

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
28 September 2006 (28.09.2006)

PCT

(10) International Publication Number
WO 2006/099665 A1

(51) International Patent Classification:

B63B 1/00 (2006.01) **B63B 1/18** (2006.01)
B63B 1/10 (2006.01) **B63B 1/24** (2006.01)
B63B 1/12 (2006.01) **B63B 1/32** (2006.01)

(21) International Application Number:

PCT/AU2006/000371

(22) International Filing Date: 22 March 2006 (22.03.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

2005201317 25 March 2005 (25.03.2005) AU

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, 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, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant and

(72) Inventor: PAYNE, Trevor William [AU/AU]; P.O. Box 1614, 80 Chinderah Bay Drv, Chinderah, NSW 2487 (AU).

Published:

— with international search report

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM,

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: VERY HIGH SPEED-HYDRO SKI STRUCTURE (VHS-HSS)

(57) Abstract: The disclosed is for a specifically designed ski structure to support a vessel's hull above the water surface while the vessel is underway so that the hull encounters minimal or no resistance from the water, the viscosity of which is 800 times greater than air. The skis, which may number more than two per vessel, are arranged in parallel to the vessel's direction of travel and support the hull from beneath via stanchions that may be of a fixed nature or capable of lifting and lowering the hull relative to the ski structures' planing position on the water surface. The skis would normally be positioned to the sides of the hull's beam to impart maximum stability to the vessel. The ski structures are designed to have multiple functions: a.) to enable sea vessels to travel at very much higher speeds than conventional designs afford; b.) To provide a lightweight, rigid structure that is able to be reinforced within itself; c.) Through their design shape and internal reinforcing to be able to bear considerable weight imposed by the vessel and its cargo; d.) To enclose air (or other friction reducing agents) in entrapment zones between the underside of the skis and the water surface; e.) To provide directional stability to the vessel through the structures' design elements; f.) To contribute wave piercing attributes through the structures' design elements; g.) To enable the ski structures to shed water readily due to the structures' design elements; h.) To provide watertight housing within the structures' for fuel and/or cargo storage and for housing the vessel's motors and drive trains (larger vessels). The ski structures may be made from any suitable metals, timber, plastics or composites thereof. Each ski structure generally consists of two complementary ski surfaces (with upward curves at their leading or entry points). The main ski surface (1) has a pair of assist skis or "glides" (2) that are arranged on either side of the main ski surface (1). These elements are attached to and supported by the ski structure's main assembly, a longitudinal shell (3), which may or may not contain reinforcing (4) within its watertight housing (6) that may also be utilised to house fuel and the vessel's engines and drive train components on larger scale vessels. The longitudinal shell (3), front-on in cross section, has the shape of an inverted 'U' the ends or edges (5) of which impart a keel-like activity to the ski structures to provide directional stability and prevent yawing. The edges (5) also provide an air entrapment zone (7) between them and the underside of the main ski surface (1) and the water surface where air, or any friction reducing agent, may be induced into the zone to provide a friction relieving interface between the water surface and ski undersides. The assist skis (2) are attached to the assembly at a lower level than the main ski surface (1) and become the main contact with the water surface at speed, allowing a cushion of air to be provided in the entrapment zone (7) for the main ski surface (1). The assist skis may also be designed to provide an air entrapment zone of their own by having a downward lip on their outer extremities running the length of the skis.

Invention Title: VERY HIGH SPEED-HYRDO SKI STRUCTURE (VHS-HSS)

DESCRIPTION

The VHS-HSS concept is specifically designed to overcome the disadvantageous characteristics of slow speed and heavy fuel consumption inherent in all modern day marine vessel designs, and to reduce the high construction costs imposed on boat manufacturing by the requirement to design hulls to overcome water resistance as much as possible.

The concept achieves these objectives by providing the means whereby a vessel's hull can be supported out of contact with the water when underway by riding on an extremely efficient ski assembly and thus largely avoiding the viscosity of the water, which is 800 times that of air. (This concept shares the intention of the hydrofoil concept, but achieves the result in a completely different and more efficient manner.)

The hydro ski structure is a novel invention in as much as it has to incorporate elements that permit it to perform the normal functions of a boat hull but in an extraordinary manner that has never previously been done in maritime history.

The ski structure described here provides the strength and robustness to support a vessel of considerable tonnage on its structure. It incorporates unique elements to assist the structure and its payload to achieve fuel and speed efficiencies never previously attained.

The ski structures themselves have no moving parts, but may have added to them steerage systems, or rams for raising and lowering the ski structures relative to the vessel's hull, or other lifting elements for special purposes.

The skis' design and roles are multi-fold:

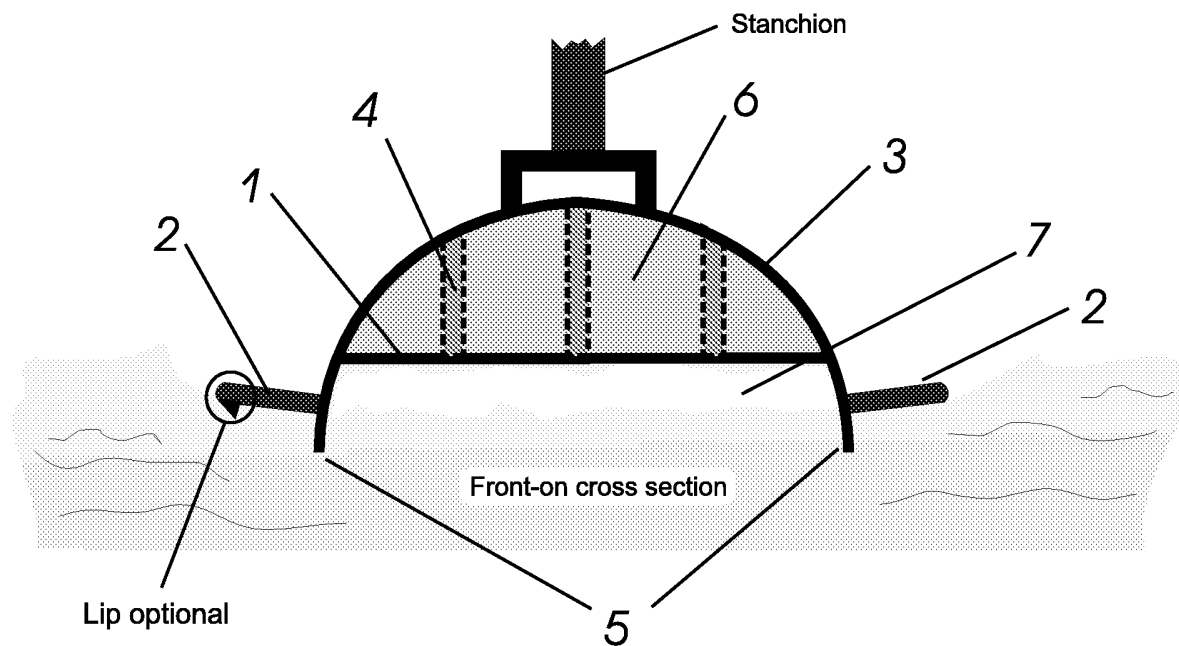
1. To allow marine vessels considerable speed gains over contemporary designs by eliminating or considerably reducing the water resistance on the hull proper and the ski structures themselves.
2. To provide a friction relieving interface of air or other suitable "lubricant" between the skis and the water surface.
3. To effect considerable fuel efficiencies when measured against contemporary hulls.
4. To reduce fossil fuel pollution as a consequence of the speed attained and other fuel efficiency factors.
5. To provide wave-piercing characteristics to the vessel through the ski design.
6. To impart greater stability to a vessel underway by placing the weight bearing points of the hull at the outside edges of the beam.
7. To eliminate the need for special bow and underwater hull designs that add greatly to manufacturing costs.
8. To allow the housing of fuel and propulsion units within the ski structures on sufficiently large vessels.
9. To enable vessels to operate in very shallow waters where hydrofoils and displacements hulls can not venture.
10. To provide environmental advantages such as reducing damage to sea life as a consequence of the shallow operating draught, and a greatly reduced wash when operating in enclosed waters.

The ski design, while having no moving parts, is capable of trapping a cushion of air within the ski surface area to reduce friction between the water surface and underside of the ski. The skis have keel-like edges that run the length of the skis that aid the air entrapment and provide directional stability and prevent yawing.

The ski structure, by being aligned to the direction of travel (unlike hydrofoils whose foils are opposed or diagonal to the direction of travel), affords theoretical speeds of hundreds of knots.

CLAIMS

1. A ski structure that may contain reinforcing within an airtight housing formed by the inverted 'U' shaped shell or top of the ski structure and the floor of the main ski surface that bridges the 'U' shape as seen head-on in cross section (see Ski Fig 1), the entire entity being able to support a boat hull above the water surface while underway.
2. A ski structure as claimed in claim 1 wherein the inverted 'U' shaped shell has edges extending down below the bridging of the main ski surface and running the length of the shell to act like keels and impart directional stability to the ski structure and prevent it from yawing.
3. The structure as claimed in claim 1 incorporates a pair of assist skis or "glides" on each side of the outside of the inverted 'U' shaped shell extending the length of the shell and affixed at a slightly lower level than the main bridging ski surface which plane on the surface of the water when at speed.
4. The downward extending edges as at claim 2 providing a means of entrapping air and froth (or other friction relieving agents) between them and the bottom of the main bridging ski surface and the water surface to provide a cushion of air/froth for reducing friction between the skis and water.
5. The assist skis or glides at claim 3, by being lower than the main ski surface, assist the main ski surface to ride higher than the water surface so air or other lubricant may be forced between the two surfaces and the edges as claimed in claim 2.
6. The action at claim 5 has a complementary and simultaneous action in assisting the activity at claim 3.
7. The ski structures at claim 1 are aligned parallel to the vessel's hull and in the same direction of travel.
8. The claims at claims 1, 2, 3, 4, 5, 6 & 7 all serve to permit a vessel to economically travel at much faster speeds than can be achieved by contemporary marine vessel designs.
9. The claims at claims 1, 2, 3, 4, 5, 6 & 7 all serve to permit a vessel vastly improved efficiency in fuel consumption relative to distance traveled when compared to contemporary marine vessel designs.
10. The claims at claims 1, 2, 3, 4, 5, 6 & 7 all serve to reduce a vessel's fossil fuel emissions (pollution levels) when compared to contemporary marine vessel designs.
11. The claims at claims 1, 2, 3, 4, 5, 6 & 7 all serve to improve a vessel's stability by providing a platform where the hulls weight bearing loads can be placed at the edges of the hull's beam.
12. The claims at claims 1, 2, 3, 4, 5, 6 & 7 all serve to enable boat designers to dispense with bow and underwater streamlining considerations to achieve considerable construction savings when compared to contemporary hull manufacturing constraints.
13. In larger vessels, the structure as claimed in claim 1 may be used to house the fuel and propulsion units for the vessel making more space available in the hull proper for payload.



Ski Fig. 1

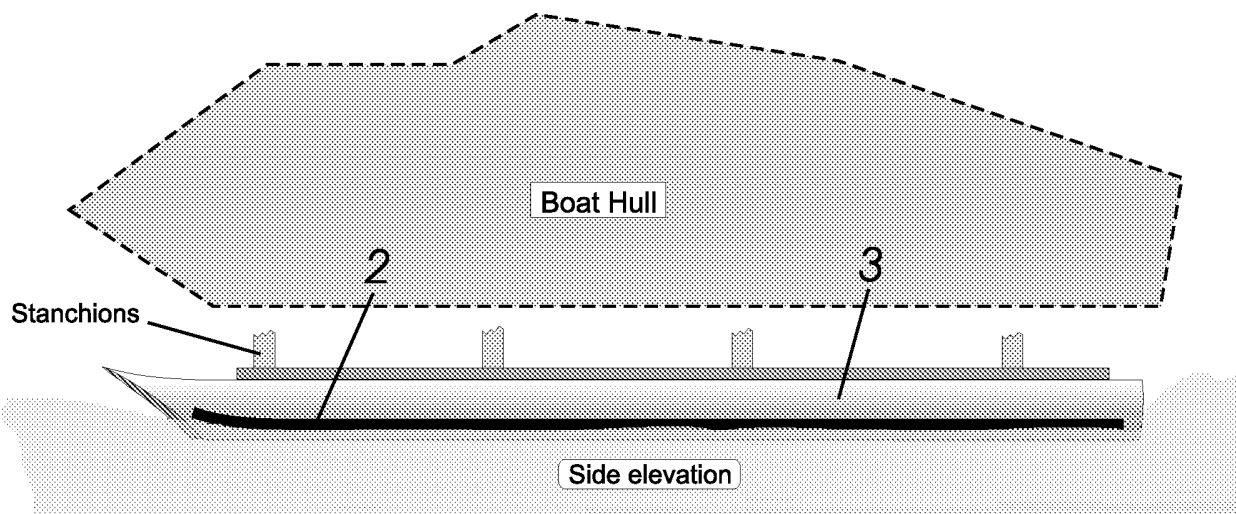
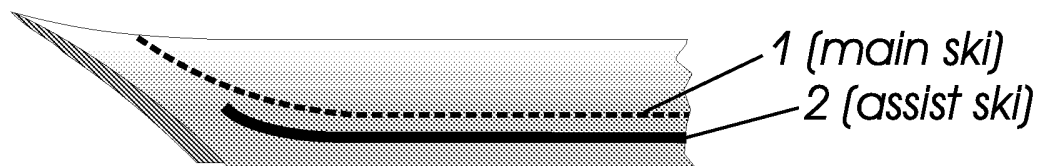


Diagram shows upward curve of skis at their entry points



Ski Fig. 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2006/000371

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

B63B 1/00 (2006.01)**B63B 1/12** (2006.01)**B63B 1/24** (2006.01)**B63B 1/10** (2006.01)**B63B 1/18** (2006.01)**B63B 1/32** (2006.01)

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)

IPC: B63B 1/00, 1/10, 1/12, 1/18, 1/24, 1/32.

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

AU IPC: B63B 1/00, 1/10, 1/12, 1/18, 1/24, 1/32.

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DWPI: IPC B63B 1/00, 1/10, 1/12, 1/18, 1/24, 1/32, (B63B 1/IC AND (SKI+ OR GLID+ OR +PLAN+)) AND (U-SHAPED)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	AU 2001100374 A (PAYNE) 18 October 2001.	
Y	See entire specification.	1,2,4,7-12.
	See entire specification.	13.
X	WO 1998 008732 A (NEWPORT TECHNOLOGIES LTD) 5 March 2001.	
	See entire specification.	1,7-12.
X	US 5988097 A (KARNEY ET AL) 23 November 1999.	
	See entire specification.	1,7-13.



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
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"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
10 July 2006

Date of mailing of the international search report 12 JUL 2006

Name and mailing address of the ISA/AU

AUSTRALIAN PATENT OFFICE
PO BOX 200, WODEN ACT 2606, AUSTRALIA
E-mail address: pct@ipaustalia.gov.au
Facsimile No. (02) 6285 3929

Authorized officer

R. WEBER

Telephone No : (02) 6283 2546

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2006/000371

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member	
AU	2001100374	NIL	
WO	9808732	AU	42358/97
US	5988097	US	5839386

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX