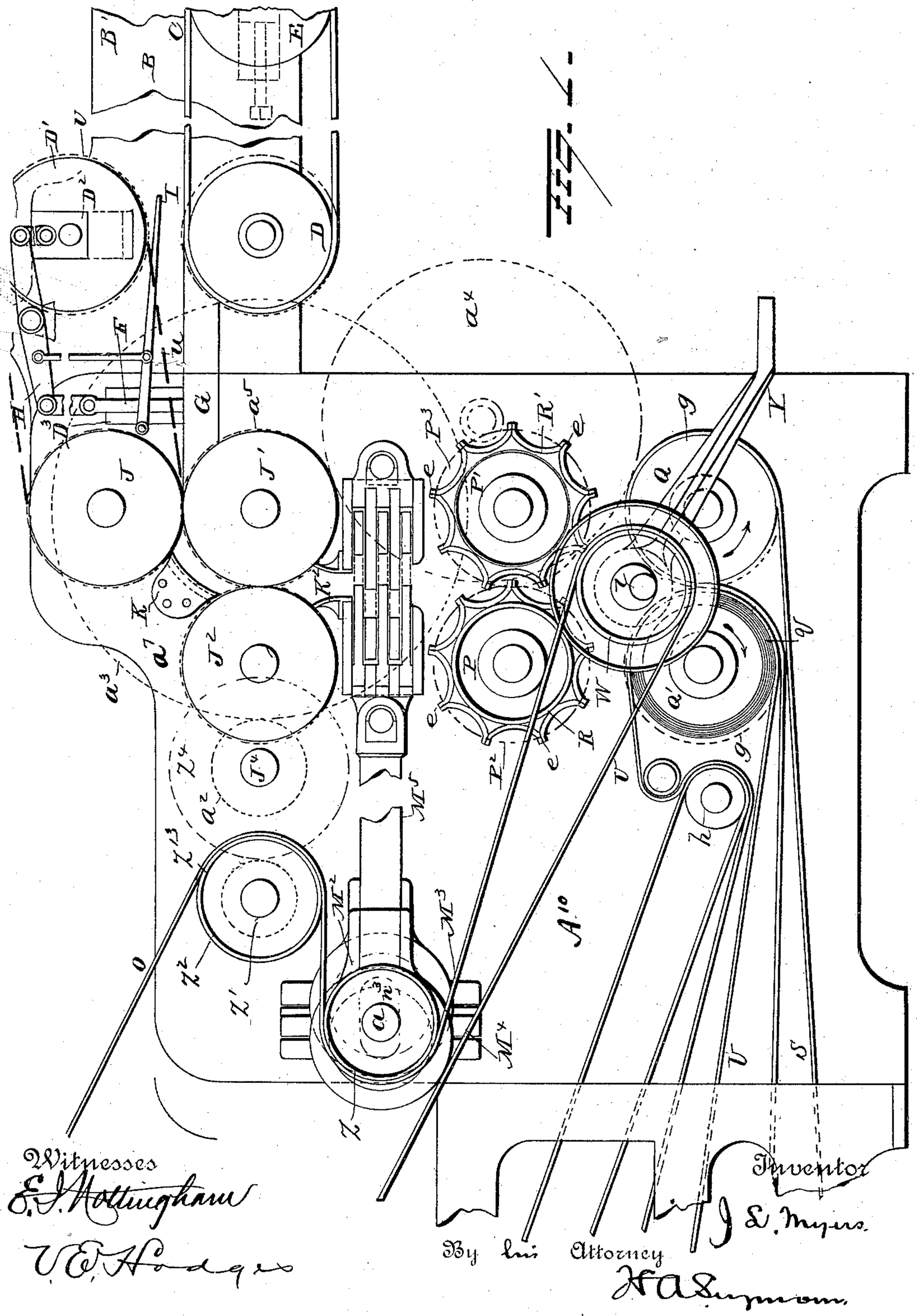
(No Model.) 6 Sheets—Sheet 1.

J. L. MYERS.

MACHINE FOR TREATING FIBROUS PLANTS.

No. 476,160. Patented May 31, 1892.



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(No Model.) 6 Sheets—Sheet 2.

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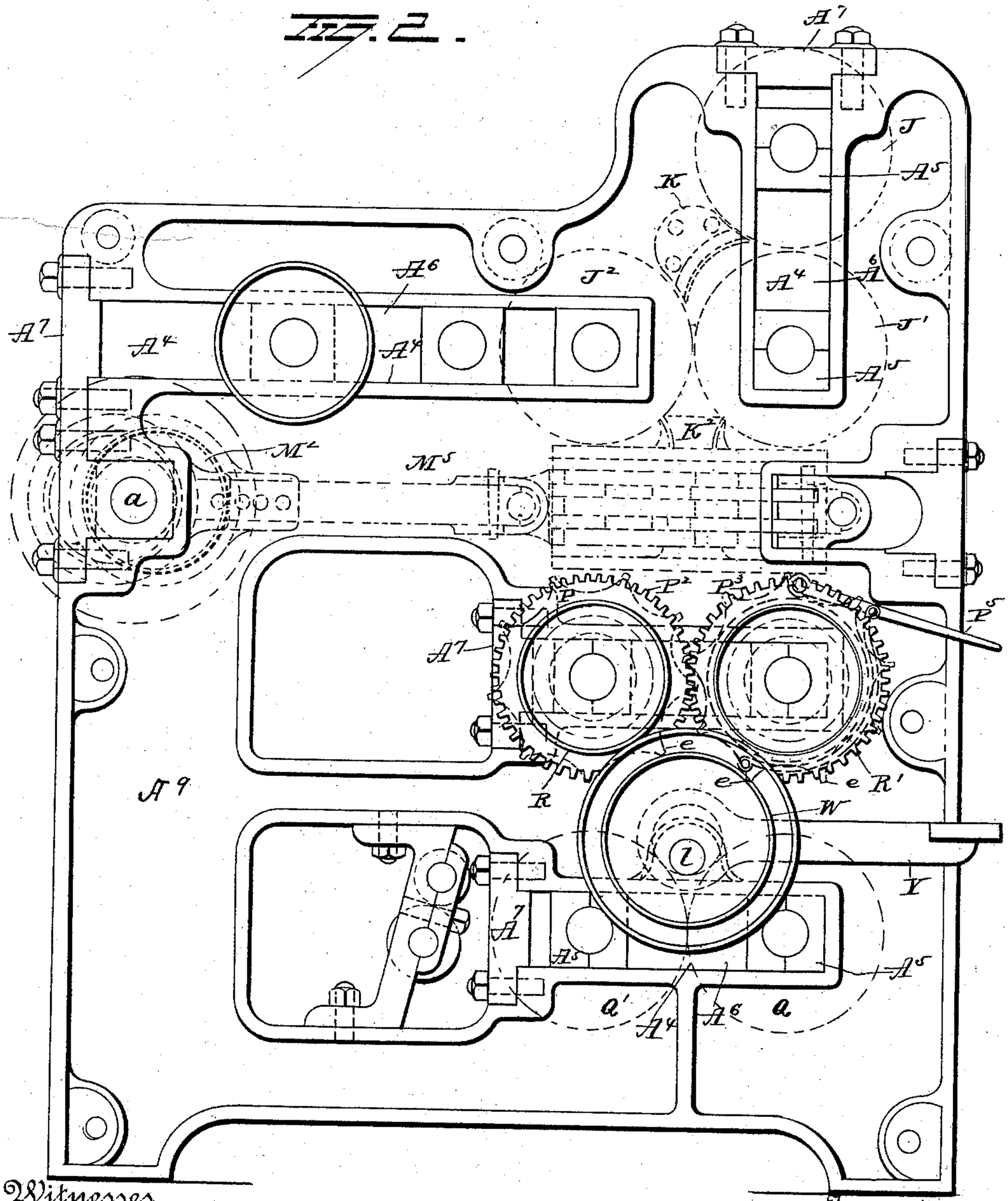
Fig. 2.



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(No Model.) 6 Sheets—Sheet 3.

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MACHINE FOR TREATING FIBROUS PLANTS.

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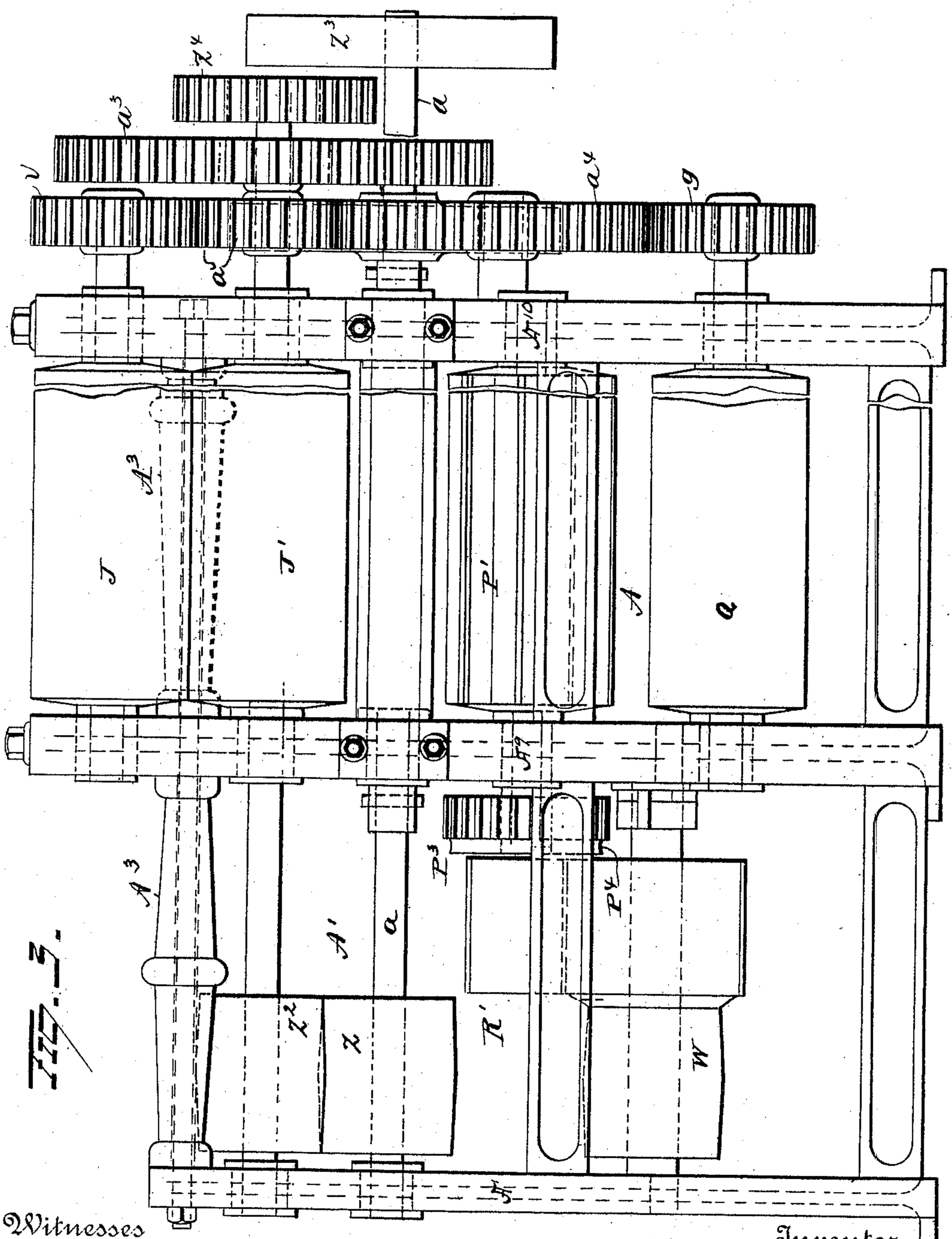

FIG. 2.

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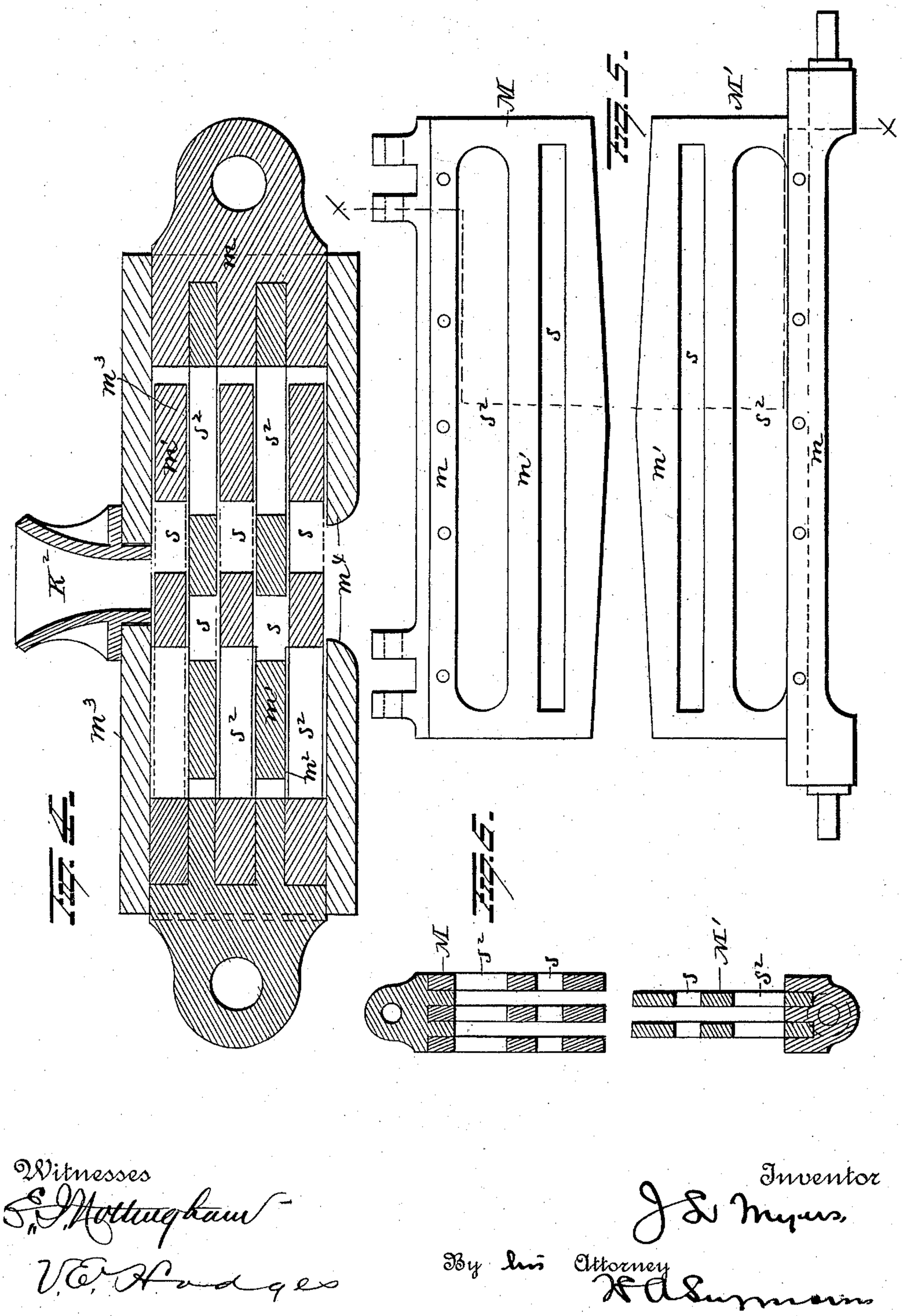

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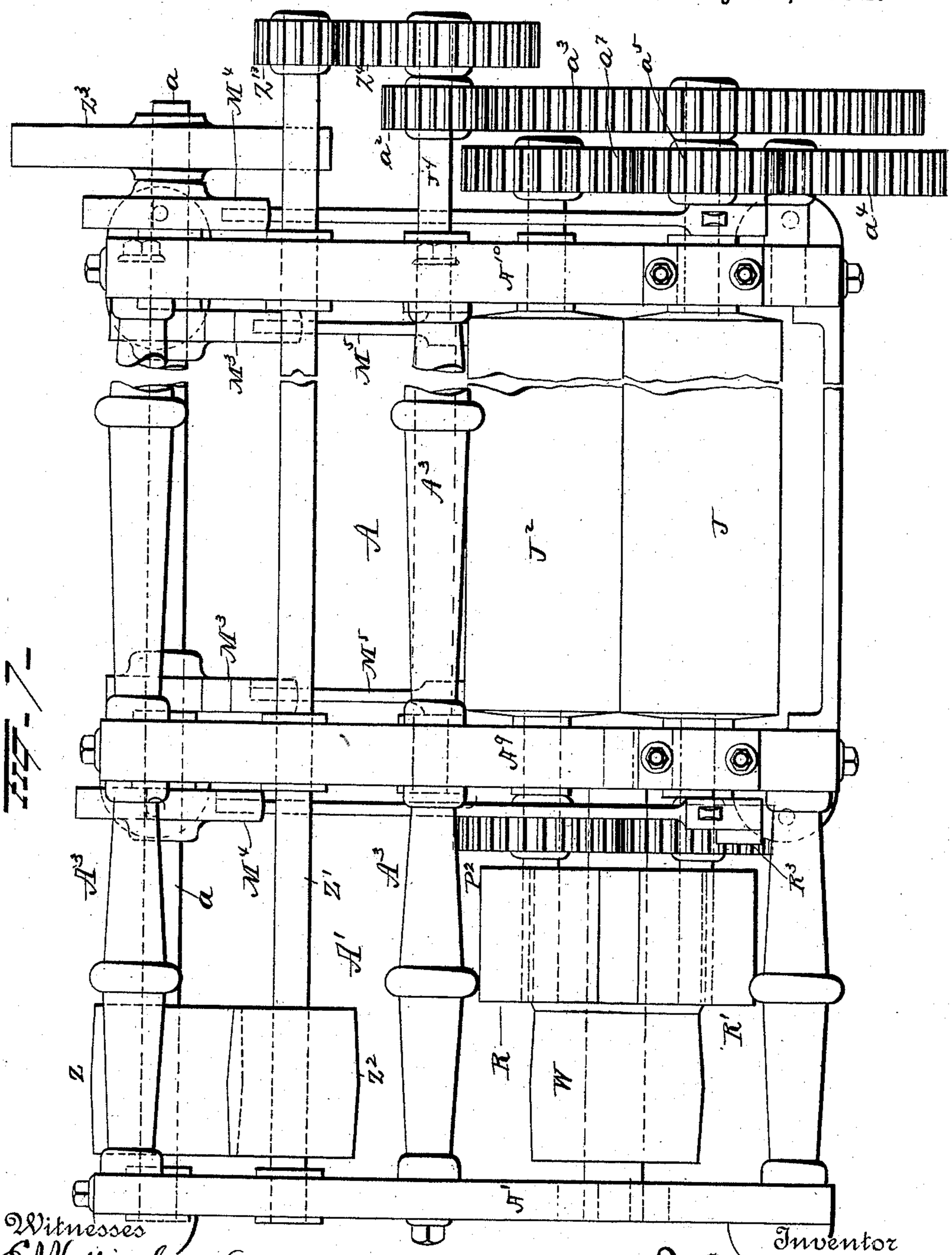

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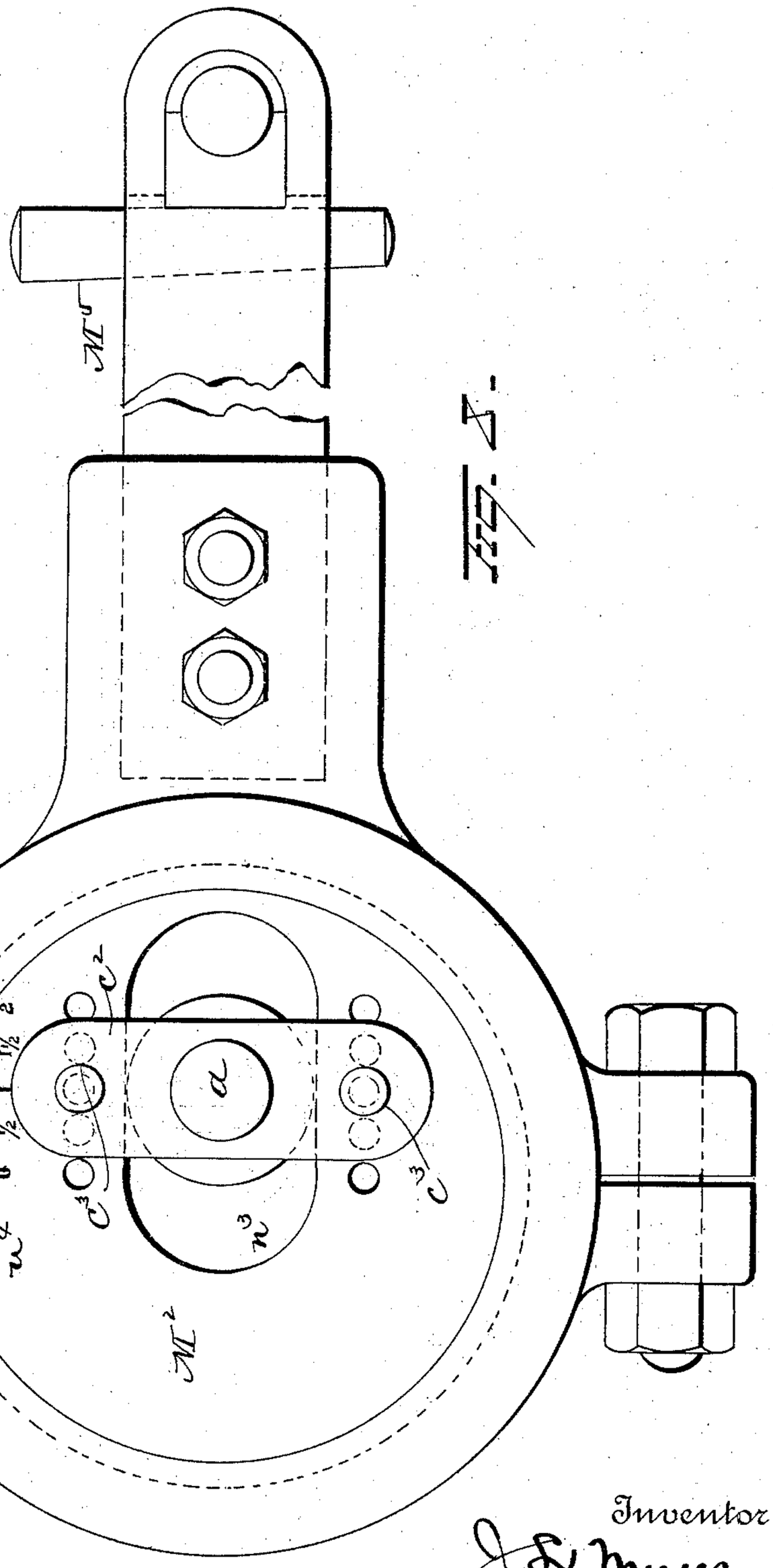

Fig. 4.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR TREATING FIBROUS PLANTS.

SPECIFICATION forming part of Letters Patent No. 476,160, dated May 31, 1892.

Application filed January 9, 1889. Renewed March 4, 1891. Again renewed November 18, 1891. Serial No. 412,298. (No model.)

To all whom it may concern:

Be it known that I, JAMES L. MYERS, a resident of New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Machines for Treating Fibrous Plants; 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.

My invention relates to an improvement in vegetable fiber cleaning and stripping machines, and is more particularly intended for operating on such plants and the leaves thereof as the abaca, banana, bromelia, henequin, agave, and pita; and it consists in certain constructions and combinations of parts, substantially as hereinafter described, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a view in side elevation of the machine, showing the outlines of part A^{10} of the frame, the cheek-plate A′, the side frame A^9, and some of the parts between the cheek-plate and side frame being removed. Fig. 2 is a view in side elevation with the cheek-plate A′ and feeding and stop mechanism removed. Fig. 3 is a broken view in end elevation with the feeding and stop mechanism removed. Fig. 4 is an enlarged sectional view through the reciprocating cross-heads and breakers. Fig. 5 is a plan view of the same, the parts being removed from each other. Fig. 6 is a section on line *x x* of Fig. 5. Fig. 7 is a broken plan, the feeding and stop mechanism being removed; and Fig. 8 is a detail.

A represents the main frame, and A′ the outside cheek. The frame may be of any suitable construction, but preferably consists of plates A^9 and A^{10}, slotted to make them as light as possible, and flanged around these slots and around the edges to prevent warping. The edges of these plates are finished off and stay-rods A^3 pass through the plates and outside cheek to form one solid continuous frame. The plates are also provided with elongated slots A^4, so arranged that their position does not weaken the machine, and for the most part extending along the line of one or more of the shafts, to be hereinafter referred to, and opening into the edges of the plates or else into the slots. These elongated slots are adapted to receive the sectional bearing or journal boxes A^5 and spacing-blocks A^6, holding the boxes apart and filling the spaces between them when two or more are located in one slot. After the parts are assembled—that is, the journal-boxes are placed in position—follower-blocks A^7 are placed over the open ends of the slots. By constructing the frame as thus set forth it may be readily taken apart and the journal-boxes need not be kept carefully sorted, as they are all interchangeable.

B is a feed-carrier frame secured to the main frame and provided with an endless traveling apron or belt C, arranged to pass at its inner end around a feed-roller D and at its outer end around a tension-roller E, and the feed-carrier apron working in between cheek or side pieces B′, consituting the sides of carrier-frame B, takes up the portions of the plants or leaves being treated. The feed-roller D works in connection with a second or upper feed-roller D′, rotary motion being given to these feed-rollers through a sprocket-wheel *v* and chain *u* from the crushing-roller J, as hereinafter described.

As the fibrous plants or portions of them are being carried forward by the traveling apron C, the upper feed-roller D′ is raised and disengaged from the lower feed-roller D, causing the roller D and the apron to cease movement at intervals, as shown in Fig. 1, and causing a stop board or shutter F to be brought down upon a plate G, which latter constitutes a fixed portion of the feeding device, in line with the carrying-surface of the apron C. This may be done by fitting the top roller D′ or its journal-boxes and the stop-board F to work in guides or grooves D^2 D^3, respectively, and connecting them by a rocking beam or lever H, to which a lifting motion is given by a hand-lever I to raise the roller D′ and lower the stop-board F simultaneously, as required. The object of thus raising the roller D′ and lowering the stop-board or shutter F is to close down in front of the foremost leaves or por-

tions of the plants for the purpose of arresting them in their feed until their ends are evened against the stop-board by hand. Upon removing pressure from the hand-lever I the roller D′ drops into its normal position again, imparting motion to the lower feed-roller D and the apron C, the stop-board F rising at the same time to its normal position, when the feed-passage will be opened and the leaves will be delivered over the feed plate or table G to and between a pair of crushing-rollers J and J′. As the forward ends of the leaves or portions of the plants under treatment pass from between these crushing-rollers J and J′, they come in contact with a concave deflector or deflecting-plate K, which directs the leaves in a downward course between the crushing-roller J′ and another crushing and gripping roller J^2 in the same horizontal plane. One object of this arrangement is to give the leaves a vertical direction, so that they will be assisted in their downward course by gravitation. The material to be stripped then passes downward through a brass trumpet K^2, where it is operated upon by the double horizontally-reciprocating breakers MM′. These breakers are of peculiar and novel construction, and a detailed description will therefore ensue. Each breaker consists of a cross-head *m*, to which are rigidly bolted, riveted, or otherwise secured elongated slotted brass plates *m′ m′*, preferably two to one head and three to the other and at distances apart a little greater than their own thickness, so as to intersect or interlock with each other with a slight clearance m^2 between them. Plate m^3 constitute, a cover over the breakers, and the plates m^4 serve as tracks on which the ends of the breakers ride, the tracks being supported suitably by the main frame of the machine. These reciprocating breakers are actuated through eccentrics M^2, mounted on driving-shaft *a*. The usual straps M^3 M^4 are loosely mounted on these eccentrics, and they are connected by rods M^5 to the breakers M M′, the inner ones M^3 to the breakers M and the outer pair M^4 to the breakers M′. The relative positions of the two pairs of eccentrics are to be noticed in this connection. It will be observed that the two pairs extend in exactly opposite directions, and the object of this arrangement is obvious when the operation, which is as follows, is understood: The passage for the material is through the slots *s* in the breakers. Now the successful operation of the breakers is dependent upon this passage being alternately opened and closed in a very rapid succession, resulting, respectively, from the alignment or non-alignment of the said slots *s*. Now if all four eccentrics projected in the same direction the plates would reciprocate together and the passage would always be opened or closed, as the case might be, but by projecting in precisely opposite directions the eccentrics reciprocate the breakers simultaneously in opposite directions, so that by one throw the position of the plates is such that the material is at the outer side of the slots and at the next throw at the inner sides, and so on, but at each time a throw is made the continuous passage, though being opened for an instant, allows a little more material to pass. Thus the fiber is held in a rapidly-vibrating zigzag, never being broken, but having the trash broken from it during its passage. The object of the wider slots s^2 is to allow any pulp to pass without clogging.

It sometimes occurs that the throw of the breakers is too much or too little, and to regulate this I have devised the following mechanism: The eccentrics, instead of having a fixed position on the shaft, are each provided with an elongated slot n^3 through the center, made of suitable size to receive the shaft *a*, and each eccentric preferably having a scale u^4 on its edge, so that the lateral projection of the eccentric upon the drive-shaft may be changed or varied by changing its center on the shaft from one extreme of eccentricity to not so great an extreme. The eccentrics may be held in such position by means of a strap c^2, fast on shaft *a*, and screws c^3, whereby the strap is secured to the eccentric. Thus the throw of the breakers may be made greater or less, avoiding the use of breakers with broader or narrower slots, which would otherwise be necessary in order to accomplish the same result. The leaves next pass between brushing and wiping drums P P′. These drums preferably have grooved surfaces and are faced with brass, the latter being riveted thereto or otherwise secured with the meeting edges of adjacent strips projecting together a short distance, where they are soldered or brazed together to form rigid cleaner-scrapers *e*, which serve to brush and wipe from the fiber any adhering pulp or substance left after its passage through the reciprocating breakers above. Said drums are coupled to rotate in concert by means of gearing p^2 and p^3 and made to revolve and reverse alternately, as hereinafter described. In this connection it is well to explain that it is important in reversing the drums that no time should be lost by a gradual stopping of the drums, but on the contrary that the stopping before reversing should be as nearly instantaneous as possible. To this end an enlarged hub or drum P^4, having, preferably, a grooved periphery, is made to project from one or more of the gear-wheels P^3 in position to be operated upon by a strap fast at one end and attached at its other end to brake-lever P^5, as shown in Fig. 2. By applying this with a slight effort the drums are stopped at once. The mechanism by which the reverse motion is given will be hereinafter described. After the fiber has passed down from and between the drums P and P′ a sufficient distance it is gripped by the lower rollers Q and Q′, both or either of which may be driven by suitable gearing. The drums Q Q′ having taken hold of the fiber or material, the brush and cleaner

drums P and P′ are reversed, thus keeping the fiber straightened or held perpendicularly while being brushed or wiped and allowing it to be carried through the grip-rollers Q and Q′ in an untangled mass, conveying it to the delivery-apron S.

The lower grip-rollers Q and Q′ can be made of any suitable material, and one or both may be made elastic, but preferably one at least is made so by facing it with rubber, as indicated at *q*, Fig. 1, and one or both of the rollers may be driven through the engagement of wheel a^4 with one of the intermeshing gear-wheels *g* on their shafts.

S is an endless apron passed around the roller Q, whereby it is driven, and an outer tension-roller, and serves to deliver the fiber from the machine. U is another endless belt arranged to pass around the elastic roller Q′ and serves to prevent the fiber from wrapping around the roller Q′ and at the same time to drive the sheave-apron V.

Z is a pulley fast upon shaft *a*, which, as before stated, carries the eccentrics, and which also carries a fly-wheel z^6. A similar shaft Z′ also traverses the machine from right to left and is provided on one end of it with a pulley Z^2 in close proximity to pulley Z, over which drive-belt *o* passes, and on the other end with pinion Z^{13}, meshing with a gear-wheel Z^4 on the end of the shaft J^4. This same shaft also carries a small pinion a^2 immediately back of gear-wheel Z^4, which meshes with and drives wheel a^3 on the shaft which carries back crushing-roller J′. A pinion a^5 on this shaft meshes with gear-wheel a^7 for driving roller J^2, with a gear-wheel above it for driving roller J, and with a gear-wheel a^4, the latter imparting motion to the gear-wheel *g* on the lower grip-roller Q, which, through the other gear-wheel *g*, drives the elastic roller Q′ and belts S, V, and U.

The pulley W is provided with two faces—one to receive the driving-belt *o* and the other made with a plain or straight face covered with leather to give a frictional surface. This pulley W revolves upon an eccentric shaft *l*, which is made to oscillate by means of the lever Y, secured thereto, whereby the driving-surface of pulley W is thrown from contact with the flat pulley R, where the tension of the driving-belt *o* normally keeps it, into contact with the flat pulley R′, which causes a reverse motion to be given to the drums P P′ by pressing down upon the lever Y. This lever Y may extend out horizontally, as shown in Fig. 2, or it may be inclined downwardly, as shown in Fig. 1, to bring it nearer the floor. The moment the pressure is removed the tension of the driving-belt *o* brings the friction-pulley W to its former position and keeps it there until required for reversing the drums P and P′ again. The pulleys R and R′ have faces to suit those of the pulley W, as desired, their position being upon the outside ends of the two drum-shafts P and P′ and for the purpose already described.

As a matter of expediency, it is important that all the metallic surfaces with which the material being operated upon comes in contact should have a brass facing, for the reason that iron and similar metals corrode and so injure the fiber.

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

1. The combination, with feeding-rollers, of crushing-rollers located behind and in a plane with the feeding-rollers and reciprocating intersecting breaker-plates located immediately below the crushing-rollers, substantially as set forth.

2. The combination, with feeding-rollers, of rollers J J′ J^2, arranged substantially as shown, reciprocating breakers located below the crushing-rollers, and a curved deflector for guiding the material from the rollers J J′ down between rollers J^2 J′, substantially as set forth.

3. In a fiber stripping and cleaning machine, the combination, with double reciprocating intersecting breakers, of rollers for feeding material thereto and rotary cleaning-scrapers, substantially as set forth.

4. In a fiber stripping and cleaning machine, the combination, with double reciprocating intersecting breakers, of rotary cleaning-scrapers located below the breakers, substantially as set forth.

5. In a fiber stripping and cleaning machine, the combination, with double reciprocating intersecting breakers, of rotary cleaning-scrapers, and mechanism, substantially as described, for rotating and reversing the scrapers, substantially as forth.

6. In a fiber stripping and cleaning machine, the combination, with two sets of intersecting breaker-plates and means for reciprocating both sets of plates, of rotary cleaning-scrapers and shiftable devices for rotating and reversing the scrapers, substantially as set forth.

7. In a fiber stripping and cleaning machine, the combination, with two sets of intersecting breaker-plates and eccentric mechanism for reciprocating both sets of breaker-plates, of rotary cleaning-scrapers and shiftable devices for rotating and for reversing the scrapers, substantially as set forth.

8. In a fiber stripping and cleaning machine, the combination, with two sets of slotted interlocking reciprocating breaker-plates and means for reciprocating both sets, of rotary cleaning-scrapers and shiftable driving devices for rotating and for reversing the motion of said scrapers, substantially as set forth.

9. In a fiber-stripping machine, the combination, with double reciprocating breakers, eccentrics having provisions for adjusting the throw thereof, and pitmen connecting the eccentrics and breakers, of rotary cleaning-scrapers for receiving the material as it leaves the breakers.

10. In a fiber-stripping machine, the combination, with double reciprocating breakers, eccentrics having provisions for adjusting the throw thereof, and the pitmen connecting the eccentrics and breakers, of rotary cleaning scrapers each having a friction-pulley, and a driving friction-pulley provided with means whereby it may be moved into contact with the pulley on either scraper, substantially as set forth.

11. The combination, with feed-rollers, crushing-rollers located behind the same, and a curved deflecting-plate located adjacent to the crushing-rollers for deflecting the material downwardly as it leaves the crushing-rollers, of intersecting reciprocating breaker-plates located below the crushing-rollers, substantially as set forth.

12. The combination, with a feed-plate, feed-rollers, one of which is vertically movable, a stop-board, and crushing-rollers, of double reciprocating breakers beneath the crushing-rollers and a deflecting-plate for guiding the material from the crushing-rollers to the breakers, substantially as set forth.

13. In a fiber stripping and cleaning machine, the combination, with feed mechanism, double reciprocating breakers, and eccentrics for actuating the breakers, having provisions for adjusting the throw thereof, of rotary cleaning-scrapers, shiftable driving devices for rotating and reversing the motion of the latter, and grip-rollers and conveyer-belts, substantially as set forth.

14. In a fiber stripping and cleaning machine, the combination, with a feed-apron, feed-plate, feed-rollers, and crushing-rollers, of double reciprocating breakers, eccentrics for actuating the breakers simultaneously in opposite directions, rotary cleaning-scrapers, shiftable driving devices for rotating and reversing the motion of said scrapers, grip-rollers, and conveyer-belts, substantially as set forth.

15. The combination, with interlocking reciprocating slotted breakers arranged as described, whereby a continuous passage through the slots is alternately made and broken, a cover over the breakers, and a trumpet to guide material between them, of eccentric mechanism for actuating said breakers simultaneously in opposite directions, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

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