

Oct. 21, 1969

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3,473,502

SAILBOAT

Filed June 18, 1968

3 Sheets-Sheet 1

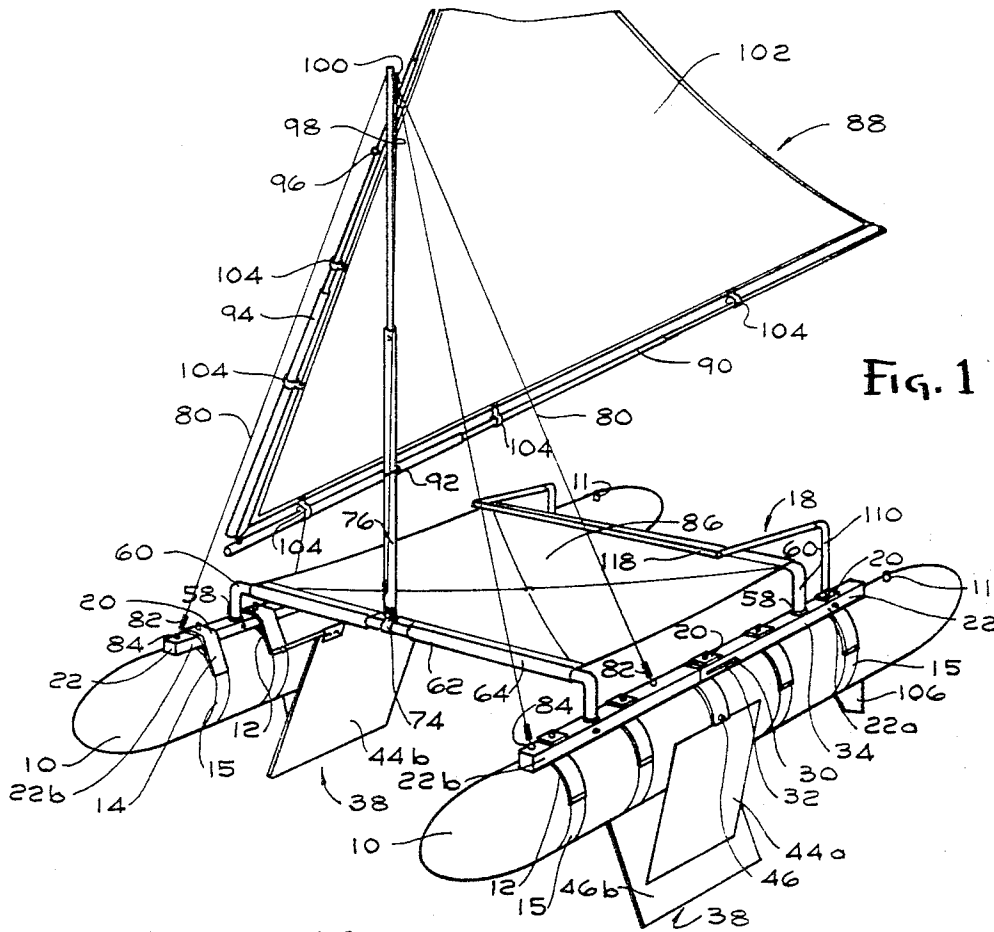


Fig. 1

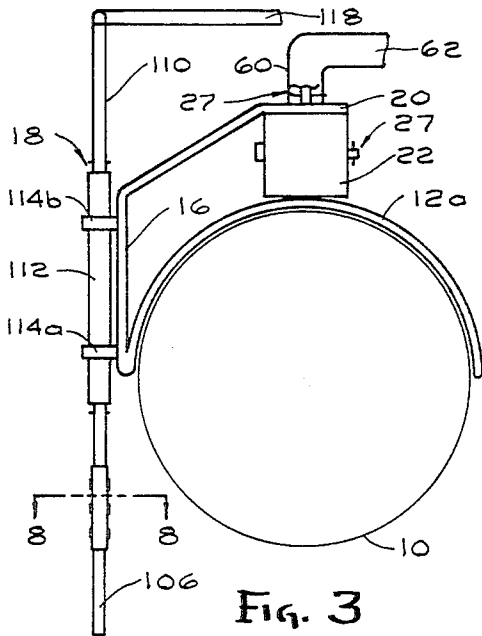


Fig. 3

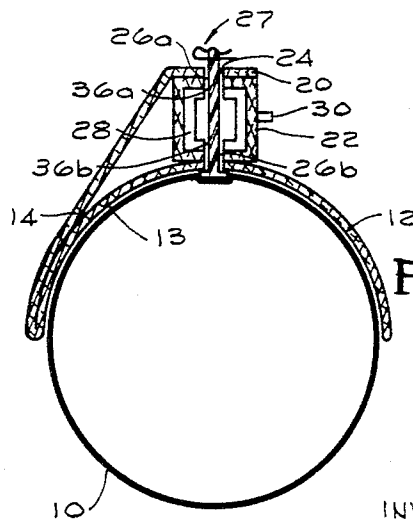


Fig. 4

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3 Sheets-Sheet 2

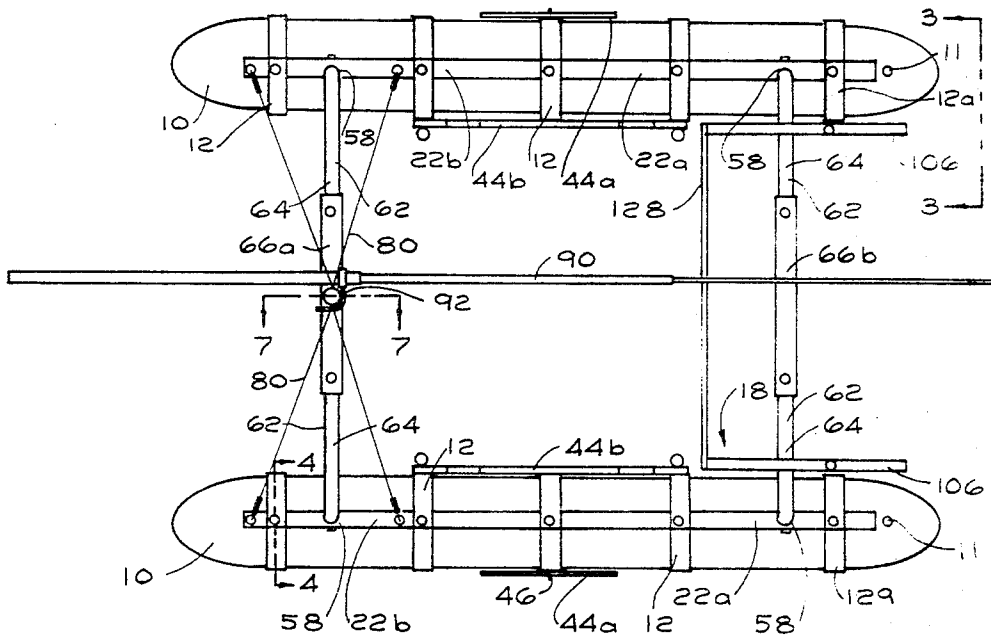


FIG. 2

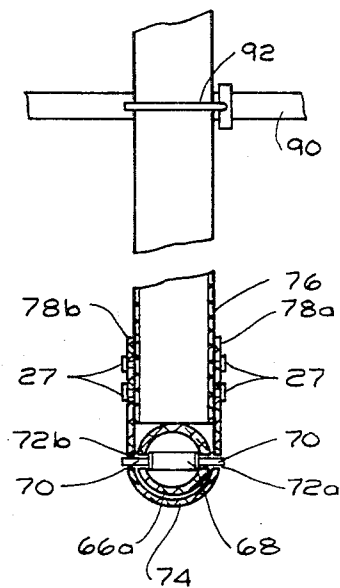


FIG. 7

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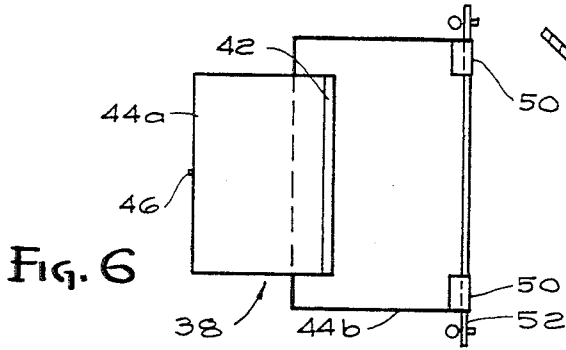


Fig. 6

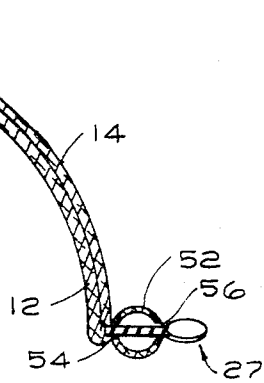


Fig. 10

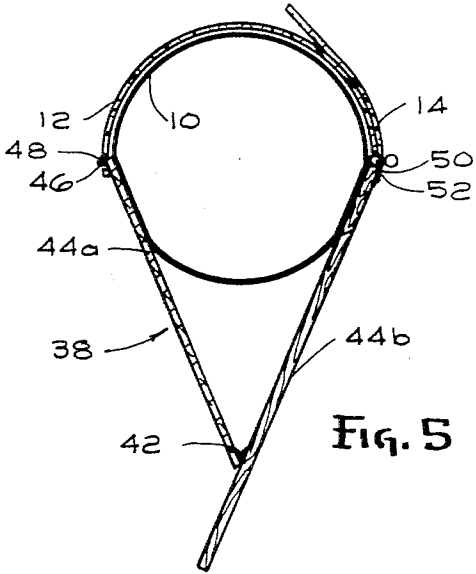


Fig. 5

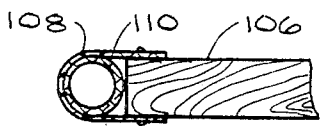


Fig. 8

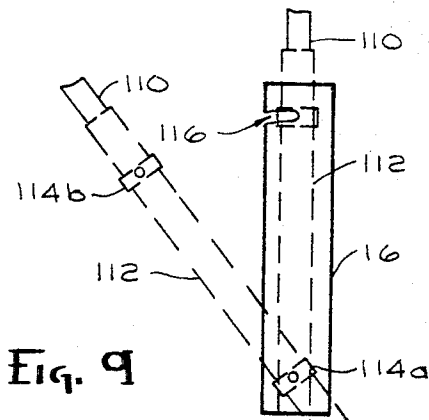


Fig. 9

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1

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U.S. Cl. 114—39

5 Claims

## ABSTRACT OF THE DISCLOSURE

A readily assembled and disassembled sailboat of catamaran design. The structural and functional components are designed to provide a craft of light weight which when disassembled occupies a relatively small volume for ready ease of transportation and/or storage. Securing means are provided which permit assembly and dismantling of the craft without the use of tools.

## BACKGROUND OF THE INVENTION

The present invention relates to sailboats and more particularly is concerned with a novel lightweight, collapsible sailboat which readily can be assembled for use and taken apart for storage and transport.

It is a principal object of the present invention to provide a lightweight, collapsible easily portable sailboat.

It is a further object of the present invention to provide a sailboat that offers complete collapsibility and which when disassembled provides a lightweight, relatively compact package that is readily stored and/or transported.

It is another object of the present invention to provide a collapsible, lightweight sailboat which readily can be handled and sailed by one having the basic fundamentals of the art of sailing.

It is also an object of the present invention to provide a portable sailboat which can be assembled and disassembled without the use of tools.

These and other objects and advantages of the present invention readily will become apparent from the detailed description presented hereinafter when read in conjunction with the appended drawing.

## BRIEF DESCRIPTION OF THE FIGURES OF THE DRAWING

FIGURE 1 is a perspective view of one embodiment of the collapsible sailboat of the present invention.

FIGURE 2 is a top view of the sailboat embodiment shown in FIGURE 1 with deck removed to show the assembly of structural and functional members.

FIGURE 3 is an end view taken along line 3—3 of FIGURE 2 showing the rudder-tiller assembly but excluding the centerboard assembly.

FIGURE 4 is a sectional view taken along line 4—4 of FIGURE 2.

FIGURE 5 is a cross-sectional view of one embodiment of a center board assembly for use with the present sailboat in position on a pontoon.

FIGURE 6 is a top view showing the centerboard assembly depicted in FIGURE 5.

FIGURE 7 is a sectional view taken along line 7—7 of FIGURE 2 showing one embodiment of a clamp assembly for supporting the mast of the portable sailboat of the present invention.

FIGURE 8 is a cross-sectional view taken along line 8—8 of FIGURE 3.

FIGURE 9 is a fragmentary side elevation showing one embodiment of a rudder-tiller assembly and clamp means therefor for use with the sailboat of the present invention.

2

FIGURE 10 is a fragmentary side view showing one embodiment of a clamp fastening assembly for holding a centerboard used with the sailboat of the present invention.

## SUMMARY OF THE INVENTION

In general, the sailboat of the present invention comprises, when assembled, a catamaran hull provided by two inflated pontoons. Each pontoon is frictionally held at spaced apart intervals along its length by a plurality of clamp members, at least one of which has a centerboard assembly detachably affixed thereto. The pontoon clamp members for each pontoon are demountably connected onto a support member which extends along the major portion of the length of the pontoon above its top surface. The support member also engages detachable fore and aft cross-members to which is demountably fastened a thin, flexible web-like deck. The other ends of the fore cross-members and aft members respectively are joined to maintain the pontoons in a spaced apart relation to provide the catamaran hull. The cross-member assembly in the fore of the craft supports a demountable mast; spars holding a sail in turn are fastened to the mast by readily detachable means; usually both the mast and spars are of a tubular telescopic construction. A rudder-tiller assembly, which can be readily dismantled is held by the support member at the aft portion of the craft.

Ordinarily, in assembling the sailboat from its component parts after being disassembled for storage and/or transport, the pontoons are inflated. The pontoon clamps are attached to the support members by frictionally engaging, spring tension, mechanical, e.g., bolt and wing nut assemblies, pin and spring lock units and the like readily connected and disconnected fastening means. The pontoons are brought into frictional engagement with the clamps. The cross-members are positioned onto the support and assembled to provide separate connections between the fore members and the aft members. The ends of the decking are attached to the fore cross-members and aft cross-members. The butt end of the mast is clamped or otherwise fastened onto the fore cross-member. The sail is positioned onto the spars and the resulting sail assembly connected to the mast. The centerboard and rudder assemblies are mounted into place thereby completing the assembly of the craft.

The disassembly or "breaking-down" of the craft is carried out in reverse order.

It is to be understood that the particular sequence of steps set forth directly hereinbefore is not critical and that the sailboat can be assembled or taken apart by putting the various components together in some other order of assembly steps.

Ordinarily, to obtain the optimum in strength to weight ratio, the clamps, supports, mast, spar, centerboards, rudder-tiller and the like structural or functional members are fabricated from a lightweight metal or alloy such as, for example, aluminum or its alloys. The functional members, e.g., rudders and centerboards also can be built entirely, or in part, from wood. The deck usually is of a high strength, light weight flexible material, canvas being representative. The sail is fabricated from conventional materials ordinarily employed for this use.

## DESCRIPTION OF PREFERRED EMBODIMENT

One preferred embodiment of the sailboat of the present invention as depicted in the figures of the drawing comprises two substantially tubular inflatable pontoons 10, usually circular or generally oval-shaped in cross-section. Alternatively, the pontoons 10 can be rectangular or other cross-sectional shape if desired. The pontoons are fabricated from a thin-walled, flexible material which can withstand and hold a gas pressure. Ordinarily, each

pontoon is fitted with at least one valving means 11, such as a conventional inner tube valve, for example, for ready inflation and deflation.

Conveniently, the pontoons are fabricated from a thin wall tubular material such that the pontoons, when in a deflated state, can be rolled or folded into a compact package of lightweight occupying a small volume. Natural or synthetic rubber, flexible polymers and resins such as vinyl plastics, for example, as well as rubber or plastic lined fabrics and the like can be employed to make the pontoons.

The pontoons can be fabricated to have either one chamber or a multiplicity of independent gas retaining chambers. The latter design configuration is particularly preferred since this assures the maintenance of buoyancy if one or a portion of the chambers should become ruptured or punctured during use. In such an assembly it is to be understood that each compartment would have separate valving means, or at least separate valve closing means. To illustrate, the multicompartment could be connected to a common manifold for ease of filling and each compartment could be fitted with a one way valve, such as a Bunsen type valve, which would permit air or gas to flow into the compartment for filling but would stop backward flow. The compartments then would be fitted with separate exhaust valves.

In the depicted preferred embodiment the pontoon clamp members 12 are bands having a substantially hemispherical section 13 having a radius less than that of the pontoon 10 such that the pontoon 10 when inflated is squeezed into this section 13 and frictionally held thereby. Usually for additional support, a thin flexible band or strap 15, e.g., of plastic or canvas, is passed under the pontoon at each clamp 12 or 12a and fastened to the ends of the hemispherical pontoon of the clamp. One end 14 of the clamp 12 is folded back on itself and extends upward at an angle of greater than 90° but less than 180° with the horizontal. One of the clamps (hereinafter designated as 12a) for each pontoon 10 has a segment 16 which is vertically bent back on itself a distance and then is bent back at a greater angle. This clamp 12a also serves as a support mount for a rudder-tiller assembly 18. This clamp 12a ordinarily is positioned near the rear of the pontoon 10.

The terminal portion 20 of each clamp 12 and 12a is bent to be substantially parallel to the horizontal for a short distance on both sides of the midpoint of the arc of the hemispherical segment 13 and is raised above this segment a sufficient distance such that a tubular clamp support member 22 can pass therebetween. For ease in assembly and the maximum in stability when assembled, ordinarily, as shown, this support member 22 is rectangular, and preferably square, in cross-section. The terminal portion 20 of each clamp 12 and 12a is fitted with a through passage 24 which can mate with any of a plurality of spaced apart through passages 26a-26b respectively, along the length of support member 22.

In a modified form at least one of the clamps 12 can be in the shape of about a 90° segment having an end 14 and terminal portion 20 as described hereinbefore. This modified clamp can be used to particular advantage for holding a centerboard assembly of a configuration described hereinafter.

In an assembled boat, a plurality of clamps 12 and 12a are positioned at intervals along the tubular support member 22 such that a passage 24 mates with passages 26a-26b. A readily movable securing means 27, such as a flat headed pin-spring tension retainer, expanding spring tension lock pin, bolt and wing nut assembly, flat-headed book binder type threaded male and female fasteners or the like is passed through the mated passages and secured thereby holding the clamps 12 and 12a in fixed position onto support 22.

The tubular support 22 in the depicted embodiment consists of two equal length members 22a-22b of rec-

tangular, preferably square cross-section. One of the members 22a, or 22b if desired, is fitted with a member 28 of identical cross-section, but of an exterior size such that it can slidably fit within the selected member, 22a for example. The junction member 28, as shown, can be fitted with a pin 30 near one end which projects through a slot 32 in the sidewall 34 near one end of support 22a. The pin 32 and slot 34 are arranged such that these provide for one end of junction 28 to be extended a distance out from the end of support 22a.

The top and bottom surfaces of junction 28 conveniently can be fitted with through passages 36a-36b near the end which can extend outward from the support 22a. By placing the corresponding support member 22b not containing the junction 28, in abutting relation with the support 22a the junction member 28 can be slid outward and passed into the interior of 22b. By predetermining the length of the extension and position of through passages 36a-36b of junction 28, these can mate with corresponding passages 24 and 26a-26b of a clamp 12 and support 22b and thereby be secured by a fastening means 27 passed therethrough. This serves to hold the supports in a rigid, fixed position in the assembled boat. This particular arrangement offers the additional advantage that the junction 28 readily is stored for ready retrieval within the section 22a, or 22b, when the boat is disassembled. Ordinarily the ends of sections 22a and 22b, which are not in abutting relationship, are capped.

Alternatively if desired for example the junction 28 can be fitted with through passages near both ends on its top and bottom surfaces and have an exterior shape so as to freely slide within either support 22a or 22b. In this embodiment the passages near the ends of the junction 28 can be mated with corresponding passages in members 22a and 22b and both be secured by securing means 27. Also a telescopic assembly can be utilized for support 22; in fact if the maximum in compact storage is not required this member 22 can be fabricated from a single long structural member.

A centerboard assembly 38 is held below the pontoon 10 by one or more of the clamp members 12, usually near the midsection of each pontoon 10. As shown in FIGURES 5 and 6, one preferred centerboard assembly 38 consists of a substantially Y-shaped unit having a hinge 42 at the junction of the arms 44a and 44b. A pin 46 is mounted in the end of arm 44a which in the assembled craft is to the outside of a pontoon 10. The arm 44a is passed under the end of a clamp 12, pin 46 passing through a passage 48 near the end of this clamp 12. (Conveniently for ease of assembly of the boat each of the clamps 12 can be fitted with a passage 48. Alternatively, the approximately 90° arc clamp described hereinbefore can be employed specifically for this duty.)

The longer arm 44b is fitted with two U-shaped members 50 at each end of its top edge. A support rod 52 is provided; this can freely pass within member 50 and through the opening between these members and the top of arm 44b, and is of a length such that it extends beyond the width of the arm 44b. This rod 52 is held by spaced apart clamps 12, usually two in number, on opposite sides of the clamp 12 holding arm 44a. Ordinarily, the clamps 12 and rod 52 are fitted with mating through passages 54 and 56 respectively and held together by securing means 27, e.g., a bolt and tap assembly, as described hereinbefore. As with passage 48, each of the clamps 12 can be fitted with through passage 54 to facilitate ease of assembly.

This particular configuration of centerboard assembly offers the additional advantage of serving as a case for storage or transporting the boat members when disassembled.

As shown, the arms 44a and 44b of the centerboard assembly 38 have straight sides. If desired, either one

or both of these can taper inwardly or outwardly from the top to the hinged junction 42.

Alternatively, this centerboard assembly 38 can be V-shaped with the hinge 42 being positioned at the junction of the two arms. Also, the smaller arm 44a can be in the form of a bar or rod to support the main centerboard arm 44b in a fixed position in the assembled craft.

Another suitable embodiment of a centerboard for use with the present craft is a flat planar member which can be detachably fitted to the vertical section 16 of a clamp configuration 12a.

Each support member 22a and 22b is fitted with a through passage 58 near the end opposite the abutting edges. Each of said passages 58 accommodates the short leg 60 of a generally right-angled, tubular cross-section deck support member 62. This is held in place by a securing means 27 passing through the side walls of the supports 22a and 22b and leg 62. The longer leg 64 of support member 62 is of a length predetermined to provide a desired distance between the pontoons and correspondingly to define the width of the deck. Each of the long legs 64 of the two supports 62 near the front of the craft are fitted by sliding engagement into opposite ends of a sleeve 66a. The corresponding legs 64 of the cross-members 62 at the rear of the craft are similarly held by a sleeve 66b. Ordinarily, each leg 64 is held in fixed position by a securing means of the general type described hereinbefore passing through mating passages in the sleeve 66a or 66b and leg 64.

The front junction 66a is fitted with a substantially V-shaped spring clamp means 68 having outwardly projecting pins 70 extending through the sidewall of said sleeve 66a at about its center and positioned about midway between the top and bottom. The pins 70 are of a length such that they can engage through passages 72a-72b in a substantially U-shaped clamp means 74 passed around sleeve 66a. The passages 72a-72b are positioned so as to mate with pins 70 when the clamp 74 is in position. The clamp 74 is held in position by the pins 70 passing through the passages 72a-72b. This connection readily is made by simply depressing the pins 70 aligning the passages 72a-72b of the clamp 74 and pins 70 and permitting the pins 70 to snap into place.

The base of the mast 76 is placed between the upright arms 78a-78b of clamp 74 the base resting on the top of the sleeve 66a. This is held in place by securing means 27 of the general type described hereinbefore, for example a flat-headed male-female mating threaded bolt and tap assembly, passing through mating passages in the mast 76 and arms 78a-78b. In another embodiment, the mast can be internally fitted near its base with a V-shaped spring clamp means 68 and this then have pins 70 mating with the passages in the arms 78a-78b of clamp 74.

Alternatively, the sleeve 66a can be fitted with a tubular member which can slidably engage the base of the mast 76, or other clamp and retaining means can be employed.

The mast 76 usually is a two piece telescopic tubular member. When extended the members are held in fixed position by a spring snap clamp such as the V-shaped assembly 68 or securing pin, bolt and tap or the like assemblies. The use of such an assembly provides for ease of storage as the smaller member can slide down inside the larger section. It is to be understood that the mast 76 can consist of more than two sections, if desired. In use the mast 76 is held in an upright, fixed position by cable stays 80 which are attached by snap connectors 82 to eye bolts 84 or the like fastening means at the top of the mast 76 and in the supports 22. Usually the stays 80 have a turnbuckle or other adjusting means also connected thereto for ease in making the connection between the connectors 82 and bolts 84.

The deck 86 is fastened to the fore and aft cross members 62 by snaps, lace and eyelet assemblies or the like connecting means. Alternatively, the front and back edges of the deck 86 can be fabricated into a tubular, loop section through which the cross-members 62 and sleeves 66a-66b can be slid before assembly. With such an assembly, the front end of the deck 86 can be cut away to accommodate the mounting assembly for the mast 76. Conveniently, the deck 86 is made from a thin, sturdy web or sheet-like material. Canvas, nylon, saran plastic or other high strength natural or synthetic materials can be used for the decking.

The sail assembly 88 can be of any of a variety of designs as used in small sailing craft. In the depicted embodiment, a lanteen sail configuration is shown. This sail assembly 88 comprises a bottom generally horizontal telescopic spar 90. This spar 90 is fitted with a detachable or fixed usually L-shaped hook member 92 near its larger end or base. This member 92 is positioned with the bent arm portion facing the base of the spar 90 and extends outward from the spar 90 a distance sufficient to engage the mast 76. The top spar 94 which in the assembled craft is generally disposed at an angle to the vertical usually is of the same tubular telescopic design as the lower spar 90. This spar 94 is fitted at about its midpoint with a hook, eyebolt or the like means 96 to which a line 98 is fastened. This line 98 in turn passes over a pulley 100 at the top of the mast 76 and is used to pull the spar 94 into position after which the line 98 is fastened or tied at the bottom of the mast 76.

The spars 90 and 94 are held in fixed position when extended for use in supporting a sail 102 by spring clamp or other securing means of the type described hereinbefore.

The sail 102 is fitted with a number of spaced apart loops 104 on the sides adjacent the spars 90 and 94. These loops 104 are slipped over the spars 90 and 94, the ends of these sides of the sail 102 being secured to the ends of the spars 90 and 94 as by a line. Also, conventional sail control and securing lines (not shown) are attached to spar 90 and held or fastened to support 22.

It is to be understood that other standard sail designs and configurations can be employed if desired.

A dual rudder-tiller assembly 18 is fitted to the two clamps 12a on each of the pontoons 10. The rudders 106 have at least one U-shaped member 108 along the leading edge which freely accommodates vertical tiller rod 110. This rod is held in fixed position by a pin-securing means or the like fastening means which passes through mating passages usually near the bottom of the member 108 and rod 110. Above the top of the rudder 106, a tubular sleeve 112 for holding the tiller rod 110 is fitted with two spaced apart circumferential bands 114a-114b each having a threaded male portion. The threaded section of lower band 114a mates with a threaded passage in the lower portion of vertical section 16 of clamp 12a. The threaded portion of upper band 114b is positioned to mate with a slot 116 near the upper end of vertical section 16 of the clamp 12a. This provides for tilting of the tiller rod 110, ready assembly and disassembly of the rudder 106 and tiller rod 110 when putting the boat together or taking it apart. In use, the tiller rod is positioned in a substantially upright position whereupon the threaded section of upper band 114b passes along slot 116 and is secured as by a mating wing nut, for example. A horizontal tiller control member 118 is fastened, as by pins or other securing means, for example, or slipped thereon, if mating tubular members are employed to each of the vertical rods 110.

For optimum in control and steering, preferably a dual rudder-tiller assembly 18, as described directly hereinbefore is employed. However, if desired, a single rudder assembly mounted to one of the clamps 12a can be employed.

The support and structural members of the present

novel sailboat, excluding the sail and deck, can be fabricated from any of a variety of wrought, sawable, or cast structural materials. Aluminum and aluminum alloys, because of their high strength/weight ratio, excellent corrosion resistance and ease of formation into predetermined shapes and configurations are preferred.

The present sailboat can be made so as to be, when assembled, of any predetermined size. However, the boat is particularly suited to be of a size so as to accommodate from 1 to about 4 persons. A craft of this size provides the maximum in ease of assembly and disassembly by one person as well as is of relatively light weight and occupies a small volume for transportation and storage.

One particularly suitable form of the present sailboat employs pontoons about 12 feet long and of an approximate 16 inch diameter when inflated. Each pontoon is held by from about 4 to about 6 clamps. The clamps are fabricated from  $\frac{1}{4}$  inch thick by about  $1\frac{3}{4}$  inch wide stock. The tubular supports for the clamps are 2-inch square cross-section tubular members of about  $\frac{1}{8}$ -inch wall thickness. These usually have an assembled length of about 4 feet less than the length of the pontoons.

The cross-members are of rod, or preferably tubes, of from about  $1\frac{1}{2}$  to  $1\frac{5}{8}$ -inch diameter having one leg of from about 10 to about 12 inches long and the other about  $2\frac{1}{2}$  feet long. The tubular sleeve for holding the cross-members is of a  $\frac{3}{16}$ -inch wall thickness tubular member of an inside diameter to provide a sliding fit with the cross member.

The mast is in two sections, the lower portion being a 2-inch outside diameter by  $\frac{3}{16}$ -inch wall thickness tubing and the upper section being of a similar thickness tubing having an outside diameter to provide a sliding fit with the inner wall of the bottom section. The overall length of the mast when extended is about 8 feet.

The spars for holding the sail are three-section telescopic tubular assemblies having about a 1-inch outside diameter as the base of the largest section and a wall thickness of about  $\frac{1}{16}$  inch. When extended these are about 11 feet long.

The centerboard assembly is about 4 feet long. The larger arm usually is of about  $\frac{1}{4}$  to  $\frac{3}{8}$ -inch thick plywood about  $2\frac{1}{2}$  feet wide and the smaller arm is of about  $\frac{1}{8}$ -inch thick aluminum about  $1\frac{1}{2}$  feet wide. If desired, the materials of the arms can be reversed or both can be made of the same structural material.

The rudders usually are of  $\frac{3}{4}$ -inch thick wood; each rudder has a total of about 1 square foot and generally is about 12 by 12 inches in length and width.

For this size craft, a total of about 95 square feet of sail is employed.

The above dimensions are meant to be illustrative of only one operable embodiment of the sailboat of the present invention and is not to be limiting thereof. It is to be understood that the structural and functional members can be of different sizes, as it is only necessary that they have

the requisite and desired high strength and light weight.

From the complete and full description presented hereinbefore, it is readily apparent how the craft can be assembled and disassembled.

Various modifications can be made in the present invention without departing from the spirit or scope thereof I claim:

1. A readily assembled and disassembled catamaran sailboat which comprises in combination:

a catamaran hull provided by two inflatable pontoons, each of said pontoons being frictionally held at spaced apart intervals along its length by a plurality of clamp members, said clamp members for each pontoon being demountably connected onto a support member which extends along the major portion of the length of each pontoon above its top surface, each of said support members engaging detachable fore and aft cross-members which in attached position maintain the pontoons in a predetermined spaced apart relation.

a demountable web-like deck attached to said fore and aft cross-members,

a demountable mast supported by said fore-cross member,

spars holding a sail, said spars fastened to said mast by readily detachable means,

a centerboard assembly detachably affixed to at least one of said clamp members near the midsection of each of said pontoons, and

a readily dismantled rudder-tiller assembly positioned at the aft portion of the craft.

2. The sailboat as defined in claim 1 wherein the mast and spars are telescopic members.

3. The sailboat as defined in claim 1 and having a dual rudder assembly.

4. The sailboat as defined in claim 1 wherein the pontoons are substantially circular in cross-section and the clamp members for holding said pontoons are bands having a substantially hemispherical section of a radius less than that of said pontoons when inflated whereby said pontoons are frictionally held thereby.

5. The sailboat as defined in claim 1 wherein the centerboard assembly is a substantially Y-shaped unit having a hinge at the junction of the short and long arms, one of said centerboard assemblies being positioned under each of said pontoons near its mid-section and being demountably attached to clamp members holding said pontoons.

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TRYGVE M. BLIX, Primary Examiner

U.S. Cl. X.R.

114-61; 9-2