R. S. B. ADAMS.

HOE.

APPLICATION FILED MAY 22, 1915.

1,184,707.

Patented May 30, 1916.

4 SHEETS—SHEET 1.

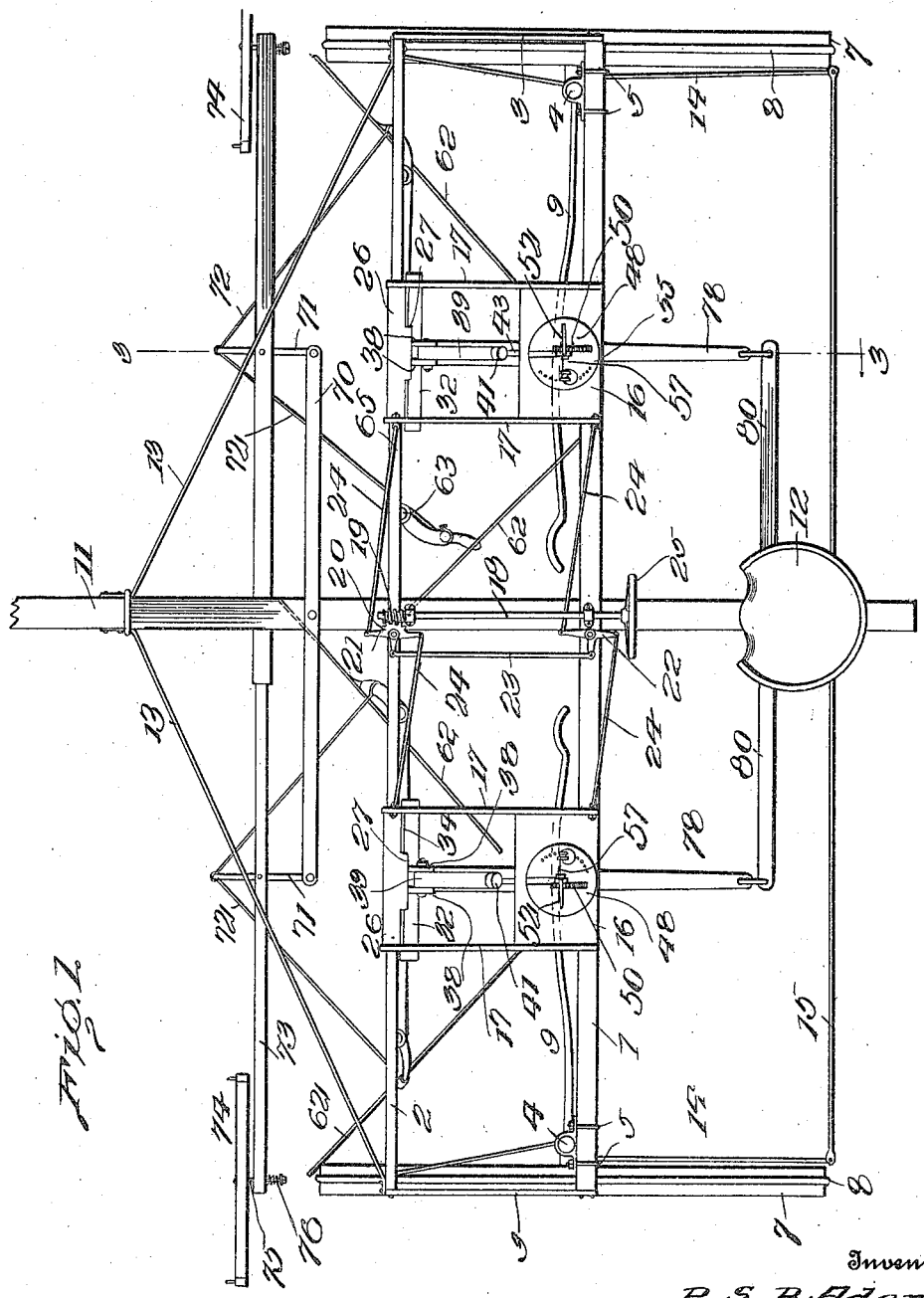


Fig. 1.

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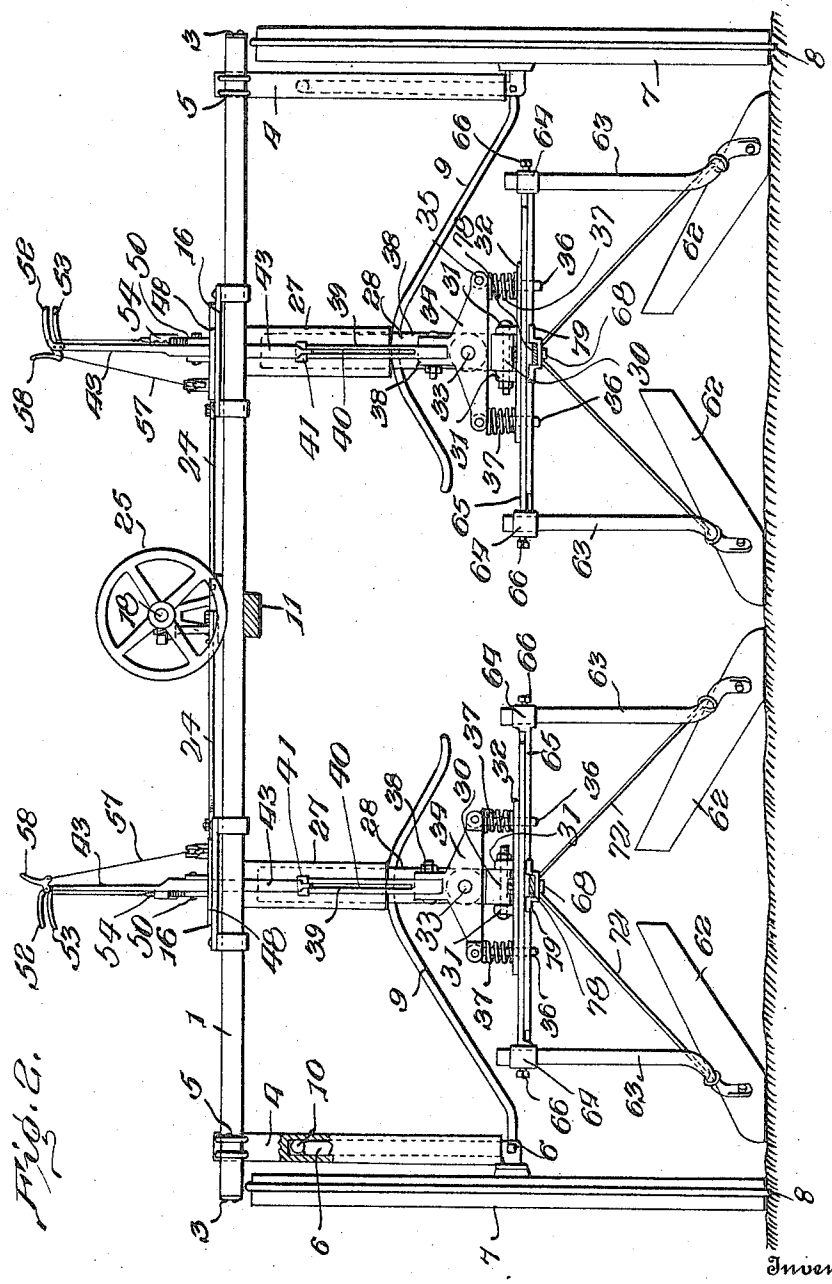


Fig. 2.

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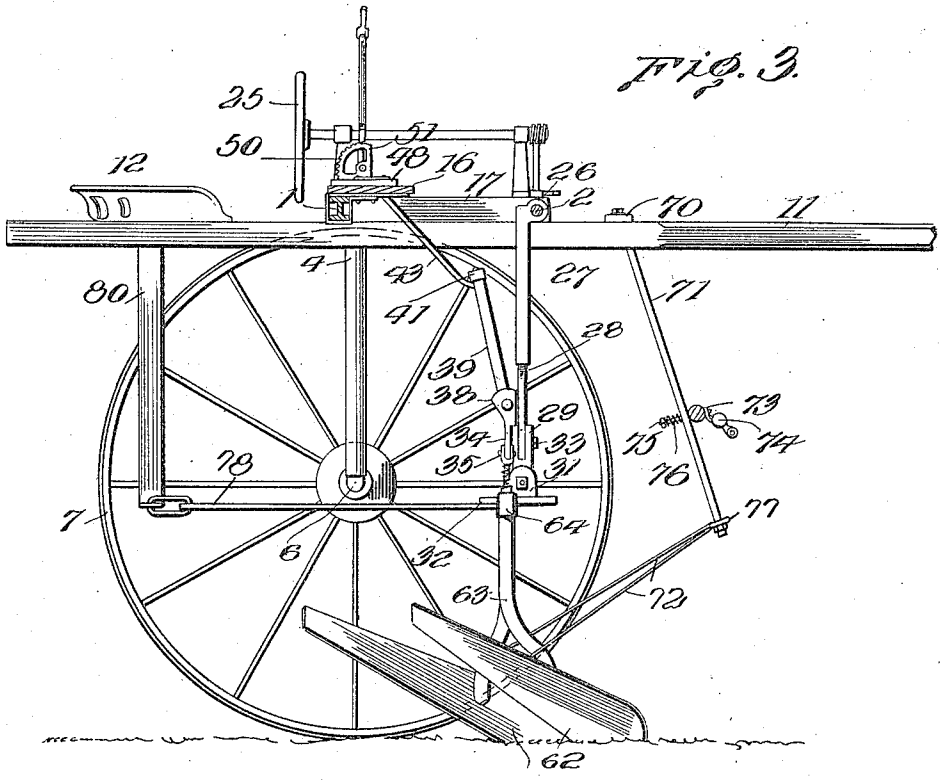
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4 SHEETS—SHEET 3.

Fig. 3.



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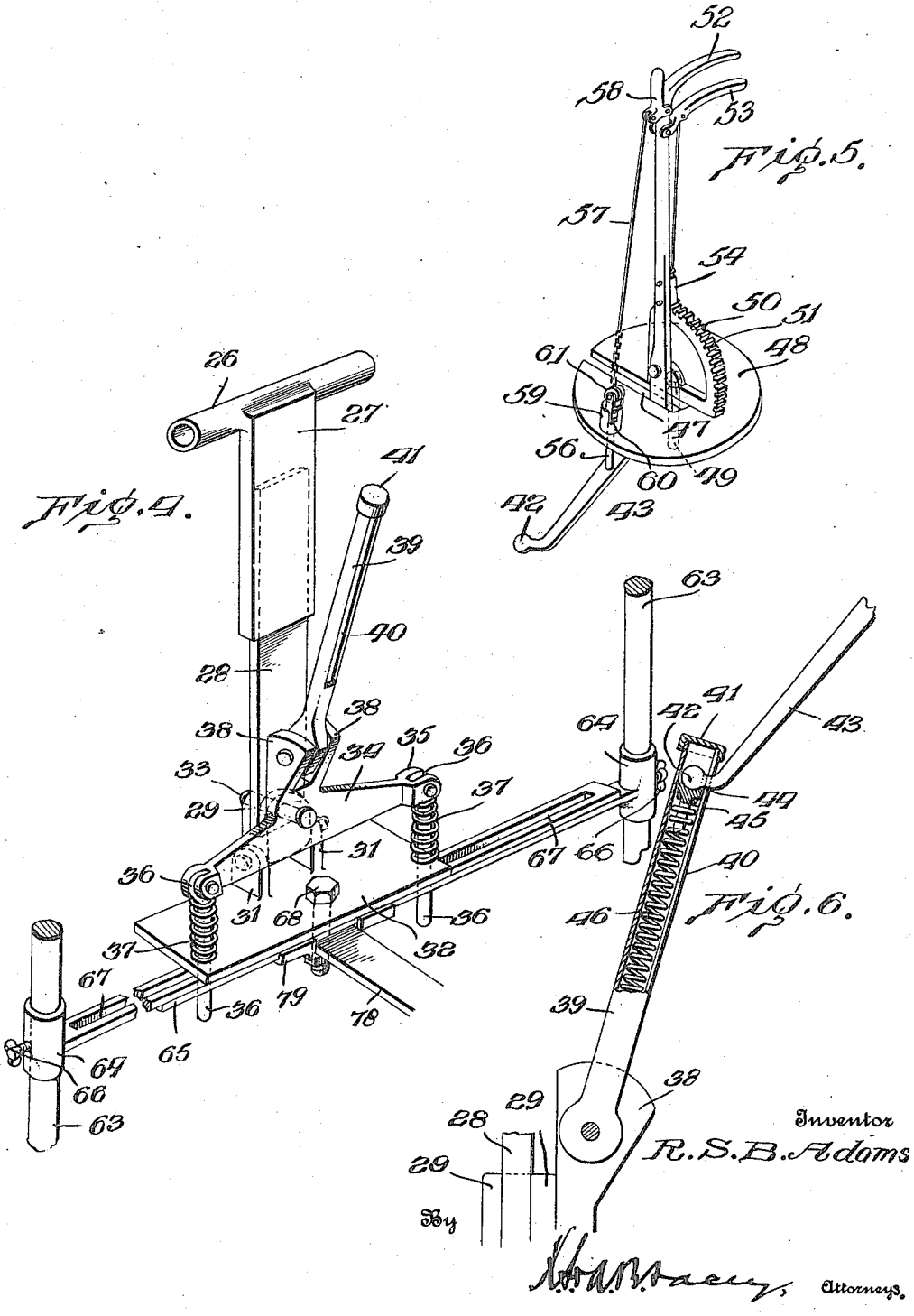


Fig. 5.

Fig. 4.

Fig. 6.

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HOE.

1,184,707. Specification of Letters Patent. Patented May 30, 1916.

Application filed May 22, 1915. Serial No. 29,889.

To all whom it may concern:

Be it known that I, REXDALE S. B. ADAMS, a citizen of the United States, residing at Smyrna, in the county of Aroostook and State of Maine, have invented certain new and useful Improvements in Hoes, of which the following is a specification.

This invention relates to wheeled hoes, and has special reference to implements for building two rows of potato hills at the same time.

One object of the invention is to provide means whereby the machine may be readily adjusted to the widths of the rows, and another object of the invention is to provide a machine in which the blades may be easily tilted so as to conform to variations in the heights or inclinations of the hills, and in which the blades may be also readily raised and lowered.

A further object of the invention is to provide means whereby the individual members of a pair of blades may be adjusted to the size of the hills, and a still further object of the invention is to provide means whereby the blades will be effectually held to the work.

The invention also seeks to provide means whereby the machine may be easily steered, and means whereby the power applied to draw the machine along the rows will also act to draw the blades along the hills.

Other incidental objects of the invention will appear as the description of the same proceeds, and the invention resides in certain novel features which will be particularly pointed out in the claims following the detailed description.

In the accompanying drawings, which fully illustrate my invention, Figure 1 is a plan view of a two-row cultivator embodying my improvements; Fig. 2 is a rear elevation of the same; Fig. 3 is a vertical section taken on the line 3—3 of Fig. 1; Fig. 4 is a detail perspective view of the mechanism for tilting and adjusting the blades; Fig. 5 is a detail perspective view of the adjusting lever; and Fig. 6 is a detail sectional view showing the manner in which said lever is connected to the adjusting mechanism.

In carrying out my invention, I employ a main frame consisting of a rear beam 1, a front beam or rod 2, and suitable braces 3 connecting the said beams at the ends thereof. Upon the rear beam 1, I adjustably mount hangers 4 which are secured upon the said beam by clips 5 fitted on the upper ends of the hangers and encircling the beam, as shown clearly in Figs. 1 and 2. The said hangers 4 are hollow and receive spindles 6, the lower ends of which are turned outwardly to serve as axles for the ground wheels 7. The ground wheels may be mounted upon the spindles in any preferred manner and will generally be provided with the annular rib 8 to take into the ground and prevent skidding. The spindles 6 are each provided with an inwardly extending lateral foot-rest 9 by which the wheels may be shifted angularly with respect to the line of draft so as to steer the machine, and the thrust of the spindles is taken up by balls, indicated at 10, fitted between the upper extremities of the spindles and the upper ends of the hollow portions of the hangers. A pole or tongue 11 is secured to the beams 1 and 2 and projects forwardly therefrom to be connected to the draft animals and also extends rearwardly from the beam 1 to support a seat 12 for the operator. Braces 13 extend from the tongue to the ends of the beam 2 so as to impart rigidity to the structure, and a yoke, consisting of side arms 14 and a connecting bar 15 pivoted to the rear ends of the side arms, is secured to and projects rearwardly from the spindles 6 so as to maintain the parallel relation of the ground wheels, as will be readily understood. This yoke is shown clearly in Fig. 1 of the drawings, but for the sake of clearness has been omitted from Figs. 2 and 3. The foot-rests and the side arms of the yoke may, obviously, be secured to the spindles by set-screws.

Slidably mounted upon the rear beam 1 are platforms 16, and projecting forwardly from the ends of each platform are guiding and supporting arms 17 which at their front ends slidably engage the forward beam 2. Journaled in suitable bearings upon the said beams 1 and 2 over the tongue 11 is a worm shaft 18, the worm gear 19 on which engages the segment 20 which is formed on one side of a three-armed lever 21 fulcrumed upon the beam 2 immediately adjacent said worm. A similar lever 22 is fulcrumed upon the rear beam 1, and the transversely extending arms of these levers are connected by a link 23 so that the levers will operate simultaneously and in the same direction.

The longitudinally extending arms of the levers are connected by links or rods 24 with the front and rear ends of the platforms 16 and the arms 17, as clearly shown in Fig. 1. A hand wheel 25 is provided upon the rear end of the shaft 18 so that it may be easily reached by the operator upon the seat 12, and the said platforms and arms connected therewith readily adjusted laterally of the machine to accommodate the cultivator blades to the distance between the rows of hills.

Mounted upon the front beam 2, between the ends of a pair of arms 17 and having its extremities lightly engaging the opposed faces of said arms, is a sleeve 26 which is adapted to slide upon the beam or rod 2 and also swing about the said beam or rod as an axis. Depending from the said sleeve 26, and preferably formed integral therewith, is a guiding tube or plate 27 which receives the upper portion of a standard 28, the lower end of which is fitted between the ears 29 of a yoke which in turn has its lower end in the form of an eye or sleeve 30 fitting between lugs 31 on a plate or cross bar 32. A bolt 33 is inserted through the ears 29 and the lower end of the lever 28, and a bolt is also inserted through the lugs 31 and the sleeve 30 so that the yoke is pivotally mounted between the said lugs 31. The plate or cross bar 32 is connected, as will be presently described, with the cultivator blades, and vertical movement of the said blades is accommodated by the sliding engagement of the standard 28 within the hanger or guide 27. The bolt 33 is disposed at a right angle to the sleeve 30 so that the plate or bar 32 may oscillate with the sleeve about the bolt 33 or may oscillate in a plane at a right angle to the plane of the sleeve, as will be readily understood. A rocker 34 is pivotally mounted upon the rear portion of the bolt 33, and this rocker is provided at its ends with forks 35 within which are pivotally hung bolts or pins 36 which project through and below the plate or cross bar 32, springs 37 being coiled around the said bolts between the forks 35 and the said plate 32.

Upon the upper edge of the rocker 34 at the center thereof is provided a yoke or a pair of spaced lugs 38 between which is pivotally mounted the lower end of an adjusting arm 39. This adjusting arm 39 is tubular and is provided with a slot 40 through its rear side, the upper end of the arm being closed by a cap 41, as shown. The tubular arm receives the spherical enlargement 42 at the end of a lever 43 which lever is provided with a reduced neck 44 to pass through the slot 40, and a follower 45 is provided within the hollow operating arm to form a seat for the spherical enlargement 42 and is yieldably held in engagement with the said enlargement by a coiled spring 46 disposed within the arm between the said plunger and the lower end of the arm, as clearly shown in Fig. 6. The lever 43 is carried upwardly through a slot 47 in a base or seating plate 48, and the lower portion of the lever, or that portion below the said plate, is preferably disposed at an angle to the upper portion of the lever, as shown most clearly in Figs. 3 and 5. The plate 48 is provided with a depending post 49 which is adapted to pass through the platform 16 and form a pivot for the plate upon the platform. A segment or holding plate 50 rises from the seating plate 48 and is so disposed that its arcuate dentated edge 51 is concentric with the fulcrum of the lever, as will be readily understood.

The upper extremity of the lever is turned laterally to provide a handle 52, and upon the lever immediately below the said handle is a supplemental handle 53 which controls the latch 54 adapted to engage the segment and thereby hold the lever in a set position. A series of openings, indicated at 55, is provided in the platform 16 concentric with the pivot 49, and these openings are adapted to be engaged by a locking pin 56 whereby to hold the base 48 and the lever at any position to which it may be adjusted in a horizontal plane. The locking pin 56 is carried by a chain or other flexible connection 57 depending from a handle 58 mounted upon the upper extremity of the lever 43 adjacent the handles 52 and 53, as clearly shown in Fig. 5. A housing or guide 59 is mounted upon the plate 48, and the pin 56 plays in the said housing, a spring, indicated at 60, being provided within the housing and acting upon the said pin so as to hold it normally in a lowered position. Upon the upper end of the housing 59 is a pulley or guide roller 61, the axis of which should be concentric with the fulcrum of the lever 43 so that the movement of the said lever in a vertical plane will not disturb the adjustment of the locking pin 56.

The blades 62 are disposed at an angle to the line of draft and are arranged in pairs, the members of which converge rearwardly, as shown most clearly in Fig. 1. The blades also project upwardly at an inclination so that they will conform to the arch described by the hills and, consequently, force the loose surface soil up onto the hills and around the plants. The blades are carried by standards 63, to the lower ends of which they are rigidly secured, and the upper ends of the standards are adjustably secured in rings or collars 64 provided at the ends of the cross bars 65, set screws 66 being fitted in the said collars or rings 64 to bear against the standards and thereby hold them in the position to which they may have been vertically adjusted. The blades can thus be easily set to accommodate the heights of the

hills, while the wheels 7 may run in the furrows between the hills. The cross bars 65 are constructed in two sections which overlap and are provided with longitudinal slots 67, the collars 64 being provided at the outer ends of the respective sections, as will be readily understood. A bolt 68 is inserted through the registering slots 67 and through the plate or cross bar 32 whereby the members of the cross bars 65 may be secured to the said plate and also be held together in a more or less extended relation to carry the blades at such a distance apart as may be rendered necessary by the size of the hills to be built up. The bars 65 or the standards 63, or both, may be offset so that there will be no interference between the inner ends of the bars or the hoe blades when the bars are extended to accommodate the largest hills. Moreover, the outer blades or hoes may project in advance of the wheels and the inner ends of the inner blades may extend beyond the central longitudinal line of the machine, as will be understood upon a study of Fig. 1. The blades will thus be sure to take up the proper amount of dirt. It will now be readily understood that, if the rocker 34 be oscillated in a vertical plane, the attaching plate 32 will be likewise oscillated and, consequently, the bars 65, together with the blades supported from said bars, will be tilted and irregularities in the formation of the hills be accommodated and the cultivation properly accomplished notwithstanding such irregularities. The bolts or pins 36 extend loosely through the attaching plate 32 and also pass through the slots in the bars 65. If the rocker 34 be tilted, one of the springs 37 will be compressed and will force down the adjacent end of the plate 32 so that said plate with the cross bars 65 and the hoe blades will be tilted. If the rocker be tilted when the blades happen to be against some obstruction, the springs will act as a cushion to prevent bending or breakage of the parts and they will also permit the plate and the hoes to swing rearwardly about the pivotal connection between the sleeve 30 and the lugs 31 so that the hoes may ride over an unvielding obstruction.

In advance of the front beam or rod 2, I mount upon the tongue 11 a draft bar or evener 70 from the ends of which depend hangers or rods 71 which are connected with the cultivator blades by links or braces 72 extending between the lower ends of said rods or hangers and the lower ends of the standards 63 to which the blades are secured. Hung upon the said hangers 71 is a lower draft bar or evener 73 carrying whiffletrees 74 at its ends. The whiffletrees are preferably connected to the draft bar 73 by bolts 75 passing rearwardly through the said draft bar, and springs 76 are preferably coiled around the said bolts between the bar 73 and suitable stops on the bolts, as will be readily understood, to permit a limited movement of either the draft bar or the whiffletree independent of the other. The draft bar 73 is constructed in two sections fitted telescopically together and loosely pivoted to the hangers 71 so that they will readily adjust themselves to the inward or outward movement of the hoes. The braces 72 extend from eyes or rings 77 through which the lower ends of the hangers 71 extend, nuts or other stops being fitted to the hangers to prevent dropping of the rings or eyes. When the hoes or blades are adjusted laterally, the braces 72 will follow the movement and will cause the hangers 71 to swing laterally at their lower ends about the connections between their upper ends and the upper draft bar 70. The telescopic construction of the lower draft bar 73 permits it to accommodate itself to the adjustment of the hangers 71 while the pivotal connection of said draft bar to the hangers prevents the dropping of the draft bar and separation of the members of the same, it being understood that the overlapping or telescopic portions of the members are long enough to accommodate the maximum separating adjustment of the pairs of hoes.

To aid in holding the blades to the work, I provide rearwardly extending braces 78 which are mounted at their front ends upon the bolts 68 within brackets 79 and extend rearwardly therefrom to braces 80 which are secured to the pole or tongue 11.

It is thought the operation and advantages of my improved machine will be readily understood from the foregoing description taken in connection with the accompanying drawings.

The machine is drawn over the field along the rows of hills and obviously will extend over two rows of hills so as to cultivate the same simultaneously. A driver occupying the seat 12 may readily reach the foot rest or steering levers 9 so as to effect the angular movement of the wheels necessary to steer the machine along the rows and, when starting the operation, will manipulate the hand wheel 25 so as to actuate the worm gearing and rock the levers 22 about their fulcrums. The movements of said levers will be transmitted through the links 24 to the front and rear ends of the inner arms 17 and as all said arms 17 are rigid with the respective platforms 16, the platforms will be slid inwardly or outwardly upon the beams 1, according to the direction of movement of the levers 22. The sleeves 26 which are parts of the respective hangers 27 fit between the front ends of the arms 17 so closely that they will be forced to follow said arms along the rod or beam 2 simultaneously

with the movement of the platforms 16 transversely of the machine to properly space the pairs of cultivator blades according to the distance between the rows. The sleeves 26, however, do not fit so snugly between the arms 17 that the hangers cannot vibrate freely in longitudinal vertical planes of the machine about the rod or beam 2. It will, of course, be understood that, as the links 24 extend to both the front and rear ends of the frames consisting of the platforms 16 and the arms 17, there will be no tendency of these parts to twist and bind upon the beams 1 and 2. Should it be necessary to tilt the blades in order to conform to irregularities in the hills, such result is attained by releasing the locking pin 56 and then rotating the lever 43 about its longitudinal axis which is co-incident with the pivot 49 and, consequently, causing the plate 48 and the lower end of said lever to swing the arm 39 to one or the other side. This lateral movement of the arm 39 will, of course, turn the rocker 34 about the pivotal bolt 33 and, consequently, bring the bars 65 into an inclined position. The parts may be held in the position to which they are thus adjusted by permitting the locking pin 56 to again engage one of the openings 55 in the platform 16. Should it be desired to raise or lower the blades, this result is attained by swinging the lever 43 forwardly or rearwardly about its pivot while holding the plate 48 stationary. If the lower end of the lever 43 be raised by swinging its upper end rearward, the extremity of the same will be brought against the cap 41 and exert a lifting action upon the arm 39 which will, of course, raise the rocker 34, the standard 28 and all parts connected therewith including the standards 63 and the blades. If the lower end of the lever 43 be swung downwardly, the weight of the blades and the parts connected therewith will, of course, cause the same to move downwardy to a corresponding extent and, inasmuch as the end of the adjusting lever does not move in a true vertical line, some forward and backward movement is imparted to the blades and the parts immediately adjacent the same. This forward and backward movement is accommodated by the swinging or pivotal movement of the sleeve 26 upon the beam or rod 22, as will be readily understood.

It will be noted from Fig. 3 that the draft is transmitted to the blades directly through the hangers 71 and the connecting rods 72 and the blades are thus held positively to the work. This result is further attained or assured by the provision of the rearwardly extending braces 78 and the brackets 79 to which they are connected, the brackets having angular engagement with the braces so that lateral movement of the braces cannot occur and the braces being connected at their rear ends with the frame so that they effectually resist the rearward thrust which is transmitted to said braces from the blades through the standards 63, the bars 65, and the bolts 68. It will be also noted that the supports for the hoes are telescopic owing to the construction and arrangement of parts 27, 28, 39 and 43 so that the blades may readily ride over obstructions without being damaged and may drop into hollows in the sides of the hills without exerting additional strain upon any of the sustaining portions of the machine. It will also be noted that the blades are disposed in advance of the axle and of the ground wheels and, consequently, the machine is well balanced.

The construction disclosed is strong and durable and produces a machine which is comfortable for the operator, and may be easily turned in a short space and steered on side-hill or long crooked rows, the hoes or blades being constantly in view and under the control of the operator.

Having thus described the invention, what is claimed as new is:—

1. A cultivator comprising a wheeled frame, and transversely disposed blades hung upon said frame between the sides thereof in advance of and extending into the paths of the wheels of the same.

2. In a cultivator, the combination of a main frame, pairs of hoes suspended from said frame, means for adjusting the hoes of a pair toward or from each other, and means on the main frame for causing the pairs of hoes to approach or recede.

3. In a cultivator, the combination of a main frame, hangers suspended upon the main frame, cultivator blades carried by said hangers, a worm shaft disposed upon the main frame between said hangers, a three-armed lever mounted upon the main frame and provided with a gear in operative engagement with said worm shaft, a second three-armed lever mounted upon the main frame, a connection between said levers, slidable frames mounted upon the main frame and engaging said hangers, and connections between the three-armed levers and said frames whereby to shift the hangers laterally.

4. The combination of a main frame, hangers suspended thereon for forward and backward movement, cultivators carried by said hangers, a draft bar upon the main frame, hangers depending from said draft bar, connections between the lower ends of said last mentioned hangers and the cultivators, and draft receiving devices on the said hangers.

5. The combination of a main frame,

hangers suspended on the main frame for forward and rearward movement, cultivators carried by said hangers, means for moving said hangers toward or from each other, an evener secured upon the main frame in advance of said hangers, hangers depending from the ends of said evener, connections between the lower ends of said last-mentioned hangers and the cultivators, and an extensible draft bar mounted upon the last-mentioned hangers.

6. In a cultivator, the combination of a main frame, a hanger slidably and pivotally mounted upon the main frame, cultivators carried by said hanger, a platform slidably mounted upon the main frame, arms projecting from said platform and slidable on the main frame at opposite sides of the hanger, means connected with the said platform and said arms to move the same laterally upon the main frame, and means carried by the platform for adjusting the cultivators over an arcuate path.

7. The combination of a main frame, cultivators suspended from the main frame, and means for raising and lowering the cultivators or moving the same forwardly or backwardly or tilting the same from the main frame.

8. The combination of a main frame, a hanger depending therefrom, a rocker pivotally connected with said hanger, cultivator blades, connections between said cultivator blades and the rocker, and means for tilting the said rocker.

9. The combination of a main frame, a hanger depending from the main frame, a rocker pivotally connected with the lower end of the hanger, cultivator blades connected with said rocker, an operating lever mounted upon the main frame to permit its lower end to swing forwardly, rearwardly or laterally, and connections between the said lever and the rocker whereby the cultivator blades may be tilted transversely or may be swung forwardly and rearwardly.

10. The combination of a main frame, a hanger depending therefrom, a cross bar pivotally connected with the said hanger, cultivator blades connected with said cross bar, and means for swinging said cross bar in intersecting planes.

11. The combination of a main frame, a hanger depending therefrom, a plate pivotally connected to the lower end of the hanger for lateral forward and backward movement, cultivator blades supported from said plate, a rocker pivotally mounted upon the hanger, yieldable connections between the said rocker and said plate, and means acting upon said rocker to oscillate the same and the plate transversely or to permit the plate to move forwardly or rearwardly.

12. The combination of a main frame, a hanger depending therefrom, a yoke pivoted to the lower end of said hanger, a plate having upstanding lugs disposed at opposite sides of said yoke and pivoted thereto, cultivator blades supported from said plate, and means for rocking the plate upon its pivotal connection with the yoke or for rocking said yoke about its pivotal connection with the hanger.

13. The combination of a main frame, a platform thereon, a hanger depending from the main frame, a rocker connected with the lower end of said hanger, cultivator blades supported from said rocker, a seating plate pivoted upon the platform for movement in a horizontal plane, a lever mounted upon the said plate for movement with the same or oscillation thereon, connections between said lever and the rocker, and a locking pin connected with the lever and carried by said seating plate and adapted to engage the platform.

14. The combination of a main frame, a telescopic hanger depending therefrom, a rocker carried by the lower end of said hanger, cultivators connected with said rocker, a tubular operating arm rising from said rocker, a controlling lever mounted upon the main frame and provided at its lower end with an enlargement fitting within the said tubular operating arm, a follower within said arm engaging said enlargement, and a spring within the arm holding said follower to the enlargement.

15. The combination of a main frame, a hanger depending therefrom, a plate connected with the lower end of said hanger to tilt laterally, forwardly or backwardly, cross bars adjustably secured to said plate, blades supported from said bars, and means for tilting said plate.

16. The combination of a main frame, a hanger depending therefrom, a plate connected with the lower end of said hanger to tilt laterally and forwardly and backwardly, cross bars adjustably secured to said plate, standards adjustably secured to the ends of said cross bars, blades secured to the lower ends of the standards, and means for tilting said plate.

17. The combination of a main frame, a hanger depending therefrom, a plate connected to the lower end of the hanger to tilt forwardly, laterally or backwardly, overlapping cross bars secured to the under side of said plate, blades supported from said cross bars, a rocker pivotally connected with the hanger, means for actuating said rocker, pins depending from the ends of the rocker, and playing through said plate, and springs coiled around said pins between the rocker and said plate.

18. The combination of a main frame, a

hanger depending therefrom, a yoke pivoted to the lower end of the hanger to swing transversely, a plate pivoted to said yoke to swing longitudinally, blades supported from said plate, a rocker pivoted to the yoke by the same pivot which connects the yoke to the hanger, yieldable means for exerting pressure from the rocker upon the plate, and means on the main frame for manipulating the rocker.

In testimony whereof I affix my signature in presence of two witnesses.

REXDALE S. B. ADAMS. [L. S.]

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."