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(54) **A sailboat**

(57) A sailboat is provided, which could use left and right jibs alternately to operate the sailboat without using mainsail. The advantages of the sailboat are the shorter route to the destination, and more efficiently and economically in production. The mast of the sailboat is set on the centerline of the sailboat. A function of helm that turns the sailboat towards the windward can be substituted

by hanging the jib on the mast set from midship to stern in the centerline of the sailboat. In addition, when the sailboat sails downwind, one end of each jib on the starboard side and the port side could be untied to make jibs become spinnakers. If sailor wants to use a traditional spinnaker, it also could be rigged by connecting the traditional spinnaker to the mast-end and the starboard side and the port side.

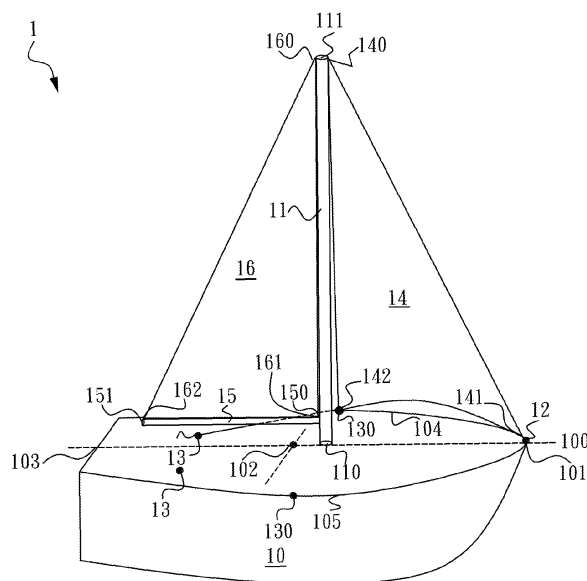


FIG. 1A (Prior Art)

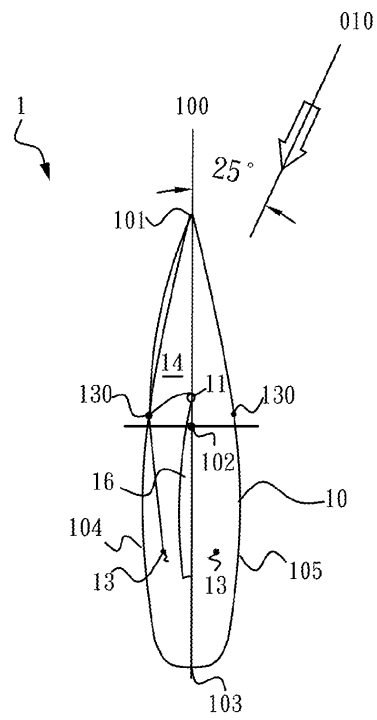


FIG. 1B (Prior Art)

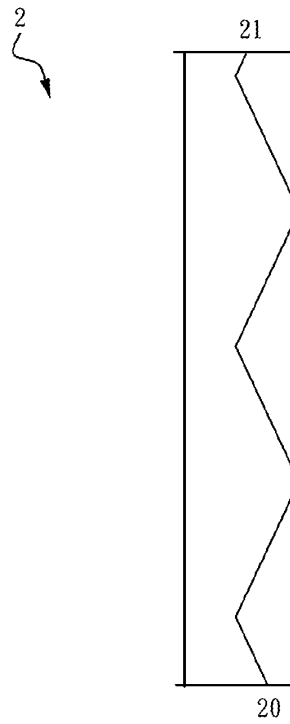


FIG. 1C (Prior Art)

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a sailboat, and more particularly, to a sailboat with left and right jibs.

BACKGROUND OF THE INVENTION

[0002] At present, a great number of sailboat-types may be distinguished. Apart from size, sailboats may be distinguished by the number of masts being established and thus can be divided into two categories, i.e. single-masted sailboats and multi-masted sailboats. It is noted that the multi-masted sailboats include double-masted sailboats and three-masted sailboats, but are not limited thereby. Moreover, traditional sailboats are monohulls, but multi-hull catamarans and trimarans are gaining popularity.

[0003] If a monohull sailboat has only one mast, it is a single-masted monohull sailboat; and if there is more than one mast on a sailboat, it can be a multi-masted monohull sailboat. In this embodiment, the sailboat is a single-masted sailboat, but it is not limited thereby. Please refer to FIG. 1A, which is a schematic diagram showing a conventional single-masted monohull sailboat. As shown in FIG. 1A, the single-masted monohull sailboat 1 includes: a hull 10, a mast 11, a fixing element 12, a winch 13, a pulley 130, a jib 14, a boom 15 and a mainsail 16, in which the hull 10 is further configured with a center line 100, a bow 101, a midship 102, a stem 103, a port side 104 and a starboard side 105; the mast 11 is configured with a first end 110 and a second end 111 at positions opposite to each other while coupling the first end 110 to the center line 100 at a position between the bow 101 and the stem 103 as the center line 100 is arranged connecting the bow 101 and the stem 103, i.e. the center line 100 is the fore-aft center line of the sailboat 1; the fixing element 12 is disposed at the bow 101 of the hull 10; the winch 13 is disposed on the hull 10; the pulley 130 is coupled to either the starboard side 105 or the port side 104; the jib 14, being configured with a plurality of ends, is configured with a first end 140, a second end 141 and a third end 142 in this embodiment in a manner that the first end 140 is connected to the second end 111 of the mast 11, the second end 141 is connected to the fixing element 12, and the third end 142 is connected to the winch 13 by way of the pulley 130; the boom 15 is configured with a first end 150 and a second end 151 at positions opposite to each other while enabling the first end 150 to be coupled with the mast 11; the mainsail 16, being configured with a plurality of ends, is configured with a first end 160, a second end 161 and a third end 162 in this embodiment in a manner that the first end 160 of the mainsail 16 is coupled to the second end 111 of the mast 11, the second end 161 of the mainsail 16 is coupled to the first end 150 of the boom 15, and the third end 162 of the mainsail 16 is coupled to the second end

151 of the boom 15.

[0004] It is noted that the maneuvering and movement of a conventional single-masted monohull sailboat is dependent upon the ability to adjust the windward angles of its jib 14 and mainsail 16. Please refer to FIG. 1B, which is a top view of a conventional single-masted monohull sailboat. As shown in FIG. 1B, the current sail configuration enables the sailboat 1 to be driven by the wind coming from a direction 010 at an included angle not smaller than 25 degrees with respect to the center line 100, that is, if the included angle between the wind direction 010 and the center line 100 is smaller than 25 degrees, the wind will not be able to be used by sailboat 1 efficiently for driving the sailboat 1 to move accordingly. Therefore, when the included angle between the wind direction 010 and the center line 100 is smaller than 25 degrees, it is required to turn the rudder of the sailboat 1 for changing the path of the sailboat 1 so as to adjust the windward angle. Consequently, the sailing trajectory of the sailboat 1 is a zigzagging path 2 as the one shown in FIG. 1C. As shown in FIG. 1C, depending upon the ability to adjust the windward angles of its jib 14 and mainsail 16 that even when the sailboat 1 is blowing by a wind in an effective windward direction, the sailboat 1 will not be able to move in a straightline to its destination 21, but have to zigzag all the way from the point of departure 20 to the destination 21.

[0005] It is noted that traditional sailboats are mostly monohulls, but multi-hull catamarans and trimarans are gaining popularity; and if a catamaran, i.e. a double-hull sailboat, has only one mast, it is a single-masted catamaran, and if there is more than one mast on a catamaran, it is a multi-masted catamaran. In the embodiment shown in FIG. 2A, the sailboat is a single-masted catamaran 3, but it is not limited thereby. As shown in FIG. 2A, the single-masted catamaran 3 includes: a hull module 30, a mast 31, a fixing element 32, a winch 33, a pulley 330, a jib 34, a boom 35 and a mainsail 36. In addition, the hull module 30 is further configured with: a first hull 300 having a first bow 3000 and a first stern 3001; a second hull 301 having a second bow 3010 and a second stern 3011; a center line 302; a starting end 303, defined to be the frontmost point on the center line 302 where it is intersected with the hull module 30; a midship 304; a terminating end 305, defined to the rear-most point on the center line 302 where it is intersected with the hull module 30; a port side 306; and a starboard side 307; the mast 31 is configured with a first end 310 and a second end 311 at positions opposite to each other while coupling the first end 310 to the center line 100 at a position between the starting end 303 and the midship 304 as the center line 302 is defined to be a line connecting the center between the first bow 3000 and the second bow 3010 and the center between the first stern 3001 and the second stern 3011; the fixing element 32 is disposed at the starting end 303; the winch 33 is disposed on the hull module 30; the pulley 330 is coupled to either the starboard side 307 or the port side 306; the jib 34,

being configured with a plurality of ends, is configured with a first end 340, a second end 341 and a third end 342 in this embodiment in a manner that the first end 340 is connected to the second end 311 of the mast 31, the second end 341 is connected to the fixing element 32, and the third end 342 is connected to the winch 33 by way of the pulley 330; the boom 35 is configured with a first end 350 and a second end 351 at positions opposite to each other while enabling the first end 350 to be coupled with the mast 31; the mainsail 36, being configured with a plurality of ends, is configured with a first end 360, a second end 361 and a third end 362 in this embodiment in a manner that the first end 360 of the mainsail 36 is coupled to the second end 311 of the mast 31, the second end 361 of the mainsail 36 is coupled to the first end 350 of the boom 35, and the third end 362 of the mainsail 36 is coupled to the second end 351 of the boom 35.

[0006] It is noted that the maneuvering and movement of a conventional single-masted catamaran 3 is dependent upon the ability to adjust the windward angles of its jib 34 and mainsail 36. Please refer to FIG. 2B, which is a top view of a conventional single-masted catamaran. As shown in FIG. 2B, the current sail configuration enables the catamaran 3 to be driven by the wind coming from a direction 010 at an included angle not smaller than 42 degrees with respect to the center line 302, that is, if the included angle between the wind direction 010 and the center line 302 is smaller than 42 degrees, the wind will not be able to be used by catamaran 3 efficiently for driving the catamaran 3 to move accordingly. Therefore, when the included angle between the wind direction 010 and the center line 302 is smaller than 42 degrees, it is required to turn the rudder of the catamaran 3 for changing the path of the catamaran 3 so as to adjust the windward angle. Consequently, the sailing trajectory of the catamaran 3 is a zigzagging path 4 as the one shown in FIG. 2C. As shown in FIG. 2C, depending upon the ability to adjust the windward angles of its jib 34 and mainsail 36 that even when the catamaran 3 is blowing by a wind in an effective windward direction, the catamaran 3 will not be able to move in a straightline to its destination 41, but have to zigzag all the way from the point of departure 40 to the destination 41. Thus, according to the sailing trajectories shown in FIG. 1C and FIG. 2C, the moving efficiency of the conventional sailboats with respect to the shorting of voyage distance is not satisfactory.

[0007] In addition, not only as the establishing and fabricating of the boom and mainsail on a sailboat can be a very complex task, the building of a conventional sailboat can be very costly; but also as the smooth sailing of a conventional sailboat depends upon the ability to adjust and control its jib and mainsail, it may require more manpower to operate.

[0008] Therefore, it is in need of a less-expensive, easy-to-operate sailboat with high sailing efficiency that can overcome the aforesaid shortcomings.

SUMMARY OF THE INVENTION

[0009] In view of the disadvantages of prior art, the primary object of the present invention is to provide a less-expensive, easy-to-operate sailboat with high sailing efficiency that is designed to operate its left jib and right jib in an alternating manner and is capable of shorting its voyage distance to a destination effectively.

[0010] In an exemplary embodiment, the present invention provides a sailboat, comprising: a hull module, configured with at least one hull; a mast, configured with a first end and a second end at positions thereof opposite to each other while coupling the first end to a position on a center line of the hull module as the center line is defined to be a line connecting the center of a line passing through each bow of the at least one hull and the center of a line passing through each stern of the at least one hull; a first fixing element, disposed at a position on the left to the center line of the hull module; a first winch, disposed at a position on the left to the center line of the hull module; a first pulley, coupled to a position at the port side of the hull module; a first jib, configured with a first end, a second end and a third end in a manner that the first end of the first jib is connected to the second end of the mast, the second end of the first jib is connected to the first fixing element, and the third end of the first jib is connected to the first winch by way of the first pulley; a second fixing element, disposed at a position on the right to the center line of the hull module; a second winch, disposed at a position on the right to the center line of the hull module; a second pulley, coupled to a position at the starboard side of the hull module; a second jib, configured with a first end, a second end and a third end in a manner that the first end of the second jib is connected to the second end of the mast, the second end of the second jib is connected to the second fixing element, and the third end of the second jib is connected to the second winch by way of the second pulley.

[0011] Further scope of applicability of the present application will become more apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The present invention will become more fully understood from the detailed description given herein below and the accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention and wherein:

[0013] FIG. 1A is a schematic diagram showing a conventional single-masted monohull sailboat.

[0014] FIG. 1B is a top view of the conventional single-

masted monohull sailboat of FIG. 1A.

[0015] FIG. 1C is a schematic diagram illustrating a zigzagging sailing trajectory of the conventional single-masted monohull sailboat of FIG. 1A.

[0016] FIG. 2A is a schematic diagram showing a conventional a single-masted catamaran.

[0017] FIG. 2B is a top view of the conventional single-masted catamaran of FIG. 2A.

[0018] FIG. 2C is a schematic diagram illustrating a zigzagging sailing trajectory of the conventional single-masted catamaran of FIG. 2A.

[0019] FIG. 3A is a schematic diagram showing a single-masted monohull sailboat with fully extended first jib according to an embodiment of the present invention.

[0020] FIG. 3B is a schematic diagram showing a single-masted monohull sailboat with fully extended first jib and a mainsail according to another embodiment of the invention.

[0021] FIG. 3C is a schematic diagram showing a double-masted monohull sailboat with fully extended left jib according to the present invention.

[0022] FIG. 3D is a top view of a single-masted monohull sailboat with fully extended first jib of FIG. 3A.

[0023] FIG. 3E is a schematic diagram illustrating a zigzagging sailing trajectory of the single-masted monohull sailboat of FIG. 3A.

[0024] FIG. 4A is a schematic diagram showing a single-masted monohull sailboat with fully extended first jib according to another embodiment of the present invention.

[0025] FIG. 4B is a schematic diagram showing a single-masted monohull sailboat with fully extended first jib and a mainsail according to another embodiment of the invention..

[0026] FIG. 4C is a top view of a single-masted monohull sailboat with fully extended first jib of FIG. 4A.

[0027] FIG. 4D is a schematic diagram illustrating a zigzagging sailing trajectory of the single-masted monohull sailboat of FIG. 4A.

[0028] FIG. 5A is a schematic diagram showing a single-masted catamaran with fully extended first jib according to an embodiment of the present invention.

[0029] FIG. 5B is a schematic diagram showing a single-masted catamaran with fully extended first jib and a mainsail according to the present invention.

[0030] FIG. 5C is a schematic diagram showing a double-masted catamaran with fully extended left jib according to the present invention.

[0031] FIG. 5D is a top view of a single-masted catamaran with fully extended first jib of FIG. 5A.

[0032] FIG. 5E is a schematic diagram illustrating a zigzagging sailing trajectory of the single-masted catamaran of FIG. 5A.

[0033] FIG. 6A is a schematic diagram showing a single-masted catamaran with fully extended first jib according to another embodiment of the present invention.

[0034] FIG. 6B is a schematic diagram showing a single-masted catamaran with fully extended first jib and a

mainsail according to the present invention.

[0035] FIG. 6C is a top view of a single-masted catamaran with fully extended first jib of FIG. 6A.

[0036] FIG. 6D is a schematic diagram illustrating a zigzagging sailing trajectory of the single-masted catamaran of FIG. 6A.

[0037] FIG. 7A is a top view of a single-masted monohull sailboat with its two jib fully extended according to the present invention.

[0038] FIG. 7B is a top view of a single-masted monohull sailboat using conventional spinnakers.

[0039] FIG. 8A is a top view of a single-masted catamaran with its two jibs fully extended according to the present invention.

[0040] FIG. 8B is a top view of a single-masted catamaran using conventional spinnakers.

DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

[0041] For your esteemed members of reviewing committee to further understand and recognize the fulfilled functions and structural characteristics of the invention, several exemplary embodiments cooperating with detailed description are presented as the follows.

[0042] Please refer to FIG. 3A and FIG. 4A, which are schematic diagrams showing a single-masted monohull sailboat with fully extended first jib and no mainsail according to two different embodiments of the present invention. It is noted that although the sailboats shown in FIG. 3A and FIG. 4A is a single-masted monohull sailboat 5, the amount of mast is not limited thereby. In the two embodiments shown in FIG. 3A and FIG. 4A, the single-masted monohull sailboat 5 includes: a hull 50, a mast 51, a first fixing element 52, a second fixing element 53, a first winch 54, a second winch 55, a first pulley 540, a second pulley 550, a first jib 56, a second jib 57, in which the hull 50 is further configured with a center line 500, a bow 501, a midship 502, a stem 503, a port side 504 and a starboard side 505. The mast 51 is configured with a first end 510 and a second end 511 at positions opposite to each other while coupling the first end 510 to the center line 500 at any position between the bow 501 and the stern 503 as the center line 500 is arranged connecting the bow 501 and the stem 503, i.e. the center line 500 is the fore-aft center line of the sailboat 5. The first fixing element 52 is disposed at the port side 504 of the hull 50 while the first winch 54 is disposed at a position on the left to the center line 500 of the hull 50. The first pulley 540 is coupled to the port side 504 of the hull 50; the first jib 56, is configured with a plurality of ends including a first end 560, a second end 561 and a third end 562 in a manner that the first end 560 is connected to the second end 511 of the mast 51, the second end 561 is connected to the first fixing element 52, and the third end 562 is connected to the first winch 54 by way of the first pulley 540. The second fixing element 53 is disposed at the starboard side 505 of the hull 50 while the first winch 55

is disposed at a position on the right to the center line 500 of the hull 50. The second pulley 550 is coupled to the starboard side 505 of the hull 50. The second jib 57, is configured with a plurality of ends including a first end 570, a second end 571 and a third end 572 in a manner that the first end 570 is connected to the second end 511 of the mast 51, the second end 571 is connected to the second fixing element 53, and the third end 572 is connected to the second winch 55 by way of the second pulley 550. It is noted that the difference of the two embodiments is that: in FIG. 3A, the first end 510 of the mast 51 is disposed at a position on the center line 500 between the midship 502 and the stem 503, and in FIG. 4A, the first end 510 of the mast 51 is disposed at a position on the center line 500 between the bow 501 and the midship 502.

[0043] Generally, the first jib 56 and the second jib 57 will not be used simultaneously unless the sailboat 5 is sailing with a tailwind, but are used alternatively and selectively according to the direction of wind. That is, when the air heading is blowing toward the sailboat 5 from its starboard side 505, the first jib 56 is expanded and used; otherwise, when the air heading is blowing toward the sailboat 5 from its port side 504, the second jib 57 is expanded and used. Accordingly, when the first jib 56 is expanded, the second jib 57 can be rolled up and furled by the rig connecting the first end 570 and the second end 571 of the second jib 57 for pulling and receiving the third end 572 of the second jib 57 to a position between the first and the second ends 570, 571. On the other hand, in response to the wind direction change that it is intended to expand the second jib 57, the first jib 56 should be furled and rolled up similarly while rigging the third end 572 of the second jib 57 to the second winch 55 by way of the second pulley 550.

[0044] Please refer to FIG. 3B and FIG. 4B, which are schematic diagrams showing a single-masted monohull sailboat with fully extended first jib and a mainsail according to another two embodiments of the invention. It is noted that although the sailboats shown in FIG. 3B and FIG. 4B is a single-masted monohull sailboat 5, the amount of mast is not limited thereby. As shown in FIG. 3B and FIG. 4B, the single-masted monohull sailboat 5 includes: a hull 50, a mast 51, a first fixing element 52, a second fixing element 53, a first winch 54, a second winch 55, a first pulley 540, a second pulley 550, a first jib 56, a second jib 57, a boom 58 and a mainsail 59, in which the hull 50 is further configured with a center line 500, a bow 501, a midship 502, a stem 503, a port side 504 and a starboard side 505. The mast 51 is configured with a first end 510 and a second end 511 at positions opposite to each other while coupling the first end 510 to the center line 500 at any position between the bow 501 and the stem 503 as the center line 500 is arranged connecting the bow 501 and the stem 503, i.e. the center line 500 is the fore-aft center line of the sailboat 5. The first fixing element 52 is disposed at the port side 504 of the hull 50 while the first winch 54 is disposed at a position

on the left to the center line 500 of the hull 50. The first pulley 540 is coupled to the port side 504 of the hull 50. The first jib 56, is configured with a plurality of ends including a first end 560, a second end 561 and a third end 562 in a manner that the first end 560 is connected to the second end 511 of the mast 51, the second end 561 is connected to the first fixing element 52, and the third end 562 is connected to the first winch 54 by way of the first pulley 540. The second fixing element 53 is disposed at the starboard side 505 of the hull 50 while the first winch 55 is disposed at a position on the right to the center line 500 of the hull 50. The second pulley 550 is coupled to the starboard side 505 of the hull 50. The second jib 57, is configured with a plurality of ends including a first end 570, a second end 571 and a third end 572 in a manner that the first end 570 is connected to the second end 511 of the mast 51, the second end 571 is connected to the second fixing element 53, and the third end 572 is connected to the second winch 55 by way of the second pulley 550. It is noted that the difference of the two embodiments is that: in FIG. 3A, the first end 510 of the mast 51 is disposed at a position on the center line 500 between the midship 502 and the stem 503, and in FIG. 4A, the first end 510 of the mast 51 is disposed at a position on the center line 500 between the bow 501 and the midship 502.

[0045] Generally, the first jib 56 and the second jib 57 will not be used simultaneously unless the sailboat 5 is sailing with a tailwind, but are used alternatively and selectively according to the direction of wind. That is, when the air heading is blowing toward the sailboat 5 from its starboard side 505, the first jib 56 is expanded and used. Otherwise, when the air heading is blowing toward the sailboat 5 from its port side 504, the second jib 57 is expanded and used. Accordingly, when the first jib 56 is expanded, the second jib 57 can be rolled up and furled by the rig connecting the first end 570 and the second end 571 of the second jib 57 for pulling and receiving the third end 572 of the second jib 57 to a position between the first and the second ends 570, 571. On the other hand, in response to the wind direction change that it is intended to expand the second jib 57, the first jib 56 should be furled and rolled up similarly while rigging the third end 572 of the second jib 57 to the second winch 55 by way of the second pulley 550.

[0046] Moreover, the boom 58 is configured with a first end 580 and a second end 581 at positions opposite to each other while enabling the first end 580 to be coupled with the mast 51; and the mainsail 59 is configured with a plurality of ends including a first end 590, a second end 591 and a third end 592 in a manner that the first end 591 of the mainsail 59 is coupled to the second end 511 of the mast 51, the second end 591 of the mainsail 59 is coupled to the first end 580 of the boom 58, and the third end 592 of the mainsail 59 is coupled to the second end 581 of the boom 58.

[0047] Please refer to FIG. 3C, which is a schematic diagram showing a double-masted monohull sailboat

with fully extended left jib according to the present invention. Although there are only jibs rigged on the masts of the double-masted monohull sailboat shown in FIG. 3C, each of the mast in FIG. 3C can be rigged with a boom and a mainsail so that it is not limited thereby.

[0048] The monohull sailboat of the present invention is different from those conventional monohull sailboat in that:

(1) The monohull sailboat of the present invention is designed to operate its left jib and right jib in an alternating manner so that it is able to operate without the mainsail and boom that are expensive and difficult to build;

(2) There are different amounts of fixing elements being arranged on the monohull sailboat of the present invention as well as their positions, that is, the monohull sailboat of the present invention is configured with two fixing elements respectively at its port side and starboard side with respect to the left jib and the right jib of the monohull sailboat, so that, comparing with those conventional monohull sailboats, the included angle between the sail and the center line is increased and thus the monohull sailboat of the present invention is able to sail under a wind blowing in a wind direction 010 with smaller included angle comparing with those conventional monohull sailboats, as the top view of a single-masted monohull sailboat shown in FIG. 3D that the sailboat can be driven by the wind coming from a direction 010 at an included angle not smaller than 17 degrees with respect to the center line, that is, if the included angle between the wind direction 010 and the center line is no smaller than 17 degrees, the wind can be used by sailboat efficiently for driving the sailboat to move accordingly, and also as another top view of a single-masted monohull sailboat shown in FIG. 4C that the sailboat can be driven by the wind coming from a direction 010 at an included angle not smaller than 4 degrees with respect to the center line, that is, if the included angle between the wind direction 010 and the center line is no smaller than 4 degrees, the wind can be used by sailboat efficiently for driving the sailboat to move accordingly; and

(3) Different from the conventional sailboat that the mast is erected at a position on its fore-aft center line between the bow and the midship, the mast of the monohull sailboat of the invention can be disposed on the center line at any position. As the single-masted monohull sailboats shown in FIG. 3A and FIG. 3B, the mast is erected at a position on the center line between the midship and the stern so that the portion of the jib that are being positioned behind the midship is increased, and thus according to a principle that the larger the portion of the jib being positioned behind the midship, the larger the torque generating from the enlarged portion of the jib, the portion of the jib will function as a rudder since the torque

generated therefrom will force the sailboat to turn into windward direction automatically.

[0049] Please refer to FIG. 3E and FIG. 4D, which are schematic diagrams illustrating a zigzagging sailing trajectories of the single-masted monohull sailboats of FIG. 3A and FIG. 4A. As shown in FIG. 3E and FIG. 4D, the two single-masted monohull sailboats are sailing from a point of departure 60 to a destination 61 following different zigzagging trajectories. Comparing the sailing trajectories shown in FIG. 1C, FIG. 3E and FIG. 4D, it is noted that the voyage distance of the sailboat disclosed in the present invention is shorter than that of a conventional sailboat.

[0050] It is noted that traditional sailboats are mostly monohulls, but multi-hull catamarans and trimarans are gaining popularity; and if a catamaran, i.e. a double-hull sailboat, has only one mast, it is a single-masted catamaran, and if there is more than one mast on a catamaran, it is a multi-masted catamaran. The sailboat shown in the embodiment of FIG. 5A and FIG. 6A is a single-masted catamaran, but is not limited thereby. As shown in FIG. 5A and FIG. 6A, the single-masted catamaran 7 comprises: a hull module 70, a mast 71, a first fixing element 72, a second fixing element 73, a first winch 74, a first pulley 740, a second winch 75 a second pulley 750, a first jib 76, a second jib 77. In addition, the hull module 70 is further configured with: a first hull 700 having a first bow 7000 and a first stern 7001; a second hull 701 having a second bow 7010 and a second stern 7011; a center line 702; a starting end 703, defined to be the frontmost point on the center line 702 where it is intersected with the hull module 70; a midship 704; a terminating end 705, defined to the rearmost point on the center line 702 where it is intersected with the hull module 70; a port side 706; and a starboard side 707; the mast 71 is configured with a first end 710 and a second end 711 at positions opposite to each other while coupling the first end 710 to the center line 700 at any position on the center line 702, as a position on the center line 702 between the midship 704 and the terminating end 705 shown in FIG. 5A or a position on the center line 702 between the starting end 703 and the midship 704 shown in FIG. 6A, whereas the center line 702 is defined to be a line connecting the center between the first bow 7000 and the second bow 7010 and the center between the first stern 7001 and the second stern 7011. The first fixing element 72 is disposed on the port side 706 of the hull module 70; the first winch 74 is disposed at a position on the left to the center line 702 of the hull module 70; the first pulley 740 is coupled to the port side 706; the first jib 76 is configured with a plurality of ends including a first end 760, a second end 761 and a third end 762 in a manner that the first end 760 is connected to the second end 711 of the mast 71, the second end 761 is connected to the first fixing element 72, and the third end 762 is connected to the first winch 74 by way of the pulley 740. The second fixing element 73 is disposed on the star-

board side 707 of the hull module 70. The second winch 75 is disposed at a position on the right to the center line 702 of the hull module 70. The second pulley 750 is coupled to the starboard side 707. The second jib 77 is configured with a plurality of ends including a first end 770, a second end 771 and a third end 772 in a manner that the first end 770 is connected to the second end 771 of the mast 71, the second end 771 is connected to the second fixing element 73, and the third end 772 is connected to the second winch 75 by way of the second pulley 750.

[0051] Generally, the first jib 76 and the second jib 77 will not be used simultaneously unless the sailboat 7 is sailing with a tailwind, but are used alternatively and selectively according to the direction of wind. That is, when the air heading is blowing toward the sailboat 7 from its starboard side 707, the first jib 76 is expanded and used. Otherwise, when the air heading is blowing toward the sailboat 7 from its port side 706, the second jib 77 is expanded and used. Accordingly, when the first jib 76 is expanded, the second jib 77 can be rolled up and furled by the rig connecting the first end 770 and the second end 771 of the second jib 77 for pulling and receiving the third end 772 of the second jib 77 to a position between the first and the second ends 770, 771. On the other hand, in response to the wind direction change that it is intended to expand the second jib 77, the first jib 76 should be furled and rolled up similarly while rigging the third end 772 of the second jib 77 to the second winch 75 by way of the second pulley 750.

[0052] Please refer to FIG. 5B and FIG. 6B, which are schematic diagrams showing a single-masted catamaran with fully extended first jib and a mainsail according to another two embodiments of the invention. It is noted that although the sailboats shown in FIG. 5B and FIG. 6B are single-masted catamaran 7, the amount of mast is not limited thereby. As shown in FIG. 5B and FIG. 6B, the single-masted catamaran 7 includes: a hull module 70, a mast 71, a first fixing element 72, a second fixing element 73, a first winch 74, a first pulley 740, a second winch 75, a second pulley 750, a first jib 76, a second jib 77, a boom 78 and a mainsail 79. Similarly, In addition, the hull module 70 is further configured with: a first hull 700 having a first bow 7000 and a first stern 7001; a second hull 701 having a second bow 7010 and a second stern 7011; a center line 702; a starting end 703, defined to be the frontmost point on the center line 702 where it is intersected with the hull module 70; a midship 704; a terminating end 705, defined to the rearmost point on the center line 702 where it is intersected with the hull module 70; a port side 706; and a starboard side 707. The mast 71 is configured with a first end 710 and a second end 711 at positions opposite to each other while coupling the first end 710 to the center line 700 at any position on the center line 702, as a position on the center line 702 between the midship 704 and the terminating end 705 shown in FIG. 5B or a position on the center line 702 between the starting end 703 and the midship 704 shown

in FIG. 6B, whereas the center line 702 is defined to be a line connecting the center between the first bow 7000 and the second bow 7010 and the center between the first stern 7001 and the second stern 7011. The first fixing element 72 is disposed on the port side 706 of the hull module 70. The first winch 74 is disposed at a position on the left to the center line 702 of the hull module 70. The first pulley 740 is coupled to the port side 706. The first jib 76 is configured with a plurality of ends including a first end 760, a second end 761 and a third end 762 in a manner that the first end 760 is connected to the second end 771 of the mast 71, the second end 761 is connected to the first fixing element 72, and the third end 762 is connected to the first winch 74 by way of the pulley 740. The second fixing element 73 is disposed on the starboard side 707 of the hull module 70. The second winch 75 is disposed at a position on the right to the center line 702 of the hull module 70. The second pulley 750 is coupled to the starboard side 707. The second jib 77 is configured with a plurality of ends including a first end 770, a second end 771 and a third end 772 in a manner that the first end 770 is connected to the second end 771 of the mast 71, the second end 771 is connected to the second fixing element 73, and the third end 772 is connected to the second winch 75 by way of the second pulley 750.

[0053] Generally, the first jib 76 and the second jib 77 will not be used simultaneously unless the sailboat 7 is sailing with a tailwind, but are used alternatively and selectively according to the direction of wind. That is, when the air heading is blowing toward the sailboat 7 from its starboard side 707, the first jib 76 is expanded and used. Otherwise, when the air heading is blowing toward the sailboat 7 from its port side 706, the second jib 77 is expanded and used. Accordingly, when the first jib 76 is expanded, the second jib 77 can be rolled up and furled by the rig connecting the first end 770 and the second end 771 of the second jib 77 for pulling and receiving the third end 772 of the second jib 77 to a position between the first and the second ends 770, 771. On the other hand, in response to the wind direction change that it is intended to expand the second jib 77, the first jib 76 should be furled and rolled up similarly while rigging the third end 772 of the second jib 77 to the second winch 75 by way of the second pulley 750.

[0054] Moreover, the boom 78 is configured with a first end 780 and a second end 781 at positions opposite to each other while enabling the first end 780 to be coupled with the mast 71; and the mainsail 79 is configured with a plurality of ends including a first end 790, a second end 791 and a third end 792 in a manner that the first end 791 of the mainsail 79 is coupled to the second end 771 of the mast 71, the second end 791 of the mainsail 79 is coupled to the first end 780 of the boom 78, and the third end 792 of the mainsail 79 is coupled to the second end 781 of the boom 78.

[0055] Please refer to FIG. 5C, which is a schematic diagram showing a double-masted catamaran with fully

extended left jib according to the present invention. Although there are only jibs rigged on the masts of the double-masted catamaran shown in FIG. 5C, each of the mast in FIG. 5C can be rigged with a boom and a mainsail so that it is not limited thereby.

[0056] The multi-hull sailboat of the present invention is different from those conventional multi-hull sailboat in that:

(1) The multi-hull sailboat of the present invention is designed to operate its left jib and right jib in an alternating manner so that is able to operate without the mainsail and boom that are expensive and difficult to build;

(2) There are different amounts of fixing elements being arranged on the multi-hull sailboat of the present invention as well as their positions, that is, the multi-hull sailboat of the present invention is configured with two fixing elements respectively at its port side and starboard side with respect to the left jib and the right jib of the multi-hull sailboat, so that, comparing with those conventional multi-hull sailboats where there is only one fixing element being arranged at the starting end of its center line, the included angle between the sail and the center line is increased and thus the multi-hull sailboat of the present invention is able to sail under a wind blowing in a wind direction 010 with smaller included angle comparing with those conventional multi-hull sailboats, as the top view of a single-masted catamaran shows in FIG. 5D that the catamaran can be driven by the wind coming from a direction 010 at an included angle not smaller than 25 degrees with respect to the center line, that is, if the included angle between the wind direction 010 and the center line is no smaller than 25 degrees, the wind can be used by catamaran efficiently for driving the catamaran to move accordingly, and also as another top view of a single-masted catamaran shows in FIG. 6C that the catamaran can be driven by the wind coming from a direction 010 at an included angle not smaller than 13 degrees with respect to the center line, that is, if the included angle between the wind direction 010 and the center line is no smaller than 13 degrees, the wind can be used by the sailboat efficiently for driving the catamaran to move accordingly; and

(3) Different from the conventional multi-hull sailboats that the mast is erected at a position on its center line between the bow and the midship, the mast of the multi-hull sailboat of the invention can be disposed on the center line at any position. As the single-masted catamarans shown in FIG. 5A and FIG. 5B, the mast is erected at a position on the center line between the midship and the stem so that the portion of the jib that are being positioned behind the midship is increased, and thus according to a principle that the larger the portion of the jib being positioned behind the midship, the larger the torque

generating from the enlarged portion of the jib, the portion of the jib will function as a rudder since the torque generated therefrom will force the sailboat to turn into windward direction automatically.

[0057] Please refer to FIG. 5E and FIG. 6D, which are schematic diagrams illustrating a zigzagging sailing trajectories of the single-masted catamarans of FIG. 5A and FIG. 6A. As shown in FIG. 5E and FIG. 6D, the two single-masted catamarans are sailing from a point of departure 80 to a destination 81 following different zigzagging trajectories. Comparing the sailing trajectories shown in FIG. 2C, FIG. 5E and FIG. 6D, it is noted that the voyage distance of the multi-hull sailboat disclosed in the present invention is shorter than that of a conventional multi-hull sailboat.

[0058] Except for the aforesaid advantages, the left and right jibs in the present invention can be expanded and used as spinnakers while sailing with a tailwind by releasing the rigging of their connection to the port side and the starboard side in respective and connecting the released ends of those jibs to either the ends connecting to the fixing elements or the ends connecting to the winches. Please refer to FIG. 7A, which is a top view of a single-masted monohull sailboat with its two jibs fully extended according to the present invention. It is noted that although the sailboat in FIG. 7A is a single-masted sailboat, the amount of masts is not limited thereby. While sailing with a tail wind as the wind direction 010 indicated in FIG. 7A, the monohull sailboat 5 can simply release the third end 562 of its first jib 56 that is rigged to the first winch 54 and also release the third end 572 of its second jib 57 that is rigged to the second winch 55 for enabling the two jibs 56, 57 to expand and thus to be used as spinnakers. It is noted that although the single-masted monohull sailboat is configured with a mainsail, it is not limited thereby, i.e. any sailboats of the invention without mainsail still can use its jibs as spinnaker by expanding the same in the aforementioned way. Nevertheless, if it is intended to use a spinnaker 9 on a monohull sailboat of the invention, as shown in FIG. 7B, the spinnaker 9 is rigged to the top of the mast and any two points on the left and right to the center line of the hull module, and thereby, since the monohull sailboat of the invention is configured with two fixing elements respectively on the port side and the starboard side of the hull module and two winches as well, the rigging of the spinnaker on monohull sailboat of the invention is much easier than that on any conventional sailboat. Similarly, although the monohull sailboat in FIG. 7B is a single-masted monohull sailboat, the amount of masts is not limited thereby. As shown in FIG. 7B, the spinnaker 9 is configured with a plurality of ends including a first end 90, a second end 91 and a third end 92. While sailing with a tail wind as the wind direction 010 indicated in FIG. 7B for example, the first end 90 of the spinnaker 9 is coupled to the mast, the second end 91 of the spinnaker 9 is rigged to the first winch 54 and the third end 92 of the spinnaker 9 is rigged to the second

winch 55. On the other hand, in addition to the aforesaid connection, the second end 91 and the third end can be connected directly to the first and the second winches 54, 55. Moreover, the expanding of the left and right jibs can be enabled simultaneously with the use of spinnaker, by that the sailboat can be propelled by more wind and thus the sailing speed is increased.

[0059] Please refer to FIG. 8A, which is a top view of a single-masted multi-hull sailboat with its two jibs are fully extended according to the present invention. Although the multi-hull sailboat in FIG. 8A is a single-masted multi-hull sailboat, the amount of mast is not limited thereby. While sailing with a tail wind as the wind direction 010 indicated in FIG. 8A, the catamaran 7 can simply release the third end 762 of its first jib 76 that is rigged to the first winch 74 and also release the third end 772 of its second jib 77 that is rigged to the second winch 75 for enabling the two jibs 76, 77 to expand and thus to be used as spinnakers. It is noted that although the single-masted catamaran is configured with a mainsail, it is not limited thereby, i.e. any multi-hull sailboats of the invention without mainsail still can use its jibs as spinnaker by expanding the same in the aforementioned way. Nevertheless, the spinnaker 9 can also be used on a multi-hull sailboat of the invention, as shown in FIG. 8B. Similarly, although the catamaran shown in FIG. 8B is a single-masted catamaran, the amount of masts is not limited thereby. As shown in FIG. 8B, the spinnaker 9 is configured with a plurality of ends including a first end 90, a second end 91 and a third end 92. While sailing with a tail wind as the wind direction 010 indicated in FIG. 8B for example, the first end 90 of the spinnaker 9 is coupled to the second end 711 of the mast 71 by way of the first winch 74, the second end 91 of the spinnaker 9 is rigged to the first winch 74 and the third end 92 of the spinnaker 9 is rigged to the second winch 75. On the other hand, in addition to the aforesaid connection, the second end 91 and the third end can be connected directly to the first and the second winches 74, 75. Moreover, the expanding of the left and right jibs can be enabled simultaneously with the use of spinnaker, by that the sailboat can be propelled by more wind and thus the sailing speed is increased.

[0060] The sailboat of the invention is designed to meet with user's demands by enabling the left and right jibs of the sailboat to operate in an alternating manner so as to enable the sailboat to be operable without the mainsail and boom, and thus not only the construction cost relating to the mainsail and boom can be save, but also the operation procedure as well as the man power for the mainsail and boom can be forgotten. In addition, by the addition of the fixing element on the sailboat of the invention and their positions as well, the voyage distance can be shortened. Furthermore, by arranging its mast on the center line at a position between the midship and the stem, the jib on the sailboat of the invention is able to function as the rudder for forcing the sailboat to turn into windward direction automatically. While sailing with a tail

wind, the sailboat of the invention can simply release its left and right jibs from their corresponding fixing elements for enabling the two jibs to expand and thus to be used as spinnakers. If it is intended to use a spinnaker on a sailboat of the invention, the spinnaker 9 can be rigged and connected by the use of the two fixing elements disposed respective on the port side and starboard side thereof. Moreover, the expanding of the left and right jibs can be enabled simultaneously with the use of spinnaker, by that the sailboat can be propelled by more wind and thus the sailing speed is increased.

[0061] With respect to the above description then, it is to be realized that the optimum dimensional relationships for the parts of the invention, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention.

Claims

1. A sailboat, comprising:

a hull module, configured with at least one hull;
a mast, configured with a first end and a second end at positions thereof opposite to each other while coupling the first end to a position on a center line of the hull module as the center line is defined to be a line connecting the center of a line passing through each bow of the at least one hull and the center of a line passing through each stem of the at least one hull;
a first fixing element, disposed at a position on the left to the center line of the hull module;
a first winch, disposed at a position on the left to the center line of the hull module;
a first jib, configured with a plurality of ends including a first end, a second end and a third end in a manner that the first end of the first jib is connected to the second end of the mast, the second end of the first jib is connected to the first fixing element, and the third end of the first jib is connected to the first winch;
a second fixing element, disposed at a position on the right to the center line of the hull module;
a second winch, disposed at a position on the right to the center line of the hull module; and
a second jib, configured with a plurality of ends including a first end, a second end and a third end in a manner that the first end of the second jib is connected to the second end of the mast, the second end of the second jib is connected to the second fixing element, and the third end of the second jib is connected to the second winch.

2. The sailboat of claim 1, further comprising:

a boom, configured with a first end and a second end at positions opposite to each other while enabling the first end thereof to be coupled with the mast;
a mainsail, being configured with a plurality of ends including a first end, a second end and a third end in a manner that the first end of the mainsail is coupled to the second end of the mast, the second end of the mainsail is coupled to the first end of the boom, and the third end of the mainsail is coupled to the second end of the boom.

3. The sailboat of claim 1, further comprising:

a first pulley, disposed at the port side of the hull module to be used for enabling the third end of the first jib to pass therethrough before being connected to the first winch; and
a second pulley, disposed at the starboard side of the hull module to be used for enabling the third end of the second jib to pass therethrough before being connected to the second winch.

4. The sailboat of claim 2, further comprising:

a first pulley, disposed at the port side of the hull module to be used for enabling the third end of the first jib to pass therethrough before being connected to the first winch; and
a second pulley, disposed at the starboard side of the hull module to be used for enabling the third end of the second jib to pass therethrough before being connected to the second winch.

5. The sailboat of claim 1, wherein the hull module is formed as a monohull structure; and the first fixing element is disposed at the gunwale of the port side of the monohull structure while the second fixing element is disposed at the gunwale of the starboard side of the monohull structure.

6. The sailboat of claim 1, wherein the hull module is formed as a multi-hull structure; and the first fixing element is disposed at the bow of the most left hull in the multi-hull structure or the gunwale of the port side of the most left hull in the multi-hull structure while the second fixing element is disposed at the bow of the most right hull in the multi-hull structure or the gunwale of the starboard side of the most right hull in the multi-hull structure.

7. The sailboat of claim 1, wherein the first end of the mast is coupled to a position on a center line of the hull module and the center line is defined to be line connecting the midship of the hull module to the stern

of the same.

8. The sailboat of claim 1, further comprising:

a spinnaker, configured with a plurality of ends including a first end, a second end and a third end in a manner that the first end of the spinnaker is connected to the second end of the mast, the second end of the spinnaker is connected to a position at the left of the center line of the hull module, and the third end of the spinnaker is connected to a position at the right of the center line of the hull module.

9. The sailboat of claim 8, wherein the second end of the spinnaker is connected to a device selected from the group consisting of a first fixing element and the first winch; while the third end of the spinnaker is connected to a device selected from the group consisting of a second fixing element and the second winch.

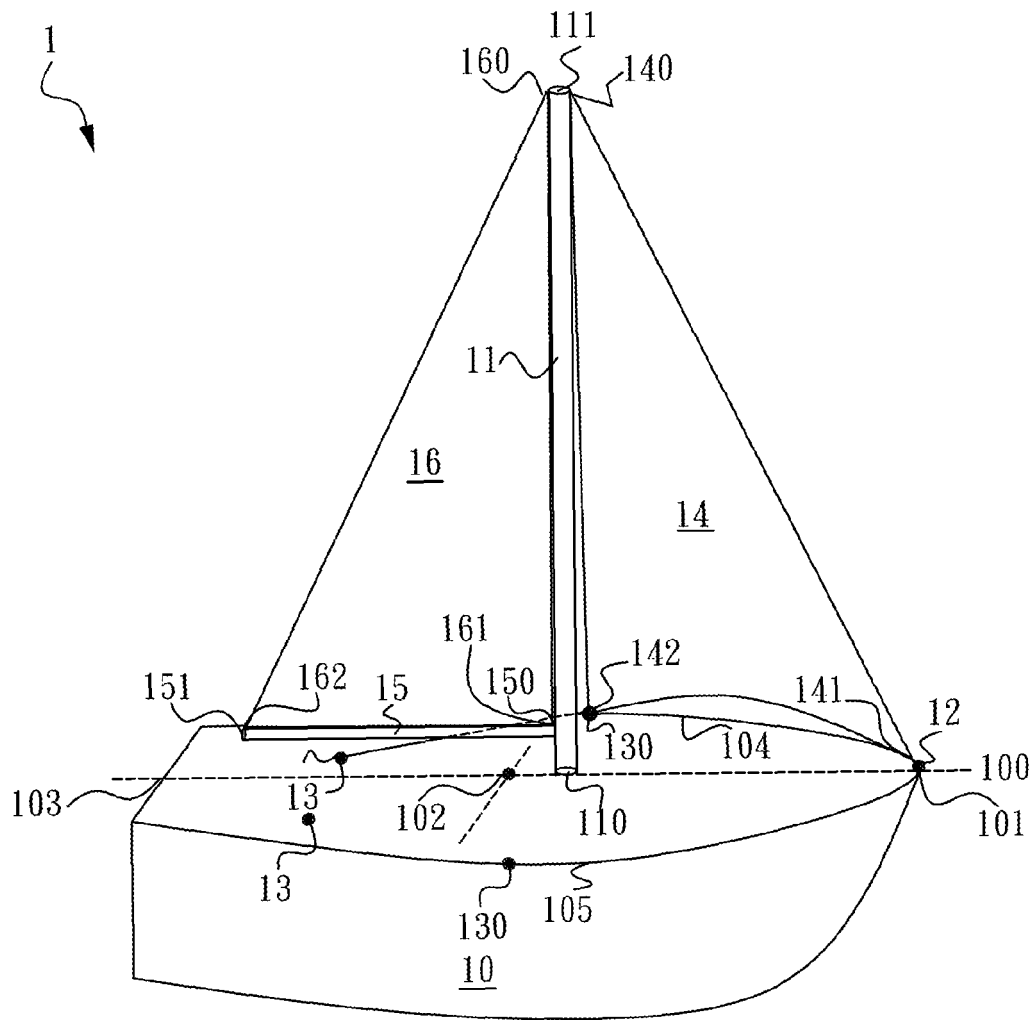


FIG. 1A (Prior Art)

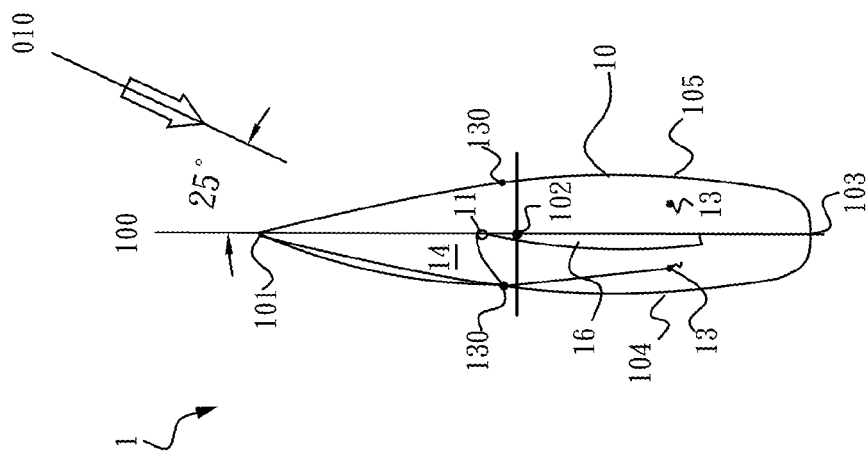


FIG. 1B (Prior Art)

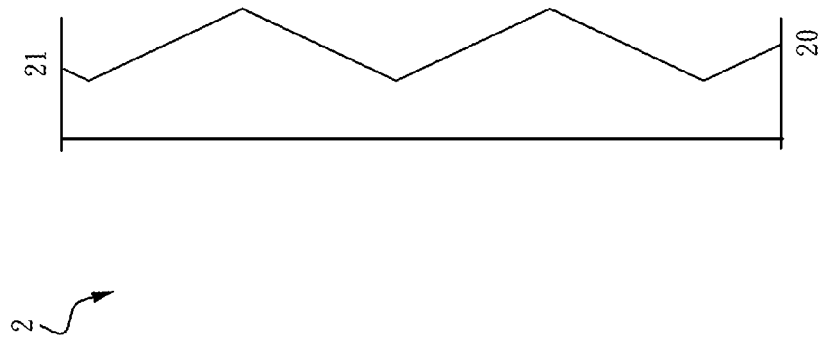


FIG. 1C (Prior Art)

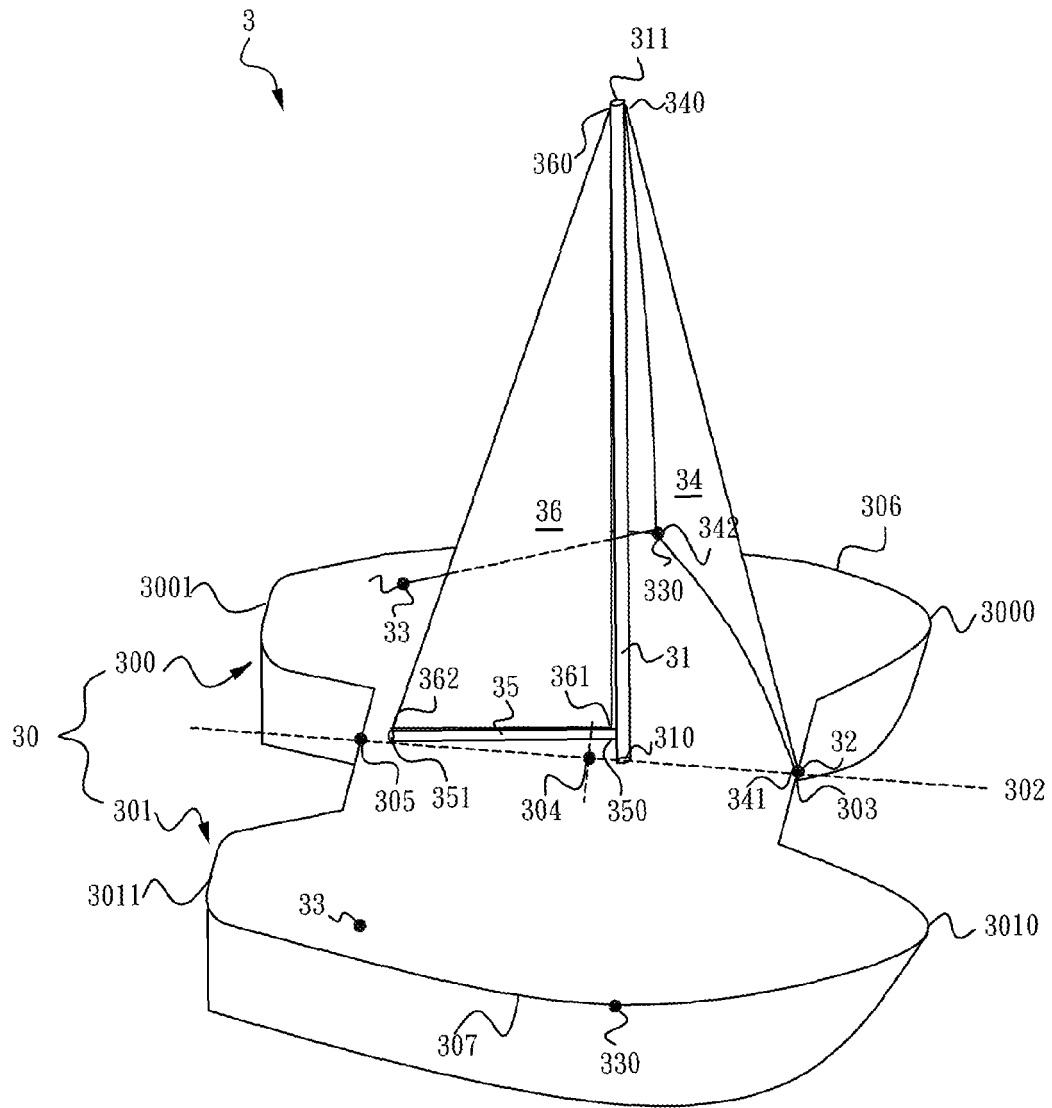


FIG. 2A (Prior Art)

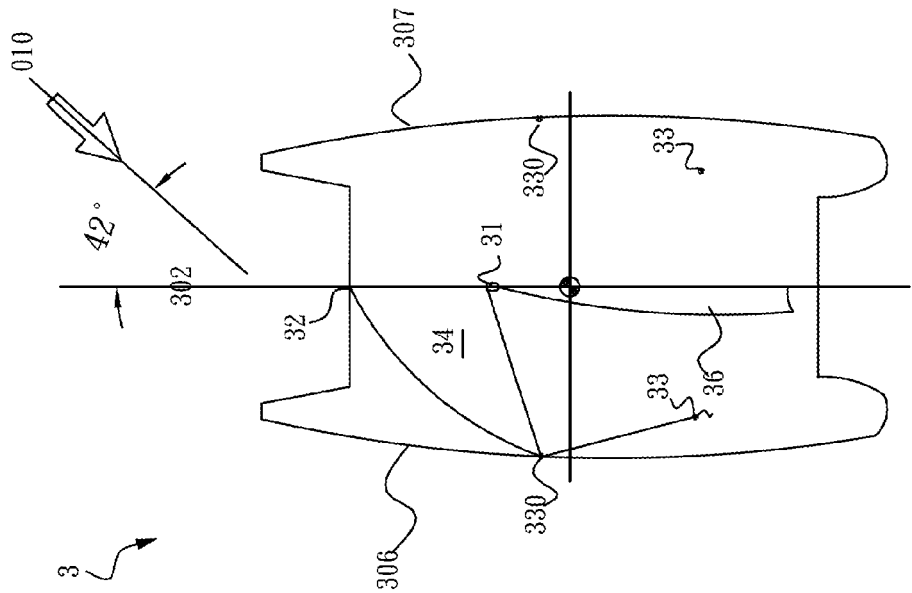


FIG. 2B (Prior Art)

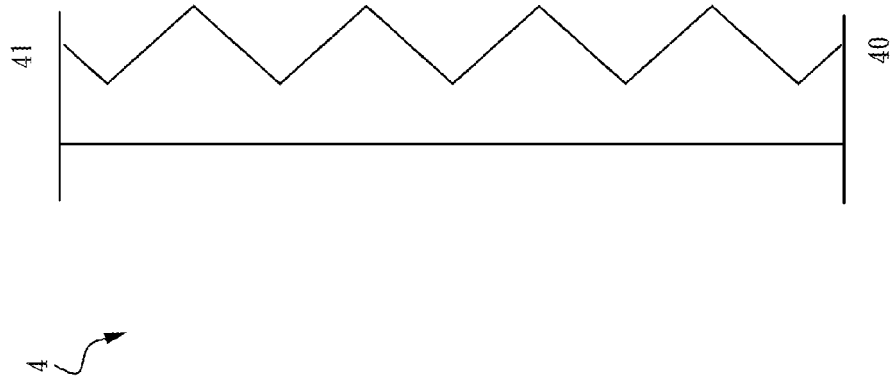


FIG. 2C (Prior Art)

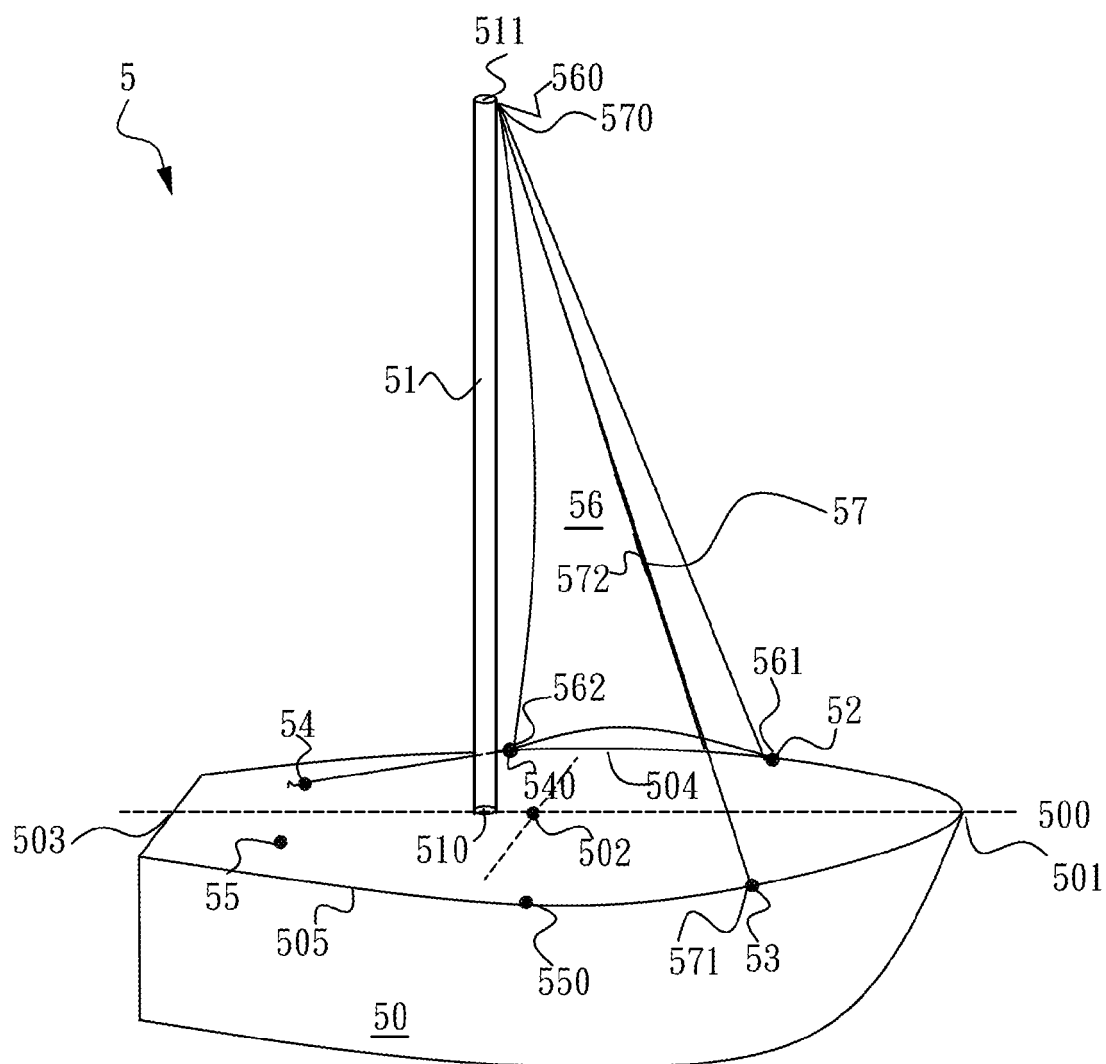


FIG. 3A

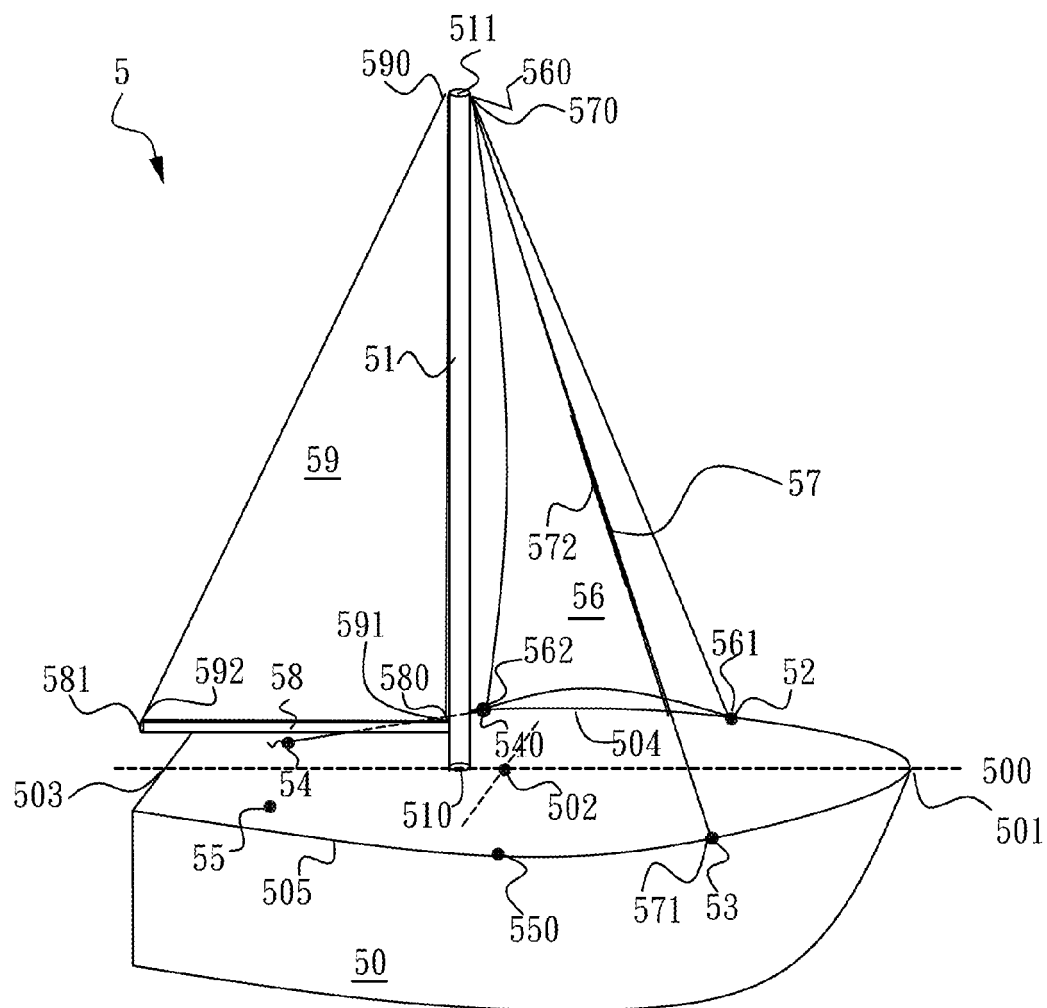


FIG. 3B

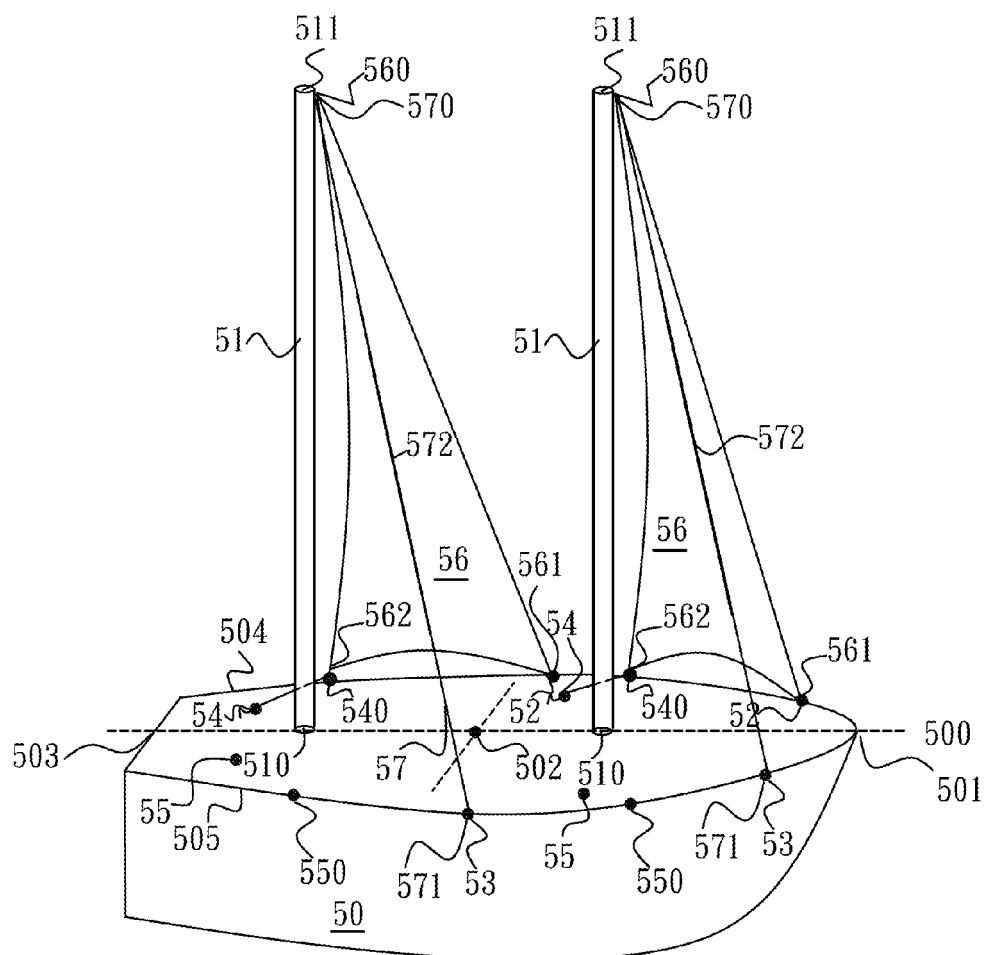
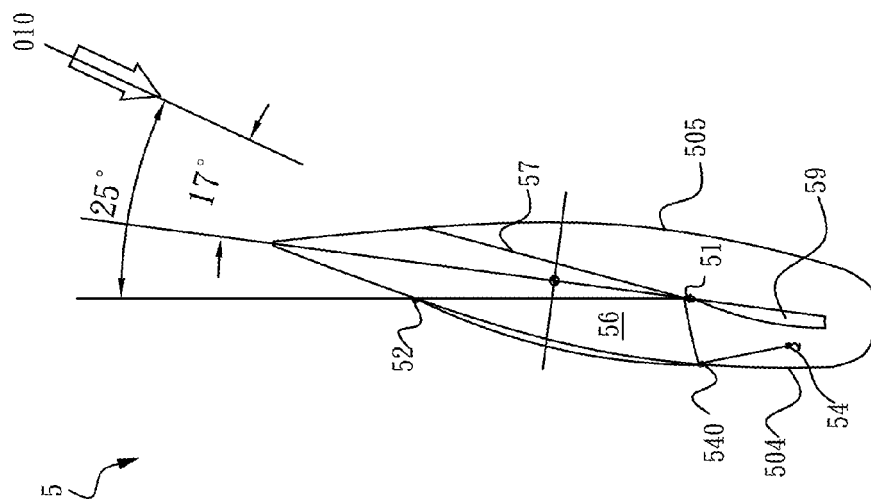
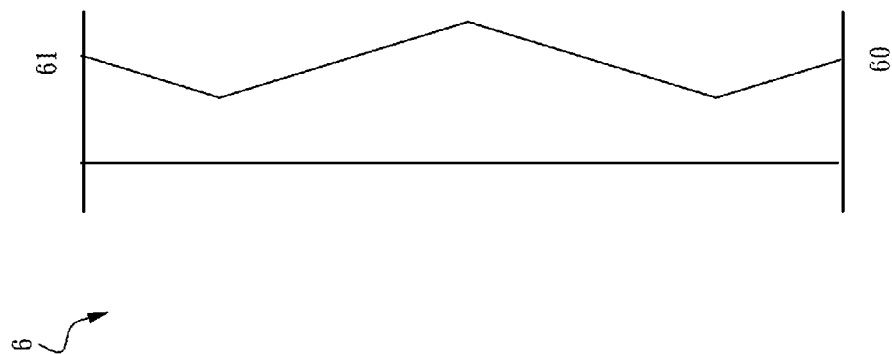


FIG. 3C



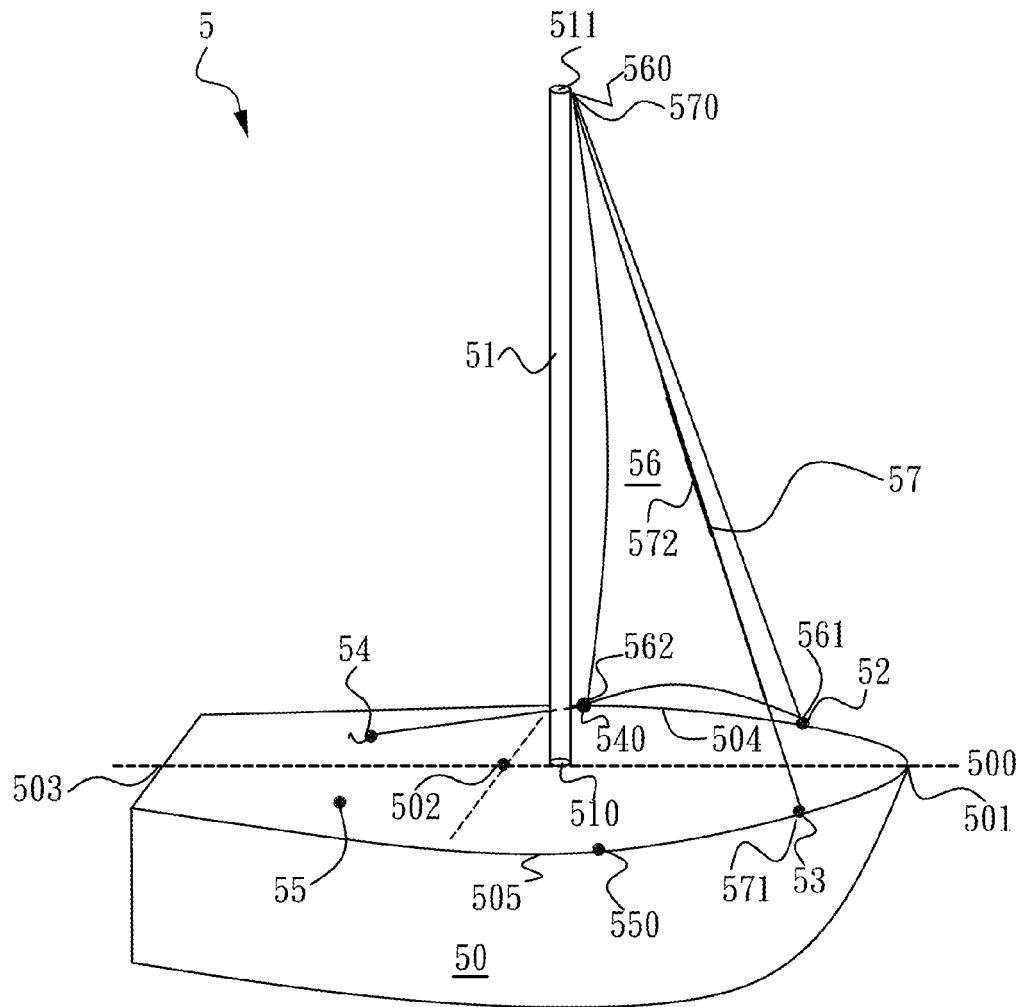


FIG. 4A

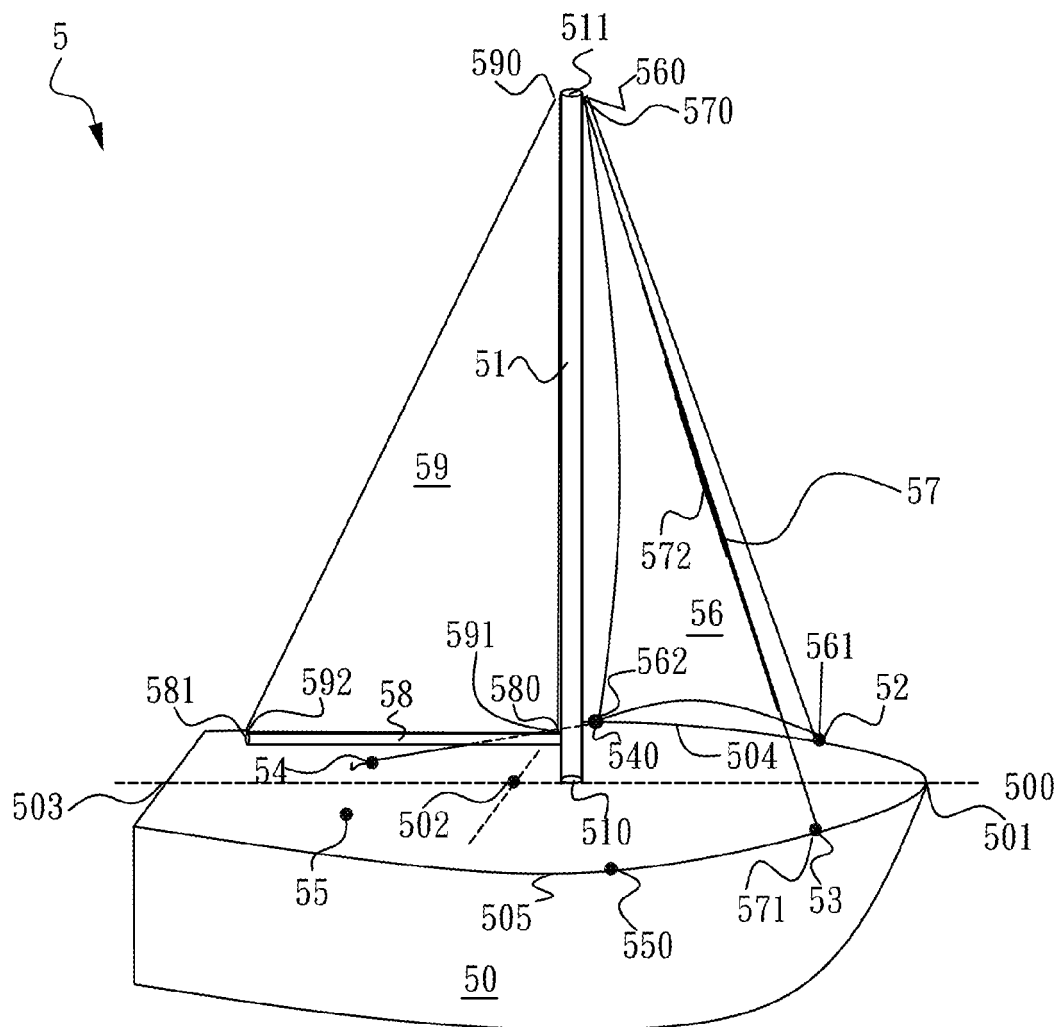


FIG. 4B

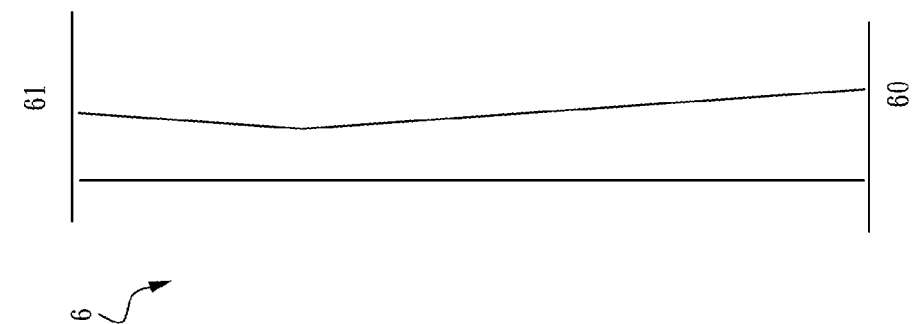


FIG. 4D

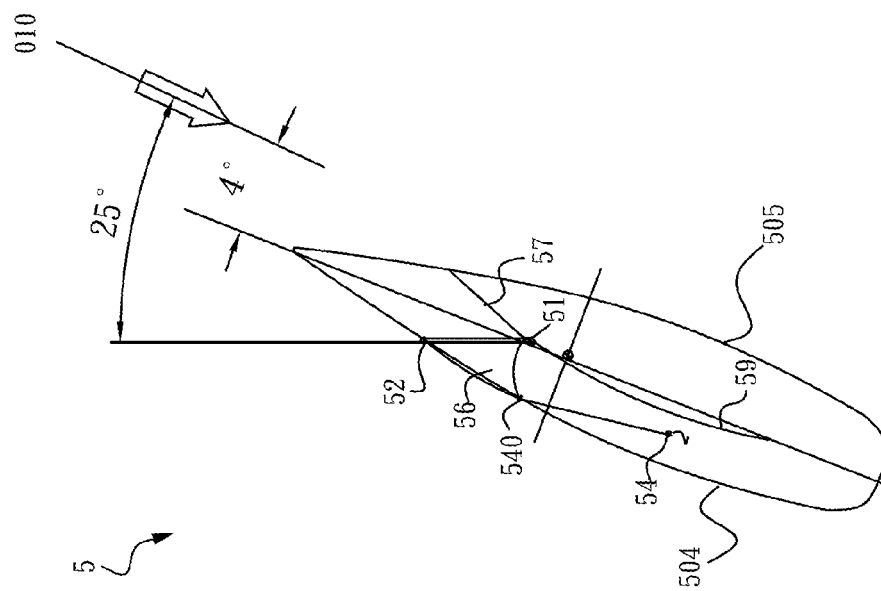


FIG. 4C

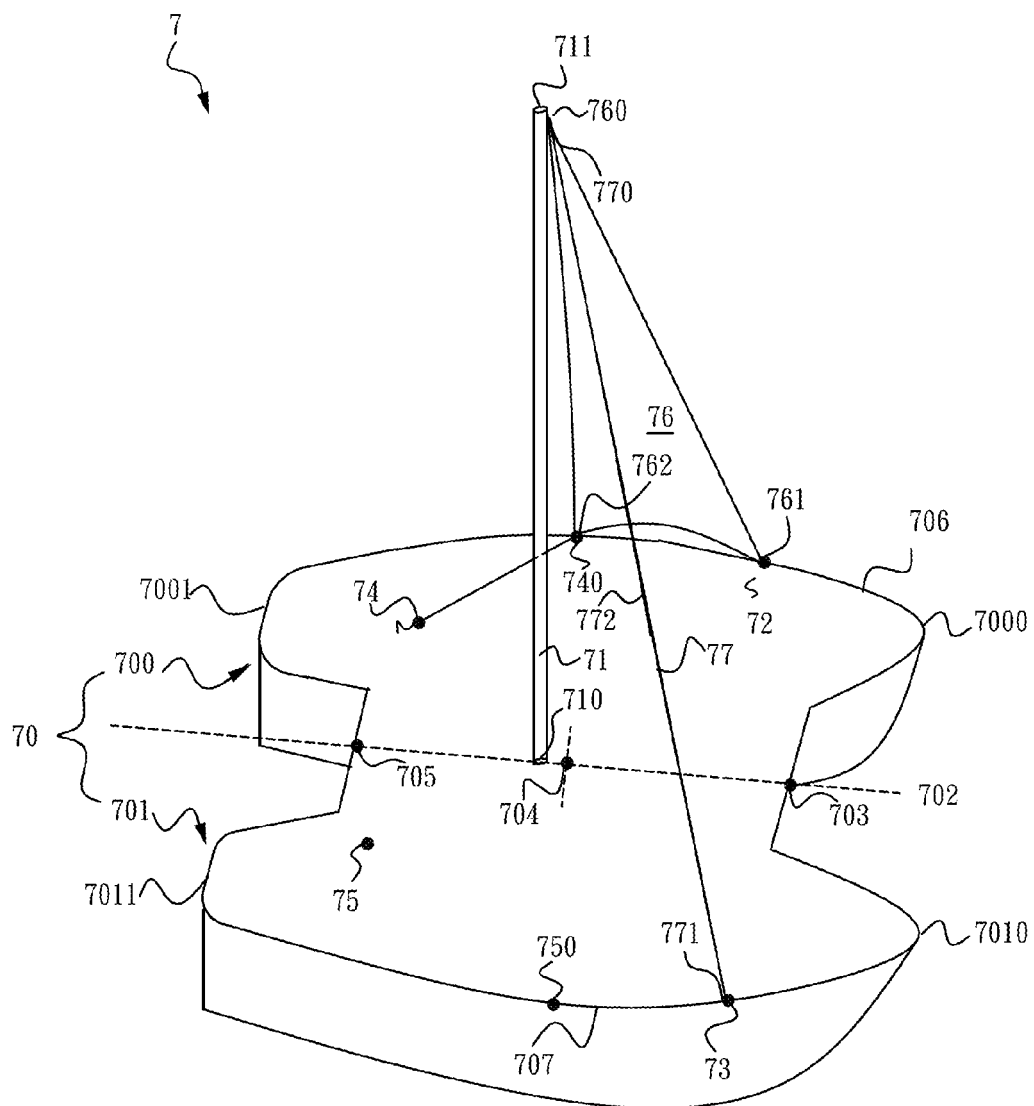


FIG. 5A

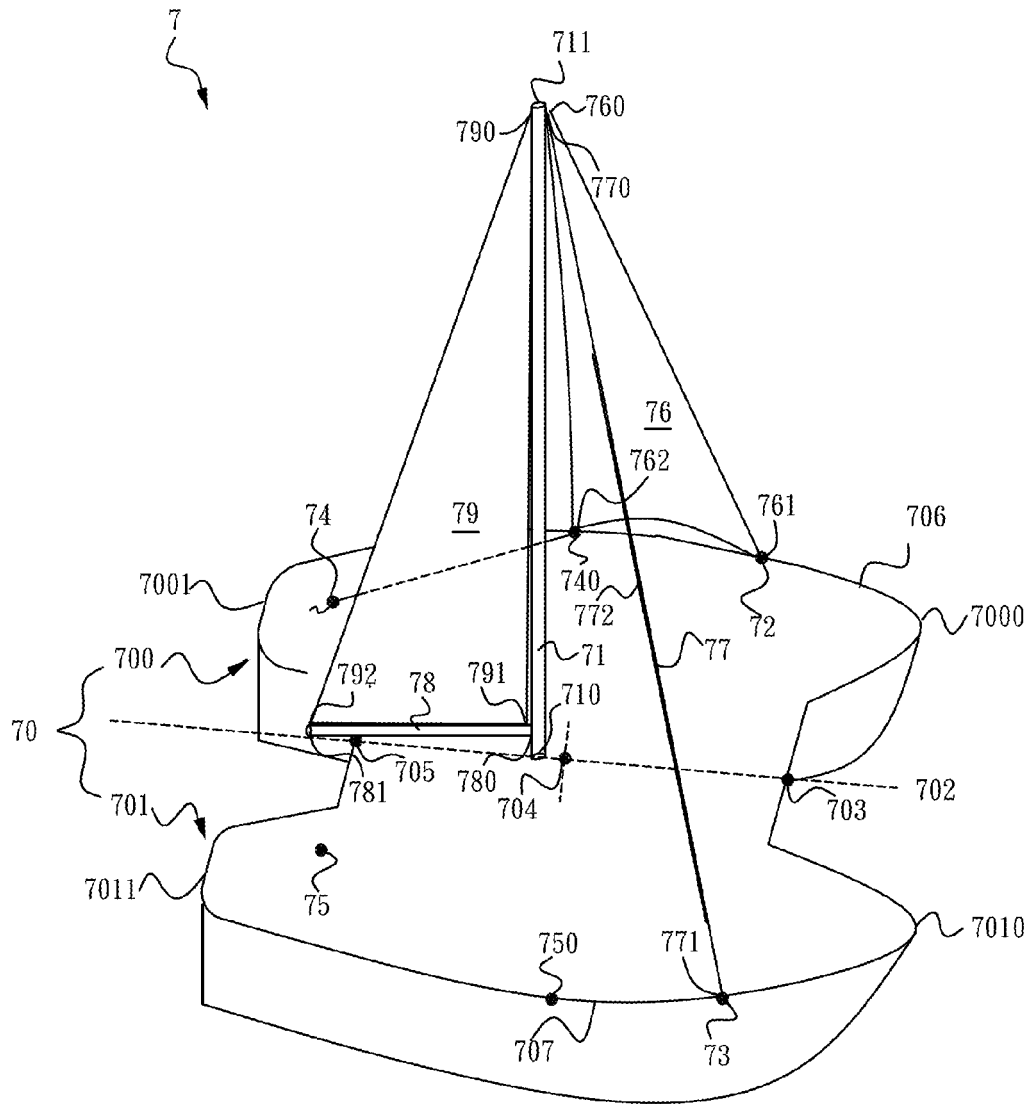


FIG. 5B

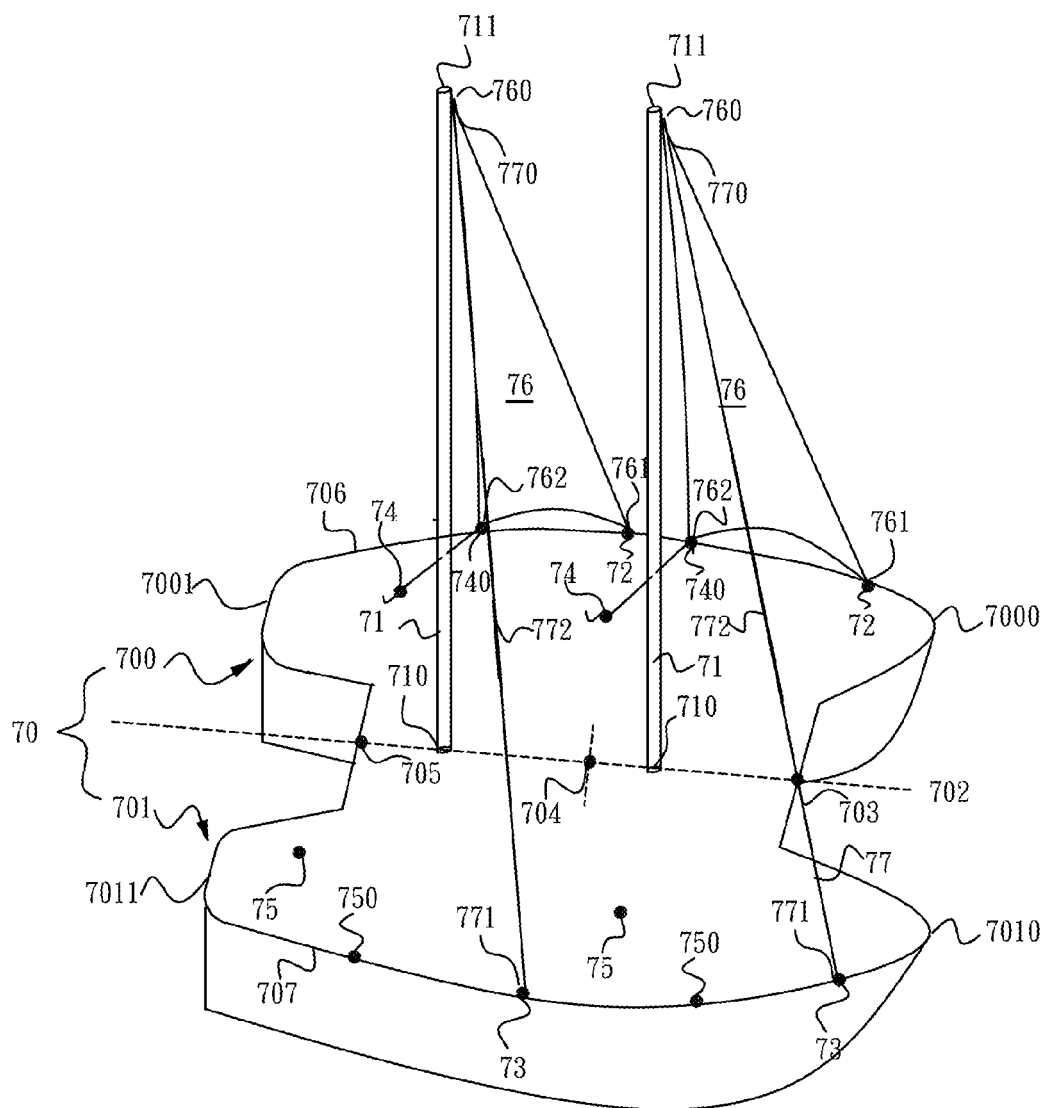
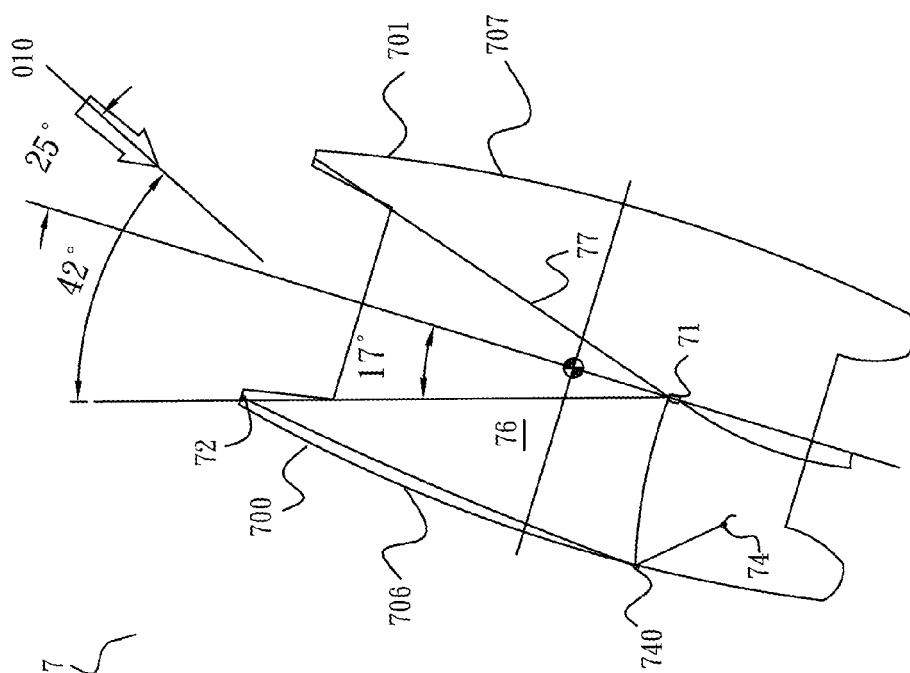
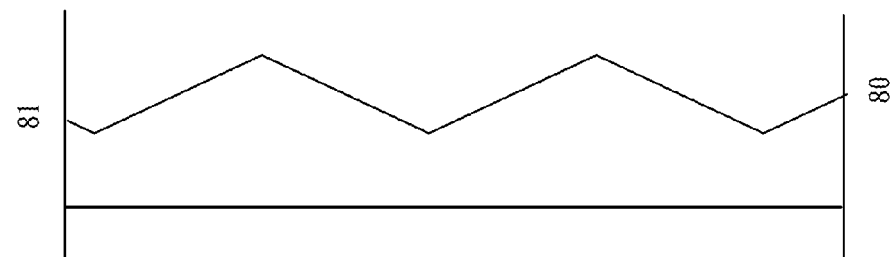


FIG. 5C



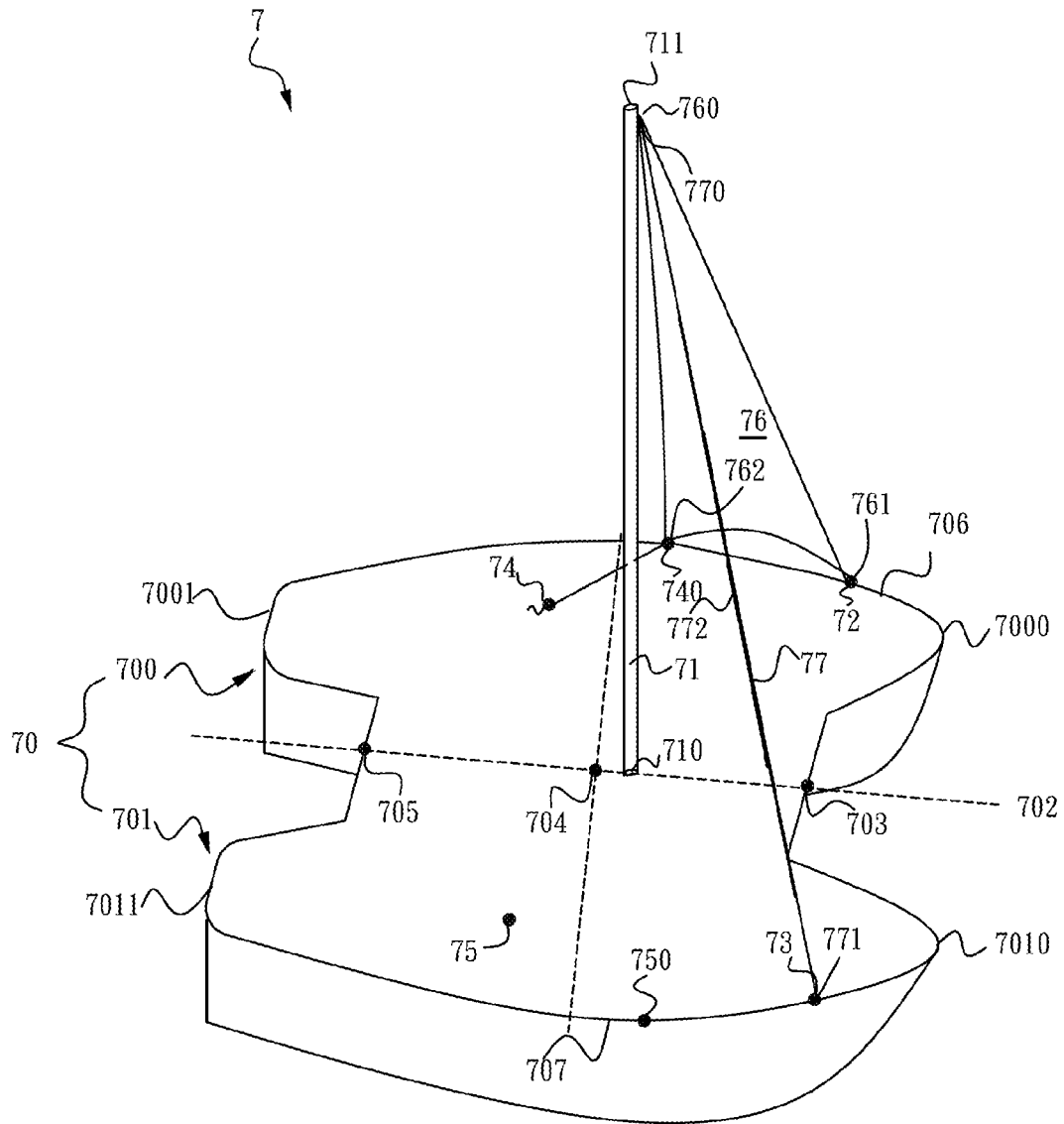


FIG. 6A

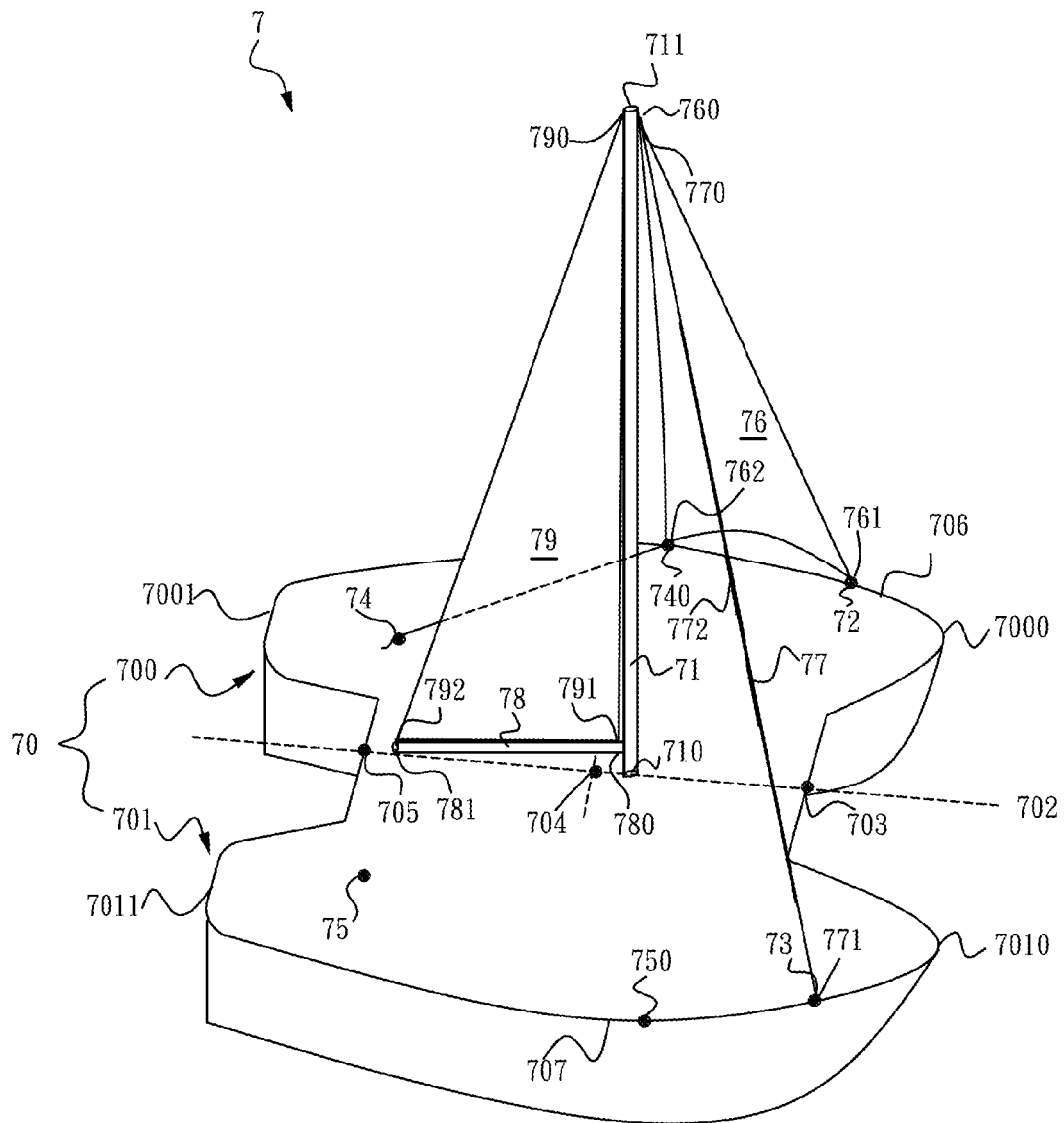


FIG. 6B

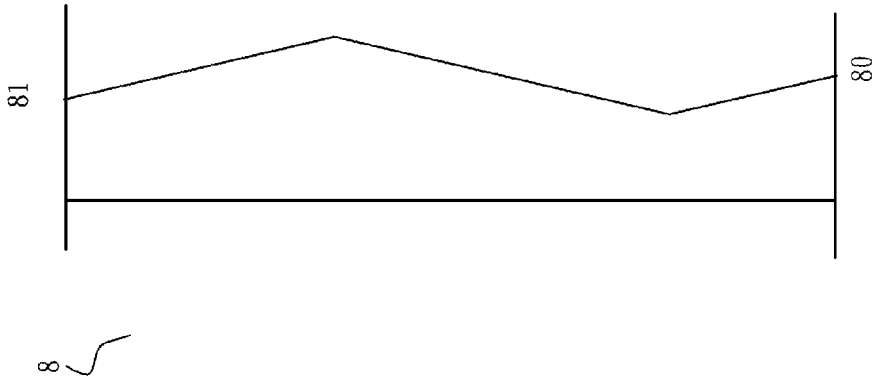


FIG. 6D

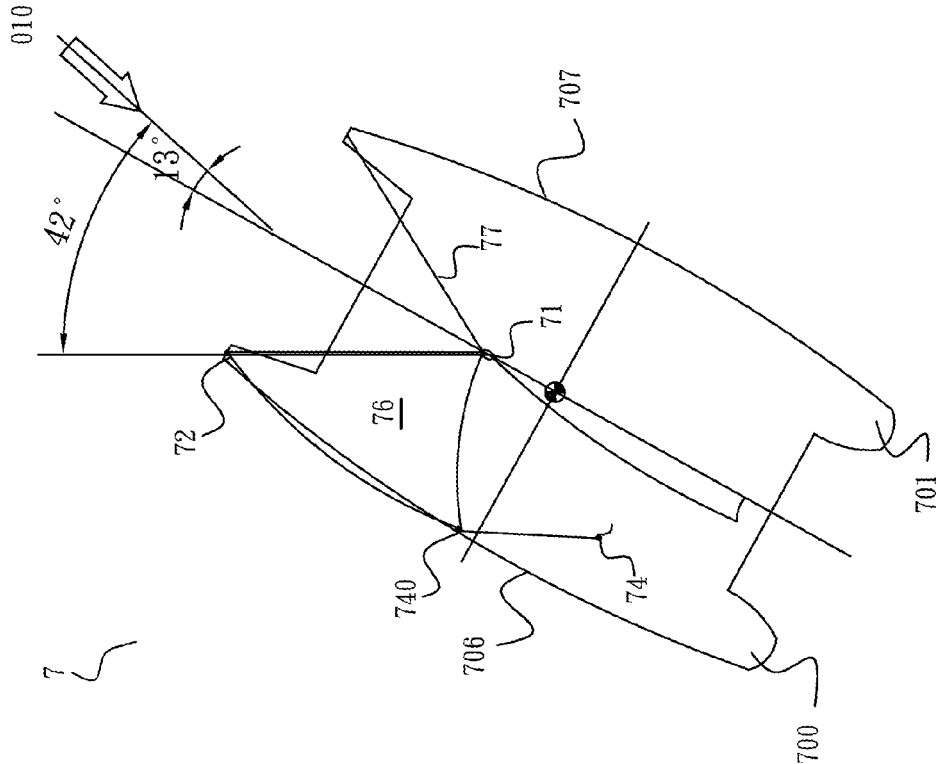


FIG. 6C

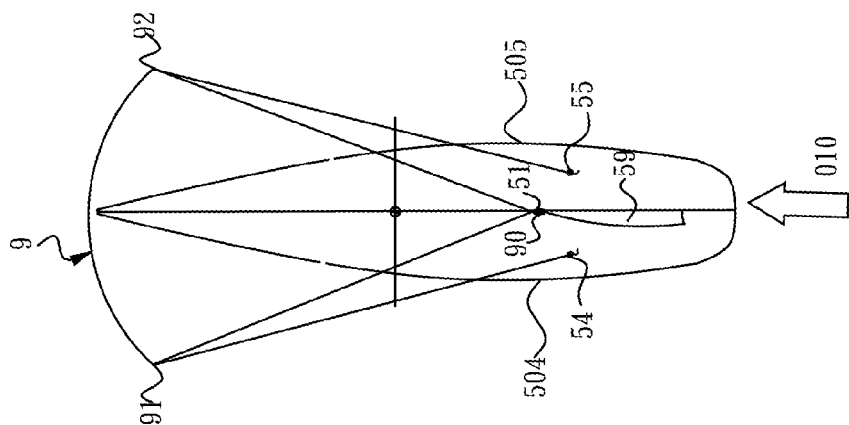


FIG. 7B

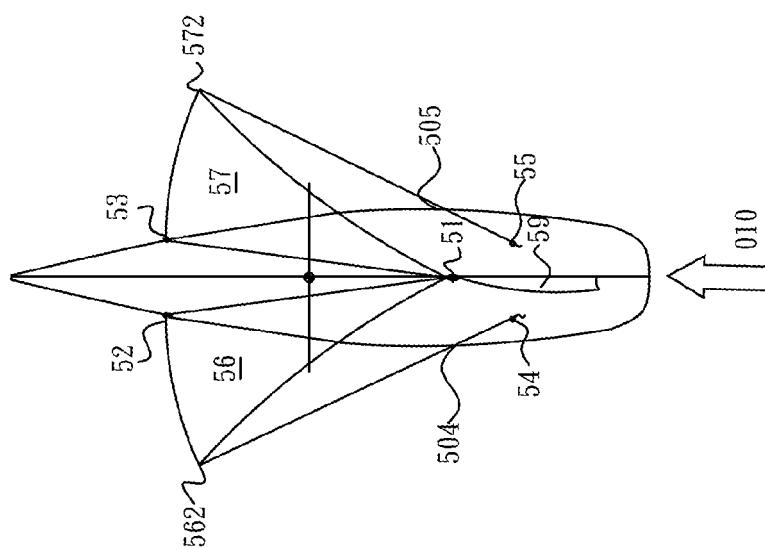


FIG. 7A

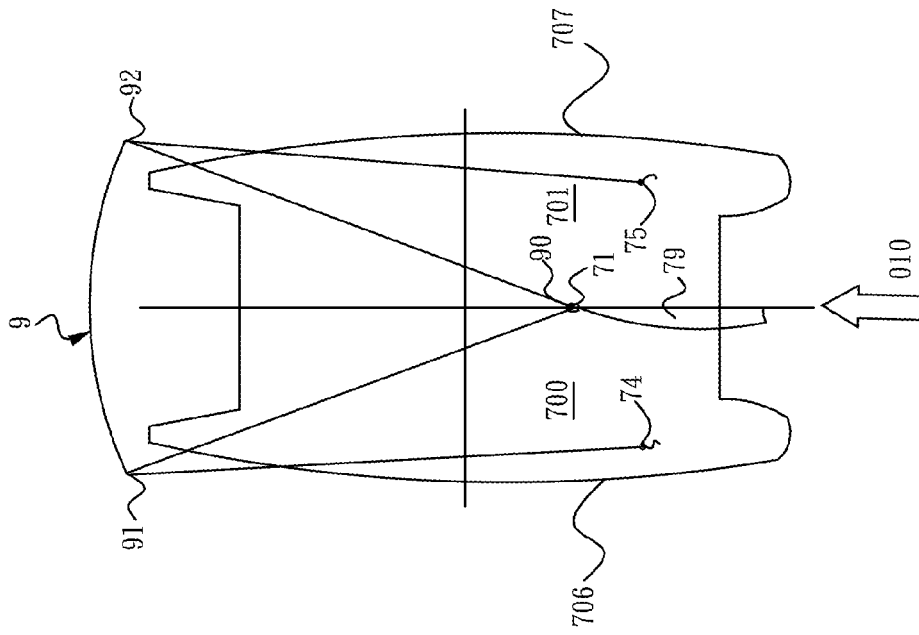


FIG. 8B

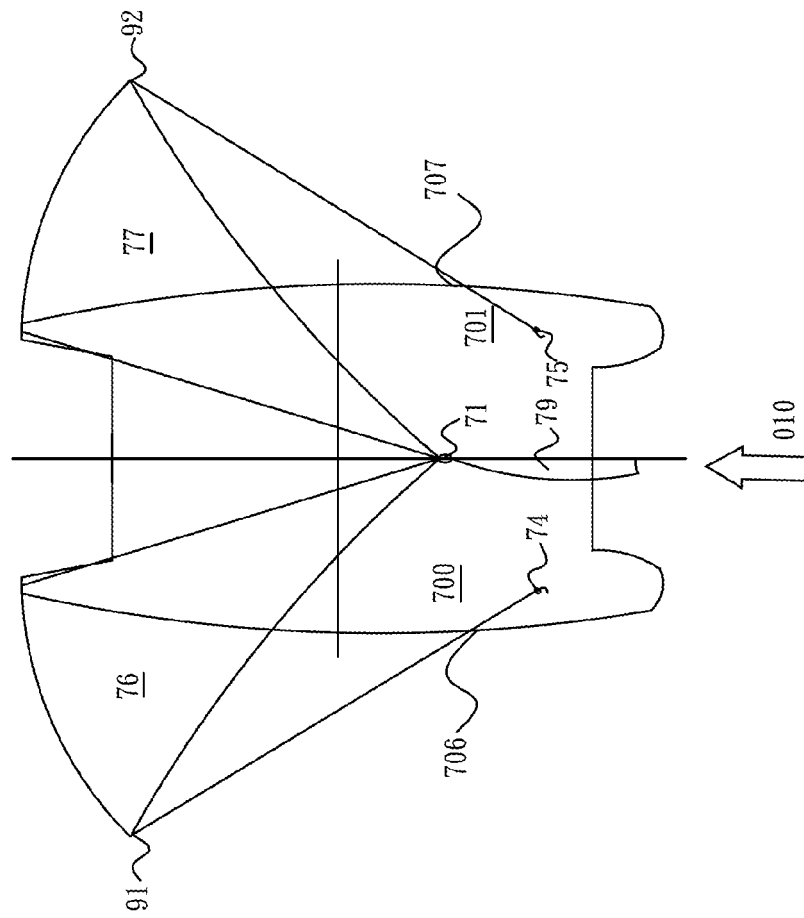


FIG. 8A