July 15, 1941. H. N. JAMES 2,249,630

LIFT MECHANISM FOR IMPLEMENTS

Filed July 10, 1940 5 Sheets-Sheet 1

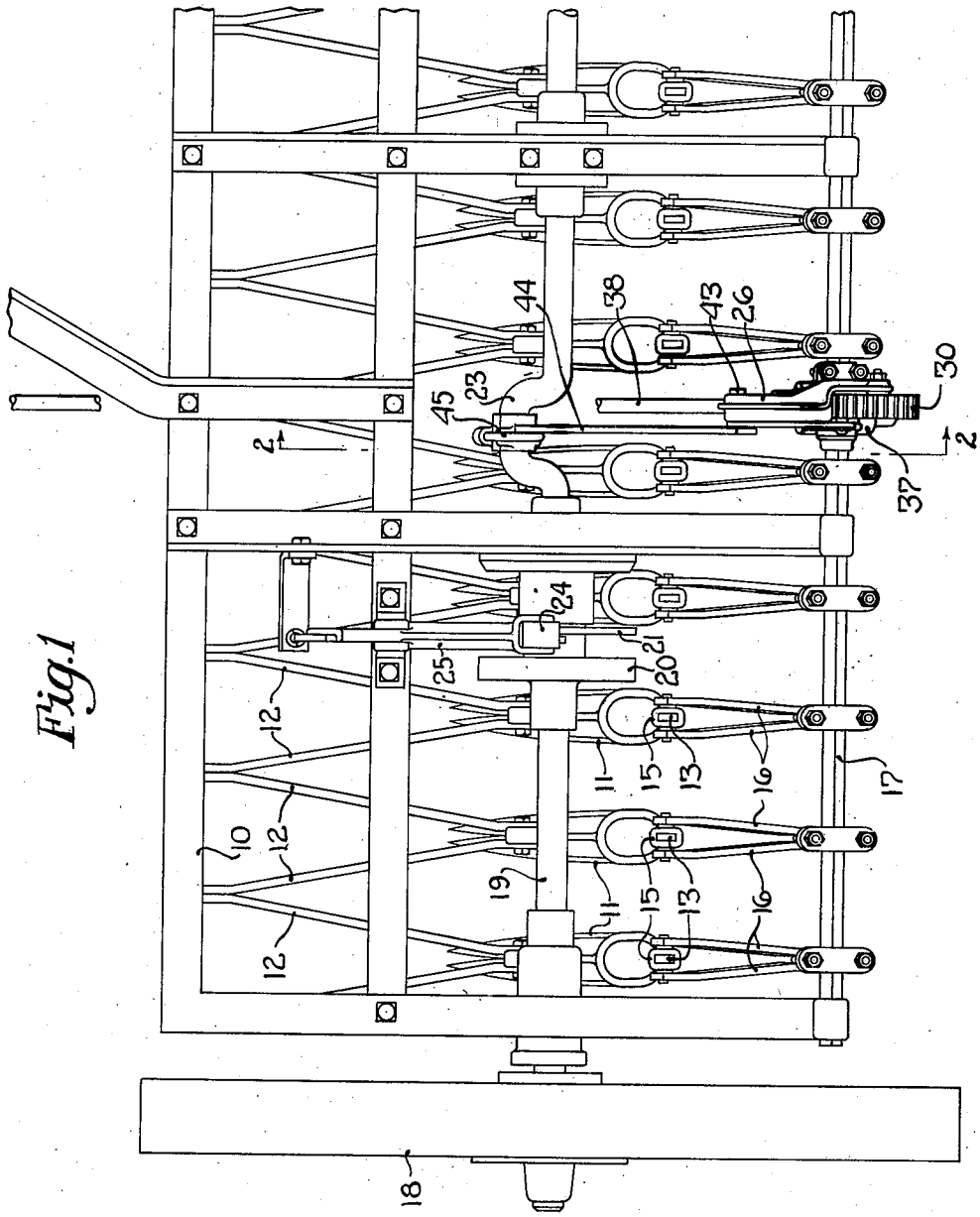


Fig. 1

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LIFT MECHANISM FOR IMPLEMENTS

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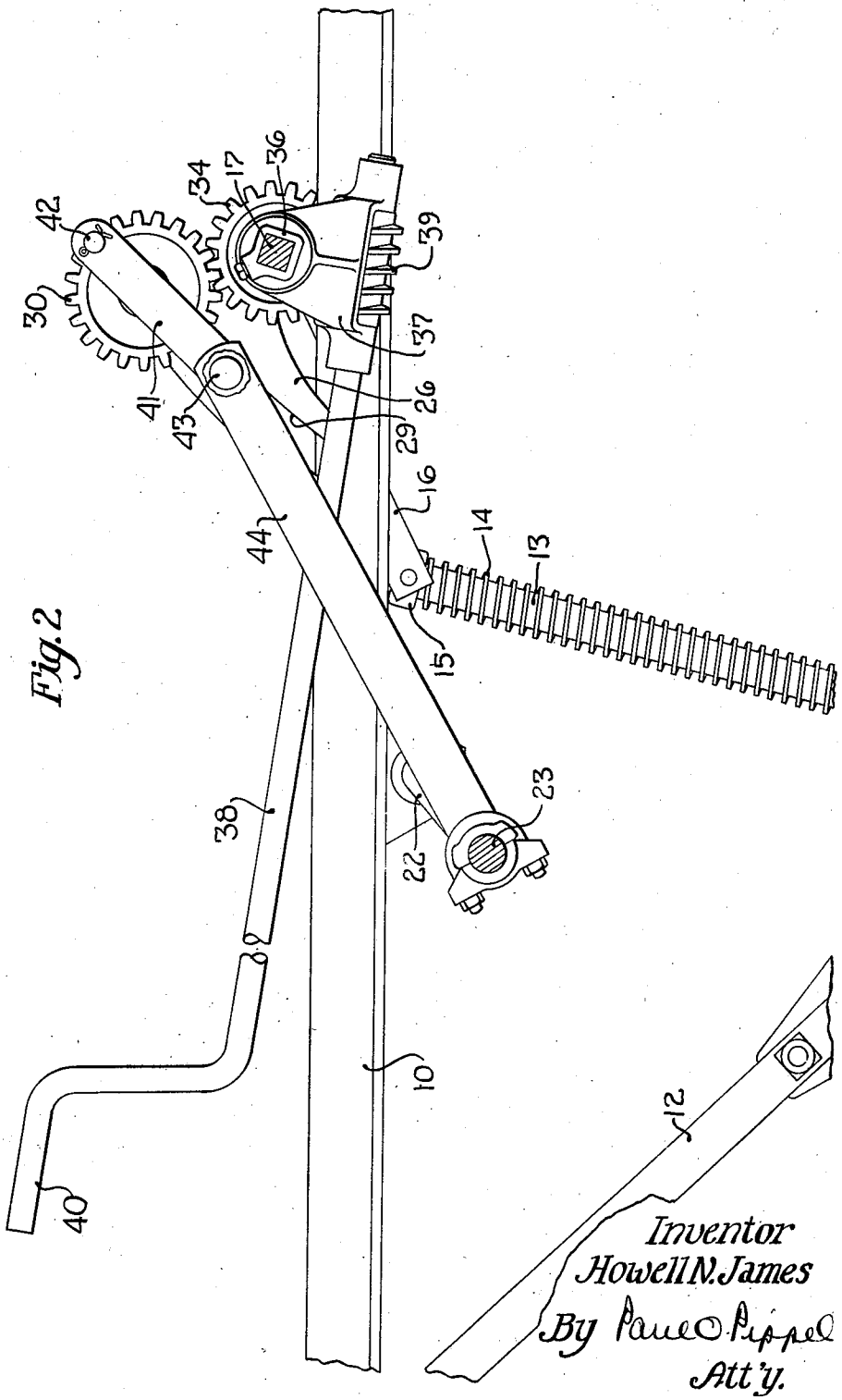


Fig. 2

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Filed July 10, 1940 5 Sheets-Sheet 3

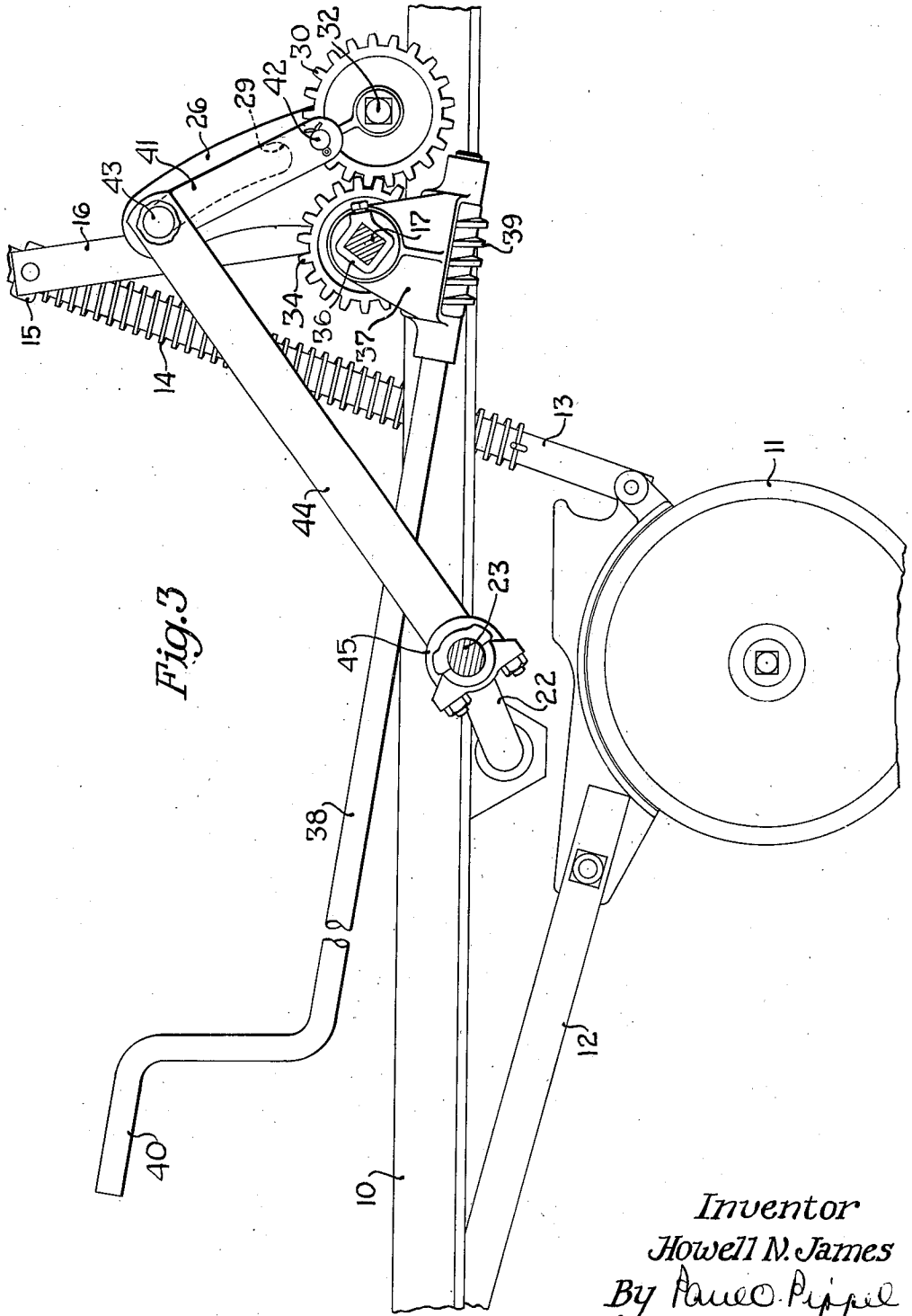


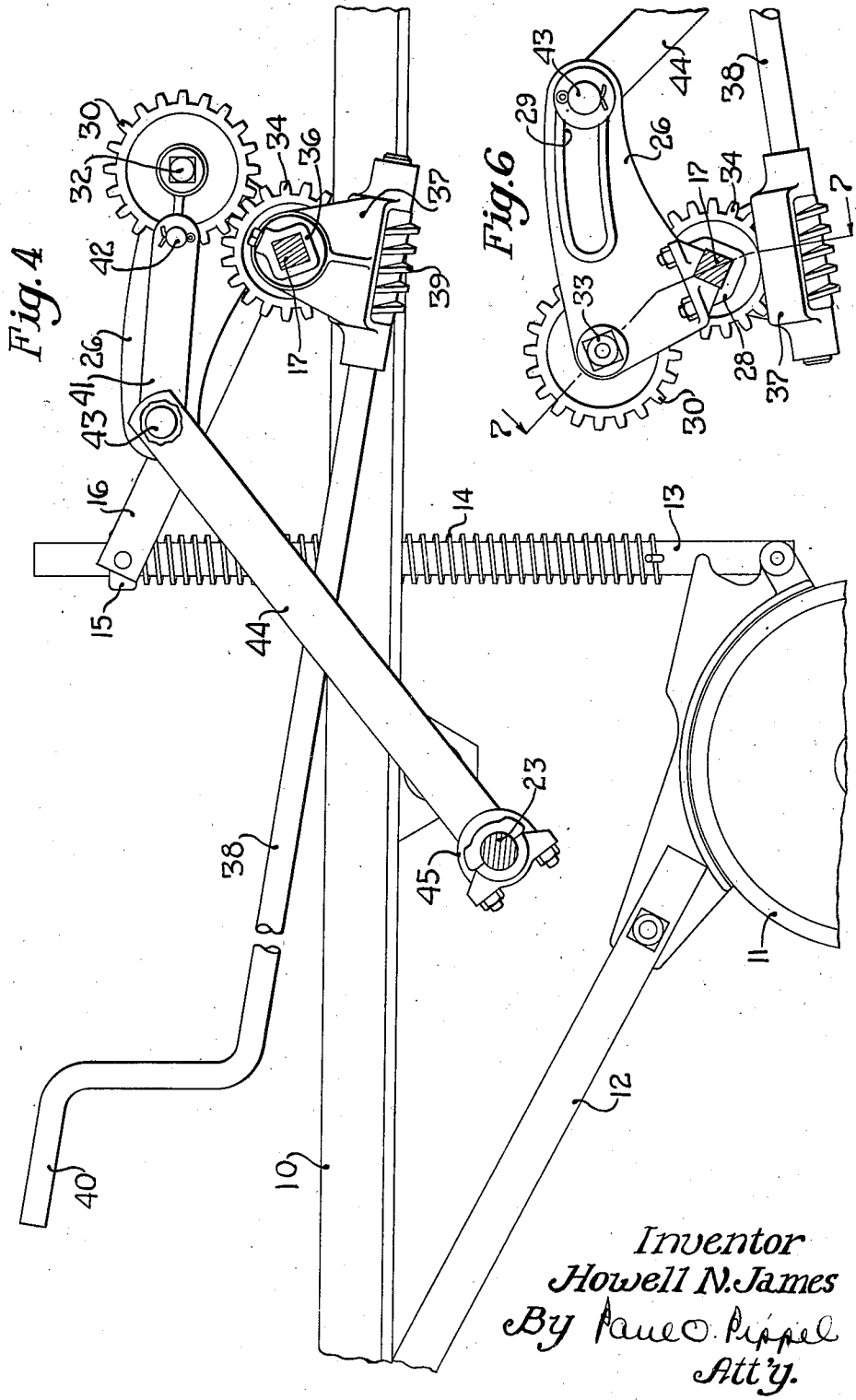
Fig. 3

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LIFT MECHANISM FOR IMPLEMENTS

Filed July 10, 1940 5 Sheets-Sheet 5

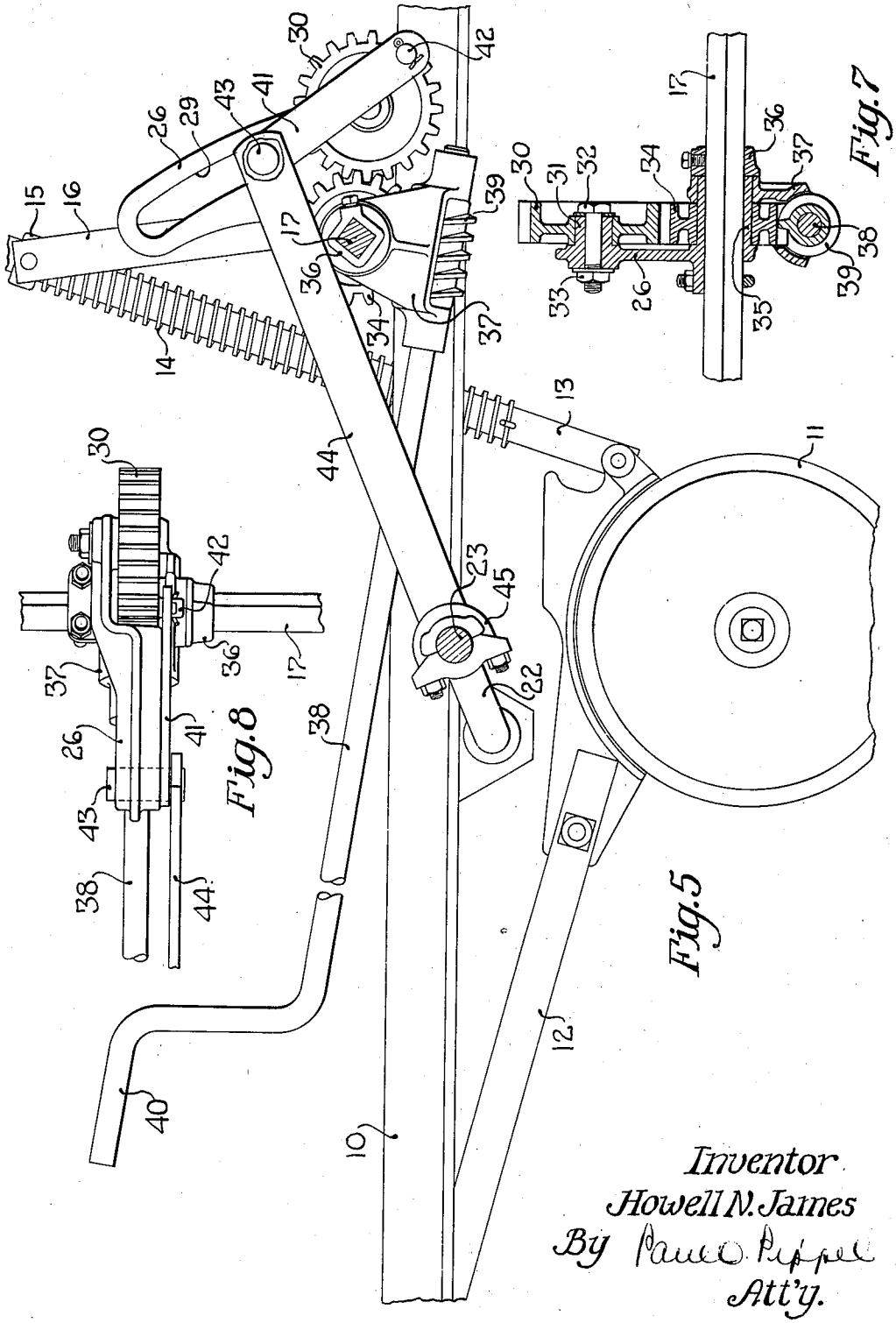


Fig. 5

Fig. 7

Fig. 8

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UNITED STATES PATENT OFFICE

2,249,630

LIFT MECHANISM FOR IMPLEMENTS

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Application July 10, 1940, Serial No. 344,753

14 Claims. (Cl. 97—244)

This invention relates to a lift mechanism. More specifically it relates to a device for raising a working element of an implement from any one of a number of low positions to a single high position.

In the patents to Cady 1,533,059, April 7, 1925, and Robinson 1,846,457, February 23, 1932, there are disclosed devices for raising ground-working implements from a variable depth to a constant height. These devices involve the use of a rockable member having an arcuate slot, a link having one end engageable with the arcuate slot and, when in a certain position, having the other end on the center of the arcuate slot. Thus, there may be an angular movement of the link without the change in the position of the member carrying the arcuate slot. In the Robinson and Cady patents, adjustment of the end of the link and the arcuate slot is by means of a lever. When the member having the arcuate slot is rotated, the lever itself is rotated. If the lever is long, as is required when a remote control of the link and slot is desired, the lever may swing through a considerable arc and thus endanger the operator. The present invention has as its purpose the elimination of the lever and provision of an improved means for adjusting the link in the slot, which means may be actuated from a considerable distance.

An object of the present invention is to provide an improved implement.

Another object is the provision of an improved device for raising an implement from any one of a number of low positions to a single high position.

The lifting device of the present invention includes a rockable member having an arcuate slot, as in the Robinson and Cady patents, and a link adjustably connected to the arcuate slot. The novel means for controlling the connection of the link in the slot includes a pair of gears, one coaxial with the rockable member, the other mounted on the rockable member off its center. Remote control is had through a long rod having a worm portion engaging the one gear.

In the drawings—

Figure 1 is a plan view of a portion of an implement, such as a grain drill, employing the novel device of the present invention;

Figure 2 is an elevational view in section taken along the lines 2—2 of Figure 1 with the depth adjusting device shown for deep planting by the grain drill;

Figure 3 is a similar view with the grain drill raised from the deep planting position;

Figure 4 is a similar view with the grain drill in shallow planting position;

Figure 5 is a similar view showing the drill raised from the shallow position of planting;

Figure 6 is a side view of the device of the present invention in the position shown in Figure 4, but taken from the opposite side;

Figure 7 is a sectional view taken along the line 7—7 of Figure 6; and,

Figure 8 is a plan view of a portion of the novel device shown in the position of Figure 4.

Figure 1 shows a grain drill comprising a frame 10 and a plurality of adjustable drill elements 11. Each drill element is carried by a support 12 and a vertically extending member 13 connected by means of a spring 14 and collar 15 to an arm 16 connected to a rock-shaft 17. Angular movement of the rock-shaft 17 makes possible raising and lowering of the drill elements 11. The drill is carried on a pair of wheels, only one wheel 18 being shown. The wheel 18 is secured to an axle 19 which carries a member 20 forming one-half of a power lift clutch. The part 20 engages a part 21 forming the other half of the clutch and secured to a crank shaft 22 having a crank portion 23. The clutch is of the type shown in the aforementioned Cady patent and is not shown in detail since it forms no part of the present invention. It includes, besides the parts 20 and 21, a spring actuated pawl which in its normal position serves to hold the parts out of driving engagement, and also a roller 24 mounted on a lever arm 25, which roller serves to hold the pawl in the aforesaid normal position.

A rockable part 26 is secured to the rock-shaft 17 for angular movement therewith by means of a clamp 28. The rockable member has an arcuate slot 29 and carries a rotatable gear 30 mounted on a circular bearing portion 31. A bolt 32 and nut 33 hold the gear on the bearing portion 31. A gear 34 meshing with the gear 30 is rotatably mounted on the rock-shaft 17 by means of a sleeve 35 formed as part of the rockable part 26, so as to have an axis of rotation coinciding with the pivot axis of the rockable part 26. Also mounted on the sleeve 35 and on a stop collar 36 secured to the rock-shaft 17 is a housing member 37 rotatably supporting a long rod 38 carrying a worm portion 39 at one end in engagement with the gear 34 and a crank portion 40 at the other end. A link 41 is pivotally connected at one end to a pin 42 extending from a point on the gear 30 spaced from its axis of rotation on the rockable part 26 and having its

other end pivotally connected with a pin 43 secured to one end of a link 44 and extending within the arcuate slot 29. The other end of the link 44 is pivotally connected to the crank portion 23 of the shaft 22 by means of a clamp 45.

As previously stated, Figure 2 shows the parts of the drill in position for deep planting. When it is desired to raise the drilling elements 11 from the position of Figure 2 to that of Figure 3, actuation of the lever 25 moves the roller 24 away from the member 21 and causes the parts 20 and 21 to engage in driving relation. Rotation of the ground wheel 18 is transmitted through the axle 19 to the crank shaft 22 and the crank portion 23 is moved through approximately 180 degrees. This movement causes a substantially lengthwise movement of the link 44 and thereby angular movement of the rockable part 26. The rockable part, being secured to the rock-shaft 17, this shaft is also moved angularly and with it the arm 16, which effects a lifting of the member 13 and thereby a lifting of the drill element 11. Since the gear 34 is in engagement with the worm 39 on the rod 38, the gear does not rotate in the lifting of the elements 11, and, consequently, the bodily movement of the gear 30 along with that of the rockable member 26 results in a rotation of the gear 30. In the changing of position of the parts from the deep planting position of Figure 2 to the position of Figure 3, the gear 30 rotates through a considerable angle of approximately 180 degrees and consequently moves the links 41 and 44 from a point near the end of the slot 29 adjacent the gear 30 to a point near the opposite end of the slot. It is to be observed from Figure 3 that the parts are so proportioned that the arcuate slot 29 has as its center in the raised position of the drill elements 11 a center of the portion of the crank 23 about which the one end of the link 44 rotates. The result is that, if, for example, it is desired to adjust the parts for a different depth of planting while the parts are in the raised position of Figure 3, a rotation of the gear 34 by means of the rod 38 rotates the gear 39 and moves the links 41 so as to move the pin secured to the end of the link 44 to the end of the arcuate slot 29 adjacent the gear 30 from the opposite end. Since in this raised position the arcuate slot 29 has as its center the axis of the connection of the link 44 with the crank portion 23, the change in the angular position of the link 44 produces no change in the angular position of the rockable part 26. Consequently, the rock-shaft 17 is not rotated and the height of the drill elements 11 is not changed. If now the parts are in the shallow planting position of Figure 4 and it is desired to lower them, actuation of the power lift rotates the crank portion 23 of the shaft 22 through approximately 180 degrees, and the link 44 is moved generally lengthwise and causes an angular movement of the rockable part 26. This effects an angular movement of the rock-shaft 17 and, consequently, a lowering of the planting elements 11 to the shallow planting position of Figure 4. This planting position of Figure 4 is not as deep as that of Figure 2. However, regardless of the planting position which may be either the extremes of Figures 2 and 4 or any intermediate position, the raised position is always the same, since in this position the center of the arcuate slot 29 in the rockable member 26 is at the connection 44 with the crank portion 23.

The improvement of the present invention over the aforementioned Cady and Robinson patents lies in the provision of the gears 30 and 34 and link 41, which make possible the use of a long rod 38 which serves as a depth adjusting means which may be operated from a substantial distance and yet does not move with a raising of the drill elements from a planting position to a raised position.

It will be apparent from the foregoing disclosure that an improvement has been made in a device for lifting a working implement from any one of a number of low positions to a single high position. As a form of illustration of the present invention, the rockable member carrying the arcuate slot is shown as connected with the power lift, as shown in the Cady patent. It is to be understood, of course, that the improved device of the present invention may also be employed in an arrangement of parts as shown in the Robinson patent, in which the arcuate slot in the rockable member is connected with the drill element rather than with the power lift.

The intention is to limit the invention only within the terms of the appended claims.

What is claimed is:

1. In an implement, a frame, a working element, a first means for raising the element from any one of a number of low positions to a single high position, said first means comprising a rockable part pivotally mounted on the frame, a second means connecting the rockable part and the element, and a third means connected with the rockable part for rocking the part and lifting the element by bodily movement from one extreme position to another extreme position of the third means, there being an adjustment of the connection of the rockable part with one of the last two mentioned means, the adjustment of the connection in one extreme position of the second means being ineffective to change the position of the working element, the combination therewith of a fourth means for effecting the said adjustment of the connection of the rockable part with one of the said last two mentioned means, said fourth means comprising a first gear rotatably mounted on the rockable part on an axis spaced from the pivot axis of the rockable part, a link connecting a point on the first gear spaced from its axis of rotation and the one of the said last two mentioned means having the adjustable connection with the rockable part, and a second gear meshing with the first gear and rotatably mounted on the pivot axis of the rockable part.

2. In the structure specified in claim 1, the said fourth means comprising a first rotatable member mounted on an axis displaced from the pivot axis of the rockable part for bodily movement with the rockable part about its pivot axis, a link connecting a point on the rotatable member spaced from its axis of rotation and the one of the said last two mentioned means having the adjustable connection with the rockable part, and a second rotatable member mounted on the same axis as the pivot axis of the rockable part and connected to the first rotatable member so as to cause the first member to rotate in response to rotation of the second member.

3. In the construction specified in claim 1, the said fourth means comprising a rotatable means including an element having an axis of rotation on the pivot axis of the rockable part and a link connecting the rotatable means and the one of the said last two mentioned means having the adjustable connection with the rockable part.

4. In the construction specified in claim 1, the said adjustable connection being between the rockable part and the third means.

5. In the construction specified in claim 1, the said adjustable connection being between the rockable part and the third means, the said fourth means comprising a first rotatable member mounted on an axis displaced from the pivot axis of the rockable part for bodily movement with the rockable part about its pivot axis, a link connecting the said second means and a point on the rotatable member spaced from its axis of rotation, and a second rotatable member mounted on the same axis as the pivot axis of the rockable part and connected to the first rotatable member so as to cause the first member to rotate in response to rotation of the second member.

6. In the construction specified in claim 1, the said adjustable connection being between the rockable part and the third means, the said fourth means comprising a rotatable means including an element having an axis of rotation on the pivot axis of the rockable part and a link connecting the rotatable means and the second means.

7. In the structure specified in claim 1, the rockable part having an arcuate guide portion, the adjustable connection of the one of the said last mentioned means being with the arcuate guide portion of the rockable part.

8. In in the structure specified in claim 1, the rockable part having an arcuate guide portion, the adjustable connection of the one of the said last mentioned means being with the arcuate guide portion of the rockable part, the said fourth means comprising a first rotatable member mounted on an axis displaced from the pivot axis of the rockable part for bodily movement with the rockable part about its pivot axis, a link connecting a point on the rotatable member spaced from its axis of rotation and the one of the said last two mentioned means having the adjustable connection with the rockable part, and a second rotatable member mounted on the same axis as the pivot axis of the rockable part and connected to the first rotatable member so as to cause the first member to rotate in response to rotation of the second member.

9. In the structure specified in claim 1, the rockable part having an arcuate guide portion, the adjustable connection of the one of the said last mentioned means being with the arcuate guide portion of the rockable part, the said fourth means comprising a rotatable means including an element having an axis of rotation on the pivot axis of the rockable part and a link connecting the rotatable means and the one of the said last two mentioned means having the adjustable connection with the rockable part.

10. In the structure specified in claim 1, the rockable part having an arcuate guide portion, the said adjustable connection being between the third means and the arcuate guide portion of the rockable member.

11. In the structure specified in claim 1, the rockable part having an arcuate guide portion, the said adjustable connection being between the third means and the arcuate guide portion of the rockable member, the said fourth means comprising a first rotatable member mounted on an axis displaced from the pivot axis of the rockable part for bodily movement with the rockable part about its pivot axis, a link connecting the said third means and a point on the rotatable member spaced from its axis of rotation, and a second rotatable member mounted on the same axis as the pivot axis of the rockable part and connected to the first rotatable member so as to cause the first member to rotate in response to rotation of the second member.

12. In the structure specified in claim 1, the rockable part having an arcuate guide portion, the said adjustable connection being between the third means and the arcuate guide portion of the rockable member, the said fourth means comprising a rotatable means including an element having an axis of rotation on the pivot axis of the rockable part and a link connecting the rotatable means and the third means.

13. In an implement, a frame, a ground-engaging element, a part connected with the ground-engaging element and pivotally mounted on the frame and having an arcuate guide portion, a first link having one end adjustably connected to the arcuate guide portion, means connected to the other end of the link for moving it in the direction of its length, the combination therewith of a first member mounted for rotation on the part on an axis spaced from the pivot axis of the part, a second link connected at one end to the first link and at the other end to a point of the first member spaced from its center of rotation, and a second member mounted for rotation on the frame on the same axis as the part and connected with the first member so as to rotate the same by its own rotation.

14. In an implement, a frame, a working element, a first means for raising the element from any one of a number of low positions to a single high position, said first means comprising a rockable part pivotally mounted on the frame, a second means connecting the rockable part and the element, and a third means connected with the rockable part for rocking the part and lifting the element by bodily movement from one extreme position to another extreme position of the third means, there being an adjustment of the connection of the rockable part with one of the last two mentioned means, the adjustment of the connection in one extreme position of the second means being ineffective to change the position of the working element, the combination therewith of a fourth means for effecting the said adjustment of the connection of the rockable part with one of the said last two mentioned means, said fourth means comprising a first member rotatably mounted on the rockable part on an axis spaced from the pivot axis of the rockable part, a link connecting a point on the first member spaced from its axis of rotation and the one of the said last two mentioned means having the adjustable connection with the rockable part, and a second member rotatably mounted on the pivot axis of the rockable part and connected with the first member so as to rotate the same by its own rotation.

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