

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
23 April 2009 (23.04.2009)

PCT

(10) International Publication Number  
**WO 2009/050023 A1**

(51) International Patent Classification:  
**B63H 9/06** (2006.01)

(21) International Application Number:  
PCT/EP2008/062940

(22) International Filing Date:  
26 September 2008 (26.09.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
MI2007A002037 19 October 2007 (19.10.2007) IT

(71) Applicant and

(72) Inventor: **CARICATO, Pietro** [IT/IT]; Via F.lli Frascchini  
12, I-20142 Milano Mi (IT).

(74) Agents: **CONCONE, Emanuele** et al.; Società Italiana  
Brevetti S.p.A., Via Carducci 8, I-20123 Milano Mi (IT).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:  
— with international search report

(54) Title: SAIL PROPULSION SYSTEM

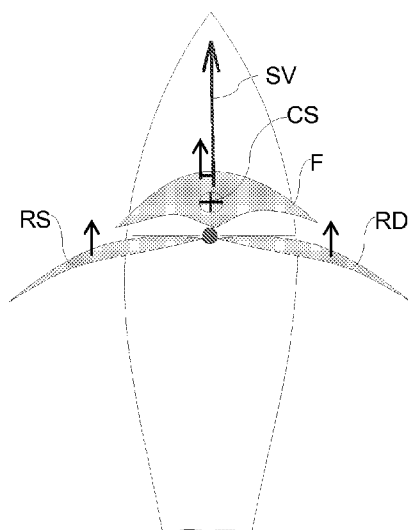


Fig.3

(57) Abstract: A sail propulsion system for boats and the like comprises at least one mast (A) and a jib (F) controlled by sheets and secured to the head of the mast (A), as well as at least two mainsails (RS, RD) rove on two shrouds (S; SR) located one to the right and one to the left of the mast (A) and arranged each on a boom (B) mounted on one of said shrouds (S; SR). This sail system has a greater sail surface with respect to the conventional set of sails consisting of a single mainsail and the relevant jib, whereby with the same wind the sail thrust is greater, moreover the jib (F) and the leeward mainsail meet the wind like a single sail whose efficiency is greater than the efficiency of the two separate sails present in conventional equipments, and finally when sailing before the wind the sail surface has its center of thrust located on the boat axis so as to make the sailing more stable and less prone to rightward or leftward deviations of the bow, thus increasing safety and allowing to dispense with the use of special sails when sailing before the wind, such as the gennaker or the spinnaker.



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“SAIL PROPULSION SYSTEM”

The present invention relates to sail propulsion systems for boats and the like, and in particular to a system comprising a jib and two mainsails rove on shrouds arranged to the sides of the mast. Specific reference will be made  
5 hereafter to the application of the present system to a single-masted boat, but it is clear that what is being said also applies to multi-masted boats and to land transportation means using a sail propulsion system.

It is known that a conventional sail propulsion system includes a jib and a  
10 single mainsail arranged all astern of the mainmast and secured between the mainmast, a boom and a gaff, if the sail is quadrangular, or only between the mainmast and the boom if the sail is triangular as in modern mainsails. On the contrary, the jib is a triangular sail arranged before the mainmast with its leading edge rove on the cable supporting the mainmast towards the bow (stay) and it is  
15 controlled only by the sheets. Such a set of sails allows a good sailing close to the wind but is not very effective when sailing before the wind, unless through the use of particular type of sails like spinnaker and gennaker.

Therefore the object of the present invention is to provide a sail propulsion system which overcomes the above-mentioned drawbacks.

20 This object is achieved by means of a sail system comprising in addition to the conventional jib also two mainsails rove on two shrouds located one to the right and one to the left of a same mainmast. Other advantageous features are disclosed in the dependent claims.

The main advantage of this sail system stems from the greater sail surface  
25 supported by the mainmast with respect to the conventional set of sails consisting of a single mainsail and the relevant jib, whereby with the same wind the sail thrust and therefore the speed of the boat provided with the present propulsion system are greater than those of a boat with conventional equipment.

A second significant advantage of the present sail system is given by the  
30 fact that the jib and the leeward mainsail meet the wind like a single sail having an area almost equal to the sum of the areas of the two sails, due to a little overlap,

and therefore form a sort of airfoil whose efficiency is greater than the efficiency of the two separate sails present in conventional equipments.

Still another considerable advantage of said sail system is the fact that when sailing before the wind the sail surface has its center of thrust located on the boat axis rather than eccentric as in conventional boats, and this makes the sailing more stable and less prone to rightward or leftward deviations of the bow, especially in the presence of waves. This is a great advantage in terms of safety and allows to dispense with the use of special sails when sailing before the wind, such as the gennaker or the spinnaker.

10 These and other advantages and characteristics of the sail propulsion system according to the present invention will be clear to those skilled in the art from the following detailed description of some embodiments thereof, with reference to the annexed drawings wherein:

Fig.1 is a diagrammatic rear perspective view of a first embodiment of a boat provided with the sail system according to the invention, the sails being arranged for sailing close to the wind;

Fig.2 is a top plan view of the boat of Fig.1 showing the arrangement of the sails for sailing close to the wind port tack and starboard tack;

Fig.3 is a top plan view showing the arrangement of the sails for sailing before the wind;

Fig.4 is a diagrammatic rear view of the boat of Fig.3;

Fig.5 is a diagrammatic rear perspective view of a second embodiment of the rigging to be used with this sail system; and

Fig.6 is a diagrammatic rear perspective view of a third embodiment of the rigging to be used with this sail system.

Referring to Fig.1, there is seen that the novel sail propulsion system according to the present invention comprises: a) a conventional jib F, whose top vertex is secured to the head portion of a mainmast A; b) a left mainsail RS rove on a shroud S, secured on deck C to the left of the mainmast A, and arranged on a boom B also mounted on said shroud S; c) a similar right mainsail RD arranged between a relevant boom B and a relevant shroud S secured on deck C to the right

of the mainmast A.

In this first embodiment the two mainsails RS, RD are rove on the same lateral shrouds S that support the mainmast A, but also other types of rigging are possible as it will be illustrated further on.

5 As shown in Fig.2, when the boat sails close to the wind the jib F and the leeward mainsail (RD port tack, RS starboard tack) meet the wind V like a single sail, thanks to their little overlap, while the windward mainsail works alone providing an additional thrust to the system.

10 When sailing close to the wind, the two mainsails RS, RD work with almost parallel profiles and when the sailing side is changed with respect to wind V the jib F is tacked to the new side so as to form a single profile with the new leeward mainsail, whereas the mainsails do not require any manoeuvre other than a trimming adjustment to the new direction.

15 Referring now to Figs.3 and 4, there is seen that when sailing before the wind the two mainsails RS, RD can be arranged symmetrically with respect to the mainmast A, while the open space remaining between the two mainsails can be covered by a suitable triangular sail or by the jib F itself. In this way, the thrust contributions of each sail (indicated by the short arrows) are combined into an overall sail thrust SV whose center of thrust CS results substantially on the boat axis, resulting in the above-mentioned advantages of safe and stable sailing.

20 Finally, in the diagrammatic views of Figs.5 and 6 other two possible solutions for the rigging to be used with this sail system are illustrated.

25 The first solution provides a mainmast A conventionally rigged with a forestay SP on which the jib F is rove, while the two mainsails RS, RD (the left mainsail RS being illustrated furled on the relevant boom B) are rove on proper dedicated shrouds SR extending between the head of the mainmast A and the deck C to the sides of the mainmast A. In this case, the point of connection to the deck C of each mainsail shroud SR can be secured on a mobile carriage CR so that the mainsail shroud SR can be moved fore and aft on the deck to search for the optimal sail balance.

30 In the second solution the rigging is simpler because the mainsails RS, RD

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are rove on the lateral shrouds S of the mainmast A, while the jib F is rove on a proper jibstay SF that from the head of the mainmast A extends down to the deck before the mainmast A yet aft of the forestay SP. In this case, the foot of the jibstay SF can be secured on a mobile carriage CF so that the search for the  
5 optimal sail balance can be performed by moving the jib F fore and aft.

Obviously, in order to have the maximum flexibility in sail adjustment nothing prevents the combination of the two solutions above into a fourth embodiment comprising both carriages CR and carriage CF.

It is clear that the above-described and illustrated embodiments of the sail  
10 system according to the invention are just examples susceptible of various modifications. In particular, shape, size and materials of the members that make up said sail system can be freely changed according to specific design requirements as long as the overall structure of the system is retained.

## CLAIMS

1. Sail propulsion system for boats and the like, comprising at least one mast (A) and a jib (F) controlled by sheets and secured to the head of said mast (A), characterized in that it further includes at least two mainsails (RS, RD) rove on two shrouds (S; SR) located one to the right and one to the left of said at least one mast (A), and arranged each on a boom (B) mounted on one of said shrouds (S; SR).

2. Sail propulsion system according to claim 1, characterized in that when the boat or the like sails close to the wind the jib (F) and the leeward mainsail (RS, RD) are slightly overlapped.

3. Sail propulsion system according to claim 1 or 2, characterized in that the two mainsails (RS, RD) are rove on the same lateral shrouds (S) that support the mast (A).

4. Sail propulsion system according to claim 1 or 2, characterized in that the two mainsails (RS, RD) are rove on proper shrouds (SR).

5. Sail propulsion system according to the preceding claim, characterized in that the point of connection to the deck (C) of each mainsail shroud (SR) is secured on a carriage (CR) mobile in the longitudinal direction.

6. Sail propulsion system according to one of the preceding claims, characterized in that the jib (F) is rove on a proper jibstay (SF) that from the head of the mast (A) extends down to the deck (C) before the mast (A) yet aft of the forestay (SP).

7. Sail propulsion system according to the preceding claim, characterized in that the foot of the jibstay (SF) is secured on a carriage (CF) mobile in the longitudinal direction.

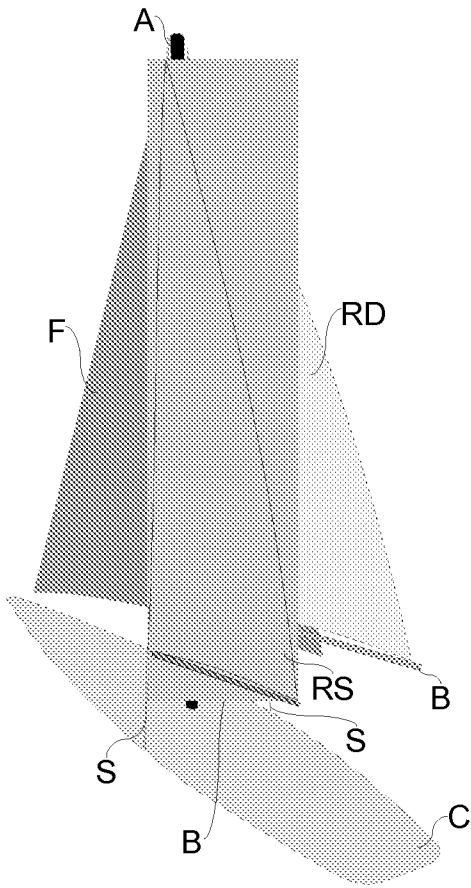


Fig.1

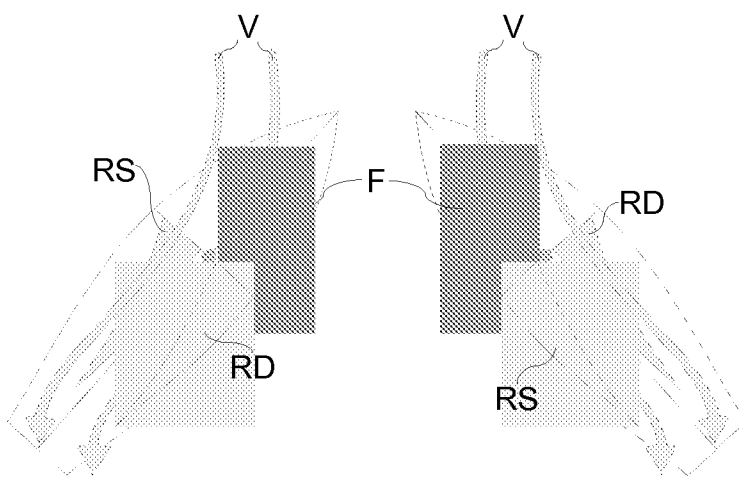


Fig.2

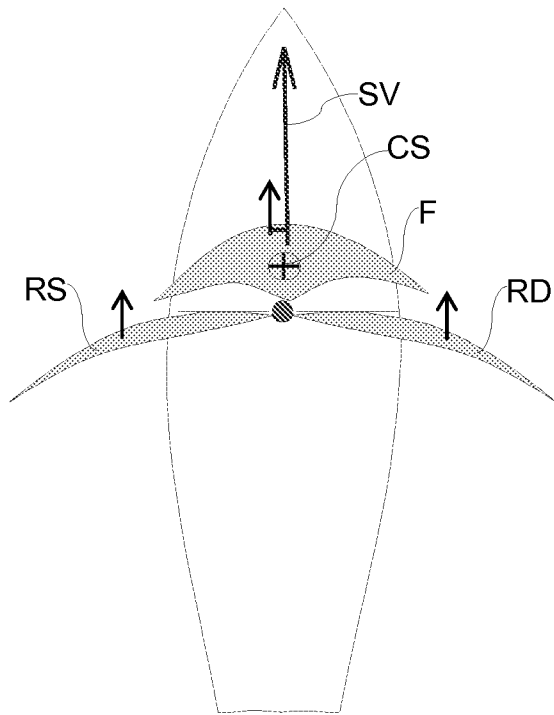


Fig.3

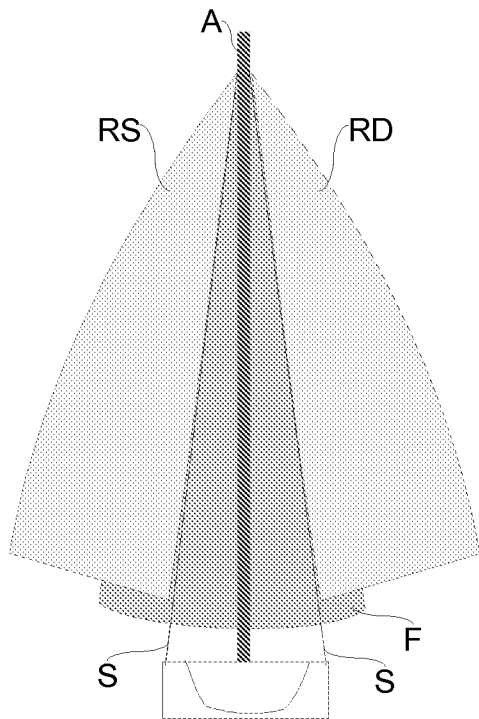


Fig.4

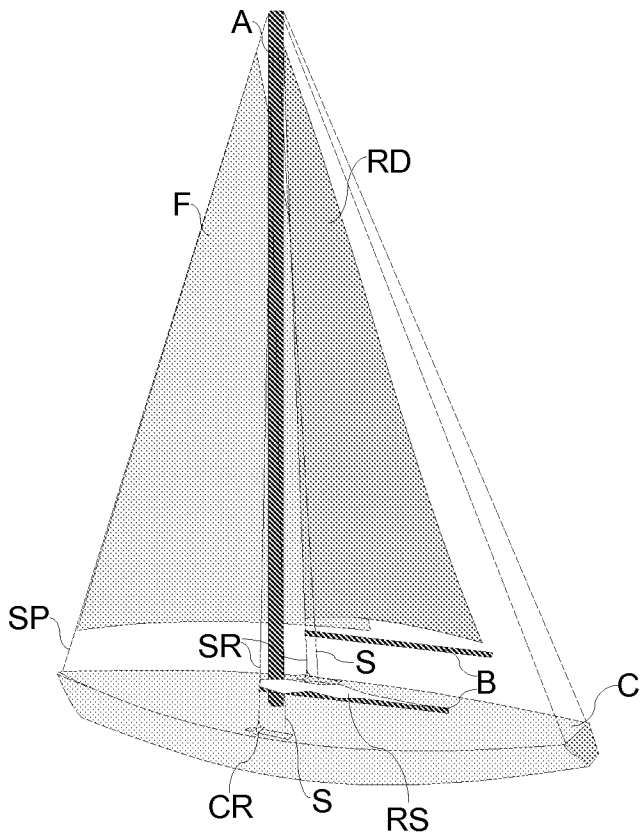


Fig.5

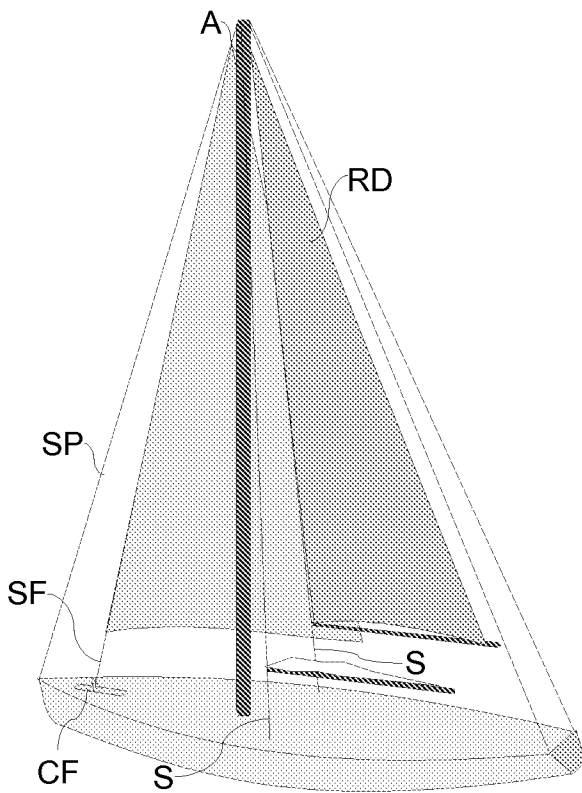


Fig.6

**INTERNATIONAL SEARCH REPORT**

International application No  
PCT/EP2008/062940

**A. CLASSIFICATION OF SUBJECT MATTER**  
INV. B63H9/06

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
B63H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)  
EPO-Internal, WPI Data

<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 230 060 A (MCCOY JOHN D) 28 October 1980 (1980-10-28)	1,4,6
Y	column 9, line 37 - column 11, line 38; figures 1-3,10,17	5,7
Y	----- EP 0 173 979 A (STAMPE HORST) 12 March 1986 (1986-03-12) column 2, lines 5-47; figures 1,6,7	5
Y	----- US 5 988 086 A (MITCHELL DAVID N [US] ET AL) 23 November 1999 (1999-11-23) column 7, line 58 - column 8, line 14; figure 11	7
X	----- FR 2 628 387 A (SAUTON ANDRE [FR]) 15 September 1989 (1989-09-15) page 2, line 19 - page 4, line 2; claim 1; figures 1,2	1,4
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Further documents are listed in the continuation of Box C.       See patent family annex.

- \* Special categories of cited documents :
- |   |   |
|---|---|
| *A* document defining the general state of the art which is not considered to be of particular relevance  | *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention   |
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| *O* document referring to an oral disclosure, use, exhibition or other means  | * & * document member of the same patent family   |
| *P* document published prior to the international filing date but later than the priority date claimed  |   |

Date of the actual completion of the international search  22 January 2009	Date of mailing of the international search report  02/02/2009
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer  Brumer, Alexandre
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INTERNATIONAL SEARCH REPORT

International application No  
PCT/EP2008/062940

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 506 620 A (GERR STANLEY [US]) 26 March 1985 (1985-03-26) column 5, line 44 - column 7, line 39; figures 1-8 -----	1

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2008/062940

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4230060	A	28-10-1980	NONE	
EP 0173979	A	12-03-1986	DE 3432345 A1 US 4723498 A	13-03-1986 09-02-1988
US 5988086	A	23-11-1999	US 5996519 A	07-12-1999
FR 2628387	A	15-09-1989	NONE	
US 4506620	A	26-03-1985	NONE	