United States Patent

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[54] **BODILY ATTACHABLE BULLDOZING ASSEMBLY FOR TRACTORS**
6 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **172/803,** 172/307, 172/807
[51] **Int. Cl.** **A01b 59/048**
[50] **Field of Search** 172/807, 803, 801, 484, 307; 37/29, 35

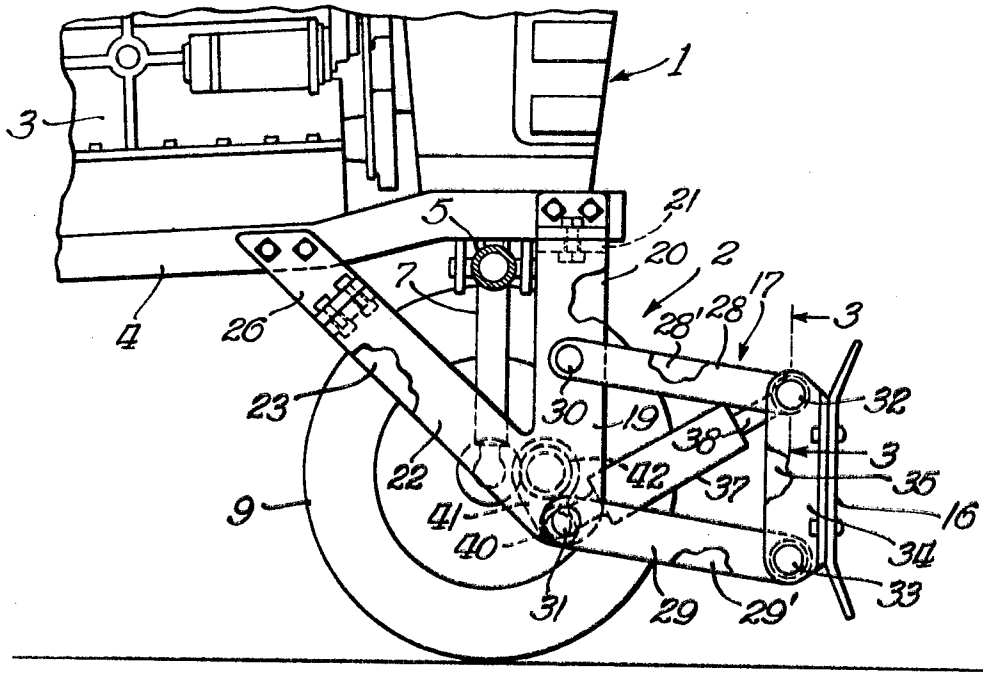
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ABSTRACT: This is a bodily attachable unitary bulldozing apparatus for conventional farm tractors or similar mobile power units and comprises a completely operable mechanism to manipulate a bulldozing blade as required to position such blade upwardly or downwardly as well as at a transverse angle in a vertical plane in relation to the surface being worked.



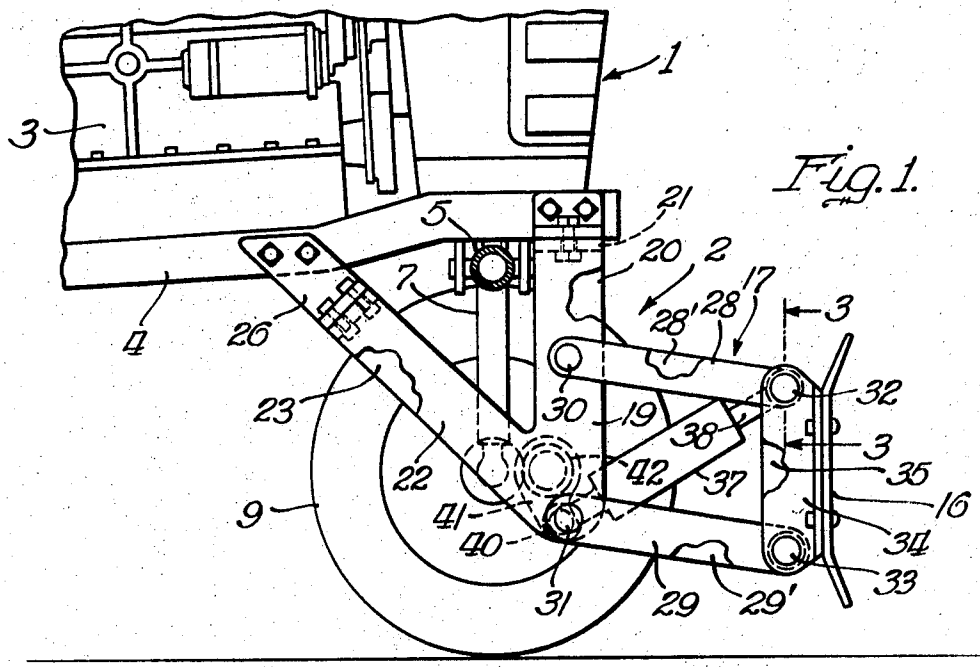
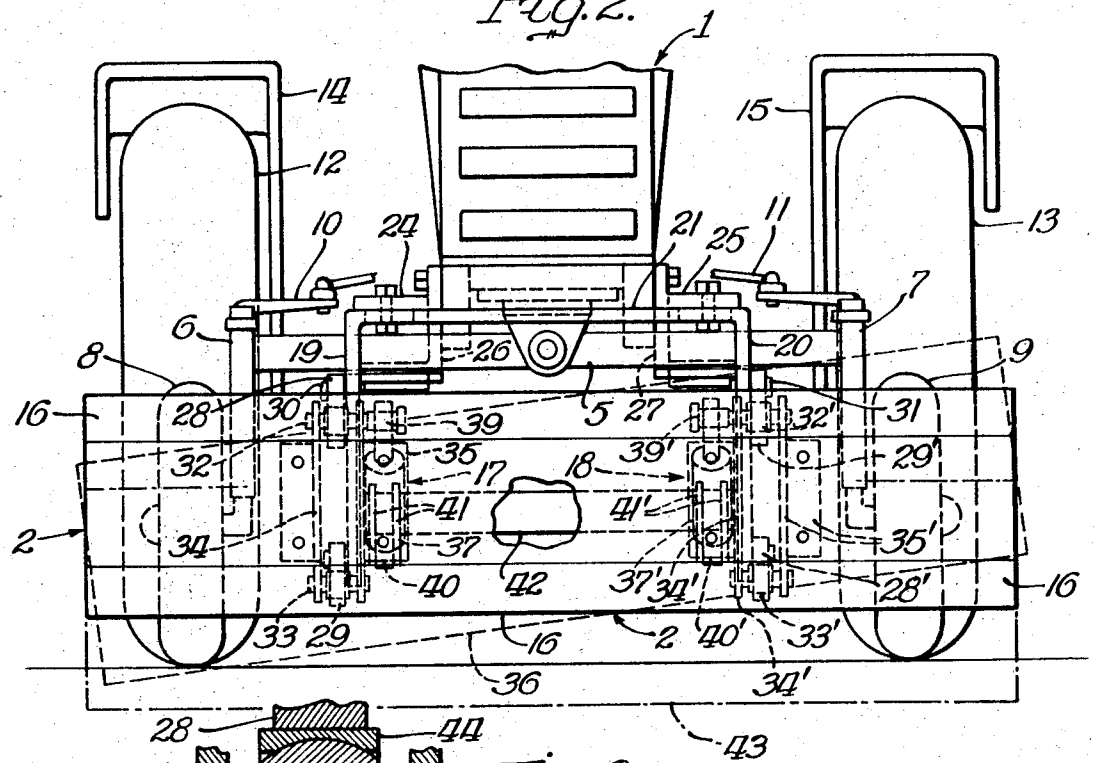


Fig. 1.

Fig. 2.



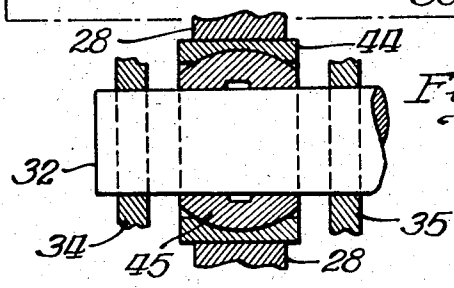


Fig. 3.

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BODILY ATTACHABLE BULLDOZING ASSEMBLY FOR TRACTORS

The present invention relates to a self-contained apparatus including an operable bulldozing blade and link mechanisms for blade manipulation, said apparatus further including adjustable mounting means for attaching the self-contained apparatus bodily to a conventional farm tractor or analogous mobile power vehicle for maneuvering such bulldozing blade.

More specifically, the invention is directed to dual supporting mechanisms carrying a bulldozing blade with power means for said mechanisms to regulate the vertical positioning of the blade either level with the ground or at a canted angle in relation to the working surface and providing mounting means for the supporting mechanisms to bodily attach the latter to a farm tractor or other mobile power means.

One of the objects of this invention, therefore, is to provide a self-contained unitary apparatus which includes a bulldozing blade having all of the functions needed for bulldozing surface areas, the apparatus also having adjustable mounting means to bodily attach the entire apparatus to a tractor, as to the chassis thereof, so as to maneuver the blade through the tractor which also supplies a power source to operate the blade-supporting apparatus.

Another object is to provide dual blade control mechanisms located in laterally spaced positions on the mounting units for such mechanisms, whereby the blade is connected at such laterally spaced locations on said mechanisms for vertically controlled movements to carry the blade upwardly or downwardly in level positions in relation to the surface to be worked or to adjust one end of the blade at a higher or lower level to the other end of the blade for vertically angular blade engagement with the surface to be dozed.

A still further object is to support the dozer blade on the mechanisms that bodily move the blade by means of swivel or tiltable roller bearings defining universal pivotal units to permit the blade to cant or tilt laterally with respect to the ground at either or both of the points of support of the blade on the operable mechanisms that carry the blade from the mounting units.

Another object is to provide parallel link assemblies on the mounting units for connection with the blade and to provide hydraulic cylinder means in diagonal relation to the links in the assemblies to cause the links to swing on the mounting units and to carry the blade accordingly on the links, power to the noted hydraulic cylinder means being supplied from the usual hydraulic power source of the tractor or other mobile power vehicle carrying the bulldozer equipment.

A further object is to provide mounting means to carry the bulldozer blade and its operable means which mounting means include spaced downwardly positioned side brackets carried on the attachable mounts secured to the tractor, wherein the side brackets are each made with vertically positioned support members to carry the link means for the blade and diagonal brace members on the support members to connect with the tractor, both such joined members providing a triangularly upwardly open space to establish clearance for the front axle structure of a tractor using wide-track steering wheels. In this connection it is to be understood that the spacing of the blade manipulation and supporting units is such that on tractors having narrow front wheel axle steering assemblies with closely set wheel pairs, these wheels will be freely usable between the more or less widely set blade manipulation units and under the tractor chassis.

Another object is to provide bracket supporting structures that provide simple orientation means to readily position the entire bulldozing apparatus in a given relation with respect to a tractor attaching part or assembly framework and to also provide adjustable means for convenient securement to the tractor structure per se to rigidly mount the bodily constructed bulldozing assembly in a given workably supported relation upon the tractor to use the latter as a converted bulldozing vehicle by reason of this attachment.

All other objects and advantages shall hereinafter appear in or become apparent from the following detailed description of the invention having reference to the accompanying drawings forming a part of this specification.

In the drawings:

FIG. 1 is a side elevational view of the bulldozer attachment apparatus of the present invention as the same would appear when bodily connected for support and operation on a farm tractor which is only fragmentarily illustrated to include the front steering wheel end thereof;

FIG. 2 is a front elevational view of the bulldozer attachment shown in FIG. 1 and the relationship of this apparatus to the tractor generally, this illustration showing more of the tractor details to establish some of the salient features of the invention; and

FIG. 3 is a detailed cross-sectional view of one of the bearings used in the link connections with the the bulldozer flange members to accommodate the canting action of the blade, this section being taken substantially along the line 3–3 in FIG. 1.

The drawings illustrate a conventional farm type tractor 1 to which is releasably attached the bulldozer blade assembly 2 comprising the unitary structure of the present invention devised for bodily securement and bodily removal to and from a tractor structure to convert the tractor into a bulldozing implement whenever an earth working facility is desired.

The tractor 1 is diagrammatically shown and comprises briefly, the engine 3, chassis 4, the front tilting axle 5, the steering spindles 6 and 7 for wheels 8 and 9 with steering connections 10 and 11, and as shown in FIG. 2, the rear tractor drive wheels 12 and 13 with fenders 14 and 15.

The bulldozer assembly comprises, mainly, the bulldozing blade 16, left and right-hand blade manipulating means 17 and 18 mounted on side brackets 19 and 20 that are part of the securing orientation mounting plate or base 21 and brace legs 22 and 23 stabilize and reinforce the side brackets 19 and 20 when operatively secured to a tractor, and as in this case, to the tractor chassis 4.

The bracket arrangement further provides adjustable securing members 24 and 25 that fasten the plate or base 21 to the tractor for rigid attachment and the brace legs 22 and 23 have similar adjustable securing members 26 and 27 to rigidly join with the chassis 4 as best shown in FIG. 1. Thus suitable leg end brackets are provided with adjustable fastening units to mount the bracket structures in a given fixed relation upon the mechanical structure or framework of a tractor.

A further feature of the bracket arrangement described is that the side brackets 19 and 20 with their respective brace legs 22 and 23 are joined but triangularly related to establish an upwardly open space in each bracket assembly to accommodate the tractor axle 5 so as to not interfere with the front wheel arrangement of tractor 1.

The manipulating means 17 and 18 are the same except being laterally spaced right- and left-hand means so that the description of unit 17 will carry over to unit 18 as well except that corresponding elements in 18 will have primed reference numerals to designate the various like parts corresponding to the parts of unit 17.

The operable means 17 comprises a parallelogram supporting arrangement having links 28 and 29 pivoted on pins 30 and 31 on side bracket 19 and further pivoted on tiltable pin bearings 32 and 33 supported by flange members 34 and 35 secured to the blade 16. Bearing means 32 is shown in section in FIG. 3 and provides the flexible securing means that permits, along with bearing 33, the tilting of the blade 16 into a transverse cant vertically as shown in broken lines at 36 in FIG. 2. Obviously, bearings 32′ and 33′ also enter into the blade tilting action which may be down to the left as shown in FIG. 2 at 36 or downward to the right side, which is accomplished by variable operation of the manipulative means 17 and 18.

Each set of links 28–29 or 28′–29′ has a power cylinder 37–37′ for controlling the link positions and the position of

the dozer blade 16. As best shown in FIG. 1, cylinder 37 is diagonally installed to the links 28 and 29 for pivotal connection of its ram 38 with extension 39 on pin 32 and for pivotal connection on pin 40 on brackets 41 secured to the cross tube 42 that joins side brackets 19 and 20 for further stability and rigidity. Expansion and contraction of the cylinder ram 38 in relation to cylinder 37 will raise and lower the link sets 28 and 29 associated with this cylinder and will raise and lower blade 16 through flange members 34 and 35 at this lateral location to act on the left side of blade 16 as viewed in FIG. 2.

By activating both cylinders 37 and 37' alike, the blade 16 will move bodily and level to the ground as from the full line position in FIG. 2 to the dot and dash line position at 43 or vice versa as directed by the operator through the usual valve means provided to feed hydraulic fluid to the double-acting cylinders 37 and 37'. Through opposite hydraulic cylinder regulation or by activating one cylinder means and not the other, the blade 16 can be tilted in a vertical plane into various selected right or left canted positions as previously explained, one position being shown at 36.

The tilting function is of course made possible by means of the ball and socket bearings such as 32 and 33. In FIG. 3, pin bearing 32 is shown as pivotally connected with the blade flange members 34 and 35 and link 28 is mounted on pin 32 through the bearing ring 44 about the convex bearing ring 45 which two rings permit angular regulation of the pin 32 in relation to the vertically swingable link 28 of the link set.

The described arrangement of blade 16, the manipulative means 17 and 18 plus the described bracket structures to support and mount the blade and its working mechanisms all constitute a unitary arrangement that can be bodily attached to a tractor or power vehicle to convert the latter mobile units into bulldozing implements with ease and simplicity. By suitable hydraulic lines, valve controlled, the cylinders can be regulated to manipulate the blade and the mobile vehicle can then maneuver this bulldozing appurtenance as the operator desires to engage in earth working operations.

The foregoing description is directed to one form of the invention by way of example and to the disclosure of this form as illustrated in the drawings which represent a suggested construction by way of example and not by way of limitation. It is to be understood that certain modifications or changes are possible in the apparatus shown or in the combinations or individual parts without departing from the general inventive concept. The extent of such modifications and/or changes are, therefore, only to be governed by the breadth and scope of the language hereinafter contained in the appended claims directed to the operative working mechanisms of the present attachable bulldozing apparatus of this invention.

What I claim is:

1. A self contained unitary operable bulldozer assembly adapted for bodily attachment with a structural portion of a farm tractor or the like comprising, in combination, a rigid structural tractor part, bracket means having attachable members for rigid securement with said tractor part, a bulldozer blade, laterally spaced blade adjustment and support means mounting said blade on said bracket means for vertical and bodily tilting movement relative thereto, each of said adjustment and support means including a parallelogram link assembly having universal pivot connections with said blade, and selectively operable power means associated with each said parallelogram link assembly and interconnected with said blade at one of said universal pivot connections.

2. In the combination of claim 1, wherein said universal pivot connections comprise ball and socket bearings.

3. In the combination of claim 1, wherein there are two laterally spaced link assemblies supporting the blade at two laterally spaced locations along the length of the blade and said laterally spaced power means coact with each link member set to induce independent blade actuation of the blade at said laterally spaced locations to either raise or lower the blade and blade ends in unison or to alternately vertically actuate the blade ends in opposite relation to each other through opposite operation of said power means.

4. In the combination of claim 1, wherein the power means are hydraulic cylinders connected along a diagonal of said parallelogram link assemblies.

5. In the combination set forth and defined in claim 1, wherein said bracket means comprise widely spaced lateral side brackets to carry the link assemblies for spaced connection therefrom to said blade, brace legs to stabilize and to reinforce the side brackets and wherein said connected side brackets and brace legs are arranged with upwardly open space therebetween to permit the bracket means to avoid interference with the forward wheel axle of the tractor to which said bracket means is rigidly attached to support the blade and its operative link assemblies.

6. In the combination set forth and defined in claim 5, with the addition of an orientation member on said bracket means to bring the bulldozer assembly into a given relationship with respect to the rigid structural portion of the tractor, and adjustable fastening units connected with the side brackets and the brace legs respectively to attach the bracket structure into fixed position upon the rigid structural part of the tractor.