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(54) **PLEASURE CRAFT**

FREIZEITWASSERFAHRZEUG

EMBARCATION DE PLAISANCE

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(56) References cited:
EP-A- 0 004 796
DE-A- 2 508 377
DE-A- 2 541 401
DE-U- 9 402 044
FR-A- 1 179 619
US-A- 3 691 976

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Description

Technical field

[0001] The present invention relates to a pleasure craft, i.e. to floating craft generally used for the purposes of sport or leisure, such as sailing dinghies, light multihulls and windsurfing boards.

Background art

[0002] A problem of known pleasure craft is that they require some skill and physical fitness from their user. In fact, known dinghies, multihulls and sailboards are subject to capsizing, even under medium or light wind conditions, if the crew is not skilled enough. In the case of multihulls, these crafts are also subject to cart wheeling, i.e. to capsize forward, thus posing a safety problem.

[0003] This is even more true for sailboards. In fact, as is known, there is a substantial difference between sailing dinghies and windsurfing boards, given the different levels of effort, skill and physical fitness required to sail these craft, even at non-competitive level. It is obvious how physically more tiring it is to sail a sailboard compared to a dinghy in optimum sea and weather conditions.

[0004] Another problem of known craft is that, except for sailboards, they are not easily dismantled and transported.

[0005] EP-A-0004796, dated 11.04.79, discloses a multi-hull craft having one bow hull and two, parallel, stern hulls connected by a frame. The hulls, that are inflatable, are provided with fins to control direction of the craft and the bow hull is acting as the rudder, being movable for steerage of the craft. The hulls can be removed and road wheels can be mounted at their place: the frame structure of the craft reflects its being substantially designed as a "land yacht" having the same motion on solid ground as in the water and results in a poor behaviour of the craft in water. In fact, in order to steer the craft, the bow hull is positioned transversal to the forward direction of the craft, thus generating a resistance to said forward movement.

Disclosure of the invention

[0006] The present invention aims to solve the above problems by providing a pleasure boat that is very stable and safe, that is easy to sail, from a seated position, in view of the reduced effort, physical ability and technique required, and that at the same time is able to reach high speeds and to glide easily.

[0007] A further aim of the invention is to provide a boat that is easily dismantled and transported on a car.

Disclosure of the invention

[0008] These aims are achieved by the present invention which relates to a pleasure craft according to Claim 1.

[0009] In a preferred embodiment, the craft according to the invention is in the form of a sailboat and comprises a mast, mainsail and (if necessary) a jib mounted on a frame which also supports the crew.

[0010] According to another preferred aspect of the invention, the frame comprises three arms joined to each other at one end by a common joint and having a means of flotation at their free ends, which gives the structure of the craft flexibility characteristics similar to a leaf-spring.

[0011] According to a further preferred aspect of the invention, the means of flotation are inflatable elements which are attached to the free ends of the arms by means of a support with rigid coupling.

[0012] The craft according to the present invention offers a number of advantages over boats known at present.

[0013] Similar to sailing dinghies and motor-boats, the presence of a means of housing the crew (which in a dinghy comprises the hull) allows the crew to control the craft from a sitting position and concentrate on the sailing instead of thinking about keeping their feet on the board (as is the case with windsurfers). Furthermore, compared to light dinghies or boats with moving centreboards (i.e. without fixed ballast or bulb keels) the crew stay in the same position in all points of sailing, even closehauled. The righting moment which opposes heeling when sailing close to the wind is assured by the position of the centre of gravity of the seated crew with respect to the roll-axis of the craft, while in a dinghy it is necessary to change position in the boat - hiking out or using a trapeze where necessary.

[0014] Furthermore, the springiness of the frame and the presence of inflatable means of floatation result in a damping effect of the stresses to which the craft is subject. The floating means and the frame flex elastically to absorb the ripples of small waves, thus dissipating the impact energy of the waves (heaving motion - vertical oscillation) and enabling the craft to go faster and be more stable while ensuring increased comfort for the crew.

[0015] Thanks to the springiness of the overall structure, that also absorbs the pitching and rolling due to sudden squalls, and to the position of the crew, located centrally to the rear arms, the craft according to the present invention always keeps a stable and substantially flat position. In this way, the craft is more stable and the crew can devote more time to the sailing manoeuvres.

[0016] A further advantage is that the craft is easily assembled and dismantled and, once dismantled, can be easily transported, e.g. on the roof of a car. The use of inflatable floating means is particularly useful to this

purpose.

[0017] Another advantage is the reduced cost of the craft, which can be made from materials already known in the nautical field and these materials do not call for specialized or expensive construction techniques.

Best mode for carrying out the invention

[0018] The invention will now be described in greater detail with reference to the attached drawings which are by way of example and not limiting and in which:

- fig.1 is a schematic side view of an embodiment of the invention;
- fig.2 is a top view of the embodiment shown in fig.1;
- fig.3 is a partial side view of an enlargement of the area where the frame elements are interconnected;
- fig.4 is a plan view of the same area shown in fig.3;
- fig.5 is an enlargement of the attachment point of a float to the frame;
- fig. 6 is a perspective view of the embodiment of figures 1 and 2; and
- fig. 7 is a top view of another embodiment of the invention.

[0019] The craft 1 according to the present invention does not have a traditional hull to house the crew, and comprises a frame 2 formed of tubular elements on which are mounted three or more means of floatation 6, a means of propulsion of the craft (e.g. the sail 4 or a motorized form of propulsion), a means of controlling the direction of the craft (rudder 17 and keel 14) and a means of housing the crew and passenger(s).

[0020] Preferably, the craft of the invention is driven by sail and the figures show embodiments of this type. Thus, the craft of the drawings comprises a mast 3 with a mainsail 4 and boom 5 mounted on the frame 2 to which are attached the floats 6.

[0021] As can be better seen from fig.2, the frame 2 comprises four arms 7 - 10, interconnected by a common cross element or joint 11 to which the mast 3 is attached. The arms are made of a material that is suitable for nautical use: such materials are known in the art and comprise the various aluminium-based alloys used for the construction of masts. Arms 7-9 are provided at their ends with floating means 6 and arm 10 is provided with means to support the crew.

[0022] Arms 7-9 flex elastically i.e. they react jointly as a leaf-spring which reacts to bending-torsional stress, absorbing the stresses to which the craft is subject in use, in particular in rough seas, so as to maintain the craft in a substantially flat position.

[0023] The arms 7-10 are inserted into corresponding housings of the common element 11 and are kept into place by any suitable means. Preferably, such means comprises a plurality of tension wires.

[0024] In the shown embodiment, three tension wires 26-28 are connecting (see fig. 2) to each other arms 7-9 in a plane. Further tension wires are provided under the cross element 11. Namely, a rod 31 is vertically mounted on the lower face of element 11 and from its end tension wire 22 (a double wire, as shown in fig. 6) is extending to both lateral sides of arm 7 and is fixed thereto in correspondence of the area where shrouds and forestay are fixed. Similarly, wire 25 extends to arm 8 and a corresponding wire 25' (not shown) extends from rod 31 to arm 9.

[0025] Shrouds made of three wires, 23, 24 and 30, are provided on each side of the craft, wire 30 being attached to mast 3 and wires 23 and 24 being connected to wire 30 and to arms 7 and 8, respectively. The same arrangement is provided on the other side of the craft to connect arm 9 also. The main task of these arrangements is to give enough room to boom 5 to swing.

[0026] Arms 7-10 and cross element 11 are also provided with means to torsionally block them, i.e. to avoid rotation of the arms within their seats in element 11. Such blocking means are preferably formed by keys such as those shown with reference 32 in figures 3 and 4. It should be noticed that the use of tension wires and keys to block longitudinally and torsionally arms 7-10 with respect to common cross element 11 provides an easy to assemble structure and avoids localization of stresses on a single point of the elastic arms.

[0027] The means of flotation are attached to the ends of the arms 7 - 9 and are shorter in length than the frame, unlike those of a catamaran; in fact, their sole function is flotation and they are physically and functionally distinct from the means of directional control of the craft, 14 and 17 or 17', unlike crafts known to the art, where the hull coincides with the means of flotation and also has a more or less directional function.

[0028] In particular, the means of flotation 6 are so shaped that their cross-section perpendicular with respect to the centreline of the craft is circular, elliptical or lenticular. By centreline is meant the projection on the horizontal plane of the arm 7 and its corresponding arm 10. The preferred shape of the float is a boat, torpedo or airship form: in particular, the shape could be defined geometrically as two ogives joined at their greater base with the front ogive slightly elongated. However, other forms, such as ellipsoids, can also be used.

[0029] As can be seen in fig.1 the rear arms 8 and 9 (rear with respect to the normal direction of movement of the craft indicated by the arrow F) are angled with respect to arm 7 while arm 10 is substantially coaxial with arm 7. The angles between the various arms may be expressed by referring to the projection of arm 8 on the plane of vertical symmetry (i.e. the plane in which arms 7 and 10 and the mast 3 lie). The preferred but not limiting angle (α) between the projection of arm 8 and the axis of arm 10 (fig.1) is in the order of 15°. Similarly, the angle β between arms 7 and 8 in projection onto the horizontal plane (see fig.2) is preferably 138°. The angle between the arms 7 and 9 is equal to angle β. The arm 10 is in line with the bisector of the angle between arms

8 and 9. Frame 2 thus has a substantially "Y" shape.

[0030] Three floats 6 are mounted on the ends of arms 7-9 in this embodiment, while the means of housing 12 - comprising a frame structure supporting a pair of seats 13 (figs. 3 and 4) - for the crew is mounted on the arm 10 behind the mast 3, along the centreline of the craft. The means of housing 12 is thus in a fixed position with respect to the frame 2 and symmetrical with the centreline of the craft, which runs through the coaxial arms 7 and 10.

[0031] The directional control of the craft is via one rudder 17 in the embodiment shown in fig. 1, 2 and 6. The rudder is mounted centrally on a tubular element 20, connecting the two rear arms 8 and 9, and is actuated by a tiller 15 and a pushrod 16 in a way known per se in the art. Two tension wires 29 are connecting the rudder area of tube 20 to arms 8 and 9 against flexion. Tubular element 20 also acts as means to improve rigidity of the structure and to distribute loads between arms 8 and 9.

[0032] Fig. 7 shows a preferred embodiment wherein there are provided two rudders 17' mounted on tubular element 20, actuated by a tiller 15 and pushrod 16'. Beside rudders 17 or 17', directional means comprises a fin keel 14 fitted in the area of joint 11. In an alternative embodiment (not shown) a single rudder is mounted on the arm 7 of the frame 2 forward of the keel 14.

[0033] Rudders 17 or 17' and keel 14 are tiltable and are easily operated by the crew from their seats.

[0034] As mentioned above, the floating means 6 are attached to the ends of the arms 7, 8 and 9. These floats are of the inflatable type, made of a material such as that normally used for inflatable dinghies, preferably provided with one or more air chambers fitted with inflation valves 18. Rigid elements (ribs or stiffeners) may be provided, preferably applied internally, to shape and reinforce the floats. The embodiments shown in the drawings are provided with internal rigid elements on the prow of the floatation means 6 to give the prow end a flat blade shape, with a double bend, longitudinally to float 6.

[0035] The attachment means connecting the arms 7-9 to the floating means 6 comprises a union 19 and an extended portion, or *palpebra,* 21, that are made in a single piece. Suitable materials are reinforced plastic, e.g. fiber glass reinforced plastic, that are substantially rigid. Namely, rigidity of these materials is intermediate between rigidity of the floats 6 and rigidity of the material of arms 7-9. Thus stresses are transmitted from floats to the arms through elements having increasing rigidity.

[0036] Portion 21 extends troughout the upper side of inflatable float 6 to stiffen it and distribute the load; as shown, portion 21 extends more to the prow than to the stern of the float 6 and is sealed to it in a way known per se in the art.

[0037] In the shown embodiments, the size of the float is such that the weight of water displaced by the completely submerged float is about 1.5 times the weight of the fully loaded craft (i.e. of the craft and the crew).

[0038] Similarly to arms and cross element 11, also floating means 6 are longitudinally and torsionally blocked on arms 7-9. Longitudinally blocking means are comprising tension wires 33, and torsionally blocking means are comprising keys 34 analogous to keys 32 previously discussed with reference to common element 11. As above, these features provide easy assembling of the structure and avoid localization of stresses in a single point.

[0039] It should be noticed that the use of inflatable floating means is strictly related to the characteristics of frame 2. In fact, frame 2 permits to the craft to remain always in a substantially plane condition, thus avoiding substantial deformation of the inflatable floats 6.

Claims

1. A craft (1), comprising means of directional control (14, 17, 17'), three or more means of flotation (6) mounted on a frame (2) which supports means of propulsion (4), and means (12) of housing the crew, the said means of flotation being substantially circular, elliptical or lenticular in cross-section with respect to the centreline of the craft, characterized in that said frame (2) comprises three or more arms (7-9) interconnected by a common element and provided with said flotation means (6) and in that said means of directional control are physically and functionally separate from said means of flotation and comprises a fin (14) located on said frame (2).

2. A craft according to Claim 1, wherein said means of flotation (6) are comprised of inflatable elements.

3. A craft according to Claim 1 or 2, wherein said means of flotation (6) has a hull shape with raised bows and lowered stern, comprising two ogive extremities joined on their greater base with the forward ogive being more elongated.

4. A craft according to Claims 1 to 3, wherein said means of flotation (6) are comprising substantially rigid elements (19, 21) to detachably connect them to said frame (2).

5. A craft according to any previous claim, wherein said frame (2) is at least in part elastically flexible and is reacting elastically overall as a leaf-spring.

6. A craft according to any claim 1 to 5, further comprising means (22, 25-28, 32-34) to longitudinally and torsionally blocking said arms (7-9) on said common element (11) and said floating means (6) on said arms (7-9).

7. A craft according to claim 6, wherein said blocking

means are comprising tension wires (22, 25-28, 33) and keys (32, 34).

8. A craft according to any previous claim, further comprising a mast (3) and sail (4) located on said common element.

9. A craft according to claim 8, comprising means of housing the crew (12,13), mounted behind the said mast (3) and along the centreline of the craft.

10. A craft according to any previous claim, wherein said means of directional control comprises two rear rudders (17').

11. A craft according to any of the Claims 1 to 10, comprising three arms (7-9) supporting the said means of flotation (6) and a rear arm (10) to support the means of housing the crew (12, 13).

12. A craft according to claim 11, further comprising a tubular element (20) connecting two of said arms (8, 9) supporting said floating means (6).

13. A craft according to any previous claim, wherein rigid elements or ribs are provided internally to said floating means (6).

14. A craft according to any previous claim wherein said fin (14) is located in the area of said common element (11).

Patentansprüche

1. Wasserfahrzeug (1), umfassend Richtungssteuerungsmittel (14, 17, 17'), drei oder mehr Schwimmelemente (6), die an einem Rahmen (2) befestigt sind, der Antriebsmittel (4) trägt, und Mittel (12) zum Aufnehmen der Schiffsmannschaft, wobei die Schwimmelemente im Querschnitt in bezug auf die Mittellinie des Wasserfahrzeuges im wesentlichen rund, elliptisch oder lentikular sind, gekennzeichnet dadurch, daß der Rahmen (2) drei oder mehr Arme (7 - 9) umfaßt, die durch ein gemeinsames Element miteinander verbunden und mit den Schwimmelementen (6) versehen sind, und daß das Richtungssteuerungsmittel körperlich und funktionell von den Schwimmelementen getrennt ist und eine Finne (14) umfaßt, die am Rahmen (2) angeordnet ist.

2. Wasserfahrzeug gemäß Anspruch 1 , bei dem die Schwimmelemente (6) aus aufblasbaren Elementen bestehen.

3. Wasserfahrzeug gemäß Anspruch 1 oder 2, bei dem die Schwimmelemente (6) die Form eines Schiffskörpers mit erhöhtem Bug und abgesenktem Heck haben, das zwei spitzbogige Ränder umfaßt, die an ihrer größeren Basis mit dem vorderen Spitzbogen verbunden sind, der länglicher ist.

4. Wasserfahrzeug gemäß den Ansprüchen 1 bis 3, bei dem die Schwimmelemente (6) im wesentlichen starre Elemente (19, 21) zum lösbaren Verbinden mit dem Rahmen (2) umfassen.

5. Wasserfahrzeug gemäß einem der vorhergehenden Ansprüche, bei der der Rahmen (2) mindestens teilweise elastisch anpassungsfähig und insgesamt elastisch wie eine Blattfeder reagiert.

6. Wasserfahrzeug gemäß einem der Ansprüche 1 bis 5, das außerdem Mittel (22, 25 - 28, 32 - 34) zum längs- und drehsteifen Arretieren der Arme (7 - 9) an dem gemeinsamen Element (11) und der Schwimmelemente (6) an den Armen (7 - 9) umfaßt.

7. Wasserfahrzeug gemäß Anspruch 6, bei dem die Arretiermittel aus Spanndrähten (22, 25 - 28, 33) und Federn (32, 34) bestehen.

8. Wasserfahrzeug gemäß einem der vorhergehenden Ansprüche, das außerdem einen Mast (3) und ein an dem gemeinsamen Element angeordnetes Segel (4) umfaßt.

9. Wasserfahrzeug gemäß Anspruch 8, das außerdem Mittel zum Aufnehmen der Schiffsmannschaft (12, 13) umfaßt, die hinter dem Mast (3) und entlang der Mittellinie des Wasserfahrzeuges befestigt sind.

10. Wasserfahrzeug gemäß einem der vorhergehenden Ansprüche, bei dem das Richtungssteuerungsmittel zwei hintere Ruder (17') umfaßt.

11. Wasserfahrzeug gemäß einem der Ansprüche 1 bis 10, umfassend drei Arme (7 - 9), die die Schwimmelemente (6) tragen und einen hinteren Arm (10) zum Tragen des Gehäuseelementes der Schiffsmannschaft (12, 13).

12. Wasserfahrzeug gemäß Anspruch 11, das außerdem ein rohrförmiges Element (20) umfaßt, das zwei der Arme (8, 9) verbindet, die die Schwimmelemente (6) tragen.

13. Wasserfahrzeug gemäß einem der vorhergehenden Ansprüche, bei dem die starren Elemente oder Rippen innerhalb der Schwimmelemente (6) vorgesehen sind.

14. Wasserfahrzeug gemäß einem der vorhergehenden Ansprüche, bei dem die Finne (14) im Bereich des gemeinsamen Elementes (11) angeordnet ist.

Revendications

1. Embarcation (1), comprenant des moyens de commande de direction (14,17,17'), trois éléments de flottaison (6) ou plus montés sur une ossature (2) qui supporte des moyens de propulsion (4), et des moyens (12) de logement de l'équipage, lesdits éléments de flottaison étant sensiblement circulaires, elliptiques ou lenticulaires en section transversale par rapport à l'axe central de l'embarcation, caractérisée en ce que ladite ossature (2) comprend trois bras (7-9) ou plus , interconnectés par un élément commun et pourvus desdits éléments de flottaison (6), et en ce que lesdits moyens de commande de direction sont physiquement et fonctionnellement séparés desdits éléments de flottaison et comprennent une dérive (14) placée sur ladite ossature (2).

2. Embarcation selon la revendication 1, dans laquelle lesdits éléments de flottaison (6) sont constitués par des éléments gonflables.

3. Embarcation selon la revendication 1 ou 2, dans laquelle lesdits éléments de flottaison (6) ont une forme de coque à avant relevé et arrière abaissé, comportant deux extrémités en ogive reliées à l'endroit de leur plus grande base, l'ogive avant étant plus allongée.

4. Embarcation selon les revendications 1 à 3, dans laquelle lesdits éléments de flottaison (6) comportent des éléments sensiblement rigides (19,21) pour les fixer de façon démontable à ladite ossature (2).

5. Embarcation selon une quelconque des revendications précédentes, dans laquelle ladite ossature (2) est au moins en partie élastiquement flexible et elle réagit élastiquement dans son ensemble comme un ressort à lame.

6. Embarcation selon une quelconque des revendications 1 à 5, comprenant en outre des moyens (22,25-28, 32-34) pour bloquer longitudinalement et en torsion les dits bras (7-9) sur ledit élément commun (11) et lesdits éléments de flottaison (6) sur lesdits bras (7-9).

7. Embarcation selon la revendication 6, dans laquelle lesdits moyens de blocage comprennent des câbles de tension (22,25-28,33) et des clavettes (32,34).

8. Embarcation selon une quelconque des revendications précédentes, comprenant en outre un mât (3) et une voile (4) placés sur ledit élément commun.

9. Embarcation selon la revendication 8, comprenant des moyens de logement de l'équipage (12,13), montés derrière ledit mât (3) et le long de l'axe central de l'embarcation.

10. Embarcation selon une quelconque des revendications précédentes, dans laquelle lesdits moyens de commande de direction comprennent deux gouvernails arrière (17').

11. Embarcation selon une quelconque des revendications 1 à 10, comprenant trois bras (7-9) qui supportent lesdits éléments de flottaison (6) et un bras arrière (10) qui supporte les moyens de logement de l'équipage (12,13).

12. Embarcation selon une quelconque des revendications 11, comprenant en outre un élément tubulaire (20) reliant deux desdits bras (8,9) qui supportent les dits éléments de flottaison (6).

13. Embarcation selon une quelconque des revendications précédentes, dans laquelle des nervures ou des éléments rigides sont prévus à l'intérieur desdits éléments de flottaison (6).

14. Embarcation selon une quelconque des revendications précédentes, dans laquelle ledit aileron (14) est situé dans la région dudit élément commun (11).

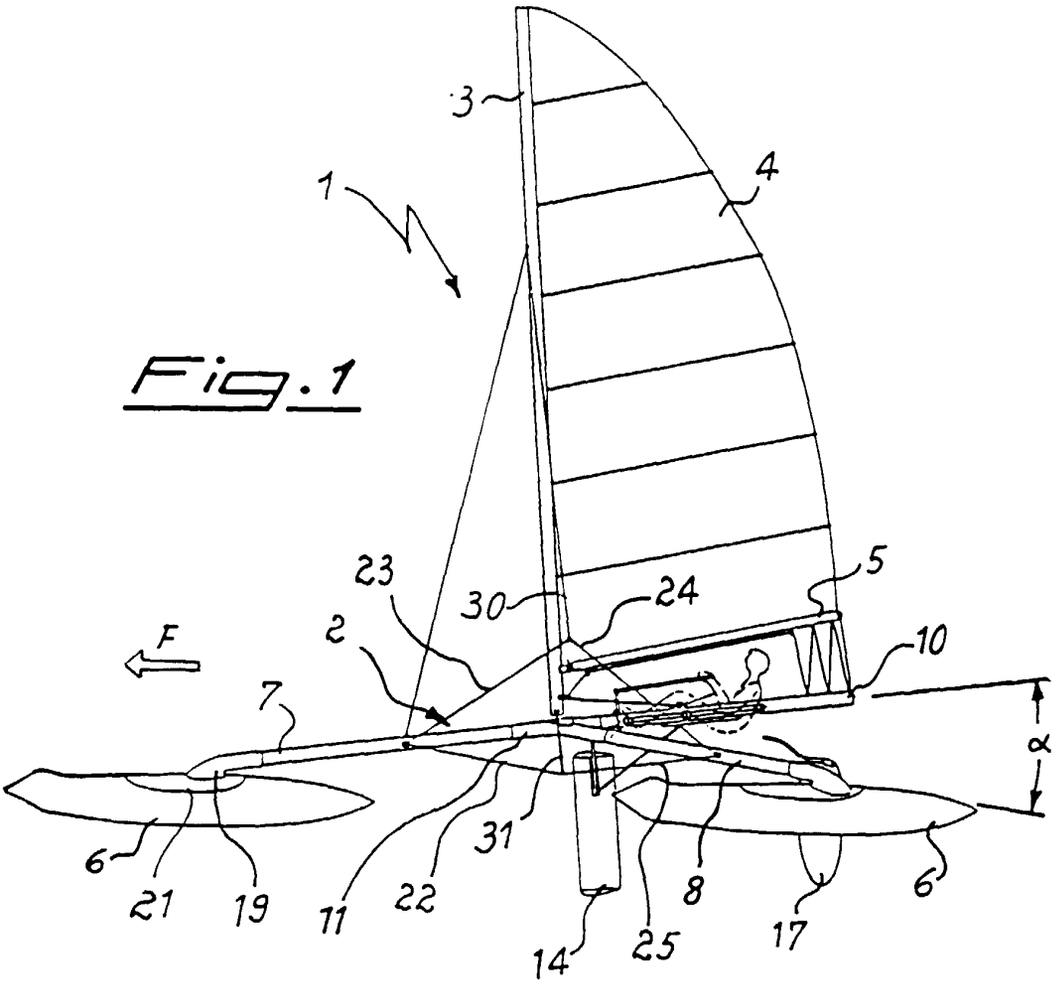
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Fig.1

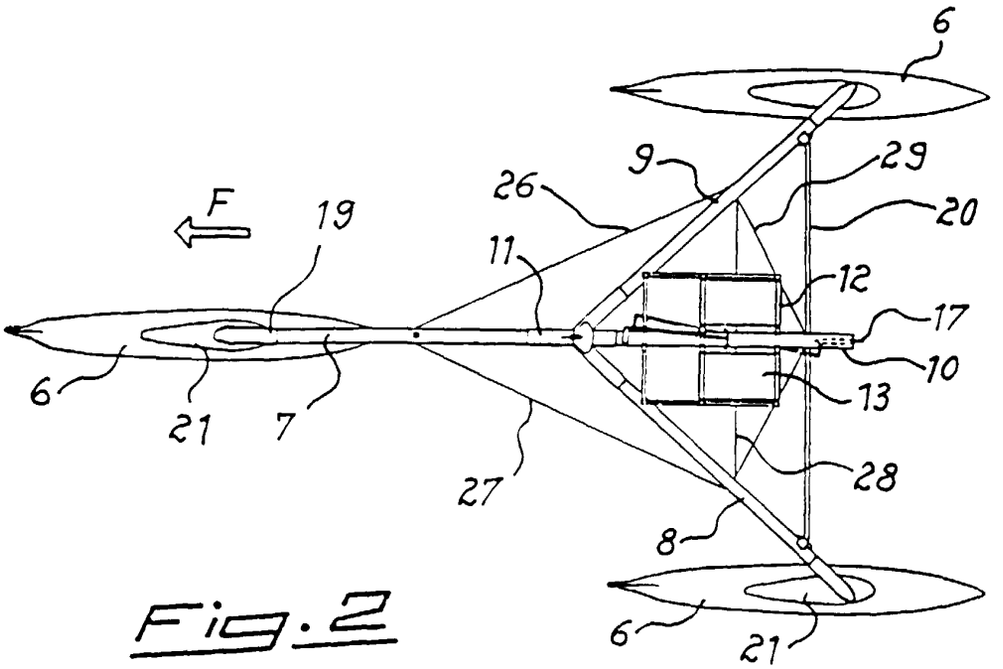
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Fig.2

Fig.3

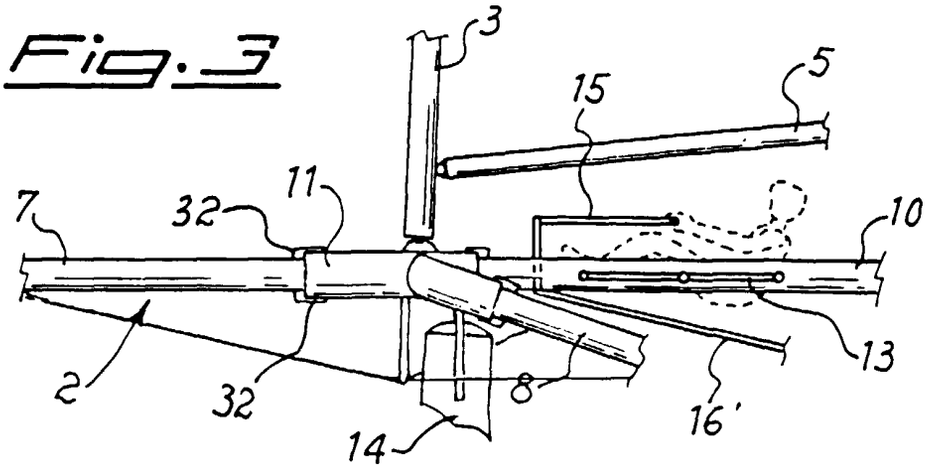
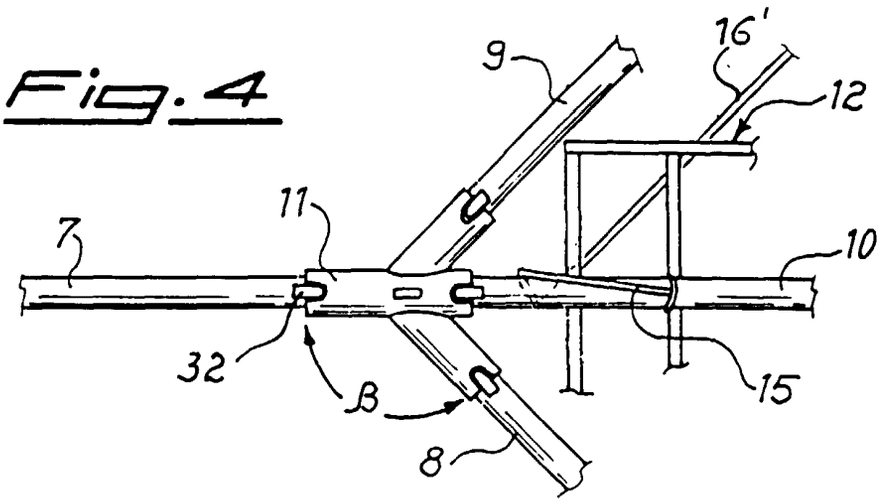


Fig.4



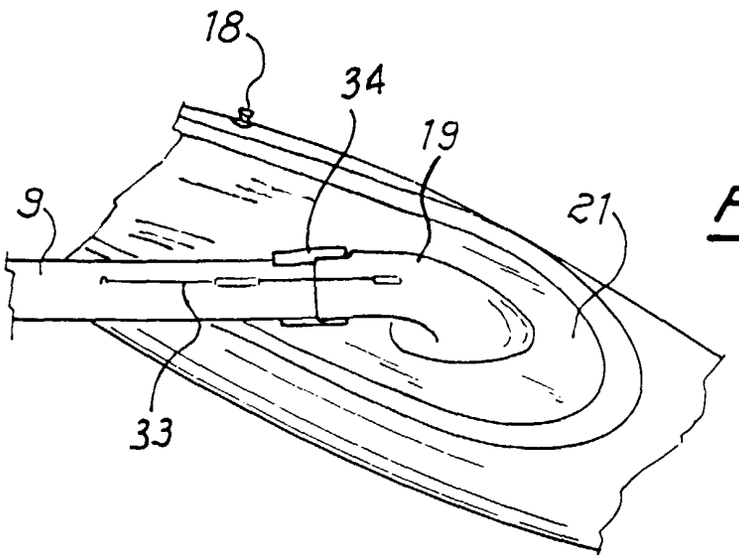


Fig.5

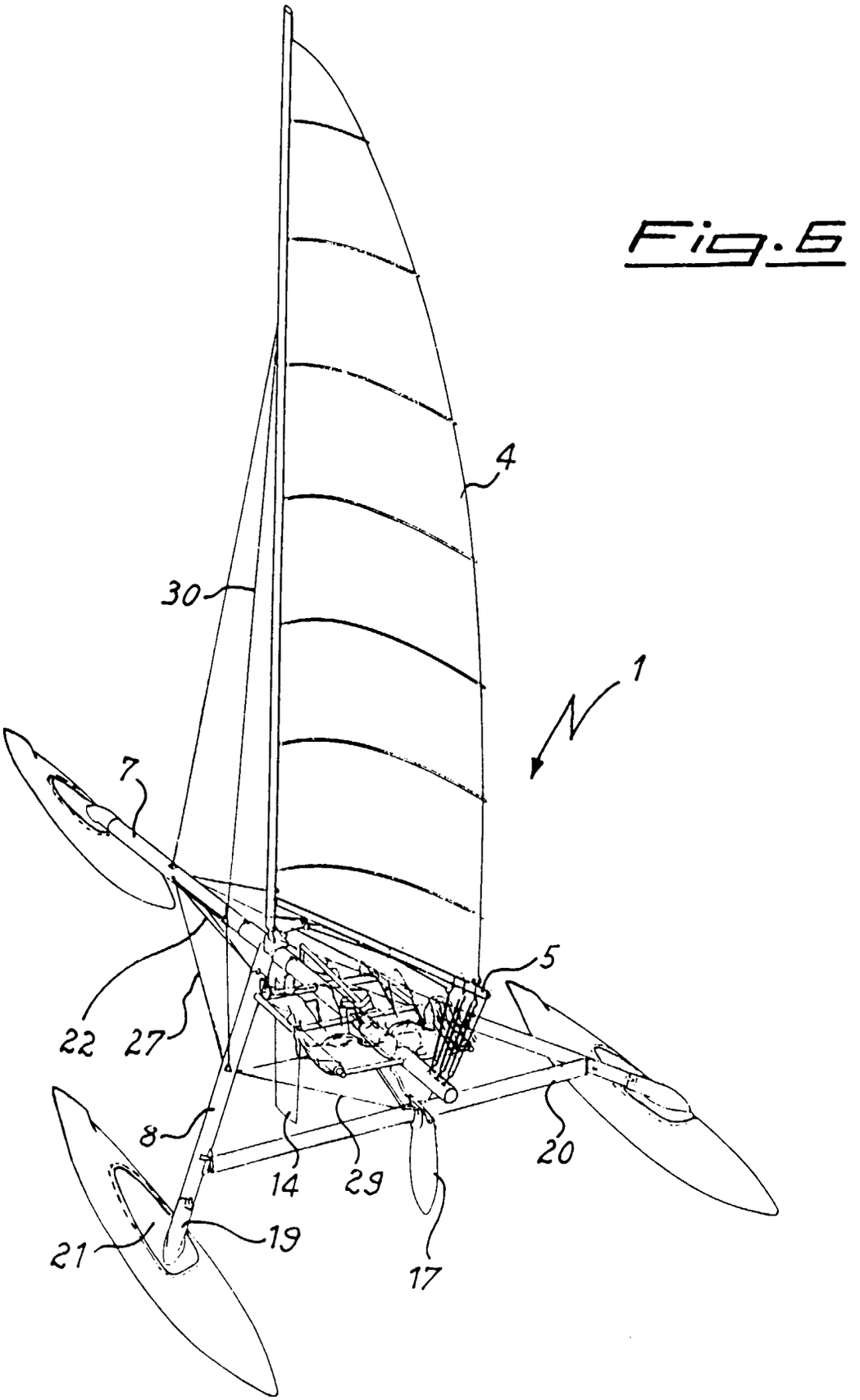


Fig.6

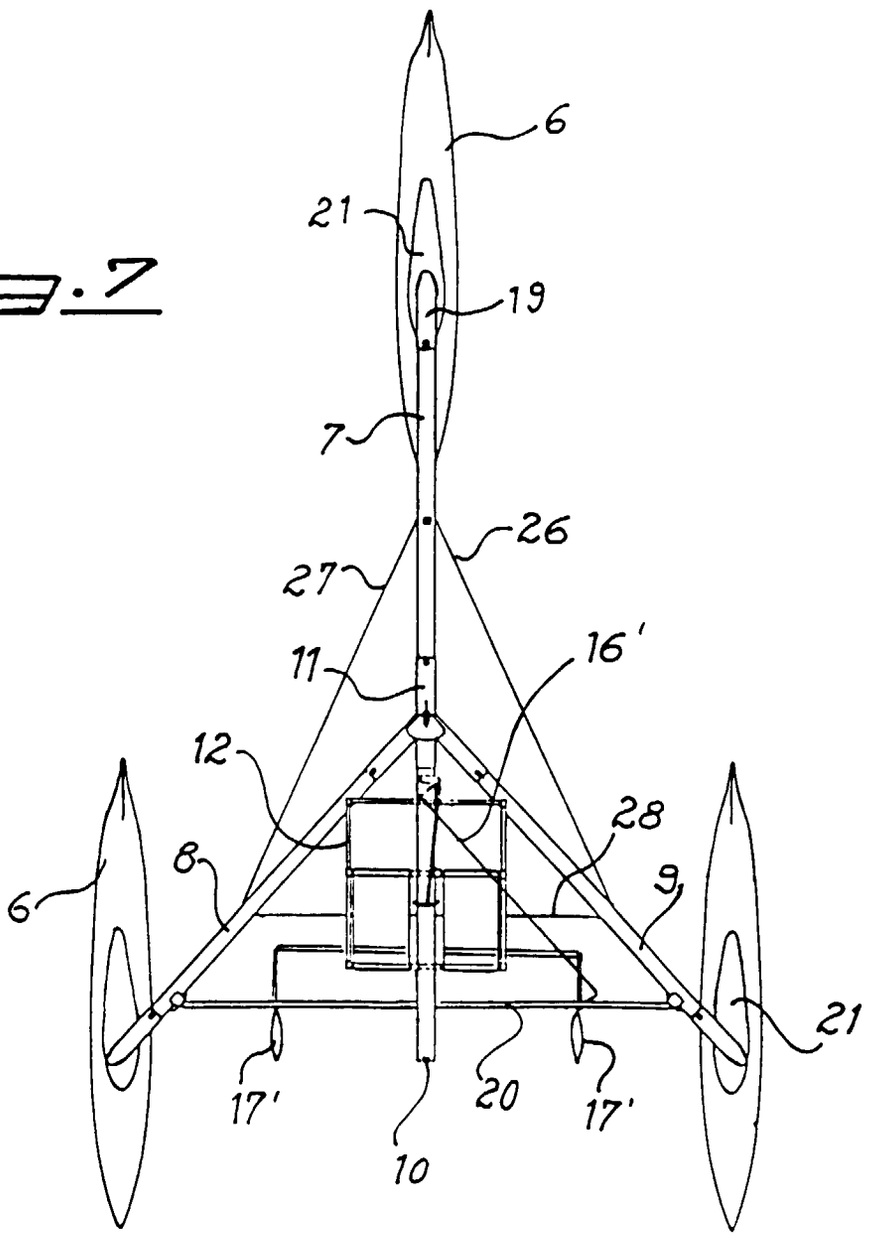



Fig.7