

July 31, 1934.

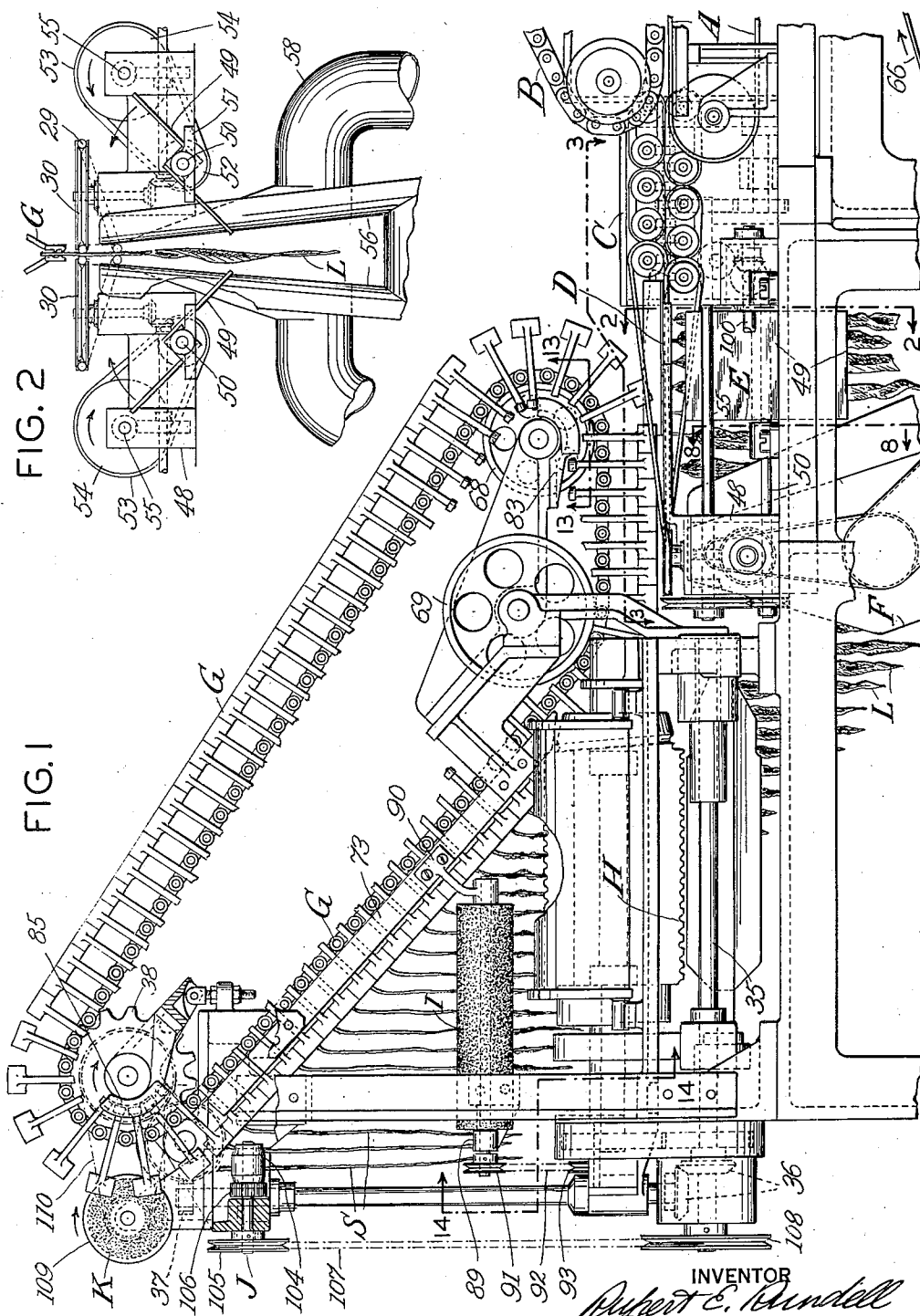
R. E. RUNDELL

1,968,098

TOBACCO STEMMING MACHINE

Filed Oct. 20, 1932

4 Sheets-Sheet 1



INVENTOR  
R. E. Rundell  
BY  
Sydney J. Prescott  
ATTORNEY

July 31, 1934.

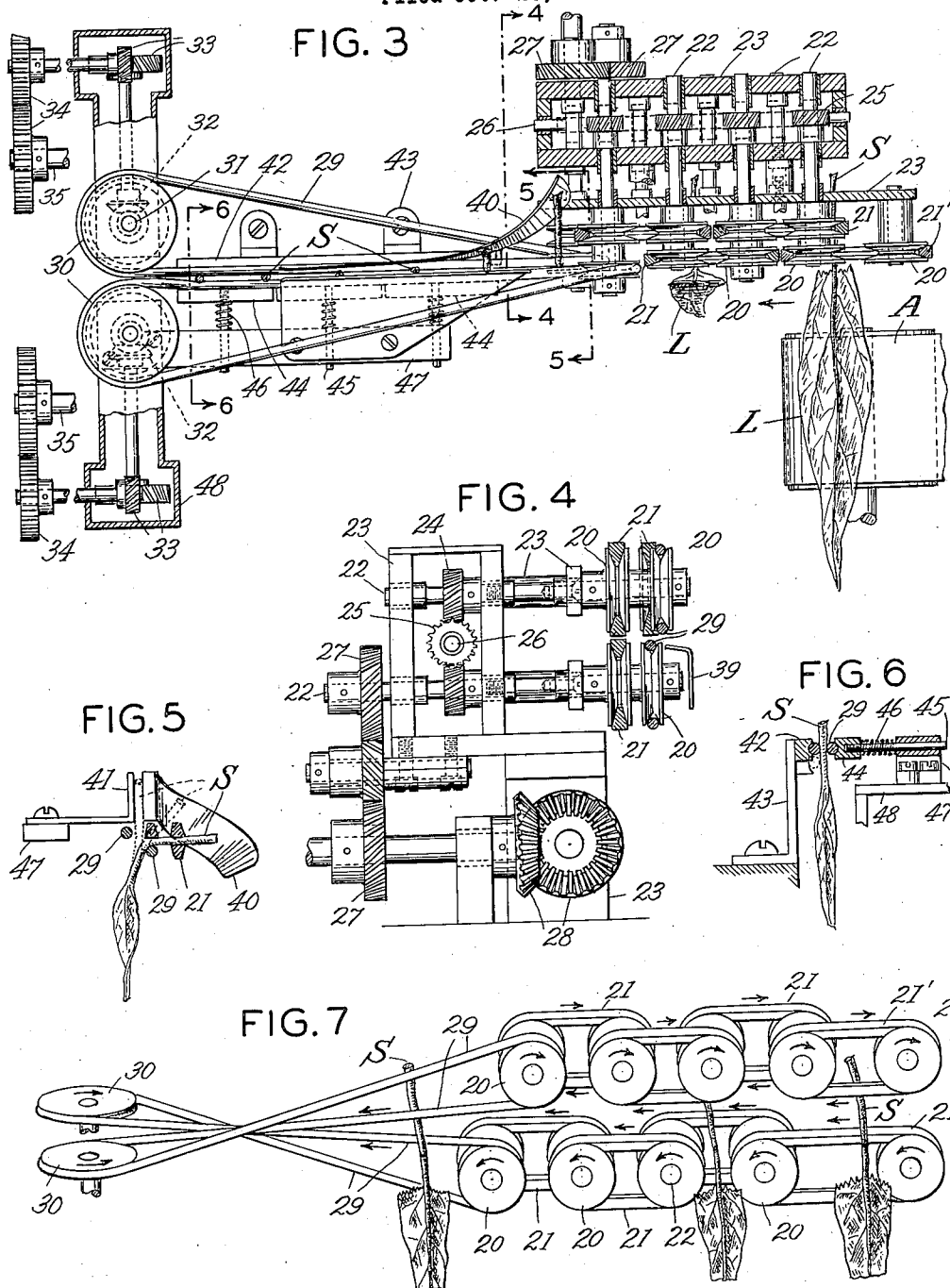
R. E. RUNDELL

1,968,098

TOBACCO STEMMING MACHINE

Filed Oct. 20, 1932

4 Sheets-Sheet 2



INVENTOR  
R. E. Rundell  
BY  
Cydney H. Prescott  
ATTORNEY

July 31, 1934.

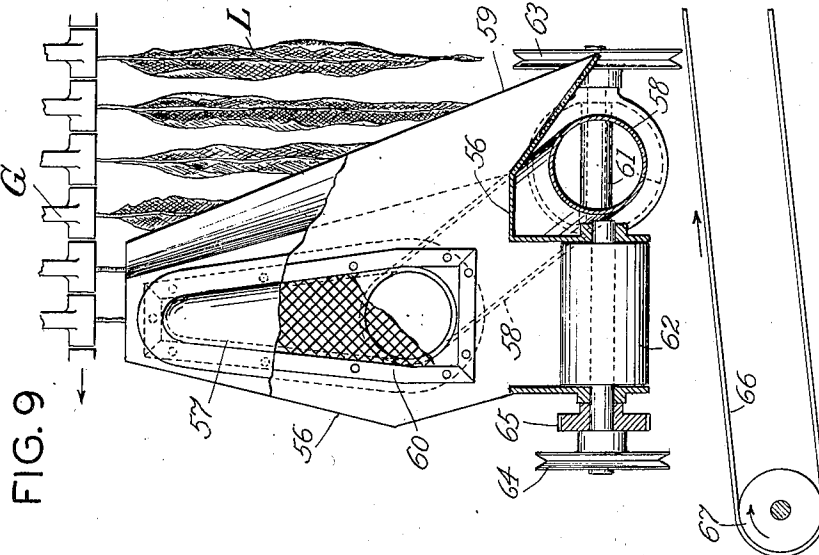
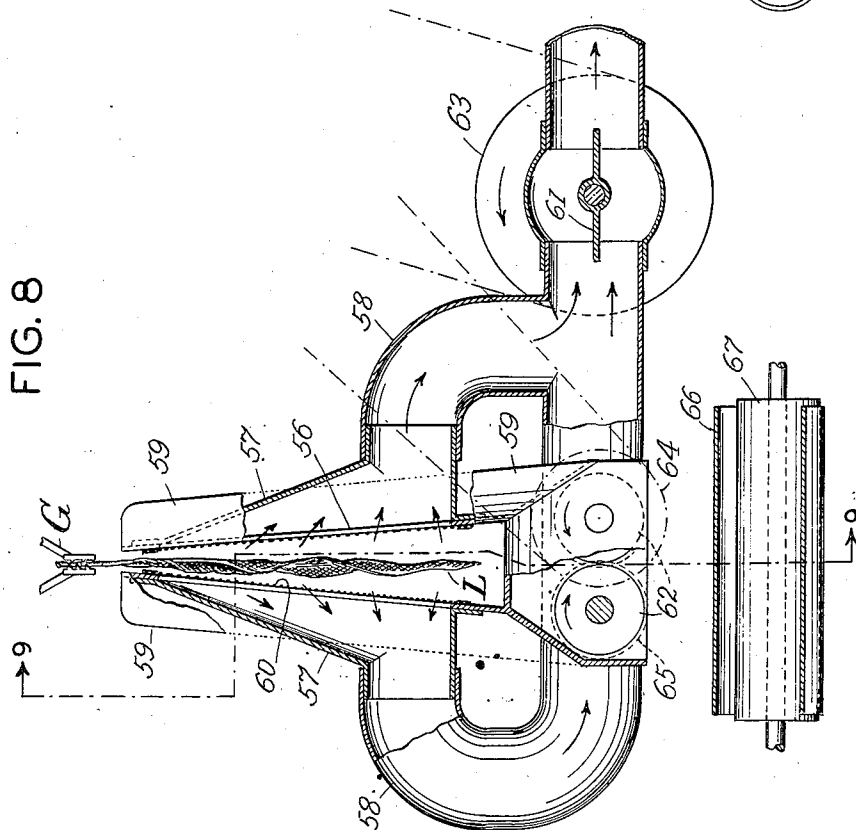
R. E. RUNDELL

1,968,098

TOBACCO STEMMING MACHINE

Filed Oct. 20, 1932

4 Sheets-Sheet 3



INVENTOR  
*Rupert E. Rundell*  
BY  
*Sydney J. Prescott*  
ATTORNEY



## UNITED STATES PATENT OFFICE

1,968,098

## TOBACCO STEMMING MACHINE

Rupert E. Rundell, Rockville Center, N. Y., assignor, by mesne assignments, to American Machine & Foundry Company, a corporation of New Jersey

Application October 20, 1932, Serial No. 638,822

62 Claims. (Cl. 131—57)

This invention relates to tobacco stemming machines, particularly machines for stripping cigarette tobacco leaves from the stems and has for one of its principal objects the improving and speeding up of machines of the general type disclosed in the United States patent to Strickland 1,301,193.

Machines of this type while giving satisfactory service have been found capable of considerable improvement in decreasing dropping of leaves and in increasing their speed. To these ends it is an important object of the invention to eliminate the need for exact timing between the movement of the stems and the grippers which pick up the stems, which was one of the causes of drop leaves in prior machines. In the improved machine, therefore, the faces of the grippers are made to form a practically continuous endless gripping surface at the position where they grip the leaves. Since the action of the means for individually gripping stems required intermittent or reciprocating motions, these means limited the speed of prior machines. The present mechanism, by eliminating timing at this point, permits substantially greater speeds.

Another difficulty which reduced the efficiency of prior machines lay in separating the leaves both at their stems where they are to be gripped and also at the blade where the leaves are sometimes tangled and intertwined. While there was some provision in former machines for separating the butt ends, there was no satisfactory provision for separating the blade portion of the leaves. Applicant has found that by accelerating the butts of the leaves while the leaves are suspended vertically from said butts, the blades of the leaves are separated and disentangled more efficiently than heretofore was possible, making possible better stemming and fewer dropped leaves at higher speeds.

In the machine of the patent above cited, an efficient stemming unit acting on vertically suspended leaves was employed but this stemming unit requires that the leaves which were fed horizontally be turned 90° to bring the leaves to vertical position. The mechanism employed for this purpose limited the speed of the machine to some extent and was a cause of dropped leaves. An object of the present invention is to provide a simpler, speedier, continuously acting and more efficient mechanism for producing this turning of the leaves from horizontal to vertical position and at the same time to employ the leaf disentangler and butt separator principle already noted, in connection therewith.

Another object of the invention is to incorporate in a machine of this type a pneumatic and/or mechanical leaf cleaning and straightening device with relatively little additional mechanism over that previously employed. As is well known,

the leaf tobacco received at the stemmery has on it a considerable quantity of dirt and grit which not only impairs the efficiency of the machine by wearing the stemming blades, but impairs the quality of the resulting tobacco product.

The present device provides for removing this dirt without any additional expense due to the handling and is particularly effective for this purpose because of the vertically suspended and moving condition of the leaves at the time during which the cleaning takes place. The waving and manipulation of the leaves in the pneumatic cleaning device serves to augment its efficiency. The cleaning and straightening mechanism also serves to straighten and disentangle the leaves since it pulls or strokes them downwardly most of the distance from butt to tip.

Still another object is to provide improved grippers which will afford a continuous gripping surface even around sprocket turns and which will provide for securely gripping small and large stems between the same units of the gripper system. It is another purpose of the invention to provide additional security against stems being dropped because located exactly between adjoining edges of successive gripper units by providing a cooperating device for pushing such a stem forward or backward out of register with said adjoining edges. Still another object is to provide a beater fan for mechanical straightening out of leaves prior to their entry into the stemming unit.

Still other objects are to provide effective means for ejecting stems which may stick in the grippers after the stripping operation, including brushing means and stem pulling means, to provide a brushing device for brushing scraps from the stems during and after the withdrawal of the stems from the stripper unit, to provide a suitable leaf trap for catching leaves drawn into the suction cleaner, and to provide a return belt for carrying leaves dropped at certain parts of the machine back to a position convenient for feeding the leaves through the machine.

With these and other objects not specifically mentioned in view, the invention consists in certain constructions and combinations which will be hereinafter fully described and then specifically set forth in the claims hereunto appended.

Referring now to the drawings, in which like characters of reference indicate the same or like parts, Fig. 1 is a side elevation of the improved stemming machine; Fig. 2 is an end elevation taken on line 2—2 of Fig. 1, showing the leaf straightening fans; Fig. 3 is a plan view taken on the line 3—3 of Fig. 1, showing the improved leaf separator, stem turning guide and leaf delivery belt; Fig. 4 is an end elevation of the leaf separator taken on line 4—4 of Fig. 3; Fig. 5 is an end elevation of the stem turning guide, taken on line 5—5 of Fig. 3; Fig. 6 is a sectional end elevation

of the delivery belts, on line 6—6 of Fig. 3; Fig. 7 is a perspective side elevation of the leaf separator, showing the arrangement of the separating belts; Fig. 8 is a sectional end elevation on line 8—8 of Fig. 1, showing the suction arrangement for cleaning and straightening the leaves, and the return belt for collecting dropped leaves; Fig. 9 is a side elevation of the suction chamber, taken on line 9—9 of Fig. 8; Fig. 10 is a detail side elevation showing the construction of the grippers; Fig. 11 is an end elevation on line 11—11 of Fig. 10; Fig. 12 is a detail top view on line 12—12 of Fig. 11 showing the construction of the gripper chain; Fig. 13 is a plan view on the line 13—13 of Fig. 1, showing one of the gripper opening and closing cams; Fig. 14 is a detail end elevation of the stemming mechanism taken on line 14—14 of Fig. 1; Fig. 15 is a side elevation of the device for preventing location of stems between successive grippers; Fig. 16 is a top view of the mechanism shown in Fig. 15; Fig. 17 is a side elevation of a modification of the device shown in Fig. 15; and Fig. 18 is a plan view of the device shown in Fig. 17.

In carrying the invention into effect, there is provided in a tobacco stemming machine, in combination with devices for forwarding leaves sideways, a stemming mechanism receiving leaves from said devices and having an endless series of travelling grippers for gripping the butts of the leaves in said devices and carrying them through said mechanism, said grippers having gripping faces parallel to the plane of their travel and forming substantially continuous surfaces to enable them to grip the stems wherever located along said surfaces. In the best constructions said devices include devices for feeding the leaves in a substantially horizontal plane and mechanism receiving the horizontal leaves and swinging them into a vertical plane and delivering them to said grippers. Preferably said devices include means for suspending the stems by their butts together with means for accelerating the movement of said butts while the leaves are suspended. In the best forms contemplated said grippers are arranged to suspend the leaves vertically and a suction cleaner acts on the suspended leaves. Preferably also a beater is arranged to act on the suspended leaves to straighten and disentangle the same. The various means referred to may be varied widely in construction within the scope of the claims, for the particular device selected to illustrate the invention is but one of many possible concrete embodiments of the same. The invention therefore is not to be restricted to the precise details shown and described.

Referring to Fig. 1, the principal parts of the machine are as follows. A feed belt A which advances the leaves served by the operator. A threshing mechanism B which clears the butt ends of the stems from leaves for a sufficient distance to securely grip the stems. A butt separator C. A leaf delivery belt runway D in which the cleared stem butts are swung to vertical position while the leaves are being straightened, disentangled and cleaned by beater fans E and suction apparatus F. A leaf gripper chain G which grips the upturned stem butts and carries the leaves suspended by their butts through the stripping mechanism H and the scraping rollers I. An ejecting device J for removing the stripped stems from the grippers. A brush K which cleans the gripper jaws after discharging the stems.

The operator unties "hands" of tobacco and spreads them rapidly in a horizontal layer on the belt A, (at a position not shown), whence the

leaves travel to the butt separator C, Figs. 1, 3, 5 and 7 which consists of two rows formed of pairs of staggered pulleys 20, the pulleys of horizontally adjoining pairs in each row being connected by endless soft rubber belts 21 in the manner shown in Fig. 7. The pulleys 20 are mounted on shafts 22 having gears 24 meshing with gears 25 on shafts 26 and driven by gears 27 from gears 28 connected with the drive of the stemming machine.

The first pair of belts 21' is driven at the speed of the feed belt A while subsequent pairs are run at progressively increasing speed to progressively accelerate the travel of the leaf butts and thereby separate them, until the delivery belts 29 are reached which are synchronized with the linear speed of the gripper chain. The belts 29 run side by side from the last pulleys of the separator to pulleys 30 on shafts 31 driven by suitable gearing 32, 33 and 34 from the drive shaft 35 of the stripping mechanism which also, through gear trains 36 and 37, Fig. 1, impart motion to the sprocket 38 which drives the gripper chain G.

By reference to Fig. 1 of the drawings, it will be seen that the accelerating belts act on the leaves as they are delivered from the feed belt and drop from there to a position in which they are hanging from their butts which are held gripped by these belts. Thus the butts of the leaves are accelerated as the blade portions bend to a greater degree and then swing suspended from their butts. It has been found that accelerating the butts at this time is particularly effective in not only separating the butts but in disentangling and separating the blade portions of the leaves which are often tangled together and which unless separated, tend to go through the stemmer in a bunch. When the leaves are forwarded as heretofore through some butt separating accelerating means with the broad portions resting on horizontal surfaces there is nothing to effectively separate the blades. Applicant by the simple expedient above noted gets an effective separation of the blades of the leaves simultaneously and as a result of the butt separation. The effectiveness of this blade separating action is apparently due in large part to the bending and suspending of the leaves so that they are free to weave and wave and thus shake themselves loose from each other. This action is further enhanced by the stroking received from the beaters 49 hereinafter described.

On having entered the butt separator, the leaves L are pulled from the feed belt A and hang from the belts 21, a guard 39 supported by the main frame of the machine protecting the leaves from injury by contact with protruding parts of the separator. The stem butts S, during this portion of their travel, are held in horizontal position by the belts 21, but upon entering the belt way 29, the stems S encounter the guide 40, Figs. 3 and 5, which gradually swings the butts from the horizontal to the vertical position in which they are held between the guides 40 and 41 while the belts 29 carry them forward. The belts 29 are supported by a stationary guide 42 held by brackets 43 and by a resilient sectioned guide 44 slidably attached, by pins 45 having springs 46, to a bracket 47 fastened to the housing 48 of the drive gear of one of the pulleys 30. The guide 44 is made in a plurality of independently spring pressed sections to provide for gripping of adjacent large and small stems.

While being advanced by the belts 29, the suspended leaves L are first subjected to the

straightening and dirt loosening action of a pair of rotating fans or beaters E, and are then suction cleaned and straightened in the suction device F. The fans E, Figs. 1 and 2, consist of blades 49 attached to shafts 50 supported in bearings 51, the shafts 50 having pulleys 52 driven in directions toward each other by belts 53 from pulleys 54 on shafts 55 of the stemming machine to beat or stroke the leaf from near its butt toward the tip.

The suction device F, Figs. 8 and 9, consists of a narrow chamber 56, open at the top and at both ends, connected by pipes 57 and 58 with a fan or other source of air suction. On its forward side, the chamber 56 has diverging guide flanges 59 to facilitate the entrance of the leaves fed sidewise into the chamber. The sides of the chamber covering the openings of the pipes 57 are provided with screens 60, to form a leaf trap to prevent leaves pulled out of the grippers G by the suction, from entering the suction pipes.

To clear the chamber of such loose leaves, the suction is made intermittent by means of a rotating valve 61, and a pair of rotating leaf ejecting rollers 62 is placed below the chamber 56. The valve 61 is rotated at a suitable speed by a pulley 63 and the ejecting rollers 62 are set in motion by a pulley 64 and gears 65. During the cessation of suction, loose leaves present in chamber 56 will drop onto the rollers 62 which will positively eject them onto an endless belt 66 driven by a pulley 67, the belt 66 carrying them back to a position adjacent the feed belt A and convenient to the operator serving the machine.

The cleaning and straightening action of the suction means and beater means have been found particularly effective when employed on leaves which are suspended vertically by their butts and consequently are free to wave and shake. The action of the air sweeping downwardly from near the butt and alongside the leaf toward the tip tends to spread the leaf and unwrinkle it and tends to draw downwardly and apart bunched leaves. The beater secures the same effect by mechanical means and also tends to loosen the caked dirt and the combination of the two while not necessary is particularly effective in securing maximum cleaning and straightening effect.

For the purpose of carrying the leaves through the suction chamber F before they reach the stripping mechanism H, the gripper chain G which is continuously driven by the drive sprocket 38 is provided with a horizontal run over the end roller 68, and the roller 69, Fig. 1. This causes the chain G to travel horizontally for a substantial distance alongside the operating runs of the delivery belts 29, and then to travel diagonally in a substantially vertical plane to draw the leaves through the stemming unit. It is at the beginning of this horizontal path that the grippers close upon the vertical stem butts carried forward by the belts 29. The horizontal run of the grippers may be extended to carry the leaves through the whole of the fan E if desired.

The gripper chain G, Figs. 10 to 12, is made up of links 70 joined by pins 71 carrying rollers 72 which engage with rails 73, Fig. 1, and thus support the chain while the stems are being stripped and scraped. The links 70 carry pins 73 on which are pivoted arms 74 and 75 which at one end carry rollers 76 held apart against stop pins 77 in links 70 by springs 78 placed in sockets 79 of arms 74 and 75. When so tensioned by the spring 78, the other ends of arms 74 and 75 which form the gripper jaws 80 are in engagement,

adapted to tightly hold a stem placed between them. These jaws have their gripping faces parallel to the plane and direction of movement of the gripper chains and these faces are so close together as to afford substantially continuous gripping surfaces.

One arm 74, is integral with its jaw 80, but the other, 75, terminates in a socket 81 and its jaw is on a separate fork 82 pivoted to the same, this arrangement permitting a limited angular movement of the pivoted against the stationary jaw, thereby enabling one gripper to tightly hold the two stems of different thicknesses.

The jaws 80 are preferably so formed that successive jaws overlap each other, as shown in Fig. 10, thus breaking the joints between them and preventing stems from being gripped insecurely by the adjacent edges of two adjoining jaws, and rendering the gripping surfaces formed thereby continuous even when passing around the roller 69.

As the links of the chain G turn on end roller 68, they encounter a stationary cam 83, Figs. 1 and 13, the rollers 76 engaging with a narrowing channel 84, thereby compressing the springs 78 and opening the jaws 80, the grippers then being in the dotted position 80' shown in Fig. 11. Upon emerging from the channel track 84 of cam 83, the springs 78 expand and thus again close the jaws 80. A cam 85 similar to cam 83 is attached to the holding bracket of sprocket 38, Fig. 1, to open the gripper jaws for the ejection of the stripped stems.

Since the blades 86 of the stripper mechanism H, Fig. 14, are set to operate on the leaves L a short distance from the stems S, the latter, on emerging from the strippers, carry small leaf fragments M which constitute a source of waste. To retrieve this, tobacco scrap card rolls 87, such as closely set stiff bristled brushes extending over a considerable length of the gripper chain travel, are supported above covers 88 of the stripping mechanism by brackets 89 and 90 from the frame of the stemming machine and are revolved in opposite directions by pulleys 91 driven by belts 92 from pulleys 93 on the stripper shafts 94.

When the gripper jaws 80 are not made overlapping as shown in Fig. 10, means are employed to locate the butts in the belt way 29 between joints of adjoining faces. One such means consists of a chain 95, Figs. 15 and 16, having alternate links extending in the form of pawl like fingers 96 across the belt way 29, these fingers engaging with the stems S carried by the belts and placing the same in predetermined relation to the jaws 80 of the gripper G at the moment of closing. The chain 94 runs on sprockets 97 supported in brackets 98 and driven at the proper speed by bevel gears 99 from the stemmer shaft 100. Another device acting to shield the joint between adjoining gripper faces is shown in Figs. 17 and 18. Here, a horizontal wheel 101 having star shaped flanges 102 projecting across the belts 29 above and below the same, is revolved in the direction of the arrow by suitable driving means acting on its shaft 103, the points of the star flanges entering between the stems S and spacing them away from the space between adjoining jaws of the grippers just emerging from cam 83.

It will be noted that due to the substantially continuous gripping surface afforded by the applicant's gripper chain, and the continuous travel of the butts of the leaves in the grip of the belts 29, that no timing of the butts relative to the

grippers is required. As will be seen from a comparison with the previously noted patent to Strickland, this makes possible continuous instead of intermittent feeding of the leaves, and eliminates a number of intermittent and reciprocating parts. In consequence the present machine can be and has been operated at 50% or more greater speed than the standard commercial model of the Strickland type. In the above manner individual feeding, picking and transferring of separate leaves in machines of this type is eliminated, while obtaining satisfactory separation of the leaves. This avoids a common cause of drop leaves. For instance when two or more leaves are tangled together in attempting to transfer one leaf, other leaves tangled with it follow part way and are dropped.

The ejection of the stripped stems is made positive by the ejecting device J. As each gripper of the chain G turns around sprocket 38, Fig. 1, the stripped stem S carried by it enters between two contacting horizontal elastic rollers 104 revolved in opposite directions by a pulley 105 and gears 106, the pulley 105 being driven by a belt 107 from a pulley 108 on the stripper shaft 35. As soon as the jaws of the gripper are then opened by the cam 85, the stem will be withdrawn from the gripper and ejected through a chute into a suitable receptacle by the pulling action of the revolving rollers. While the thus cleared gripper is still held open by the cam 85, it engages with the cleaning device K which consists of a vertical disc 109 having stiff bristles on each side, these bristles entering between the jaws of the gripper and removing all adhering tobacco scraps, gum and other matter which may otherwise prevent the gripper from positively gripping the next stem presented to its jaws by the belts 29 as they are opened by cam 83 on turning around end roller 68. The brush 109 which is supported on a shaft carried by suitable brackets on the stemming machine frame, is driven by a belt 110 from a pulley on the sprocket shaft of the gripper chain.

The continuous and direct feeding and forwarding of the leaves as has already been pointed out constitute important features of the present machine. Such a feed is adapted to use with a wide variety of stemmers, and applicant does not wish to confine himself to use thereof with any particular type of stemmer except as claimed. This feed is, however, particularly well suited for use with a stemmer of the type shown. In this type of stemmer, as best shown in Fig. 14, the action of the stripper is discontinuous. The blades 86, the lengths of which extend in a horizontal direction, are revolved to give the blades a series of short operating strokes along the stems of the tobacco leaves. After the operating movement of the blade along the stem, the blade is given a relief movement away from the stem during its general movement along the stem. This relief movement is produced by engagement of the cam follower lever 86a, which is secured to the blade 86, with a high part of cam 86b. For further details of construction of this part of the machine reference is made to the Strickland patent previously cited.

This relief movement relieves the strain on the stem and makes possible stemming by a series of short jerky strokes, found by experience to be a desirable feature. Since the movement of the blades is discontinuous it is possible to combine this type of machine with continuously

moving stem feeding devices without sacrifice of discontinuous stemming action.

What is claimed is:

1. In a tobacco stemming machine, the combination with devices for forwarding leaves side-wise, of stemming mechanism receiving leaves from said devices and having an endless series of travelling grippers for gripping the butts of the leaves in said devices and carrying them through said mechanism, said grippers having gripping faces parallel to the plane of their travel and adjacent grippers having overlapping portions, thereby forming substantially continuous surfaces to enable them to grip the stems wherever located along said surfaces.

2. In a tobacco stemming machine, the combination with devices for forwarding leaves side-wise, of stemming mechanism receiving leaves from said devices and having an endless series of travelling grippers for gripping the butts of the leaves in said devices and carrying them through said mechanism, said grippers having gripping faces parallel to the plane of their travel and adjacent grippers having overlapping portions, thereby forming substantially continuous surfaces to enable them to grip the stems wherever located along said surfaces, said devices including means for feeding the leaves in a substantially horizontal plane and mechanism receiving the horizontal leaves and swinging them into a vertical plane and delivering them to said grippers.

3. In a tobacco stemming machine, the combination with devices for forwarding leaves side-wise, of stemming mechanism receiving leaves from said devices and having an endless series of travelling grippers for gripping the butts of the leaves in said devices and carrying them through said mechanism, said grippers having gripping faces parallel to the plane of their travel and forming substantially continuous surfaces to enable them to grip the stems wherever located along said surfaces, said devices including means for feeding the leaves in a substantially horizontal plane, and said grippers being arranged to receive the butts of the leaves from said devices and suspend them in a vertical plane, and means for accelerating the movement of the butts while said leaves are suspended to separate the same.

4. In a tobacco stemming machine, the combination with devices for forwarding leaves side-wise, of stemming mechanism receiving leaves from said devices and having an endless series of travelling grippers for gripping the butts of the leaves in said devices and carrying them through said mechanism, said grippers having gripping faces parallel to the plane of their travel and forming substantially continuous surfaces to enable them to grip the stems wherever located along said surfaces, said grippers being arranged to suspend the leaves vertically, and a suction leaf cleaner acting on the suspended leaves.

5. In a tobacco stemming machine, the combination with devices for forwarding leaves side-wise, of stemming mechanism receiving leaves from said devices and having an endless series of travelling grippers for gripping the butts of the leaves in said devices and carrying them through said mechanism, said grippers having gripping faces parallel to the plane of their travel and forming substantially continuous surfaces to enable them to grip the stems wherever located along said surfaces, said grippers being arranged

to suspend the leaves vertically, and a leaf beater acting on the suspended leaves.

6. In a tobacco stemming machine, the combination with devices for forwarding leaves side-  
wise, of stemming mechanism receiving leaves  
from said devices and having an endless series  
of travelling grippers for gripping the butts of the  
leaves in said devices and carrying them through  
said mechanism, said grippers having gripping  
faces parallel to the plane of their travel, and  
means for preventing stems from locating between  
successive grippers.

7. In a tobacco stemming machine, the combination with devices for forwarding leaves side-  
wise, of stemming mechanism receiving leaves  
from said devices and having an endless series  
of travelling grippers for gripping the butts of  
the leaves in said devices and carrying them  
through said mechanism, and means for preventing  
stems from locating between successive  
grippers, said means including a star wheel and  
mechanism operating the star wheel in timed  
relation to the operation of said grippers.

8. In a tobacco stemming machine, the combination with devices for forwarding leaves side-  
wise, of stemming mechanism receiving leaves  
from said devices and having an endless series of  
travelling grippers for gripping the butts of the  
leaves in said devices and carrying them through  
said mechanism, and means for preventing stems  
from locating between successive grippers, said  
means including a series of shield elements arranged  
to shield the space between grippers, and  
mechanism for moving said elements in an endless  
path in timed relation to the operation of  
said grippers.

9. In a tobacco stemming machine, the combination with devices for forwarding leaves side-  
wise, of stemming mechanism receiving leaves  
from said devices and having an endless series of  
travelling grippers for gripping the butts of the  
leaves in said device and carrying them through  
said mechanism, said grippers having gripping  
faces parallel to the plane of their travel, means  
for preventing stems from locating between successive  
grippers, said means including projections positioned  
to engage the stems, and mechanism moving said  
projections in timed relation to the movement of the  
grippers to locate the stems in predetermined position  
relative to the gripper face.

10. In a tobacco stemming machine, the combination with devices for forwarding leaves side-  
wise, of stemming mechanism receiving leaves  
from said devices, and having an endless series  
of travelling grippers for gripping the butts of  
leaves in said devices and carrying them through  
said mechanism, said stemming mechanism including  
rotary scraping blades, and movable carding rolls  
for carding the stripped portion of the stems during  
the stemming operation.

11. The combination with a stemming unit having  
stripping elements and devices for giving said  
elements a downward stripping movement, of an  
endless series of grippers movable to a position  
above said unit, said grippers having their  
gripping faces in a plane parallel to the direction  
of their travel, and adjacent grippers having  
overlapping portions, thereby forming substantially  
continuous surfaces to enable them to grip leaves  
by the butt wherever located along said surfaces,  
and means for operating said grippers to successively  
grip leaves by the butt and then carry them into the  
range of action of said stemmer.

12. The combination with a stemming unit having  
stripping elements and devices for giving said  
elements a downward stripping movement, of an  
endless series of grippers movable to a position  
above said unit, said grippers having their  
gripping faces in a plane parallel to the direction  
of their travel, and adjacent grippers having  
overlapping portions, thereby forming substantially  
continuous surfaces to enable them to grip leaves  
by the butt wherever located along said surfaces,  
and means for operating said grippers to successively  
grip leaves by the butt and then carry them into the  
range of action of said stemmer, said operating  
means moving the grippers diagonally to the plane  
of operation of the stemming unit to pull the stems  
through the unit.

13. The combination with a stemming unit having  
stripping elements and devices for giving said  
elements a downward stripping movement, of an  
endless series of grippers movable to a position  
above said unit, said grippers having their  
gripping faces in a plane parallel to the direction  
of their travel, and adjacent grippers having  
overlapping portions, thereby forming substantially  
continuous surfaces to enable them to grip leaves  
by the butt wherever located along said surfaces,  
and means for operating said grippers to successively  
grip leaves by the butt and then carry them into the  
range of action of said stemmer, said gripper faces  
extending in a substantially vertical direction  
suspending the leaves vertically as they are acted on  
by said gripper.

14. The combination with means for transporting  
tobacco leaves by their butts with the blade portions  
hanging, of mechanism for accelerating movement of  
the butts of the hanging leaves during transportation  
of the same.

15. The combination with means for transporting  
tobacco leaves by their butts with the blade portions  
hanging, of mechanism for accelerating movement of  
the butts of the hanging leaves during transportation  
of the same, said mechanism including a series of  
opposed belts, and devices for driving successive  
belts at progressively greater speeds.

16. In a tobacco stemming machine, the combination  
with means for feeding leaves sidewise in a  
substantially horizontal plane, of a stemming unit,  
mechanism for receiving leaves from said means and  
swinging them to substantially vertical position for  
delivery to the stemming unit, and devices for  
accelerating movement of the leaves to separate the  
butts during said swinging of the leaves.

17. In a tobacco stemming machine, the combination  
with devices for feeding leaves sidewise, of a  
stemming unit spaced in the direction of movement  
of the leaves from said devices, and mechanism  
having an endless series of travelling grippers for  
gripping the butts of the leaves in said devices and  
carrying them into the range of action of said unit,  
said grippers having gripping faces extending parallel  
to the direction of travel of the leaves and normally  
spaced apart less than the width of a stem to grip  
the stems wherever located along the gripping faces.

18. In a tobacco stemming machine, the combination  
with means for feeding leaves sidewise, of a  
stemming unit spaced in the direction of movement  
of the leaves from said devices, and mechanism  
having an endless series of travelling grippers for  
gripping the butts of the leaves in said devices and  
carrying them into the range of action of said  
stripper, said grippers having gripping faces  
extending parallel to the direction of

travel of the leaves and normally spaced apart less than the width of a stem to grip the stems wherever located along the gripping faces, said means including devices for separating the butts prior to gripping.

19. In a tobacco stemming machine, the combination with means for feeding leaves sidewise, of a stemming unit spaced in the direction of movement of the leaves from said devices, and  
10 mechanism having an endless series of travelling grippers for gripping the butts of the leaves in said devices and carrying them into the range of action of said stripper, said grippers having gripping faces extending parallel to the direction  
15 of travel of the leaves and normally spaced apart less than the width of a stem to grip the stems wherever located along the gripping faces, and mechanism to prevent stems from locating on the joint between successive gripper faces.

20. The combination with devices for feeding leaves in a substantially horizontal plane, of mechanism for receiving the butts of the leaves from said devices and turning the leaves into vertical position, a stemming unit arranged to  
25 operate on leaves hanging vertically, means for receiving the vertical leaves from said mechanism and carrying the leaves suspended by their butts into position to be operated on by said unit, and means for separating the butts while suspended in said mechanism.

21. The combination with devices for feeding leaves in a substantially horizontal plane, of mechanism for receiving the butts of the leaves from said devices and turning the leaves into vertical position, a stemming unit arranged to operate on leaves hanging vertically, means for receiving the vertical leaves from said mechanism and carrying the leaves suspended by their butts into position to be operated on by said unit, and  
35 a suction device acting to draw air downwardly past the suspended leaves.

22. The combination with devices for feeding leaves in a substantially horizontal plane, of mechanism for receiving the butts of the leaves from said devices and turning the leaves into vertical position, a stemming unit arranged to operate on leaves hanging vertically, means for receiving the vertical leaves from said mechanism and carrying the leaves suspended by their butts into position to be operated on by said unit, and moving means stroking the suspended leaves downwardly prior to stemming.

23. The combination with suction leaf cleaning means, of mechanism having travelling grippers for suspending leaves vertically from their butts and carrying them sidewise through said means.

24. The combination with suction leaf cleaning means, of mechanism having travelling grippers for suspending leaves vertically from their butts and carrying them sidewise through said means, said means including a suction chamber, and mechanism cooperating with said chamber to catch and remove dropped leaves drawn into said chamber.

25. The combination with suction leaf cleaning means, of mechanism having travelling grippers for suspending leaves vertically from their butts and carrying them sidewise through said means, said means including a suction chamber, and mechanism cooperating with said suction chamber to catch and remove dropped leaves drawn into said chamber, and a conveyor arranged to receive the removed leaves and carry  
75 them away.

26. In a tobacco stemming machine, stemming mechanism having an endless series of travelling grippers for gripping the butts of leaves and carrying them through said mechanism, said grippers having gripping faces parallel to the direction of their travel, devices for opening the grippers to release the stripped stems, and a rotary brush having a portion of its circumference entering the space between opened cooperating grippers to brush stem fragments and the like from the gripping surfaces.

27. In a tobacco stemming machine, stemming mechanism having an endless series of travelling grippers for gripping the butts of leaves and carrying them through said mechanism, said grippers having gripping faces parallel to the direction of their travel, devices for opening the grippers to release the stripped stems, a rotary brush having a portion of its circumference entering the space between opened cooperating grippers to brush stem fragments and the like from the gripping surfaces, and a pair of rollers positioned to grip and pull from said grippers any depending stem portions adhering to the opened grippers.

28. In a tobacco stemming machine, the combination with stemming mechanism having an endless series of travelling grippers, of devices for opening said grippers after the stemming operation is completed, and a pair of rotating stem ejecting rollers having their axes of rotation in planes parallel to the direction of travel of the grippers and arranged to engage and eject the stems after the latter have been completely stripped.

29. The combination with leaf stemming means, of mechanism for feeding leaves sidewise to said means and suction means acting on the leaves during said feeding to clean and disentangle the same.

30. The combination with leaf stemming means, of mechanism for suspending leaves by their butts and feeding them sidewise to said means, and suction means acting on the leaves during said feeding to draw air downwardly alongside the leaves to clean and disentangle same.

31. The combination with leaf stemming means, of mechanism for suspending leaves by their butts and feeding them sidewise to said means, of a suction device and a leaf beater acting on the leaves carried by said mechanism to clean and disentangle the same.

32. The combination with leaf stemming means, of mechanism for suspending the leaves by their butts and feeding them sidewise to said means, and beating means acting on the leaves in said mechanism to disentangle the same.

33. The combination with leaf stemming means, of mechanism for suspending the leaves by their butts and feeding them sidewise to said means, and beating means acting on the leaves in said mechanism to disentangle the same, said beating means having rotating blades on opposite sides of the leaf arranged to stroke the leaf in a direction away from the butt and toward the tip.

34. The combination with leaf stemming means, of mechanism for feeding leaves sidewise to said means including grippers gripping the butt end of the leaves, and means acting on the leaves in the grippers near the butt end thereof to disentangle and straighten said leaves.

35. The combination with stemming mechanism for acting on vertical tobacco leaves, of devices for feeding leaves sidewise in a hori- 150

zontal plane, and means for swinging leaves received from said devices to vertical position and delivering them to said means, said means comprising a pair of belts having cooperating stem gripping runs and means guiding said runs from overlying relationship at their receiving end to side by side relationship at their delivery.

36. In a tobacco stemming machine, the combination with stemming mechanism, of an endless series of travelling grippers for gripping the butts of leaves and carrying them through said mechanism, of leaf feeding and forwarding devices for feeding leaves sidewise into the range of action of said grippers and a return conveyor extending from a position under said grippers to a position adjacent the receiving end of said devices for returning drop leaves to a position convenient for refeeding through the machine.

37. In a leaf treating device, the combination with means for forwarding leaves sidewise, said means having grippers for suspending the leaves by their butts, of suction means acting to draw the leaves downwardly, said suction means including a chamber having perforate walls, and devices for intermittently applying suction to said perforate walls.

38. In a leaf treating device, the combination with means for forwarding leaves sidewise, said means having grippers for suspending the leaves by their butts, of suction means acting to draw the leaves downwardly, said suction means including a chamber having perforate walls, devices for intermittently applying suction to said perforate walls, and means removing drop leaves from said chamber.

39. In a leaf treating device, the combination with means for forwarding leaves sidewise, said means having grippers for suspending the leaves by their butts, of suction means acting to draw the leaves downwardly, said suction means including a chamber having perforate walls, devices for intermittently applying suction to said perforate walls, and means for removing drop leaves from said chamber comprising a pair of rotating rolls forming at least a part of the bottom of said chamber, and a conveyor arranged to receive leaves from said rolls.

40. In a leaf treating device, the combination with means for forwarding leaves sidewise, said means having grippers for suspending the leaves by their butts, of suction means acting to draw the leaves downwardly, said suction means including a chamber having perforate walls, devices for intermittently applying suction to said perforate walls, and means for positively ejecting leaves from said chamber.

41. In a tobacco stemming machine, the combination with a member rotating on a substantially horizontal axis and having longitudinally arranged stemming elements travelling downwardly at the stemming position, of an endless series of travelling grippers arranged to suspend the tobacco leaves vertically by their stems, said grippers having adjoining gripping faces parallel to the plane of their travel and adjacent grippers having overlapping portions to form substantially continuous surfaces to enable them to grip the stems wherever located along said surfaces, and means moving said grippers in a generally vertical plane and at an angle to the stemming elements to pull the suspended leaves past said members.

42. A tobacco leaf forwarding mechanism comprising an endless chain, a series of travelling grippers mounted on said chain for gripping the

butts of the leaves, said grippers having gripping faces parallel to the plane of their travel with cooperating overlapping portions on successive grippers to form a continuous gripping surface.

43. A tobacco leaf forwarding mechanism comprising an endless chain, a series of travelling grippers mounted on said chain for gripping the butts of the leaves, said grippers having gripping faces parallel to the plane of their travel with cooperating overlapping portions on successive grippers to form a continuous gripping surface, said overlapping portions consisting of a projection on the edge of one gripper face entering a cut-away portion of the adjoining gripper.

44. Tobacco leaf forwarding mechanism comprising an endless chain having a series of travelling grippers thereon for gripping the butts of the leaves, said grippers having gripping faces parallel to the plane of their travel, and means mounting said grippers on said chain including devices permitting a rocking movement of the gripper faces relative to their normal plane to simultaneously grip stems of unequal size.

45. In a tobacco stemming machine, the combination with devices for feeding tobacco leaves sidewise in a substantially horizontal plane, of travelling means having substantially horizontally arranged butt gripping surfaces acting on the butts only of the leaves for forwarding the leaves with the butts horizontal and the blade portions unsupported and hanging freely from said butts.

46. In a tobacco stemming machine, the combination with devices for feeding tobacco leaves sidewise in a substantially horizontal plane, of travelling means having substantially horizontally arranged butt gripping surfaces acting on the butts only of the leaves for forwarding the leaves with the butts horizontal and the blade portions unsupported and hanging freely from said butts, and a guide against which said butts are forwarded for swinging said butts from horizontal position toward vertical position.

47. In a tobacco stemming machine, the combination with devices for feeding tobacco leaves sidewise in a substantially horizontal plane, of travelling means having substantially horizontally arranged butt gripping surfaces acting on the butts only of the leaves for forwarding the leaves with the butts horizontal and the blade portions unsupported and hanging freely from said butts, said travelling means including mechanism for accelerating movement of the butts during said forwarding.

48. The combination with a stemming unit adapted to act on vertical leaves, of leaf feeding means forwarding tobacco leaves with their butts projecting upwardly, an endless series of travelling grippers having gripping faces parallel to the direction of their travel, the gripping faces of which form substantially continuous gripping surfaces, and operating means causing said grippers to move in opened relation astraddle said upwardly projecting butts and then to grip the same and carry the leaves suspended by their butts into said unit.

49. The combination with a stemming unit adapted to act on vertical leaves, of leaf feeding means forwarding tobacco leaves with their butts projecting upwardly, an endless series of travelling grippers having gripping faces parallel to the direction of their travel, the gripping faces of which form substantially continuous gripping surfaces, and operating means causing said grippers to move in opened relation astraddle

said upwardly projecting butts and then to grip the same and carry the leaves suspended by their butts into said unit, said feeding means including a pair of belts arranged to grip the tobacco leaves and forward them with their butts projecting upwardly from between them.

50. In a tobacco stemming machine, the combination with stemming mechanism adapted to act on vertically suspended leaves, of continuously travelling leaf feeding means for forwarding tobacco leaves with their butts projecting, of an endless series of continuously travelling grippers having their gripping faces substantially parallel to the direction of their travel, said gripping faces forming substantially continuous gripping surfaces, and operating means for causing said grippers to grip the leaves while the grippers and the leaves continue to travel and carry the leaves suspended by their butts into said mechanism.

51. In a tobacco stemming machine, the combination with stemming mechanism including stripping elements having a movement lengthwise of the stems, of a horizontal feed table for receiving leaves spread thereon by an operator, of devices on said table for forwarding the spread leaves, a series of continuously travelling grippers for carrying leaves into the range of action of said stripping elements, and continuously travelling leaf feeding means for forwarding leaves from said table into the grip of said grippers without interrupting the forward movement of the leaves, said leaf feeding means operating to accelerate and thereby disentangle intertangled leaves.

52. In a tobacco stemming machine, the combination with tobacco leaf feeding mechanism, of a stem butt separator comprising two cooperating series of forwarding belts separated and arranged to form a stemway, and driving mechanism for imparting a progressively increasing speed to the belts of each series.

53. In a tobacco stemming machine, the combination with tobacco leaf feeding mechanism, of a stem butt separator comprising two cooperating series of forwarding belts separated and arranged to form a stemway and having the operating runs of each series overlapping to provide continuous substantially straight stem feeding surfaces, and driving mechanism for imparting a progressively increasing speed to the belts of each series.

54. In a tobacco stemming machine, the combination with stemming mechanism including stripping elements and operating means for giving said elements short strokes lengthwise of the stems, of a series of travelling grippers for carrying leaves into the range of action of said stripping element and continuously travelling leaf feeding means for forwarding leaves into the grip of said grippers without interrupting the forward movement of the leaves.

55. The combination with a tobacco leaf stemmer having scraper blades for scraping the blade portion of the leaf from the stem, of an endless series of continuously travelling grippers for carrying leaves into the range of action of said stripping elements, means operating said elements and said grippers to give the scraper blades movement relative to the leaves to strip the blade portion of the leaf from the stem, said means including devices for giving the blades a relief movement away from the stem during its general movement relative to the stem.

56. The combination with a tobacco leaf stemmer having scraper blades for scraping the blade

portion of the leaf from the stem, of means for producing relative movement of the scraper blade and the leaves to strip the leaves, and moving carding rolls cooperating with said means to act on the stripped stems to remove any remaining leaf portions.

57. In a tobacco stemming machine, the combination with means for forwarding leaves sideways, of means for receiving the leaves from said forwarding means and suspending them by one end while continuing to forward them sideways, and means acting on one end of the leaf to progressively accelerate the movement of said end to separate the ends of successive leaves.

58. In a tobacco stemming machine, the combination with means for forwarding tobacco leaves, of suction means acting on said leaves during said forwarding, said suction means including a suction chamber through which the leaves pass during forwarding, and a source of suction connected thereto, and a leaf trap cooperating with said chamber and said source of suction to prevent leaves drawn into the chamber from being sucked into the source of suction.

59. Means for trapping and ejecting leaves in suction chambers having a suction opening, comprising a screen for the opening, means for cutting off the suction through said screen and mechanism for catching and ejecting leaves dropped by said screen when the suction is cut off.

60. In a tobacco stemming machine, the combination with stemming mechanism, of leaf feeding and forwarding devices for feeding leaves sideways into the range of action of said mechanism, and a return conveyor extending from a position under said leaf forwarding devices to a position adjacent to the receiving end of said devices for returning dropped leaves to a position convenient for refeeding through the machine.

61. In a tobacco leaf feeding device, the combination with a pair of opposed travelling belts for gripping the butts of the leaves to forward the same, of guide plates bearing on said belts and holding the same against said butts, one of said guide plates consisting of a plurality of sections, and yielding means pressing said sections toward the butts, to cause the belts to grip adjacent stems of different size.

62. In a tobacco leaf stemming machine, the combination with means for accelerating movement of the butts of the leaves including a series of belts, means for swinging the leaves from horizontal to vertical position including a belt conveyor, leaf beating means, suction leaf cleaning means having a suction chamber and including devices for catching leaves drawn into the chamber, conveyor mechanism for returning dropped leaves from one or more of the means operating on the leaves to a position convenient for refeeding through the machine, gripping means including an endless series of grippers having gripping faces parallel to the plane of their travel and forming substantially continuous gripping surface, means for locating leaf butts relative to the gripper faces, stemming means acting on the gripped stems, carding means, mechanism rotating in a plane parallel to the plane of the gripper faces for ejecting adhering stem portions from the grippers, and coating mechanism for successively presenting tobacco leaves to each of said means.

RUPERT E. RUNDELL.