(No Model.) 2 Sheets—Sheet 1.

J. T. SMITH.

FINISHING MACHINE FOR FLAX OR HEMP FIBER.

No. 494,175. Patented Mar. 28, 1893.

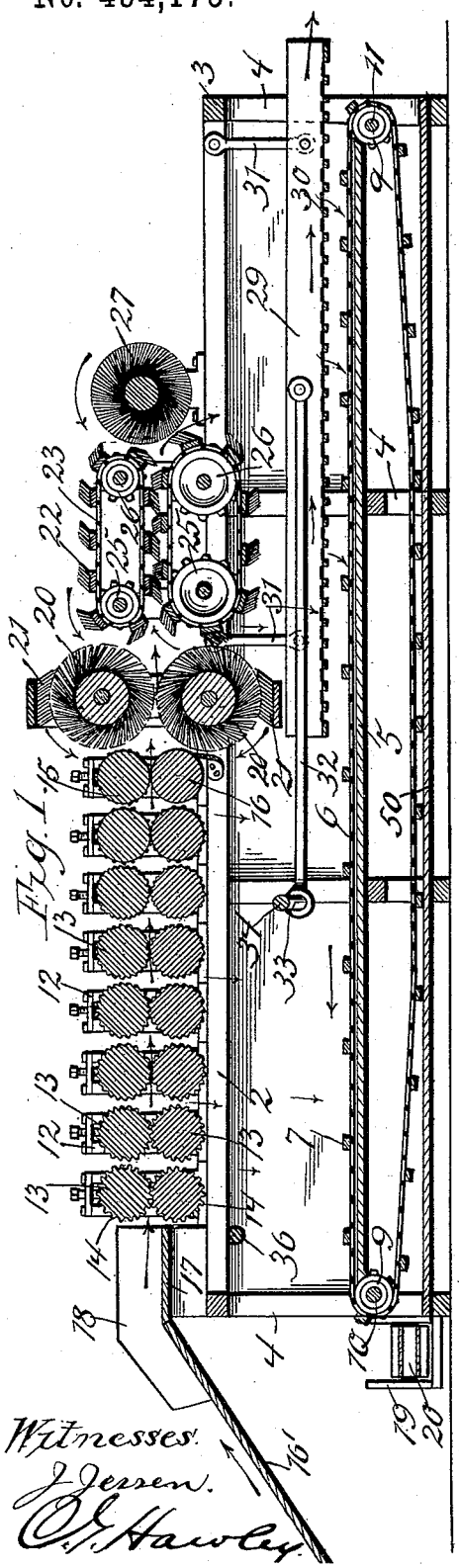

Fig. 1.

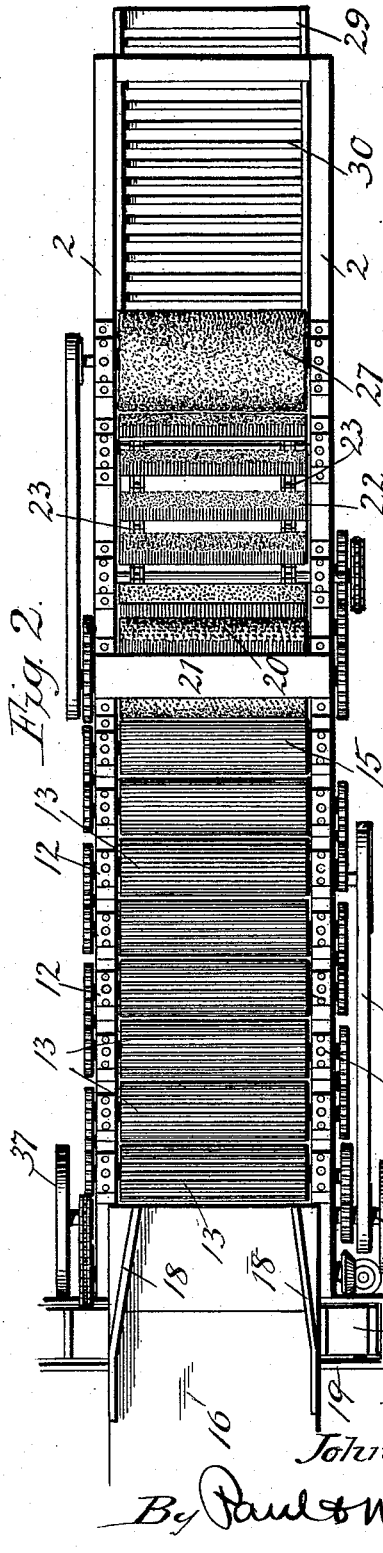

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

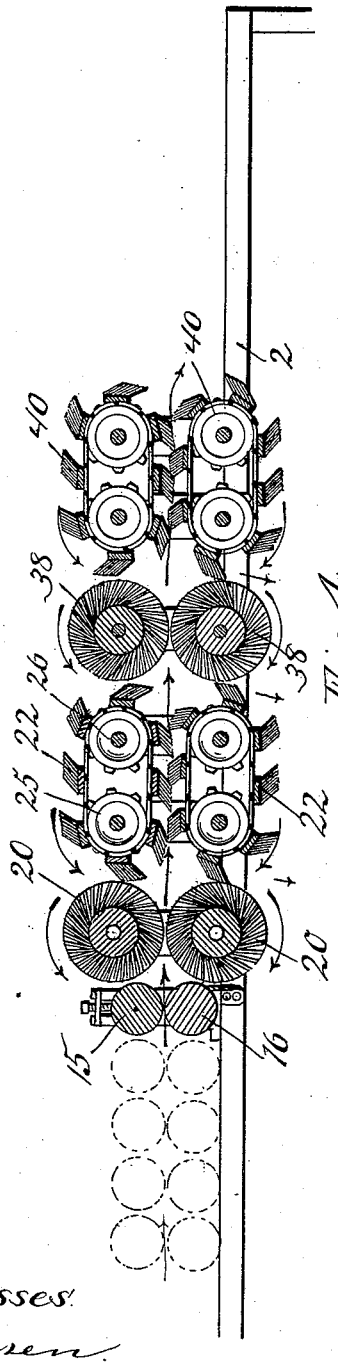
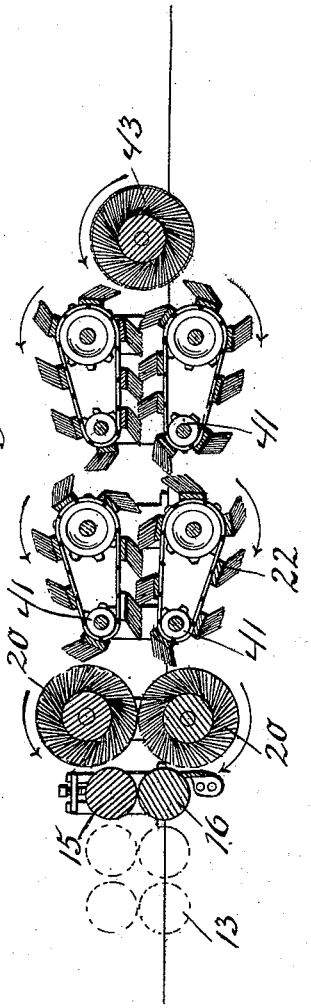


Fig. 4.



Witnesses.
J. Jensen.
C. F. Hawley.

Inventor.
John T. Smith.
By Paul & Merwin atty's.

UNITED STATES PATENT OFFICE.

JOHN T. SMITH, OF HERON LAKE, MINNESOTA.

FINISHING-MACHINE FOR FLAX OR HEMP FIBER.

SPECIFICATION forming part of Letters Patent No. 494,175, dated March 28, 1893.

Application filed April 23, 1892. Serial No. 430,414. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. SMITH, of Heron Lake, in the county of Jackson and State of Minnesota, have invented certain Improvements in Finishing-Machines for Flax or Hemp Fibers, (Case No. 3,) of which the following is a specification.

My invention relates to a machine which is particularly adapted for finally finishing, cleaning and separating the fine clean fibers of flax or hemp tow, which has previously been subjected to a preliminary breaking process, and its object is to materially simplify and cheapen the construction of finishing machines, and also to decrease the cost of maintaining the same in working order.

To this end my invention consists in a machine having a series of brake rolls of varied sizes in combination with carding and stripping devices, and a shaker upon which the fiber is thrown for a final loosening to sift out all of the woody particles which cling to the fiber.

My invention will be more readily understood by reference to the accompanying drawings, in which:—

Figure 1 is a longitudinal and sectional elevation of a finishing machine embodying my invention. Fig. 2 is a plan view thereof. Fig. 3 shows an enlarged or modified construction of the carding and stripping part of my machine, and Fig. 4 shows a second construction for the mechanism of Fig. 3.

As shown in the drawings, 2, 2 represent the long sills of the machine which are connected across the ends by beams 3 and supported upon the upright framework 4. An intermediate floor 5 is arranged in the lower part or the frame extending clear across the same and having suitable sideboards. A long conveyer running the full length of the machine is arranged to operate over this floor, the conveyer being made up of the two link belts 6 and the cross slats 7 secured thereon and extending between the same. The belts 6 revolve over the sprocket wheels 9 upon the shaft 10 and the shaft 11 arranged at opposite ends of the machine. The floor is of sufficient height from the ground so that the underside of the conveyer passes back on the second floor 50. Upon the forward ends of the sills 2 I arrange the bearing and guide blocks 12 and in each arrange a pair of corrugated rolls 13 there being in all preferably eight pairs of rolls. These rolls, beginning with the foremost which have deep corrugations, or widely separated teeth 14, become finer and finer with regard to their corrugations until finally in the last pair only the upper roll 15 is corrugated and that very finely, while the lower roll 16 presents a smooth surface to the stock which passes over it. These rolls are preferably provided with gears and each roll is driven from the corresponding roll of the next pair, which in turn drives the next corresponding roll in the series.

The stock is thrown upon the inclined table 16′ and sorted out in proper quantities therefrom by hand, being pushed thence upon the level part 17 of the table between the converging sideboards 18 and from thence it passes into the first and coarsest pair of rolls. All of the brake rolls revolve at the same rate of speed and the stock is operated through the same and the shives or woody fiber broken into finer and finer parts as the stock progresses through the same. A great portion of the shives is dropped down between the lower rolls and upon the long conveyer 6 and is carried thereby into the transverse trough 19 having the long conveyer 20 adapted to carry this waste material off to the fuel room of the factory. The stock is drawn forcibly from the rolls 15 and 16 by the very rapidly revolving carding rolls 20 between which the stock is delivered from the last pair of brake rolls. These rolls operate to draw out the fiber and to strip off the waste portions therefrom, and the pins in the rolls are so placed that the fiber is not broken or shortened.

The stationary cards or combs 21 are arranged above and below the upper and lower rolls respectively to comb off the carding rolls and take up the fiber clinging thereto, and this small quantity of fiber falls back over the carding rolls. As the fiber emerges from the carding rolls it is again subjected to a stripping and drawing action by the two sets

of cross bar cards 22, the backs of which are secured upon the sprocket chains 23 of the two endless belts which pass over the sprocket wheels 25 and 26 respectively. The carding teeth as shown, project forward so that when the stock is taken between them the shives are stripped off without breaking the fiber. These endless card belts revolve still more rapidly than the carding rolls 20. Close to the rear ends of the carding belts I arrange the large doffer or single card 27 revolving faster than any other part of the machine and adapted to take the stock directly from between the card belts and subject it to a final brushing to finish the same and detach all of the waste parts from the fiber. The doffer throws the fiber and the fine shives that are mixed therewith upon the reciprocating shaker 29 having a bottom made up of transverse slats 30. This shaker is hung upon the pivot arms or links 31 and is operated by one or more connecting rods 32 extending back to cranks 33 upon the cross crank shafts 34. The crank shaft is operated by the belt 35 extending from the main power shaft 36 of the machine. On the other end of the power shaft is a fly wheel 37 to give a steadiness of motion to the whole machine. In this manner I thoroughly clean the fiber and shake out all shives therefrom, which shives fall upon the long conveyer running over the floor 5 and are carried thereby to the conveyer 20, and thence to the fuel room. The finished stock drops off the rear end of the long shaker 29 upon the floor or a suitable conveyer.

In dealing with some kinds of flax or hemp stock the simple machine shown in Figs. 1 and 2 is all that is required, but in dealing with poorly prepared stock it is sometimes necessary to employ the additional stripping and cleaning devices shown in Figs. 3 and 4. The first may be set up the same as that in Fig. 1 except that I add thereto another pair of carding rolls 38 to take the stock from the endless carding belts having the cross slat cards 22. After passing through these additional card rolls the stock is again subjected to a drawing and cleaning process by a delivery into a second pair of carding belts 40, it being understood that the speeds of the various devices increase with respect to the other in which they receive the stock.

In Fig. 4 I have shown carding belts of a somewhat different construction, inasmuch as much smaller sprocket pulleys 41 are employed upon the ends which receive the stock, the idea being to pick up the stock as close as possible to the preceding rolls or pairs of belts. The doffer 43 of Fig. 4 corresponds to that numbered 27 in Figs. 1 and 2. In place of employing finely corrugated rolls 15 in connection with the smooth roll 16 I may substitute another smooth roll as shown in Figs. 3 and 4, so that the stock finally emerges from the brake rolls in thin, smooth and wide sheets.

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

1. The combination with a frame, of a series of brake rolls finely corrugated with a pair of carding rolls revolving at a higher rate of speed than the brake rolls and arranged to take the stock from the last pair thereof, a pair of endless carding belts having cross cards and arranged to receive the stock from said carding rolls, and a final cleaning and stripping device having a still greater speed, substantially as described.

2. The combination with a frame, of a series of diminishingly corrugated brake rolls, more rapidly revolving carding rolls to receive the stock from the last pair thereof, a pair of endless carding belts made up of endless chains, and cross slat cards means for finally stripping the shives from the stock, and reciprocating shaker to receive the fiber therefrom, and a long conveyer in the bottom of the machine to carry off the waste portions, substantially as described.

3. The combination with a series of diminishingly corrugated brake rolls, with carding rolls to receive the stock therefrom, a more rapidly revolving pair of stripping and carding belts having the cross cards 22, and a second pair of stripping and carding devices to receive the stock therefrom, substantially as described.

4. The combination with a series of brake rolls, of carding rolls to receive the stock therefrom, the combs 21 for cleaning said rolls, the endless carding belts arranged to receive the stock from said rolls, a second set of carding rolls, and a second set of carding belts, substantially as and for the purpose specified.

5. The combination with a series of brake rolls, the rapidly revolving carding rolls to receive the stock therefrom, the pins of said rolls being backwardly bent, endless carding belts having cross cards 22 and having their forward ends running over small sprocket wheels 41 and their rear ends over larger wheels and a final stripping and cleaning device, substantially as described.

6. The combination with the frame of the machine, of a table having an inclined and a level portion, a series of diminishingly corrugated brake rolls having a finely corrugated and a smooth roll, of a final pair of carding rolls 20 arranged to receive the stock from said brake rolls and operating more rapidly than the same, endless carding belts having the cross cards 22, said cards arranged to alternate in position, a final cleaning and stripping device, the shaker 29, the pivot arms 31 thereof, the slats forming the bottom of said shaker, the connecting rod or rods 32, the

crank shaft, the long conveyer extending between the whole, the floor over which said conveyer operates, and the second conveyer 20 to carry away the shives, all substantially as described and for the purpose specified.

7. The combination with a frame, of a series of brake rolls, carding rolls to receive the stock therefrom, and the endless carding belts to receive the stock from the carding rolls and to strip the same, substantially as described.

In testimony whereof I have hereunto set my hand this 11th day of April, 1892.

JOHN T. SMITH.

In presence of—
M. S. HANSON,
T. A. DIESON.