

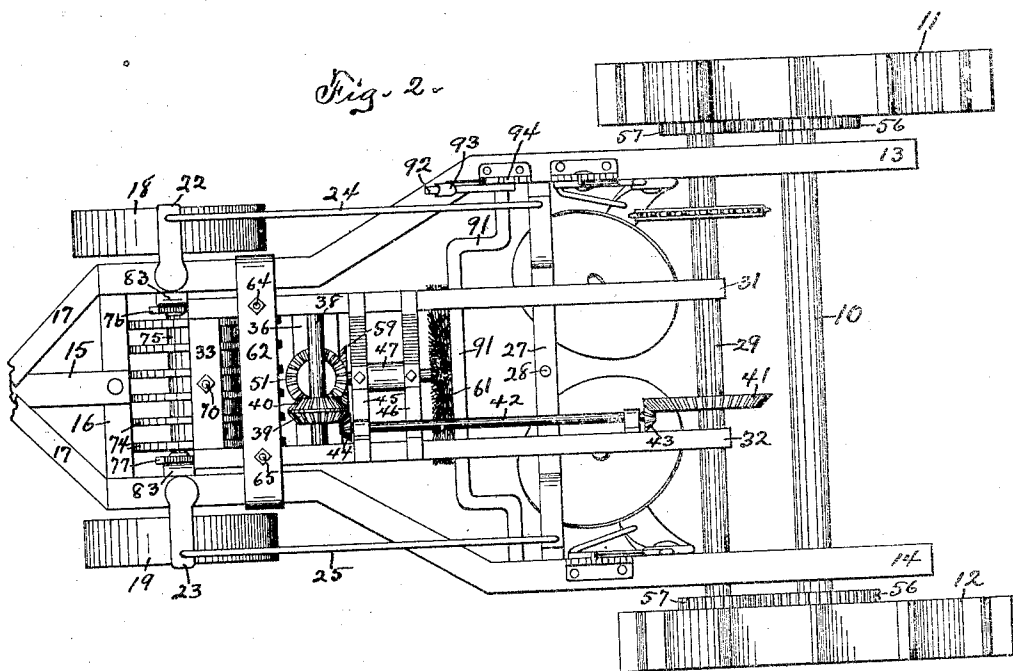
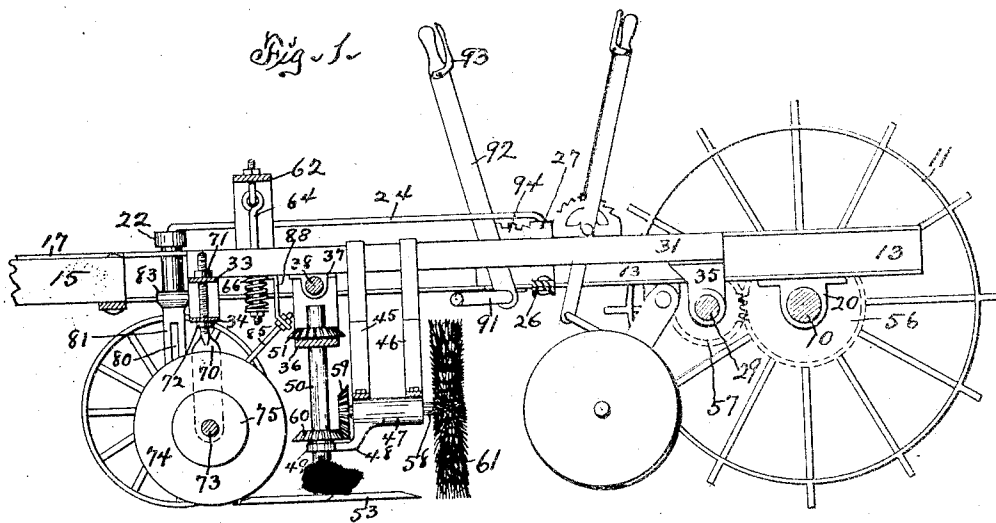
Oct. 16, 1928.

1,687,730

J. MAZZOCCO
BEET TOPPING MACHINE

Filed May 9, 1924

2 Sheets-Sheet 1



INVENTOR
James Mazocco
BY *Silas K. Week*
ATTORNEY

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2 Sheets-Sheet 2

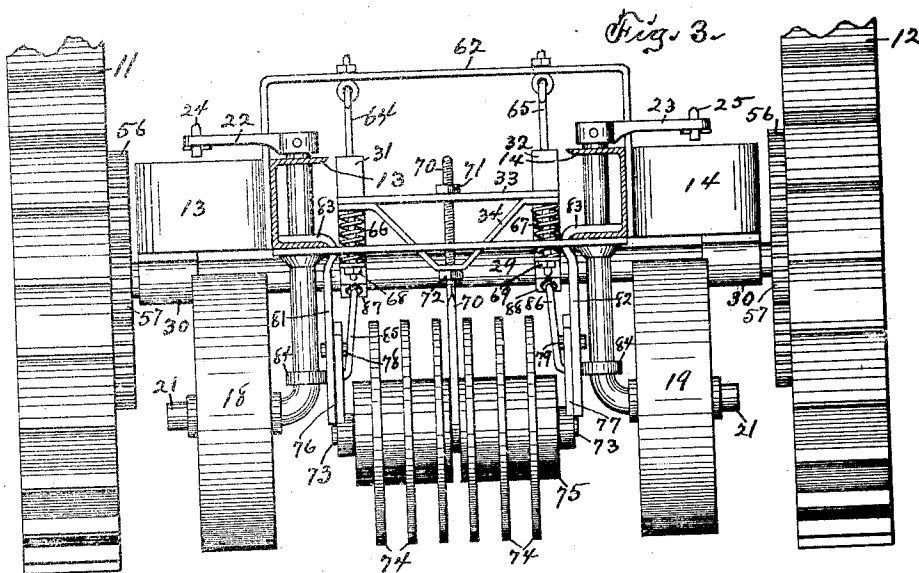


Fig. 5-

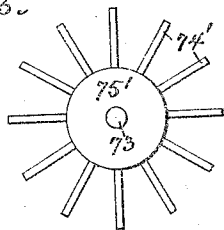


Fig. 6-

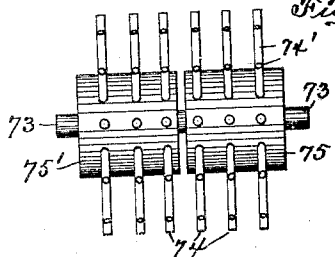


Fig. 4-

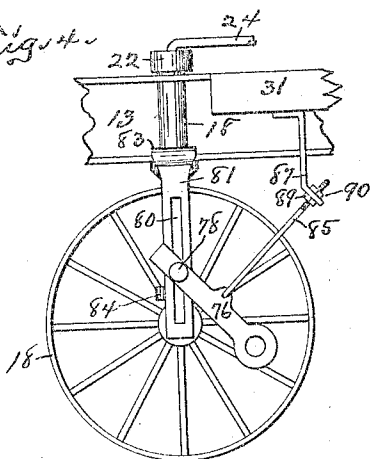


Fig. 7-

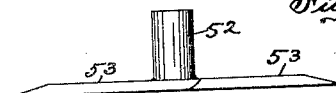
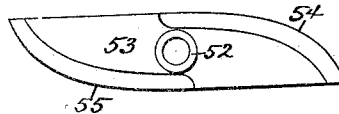


Fig. 8-



INVENTOR
James Mazocco
BY *James Sweet*
ATTORNEY

UNITED STATES PATENT OFFICE.

JAMES MAZZOCCO, OF GALLUP, NEW MEXICO.

BEET-TOPPING MACHINE.

Application filed May 9, 1924. Serial No. 711,988.

In harvesting sugar beets it is a common practice to pull the beets from the ground and thereafter top them by hand, using for the purpose a substantially straight knife which is applied transversally of the tuber by a swift strong stroke adapted to cut through the tuber and remove therefrom the top and a segment of the crown. Topping of beets by this method requires considerable skill, strength and practice since it is desirable to remove exactly the right amount of segment and make a clean cut, followed through, so as to avoid breaking down any side of the tuber. Any lack of skill or strength or sharpness of knife tends to ragged and wasteful results.

An object of this invention is to provide a machine which will simulate the best hand work in topping beets while standing in a field.

A further object of this invention is to provide a knife simulating the hand knife used as above noted, which when properly operated will simulate the best hand work, together with means for driving said knife rotatively at high speed.

A further object of this invention is to provide improved means for regulating the plane of contact between a rotary knife and a beet tuber, irrespective of the projection of said tuber above the surface of the ground.

A further object of this invention is to provide an improved means for combing through the tops of standing beets in a field and engaging the crowns of said beets successively for the purpose of regulating and determining the plane of contact of a rotary knife with the tubers of the beets to the end that uniform segments or portions of the crowns of said beets may be removed.

A further object of this invention is to provide improved means for scavenging or removing severed beet tops and segments.

A further object of this invention is to provide improved means for adjusting the altitude of the knife independent of the combing element.

A further object of this invention is to provide improved means for steering a land vehicle carrying means for topping and kindred elements.

A further object of this invention is to provide improved means for raising and lower-

ing certain operative parts relative to the frame of a land vehicle, rendering said parts temporarily inoperative, for the purpose of transporting them or turning at the ends of rows.

A further object of this invention is to provide improved means for adjusting the relative altitude of a rotary knife and a controlling element.

A further object of this invention is to provide an improved combination between a floating frame, a rotary knife and an altitudinally adjusting device.

A further object of this invention is to provide an improved construction for an altitudinally adjusting device.

This invention relates to and contains some of the elements illustrated, described and claimed in my application for Letters Patent of the United States filed January 3, 1923, Patent No. 1,582,292, to which reference hereby is made.

My invention consists in the construction, arrangement and combination of elements hereinafter set forth, pointed out in the claims and illustrated by the accompanying drawing, in which—

Figure 1 is an elevation partly in section, of a machine embodying my improvements. Figure 2 is a plan of the same machine. Figure 3 is a front elevation of the same machine, partly in section, elements being omitted to avoid confusion and obscurity. Figure 4 is a fragmentary elevation of the machine, partly in section, illustrating steering means and means for supporting an altitudinally adjusting device. Figures 5 and 6 are end and side views, respectively, of a modified form of roller assembly employed in the machine. Figures 7 and 8 are end and side elevations respectively of a rotary knife employed in the machine.

In the construction of the machine as shown a land vehicle is employed embodying and including a rear axle 10 carried by traction wheels 11, 12, side bars 13, 14 of a main frame, a tongue 15 secured to a front end bar 16 carried by the front ends of the side bars 13, 14, hounds 17 connecting the tongue to the side bars and casters 18, 19 swiveled to the forward end portions of the side bars 13, 14 and adapted to support and guide the forward

end of the main frame. The axle 10 is journaled in suitable bearings 20 on the lower faces of the rear end portions of the side bars 13, 14 and may be provided with any suitable differential or compensating means connecting its ends to the traction wheels 11, several of which devices are common and well known and form no part of this invention. The caster stems are swiveled in suitable bearings in the bars 13, 14 and turn outwardly in opposite directions, at their lower ends and have wheels journaled on spindles 21, formed thereon. The wheels of the casters preferably are spaced apart respective distances from the traction wheels 11, 12 and both sets of wheels are arranged to straddle one row only of standing beets in a field and carry the land vehicle along and over said row. Crank arms 22, 23 are secured to and extend outwardly in substantially the same horizontal plane from the upper ends of the caster stems and connecting rods 24, 25 are pivoted at their forward ends to outer end portions of said arms and extend rearwardly therefrom. A cross bar 26 is fixed at its ends to the lower faces of the side bars 13, 14 in advance of the axle 10 and a steering bar 27 is pivoted at its center to the central portion of the said cross bar by a pin 28. End portions of the steering bar 27 extend upwardly and laterally in a horizontal plane above that of the side bars 13, 14 and the rear end portions of the connecting rods 24, 25 are pivoted to the extremities thereof. Any suitable seat may be mounted on the machine to be occupied by an operator whose feet may engage the upwardly extending end portions of the steering bar 27 and operate said bar or hold the same at any desired angle relative to the median line of the main frame for the purpose of steering the course of the entire machine through oscillation of the casters 18, 19.

A counter shaft 29 is mounted for rotation in suitable bearings 30 secured to and depending from the side bars 13, 14 in front of the bearings 20. A supplemental or floating frame composed of side bars 31, 32, a cross bar 33 connecting the forward ends of the side bars, and a downwardly arched cross bar 34 also connecting the forward ends of the side bars and disposed beneath the cross bar 33, of less width than the main frame is hinged at its rear end by means of bearings 35 to the counter shaft 29 and extends forwardly therefrom substantially to the caster stems. A downwardly arched cross bar 36 is fixed to and depends from the forward portions of the side bars 31, 32 and bearings 37 are disposed in the ends thereof. A counter shaft 38 is journaled in the bearings 37 and twin bevel gears 39, 40 are keyed to said counter shaft. The bevel gear 41 of larger diameter than the gears 39, 40 is keyed to the counter shaft 29. A connecting shaft 42 is journaled in suitable bearings parallel with

the frame bar 32 and bevel gears 43, 44, of materially less diameter than the gears 39, 40, are mounted on end portions of said connecting shaft and mesh with the gears 41 and 39 respectively.

Hangers 45, 46 are fixed to and depend from the side bars 31, 32 and a journal bearing 47 is mounted on and depends from the lower ends of said hangers. A bracket 48 is fixed to and extends downwardly and forwardly from the bearing 47 and is formed with a bearing 49 on its forward end. A knife shaft 50 is disposed vertically and journaled in the bearing 49 and a suitable bearing in the central portion of the bar 36. A bevel gear 51 is fixed to the upper end portion of the shaft 50 and preferably rides on the bar 36 and meshes with the bevel gear 40 on the shaft 38. The lower end portion of the knife shaft 50 is threaded and a cutting element is screwed thereon and supported thereby. The cutting element is composed of a hub 52, internally threaded to receive the threaded end portion of the knife shaft 50, and a double knife 53 integral with the lower end portion of the hub. The knife 53 is of cross-head shape as contra-distinguished to a disc and is formed with relatively long curved opposite cutting edges 54, 55. A single knife may be employed instead of the double one shown and in that event it would be disposed radially of the hub 52. It is important in this connection to emphasize the distinction between a knife of the character shown, of either single or double type, and a disc having a beveled and sharpened periphery as is shown in some other patents in this class. The knife employed in this machine simulates the shape of the hand knife commonly and rather successfully used in topping beets and the use of a knife of this type in a mechanically driven machine simulates, in its results, the best work done by hand in this, that it makes a clean quick cut through the tuber. Inter-meshing gears 56, 57 are keyed to opposite end portions of shafts 10 and 29 and are of different diameters, the larger gears 56 being on the axle 10. The ratio between the gears 56, 57, 41, 43, 44, 39, 40 and 51 provides for the rotation of the shaft 50 and knife 53 thereon at high speed, substantially 800 R. P. M., which simulates the speed of the stroke used in hand labor in the operation of topping beets and makes for a clean quick severance of the tuber. A shaft 58 is journaled in the bearing 47 and is driven by inter-meshing of a gear 59 on said shaft with a similar gear 60 on the knife shaft 50. A circular brush 61 is fixed to the rear end portion of the shaft 58 and has its periphery immediately at the rear of the orbit of the knife 53. It is the function of the brush 61 to scavenge, remove or knock to one side the segments and tops removed from the beets by the knife 53.

It is desirable to provide means for raising and lowering the knife 53, thereby adjusting the plane in which the cutting edges of said knife will engage successive tubers for the reason that said tubers project variously from the surface of the field in which they are standing and otherwise the knife would improperly sever the tops and crown segments from different beets. To this end an altitudinally adjusting device is employed, which is about to be described. An arched bar 62 is mounted on and extends upwardly from the side bars 13, 14 of the main frame and hanger rods 64, 65 are pivotally connected at their upper ends to said arched bar and extend downwardly substantially parallel with each other through the forward end portions of the side bars 31, 32 of the floating frame. Expansive coil springs 66, 67 are mounted loosely on the lower portions of the hanger rods 64, 65 and adjusting nuts 68, 69 are screwed on the lower ends of said rods, said springs impinging at opposite ends on the bars 31, 32 and adjusting nuts 68, 69 respectively. By means of the hanger rods 64, 65 springs 66, 67 and adjusting nuts 68, 69 the forward portion of the floating frame is yieldingly suspended and cushioned and said frame may be moved through an arc upwardly freely on said rods. A hanger rod 70 is mounted vertically in registering holes in the central portions of the bars 33, 34 and adjusting nuts 71, 72 are mounted on said rod above and below said bars. The lower end portion of the hanger rod 70 is relatively flat and a shaft 73 is journaled therein and extends substantially equal distances both sides thereof. A plurality of discs 74, in this instance six in number, are journaled loosely on the shaft 73, substantially half of them on each side of the hanger rod 70 and said discs are spaced from each other and from said rod by bushings 75. Arms 76, 77 are formed with journal bearings on their lower ends and end portions of the shaft 73 are journaled in said bearings. The arms 76, 77 extend upwardly and forwardly from the shaft 73 and are provided with pins or trunnions 78, 79 extending through and slidable in vertical slots 80 in guides 81, 82. The guides 81, 82 are formed with collars 83, on their upper ends loosely embracing the caster stems within the side bars 13, 14 of the main frame and also are formed with collars 84 between their ends loosely embracing the caster stems adjacent to the lateral curves thereof. Thus is provision made for oscillation of the caster stems in the collars 83, 84 without disturbing the positions of the guides 81, 82, said guides remaining in stable position by reason of the relation of the trunnions 78, 79 therewith. Braces 85, 86 are pivoted at their lower ends in eyes formed in the central portions of the arms 76, 77 and extend upwardly and rearwardly therefrom through the lower end

portions of brackets 87, 88 fixed to and depending from the forward end portions of the side bars 31, 32 of the floating frame. The braces 85, 86 are threaded throughout the portions that extend through and on either side of the brackets 87, 88 and adjusting nuts 89, 90 are screwed thereon on opposite sides of said brackets. By means of the adjusting nuts 89, 90 the arms 76, 77 may be adjusted to regulate the overlapping relation of the discs 74 relative to the orbit of the knife 53 and likewise the disposition or relation of the shaft 73 relative to the horizontal plane of the floating frame may be adjusted.

A crank shaft 91 is journaled in suitable bearing on the side bars 13, 14 of the main frame and extends beneath the central portion of the floating frame. A hand lever 92 is fixed to one end of the crank shaft 91 and is provided with detent devices adapted to engage a quadrant 94 on the bar 13. The lever 92 is adapted for manual operation to oscillate the crank shaft 91 and when said lever is moved rearwardly through an arc the central portion of said crank shaft is raised and caused to engage and lift the side bars 31, 32 of the floating frame, thus moving the floating frame through an arc upwardly and lifting the knife 53 brush 61 and discs 74 above the field surface and rendering them temporarily inoperative for convenience in transporting the machine or turning the machine at ends of rows.

In practical use of this machine, the parts being in substantially the positions shown in the drawing, the adjusting nuts 89, 90, 68, 69, 71 and 72 are manipulated to determine the proper and desirable relative positions of the floating frame and discs 74 in respect of each other and of the main frame. These adjustments are indicated by the general projection of the tubers relative to the field surface, which may vary in different fields or in different parts of the same field due to differences of growth and soil conditions. Then the machine is advanced over and along a row of standing beets and the discs 74 comb through, intersect and bisect the tops of successive beets in the row and contact with and ride on the crowns of successive tubers. Thus the discs 74, or any adjacent pairs thereof will engage each beet in the row even though the row of beets may be somewhat sinuous considered laterally and will ride on each successive beet crown and in so doing follow an undulating tread surface due to the various degrees of projection above the field surface. The undulating surface followed by the discs is reflected in a corresponding rise and fall of the front end portion of the floating frame through the reaction on said frame provided for by the arms 76, 77, braces 85, 86, brackets 87, 88, rod 70, and bars 33, 34, all of which provide such connection between the discs and the floating frame as will result in an oscillation of said

frame consonant with the undulation of the tread surface carrying the discs. This oscillation of the floating frame reacts on the knife 53 in that said knife is disposed in a given altitude relative to said frame through its various connections. Hence as the discs 74 rise and fall under the influence of variously projecting tubers, the knife 53 is raised and lowered in similar degree and is caused to strike successive tubers in a horizontal plane correct and necessary to the severance of a uniform segment, with the top, from each tuber. In like manner the brush 61 rises and falls coincident with the knife 53 and scavenges the segments and tops from said knife.

In Figures 5 and 6 hubs 75' are substituted for the bushings 75 and spokes or pins 74' are mounted in said hubs and substituted for the discs 74. The hubs are journaled on a shaft 73 and in practical use this device operates substantially like the device first described in that the spokes or pins 74' ride over the crowns, comb through the tops, penetrate the tops and set on the crowns variously and successively to the end of altitudinally adjusting the floating frame and through it the plane of the cutting edges of the knife and the relation of the scavenging brush, uniformly relative to successive tubers.

It is important to emphasize the distinction between the spaced discs (or spokes on the hubs) and any form of shoe in the matter of so adjusting the knife as to cause it to remove uniform segments from successive tubers irrespective of the projection of the tubers above the ground surface. Any shoe device, which rides over and depresses beet tops, is modified as to the horizontal plane by the degree or quantity of the growth of foliage or tops and cannot so regulate the plane of the knife as to produce uniform segments in separation. But the discs or spokes combing through, bisecting, intersecting or penetrating the foliage or tops, are not materially impeded or obstructed thereby and can readily seat on the crowns of the tubers and so adjust the plane of the knife as to produce uniform segments in separation from said tubers.

I claim as my invention—

1. In a machine of the class described, a main frame, a floating frame hinged at its rear end to and yieldingly supported for actuation through a vertical arc at its forward end by said main frame, a rotary knife carried by said floating frame and operable through a substantially horizontal plane and an altitudinally adjusting device comprising a series of spaced rotary elements depending from and adjustably connected to the forward end of said floating frame and adapted to travel in advance of said knife and also adapted to comb through the tops of standing beets in a field and contact and ride on the crowns thereof, said knife extending beneath said rotary elements.

2. In a machine of the class described the combination of a main frame, a floating frame hinged at its rear end to and yieldingly supported for actuation through a vertical arc at its forward end by said main frame, a rotary knife carried by said floating frame and operable through a substantially horizontal plane, a scavenging device adjacent to the knife and driven coincident therewith, an altitudinally adjusting device depending from and adjustably connected to the forward end of said floating frame and comprising a series of spaced rotary elements each formed with radial parts adapted to comb through the tops of standing beets in a field and contact and ride on the crowns thereof, said knife extending beneath some of said radial parts.

3. In a machine of the class described a main frame, a floating frame hingedly supported to the main frame, a rotary knife having a substantially vertical axis carried by the floating frame and an altitudinally adjusting device comprising a shaft adjustably connected with the floating frame, guides carried by the main frame, sliding connections between the shaft and guides and rotary elements carried by said shaft and formed with radial parts adapted to comb through the tops of standing beets in a field and contact and ride on the crowns thereof.

4. In a machine of the class described, a main frame, a floating frame hinged at its rear end to and yieldingly supported for limiting altitudinal actuation at its forward end by said main frame, an altitudinally adjusting device carried by the forward end of said floating frame, said device comprising an arm adjustably fixed to and depending from the forward end of said floating frame, a horizontal shaft mounted in the lower end of said arm beneath, parallel with and spaced from the forward end of said floating frame and extending on either side of said arm, sliding connections between the ends of said horizontal shaft and portions of said main frame, discs loosely mounted on said horizontal shaft and means for spacing said discs laterally, said discs being adapted to comb through the tops of standing beets in a field and contact and ride on the crowns thereof, a vertical shaft and a knife on the latter shaft adapted to extend beneath the rear portions of said discs, and means for rotating said vertical shaft.

5. In a machine of the class described, the combination of a main frame, a floating frame hinged at its rear end to and yieldingly supported at its front end by said main frame, a vertical shaft depending from said floating frame, a rotary knife carried by said vertical shaft and operable through a substantially horizontal plane, means for rotating said vertical shaft and knife, and an altitudinally adjusting device comprising a horizontal

shaft directly and adjustably connected to the free end of said frame and spaced discs mounted for rotation on said horizontal shaft, said discs being adapted to comb through the tops of standing beets in a field and contact and ride on the crowns thereof to regulate and determine the plane of contact of said knife uniformly with successive beets, said knife extending beneath the rear portions of some of said discs. 10

Signed at Denver, in the county of Denver and State of Colorado, this 3rd day of May, 1924.

JAMES MAZZOCCO.