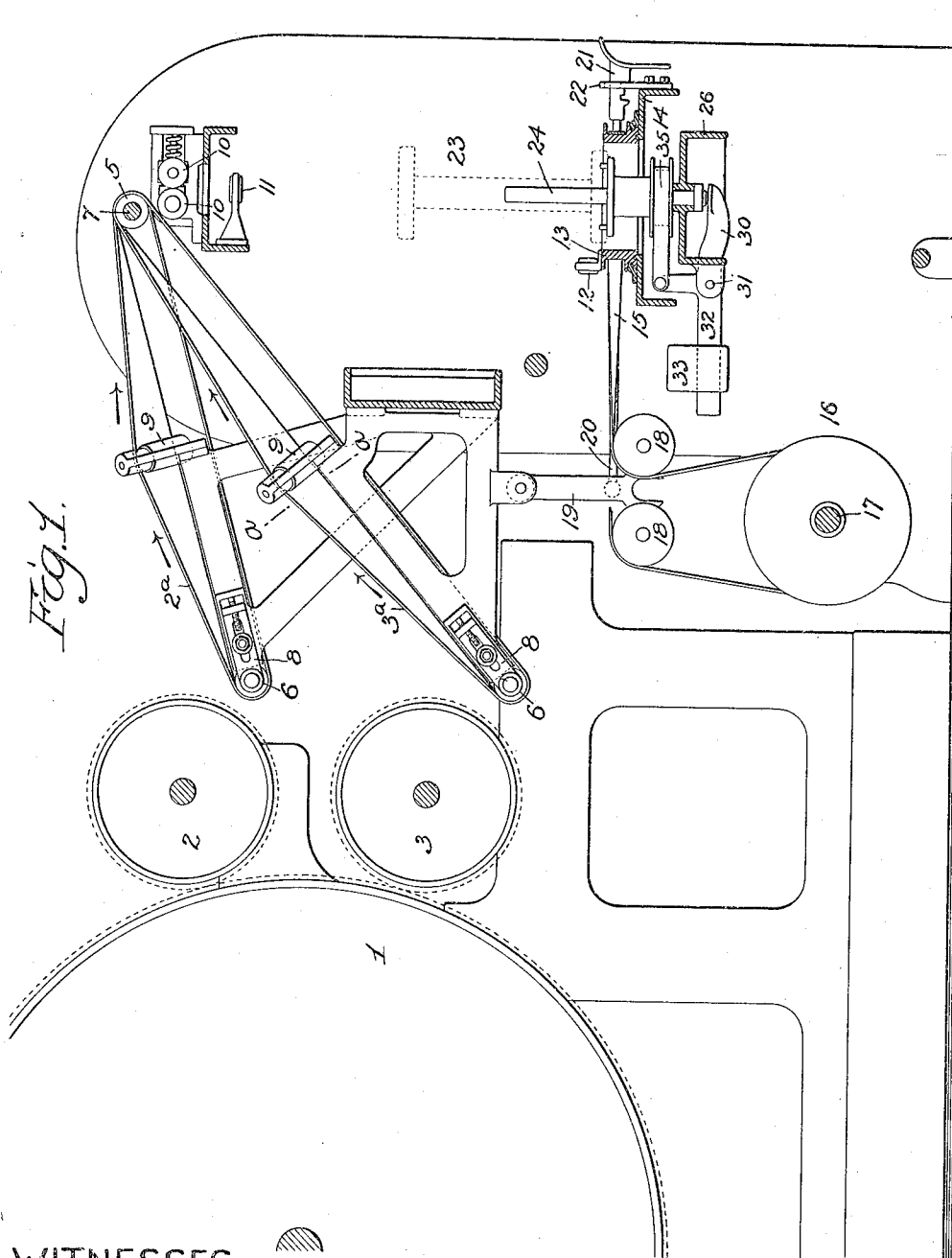


R. J. HILL & W. F. BOKUM.
 COMBINED CARDING AND TWISTING MACHINE.
 APPLICATION FILED JUNE 28, 1913.

1,127,994.

Patented Feb. 9, 1915.

3 SHEETS—SHEET 1.



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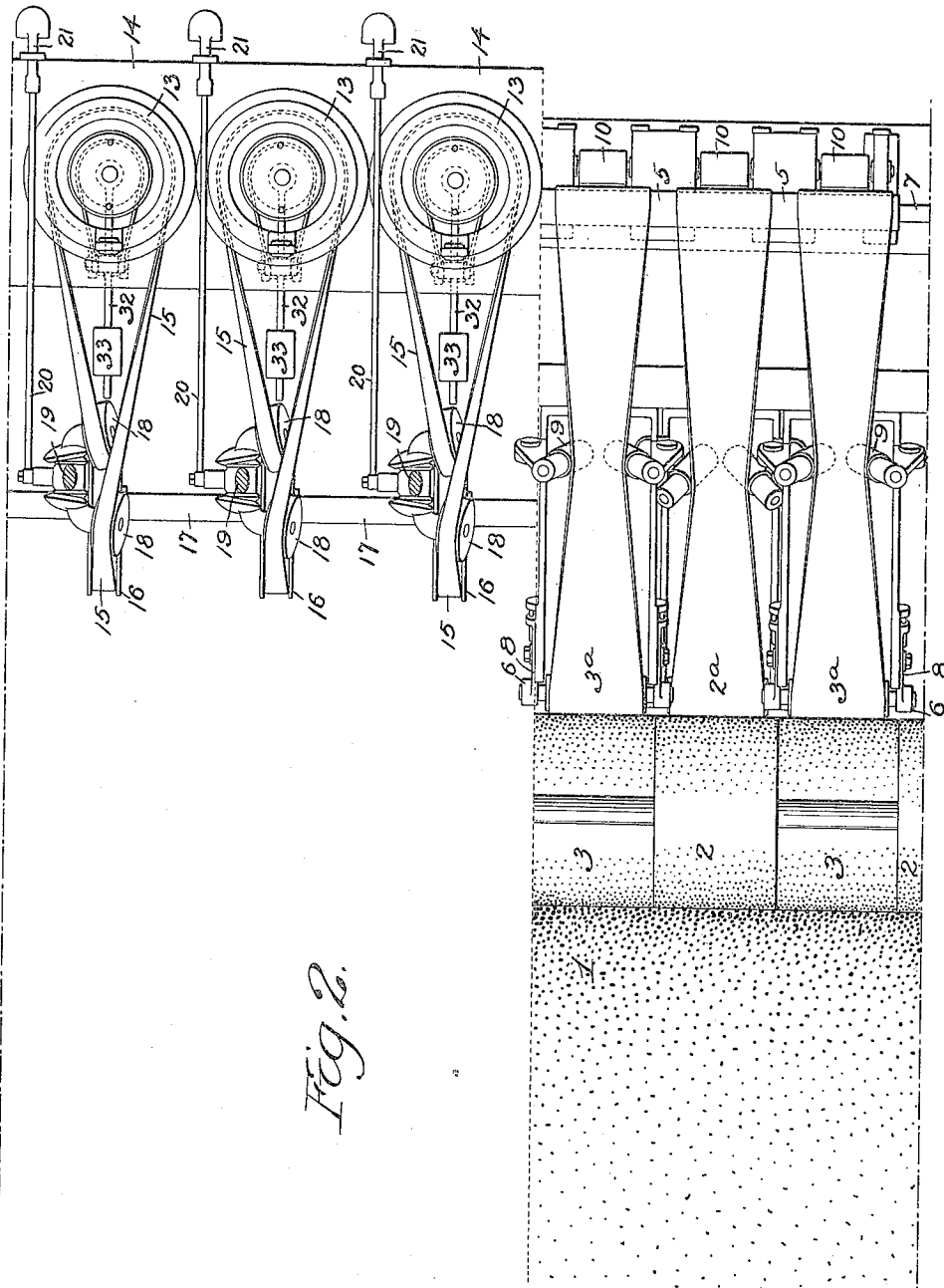


Fig. 2.

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3 SHEETS—SHEET 3.

Fig. 3.

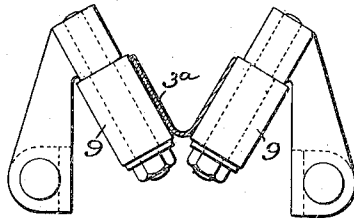


Fig. 4.

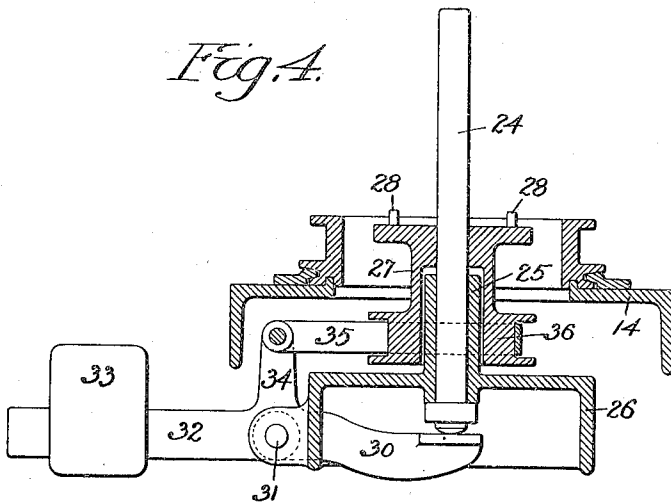
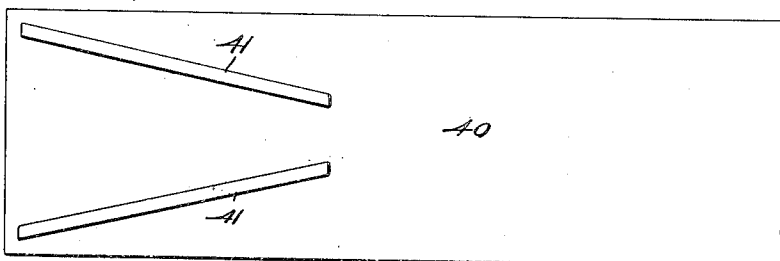


Fig. 5.



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COMBINED CARDING AND TWISTING MACHINE.

1,127,994.

Specification of Letters Patent.

Patented Feb. 9, 1915.

Application filed June 28, 1913. Serial No. 776,257.

To all whom it may concern:

Be it known that we, ROBERT J. HILL and WILLIAM F. BOKUM, both citizens of the United States, and residing, respectively, in Camden, New Jersey, and Philadelphia, Pennsylvania, have invented a Combined Carding and Twisting Machine, of which the following is a specification.

The object of our invention is to so combine a finisher carding machine and twisting mechanism that the fleeces will be delivered in the form of twisted rovings or slivers, wound upon spools, if desired, so that they can be at once conveyed to the spinning or other machine in which said rovings or slivers are to be further treated. This object we attain by combining with the doffers of the carding machine mechanism designed to condense the fleeces delivered by said doffers and feed them to twisting devices whereby they are converted into rovings or slivers having sufficient strength to permit of the winding of the same upon the spools.

In the accompanying drawings—Figure 1 is a side elevation, partly in section, of mechanism embodying our invention together with sufficient of a finisher carding machine to illustrate the application of the same thereto; Fig. 2 is a top view with some of the conveyor belts and feed rolls removed in order to show the twisting mechanism located below the same; Fig. 3 is a transverse section on the line *a-a*, Fig. 1, but on a larger scale; Fig. 4 is an enlarged longitudinal section of part of the twisting mechanism of the machine; Fig. 5 is a plan view illustrating a modification of one of the features of our invention, and Fig. 6 is a sectional view illustrating another modification.

Referring in the first instance to Figs. 1 and 2 of the drawing, 1 represents part of the main cylinder of a condenser carding machine, 2 a ring of the upper doffing cylinder, and 3—3 rings of the lower doffing cylinder, a ring of one doffing cylinder alternating with a ring of the other doffing cylinder, throughout the width of the machine, so that the fleece is removed from the main cylinder in relatively narrow strips doffed alternately by a ring of the lower and by a ring of the upper cylinder, being re-

moved from said rings by doffer combs or other mechanism available for the purpose.

Mounted upon rollers 5 and 6 adapted to appropriate bearings on the frame of the machine are a series of endless conveyers 2^a and 3^a alternating with one another throughout the width of the machine, the upper conveyers 2^a receiving the fleeces from the rings 2 of the upper doffer cylinder, and the conveyers 3^a receiving the fleeces from the rings 3 of the lower doffer cylinder. The lower ends of the conveyers 2^a and 3^a terminate, respectively, adjacent to the upper doffer cylinder 2 and lower doffer cylinder 3, but, by preference, their upper ends terminate at the same point and the rollers 5 carrying said upper ends of the conveyers are mounted upon the same shaft 7, to which rotating movement may be imparted by any suitable means so as to cause the conveyers to travel in the direction of the arrows, Fig. 1.

The rollers 6 at the lower ends of the conveyers are, by preference, mounted in adjustable bearings 8 so as to provide for imparting any desired degree of tension to the conveyers, and the upper run of each conveyor is deflected about midway of its length by means of inclined guide rollers 9 so that said upper run of the conveyor at that point assumes a V-shape, as shown in Fig. 3. The fleece which, when received by the upper run of the conveyor from the doffing cylinder ring, may extend from edge to edge of said conveyor is, therefore, gradually condensed or contracted in width as it approaches the V-shaped central portion of the conveyor, and it retains this condensed or contracted condition as the conveyor gradually flattens out again in its passage from the central portion to the top, hence each fleece, as it is delivered from the upper end of its respective conveyor, is so bunched or condensed as to possess the strength necessary to enable it to resist the strains to which it is subsequently subjected. From its conveyor the fleece passes between a pair of feed rolls 10, to which rotating motion may be imparted in any suitable manner, and thence through a fixed eye 11 below said rollers.

From the eye 11 the fleece passes to a guide eye 12 on a ring 13 rotatably mounted

on a fixed rail 14 of the frame and rotated by means of a belt 15 from a pulley 16 carried by a rotating shaft 17, the belt passing over idler pulleys 18 mounted in bearings on a swinging arm 19 which can be moved by means of a bar 20 so as to tighten or slacken the belt 15 and thus rotate the ring 13 or stop the rotation thereof, the arm 20 having a notched head 21 for engagement with a bar 22 on the rail 14 so as to retain said bar 20 either in the operative or inoperative position, as desired.

As the ring 13 is rotated, the mass of fleece passing between the feed rolls 10 and the eye 12 is twisted into a roving or sliver and passes from said eye 12 onto a spool 23 upon which it is wound. The spool 23 is carried by a spindle 24 which is free to slide as well as rotate in a bearing 25 on a rail 26 disposed below the rail 14, as shown in Fig. 4, and said spindle is provided with a hub 27 having projecting pins 28 or other means whereby it may engage the bottom of the spool so as to cause the hub 27 to rotate with said spool as the latter is rotated by reason of the pull of the twisted roving or sliver thereupon.

The lower end of the spindle 24 rests upon one arm 30 of a three-armed lever pivoted at 31 on the rail 26, another arm 32 of said lever carrying a counterbalance weight 33, and the third arm 34 of the lever being connected to a friction band 35 which bears upon a friction drum 36 on the hub 27, as shown in Fig. 4. When, therefore, the spool 23 is empty or has just begun to receive its load the weight 33 will preponderate and will cause the band 35 to be pressed against the drum 36 with force enough to frictionally retard the rotation of the hub 27 and spool 23, and thereby impart a certain amount of tension to the twisted roving or sliver, and thus cause the same to be wound firmly upon the spool at the beginning of the operation. As the wound mass accumulates upon the spool and necessitates the exertion of a greater amount of force in order to cause rotation of said spool by the pull of the yarn or sliver thereon the weight of the load overcomes the influence of the weight 33 and causes the slackening of the friction band 35 so as to lessen or remove the frictional hold of the same upon the drum 36, the result being that the twisted roving or sliver is wound firmly and smoothly upon the spool from the beginning to the end of the winding operation.

We have not considered it necessary to show any means for causing vertical reciprocation of the rail 26 in order to wind the roving or sliver from end to end of the spool, as devices of this class are well known and in common use, and many of them are capable of use in connection with the twisting device which we have shown and described.

Although we prefer, in all cases, to change the contour of the upper run of the conveyor apron in order to effect the bunching or condensing of the fleece at the central portion thereof, other means within the scope of our invention may be used for this purpose, if desired, for instance, in Fig. 5 we have illustrated an apron 40 which is flat throughout but has located above it a pair of converging bars 41 which engage the edges of the fleece and gradually contract the width of the passage through which said fleece must pass as it is carried forwardly by the conveyor.

It is not necessary that the means employed for condensing the strips of fleece should also act to convey the same, although such construction is preferred. In Fig. 6 we have shown a construction in which the strip of fleece passes through a tapering guide tube 37, which serves to condense the fleece as well as to direct the same toward the rolls 10. The twisting and winding mechanism may also differ in construction, arrangement and location from that shown and described in the drawings without departing from the essential features of our invention.

If the webs of fleece do not deliver freely from the teeth of the rings 2 and 3 of the doffer cylinder onto the belts 2^a and 3^a, doffer combs of the usual type may be used in order to facilitate such delivery.

We claim:

1. The combination of the doffer of a carding machine with a traveling conveyor for receiving the fleece from said doffer, and means whereby the web of fleece is laterally contracted without being rubbed as it is carried forwardly by the conveyor.

2. The combination of a carding machine having doffing mechanism constructed to deliver the fleece in relatively narrow bands or strips with a traveling conveyor for each of said strips, and means coöperating with said conveyor to cause it to laterally contract the web of fleece as it is carried forwardly.

3. The combination of a carding machine having upper and lower ring doffers with two sets of traveling conveyers, one set receiving the webs of fleece from one of the doffers and the other set from the other doffer, and means coöperating with said conveyers for effecting the lateral contraction of the webs of fleece as they are carried forwardly by the conveyers.

4. The combination of the upper and lower ring doffers of a carding machine with two sets of conveyor aprons whose upper ends terminate at the same point, the lower ends of one set of aprons terminating adjacent to the upper doffer and the lower ends of the other set of aprons terminating adjacent to the lower doffer.

5. The combination of the doffer of a

carding machine with a conveyer apron for receiving a web of fleece from said doffer, and means for deflecting the conveying run of said apron so as to direct the web of fleece toward the center of the same.

6. The combination of the doffer of a carding machine with a conveyer apron receiving a web of fleece from said doffer, and means for acting upon the conveyer run of said apron so as to first deflect upwardly the sides of said run and then permit it to assume its normal flat position whereby the web of fleece will be bunched or condensed at the center of the apron by the deflected portions of the same, and will retain this central position when the apron is again permitted to flatten out.

7. The combination of the doffer mechanism of a carding machine constructed to deliver a web of fleece in relatively narrow strips, means for condensing said strips, and means for twisting each of the same into a roving, said means including a guide eye and a rotating spindle.

8. The combination of the doffer mechanism of a carding machine, constructed to deliver a web of fleece in relatively narrow strips, means for condensing said strips, means for twisting each of the same into a roving, said means including a guide eye and a rotating spindle, and means for winding said rovings upon spools.

9. The combination of the doffer mechanism of a carding machine constructed to deliver a web of fleece in relatively narrow strips, a series of conveyer aprons, one for each of said strips, and mechanism for receiving the webs of fleece from said conveyers and twisting each of said webs into a roving, said means including a guide eye and a rotating spindle.

10. The combination of the doffer mechanism of a carding machine constructed to deliver a web of fleece in relatively narrow strips, a series of conveyer aprons, one for each of said strips, mechanism for receiving the webs of fleece from said conveyers and twisting each of said webs into a roving,

and means for winding said rovings upon spools.

11. The combination of the doffer mechanism of a carding machine constructed to deliver a web of fleece in relatively narrow strips, a conveyer apron for each of said strips, means for bunching or condensing each of said strips as it is carried forwardly by its conveyer apron, and means for receiving said condensed strips from the aprons and twisting each of them into a roving.

12. The combination of the doffer mechanism of a carding machine constructed to deliver a web of fleece in relatively narrow strips, a conveyer apron for each of said strips, means for bunching or condensing each of said strips as it is carried forwardly by its conveyer apron, means for receiving said condensed strips from the aprons and twisting each of them into a roving, and means for winding said rovings upon spools.

13. The combination of the doffer mechanism of a carding machine constructed to deliver a web of fleece in a series of relatively narrow strips, a conveyer apron for each of said strips, feed rolls to which the strips are delivered by said aprons, and mechanism for receiving the strips from said feed rolls and twisting them into rovings, said means including a guide eye and a rotating spindle.

14. The combination of the doffer mechanism of a carding machine constructed to deliver a web of fleece in a series of relatively narrow strips, conveyer aprons for each of said strips, feed rolls to which the strips are delivered by said aprons, mechanism for receiving the strips from said feed rolls and twisting them into rovings, and means for winding said rovings upon spools.

In testimony whereof, we have signed our names to this specification, in the presence of two subscribing witnesses.

ROBERT J. HILL.
WILLIAM F. BOKUM.

Witnesses:

KATE A. BEADLE,
HAMILTON D. TURNER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."