(No Model.) 2 Sheets—Sheet 1.

S. D. LEARNED.

AUTOMATIC TOP ROLL CLEARER.

No. 329,320. Patented Oct. 27, 1885.

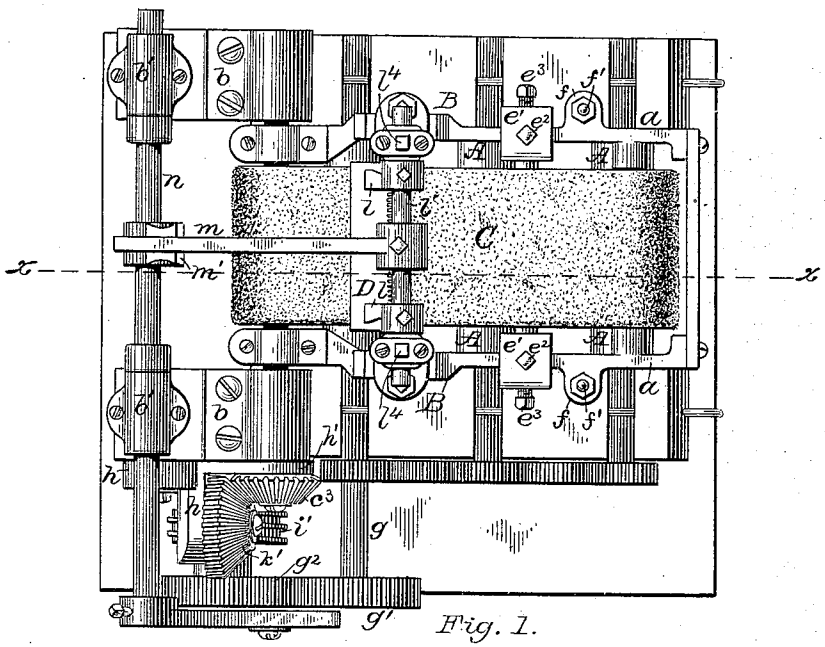


Fig. 1.

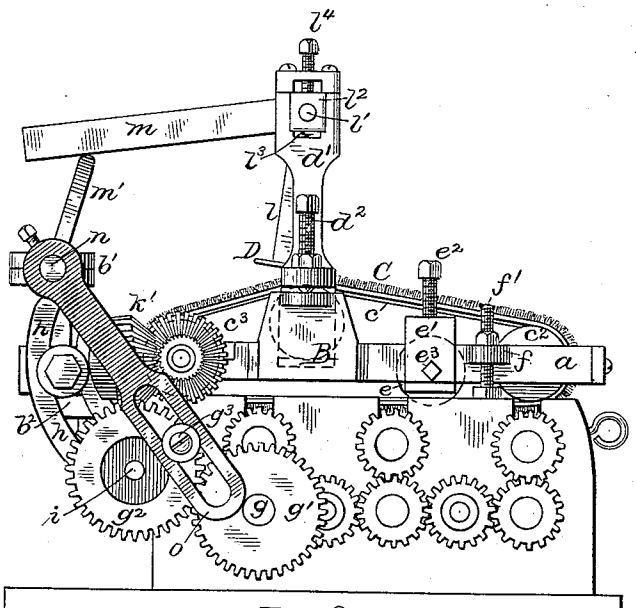


Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

S. D. LEARNED.

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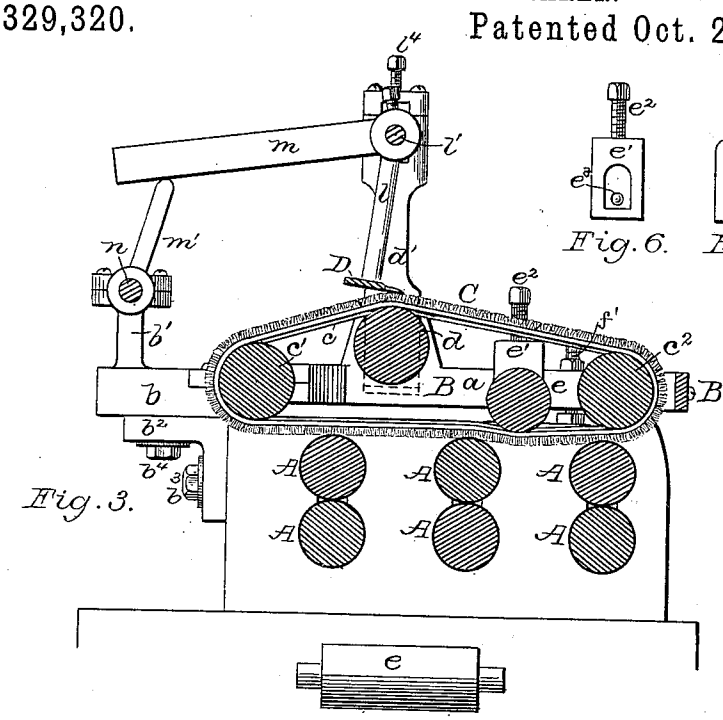


Fig. 3.

Fig. 6. Fig. 7.

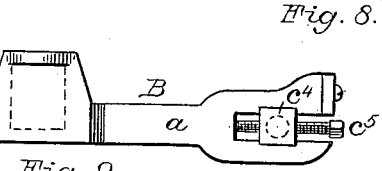


Fig. 9.

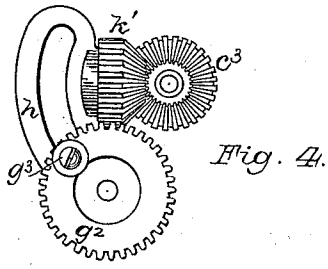


Fig. 4.

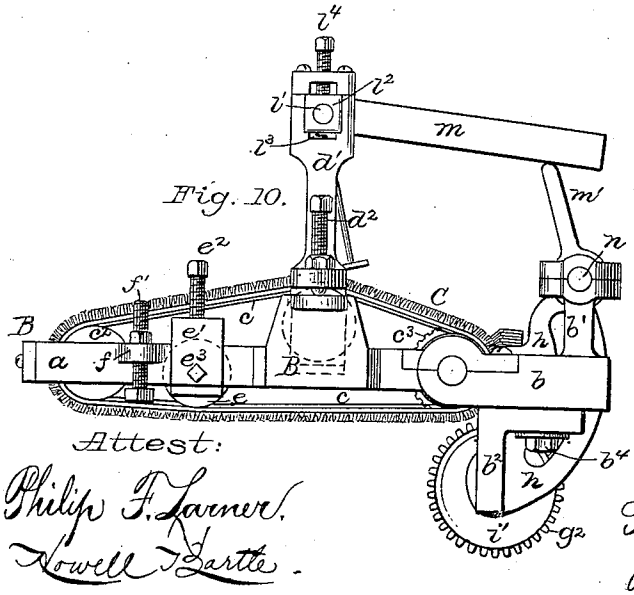


Fig. 10.

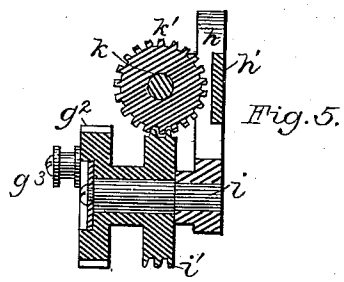


Fig. 5.

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UNITED STATES PATENT OFFICE.

STEPHEN D. LEARNED, OF WESTERLY, RHODE ISLAND.

AUTOMATIC TOP-ROLL CLEARER.

SPECIFICATION forming part of Letters Patent No. 329,320, dated October 27, 1885.

Application filed May 12, 1884. Serial No. 131,223. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN D. LEARNED, of Westerly, in the county of Washington and State of Rhode Island, have invented certain new and useful Improvements in Automatic Top-Roll Clearers for Spinning Machinery; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part thereof, is a clear, true, and complete description of the several features of my invention.

The object of my invention is to automatically perform the operation of clearing drawing-rolls in spinning machinery, and to do this so effectively as to not only increase the working capacity of such machinery, but to diminish the necessity for close attention on the part of the spinner or attendant, so far as relates to keeping the rolls freed from waste and dirt, and the consequent disadvantages.

It is not broadly new to combine with rolls automatic clearers, which carry the dirt and other waste from the rolls, it being well known that revolving brushes of various kinds have been arranged to sweep the surfaces of rolls, and that endless bands of flannel or felt have also been employed in connection with a comb for doffing the waste from said band.

I employ in my apparatus an endless-band clearer; but it differs from prior bands, in that it is, in fact, an endless soft band brush having filaments with which a doffing-comb can effectually operate, as distinguished from the prior bands of flannel or felt, which, although they have a roughened or engaging surface for taking up the dirt and lint, do not and cannot yield the same up to a comb like my soft endless-band brush. Endless bands in prior clearer apparatus have always been so operated that their brushing-surfaces traveled with the coincident surfaces of the rolls which were cleared thereby; but I have so organized my endless-band brush that its clearing-surface travels in a direction opposite to the coincident surfaces of the rolls cleared thereby, thus practically precluding the possibility of a broken end being coiled around any of the rolls with which the band-brush is in contact, and my brush, having specially soft but effective filaments, cannot injure the covering of a roll, notwithstanding its opposite movement.

I have also devised a variety of mechanism having special reference to the tension of the band-brush, to the peculiar presentation of its surface for aiding the doffing-comb to properly perform its function, to the adjustability of the comb with reference to the band-brush, and varying the movements of said comb, to the adjustability of said brush with reference to the rolls to be cleared thereby, to the adaptability of my contrivance as an attachment to machines already in use, and in certain other minor connections, all of which will be fully described in detail, and the several features deemed novel will be duly specified in the several claims hereunto annexed.

For particularly describing my invention, I will refer to the accompanying drawings, in which—

Figure 1 is a top view of a set of drawing-rolls with my improvements applied thereto. Fig. 2 is a side view of the same. Fig. 3 is a longitudinal central vertical section of the same on line *x*, Fig. 1. Figs. 4 to 9, inclusive, illustrate details which will be specifically referred to. Fig. 10 is a view of my complete clearing apparatus detached.

It is to be understood that the drawing-rolls A are as heretofore, and that they are to be suited in each case to perform their drawing functions, whether in connection with a railway-head, slubber or speeder, spinning-frame, or other variety of spinning or preparing machinery, by whatever special name it may be known. As here illustrated, said rolls are arranged as if organized in one variety of drawing-frame.

In its best form my entire apparatus is organized upon its own bed-frame, B, which can be readily and effectively mounted upon the frame of a spinning-machine; but the latter may, when originally constructed with reference thereto, embody some portions of said bed-frame as an integral portion of the main frame of the machine. The bed-frame B embodies a rectangular hinged frame, *a*, pivoted at one end to and between two blocks, *b*, each having a vertical standard, *b'*, and these as a whole are secured to the spinning-machine frame by two angle-irons, b^2. These angle-irons or brackets have each of their arms slotted for receiving the bolts b^3, by which they are se-

cured to the main frame of the machine, and also rendered vertically adjustable thereon, and also of receiving the bolts b^4, by which the blocks b are connected to the angle-irons, and also rendered horizontally adjustable thereon. The traveling endless-band roll-clearer C may be widely varied in its character without departure from certain features of my invention; but for obtaining the best results it should be in the form of a band-brush, which is a novel feature in this class of apparatus. The band-brush C is strengthened at its edges by belts c, and is mounted on the frame B by means of the rolls c' and c^2, one of which has for its axis the rod by which the rectangular portion a of said frame is pivoted or hinged to the blocks b, and the axis of the other roll, c^2, has its bearings near the opposite end of the frame. Two other brush-controlling rolls are also employed, both of which serve to regulate the tension or vary the positions of portions of the band-brush. The band-controlling roll d is mounted upon an axis provided with boxes in the lower ends of a pair of vertically-sliding standards, d', which are in one sense connected at their upper ends by a rock-shaft, to be hereinafter described. Each of said standards d' has an adjusting and supporting screw, d^2, which has its thrust-bearing upon a portion of the bed-frame, so that on turning said screws the roll d will be lifted or lowered, and the band-brush is not only thereby nicely adjusted, but it also has its upper surface presented at a favorable angle or curve for enabling the comb to co-operate therewith, as will be hereinafter more fully described. The second roll, e, which also operates tensively on the band-brush, is located between roll d and roll c^2; but it is so arranged that it can force the band-brush downward, and thus cause it to operate with greater or more extended wiping effect upon the adjacent coincident surfaces of the drawing-rolls. The axis of said roll e has its bearings in sliding boxes e', which are rendered vertically adjustable on the edges of the frame a by means of the screws e^2, and said boxes e' are also horizontally adjustable and capable of being clamped in position on the sides of the said part a of the frame by means of the screws e^3.

For graduating the pressure of the band-brush upon the surface of the drawing-rolls, the rectangular portion a of the frame has at each side laterally-projecting tapped lugs f and set-screws f', the lower ends of which rest upon the top of the spinning-machine frame, so that by turning said screws the outer end of frame B and the band-brush can be raised or lowered.

I will next describe how the proper traveling motion is imparted to the band-brush. Power may be derived from the spinning-machine in various ways for operating the band, because any adjacent revolving shaft can be relied upon; but I have organized a chain of gearing from the shaft g of the back drawing-roll, A, in the set here shown. On said shaft g is a pinion, g', which is coupled to a beveled gear, c^3, on the axis of the rear band-roll, c', by means of intermediate gearing, which is mounted on a segmental bracket, h, secured to the frame B at one side of one of the blocks b. Said bracket h has a laterally-projecting stud, i, on which is mounted a worm-gear, i', coupled to a pinion, g^2, which meshes with the pinion g', before described. Said segmental bracket h has also standing above and at right angles to said stud i another stud, k, on which is mounted a complex worm and beveled gear, k', which, respectively, meshes with the worm i' and the beveled gear c^3 on the band-brush roll c', thus completing the chain, and causing the lower surface of the band-brush to travel oppositely to the movement of the coincident surfaces of the top rolls. The segmental bracket h has a rigid arm, h', which is pivoted on the axis of the roll c', and said bracket is slotted in the arc of a circle of which said axis is the center, thus providing for ready adjustment of the pinions g' and g^2 with relation to each other. As thus far described, it is obvious that all dirt, lint, and waste will be cleared from the top rolls and carried to the upper side of the band-brush, and that said band-brush, by moving toward the front or delivery rolls, will readily take up broken ends and maintain secure control thereof until placed within the range of the vibrating doffing-comb D. This comb is supported at the lower ends of two pendent arms, l, which are mounted upon the rock-shaft l', having boxes l^2 at its ends supported in the vertically-adjustable standards d', before described. Each box l^2 is cushioned upon a spiral spring, l^3, and each is capable of vertical adjustment by means of adjusting-screws l^4, tapped into threaded holes in the caps of the standards, thus enabling the comb to be accurately adjusted with relation to the filaments of the band-brush. The comb is vibrated to and fro by means of a lever-arm, m, on the rock-shaft l', lifted by a lever-arm, m', on a second rock-shaft, n, which is mounted on short standards projecting upward from the blocks b, and said rock-shaft is partially rotated to and fro by the pinion g^2, which serves as a crank-plate having a wrist-pin, g^3, which occupies a slot in an arm or lever, o, depending from and secured to the rock-shaft n. All of these arms are adjustably secured to their respective rock-shafts, and it is obvious that by varying their positions rotatively thereon the comb can be adjusted as to the extent of its vibratory movement, as well as to the particular portion of the band-brush over which it may be desirable to vibrate it. It will also be observed (from Fig. 3) that the main tension-roll d has its axis below the rock-shaft on which the comb is mounted, and also substantially in the same vertical plane, and that therefore a portion of the upper surface of the band-brush is so presented to the comb that

the teeth of the latter have a clean path through an elevated angular or curved portion of the filaments which in service are charged with the lint, dirt, and waste cleared from the rolls, thus enabling the comb to thoroughly cleanse the band-brush during its traveling movement. The comb has a wide base-plate back of the teeth, upon which the massed dirt and lint is readily retained, it being proper to remove it, however, at more or less extended intervals.

When my apparatus is made to be applied as a ready-made attachment to spinning machinery already in use, it is advisable that provision be made for its adjustment to rolls variably set as to draft or to machinery having more than three sets of drawing-rolls, as shown, and in that case I construct the sides of the portion *a* of the frame B, as illustrated in Fig. 9, so that the boxes c^4 for the band-brush c^2 can be mounted in a longitudinal slot, and be traversed by a screw, c^5, as shown, so that rolls c' and c^2 can be separated for accommodating a longer band-brush, and thus provide either for a greater number of drawing-rolls, or for the number shown, but more widely separated.

It is important for obtaining good results that the band-brush be well adapted to the purpose, and I believe I am the first to employ such a brush, as distinguished from flannel or felt, as heretofore employed. The filaments of the brush should have a distinctive character, and while soft and pliable they should be of such length as to operate well in brushing and afford free paths for the teeth of the comb, which should always slightly dip below the surface of the brush and into its filaments. The best filamentous material which I have thus far found is a coarse grade of wool, and this can be combined with a substantially non-extensible foundation fabric in various ways, and with or without belts, as described—as, for instance, the foundation may be a woven fabric, into and through which combed tufts of wool or other filamentous material may be knotted, in a manner well known; or, if economy is to be observed, the wool can be spun into coarse slack twisted yarn, and incorporated with a linen or cotton back, after the manner of long pile weaving, and then cutting and shearing the pile to a uniform length, thus affording the surface which is to serve as the filamentous part of the brush.

Other animal and vegetable fibrous matter may be employed without departure from this portion of my invention.

In the manufacture of said band-brush, it is obvious that it may be made up in bulk, and selvages provided by solid weaving between each width, to provide for convenient separation as well as for a good edge finish.

Some of the well-known varieties of velvety fabrics can be relied upon for good service whenever circumstances may prevent the procurement of the specially-prepared band-brushes. In joining the ends care should be taken to preserve a good brush-surface at the joint or seam.

In practice I have found my roll-clearing apparatus highly efficient on spinning machinery of various classes; and while its use has been proved to be exceedingly profitable in connection with the manufacture of ordinary goods involving the use of short-staple cottons, it is even more satisfactory in connection with the spinning of fine yarns from cotton of the long-staple varieties.

It is obvious that if the lower drawing-rolls are to be also cleared it will simply involve a duplication of the apparatus shown, and a reversal thereof in position—*i. e.*, to a point below the rolls.

It is to be understood that certain portions of my invention are not dependent upon the particular character of the band-brush, as other forms of endless-band clearers may be employed with desirable results, if used in certain of the novel combinations devised by me.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with drawing-rolls, of the endless-band brush operating as a roll-clearer, provided with distinctive brushing filaments, substantially as described.

2. The combination, with drawing-rolls, of an endless-band clearer and gearing for driving the coincident and contact surfaces of the rolls and band-clearer in opposite directions, substantially as described.

3. The combination of the traveling endless-band clearer, the vibrating comb, and the tension-roll beneath the comb, substantially as described.

4. The combination, with the band-clearer and vibrating comb, of a band-tension roll beneath the comb, and means, substantially as described, for vertically adjusting said roll, and thereby adjusting the band-clearer with relation to the comb, and presenting an angular or curved surface of the brush within the path of said comb, as set forth.

5. The combination of the traveling endless-band clearer, the vibrating comb, and means, substantially as described, for adjusting said comb with relation to the surface of the band-clearer, as set forth.

6. The combination, with the traveling endless-band clearer, of the vibrating comb and means, substantially as described, for varying its vibratory movements.

7. The combination, substantially as hereinbefore described, of the drawing-rolls, the traveling endless-band clearer and its pivoted frame, and means, substantially as described, for vertically controlling the outer end of said frame, and thereby varying the pressure of the band against said rolls.

8. The combination of the endless-band clearer and its rolls, the comb, the gearing for operating the clearer and comb, and the frame

upon which they are organized and mounted, substantially as described, whereby the whole may be conveniently mounted upon a machine containing drawing-rolls and in proper working relation thereto, as set forth.

9. The combination, with the band-clearer, of the segmental bracket provided with the studs, worm-gears, and pinions, substantially as described, as a detachable system of gearing for connecting the band-clearer shaft with a driving-pinion in a spinning-machine, as set forth.

STEPHEN D. LEARNED.

Witnesses:
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B. E. HELME.