June 13, 1944. A. E. W. JOHNSON ET AL 2,351,518

DIGGER

Filed June 3, 1940 2 Sheets-Sheet 1

Fig. 1

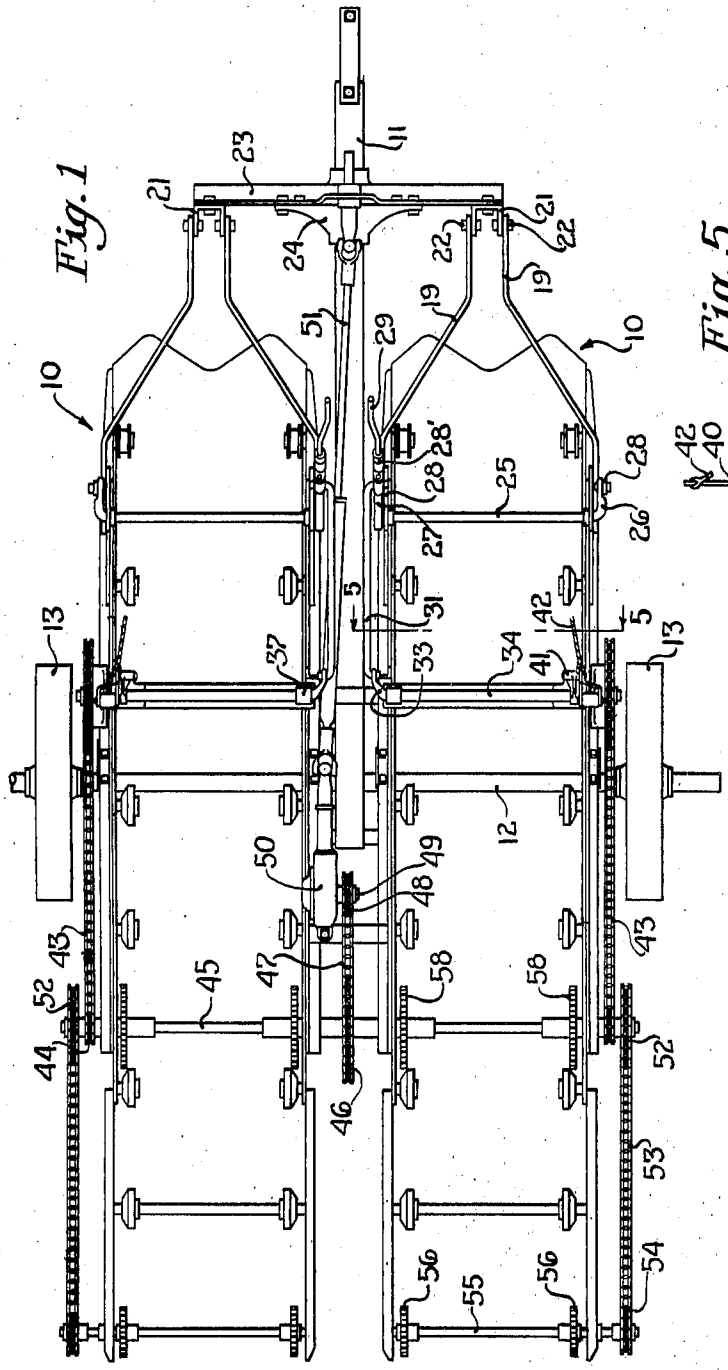
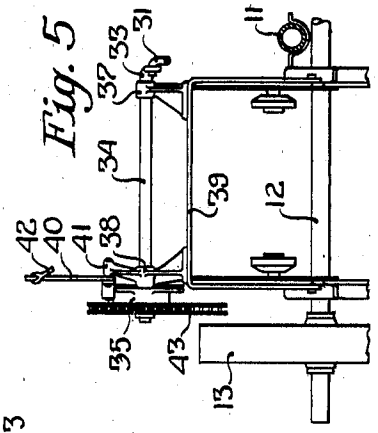


Fig. 5



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DIGGER

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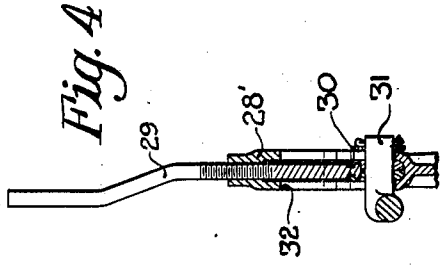

Fig. 4

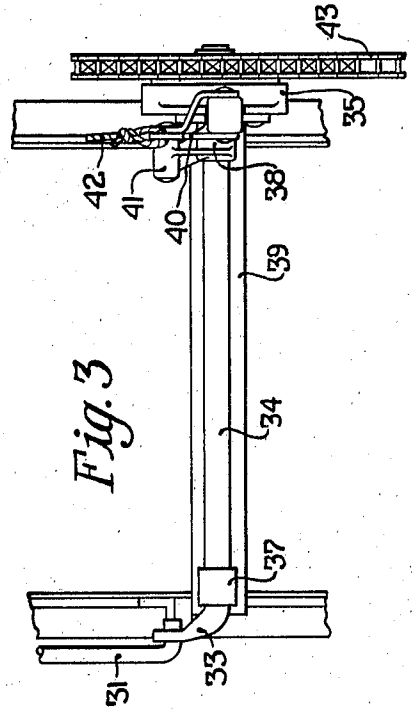

Fig. 3

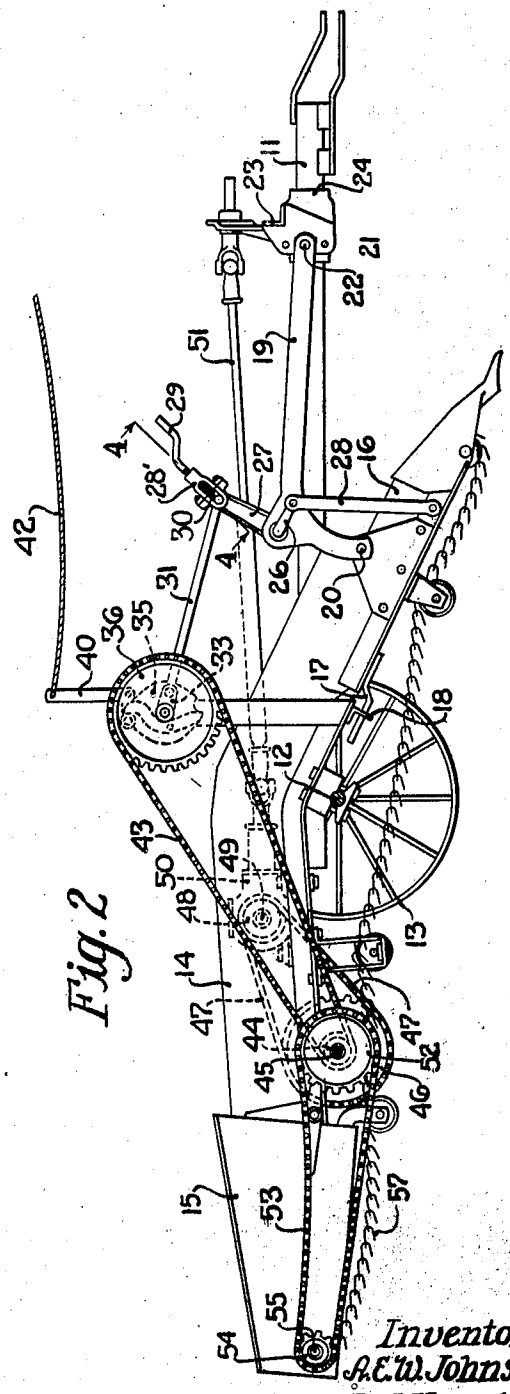

Fig. 2

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UNITED STATES PATENT OFFICE

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DIGGER

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Application June 3, 1940, Serial No. 338,518

8 Claims. (Cl. 55—51)

This invention relates to a digger. More particularly it relates to a potato digger provided with a power lift.

Diggers of various sorts are well known and certain types of diggers have been provided with power lifts. In some instances it has been found desirable to attach a power lift to a digger unit with as little change as possible in the digger.

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

A further object is to provide a potato digger with a power lift.

Another object is to attach a power lift to a digger as simply and expediently as possible.

According to the present invention the digger unit to which the power lift is attached is composed of a frame upon which an elevator is mounted and which is driven by a longitudinally extending shaft connected at its forward end to a power take-off shaft of the tractor and its rearward end to a gear box which is connected to a transverse drive shaft on the digger frame. The digger frame has a liftable section at its forward end and a power lift device is positioned on the frame adjacent the rear of the liftable section. This power lift device is driven through a connection with the transverse drive shaft.

In the drawings:

Figure 1 is a plan view of the novel digger of the present invention;

Figure 2 is a side view of the same;

Figure 3 is an enlarged detail view;

Figure 4 is a sectional view taken along the lines 4—4 of Figure 2; and

Figure 5 is a view taken along the lines 5—5 of Figure 1.

The digger of the present invention comprises a pair of similar digger frames 10 positioned in side-by-side relationship, a draft member 11 extending between the frames and secured thereto, a transverse supporting axle 12 extending the width of the frames and supporting wheels 13 at the ends of the axle 12. Each digger frame 10 comprises a stationary level bed section 14 rigid with respect to the draft member 11, and an adjustable rear section 15, and a liftable front section 16. The rear section 15 is adjustably attached to the stationary section 14 in the manner shown in the patent to Gronke et al. 1,673,193, June 12, 1928.

The liftable section 16 is loosely connected to the stationary section 14 by means of members 17 on the liftable section 16 and an angle member 18 through which the members 17 extend. The liftable sections are supported by means of a pair of members 19 which are pivotally secured to the sides of sections 16 at 20 and are in turn pivotally supported on a bracket member 21 by pins 22. The brackets 21 for the members 19 of the front liftable section 16 are secured to the ends of a cross member 23 secured in turn to a casting 24 carried on the frame member 11. A shaft 25 is rotatably mounted in each pair of members 19 and has at its ends crank portions 26, only one of which is shown.

At the one end of the shaft 25 an arm 27 is secured. It will be apparent that the arm 27 combines with the cranks 26 to act in effect as a bell crank. Links 28 connect the arms 27 and the liftable digger section 16. The arm 27 has secured to its end a member 28' which receives a threaded crank 29. A part 30 is secured to the end of the crank 29, and to this part is pivotally connected a link 31 which extends through a slot 32 formed in the member 28. The link 31 is pivotally connected to an arm 33 secured to the end of a shaft 34. The other end of the shaft is secured to a member 35 forming the intermittently rotating part of a half revolution clutch of the type shown in the patent to Graham, 1,163,143, Dec. 7, 1915. The constantly rotating part of the clutch is a member 36, which carries teeth around its periphery. The shaft 34 is supported in brackets 37 and 38 which are supported in turn on an inverted U-shaped member 39 secured to the sides of the stationary section 14 of the digger frame. The member 36 is rotatably mounted on the shaft 34. A bell crank 40, which serves as a control for the clutch, is supported on a portion 41 of the bracket 38 carried on the U-shaped member 39. A cord 42 is connected to the bell crank 40 and extends to within reach of an operator on the tractor, not shown, which is to pull the digger through the draft member 11.

A chain 43 is in engagement with the teeth of the member 36 and also engages the sprocket 44 secured to a transverse shaft 45 rotatably mounted on the stationary level bed section 14 adjacent its rear end. A sprocket 46 is secured to the shaft 45 and is engaged by a chain 47 which also engages a sprocket 48 secured to a stub shaft 49 extending from the gear box 50. A longitudinal extending drive shaft 51 extends from the gear box 50 and is adapted to be connected at its forward end with the power take-off shaft of the tractor, not shown. A sprocket 52 is secured to the shaft 45 adjacent to gear 44. A chain 53 engages the sprocket 52 and also a sprocket 54 secured to an end of a shaft 55 positioned at the rear of the adjustable section 15. Sprockets 56

are secured to a shaft 55 and drive an elevator 57 with which they are in engagement. Idler gears 58 rotatably mounted on the shaft 45 are in engagement with a mid-portion of the elevator 57. Driving of the digger starts with the power take-off shaft of the tractor and extends through the longitudinal shaft 51, gear box 50, sprocket 48, chain 47, sprocket 46, transverse drive shaft 45, sprockets 52, chains 53, sprockets 54, and sprockets 56.

Drive of the power lift for lifting the front sections 16 also starts with the power take-off shaft of the tractor and extends through the shaft 51 and the transverse drive shaft 45. From the shaft 45 the drive is through the sprockets 44 and chains 43 to the constantly rotating members 36.

When it is desired to raise the front section 16 from the ground-engaging position of Figure 2 to an elevated transport position, the lever 40 is actuated by a pull on the cord 42 so as to cause the member 35 to be engaged by the member 36. This causes a rotation of the shaft 34 along with the crank arms 33 and therewith a longitudinal movement of the links 31. A rotation of the arms 27 and 26 constituting bell cranks effects raising of the section 16. It will be appreciated that, since there is a power lift device for each frame 10, and separate cords 42 and bell cranks 40 therefor, one liftable section 16 may be raised independently of the other. The connection of the power lift device is with the transverse shaft 45 at the rear of the stationary level bed section 14 and makes possible a simple and easy connection of the power lift device to any digger unit. A digger unit is normally provided with a driving mechanism somewhat similar to that shown. There is a longitudinal drive shaft, such as a shaft 51 and a transverse drive shaft, such as the transverse drive shaft 45. It is a simple matter to attach power lift devices to the digger unit and to connect them to the transverse drive shaft. Depth control of the liftable section 16 is effected by adjustment of the crank 29. Adjustment of this crank moves the member 30 nearer or farther away from the shaft 25 which serves as a pivot for the arm 27.

It will be apparent from the foregoing description that a new and novel digger structure has been provided. The intention is to limit the invention only within the scope of the appended claims.

What is claimed is:

1. In combination, a digger frame including a stationary section and a liftable section at the front thereof, a pair of engageable elements mounted on the stationary section, draft means secured to the stationary section and extending forward therefrom, a member pivotally connected to the draft means and to the liftable section, a lever pivotally mounted on the member, means connecting the lever and the liftable section, means connecting the lever and one engageable element, a source of power, and means connecting the source of power and the other engageable element.

2. In a digger structure formed of a pair of elevators extending in side-by-side relation, each elevator comprising a stationary section and a liftable section, driving means positioned on and extending transversely across the stationary sections of the elevators, a source of power, means connecting the source of power and the driving means, and means connecting the elevators and parts of the driving means at the outer sides of the elevators for transmitting drive from the source of power through the driving means to the elevators, the combination with the driving means and the liftable sections of the elevators, of power-lift means connecting the parts of the driving means at the outer sides of the elevators and the liftable sections of the elevators for transmitting drive from the driving means to the liftable sections for lifting the sections.

3. In a digger structure formed of a pair of elevators extending in side-by-side relation, each elevator comprising a stationary section and a liftable section, driving means positioned on and extending transversely across the stationary sections of the elevators, a source of power, means connecting the source of power and the driving means, and means connecting the elevators and parts of the driving means at the outer sides of the elevators for transmitting drive from the source of power through the driving means to the elevators, the combination with the driving means and the liftable sections of the elevators, of a pair of power-lift devices positioned at the outer sides of the elevators and connecting the parts of the driving means at the outer sides of the elevators and the liftable sections of the elevators for transmitting drive from the driving means to the liftable sections for lifting the sections.

4. In the combination specified in claim 3, the power-lift devices being separately operable whereby the liftable section of one elevator may be raised independently of the other elevator.

5. A digger structure comprising a pair of elevators positioned in side-by-side relationship, each composed of a stationary section and a liftable section connected to the front thereof, driving means extending transversely across the stationary sections a considerable distance rearward of the connections of the stationary sections and the liftable sections, a drive shaft extending longitudinally between the frames, means connecting the longitudinally extending drive shaft and the transversely extending driving means, U-shaped members secured to the sides of the stationary sections of the elevators adjacent the connections with the liftable sections and extending upwardly, power lift devices for the liftable sections, each device comprising a pair of engageable elements carried at the upper end of a U-shaped member on the stationary section, means connecting one engageable element with a portion of the transversely extending driving means at the outer side of the one stationary section, and means connecting the other engageable element with the liftable section connected with the one stationary section.

6. In the combination specified in claim 3, each power-lift device comprising a rock-shaft extending transversely of one elevator for receiving drive at the outer side of the elevator at the connection between the outer end of the transversely extending drive means and the power-lift device and transmitting it across the elevator to the inner side thereof to a connection with the inner side of the liftable section of the elevator.

7. A digger structure comprising a pair of elevators positioned in side-by-side relationship, each composed of a stationary section and a liftable section connected to the front thereof, driving means extending transversely across the stationary sections a considerable distance rearward of the connections of the stationary sections and the liftable sections, a source of

power, means connecting the source of power and the driving means at the inner sides of the stationary sections, supporting means secured to the stationary sections adjacent the connection of the stationary sections with the liftable sections, power-lift devices for the liftable sections, each device comprising a transverse rockshaft extending across one elevator carried by the supporting means and having the end at the inner side of the one elevator connected with the inner side of the liftable section of the one elevator, a pair of engageable elements, one connected with the end of the transverse shaft at the outer side of the one elevator, and means connecting the other engageable element with a portion of the transversely extending drive means at the outer side of the one elevator, and separate means for causing engagement of the pairs of engageable elements individually, whereby the liftable section of one frame may be raised independently of the liftable section of the other frame.

8. The digger structure specified in claim 7, and further including adjustable sections connected at the rear of the stationary sections of the elevators, transverse shafts mounted at the rear of the adjustable sections, means connecting the transverse shafts and the rear ends of the elevators, and means connecting the outer ends of the last mentioned transverse shafts and portions of the transversely extending drive means at the outer sides of the stationary sections, whereby drive is transmitted from the source of power through the transversely extending driving means to the transverse shafts and into the rear ends of the elevators.

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