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CHEN

(54) **SAILBOAT**

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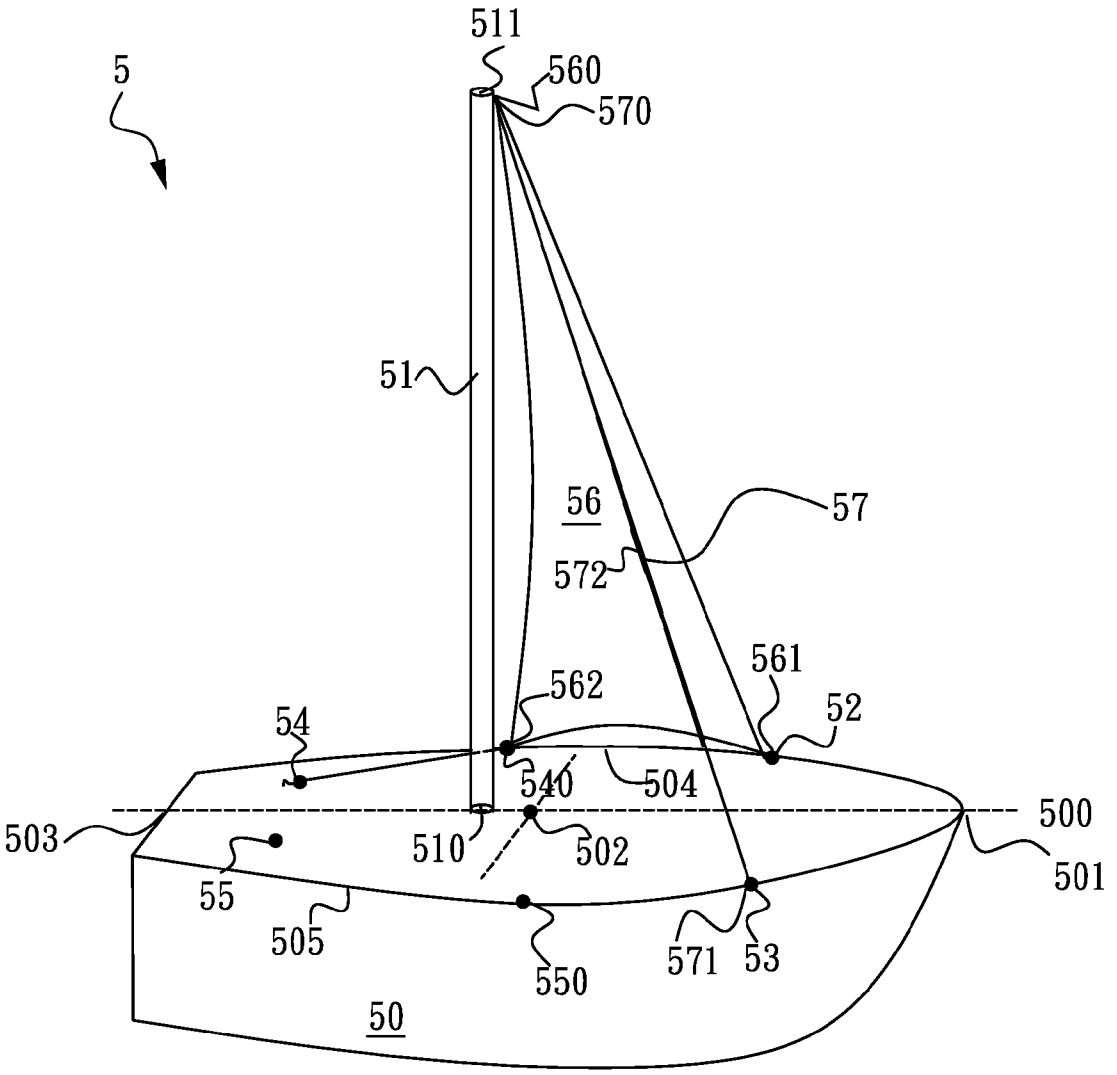
Publication Classification

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B63H 9/04 (2006.01)

(52) **U.S. Cl.** **114/39.26**; 114/39.29

(57) **ABSTRACT**

A sailboat is provided, which could use left and right jibs alternately to operate the sailboat without using mainsail. The advantages of 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.



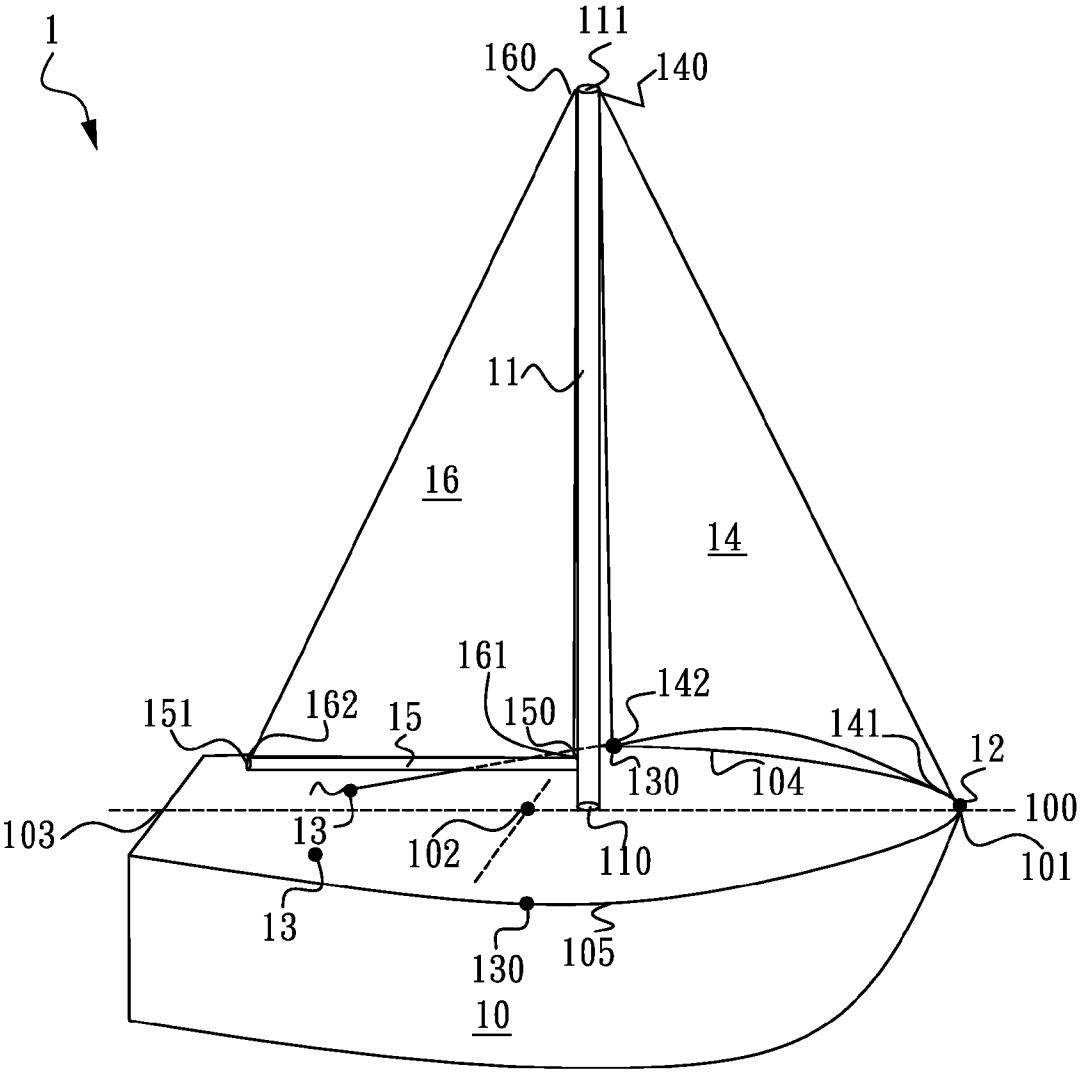


FIG. 1A (Prior Art)

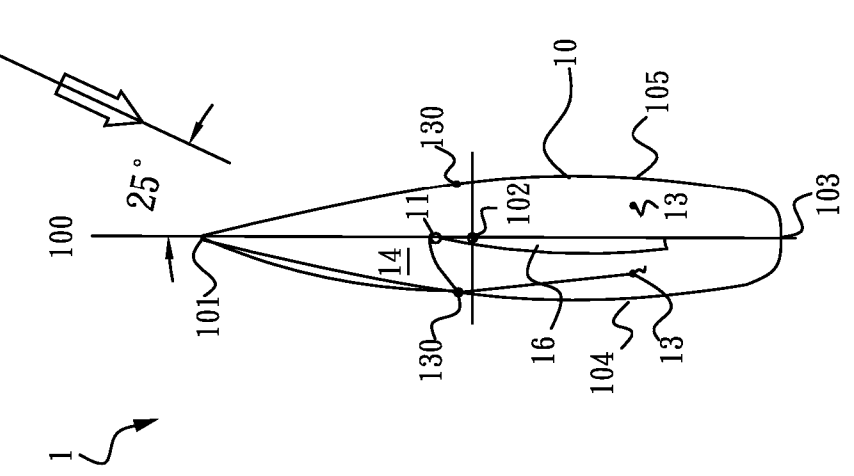


FIG. 1B (Prior Art)

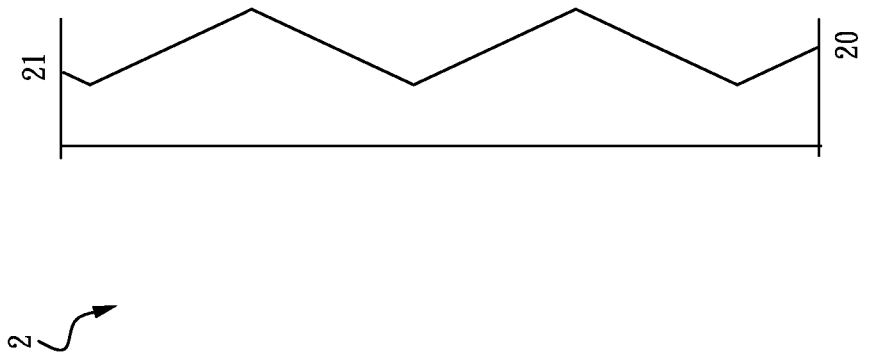


FIG. 1C (Prior Art)

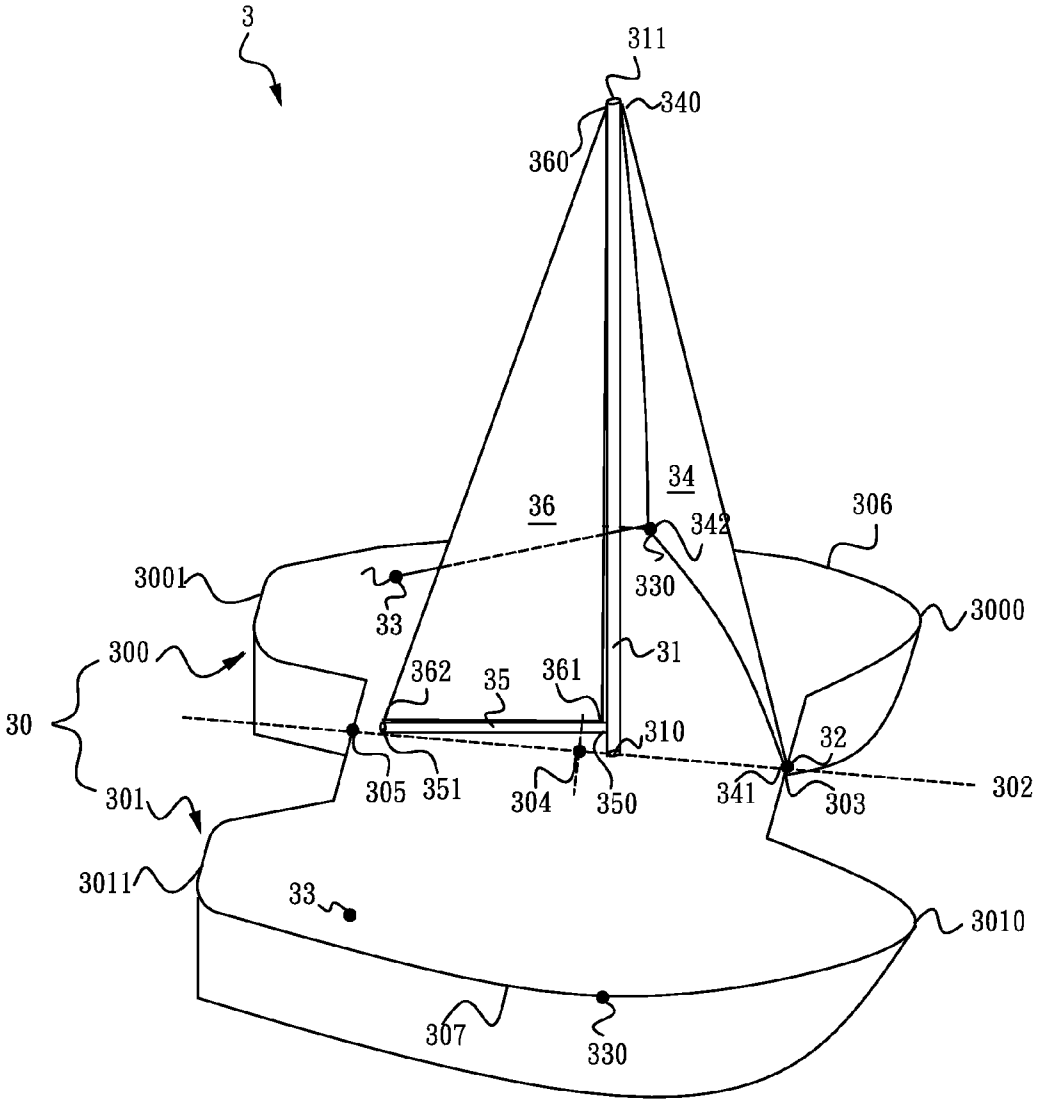


FIG. 2A (Prior Art)

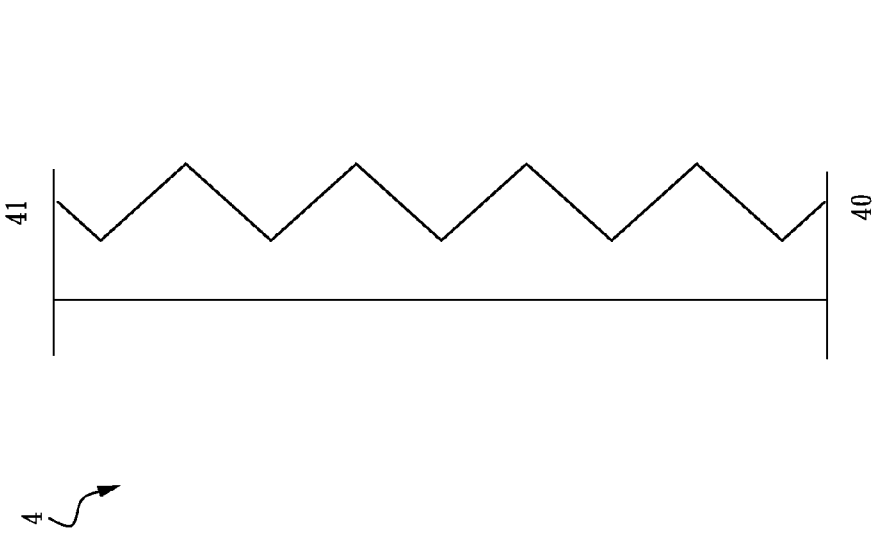


FIG. 2C (Prior Art)

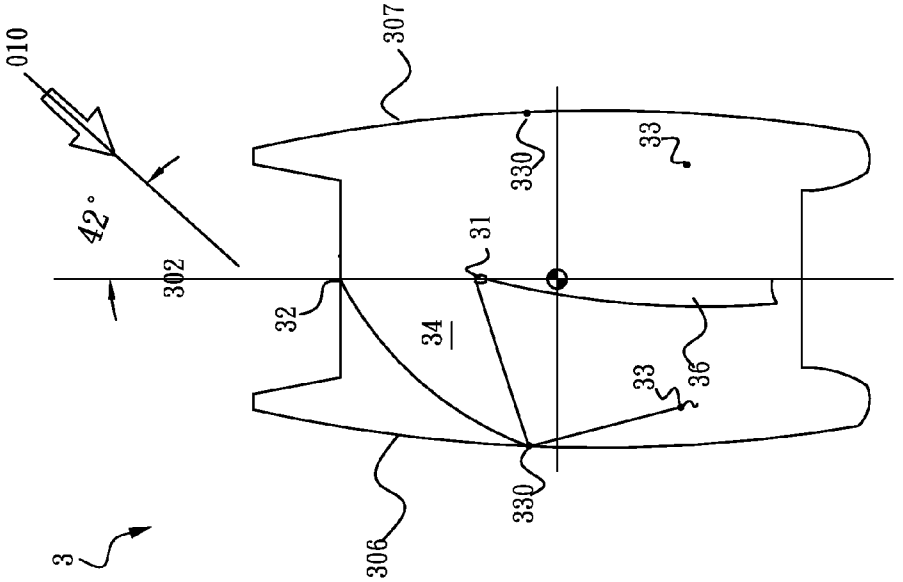


FIG. 2B (Prior Art)

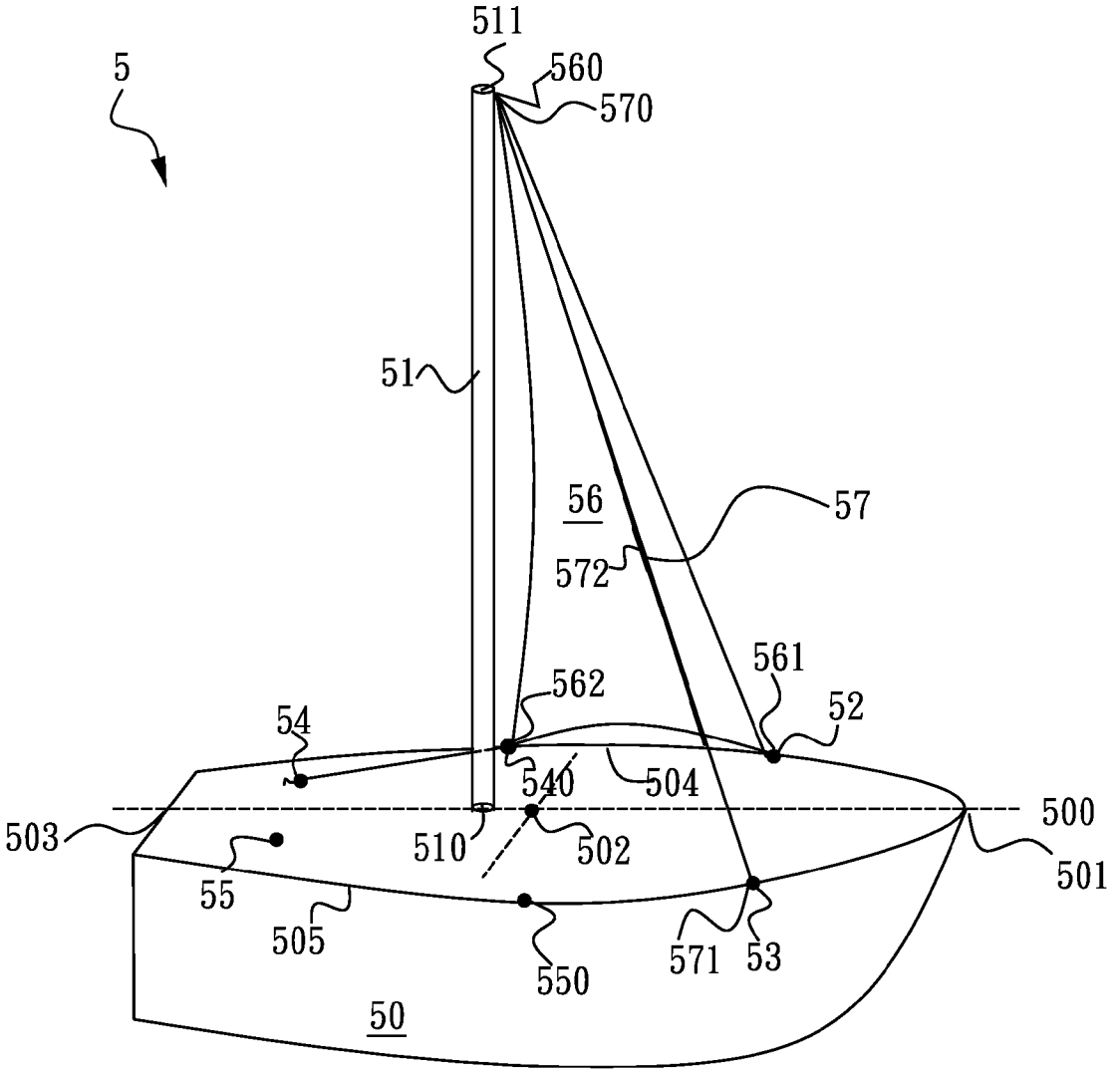

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FIG. 3A

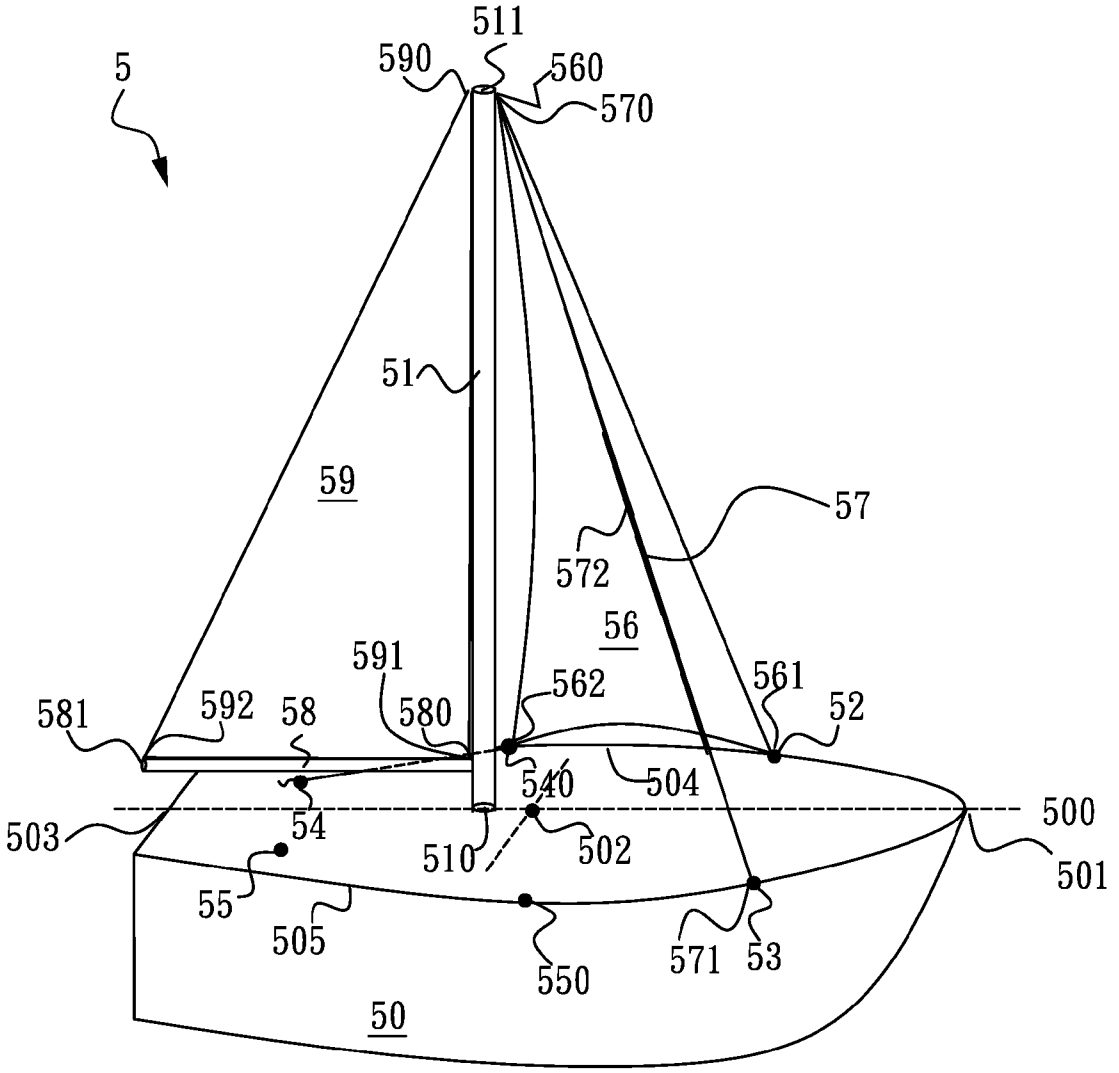

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FIG. 3B

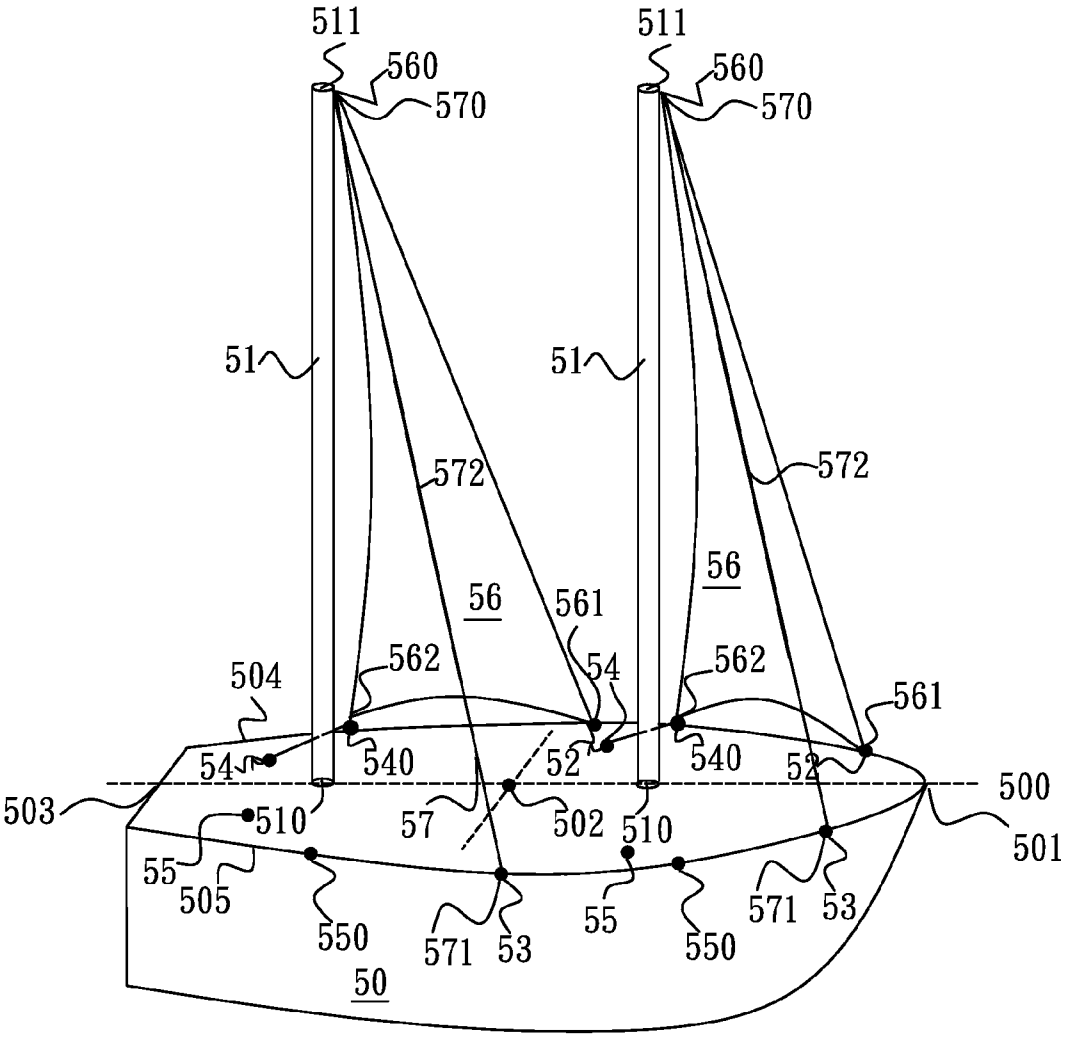

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FIG. 3C

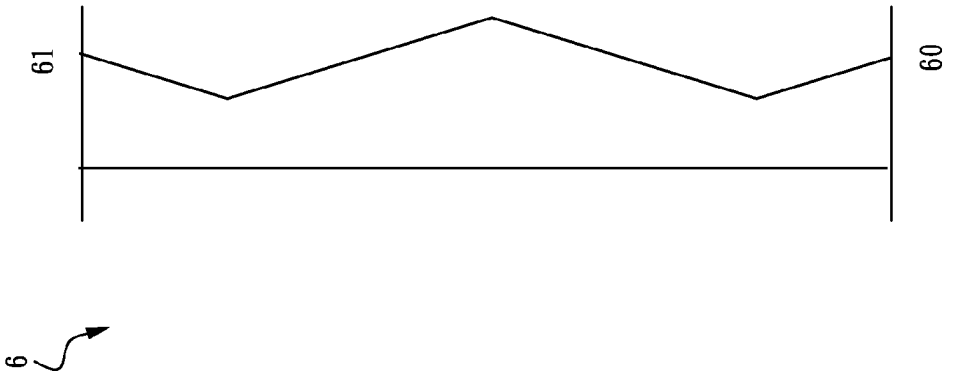


FIG. 3E

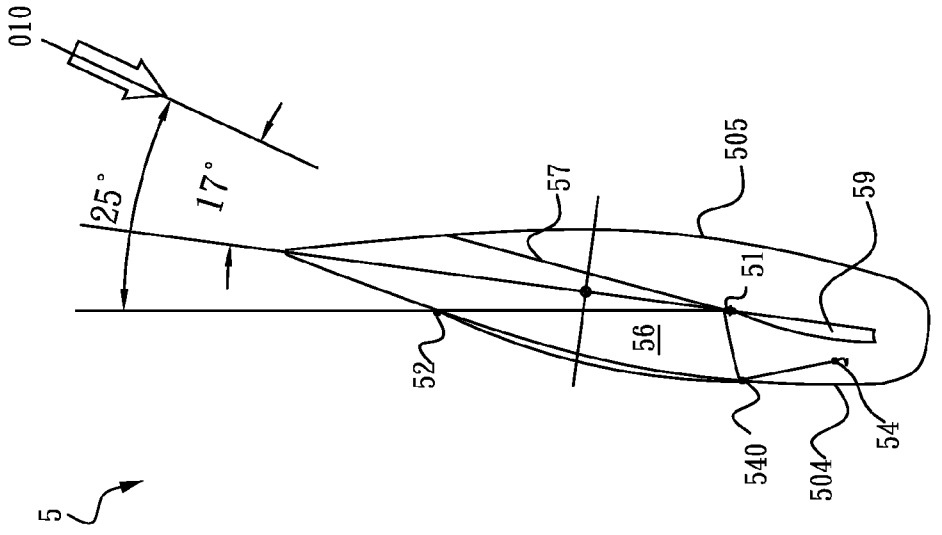


FIG. 3D

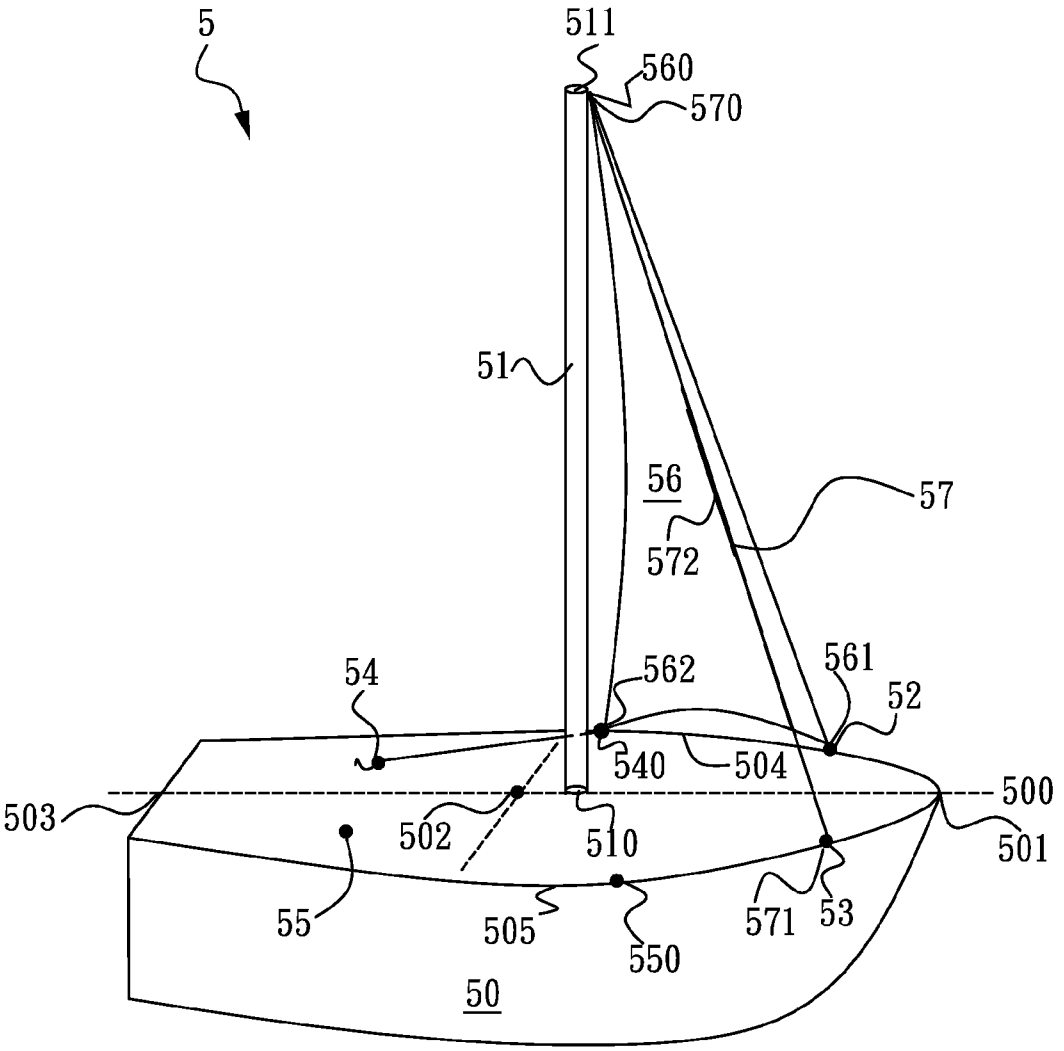

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FIG. 4A

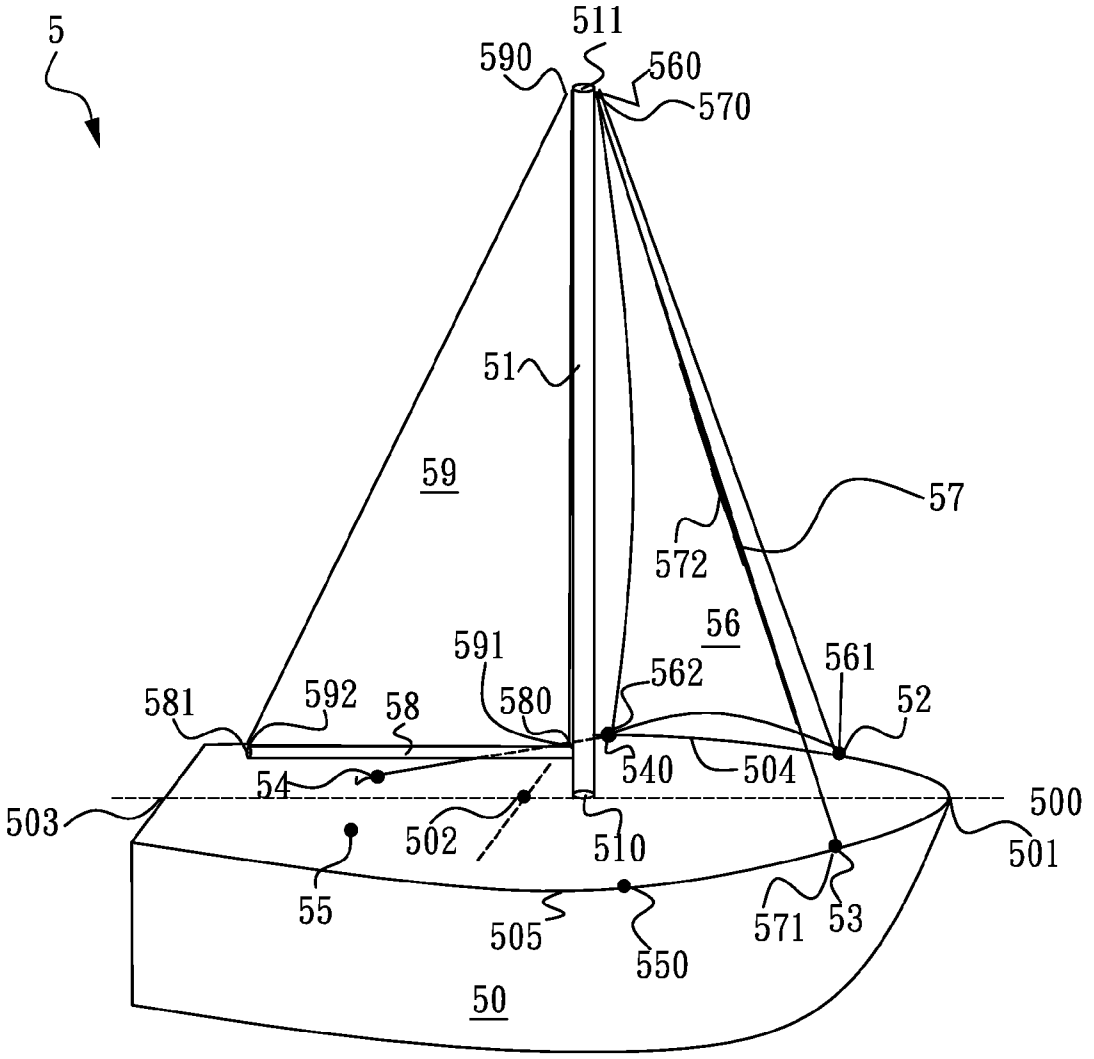

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FIG. 4B

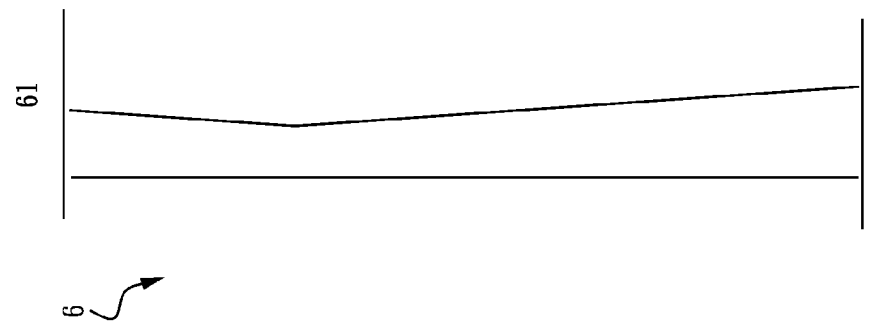


FIG. 4D

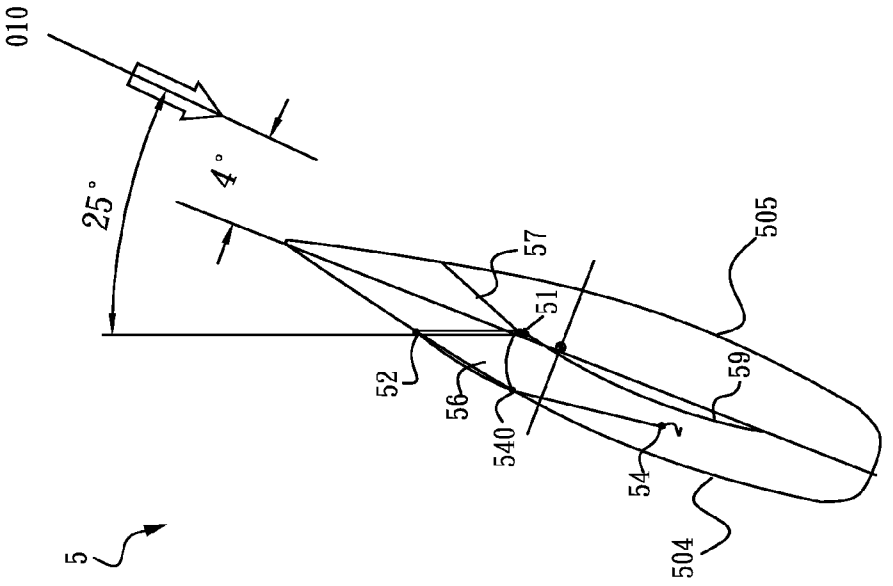


FIG. 4C

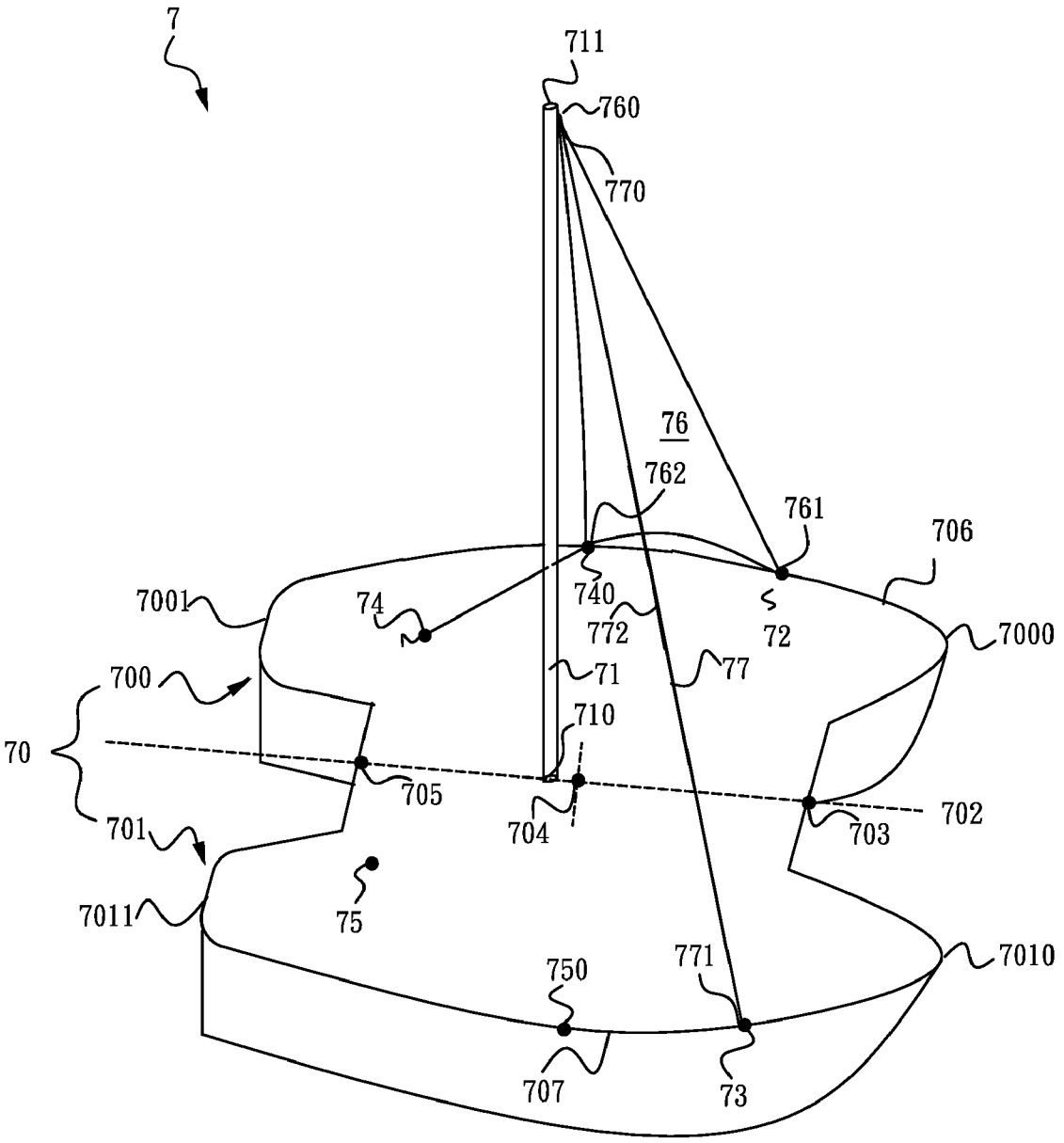

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FIG. 5A

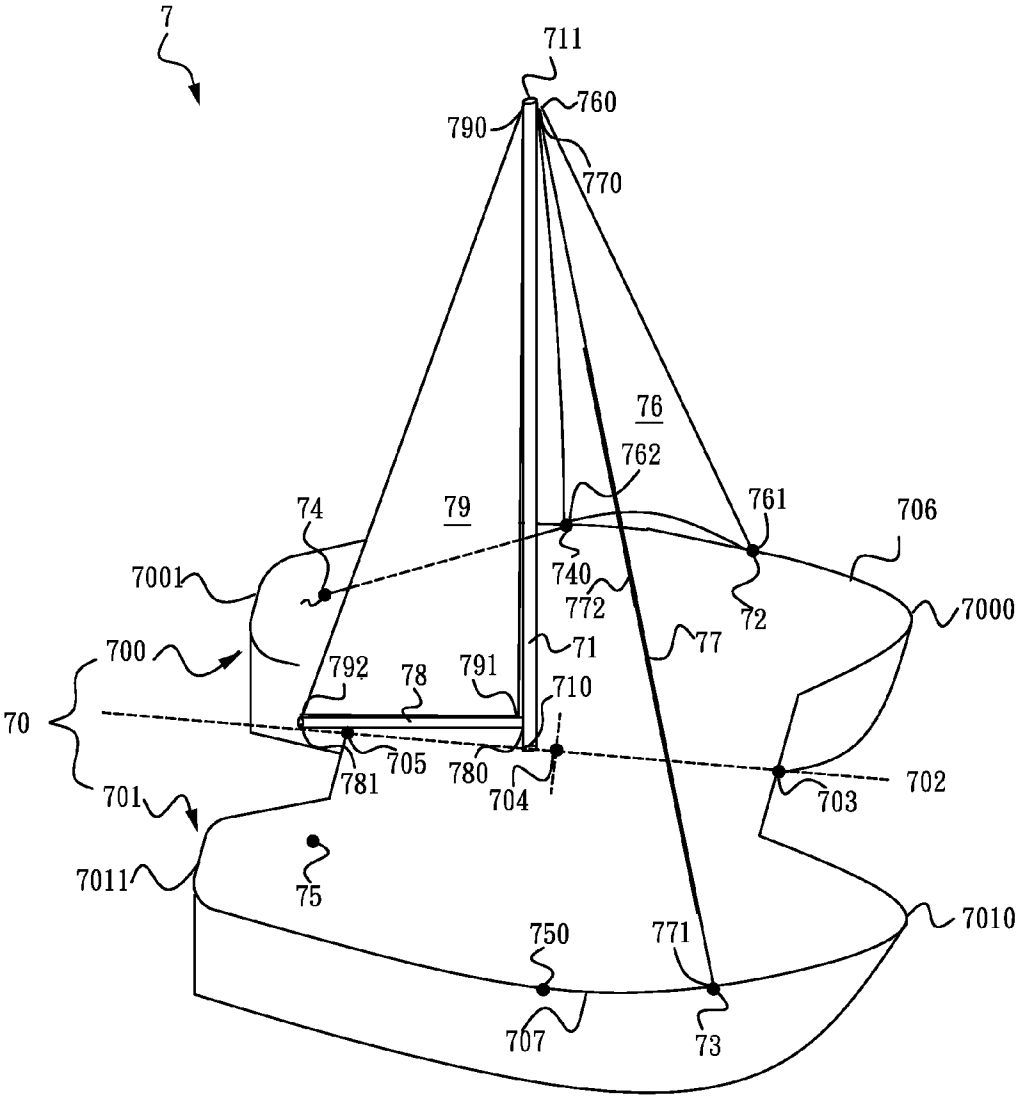

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FIG. 5B

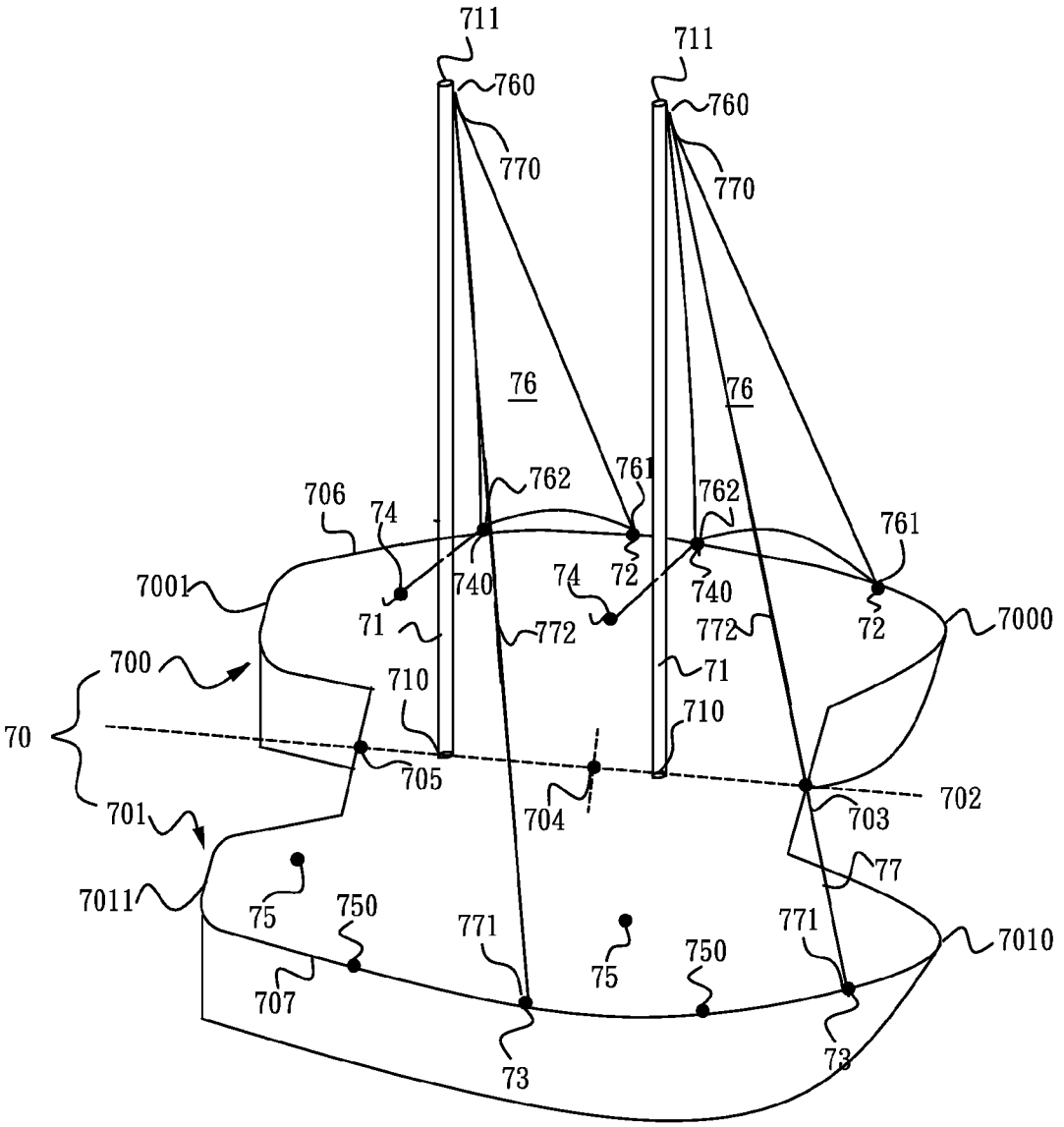

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FIG. 5C

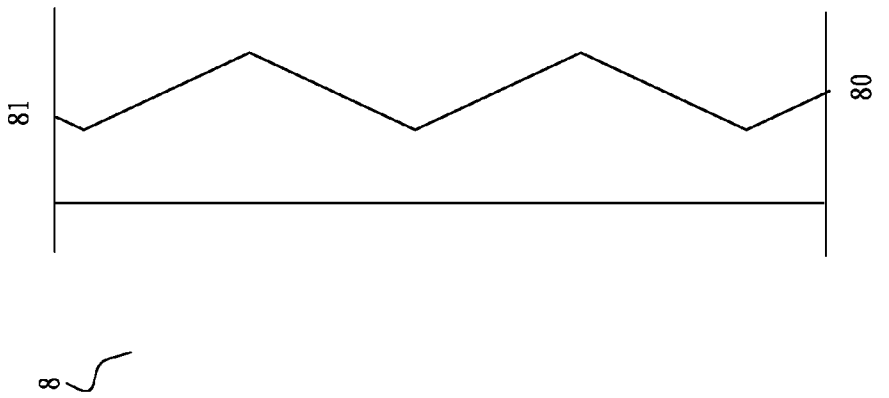


FIG. 5E

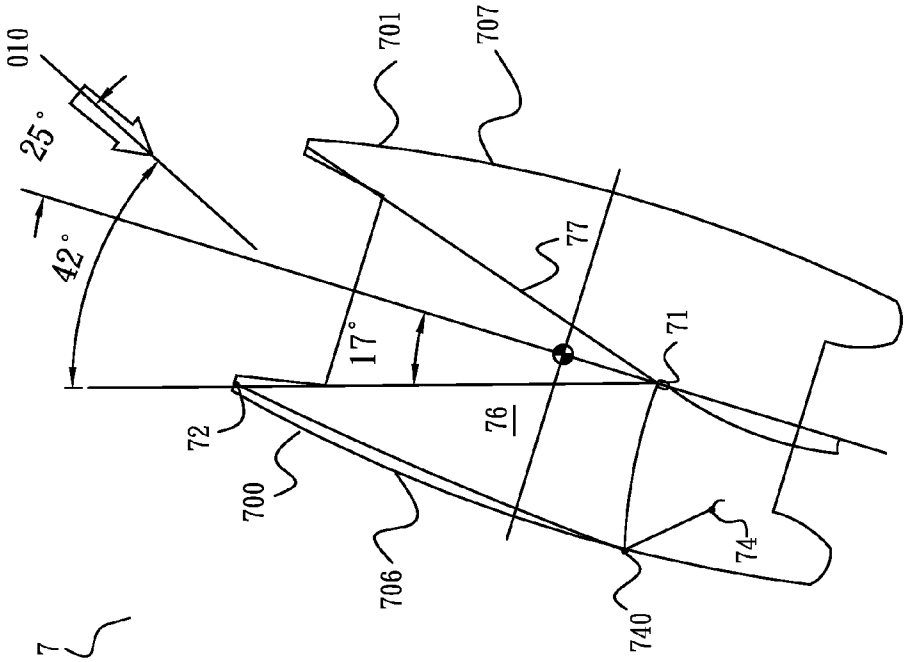


FIG. 5D

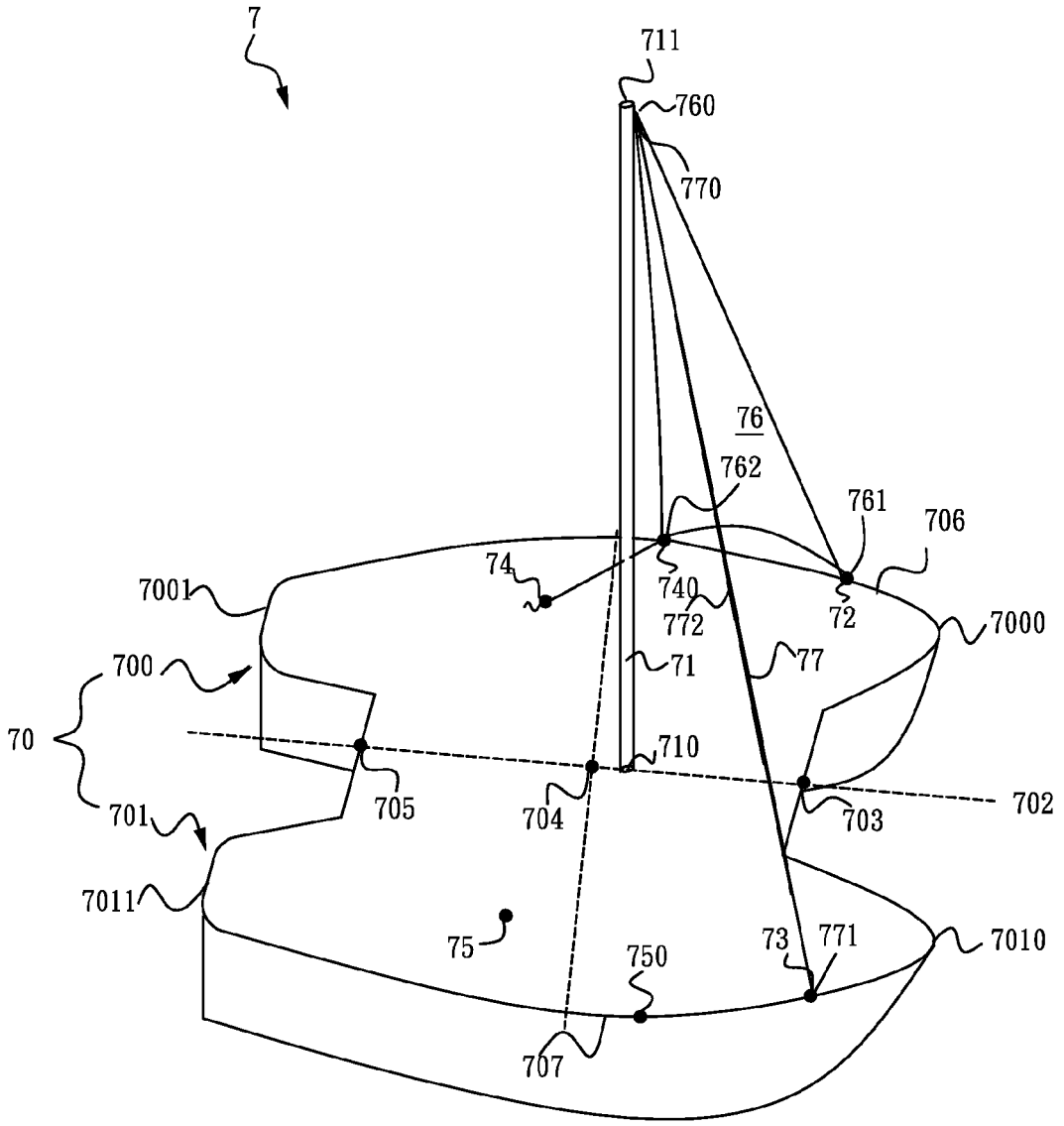

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FIG. 6A

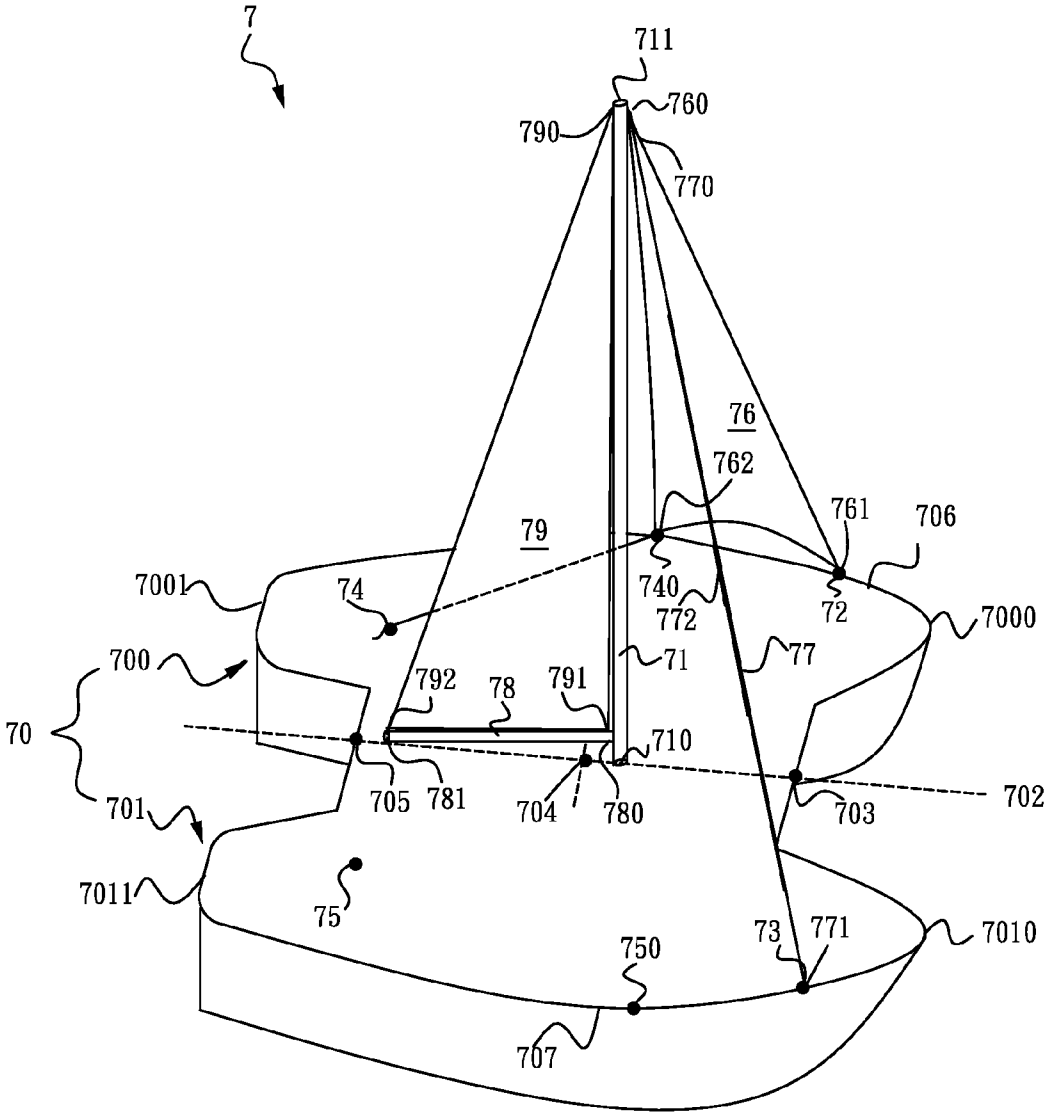

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FIG. 6B

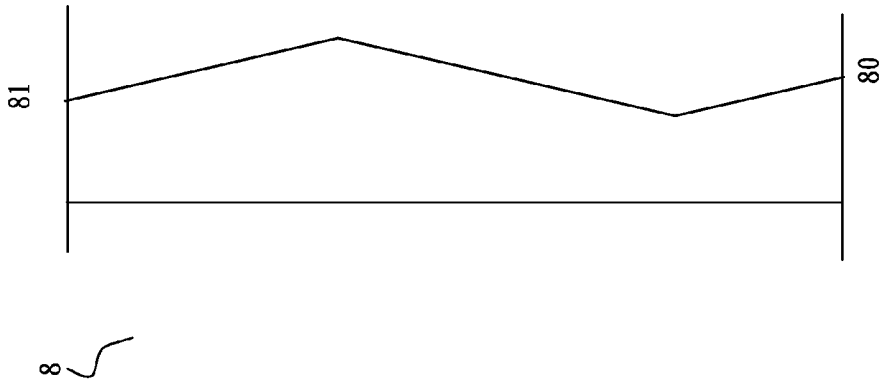


FIG. 6D

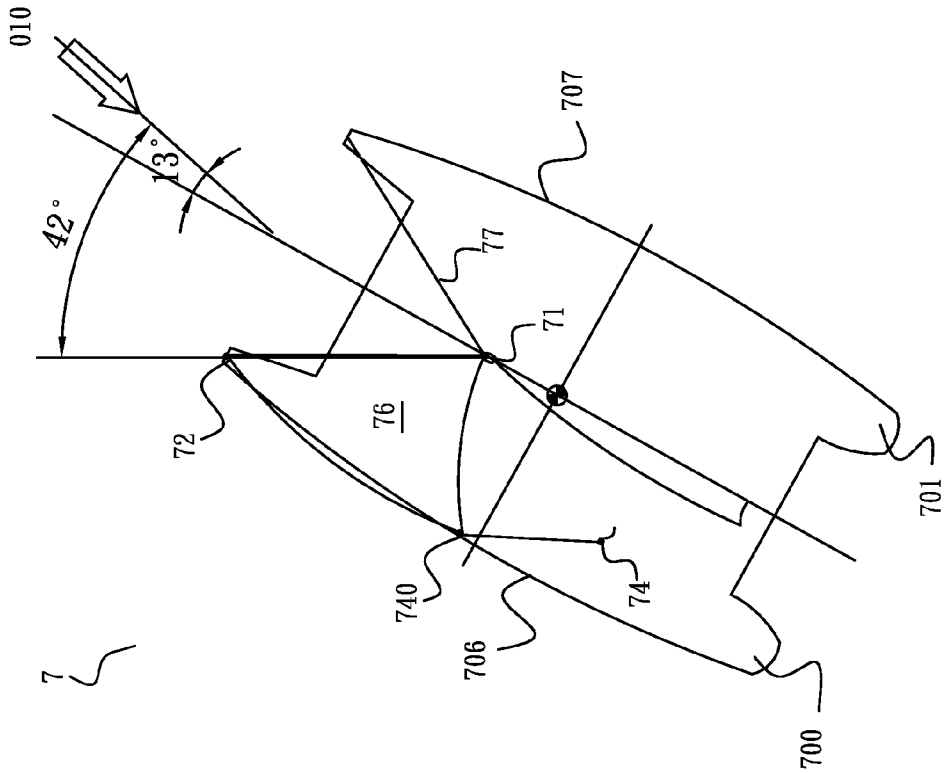


FIG. 6C

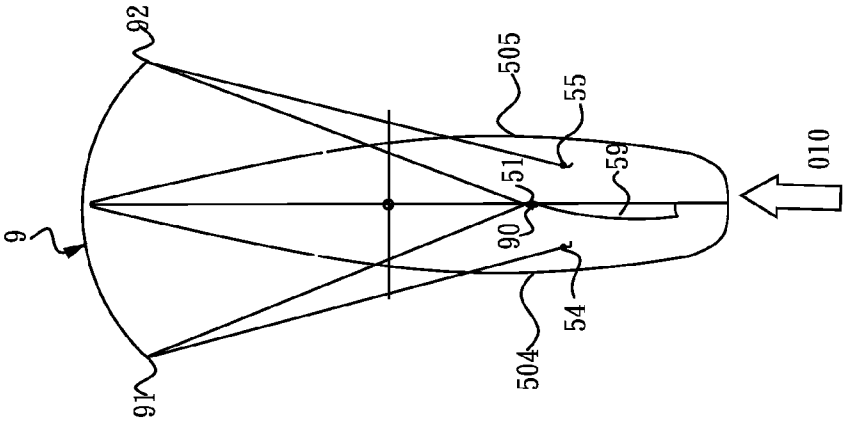

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FIG. 7B

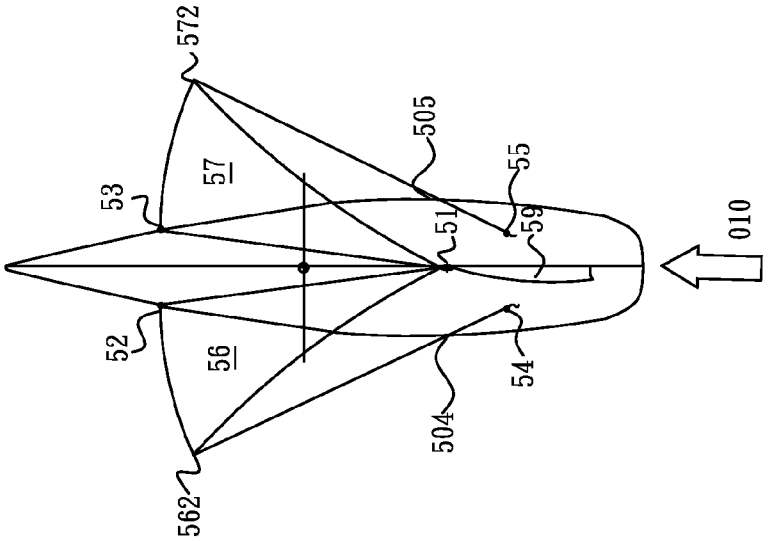

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FIG. 7A

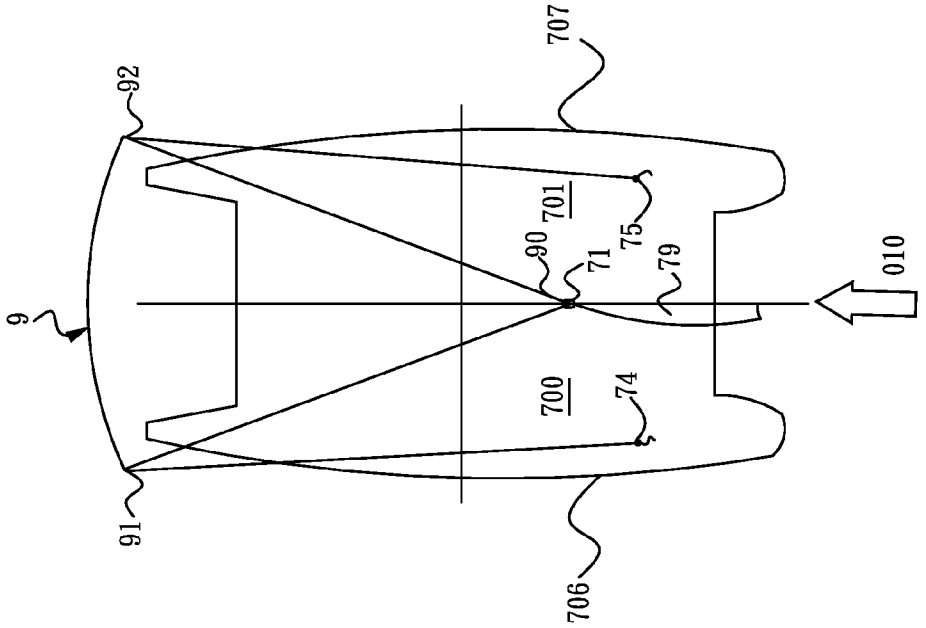

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FIG. 8B

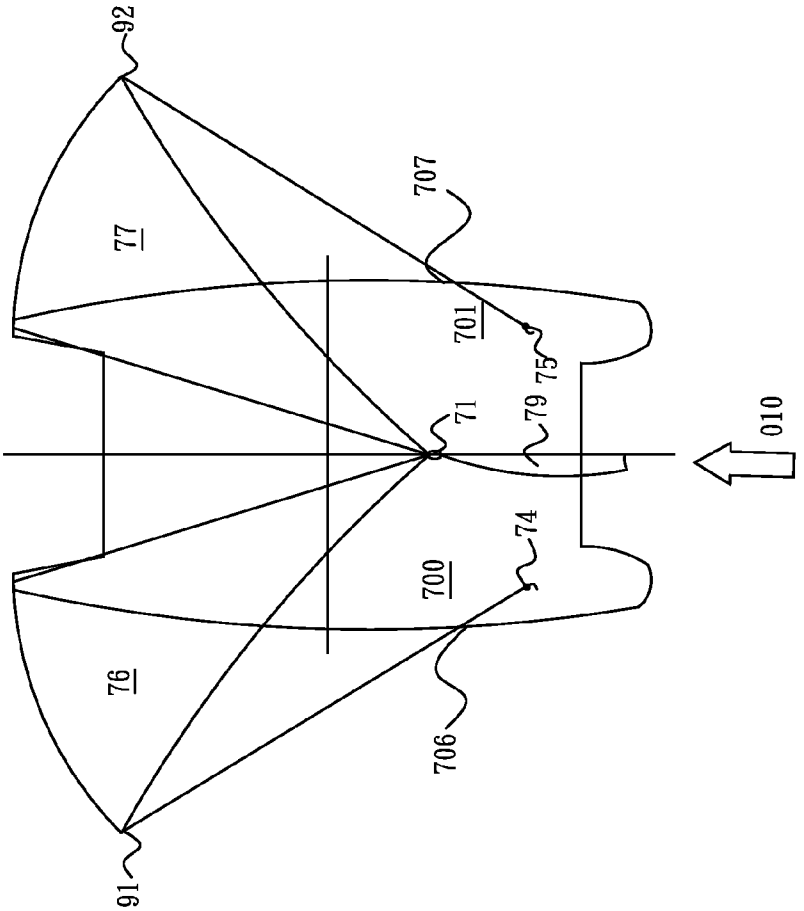

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FIG. 8A

SAILBOAT

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 categroies, i.e. single-masted sailboats and multi-masted sailboats. It is noted that the multi-masted sailboats includes 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. **1**A, which is a schematic diagram showing a conventional single-masted monohull sailboat. As shown in FIG. **1**A, 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 stern **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 stern **103** as the center line **100** is arranged connecting the bow **101** and the stern **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 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. **1**B, which is a top view of a conventional single-masted monohull sailboat. As shown in FIG. **1**B, 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. **1**C. As shown in FIG. **1**C, 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. **2**A, the sailboat is a single-masted catamaran **3**, but it is not limited thereby. As shown in FIG. **2**A, 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 rearmost 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 stem **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 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. **2**B, which is a top view of a conventional single-masted catamaran. As shown in FIG. **2**B, 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. **2**C. As shown in FIG. **2**C, 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. **1**C and FIG. **2**C, 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 position on the left to the center line of the hull module; a first winch, disposed at 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 position on the right to the center line of the hull module; a second winch, disposed at 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. **1**A is a schematic diagram showing a conventional single-masted monohull sailboat.

[0014] FIG. **1**B is a top view of the conventional single-masted monohull sailboat of FIG. **1**A.

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

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

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

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

[0019] FIG. **3**A 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. **3**B 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. **3**C is a schematic diagram showing a double-masted monohull sailboat with fully extended left jib according to the present invention.

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

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

[0024] FIG. **4**A 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. **4**B 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. **4**C is a top view of a single-masted monohull sailboat with fully extended first jib of FIG. **4**A.

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

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

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

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

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

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

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

[0034] FIG. **6**B is a schematic diagram showing a single-masted catamaran with fully extended first jib and a mainsail according the present invention.

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

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

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

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

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

[0040] FIG. **8**B 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. **3**A and FIG. **4**A, 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. **3**A and FIG. **4**A is a single-masted monohull sailboat **5**, the amount of mast is not limited thereby. In the two embodiments shown in FIG. **3**A and FIG. **4**A, 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 stern **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 stern **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 post side **504** of the hull **50** while the first winch **54** is disposed at 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 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. **3**A, the first end **510** of the mast **51** is disposed at a position on the center line **500** between the midship **502** and the stern **503**, and in FIG. **4**A, 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 roll 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 roll 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. **3**B and FIG. **4**B, 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. **3**B and FIG. **4**B is a single-masted monohull sailboat **5**, the amount of mast is not limited thereby. As shown in FIG. **3**B and FIG. **4**B, 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 stern **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 stern **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 post side **504** of the hull **50** while the first winch **54** is disposed at 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 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. **3**A, the first end **510** of the mast **51** is disposed at a position on the center line **500** between the midship **502** and the stern **503**, and in FIG. **4**A, 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 roll 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 roll 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 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. **3**C, 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 ringged on the masts of the double-masted monohull sailboat shown in FIG. **3**C, each of the mast in FIG. **3**C 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:

[0049] (1) The monohull 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;

[0050] (2) There are different amount 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 sailboat, 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 sailboat, as the top view of a single-masted monohull sailboat shown in FIG. **3**D 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. **4**C 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

[0051] (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. **3**A and FIG. **3**B, 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.

[0052] Please refer to FIG. **3**E and FIG. **4**D, which are schematic diagrams illustrating a zigzagging sailing trajectories of the single-masted monohull sailboats of FIG. **3**A and FIG. **4**A. As shown in FIG. **3**E and FIG. **4**D, 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. **1**C, FIG. **3**E and FIG. **4**D, it is noted that the voyage distance of the sailboat disclosed in the present invention is shorter than that of a conventional sailboat.

[0053] 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. **5**A and FIG. **6**A is a single-masted catamaran, but is not limited thereby. As shown in FIG. **5**A and FIG. **6**A, 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. **5**A or a position on the center line **702** between the starting end **703** and the midship **704** shown in FIG. **6**A, 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 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 **711** 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**.

[0054] 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 roll 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 roll 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**.

[0055] Please refer to FIG. **5**B and FIG. **6**B, 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. **5**B and FIG. **6**B is a single-masted catamaran **7**, the amount of mast is not limited thereby. As shown in FIG. **5**B and FIG. **6**B, 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. **5**B or a position on the center line **702** between the starting end **703** and the midship **704** shown in FIG. **6**B, 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 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 **711** 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**.

[0056] 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 roll 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 roll 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**.

[0057] 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 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 **711** 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**.

[0058] Please refer to FIG. **5**C, 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. **5**C, each of the mast in FIG. **5**C can be rigged with a boom and a mainsail so that it is not limited thereby.

[0059] The multi-hull sailboat of the present invention is different from those conventional multi-hull sailboat in that:

[0060] (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;

[0061] (2) There are different amount 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 sailboat 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 sailboat, as the top view of a single-masted catamaran shown in FIG. **5**D 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 shown in FIG. **6**C 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 sailboat efficiently for driving the catamaran to move accordingly; and

[0062] (3) Different from the conventional multi-hull sailboat 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. **5**A and FIG. **5**B, 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.

[0063] Please refer to FIG. **5**E and FIG. **6**D, which are schematic diagrams illustrating a zigzagging sailing trajectories of the single-masted catamarans of FIG. **5**A and FIG. **6**A. As shown in FIG. **5**E and FIG. **6**D, 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. **2**C, FIG. **5**E and FIG. **6**D, 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.

[0064] 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. **7**A, which is a top view of a single-masted monohull sailboat with its two jib fully extended according to the present invention. It is noted that although the sailboat in FIG. **7**A is a single-masted sailboat, the amount of mast is not limited thereby. While sailing with a tail wind as the wind direction **010** indicated in FIG. **7**A, 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. **7**B, 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 the is much easier that that on any conventional sailboat. Similarly, although the monohull sailboat in FIG. **7**B is a single-masted monohull sailboat, the amount of mast is not limited thereby. As shown in FIG. **7**B, 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. **7**B 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.

[0065] Please refer to FIG. **8**A, which is a top view of a single-masted multi-hull sailboat with its two jib fully extended according to the present invention. Although the multi-hull sailboat in FIG. **8**A 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. **8**A, 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. **8**B. Similarly, although the catamaran shown in FIG. **8**B is a single-masted catamaran, the amount of mast is not limited thereby. As shown in FIG. **8**B, 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. **8**B 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.

[0066] 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 stern, 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 post 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.

[0067] 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.

What is claimed is:

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 stern of the at least one hull;

a first fixing element, disposed at position on the left to the center line of the hull module;

a first winch, disposed at position on the left to the center line of the hul 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 position on the right to the center line of the hull module;

a second winch, disposed at position on the right to the center line of the hul 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 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.

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