Nov. 15, 1960 S. K. CLEMENTS Re. 24,895

PORTABLE BOOM SUPPORT ATTACHMENT FOR VEHICLES

Original Filed Feb. 10, 1955 2 Sheets-Sheet 1

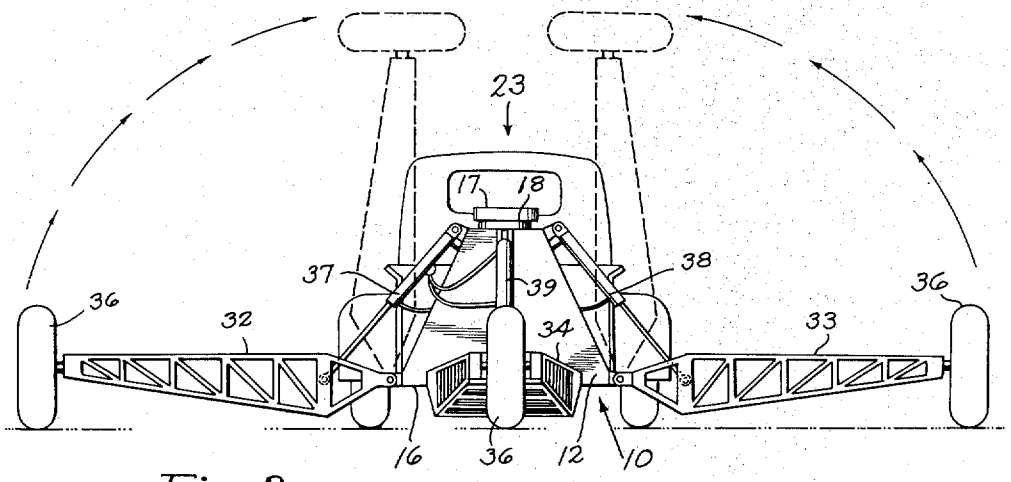


Fig. 2.

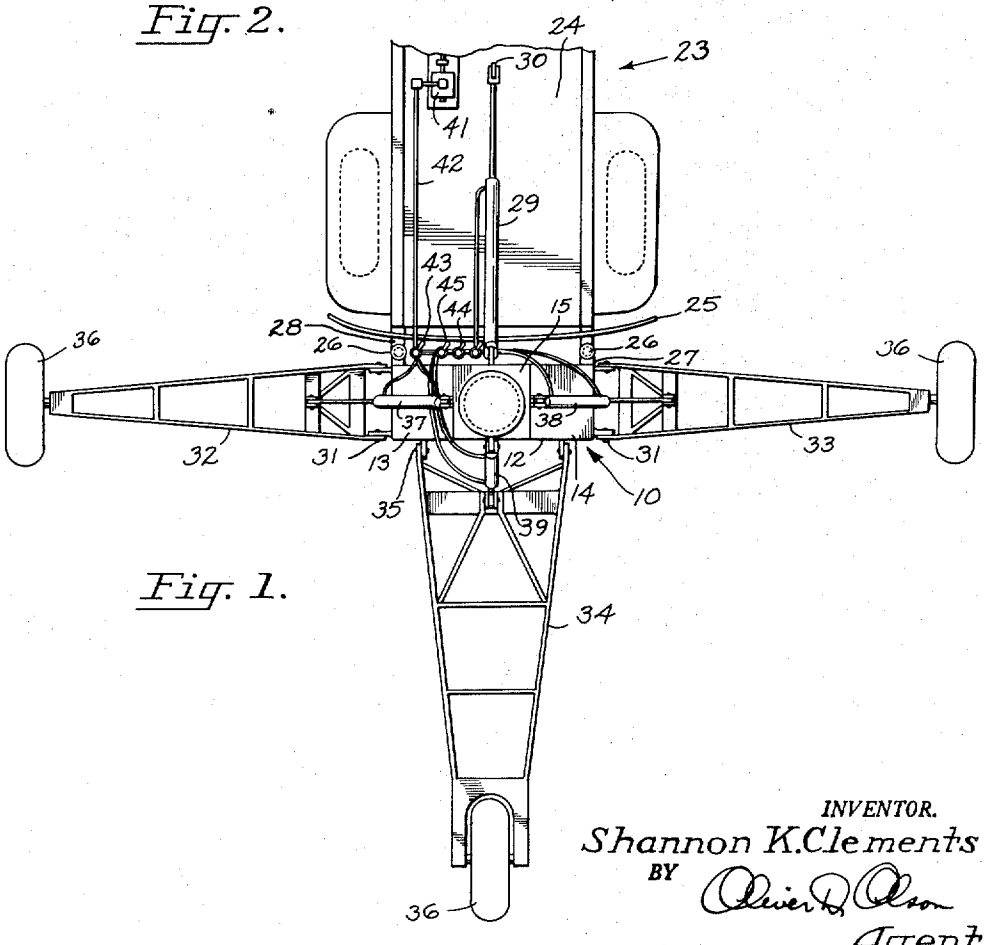


Fig. 1.

INVENTOR.
Shannon K. Clements
BY Oliver D. Olson
Agent

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PORTABLE BOOM SUPPORT ATTACHMENT FOR VEHICLES

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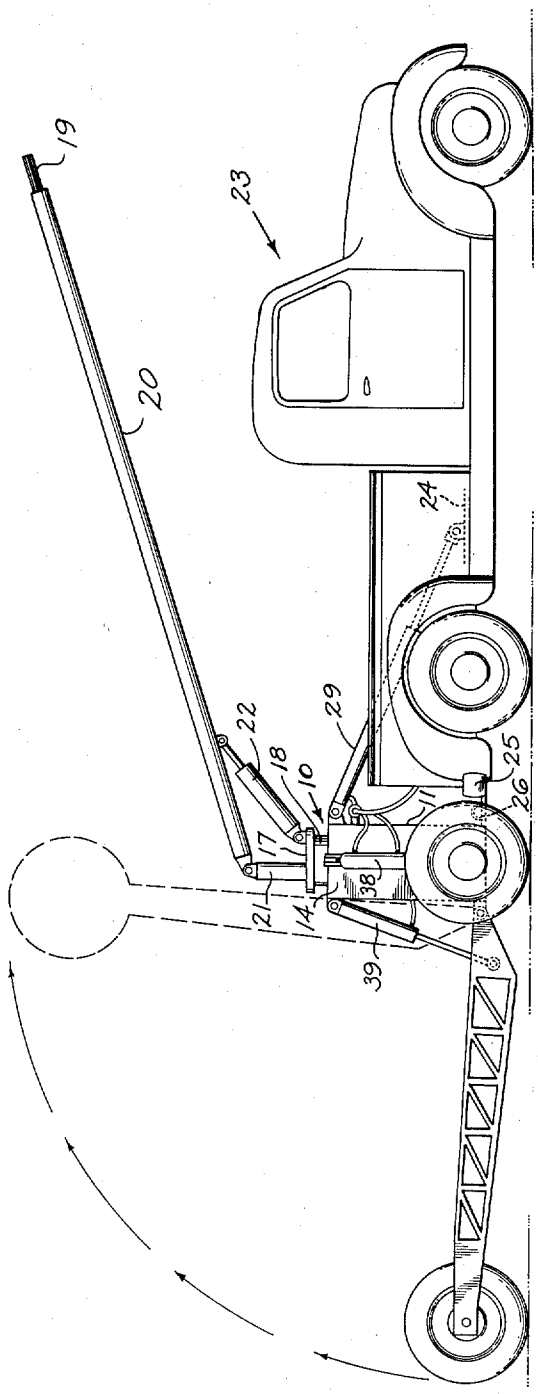


Fig. 3.

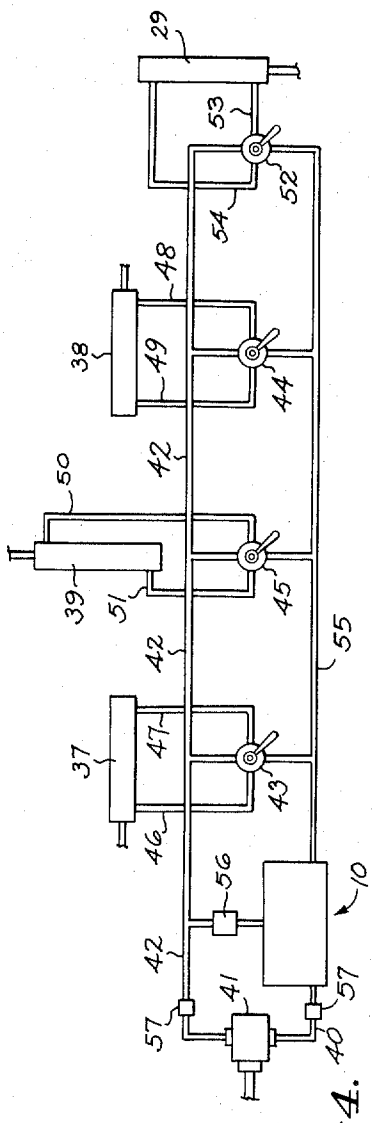


Fig. 4.

INVENTOR.
Shannon K. Clements
BY
Agent

United States Patent Office

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PORTABLE BOOM SUPPORT ATTACHMENT FOR VEHICLES

Shannon K. Clements, Elkhart, Ind., assignor of one-half to Hugh M. Rush, Elkhart, Ind.

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8 Claims. (Cl. 280—34)

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

This invention pertains to vehicle-supported booms, and relates particularly to a novel support by means of which booms and other superstructures may be operated in conjunction with small vehicles.

The use of extension booms of various constructions and for diverse purposes such as fire ladders, elevated work stations for such operations as painting of buildings and bridges, has heretofore required the mounting of such booms upon trucks of substantial size in order to provide a sufficiently stable base for the boom as it is swung to its limits of extension and lateral projection. However, it frequently occurs that the massive size of such trucks prevents or inhibits the practical utility of the boom because of limitations in accessibility at the working site. Moreover, the cost of such large transporting equipment renders it economically unfeasible for use by smaller concerns who otherwise could utilize the equipment most advantageously.

Accordingly, it is a principal object of the present invention to provide a boom support in the form of an attachment for small vehicles, such as pick-up trucks, and which attachment functions effectively to provide as stable a support as is afforded by trucks many times larger in size.

Another important object of this invention is the provision of a boom support attachment for small vehicles, which attachment is collapsible to small dimension for easy manipulation of the truck through crowded and restricted areas.

A further important object of this invention is to provide a boom support attachment for small vehicles, which support is selectively adjustable to maintain a desired level independently of the contour of the ground under it.

Still another important object of this invention is the provision of a boom support attachment for small vehicles, which support may be moved while fully extended, to change the location of the boom.

A still further important object of the present invention is to provide a boom support attachment for small vehicles, which attachment is of simplified but sturdy construction for economical manufacture and efficient operation.

These and other objects and advantages of the present invention will appear from the following detailed description, taken in connection with the accompanying drawings, in which:

Figure 1 is a plan view of a boom support attachment embodying the features of the present invention, the same being shown in extended position and mounted upon the rear of a small truck;

Figure 2 is a view in rear elevation, as viewed from the bottom in Figure 1, and showing the boom support attachment mounted on the rear end of the small truck, the lateral outrigger elements of the support being shown in retracted position in dashed lines;

Figure 3 is a view in side elevation showing the boom support attachment mounted upon the rear end of a small truck, the rearwardly extending outrigger element being shown in retracted position in dashed lines; and

Figure 4 is a schematic diagram of a hydraulic system for operating the power elements of the support.

Referring to the drawings, the support includes a main body **10** which, in the preferred construction illustrated, comprises a hollow container fabricated from steel plates to form a liquid reservoir for purposes described more fully hereinafter. Thus, the body **10** includes front and rear plates **11**, **12**, respectively, side plates **13**, **14**, top plate **15**, and a bottom plate **16**.

The body **10** supports on the upper plate **15** thereof a turntable **17** which is mounted upon and driven by a motor **18**, preferably of any conventional hydraulic type. The turntable **17** functions to support a boom structure, also of any conventional type, such as the telescoping boom illustrated in Figure 3, wherein an upper section **19** is mounted telescopically within a lower section **20**. The lower end of section **20** is pivotally connected to a pedestal **21** mounted on the turntable, and said section is rendered movable in a vertical plane by means of the hydraulic cylinder motor **22** which pivotally interconnects the boom **20** and the turntable **17**.

A particular form of boom assembly usable with the support of this invention is disclosed and claimed in my co-pending application, Serial No. 487,267, filed concurrently herewith.

The body **10** is adapted to be mounted detachably upon the rear end of a small truck, such as the pick-up truck **23** illustrated, and which includes a load carrying bed **24** and a rear bumper member **25**. The truck is provided with longitudinally and laterally spaced wheels, as shown, the distances between which define the primary support dimensions of the truck. In the embodiment illustrated, the body **10** is detachably connected to the truck by means of a pair of ball joint connections **26**, which are of conventional construction. Each ball joint connection includes a male section and a female section, one of which is connected to the body **10** by support **27** and the other section of which is mounted on the bumper element **25** on support **28**.

The pair of ball joint connections are spaced apart, for example adjacent the lateral sides of the body **10**, and function to secure the latter firmly to the truck. A brace, preferably in the form of a hydraulic cylinder motor **29**, is connected pivotally at one end to the forward plate **11** of the body **10**, adjacent the top plate **15**, and at the opposite end to a bracket **30** secured to the truck bed **24**. The brace **29** functions to stabilize the body **10** with respect to the longitudinal axis of the truck, and to control the rotation of the body **10** about an axis extending through the spaced ball joint connection **26**, as explained more fully hereinafter.

Mounted pivotally on the lateral sides of the body **10** for pivotal movement in the lateral plane of the latter, by means of the pivot pins **31**, are a pair of structural outrigger members **32**, **33** which, in the embodiment illustrated, are formed as elongated truss beams. A third outrigger member **34** of similar construction is pivotally mounted on the rear plate **12** by pivot pins **35** for movement in a plane extending substantially normal to the plane of movement of the first two outrigger members mentioned.

Each of the outrigger members preferably is provided at its terminal end with a ground engaging wheel **36**, for purposes described in detail hereinafter.

Each of the outrigger members is provided with reciprocating power means by which to pivot the outrigger between extended and retracted position. The power means

is preferably of the hydraulic type, although electric or pneumatic systems may be employed, if desired. In the embodiment illustrated, outrigger member **32** is provided with hydraulic cylinder motor **37** which is pivotally connected at one end to side plate **13** and at the opposite, piston rod end to the outrigger member. Similarly, outriggers **33** and **34** are provided with hydraulic cylinder motors **38** and **39**, respectively, which pivotally interconnect the outrigger members and the adjacent plates of the body **10**.

Referring now particularly to Figure 4 of the drawings, the hydraulic system for the reciprocating cylinder motors **37**, **38**, **39** is shown to include the hollow body **10**, which serves as a reservoir for the hydraulic fluid utilized in the operation of said motors. A conduit **40** connects the reservoir to the intake side of a hydraulic pump **41**, which may be powered by any conventional means, such as a power take-off from the truck, or by a separate motor. The outlet side of the hydraulic pump is connected through conduit **42** to each of the four-way valves **43**, **44**, **45** which control the operation of the hydraulic motors **37**, **38**, **39**, respectively. Thus, for example, valve **43** is connected to motor **37** through conduits **46** and **47** which afford retraction and extension, respectively, of the motor piston rod. Similarly, conduits **48** and **49** connect valve **44** to motor **38** to provide retraction and extension, respectively, of this piston rod, and conduits **50** and **51** connect valve **45** to motor **39** to afford retraction and extension respectively, of its piston rod.

In similar manner, four-way valve **52** is connected to opposite ends of cylinder motor **29** by conduits **53** and **54** to provide retraction and extension of the motor piston rod.

The hydraulic fluid is returned from each of the valves to the reservoir **10** through conduit **55**. A safety valve **56** interconnects the outlet side of fluid pump **41** and the reservoir to maintain a predetermined fluid pressure in the system.

In the embodiment illustrated the pump **41** is mounted on the truck **23**, and therefore the conduits **40** and **42** are each provided with a conventional quick-detach coupling **57**, preferably of the self-sealing type, to facilitate removal of the boom support from the truck. It will be understood that an electric, gasoline or other drive motor may be mounted on the boom support body **10** to drive a pump **41**, in which case the couplings **57** may be eliminated.

In the operation of the boom support described hereinbefore the body **10** is mounted upon the truck in the manner previously explained. For transport to a working site, the three outriggers **32**, **33**, **34** are retracted to the dashed positions shown in Figures 2 and 3, by proper manipulation of the respective valves **43**, **44**, **45** to retract the piston rods associated with each of the respective hydraulic cylinder motors **37**, **38**, **39**. In this manner the support assembly is reduced to minimum size i.e. the outrigger members **32** and **33** lie within the lateral dimensions of the truck and the rearward outrigger **34** is brought to a position adjacent the body **10**. The entire assembly is thus supported by the truck and transported with facility to any desired location capable of being reached by the truck alone.

At the working site the outrigger members are each lowered into contact with the ground or other underlying support. For example, if the support is to be stationed adjacent a building, one of the outriggers may be brought into contact with the building wall, while the other two outriggers placed in contact with the ground, thereby insuring maximum stability for manipulation of the boom. In the event that the working site is located on uneven terrain, each of the outrigger members is adjusted independently so that the turntable **17** is brought to horizontal position. In addition, valve **52** may be manipulated to extend or retract the piston rod of cylinder motor **29** in order to adjust the body **10** to a vertical position, in the event that the truck is positioned on an incline.

It will be noted, particularly from Figure 1 of the drawings, that the boom support functions, by its rigid connection to the truck, effectively to substantially double the load-supporting wheel base of the truck and to triple the effective width of the truck. In this manner, the small truck illustrated functions with the support attachment to provide as stable a support for the boom as may be provided by trucks many times its size and cost. For example, booms capable of extension 50 feet in the air and swinging on a circle 60 feet in diameter have been operated with complete safety and maximum efficiency from a conventional ¾ ton pick-up truck, the boom support attachment having outriggers of about eight feet in length.

Detachment of the boom support from the truck is achieved with speed and facility merely by swinging the boom to the rear of the truck while the outriggers are extended, and then disconnecting the couplings **57**, the ball joint connectors **26** and the support brace **29** from the truck. The outrigger system thus supports the boom independently of the truck for such purposes as storage, while the truck is used in other capacities.

From the foregoing, it is believed to be apparent that the present invention provides novel means by which to support load carrying booms and similar devices of substantial size, by means of relatively small trucks and other vehicles heretofore incapable of such use. The boom support is of simplified construction, and therefore economical to manufacture. It is rugged in construction, to accommodate use in the manner explained, and requires but a minimum of maintenance and repair. It is manipulated with speed and facility between retracted and extended positions and is readily detached from and attached to the vehicle employed to support and transport it.

It will be apparent to those skilled in the art that various changes may be made in the details of construction described hereinbefore without departing from the scope and spirit of this invention. Accordingly, it is to be understood that the foregoing description is primarily illustrative of the invention and is not to be considered as limiting the scope thereof.

Having now described my invention and the manner in which the same may be used, what I claim as new and desire to secure by Letters Patent is:

1. A support for booms and the like, adapted to be detachably mounted on a vehicle, said support comprising a body, adjustable connecting means on the body for securing the same to a vehicle adjustably on an axis extending transversely of the vehicle, reciprocating power means mounted pivotally on the body for connecting the body to a vehicle at a point on the vehicle spaced longitudinally from the transversely mounted body for adjusting and securing the body in levelled position on said transverse axis, base means on the support for mounting a boom or the like thereon, elongated outrigger members mounted pivotally on the opposite lateral sides and on the rearward side of the body, ground engaging means on the terminal ends of the outrigger members, said members being adapted to be pivoted between a retracted position projecting upwardly adjacent the body and an extended position projecting outwardly from the body, in which extended position the ground engaging means are disposed a substantial distance outwardly from the vehicle, whereby to increase substantially the effective supporting length and width of the vehicle, and reciprocating power means pivotally interconnecting the outrigger members and the body for operating said members arcuately between extended and retracted positions.

2. A support for booms and the like, adapted to be detachably mounted on a vehicle, said support comprising a body, connecting means on the body for detachably securing the same pivotally to the rear end of a vehicle on an axis extending transversely of the vehicle, recip-

rocating power means pivotally connecting the body to the vehicle at a point forwardly of the rear end of the latter for adjusting and securing the body in levelled position on said transverse axis, base means on the support for mounting a boom or the like thereon, elongated outrigger members mounted pivotally on the opposite lateral sides and on the rearward side of the body, ground engaging means on the terminal ends of the outrigger members, said members being adapted to be pivoted between a retracted position projecting upwardly adjacent the body and an extended position projecting outwardly from the body, in which extended position the ground engaging means are disposed a substantial distance outwardly from the vehicle, whereby to increase substantially the effective supporting length and width of the vehicle, and reciprocating power means pivotally interconnecting the outrigger members and the body for operating said members.

3. A support for booms and the like, adapted to be detachably mounted on a vehicle, said support comprising a hollow body adapted to contain hydraulic fluid, connecting means on the body for securing the same to a vehicle, base means on the support for mounting a boom or the like thereon, elongated outrigger members mounted pivotally on the opposite lateral sides and on the rearward side of the body, ground engaging means on the terminal ends of the outrigger members, said members being adapted to be pivoted between a retracted position projecting upwardly adjacent the body and an extended position projecting outwardly from the body, in which extended position the ground engaging means are disposed a substantial distance outwardly from the vehicle, whereby to increase substantially the effective supporting length and width of the vehicle, hydraulic reciprocating power means interconnecting the outrigger members and the body for operating said members, conduit means interconnecting the power means and the hollow body for supplying said fluid to the power means, and valve means in said conduit means for controlling the operation of the power means.

4. For use with a vehicle having longitudinally and laterally spaced traction elements defining the primary support dimensions of the vehicle: secondary support means for temporarily increasing the effective support dimensions of the vehicle, comprising a hollow body adapted to contain hydraulic fluid, means securing the body on a vehicle, a plurality of elongated outrigger members each mounted pivotally at one end on the body and having ground engaging means on the terminal end thereof, the outrigger members being pivotable between a retracted position projecting upwardly adjacent the vehicle and an extended position projecting outward from the vehicle with their said ground engaging means disposed a substantial distance outward from the vehicle, hydraulic power means interconnecting the outrigger members and body for moving said members between said retracted and extended positions, and conduit means connecting the hydraulic power means to the hollow body for supplying fluid to said hydraulic means.

5. A support for booms and the like adapted to be mounted on a vehicle having longitudinally and laterally spaced traction elements defining the primary support dimensions of the vehicle, said support comprising a body, base means on the body for mounting a boom or the like thereon, means securing the body on a vehicle for pivotal movement on an axis extending transversely of the vehicle, adjustable connecting means connecting the body to the vehicle for leveling the base means on said transverse pivot axis, a plurality of elongated outrigger members each mounted pivotally at one end on the body and having ground engaging means on the terminal end thereof, the outrigger members being pivotable between a retracted position projecting upwardly adjacent the vehicle and an extended position projecting outward from the vehicle with their said ground engaging means disposed a substantial distance outward from the vehicle, and power means pivotally interconnecting the outrigger members and body for moving said members between said retracted and extended positions.

6. A support for booms and the like adapted to be mounted on a vehicle having longitudinally and laterally spaced traction elements defining the primary support dimensions of the vehicle, said support comprising a hollow body adapted to contain hydraulic fluid, base means on the body for mounting a boom or the like thereon, means securing the body on a vehicle for pivotal movement transversely of the vehicle, hydraulic adjustable connecting means connecting the body to the vehicle for leveling the base means on said transverse pivot axis, a plurality of elongated outrigger members each mounted pivotally at one end on the body and having ground engaging means on the terminal end thereof, the outrigger members being pivotable between a retracted position projecting upwardly adjacent the vehicle and an extended position projecting outward from the vehicle with their said ground engaging means disposed a substantial distance outward from the vehicle, hydraulic power means interconnecting the outrigger members and body for moving said members between said retracted and extended positions, and conduit means connecting the hydraulic connecting means and power means to the hollow body for supplying fluid to said hydraulic means.

7. A support for booms and the like adapted to be mounted on a vehicle, said support comprising a body, turntable base means mounted on the body for rotation on a vertical axis for mounting a boom or the like thereon, pivot means for securing and supporting the body entirely upon a vehicle for pivotal movement on an axis extending transversely of the vehicle, and elongated adjustably extensible connecting means connected pivotally at one end to the body and arranged for pivotal connection at its opposite end to a vehicle for adjusting and securing the turntable base means in leveled position on said transverse axis.

8. The support of claim 7 including a plurality of vertically retractable outrigger members mounted pivotally on the body and each having ground engaging means on the terminal end thereof, and power means interconnecting the outrigger members and body for pivoting said members between said vertically retracted position and an extended position laterally outward of the vehicle for increasing the lateral support dimensions of the vehicle and for leveling the turntable base means in the longitudinal direction of the vehicle.

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