A combination trailer and pontoon boat includes a generally rectangular elongated frame having rectangular notches extending along opposite longitudinal sides at the juncture between the peripheral vertical walls of the frame and the adjoining flat bottom portions of upper frame members. Pontoons of generally rectangular cross section have upper corners engaged in these notches in a first position thereof. The pontoons are hinged to the frame at the junctures between the notches and the flat bottom portions of the frame in a manner to fold beneath the flat bottom portions of the frame. Wheels are supported by the pontoons to support the pontoons when folded beneath the frame.
COMBINATION TRAILER AND PONTOON BOAT

This is a continuation in part of my application for "Combination Trailer and Pontoons Boat," Ser. No. 25,462 filed Apr. 3, 1970 and now abandoned. This invention relates to an improvement in combination house trailer and pontoon boat and deals particularly with a vehicle which may be drawn along the ground behind a car or truck, or which may be used as a pontoon boat when desired.

BACKGROUND OF THE INVENTION

Various types of amphibious vehicles have been produced. Certain of these structures have pontoons pivotally supported upon a frame with supporting wheels in opposed relation to the under surfaces of the pontoons. When in one extreme position, the pontoons extend downwardly from the frame and act to support it. When rotated to their other extreme position, usually through an angle of 180°, the pontoons extend upwardly from the frame and the wheels extend downwardly so that the device may be moved along a highway. It is known in the art to have pontoons which may be swung through an angle of 180°, relative to their longitudinal axes, and to provide wheels which are retractable. One such structure includes pontoons having supporting wheels which extend downwardly when the device is to be drawn over the surface of the ground, and which extend laterally when the vehicle is used in the water. In this structure, however, the pontoons are entirely outwardly of the sides of the supporting frame when the device is used in the water, so that the weight upon the supporting platform is supported completely through the hinges.

SUMMARY OF THE INVENTION

The present invention lies in the provision of a pontoon boat which includes pontoons which are pivotal on longitudinal axes through an angle of approximately 90°. In one extreme position, the pontoons are virtually completely beneath the frame. Wheels are supported in recesses in the pontoons, and extend downwardly therefrom directly beneath the sides of the supporting frame so that the frame is securely supported by the wheels through the pontoons when the device is to be used as a trailer behind an automotive vehicle.

When the vehicle is in the water, the pontoons may be turned about their longitudinal axes through an angle of 90° so that portions of the pontoons extend outwardly beyond the supporting frame in order to provide utmost stability to the craft while on the water. However, in this position, portions of the pontoons are still maintained beneath the edges of portions of the frame so that the marginal side edges of the frame rest directly upon the pontoons when the craft is afloat. Thus, in either of the two extreme positions, at least portions of the pontoons are directly beneath, and support, the frame of the vehicle.

A further feature of the present invention resides in the provision of a third fixed pontoon or hollow cockpit extending longitudinally of the vehicle midway between the other pontoons. This cockpit assists in supporting the vehicle while in the water, and also assists in the control of the vehicle while traveling over the surface of the water. The third or intermediate pontoon is normally about the same depth as the pivotal pontoons while the vehicle is afloat. However, when the pivotal pontoons are in position for traveling over the ground, the wheels extend below the under surface of the pontoons and support all three pontoons, or the pivotal pontoons as well as the central pontoon if the central pontoon is above the surface of the ground and substantially on the same plane.

A further feature of the present invention resides in the provision of a cabin or cab supported upon the platform and which may be used to accommodate a suitable number of people either while the vehicle is on land or afloat.

A further feature of the present invention resides in the provision of spring supported wheels which act to cushion the support while still supporting the pontoons out of contact with the ground.

A further feature of the present invention resides in the provision of a device of the type described in which the pontoons are hingedly connected in such a manner that the buoyant body of the pontoons does not change materially in elevation during pivotal movements from a position in which the pontoons extend laterally of the frame, to a position in which the pontoons extend downwardly of the frame, and the supporting wheels are in position to move the vehicle over the ground. This feature is of extreme importance in view of the fact that pivotal movement of the pontoons could change the altitude of the cab to a very considerable extent, which would make the pontoons very difficult to pivot. In the present application, the combination vehicle varies but little in elevation relative to the water level during the pivotal movement of the pontoons, considerably reducing the force necessary to pivot the pontoons. In other words, when the pontoons are pivoted in one direction beyond an intermediate position, and when the amphibious vehicle is in the water, the pontoons will automatically continue the pivotal movement until the pontoons extend laterally from the frame of the device and still support a portion of the frame. In a similar manner, when the pontoons are swung into a position in which the wheels become of importance, the pontoons automatically are pivoted into their other extreme position after the pontoons pivot through an intermediate position. The force necessary to pivot the pontoons about their longitudinal axes requires but little force, and the pontoons actually swing into one extreme position or the other merely by the buoyancy of the pontoons.

An important feature of the present invention resides in the fact that the vehicle is provided with means for pivoting the pontoons through a dead center position and into either extreme position. When the boat is afloat, means are provided for swinging the pontoons about longitudinally axes so that the wheels project laterally, and the pontoons are spread apart widely enough to float the device on a very stable keel, and also to lift the wheels above the surface of the water. When the vehicle approaches shore, the pontoons may be swung back into their starting position so that the wheels project downwardly and the pontoons are folded beneath the framework. This is of importance, as the width of a vehicle being drawn over the highway is normally restricted to the width of most trucks unless a special moving permit is obtained. At the same time, when the pontoons are close enough together to be drawn over the highway, the stability of the vehicle when afloat may be inadequate. By swinging the pontoons completely below the super structure while being
drawn along the highway, the objections to the trailer because of width is eliminated. At the same time, by having the pontoons project laterally beyond the superstructure when the vehicle is afloat, not only is the vehicle stabilized while in the water but also a walk-way is provided on either side of the superstructure so that the passengers may walk entirely about the cabin when it is so desired.

These and other objects and novel features of the present invention will be more clearly and fully set forth in the following specification and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of the vehicle resting upon the surface of the ground, and supported by the supporting wheels.

FIG. 2 is a top plan view of the structure indicated in FIG. 1 of the drawings.

FIG. 3 is a front elevational view of the vehicle in position to travel over the surface of the ground, the Figure showing in dotted outline the position of the pontoons when the vehicle is afloat.

FIG. 4 is a perspective view of the vehicle in position for moving over the surface of the water.

FIG. 5 is a rear elevational view of the vehicle with the wheels in lowered position, the view showing in dotted outline the position of the pontoons when the vehicle is afloat.

FIG. 6 is a sectional detailed view of a portion of the hinge connection between a pontoon and the frame of the vehicle.

FIG. 7 is a front elevational view of a portion of the vehicle's frame with the pontoon folded into position so that the wheels are supported upon the ground.

FIG. 8 is a view similar to FIG. 7, but showing the pontoons pivoted into position to support the vehicle on the surface of the water.

FIG. 9 is an elevational view of a portion of one of the pontoons showing the wheels in supporting position.

FIG. 10 is a bottom plan view of a detailed position of one of the pontoons, showing the wheel suspension.

FIG. 11 is a detailed view of the adjustable means for supporting the trailer hitch.

FIG. 12 is a perspective view of a device which is used for locking the pontoons in either extreme position.

FIG. 13 is an end elevational view of the pontoon boat in position to travel over a highway.

FIG. 14 is a view similar to FIG. 13 but showing the pontoons in water navigating position.

FIG. 15 is a top plan view of the operating mechanism for pivoting the pontoons.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In general, the device includes an elongated generally rectangular frame 10 having a cabin 11 mounted thereupon. As is indicated in FIGS. 4, 5, 7, and 8 of the drawings, the cabin portion 11 projects somewhat beyond the remainder of the supporting frame 10 in a lateral direction for a purpose which will be later described. The frame 10 and cabin 11 are supported by a pair of pontoons 12 which are connected to the frame by means of parallel longitudinally extending hinges 13. The location of the hinges 13, and their relation with the frame and cabin is an important feature of the present invention.

As is indicated in FIG. 7 of the drawings, each pontoon 12 comprises a generally rectangular body portion including a top panel 15, generally parallel side wall panels 16 and 17 at right angles to the top panel 15, and a slightly V-shaped bottom wall 19. The V-shaped bottom wall 19 has its central apex 20 somewhat below the sides of the bottom in order to assist in the control and handling of the device.

As is indicated in FIG. 8 of the drawings, the hinge 13 is positioned at the juncture between the lower surface 21 of the frame 10 and the outer peripheral side wall 22 of the frame. The hinge 13 is attached to the side wall 16 of each pontoon, the side wall 16 being the innermost side thereof. The hinge 13 is positioned at a distance from the top wall 15 of the pontoon substantially equal to the distance between the body portion 11 of the cabin from the lower edge of the frame 10. When the pontoons 12 are in position for supporting the vehicle on the water, the top wall 15 engages the undersurface of the cabin 11 (which is secured to, and forms a part of the frame) and acts to directly support the same. When the pontoons are folded into position so that the vehicle may travel along the surface of the ground, the side wall 16 of each pontoon engages the under surface of the frame 10, as is indicated in FIG. 7 of the drawings, and is supported thereby.

A hollow elongated cockpit 23 extends substantially the full length of the frame 10 and serves as an intermediate pontoon for supporting the vehicle. The pontoon 23 may be lined with flooring to form the base of the cabin 11, and a portion of the frame on either side of the central pontoon 23 may serve as a support for longitudinally extending seats which may be cushioned to accommodate the passengers. When the pontoons are folded into position as shown in FIG. 7 of the drawings for traveling the surface of the ground, the V-shaped bottom 19 of each pontoon fits against the side wall of the cockpit or center pontoon 23.

A sealed recess 25 is provided in each pontoon 12 communicating with the outer surface of the top wall 15, the recess extending into the side wall 17 as is indicated in FIGS. 8 and 10 of the drawings. A cover plate 26 normally closes the outer side of the recess 25. The side wall 17 of each pontoon is provided with a pair of longitudinally extending channel members 27 and 29, the channel 27 being located adjoining the inner edge of the recess 25, while the channel member 29 is at the juncture between the side wall 17 and the bottom wall 19. The channel members 27 and 29 support bearings 30 and 31 respectively which support shafts 32 having crank arms 33 which support wheel spindles 34. The spindles 34 support wheels 35 which are designed to support the vehicle when traveling over the ground. Springs 36 encircle the shafts 32 and are designed to restrict the pivotal movement of the shafts, the springs 36 serving as shock absorbers while the device is moving over the surface of the ground.

A trailer hitch 39 is pivotally supported to the forward end of the cockpit 23 along aligned transverse pivots 40. A trailer hitch socket 38 is connected to the generally A-shaped trailer hitch member 39 to permit the trailer hitch to be connected to a cooperating ball joint on the rear of a towing vehicle. An adjustable, expandable, and contractable member 41 is pivotally supported at 42 between a pair of angle iron uprights 43 secured to the forward end of the frame 10. The movable member 44 of the expandable and contractable
member 41 is pivotally connected to the trailer hitch by pivot means 45 extending through lugs 46 secured to a cross member 47 on the trailer hitch 39. While the type of expandable and contractable member 41 may vary considerably in form, in the particular arrangement illustrated (see FIG. 11), the device comprises a screw jack driven by cooperative bevel gears 49 operated by a crank 50 rotatably supported in a generally U-shaped bracket 51 on the end of the screw jack cylinder 41. With this arrangement, by rotation of the crank 50, the piston or plunger of the screw jack may be moved longitudinally of the cylinder 41, and the effective length of the trailer hitch 39 may be varied. In FIG. 1 of the drawings, the trailer hitch is shown as detached from a towing vehicle, and resting upon a suitable support 48 which holds the vehicle on a generally horizontal plane.

In the particular arrangement illustrated, the cab 11 does not extend the full length of the pontoons 12, and a front deck 50 and a rear deck 51 are provided forward and rearwardly of the cabin 11, the decks 50 and 51 being supported upon the frame 10. A box-like structure 52 extends rearwardly from the central pontoon 23 and includes vertically extending longitudinal sides, and a transversely extending motor supporting wall 53 which is designed for accommodating an outboard motor such as 58.

A winch arrangement 54 is supported by the upwardly extending angles 43 and serves to pivot the pontoons 12 from the position shown in full lines in FIG. 3 of the drawings to the position shown in dotted outline in this FIG. A second winch device 55 is mounted at the rear end of the rear deck 51, and is connected to the pontoons 12 in a manner to swing the pontoons from the position shown in dotted outline on FIG. 3 of the drawings to the position shown in full lines thereof. Obviously, the position of the winches may be varied. The winches 54 and 55 operate suitable cables such as 56 to pivot the pontoons in the manner described.

Means illustrated in FIGS. 7 and 8 of the drawings is provided for holding the pontoons 12 in either extreme position. This means is perhaps best illustrated in FIG. 12 of the drawings, and is identified by the numeral 59. The device merely comprises a tightening clamp which is provided with a ring 60 at one end anchored to a fixed loop 61 on the frame 10 and having a hook 62 at its other end designed to engage in a loop 63 on an end of a corresponding pontoon 12. The device includes a lever 64 by means of which the effective length of the clamping means may be shortened or lengthened. When in use, the lever 64 is pivotally to tighten the clamping means to hold the clamp in a shortened position. When the pontoons are in a position to float the vehicle, the hook 62 may be engaged with a second loop 65 (see FIG. 8) on the end of the pontoon to hold the pontoon in its other extreme position.

A modified method and apparatus for pivoting the pontoons 12 is shown in FIGS. 13 and 15 of the drawings. As illustrated, each pontoon 12 is provided with an arm 70 secured to the top panel 15 of the pontoon and which extend generally in alignment when the pontoons are in laterally extended position as they would appear in position on the water. A winch 71 supported by a suitable bracket 72 on the frame 10 of the boat is provided with a pair of cables 73 simultaneously reeled in by the winch 71. A pair of pulleys 74 are provided on opposite sides of the bracket 71 pivoted to the frame 10. The cables 73 are designed to extend about the pulleys 74 and are terminally anchored to the ends of the arms 70. By operation of the winch 71, the cables are reeled in from the position shown in FIG. 13 and the pontoons 12 are pivoted from the position shown in FIG. 13 toward the position shown in FIG. 14. Once the pontoons pass a dead center position the pontoons pivot by their buoyancy into the position shown in FIG. 14.

An inverted generally V-shaped frame 75 is mounted on the frame 10 to support a pair of pulleys 76 in a position above the deck of the vehicle. When the pontoons are in the position shown in FIG. 14, the arms 70 extend toward the longitudinal center line of the craft. By slackening the cables 73, and extending them over the pulleys 76 at opposite corners of the frame 75, as indicated in FIG. 14, the winch 71 may be used to swing the arms 70 from the horizontal position shown in FIG. 14 to the vertical position shown in FIG. 13. This action swings the pontoons 12 beneath the frame 10, without materially changing the elevation of the frame relative to the water line. Once the pontoons 12 swing past dead center position, the pontoons swing by themselves due to their buoyancy.

It is important to note that the pontoons require little force to move them between their extreme positions. As a matter of fact, the arms 70 may be swung to either extreme position manually due to the fact that the deck, cab and the like are not materially changed in elevation relative to the water line during this operation.

In accordance with the Patent Office Statutes, I have described the principle of construction and operation of the present device; and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that changes may be made without departing from the spirit of my invention.

I claim:

1. A combination trailer and pontoon boat including:
   an elongated generally rectangular frame having substantially vertical peripheral walls on opposite sides thereof,
   a member on the upper surface of said frame and secured thereto as a part thereof extending laterally beyond said vertical walls,
   said vertical walls of said frame and the laterally projecting sides of said member forming notches of substantially rectangular vertical section,
   said frame having substantially flat horizontal bottom surfaces adjoining said notches,
   a pair of elongated pontoons having substantially flat top panels, substantially parallel side panels in substantially right angular relation to said top panel, and bottom panels connecting the lower edges of said side panels,
   longitudinal hinge means connecting one side wall of each pontoon to a side edge of said frame, the axis of each said hinge means being adjacent to the juncture between one of said vertical walls of frame and the bottom surface of said frame,
   each said hinge means being connected to said side wall of a corresponding pontoon at a distance from the top panel thereof substantially equal to the height of said vertical walls thereby in one extreme position of the pontoon a portion of the top panel engages the laterally projecting portion of said member at the top of the corresponding notch,
each said pontoon, when pivoted to its other extreme position, underlying, and bearing against, the flat bottom portion of said frame,
a wheel secured to each said pontoon to project from the other side wall thereof on a substantially vertical pivot when said pontoons are engaged in said notches and on a substantially horizontal axis when said one side walls thereof are in engagement with the flat bottom portions of said frame.

2. The structure of claim 1 and including:
a fixed downwardly extending hollow intermediate portion on said frame serving the capacity of a third pontoon, said hollow intermediate portion being parallel to, and intermediate, said pontoons, and spaced substantially therefrom in said one extreme position of said pontoons.

3. The structure of claim 2 and in which said hollow intermediate portion is open along its upper edge.

4. The structure of claim 2 and in which said pontoons, when in engagement with bottom of said frame, extend into close proximity to said hollow intermediate portion.

5. The structure of claim 2 and in which said hollow intermediate portion serves to assist in supporting said frame while said pontoons are pivoted from one extreme position to the other.

6. The structure of claim 2 and in which the bottom panels of said pontoons and one of the side panels of said hollow intermediate portion are on substantially the same plane in said one extreme position.

7. The structure of claim 2 and in which said pontoons are provided with shallow V-shaped bottom panels, and fits against said hollow intermediate portion in said one extreme position.

8. A combination trailer and pontoon boat including:
a member on the upper surface of said frame and secured thereto as a part thereof, said frame having substantially flat bottom portions adjoining said vertical peripheral walls,
a pair of elongated pontoons having substantially flat top panels, substantially parallel side panels in substantially right angular relation to said top panel, and bottom panels connecting the lower edges of said side panels,
longitudinal hinge means connecting one side wall of each pontoon to a side edge portion of said frame, the axis of each hinge means being adjacent to the juncture between one of said vertical walls of said frame and the bottom surface of said frame, said hinge means being connected to said one side panel of a corresponding pontoon intermediate the top and bottom panels of said pontoon, each said pontoon being pivotal from one extreme position in which a portion of said one side panel is adjacent said vertical wall of said frame to a second extreme position in which a portion of said one side panel engages the adjoining flat bottom portion of the frame,
a wheel secured to each said pontoon to project from the other side wall thereof on a substantially vertical pivot when said pontoons are in said one extreme position and on a substantially horizontal axis when said one side walls thereof are in engagement with the flat bottom portions of the frame, and a fixed downwardly extending hollow intermediate portion on said frame serving the capacity of a third pontoon, said hollow intermediate portion being parallel to, and intermediate, said pontoons, and spaced substantially therefrom in said one extreme position of said pontoons, said hollow intermediate portion serving to assist is supporting said frame while said pontoons are pivoted from one said extreme position to the other.

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