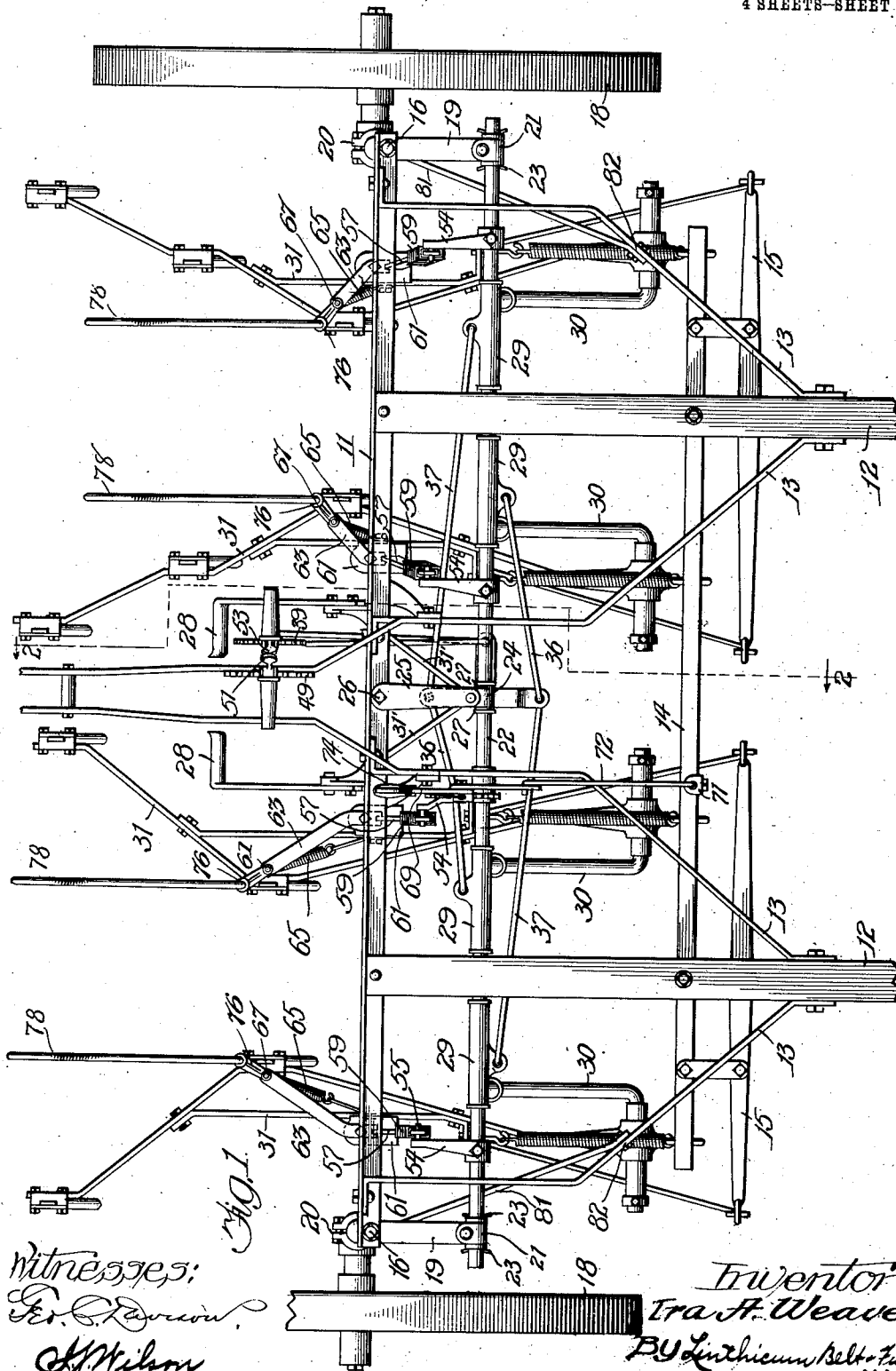


I. A. WEAVER.
TWO ROW CULTIVATOR.
APPLICATION FILED JULY 8, 1910.

1,054,884.

Patented Mar. 4, 1913.

4 SHEETS-SHEET 1.



Witnesses:
E. C. Davidson
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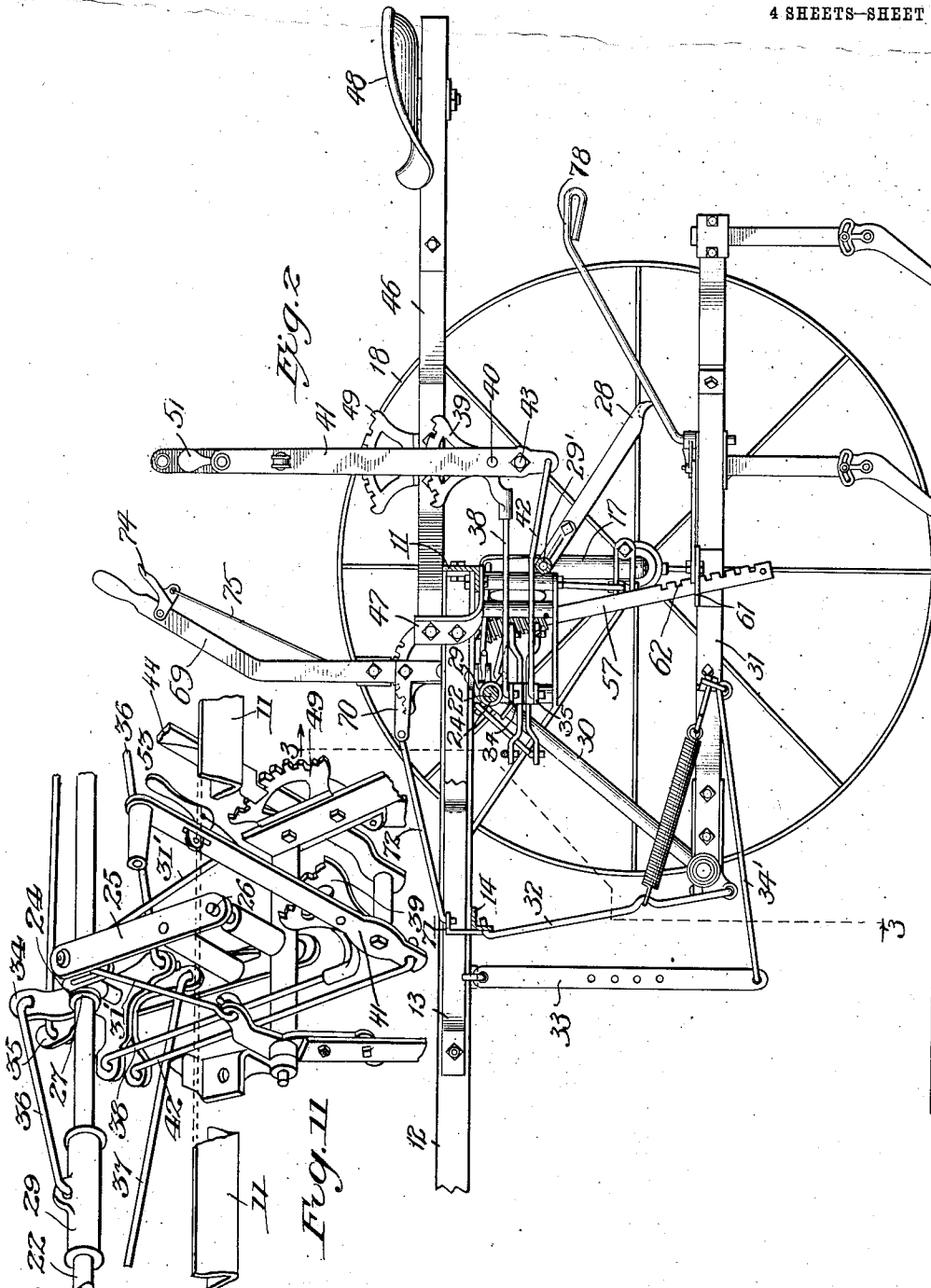
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4 SHEETS-SHEET 2.

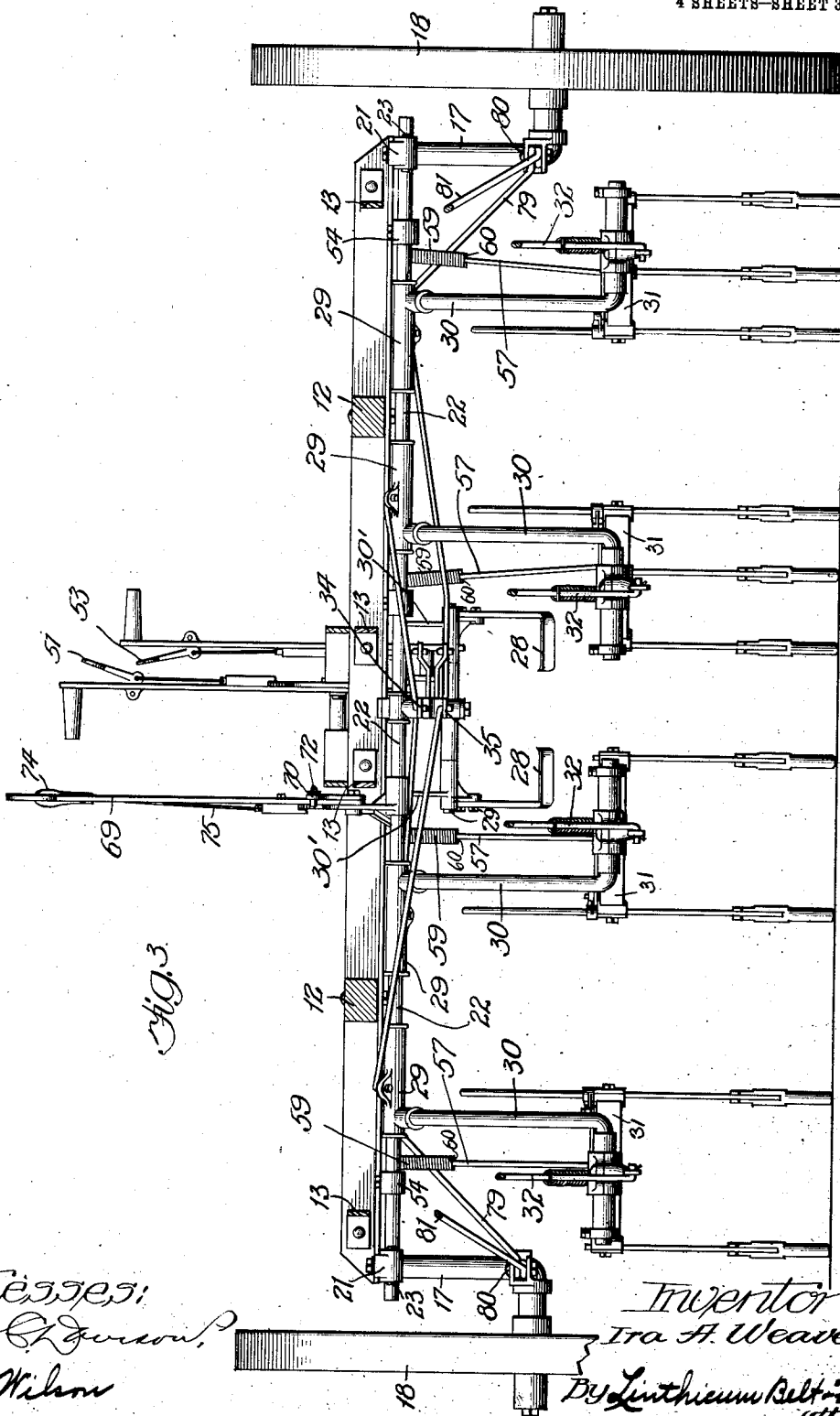


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4 SHEETS—SHEET 3.



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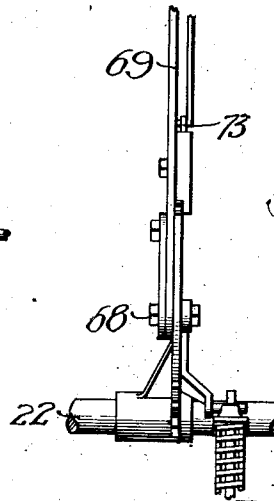
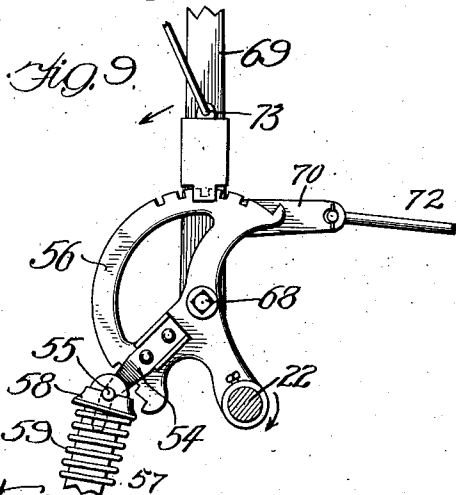
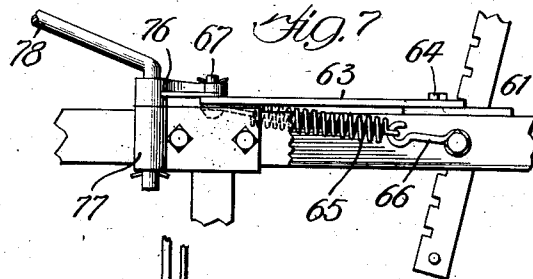
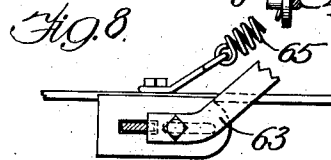
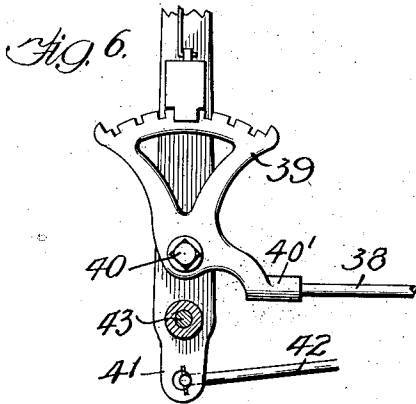
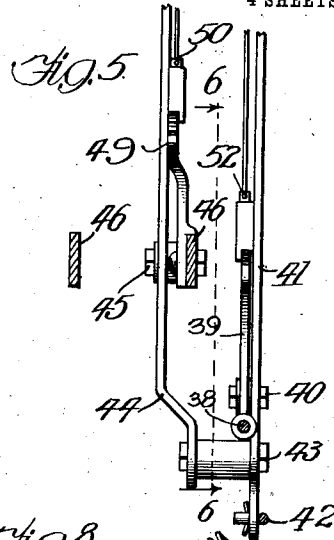
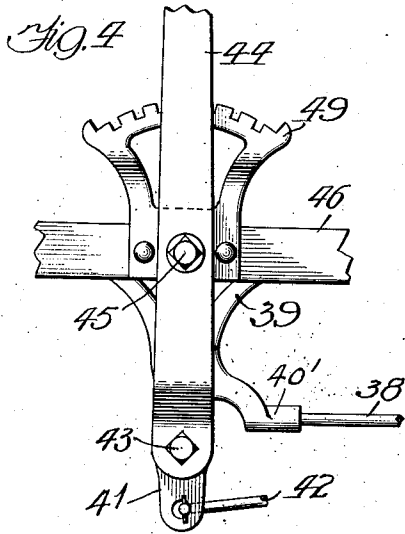
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

IRA A. WEAVER, OF SPRINGFIELD, ILLINOIS, ASSIGNOR TO RACINE-SATTLEY COMPANY, OF SPRINGFIELD, ILLINOIS, A CORPORATION OF ILLINOIS.

TWO-ROW CULTIVATOR.

1,054,884.

Specification of Letters Patent.

Patented Mar. 4, 1913.

Application filed July 8, 1910. Serial No. 571,072.

To all whom it may concern:

Be it known that I, IRA A. WEAVER, a citizen of the United States, residing at Springfield, in the county of Sangamon and State of Illinois, have invented certain new and useful Improvements in Two-Row Cultivators, of which the following is a specification.

This invention relates to two row cultivators, its principal aim and object being the production of a machine of this general character in which the various adjustments of the gangs may be accomplished when the team is in motion and the cultivator is working.

One of the particular objects of this invention is the provision of adjusting mechanism by means of which the sets of gangs may be adjusted simultaneously to accommodate them to rows of various widths.

Another object is to provide mechanism whereby the gangs may be individually adjusted to position the gangs in each set nearer to or farther from the row which is being cultivated.

A further object is the provision of new and improved means for simultaneously raising and lowering all of the gangs and for regulating the depth at which the teeth or shovels are working.

Still another object is the provision of devices for normally locking each gang to the lifting mechanism and also the provision of manual means for unlocking each of the gangs from its lifting mechanism to permit any gang to be raised independently of the others for the purpose of dislodging trash which may be collected in front of the shovels.

Additional objects are, the provision of a cultivator which shall be light, strong and durable, which will be easy to manipulate and adjust and which will be an improvement in general construction, over cultivators of this type heretofore in use.

In the accompanying drawings forming a part of this specification, I have illustrated a preferred embodiment of this invention and throughout the various views of these drawings like reference characters refer to the same parts.

In the drawings Figure 1 is a plan view of one of my improved cultivators. Fig. 2 is a

view on the line 2—2 of Fig. 1. Fig. 3 is a front elevation partially in section on the line 3—3 of Fig. 2. Fig. 4 is an enlarged detail view of a portion of the mechanism for adjusting the gangs. Fig. 5 is an elevation looking toward the left Fig. 4. Fig. 6 is a section on the line 6—6 of Fig. 5. Fig. 7 is a detail elevation of the mechanism for locking a gang to the lifting mechanism. Fig. 8 is a detail plan view of the portion of the mechanism shown in Fig. 7. Fig. 9 is a detail of the mechanism for raising and lowering the gangs; Fig. 10 is a view looking toward the right in Fig. 9, and Fig. 11 is a perspective view of the shifting apparatus, certain parts being broken away.

On the drawings, 11 designates a cross-bar preferably of angle-shape formation forming the main cross-piece for the frame of the cultivator. A pair of tongues 12 are secured to said cross-bar at their rear ends and are braced against lateral movement by suitable braces 13 which are attached to the tongue at one end and bent at their other ends to fit flush against one face of the cross-bar to which they are securely bolted. The tongues are further braced and strengthened by a cross-bar 14 bolted to the under side of the tongue and to which the eveners 15 are attached.

Upon either end of the cross-bar 11 there is pivoted at 16 an axle member which comprises a vertical portion 17, a horizontal portion upon which the carrying wheel 18 turns, and a forwardly extending arm 19. The forwardly extending arm 19 may be made integral with the vertical and horizontal portions of the member or it may be made independently therefrom and clamped to the vertical member at 20, as shown in the drawings. The pivot bolt 16 passes through the horizontal arm and permits the axle member to swing about a vertical axis, whereby the wheels may be turned to steer the cultivator.

In suitable bearings 21 and secured upon the forward ends of the arms 19, there is journaled the rock shaft 22. The rock shaft is prevented from moving longitudinally of the arms 19 by pins 23 or other suitable means on either side of the bearings 21. The shaft is supported at or near its center in a bearing 24 attached to the yoke

which is pivotally supported at 26 upon the cross-bar 11, as shown in Fig. 1. A collar 27 is secured upon the shaft on either side of the bearing 24 so that the shaft will move longitudinally of the bearing when a swinging movement is imparted to the yoke 25. In order to swing the yoke there is provided a pair of foot levers 28 pivoted upon a shaft 29' and having upwardly extending lever arms 30' which are connected by means of rods 31' with the yoke 25 near its forward end. It will be evident that when one of the foot levers is depressed by the foot of the operator, a pull will be exerted upon the rod 31' connected with that lever to swing the yoke 25 about its pivot and thereby impart a longitudinal movement to the shaft 22. Longitudinal movement of the shaft will simultaneously swing the two axle members about their pivots 16 thereby turning the wheels to the right or to the left relatively to the line of draft to guide the cultivator.

The cultivator which I have illustrated on the drawings is intended to be used for cultivating two rows, and in this embodiment of my invention, there are provided four sleeves 29, mounted to slide longitudinally upon the shaft 22, the sleeves being arranged in pairs upon either side of the center of the shaft. Arms 30 are rigidly secured to the sleeves, said arms being bent outwardly at their lower ends to form bearings for attachment thereto of the gangs 31, which may be of any ordinary or preferred type. It will be evident that the arms 30 together with the sleeves 29 and the shaft 22, form a connecting yoke for the gangs, which in the usual solid type of yoke is commonly known as the connecting arch.

As will be evident from Fig. 2, the arms 30 extend forwardly and downwardly at an angle from the rock shaft 22, and in order to support the forward ends of the gangs, there is provided for each gang a supporting rod 32 pivotally connected with the gang at its lower end and attached at its upper end to the cross-bar 14. The ordinary strap 33 to which the whiffletree is usually attached, is suspended by one end from an evener 15 and is connected at its lower end by means of a rod 34' with a gang, whereby the draft of the gang will be taken directly by the horses.

For the purpose of adjusting the gangs longitudinally of the rock shaft and laterally of the rows being cultivated, I have mounted upon the yoke 25 below the rock shaft, a pair of bell-crank levers 34 and 35, each lever having a forwardly extending arm, a rearwardly extending arm and a laterally extending arm, as will be evident from Figs. 1, 2 and 3. The forwardly and rearwardly extending arms of

the bell-crank lever 34 are connected by links 36 with the two inner sleeves 29, while the forwardly and rearwardly extending arms of the bell-crank lever 35 are connected by links 37 with the outer sleeves 29. It will be evident that swinging movement of the lever 34 about its pivot will slide the two inner sleeves longitudinally of the shaft in opposite directions and that swinging movement of the bell-crank lever 35 upon its pivot will slide the outer sleeves longitudinally of the rock shaft and in opposite directions.

As best seen in Fig. 2, the laterally extending arm of the bell-crank lever 34 is connected by means of a rod 38 with the lower end of a sector 39 pivoted at 40 upon an adjusting lever 41, the rod being rigidly secured in a socket 40' formed integrally with the sector 39 and disposed beneath the pivotal connection, and the lateral arm of the bell-crank lever 35 is connected by a rod 42 with the lower end of the lever 41. Said lever 41 is pivoted at 43 between the points of attachment of the rods 38 and 42 upon a belt projecting laterally from the lower end of a hand lever 44, which in turn is pivoted at 45 upon one of the seat bars 46. The seat bars 46 are fastened at their forward ends to brackets 47 and carry at their rear ends the usual seat 48. A tooth sector 49 is secured upon the seat bar 46 adjacent the lever 44, as shown in Figs. 4 and 5, and the lever 44 is provided with the usual spring-pressed dog 50 which is released from engagement with the sector by means of a grip 51 pivoted to the side of the lever. The handle 41 is likewise provided with a spring-pressed dog 52 which is released from engagement with the tooth sector 39 by means of a grip 53.

By means of the hand lever 44 the gangs may be adjusted longitudinally of the rock shaft to bring them closer to or farther from the rows being cultivated, and by means of the adjusting lever 41 the gangs may be adjusted in sets longitudinally of the rock shaft to accommodate them to rows of various widths. The two gangs which are mounted on the same side of the center of the machine and which operate together to cultivate a single row, will be hereinafter referred to as a set, and the present machine, as will be evident from the drawings, comprises two sets of gangs. When it is desired to adjust the sets of gangs toward or from each other to accommodate rows of various widths, the adjusting lever 41 is released from locking engagement with its tooth sector 39 and is moved about its fixed pivot 43; the hand lever 44 being in this instance locked against movement with its sector 49.

Assuming that it is desired to increase

the distance between the two sets of gangs to accommodate them to rows of a greater width than that for which the sets are at present adapted. The adjusting lever 41 is pulled rearwardly toward the operator, thereby pulling upon the rod 38 and pushing upon the rod 42. This movement will swing the forward arm of the bell-crank lever 34 to the right, looking at Fig. 3, and the forward arm of the bell-crank lever 35 to the left. It will be evident that this movement will slide all of the sleeves 29 an equal distance along the rock shaft 22 toward its ends. A reverse movement of the adjusting lever 41 will bring all of the gangs simultaneously toward the center of the machine to accommodate narrower rows. In this operation, the hand lever 44 remains stationary and the adjusting lever 41 alone, is operated upon its stationary pivot 43. Assuming now that it is desired to regulate the distance between the gangs of each set to bring them closer to or farther from the rows being cultivated without varying the distance between the centers of the sets of gangs as a whole. In order to accomplish this result, the adjusting lever 41 is left locked to its sector 39 while the hand lever 44 is released from locking engagement with the sector 49 and is rocked upon its pivot 45. If it is desired to separate the gangs in each set so that they will not plow so close to the rows which they are straddling, the hand lever 44 is pulled toward the operator. This movement carries the adjusting lever 41 bodily forward and pushes both of the rods 38 and 42 so as to swing the bell-crank levers 34 and 35 to the left, viewing Figs. 1 and 3. It will be evident that this movement of the bell-crank levers will draw both of the inner gangs nearer to the center of the machine and simultaneously thrust the outer gangs nearer to the outside of the machine, the result being that the gangs in each set are separated a greater distance from each other than before. If it is desired to bring the gangs closer to the rows, the hand lever 44 is operated in a reverse direction. It will be evident from the above that the adjusting lever 41 is employed to vary the position of the sets of gangs relatively to each other without varying the position of the individual gangs in the sets, while the hand lever 44 is employed to regulate the distance between the individual gangs in the sets without varying the relative relation of the sets to each other.

It is desirable that cultivators of this character be constructed so that all of the gangs may be elevated and adjusted to depths simultaneously. The raising and lowering mechanism in the present embodiment of my invention will now be described.

A plurality of lever arms 54 are fixed by set screws or otherwise, to the shaft 22 above the gangs 31. Each lever is provided near its outer end with a laterally projecting pin or stud 55, as shown in Figs. 1 and 9. The lever 54 in Fig. 9 is fixed to a tooth sector 56 which is fixed to the rock shaft 22, while the remaining levers 54 are fixed directly to the shaft. A strap or bar 57 slotted near its upper end to receive the pin 55, is suspended from the lever 54. A sleeve 58 slidable longitudinally of the bar, is normally maintained in engagement with the pin 55 by a coiled expansion spring 59 which bears at its lower end against the pin 60 projecting through the bar 57, as shown in Fig. 3. This yielding connection between the bar and the lever 54 permits the bar to move upwardly independently of the lever, thereby permitting the gangs to yield in an upward direction to avoid breakage if rocks or other obstacles should be encountered. The lower end of the strap 57 projects through a slotted plate 61 projecting laterally from the gang, and the bar is provided with a series of notches 62 on one side thereof adapted to receive a locking member 63, best shown in Figs. 7 and 8, which is slidable with the bolt 64 longitudinally of the plate 61 and is normally held in locking engagement in a notch by a tension spring 65 fixed at one end to a hook 66 secured on the gang beam, and attached at its other end to a pin 67 passing through the outer end of the locking member 63.

The toothed sector 56 which is shown in Figs. 9 and 10 which is secured upon the rock shaft 22, has pivotally connected thereto at 68, a depth adjusting hand lever 69. Fixed to the hand lever above its point of pivotal connection, is a bracket 70 which is connected with an eye 71 secured upon the cross-bar 14 by means of a rod 72. The lever is provided with the usual spring-pressed dog 73 and the ordinary hand-grip 74 connected with the dog by a link 75. It will be evident that when the lever is pulled backwardly toward the operator, it will swing about the pivotal connection between the bracket 70 and the rod 72 to move the point of pivotal connection between the lever and the sector, forwardly. This movement will rock the shaft 22 in a clockwise direction looking at Fig. 9 to raise the outer ends of all of the levers 54 and thereby simultaneously elevate all of the gangs. When it is desired to lower the gangs, the lever is operated in the opposite direction and the depth at which the shovels work can be regulated by adjusting the handle to any position relative to the sector 56.

It is sometimes desirable to raise one of the gangs independently of the others to enable the removal of trash or other ma-

terial which may be accumulated in front of the shovels. In order to permit this independent raising movement of the gangs, the outer end of the locking member 63 is connected by the pin 67 with one end of a bell-crank lever 76 which is pivoted in a bearing 77 secured to the side of the gang, one arm 78 of the lever extending rearwardly in position to be engaged and swung on its pivot by the hand or foot of the operator to withdraw the locking member 63 from engagement with the notched bar 57 against the force of the spring 65. When a gang has been unlocked from its bar 57 it may be raised individually and independently from the remaining gangs. When the gang is again lowered and the lever 78 is released, the spring 65 will automatically lock the gang to its lifting bar. It will thus be seen that all of the gangs may be raised, lowered and adjusted simultaneously by the lever 69, and that each of the gangs may be released from its lifting mechanism independently of the remaining gangs, whereby it can be raised to permit removal of any accumulation of trash, etc.

The structure as a whole, is strengthened and the axle members are held against movement laterally and longitudinally of the machine, by means of braces 79 which are pivoted at their lower ends upon bolts 80 and secured at their upper ends to the cross member 11 and also by the braces 81 likewise secured to the axle member by the bolt 80 and secured at their forward ends at 82 to the outer braces 13. This method of bracing while providing a firm and rigid structure enables the axle members to be turned freely on their vertical axes and does not interfere with the steering of the cultivator.

My invention embodies a number of advantageous features among which may be mentioned the strength and rigidity of the construction as a whole; the steering of the cultivator by the feet of the operator; the ability to adjust the sets of gangs for rows of various widths; and to adjust the individual gangs in each set nearer to or farther from the rows while the horses are in motion and the cultivator is in operation; also the improved mechanism for raising, lowering and adjusting the depth of the shovels of all the gangs simultaneously, and furthermore, the feature of yieldingly locking each gang to the lifting mechanism so that any gang may be readily unlocked and raised independently of the remaining gangs when occasion requires.

Although I have shown and described in considerable detail this embodiment of my invention, nevertheless it will be understood that the mechanism disclosed is capable of considerable variation in its mechanical de-

tails without departing from the spirit of the invention or sacrificing any of the material advantages thereof.

What I desire to claim is:

1. In a cultivator, the combination of a frame, a plurality of sets of gangs, each set comprising a pair of beams adapted to straddle a row of plants, the beams of each set being capable of adjustment toward and from each other, means for simultaneously adjusting the sets of gangs toward and from each other without varying the distance between the individual beams in a set, and means for simultaneously adjusting the individual beams relatively to each other without varying the distance between the sets, substantially as described.

2. In a cultivator, the combination of a frame, a plurality of sets of gangs, each set comprising a plurality of relatively adjustable gangs and being adapted to cultivate one row of plants, an adjusting lever, and connections between said lever and each of said gangs whereby the distance between the individual gangs of each set may be varied without varying the distance between the median lines of the various sets, and whereby the distance between the sets may be varied without varying the distance between the individual gangs of each set, substantially as described.

3. In a cultivator the combination of a frame, a rock shaft mounted in said frame, a plurality of pairs of gangs supported by said shaft so as to be capable of adjustment longitudinally thereof, an adjusting lever, and connections between said lever and said gangs, said connections including a plurality of bell-crank levers, a rod connecting each gang with one end of a bell-crank lever, and rods connecting each bell-crank lever with said adjusting lever whereby one movement of the lever serves to vary the distance between the gangs of each pair and another movement serves to vary the distance between the pairs of gangs, substantially as described.

4. In a cultivator, the combination of a frame, a plurality of sets of gangs, each set comprising a pair of gangs adapted to straddle one row, and means for simultaneously adjusting all of the gangs individually to vary the distance between the gangs of each set regardless of the relative positions of the sets and means for adjusting the sets bodily toward and from each other, substantially as described.

5. In a cultivator, the combination of a frame, a plurality of gangs arranged in sets, each set being adapted to cultivate one row of plants, means for adjusting the sets of gangs to accommodate rows of various widths without disturbing the relative position of the individual gangs in each set, and means

for simultaneously adjusting each of the gangs in a set toward and from the other, substantially as described.

6. In a cultivator, the combination of a frame, a rock shaft mounted in said frame, a plurality of gangs movable longitudinally of said rock shaft, means for simultaneously adjusting the sets of gangs to variously spaced rows without disturbing the relative position of the individual gangs in each set, and means for simultaneously adjusting all of the gangs in various sets toward and from the rows being cultivated by each set, substantially as described.

7. In a cultivator, the combination of a frame, a plurality of sets of gangs arranged to cultivate a plurality of rows of plants, a manually controlled adjusting lever for adjusting the sets of gangs to accommodate rows of various widths without disturbing the relative position of the individual gangs in each set, and means for actuating said adjusting lever to regulate the distance between the gangs of each set without varying the distance between the sets of gangs, substantially as described.

8. In a cultivator, the combination of a frame, a plurality of sets of gangs adjustably mounted in said frame, each set comprising two gangs adapted to straddle a row of plants, a pivoted adjusting lever, connections between said lever and each gang, whereby movement of the lever about its pivot will adjust the sets of gangs to accommodate rows of various widths without disturbing the relative positions of the gangs in each set, and means for moving said adjusting lever bodily with its pivot to adjust the individual gangs of each set toward and from each other to dispose said gangs nearer to or farther from the rows of plants being cultivated, substantially as described.

9. In a cultivator, the combination of a frame, a rock shaft mounted in said frame, a plurality of sets of gangs mounted to be adjusted longitudinally of said rock shaft, a pair of bell-crank levers pivoted on the frame between said sets of gangs, an operative connection between each gang and one end of a bell-crank lever, an adjusting lever, a second lever upon which said adjusting lever is pivotally mounted, a rod connecting one of said bell-crank levers to said adjusting lever above its pivot, and a second rod connecting the other bell-crank lever with said adjusting lever below its pivot, whereby rocking movement of the adjusting lever about its pivot will adjust the sets of gangs to rows of various widths without disturbing the relative positions of the gangs in each set, and movement of said adjusting lever by means of said second lever will adjust the individual gangs of each set to-

ward and from each other, substantially as described.

10. In a cultivator, the combination of a frame, a rock shaft supported in said frame, a plurality of sleeves slidable longitudinally of said shaft, members secured to said sleeves, a gang mounted on each of said members, and means for adjusting said sleeves longitudinally of the shaft to adjust the gangs to variously spaced rows and to regulate the distance between the gangs on each side of a row, substantially as described.

11. In a cultivator, the combination of a frame, a rock shaft supported in said frame, a plurality of members sleeved to said shaft to be adjusted longitudinally thereof, a plurality of gangs pivotally connected at one end with said members, and connections between said shaft and the gangs whereby oscillation of the shaft will raise and lower the gangs, substantially as described.

12. In a cultivator, the combination of a frame, a rock shaft mounted in said frame, a plurality of gangs, oscillatory connections between the shaft and said gangs adjustable longitudinally of the shaft, a plurality of arms fixed on said shaft, mechanism connecting said arms with the gangs intermediate their ends, and means for oscillating said shaft to raise and lower all of the gangs simultaneously, substantially as described.

13. In a cultivator, the combination of a frame, a rock shaft supported on said frame, a plurality of gangs connected at their forward ends to said shaft, a plurality of arms rigidly secured on said rock shaft, a plurality of straps, each adjustably secured at one end to a gang and yieldingly secured at its other end to one of said arms, whereby to permit limited movement of the gang and strap relatively to the arm, and means for rocking said shaft to simultaneously lift each of said gangs through the intermediary of the fixed arms and straps, substantially as described.

14. In a cultivator, the combination of a frame, a rock shaft supported by said frame, a gang sleeved at its forward end to said rock shaft, an arm fixed on said shaft, a bar provided with a series of notches on one side thereof secured at its upper end to said arm, means on the gang for engaging in said notches to connect said gangs to the bar, and means for rocking the shaft, whereby to elevate said gangs, substantially as described.

15. In a cultivator, the combination of a frame, a rock shaft carried in said frame, a plurality of gangs pivotally connected at their forward ends to said rock shaft, a plurality of arms fixed on said shaft, connections between the outer ends of said arms and said gangs, a sector fixed on said rock

shaft, a hand lever pivoted at one end to said sector within the perimeter thereof, and means for connecting said lever between its ends with said frame, whereby actuation of the lever will oscillate said sector and rock shaft to raise and lower the gangs, substantially as described.

16. In a cultivator, the combination of a frame, a rock shaft, a plurality of gangs pivotally connected at their forward ends with said rock shaft, a plurality of levers fixed on said rock shaft, a strap yieldingly secured to the outer end of each of said levers, and means for normally locking said straps to the gangs, whereby rocking of the shaft will raise and lower the gangs, substantially as described.

17. In a cultivator, the combination of a frame, a rock shaft mounted thereon, a plurality of gangs pivotally connected at their forward ends with said rock shaft, a plurality of levers fixed on said rock shaft, a strap secured to the outer end of each of said arms, means for normally locking each of said straps to a gang, and manual means for releasing said locking means to permit each of the gangs to be elevated independently of its strap, substantially as described.

18. In a cultivator, the combination of a frame, a rock shaft mounted therein, a gang pivotally connected at its forward end with said rock shaft, a lever secured on said shaft, a strap secured at one end to said lever, yielding means for normally locking said strap to said gang, means for rocking the shaft whereby to elevate the gang, and a hand lever for releasing said locking means, whereby said gang may be elevated independently of the strap, substantially as described.

19. In a cultivator, the combination of a frame, a rock shaft mounted therein, a plurality of gangs pivotally connected at their forward ends with said rock shaft so as to be capable of adjustment longitudinally thereof, means for connecting said gangs intermediate their ends with said rock shaft, a handle operatively connected with said shaft whereby to rock the shaft and simultaneously elevate all of the gangs, and a hand lever mounted upon each of said gangs for releasing said gangs intermediate their ends from the rock shaft, whereby each of the gangs may be independently elevated, substantially as described.

20. In a cultivator, the combination of a frame, an axle member pivoted at the side of said frame to turn about a vertical axis, a carrying wheel on each of said axle members, braces connecting said frame with the axle members adjacent the wheels to prevent movement of the axle members laterally and longitudinally of the frame, a rock shaft connecting the forwardly extending

portions of said axle members, means for moving said rock shaft longitudinally to turn said axle members on their axes to steer the cultivator, a plurality of gangs attached to said rock shaft, and means for rocking said shaft to raise and lower said gangs, substantially as described.

21. In a cultivator, the combination of a frame, an axle member comprising a vertical portion, an axle and a forwardly extending arm, pivotally secured at each side of said frame to turn on vertical axes, means for preventing movement of the vertical portion of the axle members laterally and longitudinally of the frame, a rock shaft connecting the forwardly extending arms of said axle members, means for moving said rock shaft longitudinally to turn the axle members on their axes whereby to steer the cultivator, a plurality of gangs adjustable longitudinally of said rock shaft, means for adjusting said gangs individually and in sets, and means for rocking said shaft to raise and lower the gangs, substantially as described.

22. In a cultivator, the combination of a frame, an axle member having a forwardly extending arm pivotally mounted at each side of the frame, a rock shaft connecting said forwardly extending arms, a plurality of sleeves slidably mounted on said rock shaft, an arm extending downwardly from each sleeve, a pair of said arms and said rock shaft forming a coupling arch for a set of gangs, a gang secured to the lower end of each of said arms, means for moving said sleeves longitudinally of the shaft to adjust the positions of said gangs, means for moving said shaft longitudinally to turn the axle members to steer the cultivator, and means for rocking said shaft to raise and lower the gangs, substantially as described.

23. In a cultivator, the combination of a frame, a plurality of gangs, a rod connecting the forward end of each gang with the frame, a rock shaft mounted in the frame, means for pivotally connecting the forward end of each of said gangs with the rock shaft, means for simultaneously raising and lowering all of said gangs, means for simultaneously adjusting said gangs laterally, and a coiled lifting spring connecting each of said gangs with the rod connected to the forward end thereof, whereby to assist in the lifting operation, substantially as described.

24. In a cultivator, the combination of a frame, a rock shaft mounted therein, a plurality of gangs pivotally connected at their forward ends with said rock shaft, and means suspended from said shaft and adapted to be connected with said gangs whereby rocking of the shaft will raise and lower the gangs, substantially as described.

25. In a cultivator, the combination of a

frame, an axle member pivoted at each side of the frame to turn about a vertical axis, a carrying wheel mounted on each of said axle members, a rock shaft connecting the forwardly extending portions of said axle members, a plurality of gangs connected to said rock shaft, and means for rocking said shaft to raise and lower said gangs, substantially as described.

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Witnesses:

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