

(No Model.)

D. D. SPENCE.

MACHINE FOR DECORTICATING VEGETABLE FIBERS.

No. 464,308.

Patented Dec. 1, 1891.

Fig. 1.

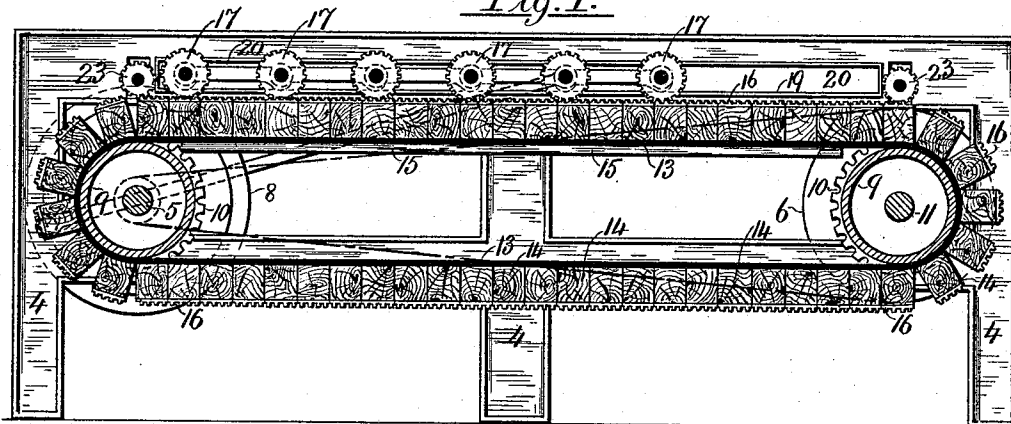


Fig. 2.

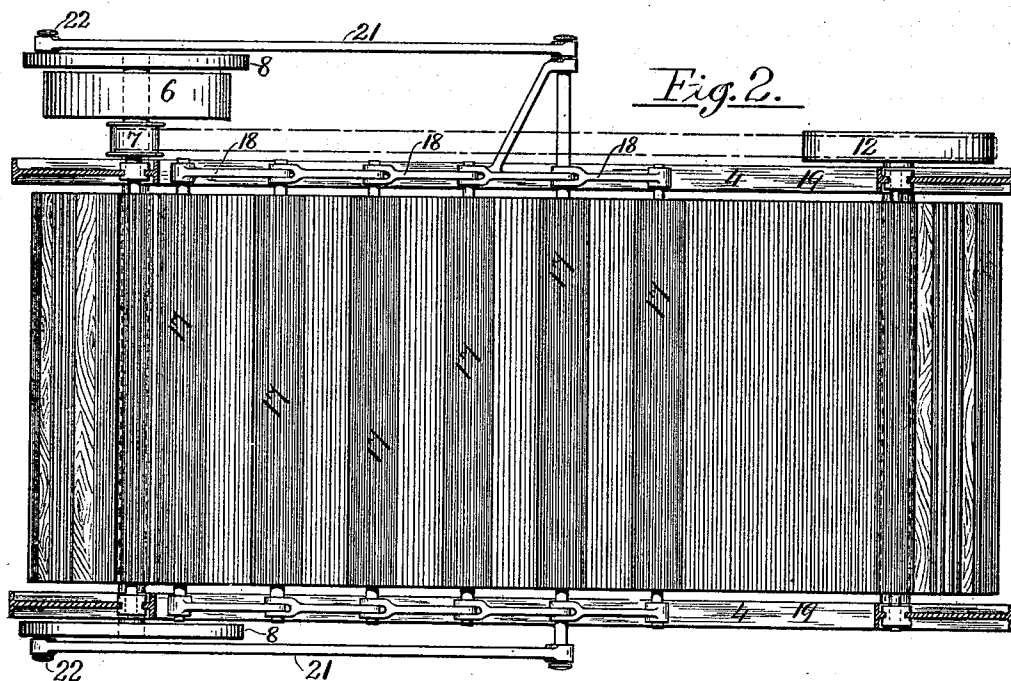
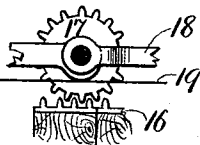


Fig. 3.



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MACHINE FOR DECORTICATING VEGETABLE FIBERS.

SPECIFICATION forming part of Letters Patent No. 464,308, dated December 1, 1891.

Application filed July 23, 1891. Serial No. 400,420. (No model.)

To all whom it may concern:

Be it known that I, DAVID D. SPENCE, of Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Machines for Decortivating Vegetable Fibers; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to an improved process for separating the fiber of hemp, flax, ramie, and other vegetable fibrous plants, or the leaves of plants, from the woody and silicious matter tenaciously adhering to such fiber, and in opening or separating the fiber, so as to adapt the same for carding, spinning, and the production of textile material, and also to machines by which the process is applied.

The invention consists in subjecting the prepared fiber to frequent bending and pressure while the fiber is supported on a horizontal plane and in the machine by which it is subjected to the process, as will be more fully set forth hereinafter.

In the various processes for decortivating and separating vegetable fiber more or less friction between the operating parts and the fiber has always been produced by which the fiber is subjected to heat and is liable to be torn. In the reciprocating breaker the plates in passing by each other exert strain and friction on the fiber placed between the same, and in the roller-breaker the teeth or corrugations exert a drawing friction on the fiber.

The object of this invention is to separate the fiber without subjecting the same to this drawing friction and consequent heating, and to this end I place the prepared fiber on the horizontal table, to which a gradual forward motion is imparted, and subject the fiber to the crushing and separating action of a series of corrugated rolls, to which a forward and backward rolling motion is imparted and by which every portion of the fiber is repeatedly subjected to the crushing and separating action of these corrugated rolls.

The machine by which I carry out this improved process is shown in the accompanying drawings provided with a corrugated bed, and

the rollers are shown supported at their ends in sliding bearings, so that the corrugations of the rolls, while they enter the corrugations of the bed, do not rest on the bed. This construction of the machine I find in practice carries out the process most expeditiously. The process may be carried out in a machine having a plane-surfaced table formed, preferably, of hard-wood blocks the end of the grain of which forms the surface of the table, and with such a plane-surfaced table the ends of the rolls are not supported in the slide, but the rolls rest directly on the surface of the table or the fiber placed on the same, which fiber is thus subjected to the same crushing and separating strain, but to a less degree to the bending action.

Figure 1 is a longitudinal vertical section of my improved decortivating-machine. Fig. 2 is a top view of the same, partly in section. Fig. 3 is an enlarged end view of one of the corrugated rolls, showing the manner of supporting the rolls and the relation of the rolls to the corrugated bed.

Similar numerals of reference indicate corresponding parts in all the figures.

In the drawings, 4 indicates the two side frames of the machine; 5, the main driving-shaft supported in suitable bearings formed in or secured to each one of the side frames 4. To the main driving-shaft 5 the driving-pulley 6 and the small pulley 7 are secured on one side of the machine, and to the opposite ends of the main driving-shaft 5 the crank-disks 8 are secured. Two drums 9, each provided at the opposite ends with the sprocket-wheels 10, are placed on the opposite ends of the machine, one of these being provided with a tubular shaft and supported on and turning on the main driving-shaft 5, while the other (shown on the right-hand side of Fig. 1) is secured to and turns with the shaft 11, which is supported in suitable bearings in the opposite side frames 4. The pulley 12 is secured to the shaft 11 and is connected with the pulley 7 by a driving-belt. The drums 9 form the support for the endless belt 13, to which the wooden blocks are secured, so that on the straight lines they form a table. To secure a firm support for this table the blocks 14 slide on the inwardly-projecting shelf 15,

formed on or secured to the inner side of the side frames 4. The upperfaces of the blocks 14 are covered with the corrugated plates, thus forming a table having transverse 5 grooves and ridges. The rollers 17 are grooved lengthwise with grooves and ridges corresponding with the grooves and ridges of the corrugated plates 16, similar to an ordinary rack and pinion. The shafts of these rollers 10 17 extend through and are supported in the chain-links 18, which links are provided with curved skids or sliding surfaces resting and sliding on the horizontal plane surfaces 19, forming the lower horizontal surface of the slot 20, in which the chain-links and shafts of the rollers 17 reciprocate. By means of these 15 chain-link connections all the rollers 17 may be moved or rolled simultaneously over the table, and while each roller may rise independent of the others and all may exert the pressure due to their weight they are held from entering the grooves of the table, so as to bear on the bottom of the grooves. The shaft of one of the rolls is connected at the opposite ends by means of the connecting-rods 21 25 with the wrist-pins 22, secured to the crank-disks 8.

Near each end of the machine are placed the rollers 23, journaled in boxes having capacity 30 for vertical motion. These rollers rest on the table and engage with the corrugated plates forming the surface of the blocks 14, so that these rollers 23 turn with the table. They act as feed and delivery rolls.

The operation of the machine is as follows: 35 The pulley 6, being connected by means of a belt with a pulley to which rotary motion is imparted by some prime motor, imparts rotary motion to the shaft 5, the pulley 7, and 40 the crank-disks 8. The small pulley 7, being connected with the large pulley 12, imparts a slow rotary motion to the shaft 11, and to the drum 9 secured thereto, and to the sprocket-wheel 10. The belt 13 or the blocks 14 being 45 provided with pins entering the sprocket-wheels 10, motion is imparted to the table formed of the belt 13 and blocks 14, by which the blocks are made to slide on the ways 15, formed on each inner side of the side frames. 50 The fiber, being placed on the table on the right-hand side of Fig. 1, is fed in by the roll 23 and carried slowly along on the upper corrugated surface of the table, where it is subjected to the actions of the forward and backward rolling rollers 17, operated by the crank-disks 8 and connecting-rods 21. As the fiber 55 is continually but slowly moved with the table from one end of the machine to the other, the rollers 17 are rolled many times forward and backward over the table, and the corrugations or ribs of these rollers repeatedly exert a crushing, bending, and separating force on the fiber, so that by the time the fiber reaches the roll 23 on the left-hand side of the machine 65 the fiber is delivered in an opened-out and separated condition with all the foreign

matter so loosened from the fiber that the fiber may at once be placed on a carding-machine and prepared for spinning. As the weight of the rolls 17 is prevented from pressing 70 directly on the table, the frictional contact, so injurious to the fiber, is avoided, and the fiber leaves the machine without being heated by frictional contact and without being torn or broken. A cleaner, longer, and 75 softer fiber is the result.

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

1. In a machine for opening and separating 80 vegetable fiber, the combination, with a series of blocks secured together to form an endless flexible table, of corrugated metal plates secured to the blocks so as to form the surface of the table, drums supported in bearings and 85 adapted to operate the endless table, a series of corrugated rolls connected at opposite ends by chain-links and supported on horizontal slides, slides forming the support of the table, and mechanism, substantially as 90 described, for operating the whole, as described.

2. The combination, with the side frames 4, provided with the horizontal slides 15 and 19, the drums 9, the endless belt 13, the blocks 95 14, having the corrugated plates 16 secured to their outer surfaces, of the corrugated rollers 17, the chain-links 18, adapted to connect the shafts of the rollers and support the rollers on the slides 19, and mechanism, substantially as described, by which a slow forward 100 movement is imparted to the endless table and a quicker forward and backward motion to the rollers 17, as and for the purpose described. 105

3. In a machine for opening and separating vegetable fiber, the combination of the following instrumentalities: a table forming the support for the fiber and consisting of a series of blocks the outer surfaces of which 110 are corrugated to form alternate grooves and ridges, said blocks being connected together to form an endless table, drums on which the endless table is supported, a series of corrugated rollers connected at opposite ends by 115 links and adapted to roll forward and backward over the table, two corrugated rolls meshing with the corrugations of the table, supported in bearings having capacity of vertical motion and placed near the opposite 120 ends of the machine, forming feed and delivery rolls, and mechanism, substantially as described, by which a slow forward motion is imparted to the table and a quicker forward and backward motion to the series of rolls, as 125 described.

4. The combination, with the drums 9 and the endless table supported on the same, of the series of rollers 17, connected together by the links 18, the feed and delivery rolls 23, 130 and the frames 4, adapted to support the machine, of the shaft 5, having the pulleys 6 and

7, and the crank-disks 8, secured to the same, the pulley 12, connected by a belt with the pulley 7, and the connecting-rods connecting the crank-disks with the shaft of one of the
5 pulleys 17, adapted to impart a slow forward motion to the table and the fiber placed on the same, and a quick forward and backward motion to the rollers 17 to compress, bend, separate, and decorticate the vegetable fiber in its passage through the machine, as described.

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