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(54) DOOR FOR BOATS

(57) Described is a door (1) for boats comprising a hollow box-shaped body (2), closing means (3) positioned inside said box-shaped body (2) and designed to slide inside it for coming out from it, a handle (4) positioned on a surface of said box-shaped body (2) and operatively connected to said closing means (3), said handle (4) being designed to move said closing means (3) relative to said box-shaped body (2), at least one guide means (5) comprising a track (5) and a recirculating ball carriage (6) slidable on said track (5), said carriage (6) being stably fixed to said closing means (3).

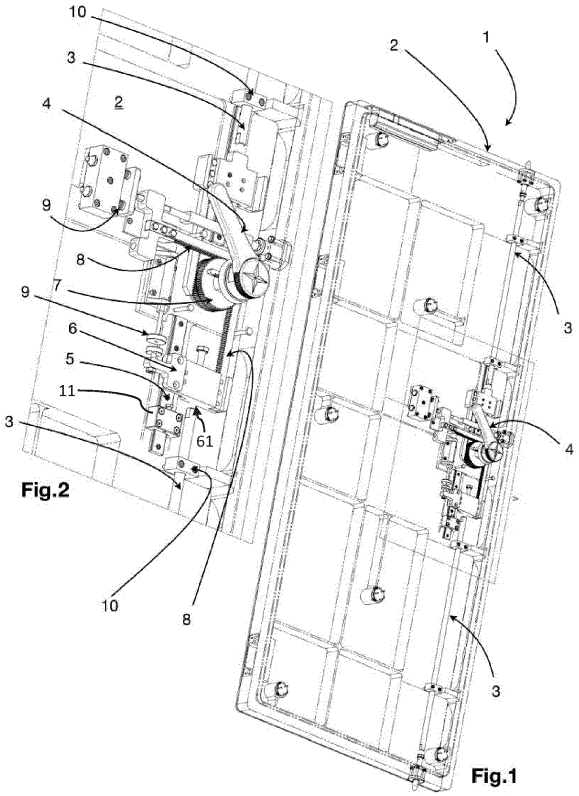

Fig.2

Fig.1

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Description

[0001] This invention relates to a door for boats.

[0002] More specifically, this invention relates to a door for use inside and outside a boat.

[0003] Generally, these doors, although not necessarily watertight, are "weathertight" certified, that is to say, at least impermeable to any adverse weather conditions.

[0004] The door according to the invention is, therefore, usually installed in zones of the boat with a high passage by users which translates into the need to open and close it many times during the day.

[0005] There are currently prior art doors for boats for external or internal use which comprise a main panel, usually made of aluminium, hinged to a respective frame, which is fixed to the boat.

[0006] In order to open and close the prior art doors there is a handle connected to a kinematic mechanism which is located inside the panel of the door and is designed to move the so-called pins or, more generally, closing points and, when present, the latch.

[0007] Since doors of this type necessarily have large dimensions, it will be understood that the mechanism for actuating the various closing points must be of high efficiency.

[0008] Currently, the prior art doors have a kinematic mechanism of a symmetrical type relative to the panel of the door and, therefore, the handle is positioned in an almost central portion of the door panel.

[0009] This position of the handle, as well as the type of internal kinematic mechanism, with high friction, cause an imperfect fluidity of movement during operation of the handle by the user.

[0010] This not perfect fluidity (that is to say, a high jerkiness in the movement) translates into an unpleasant perception by the user.

[0011] This drawback is more significant in light of the fact, as mentioned, that a door according to the invention finds applications in zones of the boat subject to considerable passage of users during the day.

[0012] The central positioning of the handle is also disadvantageous in terms of the force necessary for rotating the door panel with respect to the relative hinges.

[0013] In effect, it is understood that a central position of the handle, which constitutes the point of application of the opening/closing force by a user, is not an optimised lever relative to the shape and geometry of the door system.

[0014] A further drawback of the prior art doors is due to the fact that all the transversal forces (relative to the plane defined by the door) which are generated during the life cycle of the door are discharged on the movement for operating the handle, that is to say, where the above-mentioned pins are connected.

[0015] The fact that the transversal forces are discharged directly on the mechanism of the handle often causes breakage or premature wear of the actuations of the handle, adversely affecting the operation of the door.

[0016] This drawback is more significant in light of the fact that it is very advantageous in the sector to make the means for actuating the pins (gear wheels or the like) from brass.

[0017] The brass in effect allows the costs and the production times to be reduced but, clearly, is not designed to be stressed by the above-mentioned transversal forces. Some examples of doors for boats are described in patent documents CN112227904A, US3633389A and EP1445407A1.

[0018] The aim of the invention is therefore to overcome the drawbacks of the above-mentioned prior art.

[0019] More specifically, the aim of this invention is to provide a door for boats which allows the friction of the internal kinematic mechanism designed for moving the pins and the latch to be minimised and so make the movement of the handle by a user perfectly fluid, and without jerks.

[0020] Another aim of this invention is to provide a door for boats which allows it to be open/closed relative to its hinges by a force less than that of prior art doors. Yet another aim of the invention is to provide a door for boats which reproduces as much as possible the perception of opening and closing of a normal door (for example, in use in residential buildings), making the experience by the user more familiar and pleasant.

[0021] A further aim of this invention is to provide a door in which the transversal forces generated by its use are not discharged directly on the mechanism for actuating the handle (that is to say, the mechanism for actuating the pins) and which therefore allows the life cycle of the components inside the door to be maximised.

[0022] The technical characteristics of the invention, with reference to the above aims, can be easily inferred from the appended claims.

[0023] The advantages of the invention will become more apparent from the detailed description which follows, with reference to the accompanying drawings which illustrate embodiments of the invention provided merely by way of example without restricting the scope of the inventive concept of a door for boats, in which:

- Figure 1 illustrates a perspective view of the inside of a door for boats according to this invention and
- Figure 2 illustrates an enlarged detail of the door of Figure 1.

[0024] Hereinafter in this description, the numeral 1 generically denotes a door for boats, hereinafter referred to also only with the term "door".

[0025] The door 1 for boats according to this invention comprises a hollow box-shaped body 2, in such a way as to house any reinforcement plates and the entire kinematic mechanism designed for the opening/closing of the door 2.

[0026] The box-shaped body 2 has the shape of a parallelepiped with a rectangular base.

[0027] It is understood that the shape of the box-

shaped body 2 may also not have a regular parallelepiped shape since the invention may be installed with any door geometry. The door 1 also comprises closing means 3 positioned inside the space made in the box-shaped body 2. The closing means 3 are designed to slide inside the box-shaped body 2 in such a way as to come out from it (in particular from the lateral edge) and lock the door 2 inserting in respective locking seats positioned on the floor of the boat and/or on the frame of the door 1. The door 1 also comprises a handle 4 positioned on a flat surface of the box-shaped body 2 and operatively connected to the closing means 3.

[0028] The handle 4 is designed to move, by means of a force imparted by a user, the closing means 3 relative to the box-shaped body 2.

[0029] The kinematic mechanism of the door 2 according to the invention also comprises at least one guide means comprising a track 5 and a recirculating ball carriage 6 slidable on the track 5.

[0030] The carriage 6 is connected to the closing means 3 in such a way that their sliding translates into a sliding of the carriage 6 on the respective track 5.

[0031] Substantially, the carriage 6 has a contact portion 61 designed to make contact with and push the closing means 3 when the carriage 6 is moved with a direction divergent relative to the centre of the door 1 (in other words, when the upper carriage 6 is moved upwards and when the lower carriage 6 is moved downwards).

[0032] This sliding, being based on a recirculating ball carriage 6 has an extremely low friction, means there are no obstructions to the sliding of the closing means 3 and, therefore, of the handle 4 actuated by the user. Moreover, the fact that the carriage 6 is of the recirculating ball type allows the closing means 3 to be inserted in direct contact (and not with a considerable tolerance, as in the case of prior art doors) with the balls of the carriage 6 in such a way as to use the carriage 6 also as a point of discharge of the transversal forces acting on the closing means 3.

[0033] These transversal forces are very dangerous and harmful for the life cycle of the door 1 according to the invention since, if the recirculating ball carriage 6 were not present, they would discharge entirely on the mechanisms (gears 7, 8) for actuating the closing means 3.

[0034] In practice these transversal forces are always present on the door 1 and are mainly, but not exclusively, caused by: the same weight force as the door 1 once installed, the operation for closing the door 1 by a user, the interference which exists between the closing means 3 and the respective seats made on the flooring and/or frame of the door 1, any not perfect synchronisms for actuating the various closing means 3.

[0035] In short, the recirculating ball carriage 6 constitutes an intermediate point between the fixing point 11 of the track 5, and the gears 7, 8 of the handle, which allows all the transversal forces to be discharged without stressing the gears 7, 8.

[0036] For this reason, the structure of the door 1 according to this invention, and in particular the fact that it comprises a carriage 6 designed to slide along a stretch identified on the track 5 and interposed between the gears 7, 8 and the fixing point 11, makes it possible to optimise the distribution of the forces acting, guaranteeing the extension of the life (in terms of operation in optimum conditions) of the door 1. Advantageously, the closing means 3 comprise at least one pin.

[0037] The term "pin" is used to mean a rod-shaped element designed to extend between the zone occupied by the handle 4 and a respective end of the box-shaped body 2. The pins according to this invention are of the sliding type but it is understood that they could also be of the rotary type.

[0038] Advantageously, moreover, and with reference to the accompanying drawings, the closing means 3 comprise at least one latch.

[0039] As shown in Figure 1 and in the detail of Figure 2, the handle 4 and the closing means 3 are operatively connected by respective gears 7, 8 in such a way that the movement of the handle 4 corresponds to a sliding of the closing means 3 relative to the box-shaped body 2. According to the embodiment illustrated, the gears comprise at least one gear wheel 7 fixed in an axis to the handle 4 and at least one rack 8 integral with each of the closing means 3.

[0040] Advantageously, each closing means (pin or latch) can be operated by a respective rack 8.

[0041] Other embodiments, not shown in the drawings, require a single rack 8 to act on two or more pins.

[0042] In order to facilitate the return to position of the handle 4 (at least as regards its horizontal positioning), the door 1 according to this invention also comprises resetting means 9 for the closing means 3.

[0043] Advantageously, the resetting means 9 comprise elastic springs or gas springs acting in compression between a fixed point of the box-shaped body 2 and the respective closing means 3.

[0044] According to the embodiment shown in the drawings there are two resetting means: elastic springs acting for the resetting of the latch and gas springs to facilitate the resetting of the pins.

[0045] Advantageously, the door 1 also comprises at least one supporting element 10 fixed to the box-shaped body 2 and designed to support without friction the sliding of the closing means 3.

[0046] Substantially, the closing means 3 are designed to slide freely on the supporting element 10.

[0047] Since this relative sliding is contactless, also in this circumstance a zero or in any case very low friction coefficient is obtained.

[0048] The supporting element 10 does not perform the function of discharging transversal forces on the closing means 3 since the connection is without direct contact (there is a certain tolerance between the two components). Since the dimensions of the door 1 according to this invention are usually considerable, in order to limit the weight of the door without adversely affecting the mechanical strength, the box-shaped body 2 is made of

aluminium or steel.

[0049] According to an embodiment of a door 1 according to this invention, the closing means 3 comprise five pins and one latch, for a total of six closing points. According to a further embodiment, shown in the drawings, the closing means 3 comprise two pins and a latch, for a total of three closing points.

[0050] It is understood that this invention protects any number of closing points.

[0051] Advantageously, moreover, the door 1 according to this invention comprises a lock, positioned with the same axis as the handle 4 and operatively connected with it. The lock is designed to block the movement of the handle 4, preventing any manual intervention by a user.

[0052] Substantially, the lock prevents the handle 4 from any rotation about an axis perpendicular to a plane defined by the door 1 according to the invention.

[0053] The door 1 for boats according to the invention has important advantages and overcomes the drawbacks of the prior art.

[0054] An important advantage consists in the fact that a door 1 according to this invention makes it possible to obtain a perfect level of fluidity and precision of movement of the handle by using recirculating ball screw carriages. A further advantage, linked to the previous one, consists in the fact that a user who opens\closes the door 1 according to the invention will have the same perception as when opening a normal door, for example for buildings. Moreover, thanks to the asymmetric arrangement (lever effect) of the kinematic mechanism for actuating the closing means and, therefore, also the handle, relative to the box-shaped body 2, the movement of the door 1 is very facilitated and easy to use by a user.

[0055] A further advantage of the door 1 according to this invention is due to the fact that the recirculating ball carriages 6 allow a point of discharge of the transversal forces acting on the closing means 3 to be obtained, preventing them, on the other hand, from discharging on the gears 7, 8.

[0056] In this way it is possible to make the gears 7, 8 of brass instead of more expensive materials such as, for example, stainless steel.

Claims

1. A door (1) for boats comprising:

- a box-shaped body (2) hollow inside it,
- closing means (3) positioned inside said box-shaped body (2) and designed to slide inside it to come out therefrom,
- a handle (4) positioned on a surface of said box-shaped body (2) and operatively connected to said closing means (3), said handle (4) being designed to move said closing means (3) relative to said box-shaped body (2),
- gear means (7, 8) interposed between said handle (4) and said closing means (3) and operatively connected to both in such a way that the movement of said handle (4) corresponds to a sliding of said closing means (3) relative to said box-shaped body (2),

said door (1) being **characterised in that** it comprises at least one guide means comprising a track (5) and a recirculating ball carriage (6) slidable on said track (5), said carriage (6) being connected with said closing means (3), and **in that** said recirculating ball carriage (6) is interposed between the point (11) for fixing to the frame of said track (5), and said gears (7, 8) .

2. The door (1) according to the preceding claim, wherein said closing means (3) comprise at least one pin.

3. The door (1) according to any one of the preceding claims, wherein said closing means (3) comprise at least one latch.

4. The door (1) according to claim 1, wherein said gears comprise at least one gear wheel (7) fixed to said handle (4) and at least one rack (8) integral with said closing means.

5. The door (1) according to any one of the preceding claims, also comprising means (9) for resetting said closing means (3) configured to allow the return to an initial position of said handle (4).

6. The door (1) according to the preceding claim, wherein said resetting means (9) comprise elastic springs or gas springs.

7. The door (1) according to any one of the preceding claims, also comprising at least one supporting element (10) fixed to said box-shaped body (2), said closing means (3) being designed to slide freely on said supporting element (10).

8. The door (1) according to any one of the preceding claims, wherein said box-shaped body (2) is made of aluminium or steel.

9. The door (1) according to any one of the preceding claims, wherein said handle (4) comprises a lock arranged in axis with said handle and designed to lock the movement of said handle (4).

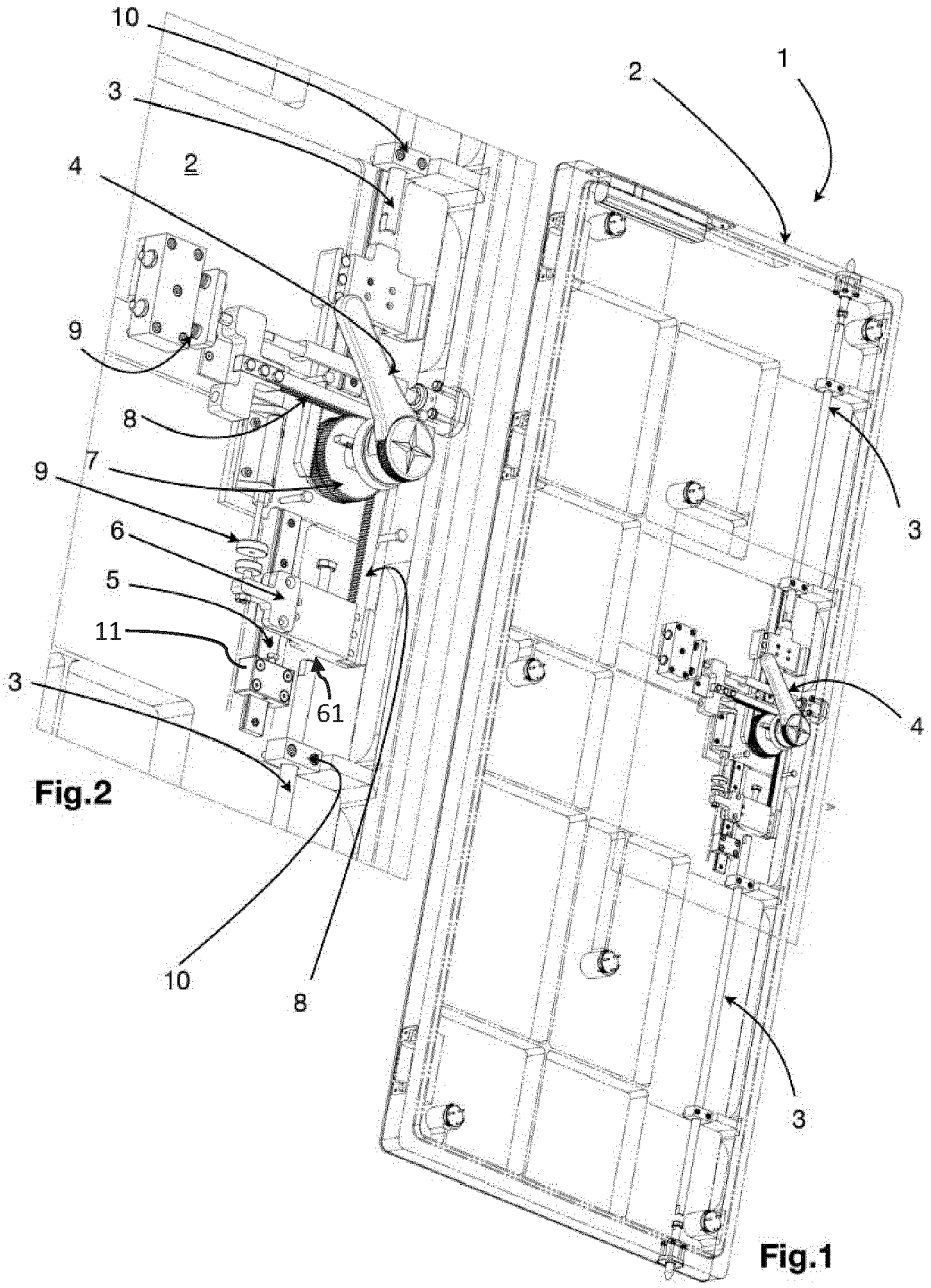

Fig.2

Fig.1

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EUROPEAN SEARCH REPORT

Application Number
EP 23 20 2963

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

E05B
E05C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	5 March 2024	Koster, Michael

CATEGORY OF CITED DOCUMENTS

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05-03-2024

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REFERENCES CITED IN THE DESCRIPTION

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