

April 2, 1963

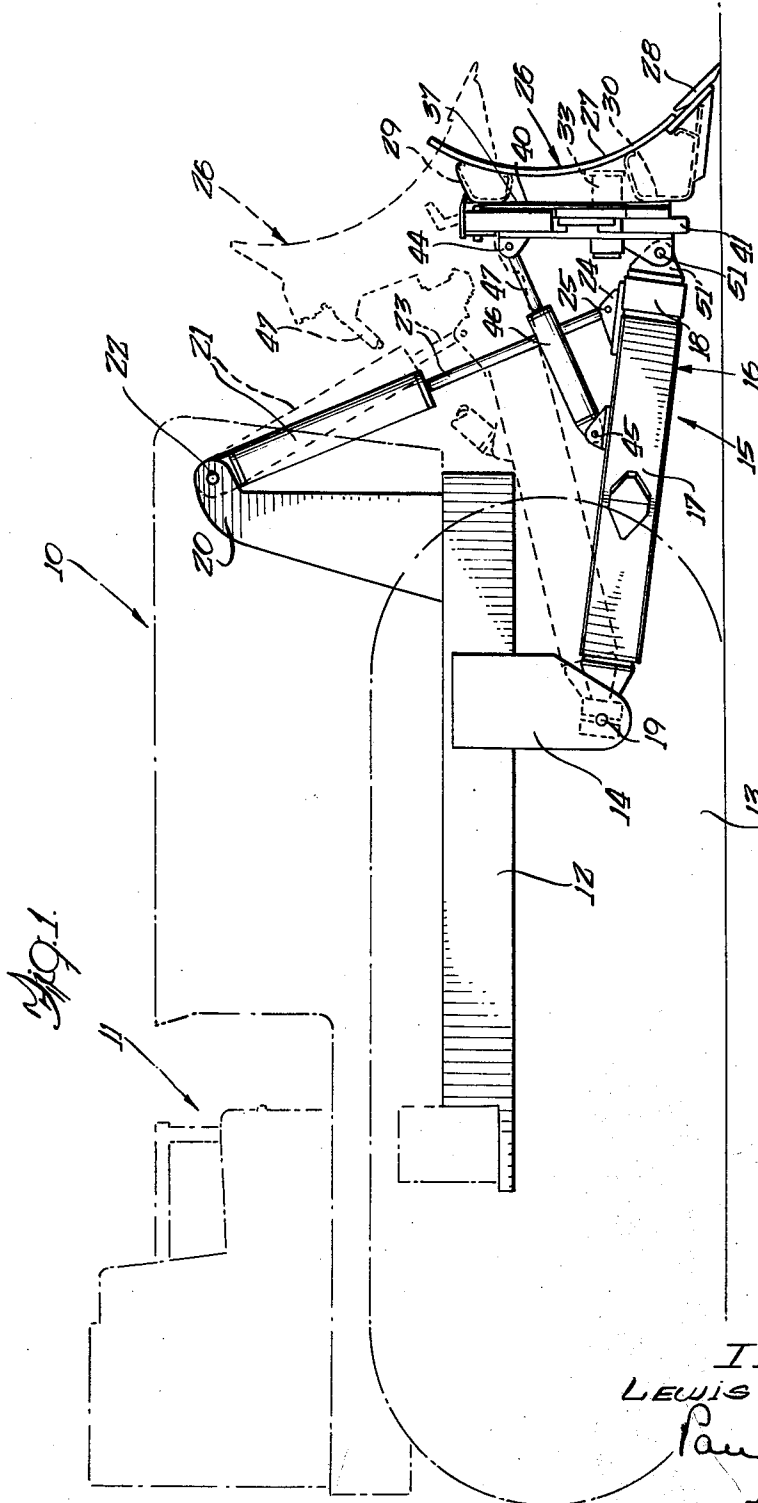
L. KIRCHLER

3,083,480

TILT AND PITCH DOZER CONSTRUCTION

Filed Oct. 28, 1960

4 Sheets-Sheet 1



April 2, 1963

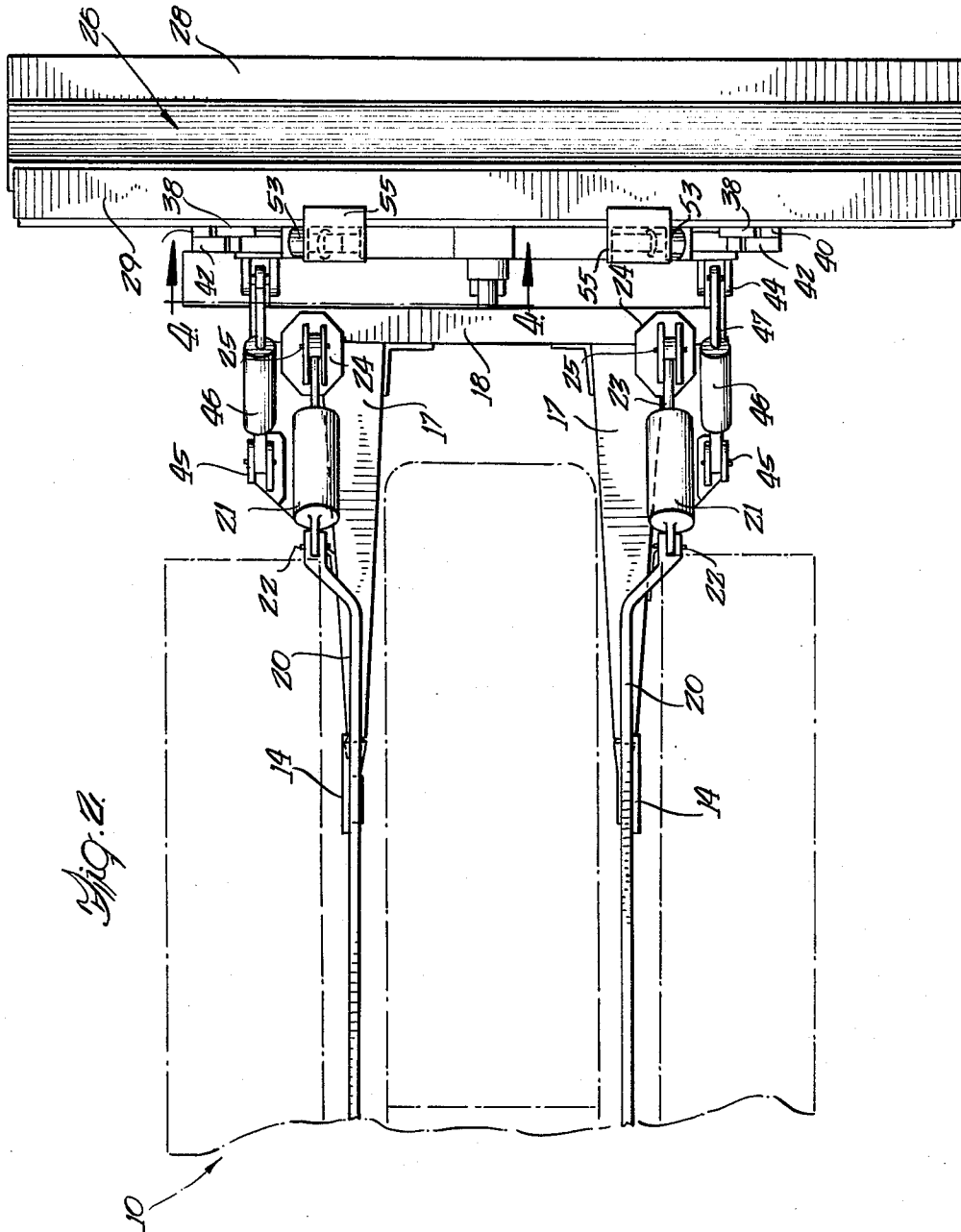
L. KIRCHLER

3,083,480

TILT AND PITCH DOZER CONSTRUCTION

Filed Oct. 28, 1960

4 Sheets-Sheet 2



INVENTOR
LEWIS KIRCHLER
Rene Pippel
ATTORNEY

April 2, 1963

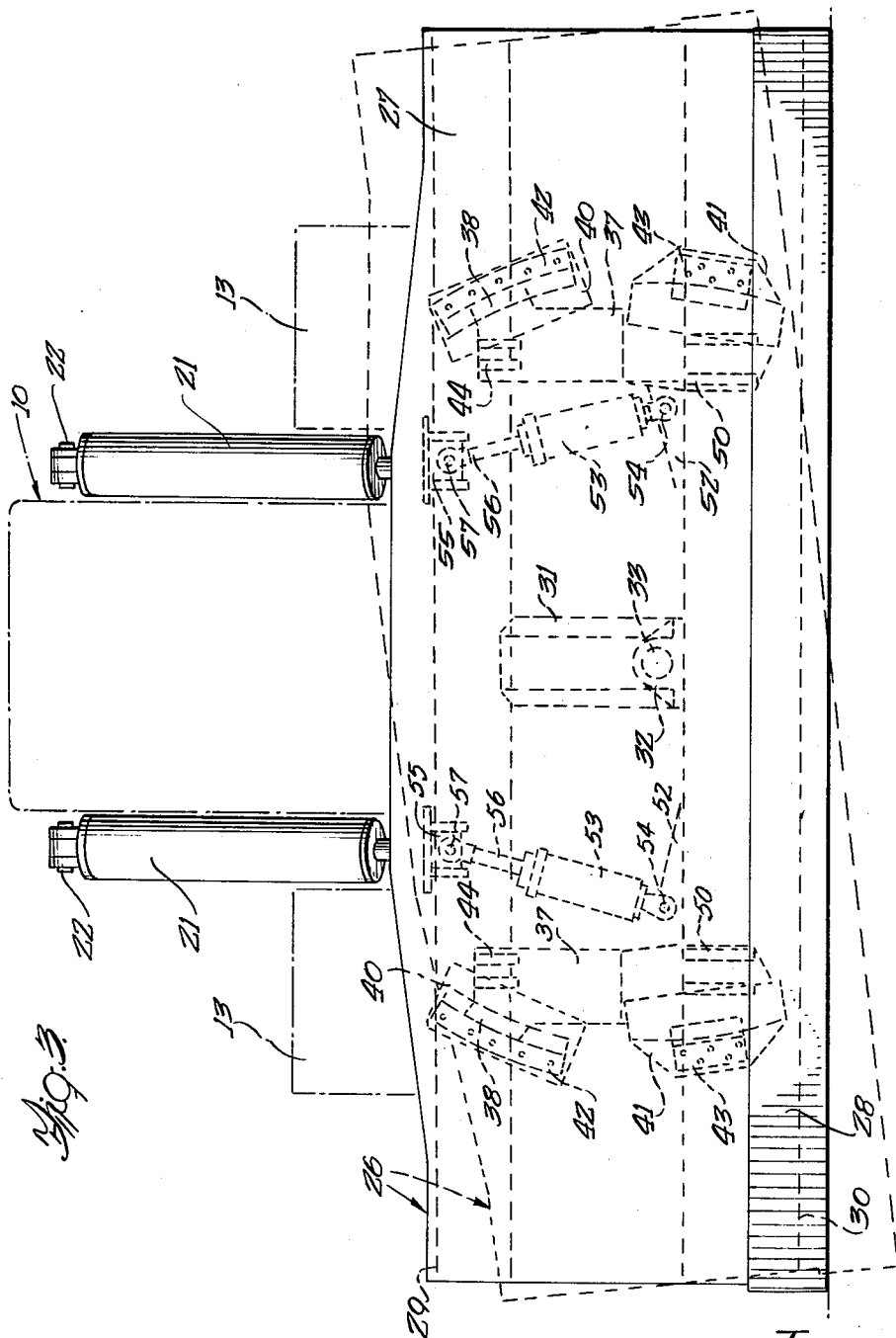
L. KIRCHLER

3,083,480

TILT AND PITCH DOZER CONSTRUCTION

Filed Oct. 28, 1960

4 Sheets-Sheet 3



INVENTOR
LEWIS KIRCHLER
Paul O. Pippel
ATTORNEY

April 2, 1963

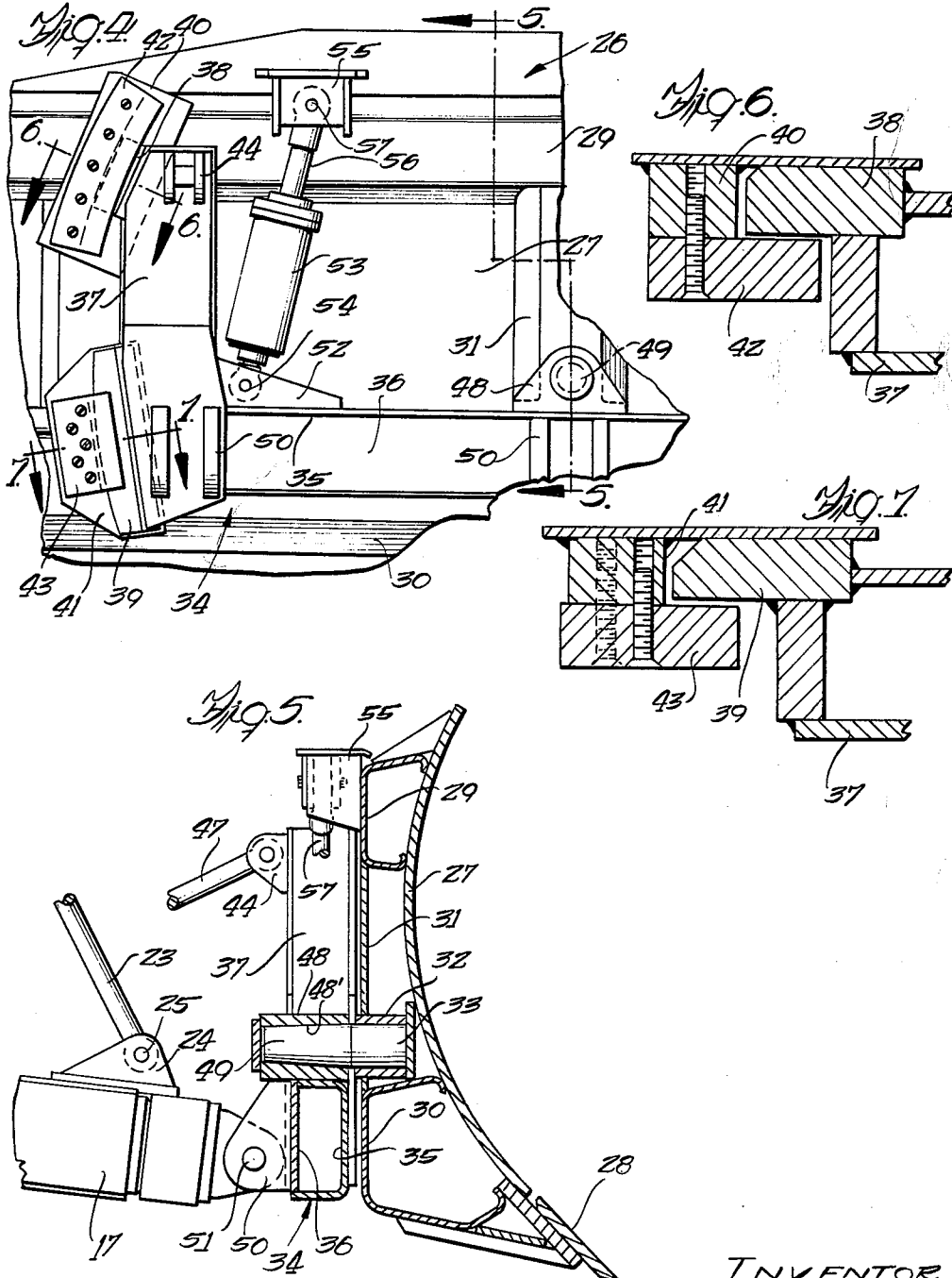
L. KIRCHLER

3,083,480

TILT AND PITCH DOZER CONSTRUCTION

Filed Oct. 28, 1960

4 Sheets-Sheet 4



INVENTOR
LEWIS KIRCHLER
Paul O. Rippe
ATTORNEY

1

3,083,480

TILT AND PITCH DOZER CONSTRUCTION

Lewis Kirchner, Skokie, Ill., assignor to International Harvester Company, Chicago, Ill., a corporation of New Jersey

Filed Oct. 28, 1960, Ser. No. 65,634

4 Claims. (Cl. 37-144)

This invention relates to an earth moving and excavating device. More specifically the invention relates to an improved bulldozer.

The prime object of this invention is to provide an improved bulldozer construction having a novel arrangement for tilting the bulldozer blade and for changing the pitch of the dozer blade to accommodate different ground working conditions.

Another object of the invention is to provide an improved bulldozer having an improved arrangement including hydraulic extensible devices for tilting and for changing the pitch of a dozer blade.

A still further object is to provide an improved bulldozer construction including an improved U-shaped supporting frame which is connected to a push frame and is adapted to be pivoted to vary the pitch of a dozer blade, the said dozer blade also being pivotally connected to the U-frame for tilting movement.

A still further object is the provision of an improved tilting and pitch frame arrangement particularly adapted to heavy working conditions and including a novel U-shaped construction providing for upper and lower guide elements attached to the rear of the dozer blade, the said U-frame arrangement having an improved guide means cooperating with the guide members for effectively securing the dozer blade to the pitch and tilt frame against relative longitudinal displacement during heavy working conditions.

These and other objects will become more readily apparent from a reading of the description when examined in connection with the accompanying sheets of drawings.

In the drawings:

FIGURE 1 is a side elevational view of an improved dozer construction showing its attachment to a crawler-type tractor;

FIGURE 2 is a plan view of the dozer construction and a portion of the tractor shown in FIGURE 1;

FIGURE 3 is an enlarged front elevational view of the improved dozer construction showing its relationship to the crawler tractor;

FIGURE 4 is a view taken substantially along the line 4-4 of FIGURE 2 with the piston rod of a pitch cylinder removed and with a dozer and pitch frame assembly removed from the tractor;

FIGURE 5 is a cross-sectional view taken along the line 5-5 of FIGURE 4 with a tilt cylinder broken away to better illustrate the invention;

FIGURE 6 is a cross-sectional view taken along the line 6-6 of FIGURE 4; and

FIGURE 7 is a cross-sectional view taken along the line 7-7 of FIGURE 4.

Referring now particularly to FIGURES 1 and 2 a crawler-type tractor is generally designated at 10 and is shown schematically. The tractor 10 includes an operator's station 11, side frame members 12 and crawler tracks 13. The side frame members 12 support downwardly projecting brackets 14.

An earth mover is generally designated by the reference character 15. The earth mover 15 comprises a push frame generally designated at 16 and includes side frame members 17 and a transverse front frame member 18 connected to said side frame member 17, the side frame members 17 being connected to the brackets 14 by means

2

of pivotal connections 19. The frame members 12 also support a plurality of upstanding brackets 20. Fluid rams or extensible devices 21 are pivotally connected to the brackets 20 by means of pivot pins 22, the said extensible devices 21 also including piston rods 23 which are pivotally connected to brackets 24 on the arms 17 by means of pivot connections 25.

A dozer blade is generally designated at 26 and is best shown in FIGURE 5. The dozer blade 26 comprises a moldboard 27 having secured thereto at its lower edge a cutting edge 28. The moldboard 27 is provided with upper and lower box-type reinforcing beams 29 and 30. A central upstanding bracket or support 31 is suitably connected to the box-type reinforcing beams 29 and 30.

As best shown in FIGURE 5 a pivot sleeve 32 is suitably secured to the lower box-type reinforcing beam 30 and the bracket 31. A pivot pin 33 projects into the sleeve 32.

A blade supporting frame, or pivot frame is generally designated by the reference character 34.

The blade supporting frame 34 comprises a transverse supporting channel 35 which has secured thereto and extensive therewith, a plate 36. Upright box-type members 37 are provided at the opposite ends of the transverse support 35 these box-type members also being formed by means of various plates connected together by welding or the like to provide rigid upright structures. Thus, the blade supporting frame 34 is of U-shaped construction.

The box-type members are provided at their upper and lower ends, as shown in FIGURES 6 and 7, with guide blocks 38 and 39 which in turn slidably engage guide brackets 40 and 41 suitably secured to the rear side at opposite ends of the moldboard 27. Thus, the guide blocks 38 and 39 may respectively slide with respect to the guide brackets 40 and 41 but retain the blade 26 against forward movement with respect to the supporting frame 34 by means of retainer plates 42 and 43 secured respectively to the guide brackets 40 and 41 by suitable means indicated.

The upper ends of the box-type members 37 are provided with rearwardly projecting ears 44. As best shown in FIGURE 1, the side frame members 17 are provided with brackets 45 on which fluid cylinders 46 are pivotally connected. Each fluid extensible device 46 includes a piston rod 47 which is pivotally connected to the ears 44. The transverse channel support 35 supports a central bracket 48 having a conical bore 48' which receives a conical end 49 of the pin 33. The blade 26 is thus able to pivot about a longitudinal axis with respect to the blade supporting frame 34.

The plate 36 of the transverse member 35 also supports a plurality of rearwardly projecting brackets 50 which as shown in FIGURE 1, include pivot pins 51 engaging bracket extensions 51' projecting forwardly and being connected to the transverse member 18. Thus, the blade supporting frame 34 may be pivotally moved about the pivot 51 to pitch the dozer blade 26 to the desired pitch angle.

Referring now to FIGURE 4, brackets 52 are connected to the transverse member 35 adjacent the upright box-type members 37. A fluid extensible cylinder 53 is suitably connected by means of a pin 54 to each of the brackets 52 the said cylinder 53 projecting upwardly. Brackets 55 are suitably connected to the reinforcing beam 29 on opposite ends thereof the said brackets 55 having pivotally connected thereto, as indicated at 57, a piston arm 56 of the cylinders 53. As indicated in FIGURES 2 and 3, two such cylinders 53 and associated structure are provided.

The fluid extensible devices 21, 46 and 53 are suitably actuated from a suitable hydraulic source including valving, pump, etc. which are not shown. In the operation

the piston rod 23 may be retracted into the cylinder 21 for raising the earth mover 15 or for lowering the same. Upon upward movement of one of the piston rods 56 of one of the cylinders 53 the blade 27 is tilted or moved about its pivot pin 33, the cylinder 53 on the opposite side, of course, having its piston rod 56, during this movement, retracted. The fluid extensible devices 53 operate to effectively tilt the dozer blade 27, about the pivot pin 33, while the supporting frame 34 remains in a stationary position. During such tilting action the guide brackets 40 and 41 move about the guide blocks 38 and 39 in sliding relation to retain the dozer blade 27 against longitudinal displacement relative to the supporting frame 34. By virtue of the upper and lower guide brackets 40 and 41 and the upright box members 37 tilting can be accomplished effectively and a rugged structure is assured so that such tilting may take place in the most difficult ground working operations. In all instances the U-shaped frame is effective to assure continued stabilized operation without any possibility of the blade becoming dislodged from the blade supporting frame 34. Thus, a strong and simplified structure results since the U-frame provides for great strength and insures positive guidance of the blade during the most difficult ground working conditions.

In the event that the operator wishes to pitch the dozer blade 26, it is a simple operation for him to actuate the cylinders 46 to extend the rod 47 whereupon the dozer blade 26 may be pitched forwardly or upon retraction of the piston rods 47 the dozer blade 26 may be pitched rearwardly. The pivotal action is, of course, about the pivot pins 51. The structure is particularly strong and is able to stand the most severe stresses, and yet a full and positive bulldozer operation is assured.

Thus it is believed that the objects of the invention have been fully achieved and that an improved earth-working structure has been described. It must be understood that changes and modifications may be made without departing from the spirit of the invention as disclosed or from the scope thereof as defined in the appended claims.

What is claimed is:

1. In a vehicle having a push frame including side frame members and a transverse frame member connected thereto; an earth mover construction comprising a U-shaped blade supporting frame having a transversely extending support, and a pair of laterally spaced upright members on said support providing an intermediate space therebetween, a centrally disposed longitudinal pivot member supported on said transversely extending support, a dozer blade, means connecting said dozer blade to said longitudinal pivot whereby said blade may be tilted about a longitudinal axis, upper and lower guide members on transversely spaced opposite end portions of said blade, upper and lower guide elements on each of said upright members slidably engaging said guide members during tilting of said blade, fluid ram means supported on said supporting frame within said space and being connected to said blade for tilting the same, a plurality of transversely spaced brackets on said transversely extending support, means connecting said brackets to said transverse frame member for pivotal movement about an axis substantially parallel with said transverse frame member, and fluid rams supported on said side frame members and connected to said upright members adjacent the upper ends thereof whereby said U-shaped frame may be pivoted for changing the pitch of said dozer blade.

2. In a vehicle having a push frame including side frame members and a transverse frame member connected thereto; an earth mover construction comprising a U-shaped blade supporting frame having a transversely extending support, and a pair of laterally spaced upright members on said support providing an intermediate space, a longitudinal pivot member supported on said transversely extending support, a dozer blade, means connecting said dozer blade to said longitudinal pivot whereby said

blade may be tilted about a longitudinal axis, upper and lower guide members on transversely spaced opposite end portions of said blade, upper and lower guide elements on each of said upright members engaging said guide members during tilting of said blade, fluid ram means supported on said supporting frame within said space and being connected to said blade for tilting the same, a plurality of transversely spaced brackets on said transversely extending support, means connecting said brackets to said transverse frame member for pivotal movement about an axis substantially parallel with said transverse frame member, and fluid rams supported on said side frame members and connected to said upright members adjacent the upper ends thereof whereby said U-shaped frame may be pivoted for changing the pitch of said dozer blade.

3. In a vehicle having a push frame including side frame members and a transverse frame member connected thereto; an earth mover construction comprising a U-shaped blade supporting frame having a transversely extending support, and a pair of laterally spaced upright members on said support providing an intermediate space therebetween, a longitudinal pivot member supported on said transversely extending support, a dozer blade, means connecting said dozer blade to said longitudinal pivot whereby said blade may be tilted about a longitudinal axis, transversely spaced guide members on said blade, upper and lower guide elements on each of said upright members slidably engaging said guide members during tilting of said blade, fluid rams means supported on said supporting frame within said space and being pivotally connected to said blade for tilting the same, a plurality of transversely spaced brackets on said transversely extending support, means connecting said brackets to said transverse frame member for pivotal movement about an axis substantially parallel with said transverse frame member, and fluid rams supported on said side frame members and connected to said upright members adjacent the upper ends thereof whereby said U-shaped frame may be pivoted for changing the pitch of said dozer blade.

4. In a vehicle having a push frame including side frame members and a transverse frame member connected thereto; an earth mover construction comprising a U-shaped blade supporting frame having a transversely extending support, and a pair of laterally spaced upright members on said support providing an intermediate space therebetween, a centrally disposed longitudinal pivot member supported on said transversely extending support, a dozer blade, means connecting said dozer blade to said longitudinal pivot whereby said blade may be tilted about a longitudinal axis, upper and lower guide members on said blade, upper and lower guide elements on each of said upright members engaging said guide members during tilting of said blade, fluid ram means supported on said supporting frame within said space and being pivotally connected to said blade for tilting the same, a plurality of transversely spaced brackets on said transversely extending support, means connecting said brackets to said transverse frame member for pivotal movement about an axis substantially parallel with said transverse frame member and fluid rams supported on said side frame members and connected to said U-shaped supporting frame whereby said U-shaped frame may be pivoted for changing the pitch of said dozer blade.

References Cited in the file of this patent

UNITED STATES PATENTS

2,224,725	Felt	Dec. 10, 1940
2,649,794	Wood	Aug. 25, 1953
2,734,292	Graves	Feb. 14, 1956
2,749,630	Nave	June 12, 1956
2,753,638	Mork	July 10, 1956
2,942,363	Long	June 28, 1960
2,950,550	French	Aug. 30, 1960