

[54] **APPARATUS FOR THE PROCESSING OF WOOL FIBRES**

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[57] **ABSTRACT**

Apparatus for the processing of textile fibers such as wool fibers to form a coherent and even layer of fibers at high velocity for further processing in which fibers are fed on a conveyor belt to a pinned cylinder, the pins of which have a negative inclination and which are forced by rotation of the cylinder into the layer of fibers picking it up from the conveyor and carrying it around. The fibers are then transferred to another pinned cylinder the pins of which also have a negative inclination and which rotates at a faster speed than the first pinned cylinder so that there is a drafting action between them, the fibers being completely stripped from the first pinned cylinder and transferred to the second either by means of a third pinned cylinder the pins of which pass between the pins of the other two or by means of a stripping plate partially encircling the first pinned cylinder to strip the fibers from its pins and lead then under a cover plate which partially surrounds the second pinned cylinder and which serves to hold the fibers while they are penetrated by the pins of the second cylinder. The fibers are finally stripped from the second pinned cylinder and passed to a second conveyor which conveys them for further processing. The negative inclination of the pins assists greatly in overcoming problems of stripping the fibers from the cylinders.

2 Claims, 2 Drawing Figures

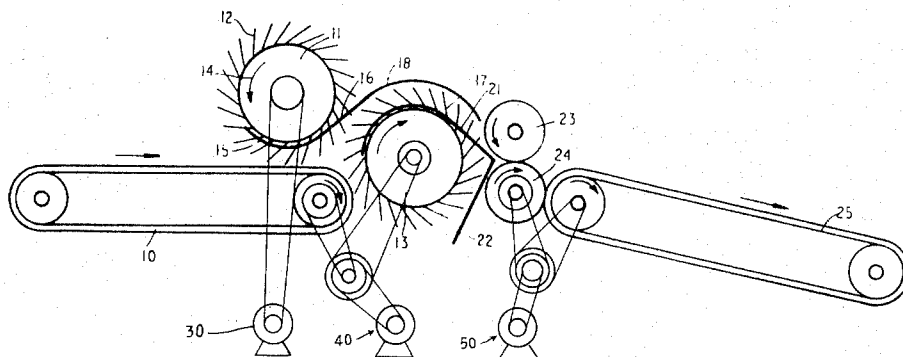
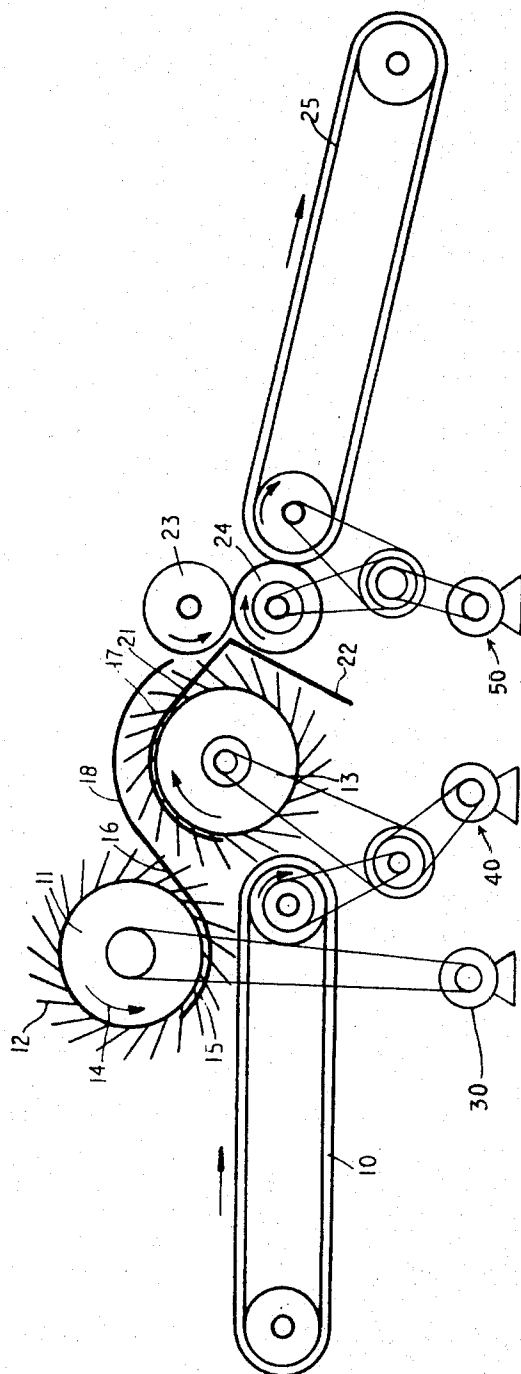
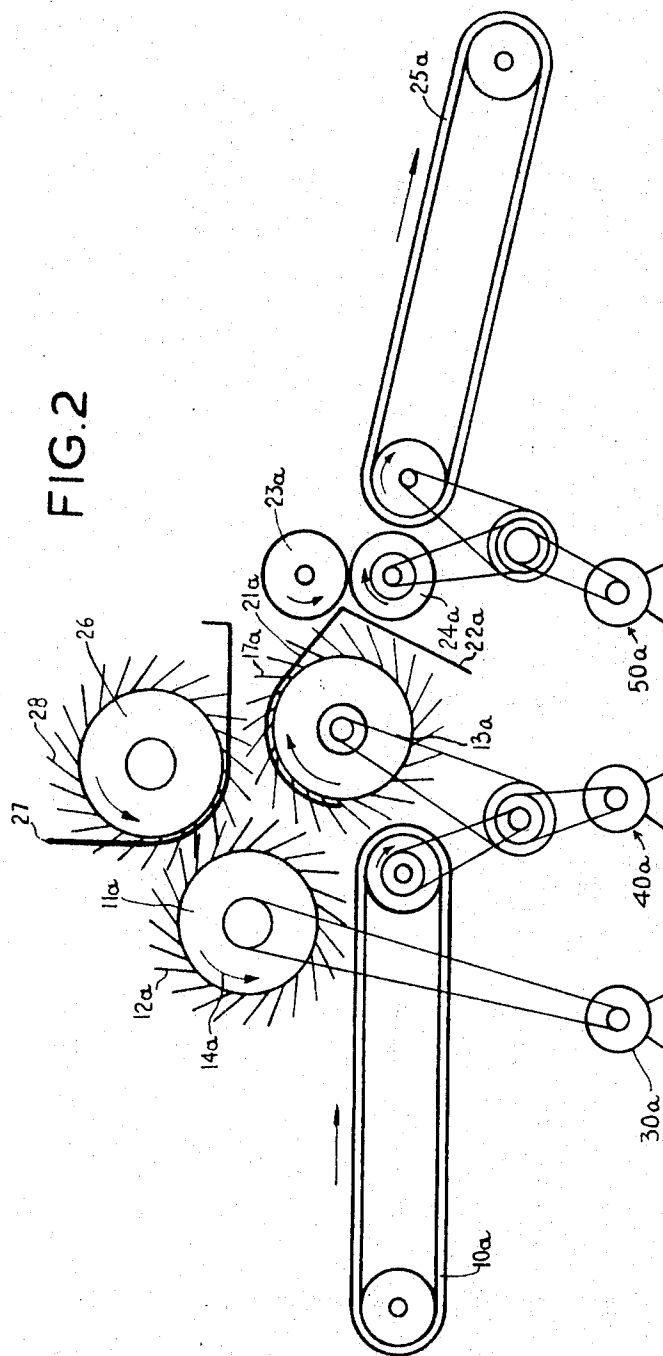


FIG. 1



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FIG. 2



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APPARATUS FOR THE PROCESSING OF WOOL FIBRES

The present invention relates to an apparatus for the processing of textile fibers such as wool fibers and more particularly, although not exclusively, to an apparatus which may be applied to form a coherent and even layer of greasy wool of aligned locks and fibers at high velocity for further processing.

At present greasy wool is fed into a scouring machine with relatively little fiber alignment. One object of the present invention is to provide an apparatus which, in a preferred form will align tufts and fibers of wool in the greasy state thus minimizing the felting process during the scouring operation and assisting subsequent processes which involve fiber alignment and straightening in the scoured state. It can also be adapted for aligning scoured wool and other textile fibers.

The invention consists in apparatus for the processing of wool fibers having feeding means to feed forward a layer of wool fibers to be processed, a cylinder mounted for rotation about its polar axis adjacent said feeding means, means to rotate the cylinder at a first speed, the cylinder having over the whole of its surface a plurality of circumferential rows of projecting pins, the pins being arranged to have a negative inclination, the cylinder being arranged so that on rotation the pins thereof enter the layer of wool fibers on the feeding means and carry the fibers around as the cylinder rotates, a second similar cylinder arranged adjacent the first, means to rotate said second cylinder at a speed greater than said first speed, means to strip wool fibers substantially completely from the pins of the first cylinder and force them onto the pins of the second cylinder against the negative inclination of those pins, the speed differential between the cylinders producing a drafting action on the fibers, means to strip processed fibers from the pins of the second cylinder and means to remove the processed fibers and convey them forward for the further processing.

The term "negative inclination" is used to mean an inclination in relation to the radial direction opposite to the direction of rotation of the cylinder. This arrangement is clearly shown in the accompanying drawings.

In order that the invention may be better understood and put into practice preferred forms thereof are hereinafter described, by way of example, with reference to the accompanying diagrammatic drawings in which:

FIG. 1 is a side view of an apparatus constituting one form of the invention, and

FIG. 2 is a similar view showing a second form of the invention.

The apparatus shown in FIG. 1 is intended for use in forming an even and coherent layer of greasy wool of aligned locks and fibers at high velocity for further processing. It consists of a feed belt 10 shown on the left and a rotating first pinned cylinder 11, the pins 12 of which are arranged with a negative inclination and which serve to pick up wool fibers fed forward on the feed belt 10 for subsequent transfer to a second pinned cylinder 13. The penetration of the wool fibers on the belt 10 by the pins 12 is impeded by the negative inclination of the latter but is aided by the fact that the fibers are supported by the belt. The cylinder 11 is rotated by an electric motor 30 or other conventional

means can be used; the other pinned cylinder rollers, feed belts and conveyors are similarly driven as shown in the drawings by the electric motor driven assemblies 40 and 50. The rotation of the cylinder 11 is at a predetermined substantially constant speed in the sense indicated by the arrow 14. As the cylinder rotates the pins pick up and carry round the wool fibers.

The fibers are stripped from the pins 12 by the slotted plate 15 which lies adjacent the surface of a sector of the cylinder 11 over a part of its length, rows of slots formed in it allowing the pins 12 to pass as the cylinder rotates. As can be seen in FIG. 1 the remainder of the plate 15 is led away from the surface of the cylinder 11 so that fibers carried by the pins are stripped off then as they pass through the slots. At the point 16 where the stripping action is taking place the pins 12 are more or less at a right angle to the slotted plate 15, the negative inclination of the pins greatly facilitating the stripping action.

The plate 15 is continued over the pins 17 of the cylinder 13 by a cover plate 18 which is entire and unslotted and which functions to force the wool fibers onto the pins 17 as the cylinder 13 rotates.

The cylinder 13 is rotated at a higher speed than the cylinder 11 so that there is a drafting action between them, so that, as the fibers are taken up on the pins 17, so they are drawn out and tend to be aligned. The negative inclination of these pins makes it more difficult for them to penetrate the layer of fibers but this difficulty is overcome by the presence of the cover plate 18.

The cylinder 13 is also partly surrounded by a stripping plate 21 constructed in a similar manner to the plate 15. It is provided with a skirt 22 to assist transfer of the wool fibers to the rotating rollers 23 and 24, as the fibers are stripped from the pins 17.

The rollers 23 and 24 are preferably rotated at a speed such that there is a further drafting action between them and the cylinder 13 to further thin out and align the fibers. The processed fibers are removed by the conveyor belt 25 and carried forward for further processing.

The apparatus shown in FIG. 2 functions generally in a manner similar to that shown in FIG. 1 and in fact utilizes a number of identical parts which are indicated by the same reference numbers as are used in connection with FIG. 1 with the suffix *a*. The difference between the two pieces of apparatus lies in the use of a pinned cylinder 26 constructed in the same manner as the other two cylinders and the use of the stripping plate 27 in place of the stripping plate 15 and cover plate 18. In this construction fibers are stripped from the pins 12a by the pins 28 of the cylinder 26 which move between the rows of pins 12a and 17a and it is these pins which act to force the fibers into the pins 17a of the cylinder 13a.

In practical embodiments of either form of apparatus the width of the cylinders can be, for example, 600 mm. and the axial spacing between adjacent circumferential rows of pins can be, for example, $7\frac{1}{4}$ mm. The linear speed of the belt 10 or 10a can be of the order of 8 m/min. and that of the belt 25 of 25a, of the order of 50 m/min. If the density of the layer of fibers on the belt 10 or 10a is 2,500qr/m², this will be reduced to about 400 qr/m² on the belt 25 or 25a.

It should be noted that in both forms of the invention the construction of the mechanism is such that it is not sensitive to wool grease, swint and dirt.

The sliver of wool produced by the apparatus shown in FIG. 1 or FIG. 2 can be fed into a suitable scourer where the alignment of the fibers is preserved and felting prevented.

After the scouring and drying is complete the wool can be treated again in a similar machine to form a layer of scoured wool consisting of disentangled fibers. This sliver is then ready for further processing in a gilling machine, thus the slow and expensive carding operation is omitted. Apart from reducing the cost of production and capital outlay, the main fiber length of the processed wool is increased because the fiber breakage is greatly reduced.

The output of a number of pieces of apparatus as shown in FIG. 1 or FIG. 2 may be combined and the fibers further treated in another apparatus of the same kind to align the fibers still further.

The embodiments of the invention described above are given by way of example only to assist in an understanding of the nature of the invention.

We claim:

1. Apparatus for processing textile fibers comprising feeding means to feed forward a layer of textile fibers to be processed, a first cylinder mounted for rotation about its polar axis and adjacent to said feeding means, means to rotate said first cylinder at a first speed, said first cylinder having over the whole of its surface a plurality of circumferential rows of outwardly projecting pins, said pins arranged at a negative inclination, said first cylinder arranged so that on rotation the pins thereof move in the direction of movement of said feeding means and enters the layer of textile fibers on said feeding means and carry the fibers around as said

first cylinder rotates, a second cylinder similar to and arranged adjacent said first cylinder, said second cylinder having over the whole of its surface a plurality of circumferential rows of outwardly projecting pins, said pins arranged at a negative inclination, means to rotate said second cylinder at a second speed greater than the first speed of said first cylinder, means to strip the wool fibers substantially completely from the pins of said first cylinder and to force them onto said pins of said second cylinder against the negative inclination of said pins on said second cylinder, said means consisting of a slotted stripping plate arranged in part in close proximity around a sector of the surface of said first cylinder and having slots through which the rows of said pins on said first cylinder pass as said first cylinder rotates. The remainder of said stripping plate extending away from the surface of said first cylinder so that the textile fibers are stripped from said pins of said first cylinder as it rotates and a cover plate extending around said pins of said second cylinder, said stripping plate and cover plate constructed and arranged so that fibers stripped from said pins of said first cylinder pass under said cover plate and are thereby forced into said pins of said second cylinder as it rotates, and the speed differential between said first and second cylinders producing a drafting action on the fibers, means to strip processed fibers from said pins of said second cylinder, and means to remove the processed fibers and convey them forward for further processing.

2. Apparatus as claimed in claim 1, wherein the means to remove the processed fibers consist in a pair of rotating rollers arranged to draw off fibers stripped from the second cylinder, the rollers being rotated at such a speed that a drafting action takes place and a conveyor belt onto which fibers drawn off by said rollers pass.

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