

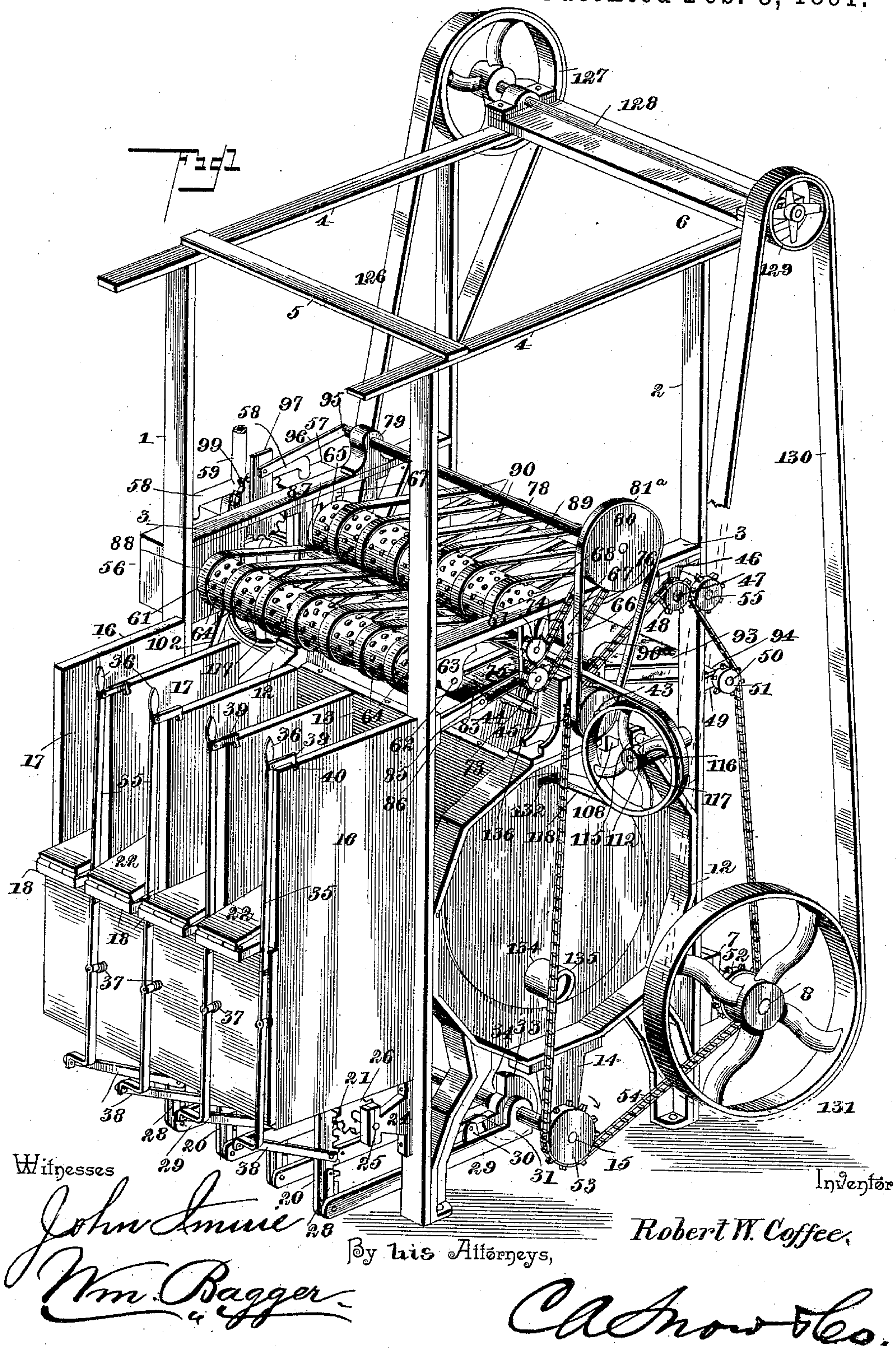
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6 Sheets—Sheet 1.

R. W. COFFEE.
TOBACCO STEMMING MACHINE.

No. 445,637.

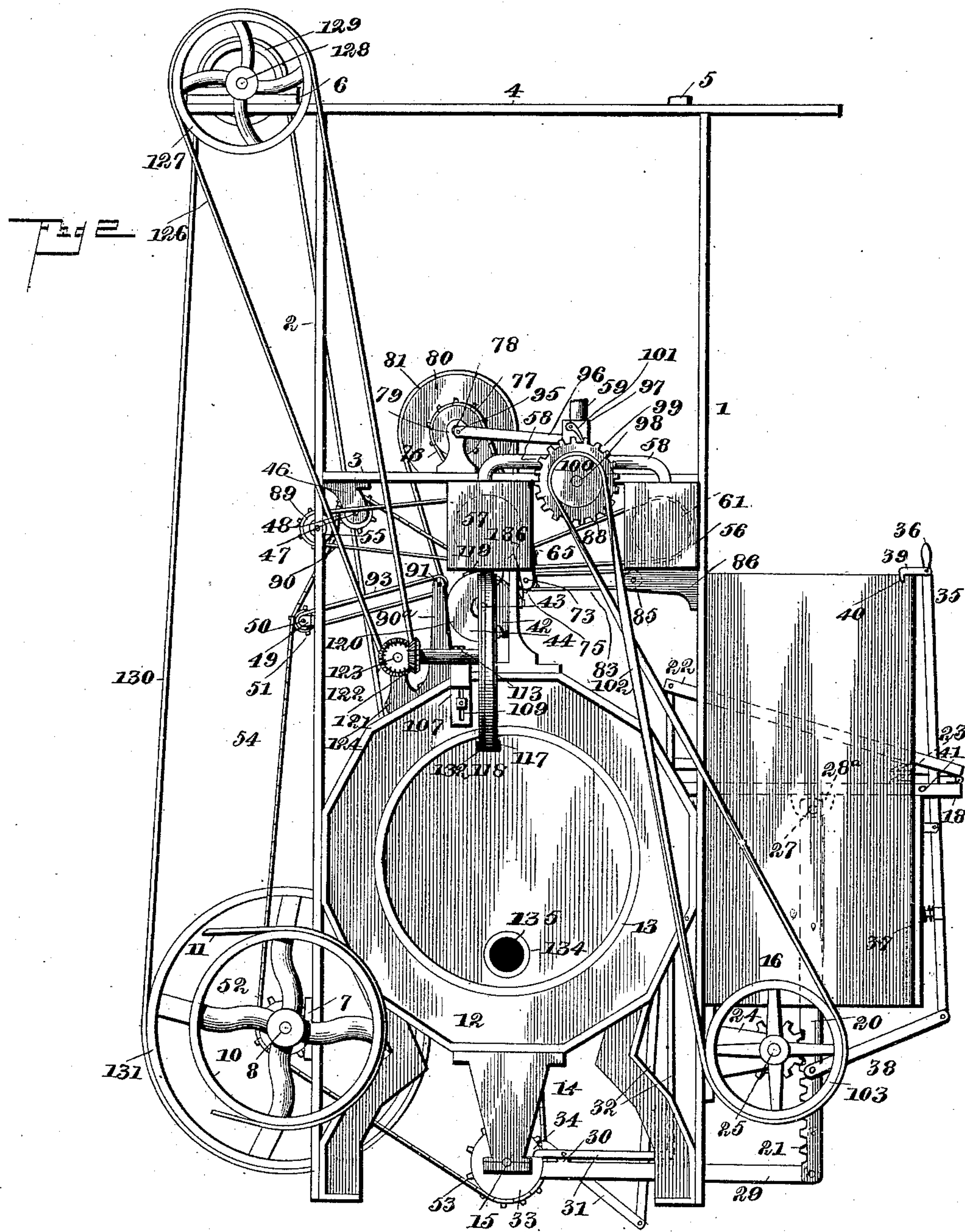
Patented Feb. 3, 1891.



6 Sheets—Sheet 2.

No. 445,637.

Patented Feb. 3, 1891.



Witnesses

Witnesses
John Imrie
Wm. Bagger.

Inventor

Robert W. Coffee

By his Attorneys

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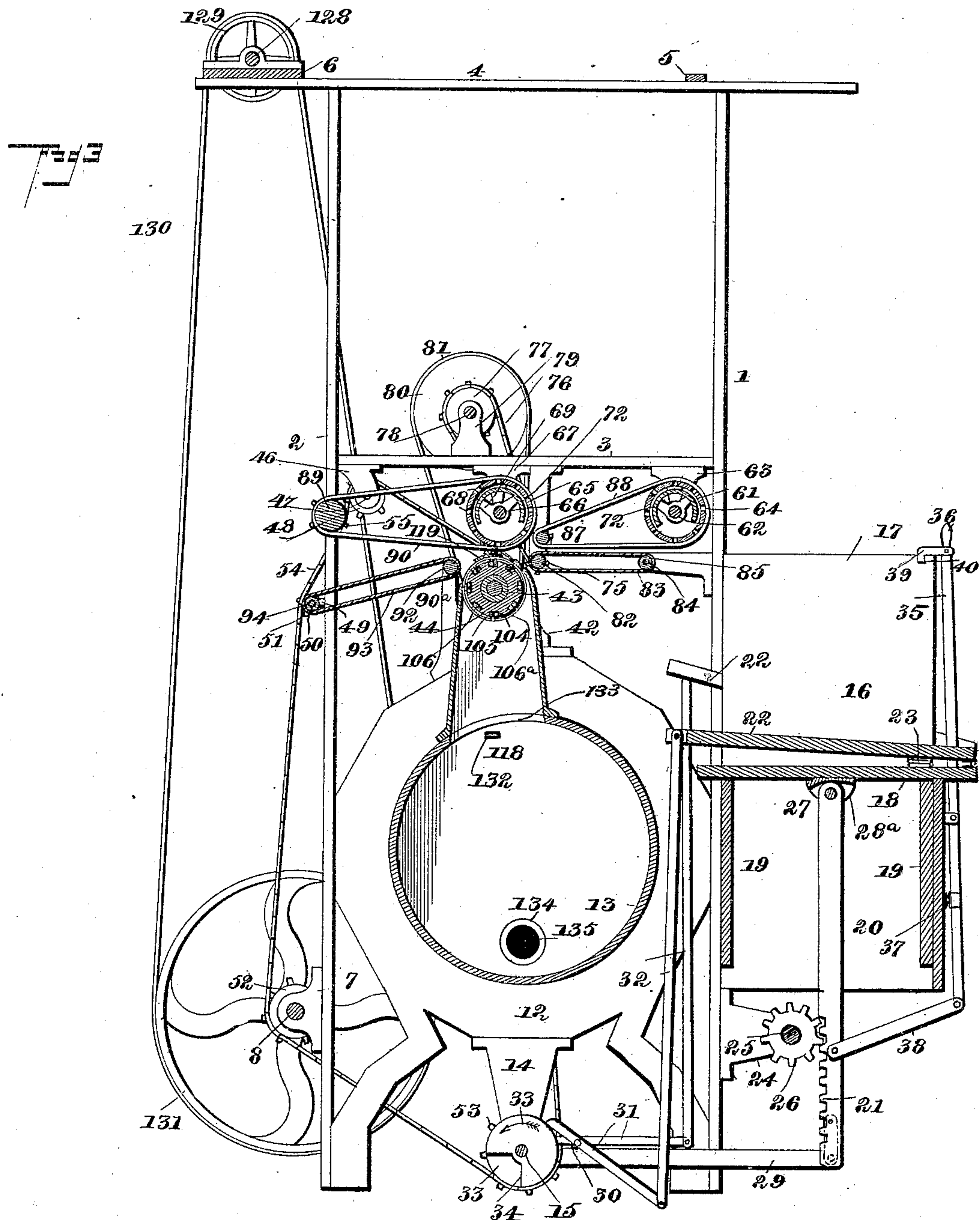
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Wm. Bagger

By his Attorneys,

Inventor

Robert W. Coffee

C. A. Snow & Co.

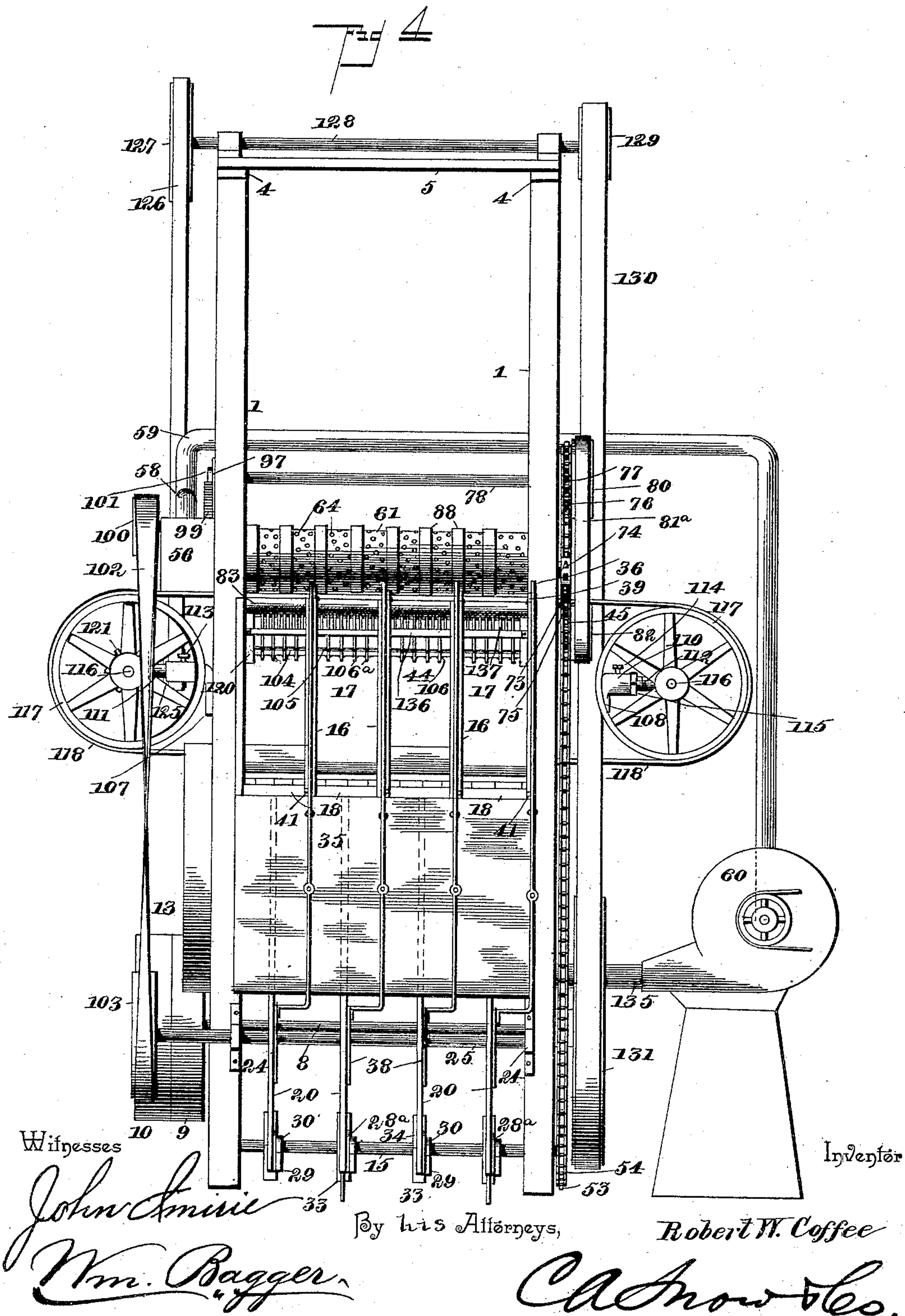
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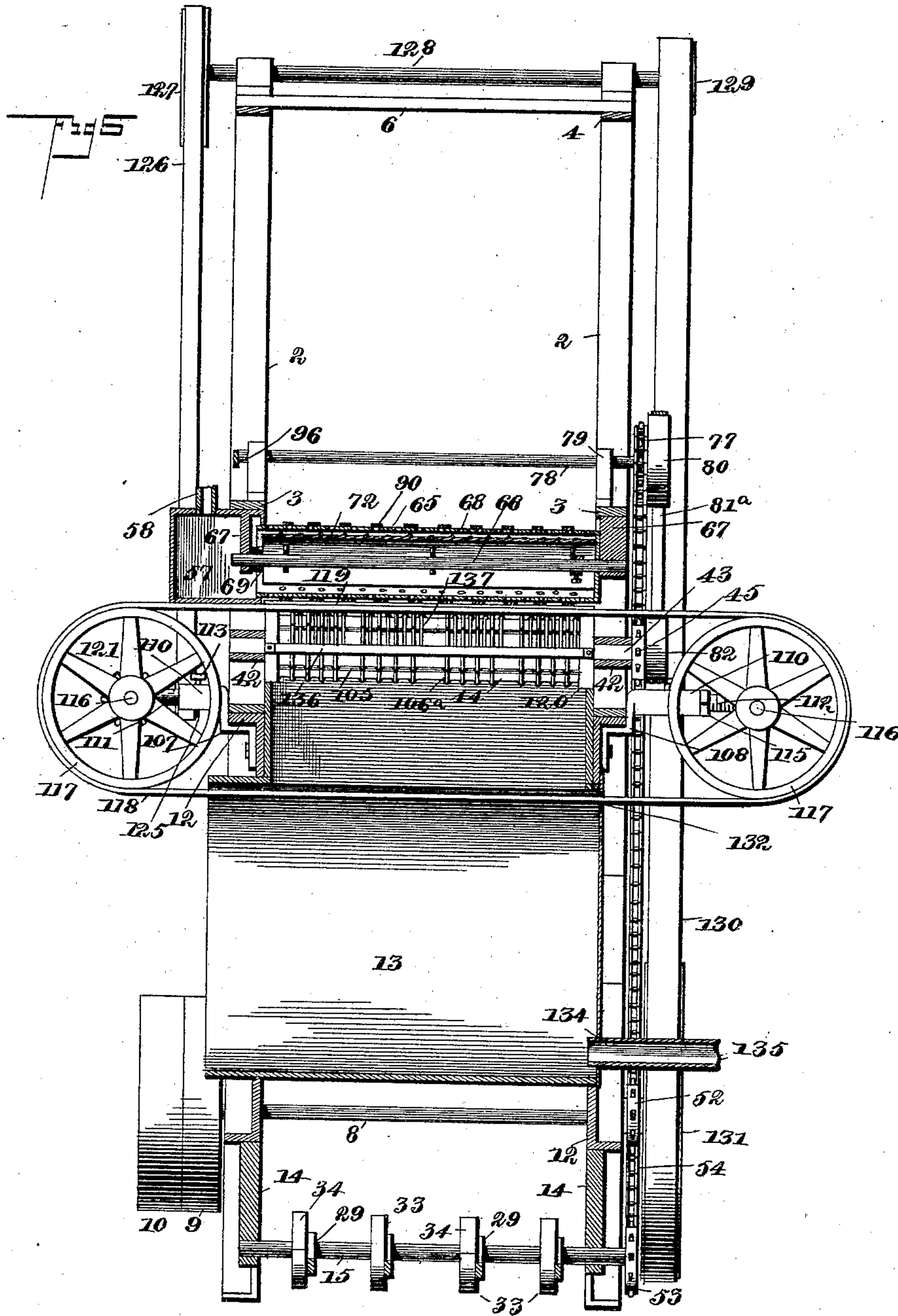
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C. A. Snow & Co.

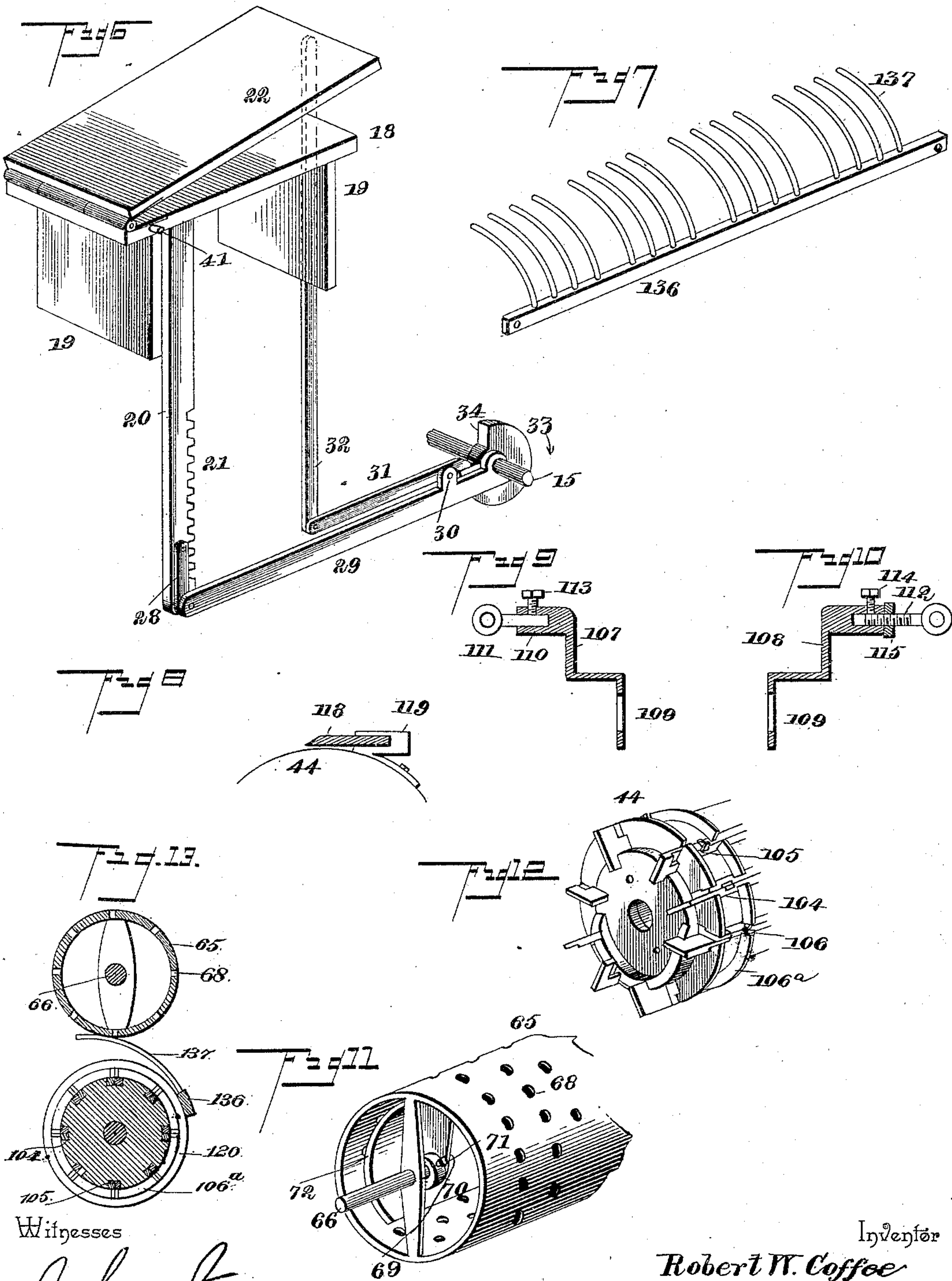
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R. W. COFFEE.
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Witnesses

John Amore
Wm. Bagges

By his Attorneys,

C. A. Snow & Co.

Inventor
Robert W. Coffee

UNITED STATES PATENT OFFICE.

ROBERT W. COFFEE, OF BEDFORD CITY, VIRGINIA.

TOBACCO-STEMMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 445,637, dated February 3, 1891.

Application filed March 18, 1890. Serial No. 344,391. (No model.)

To all whom it may concern:

Be it known that I, ROBERT W. COFFEE, a citizen of the United States, residing at Bedford City, in the county of Bedford and State of Virginia, have invented a new and useful Tobacco-Stemming Machine, of which the following is a specification.

This invention relates to machines for removing the stems from tobacco-leaves, and it may be described as being an improvement on the device for which application for Letters Patent, Serial No. 329,500, was filed by me on the 7th day of November, 1889.

My present improvement relates particularly to an improved mechanism for feeding the tobacco-leaves singly to the carrying mechanism, to the carrying mechanism by means of which the leaves are being held and conveyed through the machine, and to the cutting mechanism, which in this case consists of an endless knife or cutter.

The features of my invention will be hereinafter fully described with reference to the drawings, in which—

Figure 1 is a perspective view of a tobacco-stemming machine embodying my improvements. Fig. 2 is a side elevation of the same. Fig. 3 is a longitudinal vertical section of the same. Fig. 4 is a front elevation. Fig. 5 is a vertical transverse sectional view. Fig. 6 is a perspective detail view of one of the vertically-movable followers forming a part of the feed mechanism. Fig. 7 is a perspective detail view. Fig. 8 is an end view of the stemming-cylinder, showing in transverse section the upper portion of the endless knife or cutter and one of the guides for the same. Figs. 9 and 10 are sectional detail views of the brackets supporting the bearings, in which are journaled the shafts carrying the wheels or drums that support the endless knife or cutter. Fig. 11 is a perspective detail view of one end of one of the suction-cylinders. Fig. 12 is a perspective detail view of a portion of the stemming-cylinder. Fig. 13 is a detail view showing the construction and relative arrangement of the stemming-cylinder, the suction-cylinder 65, and the bar 136, having the fingers 137.

Like numerals of reference indicate like parts in all the figures.

The frame of my improved tobacco-stem-

ming machine is composed, essentially, of the front and rear uprights 1 and 2, connected by horizontal braces 3 3 and by top pieces 4 4, which latter are in turn connected by transverse cap-pieces 5 and 6. The rear uprights 2 2 are provided near their lower ends with boxes or bearings 7 for the main shaft 8, which is provided at one end with fixed and loose pulleys (designated, respectively, by 9 and 10) adapted to receive motion by means of a band or belt 11 from motive power of any suitable description.

Suitably secured between the front and rear uprights of the frame are the annular rings 12, forming supports for a cylindrical drum 13. The rings 12 are provided with downwardly-extending hangers 14, forming bearings for a shaft 15, which receives motion from the main shaft 8 in a manner to be hereinafter described.

Upon the front uprights 1 of the frame is mounted a box which is divided by a series of vertical partitions 16 into a series of compartments 17, in each of which is arranged a vertically-movable follower 18, having downwardly-extending guide-plates 19. Each of the followers 18 is provided with a downwardly-extending stem 20, the lower end of which is toothed on its rear side to form a rack-bar 21. To the upper front edge of each of the followers 18 is hinged a supporting-plate 22, between which and the follower-plate a spring 23 is interposed, which serves to force the said supporting-plate in an upward direction at stated points of the operation of the machine.

The front sides of the uprights 1 of the frame are provided with brackets 24, in which is journaled a transverse shaft 25, having a series of pinions 26 engaging the racks 21 at the lower ends of the stems 20 of the followers. The upper ends of said stems are connected pivotally, as shown at 27, to lugs 28^a upon the under sides of the followers. The lower ends of the said stems are provided with pivoted links 28, to the lower ends of which are pivoted rods 29, the rear ends of which are mounted pivotally upon the shaft 15. The upper sides of the rods 29 are provided with lugs 30, to which are pivoted arms or levers 31, the front ends of which are connected by pitmen or pivoted rods 32 with the rear ends of the hinged supporting-plates 22.

Mounted securely upon the shaft 15, adjacent to the rear ends of the levers or connecting-rods 29, are the disks 33, which are provided with peripheral notches 34, adapted to engage the rear ends of the levers 31.

When by mechanism which is to be hereinafter described the followers 18, with their attachments, are fed or moved intermittently in an upward direction, a rotary motion is at the same time imparted to the shaft 15 in the direction indicated by arrows in Figs. 1 and 6 of the drawings. During the greater part of the rotation of the shaft 15 the rear ends of the levers 31 are in contact with the peripheries of the disks 33, and the front ends of said levers are thereby forced in a downward direction, thereby depressing the supporting-plates 22 to a horizontal position. When during the rotation of the shaft 15 the notches 34 of the disks 33 come in engagement with the rear ends of the levers 31, the springs 23 will serve to force the rear ends of the supporting-plates 22 in an upward direction, holding said supporting-plates temporarily in a tilted or inclined position, as will be seen in Fig. 6 of the drawings. This position, however, is only momentarily occupied by the supporting-tables, which are almost instantaneously restored to their normal or approximately horizontal position by the action of the notched disks 33 and the levers and connecting-rods herein described.

Pivoted to the front edge of each of the partitions 16, which separate the compartments 17, are the levers 35, the upper ends of which have handles 36, and between the lower ends of which and the front edges of the partitions 16 springs 37 are interposed, serving to force the lower ends of said levers automatically in a forward direction. The lower ends of the levers 35 are connected by pivoted rods 38 with the lower ends of the pivoted stems 20 of the followers 18. To the upper ends of the said levers are pivoted hook-shaped catches 39, which are adapted to engage notches or recesses 40 in the upper edges of the said partitions 16. When the catches 39 are in engagement with the notches 40, the lower ends of the levers 35 are held against the tension of the springs 37, causing the connecting-rods 38 to force the lower toothed ends of the stems 20 in a rearward direction and into engagement with the pinions 26.

The followers 18 are provided with laterally-extending pins 41, which, when the said followers reach the extreme limit of their upward movement, engage the pivoted hook-shaped catches 39 and throw them out of engagement with the notches 40, thus causing the springs 37 to throw the lower ends of the levers 35 in a forward or outward direction, thereby disengaging the toothed stems 20 from the pinions 26 and permitting the followers to drop by their own weight to the lower limit of their respective movements, at which they remain until the levers 35 are so

manipulated by hand as to restore the catches 39 to engagement with the notches 40.

The upper sides of the annular supporting-rings 12 of the drum 13 are provided with upwardly-extending brackets 42, forming bearings for the shaft 43 of the stemming-cylinder 44. The detailed construction of the latter will be hereinafter more fully referred to. The shaft 43 is provided near one of its ends with a sprocket-wheel 45.

The horizontal braces 3 of the frame are provided near their rear ends with brackets or hangers 46, forming bearings for a shaft 47, one end of which is provided with a sprocket-wheel 48. The rear sides of the rear uprights 2 of the frame are likewise provided with brackets 49, forming bearings for a transverse shaft 50, having a sprocket-wheel 51.

A chain-wheel 52 is suitably mounted upon the main shaft of the machine, and a like chain-wheel 53 is mounted upon one end of the transverse shaft 15. An endless chain 54 passes over the chain or sprocket wheels 52, 53, 45, 48, and 51, thus imparting or transmitting motion from the main shaft to the shafts upon which the said sprocket-wheels are mounted. An idle sprocket-wheel 55, journaled to a stub-axle, which has an adjustable bearing upon one of the uprights of the frame, serves to give requisite degree of tension to the chain 54.

To one side of the frame is secured a pair of suction-boxes, (designated, respectively, by 56 and 57.) These suction-boxes are connected by branch pipes 58 with a pipe 59, which is connected with the casing 60 of a suction-fan of ordinary construction, and to which motion may be imparted in any suitable manner during the operation of the machine.

The inner side wall of the suction-box 56, which is nearest the front of the machine, forms a bearing for one end of a cylinder 61, the opposite end of which is closed and journaled upon a shaft or axle 62, which is mounted in bearings 63, suitably attached to the frame of the machine. The cylinder 61, which is hollow, and the end of which, mounted in the inner wall of the suction-box 56, is open, is provided with a large number of minute perforations 64. A similar suction-cylinder 65 has its open end mounted in the inner wall of the suction-box 57 and is journaled upon a spindle or axle 66, which is mounted in brackets 67, attached to the frame of the machine. The cylinder 65, like the cylinder 61, is provided with numerous perforations 68, which are distributed over its entire surface.

Suitably mounted upon the shafts 62 and 66 within the cylinders 61 and 65 are the arms 69, having collars 70, provided with set-screws 71, by means of which they may be adjusted upon the said shafts or axles. The radial arms 69 carry the segmental shields 72, which fit against the inner sides of the cylinders and serve to cover a portion of the perforations in said cylinders. It is not necessary

during the operation of the machine, for reasons which will be hereinafter made apparent, that suction should be created simultaneously through all of the perforations in the cylinders, and this is avoided by the use of the segmental shields 72, which may be adjusted, as will be readily seen, to prevent such from taking place through any desired portion of the perforated surface of either cylinder.

The horizontal braces 3 of the frame are provided with downwardly-extending brackets or hangers having bearings for the horizontal parallel shafts 73 and 74. The shaft 73 is provided at one end with a sprocket-wheel 75, which is connected by a chain 76 with a sprocket-wheel 77 upon one end of a shaft 78, which is journaled in brackets 79 upon the upper sides of the braces 3. The shaft 78 is provided with a band-wheel 80, which is connected by a belt 81 with a drum or pulley 82, which is securely mounted upon one end of the shaft 43 of the stemming-cylinder, from which motion is in this manner transmitted to the shaft 78. The chain 76 engages a sprocket-wheel 81, which is mounted on one end of shaft 74, to which rotary motion is thus transmitted in the opposite direction to the direction of rotation of the shaft 73. The latter carries a roller 82, which is connected by an endless apron 83, which is of about the width of the machine, with a roller 84 upon a shaft 85, which is journaled in brackets 86, suitably attached to the frame. The shaft 74 carries a roller 87, from which a series of belts or bands 88 pass over the suction-cylinder 61, to which latter a rotary motion is in this manner transmitted.

The shaft 47, to which motion is transmitted from the main shaft in the manner already described, is provided with a roller 89, from which the series of endless bands 90 pass over the suction-cylinder 65, to which motion is thus transmitted.

Brackets 90^a, which are suitably attached to the frame, are provided with bearings for a shaft 91, carrying a roller 92, which is connected by an endless apron 93 with a roller 94 upon the shaft 50, which receives motion from the main shaft through the medium of the endless chain 54 in the manner hereinbefore described.

The shaft 78, to which motion is communicated from the stemming-cylinder by means of the belt or band 81^a, is provided at one end with a crank 95, which is connected by a pitman 96 with a lever 97, which is mounted pivotally upon a stub-axle 98, suitably attached to the frame. Suitably mounted upon said stub-axle, adjacent to the lever 97, is a spur-wheel 99, which may be suitably connected with or formed integrally with a drum or pulley 100.

Pivotally connected to the lever 97 is a pawl 101, engaging the teeth of the spur-wheel 99, and serving when the machine is in operation to impart a slow intermittent rotary motion to the shaft 98, from which the motion is trans-

mitted by means of a belt 102 to the shaft 25, which is provided at one end with a drum or pulley 103 to carry the lower end of the said belt. The latter is twisted, as shown, in order to cause the motion of the shaft 25 to be transmitted in the proper direction, and its upper end passes over the drum or pulley 100.

The stemming-cylinder 44, which has been described as being mounted upon the shaft 43 below the suction-cylinder 65, is provided with grooves or recesses 104, extending through its entire length. In each of these grooves or recesses, of which any desired number may be used, is arranged a pair of oppositely-reciprocating holders, consisting of rods 105, having outwardly-extending hook-shaped grasping devices 106. The stemming-cylinder is also provided with annular flanges 106^a, which are intersected by the grooves 104, having the holders.

The general construction of the stemming-cylinder and the mechanism for imparting to the holders thereof a transversely-reciprocating motion is precisely the same as that shown in my application for Letters Patent, to which reference has hereinbefore been made, and I have deemed it unnecessary to illustrate and to describe the detailed construction of said stemming-cylinder in the present application, except in so far as it necessarily co-operates with other parts or elements of the machine.

To the opposite sides of the frame of the machine is bolted or otherwise secured a pair of brackets, (designated, respectively, by 107 and 108,) each of which is provided with a vertical slot 109 to receive the securing bolt or bolts and to provide for the vertical adjustment of said brackets. Each of said brackets is provided at its outer end with a laterally-extending arm having a socket 110, and in each of said sockets is mounted a spindle, said spindles being designated, respectively, by 111 and 112. The spindle 111 is cylindrical, and is held from rotating in its socket by means of a set-screw 113. A similar set-screw 114 prevents rotation in its socket of the spindle 112, which latter, however, is screw-threaded and is provided with a check-nut 115, by means of which it may be drawn outwardly in its socket. Each of the spindles 111 and 112 is provided at its outer end with a bearing for a shaft 116, and each of the shafts 116 carries a band-wheel or pulley 117. An endless-band knife or cutter 118 is mounted upon the pulleys 117, and may be strained to any desired degree of tension by manipulating the check-nut 115 in the manner described. It will also be seen that by oscillating the spindles 111 and 112 in their respective sockets or bearings the blade of the band-knife may be slightly tilted, so as to present the cutting-edge at any desired angle to the work. A guide or bearing 119 for the endless knife is secured upon the upper sides or edges of the caps 120 at the ends of the stemming-cylinder. Said caps form bearings for the ends of the said stemming-cylinder and contain the cam mechan-

ism by means of which the holders are reciprocated. The construction of these caps has been fully set forth and claimed in my previous application for Letters Patent hereinbefore referred to, and need not be described in detail herein.

Motion is imparted to the endless knife or cutter by mechanism as follows: One of the shafts 116 is provided at its rear end with a beveled pinion 121, which meshes with the similar pinion 122 upon one end of a short shaft 123, which is mounted in a bracket or bearing 124, suitably attached to the frame. The shaft 123 also carries a drum or band-wheel 125, from which a belt or band 126 passes over a band-wheel 127 upon one end of a transverse shaft 128, which is mounted in suitable bearings on top of the machine. The opposite end of the shaft 128 has a drum 129, from which a belt 130 passes over a band-wheel 131, which is mounted upon the main shaft of the machine. It will thus be seen that motion is transmitted from the main shaft to the shaft 116 of the endless knife or cutter, and it will also be seen that by properly proportioning the devices for transmitting motion the said endless knife or cutter may be operated at any desired rate of speed. The lower portion of the endless knife or cutter passes through slots 132 in the frame of the machine directly below the longitudinal slot 133, which is formed in one end of the drum 13 for the purpose of receiving the stems of the tobacco-leaves as the said stems are severed from the leaves. One end of the drum 13 is open and the other is closed, as will be seen in Fig. 1, and provided with a perforation 134, which is connected by a pipe 135 with the blast-opening of the fan-case 60. It will thus be seen that the blast from the fan-case is continually directed through the drum 13 and serves to discharge the tobacco-stems from the latter. Suitably secured to the front sides of the caps 120 of the stemming-cylinder is a transverse rod or bar 136, having a series of curved elastic fingers 137, that conform to the curvature of the stemming-cylinder and which press in an upward direction against the suction-cylinder 65, located above said stemming-cylinder. These curved spring-fingers serve to form guides for the stems of the tobacco-leaves that pass through the machine and serve the additional purpose of assisting in holding the said tobacco-leaves in contact with the suction-cylinder 65 at the point where they are subjected to the action of the endless cutter.

In operation the tobacco-leaves are piled in the compartments 17 in such a manner as to rest upon the supporting-plates 22, the front ends of which are hinged, as described, to the vertically-movable followers 18. The leaves are arranged in such a manner that their butt-ends shall face toward the suction-cylinder 61. When the machine is started, an intermittent upward motion will be imparted to each of the followers 18, and at each revolution of the

shaft 15, when the notched portion of the peripheries of the disks 33 come in contact with the levers 31, the rear ends of the latter will be permitted to descend under the impulse of the springs 23, which serve to force the rear ends of the supporting-plates 22 momentarily in an upward direction, thereby bringing the piles of tobacco-leaves in contact with the circumference of the suction-cylinder 61. The strong inward draft through the perforations in the latter will cause the topmost leaf of each pile to adhere to the said cylinder and to be carried in a rearward direction in the machine between the suction-cylinder 61 and the belts 88 upon the latter and the endless apron 83, which passes over the rollers 82 and 84, the space between said apron and the endless belts 88 being only sufficient to hold a single tobacco-leaf. The endless apron 83 may be timed to move at a slightly greater speed than the belts 88, thereby assisting in smoothing and flattening the tobacco-leaf as it enters the machine. The leaves are delivered from between the apron 83 and the endless belts 88 to the stemming-cylinder, the oppositely-reciprocating holders of which serve to grasp the stem at about the point where the leaf comes in contact with the endless knife or cutter. The latter, it will be seen, serves to sever the stem from the leaf, the stem being carried downwardly and rearwardly by the holders of the stemming-cylinder, while the leaf is held by suction in contact with the cylinder 65, and is thus held flat and smooth while being operated upon by the endless cutter. The flexible or elastic fingers 137 of the rod 136 serve to assist by their upward pressure in holding the leaves in contact with the suction-cylinder, and they serve the additional purpose of guiding the stems between the flanges 106^a of the stemming-cylinder. The part of the operation of the machine which is performed by the stemming-cylinder has been fully described in my former application for Letters Patent, and need not be further referred to in the present case. When the leaves pass out of contact with the suction-cylinder 65, they will drop upon the endless apron or carrier 93 and be conveyed by the latter to some suitable box or receptacle which has been previously arranged for their reception.

It will be observed that the series of belts or bands 88 and 90 each perform a twofold purpose, in that they first serve to drive the suction-cylinders 61 and 65, and, secondly, serve to assist in disengaging the tobacco-leaves from contact with the said suction-cylinders. Said belts or bands, it will be observed, extend from the suction-cylinders rearwardly to the driving-shafts, and their lower portions are approximately horizontal. Consequently during the operation of the machine the lower portions of the said belts or bands will serve to remove the tobacco-leaves from the suction-cylinder with which they are in contact. It is obvious, however, that the

belts or bands are not entirely relied upon to perform this function, inasmuch as the segmental shields 72, which are extended over that portion of the cylinders to which it is not deemed necessary that the tobacco-leaves shall adhere, will to some extent prevent the adherence of the tobacco-leaves to the suction-cylinders at these points. At the same time the endless belts, arranged as herein described, are entirely positive in their action and will prevent the possibility of any tobacco-leaf adhering to either of the suction-cylinders beyond a point at which it should be disengaged therefrom.

With regard to the feed mechanism, it will be seen that, while it is so constructed as to cause an intermittent movement at a slow rate of speed in an upward direction of each of the piles of tobacco-leaves, it is not so designed as to cause the topmost leaves of each pile to be constantly in engagement with the suction-cylinder which carries the leaves into the machine. If this were the case, the feed mechanism would at best be uncertain in its action, owing to the natural adherence existing between the tobacco-leaves, which would render it almost impossible for the topmost leaf to be taken off the pile without carrying the next succeeding ones along with it. On the contrary, by my improved feed mechanism I provide, in addition to the slow intermittent forward movement, a rapid reciprocating or tilting movement of each pile, which will cause the topmost leaf of each pile to be placed in contact with the suction feed-cylinder 61 only for a sufficient space of time to cause said topmost leaf to adhere to the said feed-cylinder. The body of the pile is then caused to descend, thus permitting the topmost leaf to be fed into the machine without disturbing the position of the remainder of the pile. In addition to this I have provided mechanism whereby when each of the followers supporting a pile of leaves has reached the upward limit of its movement it shall automatically throw the feed mechanism out of operation and cause the follower to descend and remain in a lowered position until a new pile of tobacco-leaves shall have been placed thereon and the feed mechanism shall have been restored by hand to its normal working condition.

In my former application for Letters Patent, to which reference has hereinbefore been made, I availed myself of a transverse reciprocating knife or cutter for the purpose of severing the stems from the tobacco-leaves. This device, while entirely practical and efficient, in many respects was open to objections, which have been entirely overcome by the substitution of the endless knife or cutter shown in the present case. Among the important advantages of the said endless knife or cutter may be named the facility with which it may be cleaned of gum and other impurities that would clog its action by sim-

ply placing a sponge saturated with water or other liquid in contact therewith at any desired point during the operation of the machine. With equal facility the endless knife may be sharpened without removing it from the machine by simply holding a whetstone or other abrading device in contact with the cutting-edge while the machine is in operation. Again, it will be seen that the tension of the said endless knife or cutter may be conveniently regulated by simply tightening the check-nut 115, and that by simply tilting the spindles 111 and 112 in their sockets the cutting-edge of the knife may be caused to engage the tobacco-leaves at any desired angle.

I desire to state that while I have herein described what I consider to be the preferred form of my improved tobacco-stemming machine, I do not limit myself to the precise construction of details herein set forth, but reserve the right to any changes and modifications that may be resorted to without departing from the spirit of my invention.

I also desire to state that I have filed of even date herewith an application for Letters Patent, Serial No. 344,390, covering the process of stemming tobacco-leaves in the manner and by the means herein described, and that such method or process is not claimed as a part of my present application.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a machine for stemming tobacco-leaves, the feed mechanism comprising, in combination, the vertically-movable followers, mechanism for imparting to said followers a slow intermittent movement in an upward direction, supporting-plates hinged to the said followers, and mechanism for vibrating the said supporting-plates at stated intervals, substantially as and for the purpose set forth.

2. In a machine for stemming tobacco, the combination of the feed mechanism having the followers, mechanism for imparting to said followers an intermittent movement in an upward direction, supporting-plates hinged to the upper sides of said followers, springs interposed between said supporting-plates and followers, and mechanism for imparting to said supporting-plates a vibrating movement at stated intervals, substantially as set forth.

3. The feed mechanism comprising, in combination, the followers, mechanism for imparting to said followers an intermittent movement in an upward direction, the supporting-plates hinged to the upper sides of said followers, mechanism for vibrating the said supporting-plates at stated intervals, and a revoluble suction-cylinder mounted above the limit of the upward movement of the vertically-movable followers, substantially as set forth.

4. In a tobacco-stemming machine, the combination, with vertically-movable followers

supporting the piles or stacks of tobacco-leaves, of a revoluble suction-cylinder adapted to take the leaves from the said piles, and endless bands encircling and transmitting motion to the said suction-cylinders, substantially as and for the purpose set forth.

5. In a tobacco-stemming machine, the feed mechanism comprising, in combination, the vertically-movable followers, the supporting-plates hinged to the upper front edges of the same, the springs interposed between said supporting-plates and followers, mechanism for feeding said followers intermittently in an upward direction, mechanism for imparting to the supporting-plates a vibrating movement at stated intervals, a revoluble suction-cylinder arranged above the limit of the upward movement of said followers, and the endless bands encircling said suction-cylinder and serving to transmit rotary motion to the latter, substantially as set forth.

6. In a tobacco-stemming machine, feed mechanism comprising mechanism for feeding the stacks of tobacco-leaves intermittently in an upward direction, and mechanism for imparting an intermittent reciprocating motion to the said stacks of leaves, substantially as set forth.

7. The combination, with the vertically-movable followers, of the supporting-plates hinged to the front upper edges of the same, the interposed springs, and operating mechanism for holding the supporting-plates, lowered against the tension of the springs, substantially as set forth.

8. The combination of a series of independently-movable followers, mechanism for imparting to said followers an intermittent motion in an upward direction, the supporting-plates hinged to said followers, the mechanism for imparting to said supporting-plates a vibratory movement at stated intervals, and mechanism for throwing the feed mechanism out of gear at the upper limit of the movement of said followers and permitting said followers to descend by gravity to their initial position, substantially as and for the purpose set forth.

9. The combination of the vertically-movable followers having the hinged vibrating supporting-plates and hinged stems having rack-bars formed at their lower ends, the revoluble shaft having pinions adapted to engage the said rack-bars, and mechanism for placing the latter into and out of engagement with the said pinions, substantially as and for the purpose set forth.

10. The combination of the vertically-movable followers having the pivoted stems toothed at their lower ends, the revoluble shaft having pinions adapted to engage the said toothed stems, the levers having catches, the partitions having notches to receive said catches, the pivoted rods connecting said levers with the lower ends of the said toothed stems, and springs to hold said toothed stems

out of engagement with the operating-pinions, substantially as set forth.

11. The combination of the vertically-movable followers having the hinged toothed stems, the revoluble shaft having pinions engaging said toothed stems, the links connected pivotally to the lower ends of the latter, the rods connecting said links pivotally with a revoluble shaft, disks mounted upon the latter and having peripheral notches, levers connected to the pivoted connecting-rods and located in the paths of said notched disks, supporting-plates hinged to the vertically-movable followers, springs interposed between the latter and said supporting-plates, and pivoted rods or pitmen connecting the latter with the front ends of the levers located in the paths of the notched disks, substantially as and for the purpose set forth.

12. The combination of the vertically-movable followers having the hinged supporting-plates, the interposed springs, a revoluble shaft having notched disks, levers having their rear ends located in the paths of said notched disks, and pitmen connecting the front ends of said levers with the hinged supporting-plates of the vertically-movable followers, substantially as and for the purpose set forth.

13. In a tobacco-stemming machine, a feed mechanism comprising, in combination, a series of compartments separated by vertical partition-plates, followers arranged independently in the said compartments and having downwardly-extending pivoted stems provided with rack-bars at their lower ends, a revoluble shaft having pinions engaging the said rack-bars, links connected pivotally to the lower ends of the latter, a revoluble shaft having peripherally-notched disks, pivoted rods mounted upon said shaft adjacent to said disks and having their front ends connected pivotally with the links at the lower ends of the rack-bars, levers mounted upon said pivoted rods and located in the paths of the peripherally-notched disks, supporting-plates hinged to the upper front edges of the vertically-movable followers, springs arranged below said supporting-plates, pitmen connecting the latter with the levers arranged in the paths of the peripherally-notched disks, means for holding the rack-bars in engagement with the operating-pinions, and mechanism for throwing said rack-bars automatically out of engagement with the pinions at the upper limit of the movement of the followers, substantially as and for the purpose set forth.

14. In a tobacco-stemming machine, the combination, with a perforated revoluble suction-cylinder, of a stationary shaft or axle extending longitudinally through the same, radial arms adjustable upon said shaft or axle, and a segmental shield carried by the shaft and adapted to cover a portion of the interior surface of said suction-cylinder, substantially as and for the purpose set forth.

15. In a tobacco-stemming machine, the combination of a suction-box, a revoluble cylinder having one end closed and its open end journaled in one wall of the said suction-box and provided with perforations distributed over its entire surface, a stationary shaft extending longitudinally through said cylinder and forming a support for the closed end of the latter, radial arms mounted adjustably upon the said shaft, and a segmental shield mounted upon said arms and adapted to cover a portion of the interior surface of the cylinder, substantially as and for the purpose set forth.

16. In a tobacco-stemming machine, the combination, with a hollow perforated suction-cylinder having an interiorly-located stationary adjustable shield, of the endless bands encircling and serving to transmit rotary motion to the said cylinder and to detach the tobacco-leaf from said cylinder, substantially as and for the purpose set forth.

17. In a tobacco-stemming machine, the combination, with a revoluble suction-cylinder having an interiorly-located stationary adjustable shield, of a series of endless bands encircling and serving to transmit rotary motion to said suction-cylinder, the endless apron beneath the bands, and a feed mechanism comprising a series of followers having hinged supporting-plates and means for transmitting to said followers an intermittent motion in an upward direction and to said supporting-plates an intermittent vibrating movement, substantially as and for the purpose set forth.

18. In a tobacco-stemming machine, the combination, with the revoluble suction-cylinder and the feed mechanism, of an endless apron arranged below said suction-cylinder, and the endless bands encircling and transmitting rotary movement to the latter, substantially as set forth.

19. In a tobacco-stemming machine, the combination, with the revoluble stemming-cylinder having the transversely-reciprocating holders provided with hooked grasping devices, of a revoluble suction-cylinder arranged above said stemming-cylinder, endless bands encircling and serving to transmit motion to said suction-cylinder, and the endless apron arranged below said bands, substantially as set forth.

20. In a tobacco-stemming machine, the combination, with the revoluble stemming-cylinder having the transversely-reciprocating holders provided with hooked grasping devices, of a revoluble suction-cylinder arranged above said stemming-cylinder, endless bands encircling and serving to transmit motion to said suction-cylinder, an endless apron arranged below the bands, and feed mechanism comprising a revoluble suction-cylinder, endless bands encircling the same, endless aprons arranged below said endless

bands, and mechanism for supplying the tobacco-leaves to the first suction-cylinder, substantially as set forth.

21. In a tobacco-stemming machine, the combination of the revoluble stemming-cylinder having the oppositely-reciprocating holders provided with hooked grasping devices, an endless knife or cutter arranged to move in a plane parallel to the axis of said stemming-cylinder, and mechanism for carrying the tobacco-leaves past the latter, substantially in the manner and for the purpose set forth.

22. In a tobacco-stemming machine, the combination, with devices for carrying the tobacco-leaf, of an endless-band knife acting between the stem and the leaf to sever the former from the latter, substantially as set forth.

23. The combination of mechanism for carrying the tobacco-leaf, devices for feeding the leaf to said carrier, and an endless-band knife, substantially as set forth.

24. The combination of mechanism for carrying the tobacco-leaf, mechanism for grasping the stem of the latter, and an endless-band knife acting between the stem and the leaf to sever the former from the latter, substantially as set forth.

25. In a tobacco-stemming machine, the combination of mechanism for carrying the tobacco-leaf, devices for feeding the leaf to said carrier, mechanism for grasping the stem of the leaf, and an endless-band knife acting between the stem and the leaf to sever the former from the latter, substantially as set forth.

26. In a tobacco-stemming machine, the combination of mechanism for feeding and conveying the tobacco-leaves, a revoluble stemming-cylinder having oppositely-reciprocating hooked holders for grasping the stems of the leaves, and an endless knife or cutter arranged to operate in a plane parallel to the axis of said stemming-cylinder and serving to sever the stems from the leaves, substantially as herein set forth.

27. The combination, with the revoluble stemming-cylinder having the oppositely-reciprocating holders provided with hooked devices for grasping the stems of the leaves, of the endless knife, the revoluble suction-cylinder arranged above the said stemming-cylinder, the endless belts encircling and serving to transmit motion to said suction-cylinder, and the segmental shield mounted adjustably within the latter and serving to cover a portion of its perforated surface, substantially as and for the purpose set forth.

28. In a tobacco-stemming machine, the combination, with the revoluble stemming-cylinder, of mechanism for carrying the leaves past the latter, an endless knife or cutter arranged to work in a plane parallel to the axis of said stemming-cylinder, and mechanism

for tilting the cutting-edge of said endless knife or cutter to any desired angle with relation to the circumference of the stemming-cylinder, substantially as set forth.

5 29. In a tobacco-stemming machine, the combination, with the revoluble stemming-cylinder having the oppositely-reciprocating holders provided with means for grasping the stems of the tobacco-leaves, of mechanism
10 for carrying the leaves past said stemming-cylinder, the endless knife or cutter arranged to work in a plane parallel to the axis of said stemming-cylinder, and a guide or socket for said endless knife extending longitudinally
15 across the said stemming-cylinder, substantially as set forth.

30. In a tobacco-stemming machine, the combination, with mechanism for carrying or conveying the tobacco-leaves, of an endless
20 knife or cutter arranged to work at right angles to the direction in which the leaves are being conveyed by the carrying mechanism, and mechanism for grasping the stems of the leaves and pulling them in a direction away
25 from that in which they are being conveyed by the carrying mechanism, substantially as herein set forth.

31. In a machine for stemming tobacco-leaves, the combination of the revoluble stemming-cylinder having oppositely-reciprocating
30 holders provided with hooked devices for grasping the stems of the tobacco-leaves, a revoluble suction-cylinder arranged above the said stemming-cylinder, endless bands encircling the said suction-cylinder and serving
35 to transmit rotary motion to the latter, an endless apron below the bands, and a series of flexible fingers arranged in front of and corresponding to the curvature of the stemming-cylinder and bearing upwardly
40 against the circumference of the suction-cylinder, substantially as and for the purpose set forth.

32. In a tobacco-stemming machine, the
45 combination of a revoluble stemming-cylinder having a series of oppositely-reciprocating holders provided with hooked devices for grasping the stems of the tobacco-leaves, a revoluble suction-cylinder arranged above
50 the said stemming-cylinder, a series of endless bands encircling the said suction-cylinder and serving to transmit rotary motion to the latter, an endless apron arranged beneath the bands, a segmental shield mounted adjustably
55 within and serving to cover a portion of the perforated surface of said suction-cylinder, an endless knife or cutter arranged to work in a plane parallel to the axis of the stemming-cylinder, and a series of
60 flexible fingers arranged in front of and conforming to the curvature of said stemming-cylinder and bearing upwardly against the suction-cylinder above the latter, substantially as and for the purpose set forth.

65 33. The combination, with the revoluble

stemming-cylinder having the oppositely-reciprocating holders provided with grasping devices and the mechanism for feeding the tobacco-leaves past said stemming-cylinder, of the vertically adjustable brackets attached
7 to the frame of the machine, the spindles journaled in sockets at the outer ends of said brackets, set-screws for retaining the said spindles at any point of adjustment, shafts
7 journaled in suitable bearings at the outer ends of said spindles, the band-wheels mounted upon said shafts, and an endless knife or cutter mounted upon the said band-wheels,
substantially as and for the purpose set forth.

34. In a machine for stemming tobacco, the
8 combination, with the revoluble stemming-cylinder having the oppositely-reciprocating holders provided with stem-grasping devices and the leaf-feeding mechanism, of the vertically-adjustable brackets having sockets at
8 their outer ends, the spindles mounted in said sockets, the set-screws to retain said spindles at any desired adjustment, a check-nut mounted upon the threaded shank of one of said
9 spindles, the shafts journaled in suitable bearings at the outer ends of said spindles and having band-wheels, and an endless knife or cutter carried by said wheels, substantially
as and for the purpose set forth.

35. The combination of the revoluble stemming-cylinder having the oppositely-reciprocating holders provided with grasping devices, the revoluble suction-cylinder arranged
9 above said stemming-cylinder, the endless bands encircling said suction-cylinder and serving to transmit rotary motion to the latter, an endless discharge-apron arranged below said endless belts, feed mechanism for
supplying the tobacco-leaves to the suction-cylinder, arranged above the stemming-cylinder, flexible fingers arranged to bear against and to hold the tobacco-leaves in contact with the said suction-cylinder, and suitable operating
mechanism, substantially as and for the purpose herein set forth.

36. In a tobacco-stemming machine, the combination of a revoluble stemming-cylinder having devices for grasping the stems of the tobacco-leaves, a revoluble suction-cylinder arranged above the said stemming-cylinder,
1 endless belts encircling said suction-cylinder and serving to transmit a rotary motion to the latter, an endless discharge-apron arranged below said endless belts, an endless
knife or cutter arranged to work in a plane parallel to the axis of the stemming-cylinder, mechanism for feeding the tobacco-leaves to the stemming-cylinder and to the suction-cylinder above the latter, comprising a suction-cylinder,
endless belts encircling and transmitting a rotary motion to the latter, an endless conveyer-apron beneath the same, initial feed mechanism comprising a series of vertically-movable followers having hinged supporting-plates and means for imparting to

said followers an intermittent movement in an upward direction and to said supporting-plates a vibrating movement at stated intervals, and suitable operating mechanism, all
5 constructed, arranged, and operating substantially as and for the purpose herein shown and specified.

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

ROBERT W. COFFEE.

Witnesses:

J. H. SIGGERS,
R. W. DAYTON.