June 12, 1962 R. H. COLLIN 3,038,620

ROTATABLE PICK-UP AND DEPOSIT DEVICE

Filed Sept. 9, 1960 3 Sheets-Sheet 1

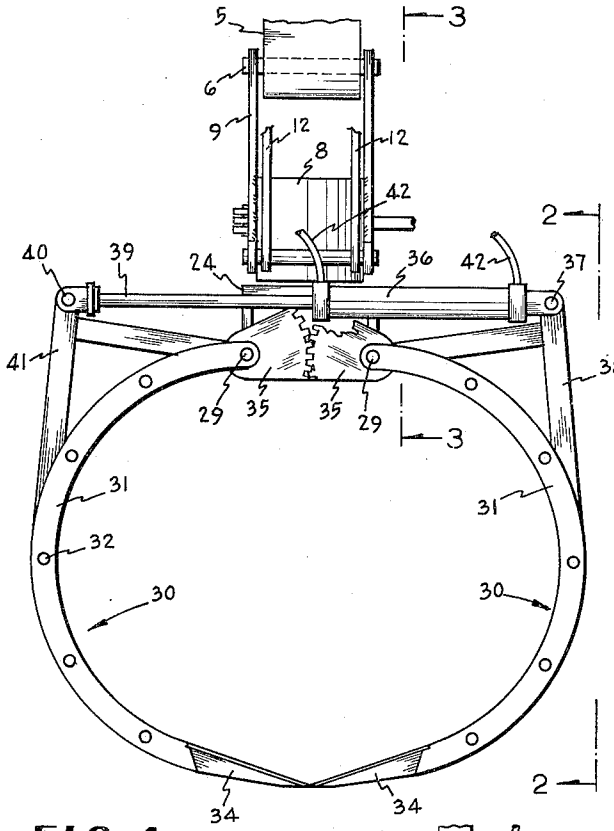


FIG. 1

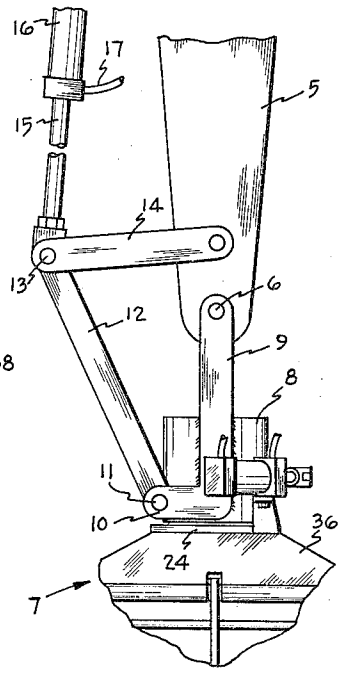


FIG. 3

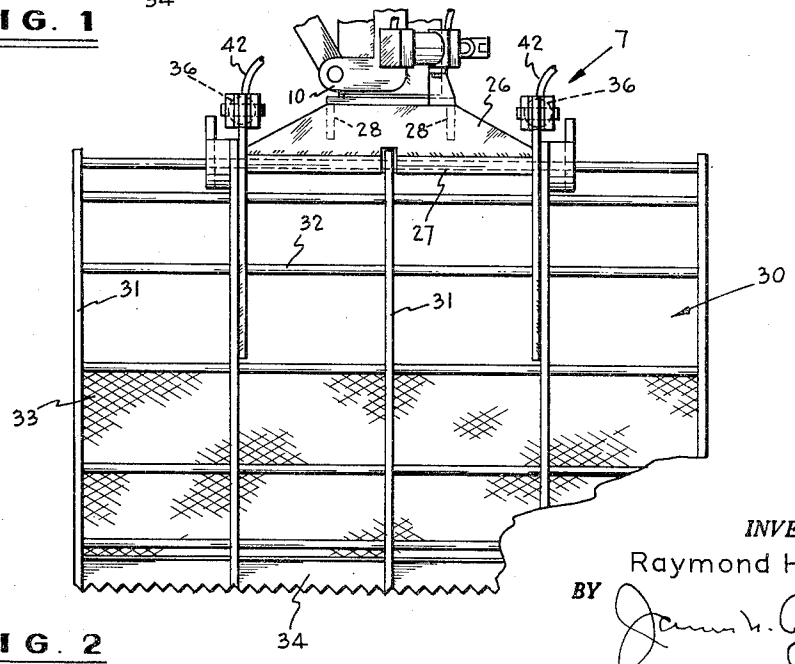


FIG. 2

INVENTOR.
Raymond H. Collin
BY
Attorney

June 12, 1962 R. H. COLLIN 3,038,620

ROTATABLE PICK-UP AND DEPOSIT DEVICE

Filed Sept. 9, 1960 3 Sheets-Sheet 2

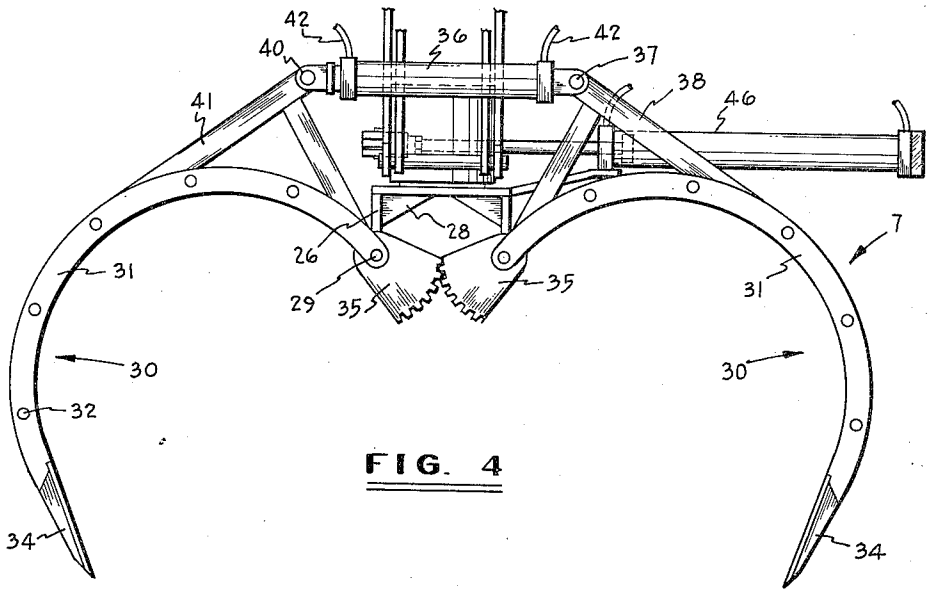


FIG. 4

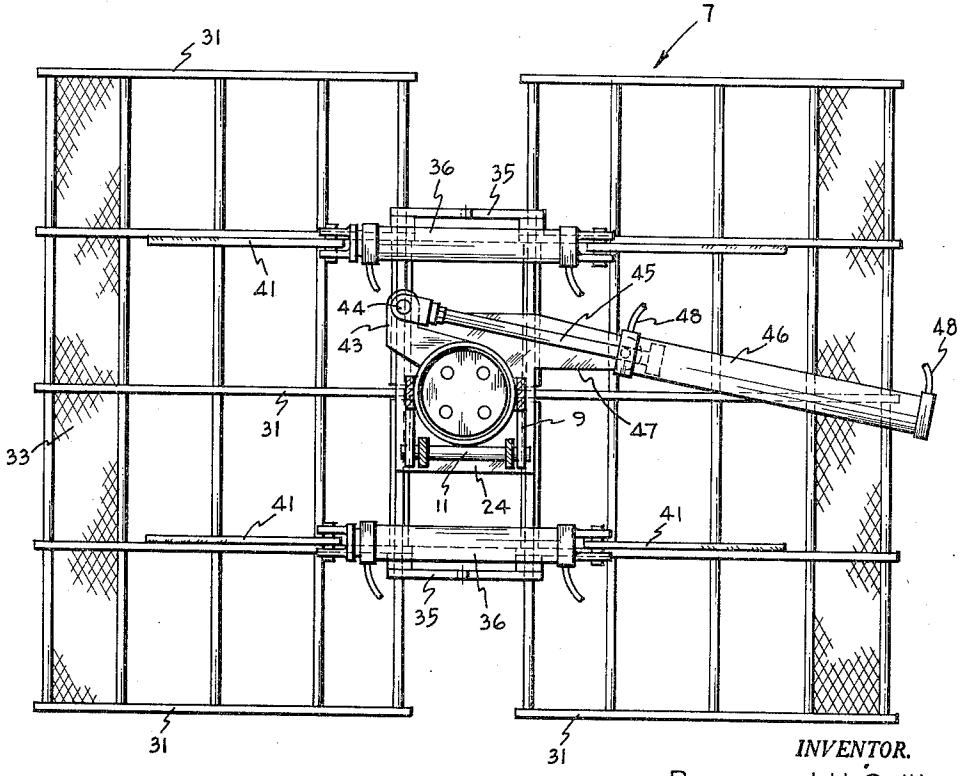


FIG. 5

INVENTOR.
Raymond H. Collin
BY
Attorney

June 12, 1962 R. H. COLLIN 3,038,620

ROTATABLE PICK-UP AND DEPOSIT DEVICE

Filed Sept. 9, 1960 3 Sheets-Sheet 3

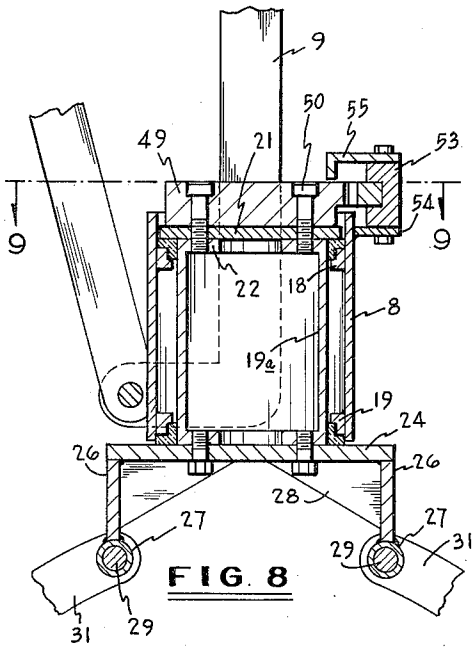


FIG. 8

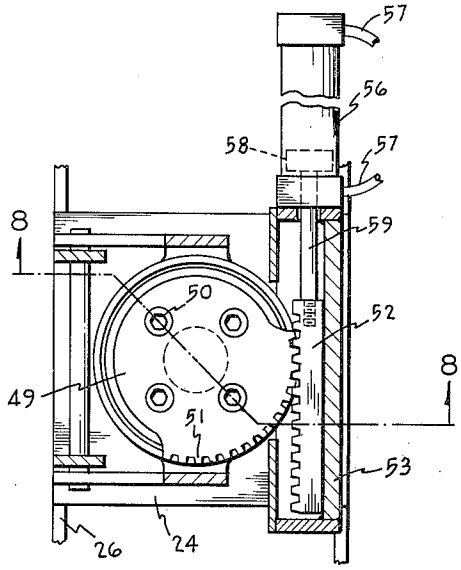


FIG. 9

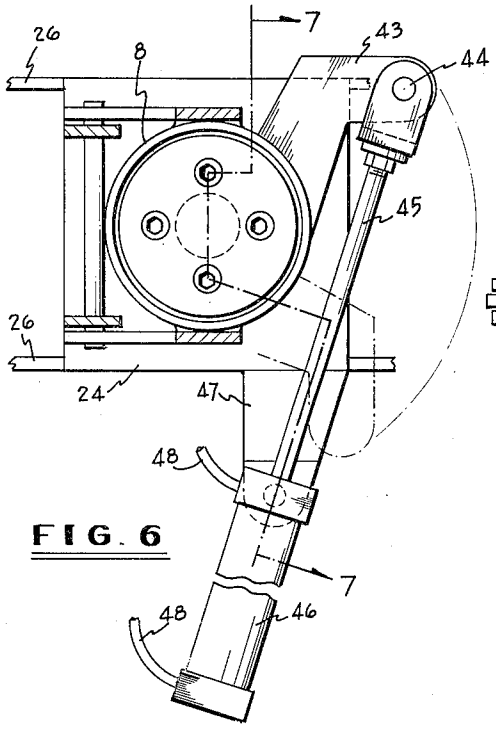


FIG. 6

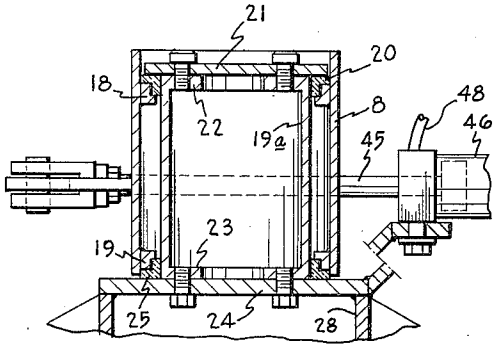


FIG. 7

INVENTOR.
Raymond H. Collin
BY
James H. Cyler
Attorney

United States Patent Office 3,038,620 Patented June 12, 1962

3,038,620
ROTATABLE PICK-UP AND DEPOSIT DEVICE

Raymond H. Collin, 60 NW. 76th St., Miami, Fla.

Filed Sept. 9, 1960, Ser. No. 55,074
4 Claims. (Cl. 214—147)

This invention relates to a material pick-up and deposit device for use in connection with a controllable boom that is movable in a vertical plane from mechanism carried by a tractor.

The invention contemplates a pick-up mechanism including a pair of cooperative jaws and with the jaws and associated mechanism being pivotally suspended from a forearm of the boom and with the jaws being actuated to gripping position with respect to the material handled by hydraulic means that is controllable in a conventional manner from the tractor. The suspension means for the jaws being also swung in a horizontal plane by hydraulic means that is also actuatable from the tractor.

The invention further contemplates a pick-up and deposit device for use with a conventional elevating boom carried by a tractor and with the device including a pair of jaws that are movable toward and from each other under the influence of hydraulic means and with the jaws and a supporting bearing member being also rotatable in a horizontal plane whereby the material held by the jaws may be accurately deposited for dumping engagement into a suitable truck or other conveyance.

Novel features of construction and operation of the device will be more clearly apparent during the course of the following description, reference being had to the accompanying drawings wherein has been illustrated the preferred forms of the device and wherein like characters of reference are employed to denote like parts throughout the several figures.

In the drawings:

FIGURE 1 is an end view of a pick-up device constructed in accordance with the invention,

FIGURE 2 is a side elevation thereof,

FIGURE 3 is a side elevation of a suspension means for the device with respect to a controllable boom,

FIGURE 4 is an end view of the device, parts being omitted for sake of clearness and with the jaws being moved to the open position,

FIGURE 5 is a plan view of the structure as illustrated in FIGURE 4,

FIGURE 6 is a fragmentary top plan view illustrating the rotating means for the claw assembly,

FIGURE 7 is a section taken substantially on line 7—7 of FIGURE 6,

FIGURE 8 is a vertical section taken substantially on line 8—8 of FIGURE 9, and

FIGURE 9 is a horizontal section taken substantially on line 9—9 of FIGURE 8.

Referring specifically to the drawings, there has been illustrated fragmentarily an end portion 5 of a conventional sectional boom that is adapted to be mounted upon a conventional tractor in the usual and well known manner and with the boom being elevated and controlled by the usual and well known hydraulic means. Since no invention is involved in the boom structure, it is believed that the fragmentary showing of the end member 5 will be adequate for purpose of this application.

Suspended from the boom member 5 in pivotal manner, as illustrated at 6, is a pick-up and deposit device, illustrated as a whole by the numeral 7. The device 7 embodies a non-rotatable housing 8 that is suspended from the boom 5, through the medium of the pivot 6, by L-shaped brackets 9. The brackets 9 are preferably welded or otherwise fixedly connected to the housing 8 at diametrically opposite sides. The lower leg 10 of the

bracket 9 is pivotally connected at 11 to links 12 that are pivotally connected at their upper ends as at 13, to fulcrum links 14. The links 14 and the links 12 function to swing the device 7 in a vertical plane and to maintain the device 7 in a susbtantially perpendicular manner throughout all elevations of the boom member 5. The swinging movement of the device 7 is through the medium of a hydarulic mechanism including a piston rod 15, having the usual piston movable in a cylinder 16 that is controlled through the medium of hydraulic fluid lines 17 from the tractor. The housing 8, as shown, is open at its upper and lower ends.

Referring to FIGURES 6 and 7, the housing 8 is provided with an upper bearing ring 18 and a lower bearing ring 19. The rings 18 and 19 may be welded or otherwise secured within the housing 8 to constitute fixed bearing surfaces. Rotatably supported within the housing 8 is a supporting sleeve 19*a*. The sleeve 19*a* constitutes a rotatable means for the structure 7. The sleeve 19*a* is provided at its upper end with a bronze or similar bearing ring 20 that engages the bearing 18. The sleeve 19*a* is supported with respect to the ring 20 by a cap plate 21, that is bolted or otherwise connected to an inwardly projecting flange 22, formed upon the sleeve 19*a*. The plate 21 disposes the ring 20 in relative position to the bearing 18 to constitute a thrust bearing. Bolted or otherwise connected to a lower flange 23 of the sleeve 19*a* is generally rectangular flat plate 24. Disposed between the plate 24 and the periphery of the lower bearing ring 19 at its lower end is a bronze or similar bearing ring 25. The ring 25 also constitutes a thrust bearing for the sleeve 19*a* throughout its rotative movement. While cast or molded bearing members have been illustrated, it will be apparent that roller bearing or ball bearings may be employed between the sleeve 19*a* and the housing 8 as may be found desirable.

Depending from opposite marginal edges of the plate 24 and connected with the plate 24 in any desirable manner, such as welding, are a pair of parallel plates 26. The plates 26 at their lower marginal edges have welded or otherwise connected thereto hinge sleeves 27. The plates 26 are braced in any suitable manner as illustrated at 28. The sleeves 27 support hinge pins 29 upon which are pivotally supported a pair of grab buckets or claws 30.

The claws 30 are substantially identical in construction and each embodies a plurality of arcuate bars 31, that are in spaced apart relation and tied together by rods 32. The bars 31 and the rods 32 constitute a frame structure upon which is disposed a section of foraminous material 33. The bars 31 at their lower ends jointly support toothed bars 34. The bars 31 at their point of hinge connection with the sleeves 27 and adjacent to the opposite ends of the plates 26, are provided with segment gears 35 that are in constant mesh and whereby the claws 30 partake of identical swinging movement toward and from each other.

The means to swing the claws 30 toward and from each other comprises a pair of hydraulic cylinders 36. The cylinders 36 are pivotally anchored at one end as at 37, to one claw 30, through the medium of an angle bracket 38 while a piston rod 39 is movable under the influence of a piston within the cylinder 36, and pivotally connected to the opposite claw as at 40. The pivot 40 is connected with the opposite claw 30 through the medium of an angle bracket 41. It will therefore be apparent, that when hydraulic fluid is introduced into the claw 30 through fluid lines 42, the rod 39 will be shiftable to rock the claw 30 upon the hinge pins 29. The cylinder 36 is operable from the tractor device through a suitable control panel to move the piston rod 39 into and out of the piston 36, thus controlling the opening and closing movement of the claw 30.

Means are provided to rotate the device 7, including the claws 30 and its associated mechanism in a horizontal plane, comprising a generally L-shaped bracket 43 that is welded or otherwise fixedly connected to the side of the housing 8 whereby the bracket is non-rotatable with the housing. Pivotally connected at 44 with the free end of the bracket 43, is a piston rod 45, that is movable under the influence of a hydraulic cylinder 46, that is supported upon a bracket extension 47 carried by the plate 24. The rod 45 is connected with a suitable piston within the cylinder 46 and is operable in opposite directions by fluid lines 48, that are connected with a suitable control panel carried by the tractor device. It will therefore be apparent that when the rod 45 is moved in one direction, it will force the plate 24 and the sleeve 19*a* in a horizontal rotative movement. The device thus has rotative means after the load has been engaged by the claws 30 to dispose the claws and its supported load into an accurate dumping position with respect to the conveyance. When the boom is elevated, the structure 7 will be actuated to a perpendicular position by the hydraulic cylinder 16 and the linkage 12 and 14.

The operation of the device so far described is as follows:

Where trash or other debris has been accumulated in a pile, such as tree cuttings or the like, the tractor supporting the boom structure 5 is directed toward the pile. The operator then actuates the cylinders 36 to swing the claws 30 outwardly to the position illustrated in FIGURE 4. The boom is then lowered and the cylinders 36 are then reversed, causing the claws to swing inwardly to engage the material in the pile. The boom is then swung upwardly, elevating the claws and associated mechanism and the boom is then swung over the bed of a conveyance. If the conveyance is not properly positioned with respect to the supported load, the operator actuates the cylinder 46, bodily swinging the claws and associated mechanism in a horizontal arcuate path so that the load will properly be deposited into the conveyance. With the claws properly disposed over the conveyance, the operator actuates the cylinder 36 to shift the claws to an open position where the load is accurately dumped into the conveyance.

Referring now to FIGURES 8 and 9, there has been illustrated a modified form of rotative means for the structure 7, embodying the same housing 8, the bearing sleeve 19*a* and the bearings 18 and 19. Bolted or otherwise connected to the plate 21, is a disc 49, held in fixed position with respect to the plate 21 and the upper flange 22 by the bolts 50 whereby the disc and the sleeve 19*a* will be rotatable in unison. The disc 49 is provided with a row of segmental gear teeth 51, being adequate to rotate the structure 7 through an arc of 90 degrees. Adapted to mesh with the gear 51 is a rack bar 52, slidable in a guide housing 53 that is fixed with respect to the housing 8 by a plate 54. The guide 53 may be provided with a suitable cover plate 55, to prevent the accumulation of trash or other debris that could possibly interfere with the proper movement and meshing engagement of the teeth 51 and the teeth of the bar 52. Connected to one end of the guide 53, is a hydraulic cylinder 56. The cylinder 56 is provided with hydraulic fluid lines 57, for moving a piston 58 in opposite directions in the cylinder 56. The piston 58 is connected with the rack bar 52 by a piston rod 59. It will be apparent, that when the piston rod 59 is moved in one direction, the bar 52 will rotate the disc 49 and the sleeve 19*a* to rotate the grab mechanism 7 in a horizontal plane. The fluidlines 57 are connected to and controlled by a suitable hydraulic panel, carried by the tractor device. In all other respects, the operation of the grab device is substantially identical and only varies with respect to the horizontal rotative means.

It will be apparent from the foregoing that a very simple and novel means has been provided to control the pick-up of relatively loose material and to elevate and deposit the material into a suitable separate conveyance. Since the position of the claws 30 are not always disposed in a proper position after pick-up to deposit its load into the conveyance, it becomes necessary that the claws and its supported load be rotated in a horizontal plane before the claws are moved to the open position, thus effectively depositing the load in a more convenient manner into the conveyance. The suspension arms 9 and the linkage 12 and 14 are controllable to support the mechanism 7 in a perpendicular manner in all positions of the boom 5. The device is simple in construction, is strong, durable and most effective as a pick-up and deposit device for trash or other accumulated material that is normally disposed in piles or, the device readily adapts itself to handle cord wood or similar materials.

It is to be understood that the invention is not limited to the precise construction shown, but that changes are contemplated as readily fall within the spirit of the invention as shall be determined by the scope of the subjoined claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A pick-up and deposit device for relatively loose material that is supported from a boom extension and with the boom extension being connected to and controllable from a tractor, the said pick-up device comprising a cylindrical housing, means for pivotally supporting the housing from an end of a boom extension, the said means comprising an L-shaped bracket that is fixedly connected to opposite sides of the housing and with the bracket at one end being pivotally supported upon the boom extension, a link device connected with the opposite end of the bracket and with the link device having pivotal connection with a piston rod operable from a hydraulic cylinder, the said link at its point of connection with the piston rod also being pivotally connected to a fulcrum link that is pivotally supported to the boom extension whereby the pick-up device may be controllable from the tractor by hydraulic influence to maintain the pick-up device in a perpendicular position throughout the various angularities of the boom extension, upper and lower fixed bearing rings disposed within the housing, a sleeve concentric to and rotatably in the housing for engagement with the bearings, the said sleeve at its lower end being connected to a flat plate, the plate at opposite sides having a pair of depending hinged bearings, a pair of claw devices that are hingedly connected to the hinge bearings to swing toward and from each other, each of the claw devices being provided with meshing segment gears whereby the claw devices move in an identical arc toward and from each other, hydraulic cylinders connected to one claw device at opposite sides of the housing and with the cylinders having piston rods that are pivotally connected to the opposite claw member, the last named hydraulic cylinder being controllable in opposite directions from the tractor device for swinging the claws toward and from each other, an arm fixedly connected to the housing, a bracket device carried by the plate, a hydraulic cylinder pivotally supported upon the bracket plate, a piston rod extending from the last named hydraulic cylinder and that is pivotally connected at its free end to the said arm, the said last named cylinder being controlled from the tractor device to move its piston rod in opposite directions for swinging the plate and the claw devices in a horizontal plane.

2. The structure according to claim 1, wherein the claw devices embody a plurality of arcuate frame members that are tied together by spaced apart rods, the claw members at their free ends being provided with serrated claw members, the said arcuate frame members and certain of the rods being covered by foraminous material.

3. The structure according to claim 1, wherein the said plate is bolted to a lower flange member of the sleeve, the said hinge bearings being fixedly connected to plates

that are fixedly connected to two opposite marginal edges of the plate.

4. A pick-up and deposit device for relatively loose material that is adapted to be supported from a boom device that is carried by and controllable from a tractor device, the boom having a movable end extension that is swingable from the tractor, the pick-up and deposit device including a cylindrical housing open at its upper and lower ends, a pair of L-shaped brackets fixedly connected to opposite sides of the housing and with the bracket device at one end being pivotally suspended from the boom extension, an actuating link connected to the other end of the bracket and with the link being pivotally connected to a piston rod that is movable under the influence of a hydraulic cylinder, the said link at its point of pivotal connection with the piston rod being also provided with a fulcrum link that is also pivotally connected to the boom whereby the pick-up and deposit device may be hydraulically controlled from the tractor to maintain a perpendicular position throughout the movement of the boom extension, upper and lower bearings fixedly connected in the cylindrical housing adjacent its upper and lower ends, a rotatable cylindrical sleeve that is concentric to the housing and that engages the bearings at the upper and lower ends of the housing, the said sleeve at its lower end being fixedly connected to a flat plate, the plate at two opposite sides being provided with depending flanges and with the flanges at their lower ends having fixed cylindrical hinge bearings, a pair of identical claw devices that are hingedly supported by the hinge bearings, the claw devices being provided with segment gears that are in constant meshing engagement and whereby the claws are movable in an identical arcuate path

toward and from each other, the claw devices comprising a plurality of arcuately frame members that are spaced apart and with the frame members being supported upon hinge pins that are engaged with the hinge bearings, the arcuate frame members being connected together by longitudinally extending spaced apart rods, each of the claw members upon opposite sides of the housing being provided with rigid upstanding brackets, hydraulic cylinders pivotally connected with the brackets of one claw device and with the cylinders controlling piston rods that are pivotally connected to the brackets of the opposite claw devices, the said hydraulic cylinder being controllable from the tractor device for moving the claws toward and from each other, the said sleeve at its upper end being provided with a fixed segment gear, a housing fixedly connected with the first named housing and that constitutes a guide for a tooth rack bar, a hydraulic cylinder connected to one end of the last named housing, a piston operable in the last named cylinder and controlling a piston rod that is connected to the rack bar, the said last named cylinder being controllable in opposite directions from the tractor device whereby the sleeve and its supported plate and claw devices are rotatable in a horizontal plane, the said pick-up device being swingable from the boom extension and bodily rotatable from the first named housing.

References Cited in the file of this patent

UNITED STATES PATENTS

75,956	Mowers	Mar. 24, 1868
2,622,915	Horn	Dec. 23, 1952
2,831,589	Way	Apr. 22, 1958