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(54) Winch and method for converting winch from manual to motorised

(57) A winch (100) for nautical use comprises a base (1) for fixing the winch (100) to a deck wall (200) of a boat, and the base (1) comprises: a bottom surface (10) intended to rest on the deck wall (200), a first fixing portion (11) for fixing the winch (100) to the deck wall (200), a second fixing portion (12) for fixing motor means (300) of the winch (100) to the base (1), and a main hole (13) for allowing the passage through the base (1) of a main shaft of the winch (100), said second fixing portion (12) and said main hole (13) being formed in portions of the base (1) not projecting below the bottom surface (10).

The winch 100 is also configured so that the main shaft is axially extractable from the winch (100) when it is in an operative configuration.

A method for converting the winch 100 from manual to motorised is also described.

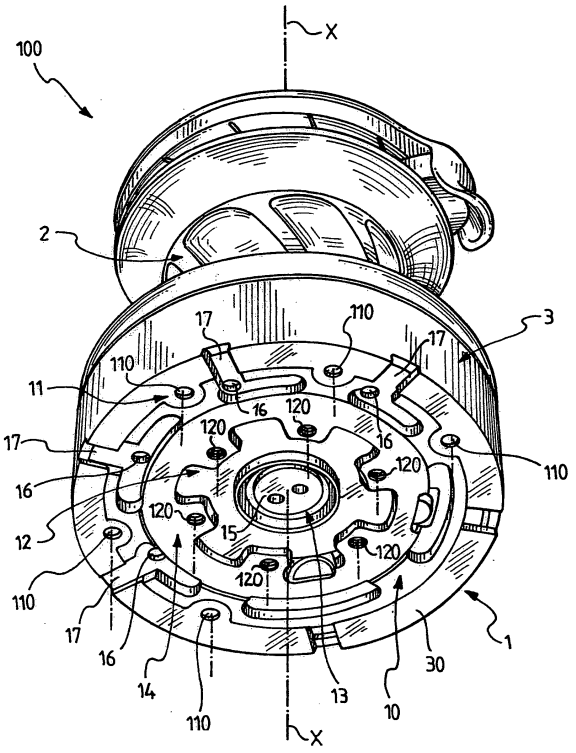

Fig.1

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Description

[0001] The present invention refers to a winch for nautical use configured to be easily converted from manual to motorised.

[0002] The invention also refers to a method for converting such a winch from manual to motorised.

[0003] The winches for nautical use are normally actuated either manually or in a motorised manner. In manually actuated winches the actuation force is provided by one or more members of the crew locally, through handles associated with each winch, or else remotely, through pedestals. In motorised winches the actuation force is on the other hand provided by suitable motor means, for example electric or hydraulic, associated with each winch. Such motor means are normally housed below the deck and can be activated through hand buttons or pedals provided above the deck.

[0004] Nowadays, above all on medium-large size sailing cruisers, the use of motorised winches is becoming increasingly popular and frequently there is also the need to convert, after the completion of the boat, manually actuated winches into motorised winches.

[0005] The conversion of known manually actuated winches into motorised winches requires a series of operations that involve a considerable amount of time and manpower.

[0006] In particular, it is normally necessary:

- to apply, between the base of the winch and the deck, an adapter plate for fixing the motor means to the winch, since the base of the winch does not allow directly fixing thereto the motor means, and
- to replace the main shaft of the winch with a main shaft configured for motorised actuation, in particular of sufficient length to allow the kinematic coupling with the motor means below the deck.

[0007] The need to arrange an adapter plate between the base of the winch and the deck necessarily requires the winch to be removed from the boat upon conversion and to be remounted once the adapter plate has been applied.

[0008] The replacement of the main shaft requires the gearbox of the winch to be disassembled to set free the main shaft, since generally in known winches the main shaft is equipped with toothed portions or support seats for pawls of freewheel mechanisms, which, in an assembled configuration of the winch, engage with the other gears of the winch gearbox, thus preventing the removal of the main shaft.

[0009] It is clear that both the removal of the winch from the deck and its subsequent remounting, and the disassembly and reassembly of the winch involve a substantial amount of time and manpower to convert known winches from manual to motorised, which amount increases proportionally to the number of conversions to be carried out.

[0010] The technical problem underlying the present invention is to provide a winch for nautical use, which, once installed on a boat, can be converted from manual to motorised in a simple manner and with a minimum amount of time and manpower, and a method to carry out such a conversion.

[0011] The present invention therefore refers to a winch for nautical use according to claims 1 and 15 and a to method for converting such a winch from manual to motorised according to claims 9 and 23. Preferred characteristics are indicated in the respective dependent claims.

[0012] In particular, in a first aspect thereof, the invention refers to a winch for nautical use comprising a base for fixing the winch to a deck wall of a boat, said base comprising:

- a bottom surface intended to rest on the deck wall, and
- a first fixing portion for the fixing of the winch to the deck wall,

characterised in that said base further comprises a second fixing portion for fixing motor means of the winch to the base and a main hole for the passage through the base of a main shaft of the winch, and in that the second fixing portion and the main hole are formed in portions of the base not projecting below said bottom surface.

[0013] Advantageously, since the base of the winch of the invention is also set up for the connection of motor means, it is not necessary to use an adapter plate to allow such a connection and, consequently, the conversion of the winch from manual to motorised can be carried out without removing the winch from the deck and operating from just one side of the deck, namely below the deck. The conversion of the winch of the invention from manual to motorised can thus be carried out quickly and with a minimum use of manpower at any time, even after its installation on the boat.

[0014] Moreover, the installation on the boat of a winch of the invention when manual actuation is foreseen does not requires additional operations or processing in the deck wall and can be carried out exactly as that of manual winches of the prior art. This is advantageously possible thanks to the second fixing portion for the motor means and the main hole for the main shaft not projecting below the bottom surface of the base of the winch.

[0015] In a preferred embodiment of the winch of the invention the first and second fixing portion are integrally formed in said base.

[0016] In alternative preferred embodiments it is in any case possible that, for design reasons, at least one from the first and second fixing portion is formed in an element structurally distinct from the base.

[0017] In a preferred embodiment of the winch of the invention the first and second fixing portion are annular shaped and the second fixing portion is substantially concentric with respect to the first fixing portion.

[0018] In another preferred embodiment of the winch of the invention the first and second fixing portion are annular shaped and the second fixing portion is eccentric with respect to the first fixing portion.

[0019] These two constructive solutions advantageously allow the concepts of the invention to be applied both in winches where the main shaft is coaxial with the rotation axis of the winch, and thus, typically, concentric with respect to the base of the winch, and in winches where the main shaft has a coupling portion with gears of the winch not coaxial with the rotation axis of the winch (for example when crankshafts are used as main shafts), and therefore eccentric with respect to the base.

[0020] Preferably, the base of the winch comprises a recessed portion with respect to the bottom surface, which recessed portion has a predetermined perimeter and is adapted to define a seat for a sealing gasket between said base and said deck wall, and the second fixing portion and the main hole are formed inside the perimeter of such a recessed portion.

[0021] The sealing gasket ensures the seal of the deck at the opening formed, either before the installation of the winch or upon converting the winch from manual to motorised, in the deck wall at the mounting seat of the winch to allow the coupling of the motor means with the base of the winch. The recessed seat allows the sealing gasket to be positioned already upon installation of the winch on the deck and even if manual actuation is initially foreseen - and therefore the aforementioned opening is not necessarily present -, without this interfering in any way with the positioning and/or fixing of the winch at its mounting seat.

[0022] The recessed portion and the sealing gasket received in it can cover the entire area of the base of the winch in which the second fixing portion and the main hole are formed or else, when an O-ring is used, can have a substantially annular shape enclosing the aforementioned area.

[0023] Preferably, the second fixing portion comprises a plurality of holes, and, in a configuration of the winch suitable for manual actuation, the main hole and the holes of the second fixing portion are closed.

[0024] This is advantageous when the aforementioned sealing gasket does not cover the entire area of the base of the winch in which the second fixing portion and the main hole are formed and therefore, if the opening for the coupling of the motor means is already formed in the deck wall in view of a subsequent conversion of the winch from manual to motorised, it is essential to close any possible water passage route from inside the winch towards such an opening.

[0025] In particular, preferably, the base of the winch comprises a diaphragm adapted to close the main hole, said diaphragm being removable or perforable.

[0026] Such a diaphragm can be defined by a bottom wall of the main hole, should this be originally formed as a blind hole, or by an element, for example a closing cap or disc, applied to the main hole, should it be originally formed as a through hole.

[0027] In any case, the diaphragm preferably has a thickness and consistency such as to be easily removed or perforated upon conversion of the winch from manual to motorised, in particular by means of an end of the main shaft configured for motorised actuation, that is intended to come out from the base of the winch through the main hole. In this way, advantageously, the seal from the main hole towards the deck is ensured in the configuration with manual actuation and, at the same time, the replacement of the main shaft upon conversion of the winch can be carried out without the need for further tool-operated boring in the base.

[0028] In a second aspect thereof, the invention refers to a method for converting from manual to motorised a winch for nautical use having the characteristics outlined above, where the winch is fixed to a deck wall of a boat at a respective mounting seat by means of said first fixing portion, said method comprising the steps of:

a) providing an opening at the mounting seat for accessing, from below the deck wall, to the second fixing portion and to the main hole formed in the base of the winch;

b) associating, from below the deck wall, motor means with the base of the winch, so as to establish a kinematic connection between the motor means and a longitudinal end portion of the main shaft of the winch projecting outside of said base through said main hole;

c) fixing, from below the deck wall, the motor means to the base of the winch at said second fixing portion.

[0029] According to this method the conversion of a winch from manual to motorised can be carried out with the winch mounted on the deck and acting just from one side of the deck. As already outlined with reference to the first aspect of the invention, this advantageously allows the amount of time and manpower necessary for the conversion to be minimised.

[0030] In a preferred embodiment of the method, step a) of providing said opening comprises forming a through hole in the deck wall in a processing step of the deck prior to the fixing of the winch to said deck wall.

[0031] The opening in the deck wall for the connection of the motor means to the base of the winch is in this case advantageously formed at the same time as the other boring operations carried out on the deck in a preparation step of the boat, for example through numerical control milling machines.

[0032] In another preferred embodiment of the method, step a) of providing said opening comprises forming a through hole in the deck wall when the winch is already fixed to said deck wall.

[0033] In this case the deck wall at the assembly seat of the winch is left untouched until the winch is used in manual configuration, avoiding possible seal problems of the deck deriving from the presence of the opening,

or the need to arrange suitable gaskets to ensure the seal. On the other hand, the formation of a through hole when the winch is already fixed to the deck wall must be carried out individually from below the deck and requires special attention not to damage the base of the winch and have a correct centring with respect to it.

[0034] In a further preferred embodiment of the method, step a) of providing said opening comprises removing or perforating, upon converting the winch, a portion of reduced thickness of said deck wall formed at said mounting seat.

[0035] This option allows the advantages of the two alternative embodiments mentioned above to be achieved simultaneously, but requires special processing of the deck at the time of its manufacture (for example, so-called "skin to skin" processing in some points of the deck).

[0036] Preferably, particularly in cases in which the opening in the deck wall is formed in advance, a sealing gasket is arranged between the base of the winch and the deck wall, and the method further comprises, before said step b) of associating the motor means, the step of removing, from below the deck wall, a portion of said sealing gasket that covers the second fixing portion and the main hole in the base of the winch.

[0037] Preferably, the holes of the second fixing portion and/or the main hole in the base of the winch are closed, and the method further comprises, before said step b) of associating the motor means, the step of opening said holes of the second fixing portion and/or said main hole by means of perforation or removal of material.

[0038] In a third aspect thereof, the invention refers to a winch for nautical use comprising:

- a base for the fixing the winch to a deck wall of a boat;
- a drum rotatable with respect to said base, and
- a main shaft kinematically connected, in an operative configuration of the winch, to said rotatable drum through a plurality of gears,

characterised in that in said operative configuration the main shaft is axially extractable from the winch.

[0039] In the present description and the subsequent claims, the expression: operative configuration of the winch, is used to indicate a configuration in which the winch, possibly also partially disassembled, is in any case able to operate, i.e. to transmit torque from the main shaft to the drum.

[0040] In the winch of the invention a removal of the main shaft can advantageously take place without having to disassemble the gearbox of the winch. This allows a substantial saving in time and manpower in the conversion operations of the winch from manual to motorised, which operations, as explained above, normally also require replacement of the shaft configured for manual actuation with a shaft configured for motorised actuation.

[0041] In particular, the winch comprises a support body of the drum adapted to cooperate with said base to contain said plurality of gears, and preferably the main shaft is axially extractable from the winch in a configuration thereof in which said support body is associated with said base.

[0042] Preferably, the main shaft comprises a grip portion at a first longitudinal end for extraction from the winch, and a first coupling portion for coupling with gears of said plurality of gears, and the maximum cross section of the first coupling portion does not extend beyond the maximum cross section of the grip portion.

[0043] This characteristic advantageously ensures the possibility of extracting the main shaft without having to disassemble the winch.

[0044] Preferably, the first coupling portion has a lateral surface with at least one longitudinally extended surface discontinuity.

[0045] More preferably, said lateral surface comprises flat faces.

[0046] This advantageously allows a shape coupling with the gears intended to couple with the main shaft for torque transmission to be easily obtained.

[0047] Preferably, in a configuration of the winch suitable for manual actuation, the longitudinal end of the main shaft opposite said first longitudinal end is completely contained in the winch.

[0048] Preferably, in a configuration of the winch suitable for motorised actuation, the longitudinal end of the main shaft opposite said first longitudinal end comprises a second coupling portion projecting outside the base of the winch for coupling with motor means.

[0049] Preferably, the gears of said plurality of gears intended to couple with the main shaft are provided with centring bushings for the centring thereof in respective seats in the winch.

[0050] Advantageously this allows the correct positioning of such gears to be maintained even when the main shaft is extracted from the winch.

[0051] In a fourth aspect thereof, the invention refers to a method for converting a winch for nautical use from manual to motorised having the characteristics outlined above, where the winch is fixed to a deck wall of a boat at a respective mounting seat, which method comprises the step of replacing a main shaft for manual actuation with a main shaft for motorised actuation, and is characterised in that said replacement step comprises extracting the main shaft for manual actuation axially from the winch in said operative configuration and inserting the main shaft for motorised actuation.

[0052] According to this method the replacement of the main shaft upon converting a winch from manual to motorised can be carried out without disassembling the winch. As already outlined with reference to the third aspect of the invention, this advantageously allows the amount of time and manpower necessary for the conversion to be minimised.

[0053] Preferably, the extraction of the main shaft for manual actuation and the insertion of the main shaft for motorised actuation are carried out from the top of the

winch.

[0054] Further characteristics and advantages of the present invention shall become clearer from the following detailed description of some preferred embodiments thereof, made hereafter, for indicating and not limiting purposes, with reference to the attached drawings. In such drawings:

- figure 1 is a schematic perspective view from below of a winch for nautical use according to the invention, in a configuration for manual actuation;
- figure 2 is a schematic perspective view with parts partially removed of the winch of figure 1, shown exploded with respect to a mounting seat on a deck wall of a boat;
- figure 3 is a schematic view in partial longitudinal section of the winch of figure 1 fixed to the deck wall of figure 2;
- figure 3a is a view corresponding to the view of figure 3, which shows an alternative embodiment of a detail of the winch;
- figure 4 is a schematic perspective view of the winch of figure 1 in a configuration for motorised actuation, fixed to the deck wall of figure 2 and with the motor means shown exploded;
- figure 5 is a schematic view in partial longitudinal section of the winch of figure 4 completely assembled;
- figure 6 is a schematic perspective view of a main shaft for manual actuation of the winch of figure 1;
- figure 7 is a schematic perspective view of a main shaft for motorised actuation of the winch of figure 1.

[0055] In such figures reference numeral 100 globally indicates a winch for nautical use according to the invention. The winch 100 can be configured for manual actuation (see figures 1, 3 and 3a) or for motorised actuation (see figures 4 and 5).

[0056] The winch 100 essentially comprises a base 1 for fixing it to a deck wall 200 of a boat (shown partially and schematically in figures 2-5) and a drum 2 rotatable with respect to the base 1 about a rotation axis X-X.

[0057] The base 1 comprises a bottom surface 10 intended to rest on the deck wall 200 when the winch is mounted on the boat, and is covered by a removable annular cover element 3, preferably made of elastomeric material. The cover element 3 is provided, at the perimeter of its bottom end, with a flap 30 adapted to cooperate perimetrically in abutment with an edge portion, preferably recessed, of the bottom surface 10.

[0058] The drum 2 is kinematically connected in a known way to a main shaft 4 (or 4') for motion input through a plurality of gears 5 (see figures 3 and 5). The specific shape and arrangement of the gears 5 can vary according to the type of winch and in any case it is not relevant for the purposes of the present invention. The gears 5 are conventionally contained in a space defined by the base 1 and by a support body 8 of the drum 2, removably associated with the base 1.

[0059] The base 1 comprises a first fixing portion 11 for fixing the winch 100 to the deck wall 200 at a respective mounting seat 201. The first fixing portion 11 has the shape of an annular flange substantially concentric with the base 1 and having a plurality of through holes 110 in the base 1. Corresponding holes 202 at the mounting seat 201 (see figure 2) on the deck wall 200 allow the removable fixing of the winch 100 to the deck wall 200 by means of bolts 111 or other conventional fastening elements, as can be seen in particular in figures 3, 3a and 5.

[0060] The base 1 further comprises a second fixing portion 12 for fixing thereto motor means 300 for the motorised actuation of the winch 100, and a main hole 13 adapted to allow the passage of a main shaft 4' for the motorised actuation of the winch 100. The second fixing portion 12 and the main hole 13 are formed in portions of the base 1 not projecting below the bottom surface 10 (see figure 1).

[0061] The second fixing portion 12 is formed at a radially inner position with respect to the first fixing portion 11 and has the shape of an annular flange around the main hole 13 with a plurality of through holes 120 in the base 1.

[0062] The position of the second fixing portion 12 with respect to the first fixing portion 11 in the base 1 depends on the internal configuration of the winch 100. In the winch type shown in the figures, since the main shaft 4 or 4' is coaxial with the rotation axis X-X, and therefore concentric with respect to the base 1, the second fixing portion 12 is also concentric with respect to the first fixing portion 11. In other winch types the main shaft 4 or 4' has a coupling portion 40 with the gears 5 not coaxial with the rotation axis X-X and therefore eccentric with respect to the base. In these cases the second fixing portion 12 shall be correspondingly eccentric with respect to the first fixing portion 11.

[0063] Moreover, in the preferred embodiments of the winch 100 shown here the first and second fixing portion 11, 12 are integrally formed with the base 1. However, alternative embodiments in which one or both of such fixing portions 11, 12 are formed in elements structurally distinct from the base 1 and associated therewith are not excluded.

[0064] The base 1 preferably further comprises a recessed portion 14 adapted to define a seat for a sealing gasket 6 arranged between the base 1 and the deck wall 200, and the second fixing portion 12 and the main hole 13 are formed in the base 1 inside the perimeter of the recessed portion 14 (see figure 1).

[0065] The sealing gasket 6 has the function of preventing the possible passage of water below the deck when at the assembly seat 201 of the winch 100 an opening 203 is formed for connecting the motor means 300 to the base 1 (see figures 4 and 5). Therefore, the sealing gasket 6 and the respective seat in the base 1 must extend at least on an annular area that contains the afore-

mentioned opening 203.

[0066] The sealing gasket 6 is in any case of conventional type and its cross section and surface extension - which determine the cross section and surface extension of the recessed portion 14 in the base 1 - can be selected by the skilled in the art based upon the contingent requirements. Figure 5 shows an embodiment in which the sealing gasket 6 is a flat gasket for flanges, whereas figure 3a shows an alternative embodiment in which the sealing gasket 6 is an O-ring.

[0067] In a preferred embodiment (see figures 1, 2, 3, 4 and 5) the recessed portion 14 has a surface extension such as to be able to receive a sealing gasket 6 shaped like a disc 60 (shown in particular in figures 2 and 3) suitable for covering the entire extension of the opening 203 in the deck wall 200. The use of a sealing gasket 6 of this type has the advantage of ensuring a complete seal at the assembly seat 201 when the winch 100 is used in manual configuration and in the deck wall 200 the opening 203 is already formed in view of a possible future conversion of the winch 100 from manual to motorised. In this condition (not shown in the figures) it is indeed necessary to avoid the passage of water below the deck through the opening 203 not only perimetrically, but also from the inside of the winch 100, through the holes 120 of the second fixing portion 12 and the main hole 13 formed in the base 1.

[0068] Upon a subsequent conversion of the winch 100 from manual to motorised, the central portion of the disc 60, indicated with a dashed edge in figure 2, can easily be removed by operating from below the deck wall 200 and without the need to remove the winch 100 from the deck.

[0069] When the winch 100 is used in manual configuration and the opening 203 is already formed in the deck wall 200, to ensure a complete seal at the assembly seat 201, in addition or alternatively to the use of a disc-shaped sealing gasket 6 it is provided for the holes 120 of the second fixing portion 12 and the main hole 13 in the base 1 to be closed. In order to make it easier to open such holes upon converting the winch 100 from manual to motorised, the holes 120 are preferably closed by applying an easily removable sealing material, for example silicon, whereas the main hole 13 is preferably closed by applying a removable or perforable diaphragm 15 (see figures 1 and 3). However, it is not excluded the possibility that such holes 120 and 13 are formed in the base 1 as blind holes that are then opened through perforation upon converting the winch 100 from manual to motorised, again without the need to remove the winch 100 from the deck wall 200.

[0070] Of course, the closing of the aforementioned holes is essential when the winch 100 is used in manual configuration and in the deck wall 200 the opening 203 is already formed, and the sealing gasket 6 is not disc-shaped but just annular, as described above.

[0071] In a radially outer portion of the base 1 with respect to the recessed portion 14, and therefore with respect to the sealing gasket 6, one or more drain holes 16 are preferably formed for draining water from inside the winch 100. The holes 16 communicate with drain channels 17, which are preferably defined by further portions recessed with respect to the bottom surface 10 of the base 1 and reach the outer perimeter thereof.

[0072] The main shaft 4 or 4' of the winch 100 is axially extractable from the winch 100 even when it is in an operative configuration, i.e. when its components are assembled at least to an extent that allows the torque transmission from the main shaft 4 or 4' to the drum 2.

[0073] A main shaft 4 for the manual actuation of the winch 100 and a main shaft 4' for the motorised actuation of the winch 100 are respectively shown in figures 6 and 7. From such figures it can be seen that, to make the aforementioned axial extractability possible, the maximum cross section of the coupling portion 40 with the gears 5 does not extend beyond the maximum cross section of a grip portion 41 for the extraction of the shaft 4 or 4' from the winch 100, defined at a first longitudinal end of the shaft 4 or 4'.

[0074] In the preferred embodiments illustrated here, the lateral surface of the coupling portion 40 comprises flat faces 42 connected through rounded corners 43. The base profile is preferably square, but any base profile with flat faces can be used.

[0075] The main shaft 4 has a length such that, when mounted in the winch 100, a second longitudinal end thereof, opposite the aforementioned first longitudinal end, is completely contained in the winch 100 (see figure 3).

[0076] The main shaft 4', on the other hand, comprises, at its second longitudinal end, a second coupling portion 44' for coupling with the motor means 300. Such a second coupling portion 44', when the shaft 4' is mounted in the winch 100, projects outside the base 1 (see figure 5). Preferably also the second coupling portion 44' has a lateral surface with parallel flat faces with rounded corners, more preferably with a square-based profile.

[0077] Both the main shaft 4 and the main shaft 4' when mounted in the winch 100 couple through shape coupling at the first longitudinal end with a coupling bushing 7 for a handle or other tool (not shown) for the manual actuation of the winch 100 (see figures 3 and 5).

[0078] In order to avoid undesired axial displacements of the gears 5 directly coupled with the main shaft 4 or 4' when it is extracted from the winch 100, such gears 5 have been provided with centring bushings 50 that engage with respective centring seats in the winch 100 and thus ensure the correct positioning of the gears 5 irrespective of the presence of the shaft 4 or 4'.

[0079] Thanks to the characteristics of the winch 100 described above it is possible to carry out its conversion from manual to motorised in a simple and fast manner at any time even after its installation on the boat, without needing to remove it from the deck wall 200 and having to disassemble it, as shall become clear from the following description of a preferred way of carrying out the con-

version method of the invention, made with reference to figures 3, 4 and 5.

[0080] Firstly, the conversion method requires forming, at the mounting seat 201 of the winch 100, the opening 203 to access, from below the deck wall 200, to the second fixing portion 12 and to the main hole 13 formed in the base 1 of the winch 100.

[0081] This essentially involves the perforation of the deck wall 200 and can be carried out either before the fixing of the winch 100 to the deck wall 200, typically in a processing step of the deck during the preparation of the boat, or when the winch 100 is already fixed to the deck wall 200 and it is desired to convert it from manual to motorised. In this second case the perforation operations are carried out from below the deck wall 200.

[0082] The following description refers, as an example, to the case where the opening 203 is formed when the winch 100 is already fixed to the deck wall 200.

[0083] Figures 2 and 3 show in particular a configuration of the deck wall 200 in which, at the mounting seat 201, there is a portion of reduced thickness 204 having a shape corresponding to the opening 203 to be formed. Portions of reduced thickness in the deck wall 200 can be formed during the manufacture of the deck for example through a so-called "skin to skin" process known to those skilled in the art. In this case, the perforation of the deck wall 200 is limited to the perforation or removal of the portion of reduced thickness 204, that can be carried out also manually without effort. In the most general case, on the other hand, it shall be necessary to bore the entire thickness of the deck wall 200 and for this purpose suitable tools shall be used, like hollow cutters.

[0084] After providing the opening 203 as described above, further operations may be necessary to make the second fixing portion 12 and the main hole 13 in the base 1 of the winch 100 accessible and functional.

[0085] In particular, in the example illustrated here, it is necessary to remove a central portion of the disc 60 defining the sealing gasket 6, to make the second fixing portion 12 and the main hole 13 accessible. This is preferably achieved by cutting, from below the deck wall 200, the disc 60 along the perimeter of the opening 203. It is then necessary to open the main hole 13, removing or perforating the diaphragm 15, and possibly the holes 120, removing the sealing material previously introduced therein to close them temporarily.

[0086] Subsequently, the main shaft 4 for manual actuation is replaced with the main shaft 4' for motorised actuation. Thanks to the characteristics of the winch 100 described above, such a replacement is carried out by extracting the main shaft 4 axially from the top of the winch 100 and inserting the main shaft 4', without the need to disassemble the winch 100, save for removing the coupling bushing 7. In particular, the replacement of the main shaft 4 does not require the removal of the support body 8 of the drum 2 from the base 1 in order to expose or free the gears 5, as necessary, on the contrary, in prior art winches.

[0087] It shall be noted that, if it is necessary to open the main hole 13 as explained above, this operation can also be carried out at the same time as the replacement of the main shaft. If, indeed, the diaphragm 15 that closes the main hole 13 has a limited thickness, it can easily be perforated by means of the longitudinal end of the main shaft 4' intended to project outside of the base 1, when the main shaft 4' is positioned in its seat in the winch 100.

[0088] After the main shaft 4' has been positioned in its seat, from below the deck wall 200 a sealing gasket 18, for example a lip seal, is preferably applied between the main shaft 4' and the main hole 13.

[0089] The configuration of the base 1 of the winch 100 and of the deck wall 200 at the end of the operations described above is represented in figure 4, in a view from below the deck wall 200.

[0090] At this point, the motor means 300 can be associated with the base 1 of the winch 100. By operating from below the deck wall 200, a fixing portion 301 of the motor means 300 is brought into contact with the base 1 of the winch 100 through the opening 203, so as to establish a kinematic connection of the motor means 300 with the main shaft 4' at its second coupling portion 44' that projects outside of the base 1 (see figure 5). The motor means 300 are then fixed to the base 1 of the winch 100 at the second fixing portion 12 by means of screws 112 or other threaded fastening elements, as shown in figures 4 and 5.

Claims

1. Winch (100) for nautical use comprising a base (1) for fixing the winch (100) to a deck wall (200) of a boat, said base (1) comprising:

   - a bottom surface (10) intended to rest on said deck wall (200), and
   - a first fixing portion (11) for fixing the winch (100) to the deck wall (200),

   characterised in that said base (1) further comprises a second fixing portion (12) for fixing motor means (300) of the winch (100) to the base (1) and a main hole (13) for the passage through the base (1) of a main shaft (4; 4') of the winch (100), and **in that** said second fixing portion (12) and said main hole (13) are formed in portions of said base (1) not projecting below said bottom surface (10).

2. Winch (100) according to claim 1, wherein said first and second fixing portion (11, 12) are integrally formed in said base (1).

3. Winch (100) according to claim 1, wherein at least one from said first and second fixing portion (11, 12) is formed in an element structurally distinct from said base.

4. Winch (100) according to any one of the previous claims, wherein said first and second fixing portion (11, 12) are annular shaped and said second fixing portion (12) is substantially concentric with respect to said first fixing portion (11).

5. Winch (100) according to any one of claims 1 to 3, wherein said first and second fixing portion (11, 12) are annular shaped and said second fixing portion (12) is eccentric with respect to said first fixing portion (11).

6. Winch (100) according to any one of the previous claims, wherein said base (1) comprises a recessed portion (14) with respect to said bottom surface (10), said recessed portion (14) having a predetermined perimeter and being adapted to define a seat for a sealing gasket (6) between said base (1) and said deck wall (200), and wherein said second fixing portion (12) and said main hole (13) are formed inside the perimeter of said recessed portion (14).

7. Winch (100) according to any one of the previous claims, wherein said second fixing portion (12) comprises a plurality of holes (120) and wherein, in a configuration of the winch (100) suitable for manual actuation, said main hole (13) and the holes (120) of said second fixing portion (12) are closed.

8. Winch (100) according to claim 7, wherein said base (1) comprises a diaphragm (15) adapted to close said main hole (13), said diaphragm (15) being removable or perforable.

9. Method for converting from manual to motorised a winch (100) for nautical use according to any one of claims 1 to 8, where the winch (100) is fixed to a deck wall (200) of a boat at a respective mounting seat (201) by means of said first fixing portion (11), said method comprising the steps of:

a) providing an opening (203) at said mounting seat (201) for accessing, from below said deck wall (200), to said second fixing portion (12) and to said main hole (13) formed in the base (1) of the winch;
b) associating, from below said deck wall (200), motor means (300) with said base of the winch, so as to establish a kinematic connection between said motor means (300) and a longitudinal end portion (44') of a main shaft (4') of the winch (100) projecting outside from said base (1) through said main hole (13);
c) fixing, from below said deck wall (200), said motor means (300) to the base (1) of the winch (100) at said second fixing portion (12).

10. Method according to claim 9, wherein said step a) of providing said opening (203) comprises forming a through hole in said deck wall (200) in a processing step of the deck prior to the fixing of the winch (100) to the deck wall (200).

11. Method according to claim 9, wherein said step a) of providing said opening (203) comprises forming a through hole (13) in said deck wall (200) when the winch (100) is already fixed to the deck wall (200).

12. Method according to claim 11, wherein said step a) of providing said opening (203) comprises removing or perforating, upon converting the winch (100), a portion of reduced thickness (204) of said deck wall (200) formed at said mounting seat (201).

13. Method according to any one of claims 9 to 12, wherein between the base (1) of the winch (100) and the deck wall (200) a sealing gasket (6; 60) is arranged, further comprising, before said step b) of associating the motor means (300), the step of removing, from below said deck wall (200), a portion of said sealing gasket (6; 60) that covers said second fixing portion (12) and said main hole (13) in the base (1) of the winch (100).

14. Method according to any one of claims 9 to 13, wherein holes (120) of said second fixing portion (12) and/or said main hole (13) in the base (1) of the winch (100) are closed, further comprising, before said step b) of associating the motor means (300), the step of opening said holes (120) of the second fixing portion (12) and/or said main hole (13) by means of perforation or removal of material.

15. Winch (100) for nautical use comprising:

- a base (1) for fixing the winch (100) to a deck wall (200) of a boat;
- a drum (2) rotatable with respect to said base (1), and
- a main shaft (4; 4') kinematically connected, in an operative configuration of the winch (100), to said rotatable drum (2) through a plurality of gears (5),

characterised in that in said operative configuration said main shaft (4; 4') is axially extractable from the winch (100).

16. Winch (100) according to claim 15, comprising a support body (8) of the drum (2) adapted to cooperate with said base (1) to contain said plurality of gears (5), wherein said main shaft (4; 4') is axially extractable from the winch (100) in a configuration of the winch in which said support body (8) is associated with said base (1).

17. Winch (100) according to claim 15 or 16, wherein said main shaft (4; 4') comprises a grip portion (41) at a first longitudinal end for the extraction from the winch, and a first coupling portion (40) for coupling with gears of said plurality of gears (5), wherein the maximum cross section of said first coupling portion (40) does not extend beyond the maximum cross section of said grip portion (41).

18. Winch (100) according to any one of claims 15 to 17, wherein said main shaft (4; 4') comprises a first coupling portion (40) for coupling with gears of said plurality of gears (5), said first coupling portion (40) having a lateral surface with at least one longitudinally extended surface discontinuity.

19. Winch (100) according to claim 18, wherein the lateral surface of said first coupling portion (40) comprises flat faces (42).

20. Winch (100) according to any one of claims 15 to 19, wherein said main shaft (4) comprises a grip portion (41) at a first longitudinal end for the extraction from the winch (100), and wherein, in a configuration of the winch (100) suitable for manual actuation, the longitudinal end of the main shaft (4) opposite said first longitudinal end is completely contained in the winch (100).

21. Winch according to any one of claims 15 to 19, wherein said main shaft (4') comprises a first grip portion (41) at a longitudinal end thereof for the extraction from the winch (100), and wherein, in a configuration of the winch (100) suitable for motorised actuation, the longitudinal end of the main shaft (4') opposite said first longitudinal end comprises a second coupling portion (44') projecting outside said base (1) for coupling with motor means (300).

22. Winch (100) according to any one of claims 15 to 21, wherein the gears of said plurality of gears (5) intended to couple with said main shaft (4; 4') are provided with centring bushings (50) for the centring thereof in respective seats in the winch (100).

23. Method for converting from manual to motorised a winch (100) for nautical use according to any one of claims 15 to 21, where the winch (100) is fixed to a deck wall (200) of a boat at a respective mounting seat (201), said method comprising the step of replacing a main shaft (4) for manual actuation with a main shaft (4') for motorised actuation, **characterised in that** said replacement step comprises extracting said main shaft (4) for manual actuation axially from the winch (100) in said operative configuration and inserting said main shaft (4') for motorised actuation.

24. Method according to claim 23, wherein the extraction of the main shaft (4) for manual actuation and the insertion of the main shaft (4') for motorised actuation are carried out from the top of the winch (100).

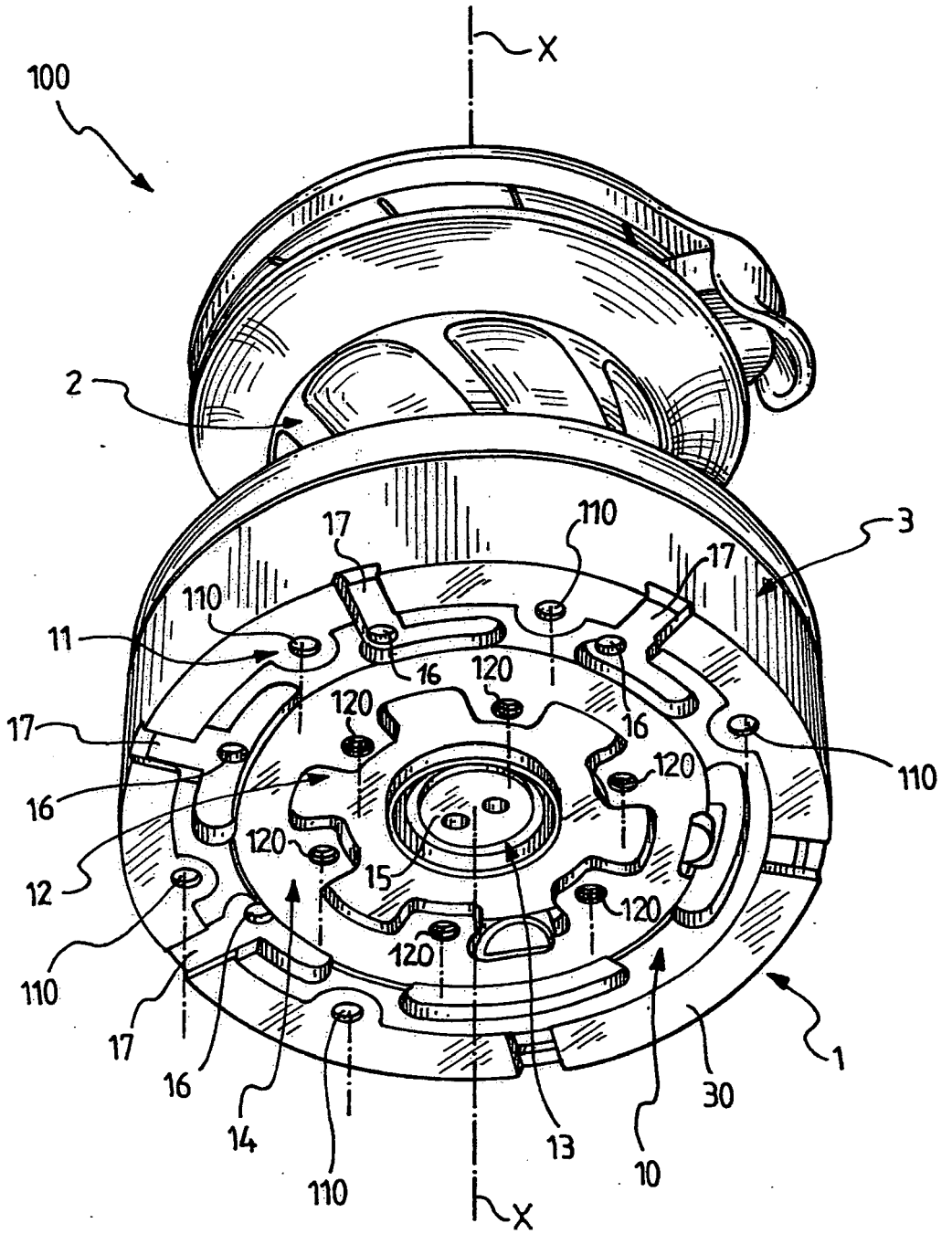


Fig.1

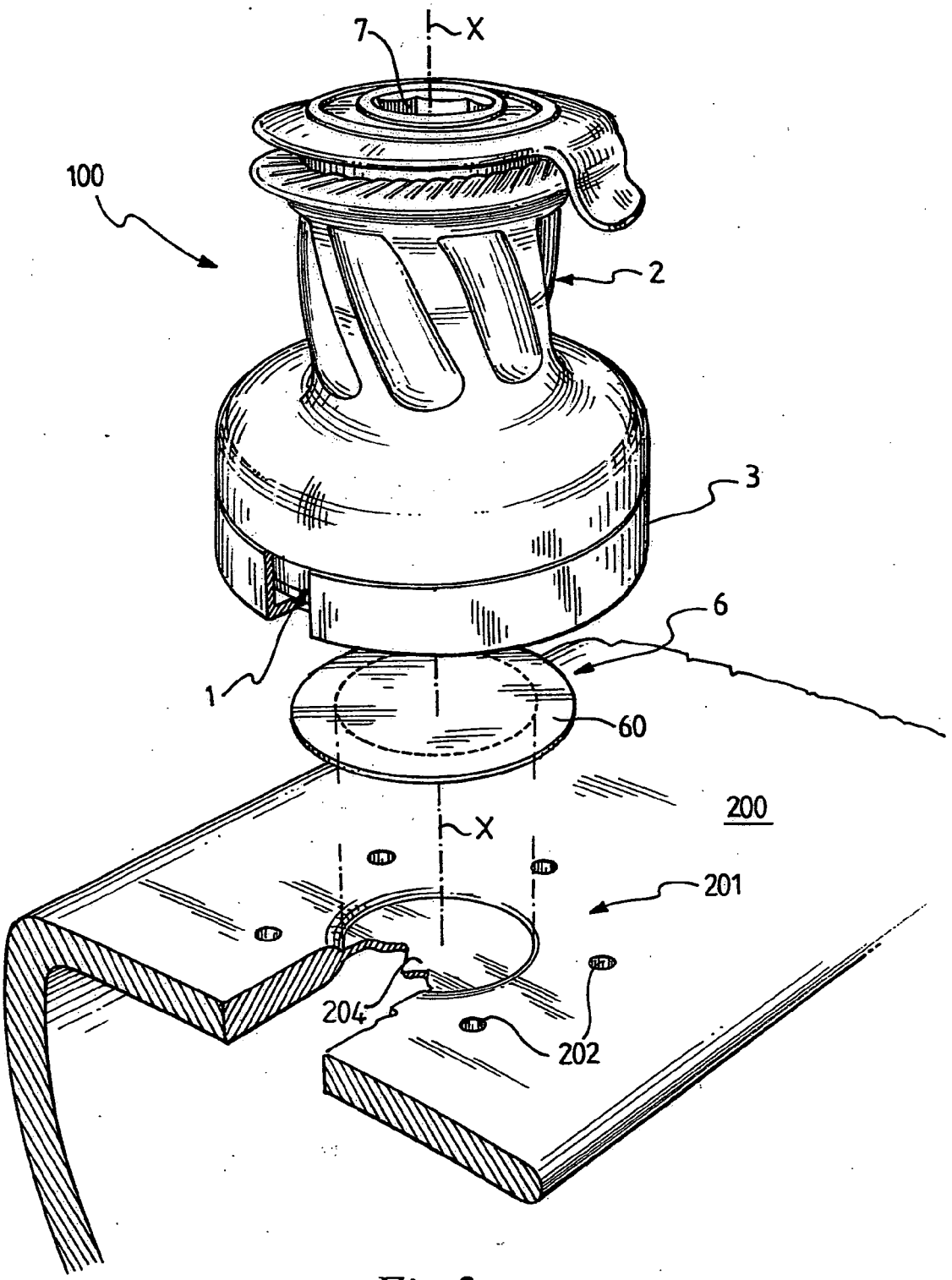
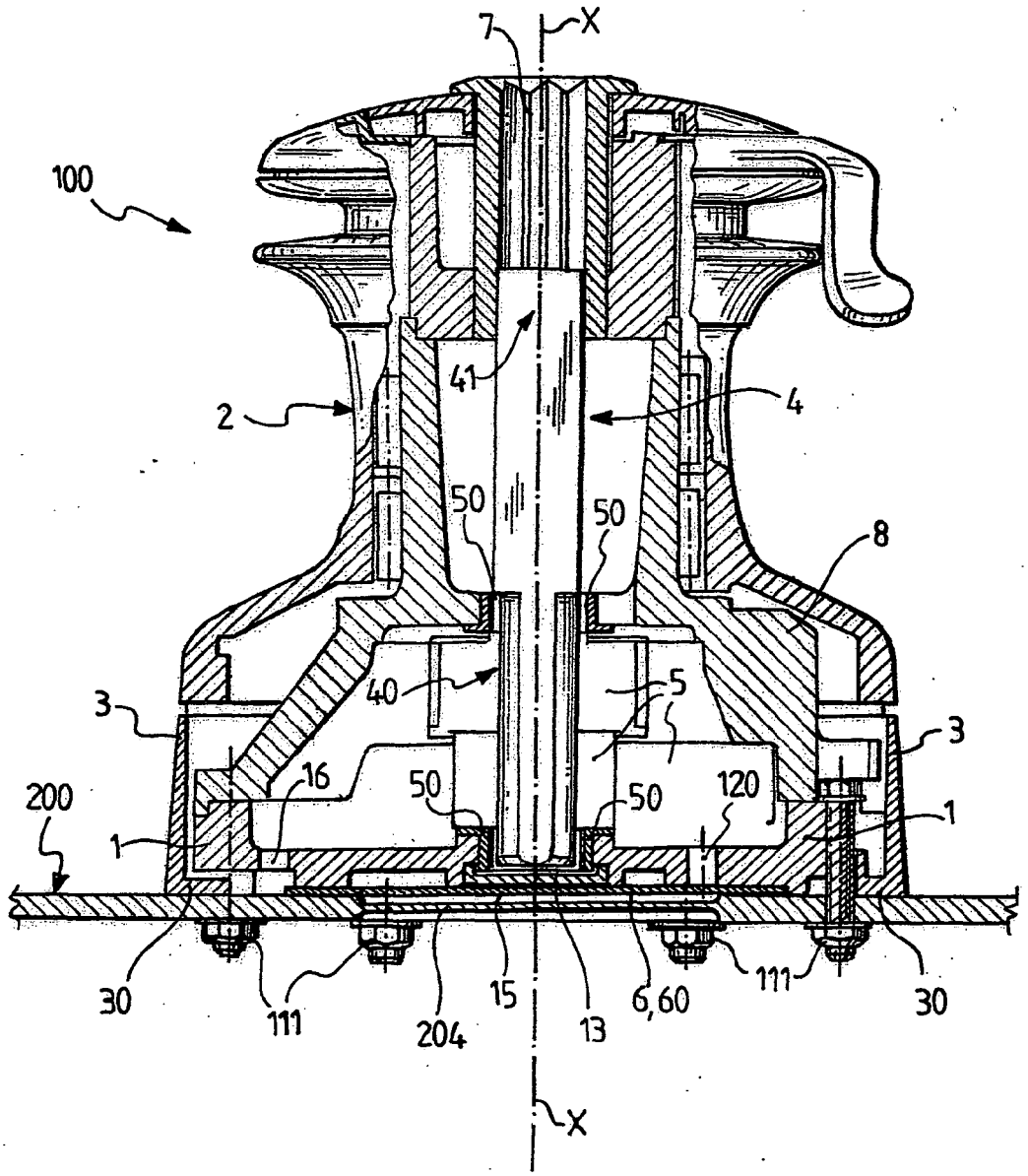


Fig.2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5
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120
200
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111
204
15
13
6,60
111
30
X

Fig.3

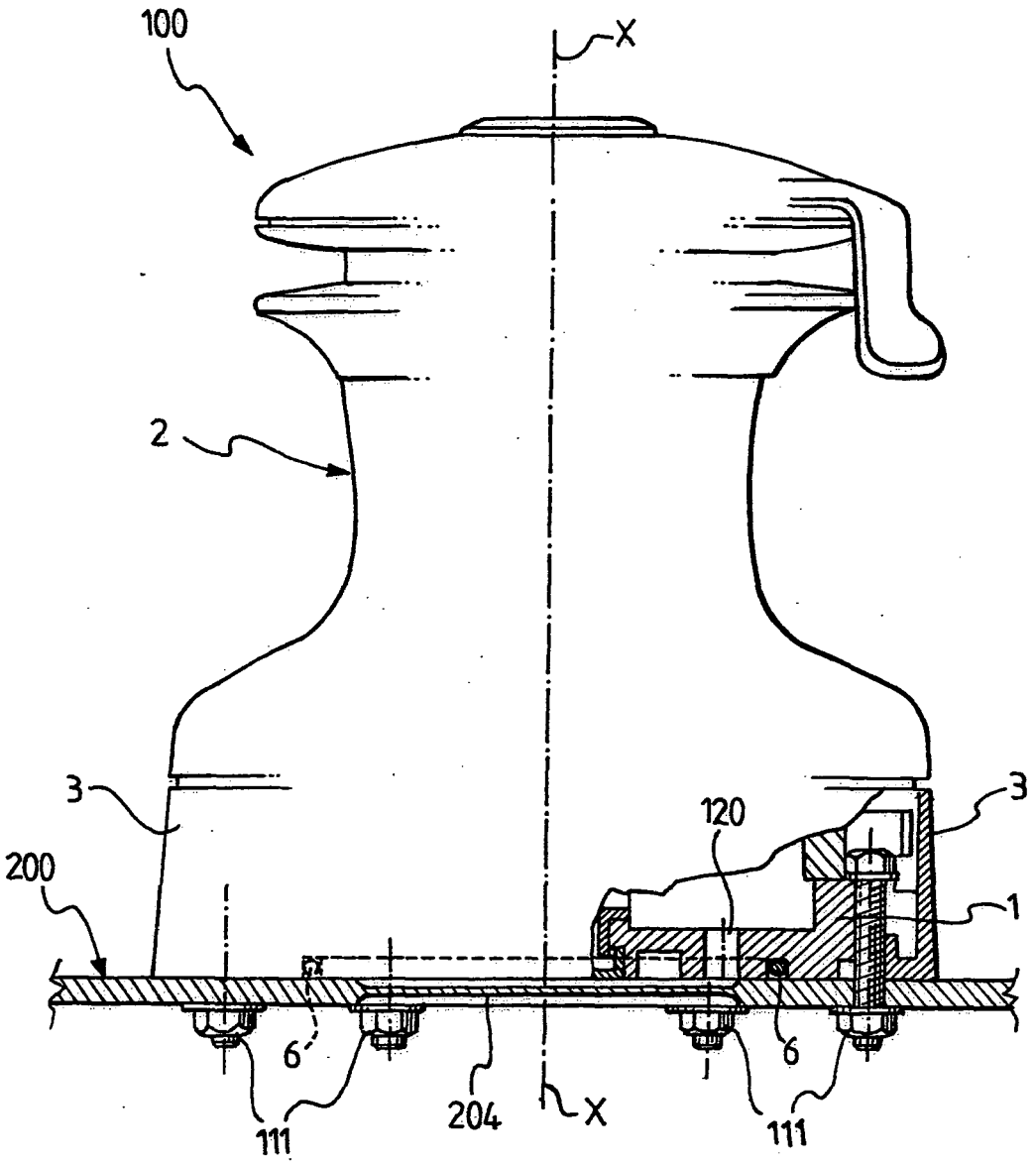


Fig.3a

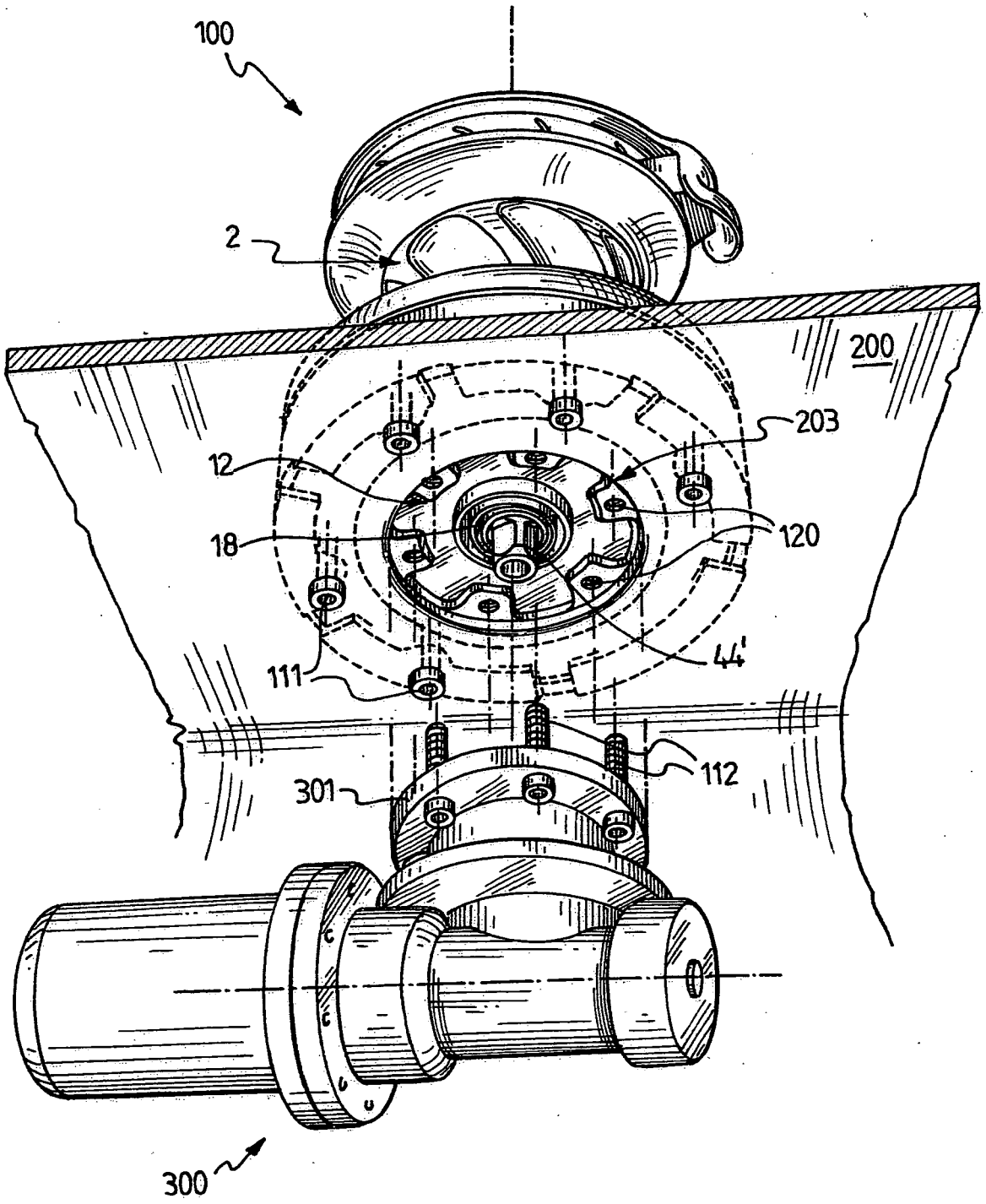
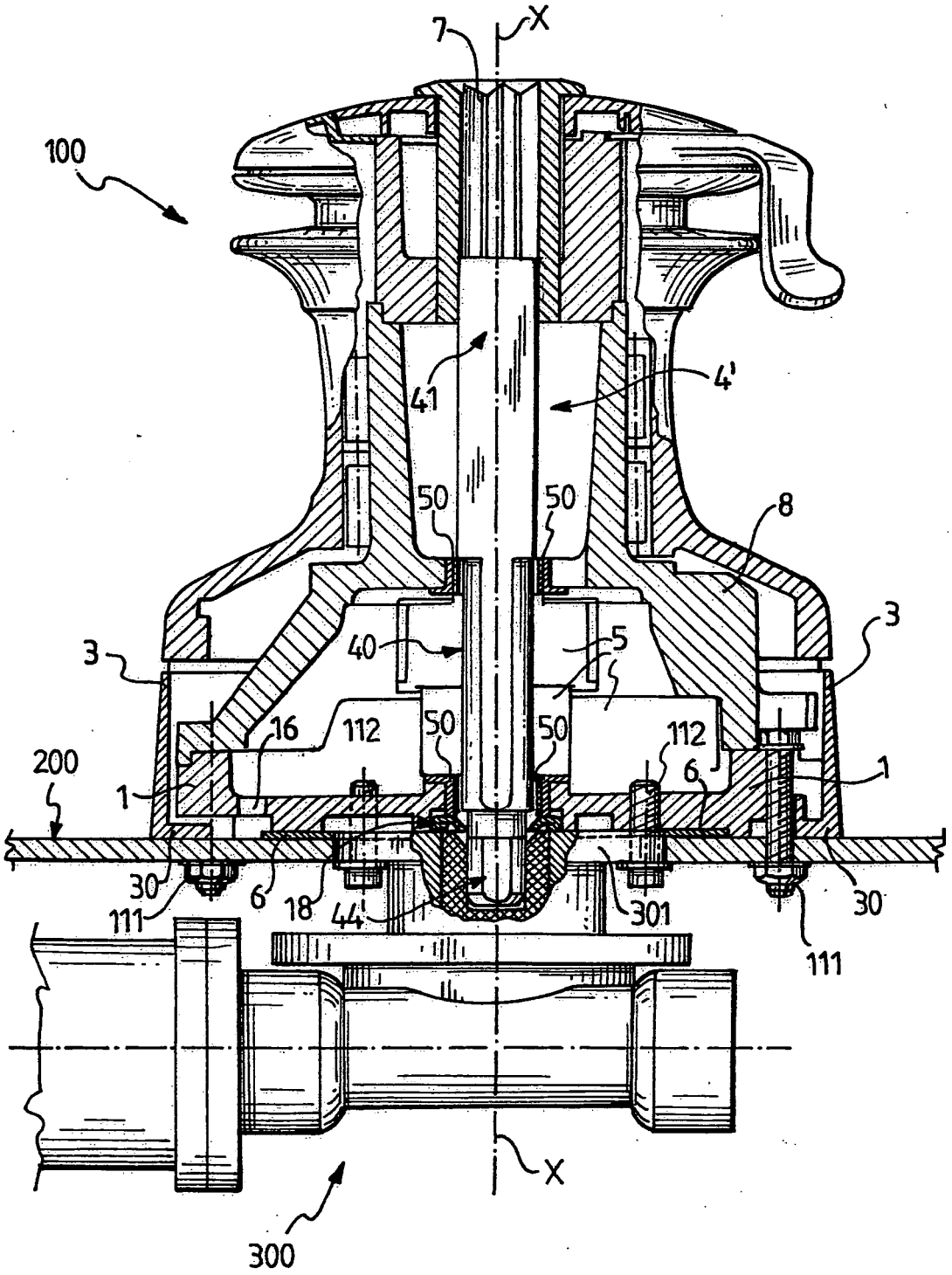


Fig.4


7
X
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41
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300

Fig.5

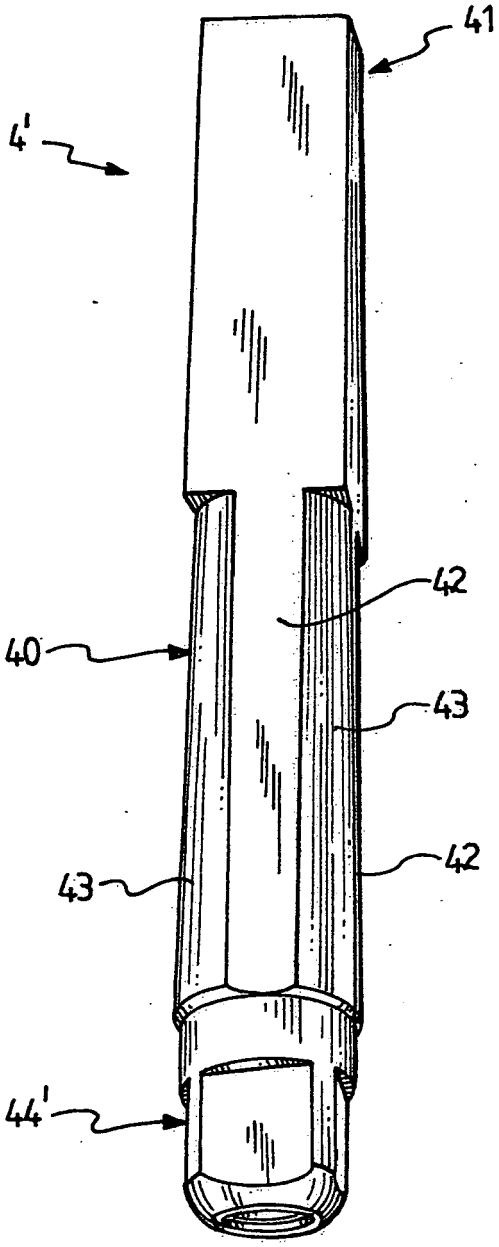

Fig.7

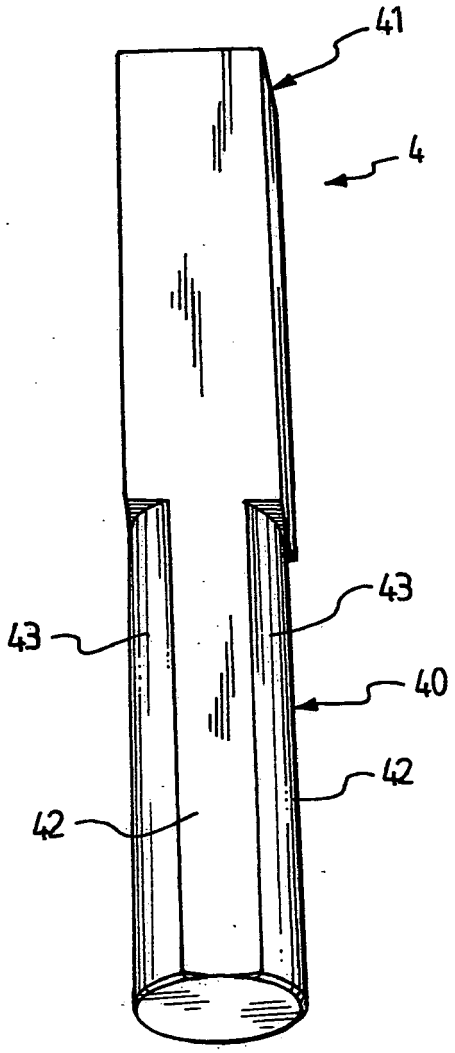

Fig.6

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EUROPEAN SEARCH REPORT

Application Number
EP 08 42 5208

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	NL 6 415 355 A (FRANCIS B T) 2 July 1965 (1965-07-02) * the whole document *	1-8	INV. B66D1/74
X	GB 2 358 169 A (HARKEN ITALY S P A [IT]) 18 July 2001 (2001-07-18) * abstract * * page 7 - page 9 * * figure 1 *	1,9,10	
X	AU 628 093 B2 (MUIR ENG PTY LTD) 10 September 1992 (1992-09-10) * page 4 - page 7 * * figures *	1	
A	LEWMAR: "Ocean Electric Winches 34-77"[Online] 2006, XP002493351 Retrieved from the Internet: URL:http://en.lewmar.com/support/PDF/Elec_win_WEB.pdf> [retrieved on 2008-08-22] * page 5 - page 8 * * page 16 *	1,9	
			TECHNICAL FIELDS SEARCHED (IPC) B66D

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
The Hague	26 August 2008	Sheppard, Bruce

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)

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European Patent Office
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Application Number
EP 08 42 5208

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-14

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 08 42 5208

The Search Division considers that the present European patentapplication does not comply with the requirements of unity of invention and relates to severalinventions or groups of inventions, namely:

1. claims: 1-14

   Winch with first and second fixing portions and hole for main shaft, wherein second fixing portion and hole do not project below bottom surface of winch base. Method for conversion of such a winch from manual to motorised.

   ---

2. claims: 15-24

   Winch with base, drum, main shaft and gears, wherein in operative configuration main shaft is axially extractable from winch. Method for conversion of such a winch from manual to motorised.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 08 42 5208

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
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26-08-2008

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