

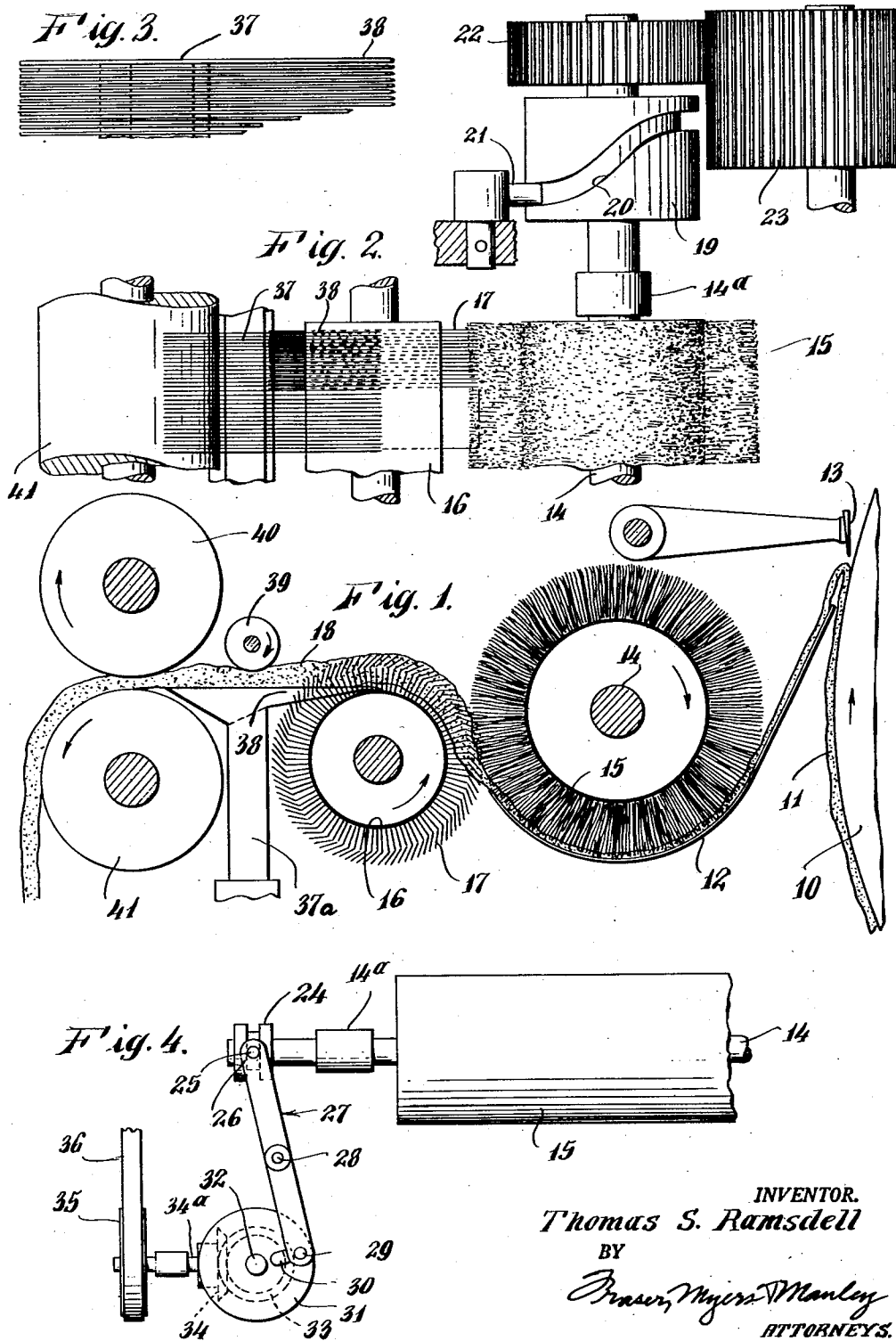
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METHOD AND MACHINE FOR FORMING HEAVY SLIVER LAPS

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METHOD AND MACHINE FOR FORMING
HEAVY SLIVER LAPS

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My present invention relates to a method of and a machine for forming an unusually heavy web or sliver lap on the front of a cotton or wool carding machine and constitutes an improvement upon the invention disclosed in my prior Patent No. 2,409,898, dated October 22, 1946.

According to the invention disclosed in my aforementioned patent I was enabled to produce at the front of a single cotton card, an unusually heavy sliver lap weighing up to 2,000 or more grains per running yard. Because of the method by which said sliver lap was made it was found to have a high tensile strength in its running or longitudinal direction but a comparatively low tensile strength in its transverse direction. The sliver lap thus produced was adapted for certain commercial applications wherein the relatively low tensile strength in a transverse direction was not objectionable. I have found, however, that if the tensile strength transversely of the lap could be substantially increased, the field of utility of the resulting sliver lap could be greatly multiplied.

My present invention accordingly relates to a method of and a machine for producing a heavy sliver lap having considerable tensile strength both longitudinally and transversely of the lap. This I accomplish by feeding an ordinary web taken from a card doffer to a condensing means moving at a slower rate than that at which the web is fed thereto, in a manner to insure a commingling, interlacing and intertwining of the normally substantially parallel fibers of the ordinary web as said web is transferred to the condensing means and builds up in thickness, and then stripping the resulting heavy sliver lap from the condensing means. If desired, after the condensed sliver lap is stripped from the condensing means it may be compacted by passing it through calender rolls.

The invention will be better understood from the detailed description which follows when considered in connection with the accompanying drawings, wherein:

Figure 1 diagrammatically shows the principal elements of a machine embodying my invention arranged at the front of a carding machine, a portion only of the card doffer of which is shown.

Fig. 2 is a fractional top plan view of the machine shown in Fig. 1, showing means for reciprocating the brush roll.

Fig. 3 is a top plan view of a comb-like member for stripping the condensed lap from the condensing means.

Fig. 4 is a side elevational view of a modified means for reciprocating the brush roll.

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Referring first to Figs. 1 to 3 of the drawings, the numeral 10 indicates a card doffer of a conventional cotton or wool carding machine upon which is shown a portion of a formed web 11. In front of the doffer 10, i. e., to the left of the card doffer, there is provided a supporting sheet or apron 12 which is adapted to receive the web 11 as it is stripped from the doffer by a comb 13, in a manner well known in the art. Fixedly mounted on a shaft 14, to rotate within the trough of the apron 12, is a roll 15 having a peripheral surface adapted to engage the surface of the web 11 for feeding said web over said apron and transferring said web to a condensing means 16. To accomplish this the roll 15 is preferably in the form of a brush, the bristles of which may be of fibre, pig hair, reed, plastic, fine wire or any other material which is capable of frictionally engaging the surface of the web 11 and moving it along as the roll is rotated.

The condensing means 16 which I prefer to use is in the form of a roll or drum, the peripheral surface of which is covered with a clothing having closely spaced circumferential rows of impaling pins 17 disposed in planes at right angles to the axis of the drum, the said pins 17 preferably having their outer portions extending non-radially to the rolls. As herein shown, the pins 17 are of the knee type but it will be appreciated that curved pins or straight pins extending non-radially from the surface of the roll may be used. The mounting and spacing of the rolls 15 and 16 are preferably such that the outer ends of the pins 17 are in interengaging or slightly overlapping tangential relation to the outer ends of the brush bristles so that, as the brush roll 15 is rotated, the outer ends of the bristles thereof will penetrate and pass through the outer ends of the pins on the condensing roll 16. The condensing roll 16 is mounted for rotation in a direction which is opposite to that of the brush roll 15 and at a peripheral speed which is much slower than that of the brush roll. It will thus be seen that as the web 11 is fed by the brush roll 15 to the condensing roll 16, said web will be progressively impaled on the pins 17 and will accumulate and build up in thickness to form a heavy sliver lap 18. The mechanism thus far described does not differ materially from that disclosed in my prior patent aforementioned, according to which the heavy sliver lap produced was found to have considerably greater tensile strength in its longitudinal or running direction than in its transverse direction.

According to my present invention the tensile strength of the produced heavy sliver lap 18

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is substantially increased in its transverse direction by causing a portion of the substantially parallelized fibers of the ordinary web 11 to be deposited onto the condensing roll at various angles transverse to said parallel direction. I propose to accomplish this by imparting to the brush roll 15 a movement transverse or reciprocatory with relation to the axis of said roll so that as the fibers of the web 11 are transferred to the condensing roll 16 a substantial portion of said fibers will have their parallel orientation altered by the reciprocatory movement of the brush roll. Various means may be employed for reciprocating the brush roll and, as shown in Fig. 2, the shaft 14 is rotatably and slidably mounted in bearings 14a, only one of which is shown, fixedly mounting on one end of the shaft 14 a barrel cam 19 having a cam track 20 therein within which extends a fixed, rigid follower 21 carried by a suitable part of the machine frame, and by also mounting on the shaft 14 a gear 22 which is in mesh with a suitable driving gear 23 having a face width sufficient to accommodate the axial movement of the gear 22 caused by the movement of the barrel cam 19. The extent of the axial movement of the brush roll 15 and the number of reciprocations of the shaft 14 per revolution of the cam will, of course, be limited by the size and shape of the barrel cam 19.

In Fig. 4 I have shown another type of means which may be employed to control both the axial movements of the brush roll and the number of reciprocations per revolution thereof. In said embodiment there is fixedly mounted on the brush roll shaft 14 a grooved roll 24 into the groove of which extends a pair of diametrically opposed pins 25 carried by a forked end 26 of an operating lever 27 which is pivoted intermediate its ends as at 28 to a rigid or fixed part of the machine. The lever 27 at its opposite end carries a stud 29 adjustably positionable in a slot 30 of a rotatable disc 31 mounted on a shaft 32 which also carries a mitre gear 33 which is in mesh with a mitre gear 34 mounted on a shaft 34a which is adapted to be driven by a pulley 35 through a belt 36. It will thus be apparent that by changing the position of the stud 29 in the slot 30, the cross-wise motion of roll 15 can be varied as desired, and by changing the size of the pulley 35 or its driving pulley (not shown) or by changing the R. P. M. of said pulley, that any desired number of reciprocations per revolution can be imparted to the roll 15.

The heavy sliver lap 18 which is formed on the condensing roll may be stripped therefrom by means such as disclosed in my prior patent, but I prefer to use an improved and simplified stripping means as shown in Figs. 1 to 3 of the drawings. The stripping means consists of a comb-like member 37 having fine teeth 38 extending between the parallel circumferential rows of impaling pins 17 substantially tangential to the surface of the condensing roll 16, said comb-like member 37 being rigidly supported and preferably integrally formed on a stand 37a, the teeth 38 being formed by milling out the upper head of the stand completely thereacross to prevent wedging or catching of the fibers of the stripped lap within the teeth of the comb. It will thus be seen that as the condensing roll 16 is rotated, the inner peripheral surface of the impaled built-up sliver lap 18 of interlaced fibers will be engaged by the teeth 38 of the comb-like member, which will remove or strip said sliver lap from the condensing roll.

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In passing over the comb-like member 37 the sliver lap may be compacted by being caused to move under a pressure roller 39 disposed above the stand 37a and may then be further compacted by being passed through a pair of calender rolls 40 and 41 and wound upon a suitable tube or cylinder (not shown).

No means have been shown for driving the various rolls at their intended speeds in the directions indicated by the arrows since it will be apparent that such driving means merely involves the application of well-known mechanical devices.

In the operation of my device the thin gossamer-like web 11 is removed from the card doffer 10 by the comb 13 in the usual manner and by means of the revolving brush 15 is drawn over the supporting sheet or apron 12 and fed to the condensing roll 16. As stated, the condensing roll 16 rotates much more slowly than the brush roll 15, with the result that the web 11 is impaled upon and forced in between the projecting pins 17 to provide a heavy sliver lap. Of course, while this impaling action is taking place, the brush roll 15 is being reciprocated so as to impart to the fibers of the web as they are being impaled on the pins 17, a transverse movement whereby said fibers will assume an interlaced, criss-cross and intertwined relation on the condensing roll. As the condensing roll 16 revolves slowly with the condensed sliver lap 18 thereon, said lap is engaged by the teeth 38 of the comb-like member 37 whereby said lap is stripped from the condensing roll, and upon passing over the teeth of the comb, the lap is compacted by the pressure roller 39, and thereafter by calender rolls 40 and 41. Of course, any other compacting means may be employed and after being compacted, the sliver lap may be wound into a roll in the conventional manner.

It will thus be seen that I have provided an exceedingly simple, practicable and efficient means for tremendously increasing the weight per running yard of a web taken from a card doffer and of providing a heavy sliver lap which is of substantially homogeneous form throughout and has considerable tensile strength both longitudinally and transversely of the lap.

While I have shown and described a preferred embodiment of my invention and the manner in which the same may be carried out, I do not wish to be limited to the specific constructional details disclosed since these may be varied within the range of engineering skill without departing from the spirit of my invention as defined in the appended claims.

What I claim is:

1. The method of forming a heavy sliver lap many times the thickness of an ordinary web and having considerable tensile strength both longitudinally and transversely of the lap, said method comprising feeding a web such as produced on a card doffer and having its fibers disposed in a substantially unidirectional relation to a condensing means moving in the same general direction as the unidirectional fibers of the web, but at a slower rate than that at which the web is fed thereto, while at the same time imparting a relative transverse movement between the web being fed and the condensing means so that a substantial portion of the fibers of said web will have their normally unidirectional relation rearranged to a substantially criss-cross relation as the web is deposited and build up in thickness on the condensing means, and then stripping the

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condensed built-up sliver lap of crisscrossed fibers from the condensing means.

2. In a machine for forming a heavy sliver lap many times the thickness of an ordinary web which comprises means for removing an ordinary web from a card doffer, means having a surface adapted to engage the surface of the web after its removal from the card doffer and for transferring said web to a condensing means, a condensing means covered with impaling pins moving in the same general direction as the web at a slower rate than that at which the web is transferred thereto, characterized in that it includes means for imparting to the web as it is being transferred to the condensing means a transverse movement whereby a substantial portion of the fibers thereof will be in crossed, interlaced relation as said fibres of the web are deposited on said condensing means, and means for stripping the condensed built-up lap of interlaced fibers from the condensing means.

3. A machine for forming a heavy sliver lap many times the thickness of an ordinary web which comprises means for removing an ordinary web from a card doffer, means having a surface adapted to engage the surface of the web after its removal from the card doffer and for transferring said web to a condensing means, a condensing means covered with impaling pins moving in the same general direction as the web at a slower rate than that at which the web is transferred thereto, means for reciprocating the transferring means transversely to the condensing means, so that the fibers of the web will accumulate, interlace and build up in thickness on said condensing means, and means for stripping the condensed built-up lap of interlaced fibers from the condensing means.

4. A machine according to claim 3 wherein

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transferring means is a rotatable brush adapted to reciprocate in an axial direction relatively to the condensing means and the condensing means is a rotatable roll disposed in parallel and substantially tangential relation to the rotatable brush.

5. A machine for forming a heavy sliver lap many times the thickness of an ordinary web which comprises means for removing an ordinary web from a card doffer, means having a surface adapted to engage the surface of the web after its removal from the card doffer and for transferring said web to a condensing means, a condensing means, covered with parallel rows of impaling pins, disposed and moving in the same general direction as the web at a slower rate than that at which the web is transferred thereto so that the web will accumulate and build up in thickness thereon, and a stationary comb-like means having teeth extending between the rows of impaling pins on the condensing means for stripping the condensed built-up sliver lap from the condensing means.

6. A machine according to claim 5 wherein the condensing means is a roll upon which the impaling pins are disposed in parallel planes at right angles to the axis of the roll and the teeth on the comb-like stripping means extend substantially tangential to the surface of the roll.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,409,898	Ramsdell	Oct. 22, 1946