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(54) AUXILIARY FRAME FOR A VEHICLE

(71) We, CATERPILLAR TRACTOR CO., a corporation organised and existing under the laws of the State of California, United States of America, of 100 N.E. Adams Street, Peoria, State of Illinois 61602, 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 present invention relates to an auxiliary frame adapted to be mounted on a vehicle for carrying working implements.

Many earth-moving vehicle manufacturers make several types of earth-moving vehicles, some of which have the same basic design. For example, many of the components of a track-type loader are similar or identical to corresponding components of a crawler-tractor. By using an identical basic component, allowing for a degree of easy modification, for two different types of vehicles, the tooling and manufacturing costs for each component will generally be lower than when a different component is used for each vehicle. Furthermore, the more components the vehicles have in common, the lower the cost of each individual vehicle.

While U.S. Patent No. 2,755,572, U.S. Patent No. 2,843,947, U.S. Patent No. 3,335,884, and U.S. Patent No. 2,878,598 disclose auxiliary frames generally of the type herein described, only U.S. Patent No. 2,755,572 and U.S. Patent No. 2,843,947 define auxiliary frames of the type designed to be useful for different vehicle functions, and while these frames can be so used, they do not incorporate various structural features so as to permit the securing of bulldozer or loader implements. Nor is there any provision for use in conjunction with for example, a vehicle roll-over protective structure.

It is an object of this invention to provide an auxiliary frame adapted to be mounted on a vehicle and which incorporates structural features enabling different working implements to be carried thereby.

It is a further object of this invention to provide an auxiliary frame which, while fulfilling the above object, is simple in design and manufacture.

Broadly stated, the invention comprises an auxiliary frame adapted to be mounted on a vehicle for carrying working implements, such frame comprising first and second generally parallel spaced-apart side plates, defining first and second forwardly extending portions and first and second rear portions, respectively, and first and second upwardly extending portions extending from the first and second rear portions respectively. Brace means interconnect the first and second upwardly extending portions. Further included are first and second auxiliary plates fixed to said brace means and extending generally parallel to the first and second upwardly extending portions respectively and in laterally spaced-apart relation thereto. The first auxiliary plate and first upwardly extending portion define coaxial apertures, and the second auxiliary plate and second upwardly extending portion define coaxial apertures. Means are included for attaching said first and second side plates to the vehicle.

The invention also extends to vehicles having such an auxiliary frame mounted thereon.

Embodiments of the present invention will hereinafter be described, by way of example, with reference to the accompanying drawings, in which;

Fig. 1 is a side elevation of a vehicle having an auxiliary frame in one form thereof mounted thereon,

Fig. 2 is a perspective view of the frame as incorporated in the vehicle of Fig. 1,

Fig. 3 is a side elevation of a vehicle having the auxiliary frame in another form thereof mounted thereon, and

Fig. 4 is a perspective view of the frame as incorporated in the vehicle of Fig. 3.

Referring initially to Fig. 1 and 2 of the drawings, an auxiliary frame is generally indicated by the reference numeral 10. Such frame 10 is illustrated in association with a crawler tractor 12. The frame 10 has generally parallel spaced-apart side plates 14, 16. The side plate 14 defines a forwardly extending portion 18 and a rear portion 20. Likewise, the side plate 16 defines a forwardly extending portion 22 and a rear portion 24. Upwardly extending portions 26,28 extend from the rear portions 20,24. A brace 30 is fixed to and interconnects the upwardly extending portions 26,28.

The rear portions 20,24 have fixed thereto and facing rearwardly thereof mounting pads 32,34. The forwardly extending portions 18,22 have fixed thereto on the bottom thereof mounting pads 36,38. The mounting pads 32,34 are provided for attaching the rear portions 20,24 to a rigid gear case 40, with the gear case 40 disposed rearwardly of such rear portions 20,24. The mounting pads 36,38 are provided for attaching the forwardly extending portions 18,22 to a transversely disposed rigid hard bar 42 of the vehicle 12 with the hard bar 42 disposed beneath the forwardly extending portions 18,22. A pair of auxiliary plates in the form of ears 44,46 are fixed to the brace 30 and extend generally parallel to the upwardly extending portions 26,28 in laterally spaced apart relation thereto. Ear 44 is disposed inwardly of upwardly extending portion 26, and ear 46 is disposed inwardly of upwardly extending portion 28. The ear 44 and upwardly extending portion 26 define coaxial apertures 48,50, and the ear 46 and the upwardly extending portion 28 define coaxial apertures 52,54, the apertures 50, 54 being upwardly extending portion apertures.

Bracket 56 is removably mounted to the rear portion 20 of the side plate 14 by means of bolts 58, and defines bracket aperture 59. A second bracket, similar to bracket 56 is removably mounted to the rear portion 24 of the side plate 16.

In the use of the frame 10 as described in this embodiment, mounting pads 32,34, 36,38 are attached as previously described, as shown in Fig. 1. A roll-over protective structure 60 is fitted and held thereon by pins 62 disposed through apertures 48,50 and apertures 52,54 to secure ears 64 of the roll-over protective structure 60 thereto. The rear of the roll-over protective structure 60 is mounted on a pair of mounting brackets 66 secured to the gear case 40.

A bulldozer arrangement 68 has a pair of push arms 70 (one shown) pivotally connected to lugs 72 extending forwardly from hard bar 42. Aperture 59 in bracket 56 receives a pin 74 for pivotally connecting a lift jack 76 of the bulldozer arrangement 68. The auxiliary frame 10 described above provides a rigid mounting for securing the front of the roll-over protective structure 60 to the crawler tractor 12 and will be used only on the tractors that will be provided with a roll-over protective structure. However, some tractors will not have a roll-over protective structure mounted thereon and the upwardly extending portions 26,28 of the side plates 14,16 of the frame 10 are not then used.

The auxiliary frame 10, as first described with reference to Figs. 1 and 2, may also be converted to a loader frame 80, which is shown in Figs. 3 and 4 to mount a loader linkage 82 thereto. Such loader frame 80 has brackets 56 removed, and includes additional plates 84,86 fixed relative to and generally parallel to the upwardly extending portions 26,28 respectively and in spaced apart relation to and outwardly thereof, so as to form box-type structures, having vertical openings at their forward edges to receive parts of the loader linkage 82.

Reinforcing plates 88,90 are disposed between the upwardly extending portions 26,28 and additional plates 84,86 as shown.

Additional plate 84 defines an aperture 92 coaxial with apertures 48,50 and additional plate 86 defines an aperture 94 coaxial with apertures 52,54. The additional plate 84, and upwardly extending portion 26, define additional pairs of coaxial apertures 96, as do the additional plate 86 and upwardly extending portions 28. A plurality of bosses 98 are included where appropriate. Through such apertures (and bosses), the loader linkage 82 may be properly pivotally mounted to the frame 80.

It is to be noted that, in the first embodiment, the frame provides a rigid mount for a roll-over protective structure 60. Of course, the protective structure 60 can be omitted if not required. The removable brackets 56 lend to the adaptability of the structure, and, if omitted, allow for the additional plates 84,86 as to be provided for the mounting of the loader linkage 82.

The particular placement of the mounting pads 32,34,36,38 ensures that proper carrying and support of the frames 10,80 and implements connected thereto are provided (by placement of pads 36,38 with hard bar 42 therebeneath), and that the frame can withstand rearward thrust loads on the implement (by the rearward placing of pads 32,34). The coaxial placing of apertures 48,50,92, and the coaxial placing of apertures 42,54,94 provide the advantage that only a single pin is needed in each of these

sets to fix whatever parts are to be associated therewith to the frame.

WHAT WE CLAIM IS:—

1. An auxiliary frame adapted to be mounted on a vehicle for carrying working implements, comprising first and second generally parallel spaced-apart side plates, defining first and second forwardly extending portions and first and second rear portions respectively, and first and second upwardly extending portions extending from the first and second rear portions respectively;

brace means interconnecting the first and second upwardly extending portions;

first and second auxiliary plates fixed to said brace means and extending generally parallel to the first and second upwardly extending portions respectively and in laterally spaced-apart relation thereto;

the first auxiliary plate and first upwardly extending portion defining coaxial apertures, and the second auxiliary plate and second upwardly extending portion defining coaxial apertures; and

means for attaching said first and second side plates to the vehicle.

2. An auxiliary frame as claimed in claim 1, wherein the first and second auxiliary plates are disposed inwardly of the first and second upwardly extending portions.

3. An auxiliary frame as claimed in claim 1 or 2, further comprising first and second brackets removably mounted to the first and second side plates and defining first and second bracket apertures respectively.

4. An auxiliary frame as claimed in claim 3, wherein the first and second brackets are removably mounted to the first and second rear portions of the first and second side plates respectively.

5. An auxiliary frame as claimed in claim 1 or 2, further comprising first and second additional plates fixed relative to and generally parallel to the first and second upwardly extending portions respectively and in spaced-apart relation thereto and outwardly thereof, the first additional plate defining a first upper aperture coaxial with the coaxial apertures defined by the first upwardly extending portion and first auxiliary plate, and the second additional plate defining a second upper aperture coaxial with the coaxial apertures defined by the second upwardly extending portion and second auxiliary plate.

6. An auxiliary frame as claimed in claim 5, wherein the first additional plate and first upwardly extending portion define additional pairs of coaxial apertures, and the second additional plate and second upwardly extending portion define additional pairs of coaxial apertures.

7. A vehicle having mounted thereon an auxiliary frame as claimed in any of the preceding claims.

8. A vehicle as claimed in claim 7, wherein said auxiliary frame further comprises means for attaching the first and second rear portions to a rigid part of the vehicle disposed rearwardly of said first and second rear portions; and,

means for attaching the first and second forwardly extending portions to a second rigid part of the vehicle in front of said rigid part, with said second rigid part disposed beneath the first and second forwardly extending portions.

9. An auxiliary frame adapted to be mounted on a vehicle for carrying working implements substantially as described with reference to the accompanying drawings.

10. A vehicle substantially as described with reference to the Figures 1 or 3 of the accompanying drawings.

For the Applicants,
FRANK B. DEHN & CO.,
Imperial House,
15-19 Kingsway,
London, WC2B 6UZ.

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1. An auxiliary frame adapted to be mounted on a vehicle for carrying working implements, comprising first and second generally parallel spaced-apart side plates, defining first and second forwardly extending portions and first and second rear portions respectively, and first and second upwardly extending portions extending from the first and second rear portions respectively;

brace means interconnecting the first and second upwardly extending portions;

first and second auxiliary plates fixed to said brace means and extending generally parallel to the first and second upwardly extending portions respectively and in laterally spaced-apart relation thereto;

the first auxiliary plate and first upwardly extending portion defining coaxial apertures, and the second auxiliary plate and second upwardly extending portion defining coaxial apertures; and

means for attaching said first and second side plates to the vehicle.

2. An auxiliary frame as claimed in claim 1, wherein the first and second auxiliary plates are disposed inwardly of the first and second upwardly extending portions.

3. An auxiliary frame as claimed in claim 1 or 2, further comprising first and second brackets removably mounted to the first and second side plates and defining first and second bracket apertures respectively.

4. An auxiliary frame as claimed in claim 3, wherein the first and second brackets are removably mounted to the first and second rear portions of the first and second side plates respectively.

5. An auxiliary frame as claimed in claim 1 or 2, further comprising first and second additional plates fixed relative to and generally parallel to the first and second upwardly extending portions respectively and in spaced-apart relation thereto and outwardly thereof, the first additional plate defining a first upper aperture coaxial with the coaxial apertures defined by the first upwardly extending portion and first auxiliary plate, and the second additional plate defining a second upper aperture coaxial with the coaxial apertures defined by the second upwardly extending portion and second auxiliary plate.

6. An auxiliary frame as claimed in claim 5, wherein the first additional plate and first upwardly extending portion define additional pairs of coaxial apertures, and the second additional plate and second upwardly extending portion define additional pairs of coaxial apertures.

7. A vehicle having mounted thereon an auxiliary frame as claimed in any of the preceding claims.

8. A vehicle as claimed in claim 7, wherein said auxiliary frame further comprises means for attaching the first and second rear portions to a rigid part of the vehicle disposed rearwardly of said first and second rear portions; and,

means for attaching the first and second forwardly extending portions to a second rigid part of the vehicle in front of said rigid part, with said second rigid part disposed beneath the first and second forwardly extending portions.

9. An auxiliary frame adapted to be mounted on a vehicle for carrying working implements substantially as described with reference to the accompanying drawings.

10. A vehicle substantially as described with reference to the Figures 1 or 3 of the accompanying drawings.

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15-19 Kingsway,
London, WC2B 6UZ.

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