

Aug. 18, 1936.

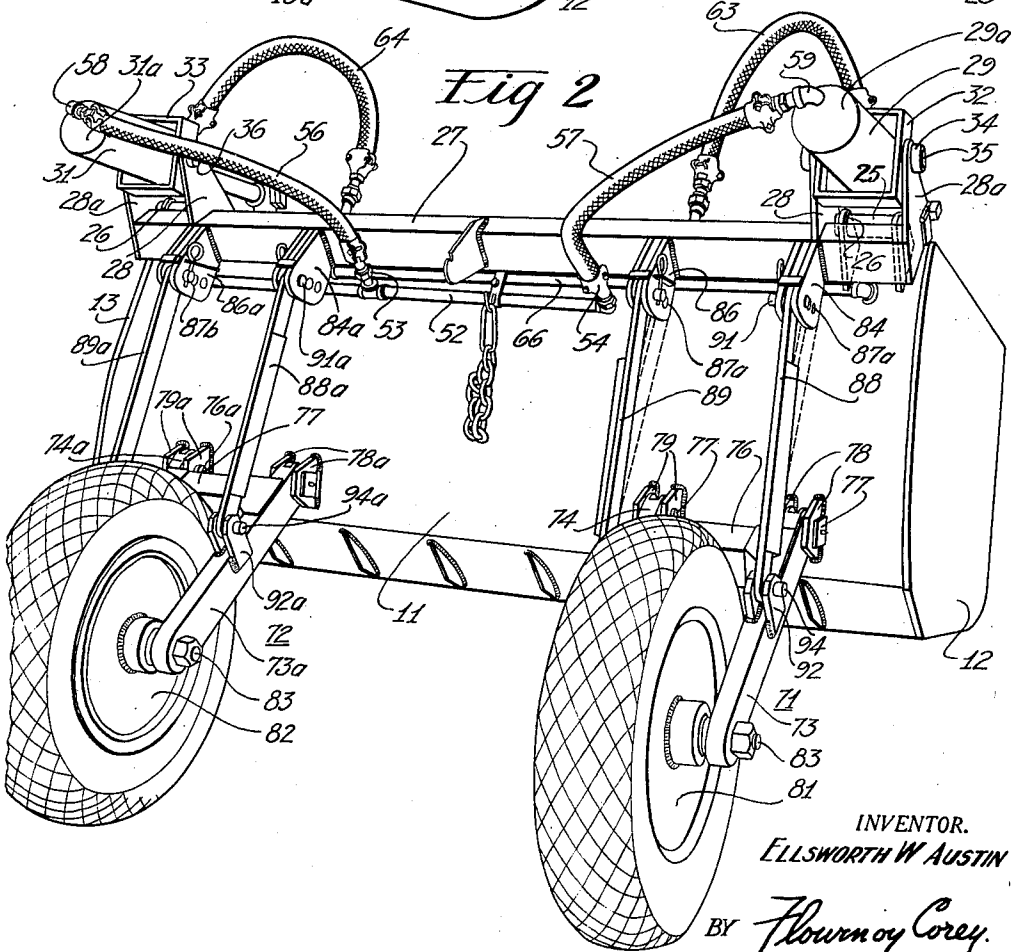
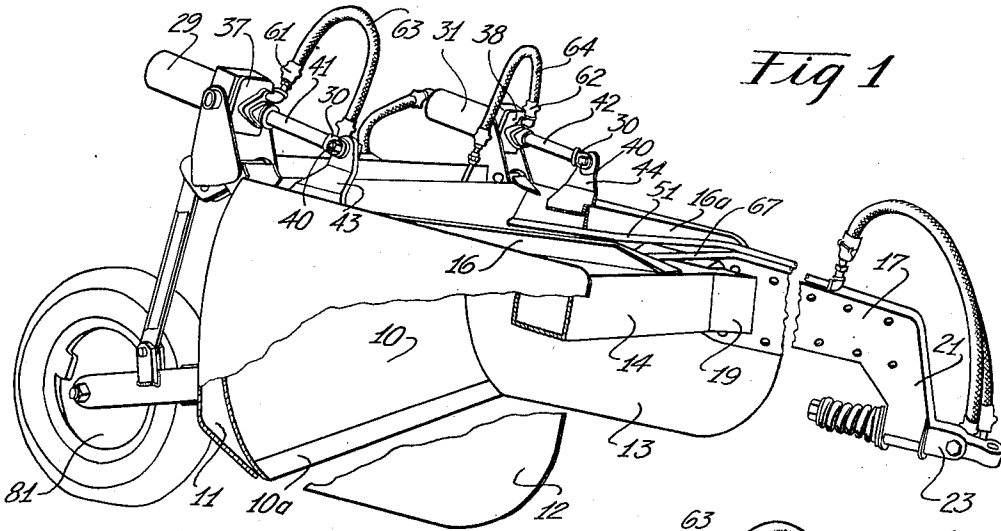
E. W. AUSTIN

2,051,283

EARTH MOVING DEVICE

Filed Feb. 11, 1935

2 Sheets-Sheet 1



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Fig 3

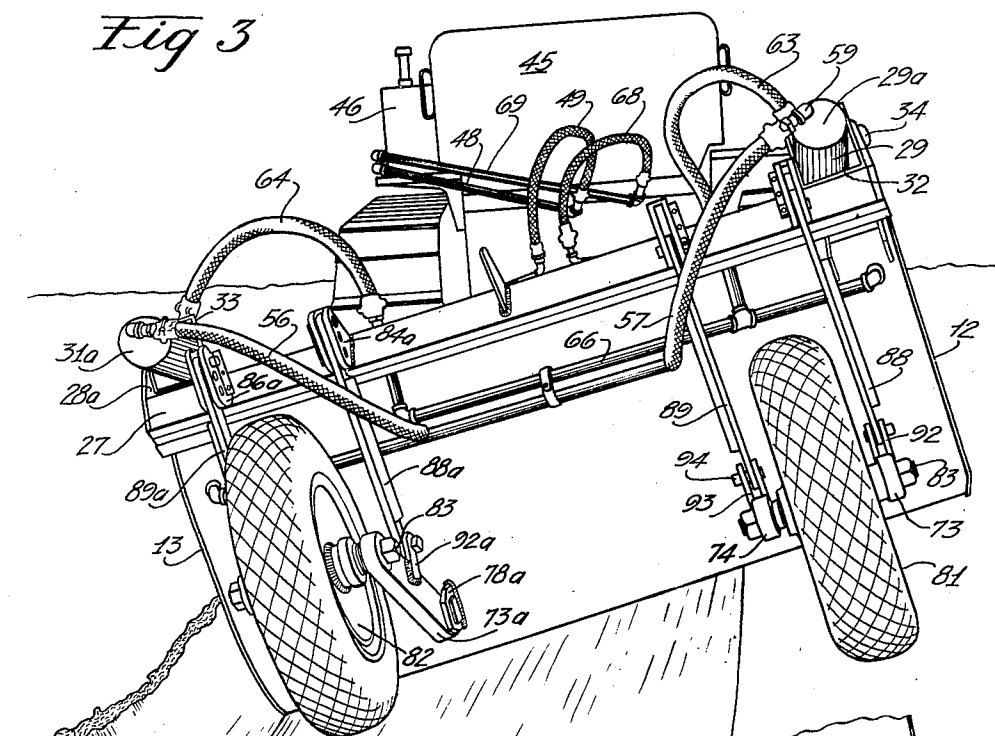
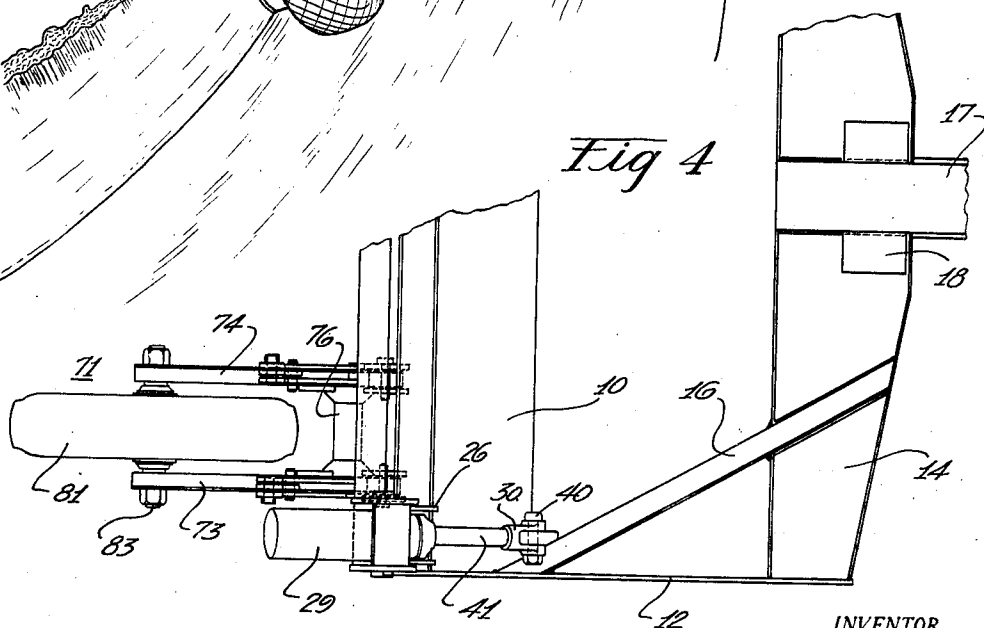


Fig 4



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UNITED STATES PATENT OFFICE

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EARTH MOVING DEVICE

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Application February 11, 1935, Serial No. 5,896

6 Claims. (Cl. 37-169)

My invention relates to earth moving devices and has particular relation to a device in which a scraper blade or mold board is employed in excavating, grading, filling and the like.

5 In a device of the character here contemplated several features, functions and structures are to be desired. It is desirable that wheels be mounted on the mold board in such a manner that the mold board may be raised and supported on the wheels for taking it from one scene of operation to another or for moving it about in the field without dragging the board on the ground. It is furthermore desirable that power means be provided for raising and lowering the wheels and it is desirable that the wheels be independently adjustable so that the mold board may be tilted to one side or the other to make a deeper cut at one side or the other as for instance in crowning a road. I have found also that it is quite desirable to provide means such that when the wheels are in the down position the mold board is supported in practically horizontal position and yet such that, with the same adjustment of the mechanism and the mold board in contact with the ground as in making a cut, one wheel will roll upon the ground and the other be raised so as to cause tilting of the mold board.

A general object of my invention is to provide a scraper having the above outlined desirable features, functions and structures.

Another object of the invention is to provide an earth moving device of the scraper type in which wheels are adjustably mounted upon the scraper so that if desired the scraper may be carried by the wheels.

Another object of my invention is to provide an earth mover of large capacity and correspondingly of considerable ruggedness.

Another object of my invention is to provide an earth mover in which the operating machinery is in an unobtrusive and protected position.

Another object of my invention is to provide, in a structure of the above character, mounting means for the jacks or other wheel actuating power means such that the jacks are not directly subject to shocks from the wheels or mold board as is the case in the devices known to the art.

An additional object of my invention is to provide an earth mover which is tiltable about a longitudinal axis primarily for use in grading.

A still further object of my invention is to provide an earth moving device which is operable by power means for adjustment of the parts thereof.

Other and further features and objects of my invention will be more apparent to those skilled

in the art upon a consideration of the accompanying drawings and following specification, wherein is disclosed an exemplary embodiment of the invention, with the understanding, however, that such changes may be made therein as fall within the scope of the appended claims without departing from the spirit of the invention.

In said drawings:

Figure 1 is a side view in perspective of a device constructed according to one embodiment of my invention.

Figure 2 is a rear view in perspective of the device shown in Figure 1.

Figure 3 is a rear view in perspective showing the device with one wheel raised as it appears while making a cut deeper at one end than at the other; and

Figure 4 is a partial plan view of the device.

A device constructed according to a preferred embodiment of my invention is adapted to be drawn by means of a tractor, truck or other prime mover. Although a self contained driving power means might be employed for driving a device constructed according to my invention, a preferred embodiment of my invention employs a structure so constructed that a tractor, truck or the like is employed for drawing the device.

Referring now to the drawings, any suitable mold board or scraper structure may be employed, but I prefer to employ a curved plate 10, reinforced by a second plate 11 of shallow U-shape in cross section, with large substantially rectangular end plates 12 and 13 at the ends thereof. The purpose of the end plates 12 and 13 is to reinforce the mold board and to restrict and confine the material picked up by the mold board while in use. A heavy beam 14 connects the front ends of the end plates 12 and 13, and braces 16 and 16a connect the beam 14 with the upper rear portions of the end plates 12 and 13. A box tongue 17 is engaged to the beam 14 as by means of suitable brackets and angle irons indicated at 18 and 19 and this structure is preferably welded together for greater rigidity. The box tongue 17 extends forwardly and is curved downwardly, as indicated at 21, and is provided with an opening therethrough adapted to receive hitch means, indicated at 23, for connecting the earth mover with a towing vehicle such as the tractor 45.

The back of the reinforcing plate 11 is provided with two pairs of upwardly and rearwardly extending lugs 26 with one pair located at each end of the upper edge of the plate. A rocker beam 27, preferably rectangular in cross section,

extends across the rear of the bowl formed by the plates 10 and 11 and ends 12 and 13. Pairs of upstanding ears or plates 28 and 28a on the rocker beam form support brackets for jacks 29 and 31. The plates 28 and 28a of the rocker beam are pivotally engaged on lugs 26 by shafts 25. The outermost of these plates 28a form caps for covering the ends of the rocker beam 27, and plates 28 and 28a are welded into place on the rocker beam. Rectangular or box-like cradles 32 and 33 are provided and these cylinder cradles have stub shafts or trunnions 35 adapted to be received in bosses 34 and 36 of plates 28 and 28a. The cylinders of jacks 29 and 31 are closed at one end by integral disc-like closures 29a and 31a. The cylinders are adapted to be closed at the other end by rectangular cylinder heads 37 and 38 which may be bolted to the cradles 32 and 33 and to the open ends of the cylinders 29 and 31. Jacks constructed in this manner are more particularly described in my copending application, Serial Number 742,368.

Plates 43 and 44 are rigidly secured to the end plates 12 and 13 respectively and project upwardly and rearwardly therefrom and the rams 41 and 42 of the jacks 29 and 31 are pivotally connected to plates 43 and 44 as by means of clevises 30 and pins 40.

The pulling tractor, shown generally at 45, is provided with a fluid supply tank 46 and a pump (not shown) for furnishing fluid under pressure to the jack or jacks of the earth moving device or other vehicle being towed by the tractor. The pulling tractor is provided with a suitable control valve (not shown) for controlling the admission of fluid to either end of the jack or jacks and for permitting the escape at the same time of fluid from the other end of the jacks.

It is apparent that if the rams 41 and 42 are driven forwardly the cylinders of the jacks will be driven rearwardly and cause the plates 28 and 28a to be driven rearwardly to rotate the rocker beam 27 to the rear end downwardly. If the rams 41 and 42 are drawn into the jack the plates 28 and 28a will be drawn forwardly to cause the rocker beam 27 to be rotated on the ears 26 in a forward and upward direction. If it is desired to rotate the rocker beam 27 forwardly and upwardly fluid under pressure is introduced into a conduit 48 on the tractor and passes through a flexible conduit 49 into a conduit 51 on the earth moving device. The conduit 51 lies within the angle iron brace 16a and the conduit passes through the plates 10 and 11 to the rear of the bowl where it connects with a conduit 52 extending across the rear of the bowl. The conduit 52 has connections 53 and 54 which connect with flexible conduits 56 and 57, and fluid under pressure is introduced into the jacks 29 and 31 through the connections 58 and 59 at the rear of the jacks. At the same time the control valve on the tractor permits fluid to be driven from the jacks 29 and 31 and through the conduits afforded by the connections 61 and 62 at the front of the jacks 29 and 31. The exhaust fluid passes out through the flexible conduits 63 and 64, into a conduit 66 at the rear of the bowl and into a common conduit 67. The conduit 67 connects with the flexible conduit 68 and conduit 69 which leads to the control valve (not shown). When the position of the control valve is reversed the fluid under pressure is introduced into the conduit 69 and at the same time the pressure of fluid within the conduit 49 is relieved and a reversal of direction of flow of fluid occurs to cause the fluid

to drive the pistons within the jacks 29 and 31 to the rear to cause the rocker beam 27 to rotate upwardly and forwardly. I have thus provided positive means for rotating the rocker beam selectively in one direction or the other as desired by the operator of the towing vehicle.

This movement of the rocker beam 27 is employed to raise and lower the wheels on which the bowl is mounted. The wheels are independently mounted on the rear of the plate 11 by means of individual platforms, indicated generally at 71 and 72. The platform 71 includes arms 73 and 74. The platform 72 has arms 73a and 74a respectively. The arms 73 and 74 are connected by a heavy cross brace 76 and the arms 73a and 74a are connected by a similar cross brace 76a. The arms 73 and 74 are pivotally attached to the rear of the bowl by means of pins 77 which pass through the ends of the arms and through brackets 78 and 79 and 78a and 79a. Wheels 81 and 82 are rotatably mounted on the free ends of the arms 73 and 74 and 73a and 74a respectively as by means of heavy bolts 83. Of course any desired wheel construction may be employed but I prefer to utilize heavy wheels constructed to utilize pneumatic tires such as those shown mounted thereon.

Ears 84 and 86 are secured to the lower face of the rocker beam 27, at suitably spaced intervals thereon, as by welding them in place. The ears 84 and 86 have a plurality of openings 87 therethrough near the lower edge thereof. Links 88 and 89 are provided for connecting the ears 84 and 86 with the arms 73 and 74. The links 88 and 89 are connected to the ears 84 and 86 respectively by means of pins 91 which are passed through suitable openings in the ends of the links and through any of the openings 87 in the ears 84 and 86. The lower ends of the links 88 and 89 are connected to brackets 92 and 93 on the arms 73 and 74, by means of pivot pins 94. Similar ears 84a and 86a are placed at the other end of the rocker beam 27 and links 88a and 89a in like manner connect the ears with brackets 92a and 93a on the lever arms 73a and 74a.

It may be readily understood that upward and forward rotation of the rocker beam 27 raises the lever arms 73 and 74 and 73a and 74a to raise the wheels 81 and 82. The wheels may be raised well above the bottom of the bowl so that the bowl rests entirely on the cutting edge 10a. In this position when the tractor draws the earth moving device forward, material will be scraped up into the bowl. When the rocker beam 27 is rotated downwardly and rearwardly the wheels 81 and 82 are driven downwardly to raise the bowl from the ground to permit it to be carried about from place to place.

If the pins 91 are in corresponding holes 87 in all of the ears 84, 86, 84a and 86a rotation of the rocker beam upwardly will cause both wheels to be raised at the same time and to the same degree, but if the pins 91 which hold the wheel 81 are in position are moved to one or the other (87a or 87b) of the remaining openings important differences of operation occur. When the wheels are in the down position the bowl will be raised in substantially a horizontal position with regard to the surface of the ground, but if the rocker beam 27 is rotated forwardly and upwardly the wheel 82 will be raised while the wheel 81 remains substantially at the same position it previously occupied. The result is that, as illustrated in Figure 3, the right end of the

bowl is prevented from digging into the ground, by the wheel 81. Since the wheel 82 is raised the left end of the bowl, by reason of its own weight, is caused to dig into the ground. Inas-
 5 much as the earth is cleared away from beneath the wheel 82 by forward movement of the earth moving device this one-sided digging operation is intensified and becomes cumulative, that is the bowl tilts more and more on forward movement
 10 thereof. If the operator wants to level off the bowl he admits just enough fluid to the front ends of the jacks 29 and 31 to drive the wheel 82 downwardly slightly below the level of cutting edge 10a and, as the earth moving device
 15 moves forward, the bowl is leveled but still carries the material which has been scraped up by the cutting edge 10a. This action of the bowl is of material importance as it enables the operator to utilize a corner of the digging edge to make his first cut into the ground and thus
 20 makes the digging operation easier. Furthermore he may employ the earth moving device for making sloping cuts as for instance in crowning a road.

25 The hydraulic jacks are mounted well above the bowl and are supported partly by the wheels and partly by the bowl in such a position that they do not interfere with digging and carrying material and such that they are out of the way
 30 where dirt and the like cannot readily reach them. The weight of the jacks is carried by both the wheels and the bowl.

It is apparent that modifications of my invention may be made by those skilled in the art.
 35 Such modifications may be made without departing from the spirit and scope of my invention as set forth in the appended claims.

I claim as my invention:

1. In a wheeled scraper, a bowl, pairs of levers
 40 pivotally engaged on the rear of the bowl, wheels rotatably mounted on each pair of levers, a rocker beam also pivotally mounted on the rear of the bowl, power means for rotating the rocker beam, and connecting links one for each of the levers
 45 pivotally engaged between the rocking beam and the levers whereby rotation of the rocker beam raises and lowers the wheels.

2. In a wheeled scraper, a bowl, pairs of levers
 50 rotatably mounted on each pair of levers, a

rocker beam also pivotally mounted on the rear of the bowl, power means for rotating the rocker beam, and a plurality of connecting means on the rocker beam for engaging connecting links en-
 5 gaged to the levers whereby the connecting links may be connected in a plurality of positions to cause differential raising and lowering of the wheels.

3. In a wheeled scraper, a bowl, levers pivotally engaged on the rear of the bowl, wheels rotatably
 10 mounted on the levers, a rocker means also pivotally mounted on the rear of the bowl, power means for rotating the rocker means, and connecting means pivotally engaged to the rocker means at one end and pivotally engaged to the
 15 levers at the other end whereby rotation of the rocker means raises and lowers the wheels.

4. In a wheeled scraper, a bowl, levers pivotally engaged on the rear of the bowl, wheels rotatably
 20 mounted on the levers, a rocker beam also pivotally mounted on the rear of the bowl, power means for rotating the rocker beam, connecting links engaged to the rocker beam and the levers, and means on the rocker beam to afford a plu-
 25 rality of engagements for the connecting links to permit differential raising and lowering of the wheels.

5. In a wheeled scraper, a bowl, levers pivotally engaged on the rear of the bowl, wheels rotatably
 30 mounted on the levers, a rocker beam also pivotally mounted on the rear of the bowl, connecting means pivotally engaged to the levers at one end and pivotally engaged to the rocking beam at the other end, and means for rotating the rocker beam including a jack pivotally engaged to the
 35 rocker beam and having the ram thereof pivotally engaged to the bowl.

6. In a scraper, a scraper bowl, pairs of levers pivotally engaged on the rear of the bowl for ver-
 40 tical movement, wheels rotatably mounted on the levers, a rocker beam also pivotally engaged on the rear of the bowl, power means for rotating the rocker beam, extending ears mounted on the rocker beam having openings arranged eccentrically therein, links connecting the ears and the
 45 levers, the eccentrically located openings in the ears being disposed at different angles to afford differential movement of the wheels on movement of the rocker beam.

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