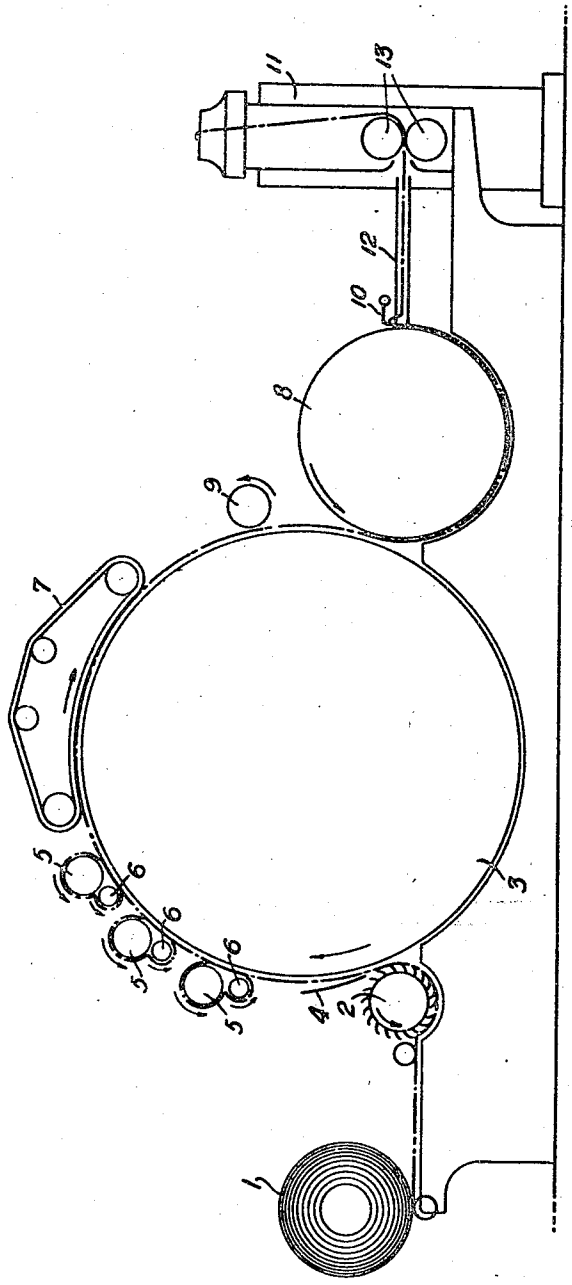
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CARDING MACHINE

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CARDING MACHINE

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This invention relates to new and useful improvements in or relating to carding machines.

In spinning so-called cottonized flax, viz. flax sub-divided into elementary fibres, one has not hitherto been able to work up flax fibres alone in a rational manner but has had to add other fibres, for instance cotton, staple fibres or wool, usually in an amount of 50% of the total quantity of fibre material. The cause for the difficulties arising in spinning cottonized flax alone is that the elementary fibres of the flax are smooth and have little or no curliness and therefore in the ordinary carding machines, whether it is a question of a flat card or a roller card, they cannot form a continuous web which can be taken off and collected into a coherent card sliver of uniform thickness. Further, it has been found that when carding cottonized flax in the ordinary carding machines the fibres are damaged to a great extent.

One object of the invention is to provide a carding machine by which it is possible to produce a continuous web of undamaged elementary flax fibres alone which are prepared for instance from flax card waste, etc., unretted or retted fibres or tows of spin flax or oil flax, etc.

Another object of the invention is to provide a carding machine by which it is possible to produce a continuous fibre web of other cottonized bast fibres than flax, such as hemp, jute, ramie, etc.

A further object of the invention is to provide a carding machine by which it is possible to treat other fibre materials than the above mentioned cottonized bast fibres, for instance cotton or staple fibres, with advantage.

A still further object of the invention is to provide a carding machine in which the card waste quantity can be varied and controlled wholly as desired.

Another object of the invention is to provide a carding machine in which the unproductive stripping of the carding means is reduced to a minimum.

Other objects and advantages of the invention will be clear from the following description of an embodiment of the invention diagrammatically shown in the accompanying drawing by way of example.

In the drawing the path of the material is shown by a dot and dash line and the movement directions of the different carding means are pointed out by arrows.

In the carding machine shown in the drawing the cottonized flax is supplied in the form of a lap roll 1 similarly as in the usual cotton card. However, the material can of course be supplied also in any other form. The lap is fed in a known manner to an ordinary licker-in 2 which carries out a first loosening of the lap and

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delivers it to the main cylinder 3. Similarly as in the well-known carding machines one can use more than one licker-in, of which lickers-in the last one in the direction of the material flow presents the fibres to the main cylinder. In order to obtain a satisfactory result it is of primary importance that during the passage through the carding machine the fibres are not pressed deep into the different card clothings but lie wholly superficially on them. For the purpose that the fibres presented to the main cylinder 3 by the licker-in shall lie wholly superficially on the main cylinder covering, a lifting plate 4 is provided which is like the make-up pieces employed in the ordinary cotton cards, but which acts in another manner as will be described in the following.

In contradistinction to what is the case with the make-up piece in the ordinary cotton carding machines, the lifting plate 4 should be adjusted so that the space between the forward edge (the edge adjacent the licker-in 2) of the lifting plate and the main cylinder is smaller than the space between the back edge of the lifting plate and the main cylinder. In other words, the lifting plate 4 is disposed in a rearwardly and outwardly inclined position relative to the surface of the main cylinder 3 covered thereby, the space defined therebetween flaring upwardly as shown somewhat exaggeratedly on the drawing. Owing to this rearwardly and outwardly flaring position of plate 4, the air following the main cylinder at its rotation into the space between the lifting plate and the cylinder will exercise a suction effect upon the fibres transferred to the covering of the main cylinder by the licker-in so that the fibres will certainly stay at or be lifted out to the surface of the main cylinder clothing.

After having passed the lifting plate 4 the fibres are carried by the cylinder 3 to one or more rollers 5 and clearers 6 arranged in pairs and being of the same general type as is used in the ordinary roller cards. In the embodiment shown in the drawing three pairs of rollers and clearers are used which act in exactly the same manner as in the ordinary roller cards.

After the treatment by means of the rollers 5 and clearers 6 the fibres on the main cylinder are subjected to a carding by a flat carding means. This means may preferably consist of carding or flat bars connected to form an endless chain 7 which revolves slowly and is of the same type as is used in the ordinary cotton carding machines although the chain should here act only over a relatively small part of the periphery of the main cylinder, for instance over 50°.

When carded by the flat carding means the fibres are pressed somewhat deeper into the covering of the main cylinder 3 and in order to be

able to take off at least the very greatest part of the fibres with certainty from the main cylinder by means of an ordinary doffer 8 the fibres are lifted outwardly on the covering of the main cylinder by means of a fancy roller 9 of known type before the arrival at the doffer. It is of great importance for obtaining the desired carding result that substantially all the fibres on the main cylinder are removed by the doffer 8 so that they do not follow the main cylinder around to the licker-in 2. Fibres thus circulated would be pressed deeply into the clothing of the main cylinder and this must be avoided as previously mentioned.

From the doffer 8 the fibres are taken off by means of a doffer comb 10 in the shape of a continuous fibre web. In the embodiment shown in the drawing the said fibre web is directly collected into a card sliver which is stored in a can 11 in the usual way. In carding cottonized flax the fibre web taken off from the doffer 8 has a very low strength and must be supported by a plate 12 which has upwardly projecting side walls converging in the direction of the material flow and which therefore collects the fibre web into a card sliver which is pressed between a pair of calender rollers 13 in the usual manner before it is stored in the can 11.

In the carding machine according to the invention, as is also the case in the usual carding machines, it is possible to vary the quantity of waste within certain limits through a suitable selection of the peripheral speeds, the card clothings, the relative distances between the carding means, etc., but in the carding machine according to the invention it is possible to control the waste quanttiy wholly at will by adjusting also the lifting plate in a suitable manner. While in the ordinary carding machines the carding means are continuously filled with waste so that the weight per unit of length of the card sliver produced is continuously altered to the detriment of the uniformity of the card sliver number and consequently of the yarn, the unproductive stripping of the carding means can be reduced to a minimum through the above mentioned possibility of control in the carding machine according to the invention.

The reason why a continuous web of cottonized flax can be obtained by means of a carding machine constructed in accordance with the invention has not yet been wholly investigated but the combined use of both the roller cards 5, 6 and the flat carding means 7 together with the rearwardly and outwardly flaring plate 4 has been found essential, this combination making possible such an adjustment of the carding machine that the fibres will not be pressed deep into the card clothings but will be superficially on them. The fancy 9 is also of great importance for ensuring a superficial disposition of the fibres on the clothing of the main cylinder 3 at the time of removal therefrom by the doffer 8, as otherwise the fibres would not be taken off completely from the main cylinder but would accumulate thereon and clog the clothing thereof. Instead of the fancy, one can use any other device which lifts the fibres outwardly on the covering of the main cylinder, for instance, a conventional suction device. Whatever the reason for the good result obtainable with a carding machine according to the invention may be, it has, however, been clearly shown by experiments that it is impossible to obtain a continuous web of cottonized flax by

means of an ordinary roller card or flat card as in the firstmentioned machine type the rollers and clearers bring the fibres together into burls or knots and in the lastmentioned machine type the clothing of the main cylinder is practically immediately filled with short fibres so that the machine must be stopped and stripped. Further, as already mentioned, the fibres are damaged when treated in either roller cards or flat cards. Only by using the present combination is it possible to obtain a satisfactory result. If carding machines according to the invention are to be used for carding of only a single, always uniform fibre material or a few fibre materials each being uniform it is of course possible to make the lifting plate replaceable by other lifting plates fitted for other uniform fibre materials.

What I claim and desire to secure by Letters Patent is:

1. A carding machine comprising in combination, a rotary main cylinder bearing card clothing, a licker-in for delivering a lap of fibres to be carded to the card clothing of said main cylinder, means comprising a plate following on said licker-in and covering part of the periphery of said main cylinder and flaring rearwardly and outwardly in relation thereto for sucking the fibres delivered to the card clothing of said main cylinder outwardly, carding means coacting with said main cylinder and comprising a series of roller cards following on said plate, and flat carding means following on said series of roller cards, means following on said flat carding means and coacting with said main cylinder for lifting the carded fibres thereon outwardly, and a doffer following on said lifting means and coacting with said main cylinder for taking off the carded fibres therefrom.

2. A carding machine comprising in combination, a rotary main cylinder bearing card clothing, licker-in means for delivering a lap of fibres to be carded to the card clothing of said main cylinder, means comprising a plate following on said licker-in means and covering part of the periphery of said main cylinder and flaring rearwardly and outwardly in relation thereto for sucking the fibres delivered to the card clothing of said main cylinder outwardly, card means coacting with said main cylinder and comprising a series of roller cards following on said plate and each comprising a carding roller and a clearer in front thereof, and flat carding means following on said series of roller cards, a fancy roller following on said flat card means and coacting with said main cylinder for lifting the carded fibres thereon outwardly, and a doffer following on said fancy roller and coacting with said main cylinder for taking off the carded fibres therefrom.

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