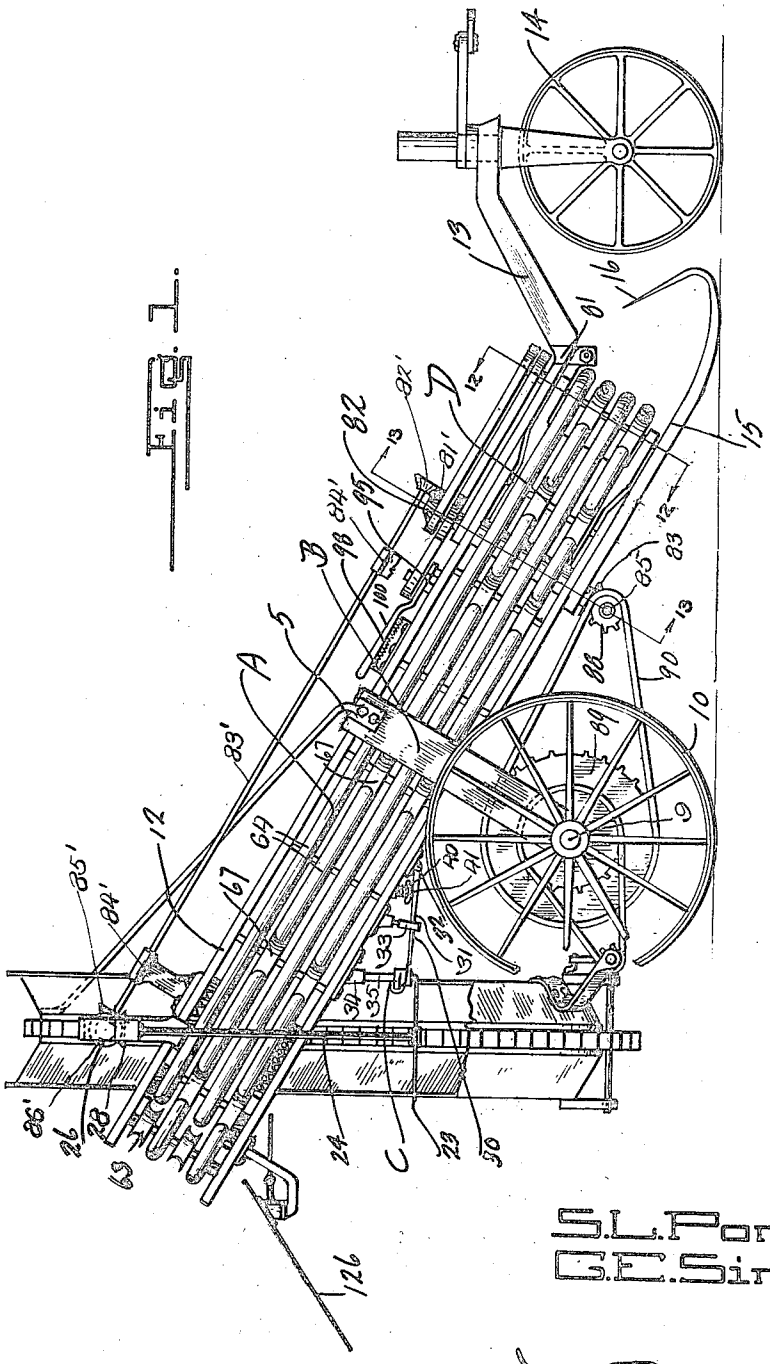
Sept. 11, 1923. 1,467,650

S. L. POND ET AL

BEET TOPPER

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Fig. 1.



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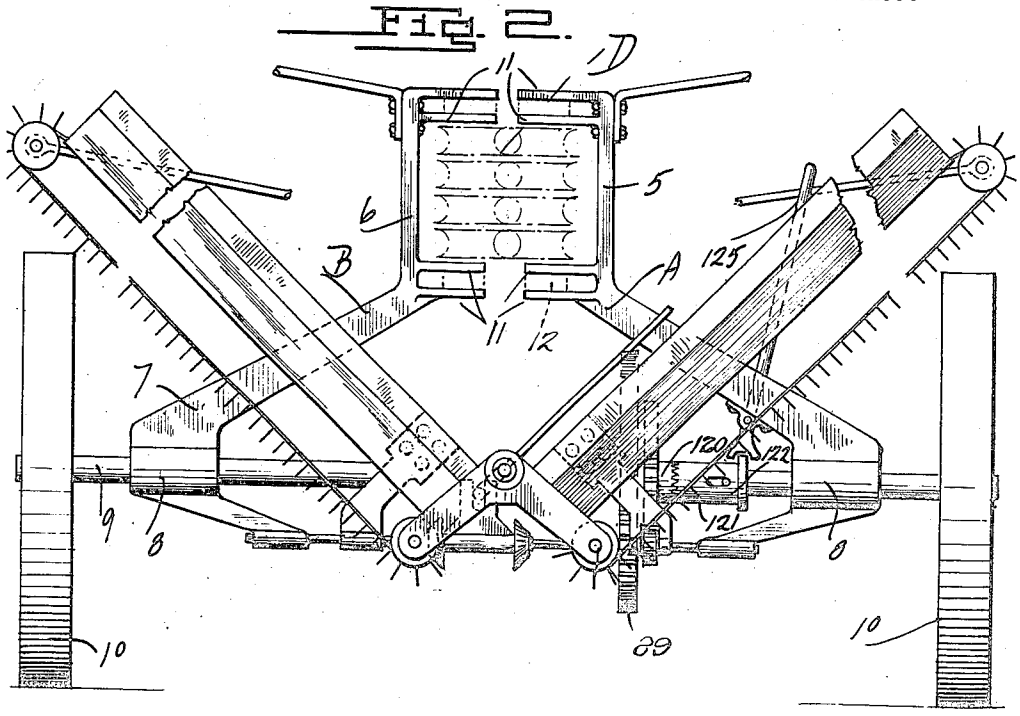
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BEET TOPPER

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Fig. 2.



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Sept. 11, 1923. 1,467,650

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BEET TOPPER

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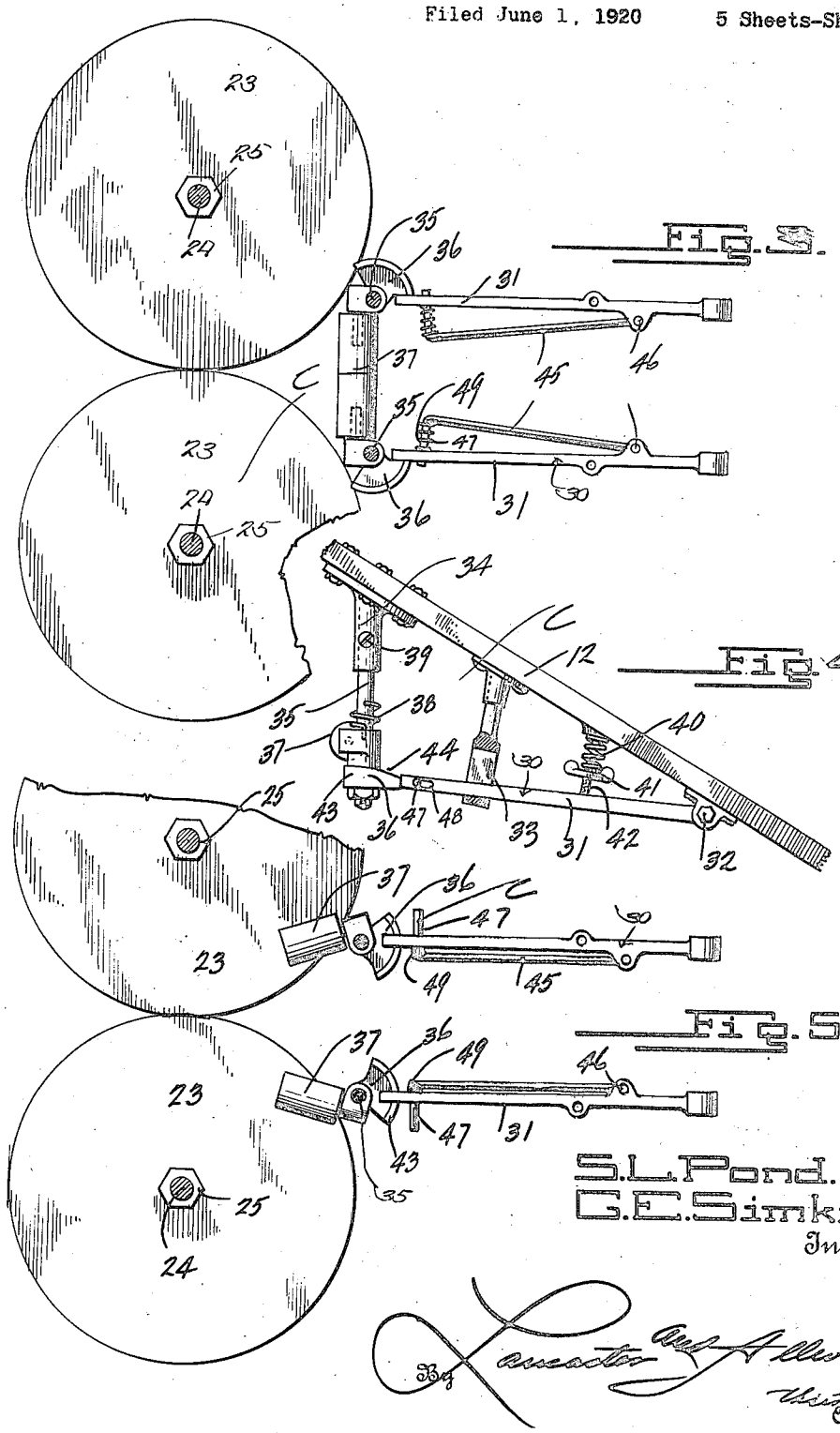


Fig. 3.

Fig. 4.

Fig. 5.

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S. L. POND ET AL

BEET TOPPER

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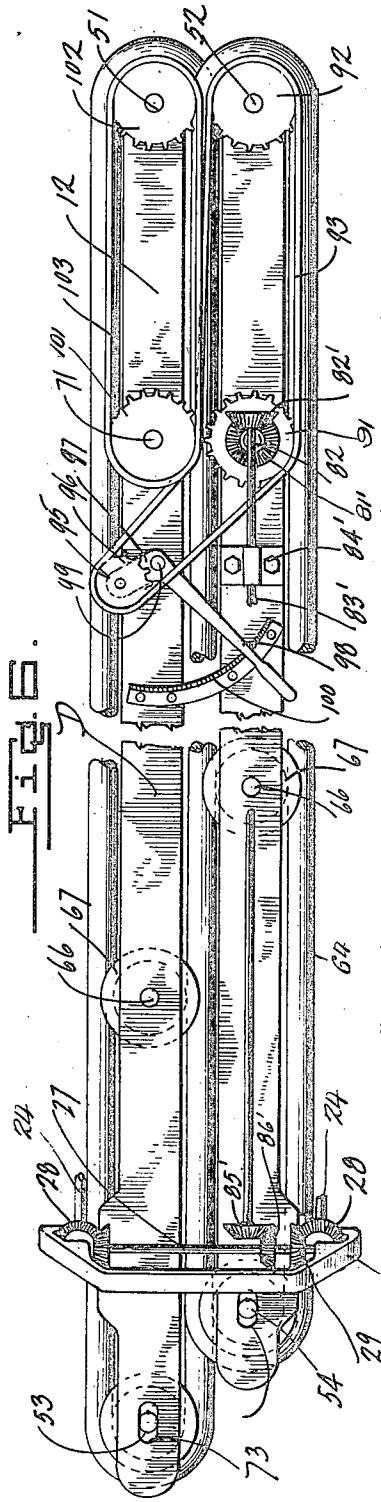


Fig. 6.

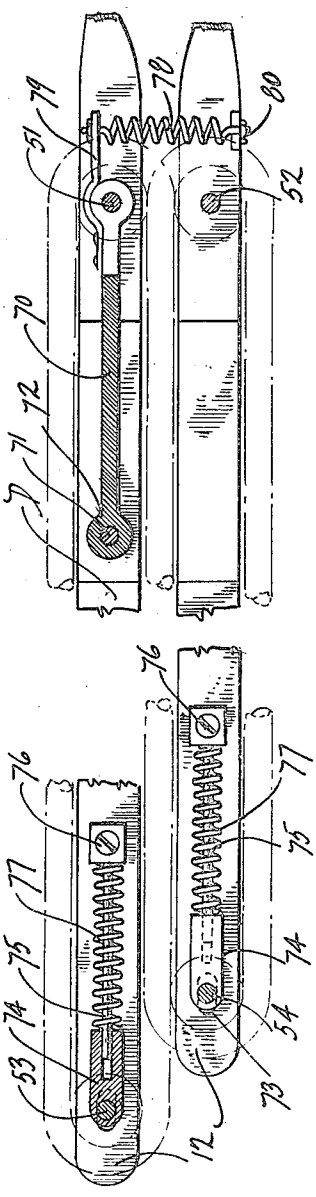


Fig. 8.

Fig. 7.

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Sept. 11, 1923. 1,467,650

S. L. POND ET AL

BEET TOPPER

Filed June 1, 1920 5 Sheets-Sheet 5

Fig. 9.

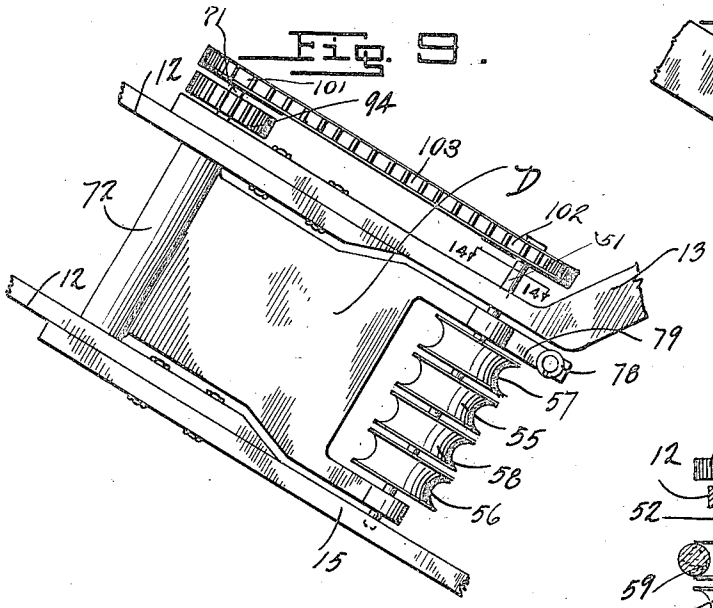
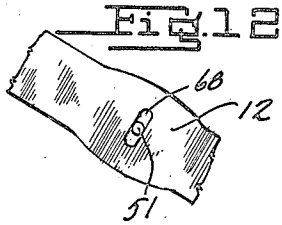


Fig. 12.



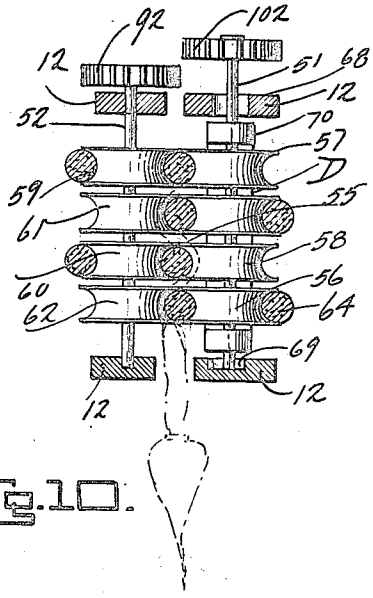


Fig. 10.

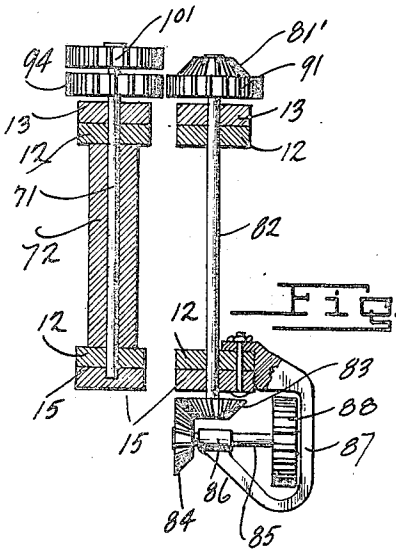


Fig. 11.

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Patented Sept. 11, 1923. 1,467,650

UNITED STATES PATENT OFFICE.

SKAIFE L. POND AND GUY E. SIMKINS, OF HILL CITY, SOUTH DAKOTA.

BEET TOPPER.

Application filed June 1, 1920. Serial No. 385,752.

To all whom it may concern:

Be it known that we, SKAIFE L. POND and GUY E. SIMKINS, citizens of the United States, residing at Hill City, in the county of Pennington and State of South Dakota, have invented certain new and useful Improvements in Beet Toppers, of which the following is a specification.

This invention relates to beet harvesters, and the primary object of the invention is to provide an improved means for effectively topping the beets, which is so constructed that the tops of the beets will be severed at substantially the same distance from the crown thereof irrespective of their size or position in the ground.

Another object of the invention is to provide an improved means for engaging the beets and for carrying the same to the topping mechanism, the topping mechanism having an improved device for regulating the position of the crowns of the beets in relation to the cutting knives, so as to insure that the tops of all the beets will be cut at the correct point.

A further object of the invention is the provision of an improved means for lifting the beets by their tops to the topping mechanism, which embodies a pair of cutting knives and a regulator, which is so arranged as to retard the bodies of the beets until the crowns thereof come in correct position to be acted upon by the knives at which time the same are released by an improved gate structure and permitted to ride into engagement with the knives.

A further object of the invention is the provision of a novel elevator structure for engaging the tops of the beets to lift the same to the topping mechanism, which embodies a plurality of super-imposed flexible gripping belts which are so arranged as to grasp the beet tops at various points throughout their lengths so as to prevent the accidental displacement of the beets while being acted upon by the topping mechanism.

With these and other objects in view, the invention consists in the novel construction, arrangement and formation of parts as will be hereinafter more specifically described, claimed and illustrated in the accompanying drawings, forming a part of this specification, in which drawings:

Figure 1 is a side elevation of the beet harvester embodying the improved beet topping mechanism.

Figure 2 is a fragmentary rear elevation of the same.

Figure 3 is a detail plan view of the improved topping mechanism.

Figure 4 is a detail side elevation of the same, parts of the device being shown in section.

Figure 5 is a detail plan view of the topping mechanism showing the controlling gate for the beet bodies in an open position.

Figure 6 is a detail plan view of the novel elevator used for lifting the beets to the topping mechanism.

Figure 7 is a detail longitudinal horizontal section through the rear portion of the elevator used for lifting the beets to the topping mechanism.

Figure 8 is a detail longitudinal horizontal section through the forward end of the beet elevating mechanism.

Figure 9 is a fragmentary detail vertical longitudinal section through the elevating mechanism for the beet topper illustrating the swinging boxing for permitting the entrance of the beet tops between the lifting and conveying belts.

Figure 10 is a transverse vertical section through the elevator for the beet topping mechanism, taken on the line 12—12 of Figure 1.

Figure 11 is a detail transverse section through the elevator for the beet topping mechanism taken on the line 13—13 of Figure 1, and

Figure 12 is a detail horizontal section taken on the line 14—14 of Figure 9.

Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter A generally indicates the harvester, which includes the frame B, the topping mechanism C, and the elevator D for lifting the beets to the topping mechanism C. The frame B includes a pair of forwardly and upwardly inclined spaced supporting bars 5 and 6, which have their lower terminals provided with outwardly and downwardly inclined arms 7, the lower terminals of which carry the bearings 8, for the rear drive axle 9. The terminals of the rear drive axles 9 have secured thereto the ground or bull wheels 10. The upper and lower ends of the supporting bars 5 and 6 have their inner surface provided with inwardly extending pairs of spaced fingers 11, between which are secured the longitudi-

nally extending downwardly inclined side bars 12. The side bars 12 are arranged in superimposed pairs and form the frame for the elevator D for the topping mechanism C. The lower forward ends of the upper pairs of side bars 12 support the forwardly and upwardly inclined arms 13, which support the front steering wheels 14. Any suitable type of draft appliance may be used for drawing the harvester over the field and if so desired means may be interposed for raising and lowering the lower end of the elevator D in relation to the ground. If so desired, a tractor or the like may be also used for drawing the harvester over the field. The forward ends of the lower pair of guide bars 12 have secured thereto the forwardly and downwardly inclined guide arms 15, which engage the upper surface of the ground and the forward ends of these guide arms are bent upwardly as at 16 and are adapted to compress the foliage of the beets together so that the elevating mechanism D can readily engage the same. These guide arms form means for guiding the beets toward the elevator, and it is to be also understood that suitable means may be provided for lifting the beets out of the ground or for loosening the earth around the same.

The improved topping mechanism C is arranged adjacent to the rear end of the conveyor D and extends from the supporting frame thereof. The same includes a pair of disc knives 23, which are adjustably mounted on a pair of shafts 24, which are disposed in spaced parallel relation and extend on each side of the pairs of side bars 12. The disc knives 23 are adapted for rotation with the shaft and are held in place by upper and lower adjustable nuts 25. A transversely extending bearing bracket 26 is secured to the uppermost pair of side bars 12 and supports for rotary movement the transversely extending shaft 27, which is driven by means hereinafter more fully described. This bearing bracket supports at its opposite ends the depending shafts 24 and the same have secured thereto the bevelled gears 28 which mesh with bevelled gears 29 keyed to the transversely extending shaft 27. Thus it can be seen that when the transversely extending shaft 27 is rotated the knives 23 will be rotated therewith. The topping mechanism C also includes the regulator 30 which is positioned directly in front of the knives 23 and this regulator includes a pair of rearwardly extending arms 31 which are pivotally secured as at 32 to the lower faces of the side bars 12 for a swinging movement in a vertical plane. Depending guides 33 are provided for the arms 31 intermediate their ends, and these guides are secured to the side bars 12 in rear of the pivot points 32. Directly in rear of the guides 33 are positioned the depending sockets 34 which are also secured to the lower side bars 12 and these sockets support the depending shafts 35, on which are mounted for rotary movement the swinging sector plates 36. These sector plates 36 carry inwardly extending pins on which are rotatably mounted rollers 37, which form the gate mechanism for retarding the bodies of the beets as the same are lifted up by the elevator, until the crowns thereof come into proper relation with the knives 23. These rollers 37 extend directly in front of the knives 23 and are adapted to engage each other to form a continuous barrier as clearly shown in Figure 3 of the drawings. The sector plates 36 and the rollers 37 are normally held against rotation on the supporting shafts 35 by means of the arms 31 which normally rest upon and engage the inner faces of these sector plates and form stops for the same. When these arms 31 are lifted above the sector plates 36 the rollers are free to swing outwardly as shown in Figure 7 and to return the same to their normal position after the beet has passed by the same, the coil springs 38 are provided which are coiled around the shafts 35 and have their terminals secured respectively to the shafts 35, which are stationary and to the sector plates 36. The shafts 35 are adjustably held in the sockets 34 by means of set screws 39 and it can be seen that the sector plates can be adjusted in relation to the knives 23 by sliding the shafts 35 in their respective sockets. The arms 31 are normally held in their lowered position in engagement with the inner faces of the sector plates 36 by means of expansion springs 40 which bear against the lower faces of the lower pair of side bars 12 and against adjustable winged nuts 41 which are threaded upon upstanding threaded pins 42 carried by the upper faces of the arms 31. It can be seen that by adjusting the wing nuts 41 upon the threaded rods 42 the tension of the springs 40 can be adjusted. The guides 33 limit the downward movement of the arms 31 under the tension of the springs 40 and insure the correct positioning of the arms in relation to the sector plates. The upper edges of the sector plates are provided with arcuate flanges 43 which have their upper faces inclined as at 44 so as to facilitate the returning movement of the arms 31 to their correct position. Thus it can be seen that as the beets are raised by the elevator D, the same will come in contact with the arms 31 and raise the same against the tension of the coil springs 40 and permit the gate to be opened thereby so as to let the same come in contact with the cutting knives 23. To insure that smaller beets will be acted upon by the regulator as well as

large beets, rods 45 are pivotally connected as at 46 to the forward inner faces of the arms 31 and these rods are provided with right angular terminals 47 which extend through suitable slots 48 formed in the rear ends of the arms. These right angular terminals 47 have springs 49 coiled around the same which normally tend to hold the rods inwardly toward each other. Thus when a relatively small beet is brought up by the elevator, the same will engage the rods 45 instead of the arms 31 and raise the arms in the same manner as if they had engaged the arms.

The improved elevating mechanism D for the topping mechanism C includes a forward pair of shafts 51 and 52 and a rear pair of shafts 53 and 54, and these shafts are mounted in the side bars 12. The side bars on one side of the elevator are extended a slightly further distance rearwardly than the other side bars so as to facilitate the dumping of the beet tops after the bodies of the beets have been severed therefrom. The shaft 51 has secured thereon a pair of drive pulleys 55 and 56, and a pair of idler pulleys 57 and 58. The idler pulley 57 is mounted above the drive pulley 55 while the lower idler pulley is mounted between the drive pulleys 55 and 56. The shaft 52 has likewise secured thereto a pair of drive pulleys 59 and 60, and a pair of idler pulleys 61 and 62. The idler pulley 61 is arranged between the drive pulleys 59 and 60 and the lower idler pulley is arranged below the lower drive pulley 60. Thus it can be seen that the drive pulleys on one of the shafts 51 or 52 are in alignment with the idler pulleys on the other shaft. The rear pair of shafts 53 and 54 have also rotatably mounted thereon a plurality of pulleys 63, which are in direct alignment with the pulleys carried by the forward pair of shafts 51 and 52. The drive pulleys carried by the shafts 51 and 52 have trained around the same the beet carrying belts 64 and these belts extend longitudinally of the harvester and are trained around the pulleys 63 carried by the rear pair of shafts 53 and 54. These belts are substantially circular in section and are preferably formed of elastic material, such as canvas impregnated with rubber or the like. It can be seen that the belts are arranged in staggered relation owing to the arrangement of the drive and idler pulleys on the shafts 51 and 52 and these belts act as fingers for grasping the beet tops. The side bars 12 also rotatably support intermediate their ends the shafts 66 which carry guide pulleys 67. These guide pulleys 67 are arranged in spaced relation to each other so as to permit the belts to give intermediate the same. The shaft 51 is mounted so that the same has a slight movement transversely of the conveyor frame so as to permit the beet tops to readily engage between the conveyor belts and to facilitate this movement, the upper bar 12 is provided with a slot 68 through which the shaft protrudes. The lower side bar 12 is provided with a transversely extending groove 69 in which the lower end of the shaft moves. This shaft is rotatably mounted in a suitable bearing 70, the rear end of which is rotatably mounted upon a shaft 71, as at 72. Thus it can be seen that the shaft 51 is free to move transversely of the frame. To permit the belts to give longitudinally, the rear shafts 53 and 54 have their terminals slidably mounted in suitable longitudinally extending slots 73 formed in the side bars 12. The shafts are normally held toward the rear ends of the slots 73 by means of brackets 74 which are mounted upon the same, and these brackets slidably receive rearwardly extending bars 75 which are pivotally mounted upon pins 76. The rearwardly extending bars 75 have coiled around the same expansion springs 77 which bear against the pins 76 and the sliding brackets 74. Thus it can be seen that the shafts 53 and 54 are normally held toward the rear ends of the slots 73. The springs 77 also act in the nature of a belt tightener so as to effectively hold the belts at the correct tension. To normally hold the belts 64 trained around the drive pulleys 55 and 56 in engagement with the idler pulleys 61 and 62 carried by the shaft 52, a contractile coil spring 78 is provided which has one end secured to a bracket 79 carried by the bearing 70. The opposite end of the spring is secured as at 80 to a depending ear 81 carried by the stationary portion of the frame. A shaft 82 is arranged in spaced parallel relation to the shaft 71 and is rotatably carried by the side bars 12 opposite to the side bars which carry the shaft 71. The lower end of the shaft 82 has keyed or otherwise secured thereto a bevelled gear 83 which meshes with a bevelled gear 84 secured to a counter-shaft 85, which is rotatably mounted in a suitable bearing 86 carried by the bracket 87 which is secured to the lower side bar 12. The counter shaft 85 has secured thereto a sprocket wheel 88 which is in alignment with the relatively large sprocket wheel 89 which is loosely mounted on the drive axle 9. The relatively large gear wheel 89 and the small gear wheel 88 have trained around the same a sprocket chain 90 and thus it can be seen that when the harvester is moved over a field, the shaft 82 will be driven thereby. The upper end of the shaft 82 has keyed thereto a sprocket wheel 91 which is in alignment with a sprocket wheel 92 carried by the forward shaft 52 and these sprocket wheels have trained around the same a drive sprocket chain 93. The inner run of the sprocket chain 93 en-

gages a sprocket wheel 94 which is keyed to the shaft 71 and the chain is held in engagement with the sprocket wheel 94, by means of a belt tightener or shifter 95 which includes a sprocket wheel 96 around which the sprocket chain 93 extends. The belt tightener or shifter 95 extends in rear of the shaft 71 and the sprocket gear 96 thereof is rotatably carried by the angle arm 97 of a lever 98. This lever is pivoted at an angle upon the pivot pin 99. The free end of the lever 98 carries a depending dog or tooth which is adapted to engage in any one of the teeth of a sector rack 100 which is secured to the uppermost side bars 12. Thus it can be seen that by shifting the lever 98 the tension of the chain can be adjusted. The shaft 71 has also keyed thereto an upper sprocket wheel 101 which is in alignment with a sprocket wheel 102 carried by the forward shaft 51 and these sprocket wheels have trained around the same a drive sprocket chain 103. Through the medium of the sprocket chains and sprocket wheels it can be seen that the conveyor belts 64 are driven from the ground wheels. The bevelled gear 81′ which is keyed to the shaft 82 meshes with a bevelled gear 82′ keyed to a longitudinally extending shaft 83′ which is rotatably mounted in suitable bearings 84′ carried by the side bars 12. The opposite end of shaft 83′ has keyed thereto a bevelled gear 85′ which meshes with the bevelled gear 86′ secured to the shaft 27. Thus it can be seen that when the conveyors are in operation the blades 23 will be driven thereby.

The gear 89 carried by the shaft 9 is loosely mounted thereon and carries the rigid clutch section 120 of a clutch 121, the movable clutch section 122 of which is splined or otherwise secured to the drive axle 9. This clutch section 122 is shifted by means of a suitable lever 125. Thus it can be seen that the section 122 can be shifted so that when the harvester is being driven from or to a field, the operating parts thereof will be idle.

The rear end of the machine carries a shiftable inclined plate 126 which is adapted to guide the beet tops to one side of the machine after the same leave the conveyor D. Owing to the mounting of this inclined plate upon the machine the tops may be directed to either side of the machine which may be desired.

In operation of the improved device, the beets will be guided to the conveyor D by means of the guide arms 15 and the tops thereof will be grasped by the belts 64 and gradually pulled from the ground. As the beets are pulled up by the belts 64, the same will be brought into engagement with the arms 31 and if the crowns thereof are positioned below the arms 31, the rollers 37 forming the gate will hold the top so that the bodies of the beets will be lifted upwardly. As the beets are lifted the same will engage the arms 31 and move the same against the tension of the springs 40 and out of the path of the sector plates 36, which will permit the gate to swing open and the beets to be brought into engagement with the cutting disc 23. The disc 23 will sever the tops therefrom. The tops will be carried past the cutting mechanism C by the belts 64 until the inclined board 126 is reached when the same will be released. The inclined board will guide the beet tops toward one side of the harvester. After the beets have passed the gate formed by the rollers 37, the rollers will be returned to their normal position by means of the springs 38 and the arms 31 will also be returned to their normal position in engagement with the inner faces of the sector plate. This operation is repeated when the next beet is swung up to the topping mechanism C and it can be seen that if the crown of the beet is in such a position that the same will immediately engage the arms 31 the gate carried by the rollers 37 will not act to retard the body of the same.

From the foregoing description it can be seen that an improved machine has been provided which will effectively elevate the beets to be harvested from the ground and carry the same to the topping mechanism which is so constructed that each of the beets will be cut at the same point.

Changes in details may be made without departing from the spirit or scope of the invention; but,

We claim:

1. In a beet harvester, the combination with means for conveying beets rearwardly by their tops, of a topping mechanism arranged below the conveying means including cutting knives, and a regulator arranged in front of the knives and including a retarding member for holding the beet bodies until the same reach a predetermined position in relation to the knives.

2. In a beet harvester, the combination with means for elevating beets by their tops rearwardly, of a topping mechanism including a pair of rotatable knives, and a movable gate arranged in front of the knives arranged to retard the bodies of the beets until the same come into proper position in relation to the knives.

3. In a beet harvester, the combination with a means for conveying beets rearwardly by their tops, of a topping mechanism arranged below the conveying means including cutting knives and a movable gate arranged to retard the movement of the bodies of the beets toward said knives, and releasable means for holding the gate against movement until the beet bodies come in correct relation to the knives.

4. In a beet harvester, the combination with a means for conveying beets rearwardly by their tops, of a topping mechanism arranged below the conveying means including a pair of rotatable knives, a releasable gate arranged in front of the knives for retarding the movement of the bodies of the beets, and means adapted to be actuated by the beets for releasing said gate when the beet bodies come into correct relation to the knives.

5. In a beet harvester, the combination with a means for conveying the beets rearwardly by their tops, of a topping mechanism arranged below the conveying means including a pair of rotatable knives, a releasable gate arranged in front of the knives and adapted to retard the movement of the bodies of the beets toward said knives, a pair of hinged arms normally holding the gate against movement and adapted to release said gate when the bodies of the beets come into engagement therewith, and means for returning the arms and the gate to their normal positions.

6. In a beet harvester, the combination with means for conveying the beets rearwardly by their tops, of a topping mechanism arranged below the conveying means including a pair of rotatable knives, a gate arranged in front of the knives including a pair of swinging rollers, a pair of hinged arms arranged to normally hold the rollers against movement until the bodies of the beets come into engagement therewith, spring means normally holding the arms in the path of the rollers, and spring means for returning the rollers to their normal positions.

7. In a beet harvester, the combination with means for conveying beets rearwardly by their tops, of a topping mechanism arranged below the conveying means including a pair of rotatable knives, means for rotating the knives, means for adjusting the position of the knives, a pair of depending shafts, sector plates rotatably mounted on the shafts, inwardly extending abutting rollers carried by the sector plates arranged in front of the knives, and adapted to retard the rearward movement of the beet bodies, a pair of hinged arms arranged in the path of the sector plates for holding the sector plates against movement, the arms being adapted to be moved out of the path of said sector plates by the bodies of the beets coming into engagement therewith, springs coiled around said shafts, and arranged to normally hold the rollers in their normal positions, spring means normally holding the arms in the path of the sector plates, and means for adjusting the tension of said last mentioned spring means.

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