June 7, 1932. M. WOOLDRIDGE 1,861,731

MATERIAL MOVING DEVICE

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Fig. 1.

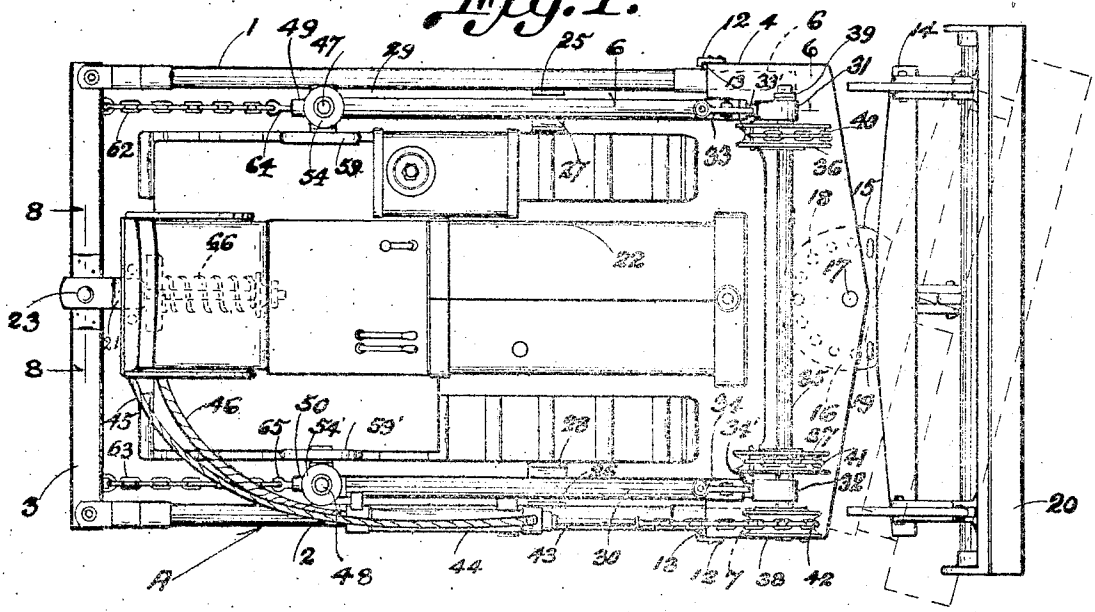


Fig. 2.

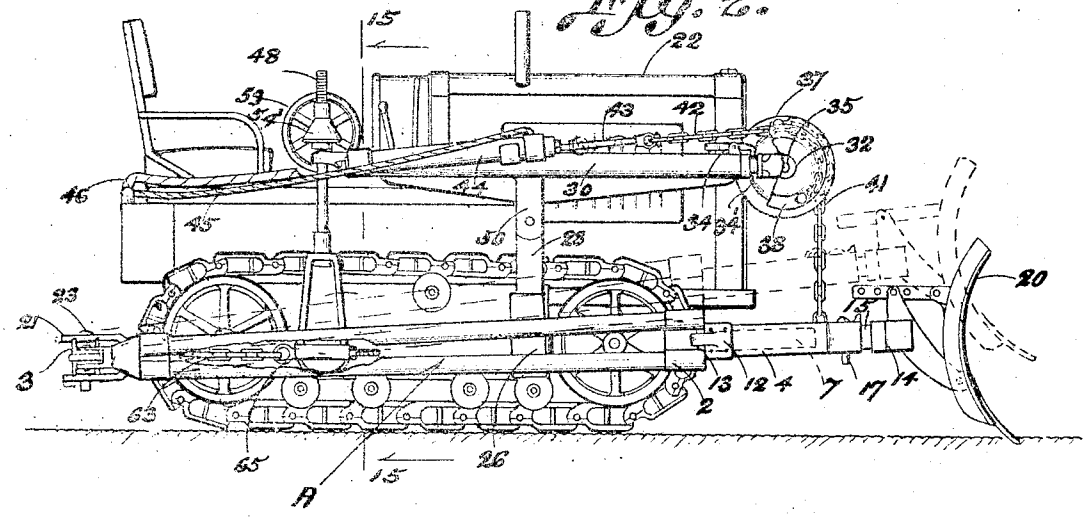
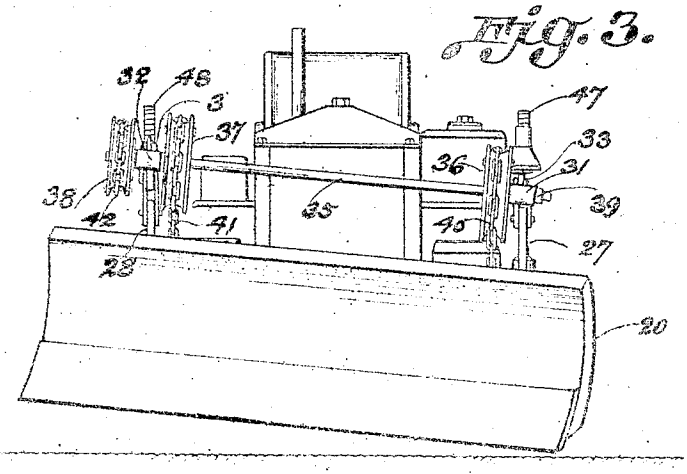


Fig. 3.



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Fig. 7.

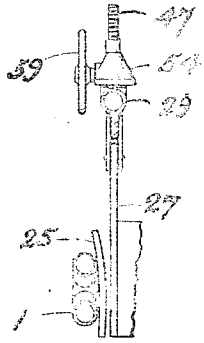


Fig. 4.

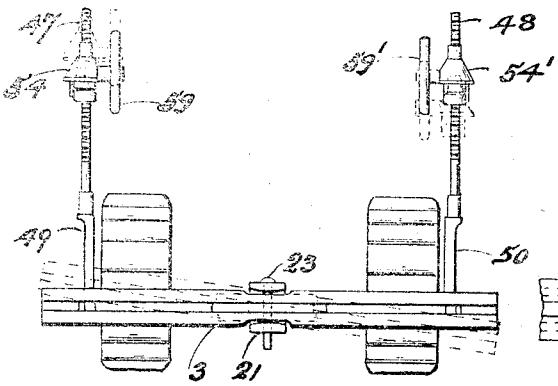


Fig. 8.

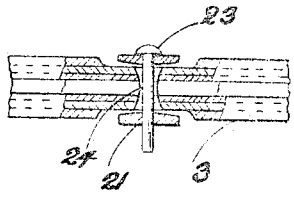


Fig. 5.

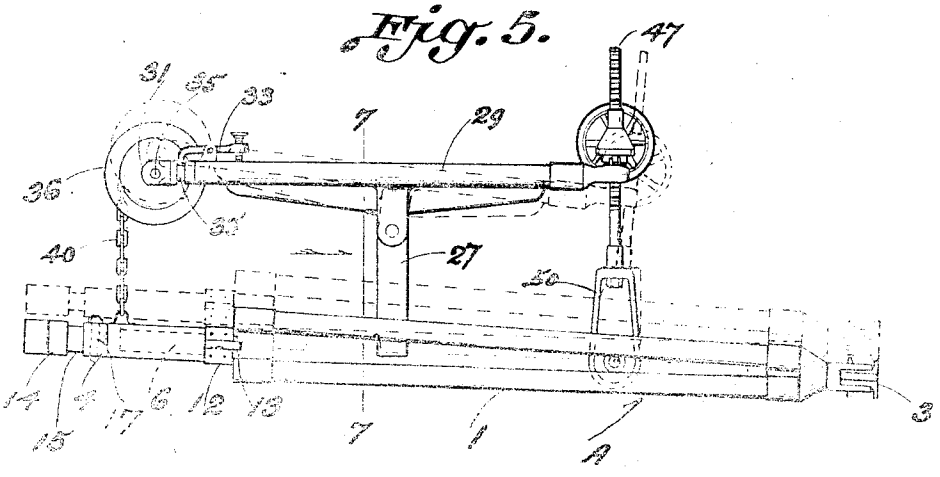
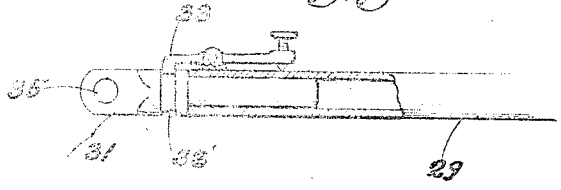


Fig. 6.



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MATERIAL MOVING DEVICE

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Fig. 9.

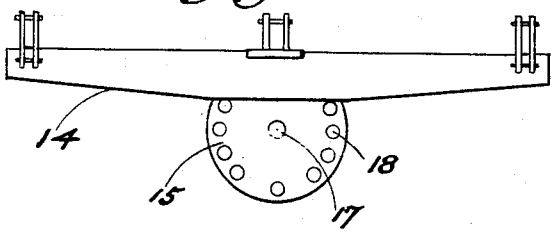


Fig. 10.

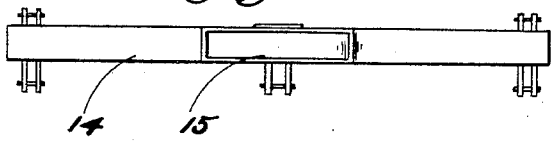


Fig. 11.

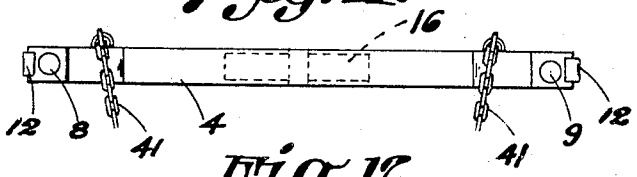


Fig. 12.

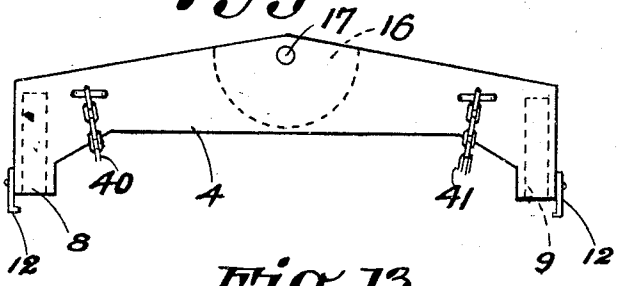


Fig. 13.



Fig. 14.

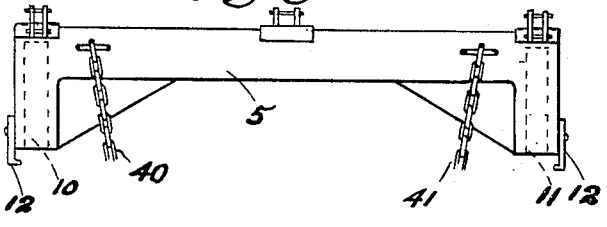


Fig. 15.

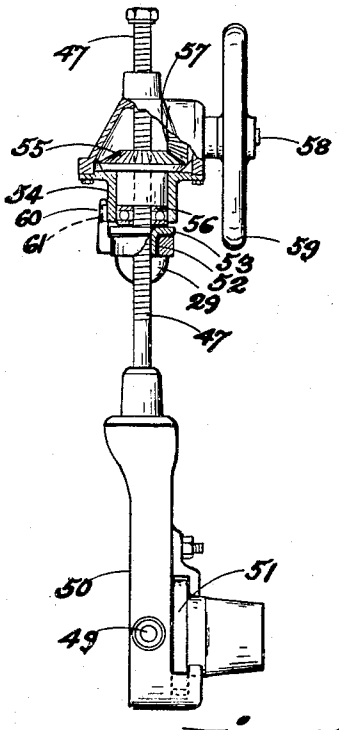
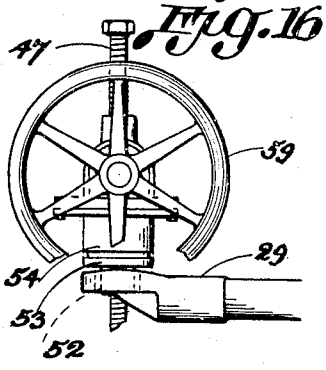


Fig. 16



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Patented June 7, 1932

1,861,731

UNITED STATES PATENT OFFICE

MACK WOOLDRIDGE, OF LOS ANGELES, CALIFORNIA

MATERIAL MOVING DEVICE

Application filed April 15, 1930. Serial No. 444,424.

This invention relates to a device or apparatus for removing or displacing dirt, sand, snow, and other materials, whether loose or solid and it includes in its functions the objects of that class of apparatus denominated generally as back fillers, bull dozers, scrapers, surfacers, etc., the present device being designed to perform with superior facility the various objects, singly or combined, of each of the designated classes of implements.

Of the manifold objects of this invention, the prime one is to provide a simple, strong, durable and efficient adjunctive unit for a traction device of any desired type by which the pull of the traction device causes the unit to push objects, whether dirt, snow, road-metal, boulders and the like, ahead or to one side of it.

Another object is to provide an accessory of this general character, in connection with a traction means, and connections with such traction means by which the accessory or unit under normal conditions, will remain parallel with the surface operated over or upon while the traction device or power unit is free to respond to surface irregularities without affecting the unit and by which strains on the tractor and strains tending to distort the adjunctive unit are eliminated.

Other objects of the invention are to provide, in combination with a tractor, a unit that is connected therewith for relative pivotal and tiltable movement; to provide a unit with a replaceable head; to provide means by which the pivotal and tilting movement of said unit may be effected, and to provide a device of the general character referred to which may be readily controlled and manipulated by a single operator.

The invention relates to and is an improvement over that type and character of machine or apparatus described and claimed in my co-pending application for patent filed March 3, 1928, Serial Number 258,761, now Patent No. 1,788,698.

The accompanying drawings which form a part of this application, illustrate a preferred embodiment of the invention, and therein

Fig. 1 is a plan view showing my invention.

Fig. 2 is a side elevation.

Fig. 3 is a front view showing the scraper blade in tilted position.

Fig. 4 is a rear view showing the rear of the frame and means for tilting the same, dotted lines indicating tilt of the frame in one direction.

Fig. 5 is a side elevational view showing the means by which the frame may be raised, lowered, or tilted, the tractor being omitted.

Fig. 6 is a fragmentary detail on line 6—6—Fig. 1.

Fig. 7 is a fragmentary section on line 7—7—Fig. 5, looking in the direction of the arrow.

Fig. 8 is an enlarged fragmentary section on line 8—8—Fig. 1.

Fig. 9 is a plan view of a swiveling blade-carrying head.

Fig. 10 is a rear view of Fig. 9.

Fig. 11 is a rear view of a carrier that is arranged for removable attachment to the front end of the frame and to receive the blade-carrying head shown in Figs. 9 and 10.

Fig. 12 is a plan view of Fig. 11.

Fig. 13 is an elevational view of a carrier that is arranged for removable attachment to the front of the frame and to receive a stationary bull dozer.

Fig. 14 is a plan view of same.

Fig. 15 is an enlarged detail, partly in section showing the structural assembly of one of the manually operated tilting means, and viewed along line 15—15—Fig. 2 in the direction of the arrow and

Fig. 16 is an enlarged fragmentary side view of Fig. 15.

In a generic sense, the invention consists of a frame arranged to surround a vehicle or traction device of any chosen type and to be connected with the traction device and preferably to the drawbar thereof, in such manner that it may be tilted to one side or the other; means being provided on the traction device by which such tilting may be accomplished and means also being provided to elevate or lower the front of the frame, which constitutes a separable element replaceable by an-

other or other elements as conditions demand or require for the performance of different classes and characters of work.

In a more specific sense and referring in particular detail to the accompanying drawings, my invention is shown as comprising a frame A, consisting of side members 1 and 2, the rear ends of which are rigidly secured to and conjoined by a substantial cross bar 3, and the front ends of which are arranged to be conjoined by carriers 4 and 5, shown in Figs. 11, 12 and and 13 and 14 respectively, which are detachably connected to said side members 1 and 2 for the purpose of interchanging them, when the class of work to be done requires such interchange. For this purpose each of the side members 1 and 2 of the frame A is provided with an extension 6 and 7, which are arranged to engage in bores 8 and 9 and 10 and 11 respectively provided in the carriers 4 and 5, the connections between the extensions 6 and 7 and the carriers 4 and 5 being substantially a swivelled one, and the union between said carriers 4 and 5 and said extensions being insured and effected by mutually engaging locking means 12 and 13 provided on the carriers and the ends of the side members 1 and 2 of the frame. Referring to Figs. 11 and 12, the carrier 4 there shown is adapted to receive and support a blade carrying head 14 Figs. 9 and 10 which is provided with a rearwardly extending circular bearing 15, that is arranged to fit into a recess or socket 16 in the carrier 4, the bearing 15 being held within said socket 16 by a king pin 17 which extends through the carrier and the bearing 15 and about which pin the bearing may be swung in a limited arc. The bearing 15 is provided with a plurality of holes 18 to receive bolts 19 which are adapted to abut against the edge of the carrier, as shown in Fig. 1 and thereby define and maintain the angle at which the head and its blade 20 have been set.

Referring to Figs. 13 and 14 the carrier 5 there shown is arranged to receive and support a blade 20 that is adapted principally for straight-ahead displacement of earth or objects and for that reason is so connected to the carrier 5 that it may be adjusted vertically but not horizontally relatively thereto. The carrier 5 is arranged for removable attachment to the ends or extensions 6 and 7 of the frame members 1 and 2 and for this purpose is provided with the bores 10 and 11 afore-referred to to receive said extensions. The connection between said carrier 5 and extensions 6 and 7 of the side frame members 1 and 2 is a swiveled one, the union of same being insured and effected by mutually engaging locking means 12 and 13, which prevent disengagement of the carrier 5 from the side members 1 and 2, while permitting relative rotation thereof.

The rear cross bar 3 which is practically an integral unit with the side members 1 and 2 of the frame A, is connected centrally thereof with the draw bar 21 of the tractor 22, by a pin 23 which extends through an aperture 24, which, as seen in Fig. 8, is diametrically larger than said pin, thereby enabling the rear bar 3 and frame A to pivot thereon and to be tilted relatively to said draw bar 21, when for any reason it is desirable to place the cutting, scraping or bull dozing blade at an angle to the horizontal, or relatively to the tractor 22 or the surface operated over.

Each of the side members 1 and 2 of the frame A is provided on the inside thereof with a wear or rub plate 25 and 26, which plates are arranged to bear against or contact with complementary plates 27 and 28, rigidly secured to the tractor 22. These plates function primarily to prevent injury to the tractor and also to limit the side movement of the frame A. The plates 27 and 28 form supports for a pair of beams 29 and 30, which are pivotally connected approximately centrally thereof to said supporting plates 27 and 28. Bearings 31 and 32 are swiveled in or on the ends of said beams 29 and 30 the bearings 31 and 32 being secured or held in connection with said beams by latches 33 and and 34 pivotally mounted on the beams and adapted to engage in grooves 33′ and 34′ in the bearings 31 and 32. By this arrangement the bearings may be readily detached or removed therefrom.

In said bearings 31 and 32, is journaled a shaft 35, upon which is secured a plurality of sheaves 36 and 37, and 38. The shaft 35 is rotatable in the bearings 31 and 32 and is also longitudinally movable relatively to the bearing 31 which for this purpose is provided with a collar 39 which fits over the end of the shaft 35 and limits the longitudinal movement thereof. The object of this arrangement is to enable the bearing 31 to move relatively to and in a direction longitudinally of the shaft during the vertical movement of the lever 29 relatively to the other, such movement also requiring that the bearings 31 and 32 be journaled for oscillation in said beams 29 and 30, as described.

Flexible connections preferably in the form of chains 40 and 41 are employed to connect either of the carriers 4 and 5 with the sheaves 36 and 37, and a flexible connection 42 is used to connect the sheave 38 with a fluid actuated piston rod 43, the fluid being supplied to and displaced from a cylinder 44 mounted upon the beam 30 and in which the piston is operable, through preferably flexible pipes or tubes 45 and 46.

The rear ends of said beams 29 and 30 are connected to threaded standards 47 and 48, forming parts of upright supports 49 and 50, which are oscillatably mounted upon flanged journals 51, that are permanently fixed to or upon the tractor 22. Since the journals 51

and the assemblies appurtenant thereto are identical in structure and operation, but one will be specifically described reference being made to the detailed views Figs. 15 and 16 Each of the rear ends of the beams 29 and 30 is provided with an eccentric aperture 52, in which is disposed a concentric flanged collar 53 through which the said threaded standards are extended, the said flanged collars 53 by reason of the structure recited, being movable relatively to and in the aperture 52 in the ends of said beams, but maintaining at all times a fixed relation to the longitudinal plane of the standards, thereby forming a protecting medium for the threads on the standards 47 and 48 which obviously move in arcuate paths during the elevation and lowering of said beams, by the means which I shall now describe.

Within housings 54 and 54′, Fig. 15, are rotatably contained bevel gears 55 internally threaded for engagement with the threaded standards 47 and 48, and mounted or resting upon antifriction bearings 56 with which the flanged collars 53 in the ends of the beams are held in engagement by the gravitational over balance of said beams. Motion is imparted to said bevel gears 55, by bevel pinions 57, keyed to shafts 58 journaled in said housings 54 and 54′ and carrying hand wheels 59 and 59′ by which said shafts and their pinions 57 are rotated to cause the bevel gears 55 to travel up or down upon the threaded standards 47 and 48 and thereby raise or lower the beams 29 and 30. Mutually engaging means 60 and 61 are provided respectively on the beams and housings to lock said housings against rotation, during the operation of the hand wheels 59.

Draft means in the form of chains 62 and 63, Figs. 1 and 2, are used to connect the cross bar 3 with said upright supports 49 and 50, means 64 and 65 also being provided to adjust such draft chains, as conditions require. The draw bar 21, as is usual in certain types of tractors, is under the tension of a spring 66—Fig. 1, against which the pull of the frame is exerted to a limited extent, it being impractical for the spring to sustain the force of the pull on the frame. In addition, a centrally disposed spring is incapable of equalizing any pull on the cross bar 3, and for this reason, the draft chains 62 and 63 are provided, which take up the pull long before the spring has reached the limit of its compression, the spring thus serving to absorb the shock incident on the initial pull of the tractor on the frame.

By the beams 29 and 30, one side or the other of the frame A and its associated head or carrier may be tilted relatively to the tractor and the surface operated over, through the operation of the hand wheels 59 or 59′, which rock one or other of said beams 29 or 30 about its pivot. Such tilting of the frame A may be effected while the front portion or end thereof is in either elevated or lowered position. The raising or lowering of the front of the frame is effected by winding of the chains 40 and 41 upon or unwinding of said chains from the sheaves 36 and 37, that are secured to the shaft 35, and which shaft is turned by the mechanism described, namely the sheave 38, chain 42 and fluid actuated piston rod 43, which as seen serves to elevate the frame A, while the lowering thereof occurs under its own weight.

What I claim, is:

1. In a device of the character disclosed, in combination with a vehicle, a frame surrounding said vehicle and connected with the rear of said vehicle to have a pivotal and tilting movement, a blade connected with the frame, means to elevate the front of the frame and means to tilt the frame transversely.

2. In a device of the character disclosed, in combination with a tractor, a frame connected at the rear thereof for relative longitudinal and transverse tilting movement, a blade connected to the front of said frame, means to lift and lower the front of said frame, and independent means to tilt said frame transversely relatively to the tractor.

3. In a device of the character disclosed, in combination with a tractor a frame connected at the rear thereof with the rear of said tractor for relative longitudinal and transverse tilting movement, a blade connected to the front of said frame, means to lift and lower the front of said frame, and means manually controllable independently of said lifting and lowering means, to tilt said frame transversely relatively to said tractor.

4. In a device of the character disclosed, in combination with a tractor, a frame including side members, a rear member, and a front member swiveled in the said side members and removably connected therewith, a blade carried by said front member, and means connecting the rear member with said tractor for longitudinal and transverse tilting movement relatively thereto.

5. In a device of the nature disclosed, in combination with a tractor, a frame including side members and a rear member, a head connecting the front ends of said side members and detachably swiveled thereto, and means connecting the rear member with said tractor for longitudinal and transverse tilting movement relatively thereto.

6. In combination with a tractor, a frame surrounding the tractor and connected with the rear thereof for relative longitudinal and transverse tilting movement, levers pivotally supported upon the tractor, a shaft swiveled to said levers, flexible means connecting the front of the frame and said shaft, means to rotate said shaft to wind said flexible means thereon and thereby lift or lower the front of said frame, and means for oper-

ating said levers to tilt the frame transversely relatively to the ground surface.

7. In combination with a tractor, a frame surrounding the tractor and connected with the rear thereof for relative longitudinal and transverse tilting movement, levers pivotally supported upon the tractor, a shaft carried by said levers, means connecting the front of said frame and shaft, means to rotate said shaft to lift or lower the front of the frame, and means to operate said levers to tilt the frame transversely.

8. In combination with a tractor, a frame surrounding the tractor and connected at the rear thereof with the tractor for relative longitudinal and transverse tilting movement, levers pivotally supported upon the tractor, a shaft carried by said levers, connections between the front of said frame and said shaft and means to operate said levers simultaneously to elevate the front of the frame or independently to tilt said frame to one side or the other.

9. In a device of the character disclosed, in combination with a tractor, a frame surrounding said tractor, means connecting the rear of said frame with the draw-bar of said tractor for longitudinal and transverse tilting movement relatively thereto and to said tractor, and draft chains connecting the rear of said frame with said tractor and substantially paralleling opposite sides of said tractor.

10. In a device of the character disclosed, in combination with a tractor, a frame surrounding said tractor and connected to the drawbar of said tractor for longitudinally and transversely tiltable movement, draft chains connecting the rear of said frame with said tractor, and a blade carrying head detachably connected with said frame and swiveled therein.

11. In a device of the character disclosed, in combination with a tractor, a frame surrounding said tractor, a blade carrier detachably connected to the front of said frame, beams pivotally supported on said tractor, bearings swiveled in one end of said beams, a shaft journaled in said bearings, a pair of sheaves secured to said shaft, flexible connections between the carrier and said pair of sheaves, another sheave secured to said shaft, a cylinder mounted on one of said beams, a fluid pressure operated piston rod within said cylinder, flexible means connecting said last-named sheave with said piston rod whereby upon movement of said piston rod said sheave is rotated and the flexible connections between the blade carrying head and pair of sheaves are caused to be wound upon or unwound from said sheaves thereby elevating or lowering the blade carrying head and front of said frame, and means operable against the other ends of said beams to tilt the frame transversely.

12. In a device of the character disclosed, in combination with a tractor having spaced pairs of tractor wheels for both sides, between which are passed continuous caterpillar treads, and track frames for the said tractor; a frame connected at the rear thereof with the rear of said tractor, a blade connected to the front of said frame and forwardly of said tractor, a supporting bracket secured to the track frame of the tractor and between a pair of said tractor wheels, and hydraulic means secured to said supporting bracket and means between the hydraulic means and the forward end of said frame to elevate and lower the front of said frame.

In testimony whereof I have set my hand.

MACK WOOLDRIDGE.