No. 824,211. PATENTED JUNE 26, 1906.

N. B. & W. A. SEBRING.

BEET HARVESTER.

APPLICATION FILED DEC. 15, 1905.

2 SHEETS—SHEET 1.

Fig. 1

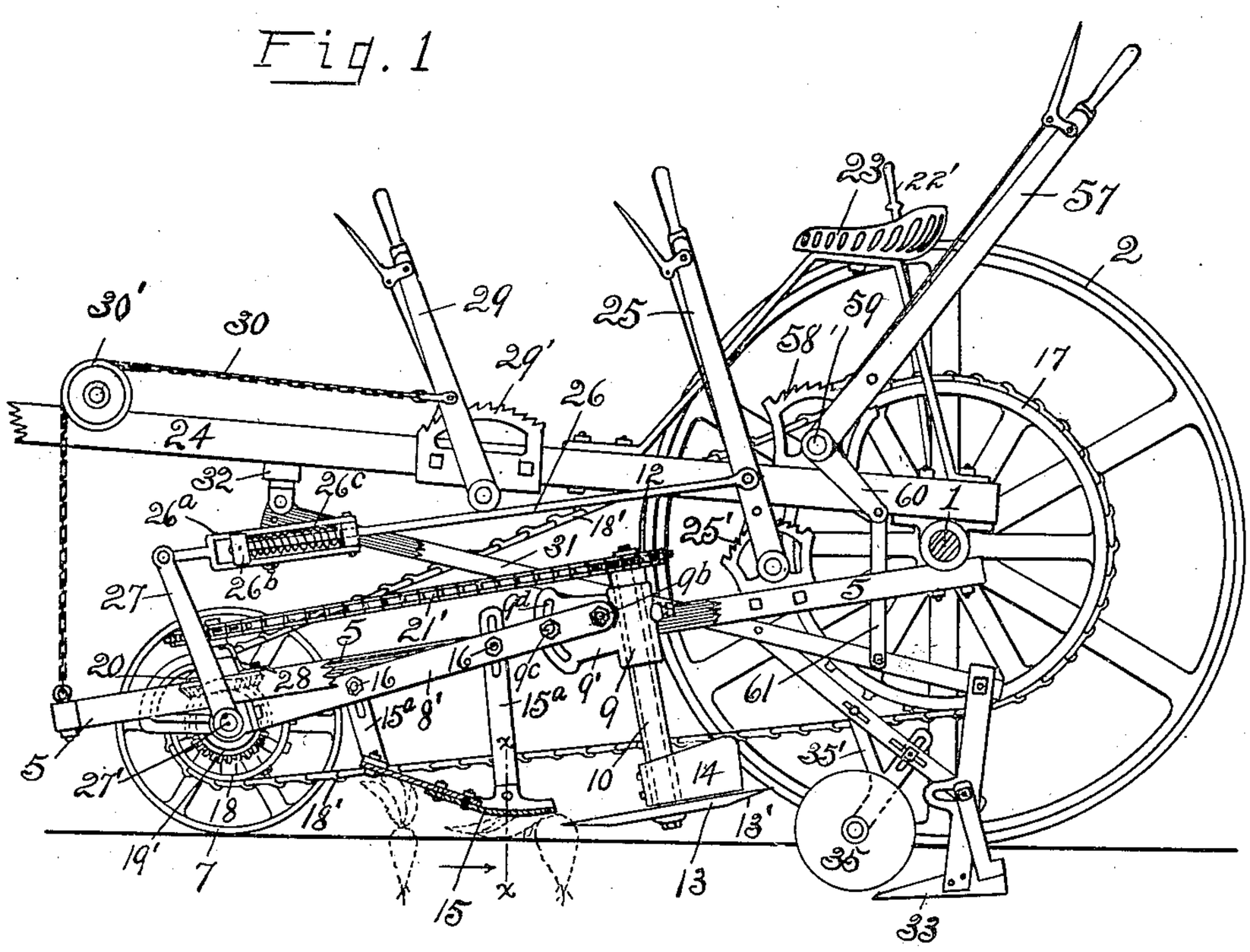
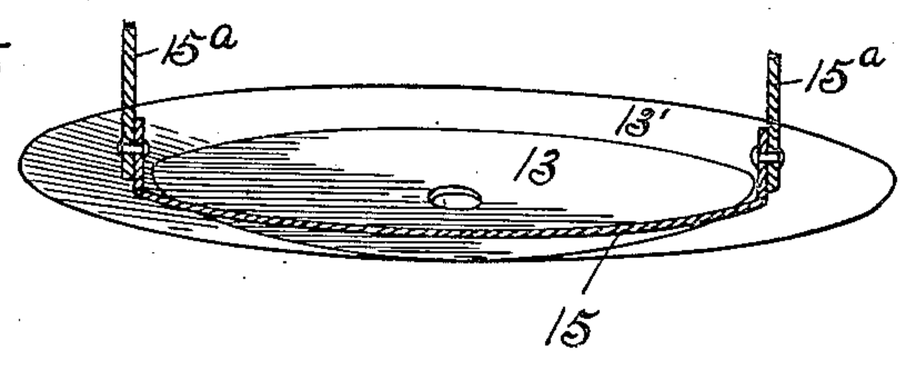



Fig. 5

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2 SHEETS—SHEET 2.

Fig. 2.

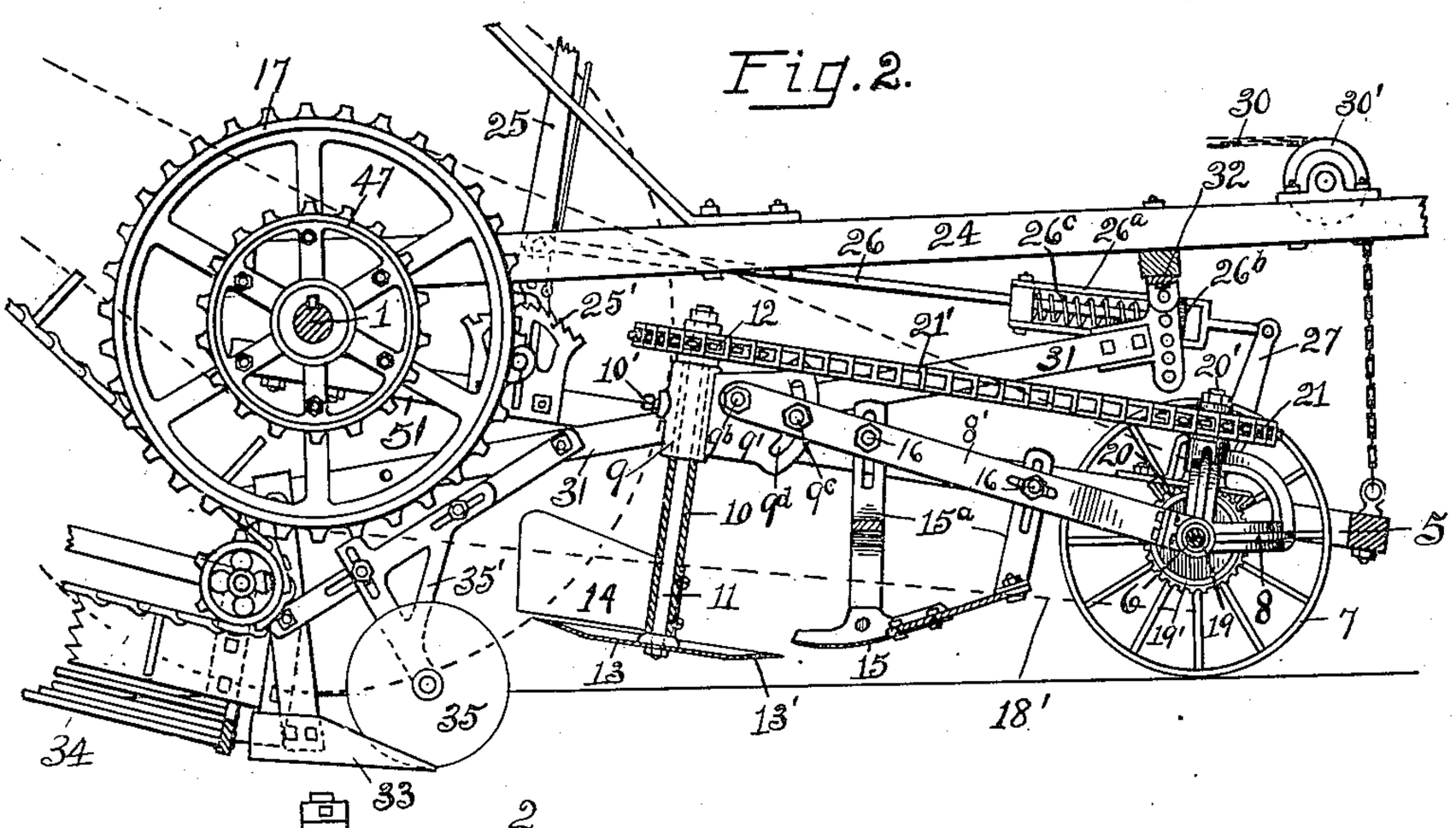



Fig. 3.

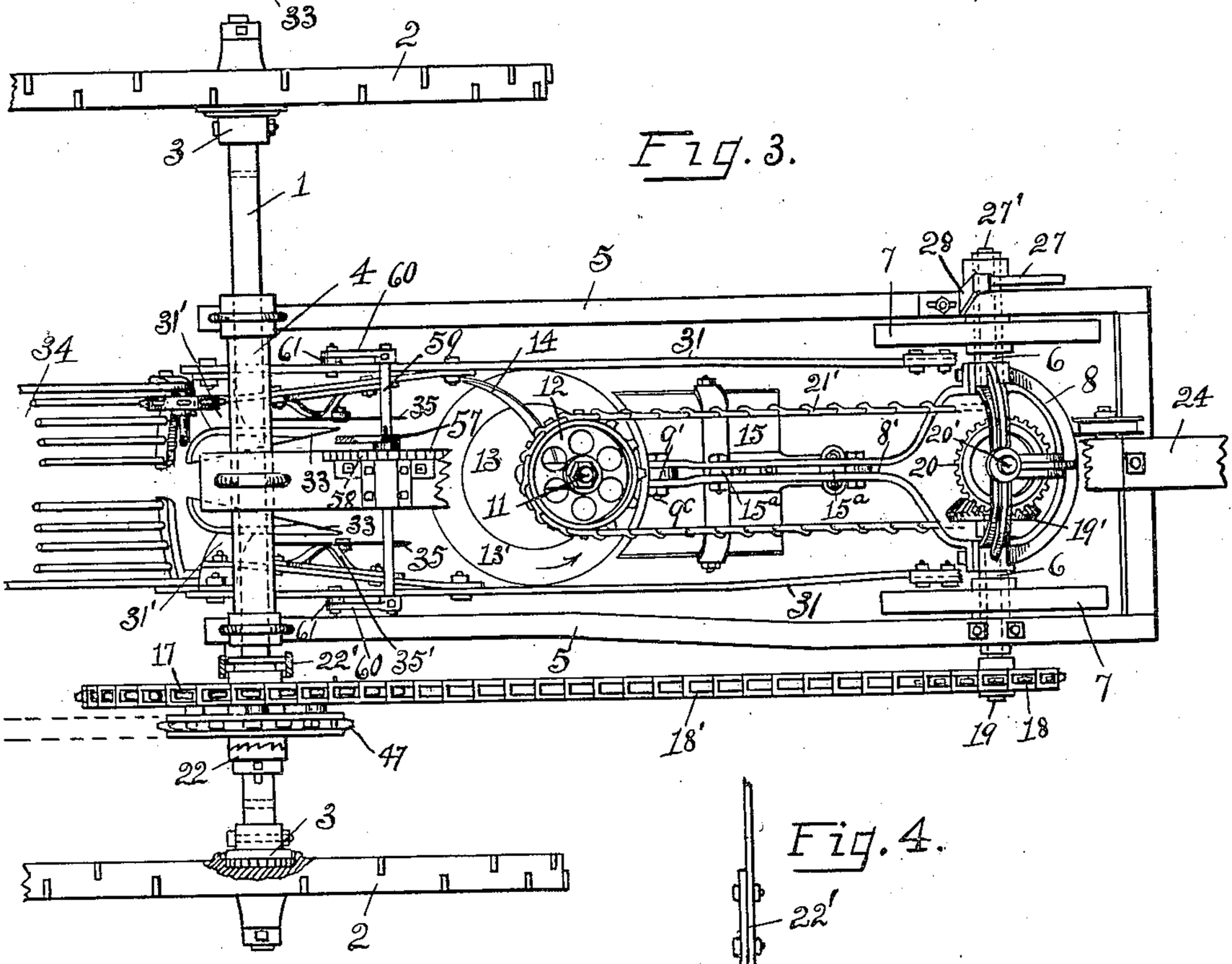
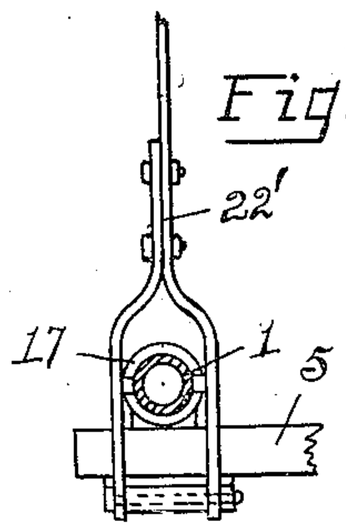



Fig. 4.

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# UNITED STATES PATENT OFFICE.

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## BEET-HARVESTER.

No. 824,211. Specification of Letters Patent. Patented June 26, 1906.

Application filed December 15, 1905. Serial No. 291,862.

*To all whom it may concern:*

Be it known that we, NORMAN B. SEBRING and WALTER A. SEBRING, citizens of the United States, and residents of Blissfield, in the county of Lenawee and State of Michigan, have invented certain new and useful Improvements in Beet-Harvesters; and we 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

Our invention relates to improvements in beet-harvesters, the same being more especially adapted for service in harvesting sugar-beets, although the machine or parts thereof may be used for other purposes.

An object of this invention is the provision of improved and simplified means for removing the tops of beets while they are still in the ground, which means is adapted to automatically adjust itself to slice the tops uniformly from the successive beets irrespective of the size of such beets or the differential projecting of the tops thereof above the ground.

A further object of the invention is the provision, in combination with the topping mechanism, of means whereby such mechanism may be elevated to inoperative position or its downward pressure yieldingly increased at the will of the operator.

Among other objects of the invention are the provision of an improved form of cutting-disk for use in conjunction with this class of machines.

To this end the invention consists of certain novel features of construction, combination, and arrangement of the parts of the machine, as is hereinafter fully described and finally claimed.

In the accompanying drawings, forming part of this specification, Figure 1 is a side elevation of the machine embodying our invention with portions thereof shown in section and portions broken away. Fig. 2 is a vertical longitudinal section of the machine with the drive-wheels removed and portions of the operative parts in section and showing a portion of an associated conveyer. Fig. 3 is a plan view thereof with the conveyer and tongue partly broken away and the driver's seat and operating-levers and connections removed. Fig. 4 is a partial side elevation of the shipper means controlling the clutch on the drive-shaft. Fig. 5 is a vertical cross-section of the gage-shoe, taken on the line $x\,x$ in Fig. 1 and illustrating the curvature of its surface relative to the curved forward edge of the cutting-disk.

Referring to the drawings, 1 represents the main drive shaft or axle, which is supported and driven by the drive-wheels 2 2, mounted on the ends thereof. The shaft 1 is caused to rotate with the wheels 2 2 in one direction of their movement by the provision of ratchet-and-pawl connection between the hubs of the wheels and the members 3 3, which are fixed to the shaft adjacent its ends, as is customary in harvesting-machines. Secured to and extending forwardly from the shaft or axle 1, with its rear end preferably attached to a sleeve 4, within which the shaft turns, is a rectangularly-shaped frame 5, which carries the two transversely-disposed axially-alining stub-shafts 6 adjacent its forward end and is supported by the two wheels 7 7, mounted on the shafts, as shown in Fig. 3. The inner ends of the stub-shafts 6 are suitably spaced and connected by a yoke or member 8, which has its ends in pivotal engagement with said shafts to permit an independent rotary movement thereof. Extending rearwardly from the ends of the yoke 8 are the converging arms of a trailer-frame 8′, which carries at its rear end a bracket 9. This bracket carries a vertically-disposed sleeve 10, in which is mounted a shaft or spindle 11, carrying at its upper end a sprocket-wheel 12 and at its lower end a rotary cutting-disk 13. The flange or arm 9′ of the bracket 9 is pivoted to the end of the frame 8′, as at $9^b$, and the bracket is made pivotally adjustable relative to the frame 8′ by reason of a bolt $9^c$, passing through said frame and a concentric slot $9^d$ in the flange, thus enabling the cutting-disk 13 to be tilted or adjusted to a proper angle relative to the ground. The cutting-disk is also made vertically adjustable by reason of the sleeve 10 being adjustably secured within the head or bracket 9 by a set-screw 10′.

The cutting-disk 13 is preferably of the concaved type; but instead of forming the same with a uniformly concaved surface the rim or edge thereof for a portion of its radial depth is annularly flattened and disposed at

an oblique angle to its axis, as shown at 13′ in Fig. 2. It is important to the proper operation of a machine of this class that the topping-disk have its axis disposed at an oblique angle to a horizontal plane, whereby the rear or elevated edge of the disk is enabled to escape contact with the top of the beet last cut as the forward edge of the disk drops in advance of said beet in position to top the succeeding beet, which may not protrude as high above the ground as the preceding beet. The forming of the disk-rim as at 13′ is for the purpose of disposing the same substantially on a plane with the line of draft thereof. A curved stripper plate or wing 14 is fixed to the sleeve 10 immediately above the cutting-disk in position to deflect the beet-tops from the surface of the disk as it revolves. The cutting-disk 13 is caused to automatically adjust its elevation relative to the ground so as to take a proper and uniform cut from each successive beet irrespective of their differential heights or sizes by reason of the provision of a gage-shoe 15, which is suspended by arms 15ª from the frame 8′ immediately in advance of the cutting-disk and in position to ride on the beet-tops of the row over which the machine is traveling. This shoe has its under surface curved gradually upward and forward, so as not to effect a too-abrupt raising of the disk-frame as the shoe comes in contact with and passes over a beet, and has its rear edge curved to substantially conform to a peripheral arc of the cutting-disk and disposed adjacent thereto, so that the cutting or topping of a beet is substantially effected before the shoe drops from the top thereof, as illustrated in Fig. 1. The shoe 15 is also transversely curved to cause its rear edge to conform to the curve described by the forward edge of the disk 13, due to the inclination of such disk from a horizontal plane, so that all points on the rear edge of the shoe will be equidistantly elevated above corresponding points on the forward edge of the disk, as shown in Fig. 5, thus causing the disk to take the same cut of a beet passing under one side of the shoe as of one passing directly under its center, which would not be the case were the shoe flat in cross-area. The arms 15ª, by which the shoe is suspended, are secured by bolts 16 or other suitable means to the frame 8′ and are made adjustable relative thereto due to said bolts passing through suitable slots, as shown in Fig. 2, thus adapting the shoe to have an adjustment both horizontally and vertically of the cutting-disk, whereby to gage the depth of cut of the disk.

The method shown for driving the cutting-disk consists in mounting a sprocket-wheel 17 on the shaft 1 to one side of the frame 5 and communicating power from it to the sprocket-wheel 18 through the medium of the chain 18′, said sprocket-wheel 18 being carried on the outer end of the shaft 19. This shaft extends through the stub-shaft 6 at the right of the machine, said stub-shaft being made in the form of a sleeve for that purpose, and has its inner end projecting within the yoke 8 and equipped with a bevel-gear 19′, which gear meshes with a companion bevel-gear 20, carried within the yoke by the vertically-disposed shaft 20′. The shaft 20′ has a suitable bearing in the yoke 8 and carries a sprocket-wheel 21 on its outer or upper end, which wheel communicates motion to the sprocket-wheel 12 through the medium of the chain 21′. The rotation of the driving sprocket-wheel 17 is controlled by a suitable clutch mechanism, of which the collar 22 represents the fixed member and is secured to the shaft 1 and the hub of the sprocket-wheel 17 represents the movable member, said sprocket-wheel being shiftable by a manipulation of the shipper-lever 22′, which has its handle disposed adjacent the driver's seat 23. This seat is supported by the tongue 24 of the machine, which tongue has its rear end centrally attached to the sleeve 4 on the shaft 1.

25 represents what may be termed a "pressure" or "tension" lever, which has connection with the cutting-disk frame and is adapted when moved in one direction to elevate said frame to avoid contact of the disk with rocks or other injurious obstructions in its path of movement and when moved in the other direction to impart a yielding downward pressure to the frame, whereby to maintain the shoe 15 in contact with each beet as it passes thereover and prevent a jumping of the frame, due to its passing over the irregular surface formed by the unevenness of the beet-tops. It is also sometimes important that the operator exert an increased or extraordinary downward pressure on the cutting-disk frame in order to cause the disk to take the proper cut of a beet the top of which is below the surface of the ground. The lever 25 is provided with the customary hand-latch, which has engagement with a toothed quadrant 25′, and has connection with the yoke 8, to which the frame 8′ is fixed through the medium of the rod 26, crank-arm 27, and rock-shaft 27′, which latter extends through a central bore in the left stub-shaft 6 and has its inner end fixedly secured to one side of the yoke 8. The rod 26, which connects the crank-arm and lever, is made in two sections, one of which has its inner end forked, as shown at 26ª, to form guides for the cross-head 26ᵇ, carried at the inner end of the other rod-section, and these sections are retained in yielding contracted relation by the insertion of a coiled compression-spring 26ᶜ between the inner face of the cross-head and the end of the yoke, substantially as shown in Figs. 1 and 2. A finger 28 is positioned on

the frame 5 in position to coact with the crank-arm 27 and limit its rearward movement. It will thus be noted that a forward movement of the lever 25 will effect a desired elevation of the frame 8′ and its attached parts and that a rearward movement of the lever will apply a yielding downward pressure to said frame and its attached parts, due to the action of the spring 26ᶜ. Pivoted to the tongue 24 adjacent the seat 23 is a lever 29, the hand-operated catch of which engages a quadrant 29′. This lever has connection with the forward end of the frame 5, carrying the topping mechanism, through a chain or cable 30, which passes over a sheave 30′, carried by the tongue 24 in advance of the lever, so as to effect a raising of such frame and its attached parts when the lever is thrown back. This raising of the forward end of the frame 5 is to facilitate a turning of the machine and also to retain the frame in elevated posit on when the topping mechanism is not being operated.

31 31 represent companion hooked-shaped trailer-frames, which are adjustably pivoted at their forward ends to the opposite ends of a cross-bar 32, which is secured to the tongue 24 in advance of the seat 23, and are provided at their rear ends with the rearwardly-inclined subsoil-lifter points 33, which points are suitably shaped and spaced to adapt them to force the cut beets out of the ground and deliver them to a conveyer or elevating trough 34 disposed at the rear of the machine. A wheel-colter 35 is carried on an arm 35′ in advance of each lifter-point for severing the furrow-slice from the land on each side of the row of beets being operated on, whereby to facilitate and render easier the lifting of the beets and soil included in the slice. Each arm 35′ is adjustably attached to its associated frame 31, as illustrated in Figs. 1, 2, and 3, or in any other suitable manner. The rear ends of the frames 31 31 converge, as shown at 31′ in Fig. 3, so as to position the lifter-points more closely together than are the major portions of such frames. The conveyer mechanism carried by the trough 34 is driven primarily from a sprocket-wheel 47 on the axle 1.

A raising or lowering of the lifter-points 33 is effected by an operation of the lever 57. This lever has its hand-operated latch coacting with a quadrant 58 and is mounted on a rock-shaft 59, which is disposed transversely of the tongue 24 and has its opposite ends connecting with the respective lifter-frames 31 through the arms 60 and links 61.

The operation of the machine is as follows: The machine being in proper position over a row of beets, the frame 5 is dropped to permit the wheels 7 7 thereof to travel on the ground on opposite sides of a beet row and the drive sprocket-wheel 17 then thrown into clutch engagement with the shaft by a movement of the shipper-lever 22′ to effect a rotation of the cutting-disk 13 through the medium of the chain 18′, sprocket-wheel 18, shaft 19, bevel-gears 19′ and 20, shaft 20′, sprocket-wheel 21, chain 21′, and sprocket-wheel 12 on the disk shaft 11. As the shoe 15 successively passes over the irregular tops of the beets it is caused to effect a corresponding rising and falling movement of the pivotal frame 8′, by which it and the cutting-disk are carried, thus causing the disk to take a proper and uniform cut from each beet in its path of movement irrespective of the irregular growth of such vegetables. The disk 13 and shoe 15 are relatively adjustable, as shown, so that the depth of bite of the disk may be easily and quickly adjusted to a nicety, as different crops or fields of beets may require. The relative adjustment of the disk and shoe are preferably such that a beet-top is substantially severed before the shoe drops from contact therewith, thus effecting a straight horizontal instead of a slanting or uneven cut, as would otherwise be the case. As the severed tops revolve with the disk they are deflected therefrom to the left of the beet row by the deflecting-plate 14. Should the operator desire to increase the downward pressure of the shoe, this he yieldingly accomplishes by a rearward movement of the lever 25, which when moved in the opposite direction effects an elevation of the disk and shoe. As the topped beets pass between the lifting-points 33, they are raised out of the ground thereby and delivered to the forward end of the elevating-trough 34, where they are engaged and elevated by suitable conveyer means.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a beet-harvester, a topping mechanism consisting of a pivotal frame, a single rotary disk carried by the frame, a shoe adjustably carried by the frame in advance of the disk for riding on the beet-tops and automatically controlling the position of the disk to uniformly top the beets, said shoe being curved in cross-section to conform to the curve described by the disk due to its inclination from a horizontal plane, and means for driving the disk.

2. In a beet-harvester, a topping mechanism consisting of a pivotal trailer-frame, a single rotary cutting-disk adjustably carried by the frame, a shoe carried by the frame in advance of the cutting-disk for riding on the beet-tops and automatically controlling the position of the disk to uniformly top the beets, said shoe being bowed in cross-section and its rear edge uniformly spaced throughout its width from the contiguous edge of the disk, and means for rotating the disk.

3. In a beet-harvester, a topping mechanism consisting of a pivotal trailer-frame, a rotary cutting-disk carried by the frame, a

shoe adjustably carried by the frame in advance of the cutting-disk for gaging the cut of the disk, said shoe having its rear edge disposed in close proximity to the cutting edge of the disk and concaved to approximately conform to an arc of the disk's circumference, and means for driving the disk.

4. In a beet-harvester, a topping mechanism comprising a pivotal frame, a cutting-disk carried by the frame, said disk having its rim annularly flattened and disposed at an oblique angle to its axis, means carried by the frame for gaging the cut of the disk, and mechanism for driving the disk.

5. In a beet-harvester, a topping mechanism comprising a pivotal frame, a cutting-disk carried by the frame and having its axis disposed obliquely to a horizontal plane, said disk having its cutting edge flattened for a portion of its radial depth and disposed at an oblique angle to its axis with its forward edge in substantially a horizontal plane, means carried by the frame for gaging the cut of the disk, and means for driving the disk.

6. In a beet-harvester, the combination with the main vehicle-frame, of a supplemental frame pivoted at its rear to said main frame and extending forwardly under said frame and having a wheeled support at its free end, a trailer-frame carried by the supplemental frame, topping mechanism carried by the trailer-frame, and means for elevating the supplemental and trailer frames to inoperative position.

7. In combination, a main vehicle-frame, a supplemental frame and a trailer-frame, the supplemental frame being pivoted at one end to the main frame and the trailer-frame being pivoted to the free end of the supplemental frame and carrying topping mechanism, means for adjusting the trailer-frame relative to the supplemental frame, and means for imparting an oscillation to the supplemental frame relative to the vehicle-frame, substantially as described.

8. In combination, a vehicle-frame, a supplemental frame having one end pivoted thereto and its free end provided with a wheeled support, a frame trailing from the free end of the supplemental frame, topping mechanism carried by the trailer-frame, and means for raising the supplemental and trailer frames to inoperative positions under the vehicle-frame, substantially as described.

9. The combination with a vehicle-frame of a supplemental frame pivoted to and extending forwardly from the main axle of the vehicle-frame, a frame trailing from the free end of the supplemental frame, topping mechanism carried by the trailer-frame, connection between the vehicle and supplemental frames for raising and lowering the latter, and means for adjusting the trailer-frame relative to the supplemental frame.

10. In a beet-harvester, the combination with the pivotally-mounted topping mechanism, of a rock-shaft fixed to the frame of such mechanism at its axis, a crank-arm on said shaft, an operating-lever, and connection between the crank-arm and lever yieldable in one direction of stress whereby the frame may be both elevated and yieldingly depressed.

11. In a machine of the class described, the combination of a frame having one end in pivotal connection with the machine-frame, topping mechanism having its frame pivotally attached to the first-mentioned frame adjacent its free end, and means for elevating the free end of the first-mentioned frame to inoperative position.

12. In a machine of the class described, the combination of a frame having one end pivotally attached to the machine-frame and its other end provided with supporting-wheels, a trailer-frame pivotally attached to the first-mentioned frame, a rotary cutting-disk and a cut-gaging member carried by the trailer-frame, mechanism for driving the cutting-disks, means for elevating the free end of the first-mentioned frame, and means for applying a yielding downward pressure to the trailer-frame, substantially as described.

13. In a machine of the class described, the combination of a frame having one end pivotally mounted to the machine-frame and its other end provided with supporting-wheels, a yoke pivoted to the frame and having a rearwardly-extending arm, a cutting-disk and a cut-gaging member carried by the yoke-arm, and mechanism for driving the disk.

14. In a beet-harvester, the combination with a cutting-disk disposed at an angle to a horizontal plane, of a gage-shoe which is curved in cross-section to conform to the curve described by the disk due to its inclination.

15. In a beet-harvester, the combination with a single cutting-disk, of a gage-shoe therefor having its rear edge uniformly spaced throughout its width from the contiguous edge of the disk.

In testimony whereof we have hereunto signed our names to this specification in the presence of two subscribing witnesses.

NORMAN B. SEBRING.
WALTER A. SEBRING.

Witnesses:
C. W. OWEN,
MARY I. SHAY.