(No Model.)

3 Sheets—Sheet 1.

J. B. UNDERWOOD.

TOBACCO STEMMING MACHINE.

No. 556,324. Patented Mar. 10, 1896.

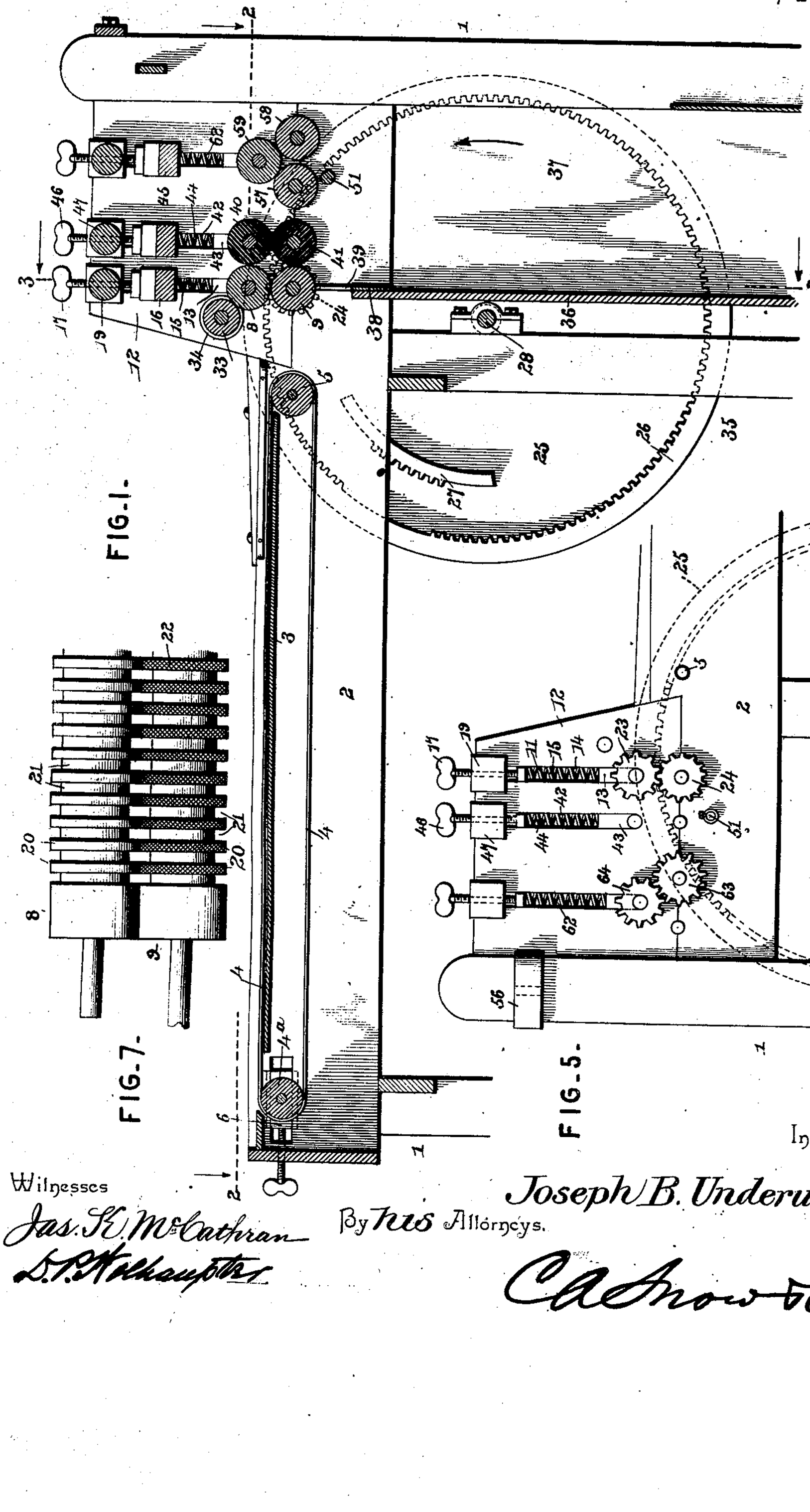

FIG. 1.

FIG. 7.

FIG. 5.

Witnesses

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(No Model.)

3 Sheets—Sheet 2.

J. B. UNDERWOOD.

TOBACCO STEMMING MACHINE.

No. 556,324. Patented Mar. 10, 1896.

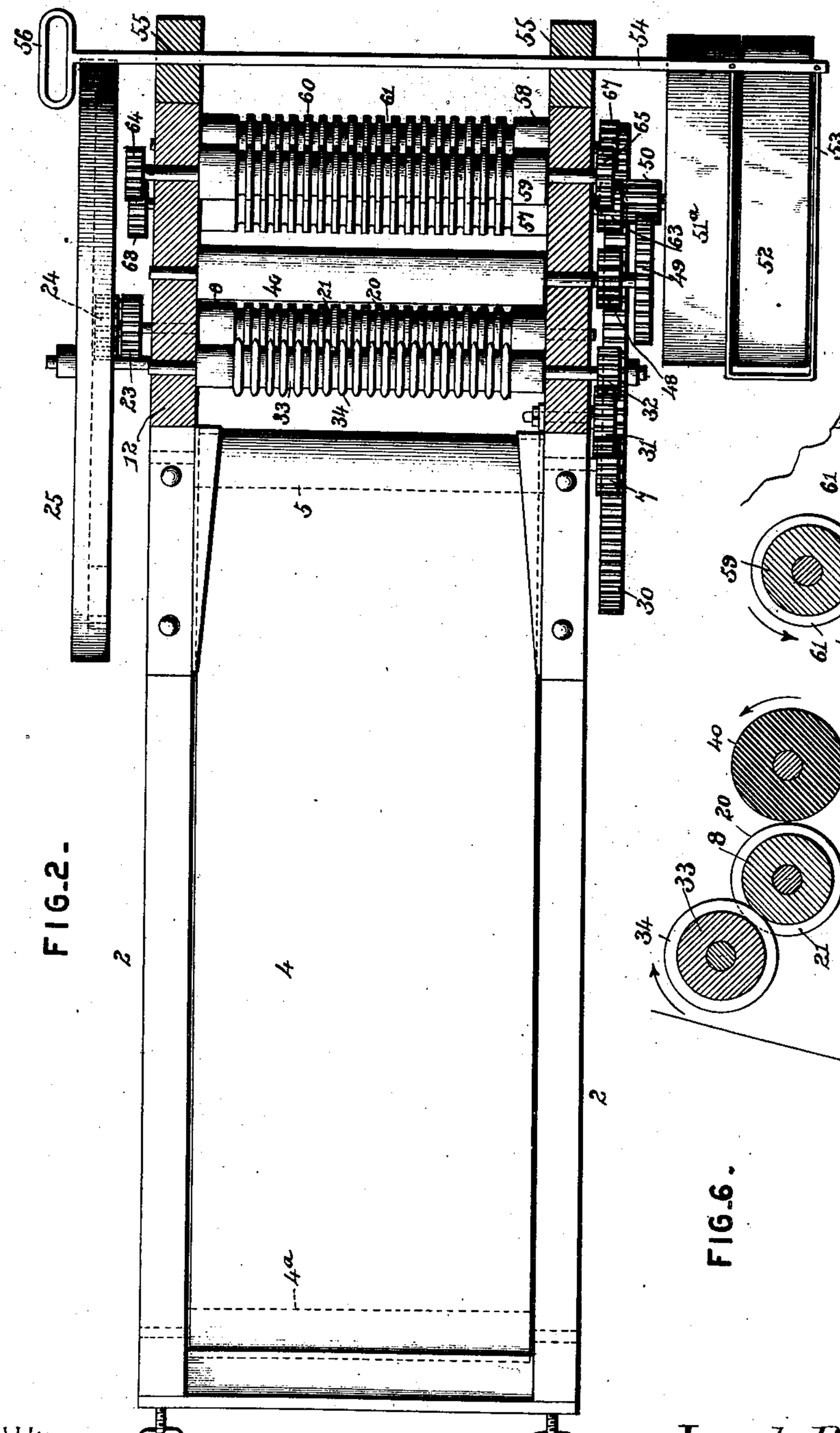

FIG. 2.

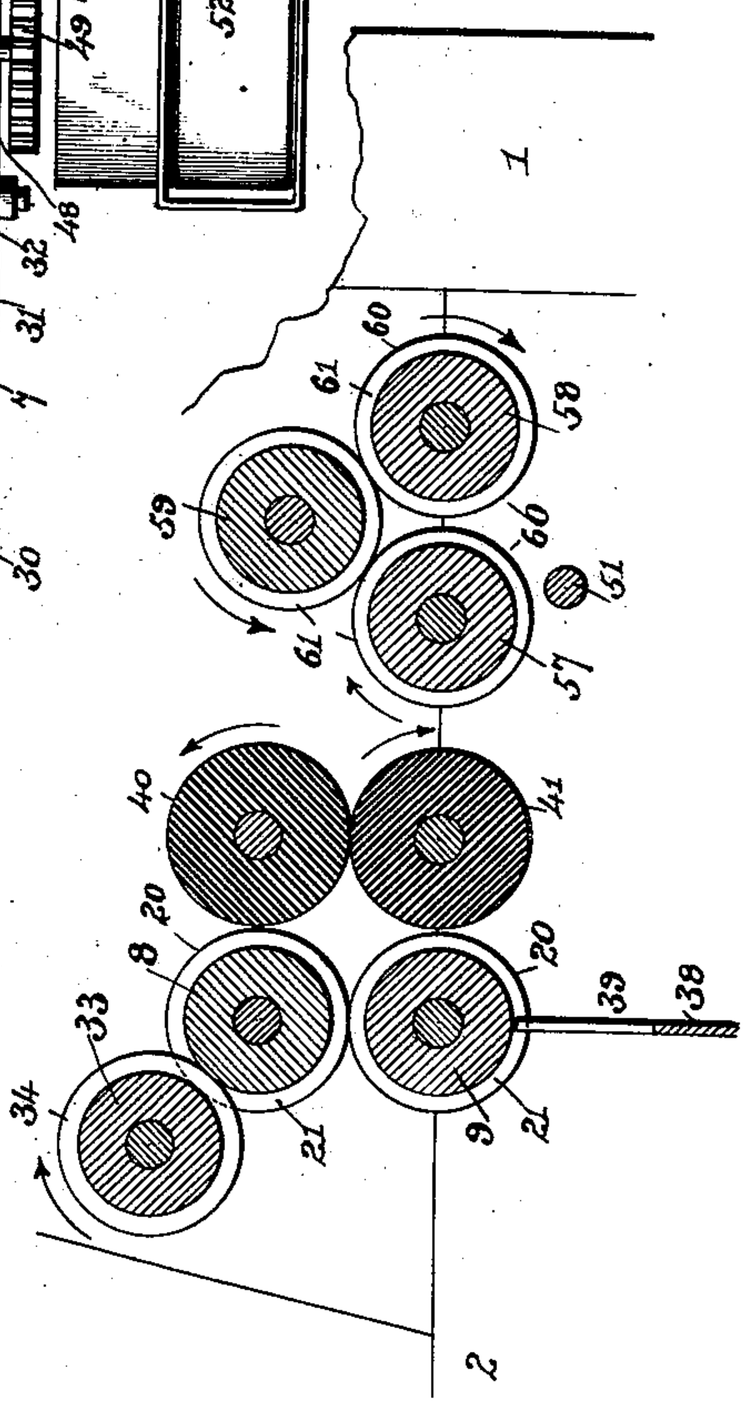

FIG. 6.

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(No Model.)

3 Sheets—Sheet 3.

J. B. UNDERWOOD.
TOBACCO STEMMING MACHINE.

No. 556,324. Patented Mar. 10, 1896.

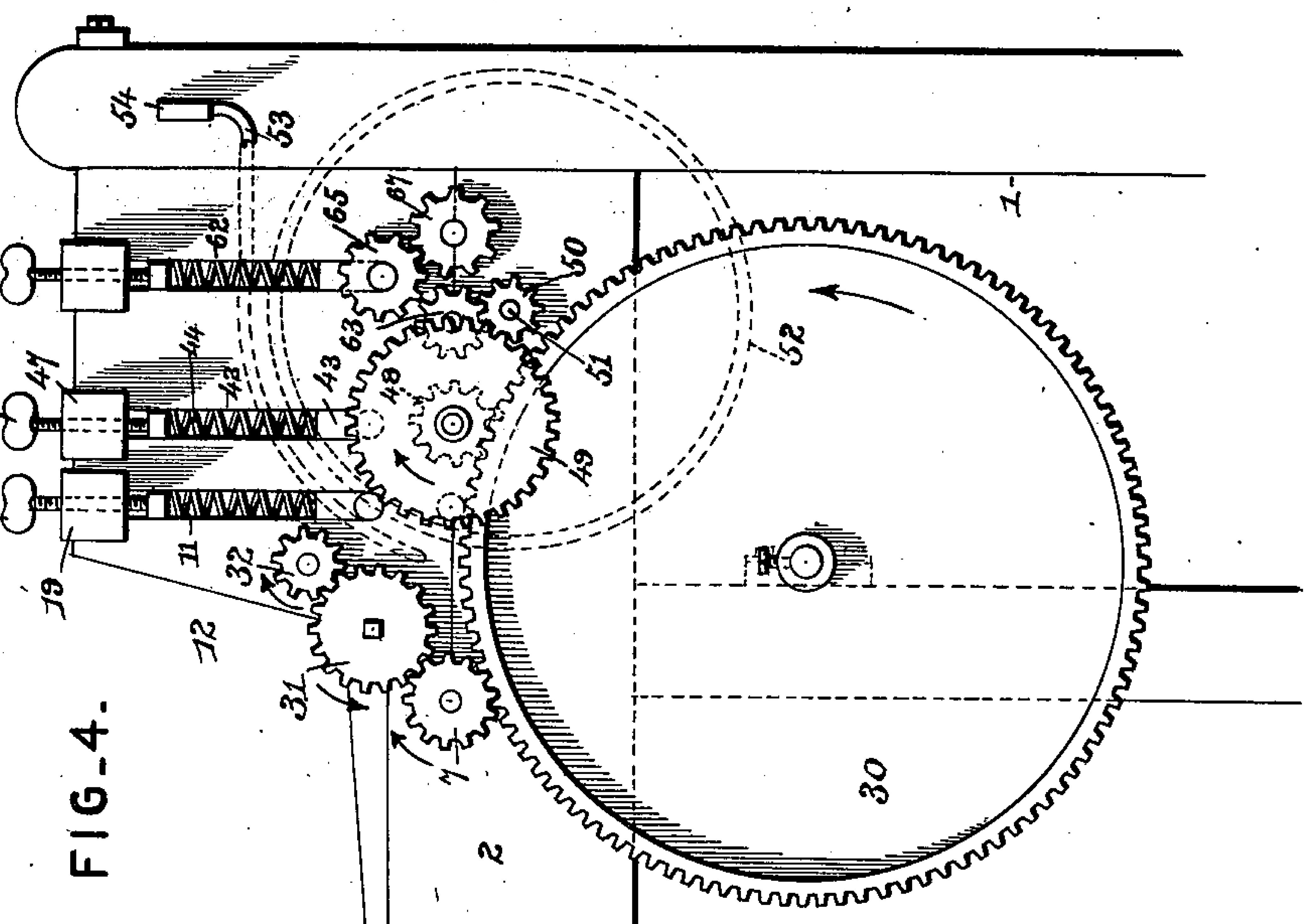

FIG-4.

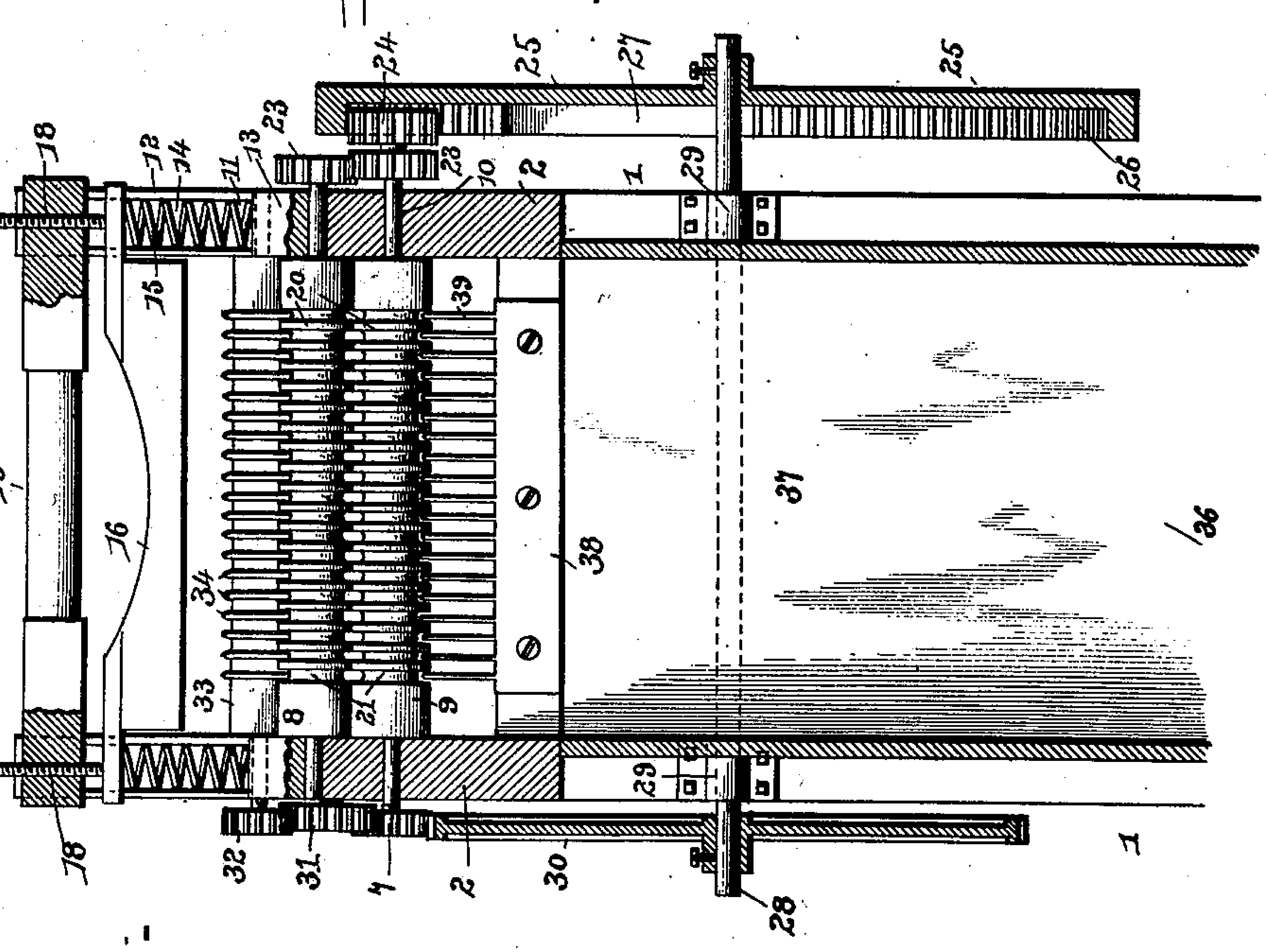

FIG.3.

Witnesses
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UNITED STATES PATENT OFFICE.

JOSEPH B. UNDERWOOD, OF FAYETTEVILLE, NORTH CAROLINA.

TOBACCO-STEMMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 556,324, dated March 10, 1896.

Application filed December 6, 1894. Serial No. 531,022. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH B. UNDERWOOD, a citizen of the United States, residing at Fayetteville, in the county of Cumberland and State of North Carolina, have invented a new and useful Tobacco-Stemming Machine, of which the following is a specification.

This invention relates to tobacco-stemming machines.

The main and primary object of the present invention is to provide a new and useful machine that will positively insure the removal of the main longitudinal stem from leaf-tobacco without the use of knives or other cutting devices.

To this end the invention therefore contemplates a construction of stemming-machine that provides for the separation of the stem and the body portion of a tobacco-leaf by providing for a drawing action on the stem, while the body portion of the leaf is held or retarded in a manner that allows the stem to be practically torn or severed from the leaf in contradistinction to the usual methods of cutting or sawing the leaf from the stem as heretofore accomplished in other machines. In securing the results sought for the present machine also provides means for insuring the stripping of remaining portions of the body of the leaf from the stem while the latter is retarded, and thereby incidentally providing two grades of tobacco, one for cigars and the other for smoking purposes.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

In the drawings, Figure 1 is a central vertical longitudinal sectional view of a tobacco-stemming machine constructed in accordance with this invention. Fig. 2 is a horizontal sectional view on the line 2 2 of Fig. 1. Fig. 3 is a vertical transverse sectional view on the line 3 3 of Fig. 1. Fig. 4 is a detail side elevation of the machine at one end thereof. Fig. 5 is a similar view of the side of the machine opposite the side illustrated in Fig 4. Fig. 6 is an enlarged diagrammatic sectional view of the stripping mechanism of the machine. Fig. 7 is a detail elevation of a portion of the superposed pair of upper and lower stripper-rolls.

Referring to the accompanying drawings, 1 designates a suitable supporting frame or stand, having an upper horizontal portion 2, in which is arranged a flat feed-table 3. The feed-table 3 extends nearly the entire length of the upper horizontal portion 2 of the frame 1, and has arranged to pass thereover the upper horizontal portion of the endless feed-belt 4. The feed-belt 4 may consist of a continuous smooth feed-belt, or may be constructed in any other suitable manner to provide for feeding the tobacco-leaf with the stem therein to the stripping mechanism of the machine, and the opposite outer and inner portions of said belt pass respectively around the outer and inner belt-rollers, 4^a and 5. The outer belt-roller, 4^a, is mounted in adjustable bearings 6, which provide means for maintaining the feed-belt at the proper tension, and the inner of said belt-rollers, 5, has the shaft extremities thereof mounted in fixed bearings, and one of the shaft extremities of the inner belt-roller, 5, carries a cog-wheel 7, arranged at one side of the frame and providing means for transmitting motion to the belt and to another part of the machine in a manner to be presently referred to.

The longitudinally-arranged feed-belt 4 is designed to feed the unstemmed tobacco-leaf up to a pair of normally-contacting upper and lower stripper-rolls, 8 and 9, respectively. The stripper-rolls 8 and 9 are arranged in contact with each other and one directly above the other, and said rolls are designed to rotate in opposite directions, intermittently, to provide for the proper feeding of the stem through the machine, and also for retarding the body portion of the leaf. The shaft extremities of the lower of said stripper-rolls, 9, are mounted in stationary bearings 10 at opposite sides of the horizontal frame portion 2, and the opposite shaft extremities of the upper stripper-roll, 8, are arranged in opposite vertically-disposed bearing-slots 11, formed in the opposite bearing-uprights 12, arranged at one end and opposite the top sides of the frame 2. The said vertically-disposed bearing-slots 11 accommodate therein the vertically-movable bearing-blocks 13, that are arranged to bear on the opposite shaft extremities of the upper stripper-roll to provide for holding the said upper stripper-roll yieldingly in contact with the lower stripper-roll, and arranged above the

bearing-blocks 13, and within the opposite side recesses 14 of the slots 11, are the coil-springs 15, on the upper ends of which bear the opposite ends of a transverse tension-bar 16, working in the slots 11 of the bearing-uprights 12. The transverse tension-bar 16 is arranged between the bearing-uprights 12, above the stripper-rolls, and is adjusted to regulate the tension of the springs 15 by means of the adjusting thumb-screws 17, working through threaded openings 18 at opposite ends of a stationary cross-bar 19, connecting the opposite bearing-uprights 12 at the upper ends of the slots 11 therein.

The stripper-rolls 8 and 9 are provided with a series of circular spaced peripheral flanges 20, which may be either formed integral with the rolls or separately placed thereon, and in either construction the said spaced circular flanges 20 form therebetween circular stem-grooves 21, which admit of a free passage of the stem therethrough, while the flanges of the said rolls grip the body of the leaf and provide for the retarding thereof. The circular flanges of the upper and lower stripper-rolls, 8 and 9, have a frictional contact to provide for securing a frictional grip on the body of the leaf to positively insure the retarding thereof, while the stem of the leaf is drawn through the spaces between the stripper-rolls formed by the stem-grooves 21. The said flanges 20 are preferably spaced at regular distances apart, so that the stem-grooves will be of substantially the same width as the flanges, and the series of alternate flanges and stem-grooves extend from end to end of the rolls 8 and 9, so that the entire length of said rolls may be utilized for gripping the tobacco-leaf.

The superposed contacting stripper-rolls 8 and 9 are made to provide for securing a non-slipping or frictional grip on the body portion of the tobacco-leaf at both sides of the stem; but only one of said rolls is necessarily made of rubber, while the other roll is made of metal, as is illustrated in Fig. 7 of the drawings, in which figure of the drawings the lower roll, 9, is illustrated as being made of metal, and the flanges 20 of said lower roll are provided with milled peripheral edges 22, which, together with the contacting flanges 20 of the upper roll, provide for the necessary non-slipping or frictional grip on the tobacco-leaf, as will be readily apparent.

The upper and lower stripper-rolls, 8 and 9, are positively geared together at one end by the cog-wheels 23, mounted on one of the shaft extremities of the said rolls at one side of the frame, and the same shaft extremity of the lower stripper roll that carries the cog-wheel 23 also carries a second cog-wheel, 24, with which meshes the mutilated reversing gear-wheel 25. The mutilated reversing gear-wheel 25 is arranged at one side of the machine-frame and is provided with an internal gear-flange 26, that meshes with the teeth at the upper side of the cog-wheel 24, to provide for rotating the same in one direction, and the teeth of said internal gear-flange 26 extend around nearly the entire inner circumference of the flange. Directly opposite the untoothed portion of the flange 26 the wheel 25 is provided with a short external gear-segment 27, the external teeth of which are adapted to pass into engagement with the teeth at the under side of the wheel 24 to provide for transmitting a short rotation to the geared stripper-rolls in a direction opposite to the rotation imparted thereto when the internal teeth of the flange 26 mesh with the wheel 24.

The mutilated gear-wheel 25 rotates in one direction, and the separate gear portions of the said wheel during one rotation thereof provide for intermittently rotating the upper and lower stripper-rolls, 8 and 9, to provide for the proper stripping operation of the tobacco-leaf in a manner that will be presently referred to, and the said mutilated gear-wheel 25 is mounted on one end of a counter-shaft 28, that is journaled transversely in suitable bearings 29 secured to the stand 1 below the horizontal frame portion 2, and on the end of the shaft 28, opposite the wheel 25, is mounted a large spur-wheel 30.

The spur-wheel 30, that is mounted on one end of the shaft 28, meshes with the cog-wheel 7 on one shaft extremity of the inner belt-roller, 5, and thereby provides means for transmitting motion to the feed-belt, and motion is also communicated from the cog-wheel 7 to an adjacent idler cog-wheel 31, mounted at one side of one of the bearing-uprights 12 and meshing with a gear-pinion 32, mounted on one shaft extremity of an upper clearing-roll, 33. The upper clearing-roll, 33, is arranged transversely between the opposite bearing-uprights 12, and is disposed above and at one side of the upper stripper-roll, 8. The upper clearing-roll, 33, is made of any suitable material and is provided from end to end thereof with a longitudinal series of peripheral spaced circular flanges 34, that are adapted to project into the stem-grooves 21 of the upper stripper-roll, 8, between the flanges 20 thereof, and the rapid rotation of said clearing-roll serves to clear the upper stripper-roll, 8, of the stripped or stemmed tobacco-leaf and to throw such stemmed leaf down between the stripper-rolls and the inner portion of the feed-belt into the compartment 35, formed within the supporting frame or stand at one side of the vertical partition-wall 36, that is arranged within the said frame or stand directly below and in a line with the stripper-rolls and serves to provide the frame or stand below the stripping mechanism into two compartments 35 and 37, respectively.

The clearing-roll 33 provides for clearing the upper stripper-roll, 8, of the stemmed tobacco-leaf, and the same function is accomplished in connection with the lower stripper-roll, 9, by an upright clearer-plate 38, suit-

ably attached to the upper end of the partition 36 and provided with a series of upwardly-disposed parallel clearing-fingers 39, the upper ends of which project into the stem-grooves at the lower side of the roll 9, between the flanges 20 thereof.

Directly adjacent to and at one side of the superposed pair of contacting stripper-rolls 8 and 9 is arranged a pair of superposed contacting upper and lower drawing-rolls, 40 and 41, respectively. The drawing-rolls 40 and 41 are preferably made of rubber and rotate in opposite directions to provide for grasping therebetween the butt-end of a tobacco-leaf steam and drawing the same while the body of the leaf is held firmly between the oppositely rotating and contacting stripper-rolls 8 and 9. The shaft extremities of the lower of said drawing-rolls, 41, are mounted in stationary bearings at opposite sides of the frame, and the shaft extremities of the upper drawing-roll, 40, are arranged in the opposite vertically-disposed bearing-slots 42, formed in the opposite bearing-uprights 12, and said slots also accommodate therein the movable bearing-blocks 43, the springs 44, arranged on said bearing-blocks, and the opposite ends of the transverse tension-bar 45, on which are arranged to work the lower ends of the adjusting-screws 46, mounted in opposite ends of the stationary cross-bar 47, all of which construction is similar to the tension-adjusting devices for the upper stripper-roll, 8, as previously described.

The specific manner of mounting the upper drawing-roll, 40, provides for holding the same in yielding contact with the lower drawing-roll, 41, and the contact between these two rolls is sufficiently firm to ordinarily provide for rotating the upper roll simply by its frictional contact with the lower roll, and one of the shaft extremities of the lower drawing-roll, 41, has mounted thereon a small and a large cog-wheel 48 and 49, respectively. The small cog-wheel 48 on one of the shaft extremities of the roll 41 meshes with the spur-wheel 30 to provide for transmitting motion thereto, and the large cog-wheel 49 on the same shaft extremity as the wheel 48 meshes with a wide gear-pinion 50, mounted on one end of the drive-shaft 51.

The manner of mounting the drawing-rolls as just referred to provides means whereby said rolls are yieldingly supported toward each other, so that any inequality which may occur in the thickness of the stems as they pass through or between the drawing-rolls may be readily compensated for by the drawing-rolls separating sufficiently apart to allow for the passage of the stems therebetween.

The drive-shaft 51 carries upon one end at one side of the wide gear-pinion 50 the fast and loose belt-pulleys 51ª and 52 to receive the driving-belt for the machine, and arranged to work over these pulleys is the belt-shifting loop 53, mounted on one end of the shifting-bar 54, arranged to slide in suitable openings 55, formed in opposite end uprights of the machine frame or stand, and said bar 54 is provided at the end opposite the loop 53 with the handle 56, whereby the operator can readily shift the belt from one pulley to the other in starting and stopping the machine.

Arranged transversely within the frame portion 2 at one end thereof and at one side of the superposed contacting drawing-rolls 40 and 41 is a group of supplemental stripper-rolls, which group preferably comprises a pair of adjacent lower supplemental stripper-rolls, 57 and 58, respectively, and an upper supplemental stripper-roll, 59, arranged between and contacting with the upper side of both of the rolls 57 and 58. All of the supplemental stripper-rolls are preferably made of rubber and are constructed similar to the main stripper-rolls 8 and 9, and are therefore provided with a longitudinal series of spaced peripheral contacting flanges 60 and intermediate stem-grooves 61, formed between the said flanges 60.

The lower adjacent supplemental stripper-rolls, 57 and 58, are mounted in fixed positions, and the upper supplemental stripper-roll, 59, is self-adjusting and is held in yielding contact with the rolls 57 and 58 by means of the tension devices 62, which tension devices 62 are the same as the tension devices for the rolls 8 and 40, as hereinbefore described. The shaft extremities of one of the lower supplemental stripper-rolls, 57, carry the cog-wheels 63, one of which cog-wheels at one end of the roll 57 meshes with the wide gear-pinion 50 of the drive-shaft 51, and the cog-wheel 63 at the opposite end of the roll 57 meshes with an adjacent cog-wheel 64 on one shaft extremity of the upper supplemental stripper-roll, 59. The shaft extremity of the upper stripper-roll, 59, opposite the cog-wheel 64 carries a cog-wheel 65, meshing with an adjacent similar wheel 67 on one shaft extremity of the lower supplemental stripper-roll, 58, thereby completing a gear connection between the rolls 57, 58 and 59, which insures the positive rotation thereof.

In operation the unstemmed tobacco-leaf is placed on the feed-belt 4 and is fed up to and between the main stripper-rolls 8 and 9. The short gear-segment 27 of the mutilated reversing gear-wheel 25 when it comes into engagement with the cog-wheel 24 provides for imparting to the rolls 8 and 9 a short rotation toward the adjacent drawing-rolls, and this rotation of the main stripper-rolls is sufficent to carry the butt-end of the stem in between the drawing-rolls 40 and 41, which, by reason of the gearing described, have a faster rotation than the rolls 8 and 9, and will therefore tend to draw or tear the stem out from the body of the leaf which is held between the stripper-rolls. By the time the drawing-rolls secure a grip on the butt-end of the leaf-stem the internal gear-flange of the wheel 25 has come into engagement with the cog-wheel 24, and immediately reverses

the rotation of the stripper-rolls 8 and 9 and turns the same in a direction away from the drawing-rolls. In this rotation the stripper-rolls maintain a firm frictional grip on the body of the leaf, while the stem is freely drawn through the stem-grooves of the stripper-rolls by the drawing-rolls, and the clearing devices for the main stripper-rolls relieve said stripper-rolls from the stemmed leaf and direct the same into the compartment 35.

The leaf-stem passes from between the drawing-rolls 40 and 41 in between the supplemental stripper-rolls 57, 58, and 59. The supplemental stripper-rolls, by reason of the gearing described, have a faster rotation than the drawing-rolls, and therefore the drawing-rolls tend to retard or hold the stem, which passes into the grooves of the faster rotating supplemental stripper-rolls, so that the contacting flanges of said supplemental stripper-rolls will strip off from the stem any remaining portions of the body of the leaf and will throw or direct such remaining portions of the body of the leaf into the compartment 37 at one side of the partition 36, and such portions of the leaf may be used for smoking purposes.

The function of the supplemental stripper-rolls is important for the reason that there is necessarily a space between the contacting surfaces of the main stripper and drawing-rolls, and since the main stripper-rolls do not commence to strip the leaf until the drawing-rolls have caught the stem a small portion of the body of the leaf remains on the stem near the butt-end thereof, and this portion of the leaf is removed from the stem by the supplemental stripper-rolls in the manner described. At this point it will be observed that, with relation to the supplemental stripper-rolls, the first set of stripper-rolls 8 and 9 and the adjacent drawing-rolls 40 and 41 constitute a primary stripping mechanism for stripping off the major portion of the body of the leaf from the stem, while the supplemental stripper-rolls constitute a secondary stripping mechanism for stripping off from the stem any remaining portions of the body of the leaf not stripped therefrom by the primary stripping mechanism referred to.

The capacity of the herein-described machine may be increased by widening the frame and correspondingly lengthening the rolls or by arranging two or more of the machines side by side and gearing them together, and it will be understood that any changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

The improvements herein described supplement the improvements set forth in my former patent, No. 543,143, issued July 23, 1895.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In a tobacco-stemming machine, a pair of contacting stripper-rolls provided with means to retard the body of the leaf and to permit the free passage of the stem, said rolls having an alternate rotation in opposite directions, and a pair of adjacent drawing-rolls, substantially as described.

2. In a tobacco-stemming machine, a pair of superposed contacting stripper-rolls provided with means to retard the body of the leaf and to permit the free passage of the stem, said rolls having an alternate rotation in opposite directions, and a pair of superposed adjacent faster-rotating drawing-rolls, substantially as described.

3. In a tobacco-stemming machine, a pair of superposed contacting stripper-rolls provided with means to retard the body of the leaf and to permit the free passage of the stem, said rolls having an alternate rotation in opposite directions, a pair of adjacent drawing-rolls, and supplemental stripper-rolls arranged at one side of the drawing-rolls, substantially as described.

4. In a tobacco-stemming machine, a pair of superposed contacting stripper-rolls provided with means to retard the body of the leaf and to permit the free passage of the stem, said rolls having an alternate rotation in opposite directions, a pair of adjacent faster-rotating drawing-rolls, and supplemental contacting stripper-rolls arranged adjacent to the drawing-rolls, substantially as described.

5. In a tobacco-stemming machine, the combination of a pair of superposed frictionally-contacting and intermittently forwardly rotating stripper-rolls having means to retard the body of the leaf and permit the free passage of the stem, a similar pair of adjacent faster-rotating drawing-rolls, and a group of contacting supplemental stripper-rolls arranged adjacent to the drawing-rolls and adapted to rotate faster than the same, substantially as set forth.

6. In a tobacco-stemming machine, the combination of a pair of superposed intermittently forwardly rotating stripper-rolls provided with a longitudinal series of peripheral frictionally-contacting flanges, and stem-grooves formed between said flanges, a pair of superposed contacting drawing-rolls arranged adjacent to the stripper-rolls, and a group of contacting supplemental stripper-rolls provided with peripheral frictionally-contacting flanges, and stem-grooves between the flanges, said supplemental rolls being arranged at one side of the drawing-rolls, and means for rotating the drawing-rolls faster than the intermittently-rotating stripper-rolls, and also for rotating the supplemental stripper-rolls faster than the drawing-rolls, substantially as set forth.

7. In a tobacco-stemming machine, a pair of intermittently forwardly rotating superposed stripper-rolls provided with a series of frictionally-contacting peripheral flanges and stem-grooves between the flanges, the flanges

of one of said rolls being provided with milled peripheral edges, a superposed pair of contacting drawing-rolls arranged adjacent to the stripper-rolls, and means for transmitting motion to the said rolls, substantially as described.

8. In a tobacco-stemming machine, the combination of a pair of intermittently forwardly rotating superposed contacting stripper-rolls provided with a series of peripheral flanges and stem-grooves between the flanges, a transverse clearing-roll arranged at one side of and above the upper stripper-roll and provided with a longitudinal series of peripheral spaced flanges working in the stem-grooves of the upper stripper-roll, a series of upwardly-disposed clearing-fingers supported to project into the stem-grooves of the lower stripper-roll at the lower side thereof, and a pair of superposed contacting drawing-rolls supported at one side of the stripper-rolls, substantially as set forth.

9. In a tobacco-stemming machine, the combination of the frame or stand provided with separate compartments, a feed-belt arranged within the frame, a pair of superposed contacting and intermittently forwardly rotating stripper-rolls having means to retard the body of the leaf and to permit the free passage of the stem, clearing devices for said stripper-rolls to direct the stemmed leaf into one compartment of the frame, a superposed pair of drawing-rolls arranged adjacent to the stripper-rolls, a group of supplemental stripper-rolls arranged at one side of and rotating faster than the drawing-rolls and above one of the compartments of the frame, said supplemental stripper-rolls being provided with peripheral contacting flanges and stem-grooves between the flanges, and suitable gearing for transmitting motion to the several rolls, substantially as set forth.

10. In a tobacco-stemming machine, the combination of the frame, a pair of superposed contacting stripper-rolls mounted in said frame and having means to retard the body of the leaf and to permit the free passage of the stem, a cog-wheel mounted on one of the shaft extremities of one of said stripper-rolls, a suitably-arranged counter-shaft, means for driving said counter-shaft, a mutilated reversing gear-wheel mounted on one end of said counter-shaft and provided with an internal gear-flange meshing with said cog-wheel at one side thereof, and with a short external gear-segment disposed directly opposite the untoothed portion of the internal gear-flange and adapted to mesh with said cog-wheel to provide for rotating the same in a reverse direction to the rotation imparted thereto from said gear-flange, and a pair of superposed contacting faster-rotating drawing-rolls mounted at one side of the stripper-rolls, substantially as set forth.

11. In a tobacco-stemming machine, a pair of superposed rotating cutterless stripper-rolls provided with a series of frictionally-contacting peripheral flanges and stem-grooves between the flanges, and having a rotation in an opposite direction to the movement of the stem, substantially as set forth.

12. In a tobacco-stemming machine, a pair of superposed cutterless stripper-rolls, one of which is made of rubber and the other of metal, said rolls being provided with a series of frictionally and flatly contacting peripheral flanges and stem-grooves between the flanges, the flanges of the metal roll being provided with milled peripheral faces, said rolls also having a rotation in an opposite direction to the movement of the stem, substantially as set forth.

13. In a tobacco-stemming machine, a pair of stripper-rolls having means to retard the body of the leaf and to permit the free passage of the stem, said rolls having a rotation in an opposite direction to the movement of the stem, means for drawing the stem from the leaf held by the rolls, and means for feeding the stem of the leaf to the drawing mechanism, substantially as set forth.

14. In a tobacco-stemming machine, a pair of stripper-rolls having means to retard the body of the leaf and permit the free passage of the stem, said rolls having a rotation in an opposite direction to the movement of the stem, a pair of rolls for drawing the stem from the leaf held by the stripper-rolls, and positive means for feeding the unstemmed leaf from the stripper-rolls to the drawing-rolls, substantially as set forth.

15. In a tobacco-stemming machine, a pair of stripper-rolls having means to retard the body of the leaf and permit the free passage of the stem, supplemental means for stripping or cleaning the stem of remaining portions of the body of the leaf not stripped therefrom by said stripper-rolls, and drawing mechanism arranged intermediate said stripper-rolls and the supplemental stripping or cleaning mechanism, substantially as set forth.

16. In a tobacco-stemming machine, the combination with the primary stripping mechanism, of supplemental stripper-rolls having means for gripping the body of the leaf and to permit a free passage of the stem, substantially as set forth.

17. In a tobacco-stemming machine, the combination with the primary stripping mechanism, of supplemental stripper-rolls having means to grip and move the body of the leaf rapidly forward and to permit a free relatively slow passage of the stem, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOSEPH B. UNDERWOOD.

Witnesses:
H. J. MARSH,
T. M. HUNTER.