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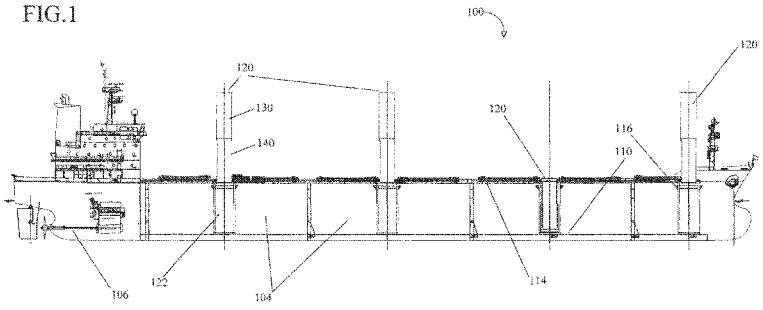
— *with international search report (Art. 21(3))*

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(54) Title: VERTICALLY-VARIABLE OCEAN SAIL SYSTEM

FIG.1



(57) Abstract: Embodiments of the present invention provide mechanical sail systems, methods, apparatus, and code which allow use of the Magnus effect to provide thrust to a ship. In some embodiments, a mechanical sail system is provided which includes a silo, positioned below a deck level of a ship, a lift carriage, mounted within the silo, and supporting a first sail cylinder and a second sail cylinder, and at least a first drive motor coupled to a control system for selectively positioning the lift carriage within the silo, the control system operable to control the at least first drive motor to position the lift carriage at a top position within the silo to deploy the first and second sail cylinders.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 12/43746

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - B63B 15/02; B63H 9/02, 9/06
USPC - 114/39.3
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(8) - B63B 15/02; B63H 9/02, 9/06
USPC - 114/39.3

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC - 114/39.29, 39.31, 39.32 (text search - see terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWEST(USPT,PGPB,EPAB,JPAB); Google Scholar; Google Patents
Search Terms: ship, vessel, boat, magnus, retractable, deploy, stow, collapsible, rotor, sail, wind, lift, raise, extend, motor, rotate, air, cylinder, propel, drive,... etc.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GB 2187154 A (Corlett) 03 September 1987 (03.09.1987), fig 1, pg 1, ln 45-63	1-19
Y	EP 0474363 A1 (England) 11 March 1992 (11.03.1992), fig 4, col 4, ln 12-49	1-19
Y	US 4,401,284 A (Austin) 30 August 1983 (30.08.1983), col 3, ln 51-52	11-12 and 18

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
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