

No. 661,199.

Patented Nov. 6, 1900.

J. B. UNDERWOOD.
TOBACCO STEMMING MACHINE.

(Application filed Apr. 8, 1899.)

(No Model.)

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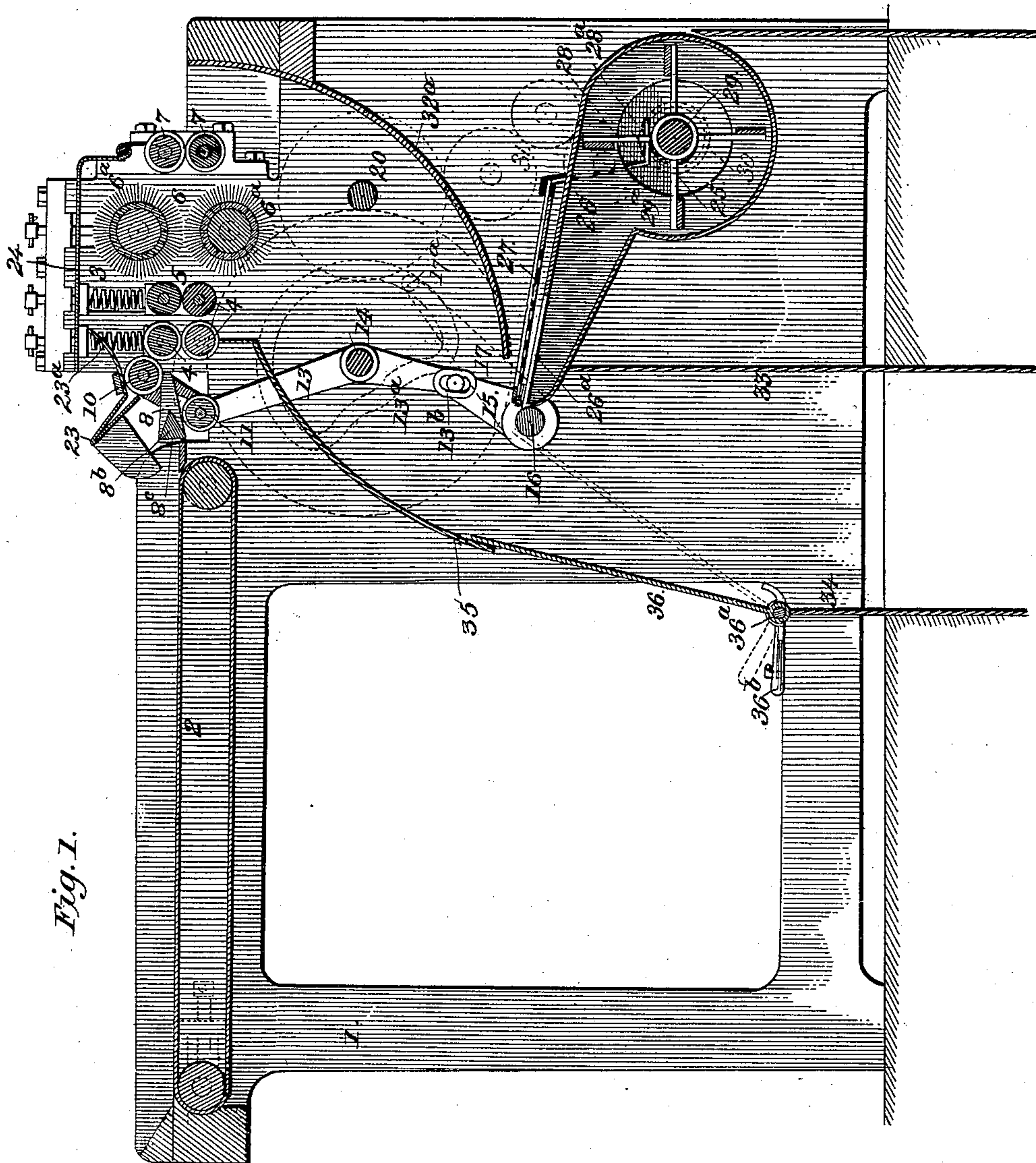


Fig. 1.

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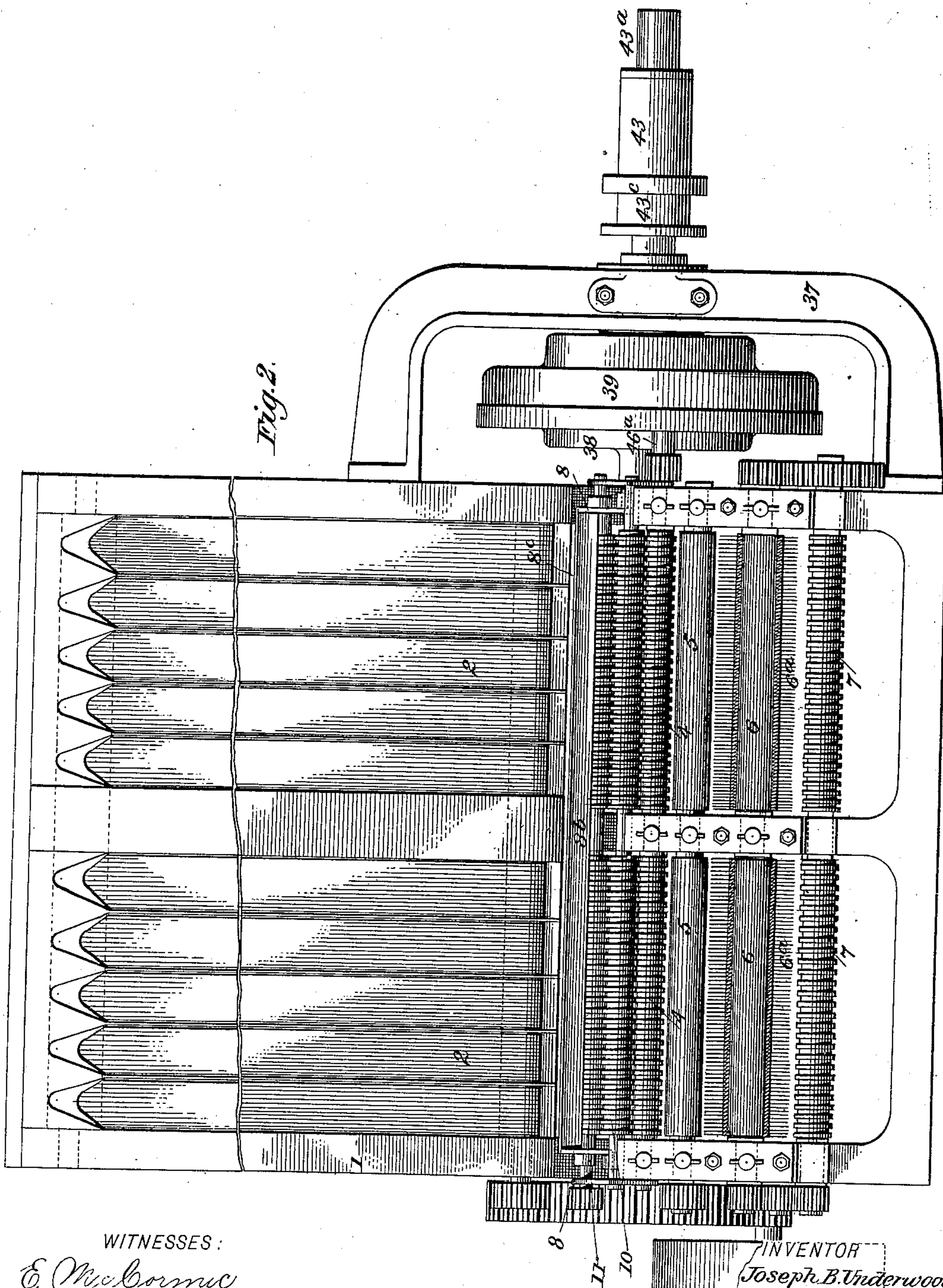
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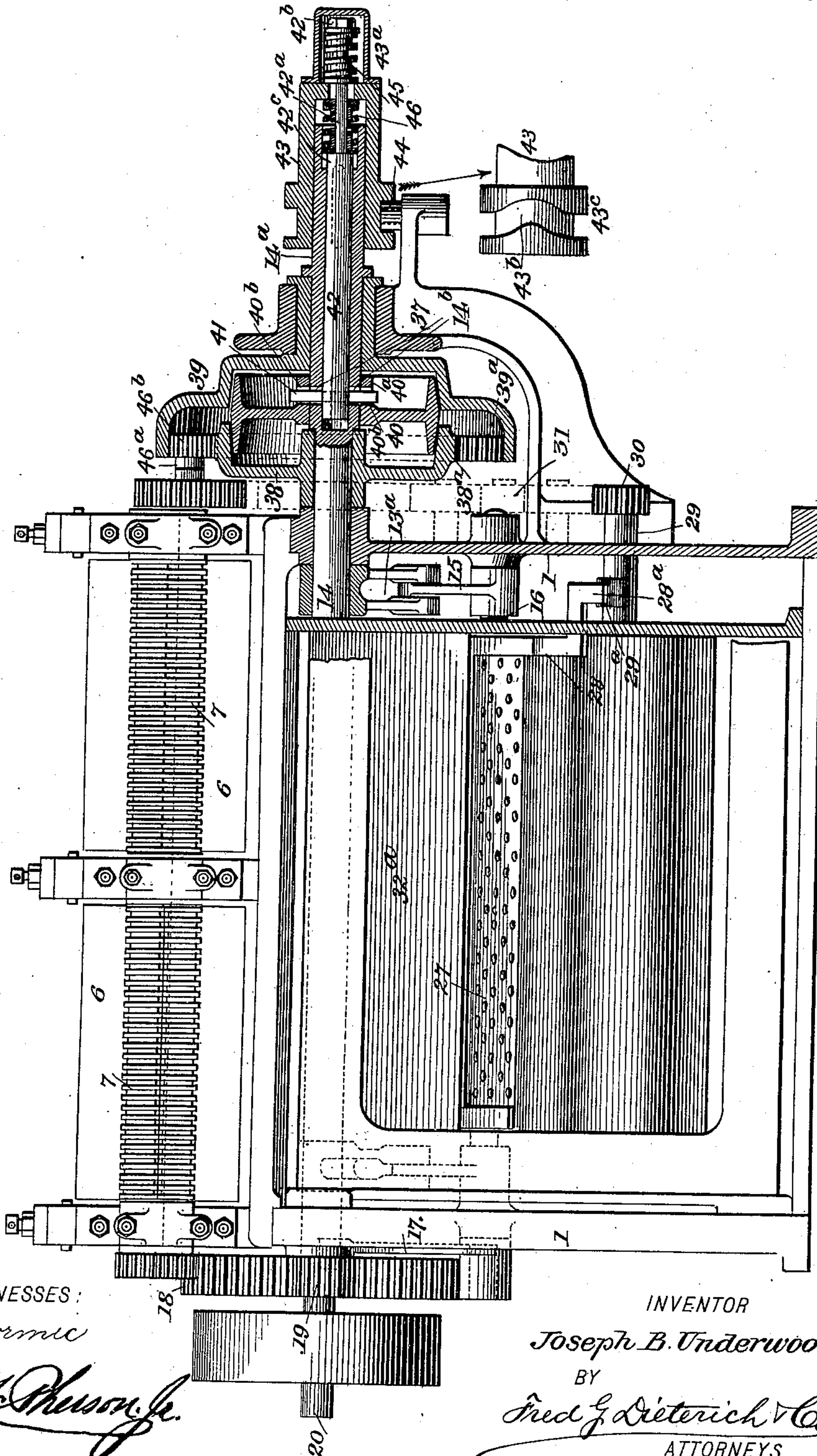
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Fig. 3.



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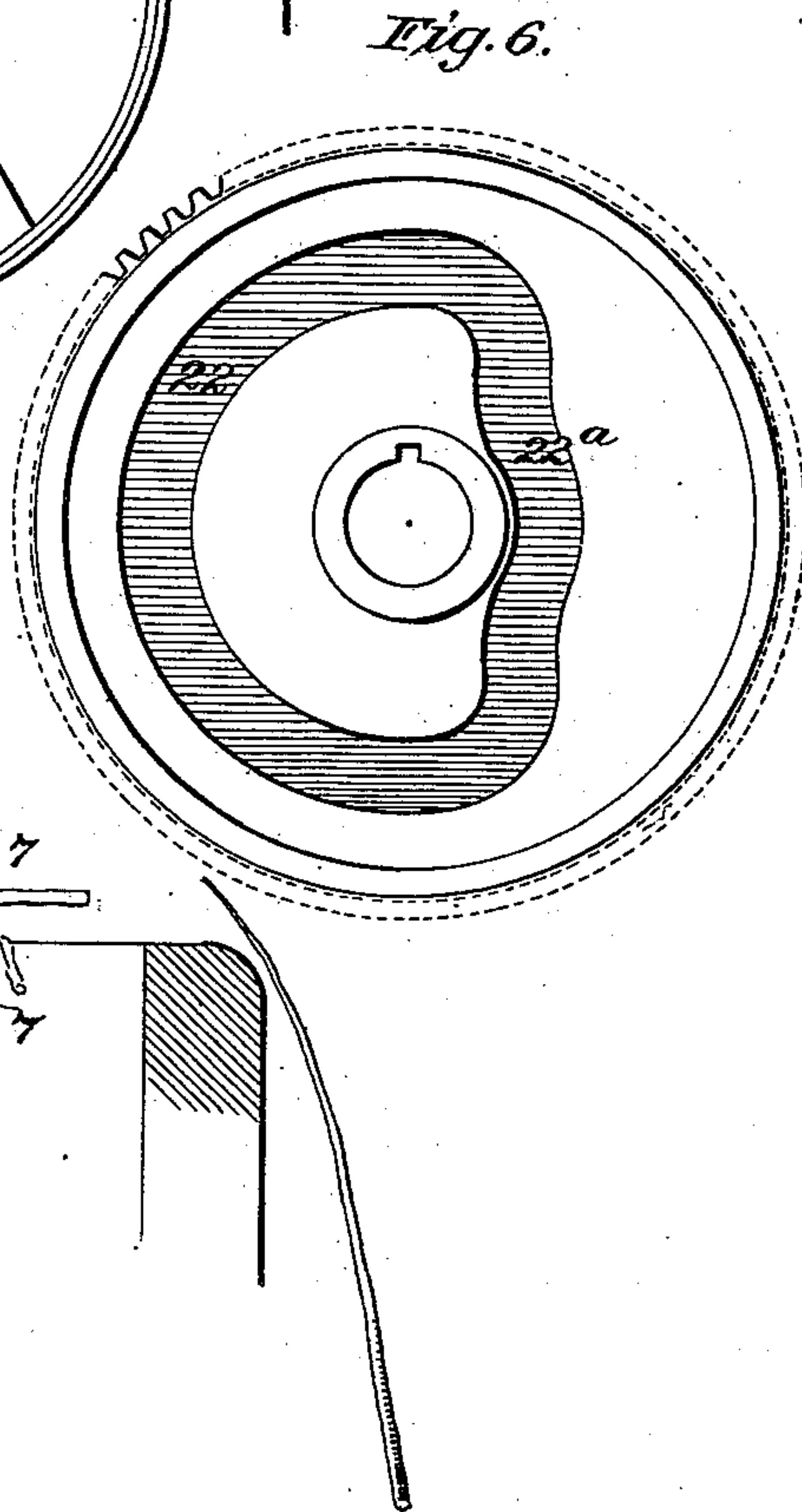
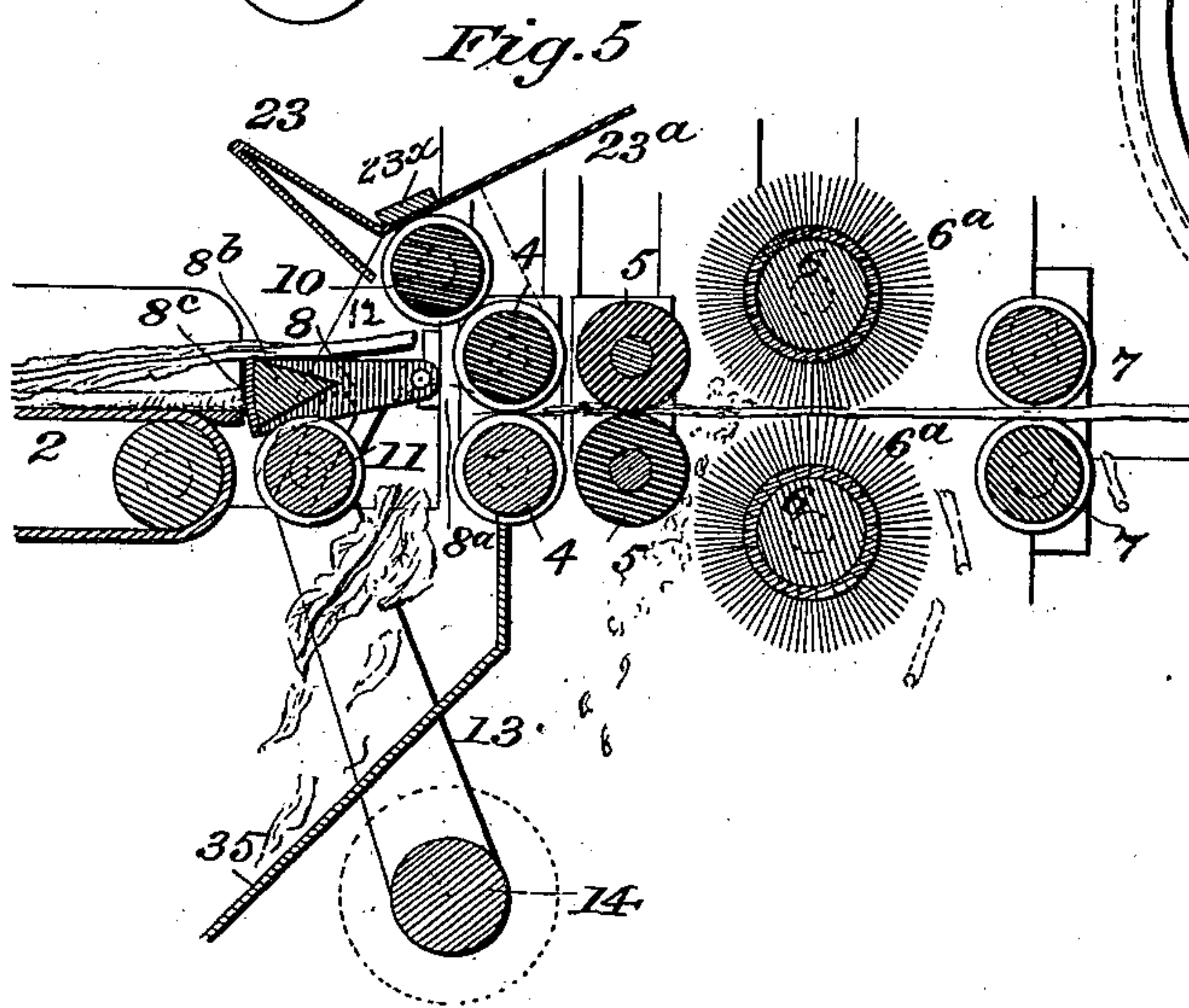
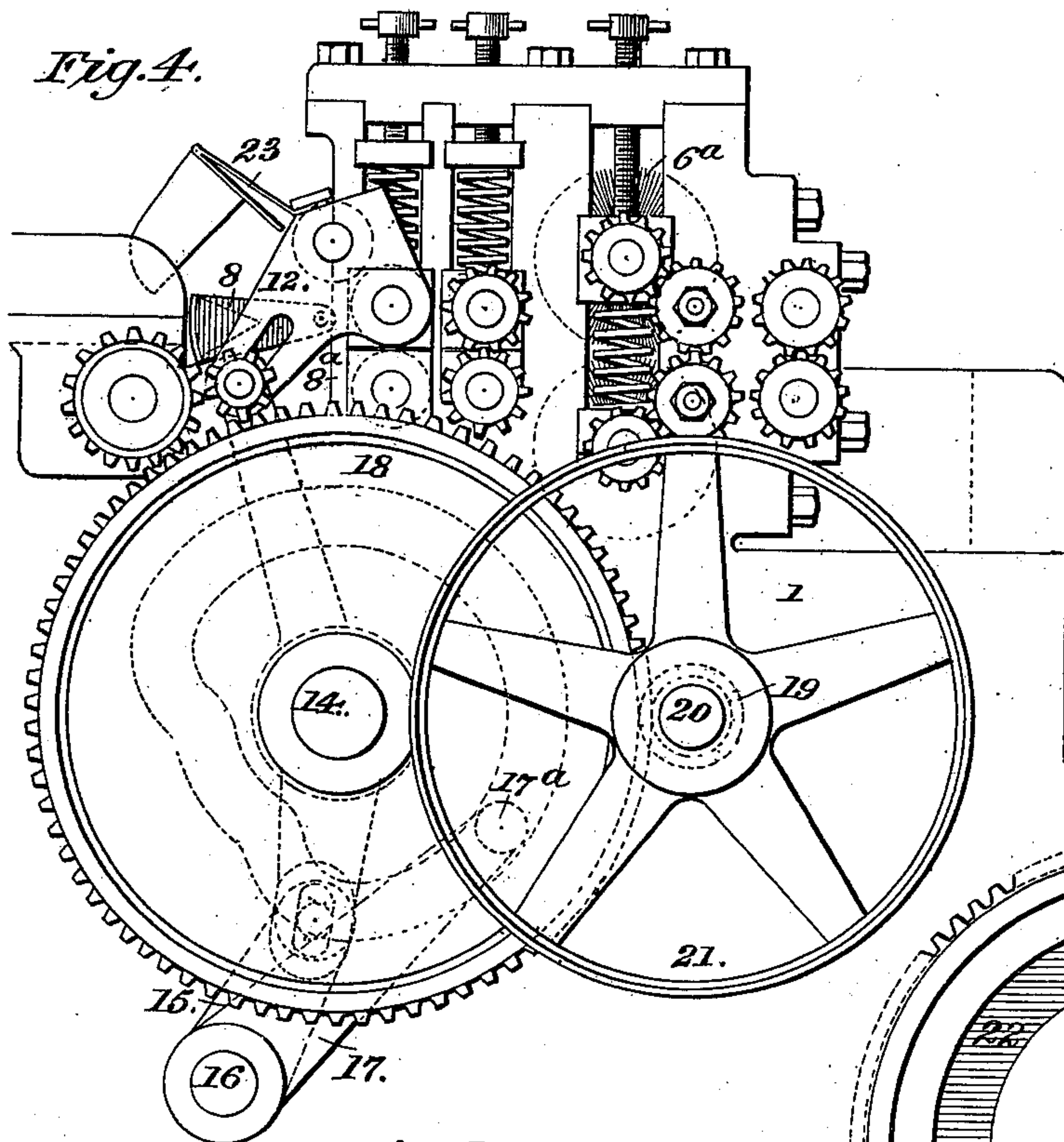
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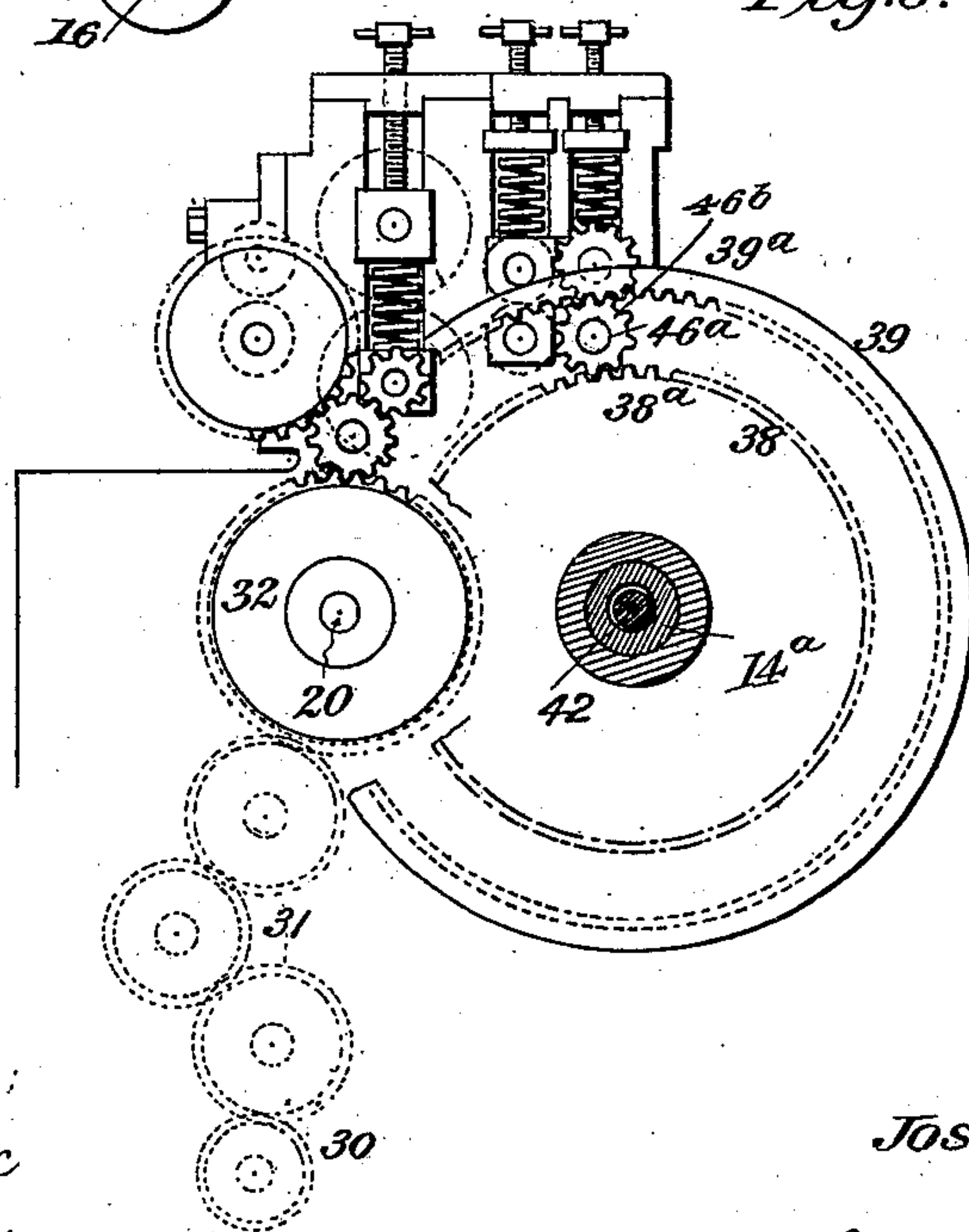
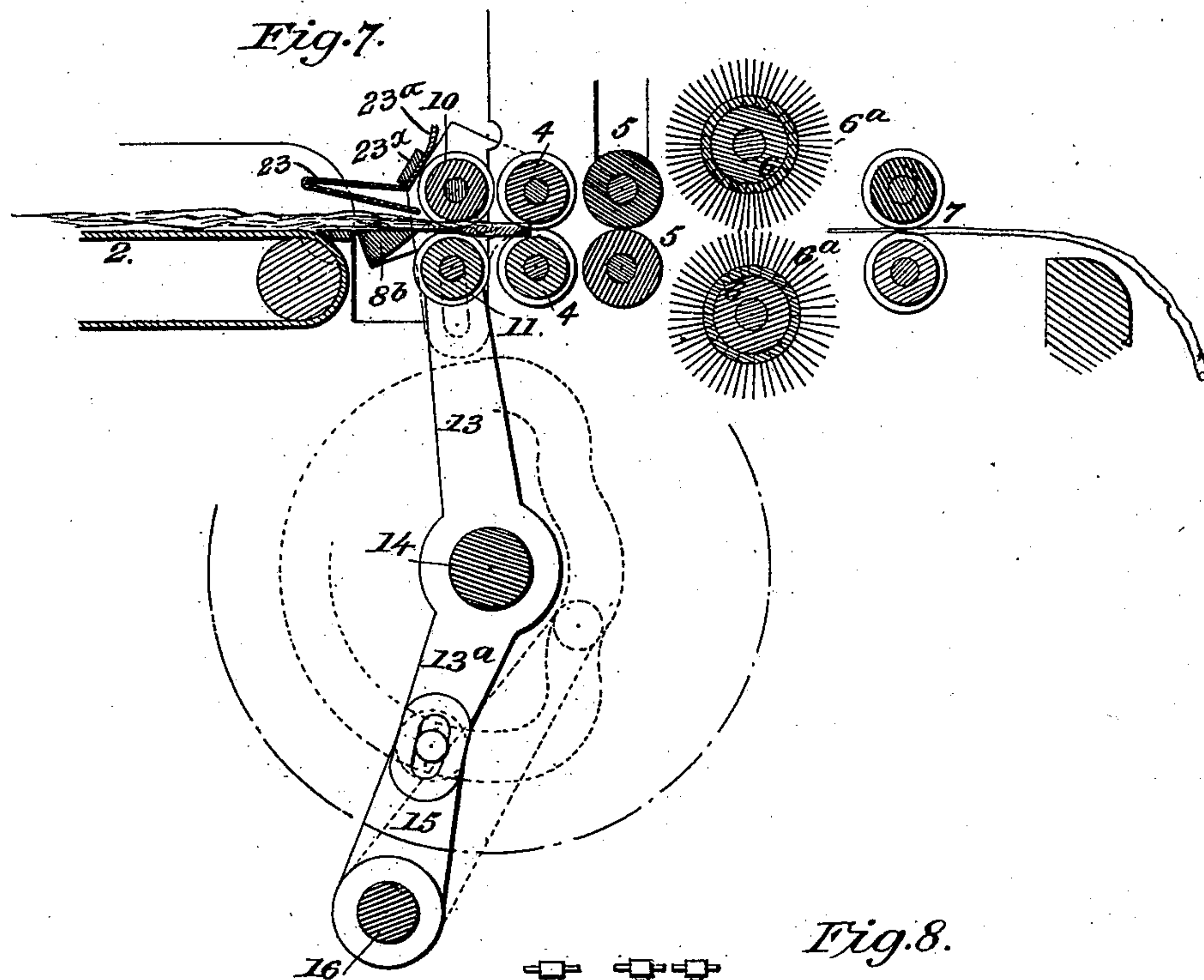
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TOBACCO-STEMMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 661,199, dated November 6, 1900.

Application filed April 8, 1899. Serial No. 712,339. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH B. UNDERWOOD, of Fayetteville, in the county of Cumberland and State of North Carolina, have invented certain new and useful Improvements in Tobacco-Leaf-Stemming Machines, of which the following is a specification.

This invention relates to that class of tobacco-stemming machines wherein the separation and removal of the leaf from the stem are effected by subjecting the leaf as a whole to a drawing action, the body or leaf portion proper being retarded and separated from the stem and discharged at one point, while the stem is discharged at another point; and such invention relates generally to improvements on a machine of this kind disclosed in my Patents No. 543,143, dated July 23, 1895; No. 556,324, dated March 10, 1896, and No. 591,436, dated October 12, 1897.

The objects of the invention are to improve the construction and operation of tobacco-stemming machines, to simplify the mechanism thereof and render it durable and free from liability to derangement, to improve the means employed for controlling the feeding of leaves to the stripping mechanism, to prevent leaves from becoming tangled in the stripping mechanism or from wrapping about the stripping or feeding rolls, to separate fine fragments of tobacco from broken pieces of stem and the like in a simple manner, and to improve the mechanism employed for driving and reversing the stripping-rolls. These objects are attained in the invention herein described, and illustrated in the drawings which accompany and form a part of this specification, in which the same reference-numerals indicate the same or corresponding parts, and in which—

Figure 1 is a vertical longitudinal section of my improved tobacco-stemming machine. Fig. 2 is a top plan view thereof, parts being in section, the inclosing cover or cap member being removed. Fig. 3 is a rear view, the reversing mechanism for operating the stripper-rolls being shown in section. Fig. 4 is a detail side view illustrating the main or cam wheel and the drive-gearing connected there-

with, the cradle devices being in position to hold the stop device elevated above the leaf-feedway. Fig. 5 is a vertical section illustrating the position of the stop device and initial feed-rolls during the operation of stripping the stem. Fig. 6 is a detail view of the combined drive and cam wheel hereinafter referred to. Fig. 7 is a detail section illustrating the position of the stop device and the initial feed, the stripper, and draw rolls during the operation of feeding the leaf to the stripping-rolls. Fig. 8 is a detail view of the main drive-gearing.

Referring to the accompanying drawings, 1 indicates the main supporting-frame, 2 the feed-table, and 3 the stripping and separating chamber, the general arrangement of which is best shown in Fig. 1 of the drawings.

4 4 indicate the main stripping-rolls, which are grooved and are arranged as shown in my former patents and have an intermittent reverse motion, so that they may serve both as feed and as stripping means.

5 indicates the drawing-rolls, which are arranged and operate in the same manner as the draw-rolls shown in my Patent No. 556,324.

6 indicates the supplemental stripping-rolls, which are of a larger diameter than the draw-rolls proper, 5, and have peripheral faces formed of card-teeth 6^a 6^a, such rolls being arranged to rotate at a greater speed than the rolls 5 to provide for a positive stripping from the stem of the leaf particles not removed by the main stripper-rolls and also to discharge the cleaned stem to the rear end of the machine.

By driving the rolls 6 at a greater speed than the drawing-rolls 5 the passage of the stem through the said rolls 6 will be retarded so long as the stem is held by the drawing-rolls 5, and be thereby practically held fixed in its relation to the rolls 6, and receive a complete stripping or wiping action, as the yielding card-teeth will spread and pass along each side of the stem and remove the small leaf particles, it being understood, however, that as soon as the tip of the stem passes beyond the drawing-rolls the swift rotation will carry it rearward.

To provide for a positive discharge of the stem to the rear of the rolls 6 and avoid the possibility of such stem curling up and winding about and between the card-covered rolls, a pair of grooved rolls 7 7 are located to the rear and adjacent the rolls 6 in such a manner that the stem as it leaves the rolls 6 will enter therebetween and pass therethrough. These rolls 7 are preferably of rubber or have a yielding peripheral face, and while they may be arranged to also act as pull-rolls they need not necessarily be so, as the stem after entering between the same is forced therethrough by the impetus given it from the rolls 6. To facilitate the passage of the stem, such rolls 7 are geared to rotate in the direction of the movement of the stem, and one of such rolls, preferably the upper, is allowed a slight vertical movement in its bearings, so as to rise slightly in case of any obstruction effected by any irregularity in the thickness of the stem. These rolls also serve to prevent the fine particles of leaf removed from the stem being thrown out of the machine and to hold the air-blast, hereinafter referred to, within the separating and stripping chamber, as will presently be more fully explained.

The combined leaf-stop, leaf-rest, and leaf-bridge mechanism in this invention comprises a single member consisting of the side arms 8, pivotally hung on the front edges 8^a of the main frame, and a transverse bar 8^b of triangular shape, the straight face 8^c of which faces the front of the discharge end of the feed-table, as clearly shown in Figs. 1 and 7. In practice the member 8 8^b is so hung to the main frame as to drop to its lower position by gravity, and the angle of the upper edge of the bar 8^b is such that when the said bar 8^b is at its lowermost position the upper edge of such bar is substantially horizontal and forms a bridge-piece between the discharge end of the feed-table and the front or initial feed-rolls 10 and 11, which are arranged substantially in the manner shown in my Patent No. 57,436 above referred to, the upper one being mounted in the cradle 12, while the lower one is mounted on the swinging arms 13, fulcrumed on a transverse shaft 14 and provided with pendant members 13^a, pivotally connected at 13^b to cranks 15, mounted on a transverse bar or shaft 16, one of which cranks has fixedly connected therewith a second crank-arm 17, which forms the shifting lever, as its free end has a stud 17^a, which works within a cam-groove in a master gear-wheel 18, intermeshing with a pinion 19 on the main drive-shaft 20, which carries the drive-pulley 21, as clearly shown in Figs. 3 and 4. The cam-groove of gear-wheel 18 consists of a main portion 22, arranged concentric with the axis of the wheel 18, and an eccentric portion 22^a.

In practice the relation of the arm 17 and the cam-groove 22 22^a is such that the stud 17^a travels in the concentric portion 22 of the groove during the stripping rotation of the rolls 4, whereby the shifter 17 is held inert

during such operation, and the cradle and initial feed-rolls are in the position shown most clearly in Figs. 4 and 5. During such action of the member 17 the device 8^b rests with its front edge above the feed-table bed or apron and forms, as it were, a combined leaf-stop and leaf-rest, as it projects in the path of a leaf upon one of the feeding-belts of the table 2 and prevents the leaf from feeding forward during the stemming of the preceding leaf, also deflecting and forming a rest for such precedingly-fed leaves as may not have properly engaged the stripper-rolls. At intervals the direction of motion of the stripping-rolls 4, which normally is opposite to that of a leaf through the machine, is reversed, so that said stripping-rolls may act temporarily as feeding-rolls. At the time when this reversal of direction of rotation occurs the cam-groove of the gear-wheel 18 moves the arms 13 and the feed-rolls 11 and 10 into the position shown in Fig. 7, so permitting the stop 8^b to fall. Leaves upon the feed-table 2 are then carried forward by the feed-belts of said table over the stop 8^b, which then forms a bridge, and are caught by the rolls 10 and 11, are carried forward thereby, and are caught by the stripping-rolls 4 4, which are then acting as feed-rolls. The rolls 4 4 carry the leaves on until their stems are firmly grasped by the drawing-rolls 5 5, and then the direction of motion of the stripping-rolls is reversed by mechanism hereinafter described, the cam-groove 22 22^a at the same time moving the lever 17, so as to throw the roll 11 back and the roll 10 up into their normal positions, thereby raising the stop 8^b. The ends of any leaves which may not have been engaged by the stripping-rolls are raised by the stop 8^b as it rises, as shown in Fig. 5, so that said leaves may not be fed forward farther until the stop descends again. This prevents the machine from becoming clogged by imperfectly-fed leaves and prevents the leaves from becoming tangled in the rolls or from being torn or imperfectly stripped. A leaf which is not engaged by the stripping-rolls when the stop 8^b first falls will usually enter between said rolls properly the second time the stop falls, and if for any reason a leaf does not enter between the said stripping-rolls properly after several attempts the attendant may enter it by hand when the stop next falls or may remove it altogether. The stop 8^b prevents leaves from passing to the stripping-rolls, except when the rolls 10 and 11 are in position for guiding the leaves, and holds away from said rolls leaves which have passed the stop, but have not been engaged by them. A frequent source of trouble with former machines is thus removed.

The stop 8 8^b drops by gravity when the roll 11 moves up to the position shown in Fig. 7 and is raised by the arm 13 and roll 11 when they move back into their normal positions.

To effect a proper feed of the leaf-butts between the initial feed-rolls 10 and 11 when

they are moved together, as shown in Fig. 7, the cradle carries a transverse guide-piece connected with a bar 23^x, which in turn is mounted on the cradle, as best shown in Fig. 4, said guide-piece having a forward-projecting portion 23 and a rearwardly-projecting member 23^a, the rear portion 23^a extending up into the separating-chamber above the stripper-rolls to prevent trash or other articles dropping in the front of the machine over the said stripper-rolls.

To protect the stripper and draw rolls, a cap-piece 24 is hinged to the rear of the machine.

25 indicates a blast-fan located within the blast-chamber 26, the front or nose end of which extends up to the shaft 16, at which point the casing has its air-outlet 26^a, over which is located a shaker-screen 27, the upper end of which has a hinged connection with the top of the blast-chamber, its rear end being freely movable vertically. To properly vibrate the screen 27, its frame at one side has a pendent projecting member 28, having a shoe 28^a, which engages a cam 29^a on the fan-shaft 29, which has a gear 30, operated through the medium of a chain of gears 31 by a drive-gear 32 on the shaft 20, as indicated in Fig. 8.

32^a indicates a guide which extends from the rear of the guide-rolls 7 down to a point just above the blast-discharge 26^a and guides thereto the fine leaf removed from the stems by the rolls 6.

33 indicates a partition disposed under and to the rear of the nose or front end of the blast-chamber, and 34 indicates a similar partition forward of the partition 33, which does not, however, extend up as high.

35 is a combined guide and partition shield which has a vertical upper end held in close engagement with the lower stripper-roll, its lower end being at a point approximately over the partition 34.

36 indicates a shifting partition, which has a rocker-bearing 36^a on the main frame and is of such height that when swung forward to the position shown in full lines in Fig. 1 it forms a continuation of the partition 34 and opens up a passage for the discharge of the short staple removed by the supplemental stripping-rolls into a compartment separate from the long or body portions of the leaf, which passes down in front of partition 34.

When it is desired to collect the short and long staple in one compartment, the rocking partition is swung over to the position shown in dotted lines in Fig. 1, it being manifest that when in this position the short and long leaf portions will be discharged in front of partition 34.

By providing a blast-fan mechanism and arranging it in the manner shown the small or broken stems will drop down onto the screen 27 and pass out at the rear end of the machine as the fine leaf particles are blown forward and discharge at the front end, there-

by effecting a thorough separation of the separated particles of the leaf and stem.

The rolls 7 prevent the fine leaf particles removed by the rolls 6 from being thrown from the machine with the stems or from being blown away by the blast. Such leaf particles as do pass the rolls 7 will fall upon the guide 32^a.

To facilitate the operation of the partition 36, it has a suitable crank-handle 36^b.

To impart to the stripping-rolls rotation first in one direction and then in another, I employ a friction clutch mechanism, the arrangement of which is best shown in Fig. 3 of the drawings, by reference to which it will be seen that the main drive-shaft 14 has a tubular extension 14^a, having a bearing in a bracket 37, secured to one end of the main frame.

38 indicates a clutch-gear loosely journaled on the shaft portion 14, having external gear-teeth 38^a. 39 indicates a clutch-gear of a larger diameter, having internal gear-teeth 39^a, such gear being also loosely mounted on the shaft portion 14^a.

40 indicates a friction clutch-wheel, which is arranged to slide upon the shaft 14^a, its hub portion 40^a carrying a pin 41, which passes transversely through elongated slots 14^b of the shaft 14^a and is made fast to the shifting rod 42, movable within the tubular shaft 14^a.

43 indicates a cam-sleeve mounted upon the shaft 14^a and arranged to rotate therewith and to slide endwise thereon, its outer end having a supplemental or pocket portion 43^a. The sleeve 43 has an annular groove having a short abrupt cam portion 43^b, its remaining portion being straight, as at 43^c.

44 indicates a stud held on the bracket 37, which engages the cam-groove 43^b 43^c.

The rod 42 has an extension 42^a, which passes through an aperture in the end of the sleeve 43 and enters the pocket 43^a, its outer end having a nut 42^b, between which and the end of the sleeve 43 is disposed a stout cushion-spring 45. 46 indicates a similar cushion-spring disposed between the end of the sleeve and the shoulder 42^c of the rod.

By referring to Fig. 3 it will be observed that the sleeve 43 has practically a fixed connection with the shifting rod 42, so that when it (the sleeve) is slid backward and forward by the cam action it reciprocates the rod 42 with it, and in consequence through the medium of the transverse pin at its inner end it shifts the clutch-wheel to alternately engage the clutch-gears 38 and 39 and bring them in gear with the drive-shaft.

By referring now to Figs. 3 and 8 it will be seen the stripper-rolls are geared with each other and the shaft of the lower roll extended, as at 46, and provided with a gear 46^b, which meshes with the gears 38 and 39. Thus should the gear 38 be in a clutched connection with the shaft 14^a the stripper-rolls will be rotated in one direction, while the

gear 39 rotates loosely on the shaft 14^a, and when the said gear 39 is clutched with the shaft 14^a the said rolls will be rotated in a reverse direction, the gear 38 at this time revolving loose on its shaft 14^a.

As the rolls 4 have their minimum rotation when acting as feed-rolls, the gear 38 is only thrown into an operative position when the groove portion 43^b engages the stud 44, the gear 39 being in an operative condition during the engagement of the stud with the straight groove portion 43^c.

By providing clutch devices for imparting the reverse motion to the rolls 4 a positive action is obtained without danger of mutilating or breaking the gear-teeth of the operating members, the hammering action and noise incident to the use of the mutilated gear devices disclosed in my other patents referred to being also avoided.

By providing the cushion-springs and arranging them as shown a jarring action or shock during the shifting of the rod 42 is avoided. Furthermore, such springs will serve to always adjust the rod 42 to take up the wear on the clutch-wheel, and thereby at all times provide for a positive and uniform action of such clutch-wheel.

Referring now more particularly to Fig. 5, it will be noticed that the diameter of the supplemental stripping-rolls is much greater than that of the draw-rolls and that the card-teeth are of such length as to produce a stem-engaging portion of much resiliency, so that such teeth will effect a complete wiping action, and thereby remove all of the leaf particles adhering to the stem before the stem is passed outward by the draw action of the said supplemental strippers. During the time in which the draw-rolls engage the leaf-stem the draw-rolls rotate at a much slower speed than the rolls 6, so that the stem will be held practically retarded in its passage through the said rolls 6. This action permits the rolls 6 to act as wipers or strippers only during the engagement of the stem with the rolls 5 5, an operation which could only be but partially obtained if the rolls 5 5 and 6 6 were rotated at a substantially uniform speed.

The operation of my machine is as follows: Tobacco-leaves are placed butt foremost upon the feed-table 2 in the several channels provided for receiving the leaves and are carried forward by the feed-belts of said table until their motion is arrested by the stop 8^b. At intervals the cam portion 43^b of the groove of the cam 43 encounters the stud 44, thereby reversing the direction of rotation of the main stripping-rolls 4 4, causing them to rotate in the same direction as the corresponding drawing-rolls 5, and at the same instant the cam-groove 22 22^a causes the rolls 10 and 11 to move together into the position shown in Fig. 7, permitting the stop 8^b to fall, and thus permitting the leaves on the feed-table 2 to move forward between the rolls 10 and 11. The

leaves enter certain of the grooves of these initial feed-rolls and are fed onward by said rolls until they are engaged by the stripping-rolls 4 4, then rotating in the same direction as the initial feed-rolls 10 and 11. The stripping-rolls 4 4 feed the leaves onward still farther until the butts are caught by the drawing-rolls 5 5. By the time the leaves are well caught by the drawing-rolls the cam 43 has reversed the direction of rotation of the stripping-rolls and the cam 22 22^a has moved the initial feed-rolls back to their normal positions, thereby raising the stop 8^b and preventing the further feeding of the leaves. The stripping-rolls by their reverse rotation strip the leaves from the stems in the manner illustrated in Fig. 5, the leaves falling between the stripping-rolls and the roll 11, while the stems are carried onward between the supplementary stripping-rolls 6 6, which remove therefrom the last particles of leaves, and between the rolls 7, and thence out of the machine. By the operation of the fan 25 and the vibrating screen 27 the fine tobacco is separated from the loose bits of stem and the like.

From the foregoing, taken in connection with the accompanying drawings, it will be noticed the leaves are separated from the stems and dropped down at the front end of the machine, the short staple or stem-adhering portions are dropped at an intermediate point or with the body of the leaf, as desired, and the stem-pieces fed into a separate receiver with the unbroken stems, the several portions of the leaf and stem being automatically separated and the handling of the product rendered more simple and economical.

While I prefer to arrange the several parts constituting the entire machine in the manner shown and described, it is manifest that in the practical application of the invention the detail arrangement of parts may be modified or changed without departing from the scope of the appended claims.

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

1. In a leaf-stemming machine, the combination, with stripping mechanism which intermittently receives leaves and then strips the same, and means for feeding leaves thereto, of means for moving away from such stripping mechanism, at times when stripping is going on, leaves which have been presented to such stripping mechanism but have not been engaged thereby.

2. In a leaf-stemming machine, the combination, with stripping mechanism, which intermittently receives leaves and then strips the same, and means for feeding leaves thereto, of a movable member located in front of such stripping mechanism, and means for moving said member across the plane of movement of the said leaves, to deflect from their normal path and hold away from the stripping mechanism leaves which have been presented thereto but not engaged thereby.

3. In a leaf-stemming machine, the combination, with stripping mechanism and means for feeding leaves thereto, of a movable stop arranged transversely of the direction of motion of the leaves passing to said stripping mechanism, and means for moving said stop across the plane of movement of the said leaves, to deflect from their normal path such leaves as have already been presented to the stripping mechanism but not engaged thereby, and arrest incoming leaves which have not been so presented.

4. In a leaf-stemming machine, the combination, with stripping mechanism, and substantially horizontally arranged feeding mechanism for feeding leaves to said stripping mechanism, of a substantially vertically movable stop arranged transversely of the direction of motion of the leaves passing to said stripping mechanism, and means for moving said stop from beneath the path of the leaves upward, thereby raising away from the stripping mechanism leaves which have been presented thereto but not engaged thereby.

5. In a tobacco-leaf-stemming machine, the combination with stripping mechanism adapted to remove the leaf by a wiping action, and a feeding means for feeding the leaves flatwise in the plane of the coacting surfaces of the stripping mechanism; of a member movably held at a point between the delivery end of the feeding means and the stripping mechanism; and devices for intermittently shifting said movable member, whereby to alternately move it in a plane with the feeding means to form a bridge-piece and to a point over the path of the movement of the leaf whereby it will act as a stop for the purposes specified.

6. In a tobacco-leaf-stemming means as described; the combination with the leaf-feeding mechanism and stripping-rolls; of a member intermittently movable in a plane above the coacting surfaces of the rolls, said member acting as a support to hold the ends of the improperly-fed leaves from engaging with the coacting surfaces of the stripping-rolls, and mechanism for operating the said movable member, as specified.

7. In a tobacco-stemming machine, the combination, with the feeding devices and the stripping mechanism, of a leaf-stop located between the delivery end of the feeding devices and the stripping mechanism, movably supported, and adapted to move below the discharge end of the feeding devices, and means for raising said stop across the plane of movement of the leaves while a leaf is being stripped, thereby checking the feeding of other leaves.

8. The combination with the main leaf-feed and the supplemental feed devices and the stripping mechanism, of a combined

bridge-piece and leaf-stop member for retarding a leaf during the stripping operation of a preceding leaf and forming a continuation of the feed-table as the leaf is fed forward, said member being gravity-operated to its lower or bridge position, and a support for the said bridge operated by the supplemental feed devices to elevate the said bridge, substantially as shown and described.

9. In a tobacco-leaf-stemming machine as described, the combination with the main feed and the stripping mechanism, of the supplemental feed mechanism, comprising the upper and lower vibrating rolls, and a guide carried by the roll-support movable with such rolls for leading the leaf between them, substantially as shown and described.

10. In a leaf-stemming machine, the combination, with main and supplemental stripping mechanisms, of a separating device, which receives the leaf particles stripped from the stems by the supplemental stripping mechanism, together with such pieces of stem as accompany such leaf particles, and separates such leaf particles from the pieces of stem.

11. In a leaf-stemming machine, the combination, with main and supplemental stripping mechanisms, of an air-blast separating mechanism, which receives the particles stripped from the stems by said supplemental stripping mechanism, together with such pieces of stem as accompany such leaf particles, and separates the leaf particles from pieces of stem.

12. In a leaf-stemming machine, the combination, with stripping mechanism, of a separating mechanism for separating the leaf particles from particles of stem, and a guide extending from the point of discharge of the stems to said separating mechanism, and arranged to direct leaf particles and particles of stem accompanying them to such separating mechanism.

13. In a tobacco-stemming machine as described, the combination with the main stripper-rolls, the main drive-shaft, the oppositely-rotatable clutch-gears loosely mounted on the shaft, and geared with the stripping-rolls, said shaft having a tubular extension, the sliding double clutch-wheel, the reciprocating rod movable in the tubular shaft and connected with the sliding clutch-wheel, a cam longitudinally movable on the shaft and rotatable therewith, a fixed member to engage and shift the cam lengthwise, said cam having a cushioned connection with the reciprocating rod, all being arranged substantially as shown and for the purposes described.

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