No. 630,408. Patented Aug. 8, 1899.

P. W. REINSHAGEN.

MACHINE FOR DISINTEGRATING HEMP.

(Application filed Aug. 29, 1898.)

(No Model.) 4 Sheets—Sheet 1.

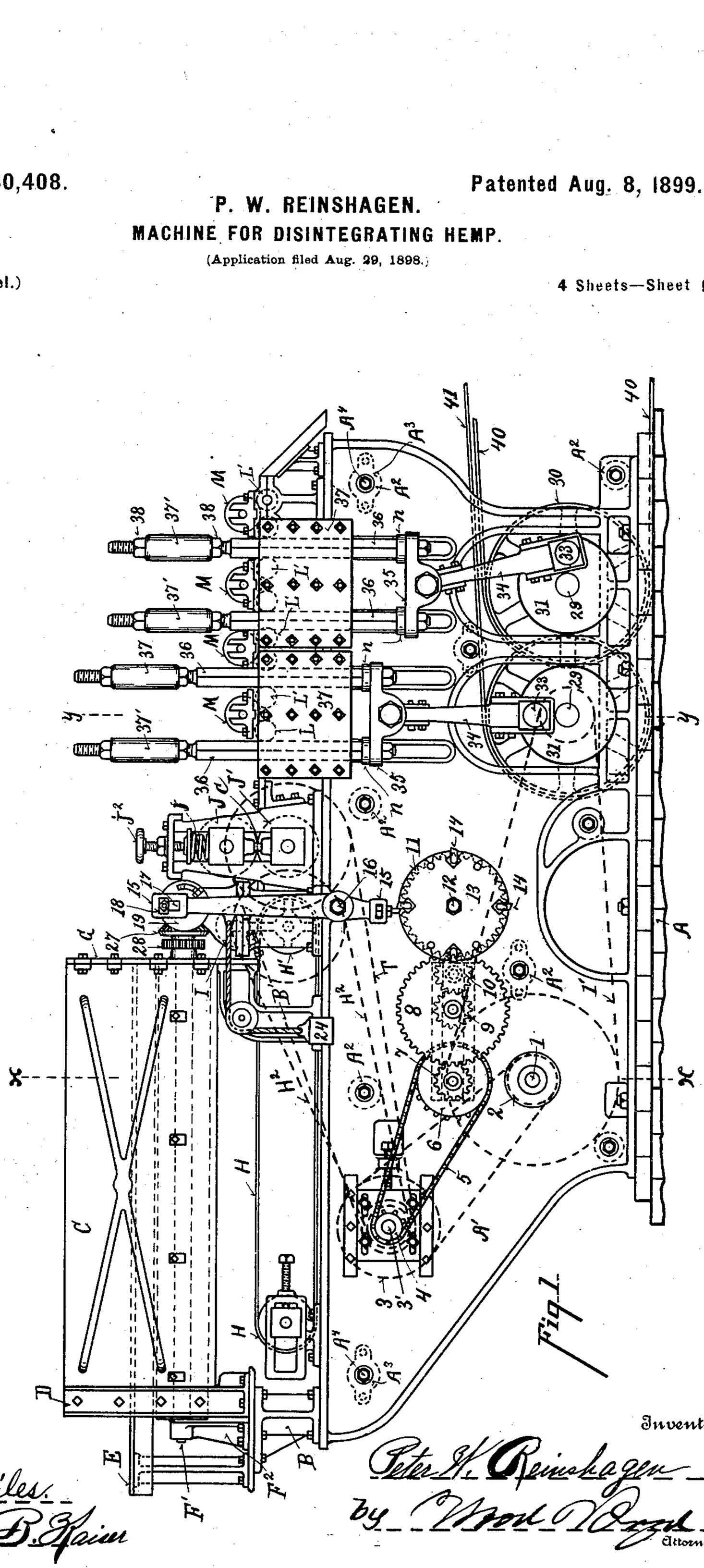

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Fig. 3.

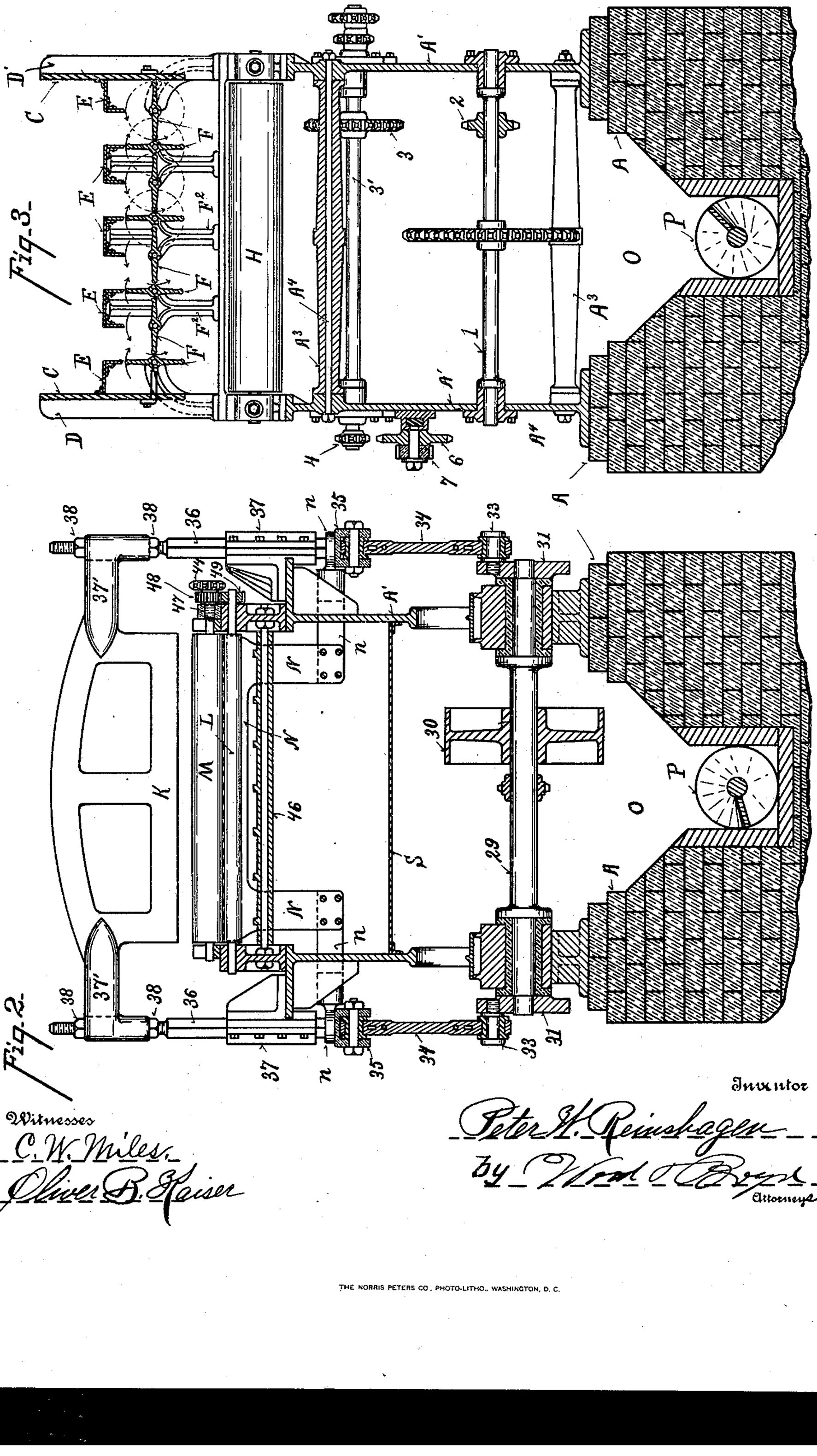

Fig. 2.

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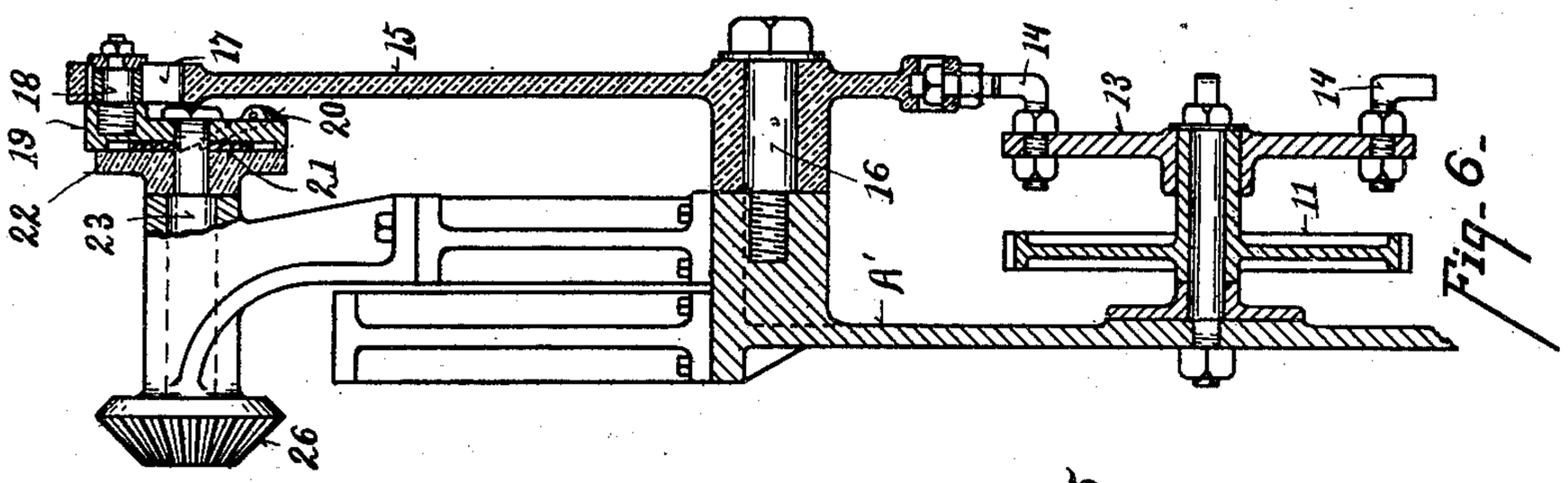

Fig. 6.

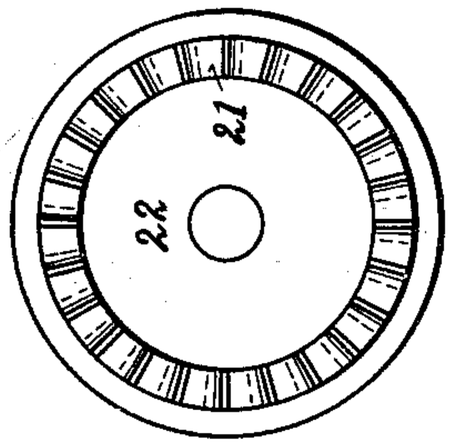

Fig. 7.

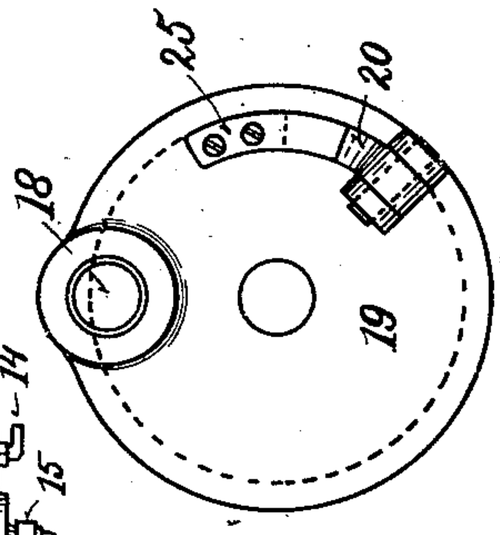

Fig. 8.

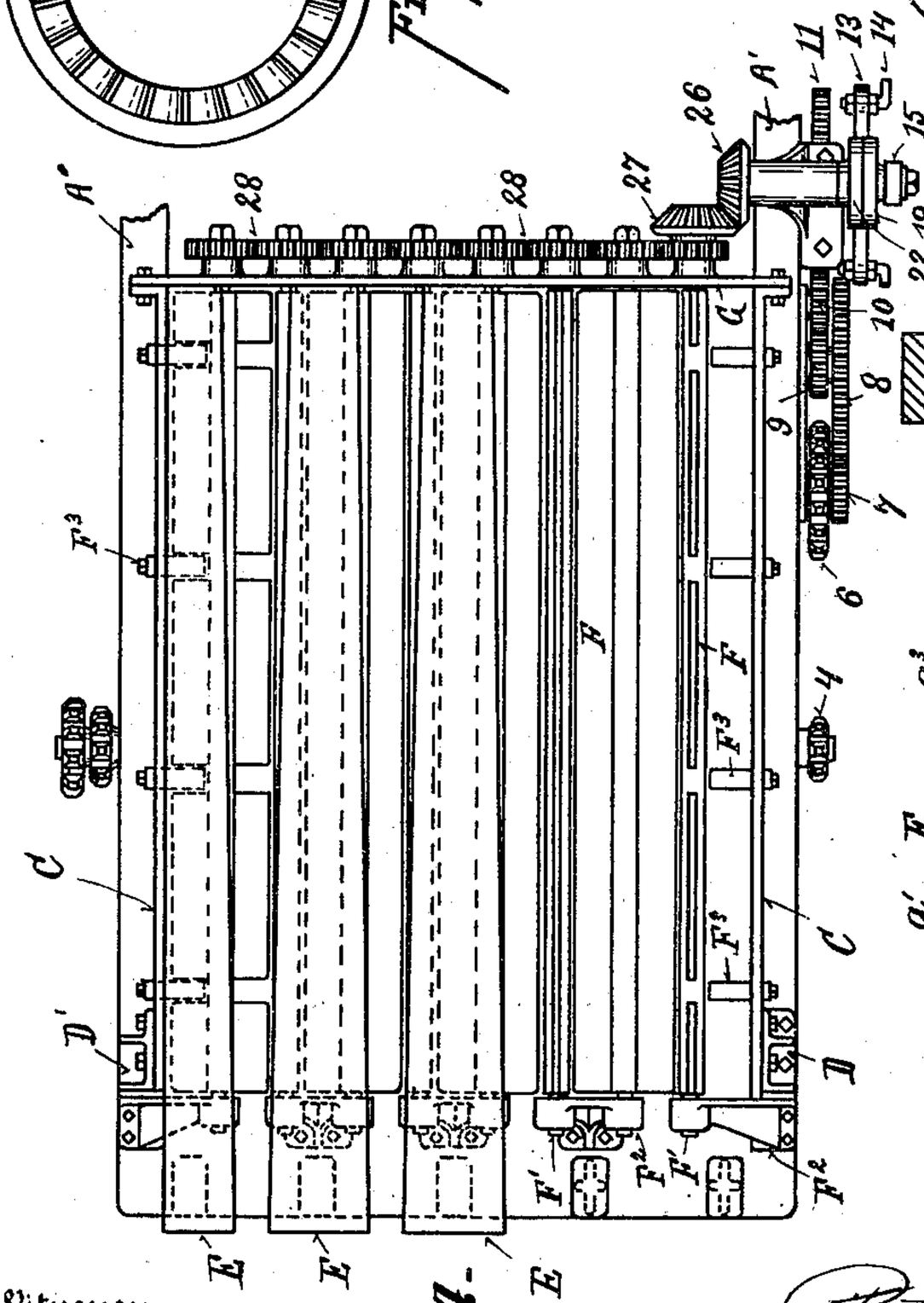

Fig. 4.

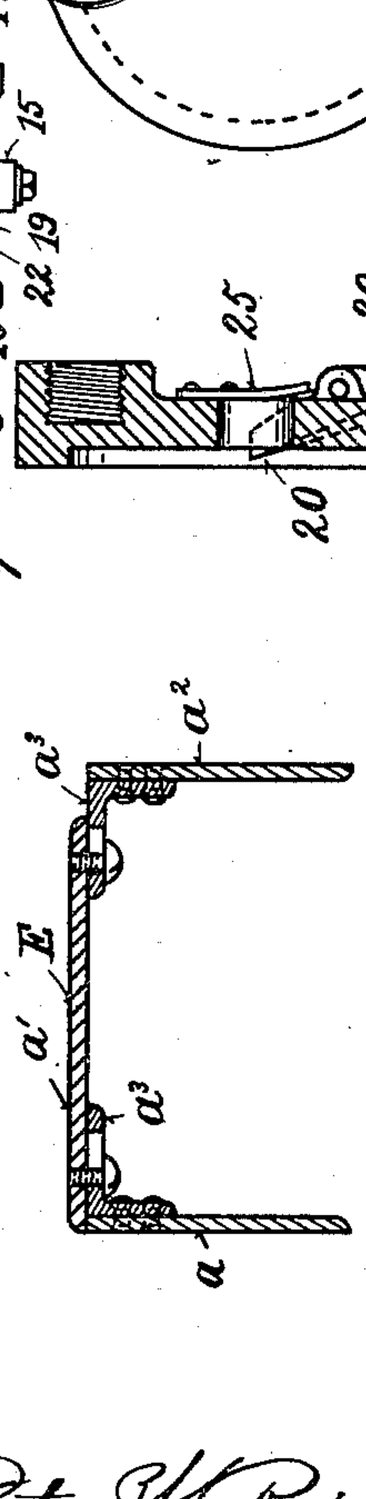

Fig. 5.

Fig. 9.

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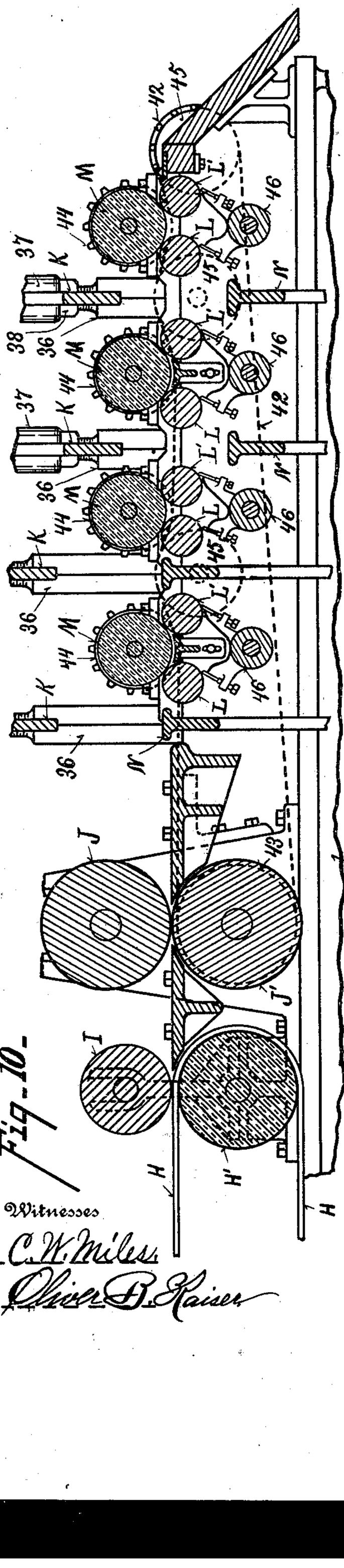

Fig. 10.

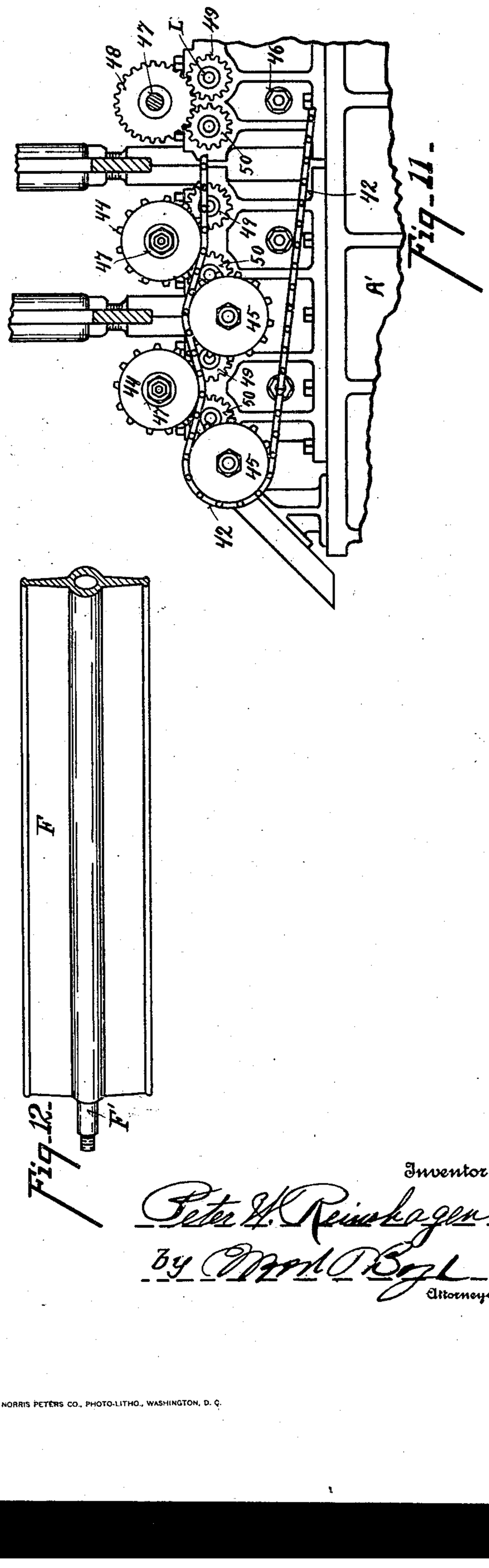

Fig. 11.

Fig. 12.

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UNITED STATES PATENT OFFICE.

PETER W. REINSHAGEN, OF CINCINNATI, OHIO.

MACHINE FOR DISINTEGRATING HEMP.

SPECIFICATION forming part of Letters Patent No. 630,408, dated August 8, 1899.

Application filed August 29, 1898. Serial No. 689,732. (No model.)

To all whom it may concern:

Be it known that I, PETER W. REINSHAGEN, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Hemp-Cleaning Machines, of which the following is a specification.

My invention relates to a new machine for simultaneously breaking and cleaning or dressing fibrous plants, such as hemp, flax, ramie, manila.

The object of my invention is first to provide a feeding mechanism which will deliver the stalks upon an endless apron or carrier in a thin stream or layer, the feeding mechanism being made adjustable to suit the different conditions.

Another object of my invention is to provide a series of rollers or holders to properly hold the stalks to the action of the beating-cleaners.

Another object of my invention is to simultaneously break and clean the hards from the fiber. This is accomplished by means of one or more reciprocating beaters or plungers, each located between sets of rollers or propelling mechanism, so as to grasp and hold the stalks upon each side of the actuating-beaters, the stalks being in thin layers, so that the hards will be driven or knocked out and separated from the fiber by the same instrumentalities which break up the stock.

Another object of my invention is to provide means for adjusting and grading the several parts of the machine which is automatic in its action of feeding, breaking, cleaning, and delivering the hemp in condition for commercial use.

The features of my invention will be more fully set forth in the description of the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side elevation of my improvement. Fig. 2 is a section on line *x x*, Fig. 1. Fig. 3 is a section on line *y y*, Fig. 1. Fig. 4 is a plan view of the feeding mechanism. Fig. 5 is a cross-section through one of the adjustable feeding-guides. Fig. 6 is a sectional elevation of a part of the mechanism operating the feeding-blades. Fig. 7 is a plan view of the ratchet feed-wheel. Fig. 8 is a face view of the feeding-disks. Fig. 9 is a cross-section of Fig. 8. Fig. 10 is a longitudinal central section, partly in elevation, of the propelling and breaking mechanism. Fig. 11 is a side elevation of a part of the driving mechanism. Fig. 12 is a perspective view of one of the feeding-blades.

A represents the base of the machine, A′ the sides thereof, and A^2 cross-arms for holding the sides together and bracing them in position. They are preferably made of a sleeve A^3 and tie-rod A^4.

B represents girders secured to the top of the side pieces A′, on which is mounted the feeding apparatus.

B′ represents an angle-bracket for supporting the rear end of the feeding apparatus.

C represents the sides of the feed-box, rigidly secured by the supports D D′. The frame of the feed-box is rectangular. It is provided with a series of longitudinal adjustable partitions E. These partitions separate the feed-box into feeding-chutes, and they are shown in Fig. 4 arranged wider at one end than the other, so as to proportion the chutes to the stalks, which are largest at the butt-ends. In order to adjust these partitions to graduate the chutes, they are preferably made of plates a a' a^2, secured together by knee-brackets a^3 and screws passing through slotted holes, as shown in Fig. 5. By means of this device the width and taper of the feeding-chutes are regulated to any desired size and proportion.

In order to feed the hemp-stalks intermittingly and in predetermined quantities, I have provided the following means.

F represents a series of feeding-blades, each blade having two wings secured to shaft F′. These shafts are journaled upon bracket-supports F^2 at the front end of the table and upon suitable journals on the plate G at the rear end of the box. It will be observed in Fig. 3 that there are two of these wings provided for each feeding-chute, the wings of one being set at right angles to that of the coacting blade. Thus the blades prevent the choking of the feed, and a charge of stalks is fed in between the blades at each intermittent revolution to an endless carrier-apron underneath. The said blades are caused to move one-quarter of a revolution at each intermitting action, changing the relative position of

the coacting blades for each chute, each blade acting alternately as a feeding and a chute-closing device. To obtain this intermitting movement of the feeding-blades, I provide the following instrumentalities:

1 represents a counter-shaft of a driven pulley. 2 represents a driving-pulley; 3, a transmitter; 4, a sprocket-wheel on the shaft of pulley 3; 5, a chain driving the sprocket-wheel 6; 7, a gear on the shaft of said sprocket-wheel driving the transmitting-gear 8, on the shaft of which is mounted a transmitting-gear 9, which drives transmitter 10, which in turn drives transmitter 11 on shaft 12, the teeth of which are shown in dotted lines, Fig. 1. 13 represents a disk on shaft 12, provided with a series of lugs 14, which successively engage with rock-arm 15, mounted on stud-shaft 16. Said rock-arm is provided with a slot 17, engaging with crank-pin 18, which engages with the pawl-disk 19. 20 represents the pawl pivoted to said disk and projected through a slot. The engaging end of said pawl engages with the ratchet-teeth 21 on the wheel 22, mounted on shaft 23. The oscillation of the lever 15 by the action of the trip-lug 14 drives shaft 23. When the lever 15 is disengaged from contact with the trip-lug, the weight 24 pulls it back to its normal position. 25 shows a spring for holding the pawl in engagement with the ratchet-teeth and allowing it to slip over on the return stroke. 26 represents a bevel-gear on shaft 23, (shown in Figs. 4 and 6,) meshing with bevel-gear 27, which is mounted on one of the shafts F′ on the feeding-blades. The other shafts of the feeding-blades are driven by the series of gears 28, as shown in Fig. 4. The relative speed of these parts is so proportioned that each feeding-shaft and its wings move one-quarter of a revolution with each oscillation of the shaft 15. This movement dumps the charge of hemp held by the action of the feeding-blades in the feed-chutes onto an endless carrier, the coacting feeding-blades being brought into the position corresponding to that of the other member—say from a vertical to a horizontal position. This movement of the feeding-blade from the vertical to the horizontal position accomplishes two results—first, it separates the stalks to be fed from the bunch in the chute and forces the feeding, and, second, it is held in position to close the chute, preventing overcharging and holding the stalks in position for the next movement of the opposite coacting blade.

A change of speed may be effected in various ways—first, by interchange of gears 7, 8, 9, and 10; second, by increasing or decreasing the space between the tripping-lugs 14, or in any other well-known manner of changing speed.

H represents an endless apron or carrier mounted and driven by pulleys H′ and located under the feeding-chutes and receiving the stalks deposited thereon by the feeders. This apron or carrier carries the hemp forward. It is shown as driven by belt H^2.

I represents a feed-roller coacting with the rear feed-roller H′ and delivers the stalks to secondary feeding-rolls J J′. The journal-boxes of said rollers are provided with adjustable stop-pins *c* to prevent the rolls from biting the stalks too hard. The upper-roll journal is provided with coil-spring *j*, the tension of which is regulated by set-screw j^2. This allows the roll to rise to accommodate itself to the thickness of the layer of hemp-stalks being passed through the rolls and secure proper tension on the layer of stalks.

In order to break up, beat, and clean the hards from the fiber, the stalks are presented in thin layers—only one or two stalks in a layer. These stalks must be held taut each side of the breaking-point—first, to assist in cleaning out the hards; second, to prevent the tangling of the fiber, which would occur if one end were free, and also to prevent the making of too much tow. It is desirable, therefore, to have the layer of stalks continuous—that is, the first layer which is fed from the apron by the intermitting action of the feeders is overlapped a slight distance by the second charge fed upon the endless apron H, and so on, thus making a continuous layer of hemp-stalks.

The rolls J J′ are the holding mechanism upon one side of the beaters, performing the function of holding as well as delivering the hemp to the beating-rollers. I have shown four sets of beaters. K represents one of the said beating-blades. I prefer to operate two of said beaters by the same driving-crank. Between each set of beaters are located holding and carrying rolls L L′, supporting the bottom of the stream of stalks. M represents an impinging roll loosely journaled above said rolls L L′ and holding the layers in position to receive the action of the beaters. Between each set of beaters is located similar holding and conveying rolls. In conjunction with said beaters I provide a set of coacting blades acting against the under side of the stream of stalks. The beating-blades are reciprocated to strike the stalks by the following mechanisms.

In Fig. 10 I have shown the relative positions of the beaters K and the returning-blades N. They may be adjusted to or from each other, as will be hereinafter explained. They are reciprocated up and down by the following mechanisms: 29 represents a shaft driven by pulley 30, journaled in the base-frame of the machine, as shown in Fig. 2. 31 represents crank-disks upon each end of the shaft 29. 33 represents crank-pins, and 34 pitmen connected to cross-heads 35. Said cross-heads are connected to plunger-rods 36, sliding in brackets 37. The beater-blades K are connected to plungers 36 by means of ears 37′ and adjustable nuts 38, so as to allow the blade K to be raised or lowered to con-

trol the stroke, as desired. The returning-blades N (see Fig. 2) are connected to the cross-heads 35 by means of the arms *n*, so that pitmen 34 move the beaters K and return-blades N up and down simultaneously, first the beaters striking the layer of stalks held in position by the rolls L L′ M upon the top of the layer, and on the return stroke the blade N strikes the under side of said layer. The third and fourth sets of cleaners and beaters are driven by mechanism the duplicate of that which drives the first and second sets, the two driving-shafts 29 29 being driven by belts 40 41, respectively, which are driven by a common source of power. The feeding-rolls L L′ are driven by mechanism shown in Figs. 10 and 11. 42 represents a sprocket-chain driven by sprocket-wheel 43 on shaft of roll J′, and 44 sprocket-wheels on stud-shafts 47, driven by chain 42. 48 represents gear-wheels on the shafts 47, meshing with and driving gears 49 and 50. Said gears 49 and 50 are mounted upon the shafts of the feeding-rolls L L′. 45 represents idler sprocket-wheels to hold the chain 42 in engagement with wheels 44. Thus the four sets of feeding-rolls are driven in the same direction. The sprocket-wheels 44 45 are supported on stud-shafts. The rolls M, which coact with the feeding-rolls L L′, impinge by weight upon the stream of fiber and accommodate themselves to the thickness of the stream or layer.

It will be observed that the preferred form of beater and returning-blades (shown in Fig. 10) travel to and fro from a central line, preferably adjusted to be near the upper peripheries of the feeding and holding rolls L, and that as reciprocated they strike alternately on the top and bottom on the stream of stalks. As shown in said Fig. 10, the first pair of beaters are shown as elevated and the returning-blades or lifters M are at their upmost position and that the second pair of beaters and cleaners are in the act of descending. They are preferably reciprocated very rapidly, so as to strike the layer of stalks or fibers alternately upon the upper and lower side in quick succession, breaking the stalks and whipping out the hards as fast as they are broken. Any desired number of beaters may be employed. Of course there must be holding and feeding rolls upon each side of the beaters, so as to prevent the fiber from being torn out of its bed or layer to any material extent, thus preventing the formation of tow. The speed of these beaters can of course be increased or diminished at pleasure. The hards thus freed from the fiber drop into the pit O, underneath the machine, and are carried off by a screw conveyer P. The gearing and belts above said pit are housed in the ordinary manner.

46 represents scraper-bars carrying scrapers resting against the faces of rolls L L′.

It will be observed that the feeding-rolls merely support the stalks upon each side of the beating action. This avoids the undesirable formation of much tow, which is incident to those hemp-disintegrators employing an anvil which holds the stock to the action or blow of the breaking device and also to those forms which disintegrate the stock between two reducing-rolls. The rapidly-reciprocating blows struck upon each side of the unsupported portions of the stalks during their progressive feeding produces a clean continuous fiber of a better quality than heretofore obtained. Also the upper feed-roll being mounted in yielding bearings not only accommodates itself to the thickness of the material, but also prevents the rigid clamping of the material as it is fed to the action of the beaters; thus preventing the jerking and tearing of the fiber.

Having described my invention, what I claim is—

1. In a hemp brake and cleaning machine, in combination with a feed-chute, a pair of revoluble feeding-blades journaled at opposite sides of the chute and standing normally in opposite planes and adapted to alternately open and close the chute in the act of feeding, substantially as specified.

2. In a hemp-brake, the combination of a series of partitions forming a series of feed-chutes, revoluble feeding-blades journaled to each side of the chutes each blade standing normally at right angles to its coacting blade, and mechanism for intermittingly moving said blades one-quarter revolution at predetermined times, substantially as specified.

3. In a hemp-brake the combination of a feeding-hopper, a series of angle-iron partitions arranged longitudinally in said hopper and dividing the same into a series of longitudinal chutes, an endless carrier located under said chutes, a pair of coacting blades revolubly journaled in each chute, and means for operating the carrier and revolving said blades, substantially as specified.

4. In a hemp-brake, the combination with an endless carrier of a series of feeding-chutes each arranged longitudinally to the line of travel of said carrier, one or more pairs of intermittingly-revoluble feeding-blades arranged in relation to each other and to the sides of the chutes as specified, and mechanism for intermittingly operating the said blades at predetermined times whereby the stalks are deposited upon the carrier in thin and continuous layer, substantially as specified.

5. In a hemp-brake, the combination of a feed-hopper, a series of angle-irons dividing said hopper into a series of longitudinal chutes, an endless carrier located under said chutes, one or more pairs of revolving coacting blades journaled in said chutes, means for operating the endless carrier and for revolving said blades, the said blades being adapted to feed the stalks between them upon the endless carrier substantially as specified.

6. In a hemp-brake, the combination of a feed-hopper, a series of angle-irons dividing said hopper into longitudinal compartments, an endless carrier located under said compartments and means for operating the same, one or more pairs of coacting blades revolubly mounted in said compartments, means for revolving the same, the said blades being adapted to travel downward in the chute-passages and feed the stalks to the endless carrier, and to travel upward under the angle-iron projections out of the way of the chute-passages, substantially as specified.

7. In a hemp-brake the combination of a feed-hopper, a series of angle-iron partitions longitudinally arranged in said hopper and dividing the same into chutes, an endless carrier located under said chutes and provided with operating mechanism, one or more pairs of coacting feed-blades revolubly journaled in said chutes, means for intermittingly operating the same, whereby the stalks are fed between the downward strokes of the coacting blades in a thin layer upon the endless belt, the upper portion of the revolution being under the projections of the angle-iron partitions out of the way of the chute-passages, substantially as specified.

8. In a hemp-brake the combination of a feed-hopper, a series of partitions located in said hopper and dividing the same into longitudinal chutes, one or more pairs of revoluble feeding-blades journaled in said chutes, an endless carrier located under said chutes, two or more pairs of supporting and feeding rollers journaled in the frame of the machine and adapted to receive the stalks from the carrier, the upper rollers being journaled in yielding bearings, one or more pairs of reciprocating beaters located between said rolls and adapted to alternately strike the stalks upon each side between said rolls, and means for operating said feeding-blades, carrier, feeding-rolls and reciprocating beaters, substantially as specified.

In testimony whereof I have hereunto set my hand.

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Witnesses:
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