

[54] **DUAL POSITION HYDRAULIC
OUTRIGGER ASSEMBLY**
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[51] Int. Cl. **B60s 9/12**
[58] Field of Search **280/150.5**, 150 C; 212/145

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[57] **ABSTRACT**

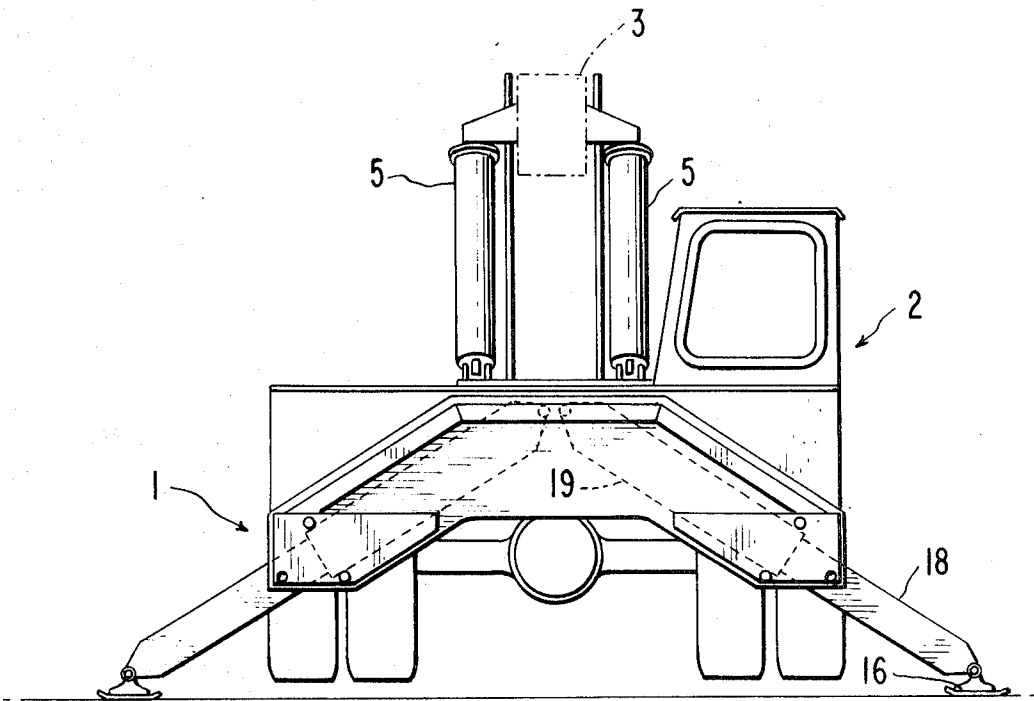
A hydraulic outrigger assembly for mobile cranes wherein the outriggers are constructed and arranged to be selectively extended to operative position in either a divergent or substantially vertical attitude relative to the vehicle being stabilized.

[56] **References Cited**

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10 Claims, 10 Drawing Figures



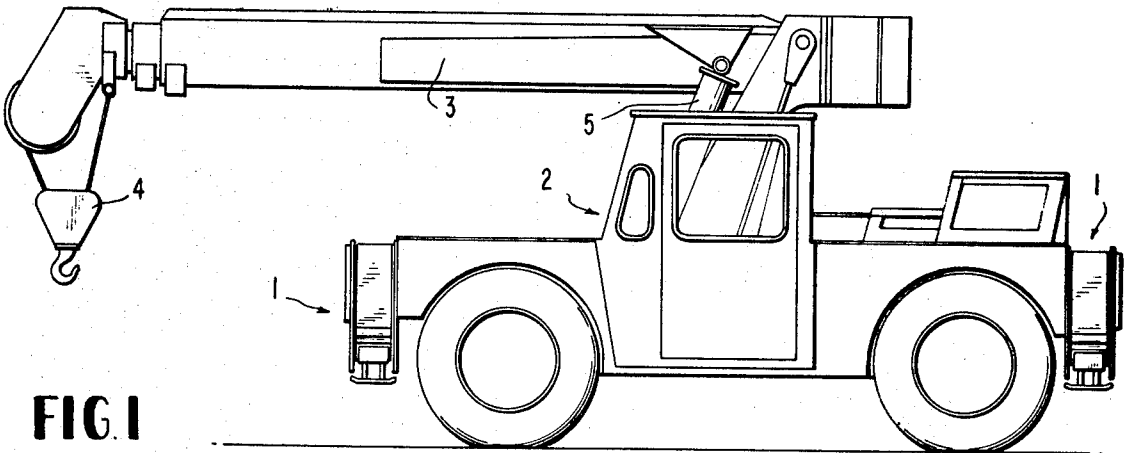


FIG. 4

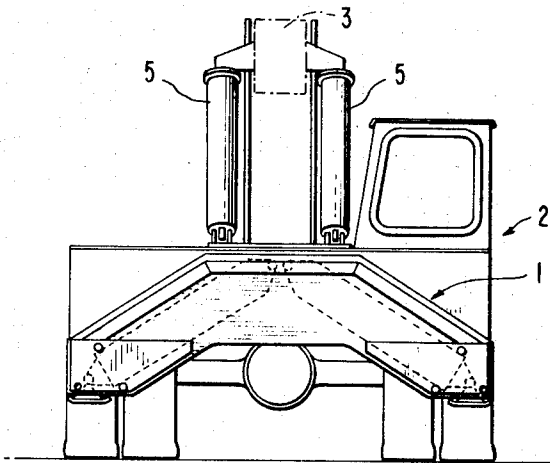
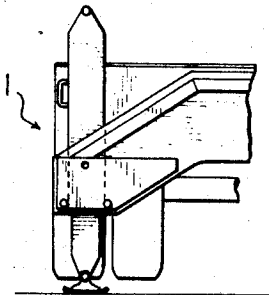


FIG. 2

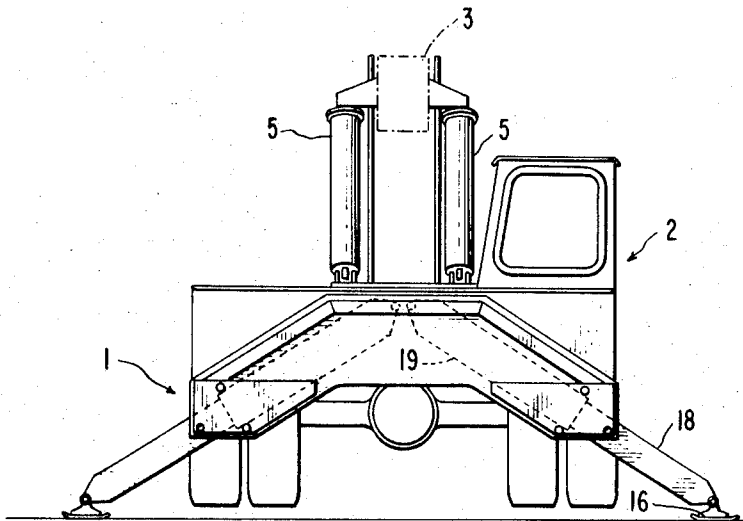


FIG. 3

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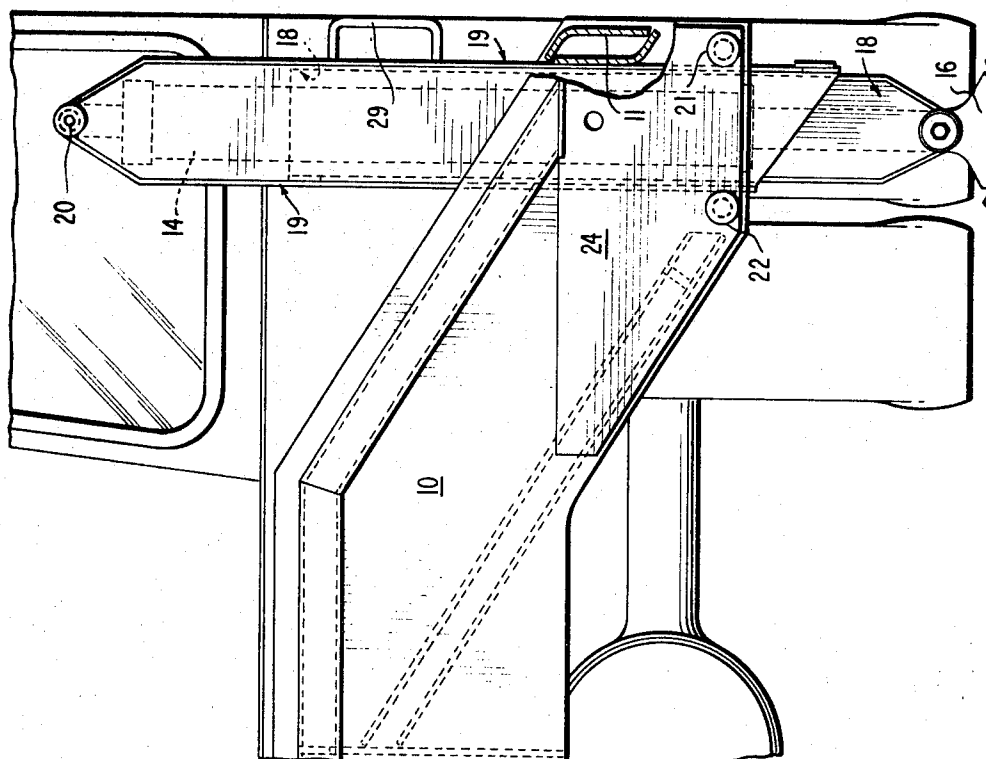


FIG. 6

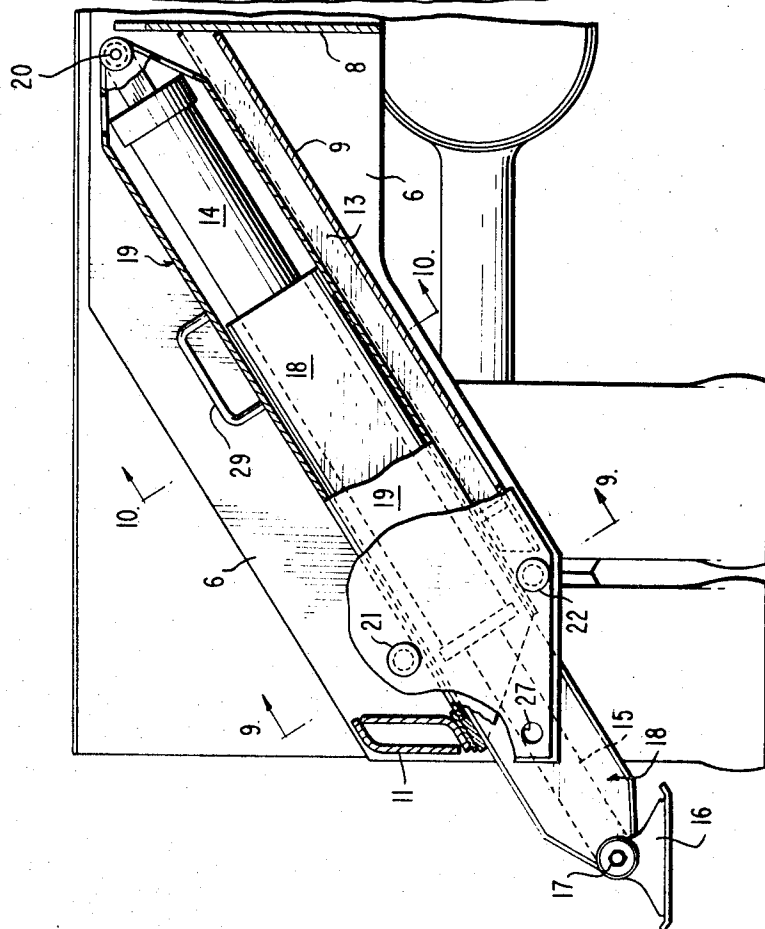


FIG. 5

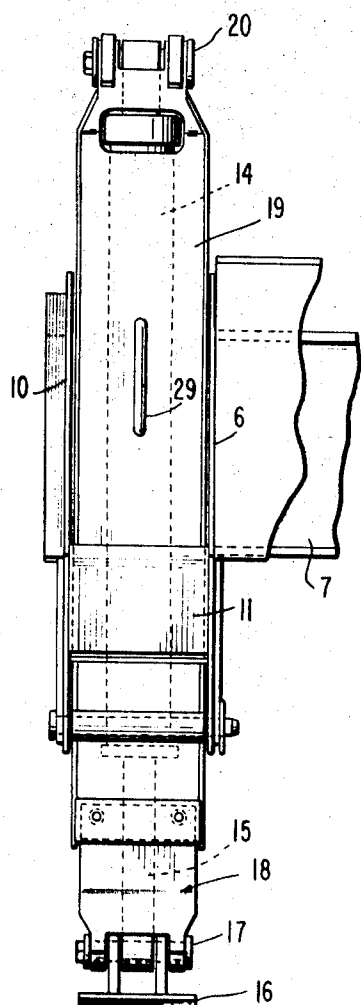


FIG. 7

FIG. 8

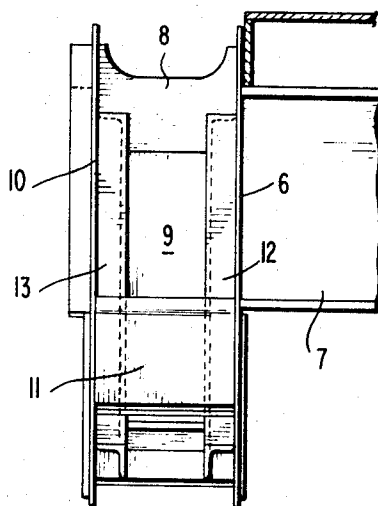


FIG. 9

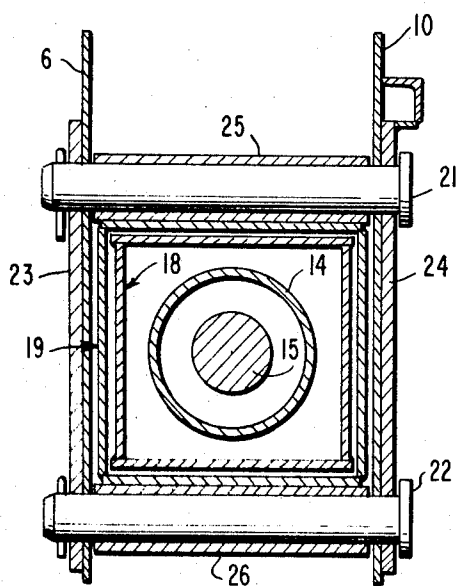
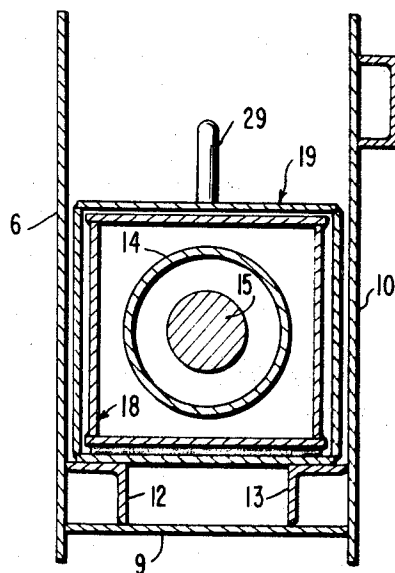


FIG. 10



DUAL POSITION HYDRAULIC OUTRIGGER ASSEMBLY

BACKGROUND OF THE INVENTION

It is conventional to provide mobile cranes, back-hoes, and the like, with hydraulic outriggers for stabilizing the vehicle while performing its work at the job site. The outriggers include a cylinder-piston type fluid motor having the ground engaging pad connected to the outer end of the piston rod and the cylinder connected to the vehicle frame. The outriggers are mounted on the vehicle in such a manner that when extended to the operative position they are disposed in either an oblique or divergent attitude, or a substantially vertical attitude relative to the vehicle. While these outriggers have been satisfactory for their intended function of stabilizing the vehicle at the job site, they have been subject to certain objections in that a vehicle provided with the divergent-type outriggers cannot be employed at a job site having relatively close working quarters; thus, requiring the use of a vehicle having the vertical-type outriggers. At other times, the proper stabilization of the vehicle might require the divergent-type outriggers; thus, a vehicle provided with the vertical-type outrigger could not be employed.

To overcome the disadvantages experienced with vehicles provided with either the divergent or vertical type outriggers, it has been proposed to provide the vehicle with outriggers which are adjustably mounted on the vehicle in such a manner that the outriggers can be caused to assume either a divergent or vertical attitude when extended to operative position. In one proposed arrangement the outriggers are pivotally mounted on the vehicle and are adapted to be shifted in a vertical plane, about the pivot, by means of a horizontally movable hydraulic ram. While this arrangement has been satisfactory for its intended purpose the additional hydraulic ram and associated fittings, hoses and linkage add considerably to the cost of the machine and the additional number of moving parts require constant maintenance.

The outrigger assembly of the present invention has been devised as an improvement over existing horizontally movable hydraulic ram actuated divergent-vertical type outriggers noted above, and comprises essentially, an elongated housing containing the outrigger cylinder which is connected to one end of the housing; the opposite end of the housing is pivotally connected to the vehicle frame by releasable pins which enable the housing and associated outrigger to be manually released, pivoted and locked in either an oblique or vertical position. By this construction and arrangement the outrigger may be easily manipulated by hand and locked in position by means of simple lock pins without the need of a horizontally movable ram.

IN THE DRAWINGS

FIG. 1 is a side elevational view of a mobile crane showing the outriggers of the present invention mounted on the front and rear of the vehicle;

FIG. 2 is a front elevational view of the mobile crane illustrated in FIG. 1 and showing the outriggers in the stored, inoperative position;

FIG. 3 is a front elevational view of the mobile crane illustrated in FIG. 1 and showing the outriggers extended to operative, ground-engaging position at an oblique or divergent attitude relative to the vehicle;

FIG. 4 is a fragmentary, front elevational view of the outrigger of the present invention extended to operative, ground-engaging position at a substantially vertical attitude relative to the vehicle;

FIG. 5 is an enlarged, fragmentary, sectional, front elevational view of one of the outriggers of the present invention shown in the stored, inoperative position as illustrated in FIG. 2;

FIG. 6 is an enlarged, fragmentary, sectional, front elevational view of one of the outriggers of the present invention shown in the operative position as illustrated in FIG. 4;

FIG. 7 is a side elevational view of the outrigger shown in FIG. 6;

FIG. 8 is a side elevational view of the portion of the vehicle frame on which the outrigger assembly is mounted;

FIG. 9 is a view taken along line 9—9 of FIG. 5; and

FIG. 10 is a view taken along line 10—10 of FIG. 5.

Referring to the drawings and more particularly to FIG. 1, the outrigger assemblies 1 of the present invention are shown mounted on the front and rear of a mobile crane 2 including a telescopic boom 3, load carrying block 4 and boom elevating rams 5. As will be seen in FIGS. 3 and 4 the outriggers are adapted to be selectively extended to operative, ground engaging position so that they assume an oblique or divergent attitude relative to the vehicle as shown in FIG. 3, or a substantially vertical attitude as shown in FIG. 4, to be described more fully hereinafter. While the outrigger assembly of the present invention is shown mounted on a mobile crane, it will be appreciated by those skilled in the art that the assembly can also be mounted on other types of work vehicles requiring stabilization at the job site, such as back-hoes, pneumatic drills, and the like.

The frame for mounting the outrigger assembly on the vehicle is illustrated in FIGS. 5 and 8 wherein it will be seen that an inclined plate 6 forming a side wall is welded or otherwise suitably secured to the vehicle frame 7. A vertical plate 8 forming an end wall and an inclined plate 9 forming a bottom wall are welded not only to plate 6 but also to another inclined side wall 10 spaced from and parallel to the side wall 6. A rhombic frame 11 extends between the side walls 6 and 10 at the lower ends thereof and a pair of angle irons 12 and 13 are secured to the bottom wall for supporting the outrigger in the inclined position as shown in FIG. 5.

As will be seen in FIGS. 5, 9 and 10, the outrigger comprises a hydraulic ram including a cylinder 14 and a piston rod 15 the outer end of which having the ground-engaging pad 16 connected thereto by pivot pin 17. The piston rod is enclosed by a sleeve 18 of rectangular cross-section having its lower end connected to the pin 17, the upper end of sleeve 18 being telescopically received within another sleeve 19 of similar cross-section, the closed end of the cylinder being connected to the upper end of sleeve 19 as at 20. The outer sleeve 19 forms a housing for the hydraulic ram and, as will be seen in FIG. 9, it is connected to the side walls 6 and 10 of the frame assembly by a pair of pins 21 and 22 extending through a pair of reinforcing plates 23 and 24 secured to the outer surfaces of side walls 6 and 10, respectively, and a pair of tubular sleeves 25 and 26 secured to the top and bottom walls, respectively, of the sleeve 19.

In the operation of the outrigger assembly thus far described, with the sleeve 19 pinned to the frame structure as shown in FIG. 5, when the hydraulic ram is actuated, the piston rod 15 and its associated sleeve 18 slides outwardly from the sleeve 19 thereby extending the outrigger to the oblique or divergent operative position as shown in FIG. 3.

One of the important features of the present invention is the capability of selectively manipulating the outrigger from the oblique position to a substantially vertical position when the vehicle is to be employed in close quarters at a job site. The manipulation of the outrigger is manually accomplished by removing pin 21 from its holding position as shown in FIG. 5 and pivoting the sleeve 19, and its associated ram, about the pin 22, as shown in FIG. 6. The pin 21 is then re-inserted through aperture 27 (FIG. 5) formed in plate 24 and aligned with similar apertures formed in walls 10 and 6 and plate 23, together with the sleeve 25. A handle 29 is secured to the top wall of the sleeve 19 to facilitate its manual manipulation, and the frame portion 11 provides an abutment surface for the wall of the sleeve 19 when disposed in the vertical position. To return the outrigger to the oblique position the ram is retracted from the ground engaging position, pin 21 is removed from aperture 27; the sleeve 19 is pivoted about pin 22 to the oblique position and the pin 21 is then reinserted to the holding position as shown in FIG. 5.

The terms and expressions which have been employed herein are used as terms of description and not of limitation, and there is no intention in the use of such terms and expressions, of excluding any equivalents of the features shown and described or portions thereof but it is recognized that various modifications are possible within the scope of the invention claimed.

I claim:

1. A dual position hydraulic outrigger assembly for a vehicle having a crane or the like mounted thereon comprising, frame means secured to said vehicle, housing means supported on said frame means and having an upper free end and a lower end, hydraulic ram means, including a cylinder and piston rod mounted within said housing means, means securing the closed end of said cylinder to the upper free end of said housing means, the hydraulic ram piston rod being extensible through the opposite lower end of said housing means, a ground-engaging pad secured to the outer end of said piston rod, means pivotally connecting said housing means to said frame means at a point proximate said opposite lower end of said housing whereby said upper free end of said housing is freely movable relative to said frame means about said pivot means to selectively orient said housing means and hydraulic ram at an oblique or at a substantially vertical attitude relative to the transverse axis of the vehicle, and releasable lock means connected between said housing means and said frame means for selectively retaining the hydraulic ram at the oblique or at the substantially vertical attitude.

2. A dual position hydraulic outrigger assembly according to claim 1 wherein the releasable lock means is located in proximity to the pivot means.

3. A dual position hydraulic outrigger assembly for a vehicle comprising, a plurality of interconnected inclined plates secured to the vehicle forming a frame

means, housing means supported on said frame means, hydraulic ram means including a cylinder and piston rod mounted within said housing means, means securing the closed end of said cylinder to one end of said housing means, the hydraulic ram piston rod being extensible through the opposite end of said housing means, a ground-engaging pad secured to the outer end of said piston rod, means pivotally connecting said housing means to said frame means at a point proximate said opposite end of said housing, releasable lock means connected between said housing means and said frame means for selectively retaining the hydraulic ram at an oblique or at a substantially vertical attitude relative to the transverse axis of the vehicle, said plurality of interconnected plates being constructed and arranged to form side walls and a floor for enclosing the housing means, and the floor plate being adapted to support the housing at the oblique attitude.

4. A dual position hydraulic outrigger assembly according to claim 3 wherein the means for pivotally connecting the housing means to said frame means comprises a pin extending through said frame means and said housing means.

5. A dual position hydraulic outrigger assembly according to claim 3 wherein a transversely extending frame member is connected between the side wall plates at the lower ends thereof, said frame member forming an abutment for the housing means when disposed in the vertical position.

6. A dual position hydraulic outrigger assembly for a vehicle having a crane or the like mounted thereon comprising, frame means secured to said vehicle, housing means supported on said frame means, hydraulic ram means including a cylinder and piston rod mounted within said housing means, means securing the closed end of said cylinder to one end of said housing means, the hydraulic ram piston rod being extensible through the opposite end of said housing means, a ground-engaging pad secured to the outer end of said piston rod, means pivotally connecting said housing means to said frame means at a point proximate said opposite end of said housing, a releasable lock pin extending through the frame means and said housing means, and a plurality of aligned apertures formed in the frame means and housing means for selectively receiving the releasable lock pin for selectively securing the hydraulic ram at an oblique or at a substantially vertical attitude relative to the transverse axis of the vehicle.

7. A dual position hydraulic outrigger assembly according to claim 6 wherein handle means is secured to the housing means to facilitate the manual manipulation of the housing means and associate hydraulic ram between the oblique and vertical attitudes.

8. A dual position hydraulic outrigger assembly according to claim 6, wherein the housing means comprises a sleeve of rectangular cross-section, another sleeve of rectangular cross-section enclosing the hydraulic ram piston rod and having one end thereof connected to the outer end of the piston rod, the opposite end of the piston rod sleeve being telescopically received within the first mentioned sleeve.

9. A dual position hydraulic outrigger assembly for a vehicle having a crane or the like mounted thereon comprising, frame means secured to said vehicle, a first

rectangular cross-section sleeve supported on said frame means, hydraulic ram means including a cylinder and piston rod mounted within said first sleeve, means securing the closed end of said cylinder to one end of said first sleeve, the hydraulic ram piston rod being extensible through the opposite end of said first sleeve, a second sleeve of rectangular cross-section enclosing the hydraulic ram piston rod and having one end thereof connected to the outer end of the piston rod, the opposite end of the second sleeve being telescopically received within the first sleeve, a ground-engaging pad secured to the outer end of said piston rod, a tubular sleeve secured to the bottom wall of said first sleeve at a point proximate to said opposite end thereof, said tubular sleeve extending transversely to the longitudinal axis of the first sleeve, apertures formed in said frame means in alignment with said tubular sleeve, a pin extending through said apertures and tubular sleeve pivotally connecting said first sleeve to said frame means at a point proximate said opposite end of said first sleeve, and releasable lock means connected between said first sleeve and said frame means for selectively retaining the hydraulic ram at an oblique or at a substantially vertical attitude relative to the transverse axis of the vehicle.

10. A dual position hydraulic outrigger assembly for

a vehicle having a crane or the like mounted thereon comprising, frame means secured to said vehicle, a first rectangular cross-section sleeve supported on said frame means, hydraulic ram means including a cylinder and piston rod mounted within said first sleeve, means securing the closed end of said cylinder to one end of said first sleeve, the hydraulic ram piston rod being extensible through the opposite end of said first sleeve, a second sleeve of rectangular cross-section enclosing the hydraulic ram piston rod and having one end thereof connected to the outer end of the piston rod, the opposite end of the second sleeve being telescopically received within the first sleeve, a ground-engaging pad secured to the outer end of said piston rod, means pivotally connecting said first sleeve to said frame means at a point proximate said opposite end of said first sleeve, a tubular sleeve secured to the top wall of said first sleeve, said tubular sleeve extending transversely to the longitudinal axis of the housing, a plurality of apertures formed in said frame means, said tubular sleeve being alignable with selected apertures, and a releasable lock pin insertable through said selected apertures for selectively retaining the hydraulic ram at an oblique or at a substantially vertical attitude relative to the transverse axis of the vehicle.

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