

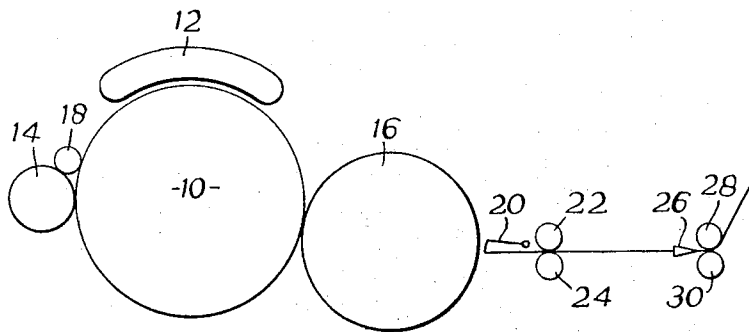
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CARDING MACHINES

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CARDING MACHINES

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1 Claim. (Cl. 19—98)

This invention relates to textile carding machines and to a method of operating such machines. More particularly, but not exclusively, the invention is applicable to cotton type carding machines, that is to say, a machine having a single card clothed cylinder over which the material is passed, there being slow moving card clothed flats or rollers or even stationary plates cooperating with the cylinder to perform the carding action.

The cotton type carding machines in general use are capable of producing only a limited quantity of carded web per hour. Of course, this quantity can be varied within limits according to the quality of the cotton or synthetic fibres being carded, and the standard required of the finished sliver delivered from the machine. Thus, for example, whilst a rate of production of 5 pounds (weight) per hour would be quite normal for a good quality finished product, it is possible to achieve up to 20 pounds per hour production, if a substantial deterioration in quality is acceptable.

On the other hand, it is known that some increases in the speed of the machine does produce an increase in the strength of the yarn manufactured from the carded material, and it is realised that an increased production (though possibly accompanied by a decreased quality of product) could be achieved by running the doffer at much higher speeds than normal, provided that some means could be devised for controlling the web issuing from the doffer. However, this has not been done, because of the great difficulties in controlling the web between the doffer and the calender rollers. The web tends to sag after it has left the doffer and at high speeds the weight of web hanging between the doffer and the calender rollers would cause the web to collapse.

The present invention provides a means whereby a carding machine can be operated to give a high rate of output.

According to this invention a method of carding textile fibres comprises passing the fibrous material through a carding machine, the cylinder and doffer of which are driven at high surface speed (as hereinafter defined), passing the thin web of carded fibres leaving the doffer through the nip of a pair of ironing rollers, and subjecting the uncondensed web to a drafting action.

The normal speed of the cylinder in a conventional carding machine is around 165 to 185 revolutions per minute, assuming the usual cylinder diameter of approximately 50 inches. The normal speed of the doffer in such a conventional carding machine is within the range of 7 to 16 revolutions per minute, assuming the usual doffer diameter of approximately 27 inches. Reference may be made to the publication "The Cotton Spinners Pocket Book," Fourth Edition, by James F. Innes, published in 1947 by Sir Isaac Pitman and Sons, Ltd., London, England.

Reference has been made above to a "high speed." It has been found that it is possible to operate the machine to give an output between 3 and 7 times the normal output by using the method of controlling the web leaving the doffer in accordance with the invention. Thus, whilst it is a well known workshop practice to increase or decrease the doffer speed for different fibres or different

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qualities and counts of finished sliver, such variations in speed have been variations only in degree (e.g. 10 percent faster or 5 percent slower); but the "high speeds" referred to herein are of a different order (e.g. 3 times as fast as normal). By "high speeds," therefore, is meant a speed which is above the ordinary range of workshop variations. As a rough guide, it may be said that the cylinder speeds are almost double or more than double the speeds which would otherwise be employed for any particular fibre.

The ironing rollers employed must operate on the full width of the carded web, and they may be of any known construction, but it is preferred that they should be hard, smooth surfaced rollers. In order to produce the drafting effect between the ironing rollers and the calender rollers, the latter must be rotated at a higher surface speed than the ironing rollers, and whilst the degree of drafting can be varied somewhat, a draft of 10 percent has been found satisfactory, but a draft of 30 percent is to be preferred. It must be emphasised that the combination of the ironing roller treatment and the drafting action is essential to provide the control required for the web coming off the doffer. It is preferred to apply such pressure to the ironing rollers as will produce an ironing or smoothing effect on the individual fibres as this improves the appearance of the finished yarns.

One practical application of the invention will now be described by way of example only, with reference to the accompanying drawing which is a diagrammatic representation of a cotton type carding machine. For this application, the machine used is an ordinary revolving flat cotton type carding machine having the usual cylinder 10, flats 12, takerin roller 14, and doffer 16. All of these are card clothed, and it may be mentioned here, that it is preferred to use metallic wire or saw tooth card clothing on the cylinder and/or doffer. It is also convenient to use a worker roller 18 in the arc between the cylinder and the takerin roller. The cylinder 10 is 50 inches diameter and the doffer 16 is 27 inches diameter.

A high speed fly comb 20 is provided for removing the carded web from the doffer, but it will be understood that any method of stripping the doffer could be employed. Immediately to the rear of the doffer (considering the direction of movement of the material through the machine) there are a pair of smooth surfaced rollers 22 and 24 adapted to press the web across its full width. These ironing rollers are geared to the machine drive (not shown) so that their speed of rotation is related to the doffer speed, and the gearing is preferably such that the surface speed of the pressure rollers is greater than that of the doffer. The usual condenser trumpet 26 and calender rollers 28 and 30 are provided, and it is essential that the gearing between the ironing rollers and the machine drive is such that the calender rollers rotate at a surface speed which is greater than that of the ironing rollers to produce the drafting effect, and in this particular example they are arranged to have a surface speed 30 percent greater than that of the ironing rollers.

As there may be a tendency for some impurities and/or fibres to stick to one or the other of the ironing rollers, means may be provided for keeping them clear. For example, scraper blades may be pressed into engagement with the surface of each roller, either by springs or by weighted levers or both. However, any other convenient means may be provided for this purpose.

The ironing rollers may be cylindrical, but it may be desirable to make them slightly barrel shaped to compensate for deflection when pressed tightly together and so ensure contact along the entire lengths of the rollers. Another way of ensuring even distribution of pressure is to arrange the rollers with their axes slightly inclined to

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one another or crossed that is, by swinging one roller about an axis which is radial to both rollers and passes through the mid point of both roller axes, such an arrangement being described in the specification of British Patent No. 697,106.

The cylinder is rotated at a speed of 320 revolutions per minute, and the doffer at a speed of 26 revolutions per minute. The speed of the flats and that of the takerin roller is not critical, but is preferably greater than usual. It will at once be appreciated that these high speeds of the cylinder and doffer rollers can be used to give a much greater output than conventional carding machines and carding processes. However, by providing the ironing roller and drafting treatment of the web, the latter does not collapse but can be condensed into sliver in the usual manner.

Despite the high rate of delivery of the web, it has been found that there is no reduction in the quality of the product. In fact, there is an unexpected improvement attributable to the combination of the cylinder speed and the smoothing and drafting effect.

If the high speed of the cylinder is combined with a conventional rate of output (i.e. by not utilising the maximum potential of increased production) it has been found

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that the improvement in the quality of the web produced by the card can be much enhanced.

I claim:

A method of carding textile fibres comprising passing the fibrous material through a carding machine, the cylinder and doffer of which are driven at high surface speeds which are respectively up to about twice and more and from 3 to 7 times the speeds normally employed for any particular fibre in known conventional carding machines, removing the material from the doffer as a thin carded web, passing the thin web of carded fibres leaving the doffer through the nip of a pair of ironing rollers and subjecting the uncondensed web leaving the ironing rollers to a drafting action sufficient to cause relative longitudinal fibre movement in the web.

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