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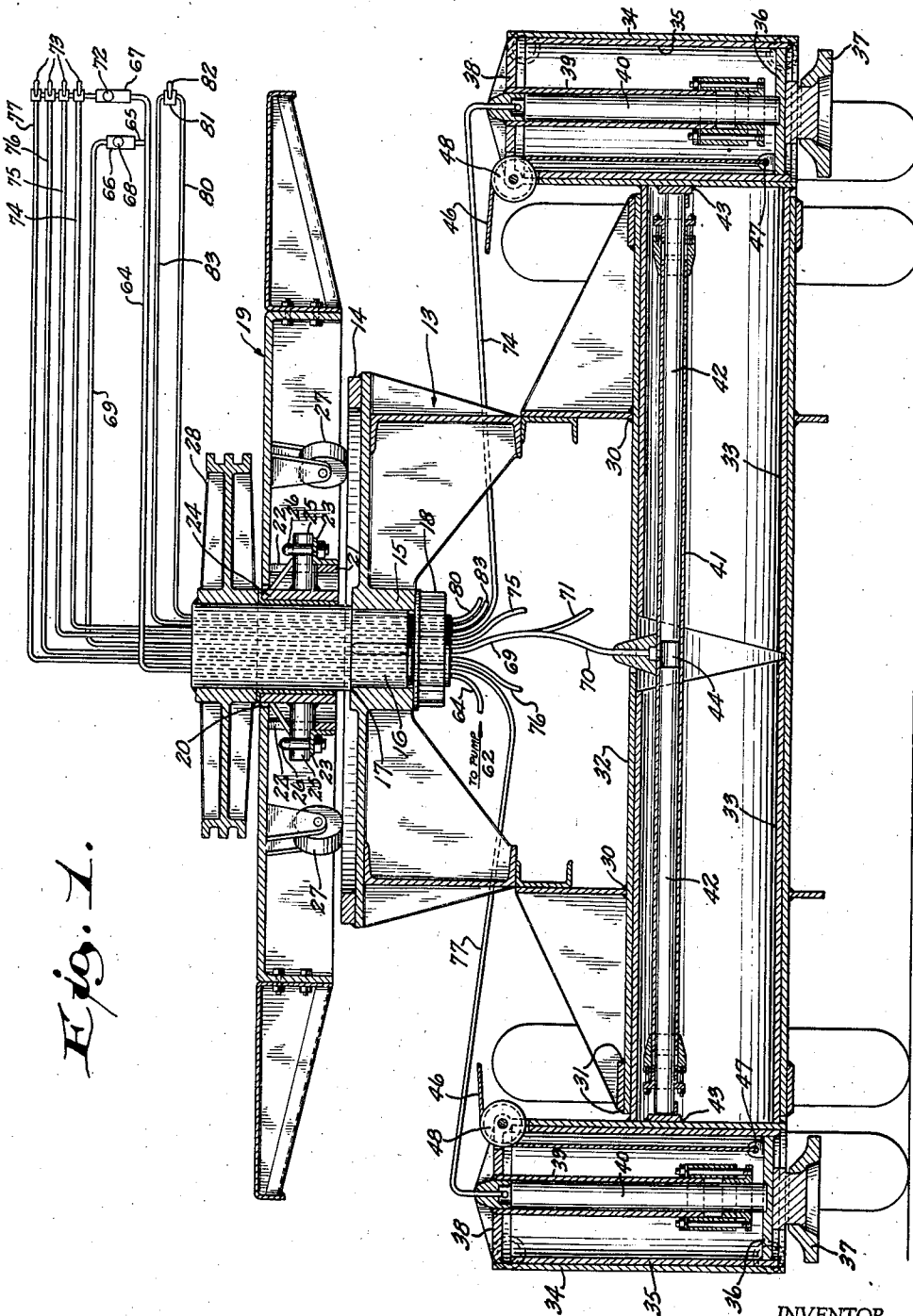
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2,365,169

VEHICLE OUTRIGGER

Filed Aug. 5, 1943

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 2.

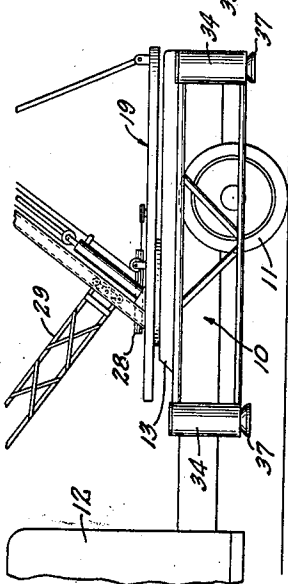
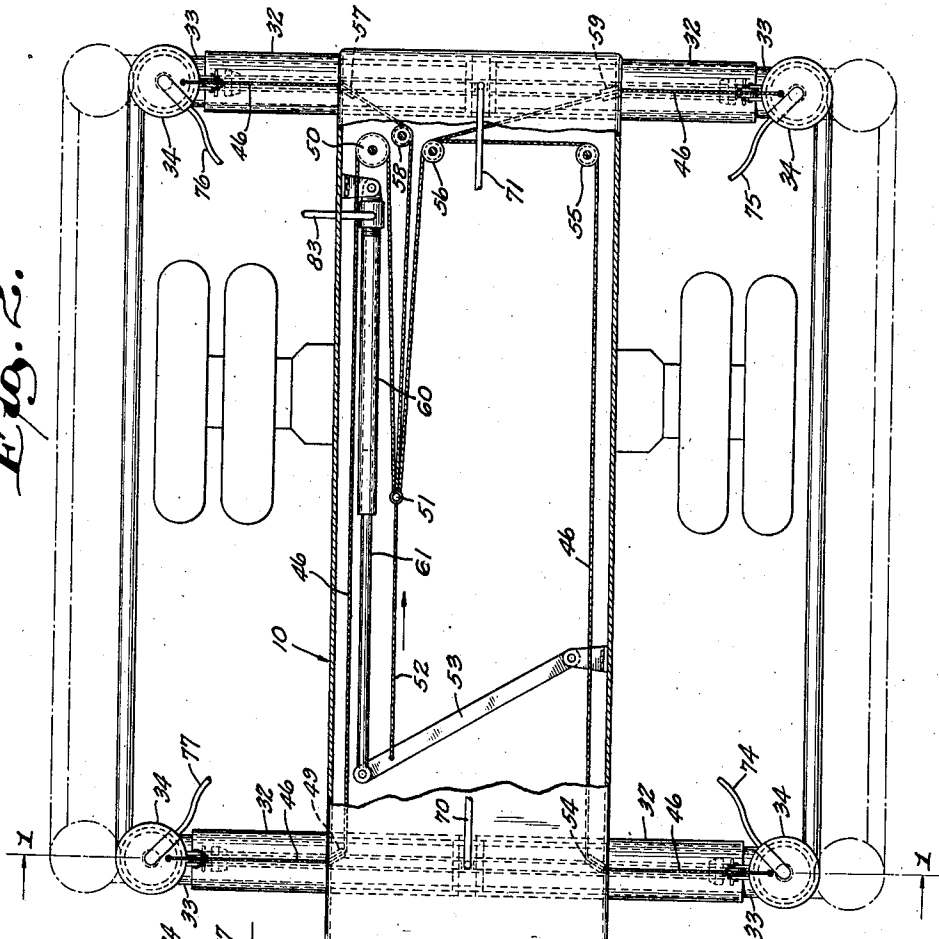


Fig. 3.

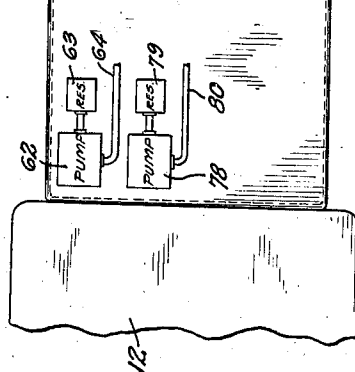


Fig. 4.

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VEHICLE OUTRIGGER

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13 Claims. (Cl. 212—145)

This invention relates to improvements in vehicle outriggers.

The present invention is particularly adapted for use in relatively small truck cranes of the type shown in my pending applications, Serial No. 457,052, filed September 2, 1942, and Serial No. 494,335, filed July 12, 1943, and relates to an improved arrangement for temporarily increasing the effective width of the vehicle frame to improve the stability thereof. Thus a crane mounted on the frame may be rotated to any desired position without causing overbalancing of the frame and tipping thereof. Furthermore, due to this increased stability, a maximum load may be safely handled by the crane even when the latter is mounted on a relatively light truck.

It is, therefore, a general object of the present invention to provide an improved vehicle outrigger which, when in withdrawn position, interfere in no way with the mobility of the vehicle and which can, nevertheless, be quickly extended to furnish increased stability for crane operations.

A further object of the invention is to provide an improved vehicle outrigger wherein means is employed for first extending the outrigger laterally and for then projecting outrigger feet in a downward direction to engage the ground.

A further object of the invention is to provide an outrigger construction as above described wherein the lateral movement of the outrigger, as well as the downward movement of the feet, is operated and controlled hydraulically.

A further object is to provide a construction as above described wherein improved mechanism is utilized for causing retrieving movement of the outrigger parts.

A still further object of the invention is to provide a construction wherein the outrigger movements may be conveniently controlled from a position on the crane turntable.

With the above and other objects in view, the invention consists of the improvements in vehicle outriggers and all its parts and combinations as set forth in the claims and all equivalents thereof.

In the accompanying drawings illustrating one complete embodiment of the preferred form of the invention, in which the same reference numerals designate the same parts in all of the views,

Fig. 1 is a transverse vertical sectional view through a crane equipped truck showing the improved outrigger mechanism as utilized in connection therewith;

Fig. 2 is a plan view of the rear of the truck frame with parts broken away and shown in section and with the turntable removed. The dot and dash lines indicate an extended position of the outrigger;

Fig. 3 is a fragmentary side elevational view of a truck crane showing the improved outrigger in connection therewith; and

Fig. 4 is a rear elevational view of the structure illustrated in Fig. 3 with the crane and turntable omitted.

Referring more particularly to the drawings, the numeral 10 designates the rear portion of the chassis of a relatively small size truck. This truck is provided with rear wheels 11 and with a cab portion 12.

Mounted on top of the portion 10 is an auxiliary frame 13 supporting a ring 14 and a bearing 15 within the ring.

Supported in the bearing 15 is the lower end of a center pin 16. This center pin is preferably tubular in form and has its lower end keyed to the bearing 15. Above the bearing 15 the center pin is of enlarged diameter to provide an annular shoulder 17. This shoulder limits the downward movement of the center pin 16 in the bearing 15. A nut 18 is threaded on the lower end of the center pin to engage the lower end of the bearing 15 and anchor the center pin rigidly in position.

A turntable 19 has its top formed with an opening 20. Secured to the lower surface of the top of the turntable and projecting downwardly therefrom is a collar 21 formed with oppositely disposed slots 22. These slots extend from the upper edge of the collar downwardly and terminate short of the lower edge of the collar. Projecting from the outer side of the collar below the slot 22 are angle members 23. A bearing member 24, preferably provided with a bushing, is rotatable around an intermediate portion of the center pin 17, as shown in Fig. 1. Studs 25, which have their inner ends rigidly secured to the outside of the bearing 24, project in opposite directions therefrom and through the slots 22 of the collar 21. The outer ends of the studs 25 are firmly anchored by means of U-bolts 26 to the angles 23. The bearing 24 fits loosely in the hole 20 of the turntable. Thus by inserting a shim beneath one or the other of the projecting ends of the studs 25, the bearing 21 may be anchored somewhat relative to the turntable to compensate for any inequalities in the distribution of the load in the turntable. As the same

time it is apparent that the bearing 21 is rigidly connected to the turntable through the structure just described. The turntable, therefore, is rotatable around the fixed center pin 16. During such rotation the turntable may be additionally supported by means of rollers 27 which depend from the lower surface of the top of the turntable and which ride on the ring 14 carried by the auxiliary frame 13.

Keyed to a portion of the center pin 16 which projects above the upper surface of the turntable is a pulley 28. The pulley and center pin are firmly supported against rotation on the frame portion 13 of the truck while the turntable is rotatable around the fixed center pin and beneath the pulley. It is preferred to utilize mechanism which is cooperable with this pulley 28 and with the turntable for causing rotation of the turntable. This mechanism is fully described in my pending application Serial No. 494,335, filed July 12, 1943. As far as the subject matter of the present application is concerned, however, any suitable mechanism for causing rotation of the turntable may be utilized.

As illustrated in Fig. 3 the turntable supports the boom 29 of a crane. This boom is movable to various angular positions in a vertical plane and is also rotatable with the turntable. In addition the boom is equipped with a suitable load line cable for lifting various objects. Any suitable mechanism may be employed for causing angular movement of the boom and any suitable mechanism may be used for raising and lowering the boom load line. It is, however, preferred to utilize hydraulically actuated cables as shown and described in my pending application Serial No. 457,705 filed September 2, 1942.

Suitably secured to the vehicle frame portion 10, as at 30 and 31, are transverse sleeves 32. Telescoped within each sleeve 32 is a pair of oppositely movable horizontal outrigger supports 33. These outrigger supports are tubular in form and have their outer ends connected to vertical outrigger sleeves 34. Telescoped within each of the vertical sleeves 34 is a downwardly movable cylinder or tube 35. The lower end of each vertical sleeve is open and the lower end of each of the downwardly movable tubes 35 is closed by a plate 36. To the underside of each of the plates 36 a foot member 37 is rigidly secured.

The upper end of each of the vertical sleeves 34 is closed by a head 38 which supports a cylinder 39 and an hydraulic ram 40. The lower end of each ram 40 is engaged with the upper surface of the plate 36. Thus downward movement of the ram 40 causes downward movement of the telescoped cylinder 35 and foot 37 until the foot is in ground engaging position.

Suitably supported in a horizontal position within the horizontal outrigger tubes 33 is a cylinder 41 having oppositely acting rams 42 therein. The outer ends of the rams 42 are connected to the vertical sleeves 34 as at 43. Thus when hydraulic fluid is forced under pressure into the central space 44 of the cylinder 41, it will act to move both of the rams 42 outwardly to cause projection of the horizontal outriggers from the full line position of Fig. 2 to the dot-and-dash line position therein. This outward movement may be limited by the use of checking cables 45 (see Fig. 4).

It is apparent from the above that after the horizontal outrigger supports have been moved from the full line position of Fig. 2 to the dot-and-dash line position therein, the vertical rams

40 are then extended to cause downward movement of the feet 37 into ground engaging position. When in this position, cables 46 are operated to cause upward movement of the feet 37, each of these cables having its lower end anchored to the bottom plate 36 of the vertically movable cylinder 35 as at 47. Each of the cables 46 then extends upwardly and over a pulley 48 supported in an opening at the upper end of the vertical sleeve 34. Referring to Fig. 2, one of the cables 46 in connection with the forward outrigger is guided around a sheave 49, then rearwardly around a sheave 50. The cable then extends forwardly again where it is connected, as at 51, to a cable 52 connected to an arm 53. The other forward cable 46 is guided around sheaves 54, 55 and 56 and is also connected to the cable 52, as at 51. One of the cables 46 in connection with the rear outrigger is guided around sheaves 57 and 58 and then connects with the cable 52 at connection point 51. The other rear cable 46 is guided around a sheave 59 and around the sheave 56. This cable then extends forwardly to connect at point 51 with the common actuating cable 52.

Hydraulic cylinder 60, having a movable ram 61, is adapted to cause swinging movement of the arm 53 in a counter-clockwise direction to the full line position of Fig. 2. This acts to first cause an upward pull on the feet 37 until the vertical rams 40 have reached the limit of withdrawal movement. The cables 46 then act to move the outrigger parts inwardly from the dot-and-dash line position of Fig. 2 to the full line position therein. Thus a single hydraulic cylinder serves to retrieve both the vertical rams and the horizontal rams.

As is indicated in Fig. 2, there is mounted preferably on the forward end of the truck frame 10 an hydraulic pump 62 having a reservoir 63. This pump may be driven by a power take-off from the motor vehicle. The pump 62 has an hydraulic line 64 which extends along the frame to a point beneath the tubular center pin 16 of Fig. 1. This line 64 is flexible and extends upwardly through the tubular center pin and to a control board on top of the turntable. The line 64 has a branch 65 extending into a valve 66 and the line 64 also continues and connects with a valve 67. When the control handle 68 of the valve 66 operated in one direction, hydraulic fluid under pressure from the pump will flow to the valve 66 and into a flexible hydraulic line 69 which leads back through the center pin to a position therebelow. The line 69 has two branches 70 and 71. The branch line 70 connects with the hydraulic chamber 44 of the forward horizontal outrigger cylinder 41. The conduit 71 connects in a similar manner with the hydraulic chamber 44 of the rear horizontal outrigger cylinder 41. Thus when the valve 66 is opened, hydraulic fluid under pressure will cause outward movement of both the front and rear horizontal outrigger supports from the full line position of Fig. 2 to the dot-and-dash line position therein. Upon retrieving movement of the horizontal outrigger rams 42 the hydraulic fluid is forced back through the lines 70, 71, 69, and 64 to the pump 62.

The hydraulic line 64 leading from the pump 62 also furnishes fluid under pressure for operating the vertical rams. Referring again to Fig. 1, when the control handle 72 of the valve 67 is open, and providing the individual controls 73 are in open condition, hydraulic fluid under pressure is forced simultaneously through all of the lines 74, 75, 76, and 77. These lines are also

flexible and extend downwardly through the center pin to deliver hydraulic fluid under pressure to all four of the vertical cylinders 39. Thus all four of the feet 37 are projected downwardly simultaneously. Should the ground be uneven, the individual controls 73 may be manipulated to stop one or more of the feet in advance of the other feet. During retrieving movement of the vertical rams 40 the valve controls 73 and 72 are all open and fluid is forced back through the lines 74 to 77 inclusive and into the main line 64 leading to the pump 62.

A second hydraulic pump 78 having a reservoir 79 in connection therewith is adapted to deliver fluid under pressure through a line 80. The line 80 is flexible and extends upwardly through the center pin 16 to a valve 81 on the turntable. When the control handle 82 is moved to open the valve, fluid under pressure will flow into a line 83 leading back through the center pin 16. The line 83 connects with the retrieving cylinder 60 (Fig. 2) and causes the ram 61 to be moved to the position of Fig. 2 to retrieve both the vertical and horizontal outrigger rams. When the horizontal and vertical rams are again extended, this will cause a pull on the cable 52, movement of the arm 53, and will force the ram 61 back into its cylinder 60. This will also return hydraulic fluid from the cylinder 60 back into the pump 78 if the control 82 is in open condition. From the above it is apparent that when the outrigger is in withdrawn position the truck may be readily moved to any desired location. If it is desired to operate the crane, however, then the outrigger may be laterally extended and the outrigger feet may be lowered to increase the effective width of the truck crane. This adds stability to the support of the crane and the latter may be safely operated in any position of rotation without causing tipping movement of the truck.

It is apparent that the mechanism for operating the outrigger is relatively simple and effective and that the arrangement is such that the extension of the horizontal rams is quickly followed by the downward movement of the feet. It is also apparent that a very novel means for retrieving all of the outrigger rams simultaneously has been provided.

Various changes and modifications may be made without departing from the spirit of the invention and all of such changes are contemplated as may come within the scope of the claims.

What I claim is:

1. In a vehicle having a wheel supported frame, an outwardly extendible outrigger member mounted on said frame, a vertically movable foot carried by said extendible member, means remotely controlled from the vehicle for causing outward movement of said extendible member, and means remotely controlled from the vehicle for causing downward movement of said foot.

2. In a vehicle having a wheel supported frame, an outwardly extendible outrigger member mounted on said frame, a vertically movable foot carried by said extendible member, hydraulically operated means controlled from the vehicle for causing outward movement of said extendible member, and hydraulically operated means controlled from the vehicle for causing downward movement of said foot.

3. In a vehicle having a wheel supported frame, an outwardly extendible outrigger member mounted on said frame, a vertically movable

foot carried by said extendible member, means remotely controlled from the vehicle for causing outward movement of said extendible member, means remotely controlled from the vehicle for causing downward movement of said foot, and a common means remotely controlled from the vehicle for retrieving said foot and for sequentially retrieving said horizontally extendible member.

4. In a vehicle having a wheel supported frame, an outwardly extendible outrigger member mounted on said frame, a vertically movable foot carried by said extendible member, means remotely controlled from the vehicle for causing outward movement of said extendible member, means remotely controlled from the vehicle for causing downward movement of said foot, and a common hydraulically operated means remotely controlled from the vehicle for retrieving said foot and for sequentially retrieving said horizontally extendible member.

5. In a vehicle having a wheel supported frame, a horizontally extendible outrigger member mounted on said frame, a vertically movable foot carried by said extendible member, means for causing outward movement of said horizontally extendible member, means for causing downward movement of said foot, means including a cable and sheaves for retrieving said foot and for sequentially retrieving said horizontally extendible member, and an hydraulically operated ram for exerting an operating pull on said cable.

6. In a vehicle having a wheel supported frame, a pair of oppositely movable horizontally extendible outrigger members guided on said frame, an hydraulic cylinder supported on said frame and extending parallel to said outrigger members, a pair of oppositely movable rams in said cylinder having free ends engaging said outrigger members to cause simultaneous movement thereof in opposite directions, and means for introducing hydraulic fluid under pressure into said cylinder at an intermediate point to act on the inner ends of both rams.

7. In a vehicle having a wheel supported frame, a transverse sleeve open at both ends mounted on said frame, a pair of oppositely movable tubular outrigger members fitted in said sleeve for telescopic movement in opposite directions, an hydraulic cylinder supported within said sleeve and having ends projecting into the tubular outrigger members, a pair of oppositely movable rams in said cylinder having free ends engaging said outrigger members to cause simultaneous movement thereof in opposite directions, and means for introducing hydraulic fluid under pressure into said cylinder at an intermediate point to act on the inner ends of both rams.

8. In a vehicle having a wheel supported frame, a horizontally extendible outrigger member supported on said frame, a vertical sleeve connected to the outer end of said outrigger member, a tube fitted in said sleeve for telescopic movement toward and away from ground engaging position, means for moving said tube downwardly, a cable having one end anchored to said tube, a sheave on the sleeve over which said cable is guided, and means for exerting an operating pull on said cable to retrieve said tube after it has been moved downwardly.

9. In a vehicle having a wheel supported frame, a horizontally extendible outrigger member supported on said frame, a vertical sleeve connected to the outer end of said outrigger member, a

tube fitted in said sleeve for telescopic movement toward and away from ground engaging position, means for moving said tube downwardly, a cable having one end anchored to said tube, a sheave on the sleeve over which said cable is guided, the cable then extending in the general direction of the movement of the horizontally extendible outrigger member, and means on the vehicle frame for exerting an operating pull on said cable to first retrieve the tube and to then retrieve the horizontally extendible outrigger member.

10. In a vehicle having a wheel supported frame, an outwardly movable outrigger member mounted on said frame, a movable foot carried by said outrigger member, means for causing outward movement of said outrigger member, means for causing downward movement of said foot, means including a cable and sheaves for retrieving said foot and for sequentially retrieving said outrigger member, and a hydraulically operated ram for exerting an operating pull on said cable.

11. In a vehicle having a wheel supported frame, an outwardly movable outrigger member supported on said frame, an upright sleeve connected to the outer end of said outrigger member, a tube fitted in said sleeve for telescopic movement toward and away from ground engaging position, means for moving said tube downwardly, a cable having one end anchored to said tube, a sheave on the sleeve over which said cable

is guided, and means for exerting an operating pull on said cable to retrieve said tube after it has been moved downwardly.

12. In a vehicle having a wheel supported frame, an outrigger member supported on said frame, an upright sleeve connected to the outer end of said outrigger member, a tube fitted in said sleeve for telescopic movement toward and away from ground engaging position, means for moving said tube downwardly, a cable having one end anchored to said tube, a sheave on the sleeve over which said cable is guided, and means for exerting an operated pull on said cable to retrieve said tube after it has been moved downwardly.

13. In a vehicle having a wheel supported frame, an outwardly movable outrigger member supported on said frame, an upright sleeve connected to the outer end of said outrigger member, a tube fitted in said sleeve for telescopic movement toward and away from ground engaging position, means for moving said tube downwardly, a cable having one end anchored to said tube, a sheave on the sleeve over which said cable is guided, the cable then extending in the general direction of movement of the outrigger member, and means on the vehicle frame for exerting an operating pull on said cable to first retrieve the tube and to then retrieve the horizontally extendible outrigger member.

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