

No. 636,347.

Patented Nov. 7, 1899.

W. H. MORENUS.

EXCAVATING AND WAGON LOADING MACHINE.

(Application filed Oct. 17, 1898.)

(No Model.)

6 Sheets—Sheet 1.

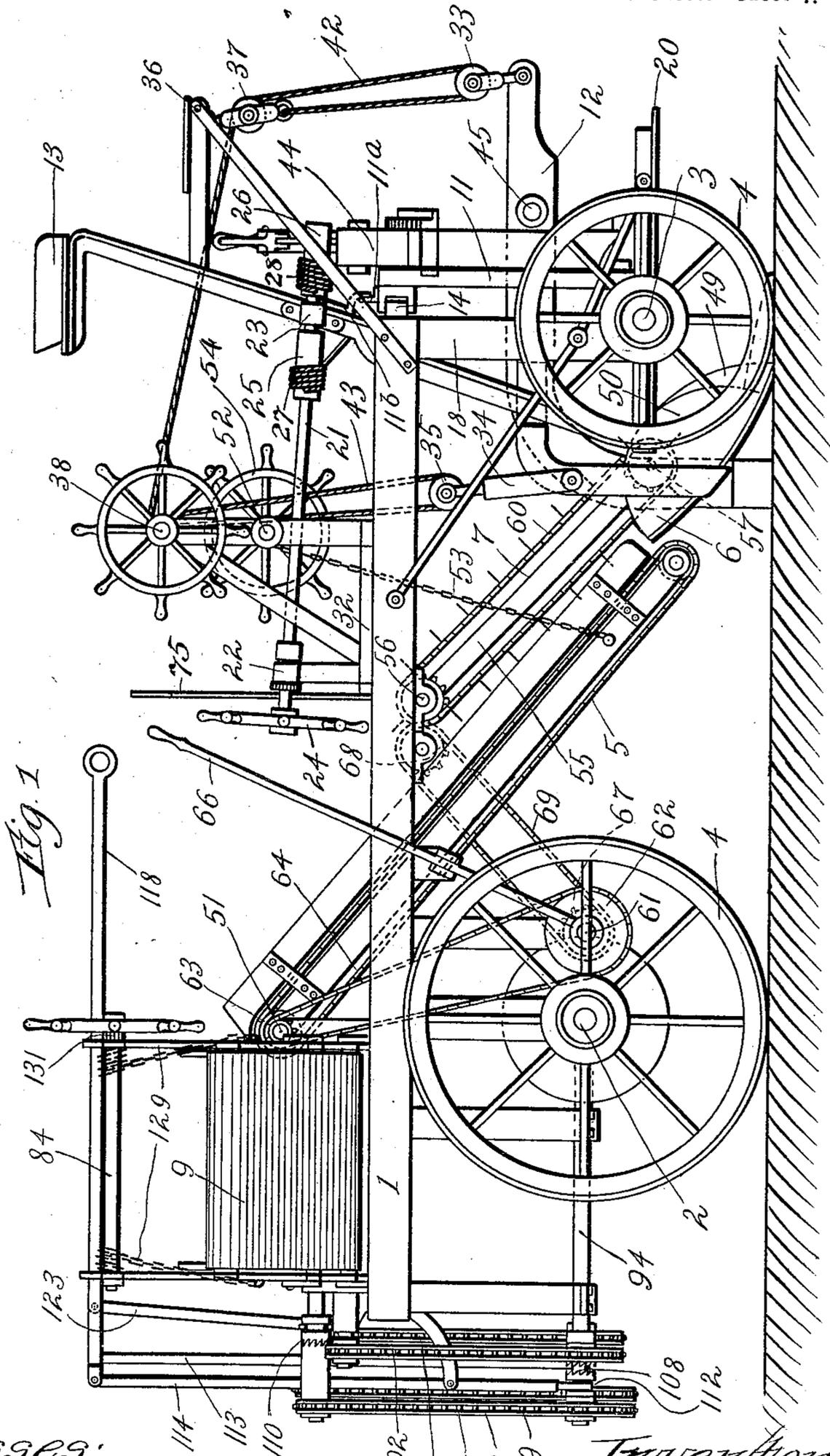


Fig. 1

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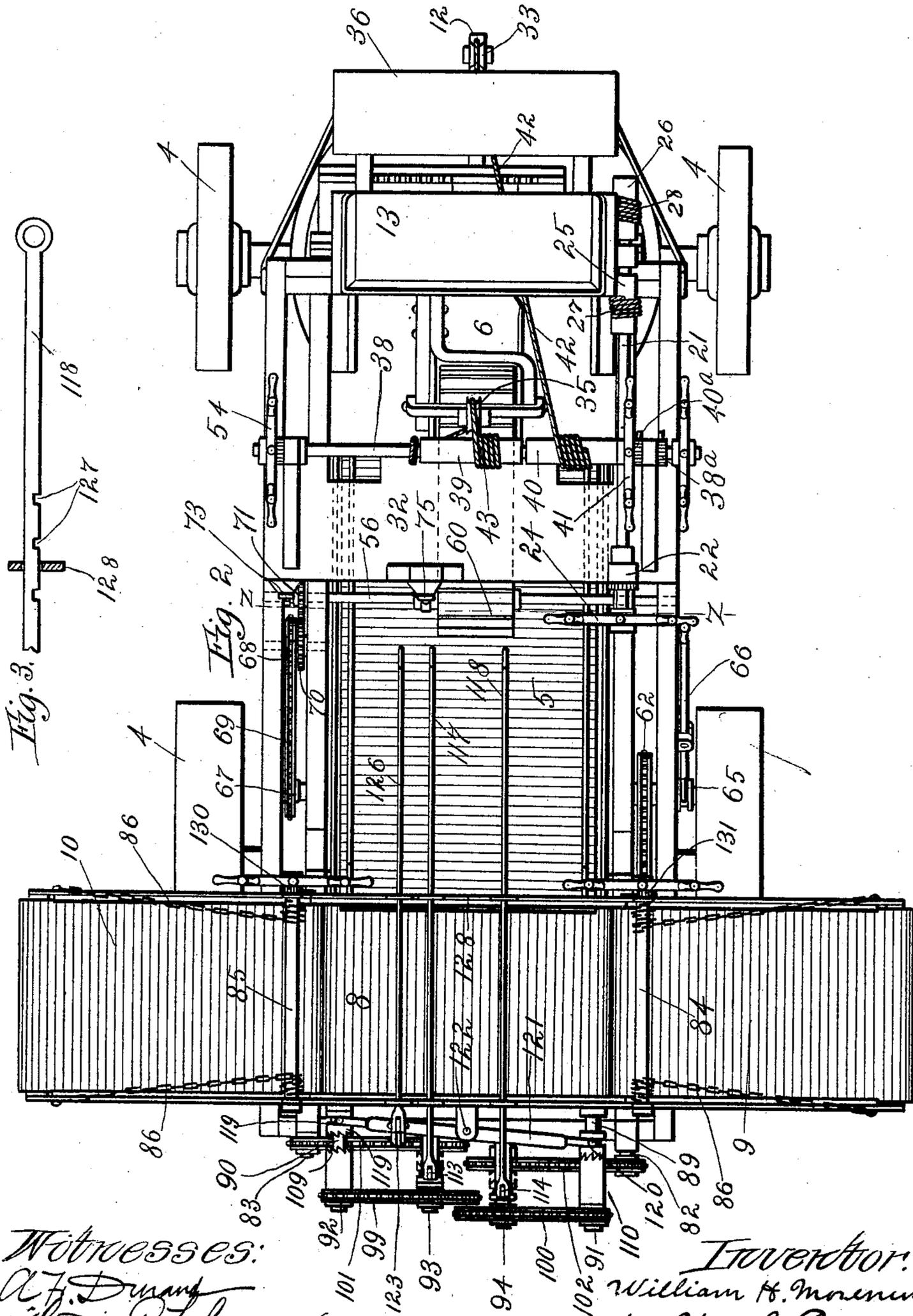
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6 Sheets—Sheet 2.



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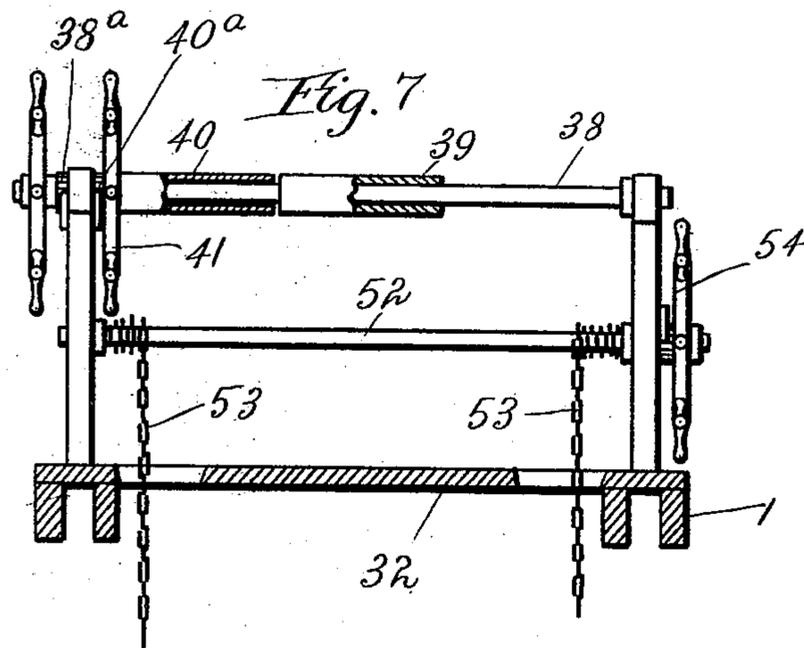
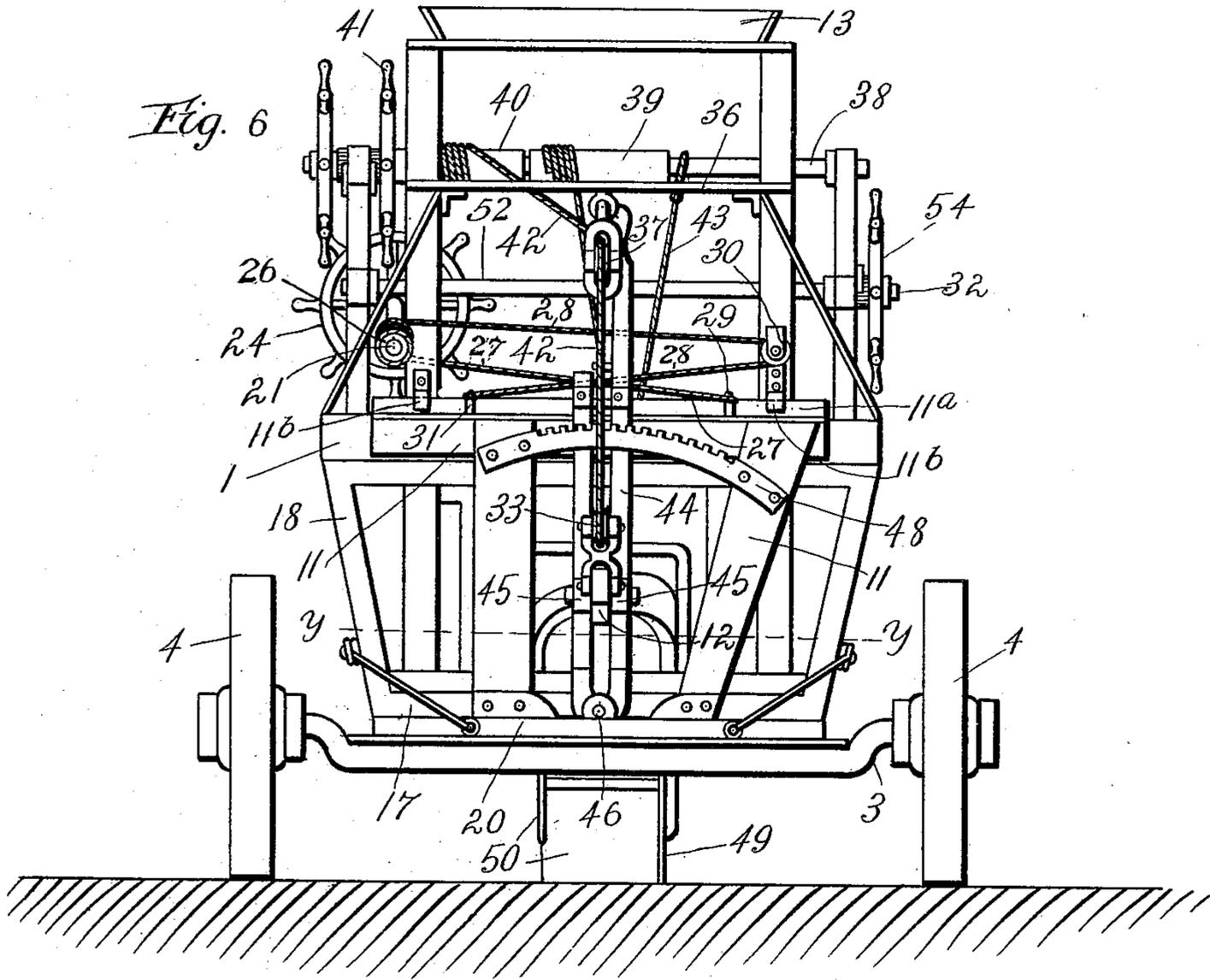
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6 Sheets—Sheet 4.



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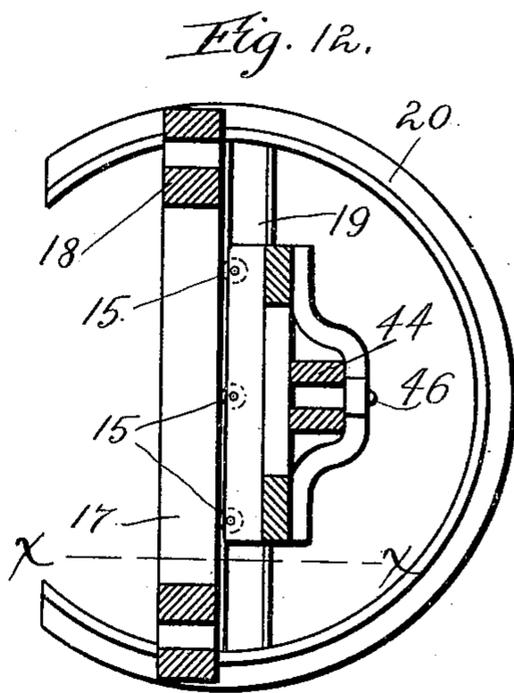
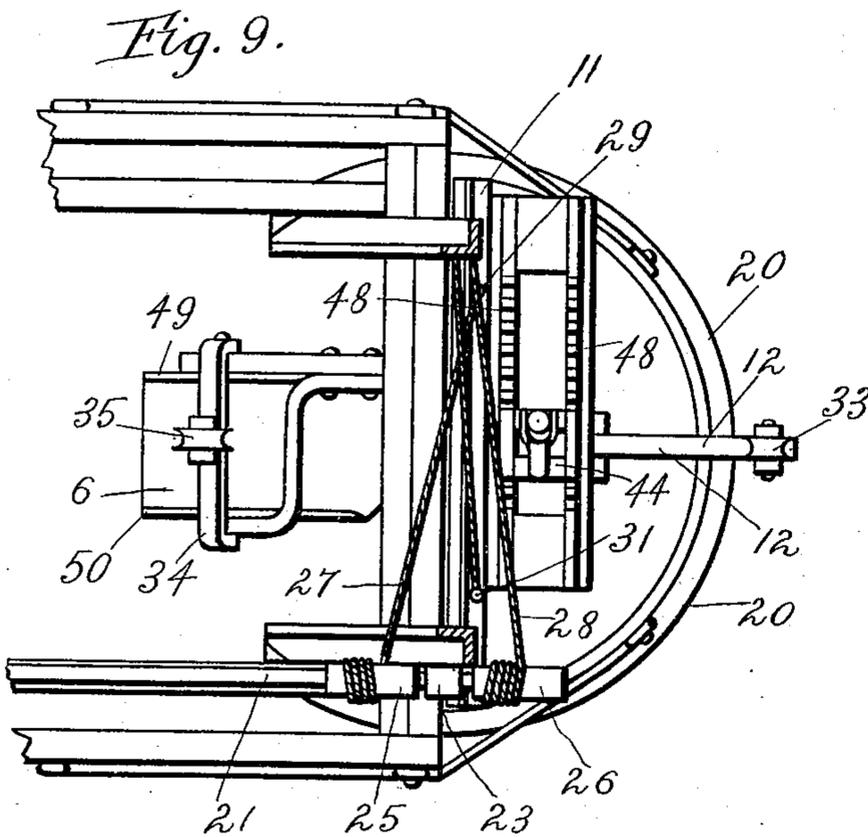
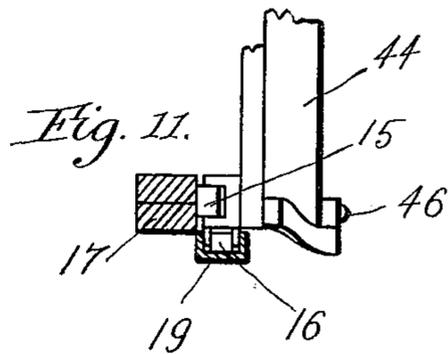
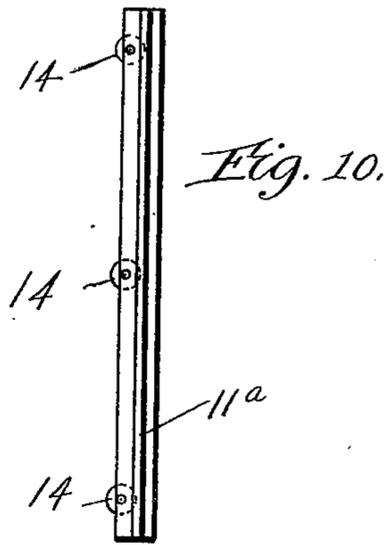
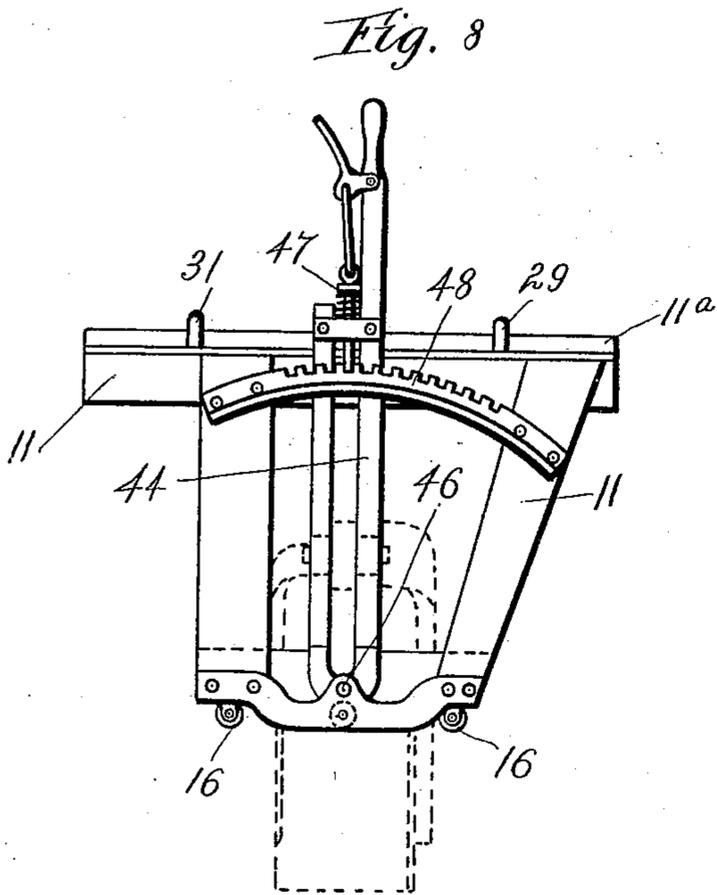
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(No Model.)

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6 Sheets—Sheet 5.



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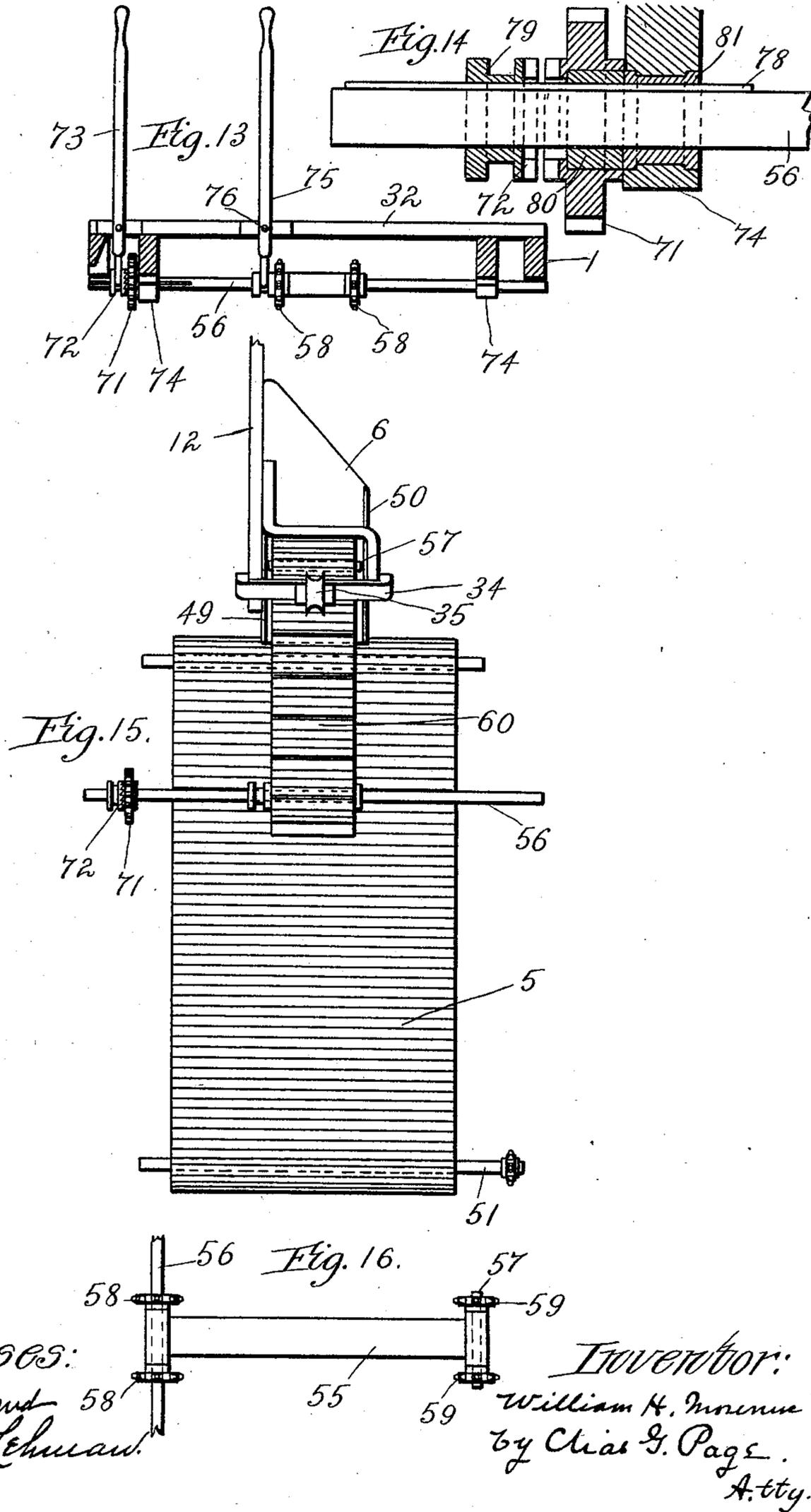
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6 Sheets—Sheet 6.



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UNITED STATES PATENT OFFICE.

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EXCAVATING AND WAGON-LOADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 636,347, dated November 7, 1899.

Application filed October 17, 1898. Serial No. 693,736. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. MORENUS, a citizen of the United States, residing at Lakeview, in the county of Sac and State of Iowa, have invented a certain new and useful Improvement in Excavating and Wagon-Loading Machines, of which the following is a specification.

My invention relates to excavating and wagon-loading machines of the class in which a plow is employed for tearing up the soil and a longitudinally-arranged elevating-carrier for receiving and conveying the soil from the plow to the rear end of the machine, the plow and carrier being of course supported from a suitably-constructed vehicle or body frame, and it being customary to provide the rear end of the machine with a transversely-arranged carrier or like device which receives and conveys the soil from the elevating-carrier to a wagon traveling at one side of the excavator.

The object of my invention, generally stated, is to increase the general efficiency and serviceability of an excavating and wagon-loading machine or "excavator and wagon-loader," as I prefer to term it. Certain special objects are to permit either side of the machine to be drawn close to the face or side of an embankment or other elevation and to thereby permit the loading of a wagon from either side of the said excavating-machine; to provide improved means for insuring a constant delivery or passage of the soil from the plow to the elevating-carrier, and to thereby prevent the soil from clogging between the plow and carrier; to facilitate the operation and adjustment of the plow with reference to the character of the soil and also with reference to the proper spacing of the furrows, and to provide certain novel and desirable details of construction tending to increase the general efficiency of machines of this class.

To the attainment of the foregoing and other useful ends an excavator and wagon-loader characterized by my invention comprises a rectangular body or vehicle frame suitably mounted upon front and rear axles, which are in turn supported by vehicle-wheels, and provided at the forward end with

the usual elevated driver's seat. A tongue or other ordinary draft device may be provided for the front axle, and, if so desired, a pushing-tongue may be connected with the rear end of the machine, according to requirements and the character of the work. The plow employed for tearing up the soil, and which is preferably of the form or type commonly known as a "ditching" or "grading" plow, is preferably arranged immediately in rear of the front axle and directly in front of the receiving end of the elevating-carrier.

With a view to securing an advantageous and highly-satisfactory working of the plow under all conditions I have provided the same with three adjustments. First, the said plow is arranged for a bodily side-to-side movement or lateral adjustment, and while I am aware that a plow having a lateral adjustment is not broadly new I have provided certain improvements adapted to make such adjustment more certain and satisfactory and also tending to secure a stronger construction. Second, the plow is capable of a vertical adjustment, which adjustment may be either a bodily up-and-down movement or a tilting movement, whereby either the heel or the point of the plow may be raised or lowered. The third adjustment consists in tilting or inclining the plow to either side and may for convenience be termed a "vertical transverse angular" adjustment, as the plow is swung in a vertical plane which is at right angles to the line of progression or the length of the machine.

The advantages of the first adjustment consist in enabling the machine to cut furrows of uniform width and distance apart regardless of the accuracy with which the driver positions the machine. For instance, should the driver fail to put the machine in a position to cut a furrow the proper distance from the preceding one, or vice versa, an adjustment of the plow to one side by the operator standing on the foot-board will bring the plow into the desired position and enable the driver to proceed without making an effort to correct the inaccuracy.

The second adjustment may be employed to simply raise the plow clear of the ground,

to cut furrows of different depths, and to throw the plow into or out of the ground by depressing or elevating the point of the plow.

The third adjustment has reference more particularly to the character of the soil in which the machine is working and will be more fully described in connection with the drawings.

To facilitate the passage of the soil from the plow to the said carrier, I provide what I term a "laterally-adjustable pick-up," consisting, preferably, of a belt conveyer arranged above the plow and receiving end of the elevating-carrier and supported for lateral adjustment with the plow. By this device the soil will be picked up from the moldboard by the cleats on the belt and carried by the lower leaf of the latter (which runs in the same direction as the upper leaf of the elevating-carrier) from the plow to the elevating-carrier. In this way clogging of the soil between the plow and carrier is prevented and an uninterrupted delivery or passage of the soil from the plow to the carrier insured irrespective of the adjustment of the plow relative to the carrier.

With reference to the final passage or discharge of the dirt into the wagon traveling at the side of the excavator I have arranged at the rear of the machine and on opposite sides thereof a couple of laterally-extending conveyers or belt carriers. Extending between the inner ends of the said conveyers and in a position to receive the dirt or soil from the upper end of the elevating-carrier is a third or intermediate conveyer. The said third conveyer is constructed to run in either direction, and dirt deposited thereon by the elevating-carrier may be conveyed to and deposited upon either one of the two laterally-extending conveyers, from which latter the soil will then be discharged into the wagon. To permit the machine to be driven close up against the face or vertical surface of an embankment or cut, the said laterally-extending conveyers are constructed to be swung about a pivotal point located at their inner ends, while the outer ends of the conveyers are supported by chains wound about a couple of rotary hand-wheel shafts, whereby either one of the two laterally-extending conveyers may be raised or swung into a substantially vertical position. By this arrangement either side of the excavator may be driven close to the side of a bank by simply swinging up or raising the conveyer on that side of the machine which is to be brought next to the bank and by then operating the intermediate or third conveyer, so as to carry and deliver the dirt to the laterally-extending conveyer on the opposite side of the machine, by which latter conveyer the dirt will then be carried outwardly and delivered to the wagon traveling at the side of the excavator.

Thus it will be seen that I provide an excavator and wagon-loader in which the plow is given a wide range of adjustment and that

with my improved arrangement a wagon may be loaded with equal facility at either side of the machine while the opposite side is being drawn close to the side of a bank or cut.

In the accompanying drawings, Figure 1 represents in side elevation an excavator and wagon-loader embodying my invention. Fig. 2 is a plan of the same. Fig. 3 is a detail of one of the hand-rods employed for operating the clutches on the rear end of the machine. Fig. 4 is a rear end elevation of the excavator, showing the two laterally-extending conveyers, the third or intermediate conveyer, and the driving mechanism therefor. Fig. 5 is a detail view showing in plan the rear axle, the two shafts, gear connected therewith for driving the three conveyers, and also the shaft from which the elevating-carrier and the pick-up are driven. Fig. 6 is a front elevation of the excavator. Fig. 7 is a detail view showing the mechanism for raising and lowering the elevating-carrier and also the mechanism for raising and lowering the plow. Fig. 8 is a front elevation of the laterally-shifting frame or carriage by which the plow is given its lateral adjustment. Fig. 9 is a top plan of the forward portion of the excavator with the driver's seat removed. Fig. 10 is a detail plan of the top bar or beam of the shifting carriage-frame, showing the antifriction-rolls. Fig. 11 is a detail sectional view taken on line $x x$ in Fig. 12. Fig. 12 is a section taken on line $y y$ in Fig. 6. Fig. 13 is a transverse section through the body-frame on line $z z$ in Fig. 2, showing the upper or driving shaft of the pick-up. Fig. 14 is a longitudinal section of the clutch mechanism mounted upon said shaft and by which the said pick-up is started and stopped. Fig. 15 is a top plan of the plow, the elevating-carrier, and the pick-up. Fig. 16 is a view showing the pick-up with the belt removed.

The excavator and wagon-loader illustrated comprise in general a vehicle or body frame 1, preferably mounted upon axles 2 and 3, which are in turn supported by vehicle-wheels 4, a longitudinally-arranged elevating-carrier 5, a plow 6, a pick-up 7, and three transversely-arranged conveyers 8, 9, and 10, arranged at the rear end of the machine, the conveyers 9 and 10 being arranged to overhang and project laterally from the rear end of the excavator, as shown in Figs 2 and 4.

The plow 6 may be of any known construction or form and is preferably arranged directly in front of the said elevating-carrier 5 and immediately in rear of the front axle 3. The plow is provided with three adjustments—first, a lateral or bodily side-shift adjustment; second, a vertical or up-and-down adjustment, and, third, a "vertical transverse angular" adjustment, the latter so called for the reason that such adjustment consists in tilting or swinging the plow in a vertical plane, which is transverse to the length of the machine and also to the line of progression. With reference to the first or lateral adjust-

ment I have provided a laterally-shifting frame 11, with which the forward portion of the plow-beam 12 is connected and which may be termed a "plow-carriage." The said plow-carriage is preferably arranged in front of the forward bolster and, as will be observed, directly beneath the position assumed by the driver while occupying the seat 13. (See Figs. 1, 6, and 8 to 12.) The plow-carriage, as stated, is arranged and adapted for lateral shift, and to such end has a sliding connection with the front of the machine. To facilitate such lateral shift or sliding movement, I have provided the plow-carriage with a number of small wheels or antifriction-rolls 14, 15, and 16. The three rolls 14 are so arranged as to bear and roll upon the end of the frame 1, the rolls 15 upon the lower cross-beam 17 of the bolster 18, while the rolls 16 travel back and forth in the groove of a cross-beam or channel-iron 19, with which the circle-iron 20 is provided. A flange 11^a on the top of the plow-carriage and a couple of guide-brackets 11^b 11^b on the seat-frame serve to keep the rollers 14 in contact with the frame 1, and thereby insure a proper working of the plow-carriage. In this way the plow-carriage is adapted to be shifted back and forth for the purpose of adjusting the plow laterally, and the end of the frame 1, together with the beam 17 and the channel-iron 19, form or constitute what may be termed a "carriage-way." The mechanism or means for shifting the plow-carriage comprises, preferably, a longitudinally-arranged rotary hand-wheel shaft 21, mounted in bearings 22 and 23 and provided with a hand-wheel 24 and a couple of winding-drums or fixed sleeves 25 and 26. (See Figs. 1, 2, and 9.) A couple of ropes or other flexible connectors 27 and 28 serve as mediums of connection between the hand-wheel shaft and the plow-carriage, it being observed that one end of the rope 27 is secured to the plow-carriage at 29 and has its other end wound about the winding-drum 25, while the rope 28 is wound about the drum 26 in the opposite direction, passed through or about the sheave 30, and then secured to the plow-carriage at 31. By this arrangement the operator standing on the foot-board 32 may shift or adjust the plow laterally at will by simply turning the hand-wheel either one way or the other, according to the particular adjustment desired.

As a simple and convenient arrangement for adjusting the plow vertically the forward end of the plow-beam is provided with a pulley 33 and the rear portion of the said beam with a bail 34 and a pulley 35. Suspended from the foot-rest 36 is a third pulley 37, and in rear of the driver's seat and in a position convenient to the operator standing on the foot-board is mounted a transverse rotary hand-wheel shaft 38. The said rotary hand-wheel shaft is provided, preferably, with a couple of winding drums or sleeves 39 and 40,

the former fixed or firmly secured upon the shaft, while the latter is loose and provided with a hand-wheel 41. (See Fig. 7.) A rope 42, having one end wound about the winding-drum 40 and the other end secured to the block of the pulley 37, is reeved through the pulleys 33 and 37, as shown in Fig. 1, and a second rope 43, having one end wound about the winding-drum 39, is reeved through the pulley 35 and then secured at its other end to a loose ring on the shaft 38. Provision is also made for preventing back rotation on the part of the shaft and drum 40 by providing the former with a ratchet-and-pawl device 38^a and by providing the latter with a like device 40^a. In this way a simple and convenient arrangement is afforded, whereby the plow may be raised or lowered bodily or whereby either the point or the heel of the plow may be elevated or depressed, according to requirements, and to permit such adjustments the draft-bar 44 is slotted to receive the forward portion of the plow-beam, and the said beam is provided with a couple of antifriction-rolls 45 45, whereby the plow may be said to have both a shifting and a swinging connection with the plow-carriage.

The vertical transverse angular or side-tilt adjustment of the plow is secured by pivoting the draft-bar 44 at its lower end, as at 46, and providing the said bar at its upper end with a handle and locking-bolt 47, the latter adapted to engage the notches in a couple of segments 48 48, mounted on the plow-carriage. The draft-bar thus constructed can be swung from side to side and constitutes a hand-lever for adjusting the plow, which latter by such arrangement may be said to have a pivotal connection with a laterally-shifting draft device. Such tilting adjustment of the plow about its pivotal connection with the draft device is made chiefly with reference to the character of the soil, and consists in throwing up either side of the plow to facilitate the tearing up of the soil. For instance, the plow, as shown, is provided with two cutters 49 and 50; but should the plow be working, as is often the case, in heavy sod, with but the one cutter 49, it would then be found necessary to tilt or throw the plow over to the left in order to completely sever the sod from the ground, for without so doing the sod would be cut or severed only on the side of the cutter 49 and would then be simply turned back on the ground and not delivered to the elevating-carrier in rear of the plow.

The soil torn up by the plow is delivered to the lower end of the elevating-carrier 5, which latter is pivotally supported at its upper end by the shaft 51 and at its lower end by the rotary hand-wheel shaft 52 through the medium of the chains or cords 53 53, the said shaft 52 being provided with a hand-wheel 54, whereby the elevating-carrier can be raised or lowered, as desired. For the purpose of facilitating the transfer or delivery of the soil from the plow to the said carrier 5 I have pro-

vided a pick-up 7, consisting of a suitably-constructed belt conveyer. The said pick-up or conveyer comprises a frame or beam 55, pivotally supported at its upper or rear end 5 by the shaft 56 and carrying at its lower or forward end the short shaft 57. The shafts 56 and 57 are each provided with a pair of sprockets 58 58 and 59 59, and a suitably-constructed chain or belt 60, provided with cleats 10 or buckets, is arranged about the said sprockets, as shown. The pick-up is preferably somewhat narrower than the plow, whereby its lower end will rest or bear upon the mold-board of the plow between the cutters 49 and 15 50, and as the belt of the pick-up is so driven that its lower leaf travels in the same direction as the upper leaf of the elevating-carrier the soil will therefore be carried or moved 20 along by such lower leaf from the said plow to the receiving end of the said elevating-conveyer, and while the pick-up could be rigidly supported from the body-frame in any suitable manner without departing from the spirit of my invention I prefer to have it piv- 25 otally mounted substantially as shown, as by so doing the said pick-up is adapted and enabled to adjust itself to different conditions or qualities of soil. The elevating-carrier is conveniently driven from the shaft 61 through 30 the medium of sprockets 62 and 63 and sprocket-chain 64, a clutch 65 and hand-lever 66 being provided for controlling the operation of the said elevating-carrier, and the said shaft 61 being gear-connected with the rear 35 axle. (See Fig. 5.) The pick-up, like the elevating-carrier, is also operated or driven from the shaft 61 through the medium of sprockets 67 and 68, sprocket-chain 69, and 40 73 being provided for starting and stopping the said pick-up.

With reference to the lateral or side-shift adjustment of the plow the shaft 56 is supported for longitudinal shift or adjustment 45 in bearings 74 74, it being observed that the pick-up must shift or move with the plow when the latter is adjusted laterally. Ordinarily the shifting of the plow to one side will operate to shift the pick-up, as the lower 50 end of the latter is confined between the two cutters 49 and 50, and any side movement of the plow will consequently result in a corresponding extent of travel or shift on the part of the pick-up and shaft 56; but with a view, 55 however, to facilitate such side shift on the part of the pick-up I have provided a lever 75, pivoted at 76 to the foot-board 32 and engaging with its lower end a fixed collar on the shaft 56. By this arrangement should 60 the shaft 56 stick or fail to slide properly when the plow is adjusted to one side the operator, standing on the foot-board 32, will be enabled to give the said shaft the desired amount of shift by grasping the lever and 65 swinging the same to one side or the other, as the case may require.

Fig. 14 illustrates a special construction of

clutch and bearing, whereby the shaft may shift, as explained, without interfering with the operation of the said clutch. The said 70 construction involves the shaft 56, provided with a long spline or feather 78, the sliding clutch member 79, keyed by said spline to the shaft, the sleeve or bushing 80, and the gear 71, loosely mounted thereon, the said gear 75 forming the loose member of the clutch, and a bushing or sleeve 81, revolving with the shaft within the bearing 74. I do not, however, limit myself to the foregoing arrangement for shifting the shaft, as it is obvious 80 that the lever 75 could be employed to shift the pick-up upon the shaft and also that various other devices could be arranged and applied to accomplish this end without departing 85 from the spirit of my invention.

Referring now to Figs. 1, 2, 3, 4, and 5, it will be seen that the soil is discharged from the upper end of the elevating-carrier onto the upper leaf of the transversely-arranged 90 reversible conveyer 8 and that a couple of laterally-extending swinging belt conveyers 9 and 10 are arranged, respectively, at either end of the said conveyer 8. The said swinging conveyers 9 and 10 are pivotally supported 95 at their inner ends by the shafts 82 and 83 and at their outer ends by the rotary hand-wheel shafts 84 and 85 through the medium of the chains or cords 86. (See Fig. 4.) This latter arrangement permits either of the two conveyers 9 and 10 to be swung or raised into a 100 substantially vertical position by rotating either one of the two rotary hand-wheel shafts 84 and 85, so as to wind the chains thereon, and as an advantage of the foregoing arrangement an excavator and wagon-loader thus 105 constructed can be operated or driven with either side close to the face or vertical surface of an embankment or cut, for, as previously observed, soil delivered to the elevating-carrier from the plow will be discharged 110 from the upper end of the said carrier onto the belt conveyer 8, and if it is found desirable to bring the left-hand side of the excavator close to an embankment the conveyer 10 will be 115 raised, while the said reversible conveyer 8 will be so operated as to deliver the soil to conveyer 9, which serves as a means of final discharge to the wagon traveling at the right-hand side of the machine.

The conveyers 8, 9, and 10 are preferably 120 driven or operated from the rear axle. As a simple and convenient method of so doing the shafts 82 and 83 are provided, respectively, with a couple of sprockets 87 and 88 and the two shafts 89 and 90 with similar sprockets 91 125 and 92. Gear-connected with the said rear axle and arranged longitudinally in the same plane as the latter are a couple of rotary shafts 93 and 94, provided, respectively, with sprockets 95 96 and 97 98. The sprockets 96 and 92 are 130 connected by sprocket-chain 99. A sprocket-chain 100 serves as a medium of connection between sprockets 98 and 91, and a couple of similar chains 101 and 102 connect, respec-

tively, the sprockets 95 88 and 97 87. The shafts 93 and 94, which are connected by gears 103 104 and 105 106 with the said rear axle, are running constantly during the operation or forward movement of the machine. It therefore becomes necessary to arrange a number of clutches intermediate the axle and the conveyers, whereby either one of the two sprocket-chains 99 and 100 may run idle while the other is driving the conveyer 8 in the desired direction and whereby either one of the two conveyers 9 and 10 may remain idle while the other is being operated to discharge the soil into the wagon. To this end the shafts 93 and 94 are provided, respectively, with a couple of ordinary clutches 107 and 108 and the two shafts 89 and 90 with a couple of similar clutches 109 and 110. The sprockets 95 and 97 are both loose on their respective shafts and form what may be termed the "loose" or "unkeyed" members of the two clutches 107 and 108, the shifting or keyed members 111 and 112 being engaged, respectively, by the lower ends of the vertical levers 113 and 114, the said levers being pivoted at 115 and 116 to brackets on the frame, as shown in Figs. 1 and 4. A pair of hand-rods 117 and 118 are arranged longitudinally above the rear end of the machine and are connected, respectively, at their rear ends with the upper ends of the two levers 113 and 114. The sprockets 92 and 91 are also loosely mounted upon their respective shafts and form the loose or unkeyed members of the clutches 109 110, while the shifting or keyed members 119 and 120 are connected by a lever 121, the latter being pivoted in the center to the frame, as at 122. A vertical lever 123, pivoted at 124, engages the said lever 121 at 125 and is connected at its upper end to the rear end of a third hand-rod 126. By this arrangement it will be seen that the attendant or operator standing on the foot-board 32 will have complete control of the driving mechanism for the three conveyers, that by pushing on the rod 126 he may, for instance, cause the conveyer 8 to operate or move in a direction to deliver its load to the conveyer 9, and that by then pushing on the rod 118 the said conveyer 9 may be caused to discharge the soil thus received from the conveyer 8 to the wagon to be loaded, the conveyer 10 in such case being stopped or rendered inoperative by pulling on the rod 117 and the chain 99 running idle by reason of the clutch member 117 being out of engagement with the sprocket 92. After running in this manner for a time should it then be found desirable to discharge the soil from the conveyer 10 a reshifting of the rods 126, 117, and 118 in the opposite direction will reverse the conveyer 8, start the conveyer 10, and stop the conveyer 9.

As a simple and convenient method of locking the hand-rods in their various positions the lower edges of the said rods are provided with notches 127, adapted to engage the for-

ward bar 128 of the frame 129, which latter forms a support for both the hand-rods and the hand-wheel shafts 84 and 85. Provision is also made for locking or maintaining the two swinging conveyers in an elevated position by providing the said hand-wheel shafts with ratchets 130 and 131.

I claim as my invention the following:

1. In an excavating-machine, a laterally-adjustable plow for tearing up the soil; an elevating-carrier in rear of said plow arranged to receive the soil from the plow; a pick-up for transferring the soil from the plow to the elevating-carrier, comprising a belt conveyer adapted to carry the soil by its lower leaf from the plow to the elevating-carrier, said pick-up being also adapted and arranged for a bodily and lateral shift or adjustment; means for driving the pick-up, means for driving the elevating-carrier, and means for adjusting the plow.

2. In an excavating-machine, a laterally and vertically adjustable plow for tearing up the soil; an elevating-carrier in rear of said plow arranged to receive the soil from the plow; a laterally and vertically adjustable pick-up arranged above the plow and elevating-carrier, and adapted and operative to transfer the soil from the plow to the elevating-carrier; said pick-up being supported and arranged for a swinging vertical adjustment, and a bodily side-to-side or lateral adjustment; means for adjusting the plow, means for adjusting the pick-up and means for driving the carrier and the pick-up.

3. In an excavating-machine, a plow provided with a horizontal and forwardly-extending plow-beam, and adapted for tearing up the soil; a laterally-shifting plow carriage or frame with which the forward portion of the said plow-beam is connected; means for shifting the said plow carriage or frame whereby the plow will be adjusted laterally, and an elevating-carrier arranged in rear of said plow to receive the soil therefrom.

4. In an excavating-machine, a plow for tearing up the soil; a vertically-arranged laterally-shifting plow carriage or frame provided with antifriction-rolls, and with which the forward portion of the plow-beam is connected; and means for shifting the said plow-carriage whereby the plow will be adjusted laterally.

5. In an excavating-machine, a plow for tearing up the soil; a laterally-shifting plow carriage or frame arranged in front of the forward bolster; means for connecting the forward portion of the plow-beam with the said plow-carriage, and means for shifting the plow-carriage whereby the plow will be adjusted laterally.

6. In an excavating-machine, a plow for tearing up the soil; a vertical laterally-shifting plow carriage or frame arranged in front of the forward bolster; antifriction-rolls interposed between the bottom of the said carriage and a cross-bar on the circle-iron, and

antifriction-rolls interposed between the carriage and the said forward bolster; guides for the carriage, means for connecting the forward portion of the plow-beam with the plow-carriage, and means for shifting the said plow-carriage whereby the plow will be adjusted laterally.

7. In an excavating-machine, a plow, a laterally-shifting plow carriage or frame, and means for connecting the forward portion of the plow-beam with the plow-carriage; and means for shifting the said plow-carriage, comprising a rotary hand-wheel shaft, and one or more cords or chains wound upon said shaft and connected with the plow-carriage, whereby a turning of the hand-wheel shaft will shift the plow-carriage and thereby adjust the plow laterally.

8. In an excavating-machine, a plow, a laterally-shifting plow-carriage arranged in front of the forward bolster, and means for connecting the forward portion of the plow-beam with the plow-carriage; a rotary hand-wheel shaft arranged transversely to the line of shift of the plow-carriage, and one or more ropes or chains wound upon the hand-wheel shaft and suitably connected with the plow-carriage, whereby a turning of the hand-wheel shaft will shift the plow-carriage and thereby adjust the plow laterally.

9. In an excavating-machine, a plow having a vertical transverse angular or side-tilt adjustment, an elevating-carrier in rear of said plow arranged to receive the soil therefrom, and means for so adjusting the plow at will.

10. In an excavating-machine, a plow having a vertical transverse angular or side-tilt adjustment; the forward portion of the plow-beam being connected with a transversely-swinging hand-lever which forms the draft-bar, and whereby the plow is adjusted; and means for locking the said lever, and thereby the plow, in such angular adjustment.

11. In an excavating-machine, a plow having a vertical transverse angular or side-tilt adjustment; a transversely-swinging hand-lever with which the forward portion of the plow-beam is connected, and by which the plow is given its aforesaid angular adjustment; a segment provided with notches, and a locking-bolt on said hand-lever adapted to engage said notches.

12. In an excavating-machine, a plow having a lateral adjustment or bodily side shift, and also having a vertical transverse angular or side-tilt adjustment, whereby the said plow may be adjusted with reference to the accuracy with which the driver positions the machine, and also with reference to the character of the soil; a laterally-shifting draft device with which the plow has a pivotal connection, the said pivotal connection being adapted to permit the said plow to be tilted sidewise about a horizontal and longitudinal axis for the purpose described, and an elevating-carrier in rear of said plow.

13. In an excavator, a plow; a laterally or transversely shifting plow-carriage; a transversely-swinging hand-lever mounted upon said plow-carriage and with which the forward portion of the plow-beam is connected, and means for shifting the said plow-carriage; a shifting of the plow-carriage operating to adjust the plow laterally, and a swinging of the said hand-lever operating to give the plow a vertical transverse angular or side-tilt adjustment.

14. In an excavating-machine, a plow having a lateral or side-shift adjustment, a vertical transverse angular or side-tilt adjustment, and a vertical or up-and-down adjustment; whereby the plow may be adjusted with reference to the accuracy with which the driver positions the machine, with reference to the character of the soil, and with respect to the depth of furrow desired; a laterally-shifting draft device with which the plow has both a shifting and a pivotal connection, the said pivotal connection being adapted to permit the said plow to be tilted sidewise about a horizontal and longitudinal axis for the purpose described, and an elevating-carrier in rear of said plow.

15. In an excavating-machine, a plow; a laterally-shifting plow carriage or frame; a transversely-swinging hand-lever mounted upon said plow-carriage and with which the forward portion of the plow-beam has a shifting connection; means for raising and lowering or adjusting the plow vertically, and means for shifting the said plow-carriage; such shifting of the plow-carriage operating to adjust the plow laterally, and a swinging of the hand-lever operating to give the plow a vertical transverse angular or side-tilt adjustment.

16. In an excavating-machine, a plow; a laterally-shifting plow carriage or frame; a transversely-swinging hand-lever mounted upon said plow-carriage, and with which the forward portion of the plow-beam has both a swinging and a shifting connection; means for raising and lowering the plow bodily, or whereby either the heel or the point of the plow may be either elevated or depressed, and means for shifting the said plow-carriage; such shifting of the plow-carriage operating to adjust the plow laterally, and a swinging of the hand-lever operating to give the plow a vertical transverse angular or side-tilt adjustment.

17. In an excavating-machine, a plow having a vertical adjustment, and also a vertical transverse angular or side-tilt adjustment; a transversely-swinging hand-lever with which the forward portion of the plow-beam has a shifting connection, and which forms the draft-bar; means for raising and lowering the plow; and means for locking the said hand-lever, and thereby the plow, in the aforesaid angular adjustment.

18. In an excavating-machine, a plow having a vertical adjustment, and also a vertical

transverse angular or side-tilt adjustment; a transversely-swinging hand-lever with which the forward portion of the plow-beam has both a shifting and a swinging connection; means for raising and lowering the plow bodily, or whereby either the heel or the point of the plow may be depressed or elevated; and means for locking the hand-lever.

19. In an excavating-machine, a plow or similar device for tearing up the soil; a transversely and vertically swinging lever provided with a longitudinal slot adapted to receive the forward portion of the plow-beam; and one or more antifriction-rolls or the like mounted upon the forward portion of the plow-beam, whereby the plow will have both a shifting and a swinging connection with the said lever.

20. In an excavating-machine, a plow having a vertical or up-and-down adjustment; a rotary hand-wheel shaft, and a rotary hand-wheel sleeve or drum arranged for independent rotation upon said hand-wheel shaft; a rope or other flexible connector arranged to connect the said rotary hand-wheel shaft with one end of the plow-beam, and a like connection between the other end of the plow-beam and the said rotary hand-wheel sleeve or drum, whereby the plow may be raised and lowered bodily, or whereby either the heel or the point of the plow may be elevated or depressed.

21. In an excavating-machine, a plow having a vertical or up-and-down adjustment; a sheave or pulley on the forward portion of the plow-beam; a bail on the rear of the plow-beam, and a sheave on the said bail; an elevated sheave or pulley suitably supported at a point substantially above the forward portion of the plow-beam; a rotary hand-wheel shaft, and a rotary hand-wheel drum mounted for independent rotation upon said hand-wheel shaft; a cord or the like arranged about the sheave on the forward portion of the plow-beam and the said elevated sheave, and extending rearwardly to the said rotary hand-wheel drum; and a similar cord or rope arranged about the sheave on the bail and the rotary hand-wheel shaft.

22. In an excavating-machine, a plow having a lateral adjustment, a vertical transverse angular or side-tilt adjustment, and a vertical or up-and-down adjustment; a body-frame, a forward bolster, and a laterally-shifting plow-carriage in front of said bolster; transversely-swinging hand-lever mounted upon said plow-carriage, and with which the forward portion of the plow-beam has a shifting and swinging connection; a longitudinally-arranged rotary hand-wheel shaft, and one or more ropes or chains wound about said shaft and connected with the said plow-carriage; a transversely-arranged rotary hand-wheel shaft, and a loose rotary hand-wheel drum or sleeve mounted upon said rotary hand-wheel shaft; a rope or the like for connecting the hand-wheel shaft with one end of the plow-beam, and a similar

connection between the rotary hand-wheel drum and the other end of the plow-beam.

23. In an excavator and wagon-loader, a couple of laterally-extending swinging discharge-conveyers located at opposite sides of the rear end of the excavator; hand-controlled power-transmitting mechanism between the rear axle and the said conveyers, and means for swinging or raising the conveyers into substantially vertical positions; whereby the soil taken up by the excavator may be discharged into a wagon from either side of the machine, and whereby either side of the excavator may be driven close to the face or side of an embankment.

24. In an excavator and wagon-loader, the combination of the plow, and the elevating-carrier; the two oppositely-arranged swinging discharge-conveyers, and the intermediate or third conveyer arranged to receive the soil from the upper end of the elevating-carrier, and also arranged to carry and deliver the soil to either one of the two swinging conveyers; a couple of rotary hand-wheel shafts for adjusting the swinging conveyers; and hand-controlled power-transmitting mechanism between the rear axle and the conveyers, comprising a pair of longitudinally-arranged shafts gear-connected with the said axle; sprockets on the said shafts, sprocket-chains connecting the said sprockets with sprockets on the said conveyers, clutches intermediate the rear axle and the conveyers, and longitudinally-arranged hand or push rods connected with said clutches and by which the said power-transmitting mechanism is controlled.

25. In an excavator and wagon-loader, a couple of laterally-extending swinging discharge-conveyers arranged at opposite sides of the machine; an intermediate or reversible conveyer arranged to carry the soil to either one of the two swinging conveyers; means for raising and lowering the swinging conveyers, and power-transmitting mechanism between the rear axle and the said conveyers, comprising a couple of longitudinally-arranged shafts gear-connected with the said axle, a pair of sprockets on each shaft, a couple of sprockets mounted respectively on each of the two shafts of the intermediate conveyer, a couple of sprockets mounted respectively on the inner ends of the said swinging conveyers, the members of each pair of sprockets on the said longitudinally-arranged shafts being connected respectively with a sprocket on a swinging conveyer and the adjacent sprocket on the intermediate conveyer, a clutch on each of the said longitudinally-arranged shafts, a clutch on each shaft of the intermediate conveyer, and longitudinally-arranged hand-rods connected with said clutches and extending forward to the foot-board.

26. In an excavator and wagon-loader, the combination of the plow, the longitudinally-

arranged elevating-carrier, the body-frame having a platform or foot-board intermediate its ends, the three transversely-arranged conveyers at the rear end of the machine, power-transmitting mechanism between the rear axle and the said transversely-arranged conveyers, clutches intermediate the said axle and the transversely-arranged conveyers, the three hand-rods connected with the said clutches and extended forward to the said foot-board or platform, the said hand-rods being provided with notches for engaging the frame upon which they are supported, and whereby the operator standing on the said foot-board may operate the said clutches substantially as and for the purpose described.

27. In an excavator and wagon-loader, the combination of the plow, the elevating-carrier, the pick-up, and the three transversely-arranged conveyers at the rear end of the machine; power-transmitting mechanism between the rear axle and the said conveyers, and between the axle and the pick-up; clutches intermediate said axle and the said transversely-arranged conveyers, and hand-rods or the like for operating the said clutches; whereby the soil may be torn up and elevated, and discharged from either side of the machine at will.

28. An excavator and wagon-loader comprising a plow located near the forward end of the machine; an elevating-carrier in rear of said plow arranged to receive the soil therefrom; a couple of laterally-extending swinging conveyers arranged at opposite sides of the rear end of the machine; means for directing the soil from the elevating-carrier to either one of the two conveyers, and means for raising the latter into substantially vertical positions; whereby the machine may be operated with either side close to an embankment, and a wagon loaded from either side of the excavator.

29. An excavator and wagon-loader comprising a plow located at or near the forward end of the machine; an elevating-carrier in rear of said plow arranged to receive the soil therefrom; a couple of laterally-extending swinging conveyers arranged at opposite sides of the rear end of the machine; a third or intermediate conveyer located between the inner ends of the two laterally-extending conveyers, and arranged to receive the soil from the said elevating-carrier; the said third or intermediate conveyer being constructed to run in either direction, whereby the soil may be carried to either one of the two laterally-extending swinging conveyers; and means whereby either one of the said swinging conveyers may be raised or swung into a substantially vertical position.

30. An excavator and wagon-loader comprising a plow for tearing up the soil; an elevating-carrier in rear of said plow arranged to receive the soil therefrom; a couple of laterally-extending swinging conveyers arranged at opposite sides of the rear end of the machine; a third or intermediate conveyer arranged to receive the soil from the upper end of the elevating-carrier, and constructed to run in either direction, whereby the soil may be carried and delivered to either one of the two swinging conveyers; the outer ends of the said two swinging conveyers being supported by chains or cords connected with a couple of rotary hand-wheel shafts; whereby either one of the two swinging conveyers may be raised into a substantially vertical position, thereby permitting either side of the excavator to be drawn close to an embankment, and a wagon to be loaded from the other side.

WILLIAM H. MORENUS.

Witnesses:

ARTHUR CAMERON,
HARRY ULRICI.