

COMMONWEALTH OF AUSTRALIA

Patents Act 1952

CONVENTION APPLICATION FOR A PATENT



SECTION 113 DIRECTION SEE FOLIO 8

NAME DIRECTED Deutsche Airbus GmbH
Abt. QZ 13 Bre, Hunefeldstrasse 1-5, 2800 Bremen 1
Germany

YACHT

which is described in the accompanying complete specification.

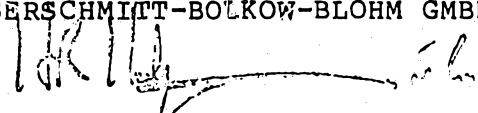
This application is made under the provisions of Part XVI of the Patents Act 1952 and is based on an application for a patent or similar protection made in Germany on 16 September 1988, under No. DE P 38 31 468.1.

Our address for service is:-

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Dated this 24th day of March 1993

MESSERSCHMITT-BOLKOW-BLOHM GMBH

by: 

Patent Attorneys for the Applicant

To: The Commissioner of Patents
AUSTRALIA

AUSTRALIA

Patents Act 1990

643424

NOTICE OF ENTITLEMENT

TO GRANT OF A PATENT,
PETTY PATENT, OR
PATENT OF ADDITION

*We, Deutsche Airbus GmbH, a company incorporated under
the laws of the Federal Republic of Germany
of Abt. GZ 13 BRE, Hunefeldstrasse 1-5
2800 Bremen 1, Germany
being the applicant(s) in respect of an Application **No 39488/89
for an invention entitled:

state the following:

The person(s) nominated for the grant of the patent:

1. ~~is/are the actual inventor(s) of the invention~~
~~or~~
has/have entitlement from the actual inventor(s).
Ernst-August Bielefeld and the facts upon
which the person(s) nominated is/are entitled to make the application
are as follows: The inventor assigned his rights to Messerschmitt-
Bolkow-Blohm GmbH and rights to the invention and application
No. 39488/89 transferred to Deutsche Airbus GmbH, by agreement
dated 8 December 1989.
2. ~~** (a) is/are the applicant(s) of the provisional application(s) listed on the~~
~~patent request form~~
~~or~~
~~has/have entitlement to make a request under Section 113 in relation~~
~~to the provisional application(s) listed on the patent request form by~~
~~virtue of:~~
- ~~** (b) is/are the applicant(s) of the basic application(s) listed on the patent~~
~~request form/declaration under Article 8 of the PCT~~
~~or~~
~~has/have entitlement from the ap, icant(s) of the basic application(s)~~
~~listed on the patent request form/declaration under Article 8 of the~~
~~PCT by virtue of: an agreement dated 8 December 1989 to transfer~~
~~interest in the invention and patent application No 39488/89~~
~~to Deutsche Airbus GmbH.~~
~~and the basic application(s) listed on the request form/declaration~~
~~made under Article 8 of the PCT is/are the first application(s) made in~~
~~a convention country in respect of the invention.~~

~~***3.~~ ~~is/are the applicant(s)/Patentee(s) of the original application(s)/~~
~~patent(s)~~
~~or~~
~~has/have entitlement to make a request under Section 113 of the Act~~
~~in relation to the original application(s) / patent(s) by virtue of:~~

**4. is/are the depositor(s) of the deposit(s) as listed hereafter
or
has/have entitlement from the depositor(s) of the deposit(s) as listed
hereafter by virtue of:

Deposit list:

* Signed at this day of 19

Status:

~~** I/We,~~
~~the applicant/patentee for application/patent~~
~~No. authorise~~
~~to apply for a patent of addition for an improvement in or modification~~
~~of the main invention.~~

Signed at Bremen this 29th day of June 1993

i. V. Schramm *Dr. Bartholdy*
i.V.Schramm i.V.Dr.Bartholdy

Status: authorized agents, both

- * If completed in the name of a company,
to be executed by authorised person
- ** Delete where inapplicable
- *** Delete if not a divisional application



AU8939488

(12) PATENT ABRIDGMENT (11) Document No. AU-B-39488/89
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 643424

(54) Title
YACHT

International Patent Classification(s)
(51)⁴ B63B 001/10 B63B 001/26 B63B 003/38 B63B 039/06

(21) Application No. : 39488/89 (22) Application Date : 11.08.89

(30) Priority Data

(31) Number (32) Date (33) Country
3831468 16.09.88 DE GERMANY

(43) Publication Date : 22.02.90

(44) Publication Date of Accepted Application : 18.11.93

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(56) Prior Art Documents
US 4164909
US 3911845
US 3425383

(57) Claim

1. A yacht operating according to the airfoil principle, comprising a hull (2) and a sail (3), a bow keel (13) and a stern keel (14); a lift control wing (9, 10) being provided at the under ends of each of the bow keel (13) and stern keel (14); an outrigger (6, 6') attached to each side of the hull, the ends of each outrigger comprising a downward leading fin (11, 11') carrying a transverse lift control fin (8, 8'), wherein the lift control wings and the transverse lift control fins form a four-point airfoil system for generating lift and for control and stabilisation of the yacht; wherein the outriggers are formed as sweptforward wings having floats (12, 12') attached at their ends; the downward leading fins (11, 11') being so formed as to act as lateral controlling fins for said outriggers; the outriggers (6, 6') having a predetermined elasticity, so that an increased load on a transverse lift control fin (8, 8') can produce flexing of the corresponding outrigger, such as to increase the angle of attack of the transverse lift control fin (8, 8').

COMMONWEALTH OF AUSTRALIA

Patents Act 1952

643424

COMPLETE SPECIFICATION

(ORIGINAL)

Class

Int. Class

Application No :

Lodged :

Complete Specification Lodged :

Accepted :

Published :

Priority :

Related Art :



Name of Applicant

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Complete Specification for the invention entitled:

YACHT

The following statement is a full description of this invention including the best method of performing it known to me:-

YACHT

The invention relates to a yacht according to the airfoil principle, comprising a hull and a sail, a bow keel and a stern keel, whose under sides each comprise a lift control fin, and an outrigger attached to each side of the hull whose end comprises a downward leading fin carrying a lift control fin. The lift control fins comprise a four-point plane system for generating lift as well as for control and stabilisation.

To enhance the performance of yachts it is desirable to maximise the efficiency of wind utilisation and to minimise water resistance whilst maintaining satisfactory stability and steering characteristics.

In the newspaper "The Times" (GB) of Thursday, July 7, on the title-page, there is shown a yacht, comprising a hull and a sail, and bow and stern keels. At the end of each of the keels is fitted a lift control fin. Sideways on each side of the hull there is attached at an outrigger whose end comprises a downward leading fin carrying several lift control fins. The lift control fins comprise a four-point wing system for generating lift as well as for steering and stabilisation. At low speeds the hulls and outriggers are submerged but at high speeds they are above the water surface as shown. This yacht does not show any means for accelerating the transition between the submerged state and the high speed state. This leads to the circumstances that at the start, when the wing system has not developed sufficient lift, when unstable handling characteristics

may appear. Further using the wing configurations shown, it may be expected that there will be relatively high values of induced water resistance. Thereby the moistened or wetted field of the under water configuration is in no way minimised.

The basis of the invention is to form a yacht in such a way that this yacht will be greatly improved with regard to utilisation of wind, minimisation of induced water-resistance and reduction of the wetted field, as well as with regard to stabilisation.

This object is obtained in accordance with the invention for a yacht in which that the outriggers are formed as slender and sweptforward wings of a predetermined elasticity, having attached at their end floats and fins performing as sideways lateral controlling wings.

Thereby, it is especially of advantage that there is fitted a combined tandem-rudder system with small high speed control wings. The yacht shows an improved stabilisation performance.

Further embodiments of the invention are to be found in the subclaims.

Embodiments of the invention are illustrated in the drawing and shall now be described in greater detail. The figure shows a yacht 1 in a so called "sailing into the wind configuration" comprising a hull 2, a sail 3 embodied as a full profile sail, as well as a tandem keel system. The keel system comprises a bow keel 13, a

stern keel 14 and a four-point fin system comprising two transverse lift control fins 8,8' and two lift control wings arranged on the keels 13, 14. The normally used spinnaker and other additional special sails for before the wind and across the wind courses are not shown. Sideways of the hull 2 there are arranged outriggers 6,6' having lateral control fins (11,11') at their ends for taking up the sideways arranged lift control fins 8,8'. At the ends of each of the outriggers 6,6' there is arranged a float 12,12' of a hydro-dynamic shape. On each of the keels 13,14 there is a bow lift control wing 9 and a stern lift control wing 10 respectively. Below these wings there is a high speed bow rudder 15 and a high-speed stern rudder 16 forming a cross configuration with the relevant keel and lift control wing 9,10. The outriggers 6,6' have a small surface and are swept forward.

The hull 2 has a slim bow area and has a concave V-shaped cross section. This arrangement deflects spray sideways from the hull, thereby preventing water from reaching the topsides. The sail 3 is arranged about the midships where the outrigger roots are also arranged. The cockpit 4 is situated aft of the sail 3 and is wide so that there is good visibility ahead.

Close to the cockpit 4 there is a stern control carrier 7, whose end carries the stern keel. This carrier 7 is of minimised cross section for aerodynamic as well as weight considerations. The sail 3 has a geometrical twist which can be matched to regional wind characteristics. Further, the sail 3 has a top disc 17

for the reduction of the induced resistance.

The sideways arranged lateral control fins 11,11' are sweptback. However, if these fins 11,11' are swept forward one can get a stabilising effect by a predetermined elasticity of the outriggers 6,6' combined with the sideways attached lift control fins 8,8'. This effect is caused by a higher degree of load on the control fin concerned as a result of the elasticity of the outrigger and hence an amplification of the angle of attack of the fin so that the load capacity of the fin increases.

The sideways attached lift control fins 8,8' form, together with the under sides of the sideways attached lateral control fins 11,11', an L-shape such that the ends of the lift control fins, 8,8' point to the yacht's central plane. For this, it is very advantageous that the L-shape produces less induced water resistance compared to a T-shape. The yacht shown has hydroynamically shaped floats 12,12', these submerged floats have a minimal water resistance. These floats are further used as ballast tanks. A dynamic pressure operated pick-up system is provided so that the tanks can be filled very fast if necessary. To empty the tanks there are provided at their under sides or at the stern at least one quick release flap. There are also provided at suitable stagnation points on the pick up system, preferably in the crossing area of the bow and stern control wings, corresponding filling openings. It is also possible to arrange liftable pick-up means on other positions on the hull, for instance directly on

the floats 12,12'.

Before starting, the yacht lies with its floats 12,12' and keels 13,14 in the water. With increasing speed the four fins function so that the hull gets lifted from the surface of the sea. This transition phase is accelerated by the hydrodynamic shape of the hull and the floats 12,12' which are constructed to provide maximum lift. To assist the lifting procedure all well known hydrodynamic means, e.g. step- or S-shaped under water contours, are applicable. The figure shows the yacht at high speed, going into the wind. The whole hull is above the surface of the water. Only the keels 13,14 and the port side lateral control fin 11' are submerged. Thus the yacht is carried by the bow- and stern lift control wings 9,10' and the leeward lift control fin 8'. The lee fin 8 is above the surface. In this sailing condition the yacht shows a minimised wetted area so that the water resistance is considerably reduced.

During pitching motion there will be a damping effect caused by the form of the bow keel 13 and the stern keel 14, especially their upper regions. They are constructed in such a way that their cross section continuously decreases in the downward direction. This shape causes the displacement of the keels to increase rapidly by deeper submersion, so that the keels function as hydrostatic stabilisers.

The axes of the sideways attached lift control fins 8,8' form a V-shape in the front view. Because of this

the vertical projected area of the presently submerged lee side lift control fin will be increased as the yacht inclines more under a stronger wind load. This results in a stabilising effect about longitudinal axis.

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Because of the stability behaviour caused by the aforementioned measures relating to the outriggers and the keels 13,14, automatic means for positional stabilisation are substantially unnecessary. The yacht comprises many means for quick manoeuvre control. It is provided that the keels 13,14 be swingable around their profile-axis. Because of this, very effective control around the vertical axis results. Further, it is provided that the lateral control fins 11,11' as well as the lift control fins 8,8' are each swingable around their profile-axis.

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THE CLAIMS DEFINING THIS INVENTION ARE AS FOLLOWS:

1. A yacht operating according to the airfoil principle, comprising a hull (2) and a sail (3), a bow keel (13) and a stern keel (14); a lift control wing (9, 10) being provided at the under ends of each of the bow keel (13) and stern keel (14); an outrigger (6, 6') attached to each side of the hull, the ends of each outrigger comprising a downward leading fin (11, 11') carrying a transverse lift control fin (8, 8'), wherein the lift control wings and the transverse lift control fins form a four-point airfoil system for generating lift and for control and stabilisation of the yacht; wherein the outriggers are formed as sweptforward wings having floats (12, 12') attached at their ends; the downward leading fins (11, 11') being so formed as to act as lateral controlling fins for said outriggers; the outriggers (6, 6') having a predetermined elasticity, so that an increased load on a transverse lift control fin (8, 8') can produce flexing of the corresponding outrigger, such as to increase the angle of attack of the transverse lift control fin (8, 8').
2. A yacht as claimed in claim 1, wherein the outriggers (6, 6') are slender.
3. A yacht as claimed in claim 1 or claim 2, wherein the transverse lift control fins (8, 8') together with under ends of the lateral controlling fins (11, 11') form an L-shaped construction such that the lift control fins (8, 8') are pointed towards the yacht's central plane.



4. A yacht as claimed in any one of preceding claims, wherein the floats (12, 12') and the hull (2) are so profiled as to produce a hydrodynamic lift to said yacht.
5. A yacht as claimed in any one of the preceding claims wherein the floats (12, 12') are so formed as to act as ballast tanks.
6. A yacht as claimed in claim 5, including dynamic pressure operated means to enable filling of said floats for taking up water ballast.
7. A yacht as claimed in claim 5 or claim 6, wherein one or more of the floats (12, 12') including quick release side flap means, to facilitate emptying of ballast water therefrom.
8. A yacht as claimed in any one of the preceding claims, wherein the bow keel (13) and the stern keel (14) are formed such that their cross-sectional area decreases continuously downwards to their deepest part, so that the keels function as hydrostatic stabilisers.
9. A yacht as claimed in any one of the preceding claims, wherein the stern area (7) of the hull (2) has a reduced cross-section.
10. A yacht as claimed in claim 3, wherein the transverse lift control fins (8, 8') are angled downwardly so that the longitudinal axes thereof extend towards each other, to meet and form a V-shape when said yacht is viewed in front view.



11. A yacht as claimed in any one of the preceding claims, wherein the underwater portion of the hull (2) has a concave V-shaped cross-section.
12. A yacht as claimed in any one of the preceding claims, wherein a bow rudder (15) and a stern rudder (16) are provided respectively below the bow lift control wing (9) and the stern lift control wing (10).
13. A yacht as claimed in any one of the preceding claims, wherein the lateral control fins (11, 11') are swept back from the outriggers.
14. A yacht as claimed in any one of the preceding claims, comprising a cockpit (4) with a wide form.
15. A yacht as claimed in any one of the preceding claims, wherein the sail (3) is a full section sail having a geometrical twist therein.
16. A yacht as claimed in any one of the preceding claims, wherein the sail (3) comprises a top disc (17) at its upper end.
17. A yacht as claimed in any one of the preceding claims, wherein the stern keel (14) and the bow keel (13) are adjustable about their profile-axes.
18. A yacht according to any one of the preceding claims, wherein the lateral control fins (11, 11') are adjustable about their profile-axes.

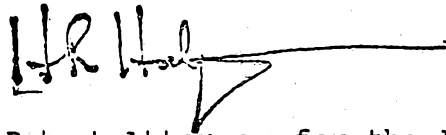


19. A yacht as claimed in any one of the preceding claims, wherein the lift control fins (8, 8') are adjustable about their profile-axes.
20. A yacht substantially as hereinbefore described with reference to the accompanying drawings.

Dated this 20th day of July 1993

MESSERSCHMITT-BOLKOW-BLOHM GMBH

by:

A handwritten signature in dark ink, appearing to be 'H. R. H.', followed by a long horizontal line extending to the right.

Patent Attorney for the Applicant

39488/89

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