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(54) Improved rack for supplying a bundle of ribbon-like fibres to textile macines such as drawing frames, lapping machines and suchlike.

(57) An improved rack, or creel, for supplying bundles of ribbon-like fibres, extracted from their container boxes in order to convey them to textile machines such as drawing frames, lapping-machines and any other similar machine, in which the said improved rack has at least one lifting and transfer track comprising endless flexible belts moved, one above the other, in the same direction and with the same value of motion. The said flexible belts are far enough apart to receive, with suitable compression, the bundle of ribbon-like fibres in order to convey it, without any alteration, to the entry of the work unit.

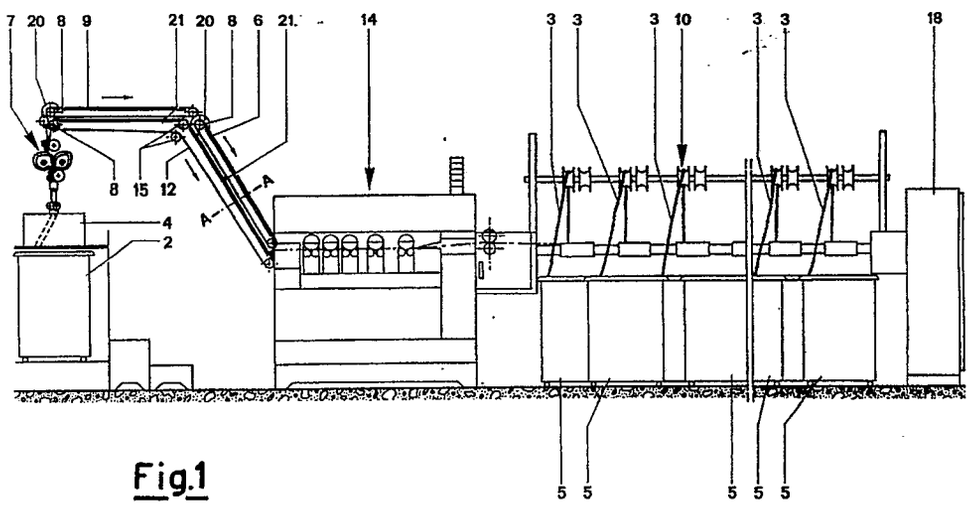

Fig.1

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IMPROVED RACK FOR SUPPLYING A BUNDLE OF RIBBON-LIKE FIBRES TO TEXTILE MACHINES SUCH AS DRAWING FRAMES, LAPPING MACHINES AND SUCHLIKE

The present invention relates to an improved rack, or creel, for supplying bundles of ribbon-like fibres to textile machines such as drawing frames, lapping machines and any similar machine.

In racks of a known type for supplying bundles of ribbon-like fibres, from container boxes, various problems often arise which create torsional stress and lengthening of the ribbons of fibres and, therefore, a worsening of the quality of the finished product. The said irregularities are extremely damaging particularly in tops, as experts in the field well know. As the bundles of ribbon-like fibres are conveyed to the entry of the work unit they are completely exposed to the dusty environment, which is typical of the preparation for spinning and thus their final textile properties are negatively affected by such exposure.

In racks of a known type, for example those for supplying the drawing rolls of vertical, or horizontal, drawing frames, the bundles of ribbon-like fibres, from the various boxes placed side by side, one to the other, are made to pass through the supply pulleys of the idler rollers and drive rollers, which are driven by the machine head. The said organs are mounted on a frame for lifting and transferring the bundle of fibres, which changes the direction of conveyance several times passing from a horizontal to an oblique direction, or to a vertical direction and vice versa, until entering the drawing rolls of the drawing frame.

Despite all the possible mechanical arrangements, the following problems arise:

- on the way from the storage box to the rolls, the bundle of ribbon-like fibres undergoes, due to stress, various distortions, which may alter the quality of the finished product; furthermore, as stated, it is completely exposed to the dusty environment;
- great difficulties are encountered in the unfortunately frequent case of ribbons with a high humidity. In such a case the bundle of fibres often breaks during its movement. Some boxes, especially those near the rack, are accessed with difficulty by the service operator who must restore the continuity of the ribbon.

Machine stoppages which last too long and are too numerous result, thus giving rise to loss of production; besides this the bundle of fibres is faulty due to the presence of joins which cause irregularities in the quality of the thread as a final product.

According to a more improved technique. applied especially in the racks of drawing frames and lapping-machines, the bundles of fibres are supported, during their journey, by stationary boards; i.e. by fixed surfaces.

While some of the above-listed problems may be regarded as overcome, the substantial problem remains whereby the bundles of ribbon-like fibres, along the said boards, which lead to the machine, undergo various stresses as a result of friction and, therefore, undergo appreciable distortions. In order to eliminate, or substantially reduce, the above-mentioned problems the present invention proposes an improved rack used in textile machines for supplying bundles of ribbon-like fibres, extracted from collection boxes, in which the said rack has at least one lifting and transfer track comprising endless flexible belts moved, one above the other, in the same direction and with the same value of motion and the said flexible belts are far enough apart to receive, with suitable compression, the bundle of ribbon-like fibres in order to convey it without any alteration to the rotating comb head or in any event to the entry of the work unit.

The present invention also proposes that the endless flexible belt track, for lifting and moving the bundle of ribbon-like fibres, has its bottom conveyor branch deformed in an essentially concave shape, due to the effect of the compression action of the bundle of fibres, which forces the section of flexible belt below onto a rigid fixed support below of an essentially concave shape in order sufficiently to envelop the bundle of fibres, guiding the latter in a perfect sideways position towards the entry to the rotating comb head. Furthermore, the endless flexible belts of the improved rack covered by the present invention have a roughness suited to the type of fibre being supplied and, moreover, the circumferential surface of the drive rollers, which operate the flexible belts, have sufficient roughness to prevent even the slightest slipping of the flexible belts as they are driven round.

With reference to the above, the attached drawings show a preferred embodiment, which is neither binding nor limiting as regards the reciprocal position of the components and as regards the consequent simplifications which could arise therefrom; the said embodiment shall be described below with reference to the following Figures:

- Fig. 1 is a schematic side overall view of a vertical drawing frame including a pre-drawing module with the supply of bundles of ribbon-like fibres extracted from collection boxes and where the said bundles of fibre, joined and pre-drawn, are conveyed in a lifting and transfer track to the comb head, by

means of several endless flexible belts appropriately positioned and moved, as is schematically illustrated in the Figure together with the collection box below;

- Figure 2 is a schematic side overall view of a vertical drawing frame including a self-regulator of the bundle of fibres joined with several bundles of fibres extracted from collection boxes and where the said bundle of fibres is conveyed in a lifting and transfer track to the comb head by means of several flexible endless belts advantageously positioned and moved, as is schematically illustrated in the Figure together with the collection box below;
- Fig. 3 is a cross-sectional schematic view along Line A-A of Figs. 1 and 2 of the flexible-belt lifting track with the bundle of fibres present and sufficiently compressed between the facing branches of the said flexible belts, and whose bottom conveyor branch is deformed in an essentially concave shape to guide the bundle of fibres in a perfect sideways position to the entry of the rotating comb head.

In the Figures the same elements, or elements which have the same or equivalent functions, bear the same reference numbers. In the Figures:
1 is the bundle of fibres positioned and sufficiently compressed between the branches of the flexible belts, to convey it and transfer it to rotating comb head 7 with the precise aim of not subjecting it to even the slightest lengthening, or to stress which causes distortions which affect the quality of the finished product; 2 is the collection box of the bundle of fibres below distributor plate 4; 3 is the bundle of fibres extracted from box 5 below and the said bundle of fibres 3, joined with the other bundles of fibres extracted from the other boxes, supplies the drawing frame; 6 is the top inclined flexible belt for vertically lifting the bundle of fibres 1, which must be conveyed from above to rotating comb head 7; 8 is the drive roller which entrains the flexible belt and the said roller 8 is operated by motor 20; 9 is the horizontal position top flexible belt; 10 is the creel, or top part of the rack for pulling up the ribbons by means of a series of unwinding pulleys and drive cylinders, which are driven by head 18; 12 is the bottom flexible belt with one section in vertical elevation and one section in a horizontal position. The passage from one position to another occurs by means of transmission rollers 15; 14 is a pre-drawing module which helps to make the bundles of fibres 3 joined together uniform and homogeneous; 16 is the self-regulator device usually present in first-passage drawing frames; 21 is the rigid fixed support below the flexible branch of the endless belt, and the said fixed support 21 has an essentially concave shape.

The operation of the device covered by the present invention, illustrated in the attached Figures, is easily understood.

The bundles of fibres 3 extracted from container boxes 5 are joined together to produce a uniform, homogeneous bundle of fibres with the fibres properly extended and essentially parallel.

Once joined together, the bundles of fibres 3 pass through pre-drawing module 14, or through self-regulator device 16, to be conveyed as a single bundle of fibres 1 to the entry of the drawing unit and rotating comb head 7. Entrainment of the bundle of fibres 1 should present no so-called "false drawing" to which bundles of fibres may be subjected. Incidentally, "false drawing" is that lengthening which materials that are easily deformed undergo, during their transfer onto textile machines, due to the effect of excessive tension or friction. The important arrangement of the present invention enables the bundle of fibres 1, once introduced between the facing branches of flexible belts 6, 12 and 9, to be accompanied, with sufficient pressure and perfectly guided sideways, to the vertical work unit without being subjected to lengthening distortion between the point of entry and the point of exit from the said flexible branches.

Clearly, variants, modifications and additions may be made by experts within the field to the constructional details without going beyond the general concept of the present invention.

Claims

1. An improved textile machinery rack for supplying bundles of ribbon-like fibres, extracted from collection boxes, characterised in that they have at least one lifting and transfer track comprising endless flexible belts, moved, one above the other, in the same direction and with the same value of motion and the said flexible belts are far enough apart to receive, with suitable compression, the bundle of ribbon-like fibres in order to convey it, without any alteration, to the rotating comb head or in any event to the entry of the work unit.

2. An improved textile machinery rack, according to Claim 1, characterised in that the endless flexible belt track, has its bottom conveyor branch deformed in an essentially concave shape, due to the effect of the compression action of the bundle of fibres, which forces the section of flexible belt below onto a rigid fixed support below of an essentially concave shape in order sufficiently to envelop the bundle of fibres, guiding the latter in a perfect sideways position towards the entry to the rotating comb

head.

3. An improved machine textile rack according to Claim 1, characterised in that the endless flexible belts, which convey and guide the bundle of ribbon-like fibres, have surfaces with a roughness suited to the type of fibres being supplied.

4. An improved machine textile rack, according to Claim 1, characterised in that the circumferential surface of the front rollers, which operates the individual flexible belt, is roughened.

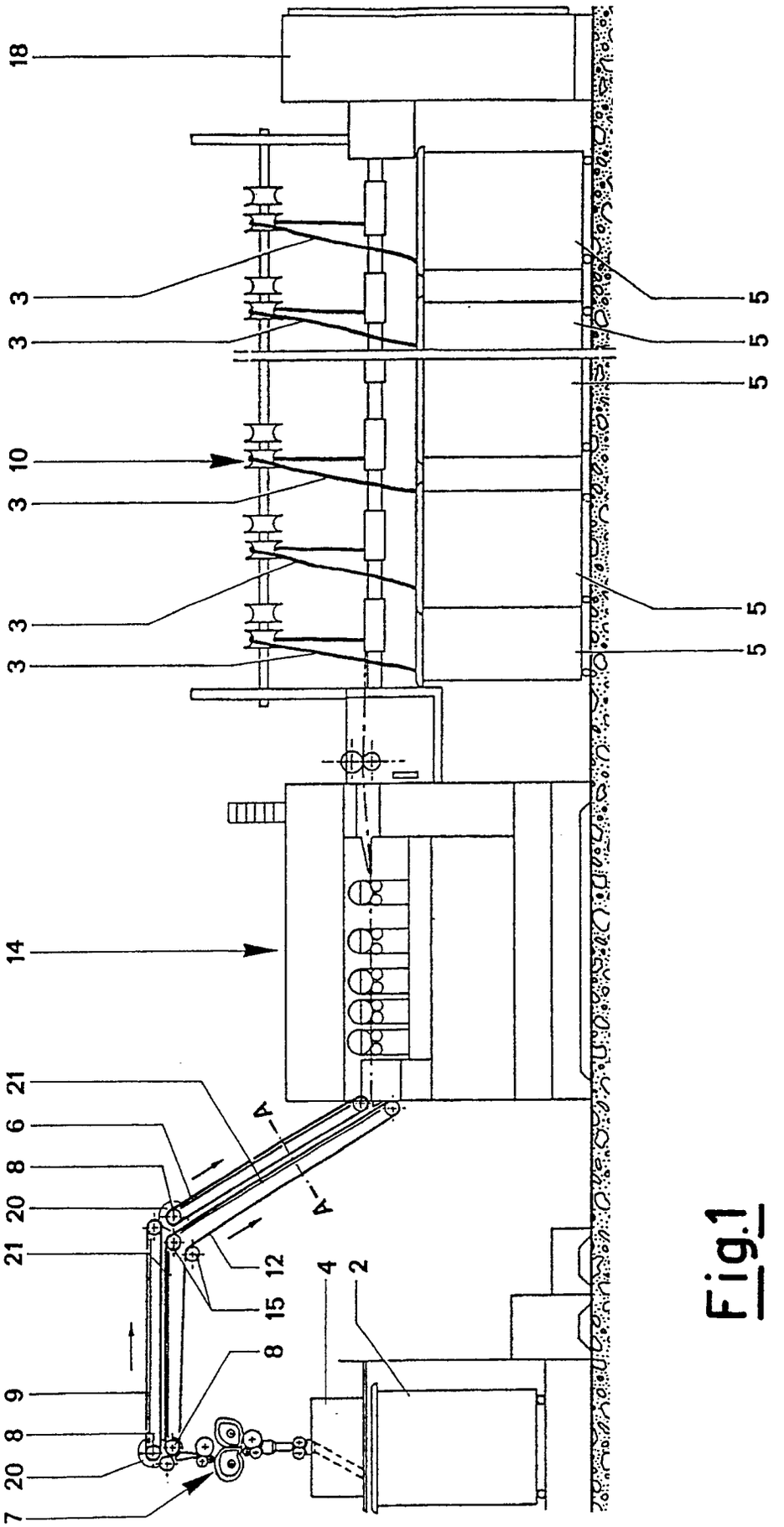

Fig.1

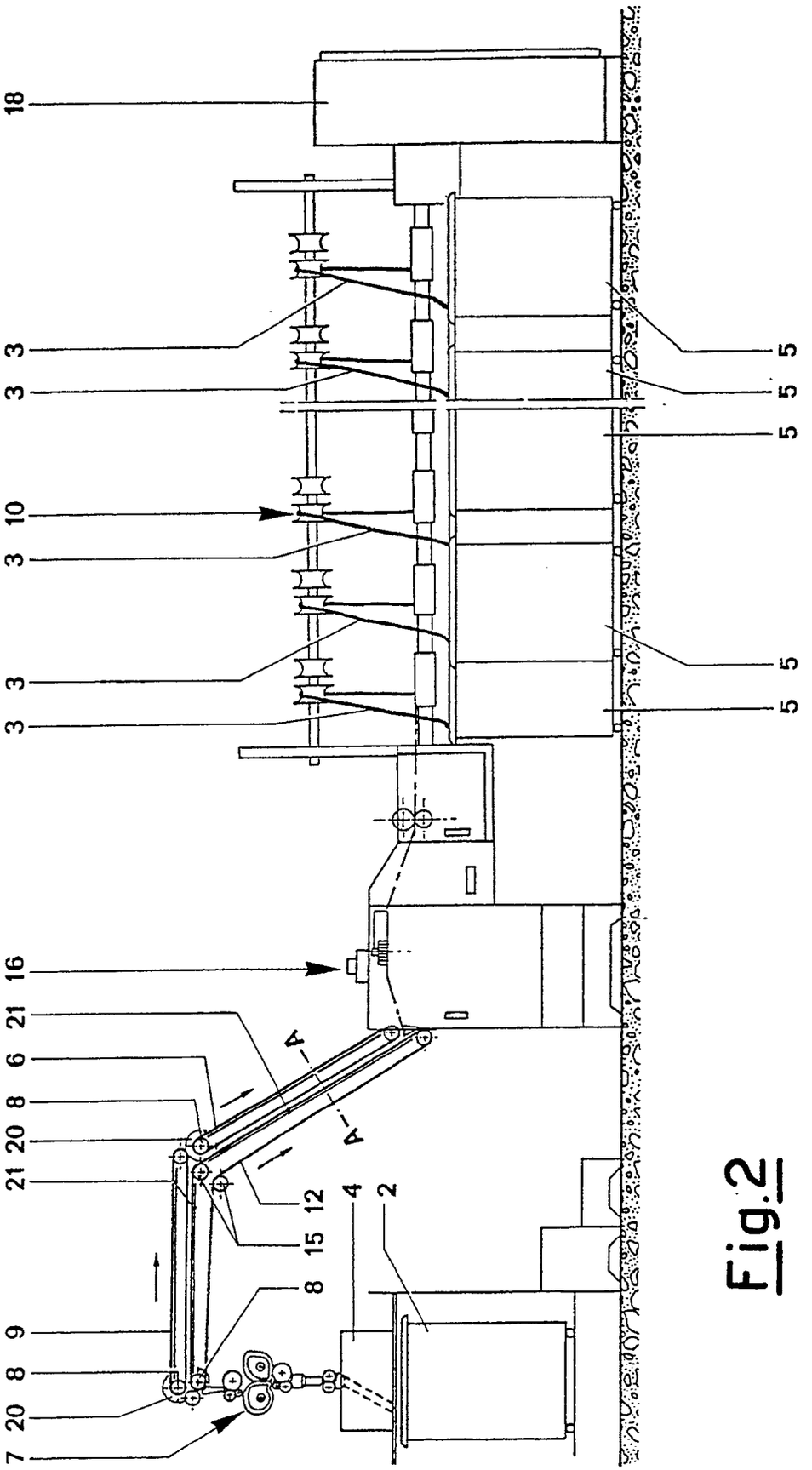

Fig.2

Fig.3