Nov. 5, 1940. M. M. BRODERSEN 2,220,473

HEAVY DUTY SCRAPER

Filed Feb. 11, 1939 6 Sheets-Sheet 1

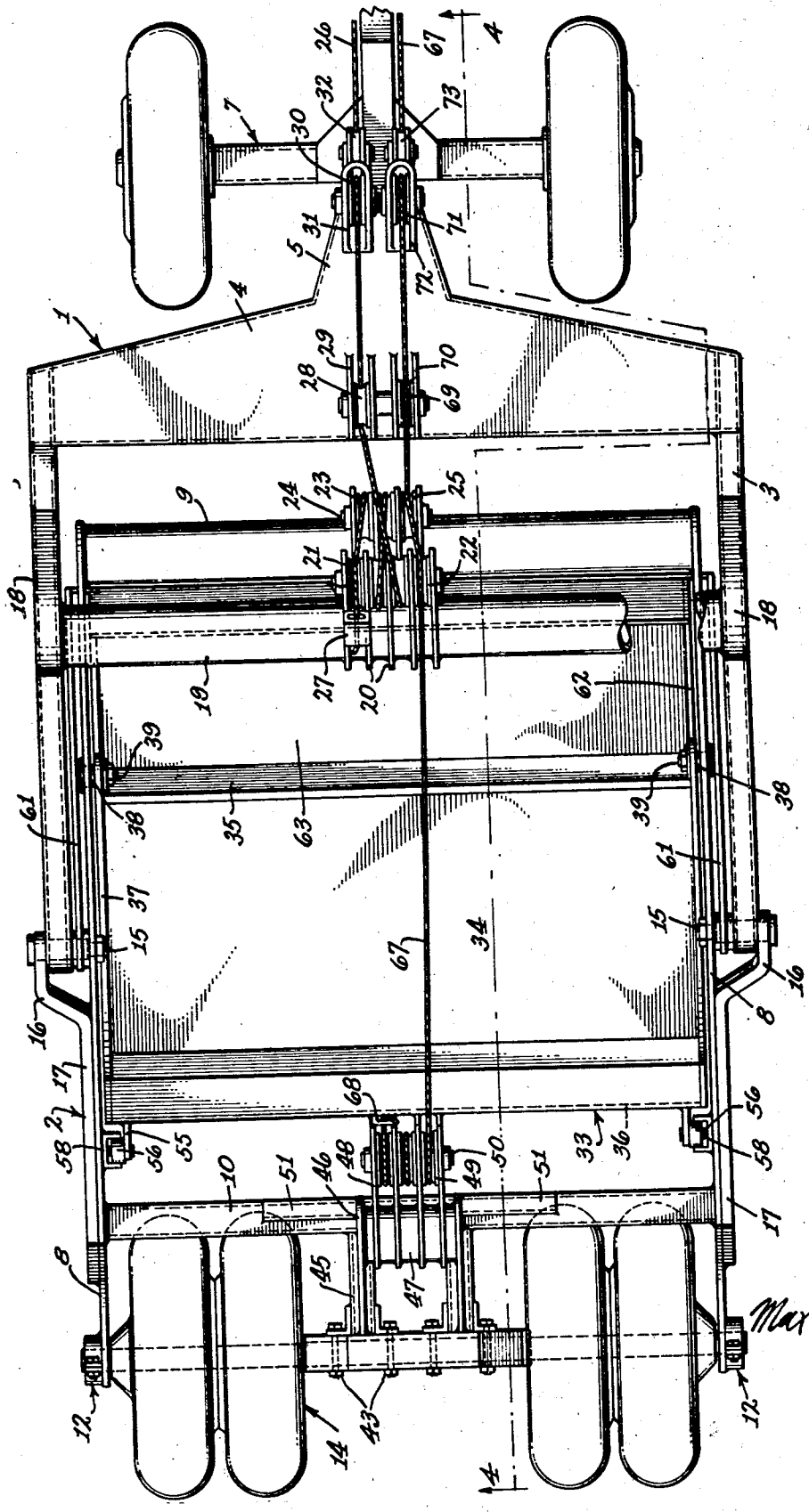


Fig. 1.

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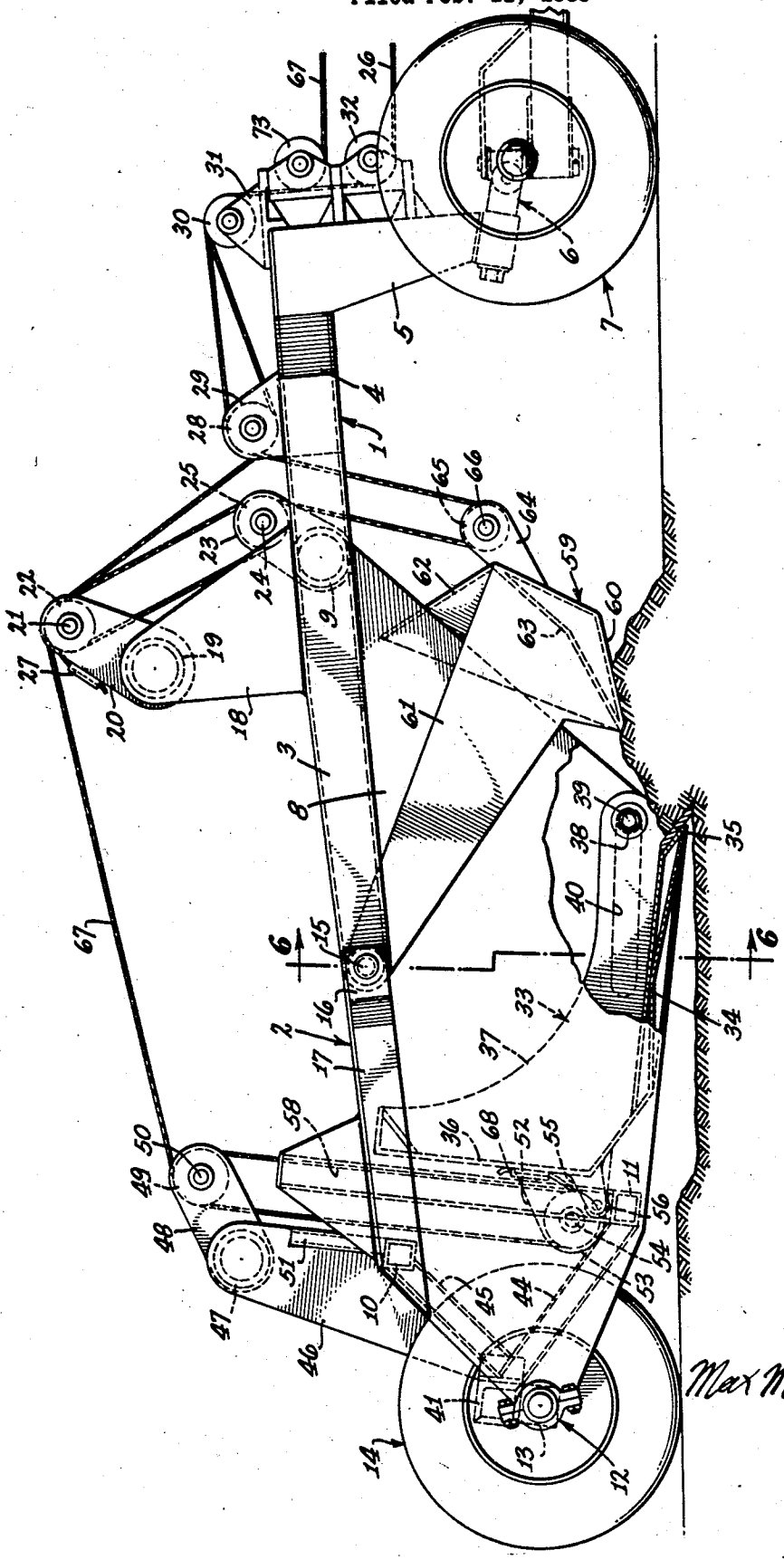


Fig. 2.

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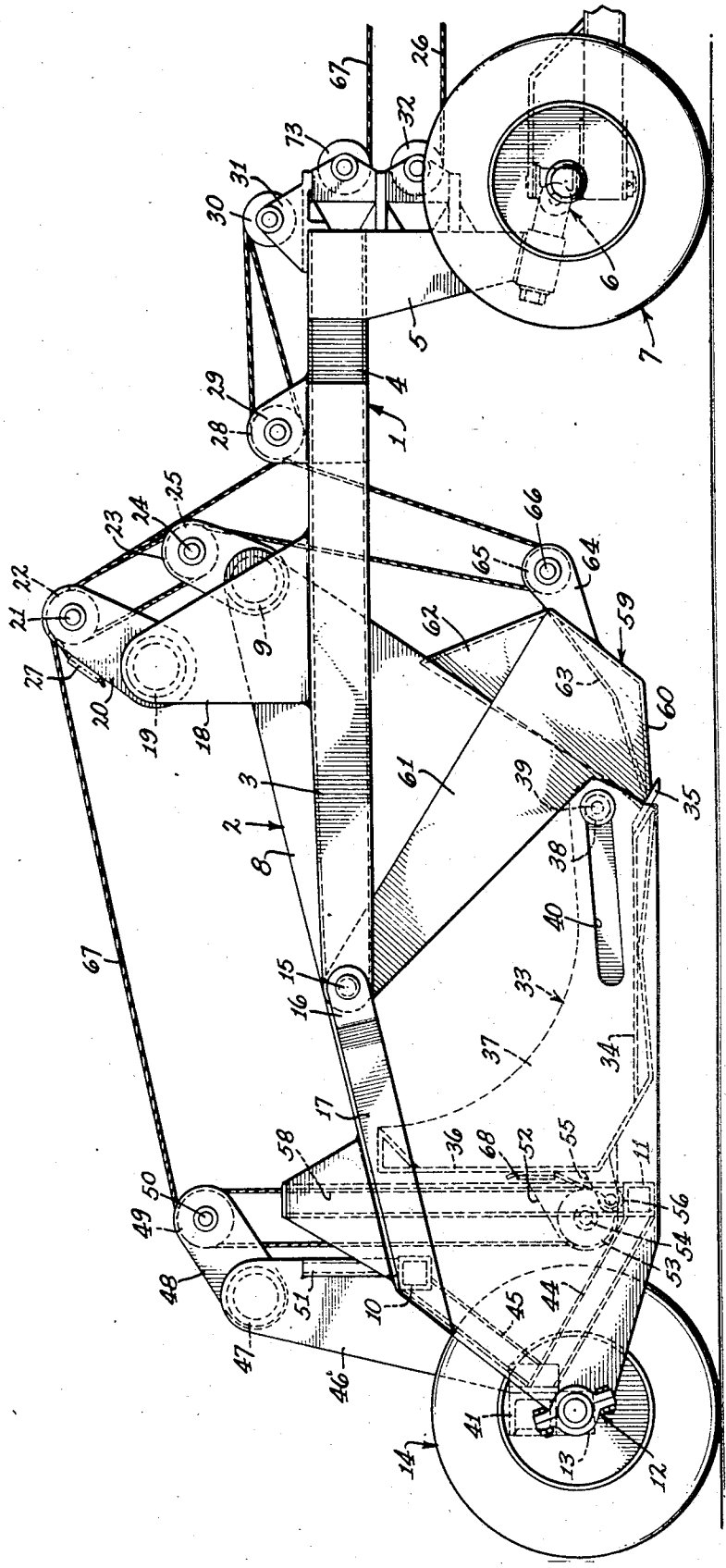


Fig. 3.

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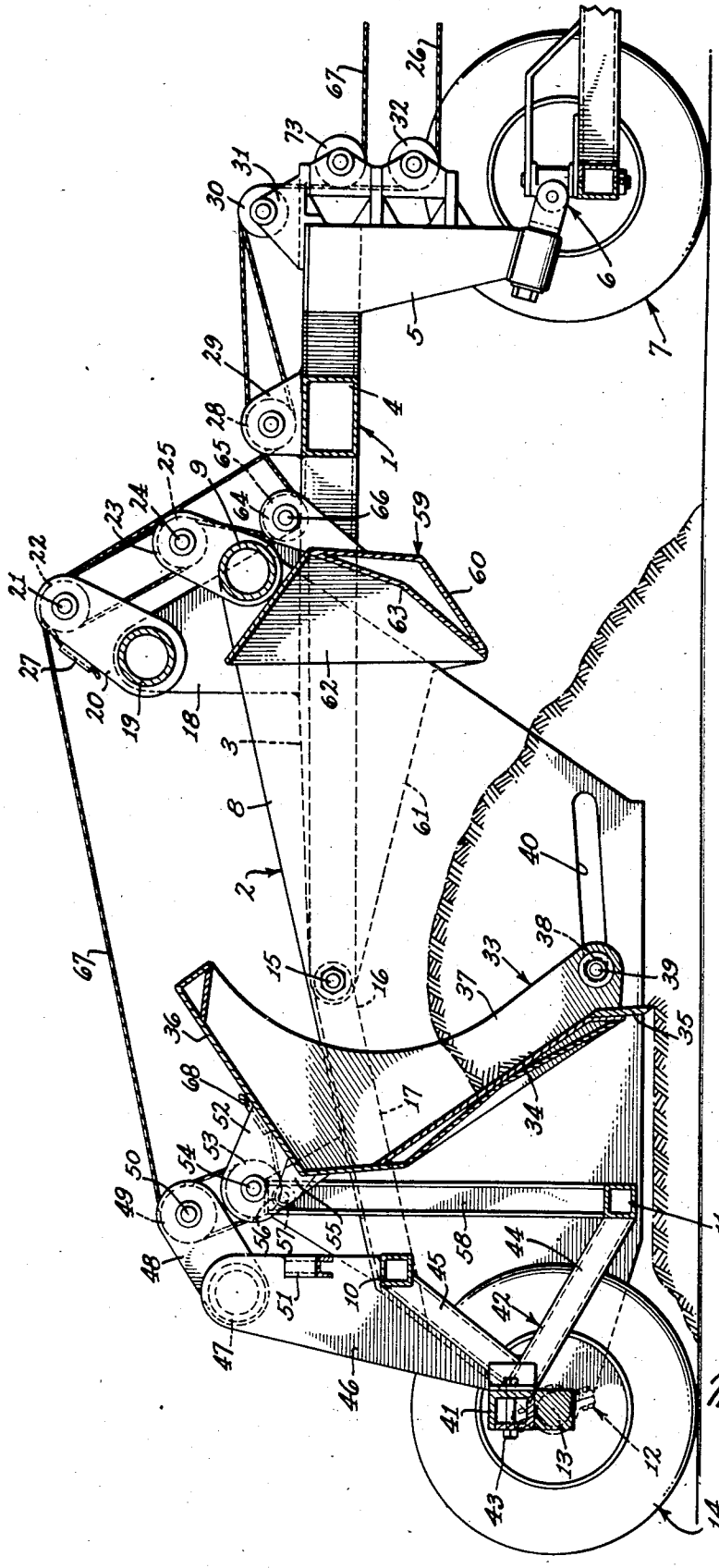


Fig. 4.

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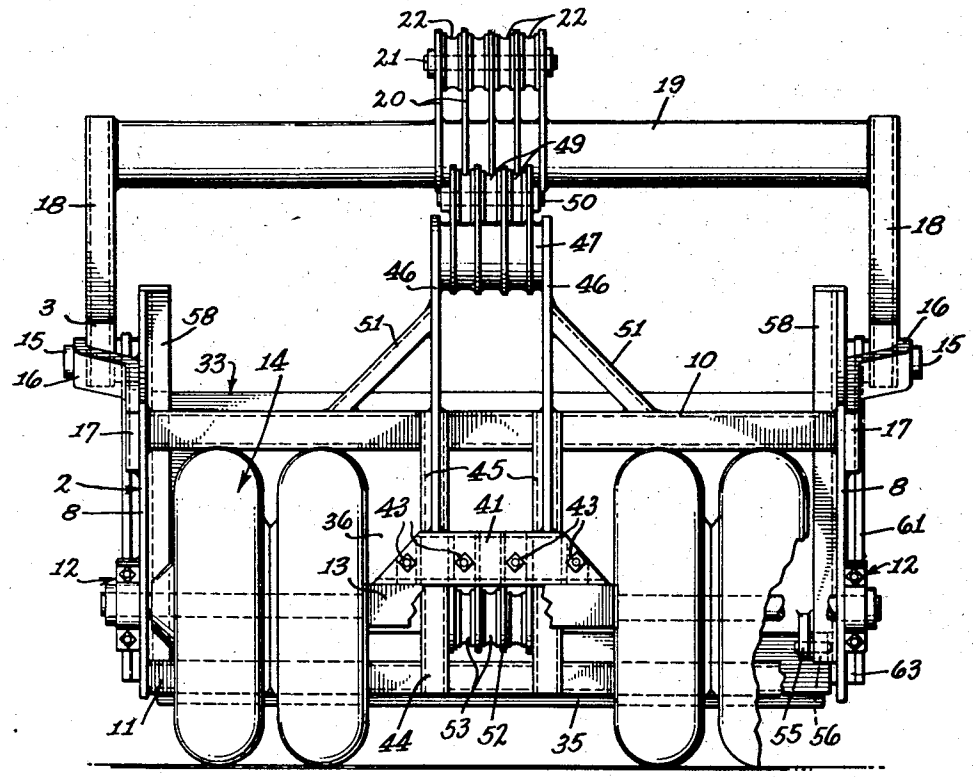


Fig. 5.

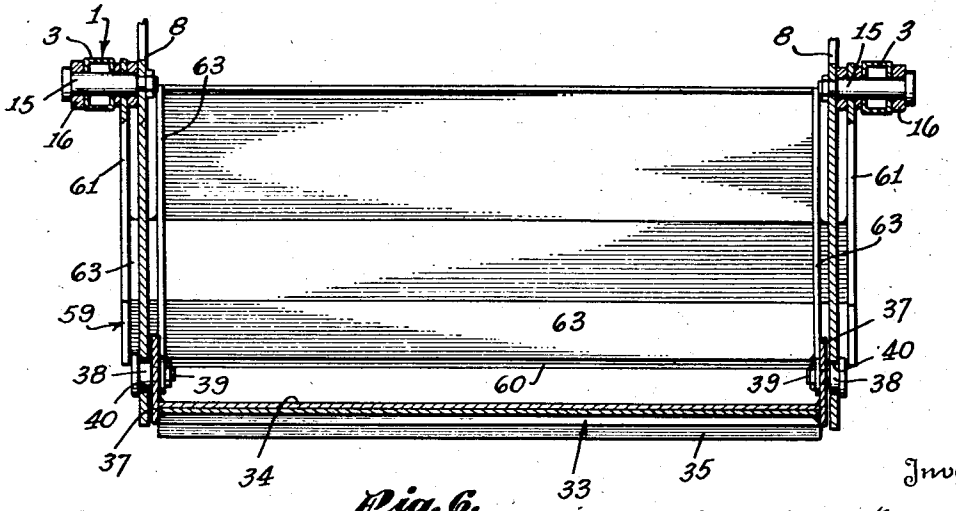


Fig. 6.

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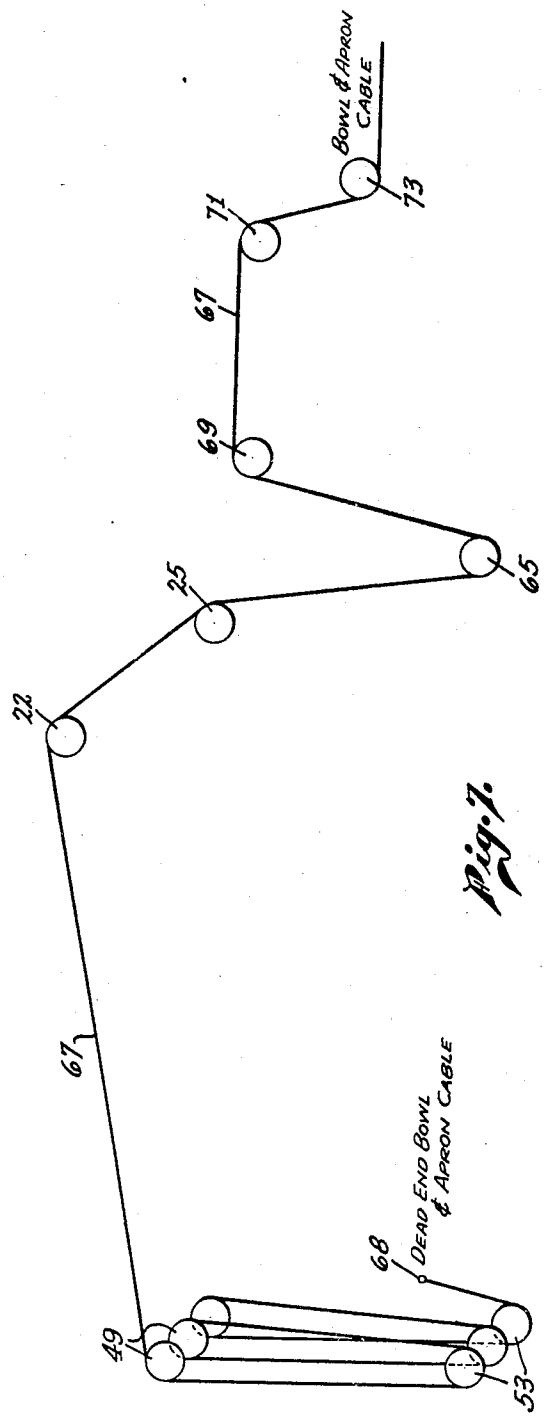


Fig. 7.

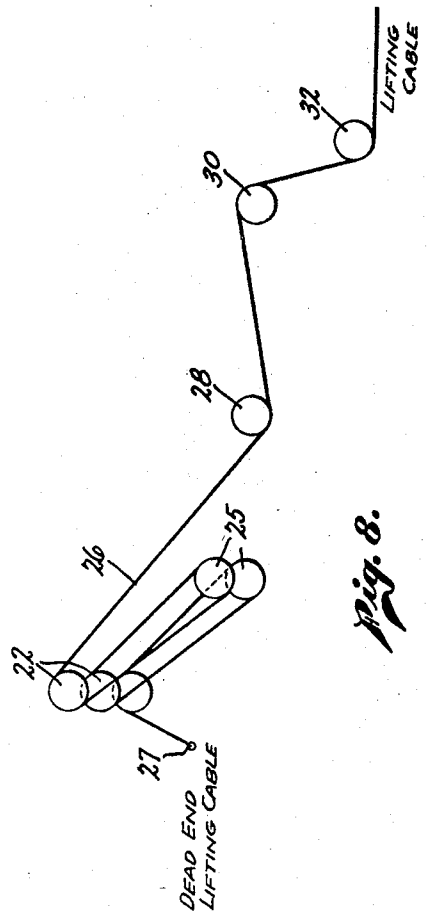


Fig. 8.

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UNITED STATES PATENT OFFICE

2,220,473

HEAVY DUTY SCRAPER

Max M. Brodersen, Alhambra, Calif., assignor to The Slusser-McLean Scraper Company, Sidney, Ohio, a corporation of Ohio

Application February 11, 1939, Serial No. 255,885

8 Claims. (Cl. 37—126)

This invention relates to tractor drawn power controlled scrapers of the front-end dumping type, having an apron at the front end to prevent the loaded earth from sliding out of said end when it is being carried.

The primary objects of my invention are to provide a bowl in which the side members form an integral part of the frame structure and the bottom and back of said bowl comprise a separate unit interposed between the side members and supported thereon near the forward edge of said bottom on longitudinally movable pivots. The back of the bowl being arranged for vertical movement effected by cable power means: so that for dumping the load the back of the bowl is raised vertically thereby moving the front edge of the bottom rearwardly consequently tilting said bottom and causing the earth to slide off.

Thus larger loads may be handled more efficiently and whereby faster dumping is effected with less power than has heretofore been possible.

I have also mounted and arranged the apron in connection with the bowl so that in the scraping and loading operation said apron may be partially lowered to act as a shoe for spreading evenly and tamping down the scraped earth as it accumulates in front of the bowl, so that a uniform volume of the earth enters said bowl thus effecting a smooth and even loading and thereby eliminating the resultant traction power surges when loading uneven amount of earth.

With these and other objects in view the invention consists in the combination, correlation and construction of parts, members and features which will be described in the specification and will be finally pointed out in the claims.

Referring to the drawings:

Figure 1 is a plan view of the scraper embodying my invention.

Figure 2 is a side elevation of the scraper in the digging position.

Figure 3 is a side elevation of the scraper in the transporting or dirt carrying position.

Figure 4 is a sectional elevation on line 4—4 in Figure 1 of the scraper in the load dumping and spreading position.

Figure 5 is a rear end elevation of the scraper.

Figure 6 is a section on line 6—6 in Figure 2 illustrating details of the bowl construction.

Figure 7 is a diagram showing the cable arrangement for operating the bowl and apron.

Figure 8 is a diagram showing the lifting cable arrangement.

Referring to Figures 1 to 8 inclusive:

The invention exemplified by the preferred form in the accompanying drawings includes a hinged frame comprising a forward section 1 and a rear section 2. The forward frame section 1 consists of a pair of spaced apart side arms 3 rigidly connected at the forward ends to a cross member 4 which in turn has centrally interposed between the ends thereof, a forwardly extending and downwardly depending leg 5, swivelably supported, as at 6, on a wheeled carriage 7 which is adapted for connection to the draw bar of a tractor. The rear frame section 2 comprises a pair of spaced apart side plates 8 having a generally pentagrammatic contour. The side plates 8 are rigidly connected at the upper forwardly extending ends to a round tubular cross member 9, and at the upper and lower edges near the rear ends to cross members 10 and 11 respectively. The rear ends of the plates 8 are supported, as at 12, on axle 13 of the rear wheel carriage 14.

The front and rear frame sections 1 and 2 are hinged together by means of pins 15. The pins 15 are secured at one end to the plates 8 and at the other end are supported in brackets 16 formed in the reinforcing members 17 which extend rearwardly along the upper edge of the plates 8. The rear ends of side arms 3 are interposed between plates 8 and brackets 16 and are pivoted on the pins 15.

Side arms 3 are provided with upwardly extending brackets 18 connected at the upper end thereof to a tubular cross member 19, which in turn, has secured thereto intermediate its ends a set of five spaced apart ears 20. The ears 20 are inclined vertically and forwardly and carry at the ends thereof a shaft 21, which in turn, carries four sheaves 22 journaled thereon in an interposed relation between said ears 20.

The tubular cross member 9, between the forward ends of plates 8, has secured thereto intermediate its ends a set of four spaced apart ears 23. The ears 23 are inclined upwardly and forwardly and carry at the ends thereof a shaft 24, which in turn, carries journaled thereon three sheaves 25 interposed between said ears 23. A cable 26 anchored or dead-ended as at 27, is reaved between three of the sheaves 22 and two of the sheaves 25 and is then passed under a sheave 28 journaled in ears 29 on the cross member 4, over a sheave 30 journaled in ears 31 on the leg 5, passed through a swiveled sheave 32 and connected to a suitable power controlled device on the tractor. See cable diagram in Figure 8.

By pulling and releasing the cable 26 vertical swinging movement is imparted to the rear frame section 2 about the axle of the rear wheeled car-

riage 14, thereby raising and lowering the implement.

A bowl 33 is deposed between the side plates 8 with clearance relation thereto and comprises a bottom 34 having a blade 35 at the forward edge and a back 36 at the rear thereof. The bowl structure being reinforced by bracing webs 37 at the sides thereof. The side plates 8 serve as earth retaining members for the bowl. The bowl 33 is supported at its front end on rollers 38 which are journaled on pins 39 secured to the webs 37 and adapted to roll in slots 40 in the side plates 8. The rear end of the bowl 33 is supported from the rear frame section on suitable cable means which will be described hereinafter.

The axle 13 of the rear carriage 14 is of a square cross section throughout its central portion between the wheels and has affixed to the upper side thereof a bracket 41. A pair of spaced apart V shaped bracing members 42 are disposed in the vertical plane and bolted at the apex to bracket 41, as at 43. The lower arm 44 of each bracing member 42 is secured to the cross member 11 and the upper arm 45 to the cross member 10. A pair of brackets 46 extend upwardly from the upper arms 45 of the bracing members 42 and carry interposed between the upper ends thereof a tubular header 47 provided with four spaced apart lobes 48 which incline forwardly and carry interposed there between three sheaves 49 journaled on shaft 50. The brackets 46 are reinforced by side braces 51.

Secured to the back 36 of the bowl 33, near the bottom thereof, are four spaced apart lobes 52 carrying interposed there between 3 sheaves 53 journaled on the shaft 54. Also secured to the back of the bowl 33, near the bottom at each side thereof, is a lug 55 having at its outer end a roller 56 journaled on a pin 57. Each roller 56 is adapted to engage a vertical channel 58 secured to the inner side of each side member 8.

The receiving end of the bowl 33 is provided with an apron or closure 59 comprising a bottom 60 in which part of the surface is substantially horizontal, when viewed in the closed position, then sloping upwardly toward the front for a portion of its surface and then sloping upwards toward the rear for the balance of its surface. See Figure 3. A pair of arms 61 are provided at the sides of the apron which extend rearwardly along the outside of side plates 8 with clearance relation thereto and are pivoted at the ends on the pins 15. The bottom 60 is also provided with earth retaining side members 62 which over-lap the side plates 8 inwardly thereof with clearance relation thereto. Another bottom 63 is inserted in the apron 59 for reinforcing purposes. The apron 59 is provided with a pair of forwardly extending lobes 64 which carry interposed therebetween a sheave 65 journaled on shaft 66.

A cable 67 anchored as at 68 on the back 36 of bowl 33 is reaved between the sheaves 49 and 53, and passed over a sheave 22 on cross member 19 and sheave 25 on the cross member 9 then passed under sheave 65 on the apron 59, over a sheave 69 journaled in ears 70 on cross member 4 and sheave 71 journaled in ears 72 on the leg 5 and then passed through the swiveled sheave 73 to be connected to the drum of a suitable power controlled device on the tractor. See cable diagram in Figure 7.

The apron and bowl operate as follows:

Assuming that the implement is in the load carrying position as shown in Figure 3 and it is desired to dump the load, a pulling force is exerted on cable 67 which causes the apron to raise, first by virtue of the fact that it is lighter in weight than the bowl and offers less resistance to the pull. After the apron has come to rest against the cross member 9, as shown in Figure 4, further pull on cable 67 raises the back of the bowl 33 vertically, by virtue of the guiding rollers 56 in channels 58, causing the blade end of the bowl to recede rearward in a substantially horizontal plane by virtue of the guiding rollers 38 and slots 40 in side plates 8. This movement causes the bottom 34 to tilt as shown in Figure 4 thereby discharging the load.

Upon releasing cable 67 the bowl is returned to the digging position by gravity, as shown in Figure 2. After the bowl comes to a stop by virtue of the guiding rollers 56 resting on the cross member 11 further releasing of the cable lowers the apron 59.

It is preferred to keep the apron in substantially the position shown in Figure 2 for digging so that a narrow gap is maintained between the blade 35 and the lower edge of the apron, to permit a restricted amount of earth to enter the bowl. The apron then acts as a shoe to spread evenly and tamp down the scraped up earth accumulated in front of the bowl, thus effecting a uniform loading and eliminating the power surges resultant in loading uneven amounts of earth.

Having thus described my invention I claim:

1. An earth moving machine comprising a front frame section having opposite side elements, a running gear unit supporting the forward end of said frame section, a rear frame section having opposed side plates, a running gear supporting the back end of said rear section, pivotal means connecting said side elements to said side plates for vertical movement relative to the ground surface, power means for imparting vertical swinging movement to said rear frame section, a bowl comprising a bottom and back rigidly associated with each other and disposed between said side plates, means supporting the front end of said bottom on the side plates for movement in the longitudinal plane, means associated with said back and said rear frame section for imparting vertical movement to said back and thereby cause the front end of said bottom to move longitudinally thus tilting said bottom, a closure for the end of said bowl.

2. In a dirt moving machine, the front frame structure having opposite side elements, a rear frame structure having side plate members pivotally connected to the side elements of the front frame structure for vertical movement, a front running gear unit supporting the forward end of said front frame structure, a rear running gear unit supporting the rear end of said rear frame structure, means associated with said frame structures for raising and lowering said rear frame structure, a scraper bowl comprising a bottom and a back rigidly associated together and disposed between said side plates with clearance relation thereto, said side plates being side closures for said bowl, a closure for the front end of said bowl, means for connecting the front end of said bowl bottom to said side plates for longitudinal movement, means connecting the back of said bowl to said side plates for vertical movement, power means associated with said bowl closure, said rear frame section and said bowl for actuating said bowl closure and for imparting vertical movement to the back of

said bowl thereby causing longitudinal movement of the front edge of said bowl bottom thus tilting said bowl.

3. In a power scraper a front frame structure having opposite side elements, a rear frame structure having side plate members pivotally connected to the side elements of the front frame structure for vertical movement relative to the ground surface, a front running gear unit supporting the forward end of said front frame structure, a rear running gear unit supporting the rear end of said rear frame structure, means associated with said frame structures for raising and lowering said rear frame structure, a scraper bowl comprising a bottom and a back integrally associated with each other and disposed between said side plates with clearance relation thereto, said side plates being side closures for said bowl, a closure for the front end of said bowl, means for connecting the front end of said bowl bottom to said side plates for longitudinal movement, means connecting the back of said bowl to said side plates for vertical movement, means associated with said bowl closure, said rear frame section and said bowl for actuating said bowl closure and for imparting vertical movement to the back of said bowl thereby causing longitudinal movement of the front edge of the bowl bottom.

4. In a power scraper comprising a frame structure supported at both ends thereof on running gear units and arranged for vertical movement with relation to the ground surface, a scraper bowl comprising spaced apart side elements attached to said frame structure, a bottom provided with a back rigidly connected at the rear thereof and disposed between said side elements with clearance relation thereto, means connecting the front end of said bottom to the said side elements for longitudinal movement relative to said side elements, means for connecting the back to the side elements for vertical movement relative thereto, power means for imparting vertical movement to said back thereby causing longitudinal movement of the front edge of said bottom.

5. In a power scraper comprising a frame structure supported at both ends thereof on running gear units and arranged for vertical movement with relation to the ground surface, a bowl comprising spaced apart side elements attached to said frame structure, a bottom having rigidly attached thereto a back at the rear and a scraper blade at the front thereof disposed between said side elements with clearance relation thereto, means connecting the front of said bottom to the side elements for longitudinal movement with respect to said side elements, means for connecting the back to the side elements for vertical movements with respect to said side elements, power means for imparting vertical movement to said back and thereby causing longitudinal movement of the front of said bottom thus tilting the bottom.

6. In a power scraper comprising a frame structure supported at both ends thereof on running gear units and arranged for vertical movement with relation to ground surface, a scraper bowl comprising spaced apart side elements attached to said frame structure, a bottom provided with a back rigidly connected at the rear thereof and disposed between said side elements with clearance relation thereto, slidable means connecting the front end of said bottom to the side elements for longitudinal movement relative thereto, slidable means for connecting the back to the side elements for vertical movement relative thereto, power means for imparting vertical movement to said back and thereby causing longitudinal movement of the front edge of said bottom thus tilting said bottom.

7. In a power scraper comprising, a frame structure supported at both ends on running gear units and arranged for vertical movement with relation to the ground surface, a bowl comprising spaced apart side plates attached to said frame structure, a bottom and a back integrally associated with each other and disposed between said side plates with clearance relation thereto, longitudinally slidable means supporting the front end of said bottom on the side plates, vertically slidable means connecting the lower edge of said back to the side plates, power means associated with the lower edge of said back and said frame structure for imparting vertical movement to the back of said bowl thereby causing longitudinal movement of the front edge of said bottom thus tilting the bottom.

8. In a power scraper comprising, a front frame structure having opposite side elements, a rear frame structure having slide plate members pivotally connected to the side elements of the front frame structure for vertical movement relative to the ground surface, a front running gear unit supporting the forward end of said front frame structure, a rear running gear unit supporting the rear end of said rear frame structure, power means associated with said frame structures for raising and lowering the rear frame structure, a scraper bowl comprising a bottom and back integrally associated with each other and disposed between said side plates with clearance relation thereto, said side plates being side closures for said bowl, a closure for the front end of said bowl, longitudinal slots near the bottom of said side plate members, rollers at the forward corners of said bottom engaging said slots, vertical channels near the rear of said side plate members, rollers at the lower corners of said back engaging said channels, power means associated with said bowl closure, said rear frame section and said bowl for actuating said bowl closure and for imparting vertical movement to the back of said bowl thereby causing longitudinal movement of the front of the bowl bottom thus tilting said bowl.

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