

No. 741,863.

PATENTED OCT. 20, 1903.

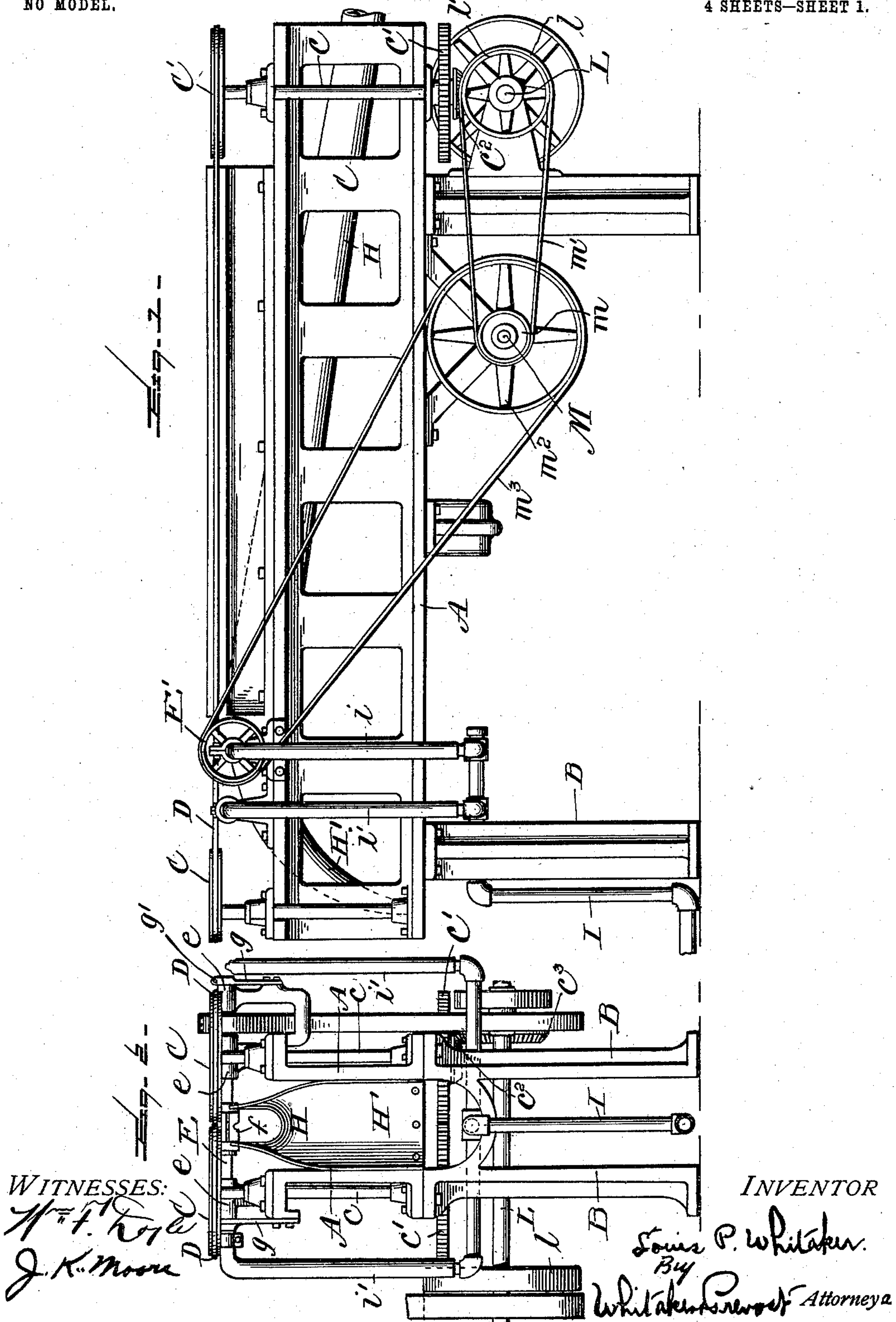
L. P. WHITAKER.

APPARATUS FOR SEPARATING THE LATERAL PORTIONS OF LEAVES  
FROM THEIR STEMS.

NO MODEL.

APPLICATION FILED MAY 9, 1902.

4 SHEETS—SHEET 1.



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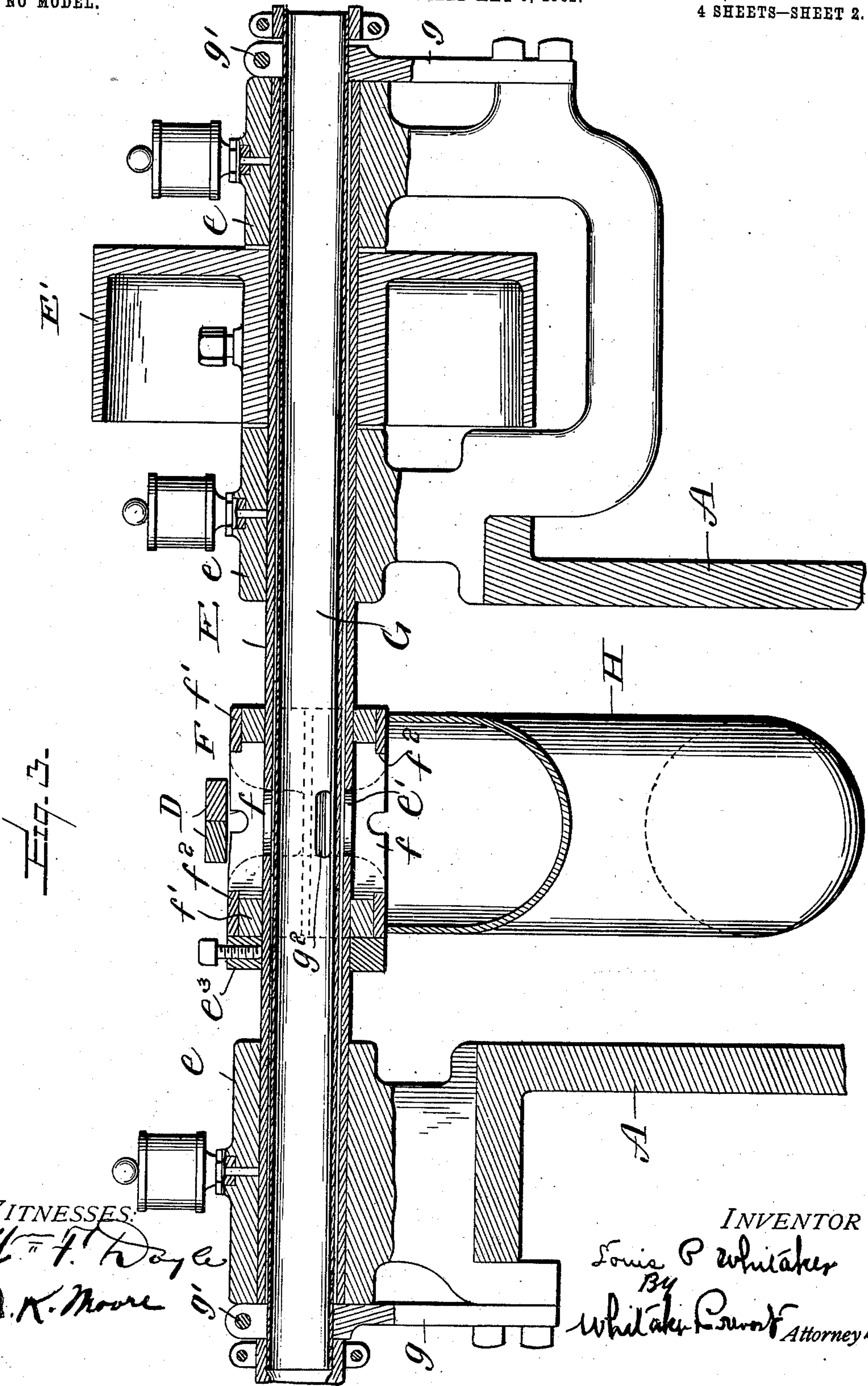
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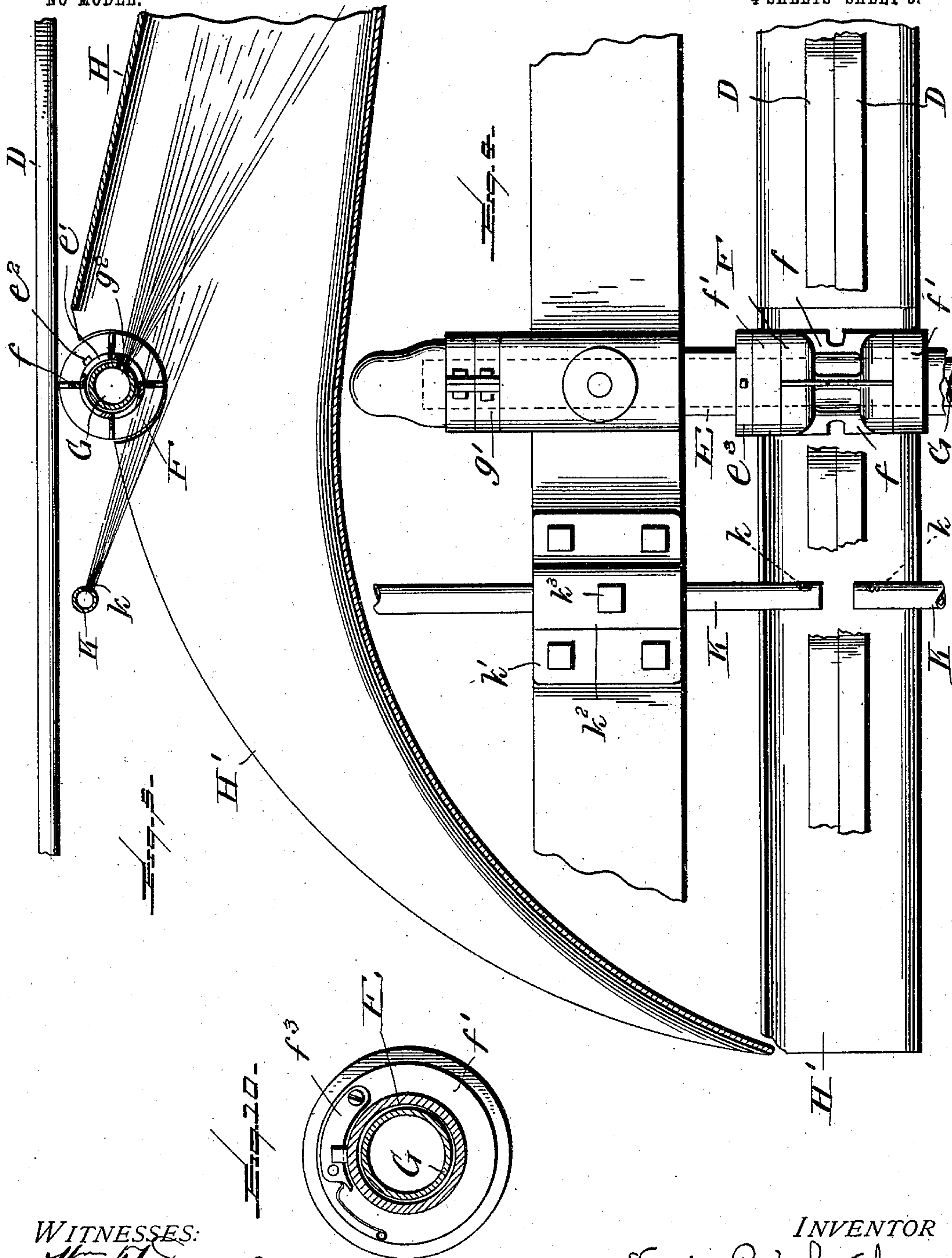
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WITNESSES:

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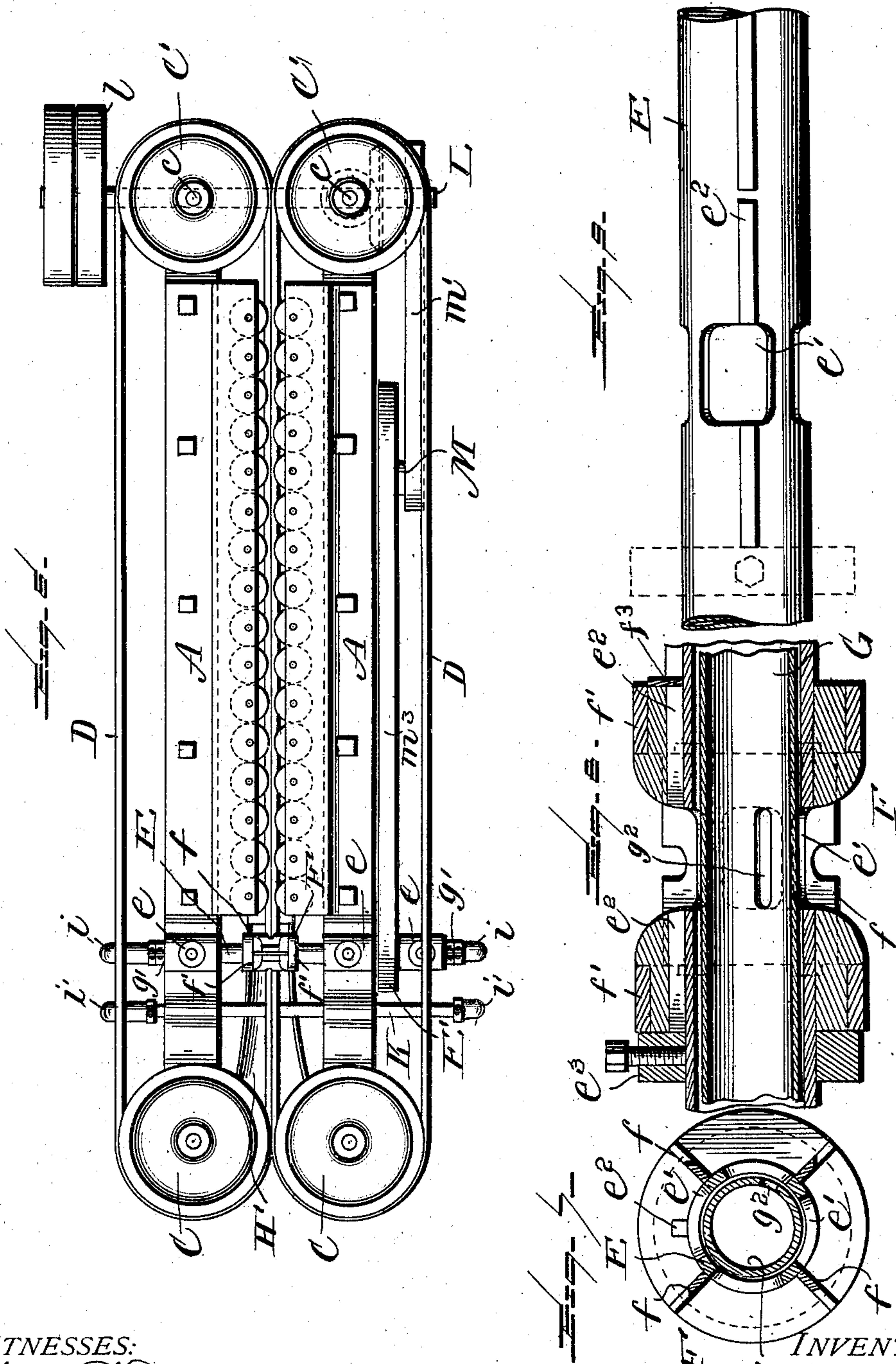
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WITNESSES:

W. F. Doyle.  
J. K. Moore.

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# UNITED STATES PATENT OFFICE.

LOUIS P. WHITAKER, OF WASHINGTON, DISTRICT OF COLUMBIA.

APPARATUS FOR SEPARATING THE LATERAL PORTIONS OF LEAVES FROM THEIR STEMS.

SPECIFICATION forming part of Letters Patent No. 741,863, dated October 20, 1903.

Application filed May 9, 1902. Serial No. 106,508. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS P. WHITAKER, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Apparatus for Separating the Lateral Portions of Leaves from Their Stems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention is an improvement upon the machine covered by my former patent, No. 671,845, dated April 9, 1901; and it consists in the novel features hereinafter described with reference to the accompanying drawings, which illustrate one form in which I contemplate embodying my invention, and said invention is fully disclosed in the following description and claims.

Referring to the said drawings, Figure 1 represents a front elevation of a tobacco-stemming machine embodying my invention. Fig. 2 is an end elevation of the same. Fig. 3 is an enlarged transverse vertical section through the hollow knife or cutter-shaft of the machine. Fig. 4 is a top plan view drawn to an enlarged scale and showing a portion of the cutter and its shaft and the front guiding blast-nozzle. Fig. 5 is an enlarged vertical sectional view through the cutter and cutter-shaft and the receiving portion or mouthpiece of the stemming-tube. Fig. 6 is a top plan view of the machine. Fig. 7 is an enlarged detail transverse sectional view of the rotary cutter and interior nozzle. Fig. 8 is a longitudinal sectional view of the same. Fig. 9 is a detail view of a portion of the cutter-shaft. Fig. 10 is a detail view of one of the hubs of the cutter, showing the locking device therefor.

In the drawings the main frame of the machine is shown as composed of two longitudinally-disposed side frames A A, supported upon suitable standards B, which are so constructed as to connect the two side frames rigidly. At the front end of the machine are located the large grooved belt-rollers C C, and at the rear end of the machine are located the driving grooved belt-rollers C' C'. Upon these rollers C and C' are supported the feeding or gripping belts D D, having their inner portions arranged parallel and said parallel

portions pressed together by a series of opposing pressure-rolls. (Not shown.) The construction and operation of these gripping or feeding belts are fully disclosed in my prior patent before referred to and also in my Patent No. 667,354, granted to me February 5, 1901, and as this particular form of feeding mechanism forms no part of my present invention its specific construction will not be further illustrated or described.

It is only necessary for the purposes of the present invention that the machine should be supplied with a feeding mechanism capable of gripping or seizing the butt-ends of the stems of the tobacco-leaves and carrying them over the rotary cutter.

E represents the shaft of the rotary cutter, which is preferably formed of a piece of hollow steel tubing and which is mounted in a suitable bearing *eee*. Upon the shaft E is placed the rotary cutter F, provided with a series of radially-disposed cutting-blades *f*, preferably four in number, each provided centrally with a notch or groove to receive the stem of a tobacco-leaf, the rotation of said knife or cutter having the effect of assisting in the separation of the lateral portions of the leaf and the fibers thereof from the stem. The knife-shaft E is provided with a series of apertures *e'*, located centrally with respect to the rotary cutter and arranged between the cutting-blades thereof, as clearly shown. These apertures may be of any size or form which may be found desirable. I prefer, however, to make them in the form of slots, having their greatest length in a longitudinal direction with respect to the shaft E. In placing the rotary cutter upon the hollow knife-shaft I also prefer to arrange the parts in such a manner that these openings *e'* will be substantially in line with the forward or front edges of the blades of the rotary cutter, so that the blast of air delivered through said openings, as hereinafter described, will sweep the front edges or faces of said blades to remove therefrom any adhering particles of leaf, grit, dirt, or other foreign matter, so as to keep these blades clean. I, however, do not limit myself to this construction, as I may in some instances locate the apertures *e'* in such relation that the blast or current of air therethrough will



sweep the back faces or edges of the cutting-blade, if desired.

G represents a stationary tube, which I preferably term the "interior knife blast-nozzle," said tube extending longitudinally through the hollow knife-shaft and preferably entirely through the same, being supported and held from rotation at one or both ends, in this case at both ends, as clearly shown in Fig. 3. In this figure,  $g$   $g$  represent the supports for the tube G, which are provided at their upper ends with split collars  $g'$ , adapted to be clamped around the tube G to hold it rigidly, said supports  $g$  being secured at their lower ends to the bearings  $e$  for the knife-shaft. The tube or nozzle G is provided with a discharge-aperture  $g^2$ , adapted to register with the apertures  $e'$  of the hollow cutter-shaft. This discharge-aperture I prefer to make of substantially the form of the apertures  $e'$ ; but it may be made of any preferred form or size.

H represents the stemming-tube, which extends from a point adjacent to the rotary cutter, as shown in Figs. 1 and 5, to the rear end of the machine and is provided at its front end with a downwardly-curved mouth-piece H', open at the top for guiding the leaves as they are carried into the machine. The interior knife blast nozzle or tube G is adjusted in its supports  $g$  in such a manner that the discharge-orifice  $g^2$  thereof will deliver a current of air into the stemming-tube H, as shown in Fig. 5, the said air being of course delivered through the apertures  $e'$  in the hollow knife-shaft as the latter is revolved. The action of this central or interior blast-nozzle is to produce a strong current of air through the stemming-tube, thereby causing a certain amount of suction at the mouth of said tube adjacent to the rotary cutter, which tends to draw the leaf which is in engagement with the cutter in the direction of the current of air, thus tending to hold it down upon the cutter and drawing down the lateral portions of the leaf on opposite sides of the stem, which, as before stated, occupies the central grooves or recesses in the cutting-blade, and thereby assists in severing the lateral portions of the leaves from the stems. It will be evident that after such separation the lateral portions of the leaves will be carried by the current of air through the stemming-tube and discharged therefrom, while the stem, which passes over the top of the rotary cutter, being drawn over by the feeding mechanism, will pass through the machine outside of said tube and be delivered from the feeding mechanism in any desired manner. In the present instance the stems will be discharged at the point where the gripping-belts separate in passing around the driving-rollers at the rear end of the machine, as in my former patents.

I represents an air-supply pipe which is connected with a continuous source or supply of air under pressure, (not shown,) which may

be an air-compressor of any suitable construction, a rotary fan or blower, a storage-tank of compressed air, or any other suitable supply.

$i$   $i$  represent tubes or pipes, preferably flexible, which are connected at their lower ends to the main supply-pipe I by means of a suitable T connection and have their upper ends connected to the opposite ends of the interior knife blast nozzle or tube G for the purpose of supplying air under pressure thereto. I prefer to supply the air to this tube G from both ends, as shown and described; but my invention contemplates the supplying of air to said tube from one end only, the other end being closed in any suitable manner; but this is not my preferred construction, and it is so obvious that particular illustration of this construction is not deemed necessary.

I also prefer to employ a pair of auxiliary blast or discharge nozzles K K, located in front of the rotary cutter and having their discharge-apertures on opposite sides of the path of the leaves to the rotary cutter, said nozzles being provided with discharge-apertures  $k$ , which direct the blast issuing therefrom substantially longitudinally into the stemming-tube and preferably below the rotary cutter. The object of these auxiliary nozzles is to further assist in holding the leaves down upon the rotary cutter. The nozzles K are supported by suitable castings  $k'$ , secured to the frame of the machine and in which the said nozzles are adjustable in a rotary direction and also in a direction transversely of the machine, or, in other words, transversely of the line of travel of the leaves through the machine. In the present instance (see Fig. 4) I have shown these castings  $k'$  provided with a sleeve portion  $k^2$ , through which the nozzle K passes, and a set-screw  $k^3$  for clamping the nozzle rigidly in its position after it has been adjusted. I do not limit myself to the particular devices for securing these two adjustments of the auxiliary nozzles. Air is supplied to the auxiliary nozzles by means of flexible pipes  $i'$  from the main supply-pipe I, said pipes  $i'$  being connected at their lower ends to the main pipe by a suitable T connection and being suitably connected at their upper ends to the auxiliary nozzle.

L represents the main driving-shaft of the machine, which is driven from any suitable source of power by means of a driving-pulley  $l$ . The vertical shafts  $c$  of the driving-rollers for operating the feeding-belt are provided at their lower ends with intermeshing gears  $c'$   $c'$ , and one of said shafts is provided with a beveled gear  $c^2$ , meshing with a beveled gear  $c^3$  on the driving-shaft L for imparting movement to the feeding or gripping belts D D.

M represents a counter-shaft provided with a pulley  $m$ , driven by a belt  $m'$  from a pulley  $l'$  on the main driving-shaft, and the counter-shaft M is provided with a large pulley  $m^2$ , connected by a belt  $m^3$  with a pulley E'



on the hollow cutter-shaft for imparting motion at the desired speed thereto.

In the operation of the machine the tobacco-leaves are fed separately into the machine by placing the butt-ends of the stems between the opposing faces of the gripping-belts D D in the manner described in my former patents. The gripping-belts carry the leaves successively and rapidly into engagement with the rotary cutter and into the sphere of action of the blasts from the auxiliary nozzles K K and the suction and blast through the stemming-tube produced by the interior knife blast-nozzle. The lateral portions of the leaf are separated from the stem and delivered through the stemming-tube H, while the stems are carried through the machine by the gripping-belts and discharged therefrom into a suitable receptacle or in any other desired way. I also provide special means for facilitating the changing of the cutter-blades when such change becomes necessary from wear upon the cutting edges thereof. The rotary cutter F is composed of two separate hubs  $f'f'$ , provided with notches to receive the blades  $f$ , said notches having overhanging portions  $f^2$  (see Fig. 3) to retain the blades in engagement with the hubs. In order to remove the blades, therefore, it is only necessary to separate the hubs, so as to allow the blades to be disengaged from these overhanging portions. When in operative position, however, the rotary cutter is directly beneath the parallel gripping portions of the belts D D, as shown in Fig. 3, and it is therefore necessary to move the cutter longitudinally upon the hollow knife-shaft in order to conveniently obtain access to the blades. I therefore form upon the hollow knife-shaft E a longitudinally-extending spline or feather  $e^2$ , and the hubs  $f'$  are each provided with a notch or groove to fit said spline. This spline or feather insures the rotation of the hubs and blades with the hollow cutter-shaft and at the same time permits the entire cutter to be moved longitudinally of the cutter-shaft into the position shown in dotted lines in Fig. 3, when the hubs may be separated and the blades removed and new ones inserted. In order to prevent the cutter from getting out of adjustment with respect to the apertures  $e'$  in the cutter-shaft, I prefer to provide an abutment, which in this instance is a collar  $e^3$ , secured to the shaft E, preferably by means of a set-screw, said abutment being so arranged that when the cutter is forced up against it it will be in exactly the required position in respect to the said apertures  $e'$  in the cutter-shaft and also in respect to the gripping-belts. At the opposite end of the cutter I preferably provide the hub  $f'$  with a locking device for preventing the longitudinal movement of the cutter away from said abutment. In this instance I have shown a spring-latch  $f^3$ , pivoted to the hub and provided with a spring which presses it toward the cutter-shaft. This latch engages a notch

formed in the spline or feather  $e^2$ , so as to lock the cutter against longitudinal movement upon the shaft. In order to change the blades, it is therefore only necessary to lift this latch and slide the entire cutter along its spline until it is removed from beneath the gripping-belts, when the blades may be quickly changed. The cutter is then pushed inwardly along the cutter-shaft until it strikes the abutment  $e^3$ , when the spring-latch  $f^3$  will drop into the notch provided for it in the spline or feather and hold it in position.

What I claim, and desire to secure by Letters Patent, is—

1. In apparatus for separating the lateral portions of leaves from their stems, the combination with a rotary cutter, of devices for conveying air to the interior of said rotary cutter and discharging it in a direction toward the periphery of the cutter, substantially as described.

2. In apparatus for separating the lateral portions of leaves from their stems, the combination with a rotary cutter, of devices for conveying air under pressure to the interior of said cutter and discharging it in a direction toward the periphery thereof, substantially as described.

3. In apparatus for separating the lateral portions of leaves from their stems, the combination with a rotary cutter provided with apertures between its cutting portions, of an interior blast-nozzle having a discharge-aperture within said cutter adapted to discharge through said apertures as they are successively presented to it by the rotation of said cutter, substantially as described.

4. In apparatus for separating the lateral portions of leaves from their stems, the combination with a rotary cutter provided with apertures between its cutting portions, of an interior blast-nozzle having a discharge-aperture within said cutter adapted to discharge through said apertures as they are successively presented to it by the rotation of said cutter, and means for adjusting said rotary nozzle to vary the position of the discharge-aperture thereof in a direction around the axis of the cutter, substantially as described.

5. In apparatus for separating the lateral portions of leaves from their stems, the combination with a hollow cutter-shaft provided with a series of apertures arranged around the shaft and a rotary cutter mounted on said shaft and provided with spaces between its cutting portions communicating with said apertures in the shaft, of an interior blast-nozzle extending longitudinally within the said shaft and provided with a discharge-aperture adapted to discharge air through the apertures of said shaft and cutter as they are presented to it by the rotation of the shaft and cutter, substantially as described.

6. In apparatus for separating the lateral portions of leaves from their stems, the combination with a hollow cutter-shaft provided with a series of apertures arranged around



the shaft and a rotary cutter mounted on said shaft and provided with spaces between its cutting portions communicating with said apertures in the shaft, of an interior blast-nozzle extending longitudinally within the said shaft and provided with a discharge-aperture adapted to discharge air through the apertures of said shaft and cutter as they are presented to it by the rotation of the shaft and cutter, a supporting device for said nozzle adapted to hold it against rotation and means for adjusting said nozzle in said support so as to vary the position of its discharge-aperture in a direction around the axis of the hollow shaft, substantially as described.

7. In apparatus for separating the lateral portions of leaves from their stems, the combination with a device provided with an aperture for the discharge of the separated portions of the leaves, a rotary knife mounted adjacent thereto and provided with apertures between its cutting portions, of an interior nozzle having a discharge-aperture within said cutter adapted to discharge air in a direction through the aperture for the discharge of the leaf portion and through the apertures between the cutting portions of the rotary cutter as they are presented by the revolution of the cutter, substantially as described.

8. In apparatus for separating the lateral portions of leaves from their stems, the combination with a stemming-tube adapted to receive and discharge the portions of the leaves separated from the stems, of a rotary cutter provided with a hollow shaft, located adjacent to said stemming-tube, said cutter and shaft being provided with apertures for the discharge of air between the cutting portions of the cutter, an interior nozzle extending longitudinally within the hollow shaft and provided with a discharge-aperture arranged to discharge air through the apertures in said shaft and cutter and in a direction substantially longitudinally of the stemming-tube, substantially as described.

9. In apparatus for separating the lateral portions of leaves from their stems, the combination with the stemming-tube adapted to receive and discharge the portions of the leaves separated from the stems, of a rotary cutter provided with a hollow shaft, located adjacent to said stemming-tube, said cutter and shaft being provided with apertures for the discharge of air between the cutting portions of the cutter, an interior nozzle extending longitudinally within the hollow shaft and provided with a discharge-aperture arranged to discharge air through the apertures in said shaft and cutter and in a direction

substantially longitudinally of the stemming-tube, and a feeding mechanism adapted to engage the stems of the leaves and carry them over the rotary cutter, substantially as described.

10. In apparatus for separating the lateral portions of leaves from their stems, the combination with a stemming-tube adapted to receive and discharge the portions of the leaves separated from the stems, of a rotary cutter provided with a hollow shaft, located adjacent to said stemming-tube, said cutter and shaft being provided with apertures for the discharge of air between the cutting portions of the cutter, an interior nozzle extending longitudinally within the hollow shaft and provided with a discharge-aperture arranged to discharge air through the apertures in said shaft and cutter and in a direction substantially longitudinally of the stemming-tube, and auxiliary nozzles located in front of said cutter and provided with discharge-apertures for discharging air in a direction substantially longitudinally of the stemming-tube, substantially as described.

11. In apparatus for separating the lateral portions of leaves from their stems, the combination with the knife-shaft, of a rotary cutter carried thereby and comprising a pair of separable hubs and a series of cutting-blades held between said hubs, of a longitudinally-disposed guide arranged upon the said shaft and engaging corresponding parts on said hubs, an abutment arranged upon said shaft for determining the location of said cutter thereon, and means for holding the cutter from longitudinal movement, substantially as described.

12. In apparatus for separating the lateral portions of leaves from their stems, the combination with the knife-shaft, of a rotary cutter carried thereby and comprising a pair of separable hubs and a series of cutting-blades held between said hubs, of a longitudinally-disposed guide arranged upon the said shaft and engaging corresponding parts on said hubs, an abutment arranged upon said shaft for determining the location of said cutter thereon, and a movable locking device secured to the cutter and engaging the shaft for holding the cutter against longitudinal movement when in engagement with said abutment, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

LOUIS P. WHITAKER.

Witnesses:

J. K. MOORE,

GEORGE M. BOND.