May 6, 1958 F. A. LEE 2,833,425

TOBACCO LEAF STRINGING MACHINE

Filed March 14, 1957 3 Sheets-Sheet 1

FIG. 1

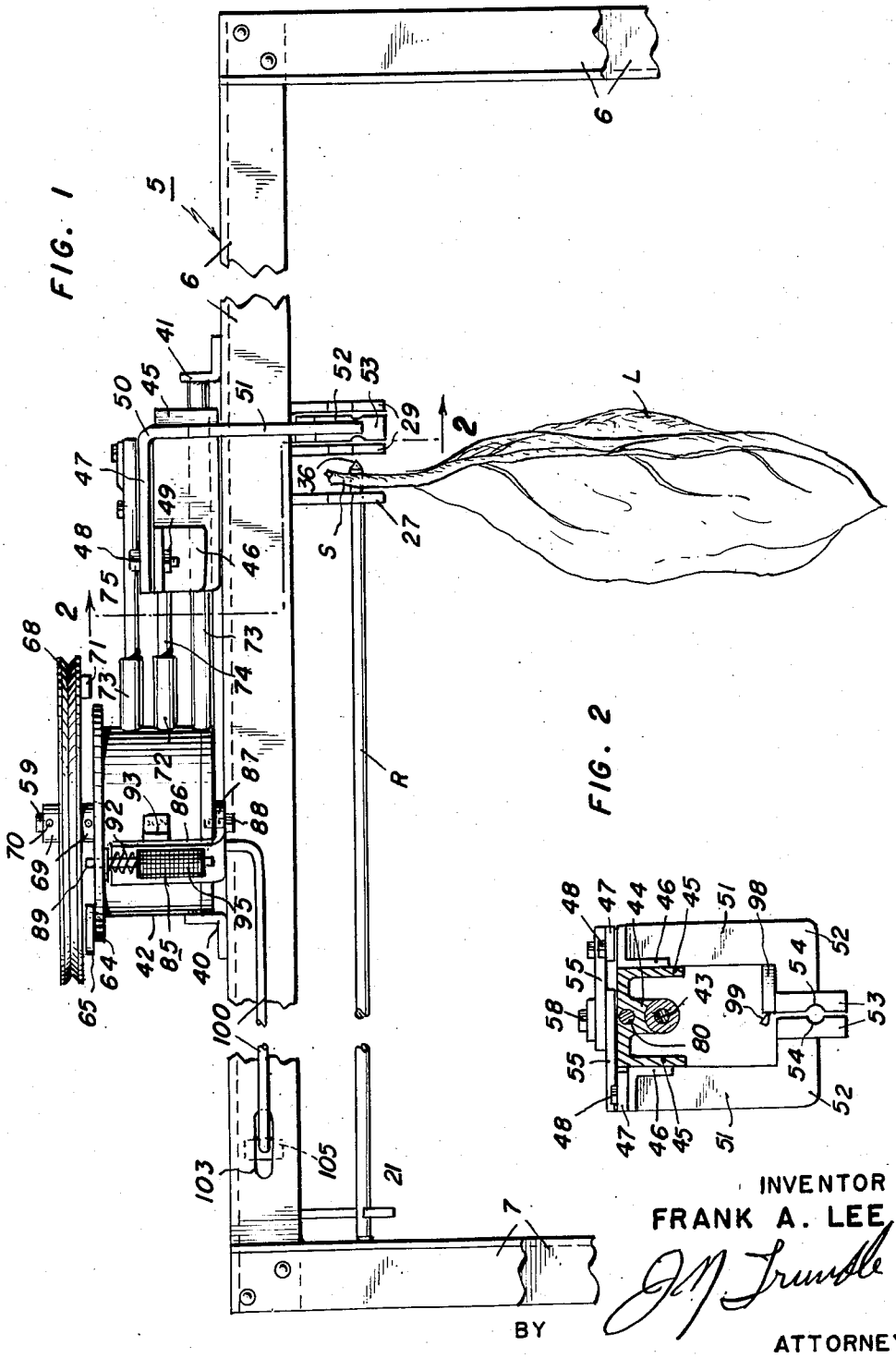


FIG. 2

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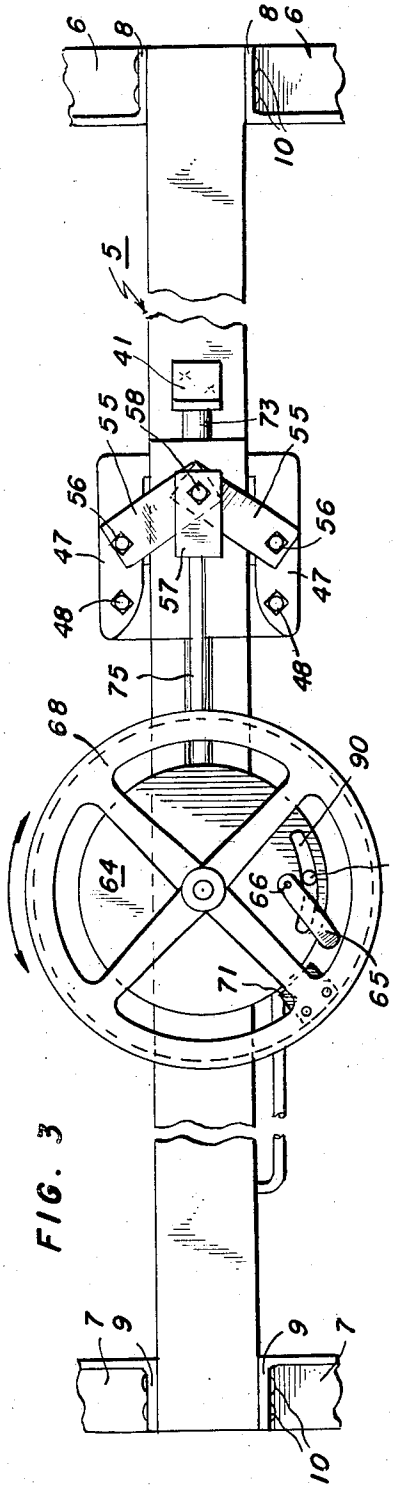


FIG. 3

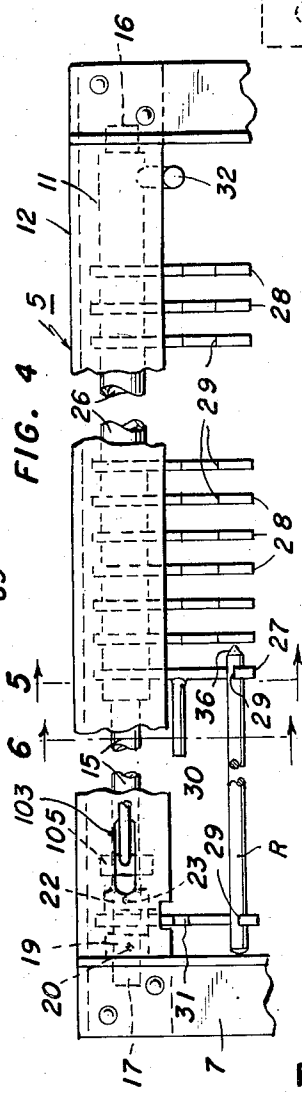


FIG. 4

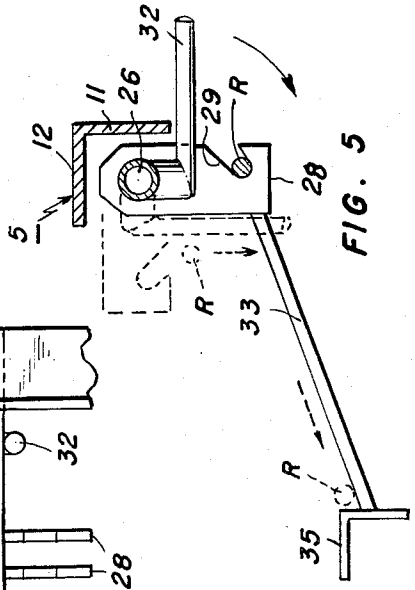


FIG. 5

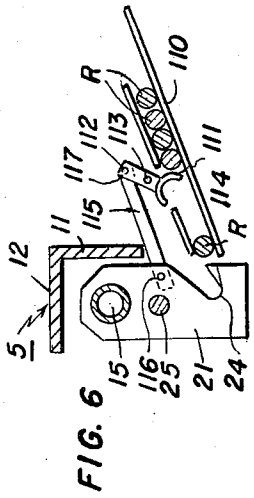


FIG. 6

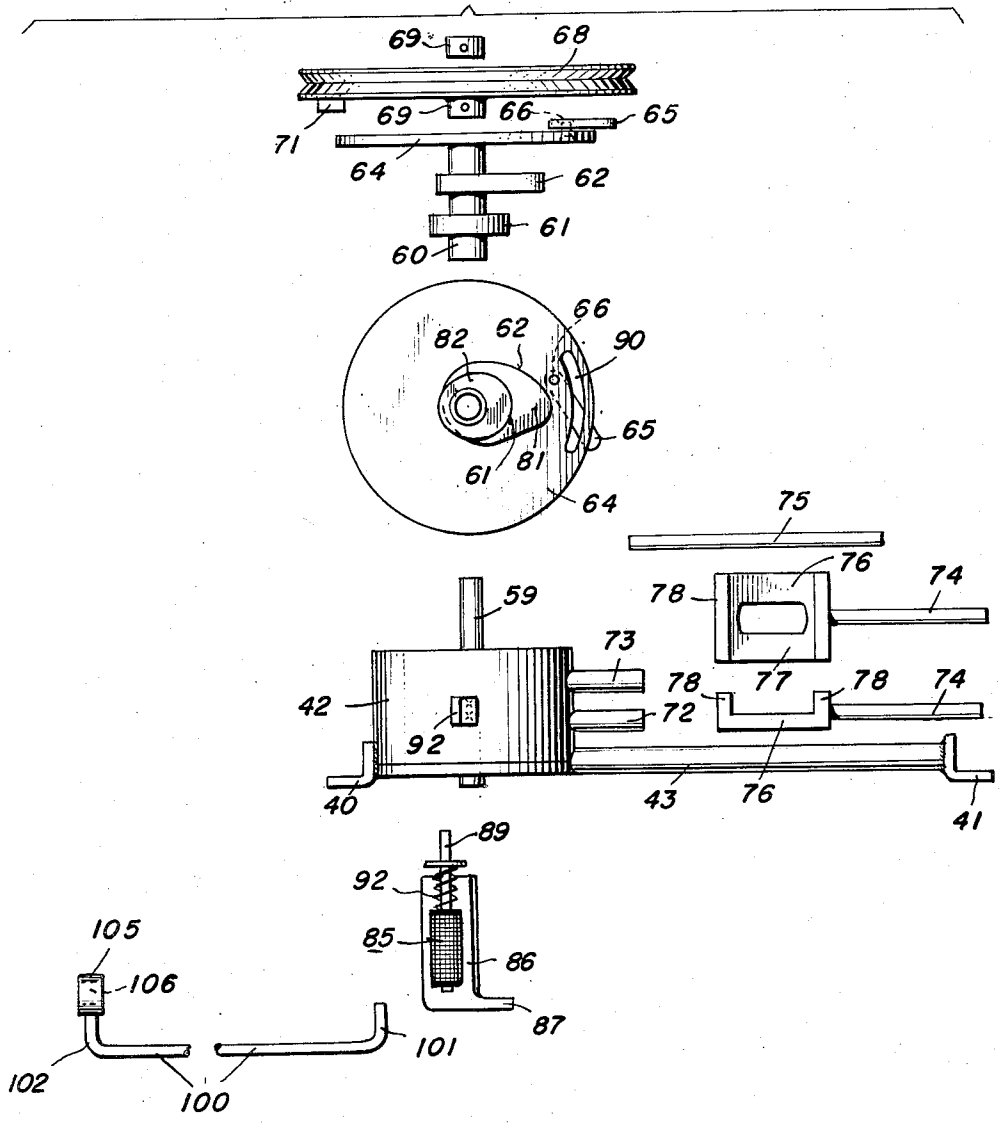
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TOBACCO LEAF STRINGING MACHINE

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FIG. 7



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2,833,425

TOBACCO LEAF STRINGING MACHINE

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Application March 14, 1957, Serial No. 645,942

14 Claims. (Cl. 214—5.5)

The present invention relates to improvements in mechanism for stringing tobacco leaves upon a hanger rod, and more particularly to provide a machine which is automatic to the extent that the tobacco leaves are individually and manually placed in position at the end of the rod and the machine automatically causes the tobacco leaf to be speared on the rod and subsequently fed therealong as additional leaves are manually placed in position.

One object of the invention, is to provide an automatic machine for loading tobacco leaves on a hanger rod by spearing the stem end of the leaf on the rod, and to provide a cyclic operation for intermittently moving the leaf into engagement with the rod and simultaneously gripping the leaf stem while the tobacco leaf is impaled on the hanger rod.

Another object, is to provide a leaf stringing machine for tobacco leaves in which the stem portion of the leaf is presented between a pair of spaced separator members which are slidably mounted to travel in unison and are moved in a step by step fashion by an automatic drive controlled by an automatic drive which is set in motion when a tobacco leaf has its stem presented between a pair of separator members.

Another object, is to provide a machine for stringing tobacco leaves on a hanger rod which is controlled by the presentation of the stem end of the tobacco leaf between a pair of adjacent separators so that the machine will operate as rapidly as the operator can manually present the leaves to the machine and does not require manual control members for initiating operation of the machine.

Another object, is to provide a machine for stringing tobacco leaves on a hanger rod in which the stem gripping jaws move into and out of gripping position and simultaneously travel with the stem a short distance until the stem is impaled on the end of the hanger rod. The mechanism for accomplishing this movement includes a cam shaft which is driven by a power wheel drivingly connected to the cam shaft through a clutch which is engaged and disengaged by a solenoid in a circuit with a suitable source of current and a micro-switch carried by one of the jaws and arranged to be engaged by the tobacco leaf stem to close the switch and energize the solenoid so that its plunger will move in a direction to permit the power wheel to be clutched to the cam shaft.

Another object of the invention, resides in the provision of means for releasably supporting the hanger rod and to provide means for manually releasing the rods after they have been completely strung so that the rods will be discharged on a receiving rack disposed adjacent the tobacco leaf stringing machine.

Another object, is to provide a tobacco leaf stringing machine having means for feeding a new hanger rod to the separator units after certain of said units have been moved to a retracted position and after the previous loaded rod has been discharged.

Another object, is to provide a tobacco stringing machine in which the solenoid for controlling the clutch is moved in a direction opposite to the direction of rotation of the power means after the tobacco leaf supporting rod is completely filled and the separator plate mechanism has been shifted to the limit of its movement so as to cause the leaf clamp arm to be held in an open position in order to permit the separator assembly to be moved back to its original position and to permit the separator plates to pass between the leaf clamping jaws to the initial or starting position. The clamping jaws remaining in their open position to permit the insertion of a new rod, and said clamping jaws in the starting position will come to rest in an open position between a pair of separator plates supported above the hanger rod.

Other objects and advantages of the invention will become apparent during the course of the following description of the accompanying drawings, wherein:

Figure 1 is a side elevational view of the tobacco leaf stringing machine showing the leaf clamping jaws in position and spaced apart between a pair of adjacent separator plates and prior to the positioning of the stem of a tobacco leaf therebetween which causes the jaws to move into engagement with the leaf and simultaneously move a short distance in the direction of the left hand end of the machine.

Figure 2 is a vertical cross-sectional view taken on line 2—2 of Figure 1 and looking in the direction of the arrows to illustrate the manner in which the leaf clamping jaws are pivoted to a cross head or slide and to indicate the position of the micro-switch which is engaged by the tobacco leaf stem to set the machine in motion.

Figure 3 is a fragmentary top elevational view of the machine further illustrating the manner in which the clamping jaws are opened and closed, and showing the drive mechanism therefor.

Figure 4 is a fragmentary side elevational view of the machine illustrating the manner in which the separator plates are supported on a sleeve or tube which is movable from one end of the machine to the other, and is moved in a step by step fashion by the to and fro reciprocating movement of the gripping jaws.

Figure 5 is a vertical cross-sectional view taken on line 5—5 of Figure 4 and illustrating the manner in which the separator plates are rocked after the hanger rod has been loaded to discharge the hanger rod and tobacco leaves in spaced relation thereon to a supporting rack.

Figure 6 is a vertical cross-sectional view taken on line 6—6 of Figure 4 and looking in the direction of the arrows to illustrate the mechanism for feeding a new rod to the separator plates after the filled rod has been discharged, and

Figure 7 is an exploded view showing the various parts of the drive mechanism for actuating the leaf clamping jaws.

In the drawings, and more in detail, there is shown a tobacco leaf stringing machine including a supporting framework generally designated 5 which is supported from a suitable base (not shown) and to which is attached at each end of the base a pair of angle bars 6—6 and 7—7. The angle bars 6—6 and 7—7 provide A shaped end frames for the frame structure 5 and the upper ends are provided with flanges 8—8 and 9—9 which are adapted to be bolted as at 10 to the side flanges 11 of a channel bar 12. The channel bar 12 is of considerable length and is broken into sections as shown in Figure 4 by the broken areas. The channel bar 12 has a portion of its rear wall cut away as shown in Figure 5 toward the end of the machine adjacent the supports 7 for a purpose which will be later more fully described.

The supporting frame structure 5 is of such a height as to permit an operator in a sitting position to feed

tobacco leaves between the separators from a position directly beneath the frame structure, and to enable the operator to manually position the stem end of a tobacco leaf between a pair of separators with considerable ease and facility.

The ends of the angle member 12 are provided with suitable bearings for supporting a rod 15, the ends of which as at 16 and 17 are reduced for being received in suitable bearing openings at the ends of the channel member.

One end of the rod 15 is provided with a spacer collar 19 which is keyed or otherwise attached thereto by a set screw 20. A tobacco rod hanger 21 is provided at its upper end with an opening for receiving said rod 15 and is held in place on the rod by a clamping collar 22 secured in place by means of a set screw or the like 23. The tobacco rod hanger 21 is provided with a rod receiving slot 24 in its lower end and is provided with an opening 25 for a purpose which will be hereinafter more fully described (Figure 6).

Slidably mounted on the rod 15 is an elongated tube for a sleeve 26 which is of a length equal to the length of the rod 15 minus the length of the tobacco hanger rod. Mounted on the tube or sleeve 26 in spaced relation thereon is a series of tobacco rod hanger and separator plates 27 and 28, and said separator plates 28 as well as the separator plate 27 are provided with inclined tobacco rod receiving notches 29 similar to the tobacco rod receiving notch 24 of the tobacco rod hanger and separator plate 21. The separator plate 27 has affixed thereto a pin 30 (Fig. 4) which is adapted to enter an opening 31 in the separator plate 21 after the tobacco hanger rod has been completely filled. A handle 32 is affixed to the right hand end of the tube or sleeve 26 to permit the sleeve to be rocked about the shaft 15 and permit the leaf hanging hooks 21, 27 and 28 to be similarly rocked to the dotted line position shown in Figure 5 so that the leaf hanging rod R may be discharged and deposited upon a pair of inclined spaced rack bars 33 which are spaced a distance sufficient to engage the tobacco hanging rod R adjacent its ends. The tobacco stringing rod upon which the tobacco leaves are strung is formed of aluminum as at R or other similar metal. It will thus be seen that the rod support and spacer element 21 remains fixed, while the rod supports and spacers 27 and 28 move longitudinally with the tube or sleeve 26. The tobacco rod supporting hooks and separators 27 and 28 are secured to the sleeve 26 in equidistant spaced apart relation by means of brazing or soldering or other well known means. In the initial starting position when an empty tobacco leaf supporting bar R is in position, the sleeve 26 and the tobacco rod supporting hooks are at rest adjacent the right hand end of the machine. The rack bars 33 may be supported from a part of the machine and from an angle bracket 35 connected therewith in any suitable fashion so that the supporting rack bars 33 are inclined slightly downward which will permit the completely filled rod R to slide downward toward the angle iron 35 and come to rest at this point as shown in Figure 5. One end of the rod R is pointed as at 36 to permit the same to penetrate a tobacco leaf stem in a manner which will be hereinafter more fully described, and the other end may be provided with a notch or head (not shown) to prevent the rod R from moving toward the right after a new rod has been inserted and during the movement of the sleeve 26 and tobacco rod hanger separators 27 and 28 toward the right hand end of the machine.

Mounted on the structural channel member 6 at a point substantially intermediate its ends is a pair of angle brackets 40 and 41 which are secured in place by welding or the like. The bracket 40 is likewise welded or otherwise secured to a cylindrical housing 42 which is further supported by means of a rod 43 which has one end secured to the lower portion of the cylindrical housing 42 and its opposite end welded or otherwise affixed to the bracket 41. The rod 43 forms a slide guide for a slide 44 (Fig. 2) having angular portions providing downwardly extending flanges 45. The downwardly extending flanges 45 have secured thereto in an approved manner angle brackets 46 with their upper angular portions extending outwardly to provide bearing supports for oscillating jaw arms 47. The jaw arms 47 are pivotally secured to the angle brackets 46 by threaded fasteners such as bolts 48 which are held in place by nuts 49. The gripping arms 47 are angularly bent as at 50 and extend downwardly to provide relatively straight portions 51, the lower ends of which are angularly shaped as at 52 to extend in opposed relation. Gripping jaws 53 are provided on the ends of the angular portions 52, and said jaws are notched as at 54 to receive the hanger rod R.

The jaws 53 are dimensioned to pass between adjacent separator plates 29 on the sleeve 26, and as shown in Figure 1 the jaws 52 and gripping jaws 53 enter the space between the separator plates from opposite sides thereof. Thus, when the gripper arms 47 are oscillated on the pivot bolts 48 the gripping jaws 53 will swing into and out of the space between the separator plates 29.

The gripper arms 47 are connected by a pair of operating links 55 (Figs. 2 and 3) which are secured to the gripper arms 47 by pivot bolts or pins 56. The inner ends of the links 55 are pivotally connected one to the other and to a crosshead 57 by means of a pivot bolt 58.

The actuating mechanism for operating the gripper jaws 53 and arms 47, as well as the slide 45 includes a vertical shaft 59 extending from the lower wall of the cylindrical housing 42 and secured thereto in any suitable approved manner. Mounted on the fixed shaft 59 is a rotary sleeve 60 having a pair of rotary cams 61 and 62 (Fig. 7) and on the extreme upper end of the rotary sleeve 60 is a disk 64 to which is pivotally attached a lug engaging pawl 65 as at 66. The lug engaging pawl 65 is spring loaded by means of a coil spring (not shown), adapted to normally urge the lug engaging pawl 65 in a radially outward direction.

Rotatably mounted on the shaft 59 is a power pulley 68 which is held in place against axial displacement by a pair of collars 69 on opposite sides of the hub of the pulley 68 and held in place by set screws 70. Formed on the pulley 68 is a driving lug 71 which is adapted to engage the pawl 65 and thus rotate the sleeve 60 and the cams 61 and 62. The cylindrical housing 42 is provided with a pair of slide guides 72 and 73 for receiving slide rods 74 and 75. The slide rods 74 project into the cylindrical housing 72 and the rod 74 is provided with an enlarged end 76 having an elongated slot 77 for receiving the sleeve 60. Upstanding cam engaging walls 78 are formed on the enlarged head 76 as shown clearly in the exploded view in Figure 7. The other end of the slide rod 74 is rigidly affixed to the slide 44 and may have its end threaded for being received in a threaded opening 80 in the wall of said slide. Thus, when the lobe 81 of the cam 62 engages the upstanding wall 78 toward the right hand side shown in Figure 7, the slide 44 will be moved in a corresponding direction and when the cam lobe 81 engages the other upstanding wall 78 of the enlarged head 76 the slide 44 will move in an opposite direction.

The slide rod 75 is slidably guided in the tubular guide 73 and has one end arranged in abutting relation with the cam 61 so that when said cam is rotated its lobe portion 82 will engage the push rod 75 and urge the same outwardly. The other end of the push rod 75 is threaded or otherwise connected to the crosshead 57, and the arrangement is such that when the cam lobe 82 urges the rod 75 to the right, the jaws will be moved inwardly by the links 55. By reason of the shape of the cam lobes 81 and 82 the jaws 53 will move outwardly or away from one another when the slide 44 is moved to the left by the cam rod 74 after the slide has moved a distance equal to the spacing of the separator plates 29. Thus, in their

initial position the jaws 53 will be separated with their opposed faces spaced a slight distance to permit the insertion of the stem end of a tobacco leaf. Upon operation of the sleeve 60 the jaws 53 will move inwardly into gripping engagement with the tobacco leaf stem and in this position the slide 44 will be moved to the left until the tobacco leaf L has had its stem portion S strung on the rod R. At the end of the stroke of the slide 44 the arms 51 will move in an outward direction from between the separator plates 27 and 29, and the leaf L will have been impaled on the end of the rod R and the sleeve 26 will have been moved a distance equal to the spacing of the separator plates 29 on the rod 15. The slide 44 is then reversed in direction of movement toward the right, while the jaws 53 are separated until they are positioned opposite the space between the next set or adjacent pair of separator plates 29. At the end of the stroke of the slide 44 the cam 82 then operates the push rod 75 to again move the jaws 53 inward between the separator plates 29 so that the jaws will be separated slightly a distance to permit the insertion of another tobacco leaf stem S therebetween.

The cyclic operation of the machine is effected by a control solenoid 85 which is supported on a bracket 86 having an angular end 87 extending under the lower wall of the cylindrical casing 42, where it is pivotally held in place by means of a pivot pin or bolt 88. The solenoid 85 is provided with a reciprocating armature plunger 89 which is adapted to project upwardly through a slot 90 adjacent the peripheral edge of the power disk 64 and into the path of the pawl 65. The slot 90 is arcuately shaped to permit the armature plunger 89 to be projected into the path of the pawl 65 and thus move the pawl 65 out of engagement with the lug 71 on the pulley 68 so that the slide 44 and gripping jaws 53 will come to rest in their initial position in which they are spaced apart slightly for receiving a tobacco leaf stem S. When the solenoid 85 is energized, the armature plunger 89 is retracted against the action of a coil spring 92. Normally, the armature bracket 86 is in the position shown in Figure 1 where it is in engagement with a stop 93 welded or otherwise secured to the cylindrical wall 42. A suitable electric circuit including a source of electrical energy is provided for the winding 95 of the solenoid 85, and said circuit includes a microswitch 98 having an operating plunger 99 as shown in Figure 2. The microswitch 98 is of the type in which slight pressure on the actuating arm 99 in an upward direction will operate the switch the contacts of which are normally open, so as to close the circuit through the winding 95 of the solenoid 85 and energize the armature plunger 89 to project the same downwardly against the action of the coil spring 92, which spring has one end arranged in abutting relation with the solenoid winding at its opposite end in engagement with a transverse pin extending through a transverse opening in the armature plunger 89.

Thus, when the stem S of a tobacco leaf is inserted between the partially opened jaws 53 when they are in their initial position the stem engages the arm 99 of the microswitch 98 in such a manner as to close the circuit through the solenoid 85 and retract the plunger 89. When this occurs the upper end of the plunger is moved out of engagement with the pawl 65 which permits the spring (not shown) to project the pawl radially outward into engagement with the driving lug 71 on the pulley 68. The pulley 68 is continuously driven by means of a motor (not shown) supported on the frame 5 with its armature shaft extending vertically and fitted with a pulley in the same plane as the pulley 68. A drive belt (also not shown) is provided for a drivingly connecting arrangement between the motor pulley and the power pulley 68. In other words, the motor pulley is drivingly connected to the power pulley 68 by the pulley belt to continuously rotate the power pulley 68.

The cams 61 and 62 can be provided with suitable hubs having set screws to permit the cams 61 and 62 to be adjusted to the proper angular position with respect to the axis of the sleeve 60 so that the various parts including the jaws 53 will operate in the manner in which they are intended to function. Attached to the armature bracket arm 87 is a rod 100 which has its end as at 101 bent upwardly for being received in an opening in the arm 87. The opposite end of the rod 100 is similarly bent upwardly and extends through a slot 103 in one of the side flanges of the channel member 6. A control ring on the bent end 102 as at 105 is provided with an opening 106 for receiving the rod 15, and said control ring 105 is adapted to be engaged by the sleeve 26 when the hanger rod R has become completely filled. When the control ring 105 is engaged by the sleeve 26 the rod 100 is moved in a direction to swing the bracket 86 in a clockwise direction about its pivot 88 so as to position the armature plunger 89 in an advanced position such that when it is projected by the spring 92 the pawl 65 will be moved out of engagement with the driving lug 71 and arrest motion of the jaws 53 so that they will be positioned in a fully opened relation with respect to one another and out of their normal position between sets of spacer plates 27 and 29.

After the hanger rod R has been completely filled, the sleeve 26 with its separator plates will assume a position toward the left hand side of the frame 5 when viewing Figure 1. In this position, the hanger rod R may be released from their supporting slots 29 in spacer plates 28 by rocking the sleeve 26 about its axis. To accomplish this, the handle 32 is operated in the direction of the arrow (Fig. 5) to swing the separator plates 28 in a direction such that their notches 29 are disposed as shown in dotted lines so that the hanger rod R in its loaded condition may fall by gravity downward upon suitably spaced rack bars 33 and will slide down the inclined rack bars in the direction of the arrow.

The hanger rods R are automatically loaded and are supported in stacked relation in a chute 110 which has its mouth presented to the notches 24 and 29 in the spacer plates 21 and 27. It is to be understood that after the loaded rod R has been discharged the sleeve 26 and spacer plates 27 and 28 are moved to the right hand end of the machine by the handle 32 after the spacer plates have been returned to the full line position shown in Fig. 5 from the dotted line position also shown in Fig. 5. Since the jaws 53 are at rest in a fully open position, the separator plates 28 can pass therebetween during the return movement of the sleeve 26 toward the right hand end of the machine. In this position the spacer plates 21 and 27 are spaced as shown in Figure 4 with their rod receiving notches 24 and 29 disposed opposite the chute 110. A pivoted rod release 111 is mounted on an arm 112 pivoted as at 113 and arranged to operate in a slot 114 in the chute 110. A link for controlling the feed release 111 is provided as at 115 and has one end pivoted to the separator plate 21, and its opposite end pivoted as at 117 to the lever 112. Thus, when the loaded rod R is discharged as shown in Fig. 5 by operating the handle 32 the link 115 will be actuated to operate the feed release and permit an empty rod to move down the chute 110 when the handle 32 is moved in a direction opposite to the direction of movement shown in Fig. 5, from the dotted line position. Upon its return movement the separator plates will be in the position shown in Fig. 6, and the feed release member 111 will also be in the position shown in Fig. 6 to permit a new rod or unloaded one to be supplied to the separator hanger plates 21 and 27 while in their spaced position shown in Fig. 4.

The spring for projecting the drive lug engaging pawl 65 may be in the form of a spiral spring encircling the pivot pin 66 with one end of the spring attached or affixed to the driving disk 64 and the opposite end after being coiled around the pin 66 attached to the pawl 65 so

that said pawl will be urged in a counterclockwise direction with respect to the axis of the pin **66**.

Since the separator hanger plate **21** is rotatably supported on the rod **15**, it is necessary to employ a pin **30** to engage in the opening **31** when the sleeve **26** has been shifted to the left during loading of the rod R so that said hanger plate **21** will also be moved in the direction of the arrows in Fig. 5 when the handle **32** is manipulated to dump or discharge the completely loaded rod R from their supporting slots **24** and **29**.

In operation, the operator sits beneath the frame 5 at a point substantially intermediate the ends and has within easy grasp a stack of tobacco leaves to be hung preparatory to curing. With the parts of the machine in their positions shown in Figs. 1 and 4 with the sleeve **26** and separator plates **28** toward the right hand end of the machine, and the tobacco leaf gripping jaws 53 in a slightly spaced position between the separator plates **27** and **28** with the machine at rest, the operator inserts the stem S of a tobacco leaf between the first set of separator plates **27** and **28** until the end of the stem engages the micro-switch actuating lever **99**. As this occurs, the circuit through the solenoid **85** is energized causing the armature plunger **89** to be moved downwardly out of engagement with the pawl **65** which will permit the pawl to move into the path of the driving lug **71**. Since the pulley **68** is continuously driven, the lug **71** will engage the pawl **65** and drive the driving disk **64** with the result that the sleeve **60** and cams **61** and **62** thereon will be rotated in a counter-clockwise direction. The initial movement of the cam **62** will cause the jaws **53** to be completely closed and maintained in a closed position, while the cam **61** moves the slide **44** in a direction toward the right, thereby carrying the gripped tobacco leaf and the separator plates in a direction toward the left so that the stem of the leaf will be impaled on the hanger rod R. Upon continued movement in a rotary direction of the sleeve **60**, the jaws **53** will be moved apart causing the micro-switch actuating lever to be moved out of engagement with the tobacco leaf stem. As this occurs, the circuit for the solenoid **85** is interrupted and the armature plunger **89** is forced upwardly under the influence of the coil spring **92** so that the pawl **65** will be disconnected from the driving lug **71** when the armature plunger **89** is projected. The momentum of the pulley **68** will have carried the driving disk **64** to a position in which the cams **61** and **62** will return the gripping jaws **53** to their initial position between an adjacent set of separator plates **28**, with the jaws **53** coming to rest as before in a slightly spaced apart relation. The slot **90** of the power disc **64** is so positioned that when the pawl **65** becomes disengaged from lug **71** of the pulley **68** the armature plunger **89** will come to rest against the advanced end of slot **90** to thereby hold the power disc **64** in a fixed position until altered through movement of the rod **100** away from the armature bracket stop **93** or upon energization of the solenoid **85**. Thus, the leaf grippers are in a fully open position normally to receive the first leaf placed on the leaf piercing rod but when the second leaf is presented, the grippers will normally be in a partially closed position between two separator members. The above cycle is then repeated until the tobacco hanger rod R has been completely filled, and when this occurs the sleeve **26** and spacer plates **27** and **28** will have moved to a position adjacent the left hand end of the machine. In this position of the sleeve **26**, the handle **32** will be within easy reach of the operator so that he may swing the handle **32** as shown in Fig. 5 from the full line position to the dotted line position. As previously explained, when the sleeve **26** engages the control ring **105** the solenoid and plunger **89** are shifted in a direction such that the pawl **65** will be disengaged from the driving lug **71** and thus permit the driving disk **64** to be disengaged so that the cams **61** and **62** will remain in a position to hold the tobacco leaf gripping jaws **53** in a fully opened position.

After the handle **32** has been operated to discharge the completely loaded tobacco rod R, a new rod or unloaded one is engaged by the feed member **111** so that when the tobacco rod hangers **21** and **27** are returned to a vertical position, the feed control **111** will be swung in a direction to release the rod R and permit the same to be fed down the chute **110** to the notches **24** and **29** of the tobacco rod hangers **21** and **27**.

With the parts in their initial position again, as shown in Figures 3 and 4, the cycle is repeated and the operator inserts the tobacco leaves between the separator plates **28** in succession until the tobacco hanger rod R is again loaded.

It is to be noted that the operator can supply the individual leaves between the separator plates **28** as rapidly as he can, and that the operation of the machine depends entirely upon the presence or absence of a tobacco leaf stem between the jaws **53**. The normally open microswitch **98** being closed upon engagement of the stem with the actuator member **99** to close the normally open circuit of the solenoid and permit the armature plunger **89** to be retracted against the action of the spring **92** and permit operation of the machine by the pawl **65** moving out into engagement with the lug **71**.

It will be seen, that when the plunger operator or armature plunger **89** is moved in a counterclockwise direction by the sleeve **26** engaging the ring **105**, that the pawl **65** will be disengaged from the driving lug **71** at an advanced position and will permit the gripping jaws **53** to remain in a fully opened position and allow the sleeve **26** and hanger rods or separator plates **28** to be shifted toward the left hand end of the machine.

Having thus described the invention, it is to be understood that the form thereof herewith described and illustrated is to be taken as a preferred embodiment, and that various changes in the shape, size and arrangement of parts will be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

What I claim is:

1. In a machine for stringing tobacco leaves on a hanger rod, a horizontal support, a series of spacing members connected one to the other and movably mounted on said support adapted to hold a tobacco stringing rod, gripping means for engaging the stem of a tobacco leaf when the same is presented between a pair of adjacent spacing members, and means for cyclically moving said gripping means into and out of engagement with the tobacco leaf stem and simultaneously shifting said spacing members so that the gripping means will be repositioned to engage the stem of another tobacco leaf presented between the next adjacent pair of spacing members.

2. In a machine for stringing tobacco leaves on a hanger rod, a horizontal support, a slide mounted on said support, a series of tobacco leaf stem spacing members arranged on said slide in spaced apart relation, said spacing members being provided with notches for removably receiving a hanger rod, gripping means for engaging the stem of a tobacco leaf when the same is presented between a pair of adjacent spacing members, means for cyclically moving said gripping means into and out of engagement with said tobacco stem and simultaneously shifting said slide whereby said gripping means will be re-positioned to engage the stem of a tobacco leaf presented between a next adjacent pair of spacing members.

3. In a machine for stringing tobacco leaves on a tobacco hanger rod, a horizontal support, a series of tobacco leaf spacing members connected one to the other and movably mounted on said support, means in said spacing members for supporting a hanger rod, gripping means adapted to engage the stem of a tobacco leaf when

the same is presented between a pair of adjacent spacing members, means for cyclically moving said gripping means into and out of engagement with the stems of the tobacco leaves presented between adjacent spacing members and simultaneously shifting said spacing members for re-positioning the gripping means between the next adjacent pair of spacing members, and means for feeding hanger rods to said tobacco leaf spacing members.

4. In a machine for stringing tobacco leaves on a hanger rod, a horizontal support, a series of spacing members connected one to the other and movably mounted on said support, means to feed hanger rods to said spacing members so that the rods will be supported throughout their length, gripping means for engaging the stem of a tobacco leaf when the same is presented between a pair of adjacent spacing members at one end of said series, means for cyclically moving said gripping means into and out of engagement with the tobacco leaf stems presented between adjacent spacing members and simultaneously shifting said spacing members so that the gripping means will be presented to an unoccupied space between the next adjacent set of spacing members, means for removing said hanger rods when they have become completely filled and motor means for actuating said gripping means.

5. In a machine for stringing tobacco leaves on a hanger rod, a horizontal support, a slide movably mounted on said support, a series of spacing members mounted on said support having notches to receive a hanger rod, gripping means for engaging the stem of a tobacco leaf when the same is presented between a certain pair of adjacent spacing members, means for cyclically moving said gripping means into and out of engagement with a tobacco leaf stem when presented between adjacent spacing members, means for shifting the gripping means to advance the spacing members in a step by step manner, means for feeding hanger rods to said spacing members, and means for removing said rods after they have been completely filled with tobacco leaves.

6. In a machine for stringing tobacco leaves on a hanger rod, a horizontal support, tobacco leaf spacing members movably mounted on said support, said members being provided with notches for removably supporting a hanger rod, gripping means adapted to engage the stem of a tobacco leaf when the same is presented between a pair of adjacent spacing members, means for moving said gripping means in a direction to string the stem on said hanger rod and simultaneously moving said spacing members, and means for removing said hanger rod from said spacing members when the same has become completely filled with tobacco leaves.

7. In a machine for stringing tobacco leaves on a hanger rod, a horizontal support, a slide mounted on said support, a series of spacing members on said slide, said spacing members being provided with notches for removably supporting a hanger rod, gripping means operable upon presentation of a tobacco leaf stem between a pair of adjacent spacer members for gripping said stem, means for moving said gripping means and said spacing members in a step by step fashion and means for returning said gripping members to re-position them between a next adjacent pair of spacing members.

8. In a machine for stringing tobacco leaves on a hanger rod, a horizontal support, a slide mounted on said support, a series of spacing members on said slide, gripping means operable upon presentation of a tobacco leaf stem between a pair of adjacent spacer members for gripping said stem and stringing the same on said hanger rod, means for moving said gripping means to and fro and into and out of engagement with said tobacco leaf stem, and means for removing said hanger rod when the same has become filled.

9. In a machine for stringing tobacco leaves on a hanger rod, a horizontal support, a slide on said support, a series of spacing members on said slide, gripping means operable upon the presence of a tobacco leaf stem between a pair of adjacent spacer members for gripping said stem, means for moving said gripping means to string the stem on said hanger rod, means for moving the gripping means into and out of engagement with the tobacco leaf stem and simultaneously shifting said spacing members a distance equal to one of said spaces, and means for feeding hanger rods individually to said spacing members after a filled hanger rod has been removed therefrom.

10. In a machine for stringing tobacco leaves on a hanger rod, a horizontal support, a slide on said support, a series of spacing members equidistantly spaced on said slide having notches for removably receiving a hanger rod, gripping means operable upon presentation of a tobacco leaf stem between a pair of adjacent spacer members for gripping said stem, means for moving said gripping members to string the tobacco leaf stem on said hanger rod, means for releasing said gripping means and returning the same to re-position them between a next adjacent pair of spacing members, means for removing the hanger rod from said spacing members when the same has become filled, and means for feeding an empty hanger rod to said spacing members after a filled rod has been removed therefrom.

11. In a machine for stringing tobacco leaves on a hanger rod, a horizontal support, a bar longitudinally movable on said support, a series of tobacco leaf spacing members equidistantly spaced on said bar, said spacing members being provided with notches for removably receiving said rod, a slide mounted on said support for to and fro movement, gripping arms on said slide having jaw members adapted to engage the leaf of a tobacco stem when the same is presented between a pair of said spacing members, means for moving said jaws in a direction to string the gripped tobacco leaf stem on said hanger rod, means for moving said jaws in a reverse direction to re-position them between an adjacent pair of spacing members and means for maintaining said jaws in a fully open position after the tobacco rod has become filled to permit the spacing members to be repositioned after the filled rod has been removed and a new one replaced in said notches.

12. In a tobacco leaf stringing machine for stringing tobacco leaves on a hanger rod, a horizontal support, a bar mounted on said support for longitudinal movement, a series of tobacco leaf spacer members on said bar having notches for receiving a hanger rod, a slide mounted on said support for to and fro movement, gripping jaws on said slide adapted to engage the stem of a tobacco leaf when the same is presented between a pair of adjacent spacer members, cam means for actuating said slide to cause the same to move to and fro, cam means for moving said jaws into and out of engagement with a tobacco leaf stem placed between said spacer members whereby said stem will be strung on said hanger rod in succession and as rapidly as tobacco leaves are placed between said spacer members in sequence, motor means for actuating said cam means in unison, means for removing a hanger rod when the same has become filled, means for supplying an empty rod to said spacer members, and means for maintaining said jaw members in a fully open position after the rod has become filled to permit the empty rod and spacer members to be restored to their initial position.

13. In a tobacco leaf stringing machine for stringing tobacco leaves on a hanger rod, a horizontal support, a series of spacing members movably mounted on said support and connected one to the other, a slide mounted on said support, a pair of gripping jaws mounted on said slide and arranged to engage the stem of a tobacco leaf when the same is presented between a pair of adjacent spacing members, switch means between said jaws adapted to be engaged by said tobacco leaf stem, cam means for reciprocating said slide, cam means for actuating said

gripping jaws to move the same into and out of gripping relation, motor means for driving said cam means, a clutch member for operatively connecting said motor means to said cam means when said switch means is closed to cause said gripping jaws to move through a cycle of gripping a tobacco leaf and moving the same in a direction to be strung on the hanger rod and then returning said gripping jaws after they have separated to re-position them between a next adjacent pair of spacing members, and control means for said clutch means to permit said jaws to remain fully open after the hanger rod has been completely filled and permit the spacing members to be returned to their initial position.

14. In a tobacco leaf stringing machine for stringing tobacco leaves on a hanger rod, a horizontal support, a bar mounted on said support for longitudinal movement,

a series of equidistantly spaced spacer members on said bar having notches for removably receiving a hanger rod, a slide on said support, a pair of gripping jaws carried by said slide, cam means for operating said slide, cam means for moving said gripping jaws into and out of engagement with the stem of a tobacco leaf, means for driving said cam means, a clutch member interposed between said driving means and cam means, an electro-magnetic actuator for said clutch, a circuit for said electro-magnetic actuator including a source of electrical energy, and a normally open switch mounted between said jaw members adapted to be engaged by the stem of a tobacco leaf to energize said circuit and operate said electro-magnetic actuator to thereby establish a driving connection between said driving means and cam means.

No references cited.