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Pizzey

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[54] SAILING VESSELS

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 18,901, filed as PCT/AU86/00159, Jun. 3, 1986, abandoned.

[30] **Foreign Application Priority Data**

Jun. 3, 1985 [AU] Australia PH0868

[51] **Int. Cl.**[5] **B63H 9/04**

[52] **U.S. Cl.** **114/39.1**; 114/102; 114/163

[58] **Field of Search** 114/39.1, 61, 163, 102

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Primary Examiner—Sherman Basinger
Attorney, Agent, or Firm—Nixon & Vanderhye

[57] **ABSTRACT**

Proa sailing vessel including a pair of spaced hulls comprising a windward and a leeward hull, a crossbeam assembly interconnecting the hulls and a fixed mast assembly with its lower end supported on the crossbeam intermediate the hulls and being inclined athwartship so that its upper end is disposed substantially vertically above the windward hull. The mast assembly is supported by a rigging arrangement which includes a standing stay extending between the upper end portion of the mast assembly and the windward side of the proa and a pair of pivot stays extending from an elevated pivotable mounting on the upper end portion of the mast assembly to respective opposite ends of a first boom connected through a lower pivotable mounting disposed intermediate the respective opposite ends to the leeward side of the proa. In this way, the pivot stays may be pivoted with the boom between respective opposing longitudinal positions at opposite sides of a pivot axis extending between the elevated and lower pivotable mountings whereby one of the pivot stays constitutes a forestay along which the sail may be hoisted.

8 Claims, 7 Drawing Sheets

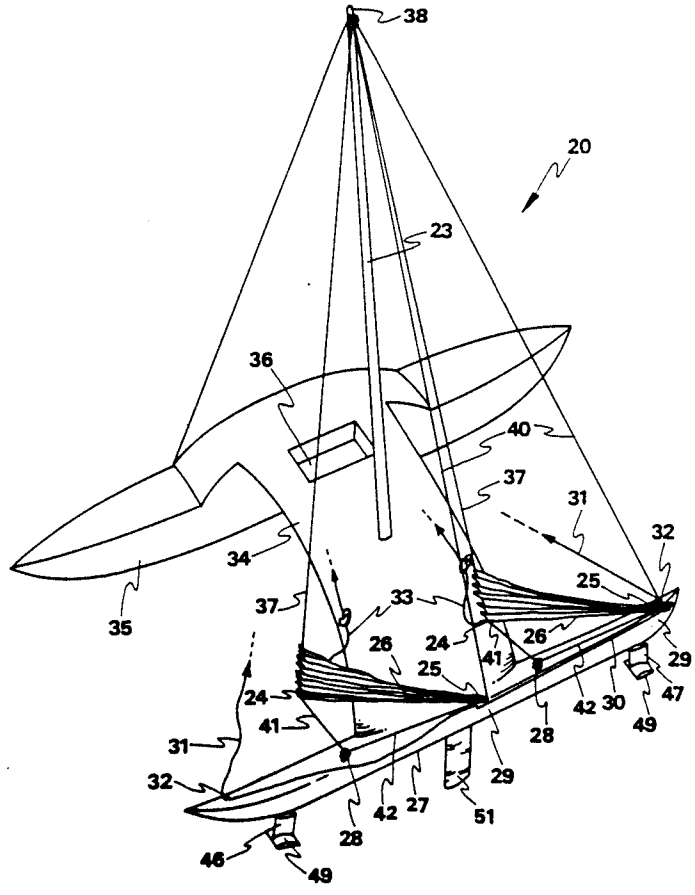
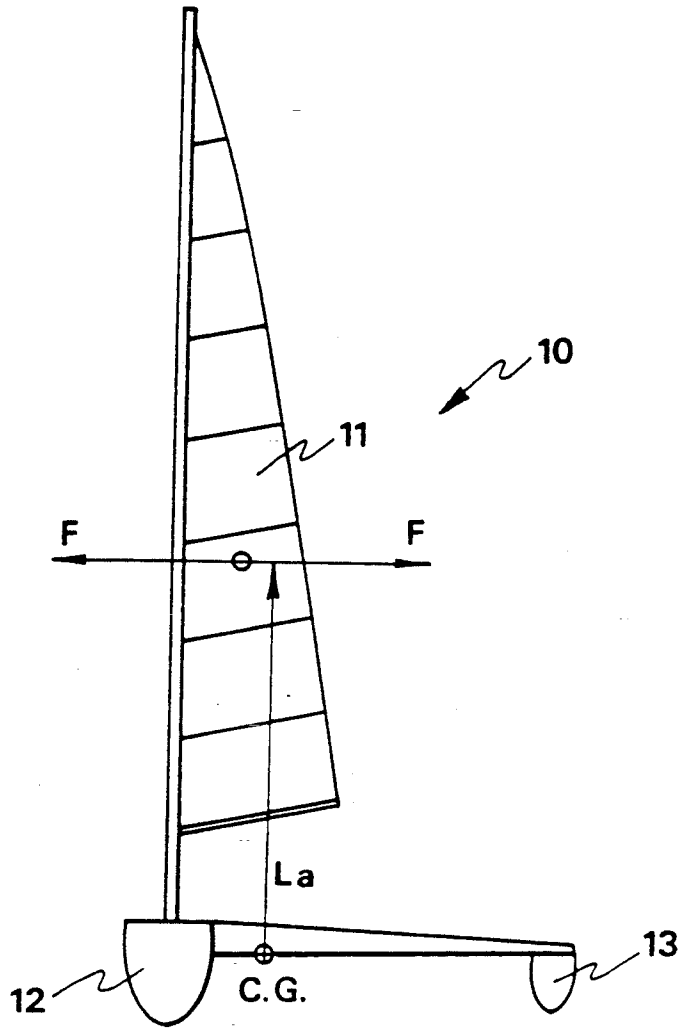


Figure 1.
(PRIOR ART)



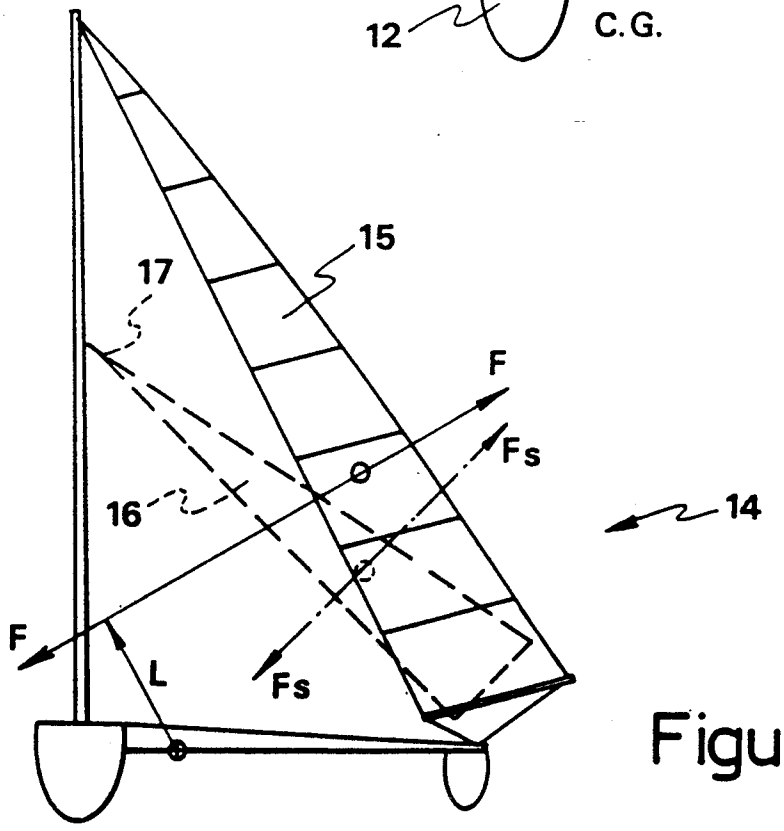


Figure 2.

Figure 3.

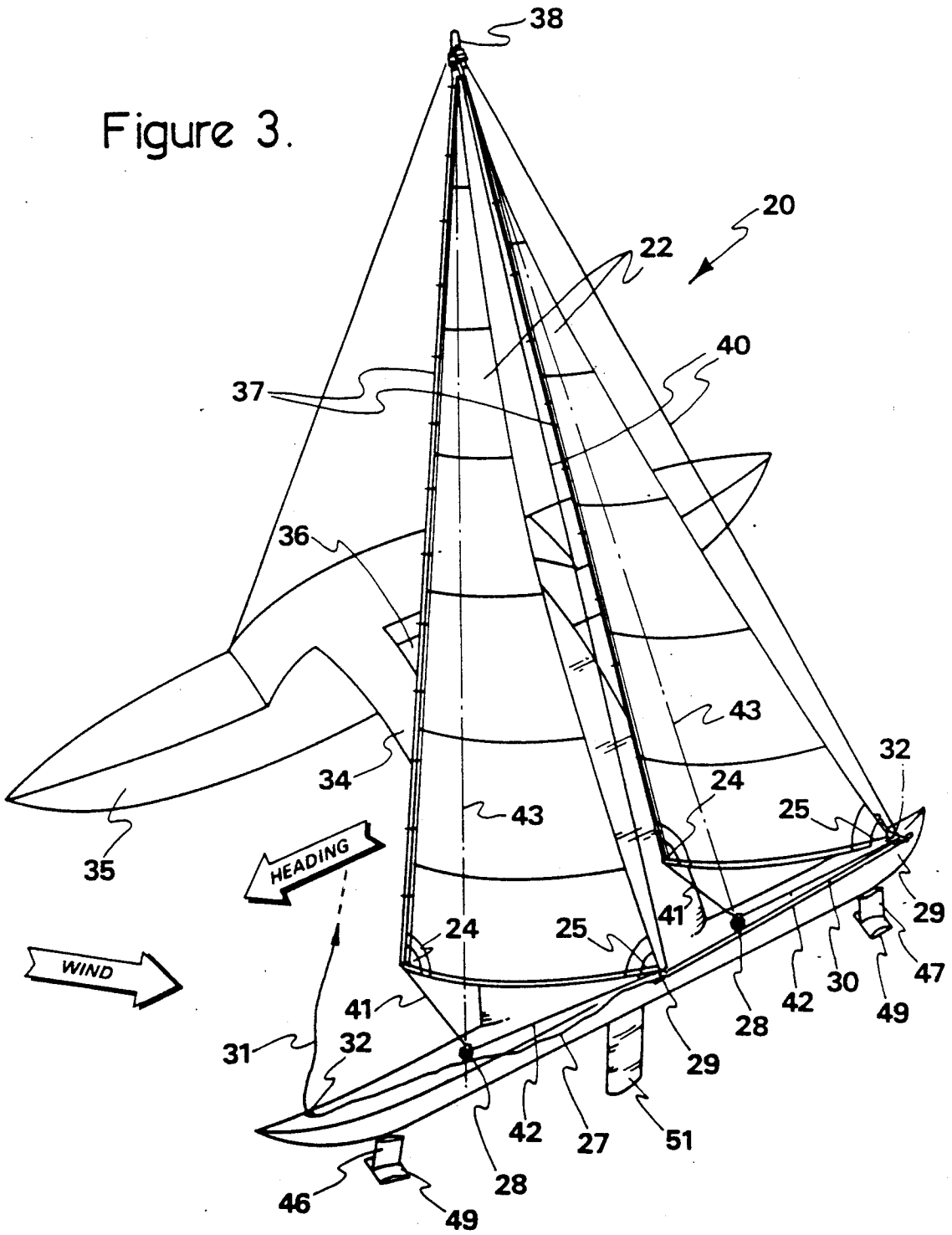

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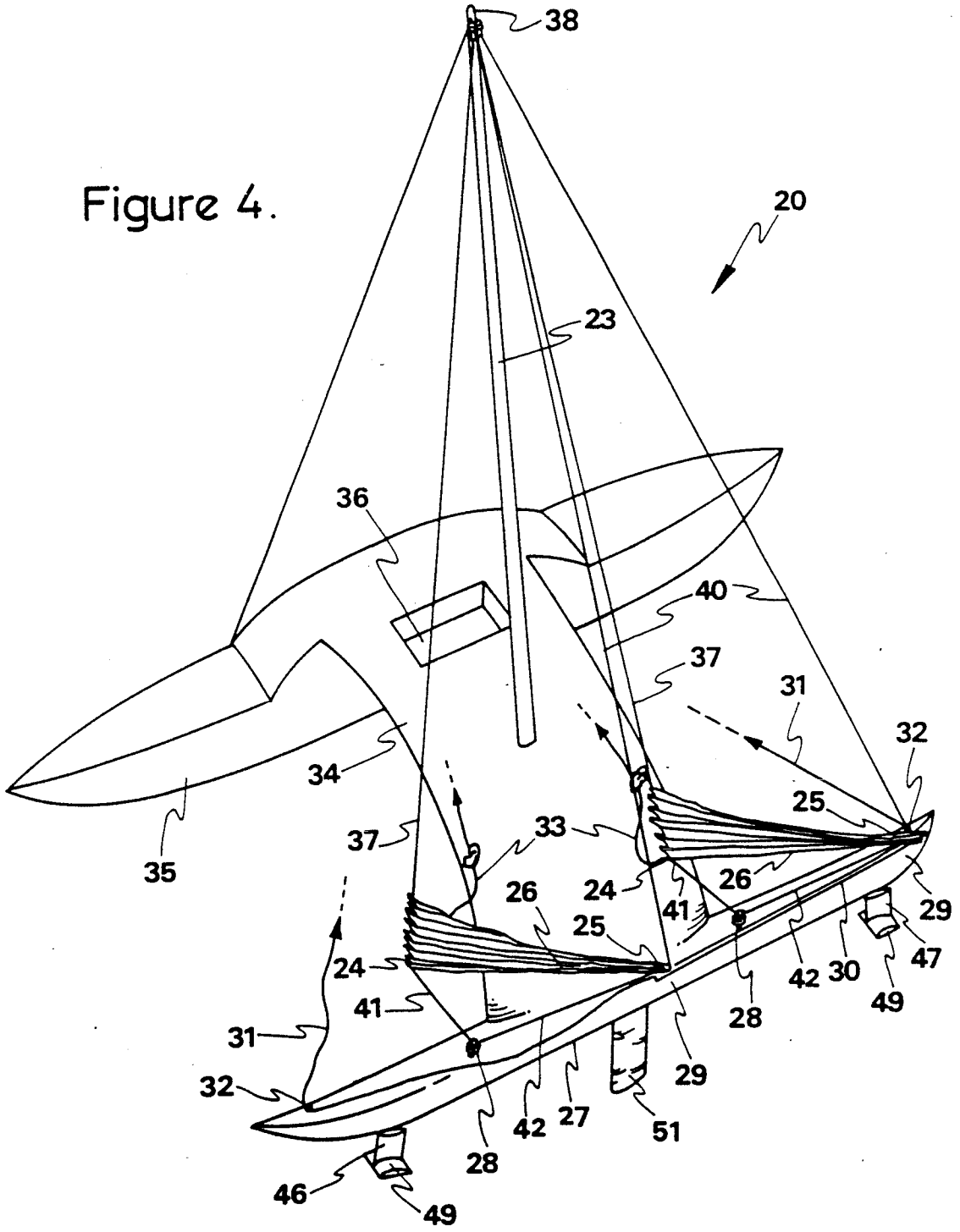
Figure 4.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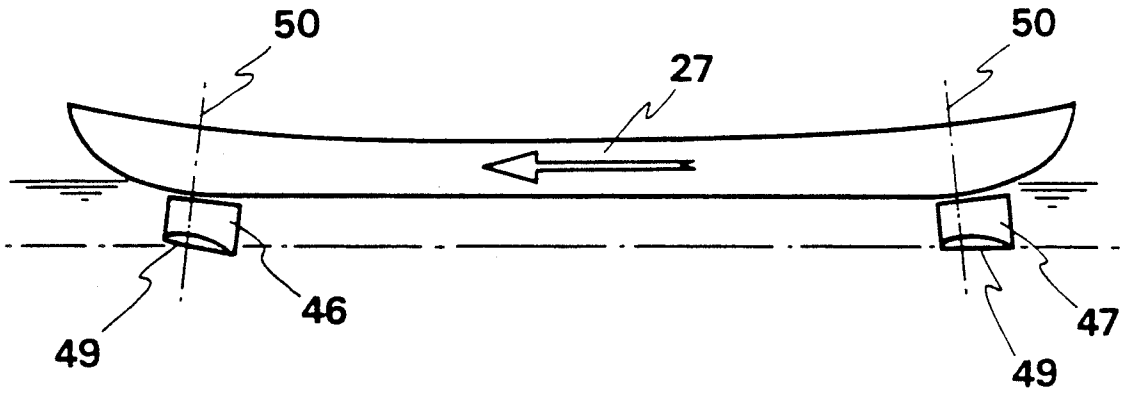
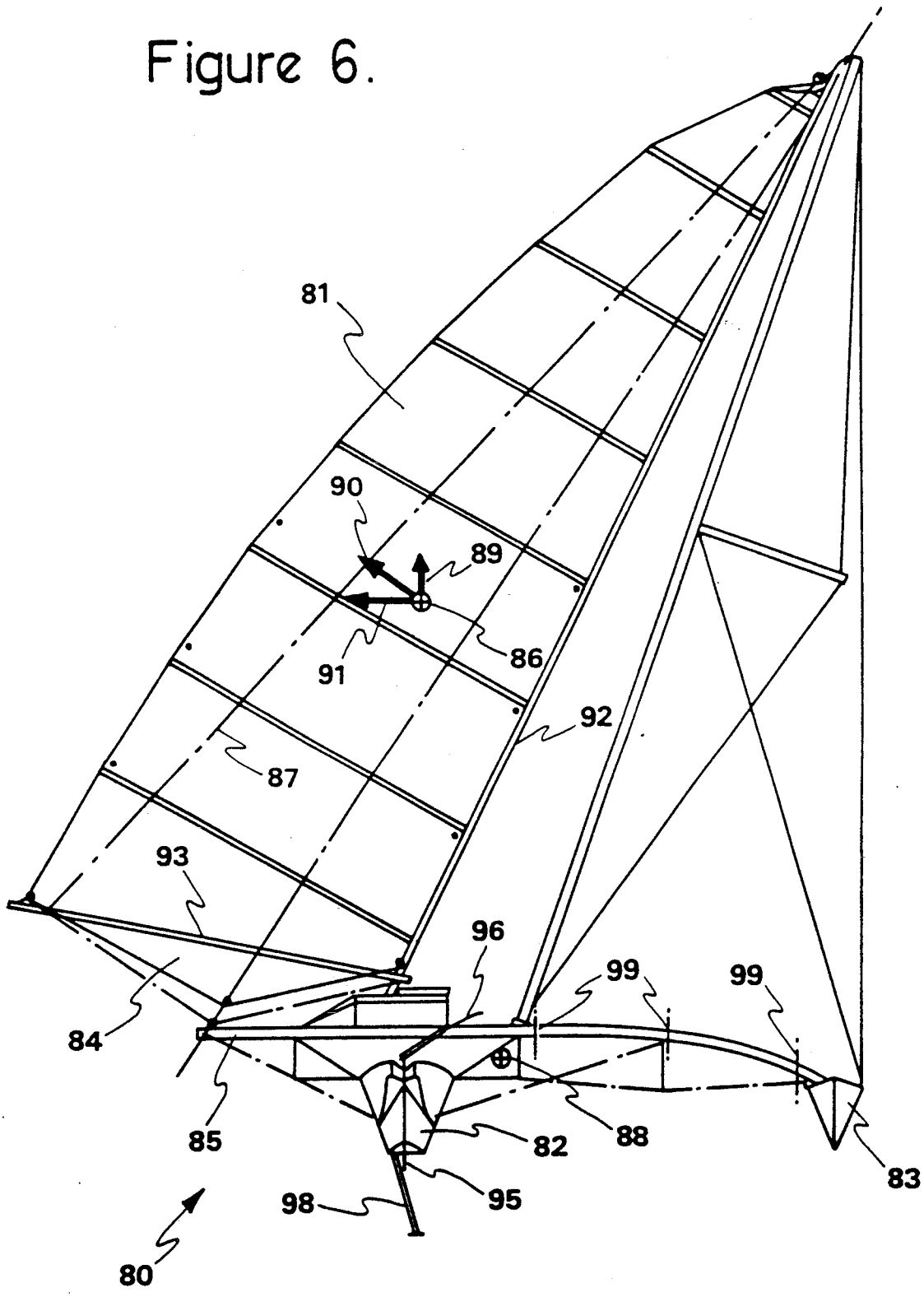


Figure 5.

Figure 6.



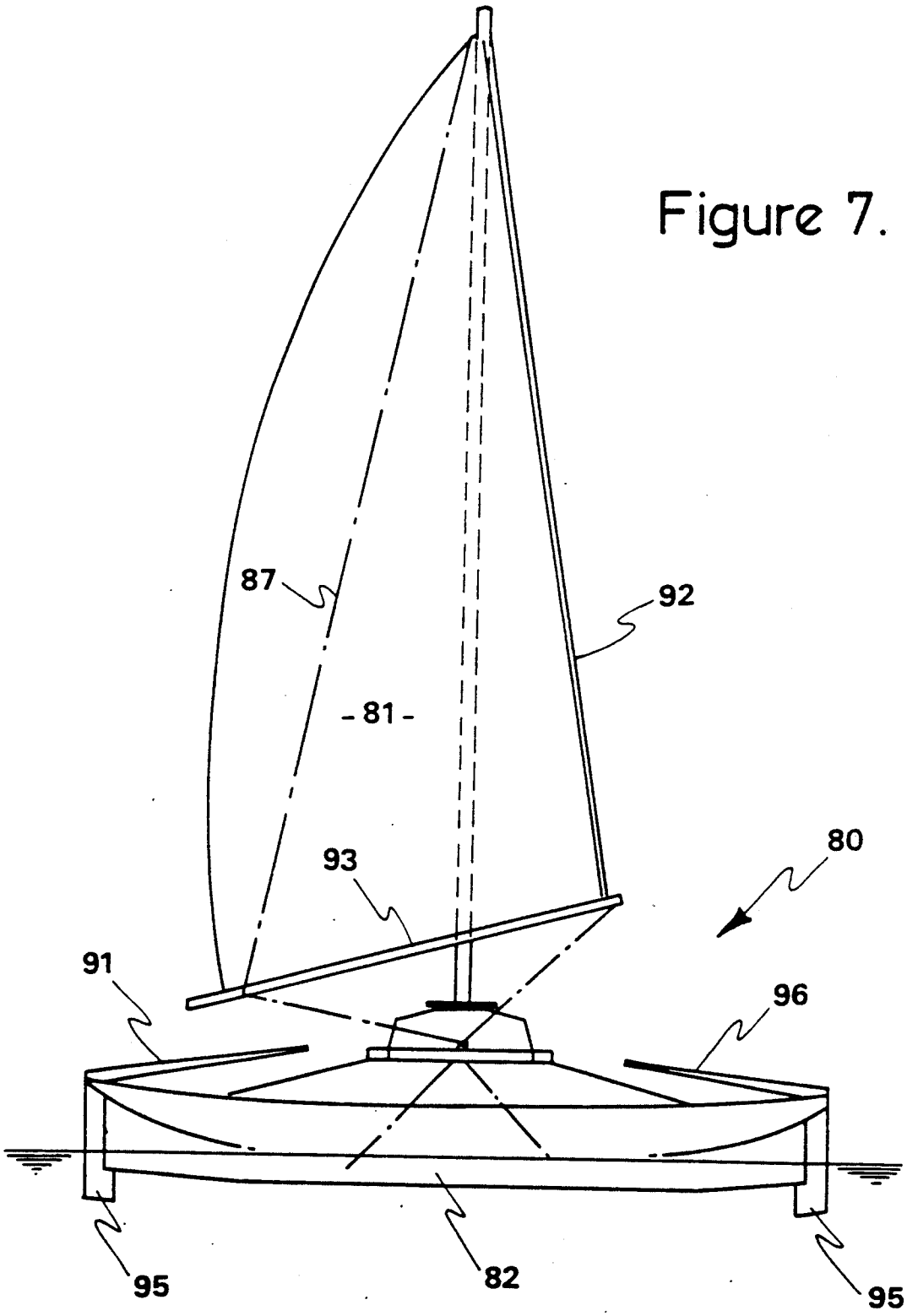
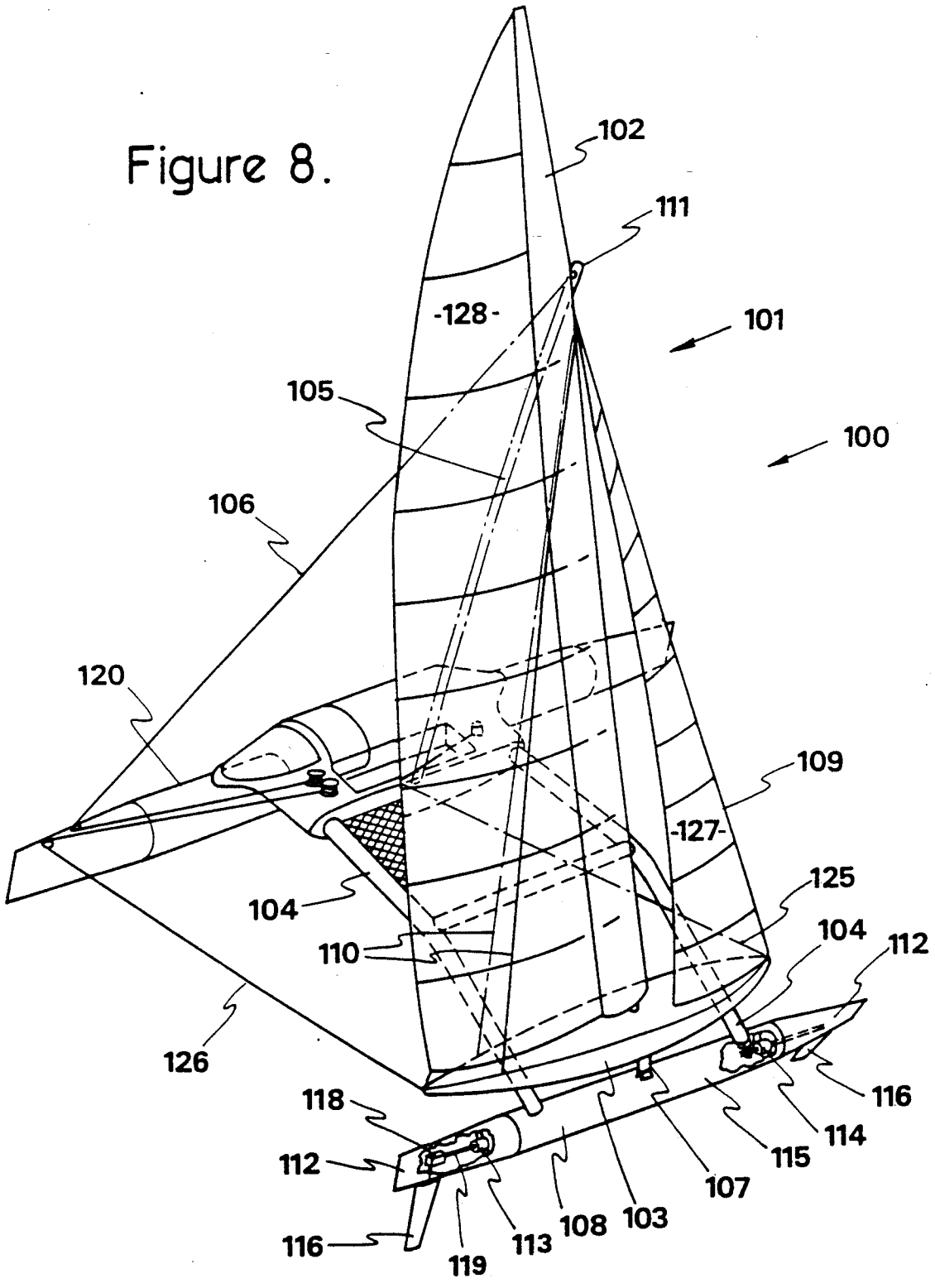


Figure 7.

Figure 8.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SAILING VESSELS

CROSS-REFERENCE TO RELATED APPLICATION

The present application is a continuation-in-part application of application Ser. No. 18,901, filed as PCT/AU86/00159, Jun. 3, 1986, and now abandoned.

This invention relates to improvements to multihull sailing boats.

BACKGROUND OF THE INVENTION

For many years attempts have been made to improve the sailing efficiency of yachts in order to increase their sailing speed while retaining safety and ease of handling. Catamarans have become extremely popular due to their stability and high speed sailing ability. This high speed potential is achieved by the use of narrow hulls which do not have a displacement speed limitation and by the relatively high power to weight ratio which may be achieved because of the inherent stability of the catamaran configuration.

The power to drive such vessels is derived from sails set fore and aft. It has been realized for many years that the force produced by the sails includes a driving components which moves the boat forward and a lateral component which normally causes the boat to heel and move sideways and that the efficiency of a yacht may be increased by inclining the sails so as to utilize the lateral component for producing lift and for reducing the sideways component.

To date however the only commercially successful yachts to utilize sails inclined to produce lift have been sailboards. Inclined sails have also been used on high speed craft such as proas which are reversible twin hulled boats which maintain their respective hulls always in a selected windward/leeward configuration. These arrangements have been used on specialized racing craft only and have not been suitable for general purpose yachts due to practical disadvantages.

Conventional proas have a main or heavy hull and an outrigger or light hull whereby the centre of gravity of the yacht is offset towards either the windward or leeward hull of the craft. In the first mentioned configuration the relatively heavy windward hull gives increases stability provided the vessel is maintained with its heavy hull to windward. If the hull is positioned to windward the ability of the vessel to stand up to the sail force is greatly reduced making a capsize probable. In the second mentioned type of proas the overturning moment created by the sail force is resisted by varying the weight of the windward hull, generally either by placing crew on the windward outrigger or by ballasting the latter with water.

SUMMARY OF THE INVENTION

This invention aims to provide sailing vessels which may utilize either a light hull or heavy hull to windward and which will be reliable and efficient for its particular purpose of use. Other objects and advantages of this invention will hereinafter become apparent.

With the foregoing and other objects in view, this invention in one aspect resides broadly in a proa sailing vessel comprising:

a pair of spaced hulls comprising a windward hull and a leeward hull each having underwater sections which

are substantially symmetrical about a transverse centreline;

a cross beam assembly interconnecting said hulls;

a mast assembly having an upper end portion which is carried above and within a vertical projection of said windward hull;

rigging means for supporting said mast assembly;

elevated sail holding means on said upper end portion of said mast assembly for holding the upper portion of a sail;

lower sail holding means on the leeward side portion of said proa for holding the lower portion of a sail, and

sail hoisting means for hoisting a sail to extend between said elevated and lower sail holding means in such manner that the operative leading and trailing edges of said sail may be altered from one end of the vessel to the other so as to maintain said hulls in their windward and leeward placements.

In another aspect, there is provided a proa sailing vessel comprising:

a pair of spaced hulls comprising a windward hull and a leeward hull;

a cross beam assembly interconnecting the hulls;

a fixed mast assembly having its lower end supported on the cross beam intermediate the hulls and being inclined athwartship whereby its upper end is disposed substantially vertically above the windward hull;

rigging means for supporting the mast assembly and including a standing stay extending between the upper end portion of the mast assembly and the windward side of the proa and a pair of pivot stays extending from an elevated pivotable mounting on the upper end portion of the mast assembly to respective opposite ends of a first boom connected through a lower pivotable mounting disposed intermediate the respective opposite ends to the leeward side of the proa, whereby the pivot stays may be pivoted with the boom between respective opposite longitudinal positions at opposite sides of a pivot axis extending between the elevated and lower pivotable mountings and wherein one of the pivot stays constitutes a forestay along which a sail may be hoisted.

In a preferred form, the sailing vessel is provided with a pair of booms each suspended from respective pairs of pivot stays supported by respective pivot mounting and each connected by a respective one of a pair of longitudinal spacer lower pivot mountings to the leeward sides portion. Preferably, the forestay when disposed in either of the opposing longitudinal positions is inclined between 25 and 35 degrees from the vertical. In a further preferred feature, the sail is a soft sail and there is provided a second boom for maintaining luff and leech parts of the sail in their operative spaced relationship.

The sail assembly is preferably supported by an elevated pivotable mounted and a lower pivotable mounting whereby the sail assembly may be pivoted between respective opposing longitudinal positions at opposite sides of the pivot axis extending between the elevated and lower pivotable mountings, the mast assembly being support by the pivotable mounting. According to another preferred feature, the sail assembly includes a lower beam secured to the mast assembly and extending forwardly and rearwardly therefrom, a main sail supported by the mast assembly and the rearward extension of the beam, and a foresail supported by the mast assembly and the forward extension of the beam.

The sail assembly may be a wing sail but preferably the sail assembly includes a soft sail supported on a stay

assembly and/or mast or the like which extends from a lower attachment position on or adjacent said leeward hull to an elevated attachment position on a mast above the windward hull. The sail assembly may include a stay which may be constituted by or incorporated in the leading edge of a sail but preferably it is separate from the sail whereby the latter may be raised and lowered along or furled about the stay. Of course more than one mast may be used and more than one sail may be set from each mast.

The sail assembly may be adjustably inclined and preferably between twenty and forty-five degrees to the vertical. Of course the masthead or the mast or sail base could be outside the extremities of the vessel if desired. Suitably the sail arrangement is such that the sail may pivot about an inclined pivot axis to an opposed position to cause the vessel to pivot towards its new heading so that as the sail is sheeted in, the vessel will move off in the desired direction.

The line or axis interconnecting the sail attachment points preferably lies between the front and rear edges of the sail. Suitably this axis lies int he front one third of the sail such that latter in use is substantially balanced. For this purpose, the mast may be secured to a base beam which projects forwardly therefrom to support a headstay or sail and rearwardly to support the clew of the sail set from the mast and back stays for tensioning the luff or headstay. In this manner sail tension stresses are accommodated internally within the mast, base beam and backstays. In such assembly the upper end of the mast is supported by prop means which connects universally to the front of the mast above the forestay connection. The prop means may be stayed to enable controlled fore and aft movement of the upper end of the mast and it may be extendible or otherwise mounted to enable the inclination of the mast to be varied.

The base of the sail may be supported outside the extremities of a vertical projection of the water plane of the leeward hull. The centre of lift may be disposed to leeward of the lateral position of the vessels C.G. so that the lifting force provides a stabilizing moment which opposes the overturning moment caused by the horizontal component of the sail force. The mast may be inclined in the athwart plane whereby the staying angles for lateral stays to both sides of the vessel are sufficiently large to eliminate the need for mast/stay spreaders. The stay extending from the outermost side of the vessel to the elevated attachment point may be substantially vertical. Of course a conventionally stayed mast system could be used and the uppermost attachment point could be inboard of the outer extremities of the vessel.

In one form there is provided a central stay or member for supporting a central sail and longitudinally spaced stays or members for supporting respective headsails at opposite ends of the vessel. Either headsail may be employed as required and the central sail may pivot about the central stay for changing direction. Alternatively a single headsail could be swapped from end to end to suit the direction of travel of the vessel. For this purpose the sail could be in the form of a triangular sail or a spinnaker like sail set flying and adapted to be moved towards either end, such as in a so called "Taylor Rig".

Preferably however the sail assembly includes one or more sails each of which in use is set between upper and lower attachment points or pivots about which the sail may pivot for reversal. Such arrangement has the advantage that movement of the sail about its pivot axis to an opposed position causes the vessel to pivot towards its new heading so that as the sail is sheeted in, the vessel will move off in the desired direction. The line or axis interconnecting the sail attachment points preferably lies between the front and rear edges of the sail. Suitably this axis lies in the front one third of the sail such that the latter in use is substantially balanced.

A storm sail may be arranged so that athwartship component of the sail force vector acts through or adjacent the centre of gravity of the vessel so as to substantially reduce or eliminate the transverse overturning moment which may be created thereby. Of course the sail force may b e arranged to act through a point at either side of the centre of gravity of the vessel. This may be achieved by setting a sail from a lower point on a fixed mast rig or by increasing the inclination of a reefed sail on an adjustable mast rig.

This invention in a further aspect includes a steering system for a vessel including longitudinally spaced rudders each being freely rotatable about their steering axis so as to operatively align with the water flow there past and having control means such that they may be used to steer and/or trim the vessel. The operative leading rudder may be locked in a position in which it has a suitable angle of attack with the water flow to counteract imbalance caused by the sails or asymmetrical hulls and the trailing rudder may be used to steer the vessel or vice versa. Preferably, each rudder is mounted for selected pivotal movement about a longitudinal axis whereby each rudder may be pivoted to a selected inclined position. Both rudders may be used to steer the vessel and for this purpose they may be controlled by respective tillers or wheels supported adjacent one another. Alternatively, both rudders may be controlled for simultaneous actuation by a common steering wheel.

In a proa the rudders may be in either hull and a single rudder could be used, acting as a trailing rudder during motion in one direction and a leading rudder in the opposite direction of motion. Alternatively the rudder or rudders could be in the form of an adjustable trim board adapted to be raised or lowered or pivoted to achieve the desired balance on any selected heading.

Preferably in larger proas having accommodation, the windward hull is relatively large to provide the accommodation and the leeward hull is in the form of a stabilizing float or outrigger.

If desired the balancing forces created by the asymmetrical hull could be provided by suitable foils which could be asymmetrical if desired. The main hull could be in the form of a displacement or planing hull and the foils could be arranged to lift the outrigger from the water at a selected speed. The foils could be used to steer the vessel.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that this invention may e more·readily understood and put into practical effect, reference will now be made to a preferred embodiment of the invention illustrated in the accompanying drawings, wherein:

FIG. 1 is a diagrammatic end view of a conventional proa;

FIG. 2 is a diagrammatic end view of a proa made in accordance with one aspect of this invention;

FIG. 3 is a perspective view of a cruising proa according to this invention;

FIG. 4 is a perspective view of the proa illustrated in FIG. 3, and illustrating basic rigging details;

FIG. 5 illustrates the rudder configuration;

FIGS. 6 and 7 illustrate a trailerable embodiment of the invention, and

FIG. 8 illustrates another embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. 1 it will be seen that in a conventional proa **10** the sideways force from the sail assembly may be inclined at between twenty to forth degrees to the vertical of the vessel. Thus an overturning moment equal to F.La is produced in use. When acting clockwise this can be counterbalanced by the heavy main hull **12**. When acting anti-clockwise this can be counterbalanced only by the leverage exerted by the relatively light float **13**. Since the main hull **12** may be four or more times the weight of the float **13** it will be seen that it is important that the main hull **12** is maintained to windward for maximum stability.

In the proa **14** illustrated in FIG. **2** the same force F from the sails **15** acts in a direction inclined to the horizontal so that the overturning moment created thereby is reduced by the smaller leverage distance L from the centre of gravity. The ratio of L:La in this instance, for similar sails is approximately 2.5:1. Since the stability provided by the hulls is unchanged it will be seen that the force F necessary to capsize the proa **14** in either direction will be 2.5 times that necessary to capsize the conventional proa **10**. This is particularly significant for a capsizing moment in the anti-clockwise direction whereby the risk of capsizing the proa **14** in the anti-clockwise direction is greatly reduced. In addition "anti-clockwise" wind forces have a downward component which adds to the stability of the vessel.

If high winds are encountered a storm sail (shown in dotted outline at **16**) may be set on a lower stay **17**, or free if desired, such that the sail inclination is increased whereby its force Fs acts through the centre of gravity thereby producing no overturning moment due to wind pressure. If desired the storm sail **16** could be set with the outer sails which could be lowered during periods of strong winds or when sailing with the vessel unattended.

In the vessel **20** illustrated in FIGS. **3** and **4**, the working sails are inclined at thirty degrees to the vertical and comprise a pair of identical balanced triangular sails **22** each having their upper ends supported by masthead pivot mounting **38** on the mast **23** and their respective lower corners **24** and **25** supported adjustably in spaced apart relationship by a boom or batten **26** which is anchored pivotally to the outrigger **27** by pivot mountings **28** disposed at positions approximately one third back from the leading edge of each sail **22**.

The trailing ends **29** of the booms **26** are interconnected by a strut **30** and control ropes **31** lead from the strut **30** about blocks **32** at the respective opposite ends of the outrigger **27** to the cockpit **36** so that the sails may be trimmed and rotated through 180 degrees to enable the vessel **20** to sail in opposite directions of travel. For this purpose the aft line **31** is adjusted to pivot the sails to their operative positions.

Trim lines **33** may be connected between the leading ends of the booms **26** and the bridgedeck **34** (which connects the outrigger **27** to the main hull **35**) to prevent over rotation of the sails beyond their close-hauled positions. These trim lines **33** may be adjusted from the cockpit **36**. The luff of each sail **22** is banked to its respective forestay **37** both of which extend from their masthead pivot mounting **38** to the leading end **39** of the boom **26**. In use, the leech extends freely from the boom **26** to the masthead pivot mounting **38**. However, in use the leech will at all times be tensioned so that the sail is maintained in a selected airfoil shape irrespective of its pivotal location. The sails **22** may be raised, lowered and stowed in conventional manner as shown in FIG. **4**. The sails may be set on roller furling gear if desired. The lower part of the sails **22** may extend downwardly from the boom **26** to the pivot mountings **28** on the outrigger. Such sails may be set loose from the boom with the leading sail set outside the boom and the trailing sail set inside the boom. This will have the effect of producing a leading sail which will be fuller than the trailing sail.

As shown in FIG. **4**, each boom **265** is permanently suspended from the masthead pivot mounting **38** by the forestay **37** and a rear stay **40**. In this embodiment, the bridle has a short leading bar **41** and a longer trailing bar **42** whereby the boom may pivot about the respective axis **43** passing from the masthead pivot mount **28** to the outrigger pivot mount **28**. Each axis **43** is disposed intermediate the forestay and back stay and the luff and leech of the sails **22** and in the leading part of each sail **22**. The booms **26** are interconnected by the strut **30** for simultaneous pivotal movement. The strut **30** may be length adjustable if desired to enable the relative settings of the sails to be varied. The trim lines **33** may also be used for this purpose.

the control ropes **31** may pass to a common winch rotatable in either direction to pivot the sails in a corresponding direction. This winch may include a wheel activated rope drum which may be supported co-axially with a vessel steering wheel for ease of control of the vessel **8**. Alternatively the rope **31** may pass to separate winches. The clew **25** of one of the sails **22** may be attached to its boom **26** by a trip mechanism adapted to release when the sail is caught aback. In such situations release of one sail will halve the sail force. Wind force on the other sail will force the vessel back around to its correct alignment.

In the embodiment illustrated there are provided two rudders **46** and **47** disposed one at each end of the outrigger **27**. Each rudder is a freely rotatable balanced rudder which rotates through 180 degrees when the vessel **20** reverses. These rudders **46** and **47** may be steered from a common wheel or separate wheels. Each is provided with a foil **49** at its base. The rudders **46** and **47** are pivotable about inclined axes **50** as illustrated in FIG. **5**, and the blade of each foil **49** is inclined to its axis of rotation so that the angle of attack of the leading rudder is always greater than the trailing rudder. In use this lifts the bow of the outrigger **27** and stabilizes the stern. The stern rudder remains submerged from steering. The foil **49** also is of shallow form so that it will slide sideways through the water should the vessel be caught in strong winds with the outrigger **27** to windward. In such event, if the vessel begins to overturn, the sail will quickly approach a horizontal attitude and spill the wind therefrom. A lee-board or daggerboard **51** or the like may be positioned centrally on the outrigger **27**.

In lieu of the two sails illustrated a single balanced sail of the type described above could be used. This could be an asymmetrical sail which would be rotated about a central pivot point on the outrigger for reversing or it

could be a symmetrical sail having a boom mounted track connected by a traveller car to a central position of the float **14** whereby the pivot axis of the sail could be varied as desired, suitably by tensioning respective sheets connected to the lower corners of the said at opposite ends of the boom.

The trailerable vessel **80** illustrated in FIG. **6** and **7**, utilizes a single balanced sail **81** of the type described above which in use is inclined to windward from the crew supporting hull **82** whereby the small stabilizing hull **83** is maintained to windward. The leeward hull provides sufficient buoyancy to support the vessel when caught aback or just sufficient so that it will be initially depressed beneath the water until the wind is spilled from the sail whereupon it will resurface. This will prevent a capsize. The windward hull **83** can be provided with water ballast tanks if desired which may be filled to suit the prevailing conditions.

The base **84** of the sail **81** is supported on a side extension **85** of the hull **82** so that its centre of lift point **86** is to leeward of the vessel's centre of gravity C.G. **88** whereby the moment resulting from the vertical component **89** of the sail force **90** opposes the moment resulting from the horizontal component **91**.

The sail **81** is a battened sail and for this purpose the leading stay incorporates an aerodynamic foil **92** with a boltrope groove or the like for retaining the sail luff. The boom **93** is a wishbone boom with the rear thereof supported by a pair of spaced stays **87** at either side of the sail. The latter may be formed with a hollow luff to maintain correct sail shape when set form a sagging stay and the rear stays may be adjustable to selectively vary the sag in the forestay and luff foil or spar. The latter is also selectively and adjustably rotatable about its axis for optimum sail/foil shape. Alternatively, the foil may be rigged with diamond stays or the like in known manner which may be adjustable so that a selected forward bow or straightness may be maintained in the foil or spar.

The rudders **95** are supported at each end of the crew supporting hull **82** and are connected to separate tillers **96** which may be operated independently and locked so that the rear rudder can be used for steering and the front rudder trimmed, if desired, or locked in a straight ahead position. A central centreboard **98** is also provided. The cross beams are hinged at **99** so that they may break at the hinges to enable the hull **83** to move inwards to a position beside the hull **82** for trailing purposes. This arrangement enable all steering controls and the centreboard **98** to be positioned on the main hull **82** for convenient folding.

The vessel **100** illustrated in FIG. **8** utilises an internally stressed sail assembly **101** whereby stay tensions are reacted against the must **102** and the base beam **103** and thus do not induce high bending moments in the cross beams **104**. A relatively light vessel can therefore be given a relatively wide beam and a relatively tail sail assembly **101**. The mast **102** is supported by rigging which includes a prop **105** stayed by running stays **106** to enable to prop **105** and the mast **102** to be pivoted fore and aft.

The mast **102** is supported rotatably on the base beam **103** which is connected universally at **107** to the float **108**. A forestay **109** and opposed side stays **110** secure the mast to the base beam **103**. The prop **105** connects to the front of the mast above the stays **109** and **110** by a universal mounting **111**. The prop **105** is a telescopic strut which may be selectively extended or retracted to vary the inclination of the sails and thus maintain them at maximum driving inclination.

The float **108** is tubular and the end sections **112** are supported on central tubular stub axles **113** which pass through bearing tubes **114** fixed to the float **108** so that they may be rotated about a longitudinal axis **115** to pivot the end sections **112** and thus the steerable foils **116** about the axis **115**, as required. The rudders **116** are steered through right angle drive gearboxes **118** by steering controls **119** which pass through the hollow stub axles **113** and the cross beams **104** to the main hull **120**. Control cables also pass through the cross arms to the cockpit to enable the inclination of the rudders and thus there projected vertical area to be selectively varied.

In use, the centre of lateral resistance can be varied fore and aft by varying the relative inclinations of the rudders. For example, the leading rudder can be inclined at 45 degrees while the trailing rudder remains vertical. The latter can be used for steering and the leading rudder trimmed to lift the float **108** to counteract sail forces which tend to depress the leading end of the vessel **100**. The sail assembly **101** can also be trimmed fore and aft so that both leading and trailing rudders provide lift to windward. In this embodiment, the said assembly with the mast beam is pivoted about the axis extending between the mountings **107** and **111** to position the said assembly **101** for use in either direction and to spin the vessel from one windward heading to the other. Front and rear control lines **125** and **126** are provided for this purpose. The sails **127** and **128** may be adjusted in conventional manner.

A solid wing can also provide such benefits. Preferably the latter is pivoted from a base point aft of its leading edge so that the sail will be partially balanced to reduce control forces. Furthermore the sail assemblies described above can be pivoted so as to be overbalanced if desired.

Other vessels provided with a centrally disposed mast could also utilize the sails of this invention. For example on a catamaran a storm sail could be set between a float and a suitable position on the central mast. Alternatively the vessel could be provided with respective sets of sails set on inclined stays or spars at each side for use on respective tacks. Furthermore the balance sail assemblies described herein could be used advantageously on a conventional proa or other sailing vessel with upright sails by utilizing a bipod mast assembly with the balanced sail set between the legs of the mast assembly and such configurations are embraced by this invention.

Of course it will be realised that the above has been given only by way of illustrative examples of the present invention and that all such modifications and variations thereto as would be apparent to persons skilled in the art are deemed to fall within the broad scope and ambit of this invention as is defined in the appended claims.

I claim:

1. A proa sailing vessel comprising:

a pair of spaced hulls comprising a windward hull and a leeward hull;

a cross beam assembly interconnecting said hulls;

a fixed mast assembly having its lower end supported on said cross beam intermediate said hulls and being inclined athwartship whereby its upper end is disposed substantially vertically above said windward hull;

rigging means for supporting said mast assembly and including a standing stay extending between the upper end portion of said mast assembly and the windward side of said proa and a pair of pivot stays extending from an elevated pivotable mounting on said upper end portion of said mast assembly to respective opposite ends of a first boom connected through a lower pivotable mountings disposed intermediate said respective opposite ends to the leeward side of said proa, whereby said pivot stays may be pivoted with said boom between respective opposing longitudinal positions at opposite sides of a pivot axis extending between said elevated and lower pivotable mountings and wherein one said pivot stay constitutes a forestay along which a sail may be hoisted.

2. A proa sailing vessel according to claim 1, wherein said pivot axis is disposed closer to said forestay than to the other said pivot stay.

3. A sailing vessel according to claim 2, wherein there are provided a pair of said booms each suspended from respective said pairs of pivot stays supported by respective pivot mountings and each connected by a respective one of a pair of longitudinal spaced lower pivot mountings to said leeward side of said proa.

4. A proa sailing vessel according to claim 2, wherein said sail is a soft sail and there is provided a second boom for maintaining luff and leech parts of said sail in their operative spaced relationship.

5. A proa sailing vessel according to claim 1, wherein said forestay when disposed in either said opposing longitudinal positions is inclined at between twenty-five and thirty-five degrees from the vertical.

6. A proa sailing vessel comprising:

a pair of spaced hulls comprising a windward hull and a leeward hull each having underwater sections which are substantially symmetrical about a transverse centerline;

a crossbeam assembly interconnecting said hulls;

a mast assembly having an upper end portion which is carried above and within a vertical projection of said windward hull;

rigging means for supporting said mast assembly;

elevated sail holding means on said upper end portion of said mast assembly for holding the upper portion of a sail;

lower sail holding means on the leeward side portion of said proa for holding the lower portion of a sail;

said hoisting means for hoisting a sail to extend between said elevated and lower sail holding means in such manner that the operative leading and trailing edges of said sail may be altered from one end of the vessel to the other so as to maintain said hulls in their windward and leeward placements, and

a sail assembly supported by an elevated pivotable mounting and a lower pivotable mounting whereby said sail assembly may be pivoted between respective opposing longitudinal positions at opposite sides of a pivot axis extending between said elevated and lower pivotable mountings;

wherein said mast assembly is supported by a fixed mast assembly having rigging means for supporting said mast assembly and includes a standing stay extending between the upper end portion of said mast assembly and the windward side of said proa and a pair of pivot stays extending from said elevated pivot mounting disposed on the upper end portion of said mast assembly to respective opposite ends of a boom connected through said lower pivot mounting to the leeward side of said proa, whereby said pivot stays may be pivoted with said boom between respective oppositing longitudinal positions at opposite sides of a pivot axis extending between said elevated and lower pivot mountings and wherein one said pivot stay constitutes a forestay along which a sail of said sail assembly may be hoisted.

7. A proa sailing vessel as claimed in claim 6, wherein said leeward hull is provided with a steerable rudder at each end thereof and wherein each said rudder is selectively pivotable about a longitudinal axis whereby the projected vertical area thereof may be varied.

8. A proa sailing vessel comprising:

a pair of spaced hulls comprising a windward hull and a leeward hull each having underwater sections which are substantially symmetrical about a transverse centerline;

a crossbeam assembly interconnecting said hulls;

a mast assembly having an upper end portion which is carried above and within a vertical projection of said windward hull;

rigging means for supporting said mast assembly;

elevated sail holding means on said upper end portion of said mast assembly for holding the upper portion of a sail;

lower sail holding means on the leeward side portion of said proa for holding the lower portion of a sail;

said hoisting means for hoisting a sail to extend between said elevated and lower sail holding means in such manner that the operative leading and trailing edges of said sail may be altered from one end of the vessel to the other so as to maintain said hulls in their windward and leeward placements, and

a sail assembly supported by an elevated pivotable mounting and a lower pivotable mounting whereby said sail assembly may be pivoted between respective opposing longitudinal positions at opposite sides of a pivot axis extending between said elevated and lower pivotable mountings;

wherein said mast assembly is supported by said pivotable mountings and said sail assembly includes:

a lower beam secured to said mast assembly and extending forwardly and rearwardly therefrom;

a mainsail supported by said mast assembly and the rearward extension of said beam, and

a foresail supported by said mast assembly and the forward extension of said beam.

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