(No Model.) 6 Sheets—Sheet 1.

C. H. NORTON.

FLAX DRESSING MACHINE.

No. 502,010. Patented July 25, 1893.

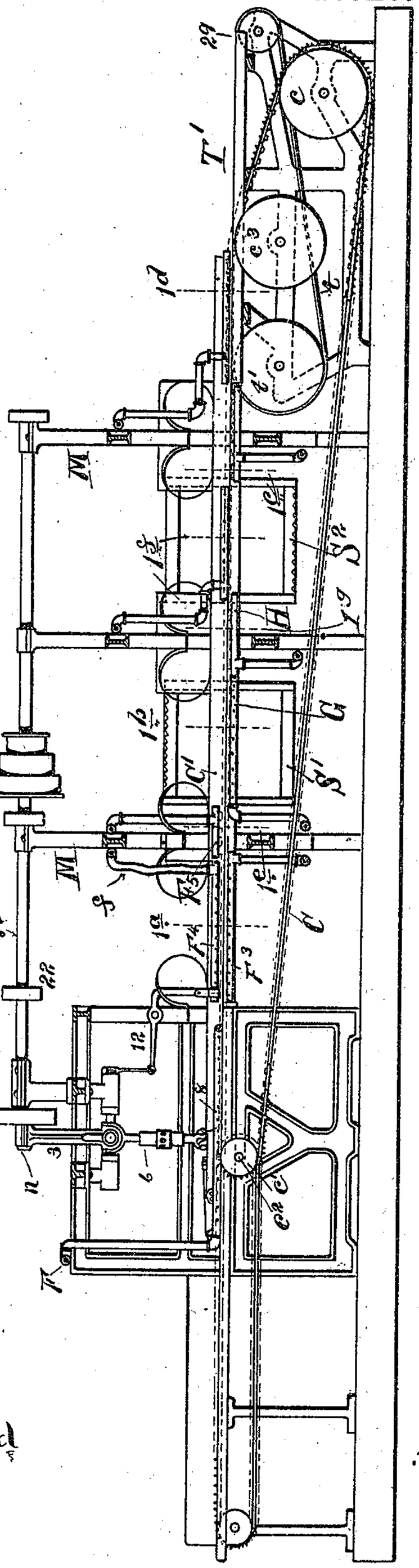

Fig. 1.

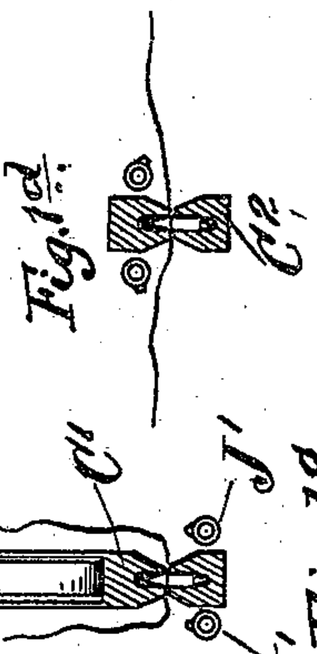

Fig. 1d.

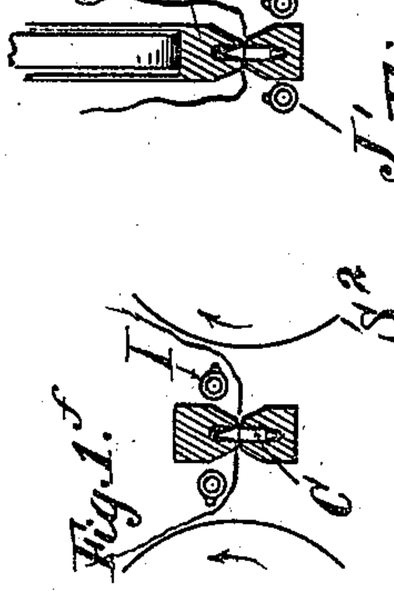

Fig. 1a.

Fig. 1c.

Fig. 1e.

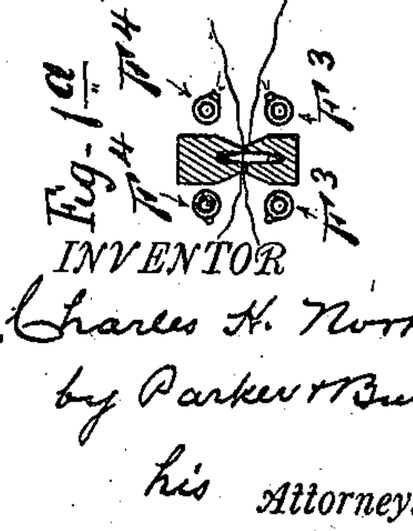

Fig. 1b.

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(No Model.)

6 Sheets—Sheet 2.

C. H. NORTON.

FLAX DRESSING MACHINE.

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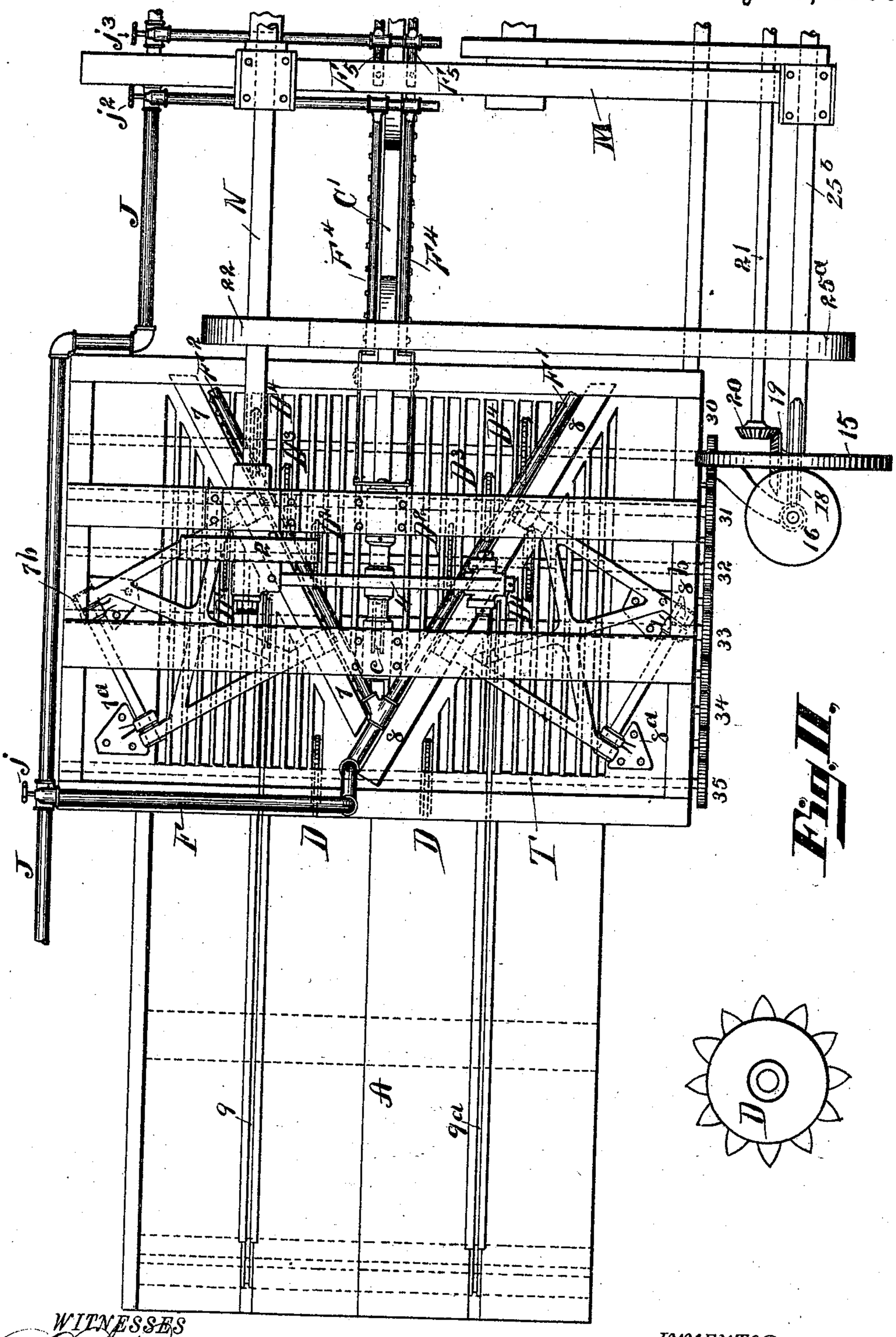

WITNESSES

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FLAX DRESSING MACHINE.

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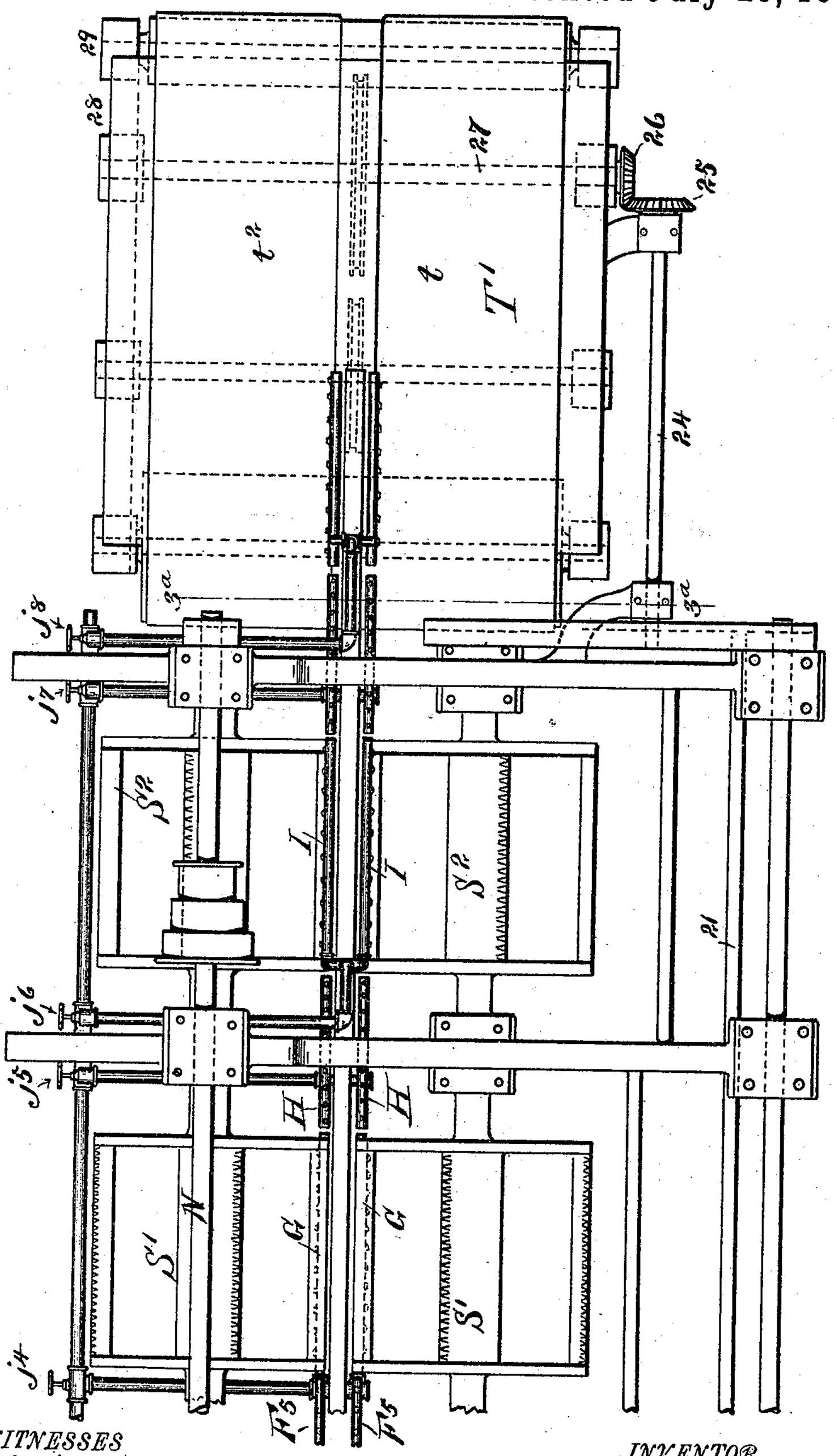
Fig. III.



WITNESSES

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C. H. NORTON.

FLAX DRESSING MACHINE.

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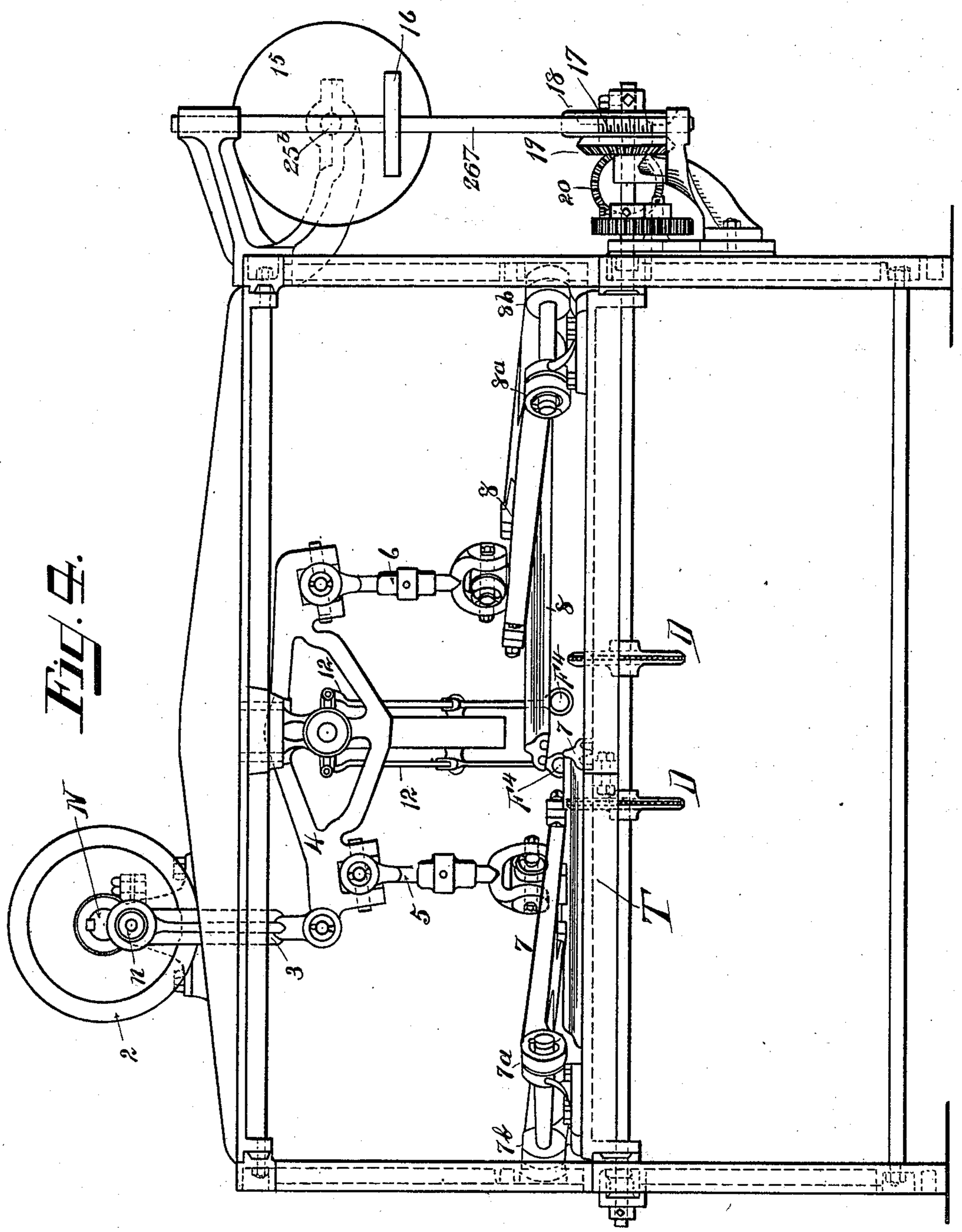

Fig. 4.

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FLAX DRESSING MACHINE.

No. 502,010. Patented July 25, 1893.

Fig. V.

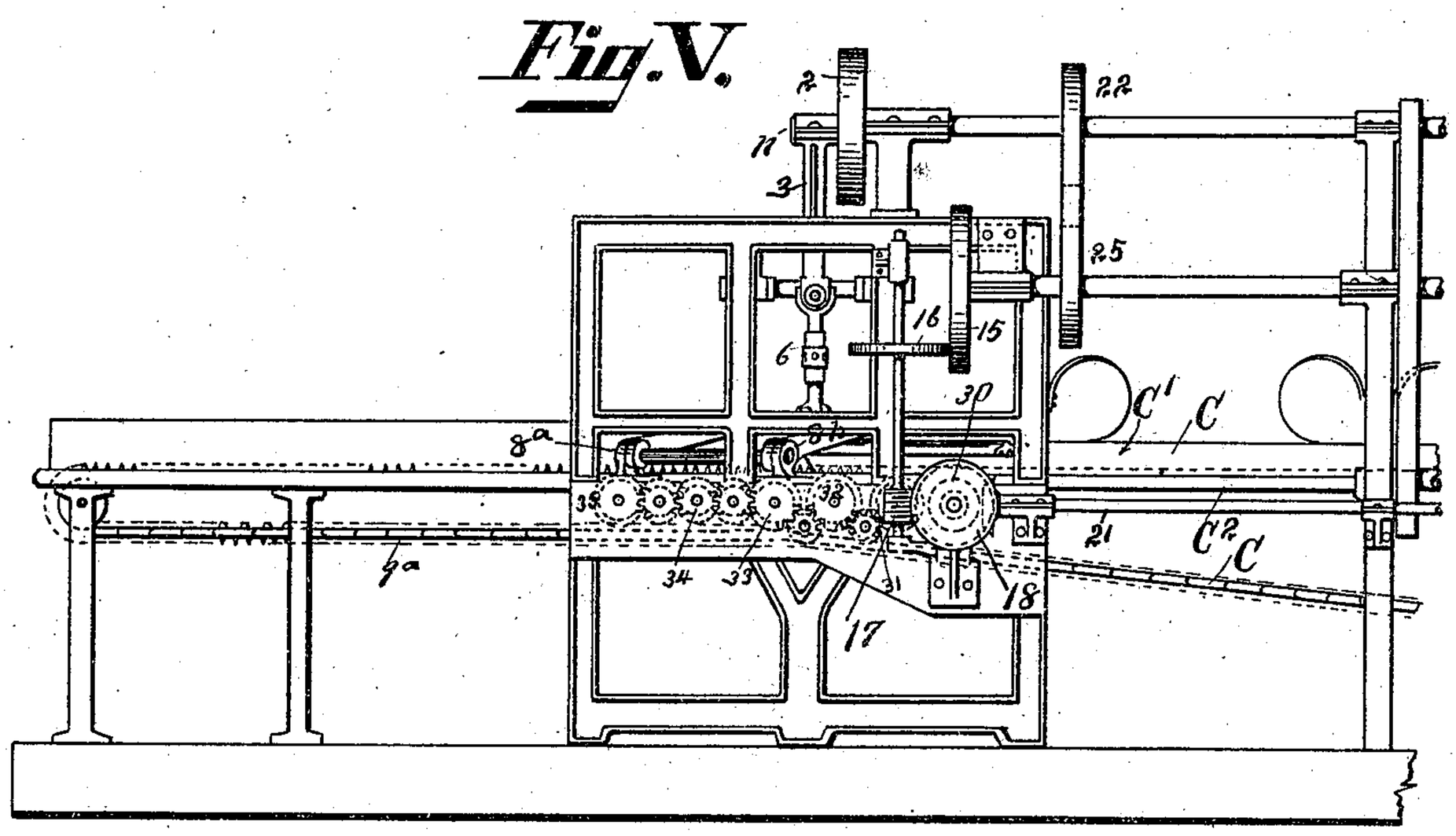
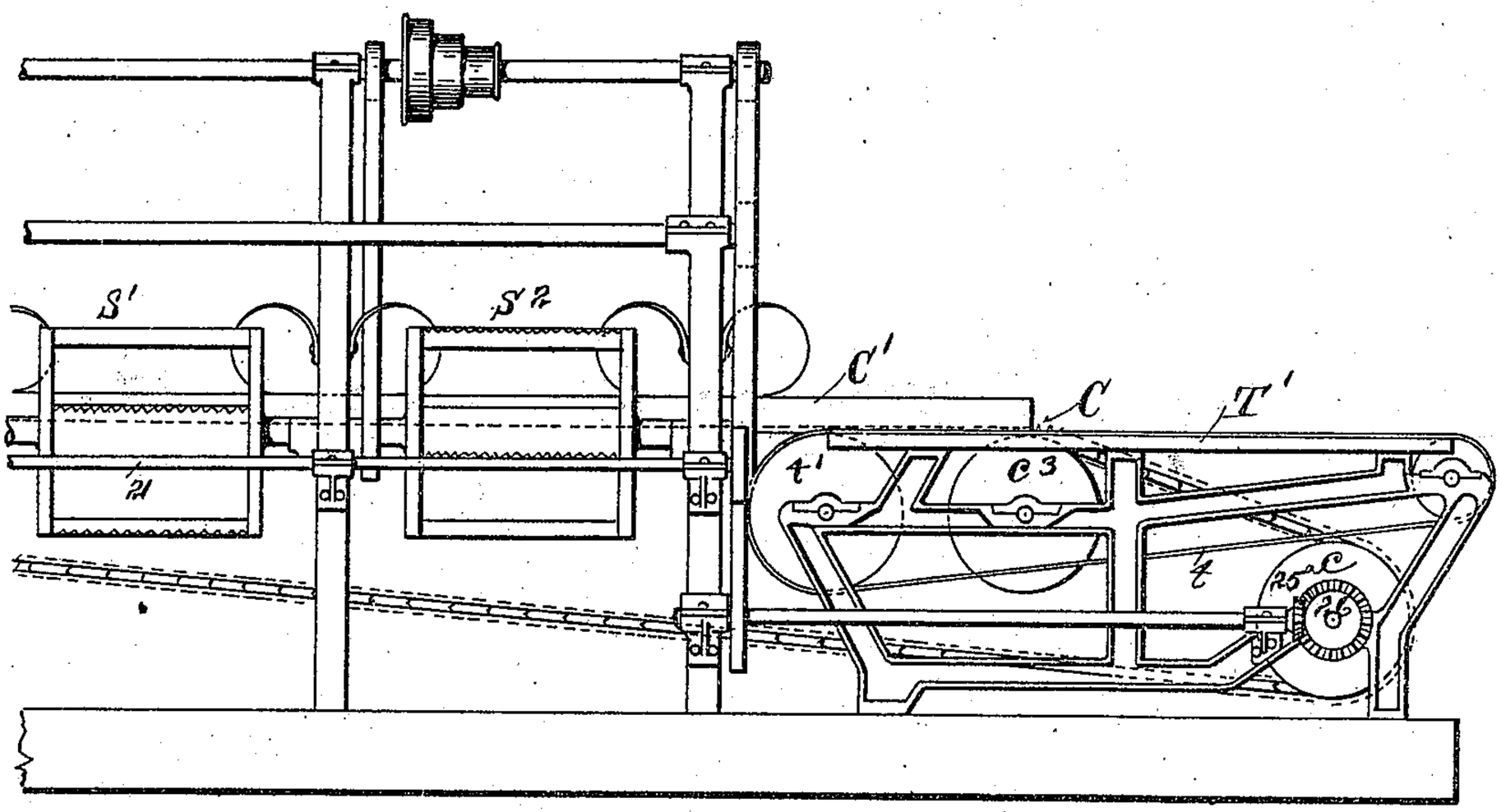


Fig. VI.



WITNESSES

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(No Model.)

6 Sheets—Sheet 6.

C. H. NORTON.

FLAX DRESSING MACHINE.

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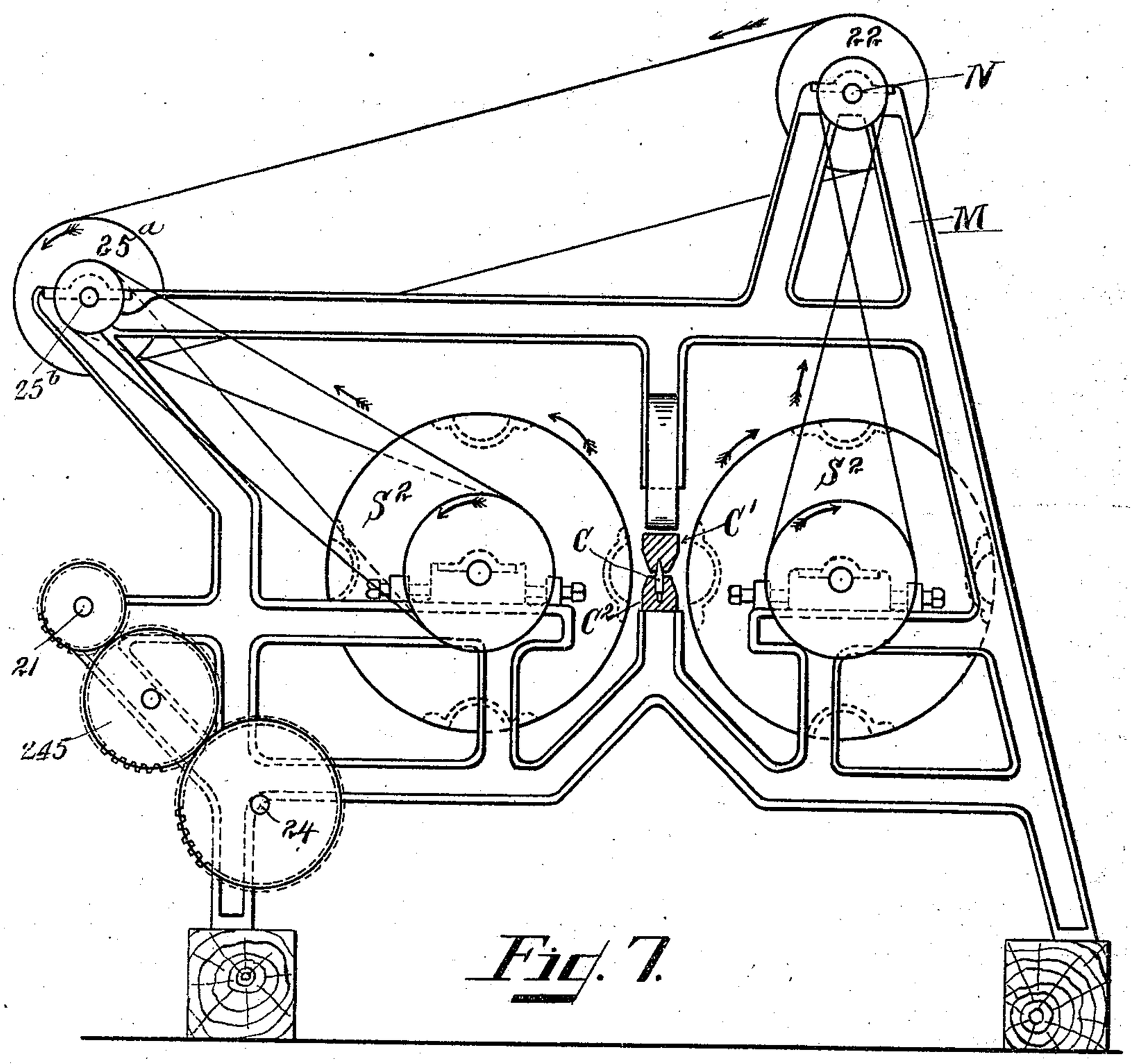

Fig. 7.

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UNITED STATES PATENT OFFICE.

CHARLES H. NORTON, OF DETROIT, ASSIGNOR TO ARTHUR PACK AND RENA A. FRASER, OF ALPENA, MICHIGAN.

FLAX-DRESSING MACHINE.

SPECIFICATION forming part of Letters Patent No. 502,010, dated July 25, 1893.

Application filed January 18, 1892. Serial No. 418,418. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. NORTON, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Flax-Dressing Machines; and I 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 pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to fiber dressing machines, and has for its object the provision of a machine, for treating fiber bearing plants that will remove from the fiber-strands all the woody or stem particles and deliver the fiber clean and straight in condition to be used immediately for spinning or in a condition to be baled and laid away for future use if desired.

As the basis of my improved machine, I employ a breaking and scutching machine that is adapted to receive the straw of a fiber-bearing plant to be treated, and carry it sidewise between the break-jaws, and in front of revolving scutching knives, until all the woody material has been broken and pounded to pieces, and combed and driven out from the threads of fiber.

I have preferred to employ as the basis upon which to found my improvements, the machine for which a patent was granted to Mr. Alexander Morison, on November 10, 1891, and numbered 463,125, to which in addition to the main improvement, to be described hereinafter, I have added some minor improvements in the feeding mechanism, which will also be described at length. But the main improvement in this present invention, consists in the means of applying a series of jets of air to fibrous material under treatment during its passage through the machine; these air jets serve to blow out the crushed woody material from among the fiber; they also serve at times to lift the ends of the fiber upward while it is being carried forward, and thus prevent it from coming in contact with the parts of the machine and becoming entangled or knotted. At other times the ends of the fibrous material are blown down for the same purpose, and at still other times blown straight out, or in a direction to be most effectively struck and combed by the teeth of the scutcher knives, and at all times during the passage of the material through the machine, the effect of the jets of air is to separate the ends of the fiber, to prevent it from becoming entangled and blow out from it the undesirable material.

In the drawings, Figure 1 is a sectional elevation showing the relative location of the parts. Figs. 1^a, 1^b, 1^c, 1^d, 1^e, 1^f, 1^g, are cross sections showing the position of the feeding mechanism and the air pipes, and the direction of the jet nozzles at different parts in the machine, each cross section belonging to that part where the reference line is indicated by the same character as that used to designate the sectional figure. Figs. 2 and 3 show a plan view, of which Fig. 2 represents the front or breaking end of the machine, and Fig. 3 the rear end of the machine, each part showing about half the machine. Fig. 4 shows an elevation of the front or break end of the machine. Figs. 5 and 6 together are a side elevation of the machine showing more especially details of the means for imparting motion to the various parts. The two figures represent a complete elevation, Fig. 5 representing the front end and Fig. 6 the rear end of the machine. Fig. 7 is a cross-section at the line 3^a of Fig. 3, showing the belting by means of which the scutching-wheels are driven.

M, represents the frame work supporting the main driving shaft N. The driving shaft N, is above the main part of the operating machinery and from it the motion is transmitted to the moving parts by means of belting and gearing, adapted to give the proper motion to the several moving parts. At the forward end a crank-wheel 2, is mounted on the shaft N, and a pitman rod 3, connects the wrist-pin *n*, on the wheel 2 with the walking beam 4, and gives motion to the latter. To each end of the walking beam 4 is connected a link 5, 6, operating to alternately raise and lower the break-jaws 7 and 8, which are hinged at 7^a, 7^b, 8^a, 8^b, to the table T. Each break-jaw 7, 8, lies diagonally across the table and breaks into lower jaws fixed to the table and

below its upper surface. One of the jaws 7 reaches from about the middle line of the table diagonally outward and backward beyond the outermost probable reach of any of the stems of material to be treated. The other break-jaw 8 lies across the table diagonally in the opposite direction, its inner and forward end extending across the middle line of the table and beyond the inner and forward end of the jaw 7, so that the material passing under the two jaws is broken throughout its entire length. The table T, is made of strips of any suitable material placed side by side, and with a small opening between each two adjacent strips. The openings permit any of the woody part of the straw that becomes loosened to drop down under the table. In front of the table T is a second table A, traversed from front to rear by two feed chains 9, 9^a. These feed chains 9, 9^a extend backward partially through the table T, and until they have fed the super-imposed straw into the break-jaws 7, 8, whence it is carried farther on by the main carrying chain C. In traversing the table T, the material treated is constantly urged forward by a series of toothed wheels D, D′, D^2, D^3, D^4. The teeth on the wheels D, &c., are involute in form, and they rise only slightly above the surface of the table and push the stems along without danger of catching upon any of them. As the stems pass under the upper break-jaws, they are received between the teeth of the carrying-chain. C, and carried forward under a pressure bar C′. The carrying chain C is a sprocket-chain that passes from the front to the rear of the machine, and is driven by a sprocket-wheel *c*, at the rear. The chain *c* passes around a supporting wheel *c′*, loose upon the shaft c^2, at the front end of the machine. Between the wheels *c′*, c^3, the carrying-chain is supported on a supporting-bar C^2. The supporting-bar C^2 and the pressure-bar C′, are both grooved throughout their length, and the sprocket chain C, moves between the pressure-bar and the supporting-bar in the grooves of the two; the edges of the two bars come in close together and the stems of material to be treated are received across the sprocket-chain C, between the teeth of the sprocket-chain and are forced along between the pressure-bar and the supporting-bar with the chain; the straw passes first under the upper members of the break-jaws as described above, and is broken by the jaws; the first break being at the middle of the straw, and each subsequent break being farther out than the last as the straw moves forward through the diagonal jaws. While the material is between the break-jaws it is treated with an air blast from the two pipes F′, F^2, which lie behind the jaws or within the angle V formed by them, and are provided with nozzles or jets directed outward. The pipes F′, F^2, receive their air from the feed pipe F, connected to any source of air pressure that may be desired. As the material leaves the table T, the ends of it would naturally drop down, but between the table T, and the front end of the cylinder S′, I treat the material with jets of air on both its upper and under sides as shown in Fig. 1^a, where the pipes F^3, are provided with jets that are directed upward and outward, and the pipes F^4 are provided with jets, that are directed downward and outward. The pipes F^3 are fixed in position while the pipe F^4 vibrates in the path parallel to the path of the moving fiber, the vibration being produced by the bell-crank lever 12, connected to and operated by an arm, or any other means on the walking beam 4.

The object of the air jets is two fold: First, to blow out from among the fiber loose stuff, boon, and short threads; second, to compel the fiber to take such a position that in moving forward it will pass over projecting parts of the machine without catching upon them; in compelling the fiber to take these positions, the air blast sometimes lifts the loose end of the fiber, sometimes blows the loose end downward, sometimes holds it directly outward. There is also another result attained by the use of the air jets, as by means of them the fiber is held in position to be most effectually treated by the scutching bars; these different results are attained in the different parts of the machine. Thus, at 1^a, there are on each side of the carrier bar two pipes of which one is above and the other below the carrier chain, and the effect of the combined jets is to hold the fiber out nearly horizontal. At 1^c, there is on each side of the carrier bar one jet, so located as to direct the fiber downward, in a position suitable to enable it to pass the frame stud. At 1^b, there is on each side of the supporting bar a single jet pipe from which the jets of air are directed out nearly horizontally, and serve to hold the loose ends of the fiber in a position to be treated most advantageously by the scutching bars which strike down against the fiber. At 1^c, the ends of the fiber are directed upward to enable them to be carried past a part of the frame work and so also at 1^g. At 1^f the ends of the fiber are directed outward against the scutching bars, by blasts from pipes, that lie at either side of the pressure bar and above the fiber. At 1^d, the free ends of the fiber are directed outward on to the horizontal supporting aprons which here underlie them. The vibrating jets of air act somwhat in the same way that successive short blasts of air would act and tend to separate the fiber, and blow out the foreign matter more effectually than a continuous blast from a stationary jet nozzle. Air is supplied to the pipe F^4, through the flexible tube *f*. The rear end of the pipe F^3, reaches to the part of the frame work in which are journaled the rotary scutching-bars S′; in passing this frame-work and just before the material comes in front of the scutching bars, the air

blasts from pipe F^3 ceases while the jets from the upper pipe F^5, are directed downward forcing the ends of the material to drop downward until the material shall have been carried past the front end of the drum supporting the scutching bars S′; the treatment at this point is indicated in Fig. 1ᵉ. Passing in front of the rotary scutching bars S′, the material comes in front of the pipe G, whose jet nozzles are directed outward nearly horizontal. The scutching-bars S′, rotate so as to strike the material downward at this point, and the fiber being driven by the air blast G, into a horizontal position, is effectually cleaned by the scutcher-bar. As the material passes beyond the scutch-bar S′, and before coming in front of the scutch bar S^2, it again passes a part of the frame-work and here the ends are lifted by jets of air, directed from the pipes H, upward against the ends of the fiber, as shown in Fig. 1ᶠ. The rotary scutcher-bar S^2, rotates so as to strike the ends of the fiber from below and in order that these bars may do effective work, there are behind the fiber and in front of these bars, the pipes I, provided with jet nozzles directed nearly horizontally outward.

In combing or scutching the fiber, it is frequently necessary to regulate the treatment, according to the condition of the material; sometimes the stock has not been retted enough, or has been retted too much.

By the use of the air blast the fiber can be combed more or less heavily as may be desired. An increased force of air directed against the fiber holds it more strongly against the scutching bars and they comb it more thoroughly;—if however the fiber is weak or tender a lighter blast of air is directed against the fiber and holds it against the scutcher with less force. After passing beyond the scutch-bars S^2, the fiber passes another part of the frame-work before reaching the packing table T′, and the ends are again lifted by air from the jet pipes J′ after reaching the table T′. A pipe located above the fiber and provided with horizontal nozzles, lays the fiber smoothly on an apron above the table T′, in a position to be packed.

The table T′ is covered with a pair of endless aprons t, t^2, which carries the fiber backward to a position convenient to be gathered and bundled, either by an operator or an automatic attachment adapted for that purpose.

All air pipes above the fiber as it passes from the front to the rear of the machine, are fed from a supply pipe lying anywhere along the top of the machine; all air pipes below the fiber, are fed from an air supply pipe, lying along the under part of the machine.

N indicates the main driving shaft receiving motion from any convenient source of power and in turn transmitting motion to the various operative parts of the machine. The shaft N, lies lengthwise of the machine, and upon it is fixed a driving pulley 22, which connects by belting (shown on Fig. 2) with a wheel 25^a, on a counter shaft 25^b, lying parallel with the driving shaft N, and supported by brackets at the side of the machine; to the forward end of this shaft 25^b, is secured a face friction wheel 15, supported by brackets extending from the side of the machine; engaging with the face friction wheel 15, is a second friction wheel 16, carried by an upright shaft 267 at the bottom end of which is a screw or worm 17; the friction wheel 16, engages with the face of the friction wheel 15, and is driven by it; the worm or screw 17, forming part of the shaft of the wheel 16, turns with that shaft and engages with and communicates motion to a worm wheel 18 on the shaft with the bevel wheel 19, and the bevel wheel 19. engages with and turns a bevel wheel 20, on the shaft 21; suitable gearing on the rear end of shaft 21 (shown in Fig. 7) engages with gearing on shaft 24, (through an intermediate idler 245) and shaft 24, communicates motion through the bevel gears 25, 26 to the cross shaft 27; and the cross shaft 27, has secured to it the sprocket wheel c, which acts as a driving wheel for the carrying chain C; through the carrying chain C, motion is transmitted to the wheel c', at the front end of the machine; the wheel c', runs loosely on its shaft c^2, and serves simply as a bearing or turning wheel to support the forward end of the carrying chain C; on the shaft of the worm wheel 18, (shown on Fig. 5) is a spur gear 30, the first one of a chain of gear wheels 30, 31, 32, 33, 34, 35, with intermediate idlers, and each of the gears 30, 31, 32, 33, 34, 35, is secured to its own proper shaft lying transversely across the feeding table; upon one of the transverse shafts are secured two or any convenient number of forcing wheels, D, D′, D^2, D^3, D^4. The gear wheels 30, 31, 32, 33, 34, 35, are all of the same size and thus cause the forcing wheels to turn in unison. The feed wheels are so located with respect to the surface of the feed table as to force forward all parts of the fiber plant uniformly.

Fig. 7, indicates the manner of belting from the main driving shaft N, to the several scutching cylinders. N indicates the main driving shaft; 25^b a counter shaft. The main driving shaft N, is belted to the counter shaft 25^b, by a direct belt, and it is belted to the right hand scutching cylinder S′, also by a direct belt, and to the shaft of the right hand scutching cylinder S^2, by a crossed belt. The counter shaft 25^b, is belted to the shaft of the left hand scutching cylinder S′, by a crossed belt, and to the shaft of the left hand scutching cylinder S^2, by a direct belt; this system of belting causes the right and left hand scutching cylinders to revolve in opposite directions, and the front and rear cylinders on each side also revolve in opposite directions.

The aprons t, t^2, are driven by a belt running from pulley 28 on the shaft 27 to pulley 29, on the drum over which the aprons t, t^2

run. The forward end of the aprons t, t^2, passes around the carrying wheel t'. The driving-wheel c, is located below the apron t, and the sprocket-chain C, rises through the surface of the table T′ and between the edges of the apron lying above it, by passing over the carrying wheel c^3. The carrying wheel c', at the forward end runs loosely on the shaft c^2, and the wheel c', is itself rotated as are also all the shafts of the forcing wheels D, D′, D^2, D^3, D^4, from the shaft of the worm-wheel 18. All of the gear wheels driving these feed-wheels are turned in the same direction by the chain of gearing 30, 31, 32, 33, 34, 35, with the intermediate idlers.

The air main J, connects with the several air jet pipes by valves j, j', j^2, j^3, j^4, j^5, j^6, j^7, j^8, and these valves are regulated at will to increase or diminish the force of air at the jet nozzle.

I claim—

1. In a machine for cleaning flax or other vegetable fiber, the combination of a carrier adapted to grasp the fiber at a central point and to move the fiber forward, a pair of break jaws each consisting of a fixed and movable member lying diagonally across the path of moving fiber, one or more auxiliary feeding wheels rotating in planes parallel with the motion of said carrier; said feeding wheels being provided with involute teeth adapted to push forward the ends of the fiber, substantially as and for the purpose specified.

2. In a machine for cleaning flax or other vegetable fiber, the combination of a carrier adapted to move the fiber forward of an air blast pipe lying parallel to the track of said carrier, provided with a series of air jet nozzles, adapted to direct jets of air against the fiber, and a regulating valve adapted to regulate the force of said jets of air, substantially as and for the purpose described.

3. In a machine for cleaning flax or other vegetable fiber, the combination with a carrier, a feed table, and a pair of vertically acting break jaws, each consisting of a fixed and a movable member, of an air pipe lying above said table and provided with jet nozzles, adapted to direct jets of air across the surface of said table and against the fiber, while under operation between said break jaws, substantially as and for the purpose described.

4. In a machine for cleaning flax or other vegetable fiber, the combination of a feed table, a carrier, a pair of vertically acting break jaws, each consisting of a fixed and a movable member, a walking-beam actuator, adapted to give alternate motion to said movable jaws, an air pipe provided with jet nozzles, adapted to direct jets of air across the surface of said table, and against the fiber while the fiber is passing between the break-jaws, substantially as and for the purpose specified.

5. In a machine for cleaning flax or other vegetable fiber the combination of a carrier, adapted to carry the fiber forward sidewise, an air pipe provided with jet nozzles, and adapted to vibrate in a path parallel to the path of said carrier, the said jet nozzles being arranged to direct jets of air outward from near the point of support of said fiber, substantially as and for the purpose described.

6. In a machine for cleaning flax or other vegetable fiber, the combination of a carrier, adapted to carry the fiber forward sidewise, a vibrating air pipe provided with jet nozzles and a regulating valve, adapted to regulate the force of the air escaping from said nozzles, substantially as and for the purpose specified.

7. In a machine for dressing flax or other vegetable fiber, the combination of a carrier adapted to grasp the fiber and move it forward sidewise, a rotary scutching knife having its axis of rotation parallel to the path of the moving fiber, an air pipe provided with jet nozzles extending in a line parallel to the path of the moving fiber, and adapted to direct air jets outward toward the scutching bar, and a regulating valve for the pipe, substantially as and for the purpose described.

8. In a machine for treating flax or other vegetable fiber, in combination with a carrier adapted to hold the fiber and carry it forward sidewise, a moving apron adapted to receive the free ends of the fiber and carry the same forward, the delivery end of the carrier being arranged to lap by the receiving end of the apron whereby the fiber is laid upon the apron before it is released from the carrier, substantially as and for the purpose specified.

9. In a machine for cleaning flax or other vegetable fiber, the combination of a carrier adapted to grasp the fiber and carry it forward sidewise, a moving apron adapted to receive the free ends of the fiber, while it is still held in the carrier and an air pipe provided with air jet nozzles adapted to lay the fiber from the ends which are held smoothly outward on said apron, substantially as and for the purpose specified.

10. In a machine for treating flax and other vegetable fiber, the combination with a carrier adapted to grasp the fiber and carry it forward sidewise, of a moving apron adapted to receive the free ends of the fiber while it is still held by the carrier, an air pipe provided with jet nozzles adapted to lay the fiber smoothly on the apron and a regulating valve, substantially as and for the purpose described.

11. In a flax cleaning machine the combination with a carrier arranged to engage the material and carry the same sidewise, of a series of air jet nozzles, adjacent to the carrier, inclined in opposite directions, substantially as described.

12. In a flax cleaning machine, the combination with the breakers and carrier, of air discharge nozzles in the path of the moving material inclined to direct air currents against

the opposite sides of the material, substantially as described.

13. In a flax cleaning machine, the combination with a carrier, of a series of air discharge nozzles arranged at different angles, along and adjacent to the same, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

CHARLES H. NORTON.

Witnesses:
CHARLES F. BURTON,
EFFIE I. CROFT.