No. 622,587. Patented Apr. 4, 1899.

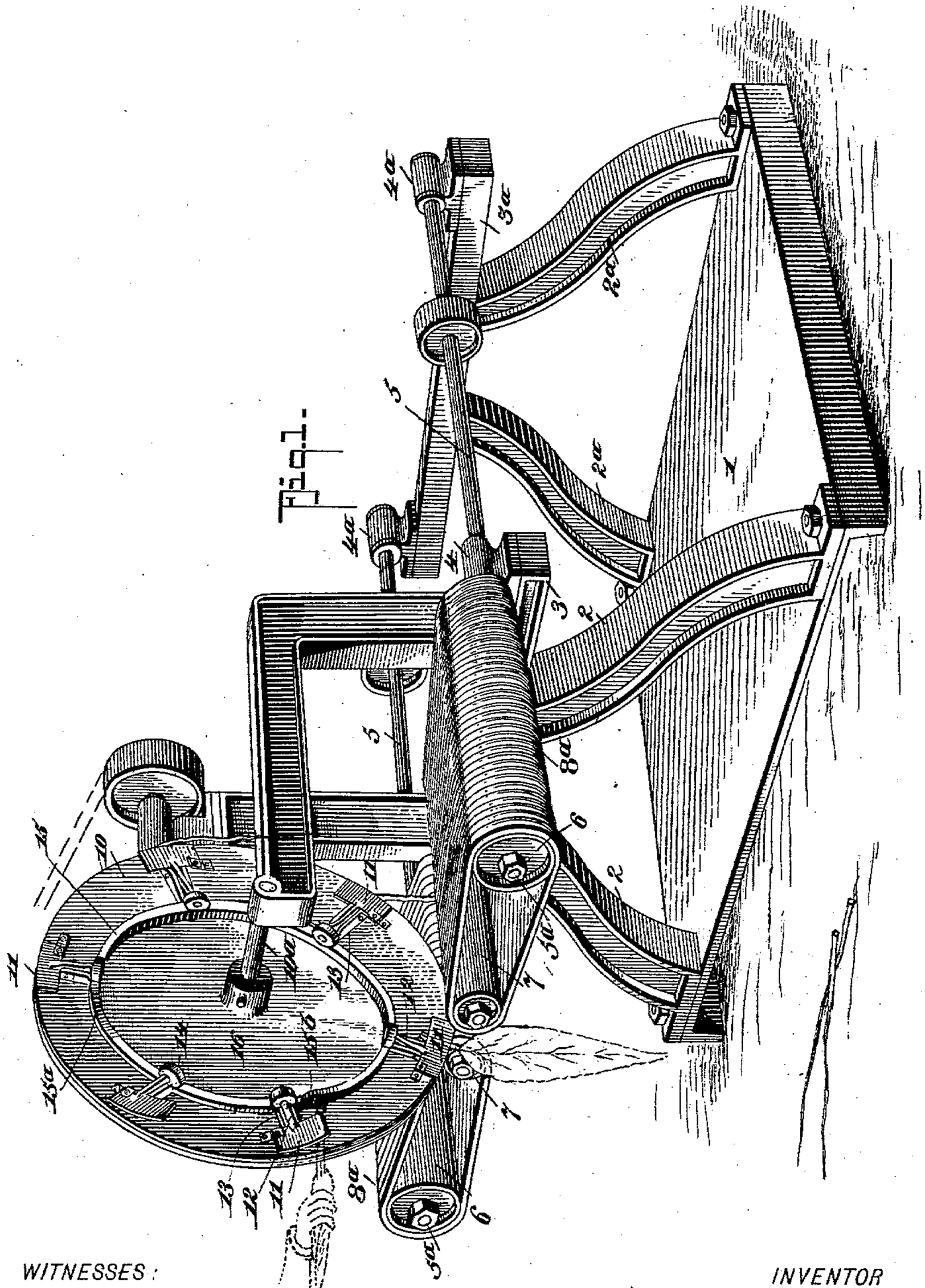
A. R. ALLISON.

TOBACCO LEAF STEMMING MACHINE.

(Application filed Mar. 25, 1898.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



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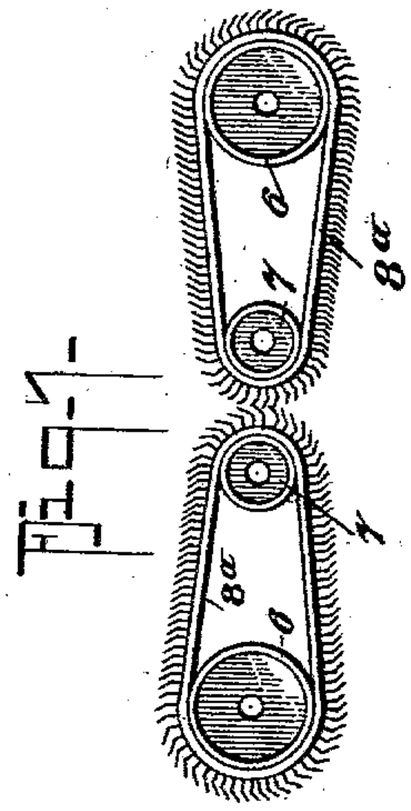

FIG. 1.

FIG. 2.

FIG. 6.

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(No Model.) 3 Sheets—Sheet 3.

Fig. 3.

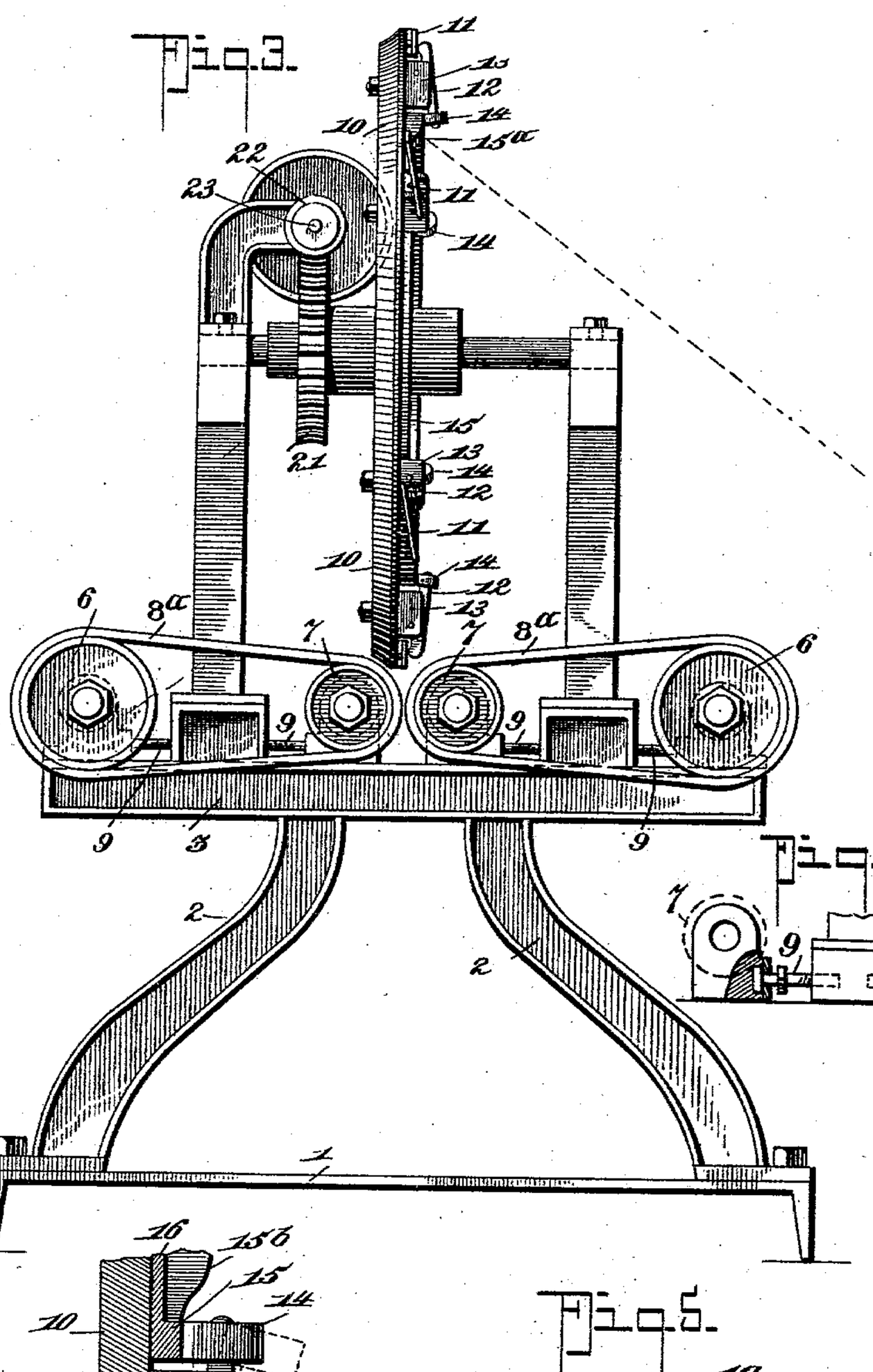


Fig. 3a.

Fig. 4.

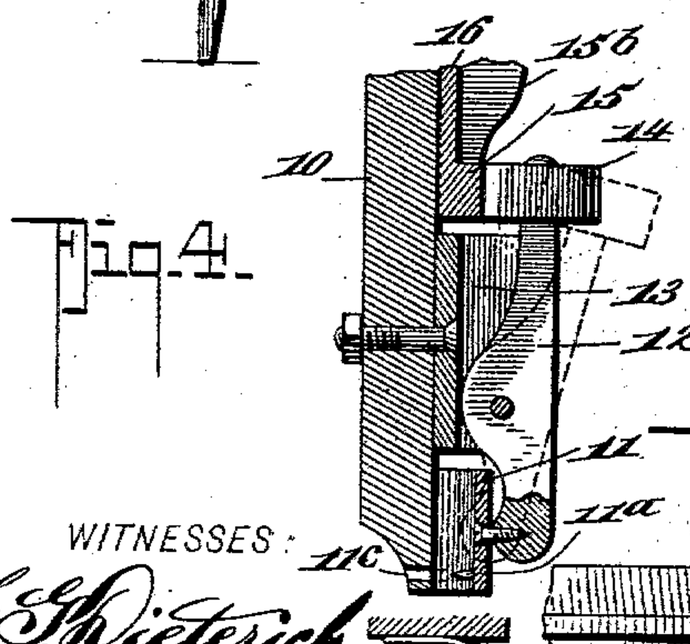


Fig. 5.

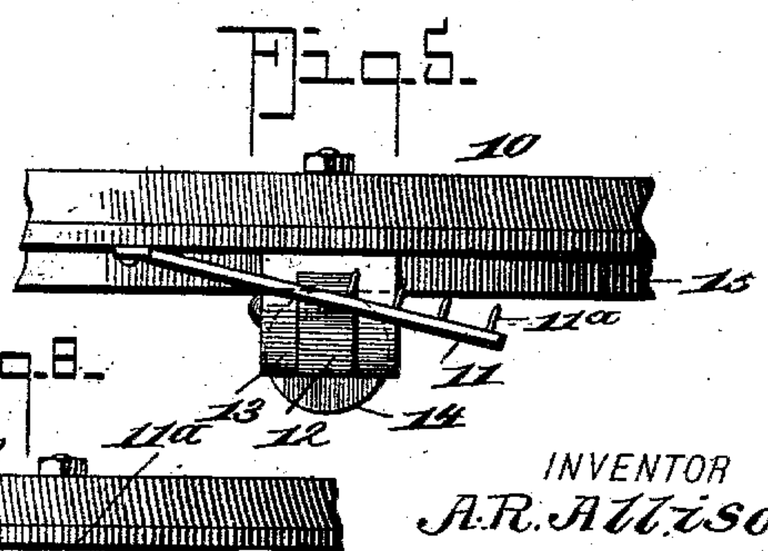
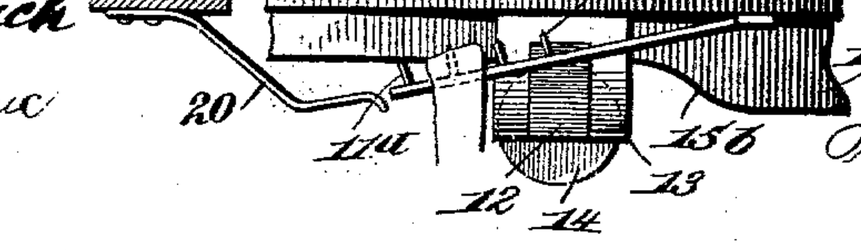


Fig. 8.



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UNITED STATES PATENT OFFICE.

ALPHONSO ROSS ALLISON, OF RICHMOND, VIRGINIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE UNIVERSAL STRIPPING MACHINE COMPANY, OF SAME PLACE.

TOBACCO-LEAF-STEMMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 622,587, dated April 4, 1899.

Application filed March 25, 1898. Serial No. 675,119. (No model.)

To all whom it may concern:

Be it known that I, ALPHONSO ROSS ALLISON, residing at Richmond, in the county of Henrico and State of Virginia, have invented a new and Improved Tobacco-Leaf-Stemming Machine, of which the following is a specification.

This invention relates generally to a class of tobacco-leaf-stemming machines wherein the leaf is acted upon by a positive and unvarying pressure upon all portions thereof, and it more particularly refers to that type of machine such as is disclosed in Patent No. 569,575, dated October 13, 1896, granted to R. W. Coffee. In the type of machines disclosed by said Patent No. 569,575 the wiper mechanism consists of a pair of superimposed coöperative rolls arranged at an acute angle to the feed mechanism, which is so disposed as to carry the leaf horizontally sidewise in a plane parallel with the contacting or wiper surfaces of the stripper-rolls.

In the practical use of machines of this kind the results have not been all that is desired in the process of separating the stem from the leaf.

One of the most serious objections in the use of machines of this character having wiper devices operative for a positive and unvarying pressure and having mechanical feed mechanisms such as have heretofore been employed therewith is that the pressure on the butt-end of the leaf, where it the more tenaciously adheres to the stem, and the tip end of the leaf, where it and the stem are more fragile, being the same the leaves and the stems have been more or less crushed, torn, or broken and the staple rendered more or less unfit for its best uses. In this kind of machines improvements have been made, as shown in Patent No. 595,041, granted to W. H. Butler December 7, 1897. In this structure the rotation of the wiper-rollers during the complete stripping operation remains uniform, as also does the action of the feed devices—that is to say, the feed of the leaf during its travel through the wipers—and the speed of the said wipers remains regular. In the Butler patent wiper-rolls having their stripping-surfaces of different efficiencies to produce a stripping action of gradually-decreased pressure commensurate with the different thickness and tenacity of the successive portions of the leaf from the butt to the tip have been provided. This construction, it is believed, does not entirely overcome the objections above noted, inasmuch as the velocity of the stripper-rolls and the speed of the feed devices are such that the butt and the tip ends of the leaf pass through the wipers at practically the same speed and are treated to substantially the same wiping or stripping action. Furthermore, when the wiper devices are arranged at an angle to the line of the feed, as in the said Coffee and Butler patents, and the leaf is fed forward in a horizontal direction an operation is effected reverse to that which practical experiments have developed is productive of the best results in leaf-stemming—*i. e.*, pulling the stem from the leaf through the wipers, (see, for example, patent to A. H. Cochrane, No. 546,843, dated September 24, 1895, in which the feed of the leaf is effected by hand manipulation.) In other words, mechanisms such as shown in the Butler and Coffee patents pull the leaf from the stem instead of the stem from the leaf.

Another serious defect in the operation of that class of machines above referred to is that the leaf as it enters the wiping devices must of necessity be drawn into them at an acute angle (rearwardly) before the wipers can begin their stripping action, thereby permitting the portion of the leaf next the butt to escape the wipers entirely. Again, as the leaves as soon as they engage the wipers in the actual operation of the machines of the type stated assume a position at an acute angle (rearwardly) to the feed-line and substantially at right angles to the axis of the wiper-rolls it follows that the leaf will not alone be subjected to a differential stripping action on each side of the stem, but the stems at their point of engagement with the grip portion of the feed will be bent, and in consequence made liable to break off at the least irregular or jerky wiping operation.

At this point it should be stated I am

aware that machines are provided in which the stem is pulled from the leaf and the stem held its entire length practically at right angles to the axis of the wiper or stripper rolls, and I shall hereinafter fully set out wherein my improved feed devices differentiate from such means and the advantage of their construction thereover.

A still further objectionable defect in the perfect operation of mechanically stemming tobacco-leaves by the several forms of mechisms above referred to is that the laminæ or blade particles as they are separated from the stem are precipitated by gravity on or over the face of the lower wiper-roll, and thereby frequently crushed or broken and rendered unfit for their best uses.

The leading object of my invention is the production of means for accomplishing the stemming operation in an automatic, expeditious, and thorough manner which in its structure is of a very few parts, capable of economical manufacture, which can be easily manipulated, and which will positively effect the result desired with a minimum amount of waste or defective separation of the stem and leaf portions.

Another and essential feature of this invention is to provide a feed means for wiper mechanisms having positive and unvarying pressure and uniform speed which will hold the leaf and stem in such contact with the wiper devices as to effect a positive separation of the leaf from the stem and remove the stripped or separated portions of the leaf from contact with either of the said rolls as it is stripped from the stem.

Another object is to provide a simple and effective means embodying a combined stripping mechanism having a uniform speed and pressure and a feed mechanism for holding the leaf and stem in engagement therewith, whereby the butt-end or the more tenacious portion of the leaf will be subjected to a wiping action greater than that of the thinner or less tenacious parts of the leaf, proportionate to the varying degree of tenacity of the different parts of the leaf. As the blade portion of the tobacco-leaf frequently adheres more tenaciously at one side of the stem than it does at the point directly on the opposite side, it is difficult to obtain a perfect separation of the leaf from the stem by a stripping action lengthwise of the same alone, as a wiping pressure or action which will properly remove the least tenacious parts of the blade from one side of the stem will often tear the corresponding part of the blade on the other side of the stem and leave parts thereof adhering to the said stem.

To provide for separating all parts of the leaf from the stem, I have produced the feed means, which will not only draw the leaf-body and the stems through the same but at the same time draw them at an angle to the line of rotation of the rolls to engage the card-teeth, stripper-grooves, or faces in the direction transverse to the rotation of the rolls, whereby to cause the stem and leaf-body to tend to rub transversely against the stripper-faces, and also to slightly turn the leaf and stem to create a partial rotary action thereof as it is receiving a stripping action in the direction of its length.

A still further object of my invention is to provide a feed mechanism having devices for holding the stem which differ from the grip devices heretofore employed in that it has a clearly-defined means for engaging the stem-butt and holding it from being pulled away from the feeder, as frequently occurs in grip devices depending on the frictional contact for holding the stem.

In its subordinate features my invention consists in certain details and combination of parts, which will hereinafter appear, and be particularly set out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of a form of tobacco-stemming machine embodying the general features of my invention. Fig. 2 is a side elevation of the same, the guide devices for lifting the leaf to the feeder being also shown. Fig. 3 is an end elevation thereof. Fig. 3ª is a detail view illustrating the devices for adjusting the endless-belt shafts. Figs. 4 and 5 are detail views of the grip device hereinafter specifically referred to. Fig. 6 is a detail view of the leaf-guide, and Fig. 7 is a detail view showing the stripping-belts provided with card-clothing. Fig. 8 is a view of a modification hereinafter referred to.

In its practical construction my improvement embodies a suitable framework, stripping mechanism consisting of two endless belts arranged in the same horizontal plane and having their coöperative faces formed either of flexible (rubber or leather) belts corrugated or grooved lengthwise or of card-clothing, and such faces may or may not be of increased pliability from the entrant to the exit ends of the wiping portion of the belts, and a feed mechanism mounted on the frame and arranged to carry the leaf crosswise to the stripping-belts and the stem up between the said wiping portions.

The frame, which may be of any suitable construction in the form shown, consists of the base 1, upon which is mounted a pair of standards 2 2ª, each of which supports a transverse bed-sill 3 3ª, on which are mounted the bearing-boxes 4 4ª for the wiping-belt-driving shafts 5 5, which have their front ends 5ª extended and carry drive-pulleys 6 6, as clearly shown in Figs. 1 and 3.

7 7 indicate a pair of pulleys held in the same horizontal plane with the pulleys 6 (they, however, being preferably of a smaller diameter) and placed near the center of the sill 3, spaced apart in such a manner that when the wiping or stripping endless belts 8ª are mounted thereon and the rolls 6 their coöperative faces will be separated just suffi-

ciently to admit of the passage of the leaf-stem. These belts in the preferred form, as shown in Figs. 1 and 2, are of flexible material and corrugated or grooved lengthwise, as at 8^a, which grooves are of the maximum width at the entrance end of the wiping-face of the belt and of gradually-diminishing width to their opposite end, the purpose of which will hereinafter appear.

While I have illustrated wiping-surfaces in the nature of endless belts mounted on rolls and having means for effecting a proper adjustment, such as making the boxes 4 slidable and the boxes 4^a pivotal on their supporting-sills 3 3^a and providing the front boxes 4 with adjusting-screws 9, as shown in Fig. 3, and forming said belts with longitudinal corrugating or cog teeth of gradually-diminishing gripping-surface, whereby a greater surface of the wiping-faces will engage with the leaf-stem at the entrant end of the wipers than at the exit end thereof, it is manifest that my improved arrangement of feed mechanism may be employed with other forms of stripping devices having wiping action—for example, with the form of wipers shown in the Coffee and Butler patents, hereinbefore referred to. It should be stated, however, in the practical application of my particular form of feed mechanism I have found the best results by combining same with wiping-surfaces mounted on endless belts having the wiping-surfaces arranged in the manner fully disclosed in a copending application, Serial No. 689,856, filed on August 30, 1898, by myself and C. E. Buek.

So far as described, it will readily be seen that the stripping-rolls are held to operate with a positive unvarying pressure. By providing for operating on the successive portions of the leaf to a varying extent greatest at the butt-end, where the leaf is the most tenacious, and least at the tip of the leaf, I employ a novel form of feed mechanism, which *per se* and in combination with the peculiar arrangement of the wiping mechanism forms the essential feature of this invention.

Broadly, my novel form of feeder has for its purpose to draw the stem through the wiping mechanism in the same manner as can be effected by hand manipulation, slowly at that point where it needs receive the most wiping for stripping off the blade from the stem and with gradually-increased swiftness as it reaches its tip, it also having for its purpose to so move the leaf to the strippers that the extreme butt-end of each and every leaf carried forward thereby will be engaged by the wiping devices and stripped thereby from the stem, and, again, to effect a partial rotary action of the stem and leaf as it is being drawn up between the said strippers.

As the simplest way of illustrating the means for mechanically carrying the leaf through the stripping mechanism in the manner stated I have shown a rotary disk 10, which is held to rotate at right angles to the movement of the stripper-belts, it being held loose on the shaft 10^a, fixedly held in its supports and so disposed that the peripheral edge of the disk 10 will just pass over the contact-point of the wiping-faces of the belt, as clearly shown in Fig. 2, by reference to which it will also be seen the vertical axis of the feed-disk is nearly over the entrance end of the wiper-faces of the stripping-belts. To provide for a quick and accurate feed of the leaf to the stripper-belts, such disk has suitable automatically-operated grip devices to clamp the leaf-stem at a proper point, securely hold it as it is drawn between the stripper-belts, and to carry it after it has been stripped to a suitable point of discharge, where they automatically release the stem. Various means for effecting such operation may be provided; but I prefer using a solid rotary disk 10, on which the leaf-engaging means are mounted, and such means consist, preferably, of a series of equidistant-disposed hinged grip-plates 11, operating at the peripheral edge of the disk 10 to close thereagainst and clamp the stem between it and such disk.

For automatically opening and closing the hinged plates at proper intervals each hinge-plate is loosely joined to a rock-lever 12, fulcrumed on a U-shaped bearing 13 and secured to the disk 10, the lower ends of such levers being bent outward and carrying friction-rollers 14, adapted to travel on a cam-ring 15, secured to or integrally formed with the disk or frame member 16, which is attached to the shaft 10^a, so that said cam is held stationary.

As will be clearly seen in Fig. 2, the ring 15 has a depressed or cam portion 15^a at a point just in advance of the vertical axis of the disk and another, but rising, cam portion 15^b at a point preferably at an angle of about forty-five degrees below the horizontal axis of the disk, so as to cause the plates 11 to open as they pass the vertical line of the disk to discharge the stripped stem and to remain open the major part of their down-going sweep, whereby to provide ample time to enter the stem of the leaf, which operation may be effected by placing the ends of the stem into the grips by hand, as shown in Fig. 1, or by laying them onto a suitable guide 17, disposed in line with the cam 15^b, as clearly shown in Fig. 2.

By using the guides 17 it is manifest the operator need but lay the leaf thereon with its stem projecting in the path of the movement of the plates 11.

By providing a feed mechanism as described it is manifest no skill or special manipulation is required to feed the tobacco-leaves to the rotary carrier, the construction of the grip devices being of such a character as to insure a positive operation thereof, and thereby reducing the danger of missing a leaf as it is fed to the carrier to a minimum.

As before stated, one of the essential features of this invention is to provide means

which will accomplish substantially the same action of passing the stem between the strippers as is capable of being produced by hand manipulation. This mechanical action will be best understood from Fig. 2 of the drawings. It will be seen that as the carrier rotates in the direction indicated by the arrow the leaf as it is pulled from the guide 17 will drop to the vertical position until its butt-end engages the wiping-line of the stripping-belts, when it will assume a position at an acute angle to the said wiping-line and be drawn along practically in a horizontal direction from the entrance end Z of the strippers to the point Y, and during such movement receive no draw or pull action upward. Thus the butt or most tenacious end of the leaf receives a continuous wiping action between the points Z Y, thereby insuring a positive and complete separation of the blade from the stem at the butt-end. After the leaf passes the point Y, it and the stem will be subjected to an upward draw action, it being obvious that as the same is drawn upward by a rotary lift mechanism its draw speed will be a differential one from Y to Y′, being slowest at the point Y and gradually increasing from such point toward Y′. Although the pressure of the stripper-faces of the belts is unvarying and their speed of rotation is uniform, the leaf and stem will be subjected to a variable wiping action more extended on that portion where it is most needed and of a gradually-diminishing extent on the successively-increased weaker or fragile portions of the leaf and stem. Furthermore, as the leaf and stem are retarded in their vertical movement by the wiping action effected thereon at right angles to its line of travel it follows that in passing between the "strippers" it will be drawn therebetween diagonally to the wiping movement thereof. By thus moving over the strippers the wiping action will not be entirely lengthwise on the stem, but also in a measure at a transverse angle thereto, which will effect a partial rotary movement of the stem, and thereby subject its longitudinal edges to the varying combined transverse and longitudinal action, which, owing to its varied action, will serve to positively strip off the varied tenacious clinging portions of the blade, and thereby leave the stem absolutely stripped from its butt to its point as it leaves the strippers.

By providing a feed mechanism which carries the leaf practically suspended and draws it up through the strippers it follows that as the blade is separated from the stem it is held from resting on any part of the stripper devices and free from engagement therewith, so as to prevent its being torn or crushed by contact with such devices after it has been stripped from the stem.

To provide for a positive grip of the stem, the plates 11 may have thin prongs 11ª, adapted to pass through the stem and enter sockets 11ᶜ in the disk 10. When such form of grip-plates are used, suitable means are also provided for removing the stripped stem from such plate as the grip-faces open, one form of such means being shown in Fig. 8 and consisting of a flexible tripper or guide 20, with which the loop on the stem engages and by which it is retarded and pulled from the prongs 11ª. Any suitable drive-gearing is used to rotate disk 10. In the drawings such disk has a hub provided with a worm-wheel 21, which meshes with the worm-gear 22 on the bearing-shaft 23.

I have made no claim, broadly, to the arrangement and construction of the stripper-belts, as this forms the subject-matter of another application filed by me November 18, 1898, Serial No. 696,796.

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

1. A tobacco-leaf-stemming means, comprising stripper mechanism having a wiping action on the leaf, and automatically-operated feed devices for drawing the leaf through the said stripping mechanism at a varying speed.

2. A leaf-stemming means, comprising a wiping mechanism having a uniform stripping action throughout the length of its wiping-line and devices for drawing the leaf through such wiping mechanism at a varying speed.

3. Leaf-stemming means; comprising stripping mechanism having coacting surfaces operating with constant pressure, and having a greater proportion of their surface adapted to wipe the blade of the leaf at the entrant than at the exit end of the same.

4. Leaf-stemming means; comprising stripping mechanism having coacting surfaces operating with constant pressure and having parallel longitudinal corrugations at right angles to the wiping-line, said corrugations gradually diminishing in size from the entrant to the exit end for the purposes specified.

5. A leaf-stemming machine, comprising stripper means having coacting opposing surfaces, in operation effecting a wiping action; and means for automatically drawing the leaf through such surfaces, slowly at the entrance end and with gradually-increasing speed as it is drawn toward the exit end.

6. In a tobacco-stemming machine; in combination with the stripper mechanism having coacting faces adapted to work with a wiping action on the leaf; of means for feeding the leaf in the direction of the length of such surfaces and drawing it diagonally between them at a varying speed, as specified.

7. In a machine of the class described; a stripping mechanism having coacting opposing surfaces adapted to work with a wiping action; means for conveying the leaf in the direction of the length of the opposing surfaces, said means including a mechanism for moving the leaf in the direction substantially parallel to the line of contact of the stripping-surfaces during the wiping action of the ex-

treme butt-end of the leaf and then for combining with that motion a motion away from the wiping-surfaces so as to draw the leaf lengthwise between said coacting surfaces.

8. Leaf-stemming means to operate with a wiping action upon the leaf; comprising a pair of endless belts whose upper surfaces move toward each other in a horizontal plane and having coacting opposing surfaces where they pass over supporting-rolls; and a rotary feed mechanism adapted to carry the stem of the leaf in a plane at right angles to the plane of horizontal movement of the belts and having devices for drawing the leaf between the wiping-surfaces of said belts, as specified.

9. In combination with leaf-stemming mechanism constructed to operate with a wiping action on the leaf; means for feeding and drawing the leaf between the wiping-surfaces of the stemming mechanism, said means comprising a rotary carrier; clamps mounted thereon for gripping the butt-end of the leaf-stem, and cam devices on the carrier for automatically operating to close and open the stem-engaging clamps at predetermined intervals, substantially as and for the purposes described.

10. In a machine as described; the combination of a stripping mechanism having a wiping action; of means for feeding the leaf between the coacting surfaces of such stripper mechanism, comprising a rotary carrier; grip devices mounted on such carrier, means for automatically opening and closing them at predetermined intervals, said grip devices having prongs to engage the stem, and cleaner devices for removing the stem-pieces from the said prongs, as specified.

11. In a tobacco-leaf-stemming machine, the combination with a stripping mechanism having a wiping action, of a leaf-feeder, comprising a rotary carrier; grip-plates hinged on such carrier; rocker-levers connected with such plates; a ring held stationary and adjacent to the carrier and having cam portions adapted to be engaged by the rocker-levers, as specified.

12. A stemming-machine, embodying the following elements, in combination; stripping-surfaces arranged to operate with a wiping action on the leaf; and a leaf-feeding mechanism comprising a rotary carrier having movement in the plane in which the wiping-surfaces coact, said carrier having a portion projected forward of the entrant end of the said stripping-surfaces, said portion having means for gripping the leaf before it approaches the entrant end of the said stripping-surfaces and to draw the leaf through the said surfaces as specified.

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D. A. RITCHIE.