

(No Model.)

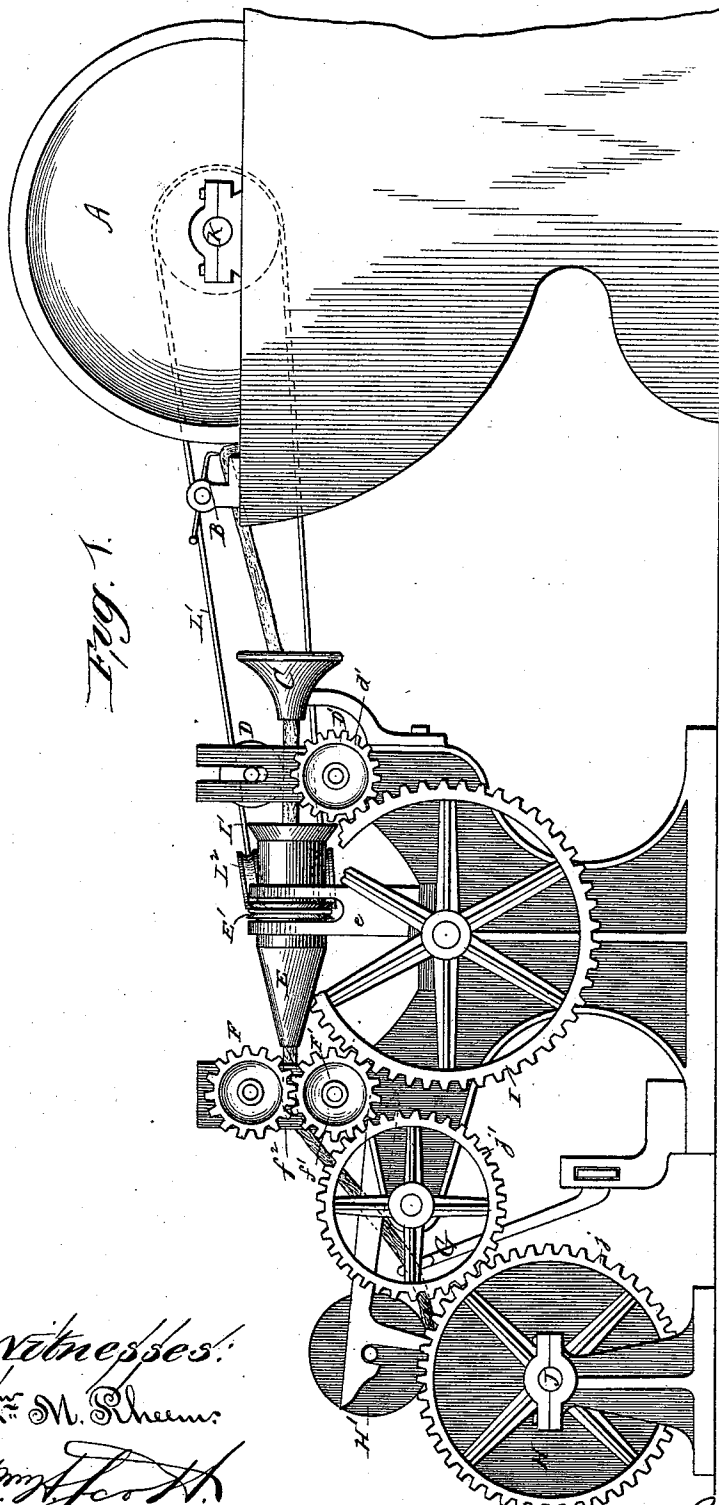
2 Sheets—Sheet 1.

J. HARLEY.

APPARATUS FOR MANUFACTURING WOOLEN YARNS.

No. 541,046.

Patented June 11, 1895.



Witnesses:
Wm. M. Rheem:
Wm. J. H.

Inventor:
James Harley.

BY Dayton, Pooler & Brown Attys.

(No Model.)

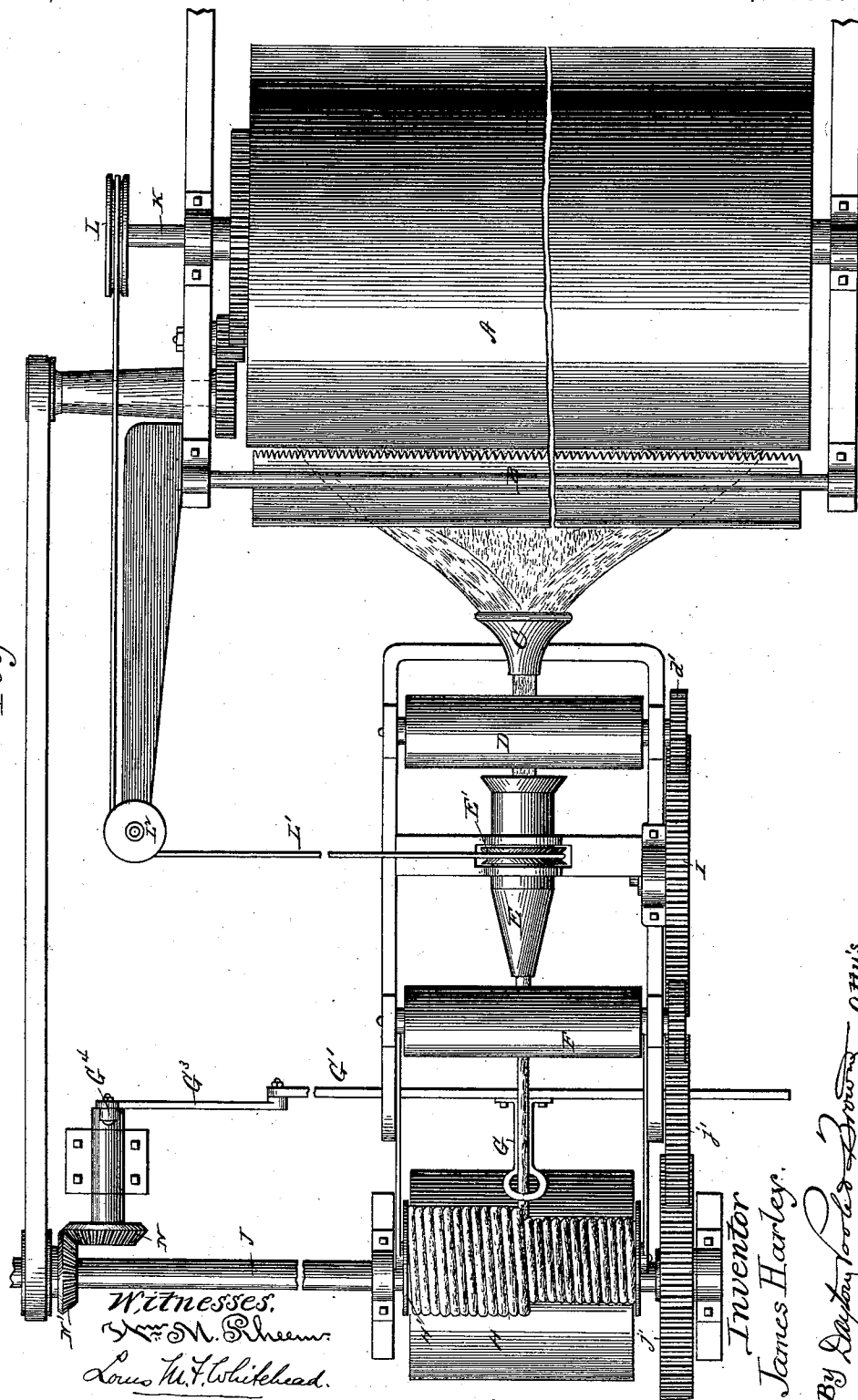
2 Sheets—Sheet 2.

J. HARLEY.

APPARATUS FOR MANUFACTURING WOOLEN YARNS.

No. 541,046.

Patented June 11, 1895.



UNITED STATES PATENT OFFICE.

JAMES HARLEY, OF BEAVER DAM, WISCONSIN, ASSIGNOR OF ONE-HALF TO
GEORGE B. CONGDON, OF SAME PLACE.

APPARATUS FOR MANUFACTURING WOOLEN YARNS.

SPECIFICATION forming part of Letters Patent No. 541,016, dated June 11, 1895.

Application filed October 21, 1891. Serial No. 409,443. (No model.)

To all whom it may concern:

Be it known that I, JAMES HARLEY, of Beaver Dam, in the county of Dodge and State of Wisconsin, have invented certain new and useful Improvements in Apparatus for Manufacturing Woollen Yarns; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to the drawing off attachments for the doffer cylinders of wool carding machines.

One of the objects of the invention is to provide means for so manipulating what is known in the art as short staple wool of any given grade in process of carding, by keeping the fibers of wool parallel to each other, as to insure a better spinning quality of roping whereby a much larger output of yarn per spindle is obtained and a material saving of stock and labor is effected.

Another object is to produce a higher grade of woollen yarn from any given grade of wool, and to produce from ordinary short staple wool a smooth round woollen yarn, with a strength, springiness and luster closely resembling worsted yarn or yarn made from combed wool; an effect not to be had by any other process of woollen carding.

Another object of the invention is to produce a simple and cheap attachment for wool carding machines, which will accomplish the above objects, be not liable to get out of repair, and which may be used in connection with any form of carding machine.

With these objects in view the invention consists in novel features of construction and operation, which will be fully described in the following specification and pointed out in the claim at the close thereof.

In the accompanying drawings, Figure 1 is a side elevation of part of a wool-carding machine embodying my improvements. Fig. 2 is a plan view of the same.

The improvements to be hereinafter described may be used in connection with any usual or preferred form of carding machine in which is included a doffer cylinder A, a comb B for doffing the wool from said cylinder,

a funnel C located somewhat in rear of comb B, to gather the sheet of wool as it comes from the comb and deliver it in a sliver or rope to the drawing rollers D and D'. The funnel C and drawing rollers are shown as located in a horizontal plane somewhat below the plane of the comb B; the funnel being arranged at right angles to the cylinder A, and the rollers with their axes parallel with each other and with the axis of said cylinder A.

At a distance beyond or in rear of the drawing rollers D D' is a vibrator G which distributes the rope or sliver upon the spool H'.

Between the pair of drawing rollers D D' and the vibrator another pair of rollers F F' are mounted, suitable standards ^f² being provided to support the shafts of said rollers. Between the pairs of rolls D D' and F F', a tube E is mounted, preferably as shown, to rotate in bearings carried by a standard ^e fixed to or forming part of the frame. This revoluble tube E is arranged at right angles to the longitudinal axes of the rolls, its front or feeding end being located quite close to the pair of rolls D D' while its rear or delivery end is located close to the rolls F F'. One purpose of this arrangement is to afford support to the rope or sliver throughout the entire distance, approximately between the two pairs of rolls and thereby avoid further attenuation of the thinner parts of said rope due to its tendency to sag, and also to provide a relatively narrow throat for the passage of the sliver on its way to the pair of rolls F F', whereby the sliver is somewhat condensed and the fibers rearranged longitudinally without twisting to insure evenness of the sliver, while maintaining the parallelism of the fibers thereof, thus preserving the luster of the sliver end of the resultant yarn, at the same time producing a more even and stronger sliver which is capable of more economical working, being less liable to break, the resultant yarn closely resembling worsted yarn inasmuch as it is strong, hard and lustrous.

The revoluble tube E is tapered interiorly from its front to its rear end to receive the rope or sliver as it leaves the rolls D D' and to deliver it to the rolls F F', in a rounded slightly compressed condition. To enable the delivery end of the tube to approach more

closely to the bite of the rolls F F', I taper the outside of the delivery end.

The shaft J of the spool drum H receives motion from the shaft K of the doffer cylinder A, and in the same direction, said two shafts being connected by any suitable means, such as a train of gears and the belt shown. The shaft J carries a gear wheel *j* from which motion is transmitted to the drawing roller F' of the second pair of rolls, through an idler *j'* journaled on a stub shaft, projecting from the frame, and a pinion *f'* secured to the shaft of said roller F'. A second idler I mounted on another stub shaft projecting from the frame, transmits motion from the roller F' to a pinion *d'* secured to the shaft of the roller D' of the first pair of rolls. The upper roll or rider of the first pair of rolls, is actuated only by friction with the roll D' or the rope passing between them. The drawing rolls F F' are geared so as to have a higher surface speed than that of the rolls D D'. The shaft J also carries a beveled gear N' meshing with a similar gear N, the shaft of which is journaled in a suitable standard conveniently located, and the other end of this shaft is provided with a crank arm G⁴, which is connected by a pitman G³ with a transversely arranged reciprocating bar G' mounted to slide in suitable guides, and carrying the vibrator G.

The tube or funnel E is provided with a pulley E' to receive a belt L' which runs over idlers L² mounted on brackets projecting from the frame and over a pulley L secured to the shaft K of the doffer cylinder A. Owing to this arrangement, all the moving parts described are driven from a shaft K of the doffer cylinder so that their various speeds may be timed with said cylinder, and any change in the speed of cylinder, will insure a corresponding change in the speed of said parts.

The wool is doffed from the cylinder by the comb B in the form of a broad web or sheet of wool of varying thickness, and is gathered into a rope by the funnel C for delivery to the rolls D D'. In the passage of this rope from the rolls D D' to the rolls F F' it is passed through the revoluble tube E which not only serves to sustain the weight of the rope and prevent sagging or uneven stretching, but which leaves the fibers of the wool parallel to each other without twisting the rope, and which slightly compresses the fibers into a round rope remarkable for its strength and freedom from inequalities, and in the fibers of which is preserved a luster closely imitating that of combed worsted rolls.

As the rope is held by two pairs of rolls D D' and the drawing rolls F F' during its passage through the tube E, the revolution of the latter does not have the effect of giving a twist to the rope, but leaves the fibers parallel as taken from the doffer. The rope is taken from the contracted delivering end of the revoluble tube E by the drawing rolls F F', which having a greater surface speed

than the rolls D D' exert a draft on the rope and maintain a tension thereon as it passes through the revoluble tube, thus assisting in the obtainment of greater evenness in the rope, and in the straightening out and the keeping the fibers of the wool parallel.

In the arrangement which I have described for imparting rotation to the pairs of rolls D D' and F F' the pairs of rolls F F' may be driven at any desired greater rate of speed than the pairs of rolls D D' by the employment of a pinion *f'* on the shaft of roll F' of less diameter than the pinion *d'* on the shaft of the roll D'. This draft may be increased within reasonable limits by increasing the speed of the pair of rolls F F' by the use of a changeable pinion, or it may be obtained by additional pair or pairs of rolls arranged in the rear of the pair of rolls F F' and geared together in like manner.

The rope passes from the rolls F F' through the vibrator G to the spool H' and the spools as they become filled are taken from the first breaker to the "second breaker" from which the wool is taken the same way and by the same devices as those hereinbefore described and from whence it is sent to the "finisher" as usual. By using the invention on the second breaker I am enabled to keep the fibers of the wool in the same straightened and parallel condition, which, as above stated, makes a superior rope.

Owing to the improvements hereinbefore described, I produce a rope of greater evenness and strength than by the old side drawing attachment now in general use, whereby I not only avoid liability of breakage and the consequent loss of time and waste of material in spinning, but am enabled to get an increased number of and better doublings.

Woolen yarn produced in accordance with this invention, aside from its evenness and freedom from knots and bunches, possesses a superior strength, fullness and luster, that materially enhances its commercial value. This result I have been unable to attain from the operation of carding machines in general use. I also find that the roping so made can be spun into finer yarn and possesses better spinning qualities whereby the product of the spinning machines is materially increased. I also find that in this system of straight doffing or keeping the fibers of the wool parallel to each other, any given grade of wool requires considerably less carding, and that therefore the carding machines may be run at less speed, thereby not only saving largely in wear and tear to the machines, but also so materially preventing waste as to reduce it to a minimum.

The machines in general use where the wool is drawn off from the end of doffer, kink the fibers and produce a dull, lusterless rope or sliver of such unevenness and little strength as to occasion great waste of material and a weak lusterless yarn. The side drawing tends to so roll and twist the wool

as it comes from the doffer that the fibers are not straightened out and are not parallel. It is therefore highly important to convey the sliver straight from the doffer in the manner described, as by so doing the parallelism of the fibers is established and maintained.

I claim as my invention—

The combination with the doffing cylinder of a wool carding machine, of a gathering funnel located at right angles to the axis of said cylinder, and centrally in rear of the latter, a pair of drawing rolls located in alignment with said funnel and adapted for drawing the sliver through the latter, a second pair of drawing rolls having surface speed greater

than the first pair and located in rear of said first pair, and a revolving tapered tube or funnel located in alignment with the funnel and extending from one to the other pair of drawing rolls, the longitudinal axes of said pairs of drawing rolls being parallel to each other and to the longitudinal axis of the doffer cylinder, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

JAMES HARLEY.

Witnesses:

FRANK F. CONGDON,
WARREN H. LEWIS.