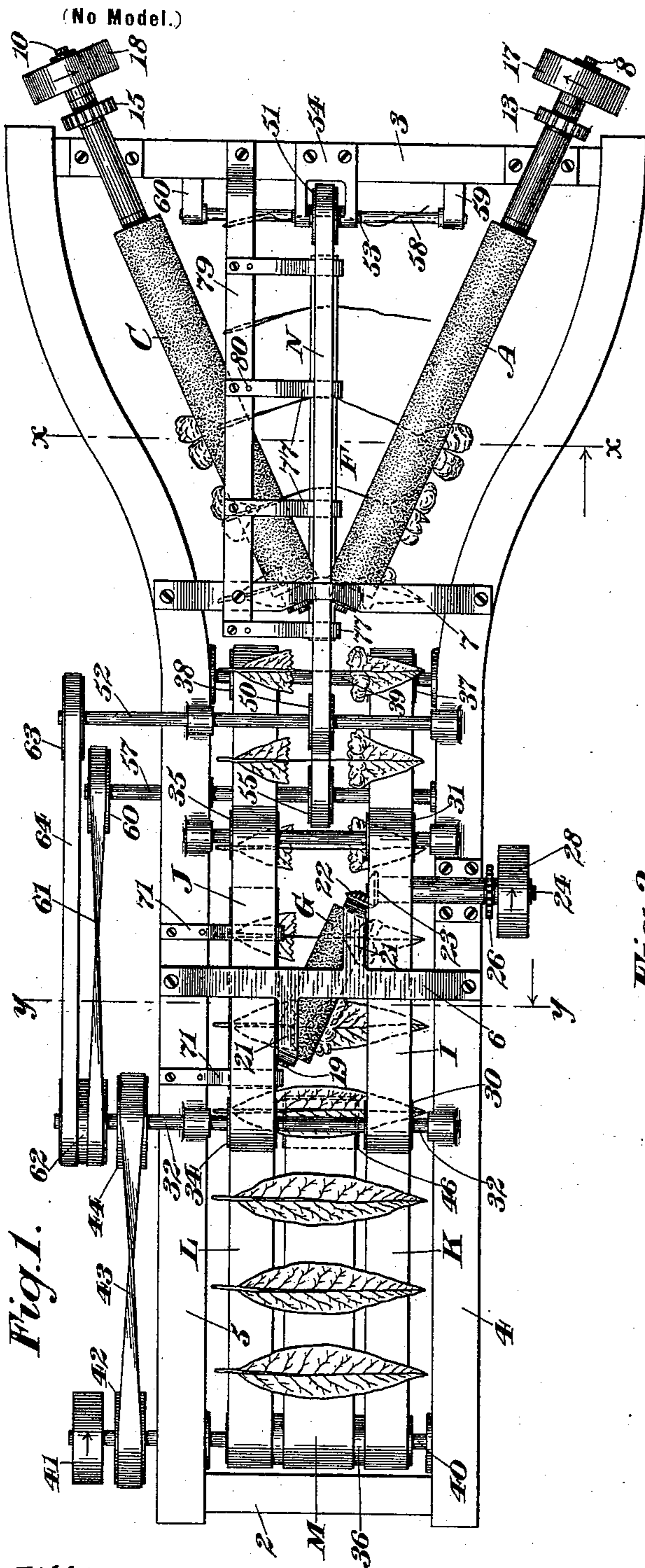


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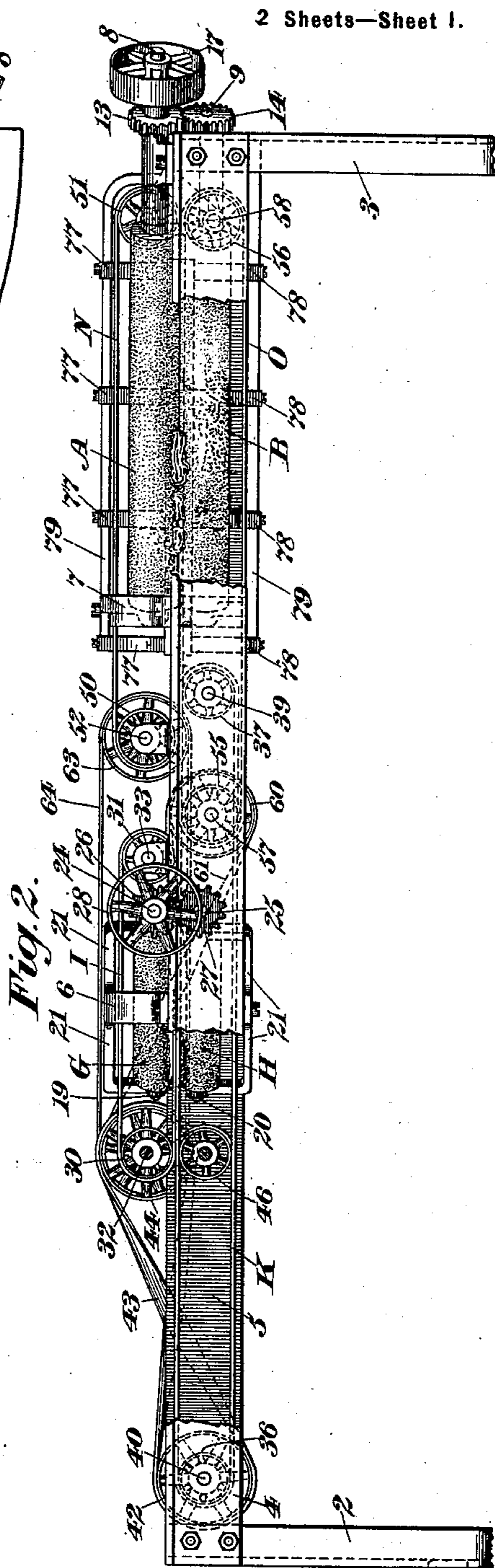
Patented Dec. 6, 1898.

G. P. BUTLER.  
LEAF STEMMING MACHINE.

(Application filed Sept. 20, 1897.)



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2 Sheets—Sheet 2.

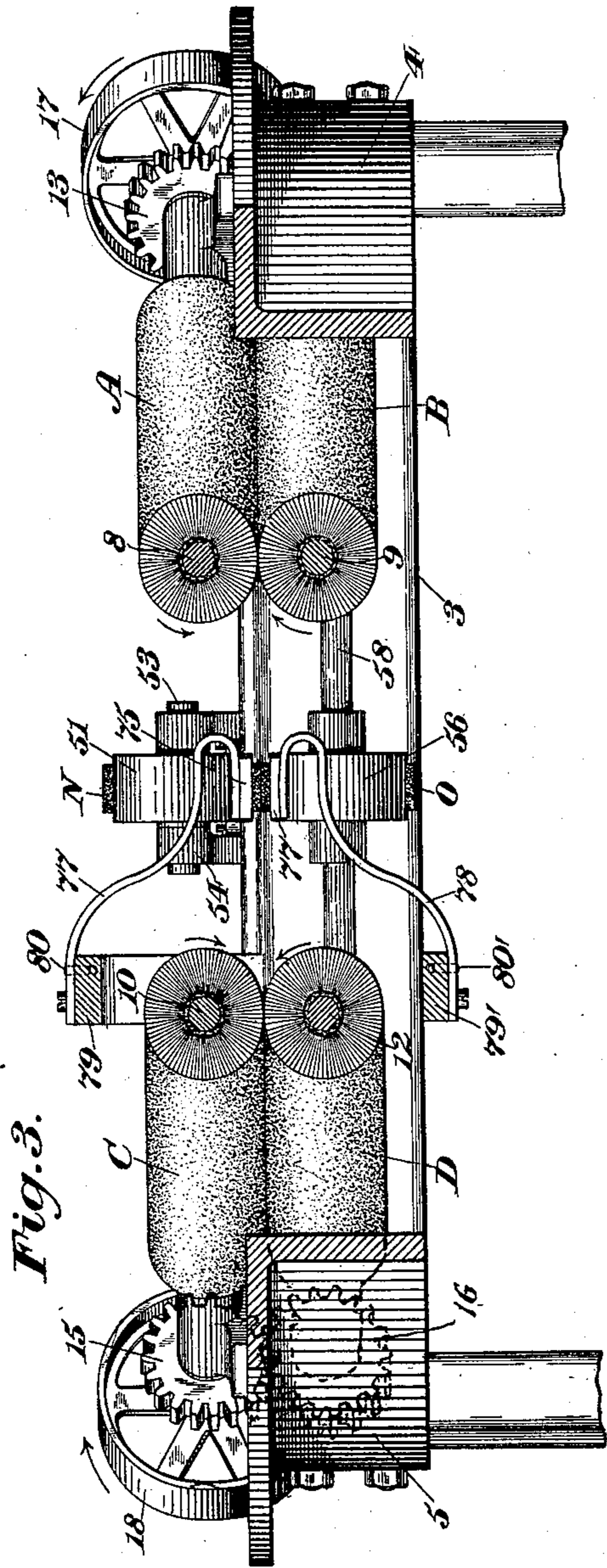


Fig. 3.

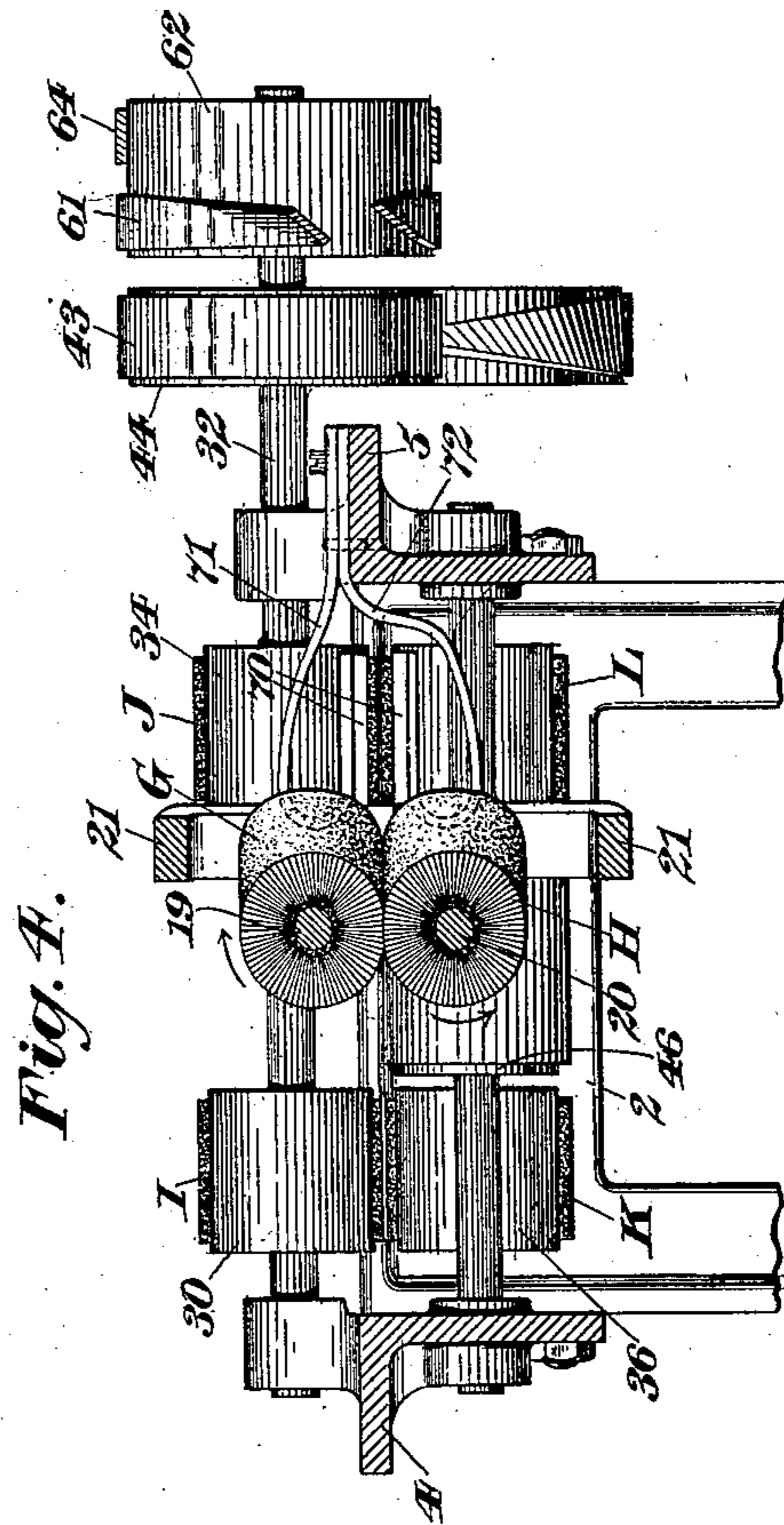


Fig. 4.

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# UNITED STATES PATENT OFFICE.

GEORGE P. BUTLER, OF HARRISON, NEW YORK.

## LEAF-STEMMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 615,247, dated December 6, 1898.

Application filed September 20, 1897. Serial No. 652,235. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE P. BUTLER, a citizen of the United States, residing in Harrison, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Leaf-Stemming Machines, of which the following is a specification.

This invention relates to leaf-stemming machines; and the object thereof is to provide an improved machine of this character for stripping the web or side portions of a tobacco-leaf from the stem automatically and cleanly and without tearing or rupturing the same.

My invention includes as one of its essential features leaf-stemming means constructed and adapted to operate upon a leaf between its ends and to strip the web or side portions of the leaf from the stem toward said ends simultaneously, and in connection with the stripping devices means are preferably employed for feeding the leaf into position to be acted upon by said devices.

In the improved machine illustrated several leaf-stemming means are provided, they being disposed in an independent series, the respective series acting in opposite directions to accomplish the desired result. The stemming means consist, preferably, of two sets of pairs of rolls whose working surfaces are contiguous and whose entrant ends are adjacent; but other devices operating on the same principle may be employed as substitutes for the rolls, if desired. The leaf to be treated is conducted to and past the several stemming devices, so that as it travels with the feed device said rolls will act upon the leaf between its ends and work toward the tip and butt thereof to strip or detach the web from the stem, the sets of pairs of stemming-rolls diverging from a substantially common point, so that the draft applied to one end of the stem by one set of rolls opposes the draft applied to the opposite end of the stem by the other set of rolls, whereby the tendency of the rolls to pull the stem from the feeding and gripping mechanism is obviated, thereby permitting the employment of extremely simple means for holding the stock. For the purpose of facilitating the removal of the web by the stemming devices or

rolls a portion of said web is preferably initially separated from the stem at a point in the length of the leaf, feeding and gripping means being provided for holding or seizing the stem at the place from which the web has been partially stripped, so that the stem will be firmly held and the leaf will be subsequently presented to the main stemming-rolls.

Another feature of the invention resides in means for holding the leaf at different points in its length simultaneously, whereby the leaf may be presented in the proper position to the primary leaf-stemming means, which preferably consists of a pair of rolls similar in construction to the main stemming-rolls.

In the drawings accompanying and forming part of this specification, Figure 1 is a plan view of my improved machine. Fig. 2 is a side elevation of the same as seen from the right of the entering end in Fig. 1, a portion of the framework being removed to illustrate more clearly certain features of the invention; and Figs. 3 and 4 are transverse central sections taken, respectively, in lines  $xx$  and  $yy$ , Fig. 1, and looking in the direction of the arrows.

Similar characters designate like parts in all the figures of the drawings.

The framework for supporting the different parts of the machine may be of any suitable construction, and it is represented consisting of the uprights or end pieces 2 and 3, joined near the top by the longitudinal beams 4 and 5, the latter being spread apart at one end to accommodate the diagonally-disposed stemming-rolls and being braced at intervals by the cross-bars 6 and 7, secured thereto.

My invention includes, broadly, leaf-stemming means constructed and adapted to operate upon a tobacco-leaf between its ends and to strip the web or side portions of such leaf from the stem toward said ends simultaneously, it being apparent that the leaf may be supplied to the stemming means by hand, although it is preferably positively fed thereto by mechanism, so that the output of the machine is materially increased.

The leaf-stemming means consists, preferably, of a plurality of rolls disposed in sets of two each, the entrant ends of the respective sets being adjacent, so that as the leaf is carried to and past the rolls they will op-

erate simultaneously and reversely and will thoroughly remove the web or blade of said leaf from its stem.

The stemming-rolls, as stated, are disposed in pairs and are located at each side of and at substantially similar angles, respectively, to the feeding means, as will hereinafter appear, so that as the leaf travels past the several rolls one set will operate in one direction and the other set in the opposite direction, whereby the stem of the leaf will be held taut and will not be pulled from the gripping mechanism, and the web will be detached without injury evenly therefrom.

In the present case I employ in connection with the stemming-rolls a preliminary instrumentality for stripping a portion of the web from the leaf and means for gripping the stem at the place from which the web has been thus stripped, so that a firm purchase may be had upon the stem to present the partially-stripped leaf edgewise to the stemming-rolls, and for convenience I shall term the latter the "main" stemming means, and the preliminary web-stripping device the "auxiliary" or "initial" stemming means.

The main stemming-rolls are designated, respectively, one pair by A and B and the opposing pair by C and D, the inner ends of the two sets of rolls being in proximity and the rolls diverging, so that the leaf may be carried between them for simultaneous treatment thereby.

The means for feeding or advancing the leaf to the stemming means or series of rolls A and B and C and D is designated by F and will be hereinafter more fully described.

The working surfaces of the two rolls are contiguous and intermesh, as is usual, and one roll of each pair is movable or rotative in a direction from or reverse to that of the other, so that the web may be brushed from the stem with a wiping action. These stripping or stemming rolls are of the ordinary form, each consisting of a wooden body or core equipped with teeth, card-clothing, or analogous material, and hence a detailed description of their construction is unnecessary.

The shafts of the rolls A and B are designated by 8 and 9 and those of the rolls C and D by 10 and 12, respectively, the several shafts being mounted in the usual bearings on the framework.

As hereinbefore stated, a roll of each pair is rotative in a direction opposite to that of the other roll of such pair, as indicated by the arrows in Fig. 3, and for the purpose of attaining such motion the several roll-shafts are provided with meshing gears, as 13 and 14 and 15 and 16, and the upper shaft of each pair of rolls is provided with a pulley, as 17 and 18, which may be connected by belting with a suitable driver or motor. (Not shown.)

On the rotation of the pulley 17 in the direction of the arrow in Fig. 1 the roll A will be turned in a corresponding direction and the roll B will be oppositely rotated, the same

operation taking place with the other pair of rolls when the pulley 18 is driven in the direction of the arrow.

I have shown and described simple means for operating the several rolls; but it is obvious that other mechanism might be employed for this purpose without affecting the scope of the invention.

It will be remembered that the invention includes the provision of means for detaching a portion of the web of the leaf from the stem prior to its treatment by the main stemming means, and to accomplish this result I interpose in the path of the traveling leaf a second set of stemming-rolls constituting the auxiliary leaf-operating means, as they detach but a small portion of the blade from the stem. These preliminary stemming-rolls are designated by G and H, are situated obliquely to the line of feed of the leaf, and are similar in construction to the stemming-rolls hereinbefore described, and their shafts 19 and 20 are supported by the hangers or brackets 21, projecting at different points at opposite directions from the cross-bar 6.

The shafts 19 and 20 of the rolls G and H are equipped with bevel-gears, as 22, meshing with corresponding gears 23 on the shafts 24 and 25, carried by the beam 4, the two shafts 24 and 25 being provided with meshing gears 26 and 27. The upper shaft 24 carries the pulley 28, by rotating which in the direction of the arrow the primary rolls G and H will be driven to perform their function, the direction of movement of the two rolls being also indicated by arrows. (See Fig. 4.)

For conveying the leaf to the preliminary stemming means devices are provided for engaging said leaf at different points in its length, said devices gripping the leaf near its opposite ends, so that the middle or intermediate portion thereof will be presented to the preliminary stemming device at the proper angle to accomplish the primary operation, said preliminary device being disposed intermediate the leaf-holding means and being arranged diagonally thereto.

When the leaf has been treated by the preliminary stemming means the same is seized by independent conveying and gripping means, which conducts it toward the main stemming-rolls for subsequent treatment to detach the remainder of the web or blade.

The means illustrated for feeding the leaf to the preliminary stemming-rolls G and H consists of a plurality of horizontally-disposed endless conveyers or belts, the adjacent runs of the upper and lower belts traveling approximately in contact and operating to grip the leaf. To sustain the middle part of the leaf, I place between the main or outside belts a short belt, on the upper run of which said middle portion rests.

To prevent displacement of the leaf as it is being treated by the preliminary stemming means, a greater amount of pressure is applied to the belt which holds the leaf near its

but a wider portion, as the preliminary stemming-rolls work from the butt-end of the leaf toward the tip. It is, however, distinctly to be understood that the preliminary stemming-rolls may operate upon the leaf from the tip toward the butt thereof, if deemed necessary, the leaves of course then being fed to the machine in positions reverse to those shown. The upper belts for feeding and gripping the leaf are designated, respectively, by I and J and the lower belts by K and L.

The lower runs of the belts I and J and the upper runs of the belts K and L run in contact for a portion of the lengths of the two long belts K and L, so that the cooperating pairs I and K and J and L, which are some distance apart, will grip the leaf near its opposite ends to conduct it to the rolls G and H, the lower belts K and L, upon which the opposite ends of the leaves rest, also serving to feed the leaf to the independent carrying means which moves it to the main stemming-rolls.

The belt I is passed around the drums 30 and 31, carried on the shafts 32 and 33, respectively journaled in bearings on the beams 4 and 5, the belt J being passed around a similar pair of drums 34 and 35, secured, respectively, to said shafts 32 and 33.

The belt K is carried around the drum 36 at one end and around the drum or pulley 37 at its opposite end, the cooperating belt L being carried by the drum 36 and by a pulley or wheel 38, which, with the pulley 37, is carried by the shaft 39 on the framework. The drum 36 is carried by the shaft 40, supported between the beams 4 and 5 and projecting from one of them, said shaft carrying the main driver 41, consisting of a pulley, through which the several belts receive their motion.

The shaft 40 carries the pulley 42, connected by the cross-belt 43 with the pulley 44 on the shaft 32, said mechanism serving to drive the belts I and J, it being evident that by reason of the construction specified the two contiguous or substantially contacting runs of the two pairs of belts travel in a corresponding direction.

To sustain the middle part of the leaf, the belt M is provided, it being situated between the belts K and L and carried on the drum 36 and on the drum 46 of the shaft 32. The entering ends of the belts K, L, and M serve as a feed-table, upon which the leaves may be placed by an attendant to move them successively into position, where they will be gripped by the belts I and K and J and L, respectively, to conduct them to the primary stemming-rolls G and H, which detach a portion of the blade.

When the leaf has been primarily treated, the opposite ends thereof are retained by the several belts for a short distance, after which the lower belts K and L continue to feed the partially-stripped leaf to the independent carrying and gripping means, which advances the same to the final stripping devices.

I have described a simple and efficient mechanism for conducting the leaf or leaves to and past the primary stemming-rolls, although it is evident that other means may be substituted therefor without departing from the scope of the invention.

The feeding and gripping means illustrated for seizing the leaf subsequent to its treatment by the primary stemming device consists of the belts N and O, the adjacent runs of which travel substantially in contact, said belts passing between the entrant or inner ends of the series of rolls A and B and C and D and their receiving ends being disposed between the carriers or belts K and L, so that they will grip the stem at the place from which the web has been detached and convey the leaf to and past the final rolls for effecting the removal of the remainder of the web. The belt N is passed around the pulleys 50 and 51. The pulley 50 is secured to the transverse shaft 52, rotative in bearings on the longitudinal beams 4 and 5, respectively, the pulley 51 being secured to the short shaft 53, working in the bifurcated bracket 54 on the end frame 3. The lower horizontal belt O is carried around the pulleys 55 and 56, the pulley 55 being secured to the shaft 57, supported by the beams 4 and 5, and the pulley 56 being secured to the shaft 58, working in the bearings 59 and 60 on the inside of the end frame 3.

To obtain the necessary corresponding movement of the lower and upper runs, respectively, of the horizontally-disposed carrying-belts N and O, the following means may be employed: The shaft 57 is equipped with the pulley 60, connected by the cross-belt 61 with the pulley 62 on the shaft 32. The shaft 52 is provided at its outer end with the pulley 63, connected by the straight belt 64 with said pulley 62, both of the shafts being driven from the main shaft 40 by the main driver 41.

To prevent the leaves from being pulled from the primary stemming-rolls G and H, I prefer to provide pressure devices adapted to act upon the contacting or contiguous runs of the belts J and L, constituting the primary feed device, as the greatest strain is applied to the leaf at its butt, it being remembered that the web is primarily stripped from the leaf toward the tip. The pressure devices consist of spring presser feet or shoes, as bearing against the outer faces of the adjacent runs of the two belts, said feet being secured to the inner ends of the bow-springs 71 and 72. The springs 71 and 72 are secured at their opposite ends to the frame member or beam 5, as indicated in Figs. 1 and 4. Similar means act against the adjacent runs of the secondary or final feed-belts N and O, and these presser feet or blocks are designated by 75 and 76, respectively, they being secured to the free ends of the bow-springs 77 and 78, whose opposite ends are fixed at suitable intervals to the upper and

lower sides of the bars 79 and 79', attached, respectively, to the cross-bar 7 and the end frame 3, as indicated in Figs. 1 and 2. To prevent the several bow-springs from turning, they are provided with pins 80 80', fitting in corresponding apertures in their supports.

The order of operation of the machine illustrated is as follows: The leaves are placed by an attendant upon the upper run of the feed-belts K, L, and M, as represented in Fig. 1, which feed them forward until they are gripped by the two pairs of cooperating belts I and K and J and L near their opposite ends, said pairs of belts moving the leaf toward and past the primary stripping-rolls G and H, which, rotating in the direction of the arrows indicated in Fig. 3, brush the middle part of the web from the stem by a wiping action, as indicated in Fig. 1. The middle part of the web of a leaf having been detached, the leaf is farther advanced by the two pairs of belts just mentioned to the belts N and O, the receiving ends of which are, as above described, situated between the discharging ends of said first-mentioned belts, the naked or stripped portion of the stem being placed on the upper run of the lower belt O and advanced for a very short distance or until the stripped stem is engaged by the lower run of the upper belt N. The stem now being firmly held, the leaf is fed forward to the diverging sets of rolls A and B and C and D, which simultaneously and oppositely strip the remainder of the web from the stem, and the side portions of the leaf after having been thus detached are discharged from the two sets of rolls into suitable receptacles. (Not shown.) The belts N and O then advance the stripped stems and permit them to drop therefrom to be disposed of in the ordinary manner.

Having described my invention, I claim—

1. In a machine of the class specified, leaf-stemming means constructed and adapted to operate simultaneously in opposite directions upon the leaf between its ends and to strip the web or lamina from the stem toward the ends of said leaf.

2. The combination, with leaf-stemming means constructed to operate simultaneously upon a leaf between its ends to strip the web from the stem toward said ends, of means for detaching a portion of the web from the stem prior to its treatment by said stemming means.

3. The combination, with leaf-stemming means constructed to operate simultaneously upon a leaf between its ends to strip the web from the stem toward said ends, of means for feeding a leaf into position to be treated by said leaf-stemming means.

4. The combination, with leaf-stemming means constructed to operate simultaneously upon a leaf between its ends to strip the web from the stem toward said ends, of means operable to feed a leaf into position to be treated by said leaf-stemming means and to conduct it past the same.

5. The combination, with leaf-stemming

means, of a device located to detach a portion of the web from the stem intermediate the ends of a leaf, and means for holding the stem at the place from which the web has been detached and for conveying the same to the stemming means.

6. A machine of the class specified including leaf-stemming means disposed in sets, the respective sets diverging from a substantially common point.

7. A machine of the class specified including a series of leaf-stemming rolls disposed in sets, the respective sets diverging from a substantially common point, and one roll of each set being reversely rotative to that of the other roll.

8. A machine of the class specified including a carrier and a plurality of leaf-stemming means disposed in sets, the respective sets diverging from a substantially common point and being situated at an angle to the carrier.

9. The combination, with means for simultaneously engaging a leaf at different points in its length, of a device for detaching a part of the web from the stem of the leaf.

10. The combination, with means for simultaneously engaging a leaf at different points in its length, of a device for detaching a part of the web from the stem between the points at which the leaf is engaged by said means.

11. The combination, with means for simultaneously engaging a leaf at different points in its length, of a device for detaching a part of the web from the stem between the points at which the leaf is engaged, and means for subsequently removing the remainder of the web.

12. The combination, with means for engaging a leaf at different points in its length, of a device for detaching a part of the web from the stem between the points at which the leaf is engaged, and means for subsequently removing the remainder of the blade of the leaf, said means consisting of a plurality of devices constructed to operate upon the leaf between its ends and to work simultaneously and oppositely toward said ends.

13. The combination, with means for engaging a leaf at different points in its length, of a device for detaching a part of the web from the stem between the points at which the leaf is engaged; means for subsequently removing the remainder of said web; and a conveying and gripping instrumentality constructed to grasp the leaf at the place from which the web has been partially stripped.

14. The combination, with means for engaging a leaf near its opposite ends, of a web-detaching device situated between the leaf-engaging means.

15. The combination, with means for simultaneously engaging a leaf at different points in its length, of a pair of cooperating rolls adapted to detach a portion of the web from the stem of the leaf while the latter is fed past the same by the leaf-engaging means.

16. The combination, with two pairs of co-

operating carriers whose adjacent runs travel in contact, one pair being adapted to grip a leaf near one end and the other pair to grip the leaf near its opposite end, of means for  
 5 detaching a part of the web from the stem of the leaf while it is gripped by said carriers.

17. The combination, with two pairs of co-operating carriers whose adjacent runs travel in contact, one pair being adapted to grip the  
 10 leaf near one end and the other pair to grip the leaf near its opposite end, of pressure devices acting against said carriers, and means for detaching a part of the web from the stem of the leaf while it is held by said carriers.

18. The combination, with two pairs of endless belts whose adjacent runs travel in contact, one pair being adapted to grip the leaf  
 15 near one end and the other pair to grip the leaf near its opposite end, of means for detaching a part of the web from the stem of the leaf while it is held by said belts.

19. The combination, with means for simultaneously engaging a leaf at different points in its length, of a device for detaching a part  
 20 of the web from the stem; gripping and carrying means for engaging the stem of the leaf at the place from which the web has been detached; and means for removing the remainder of the web while the leaf is held by said  
 25 gripping and carrying means.

20. The combination, with a plurality of carriers for engaging a leaf near its opposite ends, of a device for detaching a portion of the web from a leaf held by said carriers; independent leaf gripping and carrying means  
 30 situated between the first-mentioned leaf-holding means; and means operable to remove the remainder of the web from the stem while the latter is gripped by the independent gripping and carrying means.

21. The combination, with two pairs of co-operating carriers whose adjacent runs travel in contact, one pair being adapted to grip a  
 35 leaf near one end and the other to grip the leaf near its opposite end, of means for detaching a part of the web from the stem of

the leaf while it is gripped by said carriers; a third pair of coöperating belts adapted to grip the stem at the place from which the web  
 40 has been partially stripped; and means for removing the remainder of the web from the stem while the latter is held by said third pair of belts.

22. A machine of the class specified, including a carrier and a plurality of leaf-stemming  
 45 rolls disposed in sets, the entrant ends of the respective sets being adjacent to each other and situated, respectively, at an angle to the carrier whereby the two sets can simultaneously act upon a leaf.

23. The combination, with means for engaging a leaf between its ends, of a plurality of leaf-stemming means constructed and adapted  
 50 to operate simultaneously upon a leaf between its ends to strip the web from the stem toward said ends.

24. The combination, with leaf-stemming means constructed and adapted to operate simultaneously upon a leaf between its ends to  
 55 strip the web from the stem toward said ends, of means for gripping a leaf at a predetermined point in its length and for advancing said leaf sidewise toward the leaf-stemming means for treatment by the latter.

25. In a tobacco-stemming machine, the combination with feed mechanism for carrying  
 60 forward the leaf, of a web-severing device located to break or separate the web or leafy portion of the tobacco-leaf at a point between its ends, and a stem cleaning or stripping instrumentality located beyond the web-severing device and for operating upon the  
 65 leaf-stem from the place of said transverse break or separation toward the butt of the stem, whereby the thicker portion of the stem will be stripped or cleaned in a direction from the tip portion of the stem toward the butt  
 70 of the stem.

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