March 19, 1957 J. W. DAVIDSON 2,785,683

DIRECTION CHANGING AND SPREADING DEVICE

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FIG.2

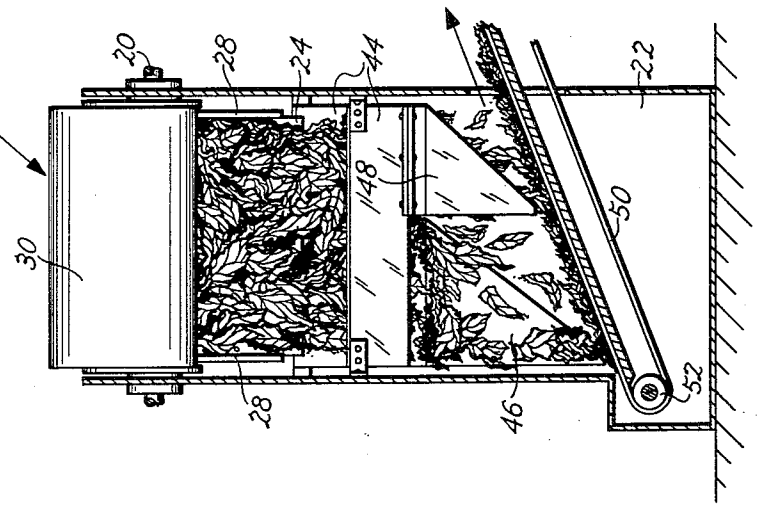
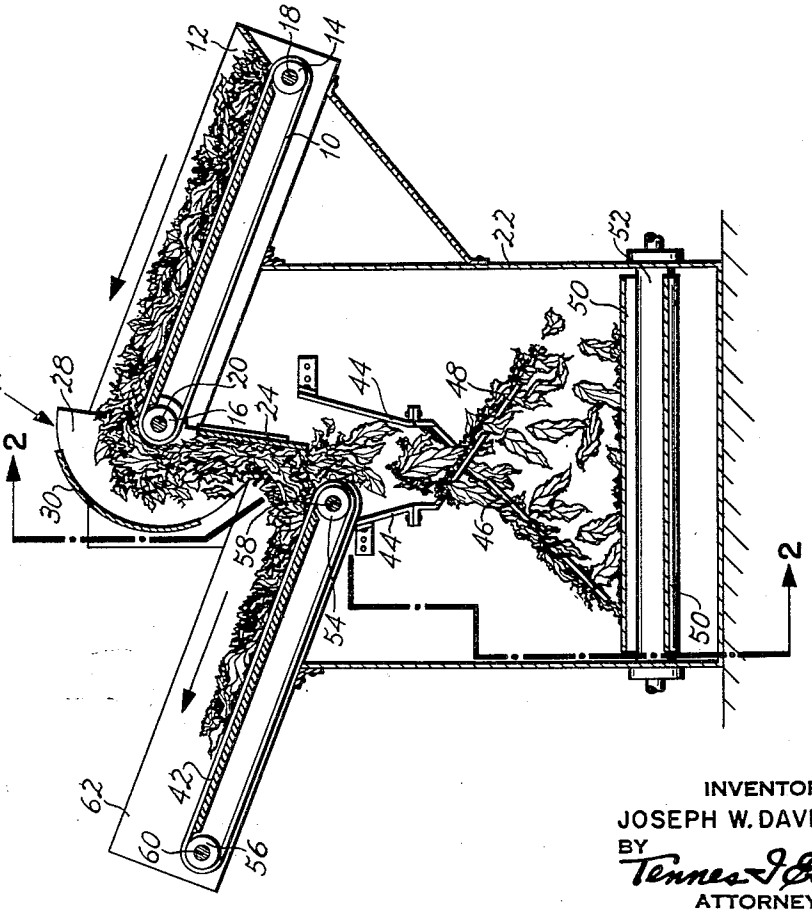


FIG.1



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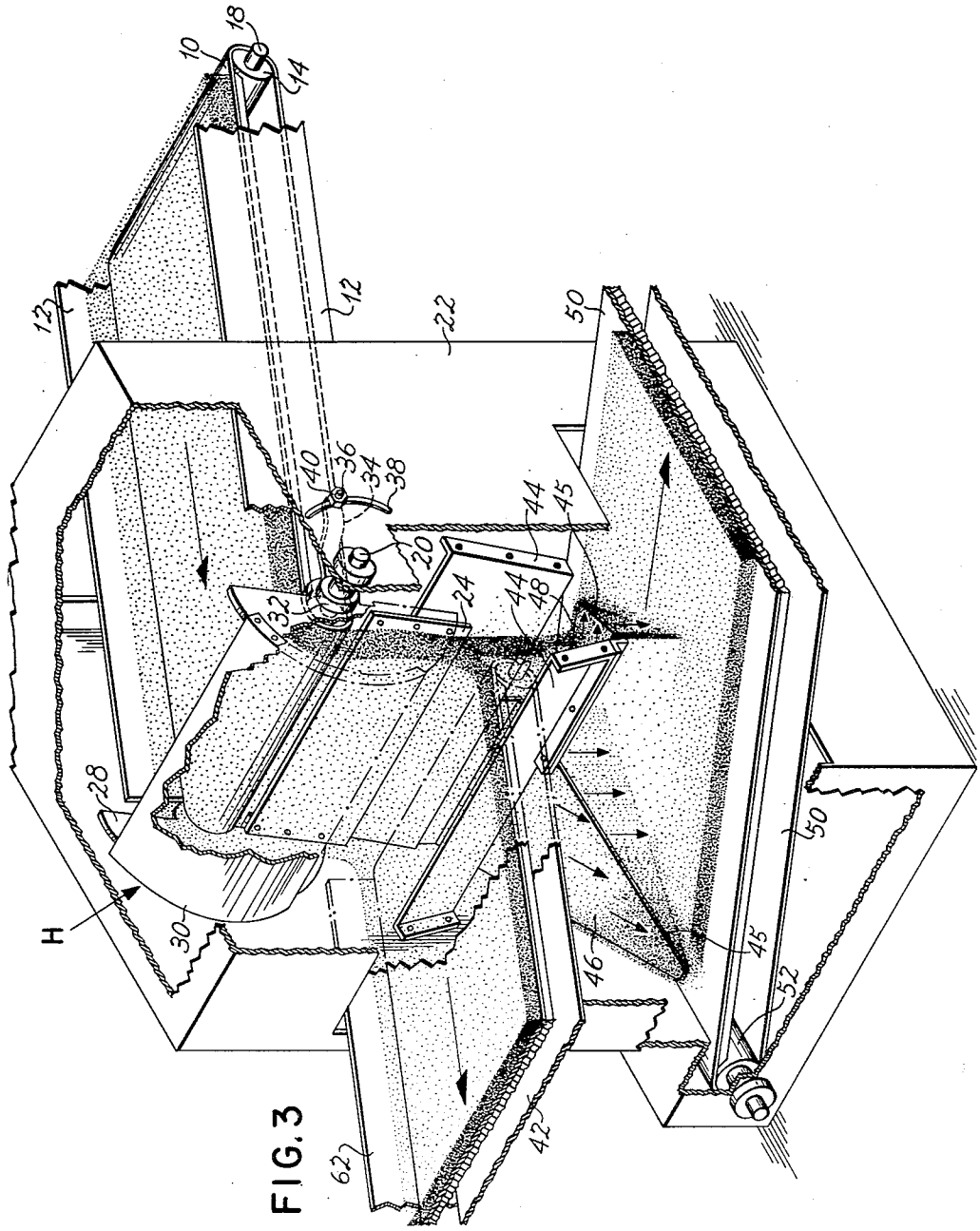


FIG. 3

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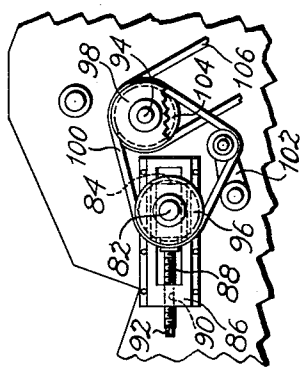


FIG. 5

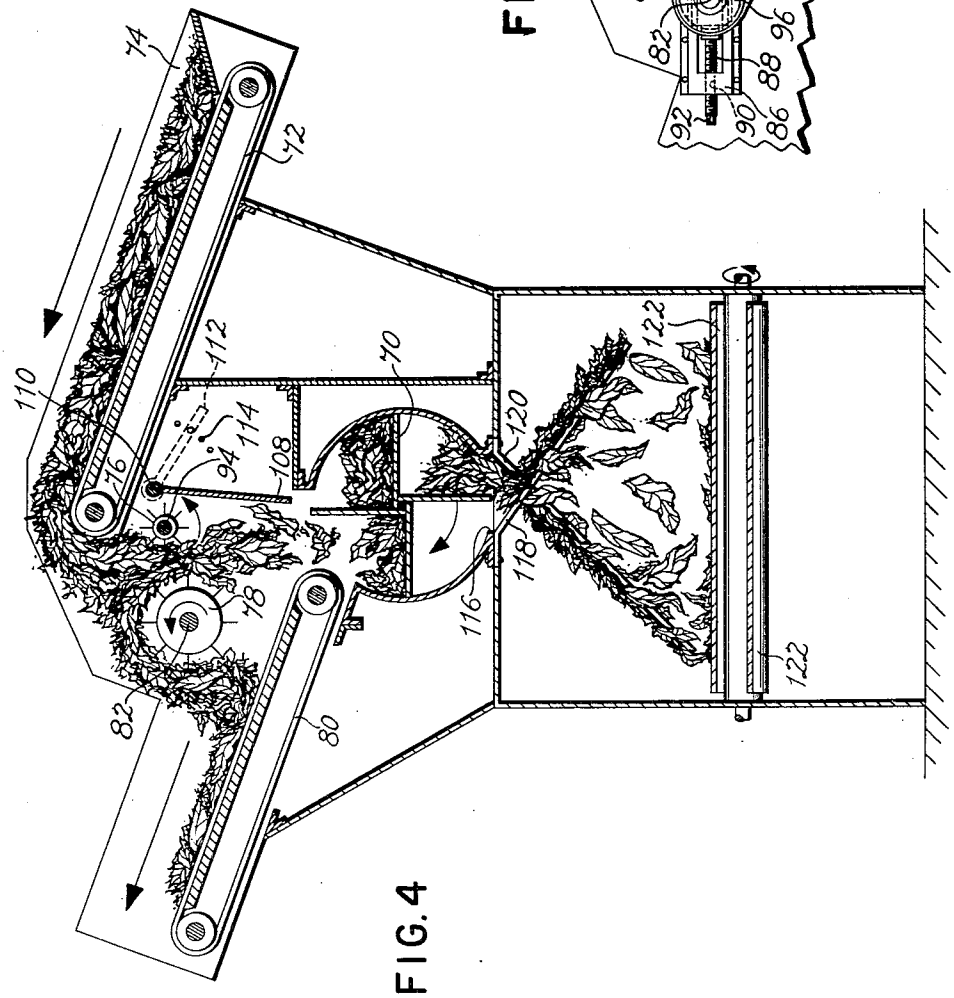


FIG. 4

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United States Patent Office 2,785,683 Patented Mar. 19, 1957

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DIRECTION CHANGING AND SPREADING DEVICE

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Application April 11, 1952, Serial No. 281,777

18 Claims. (Cl. 131—149)

This invention relates to tobacco handling apparatus, and more particularly, to a device for changing the direction of torn tobacco leaves and spreading such leaves as they are deposited from one belt onto another belt. This type of apparatus is shown but not claimed in the copending application of O. E. Eissmann, Serial No. 264,200, filed December 29, 1951.

In many machines it is desired to change the direction of material such as torn tobacco leaves falling from one belt onto another belt, and maintaining the tobacco so uniformly distributed across the second belt regardless of whether the second belt is wider or narrower than the first belt.

It is therefore an object of this invention to provide a simple tobacco spreading device which will turn a stream of tobacco at right angles and also spread out a stream of tobacco uniformly over a wider belt.

Another object is to provide a direction turning and spreading device which can be located between superimposed belts that are very close to one another.

A further object of this invention is to provide a device for removing a uniform predetermined quantity of tobacco from a moving stream of tangled tobacco leaves.

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.

Figure 1 is a sectional side elevation of a tobacco feeding apparatus in conjunction with a tobacco stream divider and a direction changing spreading device.

Figure 2 is a sectional end elevation of the same, taken on line 2—2 of Figure 1.

Figure 3 is an isometric view graphically illustrating the stream dividing, as well as the direction changing actions taking place during feeding operation.

Figure 4 is a sectional side elevation of a tobacco feeding apparatus employing a tobacco stream divider in conjunction with a leaf untangling and a direction changing spreading device.

With reference to the drawings, the automatic tobacco feed illustrated is substantially of the same type and construction as the one shown and described in copending application of O. E. Eissmann, Serial No. 264,200 filed December 29, 1951, which may be used in conjunction with a battery of stemmer-separator machines positioned side by side. All of these machines are supplied with tobacco leaves from a single feeding point and the tobacco stream enters at the side of one machine and is carried through all machines of the respective battery discharging a portion of said tobacco stream into each machine while passing through the same.

The automatic tobacco feed consists of a continuously driven, inclined endless conveyor belt 10 surrounded by a suitable trough 12 and supported by a pair of spaced rollers 14 and 16 mounted on shafts 18 and 20 respectively. The shafts 18 and 20 are journaled in suitable bearings integral with trough 12 which in turn is suitably attached to the housing 22 of the stemmer-separator machine.

While the lower end of the conveyor belt 10 and trough 12 project from the side of housing 22, the upper end of said belt and trough protrude into the center portion of said housing of the stemmer-separator machine. The lower end of the trough 12 is open which permits the tobacco mass T to be dumped into the lower portion of said trough and conveyed by belt 10 in the direction of the arrow. When the tobacco reaches the upper end of said belt it is dropped onto a deflector plate 24 attached to a hood H.

The hood H is made up of a pair of spaced, semi-circular side walls 28, the curved edges of which are connected to a curved cover plate 30. Each side wall 28 is provided with a hub 32 (Fig. 3) both of which are rotatably supported by the upper shaft 20 of the belt conveyor. The deflector plate 24 is attached to suitable flanges of said side walls 28.

One of the hubs 32 of side walls 28 is provided with an arm 34, the free end of which carries a stud 36 (Fig. 3). The stud 36 protrudes through a semi-circular slot 38 of a vertical wall of housing 22 of the machine. A nut 40 carried by stud 36 is provided for the purpose of locking the deflector plate 24 by means of arm 34 in the desired position.

Depending on the exact position of the deflector plate 24, a portion of the stream of tobacco dropping from the conveyor belt 10 downward is deflected onto another continuously driven inclined conveyor belt 42 which carries said deflected tobacco towards the next machine. The other portion of the tobacco stream, which is not deflected onto said second conveyor belt 42, drops downward through the guide chute 44 which at its sides is suitably attached to the vertical walls of the housing. Two spreader plates 46 and 48 are secured to the bottom edges of said guide chute 44 for the purpose of spreading the narrow column of tobacco leaves dropped onto the spreader plates 46 and 48. The tobacco so dropped onto the spreader plates 46 and 48 slides downwardly thereon until it falls over the edge of the hypotenuses thereof and is deposited on the wide conveyor belt 50 which runs at a 90 degree angle to the direction in which said column is received. These plates not only guide the separated leaves and spread them in a wide, even layer, but also change the direction of the flow of said stream.

The two spreader plates 46 and 48 are of right-triangular shape, each plate being attached with its shortest side to one of the two opposed bottom edges of chute 44 in such manner that the triangular plates decline in opposite direction as shown in Figure 3. In spreading such material as tobacco leaves it is necessary to place the direction turning and spreading apparatus in a short, confined area to keep the over-all height of the machine low. The double, triangular, plate type spreader illustrated is very adaptable for use in such a confined space.

Since the conveyor belt 50 which feeds said layer of leaves into the threshing mechanism of the machine is usually inclined, the space for the spreading apparatus is still more limited. This is provided for by arranging the spreader plates in such a way that the slanted side edges 45 of the two right triangular plates face in the direction the belt 50 inclines upwardly.

The inclined conveyor belt is supported on one end by means of a roller 52 while the other end engages with a similar roller (not shown) which is continuously driven from the main drive of the machine. The conveyor belt 42, which carries the surplus tobacco to the feed trough of the next machine, is supported by rollers 54 and 56 secured to shafts 58 and 60, respectively, which are sup-

ported in suitable bearings attached to the conveyor side guide plates **62**. The plates **62** are secured to the main housing of the machine. Shaft **58** is continuously driven from the main drive (not shown) of the machine.

In cases where there are "tangled leaves" it has been desirable to employ a modified form of my invention such as shown in Figure 4. "Tangled leaf" usually consists of long tobacco leaves laying criss-cross and tangled up to such an extent that they frequently form lumps which, when allowed to enter the machine, will interfere with a uniform flow of tobacco fed into said machine.

The modified feeding mechanism illustrated in Figure 4 is shown in conjunction with a rotary gate valve **70** which may be of the same design and construction as the ones shown in the copending application and which is employed for the purpose of feeding tobacco into the closed system of a stemmer-separator machine.

The modified feeder (Fig. 4) is provided with an inclined conveyor belt **72** running in a trough **74** which may be of identical construction as the one shown in Figures 1 and 3 with the open upper end of said trough permitting the tobacco leaves to drop towards the rotating gate valve **70** located therebeneath. The tobacco leaves, after dropping from the upper end of the conveyor belt **72**, are intercepted by a pair of spaced, spiked rollers **76** and **78** rotating continuously in the same direction. The spiked roller **76** rotating in the direction of the arrow shown in Figure 4, helps to move the tobacco leaves downward, while the spiked roller **78** rotating in the same direction, creates an upward movement which tears any lump of tobacco leaves apart and permits only the desired amount of tobacco to go through the space between the two spiked rollers.

The surplus tobacco is carried away by spiked roller **78** and deposited onto an inclined conveyor belt **80** which feeds said surplus tobacco into the next machine. Therefore, the spiked rollers **76** and **78** not only serve the purpose of segregating the tangled, lumped tobacco but also discharge a fixed and predetermined quantity of segregated free leaves through the space between the two rollers.

Since the spacing between the two spiked rollers determines the quantity of tobacco to be discharged, provision has been made for varying this space. Shaft **82**, to which the spiked roller is secured, is supported at each end in a bearing block **84** (Fig. 5) slidably supported in a suitable guide frame **86** fastened to the respective vertical walls of the housing. Each bearing block **84** is provided with a turnable, horizontally extending spindle **88**, the free end of which engages with a threaded bore **90** at the vertical end of frame **86**.

The free extreme end of each spindle is also provided with a square portion **92** to enable the operator to turn said spindle with a wrench and thereby effect a movement of the spiked roller **78** either towards or away from the other spiked roller **76**. The latter is mounted on a shaft, each end of which is supported in a suitable bearing rigidly attached to the respective side walls of the housing.

Shafts **82** and **94** carry pulleys **96** and **98** respectively which are connected by a belt **100** which also engages with a conventional adjustable belt tightener **102**. A pulley **104** is also secured to shaft **94** which by means of a belt **106** is driven constantly from a suitable source of power (not shown).

In order to further control the amount of tobacco leaves discharged by the two spiked rollers **76** and **78** downward towards the rotating gate valve **70** (Fig. 4), the machine is also provided with an adjustable deflector plate **108**. The latter, depending on its setting, may permit all the tobacco discharged by said spiked rollers to enter the gate valve **70** or deflect part of said tobacco on the conveyor belt **80**. It also enables the operator to deflect all the tobacco onto conveyor belt **80** in case the system of one machine becomes clogged or develops trouble. In such case said tobacco is simply conveyed to the next machine.

The deflector plate **108** is mounted on a suitable horizontal rod **110** the ends of which are supported in suitable bearings attached to the vertical walls of the housing. To one end of rod **110** protruding on one side of the housing is secured an arm **112**, the free end of which may be provided with a conventional spring loaded stud or pin which may be engaged with any one of the row of holes **114**, depending on the setting desired.

Adjacent to the bottom opening **116** of the rotating gate valve **70** are attached two triangular spreader plates **118** and **120** slanting downward in opposite direction towards an inclined wide conveyor belt **122**. The conveyor belt **122** feeds the stream of tobacco leaves deposited thereon into the threshing and separating mechanism.

The spreader plates **118** and **120** are of the same shape and construction as plates **46** and **48** shown in Figures 1, 2, and 3 and described heretofore. Plates **118** and **120** perform the same function, namely, spreading the tobacco leaves emerging from the gate valve **70** and changing its flow of direction to conform with the width and direction of travel of the conveyor belt **112**.

The invention hereinbefore described may be varied in construction within the scope of the claims, for the particular device selected to illustrate the invention 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. Tobacco handling apparatus comprising, an infeed conveyor belt and outfeed conveyor belt positioned below said infeed conveyor belt, a guide member for directing material delivered from said infeed conveyor belt towards said outfeed conveyor belt, a chute positioned below the delivery end of said infeed conveyor belt for receiving tobacco which is not directed over onto said outfeed conveyor belt by said guide member, a pair of declining right angle, triangular plates positioned below said chute for spreading out said tobacco, the apices of said triangular guide plates being oppositely arranged with respect to one another, the base ends of said triangular plates being arranged to receive tobacco falling through said chute, and a collecting conveyor positioned below said triangular guide plates for receiving tobacco discharged over the hypotenuses of said triangular plates.

2. A tobacco handling apparatus comprising, a tobacco receiving conveyor for moving tobacco through said apparatus, an infeed conveyor for delivering tobacco to said apparatus at right angles to the direction of travel of the tobacco receiving conveyor in said apparatus, and a pair of spreading plates, each of which has a tapered inclined edge extending in opposite directions across the width of the tobacco receiving conveyor to spread tobacco received from said infeed conveyor uniformly across the width of said tobacco receiving conveyor by causing tobacco to slide off the inclined tapered edges under the force of gravity.

3. A tobacco leaf spreading device comprising, a pair of inclined triangular leaf spreading plates arranged so that the apexes of the plates extend in opposite directions and the sides thereof are arranged to receive a shower of tobacco, and a tobacco discharge device extending along said sides to shower tobacco downwardly thereon to allow said showered tobacco to slide down said oppositely disposed triangular plates to effect a discharge of said showered tobacco over the sides of said triangular plates onto a common collecting conveyor.

4. A direction changing and spreading device comprising, a source of tobacco showered in a broad stream, a pair of declining right angle triangular plates arranged so that the sides thereof are positioned to receive said stream at one end from said source of showered tobacco and to discharge said tobacco over the hypotenuse of each

triangular plate as it slides downwardly under the action of gravity over the plates, the apex of each plate being arranged to be the lowermost portion of each plate to thereby effect a discharge of the material onto a common collecting conveyor.

5. A tobacco handling apparatus comprising, an infeed belt, an outfeed belt positioned below said infeed belt for receiving tobacco discharged from said infeed belt, a toothed roller positioned below the discharge end of said infeed belt for pushing tobacco toward said outfeed belt, a second toothed roller spaced from said first toothed roller for removing a predetermined quantity of tobacco from the tobacco discharged from the infeed belt onto the first toothed roller, and a receiving chute for receiving and discharging said tobacco so removed into a tobacco processing machine.

6. Apparatus of the type described in claim 5 wherein an adjustable guide plate is positioned adjacent the second toothed roller for regulating the amount of tobacco delivered into the receiving chute and for causing the balance of the tobacco to be deposited upon the outfeed belt.

7. Apparatus of the type described in claim 5 wherein a pair of right angle triangular spreading plates are disposed below said receiving chute, said triangular plates being arranged so that the hypotenuses thereof are disposed at a downwardly declining angle and both plates are contiguous with each other so that tobacco leaves falling downwardly through said chute slide along the plate on which it falls until it is discharged over the hypotenuses thereof, and a collecting belt arranged and disposed under said triangular plates for receiving a tobacco so discharged over said hypotenuses in a wide stream.

8. Apparatus for spreading tobacco uniformly over a wide area comprising, an infeed belt, means for delivering a shower of tobacco from said infeed belt into a tobacco receiving chute, a pair of triangular plates arranged so that the tapered side declines downwardly in opposite directions from a point where said plates are contiguous with each other, said decline being of a grade which will cause the showered tobacco to slide downwardly along said plates, and a tobacco receiving belt for receiving tobacco showered over the tapered side of said triangular plates.

9. Apparatus for removing a uniform portion of tobacco continuously from a traveling stream of tobacco comprising, an infeed conveyor belt having a discharge end, an outfeed conveyor belt positioned below said infeed belt, a spiked roller positioned in the path of the tobacco stream as it is discharged from the infeed belt onto the outfeed belt to push said tobacco toward said outfeed belt, a second spiked roller spaced from the first spiked roller from removing a uniform quantity of tobacco from that discharged by said infeed belt onto said first spiked roller, and tobacco receiving device for receiving tobacco so removed.

10. Apparatus for removing a uniform portion of tobacco continuously from a traveling stream of tobacco comprising, an infeed conveyor belt having a discharge end, an outfeed conveyor belt positioned below said infeed belt, a spiked roller positioned in the path of the tobacco stream as it is discharged from the infeed belt onto the outfeed belt, a second spiked roller spaced from the first spiked roller for removing a uniform quantity of tobacco from that discharged by said infeed belt onto said first spiked roller, tobacco receiving device for receiving tobacco so removed, and a guide plate positioned adjacent the second spiked roller for deflecting excess tobacco removed by said spiked roller to said outfeed conveyor belt.

11. A tobacco handling and spreading device comprising, a conveyor for delivering a continuous stream of tobacco to a discharge station, a pair of inclined plates positioned under said discharge station for receiving tobacco discharged to spread said tobacco laterally in opposite directions, each of said plates being formed with a taper so that as the tobacco slides downwardly under the action of gravity along the plates it is discharged uniformly along the length of said tapered sides, and a collecting belt traveling in a direction which is at an angle to the direction of travel of said conveyor.

12. A tobacco handling and spreading apparatus comprising, an infeed belt for delivering tobacco in a broad stream continuously to a discharge station, an inclined belt positioned on a lower elevation and in a direction transverse to the first named belt for receiving tobacco discharged from the infeed belt to convey the tobacco from a lower elevation to a higher elevation, and a pair of inclined, right-angle, triangular plates arranged so that the base ends thereof are interposed between said infeed belt and said inclined belt to receive the tobacco showered from said infeed belt, said triangular plates being arranged so that the hypotenuses thereof face in the direction said inclined receiving belt inclines upwardly.

13. The method of removing a uniform quantity of tobacco leaves from an entangled stream of tobacco leaves comprising, removing a predetermined amount of tobacco away from the underside of said stream of entangled leaves, dropping the tobacco so removed donwardly towards a tobacco receiving chute, and deflecting the balance of the tobacco to an outgoing conveyor.

14. The method of removing a uniform quantity of tobacco leaves from an entangled stream of tobacco leaves in a tobacco processing machine, comprising, removing a predetermined amount of tobacco away from the underside of said stream of entangled leaves, dropping the tobacco so removed downwardly towards a tobacco receiving chute, and conveying the balance of the tobacco not removed away from the machine.

15. The method of removing a predetermined portion of tobacco from the under side of a continuously showered stream of entangled tobacco leaves comprising, making a preliminary separation of a portion of the showered tobacco stream and showering said portion downwardly, then making a secondary separation of a portion of the tangled leaves so showered by the first separation, and then removing the surplus of tobacco remaining after the second separation has taken place.

16. A tobacco handling and spreading apparatus comprising, a conveyor belt for delivering a continuous stream of tobacco to a discharge station, a pair of right-angle, triangular plates positioned adjacent to each other under the stream of tobacco discharged at said discharge station and arranged so that the sides thereof extend along the same direction as said first conveyor belt travels, and a tobacco receiving conveyor belt positioned under said triangular plates for conveying tobacco in a direction transverse to that of the first conveyor belt, said tobacco receiving conveyor belt being arranged at an upwardly inclined angle so that the hypotenuses of the right-angle triangular plates face the upwardly inclined portion of the second collecting belt.

17. A device for spreading and changing the direction of a continuous stream of tobacco comprising, a conveyor belt having a discharge end, a pair of inclined plates extending in the same direction as said conveyor belt and positioned in the path of the falling tobacco discharged from said conveyor belt so as to receive said tobacco and allow it to slide down the inclined plates in opposite directions under the force of gravity, said plates each having a tapered side so that the sliding tobacco is discharged over the tapered side, and a collecting belt traveling under said tapered plates in a direction transverse to the first-named conveyor belt for receiving tobacco discharged from said plates in a broad stream.

18. A tobacco spreading device comprising a pair of right angle triangular plates having their hypotenuses facing in the same direction, and a mounting for said plates to position said plates to decline in opposite directions so that tobacco deposited thereon slides down over their respective hpyotenuses across the width of said

apparatus, one side of each of said plates being positioned transversely across a stream of showered tobacco.

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