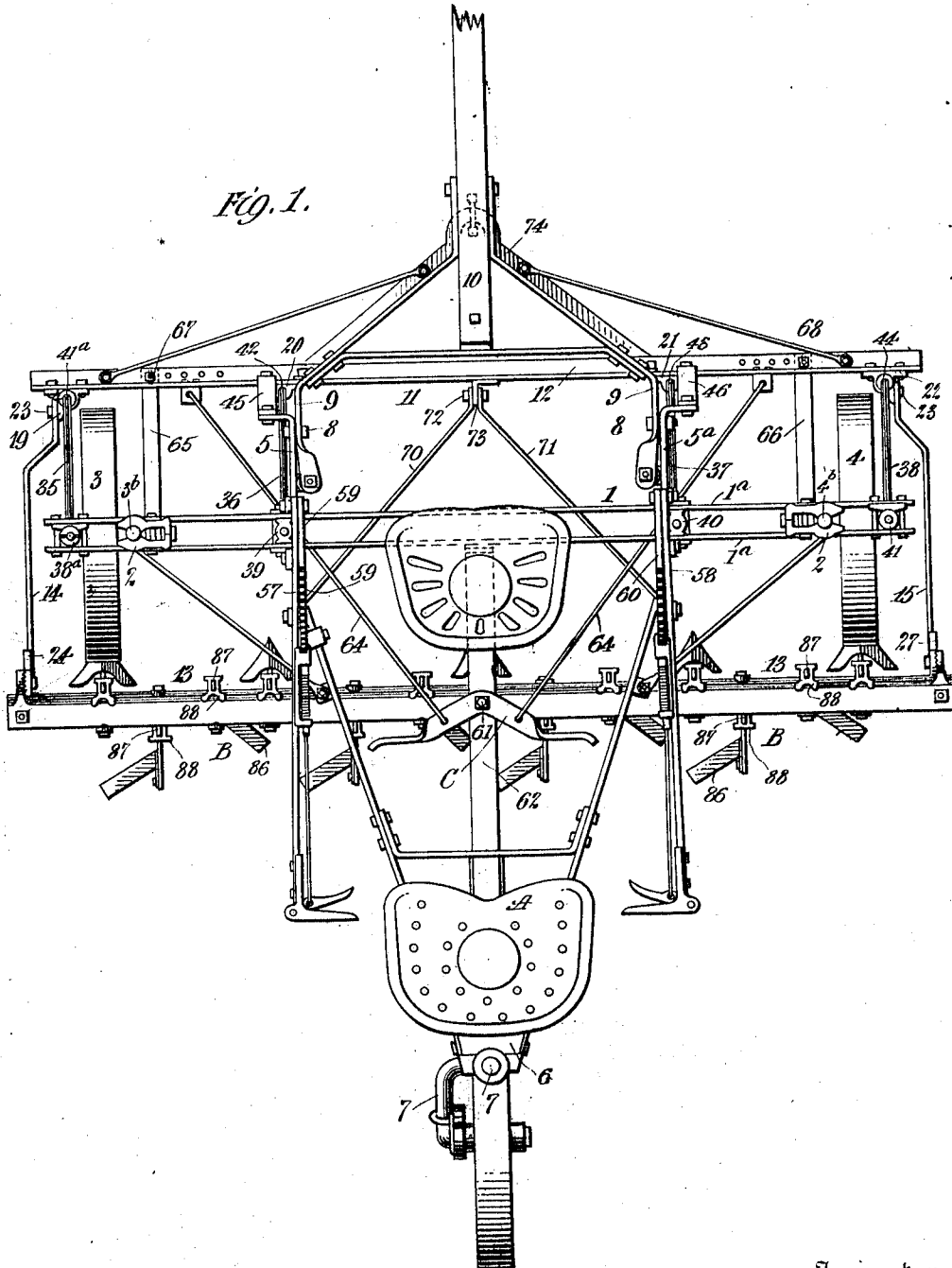


A. C. LINDGREN.
CULTIVATOR.
APPLICATION FILED JULY 28, 1910.

Patented May 23, 1911.
4 SHEETS—SHEET 1.

993,081.



Witnesses:
Thos. S. Ober
L. E. Morrison

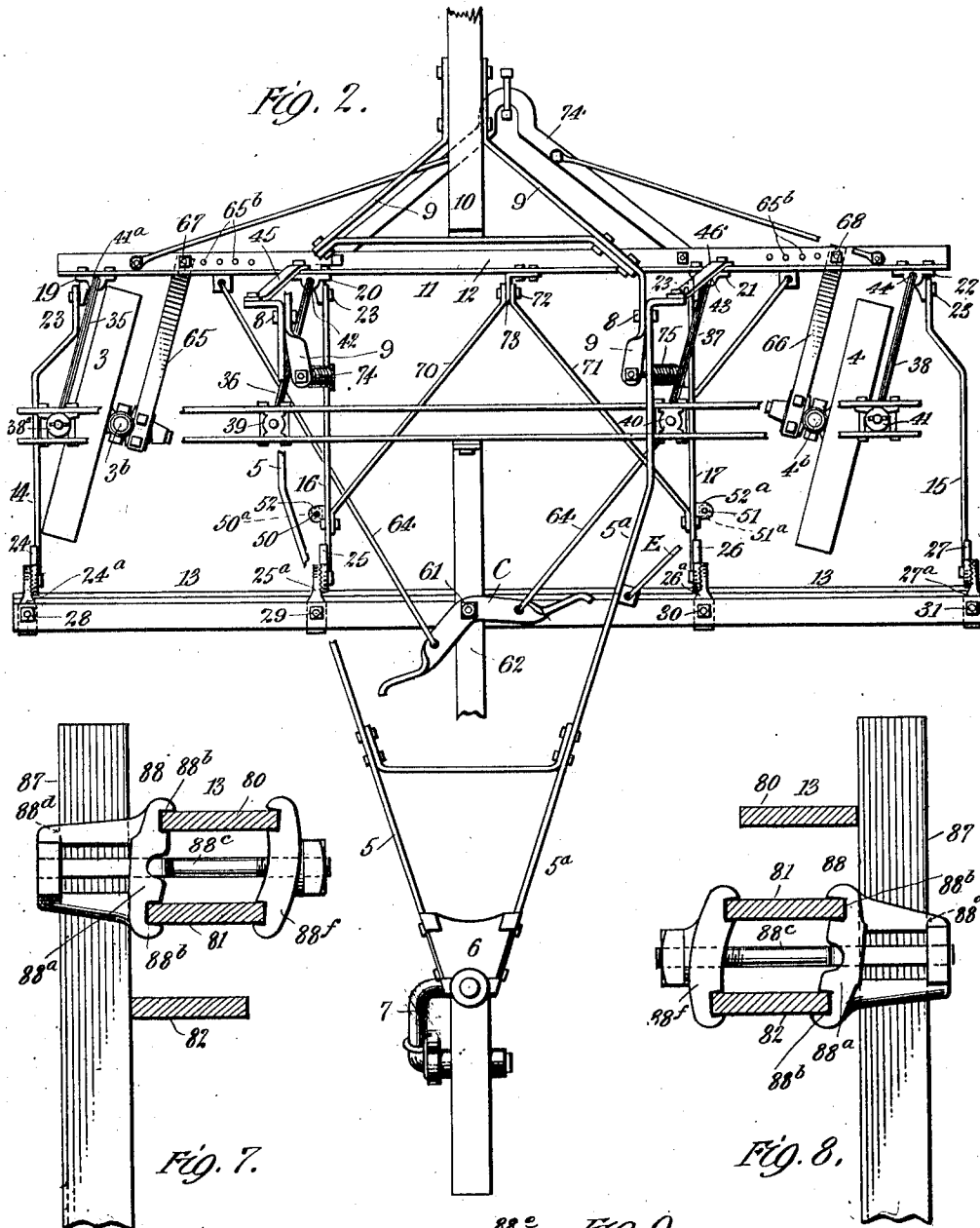
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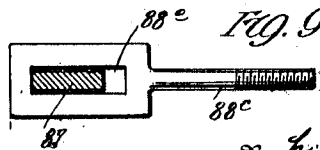
993,081.

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4 SHEETS-SHEET 2.



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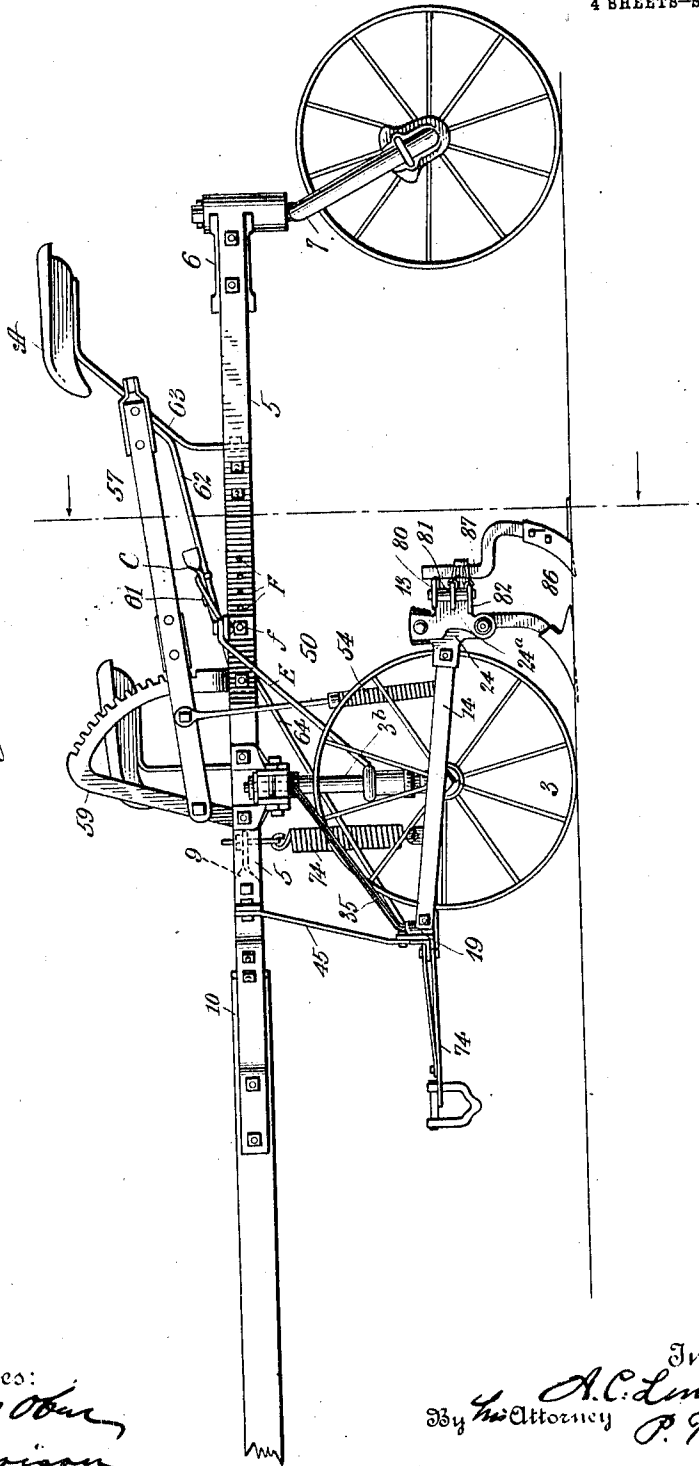
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4 SHEETS—SHEET 3.

993,081.

FIG. 3.



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4 SHEETS—SHEET 4.

Fig. 4.

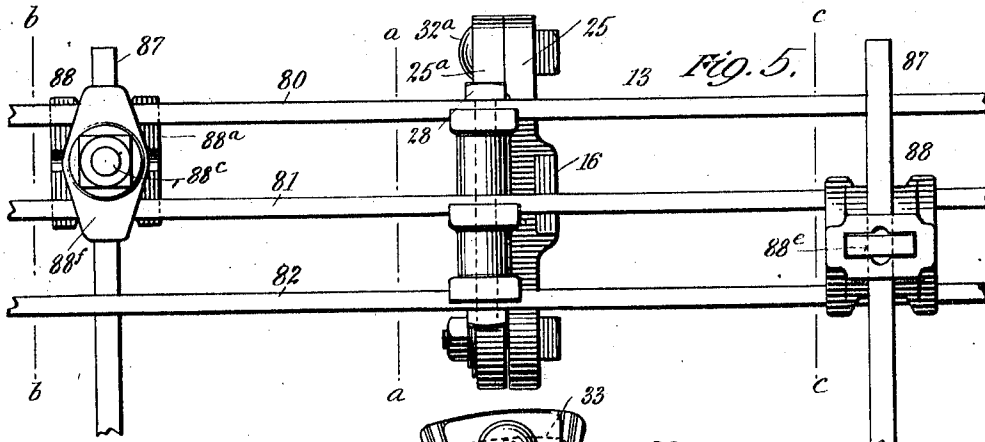
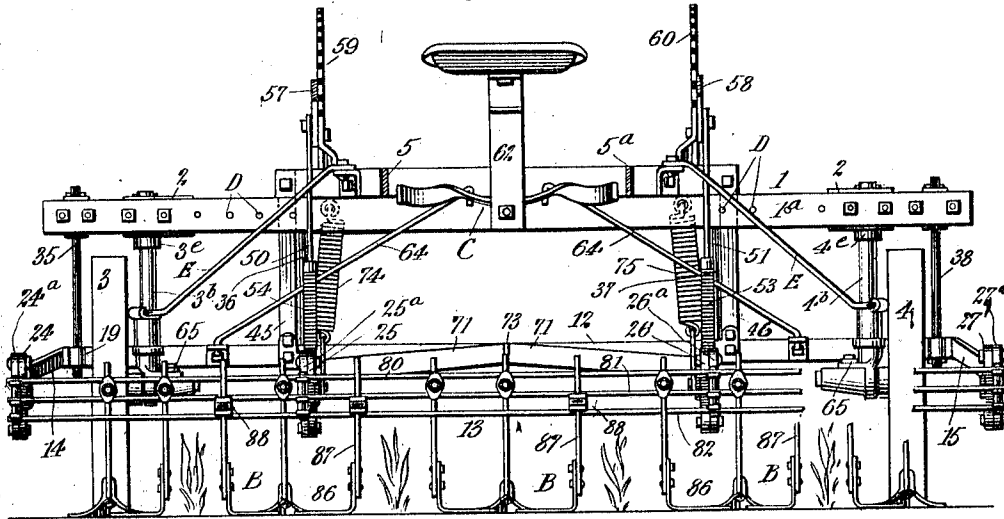
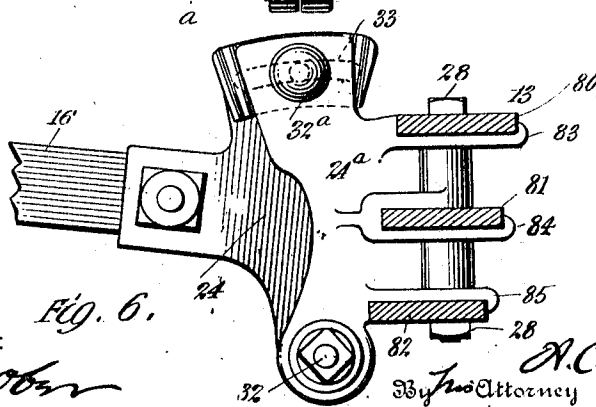


Fig. 6.



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UNITED STATES PATENT OFFICE.

ALEXUS C. LINDGREN, OF MOLINE, ILLINOIS, ASSIGNOR TO MOLINE PLOW COMPANY,
A CORPORATION OF ILLINOIS.

CULTIVATOR.

993,081.

Specification of Letters Patent.

Patented May 23, 1911.

Application filed July 28, 1910. Serial No. 574,330.

To all whom it may concern:

Be it known that I, ALEXUS C. LINDGREN, of Moline, county of Rock Island, and State of Illinois, have invented a new and useful Improvement in Cultivators, of which the following is a specification.

This invention relates to cultivators designed more particularly for the cultivation of sugar beets, where the conditions are such that the cultivating tools must act close to the plants, and consequently must be guided with great accuracy to follow truly any deviations which may exist in the rows.

To meet these conditions, the invention consists in various improvements in the form and construction of the machine, said improvements relating more particularly to the means for guiding and controlling the cultivating tools, and the manner of mounting the tools on the frame to provide for various adjustments of the tools, and to other features of construction designed to render the machine as a whole durable in construction and effective in operation.

In the accompanying drawings: Figure 1 is a top plan view of my improved machine showing the same as it appears when traveling in a straight path. Fig. 2 is a similar view with the parts as they appear when the machine is guided to the right. Fig. 3 is a side elevation of the same. Fig. 4 is a rear elevation of the same. Fig. 5 is a similar view on an enlarged scale of the tool supporting bar. Figs. 6, 7 and 8 are sectional elevations taken respectively on the lines *a-a*, *b-b* and *c-c* of Fig. 5. Fig. 9 is a view of a detail.

Referring to the drawings:—1 represents a transverse main frame bar, preferably in the form of two metal rails 1^a disposed edge-wise side by side and suitably spaced apart and held firmly in spaced relations as a single structure by means of blocks, 2, 2, seated between the bars near the opposite ends of the same and firmly bolted thereto. This frame bar is sustained by ground wheels 3 and 4 mounted on stub axles on the lower ends respectively of vertical stems 3^b and 4^b, whose upper ends are mounted loosely in bearing openings in the blocks 2, 2, which latter rest on collars 3^a, 4^a, on the stems, so that the said wheels will support the frame and may swivel relatively to the same around vertical axes, for the purpose presently to be described. Fixed firmly to the

transverse frame bar 1, on opposite sides of its center, are two fore and aft frame bars 5, 5^a, which converge toward their rear ends, where they give support to a driver's seat A, and have their rear extremities fixed to the sides of a casting or block 6, in which the upper end of a caster wheel stem 7 is mounted, and by which wheel the rear end of the frame is supported. The fore and aft bars terminate a short distance in front of the frame bar 1 and have pivoted to their inner sides, by means of horizontal pivot-bolts 8, 8, the rear ends of arms 9, 9, extending forwardly and fixed firmly to the sides of a draft tongue 10.

Arranged beneath the main frame is a horizontal tool-carrying frame 11 of rectangular form, and comprising a front transverse draft bar 12, a rear transverse tool-supporting bar 13, and a number of fore and aft connecting bars—four in the present instance—two outer ones 14 and 15, and two inner ones 16 and 17, which are spaced uniformly apart and connected at their front and rear ends respectively with draft bar 12 and the tool-supporting bar 13. The tool carrying frame made up of these parts forms in effect a single unitary structure arranged beneath the main frame of the machine with the wheel 3 situated between the fore and aft bars 14 and 16 and the wheel 4 situated between the fore and aft bars 15 and 16. This frame is supported from the main frame in such manner that it may be shifted bodily in a transverse direction back and forth to cause the cultivating tools B, carried by the rear bar 13, to follow the rows of plants; and the parts of the frame are so connected together that the rear tool supporting bar may be raised and lowered relative to the front draft bar in order to control the depth of the cultivating tools in the soil.

The connection of the parts of the main frame to permit this to be done, is shown more particularly in Figs. 1 and 3, where it will be seen that the forward ends of the fore and aft bars 14, 15, 16, 17, are seated respectively flatly against the sides of bracket blocks 19, 20, 21 and 22, which are in turn fixed to the rear side of the draft bar 12, the said fore and aft bars being connected to the bracket blocks by horizontal pivot bolts 23 extending through the bars and blocks, this construction permitting the

tool supporting bar to rock vertically with reference to the draft bar on a horizontal transverse axis coincident with the axes of the pivoting bolts. At their rear ends, the fore and aft bars are firmly fixed respectively to bracket plates 24, 25, 26 and 27, connected in turn to the tool supporting bar 13 by connecting plates 24^a, 25^a, 26^a and 27^a, fixed to the supporting bar by vertical clamping bolts 28, 29, 30 and 31. At their lower ends, each connecting plate is jointed to its bracket plate by a horizontal bolt 32, while at its upper end the connecting plate and bracket plate are adjustably clamped together by a clamping bolt 32^a, carried by the connecting plate and extending in a slot 33 in the bracket plate, so that by loosening the clamping bolts of the several pairs of plates, the bar 13 may be adjusted on the axes of the lower bolts 32 in order to change the angle of the cultivating tools relative to the surface of the ground so as to vary their penetration.

The tool carrying frame 11, before alluded to, is supported by the main frame by means of a series of parallel laterally swinging links—four in the present instance—35, 36, 37 and 38, which links extend forwardly and downwardly from the transverse frame bar 1 to the transverse draft bar 12, the upper ends of the links being provided with vertical pivoting studs seated loosely in bearing openings in blocks 38^a and 39, 40 and 41, fixed to the bars 1^a, while the lower ends of the links are similarly provided with studs 41^a, 42, 43 and 44, mounted loosely respectively in bearing openings in the bearing blocks 19, 20, 21 and 22 on the draft bar, this construction permitting the frame 11 to shift transversely back and forth while preserving its rectangular relation to the line of draft, so that notwithstanding the position transversely the frame may be in, the cultivating tools will face squarely in the line of travel.

The weight of the forward ends of the frame 11 is sustained by two vertical suspending links 45 and 46, pivoted at their upper ends respectively to the out-turned ends of the fore and aft frame bars 5, 5^a, and pivoted at their lower ends to the transverse draft bar 12.

The tool carrying frame 11 is connected near its rear end with the overlying main frame by means of lever-operated adjusting links 50 and 51, in order that the driver may raise the tools out of the ground or control their working depth. The lower ends of the links pass loosely through openings in plates 52, 52^a, fixed respectively to the sides of the fore and aft bars 16 and 17, and have fixed to their lower extremities, heads 50^a and 51^a, adapted when the links are raised, to engage the plates and lift the tool supporting bar, spiral springs 53 and 54 encircling the links

above the plates and bearing at their upper ends against collars 55 and 56 on the links. At their upper ends, the links are jointed respectively to hand levers 57 and 58 pivoted to segment frames 59 and 60 on the main frame, which segment frames are provided with teeth adapted to be engaged by locking latches on the levers so that the latter may be held in their different positions of adjustment. By means of these levers the tools may be raised or lowered and held with a yielding spring action in the ground.

The transverse movements of the frame 11 in the action of guiding the cultivating tools is effected by means of a foot lever C, pivoted between its ends, as at 61, to a longitudinal bar 62, fixed at its forward end to the transverse frame bar 1 and at its rear end to the seat standard 63, which supports the driver's seat A. The foot lever is connected with the draft bar 12 of the frame 11 by means of two links 64, jointed at their rear ends respectively with the ends of the foot lever, and extending outwardly therefrom and jointed at their forward ends to the draft bar, the arrangement being such that pressure on either end of the lever will shift the tool carrying frame endwise transversely with reference to the main frame. By this means, the driver is enabled to effectually control the path of travel of the cultivating tools, and by pressing on one or the other end of the foot lever, cause the tools to follow accurately any deviations or irregularities in the rows of plants. In order that when the tools are thus moved transversely the main frame will be caused to follow, I so connect the ground wheel stems with the frame 11 that the ground wheels will be turned as the tool frame is shifted. This action is effected, as shown more particularly in Figs. 1 and 2, by means of two longitudinal links 65 and 66, fixed at their rear ends respectively to the lower ends of the wheel stems, and pivoted at their front ends respectively to the draft bar 12 on vertical axes, by pivot bolts 67 and 68, the points of pivotal connection between the links and the draft bar being made adjustable transversely along said bar by providing in the latter a series of holes 65^b to receive the pivoting bolts. As a result of this arrangement, when the foot lever is pushed to the right, as shown in Fig. 2, the frame 12 will be moved endwise to the right and will correspondingly shift the cultivating tools, at the same time turning the ground wheels and causing the machine to follow in the same direction.

The frame 11 is braced so that it will maintain its rectangular shape, by means of two brace-straps 70 and 71, fixed at their rear ends respectively to the two fore and aft bars 16 and 17, whence they converge and have their forward ends pivotally con-

nected on a horizontal axis, as at 72, to a rearwardly extending plate 73 in the transverse draft bar 12. The draft of the animals is applied to the tool supporting frame 11 by means of a forwardly extending draft frame 74, fixedly connected with the draft bar 12.

Means are provided for adjusting the ground wheels transversely along the frame bar, to which the stems of the wheels are connected. This is conveniently effected by forming a number of holes D in the bars 1^a to receive the bolts by which the blocks 2 are connected between the seat bars. In the adjustments of the wheel stems by this means, brace rods E, by which said stems are braced to the main frame, are adjusted at their rear ends along the sides of the fore and aft frame bars 5, 5^a, the latter being formed with a number of holes F to receive bolts f, by means of which the rear ends of these brace rods are connected with the frame bars. Likewise, it will be necessary when the wheel stems are adjusted transversely, to adjust the pivotal connections of the links 65 and 66 with the transverse draft bar by changing the pivoting bolts 67 and 68 from one hole to another in said draft bar.

In the use of the machine in hard, dry ground, where considerable pressure is necessary on the tool carrying frame 11 to cause the cultivating tools to enter the ground, it is found that when sufficient pressure is thus applied through the levers and suspending links, it tends to take the weight off the ground wheels. This interferes materially with the action of the wheels in properly guiding the machine, and in order to avoid such objectionable action and at the same time provide for assisting the driver in lifting the tool frame, I provide two lifting springs 74 and 75, connected at their upper ends with the rear ends of the tongue arms 9 in rear of their pivots 8, and connected at their lower ends respectively with the fore and aft bars 16 and 17. These springs act to support the weight of the tongue and neck yoke and thereby transfer the same to the frame, the leverage of the parts by acting through the frame 11 and suspending links, causing the frame to fulcrum on the points of contact of the tools with the ground, and in this manner throwing the weight of the tongue and neck yoke on the ground wheels.

The tool supporting bar 13 consists of a plurality of members in the form of three flat steel rails 80, 81, 82, arranged one above the other and firmly and fixedly connected in spaced relations to the connecting plates 24^a, 25^a, 26^a and 27^a, before alluded to. These plates are provided with rearwardly extending horizontal socketed ledges 83, 84, 85, in the sockets of which ledges the bars are seated and secured by means of the ver-

tical clamping bolts 28, which pass through the ledges and sockets and through the bars. The relative form and arrangement of the sockets is such that the bars will extend one a slight distance in advance of the other, the lower bar 82 being slightly in advance of the central bar 81, and the latter slightly in advance of the upper bar 80, the purpose of this construction being to afford such a support for the cultivating tools that the strain on their lower ends, where they enter the ground, will be properly resisted and prevented from twisting the parts of the bar.

The cultivating tools are in the form of sweeps 86 arranged in four pairs to cultivate four rows of plants at once, which sweeps are carried on the lower ends of vertical shanks 87 connected to the sides of the bar 13 by means of clip devices 88 of such form that the individual sweeps may be adjusted in a transverse direction along the bar to vary the distance between them, or may be adjusted vertically according to the conditions encountered in practice. The clip devices are each in the form of a clamping frame 88^a, provided in one side with notches 88^b to receive the edges of two of the rails of the supporting bar, to which the clamping frame is firmly clamped by means of a horizontal clamping bolt 88^c through the medium of the shank 87. This shank extends vertically through the opening 88^d in the frame and also through an opening 88^e in the inner end of the clamping bolt, which latter extends at its opposite end between the two rails and beyond the same and through a strap plate 88^f seated against the edges of the two rails, a nut being applied to the end of the bolt and bearing against the strap plate. By tightening the nut up, the shank of the tool is drawn up against the side of the opening in the clamping frame, and acts to force the frame tightly and firmly against the edges of the rails, the latter being thus tightly clamped between the frame and the strap plate. By loosening the nut, the clamping frame and connected parts, including the shank of the cultivating tool, may be moved transversely along the bar and set in the position desired. So also the shank of the tool may be adjusted vertically in the opening in the plate to vary the height of the tool. The individual tools of the several pairs have their shanks applied respectively on opposite sides of the bar 13 in order to equalize the strain thereon. When applied to the front side of the bar, the clamping frame of the clip devices is seated against the two upper rails, as in Fig. 7 and by reason of the fact that the lower rail is in advance of the others, the shank carried by the clip device will have a bearing against the lower rail. As a result of this arrangement, the tendency of the strain coming against the shanks to force

them rearwardly and thereby twist the two upper rails, will be resisted by the lower rail. When the tools are applied to the rear side of the bar 13, the clamping frame will bear
 5 against the two lower rails of the bar, and the upper end of the shank will have a bearing against the upper rail, which is a slight distance in rear of the others, the result being that, as in the first instance described,
 10 the tendency of the rearward strain on the cultivating tool to twist the two lower rails, will be resisted by the upper rail. The action of the strain against the tools in the construction described is to cause a straight
 15 pull on the clamping devices in one direction, and a straight push against the supporting rail in the other direction, thereby effectually preventing any twist on the two rails to which the clamping device is
 20 clamped.

The bar 13, made up of the three connected rails as described, forms in effect a tool holding bar having a supporting surface, formed by two of the rails, to receive the
 25 clip device, and an abutment, formed by the third rail, to receive the thrust of the shank of the cultivating tools, the two upper rails forming the supporting surface, and the lower rail the abutment when the shanks are
 30 applied to the front of the bar; and the two lower rails forming the supporting surface, and the upper rail the abutment, when the shanks are applied to the rear of the bar.

In the accompanying drawings I have
 35 illustrated my machine with the parts in the form which I prefer to adopt, and which in practice has been found to answer to a satisfactory degree the objects to be attained. It is manifest, however, that the details may be
 40 variously modified by persons skilled in the art, without departing from the limits of my invention, provided the operation is substantially as indicated above. Further, it will be understood that the invention is not
 45 limited to any particular form or construction of the parts except in so far as such limitations are specified in the claims.

Having thus described my invention, what I claim is:—

50 1. In a cultivator, and in combination with the main frame, a horizontal transversely extending tool carrying frame sustained beneath the main frame and movable
 55 as a whole bodily transversely thereof with reference to the main frame, said tool carrying frame comprising a front transverse draft bar, a rear transverse tool carrying
 60 bar and fore and aft connecting bars connected fixedly at their rear ends to the tool carrying bar, a series of cultivating tools fixed to the tool carrying bar, and a lever mechanism for controlling the transverse
 movements of the tool carrying frame.

2. In a cultivator, and in combination
 65 with the main frame, a horizontal trans-

versely extending tool carrying frame sustained beneath the main frame and movable as a whole bodily transversely thereof with reference to the main frame, said tool carrying frame comprising a front draft bar, a
 70 rear tool carrying bar and fore and aft connecting bars pivoted at their forward ends to the draft bar and connected fixedly at their rear ends to the tool carrying bar, cultivating tools carried by the rear bar, a foot
 75 lever mechanism for controlling the transverse movements of the tool carrying frame, and a hand lever mechanism sustained by the main frame and connected with the tool carrying frame for raising and lowering the
 80 latter.

3. In a cultivator, and in combination with the main frame, a horizontal transversely extending tool carrying frame sustained beneath the main frame and movable
 85 bodily transversely thereof, said tool carrying frame comprising a front draft bar, a rear tool carrying bar and outer and inner fore and aft connecting bars, ground wheels sustaining the main frame and movable relatively
 90 thereto about a vertical axis, said wheels arranged respectively between the inner and outer fore and aft connecting bars, connections between the wheels and tool carrying frame to cause the wheels to turn when
 95 the frame is shifted transversely, and a lever mechanism for controlling the transverse movements of the tool carrying frame.

4. In a cultivator, and in combination with the main frame, a horizontal transversely extending tool carrying frame arranged beneath the main frame and movable
 100 bodily transversely thereof, said tool carrying frame comprising a front draft bar, a rear tool carrying bar, fore and aft bars jointed at their forward ends to the draft bar and fixed at their rear ends to the tool carrying bar, and brace rods fixed at their
 105 rear ends to the fore and aft bars and pivoted at their forward ends to the draft bar on an axis coincident with the axes of the connection of the fore and aft bars, and a lever mechanism for controlling the movements of the tool carrying frame.

5. In a cultivator, and in combination with the main frame including a transverse frame bar, ground wheels carried by supports mounted on the frame bar to swivel
 115 on vertical axes and adjustable transversely along said bar, a tool carrying frame sustained beneath the frame bar and movable bodily transversely of the line of travel, and connecting devices between the wheels and tool carrying frame, said connecting devices being fixed at one end to the wheel
 120 supports respectively and connected at their opposite ends adjustably to the wheel carrying frames.

6. In a cultivator, and in combination with the main frame, ground wheels sup-
 130

porting the same, a tool carrying frame beneath the main frame and movable up and down, cultivating tools carried by the tool carrying frame in rear of the ground wheels, means carried by the main frame and connected with the tool carrying frame for forcing the cultivating tools into the ground, a draft member mounted on the main frame on a transverse axis, and springs connected respectively with the tongue and tool carrying frame.

7. In a cultivator, and in combination with the main frame, a tool carrying frame sustained beneath the main frame and comprising a front draft bar, a rear tool carrying bar and fore and aft connecting bars pivoted at their forward ends to the draft bar and fixed at their rear ends to the tool carrying bar, cultivating tools on the rear bar in rear of the ground wheels, a lever on the main frame, a depressing rod connected with the lever and tool carrying frame for forcing the tools into the ground, a draft tongue provided with rearwardly extending arms pivoted to the main frame on a horizontal transverse axis, and springs connected at their upper ends to said arms in rear of their axes and connected at their lower ends to the fore and aft bars of the tool carrying frame.

8. In a cultivator, a tool holding bar provided with a supporting surface and an abutment, in combination with a tool holding device applied to the supporting surface, and a cultivating tool formed with a shank held by the holding device free of the supporting surface and engaging the abutment.

9. In a cultivator, a tool holding bar provided on opposite sides with supporting surfaces arranged respectively at the top and bottom of the bar and having abutments disposed respectively above and below the supporting surface, in combination with a series of tool holding devices applied respectively at the front and rear sides of the bar on the supporting surfaces, and cultivating tools provided with shanks held by the respective devices free of the supporting surface and engaging the abutments.

10. In a cultivator, a tool carrying bar comprising a plurality of connected members, a tool holding device, means for clamping the same to two of said members, and a cultivating tool provided with a shank held by said device and engaging another of said members.

11. In a cultivator, a tool carrying bar comprising a plurality of connected members arranged one above another and spaced apart, a tool holding device, means for clamping the same to the front of two of said members, a cultivating tool provided with a shank held by said device and engaging the front of one of the members below the holding device, a second holding device, means for clamping the same to the rear of two of said members, and a cultivating tool provided with a shank held by said device and engaging one of the members above the same.

12. In a cultivator, a tool holding bar comprising a series of connected members arranged one above the other, in combination with a series of tool holding devices applied respectively to opposite sides of the bar, those on the front engaging the upper members and those on the rear engaging the lower members, means for clamping the devices to said members, cultivating tools provided with shanks held by the respective devices, the shanks on the rear engaging one of the members above their holding devices, and the shanks at the front engaging one of the members below their holding devices.

13. In a cultivator, a tool holding bar comprising three rails spaced apart one above the other and each in advance of the next above, in combination with a tool holding device applied to the front of the two upper rails, and a cultivating tool having a shank held by the device and engaging the lower rail.

In testimony whereof I hereunto set my hand this 26th day of July, 1910, in the presence of two attesting witnesses.

ALEXUS C. LINDGREN.

Witnesses:

L. C. BLANDING,
W. RICHARDS.