

April 9, 1957

K. R. HENDRIX
TOBACCO CROPPING MACHINE

2,788,141

Filed Dec. 31, 1953

3 Sheets-Sheet 1

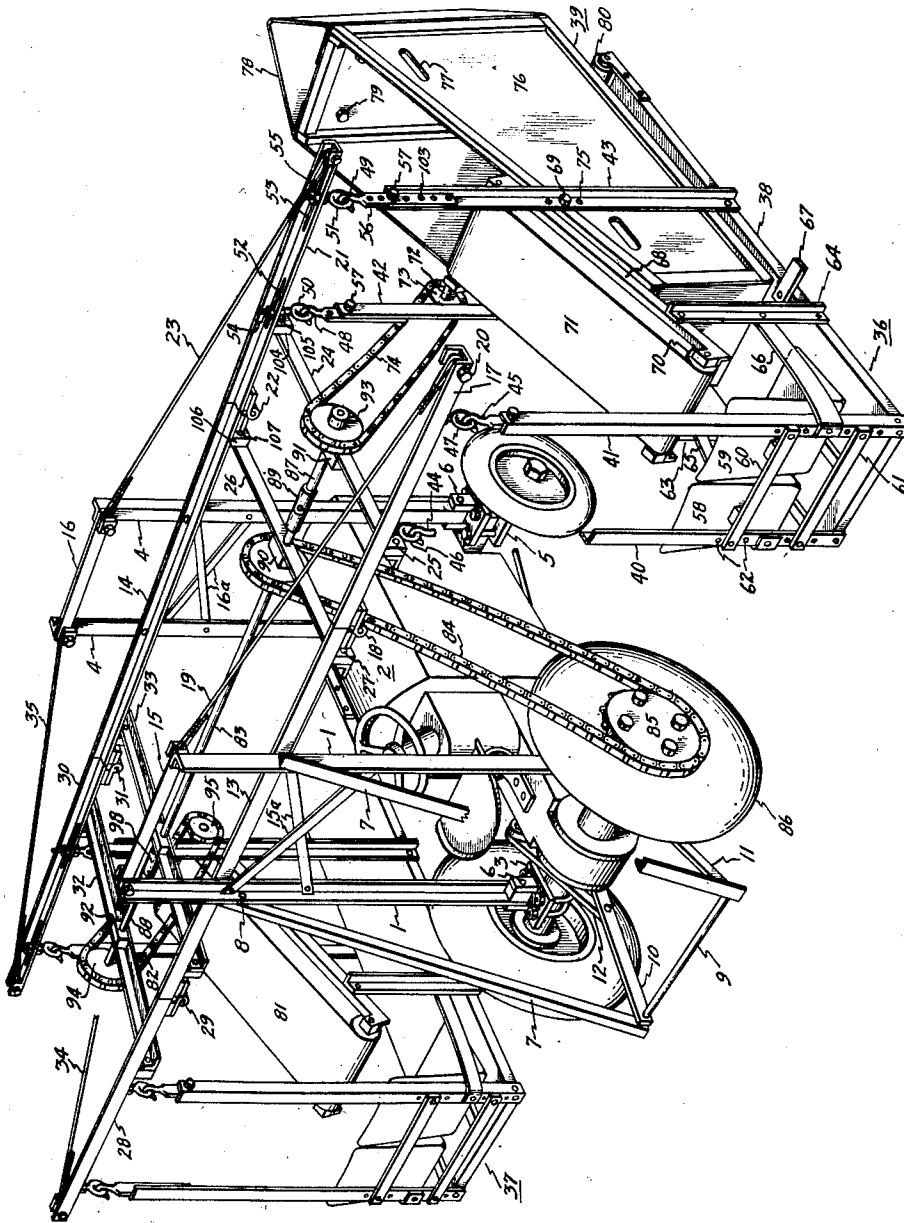


Fig. 1.

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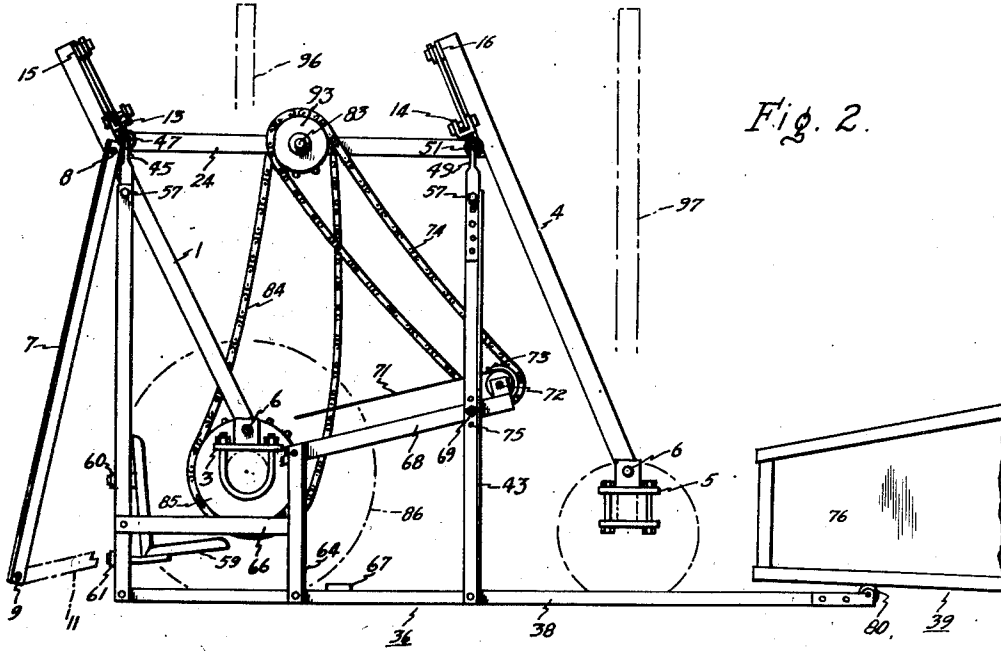


Fig. 2.

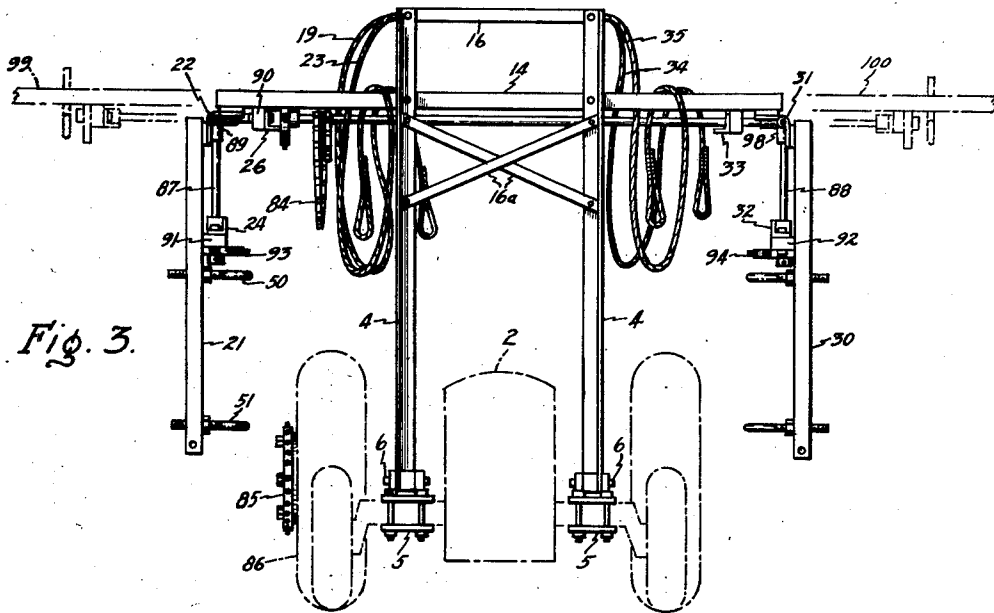


Fig. 3.

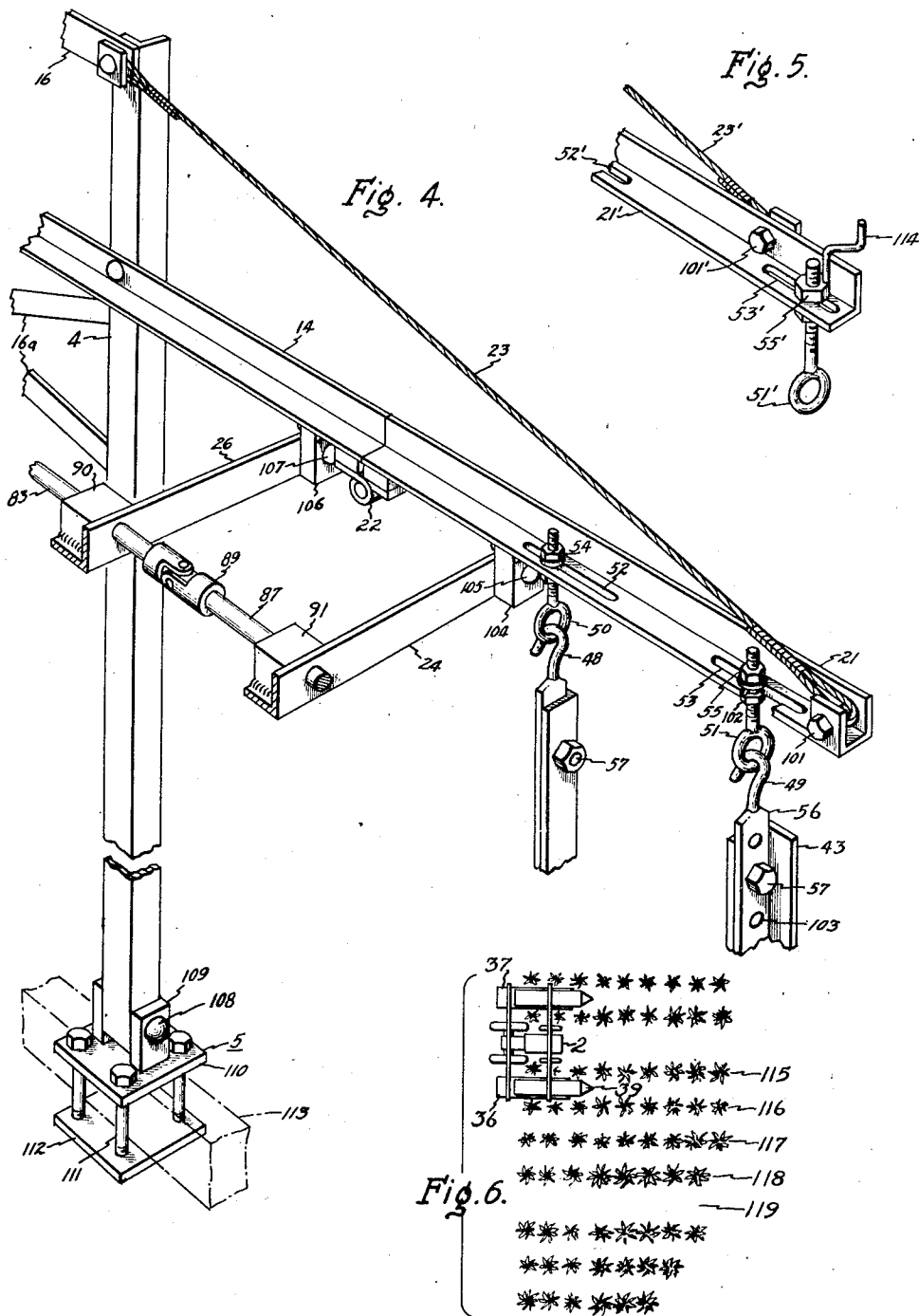
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Application December 31, 1953, Serial No. 401,468

9 Claims. (Cl. 214—83.1)

The invention pertains to tobacco cropping machines, and more particularly to a machine comprising platforms arranged to carry human croppers and to carry tobacco leaves picked by the croppers, and further comprising supporting means for the platforms operative to convey the platforms along the rows of tobacco.

An object of the invention is to provide a machine to make cropping of tobacco leaves less difficult, more rapid, and, in general, more efficient, with less physical effort on the part of the croppers.

Tobacco may be planted in accord with many different plans. The tobacco plants are usually set in rows in the field, and it has proved desirable to provide a wide path at every fourth row, for example, the wide path being arranged to permit a tractor or the like to pass along the path to carry spraying equipment for spraying the rows near the path and for pulling loaded sleds of tobacco leaves during cropping. A typical planting of tobacco in the Southeastern United States, particularly in Florida or Georgia, may comprise, at the present time, rows of plants set on forty-four inch centers between rows and with every fifth row omitted to provide a path between each group of four rows, the path being bounded by rows set on eighty-eight inch centers across the path. The specific dimensions may vary from field to field, and the rows, for example, may be set on 40 inch centers with a path, at each omitted fifth row, 80 inches wide between centers of the adjacent rows, or on 48 inch centers with a path 8 feet wide. Some planters prefer to provide paths that are less than twice as wide as the distance between adjacent rows, and if the rows are spaced on four foot centers, the paths separating the groups of four rows may be only seven feet wide.

The machine specifically shown and described in this application is particularly adapted to the harvesting of tobacco planted in the general pattern outlined above, wherein groups of four rows of plants are set with a predetermined spacing between rows, and the several groups of such rows are separated one from the next by a path substantially wider than the distance between the adjacent rows in each group. Modifications of the machine to adapt it for use with other planting patterns will be apparent to those skilled in the art.

The tobacco plant as grown in the Southeastern United States provides several crops of harvestable leaves. The first cropping may take place, for example, in June and further croppings may follow at about two-week intervals through July and into August. The lower leaves are pulled at each cropping as the leaves develop to good size, until the last cropping in which the top leaves are taken. While the first croppings take leaves which grow only a few inches from the ground, later croppings are of leaves growing from the stalks two or three feet or more above the ground.

In hand cropping the cropper or picker passes along a row, breaking off the desired leaves and dumping the leaves into a basket or bag which he or she carries or

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drags along. When the basket or bag is full, it is taken to the nearest wide path and dumped onto a sled, the sled being dragged along by mule or tractor down the path approximately keeping up with the croppers in the rows. The full sleds are periodically taken to a tying shed, at which the leaves are gathered by "handlers" into "hands" of from two to three to six or eight leaves and tied by "stringers" to sticks for curing. This method results in considerable breakage of the leaves in the bags and while dumping onto the sled. It further results in slow typing in that the leaves as delivered to the stringing or typing shed are not in any order but are in a disordered heap. The hander must pick stems from several different directions to assemble each hand for tying. In usual practice, one stringer may be tying the hands to sticks while one or two handlers collect leaves from the heaps into hands and give the collected hands to the person doing the typing, the stringer.

Cropping tobacco under the conditions indicated above is work that is very hard and physically tiring. Under good conditions in moderately hot weather, three strong men can crop about two acres or a little more per day. Women and children can crop much less.

It is an object of the invention to remove the physical strain heretofore associated with cropping tobacco, whereby the manual dexterity of women and children can be utilized, by the provision of a machine which will collect the leaves of tobacco from the hands of the croppers, which will transport the croppers along the rows to be cropped in a convenient and comfortable position for cropping, which will transport the leaves of tobacco with minimum breakage to a collection point, such as a stringing shed, and which will permit the croppers originally to form hands of tobacco leaves and will thereafter cause the assembled hands to remain at least partially in order, and may, for example, deliver the leaves to a stringing shed in piles in which the leaves are oriented for ready collection again into hands.

A tobacco cropping machine, to be practicable, must be inexpensive, simple, readily adaptable to different planting patterns, easily repairable, proportioned so as to be transportable on highways and to pass through narrow gates and barn doors, light in weight and with a sufficiently low center of gravity to pass safely over the uneven ground of tobacco fields, operable by persons without special training, and arranged to avoid damage to the tobacco plants or the leaves thereof, while providing economic, labor saving efficiency and speed in the cropping operation. It is a general object of the invention to incorporate all of these features in a tobacco cropping machine.

It has been found that a machine in accord with the herein described preferred embodiment of the invention will permit the cropping of 8 to 12 acres of tobacco, depending upon the leaf development, by four croppers, plus one driver, in one day, and it has further been found that women and children can be employed as croppers and can accomplish the cropping without undue physical strain at a rate at least twice that of strong men cropping without benefit of the machine. Since tobacco must be cropped at times determined by leaf sizes and degree of development or ripeness, and since extra labor at such times is usually very difficult to obtain, particularly in that vegetable crops must be harvested at the same time of the year, it is an extremely important practical economic advantage that women and children can be employed as croppers with the machine.

The novel features which are believed to be characteristics of the invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation, together with further objects and advantages thereof, may best be

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understood by reference to the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of a complete tractor attached machine shown in position for use, certain portions being broken away, however, for the purposes of better illustration;

Fig. 2 is a side view showing the machine following operation by the tractor drawbar into a partially collapsed condition in which ready removal of tobacco leaf containing bins is permitted;

Fig. 3 is a front view showing certain parts folded or collapsed inwardly to condition the machine for operation along a highway, through gates, and the like;

Fig. 4 is an enlarged detail perspective view of a portion of the machine in erected condition as shown in Fig. 1;

Fig. 5 is a perspective detail view on the scale of Fig. 4 showing a modification applicable to the end portions of the main horizontal, transverse support members; and

Fig. 6 is a top view in greatly reduced scale of a complete machine in operation in a tobacco field.

As seen in Fig. 1 the attachment machine comprises four main support stanchions or posts, including the pair of rear posts 1 which are supported from the rear axle of tractor 2 by brackets 3, and including the pair of forward posts 4 which are supported from the front axle of the tractor by brackets 5. The upright posts 1 and 4 are each connected to the respective axle bracket through a pivotal connection 6, being thus permitted to swing through a limited distance in longitudinal planes parallel to the direction of motion of the tractor. The members 1 are maintained in upright position by a pair of lever members 7 connected at their respective upper ends by means of a suitable pivot, such as a bolt or rivet 8, to the upper portions of the respective upright members 1 and connected at their lower ends, through a bracing rod 9 and links 10 and 11, respectively, to a drawbar 12 of the tractor. The drawbar may be operated to swing the upright posts rearwardly to cause the upper portions of the frame to move from the fully erected position shown in Fig. 1 to a lowered or partially collapsed position.

The four upright stanchions, together with main horizontal upper frame members 13 and 14, form the main frame of the machine. In the upper portion of the frame, member 13 comprises a rigid horizontal transverse bar which is rigidly affixed to the upper portion of rear uprights 1, and member 14 comprises a similar rigid section affixed to the upper portion of forward uprights 4. A brace bar 15 is connected between rear uprights 1 at their extreme upper ends, and a similar brace bar 16 is connected between the extreme upper ends of forward uprights 4. The upright stanchions 1, and the stanchions 4, may be further braced as necessary, such as by diagonal cross members 15a and 16a.

Horizontal frame members 13 and 14 are extended at each side of the attachment machine into outboard sections hingedly attached at the ends of the rigid center sections of members 13 and 14. Outboard section 17, for example, is hinged by a hinge 18 to the center section of frame member 13 at the right hand side of the machine and normally extends outwardly in alignment with the rigid central portion of member 13. Cable 19 is attached to the extreme upper end of the adjacent one of rear uprights 1 and extends to the outer end of the frame outboard section 17, the cable being attached to the section 17 by readily detachable means, such as by a bolt 20. An outboard upper frame member 21 extends outwardly from forward horizontal frame member 14, being hingedly attached by a hinge 22 and having an outer end supported by a cable 23 from the extreme upper end of the adjacent upright 4, all as described in connection with section 17. Frame sections 17 and 21 are retained in predetermined spaced positions in part by a longi-

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tudinal brace and bearing support member 24, which extends substantially horizontally in a direction parallel to the direction of motion of the tractor or power unit 2. Brace 24 is pivotally or hingedly attached at its ends to the respective sections 17 and 21 by means of hinge pins or bolts 25, the hinge pins being horizontally disposed and providing hinge axes transverse to the direction of motion of the tractor. A similar brace 26 is similarly hinged, by hinge pins 27, at its ends to the central portions of members 13 and 14 near the hinges 18 and 22.

It will be apparent that the frame members described above, as well as other parts of the machine attachment later considered, are duplicated and symmetrically arranged on opposite sides of a vertical plane passing through the longitudinal center of the power unit or tractor 2, with the exceptions of a power takeoff connection described hereinafter and with the further exception that the tractor drawbar link 12 may be only a single member located to the left of the tractor differential as shown. Depending upon the type of tractor, the link 12 may or may not be duplicated by a similar link to the right of the differential. Accordingly, the power unit which forms a part of the overall machine in accord with the invention may or may not permit the drawbar arrangement to be symmetrical, and while symmetry at this point is desirable, it is by no means necessary.

The symmetry mentioned above is preserved by the provision of an outboard section 28 hingedly attached, by hinge 29, to the left hand end of the rigid center section 13 of the upper rear frame member, corresponding to outboard section 17 and hinge 18, and by the provision of left hand forward frame member section 30 and hinge 31, corresponding to section 21 and hinge 22, and longitudinal braces 32 and 33 corresponding to braces 24 and 26, respectively. Cables 34 and 35 are provided for the erected support of outboard sections 28 and 30 and correspond to cables 19 and 23. Members 13 and 14, together with their respective outboard sections 17, 28, 21 and 30, and with cables 19, 23, 34 and 35 and braces 15 and 16, form an upper overhead bridging frame portion of the machine frame.

Substantially identical platform or stage assemblies 36 and 37 depend from the outboard ends of the horizontal transverse overhead bridging frame portion at respective opposite sides of the machine. The right hand stage comprises a floor 38, which may be solid, as shown, or which may be only an open framework, the function of the floor being primarily to support or carry a removable tobacco leaf bin 39 or other receiving and carrying means for the cropped hands of tobacco and to provide an interconnecting base for the lower ends of vertical hanger members 40, 41, 42 and 43. Hanger members 40 and 41 are joined by bolts or screws to hook 38 at the respective rear corners thereof, and hooks 44 and 45 are provided at the upper ends of the hangers for removable connection with rings 46 and 47, the rings, in turn, being attached to the outboard section 17 of the overhead frame member. Hangers 42 and 43 are connected to the floor 38 at opposite sides of and toward the forward end of the floor, and these hangers carry hooks 48 and 49 at their respective upper ends to engage in rings 50 and 51. As shown, rings 50 and 51 are provided with threaded shanks which extend upwardly through slots 52 and 53 in the horizontal web of the angle iron outboard section 21. Nuts 54 and 55 are threaded on the respective shanks of the ring members to complete the attachment of the rings to the overhead section 21. The mounting of eyes or rings 46 and 47 to section 17 is similar to that described for eyes 50 and 51. The screwing on or off of the nut on the shank of any one eye will raise or lower the respective hanger, and the stage 36 may be raised or lowered, or leveled, by appropriate adjustment of the nuts.

The stage may also be adjusted along the overhead

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horizontal frame in accord with the spacing of the rows of tobacco by sliding the shanks of rings 50 and 51 along slots 52 and 53, and by making a similar adjustment of rings 46 and 47 along overhead frame section 17. Furthermore, in addition to the height adjustments permitted by the nuts 54, 55 as provided on the shanks of the supporting eye members, the height of the stage may be adjusted in steps. Hook 49 is seen to comprise the upper end of a bar 56, and the bar comprises a series of openings through a selected one of which a bolt 57 extends to attach the bar 56 to hanger member 43. The distance from the hook 49 at the upper end of hanger member 43 to the floor 38 is thus readily adjusted by selection of the bolt hole of bar 56 through which bolt 57 extends. Identical step adjustment means are provided for each of hanger members 40, 41 and 42.

A pair of side by side seats 58 and 59 are attached to transverse members 60 and 61, which members, in turn, are bolted, or affixed by pin means, to hangers 40 and 41, a series of openings 62 being provided in the hangers to permit the seats to be adjusted in height above the floor 38. The most comfortable height of the seats 58 and 59 will depend upon the size of the persons who will act as croppers and who are seated upon the particular stage and will further depend upon the location of the leaves to be cropped. For early season croppings, when only tobacco leaves close to the ground are being pulled from the stalks, the seats may be located in a position almost touching floor 38, whereas for later croppings to collect leaves near the upper ends of the mature plants, the elevation of the seats above the floor 38 may be considerably higher. Supporting posts 63 and 64 extend upwardly from an attachment to floor 38 at respective sides of the stage a few inches forward of the seats 58 and 59. Belts 65 and 66 are provided to extend along the side of the exposed side of each seat 58, 59, and these belts are attached in adjustable position along the respective hanger 40, 41, at one end of each belt, and along post 63, 64 at the forward end of each belt. The belt in each case extends under the arm of the cropper and against his body to permit leaning out to collect leaves from the tobacco plants. A foot rest 67, affixed to floor 38, may also be provided for the convenience and comfort of the cropper.

The upper ends of posts 63 and 64 support a conveyor belt frame 68 adjacent its rearward end, the frame being also attached adjacent its forward end to hangers 42 and 43 by means of suitable bolts, such as bolt 69. A roller, such as roller 70, is carried in suitable bearings at the opposite ends of frame 68 and a continuous conveyor belt 71 extends over these rollers. The forward belt roller is power driven through a shaft 72 which carries a chain sprocket 73 connecting with chain 74. Rotation of sprocket 73 in a clockwise direction, as seen in Fig. 1, causes movement of the upper section of the belt forwardly from the roller near the seats 58, 59 to a position over the open top tobacco leaf receiving bin 39. In operation, tobacco leaves pulled from the stalks by the hands of the croppers seated in seats 58 and 59 are deposited in groups approximating the size of hands across the rearward end of the conveyor belt and these hands of tobacco leaves are conveyed forwardly by the belt and supplied to the tobacco leaf receiving and collecting means 39 at the forward end of the stage or platform 36.

The tobacco leaf receiving and collecting means comprises a bin 39 in the form of a box-like structure with a rectangular bottom and sides tapered in height to have a rearward end of less height than the forward end. At least one of the side panels, such as side panel 76, is preferably removable from the bin, and hand holes 77 may be provided to assist in its removal. A sheet-metal prow 78 is preferably mounted across the forward end of the bin 39 to deflect overhanging leaves of the tobacco plants and to prevent such leaves from being torn by the

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passage of the bin between the rows. It has been found convenient to provide several extra bins for each cropping machine, the filled bins being deposited for unloading by handers at a stringing shed, while other bins are being filled by croppers on the cropping machine. It may be found convenient, accordingly, to arrange the prow member 78 for quick detachment from the bin, whereby the prow may be transferred from a filled to an empty bin. Bolts 79 are provided for this purpose. The bin 39 is supported on floor 38 of the stage and an idling roller 80 is preferably located across the forward end of the floor to assist in unloading a filled bin and in the ready positioning of a new unfilled bin on the floor. Since the belt 71 deposits the hands of tobacco through its forward motion, it has been found that tobacco tends to roll toward the forward end of the bin and fills the rearward end slowly. Accordingly, even though the hands of tobacco are continuously deposited near the center of the bin, they tend to fill the forward end to increased height and to fall back into and fill the rearward end of less height.

The arrangement described above in connection with stage 36 is duplicated in stage 37, as will be immediately apparent in Fig. 1, it being understood that the tobacco leaf bin is removed from stage 37 in the drawing for the sake of clarity of illustration.

Conveyor belt 71 of stage 36 and the corresponding belt 81 of stage 37 are driven by chains 74 and 82, respectively, from an overhead shaft 83 which receives power through a coupling in the form of drive chain 84 connecting with a power take-off 85 of the power unit 2. The power take-off 85 is illustrated as a sprocket wheel affixed to one of the rear driving wheels 86 of the farm tractor power unit 2, although it will be apparent that the chain 84 may readily be connected to any other type of power take-off arrangement which happens to be provided on the power unit selected for use in the invention.

Overhead shaft 83 is supported in the overhead bridging frame portion of the machine, and the shaft comprises a continuous rigid central section equal in length to the central sections 13 and 14 of the transverse frame members. The central shaft section is coupled at its ends to end sections 87 and 88 through universal shaft joints or couplings, such as coupling 89. The central section of shaft 83 is supported in bearings, such as bearing 90, carried on longitudinal brace members 26 and 33, and the shaft extends outwardly beyond the braces 26 and 33 into the coupled end sections 87 and 88, bearings 91 and 92 being provided on braces 24 and 32, respectively, for retaining the end sections in alignment with the central section of the shaft during normal operation of the cropping machine. The rotation of driving wheel 86 as the machine travels through the tobacco field will drive chain 84 and cause shaft 83, including end sections 87 and 88, to rotate, thus to rotate sprocket wheels 93 and 94 and to drive the forward rollers for the conveyor belts 71 and 81 through the respective chains 74, 82 and sprockets 73, 95.

In accord with the above description, the chain 84, shaft 83 with its end sections 87 and 88, and chains 74 and 82, with the several sprockets, together comprise a power transfer arrangement adapted for connection at one end to the power take-off 85 of the tractor and extending from the one end upwardly to the upper frame portion. The power transfer arrangement further extends outwardly along the overhead bridging frame portion into the outer sections thereof, and extends downward from the outer sections to connections with the conveyors carried on the respective stages.

Vertical or height adjustments of the stages by means of nuts 54, 55 and by means of the adjusting bar 56 and bolt 57 arrangement, and to a less extent horizontal adjustments along slots 52, 53, will result in tightening or loosening of chain 74. It is not necessary that chain 74 be at all times tight between sprockets 73 and 93, and if

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the length of chain 74 is such that the chain is taut with the stage at the lowest position to which it need be adjusted, considerable upward adjustment of the stage may be made without impairing the chain operation. If desired, however, the forward end of the conveyor frame 68 may be adjusted along hangers 42 and 43. The bolt 69, for example, may be replaced in a new bolt hole 75 provided in hanger 43 to support the conveyor frame at a different angle, raising or lowering the sprocket 73 with respect to floor 38 as necessary to provide an approximately correct tightness of the chain 74. Alternatively, the chain may be provided with any well known automatic tensioning arrangement, such as spring loaded or weighted idler sprockets or the like, if found necessary.

The machine is shown in Fig. 1 in full operating condition, with the exception of the omission of a bin from stage 37. Since the stages are suspended a few inches, or up to a foot or more, above the ground, it may be difficult to unload the filled bins from the stages. Provision is made for lowering the stages to the ground, as best seen in the side view of Fig. 2.

In considering Fig. 2, certain members of the machine are identified by numerals applied to corresponding parts of Fig. 1 without specific description in connection with Fig. 2. It will be understood that in this instance, and elsewhere in the application, the identifying numerals are used throughout to identify the same parts, and that when applied in a particular view without specific description, such numerals are intended to assist in comparing the several views and apply to the elements as described in connection with other views.

In Fig. 2 the tractor drawbar has been operated from the position of Fig. 1 in a direction to lower link 11, and thus to lower support members 7. Uprights 1 and 4 have swung into positions slightly tilted toward the rear of the machine on their respective pivots 6, and the result is that main overhead transverse members 13 and 14 have been lowered. As a result of this partial collapsing of the frame, the floor 38 of stage 36 is resting upon the ground, and in this position bin 39 is readily removable from the stage, roller 80 assisting in the removal. It has been found that the removal of the bins from the stages is accomplished with a minimum of manual effort by backing the tractor with the stages lowered to ground level or lowered to a position almost at ground level. Since the heavily loaded bins are removed from the forward ends of the stages, the rearward ends tend to raise slightly as the bins are removed, reducing any tendency of the rearward ends of the stages to dig into the ground as the tractor is operated in reverse as suggested, and, furthermore, as the weight of the loaded bins is removed from the stages, the natural tendency of the stages, due to some resilience in the overhead bridging frame members, is to rise slightly above ground level.

If it is desired to proceed immediately with further cropping following the removal of the loaded bins, empty bins are rolled into place on the stages and the drawbar is again operated to pivot uprights 1 and 4 back into the vertical erected positions indicated by the broken lines at 96 and 97, respectively. The re-erection of the frame into the upright position of Fig. 1 raises the longitudinal braces, such as brace 24, as well as the main transverse overhead frame members 13 and 14, and causes the stage 36 to resume its operative position spaced above the ground as adjusted by the adjusting means heretofore described, the adjusting means comprising the perforated bar 56 affixed at the upper end of hanger 43 and the adjusting nut 55, and the similar adjusting arrangements provided for the other hanger members. Chain 84, which becomes slack as the overhead portions of the framework are lowered into the Fig. 2 position, again becomes tight when the frame is erected into upright position.

The lowering of the overhead frame members by the tractor drawbar into the Fig. 2 position provides an

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important additional feature in that, with the stages resting on the ground, the hooks, such as hooks 45 and 49, may be released from the supporting rings 47 and 51 without difficulty, and when all four of the hooks of the stage are uncoupled in this manner, the stage becomes disconnected from the supporting frame. Complete removal of the stage further requires only the disengagement of the chain 74 from its overhead sprocket 93 or, preferably, from the sprocket 73. The chain 74 becomes slack for this purpose when the supporting hooks for the stage become loose in their respective rings, or, following disengagement of the hooks, upon motion of the tractor a short distance forward. With the four hooks of each of the stages uncoupled, and with the conveyor belt driving chains disconnected, the overhead frame assembly may be further collapsed into the condition seen in the front view of Fig. 3.

The stages having been removed as suggested above, the bolts or pins which hold the ends of cables 19, 23, 34 and 35 to the ends of the respective outboard sections, such as sections 21 and 30, of the main transverse members may be removed and the end sections dropped with a hinging motion about the respective axes of hinges 22 and 31. The universal joints 89 and 98 permit the shaft 83 to break or hinge correspondingly to dispose shaft end sections 87 and 88 into downwardly extending directions. As further shown in Fig. 3, the cables may be merely thrown over convenient portions of the frame adjacent the main uprights and the chains either looped over portions of the frame or completely removed, to prevent interference with the operation of the tractor 2. When so arranged, the extreme width between the end sections 21 and 30 will, if the machine is correctly proportioned, be less than the legal distance of eight feet, which is the maximum permitted on the highways of most of the tobacco growing States, and the machine is now in condition for moving along highways, through gates or into a barn or garage.

The pins which attach the ends of the cables to the outer ends of the outboard sections are most readily removed for collapsing the overhead bridging frame members into the Fig. 3 position if the pins are removed while some of the weight of the outboard sections is carried on the hooks at the upper ends of the stage hangers. When the outboard sections are to be opened out again into the positions indicated by broken lines 99 and 100, respectively, it will be found to be convenient to swing the sections manually into their horizontal positions and to rest the raised end portions on the upper ends of the stage hangers to afford support while attaching the cables by bolts such as bolt 20 heretofore described in connection with Fig. 1. The tractor drawbar is useful in lowering the frame into the position to support the end sections temporarily on the hangers of the stage to assist in attaching the cables.

Fig. 4 shows, in enlarged scale, certain details of the machine and particularly the right hand forward portion thereof. The outwardly extending section 21 of member 14 is supported in horizontal position by cable 23, and the outer end of the cable is attached by a readily removable bolt 101 to the outer end of section 21. Slots 52 and 53 are provided to receive the shanks of ring or eye members 50 and 51, respectively. A nut 54 threads on the shank of ring 50, and a nut 55 threads on the shank of ring 51, in each case above the horizontal web of the angle iron section 21. Small adjustments in height of rings 50 and 51, respectively, are accomplished by rotation of nuts 54 and 55 as previously described. A lock nut, such as lock nut 102 for the shank of ring 51, is preferably arranged on the shank below the web of section 21 to be tightened against the under side of the web after height adjustments with nut 55 have been accomplished and after the desired position of ring 51 along slot 53 has been attained.

The right hand stage, of which the upper end of

hanger member 43 is shown, may be adjusted in height at each hanger member in increments of about one or two inches by means of bolts, such as the bolt 57 which holds together bar 56 and member 43. For such adjustment, the bolt 57 is removed; the bar 56 repositioned along the hanger member and the bolt inserted through a different selected one of the bolt openings 103 of the bar.

Lateral brace member 24 is joined to section 21 through a block 104 welded to section 21 and carrying a hinge pin or bolt 105 which extends through member 24 and which permits a slight rotative motion between the brace and section 21 when the frame is lowered by the tractor drawbar into the partially collapsed position of Fig. 2 as previously described. A similar block 106 and pin or bolt 107 are provided at the forward end of longitudinal brace member 26 to attach this brace to the intermediate rigid section of lateral upper frame member 14. Bearing blocks 90 and 91 are welded to respective brace members 26 and 24, preferably midway between the ends of the members, to support shaft 83 and the extension 87 of shaft 83. The universal joint 89 which is interposed in shaft 83 permits bending of the shaft about an axis aligned with the axis of the hinge pin of hinge 22, and, accordingly, the outboard portions 21 and 87 of the transverse upper frame member 14 and of the shaft 83 may be folded down without binding or warping into the position of Fig. 3 when desired following release of the outboard ends of the cables, such as cable 23, by removal of the cable attaching bolt, such as bolt 101.

The right hand one of forward upright frame members or stanchions 4 is shown in Fig. 4. The lower end of this frame member comprises a pivot including a pin 108 extending through a pair of blocks 109 and through the lower end portion of the angle iron member which the upstanding frame member principally comprises. The blocks 109 are welded to a plate 110 which, with bolts 111 and a second plate 112, forms the bracket 5 for connecting the lower end of the frame member to the forward axle 113 of the tractor or power unit, the axle being indicated in broken lines.

Fig. 5 discloses a modification applicable to the height adjusting arrangement of each of the stage supporting eyes. The ring or eye 51' of Fig. 5 has a shank extending through slot 53' in outboard transverse frame section 21'. Nut 55' is threaded on the shank of eye 51' above the horizontal web of the frame member, and a crank 114 is affixed to nut 55'. The crank extends upwardly from the nut by a sufficient distance to dispose the offset handle portion at a level to clear the vertical web of section 21' as the crank is rotated to rotate nut 55'. A crank 114 for each of the nuts which hold the stage-supporting eyes permits more rapid and easier adjustment of the height of each corner of each stage. The cable 23' may connect through a detachable bolt 101' to section 21' a short distance inwardly from the end of the section when cranks such as crank 114 are provided, whereby the cable will not be in a position to interfere with manual operation of the cranks.

It will be understood that the parts identified by numerals including a prime symbol in Fig. 5 correspond to the parts of Figs. 1-4 identified by the same respective numerals without prime symbols and have the same functions and same arrangement except as specifically pointed out in the discussion relating to Fig. 5.

The intended use of the machine and its proportions with relation to the planting plan of a typical field of tobacco plants can best be understood with reference to Fig. 6, which is a plan view showing the machine, including tractor 2, in progress through a field in which rows of tobacco plants 115, 116, 117, 118 are arranged in groups of four rows, each group of rows being separated from the next group by a path 119. As heretofore suggested the adjacent rows in each group, such

as rows 115 and 116, may be planted with plants on about 42 to 44 inch centers across the rows, and with paths 119 of about 7 feet to 8 feet in width, as measured between centers of the plants bordering the path. As the machine passes along to the right, as seen in Fig. 6, the croppers sitting side by side on stage 36 are able to pick the ripe leaves from the plants in rows 115 and 116 and to place the leaves on the conveyor belt for deposit and collection in the bin 39. Following passage to the end of the field, the machine may be turned around and operated along path 119 in the direction from right to left in Fig. 6. During this later pass, the croppers on stage 36 will be carried along between rows 117 and 118 and can collect leaves from the plants in these rows. While the croppers on stage 36 are cropping the two rows to the right of the path along which the tractor is operating, the croppers on stage 37 are, of course, cropping the two rows lying to the left of the path.

It will be apparent from Fig. 6, when considered in connection with the more detailed view of Fig. 1, that the danger of damage to the leaves of the plants is very slight. The overhead bridging frame portion which supports the outboard stages, and along which the conveyor power connections extend, is sufficiently high to be above the tops of the plants in the bridged rows, such as row 115, and the pointed or rounded prow shape of the forward or leading end of each bin serves to prevent damage to leaves extending out into the space between rows, such leaves being merely deflected toward the plants. The width of the path will, ordinarily, be sufficient to pass the tractor without damage to the leaves of the rows of tobacco alongside the path.

In some instances, in order to utilize the highest gear ratio embodied in the transmission of the tractor or power unit, which is usually the reverse gear, it may be desired to operate the power unit or tractor in reverse. If it is necessary or desirable to back the tractor down each path 119, the stages 36 and 37 are substituted one for the other and are arranged to dispose the seats approximately opposite the small front wheels of the tractor, instead of opposite the driving wheels, and to point the bins in the backward direction in which the tractor is to move. The sprocket 73 of stage 36, when the stages are reversed, will engage with chain 82, while sprocket 95 will engage with chain 74. The shaft 83 is located midway between members 13 and 14, and, accordingly, no adjustment to the length of the chains or any other changes are required, except for possible height adjustments at the hangers of the stages. It is only necessary in rearranging for reverse tractor operation to unhook the hangers of the stages, to disengage the chains 74 and 82 from the sprockets 73 and 95, respectively, to re-hook the stages in the new locations and to engage the chains 74 and 82 with sprockets 95 and 72, respectively. Since driving the tractor in reverse will reverse the direction of rotation of shaft 83, it will be seen that conveyor belts 71 and 81 will now be driven in appropriate directions to carry the hands of tobacco leaves from the seated croppers for deposition in the bins in the same manner as for normal forward tractor operation. It will also be understood that operation of the drawbar to raise and lower the frame and stages will be effective in substantially the same manner as heretofore described.

While there have been shown and described only certain preferred embodiments of the invention by way of illustration, many modifications will occur to those skilled in the art and it is therefore to be understood that it is intended, in the appended claims, to cover all such modifications as fall within the true spirit and scope of the invention.

What is claimed as new and desired to secure by Letters Patent of the United States is:

1. A tobacco harvesting machine adapted for attachment to a farm tractor of the type having a power take-off connection and a drawbar, said machine comprising a

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plurality of upright supporting members, means pivotally to attach said members to the axles of said tractor, bracing members interconnecting said supporting members remote from said axles, a lever member to connect said supporting members to said drawbar and arranged normally to retain said supporting members in a first position and in accord with predetermined motion of said drawbar to pivot said supporting members into a second position, overhead outrigger extensions from upper end portions of said supporting members, platform means depending from outer end portions of said outrigger extensions, each said platform means comprising seat means and tobacco leaf carrying means, said platform means being elevated above the ground when said supporting members are in said first position and being lowerable toward the ground upon operation of said drawbar to dispose said supporting members in said second position.

2. A tobacco harvesting machine attachment for a self-propelling power unit, said machine attachment comprising an upwardly and outwardly extending framework adapted for attachment to said power unit to be carried thereby, said framework comprising two outer portions extending outwardly from respective opposite sides of the upper portion of said framework, a respective platform depending from the outer end portion of each of said two outer portions of said framework, means to support a respective tobacco leaf bin at a forward end portion of each said platform, seat means toward the rear of each said platform, a respective conveyor for each said platform having a rearward receiving end disposed immediately forward of the seat means of the respective said platform and extending upwardly and forwardly to a discharge end at said forward end portion of said platform, and power transfer means drivingly connecting said power unit to said conveyors and comprising portions extending outwardly with said outer portions of said framework and downwardly from outer end portions of said outer portions to said conveyors.

3. A tobacco harvesting machine attachment for a self-propelling power unit, said machine attachment comprising an upwardly and outwardly extending framework adapted for attachment to said power unit to be carried thereby, said framework comprising two outer portions extending outwardly from respective opposite sides of the upper portion of said framework, a respective platform depending from the outer end portion of each of said two outer portions of said framework, means to support a respective tobacco leaf receiving means at a forward end portion of each said platform, seat means toward the rear of each said platform, a respective conveyor for each said platform having a rearward receiving end disposed immediately forward of the seat means of the respective said platform and extending upwardly and forwardly to a discharge end at said forward end portion of said platform, and power transfer means drivingly connecting said power unit to said conveyors and comprising portions extending outwardly with said outer portions of said framework and downwardly from outer end portions of said outer portions to said conveyors.

4. In a tractor attachment for transporting tobacco coppers and tobacco leaf bins between rows of tobacco plants, the combination of two platforms, a pair of seats side-by-side carried on the rearward portion of each said platform, the portion of each said platform forward of said seats being adapted and arranged to carry thereon a respective said bin, a conveyor for each said platform comprising a continuous belt disposed to have a leaf receiving rearward end immediately in front of coppers seated in said seats and a leaf discharging forward end higher than said receiving end and arranged to drop tobacco leaves into the respective said bin on said platform, an upstanding supporting frame, an overhead bridging frame connected to said supporting frame and extending on respective opposite sides thereof and supporting said platforms in spaced apart relation, said supporting means

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comprising tractor attachment means to affix said supporting means to be carried by said tractor, and power transfer means for said conveyors extending upwardly therefrom to said bridging frame and along said bridging frame and downwardly along said support means to said tractor and terminating in power take-off means adapted to receive power from said tractor.

5. An attachment for a farm tractor having a power take-off and a drawbar, said attachment comprising an upstanding frame having legs for pivotal attachment to the axles of said tractor, a frame supporting member having one end attached to said frame and another end adapted to be attached to said drawbar, said frame being partially collapsible in response to predetermined motion of said drawbar, said frame comprising an upper portion including members extending outwardly on each side of said frame, a respective platform assembly suspended from said members at each side, each said platform assembly comprising means to support a tobacco cropper and means for receiving and collecting hands of tobacco leaves.

6. An attachment for a farm tractor having a power take-off and a drawbar, said attachment comprising an upstanding frame having legs for pivotal attachment to the axles of said tractor, a frame supporting member having one end attached to said frame and another end adapted to be attached to said drawbar, said frame being partially collapsible in response to predetermined motion of said drawbar, said frame comprising an upper portion including members extending outwardly on each side of said frame, a respective platform assembly suspended from said members at each side, each said platform assembly comprising means to support a tobacco cropper and a removable bin for receiving and collecting hands of tobacco leaves.

7. A tobacco cropping machine adapted for attachment to a farm tractor having a drawbar and a power take-off, said machine comprising a normally upstanding frame structure, said structure comprising axle attachment means at the lower end of said frame structure and hinge means adjacent said attachment means, a lever member having one end attached to the upper portion of said structure and being adapted for coupling with said drawbar adjacent its other end, said structure comprising an overhead outwardly extending portion, an outboard stage suspended from said last portion, said stage being adapted to carry a cropper toward its rearward end and carrying a removable tobacco leaf receiving bin toward its forward end, a conveyor extending between said rearward and forward ends, and means to power said conveyor from said power take-off, said last means comprising power transfer means having an end adapted for connection with said power take-off and extending upwardly from said end generally along the upstanding portion of said frame structure and further extending overhead and outwardly generally along said outwardly extending portion of said frame structure, and further extending downwardly to said conveyor and being drivingly connected to said conveyor.

8. A cropping machine for tobacco leaves and the like comprising a main frame adapted for attachment to a self-propelled power unit of the type having a drawbar and a power take-off, said frame being generally upstanding and having lower attachment portions including pivot means and having an overhead bridging upper portion extending outwardly at each side of said frame, lever means attached at one end to said frame and being adapted for attachment at its other end to said drawbar, two stages, said respective stages being connected to hang from the respective outer ends of said upper portion of said frame, tobacco hand collecting means on a forward portion of each said stage, a respective seat for a cropper on a rearward portion of each said stage, a respective conveyor extending between said portions of each said stage and adapted to convey hands of tobacco placed thereon by said cropper to said collecting means, and

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power transfer means for said conveyors comprising means adapted to receive power at one end from said power take-off and extending upwardly from said end thereof and outwardly along said upper portion of said frame and having power connection means extending downwardly from said upper portion to each said conveyor. 5

9. A cropping machine for tobacco leaves and the like comprising a main frame adapted for attachment to a self-propelled power unit of the type having a drawbar and a power take-off, said frame being generally upstanding and having lower attachment portions including pivot means and having an overhead bridging upper portion extending outwardly at each side of said frame, lever means attached at one end to said frame and being adapted for attachment at its other end to said drawbar, two stages, said respective stages being connected to hang from the respective outer ends of said upper portion of said frame, a tobacco hand collecting bin on a forward portion of each said stage, a respective seat for a cropper on a rearward portion of each said stage, a respective conveyor extending between said portions of each said stage and adapted to convey hands of tobacco placed

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thereon by said cropper to said collecting bin, and power transfer means for said conveyors comprising means adapted to receive power at one end from said power take-off and extending upwardly from said end thereof and outwardly along said upper portion of said frame and having power connection means extending downwardly from said upper portion to each said conveyor.

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