

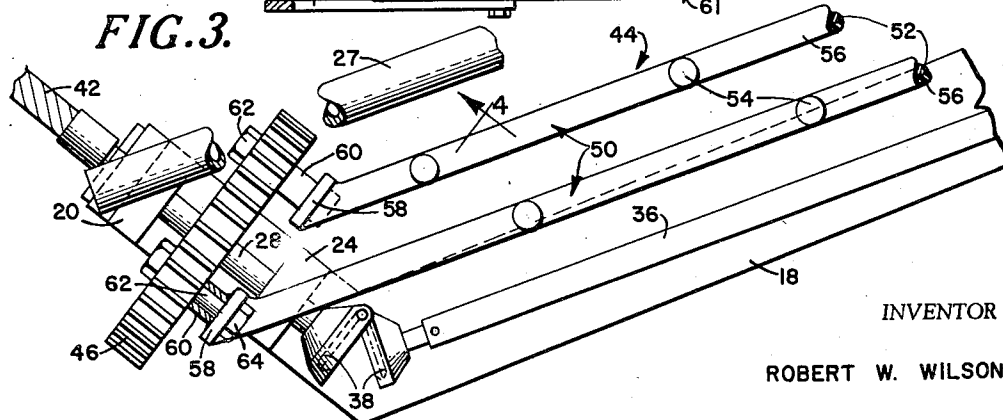
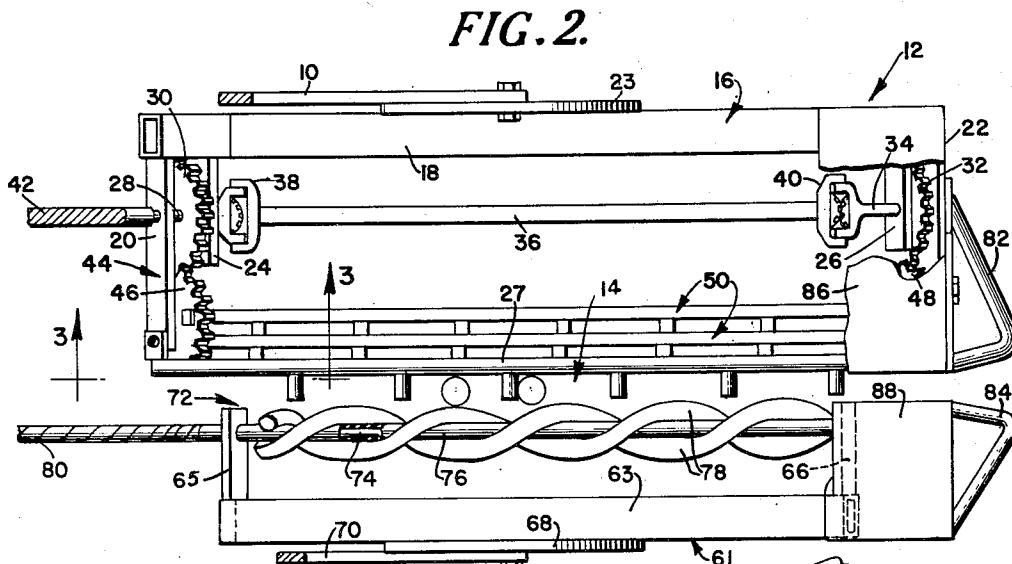
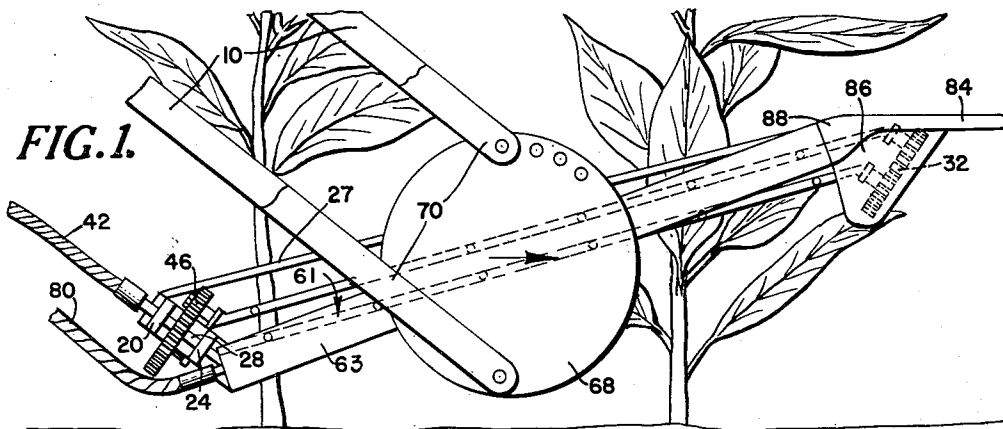
May 13, 1958

R. W. WILSON
TOBACCO PRIMING DEVICE

2,834,173

Filed Oct. 24, 1955

2 Sheets-Sheet 1



INVENTOR

ROBERT W. WILSON

BY *Cushman, Darby & Cushman*
ATTORNEYS

May 13, 1958

R. W. WILSON
TOBACCO PRIMING DEVICE

2,834,173

Filed Oct. 24, 1955

2 Sheets-Sheet 2

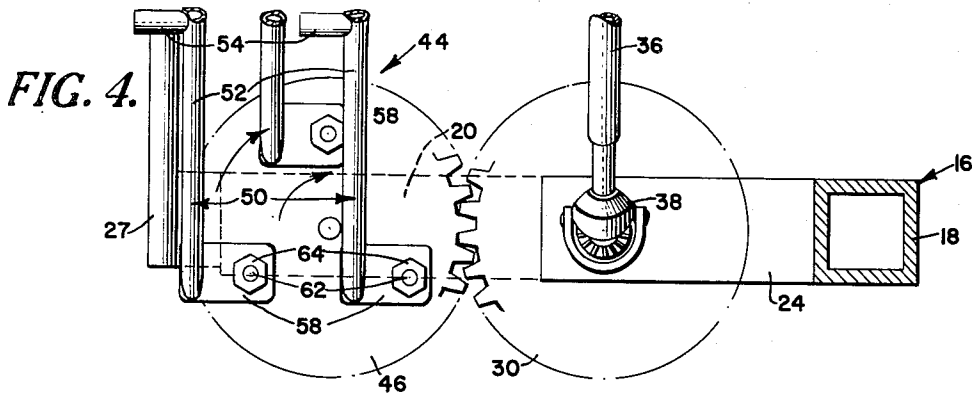


FIG. 5.

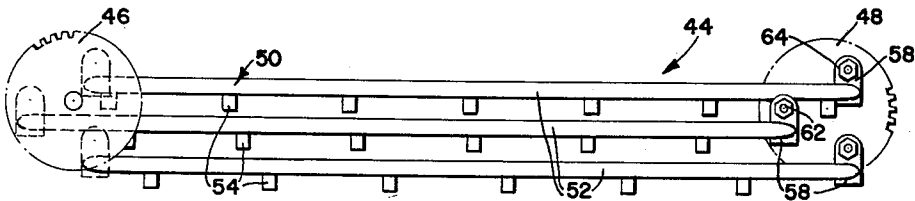


FIG. 6.

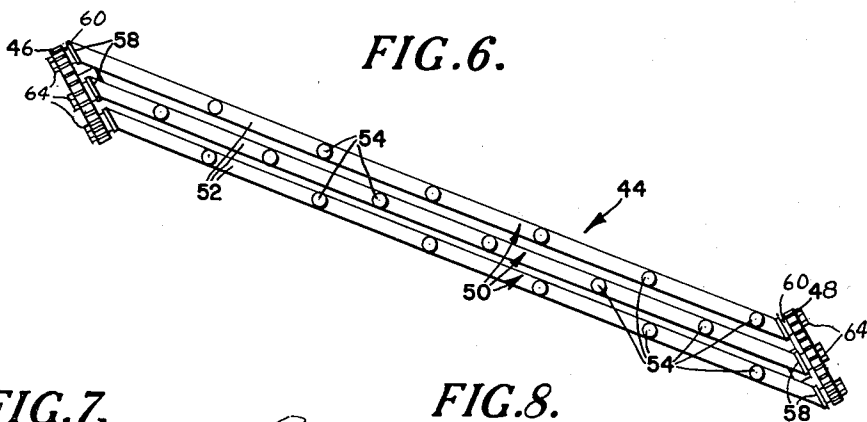


FIG. 7.

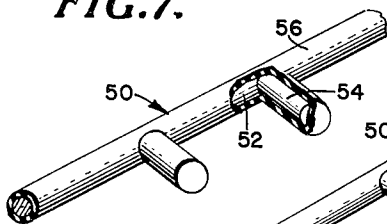
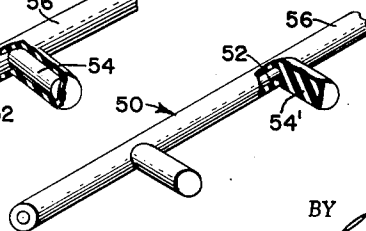


FIG. 8.



INVENTOR

ROBERT W. WILSON

BY

Cushman, Darby & Cushman
ATTORNEYS

1

2,834,173

TOBACCO PRIMING DEVICE

Robert W. Wilson, Charlotte, N. C., assignor to Research Corporation, New York, N. Y., a corporation of New York

Application October 24, 1955, Serial No. 542,355

8 Claims. (Cl. 56—27.5)

This invention relates to tobacco harvesters and more particularly to a device for priming tobacco plants having improved defoliating means incorporated therein. This application discloses an improvement over the device in my related copending application Serial No. 444,813, filed July 21, 1954.

In the above-entitled application, there is disclosed a tobacco priming device embodying a defoliating mechanism capable of imparting an impact blow to the tobacco leaves at a point adjacent their connection with the stalk. In brief, the mechanisms disclosed employ a rotary motion, and it has been found that such motion results in considerable damage to the tobacco leaves during the priming process.

Accordingly, it is an object of the present invention to provide a novel defoliating mechanism which is operable to impart impact blows to the tobacco leaves adjacent their connection with the stalk, such blows being delivered by the mechanism moving with a substantial translational movement.

Another difficulty encountered by the utilization of the devices described in the aforesaid application is that the leaves at times would not be completely removed but would hang to the stalk by leaf or stalk tissue on the underside of the leaf at the connection thereof with the stalk. This phenomena seemed to be due to the fact that the impact blow was not imparted to the leaf at the proper position.

It is, therefore, another object of the present invention to provide a tobacco priming device which utilizes, in conjunction with the impact blows mentioned above, a "wiping" action which insures that the leaves will be completely removed from the stalks to thereby overcome the disadvantages set forth above.

A still further object of the present invention is the provision of an improved tobacco priming device which is simple in construction, easy to operate and economical to manufacture and maintain.

These and other objects of the present invention will become more apparent during the course of the following detailed description and appended claims.

The invention may best be understood with reference to the accompanying drawings wherein an illustrative embodiment is shown.

In the drawings:

Figure 1 is a side elevational view of a tobacco priming device embodying the principles of the present invention and showing the same in its normal operation position with respect to a row of tobacco plants;

Figure 2 is a top plan view, with parts broken away, of the device shown in Figure 1;

Figure 3 is a fragmentary cross-sectional view taken along the line 3—3 of Figure 2;

Figure 4 is a cross-sectional view taken along the line 4—4 of Figure 3;

Figure 5 is a plan view of one of the defoliating units

2

looking in a direction parallel with the axis of rotation of the gears:

Figure 6 is a side elevational view of the defoliating unit of Figure 5 showing the same in its normal operative position;

Figure 7 is an enlarged fragmentary view with parts broken away and shown in section of one of the defoliating members; and

Figure 8 is a view similar to Figure 7 showing a modification of the defoliating member.

The tobacco priming device of the present invention is adapted to be moved through a tobacco field by means of a suitable propelling vehicle, such as disclosed in the above-mentioned application, or a conventional tractor.

Any suitable means may be utilized to mount the device on the propelling vehicle, the preferred arrangement being such that the device may be adjusted vertically so that a swath of tobacco leaves may be removed from different vertical positions on the tobacco stalks as the leaves ripen. In Fig. 1, there is shown a pair of parallel links 10 which constitute a conventional implement mounting means for a farm tractor.

The tobacco priming device of the present invention comprises, in general, a pair of substantially parallel defoliating units 12 and 14. As shown, these units are arranged to impart a combined action upon the tobacco leaves as the device is moved along the row of plants. The unit 12 primarily delivers downward impact blows to the leaves at a point adjacent their connection with the stalks, but also imparts a wiping action during operation. The unit 14 is primarily arranged to deliver a downward wiping action on the leaves adjacent their connection to the stalk, but will also deliver impact blows. It has been found that the combined effect of these two actions of each unit is very effective in completely removing the leaves and in minimizing the damage thereto. However, it will be understood that the individual units are not restricted in their use to the combination illustrated but may be utilized with other units imparting a similar or different action.

As mentioned in the aforesaid application, it will be understood that suitable means may be provided beneath the device for conveying the removed leaves to a collection point on the propelling vehicle. In general, the manner in which the leaves are handled after removal is adequately exemplified in the above-mentioned application, and forms no part of the present invention.

The defoliating unit 12 comprises a frame 16 having an upwardly and forwardly inclined longitudinal frame member 18 and a pair of end members 20 and 22 extending laterally from opposite ends thereof. A circular vertical plate 23 may be fixed to the frame member 18 and selectively pivoted to the links 10 for the purpose of mounting the device on the propelling vehicle. As shown in Figure 1, the lower and rearward end of the frame member 18 is preferably directed upwardly and rearwardly and is provided with a parallel frame member 24 spaced inwardly from the end frame member 20. At the downwardly and forwardly inclined upper end of the longitudinal frame member 18, a similar parallel frame member 26 is secured in spaced relation with respect to the end frame member 22. As best shown in Figure 2, the ends of the end frame members 20 and 22 opposite from the member 18 extend beyond the associated parallel members 24 and 26 and are interconnected by an elongated bar 27.

Journalled between rear parallel frame members 20 and 24 is a downwardly and forwardly inclined shaft 28 having a spur gear 30 fixed thereto between the members 20 and 24. A second spur gear 32 disposed between forward parallel frame members 22 and 26 is

mounted on a shaft 34 journaled therein. The pair of spur gears are drivingly interconnected by means of an intermediate shaft 36 connected at its opposite ends to the respective shafts 28 and 34 by any suitable means, such as universal joints 38 and 40. The structure described above may be driven from any suitable source of power as through flexible shaft 42 and constitutes a driving means for the defoliating mechanism which will now be described.

The defoliating mechanism which is generally indicated at 44, and best illustrated in Figures 5 and 6, comprises a pair of spur gears 46 and 48 journaled on the outer end of the frame members 20 and 22 in a position to mesh with the respective gears 30 and 32 thereof. Extending between the spur gears 46 and 48 in an upwardly and forwardly inclined direction is a plurality of leaf engaging elements or defoliating members 50 mounted in echelon. Each of the defoliating members comprises an elongated rod or member 52 having a plurality of longitudinally spaced short rods or members 54 extending laterally outwardly therefrom. All of the short rods 54 on a single elongated rod 52 are disposed in substantially the same plane so that during operation they will all extend outwardly from the frame 16 toward the row of tobacco plants. As best shown in Figures 5 and 6, each series of short rods 54 is staggered with respect to the short rods of the other series so as to insure a more complete engagement of the tobacco leaves. As shown in Figure 7, the defoliating members 50 are preferably covered with an exterior coating of resilient material 56 such as rubber, plastic or the like. In this manner, the defoliating member presents resilient tobacco plant engaging surfaces which reduce the damage caused during operation. It will be understood that short rods 54 may be made flexible by constructing them entirely of rubber or other suitable resilient material, as indicated at 54' in Figure 8.

Secured to the opposite ends of each elongated rod 52 is a transverse bar or lug 58. As best shown in Figure 3, the free end of each bar is provided with a sleeve 60 and is apertured to receive a bolt 62 which passes through the bar aperture and sleeve and through a cooperating aperture formed in the adjacent spur gear. Each bolt 62 may be secured in position by a suitable fastening element, such as nut 64.

Referring now to Figure 6, it will be seen that the spur gears 46 and 48 are rotatable about vertically spaced downwardly and forwardly inclined axes and that the series of defoliating members 50 are parallel with each other and extend upwardly and forwardly between the two spur gears. By virtue of the parallel pivotal connections of the defoliating members with the spur gears, rotation of the latter will cause the former to move in an endless path with a substantially pure translational movement. When the device is stationary, the movement of any one of the short rods 54 will be in a circular path substantially parallel to the face of the spur gears. When the forward motion of the propelling vehicle is considered, the motion of any one of the short rods is in a substantially helical path having an outer operative run wherein the rods move substantially vertically downwardly. Of particular significance is the fact that the defoliating members are moved vertically downwardly into engagement with the tobacco leaves with a substantial translational movement. It has been found that such a movement results in considerably less leaf damage and removal is quite effective. Of further significance is the arrangement of the various short rods 54. By staggering the position of the short rods of the various defoliating members, complete engagement of the tobacco leaves, disposed in the direction of movement of the propelling vehicle is assured.

The driving means shown is preferred since it distributes the driving force equally to the two spur gears of the defoliating mechanism and hence, eliminates the

possibility of the binding or twisting of the individual defoliating members. However, it will be understood that other driving means may be provided if desired.

The defoliating unit 14 comprises a U-shaped frame 61 which includes an elongated longitudinal frame member 63 having an end frame member 65 extending laterally from the lower end thereof and a second end frame member 66 extending laterally from the upper end thereof. As before, a circular vertical plate 68 is fixed to the longitudinal frame member 63 and selectively pivoted to a pair of tractor parallel links 70.

Extending between the frame members 65 and 66 is a defoliating member, generally indicated at 72, which includes a shaft 74 having its ends journaled respectively in the frame members 65 and 66. Mounted on the shaft 74 is a hollow resilient member or hose 76, and a pair of resilient tubular members 78 are secured to the outer periphery of the hose 76 in helical arrangement. Any suitable means may be provided for driving the defoliating member 72, such as a flexible shaft 80 connected at one end to the rear end of shaft 74 and at its other end to a suitable source of power on the propelling vehicle.

It will be seen that rotation of the defoliating member 72 during the movement of the frame along one side of a row of tobacco plants will cause the hollow tubular members 78 to engage the tobacco stalks and to be slightly deflected inwardly thereby. This inward deflection enables the tubular members to engage more of the leaves on the tobacco stalks. Since the tubular members 78 are continuous throughout the longitudinal extent of the defoliating member, in the main they act to rub and/or push the leaves free from the stalk. Of course, where the tubular members 78 initially contact a tobacco plant or the like, impact force is applied.

In operation, the device of the present invention is moved along a row of tobacco plants by a suitable propelling unit in the manner described in the aforesaid application with the defoliating units 12 and 14 disposed on opposite sides of the row in upwardly and forwardly inclined relation. In order to direct the plants between the cooperating units, suitable guide elements 82 and 84 may be fixed to the forward end of the respective frames 16 and 61. If desired, plates or shielding elements 86 and 88 may be attached to the upper portion of the respective frames to prevent entanglement of overhanging leaves. Thus, as the device proceeds along the plant row, the guide elements will direct the stalks between the two driven units and the shielding elements serve to direct the overhanging leaves out of the way. Preferably, the units are disposed at an inclination of approximately 20° to the horizontal so that the upper end of the units will initially engage the uppermost portion of the swath to be removed and removal then proceeds from top to bottom. As set forth in the aforesaid application, the leaves of tobacco plants ripen from bottom to top so that it is necessary to remove the lower leaves first and then to subsequently remove the upper leaves as they ripen. Accordingly, it is preferable that the device be carried for vertical adjustment by the propelling vehicle so that the swaths may be removed from progressively higher vertical positions on the stalks.

As noted above, the motion of the defoliating members 50 of the unit 12 during the movement of the device is such that the elongated rod 52 and the short rods 54 move downwardly into engagement with the tobacco leaves with a substantial translational movement so as to engage the same. All of the defoliating members 50 translate in a common circular orbit and the downward translation of each into engagement with the tobacco leaves constitutes but a part of the total orbital movement. While the movement of all the members 50 through their total orbital travel is translational in the arrangement shown, such translational movement is essential only in the downward leaf engaging portion thereof.

Of course, in addition to the orbital translational movement, there is also a forward component of movement as a result of the traversal of the carrying frame along the tobacco rows in the field. The tubular members 78 of the unit 14 move rotationally downwardly into engagement with the leaves with a smooth continuous action. In this manner, as the stalks pass between the two cooperating units, all of the leaves within a vertical swath will be removed by the combined actions of each unit as noted above. Preferably, the units rotate at approximately 575 R. P. M. with a ground speed of $1\frac{1}{2}$ M. P. H. of the propelling vehicle being preferred.

It has been found that highly satisfactory removal can be obtained with the use of the device of the present invention. For example, leaf damage of only about 5.4% was noted in tests where non-removed leaves in the swath were considered to be 100% damaged. These results also include considerable damage to overhanging leaves and it is contemplated that by the use of appropriate shielding the total figure may be reduced to 4% or lower. Greatest damage occurred to the leaves extending generally in the direction of vehicle travel or the disposition of the row.

It is to be understood that the form of the invention herewith shown and described is to be taken as the preferred embodiment of the same and that various changes may be made without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. Apparatus for priming tobacco plants having stalks and leaves extending outwardly therefrom comprising a frame movable along a row of such plants, a pair of closely spaced means carried by said frame for engaging the plants adjacent their stalks on opposite sides thereof as the frame is moved therealong, at least one of said means comprising a plurality of defoliating elements, means operatively associated with said elements mounting the same on said frame for movement in an endless path including a portion during which said elements move translationally downward into engagement with the leaves of the plants, and means operatively associated with said elements for rapidly moving the same in said endless path so that during the translationally downward portion thereof the members will deliver to substantially all of the leaves engaged thereby a downward impact blow adjacent their connection with the stalks.

2. Apparatus as defined in claim 1 wherein each of said defoliating elements comprises an upwardly and forwardly inclined elongated member having a series of spaced relatively short members extending laterally outwardly therefrom.

3. Apparatus as defined in claim 2 wherein each of said short members is provided with a resilient exterior.

4. Apparatus as defined in claim 2 wherein the short members of each series are longitudinally aligned and spaced in staggered relation with respect to the spaced short members of the other series.

5. Apparatus as defined in claim 1 wherein said mounting means comprises a forward rotary member mounted on said frame for rotation about a downwardly and forwardly inclined axis, shaft means connecting the forward ends of said defoliating elements to said forward rotary member for rotation about circumferentially spaced axes parallel to the axis of said forward rotary member, a rearward rotary member mounted on said frame rearwardly and below said forward member for rotation about a parallel axis, and shaft means connecting the rearward ends of said defoliating elements to said rearward rotary member for rotation about circumferentially spaced axes parallel to and in the same vertical plane as the respective axes of rotation of their forward ends to said forward rotary member.

6. Apparatus as defined in claim 5 wherein said rotary members comprise spur gears.

7. Apparatus as defined in claim 6 wherein said means for moving said defoliating elements comprises a second pair of spur gears rotatably mounted on said frame in meshing engagement respectively with said first-mentioned spur gears, and means drivingly connecting said second pair of spur gears.

8. Apparatus for priming tobacco plants having stalks and leaves extending outwardly therefrom comprising a mobile frame for movement along a row of such plants, a pair of closely spaced means carried by said frame for engaging the plants adjacent their stalks on the opposite sides thereof as the frame is moved therealong, one of said means comprising driven impact means for delivering to substantially all of the leaves engaged thereby a downward impact blow adjacent the connection of the leaves with their stalks, said driven impact means comprising a plurality of elongated tobacco leaf engaging means, means operatively associated with said members for mounting the same in an upwardly and forwardly inclined position and for movement in an endless path including a portion wherein said members are moved translationally downward into engagement with the leaves of the plants so as to deliver said downward impact blow adjacent the connection of the leaves with their stalks, the other of said means comprising driven wiping means for delivering to substantially all of the leaves engaged thereby a downward wiping action adjacent the connection of the leaves with their stalks, and means operatively associated with said driven impact means and with said driven wiping means for rapidly moving the same in a generally downward path as said frame is moved along the row of said plants.

References Cited in the file of this patent

UNITED STATES PATENTS

1,942,011	Urschel	Jan. 2, 1934
2,475,531	Townsend	July 5, 1945
2,635,408	Cox	Apr. 21, 1953