J. B. HARRISS.

METHOD AND APPARATUS FOR SEPARATING LEAVES FROM PACKAGES.

APPLICATION FILED APR. 12, 1917.

1,328,734.

Patented Jan. 20, 1920.

3 SHEETS—SHEET 1.

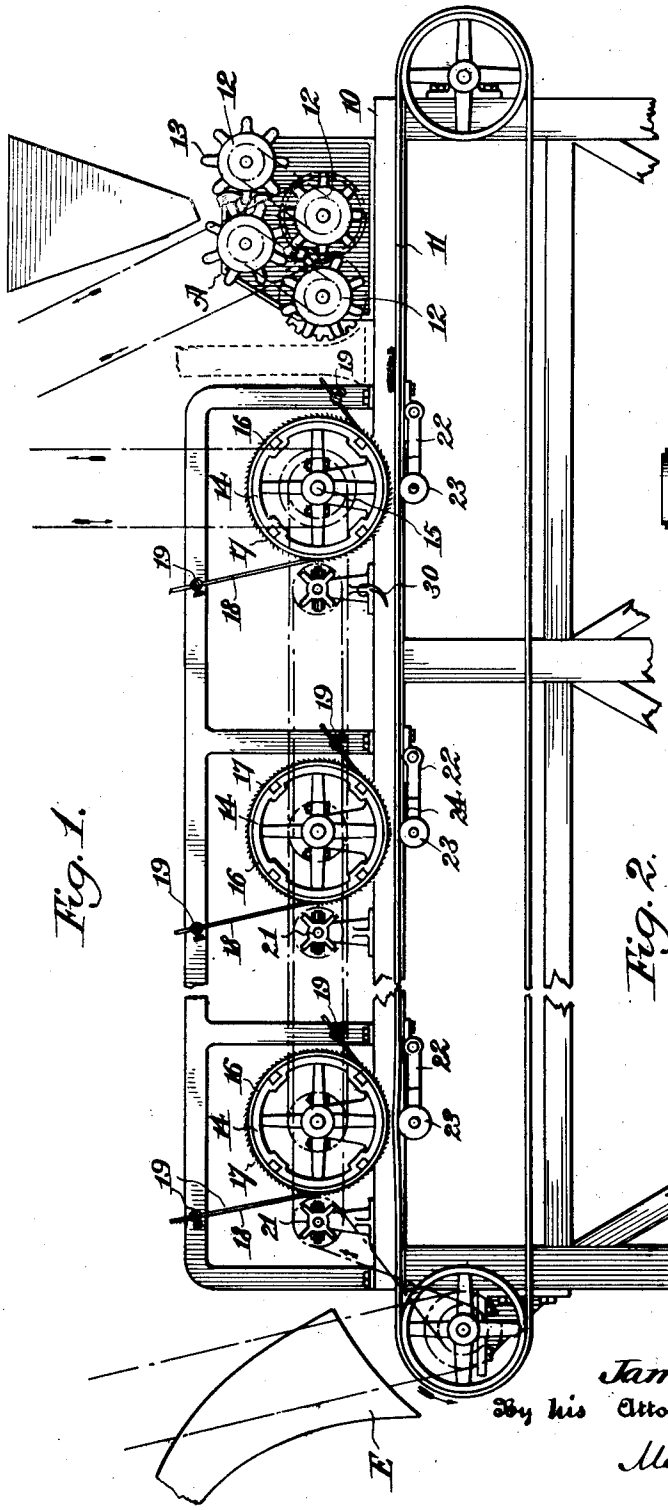


Fig. 1.

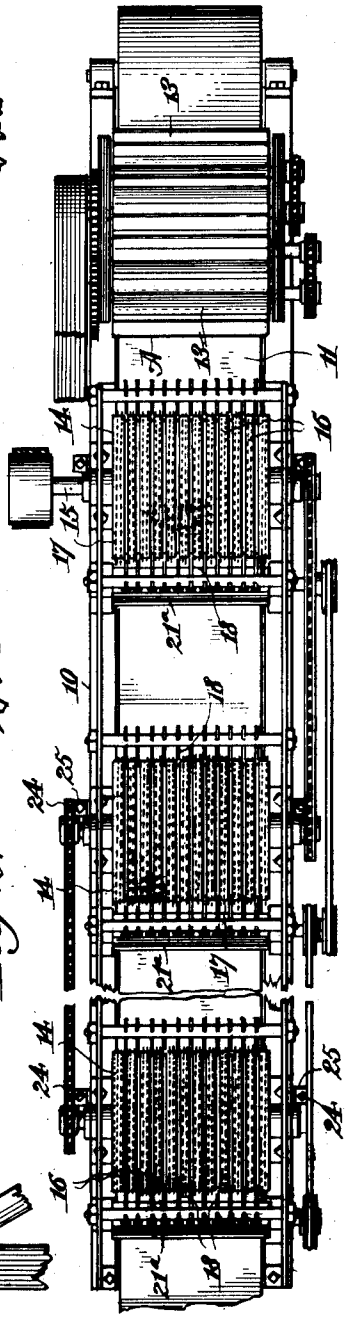


Fig. 2.

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3 SHEETS—SHEET 2.

Fig. 3.

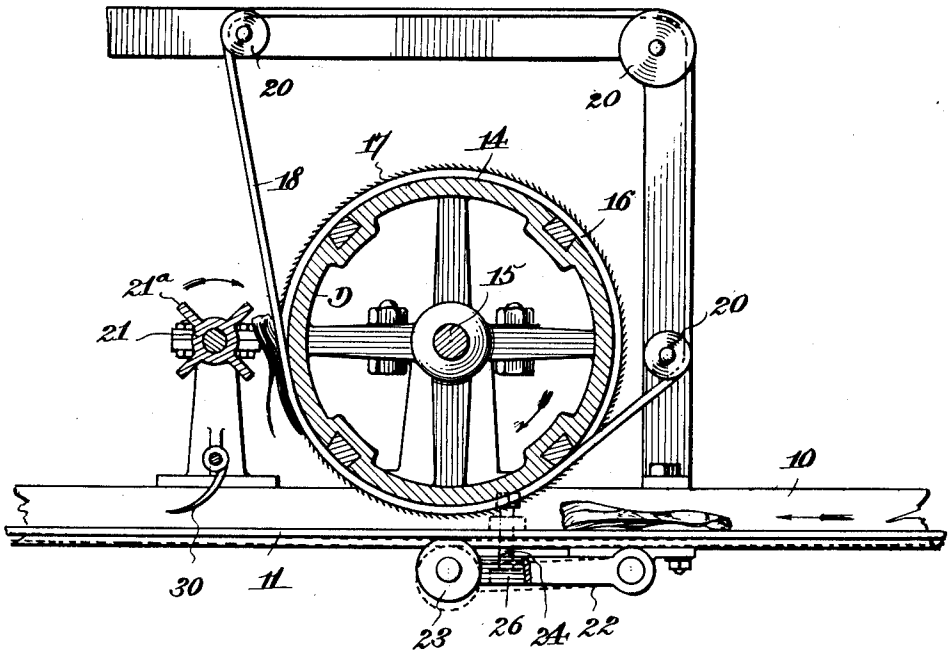


Fig. 5.

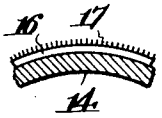


Fig. 4.

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3 SHEETS—SHEET 3.

Fig. 5.

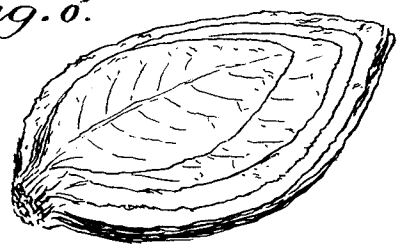
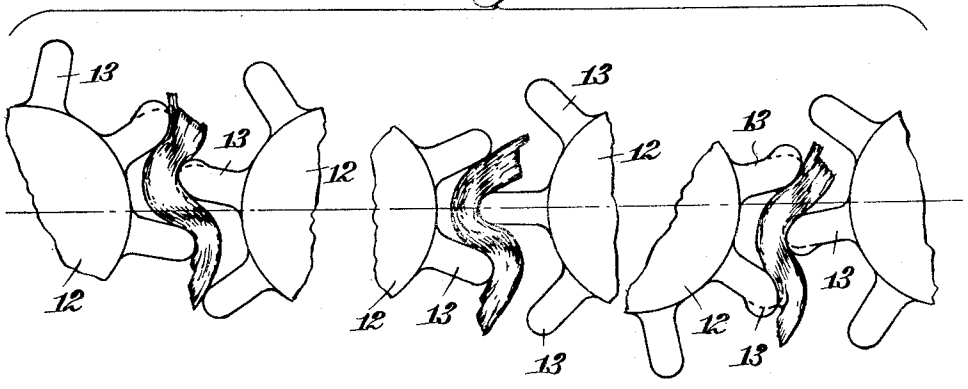


Fig. 6.

Fig. 7.



Inventor,
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UNITED STATES PATENT OFFICE.

JAMES B. HARRISS, OF NEWARK, NEW JERSEY.

METHOD AND APPARATUS FOR SEPARATING LEAVES FROM PACKAGES.

1,328,734. Specification of Letters Patent. Patented Jan. 20, 1920.

Application filed April 12. 1917. Serial No. 161,541.

To all whom it may concern:

Be it known that I, JAMES B. HARRISS, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Methods and Apparatus for Separating Leaves from Packages, of which the following is a specification.

The present invention relates to the art of "picking" packs of leaf tobacco, and pertains more particularly to methods and apparatus for producing mechanical "picking" action in contradistinction to the general hand "picking" operation.

Imported leaf tobacco, when delivered to the manufacturer of tobacco products, and especially where the tobacco is of the kind known to the trade as Turkish tobacco, is in pack form. The individual tobacco leaves, of irregular dimensions, are more or less superimposed in preparing the leaves for transportation, a sufficient number of leaves being employed to produce what is known as a bale. The formation of the bale provides more or less pressure on the leaves, and the resultant action, combined with the fact that a portion of the curing of the tobacco takes place while the leaves are in bale form, causes the superimposed leaves to be facially united adhesively or cohesively, the amount of adhesion or cohesion depending to some extent upon the particular characteristics of the tobacco leaf—the leaf characteristics generally vary with different tobacco growing districts—as by variations in size, texture, sap contents, etc.

Owing to this facial uniting and the requirements of manufacture, the pack formation thus produced must be broken down in order that comparatively thin pack portions or layers—a leaf or a relatively small number of leaves—may be produced.

As it is desirous that the general leaf formation be preserved as far as possible, this separation of leaves, prior to my inventions, have been performed by hand labor, the operative separating the pack into leaf layers by hand, this operation being known as "picking" the pack, and provides the separation with a minimum amount of scrap and without materially affecting leaf formation or characteristics. So far as I am aware, mechanical "picking" has not been employed prior to my inventions, no substitute for the more or less delicate handling of the leaves produced by the fingers of an operative having been provided. I believe myself to be the first to provide constructions and methods of operation which will form an efficient substitute for this hand "picking" operation.

Various ways may be employed in carrying out the general and broad principles of these inventions. In the application filed by me July 10th, 1916, Serial No. 108,519, and that filed April 12, 1917 Serial No. 161,542, I have disclosed several ways in which these principles may be applied. In the present application I have disclosed other ways of producing the desired result, and while I have disclosed specific mechanisms, these are more or less illustrative.

The general object of the invention is, therefore, to provide mechanical "picking" action as a substitute for the hand "picking" operation, thus decreasing the cost of production either through decrease in labor or increase in capacity, or both.

Briefly stated the invention provides for mechanically separating the leaves of a pack of facially-united tobacco leaves, and consists broadly, in subjecting the pack to opposing separating strains sufficient to cause a relative movement between adjacent leaves of the pack whereby the uniting medium loses its uniting effect; it may be further stated as a method for mechanically "picking" a pack of facially united tobacco leaves which consists in bodily moving the pack, and causing a relative separating movement between adjacent leaves of the pack during such pack movement.

To these and other ends, therefore, the nature of which will be readily understood as the invention is hereinafter disclosed, said invention consists in the arrangement and combinations of parts, together with the general manipulative methods, hereinafter more fully described, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

In the accompanying drawings in which similar reference characters indicate similar parts in each of the views:—

Figure 1 is a side elevation showing one way in which the present invention may be embodied.

Fig. 2 is a top plan view.

Fig. 3 is a sectional view—on an enlarged scale—of a drum unit, the section being taken longitudinally of the machine.

Fig. 4 is a sectional view taken vertically and longitudinally through the drum best shown in Fig. 3.

Fig. 5 is a detail view showing a different arrangement of pin structure.

Fig. 6 is a diagrammatic view showing a different arrangement.

Fig. 7 is a detail view showing the action of the flexing mechanism.

Fig. 8 is a view of a "pack."

As shown in Fig. 6, the "picking" manipulation may involve a flexing action, an action in which a leaf or leaves are "picked" off of the pack, or a combination of these methods. Where the facial uniting is insufficient to witstand the flexing action produced by the mechanism A, the leaves of the pack will become separated in passing through this mechanism and fall on to the endless conveyer *a* which may deliver the separated leaves to any suitable point, the conveyer in such case being of any desired type. In the drawings this conveyer is adapted to drop the leaves into the flow path of fluid pressure means B which may be in jet form and which will carry the separated leaves laterally on to an endless conveyer *a'*, this being a simple arrangement for producing the result, it being understood that where it is desired to transfer leaves from conveyer *a* to another conveyer, any other well-known form of transfer means—as for instance, suction mechanism—may be employed. Obviously, a complete "picking" operation is produced by the mechanism A on those packs in which the cohesion is such that the desired separation is had in passing through this mechanism.

Fluid pressure means B and conveyer *a'* may be employed where the facial uniting of pack leaves in such that mechanism A will provide but a partial separation of the pack or even an entire lack of separation. In such case, the falling packs or pack portions, in passing the fluid pressure stream or streams will be diverted more or less according to the weight of the portion, those portions which are of the desired thickness and consequently of light weight, being carried laterally on to conveyer *a'*, while the remaining portions continue to fall and pass into a hopper C or directly on to an endless conveyer *d*, as may be desired.

Conveyer *d* is adapted to operate in connection with what may be termed "picker" units or pack manipulating mechanisms arranged to remove pack portions or leaf layers from the pack during travel of the conveyer past these mechanisms. If desired, another flexing operation may be provided beneath hopper C as indicated for instance, in Fig. 1. Obviously, the "picker" or pack-manipulating mechanisms, indicated generally at D, form an apparatus for "picking" the packs which are delivered into hopper C; hence, the mechanism A may be omitted if desired and all of the packs be fed directly into hopper C.

As will be understood, therefore, each of mechanisms A and D may form an individual "picking" pack travel path complete in itself and capable of separate or individual installation or operation, or they may be combined to produce a single travel path, mechanism A then acting more or less as a preliminary flexing mechanism, fluid pressure means B and conveyer *a'* being omitted, or mechanism A may serve as a combined separating and flexing mechanism, fluid pressure means B and conveyer *a'*, serving to remove separated pack portions from the pack travel path prior to entering into mechanism D and thus reduce the amount of pin pricking on the leaves, where mechanism D is of the type indicated in other figures of the drawings.

As heretofore pointed out, leaf size, configuration, texture, etc., may vary considerably, depending on the particular location at which the tobacco is being raised. For instance, the leaves may vary in length from ¾ of an inch to 10 to 12 inches, the texture generally varying with variations in leaf size. These variations may affect the amount of cohesion or adhesion of leaves in the pack and thus vary the character of pack manipulation required to provide the leaf-layer separation. Therefore, in installing a mechanical apparatus for manipulating the packs, the particular mechanism or mechanisms employed may depend somewhat upon the charcteristics of the tobacco which is being employed in the manufacture, it being obvious that where the only tobacco employed has a small amount of cohesion, either of mechanisms A or D will be sufficient for the picking operation. Where the tobacco for manufacture is of many grades and types, and with many degrees of cohesion, it may be desirable to employ these mechanisms in combination. I therefore desire it to be understood that the invention contemplates the use of these types of mechanisms individually or in combination, the omission of one mechanism still retaining the remaining structure within the scope of the invention.

Obviously, mechanism A may be of any suitable type, as, for instance, is disclosed in the earlier companion application above identified, in which mechanism A is in the form of a series of opposing rolls, one set being provided with beads or rings and the other set with grooves more or less complemental to the beads or rings. In such form the opposing rolls are in sets in which the beaded rolls of one set are located on

the opposite side of the pack travel path from the beaded rolls of a succeeding set, thus providing bending or flexing manipulations of the pack in opposite directions during passage of the pack through the rolls.

Mechanism D of said companion application employs a conveyer above which is mounted a rotating drum having its rotating surface in proximity to the top surface of the packs carried by the conveyer, the drum having suction means which causes the pack to become temporarily affixed to the drum by the suction action on one face of the pack, thus causing the pack to travel with the drum. A suitable device is located in the travel path of the pack for obstructing the continued movement of the major portion of the pack, the result being that the pack portion which is temporarily held affixed to the face of the drum by the suction device is moved relative to the remainder of the pack and thus provides separation, the suction being broken at a suitable point and the pack portion removed from the drum.

As shown in said prior applications these mechanisms may be employed in a single machine, mechanism A serving to provide a preliminary flexing, mechanism D acting to separate pack portions which have not become separated during the flexing operation.

In the present disclosure, these mechanisms are of a different type although providing the same general results. For the purposes of illustration, both mechanisms are shown in Figs. 1 and 2 as mounted on the same general frame, indicated at 10, and above the travel path of an endless conveyer 11, it being understood, of course, that these mechanisms may be independent, as in Fig. 6, or may be mounted in the relation shown in Fig. 1, or may be mounted on independent frames, as desired.

Mechanism A, in this particular form embodies a plurality of rolls 12 having teeth 13, these teeth being preferably yieldable, this yieldable characteristic may be controlled by the nature of the material employed for the teeth or by the use of a rigid tooth structure mounted in such a way as to be yieldable. For illustrative purposes, the teeth are shown as formed of rubber or a rubber composition. The rolls are so arranged that the teeth 13 of one roll do not mesh with the teeth of the coöperating roll excepting that the rolls are geared or otherwise operatively connected in such manner that a tooth of one roll is opposite the space between adjacent teeth of the complemental roll when passing a plane intersecting the axes of the two rolls. Consequently, there is provided a tortuous passageway through which a pack may pass, the teeth of one roll causing the portion of the pack in contact therewith to be forced into the space of the other roll, thus flexing the pack generally. In this operation the yielding tooth arrangement is of advantage in that there may be provided a more or less tendency to the formation of a creeping action in the pack through the more or less shifting in position of a tooth in moving through its path of activity with the adjacent roll. Hence, there is not only a bending action on the pack but also a more or less pressure application which tends to reduce the cohesion between pack portions through this tendency of a creeping action. There is thus produced a more or less combined action of the bending and the shifting pressures with the result that the pack is subjected to manipulations which will tend to reduce the cohesion in the pack and at the same time produce this result without subjecting the pack to the action of a mechanism which will materially affect the leaf texture of the pack.

As shown in Figs. 1 and 2, a series of rolls 12 are employed—the drawings showing four rolls as an illustration, it being understood that any desired number of rolls may be employed. In this particular form, a pack is required to pass through three different tooth-manipulating zones, the rolls being preferably arranged in such manner as will cause the different pressures to apply at different points of the pack in each zone, so that a pack portion bent in one zone will be bent in the opposite direction in another zone, thereby effectively loosening the pack even where the cohesion between leaves is such that complete separation is not had. Obviously, by increasing the number of rolls, additional tooth-manipulating zones may be provided and thus increase the loosening effect.

As heretofore pointed out, manipulation by mechanism A may be sufficient to produce the desired pack separation, depending, of course, upon the character of cohesion of the leaves, so that this mechanism alone may be sufficient to provide for pack separation, and in small manufactories may form the only manipulating means employed, hand "picking" being utilized to complete the operation on such packs as are not properly separated, the manipulation by the mechanism decreasing the amount of hand manipulation required and consequently increasing the capacity of the operative to this extent. Obviously, the fact that complete separation would be had, of a considerable portion of the tobacco, would in itself materially decrease the cost of the "picking".

Mechanism D is shown in the form of what may be considered as drum units or leaf manipulating mechanisms which are more or less similar in arrangement, so that a description of one unit will suffice. These

units or mechanisms are preferably arranged successively in the travel path of the carrier 11 and are suitably connected up to drive mechanisms so as to provide the proper drive action.

Each unit includes a drum 14 which is mounted on shaft 15 and has its face provided with a plurality of leaf-affixing zones spaced apart and extending peripherally of the drum. In the form shown, I employ a plurality of strips 16 from which project teeth or pins 17, the length of projection being small so as to provide impaling of but a small number of the leaves of a pack. The pins 17 may project in radial directions, as in Fig. 5, or more or less tangential to the face of the strip, as in Figs. 1 and 3. In each case the pins are preferably pointed, and in the tangential arrangement the pin formation may be such as to provide a portion adjacent the strip which more closely approaches a radial direction and which acts to retain a leaf-layer in affixed position during the pack manipulation to be described.

The strips 16 are comparatively narrow—I have found a width of $\frac{5}{8}$ inch satisfactory in operation—the space between strips serving to accommodate for stripping devices which are shown as in the form of wires or bands 18, these wires being housed between the strips for a portion of the peripheral length of the drum, as shown in Figs. 1 and 3. Wires 18 may be adjustably mounted in supports 19 carried by the frame and be held stationary, or, as shown in Fig. 3, the wires may be endless and supported on rolls 20 and travel with the drum during that portion of the drum travel in which the wires are housed between the strips, the latter arrangement tending to reduce friction, thereby increasing the life of the wires.

As shown in Fig. 3, conveyer 11, traveling in the direction of the arrow, brings a pack into the space between the drum and the upper surface of the conveyer. Where the tangential arrangement of pins is employed the conveyer preferably travels at a slightly higher speed than the surface speed of the drum to slightly advance the pack while in contact with the teeth in order that the pack face may become impaled on the pins. Where the radial pin structure is employed, the speeds of the drum and conveyer are preferably equal. In either case the conveyer and the drum travel at synchronous speeds.

As will be understood, the advance end of the pack first engages the drum teeth as the pack approaches the contracted space between drum and conveyer, at which time the pins engage the upper face of the pack and penetrate through such face into the pack body and practically impale the pack. Since no restraining means is provided by the conveyer, further advancing movement of the pack not only causes the remainder of the pack to be brought into the pack-impaling position, but the impaled condition of the pack causes it to travel with the drum and pass out of contact with the conveyer. While the pins or teeth extend into the body of the pack but a comparatively small distance, the cohesion between the pack portions causes the entire pack to move with the drum during the drum travel to a point where the travel path of the pack passes into the travel path of a rotating member or members 21. This member may be of any desired configuration, the form shown in the drawing being in the nature of a beater in which one or more vanes 21^a project radially from a hub portion. The beater preferably rotates in a direction opposite to that of the drum, and the vanes have such radial length as will cause them to intersect or obstruct the travel of substantially that portion of the pack which is not actually impaled on the face of the drum and which entering the path of travel of a beater vane, is struck or comes in contact with such vane. This provides a pressure on this portion of the pack in opposition to the pack movement provided by the impaled portion of the pack and results in the unimpaled portion being dislodged from the impaled portion, the dislodged portion falling back on to the conveyer.

Wires 18 leave their housed position between strips 16 at a point approximating the point where this dislodging action takes place, thus bringing the wires into contact with the inner face of the impaled pack portion and acting to strip the impaled portion as the drum carries such portion into contact with the wires. The particular point at which the wires emerge may be varied to meet operating conditions.

Obviously, any other form of dislodging device may be employed. For instance, a stationary device may be employed as indicated in the companion application referred to, the packs passing into contact with the device which obstructs the travel path of the pack and produces a dislodging action.

As will be seen, this operation acts to temporarily affix the pack to the drum surface through the effect of the impaling pins projecting into the body portion of the pack although the projection is of relatively small amount. This affixing action is sufficient to cause the pack to be carried along by the drum to a point where the obstructing device becomes active to oppose the continued movement of the unimpaled portion of the pack. When this occurs, the cohesion between adjacent leaves in proximity to the ends of the pins is broken, and since the impaled portion is held to the drum by the pins, the remainder will drop while the fur-

ther movement of the drum acts to strip the impaled portion as indicated. In practise, I have found that in some cases, the impact between the pack and a vane has resulted in breaking the cohesion at additional points in the pack, especially where the pack leaves have been loosened by passing through mechanism A.

I prefer to employ a plurality of drum units, or mechanisms, as shown, for instance, in Figs. 1 and 2, these units being located successively in the direction of pack travel. Since a pack which has been acted upon by one drum necessarily is reduced in thickness by the removal of the pack portion by such drum, it is desirable that when the pack reaches the next drum its upper surface will be similarly affixed to the surface of that drum. To produce this result, I preferably arrange the apparatus in such manner that the distance between the face of the drum and the conveyer is decreased at the point where the pack is brought into position for action by the drum, thus compensating for reductions in pack thickness. This result can be provided in any number of well-known ways. For instance, in Figs. 1, 3 and 4, I have shown a swinging structure 22 mounted below the conveyer and carrying a roll 23 which is positioned directly below the lowest part of the drum surface, each drum having its individual roll, the rolls forming a support for the conveyer at these points. By adjusting the position of the rolls, the distance between the drum and conveyer can be varied as desired. As shown more particularly in Figs. 3 and 4, I may yieldingly support a roll by means of springs 23^a which thus permits the conveyer to yield in case of excessive thickness of pack. In such arrangement I prefer to employ an adjustable device of suitable form for limiting the upward movement of the roll and conveyer thus insuring the desired minimum width of space between the drum and conveyer; in the drawings I have shown the adjusting device in the form of a bolt 24 carried by bracket 25 on the frame and which coöperates with a member 26 carried by member 22.

As the distances between conveyer and drum are designed more particularly to operate with certain pack thicknesses, it will be understood that where a pack portion present on the conveyer is of a thickness which will permit its free passage beneath the drums, it will generally not be impaled. Similarly, a pack portion may pass either of the advance drums without impaling and yet be acted upon by the remaining drums when a point is reached in the travel path where the distance between drum and conveyer is such as to force the impaling action.

If desired, a suitable comb or trailing device or a brush may be located between adjacent drums for the purpose of shifting pack portions which may, in falling, be superposed on other pack portions on the conveyer. Any of the well-known forms of combing devices may be employed for this purpose, as for instance shown at 30 in Fig. 1.

The separated pack portions may be removed from the apparatus in any desired way, one form being to employ a suction device, indicated at E at the end of the upper flight of the conveyer and which is adapted to withdraw the light weight layers while permitting heavier portions to pass by the device, thus tending to select those pack portions which are in proper condition from the passing stream. If desired, similar devices may be employed between successive drums so that after the pack portions are removed from the drum face, they are withdrawn from the apparatus, thus making a series of devices which take up leaf layers as they are completed instead of simply after they are brought to the end of the upper flight of the conveyer. I may also employ a suction device between mechanism A and the first drum in Fig. 1 to take up those layers which may have become separated in passing through the roll manipulating mechanism, thus providing an arrangement somewhat equivalent in operation to that shown in Fig. 6.

It will be understood, of course, that the operation provided by the drums is also of pack manipulation through the pressure application which is exerted in opposition to the advancing movement of the pack.

From the above description, it will be seen that I have provided means whereby packs of cohering leaves of tobacco will be mechanically manipulated in such manner as to separate the pack into pack portions or leaf layers of a type adapted for manufacturing purposes, the manipulation being had without materially damaging the leaf texture, the pin pricks produced in the drum manipulation being generally unobjectionable, the principal essential being that the length of the leaves be maintained as far as possible; where the leaves are broken into short lengths, they are of little or no value for manufacturing purposes, scrap having but small value. And since tobacco of this type—Turkish tobacco—is of a comparatively high cost, it will be readily understood that reduction in the amount of scrap to the minimum is exceedingly desirable.

It will be understood, of course, that the number of drum units or leaf-manipulating mechanisms employed will be dependent more or less upon the particular work to be performed, duplicating such structures to meet conditions, obviously falling within the scope of the invention.

It may be desirable, where a comparatively large number of separating points is to be provided, that a plurality of conveyers or carriers be located side by side, each drum coöperating with the several carriers. In such arrangement, independent compensating devices might be employed in connection with each conveyer and thus provide for smaller variations in pack thicknesses. In such arrangement, mechanism A may be located in advance of the mechanism for receiving the pack of greatest thickness, the pack passing through the several mechanisms of that carrier and then being transferred to the succeeding carrier in any suitable way.

As will be seen, each of the mechanisms A and D is adapted to subject the pack to opposing separating strains sufficient to cause a relative movement between adjacent leaves of the pack whereby the uniting medium loses its uniting effect. And each mechanism also provides a bodily movement to the pack and causes a relative separating movement between adjacent leaves of the pack during the pack movement. In each case there is a mechanical manipulating of pack portions or leaf layers while the pack is supported, and each is adapted to provide for separating leaf layers.

In the companion application Serial No. 161,542, these general characteristics are also maintained, the arrangement disclosed in such application differing from the specific disclosure of mechanism D in the present application in that the opposite faces of the pack are temporarily affixed during the pack movement and the parts are arranged in such manner that the separation is more or less of a pulling strain action. The specific structure of said companion applications is considered as falling within the broad scope of the present application as claimed herein.

The terms "pack portion" or "leaf layer" employed herein are intended to include either a single leaf or a plurality of leaves in facial cohesion, it being understood that the part removed in reducing the pack thickness may take either form.

While not entirely essential, I prefer to condition the packs prior to mechanical manipulation, the conditioning being more or less along the lines of that employed in conditioning the packs for hand picking.

While I have herein shown and described several ways in which the general principles of the basic invention may be employed, it is to be understood that modifications and variations therein as to form and character of apparatus and methods of manipulation may be required or desired to meet the various exigencies of use. In addition, I may employ any or all of the different manipulating devices herein referred to individually or in combination, it being my desire to claim broadly the general principles involved, I believing myself to be the first to provide any method by means of which the mechanical manipulation of packs of tobacco in which the leaves are facially united can be efficiently provided. I therefore, reserve the right to make any and all such changes and modifications as may be found necessary or desirable in carrying out these broad principles, in so far as the same may fall within the spirit and scope of the invention as expressed in the accompanying claims which are to be considered in their broad aspects.

Having thus described my invention, what I claim as new, is:—

1. That improvement in the art of loosening and separating the facially cohering tobacco leaves from packs of such leaves, the steps which consist in causing the packs to move in a given travel path, and subjecting the packs while moving in said path to yielding pressure exerted on opposite faces thereof, whereby the packs are flexed and the leaf-layers loosened.

2. That improvement in the art of loosening and separating the facially cohering tobacco leaves from packs of such leaves, the steps which consist in causing the packs to move in a given travel path, subjecting the packs while moving in said path to yielding pressure exerted on opposite faces thereof, whereby the packs are flexed and the leaf-layers loosened, and removing from the travel path such leaves as may have become detached from the pack during the flexing action.

3. That improvement in the art of separating the facially cohering tobacco leaves from packs of such leaves, the steps which consist in causing the packs to move in a given travel path, subjecting the packs while in said path to yielding pressure exerted on opposite faces thereof, whereby the packs are flexed and the leaf-layers loosened, removing from the travel path such leaves as may have become detached from the pack during the flexing action, thereafter causing the remaining pack portions to continue their movement along said travel path, and stripping the leaves therefrom during such continued movement.

4. That improvement in the art of separating the facially cohering tobacco leaves from packs of such leaves, the steps which consist in causing the leaf packs to move in a travel path, flexing the packs transversely during movement in said path to detach some of the leaves from the pack and loosen the uniting means between others, and removing the detached leaves from the travel path while continuing the remaining pack portions along said path.

5. That improvement in the art of sepa-

rating the facially cohering tobacco leaves from packs of such leaves, the steps which consist in feeding a succession of packs in a travel path, subjecting the packs to a flexing action during movement in said path, to detach some of the leaves from their packs and loosen the uniting medium between adjacent leaves of the packs, and continuously removing the detached leaves from the travel path while causing the remaining pack portions to continue on in said path.

6. That improvement in the art of separating the facially cohering tobacco leaves from packs of such leaves, the steps which consist in feeding a succession of packs of leaves in a travel path, subjecting the packs to successive flexing actions during movement thereof in said path, to detach some of the leaves from their packs and loosen others, and continuously removing the detached leaves from the travel path while causing the remaining pack portions to continue on in said path.

7. In a machine for the treatment of packs of co-hering tobacco leaves, pack-flexing mechanism comprising opposed rotating members having yielding projections so arranged that the projections of one member enter between those of the other member during rotation of the members, whereby packs of leaves fed between the projections will be engaged thereby and flexed to produce leaf separation, and means for rotating the said members.

8. In a machine for separating leaves from packs of tobacco leaves wherein the leaves are facially but separably united, a rotating element adapted to support a leaf pack through a predetermined travel path, said element having impaling means adapted to enter a face of the pack to cause the latter to cling to and move with said element, means for providing a relative movement between the impaled and unimpaled pack portions during such pack movement to separate the pack into different portions, and means for thereafter removing the clinging portion of the pack from the rotatable element.

9. In a machine for separating leaves from packs of tobacco leaves wherein the leaves are facially but separably united, a rotatable member having leaf impaling elements at its periphery adapted to enter and support a pack by affixing a pack face thereto, means for successively feeding packs of leaves in position to be facially engaged by said impaling elements, means in the path of travel of the pack for providing relative movement between the affixed and unaffixed portions of the pack to separate them, and means for stripping the affixed portion from the said element.

10. In the treatment of packs of tobacco leaves wherein the leaves are facially but separably united, a traveling pack support, and a plurality of pack-manipulating mechanisms coöperatively associated with said support and operative at successive points in the pack travel path, each mechanism being operative to separate a leaf layer from the pack to reduce pack thickness, whereby a plurality of leaf layers will be removed during the pack travel.

11. In the treatment of packs of tobacco leaves wherein the leaves are facially but separably united, pack engaging mechanism including opposed resilient members positioned to engage opposite faces of the pack and operable to yieldably flex the pack during pack advancing movements, whereby to loosen and separate pack layers, and means in the travel path of the pack for causing relative separating movement between adjacent pack leaves.

12. In the treatment of packs of tobacco leaves wherein the leaves are facially but separably united, pack-engaging mechanism for flexing the pack during pack advancing movements to loosen and separate pack layers, means for removing separated pack layers from the pack travel path, and means operative in the travel path of the remaining pack layers for providing opposing separating strains sufficient to cause relative movement between adjacent layers.

13. In apparatus for mechanically picking a pack of facially united tobacco leaves, a pack carrier, a plurality of pack manipulating mechanisms positioned relative to said carrier and operative at successive points in the travel path of an advancing pack, each mechanism being operative to separate leaf layers from the pack, and means operative at such points for compensating for reduced pack thickness.

14. In a machine for the treatment of packs of cohering tobacco leaves, pack-flexing mechanism comprising opposed rotating members having resilient projections extending in the direction of the axis of the members, said rotating members being arranged so that the projections of one member will enter between adjacent projections of the other member during rotation thereof, whereby packs of leaves fed between the resilient projections will be engaged thereby and flexed to effect a separation of the leaves of the packs, and means for rotating said members.

15. In a machine for the treatment of packs of cohering tobacco leaves, pack-flexing mechanism comprising a plurality of pairs of rotating members arranged to form a throat-way for the passage of leaf packs, each of said members having complemental yielding projections and depressions, with the projections of one member entering the depressions of the companion member, whereby packs of leaves fed through said

throat-way will be engaged by the yielding projections and flexed to effect leaf layer separation, and means for rotating the said members.

16. In a machine for the treatment of packs of cohering tobacco leaves, pack flexing mechanism comprising opposed rotating members each having alternately-arranged depressions and projections, with the projections of one member arranged opposite the depressions in the companion member, whereby packs of leaves fed between the members will be engaged by the projections and flexed to effect leaf layer separation, and means for rotating the said members.

In testimony whereof I affix my signature.

JAMES B. HARRISS.