A. VARGA

TEXTILE CARDING MACHINES

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This invention relates to the processing of cotton fibres and to cotton carding machines; the main components of which usually comprise a single card clothed cylinder co-operating with card clothed moving flats.

It was known practice several decades ago to subject cotton fibres to a double carding process by first passing the cotton through one card, producing a web, and then feeding this web to a second card. The web obtained from the second card was cleaner and contained less neps than a web treated only on a single card. Nevertheless, the process has been discontinued, presumably because the improvement in quality was not considered adequate to justify the extra expense.

According to this invention there is provided a method of processing cotton fibres consisting in submitting the fibres to a carding operation, transferring a thin uncondensed web of the carded fibres directly to a roller pressure applying stage, then transferring the web further in uncondensed form and submitting it to a second carding operation in a one continuous process.

The invention includes apparatus including in combination a carding machine, a pressure roller assembly, and a second carding machine in that order, driven rotary means for transferring a thin web of cotton fibres from said first carding machine to the nip of the pressure rollers, and further driven rotary means for transferring the said web from the said pressure rollers on to the cylinder of the second carding machine for a further carding operation.

Thus it will be appreciated, that the invention consists essentially in the introduction of a pair of pressure rollers between two cotton carding machines. The pressure rollers are preferably positioned immediately on the exit side of the doffer of the first carding machine, so that they act upon the full width of the uncondensed carded web. As the web is very thin, the rollers not only smooth out (i.e. iron) the individual fibres, but they also crush neps and any impurities.

According to a preferred feature of this invention at least the doffer of each carding machine is driven at a higher surface speed (as herein defined) than is usually employed.

In reference to a "high surface speed," it has been found that it is possible to operate the machines to give an output up to seven times the normal output by using the method of controlling the web leaving the first doffer in accordance with the invention. Thus, whilst it is a well known mill practice to increase or decrease the doffer speed for different fibres or different qualities and counts of finished sliver, such variations in high 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 mill variations. Cylinder speeds may be normal or almost double or more than double the speeds which would otherwise be employed for any particular fibre.
and 28 and the drive for all these rollers, may be mounted on a single frame 22 so that the whole be displaced as a unit from its operative position between the two carding machines 1, 2. The frame 22 may have sliding means 23 to be engaged by lifting tackle.

As there may be a tendency for some impurities and/or fibres to stick to one or the other of the pressure 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 pressure 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 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 U.S. Patent No. 2,762,295.

The web taken from doffer 16 to the pressure rollers 4, 5 by the use only of a stripper roller 17 (FIG. 2), or by the use of one or more transfer doffer rollers 18. Moreover, as shown in FIG. 2, the web passing from the nip of the pressure roller assembly 4, 5 can be stripped by stripper roller 19 (it may be taken therefrom by one or more transfer rollers) which in turn can be stripped by a take-in roller 21 from which the web will be stripped by the cylinder 14a of the second carding machine 2. Also as shown in this view the second doffer 16a may be stripped by stripper roller 17a and the web taken therefrom by roller 18a for the web to be passed on through a trumpet 8 and between calender rollers 9 and thence to the usual type of sliver collecting means. It will be observed in this arrangement the second pressure roller assembly is dispensed with although of course it could be used if desired.

It will be understood that when the web is taken from a roller such as 17 or 19 by a roller such as 18 or 20 so that the web extends over the arc between rollers, the supporting roller has a slightly faster surface speed to cause this and may have a slight drafting effect.

The carding machines may be driven at cylinder speeds from normal up to approximately 320 revolutions per minute with the doffers 16, 16a rotating at say 2600 revolutions per minute. The speeds of the doffers may be up to 5 or 6 times the ordinary doffer speed.

At these high speeds, both carding machines work the fibre stock at a much greater rate of feed than is usual. This is the result of the increased doffer speeds. Increased cylinder speeds enable the machines to perform the carding action more efficiently, because (a) the density of the fibres on the cylinder surface is reduced, and (b) the cylinder wires act more severely on the fringe of fibres caught by the flats and doffer. The effect of this greater carding efficiency will show itself in the quality of the sliver produced by the tandem machines, although there is an improvement even at normal cylinder speeds.

The pressure rollers 4, 5, 6 and 7 have a purifying action upon the web. This action is greatly improved when used in conjunction with the tandem carding, even if only one pressure roller assembly is provided between the tandem carding machines. Where two pressure roller assembly 6, 7 is also fitted after the second carding machine 2 the resultant improvement in the carded web 3 and sliver 10 produced from that web is even greater. It will be appreciated that impurities crushed in the first pair of pressure rollers 4, 5 are disintegrated by the second action of the second pressure roller assembly 6, 7. The second pair of pressure rollers 6, 7 then act upon a fibre web that approaches the ideal as regards fibre distribution, levelness and cleanliness. A few remaining impurities which might have escaped disintegration previously because they were cushioned in fibre agglomerations in the web at the end of the first machine are almost certain to be fully exposed to the crushing action of the second pressure rollers 6, 7. Moreover, the dis-integrated bits of the impurities produced on the second carding machine will probably be thrown under the cylinder and doffer and cleaned by the first cylinder and cylinder waste. This removal of impurities during carding means that less waste is produced in subsequent processes.

It is found that by using the present invention, the quality of the cotton sliver obtained from the second card is a great improvement on that obtained from a single card. In fact, the quality approximates to that of combed cotton as regards the absence of trash and/or neps. Moreover, the yarn spun from such a sliver is fuller and rounder than if the cotton had been combed and, of course, the loss of fibres in the second card is considerably less than would be extracted by combing the sliver that had been carded once only.

What is claimed is:

1. In a high speed high production cotton carding apparatus the combination comprising, a first cylinder and doffer of a doffer roller 18. Moreover, as shown in FIG. 2, the web passing from the nip of the pressure roller assembly 4, 5 can be stripped by stripper roller 19 (it may be taken therefrom by one or more transfer rollers) which in turn can be stripped by a take-in roller 21 from which the web will be stripped by the cylinder 14a of the second carding machine 2. Also as shown in this view the second doffer 16a may be stripped by stripper roller 17a and the web taken therefrom by roller 18a for the web to be passed on through a trumpet 8 and between calender rollers 9 and thence to the usual type of sliver collecting means. It will be observed in this arrangement the second pressure roller assembly is dispensed with although of course it could be used if desired.

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What is claimed is:
ond doffer and to receive the web from said second doffer, and a second pair of web ironing and impurity crushing rollers receiving the web in their nip in full width from said last-mentioned stripping roller.

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