United States Patent

[11] 3,593,684

[72] Inventor **Joseph A. Cogliano**
1268 Maple Ave., Baltimore, Md. 21227

[21] Appl. No. **856,525**
[22] Filed **Sept. 5, 1969**
[45] Patented **July 20, 1971**
Continuation-in-part of application Ser. No. 775,703, Nov. 14, 1968, now abandoned.

[50] **Field of Search**..... 115/127, 126, 122; 9/2 C; 114/61, 0.5 F, 66.5 F; 248/214, 221, 62; 287/189.36 A, 51

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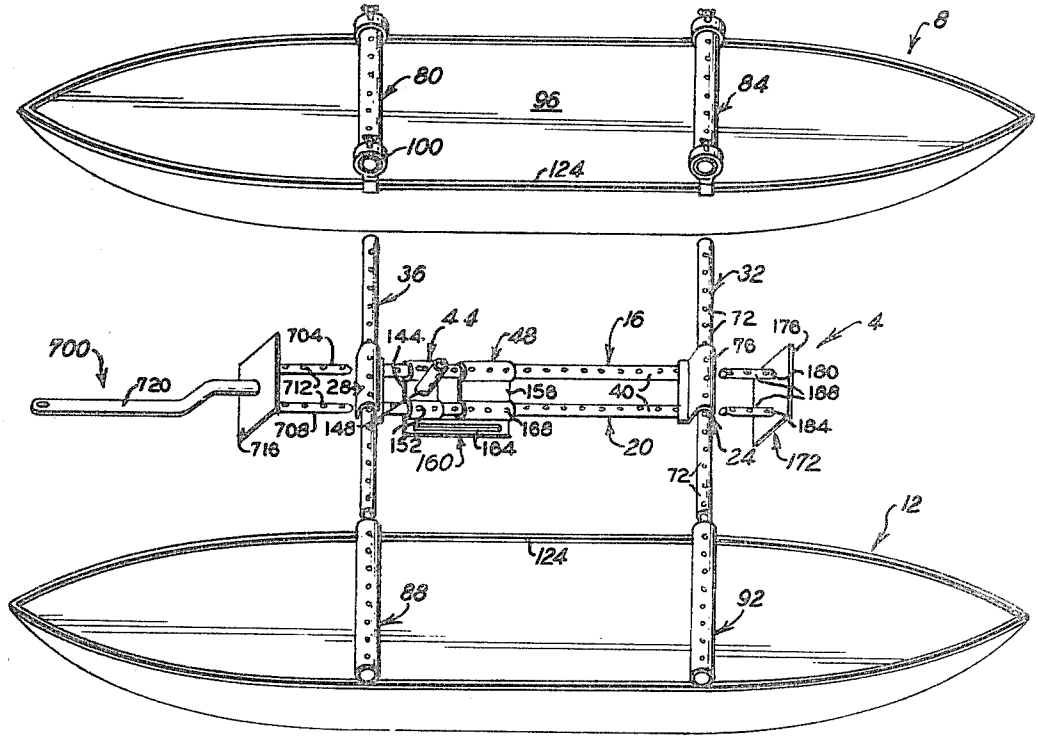
Primary Examiner—Andrew H. Farrell
Attorney—Virgil H. Marsh

[54] COLLAPSIBLE CATAMARAN

18 Claims, 36 Drawing Figs.

[52] **U.S. Cl.**..... **114/61**
[51] **Int. Cl.**..... **B63b 1/10**

ABSTRACT: A collapsible assembly is disclosed which can be made into or converted into a catamaran, a swamp boat, a sail car, an iceboat, a ski vehicle, a snowmobile, a snow blower (vehicle), etc.



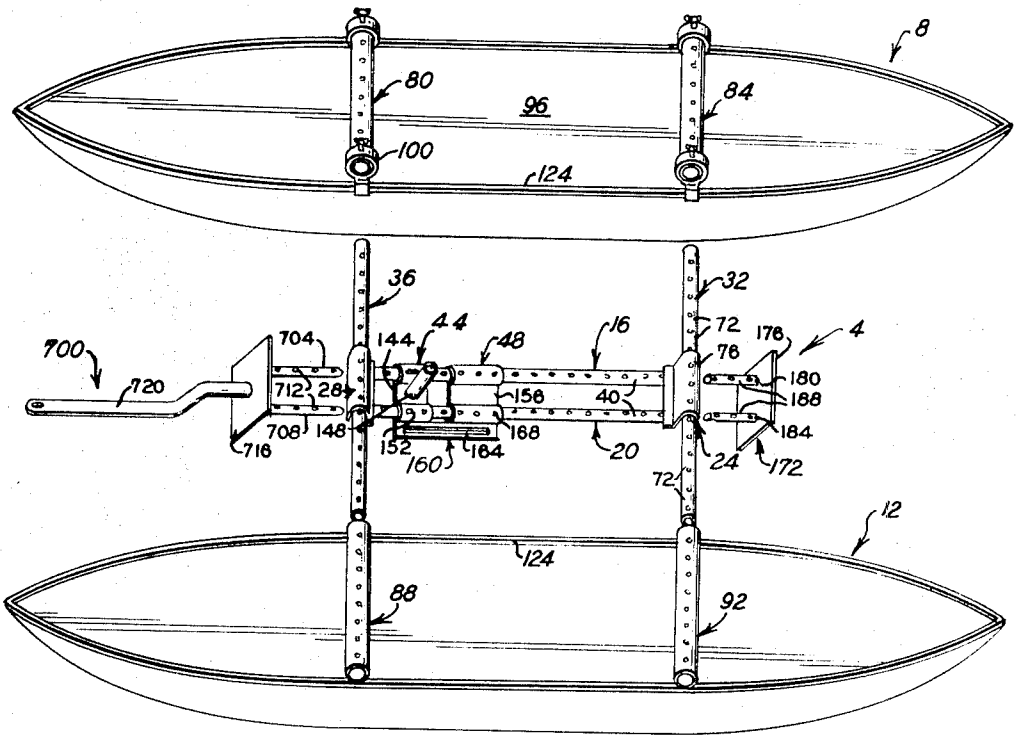


FIG. 1

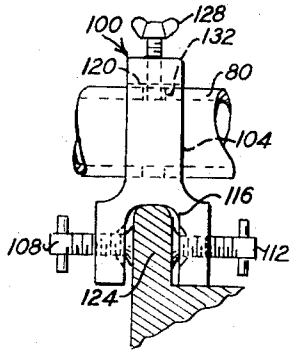


FIG. 4

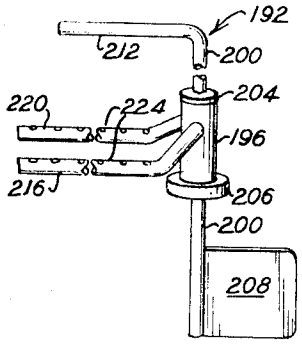


FIG. 5

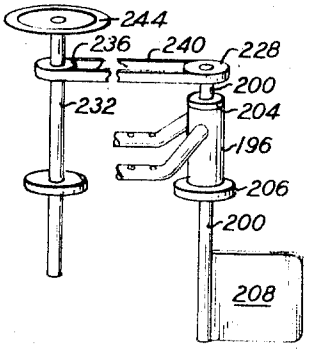


FIG. 6

INVENTOR
JOSEPH A. COGLIANO
BY

Virgil H. Marsh
ATTORNEY

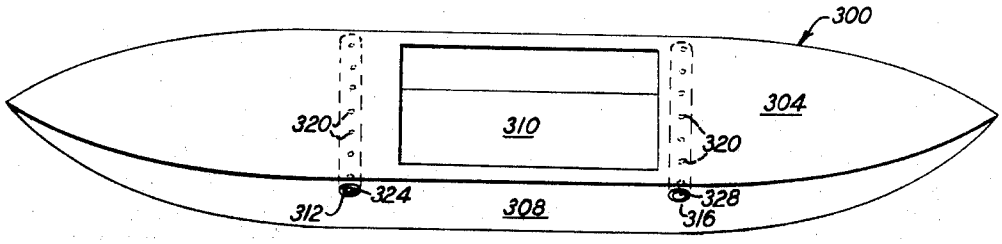


FIG. 7

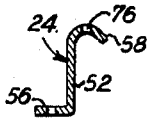


FIG. 2

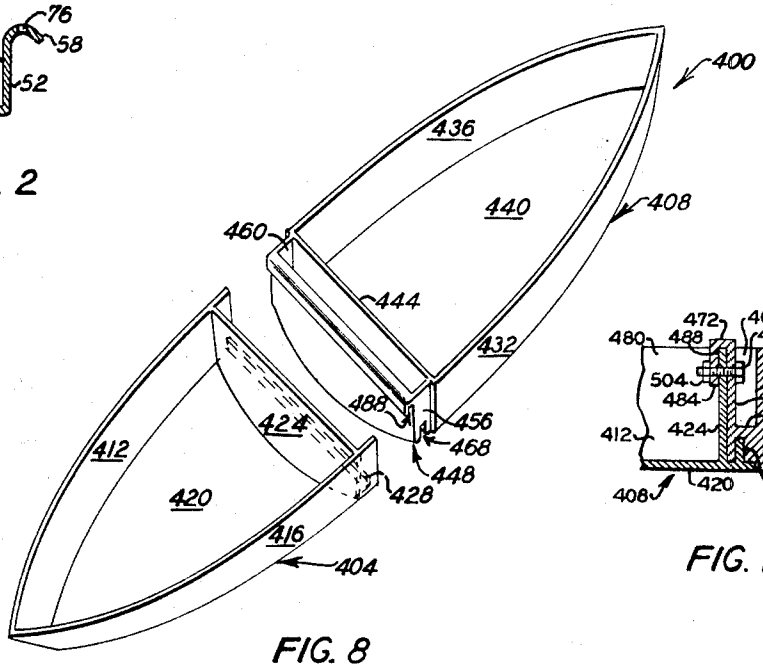


FIG. 8

FIG. 10

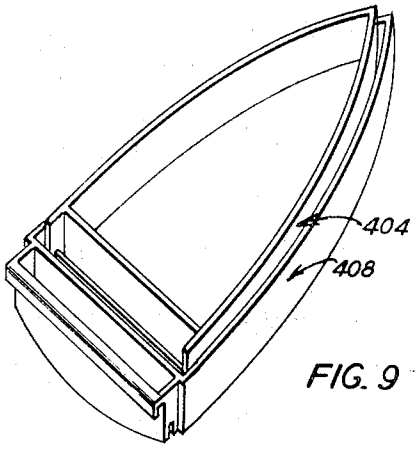


FIG. 9

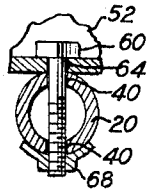


FIG. 3

INVENTOR
JOSEPH A. COGLIANO
BY

Virgil H. Marsh
ATTORNEY

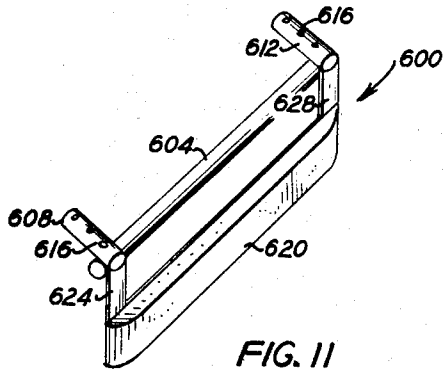


FIG. 11

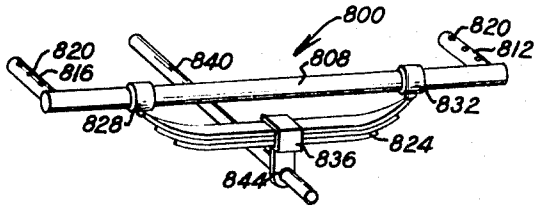


FIG. 12

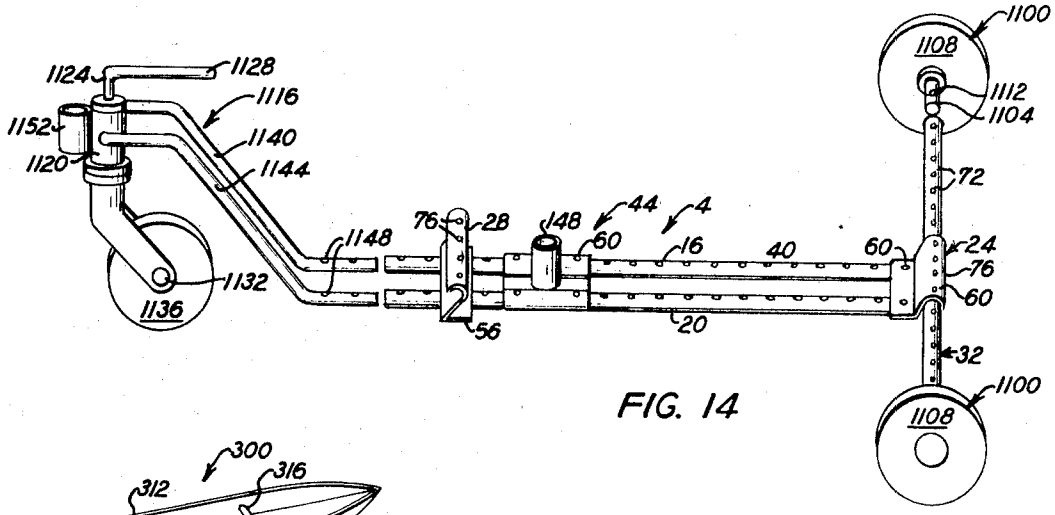


FIG. 14

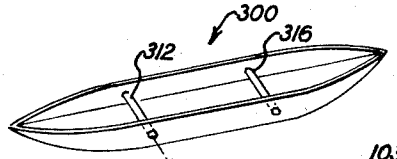
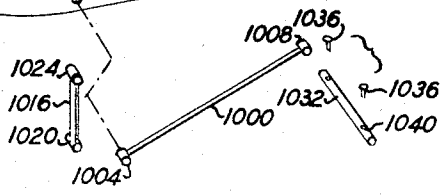


FIG. 13



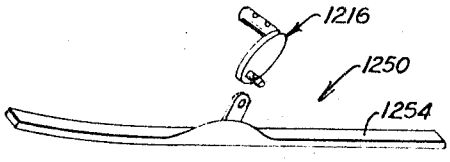


FIG. 16

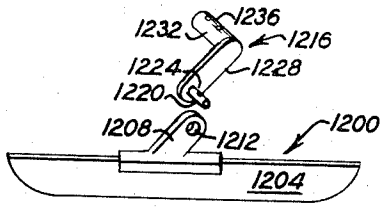


FIG. 15

INVENTOR
JOSEPH A. COGLIANO
BY

Virgil H. Marsh
ATTORNEY

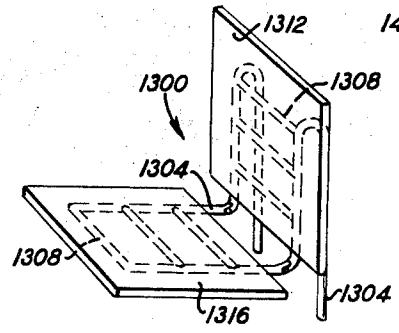


FIG. 17

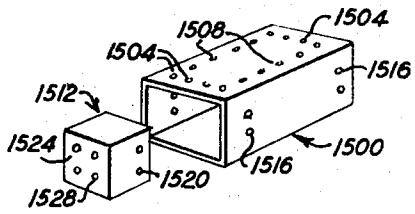


FIG. 20

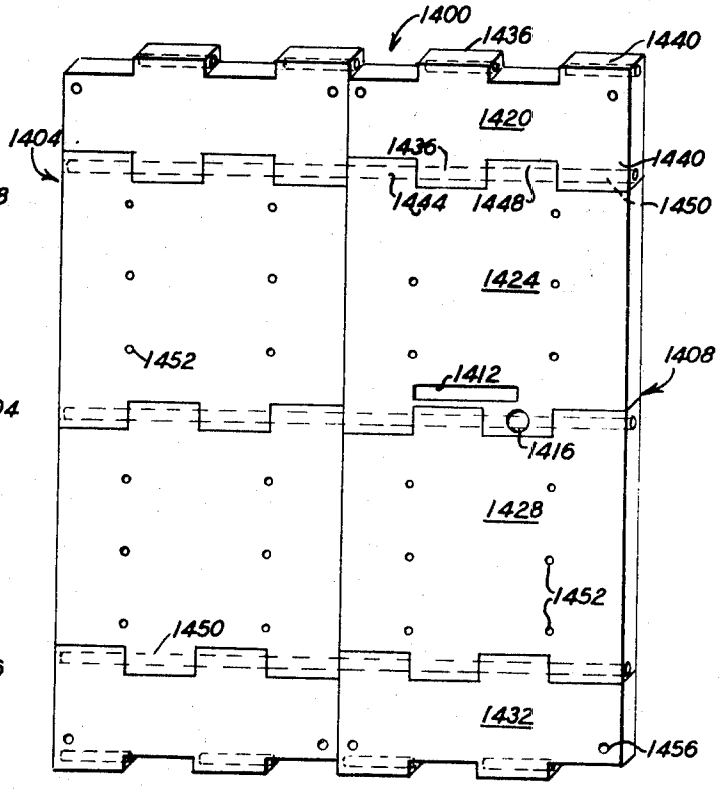


FIG. 18

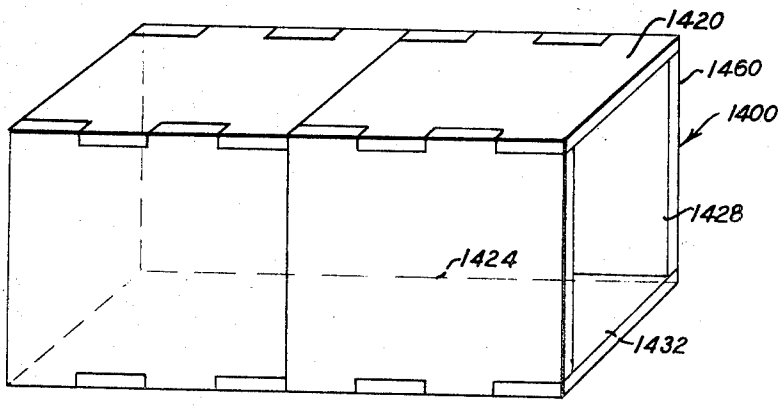


FIG. 19

INVENTOR
JOSEPH A. COGLIANO
BY

Virgil H. Marsh
ATTORNEY

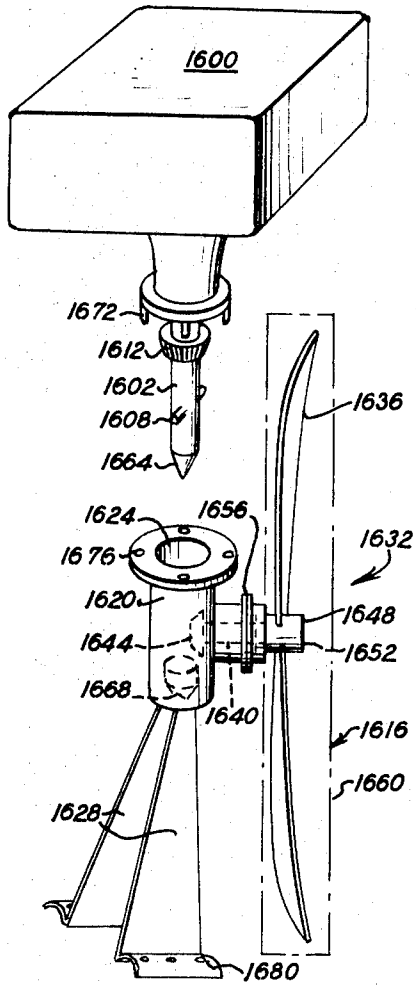


FIG. 21

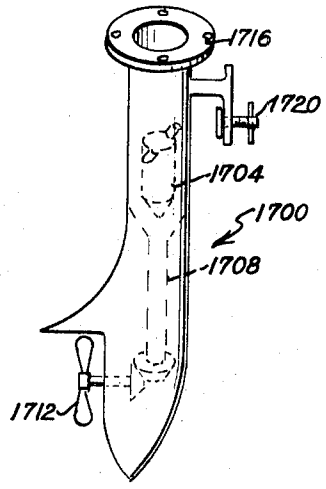


FIG. 22

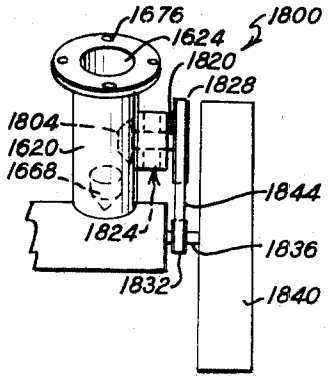


FIG. 23

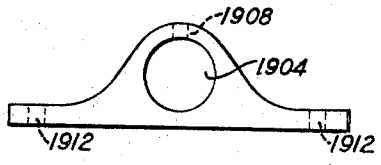


FIG. 24

INVENTOR
JOSEPH A. COGLIANO
BY

Virgil H. Marsh
ATTORNEY

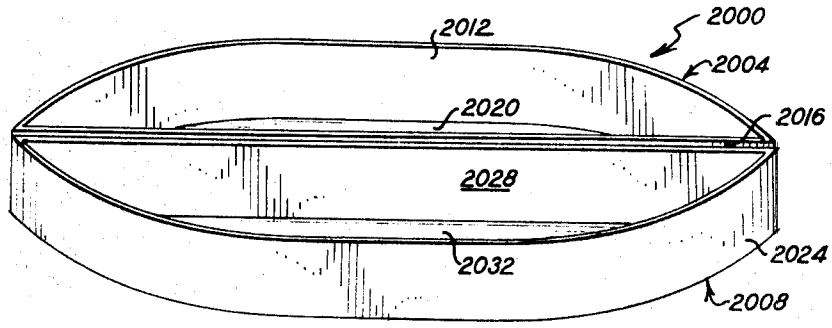


FIG. 25

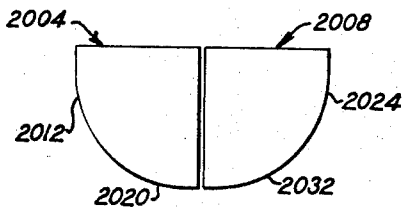


FIG. 26

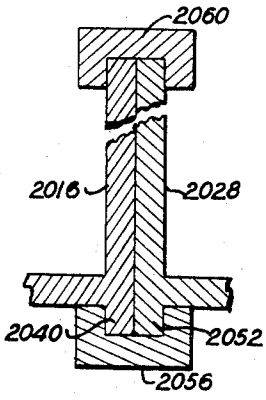


FIG. 29

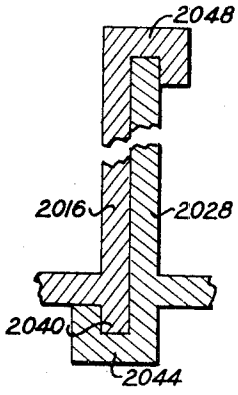


FIG. 28

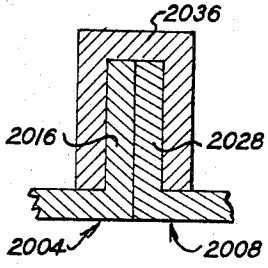


FIG. 27

INVENTOR
JOSEPH A. COGLIANO

BY

Virgil H. Marsh
ATTORNEY

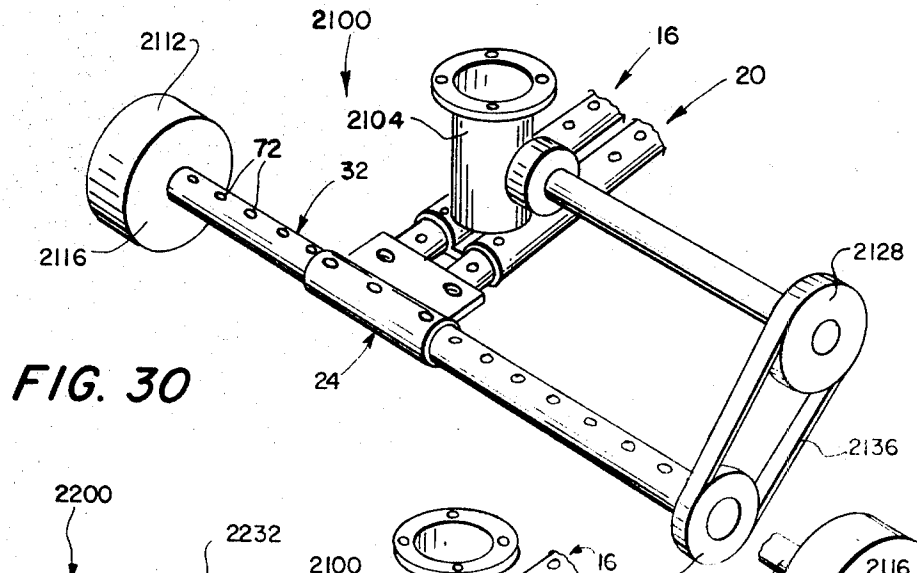


FIG. 30

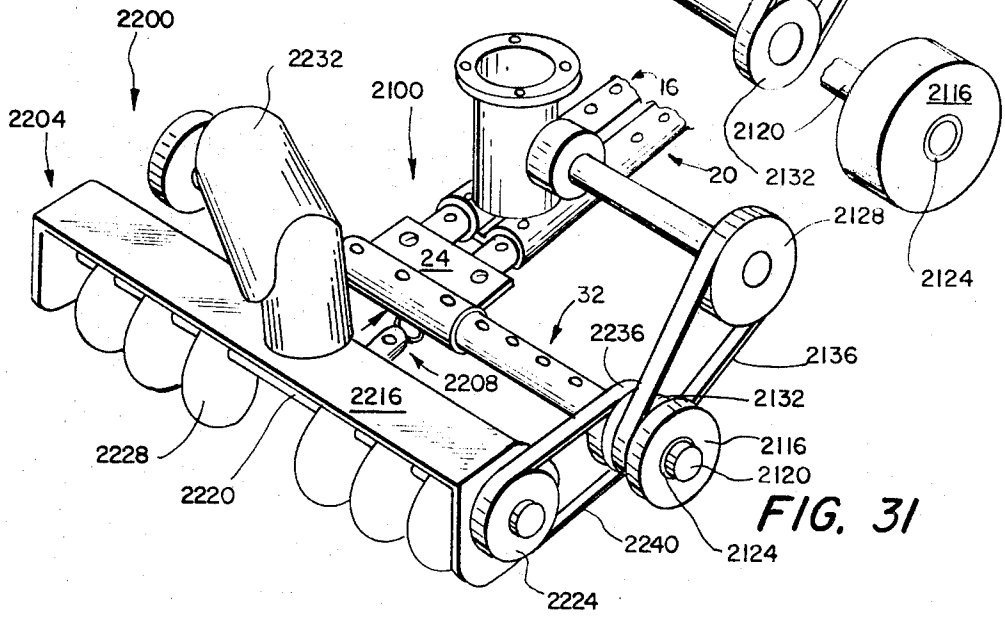


FIG. 31

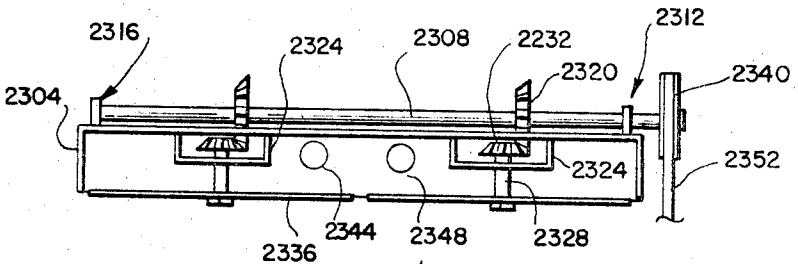


FIG. 32

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INVENTOR
JOSEPH A. COGLIANO

BY Virgil H Marsh

ATTORNEY

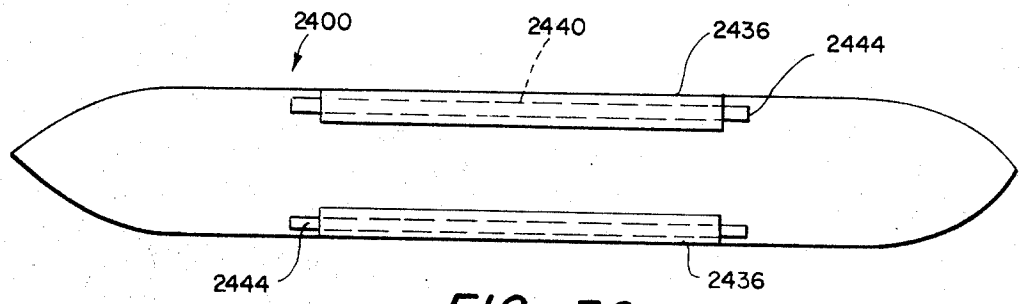


FIG. 36

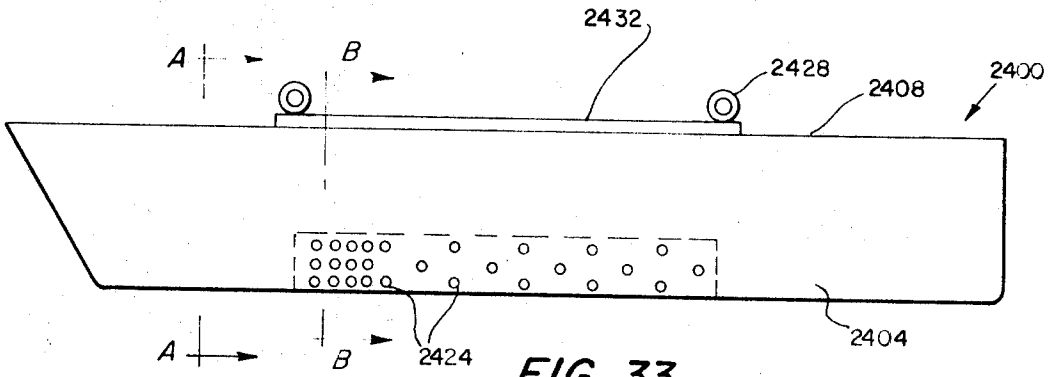


FIG. 33

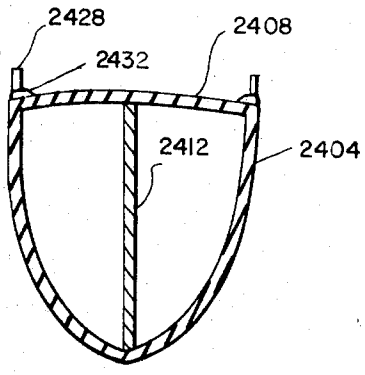


FIG. 34

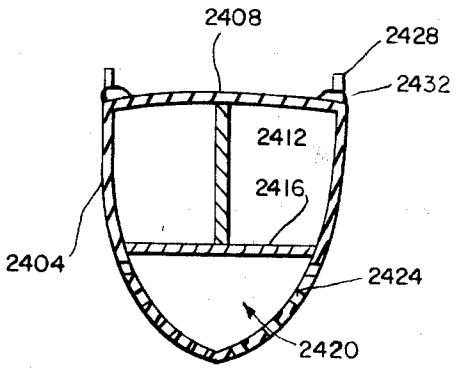


FIG. 35

INVENTOR
JOSEPH A. COGLIANO

BY Virgil H Marsh

ATTORNEY

COLLAPSIBLE CATAMARAN

This application is a continuation-in-part of my earlier filed application Ser. No. 775,703, filed on Nov. 14, 1968, now abandoned.

This invention relates to an assemblage from which a catamaran, iceboat, sail car, ski vehicle, snowmobile, snow blower (vehicle), grasscutter (vehicle), swamp boat, etc., which are collapsible and can readily be assembled.

An object of this invention is to provide a novel, basic assemblage which is convertible into a catamaran, an iceboat, a swamp boat, a ski vehicle (snow velocipede), a sail car, a snowmobile, a snow blower (vehicle), a grasscutter (vehicle), etc. A further object is to provide an assemblage which is easily and quickly convertible, is comprised of a minimum of interchangeable parts and is rugged, inexpensive to construct and easily serviceable. An even further object is to provide such an assemblage which can readily be converted into a trailer. A still further object is to provide novel collapsible boats which can be used in conjunction with the novel assemblage when it is converted into a catamaran. Other important objects and advantageous features of this invention will be apparent from the following description, accompanying drawings and claims.

The accompanying drawings illustrate several of the embodiments of this invention. In such drawings:

FIG. 1 is a modified top perspective view, partially separated, of this invention showing a catamaran form powered by sail, the mast and sail being excluded;

FIG. 2 is a vertical section of curved plate member 24 (identified as such in FIG. 1);

FIG. 3 is a vertical section of a variation of the attaching means used in portions of FIG. 1;

FIG. 4 is a vertical section of a clamping device used in the catamaran of FIG. 1;

FIG. 5 is a side perspective view of a rudder mount, including a rudder, which can be utilized with the catamaran of FIG. 1;

FIG. 6 is a partial side perspective view of a rudder mount, including a rudder and a steering device;

FIG. 7 is a top perspective view of a boat that can be used in the catamaran form of this invention;

FIG. 8 is a top perspective view, partially separated, of a boat that can be used in the catamaran form of this invention, the hull of said boat being constructed as two separate units;

FIG. 9 is a top perspective view of the boat of FIG. 8, one portion of the hull positioned inside of the other portion of the hull;

FIG. 10 is a sectional view of the assembled boat of FIG. 8 (partial view);

FIG. 11 is a top perspective view of an outrigger portion which can be used in conjunction with one of the boats comprising the catamaran of FIG. 1;

FIG. 12 is a top perspective view of a wheel mount which can be used with the catamaran of FIG. 1 to form a trailer;

FIG. 13 is a top perspective view of another trailer form that can be used with the boats of FIG. 1;

FIG. 14 is a top perspective view of this invention showing the sail car form powered by sail, the sail and mast being excluded;

FIG. 15 is a top perspective view of an ice-runner unit which can be used in place of the wheels shown in FIG. 14 to convert the sail car form to an iceboat form;

FIG. 16 is a top perspective view of a ski runner unit which can be used in place of the wheels shown in FIG. 14 to convert the sail car form to a ski vehicle form;

FIG. 17 is a top perspective view of a seat which can be used in conjunction with the various forms of this invention;

FIG. 18 is a top perspective view of a deck that can be utilized with the catamaran of FIG. 1;

FIG. 19 is a box form of the deck of FIG. 18;

FIG. 20 is a top perspective view of another embodiment of this invention;

FIG. 21 is a top perspective view of a motor and propeller which can be used in the swamp boat form of this invention;

FIG. 22 is a top perspective view of a motor mount which can be used with the catamaran form of this invention;

FIG. 23 is a motor mount which can be used with the sail car (minus the sail, mast, etc.) of FIG. 14;

FIG. 24 is a vertical view of a mounting device that can be used in conjunction with the boats of FIG. 1;

FIG. 25 is a top perspective view, partially separated, of a boat that can be used in the catamaran form of this invention, the hull of the boat being constructed as two separate lengthwise units;

FIG. 26 is a front view of the boat hulls shown in FIG. 25;

FIG. 27 is a vertical section of a novel clamping device used in the boat of FIG. 25;

FIG. 28 is a vertical section of another clamping device used in the boat of FIG. 25;

FIG. 29 is a vertical section of still another clamping device used in the boat of FIG. 25;

FIG. 30 is a top perspective view, partially expanded, of the rear portion of a snowmobile;

FIG. 31 is a top perspective view of the rear portion of a snow blower (vehicle);

FIG. 32 is a vertical section of a grass-cutting attachment which can be used in place of the snow blower attachment of FIG. 31;

FIG. 33 is a side view of a boat that can be used in the catamaran of this invention;

FIG. 34 is a sectional view along line A–A of the boat in FIG. 33;

FIG. 35 is a sectional view along line B–B of the boat in FIG. 33; and

FIG. 36 is a top view of a boat that can be used in the catamaran form of this invention.

The catamaran form of this invention, as shown in FIG. 1, includes collapsible assemblage 4, and boats 8 and 12. FIG. 1 represents a preferred embodiment of collapsible assembly 4, which includes spaced, generally parallel, longitudinally elongated members 16 and 20, curved plate members 24 and 28, and elongated cross members 32 and 36. Elongated members 16 and 20 are shown as tubular members, which is the preferred form, but can be any elongated member which is hollow (the cross-sectional portion of the hollow portion can be anything, for example, square, triangular, etc.) on either or both ends, as is desired. A series of uniformly spaced holes 40 (top and bottom, as are shown in FIG. 3) are located along the top surface of elongated members 16 and 20. While holes 40 do not have to extend over the entire length of elongated members 16 and 20, it is preferred that they do so extend. Also holes 40 do not have to be uniformly spaced nor located on the top of elongated members 16 and 20, but both situations are preferred. Elongated members 16 and 20 are parallel in FIG. 1 so that two-pronged objects can be inserted into either end. The main body portions of elongated members 16 and 20 can be bent or shaped in any manner desired, but the straight form shown in FIG. 1 is definitely preferred as it readily lends itself to the mounting of devices such as sail mount 44 and center board mount 48. Elongated members 16 and 20 can be constructed of any suitable material, e.g., stainless steel, copper, plastics, which is resistant to the weather and conditions of exposure to boat travel on open bodies of water (fresh and salt) and has the necessary structural strength, but marine aluminum is the preferred construction material. At least two elongated members, such as 16 and 20, are preferably used to prevent any flexing of boats 8 and 12. Curved plate members 24 and 28 are generally shaped as a vertically elongated "S," but can be any suitable shape. Curved plate members 24 and 28 are best illustrated in FIG. 2. As curved plate member is identical to curved plate member 28, only curved plate 24 is described in detail. Curved plate member 24 includes flat body portion 52, flat lip portion 56, which is located perpendicular to the lower edge of flat body portion 52, and curved lip portion 58, which is located so that

it is generally perpendicular to the upper edge of flat body portion 52 and is situated on the opposite side from flat lip portion 56. Curved lip portion 58 can be extended so that it forms a closed passageway, having an internal diameter which is equal to the outside diameter of elongated cross members 32 and 36. Curved lip portion can also be a flat plate, etc. Curved plate 24 is detachably affixed to the back end of elongated members 16 and 20 (see FIG. 3) by means of inserting bolts 60 through holes 64 in flat lip portion 56 and a pair of adjacent holes 40 in elongated members 16 and 20 so that they are incapable of turning once tightened. (When it is stated that a bolt or pin is inserted through holes 40, or any similar holes in a member, it is understood that the bolt and pin is inserted through the top and bottom holes, e.g., 40, in each member, unless otherwise stated.) Curved plate 24 is affixed so that curved lip 58 faces outward. Curved plate 28 is similarly detachably affixed to the other end of elongated members 16 and 20. Curved plate members 24 and 28 can be affixed to elongated members 16 and 20 in any suitable and conventional manner, and even can be affixed to said members by welding, etc., but the above described method of detachable mounting is preferred.

Elongated crossmember 32 contains a series of holes 72 (top and bottom, as are holes 40), which are shown in FIG. 1 in the preferred manner, namely, uniformly spaced so as to match up with holes 76 in the curved lip portion of curved plate 24. Elongated crossmember 32 is detachably affixed to the underside of curved lip portion 58 by means of bolts 60, nuts 68 and holes 76. Elongated crossmember 32 can have any cross-sectional shape, but is preferably as shown a tubular member. Elongated member 32 is preferably constructed of marine aluminum. Elongated crossmember 36 contains a series of holes 72, which are shown in FIG. 1 in the preferred manner, namely, uniformly spaced so as to match up with holes 76 in curved lip portion 58 of curved plate 28. Elongated crossmember 36 is detachably affixed to the underside of curved lip portion 58 by means of bolts 60, nuts 68 and holes 76. Elongated crossmember 36 can have any cross-sectional shape, but is preferably, as shown, a tubular member. Elongated member 36 is preferably constructed of marine aluminum. Elongated crossmembers 32 and 36 can be attached to curved plate members 24 and 28 in any suitable and convenient manner, etc., but the above-described method of detachable mounting is preferred.

Elongated crossmembers 32 and 36 are shown perpendicular to elongated members 16 and 20 so that boats 8 and 12 can be readily mounted on collapsible assemblage 4 to form a catamaran. To mount boats 8 and 12 on assemblage 4, the ends of elongated crossmembers 32 and 36 are inserted into hollow elongated members 80 and 84 of boat 8 and hollow elongated members 88 and 92 of boat 12. Hollow members 80 and 84 can be mounted onto hull 96 of boat 8 by any convenient means, such as, clamp 100 (see FIG. 4 for an enlarged view of clamp 100). Referring in part to FIG. 4, clamp 100 includes main body portion 104, screw portions 108 and 112, slot 116 and hole 120 which runs in the operational direction of screw portions 108 and 112. Clamps 100 are attached to hull 96 by inserting slots 116 over rim 124 at the indicated positions in FIG. 1. Screw portions 108 and 112 are then tightened down. Elongated members 80 and 84 are inserted into hole 120 of mounted clamps 100 and are detachably affixed into place by turning thumbscrews 128 so that they are inserted into one of holes 132 in the top surface of hollow members 80 and 84. Holes 132 are preferably uniformly spaced along hollow members 80 and 84. Holes 132 are also located on the bottom surface of hollow members 80 and 84. The ends of elongated members 32 and 36 are inserted into internal passageways 136 and 140 of hollow members 80 and 84, respectively, and are detachably affixed therein by inserting screws 60 through the threaded and unthreaded portions of holes 132, and through mating holes 72, and screwed into nuts 68. As shown in FIG. 1, boat 8 is a duplicate of boat 12, so only boat 8 has been described at this point. The means and method of attaching elongated members 32 and 36 to boat 8 by insertion into hollow members 80 and 84 are also the same for hollow members 88 and 92 of boat 12, so that portion of the description has not been repeated for boat 12. Clamps 100 have been left off of hollow members 88 and 92 in FIG. 1 for the sake of clarity, but they are necessary for the embodiment shown in FIG. 1.

The distance between boat 8 and boat 12 can be varied to some degree by adjusting the position of elongated members 32 and 36 in hollow members 80, 84, 88 and 92.

Each boat (8 and 12) can be divided into several compartments and each compartment can contain an inflated balloon-like unit, or can be filled with foam (e.g., polyurethane foam), or so forth.

The catamaran can be propelled manually by means of oars, paddles, etc., as when it is used as a rowboat, or propelled by means of a sail or sails or by means of an outboard motor, or so forth.

The beam-to-length ratio makes the catamaran shown in FIG. 1 very stable when under sail so that capsize is nearly impossible. Also the great beam provides far greater useful space and carrying capacity than conventional craft of similar length.

Mast mount 44 can be detachably affixed at a number of positions along the length of elongated members 16 and 20. (Mast mount 44 can also be mounted on extension bars detachably inserted into the front ends of elongated members 16 and 20.) Mast mounting 44 includes baseplate 144 and mast-mounting socket 148. Base plate 144 is longitudinally curved on both sides, and each curved portion has a set of holes 152 longitudinally spaced thereon. (Base plate 144 can be an entirely flat plate, for example.) Bolts 60 are inserted through holes 152, which mate with holes 40, and through holes 40, and are screwed into nuts 68, whereby mast mount 44 is detachably mounted on assembly 4. A mast (not shown) can be inserted into socket 148 and the catamaran can then be propelled by means of a sail. The mast can be of the type that may be separated into two pieces (not shown) to permit storage withing the folded catamaran. Other means of mounting a mast, besides mast mount 44, will readily be apparent to those skilled in the art.

Center board mount 48 can be detachably affixed at a number of positions along the length of elongated members 16 and 20. Center board mount 48 includes base member (plate) 156 and extension plate 160. A center board (not shown) can be variably mounted in slot 164 in extension plate 160 when the catamaran is powered by sail. As a variation, a center board could be mounted in a slot (not shown) in baseplate 156 between elongated members 16 and 20. Baseplate 156 is longitudinally curved on both edge sections, and each curved portion has a set of holes 168 longitudinally and uniformly spaced thereon. (Baseplate 156 can be an entirely flat plate.) Bolts 60 are inserted through holes 168, which mate with holes 40, and through holes 40, and are screwed into nuts 68, whereby center board mount 48 is detachably mounted on assemblage 4.

Motor mount 172 includes mounting plate 176 and hollow elongated members 180 and 184 (which are essentially parallel). Motor mount 172 is detachably mounted on assemblage 4 by inserting hollow elongated members 180 and 184 into the mating hollow ends of elongated members 16 and 20. Elongated members 180 and 184 contain uniformly spaced holes 188 (top and bottom, as are holes 40). Bolts 60 are inserted through holes 40, which mate with holes 188, and through holes 188, and are screwed into nuts 68, whereby motor mount 172 is detachably mounted on assemblage 4.

Rudder mount 192 (shown in FIG. 5) includes rudder pivot mount 196; rudder shaft 200, which is pivotally mounted in rudder mount 196 (shaft 200 is kept from moving upwards or downwards by collars 204 and 206 mounted thereupon); rudder 208, which is attached to the lower portion of shaft 200; tiller arm 212, which is attached to the upper portion of shaft 200 (by inserting it into a slot in shaft 200); and elon-

gated members 216 and 220, which are each bent inwardly on the ends which are attached to rudder pivot mount 196. Collar 204 and tiller arm 212 are detachably mounted (e.g., set-screws) on shaft 200 so that shaft 200 can be removed from rudder pivot mount 196. Elongated members 216 and 220 are essentially parallel on the ends which are inserted into hollow elongated members 180 and 184. Elongated members 216 and 220 contains uniformly spaced holes 224 (top and bottom, as are holes 40). Bolts 60 are inserted through 188, which mates with holes 224, and through holes 224, and are screwed into nuts 68, whereby rudder mount 192 is detachably mounted on motor mount 172. Rudder mount 192 can be directly mounted on assemblage 4 by inserting elongated members 216 and 220 into elongated members 16 and 20, where curved spacers (not shown) containing properly spaced holes are inserted around elongated members 216 and 220.

FIG. 6 illustrates another means of controlling rudder 208. In FIG. 6 tiller arm 212 is replaced by pulley 228, which is detachably mounted on the upper end of shaft 200. Shaft 232 is pivotally mounted in mast socket 148 of mast mount 44, or any other slot which is provided or convenient. Pulley 236 is mounted on shaft 232. Turn wheel 244, which is mounted on the upper end of shaft 232, provides the means of readily controlling rudder 208.

Elongated members 16 and 20 can be so constructed that they are telescoping units (which, of course, can be firmly positioned by means of inserting bolts, pins, etc., Each of elongated members 16 and 20 can be constructed of two elongated portions, one of which fits within the other, at least for a portion of each of said elongated portions. This telescoping arrangement allows a variable overall length of assemblage 4 and when shortened, imports greater strength to elongated members 16 and 20 (double thickness).

Other boats or pontoons and means of attachment of assemblage 4 can be used in the catamaran form of this invention. For example, FIG. 7 illustrates kayak 300 which can be used in place of the boat shown in FIG. 1. Kayak 300 has cover 304 on hull 308. Hull 308 can be totally or partially filled with foam, etc. Cockpit 310 is open in FIG. 7, but can be covered in part or in total and can contain splash panels. Hollow elongated members 312 and 316 are mounted in hull 308 so that the ends of elongated members 312 and 316 are firmly affixed in each side of hull 308. A series of uniformly spaced holes 320 (top and bottom, as with holes 40) are located on hollow elongated members 312 and 316. The problem of reaching holes 320 can be solved in several manners, for example, as shown in FIG. 7, by leaving sufficient space below cover 304 when hollow elongated members 312 and 316 are mounted in hull 308. Other solutions are obvious to one skilled in the art, such as, leaving sufficient spaces or doors in cover 304 above elongated members 312 and 316. The ends of elongated members 32 and 36 of assemblage 4 are inserted into internal passageways 324 and 328 of hollow members 312 and 316, respectively, and are detachably affixed therein by inserting screws 60 through holes 320, which mate with holes 72, and through holes 72, and screwed into holes 68. A single set of threaded holes 320 on top of elongated members 312 and 316 can be used or the bottom set of holes 320 can be threaded.

The boats which can be used in the catamaran form of this invention can be collapsible boats, such as, the one shown in FIG. 8. Boat 400 has two hull segments (404 and 408). As shown in FIG. 9, hull segment 404 fits inside of hull segment 408 when boat 400 is collapsed. Hull segment 404 includes sides 412 and 416, bottom 420, and bulkhead 424, which is attached to sides 412 and 416 and bottom 420 at a short distance back from the inner edge of hull segment 404. Lip 428 is perpendicularly mounted on bottom 420 at its inner edge. Hull segment 408 includes sides 432 and 436, bottom 440, and bulkhead 444, which is attached to sides 432 and 436 and bottom 440 at the inner edge of hull segment 408. Extension unit 448 is attached to bulkhead 444 by means of horizontal plate 452 (as best seen in FIG. 10) and side plates 456 and 460, which are located on bulkhead 444 so that extension unit 448 will fit compactly within the end portion of hull segment 404. The portion of bulkhead 444 which fits inside of extension unit 448 is optional. Extension unit 448 (see FIG. 10) includes wall 464 which is attached to horizontal plate 452 and sideplates 456 and 460. This forms lower slot 468. Horizontal lip 472 is attached to the upper edge of wall 464, which extends slightly above rims 476 and 480. Vertical lip 484 is attached to the edge of horizontal lip 472, to form slot 488. To assemble boat 400, hull segment 408 is attached to hull segment 404 as indicated in FIG. 10. Slot 468 fits over lip 428 and slot 488 fits over the upper edge of bulkhead 424; bolts 492 (which are inserted through mating holes 496 in lip 484 and the upper portion of bulkhead 464, and holes 500 in the upper portion of bulkhead 424) and nuts 504 firmly hold hull segments 404 and 408 together. Assemblage 4 can be attached to two boats 400 by means of hollow members (like 80) and clamps 100 (as shown in FIG. 1). A modified cover may be placed over boat 400 or either of the hull segments. (Rims 476 and 480 can contain a lip whereby a cover can be slid over hull segments 404 and 408, and said covers can contain splash guards).

FIG. 11 illustrates pontoon 600 which can be used with a boat such as 8, when said boat is not being used in the catamaran form, to form a boat with an outrigger. Pontoon 600 includes elongated member 604 and short members 608 and 612, which are perpendicularly attached to the ends of elongated member 604. Bars 608 and 612 are preferably hollow and contain uniformly spaced holes 616 (top and bottom, like holes 40). Pontoon 600 also includes float 620 which is mounted to the lower portion of elongated member 604 by means of bars 624 and 628. Pontoon 600 is detachably attached to a boat (such as 8) by inserting bars 608 and 612 into holes 136 and 140 of hollow members 80 and 84, respectively. Bolts 60 are inserted through holes 132, which mate with holes 616, and through holes 616, and are screwed into nuts 68, whereby pontoon 600 is detachably mounted on boat 8. An outboard motor can be mounted on the outrigger form of the boat by inserting members (similar to 608 and 612) of a piece that is similar to pontoon 600 into hollowed bars 608 and 612. This motor mount would have a plate (instead of a pontoon) attached to the elongated main bar. The outboard motor could be mounted on the plate by any convenient means, such as, clamps, etc.

The catamaran shown in FIG. 1 can be converted, as is, into a trailer as means of transporting said catamaran. For example, trailer hitch 700 can be detachably mounted on assemblage 4 by inserting parallel bars 704 and 708 (of trailer hitch 700) into the hollow front ends of elongated members 16 and 20. Bars 704 and 708 contain holes 712 (top and bottom, as are holes 40). Bolts 60 are inserted through holes 40, which mate with holes 712, and through holes 712, and are screwed into nuts 68, whereby trailer hitch 700 is detachably mounted on assemblage 4. Trailer hitch 700 further includes plate 716, upon which bars 704 and 708 are mounted, and tow bar 720, which can be detachably affixed to the towing vehicle in a conventional manner. Tow bar 720 can be downwardly bent so as to facilitate attachment to the towing vehicle. Two wheel assemblies can be mounted on boats 8 and 12 to complete the trailer. Wheel assembly 800 is a duplicate of wheel assembly 804 (not shown), so only wheel assembly 800 is described. Wheel assembly 800 is best illustrated in FIG. 12. Wheel assembly 800 includes bar 808, and shafts 812 and 816, which are perpendicularly mounted on each end of bar 808. Shafts 812 and 816 contain holes 820 (top and bottom, as are holes 40). Bolts 60 are inserted through holes 132, which mate with holes 820, and through holes 820, and are screwed into nuts 68, whereby wheel assembly 800 is detachably mounted on boat 8. Wheel assembly 800 also includes leaf spring 824 which is attached to the underside of bar 808 by means of clamps 828 and 832. Axle mount 836 is mounted on the center part of leaf spring 824. Axle 840 is rotatably mounted in axle mount 836 at 844. A wheel (not shown) is mounted on axle 844. When wheel assembly 804 is mounted in the manner

described for wheel assembly 800, the catamaran is in essence a trailer.

Other wheel-mounting devices can be used, and various known stabilizing units for wheel assemblies 800 and 804 can also be used.

As partially shown in FIG. 13, a trailer device can be assembled to mount one boat on top of another, the top boat being mounted upside down. A boat (300), with cover 304 removed, is shown in FIG. 13. Rod 1000 has tubular members 1004 and 1008 perpendicularly mounted on its ends. Rod 1012 (not shown in FIG. 13) is a duplicate of rod 1000. Rod 1000 is positioned so that tubular member 1004 mates with the end of hollow elongated member 312 (and tubular member 1008 mates with the end of a hollow elongated member of the upside-down boat not shown). Rod 1016 has tubular members 1020 and 1024 perpendicularly mounted on its ends. Rod 1016 is located so that tubular member 1020 mates with tubular member 1004. The other end of rod 1016 (i.e., its other tubular member) mates up with the end of a hollow elongated member of the upside-down boat, which is not shown. Bar 1032 fits through tubular members 1020 and 1004 (plus similar ones on the other side of boat 300, and through hollow elongated member 312). Pins 1036 fit into holes 1040 to hold bar 1032 in place. Rod 1044 (not shown) is a duplicate of rod 1016. In a similar manner, the other three rods 1032 are mounted in the tubular members so that an X-frame, with vertical side members, is assembled. A similar supporting framework is assembled on both sides of the boats. As bars 1032 extend out from holes 1040, wheels can be conventionally mounted on lower bars 1032 (both) to form a trailer for the transportation of the boats. Rods 1000, 1012 and 1016 can be rotatably mounted with each other to form a collapsible unit can be used in conjunction with bar 1044.

Assemblage 4 (minus members 32 and 36) can be mounted inside of boat 300 (top or bottom one) by attachment to elongated members 312 and 316. If this is done, spacers may be needed when elongated crossmembers 32 and 36 are mounted on curved plate members 24 and 28.

The trailer device can be assembled to mount one boat beside another, or one boat on top of another, both being right side up.

Assemblage 4 can be converted into a sail car as shown in FIG. 14. Assemblage 4, as shown in FIG. 14, differs from assemblage 4, as shown in FIG. 1, in that elongated member 36 has been removed. Also curved plate member 28 could be removed and replaced by a plate having two holes which was the equivalent of lip 56 of curved plate member 24. Wheel unit 1100 includes short bar 1104 and wheel 1108, which is pivotally mounted on one end of short bar 1104. Bar 1104 is inserted into hollow elongated member 32. Bolt 60 is inserted through hole 1112, which mates with hole 72, and through hole 72, and are screwed into nuts 68, whereby wheel unit 1100 is detachably mounted on assemblage 4. Another wheel unit (1100) is similarly mounted on the other side of elongated member 32. Wheel unit 1116 includes pivot mount 1120 and shaft 1124 pivotally mounted in pivot mount 1120. Bar 1128 is mounted on the top of shaft 1124 to supply steering means. Shaft 1124 is branched at its lower ends and each branch contains a hole in which an end of axle 1132 is mounted. Wheel 1136 is rotatably mounted on axle 1132. Elongated members 1140 and 1144 are attached to pivot mount 1120. The other ends of elongated members 1140 and 1144 are parallel and inserted into elongated members 16 and 20. Elongated members 1140 and 1148 contain holes 1148. Bolts 60 are inserted through holes 40, which mate with holes 1148, and through holes 1148, and are screwed into nuts 68, whereby wheel unit 1116 is detachably mounted on assemblage 4. This comprises a sail car. Mast slot 1152 (which is shaped like a conventional cup) can be used to hold the end of the sail mast and is an optional feature.

The sail car shown in FIG. 14 can be converted to an ice boat. Wheel 1136 is replaced by runner unit 1200 (which includes runner 1204, attachment plate 1208, and hole 1212 in attachment plate 1208) by placing it on shaft (axle) 1132. See FIG. 15 for runner unit 1200. Mounting unit 1216 can be attached to runner unit 1200 by inserting shaft 1220 through hole 1212, and then being fixed in place by use of bolt 60 (and nut 68) in conjunction with hole 1224 in shaft 1220. Mounting unit 1216 includes plate 1228, shaft 1220, which is attached to plate 1228, and shaft 1232, which is attached to the side of plate 1228. Shaft 1232 is inserted into a hollow end of elongated member 32. Shaft 1232 contains hole 1236. Bolt 60 is inserted through hole 72, which mates with hole 1236, and through hole 1236, and is screwed into nut 68, whereby runner unit 1220 is detachably mounted on assemblage 4. The other wheel on elongated member can be similarly replaced by runner unit 1200.

A ski vehicle can be assembled in a manner similar to the way the sail car is assembled. Ski unit 1250 (see FIG. 16) is similar to runner unit 1200, except that ski 1254 is used in place of runner 1204.

FIG. 17 illustrates seat 1300 which can be placed on the catamaran illustrated in FIG. 1, or the sail car (iceboat, ski vehicle, etc.) illustrated in FIG. 14. Seat 1300 includes frame members 1304, crossmembers 1308 (which are attached to frame members 1304), back support member 1312 (which is attached to frame members 1304) and seat member 1316 (which is attached to frame members 1304). Seat 1300 is mounted on assemblage 4 by placing the ends of frame members into holes 40 on elongated members 16 and 20.

FIG. 18 illustrates deck 1400 which can be mounted on assemblage 4 in FIG. 1. Deck 1400 includes sections 1404 and 1408. Section 1408 contains slot 1412, for the insertion of the center board and which mates with slot 164. Section 1408 contains hole 1416, for the insertion of the mast or mast slot 148, and which mates with mast slot 148. Section 1408 is comprised of four main plates (1420, 1424, 1428 and 1432). Plate 1420 has two tubular hinge portions (1436 and 1440) on each end. Plate 1424 has two tubular hinge portions (1444 and 1448) on each end, and hinge portions 1444 and 1448 mate with hinge portions 1436 and 1440, so that rod 1450 can be inserted through all of them to form a unitary piece and a hinged joint when needed. All of the main plates 1420, 1424, 1428 and 1432 are held together in the same manner. An allowance must be made for hole 1416 in placing rods or parts of rods in the hinged portions. Section 1404 is identical to section 1408, except for slot 1412 and hole 1416. Long rods can be inserted through the hinge portions of both sections to help bind both sections together. Series of holes 1452 are present in sections 1404 and 1408 which mate up with holes 72 in elongated members 32 and 36. Deck 1400 can be placed on assemblage 4 by means of long-shaft bolts 60 and nuts 68. Deck 1400 may also be large enough so that it extends over boats 8 and 12, and mounted thereon in a similar manner. Portions of deck 1400 can be used to make a smaller deck. Deck 1400 contains holes 1456 around its edge for inserting railing posts (not shown). Also a tent can be mounted on deck 1400. FIG. 19 shows deck 1400 when it is reassembled to form box 1460, which can be mounted on assemblage 4 (when it is arranged as a trailer). The center board used with the catamaran would serve as one end for box form 1460.

FIG. 20 illustrates another embodiment of this invention wherein elongated members 16 and 20 are replaced with hollow unitary member 1500. The cross-sectional configuration can be any suitable one, such as, circular, triangular, etc., but rectangular is preferred. The same statement holds for the cross-sectional configuration of the hollow portion of unitary member 1500. Elongated crossmembers 32 and 36 can be attached directly to the top surface of unitary member 1500 by means of bolts, etc., placed in uniformly spaced holes 1504 or indirectly through curved plate members 24 and 28. Additives, such as, mast mount 44 and center board mount 48 can be mounted to the top of unitary member by means of bolts, etc., placed in uniformly spaced holes 1516 and 1520. Motors, rudders, trailer hitches, etc., can be mounted on face 1524 of insert member 1512 by means of bolts, etc., placed in holes 1528.

FIG. 21 represents an embodiment for providing motor driven fan means of propelling, e.g., the sail car, iceboat or swamp buggy form of this invention. Motor 1600 is a conventional motor (such as a gasoline motor). Shaft 1604 of motor 1600 contains pin 1608 and gear 1612. Fan means 1616 includes body 1620, slot 1624 in body 1620, mounting legs 1628, and fan means 1632. Fan means 1632 includes blades 1636, shaft 1640, gears 1644 and mounting unit 1648. Shaft 1640 is rotatably mounted in mounting unit 1648 at 1652. Mounting unit 1648 is attached to body 1620 at 1656. Fan cover 1660 is mounted around blades 1636. Shaft 1604 is inserted into slot 1624 so that gears 1612 and 1644 intermesh, and tip 1664 of shaft 1604 rotatably seats in seat 1668 of body 1620. Pins 1672 fit in holes 1676 (and can be bolted in place). Fan means 1632 are bolted to elongated members 16 and 20 of assemblage 4 by means of holes 1680 in mounting legs 1628.

Motor 1600 can be mounted on propeller means 1700 in FIG. 22 to provide motorized propulsion means for the catamaran shown in FIG. 1. In FIG. 22, shaft 1604 of motor 1600 fits into slot 1704 of shaft 1708. Propulsion is achieved by means of pin 1608 (that is, shaft 1708 is rotatably interconnected with blades 1712). Pins 1672 fit in holes 1716. Propeller means 1700 can be mounted on motor mount 172 by means of clamp 1720.

Motor 1600 can be mounted on block 1620 in FIG. 23 to provide motorized propulsion of the sail car form of this invention. In FIG. 23, shaft 1604 of motor 1600 fits into slot 1624 of body 1620, so that gears 1612 and 1804 intermesh, and tip 1664 rotatably seats in seat 1668. Pins 1672 fit in holes 1676. Gears 1804 are mounted on one end of shaft 1820, which is rotatably mounted in body 1620 at 1824. Grooved circular plate (pulley) 1828 is mounted on the other end of shaft 1820. Grooved circular plate (pulley) 1828 is movably attached to grooved circular plate 1832 (affixed to rotatable shaft 1836 of wheel 1840) by means of belt 1844.

To further illustrate the various types of mounts that can be used to secure elongated members 80 and 84 to hull 8, see mounting device 1900 in FIG. 24. Mounting device 1900 contains slot 1904 wherein elongated member 80 or 84 is inserted. Hole 1908 is used to bolt elongated 80 or 84 in place. Holes 1912 are used to bolt mounting device 1900 to the rim of hull 8.

As shown in FIG. 25, boat 200 has two separate lengthwise hull segments (2004 and 2008). Hull segment 2004 includes outer side 2012, bulkhead 2016 and bottom 2020. Hull segment 2004 includes outer side 2024, bulkhead 2028 and bottom 2032. As shown in FIG. 26, the intersection of outer wall 2012 and bottom 2020, and the intersection of outer wall 2024 and bottom 2032 can be smooth curved surfaces. As shown in FIG. 27, hull segments 2004 and 2008 can be held together by means of -shaped attachment unit 2036 which fits over bulkheads 2016 and 2028. A series of mating holes can be placed in attachment unit 2036, bulkhead 2016 and bulkhead 2028 so that bolts, pins, etc., can be inserted therethrough. Another means of holding together hull segments 2004 and 2008 (see FIG. 28) includes extending bulkhead 2016 to form lower extension 2040. The lower portion of bulkhead 2028 is extended to form -shaped portion 2044. The upper portion of bulkhead 2016 is extended to form -shaped portion 2048. Lower extension 2040 fits into the -shaped 2044 and the upper edge of bulkhead 2028 fits into -shaped portion 2048. FIG. 29 illustrates another scheme of holding together hull segments 2004 and 2008. Bulkhead 2016 is extended to form lower extension 2040 and bulkhead 2028 is extended to form lower extension 2052. -shaped attachment unit 2056 fits over the lower extensions 2040 and 2052. -shaped attachment unit 2060 fits over the upper edge of bulkheads 2016 and 2028. A series of mating holes can be placed in bulkheads 2016 and 2028 so that bolts, pins, etc., can be inserted therethrough.

Two boat hulls can be used as a unit where they are connected by means of crossmembers 32 and 36, without the remainder of assembly 4.

FIG. 30 illustrates the rear portion of snowmobile 2100. Motor mount 2104 is similar to the motor mount illustrated in FIG. 23. Motor 1600 can be mounted on motor mount 2104 to provide motorized propulsion for the snowmobile form of this invention. Motor mount 2104 internally incorporates a clutch for use in conjunction with motor 1600. Motor mount 2104 is affixed on plate 2108, which contains holes that match up with the holes of elongated members 16 and 20 for purposes of being bolted thereto. The front portion of snowmobile 2100 is not shown in FIG. 30, but is identical to the front portion of the sail cart of FIG. 14 (minus sail mount 44) where wheel 1136 has been replaced by the front ski attachment 1250 of FIG. 16 and axle pin 1132 of FIG. 14. Elongated members 16 and 20 are attached to curved plate 24 is shown in FIG. 14 and curved plate 24 is attached to elongated crossmember 32 as shown in FIG. 14. Flotation wheels 2112 are attached to the ends of elongated crossmember 32. Flotation wheel unit 2112 is identical to wheel unit 1100 except that its wheel portion 2116 (corresponding to wheel 1108) is a large flotation type of wheel which can be used to navigate across snow-covered ground. Wheel unit 2112 contains shaft 2120 which is detachably mounted in the end of elongated member 32 and rotatable shaft 2124 which is rotatably mounted on the other end of shaft 2120. Pulley 2128 (part of motor mount 2104 and similar to pulley 1828) is rotatably connected to pulley 2132 by means of belt 2136. Pulley 2132 is mounted on rotatable shaft 2124.

FIG. 31 illustrates the rear portion of snow blower (vehicle) 2200. The snowmobile (2100) is modified to obtain snow blower (vehicle) 2200. Engine 1600 is operated in reverse (and optionally geared down). Snow blower unit 2204 is attached to snowmobile 2100 by inserting elongated members 2208 (shown) and 2212 (not shown) into the hollow ends of elongated members 16 and 20. Elongated members 2208 and 2212 contain holes that match up with the holes of elongated members 16 and 20 for purposes of being bolted thereto. Snow blower unit 2204 also includes: frame 2216, which also serves as a protective shield; shaft 2220, which is rotatably mounted in the end portions of frame 2216 pulley 2224; helical-shaped blades 2228, which both are mounted on shaft 2220 so that shaft is positioned on their central axis; and snow director 2232, which is rotatably mounted on the top surface of frame 2216. Elongated members 2208 and 2212 are mounted on frame 2216. Pulley 2224 is rotatably connected to pulley 2236 (which is mounted on rotatable shaft 2124) by means of belt 2240. Helical-shaped blades are conventionally pitched and rotated so that the snow is moved inwardly and literally thrown or blown out of snow director 2232. The diameters of pulleys 2128, 2132, 2236 and 2224 are adjusted to give the desired rotational speeds for wheels 2116 and helical-shaped blades 2228. To obtain snow blower (vehicle) 2200, snowmobile 2100 is further modified in that the direction of front ski attachment (1250 and 1216) is reversed. Snow blower (vehicle) 2200 is operated in what would normally be termed in reverse (in view of snowmobile 2100).

FIG. 32 shows grasscutter unit 2300 which can be mounted on main vehicle in a manner similar to that used for mounting snow blower unit 2204. Grasscutter unit 2300 includes: frame 2304, which also serves as a protective shield; shaft 2308, which is rotatably mounted at 2312 and 2316 on the top of frame 2304; gears 2320, which are mounted on shaft 2308 and protrude through slots in frame 2304; gear houses 2324, which are mounted on frame 2304 under gears 2320; shafts 2328, which are rotatably mounted in the lower side of gear houses 2324; gears 2332, which are mounted on shafts 2328 and which mesh with gears 2320; blades 2336, which are mounted on the ends of shafts 2328; pulley 2340, which is mounted on the end of shaft 2308; and elongated members 2344 and 2348, which are attached to frame 2304. Grasscutter unit 2300 is attached to unit 2100 (of FIG. 31) by inserting elongated members 2344 and 2348 into the hollow ends of elongated members 16 and 20. Elongated members 2344 and 2348 contain holes that match up with the holes of

elongated members 16 and 20 for purposes of being bolted thereto. Pulley 2340 is rotatably connected to pulley 2236 by means of belt 2352. When grasscutter unit 2300 is used in conjunction with unit 2100 (of FIG. 31), the reversed front ski unit is replaced with the front wheel unit (1132 and 1136) shown in FIG. 14. Pulley diameters and gear ratios can be adjusted to give the desired rotational speeds of the wheels and blades.

Another type of boat which can be used in the catamaran form of this invention is illustrated in FIG. 33. Boat 2400 includes hull 2404 and deck 2408, both of which are constructed of a flexible material like rubber. Boat 2400 is inflated with a gas when in use and can be collapsed for storage, etc. Boat 2400 can contain internal dividers such as 2412 (best shown in FIG. 34 which is a cross-sectional view of boat 2400 in FIG. 33 taken at A–A) which are constructed of a flexible material like rubber. As best shown in FIG. 35, boat 2400 contains internal divider 2416 which separates chamber 2420 from the rest of the internal portion of boat 2400. Divider 2416 is constructed of a flexible material like rubber, neoprene impregnated nylon, etc. That portion of hull 2404 which forms part of the wall structure of chamber 2420 contains a number of holes 2424. Preferably there are two holes 2424 at the top and two holes 2424 at the bottom. Also the drainage of water out of holes 2424 should be at least 2 minutes. Holes 2424 can be sealed after the filling of chamber 2420 if desired. While water may be set up to flow slowly in and out of holes 2424, when boat 2404 (one of two used in the catamaran) is lifted out of the water (due to the wind, etc.) the water contained in chamber 2420 serves as a weight which tends to stabilize the catamaran from capsizing. Rings 2428 are attached at each end of ridges 2432, which is rigid to give some lateral strength to boat 2400. Ridges 2432 can be constructed of rubber, etc. To mount boats 2400 on the central framework of the catamaran, elongated crossmembers 32 and 36 are inserted into rings 2428. Rings 2428 are attached to elongated crossmembers 32 and 36 by inserting bolts, etc., through mating holes contained in each. Rings 2428 can have any shaped internal configuration, but as usual a circular configuration is preferred.

FIG. 36 illustrates another (preferred) embodiment of attaching boats 2400 to the central framework of the catamaran. Elongated loops 2436 are used in place of ridges 2432. Elongated members 2440 are inserted into loops 2436. Rings 2444 are mounted on the protruding ends of elongated members 2440. Elongated crossmembers are inserted into rings 2444 and bolted in place. Elongated members 2440 can be collapsible, telescoping, etc.

It should be noted that many of the connection points described in the above paragraphs could be welded (which would detract from the collapsible aspects of this invention), clamped, pinned, screwed, or so forth, together—this aspect being within the skill of the art.

The various items of the several forms of this invention can be constructed from any suitable materials which is resistant to the weather and which has the necessary structural strength, etc. In most instances, marine aluminum is the preferred construction material.

Catamarans have always been recognized as outstanding watercraft. Because of their relatively large beam-to-length ratio, they are seaworthy, stable and highly resistant to capsize. However, this relatively large beam, which is so advantageous when the craft is waterborne, is a serious handicap when the craft are moved ashore. They are then clumsy, bulky and difficult to handle. Many catamarans have been so constructed that their hulls and central deck are substantially rigid relative to each other. To achieve this rigidity, extra structure is necessary, thereby increasing the cost and weight of the craft, and also reducing its seaworthiness. The invention described in the present specification has been designed, in part, to overcome these drawbacks in other catamarans.

This invention and its various forms can be miniaturized so that it can be sold and used as a toy.

I claim:

1. An assemblage which comprises:

a. a centrally located longitudinally elongated unit which comprises at least two spaced, generally parallel, longitudinally elongated members which are hollow on at least one end;

b. a first short crossmember which is a curved plate member which is a shaped like a vertically elongated "S," the lower portion of said short crossmember being detachably affixed to the top portion of at least two of said spaced, generally parallel, longitudinally elongated members;

c. a first elongated crossmember which is detachably affixed to the upper portion of said first short crossmember, which is perpendicular to said spaced, generally parallel, longitudinally elongated members, and which is hollow on at least one end;

d. a second short crossmember which is a curved plate member which is shaped like a vertically elongated "S," the lower portion of said second crossmember being detachably affixed to the top portion of said spaced, generally parallel, longitudinally elongated members near the ends opposite thereof where said first short crossmember is affixed; and

e. a second elongated crossmember which is detachably affixed to said second curved plate member, which is perpendicular to said spaced, generally parallel, longitudinally elongated members, and is hollow on at least one end, said vertically elongated S-curved plate members being situated so that each of said plate members faces away from said spaced, generally parallel, longitudinally elongated members.

2. An assemblage as described in claim 1 wherein said elongated crossmembers are detachably affixed at both ends to boats, and wherein there are two elongated spaced members.

3. An assemblage as described in claim 2 wherein said elongated crossmembers are detachably affixed to said boats by fastening means whereby the end portions of said elongated crossmembers are positioned in and detachably affixed in hollow elongated members that are affixed to said boats.

4. An assemblage as described in claim 3 wherein said hollow elongated members that are affixed to said boats are an integral part thereof.

5. An assemblage as described in claim 3 wherein said spaced elongated members, said elongated crossmembers, and said elongated members which are attached to said boats are tubular.

6. An assemblage as described in claim 3 wherein said elongated crossmembers are adjustably affixed in said hollow elongated members that are affixed to said boat.

7. An assemblage as described in claim 2 wherein said boats are comprised of two nearly equal lengthwise sections that are detachably mounted together in a watertight manner.

8. An assemblage as described in claim 2 wherein a sail mount, which includes a baseplate member and a hollow member vertically mounted on the top surface of said baseplate, is detachably affixed by means of its baseplate to said spaced elongated members at a position proximate where said second curved plate member is attached to said spaced elongated members.

9. An assemblage as described in claim 2 wherein a variable, center board mount, which includes a base member and a slot therein wherein a center board can be variably positioned is detachably affixed to said spaced elongated members at a position proximate where said second curved plate member is attached to said spaced elongated members.

10. An assemblage as described in claim 2 wherein a seat is detachably mounted on said spaced elongated members.

11. An assemblage as described in claim 2 wherein a deck unit is detachably mounted on top of said spaced elongated members and said elongated crossmembers, said deck unit having passageways for a sail mast and a center board.

12. An assemblage as described in claim 10 wherein said deck unit can be reassembled to form a box having two diametrically located open ends.

13. An assemblage as described in claim 3 which includes two wheel assemblies, each of which comprises a bar, a leaf spring mounted on the underside of said bar, a wheel axle mounted on said leaf spring, a wheel mounted on said wheel axle and two shafts mounted on said bar which are positioned in and detachably affixed in said hollow elongated members that are affixed on one of said boats.

14. An assemblage as described in claim 3 which includes a motor mount comprising a mounting plate and two spaced, essentially parallel, hollow, elongated members, which are affixed to said mounting plate and which are positioned in and detachably affixed in said hollow end portions of said spaced elongated members upon which the second curved cross-member is affixed.

15. An assemblage as described in claim 14 wherein a propulsion unit is attached to said assemblage, said propulsion unit comprising (a) a gasoline motor unit which comprises (i) a gasoline motor, including a rotating shaft, (ii) an extension arm, which is attached to said rotating shaft, which is V-shaped on the unattached end of said extension arm, and which has a passageway therethrough, (iii) a gear, which is attached to said extension arm, and (iv) a pin, which is positioned and affixed in said passageway of said extension arm, (b) attaching means, whereby the propulsion means are attached to said mounting plate of said motor mount, and (c) propeller means, which are rotatably attached to said rotatable shaft of said gasoline mount.

16. An assemblage as described in claim 14 which includes a rudder mount comprising a rudder pivot mount, a rudder shaft pivotally mounted in said rudder pivot mount, a rudder attached to the lower portion of said rudder shaft and two spaced essentially parallel-in-part, elongated members, which are affixed to said rudder pivot mount and which are positioned in and detachably affixed in the ends of said two hollow elongated members affixed to said motor mount mounting plate located away from said ends detachably affixed in said spaced elongated members.

17. An assemblage as described in claim 7 which includes a tow-bar unit comprising a mounting plate, a tow bar which is attached to said mounting plate, and two spaced, essentially parallel units, which are positioned in and detachably affixed in said hollow end portions of said spaced elongated members upon which the first curved member is affixed.

18. An assemblage as described in claim 2 wherein a propulsion unit is attached to said Assemblage, said propulsion unit comprising (a) a gasoline motor unit which comprises (i) a gasoline motor, including a rotatable shaft, (ii) an extension arm, which is attached to said rotatable shaft, which is V-shaped on the unattached end of said extension arm, and which has a passageway therethrough, (iii) a gear, which is attached to said extension arm, and (iv) a pin, which is positioned and affixed in said passageway of said extension arm, (b) at least one mounting bar, said mounting bar being attached to said gasoline motor unit and to said spaced elongated members, and (c) rotatable blade means, which are rotatably attached to said rotatable shaft of said gasoline unit.