April 15, 1930. H. V. HOSKINS 1,755,004

ROTARY DISK WEEDER

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Fig. 1.

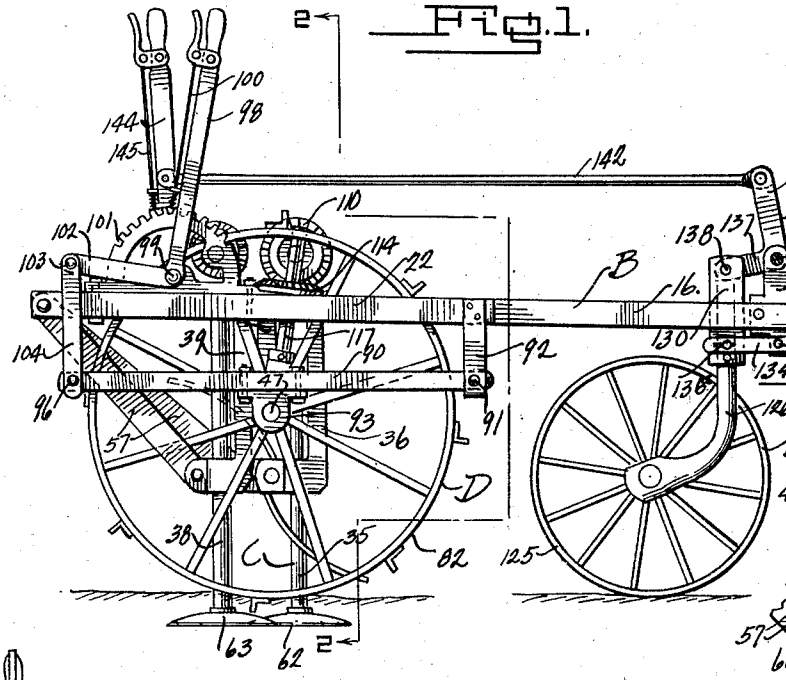


Fig. 10.

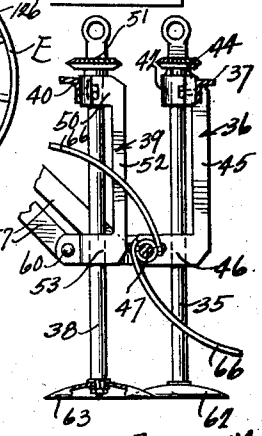
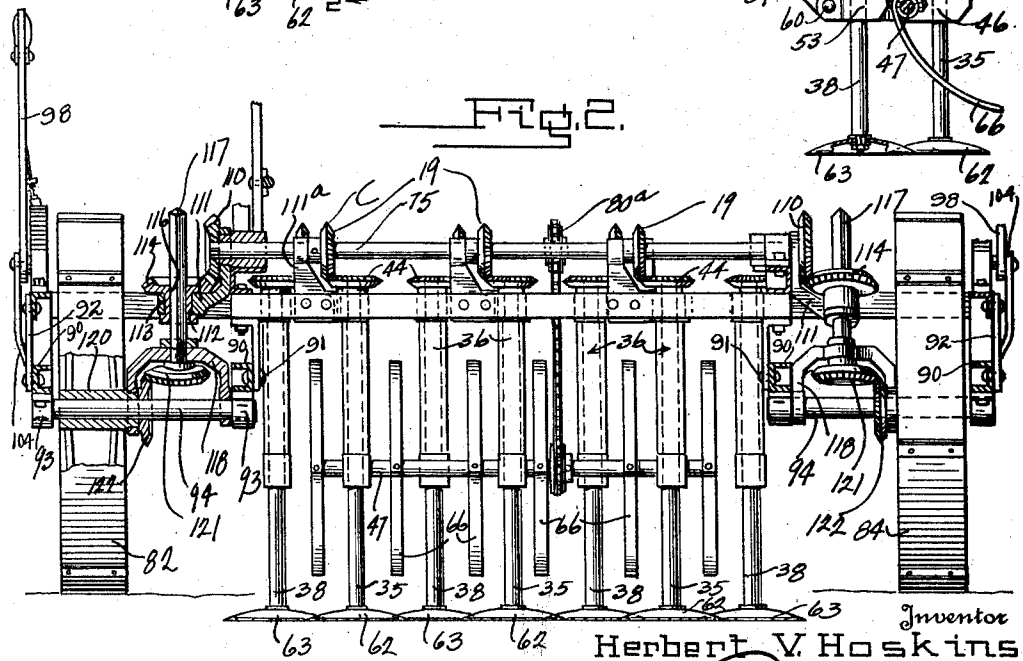


Fig. 2.



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Fig. 5.

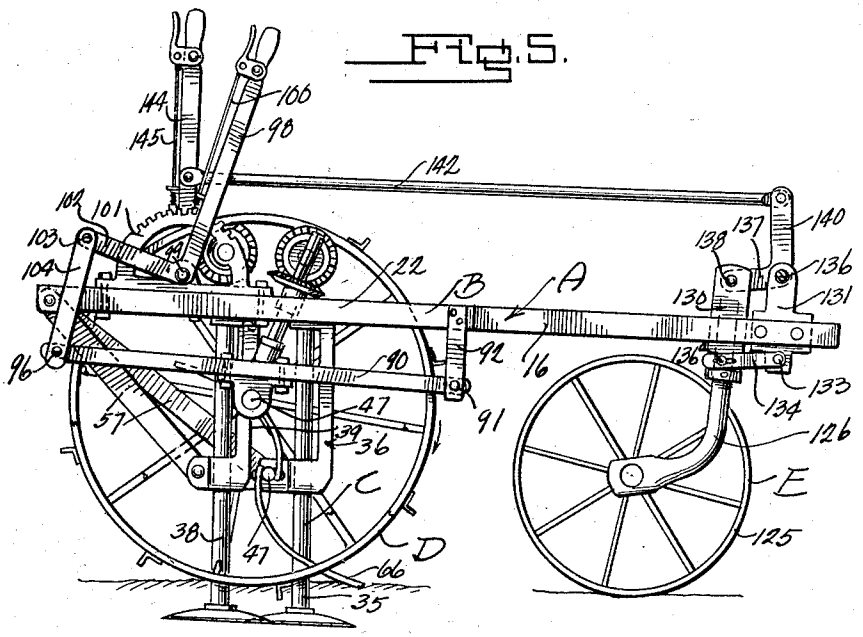
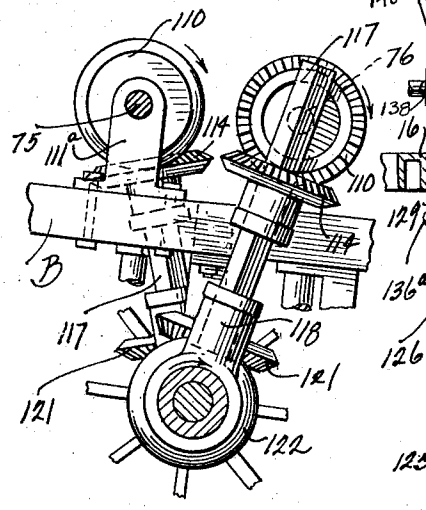


Fig. 7. Fig. 8.

Fig. 6.



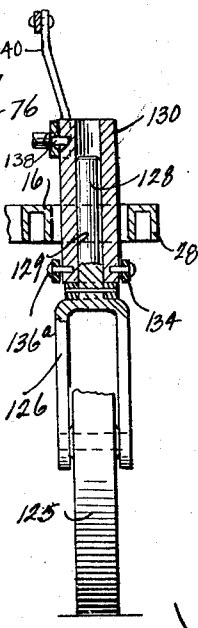
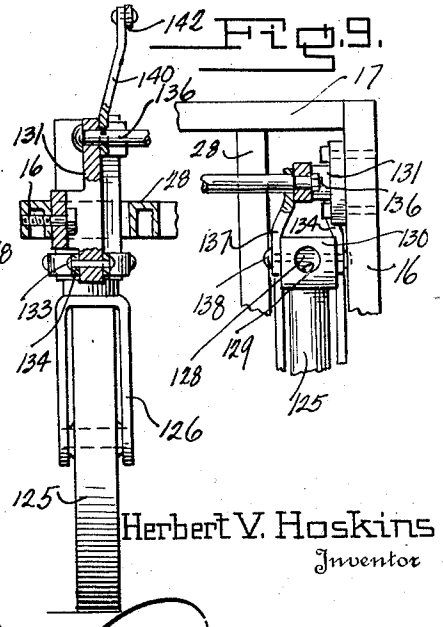


Fig. 9.



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ROTARY DISK WEEDER

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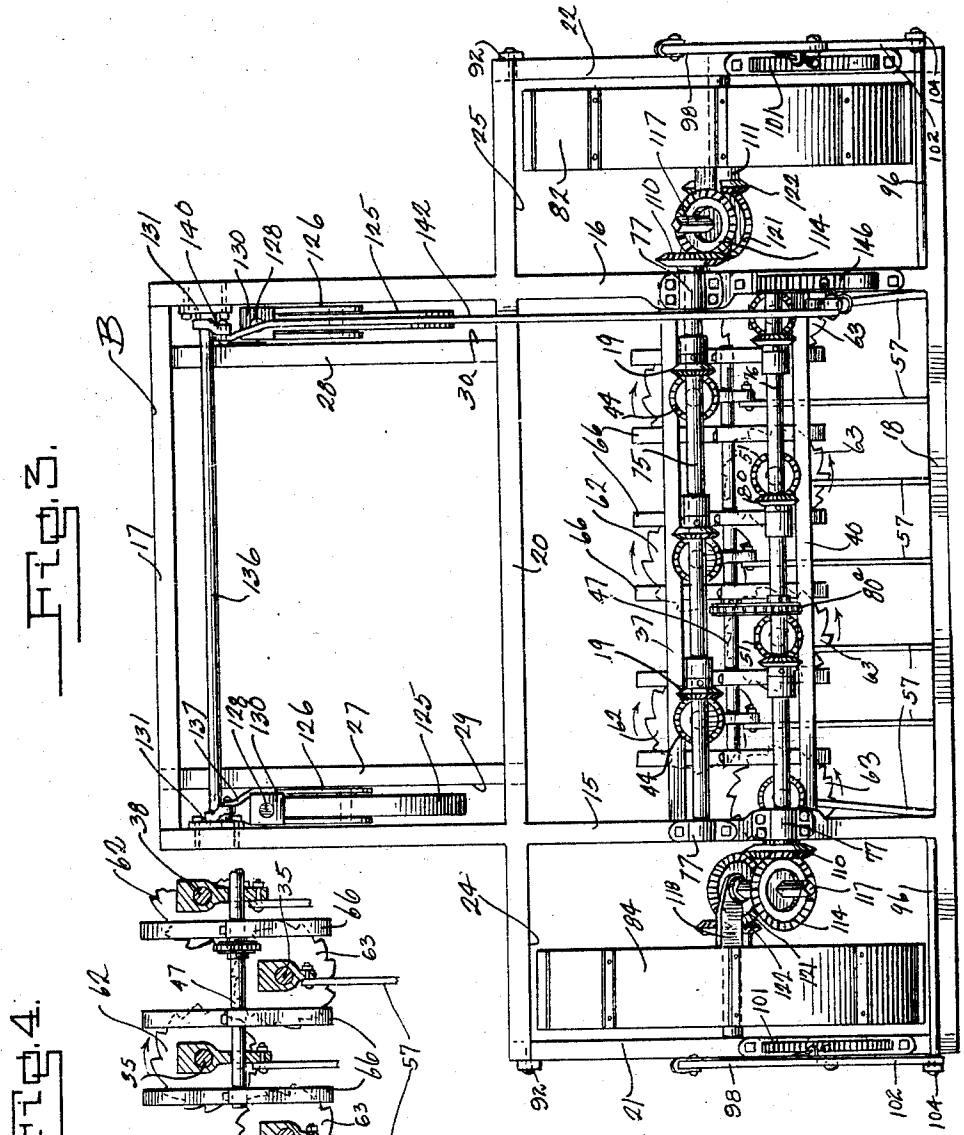


Fig. 3.

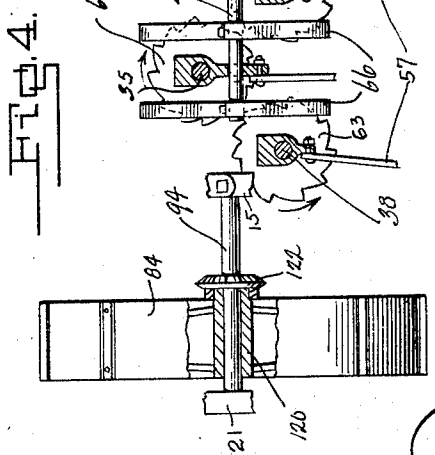


Fig. 4.

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Patented Apr. 15, 1930 1,755,004

UNITED STATES PATENT OFFICE

HERBERT V. HOSKINS, OF WATERVILLE, WASHINGTON

ROTARY DISK WEEDER

Application filed August 16, 1926. Serial No. 129,553.

This invention relates to improvements in weeders.

The primary object of this invention is the provision of a rotary disk weeder embodying improvements in means to support a plurality of rotary weed cutting disks upon a frame, in such manner that the angle thereof with respect to the contour of travel may be altered.

A further object of this invention is the provision of an improved rotary disk weeder embodying means to vary the depth of penetration of the cutter disks into the earth.

Other objects and advantages of this invention will be apparent during the course of the following detailed description.

In the accompanying drawings, forming a part of this specification, and wherein similar reference characters designate corresponding parts throughout the several views,

Figure 1 is a side elevation of the improved rotary disk weeder, showing one adjustment thereof.

Figure 2 is a sectional view taken substantially on the line 2—2 of Figure 1.

Figure 3 is a plan view of the improved weeder.

Figure 4 is a fragmentary sectional view looking down upon the cutter disks.

Figure 5 is a side elevation of the improved rotary disk weeder with the parts thereof in a different adjusted relation than illustrated in Figure 1.

Figure 6 is a view showing the adjustable mounting and driving connection for the rear running gear of the vehicle.

Figures 7 and 8 are views illustrating the details for the adjustable mounting of the front running gear of the improved weeder.

Figure 9 is a plan view of the adjustable front running gear details illustrated in Figures 7 and 8.

Figure 10 is a fragmentary sectional view showing the improved rotary cutter disk and means for mounting the same.

In the drawings, wherein for the purpose of illustration is shown only a preferred embodiment of this invention, the letter A may generally designate the improved weeder, which may comprise a main frame B, upon which the improved rotary cutting disk construction C is mounted. The frame B is supported by adjustable rear running gear D which is adjustable vertically with respect to the plane of the main frame B to vary the depth of penetration of the rotary cutting disks into the earth. The front running gear E is adjustably mounted for elevating or lowering the frame at its front end.

The main frame B preferably includes the elongated side rails or angles 15 and 16 connected at their forward ends by a transverse rail or beam 17. At their rear ends the rails 15 and 16 are connected by an elongated transverse beam 18, which at the end portions thereof extend beyond the side rails 15 and 16, for a considerable distance. Intermediate the ends of the side rails 15 and 16, the same are connected by means of a transverse elongated beam 20, which is preferably of the same length as the rear beam or rail 18, at the ends thereof extending beyond the side rails 15 and 16. The free ends of the transverse beams 18 and 20 are connected at the sides of the vehicle by short side beams 21 and 22. This construction provides a framework having wheel receiving compartments 24 and 25 at opposite sides of the frame B, laterally outwardly of the side rails 15 and 16, so that the rear wheels of the vehicle may be accommodated therein in a non-interfering relation with the weed cutting apparatus.

In the main frame B forwardly of the cross beam 20 are disposed short beams 27 and 28 in adjacent spaced parallel relation with respect to the side beams 15 and 16; and at the inner sides thereof; said beams 27 and 28 at their rear ends being connected to the cross beam 20 and at their forward ends connected to the cross beam 18, so as to provide spaces between the main frame side beams and said shorter beams 27 and 28, illustrated at 29 and 30 in Figure 3 of the drawings, wherein details of the support and adjusting means for the front running gear are received, as will be subsequently described.

Referring to the rotary cutter disk construction, it is preferred to provide two transverse rows of rotary cutting disks, one forwardly of the other, with disks of one row

staggered with respect to the other. To this end, front upright disk supporting shafts 35 are supported by brackets 36 upon a cross angle or beam 37. The uprights 35 are preferably three in number arranged transversely of the longitudinal axis of the frame B and comprise the uprights for the rotary disks of the front row. Similar uprights 38 are mounted by brackets 39 upon a second cross beam 40 rearwardly of and parallel with the front cross beam 37; the cross beam 40 of course being secured at its ends to the side rails 15 and 16 in the main frame, as is also the beam 37. The rotary disk uprights 38 are arranged in a plane transversely of the frame B, rearwardly of the row of uprights 35, and said uprights 38 are preferably four in number and staggered with respect to the uprights 35.

The bracket means 36 for the uprights 35 includes a clamp 42 at the upper end thereof clamped directly to the angle 37, and in which the upper end of the upright 35 rotatably bears, each upright 35 at its end supporting a bevel gear 44 which is driven by means to be subsequently described. The bracket means 36 furthermore includes a downwardly extending brace 45 which is connected at its upper end either to the angle 37 or clamp 42 and at its lower end it is provided with a right angled upright supporting extension 46, in which an upright 35 rotatably bears intermediate the ends thereof. The bearing extensions 46 extend to the rear of the vehicle, and at their rear ends beyond the rotary shafts 35 they rotatably support a horizontal rake or tedder shaft 47, which is horizontally positioned between the rows of uprights 35 and 38, as can readily be seen from Figure 10 of the drawings.

The bracket means 39 for each of the rear uprights 38 includes a bearing portion 50 at its upper end thru which the upper end of the shaft 38 rotatably extends, and receives a gear 51 above the bearing portion 50. This portion 50 is connected to the cross beam 40 as illustrated in Figure 10 of the drawings. The bracket 39 furthermore includes the depending brace portions 52 which at the lower end thereof is provided with a rearwardly extending right angled bearing extension 53 in which the upright 38 bears substantially midway of its ends, although closer to the lower end than the upper end.

To stabilize the position of the lower ends of the brackets 36 and 39, diagonal thrust bars 57 are provided, which at their upper ends are connected to the rear beam 18 of the frame B, and at their lower ends are connected as at 60 either to the lower bearing extensions of said brackets, or in the case of the mounting for the forward uprights 35 the thrust bars 57 may be connected directly to the shaft 47.

At their lower ends the uprights 35 and 38 are respectively provided with rotary disks 62 and 63. The disks 62 which comprise the front row are arranged to rotate in one direction, whereas the disks 63 comprising the rear row of disks rotate in an opposite direction. The rotary disks 62 and 63 are provided with peripheral teeth which face in the direction of rotation, to effect the cutting operation. The rotary disks 62 and 63 are all located in the same plane of rotation, although this plane of rotation may be varied from a horizontal plane to an inclined plane depending upon the adjustment of the running gear of the vehicle to be subsequently described.

It is readily apparent that the function of the rotary cutter disks is to cut the weeds beneath the earth surface as is clearly designated in Figures 1 and 5 of the drawings. On the shaft 47 are provided wire arms 66 or the like, the purpose of which are to engage the weeds as they are cut by the rotary disks and throw them to the rear of the vehicle out of the way.

Transverse horizontally disposed rotary shafts 75 and 76 are provided for the front and rear rows of rotary disks respectively; these rotary shafts 75 and 76 being rotatably supported in suitable bearings 77 on the side rails 15 and 16 of the main frame B; said shafts 75 and 76 of course being parallel and extending directly transversely of the longitudinal axis of the frame B, above the respective cutters which they drive. On the shaft 75 are provided bevel gears 79, one of each in meshing relation with a bevel gear 44 at the top of the front row uprights 35, and on the rotary shaft 76 are provided similar bevel gears 80 each of which is in meshing relation with a top bevel gear 51 of the shaft 38 of the rear row disks 63.

In order to accomplish the opposite drive of the rotary disks in the front row of the rotary disks of the rear row, the front row drive shaft 75 is connected to the right hand rear wheel 82 of the rear running gear D, whereas the rear drive shaft 76 for the rear row of rotary disks is connected for drive directly by the left hand supporting wheel 84 of the rear running gear D.

Referring to the rear running gear D, the construction thereof includes the rear wheels 82 and 84 above mentioned, at opposite sides of the vehicle, operating in the spaced side compartments 25 and 24 respectively.

For each of the wheels 82 and 84, a pair of movable beams 90 is provided, located at opposite sides thereof, at their forward ends being pivotally supported at 91 upon the lower ends of depending brackets 92 which are connected with the frame B and depend therefrom. Intermediate the ends the movable beams 90 have bearings 93 thereon, in which a wheel shaft 94 is journalled at its ends. At their rear ends the movable beams

90 for each of the running wheels are connected by means of a transverse rod 96. For each transverse rod 96 of each rear running wheel 82 and 84, it is preferred to provide means to hold the rear ends of the movable beams 90 in a desired elevation. This means consists in providing a bell crank operating lever 98, pivoted at 99 on the frame B, which has a pawl mechanism 100 thereon, for cooperation on a toothed segment 101 of the well known type. At the outer end the arm portion 102 of the operating lever 98 is pivoted at 103 to the upper end of a connecting link 104, the lower end of said connecting link 104 being connected to the rod 96, preferably at one end thereof, although it may be connected intermediate the ends thereof in any desired location where found practical in order to effect the proper operation of the beams 90 to hold the axis of the supporting wheel at a desired spaced relation with respect to the plane of the frame B, to vary the depth of the rotary cutters in the ground over which the weeder is traveling.

The rotary disk operating shaft 75 is directly driven by the supporting wheel 82, and the rear shaft 76 is directly rotated by the supporting wheel 84. The means for driving these shafts from their respective supporting wheels consists in the provision of a bevel gear 110 placed at the end of the respective shaft 75 or 76, as the case may be, which faces the ground wheel to drive the same. This gear 110 is keyed with its shaft, and the same is provided with a groove in the hub portion thereof upon which an L-shaped supporting bracket 111 is pivoted or fulcrumed. The bracket 111 is provided with a horizontal arm portion in which a vertical opening 112 is provided, which rotatably receives the hub portion 113 of a bevel gear 114 which meshes with the gear 110. Thru the gear 114 and its collar or hub portion 113 is provided a polygonal shaped opening 116, thru which a polygonal shaped shaft 117 is slidable, although non-rotatably mounted in said passageway 116. The gear 114 may thus be said to be splined on the shaft 117. The shaft 117 is rotatably mounted at its lower end in a yoke or U-shaped bracket 118. One leg of this yoke 118 is pivoted direct on the shaft 94 adjacent the inner end thereof whereas the other end is pivoted on the hub portion 120 of the respective running wheel 82 or 84 as the case may be. On the lower end of the sliding shaft 117 is provided a gear 121 which meshes with a gear 122 rigid with the hub 120.

Upon rotation of the wheel 82, 84, the shaft 94 which is keyed therewith rotates, and this causes a rotation of the gear 121 and rotation of the shaft 117. As the gear 114 is splined on the shaft 117 said gear 114 rotates, and with it the gear 110 to cause rotation of the rotary disk connected shaft 75 or 76, as the case may be. The raised or lowered movement of the supporting wheels 82 or 84 with respect to the main frame of the weeder is permitted without interfering with the driving connection between the rear running gear and the shafts 75 and 76, because upon such movement the shafts 117 will slide thru the passageways 116 of the gears 114 which are splined thereon, and the gears 114 may slightly rock incident to the fulcruming or pivoting of the L-shaped brackets 111 about the axes of the shafts 75 and 76.

It is readily apparent that upon adjustment of the operating levers 98 the axes of the ground wheels 82 and 84 may be moved towards or away from the plane of the frame B, and thus since the rotary disk supporting shafts 35 and 38 are not vertically slidable upon adjustment of the supporting wheels, the depth of penetration of the rotary disks into the soil is regulated.

Means is provided to regulate the plane in which the rotary disks operate, which includes the front running gear construction E. This front running gear includes a pair of front supporting wheels 25, each pivotally supported at the free end of an L-shaped caster bracket 126, in the usual manner. The caster bracket 126 of each wheel 125 includes an upper end 128 insertable into the passageway 129 of a sleeve-like socket 130 which is mounted for pivotal movement. The wheels 125 are provided below each of the spaces 29 and 30 at the front of the main frame B, and in these spaces the respective sockets 130 are mounted. On the frame B for each of the caster wheels, a bracket 131 is mounted, forwardly of the sockets 130, which at their lower ends extend below the plane of the frame B and are pivotally connected at 133 with the forward end of a connecting link 134, which at its rear end has a slot therein having slidable pin connection at 136ª with the lower end of each of the caster sockets 130.

At the front of the frame B, on the upper ends of each bracket 131, is a transverse rod 136, which is provided with rearwardly extending arms 137 pivoted at 138 to the upper ends of the caster sockets 130. It is now readily apparent that upon oscillation of the shaft 136 the extending arms 137 will be swung upwardly or downwardly and as a consequence the caster sockets 130 will be elevated and rocked forwardly and rearwardly in order to elevate or lower the caster wheels 125, and consequently to permit a front end elevation or lowering of the frame B, so that the cutting plane of the rotary cutting disks 62 and 63 will be horizontally inclined or disposed at an inclination to the horizontal, to perform the most efficient weed cutting.

In order to operate the shaft 136 an up-

standing lever arm 140 is connected therewith, which at the top thereof has a connecting rod 142 pivoted thereto and extending rearwardly for intermediate connection to an operating lever 144, which at the lower end is pivoted on the frame B and is provided with a pawl mechanism 145 operating on a segment 146 of the frame B, in the usual and conventional manner.

The operation of the weeder from the foregoing description will be apparent to anyone skilled in this art. Due to the ability to elevate the rear running gear, with respect to the frame B and the cutting disks, the latter may be inserted to the desired depth into the ground for cutting the root of the weed at the desired location, according to the characteristic thereof. In some instances it may be desirable to incline the cutting plane of the rotary disks, and the front running gear is adjustable as described to permit such. The shaft 47 is operably connected to the shaft 76 by a chain 80ª.

Various changes in the shape, size, and arrangement of parts may be made to the form of invention herein shown and described, without departing from the spirit of the invention or the scope of the claims.

I claim:

1. In a weed cutting machine the combination of a main frame, a shaft horizontally and rotatably supported by the main frame, vertical shafts supported by the frame, gear means connecting the horizontal shaft to the vertical shafts for rotation of the latter upon rotation of the former, cutting disks at the lower ends of said vertical shafts, running gear including supporting wheels, means for adjusting the axes of the supporting wheels towards and away from the frame, and a driving connection between a wheel of the running gear and shaft, operative in any vertically adjusted position of the wheel.

2. In a weed cutting machine the combination of a main frame, a shaft horizontally and rotatably supported by the main frame, vertical shafts supported by the frame, gear means connecting the horizontal shaft to the vertical shaft for rotation of the latter upon rotation of the former, cutting disks at the lower ends of said vertical shafts, running gear wheels, means for adjusting the axes of the said wheels towards and away from the frame, means for connecting the running gear for operation of the horizontal shaft, said last mentioned means including a gear keyed on the horizontal shaft, a gear keyed with a supporting wheel of said running gear, a bracket swingable about the axis of rotation of the horizontal shaft, a gear rotatably carried by the bracket in meshing relation with the last mentioned gear keyed on said horizontal shaft, said gear carried by said bracket having a passageway therethrough, a bracket pivotally mounted for swinging about the axis of rotation of said supporting wheel of the running gear, a gear carried by the last mentioned bracket in connected relation with the gear which is keyed with said supporting wheel, and a shaft connected with said last mentioned gear having a splined connection within the passageway of the gear above mentioned.

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