of each arm and is thus transported upwards as indicated by arrow A upon rotation of the drive wheels 7a and 7b that are coupled to rings 8 and to pulleys 14 that are mounted on the arms 5 and 6, said arms being kept in position and sustained by the attraction force of magnets 17 and 18.

[0025] When a larger width of the tubular fabric is desired to be obtained, the arms 5 and 6 are displayed relative to one another until they reach the maximum distance shown in the positions of figure 1.

[0026] Moreover, the stretcher can take all the positions from a minimum to a maximum distance without having to take care to substitute to stretcher, thus avoiding to stop the machine with the consequent slip off of the tubular from the stretcher arms.

[0027] In case on an emergency, where the magnets should be in such a position as not to attract the arms 5 and 6, the latter would nonetheless remain in position because the rings 8 would lean with their circumferential outlines 8' to the wheels 10 and 11. However, such a situation will be temporary and would become normal again upon a proper adjustment of the position of magnets 17 and 18 by means of hand grips 19.

[0028] According to the new feature of the present invention, with reference to figure 3, each are 5 and 6 carries an electric motor 21, each electric motor being coupled to the drive wheel 7a by means of a motor reducer 22 on the shaft 23 of which a pulley 24 is keyed, said pulley being coupled by means of a transmission belt 25 to a pulley 26 that is keyed onto the shaft 27 of a second drive. . wheel 7b.

[0029] Electric means for the control of the speed of both motors 21 are provided, said means comprising two frequency converters that are connected to the respective motors 21, one for arm 5 and the other for arm 6.

[0030] The speed of motors 21 can be synchronized or made different by means of the converter that is connected to a frequency change signal.

[0031] In the first case, the speed of motors 21 is the same and such a choice is adopted when the advancement of fabric 4 is a regular.

[0032] The second case, the speeds are different and can be controlled, and such a choice is adopted when one edge of fabric 4 advances faster than the other one.

[0033] Upon ascertaining the different advancement of the edges of fabric 4, the operator carries out to the necessary adjustments.

[0034] Changes can be carried out in the present invention in the practical application features of design details, remaining nonetheless in the scope of the invention as it is claimed hereinafter.

Claims

1. 1. A tubular fabric stretcher comprising: pulleys (14) for the advancement of the fabric (4), said pulleys being carried by two stretcher arms (5, 6) and coupled to transmission belts (13); and two drive wheels (7a, 7b) on each arm (5, 6); **characterized in that** each arm (5, 6) carries an electric motor (21), each motor being coupled said. drive wheels (7a, 7b) of each arm (5, 6) and in that electric means are provided for the adjustment of the speed of the two motors (21) that can be the same, that is synchronized, or differential.

2. 2. A tubular fabric stretcher according to claim 1, **characterized in that** each motor (21) is coupled to a motor reducer (22) which in turn is coupled to said drive wheels (7a, 7b).

3. 3. A tubular fabric stretcher according to each of the previous claims, **characterized in that** the speed control means comprise two frequency converters that are connected to their respective motors (21).

4. 4. A tubular fabric stretcher according to the previous claims, **characterized in that** said frequency converters are connected to a frequency change signal.

Fig.1

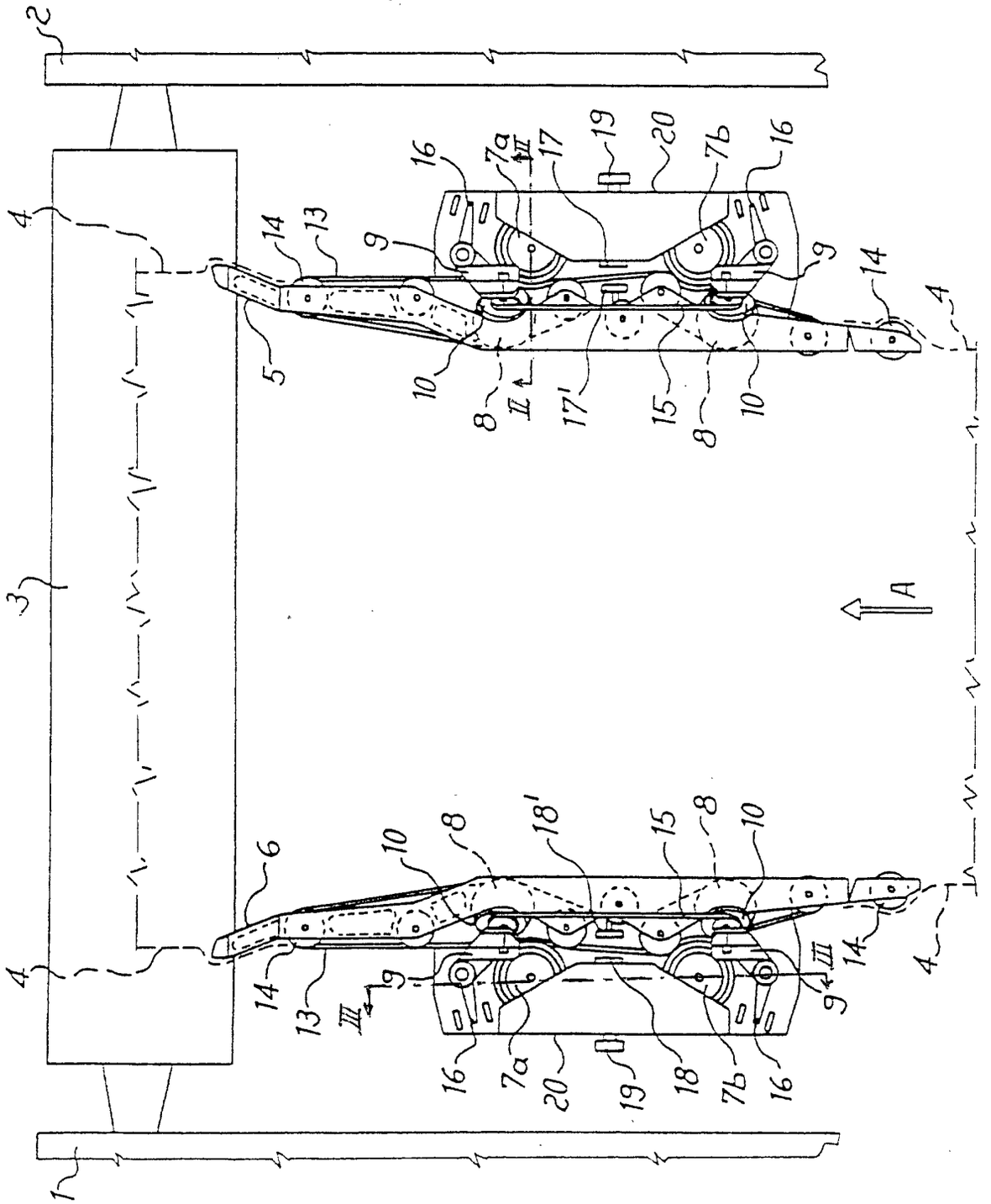
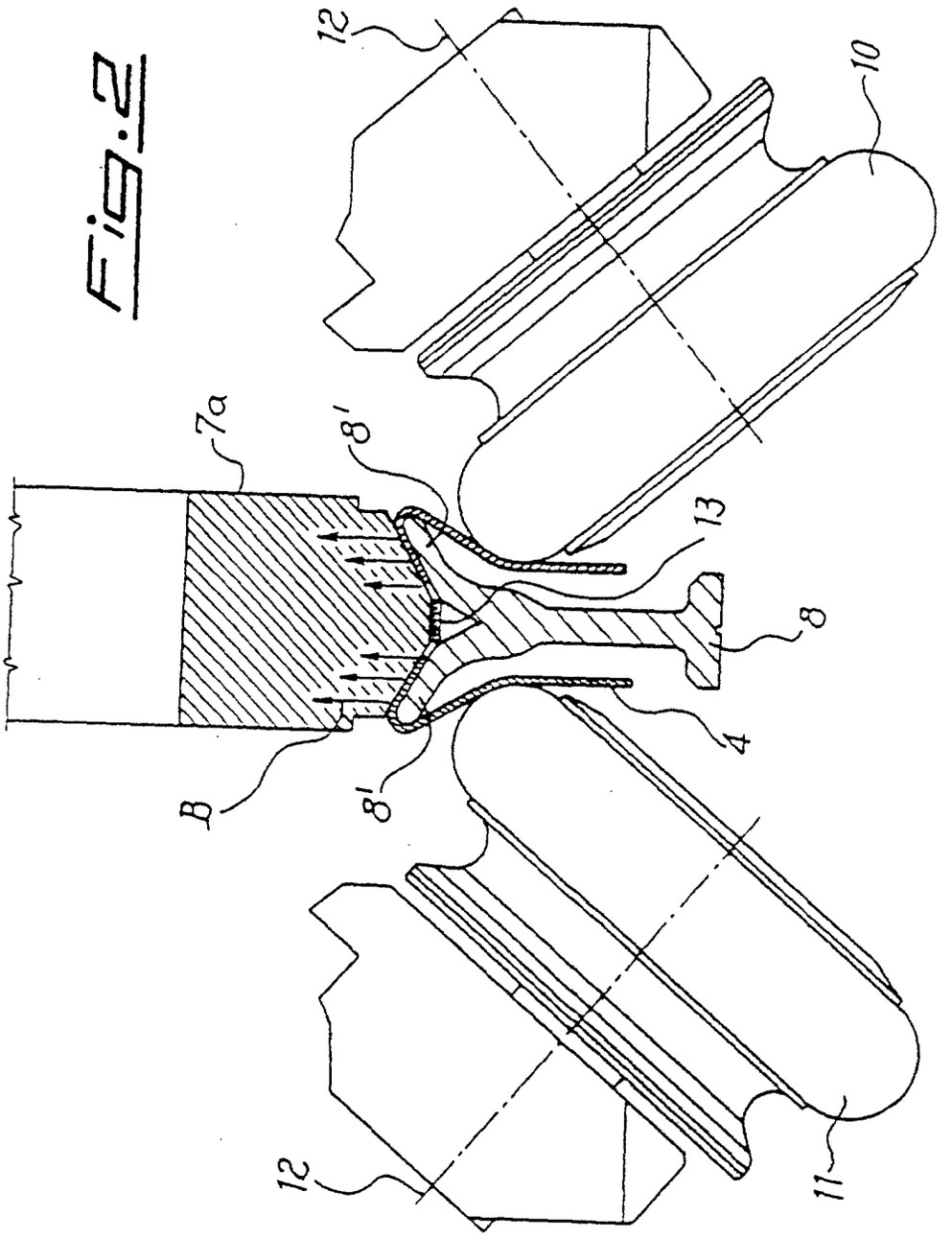


Fig.2



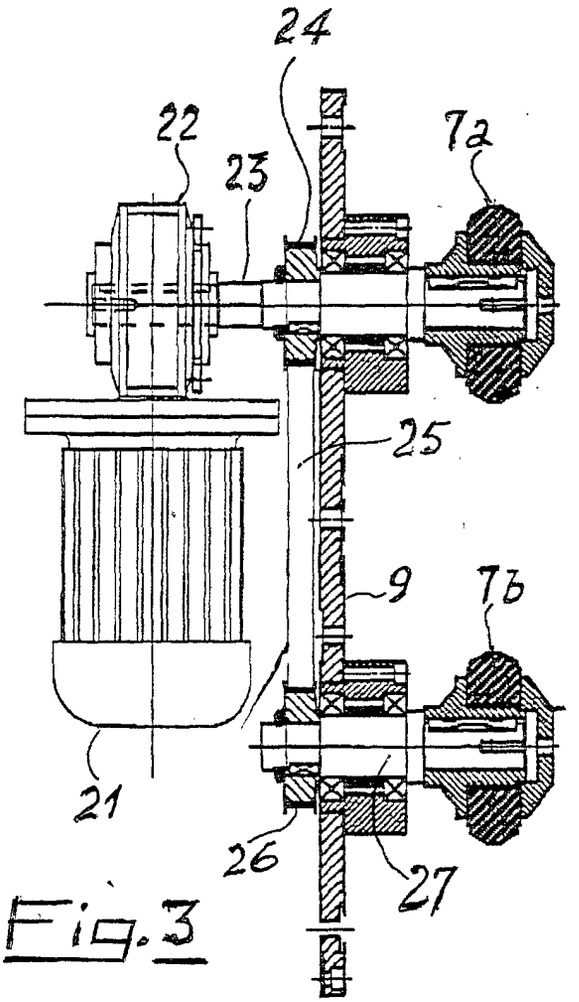


Fig. 3