

July 16, 1963

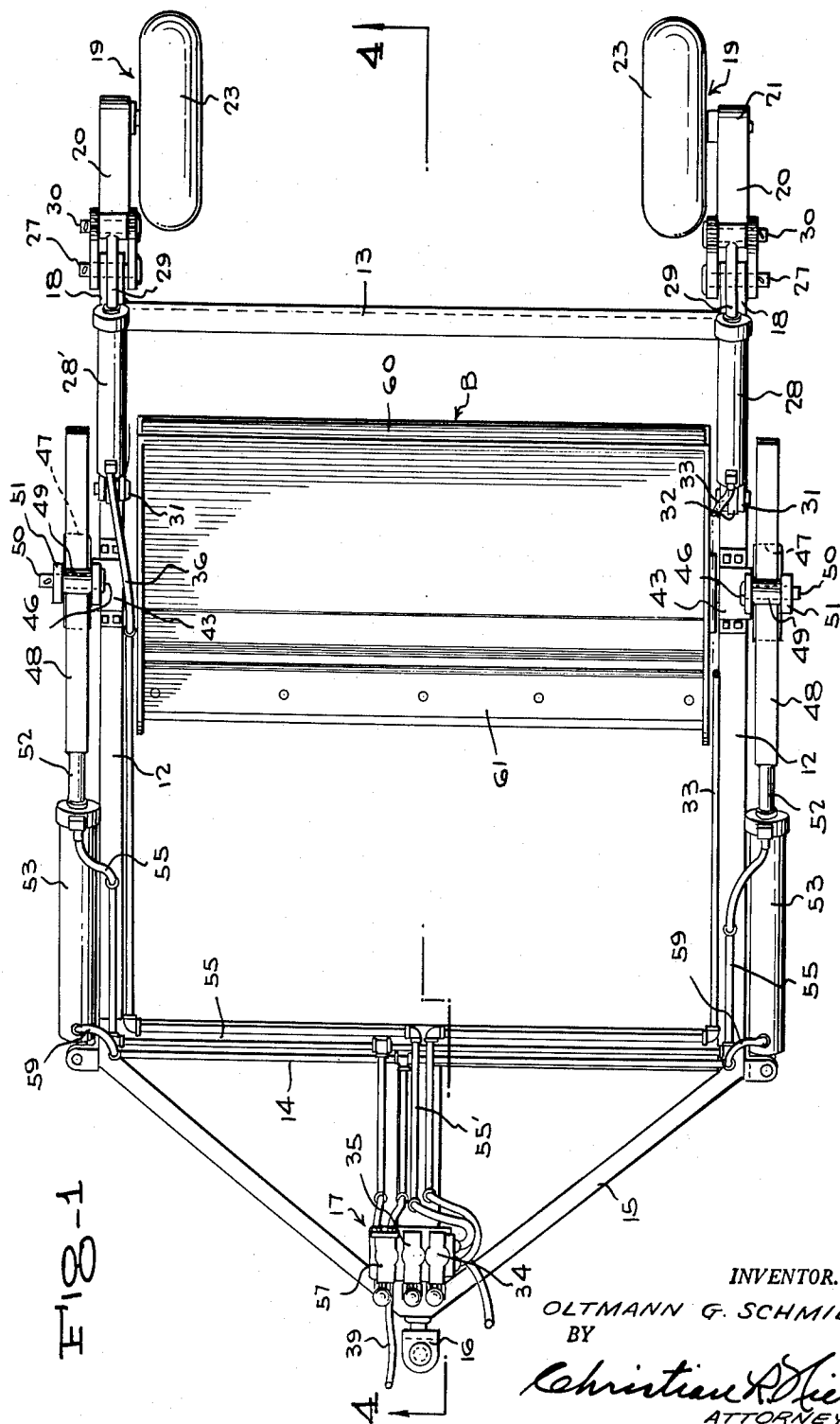
O. G. SCHMIDT

3,097,440

HYDRAULICALLY OPERATED LAND CONTOURING MACHINE

Filed June 9, 1960

4 Sheets-Sheet 1



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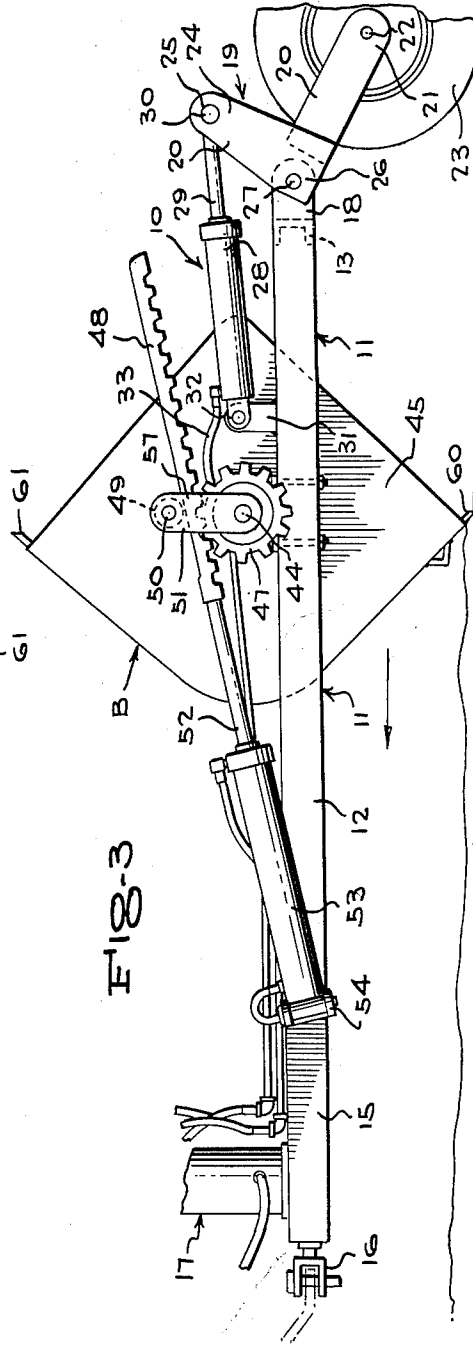
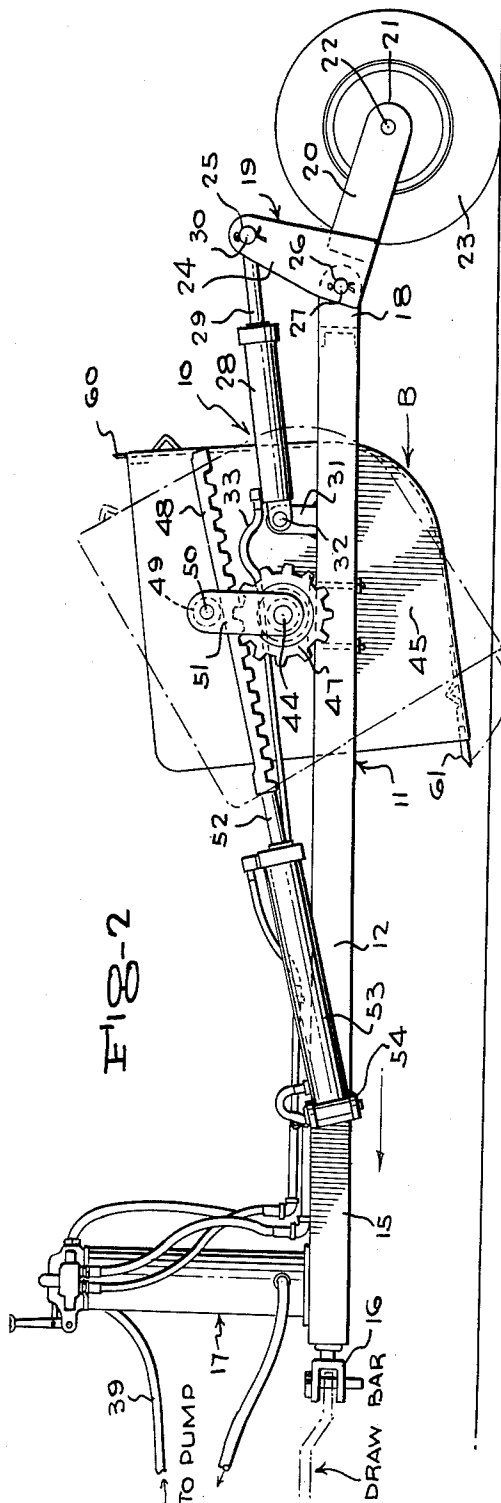
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4 Sheets-Sheet 2



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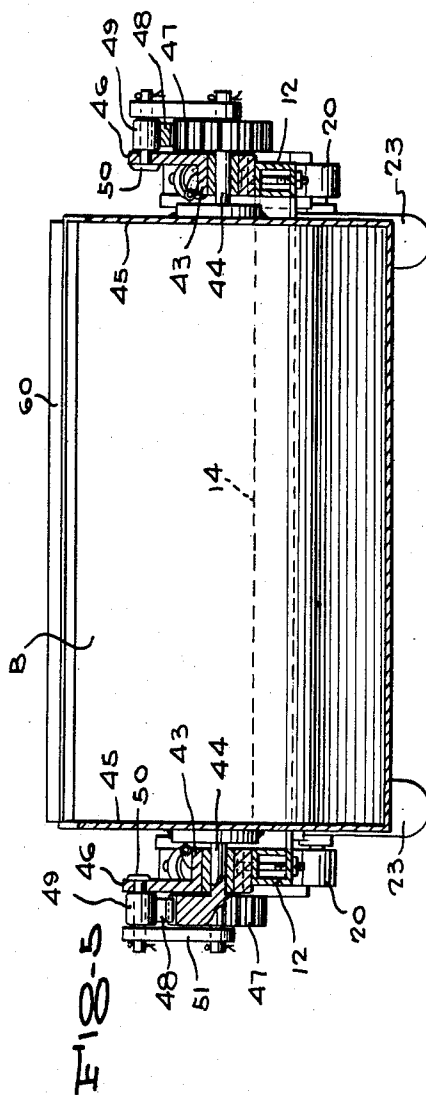
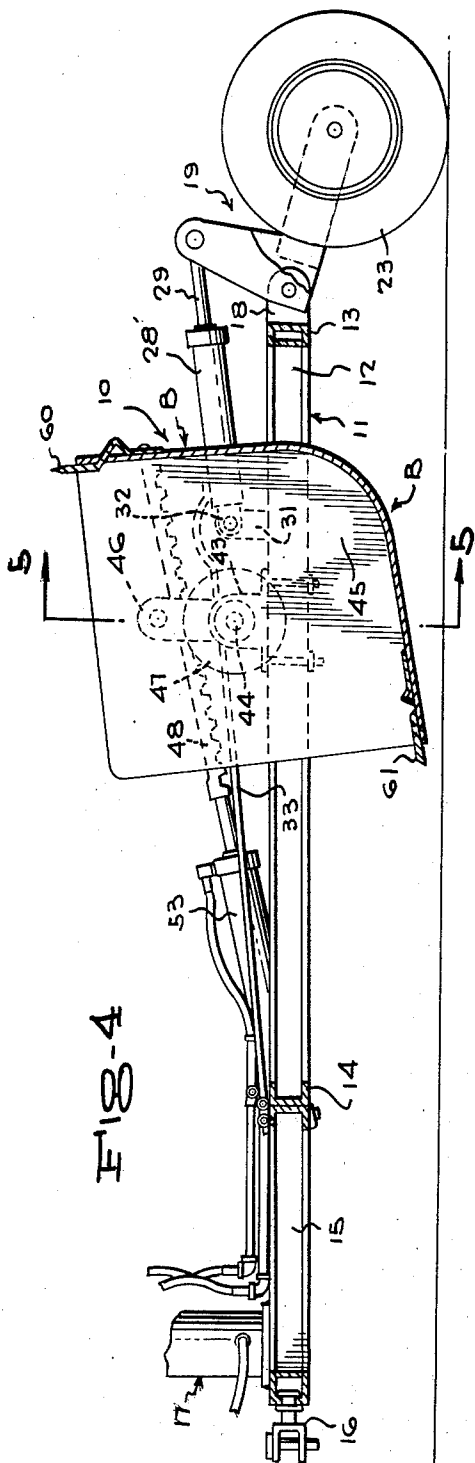
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HYDRAULICALLY OPERATED LAND CONTOURING MACHINE

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4 Sheets-Sheet 3



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HYDRAULICALLY OPERATED LAND CONTOURING MACHINE

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4 Sheets-Sheet 4

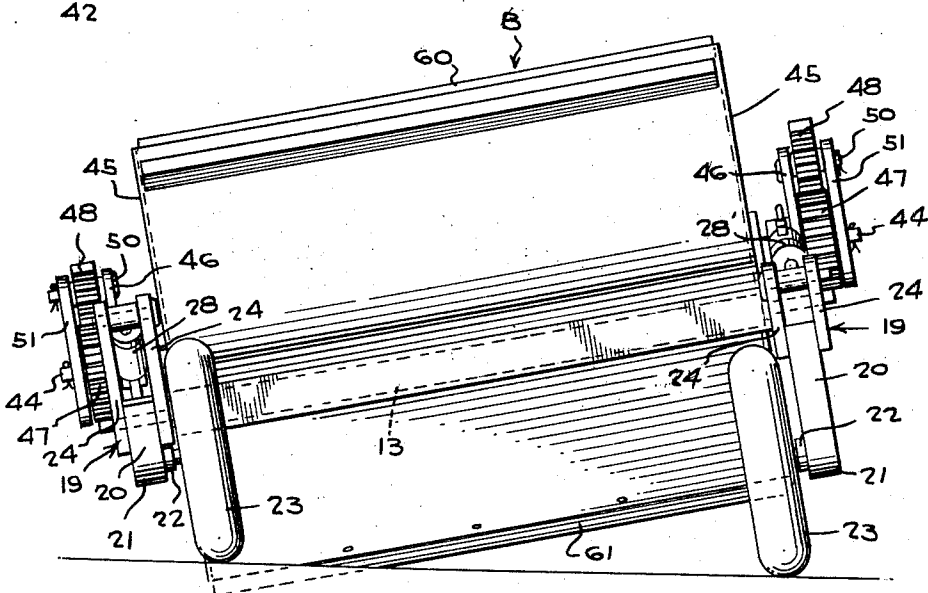
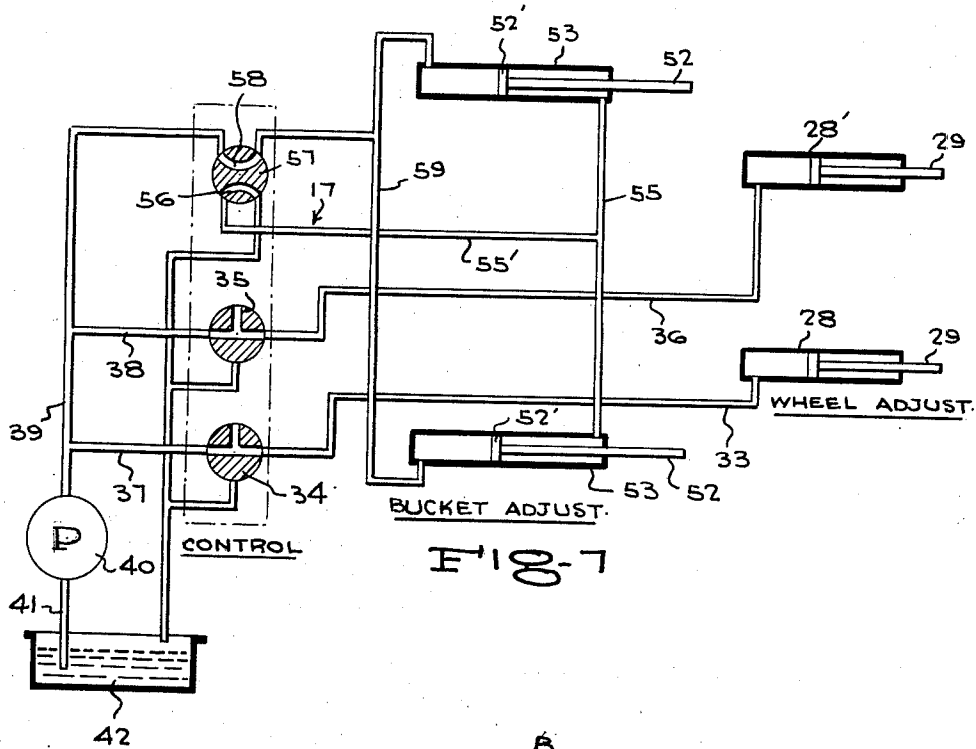


FIG-6

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3,097,440 HYDRAULICALLY OPERATED LAND CONTOURING MACHINE

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2 Claims. (Cl. 37-129)

This invention relates to a hydraulically operated land contouring machine and it consists in the constructions, arrangements and combinations herein described and claimed.

It is the cardinal object of the invention to provide a land contouring machine in the form of a scraper, which is hydraulically operated to perform various operations in land contouring, such as grading, removal or leveling of earth; ditch forming, as well as general hauling of earth from place to place as may be required, all of which operations are effected by a single control mechanism.

More specifically, it is an object of the invention to provide an ambulant frame for tilting and rocking the support of a scraper bucket, the wheels of the frame being individually adjustable to raise or lower the frame upon either side thereof to vary the angularity of the cutting and scraping blade of the scraper bucket with respect to the ground surface, as well as to provide an actuating means for rocking or rotating the scraper bucket through an arc of 360 degrees to effect a scraper-loading position and to also assume a dumping-leveling position.

Additional objects, advantages and features of invention will be apparent from the following description, considered in conjunction with the accompanying drawings, wherein

FIGURE 1 is a top plan view of the scraper contouring machine,

FIGURE 2 is a side elevation thereof, the scraper bucket being shown in normal position, the operative position for scraping being shown in dotted lines.

FIGURE 3 is a similar view, but illustrating the scraper bucket in an earth leveling and dumping position.

FIGURE 4 is a longitudinal section taken on the line 4-4 of FIGURE 1.

FIGURE 5 is a vertical section taken on the line 5-5 of FIGURE 4.

FIGURE 6 is a rear elevation of the scraper, the left wheel having been raised to tilt the frame and the scraper bucket toward the left side for a ditch contouring operation, and

FIGURE 7 is a diagrammatic plan view of the control means for the bucket and wheel adjustments.

Referring more particularly to the drawings, there is illustrated an earth scraper generally indicated by the reference character 10, which as shown comprises a frame 11 having side beams 12 connected by a transverse beam 13 at the rear of the side beams and a similar beam 14 at the front end thereof. The frame as well as other parts may be reinforced for strength by the use of suitable gusset plates as found necessary. A triangularly shaped draw bar 15 is suitably connected to the transverse front beam 14 at points adjacent the outer ends of the beam, the apex of the draw bar being provided with a suitable swivel coupling 16 for attachment to a tractor. A control unit 17 is also suitably mounted upon or adjacent the apex of the draw bar 15, the construction and function of which will be explained in further detail.

Extending rearwardly of each side beam 12 there is an ear 18 for mounting of respective wheel assemblies 19, and since the assemblies are identical in construction, a description of one will be ample for an understanding of the construction and operation.

The wheel assembly comprises an elongated body member of substantial structure, one end 21 of which is formed

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with a suitable right angularly disposed axle 22 for mounting of a ground engaging wheel 23. Upon the body at the end opposite the axle 22 a pair of upstanding arms 24 are suitably secured, as by welding, to opposite sides of the body 20, the arms being approximately at right angles to the body and are provided with aligned openings 25 for a purpose as will presently appear. The lower ends of the arms are provided with aligned openings 26 for reception of a bolt 27 when said arms embrace the apertured ears 18 of the side beams of the frame for pivotal movement of the wheel assembly 19 with respect to the frame.

Thus the wheel assembly 19 is mounted for vertical movements with respect to the terrain upon which the scraper is being worked and in order to obtain separate and individual adjustment of the wheel assemblies a single acting hydraulic cylinder is employed for the wheel assemblies, which cylinders are indicated at 28 and 28', each including a piston rod 29, the outer end of which is disposed between the arms 24 and pivotally mounted upon a bolt 30 extended through aligned openings 25 of the arms. The cylinders 28 and 28' at the end opposite that of the rods 29 are pivotally connected to a respective bracket 31 as at 32 which are suitably mounted upon the side frame beams 12. The cylinder 28 is provided with a fluid inlet line 33 operatively connected to a fluid control valve 34; while cylinder 28' is similarly connected to a control valve 35 by means of a fluid line 36. Hydraulic fluid is supplied to the valves 34 and 35 by means of respective fluid lines 37 and 38 which are connected to a main fluid line 39 from a pump 40 having a suction line 41 operatively connected to a fluid reservoir 42 (see FIG. 7).

For an understanding of the construction and mounting of the scraper bucket, attention is directed to FIGURES 2, 3, 4 and 5 particularly. A heavily constructed bearing housing 43 is mounted upon each side beam 12 of the frame, arranged in parallel aligned relation to receive a shaft 44 carried by respective end walls 45 of the scraper bucket generally indicated at B. The bearing housings 43 are formed with an upright extension 46 for a purpose presently to be explained. The shaft 44 is of a length to project a substantial distance outwardly of the bearing housing for mounting of a gear 47 which is suitably keyed or otherwise secured to the shaft. A rack bar 48 is positioned upon the upper periphery of the gear 47 and the teeth of the gear and rack bar are held in meshed engagement by means of a roller 49 which is rotatably supported upon a bearing pin 50 carried by the extension 46 of the bearing housing, the roller 49 being retained against lateral movement upon the pin by means of a plate 51 connected between the shaft 44 and pin 50.

It will be understood that both shafts 44 embody the above construction and that the rack bars 48 may be operated simultaneously by means of respective piston rods 52 of hydraulic cylinders 53 mounted in brackets 54 adjacent to or at the front cross beam 14 of the frame and extend at an upward angle with respect to the frame to properly engage the gear 47.

As best seen in FIGURE 7, the cylinders 53 have a common fluid line 55 and an interposed line 55', the latter leading to a port 56 of a control valve 57. The valve 57 also has a port 58 which at times has communication with the fluid line 39 from the pump 40, and from the port 58 fluid passes through a fluid line 59 to respective cylinders 53, the pressure exerted upon the pistons 52' causing the piston rod 52 and rack bar 48 to rotate the gear 47 with corresponding rotation of the scraper bucket B, from the dotted line position shown in FIGURE 2 to the load carrying position shown in solid lines, the valve 57 then being operated to maintain pressure on the piston for retention of the scraper bucket in the latter position. After the load carried by the scraper bucket has been dis-

charged and it is desired to level the material, the valve 57 is again operated to further advance the rack bar 48 causing the scraper bucket to partake of a rotating movement to present the leveling blade 60 so as to contact the material to be leveled under movement of the machine. In order to return the scraper bucket to a normal position, it is only necessary to adjust the valve 57 so that the port 58 is closed and the port 56 opened so that fluid in the cylinders may return to the fluid reservoir 42 by way of the fluid lines 55 and 55', which return of the fluid is effected by the pressure created by the weight of the scraper bucket.

The leveling and scraper blades 60 and 61 are preferably two edged and are reversible upon removal, so that a sharp working edge may at all times be available.

In various grading and leveling operations, it is desirable that the scraper bucket B assume angular relations with respect to the surface being worked, as indicated in FIGURE 6 of the drawings. This position of the scraper bucket was attained by adjusting the valve 34 (see FIG. 7) so that fluid pressure in cylinder 28 may feed back to the reservoir 42 and due to the pivotal connection between the frame and wheel assembly and weight thereof, as well as the swivel connection 16 at the front of the frame, the frame and cutting blade will assume the desired inclination, which of course is determined by the amount of fluid pressure retained in the cylinder 28. The cylinder 28 is likewise operable through the valve 35; and it will be obvious that the cylinders 28 and 28' may be simultaneously operated to raise or lower the frame with respect to the ground surface.

From the foregoing, it will be seen that the scraper bucket B may be rotated by virtue of the gear and rack to a full 360 degrees which will permit the bucket to assume a proper position for scraping and cutting, whether the scraper is moving either forwardly or rearwardly and that the position of the scraper bucket, as well as the level and angle thereof may be quickly and easily obtained due to the knee-action provided in the wheel assemblies and the pivotal movement of the frame as a whole.

While I have shown and described a preferred form of the invention, this is by way of illustration only, and

I consider as my own, all such modifications in construction, as fairly fall within the scope of the appended claims.

I claim:

1. In a land contouring machine, the combination of a frame having a swivel connector means at one end thereof and positioned in the longitudinal medial axis of the frame to establish a draft engagement with a tractor or the like and permitting horizontal pivotal movement of said frame, a hingedly connected ground engaging wheel mounted at respective sides of said frame at the end opposite said swivel connector means providing pivotal movement of said frame, said means including cylinders for stabilizing the hingedly connected ground engaging wheels, opposed aligned bearing means mounted on said frame, a scraper bucket positioned within said frame and having an axle member journaled in each bearing member, a gear fixed to each axle, a rack bar in meshed engagement with each gear, a hydraulic unit operatively connected to each rack bar and a control means connected to said hydraulic units for actuating said rack bars.

2. The structure of claim 1, in which said bearing members including an upright extension and an opposed spaced plate member, a shaft secured between said extension and said plate member for rotatable support of a roller for contacting engagement upon the upper side of said rack bar.

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