Sept. 12, 1933.

O. V. KEAN

1,926,776

LEAF STEMMING MACHINE

Filed March 20, 1931

Fig. 1.

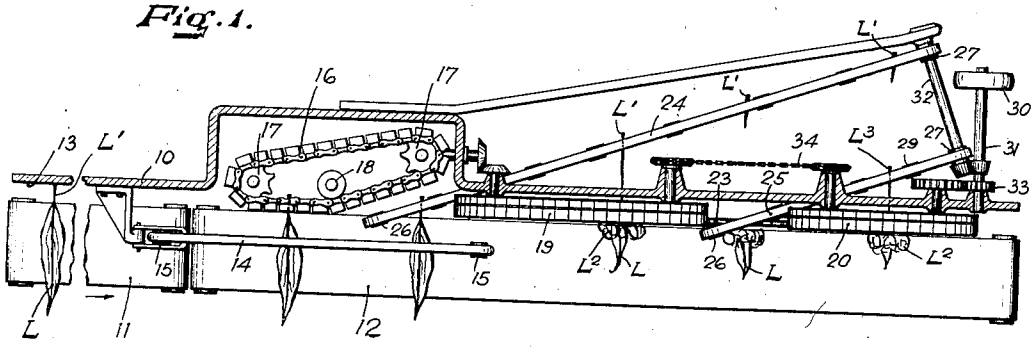


Fig. 2.

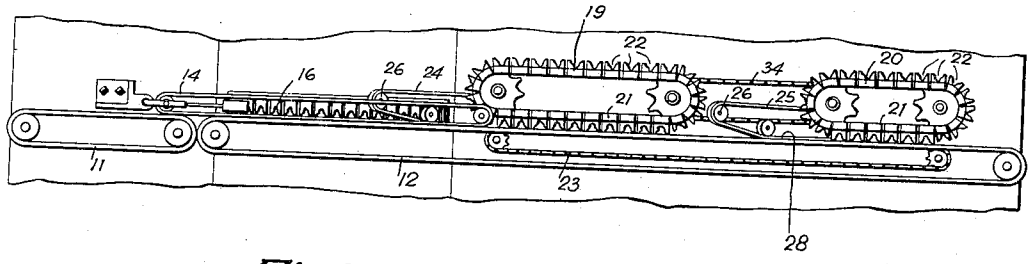


Fig. 3.

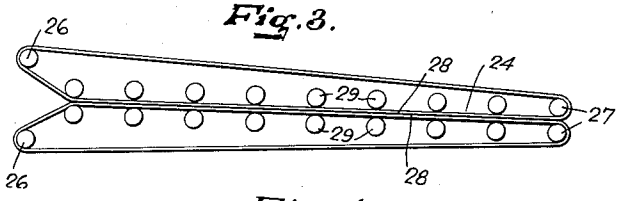


Fig. 6.

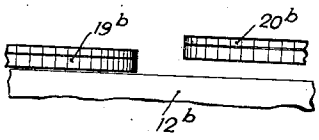


Fig. 4.

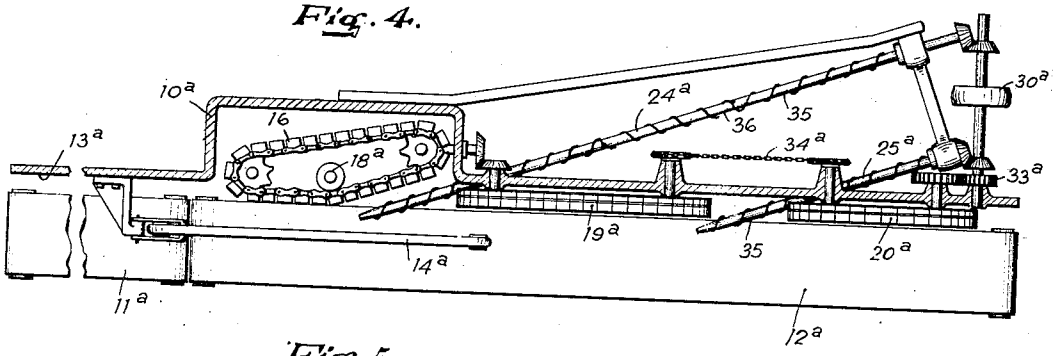
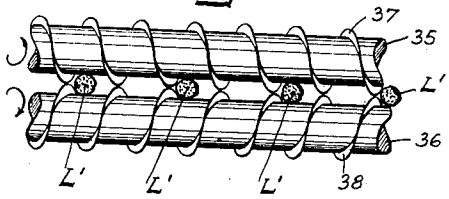


Fig. 5.



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LEAF STEMMING MACHINE

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9 Claims. (Cl. 131—57)

This invention relates to improvements in article stripping mechanism, and more particularly to such mechanism especially designed for withdrawing the stems or tough woody parts from leaves such, for example, as tobacco leaves in preparation thereof for their use.

It is a general object of the invention to provide an improved stripping mechanism of the class mentioned which is especially effective in removing the stems and tough woody parts from the leaves without undue crushing or other injury to the leaves, and which will reduce to a minimum the amount of such woody parts remaining in the stemmed leaf.

Another and important object of the invention is to provide in an apparatus of the class mentioned, an improved arrangement whereby the leaf stems which have become broken in the process of stemming will be picked up again at the leaf side of the break, thus effecting a more complete stemming of the leaf and reducing very materially the amount of tough woody stem parts remaining in the stemmed leaf.

Still another object of the invention is to provide an improved stem pulling mechanism which will reengage a broken leaf stem at the leaf side of the break, so that the stripping or stemming operation can be effectually completed even though the stem may have become completely severed.

Another object is to provide, in an apparatus of the class mentioned, an improved carrier or transfer device for transferring the leaves from one stripper unit to another, and for engaging or gripping the leaf stem near the stripped part of the leaf during the transfer.

Other objects of the invention will be in part pointed out in the following detailed description of certain illustrative but preferred embodiments of the invention and will be in part obvious in connection therewith.

The invention accordingly comprises the features of construction, combinations of elements and arrangement of parts, which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the claims.

For a more complete understanding of the nature and objects of the invention, reference is had to the following detailed description and to the accompanying drawing, in which:

Fig. 1 is a horizontal sectional view, parts being shown in plan, disclosing somewhat diagrammatically a preferred embodiment of the invention;

Fig. 2 is a side elevation of Fig. 1;

Fig. 3 is a diagrammatic view of one of the stem pulling elements or stem gripping belts;

Fig. 4 is a view similar to Fig. 1, showing another preferred embodiment of the invention;

Fig. 5 is an enlarged fragmentary elevation of the stem pulling element of Fig. 4, and

Fig. 6 is a side elevation of a further slight modification.

Referring to the drawing for a detailed description of the illustrative embodiments of the invention herein disclosed, and first to the embodiments shown in Figs. 1, 2 and 3, the framework of the machine is indicated diagrammatically at 10, the operative elements being supported thereby. Since the invention is especially adapted for stemming leaves such as tobacco leaves, it is herein disclosed for illustrative purposes as embodied in machines for stemming tobacco and like leaves. Therefore, the form of the invention as disclosed in the drawing will be described in detail, it being understood, however, that the invention may be embodied in other types of stripping apparatus than that particularly shown.

There is a conveyor which may be of any suitable type, such as the belt conveyor 11 shown, suitably driven and adapted to carry or transfer the leaves L placed thereon in any suitable manner such as, for example, by hand. Longitudinally aligned with the conveyor 11 is a similar but longer belt conveyor 12, also driven in any suitable manner. The surface 13 of the frame provides a guide engaging with the butt end L' of the leaves to aid in correctly positioning the latter upon the conveyor 11.

For the purpose of retaining the leaves in position upon the carriers 11 and 12, an endless leaf retaining belt 14 is preferably provided mounted upon supporting idlers 15 and having its lower reach positioned for engagement with the upper reaches of the carrier belts 11 and 12. By this means the leaves are gripped and held in correct position between the leaf retaining belt 14 and one or another of the carrier belts. When the leaves are placed upon the carrier belt, they are fed forwardly into the machine in the direction indicated by the arrows in Fig. 1.

Positioned adjacent the forward inner edge of the carrier 12 is a stem stripping mechanism serving to butt the leaves and including a sprocket chain 16 mounted upon suitably driven sprockets 17. The reach of butting chain adjacent the carrier 12 may be guided and held in position by means of a roller 18. This stem butting or strip-

ping mechanism may be of any preferred form and does not form a part of this invention except in combination. It is, therefore, deemed unnecessary to describe it in detail.

Arranged adjacent to the inner edge of the conveyor 12 is a plurality of leaf stripping units 19 and 20. While there may be as many of these serially arranged stripping units as desired, only two are disclosed herein. Each stripping unit includes an endless sprocket chain 21 suitably mounted upon driven sprockets, and each is provided with a series of stripping teeth 22 of any suitable preferred form. The ends of these stripping teeth when positioned at the lower reach of the sprocket chain 21 will lie normally about in the plane of the upper surface of the carrier belt 12. Also, a cooperating auxiliary stripping element is provided by the sprocket chain 23 having its upper reach lying substantially in the plane of the upper reach of the carrier belt 12, being positioned opposite and in juxtaposition to the stripper teeth 22. By means of this auxiliary sprocket chain 23, the leaves being stemmed are held in contact with the stripper teeth 22 as said leaves are carried forwardly by the carrier mechanism. While there may be as many of these auxiliary chains 23 as desired but one is herein disclosed, serving for both stripping units. It will be understood that the sprocket chains 21 and 23 of the stripping units and carrier belt 12 will be driven at substantially the same speed so that the leaves being stemmed are carried forwardly in their course through the machine.

It will be observed that the stripping units 19 and 20 are longitudinally spaced apart a short distance thus providing a gap or space between the adjacent ends of these units. This gap may vary in longitudinal dimension as desired for the accommodation of the stem pulling elements of the stripping mechanism as below described. It will also be understood that one or more additional gaps of this nature may be provided in case the number of stripping units is increased. Also, it is preferable that the stripping units 19 and 20 be arranged in longitudinal alignment with each other as shown, but it will be clear that they may deviate considerably from precise longitudinal alignment.

The stem withdrawing or pulling mechanism as shown in Figs. 1, 2 and 3 is provided by a plurality of pairs of stem gripping belts 24 and 25. These belts are mounted upon suitable supporting and driving pulleys 26 and 27 and are suitably driven to effect traveling movement thereof. The courses of each of these pairs of stem gripping belts are inclined or divergent to the course of the leaves through the stripping elements 19 and 20 as clearly shown in Fig. 1. Also, the adjacent reaches 28 of the stem gripping and pulling belts may be guided and held in co-operative relation by means of a series of guides or guiding rollers 29 as shown in Fig. 3.

The forward or leading end of the stem gripping and pulling element 24 is preferably positioned slightly in advance of the forward end of the forward stripping element 19 and substantially in alignment with the leaf stripping teeth of the latter. Thus the stems L' of the leaves will be gripped by the pulling element 24 approximately at the time that the forward end of the leaf proper comes into engagement with the stripping teeth 21 of the forward stripping unit 19.

It will be understood that the strip pulling element 25 also includes a pair of gripping belts arranged as just described for the element 24. The element 25, however, may as shown be shorter than element 24 or it may be as long as the latter if an additional stripping is utilized. The gripping part of the leading end of element 25 is positioned in juxtaposition to the gap or space between the stripping units 19 and 20. Also, the leading end of this belt grip is preferably positioned substantially in alignment with the course followed by the leaves through the stripping elements 19 and 20. This positioning of the leading end of the grip of the stem pulling element 25 has a particular and important function in the operation of the stemming mechanism which will be made clearer below.

Any suitable driving mechanism may be provided for the stemming machine. The main driving pulley 30 may, for example, be connected to a suitable source of energy for driving the shaft 31 which has driving connection with the shaft 32 for driving the belts 24 and 25. Shaft 31 is also connected to driving gears 33 and driving chain 34 to drive the stripping sprocket chains 21 of the stripping units 19 and 20. These driving connections are diagrammatical merely and any suitable connections may be utilized for this purpose.

An illustrative embodiment of the invention having been set forth in detail, the operation will now be clearly understood and may be summarized as follows:

Leaves having been placed upon the carrier 11 with the butts of their stems against the guide 13, are transferred forwardly in the direction of the arrows passing to the carrier 12 and beneath the lower stretch of the retaining belt 14 by which they are held in position during the stem butting operation. Thence, the leaves are carried forwardly until the stems are entered between the gripping stretches 28 of the pulling element 24, said stems being prepared by the butting operation to be properly received and gripped by the gripping stretches. Approximately at this moment the leaf is carried into engagement with the stripping teeth 21 at the leading end of the stripping unit 19.

As the gripped end of the stem and the butt end of the leaf engaged with the stripping unit are carried forwardly along their respective courses, the stem will be pulled transversely of the stripping unit 19 due to the divergent courses of the pulling element 24 and the stripping unit. In this manner the stem will be pulled or stripped from the web part of the leaf which, during this period, is engaged by the stripping teeth of the stripping unit 19. The stripping and pulling units are preferably driven at such speed that the stem L' is kept abreast of the leaf L. In this manner the web of the leaf is separated from the stem, bunching up slightly against the stripping unit as indicated at L^2 in Fig. 1.

As stripping progresses in the manner set forth the stripped or partially stripped leaf passes from the stripping unit 19 forwardly into the gap or space between the two adjacent stripping units. If the leaf is a comparatively short one, it may be thus fully stripped by the first unit or, if it is relatively long, it may pass in partially stripped condition over the gap into the next stripping unit 20. The leaf thus partially stripped will be transferred or carried across the gap by the carrier belt 12, and the auxiliary stripper or sprocket chain 23 may also be utilized for this purpose. It is advantageous to make the gap between successive stripper units quite short so

that the stem part of the leaf will not be advanced too far by pulling operation of the pulling element 24 during the period that the leaf is passing the gap. Furthermore, it may be advantageous in some cases to offset slightly the second stripping unit from exact alignment with the first stripping unit as shown diagrammatically in Fig. 6 wherein unit 20^b is slightly offset from carrier 12^b and from alignment with stripping unit 19^b. In this manner the stripped web portion L^2 will be caused to pass into the stripping unit 20 at the outer face or plane thereof and will not be gripped between the top faces of the stripping teeth 21.

When the leaf is severed or weakened during the stripping operation of the stripping unit 19, a very important function is accomplished by the spaced arrangement of the successive stripping units described. If the leaf stem breaks during the first pulling or stripping operation such breaking occurs more commonly than otherwise very close up to the adjacent surface of the stripper chains. This may be due to the fact that the stem may be scored or cut slightly by the chain or teeth of the stripping element thus weakening it and causing breakage; it may also be due to other causes. When thus broken, the severed end of the stem will continue to move away from the leaf without effecting stripping thereof.

However, when the leaf with the broken stem emerges into the gap between the stripping units, the broken stub end of the stem will be picked up and gripped by the forward gripping end of the pulling unit 25 as the leaf is being carried across the gap by the carrier belt 12. In this condition, the leaf is thus advanced into the second stripping unit 20 and the stripping operation is continued without interruption, thus preventing a partially stripped leaf from passing with the completely stripped leaf webs. Defective or partially stripped leaves are thus avoided. Such a broken stem is indicated at L^3 in Fig. 1, having been picked up and gripped by the pulling unit 25 to continue the stripping of the leaf. It will be noted that the course of the pulling unit lies substantially in the same plane as that of the stripping units so that a direct pull is exerted at all times upon the leaf stem.

Provision will be made for separately disposing of the stems which are thus stripped from the webs of the leaves, while the stripped web portions will be diverted into any appropriate receptacle.

In the embodiment of the invention shown in Figs. 4 and 5, the general arrangement of elements is the same as that described above and corresponding parts are indicated by the same reference numeral with the addition of the index "*a*". However, in this embodiment the stem pulling elements 24^a and 25^a are formed by the rotary shafts 35 and 36 positioned in divergent relation with the course of the stripping units 19^a and 20^a, the divergent positioning being similar to that of the belts above described.

The shaft 35 is provided with a helical rib 37, while the shaft 36 is provided with a similar helical rib 38, the direction of the helices of the two shafts being opposite to each other as shown in Fig. 5. These shafts are placed side by side rotating in opposite directions and the helical ribs cooperating with each other to provide a helical conveyor which engages with the stems L' of the leaves. Also, the peripheries of the shafts may engage with the stems. It will be understood that the construction of the stem pulling unit 25^a is like that of unit 24^a, except that the former unit may be shorter, as shown.

The forward or leading end of the pulling unit 25^a is positioned at the gap between the stripping units 19^a and 20^a in a manner similar to the positioning of the gripping belts of the pulling unit 25. The shafts of pulling units 24^a and 25^a are preferably rotated in a direction tending to pull the stems away from the stripping units. Thus, the frictional engagement of these rotary shafts with the stem aid in the stripping operation. The helical ribs 37 and 38 operate to convey the stems along the pulling unit so as keep the stems abreast of the leaf engaged by the stripping unit. Also, it will be understood that the stems may be directly engaged by the ribs 37 and 38 which thus act like screw threads to advance the stems. The divergent positions of the pulling units 24^a and 25^a will result in pulling the stems away from the leaves to effect the stripping operation. The pulling element 25^a will operate to pick up the stems after the outer ends thereof have been broken off close to the forward stripping element 19^a in a manner similar to that above described. Therefore, it will be seen that this embodiment of the invention operates in substantially the same manner as that above described, and need not be set forth in detail.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

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

1. In an article stripping machine, in combination, a plurality of separate serially arranged traveling stripping units and a plurality of serially arranged article pulling means for pulling the articles over said stripping units and for advancing said articles along with the travel of the units, one of said pulling means having an article gripping part positioned directly in longitudinal alignment with the course of travel of one of said stripping units and adjacent to the latter.

2. In an article stripping machine, in combination, a plurality of separate serially arranged traveling stripping units, adjacent units being longitudinally spaced apart and a plurality of serially arranged article pulling means for pulling the articles over said stripping units and for advancing the articles along with the travel of the units, one of said article pulling means having its leading end substantially coincident with the space between adjacent stripping units.

3. In an article stripping machine, in combination, a plurality of separate serially arranged traveling stripping units, adjacent units being longitudinally spaced apart and a plurality of serially arranged article pulling means for pulling the articles over said stripping units and for advancing the articles along with the travel of the units, one of said article pulling means having its leading end substantially coincident with the space between adjacent stripping units and positioned substantially in alignment with the course of travel of the stripping unit adjacent to which it is positioned.

4. In an article stripping machine, in combination, a plurality of separate serially arranged traveling stripping units, adjacent units being longitudinally spaced apart and arranged in longitudinal alignment with each other, and a plurality of serially arranged article pulling means for pulling the articles over said stripping units and for advancing the articles along with the travel of the units, one of said article pulling means having its leading end substantially coincident with the space between adjacent stripping units and positioned substantially in alignment with the course of travel of the stripping unit adjacent to which it is positioned.

5. In an article stripping machine, in combination, a plurality of separate serially arranged traveling stripping units, adjacent units being longitudinally spaced apart and a spiral article conveyor having its course diverging with the course of travel of said stripping units and having the leading article engaging part thereof positioned substantially in alignment with the course of travel of said stripping units at the space.

6. In a leaf stemming machine, in combination, a plurality of separate serially arranged traveling stripping units, adjacent units being longitudinally spaced apart and a stem pulling device for pulling a leaf stem transversely of the course of the stripping units and positioned for engagement with the leaf stem substantially in longitudinal alignment with the course of travel of a forward stripping unit at the space between said units.

7. In a leaf stemming machine, in combination, a plurality of separate serially arranged traveling stripping units, adjacent units being longitudinally spaced apart, a stem pulling device for pulling a leaf stem transversely of the course of the stripping units and positioned for engagement with the leaf stem substantially in longitudinal alignment with the course of travel of said stripping units at the space therebetween and a carrier for transferring the leaves over the space between said stripping units.

8. In a leaf stemming machine, in combination, a plurality of separate serially arranged traveling stripping units, adjacent units being longitudinally spaced apart, a stem pulling device for pulling a leaf stem transversely of the course of the stripping units, said pulling device including a pair of traveling stem gripping belts diverging with the course of travel of said stripping units and having the leading stem gripping part thereof arranged in juxtaposition with the space between said stripping units.

9. In an article stripping machine, in combination, a plurality of separate serially arranged traveling stripping units, adjacent units being longitudinally spaced apart, and a pair of cooperating traveling article gripping belts, the course of travel of said gripping belts diverging with the course of travel of the said stripping unit positioned adjacent thereto but positioned substantially in the same plane therewith, said belts having the leading gripping part thereof positioned substantially in alignment with the course of travel of one stripping unit at the space between said units.

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