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O. E. EISSMANN ET AL

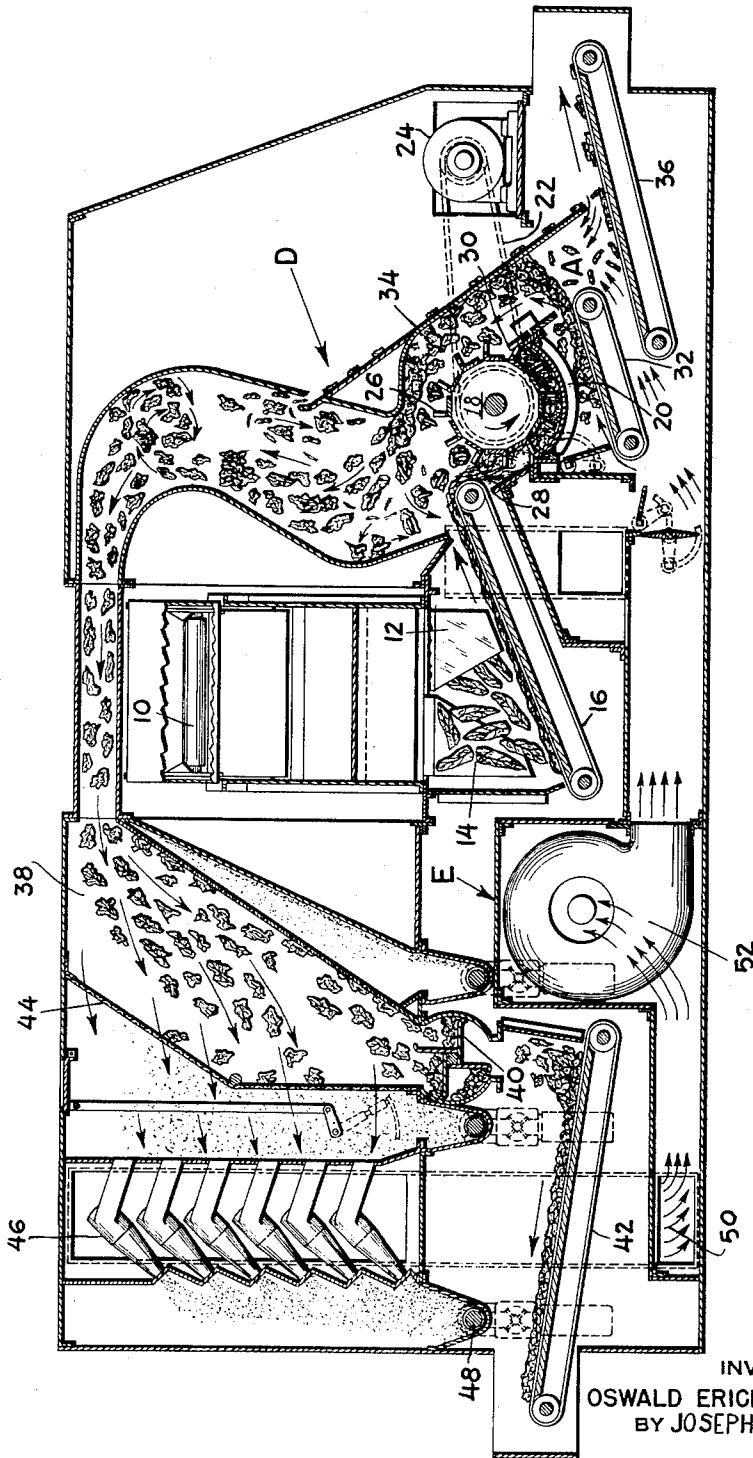
2,984,246

TOBACCO RIPPING AND SEPARATING APPARATUS

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3 Sheets-Sheet 1

FIG. 1



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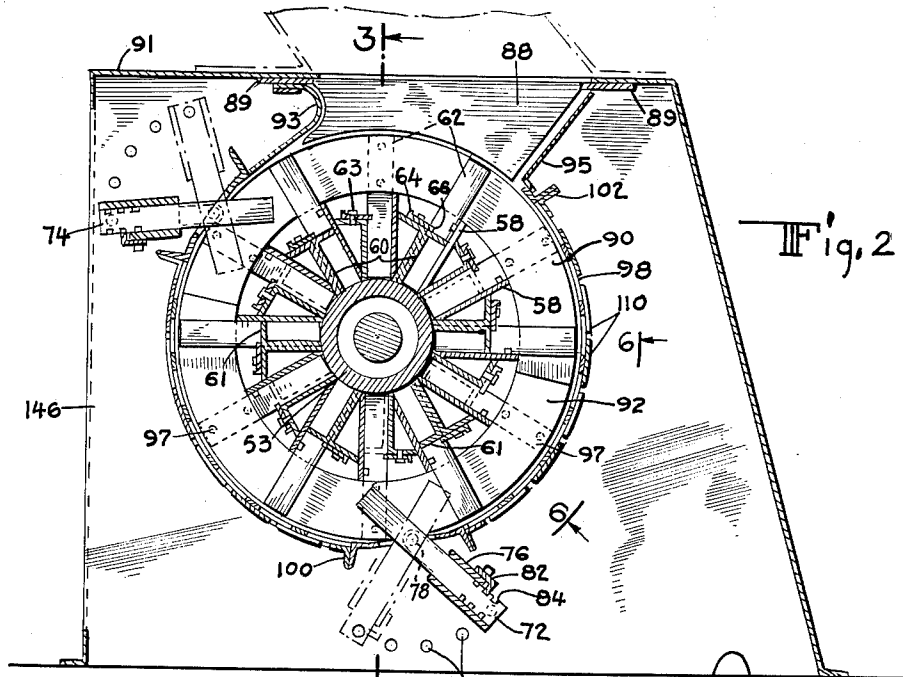
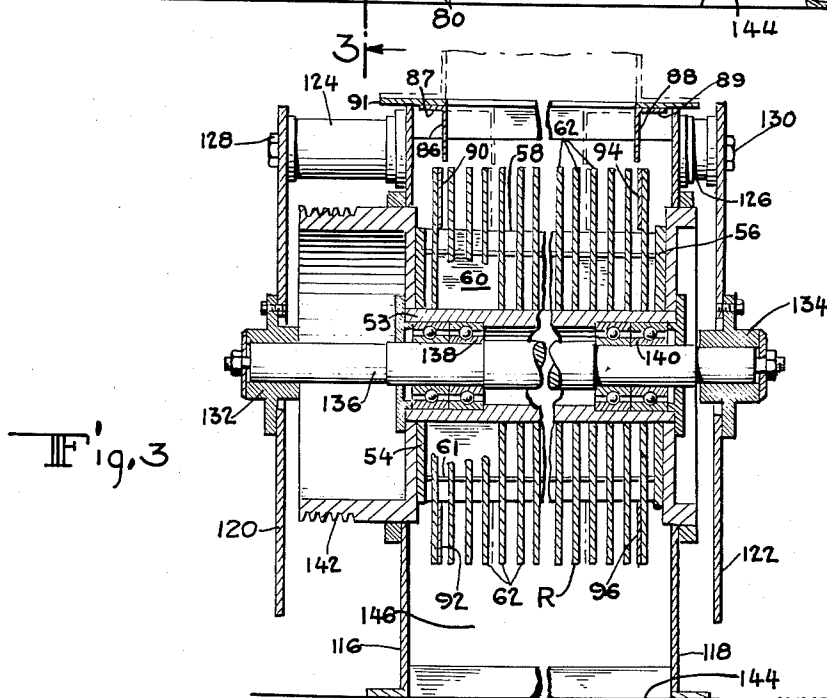
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3 Sheets-Sheet 2



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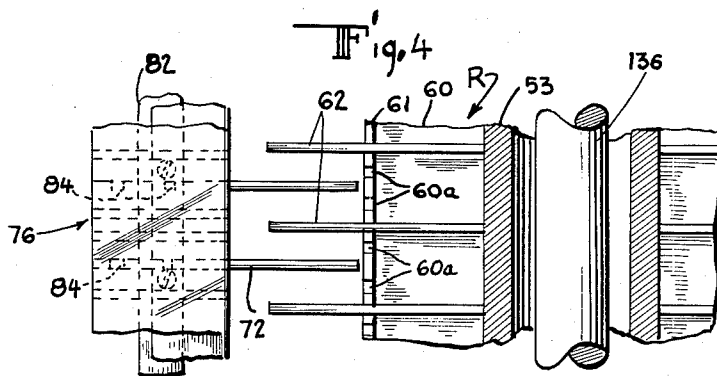
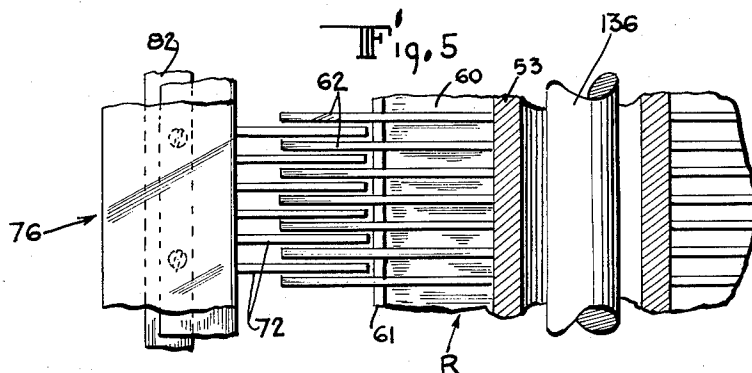
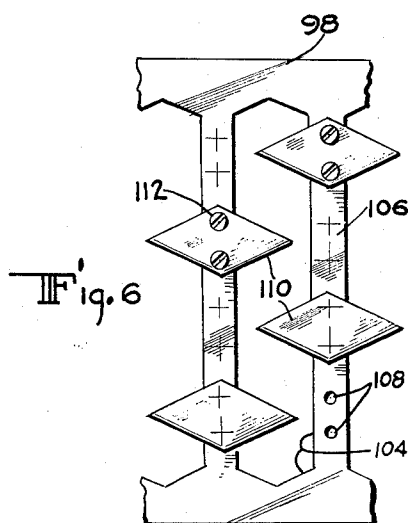
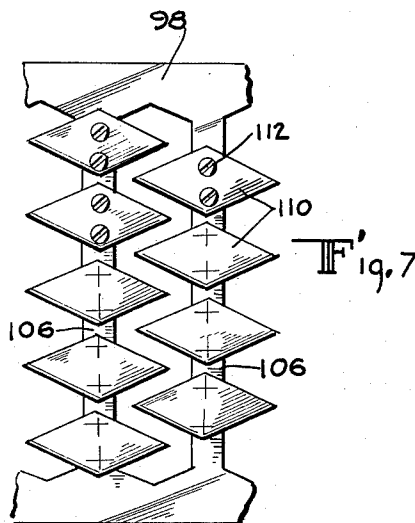
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TOBACCO RIPPING AND SEPARATING APPARATUS

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3 Sheets-Sheet 3



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TOBACCO RIPPING AND SEPARATING APPARATUS

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11 Claims. (Cl. 131-146)

This invention relates to a tobacco ripping and classifying apparatus and a method for ripping and classifying tobacco leaves. This application is a continuation in part of a prior application filed December 29, 1951, by Oswald Erich Eissmann, Ser. No. 264,200 which matured as U.S. Patent No. 2,826,205, issued March 11, 1958.

In the above-mentioned patent it has been described how a high efficiency in ripping lamina from stems may be obtained in a tobacco ripping apparatus by controlling the rate at which tobacco leaves to be torn is fed in between a spiked roller and a concave. It has been found that in some situations the quantity of tobacco is not always available to enable this to be done and it is the purpose of the present invention to provide a versatile tobacco ripping apparatus which will provide the same ripping efficiency by moving the components of the ripping apparatus closer together to obtain the same results as is mentioned in the U.S. Patent 2,826,205 and by regulating the size of the escape openings of the ripping apparatus.

An object of this invention is to provide an improved method for feeding tobacco in between a spiked drum and concave to obtain a more efficient removal of leaf lamina from stems on one pass.

A further object is to provide a tobacco ripping apparatus wherein the components of the ripping apparatus may be moved closer together to regulate the amount of compaction of the leaves as they undergo ripping and threshing.

Another object is to provide stationary ripping teeth which may be readily adjusted in and out as well as to the angle of attack.

A further object of this invention is to provide an improved threshing apparatus wherein the threshing elements may be readily rearranged to handle various types of tobacco leaves to be threshed.

A further object is to provide a threshing machine wherein the components are readily changed about to handle different kinds of tobacco and to provide for an adjustment which will enable a tobacco density to be obtained which will result in the greatest separating efficiency in the removal of lamina from the stems.

Other objects and features of the invention will appear as the description of the particular physical embodiment selected to illustrate the invention progresses. In the accompanying drawings, which form a part of this specification, like characters of reference have been applied to corresponding parts throughout the several views which make up the drawings.

Referring to the drawings:

Fig. 1 shows a sectional side elevation of the complete tobacco ripper and separator.

Fig. 2 shows a sectional side view of a modified form of threshing.

Fig. 3 is a sectional view and elevation of the threshing taken on lines 3-3 of Fig. 2 omitting the stationary teeth.

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Fig. 4 is a schematic illustration showing one of many possible combinations of tooth spacing.

Fig. 5 shows another possible spacing of the teeth on the drum and the stationary teeth.

Fig. 6 shows one possible combination of mounting the teeth on the concave wall taken on the line 6-6 of Fig. 2.

Fig. 7 shows another spacing of the teeth on the outside concave wall.

The ripper and separator apparatus shown in Fig. 1 has been fully described in U.S. Patent 2,826,205 referred to above. This apparatus, for the purposes of this disclosure may be briefly described as follows:

Tobacco leaves to be ripped are delivered into the machine on an endless conveyor belt 10. These leaves are discharged onto the deflector plates 12 and 14. The deflector plates spread the leaves across the endless conveyor belt 16 which conveys and discharges the leaves so received into the space located between the spiked drum 18 and the concave 20. The spiked drum 18 is driven by a belt 22 from a motor 24. The speed of the belts 10 and 16 and the speed of the spiked drum 18 may be regulated by suitable means so as to control the density of the tobacco located between the spiked drum and the concave 20 so as to thereby achieve the maximum leaf tearing efficiency.

The rotating ripper or spiked drum 18 and the concave 20 may be of a similar construction to that shown in U.S. Patent 2,755,930 and may be provided with suitably spaced and shaped combs and rakes. The combs 26, 28 and 30 cause the lamina to be torn from the stem portions of the leaves in the manner described in said last mentioned patent.

The torn leaf and stem portions drop through the spaces between the serrated bars of concave 20 surrounding the spiked drum 18 and fall onto a continuously moving conveyor belt 32. As described in U.S. Patent 2,826,205 the feeding of tobacco is at a fast enough rate and in sufficient volume to maintain the space between the stemming cylinder 18 and the concave 20 filled with tobacco leaves. A much more efficient ripping action was obtained than when prior practices were used. This method of feeding tobacco has been found to be so effective that most leaves have the lamina and stems completely separated from each other after making only one pass around the spiked drum 18.

Heretofore it was necessary to rely a great deal upon reprocessing to completely remove all lamina from the stems.

Due to the method described in U.S. Patent 2,826,205, wherein larger quantities of tobacco are fed to the tobacco ripping apparatus, there is less tobacco returned for retearing. If there is too much air flowing through the machine shown in Fig. 1, this is rectified by merely feeding more tobacco. This method of feeding tobacco leaf results in cutting down the amount of air and also results in more complete stemming in one pass. Belt 32 hurls the leaf and stem pieces towards a wall 34 of housing D into an air stream entering the separating housing at point A. The air stream is created by the suction and blower system E, which air stream carries the torn tobacco through the separator housing in the manner fully described in U.S. Patent 2,826,205.

The lamina free stems fall downwardly at point A onto an endless belt 36 which removes the stems from the separating apparatus. The stemless lamina are separated from the air stream in chamber 38 and fall downwardly into the pockets of the gate valve 40 which discharges them onto the endless conveyor belt 42.

The air is removed from the chamber 38 through a screen 44 and passes through cyclone dust separators 46 which separates the dust from the air stream. The dust

so separated is removed by a screw conveyor 48. The clean air is exhausted from the dust separator through a duct 50 and is recirculated through the machine by means of the suction fan 52, in the manner described in U.S. Patent 2,826,205.

As has been heretofore mentioned when the quantity or type of tobacco leaves to be processed through the separating apparatus has been materially changed, it may not be possible to obtain the high efficiency tearing action that has just been described. This is because the quantity of leaves is not sufficient to provide the compactness or density of the leaves between the spiked drum 18 and the concave 20.

To solve this problem of tobacco leaf processing we have provided a ripping apparatus wherein the components can be moved closer together to provide for this variation. This modified form of the invention is shown in Figs. 2 to 7 and may be briefly described as follows:

Referring to Figs. 2 to 5, we have provided a rotor assembly R including a rotatable cylinder or drum shaft 53 having a pair of annular end plates 54 and 56 between which are mounted a plurality of peripherally spaced and transversely extending flat bars 58 each of which is backed by correspondingly disposed T-bars 60, the flange 61 of each T-bar 60 abutting adjoining flat bars 58. The flat bar 58 and T-bar 60 assemblies serve as peripheral and transverse spacer members for the threshing teeth or spikes 62 mounted on the shaft 53, as well as transverse spacers for the end plates 54 and 56. The threshing teeth 62 are in the form of radially extending flat bars which are inserted within longitudinally spaced serrations or notches 60a in the flanges 61 of T-bars 60 (Figs. 4 and 5), the edge portions of the teeth being in abutting relation to the webs of the T-bars 60 and to the faces of the flat bars 58. Clamp plates 64 (Fig. 2) adjustably secured to the flanges 61 of T-bars 60 by means of bolts 63 are received within edge notches 66 in teeth 62 to secure the latter against radial movement. The teeth 62 may be positioned at any desired positions by merely disengaging clamp plates 64 from the notches 66 in the spikes or teeth 62. Any number of clamping means and any number of sets of teeth may be used on the rotor. Fig. 2 shows six sets of teeth inserted into the notched T-bars 60 on said rotor. The alternate six notched T-bars 60 shown have their notches for the teeth staggered in relation to the first six. This staggering effect gives almost any desired tooth arrangement two of which arrangements are shown in Figs. 4 and 5.

The two stationary sets of teeth 72 and 74 are clamped in carriers 76 and pivot about points 78 and are located in any one of the hole positions 80. This adjustment in turn changes the impact angle at which the tobacco to be processed engages teeth 72. This setting can be from a negative angle to a straight line engagement, similar to a shearing action or to a positive angle where only the edge of the teeth penetrates the leaf. In addition, the individual teeth 72 can be adjusted in and out by means of clamp 82 engaging in different notches 84 in the teeth 72.

The control of the tobacco density is obtained by setting the intake side walls 86 and 88 toward or away from each other from the full line position shown in Figure 3 to the broken line position shown therein to thereby fix the working width of the threshing rotor. Referring to Figs. 2 and 3, the side walls 86 and 88 are provided at their upper edges with horizontal flanges 87 and 89 and, as best seen in Fig. 2, these flanges 87 and 89 extend beyond the edges of the tobacco feed opening in the top plate 91 of the housing, in underlying sliding relation to the plate 91 and being held thereagainst by being slidably supported on the upper ends of fixed front and rear walls 93 and 95 of the tobacco intake. The side

walls 86 and 88 may thus be adjusted in location by sliding the walls toward or away from one another as may be needed to narrow or widen the width of the tobacco intake. The walls 86 and 88 may be releasably locked in any desired position by conventional means, for example, bolt and nut assemblies (not shown) extending through slots in the flanges 87 and 89. In addition to walls 86 and 88 there are two rings, one on each side. Each ring consists of two sections 90 and 92, and 94 and 96, respectively, selectively mounted by bolts 97 (Fig. 2) on the rotating teeth retaining the tobacco to be threshed within the most efficient working width of the unit. When the intake walls 86 and 88 are changed to a narrower or wider width, the ring sections 90, 92, 94 and 96 have to be changed accordingly (see Figs. 2 and 3).

The adjustability in the openings in the stationary curved sheets can be clearly seen in Figs. 6 and 7. The concave consists of a curved sheet 98 (Fig. 2) mounted on stationary crossbars 100 and 102.

The curved sheet 98 has a number of substantially rectangular openings 104 having bars 106 therebetween. These bars 106 have uniformly distributed mounting holes 108 shown in Fig. 6.

Individual diamond shaped teeth 110 have two sets of mounting holes, corresponding with the holes 108 in bars 106 and are attached to said bars 106 by suitable mounting bolts 112. Depending on the number of these diamond shaped teeth 110 and their mountings on the bars 106 almost any size opening can be obtained. Two of said arrangements have been shown in Figs. 6 and 7.

The tobacco ripping apparatus we have described herein may be supported in a suitable tobacco ripping and classifying machine of the type shown in U.S. Patent 2,755,930, granted July 24, 1956 or may be supported in a separate housing for the ripping apparatus alone as shown in Figs. 2 and 3.

The ripping apparatus shown in Fig. 3, is supported between two side walls 116 and 118 which form the side housing of our apparatus. A pair of plates 120 and 122 are supported by side walls 116 and 118 by means of suitable spacers 124 and 126 attached to plates 120 and 122 by bolts 128 and 130. The plates 120 and 122 in turn, carry supports 132 and 134 in which is fixedly mounted a shaft 136.

The spiked rotor R supported on ball bearings 138 and 140 is free to revolve about the shaft 136.

A conventional multiple pulley 142 is secured to the side of rotor R. Conventional V-belts, not shown, travel in the grooves formed in pulley 142 so that when the pulley 142 is rotated it causes the rotor R to be similarly rotated. Tobacco may be discharged through the open bottom 144 or side 146 onto a conveyor belt to be transported to a suitable tobacco classifying apparatus.

The invention herein described may be varied in construction within the scope of the claims, for the particular device illustrated is but one of many possible embodiments of the same. The invention therefore is not to be restricted to the precise details of the structure shown and described.

What is claimed is:

1. A tobacco leaf ripper comprising, a spiked rotor, a perforated concave spaced from and surrounding said rotor, adjustable side walls for limiting cross sectional area between said rotor and the concave and a feed means adapted for delivering tobacco into said cross sectional area at a rate which will provide a high efficient tearing of lamina from the stems of tobacco leaves.

2. A tobacco leaf ripper comprising, a spiked rotor having spikes with means for rearranging the spikes across the periphery of said rotor, and a stationary spiked concave having spikes surrounding said rotor and having openings through which torn leaf tobacco pieces can pass,

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said spikes on the concave being adjustably positioned on said concave and means for feeding leaves into the space between said rotor and concave for tearing, said spikes on said rotor and on said concave being positioned to limit the spaces between them so as to compel the tobacco to be compacted at the time it undergoes tearing.

3. A tobacco leaf ripper comprising a housing, a source of supply to feed tobacco into said housing, rotatable means in said housing, a stationary perforated concave member cooperatively positioned around said rotatable means for threshing tobacco, and adjustable teeth mounted on said member to regulate the open area through which the tobacco being threshed can pass.

4. A threshing device for tobacco comprising a housing, a shaft mounted in said housing, spaced discs attached to said shaft and rotatable with said shaft teeth mounted on said shaft between said discs and rotatable therewith, teeth spacer members having notches formed therein and being supported between said discs, the teeth being retained in said notches, clamping means to hold said teeth in said notches, a perforated concave member positioned about the periphery of said teeth, and other adjustable teeth mounted on said perforated member to regulate the area opening through which tobacco being threshed passes.

5. In an apparatus for threshing tobacco, a housing having an opening to receive tobacco leaves to be threshed, means to supply tobacco into said opening, a set of parallel rotating side plates in said housing, elongated notched members attached to said plates and extending therebetween, adjustable teeth selectively supported in and projecting substantially radially from the notches of said elongated members which serve as spacers for said teeth, a drive for rotating said plates continuously in one direction, a concave member positioned around said plates having apertures in its circumference and a plurality of stationary teeth extending inwardly from said concave members and interpassing with said internal rotating teeth for threshing tobacco.

6. A threshing apparatus for tobacco leaves comprising a housing having an opening to receive tobacco, a shaft supported in said housing, parallel rotatable members supported by said shaft, elongated members supported between said rotatable members, individual teeth extending radially from said members which serve as teeth spacers, releasable clamping means to adjustably secure said teeth in said spacers, an outer casing attached to said housing and other teeth extending inwardly from said casing interpassing with said rotating teeth for threshing tobacco.

7. Apparatus for threshing tobacco comprising a housing, a source of supply of tobacco fed to said housing, adjustable walls in said housing to receive said tobacco, a rotatable shaft extending through said housing, a set of rotatable discs attached to said extending shaft, spacer members extending between said discs to keep said discs in spaced relationship to each other, radially extending teeth adjustably supported by said spacer members and flat ring sections supported by certain of said teeth in the same plane as said walls and adjustable with said walls so as to compel the tobacco to be compacted at the time it undergoes tearing.

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8. A mechanism for threshing tobacco comprising a housing, a rotatable shaft supported in and extending through said housing, rotatable side plates supported by said shaft inside said housing, a drive pulley supported by said shaft outside of said housing, spacer members extending between and attached to said rotatable side plates to hold said plates in spaced relationship with each other, notched T-bars supported by said spacer members, individual teeth inserted in said notched T-bars and rotatable therewith, clamps to hold said teeth radially in said notches and adjustable stationary teeth on the periphery of said rotatable teeth interpassing said rotatable teeth for threshing tobacco.

9. In a device for threshing tobacco, a housing, a shaft supported in said housing, rotatable members in spaced relationship to each other supported by said shaft, notched elongated spacers extending between and supported by said rotatable members, teeth removably inserted in the notches of said spacers and extending radially therefrom, a concave outer casing supported by said housing and teeth mounted on said casing adjustable about their own centers to change the angle of attack at which the tobacco to be threshed engages said casing teeth.

10. A threshing apparatus for tobacco leaves comprising a housing, a stationary concave having transversely elongated openings peripherally spaced so as to form elongated transverse bars on the periphery of said concave, stationary teeth attached to said bars to regulate the area of said openings, stationary teeth extending radially through and attached to said concave, a shaft in said housing and coaxial with said concave, spaced discs supported on said shaft, spacers attached between said discs, and teeth extending radially and attached to said spacers to rotate and co-act with said stationary teeth to thresh tobacco and push it through the regulated openings formed by the teeth on the concave.

11. A threshing apparatus for tobacco leaves comprising a housing, a source of supply of tobacco fed to said housing, adjustable walls to regulate the size of an opening in said housing to receive said tobacco, a shaft projecting through said housing, a spiked rotor rotatably supported by said shaft, a drive pulley attached to one end of said rotor, spaced discs attached to said rotor, spacer members supported by and extending between said discs, teeth supported by clamping means on said spacer members, a curved concave sheet in the periphery of said rotor having substantially rectangular openings to form solid bars between said openings, said bars having mounting holes and diamond-shaped individual teeth supported in said mounting holes to adjust the open area in said rectangular openings through which threshed tobacco passes.

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