

Aug. 21, 1956

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2,759,201

AMPHIBIOUS DEVICE OF THE FOLDABLE OUTRIGGER TYPE

Filed Dec. 28, 1953

4 Sheets-Sheet 1

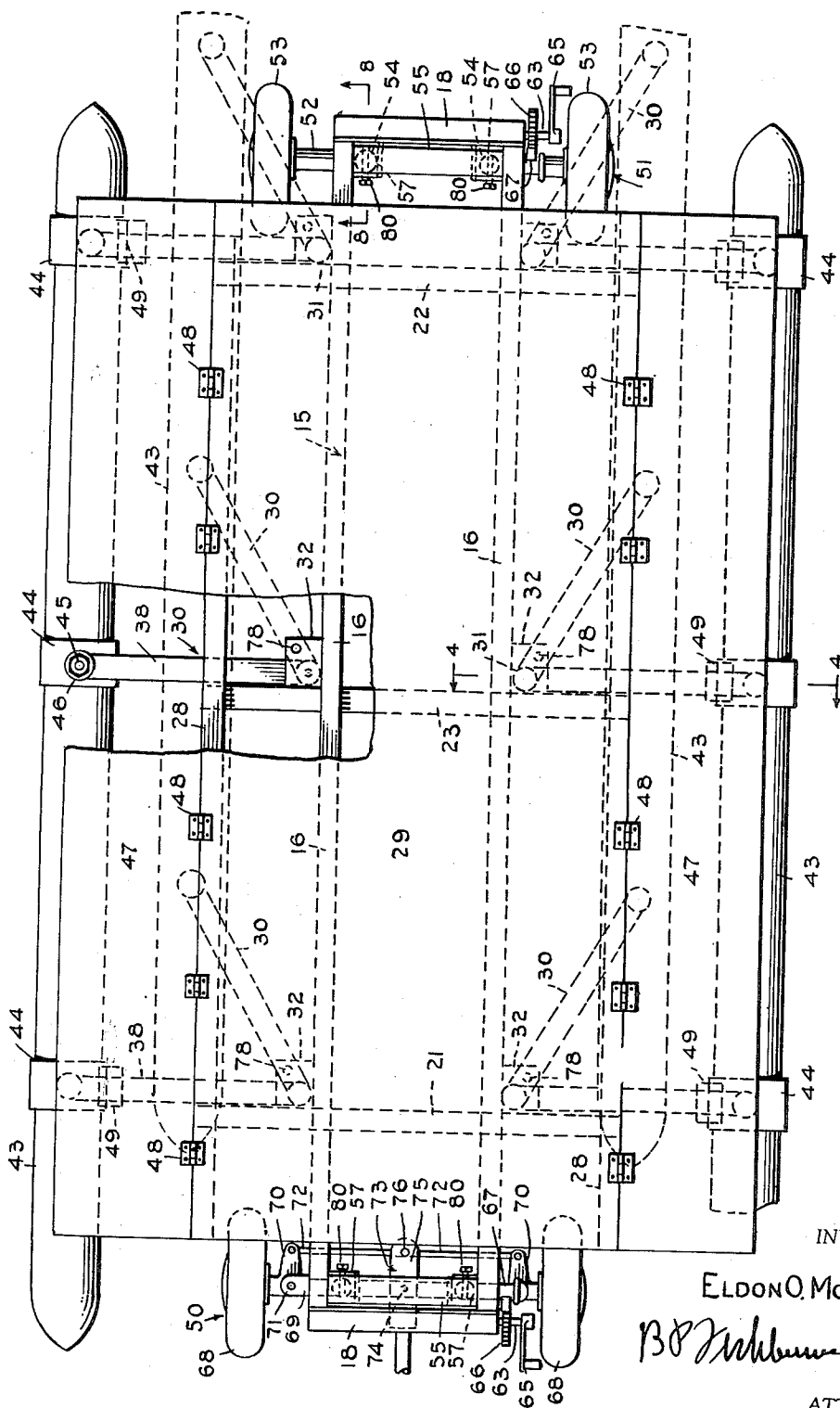


FIG. 1.

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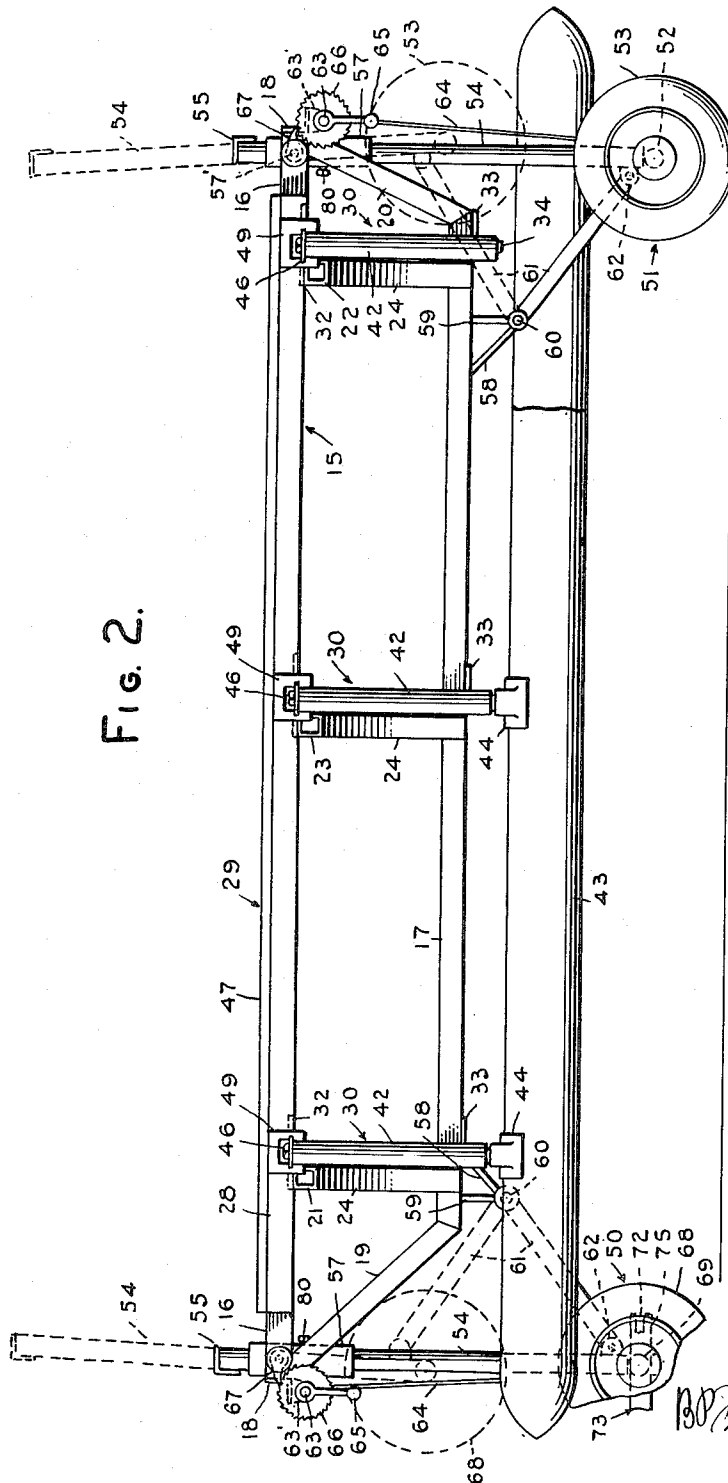
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FIG. 3.

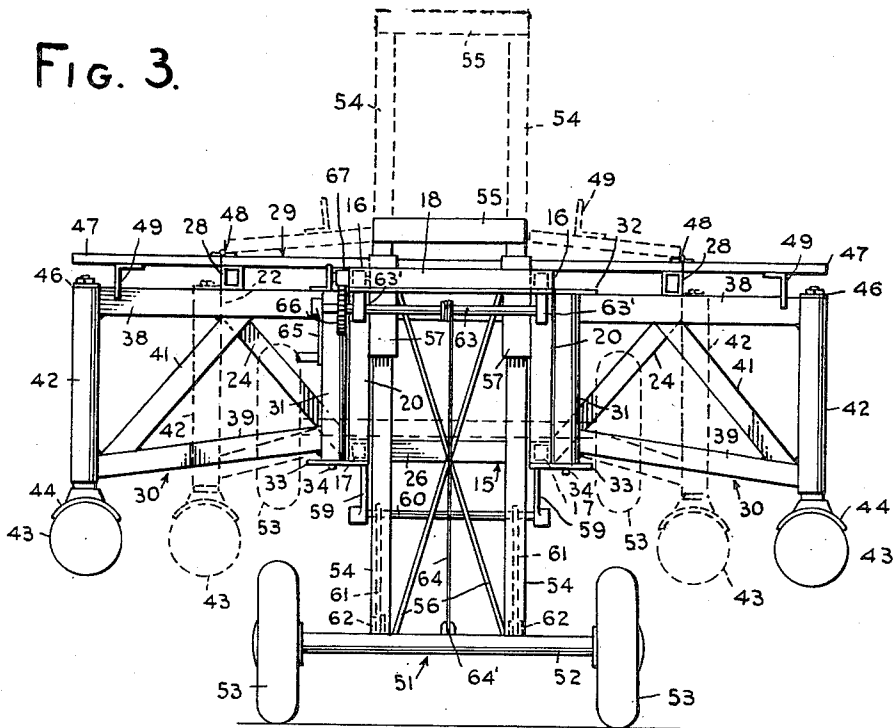
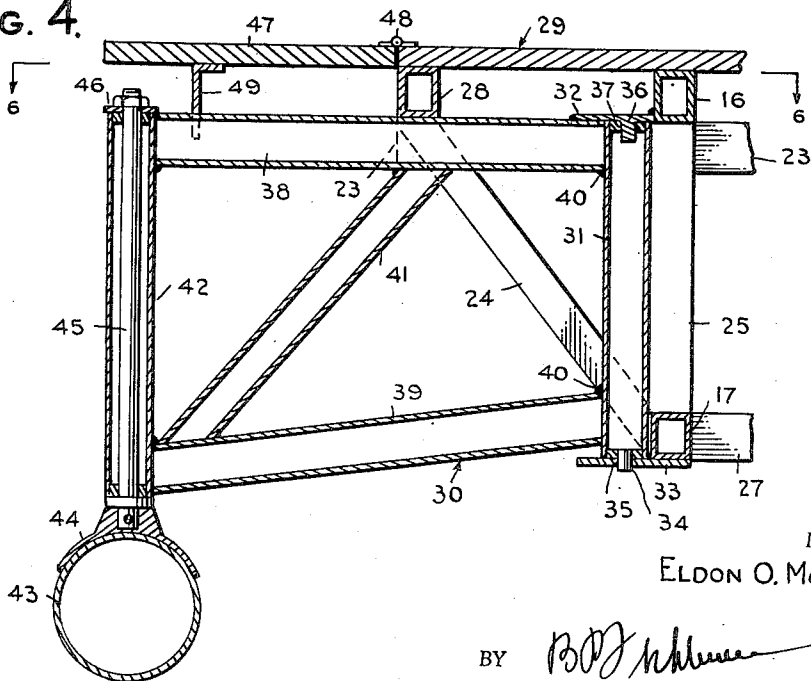


FIG. 4.



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AMPHIBIOUS DEVICE OF THE FOLDABLE OUTRIGGER TYPE

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Application December 28, 1953, Serial No. 400,407

3 Claims. (Cl. 9—1)

My invention relates to boats of the catamaran or outrigger type.

An important object of the invention is to provide a foldable catamaran which is amphibious, and including a retractable wheeled running gear.

A further important object of the invention is to provide an amphibious catamaran which is particularly useful for Coast Guard and life saving work, as well as for sports, such as fishing, pleasure boating, beach landing craft for the armed services and the like.

Another object is to provide an amphibious catamaran or outrigger boat, which when folded is narrow enough to run on a highway, behind a towing vehicle or the like, and when extended or unfolded provides a broad deck, supported by pontoons near the sides of the deck, so that the boat may be launched in rough surf and used on the ocean, without upsetting.

A further object is to provide a catamaran or boat of the above-mentioned character having a deck section of permanent construction, and foldable auxiliary deck sections.

A still further object of the invention is to provide a catamaran which is simplified and light weight in construction, rugged and durable, reliable in operation, and inexpensive to manufacture.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this application, and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a plan view of a foldable outrigger boat or catamaran embodying my invention, part broken away, and showing the folded condition of the catamaran in broken lines,

Figure 2 is a side elevation of the catamaran with the wheeled running gear lowered, the running gear being shown elevated in broken lines,

Figure 3 is a rear end elevation of the catamaran in the extended or unfolded condition with the running gear lowered, and showing the folded condition of the same and the running gear elevated in broken lines,

Figure 4 is an enlarged fragmentary transverse vertical section taken on line 4—4 of Figure 1,

Figure 5 is a perspective view of the main rigid frame or body portion of the device disassociated from the other parts thereof,

Figure 6 is an enlarged fragmentary plan view taken substantially on line 6—6 of Figure 4, parts omitted and parts broken away,

Figure 7 is an enlarged fragmentary plan view of front wheel steering means,

Figure 8 is an enlarged fragmentary vertical section taken on line 8—8 of Figure 1,

Figure 9 is a vertical section taken on line 9—9 of Figure 8, and,

Figure 10 is a vertical section taken on line 10—10 of Figure 6.

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In the drawings, where for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 15 designates generally a main frame or supporting structure for the device. The main frame 15 is relatively narrow and elongated, as shown, and preferably comprises upper and lower pairs of transversely spaced parallel longitudinal frame members or bars 16 and 17, which are of stout or rigid construction. The forward and rear ends of the upper longitudinal frame bars 16 are rigidly connected by transverse horizontal frame bars 18, rigidly secured thereto by welding or the like, as shown. The lower longitudinal frame bars 17 are somewhat shorter than the upper bars 16 and have their ends terminating inwardly of the ends of the bars 16. The forward and rear ends of the lower longitudinal frame bars 17 are rigidly connected with the upper frame bars 16 by means of inclined or diagonal braces 19 and 20, rigidly secured thereto by welding or the like, and arranged in vertical planes. The diagonal bars 19 and 20 are rigidly secured to the upper longitudinal bars 16, slightly inwardly of their opposite ends.

Forward and rear transverse horizontal beams 21 and 22 are welded or otherwise rigidly secured to the bottoms of the upper longitudinal bars 16, somewhat inwardly of their opposite ends, and the beams 21 and 22 extend laterally outwardly beyond the longitudinal bars 16 for substantial equal distances at the opposite sides of the main frame 15. An intermediate transverse horizontal beam 23, identical with the beams 21 and 22 is rigidly secured to the bottoms of the longitudinal bars 16 at their longitudinal center, as shown. The ends of the beams 21, 22 and 23 terminate in longitudinal alignment, and the beams are at the same elevation, and lie in a horizontal plane. The ends of the beams 21, 22 and 23 are rigidly connected with the lower longitudinal bars 17 by means of inclined or diagonal braces 24, as shown, rigidly secured thereto by welding or the like. Additional vertical braces or bars 25 rigidly connect the transverse beams 21, 22 and 23 with the lower longitudinal frame bars 17, as shown. Forward and rear horizontal transverse frame bars 26 are rigidly secured by welding or the like to the lower longitudinal bars 17, below the beams 21 and 22, and a similar horizontal transverse bar 27 is rigidly secured between the longitudinal bars 17, below the beam 23. A pair of parallel longitudinal deck supporting beams 28 are rigidly secured by welding to the tops of the beams 21, 22 and 23, adjacent their outer ends, and the beams 28 are preferably somewhat shorter than the upper longitudinal bars 16, and spaced laterally outwardly of, in parallel relation therewith. The beams 28 lie in the same horizontal plane as the upper longitudinal bars 16.

The parts thus far described make up the main frame 15, and constitute a rigid unit, forming the body portion of the device. This unit or frame 15 is clearly shown disassociated from the remainder of the device in Figure 5 of the drawings.

A central horizontal permanent deck section 29, formed of wood or the like, rests upon the tops of the upper longitudinal frame bars 16 and the deck supporting beams 28, and is rigidly secured thereto, by bolting, or any other suitable means. The deck section 29 is uninterrupted between the beams 28, and its forward and rear ends terminate at the forward and rear ends of the beams 28, as shown. The opposite end portions of the upper and lower longitudinal frame bars 16 and 17 project longitudinally beyond the ends of the deck section 29, as shown.

Horizontally swingable outrigger arms or frames 30 are provided upon the opposite sides of the main frame 15, adjacent to the transverse beams 21, 22 and 23. Each outrigger frame 30 comprises a vertical pivot shaft

or tube 31, at the inner end thereof, and arranged adjacent the rear side of the associated beams 21, 22 or 23. The pivot shafts 31 are disposed adjacent to the ends of the lower transverse bars 26 and 27, and just rearwardly thereof, the bars 26 and 27 being arranged in the same vertical planes as the beams 21, 22 and 23.

Upper horizontal support plates 32 are rigidly secured to the transverse beams 21, 22 and 23 and upper longitudinal frame bars 16, Figure 6, adjacent to the rear sides of the beams 21, 22 and 23, and the outer sides of the bars 16. The shafts 31 are provided at their lower ends with reduced pivot extensions or trunnions 34, rigidly secured thereto, and journaled within openings 35 of the horizontal support plates 33. Depending trunnions 36 on the upper horizontal plates 32 engage within openings 37 in the tops of the vertical shafts 31, as shown. The outrigger frames 30 are thus journaled adjacent to the rear sides of the beams 21, 22 and 23, at the outer ends of the lower transverse bars 26 and 27.

Each outrigger frame 30 further comprises spaced upper and lower substantially horizontal bars or arms 38 and 39, having their inner ends rigidly secured by welding to the vertical shaft 31, as indicated at 40. Diagonal braces 41 for the outrigger frames 30 extend between the upper and lower arms 38 and 39, as shown, and are rigidly secured thereto by welding or the like. The outer ends of the outrigger arms 38 and 39 are rigidly connected by vertical tubes or sleeves 42.

Elongated tubular pontoons or floats 43 extend horizontally beneath the lower ends of the vertical tubes 42, and the pontoons 43 preferably extend continuously for the entire length of the main frame 15, or slightly beyond the ends of the main frame, if preferred. The pontoons 43 are rigidly secured at their tops to curved shoes or plates 44 by any suitable means, and vertical pivot shafts 45 have their lower ends rigidly secured to the shoes 44, and extend rotatably through the vertical tubes 42, as shown, for forming a pivotal connection between the outrigger frames 30 and the pontoons. The tops of the shafts 45 are provided with nuts 46, and flat washers slidably engaging the tops of the tubes 42, and serving to hold the shafts 45 against downward movement within the tubes 42.

It is thus seen that the three outrigger frames 30 upon each side of the main frame 15 have their inner ends pivotally secured to the main frame and their outer ends are pivoted to the horizontal longitudinal pontoons 43. The outrigger frames 30 upon each side of the main frame are thus swingable horizontally in unison, and are maintained parallel because of their pivotal connections with the pontoons. The pontoons 43 remain parallel with the main frame 15 in all adjusted positions, and the pontoons are bodily swingable with the outrigger frames 30.

With the means described, the pontoons 43 are shiftable from extended positions wherein the outrigger frames 30 are perpendicular to the sides of the main frame 15, to folded or retracted positions, wherein the outrigger frames are at angles to the sides of the main frame 15, with their outer ends swung toward the rear end of the main frame, see the broken line showing the pontoons in Figure 1.

I provide auxiliary deck sections 47, outwardly of the central permanent deck section 29. The auxiliary deck sections 47 have their inner sides hingedly secured at 48 to the outer longitudinal sides of the central deck section 29, and are adapted to be folded over the central deck section to stowed horizontal positions, when the pontoons 43 are folded or retracted. When the pontoons are extended to their outermost positions, the hinged auxiliary deck sections 47 are foldable outwardly to extended horizontal positions, wherein they rest upon the tops of the outrigger frames 30, and provide a continuous deck of substantially increased width. The auxiliary deck sections 47 are preferably of the same length as the permanent central deck section 29.

In order to lock the outrigger frames 30 in the extended positions, perpendicular to the sides of the main frame 15, I provide U-shaped locking elements 49, rigidly secured to the bottoms of the auxiliary deck sections 47, near the outer longitudinal edges of the same, and adjacent to the several outrigger frames 30. The U-shaped locking elements 49 are adapted to engage over the upper arms 38 of the outrigger frames, when the frames are at right angles to the sides of the main frame 15, Figure 4, to releasably and positively hold the pontoons 43 and outrigger frames in their extended positions. When the auxiliary deck sections 47 are folded inwardly upon the central deck section, the elements 49 release the outrigger arms 38 so that the pontoons may be shifted to their retracted positions.

It is to be noted that the outer portions of the transverse beams 21, 22 and 23 overlap the upper outrigger arms 38 for a considerable distance outwardly of the vertical tubes 31, and limit the forward or counterclockwise swinging movement of the outrigger frames 30 in Figure 1. When the outrigger frames 30 are swung forwardly, they engage the rear sides of the beams 21, 22 and 23, and the beams serve as positive stops for the outrigger frames, and position the same at right angles to the sides of the main frame 15, so that the arms 38 may properly engage the U-shaped locking elements 49 without further adjustment.

In order to render the foldable catamaran transportable on land and amphibious, I provide forward and rear retractable wheel units 50 and 51. The rear wheel unit 51 comprises a horizontal axle 52, having rubber tired wheels 53 of the automotive type journaled upon its ends. Rigidly secured to the axle 52, inwardly of the wheels 53 are vertical posts or bars 54, of considerable length, which extend above the axle 52 and are rigidly connected at their upper ends by a transverse horizontal bar 55. Crossed diagonal braces 56 may be provided between the upper cross bar 55 and the lower ends of the posts 54, as shown, to strengthen the retractable wheel unit. Guide sleeves 57 are pivotally secured to the inner sides of the upper longitudinal frame bars 16, as at 57' adjacent their rear ends, for vertical swinging movement, and these guide sleeves slidably receive the posts 54, as shown. Inclined and vertical brace bars 58 and 59, rigidly secured to the bottoms of the lower longitudinal frame members 17, near their rear ends support a horizontal transverse rock shaft 60, spaced somewhat below the lower frame members 17, somewhat forwardly of their rear extremities. Pivoted brace bars 61 have their forward ends rigidly secured to the rock shaft 60, just inwardly of the longitudinal bars 17, and the rear ends of the brace bars 61 are pivotally secured to the posts 54, near the lower ends of the same, as indicated at 62.

A horizontal transverse cable winding shaft 63 is journaled within bearings 63', which are fixedly secured to the rear ends of the upper frame bars 16, and a cable 64 has its upper end secured to the shaft 63, near the longitudinal center thereof, and its lower end attached to the axle 52, at 64'. The shaft 63 is provided at one end with a hand crank 65, and carries a ratchet wheel 66, for engagement with a pawl 67 pivoted near the rear end of the adjacent upper longitudinal frame bar 16. When the crank 65 is turned for winding the cable 64 upon the shaft 63, the rear wheels 53 and associated elements are elevated or retracted in the manner shown in the drawings, and the wheels 53 travel upwardly and assume elevated positions just below the longitudinal beams 28. In such positions, the bottoms of the wheels 53 are substantially at the tops of the pontoons 43. The wheels 53 and axle 52 swing in an arc as they are raised and lowered, Figure 2, due to the pivotal connection of the rods 61 with the main frame, through the medium of the rock shaft 60. When the wheels 53 are fully lowered, due to unwinding of the cables 64 from the shaft 63, the bottoms of the wheels are well below the pontoons 43, and

the rear end of the device is held elevated by the rear wheeled unit 51 for transportation on the ground.

The forward retractable wheel unit 50 is substantially the same as the rear unit 51, and embodies identical up-standing posts 54 and brace bars 55 and 56. Additional sleeves 57 are pivoted to the inner sides of the upper frame bars 16, adjacent their front ends, and the posts 54 of the forward unit 50 are slidably received by the sleeves 57. An identical cable winding shaft 63 and cable 64 are mounted upon the forward ends of the frame bars 16, in the same manner that the corresponding parts are mounted upon the rear ends of the frame bars 16, and these elements coact in the forward retractable wheel unit 50 in the identical manner that they coact in the rear unit 51 to raise and lower the same. An additional rock shaft 60 and pivoted connecting rods 61 and associated elements are arranged below the forward portions of the lower frame bars 17, for the same purpose that the corresponding elements of the rear unit 51 serve, and no further description of these elements in the forward unit 50 is necessary.

The forward retractable wheel unit 50 differs from the rear wheel unit 51 only in that the forward wheels 68 are adapted to be steered. The forward axle 69 is secured to the lower ends of the posts 54 in the identical manner that the rear axle 52 is secured to the posts 54. However, the wheels 68 of the forward unit 50 are journaled upon L-shaped steering levers or bell cranks 70, pivotally connected with the ends of the axle 69 for horizontal swinging movement by means of steering knuckles 71. A horizontal transverse drag link 72 connects the steering bell cranks 70, as shown, and a forwardly extending horizontal towing tongue 73 is pivoted at 74 to the center of the axle 69. A rear extension 75 of the tongue 73 is pivoted at 76 to the center of the drag link 72, and when the tongue 73 swings from side to side, the front wheels 68 are steered. The tongue 73 is connected with a towing vehicle, not shown, when the device is to be transported over a highway, or the like. The forward portion of the tongue 73 is detachable, as shown, and may be removed if desired when the forward unit 50 is elevated or retracted. The forward unit 50 is raised and lowered in the identical manner of the rear unit 51, and no further description of its operation is necessary.

In use, the device is readily transportable over a highway or roadway with the wheel units 50 and 51 lowered and the main frame 15 and pontoons 43 elevated. At this time, the pontoons 43 are placed in the retracted or folded positions, and the inner sides of the pontoons are arranged close to the outer sides of the rear wheels 53, as shown in Figure 1.

It should be mentioned, that means are provided to lock the outrigger frames 30 and pontoons in the folded or innermost positions. This means comprises a pair of readily removable vertical locking pins 77, Figure 10, which are placed through openings 78 and 79 of the intermediate mounting plate 32 and arms 38 of the intermediate outrigger frame 30 respectively. These openings 78 and 79 will register to permit the passage of the locking pins 77 therethrough, when the pontoons 43 and outrigger frames 30 are in their proper folded positions. If desired, additional locking pins 77 between the other outrigger frames 30 and the forward and rear mounting plates 32 may be provided, but it is believed that a single pair of the pins 77 will serve to properly hold the pontoons in the folded position during transportation of the device on wheels.

It should also be mentioned that means are provided to lock the main frame 15 in the elevated position, relative to the lowered wheel units 50 and 51. This means may comprise removable pins 80, extending through transverse openings 81 and 82, in the vertical posts 54, and shoes 57, as shown. When the wheel units 50 and 51 are fully lowered, the openings 81 and 82 will register to receive the pins 80, for preventing downward move-

ment of the main frame 15, and associated elements, relative to the lowered wheel units. When traveling on wheels, the auxiliary deck sections 47 are folded inwardly upon the central deck 29, and the entire device is now narrow enough to travel safely along the highway.

The catamaran is launched in the water from a beach, river bank or other ground with the wheel units 50 and 51 down. The pontoons 43 may be swung to their outermost positions prior to launching in the water, or after the boat is afloat, and when the deck sections 47 are swung to their outer horizontal positions, the U-shaped locking elements 49 will engage the outrigger frames 30 and lock them and the pontoons in the extended positions, with the arms 38 engaging the transverse beams 21, 22 and 23, as previously explained. Once afloat, the wheel units 50 and 51, may be elevated, as previously described, by cranking the shafts 63 and winding up the cables 64 thereon. The pawls 67 will engage the toothed ratchet wheels 66, and lock the wheel units in their retracted positions above the pontoons. The wheel units are thus elevated above the surface of the water, and the catamaran is now ready for use afloat.

The floating catamaran has a very wide flat horizontal deck, and the pontoons 43 are spaced far apart beyond the opposite longitudinal sides of the deck, so that the catamaran is practically impossible to upset, even in rough surf. It should be mentioned there that the shape and size of the pontoons 43 may be varied, as found desirable, to provide better buoyancy and performance.

My catamaran is useful for a variety of purposes, like life saving work by the Coast Guard and at beach resorts. It will also serve as a light weight sports or pleasure craft, for fishing and the like, as well as a small landing craft for troops assaulting a beach, or the like.

When the catamaran is to leave the water and come upon the land, the wheel units 50 are fully lowered while the device is still afloat. The pontoons 43 will support the main frame 15, as the wheels lower by gravity, and the locking pins 80 are then slipped into place. The device can then travel from the water onto a beach or other solid ground, and the wheels will again support and transport the device, the pontoons 43 being now elevated as they leave the water. Either to leaving the water or after the device is on land, the pontoons and outrigger frames 30 may be returned to and locked in their retracted positions, as previously described.

Although not shown in the drawings, I also contemplate building my catamarans with an engine suitably mounted upon the main frame 15, and operatively connected through suitable gearing with the rear wheels 53, to drive the same. A steering wheel for the front wheels 68 may be provided, instead of the tongue 73, and the device will then be self-propelled on land.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of the invention or scope of the subjoined claims.

Having thus described my invention, I claim:

1. A foldable catamaran comprising a substantially rigid main frame including upper and lower horizontal frame members and transverse vertical frame members, a central deck mounted on top of the main frame and substantially covering it, horizontally swingable outrigger arms pivoted to opposite sides of the main frame and adapted to extend transversely of the main frame and generally longitudinally thereof, the outrigger arms extending vertically from substantially the elevation of the upper horizontal frame members to the lower horizontal frame members, said arms extending for substantial distances beyond the longitudinal edges of the central deck when positioned transversely of the main frame, pontoons carried by the outer ends of the outrigger arms, auxiliary decks hinged to the central deck adjacent the longitudinal

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edges of the same and adapted to swing vertically into stowed positions on top of the central deck and to extended positions resting upon said outrigger arms, the auxiliary decks then forming with the central deck a continuous and unobstructed broad horizontal deck arranged bodily above the main frame, outrigger arms and pontoons, means carried by the auxiliary decks to engage the outrigger arms for locking them in their transversely extended positions, and means for locking the outrigger arms in their positions generally longitudinally of the main frame.

2. A foldable catamaran comprising a main substantially rigid frame, said frame including upper and lower horizontal frame members and transverse vertical frame members, a central deck mounted upon and substantially covering said upper horizontal frame members, horizontally swingable outrigger arms pivoted to the sides of the main frame and extending vertically from substantially the elevation of the upper horizontal frame members to the lower horizontal frame members, said outrigger arms being adapted to extend transversely of the main frame and outwardly of the longitudinal edges of said central deck, said arms then being in parallel contacting relation with said transverse frame members, pontoons connected with the bottoms of the outrigger arms adjacent their outer ends and thereby disposed below the elevation of said bottom horizontal frame members, auxiliary decks hinged to the central deck adjacent the longitudinal edges of the latter and adapted to swing vertically into overlying contacting relation with the central deck and also to extended horizontal positions outwardly of the central deck and resting upon the tops of the outrigger arms, the central and auxiliary decks then forming a broad horizontal unobstructed deck spaced bodily above the main frame and out-

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rigger arms and spaced a substantial distance above said lower horizontal frame members and said pontoons.

3. An amphibious device comprising a substantially rigid main frame of considerable depth, a central deck mounted on top of the main frame outrigger arms pivoted to the sides of the main frame for horizontal swinging movement to positions transversely and generally longitudinally of the main frame, said outrigger arms extending vertically for substantially the full depth of the main frame, pontoons carried by the bottoms of the outrigger arms adjacent their outer ends and spaced below the bottom of the main frame, auxiliary decks hinged to the central deck adjacent its longitudinal edges and being vertically swingable to lie horizontally upon the main deck or outwardly of the main deck and upon the tops of the outrigger arms, elements carried by the bottoms of the auxiliary decks and engaging the outrigger arms for releasably locking them in their positions transversely of the main frame while supporting the auxiliary decks, and separate means for locking the outrigger arms in their positions generally longitudinally of the main frame.

References Cited in the file of this patent

UNITED STATES PATENTS

22,175	Furbush	Nov. 30, 1858
392,407	Chorman	Nov. 6, 1888
650,479	Pepin	May 29, 1900
1,681,071	Vitanyi	Aug. 14, 1928
2,233,240	Boldis et al.	Feb. 25, 1941
2,570,528	Davis	Oct. 9, 1951

FOREIGN PATENTS

357,124	Germany	Aug. 16, 1922
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