(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 311 758 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
31.01.2024 Bulletin 2024/05

(21) Application number: **23186340.8**

(22) Date of filing: **19.07.2023**

(51) International Patent Classification (IPC):
B63B 35/08 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
B63B 35/08

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

(30) Priority: **26.07.2022 IT 202200015771**

(71) Applicants:
- **Viscomi, Natale**
  88060 Montepaone (CZ) (IT)
- **Viscomi, Miriam**
  20127 Milano (MI) (IT)

(72) Inventors:
- **VISCOMI, NATALE**
  88060 MONTEPAONE (CZ) (IT)
- **VISCOMI, MIRIAM**
  20127 MILANO (MI) (IT)

(74) Representative: **Giuliano, Natalia**
C/o Studio Rubino SRL
Via Lucrezia della Valle, 84
88100 Catanzaro (CZ) (IT)

(54) SYSTEM FOR MANEUVERING SHIPS IN ICY WATERS

(57) System (100) for maneuvering ships in icy waters, comprising:
- an electronic control unit mounted inside a compartment of a ship (50);
- a driving means (101), connected to the electronic control unit, consisting of telescopic modules;
- a lifting device, connected to the driving means (101) and to the electronic control unit, configured to activate said driving means (101).

The driving means (101) is housed in correspondence with the stern portion (51) of the ship (50) and is configured, following the activation by means of the lifting device, to come out from said compartment and extend along the surface of the water in a substantially circular shape to surround substantially an entire lower portion of the hull of the ship (50).

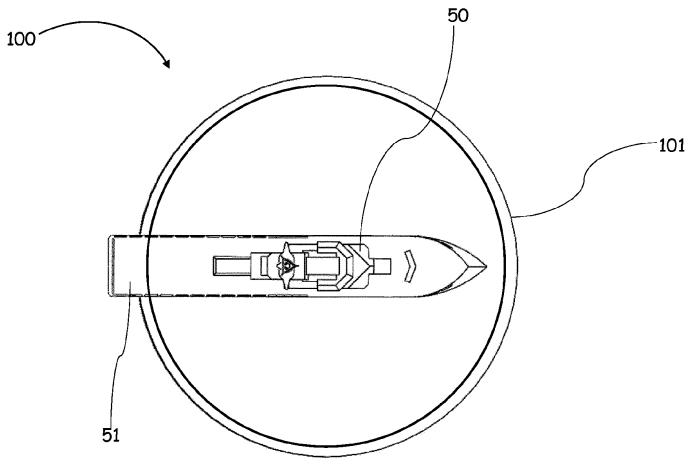

Fig. 1

EP 4 311 758 A1

Description

[0001] The present invention relates to a system for maneuvering ships in icy waters.

[0002] In particular, the present invention relates to a system for maneuvering ships in icy waters which includes means able to release large vessels in situations of blockage or major obstacle to the navigation.

[0003] As is known, several systems for facilitating vessel maneuvers in hostile environments, for example as in the present case, in icy waters, are available in the patent literature.

[0004] A first example of a known technical solution is disclosed in the Chinese patent application CN105584602A, which mentions an auxiliary apparatus which allows the freeing of a beached ship. The apparatus comprises a cylindrical body composed of an inner cylinder and an outer cylinder. A water suction expansion rubber is arranged in the center of the inner cylinder and lined with a hollow steel structure. The outer wall of the hollow steel structure is coupled to the inner wall of the inner cylinder. The hollow steel structure extends outside the inner cylinder. A rubber of a surface layer is attached to the outer end. A lower face adsorption device is hermetically connected to the lower end of the cylindrical body.

[0005] The Chinese patent application CN202783735U, on the other hand, describes a device for rescuing a stranded ship, made up of airbags suitably connected in series and independently of each other. Each airbag is provided with a connecting and fastening cable, and a fastening ring is arranged at one end of each cable, with the other end provided with a fastening hook which can be opened and locked so that the airbags are connected in series and fixed to the ship's hull. A diver places airbags on the submerged part of the vessel while a rescue is being performed, and the airbags are subsequently inflated. In this way, the ship's hull is lifted and freeing is facilitated.

[0006] The patent application LU501255B1 discloses a watercraft ice-breaking device and a watercraft comprising ice-breaking devices. The ice-breaking device comprises a watercraft body and two ice-breaking devices, with two mounting grooves defined on two sides of a front end of the watercraft body. The two ice-breaking devices for breaking ice are respectively mounted in the two mounting grooves. The ice- breaking member in the ice-breaking device and the impact component cooperate so that the ice surface is precut and damaged, and the thickness of the ice layer is reduced. After that, the ice surface is broken through smash of the free falling of the weight.

[0007] Finally, the Chinese patent application CN110424346A relates to a sea ice releasing device, capable of propelling the same ice by means of sea currents. The ice releasing device mainly aims to solve the problem that a known similar device involves a high energy consumption. The releasing device comprises a plurality of ship hulls side by side, in which pairs of adjacent hulls are connected via a traction rope, and each hull comprises a deck made by combining a working deck and an operating deck, with the lower surfaces of such wire bridges, and with the upper surface of each working bridge higher than the corresponding upper surface of the working bridge. The ice releasing device, on each working deck, consists of a horizontal defrost chamber and a vertical storage chamber, with each defrost chamber and each storage chamber designed in one-sided open mode, and with a filter plate installed on the open side of each storage chamber.

[0008] However, the currently known technical solutions suffer from some limitations, in particular they are complex and difficult to install.

[0009] The purpose of the present invention is to provide a system for maneuvering ships in icy waters easy enough to install and operate, therefore having characteristics such as to overcome the limits which still affect the current known systems.

[0010] According to the present invention, a system for maneuvering ships in icy waters is provided, as defined in claim 1.

[0011] For a better understanding of the present invention, a preferred embodiment is now described, purely by way of nonlimiting example, with reference to the attached drawings, in which:

- figure 1 shows an elevation view of a system for maneuvering ships in icy waters, according to the invention;
- figure 2 shows an overall perspective view of the system for maneuvering ships in icy waters, according to the invention;
- figure 3 frontal shows a front view of the system for maneuvering ships in icy waters, according to the invention.

[0012] With reference to these figures and, in particular, to figure 1, a system for maneuvering ships in icy waters is shown, according to the invention.

[0013] In particular, the system 100 for maneuvering ships in icy waters comprises:

- an electronic control unit mounted inside a compartment of a ship 50, connected to the internal systems of the ship 50 itself;
- a driving means 101, connected to the electronic control unit, consisting of telescopic modules and housed inside a compartment of the ship 50, in correspondence with the stern portion 51 of the ship itself;
- a lifting device, connected to the driving means 101 and to the electronic control unit, configured to activate the driving means 101.

[0014] According to one aspect of the invention, the driving means 101 is configured, following the activation

by means of the lifting device, to come out of the aforesaid compartment, in which it is folded telescopically, and to extend along the surface of the water or ice, in a substantially circular shape up to substantially surround an entire lower portion of the hull of the ship 50, in such a way that the ship 50 itself is free to rotate along the driving means 101, around an 'x-x' axis parallel to a height 'H', visible in figure 3 , of the same ship 50.

[0015] According to one aspect of the invention, the system 100 and the driving means 101 are able to increase the height of the hull with respect to icy waters in which the ship 50 is aground, so as to facilitate the movement of the ship 50.

[0016] According to one aspect of the invention, the lifting device comprises a hydropneumatic means or pressure means mounted on corresponding external portions of the hull of the ship 50.

[0017] According to one aspect of the invention, the system 100 comprises a plurality of sensors, e.g., tilt sensors, connected to the electronic control unit, able to evaluate the stability of the hull of the ship 50.

[0018] According to one aspect of the invention, the system 100 comprises a tank containing heat liquids able to melt icy waters surrounding the ship 50, with said tank being removably mounted on an external portion of the hull of the ship 50.

[0019] According to one aspect of the invention, the system 100 comprises an infrared device, connected to the electronic control unit, able to melt icy waters surrounding the ship 50, with said infrared device being mounted on a further portion of the hull of the ship 50.

[0020] According to one aspect of the invention, the driving means 101 is made of a material able to float.

[0021] According to one aspect of the invention, alternatively, the driving means 101 consists of a track made of a metallic material.

[0022] According to another aspect of the invention, the system 100 comprises means for heating the driving means 101 up to temperatures sufficiently higher than 0°C, in order to facilitate the melting of a surface portion of ice.

[0023] In use, the system 100 is activated when the ship 50 encounters maneuvering difficulties caused by ice. The driving means 101 protrudes from the stern portion and, since it is composed of telescopic modules, begins to extend so as to form a substantially circular guide around the ship 50. Once the operation for extending the driving means 101 is completed, the ship 50 can, through its own engines, perform a partial rotation around the x-x axis until the bow is in a favorable position for freeing the ship 50.

[0024] Advantageously according to the invention, the system 100 allows, once actuated by the lifting device in its primary components, i.e., the hydropneumatic means or the local pressure means, to disengage or facilitate the maneuvers in the ice of ships 50 through the lifting and rotation of the hull around the driving means 101.

[0025] Therefore, the system for maneuvering ships in icy waters according to the invention allows to disengage a large vessel, in the open sea and in critical situations.

[0026] Furthermore, the system for maneuvering ships in icy waters according to the invention is safe as regards its use on vessels of considerable tonnage.

[0027] At last, the system for maneuvering ships in icy waters according to the invention may be easily replicated over a large scale, within a series production.

[0028] It is finally clear that the system for maneuvering ships in icy waters, described and illustrated herein, may be subject to modifications and variations without thereby departing from the protective scope of the present invention, as defined in the appended claims.

Claims

1. System (100) for maneuvering ships in icy waters, comprising:

   - an electronic control unit mounted inside a compartment of a ship (50);
   - a driving means (101), connected to the electronic control unit, consisting of telescopic modules;
   - a lifting device, connected to the driving means (101) and to the electronic control unit, configured to activate said driving means (101);

   characterized in that the driving means (101) is housed in correspondence with the stern portion (51) of said ship (50) and is configured, following the activation by means of the lifting device, to come out from said compartment and extend along the surface of the water in a substantially circular shape to surround substantially an entire lower portion of the hull of the ship (50).

2. System (100) according to claim 1, **characterized in that** said driving means (101) is configured to increase the height of said hull with respect to icy waters in which the ship (50) is aground, so that the ship (50) is free to rotate around an 'x-x' axis parallel to a height 'H' of said ship (50).

3. System (100) according to claim 1, **characterized in that** the lifting device comprises a hydropneumatic means or pressure means mounted on corresponding external portions of the hull of the ship (50).

4. System (100) according to claim 1, **characterized in** comprising a plurality of sensors connected to the electronic control unit, able to evaluate the stability of the hull of the ship (50).

5. System (100) according to claim 1, **characterized in** comprising a tank containing heat liquids able to melt icy waters surrounding the ship (50), said tank

being removably mounted on a portion of the hull of the ship (50).

6. System (100) according to claim 1, **characterized in** comprising an infrared device, connected to the electronic control unit, able to melt icy waters surrounding the ship (50) , said infrared device being mounted on a further portion of the hull of the ship (50).

7. System (100) according to claim 1, **characterized in that** the driving means (101) is made of a material able to float.

8. System (100) according to claim 1, **characterized in that** the driving means (101) consists of a track made of a metallic material.

9. System (100) according to claim 1, **characterized in** comprising means for heating the driving means (101).

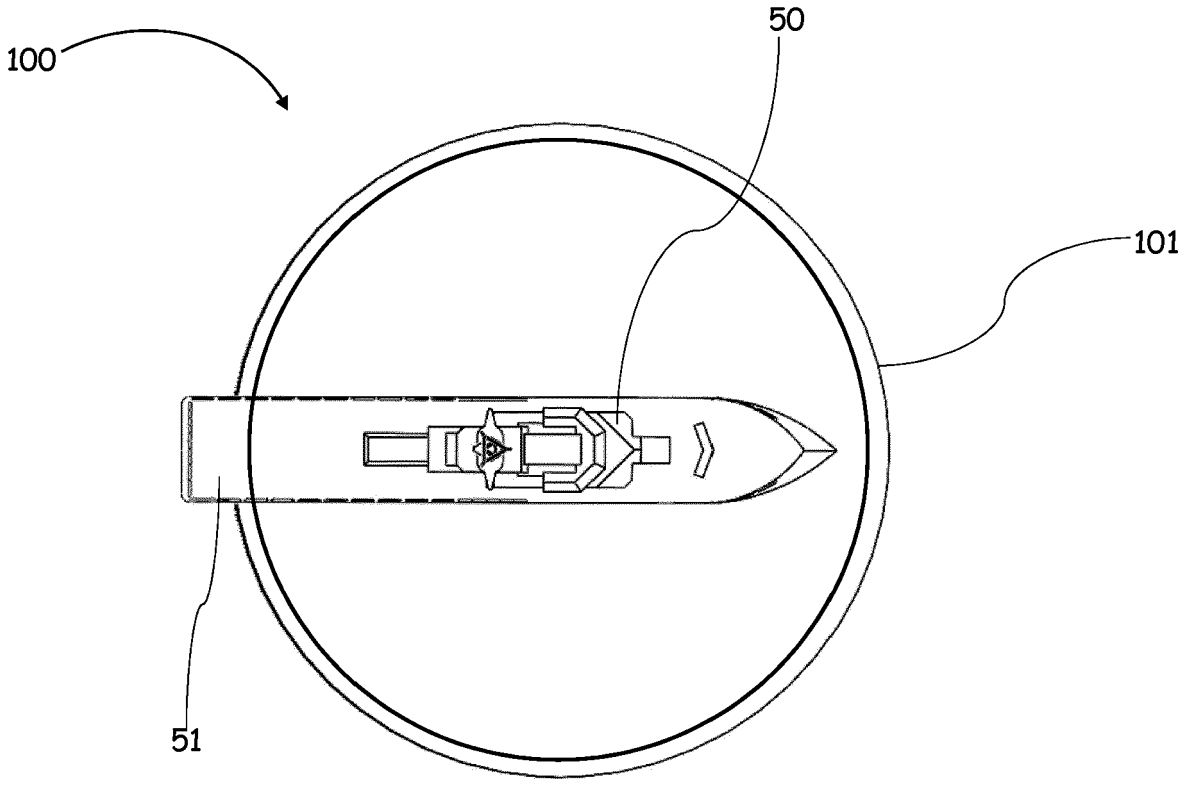

Fig. 1

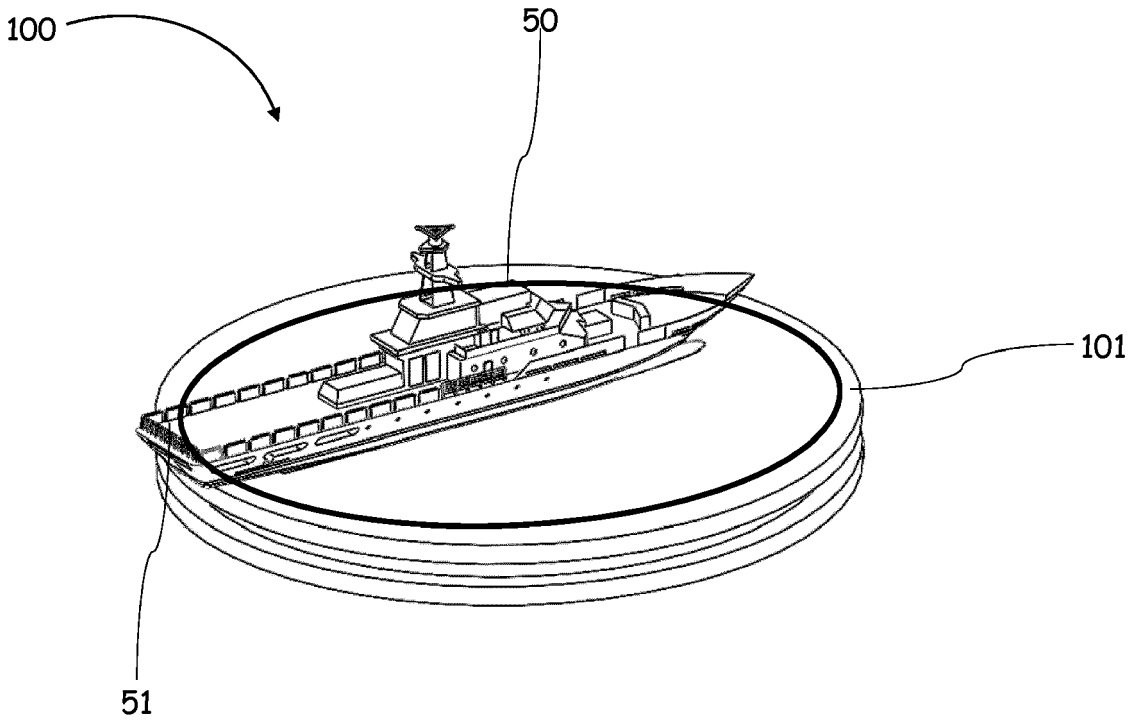

Fig. 2

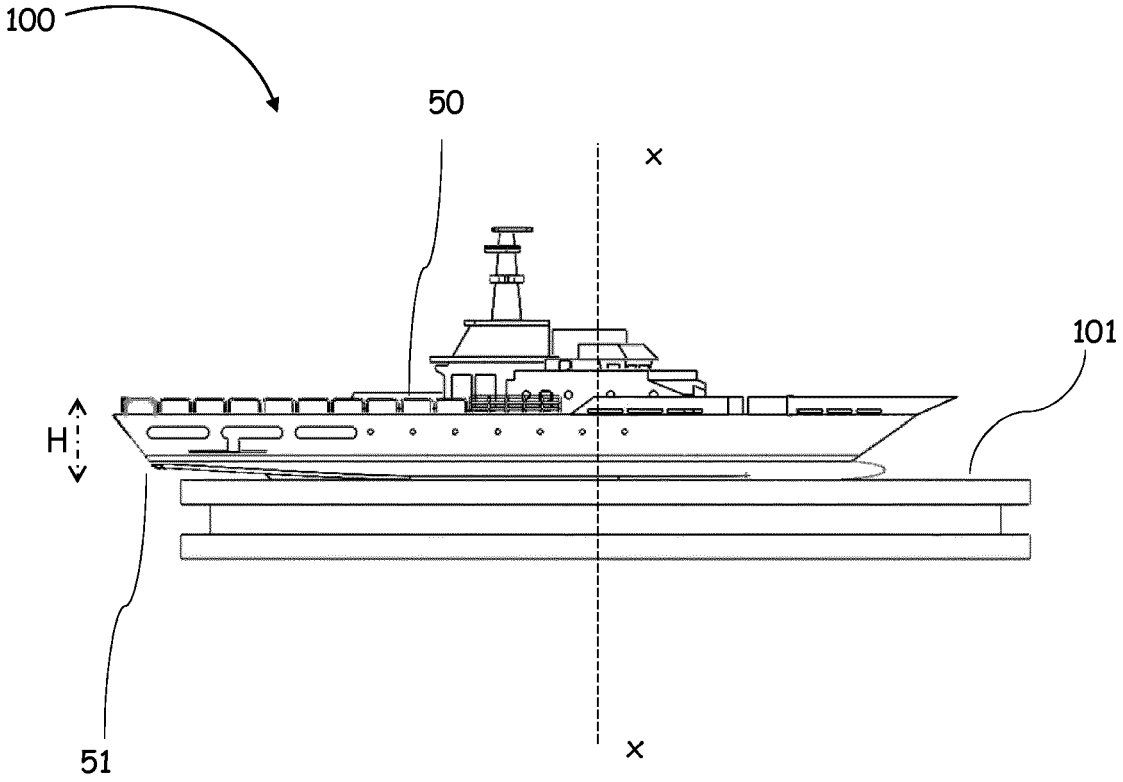

Fig. 3

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 23 18 6340

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	LU 501 255 B1 (UNIV GUANGDONG OCEAN [CN]) 13 June 2022 (2022-06-13) * page 4, line 7 - page 6, line 26; figures 1-8 *	1-9	INV. B63B35/08
A	EP 2 630 305 B1 (CONOCOPHILLIPS CO [US]) 22 July 2015 (2015-07-22) * paragraph [0013] - paragraph [0025]; figures 1-6 *	1-9	
A	CN 109 250 043 A (CHINA MERCHANTS HEAVY IND JIANGSU CO LTD ET AL.) 22 January 2019 (2019-01-22) * paragraph [0035] - paragraph [0060]; figures 1-8 *	1-9	
A	CN 107 651 126 B (UNIV ZHEJIANG OCEAN) 21 May 2019 (2019-05-21) * paragraph [0042] - paragraph [0082]; figures 1-6 *	1-9	
			TECHNICAL FIELDS SEARCHED (IPC)
			B63B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	16 September 2023	Martínez, Felipe

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 23 18 6340

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

16-09-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
LU 501255 B1	13-06-2022	CN 112550573 A	26-03-2021
		CN 113525610 A	22-10-2021
		LU 501255 B1	13-06-2022
		WO 2022122049 A1	16-06-2022
EP 2630305 B1	22-07-2015	CA 2812596 A1	26-04-2012
		CN 103180514 A	26-06-2013
		EP 2630305 A1	28-08-2013
		KR 20130120462 A	04-11-2013
		RU 2013123024 A	27-11-2014
		SG 189102 A1	31-05-2013
		WO 2012054855 A1	26-04-2012
CN 109250043 A	22-01-2019	CN 109250043 A	22-01-2019
		US 2020056342 A1	20-02-2020
CN 107651126 B	21-05-2019	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 105584602 A **[0004]**
- CN 202783735 U **[0005]**
- LU 501255 B1 **[0006]**
- CN 110424346 A **[0007]**