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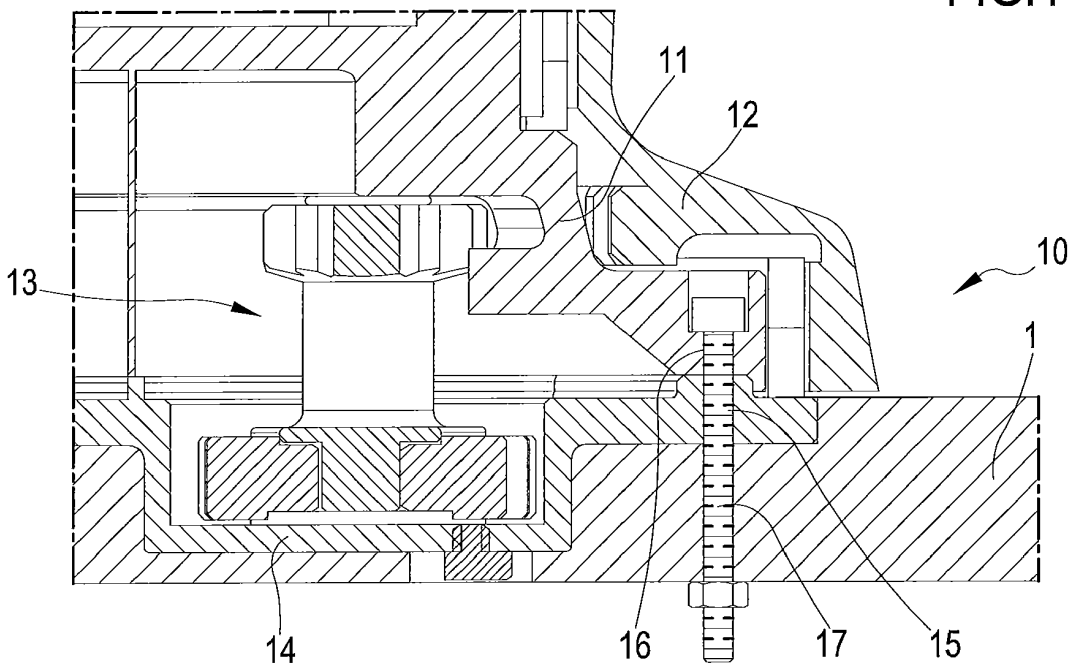
(54) WINCH AND METHOD FOR EQUIPPING A STRUCTURE WITH A WINCH

(57) The invention describes a winch (10; 10'; 10"; 10"') intended to be mounted on a structure (1; 1'), comprising a stator body (11), a rotor body (12) rotatably mounted on the stator body (11), a gear group (13) to command the angular movement of the rotor body (12) with respect to the stator body (11), and a base body (14; 14'; 14"; 14"') distinct from the stator body (11) and associated therewith; the gear group (13) is supported by the base body (14; 14'; 14"; 14"') associated with the stator body (11). The winch (10; 10'; 10"; 10"') also comprises through holes (15, 16) formed in corresponding positions on the stator body (11) and on the base body (14; 14'; 14"; 14"'), for the passage of screws (17) for the simultaneous attachment of the stator body (11) and of the base body (14; 14'; 14"; 14"') to the structure (1; 1').

FIG.1



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Description

[0001] The present invention concerns a winch, for example for nautical use, and a method for equipping a structure, for example a boat, with a winch.

[0002] In many circumstances, winches are used applied to various structures, in order to be able to apply a traction on a rope, a cable or similar. In particular, in boats and particularly in sailing boats, numerous winches are normally used, to facilitate the manoeuvring of halyards and sheets under load. In some applications, like for example sailing boats for extreme competitions, where it is attempted to reduce the weight of every component to maximise performance, the weight of the winches installed on board becomes substantial.

[0003] Therefore, it is known, for example, to use composite materials (based on carbon fibre, Kevlar and similar) for all of the parts of the winch that can be made from such materials. However, there are parts of the winch that can only substantially be made of steel, such as gears, shafts, screws.

[0004] A problem forming the basis of the present invention is that of further reducing the weight of winches.

[0005] This problem is solved by a winch according to claim 1, as well as by a method according to claim 4.

[0006] More specifically, in a first aspect thereof, the invention concerns a winch that comprises a stator body, a rotor body rotatably mounted on the stator body, a gear group to command the angular movement of the rotor body with respect to the stator body, a base body distinct from the stator body and associated therewith; the gear group is supported by the base body associated with the stator body; the winch also comprises through holes formed in corresponding positions on the stator body and on the base body, for the passage of screws for the simultaneous attachment of the stator body and of the base body to the structure.

[0007] Preferably, the structure on which the winch is usefully used is a boat, for example a sailing boat for extreme competitions. In this case, indeed, the reduction of weight is particularly useful.

[0008] Normally, according to the prior art, the base body of the winch is assembled with screws to the stator body, so as to form a single assembly already before the structure is mounted. However, this makes it necessary to have a series of specific screws, for the attachment of the base body to the stator body. This series of screws, on the other hand, is avoided thanks to the invention: a single series of screws is used simultaneously to fix together the structure, the base body and the stator body. For a winch of typical dimensions for sailing boats for extreme competitions (like for example the America's Cup), this allows there to be 6-8 screws less, with a reduction in weight of about 100 grams.

[0009] The elimination of the series of screws normally provided for fixing the base body to the stator body is also advantageous, since it reduces the number of components of the winch.

[0010] The base body is pre-assembled on the structure irreversibly, before the winch is mounted on it. This allows the base body to be made with a particularly thin and light structure.

[0011] Irreversible pre-assembly is obtained by co-moulding or by gluing. Therefore, in a preferred embodiment the base body is co-moulded together with the structure; in an alternative embodiment, it is glued to the structure. In this way, it is clearly necessary to pre-set already at the manufacturing step of the structure which winch will be used, but it becomes possible to design in an integrated manner the portion of structure and the base body of the winch, i.e. taking into account the structural strength both of the base body of the winch and of the portion of structure, thus optimising the sizing of both for the purposes of a reduction in weight for the same structural strength.

[0012] In an embodiment, before the winch is mounted on the structure, the winch is pre-assembled with the base body fixed in a temporary and removable manner to the stator body. This provision makes it possible to produce and distribute a complete winch, in a totally analogous manner to a conventional winch; in the step of mounting the winch on the structure, the means that temporarily fix the base body to the stator body can be removed, since they are no longer useful.

[0013] Preferably, such means can comprise an adhesive tape and/or an adhesive between the base body and the stator body, or temporary screws between the base body and the stator body. In this last case, preferably the temporary screws are mounted in a position such as to be accessible and removable when the winch is mounted on the structure; it is thus possible to keep the base body fixed to the stator body until the completion of the attachment of the winch on the structure, in such a way making the mounting operations easier.

[0014] In a second aspect thereof, the invention concerns a method for equipping a structure with a winch, comprising:

- providing a stator body of the winch
- providing a rotor body of the winch,
- providing a base body, distinct from the stator body,
- irreversibly pre-assembling the base body on the structure, before fixing the stator body to the structure;
- mounting on the base body a gear group, operative between the rotor body and the stator body to command the angular movement of the rotor body with respect to the stator body,
- fixing the stator body on a portion of the structure, blocking the base body between the stator body and the portion of the structure,
- mounting the rotor body on the stator body.

[0015] In this way, it is not necessary to provide a specific series of screws for fixing the base body to the stator body.

[0016] Preferably, the base body is formed on the structure, more preferably it is co-moulded together with the structure; alternatively, it is glued to the structure.

[0017] In an embodiment, to facilitate mounting, it is provided to:

- pre-assemble the base body with a temporary attachment to the stator body, before fixing the stator body to the structure.

[0018] Preferably, it is provided to:

- remove the temporary attachment of the base body to the stator body, before fixing the stator body to the structure, or after having fixed the stator body to the structure.

[0019] Further characteristics and advantages of the invention will become clearer from the following description of preferred embodiments thereof, made with reference to the attached drawings. In such drawings:

- fig. 1 is a section view of a winch according to a first embodiment of the invention;
- fig. 2 is a section view of a winch according to a second embodiment of the invention;
- fig. 3 is a section view of a winch according to a third embodiment of the invention;
- fig. 4 is a section view of a winch according to a fourth embodiment of the invention.

[0020] Figure 1, in accordance with a first embodiment of the invention, shows a winch **10**, for example for nautical use, mounted on a structure **1** (for example a boat, only visible for the portion of deck close to the winch 10). The winch 10 comprises a stator body **11**, a rotor body **12** rotatably mounted on the stator body 11 and a gear group **13** that commands the angular movement of the rotor body 12 with respect to the stator body 11. Figure 1 does not show the details of the gear group 13, since it can be of any *per se* known type.

[0021] The winch 10 also comprises a base body **14**, distinct from the stator body 11 and associated therewith, and the gear group 13 is supported by the base body 14 associated with the stator body 11. The winch 10 also comprises first through holes **15**, formed in the base body 14, and second through holes **16**, formed in the stator body 11 in positions corresponding to the first holes 15 on the base body, so that the first through holes 15 are aligned with the second through holes 16 when the stator body 11 is associated with the base body 14.

[0022] Screws **17** are inserted through the first and second through holes 15, 16 and screwed into the structure 1, so as to simultaneously hold the stator body 11 and the base body 14 fixed to the structure 1.

[0023] The base body 14 - although part of the winch 10, since it is linked to it both functionally and structurally, once the winch 10 is mounted on the structure 1- is pre-assembled on the structure 1, in particular it is formed on the structure 1 during the construction thereof, for example and preferably through co-moulding.

[0024] Fig. 2 shows a winch **10'** in accordance with a second embodiment of the invention. The winch 10' comprises many elements identical to those described above with reference to the winch 10; these elements are not described here and are marked in fig. 2 with the same reference numerals used in fig. 1 for the winch 10. On the other hand, different but corresponding elements are marked with the same number, provided with a prime (').

[0025] Differently from the winch 10, the base body **14'** of the winch 10' - also pre-assembled on the structure 1- is glued to the structure 1, through a layer of adhesive **18'.** The structure **1'** is thus preferably provided with a receiving and centring seat **2'** of the base body 14'.

[0026] Fig. 3 shows a winch **10"** in accordance with a third embodiment of the invention. The winch 10" comprises many elements identical to those described above with reference to the winch 10; these elements are not described here and are marked in fig. 3 with the same reference numerals used in fig. 1 for the winch 10. On the other hand, different but corresponding elements are marked with the same number, provided with a double prime (").

[0027] Differently from the winch 10, the base body **14"** of the winch 10" is pre-assembled in a temporary and removable manner to the stator body 11, through a layer of adhesive **18"**, between the base body 14" and the stator body 11. The layer of adhesive 18" can be provided in the form of adhesive tape.

[0028] Fig. 4 shows a winch **10"'** in accordance with a fourth embodiment of the invention. The winch 10'" comprises many elements identical to those described above with reference to the winch 10; these elements are not described here and are marked in fig. 4 with the same reference numerals used in fig. 1 for the winch 10. On the other hand, different but corresponding elements are marked with the same number, provided with a triple prime ("').

[0029] Differently from the winch 10, the base body **14"'** of the winch 10"' is pre-assembled in a temporary and removable manner to the stator body 11, through temporary screws **19"'** between the base body 14"' and the stator body 11"'. The temporary screws 19"' are inserted through holes **20"'** formed in the stator body 11"' and are screwed to the base body 14"'. The temporary screws 19"' are mounted in a position such as to be accessible and removable when the winch 10"' is mounted on the structure 1, and are in fact moved once the first screws 17 fix the stator body 11"' and the base body 14"' together on the structure 1.

[0030] The mounting on the structure of a winch according to the invention takes place in the following way.

[0031] Firstly the stator body 11, the rotor body 12 and the base body 14, 14', 14", 14'", distinct from the stator body 11, are provided. On the base body 14, 14', 14", 14"' the gear group 13 is mounted, operative between

the rotor body 12 and the stator body 11 to command the angular movement of the rotor body 12 with respect to the stator body 11. The stator body 11 is fixed to the structure 1, 1' through the screws 17, so that the base body 14, 14', 14", 14"' remains blocked between the stator body 11 and the structure 1, 1'. Finally, the rotor body 12 is mounted on the stator body 11.

[0032] In accordance with the first and the second embodiment of the invention, the base body 14, 14' is pre-assembled on the structure 1, 1', before fixing the stator body 11 to the structure 1, 1'.

[0033] In accordance with the first embodiment of the invention, the pre-assembly of the base body 14 on the structure 1 comprises the formation of the base body 14 on the structure 1, for example through co-moulding during the formation of the structure 1 itself.

[0034] In accordance with the second embodiment of the invention, the pre-assembly of the base body 14' on the structure 1' provides the gluing of the base body 14' on the structure 1'.

[0035] In accordance with the third and fourth embodiment of the invention, the base body 14", 14"' is pre-assembled with a temporary attachment to the stator body 11, before fixing the stator body 11 to the structure 1.

[0036] In accordance with the third embodiment of the invention, this pre-assembly is obtained with the layer of adhesive 18", whereas in accordance with the fourth embodiment of the invention the pre-assembly is obtained with the temporary screws 19'". The temporary attachment of the base body 14", 14'" to the stator body 11 can be removed, before fixing the stator body 11 to the structure 1 or after having fixed the stator body 11 to the structure 1.

[0037] From the above, it can be understood how thanks to the invention - in any of the illustrated embodiments thereof - it is possible to avoid the presence (in the winch mounted on the structure) of screws for fixing the base body to the stator body. This, as stated, allows both a reduction of weight, particularly useful for example in the case of boats used in extreme competitions, and a reduction of the number of pieces.

Claims

1. Winch intended to be mounted on a structure (1; 1'), comprising a stator body (11), a rotor body (12) rotatably mounted on the stator body (11), a gear group (13) to command the angular movement of the rotor body (12) with respect to the stator body (11), a base body (14; 14'; 14"; 14"') distinct from the stator body (11) and associated therewith, wherein the gear group (13) is supported by the base body (14; 14'; 14"; 14"') associated with the stator body (11), further comprising through holes (15, 16) formed in corresponding positions on the stator body (11) and on the base body (14; 14'; 14"; 14'"), for the passage of screws (17) for the simultaneous attachment of the stator body (11) and of the base body (14; 14'; 14"; 14"') to the structure (1; 1'), **characterised in that** - before mounting the winch on the structure (1; 1') - the base body (14; 14') is irreversibly pre-assembled on the structure (1; 1').

2. Winch according to claim 1, wherein the base body (14) is co-moulded together with the structure (1).

3. Winch according to claim 1, wherein the base body (14') is glued to the structure (1').

4. Method for equipping a structure with a winch (10; 10'; 10"; 10'"), comprising:

   - providing a stator body (11) of the winch (10; 10'; 10"; 10"')
   - providing a rotor body (12) of the winch (10; 10'; 10"; 10'"),
   - providing a base body (14; 14'; 14"; 14'"), distinct from the stator body (11),
   - irreversibly pre-assembling the base body (14; 14') on the structure (1; 1'), before fixing the stator body (11) to the structure (1; 1');
   - mounting on the base body (14; 14'; 14"; 14"') a gear group (13), operating between the rotor body (12) and the stator body (11) to command the angular movement of the rotor body (12) with respect to the stator body (11),
   - fixing the stator body (11) on a portion of the structure (1; 1'), thereby blocking the base body (14; 14'; 14"; 14"') between the stator body (11) and the portion of the structure (1; 1'),
   - mounting the rotor body (12) on the stator body (11).

5. Method according to claim 4, wherein the step of pre-assembling the base body (14) on the structure (1) comprises forming the base body (14) on the structure (1).

6. Method according to claim 5, wherein the step of forming the base body (14) on the structure (1) comprises co-moulding the base body (14) together with the structure (1).

7. Method according to claim 4, wherein the step of pre-assembling the base body (14') on the structure (1') comprises gluing the base body (14') on the structure (1').

FIG.1

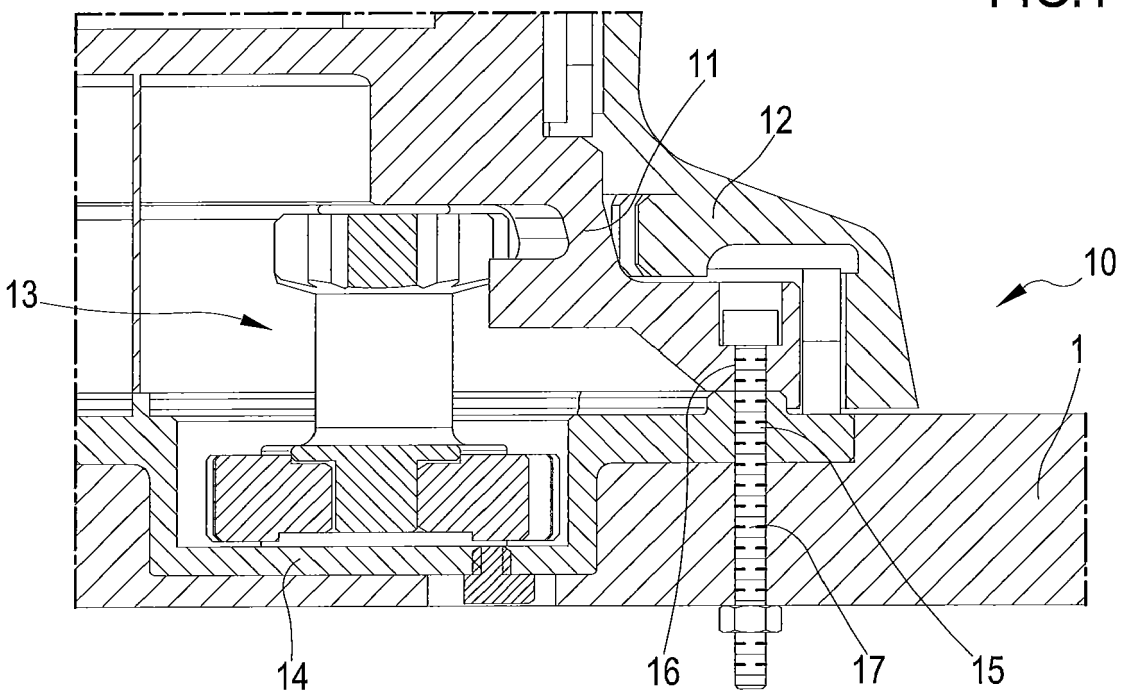


FIG.2

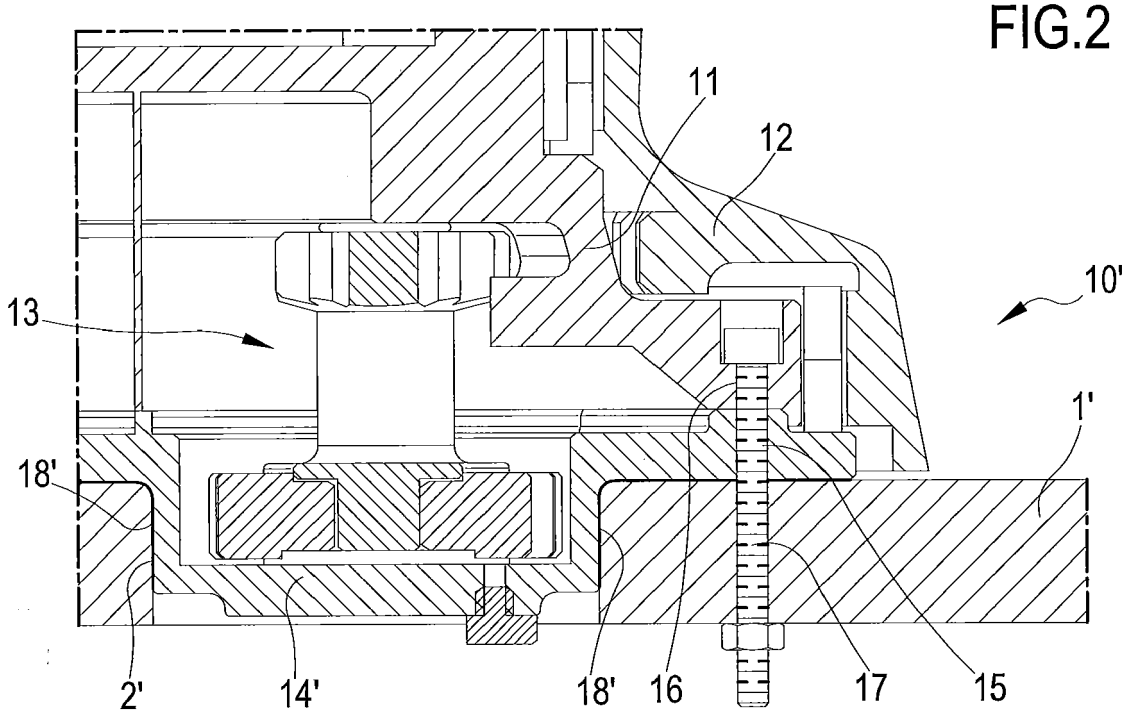


FIG.3

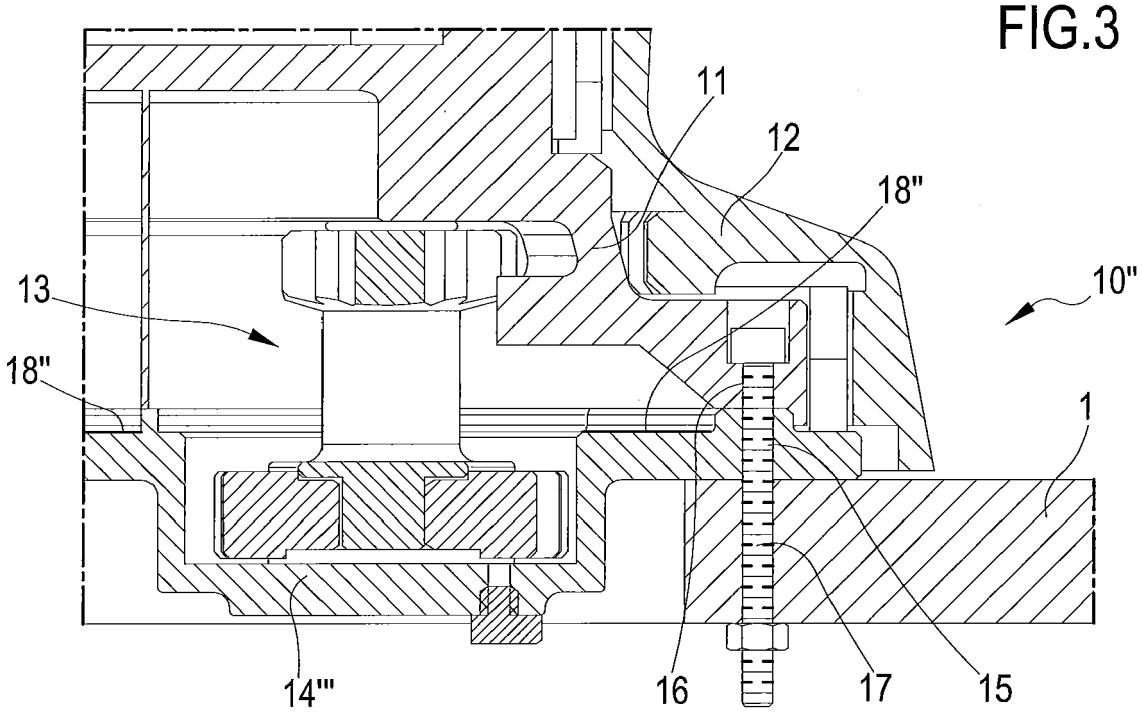
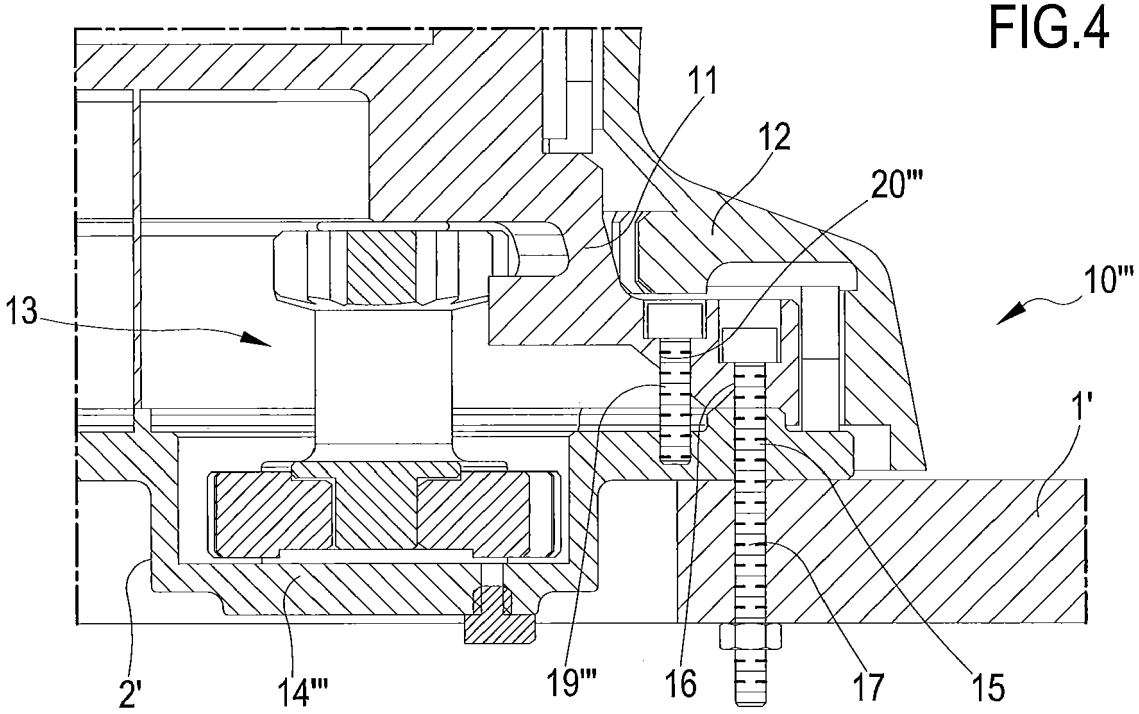


FIG.4



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EUROPEAN SEARCH REPORT

Application Number
EP 16 17 3914

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	US 4 475 718 A (VAN BEERS WILLEM P [NL]) 9 October 1984 (1984-10-09)	4,5	INV. B66D1/28
A	* column 2 - column 3; figure 1 *	1-3,6,7	B66D1/74
X	GB 2 029 496 A (BARIENT CO) 19 March 1980 (1980-03-19)	4,5	
A	* page 2, line 48 - page 2, line 84; figures 1-5 *	1-3,6,7	

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	7 November 2016	Rupcic, Zoran

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

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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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07-11-2016

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