(No Model.) 6 Sheets—Sheet 1.

E. MARC.

MACHINE FOR DISINTEGRATING RAMIE AND OTHER FIBROUS MATERIALS.

No. 440,775. Patented Nov. 18, 1890.

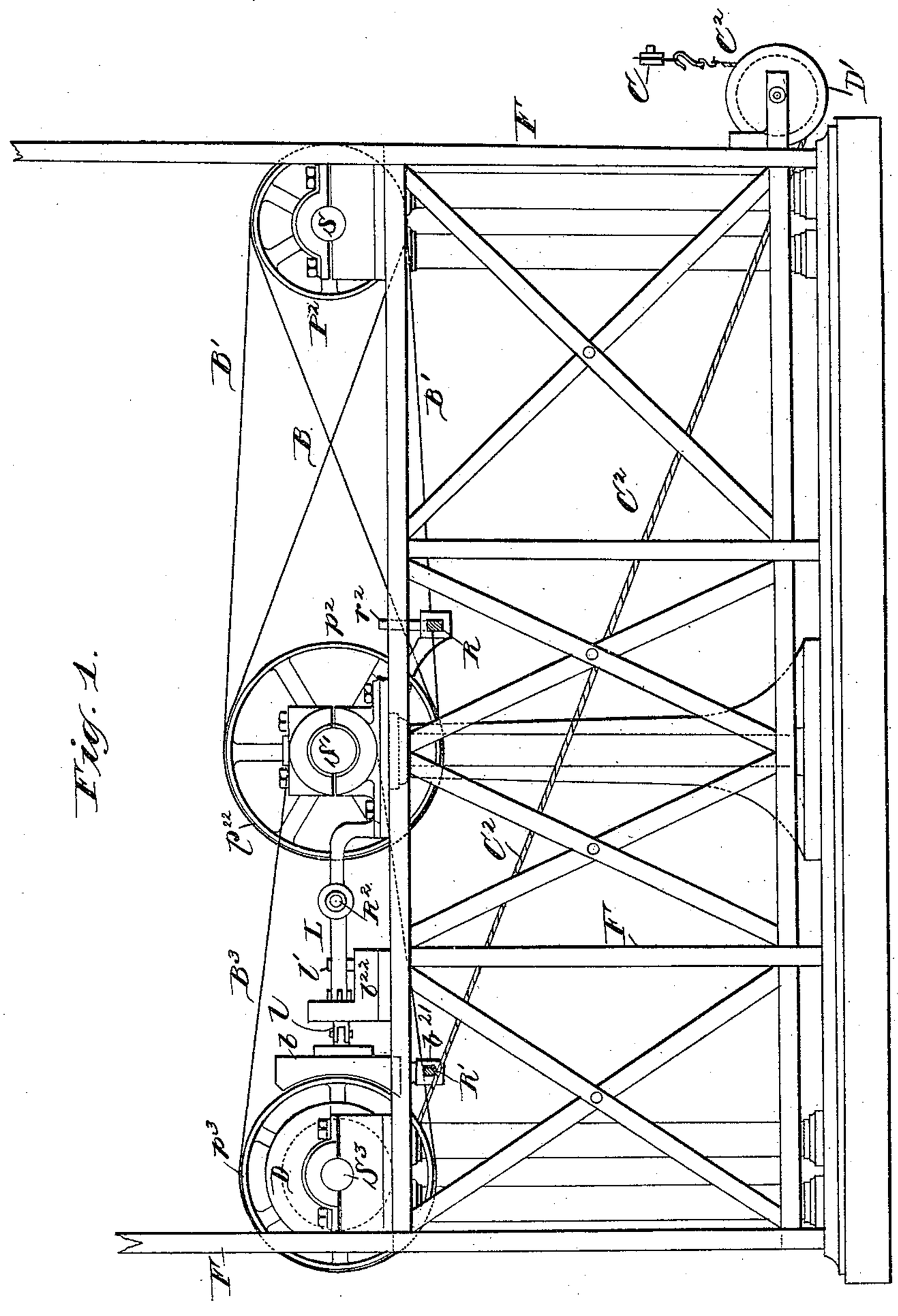

Fig. 1.

Witnesses.
J. Thomson Cross.
A. D. Weaver.

Inventor:
Edmond Marc.
per Henry A. Abby.

(No Model.) 6 Sheets—Sheet 2.

E. MARC.

MACHINE FOR DISINTEGRATING RAMIE AND OTHER FIBROUS MATERIALS.

No. 440,775. Patented Nov. 18, 1890.

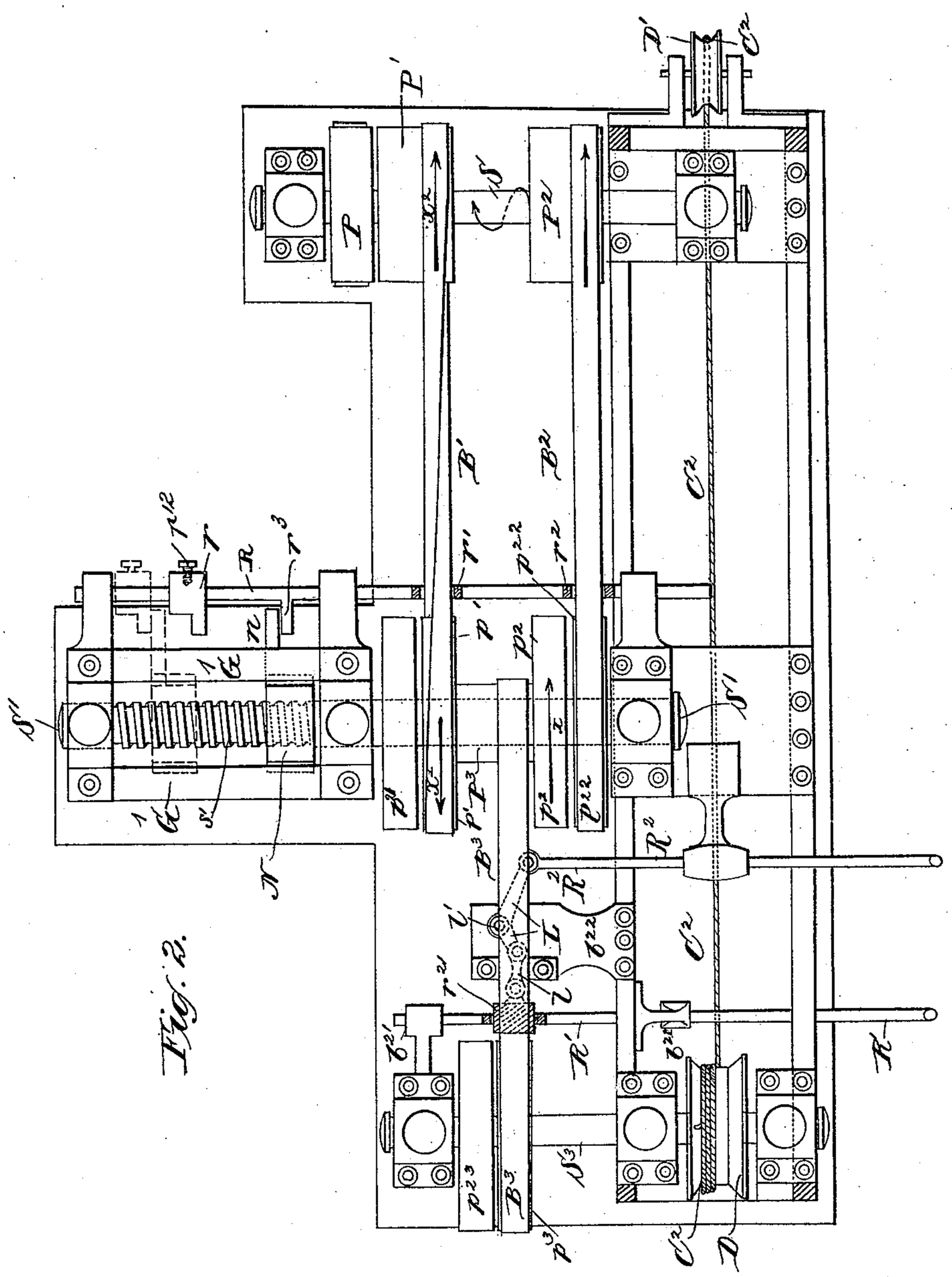

Fig. 2.

Witnesses.
J. Thomson Cross
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(No Model.)

6 Sheets—Sheet 3.

E. MARC.

MACHINE FOR DISINTEGRATING RAMIE AND OTHER FIBROUS MATERIALS.

No. 440,775. Patented Nov. 18, 1890.

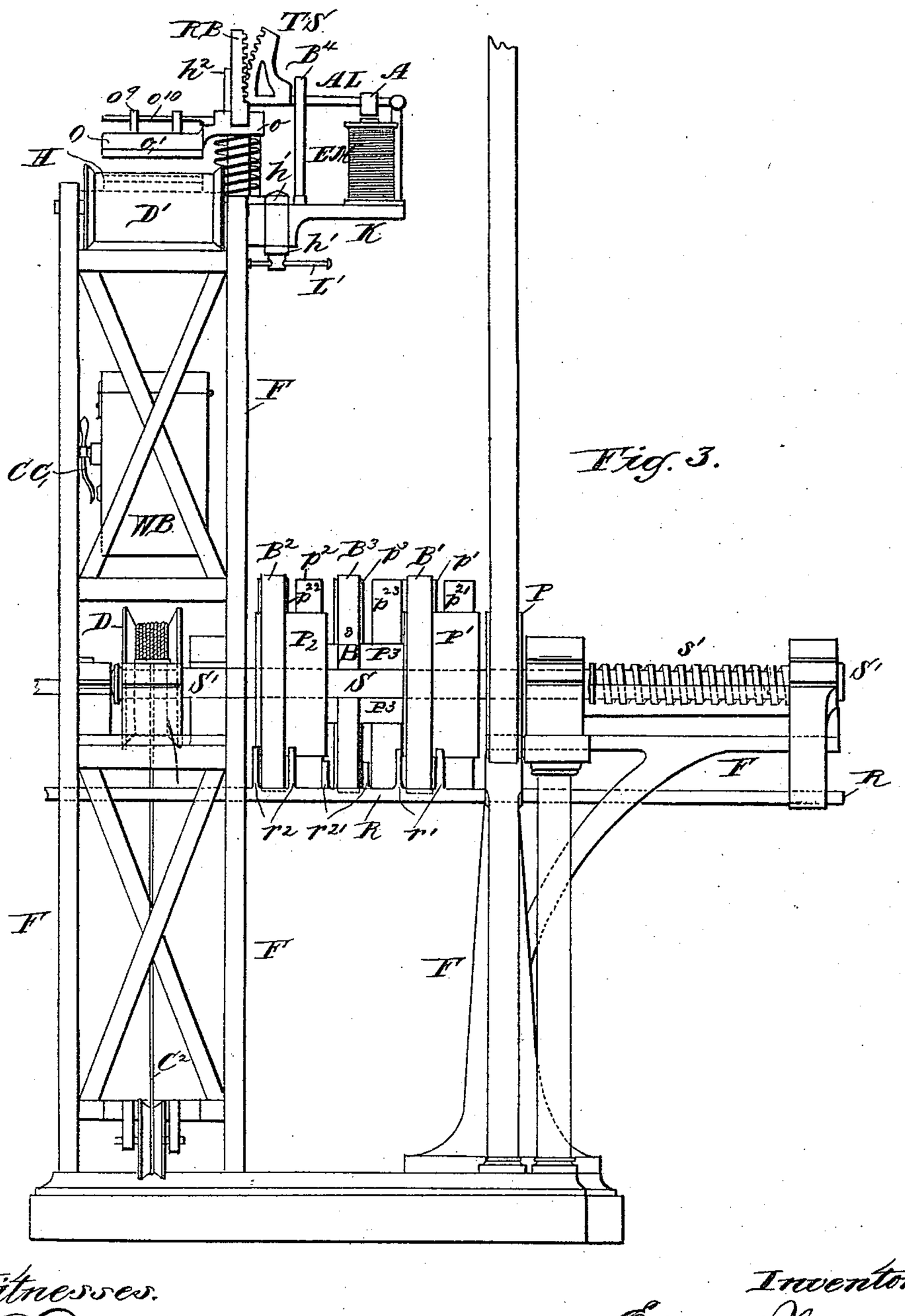

Fig. 3.

Witnesses.
J. Thomson Cross
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Edmond Marc
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Att'y.

(No Model.) 6 Sheets—Sheet 4.

E. MARC.

MACHINE FOR DISINTEGRATING RAMIE AND OTHER FIBROUS MATERIALS.

No. 440,775. Patented Nov. 18, 1890.

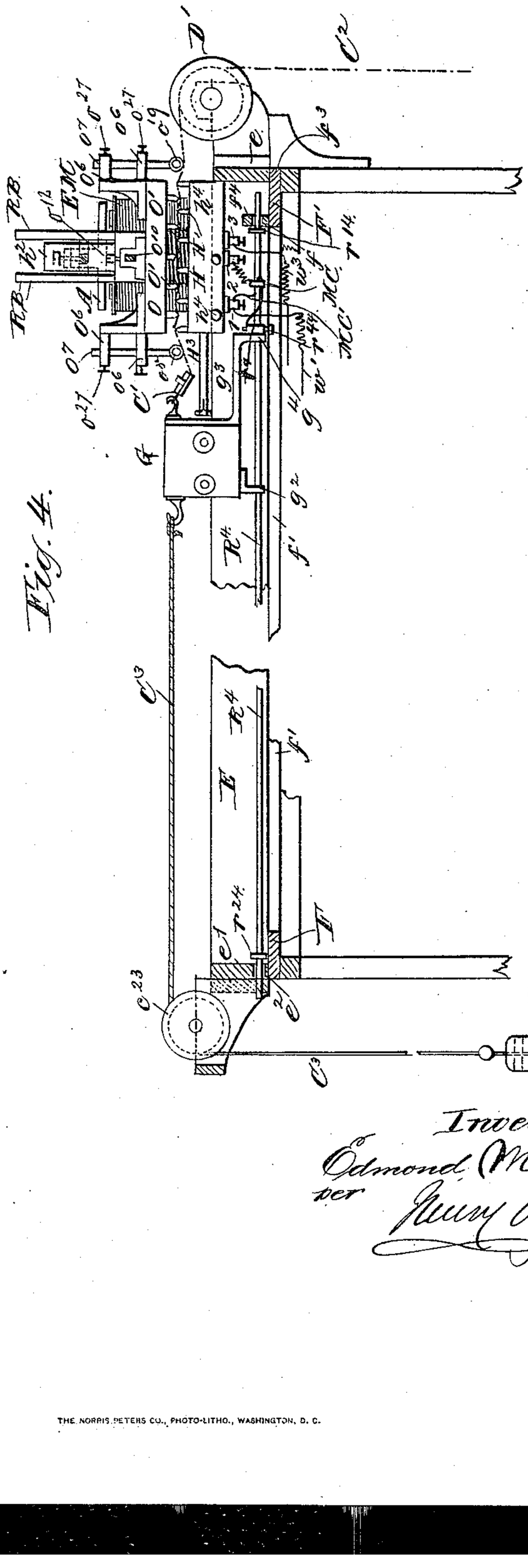

Fig. 4.

Witnesses.
J. Thomson Cross.
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Edmond Marc
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(No Model.) 6 Sheets—Sheet 5.

E. MARC.

MACHINE FOR DISINTEGRATING RAMIE AND OTHER FIBROUS MATERIALS.

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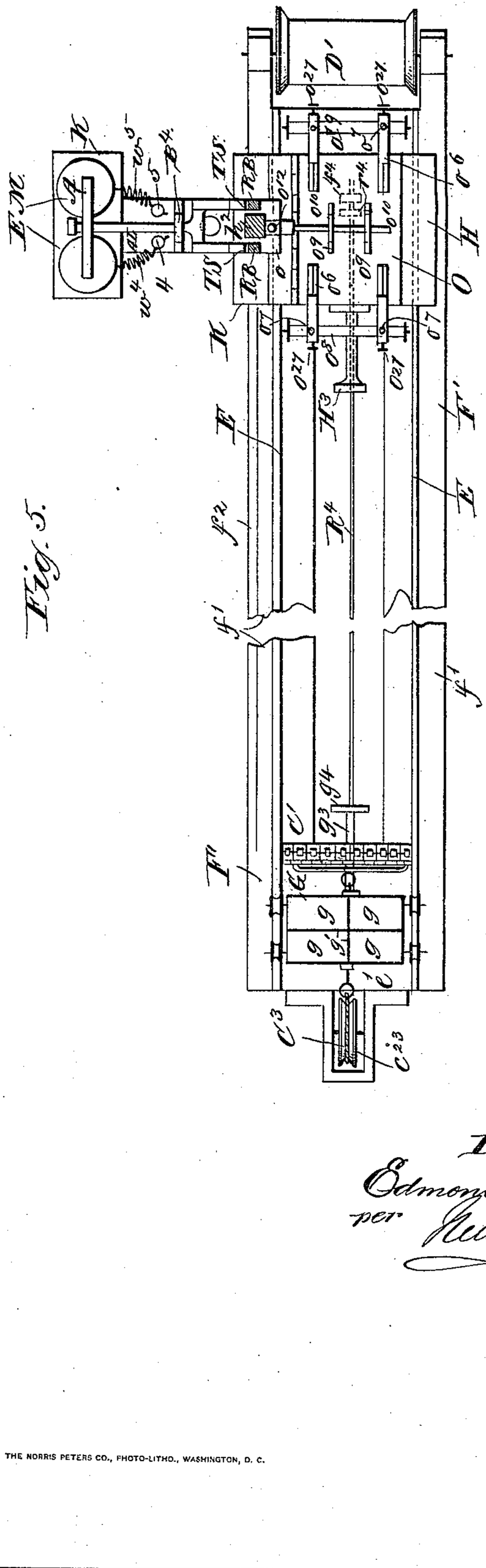

Fig. 5.

Witnesses.
J. Thomson Cross.
A. D. L. Weaver

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(No Model.) 6 Sheets—Sheet 6.

E. MARC.

MACHINE FOR DISINTEGRATING RAMIE AND OTHER FIBROUS MATERIALS.

No. 440,775. Patented Nov. 18, 1890.

Fig. 7.

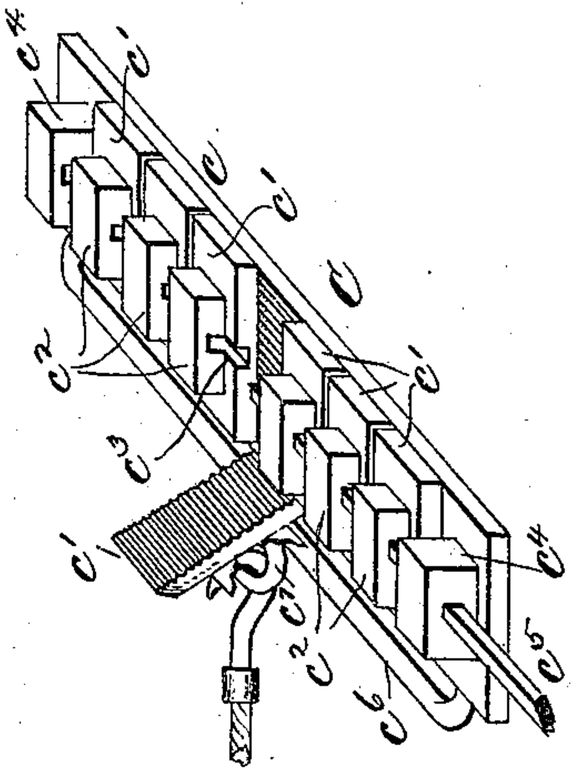
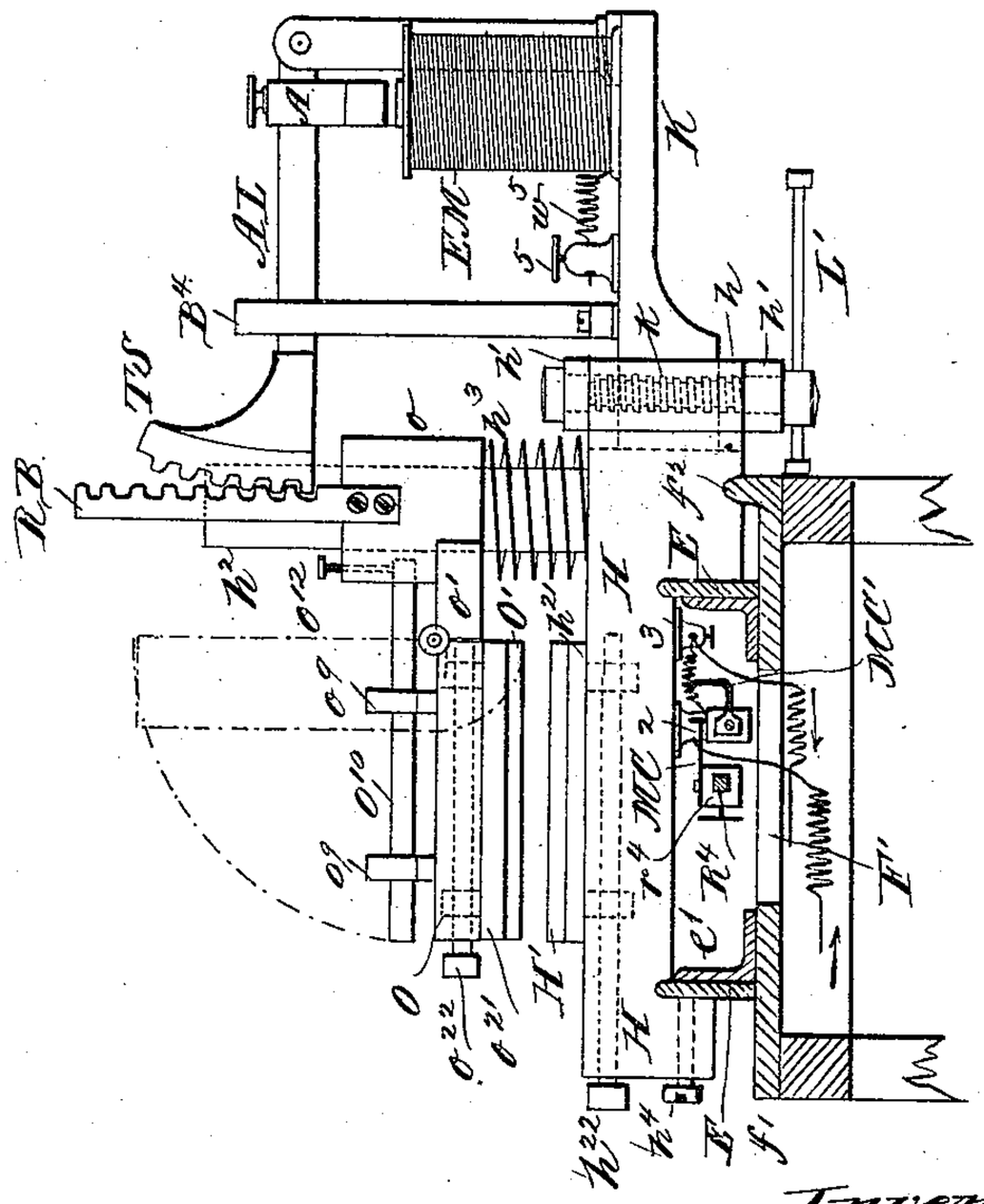


Fig. 6.



Witnesses.
J. Thomson Cross.
A. D. Weaver

Inventor
Edmond Marc
per Henry Orth
Atty.

UNITED STATES PATENT OFFICE.

EDMOND MARC, OF PARIS, FRANCE.

MACHINE FOR DISINTEGRATING RAMIE AND OTHER FIBROUS MATERIALS.

SPECIFICATION forming part of Letters Patent No. 440,775, dated November 18, 1890.

Application filed October 2, 1889. Serial No. 325,769. (No model.)

To all whom it may concern:

Be it known that I, EDMOND MARC, architect, a citizen of the Republic of France, at present residing in the city of Paris, France, have invented certain new and useful Improvements in Machines for Disintegrating Ramie and other Fibrous Materials; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters and figures of reference marked thereon, which form a part of this specification.

Referring to the drawings, Figure 1 is a side elevation of the lower part of a machine embodying my invention. Fig. 2 is a plan view of Fig. 1. Fig. 3 is a front end elevation of the entire machine. Fig. 4 is a sectional side elevation of the upper portion of the machine. Fig. 5 is a top plan view of Fig. 4. Fig. 6 is a sectional front end elevation of the upper part of the machine, and Fig. 7 is a detail view of one of the clamps.

The invention relates to the art of preparing the ramie or rhea and other like fibrous materials for spinning; and it has for its object to provide a machine in which the operations of preparing the fiber are performed automatically.

The machine is designed more especially for disintegrating the fibrous material after it has gone through the process of breaking or decortication to remove the gummy or resinous matter that unites the fibers; and it consists in operating devices comprising electrically-controlled rubbing-surfaces, said surfaces being adjustable relatively to the length of material operated upon; in means for imparting to the material a reciprocating motion between the rubbing-surfaces, in combination with reversing-gear operating automatically to reverse the motion of the material; and in the combination, with the mechanism for imparting a reciprocating motion to the material operated upon and with the rubbing-surfaces, of electrical devices controlled by and timed to the movement of the said material, whereby the rubbing-surfaces are moved out of contact with the material during its motion in one direction.

The invention finally consists in structural features and combinations of parts substantially as hereinafter described, and as set forth in the claims.

The operating mechanism of the machine is supported from a suitable frame-work F, and referring more particularly to Figs. 1, 2, and 3 I will first describe the main driving mechanism, of which S is the main driving-shaft. I would here observe that this main driving-shaft has a continuous motion and is driven from any suitable prime motor, and carries, besides the pulley P, driven from said prime motor, two pulleys P′ and P^2, belted to corresponding pulleys p' p^2 on a counter-shaft S′—that is to say, the pulley P′ on shaft S is belted by means of a crossed belt B′ to pulley p', and pulley P^2 on said shaft S is belted by means of a straight belt B^2 to a pulley p^2 on said counter-shaft S′. By the side of each pulley p' p^2 on shaft S′ is mounted a loose pulley p^{21} p^{22}, respectively, to which the belts B′ B^2 are automatically shifted to reverse the rotation of shaft S′. This is effected as follows: One end of shaft S′ is screw-threaded, as shown at s', and carries a nut N, that is held against rotation with the shaft by guideways G′ G′, along which said nut is free to slide, so that as the shaft S′ revolves the nut N is moved longitudinally thereof along the guideways G′ G′. The nut N has a tappet n in the path of two abutments r and r^3 on a belt-shifting rod R, that has two shifting-forks r' r^2 straddling the belts B′ B^2, respectively. The abutment r on rod R is adjustable by means of a set bolt or screw r^{12}, Fig. 2, so that the distance traveled by the nut may be adjusted or regulated. The counter-shaft S′ carries another pulley P^3, belted by means of a straight belt B^3 to a pulley p^3 on a second counter-shaft S^3 at the rear end of the machine, and by the side of said pulley P^3 is arranged a loose pulley p^{23}. The counter-shaft S^3 also carries a cord-drum D, on which is wound a cord C^2, that has one of its ends fixed to said drum and passes around a guide pulley or drum D′ at the front end of the machine, said cord having at that end a clamp C, Fig. 1, attached for holding one end of the fibrous material and to be hereinafter described.

The belt B^3 is shifted from the fast to the

loose pulley on shaft S^3 by means of a hand shifter-rod R′, that has the belt-fork r^{21} and that slides freely in bearings b^{21} b^{21}, the fork of the shifting-rod operating on the lower part of the belt.

The motion of the pulley p^3 can be arrested independently of the belt-shifting devices by means of a brake, consisting of a brake-shoe b, Fig. 1, connected by means of a link l to a bell-crank lever L, pivoted at l' on a suitable bracket b^{22}, Figs. 1 and 2, said bell-crank lever L being connected with an operating-rod R^2. The operation of these devices is as follows: It being presumed that belt B′ is on its loose pulley p^{21}, motion being imparted to the shaft S in the direction of arrow x^2, Fig. 2, the counter-shafts S′ S^3 are revolved from right to left, as shown by arrow x', Fig. 2, through the medium of belts B′ B^3, thereby unwinding the cord C^2 from drum D. As shaft S′ revolves, the nut N travels outwardly, and when tappet n contacts with abutment r the rod R is moved in the same direction, thereby shifting belt B′ from fast pulley p' to loose pulley p^{21} and belt B′ from loose pulley p^{22} onto fast pulley p^2, thus reversing the motions of the shafts S′ S^3, the cord being wound on drum D.

Having described the arrangement and operation of the main driving mechanism and shown that a motion in one direction is imparted to the cord C^2 to draw the material operated upon in a like direction, one end of said material being clamped in clamp C, Fig. 1, also that the cord is unwound from drum D to permit its being drawn in a reverse direction, and that this alternate movement of the cord and drum D is effected by the automatic reversal of the rotation of shafts S′ and S^3, I will now describe the means for drawing the material in a reverse direction from that described, as well as the means employed for freeing such material from the gummy constituents, to place the fibers in a condition for spinning, reference being had to Figs. 4, 5, and 6. The superstructure of the machine consists of an open frame F′ of rectangular form, bolted or otherwise secured to suitable uprights on main frame F. To each of the longitudinal girts f' of frame F′ is secured a rail E, the tread of which is preferably rounded off, (see Fig. 6,) one of said longitudinal girts being provided with an upwardly-projecting flange f^2, whose tread is also rounded, as shown in said Fig. 6. At the front and rear ends of the machine the rails E are connected by cross-girts e e', respectively, and in the rear cross-girt e' is formed an opening e^2, a similar opening being formed in a lug f^4, projecting from the front cross-girt f^3 of frame F′. (See Fig. 4.) A rod R^4, arranged centrally of the frame F′, is supported and slides freely in said openings. The rod R^4 has at its front and rear ends stop-collars r^{14} and r^{24}, respectively, and near its front end an adjustable abutment r^4, (see Fig. 4,) and to the abutment r^4 is secured a metallic contact M C, for purposes presently explained. The adjustment of the abutment r^4 may be effected in any desired manner, as by means of a set-screw r^{44}, Fig. 4.

On the rails E rests a four-wheeled carriage G, the body of which is rectangular, and preferably a sheet-metal box, divided into four (more or less) compartments g by cross-partitions g', so as to form receptacles for ballast, such ballast consisting of any weighty substance, preferably shot, so that the stability of the carriage on the rails may not only be insured, but the weight of said carriage varied, to vary the tension of the material operated upon, as will hereinafter appear. The carriage G at its rear end has attached to it a cord C^3, that passes over a guide-pulley c^{23}, and has attached thereto a counter-weight W. (See Fig. 4.) To the front end of the carriage is hooked a clamp C′, similar to the clamp C, hooked to cord C^2, for holding the other end of the material. The clamps are each constructed as follows, referring to Fig. 7. Upon a plate c, that has longitudinal corrugations so as to form more or less sharp teeth, are hinged a number of blocks c', that have bosses c^2, provided with a perforation c^3, that is preferably rectangular in cross-section, one half of the perforation being formed in the boss and the other half in the block, though this is not absolutely necessary, as the perforation may be formed in the bosses solely. At each end of the plate c is secured or cast a block c^4, also provided with a similar perforation. c^5 is a locking pin or bar, that has the same form in cross-section as the blocks and bosses referred to, and by means of which the hinged blocks c' are firmly locked to plate c. The material is secured by inserting one end of a bunch between the plate and first block c' of the series, spreading it out properly, then closing the block upon the material and pushing the locking-rod into the same. In a similar way a bunch of material is spread on the plate c under the second block, and so on until finally the locking-bar is pushed into the stationary block c^4 at the opposite end. The blocks c' are corrugated or toothed transversely, so that when locked to the longitudinally-corrugated or toothed plate c the end of the material is firmly held between the two.

In Fig. 7 I have shown one of the blocks turned up, the boss c^2 being partly broken away to show the handle c^6 of the clamp on which is formed the eye c^7, by means of which it is hooked either to the cord C^2 or to carriage G. At the front end of the frame F′ is mounted a guide-drum D′ over which the material travels during its movements to and fro.

From what has been said it will be readily understood that the material held in clamps C C′ is moved from left to right by drum D and cord C^2 and in a reverse direction by weight W, attached to cord C^3 and carriage G. It will further be obvious that by varying the load in carriage G the tension upon the material held between clamps C and C′ can be varied. This may also be effected by using

a plurality of weights, as shown in dotted lines in Fig. 4, adapted to be removed and replaced at will.

To the front end of the carriage G is secured an arm g^3, that has a forked end g^4 straddling the rod R^4, and on the under side of said carriage G at the rear end projects a fork g^2, that also straddles the rod R^4. (See Fig. 4.) The fork g^4 operates on the adjustable stop or abutment r^4, and the fork g^2 on the stop-collar r^{24}, for purposes presently explained.

On the rails E and flange f^2 is seated a scraper-frame H, that has a projection h, in which is formed a vertical groove for the reception of the end of a bracket or shelf K, that is adjustable vertically in the groove by means of a screw k, for purposes hereinafter explained. The screw k works in a threaded opening in said bracket K and revolves in suitable bearings h' h', the screw being operated by the lever-handle L'. From the frame H projects a standard h^2, that is preferably square in cross-section, and on said standard slides freely a sleeve o, connected with or having formed thereon a plate o', to which is hinged a second scraper-frame O, that is adapted to move vertically with the sleeve o, as presently explained, and is moved back into its normal position after having been depressed by a spring h^3, arranged on the standard h^2 between the sleeve and the lower scraper-frame H.

The object of hinging the frame O to plate o is to afford better access to the scraper-bars, as the frame may be swung up, as shown in dotted lines in Fig. 6, when it is desired to remove and replace such scraper-bars.

To prevent the frame O from swinging on its hinges, I provide two perforated bars o^9 o^9, through which passes a locking-bar o^{10}, that takes into a hole in the sleeve o and is secured against displacement by a set-screw o^{12}.

The frame H is secured against motion on the rails E and flange f^2 by means of binding-screws h^4, Figs. 4 and 6, or any other desired means. The said frame H has, as shown, six scraper bars or ribs H', the upper frame having but five scraper-bars O' and so arranged relatively to the bars H' as to lie in a plane intersecting the space between each two bars H', as shown in Fig. 4.

The scraper-bars are constructed of hard wood—such as *Guaicum* (lignum-vitæ) or other like wood or of ivory—and have a tolerably-sharp cutting or scraping edge, not sharp enough, however, to cut the fiber. The scrapers are secured to bars of metal or wood h^{21} o^{21}, respectively, that have perforated lugs through which passes a pin h^{22} or o^{22}, by means of which they are secured to their respective frames H O. To the rear face of frame H is secured a buffer H^3, Figs. 4 and 5, to deaden the shock of carriage G and prevent injury to the electric contacts presently to be described.

Upon the under side of the scraper-frame H are secured three binding-posts 1, 2, and 3, respectively. The binding-post 1 is connected with one of the line-wires w' and the binding-post 3 with the other line-wire w^3, and to said binding-post 1 is secured a metallic contact M C' in the path of the contact M C and in connection with line-wire w'. The binding-post 2 is connected by wire w^2 with contact M C, and said post 2 is also connected with binding-post 3, and consequently with line-wire w^3. The binding-posts 1 and 3 are respectively connected with binding-posts 4 and 5, to which the terminals w^4 and w^5 of an electro-magnet E M are connected. (See Fig. 5.) The wires w' w^3 are connected to the opposite poles of an electric battery composed, preferably, of four Leclanché cells contained in a wooden box W B. (See Fig. 3.)

In some cases where the adjustment of the scraper-frames on the rails E and flange f^2 varies consideraby—that is, if fibrous materials the length of which varies considerably are treated—the box W B may be supported from the frame H, so as to avoid using wires w' w^3 of such a length as to render them liable to become entangled in the belting or the cord C^2 below. A circuit-breaker C C is connected with the box, so that the circuit through the electro-magnet E M may be interrupted by hand whenever desired.

A is the armature of the electro-magnet E M, and A L the armature-lever whose outer end is forked, the branches of the fork terminating in toothed sectors T S, that mesh with rack-bars R B, secured to opposite sides of the sleeve o on standard h^2. The upward movement of the armature-lever A L is limited by a bridge B^4, as shown in Figs. 5 and 6.

To the scraper-frame O are secured brackets or bracket-arms o^6, that have openings through which pass vertical rods o^7, that have bearings for rollers o^8 and o^{19}, respectively, on opposite sides of the frame O, (see Figs. 4 and 5,) said rods o^7 being adjustable in their brackets by means of set-screws o^{27}. These rollers serve to hold the material down against the first and last scraper-bar of frame H, as shown in Fig. 4.

The operation of the last-described mechanism is as follows: Supposing a clamp full of fibrous material operated upon has just been removed, the brake b being applied to pulley B^3 to stop the motion of shaft S^3, and a fresh clamp full of material in position, the carriage G being in the position shown in Fig. 5, on reaching which position the fork g^2, coming in contact with stop r^{24}, draws back the rod R^4, thereby closing the battery-circuit by the contact of M C with M C'. The closure of the electric circuit will attract the armature A and armature-lever A L, thereby depressing the upper scraper-frame O into the position shown in Fig. 4 through the medium of the toothed segments T S and rack-bars R B. The pulley B^3 being released from the brake b, the cord C^2 will draw the carriage from left to right, the material passing between the scraper-bars H' O'. As the carriage approaches the right end of the machine,

the fork g^4 carries the contact r^4 along, thereby interrupting the circuit through the electro-magnet E M, when the spring h^3 will move the upper scraper-frame O upward, thereby causing the rollers o^8 to release the material held in clamps C and C′. This abutment r^4 is so adjusted relatively to the abutment r of the belt-shifting rod R, Fig. 1, that the closure of the electric circuit will take place a little before the reversal of the rotation of the shaft S′. When this has taken place, the cord C^2 will unwind from drum D, thus permitting the weight W to draw the carriage G back to its starting-point, thereby again closing the electric circuit. Simultaneously therewith, or nearly so, the arm n on nut N will contact with abutment r^3 of belt-shifting rod R to shift the belt B′ from the fast pulley p' to the loose pulley p^{21} and the belt B^2 from the loose pulley p^{22} to the fast pulley p^2, as shown in Fig. 2.

As the scraper-frames are adjustable on the rails E and the flange f^2, they can be moved nearer to the left end of the machine, according to the length of material to be operated upon. The degree of pressure exerted by the scraper-bars H′ O′ and the rollers o^8 o^{19} may also be varied by adjusting the shaft K, and through the medium of the toothed segments T S the scraper-frame H′ on standard h^2 by means of screw k, hereinbefore referred to. The degree of tension of the fibrous material while being operated upon may also be varied according to the nature of the said material by varying the weight of carriage G or that of weight W, attached to cord C^3.

It will be readily observed that the machine may be employed as a breaker for breaking fibrous materials, and that by simply substituting comb-plates for the scraper-bars the machine may be converted into a carding or combing machine.

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

1. In a machine of the class described, means for supporting the fibrous material, consisting of two clamps adapted for connection to opposite ends of said fibrous material, a cord connected with one of the clamps, a winding-drum for said cord, and a resistance connected with the other clamp and adapted to antagonize the motion of the clamps and hold the material under tension, in combination with scraper-bars arranged on opposite sides of the line of motion of the fibrous material and adapted to be moved into and out of contact therewith, substantially as and for the purposes specified.

2. In a machine of the class described, means for supporting the fibrous material and imparting motion thereto, consisting of two clamps adapted for connection to opposite ends of the fibrous material, a cord connected with one of the clamps, a winding-drum for said cord, and a resistance connected with the other clamp adapted to antagonize the motion of said clamps and hold said material under tension, in combination with scraper-bars arranged on opposite sides of the line of motion of the fibrous material and adapted to be moved into and out of contact therewith, substantially as and for the purposes specified.

3. In a machine of the class described, means for supporting the fibrous material and imparting motion thereto, consisting of two clamps adapted for connection to opposite ends of the fibrous material, a cord connected with one of the clamps, a winding-drum for said cord, and an adjustable resistance connected with the other clamp and adapted to antagonize the motion of the clamps and hold said material under tension, in combination with scraper-bars arranged on opposite sides of the line of motion of the fibrous material and adapted to be moved into and out of contact therewith, substantially as and for the purposes specified.

4. In a machine of the class described, means for supporting the fibrous material, consisting of two clamps adapted for connection to opposite ends of the fibrous material, a cord connected with one of the clamps, a winding-drum for said cord, a weight connected with the other clamp, and a driving mechanism for imparting motion to said drum, in combination with scraper-bars arranged on opposite sides of the line of motion of the fibrous material and adapted to be moved into and out of contact therewith, and a reversing mechanism adapted to reverse the motion of the driving mechanism, substantially as and for the purposes specified.

5. In a machine of the class described, means for supporting the fibrous material, consisting of movable clamps adapted for connection to opposite ends of the fibrous material, a cord connected with one of the clamps, a winding-drum for said cord, and a resistance connected with the other clamp and adapted to antagonize the motion of the clamps and hold said material under tension, in combination with a circuit-closer arranged in the path of and adapted to be controlled by said tension device, an electric circuit, an electro-magnet included in said circuit, fixed and movable scraper-bars, and an armature-lever controlled by the electro-magnet and controlling the motion of the movable scraper-bars, substantially as and for the purposes specified.

6. In a machine of the class described, means for supporting the fibrous material, consisting of two clamps adapted for connection to opposite ends of the fibrous material, a cord connected with one of the clamps, a winding-drum for said cord, and a weight connected with the other clamp, in combination with a driving mechanism for imparting motion to said winding-drum, scraper-bars arranged on opposite sides of the line of motion of the fibrous material and adapted to be moved into and out of contact therewith, and a reversing mechanism adapted to automatically reverse

the direction of motion of the clamps, substantially as and for the purposes specified.

7. In a machine of the class described, the combination, with holders for holding the ends of the fibrous material, a winding-drum, and cord-connection with one of the holders, said drum being adapted to revolve in reverse directions, and a weight connected with the other holder, of scrapers arranged on opposite sides of the line of motion of the fibrous material and adapted to be moved into and out of contact therewith, substantially as and for the purposes specified.

8. In a machine of the class described, the combination, with holders for holding the ends of the fibrous material, a winding-drum, and a cord-connection between said drum and one of said holders, and a weight connected with the other holder, of scrapers arranged on opposite sides of the line of motion of the fibrous material and adapted to be moved into and out of contact therewith, and a reversing mechanism for reversing the motion of the winding-drum, substantially as and for the purposes specified.

9. In a machine of the class described, a tension device for the fibrous material, consisting of two clamps adapted to clamp the opposite ends of such material, a winding-drum, and a cord-connection between the drum and one of the clamps, and an adjustable weight connected with the other clamp, said tension device being adapted to move in reverse directions, in combination with scrapers arranged on opposite sides of the line of motion of the clamps and adapted to be moved toward and from said line of motion, substantially as and for the purposes specified.

10. In a machine of the class described, a tension device and means for imparting to said device a reciprocating motion, consisting of two clamps for securing the opposite ends of the fibrous material, a winding-drum adapted to revolve in opposite directions, a cord-connection between the drum and one of the clamps, and a weight connected with the other clamp, in combination with disintegrating devices consisting of a stationary frame and a vertically-movable frame arranged on opposite sides of the line of motion of the fibrous material, and scrapers arranged in the said frames transversely of said line of motion, the scrapers of one frame being arranged to alternate in position relatively to the scrapers of the other frame, substantially as and for the purposes specified.

11. In a machine of the class described, a tension device and means for imparting to said device a reciprocating motion, consisting of two clamps for securing the opposite ends of the fibrous material, a winding-drum adapted to revolve in opposite directions, a cord-connection between said drum and one of the clamps, a resistance adapted to antagonize the motion of the tension device, and a cord-connection between said resistance and the other clamp, in combination with disintegrating devices consisting of a stationary frame, a vertically-movable and adjustable frame, an elastic support therefor, said frames being arranged on opposite sides of the line of motion of the tension device, and scrapers secured to said frames transversely of the said line of motion, substantially as and for the purposes specified.

12. In a machine of the class described, a tension device and means for imparting motion thereto in reverse directions, consisting of two clamps for securing the opposite ends of the material, a winding-drum adapted to revolve in opposite directions, a cord-connection between the drum and one of the clamps, a wheeled carriage connected with the other clamp, a weight, a cord-connection between the weight and carriage, and a track for said carriage, in combination with disintegrating devices arranged to operate on the fibrous material, substantially as and for the purposes specified.

13. In a machine of the class described, a tension device and means for imparting motion thereto in reverse directions, consisting of two clamps for securing the opposite ends of the material, a winding-drum adapted to revolve in opposite directions, a cord-connection between the drum and one of the clamps, a wheeled carriage connected with the other clamp and containing loose ballast, a counterweight, a cord connecting the weight with the carriage, and a track for said carriage, in combination with disintegrating devices arranged to operate on the fibrous material, substantially as and for the purposes specified.

14. In a machine of the class described, the combination of the scraper-frame H, provided with the standard h^2, of the scraper-frame O, connected with and adapted to move on said standard, and a spring-bearing interposed between the two frames, substantially as and for the purposes specified.

15. In a machine of the class described, the combination of the scraper-frame H, provided with the standard h^2, an electro-magnet supported from said frame, and an armature-lever terminating in a toothed segment, of the scraper-frame O, connected with and adapted to move on said standard, gearing connected with frame O and meshing with the armature-lever segment, and a spring-bearing interposed between the two frames, substantially as and for the purposes specified.

16. In a machine of the class described, a tension device and means for imparting a reciprocating motion thereto, consisting of two clamps, a winding-drum adapted to revolve in reverse directions, a cord connecting the drum with one of the clamps, a weight, a cord-connection between the weight and the other clamp, and disintegrating devices consisting of stationary and vertically-movable scrapers respectively arranged on opposite sides of the line of motion of the tension device, in combination with devices for imparting motion to the movable scrapers, which

consist of a circuit-closer comprising a stationary and a movable electric contact and an electro-magnet included in an electric circuit, an armature-lever connected with and controlling the movements of the movable scrapers, and tappets connected with the tension device and adapted to move the movable contact to close or interrupt the electric circuit, substantially as and for the purposes specified.

17. In a machine of the class described, a tension device consisting of two clamps for securing the opposite ends of the fibrous material, a winding drum, a cord connecting the drum with one of the clamps, a carriage adapted to travel on rails and connected with the other clamp, a weight, and a cord connecting the weight with the carriage, in combination with stationary disintegrating devices and disintegrating devices adapted to move toward and from the stationary devices, an electro-magnet, an armature-lever adapted to control the movements of the movable disintegrating devices, a circuit-closer controlled by the tension device, a driving mechanism for the winding-drum, and a reversing-gear adjusted to the movements of the tension device, so that when said device reaches the limits of its motion in opposite directions the electric circuit will be closed to move one set of disintegrating devices toward the other and the rotation of the drum reversed to wind the clamp-cord, and when at the limit of its motion in a reverse direction the electric circuit will be interrupted to move the disintegrating devices from each other and the motion of the drum reversed to unwind the clamp-cord, substantially as and for the purposes specified.

18. In a machine of the class described, the combination, with the carriage G, its cord C^3, weight W, and clamp C′, of the shaft S^3, carrying pulleys p^3 and p^{23}, the drum D, cord C^2, and clamp C, the shaft S′, carrying loose pulleys p^{21} p^{22} and fast pulleys p' p^2 P^3, the shaft S, carrying pulleys P′ P^2, the crossed and straight belts B′ B^2, belted, respectively, to pulleys P′ and P^2, the belt B^3, belted to pulley P^3 on the shaft S′ and to pulley p^3 on drum-shaft S^3, said shaft S′ having one end screw-threaded and carrying a nut N, provided with a tappet n, and a belt-shifting rod R, provided with abutments in the path of the nut-tappet and operating on the belts B′ B^2, substantially as and for the purposes specified.

19. The frame F, having a lateral flange f^2 and the rails E, in combination with the frame H, adapted to be shifted on rails E and flange f^2, the vertically-movable frame O, the racks R B, an electro-magnet and binding-posts for connecting the electro-magnet with a battery, the armature-lever A L, and segments T S, all supported from frame H, substantially as and for the purposes specified.

20. The frame H, having standard h^2, in combination with the sleeve o and the frame O, hinged to said sleeve, substantially as and for the purposes specified.

21. The frame H and the scraper-bars H′, having perforated lugs, and the locking-pins h^{22}, substantially as and for the purposes specified.

22. The clamp C, consisting of a plate c, having a perforated block c^4 at each end, and a series of intermediate perforated clamping-blocks hinged to said plate, in combination with a locking-bar adapted to fit the perforations of the fixed and hinged blocks, substantially as and for the purposes specified.

In testimony that I claim the foregoing I have hereunto set my hand this 26th day of August, 1889.

EDMOND MARC.

Witnesses:
E. CONCHAM,
R. J. PRESTON.