United States Patent

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[54] **HYDRAULIC CYLINDER MOUNTING ASSEMBLY**
3 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **172/804,** 248/179, 64/17
[51] **Int. Cl.** **E02f 3/76**
[50] **Field of Search** ..... 172/803, 804, 805, 806, 807, 809; 64/17; 248/179; 287/(Inquired)

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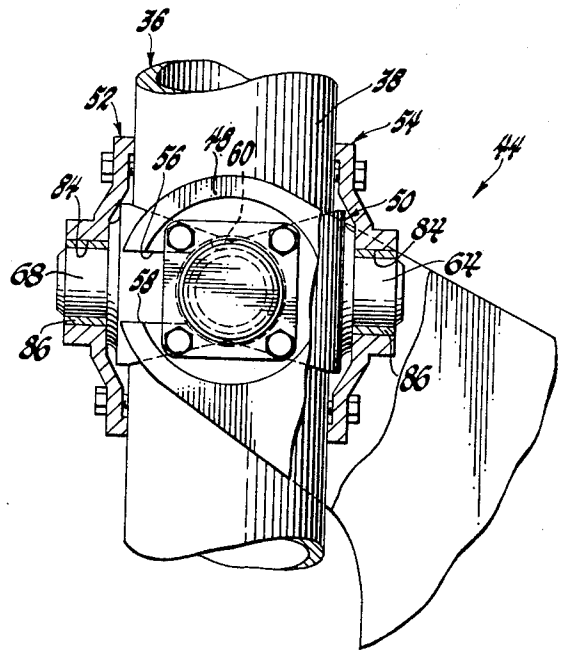
ABSTRACT: A mounting assembly for universally supporting the cylinder member of a hydraulic lift jack on a tractor. The mounting assembly includes a collar which surrounds the cylinder member and has four radially outwardly extending pivot pins formed therewith along mutually perpendicular pivot axes. A pair of the pivot pins are rotatably supported within a support bracket rigid with the tractor, while the other pair of pivot pins are journaled in support members rigidly secured to the cylinder member so that the hydraulic jack is movable about the aforesaid perpendicular axes during adjustable movement of a dozer blade.



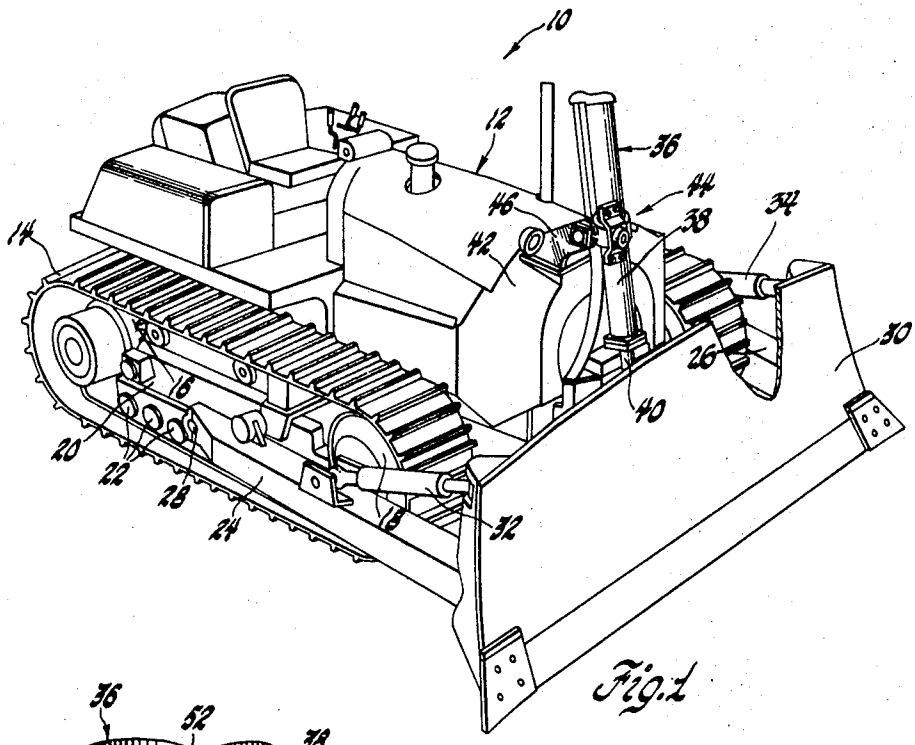


Fig. 1

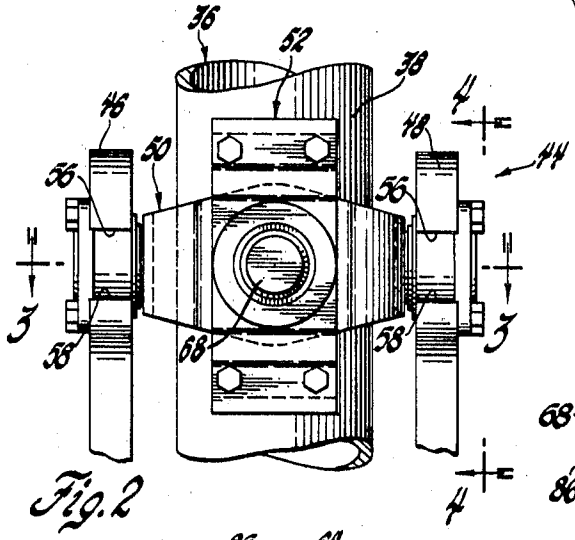


Fig. 2

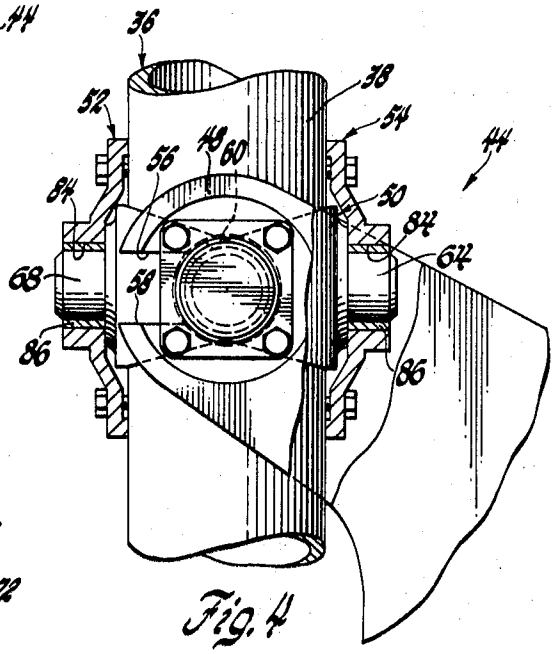


Fig. 4

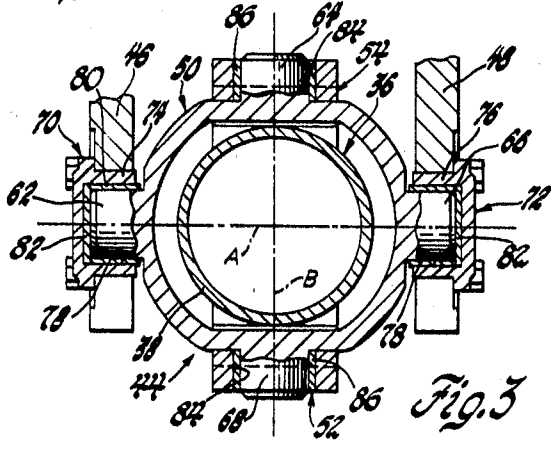


Fig. 3

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HYDRAULIC CYLINDER MOUNTING ASSEMBLY

This invention relates to a mounting assembly particularly useful for supporting the lift jack associated with an earthmoving tractor of the type having a pair of push beams, the forward ends of which support a dozer blade assembly. Vehicles of this type are typically provided with suitable power-operated means for pitching the blade about a transverse horizontally axis and for tilting the blade about an axis extending longitudinally of the tractor so the latter is capable of performing various earthmoving operations. The vehicle also includes a lift jack for raising and lowering the entire blade assembly, and such lift jack can be located on each side of the tractor or centrally positioned along the longitudinal axis of the tractor and in the front thereof. In either case, some form of universal coupling is required to support the lift jack on the tractor so that tilting movement of the blade can be realized without imposing undue stress concentrations in the jack structure.

In its preferred form, the mounting assembly made according to this invention includes a collar which surrounds an intermediate part of the cylinder member of the lift jack and has four radially outwardly extending pivot pins integrally formed therewith. The pivot pins are arranged in pair positioned along mutually perpendicular axes and one pair of the axially aligned pivot pins are rotatably mounted within a support bracket rigidly secured to the tractor. The other pair of axially aligned pivot pins are journaled within a pair of support members which are rigidly secured to the cylinder member. Thus, the arrangement is such that raising and lowering of the blade assembly through the lift jack will result in pivotal movement of the lift jack about one of the axes, while tilting of the blade assembly can cause pivotal movement of the lift jack about the other of the axes.

The objects of the present invention are to provide a universal coupling for supporting a hydraulic cylinder that has a minimum of parts, is inexpensive to manufacture and simple to assemble for use; to provide an improved universal mounting assembly for supporting the lift hydraulic jack associated with a dozer assembly; and to provide a mounting assembly which supports a hydraulic jack on a tractor for movement about a pair of mutually perpendicular pivot axes and may be easily removed from and replaced on the tractor.

Other objects and advantages of the present invention will be apparent from the following detailed description when taken with the drawing in which:

FIG. 1 is a perspective view showing a bulldozer supporting a dozer assembly and incorporating a mounting assembly made in accordance with the invention;

FIG. 2 is an enlarged fragmentary view showing the front end of the mounting assembly incorporated with the bulldozer of FIG. 1;

FIG. 3 is a sectional view taken on line 3–3 of FIG. 2, and

FIG. 4 is a side elevational view taken on line 4–4 of FIG. 2.

Referring now to the drawing and more particularly FIG. 1 thereof, a bulldozer 10 is shown comprising a crawler tractor 12 having an endless track 14 entrained about a drive sprocket 16 and idler wheel 18 and supported at its lower end by a roller frame 20 having a plurality of track rollers 22. Although not shown, a similar track assembly is located on the other side of the tractor and suitable power means are provided for driving both tracks for propelling the crawler tractor 12 in a manner well known to those skilled in the art. A pair of laterally spaced push beams 24 and 26 each has its rear portion connected to the roller frame 20 by a spherical connection 28 located along a transverse horizontal axis, while the forward end of each push beam supports the lower end of a dozer blade 30 through a pivot joint (not shown). A pair of hydraulically operated tilt struts 32 and 34 are pivotally connected between an intermediate portion of the push beams 24 and 26 and an upper portion of the dozer blade 30. A hydraulic lift jack 36 including relatively movable cylinder and piston members 38 and 40 is supported on a forward end of the crawler tractor 12 by a mounting assembly 44 made in accordance with the invention. The lower end of piston member 40 of the lift jack is connected by a spherical joint (not shown) to the rear wall of the dozer blade 30. Thus, it should be apparent that by contracting the lift jack 36, the entire dozer blade assembly will be raised about the aforementioned transverse horizontal axis passing through the spherical connection 28, while expansion of both tilt struts 32 and 34 will cause the dozer blade to pitch forwardly about is pivotal joints with the push beams 24 and 26.

As best seen in FIGS. 2 through 4, the mounting assembly 44 comprises a pair of spaced upstanding support brackets 46 and 48, a collar 50, and a pair of support members 52 and 54. The support brackets 46 and 48 have the lower ends thereof secured to the font upper end of the crawler tractor 12 and are located in laterally spaced parallel planes. A keyhole-shaped aperture is formed in the upper portion of each support bracket and is defined by parallel and vertically spaced walls 56 and 58, both of which are connected at their rearward ends with a circular opening 60 as seen in FIG. 4. The walls 56 and 58 lie in substantially horizontal planes and have the forward ends thereof serving as pivot pin guides in a manner to be explained hereinafter.

The collar 50 is generally ring-shaped and surrounds an intermediate portion of the cylinder member 38. Four pivot pins 62, 64, 66, and 68 are integrally formed with the collar and project radially outwardly therefrom. The longitudinal center axes of the pivot pins 62 and 66 are axially aligned and located along a transverse horizontal axis A, while the longitudinal center axes of the pivot pins 64 and 68 are also axially aligned and located along an axis B which extends longitudinally of the crawler tractor 12. A pair of end caps 70 and 72 have cylindrical ends 74 and 76 which respectively are fitted within the circular opening 60 formed in the support brackets 46 and 48. The end caps 70 and 72 are respectively bolted to the support brackets 46 and 48, and each end cap is provided with a cylindrical bore 78 which accommodates a sleeve-type bushing 80 and thrust bearing 82 which rotatably support one of the pivot pins 62 and 66 as seen in FIG. 3. The pivot pins 64 and 68, on the other hand, are carried by the support members 54 and 52 respectively, which is inturn are bolted to the cylinder member 38 as seen in FIGS. 2 and 4. Each of the support members 52 and 54 has a generally C-shaped cross-sectional configuration and is provided with a cylindrical opening 84 which has a sleeve-type bushing 86 press-fitted therein. The bushing 86 in each of the support members 52 and 54 supports the pivot pins 64 and 66 for rotation about the aforementioned axis B.

It should be apparent from the above description that the mounting assembly 44 includes a minimum of parts and provides an arrangement which can be quickly assembled to a tractor for purposes of supporting the lift jack 36. In this regard, it will be noted that during assembly with the lift jack 36, initially the collar 50 is located about the cylinder member 38 and thereafter the pivot pins 64 and 68 are slipped into the accommodating bushing 86 of the support members 52 and 54 after which the latter are bolted to the cylinder member 38. Thereafter, the pivot pins 62 and 66 are passed between the walls 56 and 58 formed in the support brackets 46 and 48 and the end caps 70 and 72 are then located in the circular openings 60, fitted on the associated pivot pin, and bolted to the support bracket.

As mentioned above, the mounting assembly 44 permits the cylinder member 38 of the lift jack 36 to move about a pair of axes, one of which extends longitudinally of the tractor and the other transversely of the tractor. Accordingly, when the lift jack 36 is contracted for purposes of raising the dozer blade 30, some movement of the lift jack 36 can occur about the horizontal axis A. On the other hand, when the tilt struts 32 and 34 are actuated so as to cause the dozer blade 30 to tilt about a longitudinal axis, any sideway movement of the piston member 40 will be compensated for by movement of the cylinder member 38 about the axis B. Moreover, should the dozer blade 30 be subjected to side loads which might cause the push beams to shift slightly to one side or the other along a

horizontal plane, the stresses which normally would be encountered by the lift jack **36** would again be compensated for by permitting the latter to pivot abut about the pivot axis B.

Various changes and modifications can be made in this construction without departing from the spirit of the invention. Such changes and modifications are contemplated by the inventor and he does not wish to be limited except by the scope of the appended claims.

I claim:

1. THe combination with a tractor and an earthworking implement, a hydraulic lift jack for raising and lowering said implement, said jack having relatively movable piston and cylinder members, a mounting assembly for universally supporting the cylinder member of said jack on said tractor, the improvement wherein said mounting assembly includes a pair of spaced support brackets fixed to said tractor, a collar surrounding an intermediate portion of said cylinder member, a first pair of axially aligned pivot pins projecting outwardly from said collar, a second pair of axially aligned pivot pins projecting outwardly from said collar along an axis substantially normal to a center axis passing through said first pair of pivot pins, a pair of axially aligned oblong apertures formed in said support brackets, each of said apertures having an open end for receiving one of said first pair of pivot pins and serving to accommodate means for pivotally supporting said one of said first pair of pivot pins, a pair of pivot support members rigidly secured to said cylinder member, each of said support members having an opening therein for pivotally supporting one of said second pair of pivot pins whereby said jack is movable about mutually perpendicular axes passing through said first pair and second pair of pivot pins.

2. The combination with a tractor and an earthworking implement, a hydraulic lift jack for raising and lowering said implement, said jack having relatively movable piston and cylinder members, a mounting assembly for universally supporting the cylinder member of said jack on the forward end of said tractor, the improvement wherein said mounting assembly includes a pair of laterally spaced support brackets fixed to said tractor, a collar surrounding an intermediate portion of said cylinder member, a first pair of axially aligned pivot pins projecting outwardly from said collar, a second pair of axially aligned pivot pins projecting outwardly from said collar along an axis substantially normal to a center axis passing through said first pair of pivot pins, a pair of transversely aligned keyhole-shaped apertures formed in said support brackets, each of said apertures having an open end for receiving one of said first pair of pivot pins and having an end cap mounted therein that pivotally supports one of said first pair of pivot pins, a pair of pivot support members rigidly secured to said cylinder member and lying in a vertical plane extending longitudinally of the tractor, each of said support members having an opening therein for pivotally supporting one of said second pair of pivot pins whereby said jack is movable about mutually perpendicular axes passing through said first pair and second pair of pivot pins.

3. The combination with a tractor supporting a blade assembly for movement about a transverse horizontal axis and an axis extending longitudinally of the tractor, a hydraulic lift jack for moving said blade assembly between a lowered dig position and a raised carry position about said transverse axis, said jack having relatively movable piston and cylinder members, a mounting assembly for universally supporting the cylinder member of said jack on the forward end of said tractor, the improvement wherein said mounting assembly includes a pair of laterally spaced support brackets fixed to said tractor, a collar surrounding an intermediate portion of said cylinder member, a first pair of axially aligned pivot pins projecting outwardly from said collar, a second pair of axially aligned pivot pins projecting outwardly from said collar along an axis substantially normal to a center axis passing through said first pair of pivot pins, a pair of transversely aligned apertures formed in said support brackets, an end cap secured to each of said support brackets and having a portion extending into the aperture, each of said portions having a cylindrical bore that pivotally supports one of said first pair of pivot pins, a pair of generally C-shaped pivot support members rigidly secured to said cylinder member and lying in a vertical plane extending longitudinally of the tractor, each of said support members having an opening therein for pivotally supporting one of said second pair of pivot pins whereby said jack is movable about mutually perpendicular axes passing through said first pair and second pair of pivot pins.