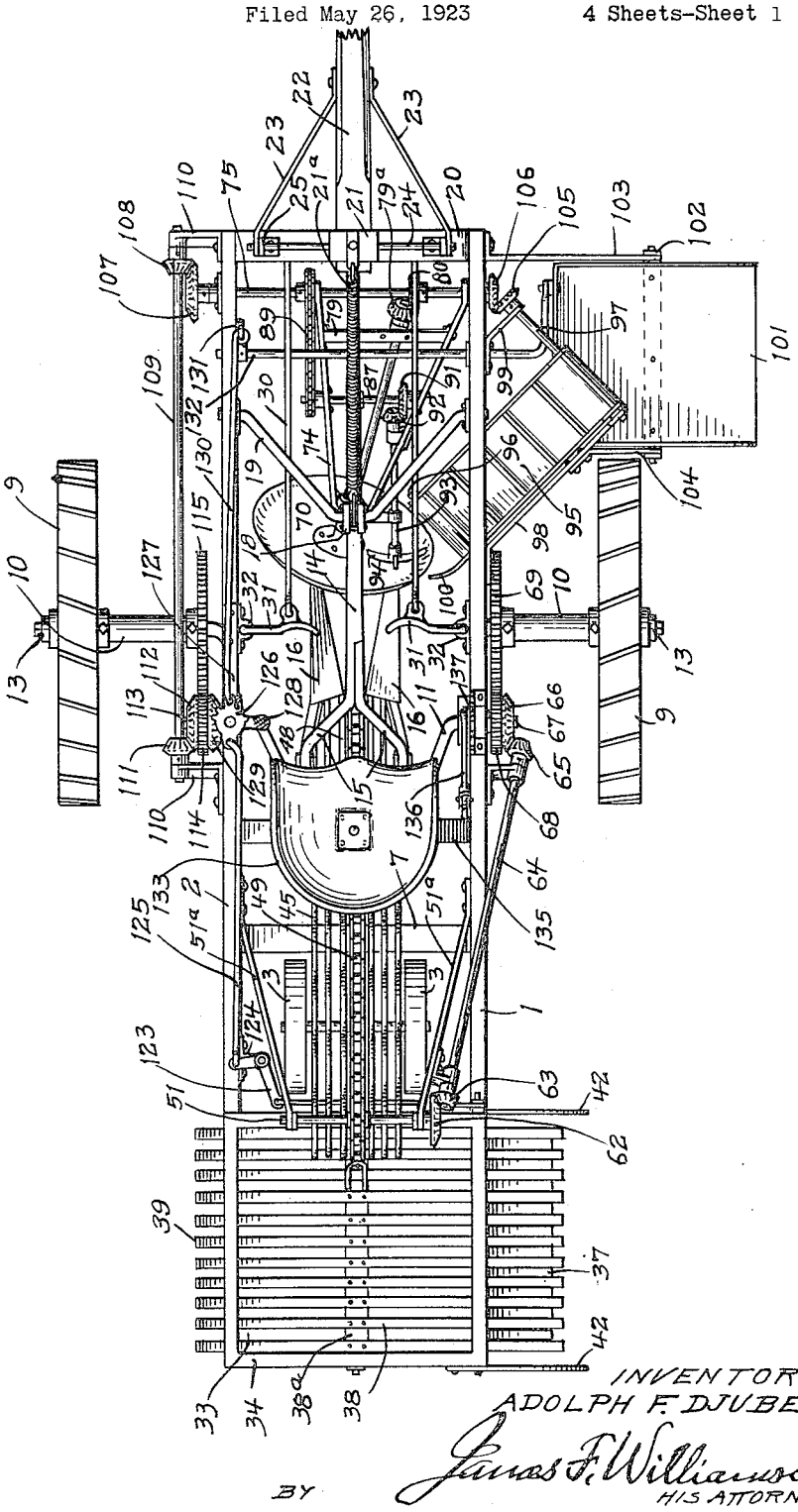
Jan. 5, 1926. 1,568,810

A. F. DJUBERG

BEET HARVESTER

Filed May 26, 1923 4 Sheets-Sheet 1

FIG 1.



INVENTOR
ADOLPH F. DJUBERG

BY James F. Williamson
HIS ATTORNEY

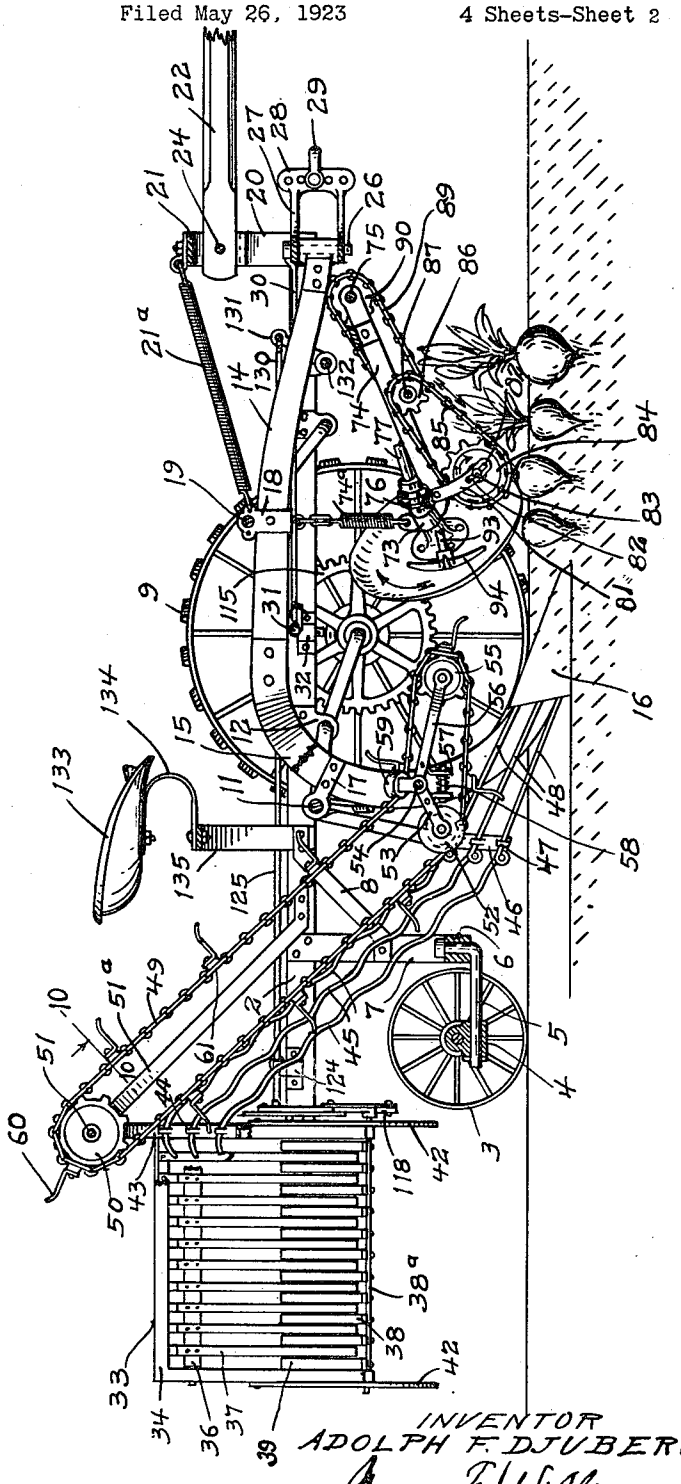
Jan. 5, 1926. 1,568,810

A. F. DJUBERG

BEET HARVESTER

Filed May 26, 1923 4 Sheets-Sheet 2

Fig 2.



INVENTOR
ADOLPH F. DJUBERG
BY James F. Williamson
HIS ATTORNEY

Jan. 5, 1926. 1,568,810

A. F. DJUBERG

BEET HARVESTER

Filed May 26, 1923 4 Sheets-Sheet 3

Fig 3.

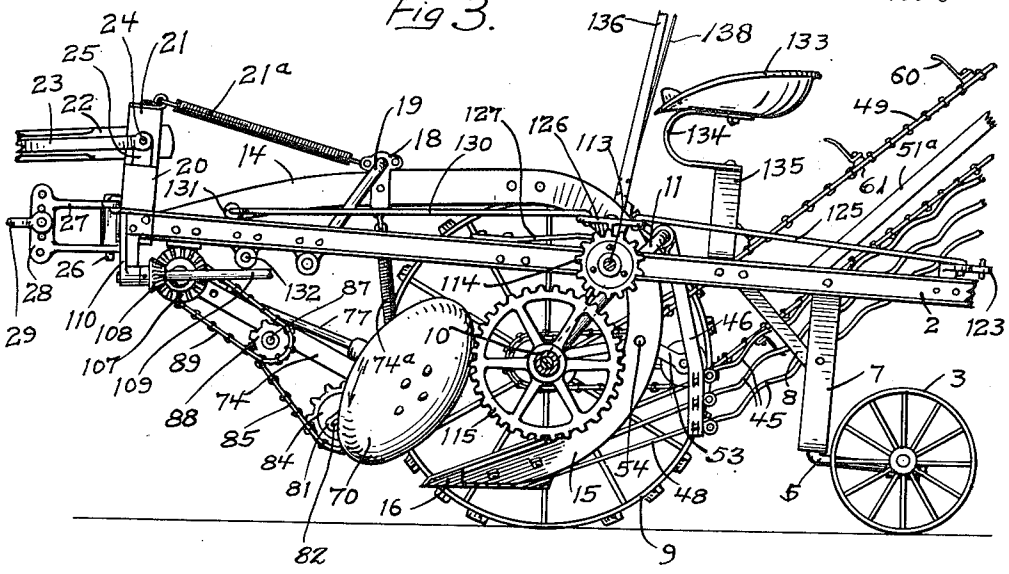


Fig 4.

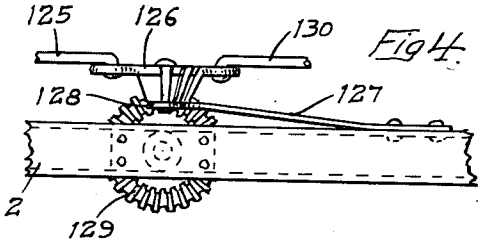


Fig 5.

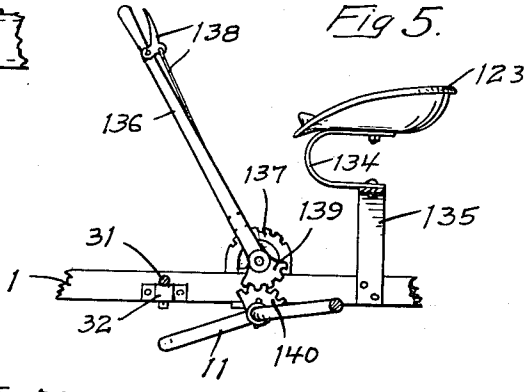
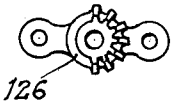


Fig 6.



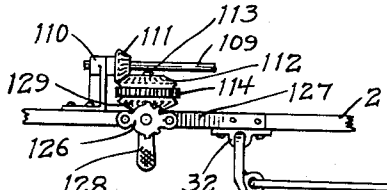
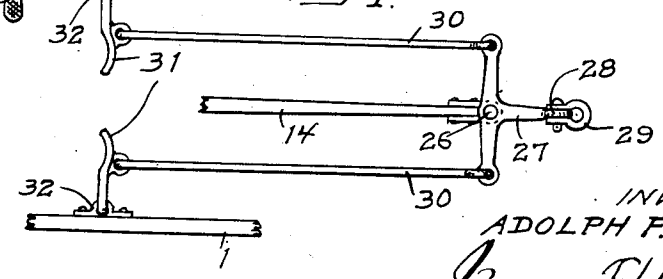


Fig 7.



INVENTOR
ADOLPH F. DJUBERG

BY James F. Williamson
HIS ATTORNEY

Jan. 5, 1926. 1,568,810

A. F. DJUBERG

BEET HARVESTER

Filed May 26, 1923 4 Sheets-Sheet 4

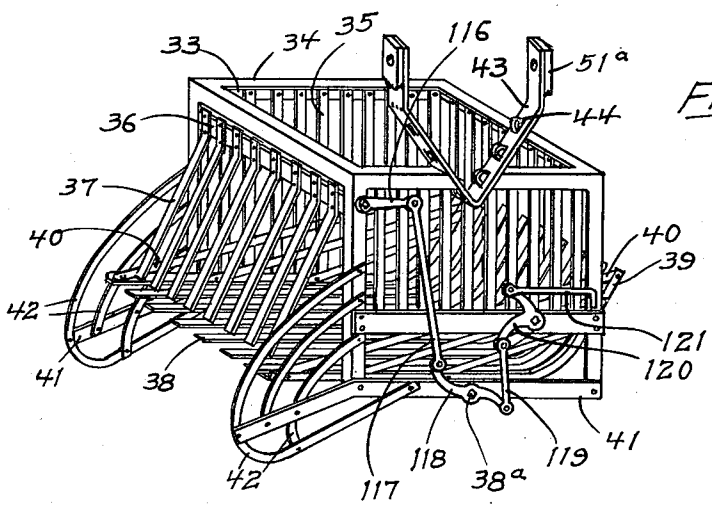


Fig 8.

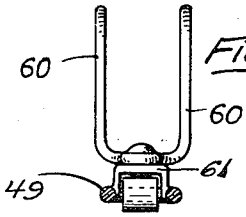


Fig 10.

Fig 11.

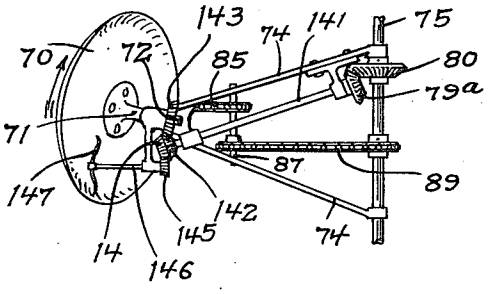
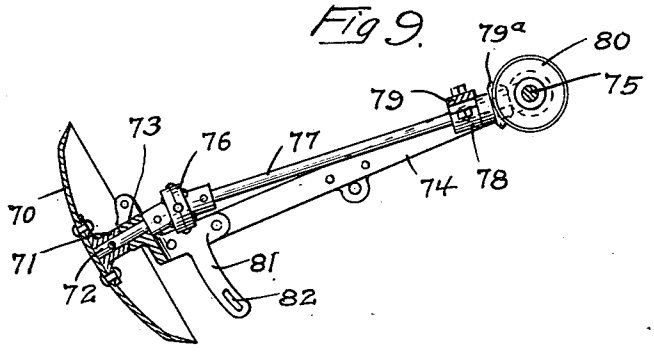


Fig 9.



INVENTOR
ADOLPH F. DJUBERG
BY James F. Williamson
HIS ATTORNEY

Patented Jan. 5, 1926. 1,568,810

UNITED STATES PATENT OFFICE.

ADOLPH F. DJUBERG, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR OF ONE-EIGHTH TO WILLIAM BERG AND ONE-EIGHTH TO CARL LINDQUIST, BOTH OF MINNEAPOLIS, MINNESOTA.

BEET HARVESTER.

Application filed May 26, 1923. Serial No. 641,621.

To all whom it may concern:

Be it known that I, ADOLPH F. DJUBERG, a subject of the King of Great Britain, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Beet Harvesters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a machine for harvesting beets. As is well known, beets are now raised in this and other countries in large quantities for sugar making. The beets are generally planted in rows and when harvesting the beets it is desirable to sever the tops therefrom. As the beets are located quite close together in a row and some of the same project higher than others, any severing means which operates on the tops of the beets while in the ground must be capable of being positioned at different heights, in accordance with the height of the beet and must also be capable of getting in between the beets so that it will not be held above a low beet by contact with an adjacent high beet. The harvesting device must also be capable of some lateral motion to keep in correct alinement with the beets in the row as the same are located more or less at one side or the other. It is desirable also to clean the beets after the same are raised from the ground and to collect the beets and tops into separate piles.

It is an object of this invention, therefore, to provide a beet harvesting machine which is constructed and arranged to sever the tops of the beets at a point located uniformly relatively to the body of the beet, to collect and deposit the severed tops, to lift the beets from the ground, clean the dirt therefrom and deposit the same in piles along the ground.

It is a further object of the invention to provide a severing means for the tops comprising a dish-shaped disk having a cutting edge which is disposed in an upstanding inclined position so that it can pass down between adjacent beets to come into correct cutting relation thereto.

It is a further object of the invention to provide a controlling means for said disk which passes over the beet in contact therewith in the form of a toothed chain driven wheel, which wheel travels ahead of the disk and has its lower portion substantially in line with or slightly overlapping the cutting edge of the disk.

It is still another object of the invention to provide such a disk and wheel carried in a vertically swinging support pivoted about a driven shaft extending transversely of the machine, which shaft and support carry the driving means for said wheel and disk.

It is another object of the invention to provide such a driven cutting disk and a driven wheel having radial spikes or arms disposed in close proximity to the surface of said disk at one side of the center thereof, which wheel is also driven to discharge the severed tops from the disk onto a conveyor which carries the same to a receptacle.

It is also an object of the invention to provide a machine having lifting blades or shares for the beets and a runway for the beets formed of rods having wave bends therein, together with a conveyor traveling above said runway and moving the beets therealong so that the beets are agitated and cleaned of dirt, said runway discharging into a collecting receptacle.

Other objects and advantages of the invention consist in the novel manner of suspending and mounting the disk and said controlling means and a novel construction and arrangement of said runway and conveyor co-operating therewith, the novel mounting of the frame carrying the beet-lifting blades and novel means for discharging the collect tops and beets.

Other objects and advantages of the invention will more fully appear from the following description made in connection with the accompanying drawings in which like reference characters refer to the same parts throughout the different views, and in which,

Fig. 1 is a plan view of the machine;

Fig. 2 is a view in side elevation thereof, one side of the machine being broken away to more clearly show the parts;

Fig. 3 is a partial side view, as seen from

the other side of the machine, a part of the machine being broken away to more clearly show the parts;

Fig. 4 is a fragmentary view in side elevation on an enlarged scale of one part of the device;

Fig. 5 is a view in side elevation of a portion of the machine;

Fig. 6 is a plan view of one of the separator parts;

Fig. 7 is a fragmentary plan view of the front end of the machine;

Fig. 8 is a perspective view of the receptacle in which the beets are collected;

Fig. 9 is a view in vertical section taken substantially through the center of the cutting disk and its driving shaft;

Fig. 10 is a section taken on the line 10—10 of Fig. 2, as indicated by the arrows and shown on an enlarged scale; and

Fig. 11 is a fragmentary plan view of the front portion of the machine showing the modified form of the driving arrangement for the cutting disk and associated parts.

Referring to the drawings, the machine comprises a main frame having longitudinal side members 1 and 2. This frame is supported upon a pair of follower or caster wheels 3 mounted upon short axles secured in blocks 4 carried on rods or arms 5 extending horizontally and having forward upwardly projecting headed portions disposed in apertures in bearings 6 carried by members 7 depending from and secured at their upper ends to the side members 1 and 2. The members 7 are suitably braced by arms 8 extending diagonally therefrom and secured to the side members 1 and 2. The main frame is also supported on the cleated driving wheels 9, the hubs of which are secured to sleeves 10 journaled upon axles formed by the ends of a yoke member 11. The yoke member 11 is formed with a crank-like portion between the members 1 and 2 and has horizontally projecting arms carried in bearings 12 secured to the side members 1 and 2. The sides of the yoke then extend downwardly and forwardly and are turned outwardly in a horizontal direction to receive the sleeves 10. The sleeves 10 are held on their axles by suitable collars 13 held in place by nuts threaded on the ends of the axle.

A frame or beam 14 is disposed between the frame members 1 and 2 and is bifurcated at its rear end to have curved arms 15 which extend downwardly and then somewhat forwardly and have secured at their lower ends the blades or shares 16, which, as shown in Figs. 1 and 2, are pointed at their front ends and increase in width toward their rear ends being inclined upwardly and outwardly from a central longitudinal line. The arms 15 have bearing brackets 17 secured thereto through which passes the central horizontal portion of the yoke 11. The beam 14 also has a U-shaped clip or bearing bracket 18 secured thereto and a yoke 19 has a central horizontal portion passing therethrough, said yoke having forwardly and outwardly extended arms, the ends of which are journaled in suitable bearings secured in the side members 1 and 2. An end member 20 extends between the members 1 and 2 and has an upstanding yoke 21 secured thereto between the sides of which is pivoted a tongue member 22 extending forwardly therefrom. Said tongue member is suitably braced by diagonal members 23 secured thereto and extending rearwardly therefrom to a transverse rod 24 carried in spaced brackets 25 secured to the member 20, which rod 24 also extends through the yoke 21 and forms the pivot for the tongue 22 as well as for its bracing arms 23. A tensile spring 21[a] is secured to the top of the yoke 21 at one end and extends rearwardly, being secured at its other end to the bracket 18. The forward end of the beam 14 has a vertically disposed aperture therethrough receiving a headed pivot pin 26 connecting said beam to a clevis 27 having laterally projecting arms extending to each side of the pivot 26 and vertically spaced forward arms joined by a portion 28 having a vertical series of holes therein adapted to receive a connecting member 29 by which the machine will be drawn. The laterally extending arms of the clevis 27 are apertured and pivotally receive the forward down-turned ends of a pair of rods 30 which extend rearwardly therefrom and have their rear down-turned ends pivotally connected to pedal levers 31. The pedal levers are pivoted to brackets 32 secured to the inside of the frame members 1 and 2.

The rear ends of members 1 and 2 have secured thereto a beet gathering receptacle designated generally as 33. This receptacle comprises a rectangular top frame 34 formed of channel members from which extend downwardly on three sides thereof, vertically spaced slats 35. The receptacle has a hinged section at one end comprising a pivot bar 36 to which are secured downwardly and outwardly spaced slats 37. The latter slats terminate adjacent a series of spaced bottom slats 38 extending across the bottom of the receptacle and having upturned curved portions 39 projecting out at the other end of the receptacle. A plurality of side slats 40 extend along the sides of the outermost slats 38 inside of the receptacle frame and are secured at their ends to said slats 38. Said bottom slats 38 are connected to a bottom cross member 38[a] having its ends journaled in side members 41. The receptacle has its bottom side members 41 projected downwardly at one end thereof and curved spaced slats 42 are secured there-

to and to the vertical members of the frame 34. The frame 34 has a V-shaped member 43 secured thereto at one side which is the forward side thereof. The member 43 is conveniently made from a flat bar and is illustrated as having eye portions 44 struck up therefrom. The eye members 44 have passing therethrough the upper ends of a plurality of spaced rods 45. The rods 45 extend downwardly substantially centrally between the side members 1 and 2 and are disposed in V-shaped formation, as indicated by the members 43 and thus form, in effect, a trough. Another yoke member 46 having a central V-shaped portion is secured at its upper ends to the yoke member 11 and depends therefrom, the said member also having eyelets 47 struck up at the inner side thereof. A plurality of spaced rods 48 extend through the eyes 47 and thence in V-shaped formation to the shares or blades 16 having their ends secured to the outer sides of said blades. The rods 48 have eyelets formed therein at their upper ends beyond the eyes 47 and the lower ends of rods 45 are secured in these eyelets. As clearly shown in Figs. 2 and 3 the rods 45 are formed with a series of wave-like bends therein, said bends being disposed in a vertical plane. A conveyor is mounted to travel above the rods 45, which conveyor comprises a chain 49 running over a sprocket 50 at its upper end, which sprocket is mounted on a shaft 51 mounted in the upper portion of the member 43 and in brace bars 51^a secured to the upper ends of member 43 and to the inside of frame members 1 and 2. The lower run of the chain 49 passes upwardly substantially parallel with the rods 45 and passes under a roller 52 carried in a fork 53 pivoted on a short shaft 54 extending between arms 15. The chain extends substantially horizontally or at a slight downward angle forwardly from the roller 52 and passes around a sprocket 55 carried in a fork 56 which also is pivoted at its other end to the shaft 54. The arms 53 and 56 have secured thereto, respectively and extending downward therefrom, short arms 57 through which extends a headed bolt held in place by a split key passing through its end or by any other suitable means, and a spring 58 surrounds said bolt and presses upon the arms 57, thus tending to separate the roller 52 and the sprocket 55. The upper run of the chain passes around a small roller 59 carried on a bracket upstanding from the shaft 54. The chain 49 has secured thereto at intervals, fork members 60, which, as shown in Fig. 10, are bolted to the links 61 of the chain.

The chain 49 is driven through sprocket 50, the carrying shaft 51 of which has a beveled gear 62 at one end thereof driven by a pinion 63 secured to the upper end of a shaft 64 secured adjacent each end in small bearings attached, respectively, to one of the rods 51^a and the side frame member 1. The shaft 64 has a pinion 65 at its lower end driven by a beveled gear 66 carried on a short stub shaft 67 projecting from and secured in the side frame member 1. The shaft 67 also carries adjacent the beveled gear 66, a spur gear 68 which is driven by a larger spur gear 69 secured to the sleeve 10 at one side of the machine.

It is, as stated, desirable to sever the tops of the beets before the same are lifted and the novel mechanism provided for this purpose comprises a cutting disk 70. The disk 70 is dish-shaped and the main portion thereof is formed substantially on the arc of a circle but the edge portions are formed on a steeper angle or sharp curve, as clearly shown in Fig. 9. The disk 70 has a small bracket 71 secured centrally thereof and to its concave side and an axle or stem 72 is pinned to this bracket and projects outwardly therefrom, being journaled in the bearing 73 formed at the lower end of a pair of bars 74 which diverge and extend upwardly from said bearing, being pivotally mounted at their upper ends on a shaft 75 extending transversely between the side members 1 and 2 and journaled in bearings secured thereto. The axle or stem 72 is connected by a universal joint 76 of any suitable type to a shaft 77 which extends forwardly and upwardly and is journaled in its upper end in a small bearing 78 secured to a cross bar 79 carried by and extending between the bars 74. The shaft 77 has a beveled gear 79^a at its upper end beyond the bearing 78 which meshes with and is driven by another beveled gear 80 secured to the shaft 75. One of the bars 74 has an arm 81 projecting downwardly therefrom having an arcuate slot 82 formed therein in which is adjustably secured a short stub shaft 83. A sprocket or toothed wheel 84 is journaled on the shaft 83 and is rotated by a chain 85 passing thereover and over a sprocket 86 journaled on a short shaft 87 extending between the bars 74. The shaft 87 has thereon another sprocket 88 driven by a chain 89 from a sprocket 90 which is secured to the shaft 75. The shaft 87 also carries a beveled gear 91 meshing with and driving a beveled gear 92 secured to the upper end of a shaft 93 journaled in brackets secured to the bar 74 and which carries at its lower end a wheel 94 formed with spaced rearwardly projecting tines or tapered arms which are disposed closely adjacent the concave side of the disk 70 and are curved somewhat in accordance with the concave side thereof. The bars 74 and the parts carried thereby are suitably supported from the beam 14 and bracket 18 by means including a tensile spring 74^a. A slat conveyor belt 95 is

carried on rollers secured to spaced shafts 96 and 97 mounted in members 98 and 99 secured to the side member 1. This conveyor has its lower end disposed adjacent the disk 70 and wheel 94 and extends upwardly and diagonally forward of the frame and has its upper end disposed at some distance outside of the side frame member 1. A curved guard 100 projects from one side of the lower end of the conveyor frame to a point adjacent the edge of the disk 70. The upper end of the conveyor delivers to a chute or scoop-shaped receptacle 101 which is pivotally mounted in a yoke member 102 carried by a bracket 103 secured to the side member 1 and another bracket 104 secured to the member 98. The shaft 97 which drives the conveyor 95 carries a beveled gear 105 at one end driven by another beveled gear 106 secured to the end of the shaft 75. The shaft 75 is driven to properly drive the disk 70, wheel 94, wheel 84 and the conveyor 95 by a beveled gear 107 secured to its other end which is driven by a beveled pinion 108 mounted on a shaft 109 extending longitudinally of the side member 2 and journaled in bearings 110 secured thereto. The shaft 109 is driven by a beveled pinion 111 meshing with a beveled gear 112 which is secured to a short stub shaft 113 carried in the side frame member 2. A spur gear 114 is also carried on the shaft 113 adjacent the gear 112 and is adapted to mesh with a larger spur gear 115 secured to one of the sleeves 10.

The hinged portions 36 and 38 of the receptacle 33 and the receptacle 101 are adapted to be oscillated to dump the material in said receptacles. For this purpose, the member 36 has an arm 116 secured to one end thereof which is connected by a link 117 to one arm of a lever 118 comprising oppositely curved arms and secured at its central portion to the member 38^a of the bottom section of receptacle 33. The lever 118 is connected at its other end by link 119 to a bell crank lever 120, the other arm of which has a link 121 connected thereto, which link extends and is connected to a bell crank lever 123 pivotally mounted in a bracket 124 bolted to the rear portion of the side frame member 2. The other arm of the bell crank lever 123 is connected by the rod link 125 to one end of a lever member 126 (see Figs. 1, 4 and 6). The member 126 has a central portion formed as a mutilated beveled gear and arms extending in opposite directions therefrom. Said member 126 is centrally and rotatably mounted by a suitable headed and nutted bolt in one end of a leaf spring 127 secured at its other end to the top of side frame member 2. The spring 127 has a laterally projecting pedal portion 128 projecting therefrom in alinement with the member 126. The member 126 is mounted in central alinement with a beveled gear 129 which is carried by the shaft 113. The other end of member 126 is connected by a rod link 130 to an arm 131 secured to and projecting upwardly from a shaft 132 journaled in and extending between the side frame members 1 and 2 adjacent the forward end thereof. Said shaft 132 projects to the outside of side frame member 1 and has its outer end bent to extend parallel to the side frame member 1 and along the rear side of the receptacle 101 to which it is connected by a link motion connection. The seat member 133 is connected to a bow supporting spring 134 carried by a yoke 135 upstanding from and secured at its lower ends to the side frame members 1 and 2 substantially centrally lengthwise thereof. A hand lever 136 is pivotally mounted adjacent its lower end to a toothed quadrant 137 secured to the side frame member 1, said lever 136 being provided with the usual grip-operated pawl and rod mechanism 138 whereby it is held in any desired position relative to the quadrant 137. Said lever has a gear segment 139 at its lower end meshing with a toothed segment 140 which is secured to the yoke member 11.

In Fig. 11, a modified form of driving mechanism for the disk 70 and wheel 94 is illustrated. In this modification the shaft 75 is shown together with the gear 80 thereon meshing with the gear 79 on a shaft 141. The shaft 141 is journaled in a small bearing carried by the lower ends of the bars 74 which, as previously described, are pivotally mounted on the shaft 75. The shaft 141 carries a beveled pinion 142 adjacent its lower end meshing with the driving beveled gear 143 secured to the stem 72 of disk 70 and shaft 141 also carries a beveled gear 144 meshing with another beveled gear 145 secured to the shaft 146 which carries at its lower end a wheel 147 corresponding to the wheel 94 already described. The shaft 87 and chains 85 and 89 are also shown in this figure but these parts are the same as already described.

In operation, the machine will be drawn along the row of beets with the parts in the position shown in Fig. 2. The tractor or team will be connected to clevis 27 and tongue 22. The operator of the machine will occupy the seat 133 and will thus be in position to manipulate the pedal levers 31, the pedal arm 128 and the hand lever 136. The lower edge of the cutting disk 70 and the central line between the blades 16 should be kept in line with the row of beets. The beets are, as stated, considerably to one side or the other of a central row line and the disk and blades can be kept properly alined with the row by the operator manipulating the pedal levers 31. As

shown in Fig. 7, the fixed point on the clevis is the front end thereof connected to member 29. As the operator pushes on one or the other of the pedals 31, the clevis 27 will swing the member 29 about a vertical pivot and the end of the beam 14 will thus be moved to one side or the other. This will cause the disk 70 and the blade 16 to move to one side or the other and thus be kept in line with beets which are more or less out of the general line of the row. The machine will be kept practically centered over the row, of course, by steering the tractor or team which is pulling the same. The beam 14 is steadied and somewhat yieldingly supported by spring 21^a.

As the machine progresses, the shaft 75 is driven through the connections described and the wheel 84 and chain 85 will be driven in the direction indicated by the arrows. The wheel 84 and chain 85 come into contact with the beet tops and ride over the tops of the bodies of the beets so that their arms 74 and parts carried thereby are raised or lowered in accordance with the heights of the bodies of the beets. The disk 70 is therefore raised or lowered, according to the position of the wheel 84 and the lower edge of the disk will thus always be kept in uniform and proper relation to the top of the beet bodies. It will be noted that the disk 70 is disposed in an inclined upstanding position so that the center line of the axle or stem 72 makes an angle of less than forty-five degrees with the horizontal. As clearly shown in Fig. 1, it will also be seen that the axis of said stem makes an acute angle with the longitudinal axis of the machine. This positioning of the disk is very important and attains a new and important result. While it has heretofore been proposed to use cutting disks for the beet tops, the same have been disposed in comparatively flat positions with the central axes thereof, making an angle of less than forty-five degrees with the vertical. If the disk is thus disposed it cannot get in between the successive beets and will be held up by a high beet so as to pass a considerable distance thereover an adjacent low beet. By positioning the disk in the upstanding position herein disclosed, the edge of the disk can get in between the beets that are very close together and the tops of each beet will, therefore, be cut at the proper point and the disk 70 will be gauged by each individual beet. As previously stated, the bottom portion of the wheel 84 and chain 85 slightly overlaps the lower edge of the disk 70 and this edge thus always follows the movements of said wheel and chain, which movements are determined solely by the position of the beets. It will also be noted that as the wheel 84 and chain 85 turn toward the disk the tops will be pulled over against the cutting edge of the disk so as to be efficiently and neatly severed. After the tops are thus cut by the disks they will be carried around the same a short distance due to the rotation thereof and will come into the path of the arms of the wheel 94 and be discharged by said arms from the disk onto the top of the conveyor belt 95 by which they will be carried to the receptacle 101. By suspending the arms 74 and parts carried thereby from the beam 14 by the spring 74^a, the weight of said parts is largely relieved so that the movements thereof can be easily controlled by the wheel 84 and chain 85. The vertical position of the wheel 84 relatively to the edge of the disk 70 can be varied by adjustment of the shaft 83 in the slot 82. This slot is concentric with the axis of shaft 87 so that such adjustment will not interfere with the chain 85. By having the axis of stem 72 swing to one side, as shown in Fig. 1, it will be seen that the tops of the beets will pass more readily around to the wheel 94 as they do not have to be elevated appreciably by the disk. The abrupt curve at the edge of the disk 70 makes it possible to position the disk in an upstanding position and at the same time maintain a substantially horizontal cutting edge for severing the tops and this shape of disk also assists in retaining the tops in the disk until they are discharged onto the conveyor 95 by the wheel 94. The disk 70 and wheel 94, will, of course, be constantly driven by the parts already described.

As the machine moves along the blades 16 travel beneath the surface of the ground at a depth sufficient to get under the bodies of the beets, as shown in Fig. 2 The beets pass in between these blades and are gradually raised by the inclined surfaces thereof and pushed back onto the rods 48. The beets are then engaged by the arms of the fork 60 and carried rearwardly and upwardly along the rods 48 and the rods 45. As the beets move along the waved or ruffled rods 45 they will be shaken or agitated and any dirt adhering thereto will be removed therefrom. The beets will pass off of the tops of the rods 45 and drop into the receptacle 33. The proper tension will be maintained on the chain 49 by the roller 52 which is applied by the spring 57. The lower run of the chain will also be free for adjustment when an unusually large beet passes under the roller 52, as the arm 53 would thus be raised and the arms 56 would swing slightly downwardly. The forked arms 60 are sufficiently long to engage the smallest beets and the chain will thus conveniently accommodate beets of all sizes and will adjust itself thereto.

After the beets have accumulated in the receptacle 33 and the tops have accumu-

lated in the receptacle 101 in sufficient amount, the same will be dropped upon the ground or into a suitable receptacle. To effect this operation, the operator presses upon the pedal arm 128 and depresses the member 126 so that the teeth thereof come into engagement with the teeth of gear 129. Member 126 is thus revolved for a part of a revolution and the rods 125 and 130 are drawn toward the center of the machine. The rod 125 thus actuates the bell crank 123 and the bell crank lever 120, lever 118 and arm 116 so that the swinging member 36 of the receptacle 33 is swung upwardly and the bottom slats 38 tilted downwardly and the beets in the receptacle allowed to drop out at one end thereof. The rod 130 swings the shaft 132 and through its outer arm, elevates the rear end of the receptacle 101 so that the tops are, likewise, discharged from said receptacle. The operator then releases the pedal arm 128 and the parts return to their original position by gravity, the spring 127 lifting member 126 from engagement with gear 129. The beets are thus effectively and efficiently topped, lifted, cleaned and collected, as well as the severed tops. The disk 70, as stated, is positioned for each individual beet and is so positioned that it can readily and properly be positioned to sever the tops at a uniform point in relation to the beet body.

When it is desired to transport the machine without operating the same, the lever 136 will be pulled rearwardly and the yoke 11 will be turned to swing its central crank portion upwardly. This will result in raising the beam 14 and its arms 15 so that the shares or blades 16 will be elevated to a position shown in Fig. 3. The front part of the frame will also be raised as the yoke must swing about its ends disposed in the sleeves 10 and wheels 9 and the gears 68 and 114 will thus be carried out of mesh with the gears 69 and 115, respectively. The upper ends of the rods 45 being loosely disposed in the eyes 44 the member 43 will move therein during this movement and the chain 49 will merely swing slightly about the center of shaft 51. The raising of the front portion of the frame and beam 14 also raises the lower end of the arm 74 and the parts carried thereby, so that the disk 70 and wheel 84 will also be raised, as shown in Fig. 3 The machine can then be transported without operating the conveyor chain 49 or turning the shaft 75 and the parts driven therefrom.

From the above description it is seen that applicant has provided a comparatively simple and very efficient beet harvesting machine. The various features of the machine have been carefully worked out in view of practical difficulties encountered in the harvesting of beets and the machine is constructed to overcome such difficulties which have heretofore been encountered. The parts of the machine are easily made and assembled and adapted for local construction and also so that there is little tendency for the parts to become disarranged or out of repair.

It will, of course, be understood, that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of applicant's invention, which, generally stated, consists in a machine capable of carrying out the objects above enumerated, such as shown and described and set forth in the appended claims.

What is claimed is:

1. A beet harvester comprising a dish-shaped cutting disk mounted for vertical movement with its central axis inclined at an angle of forty-five degrees, or less, with the horizontal, means engaging the tops of the beets for controlling the position of said disk, whereby as the harvester advances said disk, owing to its upstanding position, can enter between and adjacent itself to individual closely adjacent beets.

2. A beet harvesting machine comprising a vertically movable dish-shaped cutting disk disposed in an inclined upstanding position so that it can move in between closely adjacent beets, means moving over said beets comprising a chain driven sprocket wheel having its lowest point substantially in line with the lowest point of said disk and in fixed relation thereto, whereby the position of said disk is controlled by the position of said wheel.

3. The structure set forth in claim 2, said sprocket wheel being driven so that its lower side moves toward the lower side of said disk.

4. The structure set forth in claim 2, a chain passing over said sprocket wheel, and a sprocket wheel disposed forwardly of and above said sprocket wheel whereby the lower run of the chain moves downwardly in an inclined position over and under said first mentioned sprocket wheel.

5. The structure set forth in claim 2, a frame, spaced members carrying said disk and sprocket wheel and extending upwardly and forwardly, a transverse shaft to which the upper ends of said members are pivoted for vertical swinging movement, and a sprocket wheel on said shaft from which said first mentioned sprocket wheel is driven.

6. A beet harvesting machine comprising a vertically movable dish-shaped cutting disk disposed in an inclined upstanding position so that it can move in between closely adjacent beets, means moving over said beets comprising a chain driven sprocket wheel having its lowest point substantially in line with the lowest point of said disk and in

fixed relation thereto, whereby the position of said disk is controlled by the position of said wheel, a frame, spaced members carrying said disk and sprocket wheel and extending upwardly and forwardly, a transverse shaft to which the upper ends of said members are pivoted for vertical swinging movement, and a sprocket wheel on said shaft from which said first mentioned sprocket wheel is driven, a transverse shaft carried intermediate the ends of said members, a pair of sprocket wheels carried thereby, a chain running over one of the same and said first mentioned sprocket wheel, and a chain running over the other of said pair of sprocket wheels and over the second mentioned sprocket wheel.

7. A beet harvesting machine comprising a vertically movable dish-shaped cutting disk disposed in an inclined upstanding position so that it can move in between closely adjacent beets, means moving over said beets comprising a chain driven sprocket wheel having its lowest point substantially in line with the lowest point of said disk and in fixed relation thereto, whereby the position of said disk is controlled by the position of said wheel, a frame, spaced members carrying said disk and sprocket wheel and extending upwardly and forwardly, a transverse shaft to which the upper ends of said members are pivoted for vertical swinging movement, and a sprocket wheel on said shaft from which said first mentioned sprocket wheel is driven, and a yielding means suspending said members, disk and attached parts.

8. A beet harvestor having in combination, a frame, a driven shaft extending transversely thereof adjacent its front end, a gear on said shaft, spaced members pivoted at their upper ends on said shaft and extending downwardly and rearwardly therefrom, a bearing on said members adjacent their lower ends, a dish-shaped disk member having a stem projecting from its concave side and journaled in said bearing, a shaft having a gear on its upper end meshing with the gear on said shaft and extending downwardly therefrom and a universal joint connecting the lower end of said shaft and said stem.

9. The structure set forth in claim 8, an arm carried by one of said members adjacent its lower end, a stub shaft carried therein extending transversely of said member, a sprocket wheel journaled on said stub shaft, a chain running over said sprocket wheel, the lower portion of said wheel and chain being disposed adjacent the lower edge of said disk, and means for driving said chain from said first mentioned shaft.

10. A beet harvester having in combination, a frame, a driven shaft extending transversely thereof adjacent its front end, a gear on said shaft, spaced members pivoted at their upper ends on said shaft and extending downwardly and rearwardly therefrom, a bearing on said members adjacent their lower ends, a dish-shaped disk member having a stem projecting from its concave side and journaled in said bearing, a shaft having a gear on its upper end meshing with the gear on said shaft and extending downwardly therefrom and a universal joint connecting the lower end of said shaft and said stem, an arm carried by one of said members adjacent its lower end, a stub shaft carried therein extending transversely of said member, a sprocket wheel journaled on said stub shaft, a chain running over said sprocket wheel, the lower portion of said wheel and chain being disposed adjacent the lower edge of said disk, and means for driving said chain from said first mentioned shaft, said arm having an arcuate slot therein and said stub shaft being adjustable in said slot.

11. A beet harvester comprising a dish-shaped cutting disk mounted for vertical movement with its central axis inclined in an upstanding position, and means moving over said beets and engaging the same for controlling the vertical position of said disk whereby, as the harvester advances, said disk, owing to its upstanding position, can enter between and be adjusted to individual closely adjacent beets and said beets will be severed by said disk at uniform points relative to the tops thereof.

12. A beet harvester having in combination a dish-shaped disk for severing the tops of the beets, means for controlling said disk to sever the tops at uniform points relative to the bodies of the beets and a rotating means disposed adjacent the surface of said disk for discharging the severed tops therefrom.

13. The structure set forth in claim 12, a conveyor to which said tops are delivered by said rotating means, and a receptacle into which said tops are discharged by said conveyor.

14. The structure set forth in claim 12, and spaced members extending upwardly and mounted at their upper ends for vertical swinging movement carrying said disk and both of said means.

15. A beet harvester having in combination a dish-shaped disk for severing the tops of the beets, and a rotatable means disposed adjacent the concave surface of said disk to engage and discharge the severed tops therefrom.

16. A beet harvester having in combination a dish-shaped disk for severing the tops of the beets, means for controlling said disk to sever the tops at uniform points relative to the bodies of the beets and a rotating means disposed adjacent the surface of

said disk for discharging the severed tops therefrom, spaced members extending upwardly and mounted at their upper ends for vertical swinging movement carrying said disk and both of said means, said means comprising means having spaced radially projecting arms.

17. A beet harvester having in combination a dish-shaped disk for severing the tops of the beets, means for controlling said disk to sever the tops at uniform points relative to the bodies of the beets and a rotating means disposed adjacent the surface of said disk for discharging the severed tops therefrom, spaced members extending upwardly and mounted at their upper ends for vertical swinging movement carrying said disk and both of said means, said means comprising means having spaced radially projecting arms, the axes of said disk and wheel projecting upwardly away from the concave side of said disk.

18. A beet harvester having in combination a frame, an upwardly inclined dish-shaped disk for severing the beet tops, a stem projecting upwardly from the concave side thereof, a shaft connected to said stem and extending upwardly from said disk, a rotating wheel having projecting arms disposed adjacent the concave surface of said disk at one side of the center thereof, a shaft carrying said wheel and projecting upwardly therefrom, upwardly extended spaced members in which said shafts are mounted, a transverse shaft mounted in said frame on which the upper ends of said members are swingingly mounted, and means on said last mentioned shaft for driving said disk and said wheel.

19. A beet harvester comprising a dish-shaped disk having its central portion formed on the arc of a circle and its edge portion formed on a curve of much smaller radius than said circle, said disk being mounted for vertical movement and having its central axis disposed at less than 45 degrees with the horizontal.

20. A beet harvesting machine comprising a frame, a dish-shaped disk carried thereby and disposed in an upstanding inclined position with its concave side upwardly and its central axis making an angle of less than 45 degrees with the horizontal and making an acute angle with the longitudinal center line of the machine.

21. A beet harvester comprising a dish-shaped disk having its central portion formed substantially on the arc of a circle and its edge portion formed on an arc of much smaller radius than said circle, said disk being disposed in an inclined upstanding position with its axis making an angle of less than forty-five degrees to the horizontal, and making an acute angle with the longitudinal center line of the machine, and means for raising and lowering said disk to position its edge in accordance with the height of the beets, whereby the same can move in between closely adjacent beets to sever the tops thereof.

In testimony whereof I affix my signature.

ADOLPH F. DJUBERG.