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(54) **DEVICE FOR MOUNTING AN OUTBOARD MOTOR AT THE STERN OF A BOAT**

(57) Device (5) for the mounting of an outboard motor (4) at the stern (2) of a boat (1), in particular an inflatable boat, comprising a boxed assembly (70) to which the motor (4) is secured, said assembly (70) being rotatably mounted around the axis (X) of a solid shaft (10) fixed to

said stern (2), so as to be able to move said motor (4) from a vertical position, in sailing trim, to an inclined position, in storage trim, with reduction in its vertical overall dimensions.

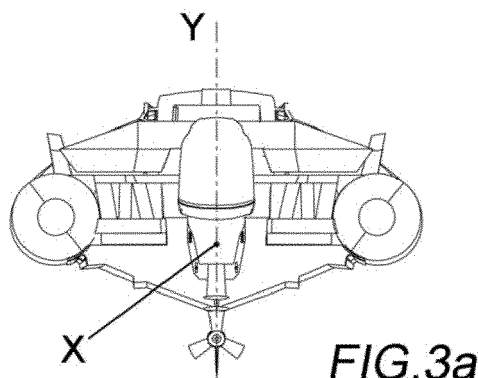
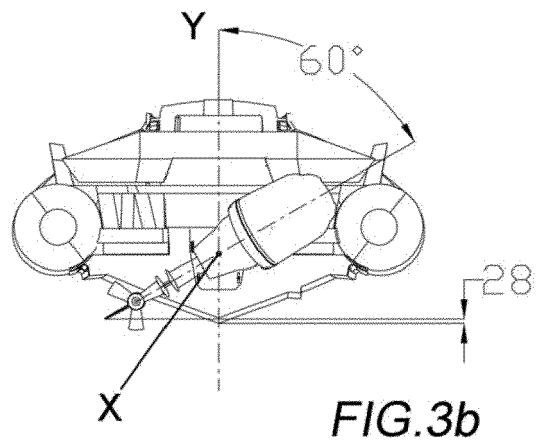


FIG.3a



Description

[0001] The subject of the present invention is a device for the mounting of an outboard motor at the stern of a boat, in particular an inflatable boat or dinghy, suitable for reducing the overall dimensions of the same during storage.

[0002] In recreational boating, small boats or inflatable boats, known as dinghies, of various sizes and fitted with an outboard motor, are used as means of support for medium to large-sized boats, in particular yachts, for transporting passengers and for excursions in waters close to coasts.

[0003] Since space in a yacht is used to its maximum capacity, storage of the dinghy can be a problem, especially because of the considerable height of the outboard motor.

[0004] Obviously, the space occupied by the dinghy in terms of length and height can be reduced by disassembling and deflating completely the boat when it has to be hoisted aboard, and it requires subsequent inflation and reassembly when it has to be put to sea whenever it needs to be used, operations that are long and laborious.

[0005] Some solutions proposed since the 1960s (see for example GB 1129478) provide for the lowering of the transom of the boat to allow the motor to be hoisted on board, a solution that is somewhat complicated and requires work on the structure of the boat.

[0006] EP 3549851 A1 describes a support device for the support of an outboard motor of a boat, comprising a telescopic tubular assembly carried by a first plate rigidly connected to the transom of the boat, externally to which an electric motor is attached, that rotates a second plate cantilevered on said telescopic tubular assembly, to which the outboard motor is attached.

[0007] Such a solution has the disadvantage that the plate carrying the weight of the outboard motor is fixed to the end of a shaft placed inside the telescopic tubular assembly, subject to a bending moment. Furthermore, the electric motor placed outside the telescopic assembly, together with the gears for driving rotation of the plate carrying the outboard motor, is exposed to the corrosive agents of seawater, which may produce a rapid deterioration thereof.

[0008] The object of the present invention is to remedy, at least in part, the disadvantages of the prior art, by proposing a device for the mounting of an outboard motor at the stern of a boat, in particular an inflatable boat or dinghy, which allows a reduction in the vertical overall dimensions, and therefore the housing in height intended for the storage, thus freeing up available space.

[0009] Another object of the invention is to provide such a device that allows a reduction in the vertical overall dimensions of the boat in the storage space of a "mother" boat without having to perform structural work on the same.

[0010] A further object of the invention is to provide such a device which can be easily and quickly operated

by the user.

[0011] Yet another object of the invention is to provide such a device, the components of which are protected from the corrosive agents of sea water.

[0012] These and other objects are achieved by the device according to the invention that has the features of the appended independent claim 1.

[0013] Advantageous embodiments of the invention are disclosed in the dependent claims.

[0014] 1. Substantially, the device according to the invention for the mounting of an outboard motor at the stern of a boat, in particular an inflatable boat, comprises drive means designed to move said outboard motor from a vertical position, in a sailing trim, to an inclined position, in a storage trim, with reduction in its vertical overall dimensions, wherein said drive means are mounted integral inside a boxed assembly to which the outboard motor is restrained, said boxed assembly being mounted rotatably around the axis of a solid shaft fixed to said stem, in such a way that the whole assembly constituted by the boxed assembly, by the outboard motor and by the drive means can rotate around said axis.

[0015] Further features of the invention will be made clearer by the following detailed description, referring to an embodiment thereof purely by way of a non-limiting example, illustrated in the accompanying drawings, wherein:

Figures 1a, 1b are, respectively, a side view and a longitudinal section view of a boat, in particular an inflatable boat, provided with an outboard motor with mounting device according to the invention;

Figure 2 is an enlarged axonometric view of the transom of the inflatable boat of Figure 1 showing in blown-up view the mounting of the motor;

Figures 3a, 3b are views from the rear of the inflatable boat with the motor, respectively, in sailing trim and in "storage" trim, following a rotation about an axis passing through the vertical axis of the inflatable boat;

Figures 4a, 4b are similar views to Figures 3a, 3b, in which the rotation of the motor takes place around an axis that is off-centre with respect to the vertical axis;

Figure 5 is a blown-up view of the device for mounting of the outboard motor according to the invention;

Figures 6a, 6b are section views, respectively, along lines A-A and B-B, of the assembled device of Figure 5.

[0016] Figures 1- 4 schematically show an inflatable boat, denoted generically by reference numeral 1, provided with a rigid transom 2 and an air-inflated tube 3

that covers the sides and the bow.

[0017] In the present description, specific reference is made to an inflatable boat, but it is clear that the teachings of the invention are applicable to any boat, normally of small to medium size, suitable for being hoisted onto larger boats.

[0018] An outboard motor 4 is mounted at the transom 2 of the boat 1 by interposition of the mounting device 5 according to the invention, which will be described here below.

[0019] The mounting device 5 is made integral with the transom 2 by means of a flange 7 attached by screws 6, and the motor 4 is made integral with the device 5 by means of screws 8.

[0020] The characteristic of the mounting device 5 is that of allowing the rotation of the motor 2 around a horizontal axis, so that it can be brought from a vertical position, in sailing trim, to an inclined position, such as to reduce the vertical overall dimensions thereof, as schematically shown in Figures 3 and 4.

[0021] In Figures 3a, 3b, the axis of rotation X of the motor passes through the vertical axis Y of boat 1, i.e. it is contained in the vertical plane containing the longitudinal axis of the boat, while in Figures 4a, 4b, the axis X is off-centre with respect to the axis Y to the right with reference to the view from the rear of boat 1.

[0022] In the example shown, a clockwise rotation of 60° is provided, which in both cases produces a reduction in the vertical overall dimensions, with lifting of the "foot" of the motor. In particular, referring to the distance of the "foot" from the lower end of the keel of the boat, in the case of an off-centre axis of rotation X (Figs. 4a, 4b) a gain can be seen with respect to the case of a centred axis of rotation (Figs. 3a, 3b), which increases from 28 mm to 114 mm.

[0023] Referring now to Figures 5 and 6, an exemplary embodiment of the mounting device 5 that allows the rotation of the motor is described in detail.

[0024] In these drawings, the flange 7, provided with a hole 18, is intended to be fixed to the stem 2 of the boat 1 (not shown) by means of the screws 6, as shown in Figure 2.

[0025] The device 5 according to the invention comprises a hollow flanged shaft 9 attached to the flange 7 by means of screws 13, thus remaining stationary with respect to the stem 2 of the boat 1.

[0026] The kinematic chain that makes rotation of the motor possible around the axis of the flanged shaft 9, which coincides with the axis X shown in Figures 3 and 4, is now described.

[0027] The hollow shaft 9 bears internally a "female" toothed profile which couples with the "male" profile of a solid toothed shaft 10. The coupling of these toothed profiles makes the shafts 9 and 10 integral.

[0028] The toothed shaft 10 has on one side a flange 11 and on the other side a tang 12 which is housed in the hole 18 of the flange 7.

[0029] On the toothed shaft 10, inside the flanged end

11, a bearing 20 is placed, for example of the cross-roller type, whose inner and outer rings are denoted by the numbers 21 and 22.

[0030] The toothed shaft 10 is made integral with a crown wheel 30 and with the inner ring 21 of the bearing 20 by means of screws 23, which pass through its flanged end 11.

[0031] Two washers 14, 15 and a ring nut 16, fitted on the tang 12 of the shaft 10, compact the hollow shaft 9 and the solid shaft 10 against the inner ring 21 of the bearing 20.

[0032] The outer ring 22 of the bearing 20 is fixed, by means of screws 23, to a perforated plate 40, provided with a central hole 45, rotatably mounted on the hollow shaft 9 with interposition of a sealing ring 41.

[0033] The plate 40, which in actual fact has the shape of an open box, is closed by a second plate 42 having approximately the same conformation, determining a seat 43 in which the bearing 20 and the crown wheel 30 are housed, together with the corresponding portion of the solid shaft 10.

[0034] A hole 44 is provided in the plate 42 for the passage of the output shaft 52 of an electric gearmotor 50 fixed externally to the plate 42 by means of screws 53.

[0035] A pinion 51 is splined on the shaft 52 of the gearmotor 50, which meshes with the crown wheel 30.

[0036] A cover plate 60 is provided to close the gearmotor 50.

[0037] The three plates 40, 42, 60 are restrained one to the other by means of screws 61, constituting a single boxed assembly 70 capable of rotating about the axis of the coaxial shafts 9, 10.

[0038] In fact, since the crown wheel 30 is fixed, the pinion 51 is forced to rotate around it, and therefore around the axis of the shafts 9 and 10, bringing about the rotation of the gearmotor 50 which, in turn, is integral with the plate 42.

[0039] The pinion 51 with the crown wheel 30 offer not only the transmission of the motion but also a further reduction, in addition to that already guaranteed by the gearmotor 50, leading to an increase in final torque and to a necessary reduction in rpm (revolutions per minute).

[0040] The sealing ring 41 will prevent leaks of the oil necessary for lubricating the gear pair in the seat 43.

[0041] The cover plate 60 not only has the purpose of protecting the gearmotor 50 but, above all, has to hold the outboard motor fixed thereto, by means of the screws 8 shown in Figure 2.

[0042] Therefore the plate 60 replaces the fixed stem, where the outboard motor is normally fitted. It rotates and drives rotation of the motor mounted on the boat.

[0043] In the foregoing description, a gearmotor has been indicated for driving rotation of the assembly 70. However, a pneumatic/hydraulic, or even manual, drive could be provided, with end of stroke stops for the positions of the assembly 70.

[0044] From what has been disclosed, the advantages of the device according to the invention, which allows a

reduction in the vertical overall dimensions of a boat during storage with extremely simple and rapid operations, appear evident.

[0045] Naturally, the invention is not limited to the particular embodiment previously described and illustrated in the accompanying drawings, but numerous detailed changes can be made thereto within the reach of the person skilled in the art, without departing from the scope of the invention itself, as defined in the following claims.

Claims

1. Device (5) for the mounting of an outboard motor (4) at the stern (2) of a boat (1), in particular an inflatable boat, comprising drive means designed to move said outboard motor (4) from a vertical position, in sailing trim, to an inclined position, in storage trim, with reduction in its vertical overall dimensions, **characterised in that** said drive means are mounted integral inside a boxed assembly (70) where to the outboard motor (4) is restrained, said boxed assembly (70) being mounted rotatably around the axis (X) of a solid shaft (10) fixed to said stem (2), in such a way that the entire assembly constituted by the boxed assembly (70), by the outboard motor (4) and by the drive means can rotate around said axis (X). 5 10 15 20 25
2. Device according to claim 1, **characterised in that** said boxed assembly (70) is mounted on the solid shaft (10) by means of a bearing (20), the inner ring (21) of which is fixed to the shaft and the outer ring (22) of which is attached to the boxed assembly (70). 30
3. Device according to claim 2, **characterised in that** said solid shaft (10) is coaxially engaged in a hollow flanged shaft (9) fixed to a perforated flange (7), in turn fixed to the stern (2). 35
4. Device according to claim 3, **characterised in that** said solid shaft (10) has an end tang (12) housed in the hole (18) of said perforated flange (7), on said tang (12) being fitted washers (14, 15) and a ring nut (16) apt to compact the two shafts (9, 10) against the inner ring (21) of the bearing (20). 40 45
5. Device according to any one of claims 2 to 4, **characterised in that** a crown wheel (30) is fixed to said solid shaft (10) with which a pinion (51) of a gearmotor (50) meshes, constituting said drive means integral with said boxed assembly (70). 50
6. Device according to claim 5, **characterised in that** said crown wheel (30) is fixed to the shaft (10) by means of screws (31) traversing a flanged end (11) of the shaft (10) and screwing into the inner ring (21) of the bearing (20). 55
7. Device according to claim 5 or 6, **characterised in that** said boxed assembly (70) comprises:
 - a first perforated plate (40) mounted on said hollow shaft (9), to which the outer ring (22) of the bearing (20) is fixed,
 - a second plate (42) determining with the first plate (40) a seat (43) in which the bearing (20), the crown wheel (30) and the corresponding portion of the shaft (10) are housed, externally to said second plate said gearmotor (50) being fixed, whose shaft (52) carrying the pinion (51) passes through a hole (44) formed in the plate itself,
 - a third plate (60) covering the gearmotor (50), the three plates (40, 42, 60) being restrained one to the other by means of screws (61).
8. Device according to any one of the preceding claims, **characterised in that** said axis (X) of rotation of the boxed assembly (70) passes through the vertical axis of the boat (1).
9. Device according to any one of claims 1 to 7, **characterised in that** said axis (X) of rotation of the boxed assembly (70) is off-centre with respect to the vertical axis of the boat (1).
10. Boat (1) equipped with outboard motor (4) mounted at its stern (2) by means of a device (5) apt to allow a movement of said outboard motor (4) from a vertical position, in sailing trim, to an inclined position, in storage trim, according to any one of the preceding claims.

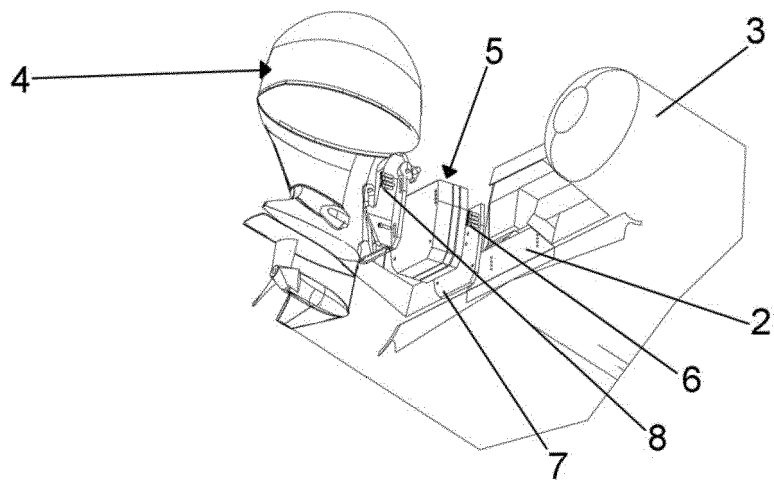
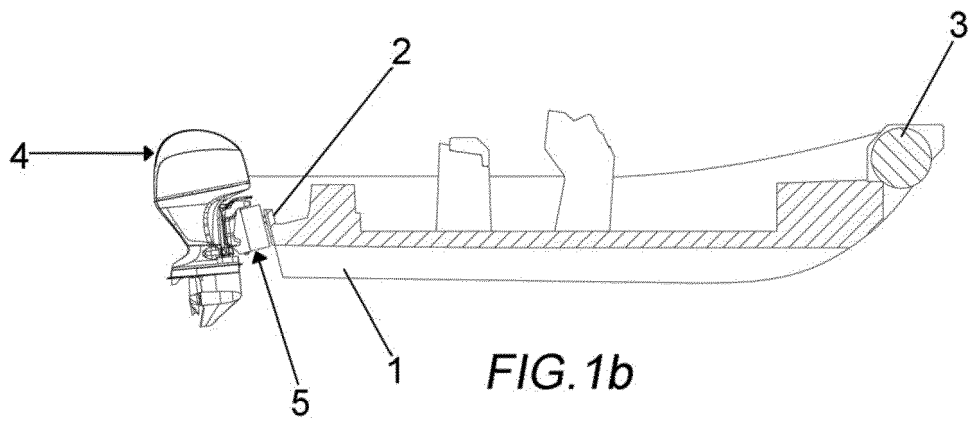
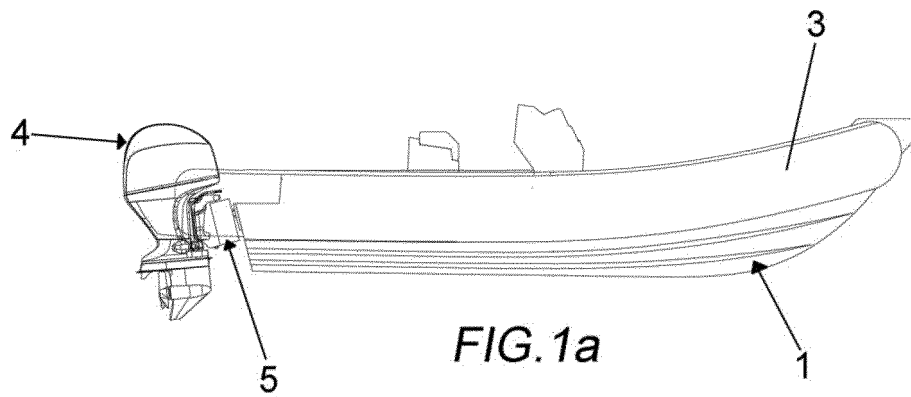
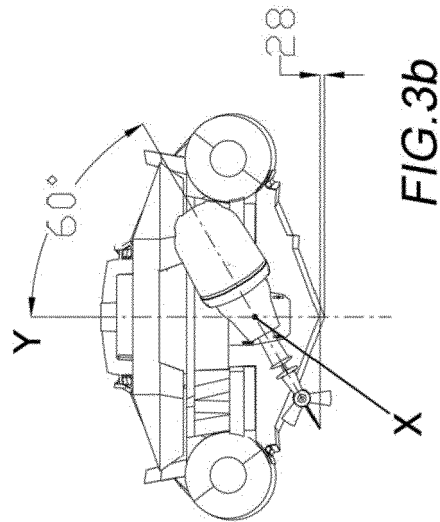
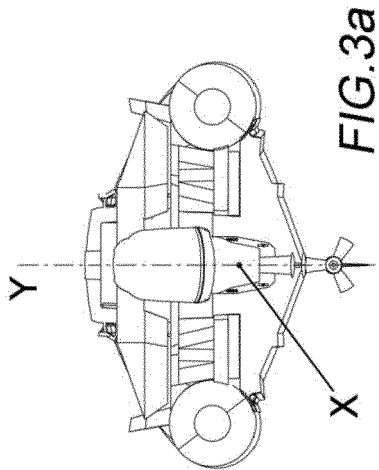
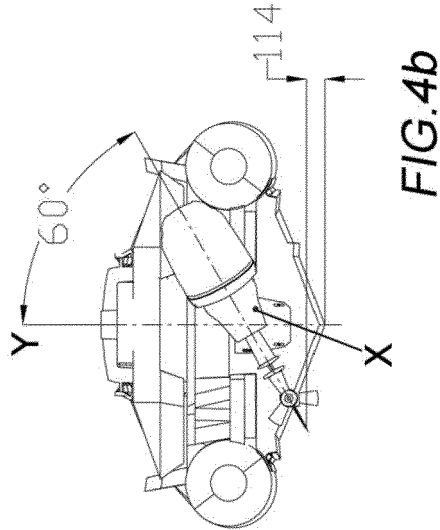
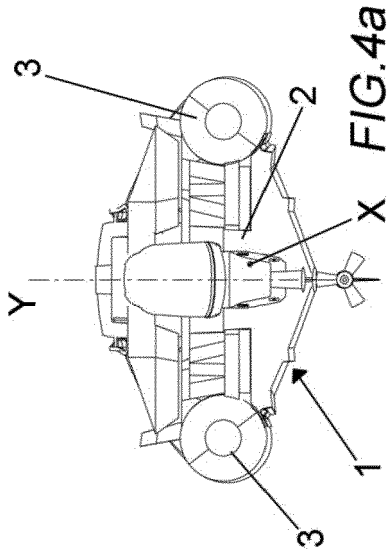


FIG.2



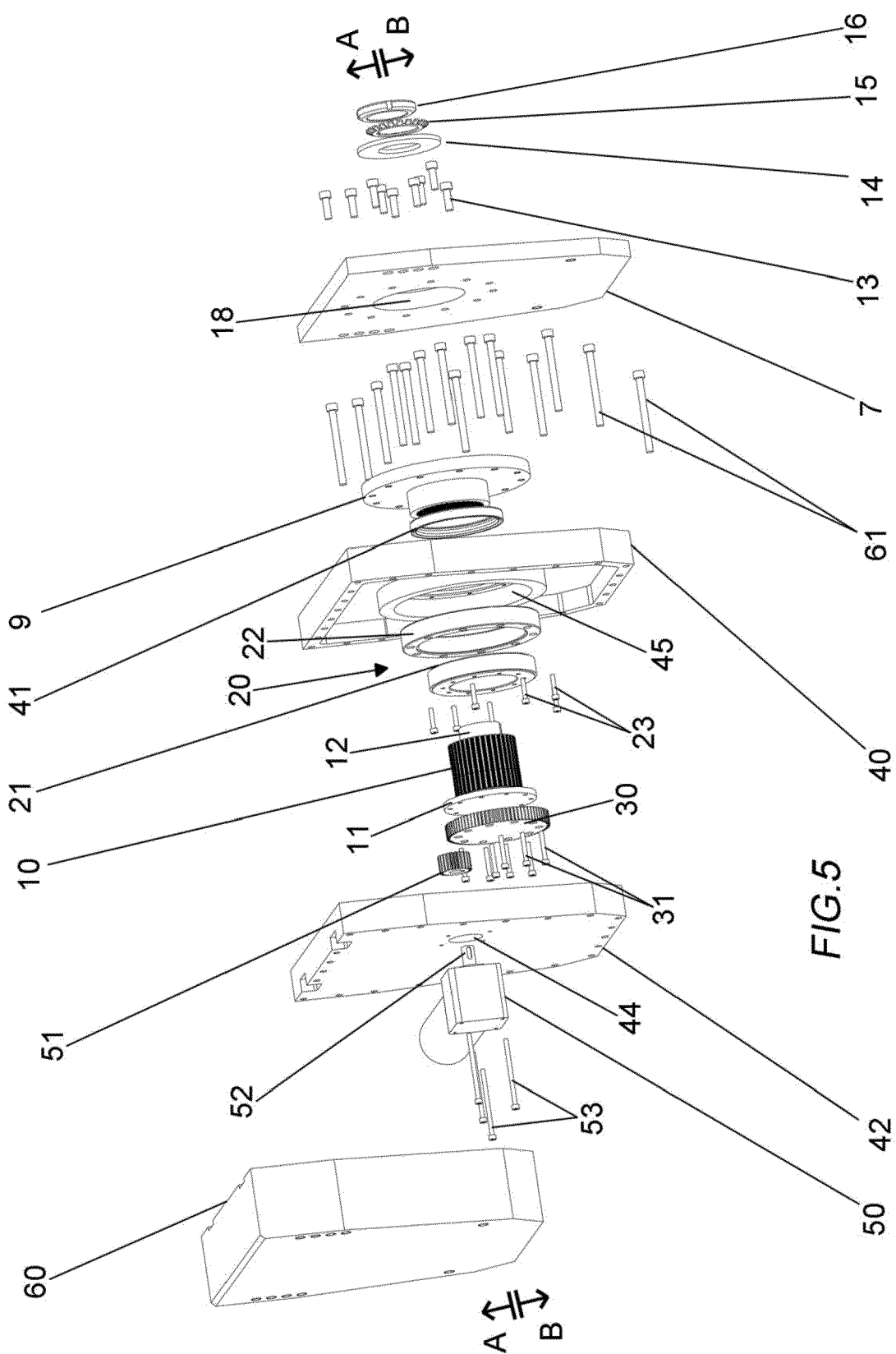


FIG. 5

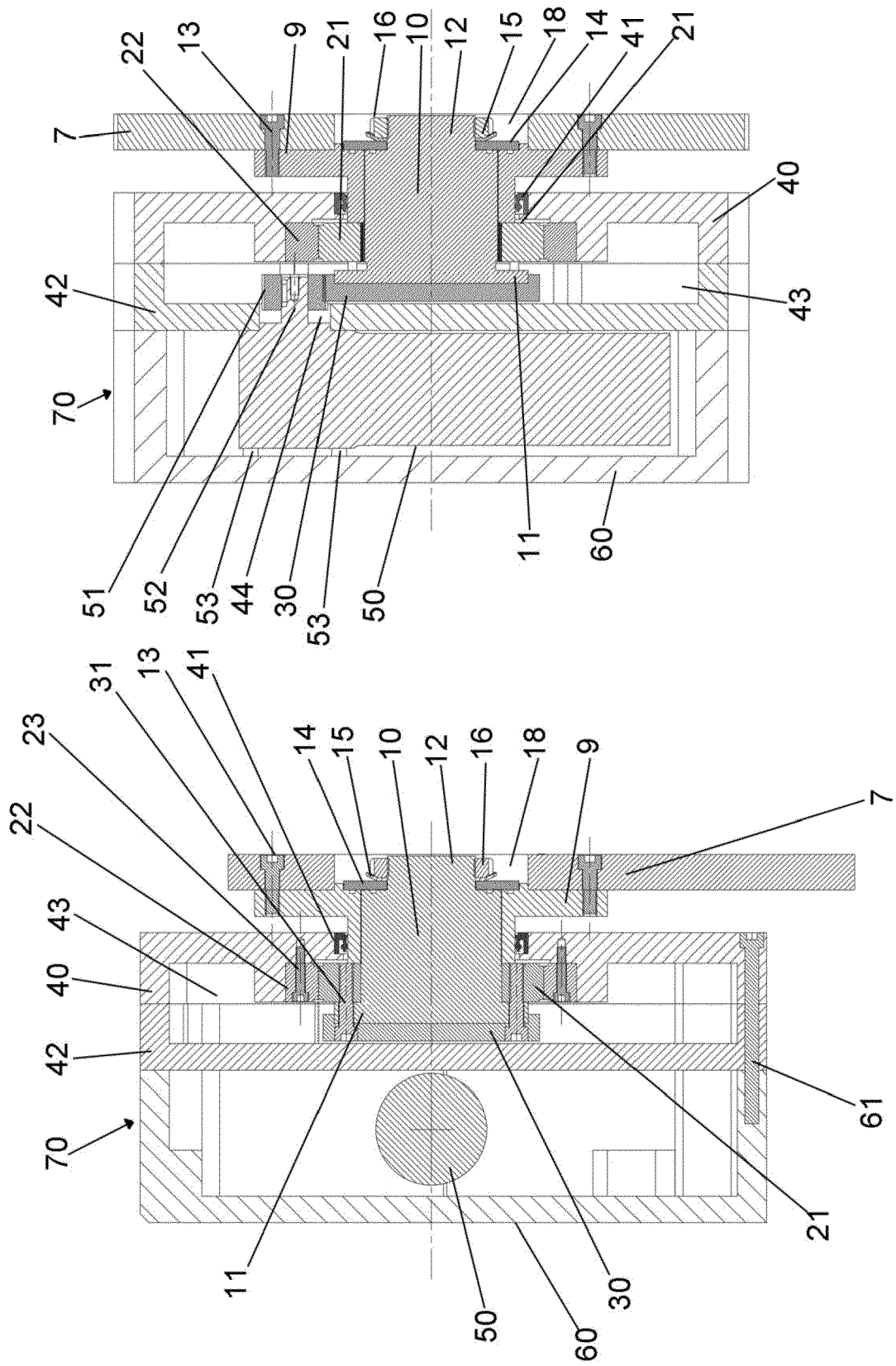


FIG. 6b

FIG. 6a



EUROPEAN SEARCH REPORT

Application Number

EP 22 15 8259

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EPO FORM 1503 03.82 (P04C01)

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,D	EP 3 549 851 A1 (EXTENDER S R L [IT]) 9 October 2019 (2019-10-09) * figures 1-15 *	1, 8, 10	INV. B63B7/08 B63H20/10 B63H20/06
A	-----	2, 3, 5	
A	US 2006/223390 A1 (SILVA RICHARD F [US] ET AL) 5 October 2006 (2006-10-05) * figures 1-4 *	1-10	
A	----- EP 3 241 735 A1 (ULTRAFLEX SPA [IT]) 8 November 2017 (2017-11-08) * paragraphs [0084], [0085]; figures 9, 10 *	1-10	
A	----- US 4 077 353 A (WEBB JR LEWIS W) 7 March 1978 (1978-03-07) * figures 1-7 *	1	
A,D	----- GB 1 129 478 A (WESTERLY MARINE CONSTRUCTION L) 9 October 1968 (1968-10-09) * figures 1-4 *	1	TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 20 May 2022	Examiner Székely, Zsolt
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ON EUROPEAN PATENT APPLICATION NO.**

EP 22 15 8259

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