No. 773,279. PATENTED OCT. 25, 1904.

F. E. DEWEY.

BEET HARVESTER.

APPLICATION FILED JULY 10, 1903.

NO MODEL. 4 SHEETS—SHEET 1.

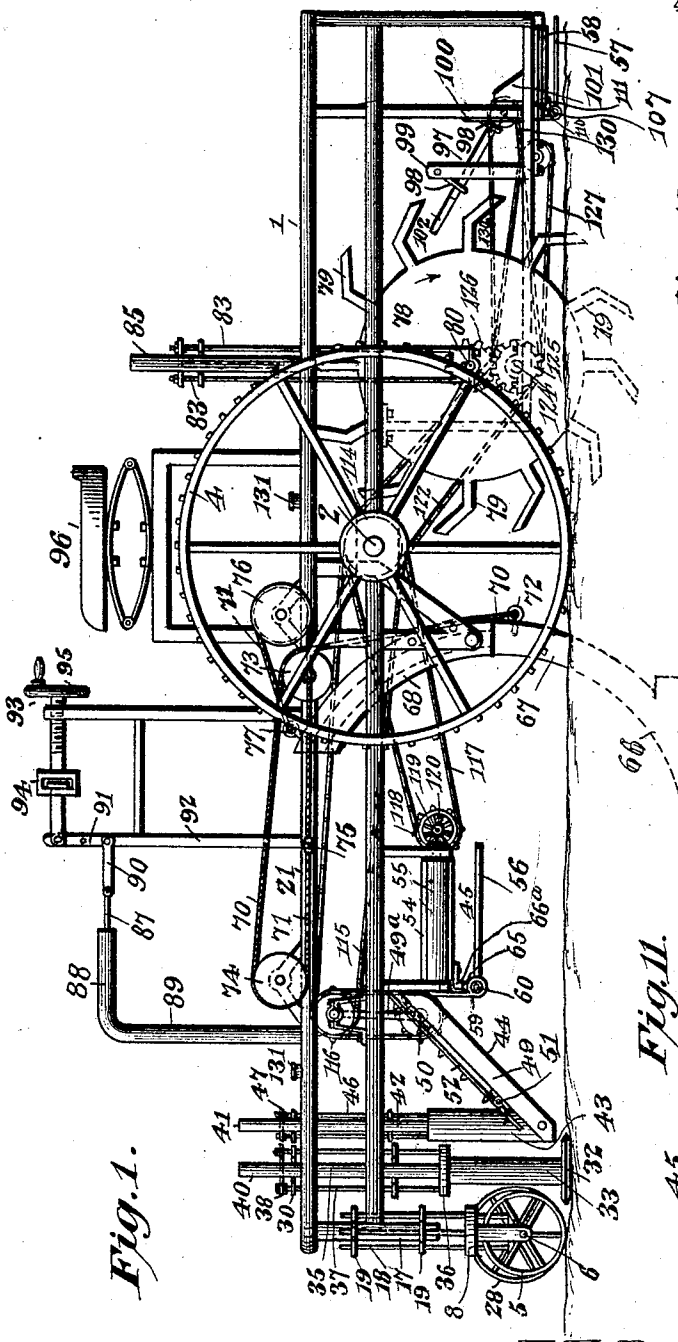


Fig. 1.

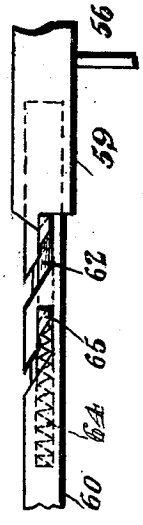


Fig. 13.

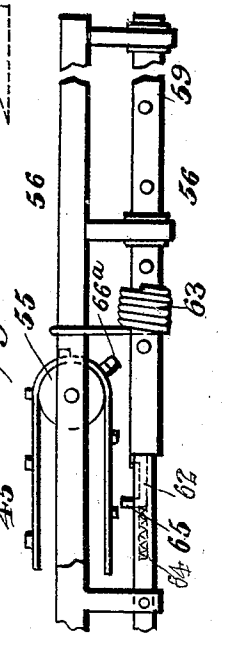


Fig. 11.

Witnesses
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NO MODEL. 4 SHEETS—SHEET 2.

Fig. 14.

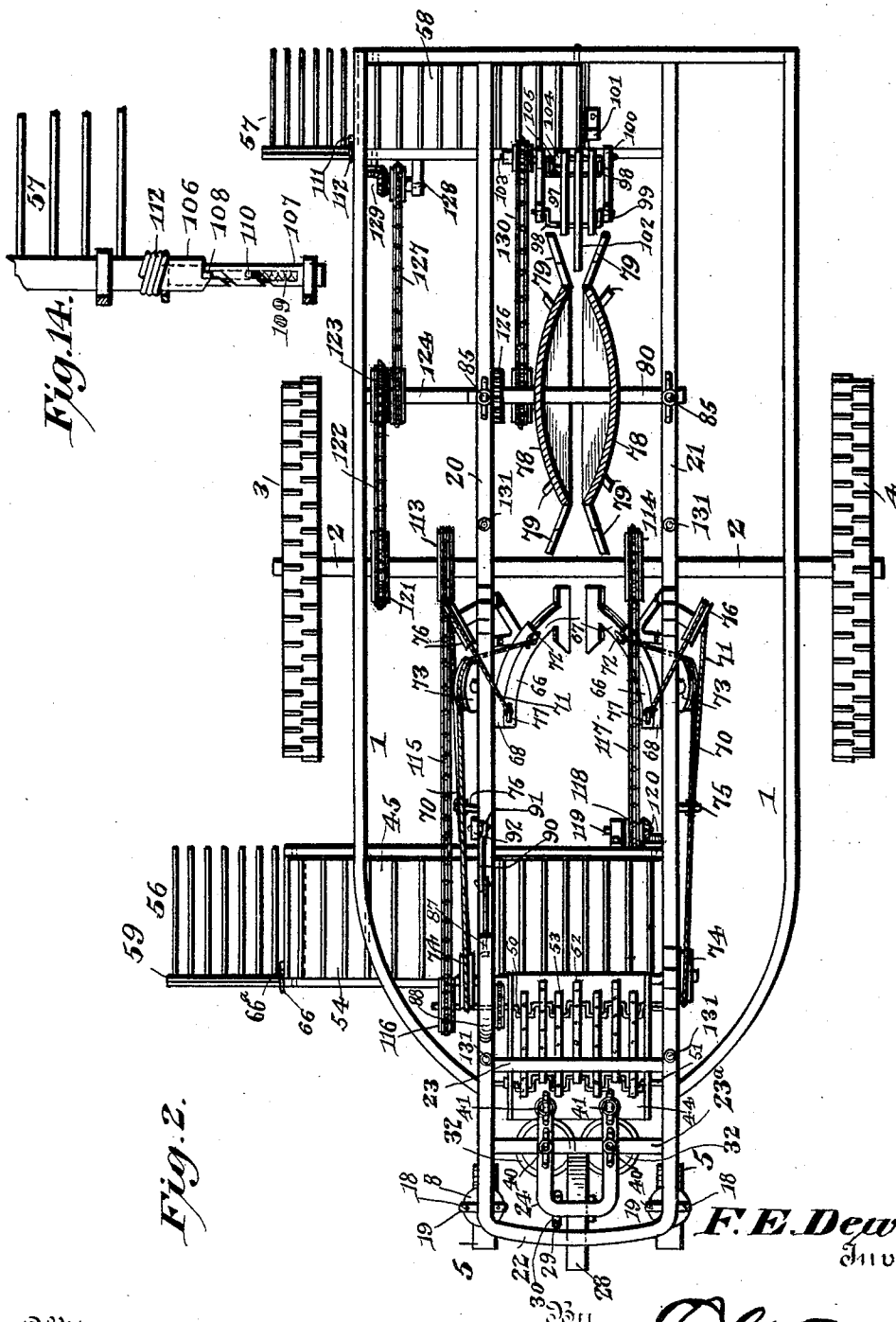


Fig. 2.

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NO MODEL. 4 SHEETS—SHEET 3.

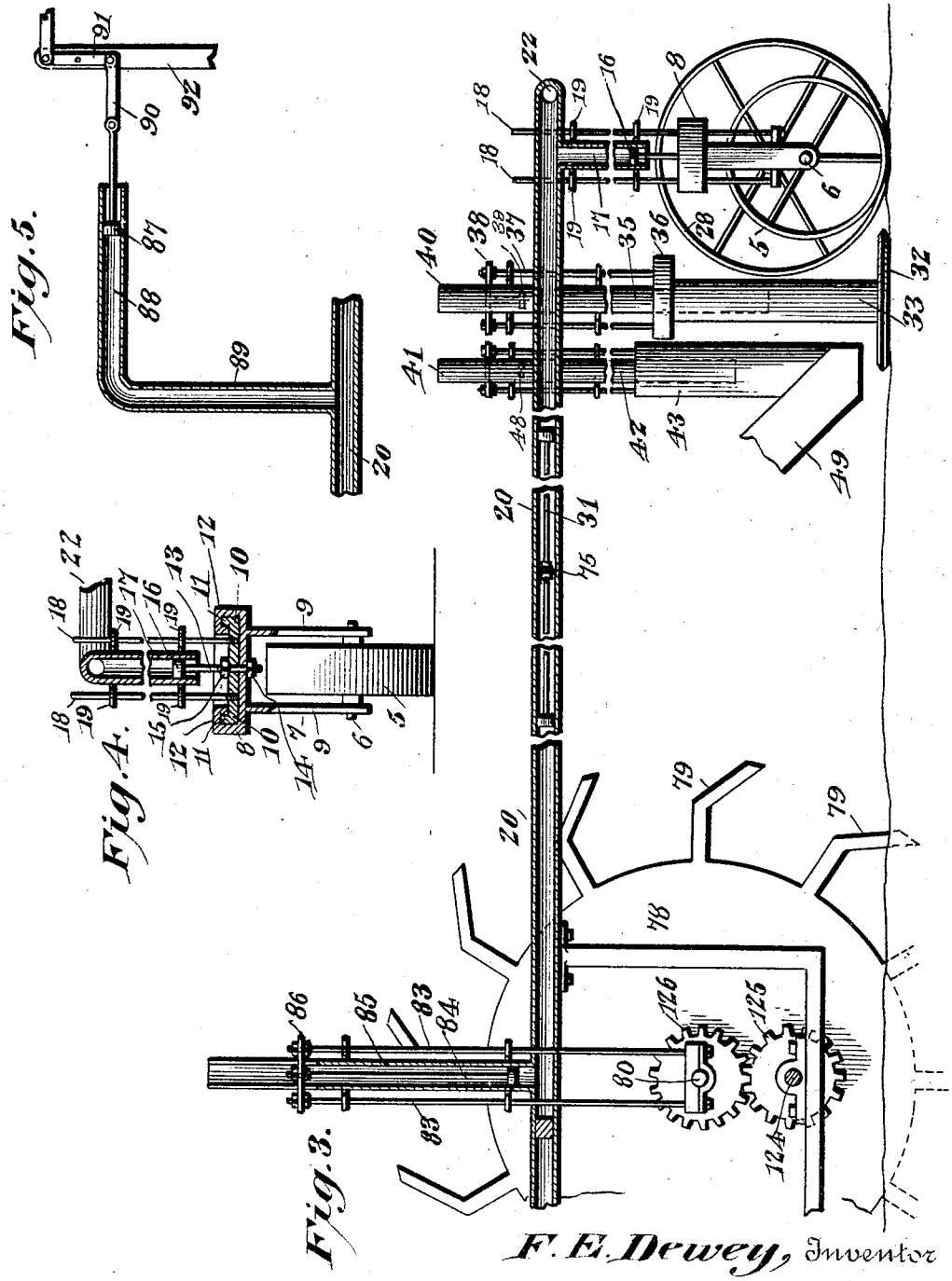


Fig. 5.

Fig. 4.

Fig. 3.

Witnesses
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NO MODEL. 4 SHEETS—SHEET 4.

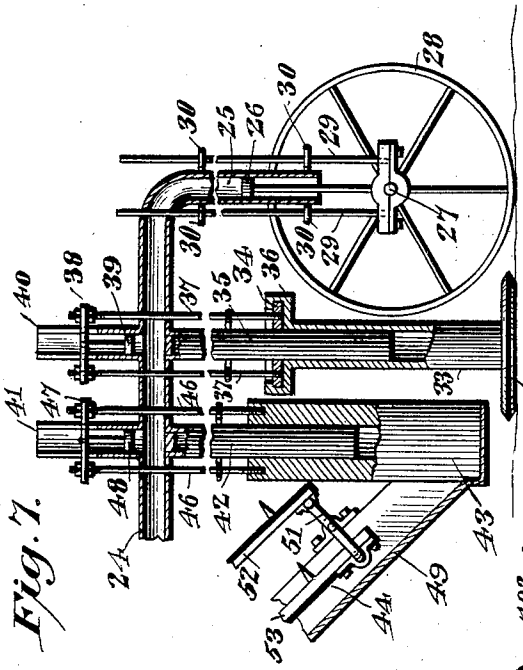


Fig. 7.

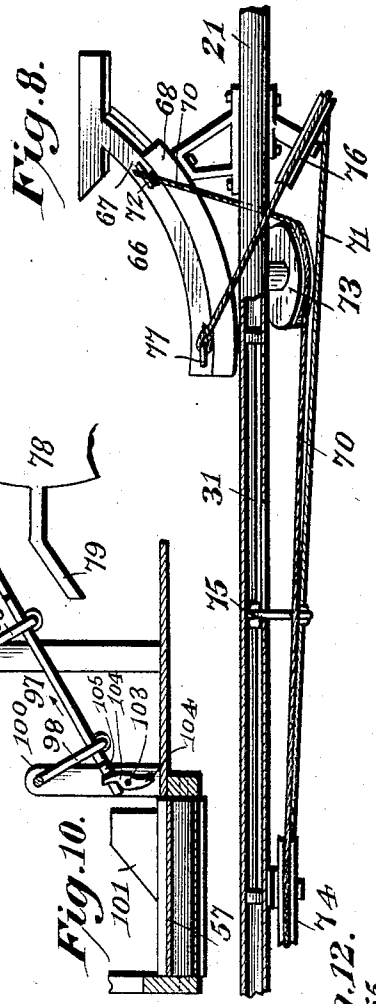


Fig. 8.

Fig. 10.

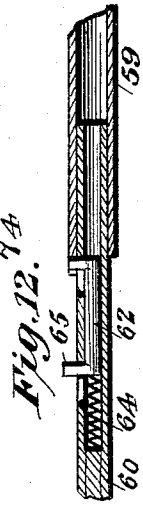


Fig. 12.

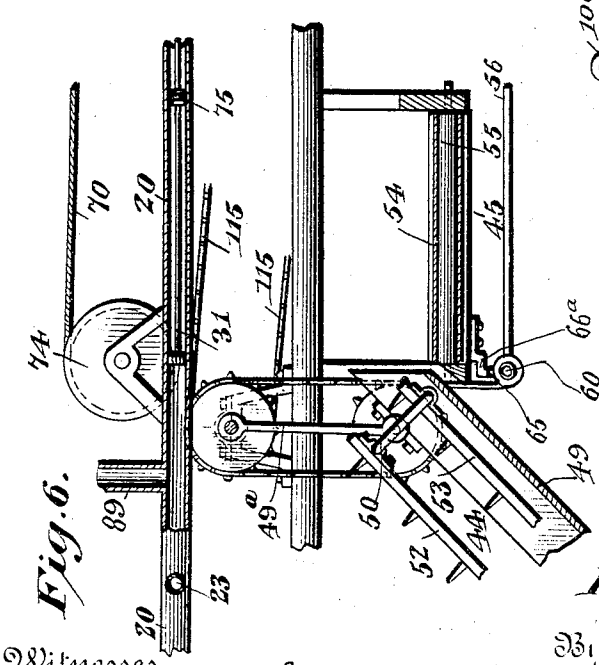


Fig. 6.

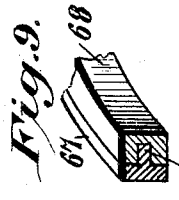


Fig. 9.

Witnesses
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F. E. Dewey, Inventor

By E. G. Siggers

Attorney

No. 773,279. Patented October 25, 1904.

UNITED STATES PATENT OFFICE.

FRANK E. DEWEY, OF FORT COLLINS, COLORADO.

BEET-HARVESTER.

SPECIFICATION forming part of Letters Patent No. 773,279, dated October 25, 1904.

Application filed July 10, 1903. Serial No. 165,014. (No model.)

To all whom it may concern:

Be it known that I, FRANK E. DEWEY, a citizen of the United States, residing at Fort Collins, in the county of Larimer and State of Colorado, have invented a new and useful Beet-Harvester, of which the following is a specification.

The invention relates to improvements in beet-harvesters.

The object of the present invention is to improve the construction of beet-harvesters and to provide a simple and comparatively inexpensive machine of this character capable of topping the beets and adapted to plow beets out of the ground and loosen the soil around the same and capable also of picking up the beets and of cleaning the same.

A further object of the invention is to provide a harvesting-machine designed particularly for operating on sugar-beets and adapted to deposit the tops and beets in separate bunches and at different points whereby the same may be readily gathered and hauled away.

The invention also has for its object to provide means for automatically adjusting the beet-topping device for enabling the machine to operate on large and small beets.

Furthermore, it is the object of the invention to enable the devices which operate on the beets to be readily raised clear of the ground when the machine is not in operation and when it is desired to move the same from one place to another.

With these and other objects in view the invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended, it being understood that various changes in the form, proportion, size, and minor details of construction within the scope of the claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a side elevation of a beet-harvesting machine constructed in accordance with this invention. Fig. 2 is a plan view of the same. Fig. 3 is a longitudinal sectional view of a portion of the machine, illustrating the arrangement of the longitudinally-movable double piston which is connected with the plows. Fig. 4 is a sectional view illustrating the manner of mounting the caster-wheels of the front of the machine. Fig. 5 is a detail view illustrating the arrangement of the manually-operated piston. Fig. 6 is an enlarged detail sectional view of a portion of the machine, illustrating the construction of the upper end of the front elevator. Fig. 7 is a similar view of the front portion of the machine, illustrating the manner of mounting the gage-wheel, the beet-topper, and the front elevator. Fig. 8 is a detail sectional view taken longitudinally of one side of the machine and illustrating the manner of raising and lowering one of the beet-plows. Fig. 9 is a detail sectional view illustrating the manner of guiding the plows. Fig. 10 is a detail sectional view illustrating the manner of transferring the beets from the rotary picker wheel or carrier to the rear transverse conveyer. Fig. 11 is an enlarged detail view illustrating in elevation the construction for tripping the bunchers. Fig. 12 is a sectional view of the same. Fig. 13 is a plan view of a portion of the tripping device. Fig. 14 is a similar view of a portion of the rear buncher and the tripping device thereof.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

1 designates the main frame of the machine provided at opposite sides with suitable bearings for a transverse shaft or axle 2, which has mounted on it carrying-wheels 3 and 4, which support the weight of the rear portion of the machine, the transverse shaft or axle being located in rear of the center of the machine to throw the weight of the same forward upon the wheels at the front of the frame for a purpose hereinafter explained. The wheel 3 at the right-hand side of the machine is fixed to the transverse shaft of the axle and rotates the same when the machine is drawn forward. The other wheel, 4, is arranged on a spindle of the shaft or axle 2 and rotates freely thereon. These wheels 3 and 4 are pro-

vided with broad peripheries to prevent them from sinking into soft soil and are provided with projections or lugs to prevent slipping.

The front of the machine is supported by a pair of oppositely-disposed caster-wheels 5, mounted on suitable axles 6 of a rotary frame 7, consisting of a top bearing portion 8 and depending sides 9, located at opposite sides of the wheel 5 and receiving the ends of the axle thereof, as clearly illustrated in Fig. 4 of the drawings. The top or bearing portion of the frame 7 is pivotally connected with a disk 10, and it forms a casing for the same. The disk 10 is provided with an upwardly-extending annular flange 11, located at its periphery and fitting within an upwardly-extending annular portion 12 of the top of the frame. The upwardly-extending portion 12 forms an annular casing for the periphery of the disk 10. The pivot which connects the disk and the frame preferably consists of the lower end of a valve-stem 13, having threaded portions for the reception of suitable nuts 14 and 15; but any other fastening means may be employed. The upper end of the stem 13 is provided with a piston-head 16, which operates in a depending pipe or tube 17 of the frame of the machine. The disk 10 is held against rotation and is guided in its vertical movement with relation to the frame of the machine by means of guide-rods 18, secured at their lower ends to the disk 10 and passing through guide-eyes 19. The guide-eyes 19, which are located at opposite sides of the depending pipe or tube of the frame, are arranged in pairs, as clearly shown in Fig. 4, and are preferably formed by eye-bolts; but any other suitable means may be employed for guiding the rods. By this construction each caster-wheel is swiveled and the frame 7 is adapted to rotate horizontally on the disk 10, which is held against rotation by the guide-rods.

The depending tubes or pipes 17 extend downward from a pair of longitudinal pipes or tubes 20 and 21, designed to contain compressed air or any other aeriform fluid or liquid fluid under pressure for transmitting motion from operating-pistons to pistons hereinafter described and connected with the devices for operating on the beets for raising and lowering such devices. The front ends of the longitudinal pipes or tubes 20 and 21 are connected by a transverse pipe or tube 22, which is preferably curved, as shown, and a straight transverse connecting pipe or tube 23 is located a short distance in rear of the pipe or tube 22. An approximately U-shaped pipe is connected with a transverse brace 23^a, and it extends forward and rearward therefrom, as clearly shown in Fig. 2 of the drawings. At the front of the approximately U-shaped tube or pipe 24, adjacent to the right-hand side thereof, depends a tube or pipe 25, in which is arranged a piston 26. The piston 26, which is provided at its upper end with a suitable piston-head, has a spindle 27 at its lower end for a gage-wheel 28, adapted to run over a row of beets and to move upward and downward accordingly as the beets are tall or short, the piston being raised by a large beet, as will be readily understood. The lower end of the piston is suitably connected with a pair of guide-rods 29 located in advance and in rear of the depending pipe or tube 26 and passing through suitable guides arranged in pairs and preferably consisting of eyebolts 30. When the piston of the gage-wheel moves upward, the compressed air or other fluid under pressure within the approximately U-shaped pipe or tube 24 is forced rearwardly through the sides thereof and is caused to operate vertically-movable pistons, as hereinafter explained. The guide-rods 29 of the gage-wheel are preferably secured at their lower ends to a bearing mounted on the spindle 27 and adapted to prevent the same from rotating horizontally, whereby the gage-wheel is maintained in proper position longitudinally of the machine.

Located immediately in rear of the gage-wheel, which is larger than the caster-wheels, is a beet-topper consisting of a pair of horizontally-disposed cutting disks or blades 32, beveled at their peripheries to provide cutting edges and adapted to sever the tops from the beets as the machine advances. These rotary cutting-blades are suitably journaled, preferably by means of tubes 33, swiveled at their upper ends to collars 34 of depending guides 35. The guides 35, which preferably consist of tubes, are secured to and depend from the sides of the U-shaped pipe or tube, and the collars 34, which are loose on the guides 35, are adapted to move upward and downward thereon. The pipes or tubes 33, which slide on the guides 35, are also adapted to rotate on the same to permit the rotary cutting disks or blades to rotate; but the disks or blades may be mounted for rotation in any other desired manner. The upper ends of the tubes 33 are provided with casings 36 to receive the loose collars and these casings are annular and coöperate with the loose collars to form swivel connections similar to those of the caster-wheels. The loose collars are connected by guide-rods 37 with cross heads or pieces 38 of pistons 39, operating in upright tubes 40, which extend upward from the U-shaped tube or pipe at points directly above the guides 35. The rods 37 pass through suitable guides which may consist of perforations of the sides of the U-shaped pipe or tube 24, and in praction the connections will be made air-tight to prevent any leakage of the air or other fluid under pressure. The cross-pieces 38, which are secured to the pistons 39 and the upper ends of the rod 37, operate in slots of the upper portions of the pipes or tubes 40, and when the piston of the gage-wheel moves upward the pistons 39 of the pipes or

tubes 40 will also be forced upward, thereby raising the rotary cutting disks or blades. In practice the rotary cutting disks or blades will operate close to the surface of the ground, and the gage-wheel, which runs along the tops of the beets, will occupy a position slightly above the cutting disks or blades.

The rear portions of the sides of the pipe or tube 24 are provided with upwardly-extending pipes or tubes 41 and support depending guides 42, which receive vertically-movable tubes or members 43, and the latter have connected with them a front inclined elevator 44, which is adapted to carry the severed tops of the beets upward to a transverse conveyer 45. The upright tubes or members 43, which slide on the guides 42, are connected by rods 46 with cross heads or pieces 47 or pistons 48, which operate in the pipes or tubes 41. The pipes or tubes 41 are slotted to receive the cross heads or pieces, and the pistons 48 are moved upward in the same manner as the pistons 39 when the piston of the gage-wheel moves upward. By this construction the front inclined elevator maintains the same relative position to the rotary cutting blades or disks at all times. The transverse shaft or axle of the machine is located in rear of the center of the frame, and sufficient weight is thrown on the gage-wheel to insure a proper operation of the topper and the front elevator.

The front inclined elevator is provided with a suitable frame 49, and it consists of upper and lower crank-shafts 50 and 51, provided with crank-bends extending in opposite directions and having transverse portions located at diametrically opposite points and supporting bars or members 52 and 53. These bars or members 52 and 53 are provided with suitable projections or teeth and when the crank-shafts are rotated are moved upward and rearward and are adapted to carry the beet-tops upward. When one set of the inclined bars or members of the front elevator has reached the limit of its upward and rearward movement, the other set commences its upward and rearward movement, and by this operation the beet-tops are rapidly carried upward to the transverse conveyer. The transverse conveyer 45, which may be constructed in any desired manner, preferably consists of a canvas belt 54, arranged on suitable rollers 55 and provided with slats for engaging the beet-tops. The rollers are journaled in suitable bearings of a frame, and the transverse conveyer 45, which is located at the front of the machine, extends laterally from the right-hand side thereof and discharges the beet-tops upon a front buncher 56. The front buncher 56 is offset from the frame of the machine a greater distance than a rear buncher 57 to discharge the beet-tops at points beyond the places where the beets are discharged. The rear buncher 57 is located at the outer end of a rear transverse conveyer 58 and is adapted to discharge or dump the clean beets into bunches or piles, as hereinafter explained.

The front buncher 56 consists of a series of rods or fingers secured to a tube 59 and forming a hinged platform or support to receive the tops of the beets. The tube 59 is arranged on a smaller tube 60, which forms a journal or pintle for the buncher and which is provided with a spring-actuated bolt 62 for normally locking the buncher rigid with the pivot or pintle 60. A coiled spring 63 is disposed on and has one end connected with the tube 59 of the buncher 56, and its other end is connected with the frame of the conveyer or to any other fixed portion of the frame of the machine. The bolt or catch 62, which is actuated by a coiled spring 64, is provided with a projection or lug 65, which is arranged in the path of a trip lug or projection 66^a, carried by the conveyer. The lug or projection 66^a of the conveyer is adapted to retract the bolt or catch against the action of the coiled spring 64, and the front buncher is thereby released and permitted to rotate partially on the journal or pintle formed by the pipe or tube 60. The front buncher when thus released is swung downward automatically by the beet-tops, which are discharged in a bunch or pile, and as soon as the front buncher is relieved of the weight of the beet-tops it is automatically swung upward and returned to its initial position by the coiled spring 63. When the buncher is returned to a horizontal position by the coiled spring 63, it is reengaged by the spring-actuated catch or bolt, which locks the buncher in such position until it is released by the trip projection of the conveyer. One or more trip projections may be provided to cause bunches of the desired size to collect before being discharged by the machine. The lower end of the frame of the front inclined elevator is pivotally connected with the vertically-movable tubes or members 43, and the upper end of this elevator-frame is supported by a swiveled or pivotally-mounted link 49^a, which permits the adjustment of the elevator without affecting the tension of the chain of sprocket-gearing hereinafter described for communicating motion to the elevator.

After the tops have been severed from the beets the latter are loosened and partially removed from the ground by a pair of beet-plows 66, provided with curved shanks or standards 67, arranged in suitable guides 68 and adapted to be raised and lowered manually by the operating mechanism hereinafter described. The plows have their shanks or standards diverged upwardly and forwardly, as shown, whereby the said shanks or standards are adapted to direct or guide the beets inward toward the center, and the plows have their shares or engaging portions set at an an-

gle or inclination to facilitate this result. The guides 68 are preferably grooved to receive a tongue or flange 69, as illustrated in Fig. 9 of the drawings; but the guides may be constructed in any other desired manner, as will be readily understood. Each plow is connected with one of the pair of double longitudinally-movable pistons by wire ropes or cables 70 and 71. The longitudinally-movable pistons, which are provided at each end with a piston-head, are arranged in the tubes 20 and 21, which are connected by a transverse tube 23, whereby the longitudinally-movable pistons will be simultaneously actuated. The wire rope or cable 70 is connected at its lower or rear end with an eye or ring 72 of the shank or standard 67 of the plow, and it extends upward therefrom to a guide-pulley 73, located at a point approximately above the plow and suitably mounted on the adjacent longitudinal tube or pipe of the machine. The wire rope or cable 70 is then extended forwardly to a front guide-pulley 74, and it passes partially around the same and is extended backward to the center of the piston 31. The piston 31 is provided at its center with a suitable ring or eye 75 for the attachment of the wire ropes or cables. The other wire rope or cable, 71, extends rearward from the upper end of the shank or standard of the plow to a rear guide-pulley 76, and it extends partially around the same and passes forward to the said eye or ring 75, to which it is secured. By this arrangement the plow will be moved upward or downward, according to the direction in which the longitudinal piston is reciprocated. The shank or standard 67 is provided at its upper end with an eye or ring 77 to receive the wire rope or cable 71, and the eye or ring 72 is located at the lower portion of the shank or standard of the plow. These eyes or rings 72 and 77 are arranged to clear the guide in which the shank or standard of the plow is mounted in order that the adjustment of the plow may not be restricted by the guide. The guide-pulleys which receive the wire ropes or cables are preferably grooved; but any other suitable means may be employed for retaining the ropes or cables on the pulleys. When the longitudinally-movable pistons are forced backward by the manually-operated means hereinafter described, the plows will be correspondingly raised, as the backward movement of the pistons 31 will pull upon the rope or cable 70, and thereby elevate the plows.

The beets are lifted out of the ground by a rotary carrier or picker-wheel, composed of two similar sides or sections 78, constructed of suitable material and consisting of concavo-convex disks, presenting inner concave faces and provided at their peripheries with divergent resilient beet-engaging fingers 79. These beet-engaging fingers 79 have outer portions arranged at an angle to their inner portions and adapted to permit a beet to be readily engaged by the latter. The rotary picker is mounted on a transverse shaft 80, which may be journaled in suitable bearings of vertically-movable tubes or members. These tubes or members may be arranged to slide on depending tubes or stems, and the ends of the shaft 80 are connected by rods 83 with pistons 84, and the latter operate in vertical tubes or pipes 85, extending upward from the rear portions of the longitudinal side pipes or tubes. The pistons 84 are connected by cross heads or pieces 86 with the upper ends of the rods 83, and these cross heads or pieces operate in suitable slots of the upper portions of the tubes or pipes 85. The pistons 84 are located above the longitudinal pipes or tubes 20 and 21, and they are moved upward when the pistons 31 are forced backward, as before explained. The upwardly-extending pipes or tubes, which receive the pistons of the beet-engaging devices, form barrels or cylinders, and the parts are designed to be constructed of brass or other suitable material and will be provided with suitable packing to prevent any leakage. The longitudinal pistons, which are provided at their front and rear ends with piston-heads, are of sufficient length to provide an intervening dead-air space between the heads to permit the adjacent portions of the longitudinal pipes to be slotted for the eyes or rings 75 without affecting the pressure of the air within the front and rear portions of the pipes or tubes 20 and 21. The pistons which are connected with the beet-engaging devices may be moved upward by hand to raise such devices clear of the ground when it is desired to move the machine from one place to another, and this operation is effected by means of a horizontal piston 87, operating in a horizontal pipe or tube 88, which is connected with the pipe or tube 20 by a vertical portion 89. The horizontal portion 88 extends rearward from the upwardly-extending portion 89, and the horizontal piston is connected by a link 90 with one arm of a lever 91, which is fulcrumed on the frame 92 and which has its other arm connected with an adjusting-screw 93. The adjusting-screw has a swiveled joint or connection 94 and carries a hand-wheel 95, by means of which the screw is rotated. The hand-wheel is located adjacent to a seat 96, which is provided for the accommodation of the driver, and when the piston 87 is moved forwardly or inwardly the compressed air or other medium for operating the other pistons will act upon the latter and will actuate the same to raise the beet-engaging devices. Any other means may be employed for enabling the piston 87 to be operated by hand.

The rotary picker-wheel or carrier moves in the direction of the arrow of Fig. 1 of the drawings, and when the inner portions of the fingers at the front of the rotary picker-wheel or carrier assume a horizontal position the

outer portions will extend upwardly and forwardly at an inclination. The beets are positively gripped and held by the divergent clamping-fingers, and they are carried upward and rearward over the top of the rotary picker-wheel and are delivered upon the rear transverse conveyer 58. The beets are positively removed from between the resilient fingers of the rotary picker-wheel by a reciprocating chute 97, consisting of a series of slats spaced apart and suspended by links 98 from posts 99 and 100. The posts 99 and 100 are mounted upon a suitable support, and the downward or rearward movement of the inclined vibratory chute is limited by a stop 101, which is also adapted to shake the loose soil from the inclined vibratory chute to prevent such soil from interfering with the downward movement of the beets. The central slat or bar of the inclined vibratory chute is provided at its upper end with an extension 102, arranged to extend upwardly between the resilient fingers of the rotary picker-wheel, whereby the beets are positively removed from the same. The inclined chute is actuated by means of a shaft 103, provided with arms 104, arranged to engage a projection 105 of the inclined chute, whereby the same is thrown forward at each half-revolution of the shaft. The jar incident to the arms 104 striking the inclined vibratory chute is adapted to loosen the soil from the beets, and thereby clean the latter, and the beets are positively dislodged from the resilient fingers of the rotary picker-wheel by the extension of the chute, which is arranged in the path of the beets. The beets are delivered in a clean condition to the rear transverse conveyer, and the slats of the inclined chute are spaced apart to permit the loose earth shaken from the beets to drop to the ground.

The beets are carried outward by the rear transverse conveyer to the rear buncher 57, which is constructed in the same manner and which operates in the same way as that heretofore described. The rear buncher consists of a series of fingers or rods spaced apart and extending rearward from a tube 106, which has its inner end arranged on a smaller tube 107, and the latter forms a pivot or pintle for the rear buncher. The rear buncher is locked in a horizontal position to receive the beets from the rear transverse conveyer by a spring-actuated bolt or catch 108, mounted in the tube 107 and arranged to engage the inner end of the tube 106. The catch or bolt, which is engaged by a coiled spring, is provided with a projecting lug arranged in the path of a trip-lug of the rear conveyer, and when the buncher 57 has received the desired number of beets the catch or bolt is withdrawn and the buncher is swung downward under the weight of the beets, which are deposited upon the ground at one side of the machine and at points between the row operated on and the bunches of tops, which are dumped beyond the beets. The buncher 57 is returned to a horizontal position by a coiled spring 112, disposed on the tube 106 and connected with the same and with a stationary portion of the conveyer-frame or other fixed part of the machine.

The transverse shaft or axle 2 is provided at points adjacent to the bars or pipes 20 and 21 with sprocket-wheels 113 and 114, the sprocket-wheel 113 being connected by a forwardly-extending sprocket-chain 115 with a sprocket-wheel 116 of the upper crank-shaft 50 of the front elevator, whereby motion is imparted to the said crank-shaft 50 for operating the elevator, which carries the beet-tops upward to the front transverse conveyer. The other sprocket-wheel, 114, which is located at the left-hand side of the machine, is connected by a sprocket-chain 117 with a front sprocket-wheel 118 of a short shaft 119, and the latter is connected by bevel-gearing 120 with the adjacent roll of the front transverse conveyer for operating the latter.

The transverse shaft or axle 2 also carries a sprocket-wheel 121, located at the right-hand side of the machine and connected by a sprocket-chain 122 with a sprocket-pinion 123 of a rear transverse shaft 124, located below and in the same vertical plane as the shaft 80, upon which the rotary picker-wheel is mounted. The shaft 124 is located at the right-hand side of the machine, and it is provided with a gear 125, having spur-teeth and located beneath and meshing with a corresponding gear 126 of the shaft 80. The shaft 80 is capable of vertical movement, as before explained, and the gear 126 is adapted to be lifted out of mesh with the gear 125, whereby the rotary picker-wheel is thrown out of operation.

The rear transverse shaft 124 is connected near its outer end by sprocket-gearing 127 with a short shaft 128, and the latter is connected by bevel-gearing 129 with the outer roll of the rear transverse conveyer. The vibrating chute and agitator which removes the beets from the rotary picker-wheel and discharges them upon the rear transverse conveyer is operated by sprocket-gearing 130, which connects the shaft 103 with the rear transverse shaft 124.

By the particular arrangement of gearing before described the front elevator and front conveyer, the rotary picker-wheel, the inclined chute and agitator, and the rear transverse conveyer are simultaneously operated. The machine may be drawn or propelled in any desired manner, and it may be supplied with compressed air or other fluid, either liquid or gaseous, in any desired manner, and suitable valves 131 are provided at different points to facilitate the introduction of such fluid in the tubes or pipes of the machine.

The substantially U-shaped pipe or tube 24,

which is independent of and does not communicate with the longitudinal pipes or tubes 20 and 21, contains compressed air or other fluid under pressure for operating the beet-topper and the front inclined conveyer, which are operated automatically by the gage-wheel. The longitudinally-movable double pistons of the pipes or tubes 20 and 21 are manually operated by the means before described and are not affected by the operation of the gage-wheel.

What I claim is—

1. In a machine of the class described, the combination with a topping device, of means embodying a fluid under pressure for automatically adjusting the said device, substantially as described.

2. In a machine of the class described, the combination with digging and elevating devices, of means embodying a fluid under pressure for adjusting the said devices, substantially as described.

3. In a harvesting-machine, the combination with topping, digging and elevating devices, of fluid-pressure mechanism for raising and lowering the said devices, substantially as described.

4. A machine of the class described, embodying topping, digging and elevating devices, fluid-pressure mechanism for manually adjusting the digging and elevating devices, and fluid-pressure mechanism for automatically adjusting the topping device, substantially as described.

5. A machine of the class described, embodying topping and digging devices, mechanism operable automatically for raising and lowering the topping device, and mechanism for manually raising and lowering the digging device, substantially as described.

6. In a machine of the class described, the combination of topping, and elevating devices, and means for automatically adjusting the same as the machine advances, substantially as described.

7. In a machine of the class described, the combination of topping, digging and picking devices, and fluid-pressure mechanism for adjusting the said devices, substantially as described.

8. In a machine of the class described, the combination of topping and elevating devices, and means embodying a fluid under pressure for automatically adjusting the said devices as the machine moves forward, substantially as described.

9. A machine of the class described, embodying topping, digging and picking devices, fluid-pressure mechanism operable automatically for adjusting the topping device, and fluid-pressure mechanism for manually adjusting the said digging and picking devices, substantially as described.

10. In a machine of the class described, the combination of digging and elevating devices, and means comprising pistons connected with the said devices, and a fluid under pressure for actuating the pistons to adjust the said devices, substantially as described.

11. In a machine of the class described, the combination of topping, digging and elevating devices, and fluid mechanism having pistons operated on by the fluid for adjusting the said devices, substantially as described.

12. In a machine of the class described, the combination of digging and elevating devices, and means for adjusting the same comprising a fluid under pressure, pistons connected with the said devices and operated on by the fluid, and an operating-piston for controlling the fluid in its action on the said pistons, substantially as described.

13. In a machine of the class described, the combination of topping and elevating devices, and means for adjusting the same comprising a fluid under pressure, pistons connected with the said devices and operated on by the fluid, and a gage provided with a piston operating on the said fluid, whereby the devices are adjusted automatically as the machine moves forward, substantially as described.

14. In a machine of the class described, the combination of topping and elevating devices, and means for adjusting the same comprising a fluid under pressure, pistons connected with the said devices and operated on by the fluid under pressure, and a gage-wheel arranged to run over a row and provided with a piston operating on the said fluid, whereby the topping and elevating devices are adjusted automatically, substantially as described.

15. In a machine of the class described, the combination of topping and elevating devices, and fluid-pressure mechanism for adjusting the same, comprising pistons connected with the said devices, and a gage-wheel arranged to run over a row and provided with a piston whereby the topping and elevating devices are adjusted automatically, substantially as described.

16. A machine of the class described, embodying a frame, a vertically-movable topper, plows located in rear of the topper and capable of upward and downward movement, a vertically-movable picker located in rear of the plows, a fluid-pressure mechanism comprising vertically and longitudinally movable pistons, the vertically-movable pistons being connected with the picker, flexible connections between the longitudinally-movable piston and the plows, and operating mechanism, and fluid-pressure mechanism having vertically-movable pistons connected with the topper, substantially as described.

17. In a machine of the class described, the combination of a frame, digging and elevating devices, means for adjusting the said devices comprising a fluid under pressure, and pistons connected with the said devices and operated on by the fluid, and a caster-wheel sup-

porting the front of the frame and provided with a piston operated on by the said fluid, substantially as described.

18. In a machine of the class described, the combination with a frame provided with a tube, of a fluid under pressure within the tube, a piston operating in the tube, a frame provided with a wheel and pivotally connected with the frame of the machine by the stem of the piston, and means for controlling the fluid, substantially as described.

19. In a machine of the class described, the combination of a frame having a tube, a piston operating in the tube, a fluid under pressure within the tube, a disk connected with the piston, a rotary frame mounted on the disk, and a wheel carried by the rotary frame, substantially as described.

20. In a machine of the class described, the combination of a frame having a tube, a piston operating in the tube, a disk secured to the piston, a rotary frame connected with the disk and provided with a wheel. and means for guiding the disk and for holding the same against rotation, substantially as described.

21. In a machine of the class described, the combination of a frame having a tube and provided at opposite sides of the same with guides, a piston operating in the tube, a swivel connection secured to the piston, guide-rods connected with one member of the swivel connection and arranged in the said guides, and a wheel connected with the other member of the swivel connection, substantially as described.

22. In a machine of the class described, the combination of a frame having a tube, a piston operating in the tube, a swivel connection composed of two members pivotally connected by the stem of the piston, a guide connected with one of the members and slidable on the frame, and a wheel connected with the other member, substantially as described.

23. In a machine of the class described, the combination of a frame having a tube, a piston operating in the tube, a disk having an annular peripheral flange and secured to the piston, a frame pivoted to the disk by the piston and provided with an annular casing receiving said flange, a wheel supporting the pivoted frame, and guides connected with the disk and slidable on the frame of the machine, substantially as described.

24. In a machine of the class described, the combination of a frame having a vertical tube, a vertically-reciprocating piston operating in the said tube, and a gage-wheel connected directly with the piston and arranged to actuate the same, substantially as described.

25. In a machine of the class described, the combination of a frame having a depending tube, a vertically-movable piston operating in the tube, a gage-wheel arranged to run on a row and connected with the piston for actuating the same, and guiding means connected with the piston and slidable on the frame for holding the piston against rotation to maintain the wheel longitudinally of the machine, substantially as described.

26. In a machine of the class described, the combination of a frame having a tube, a piston operating in the tube, a gage-wheel arranged to run on a row and connected with the piston, rods located at opposite sides of the tube and connected with the piston, and guides carried by the frame and receiving the rods, substantially as described.

27. In a machine of the class described, the combination of a frame having upright tubes, pistons arranged in the tubes, a pair of rotary cutting-blades connected with the pistons and arranged to sever the tops of beets, a fluid under pressure operating on the pistons, and means for controlling the fluid, substantially as described.

28. In a machine of the class described, the combination of a frame having upright tubes, a fluid under pressure in the said tubes, pistons operated on by the fluid, guides carried by the frame, cutting-blades provided with members slidable on the guides and connected with the pistons, and means for controlling the fluid, substantially as described.

29. In a machine of the class described, the combination of a frame having tubes, a fluid under pressure in the tubes, pistons operated on by the fluid, cutting-blades slidably connected with the frame and actuated by the pistons, and means for controlling the fluid, substantially as described.

30. In a machine of the class described, the combination of a frame having tubes and provided with guides, a fluid under pressure in the tubes, pistons operating in the tubes and acted on by the fluid, cutting-blades provided with tubular members slidable on the guides, and means for connecting the tubular members with the pistons, substantially as described.

31. In a machine of the class described, the combination of a frame having upwardly-extending tubes and provided with depending guides, tubular members slidable on the guides, cutting-blades carried by the tubular members, pistons operating in the tubes, and rods connecting the pistons with the tubular members, substantially as described.

32. In a machine of the class described, the combination of a frame having a guide, a slidable member loosely mounted on the guide, a tubular member swiveled to the slidable member and arranged to rotate on the guide, a cutting-blade carried by the tubular member, and means for raising and lowering the slidable member, substantially as described.

33. In a machine of the class described, the combination of a frame having a depending guide, a collar loosely mounted on the guide, a cutting-blade having a tubular member con-

nected with the collar and arranged to rotate on the guide, and means for adjusting the collar, substantially as described.

34. In a machine of the class described, the combination of a frame having a depending guide and provided with an upwardly-extending tube, a piston operating in the tube, a cutting-blade slidable on the guide and capable of rotation, and means for connecting the blade with the piston, substantially as described.

35. In a machine of the class described, the combination of a frame having a depending guide and provided with an upwardly-extending tube, a piston operating in the tube, a tubular member slidable on the guide and capable of rotation, a cutting-blade carried by the tubular member, a collar loosely mounted on the guide and connected with the tubular member, and a rod slidable on the frame and connected with the collar and with the piston, substantially as described.

36. In a machine of the class described, the combination of a frame having depending guides and upwardly-extending tubes, pistons operating in the tubes, rotary blades provided with members slidable on the guides, means for connecting the pistons with the said members, a fluid under pressure operating on the said pistons, and a gage having a piston operating on the said fluid, substantially as described.

37. In a machine of the class described, the combination of a frame having an upright guide and provided above the same with a tube, a member slidable on the guide, a piston operating in the tube, means for connecting the piston with the slidable member, and means for operating the piston, substantially as described.

38. In a machine of the class described, the combination with a frame having an upright tube and provided below the same with a guide, a piston operating in the tube, a member slidable on the guide, a rod slidable on the frame and connected with the piston and with the said member, and means for operating the piston, substantially as described.

39. In a machine of the class described, the combination of a frame provided with tubes, upright pistons operating in the tubes, round stems located beneath the pistons, rotary tubular members slidable on the stems and provided with cutting-blades, rods connected with the pistons and with the said members and slidable on the frame, and a gage-wheel having a piston for operating the said piston, substantially as described.

40. In a machine of the class described, the combination with a frame, of a conveyer, a beet-topper, an elevator extending to the conveyer and located immediately in rear of the beet-topper, a piston connected with the elevator, and means for operating the piston, substantially as described.

41. In a machine of the class described, the combination with a frame, of a beet-topper, an elevator located in rear of the beet-topper, a member slidably connected with the frame and carrying the elevator, and means for automatically adjusting the elevator, substantially as described.

42. In a machine of the class described, the combination of a frame having a tube and provided with a guide, an elevator having a member slidable on the guide, a piston operating in the tube and connected with said member, and means for actuating the piston, substantially as described.

43. In a machine of the class described, the combination of a frame provided with tubes and having guides located beneath the tubes, an elevator provided with members slidable on the guides, pistons operating in the tubes, rods connecting the members and the pistons, a beet-topper located in advance of the elevator, and means for operating the piston, substantially as described.

44. In a machine of the class described, the combination of a frame, a beet-topper, a transverse conveyer, means for carrying the beet-tops to the conveyer, a buncher arranged at the outer end of the conveyer, and means for automatically operating the buncher to deposit the beet-tops at intervals, substantially as described.

45. In a machine of the class described, the combination of a frame, an endless conveyer, a movable buncher, means for normally locking the buncher against movement, and a trip carried by the conveyer for releasing the buncher at intervals, substantially as described.

46. In a machine of the class described, the combination of a frame, a conveyer, a movable buncher arranged at the outer end of the conveyer, a locking device for holding the buncher normally stationary, and means for automatically tripping the locking device, substantially as described.

47. In a machine of the class described, the combination of a frame, a conveyer, a movable buncher, a locking device for holding the buncher normally stationary, means for automatically tripping the locking device to permit the buncher to drop under the weight of a load, and means for automatically returning the buncher to its initial position, substantially as described.

48. In a machine of the class described, the combination of a frame, a conveyer, a hinged buncher, a locking device for holding the buncher normally stationary, means for tripping the locking device to permit the buncher to drop under the weight of a load, and a spring for returning the buncher to its initial position, substantially as described.

49. In a machine of the class described, the combination of a frame, an endless conveyer, a hinged buncher, a locking device for holding the buncher normally stationary, and a

trip carried by the endless conveyer and arranged to engage the locking device to permit the buncher to drop under the weight of a load, substantially as described.

50. In a machine of the class described, the combination of a frame, an endless conveyer, a hinged buncher, a spring-actuated bolt normally locking the buncher stationary and provided with a projecting portion, a lug carried by the endless conveyer and arranged to engage the projecting portion of the bolt to trip the buncher, and a spring for returning the buncher to its initial position, substantially as described.

51. In a machine of the class described, the combination of a frame, a transverse conveyer, a buncher located at the outer end of the conveyer and hingedly mounted, a spring-actuated locking device for holding the buncher normally stationary, a trip carried by the conveyer for releasing the buncher to permit the same to drop under the weight of a load, and a spring for returning the buncher to its initial position, substantially as described.

52. In a machine of the class described, the combination of a frame provided with guides, beet-plows having standards arranged in the guides, pistons movable on the frame, flexible connections between the beet-plows and the pistons, and means for operating the pistons, substantially as described.

53. In a machine of the class described, the combination of a frame having a guide, a beet-plow mounted in the guide and capable of upward and downward movement, a piston, flexible connections extending from the piston and connected with the plow and arranged to move the same in either direction, and means for operating the piston, substantially as described.

54. In a machine of the class described, the combination of a frame, a beet-plow capable of upward and downward movement, and fluid-operated pistons movable in opposite directions for raising and lowering the plow, substantially as described.

55. In a machine of the class described, the combination of a frame, a beet-plow capable of upward and downward movement, and means embodying a fluid under pressure for adjusting the plow, substantially as described.

56. In a machine of the class described, the combination of a frame having a tube, a piston operating in the tube, guide-pulleys, a plow capable of upward and downward movement, flexible connections arranged on the guide-pulleys and extending from the piston to the plow, and means for operating the piston, substantially as described.

57. In a machine of the class described, the combination of a frame having a longitudinal tube, a piston operating in the tube, a fluid under pressure in the tube for acting on the piston, a beet-plow capable of upward and downward movement, guide-pulleys, and flexible connections arranged on the guide-pulleys and attached to the piston and extending forwardly and rearwardly therefrom and connected with the plow, and means for controlling the fluid, substantially as described.

58. In a machine of the class described, the combination of a frame provided with longitudinal and upright tubes, an elevator, plows, a rotary picker located in rear of the plows, pistons arranged in the upright tubes and connected with the elevator and the rotary picker, longitudinal pistons located within the longitudinal tubes and connected with the plows, a fluid under pressure within the tubes for actuating the pistons, and means for controlling the fluid, substantially as described.

59. In a machine of the class described, the combination of a frame having longitudinal and upright tubes, an elevator, a beet-topper located in advance of the elevator, vertically-movable pistons operating in the upright tubes and connected with the beet-topper and with the elevator, and a gage-wheel having a piston operating in one of the upright tubes for automatically raising and lowering the beet-topper and elevator, substantially as described.

60. In a machine of the class described, the combination of a frame having a tube, a fluid under pressure within the tube, a piston operating in the tube, a screw, a lever connected with the piston and the screw, means for operating the screw by hand, and devices carried by the frame and operated by the fluid under pressure, substantially as described.

61. In a machine of the class described, the combination of a rotary picker having engaging picking-fingers, an inclined chute mounted for reciprocation and having its upper end arranged in the path of the contents of the rotary picker, and means for engaging and releasing the inclined chute, whereby the same is reciprocated, substantially as described.

62. In a machine of the class described, the combination of a rotary picker provided with picking-fingers, an inclined chute extending downwardly from the picker and having its upper end extended and arranged to project into the space between the picking-fingers, and a shaft located at the lower end of the chute and provided with arms arranged to engage and release the chute, whereby the same is reciprocated, substantially as described.

63. In a machine of the class described, the combination of a rotary picker provided with means for engaging the beets, and a longitudinally-reciprocating device arranged in the path of the beets to dislodge the same from the rotary picker, substantially as described.

64. In a machine of the class described, the combination of a rotary picker provided with beet-engaging fingers arranged in pairs, and a longitudinally-reciprocating device located in the path of the beets and adapted to pass

through the spaces between the fingers, whereby the beets are dislodged from the rotary picker, substantially as described.

65. In a machine of the class described, the combination of a picker provided with fingers arranged in pairs, and a vibratory chute having an extension operating in the space between the fingers and adapted to dislodge the beets, substantially as described.

66. In a machine of the class described, the combination of a picker provided with beet-engaging devices arranged in pairs, and an inclined vibratory chute arranged in the path of the beets whereby the same are dislodged from the picker and the loose earth shaken therefrom, substantially as described.

67. In a machine of the class described, the combination of a picker having beet-engaging devices arranged in pairs, and an inclined chute having an extension arranged in the path of the beets, said chute being composed of bars arranged at intervals, and means for vibrating the chute, substantially as described.

68. In a machine of the class described, the combination of a frame, a beet-picker, an inclined vibratory chute arranged to receive the beets, a stop located at the lower end of the chute, and means for actuating the chute, substantially as described.

69. In a machine of the class described, the combination of an inclined chute, a stop located at the lower end of the chute, and a shaft provided with arms for engaging the chute to move the same upward, substantially as described.

70. In a machine of the class described, the combination of a rotary picker, an inclined chute arranged in the path of the beets, means for vibrating the chute, a transverse conveyer extending from the lower end of the chute, and a buncher located at the outer end of the conveyer and operated by the same, substantially as described.

71. In a machine of the class described, the combination of a frame, front and rear transverse conveyers projecting different distances from the frame, bunchers located at the outer ends of the conveyers, a beet-topper located in advance of the front conveyer, means for conveying the beet-tops to the front conveyer, and means for digging the beets and carrying the same to the rear conveyer, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

FRANK E. DEWEY.

Witnesses:

FRED W. STOW,

EDWARD J. LONSIGNY.