

No. 763,571.

PATENTED JUNE 28, 1904.

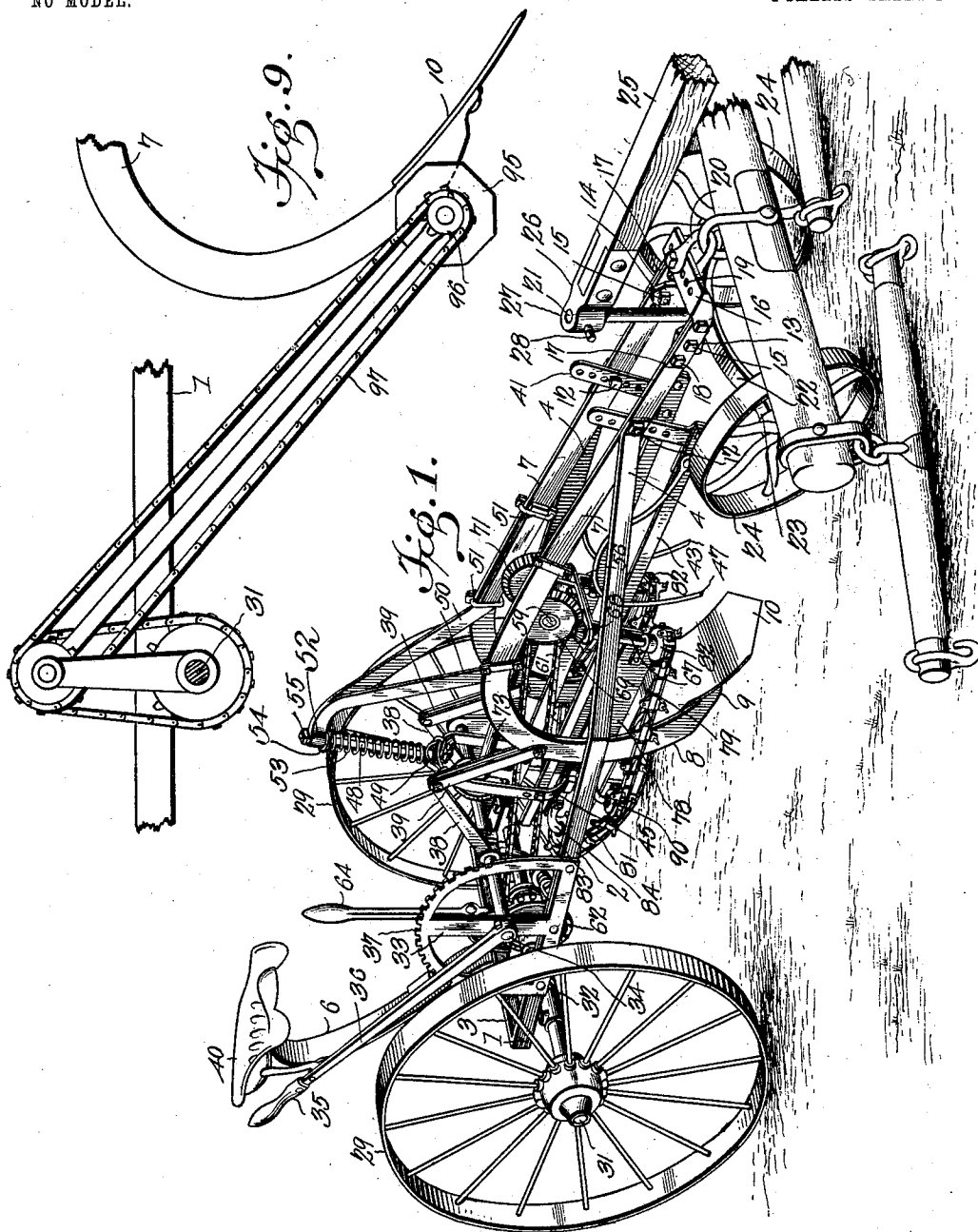
C. H. SMITH & F. D. GIDDINGS.

BEET LIFTER AND TOPPER.

APPLICATION FILED MAY 11, 1903.

NO MODEL.

4 SHEETS—SHEET 1.



Witnesses
E. H. Stewart
Wm. Ragger

Charles H. Smith and
Frank D. Giddings, Inventors,
by *Calderwood*
Attorneys

No. 763,571.

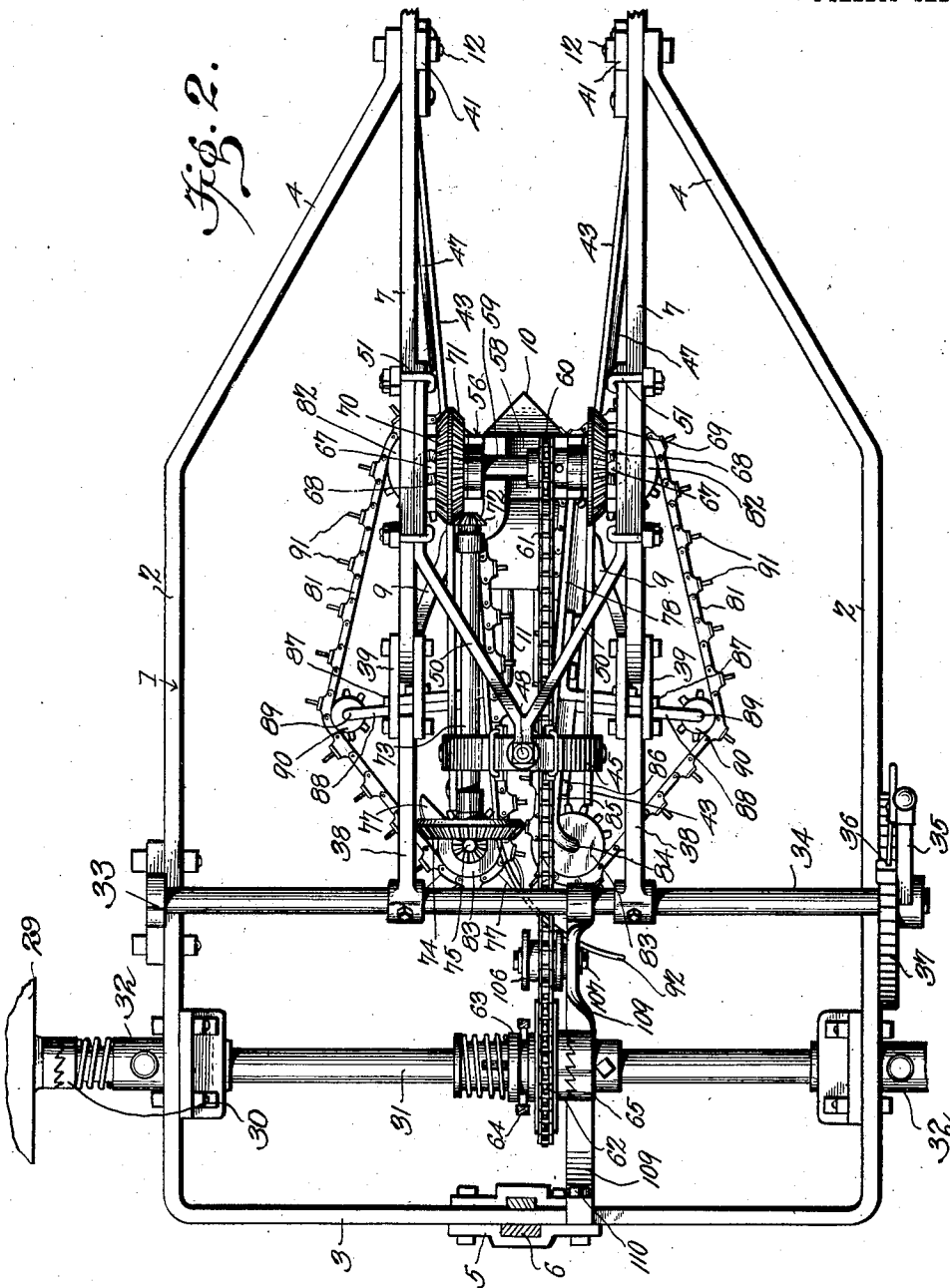
PATENTED JUNE 28, 1904.

C. H. SMITH & F. D. GIDDINGS.
BEET LIFTER AND TOPPER.

APPLICATION FILED MAY 11, 1903.

NO MODEL.

4 SHEETS—SHEET 2.



Witnesses
E. P. Stewart
Wm. Ragger

Charles H. Smith and
Frank D. Giddings, Inventors.
by *C. A. Snow & Co.*
Attorneys

No. 763,571.

PATENTED JUNE 28, 1904.

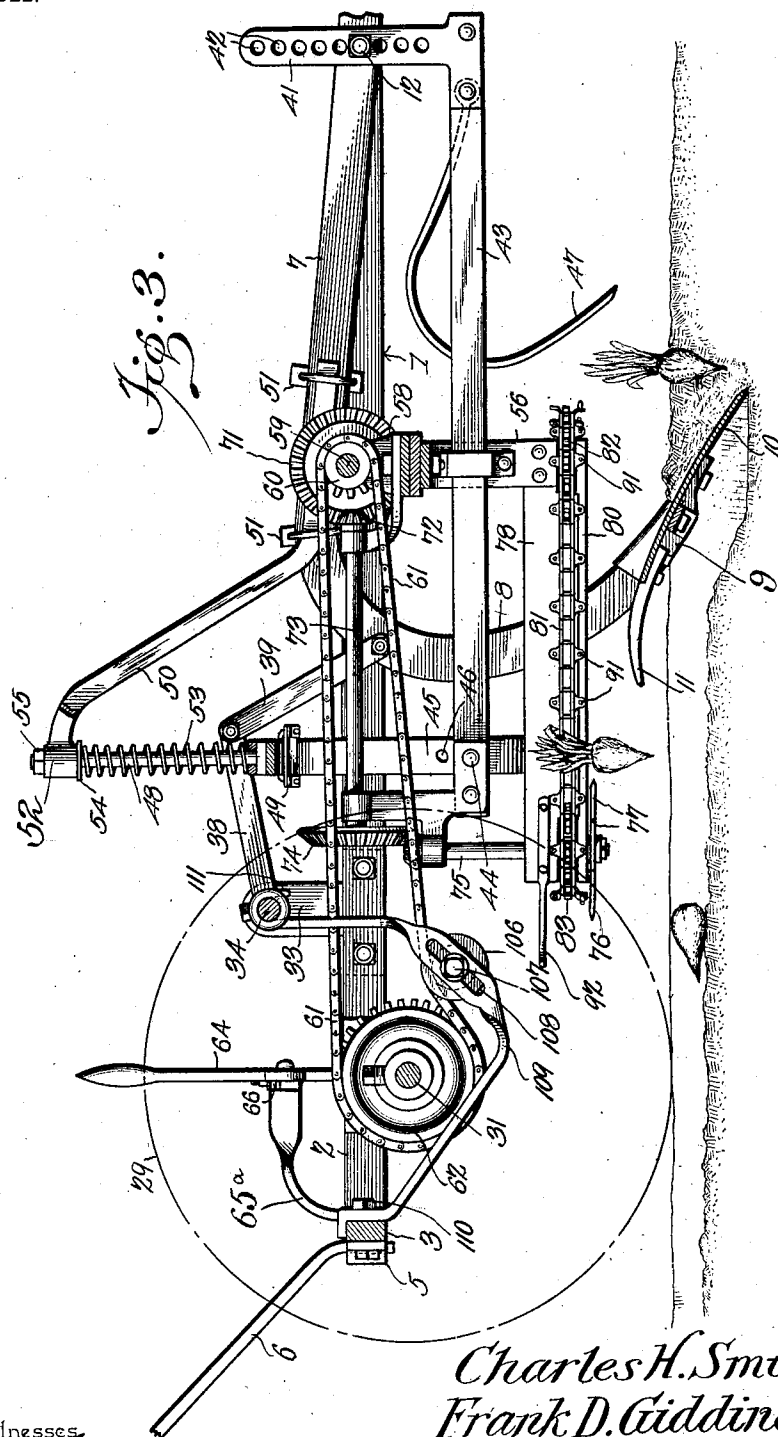
C. H. SMITH & F. D. GIDDINGS.

BEET LIFTER AND TOPPER.

APPLICATION FILED MAY 11, 1903.

NO MODEL.

4 SHEETS—SHEET 3.



Witnesses
E. C. Stewart
Wm. Ragger

Charles H. Smith and
Frank D. Giddings, Inventors.
by *C. A. Snow & Co.*
Attorneys

No. 763,571.

PATENTED JUNE 28, 1904.

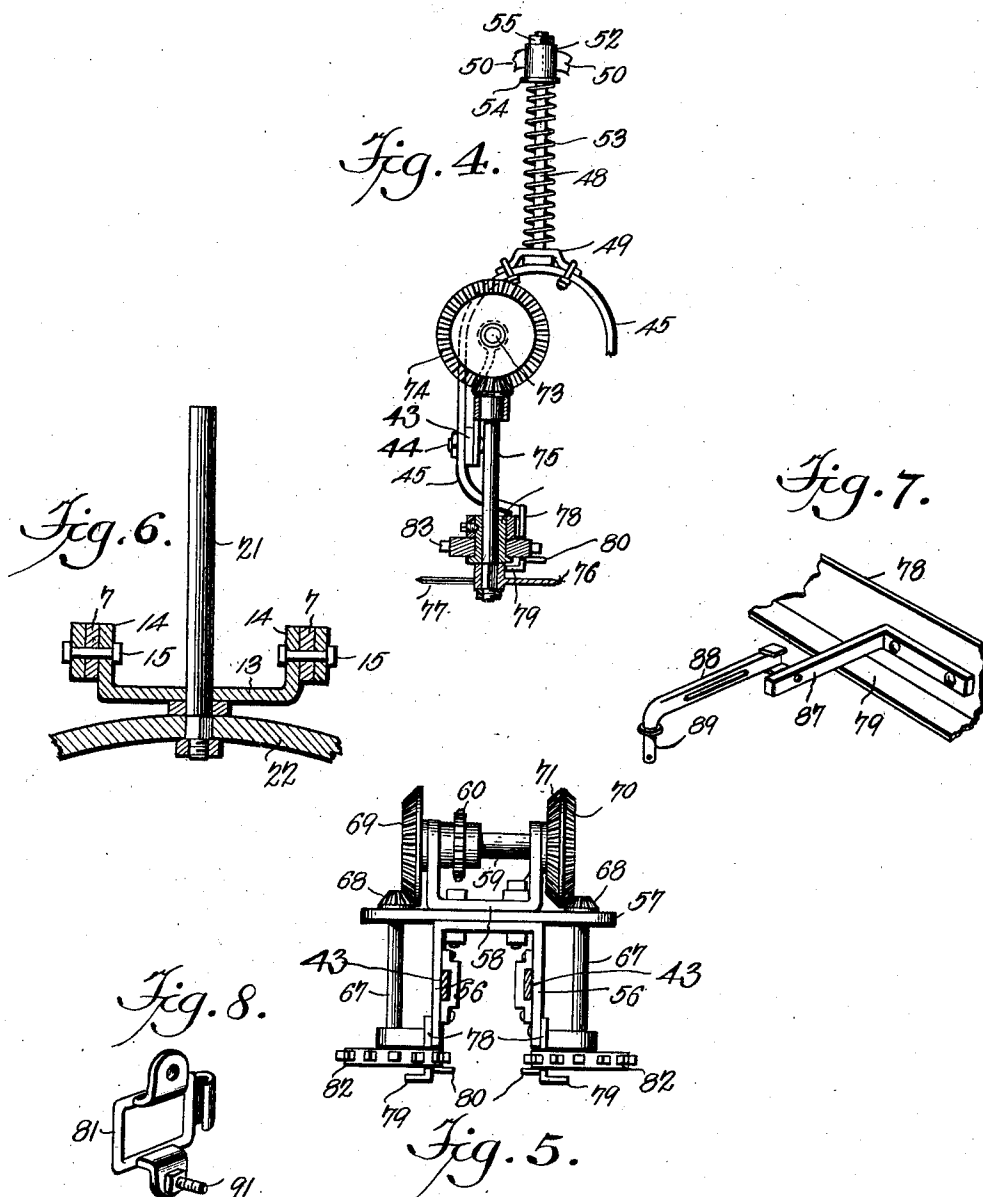
C. H. SMITH & F. D. GIDDINGS.

BEET LIFTER AND TOPPER.

APPLICATION FILED MAY 11, 1903.

NO MODEL.

4 SHEETS—SHEET 4.



Witnesses
E. H. Stewart
Wm. Ragger

Charles H. Smith and
Frank D. Giddings, Inventors,
by *C. A. Snowles*
Attorneys

UNITED STATES PATENT OFFICE.

CHARLES H. SMITH AND FRANK D. GIDDINGS, OF FORT COLLINS,
COLORADO.

BEET LIFTER AND TOPPER.

SPECIFICATION forming part of Letters Patent No. 763,571, dated June 28, 1904.

Application filed May 11, 1903. Serial No. 156,684. (No model.)

To all whom it may concern:

Be it known that we, CHARLES H. SMITH and FRANK D. GIDDINGS, citizens of the United States, residing at Fort Collins, in the county of Larimer and State of Colorado, have invented a new and useful Beet Lifter and Topper, of which the following is a specification.

This invention relates to beet lifters and toppers; and it has for its object to provide a machine of this class which shall possess superior advantages in point of simplicity, durability, ease and convenience of operation, and general efficiency.

Our invention may be generally described as consisting of a wheel-supported frame having connected therewith a pair of beams supporting a single plow, the latter being in the nature of an inclined plane which is adapted to raise or lift the beets. Endless chains are provided which seize the tops of the beets and carry the same in a rearward direction within the range of influence of a rotary knife or cutter, whereby the beets severed from the tops are deposited upon the ground conveniently for gathering, while the tops are disposed of to one side of the row. Means are provided for guiding the carrying-chains, for adjusting and regulating the gathering mechanism, and for lowering or raising the beams carrying the plow as may be desired or necessary.

In addition to these general features the invention consists in the improved construction, arrangement, and combination of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of our improved beet lifter and topper. Fig. 2 is a top plan view of the same, the front end, including the draft attachment and the front supporting-wheels, having been removed. Fig. 3 is a sectional elevation of the device as shown in Fig. 2. Fig. 4 is a sectional elevation showing a portion of the ox-bow frame and related parts. Fig. 5 is a detail elevation of the front supporting means for the endless carrying device. Fig. 6 is a detail view showing the connection with the main frame of the front sup-

porting device and the tongue-supporting bolt. Fig. 7 is a perspective detail view showing one of the chain-tightening devices for the endless carrier with the parts separated. Fig. 8 is a perspective detail view of one link of one of the endless carriers. Fig. 9 is a side elevation illustrating a modification.

Corresponding parts in the several figures are indicated by similar numerals of reference.

The main frame 1 of the device is composed of parallel side pieces 2 2, connected at their rear ends by a cross-piece 3 and having front ends 4 4, that converge forwardly in the direction of each other. This entire frame structure may, if desired, be bent from a single bar of iron of suitable dimensions, and to the rear piece 3 is bolted a clip 5 for the attachment of the seat-supporting standard 6.

The plow-beams 7 7 are preferably made of iron and are curved downwardly at their rear ends to form standards 8, the extreme lower and forward ends of which are curved inwardly in the direction of each other, as shown at 9, and are flattened, so as to form suitable supports for the plow 10, which is bolted thereon. The plow, as already stated, practically forms an inclined plane adapted to dig into the ground under the beet-roots and to lift the latter gradually to the desired elevation, lifting at the same time such dirt as may adhere to the roots. In the preferred form of the invention the plow-blade 10 is provided with a plurality of rearwardly-extending fingers 11, bolted or otherwise suitably secured to the under side of its rear end, said fingers serving to support the beets as they pass from the plow and to permit the adhering dirt to be separated therefrom.

The plow-beams are connected pivotally with the front ends of the converging side pieces 4 of the frame by means of bolts 12, the front ends of the plow-beams being extended for some distance—say about twenty-four inches—in front of said pivotal connection. The extreme front ends of the plow-beams are connected and spaced by means of a brace 13, having upturned ends 14, which are pivotally connected with the front ends of the plow-

beams by means of single bolts 15, upon which the connecting and spacing piece or brace 13 is thus permitted to swing. The front ends of the plow-beams are, furthermore, 5 connected by means of a horizontally-disposed brace 16, having lugs or ears 17, whereby it is connected by means of bolts 18 with the outer sides of the plow-beams. The brace 16, which is provided with a plurality of perforations 19, is for the attachment of the draft, 10 a clevis 20 being provided for this purpose.

The pivoted brace 13 is centrally perforated for the passage of a shank or shaft 21, the lower end of which carries an axle 22. The 15 outer ends of the latter are bent or tilted downwardly and form spindles 23, upon which the front supporting-wheels 24 are journaled. It will be seen that these front supporting-wheels are downwardly inclined in the direction of 20 each other and that they travel on opposite sides of the row of beets that is to be operated upon. Thus by the downward pressure exerted by said wheels the tendency will be to loosen the beets in the ground, thereby lightening the 25 work of the plow or lifter and correspondingly lightening the draft upon the machine. By this construction, which will admit of the wheels swinging under the front part of the frame, a short turn may also be made whenever 30 desired. The upper end of the shaft or shank 21 supports the tongue 25, which is preferably provided at its rear end with a clip 26, terminating in a collar 27, engaging the shank 21 and provided with a set-screw 28 or other suitable means whereby a solid attachment may 35 be effected.

The rear part of the frame is supported by means of traction-wheels 29, the hubs of which are to be provided with automatically-operating clutch means 30 to facilitate the backing 40 and the turning of the machine. The wheels 29 are mounted upon the ends of an axle 31, which is journaled in boxes 32, the latter being suitably secured upon the under sides of 45 the parallel side pieces of the main frame. The latter is provided at opposite sides with uprights 33, affording bearings for a rock-shaft 34, which is provided at one end with a hand-lever 35, carrying a spring-actuated dog 50 or pawl 36, which engages a segmental rack 37, which is suitably attached to one of the side pieces of the main frame and which, as shown in the drawings, may be associated with one of the uprights 33. The rock-shaft 55 34 is provided with radially-extending arms 38, which are connected, by means of links 39, with the plow-beams 7. The latter and the parts related thereto may thus be vertically adjusted by means of the hand-lever 35 which, 60 as will be seen, is within convenient reach of the driver, whose seat 40 is supported upon the standard 6.

The bolts 12, which form the pivotal connection between the front ends of the sides of 65 the main frame and the plow-beams 7, also

serve for the attachment of a pair of heavy iron straps 41, each of which is provided with a plurality of perforations 42 in order that vertical adjustment of said straps may be readily effected. Projecting rearwardly from 70 the straps 41 are a pair of supporting-arms 43, which latter may be formed integrally with or suitably connected with said straps 41. The supporting-straps 43 are extended rearwardly between the plow-standards, and their 75 rear ends are connected, by means of bolts 44, with an ox-bow frame 45, the sides of which have perforations 46 to admit of the proper adjustment of the rear ends of the supporting-arms 43. Suitably attached to the latter 80 near their front ends are a pair of rearwardly-extending downwardly-curved fingers 47, which as the machine progresses serve to engage and elevate the beet-tops and to convey them into the path of engaging elements to 85 be hereinafter described.

48 designates a bolt the head of which is in engagement with a clip 49, suitably secured to the top of the ox-bow frame 45, from which said bolt thus extends in an upward direction. 90 A pair of arms 50, which are firmly secured, by means of clips 51, to the inner sides of the plow-beams, are extended upwardly and rearwardly from the latter, converging to form a tubular sleeve 52, through which the upper 95 end of the bolt 48 extends. Upon said bolt, between the sleeve 52 and the clip 49, is coiled a spring 53, a washer 54 being interposed between the upper end of said spring and the sleeve 52. Above the said sleeve the bolt 48 100 is provided with a tightening-nut 55, whereby the tension of the spring may be regulated. It will be readily understood that the rear ends of the supporting-arms 43 are supported, 105 by means of the frame 45 and bolt 48, from the arms 50, which are firmly clipped to the plow-beams.

Suitably bolted, clipped, or otherwise secured to the supporting-arms 43 at a suitable distance in front of the ox-bow frame 45 is a 110 frame composed, essentially, of side pieces 56, connected at their upper ends by a cross-piece 57, supporting a bearing-frame 58. The latter frame affords bearings for a counter-shaft 59, carrying a sprocket-wheel 60, which is 115 connected, by means of a chain 61, with a sprocket-wheel 62 upon the axle 31 of the machine. The sprocket-wheel 62 is normally loose upon the axle, and it has an annularly-grooved hub or collar 63 engaging a forked 120 lever 64, which may be fulcrumed to an upright or standard 65, suitably supported by the main frame and capable of throwing the said sprocket-wheel into or out of engagement with a clutch 65, which is mounted securely upon the axle. A segmental ratchet, 125 as 66, or any other suitable means may be provided for the purpose of retaining the lever 64 in such position as to retain the sprocket-wheel either in or out of engage- 130

ment with the clutch. It is obvious that when the sprocket-wheel 62 is in engagement with the clutch rotary motion will be transmitted from the axle of the machine and said sprocket-wheel to the parts operated by the latter, as will be presently more fully set forth.

The ends of the top pieces 57 are extended beyond the uprights 56, so as to afford bearings for vertically-disposed shafts 67, for the lower ends of which suitable bearings are provided. The upper ends of the shaft 67 are provided with bevel-pinions 68, meshing with bevel-gears 69 and 70 upon the counter-shaft 59. One of the bevel-gears, 70, in addition to the cogs upon its outer side, which mesh with the corresponding pinion 68, is provided on its inner side with cogs 71, meshing with a pinion 72 upon the front end of a rearwardly-extending shaft 73, suitable bearings for which are provided in the frame of the machine, the rear bearings being formed upon the inside of one of the side pieces of the ox-bow frame 45, the shaft 73 being extended a short distance in rear of the latter frame and being there provided with a bevel-gear 74. Additional bearings are provided for a vertically-disposed shaft 75, carrying at its lower end a horizontally-disposed cutter 76, provided with a plurality of curved radiating blades 77, for the purpose of severing the tops of the beets. 78 78 designate a pair of shields, preferably constructed of heavy sheet metal and secured, by means of bolts, rivets, or other suitable means, with the lower ends of the frame-bars 56 and the sides of the ox-bow frame 45, the sides of the latter being converged in the direction of each other, as will be understood. It is obvious that the rear ends of the shields 78 approach each other much more closely than at their front ends. Said shields are provided at their lower edges with outwardly-extending flanges 79, and to their inner sides, near the lower edges, are bolted flange-bars 80, which are for the purpose of supporting the conveyer-chains. The front ends of the latter, which are designated 81, are mounted upon sprockets 82 near the lower ends of the shafts 67, and the rear ends of the said chains are mounted upon sprocket-wheels 83, one of which is journaled upon a stub 84, projecting from a plate 85, adjustable on the frame 45 by means of bolts 86, and the other upon the shaft 75 of the revoluble cutter. Suitably bolted to the outer sides of the shields 78, about centrally between their front and rear ends, are laterally-extending flanged brackets 87, having extension-arms 88, the outer ends of which are downturned to form spindles 89, upon which chain-tighteners 90 are journaled, said tighteners being either in the form of plain guide-wheels or sprocket-wheels, as may be preferred. In the annexed drawings sprocket-wheels have been shown. In is evident that by moving the extensions 88 out-

wardly upon the flange-supported arms 87 the conveyer-chains 81 may be tightened to any desired extent. The inner leads of the latter will be supported upon the flanges 80, secured upon the inner sides of the shields 78, and the outer leads of said chain will be supported by means of the tighteners 90, which may be adjusted to impart to said chains any desired degree of tension.

Alternate links of the conveyer-chains 81 are provided with outwardly-extending fingers 91, the fingers of the two chains intermeshing, so that they will seize upon and firmly hold the tops of the beets as the latter are being brought within the path or range of operation of said chains. The latter will serve to carry the beets rearwardly in the path of the rotary cutter, whereby the tops are severed, the beets permitted to drop upon the ground, and the tops as they emerge from between the inner or coacting leads of the chain are engaged by a curved rod 92, whereby they are thrown to one side of the row of beets, so that the latter may be subsequently conveniently gathered.

For the purpose of keeping the main driving-chain taut during the operation of the machine we provide a chain-tightening device consisting of a flanged pulley or guide-wheel 106, the axle of which, 107, is mounted in a slot 108 in a bracket 109, one end of which is hooked over the rear frame-beam 3, with which it is firmly connected by means of a bolt 110, while the other end of said bracket is bent to form a hook 111, which engages the rock-shaft 34, upon which said hook rests and is firmly supported. It will be seen that by moving the pulley up against the lower lead of the driving-chain the latter may be tightened to any extent that may be required to insure the smooth and perfect operation thereof.

It will be observed that the construction and arrangement of the parts of the machine are such that the inner coacting leads of the conveyer-chains are spaced apart at their front ends and converge rearwardly. It follows that when the machine is in operation and the beets are elevated out of the ground by the operation of the inclined plane of the plow the tops of the beets will, as will be readily understood, be seized upon by the said inner leads of the chains, and the beets will first be carried over the rearwardly-extending fingers 11 at the rear end of the plow, where they will be subjected to a shaking action whereby the adhering dirt is separated therefrom. As the machine progresses the conveyer-chains cooperate to grasp the tops of the beets more tightly, and as the latter progress rearwardly the rear part of the supporting-frame—namely, the ox-bow frame 45 and its related parts—will yield upwardly against the tension of the spring 48, thereby causing the machine to adjust itself automatically to roots

of various sizes. Consequently when the latter pass within the range of influence of the knife or cutter the tops will be severed from the beets without injuring the latter. At the point where severance of the tops takes place the grip of the conveyer-chains upon the said tops is tightest; but almost instantly after the severance of the tops, the beets having been dropped point downward upon the surface of the ground, the tops emerge from between the conveyer-chains and by the action of the curved rod 92 are thrown to one side, as will be readily understood.

Our improved beet lifter and toppler as hereinbefore shown and described will be found to be extremely simple, durable, and effective in operation. While the form of embodiment of our invention which has been herein described is the preferred one, we do not wish to be regarded as restricting ourselves to the structural details herein set forth. Thus we have in Fig. 9 of the drawings shown a substitute for the rearwardly-extending fingers 11, which consists in a polygonal roller 95, journaled in suitable bearings between the plow-standards and provided at one end with a sprocket-wheel 96, connected by a chain 97 with some rotary element of the machine. This device may at times be preferred for the purpose of guiding the beets into engagement with the conveyer elements of the machine.

It is obvious that ordinary gearing may, if preferred, be substituted for the sprocket wheels and chains herein shown and described for transmitting motion between the parts of the machine.

Having thus described our invention, we claim—

1. In a machine of the class described, the combination of a wheel-supported main frame having forwardly - converging side pieces, beams pivotally connected with the front ends of said side pieces, and a pivotally-mounted spacing-brace.

2. In a machine of the class described, a wheel - supported main frame having forwardly-converging side pieces, beams connected pivotally with the front ends of said side pieces, a vertically-perforated brace connecting the front ends of the beams, a shank extending through said brace, and rotary supporting means carried by said shank.

3. In a machine of the class described, the combination of a wheel-supported main frame having forwardly - converging sides, beams connected pivotally with said sides, connecting means for the front ends of said beams, a pivoted spacing-brace between said beams, a shank extending vertically through said pivoted brace, rotary supporting means carried by the lower end of said shank, a tongue supported upon the upper end of the latter, and means for attaching draft to the connecting-brace of the beams.

4. In a machine of the class described, a

wheel - supported main frame having forwardly-converging side pieces, beams connected pivotally with said side pieces, a spacing-brace between said beams having a vertical perforation, a shank extending through said perforations, an axle at the lower end of said shank having downwardly-inclined ends forming spindles and downwardly and inwardly converging supporting-wheels upon said spindles.

5. In a machine of the class described, the combination of a wheel-supported main frame having forwardly - converging sides, beams pivotally connected with said sides, a beet-lifting element supported by and between said beams and rotary supporting means for the front part of the machine comprising a pair of downwardly and inwardly converging wheels adapted to exert pressure obliquely upon opposite sides of the row of beet-roots operated upon.

6. In a machine of the class described, a wheel-supported main frame, beams connected pivotally with the sides of said frame near their front ends, a root-lifting element supported by and between said beams, bearings supported upon the frame, a rock-shaft journaled in said bearings, arms extending radially from said rock-shaft, links connecting said arms with the beams, means for operating the rock-shaft to adjust the beams, arms extending upwardly and rearwardly from the beams, and a conveyer - frame having pivotal connection with the front ends of the beams and yieldable connection with the arms extending upwardly and rearwardly from the latter.

7. In a machine of the class described, a wheel-supported main frame, beams connected pivotally with said frame, a root-lifting element supported by and between said beams, rearward-extending supporting-arms mounted adjustably upon the pivotal bolts connecting the main frame and the beams, an ox-bow frame connected with said arms near the rear ends thereof, a supporting-frame connected with intermediate points of said arms, a shaft mounted upon said frame, means for transmitting motion to said shaft from the axle of the machine, shields and chain-guides secured to the ox-bow frame and to the supporting-frame, endless conveyer-chains engaging said guides, sprocket - wheels supporting said chains, and means for transmitting motion to said sprocket-wheels from the shaft journaled upon the supporting-frame and receiving motion from the axle of the machine.

8. In a machine of the class described, the combination of a root-lifting element, beams and standards upon the same, coacting endless conveyer-chains disposed above the root-lifting element, the inner leads of said chains converging rearwardly, supporting means for said chains including supporting-arms provided at their front ends with upwardly-extending perforated straps pivotally connected

with the beams, and rearwardly - extending downwardly-curved top-engaging fingers connected at their front ends with said supporting-arms.

- 5 9. In a machine of the class described, the combination of a wheel-supported main frame, beams pivotally connected with the sides thereof, upwardly and rearwardly extending converging arms secured to said beams and terminating in a vertical sleeve, an ox-bow frame having a bolt loosely engaging said sleeve, a spring coiled upon said bolt between the sleeve and the upper part of the frame, supporting-arms connected with the sides of said ox-bow
10 frame, straps connected with the front ends of said arms and connected pivotally and adjustably with the pivotal connecting-point of the frame and the beams, an auxiliary

frame supported by said arms, shields and chain-guides secured to the inner sides of the 20 ox-bow frame and the auxiliary frame, conveyer-chains, sprocket-wheels supporting the same, means connected with the frames for supporting said sprockets, means for transmitting motion from the source of power of 25 said sprockets, and means near the discharge ends of the conveyer-chains for severing the tops engaged thereby from the roots.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures 30 in the presence of two witnesses.

CHARLES H. SMITH.
FRANK D. GIDDINGS.

Witnesses:

C. C. EMIGH,
H. L. ORR.