W. S. GRAHAM.

BEET PULLER.

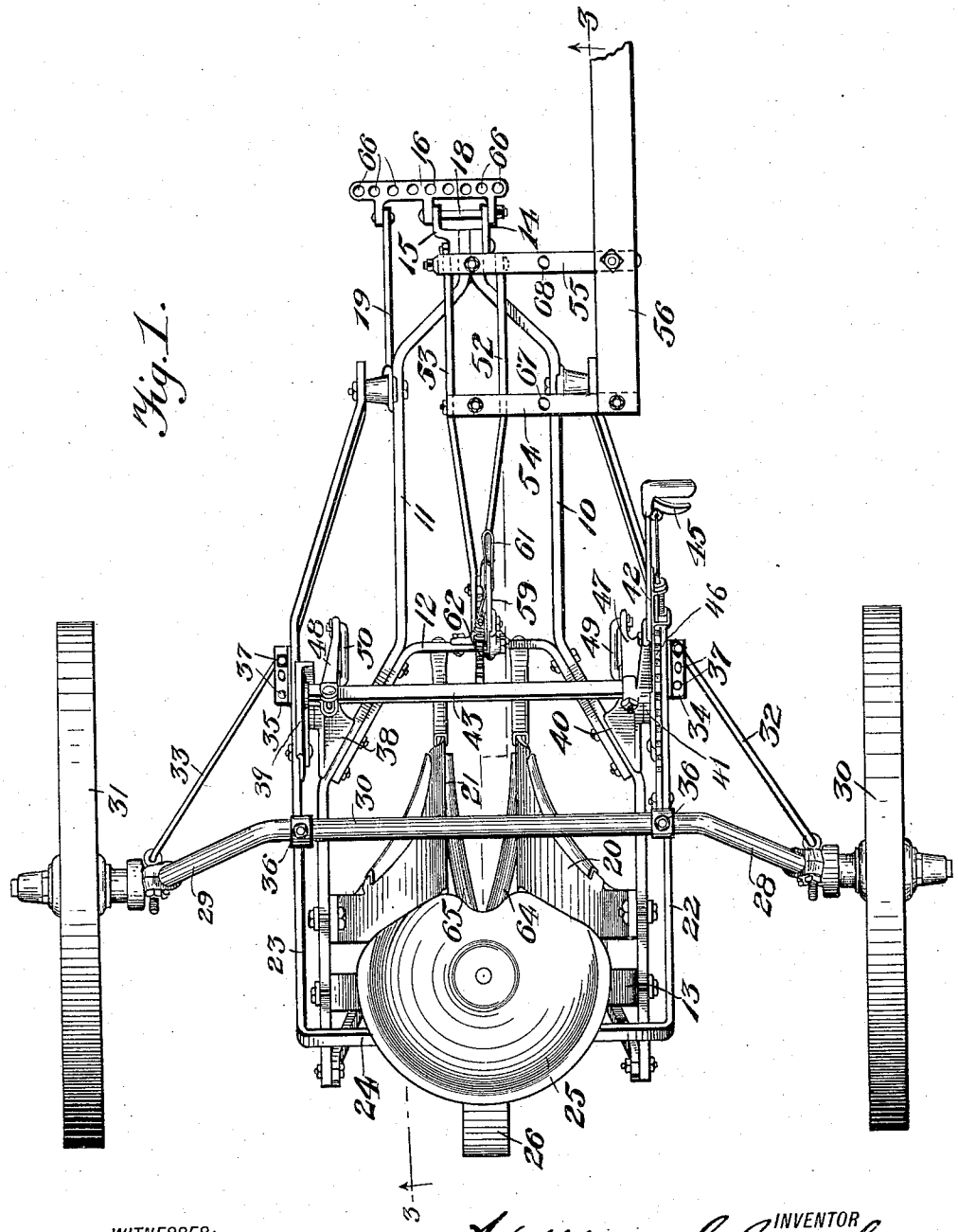
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1,149,644.

Patented Aug. 10, 1915.

4 SHEETS—SHEET 1.

Fig. 1.



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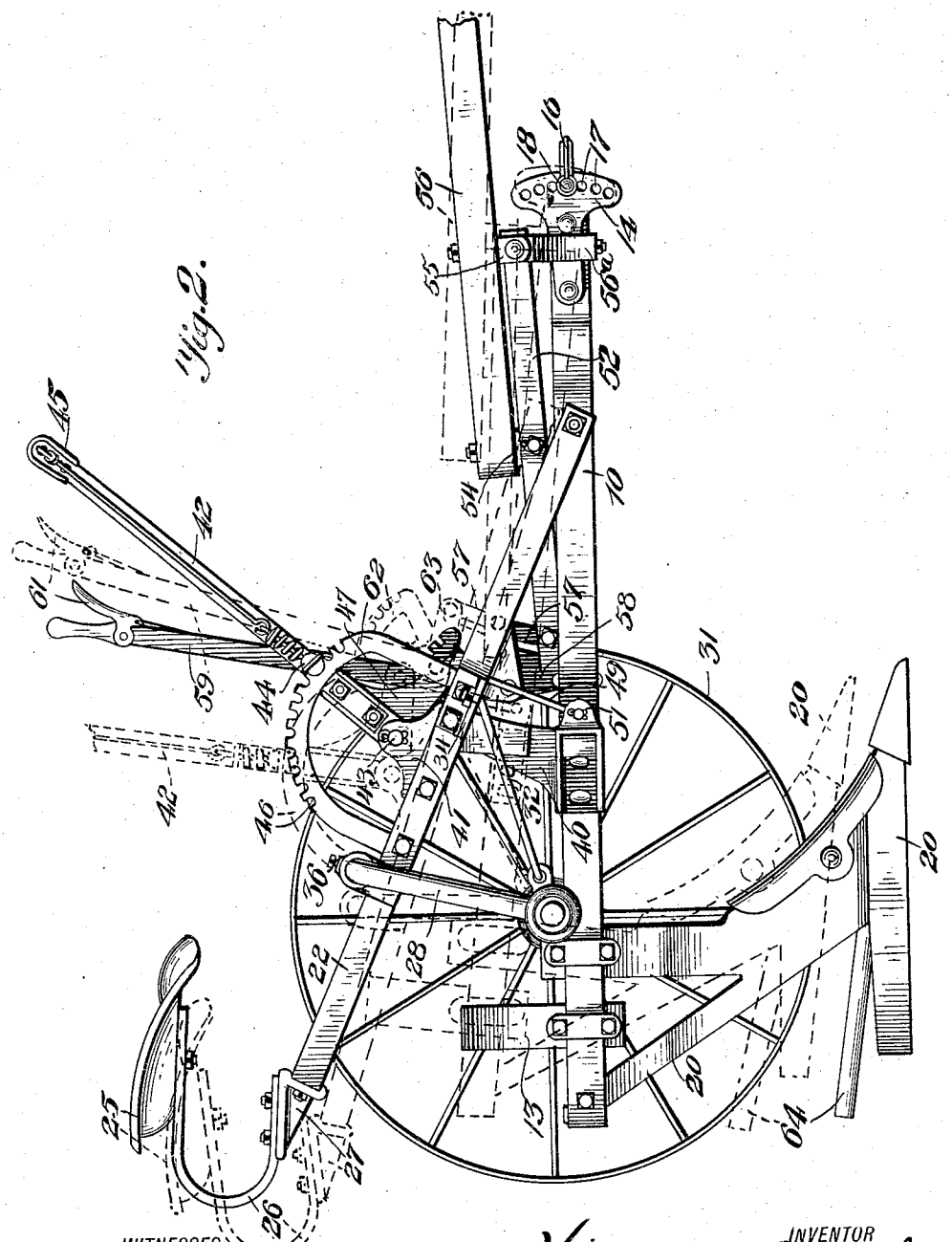
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4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

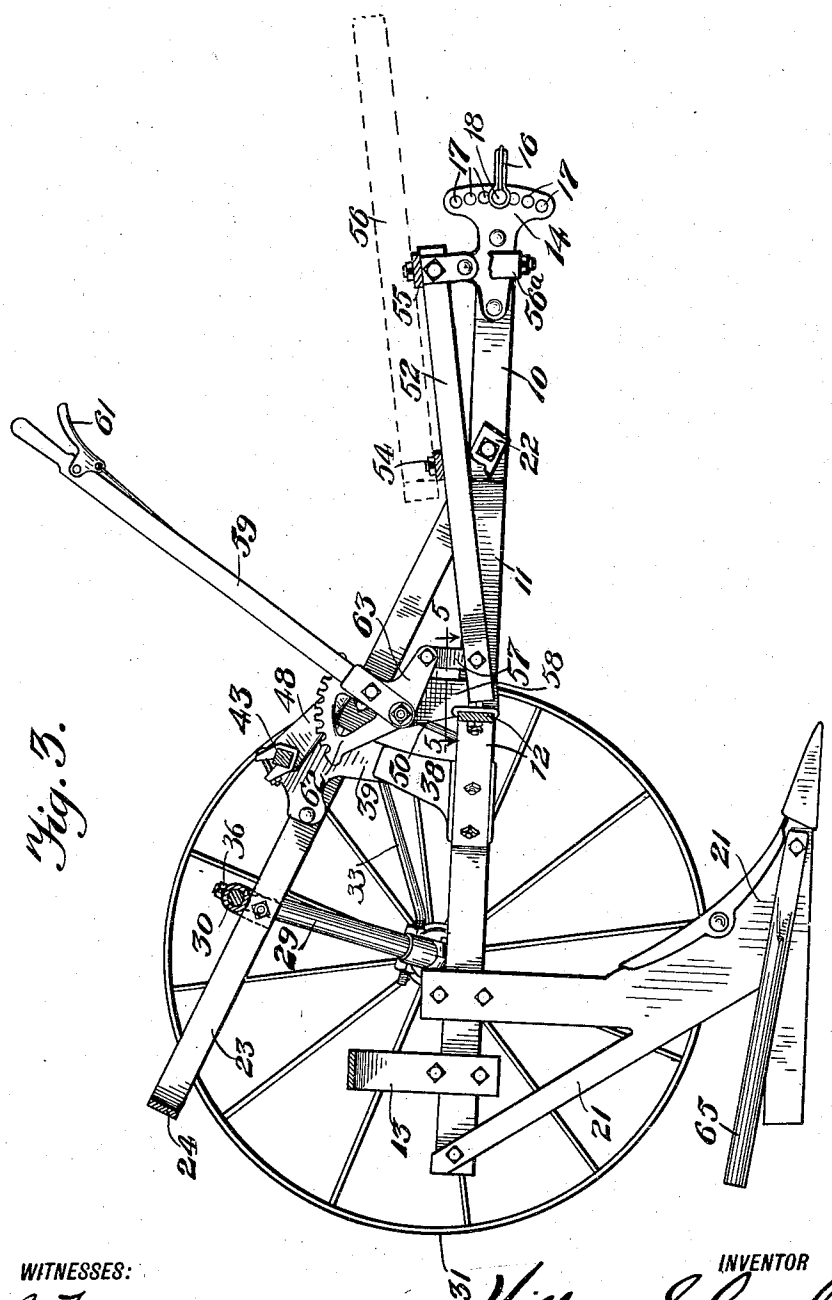


Fig. 3.

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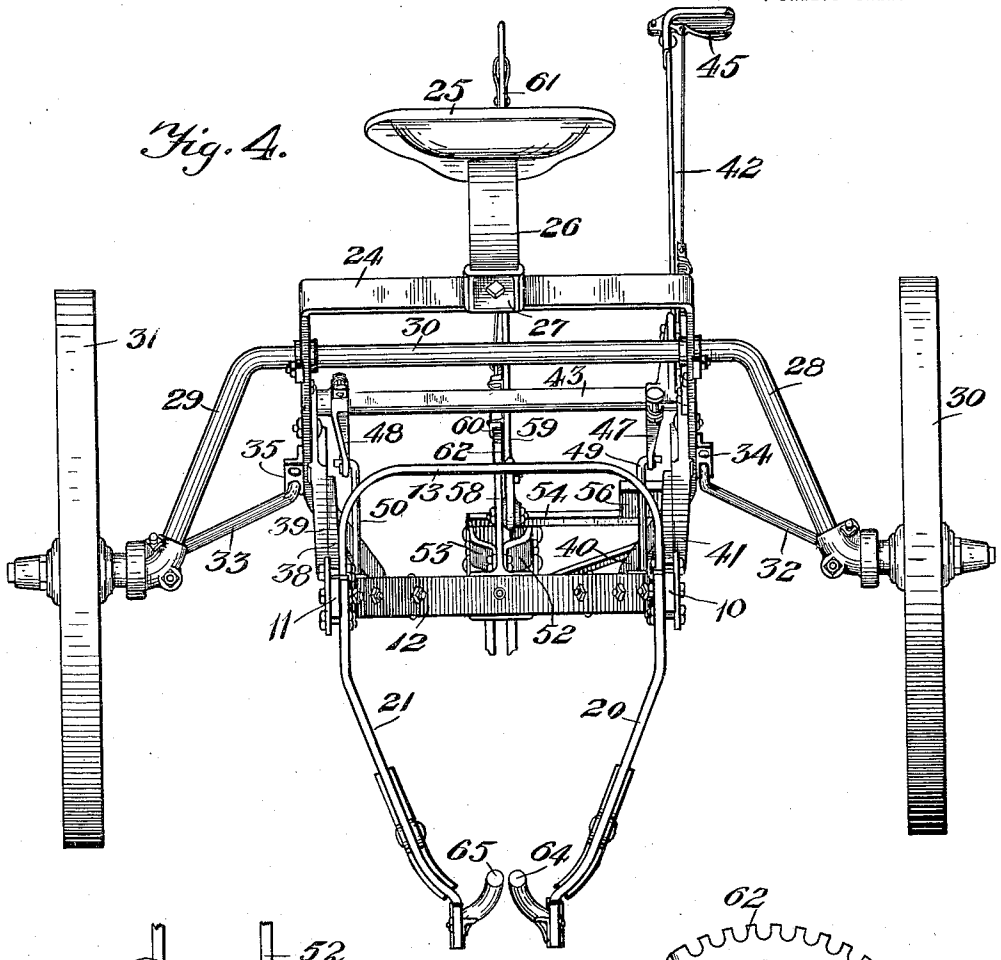
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4 SHEETS—SHEET 4.

Fig. 4.



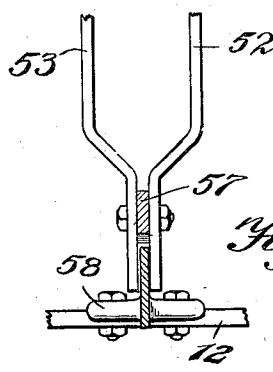


Fig. 5.

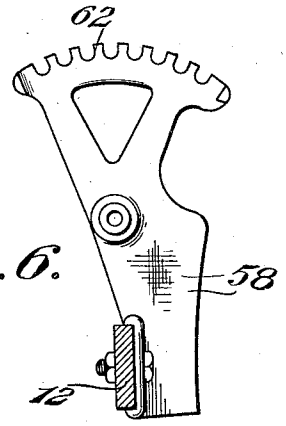


Fig. 6.

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UNITED STATES PATENT OFFICE.

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BEET-PULLER.

1,149,644. Specification of Letters Patent. Patented Aug. 10, 1915.

Application filed March 20, 1914. Serial No. 826,024.

To all whom it may concern:

Be it known that I, WILLIAM S. GRAHAM, a citizen of the United States, residing at Canton, in the county of Fulton, in the State of Illinois, have invented certain new and useful Improvements in Beet-Pullers, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to machines known as beet pullers, which are adapted to be drawn along a row of beets for loosening them in the ground or for lifting them out of the ground.

It is the object of my invention to provide a new and improved construction and arrangement of parts by reason of which the parts may be adjusted easily and quickly to attain the various methods of operation desired under different conditions of work, and by reason of which the operator may be enabled to handle the machine to the best advantage for attaining the desired results.

The particular features of improvement involved in my construction will be hereinafter enumerated and set forth in the claims.

In the drawings:—Figure 1 is a top or plan view of my improved machine; Fig. 2 is a side view of the machine, showing in dotted lines an adjusted position in which the beet lifting plows are held in a higher position; Fig. 3 is a central longitudinal section through the machine, being substantially a section on line 3—3 of Fig. 1; Fig. 4 is a rear elevation of my improved machine; Fig. 5 is an enlarged detail, being substantially a section taken on line 5—5 of Fig. 3; and Fig. 6 is an enlarged detail showing the segmental rack comprising a part of the connections between the plow-frame and the tongue frame.

Referring to the several figures of the drawings in which corresponding parts are indicated by like reference characters, 10—11 indicate the longitudinally-extending side-bars of a plow frame, said bars being connected at their intermediate points by a cross-bar 12 and being connected near their rear ends by an arched bar 13. As best shown in Fig. 1, the bars 10—11 converge at their forward ends and have mounted thereon brackets 14—15 by which a clevis 16 is secured to said bars. As shown in Figs. 2 and 3, the brackets 14—15 are provided with a plurality of registering openings 17 therethrough for the reception of the pin 18 by which the clevis 16 is secured to said brackets. One end of the clevis 16 has pivotally connected to it a reinforcing link 19, the rear end of which is pivotally connected in any suitable manner to the frame-bar 11.

20—21 indicate beet lifting plows rigidly connected to the plow frame-bars 10—11, respectively, said plows being of any suitable type adapted to loosen the earth about a beet or to lift the beet out of the ground. As will be readily understood by shifting the draft device 16 up or down relative to the brackets 14—15 the angle at which the plows 20—21 will tend to run may be varied, thus changing the depth at which the plows will tend to work.

22—23 indicate the side-bars of a frame pivotally mounted upon the plow frame near its forward end, the bars 22—23 being connected at their rear ends by a cross-bar 24. In the construction shown, the bars 22, 23 and 24 are formed integral with each other. A seat 25 is connected to the cross-bar 24 by means of a standard 26 rising from a bracket 27 suitably secured to said cross-bar. As shown in Figs. 1 and 2, the seat 25 is located rearwardly of the beet lifting devices 20—21 in such a position that the operator can easily watch the operation of the plows upon the beets, in order to make such adjustments as may be necessary from time to time for securing the best operation of the device.

The frame upon which the seat 25 is mounted has mounted upon it an arched axle comprising axle members 28—29 adjustably secured in a transverse sleeve 30. Said axle members 28—29 have mounted upon their lower ends carrying wheels 30—31, respectively. The axle members 28—29 are held against swinging relative to the frame upon which they are mounted by means of links 32—33 secured at their rear ends to said axle members, and at their front ends to brackets 34—35 carried by said frame. By loosening the set-screws 36 by which the axle members 28—29 are held in the transverse sleeve 30, and by releasing the links 32—33 from the brackets 34—35 the axle members 28—29 are adapted to be adjusted laterally of the machine to vary the distance between the supporting wheels, as will be readily understood, the

links 32—33 being adapted to be inserted at their forward ends in any one of a plurality of openings 37.

38—39 indicate brackets mounted upon the bar 11 of the plow frame and the bar 23 of the supporting frame, respectively, at one side of the machine, and 40—41 indicate brackets mounted upon the bars 10—22, respectively, of said frames. As best shown in Figs. 3 and 4, the brackets 38—39 bear against each other at one side and the brackets 40—41 bear against each other at the other side of the machine whereby the plow frame and the supporting frame are held against lateral movement relative to each other.

The means for swinging the plow frame relative to the supporting frame comprises a lever 42 fixedly mounted upon a rock-shaft 43 journaled between the brackets 39—41. As best shown in Fig. 2, the lever 42 is provided with a spring-dog 44 operated by the latch 45 for holding said lever in any adjusted position upon a circular rack-bar 46 mounted upon the supporting frame 22. The rock-shaft 43 is provided at its ends with arms 47—48 projecting forward therefrom, the forward ends of which arms are pivotally connected by means of links 49—50 with perforated lugs 51 carried by the brackets 38—40. As will be readily understood, by a backward stroke of the lever 42 the plow frame is adapted to be lifted relative to the supporting frame. The adjustment of the parts effected by a stroke of the lever 42 is illustrated in Fig. 2.

52—53 indicate the side-bars of a frame pivotally connected at their forward ends to the brackets 14—15, respectively, carried by the plow frame.

54—55 indicate transversely-extending bars suitably secured to the bars 52—53, having mounted upon their outer ends a pole or tongue 56.

56ª indicates a diagonally-extending brace-rod connected at one end to the outer end of the bar 55 and connected at its other end to the forward end of the plow frame. As best shown in Figs. 1 and 5, the bars 52—53 converge toward their rear ends where they are held spaced apart by the lower end of a link 57 hereinafter referred to.

58 indicates a bracket secured to the cross-bar 12 at about its central point, the rear ends of the bars 52—53 being adapted to slide on opposite sides of the lower end of said bracket. The tongue frame comprising the bars 52—53 is thus held against lateral movement relative to the plow frame.

59 indicates a lever pivotally mounted upon the bracket 58. As best shown in Fig. 4, the lever 59 is provided with a dog 60 actuated by a hand latch 61 of any approved type for holding the lever in any desired adjusted position relative to the circular rack-bar 62 carried by the bracket 58 at its upper end. Projecting forward from the lever 59 at its lower end is an arm 63 to which the upper end of the link 57 is pivotally connected.

As will be readily understood, by a backward stroke of the lever 59 the tongue frame is adapted to be swung upward at its rear end relative to the plow frame. Inasmuch as the front end of the pole or tongue 56 is supported in approximately the same position at all times by the draft animals it will be seen that the effect of moving the lever 59 backward is to raise the front end of the plow frame, thus raising the front end of the beet lifting plow. By this means the angle at which the plow shall run is controlled, and the depth at which the plow tends to run by reason of the angle at which it is set may likewise be varied.

The plow members 20—21 are provided with converging bars 64—65. When the plows 20—21 are drawn through the earth on opposite sides of a beet the beet rides up the bars 64—65 and is thoroughly loosened in the earth so that it can be easily gathered up by hand and harvested. If desired, however, the lever 59 can be given a forward stroke serving to lower the rear end of the tongue relative to the plow frame, the effect of which will be to lower the front end of the plow frame also. This movement of the lever results in angling the bars 64—65 very considerably whereupon said bars have the effect of forcing the beets entirely out of the ground instead of merely loosening them in the ground. As will be readily understood, whether the machine is being used for loosening the ground about the beets or for lifting the beets entirely out of the ground the depth at which the plows run is regulated by the lever 42 by which the plows are raised or lowered relative to the supporting frame. As will be seen from an inspection of Fig. 2 a backward stroke of the lever 42 serves not only to raise the plow frame at its rear end but also to lower the rear end of the supporting frame. By reason of this construction and operation it can be readily seen that the weight of the operator assists in the raising of the plows.

In practice the draft device 16 is connected by the pin 18 with any one of the holes 17 of the brackets 14—15 in accordance with the angle at which the plows are desired to run. Whenever in the progress of the machine over the field it is desired to change the angle of the plows this is accomplished by the use of the lever 59 as above described without its being necessary to change the position of the draft device 16.

The draft device or clevis 16 is provided with a plurality of openings 66, any one of which may be used for connecting the draft animals to the machine, as may be desired.

The pole 56 may also be attached at the free ends of the brackets 54—55, as shown in the drawings, or it may be attached at the middle points of said bars by the use of the holes 67—68, or if desired it may be connected at the other ends of said bars, in accordance with the number of draft animals it is desired to use.

By reason of the plows 20—21 being located directly under the arched axle, when the plows are being worked at a considerable angle from the horizontal and the depth at which they are permitted to run is limited through the ground wheels, the downward pull of the plows 20—21 is substantially downward directly from the axle and thus has little or no tendency to swing the supporting frame either toward the front or toward the rear upon the axle. By reason of having the axle and the plow frame-bar 13 arched the beets may be raised entirely out of the ground by the bars 64—65 without the beet tops being brought into contact with the frame bars and seriously interfering with the action of the plow.

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

1. In a beet puller, the combination of a frame, a second frame pivotally connected therewith, carrying wheels mounted on one of said frames, a plow mounted on the other frame, guides carried by said frames for holding them against lateral movement relative to each other, and means for adjusting said frames vertically relative to each other.

2. In a beet puller, the combination of a frame, a second frame pivotally connected therewith, carrying wheels mounted on one of said frames, a plow mounted on the other frame, brackets carried by each of said frames extending toward the other frame, said brackets being adapted to engage to prevent lateral movement of one frame relative to the other, and means for adjusting said frames vertically relative to each other.

3. In a beet puller, the combination of a frame, a second frame pivotally connected therewith, a pair of carrying wheels mounted on said first-named frame, a plow mounted on the second frame, means for holding said frames in a plurality of adjusted positions relative to each other, a seat carried by said first-named frame rearwardly of said plow, draft devices mounted on said second frame, and a pole mounted on said second frame and adjustable vertically relative thereto.

4. In a beet puller, the combination of a frame, a second frame pivotally connected therewith, carrying wheels mounted on said first-named frame, a third frame pivotally connected to said second frame, a plow mounted on said second frame, means for holding said first-named and said second frames in a plurality of adjusted positions relative to each other, a pole rigidly mounted on said third frame, and means for holding said second and said third frames in a plurality of adjusted positions relative to each other.

5. In a beet puller, the combination of a frame, a second frame pivotally connected therewith, carrying wheels mounted on said first-named frame, a third frame pivotally connected to said second frame, a plow mounted on said second frame, means for holding said first-named and said second frames in a plurality of adjusted positions relative to each other, a pole rigidly mounted on said third frame, means for holding said second and said third frames in a plurality of adjusted positions relative to each other, and a seat carried by said first-named frame rearwardly of said plow.

6. In a beet puller, the combination of a frame, a plow mounted thereon, a second frame pivotally mounted at its forward end on said first-named frame and adapted to be angled vertically relative thereto, a pole rigidly mounted on said second frame, means for holding the rear end of said second frame against moving laterally of the first-named frame as it is angled relative thereto, and means for angling said frames relative to each other for controlling the position at which said plow shall work.

7. In a beet puller, the combination of a frame, a plow mounted thereon, a second frame pivotally mounted at its forward end on said first-named frame and adapted to be angled vertically relative thereto, said second frame comprising laterally-extending bars, a pole adapted to be rigidly connected to said bars at any one of a plurality of points therealong, and means for angling said frames relative to each other for controlling the position at which said plow shall work.

8. In a beet puller, the combination of a frame, a plow mounted thereon, a second frame pivotally mounted at its forward end on said first-named frame and adapted to be angled vertically relative thereto, a pole rigidly mounted on said second frame, a bracket carried by said first-named frame between the side bars of said second frame serving to hold said second frame against moving laterally relative to the first-named frame, a lever pivotally mounted on said bracket, means for holding said lever in adjusted position, and connections between said lever and said second frame whereby a stroke of the lever serves to angle said frames relative to each other.

9. In a beet puller, the combination of a frame, a plow mounted thereon, a second frame converging toward its rear end pivotally mounted at its forward end on said first-named frame and adapted to be angled vertically relatively thereto, a pole rigidly

mounted on said second frame, a bracket carried by said first-named frame serving as a guide for the rear end of said second frame, a lever pivotally mounted on said bracket, a latch for locking said lever in adjusted position upon a circular rack-bar carried by said bracket, and connections between said lever and said second frame whereby a stroke of the lever serves to angle said frames relative to each other.

10. In a beet puller, the combination of a frame, an arched axle rigidly mounted thereon, a pair of supporting wheels mounted on said axle, a second frame pivotally mounted on said first-named frame adapted to be moved vertically relative thereto, a beet lifting device mounted on said second frame directly below said arched axle, and means whereby said frames may be angled relative to each other to regulate the depth at which said plow shall run.

11. In a beet puller, the combination of a frame, carrying wheels between which said frame is adapted to swing up and down, a beet lifting plow mounted on said frame, a seat movably supported by said wheels, and means for raising said plow relative to said wheels, the weight of the operator in the seat being adapted to assist in raising the plow.

12. In a beet puller, the combination of a frame, a beet lifting plow mounted thereon, a second frame pivotally connected to said first-named frame, a seat carried by said second frame, carrying wheels mounted on said second frame in advance of said seat, and means for swinging said frames relative to each other for raising said plow and for simultaneously lowering said seat.

13. In a beet puller, the combination of a frame, a plow mounted thereon, a second frame pivotally connected at its front end to said first-named frame, a seat carried by said second frame at its rear end, carrying wheels mounted on said second frame in advance of said seat, and means for swinging said frames toward each other for raising said plow and for simultaneously lowering said seat.

14. In a beet puller, the combination of three frames pivotally connected together, a plow mounted on one of said frames, a pole mounted on one of the other of said frames, and means for adjusting said frames relative to each other for angling the plow and for raising and lowering the same.

15. In a beet puller, the combination of three frames pivotally connected together, carrying wheels mounted on one of said frames, a plow mounted on another of said frames, and a pole mounted on the other of said frames, and means for moving said frames relative to each other for angling said plow vertically and for raising and lowering the plow relative to the carrying wheels.

16. In a beet puller, the combination of a frame comprising an arched axle, a pair of supporting wheels mounted on said axle, a plow pivotally connected to said frame adapted to swing vertically directly below said arched axle, and means for raising and lowering said plow relative to said frame.

17. In a beet puller, the combination of a frame comprising an arched axle, a pair of supporting wheels mounted on said axle, a beet lifting device pivotally connected to said frame and adapted to be moved vertically directly below said arched axle, means for raising and lowering said plow relative to said frame, a pole connected to said frame, and means for angling said pole relative to the frame whereby the angle at which said plow shall run may be varied.

18. In a beet puller, the combination of a frame comprising an arched axle adapted during the operation of the machine to be maintained substantially in vertical position, a pair of supporting wheels mounted on said axle, a plow pivotally connected to said frame adapted to swing vertically directly below said arched axle, and means acting independently of said arched axle for raising and lowering said plow relative to said frame.

19. In a beet puller, the combination of a frame comprising an arched axle adapted during the operation of the machine to be maintained substantially in vertical position, a pair of supporting wheels mounted on said axle, a second frame pivotally connected with said first-named frame, a plow mounted on said second frame adapted by a swinging of said second frame to be reciprocated up and down directly below said arched axle, and means acting independently of said arched axle for moving said frames relative to each other for raising and lowering said plow.

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

WILLIAM S. GRAHAM.

Witnesses:
WILLIAM C. LINTON,
ARTHUR GALLAGHER.

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