

May 30, 1939.

C. LE BLEU

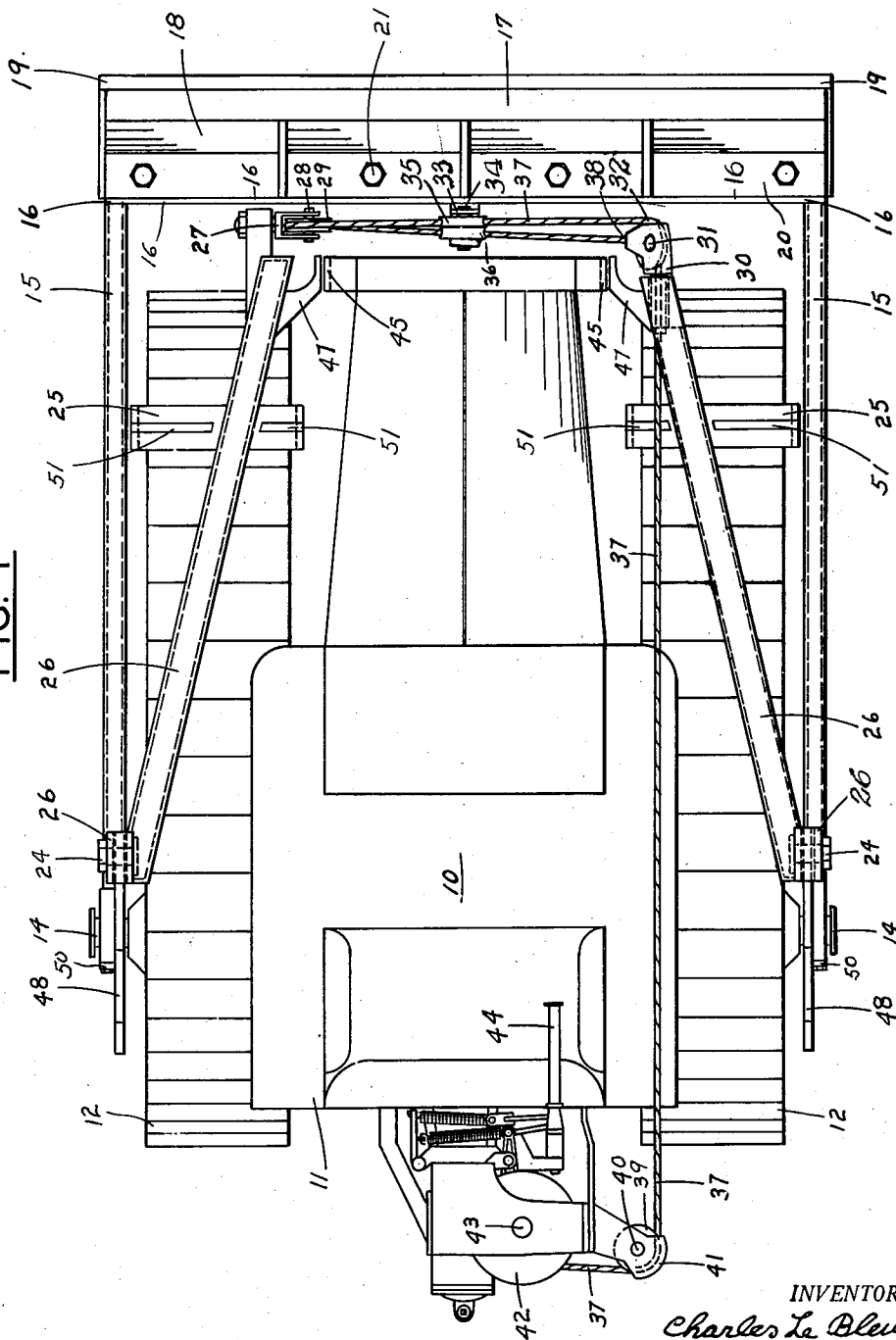
2,160,702

BULLDOZER

Filed April 2, 1937

3 Sheets-Sheet 1

FIG. 1



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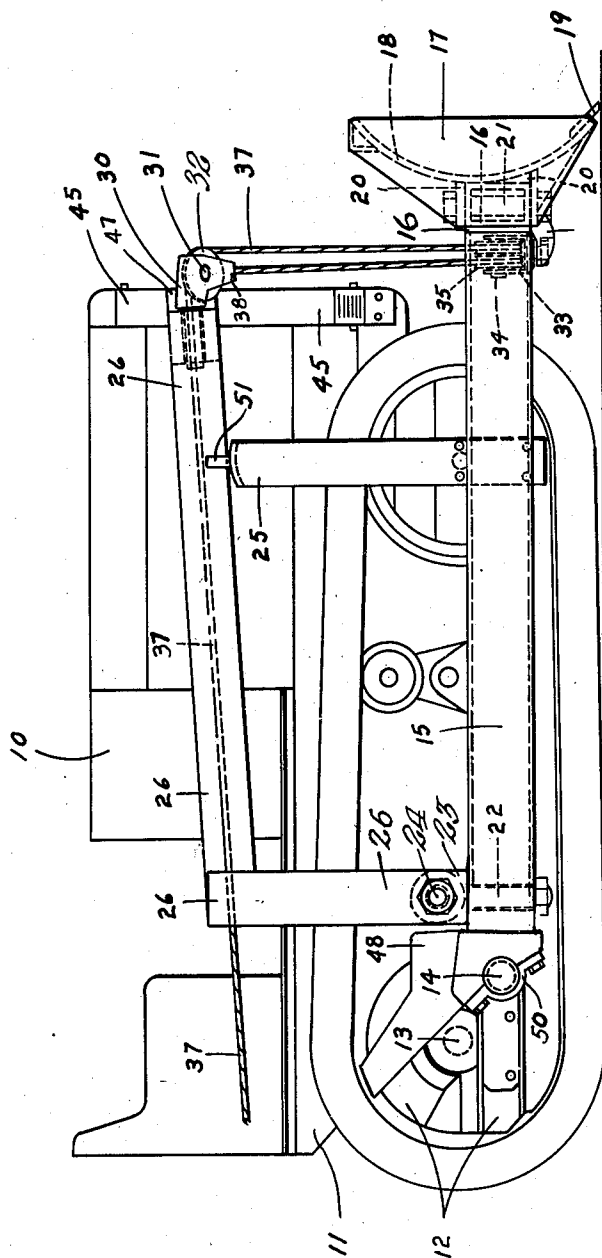
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3 Sheets-Sheet 2

FIG. 2



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3 Sheets-Sheet 3

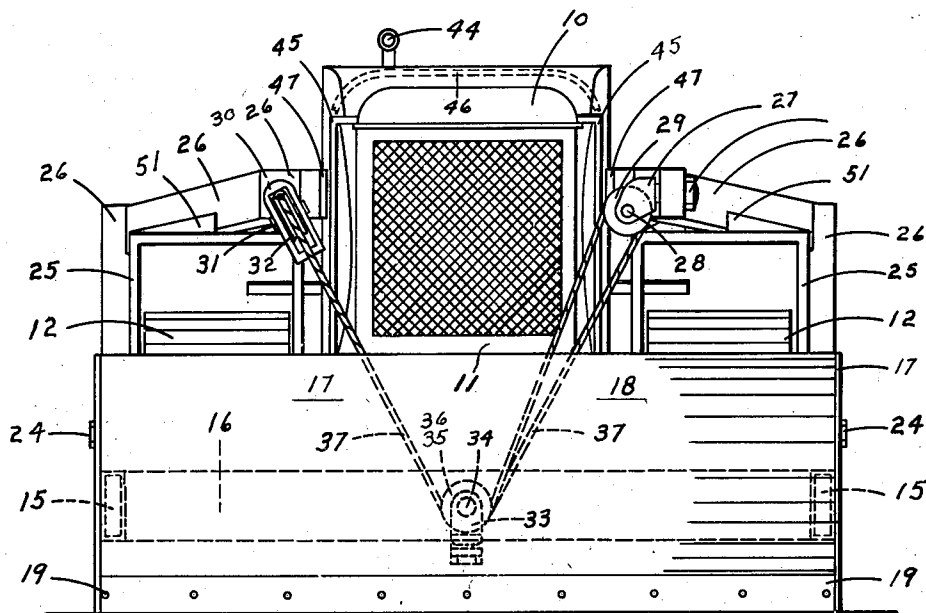


FIG. 3.

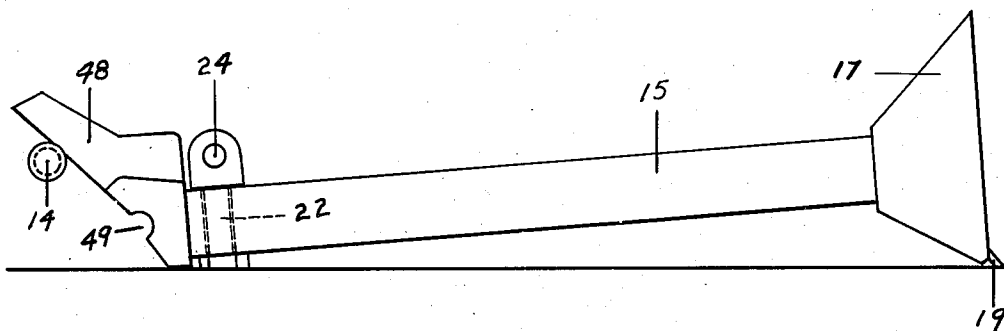


FIG. 4.

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2,160,702

BULLDOZER

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15 Claims. (Cl. 37-144)

This invention relates generally to earth moving devices, the term "earth" being taken in the broad sense to include snow, ice and the like, adapted to be connected to a tractor to be moved thereby across a surface to be treated, and includes an earth handling implement disposed forwardly of the tractor. Such devices are commonly termed, scrapers, trailbuilders, bulldozers, snow plows and the like.

10 A tractor of conventional design used extensively to operate the class of devices to which this invention relates includes a body and a pair of track laying units disposed one on each of the opposite sides of the body and parallel therewith and pivotally attached behind their front ends to the tractor body for independent swinging movement in a vertical plane and therefore, on uneven surfaces, do not maintain a fixed parallel relationship.

20 An earth moving device of the class referred to includes a pair of pusher arms disposed one at each of the opposite sides of the tractor and journaled behind their front ends each to a track laying unit for swinging movement in a vertical plane. In the bulldozer these pusher arms may be directly connected at their front ends to a transversely disposed scraping element, and in the trailbuilder these pusher arms may be connected at their front ends to a transversely disposed cross beam, the cross beam being adapted to support the scraping element. In either case the results are a substantially U shaped pusher frame adapted behind its front end to be mounted on the track laying units for swinging movement in a vertical plane about a horizontal axis, and provided at its front end with a scraper. The invention herein described is applicable to either of these conventional types of construction, the pusher frame control of my invention being associated with the transverse member of a U shaped pusher frame whether it be a scraping element or a cross beam.

Now, an object of this invention is the provision in devices of the class referred to, of a simple and novel control means for swinging the pusher frame.

Still another object is the provision in a device of the class described, of a pusher frame control for swinging the pusher frame, and disposing the weight of the front end thereof substantially equally on the track laying units regardless of the relative position of the track laying units in the vertical plane.

Still another object is the provision in a device of the class described, a tractor including a body

and a pair of track laying units disposed one at each of the opposite sides thereof and journaled behind their front ends on the body for independent vertical swinging movement, a pusher frame mounted behind its front end on the track laying units for swinging movement about a horizontal axis, and means for supporting the front end of the pusher frame on the track laying units in parallel relationship to the said horizontal axis regardless of the relative position of the track laying units in the vertical plane.

Another object of this invention is the provision in a device of the class described, of means to facilitate the mounting of the rear end of the pusher frame on the tractor.

Still another object of the invention is the provision in a device of the character described of novel means for mounting the pusher frame control on the track laying units.

Another object of this invention is the provision in a device of the class described, of a pusher frame control therefor adapted to dispose the weight of the front end of the pusher frame equally on the track laying units without imparting torsional strains to the pusher frame or lateral strains to the track laying units, regardless of the relative positions of the track laying units in the vertical plane.

Other objects and advantages of this invention will be apparent to those skilled in the art upon a detailed perusal of the specifications in connection with the accompanying drawings wherein I have illustrated and described an embodiment of my invention, but it is to be understood that the disclosures are susceptible to modification in the combination, correlation and construction of parts, members and features without constituting a departure from the spirit of the invention as defined in the claims annexed hereto.

In the drawings:

Figure 1 is a plan view of my invention.

Figure 2 is a side elevation of Figure 1.

Figure 3 is a front elevation of my invention.

Figure 4 is a side elevation of the earth moving device disconnected from the tractor and resting on the ground and shows the trunnion on the tractor in engagement with the upwardly inclined member whereby the tractor may be advanced to raise the rear end of the pusher frame to position to be connected to the tractor.

Reference will now be made to the accompanying drawings for a more detailed description of my invention.

The numeral 10 indicates a tractor of conventional design including a body 11 and a pair of

track laying units 12 pivoted to the body 10 at 13 for independent vertical swinging movement.

Each of the track laying units 12 are provided with a horizontally projecting trunnion 14.

5 A substantially U shaped pusher frame comprises pusher arms 15 disposed one at each of the opposite sides of the tractor 10, and a transversely disposed cross beam 16 to which the pusher arms 15 are connected at their front ends, the pusher arms 15 being journaled at their rear ends each on a trunnion 14. Thus a substantially U shaped pusher frame is mounted on the track laying units 12 for swing movement about a horizontal axis.

10 An earth scraper 17 includes an arcuate back plate 18 provided at its lower edge with a scraper 19. Rigid with arcuate back plate 18 are vertically spaced plates 20 to receive therebetween the cross beam 16. Cross beam 16 and vertically spaced plates 20 are provided with coinciding openings to receive bolts 21 and thus the pusher frame is provided at its front end with an earth scraper 17.

20 Each of the pusher arms 15 is provided near its rear end with a vertically disposed pivot pin 22 having formed on its upper end a bracket 23 provided with an opening adapted to receive a horizontal pin 24.

25 Each of the track laying units 12 is provided with an upstanding bracket 25 forwardly of the pivotal connection of the pusher frame with the track laying units.

30 Beams 26 are disposed one at each of the opposite sides of the tractor and pivotally connected at their rear ends to the brackets 23 and supported adjacent their front ends each on an upright bracket 25.

35 One of the beams 26 is provided at its front end with an articulately mounted bracket 27 carrying a pin 28 having journaled thereon a sheave 29. The other of said beams 26 is provided at its front end with an articulately mounted bracket 30 carrying a pin 31 having journaled thereon a sheave 32.

40 A bracket 33 is disposed centrally of the cross beam 16 and articulately mounted thereon. Bracket 33 is provided with a pin 34 having journaled thereon sheaves 35 and 36.

45 A cable 37 is anchored at an end to the bracket 30 at 38 and passes thence downwardly to and thence upwardly about sheave 36, thence upwardly to and about sheave 29, thence downwardly to and thence upwardly about sheave 35 to sheave 32, thence rearwardly about sheave 32 to a sheave 39 journaled on pin 40 carried by bracket 41. Cable 37 passes thence to a winding drum 42 to which it is anchored.

50 Winding drum 42 is adapted to operate in a conventional manner about vertical pivot 43 and is controlled, also in a conventional manner, by a clutch and brake mechanism operated by the hand lever 44.

55 Rub or stabilizing plates 45 are secured one on each side of the tractor body at its front end, see Figures 1, 2 and 3. These rub plates may be independent of each other as shown in the full lines, or may be cross connected at their top ends as indicated by the broken lines 46; see Figure 3. One is the equivalent of the other. Each of the beams 26 are adapted at their front end, see members 47, to contact the rub plates 45. Means are thus mounted on the body of the tractor between the front ends of beams 26 to receive lateral thrust therefrom.

70 Since beams 26 are mounted at their rear ends for lateral swinging movement, and have means

disposed between their front ends to receive lateral thrust therefrom, the front end of the pusher frame may be supported centrally of its width on the track laying units without imparting lateral strains thereto, and since the front end of the pusher frame may be supported on the track laying units centrally of its width, the front end of the pusher frame may be supported parallel to the horizontal axis, formed by trunnions 14, without imparting torsional strains thereto, regardless of the relative positions of the track laying units in the vertical plane, and since cable 37 is free to shift on sheaves 35 and 36 the weight of the front end of the pusher frame may be supported equally on the track laying units at all times.

Members 51 rigid with brackets 25 serve to limit lateral swinging movement of beams 26.

20 In operation, the device is moved across a surface to be treated by the advancing movement of the tractor and the vertical position of the scraper 19 relative to the surface to be treated may be controlled by suitable manipulation of the winding drum 42 to wind up cable 37 for raising the scraper, and unwinding cable 37 to lower the scraper, the brake being adapted to hold the winding drum in any desired position of the scraper.

30 The rear end of beams 26 are provided each with an inclined arm 48 the under edge of which is arranged relative to the bearing 49 formed in the rear end of each of beams 26 to receive trunnions 14. The under edge of arms 48 are adapted to engage trunnions 14 when the rear end of the pusher frame rests on the ground. Thus, to mount the rear end of the pusher arms on trunnions 14, the tractor is driven between the pusher arms from the rear. Trunnions 14 will engage arms 48 as shown in Figure 4 and as the tractor continues to advance the rear end of pusher arms 15 will be raised until trunnions 14 rests in the bearings 49. The bearing cap 50 may then be secured in place.

45 From the foregoing description it will be seen that I have provided such a device as substantially fulfills the objects of the invention as set forth herein.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

50 1. In a device of the character described, a tractor including a body and a pair of track laying units disposed one at each of the opposite sides thereof and journaled behind their front ends thereto for independent vertical swinging movement, a pusher frame journaled behind its front end on the track laying units for swinging movement about a horizontal axis, a beam supported on each of the track laying units, a sheave mounted on the front end of each beam, sheaves mounted on the front end of the pusher frame centrally of its width, a single flexible means passing about the sheaves on the pusher frame and supported on the sheaves carried by the beams to dispose the weight of the front end of the pusher frame substantially equally on the track laying units regardless of the relative positions of the track laying units in the vertical plane, and means to manipulate the flexible means to swing the pusher frame for raising and lowering the front end thereof.

70 2. In a device of the character described, a tractor including a body and a pair of track laying units disposed one at each of the opposite sides thereof and journaled behind their front

ends thereto for independent vertical swinging movement, a pusher frame journaled behind its front end on the track laying units for swinging movement about a horizontal axis and provided at its front end with a scraper, a beam supported on each of the track laying units, a sheave mounted on the front end of each of the beams, sheaves mounted on the front end of the pusher frame centrally of its width, a single flexible means passing about the sheaves on the pusher frame and supported on the sheaves carried by the beams, and means to manipulate the flexible means to swing the pusher frame for raising and lowering the front end thereof to position the scraper vertically relative to the ground.

3. In a device of the character described, a tractor including a body and a pair of track laying units disposed one at each of the opposite sides thereof and journaled behind their front ends thereto for independent vertical swinging movement, a pusher frame journaled behind its front end on the track laying units for swinging movement about a horizontal axis and provided at its front end with a scraper, a beam supported on each of the track laying units, stabilizing plates disposed between the beams and mounted on the body of the tractor said beams being normally disposed in contact with said stabilizing plates, a sheave mounted on the front end of each of the beams, sheaves mounted on the front end of the pusher frame centrally of its width, flexible means passing about the sheaves on the pusher frame and supported on the sheaves carried by the beams, and means to operate the flexible means to swing the pusher frame for raising and lowering the front end thereof to determine the elevation of the scraper with respect to the ground.

4. In a device of the character described, a tractor including a body and a pair of track laying units disposed one at each of the opposite sides thereof and journaled behind their front ends thereto for independent vertical swinging movement, a pusher frame journaled behind its front end on the track laying units for swinging movement about a horizontal axis and provided at its front end with a scraper, a beam supported on each of the track laying units, means disposed between the beams and mounted on the body of the tractor said beams being normally disposed in contact with said means, a sheave mounted on the front end of each of the beams, sheaves mounted on the front end of the pusher frame centrally of its width, flexible means passing about the sheaves on the pusher frame and supported on the sheaves carried by the beams, and means to manipulate the flexible means to swing the pusher frame for raising and lowering the front end thereof to determine the elevation of the scraper with respect to the ground.

5. In a device of the character described, a tractor including a body and a pair of track laying units disposed one at each of the opposite sides thereof and journaled behind their front ends thereto for independent vertical swinging movement, a pusher frame journaled behind its front end on the track laying units for swinging movement about a horizontal axis and provided at its front end with a scraper, a beam supported on each of the track laying units and articulately connected at their rear ends to the pusher frame, a sheave mounted on the front end of each of the beams, sheaves mounted on the front end of the pusher frame centrally of its width, flexible means passing about the sheaves on the pusher

frame and supported on the sheaves carried by the beams, and means to manipulate the flexible means to swing the pusher frame for raising and lowering the front end thereof to determine the elevation of the scraper with respect to the ground.

6. In a device of the character described, a tractor including a body and a pair of track laying units disposed one at each of the opposite sides thereof and journaled behind their front ends thereto for independent vertical swinging movement, a pusher frame journaled behind its front end on the track laying units for swinging movement about a horizontal axis and provided at its front end with a scraper, a beam supported on each of the track laying units for lateral shifting movement said beams being articulately mounted at their rear ends on the pusher frame, stabilizing plates disposed between the beams and mounted on the body of the tractor said beams being normally disposed in contact with said stabilizing plates, a sheave mounted on the front end of each of the beams, sheaves mounted on the front end of the pusher frame centrally of its width, flexible means passing about the sheaves on the pusher frame and supported on the sheaves carried by the beams, and means to manipulate the flexible means to swing the pusher frame for raising and lowering the front end thereof to determine the elevation of the scraper with respect to the ground.

7. In a device of the character described, a tractor including a body and a pair of track laying units disposed one at each of the opposite sides thereof and journaled behind their front ends thereto for independent swinging movement in a vertical plane, a pusher frame journaled behind its front end on the track laying units for swinging movement about a horizontal axis, a beam supported on each of the track laying units, a sheave mounted on the front end of each of the beams, sheaves mounted on the front end of the pusher frame centrally of its width, a single flexible means passing about the sheaves on the pusher frame and supported on the sheaves carried by the beams to dispose the weight of the front end of the pusher frame substantially equally on the track laying units and suspend the front end of the pusher frame in parallel relationship to the horizontal axis regardless of the relative positions of the track laying units in the vertical plane.

8. In a device of the class described, a tractor including a body and a pair of track laying units disposed one at each of the opposite sides thereof and journaled behind their front ends thereto for independent swinging movement in a vertical plane, a pusher frame journaled behind its front end on the track laying units for swinging movement about a horizontal axis and provided at its front end with a scraper, a beam supported on each of the track laying units, stabilizing plates disposed between the beams and mounted on the body of the tractor said beams being normally disposed in contact with said stabilizing plates, a sheave mounted on the front end of each of the beams, sheaves mounted on the front end of the pusher frame centrally of its width, flexible means passing about the sheaves on the pusher frame and supported on the sheaves carried by the beams to suspend the scraper in parallel relationship to the horizontal axis regardless of the relative positions of the track laying units in the vertical plane, and means to manipulate the flexible means to swing the

pusher frame for raising and lowering the front end thereof to position the scraper vertically relative to the ground.

9. In a device of the class described, a tractor including a body and a pair of track laying units disposed one at each of the opposite sides thereof and journaled behind their front ends thereto for independent swinging movement in a vertical plane, a pusher frame journaled behind its front end on the track laying units for swinging movement about a horizontal axis and provided at its front end with a scraper, a beam supported on each of the track laying units, said beams being articulately mounted at their rear ends on the pusher frame, means disposed between the beams and mounted on the body of the tractor said beams being normally disposed in contact with said means, a sheave mounted on the front end of each of the beams, sheaves mounted on the front end of the pusher frame centrally of its width, flexible means passing about the sheaves on the pusher frame and supported on the sheaves carried by the beams to suspend the scraper in parallel relationship to the horizontal axis regardless of the relative positions of the track laying units in the vertical plane, and means to manipulate the flexible means to swing the pusher frame for raising and lowering the front end thereof to position the scraper vertically relative to the ground.

10. In a device of the character described, a tractor including a body and a pair of track laying units disposed one at each of the opposite sides thereof and journaled behind their front end thereto for independent swinging movement in a vertical plane, a pusher frame journaled behind its front end on the track laying units for swinging movement about a horizontal axis, an upstanding bracket mounted on each of the track laying units, a cantilever beam supported on each of the upstanding brackets and articulately connected at its rear end to the pusher frame, and a single flexible means to suspend the front end of the pusher frame on the front ends of the cantilever beams.

11. In a device of the character described, a tractor including a body and a pair of track laying units disposed one at each of the opposite sides thereof and journaled behind their front ends thereto for independent swinging movement in a vertical plane, a pusher frame journaled behind its front end on the track laying units for swinging movement about a horizontal axis, an upstanding bracket mounted on each of the track laying units, a cantilever beam supported on each of the upstanding brackets and articulately connected at its rear end to the pusher frame, and a single flexible means adapted to be power operated to adjustably suspend the front end of the pusher frame on the front ends of the cantilever beams.

12. A material moving machine comprising a tractor having a body and a pair of track laying units disposed one at each of the opposite sides thereof and journaled behind their front ends thereon for independent vertical swinging movement about a common axis, a pusher frame carrying a scraper at its front end, means mounting the rear end of the pusher frame on the track laying units for swinging movement about a horizontal axis, brackets carried by the track laying units, sheave means mounted on the front end of the pusher frame centrally of its width, a

single flexible means passing about said sheave means and supported on said brackets to automatically shift in response to relative swinging movement thereof to suspend the front end of the pusher frame parallel to said horizontal axis and dispose the weight thereof substantially equally on the track laying units regardless of the relative positions of said track laying units about their common axis.

13. A material moving machine comprising a tractor having a body and a pair of track laying units disposed one at each of the opposite sides thereof and journaled behind their front ends thereon for independent vertical swinging movement about a common axis, a pusher frame carrying a scraper at its front end, means mounting the rear end of the pusher frame on the track laying units for swinging movement about a horizontal axis, brackets carried by the track laying units, sheave means mounted on the front end of the pusher frame centrally of its width, a single flexible means passing about said sheave means and supported on said brackets to automatically shift in response to relative swinging movement thereof to suspend the front end of the pusher frame parallel to said horizontal axis and dispose the weight thereof substantially equally on the track laying units regardless of the relative positions of said track laying units about their common axis, and means to manipulate said flexible means for swinging the pusher frame about said horizontal axis.

14. A material moving machine comprising a tractor having a body and a pair of track laying units disposed one at each of the opposite sides thereof and journaled behind their front ends thereon for independent vertical swinging movement about a common axis, a pusher frame carrying a scraper at its front end, means mounting the rear end of the pusher frame on the track laying units for swinging movement about a horizontal axis, brackets carried by the track laying units, sheave means mounted on the brackets, sheave means mounted on the front end of the pusher frame centrally of its width, a single flexible means passing about said sheave means and being secured at one end to one of said brackets, and means for controlling said flexible means for swinging the pusher frame about said horizontal axis.

15. In a device of the character described, a tractor including a body and a pair of track laying units disposed one at each of the opposite sides thereof and journaled behind their front ends thereon for independent vertical swinging movement about a common axis, a pusher frame journaled behind its front end on the tractor for swinging movement in a vertical plane, a beam supported on each of the track laying units, a sheave mounted on the front end of each beam, sheaves mounted on the front end of the pusher frame centrally of its width, a single flexible means passing about the sheaves on the pusher frame and supported on the sheaves carried by the beams to dispose the weight of the front end of the pusher frame substantially equally on the track laying units in any position of each of them about their common axis, and means to manipulate the flexible means to swing the pusher frame for raising and lowering the front end thereof.

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