Aug. 16, 1932. T. BROWN 1,872,236

POWER LIFT CULTIVATOR

Filed July 31, 1926 4 Sheets-Sheet 1

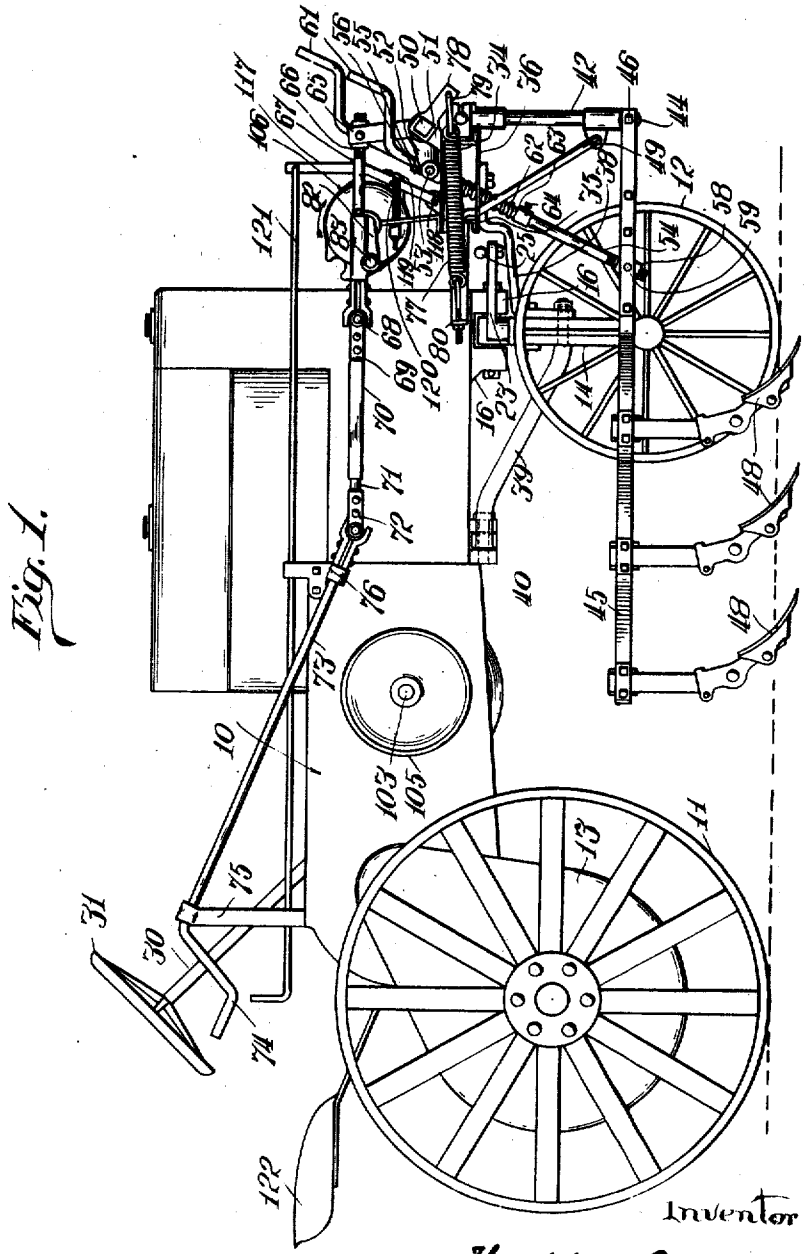


Fig. 1.

Witness
Alice R. Girard

Inventor
Theophilus Brown,
John L. Jackson,
Attorney

Aug. 16, 1932. T. BROWN 1,872,236

POWER LIFT CULTIVATOR

Filed July 31, 1926 4 Sheets-Sheet 2

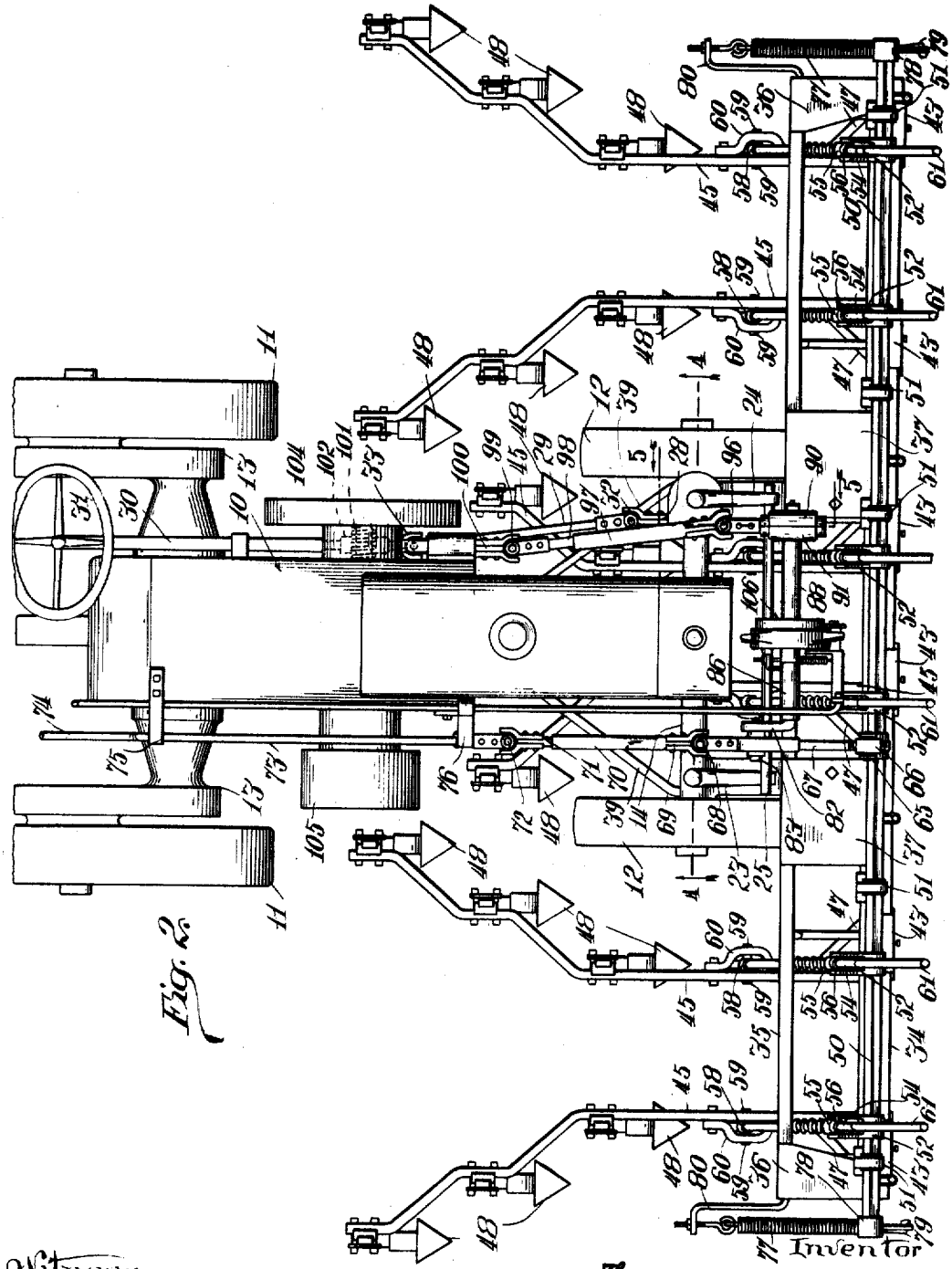


Fig. 2

Witness
Alice R. Girard

Inventor
Theophilus Brown.
By John L. Jackson
Attorney

Aug. 16, 1932. T. BROWN 1,872,236

POWER LIFT CULTIVATOR

Filed July 31, 1926 4 Sheets-Sheet 3

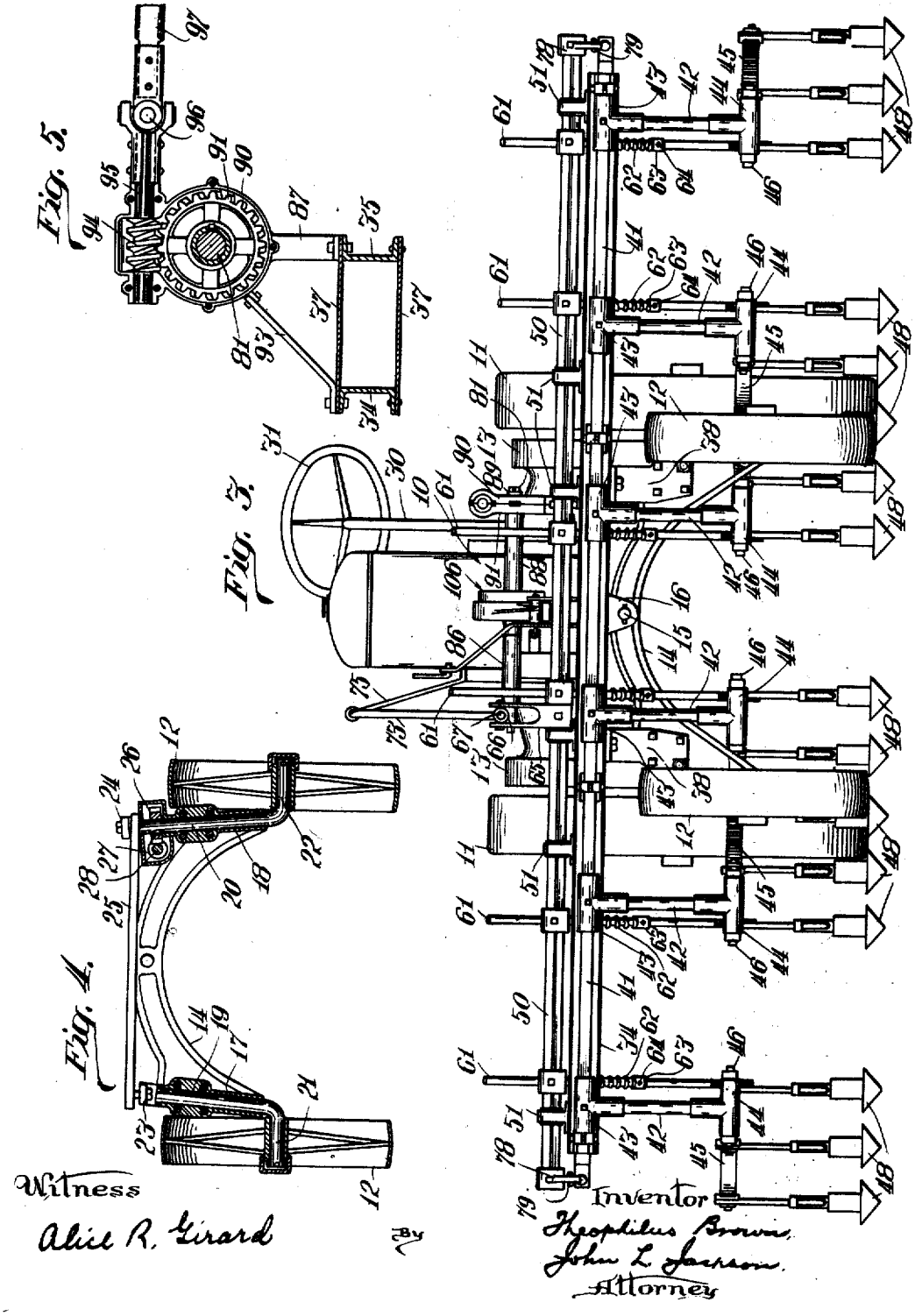


Fig. 5.

Fig. 3.

Fig. 4.

Witness
Alice R. Girard

Inventor
Theophilus Brown
John L. Jackson
Attorney

Aug. 16, 1932. T. BROWN 1,872,236

POWER LIFT CULTIVATOR

Filed July 31, 1926 4 Sheets-Sheet 4

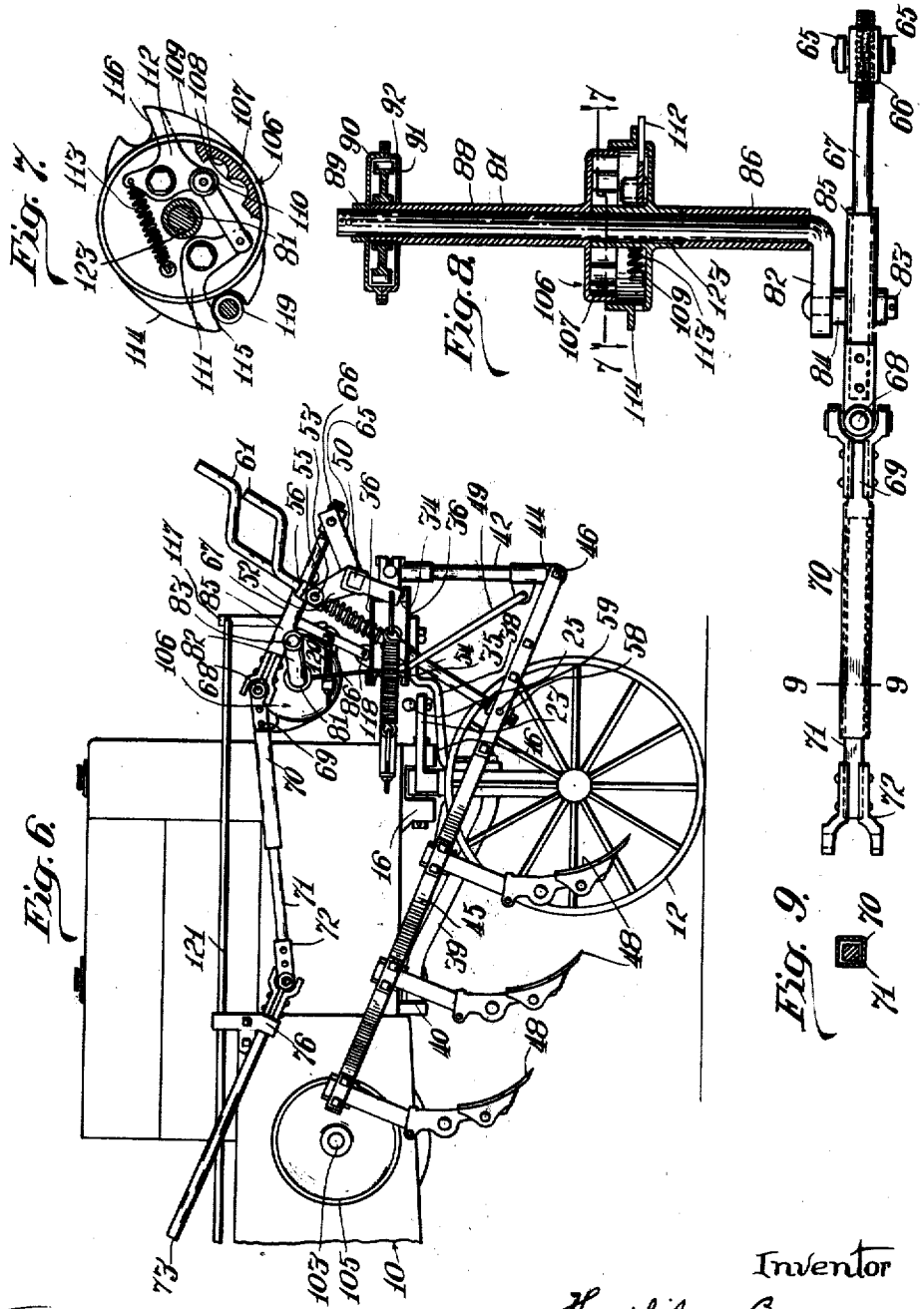


Fig. 7.

Fig. 8.

Fig. 6.

Fig. 9.

Witness
Alice R. Girard

Inventor
Theophilus Brown,
By John L. Jackson,
Attorney

Patented Aug. 16, 1932 1,872,236

UNITED STATES PATENT OFFICE

THEOPHILUS BROWN, OF MOLINE, ILLINOIS, ASSIGNOR TO DEERE & COMPANY, OF MOLINE, ILLINOIS, A CORPORATION OF ILLINOIS

POWER LIFT CULTIVATOR

Application filed July 31, 1926. Serial No. 126,122.

My invention relates to cultivators, and has particularly to do with the means for lifting the cultivator rigs out of operative position and for adjusting the depth of cultivation. The use of mechanical power for operating farm implements has made practicable the development of much larger implements than have been used where the farmer had to rely on manual effort to operate such machinery, and has resulted in considerable economy of operation, since with a larger implement ordinarily a much larger tract of land proportionately can be farmed than with a small implement. For example, a two-row cultivator is about the maximum size that can be handled by horse power, but by using mechanical power for propulsion purposes a three-row cultivator becomes entirely practicable. But the problem of propulsion is not the only one that must be solved where such large implements are used. In the use of cultivators particularly it is necessary at more or less frequent intervals to lift the cultivators out of operative position, and also to adjust the several rigs either simultaneously or separately to operate at the same or different depths, and it is extremely difficult, if not impossible, for a single operator to manually perform the various operations necessary to the proper handling of cultivators of such large sizes. With these considerations in mind my present invention has for its object to provide for raising the several rigs of a cultivator, simultaneously out of operative position, and restoring them to a predetermined operative position, by mechanical power; and, in connection therewith, to provide manually operated means for adjusting the rigs to operate at the desired depth. Also, as a further improvement, my invention has for its object to provide means by which the several rigs may be set independently of each other to operate at the same or different depths, of such character that after the rigs have been set they may be raised or lowered by power without disturbing their setting. A further object is to provide certain other improvements which will be particularly pointed out hereinafter. I accomplish these objects as illustrated in the accompanying drawings and hereinafter described. What I regard as new is set forth in the claims.

In the accompanying drawings, in which I have shown my improvements applied to a three-row cultivator arranged to be propelled by a tractor arranged back of the cultivator frame,—

Fig. 1 is a side elevation;

Fig. 2 is a plan view;

Fig. 3 is a front elevation;

Fig. 4 is substantially a vertical cross-section on line 4—4 of Fig. 2 illustrating the front axle and the mounting of the steering wheels;

Fig. 5 is an enlarged longitudinal vertical section, taken substantially on line 5—5 of Fig. 2, illustrating a worm drive for the power operated lifting and lowering mechanism;

Fig. 6 is a view similar to Fig. 1, but with the propelling wheels omitted, showing the position of the parts when the rigs have been lifted out of operative position;

Fig. 7 is a partial sectional view taken approximately on the plane of the line 7—7 of Figure 8 showing one form of clutch that may be employed to effect the raising and lowering of the rigs;

Fig. 8 is a horizontal sectional view illustrating certain parts of the lifting mechanism; and

Fig. 9 is a cross-section on line 9—9 of Fig. 8.

Referring to the drawings, 10 indicates a tractor, which may be of any approved type, having propelling wheels 11 and a front truck adapted to rock about a longitudinal axis. In the present embodiment of my invention the front truck carries dirigible

wheels 12. The tractor illustrated is equipped with a chain drive for the propelling wheels, the chains being enclosed in housings 13 shown in Fig. 1, but the driving mechanism for the propelling wheels may be of any preferred type.

The dirigible wheels 12 are carried at the opposite end portions of an arched axle 14, which, as best shown in Figs. 1 and 3, is connected with the front portion of the main or tractor frame by a longitudinally disposed pivot 15 mounted in spaced blocks 16 depending from the front central portion of said frame, so that the front truck is adapted to rock relatively to the tractor frame about a longitudinal axis. As shown in Fig. 4, the end portions of the axle 14 are provided with bearings 17, 18 in which are journaled circular standards 19, 20 having horizontally disposed wheel spindles 21, 22 at their lower ends on which the wheels 12 are mounted. The upper ends of the standards 19, 20 are respectively provided with forwardly extending parallel arms 23, 24, which are cross connected by a connecting rod 25 so that the wheels 12 turn in unison for steering purposes. Preferably the standards 19, 20 converge slightly in an upward direction, as shown in Fig. 4. One of the standards 19 or 20, in the illustrated construction the standard 20, is provided near its upper end with a worm wheel 26 with which meshes a worm 27 carried at the forward end of a longitudinally disposed shaft 28 at one side of the tractor frame. Said shaft is connected by a connecting rod 29 with a steering post 30 that carries a steering wheel 31. The front and rear ends of the rod 29 are flexibly connected respectively with the worm wheel shaft 28 and the steering post 30 by universal joints 32, 33, as shown in Fig. 2. Thus the steering connections may adapt themselves to any rocking movement of the front axle.

Disposed transversely in front of the front truck is an attachment comprising a cultivator frame that is firmly secured to the front axle 14 and is principally supported thereby, so that said axle serves to connect it with the main or tractor frame in such manner as to permit it to rock relatively thereto about a longitudinal axis, i. e. in a transverse vertical plane. Said cultivator frame preferably comprises two oppositely disposed channel bars 34, 35 spaced apart and rigidly connected together by upper and lower end plates 36, and upper and lower intermediate plates 37, as best shown in Figs. 2 and 5. The intermediate portion of said cultivator frame is firmly secured to the end portions of the front axle 14 by braces 38 shown in Fig. 1, so that said cultivator frame is supported independently of the tractor frame. Preferably the end portions of the axle 14 are connected with the tractor frame by rearwardly extending braces 39 which are connected with said tractor frame at their rear ends, as shown at 40 in Fig. 1, preferably in line with the pivot 15, so that they do not interfere with the rocking movement of the axle.

Mounted on the front portion of the cultivator frame and extending longitudinally thereof is a bar 41 from which depend a series of hangers 42 which form means of attachment for the front ends of a series of cultivator rigs. Said hangers are preferably tubular, and are connected with the bar 41 at their upper ends by sleeves 43, as best shown in Fig. 3. At their lower ends said hangers carry horizontal sleeves 44 disposed transversely of the cultivator, and to these sleeves are pivotally connected a series of cultivator beams 45 by means of pivots 46. As best shown in Fig. 2, the beams 45 are provided with straps 47, which, with the forward ends of the beams, form yokes to support the pivots 46, so that the beams 45 have pivotal support at laterally separated points. It will be understood that the several hangers 42 are spaced a suitable distance apart along the bar 41 and are secured in position thereon in any suitable way, preferably by means designed to permit their adjustment along said rod to regulate the spacing between the several cultivator rigs. The cultivator beams 45 carry shovels 48 arranged in the usual way. By the arrangement described the cultivator beams are held against lateral swinging, but are free to swing upward and downward about the pivots 46 at their forward ends, to raise or lower the shovels with respect to the ground. In the arrangement shown there are six rigs arranged to cultivate three rows at one time, but my invention contemplates modification of such arrangement as may be desired. The hangers 42 are held against fore and aft swinging by braces 49 secured to their lower ends, and also suitably attached to the cultivator frame, as best shown in Figs. 1 and 6.

In the machine which forms the subject-matter of this application the several cultivator rigs may be raised or lowered independently of each other by manually operable means; they may be raised or lowered in unison, also by manually operable means, and they may be raised or lowered in unison by power operated means, the power being derived from the motor by which the tractor is driven, although my invention contemplates the use of other power for that purpose, such as that derived from a separate motor. The manual adjustments referred to are designed primarily for setting the rigs to operate at a greater or less depth, but if desired they may be used to raise the shovels clear of the ground. The power operated means for raising or lowering the rigs is so designed that it does not alter the setting of

the several rigs, and, therefore, whatever such setting may be after the rigs have been raised out of operative position by the action of the power operated means, when they are again lowered to operative position by the operation of said power operated means they return to the position in which they were previously set, so that their re-adjustment is unnecessary unless the operator wishes to change the setting.

Referring first to the manually operable means for independently moving the rigs vertically, by reference to Figs. 1, 2 and 3, it will be seen that a lifting device comprising a rock shaft 50 is mounted upon and extends longitudinally of the cultivator frame from one end thereof to the other. Such shaft is preferably located over the front portion of said frame and is mounted in bearings carried by suitable brackets 51 secured upon the front beam 34 of the frame at suitable intervals. Said shaft is held against endwise movement by any suitable means, and as it is carried by the cultivator frame, it swings vertically in unison with such frame. This shaft is provided at points above the several cultivator beams with crank arms 52 fixedly secured thereto so as to rock therewith, and forked at their rear ends to receive pivot pins or trunnions 53 which connect them with lifting devices in the form of rods 54, best shown in Figs. 1 and 6. The trunnions 53 are carried by sleeves 55 that are loosely mounted intermediately upon the rods 54 and abut at their upper ends against shoulders 56 on said rods. Said sleeves bear at their lower ends on collars 57 loosely mounted on the rods 54. By this construction the rods 54 are free to rotate for adjustment purposes, as will hereinafter appear. At their lower ends the rods 54 are provided with screw-threads which screw into blocks 58 pivotally supported by trunnions 59 mounted in bearings in the beams 45 and in straps 60 secured to the beams, as best shown in Fig. 2. At their upper ends the rods 54 are provided with cranks 61, as best shown in Figs. 1 and 6. Assuming that the rock shaft 50 is held against rocking, it will be apparent that by rotating any one of the rods 54 by means of its crank the cultivator beam attached to it may be raised or lowered by the screwing of its lower end into or out of the block 58. By this means, therefore, any of the cultivator beams may be manually adjusted vertically independently of the others and of the rocking of the rock shaft 50 to set it for cultivating at any desired depth, or to lift it clear of the ground. Also, by means of the rock shaft 50, the several lifting devices may be actuated in unison to raise or lower the several beams at the same time, as will be hereinafter described. Preferably each of the rods 54 is provided with a spring 62 mounted upon it between the collar 57 and a collar 63 adjustably mounted on said rod and held in place by a set screw 64, as shown in Fig. 1. These springs serve to yieldingly hold the cultivator shovels in the ground, and permit them to rise when an obstacle is encountered.

It will be noted that two of the cranks 61 are shown as extending higher than the rest, but this is simply to permit them to turn freely without striking certain other parts of the mechanism which have not yet been described.

For lifting and lowering the several cultivators manually in unison I provide the rock shaft 50 with an upwardly extending arm 65 which is non-rotatably secured thereto and is provided at its upper end with a trunnion block 66 having internal screw threads, said block being similar in construction to the blocks 58. Screwed into the block 66 is the forward end of a rod 67 which extends rearwardly at one side of the tractor frame and at its rear end is provided with a universal joint 68 by which it is flexibly connected to a telescopic connecting rod 69 comprising a tubular member 70 in which is fitted an extensible member 71 having at its rear end a universal joint 72. The latter universal joint connects the member 71 with the forward end of a rod 73 which is mounted on the frame of the tractor and is provided at its rear end with a crank 74. Said rod is rotatably supported on the tractor frame, preferably by means of brackets 75, 76, as shown in Fig. 1. Obviously, by turning the crank 74 the rod 67 may be rotated to screw it through the block 66 in one direction or the other and thereby swing the arm 65 back or forth to rock the rock shaft 50 so as to lift or lower the rigs. By thus flexibly and extensibly connecting the rod 73 with the arm 65 it will be apparent that said rod may be used to rock the rock shaft 50, and thereby raise or lower the cultivator rigs regardless of any rocking movement in a transverse vertical plane of the front axle and cultivator frame. The extensible members 70, 71 permit the arm 65 to swing back and forth independently of the rod 73. When the shaft 50 is rocked, since all the cultivator rigs are connected with it through the cranks 52 and rods 54, they will all be raised or lowered in unison, unless at the same time one or another of the rods 54 be rotated separately, which would change the relation of the rig connected with it with respect to the other rigs.

To aid in lifting the several rigs in unison I provide springs 77 at the ends of the cultivator frame, which at their front ends are connected to arms 78 secured to the rock shaft 50, and at their rear ends are connected by adjustable links 79 with brackets 80 secured to the tractor frame, as best shown in Figs. 1 and 2.

Coming now to the power lift mechanism for raising or lowering the rigs in unison, it is of the unidirectional, optionally controlled type, and comprises a rotary shaft 81 that extends transversely of the machine, preferably over the central portion of the cultivator frame, and is provided with a swinging member in the form of a crank 82 at the end adjacent to the rod 67, as best shown in Figs. 2 and 8. Said crank is connected with said rod by a pivot pin 83 fitted in a bearing 84 carried by a sleeve 85 through which the rod 67 extends. Said rod is journaled in said sleeve but is held against endwise movement through it, so that when the clutch mechanism with which said sleeve is connected, as hereinafter described, is idle, said sleeve holds the rod 67 against endwise movement but does not interfere with its rotation by operation of the crank 74 to manually actuate the rock shaft 50 for raising or lowering the rigs. In the latter operation the sleeve 85 is held stationary by the crank 82 and serves as an abutment that resists the end thrust in either direction of the rod 67, as best shown in Figs. 1 and 8. By this construction rotation of the crank 82 will move the rod 67 endwise and rock the rock shaft 50 to raise or lower the rigs in unison. The range of movement of the lifting devices effected by the crank may be varied by screwing rod 67 in one direction or the other through the trunnion block 66, to change the normal position of the arm 65.

The end of the shaft 81 that carries the crank 82 is mounted in a bearing 86 supported upon the cultivator frame by standards 87, shown in Fig. 1. The opposite end portion of said shaft is journaled in a tubular shaft 88 that is disposed transversely of the machine, and at its outer end is mounted in a bearing 89, preferably integral with the housing member 90, and adapted to receive a worm wheel 91, as shown in Fig. 8. A cooperating housing member 92, mounted on the tubular shaft 88 and connected with the housing member 90, encloses said worm wheel at the opposite side, as shown in the latter figure. Said housing is braced by a brace 93 connected to it and to the cultivator frame, as best shown in Fig. 5. The worm wheel 91 is keyed to the tubular shaft 88 and operates to rotate said shaft. Said worm wheel is driven by a worm 94 carried by a shaft 95 that extends fore and aft, and is flexibly connected by a universal joint 96 with the front member 97 of an extensible coupling rod comprising said front member 97 and a rear member 98 telescopically and non-rotatably connected therewith, preferably by making said rod non-circular in cross-section. The rear member 98 of said connecting rod is connected by a universal joint 99 with a power takeoff or drive shaft 100 which at its rear end carries a spiral gear 102 meshing with a spiral gear 101 driven by the motor on the tractor frame. In the construction illustrated said motor drives a transversely disposed shaft 103 shown in Fig. 1, and the spiral gear 101 is mounted on and keyed to said shaft, but any other suitable arrangement for the purpose may be employed. The shaft 103 preferably carries a fly wheel 104 at one end, and a belt pulley 105 at the other, as shown in Fig. 2. By this construction the worm 91 on the tubular shaft 88 is constantly rotated while the motor is running, and, therefore, said tubular shaft is also driven constantly.

At its inner end the tubular shaft 88 is provided with a clutch member 106, preferably formed integral therewith, which has a marginal flange 107 provided with notches 108. Co-acting with the clutch member 106 is a second clutch member 109 which carries means for operatively connecting the two clutch members so that they rotate in unison, comprising a roller 110 movable into or out of engagement with the notches 108 by the operation of either of two triggers 111, 112 arranged at diametrically opposite points. A spring 113 tends to move the roller 110 into engagement with the notches 108. The clutch member 109 is provided with a rim 113 having a radial flange 114 in which are notches 115, 116 at diametrically opposite points, and as best shown in Fig. 7 the triggers 111, 112 project out beyond the rim 113 at one side of the notches 115, 116, respectively. This type of clutch is well known in the art as it is commonly used on power lift plows of the frameless type, and its construction and operation therefore need not be described in detail. It will suffice to say that the clutch members are connected by the action of the spring 113, and are disconnected automatically at the end of every half revolution of the clutch by means operating to press back one or the other of the triggers 111, 112, and hold it in that position. The rotation of the clutch member 109 accordingly stops until such latch is again released. The means for disengaging the clutch members comprises a trip lever 117 pivoted at its lower end upon the cultivator frame by a pivot 118 shown in Figs. 1 and 6, and carrying a roller 119 arranged to ride on the flange 114 as the clutch rotates and adapted to engage one or the other of the triggers 111, 112 as such trigger is carried around by the rotation of the clutch, thereby actuating the trigger to disconnect the clutch members. The trip lever 117 is normally held in operative position by a spring 120 connected at one end with said lever and at the other end with the standard 107, as shown in Figs. 1 and 6, but the lever 117 may be moved forward to carry its roller 119 out of engagement with the clutch trigger with which it is in engagement by a rod 121 connected at its forward end with the upper end of said trip lever and

extending back to a position where it may be conveniently operated by the person occupying the driver's seat 122. The rod 121 is preferably supported and guided by the bracket 76, as shown in Fig. 1. It will be evident from the foregoing that by means of the operating rod 121 the driver may optionally connect the clutch member 109 with the clutch member 106 so that it will rotate in unison therewith, and that after being so connected if the operator releases the operating rod the spring 120 will return the trip lever 117 to its operative position so that the roller 119 will disconnect said clutch members as soon as the tubular shaft 88 has made a half revolution. Upon the next actuation of the trip lever the clutch member 109 will operate through the second half of the cycle and then stop. This operation may be repeated as often as desired. It will thus be seen that this motor driven power lift clutch has a definite cycle of operation for raising and lowering the rigs.

The clutch member 109 is non-rotatably connected with the shaft 81 by a key 123, or in any other suitable way, so that the rotary movement of said clutch member is imparted to said shaft. It will be clear, therefore, that assuming the parts to be in the position shown in Fig. 1, if the trip lever 117 be actuated the clutch will rotate through a half cycle, thereby similarly rotating the shaft 81 and swinging its crank 82 through an arc of one hundred and eighty degrees. This movement of the crank will move the rod 67 forward to the position shown in Fig. 6, thereby rocking the rock shaft 50 and lifting all the cultivator rigs in unison, as shown in said figure. This movement of the rod 67 is permitted by the telescopic connection 70, 71, which is then extended as shown in Fig. 6, but without interfering with the operative connection between said members.

The crank 74, therefore, remains operative to modify the range of movement of the lifting devices under the action of the power lift mechanism even while the rigs are being raised or lowered by the power lift mechanism. After the rigs have been raised to the position shown in Fig. 6 they will be held in their raised position by the action of the trip lever 117, which, as has been explained, is moved rearwardly by the action of the spring 120 as soon as the rod 121 is released by the operator. To lower the rigs the operator again thrusts the rod 121 forward to move the trip lever 117 out of its operative position, whereupon the clutch completes the cycle, thereby swinging the crank 82 downwardly and rearwardly to the position shown in Fig. 1, where it is stopped by the disconnection of the clutch members. Thus the rock shaft 50 is rocked in the opposite direction, lowering the rigs.

As has been explained, the several rigs may be individually adjusted vertically to set them for operating at any desired depth by means of the cranks 61, which adjustment is wholly independent of the operation of the power lift mechanism, or of the manual adjustment of the rigs in unison effected by the crank 74. Therefore, the rigs may be set to operate at any desired depth, and such setting will not be disturbed when the rigs are lifted in unison either by the operation of the manual lifting devices or by the operation of the power lift mechanism, so that when the rigs are lowered by either of the latter mechanisms they will maintain the same relative position that was established by the operation of the individual adjusting cranks 61.

So far as I am aware the means above described for raising and lowering cultivator rigs, or analogous tilling devices, and providing for their adjustment, is broadly new, and the claims hereinafter made are, therefore, to be construed accordingly. The term "attachment" as used in the claims is not to be considered as necessarily meaning that the cultivator or other implement supporting frame is one that must be capable of being applied to or removed from a conventional tractor without special arrangement for its reception, or one that may readily be removed from the tractor, as it may either be permanently affixed thereto, or be made readily separable therefrom, as circumstances may dictate.

What I claim as my invention and desire to secure by Letters Patent, is—

1. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a frame connected with the tractor to rock with respect thereto in a transverse vertical plane, soil tilling rigs connected with said frame to swing toward or from the ground, and lifting devices mounted on said frame to swing therewith and operable to lift the rigs in unison, said lifting devices including connections for actuating the same by power from said motor through a motor driven power lifter having a substantially definite cycle of operation, said connections being adjustable manually to vary the upper and lower limits of the lifting movement of the rigs.

2. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a frame connected with the tractor to rock with respect thereto in a transverse vertical plane, soil tilling rigs connected with said frame to swing toward or from the ground, and lifting devices mounted on said frame to swing therewith and operable to lift the rigs in unison, said lifting devices including connections for actuating the same by power from said motor through a power lifter having a definite cycle of operation, said connections

being adjustable manually to vary the upper and lower limits of the lifting movement of the rigs, and means operable manually to adjust the rigs vertically independently of each other.

3. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a frame connected with the tractor and extending transversely thereof, soil tilling rigs connected with said frame to swing toward or from the ground, and lifting means operable to lift the rigs in unison, said lifting means including a motor operated power lifter on the attachment frame, said lifter having a substantially definite cycle of operation, operating connections between said lifter and the rigs, and means operable manually to adjust such connections to vary the operating position of the rigs.

4. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a frame connected with the tractor and extending transversely thereof, soil tilling rigs connected with said frame to swing toward or from the ground, and lifting means operable to lift the rigs in unison, said lifting means including a motor operated power lifter on the attachment frame, said lifter having a substantially definite cycle of operation, operating connections between said lifter and the rigs, and means operable manually to adjust such connections to vary the operating position of the rigs, and means operable manually to adjust the rigs vertically independently of each other.

5. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a frame rockably connected with the tractor to extend transversely thereof, soil tilling rigs connected with said frame to swing toward or from the ground, and lifting means operable to lift the rigs including connections for actuating the same by power from said motor, said connections comprising co-acting clutch members mounted on said frame, means for continuously driving one of said clutch members from said motor, means connected with the other clutch member for lifting or lowering the rigs, the latter means comprising a connection adjustable manually to vary the operating position of the rigs, means operable to optionally connect said clutch members, and means for disconnecting said clutch members at the end of each lifting or lowering operation thereof.

6. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a frame connected with the tractor to extend transversely thereof and to rock with respect thereto in a vertical plane, soil tilling rigs connected with said frame to swing toward or from the ground, and lifting means operable to lift the rigs including connections for actuating the same by power from said motor, said connections comprising co-axial clutch members on said frame, means for continuously driving one of said clutch members from said motor, means connected with the other clutch member for lifting or lowering the rigs, means operable to optionally connect said clutch members, means for disconnecting said clutch members at the end of each lifting or lowering operation thereof, and means operable manually to move the rigs vertically in their entireties to vary one of the limits of the movement thereof effected by the operation of the clutch members.

7. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a frame pivotally connected with the tractor to extend transversely thereof and to tilt with respect thereto in a transverse plane, soil tilling rigs connected with said frame to swing toward or from the ground, and lifting means operable to lift the rigs including connections for actuating the same by power from said motor, said connections comprising co-acting clutch members on said frame, means for continuously driving one of said clutch members from said motor, means connected with the other clutch member for lifting or lowering the rigs, means operable to optionally connect said clutch members, and means for disconnecting said clutch members at the end of each lifting or lowering operation thereof, and means operable manually to set the operating position of said rigs independently of each other.

8. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a frame connected with the tractor to rock with respect thereto, soil tilling rigs connected with said frame to swing toward or from the ground, and lifting means operable to lift the rigs in unison including co-acting clutch members mounted on said frame, means for continuously driving one of said clutch members from said motor, means operable by the other clutch member to lift or lower the rigs, means optionally operable to operatively connect said clutch members, and means for disconnecting said clutch members at the end of each lifting or lowering operation thereof.

9. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a frame connected with the tractor to rock with respect thereto, soil tilling rigs connected with said frame to swing toward or from the ground, and lifting means operable to lift the rigs in unison including co-acting clutch members mounted on said frame, means for continuously driving one of said clutch members from said motor, means operable by the other clutch mem-

ber to lift or lower the rigs, means optionally operable to operatively connect said clutch members, means for disconnecting said clutch members at the end of each lifting or lowering operation thereof, and means operable manually to vary the upper and lower limits of the lifting movement of said rigs effected by the clutch members.

10. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a frame connected with the tractor to rock with respect thereto, soil tilling rigs connected with said frame to swing toward or from the ground, and lifting means operable to lift the rigs in unison including co-acting clutch members mounted on said frame, means for continuously driving one of said clutch members from said motor, means operable by the other clutch member to lift or lower the rigs, means optionally operable to operatively connect said clutch members, and means for disconnecting said clutch members at the end of each lifting or lowering operation thereof, and means on said frame operable manually to set the operating position of the rigs independently of each other.

11. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a frame connected with the tractor to rock with respect thereto, soil tilling rigs connected with said frame to swing toward or from the ground, and lifting means operable to lift the rigs in unison including co-acting clutch members mounted on said frame, flexible means for continuously driving one of said clutch members from said motor, means operable by the other clutch member to lift or lower the rigs, means optionally operable to operatively connect said clutch members, and means for disconnecting said clutch members at the end of each lifting or lowering operation thereof.

12. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a frame connected with the tractor to rock with respect thereto, soil tilling rigs connected with said frame to swing toward or from the ground, and lifting means operable to lift the rigs, comprising connections for actuating the same by power from said motor, including a motor actuated power lifter on said frame having a substantially definite cycle of operation, said connections being adjustable manually to vary one of the limits of the power actuated movement of the rigs.

13. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a frame connected with the tractor to rock with respect thereto in a transverse vertical plane, soil tilling rigs connected with said frame to swing toward or from the ground, and lifting devices mounted on said frame to swing therewith and operable to lift the rigs in unison, said lifting devices comprising connections for actuating the same by power from said motor, including a motor driven power lifter on said frame having a substantially definite cycle of operation, said connections being adjustable manually to vary one of the limits of the swinging movement of the rigs.

14. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a frame connected with the tractor to rock with respect thereto in a transverse vertical plane, soil tilling rigs connected with said frame to swing toward or from the ground, and lifting devices operable to lift the rigs in unison, said lifting devices comprising connections for actuating the same by power from said motor including a power lifter on said frame having a definite cycle of operation, said connections being adjustable manually to vary the lower limit of the swinging movement of the rigs, and means operable manually to adjust the rigs vertically independently of each other.

15. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a frame connected with the tractor to swing with respect thereto and extending transversely thereof, a rock shaft carried by said frame, soil tilling rigs connected with said rock shaft to swing toward or from the ground by the rocking thereof, and lifting means operable to rock said shaft to lift the rigs, comprising an arm on said rock shaft, a power lifter on said frame having a definite cycle of operation, means for actuating said power lifter from said motor, an operating connection between said power lifter and said arm, for rocking said shaft, and means operable to adjust said operating connection to vary the operating position of the rigs.

16. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a frame connected with the tractor to swing in a transverse vertical plane, a rock shaft on said frame, soil tilling rigs connected with said rock shaft to swing toward or from the ground by the rocking thereof, and lifting means on said frame operable to rock said shaft to lift the rigs, comprising an arm on said rock shaft, a power lift clutch having a definite cycle of operation, said clutch including a shaft having a crank, means for operating said clutch from said motor, and a rod and sleeve connection between said crank and said arm, said connection being adjustable to vary the operating position of the rigs.

17. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a frame connected with the tractor to swing in a transtion between said crank and said arm, said frame soil tilting rigs connected with said

rock shaft to swing toward or from the ground by the rocking thereof, and lifting means on said frame operable to rock said shaft to lift the rigs, comprising an arm on said rock shaft, a power lift clutch having a definite cycle of operation, said clutch including a shaft having a crank, means for operating said clutch from said motor, and a connection between said crank and said arm for rocking said rock shaft by rotation of said crank, said connection being adjustable to vary the normal position of said arm with respect to said crank.

18. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a draft frame pivotally connected with the tractor to rock with respect thereto in a transverse vertical plane, soil tilling rigs connected with said frame to swing toward or from the ground, lifting means on said frame operable to lift the rigs, power lift mechanism actuated by power from said motor, an operating connection between said power lift mechanism and said lifting means for actuating the same by power, and means operable manually to move said connection either independently of the operation of said power lift mechanism, or in conjunction with the operation thereof, to actuate said lifting means.

19. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a draft member pivotally mounted on the tractor to swing in a transverse vertical plane, and extending transversely thereof, a plurality of soil tilling rigs connected with said draft member to swing toward or from the ground independently of each other, lifting means on said draft member operable to lift the rigs in unison, and means for operating said lifting means including power lift mechanism actuated by power from said motor, and connections between said power lift mechanism and said lifting means adjustable to simultaneously vary the operating position of the rigs.

20. In an agricultural implement, the combination with a tractor including a motor, of an attachment comprising a draft member pivotally connected with the tractor to rock with respect thereto in a transverse vertical plane, soil tilling rigs connected with said draft member to swing toward or from the ground, lifting means on said draft member, operable to lift the rigs, and means for operating said lifting means including power lift mechanism having a substantially definite cycle of operation, actuated by power from said motor, and connections between said power lift mechanism and said lifting means, including means for adjusting said connections to vary the operating position of the rigs.

21. The combination with a tractor including a motor, of a frame comprising a draft member extending laterally from the tractor, and rigs supported therefrom for independent vertical movement, whereby said rigs may accommodate themselves to unevenness of the ground surface, power lift mechanism actuated by the tractor motor, and lifting means connected with the rigs and operable either by said power lift mechanism, or manually, or by both conjointly.

22. The combination with a tractor including a motor, of a frame comprising a draft member extending laterally from the tractor, and rigs supported therefrom for independent vertical movement, whereby said rigs may accommodate themselves to unevenness of the ground surface, power lift mechanism actuated by the tractor motor, lifting means connected with the rigs for lifting them either separately or in unison, and power transmitting connections between said power lift mechanism and said lifting means for actuating said lifting means to move the rigs in unison, and said lifting means being operable manually either separately from or conjointly with the operation thereof by said power lift mechanism.

23. The combination with a tractor including a motor, traction wheels driven by said motor, a power take-off shaft on the tractor, and driving connections between the motor and said shaft, of lifting mechanism for an implement associated with the tractor to be propelled thereby, comprising half revolution clutch mechanism including a normally rotating clutch member, a normally stationary clutch member having a crank, and means for optionally connecting said clutch members to rotate in unison, a worm and worm wheel connection between said power take-off shaft and said normally rotating clutch member, a rock shaft, a lifting connection between said rock shaft and the implement, operable manually to lift the implement independently of the rocking of said rock shaft, and also operable by the rocking of said rock shaft, and a power transmitting connection between said crank and said rock shaft for rocking the same to lift or lower the implement by rotation of said normally stationary clutch member.

24. The combination with a tractor including a motor, a power take-off shaft extending longitudinally of the tractor, and driving connections between the motor and said shaft, of lifting mechanism for an implement associated with the tractor to be propelled thereby, comprising half revolution clutch mechanism including a normally rotating clutch member, a normally stationary clutch member, and means for optionally connecting said members to rotate in unison, a worm and worm wheel for driving said normally rotating clutch member from said power take-

off shaft, a transverse shaft connected to rotate with said normally stationary clutch member, a crank on said transverse shaft and driven thereby for swinging movement in a substantially vertical plane, a rock shaft, a lifting connection between the rock shaft and the implement, operable manually to lift the implement independently of the rocking of said rock shaft, and also operable by the rocking of said rock shaft, and an operating connection between said crank and said rock shaft for rocking the same to lift or lower the implement by the rotation of said transverse shaft.

THEOPHILUS BROWN.

CERTIFICATE OF CORRECTION.

August 16, 1932.

Patent No. 1,872,236.

THEOPHILUS BROWN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 7, line 129, claim 17, strike out the syllable, words and comma "tion between said crank and said arm," and insert instead verse vertical plane, a rock shaft on; and in line 130, after "frame" insert a comma; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of November, A. D. 1932.

M. J. Moore,
Acting Commissioner of Patents.

(Seal)

off shaft, a transverse shaft connected to rotate with said normally stationary clutch member, a crank on said transverse shaft and driven thereby for swinging movement in a substantially vertical plane, a rock shaft, a lifting connection between the rock shaft and the implement, operable manually to lift the implement independently of the rocking of said rock shaft, and also operable by the rocking of said rock shaft, and an operating connection between said crank and said rock shaft for rocking the same to lift or lower the implement by the rotation of said transverse shaft.

THEOPHILUS BROWN.

CERTIFICATE OF CORRECTION.

August 16, 1932.

Patent No. 1,872,236.

THEOPHILUS BROWN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 7, line 129, claim 17, strike out the syllable, words and comma "tion between said crank and said arm," and insert instead verse vertical plane, a rock shaft on; and in line 130, after "frame" insert a comma; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of November, A. D. 1932.

M. J. Moore,
Acting Commissioner of Patents.

(Seal)