(No Model.) 2 Sheets—Sheet 1

J. GOOD.

MACHINE FOR SPREADING AND DRAWING HEMP, &c.

No. 315,766. Patented Apr. 14, 1885.

Fig 1.

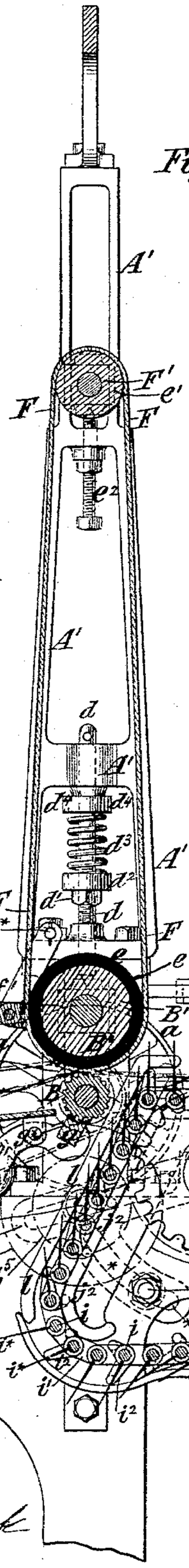
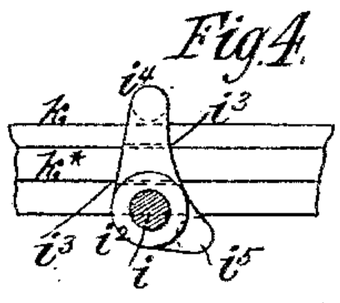


Fig 4.



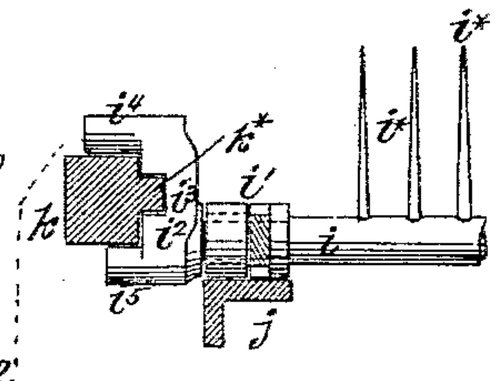


Fig 3.

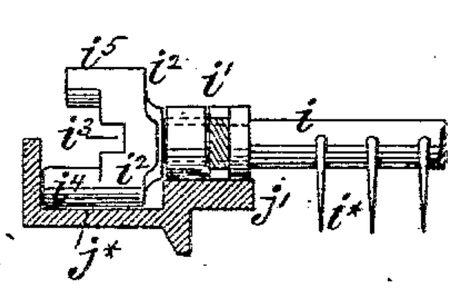
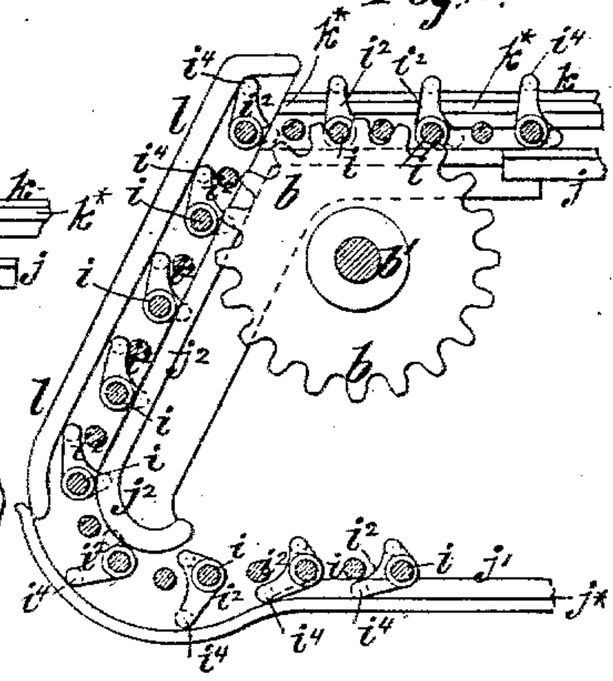


Fig 2.



Witnesses
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(No Model.) 2 Sheets—Sheet 2.

J. GOOD.

MACHINE FOR SPREADING AND DRAWING HEMP, &c.

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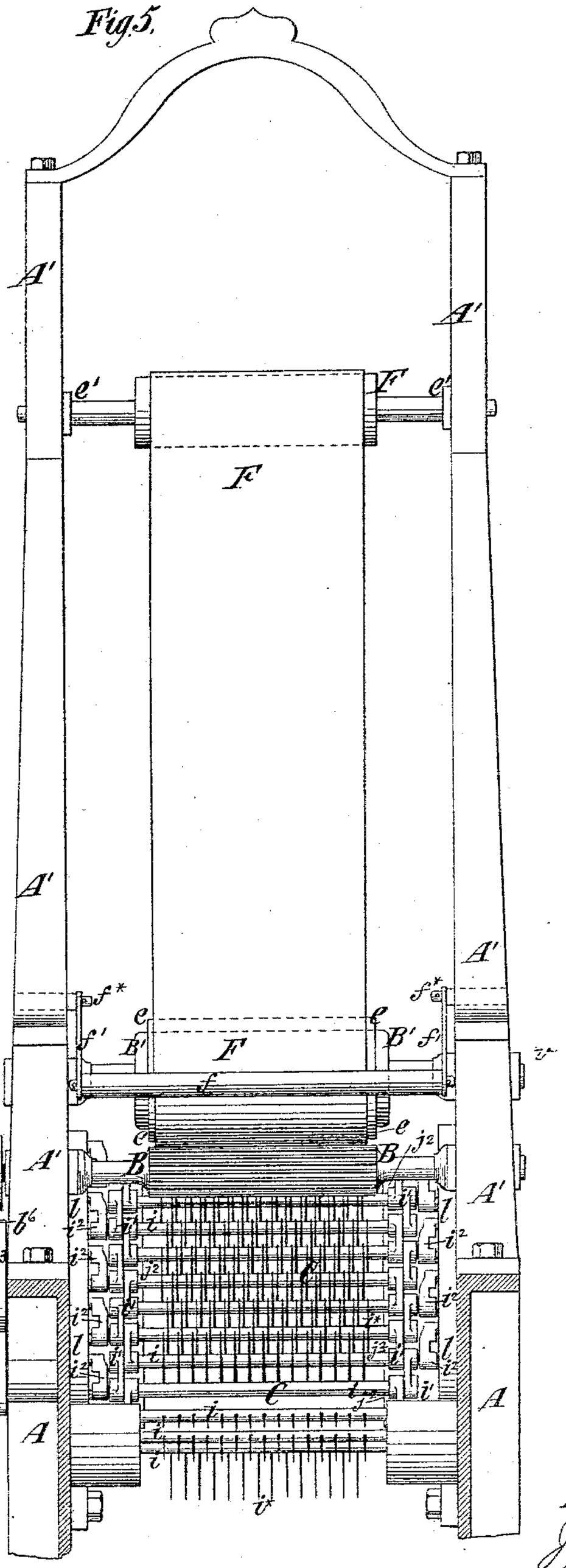
Fig. 5.



Witnesses:
C. L. Sundgren
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Inventor:
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Brown & Hall

UNITED STATES PATENT OFFICE.

JOHN GOOD, OF BROOKLYN, NEW YORK.

MACHINE FOR SPREADING AND DRAWING HEMP, &c.

SPECIFICATION forming part of Letters Patent No. 315,766, dated April 14, 1885.

Application filed July 18, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN GOOD, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Machines for Spreading and Drawing Hemp and other Fibrous Materials, of which the following is a specification.

My invention is applicable more particularly to the machines known as "spreaders" and to those known as "drawing-frames," used in the preparation of hemp and flax for spinning, but may be applicable to the spreading or drawing of other fibrous materials. Machines of this class are provided at the delivery end of the machine with a drawing-head wherein is arranged a pair of drawing-rolls; and my invention relates to this drawing-head and means for operating and guiding the endless belt of combing or hackling pins, which deliver the hemp or other fiber to the nip or bite of the drawing-rolls. In order to insure effective operation it is necessary that the drawing-rolls should have a firm bite on the fiber to draw it forward, and to obtain this firm bite it is desirable the working-surface on one roll should be of a material more elastic and yielding than metal, although the working-surface of the other roll may be metal. A roll having the working-surface of rubber is not effective because of the tendency of the fiber to adhere to and lap around the roll, and also because it is not durable, and a roll having a leather jacket or covering is objectionable because of the difficulty in securing it permanently to the roll, and because it does not possess a degree of elasticity which is most desirable.

My invention consists in the combination, with an endless belt of combing or hackling pins, of a pair of drawing-rolls, one having a metallic working-surface and the other having a covering or jacket of india-rubber, means for operating said belt of pins and said rolls, and a leather belt passing around the rubber-covered roll. In order to render it more effective, the roll having an exposed surface is of small size and is preferably fluted. The leather belt operates better in conjunction with a fluted roll than would a belt of other material, and the rubber jacket or covering around which the belt passes imparts the necessary degree of elasticity to the bite of the rolls. In order to prevent loose fiber ends from adhering to the belt and smaller exposed roll, I employ cleaning rubbers or guards, which bear lightly on the belt and roll and prevent fiber from lapping round them. The belts of pins usually employed consist of parallel bars or rods armed with rows of pins and moved along by chains, in the links of which the bars or rods are loosely fitted so as to turn, and fast upon the ends of the bars or rods are dogs, which, in connection with suitable guides and stationary cams, hold the rods or bars in such positions that the pins are presented in the desired directions. The chain-driving wheels in these machines are necessarily of considerable size, and when the chains conform to the circumference of the wheels as they leave the fiber the pins are swung out of the fiber considerably in rear of the bite of the drawing-rolls.

My invention also consists in the combination, with drawing-rolls and the endless chains of the belt of combing or hackling pins, and means for operating said rolls and belt of pins, of chain-wheels adjacent to the drawing-rolls, and tracks or guides and cams, whereby the chains are caused to travel in a direct line beyond the chain-wheels and close to the drawing-rolls to secure a close nip of the rolls, and then downward at a forward inclination to withdraw the pins from the fiber by a movement directly lengthwise of the pins.

The invention also consists in other combinations of parts, hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a longitudinal section of a portion of a spreader or drawing-frame embodying my invention. Fig. 2 is a detail view illustrating the tracks or guides and cam shown in Fig. 1 and the dogs on which they act, the chains being omitted. Fig. 3 is a transverse section of the upper and lower portion of one chain and the tracks or guides therefor on a larger scale. Fig. 4 is a detail view, on the same scale as Fig. 3, of a chain-dog and the guide whereby it is held in the direct movement of the portion of the chain which is operative; and Fig. 5 is a transverse vertical section on the plane of the dotted line *x x*, Fig. 1, omitting the

scraper or fiber-clearer from the lower drawing-roll.

Similar letters of reference designate corresponding parts in all the figures.

A designates the side frames of the machine, and A′ the upright standards or frames of the drawing-head, in which are comprised a pair of drawing-rolls, B B′.

C designates the belt of pins, which is endless, although its whole length is not here shown. This belt of pins carries the fiber to the bite of the drawing-rolls, and after passing between the rolls it enters a condenser or trumpet-mouth, D, and is thereby formed into a sliver, which is delivered by the rolls E E′.

The mechanism for driving the several parts of the machine may be of any suitable character. In this example of my invention the lower drawing-roll, B, constitutes the driving-shaft, and carries a driving-pulley, *a*, a pinion, *a′*, and a pulley, a^2. From the pulley a^2 a belt, a^3, drives onto a pulley, a^4, on the shaft of the lower delivery-roller, E. The two chains carrying the belt of pins C are driven by chain-wheels *b* on a shaft, *b′*. Below the drawing-roll B is a short shaft or stud, b^2, which is carried by an arm, b^3, supported concentrically with the chain-wheel shaft *b′*, and in which the stud may be adjusted toward and from said shaft. On the stud b^2 are supported a gear-wheel, b^4, which engages with and receives motion from the pinion *a′*, and a pinion, b^5, which engages with and drives a gear-wheel, b^6, on the chain-wheel shaft *b′*. The adjustment of the stud b^2 in the arm b^3 provides for bringing the pinion b^5 in proper gear with the wheel b^6, and the swinging of the arm on its center and securing it by the clamping-bolt b^*, passing through an arc-shaped slot, *, provides for the adjustment of the wheel b^4 into proper relation to the pinion *a′*, which drives it. The lower delivery-roll, E, is in fixed bearings, but the bearings of the upper roll, E′, are in boxes which are vertically movable in housings *c*, and are acted upon by springs *c′*, to maintain the bite of the rolls on the sliver. The lower drawing-roll, B, is in fixed bearings, but the bearings of the upper roll, B′, are in boxes *v v*, which are vertically movable, and are acted upon by springs to hold them down. As here shown, the boxes *v v* are held down by plungers or push-rods *d*, which are guided at their upper ends in the standards or uprights A′ and extend downward through the caps of the housings in which the boxes are fitted. The rods *d* are fitted with nuts *d′* and loose collars d^2, and upon them are spiral springs d^3, bearing at one end on the collars d^2 and at the other end against loose collars d^4, abutting against the cross portions of the frames A′. By adjusting the nuts *d′* the tension of the springs may be properly regulated to load the upper roll to the required extent. The lower drawing-roll, B, is of much smaller size than the upper roll, B′, and has an exposed metal surface. It is shown as longitudinally ribbed or fluted. The upper roll, B′, is of metal, and is covered with a sleeve or jacket, *e*, of india-rubber. Around this roll passes an endless belt of leather, F, which is also carried around or over a tension-roller, F′, journaled in the upper part of the frames A′. The boxes *e′* of the roller F′ are movable in the frames A′, and may be adjusted by screws e^2 to maintain the proper tension on the belt. The leather belt forms a very durable working-surface, and in connection with the small fluted roll B is very effective. The length of the belt exposes a large surface for wear, and the rubber jacket or covering *e* gives the required degree of elasticity. The electricity generated in the fibers is sufficient to cause their ends to adhere to some extent to the leather belt F, though not so much as to a rubber surface.

In order to prevent the adhering fibers from lapping on the belt, I employ a rubber, clearer, or scraper, which consists of a simple bar, *f*, faced with felt and supported at the ends by arms *f′*, pivoted at *f**. This rubber or clearer bears against the belt by gravity alone and clears it of fiber. I have also shown a similar rubber or clearer bar, *g*, bearing against the under side of the lower drawing-roll, B. This bar has at its ends arms *g′*, pivoted at *g**, and weighted to hold the bar against the roll. A similar rubber or clearer bar, *h*, carried by weighted arms *h′*, pivoted at *h**, is applied to the lower delivery-roll, E, for a like purpose. The belt of pins C is composed of parallel rods or bars *i*, armed with pins *i**, and carried by two endless chains, *i′*. The rods fit loosely in the chain-links, so as turn freely, and on their outer ends and beyond the chains are dogs i^2, which are secured fast to them, and the form of which is best shown in Figs. 3 and 4. The chains which I prefer to use are very similar to that shown and described in my Letters Patent No. 108,473, dated October 18, 1870, or that forming the subject of my Letters Patent No. 311,310, dated January 27, 1885; but chains of any other suitable character may be used. The dogs i^2 are like those shown and described in my application for patent filed July 17, and of which the serial number is 137,910. Each dog has in outer side a notch or channel, i^3, and two studs, i^4 i^5, the latter of which is the shorter of the two. The shorter stud i^5, which is nearer the center of the dog, has no function so far as the delivery end of the machine is concerned; but its purpose is described in my aforesaid application. The chain-wheels *b* engage with the rods *i* or with the hubs of the chain-links, as may be desired; and I provide tracks, ways, or guides *j j′* for the upper and lower portions of the chains as they move toward and from the drawing-head.

Extending parallel with the upper chain-ways or supporting-rails, *j*, is a guiding-rail, *k*, having a rib, *k**, on which the notches or channels i^3 of the dogs i^2 fit and slide, and by which the rods *i* are maintained with their pins pointing upwardly and preferably very slightly forward, to take a firm hold on the

fiber and prevent their throwing off the fiber. The chain-support *j* and guiding-rail *k k** are continued forward beyond the center of the shaft *b'*, as shown most clearly in Fig. 2, and almost to the bite of the drawing-rolls, and by this prolongation of the guiding-rail the chains are lifted or held out of the chain-wheels after passing their centers, and the direct line of travel of the operative portion of the belt of pins is continued or prolonged beyond the wheels and almost to the bite of the drawing-rolls.

Forward of the chain-wheels *b* are downwardly and forwardly inclined chain-supports j^2, and parallel therewith are stationary inclined cams or rails *l*, which project sufficiently inward of the side frames, A, to cause the pins or studs i^4 of the dogs i^2 to act upon them. At the time the dogs i^2 in their forward movement leave the guiding-rails *k k** the studs i^4 come to a bearing on the cams *l* and the chains commence their downward movement. During the whole or principal portion of such downward movement the studs i^2 bear against the cams *l*, and the rods *i* are thereby prevented from turning in a direction to throw their pins forward. The pins cannot fall back so long as they are in the fiber, and after they leave the fiber they are prevented from falling back by the pins of each rod bearing against the rod above them. By this means the pins are withdrawn from the fiber directly downward, or in the direction of their length; or, in other words, they drop out of the fiber instead of swinging out, as heretofore. The pins therefore readily clear themselves of the fiber, and are kept cleaner than they are when they leave the fiber by a swinging movement.

Extending parallel with and slightly below the level of the lower chain-supporting rails are tracks or ways *j**, and in their return movement the studs i^4 drag on these tracks or ways, as shown in Figs. 2 and 3, and so keep the pins up as closely as possible to the rods.

The pin-bars *i* may have dogs at both ends, or each bar may have a single dog, the dogs on alternate bars being at one edge of the belt, and those on intermediate bars being at the other edge of the belt.

At both sides of the machine are guides and cams similar in construction and acting simultaneously on the dogs at the two edges of the belt of pins.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with an endless belt of combing or hackling pins, of a pair of drawing-rolls, one having an exposed metallic surface and the other having a covering or jacket of india-rubber, means for operating said belt of pins and said rolls, and an endless leather belt passing around the rubber-covered roll and forming one of the working-surfaces, substantially as herein described.

2. The combination, with an endless belt of combing or hackling pins, of a pair of drawing-rolls, one having an exposed metallic surface and the other having a covering or jacket of india-rubber, upright frames or standards and a tension-roller, means for operating said belt of pins and said rolls above said drawing-rolls, and an endless leather belt passing around the rubber-covered drawing-roll and the upper tension-roller, and forming one of the working-surfaces, substantially as herein described.

3. The combination, with an endless belt of combing or hackling pins, of the small fluted drawing-roll B, the larger rubber-covered roll B', means for operating said belt of pins and said rolls, the upright frames A', the upper tension-roller, F', and screws for adjusting it, and the leather belt F, passing around the rubber-covered roll B' and the tension-roller F', substantially as herein described.

4. The combination, with an endless belt of pins, of a lower drawing-roll, B, an upper rubber-covered draw-roll, B', means for operating said belt of pins and said rolls, upright frames A, boxes *v* for said roll B', vertically movable in said frames, plungers *d*, bearing on said boxes, and spiral springs d^3, applied to said plungers, substantially as herein described.

5. The combination, with an endless belt of pins, of the lower drawing-roll, B, the upper rubber-covered roll, B', means for operating said belt of pins and said rolls, upright frames A', and the upper tension-roller, F', the leather belt F, and the fiber clearer or scraper *f*, bearing against the front of said belt, substantially as herein described.

6. The combination, with an endless belt of pins, of upper and lower drawing-rolls, means for operating said belt of pins and said rolls, and a fiber clearer or scraper, *g*, provided with weighted and pivoted arms *g' g**, whereby it is held against said lower roll, substantially as herein described.

7. The combination, with an endless belt of pins, of a pair of drawing-rolls, means for operating said belt of pins and said rolls, a trumpet-mouth or condenser forward of said rolls, a pair of delivery-rolls for the sliver, and a fiber clearer or scraper, *h*, provided with weighted and pivoted arms *h' h**, whereby it is held against the lower delivery-roll, substantially as herein described.

8. The combination, with a pair of drawing-rolls and means for operating them, of a belt of combing or hackling pins comprising endless chains, chain-driving wheels adjacent to said rolls, and guides for said chains in their movement toward the rolls extending forward of said chain-wheels, whereby the direct travel of the belt of pins is prolonged beyond said wheels, substantially as and for the purpose herein described.

9. The combination, with a pair of drawing-rolls and means for operating them, of endless chains and parallel rods armed with hackling-pins and loosely fitting the chain-links, dogs fast upon the ends of said rods, driving-

wheels for the chains adjacent to said rolls, and guides with which said dogs engage in the movement of the chains toward said rolls to hold the pins in an operative position, and which are prolonged beyond said wheels, whereby the direct travel of the belt of pins is prolonged beyond said wheels, substantially as herein described.

10. The combination, with a pair of drawing-rolls, means for operating them, and an endless belt of pins composed of endless chains, pin-bars capable of turning in the chain-links, and dogs fast on said pin-bars, of chain-wheels adjacent to said rolls, guides with which said dogs engage in the movement of the belt of pins toward said rolls to hold the pins in operative position, and which are prolonged beyond said wheels to prolong the direct travel of the belt of pins beyond said wheels, inclined chain-supports forward of said wheels, and stationary cams acting upon said dogs to hold the pins upright as they are withdrawn from the fiber, substantially as herein described.

11. The combination, with a pair of drawing-rolls and means for operating them, of the endless belt of pins composed of pin-bars *i*, chains *i'*, and dogs i^2, provided with notches and studs i^3 i^4, fast on said pin-bars, the chain-wheels *b*, the guiding-rails *k* *k**, prolonged beyond said wheels, and the inclined chain-supports and cams j^2 *l*, all substantially as herein described.

JOHN GOOD.

Witnesses:
EMIL SCHWARTZ,
CHANDLER HALL.