

May 31, 1927.

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1,630,576

TRACTOR SUPPORTED PLOWING ATTACHMENT

Filed March 20, 1925

3 Sheets-Sheet 1

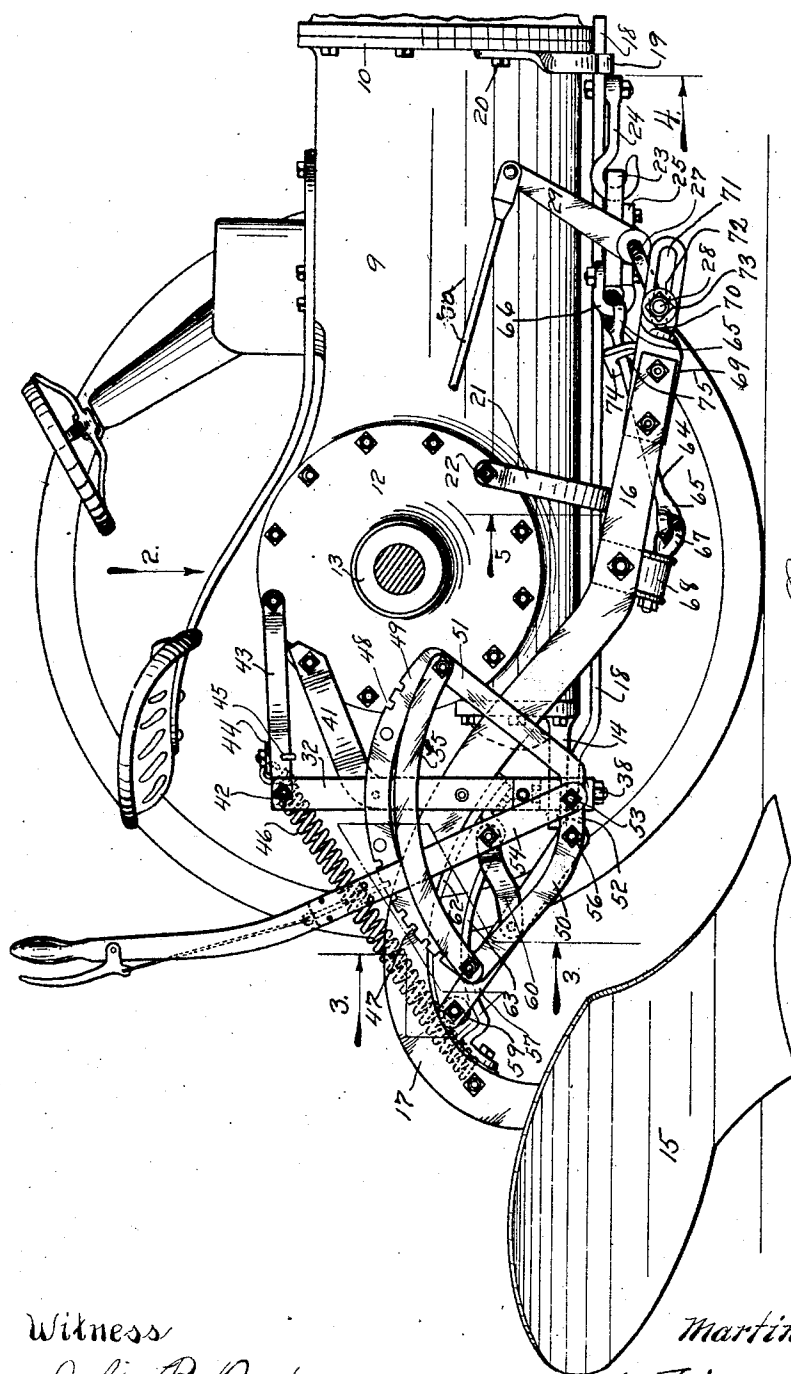


Fig. 1.

Witness

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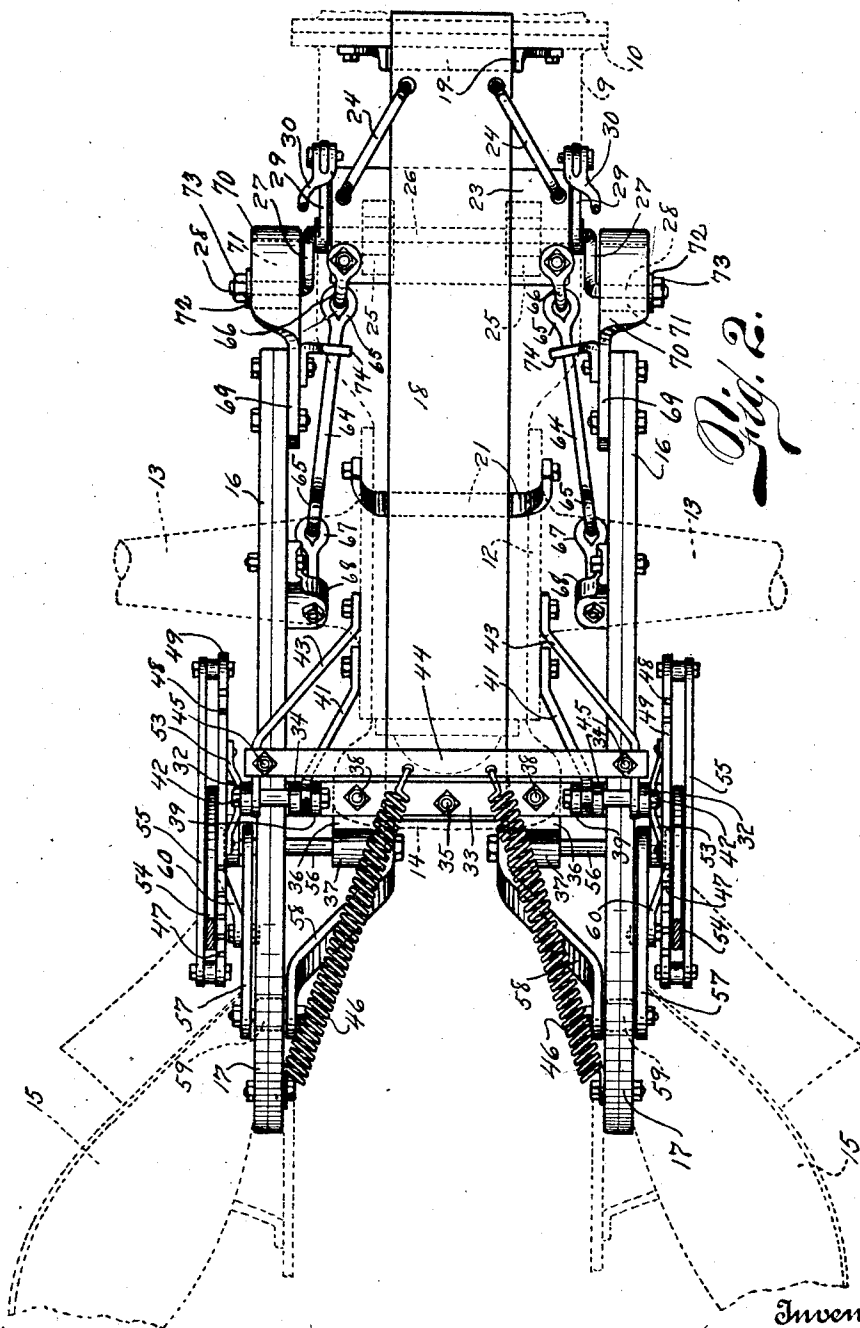
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3 Sheets-Sheet 2



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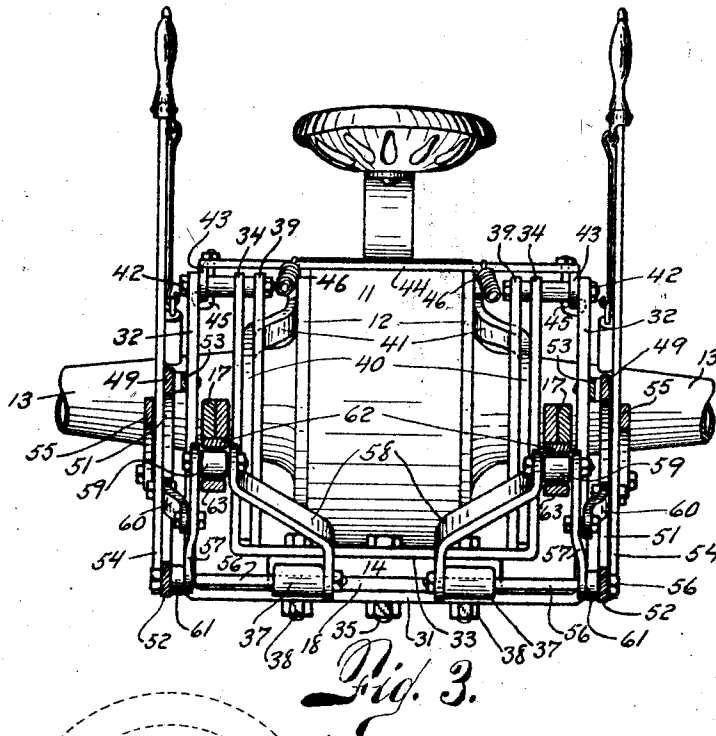
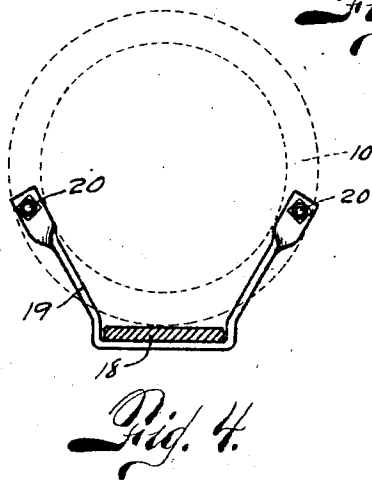
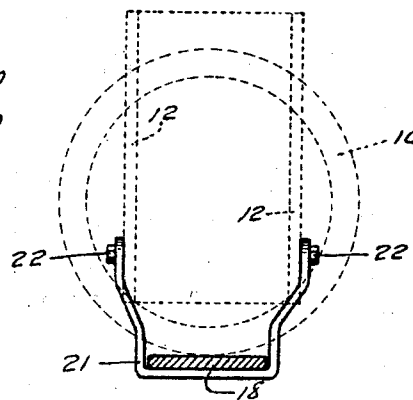
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TRACTOR SUPPORTED PLOWING ATTACHMENT

Filed March 20, 1925

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

MARTIN B. MONSON, OF JEFFERSON COUNTY, NEAR WHEATRIDGE, COLORADO, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE MORO PLOW & MANUFACTURING COMPANY, OF DENVER, COLORADO, A CORPORATION OF COLORADO.

TRACTOR-SUPPORTED PLOWING ATTACHMENT.

Application filed March 20, 1925. Serial No. 16,981.

This invention relates to tractor-supported plowing attachments and more particularly to means for mounting and adjustably controlling the plowing means thereof.

5 The improvements have been more especially devised with reference to that type of tractor plows with which each of a balanced pair of laterally spaced plows, alternatively operative for two-way plowing, has its plow beam dually mounted by means of substantially spaced forwardly and rearwardly disposed supporting elements in directly suspended association with the tractor, the forward support providing for pivotal connection, between the plow beam and a main body part of the tractor, while the rearward element functions as a movable support for controlling the raising and lowering of the plow beam with its attached plow body or bottom, and the advantages of which are all well understood.

10 However, while I have illustrated and shall describe my improvements with more particular reference to two-way plowing apparatus, it is nevertheless emphasized at the outset that I do not wish to unnecessarily confine myself to this particular use in all cases, excepting where especially claimed, because from another aspect the invention actually comprehends the broader embodiment of the novel combination of elements relatively to a single plow beam and its attached bottom.

15 Primary objects of the invention have been to simplify, strengthen and generally perfect plow beam mountings of the aforesaid analogous type, not only for more facile operation, increased efficiency and durability in use, but also from the viewpoints of economy in manufacture and the material saving of time, trouble and expense in installation and demounting operations, and especially with reference to a certain type of relatively low cost and compactly built tractor which has its main body extending down well below the axis of its power traction wheels.

20 The foregoing and other objects and advantages, however, will more clearly appear as incidental to the following disclosure, and with these general outlining remarks, therefore, reference will now be had to the accompanying drawings, illustrating a practical

embodiment of the improvements, in which drawings—

25 Figure 1 is a side elevational view of the attachments as applied to the rear end of the aforesaid type of tractor, the traction wheel on that side being omitted, for clearer illustration; Figure 2 is a top plan view thereof, the plow bottoms and tractor end being shown in dotted outline; Figure 3 is a cross-sectional view, taken along the irregular section line 3—3 of Figure 1; Figure 4 is a detail cross-sectional view taken along the line 4 of Figure 1; and Figure 5 is a detail cross-sectional view taken locally along the line 5 of Figure 1.

30 The numeral 9 designates the elongated portion of the transmission housing of the tractor, the forward end of which housing has an annular coupling flange 10, while the rear end provides for the worm drive casing 11 that has the head plates 12, carrying the axle casings 13, and the tractor being provided with the usual tail lug or draw bar cap 14. The numeral 15 designates the plowing means proper, the beam of each of which may have a forwardly disposed straight section 16, extending rearwardly as a substantially curving section 17 for mounting its plow bottom. However, none of these elements of themselves forms any part of my invention, but I have first referred to them by reference numerals, in identifying the parts to which my equipment may perhaps be best fitted.

35 The numeral 18 designates an elongated base bar support that extends longitudinally, from immediately below the draw bar cap 14, for the entire length of the transmission housing 9, in slightly offset or spaced relation to the central bottom of said housing, the forward end of said base bar 18 being supported by a forward metal strap hanger 19, the angular suspension arms of which are securely bolted, as at 20, or otherwise anchored to the coupling flange element 10. To prevent any possible buckling or distortion of this main base bar 18 from stresses imposed thereon by parts connected thereto, although I do not believe the addition is necessarily essential, I have shown an intermediate metal strap hanger 21, for snugly seating the base bar 18 at more or less of a central position, the bent suspension arms

of which intermediate hanger may be securely bolted, as at 22, or otherwise anchored to the head plates 12 of the worm drive casing.

5 At the underneath forward end portion of the base bar 18, substantially distant rearwardly from its extreme forward end, there is securely bolted, or otherwise fixedly attached, a cross-bar support 23, which projects transversely at each end substantially beyond the side edge faces of the main bar support 18, or perhaps instead of providing a separate cross-bar support, these lateral projections might be formed as an integral part of the base bar 18. Although I do not believe them to be necessarily essential, I have also shown a pair of angularly disposed bracing rods 24, in the form of hook elements, extending from the projecting ends of said cross-bar 23 to the said base bar 18 forwardly of said cross-bar.

The underneath face of the cross-bar 23 may be provided with a pair of bearing blocks 25, shown in dotted lines at Figure 2, for journaling a rock shaft 26 that is formed with crank-like ends 27 terminating in laterally projected pintle arms 28, which are adapted for actuation within complementary slotted elements as hereinafter referred to. The rock shaft 26, with its crank-like ends, may be operated by lever arms 29 attached thereto adjacently of said crank-like ends, and the whole functioning analogously to bell-crank leverage. The swinging ends of the lever arms 29 may be pivotally connected to complementary actuating rods 30, shown broken off.

The cross-arm 31, of a U-shaped support having upstanding arms 32 and forming part of a framework general supporting structure which will now be described, extends immediately underneath the rear end of the base bar 18, and the cross-arm 33, of a second U-shaped support having upstanding arms 34, rests directly upon the draw bar cap 14, the two said cross-arms 31 and 33 being transversely disposed in parallel alignment and being securely bolted together and to said draw bar cap 14 and to the rear end of said base bar 18, as is indicated by the single bolt 35 although there may be more of such bolts. At the opposite side edge faces of the rear end of the base bar 18, and between the cross-arm 31 and the draw bar cap 14, there are disposed a pair of narrow supporting plates 36 terminating in rearwardly projected transversely disposed shaft supports 37, hereinafter referred to, and the cross-arms 31 and 33 are further bolted together and to said draw bar cap and said supporting plates 36 by bolts, indicated at 38, extending through and tying all of these elements together, as is clearly seen from Figures 2 and 3.

Upstanding stiffener bars 39 are shown in

slightly spaced relation to the upstanding arms 34, between which are disposed the bars 40 having forwardly projected arm extensions 41, at their upper ends, that are securely bolted to the head plates 12. The paired sets of bars or arms 34—39—40 are rigidly bolted together, or otherwise suitably clamped, but the bars 39 could be dispensed with, or in fact the upstanding arms 34 could be omitted and the bars 40 made to serve in their place, by forming the bars 40 as integral continuations of the cross-arm 33 of the inner U-shaped support.

In the drawings, the upper ends of the sets of arms or bars 32—34—39 are shown as being securely connected together by the tie bolts 42, which latter also rigidly support the rear ends of forwardly projected angle bars 43, the forward ends of which latter are securely bolted to the head plates 12. Spacing sleeves are shown encompassing the tie bolts 42 for obvious purposes.

A laterally disposed brace bar 44 is seated at its ends upon the angle bars 43, being securely fastened thereto in any suitable manner, as for instance by the nut controlled hook elements 45, and substantially stiff coil springs 46 extend between and at their ends are secured, respectively, to said brace bar 44 and the curved rear sections 17 of the plow beams, the said springs functioning for the purpose hereinafter referred to.

The numerals 47 and 48 respectively designate rearwardly and forwardly located peripheral notches in ratchet or segment bars 49 of sector frames having downwardly convergent radial arms 50—51 which are joined at their lower ends by short sections 52. These sector frames, of which there is one at each side of the general framework structure, may be integrally formed and the segment bars 49 thereof are securely held in spaced relation to their complementary upstanding arm 32, of the outer U-shaped support, by spacing elements 53 to which the segment bars are secured and which spacing elements in turn are secured to said upstanding arms 32. The lower ends of said sector frames are also securely bolted as at 53, through the short sections 52, to their complementary upstanding arm 32, on which bolts 53 the lower ends of operating levers 54 may be pivotally supported, and the said operating levers being provided with the usual means for controlling the actuation of detents coacting with the ratchet notches 47 and 48 of the segment bars 49. A curved guide bar 55 is mounted in spaced relation to each of the segment bars 49, between which bars the levers operate, as is understood.

Short shafts 56 extend between the supports 37 and the lower portions 52 of the sector frames, the ends of which shafts may be threaded and project slightly beyond

their supports to receive securing nuts. On these short shafts 56 are mounted the lower ends of crank members, the upper ends of the paired rocker arms 57—58 of which
 5 mount a crank arm or cross element therebetween, shown as a roller 59, disposed immediately under the curved section 17 of its complementary plow beam, which roller has a cam action on the underneath curved face
 10 of said plow beam, or on suitable cam-track means carried thereby. The outer rocker arms 57 are each pivotally connected by a link 60 to a complementary one of the operating levers 54. The short shafts 56 may be
 15 fixedly supported, with the rocker arms 57—58 pivotally swinging thereon, or these shafts could be mounted as rock shafts, with the rocker arms 57—58 securely attached thereto, to swing in reverse directions when so actuated by the operating levers. The numeral
 20 61, Figure 3, simply designates spacing washers which may encompass the shafts 56 between the parts 52 and 57.

Of course, in addition to the direct suspension of the plows from the tractor, the swinging or rocker-cam arms 57—58 mounting the rollers 59, underneath the rear curved section 17 of each plow beam, provides both a fulcruming means for tilting the plow
 25 beams, as may be desired, and also means controlled by the operating handles 54 for bodily elevating and permitting of the lowering of the plows relatively to the ground.

While in many instances each roller 59
 35 could be made to directly contact the lower face of its rear plow beam section, there may be other instances where it would be more desirable to employ cam-track means, underneath said lower faces, to provide a more
 40 pronounced curving face or wedging surface, towards the forward end of the travel of the roller, than would be provided for by the ordinary curvature of such plow beams of standard makes, unless indeed they were
 45 specially shaped in initial production, the object of such pronounced curvature being to facilitate and accelerate the raising of the plow as the operating lever 54 approaches the forward position of its swing.

To this end there is illustrated an inserted rearwardly tapering upper track element or shim 62, disposed along the underneath face of the rear portion of each plow beam, and spaced therefrom, at a distance slightly
 55 greater than the diameter of the rollers 59, is a lower track element 63, against which track elements the rollers ride, the elements 62 and 63 providing for an arcuate slot along the under side of the beam. Although
 60 the shim 62 is shown seated directly against the underneath face of the plow beam, it is nevertheless obvious that it could be so mounted as to be wholly or partially spaced therefrom, and it is equally obvious that the
 65 two track elements 62—63, of each pair, could

be formed as a unit, for attachment to the plow beam, instead of in two separate parts as actually illustrated.

The numeral 64 designates coupling rods, one of which extends between each plow
 70 beam and the base bar 18, and these coupling rods may be formed with end eyes 65, disposed at right angles to each other, the forwardly located eyes being connected to complementary clevis-like elements 66, attached
 75 to the rear corners of the cross-bar 23, and said rearwardly located eyes being connected to complementary eye-bolt elements 67 of supports 68 fixedly secured to the plow beams, preferably at positions towards the
 80 rear of the forward portions 16 thereof. Of course, equivalent coupling means could be substituted for the foregoing.

At the end of each plow beam section 16, or at any suitable position thereof in advance
 85 of the supports 68, I provide any suitable slotted means to receive the pintle arms 28. This means is specifically shown as embodying plates 69, fixedly attached to said sections 16, which plates at their forward portions
 90 70 are bent at right angles and turned back upon themselves to provide substantially wide laterally opening slots 71, and within these slots are projected the pintle
 95 arms 28 of the crank-like elements 27, carried by the shaft 26 that is operated by the levers 29 connected with the actuating rods 30 leading towards the seat of the tractor.

With the forward mounting of the plow beams as thus far disclosed, there would
 100 probably be a tendency towards lateral swing, which should be avoided, and this might be overcome in various ways. I prefer to do this by threading the ends of the pintle arms 28 to take the nuts 73 with
 105 washers 72 interposed between the nuts and the outer edge faces of the slotted member 70, the inner edge faces of said members 70 substantially abutting against the crank arms
 110 27. Or I might employ a retaining guide member 74 for the anchoring connecting rod 64, either with or without the use of the elements 72—73, the said guide member 74 having a vertical slot 75 (see Fig. 1) through
 115 which the rod 64 extends. Either or both of these constructions would overcome any substantial side sway or swing of the plow beams.

As the individual mountings of the plows, one at opposite sides of the tractor, is the
 120 same in each instance, in describing the operations of my improvements, I will accordingly only refer to the plow mountings at one side of the tractor.

Referring more particularly to Figure 1,
 125 where the plow is shown partially lowered and with the forward end of its beam set at a position above its lowermost vertically adjustable limits, although the coil spring
 130 46 provides for a resilient connection and

the rod 64 for a flexible anchorage, respectively, between the tractor and the rear and forward portions of the plow beam, it will be seen that the plow beam is in fact only positively supported at two positions, one supporting means being the roller 59, located rearwardly of the tractor, while the other supporting means is the pintle arm 28, located forwardly of the rear of the tractor and below the zone of its body portion, and both of said supporting means functioning as shiftable fulcrums.

Now, if it be desired to plow a deeper furrow, upon gradually operating the lever 54 rearwardly, the link 60 will force the arm 57, together with the roller 59 and its other supporting arm 58, to swing rearwardly and downwardly, thus allowing the plow 15 to tend to lower itself of its own weight, against the tension of the spring 46, and as augmented by the bite of the plow point, in the earth, as well as by the engagement of the roller with the lower track 63, the parts being automatically locked against reverse movements, until released, by the detent of the lever 54 engaging the proper notch 47 of the segment bar 49.

During the foregoing movements, the forward end support of the plow beam would pivot on the pintle arm 28, and the tendency would be to cause the plow point to be slightly directed upwardly. If it is desired, therefore, to make the plow point bite more positively down into the earth, then upon exerting a pull on the rod 30, through the medium of its operating lever not shown, the lever 29 will rotate the shaft 26 slightly in a direction to swing the pintle arm 28 in an arc downwardly and forwardly, moving the front end of the plow beam downwardly, with the rear end thereof fulcruming on the roller 59, and causing the plow point to slightly swing downwardly and rearwardly. It is understood that these operations would be reversed if it were desired to have the plow point make an upward glancing cut.

To elevate the plow any limited distance, the lever 54 is operated forwardly as far as desired, but assuming that the plow is to be raised entirely out of operative position, as when arriving at the end of a field or on any other occasion, then it is apparent that the lever 54 will be operated forwardly until its detent engages with one of the forward notches 48 of the segment bar 49, when the parts will be held locked or latched. During the forward movement of the lever 54, the link 60 pulls the swinging arm 57, with the roller 59 and its other supporting arm 58, upwardly and forwardly to cause the roller to ride along the upper track 62, or against the plow beam if there be no upper track, so that the rear end of the plow beam will be elevated, with its plow, the forward end support of the plow

beam trunnioning on the pintle 28. During the elevating movement of the plow, it is obvious that the action of the spring 46 will augment the forward pressure on the lever 54 and thereby assist in raising the more or less heavy plow and rear end of the beam, and it will likewise be obvious that the raising of the plow will be more or less accelerated, towards the end of the forward movement of the lever 54, in proportion to the degree of curvature of the forward bottom face of the track 62.

Although I prefer to employ suitable means for the vertical adjustment of the forward ends of the plow beams, still I do not wish to unnecessarily limit myself to this feature in all instances, because the other general elements of the improvements, in broader combination, would in a large degree function satisfactorily, even without the employment of the elements 26 to 30 and 69 to 73, although in the latter event, in so far as the drawings disclose, the pivotal supporting means for the forward portion of the plow beams would not necessarily be a shiftable fulcrum.

Although I have thus fully disclosed practical embodiments of my improvements, it will nevertheless be understood that I do not limit myself to all of the details exactly as shown and described, excepting as they may come within the terms of the appended claims, or equivalent elements and combinations thereof, or as fairly interpreted in the light of the specification if necessary.

What I do claim, as new and patentable, is:—

1. In combination with a tractor and paired plow elements including rear and forward plow beam portions, of supporting means directly mounted upon said tractor, for suspending said rear plow beam portions therefrom, embodying rocker crank-like elements pivotally mounted at their lower ends and at their upper ends provided with a cross-member disposed in arcuately operative association with the under side of its complementary rear plow beam portion, adjustable means for swinging said crank elements, and means for pivotally connecting the forward plow beam portions with said tractor at positions forwardly of the rear of said tractor.

2. In combination with a tractor and paired plow elements including rear and forward plow beam portions, of supporting means directly mounted upon said tractor, for suspending said rear plow beam portions therefrom, embodying rocker crank-like elements pivotally mounted at their lower ends and at their upper ends provided with a cross-member disposed in arcuately operative association with the underside of its complementary rear plow beam portion, adjustable actuating means for swinging said

crank elements, and means for pivotally connecting the forward plow beam portions with said tractor at positions forwardly of the rear of said tractor and under vertically adjustable control.

3. The combination with a tractor, having a rear transmission housing section, and paired plow elements including rear and forward plow beam portions, of supporting means directly mounted upon said tractor for suspending said rear plow beam portions therefrom, the said supporting means embodying adjustable means controlling the raising and lowering of said rear plow beam portions, a base bar extending longitudinally underneath said transmission housing in anchored relation thereto, and means for pivotally connecting said forward plow beam portions with said base bar.

4. The combination with a tractor, of a base bar so directly supported by the tractor as to extend forwardly underneath the body of the same from the drawbar cap thereof, a plow element including rear and forward plow beam portions, vertically adjustable actuating means supporting said rear plow beam portion, and a coupling rod pivotally connected at its opposite ends respectively to said base bar and the forward portion of said plow beam.

5. The combination with a tractor, of a base bar so directly supported by the tractor as to extend forwardly underneath the body of the same from the drawbar cap thereof, a plow element including rear and forward plow beam portions, a crank-like element pivotally mounted adjacently of the rear portion of said base bar and having its cross-member disposed in arcuately operative association with said rear plow beam portion, adjustable actuating means for swinging said crank element, and coupling means connecting the forward portion of said plow beam to said base bar.

6. The combination with a tractor, of a base bar so directly supported by the tractor as to extend forwardly underneath the body of the same from the drawbar cap thereof, a plow element including rear and forward plow beam portions, a crank-like

element pivotally mounted adjacently of the rear portion of said base bar and having its cross-member disposed in arcuately operative association with the under side of said rear plow beam portion, and a coupling rod pivotally connected at its opposite ends respectively to said base bar and the forward portion of said plow beam.

7. The combination with a tractor and a plow element including rear and forward plow beam portions, of supporting means directly mounted upon said tractor for suspending said rear plow beam portion therefrom in positively carried relation, the said supporting means embodying a swinging upwardly disposed pivoted support mounting an antifriction arcuately shiftable fulcrum so operatively associated with said rear plow beam portion as to raise and lower the same, a pivoted operating lever extending adjacently of the tractor seat, pivotal link connection means between said operating lever and said swinging support, and means pivotally connecting said forward plow beam portion with said tractor at a position forwardly of the rear end of said tractor.

8. The combination with a tractor, having a rearwardly located and projected draw bar element, and a plow element including rear and forward plow beam portions, of supporting means directly mounted upon said draw bar element for suspending said rear plow beam portion therefrom in positively carried relation, the said supporting means including a swinging upwardly disposed pivoted support mounting an arcuately shiftable fulcrum element so operatively associated with said rear plow beam portion as to raise and lower the same, a pivoted operating lever extending adjacently of the tractor seat, a pivotal link connecting said lever with said swinging support, a coupling rod in pivotal connection between said forward plow beam portion and said tractor, and an arcuately shiftable fulcrum element suspending the forward end portion of said plow beam from said tractor.

In testimony whereof, I affix my signature.

MARTIN B. MONSON.