A DEVICE FOR MOVING AN OUTBOARD MOTOR AND A BOAT COMPRISING THE DEVICE

(57) Abstract: A device (4) for moving an outboard motor (2) for a boat (1) comprising a supporting element (6) to which the motor (2) is engaged and moving means (7), movably associated with the supporting element (6), designed to move the motor (2) between an operating position, in which the motor (2) can be positioned outside the boat (1), and a stowed position, in which the motor (2) can be positioned inside the boat (1). The moving means (7) and the supporting element (6) are movable between an extended configuration, corresponding to the motor in the operating position, in which the supporting element (6) is spaced from the moving means (7), and a retracted configuration, corresponding to the motor completely stowed, in which the supporting element (6) is drawn in and folded towards the moving means (7).

FIG 5d
Description

A Device for Moving an Outboard Motor and a Boat comprising the Device.

Technical sector
The present invention relates to a device for moving an outboard motor, and a boat comprising the device.

Generally, in outboard motor boats the motor, mounted on a support known as a bracket, which bears pins (fixed and/or mobile) for engaging the steering linkage and the Bowden command cables, is engaged to the transom (in a zone that may be reinforced) by means of one or more hooks present on the support. In this position it is fastened and, in order to be stowed onto the main deck of the boat, must be demounted, raised and rested in the boat by brute force.

When the boat is to be stowed in a garage or on another boat, this operation may become necessary to reduce the length (and height) of the boat.

Prior art
A known solution for reducing longitudinal size of boats is described in Italian patent IT 0001347241, which provides for a portion of a transom which is tiltable.

This solution exhibits various drawbacks, not least the fact that the motor does not completely enter the area of the stern deck and has to be further moved to achieve this, after demounting or providing the tiltable transom with slides. If the motors are powerful and heavy this can become a problem.

The technical object of the present invention is therefore to disclose a device for moving an outboard motor, and a boat comprising the device, which are free of the
drawbacks encountered in the prior art.
Within this technical object, the aim of the present invention is to realise a device for moving an outboard motor which enables complete stowing of the motor internally of the boat, without involving demounting of parts of the boat or motor.

Description of the invention
The aim of the present invention is therefore to disclose a boat which can pass from a operating configuration of maximum longitudinal extension to a stowed configuration of minimum longitudinal extension.
These and other aims, which will more fully emerge during the course of the following description, are attained by a device for moving an outboard motor and a boat comprising the device according to one or more of the appended claims.

Brief description of the drawings
There now follows an illustration, by way of non-limiting example, of a preferred but not exclusive embodiment of a device for moving an outboard motor and a boat comprising the device, as illustrated in the accompanying drawings, in which:
- Figures 1 and 2 are a perspective view, from two different angles, of a device for moving an outboard motor in an operating position, in accordance with the present invention;
- Figure 3 is a perspective view of the device of the present invention, with some parts removed for the sake of clarity, in an initial stowed position;
- Figure 4 is a perspective view of the device of the present invention, with some parts removed for the sake of clarity;
- Figures 5a-5e illustrate, in a schematic lateral view, the various steps of the
movement of the device, from a step in which the motor is in operation to a final step of stowing the motor internally of the boat;

- Figures 6 and 7 illustrate two positions of a detail of the device of the present invention, with some parts removed for the sake of greater clarity.

Detailed description of the preferred embodiments of the invention

1 denotes generally a boat with an outboard motor 2 applied to a transom 3.

The present invention relates, in particular, to a device 4 for moving the outboard motor 2, able to move the motor between an operating position (Figures 1, 2, 5a), in which it is active in the water, and a stowed position (Figure 5e) in which it is located internally of the space on the boat between the flanks in proximity of the stern and at the stern itself, in a special housing 5 realised internally of the boat 1.

For simplicity of description, in the following description reference will be made to a horizontal reference plane Z for a boat considered to be in a garage.

Describing the invention with greater detail, the moving device 4 comprises a supporting element 6 to which the motor 2 is hooked and moving means 7, substantially defining an arm, movably associated to the supporting element 6 and hinged to the inside of the boat 1.

The moving means 7, cooperating with the supporting element 6, are adapted to move the motor 2 between an operating position (Figure 5a), in which the motor 2 is locatable externally of the boat, beyond the transom 3, and a stowed position (Figure 5e), in which the motor is positionable internally of the boat in the special housing 5 afforded on the plane of the deck 8.

The moving means 7 and the supporting element 6 are movable between a configuration of maximum extension (Figure 5b), in which the supporting element 6
distances from the moving means 7, and a retracted configuration, (Figure 5e), in which the supporting element 6 is retracted and bent nearingly to the moving means 7.

During the movement, the device 1 performs a curved trajectory, with a concavity facing downwards, in which the supporting element 6 describes a curve defined by a rising tract, a summit point and a downwards tract.

This trajectory enables the supporting element 6, and therefore the motor 2 to surmount the transom 3 such as to be positioned outside the boat 1.

The movable supporting element 6 is an additional bracket which, in the operating position of the motor, is in front of and parallel to the transom 3, externally of the boat 1, and functions as a transom only for the hooking-on of the motor; the transom 3 is not eliminated and the body of the boat undergoes no structural modification. In the stowed position, on the other hand, the supporting element 6 is brought near to the plane of the deck 8, preferably in the relative housing 5, where the motor 2 is also partially housed.

The moving means 7 comprise a plurality of levers, hinged to one another and to the body of the boat 1 in one or more points inside the deck 8 (Figures 2 and 3), such as to form a pantograph structure.

The pantograph structure, considering the device 4 mounted on the boat 1, rotates about one or more rotation axes x', x", parallel to the horizontal reference plane Z, orientated transversally to the two flanks.

In particular, the pantograph structure comprises a first 9 and a second 10 arm, having a predetermined length, pivoted at two appropriately-chosen different points to the body of the boat. The two arms 9 and 10 rotate about respective rotation axes x' and x".
The supporting element 6 is in turn hinged to the moving means 7 and rotates about a hinge axis 6a parallel to the rotation axes x', x''.

The above-mentioned pantograph structure further comprises a third arm 11 provided with a plate-shaped portion 11b arranged vertically and having a preferably triangular conformation, and a lever 11c extending from the plate-shaped portion 11b. In particular, the third arm 11 connects the supporting element 6 to the first arm 9 and to the second arm 10, and connects the first arm 9 and the second arm 10 to one another.

The first arm 9 is hinged to an end of a lever 11c of the third arm 11, such as to rotate with respect to the third arm 11 about the rotation axis 11a. The second arm 10 and the supporting element 6 are located on opposite sides of the plate-shaped portion 11b, and are hinged to one of the three corners of the plate 11b, through which the hinge axis 6a passes.

The supporting element 6 can rotate by a certain predetermined angle limited and contained within 90°.

In greater detail, with reference to the device 4 mounted on the boat 1 considered to be garaged, the supporting element 6 is movable between an operating position, shown for example in Figures 1, 2 and 5a, at which the supporting element 6 is parallel to the transom 3 and is therefore in a transversal position (in particular, for example, in a substantially vertical position) with respect to the horizontal reference plane Z, and an initial stowed position, illustrated for example in Figures 3 and 5b, in which the supporting element 6 is transversal to the transom 3 and the motor is raised and inclined already in the stowed position.

The angle of rotation of the supporting element 6, with respect to the vertical, is comprised between 20° and 90°, preferably between 30° and 80°. The movement
and rotation of the supporting element 6 are such as never to cause the motor 2 to incline beyond a certain angle, such as to prevent leakage of oil or other problems which might damage functioning thereof.

To prevent excessive inclination of the motor 2, the device 1 comprises a lock/release mechanism 12 of the supporting element 6 into and from the stowed position illustrated in Figures 3 and 5b.

The lock/release mechanism 12 comprises a pin 13 which can be engaged in a respective seating 14 afforded in the third arm 11 and retro-activated by an elastic element 15, such as for example a plate spring. The lock/release mechanism 12 is solidly constrained to the supporting element 6.

Starting from the operating position, the first element that moves with respect to the others is the supporting element 6, which rotates upwards about the fixed hinge axis 6a. The lock mechanism 12 also rotates rigidly with the supporting element 6 until the pin 13 engages in the seating 14 afforded on the plate 11b of the third arm 11. The seating 14 is afforded preferably at the corner of the plate 11b orientated downwards.

As long as the pin 13 stays in the seating 14, the supporting element 6 and the motor maintain the inclination constant.

To release the supporting element 6, the elastic element 15 is pulled such as to disengage the pin 13 from the seating 14.

The lock mechanism 13 is able to fix the position of the supporting element 6 only with respect to the third arm 11 and prevent any relative movement thereof with respect to the third arm 11; the relative movements of the first 9 and the second arm 10 with respect to the third arm 11, and thus with respect to the supporting element 6, are not blocked. This enables rotation of the supporting element 6, and thus of the
motor 2, from the initial stowed position to the final position, at which the motor is completely housed internally of the boat.

Therefore, the whole movement of the device can be substantially sub-divided into two movements: a first rotation movement of only the supporting element 6 about the hinge axis 6a, and a second movement during which the supporting element and the motor are at a constant inclination and translate following the curved trajectory about the rotation axes x' and x", following the drawing movement impressed by the first 9 and second 10 arm.

The moving means 7 further comprise a servo mechanism 16 for controlling and guiding the movement of the arms and for assisting and aiding both the raising and the lowering of the motor 2.

One of the two arms, in particular the second arm 10, is assisted by the servo mechanism 16. The servo mechanism 16 comprises, for example, a gas spring.

The gas spring works at null effect when the motor is at the summit of the curved trajectory of the second part of the movement, which the motor follows by translating and, in descent on a side towards the stowed position or the other side towards the operating position, the spring slows the motion down, while taking the weight of the motor. In at least one of the two end positions, the gas spring is not completely closed and therefore aids the action of the user in commencing the raising of the motor.

The device advantageously comprises lock means of the supporting element 6 in the operating position.

The supporting element exhibits at least a slot 17 for fastening to a hooking element 18, 19 present on a boat. In particular, the at least a slot 17 preferably enables passage of a bolt 18 and a consequent fastening of the supporting element 6 to the
transom 3. A handle 19, predisposed appropriately internally of the boat 1 at the transom 3, enables the bolt 18 to block the supporting element 6 of the motor to the transom 3 when it reaches the operating position. The supporting element 6 comprises a plate of a determined thickness, in which the at least one slot 17 is afforded. The supporting element 6 is preferably a plate of a determined thickness, in which the at least a slot 17 is afforded.

The pantograph lever mechanism is advantageously located on a flank of the inside of the boat, with the supporting element 6 of the motor connected laterally projectingly, towards the halfway line of the boat, and fixed to the boat by two relative brackets 20.

The supporting element 6 preferably exhibits a plurality of slots which lighten the structure as well as enabling passage of pins, tie-rods and cables for guiding and controlling the motor.

As illustrated in the accompanying drawings, before moving the motor from the operating position in order to bring it into the initial stowed position (or, at least, before performing the second part of the movement once the first rotation of the supporting element 6 is performed about the fixed horizontal hinge axis 6a), the user should appropriately rotate the motor on one side, about the vertical axis of the motor (by rotating the steering wheel, or rudder, completely to one side) such as to free the zone in which the movement of the levers and the motor itself is done from the pins, tie rods and guide tubes of the motor (Figure 5).

Both the raising of the supporting element 6a from the operating position (Figure 5a) to the initial stowing position (Figure 5b), and the rotation of the movement means 7 from the initial stowed position (Figures 5b or 5c) to the final stowed position (Figure 5e) with the device 1 completely closed internally of the boat can be
performed manually. At least the rotation of the moving means 7 from the initial stowed position (Figure 5b or 5c) to the final stowed position (Figure 5e) with the device 1 completely closed internally of the boat can advantageously be motorised. Preferably both the raising of the supporting element 6a from the operating position (Figure 5a) to the initial stowed position (Figure 5b), and the rotation of the moving means 7 from the initial stowed position (Figure 5b or 5c) to the final stowed position (Figure 5e) with the device 1 completely closed internally of the boat can be advantageously motorised. The motorisation of these operations enables moving even very heavy motors 2. The motorised movement can be obtained by means of automatic mechanisms comprising one or more servo mechanisms activated hydraulically and/or electrically (in particular with suitable motors). The servo mechanism 16, in particular, can comprise one or more hydraulic and/or electric motors. In a case of a motorised movement, the releasing of the rotation of the supporting element 6 with respect to the plate 1ib can be obtained with advantageous automated mechanical actuators.

The inverted movement to the one described up to now returns the motor 2 from the stowed position to the operating position. Once the above-described second part of the movement is completed (in which motor and support translate without changing inclination along an arc of curvature with the concavity facing downwards such as to newly pass over the transom 3), the rotation of the supporting element 6 with respect to the plate 1ib of the third arm 11 is released (in particular, for example, by acting on the plate spring 15 connected to the pin 13 inserted in the seating 14) and the motor is accompanied in rotation of the support up to the operating configuration.

The invention attains the set aims as the device avoids modification of the transom and in general avoids structural interventions on the body of the boat with openable
parts that can compromise the body seal.

The device enables the motor to be moved from the operating position to the stowed position without any oil leakage and in conditions of safety.

In this way the motor is completely stowed internally of the boat, without any need to demount parts of the boat or the motor, thus ensuring a configuration of minimum longitudinal size.
CLAIMS

1. A device for moving an outboard motor for a boat comprising a supporting element (6) to which the motor (2) is hooked and movement means (7), movably associated with the supporting element (6), designed to move the motor (2) between an operating position, in which the motor (2) can be positioned outside the boat (1), and a stowed position, in which the motor (2) can be positioned inside the boat (1); the movement means (7) and the supporting element (6) being able to move between an extended configuration, corresponding to the motor in the operating position, in which the supporting element (6) is spaced from the movement means (7), and a retracted configuration, corresponding to the motor completely stowed, in which the supporting element (6) is drawn in and folded towards the movement means (7).

2. The device according to claim 1, characterised in that the movement means (7) comprise a plurality of arms (9, 10, 11) which are hinged together to form a pantograph linkage structure.

3. The device according to any of the foregoing claims, characterised in that the movement means (7) comprise a servo-mechanism (16) for controlling the movement of the movement means (7).

4. The device according to claim 3, characterised in that the servo-mechanism (16) comprises at least one gas spring, for guiding, balancing and controlling the movement of the motor (2) supporting element (6).

5. The device according to any of the foregoing claims, characterised in that the movement means (7) rotate about at least one axis of rotation ($\chi'$, $x''$); the axis of rotation ($\chi'$, $x''$), considering the device (4) mounted on a boat (1), being parallel
with a horizontal reference plane (Z) of the boat and its orientation being transversal
to the sides of the boat.

6. The device according to any of the foregoing claims, characterised in that the
supporting element (6) rotates about a hinge axis (6a) so as to move from an
operating position, parallel with a transom (3) considering the device (4) mounted
on a boat, in which the motor (2) is operating, to an initial stowed position,
transversal to the transom (3), in which the motor (2) is lifted into a stowed position;
the hinge axis (6a), considering the device (4) mounted on a boat, being parallel with
a horizontal reference plane (Z) of the boat and its orientation being transversal to
the sides of the boat.

7. The device according to claim 6, characterised in that it comprises a lock/release
mechanism (12) for the supporting element (6) in the initial stowed position.

8. The device according to claim 7, characterised in that the lock/release mechanism
(12) for the supporting element comprises a plate spring (15) operating in
conjunction with a pin (13) which engages in a cavity (14) made in a plate-shaped
portion (11b) of an arm (11) belonging to the movement means (7).

9. The device according to claim 7 or 8, characterised in that the supporting element
(6), locked in the initial stowed position, is at a constant angle and is moved by the
movement means (7) always parallel with itself until it reaches the final stowed
position, in which the supporting element (6) is in the retracted configuration, drawn
in and folded towards the movement means (7).

10. The device according to any of the foregoing claims, characterised in that the
supporting element (6), in the operating position, projects outside the transom (3) of
a boat (1), whilst in the final stowed position it rests on the deck (8) of the boat.

11. The device according to any of the foregoing claims, characterised in that the supporting element (6) is connected cantilever-style to the movement means (7).

12. The device according to any of the foregoing claims, characterised in that the supporting element (6) comprises at least one slot (17) for fixing to a hooking element (18, 19) present on a boat.

13. A boat characterised in that it comprises a device (4) for moving an outboard motor according to one or more of the claims from 1 to 12.

14. The boat according to claim 13, characterised in that it comprises a transom (3) shaped to match the motor (2) supporting element (6).

15. The boat according to claim 13 or 14, characterised in that it comprises a bolt (18) for locking the motor supporting element (6) to the transom (3).

16. The boat according to any of the claims from 13 to 15, characterised in that it comprises a deck (8) and a housing (5) made on the deck (8) for the motor (2).
### A. CLASSIFICATION OF SUBJECT MATTER

**INV.** B63H20/10

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): B63H

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

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

**EPO-Internal**, **WPI Data**

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>US 4 966 566 A (BAI RD JOHN S [US]) 30 October 1990 (1990-10-30)</td>
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Further documents are listed in the continuation of Box C. X See patent family annex.

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