

PATENT SPECIFICATION

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- (21) Application No. 13859/76 (22) Filed 6 April 1976
(31) Convention Application No. 610 705 (32) Filed 5 Sept. 1975 in
(33) United States of America (US)
(44) Complete Specification published 12 Oct. 1977
(51) INT. CL.³ E02F 3/76
(52) Index at acceptance
E1F 12
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(54) A VEHICLE HAVING A BULLDOZER ASSEMBLY

(71) We, CATERPILLAR TRACTOR Co., a corporation organized and existing under the Laws of the State of California, United States of America, of 100 N.E. Adams Street, Peoria, State of Illinois - 61629, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to vehicles fitted with bulldozer blades.

In our U.S. Patent Specification No. 3,825,074, means are disclosed for mounting a bulldozer assembly to a tractor wherein universal joints are disposed on opposite sides of an open box cross frame internally containing a heat exchanger system of the tractor. The universal joints are mounted to the box frame side members substantially below the upper end thereof and extend laterally outwardly from the opposite sides of the box frame.

In our U.S. Patent Specification No. 3,834,478, a construction is disclosed in which a guard is provided which, together with the heat exchanger, is pivotally mounted to be swung as a unit away from the power unit of a tractor such as to provide service access to the power unit.

In U.S. Patent Specification No. 2,965,187 a tiltable engine guard is described for use on a tractor which is also adapted to serve as a support for the lift mechanisms used to raise and lower a bulldozer blade. The bracket structure mounting the hydraulic jack is attached to the side plate of the guard.

In another form of jack mounting means, brackets are provided on cross tube supports which tend to retard the flow of cooling air through the radiator.

The use of external jack mounting brackets has been found to raise several

additional problems, including the undesirable obstruction of the operator's vision forwardly of the tractor, as well as the occasional blocking or jamming of debris inwardly and forwardly of the track chains.

In accordance with the invention, a vehicle has a frame which carries an engine coolant radiator; a bulldozer assembly pivotally carried by the frame; a radiator guard for protecting the radiator, the guard having sockets at corner portions adjacent to upper lateral corners of the radiator; and lift jack means having portions connected to the bulldozer assembly and mounting portions received in the sockets for adjustably mounting the lift jack means on the radiator guard.

The corner portions may comprise castings having the sockets formed integrally therein.

The guard may comprise an U-shaped assembly including side portions and an upper cross portion, the corner portions being secured to the opposite ends of the cross portion and to the upper ends of the side portions.

Facilitated installation of the jack mounting means may be provided by mounting pivot portions of the jack mounting means in the socket. In one construction the socket extends forwardly at an upward angle to the horizontal. The mounting means may comprise a yoke which further carries between the arms thereof a second pivot to provide, in cooperation with the pivot portion in the corner portion socket, a universal mounting of the jack for improved lifting of the bulldozer blade.

The pivot portion of the mounting structure may be removably retained in the socket by means engaging an annular groove in an inner end portion thereof. The pivot portion of the mounting means may comprise a pivot stepped complementarily to a stepped socket configuration and suit-

able annular bearings may be provided at spaced, stepped portions of the pivot for freely rotatively mounting the pivot in the socket.

5 As the jack mounting means are disposed at the corners of the radiator, and more specifically may be disposed laterally of the space above the radiator, and as the mounting means need not project outwardly or
10 upwardly to obstruct the tractor operator's vision, improved facilitated operation of the tractor may be provided.

The present jack mounting means provides a rigid mounting structure obviating
15 the need for additional support members. The use of the upwardly inclined socket mounting means permits facilitated installation and removal of the mounting means when desired while yet the mounting means
20 may be effectively positively locked in pivotal association with the radiator guard in normal use.

Further, as the socket means may be disposed substantially vertically above the side
25 walls of the radiator guard, maximum structural integrity of the apparatus is obtained over the entire range of jack and bulldozer operation.

One example of a bulldozer constructed
30 in accordance with the invention is illustrated in the accompanying drawing, wherein:

Figure 1 is a side elevation;

35 Figure 2 is a fragmentary enlarged elevation illustrating more specifically the mounting means to the radiator guard;

FIGURE 3 is a fragmentary front elevation of the radiator and radiator guard means with the jacks and jack mounting
40 means removed therefrom; and,

FIGURE 4 is a fragmentary enlarged section taken substantially on the line 4-4 in Figure 2.

In the construction disclosed in the drawings, a crawler-type tractor generally designated
45 10 is provided with a bulldozer assembly generally designated 11 having push arms 12 mounted by pivots 13 to a frame 14 of the tractor. The bulldozer blade
50 15 is movably mounted by pivots 16 to the front ends of the push arms. The front ends of the push arms and bulldozer blade are supported by a pair of lift jacks 17 having connecting rods 18 connected to the bulldozer blade by pin connectors 19.
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Each jack further includes a cylinder 20 which is universally adjustably mounted to a radiator guard 21 by a mounting structure generally designated 22. The radiator
60 guard may be tiltably mounted to the tractor frame generally in the manner shown in the above referred to U.S. patent specification No. 3,834,478.

The present invention is concerned with
65 the mounting structure 22 and radiator

guard configuration providing improved mounting of the bulldozer blade in the tractor by means of jacks 17.

More specifically, as best seen in Figures 2-4, each mounting means 22 includes a
70 yoke 23 having a pair of forwardly spaced arms 24 and 25. The bight 26 of the yoke is provided with a rearwardly projecting pivot 27 adapted to be rotatably received in a socket 28 in a corner portion 29 of
75 radiator guard 21.

As best seen in Figure 4, the jack cylinder 20 may be provided with a pair of trunnions 30 journaled in bearings 31 secured to the yoke arms 24 and 25 by suitable means, such as screws 32. Thus, jack
80 cylinder 20 may pivot about the horizontal axis of trunnions 30 and about the axis of pivot 27 to provide a universal mounting of the jacks.
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As best seen in Figure 2, socket 28 extends forwardly at an upwardly inclined acute angle in guard corner portion 29. Thus, yoke pivot 27 may be readily installed in the socket by simple slight downward,
90 rearward insertion thereof to bring a rear end surface 33 of the pivot against a stop shoulder 34 on corner portion 29 at the inner end of the socket. As shown in Figure 4, pivot 27 is stepped to define four successively smaller pivot portions 35, 36, 37 and 38. Socket 28 is correspondingly stepped to define socket portions 39, 40, 41 and 42. Sleeve bearings 43 and 44 may be provided in socket portions 39 and 41, respectively,
100 for rotatively journaling the pivot. A seal 45 may be provided at the outer end of socket portion 39.

Inner pivot portion 38 is provided with an annular groove 46 for receiving the inner end 47 of a lock pin 48. Lock pin 48 may further be provided with an outer enlarged flange 49 adapted to be secured to a boss 50 on radiator guard corner portion 29, by suitable means, such as screws 51 for removably retaining the lock pin portion 47 in groove 46 to provide axially fixed rotative retention of pivot 27 in the socket.
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As best seen in Figure 3, radiator guard 21 includes a pair of such corner portions 29 at opposite ends of a cross portion 52 and at the upper end of a pair of side portions 53 and 54, respectively. The corner portions 29 may comprise individual castings having sockets 28 formed therein and the corner portion castings may be secured to the cross portion and side portions of the guard by suitable means, such as welding. The guard may further carry suitable attaching means generally designated 55, 56
110 and 57 for mounting fan baffle segments 58, fan and drive support struts 59, and the like in the assembly.

By providing the means for mounting the jack yokes to the radiator guard effectively
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internally of the guard so as to provide an effectively flush mounting thereof, maximum strength is obtained without the need for expensive reinforcing elements, double wall construction, and the like, as required in the prior art. Further, the effective recessing of the mounting means within the radiator guard provides improved operator visibility. Still further, by mounting the jacks laterally of the radiator, blocking and jamming of debris inwardly and forwardly of the tractor chains is effectively minimized. The readily removable mounting of the jacks to the radiator guard further provides for improved facilitated installation and servicing of the apparatus.

WHAT WE CLAIM IS:—

1. A vehicle having a frame which carries an engine coolant radiator; a bulldozer assembly pivotally carried on the frame; a radiator guard for protecting the radiator, the guard having sockets at corner portions adjacent to upper lateral corners of the radiator; and lift jack means having portions connected to the bulldozer assembly and mounting portions received in the sockets for adjustably mounting the lift jack means on the radiator guard.
2. A vehicle according to claim 1, wherein the sockets open forwardly from the guard corner portions at a front of the vehicle.
3. A vehicle according to claim 1 or claim 2, wherein the sockets have axes which are inclined upwardly out of the socket at an acute angle to the horizontal.
4. A vehicle according to any one of claims 1 to 3, wherein the lift jack means mounting portions comprise yokes having pivot portions rotatably received in the sockets.
5. A vehicle according to claim 4, wherein the lift jack means mounting portions comprise spaced mounting arms, and means for providing with the pivot portions universally movable mounting of the lift jacks on the radiator guard.
6. A vehicle according to claim 5, wherein the means for providing with the pivot portions universally movable mounting of the lift jacks on the radiator guard are trunnion bearings.

7. A vehicle according to claim 5 or claim 6, wherein the means for providing with the pivot portions universally movable mounting of the lift jacks on the radiator guard are removably secured to the yoke.

8. A vehicle according to any one of the preceding claims, wherein the radiator guard corner portions comprise castings having the sockets formed integrally therein.

9. A vehicle according to any one of the preceding claims, wherein the radiator guard comprises an U-shaped assembly including side portions and an upper cross portion, the corner portions being secured to the opposite ends of the cross portion and to the upper ends of the side portions.

10. A vehicle according to any one of the preceding claims, wherein the radiator guard comprises a fabricated assembly including weld means securing the corner portions therein.

11. A vehicle according to any one of the preceding claims, further including means for releasably locking the mounting portions against withdrawal from the sockets.

12. A vehicle according to any one of the preceding claims, wherein the sockets and mounting portions are complementarily stepped.

13. A vehicle according to claim 12, wherein annular bearing means are provided at spaced stepped portions of the sockets and mounting portions.

14. A vehicle according to claim 12, when dependent on claim 11, wherein the means for releasably locking the mounting portions against withdrawal from the sockets is positioned inwardly of the bearing means.

15. A vehicle according to any one of the preceding claims, wherein the corner portions are disposed laterally of the space above the radiator.

16. A vehicle according to claim 1, substantially as described with reference to the accompanying drawings.

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4. A vehicle according to any one of claims 1 to 3, wherein the lift jack means mounting portions comprise yokes having pivot portions rotatably received in the sockets.

5. A vehicle according to claim 4, wherein the lift jack means mounting portions comprise spaced mounting arms, and means for providing with the pivot portions universally movable mounting of the lift jacks on the radiator guard.

6. A vehicle according to claim 5, wherein the means for providing with the pivot portions universally movable mounting of the lift jacks on the radiator guard are trunnion bearings.

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15. A vehicle according to any one of the preceding claims, wherein the corner portions are disposed laterally of the space above the radiator.

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