(No Model.) 3 Sheets—Sheet 1.

J. GOOD.

MACHINE FOR SPREADING HEMP, &c.

No. 315,765. Patented Apr. 14, 1885.

Fig. 2.

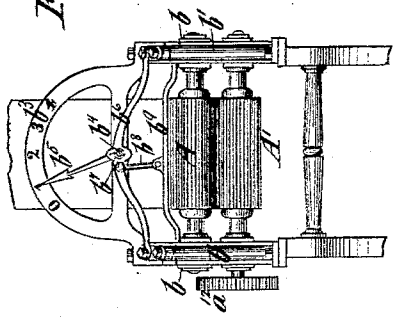


Fig. 1.

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J. GOOD.

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Fig4.

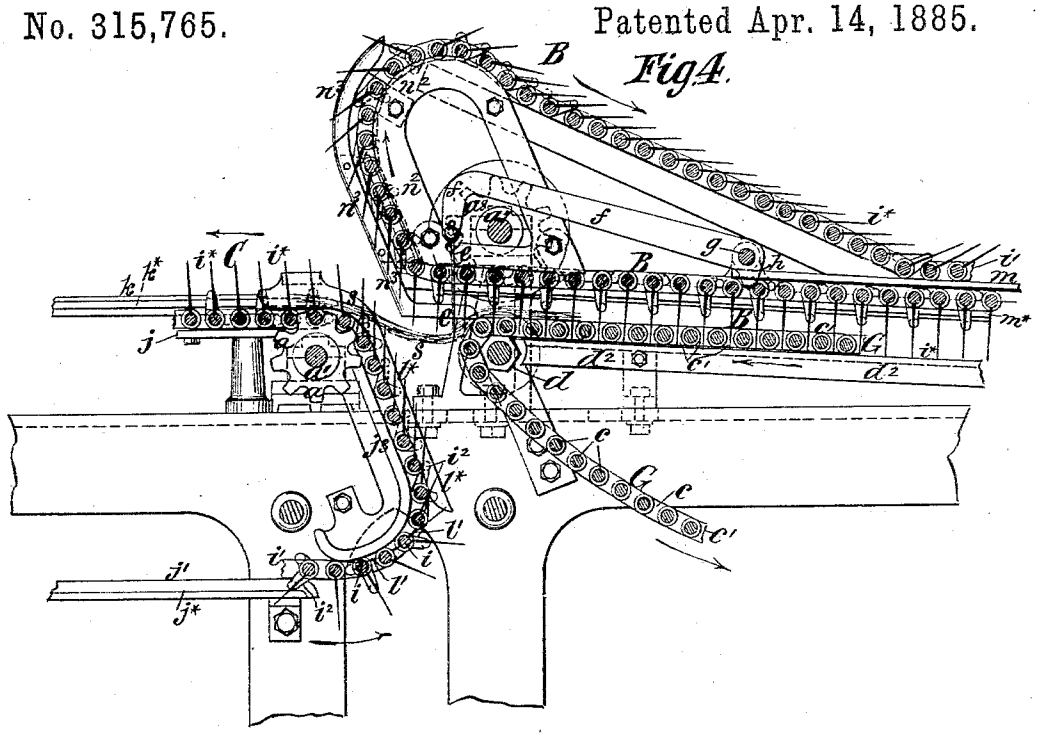
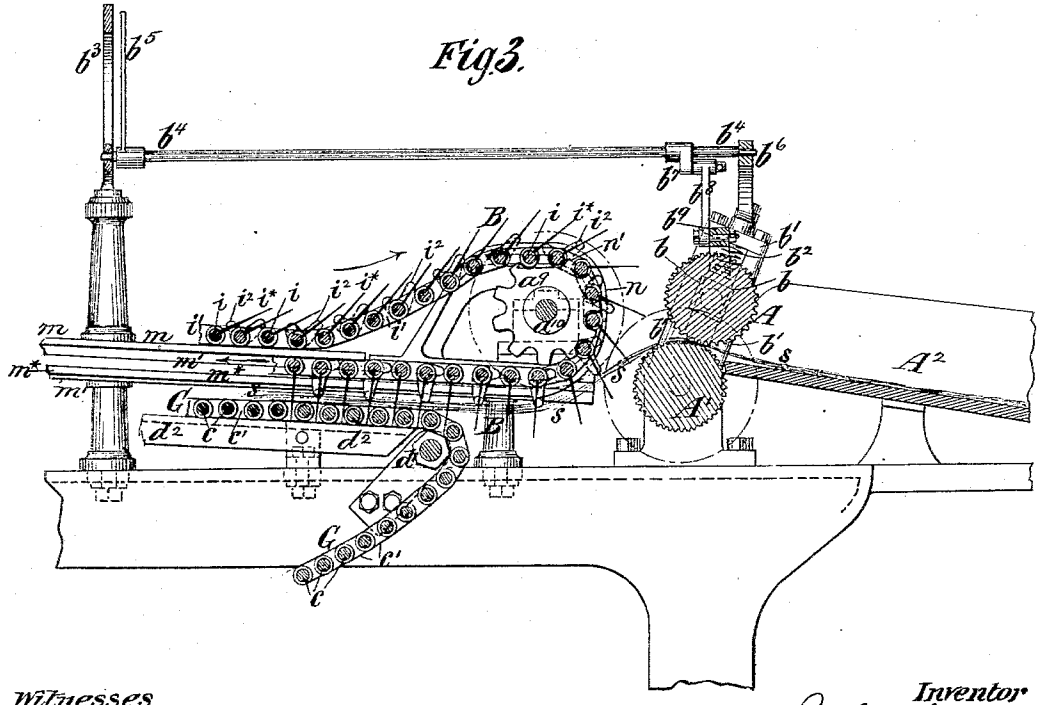


Fig3.



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MACHINE FOR SPREADING HEMP, &c.

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Fig 6.

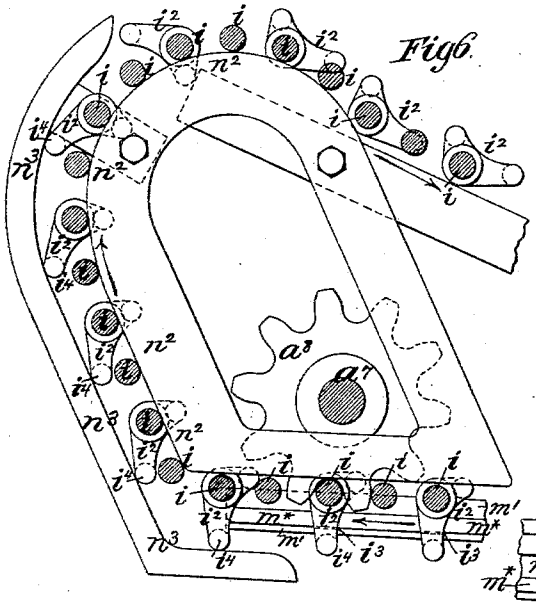


Fig 5.

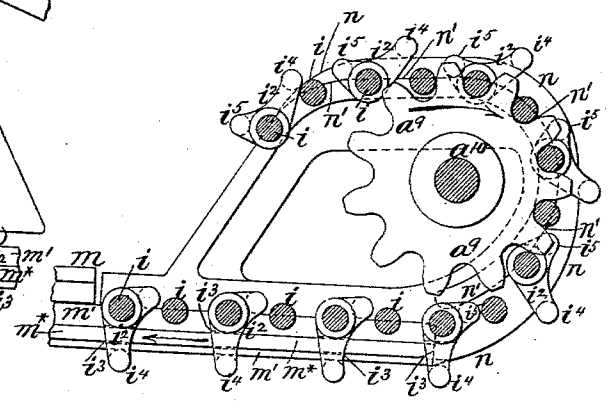


Fig 8.

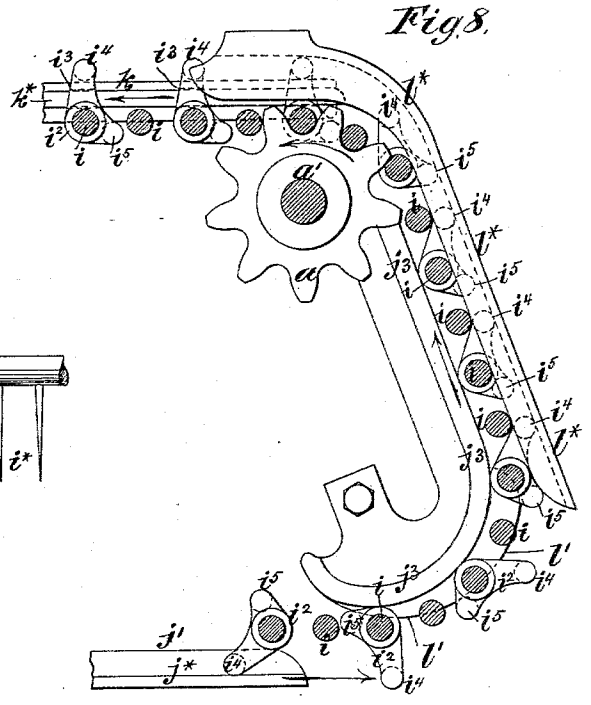
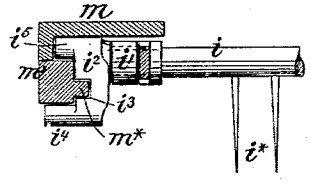


Fig 7.



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UNITED STATES PATENT OFFICE.

JOHN GOOD, OF BROOKLYN, NEW YORK.

MACHINE FOR SPREADING HEMP, &c.

SPECIFICATION forming part of Letters Patent No. 315,765, dated April 14, 1885.

Application filed July 17, 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 Hemp and other Fibrous Materials, of which the following is a specification.

My invention is more particularly applicable to machines known as "spreaders," for spreading hemp or flax, but may be embodied in machines for spreading other fibrous materials.

The invention relates to machines wherein are employed two endless belts of combing or hackling pins, the fiber being taken from the feeding-rolls by the lowermost portion of one belt, having its pins presented downward, and thence delivered to the uppermost portion of the second belt, having its pins presented upward, the two belts moving in opposite directions, so that their operative portions will move in the same direction, but at different velocities. Such a machine is shown and described in my Letters Patent No. 311,310, dated January 27, 1885, and the advantage of such reversed arrangement of the two belts of pins is that a closer nip on the fiber is secured at the point of delivery from the first belt to the second than can be obtained when the two belts move in the same direction and have their upper portions operative. The belts of pins which are used in these machines each comprise parallel pin bars or rods, two endless chains in the links of which the pin bars or rods fit loosely, so that they are capable of turning, and dogs which are secured fast to the ends of the pin bars or rods, and are fitted to guides or guiding-rails in order to prevent the turning of the bars or rods, when desired, and to hold the pins properly presented for operation. The chain-wheels whereby the chains of the belts of pins are operated must be of considerable size in order to operate properly, and although by reversing the two belts of pins, as described in my aforesaid application, I obtained a closer nip on the fiber than had been before possible, I did not obtain as close a nip as I now deem desirable in order to obtain the best results. The reason of this was that in the former machine the travel of the first belt of pins at its delivery end conformed to the circumference of the chain-wheels at that end.

The present invention consists in the combination, with a belt of pins, the lowermost portion of which is operative with its pins presented downward, of a second belt of pins to the uppermost portion of which the fiber is delivered from the first belt of pins, driving-wheels for the first belt of pins arranged at the delivery end thereof, and guides or guiding-rails, whereby the downwardly-presented pins of the first belt are held in operative position, and which are extended forward of said wheels, whereby the direct travel of the first belt of pins is prolonged beyond its driving-wheels.

The invention also consists in the combination, with the foregoing, of stationary cams inclined forward and upward from the termination of the aforesaid guides or guiding-rails, and acting upon the dogs of the pin-bars to hold the pins presented directly downward as they are withdrawn or raised out of the fiber, and prevent the pins from swinging forward and upward in leaving the fiber.

The invention also consists in the combination, with the two belts of pins, arranged as described, the driving-wheels, prolonged guides or guiding-rails, and inclined cams at the delivery end of the first belt, of stationary cams at the receiving end of the second belt, inclined correspondingly to those of the first belt and acting upon the dogs on the pin-bars of the second belt to hold the pins in vertical positions, so that they will rise straight into the fiber.

The invention also consists in the combination, with a pair of feed-rolls and an endless belt of pins the lowermost portion of which is operative, with its pins presented downward, of a vertically-movable blade or plate arranged within said belt at its delivery end, and working upward and downward between the pin-bars to push down or throw off the fiber from the pins, said blade or clearing-plate being preferably supported by pivoted arms having downwardly-projecting toes, which are acted upon by the pin-bars as they successively pass them in order to raise the blade or plate and allow it to drop.

In the accompanying drawings, Figure 1 is

a side elevation of a machine embodying my invention. Fig. 2 is an elevation of the feeding end of the machine. Fig. 3 is a vertical longitudinal section of the feeding end of the machine on a larger scale. Fig. 4 is a similar section, on the same scale, of the middle portion of the machine, including the delivery end of the first endless belt of pins and the receiving end of the second belt of pins. Figs. 5 and 6 are views in planes parallel with the planes of Figs. 3 and 4, illustrating, on a larger scale, the guide or guiding-rail and stationary cams at the receiving and delivery ends of the first belt of pins and the action of such guides and cams on the chain-dogs, the chains not being shown. Fig. 7 is a transverse section of a guide rail and a portion of a chain and a dog fitting the guide-rail; and Fig. 8 is a side view, similar to Figs. 5 and 6, illustrating the stationary cams at the receiving end of the second belt of pins and their action on the chain-dogs, the chain being omitted.

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

A A′ designate upper and lower feed-rolls, to which fiber is fed from a chute or table, A^2. The feed-rolls deliver fiber to the first belt of pins, B, the lowermost portion of which is operative, with its pins presented downward. From the first belt the fiber is delivered to a second belt of pins, C, the uppermost portion of which is operative, with its pins presented upward. From the second belt of pins, C, the fiber passes to upper and lower drawing-rolls, D D′, at the delivery end of the machine; and thence the fiber passes to a trumpet-mouth or condenser, E, whereby it is made into a sliver which passes between upper and lower delivery-rolls, E′ E^2.

The construction of the drawing-head, the means employed to properly direct and guide the belt of pins C at the delivery end, the mechanism for operating the drawing and delivery rolls and the belt of pins C, and the arrangement of the several parts are all fully shown and described in my application for Letters Patent filed July 18, 1884, Serial No. 138,043, and no further description is here necessary.

As in the application last above mentioned, the belt of pins C is driven in the direction of the arrows by chain-wheels at its delivery end, and is carried at its receiving end by chain-wheels a on a shaft, a'.

On the end of the shaft a' is a pinion, a^2, meshing into a wheel, a^3, and on the same shaft or stud as the wheel a^3 is a pinion, a^4, gearing into a pinion, a^5. The pinion a^5 gears into a wheel, a^6, on the end of a shaft, a^7, which is at the delivery end of the first belt of pins, B, and has upon it chain-wheels a^8, for driving said belt.

At the receiving end of the belt of pins B are chain-wheels a^9 on a shaft, a^{10}, and on said shaft is a wheel, a^{11}, gearing into and driving a wheel, a^{12}, on the shaft of the lower feed-roll, A′.

The mechanism herein described transmits to the first belt of pins, B, a movement in the reverse direction to the belt C; but the operative portions of the two belts of course move in the same direction. The movement of the belt of pins B is slower than that of the belt C, and any mechanism which will produce this result may be employed. The lower feed-roll, A′, is in fixed bearings; but the boxes b of the upper roll, A, are movable in housings b', and are loaded to the desired degree by springs b^2, placed above them within the housings b', in a manner common to the upper feeding-rolls of machinery for preparing fibrous materials. Forward of the feed-rolls is arranged an indicator-scale, b^3; and b^4 designates a rock-shaft carrying an indicator, b^5, registering thereon. At its front end the shaft b^4 has a bearing in a cross-bar, b^6, and is connected by an arm, b^7, and rod b^8 with a cross-bar or saddle-piece, b^9, the ends of which are attached to and movable with the boxes b. By these connections the rising and falling of the upper feed-roll, A, will move the indicator b^5 over the scale b^3, and the position which the indicator should occupy when the feeding is properly performed being determined, the attendant has only to glance at the indicator to see whether he is feeding too fast or too slow, and then regulate his feed accordingly.

In order to hold the fiber upon the downwardly-presented pins of the belt B and to prevent its dropping off said pins, I employ a retaining apron or belt, G, composed of parallel rods c and chains c'. This apron or belt is carried by polygonal rollers d d', and upon the shaft of the roller d is placed the transmitting-pinion a^5, which gears into the wheel a^6 and thus drives the shaft a^7. The links of the chains c' of the retaining apron or belt should be equal in length to the links of the chains carrying the belts of pins, and as the uppermost portion of the retaining apron or belt moves in the same direction and at the same speed as the lowermost portion of the belt of pins B, the rods of the retaining apron or belt receive the pins between them, and so retain the fiber on the pins. The uppermost and operative portions of the apron-chains c' are supported by tracks or rails d^2.

In order to aid in detaching the fiber from the pins of the first belt, B, at the delivery end thereof, I arrange within the said belt a clearing blade or plate, e, which is of a size to enter between the chains of the belt and between the pin-bars. As here shown, this blade or plate is pivoted to the ends of arms f, which extend over the shaft a^7, and are pivoted or fulcrumed at g, and are provided with downwardly-projecting toes h. Only one arm f is shown in the drawings; but one is arranged near each side of the belt of pins. As the pin-bars of the belt pass the toes h they act

successively upon them, and so raise the arms *f* and lift the clearing blade or plate *e* clear of the pin-bars. As each bar in succession releases the toes *h* the blade or plate falls, and, descending between two pin-bars, clears the fiber from their pins.

The belts of pins are each composed of parallel cross-rods *i*, armed with combing or hackling pins *i**, and fitting loosely in the links of two endless chains, *i'*, in which they are free to turn.

Secured fast on the ends of the pin-bars *i* are dogs i^2, the form of which is best seen in Figs. 5, 6, 7, and 8, and which have in their outer sides notches or chambers i^3, and projecting from their outer sides studs or pins i^4 i^5, the latter being the shorter of the two, as shown in Fig. 7.

The chains *i'* may be of any suitable construction; but I prefer to use chains very similar to that shown and described in my Letters Patent No. 108,473, dated October 18, 1870, or like that shown and described in my Letters Patent No. 311,310, dated January 27, 1885.

Extending forward of the receiving end of the first belt, B, are rails *m*, which support the uppermost or returning portion of the chains.

Parallel with the rails *m* extend rails *m'* provided with ribs or tongues *m**, which receive the channels or notches i^3 of the dogs i^2, and on which the dogs slide and are guided and held with the pins *i** in operative position.

Adjacent to the chain-wheels a^9 and shafts a^{10}, at the receiving end of the first belt of pins, B, are two cams, *n n'*, the forms of which are shown in Fig. 5, and on which bear the studs i^4 i^5 of the dogs i^2 as the chains pass around the wheels a^9. By these cams the pin bars are turned and held in proper position for the pins *i** to enter the fiber *s*, and are supported against backward movement as they enter the fiber and until the channels or notches i^3 of the dogs engage the end of the guiding-rail *m'* *m**, by which the bars are held against turning throughout the operative portion of the belt.

As shown best in Fig. 6, the guiding-rail or guide *m' m** is extended forward of the wheels a^8, and as the belt of pins passes the wheels a^8 its line of travel, instead of conforming to the circumference of the said wheels, is prolonged in a direct line beyond said wheels.

At the forward ends of the guiding-rails *m'* *m** are chain-supports n^2, inclined upwardly and forwardly, and extending at a corresponding inclination and parallel therewith are stationary cams n^4, which are arranged to act on the studs or pins i^4 of the dogs i^2. As the chain-dogs i^2 leave the guiding-rails *m'* *m**, the chains pass directly upward and forward along the chain supports or tracks n^2, and at the same time the studs i^4 come in contact with the cams n^3, and the pin-bars *i* are thus held against turning in a direction to swing the pins forward. By said cams the pins are prevented from swinging out of the fiber as they leave it, and are withdrawn directly upward, thereby clearing themselves of tow. The chains of the second belt of pins, C, are supported in their operative movement by supporting rails or tracks *j*, at opposite sides of the machine, and extending parallel therewith are guiding-rails *k*, having tongues *k**, which fit the channels or notches i^3 of the chain-dogs, and thus hold the pin-bars against turning during the forward operative travel of the belt. The returning or lowermost portions of the chains are guided or travel on supporting-rails *j'*, and parallel rails or tracks *j** support the studs i^4 of the chain-dogs i^2 and keep the pins at a rearward inclination.

Rearwardly of the chain-wheels *a* are chain guides, supports, or tracks j^3, extending forward and upward at an inclination corresponding to the inclination of the supports or tracks n^2, and stationary cams *l**, correspondingly inclined and adapted to act on the studs i^4 of the chain-dogs.

Adjacent to the lower part of the cam *l**, and extending below and forward thereof, is a second cam, *l'*, adapted to act on the studs i^5 of the dogs.

Before the chains of the belt C reach the guides or supports j^3 the studs i^4 of the dogs drop off or leave the end of the supporting rails or tracks *j**, and by the studs i^5, bearing on the cams *l'*, the dogs are swung round to enable their studs i^4 to enter under the cams *l**, and as the chains pass upward their pin-bars *i* are held against turning backward by the studs i^4 of the dogs bearing on the inner side of the said cams *l**, and consequently the pins are kept in vertical position and are raised vertically into the fiber *s*, instead of being swung into the fiber. As the dogs approach the upper part of the cams *l**, the studs i^5 also come in contact therewith, and the bars *i* and pins are thus prevented from being swung forward as they enter the fiber and until the notches or channels i^3 obtain a firm hold on the guiding-rails *k**.

By the above-described arrangement of guides or tracks and cams for the chains and chain-dogs a very close nip on the fiber is maintained by the two belts of pins.

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

At the two sides of the machine are tracks or guides and cams, which are similar, and which act simultaneously on the dogs at opposite ends of pin-bars.

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

1. The combination, with a belt of pins the lowermost portion of which is operative, with its pins presented downward, of a second belt of pins to the uppermost portion of which the fiber is to be delivered by the first belt of

pins, driving-wheels for the first belt of pins, arranged at the delivery end thereof, and guides or guiding-rails whereby the downwardly-presented pins of the first belt are held in operative position, and which are extended forward of said wheels, whereby the direct travel of the first belt of pins is prolonged beyond its driving-wheels, substantially as and for the purpose herein described.

2. The combination, with the two belts, B C, of pins, arranged as described, and composed of endless chains, pin-bars capable of turning in the links of the chains, and dogs fast upon the ends of the pin-bars, of chain-wheels for supporting both of said belts, guides or guiding-rails m' m^* for the dogs of the first belt, B, extending forward of the chain-wheels a^8 at the delivery end of the said belt, chain supports or guides n^2, inclined upward and forward from the forward ends of said guiding-rails, and stationary cams n^3, inclined correspondingly to said chain supports or guides and acting upon the dogs as the chains move upward and forward to hold the pins in vertical or nearly vertical positions as they withdraw from the fiber, substantially as herein described.

3. The combination, with two belts, B C, of pins, arranged as described, and each composed of pin-bars, endless chains in which said bars may turn, and dogs fast on the ends of said bars, of chain-wheels for supporting both of said belts, guides or guiding-rails for the dogs of the first belt, B, prolonged beyond the chain-wheels at the delivery end of that belt, whereby the direct travel of the first belt is prolonged beyond said wheels, inclined chain guides or supports n^2, and stationary cams n^3, acting upon the dogs of the first belt to cause its pins to withdraw vertically from the fiber, and correspondingly-inclined chain guides or supports j^3, and stationary cams l^*, acting upon the dogs at the receiving end of the second belt, C, to hold the pins thereof vertical, or nearly so, as they are carried upward into the fiber, substantially as herein described.

4. The combination, with two endless belts of pins, B C, arranged as described, and each composed of pin-bars i, chains i', and dogs i^2, having notches or channels i^3, and studs or pins i^4 and i^5, of chain-wheels a^8 at the delivery end of the belt B, and other chain-wheels, a, at the receiving end of the belt C, guides or guiding-rails m' m^*, for the dogs of the belt B, extending forward of the wheels a^8 and inclined chain guides or supports n^2, and stationary cams n^3 at the ends of the guiding-rails m' m^*, guiding-rails k k^*, for the dogs of the belt C, and inclined chain supports or guides j^3, and cams l' l^*, extending upward and forward at the receiving end of the belt C, all substantially as herein described.

5. The combination, with a pair of feeding-rolls and an endless belt of pins the lowermost portion of which is operative, with its pins presented downward, of a vertically-movable fiber-clearing blade or plate arranged within the belt of pins and working upward and downward between the pin-bars to throw or push off the fiber from the pins, and means of supporting and operating the said belts of pins and the said blade, substantially as herein described.

6. The combination, with a pair of feeding-rolls and an endless belt of pins the lowermost portion of which is operative, with its pins presented downward, and which comprises parallel pin-bars i, of the fiber-clearing blade or plate e, and the pivoted supporting-arms f therefor, provided with toes h, which project in the path of said pin-bars and are operated on by said bars to lift the said blade or plate and its said arms, substantially as herein described.

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Witnesses:
FREDK. HAYNES,
EMIL SCHWARTZ.