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(54) **MODULAR CATAMARAN**

(57) Catamaran comprising: two parallel hulls; a bridge connecting the two hulls; wherein the catamaran is configurable between the following driving configurations: a sailing configuration in which the catamaran is driven by sailing and a rowing configuration in which the catamaran is driven by rowing.

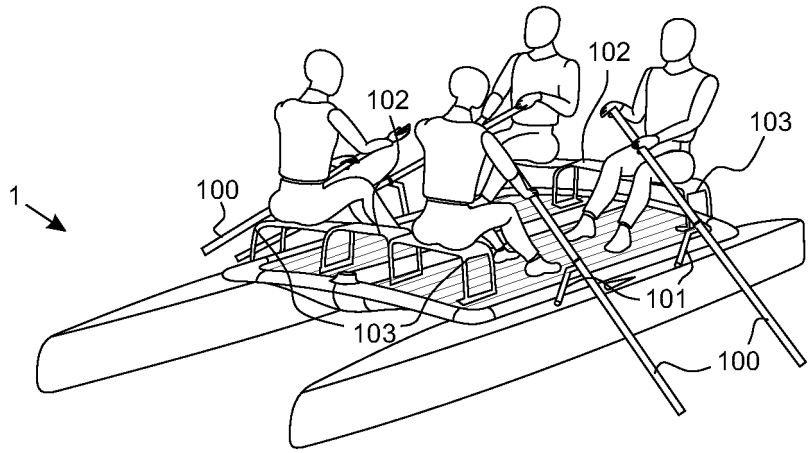

Fig. 4

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Description

Field of the invention

[0001] The present invention concerns a modular Catamaran, in particular a catamaran which can be easily mounted and demounted and/or which can be used in different driving modes like sailing, rowing or motor-driven.

Description of related art

[0002] Catamarans for rowing are well known. In Italy, they are called "moscone", "natante" or "pattino". However, they need physical effort for moving the catamaran.

[0003] Catamarans for sailing are also well known. However, they need wind for moving the catamaran. Sometimes, catamarans for sailing can be used as well with a paddle for emergency situations. However, this does not offer the possibilities of specialised catamaran for rowing and often the mast and sail disturb for this purpose.

[0004] Catamarans are also often difficult to assemble and disassemble.

[0005] D19621521 discloses a modular catamaran with a motor configuration, a rowing configuration, a sailing configuration and a windsurf configuration. In the sailing configuration, one mast and sail are arranged on each hull, respectively, which provides not the same sailing experience as for a catamaran with a central mast and sail. In the windsurf configuration, the mast and sail are arranged centrally, but with a joint at the mast feet so that a user needs to hold the sail on a boom which also does not provide the same sailing experience as for a classic catamaran.

[0006] WO91/09231A1 discloses a catamaran which can be sailed or rowed. The catamaran is made of two pieces, wherein each piece provides one hull and half of the bridge. In the sailing configuration, a windsurf mast and sail is used with a joint at its feet. This requires additional fixations to keep the mast in its vertical position.

[0007] Also RU11168U1 discloses a catamaran for rowing.

Brief summary of the invention

[0008] It is object of the present invention to provide a catamaran which is more flexible.

[0009] This object is achieved with a catamaran according to claim 1.

[0010] Since catamaran is configurable and can be driven in a sailing configuration and in a rowing configuration, the catamaran is more flexible and can be used on more situations.

[0011] This object is further solved by a catamaran comprising: two parallel hulls; a bridge connecting the two hulls and one or more of the subsequently described features and/or any feature described in the description.

[0012] The subsequent embodiments refer to further advantageous embodiments of the invention.

[0013] In one embodiment, the catamaran is configurable between at least two of the following driving configurations: a sailing configuration in which the catamaran is driven by sailing, a rowing configuration in which the catamaran is driven by rowing and a motor configuration in which the catamaran is driven by a motor.

[0014] In one embodiment, the catamaran comprises a steady base module which comprises the two hulls and the bridge. Preferably, the steady base module is used as base for all driving configurations. Preferably, the catamaran comprises different parts for each driving configuration, which are preferably demountable from the base module. This has the advantage that the steady base module can be used for all driving configurations, while the parts necessary for one particular driving configuration can be mounted when the catamaran is driven in the particular driving configuration and demounted when driven in another driving configuration.

[0015] In one embodiment, the catamaran, preferably the base module comprises at least two steady oar attachments for mounting at least two oars in the rowing configuration and at least one steady mast attachment for mounting a mast with a sail in the sailing configuration.

[0016] In one embodiment, the (steady) mast attachment is arranged in centre between the two hulls and/or in a transverse beam connecting the two hulls.

[0017] Catamaran according to the previous claim, wherein the catamaran in the rowing configuration comprises at least two oar attachments and at least two oars, wherein each of the at least two oars is supported by one of the at least two oar attachments.

[0018] Catamaran according to the previous claim, wherein each oar attachment comprises a steady oar attachment and a demountable oar attachment which is mounted in the steady oar attachment and projects from the catamaran, in particular from one of the hulls, wherein each oar is mounted at the demountable oar attachment, preferably at its distal end.

[0019] In one embodiment, the steady oar attachment is a female recess, preferably in each of the hulls, configured to support and/or to lock a male part of the demountable oar attachment, wherein the male part of the demountable oar attachment is arranged on the opposite end of the demountable oar attachment supporting the oar.

[0020] In one embodiment, the steady oar attachment comprises two female recesses arranged such that a line through the two female recesses is parallel to the longitudinal axis of the catamaran.

[0021] In one embodiment, the steady oar attachment is arranged on the top side of each hull versus the external side of the catamaran.

[0022] In one embodiment, each hull comprises two steady oar attachments at different longitudinal positions.

[0023] In one embodiment, the at least two oars and/or the at least two demountable oar attachments are de-

mountable in another driving configuration than the rowing configuration.

[0024] In one embodiment, the demounted at least two oars and/or the demounted at least two demountable oar attachments are storable in a storage compartment in the catamaran.

[0025] In one embodiment, the catamaran comprises in the rowing configuration at least one seat on the bridge.

[0026] In one embodiment, the at least one seat is demountable from the bridge such that the at least one seat can be removed in another configuration than the rowing configuration.

[0027] In one embodiment, the catamaran is configurable between different rowing configuration by mounting the at least one seat in different positions on the bridge to obtain different rowing configurations and/or by mounting different type of seats to obtain different rowing configurations.

[0028] In one embodiment, the bridge comprise at least one, preferably at least two, preferably four functional rails for mounting at least one seat for a rowing configuration. Preferably, the at least one seat is mounted in the at least one functional rail extending parallel to the longitudinal axis of the catamaran. Preferably, the at least two functional rails extending parallel to each other.

[0029] In one embodiment, the at least one seat is mounted so on the bridge that the at least one seat is slidable along the longitudinal axis of catamaran, when a user is rowing the catamaran in the rowing configuration.

[0030] In one embodiment, the catamaran is configurable between different rowing configurations comprising at least two of the following rowing configurations:

- a configuration with one seat centrally arranged between the two hulls, with two oars attachments and with two oars mounted on the two oar attachments, wherein the two oar attachments and the two oars are arranged such that a person sitting on the centrally arranged seat can row the catamaran with the two oars,
- a configuration with two seats at different longitudinal positions and each arranged centrally between the two hulls, with four oars attachments and with four oars mounted on the four oar attachments, wherein first pair of the oar attachments and first pair of the oars are arranged such that a first person sitting on the first seat can row the catamaran with the first two oars, and second pair of the oar attachments and second pair of the oars are arranged such that a first person sitting on the first seat can row the catamaran with the second pair of oars,
- a configuration with two seats arranged at the same longitudinal position and with two oars attachments and with two oars mounted on the two oar attachments, a first one of the two seats arranged on a first lateral side and the second one of the two seats at the second lateral side, wherein a first one of the two oar attachments and a first one of the two oars are arranged such that a person sitting on the first seat can row the catamaran with the two oars,
- a configuration with four seats and with four oars attachments and with four oars mounted on the two oar attachments, a first one of the four seats arranged on a first lateral side and a first longitudinal position, a second one of the four seats arranged on a second lateral side and the first longitudinal position, a third one of the four seats arranged on the first lateral side and a second longitudinal position, a fourth one of the four seats arranged on the second lateral side and the second longitudinal position, wherein a first one of the four oar attachments and a first one of the four oars are arranged such that a person sitting on the first one of the seats can row the catamaran with the first one of the oars, wherein a second one of the four oar attachments and a second one of the four oars are arranged such that a person sitting on the second one of the seats can row the catamaran with the second one of the oars, wherein a third one of the four oar attachments and a third one of the four oars are arranged such that a person sitting on the third one of the seats can row the catamaran with the third one of the oars, wherein a fourth one of the four oar attachments and a fourth one of the four oars are arranged such that a person sitting on the fourth one of the seats can row the catamaran with the fourth one of the oars,
- a configuration in which the at least one seat is mounted with a fixed longitudinal position on the bridge and/or the at least one seat has a first height,
- a configuration in which the at least one seat is mounted such on the bridge that the seat is movable along a longitudinal direction and/or in which the at least one seat has a second height being smaller than the first height and/or in which a feet support is mounted in a fixed longitudinal position on the bridge for each of the at least one movable seat.

[0031] In one embodiment, the catamaran comprises in the sailing configuration a mast attachment, a mast mounted on the mast attachment and a sail mounted on the mast.

[0032] In one embodiment, the mast attachment is arranged on the centre line of the catamaran between the two hulls.

[0033] In one embodiment, the mast attachment comprises a steady mast attachment and a demountable mast attachment which is mounted in the sailing configuration in the steady mast attachment and which supports the mast.

[0034] In one embodiment, the steady mast attachment is a female recess configured to support and/or to lock a male part of the demountable mast attachment, wherein the male part of the demountable mast attachment is hollow to support the mast and extends out of the female recess of the steady mast attachment in the

longitudinal direction of the female recess or of the mast in order to increase the supporting surface of the mast.

[0035] In one embodiment, the mast, the sail and/or the demountable mast attachment is/are demountable in another driving configuration than the sailing configuration.

[0036] In one embodiment, the demounted mast, the demounted sail, the demounted demountable mast attachments, the demounted at least two oars and/or the demounted at least two demountable oar attachments are storable in a storage compartment in the catamaran. Preferably, the storage compartment is arranged in the bridge. The storage compartment extends with its longitudinal axis preferably along the longitudinal axis and/or the symmetry axis of the bridge and/or the catamaran.

[0037] In one embodiment, the mast is decomposable into at least two, preferably at least three, preferably at least four mast parts.

[0038] In one embodiment, the catamaran is configurable between the sailing configuration, the rowing configuration and a motor configuration in which the catamaran is motor-driven. Preferably, the catamaran comprises a motor attachment and a motor mounted on the motor attachment.

[0039] In one embodiment, the catamaran is decomposable into the two hulls and the bridge.

[0040] In one embodiment, the bridge is decomposable into two transverse beams mounted each between the two hulls and at least two longitudinal beams mounted between the two transverse beams.

[0041] In one embodiment, each hull comprises at least two transverse attachment recesses for fixing the ends of the two transverse beams to the hull.

[0042] In one embodiment, each end of the transverse beam comprises a through hole which is aligned with a corresponding one of the transverse attachment recesses, wherein a fixation pin extends through the through hole of the end of the transverse beam and is locked in the corresponding one of the transverse attachment recesses.

[0043] In one embodiment, the at least two longitudinal beams comprise two external longitudinal beams constituting with the two transverse beams an external frame of the bridge.

[0044] In one embodiment, each hull comprises two further transverse attachment recesses for fixing the ends of the two transverse beams and the ends of the two external longitudinal beams to the hull.

[0045] In one embodiment, each end of the external longitudinal beam and each end of the transverse beam comprises a through hole which are both aligned with one of the further transverse attachment recesses, wherein a fixation pin extends through the through hole of the end of the external longitudinal beam and the end of the transverse beam and is locked in the one of the further transverse attachment recesses.

[0046] In one embodiment, wherein each hull comprises at least two bridge attachment recesses for fixing the bridge to the respective hull, each bridge attachment recess comprises an expansion chamber with a larger diameter than the entrance opening of the bridge attachment recess, wherein the bridge comprises at least four through holes aligned with the at least four bridge attachment recesses, wherein each through hole of the bridge is fixed to the respective bridge attachment recess by an expansion pin which extends through the through hole into the attachment recess, wherein the extension pin can be switched between a locked state and an open state, wherein the extension pin comprises an expansion portion which has a locked diameter and a locked length in the locked state and has an open diameter smaller than the locked diameter and an open length larger than the locked length, wherein the expansion portion expands in the locked state in the expansion chamber to lock the expansion pin in the bridge attachment recess.

[0047] In one embodiment, the two hulls are equal and/or each of the two hulls is symmetric to a longitudinal plane.

[0048] In one embodiment, each hull comprises a conduct for a centerboard. Preferably, the centerboard is mounted in the conduct for the centerboard, if the catamaran is configured for the sailing configuration. The centerboard is preferably movably mounted in the conduct such that the centerboard moved between an moved-in-configuration and an moved-out configuration.

[0049] In one embodiment, the catamaran comprises a mast attachment for mounting a sailing mast, wherein at least one of the two oars is configured to constitute the sailing mast. Since the oars are used either to row or to sail the catamaran, the catamaran becomes more flexible. When there is wind, the catamaran can be sailed, if there is no wind or if the person on board would like to do some physical education, the catamaran can be rowed

[0050] In one embodiment, the catamaran comprises a rudder mechanism for steering the catamaran during the sailing configuration.

[0051] In one embodiment, the rudder mechanism comprises a rudder attachment, wherein one of the oars can be disassembled in an oar blade and an oar shaft, wherein the oar blade can be mounted in the rudder attachment for steering the catamaran during sailing.

[0052] In one embodiment, the other one of the oars can be disassembled in an oar blade and an oar shaft, wherein the two oar blades can be mounted behind each hull of the catamaran in the rudder attachment for steering the catamaran during sailing.

[0053] In one embodiment, the oar shaft(s) is mounted in the mast attachment as sailing mast.

[0054] In one embodiment, the two oar shafts can be assembled to a mast and a boom.

[0055] In one embodiment, the two rowing attachments are arranged at two hulls of the catamaran, respectively.

[0056] In one embodiment, the two rowing attachments are arranged such that one person could row the

catamaran with the two oars.

[0057] In one embodiment, the bridge comprises a seat between the two rowing attachments. In one embodiment, the mast attachment is arranged in the seat.

Brief Description of the Drawings

[0058] The invention will be better understood with the aid of the description of an embodiment given by way of example and illustrated by the figures, in which:

Fig. 1 shows an embodiment of the catamaran in a first rowing configuration.

Fig. 2 shows an embodiment of the catamaran in a second rowing configuration.

Fig. 3 shows an embodiment of the catamaran in a third rowing configuration.

Fig. 4 shows an embodiment of the catamaran in a fourth rowing configuration.

Fig. 5 shows an embodiment of the catamaran in a fifth rowing configuration.

Fig. 6 shows an embodiment of the catamaran in a sixth rowing configuration.

Fig. 7 shows an embodiment of the catamaran in a seventh rowing configuration.

Fig. 8 shows an embodiment of the catamaran in a first sailing configuration.

Fig. 9 shows an embodiment of the catamaran in a first motor configuration.

Fig. 10 shows an embodiment of parts of a base module of the catamaran.

Fig. 11 shows a first step for mounting an embodiment of the base module of the catamaran.

Fig. 12 shows a second step for mounting an embodiment of the base module of the catamaran.

Fig. 13 shows a third step for mounting an embodiment of the base module of the catamaran.

Fig. 14 shows a fourth step for mounting an embodiment of the base module of the catamaran.

Fig. 15 shows a first embodiment of an oar attachment.

Fig. 16 shows a second embodiment of an oar attachment for reverse rowing.

Fig. 17 shows an enlargement of the second embodiment of the oar attachment for reverse rowing.

Fig. 18 shows a first embodiment of a rudder mechanism.

Fig. 19 shows a second embodiment of a rudder mechanism in the retracted state.

Fig. 20 shows the second embodiment of a rudder mechanism in the extended state.

Fig. 21 shows the movement between the extended state and the retracted state of the second embodiment of a rudder mechanism.

Fig. 22 shows a first embodiment of a fin mechanism.

Fig. 23 shows a second embodiment of a fin mechanism.

Fig. 24 shows a third embodiment of a fin mechanism.

Fig. 25 shows an embodiment of the catamaran in the first sailing configuration.

Fig. 26 shows an embodiment of the catamaran in a second sailing configuration.

Fig. 27 shows an embodiment of the catamaran in a first sailing configuration.

Fig. 28 shows an embodiment of the catamaran in a first sailing configuration.

Fig. 29 shows all the parts of the configurable catamaran for the configurations shown before.

Detailed Description of possible embodiments of the Invention

[0059] The catamaran comprises two hulls 2 and a bridge 3. The two hulls 2 and the bridge 3 constitute a base module 1.

[0060] The catamaran and/or the base module 1 has a front side, a back side, a starboard side, a larboard side, a bottom side and a top side. The front side or also called prow is in the direction of driving. The back side or also called stern is opposed to the front side. The bottom side is the side of the catamaran and/or the base module 1 directed versus the water, when the catamaran and/or the base module 1 swims in the water. The top side is opposed to the bottom side and/or is directed to the sky, when the catamaran and/or the base module 1 swims in the water. The starboard side is the right side, when looking from the back side to the front side, and/or is perpendicular to the vertical direction. The larboard

side is the left side, when looking from the back side to the front side, and/or is perpendicular to the vertical direction. The vertical direction refers to the direction from the top side to the bottom side and vice versa. The horizontal direction refers to any direction in the plane rectangular to the vertical direction. The catamaran direction refers to the (horizontal) direction from the front side to the back side or vice versa. The catamaran direction corresponds preferably also to the longitudinal axis of the catamaran and/or base module 1 and/or corresponds to the direction of driving of the catamaran and/or of the base module 1, when going straight, and/or is parallel to the symmetry plane of the catamaran and/or of the base module 1 and/or is parallel to the longitudinal axis of the two hulls 2 and/or is parallel to the plane of the bridge 3 and/or is parallel to the plane of the water surface, when the catamaran swims in the water. The lateral direction refers to the direction from the starboard side to the larboard side and vice versa. A vertical plane is the plane spanned by the vertical direction and the catamaran direction. A horizontal plane is the plane spanned by the catamaran direction and the lateral direction or by any other two different horizontal directions. The lateral plane is spanned by the vertical direction and the lateral direction. Those terms will be used in the following to describe the catamaran and its parts. A symmetry plane of the catamaran and/or of the base module 1 is defined as the vertical plane going through its longitudinal axis and/or through the centre between the two hulls 2.

[0061] The two hulls 2 are connected via the bridge 3. The two hulls 2 comprise a first hull 2 on the starboard side and a second hull 2 on the larboard side. Preferably, the longitudinal axes of the two hulls 2 are parallel to each other and/or are parallel to the catamaran direction. Preferably, each of the two hulls 2 is symmetrical towards a vertical plane going through the longitudinal axis of each hull 2 and/or towards the symmetry plane, and/or the two hulls 2 are identical to each other. This is well shown in Fig. 10. This has the advantage that the same hull 2 can be used for the starboard and the larboard side and the hulls 2 are interchangeable between starboard and larboard.

[0062] The bridge 3 connects the two hulls 2 and/or provides a surface for carrying the crew. The crew comprises one or more persons. The width of the bridge (in the lateral direction) is preferably smaller than its length (in the catamaran direction). The bridge 3 extends substantially in the horizontal plane (maybe with a small curvature (preferably in the lateral direction) with the zenith (preferably in the centre of the bridge 3) pointing towards the top side). The bridge 3 comprises preferably a frame which is then covered by a crew carrying element. This crew carrying element can be flexible as a textile under tension or a rigid element.

[0063] The bridge 3 and/or the frame comprise(s) two transverse beams 4. The two transverse beams 4 support the load on the bridge 3 and lead the load to the hulls 2. The two transverse beams 4 comprise a front transverse beam 4 arranged at the front side of the bridge 3 and a back transverse beam 4 arranged at the back side of the bridge 3. Preferably, the two transverse beams 4 are constructed identical such that they are interchangeable. However, it is also possible to use different transverse beams 4 in the front and in the back. Preferably, each transverse beam 4 extends in the lateral direction substantially straight (maybe with a slight curvature in the vertical direction or in the catamaran direction). Each end of the transverse beam 4 forms preferably an angle (substantially 90°) pointing to the respective other transverse beam 4. Each transverse beam 4 comprises preferably at least one handle allowing to carry the catamaran with two hands of a first person on the front transverse beam 4 and with two hands of a second person on the back transverse beam 4. The at least one handle 4 of each transverse beam 4 is arranged such that one hand can be inserted in the handle on the starboard side of the symmetry line of the catamaran and a second hand at the larboard side of the symmetry line of the catamaran. The handle comprises preferably two recesses for the two hands at the bottom side of the transverse beam 4, preferably one the larboard side of the symmetry line of the catamaran and one on the starboard side of the symmetry line of the catamaran. This allows a very easy carrying of the catamaran.

[0064] The bridge 3 and/or the frame comprises preferably two longitudinal beams 5 connecting on the two lateral sides the two transverse beams 4. The two longitudinal beams 5 comprise a starboard longitudinal beam 5 arranged at the starboard side of the bridge 3 and a larboard longitudinal beam 5 arranged at the larboard side of the bridge 3. The two longitudinal beams 4 are arranged preferably above the two hulls 2. Preferably, the two longitudinal beams 5 are constructed identical such that they are interchangeable. The longitudinal beams 5 and the transverse beams 4 stiffen the bridge 3 and/or the frame and/or form a substantially rectangular bridge 3.

[0065] The bridge 3 comprises preferably at least one fixing means 6 for modularly fixing elements, preferably the later described seats, on the top surface of the bridge 3. The fixing means 6 comprise preferably at least one rail 6 extending in or parallel to the catamaran direction and/or parallel to the longitudinal axis of the hulls 2 and/or to the longitudinal beams 5 and/or perpendicular to the transverse beams 4 and/or to the lateral direction. The fixation of the seats 102, 104 in the rails 6 has the advantage that they can be fixed at any position along the catamaran direction. Preferably, the at least one rail 6 comprises at least two rails 6 arranged symmetrically to the symmetry plane of the catamaran and/or to the longitudinal axis of the bridge 3. Preferably, the at least two rails 6 comprise four rails 6 arranged symmetrically to the symmetry plane of the catamaran. Thus, two rails 6 are arranged on each side of the symmetry plane. Preferably, the rails 6 extend from one transverse beam 4 to the other one 4. This has further the advantage that the

rigidity and stability of the bridge 3 is increased. The distance between each pair of neighbouring rails 6 is preferably the same. This has the advantage that the same seat 102, 104 and/or feet support 105 (fixed in two neighbouring rails 6) can be mounted at different positions on the bridge 3 (in the lateral direction). Each seat 102, 104 and/or feet support 105 is preferably mounted in two neighbouring rails 6. This allows three different positions (right position, central position, left position) of the seat 102, 104 and/or feet support 105 in the lateral direction.

[0066] The bridge 3 comprises preferably a storage compartment 8. The storage compartment 8 is preferably arranged in the centre of the bridge 3 (between starboard and larboard) and/or extends along the catamaran direction from the back side of the bridge 3 and/or from the back transverse beam 4 to the front side of the bridge 3 and/or to the transverse beam 4. The storage compartment 8 is preferably arranged between two rails 6 (the two inner rails 6) and/or the two transverse beams 4. The two rails 6 (the two inner rails 6) and/or the two transverse beams 4 support the storage compartment 8. The storage compartment 8 comprises preferably an opening on the top side of the storage compartment 8 which is closable and openable by a cover 81 or a door 81. Preferably, the cover or door 81 closes the storage compartment hermetically such that no water can enter the storage compartment 8 when the cover 81 is closed. The storage compartment 8 is configured to carry various modular parts of the catamaran and/or other any objects fitting in the compartment 8. Since the compartment 8 is arranged in the centre of the bridge 3 and/or symmetrically around the symmetry plane of the catamaran, the catamaran is always well balanced and cannot be charged too much on one side. In addition, the storage compartment 8 extends over the full length of the bridge 3 and offers thus a large space. The storage compartment 8 extends from the bridge 3 towards the bottom side of the catamaran so that no space on the bridge 3 is wasted for the storage compartment 8. The cover 81 and/or the top side of the storage compartment 8 forms part of the top surface of the bridge 3 which is used for carrying the crew. Preferably, the cover 81 is replacable by another type of the cover to change the top surface of the storage compartment 8. The cover 81 or different types of covers 81 can have a top surface comprising a plastic, composite, wooden or photovoltaic surface. Fig. 29 shows different covers 81. It is however in addition or in alternative possible to arrange a storage compartment in each of the hulls 2. This may have the advantage to allow longer or larger storage compartments which could be advantageous for the long mast pieces 200.1 and the voluminous sail 203. It is however in addition or in alternative possible to have storage fixation means which allow to fix parts for other catamaran configurations not in use at the catamaran. For example, the bridge 3 (e.g. on its bottom side) could have fixations to hold the mast 200 and/or mast pieces 200.1 and/or the oars 100

[0067] The hulls 2, the frame, the transverse/longitudinal beam 4/5, the rails 6 and/or the storage compartment 8 is made of a plastic, a composite material and/or a metal. Preferably, the composite material is a fibre composite. Preferably, carbon fibre, glass fibre and/or natural fibre can be used as fibre.

[0068] The base module 1 is preferably modular and/or (easily) disassembled and assembled. Fig. 10 shows a top view of most parts of the base module 1.

[0069] The hull 2 comprises bridge attachment means 21. The bridge attachment means 21 comprise preferably a front bridge attachment means 21 and a back bridge attachment means 21. Preferably, The (front/back) bridge attachment means 21 comprise preferably at least one opening on the top side of the hull 2, preferably at least one blind hole. The bridge attachment means 21 are preferably arranged along the longitudinal centre line and/or along the symmetry plane/line of the hull 2. Preferably, each of the (front/back) bridge attachment means 21 comprises two openings, preferably in a line along the (central) longitudinal axis of the hull 2. Preferably, each opening and/or blind hole comprises a top opening with a smaller diameter than an expansion chamber 211 as shown in the transparent enlargement in Fig. 11. Preferably, each opening and/or blind hole comprises a first portion with a first diameter, a second portion with a second diameter larger than the first diameter and optionally a third portion with a third diameter (being equal or smaller than the first diameter). The first portion has a first length (in the direction of the longitudinal axis of the expansion pin), the second portion has a second length, the third portion has a third length. The first portion is arranged in the longitudinal axis of the blind hole at the entrance, the third portion at the end and the second portion in the centre. The second portion comprises or constitutes the expansion chamber 2. Preferably, a step is provided between the second portion or the expansion chamber and the first/third portion or the top opening.

[0070] The bridge 3, the frame, the transverse beams 4 and/or the longitudinal beams 5 comprise corresponding hull attachment means 42, 52 which allow to fix the bridge 3, the frame, the transverse beams 4 and/or the longitudinal beams 5 to the hulls 2. Preferably, the hull attachment means 42 in the transverse beams 4 and the hull attachment means 52 in the longitudinal beams 5 are through holes configured to fixe the bridge 3, the frame, the transverse beams 4 and/or the longitudinal beams 5 to the bridge attachment means 21 of the hulls 2. Preferably, each transverse beam 4 comprises at each end (in the lateral direction) at least one hull attachment means 42, preferably two at each end. The at least one (here two) hull attachment means 42 on the starboard side/end is fixed to the at least one (here two) bridge attachment means 21 in the hull 2 on the starboard side. The at least one (here two) hull attachment means 42 on the larboard side/end is fixed to the at least one (here two) bridge attachment means 21 in the hull 2 on the larboard side. Preferably, at least one hull/bridge attachment means 21/42 in each corner of the bridge 3 or the

frame comprises two hull/bridge attachment means 21/42. A first one pointing to the distal end of the hull 2 in the catamaran direction and a second one pointing to the centre of the hull 2 in the catamaran direction. Preferably, the first hull attachment means 42 is arranged on the intersection of the longitudinal axis of the transverse beam 4 (in the lateral direction) and the longitudinal axis of the angle and/or the hull 2 (in the catamaran direction). Preferably, the second hull attachment means 42 is arranged on the longitudinal axis of the angle (in the catamaran direction) offset from the first one towards the centre of the hull 2. The hull attachment means 42 of the transverse beam 4 is fixed to the first bridge attachment means 21. The longitudinal beam 5 comprises at each (back and front) end (in the catamaran direction) a hull attachment means 52. The hull attachment means 52 of the longitudinal beam 5 is fixed via the second hull attachment means 42 of the transverse beam 4 to the second bridge attachment means 21 such that the (hull attachment means 52 of the) longitudinal beam 5 and the (second hull attachment means 42 of the) transverse beam 4 (in the angle) overlap.

[0071] Preferably, an expansion pin 7 is used to fix the hull attachment means 42, 52 (through holes) to the bridge attachment means 21 (blind holes with expansion chamber 22). The expansion pin 7 comprises at least a first portion and a second portion 71, preferably also a third portion. The first and/or third portion comprises a first diameter (corresponding preferably to the first diameter of the first/third portion of the blind hole 21). The first portion comprises a first length (in the direction of the longitudinal axis of the expansion pin) which is constant. The distal end of the first portion comprises a head 73 which has a diameter larger than the first diameter. The third portion comprises a third length which is constant. The second portion 71 is expandable and can be switched by a switching mechanism 72 between an inserting state in which the second portion has an extended length and/or a second diameter and an expanded state in which the second portion has a second length (smaller than the extended length) and/or an expanded diameter (larger than the second diameter). The second diameter is preferably equal or smaller than the first and/or third diameter. The switching mechanism 7 allows to reduce the axial length of the expansion pin by compressing the flexible second portion 71. When the axial length of the pin is reduced by switching in the expansion state, the length of the second portion 7 is reduced and increases as a consequence its diameter. The switching mechanism 72 comprises preferably a lever at the distal end of the first portion which is connected with the third portion (or the distal end of the second portion) to control the distance of the third portion from the first portion by the state of the lever.

[0072] Fig. 11 shows the working principle of the expansion pin 7. The expansion pin 7 is switched in the inserting state. The expansion pin 7 is inserted with the third portion first through the hull attachment means 42 and/or 52 (through hole) into the bridge attachment means 21 of the hull 2 (blind hole). Since the second portion 71 of the pin is in the inserting state, the diameter has the second diameter which fits through the first diameter of the first portion of the bridge attachment means 21. The expansion pin 7 is preferably inserted until the third portion of the expansion pin 7 is in the third portion of the bridge attachment means 21 and/or the second portion 71 of the expansion pin 7 is in the second portion of the bridge attachment means 21 with the expansion chamber 211. Since the second portion 71 of the pin is in the inserting state, the length of the second portion 71 of the pin 7 is longer than the length of the expansion chamber 211. Then, the pin 7 is switched by the switching mechanism 72 from the inserting state into the expanded state. This causes the second portion of the pin 7 to expand in the expansion chamber 211 and to shorten its length. Therefore, the head 73 presses the bridge 3, the frame, the transverse beam 4, the longitudinal beam 5 and/or the hull attachment means 42 and/or 52 on the hull 2 and/or on the bridge attachment means 21. Due to the expanded diameter of the second portion 71 of the pin 7, the expansion pin 7 is blocked in the blind hole 21 by the step of the expansion chamber 211. This is a very advantageous way to connect the bridge 3 with the hull 2. However, also other connection means like screws, etc are possible.

[0073] Fig. 11 to 14 describe the single steps to assemble the base module 1. As seen in Fig. 11, first the two transverse beams 4 are connected with four hull attachment means 42 to the bridge attachment means 21 of the hulls 2, preferably via four expansion pins 7. Preferably, one hull attachment means 42 at each end of each transverse beam 4 is connected to a corresponding one bridge attachment means 21 of the hulls 2 in each corner of the bridge. Then, longitudinal beams 5 are connected via the hull attachment means 52 to the (hull attachment means 42 of the) transverse beam 4 and/or to the (bridge attachment means 21 of the) hulls 2. Preferably, the (hull attachment means 52 of the) longitudinal beam 5 is connected to a second one of the (hull attachment means 42 of the transverse beam 4 and the bridge attachment means 21 of the hulls 2 arranged in each corner of the bridge 3. Now, the beams 4 and 5 constitute a frame which stabilizes the bridge 3. This frame is very easy to assemble. The rails 6 are connected between the transverse beams 4. Preferably, each end of the rails 6 has a rail attachment means for fixing the rail 6 on the bridge 3. This could be a pre-stressed pin which can be pressed against the force of a spring into the rail 6 (in the longitudinal direction of the rail 6) and a corresponding rail fixing opening in the transverse beam 4. When the rail 6 is placed in the correct position between the two transverse beams 4, the spring presses the pin out into the rail fixing opening of the transverse beam 4. Obviously many other fixation mechanisms are possible for the rails 6. Fig. 12 shows this assembling state of the base module 1. As shown in Fig. 13, a storage compart-

ment 8 is mounted on the bridge 3, on the frame and/or between the transverse beams 4 and/or the (inner) rails 6. This can also be realized by pre-stressed pins which grap into the transverse beams 4. However, other fixation means are also possible. Finally, the gap between the storage compartment and the longitudinal beam 5 needs to be covered to create a closed top surface 9 of the bridge 3 for hosting the crew. In a first embodiment shown in Fig. 14 or Fig. 1 to 7, said gaps are covered by rigid boards or plates 91 and 92. The boards 91, 92 can be made of composite material or wood. The rigid boards 91, 92 are supported on at least one lateral side by a rail 6, the longitudinal beam 5 and/or the compartment storage 8 and/or are supported on the front and/or back side by the transverse beam 4. Preferably the board 91 arranged closer to the storage compartment 8 is supported between two rails 6 (and/or the storage compartment 8 and a rail 6). Preferably the board 92 arranged closer to the hull 2 is supported between on rail 6 and the longitudinal beam 5. This has the advantage that the rails 6 are accessible from the top side to fix maybe a seat. However, it is also possible to cover the gaps by a textile 94 spanned (on each lateral side) between the storage compartment 8 (or the rail 6 supporting the same) and the longitudinal beam 5. Preferably, the textile 94 comprises zips 95 for accessing the rails 6 under the textile 94.

[0074] The base module 1 as for example shown in Fig. 14 and/or the catamaran is preferably configurable between different configurations. Preferably, the base module 1 and/or the catamaran can be configured in at least two of any combination of the following configurations: A sailing configuration, a rowing configuration, a motor configuration, a further sailing configuration (different sailing configurations are described below) and a further rowing configuration (different rowing configurations are described below).

[0075] In the (or all) sailing configuration(s), the catamaran comprises a mast 200, a mast attachment and a sail 203. Preferably, the catamaran comprises further a boom 201, a steering mechanism. Fig. 25 to 28 shows four different sailing configurations with a different sail configuration. The embodiment of Fig. 25 is shown enlarged in Fig. 8.

[0076] The mast attachment is configured to mount (a bottom end of) the mast 200 on the bridge 3. The mast attachment is preferably arranged on the base module 1 and/or the bridge 3 and/or the front transverse beam 4 at the symmetry line/plane of the catamaran or the bridge 3 or the base module 1. This allows to mount the mast 200 as in conventional sailing catamarans on the front side of the bridge 3 and in the centre of the bridge 3 with respect to the lateral direction. Thus, the catamaran would have the handling as a conventional sailing catamaran without the necessity for the user to learn a new handling. The mast attachment comprises preferably a steady (mast) attachment 41 and a demountable mast attachment 202.

[0077] The steady mast attachment 41 of the bridge 3 is configured to support the mast 202 (indirectly) and/or the demountable mast attachment 202 (directly). The steady mast attachment 41 is arranged in the centre of the front transverse beam 4. Preferably, the front transverse beam 4 thickens in the center of the transverse beam 4 such that the transverse beam 4 is in the vertical direction and/or the direction of the mast 200 thicker in the center (between the two hulls 2) than at the ends of the transverse beam 4. This allows to increase the steady mast attachment 41 in the transverse beam 4 to increase the support for the mast 200 and/or increases the support for the storage compartment 8. Preferably, the increase in thickness of the transverse beam 4 in the centre corresponds to the thickness of the storage compartment 8. Preferably, the front and back transverse beam 4 are realized equally so that the transverse beams 4 are exchangeable. This eases the assembling and allows to use both transverse beams as front transverse beams 4 which divides in half the wear of the steady mast attachment 41 from the forces of the sail 203. The steady mast attachment 41 is preferably a recess in the bridge 3, the frame and/or front transverse beam 4, preferably a (cylindrical) hole. The longitudinal axis of the recess and/or hole 41 is substantially in the vertical direction, maybe with a slight inclination of the longitudinal axis towards the back side of the catamaran.

[0078] The demountable mast attachment 202 is configured to be fixed in the steady mast attachment 41 and/or to support the mast 200 in the sailing configuration. The outer form of the demountable mast attachment 202 corresponds (at least in the bottom portion) to the inner form of the recess of the steady mast attachment 41 such that the steady mast attachment 41 houses the demountable mast attachment 202 in the sailing configuration. This provides a support for the mast 200 and/or the demountable mast attachment 202 in any horizontal direction. Preferably, the demountable mast attachment 202 is further locked or blocked in the steady mast attachment 41 such that the demountable mast attachment 202 cannot be moved in a vertical direction and/or the (longitudinal) direction of the mast 200. The demountable mast attachment 202 fits in the storage compartment 8. This allows to store it when the catamaran is not in the sailing configuration, but allows nevertheless to configure the catamaran in open waters or during travel in the sailing configuration.

[0079] Preferably, the mast attachment and/or the demountable mast attachment 202 (when mounted in the steady mast attachment 41) is rigid and/or provides a rigid attachment for the lower end of the mast 200. Preferably, the mast attachment and/or the demountable mast attachment 202 (when mounted in the steady mast attachment 41) is configured to support the lower end of the mast 200 such that the mast 200 is hold/maintained in a roughly vertical direction without the need of further holding structures for the mast 200 (e.g. like the ... of a sailboat or the user force as in a windsurf sail rigg). This distinguishes from the mast attachment of a windsurf sail,

which is elastic and is not sufficient to keep the mast in a vertical direction without the force of a human or without further support above the mast attachment or above the lower end of the mast 200. Preferably, the mast attachment and/or the demountable mast attachment 202 provides a rigid protrusion (extending in the direction of the mast 200) which is inserted in a recess of the mast 200.

[0080] However, the mast attachment 202 can alternatively also be arranged (fully) in the bridge 3, in particular in the front transverse beam 4, in particular at its centre between starboard and larboard such that the mast 202 is directly fixed in the bridge 3, in particular in the front transverse beam 4, in particular at its centre between starboard and larboard.

[0081] The mast 200 is preferably mounted with the bottom end on the symmetry or center line (between the two hulls 2) on the bridge 1. In the mounted position, the mast 200 extends in the vertical direction such that the second end opposed to the bottom end points to the top or to the sky. The (roughly) vertical direction includes slight deviations of 0° to 30°, preferably between 0° and 20° from the vertical direction. The deviation from the vertical direction is preferably towards the back of the catamaran. The direction of the mast 200 is preferably measured at the longitudinal axis of the mast 200 at the lower end of the mast 200 as the lower end 200 is bend normally less from the sail or the wind. Preferably, the mast 200 is mounted in the frame and/or the front transverse beam 4 of the bridge. Preferably, the mast 200 is made of a flexible material. The flexibility of the mast 200 is preferably such that the mast 200 is pressed in the form of the sail 203, when mounting the sail 203 on the mast 200. Preferably, the mast 200 is made of a fibre-reinforced composite material (e.g. carbon). Preferably, the mast 200 is decomposable into at least two, preferably at least three, preferably four (or more) mast pieces 200.1 (similar to a mast for windsurfing but with more pieces). For different sails, the length of the mast 200 can be changed by changing one or more of the mast pieces 200.1. In the shown embodiments in Fig. 25 and 26 a mast 200 with a first length is used. In the shown embodiments in Fig. 27 and 28 a mast 200' with a second length larger than the first length is used. This can be achieved by replacing just the top most mast piece 200.1 with another mast piece 200.1 of different length. The mast pieces 200.1 have preferably each a smaller or equal length than the length of the storage compartment 8 and/or fit in the storage compartment 8. This allows to store the mast 200 when the catamaran is not in the sailing configuration, but allows nevertheless to configure the catamaran in open waters or during travel in the sailing configuration. The mast 200 has preferably a larger diameter at the bottom end then on the top end. This makes the mast 200 lighter and more flexible at the top end. Preferably, the mast 200 tapers from the bottom end to the top end. The mast 200 is preferably hollow. The mast 200 is preferably riggless or stayless. This means that the mast 200 is not hold in place by a (standing rigg) and/or by stays and/or that the mast 200 is hold in place by the mast attachment 202 (alone). This makes the mounting and dismounting of the mast 200 easy to change between the configurations and/or to disassemble the catamaran for travelling on the road or for storing. However, it is also possible that the mast 200 is fixed by a stays, e.g. a front stay, a back stay, side stays.

[0082] The boom 201 is preferably mounted with one end on the mast 200. The boom 201 is mounted preferably on the bottom most mast piece 201. Preferably, the boom 201 is mounted at the bottom edge (foot) of the sail 203. However, it would also be possible to hold the boom 201 with the sail 203 in the right position. The boom 201 is configured to hold the foot of the sail 203 along the boom 201 such that the foot of the sail 203 follows the form of the boom 201 and/or such that no wind passes between the foot of the sail 203 and the boom 201. However, it is also possible to use a sail without a boom 201. The boom 201 has preferably a smaller or equal length than the length of the storage compartment 8 and/or fits in the storage compartment 8. This allows to store the boom 201 when the catamaran is not in the sailing configuration or when the boom 201 is not used, but allows nevertheless to configure the catamaran in open waters or during travel in the sailing configuration.

[0083] The sail 203 is mounted on the mast 200 and/or the boom 201. The sail 203 has a front edge (luff) mounted on the mast 200, a bottom edge (foot) mounted preferably on the boom 201 and/or a back edge (leech). The top end (head) of the sail forms a corner for a triangular sail 200 as shown in Fig. 25 or forms a fourth edge as shown in the sails 203' in Fig. 26 or 203" in Fig. 27 and 28. The corner between the front edge and the bottom edge is also called tack. The corner between the bottom edge and the back edge is also called clew. Preferably, the sail 203 is made of a flexible material like a textile, a (plastic) film, etc.. The flexible material can be reinforced by form-giving-bars (extending from the mast or front edge to the back edge). However, it is also possible to use rigid sails such as wing sails. Preferably, the sail 203 can be fixed in different orientations to the wind. Preferably, the sail 203 and/or the boom 201 is fixed at its end portion (preferably at the clew) with a rope to the catamaran, the base module 1 and/or the bridge 3, preferably at the symmetry line of the catamaran and/or at the back end of the bridge 3. By changing the length of this rope, the orientation of the sail 203 with respect to the wind and/or the mast 200 can be changed. The sail 203 can be brought in a dismounted state in which it is smaller than in the mounted state. Preferably, the sail 203 fit in the dismounted state in the storage compartment 8. For a flexible sail 203, this dismounted state can be folded or rolled. For a rigid sail, the sail could be dismountable in several rigid sail pieces. The catamaran can be configured to mount different sails 203, 203' and 203" with different sizes as shown in Fig. 25 to 27.

[0084] As shown in Fig. 28, the sailing configuration could comprise more than one sail, e.g. a main sail

203" and head sail. The head sail can be of any type like a jib, a genoa or spinnaker. The head sail is preferably a staysail. The head sail has preferably three corners: a top corner, a back corner and a front corner. The top corner can be fixed at the mast 200 or the front edge of the main sail 203". The back corner can be fixed at the mast 200 or the bottom portion of the front edge of the main sail 203" or the bridge 3. The front corner can be fixed with two ropes at the two hulls 2.

[0085] The catamaran in the sailing configuration comprises preferably a steering mechanism as shown for example in Fig. 18. The steering mechanism comprises preferably two steering rudders 206 (steering blades), each arranged at the back end of the each one of the two hulls 2. The two steering rudders project into the water and are supported pivotable around a vertical rotation axis to change the direction of the catamaran. The steering mechanism comprises preferably a steering means (not shown) connected over a connection mechanism 208 to the two steering rudders 206 to allow a crew member on the bridge 3 to control the orientation of the steering rudder in order to control the direction of the catamaran. Preferably, the steering mechanism comprises a pivot mechanism 207 for pivoting the steering rudders 206 around a horizontal rotation axis (preferably extending in the lateral direction). The steering rudders 206 are pivotable around the horizontal rotation axis to pivote the steering rudders 206 out of the water. The pivoting mechanism 207 is preferably configured to pivote the steering rudder 206 between a steering configuration and a second configuration. In the steering configuration, the steering rudders 206 extend in a substantially vertical direction and/or such to project into the water. In the second configuration, the steering rudders 206 are pivoted by such an angle that the steering rudders 206 are less deep in the water or come out of the water. Preferably, the pivot angle between the steering configuration and the second configuration is more then 60°, preferably more than 80°. This pivot mechanism can be used for navigating in shallow waters or for an oaring configuration in which the steering is done by the oars. In one embodiment as shown in Fig. 18, the steering rudders 206 can be pivoted around the horizontal rotation axis by around 90° and/or extend in a substantially horizontal direction projecting backwards. This mechanism is widely known for catamaran and is very simple and standard. The steering rudders 206 projecting from the hulls 2 and could be disturbing for an oaring configuration or for transporting the catamaran in the water. In one alternative embodiment as shown in Fig. 19 to 21, the pivoting mechanism 207' is such that the steering rudders 206 are pivoted by more than 180°, preferably more than 200°, preferably more than 220°, preferably more than 240° between the steering configuration and the second configuration. Preferably each hull 2 comprises a steering compartment 210 for hosting the respective steering rudder 206 in the second configuration. Preferably, the steering rudders 206 are pivoted so much between the steering configuration and the second configuration that the steering rudders 206 are hosted (in the second configuration) in the steering compartments 210. This allows to make the steering mechanism quickly vanish in the oaring configuration. The steering rudders 206 and the pivoting mechanism 207' can be hosted in the steering compartments 210. The rest of the steering mechanism can be dismounted and stored in the steering compartments 210 or the storing compartment 8. The steering compartments 210 might have a cover to be closed as shown in Fig. 19 to 21. The steering mechanism can also be dismounted from the catamaran or the base module 1, e.g. when only used in an oaring configuration.

[0086] Preferably, each hull 2 is configured to receive (in the sailing configuration) a fin. The fin can normally be arranged in at least two states. A first extended state and a second retracted state. In the extended state, the fin projects from each hull 2 into the water to improve the resistance of the catamaran on rolling forces from the sail 203. In the retracted state, the fin is retracted such that the floating depth of the catamaran is reduced, preferably that the fin does not project any more from the hull 2. In some embodiments, the fin can be arranged in some or in any depth configuration between the first and the second. Fig. 22 to 24 show different types of fins 211, 212 and 213.

[0087] In one embodiment (shown in Fig. 22), the fin 211 can retracted by pivoting the fin around a horizontal rotating axis in the hull 2 (extending in the lateral direction). The hull 2 comprises (at their bottom sides) fin compartments for housing the fins 211 in the retracted state. The fin compartments are connected with a conduit through the hull 2 to the top side of the hull 2. The fin 211 extends through the conduit to project on the top side of the hull 2 to allow a member of the crew on the bridge 3 to change the rotational state of the fin 211. This fin 211 works similar to a centreblade.

[0088] In one embodiment, hulls 2 have each a conduit 23 for allowing a member of the crew to slide the fin 212, 213 along conduit axis between the retracted and the extended state. The fins 212 and 213 (as shown in embodiments 23 and 24) can thus be extended and/or retracted by a translational movement (roughly in the vertical direction) of the fin 212, 213 along the longitudinal axis of the conduit 23. Fig. 10 and 11 show well the conduit 23. The conduit 23 extends preferably from the top side of the hull 2 to the bottom side of the hull 2. The conduit 23 is preferably curved towards the centre of the catamaran. Preferably, the opening of the conduit 23 on the top side is farther away from the symmetry plane or centre plane of the catamaran than the opening of the conduit 23 on the bottom side. In order to realize symmetrical hulls 2, two conduits 23 are arranged around the symmetry axis of the hull 2. The external conduit 23 of the respective hull 2 would be accessible and/or should be used for the respective fin 212, 213. However, the conduit can also be arranged straight. In this case, only one conduit would be enough to realize symmetrical hulls

2. The deepness of the fin 212, 213 can preferably be configured in any position between the retracted and the extended state. The fin 212, 213 is preferably curved such that the fin 212, 213 extends into the water and to the centre line of the catamaran or to the respective other fin 212, 213. The curvature of the fin 212, 213 corresponds preferably to the curvature of the conduit 23. The fin 212 of the embodiment in Fig. 23 works similar like a daggerboard. The fin 213 of the embodiment in Fig. 24 corresponds to the fin 212 of the embodiment in Fig. 23 including in addition a (lifting) foil at the bottom end of the fin. This lifting foil is realized by the end of the fin 213 extending horizontally to create a lifting draft over this horizontal foil portion.

[0089] In the shown embodiment of hull 2, the conduit 23 is configured (just) for sliding fins such as fins 212 and 213. However, it is also possible to realize in addition or alternatively another conduit(s) to allow pivoting fins 211.

[0090] In the rowing configuration, the catamaran comprises at least two oar attachments 101 and at least two oars 100.

[0091] Each oar 100 as at a first end a blade and at a second end (opposed to the first end) a handle. The oar comprises normally a rod which connects the first end with the second end. The handle can be configured for one hand, for two hands or even for more than two hands. Each oar is the rowing configuration is fixed with a fixation point to the oar attachment. The fixation point is between the first end and the second end and divides the oar in an inboard portion between the second end and the fixing point and an outboard portion between the first end and the fixing point. The oar could have a special fixation means at the fixing point to fix the oar at the oar attachment. This could be for example a sleeve on the rod which has a larger diameter than the rod. However, it is also possible that the oar attachment is configured to fix the oar at any point between the handle and the blade such that the fixing point can be varied depending the rowing position and the rower. The oars 100 can be unmounted, when the catamaran is not in the rowing configuration. This allows to use the catamaran in other configurations without the oars 100 disturbing. The oars 100 are preferably configured to be stored in the storage compartment 8. Preferably, the oars 100 can be disassembled into pieces, preferably at least one rod piece and a blade piece. The blade could be just the blade or the blade with a part of the rod.

[0092] Each of the at least two oar attachments 101 is configured to support one of the at least two oars 100. Fig. 15 shows an embodiment of an oar attachment 101. Each oar attachment 101 projects preferably from the catamaran, preferably from the hull 2 in the vertical direction to the top and/or in the lateral direction away from the symmetry plane of the catamaran. Preferably both projection directions overlap. Obviously it would be possible that the projection direction overlaps with a projection in the catamaran direction. Each oar attachment 101 is preferably arranged at the starboard or the larboard side of the catamaran in the region of the bridge 3. Preferably, each oar attachment 101 is arranged at one of the hulls 2. Preferably, each oar attachment 101 is arranged at one of the hulls 2. Each oar attachment 101 comprises a distal end and a proximal end. The proximal end is connected to the catamaran, preferably to one of the hulls 2. The distal end comprises a fixing means for fixing the oar 100 at its fixing point. The at least two oar attachment comprise at least one starboard oar attachment 101 and at least one larboard oar attachment 101. The starboard oar attachment 101 is arranged at the starboard side of the catamaran. Preferably the starboard oar attachment 101 is arranged at the starboard hull 2. The larboard oar attachment 101 is arranged at the larboard side of the catamaran. Preferably the larboard oar attachment 101 is arranged at the larboard hull 2.

[0093] Preferably, each oar attachment comprises a steady oar attachment 22 and a demountable oar attachment 101. This will now be described in more detail below. However, it would alternatively also be possible to have the oar attachment steadily fixed on the base module.

[0094] The steady oar attachments 22 remain always present in the base module, preferably in the hulls 2. As shown in Fig. 15, the steady oar attachments 22 are recesses for receiving the demountable oar attachments 101. Each demountable oar attachment can be fixed in one corresponding recess (see Fig. 15) or in two or more recesses (see Fig. 17). It is further possible that one steady oar attachment is shared between more than one demountable oar attachment on one of the lateral sides of the catamaran. This steady oar attachment could be for example a rail. The base module on each lateral side or each hull has preferably more than one steady oar attachment or more than one recess (along the catamaran direction). This allows to vary the mounting position of the oars. This would also allow to install different types of demountable oar attachments as shown in Fig. 15 and 17. The oar attachment shown in Fig. 17 is more stable against rotational forces, as it has two male projections to be received in two respective female recesses.

[0095] The demountable oar attachment 101 is mounted in the steady oar attachment 22 and projects from the catamaran, in particular from one of the hulls 2, wherein each oar 100 is mounted at the demountable oar attachment, preferably at its distal end. The description of the oar attachment 101 refers also to the demountable oar attachment 101, when mounted in the steady oar attachment 22.

[0096] Fig. 16 and 17 show an alternative embodiment for the oars 100' and the oar attachment 101'. A reverse mechanism reverses the rowing direction. The reverse mechanism comprises a rotational transmission at the fixing point of the oar which allows that the blade moves in the same direction as the handle during rowing. This allows that the rower can look in the direction of travel. Thus, the catamaran allows to exchange the type of oars and oar attachments.

[0097] Preferably, the catamaran in the rowing configuration comprises at least one seat 102, 104 on the bridge 3 as shown exemplary in Fig. 1 to 8. Each of the at least one seat 102, 104 is arranged such that a crew member sitting on the seat 102, 104 can row the catamaran with at least one oar fixed in at least one oar attachment 101.

[0098] In one embodiment, the at least one seat 102 is arranged such on the bridge 3 that the seat 102 does not move during the rowing configuration (see Fig. 1 to 4). Thus, the rowing operation is mainly operated by the upper body of the crew member(s) rowing the catamaran. The seat 102 is preferably higher than 20 cm, preferably higher than 25 cm, preferably higher than 30 cm, preferably higher than 35 cm. The height of the seat corresponds roughly to the height of a normal chair. This seat 102 corresponds to the rowing operation as in a classic "pattino". In an alternative embodiment, each of the at least one seat 104 is arranged in the rowing configuration such on the bridge 3 that the seat 104 is movable along the catamaran direction (during the rowing operation). Thus, the rowing operation is operated by the full (upper and lower) body of the crew member(s). Preferably, the seat 104 is supported movably in the at least one rail 6, preferably in two (neighbouring) rails 6. Preferably, the seat 104 is lower than 30 cm, preferably than 20 cm, preferably than 15 cm, preferably than 10 cm. Preferably, the bridge 3 comprises for each seat 104 a corresponding feet support 105 for supporting the feet of the rowing crew member sitting on the respective seat 104. The feet support 105 is arranged in a fixed manner on the bridge 3 such that the seat 104 can move relative to the feet support 105. Thus, the rowing crew member can push with his/her feet against the feet support 105 to move the seat 105 away from the feet support 105 to support the oar movement by the force of the legs of the rowing crew member. The feet support 105 is preferably arranged in the same rail(s) 6 as the respective seat 104 (but in a fixed manner).

[0099] Preferably, the seat 102, 104 is fixed on the bridge 3 in a removable manner. Thus, the seat 102 is mountable in the rowing configuration and is dismountable in other driving configurations as sailing configuration and/or motor configuration. Preferably, the seat(s) 102, 104 is/are fixed in the rail(s) 6 of the bridge 3. Preferably, the seat 102 or 104 is fixed in two neighbouring rails 6. The seat 104 and/or its corresponding feed support 105 in Fig. 5 and 6 is/are supported in the two central rails 6 and/or along the catamaran axis. Thus, the crew member sitting on the seat 104 can row the catamaran (alone) by holding two oars, one starboard and one larboard. The two seats 104 are fixed each by two lateral rails 6 and/or on an axis being parallel to the catamaran axis (and offset to the starboard side and to the larboard side, respectively). Thus, each crew member sitting on one of the two seats 104 can row the catamaran by holding one oar, the starboard oar or the larboard oar. The seat(s) 102 in Fig. 1 to 4 is/are fixed at the two central rails 6 and/or along the central catamaran axis. The seat 102 can be extended laterally by lateral extensions 103 to form further lateral seats 103 as shown in Fig. 3 and 4. Each lateral extension 103 is fixed on the central seat 102 and at one of the outer lateral rails 6. However, it is also possible to use two of the central seats 102 as lateral seats which are then fixed between two respective lateral rails 6 as shown in Fig. 7 for seats 104. This mounting system described allows to row the catamaran in may different rowing configurations. The number of seats 102, 103, 104 can be easily changed. The position of the seats 102, 103, 104 of the seats can be easily changed (laterally by changing the rails 6 in which the seat 102, 103, 104 is fixed and/or longitudinally by determining the fixing position of the seat 102, 103, 104 in the rail(s) 6). The type of the seat 102, 104 (different height, different fixation manner) can be changed. The direction of the seat 104 can be changed for reverse or forward oar attachment.

[0100] The following rowing configurations are examples for possible rowing configurations for the catamaran. The catamaran can be driven in one, in two or in more of the following rowing configurations.

[0101] In one rowing configuration one seat 102, 104 is centrally arranged between the two hulls, with two oars attachments 101, 101' and with two oars 100 mounted on the two oar attachments 101, 101', wherein the two oar attachments 101, 101' and the two oars 100 are arranged such that a person sitting on the centrally arranged seat 102, 104 can row the catamaran with the two oars 100 (see for example Fig. 1, 2, 5 and 6).

[0102] In one configuration the bridge 3 comprises (at least) two seats 102 at different longitudinal positions (see Fig. 4) and comprises four oar attachments 101 and four oars 100 mounted on the four oar attachments 101. Preferably, at least one first oar attachment, preferably a first pair of the oar attachments 101 and at least one first oar 100, preferably a first pair of the oars 100 are arranged such that a first person sitting on the first seat 102 can row the catamaran with the at least one first oar 100, preferably with the first pair of oars 100. Preferably, at least one second oar attachment 101, preferably a second pair of the oar attachments 101 and at least one second oar 100, preferably a second pair of the oars 100 are arranged such that a second person sitting on the second seat 102 can row the catamaran with the at least one second oar 100, preferably with the second pair of oars 100. Preferably, the two seats are arranged each centrally between the two hulls 2.

[0103] In one configuration two seats 102, 104 are arranged at the same longitudinal position and the catamaran comprises two oars attachments 101 and two oars 100 mounted on the two oar attachments 101 (see for example Fig. 3, 4 or 7). Preferably, a first one of the two seats 102 is arranged on a first lateral side and the second one of the two seats 102 at the second lateral side. A first one of the two oar attachments 101 and a first one of the two oars 100 are arranged such that a person sitting on the first seat can row the catamaran with the first one

of the two oars 100. A second one of the two oar attachments 101 and a second one of the two oars 100 are arranged such that a person sitting on the second seat can row the catamaran with the second one of the two oars 100.

[0104] In one configuration the catamaran comprises four seats 102, four oars attachments 101 and four oars 100 mounted on the four oar attachments 101 (See Fig. 4). A first one of the four seats 102 is preferably arranged on a first lateral side and a first longitudinal position, a second one of the four seats 102 is arranged preferably on a second lateral side and the first longitudinal position, a third one of the four seats 102 is arranged preferably on the first lateral side and a second longitudinal position, a fourth one of the four seats 102 is arranged preferably on the second lateral side and the second longitudinal position. Preferably, a first one of the four oar attachments 101 and a first one of the four oars 100 are arranged such that a person sitting on the first one of the seats 102 can row the catamaran with the first one of the oars 100. Preferably, a second one of the four oar attachments 101 and a second one of the four oars 100 are arranged such that a person sitting on the second one of the seats 102 can row the catamaran with the second one of the oars 100. A third one of the four oar attachments 101 and a third one of the four oars 101 are arranged such that a person sitting on the third one of the seats 102 can row the catamaran with the third one of the oars 100. Preferably, a fourth one of the four oar attachments 101 and a fourth one of the four oars 100 are arranged such that a person sitting on the fourth one of the seats 102 can row the catamaran with the fourth one of the oars 100.

[0105] Preferably, when the catamaran is in the sailing configuration or the motor configuration, the oars 100 are not mounted, i.e. not fixed in the oar attachments 100. Preferably, the oars 100 are configured to be stored in the storage compartment 8. Preferably, when the catamaran is in the sailing configuration or the motor configuration, the oar attachments 101 are not mounted, i.e. the demountable oar attachments 101 are removed from the catamaran. Preferably, the oar attachments 101 are configured to be stored in the storage compartment 8.

[0106] In one embodiment (not shown), the rods of the oars 100 are used in the sailing mode to establish the mast 200 and in the rowing configuration the oars 100. The rods of the different oars 100 can form the mast pieces 200.1 described above.

[0107] In one embodiment (not shown), the (two) blades of the oars 100 are used for the blades of the steering mechanism in the sailing configuration and for the blades of the oars 100 in the rowing configuration. This embodiment is in particular advantageous in combination with the previously described embodiment of the rods of the oars 100 to be used as well as mast pieces 200.1.

[0108] In the motor configuration, the catamaran comprises a motor 300, preferably an electrical motor 300. The motor 300 is preferably fixed on the bridge 3, preferably at the back side of the bridge 3, preferably on the transverse beam 4 at the back side of the bridge 3. Preferably the motor 300 can be mounted and dismounted, i.e. is fixed in a removable manner. This allows to remove the motor 300 in other driving configurations, in the sailing configuration and/or in the rowing configuration. Preferably, the motor 300 is fixed in a motor attachment means. Preferably, the motor attachment means comprises a fixed motor attachment means 41 in the bridge 3, preferably in the back transverse beam 4, preferably on the symmetry line of the catamaran. The fixed motor attachment means 41 is preferably a recess with a vertical recess axis. Preferably, the recess is a through hole. In the embodiment, the fixed motor attachment 41 of the back transverse beam 4 corresponds to the fixed mast attachment 41 of the front transverse beam 4, in particular where the front transverse beam 4 and the back transverse beam 5 are equal. In one embodiment, the motor attachment can comprise a demountable motor attachment which is mounted in the fixed motor attachment 41 and which supports the motor 300. The demountable motor attachment can be equal to the demountable mast attachment or can be different. However it is also possible that the motor 300 is mounted directly in the fixed motor attachment 41. The motor 300 is supported in the (fixed or demountable) motor attachment such that the motor 300 can be rotated around a substantially vertical rotation axis to steer the catamaran, when the catamaran is motor driven. The motor 300 comprises a propeller which is supported on an extension extending into the water and which is driven by the motor 300.

Claims

1. Catamaran comprising:

   two parallel hulls (2);
   a bridge (3) connecting the two hulls,
   characterized in that the catamaran is configurable between the following driving configurations:

   a sailing configuration in which the catamaran is driven by sailing and
   a rowing configuration in which the catamaran is driven by rowing.

2. Catamaran according to the previous claim, wherein the catamaran in the rowing configuration comprises at least two oar attachments and at least two oars (100), wherein each of the at least two oars (100) is supported by one of the at least two oar attachments.

3. Catamaran according to the previous claim, wherein each oar attachment comprises a steady oar attachment (22) arranged in one of the hulls (2) and a de-

mountable oar attachment (101) which is mounted in the steady oar attachment (22) and projects from one of the hulls (2), wherein each oar (100) is mounted at the demountable oar attachment (101), wherein the steady oar attachment (22) is a female recess in each of the hulls (2) configured to support and/or to lock a male part of the demountable oar attachment, (101), wherein the at least two oars (100) and/or the at least two demountable oar attachments (101) are demountable in another driving configuration than the rowing configuration.

4. Catamaran according to one of the previous claims, wherein the catamaran comprises in the rowing configuration at least one seat (102, 104) on the bridge (3), wherein the at least one seat (102, 104) is demountable from the bridge (3) such that the at least one seat (102, 104) can be removed in another configuration than the rowing configuration.

5. Catamaran according to the previous claim, wherein the bridge (3) comprises four functional rails (6) extending parallel to each other in the catamaran direction, and the at least one seat (102, 104) is mounted in the rowing configuration in two of the four functional rails (6), wherein the catamaran is configurable between different rowing configurations by mounting the at least one seat in different two neighboring functional rails (6) on the bridge (3) to obtain different rowing configurations.

6. Catamaran according to the previous claim, wherein the four functional rails (6) extend over the full length of the bridge in the catamaran direction.

7. Catamaran according to claim 5 or 6, wherein the at least one seat (102) is extendable to a bench by a lateral extension (103), wherein the lateral extension (103) is fixed in another rail (6) of the four rails (6) and at the at least one seat (102).

8. Catamaran according to one of claims 4 to 6, wherein the at least one seat is mounted so on the bridge that the at least one seat is slidable along the longitudinal axis of catamaran during the rowing configuration and so that a feet support is mounted in a fixed longitudinal position on the bridge for each of the at least one movable seat.

9. Catamaran according to one of the previous claims, wherein the catamaran is configurable between different rowing configurations comprising at least two or more of the following rowing configurations:

- a configuration with one seat (102) centrally arranged between the two hulls (2), with two oars attachments (101) and with two oars (100) mounted on the two oar attachments (101), wherein the two oar attachments (101) and the two oars are arranged such that a person sitting on the centrally arranged seat (102) can row the catamaran with the two oars (100),
- a configuration with two seats (102) at different longitudinal positions and each arranged centrally between the two hulls (2), with four oars attachments (101) and with four oars (100) mounted on the four oar attachments (101), wherein first pair of the oar attachments (101) and first pair of the oars (101) are arranged such that a first person sitting on the first seat can row the catamaran with the first two oars (100), and second pair of the oar attachments (101) and second pair of the oars (100) are arranged such that a second person sitting on the second seat can row the catamaran with the second pair of oars (100),
- a configuration with two seats (103) arranged at the same longitudinal position and with two oar attachments (101) and with two oars (100) mounted on the two oar attachments (101), a first one of the two seats (103) arranged on a first lateral side and the second one of the two seats at the second lateral side, wherein a first one of the two oar attachments (101) and a first one of the two oars (100) are arranged such that a person sitting on the first seat (103) can row the catamaran with the first one of the two oars (100), wherein a second one of the two oar attachments (101) and a second one of the two oars (100) are arranged such that a person sitting on the second seat (103) can row the catamaran with the second one of the two oars (100),
- a configuration with four seats (103) and with four oars attachments (101) and with four oars (100) mounted on the four oar attachments (101), a first one of the four seats (103) arranged on a first lateral side and a first longitudinal position, a second one of the four seats (103) arranged on a second lateral side and the first longitudinal position, a third one of the four seats (103) arranged on the first lateral side and a second longitudinal position, a fourth one of the four seats (103) arranged on the second lateral side and the second longitudinal position, wherein a first one of the four oar attachments (101) and a first one of the four oars (100) are arranged such that a person sitting on the first one of the seats (103) can row the catamaran with the first one of the oars (100), wherein a second one of the four oar attachments (101) and a second one of the four oars (100) are arranged such that a person sitting on the second one of the seats can row the catamaran with the second one of the oars (100), wherein a third one of the four oar attachments (101) and a third one of the four oars (100) are arranged such that a person sit-

ting on the third one of the seats (103) can row the catamaran with the third one of the oars (100), wherein a fourth one of the four oar attachments (101) and a fourth one of the four oars (100) are arranged such that a person sitting on the fourth one of the seats can row the catamaran with the fourth one of the oars (100),
- a configuration in which the at least one seat (102, 103) is mounted with a fixed longitudinal position on the bridge and/or the at least one seat has a first height,
- a configuration in which the at least one seat (104) is mounted such on the bridge that the seat (104) is movable along a longitudinal direction and/or in which the at least one seat has a second height being smaller than the first height and/or in which a feet support is mounted in a fixed longitudinal position on the bridge for each of the at least one movable seat.

10. Catamaran according to one of the previous claims, wherein the catamaran comprises in the sailing configuration a mast attachment, a mast (200) mounted on the mast attachment and a sail (203) mounted on the mast (200).

11. Catamaran according to the previous claim, wherein the mast attachment provides a rigid attachment for the lower end of the mast (200) in order to support the lower end of the mast (200) such that the mast (200) is hold in a roughly vertical direction without the need of further holding the mast (200), wherein the mast attachment is arranged in centre between the two hulls (2).

12. Catamaran according to the previous claim, wherein the mast attachment comprises a steady mast attachment (41) and a demountable mast attachment (202) which is mounted in the sailing configuration in the steady mast attachment (41) and which supports the mast (200).

13. Catamaran according to one of claims 11 to 12, wherein the mast (200), the sail (203) and/or the demountable mast attachment (202) is/are demountable in another driving configuration than the sailing configuration.

14. Catamaran according to one of the previous claims, wherein the catamaran comprises in the sailing configuration a mast attachment, a mast (200) mounted on the mast attachment and a sail (203) mounted on the mast (200), wherein the catamaran in the rowing configuration comprises at least two oar attachments (101) and at least two oars (100), wherein each of the at least two oars (100) is supported by one of the at least two oar attachments (101), wherein the demounted mast (200), the demounted sail (203) and/or the demounted at least two oars (100)are storable in a storage compartment (8) in the catamaran, wherein the storage compartment is arranged in the bridge (3), wherein the storage compartment (8) extends with its longitudinal axis preferably along the longitudinal axis and/or the symmetry axis of the bridge (3).

15. Catamaran according to the previous claim, wherein each hull (2) comprises at least two bridge attachment recesses (21) for fixing the bridge to the respective hull (2), each bridge attachment recess (21) comprises an expansion chamber (211) with a larger diameter than the entrance opening of the bridge attachment recess (21), wherein the bridge (3) comprises at least four through holes (42) aligned with the at least four bridge attachment recesses (21), wherein each through hole of the bridge (42, 52) is fixed to the respective bridge attachment recess (21) by an expansion pin (7) which extends through the through hole (42, 52) into the bridge attachment recess (21), wherein the extension pin (7) can be switched between a locked state and an open state, wherein the extension pin (7) comprises an expansion portion (71) which has a locked diameter and a locked length in the locked state and has an open diameter smaller than the locked diameter and an open length larger than the locked length, wherein the expansion portion (71) expands in the locked state in the expansion chamber (211) to lock the expansion pin (7) in the bridge attachment recess (21).

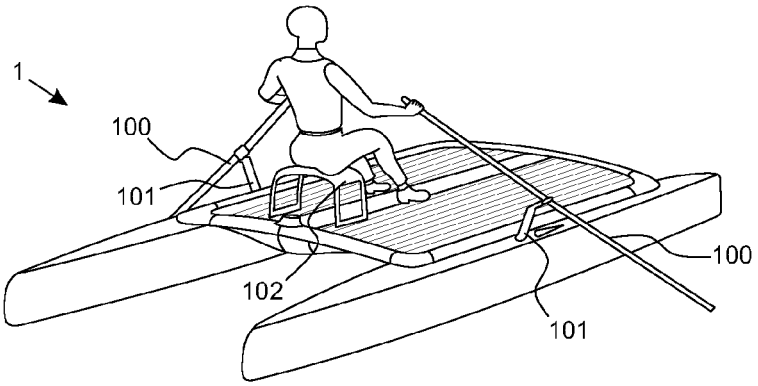

Fig. 1

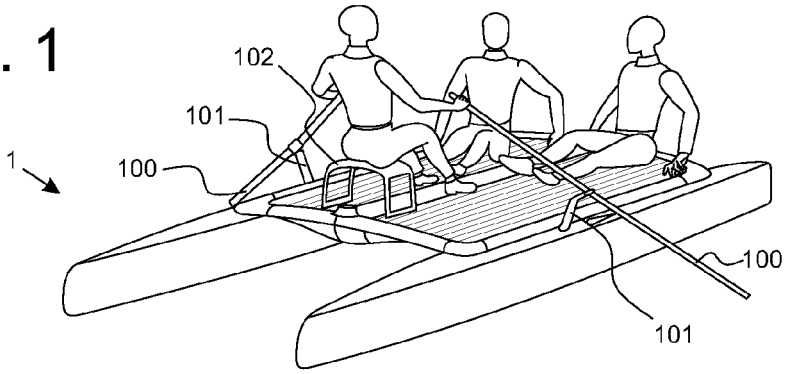

Fig. 2

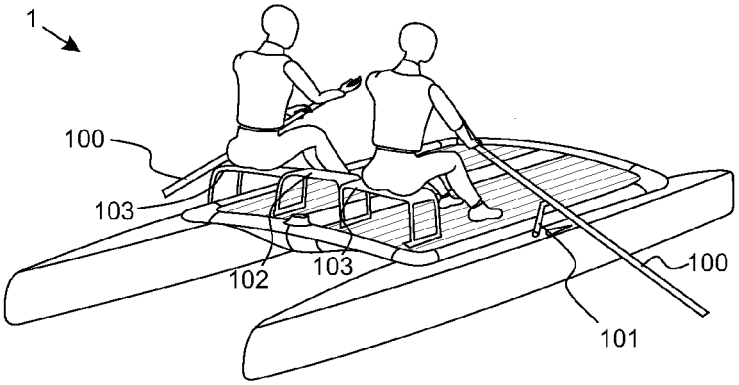

Fig. 3

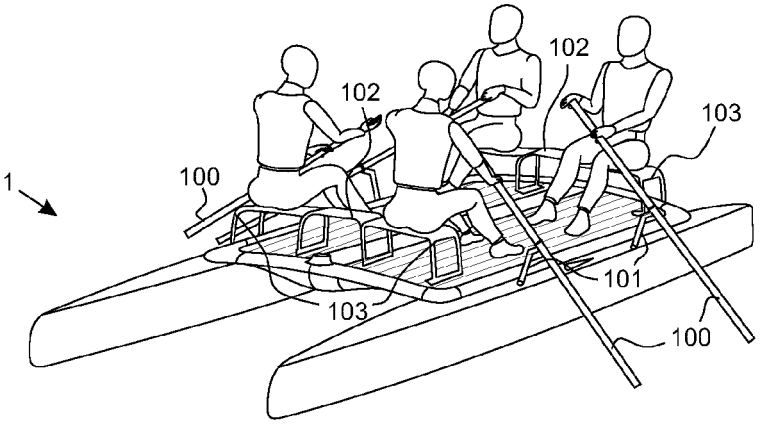

Fig. 4

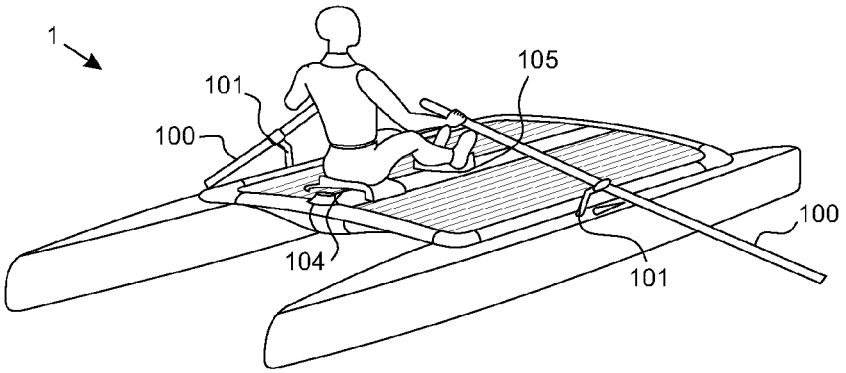

FIG. 5

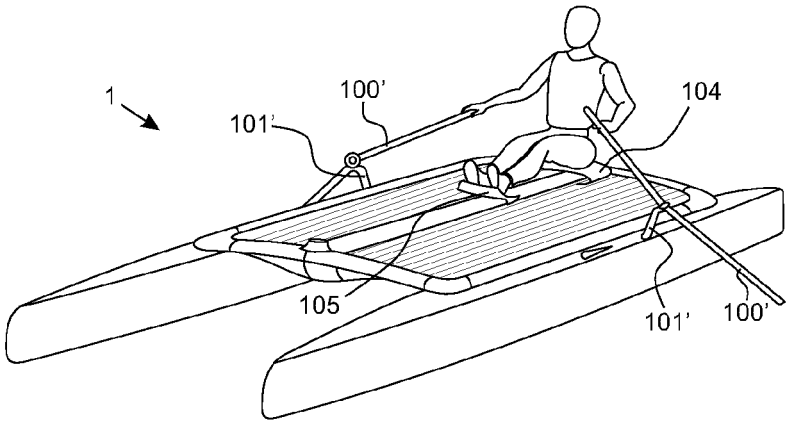

FIG. 6

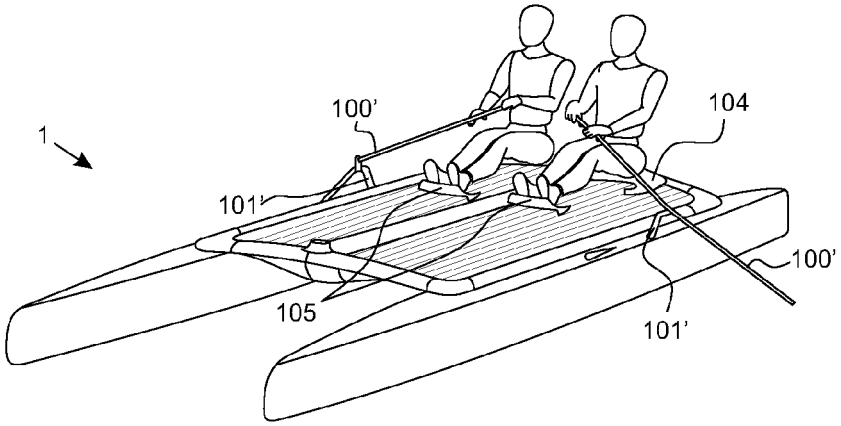

FIG. 7

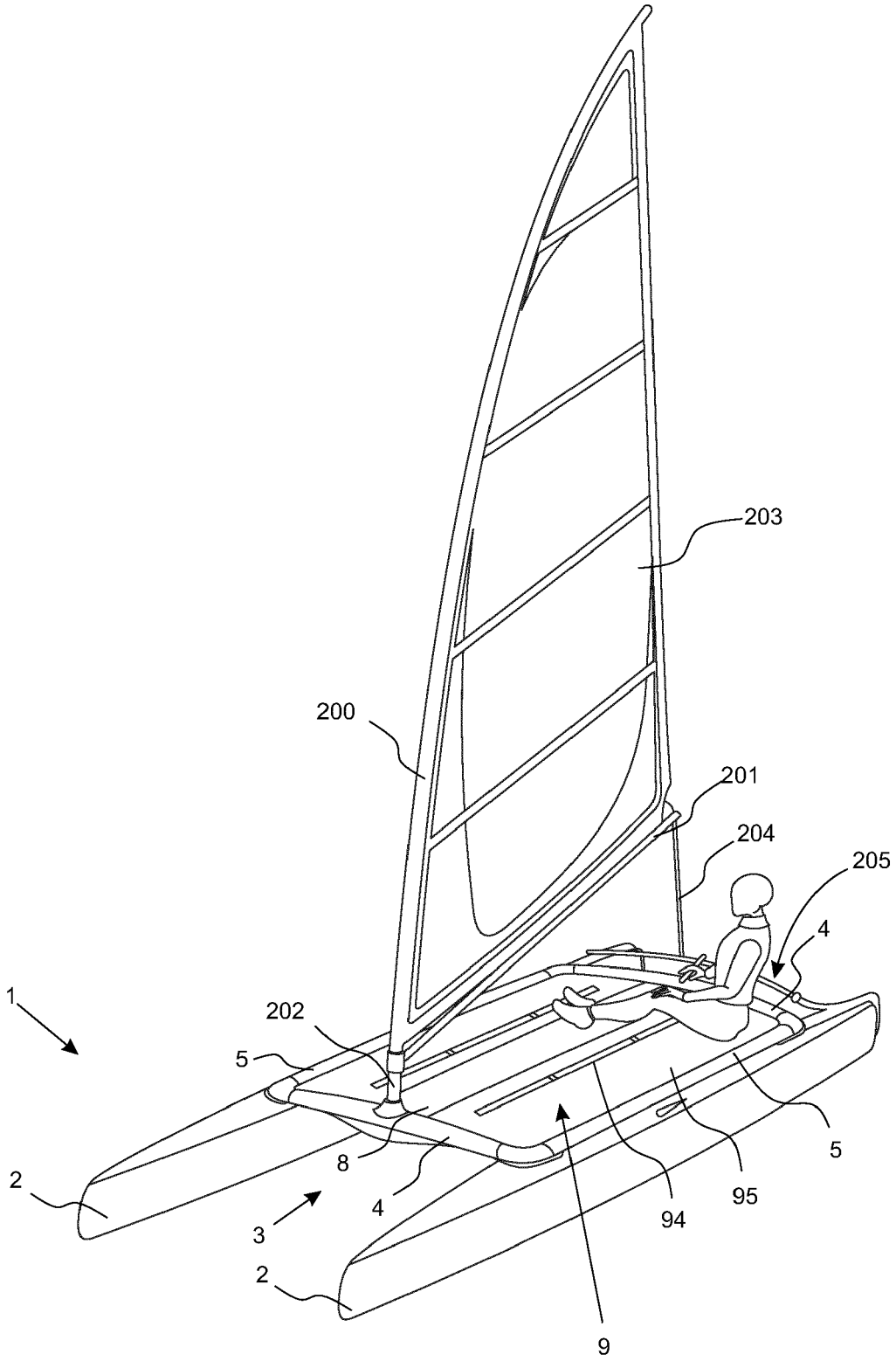

Fig. 8

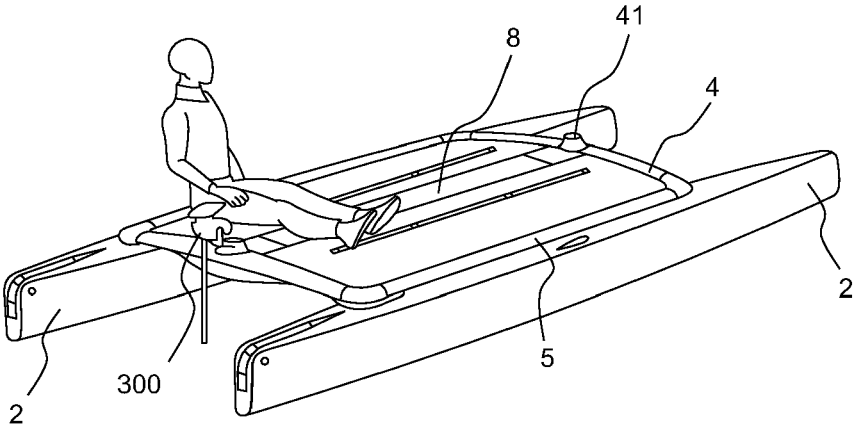

Fig. 9

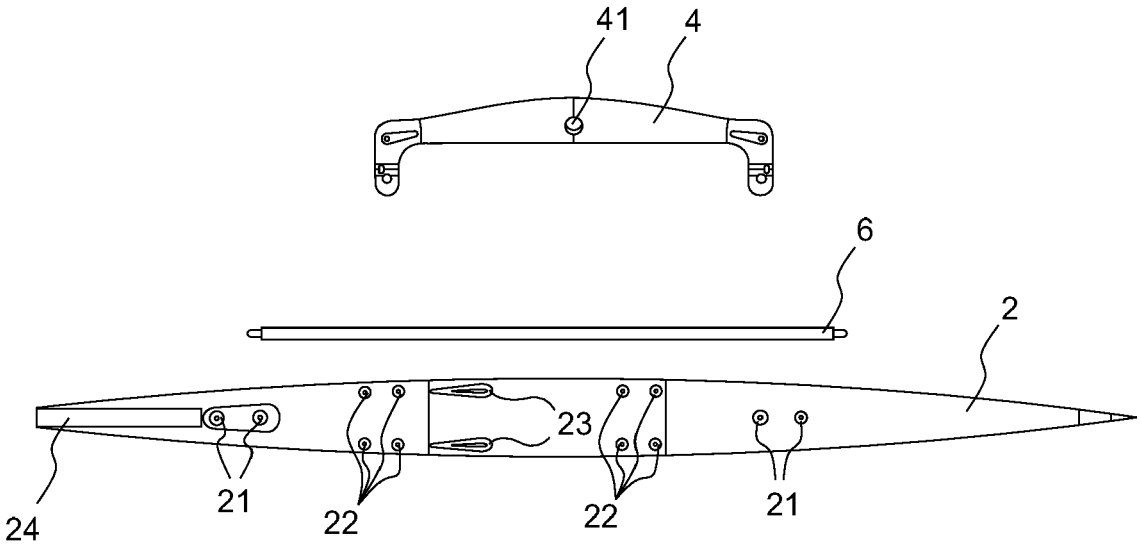

Fig. 10

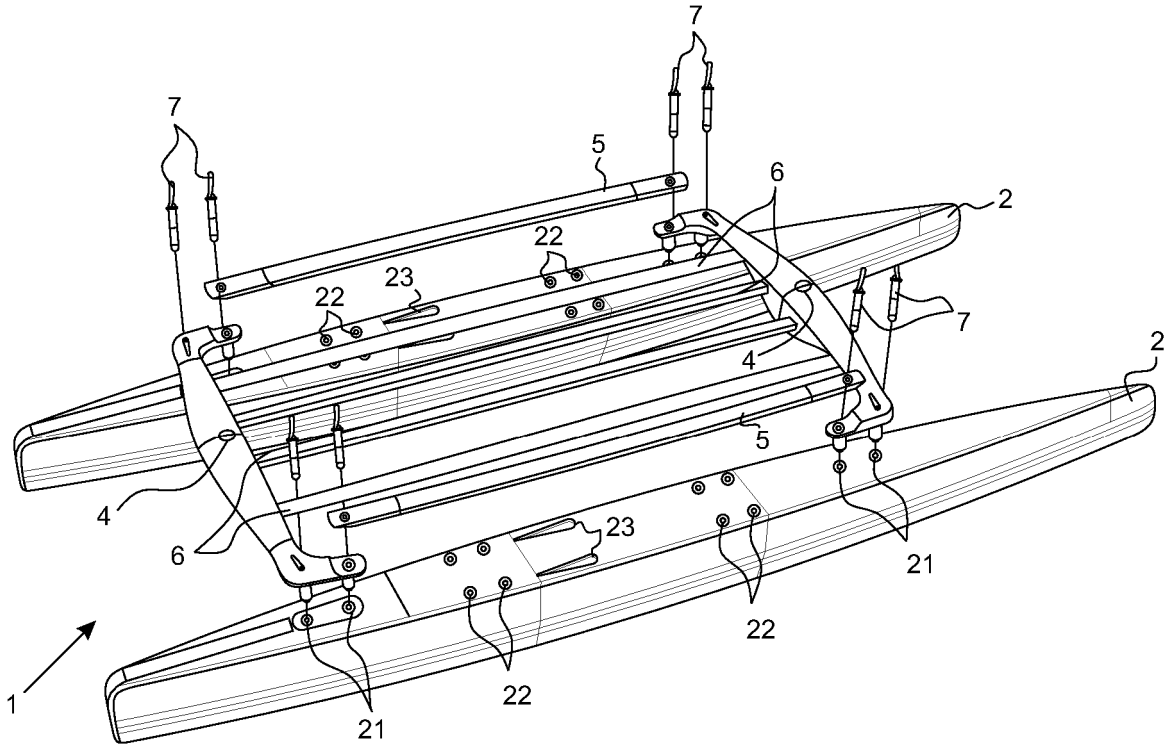

Fig. 11A

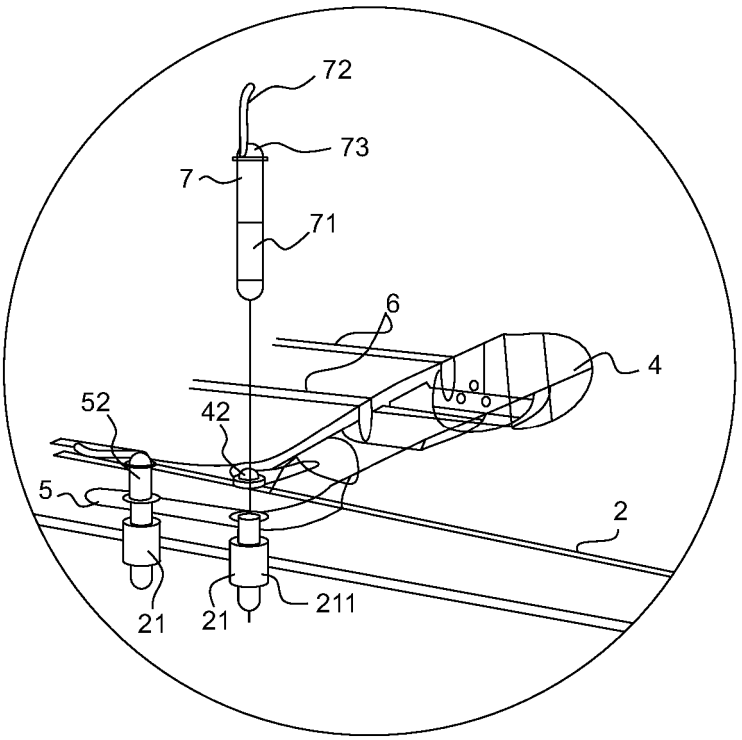

Fig. 11B

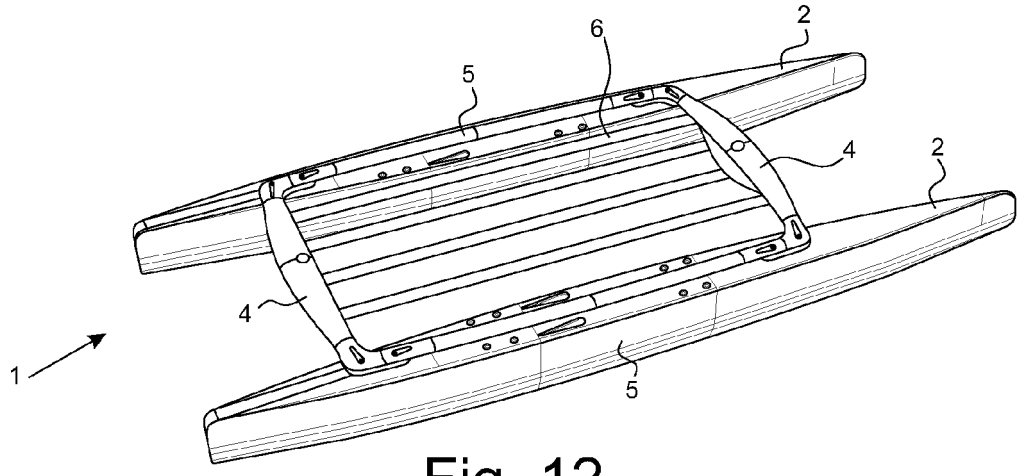

Fig. 12

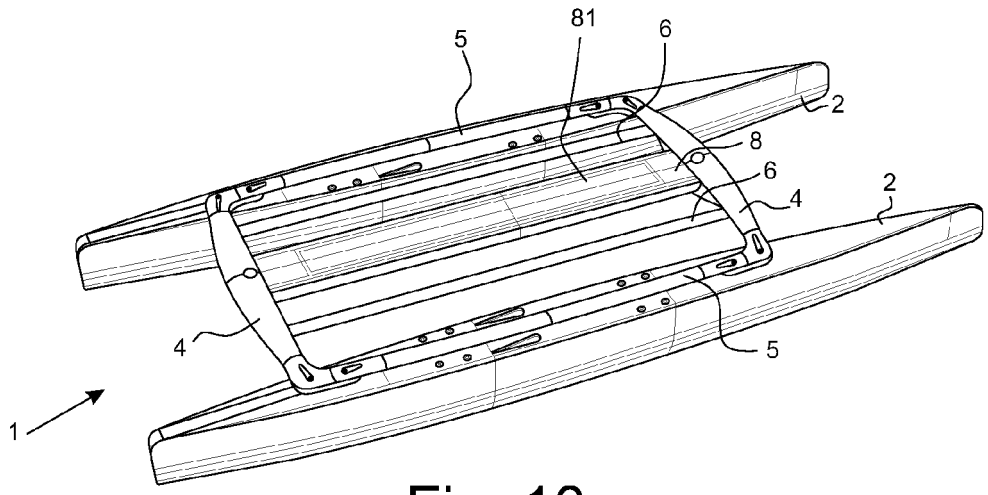

Fig. 13

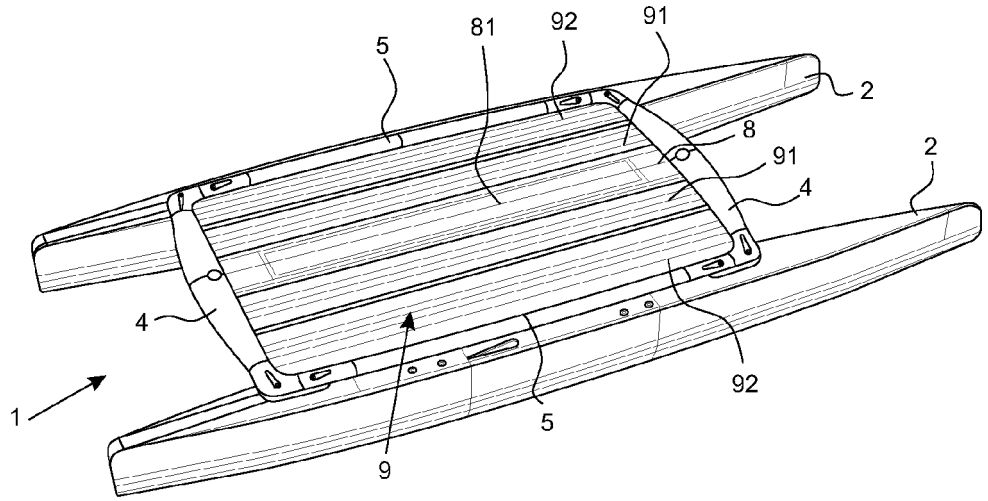

Fig. 14

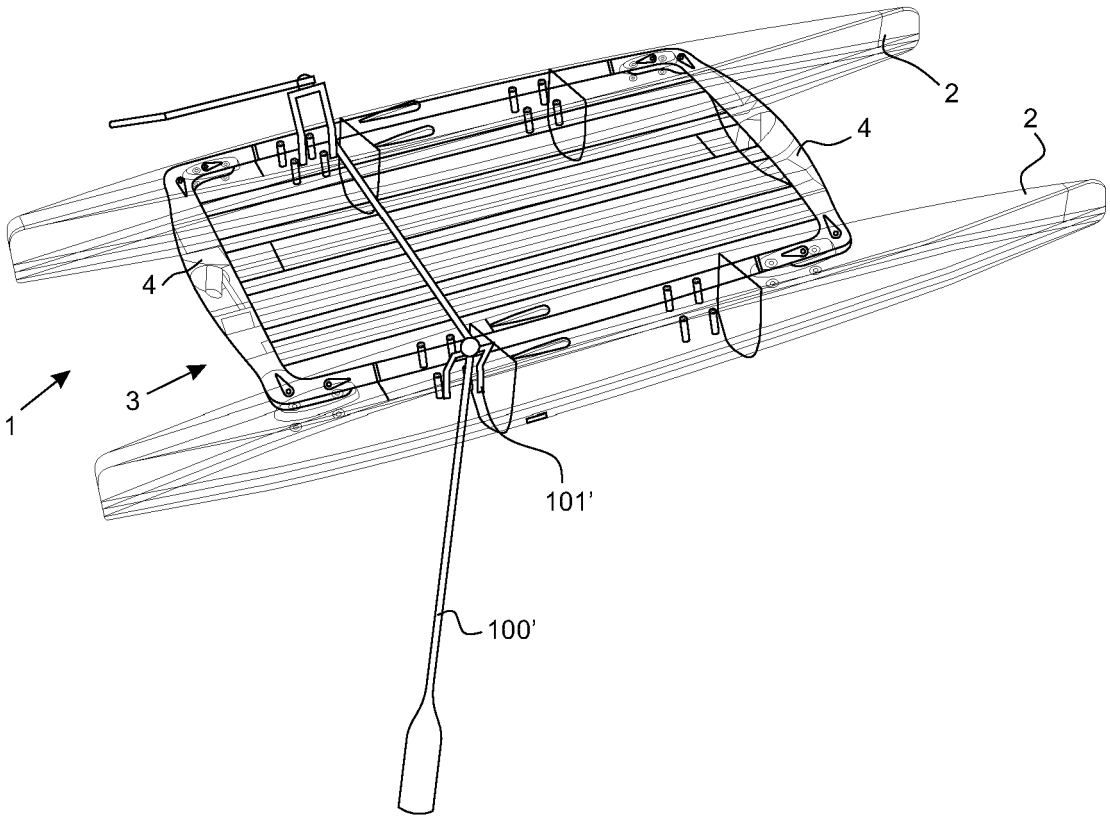

Fig. 16

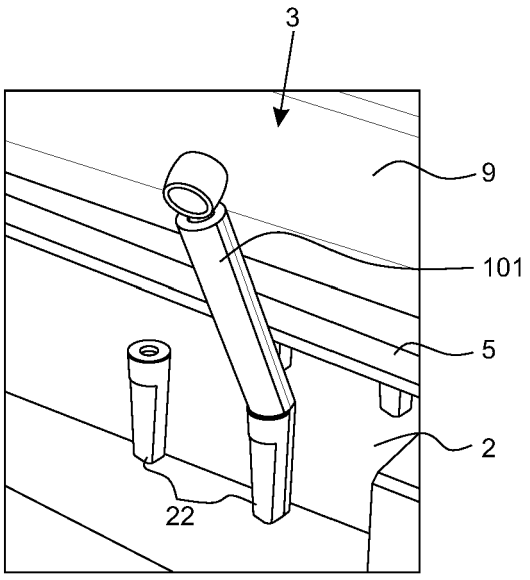

Fig. 15

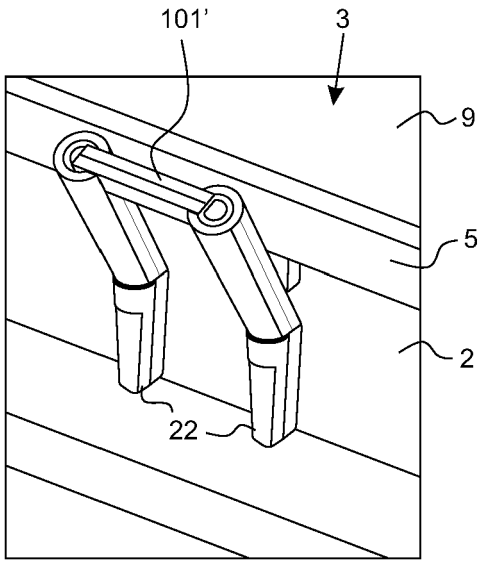

Fig. 17

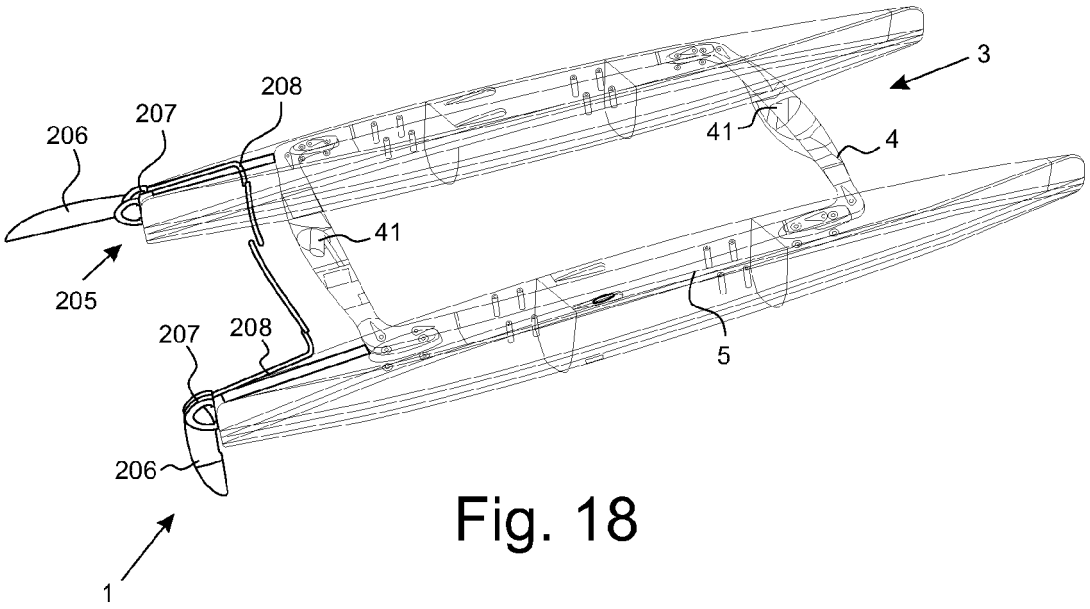

Fig. 18

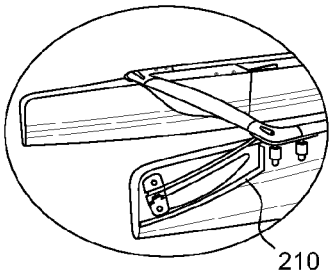

Fig. 19

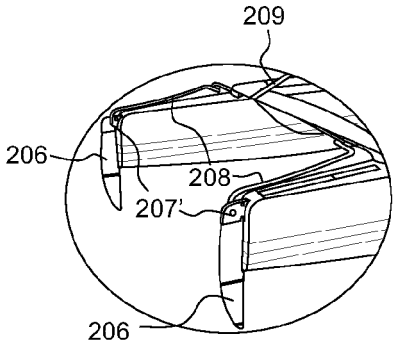

Fig. 20

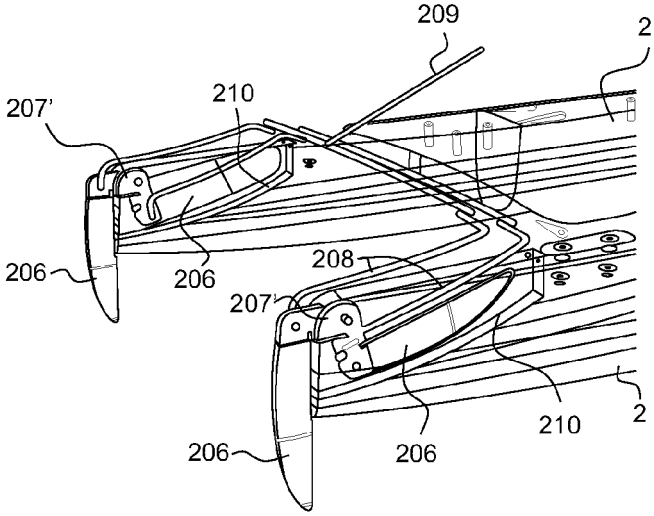

Fig. 21

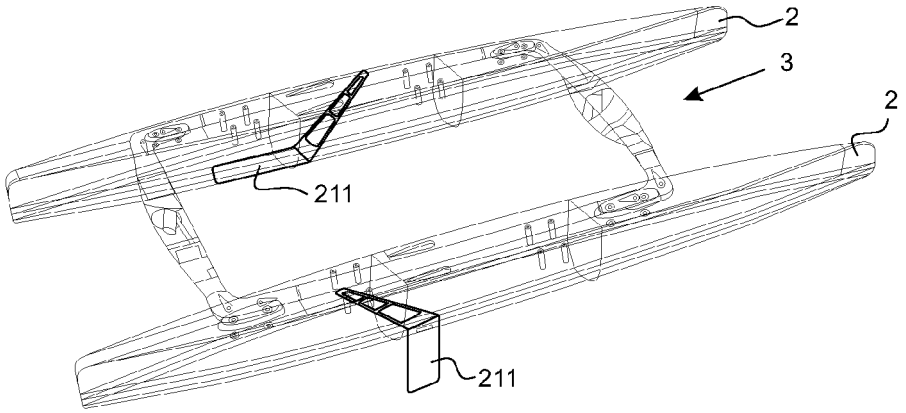

Fig. 22

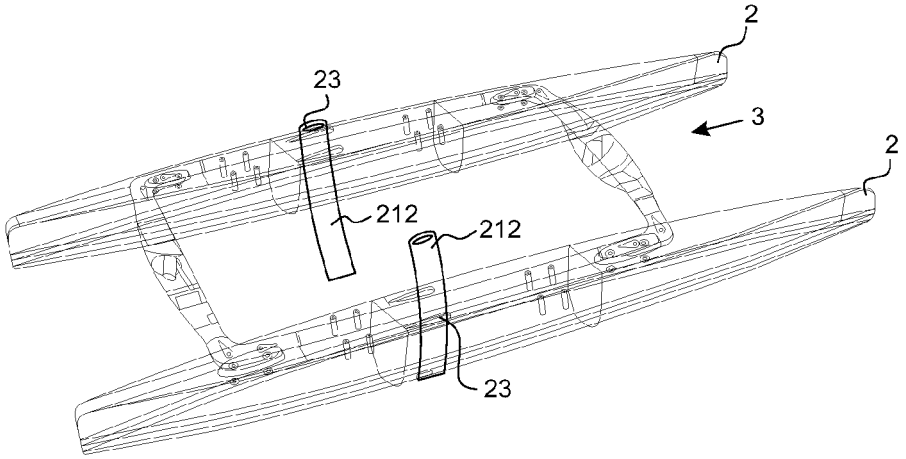

Fig. 23

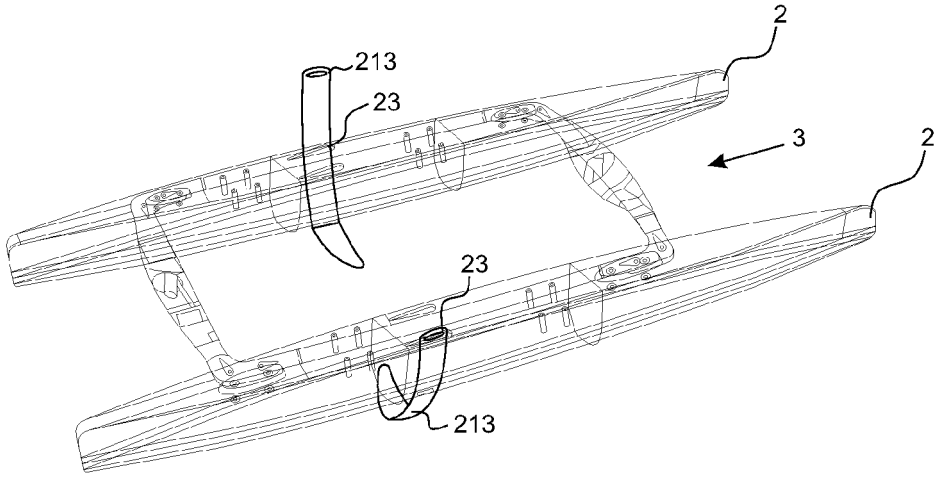

Fig. 24

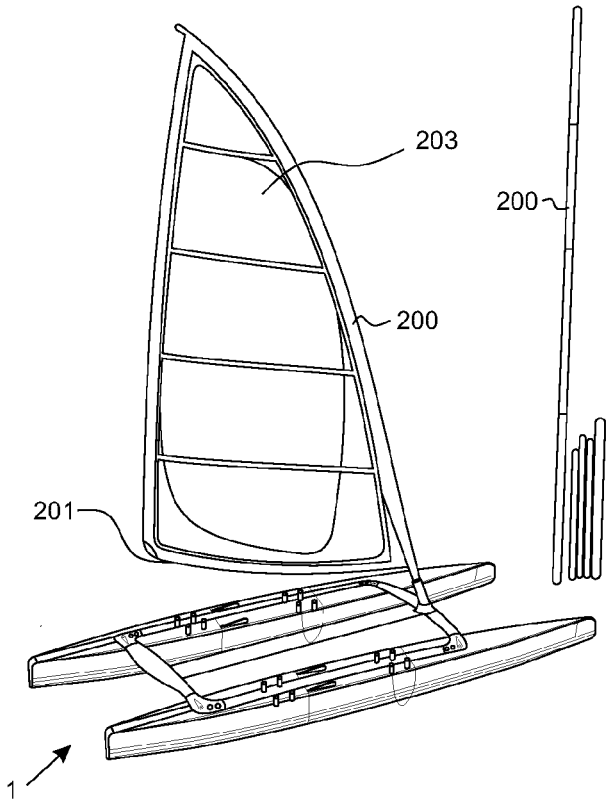

Fig. 25

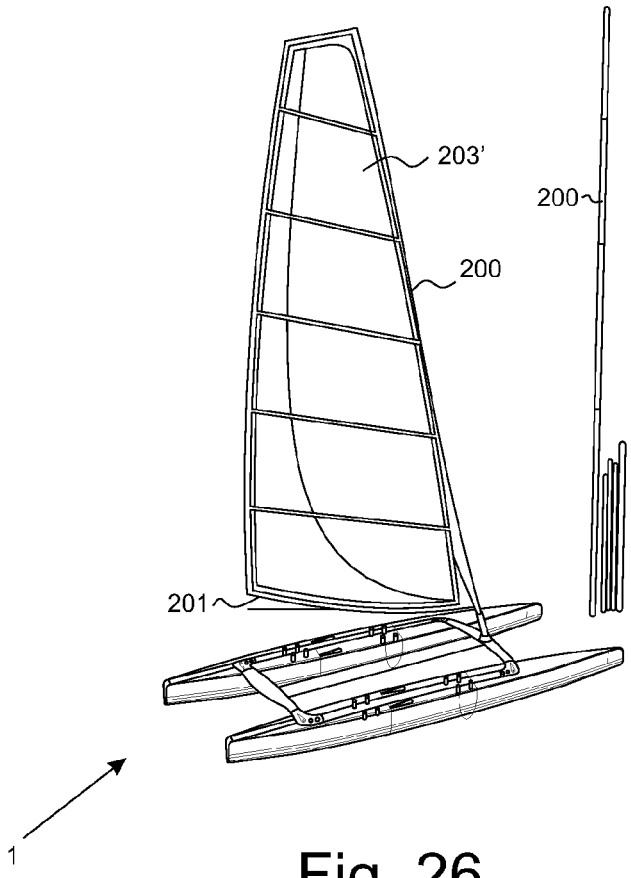

Fig. 26

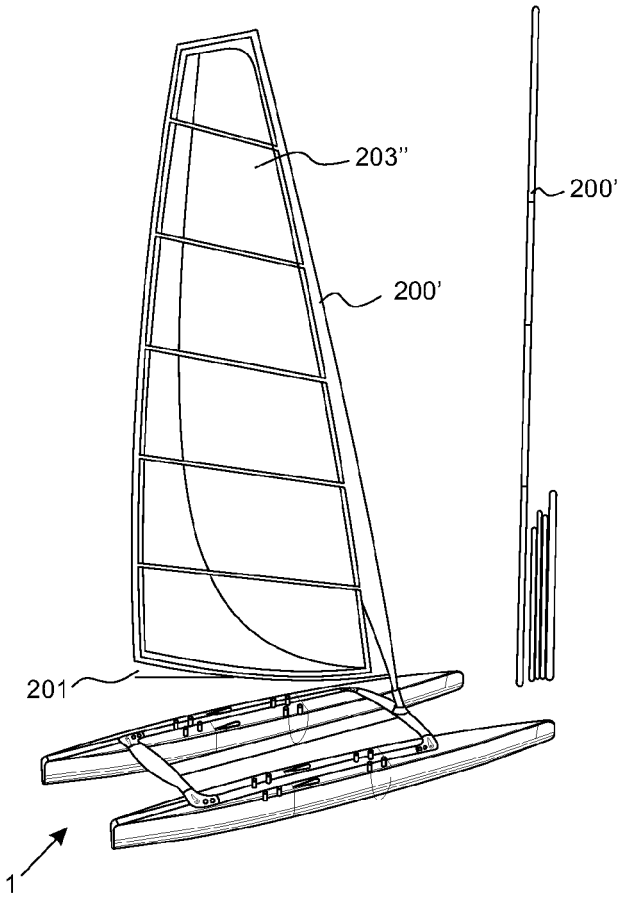

Fig. 27

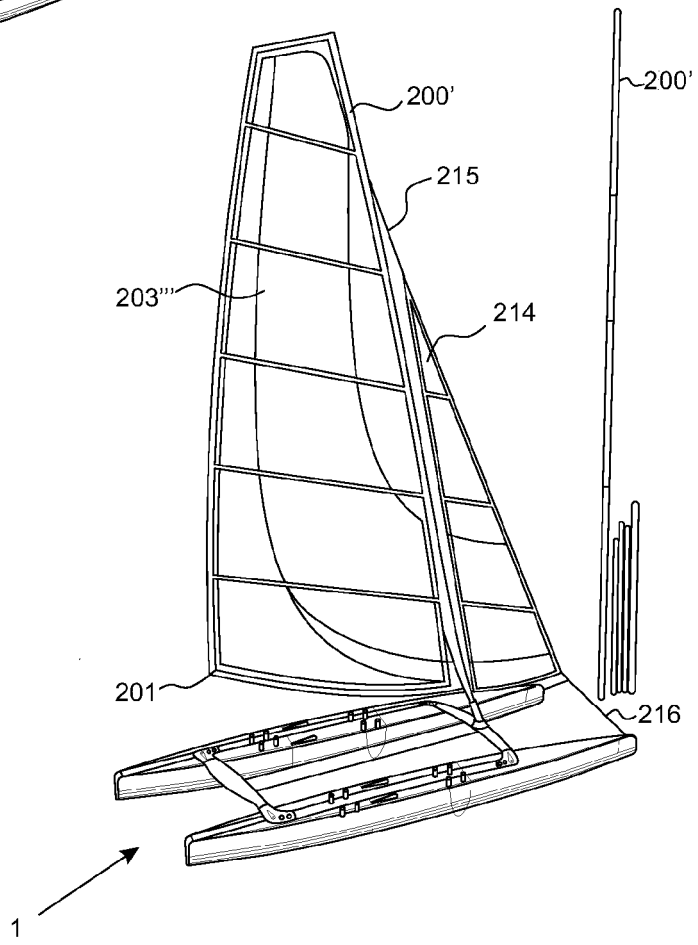

Fig. 28

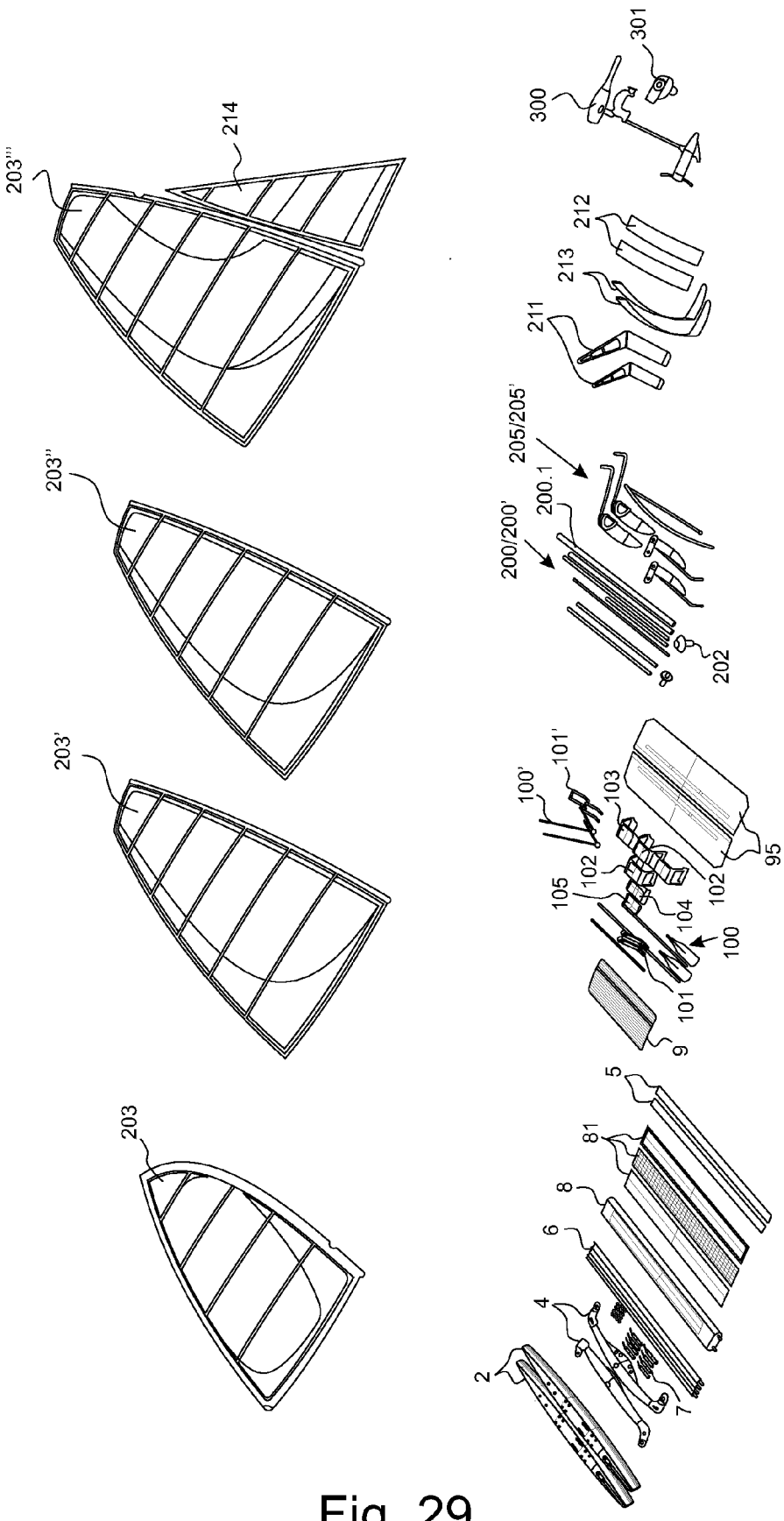
203'''
214
203''
203'
203
300
301
212
213
211
205/205'
200.1
200/200'
202
100'
101'
103
95
102
105
104
100
101
9
5
81
8
6
4
7
2

Fig. 29

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EUROPEAN SEARCH REPORT

Application Number
EP 20 16 9228

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	10 August 2020	Mauriès, Laurent

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