

Sept. 15, 1942.

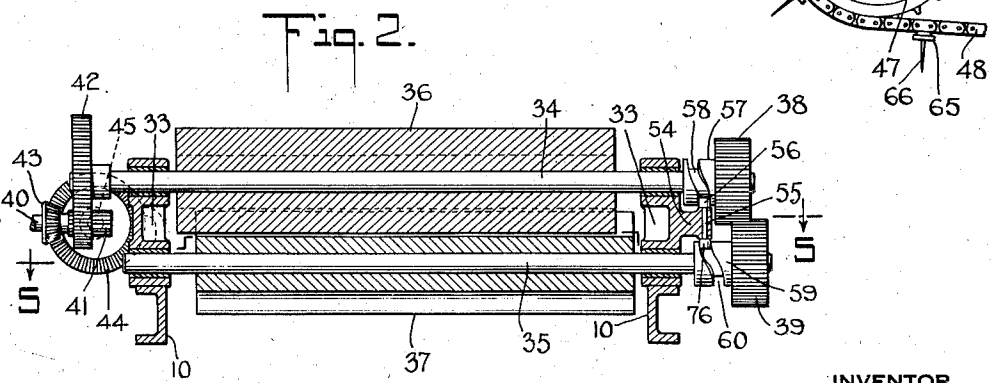
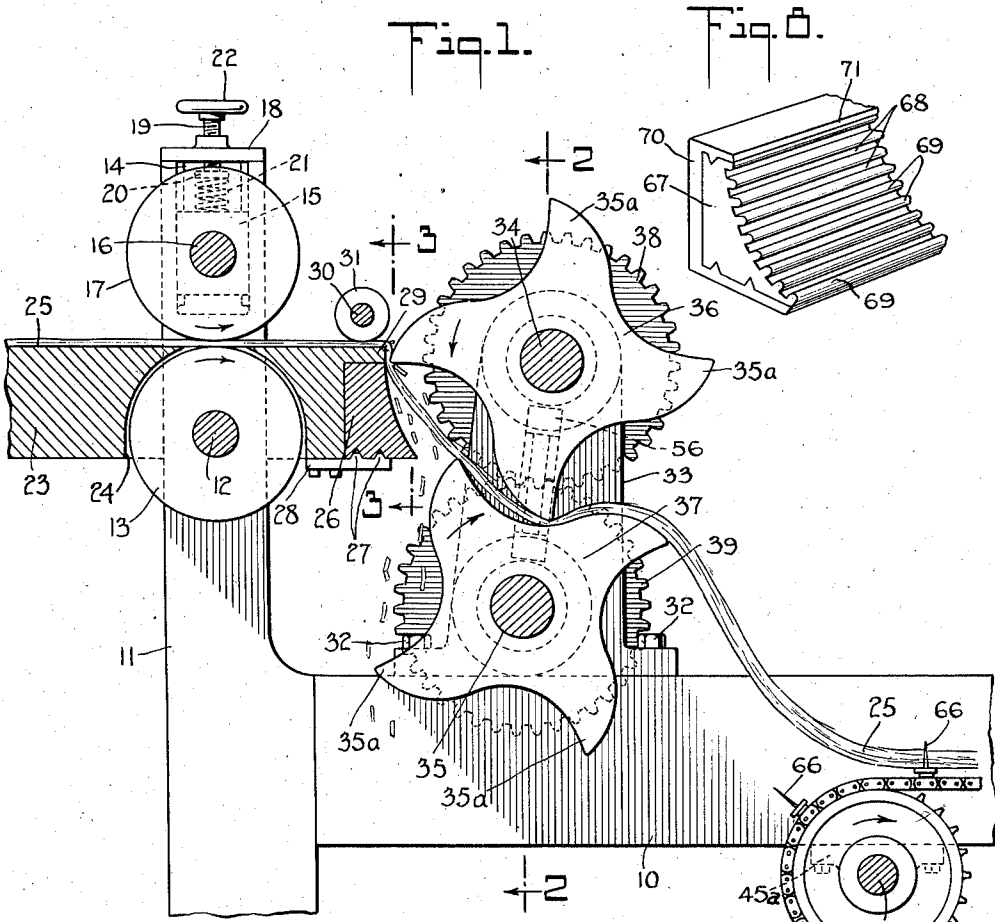
W. A. BOYCE

2,295,929

DECORTICATING MACHINE

Filed April 13, 1940

2 Sheets-Sheet 1



INVENTOR,
William A. Boyce
Henry J. Pucke
ATTORNEY

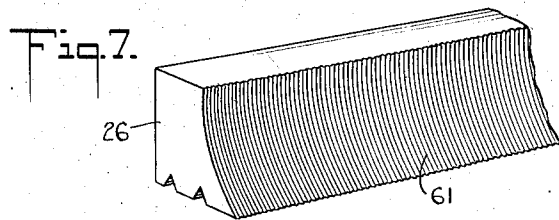
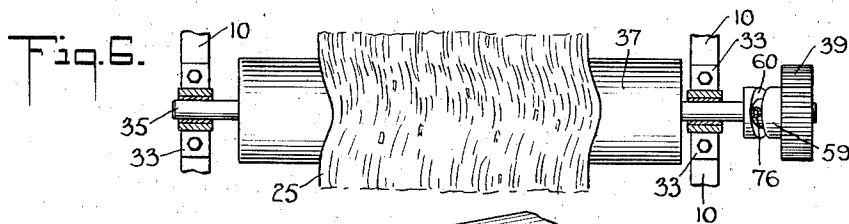
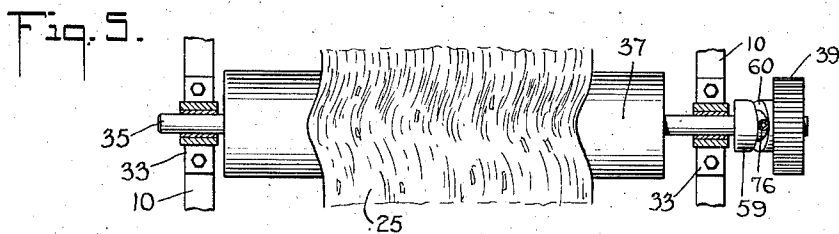
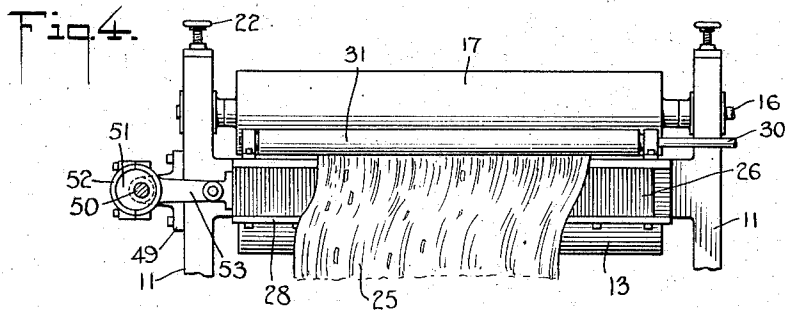
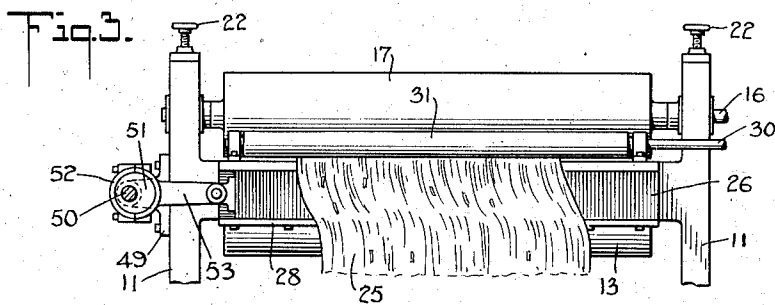
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W. A. BOYCE
DECORTICATING MACHINE

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2 Sheets-Sheet 2



INVENTOR
William A. Boyce
BY *Henry J. Lucke*
HIS ATTORNEY

UNITED STATES PATENT OFFICE

2,295,929

DECORTICATING MACHINE

William A. Boyce, Bridgeport, Conn.

Application April 13, 1940, Serial No. 329,512

4 Claims. (Cl. 19—25)

My present invention relates to fiber preparing devices and more particularly to an improved scutching machine for flax, hemp, ramie, and the like.

In carrying out my invention, I provide a scutching machine, having the usual stalk feeding and controlling mechanism for feeding stalks to and over an apron and with such operation associate a scutching rotor or rotors, or a train of rotors for mechanically removing the shives from the fibrous part of the stalks. I have, however, devised a new and improved combination of devices associated with the usual scutching elements above referred to and which enable me to more rapidly and efficiently, both from a productive and loss of material point of view, process material of this character.

In my present invention I arrange the apron preferably with a plurality of parallelly arranged substantially vertical situated grooves, and with means for reciprocating the apron longitudinally, that is, in a direction transverse to the direction of feed of fibrous material thereover to thereby effect the turning or twisting of the stalks of fiber on its axis and thus present every portion thereof to the action of the scutching roller. Also, I provide means for use in connection with the scutching rotor or rotors, or train of rotors by which either one or more, or a plurality of scutching rotors simultaneously may be reciprocated longitudinally of their axes of rotation, and such reciprocation may take place in conjunction with reciprocating apron or any other combination of movements of the various elements may be produced as desired.

A feature of my invention, therefore, is an improved decortivating machine for decortivating flax, hemp, ramie and the like.

Another object of my invention is an improved scutching machine in which means is provided for feeding stalks of material into a scutching or decortivating zone and moving such stalks laterally of their line of travel and to and fro, so as to impart a wavy or shaky motion to the stalks during the scutching operation.

Still another object of my invention is an improved scutching machine in which a reciprocating apron is provided over which the stalks to be scutched are fed and with which apron is associated a scutching rotor.

A further object of my invention is an improved scutching machine in which the scutching elements are reciprocable, either singly or in combination, through any desired extent.

Other features of the invention will appear as the description of the invention progresses.

In the accompanying drawings:

Fig. 1 is a sectional elevation of a portion of a scutching machine in which my present invention is embodied.

Fig. 2 is a vertical sectional elevation on the line 2—2 of Fig. 1, looking in the direction of the arrows shown in connection with such figure.

Fig. 3 is a sectional elevation taken on the line 3—3 of Fig. 1, and showing a web of fibrous producing stalks movable out of their line of travel by the reciprocation of the reciprocating apron.

Fig. 4 is a view similar to Fig. 3, but illustrating the distortion of the web of fibrous material in the opposite direction from that shown in Fig. 3, due to the reciprocation of the apron in the opposite direction.

Fig. 5 is a sectional plan view taken on the line 5—5 of Fig. 2 and showing the lowermost scutching rotor in elevation, and also illustrating the distortion of the web of fibrous material which takes place when the upper or lower rotors are individually reciprocated.

Fig. 6 is a view similar to Fig. 5 and showing the distortion in the opposite direction of the web of fibrous material when the upper and lower rotors are reciprocated in the opposite direction to that illustrated in Fig. 5.

Fig. 7 is a perspective view of a portion of the apron illustrating the corrugation or grooves on the working face thereof, and

Fig. 8 is a perspective view of one end of an anvil showing a modified form of apron associated therewith.

Referring to the drawings, 10 designates side frame members connected at one end to an upright end frame member 11. Journaled in the side frame members is a shaft 12 carrying a crushing and feed roll 13, smooth or corrugated as desired. Formed in the upper ends of the end frame member 11 is a slot 14, in each of which is slidably mounted a bearing block 15. Rotatably mounted in the bearing blocks 15 is a shaft 16 carrying a crushing and feed roll 17, of the same character as the crushing and feed roll 13. The open top of each of the slots 14 is closed by a member 18 in which is threaded a screw 19, such screw 19 carrying at its lower end and within the slot 14 a plate 20. Between the plate 20 and the upper end of the bearing block 15 is a coil spring 21. The coil springs 21 force the bearing block 15, and, therefore, the crushing and feed roll 17 downwardly into close association with the crushing and feed roll 13. A hand wheel 22 on the

screw 19 is utilized to assist in the rotation of the screws 19 in either direction.

To the end frame members 11 is secured a platform 23, such platform, as shown in Fig. 1, being cut away at 24, to provide a housing for the lower crushing and feed roll 13, and also to permit a portion of the periphery of the crushing and feed roll 13 to extend upwardly through the upper surface of the platform 23 in order that the crushing and feed roll 17 may assist in crushing and feeding the fibrous material 25.

The end of the platform 23 extends to a point above the side frame members 10, and the lower front face of the platform is cut away to provide a recess in which is slidably mounted an apron 26. The under face of the apron 26 is grooved, as shown, to provide a housing for aligned projections 27 on a member 28 bolted to the under face of the platform 23. The upper outer end of the platform 23 is practically square, but is slightly rounded to prevent undue cutting of the fibrous material 25. The upper, outer end constitutes a stationary anvil 29 over which the fibrous material 25 is fed by the cooperating crushing and feed rolls 13 and 17, and such crushing and feed rolls prevent a too rapid or uneven feeding movement of the stalks of fibrous material 25. Adjacent to the anvil 29 and above the upper surface of the platform 23 is rotatably mounted a shaft 30 carrying preferably a resilient hold down roll 31, the function of which primarily is to prevent the ends of the stalks of fibrous material 25 from riding upwardly.

Secured to the upper edges of the side frame members 10 by bolts 32 are bearing standards 33, these bearing standards being provided with pairs of aligned bearings. In one pair of aligned bearings is rotatably mounted a shaft 34, while in the other pair of aligned bearings is rotatably mounted a shaft 35. These shafts lie parallel to each other and on such shafts are mounted the scutching rotors 36 and 37, respectively. As shown, the scutching rotors 36 and 37, are provided with radially extending ribs or blades 35a.

The ribs or blades 35a of each of the decortivating rolls 36 and 37 interengage with the depressions between the adjacent ribs or blades 35a on the other decortivating roll during the rotary movement of the rolls, as clearly shown in Fig. 1.

The decortivating rolls 36 and 37 are driven at the same speed and in opposite directions by the gear 38 attached to the shaft 34, and the gear 39 attached to the shaft 35. The gears 38 and 39 are side faced gears to permit a longitudinal movement of the shafts 34 and 35 within reasonable limits without having the gears 38 and 39 go out of mesh with each other.

The shaft 34 is the drive shaft and obtains power from a shaft 40 through a pinion 41 on such shaft 40, meshing with a driving gear 42 on the shaft 34. In order to permit a reciprocating movement of the shaft 34, the pinion 41 is made with a relatively long face. Secured to the drive shaft 40 is a bevel pinion 43 which meshes with and drives a bevel gear 44 secured to one end of a shaft 45 and from which the shaft 12, carrying the crushing and feed roll 13 is driven through suitable instrumentalities.

Secured to the under edge of the side frame members 10 are aligned pillow blocks 45a in which is rotatably mounted a shaft 45 carrying

the sprocket wheels 47 rotating in the direction of the arrow shown in Fig. 1. Over the sprocket wheels 47 run endless conveyor chains 48. The sprocket wheels 47 are spaced apart from each other on the shaft 46. Connecting the sprocket chains 48 are cross bars 65, such cross bars being spaced along the length of the chains 48. Along the length of the cross bars 65 are arranged pins 66. It will be understood that other sprocket wheels are mounted on a shaft similar to the shaft 46, but a showing of such other sprocket wheels and shaft is not deemed necessary. The sprocket chains 48 with the cross bars 65 and pins 66 constitute a conveying belt or drawing frame on which the scutched fibrous material 25 is fed and carried away to any suitable delivery point in the desired manner. The shaft 46 is driven in any desired manner, and if desired, from the main drive shaft 40, or from the drive shaft 45.

The apron 26 may be reciprocated in any desired manner. For example (see Fig. 3) on one of the side uprights 11 may be mounted a bearing member 49 in which is rotatably mounted a shaft 50 driven from the shaft 45. Secured to the shaft 50 is an eccentric 51 rotatably mounted in an eccentric strap 52 at one end of a connecting rod 53. The other end of the connecting rod 53 is pivotally attached to one end of the apron 26. The speed of reciprocation of the apron 26 may bear any desired relation to the rotary movement of the crushing and feed rolls 13 and 17, or to the speed of rotation of the scutching rotors 36 and 37.

The scutching rotors 36 and 37 may be reciprocated in any desired manner, as by the following mechanism (see Fig. 2). In one of the bearing uprights 33 is a projection 54, and in this projection is provided a shaft 55 carrying on its upper end a cam roller 56 and on its lower end a cam roller 76. On the shaft 34 is secured a cam 57 provided with a cam race 58 in which fits the uppermost cam roller 56. Secured to the shaft 35 is a cam 59 provided with a cam race 60 with which cooperates the lowermost cam roller 76. As the shafts 34 and 35 are rotated, they will be constrained to take on a longitudinal reciprocating motion in conformity with the pitch of the cam races 58 and 60.

The working surface of the apron 26 may be plain or grooved. Preferably the working surface is grooved and one type of such grooving is shown in Figs. 3 and 4, and on an enlarged scale in Fig. 7. In such figures the grooving is perpendicular. I may, however, have such grooving extending horizontally and reference is hereby had to Fig. 8 in which is shown, on a relatively enlarged scale, an apron 67 provided with the horizontally arranged parallel grooves 68 with the intervening ridges 69. The grooves 68 are relatively deep and provide a recess into which the shives may be forced or moved as such shives are removed from the fibrous material 25. The apron 67 is slidably mounted in the front end of a platform 70 and the anvil portion 71 thereof lies practically, or substantially, in the curved surface in which lies the top of the ridges 69. The grooves, as the grooves 61 in Fig. 7, or the horizontal grooves shown in Fig. 8, materially assist in the removal of shives from the fibrous material, and, further, they assist in rotating the stalks of fibrous material 25 on their axes, as the aprons are reciprocated in the front face of the platforms.

As any or all of the scutching rotors 36 and 37, as well as the apron 26 may reciprocate simultaneously or in desired combination, a variety of situations may arise:

(1) The apron 26 may remain stationary and the scutching rotor 36 may rotate and simultaneously reciprocate.

(2) The apron 26 remains stationary and the scutching rotors 36 and 37 may both rotate and reciprocate simultaneously but in opposite directions.

(3) The apron 26 may reciprocate and the scutching rotor 36 may rotate but without reciprocating movement.

(4) The apron 26 may reciprocate, the scutching rotor 36 may rotate but not reciprocate, and the scutching rotor 37 may rotate and simultaneously reciprocate.

(5) The apron 26 may reciprocate and the scutching rotor 36 may rotate and reciprocate in a direction opposite to the direction of reciprocation of the apron 26.

(6) The apron 26 may reciprocate, the scutching rotor 36 may rotate and reciprocate in an opposite direction to the reciprocation of the apron, and the scutching rotor 37 may rotate and reciprocate in a direction opposite to the reciprocation of the scutching rotor 36.

Various other combinations of movements may be had, all within the scope of the present invention, but the above noted are illustrative and need not be enlarged upon.

Referring now to Fig. 3, there is shown the web of fibers 25 draped from the apron 26, and being inclined in a direction to the right and downwardly as viewed in such figure. This may occur when the scutching rotor 36 is stationary but rotatable on its axis and the apron 26 reciprocates. The movement of the stalks of fiber 25 under this combined rolling and combing action exerted between the scutching rotor 36 and the corrugated face of the apron 26 will result in rolling the individual stalks on their axes, and thus bring every portion of the partially scutched stalks into operative relation to the extending faces of the scutching rotor 36. The same action will occur if the apron 26 is stationary and the reciprocating motion takes place in the scutching rotor 36.

Fig. 4 shows the results of a reciprocating movement of the apron in a direction opposite to that suggested with regard to Figure 3, or the same movement of the stalks of fiber 25 may take place where the apron 26 is stationary and any reciprocating movement residing only in the scutching rotor 36. This rolling or turning of the fibrous material 25 occurs also between scutching rotors 36 and 37, and the result of the reciprocation in one direction of either of the scutching rotors 36 and 37 is illustrated in Fig. 5, while the direction of motion of such fibers in the opposite direction is illustrated in Fig. 6. As the manner in which this is produced is clearly described above with respect to Figs. 3 and 4, a detailed description thereof is not deemed necessary. The vertically arranged parallel grooves 61 in the working face of the apron 26 with the resultant corrugated appearance of the working face, are clearly illustrated in the perspective view of the structure shown in Fig. 7, while the horizontally arranged parallel grooves 68 are clearly illustrated in the perspective view of the structure shown in Fig. 8.

Whereas, I have described my invention by reference to specific forms thereof, it will be understood that many changes and modifications

may be made without departing from the spirit of the invention.

I claim:

1. An apparatus for treating fibrous material comprising in combination a platform, combined crushing and feeding means associated therewith for feeding stalks of fibrous material over the platform at a definite rate of speed, an anvil formed on one end of the platform, a hold-down roller mounted above the platform adjacent the anvil, whereby the stalks of fibrous material are held in close association with the platform, an apron mounted in the end of the platform and having an arcuate face provided with corrugations extending perpendicular to the width of the platform, a scutching rotor provided with a plurality of radially extending ribs or blades, and having the outermost edge of said ribs or blades cooperating with the anvil and apron, whereby upon rotation of the scutching rotor the ribs or blades break and remove the shives from the stalks of fibrous material, and means for imparting relative reciprocating movement parallel to each other between the anvil and scutching rotors.

2. An apparatus for treating fibrous material comprising in combination an anvil, a platform over which stalks of fibrous material are fed, means for feeding the stalks of fibrous material over the platform into association with the anvil at a predetermined rate of speed, an apron having an arcuate face located beneath the anvil and slidably mounted to move transversely of the width of the platform, means for reciprocating said apron, said apron being provided with a plurality of corrugations on its working face and said corrugations extending perpendicular to the working face of the anvil, and a scutching rotor provided with a plurality of spaced radially extending ribs or blades, said scutching rotor being mounted for rotation on an axis lying parallel to the working face of the apron, whereby the working edges of the ribs or blades are in operative association with the anvil and the working face of the apron, and means for simultaneously rotating and imparting a reciprocatory motion to the scutching rotor and for reciprocating said rotor in a direction opposite to the reciprocation of the apron.

3. An apparatus for treating fibrous material comprising in combination an anvil, a platform over which stalks of fibrous material are fed, means for feeding stalks of fibrous material over the platform into association with the anvil at a predetermined rate of speed, an apron having an arcuate face located beneath the anvil and slidably mounted to move transversely of the width of the platform, means for reciprocating said apron, said apron having a plurality of corrugations arranged in its working face and lying parallel to the anvil, and a scutching rotor provided with a plurality of spaced radially extending ribs or blades, said scutching rotor being mounted for rotation on an axis lying parallel to the working face of the apron, whereby the working edges of the ribs or blades are in operative association with the anvil and the working face of the apron, and means for simultaneously rotating and imparting a reciprocatory motion to the scutching rotor and for reciprocating said rotor in a direction opposite to the reciprocation of the apron.

4. An apparatus for treating fibrous material comprising in combination a stationary anvil, a feeding apparatus for feeding the fibrous mate-

rial over said anvil, an apron slidably mounted in the face of the stationary anvil and below the working edge thereof, a scutching rotor provided with radially extending ribs or blades and mounted on an axis parallel to the working edge of the anvil, means for reciprocating the apron in the stationary anvil and in a direction parallel to the

axis of rotation of the scutching rotor, and means for rotating the scutching rotor to engage first with the working edge of the stationary anvil and subsequently with the face of the slidably mounted apron.

WILLIAM A. BOYCE.