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(54) **ANCHORAGE ASSEMBLY FOR A BOAT**

(57) Anchorage assembly for a boat comprising an anchor (2), provided with a shaft (21) and a fluke (22), and an elongated containment body (3), internally delimiting a channel (30), within which the shaft (21) of the anchor (2) is susceptible of sliding. The shaft (21) is movable between a lowered position, in which it is placed outside the containment body (3) and is free to rotate and a raised position, in which it is placed inside the containment body (3), with a predefined orientation with respect to the containment body (3) and is substantially prevented from rotating. The anchorage assembly also comprises guide means (4), configured for guiding the shaft (21) from the lowered position to the raised position, and comprising at least one conveyance portion (41), made on the shaft (21) and provided with two slides (410) which are extended with helical first grooves (411) in circumferentially opposite senses from a common upper deflection end (41') to a common lower connection end (41''). The guide means (4) also comprises at least one guide portion (42), made on the shaft (21) and provided with a guide track (420) which is extended with a second groove (421), and at least one engagement element (43) fixed to the containment body (3) and projecting inside the channel (30). The engagement element (43) is configured for interfering at least with the conveyance portion (41) and rotating the shaft (21) in the predefined orientation, in which at least part of the engagement element (43) is inserted in the second groove (421) in order to stably retain said shaft (21) in said predefined orientation.

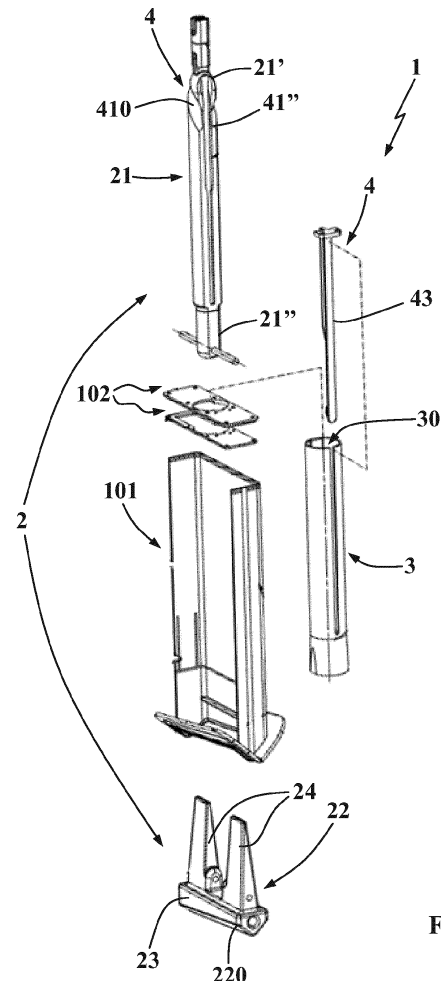


Fig. 2

Description

Field of application

[0001] The present invention regards an anchorage assembly for a boat, according to the preamble of the respective independent claims.

[0002] The present anchorage assembly is intended to be advantageously employed for anchoring, in an integral manner, a boat in a specific point of the seabed of a body of water.

[0003] More in detail, the anchorage assembly, object of the present invention, is advantageously employable on boats for high speeds, such as for example hydrofoils, which require a hidden anchor, which is recoverable in a precise orientation in order to minimize the impact on the hydrodynamic profile of the boat.

[0004] The invention is therefore inserted in the context of the nautical industry, in the field of production of anchorage devices for boats.

State of the art

[0005] Anchorage assemblies for boats are known on the market, which comprise an anchor (provided with a shaft and with a fluke fixed to the shaft) which is connected to a device for lifting the anchor mounted on the boat.

[0006] Usually, the anchors of known type are movable between a lowered position in which they are placed on the seabed in order to anchor the boat, and a raised position, in which they are housed within a containment peak made on the hull of the same boat.

[0007] The containment peak, known in the technical jargon with the term "hawse" is usually placed on a side of the hull and is provided with an access opening which allows the anchor to be stored at its interior following its lifting.

[0008] This type of anchorage assemblies has in practice shown that it does not lack drawbacks.

[0009] The main drawback lies in the fact that such anchorage assemblies define an interruption of the external hydrodynamic profile of the hull and therefore they are unsuitable for being employed on boats intended to travel at high speeds, since the latter require a continuity of the hydrodynamic profile in order to be able to reach high speeds, simultaneously maintaining high efficiency.

[0010] In addition, a further drawback lies in the fact that such anchorage assemblies risk, during the recovery of the anchor, making the anchor itself impact against the hull of the boat, risking causing damage to the hull.

[0011] In order to at least partly resolve the abovementioned drawbacks, anchorage assemblies were developed which comprise an anchor provided with a profile counter-shaped with respect to the hull and with guide means for guiding the shaft of the anchor to take on a predefined orientation during the recovery of the anchor between the lowered position and the raised position so as to allow an oriented recovery thereof.

[0012] In particular, known from the patent EP 2699471 is an anchorage assembly which comprises an anchor, provided with a shaft and with a fluke, and a containment body, internally delimiting a channel in which the shaft of the anchor is slidable.

[0013] More in detail, the shaft is movable between a lowered position, in which it is placed outside the containment body and it is free to rotate, and a raised position, in which it is placed inside the containment body, with a predefined orientation with respect to the containment body and the rotation thereof is prevented.

[0014] The anchorage assembly described in the patent EP 2699471 also comprises guide means, in order to rotate the shaft towards the predefined orientation while it is lifted from the lowered position to the raised position.

[0015] The guide means described in the present patent comprise at least one group of ribs, which are made on the containment body, projecting from the latter to intercept the channel inside the containment body.

[0016] More in detail, the group of ribs comprises multiple ribs which are extended helically in circumferentially opposite senses from an inlet end towards a connector end, at which a guide track provided with a longitudinal groove is attained.

[0017] The guide means described in the present patent also comprise an engagement element, obtained radially projecting from the shaft of the anchor and configured for interfering with the group of ribs made on the containment body, in order to slide along one of the ribs of the aforesaid group of ribs, inducing a rotation of the shaft towards the predefined orientation, until the same engagement element made on the shaft is inserted within the longitudinal groove of the guide track.

[0018] Also the aforesaid anchorage assembly has nevertheless proven in practice that it does not lack drawbacks.

[0019] The main drawback lies in the fact that such anchorage assembly has proven unsuitable for ensuring a safe and precise recovery of the anchor.

[0020] More in detail, having to allow the passage without jamming of the shaft, with the projecting engagement element made thereon, the diameter of the shaft must of course be smaller than the diameter of the containment body, in particular it must be provided with a maximum diameter that is equal to the diameter of the containment body minus the radial depth of the ribs of the group of ribs.

[0021] Therefore, the shaft is not housed to size within the containment body and is subjected to be tilted during the lifting thereof.

[0022] This can cause damage of the shaft or of the containment body due to impact between the latter.

[0023] It is also possible that due to the aforesaid tilts, also sliding takes place that could cause jamming of the anchor during the lifting thereof.

[0024] It is therefore necessary to provide a suitable alignment portion, provided with multiple projecting ribs aligned with the containment body and arranged for

maintaining the shaft aligned during the lifting thereof, which negatively affects the costs and times for making and assembling the above-described anchorage assembly.

[0025] A further drawback lies in the fact that, since the group of ribs is integrally made with the containment body, in case of damage of one of the ribs of the group of ribs it is necessary to disassemble the entire containment body and proceed with the replacement thereof or with the repair thereof.

[0026] A further drawback lies in the fact that the containment body provided with the aforesaid group of ribs is hard to make and is very complicated to obtain since it requires carrying out multiple welding operations of helical ribs on the containment body.

Presentation of the invention

[0027] In this situation, the underlying the present invention is therefore that of overcoming the drawbacks manifested by the anchorage assemblies of known type, by providing an anchorage assembly for a boat which allows a precise and quick lifting of the anchor with the shaft in a predefined orientation.

[0028] Further object of the present invention is to provide an anchorage assembly which allows a precise lifting in particular in the case of asymmetric anchor.

[0029] Further object of the present invention is to provide an anchorage assembly which is easy to disassemble in case of damage to the internal components.

[0030] Further object of the present invention is to provide an anchorage assembly which is simple to attain.

[0031] Further object of the present invention is to provide an anchorage assembly which is entirely efficient and reliable.

Brief description of the drawings

[0032] The technical characteristics of the invention, according to the aforesaid objects, can be clearly seen from the contents of the below-reported claims and the advantages thereof will be more evident in the following detailed description, made with reference to the enclosed drawings, which represent a merely exemplifying and non-limiting embodiment of the invention, in which:

- Fig. 1 shows a side view of a boat carrying, mounted thereon, an anchorage assembly, object of the present invention;
- Fig. 2 shows an exploded view of the anchorage assembly of figure 1;
- Fig. 3A shows a front view of a shaft of the anchorage assembly of figure 2;
- Fig. 3B shows a side view of the shaft of the anchorage assembly of figure 2;
- Fig. 4 and 5 show two sectional views of the shaft of figure 3A, respectively attained along the traces IV-IV and V-V of figure 3;

- Fig. 6 shows a rear perspective view of the shaft of figure 3;
- Fig. 7 shows a perspective view of a containment body of the anchorage assembly of figure 2;
- Fig. 8 shows a sectional view of the containment body of figure 7;
- Fig. 9 shows a perspective view of the containment body mounted on the hull of the boat with an engagement element fixed thereto;
- Fig. 10 shows the engagement element of the anchorage assembly of figure 2.

Detailed description of a preferred embodiment

[0033] With reference to the enclosed drawings, reference number 1 overall indicates an anchorage assembly for a boat, according to the present invention.

[0034] The anchorage assembly 1 according to the invention is advantageously intended to anchor the boat in a specific point of the seabed of a body of water.

[0035] Advantageously, with the term "boat" it will be intended hereinbelow any one floating unit, such as for example a vessel or a ship, regardless of its dimensions or of the propulsion system with which the boat is possibly equipped.

[0036] Preferably, the anchorage assembly 1, object of the present invention, is intended to be mounted on a hydrofoil, though a different destination could also be provided for, such as for example a motorboat, cabin cruiser etc.

[0037] Hereinbelow in the present description, for the sake of description simplicity, reference will be made to an anchorage assembly 1 mounted on a hydrofoil 10, which is provided with a hull 100 on which a containment peak is advantageously made, known in the technical jargon as "chain well", intended to contain the anchorage assembly 1. Preferably, the containment peak is placed along the keel line of the hull 100, substantially on the middle line with respect to the hull 100 itself.

[0038] In accordance with the invention, the anchorage assembly 1 comprises an anchor 2 which is provided with a shaft 21 extended along a longitudinal axis X between a first end 21', intended to be connected, preferably by means of at least one hinging eyelet to a lifting device placed on the boat, such as for example a docking rope or a chain, and a second end 21".

[0039] The anchor also comprises a fluke 22, mechanically connected to the shaft 21.

[0040] More in detail, the anchor 2 is preferably an anchor 2 with fluke 22 hinged and still more preferably the anchor 2, object of the present invention, is an anchor of "hall" type.

[0041] Of course, without departing from the protective scope of the present invention, the anchor 2 can be of different type, such as for example a Danforth anchor, a grappling anchor, an admiralty anchor or a foldable anchor.

[0042] Advantageously, in accordance with the pre-

ferred embodiment in which the anchor has hinged fluke 22, the fluke 22 of the anchor 2 is pivoted to the shaft 21, along an axis transverse to the longitudinal axis X of the shaft 21, preferably at the second end 21" of the shaft itself.

[0043] More in detail, the fluke 22 is advantageously provided with a main body 23 and with two retention teeth 24, and is susceptible of being caught on the seabed in order to maintain the boat 10 in position with respect to the same seabed.

[0044] Advantageously, the second end 21" of the shaft 21 is provided with a first opening and the retention teeth 24 of the fluke 22 are each provided with a second opening, aligned with the first, and traversed by a hinging pin.

[0045] Preferably, as mentioned above, the containment peak for the anchor 2 is made on the keel line of the hull 100, preferably on the middle line, and comprises a containment opening, intended to allow the housing of the anchor 2.

[0046] The fluke 22 of the anchor 2 is advantageously provided with a lower face 220, in particular extended on its main body 23, susceptible of closing the containment opening of the containment peak when the anchor 2 is housed within the latter.

[0047] For such purpose, the lower face 220 of the fluke 22 is advantageously counter-shaped with respect to the hull 100 in a manner such that, when the anchor 2 is housed within the containment peak, the lower face 220 of the fluke 22 is substantially continuous with the hull 100, thus allowing a continuity of the hydrodynamic profile of the boat 10. In particular, in accordance with the preferred embodiment, the hull 100 has a substantially V-shaped extension, in which the keel line defines the lower edge of the V, and the lower face 220 of the fluke 22 also has a shape (front section view) that is substantially V shaped.

[0048] Advantageously, the hull 100 has a lateral profile, which is placed tilted with respect to the water surface when the boat is immersed and in particular with progression increasing from the stern to the bow of the boat.

[0049] Preferably the fluke 22 is provided with a lateral profile analogous to that of the hull 100 and is in particular provided with a trapezoidal shape in which the end directed towards the bow of the boat 10 has a lower height than the end of the fluke 22 directed towards the stern of the boat 10.

[0050] Therefore, the fluke 22 is advantageously asymmetric along the longitudinal extension thereof and is housable within the containment peak of the hull 100 in only one position, such to allow placing the lower face 220 of the fluke 22 to close the containment peak itself.

[0051] The anchorage assembly 1 also comprises an elongated containment body 3, intended to be fixed to the hull 100 of the hydrofoil 10, preferably within the containment peak of the hull 100.

[0052] More in detail, as better seen in figure 2, the containment body 3 is intended to be fixed within a sup-

port casing 101, which has elongated extension and is fixed to the hull 100 within the containment peak.

[0053] The containment body 3 is advantageously provided with a longitudinal main extension along an extension direction Y, substantially parallel to the longitudinal axis X of the shaft 21.

[0054] The containment body 3 internally delimits a channel 30, within which the shaft 21 of the anchor 2 is susceptible of sliding.

[0055] The shaft 21 of the anchor is movable between a lowered position, in which the shaft 21 is placed outside the containment body 3 and is free to rotate around the longitudinal axis X, and a raised position, in which the shaft 21 is placed inside the containment body 3 with a predefined orientation with respect to the containment body 3 and is substantially prevented from rotating around the longitudinal axis X.

[0056] More in detail, with the expression "predefined orientation" it will advantageously be intended hereinbelow an angular position of the shaft 21, around the longitudinal axis X thereof, with respect to the containment body 3.

[0057] As mentioned above, indeed, the fluke 22 is advantageously housable within the containment peak of the hull 100 in only one position, such to allow placing the lower face 220 of the fluke 22 to close the containment peak itself. The predefined orientation is preferably therefore the angular position of the shaft 21 with respect to the containment body 3 which allows housing the anchor 2 within the containment peak and simultaneously placing the lower face 220 of the fluke 22 to close the storage opening of the containment peak itself, ensuring the continuity of the hydrodynamic profile of the hull 100.

[0058] Advantageously, in the aforesaid lowered position, the anchor 2 is operative on the seabed or in any case spaced from the hull 100, while in the aforesaid raised position the anchor 2 is at least partially housed in the hull 100, and preferably completely housed within the containment peak.

[0059] The anchorage assembly 1 also comprises guide means 4, which are configured for guiding the shaft 21 of the anchor 2 towards the predefined orientation during the movement of the shaft 21 from the lowered position to the raised position.

[0060] In accordance with the idea underlying the present invention the guide means 4 comprise at least one conveyance portion 41, made on the shaft 21 of the anchor 2, preferably in a depression on the shaft 21, for example by means of a turning operation. Advantageously, the conveyance portion 41 of the guide means 4 is placed in proximity to the first end 21' of the shaft 21.

[0061] The conveyance portion 41 is provided with two slides 410 which are extended with helical first grooves 411, in circumferentially opposite senses, from a common upper deflection end 41' to a common lower connection end 41".

[0062] In accordance with the preferred embodiment, the upper deflection end 41' and the lower connection

end 41" are placed on the shaft 21 of the anchor 2 diametrically opposite and spaced from each other along the longitudinal axis X.

[0063] Advantageously, the first grooves 411 are symmetric with respect to each other and each are extended to partially enclose the shaft 21, preferably each to enclose half of the shaft 21.

[0064] In accordance with the aforesaid preferred embodiment, each slide 410 defines a path, and such paths are symmetric and are extended for the same length.

[0065] Of course, without departing from the protective scope of the present invention, it is possible to make two asymmetric first grooves 411, which are extended from a common upper deflection end 41' to a common lower connection end 41" which are not diametrically opposite.

[0066] In such case, one of the two slides 410 is extended with a length thereof greater than that of the other slide 410.

[0067] The guide means 4 also comprise at least one guide portion 42, made on the shaft 21 and provided with a guide track 420, which is extended with a second groove 421 at least from the lower connection end 41" of the conveyance portion 41. Advantageously the second groove 421 is extended parallel to the longitudinal axis X and preferably substantially up to the second end 21" of the shaft 21.

[0068] Advantageously, the second groove 421 is also extended above the lower connection end 41", in particular interposed between the two slides, preferably along the conveyance portion 41 and still more preferably along the introduction portion 210 of the shaft 21.

[0069] Advantageously, the second groove 421 comprises a first enlarged section 421', extended at least starting from the lower connection end 41" up to an insertion point thereof (and preferably also extended above the lower connection end 41", in particular partly interposed between the two slides, preferably along the conveyance portion 41 and still more preferably along the introduction portion 210 of the shaft 21). Advantageously, the second groove 421 comprises a second narrow section 421", extended starting from the aforesaid insertion point up to a stop wall thereof. Preferably, the first enlarged section 421' of the second groove 421 is tapered depthwise, i.e. in particular it is delimited by two first lateral surfaces that are tilted with respect to each other.

[0070] Preferably, the second narrow section 421" of the second groove 421 is delimited by two second lateral surfaces that are parallel to each other and substantially not tapered. The guide means 4 also comprise at least one engagement element 43 fixed to the containment body 3 and projecting inside the channel 30 of the containment body 3. The engagement element 43 is advantageously placed to partially intercept the channel 30 of the containment body 3 in order to intercept the shaft 21 of the anchor during its lifting from the lowered position to the raised position.

[0071] The engagement element 43 of the guide means 4 is configured for interfering with the conveyance

portion 41 of the guide means 4 and rotating the shaft 21 of the anchor 2 in the predefined orientation, in which at least part of the engagement element 43 is inserted in the second groove 421 of the guide track 420 in order to stably retain the shaft 21 in the predefined orientation.

[0072] Advantageously, the shaft 21 comprises a first flat face 211, preferably placed on the guide portion 42 of the guide means 4.

[0073] Advantageously, the second groove 421 of the guide track 420 is made on the first flat face 211 of the shaft 21.

[0074] The first flat face 211 is preferably attained by means of an operation of milling on the shaft 21.

[0075] Advantageously, the shaft 21 comprises a second flat face 212, which is preferably placed diametrically opposite with respect to the second groove 421 of the guide portion 42 and is extended at least in proximity to the second end 21" of the shaft 21, and preferably substantially along the entire shaft 21.

[0076] Advantageously, the containment body 3 has substantially tubular shape and comprises an internal third flat face 31, susceptible of being opposite the second flat face 212 of the shaft 21.

[0077] Advantageously, the containment body 3 is extended between a lower access opening 3' and an upper access opening 3", susceptible of being directed towards an internal portion of the hull 100 of the hydrofoil 10.

[0078] Advantageously, the containment body 3 comprises at least one section with narrow diameter 32, at which a step 320 is made, placed in proximity to the upper access opening 3" and diametrically opposite with respect to the engagement element 43. Preferably, the third flat face 31 is placed on the section with narrow diameter 32 and in particular on the step 320, in order to push the shaft 21 towards the engagement element 43 itself.

[0079] In this manner, when the shaft 21 is in the raised position, the same shaft 21 is stably retained in the predefined orientation, since its rotation is prevented by the engagement element 43 inserted in the second groove 421 of the guide track 420 and simultaneously prevented from being disengaged from the step 320 of the section with narrow diameter 32 of the containment body 3.

[0080] Preferably, at least the guide portion 42 of the shaft 21 is insertable substantially to size within the channel 30 of the containment body 3 at least at the section with narrow diameter 32, so as to maintain the shaft 21 substantially aligned within the channel 30 itself.

[0081] Advantageously, the engagement element 43 of the guide means 4 has the shape of an elongated fin and is extended substantially parallel to the channel 30 of the containment body 3, preferably between a lower end 43' and an upper end 43".

[0082] Advantageously, the engagement element 43 comprises an interference portion 430, preferably placed in proximity to the lower end 43' and provided with a projecting nose 431 which is intended to interfere with the conveyance portion 41 of the guide means 4. Preferably the projecting nose 431 has semicircular shape for facil-

itating the sliding thereof along one of the two slides 410.

[0083] Advantageously, the shaft 21 comprises at least one introduction portion 210, which is preferably extended between the conveyance portion 41 and the first end 21' of the shaft 21.

[0084] More in detail, the introduction portion 210 has tapered profile, in particular convex, starting from the conveyance portion 41 towards the first end 21' of the shaft 21 and is provided with a maximum width along a direction transverse to the longitudinal axis X that is smaller than that of the guide portion 42.

[0085] In this manner, when the anchor 2 is retracted into the housing peak and the shaft 21 slides within the channel 30, the projecting nose 431 of the engagement element 43 intercepts the introduction portion 210 (preferably with convex profile), sliding therein until it is at least partially inserted in one of the two first grooves 411.

[0086] In particular, with the shaft 21 at least partially housed in the channel 30, the introduction portion 210 forms, with the containment body 3, an opening and the projecting nose 431 has an extension starting from an internal surface of the containment body 3 smaller than the aforesaid opening.

[0087] Advantageously, the aforesaid extension of the projecting nose 431 is smaller than a clearance defined between the first flat face 211 of the shaft 21 and the internal surface of the containment body 3, when the shaft 21 is at least partially housed within the containment body 3, in a manner such that the projecting nose 431 does not come into contact, and in particular does not slide, against the guide portion 42, and in particular against the first and/or second lateral surfaces of the second groove 421. Advantageously, the projecting nose 431 is configured for remaining substantially outside the second groove 421.

[0088] This allows reducing to a minimum the wear, in particular due to fatigue, of the projecting nose 431.

[0089] In operation, the projecting nose 431 first causes the rotation of the shaft 21 around the longitudinal axis X by cooperating with the slides 410 of the conveyance portion 41 and subsequently, once the guide portion 42 has been reached, it prevents the rotation of the shaft 21. More in detail, the shaft 21 is free to rotate around the longitudinal axis X until the first flat face 211 comes to abut against the projecting nose 431.

[0090] Advantageously, the engagement element 43 also comprises a constraint portion 432, preferably placed in proximity to the upper end 43' and provided with a retention rib 433 intended to at least partially engage the second groove 421 of the guide track 420 in order to prevent further rotations of the shaft 21 of the anchor 2 once the predefined position C has been reached.

[0091] Preferably, the engagement element 43 comprises a connector portion 434 interposed between the interference portion 430 and the constraint portion 432.

[0092] More in detail, the connector portion 434 comprises a connector rib 435 extended starting from the

projecting nose 431 up to the retention rib 433.

[0093] In particular, the connector rib 435 has extension along a direction transverse to the longitudinal axis X, smaller than the extension of the projecting nose 431 and of the connector rib 435.

[0094] In this manner, the connector rib 435 does not interfere with the shaft 21 and increases the rigidity of the same engagement element 43.

[0095] In addition, the engagement element 43 advantageously has length, along the longitudinal axis X from the upper end 43" thereof to the lower end 43' thereof, substantially equal to the length of the guide track 420 along the same longitudinal axis X.

[0096] Preferably, the constraint portion 432 has length along the longitudinal axis X substantially equal to the length of the first enlarged section 421' of the second groove 421 of the guide track 420 along the same longitudinal axis X.

[0097] In addition, the connector portion 434 and the interference portion 430 preferably have length along the longitudinal extension axis X substantially equal to the length of the second narrow section 421" of the second groove 421 of the guide track 420. Advantageously, the projecting nose 431 of the interference portion 430 is intended to abut against the stop wall to be a lower delimitation of the second narrow section 421". The engagement element 43 advantageously comprises a support body 436 and the interference portion 430, and preferably also the constraint portion 431, are projectingly extended from the support body 436, orthogonal with respect to the latter. Advantageously the engagement element 43 comprises a fixing portion 437, preferably placed at the upper end 43" of the engagement element 43.

[0098] Preferably, the fixing portion 437 comprises a coupling wall 438, which is projectingly extended from the support body 436, preferably in the sense opposite that of the interference portion 430.

[0099] More in detail, the coupling wall 438 of the fixing portion 437 is provided with at least one through hole (not shown in the enclosed figures) and the engagement element 43 is advantageously removably fixed to the containment body 3 by means of second fixing means.

[0100] In particular, the second fixing means, e.g. screws, bolts and the like, are placed to engage the aforesaid through hole and are fixed to the hull 100 of the boat 10 in order to fix the engagement element 43 to the latter.

[0101] Preferably, the engagement element 43 is fixed to the hull by means of fixing plates 102, represented in figure 2.

[0102] Advantageously, in accordance with the embodiment illustrated in the enclosed figures in which the engagement element 43 is removably fixed to the containment body 3, the latter comprises a longitudinal through slit 33, which is extended along the containment body 3 and in which the engagement element 43 is inserted, in particular by means of at least the interference portion 430 and preferably by means of also the constraint portion 432.

[0103] More in detail, the engagement element 43 is engaged in the aforesaid through slit 33 up to bringing the interference portion 430, and preferably also the constraint portion 432, to project inside the channel 30.

[0104] Advantageously, with the engagement element 43 engaged in the through slit 33, the support body 436 is placed in abutment against the edge of the through slit 33 of the containment body 3.

[0105] Advantageously, the conveyance portion 41 comprises, at the upper deflection end 41' thereof, a longitudinal rib 412, parallel to the longitudinal axis X and placed to separate the two slides 410.

[0106] In this manner the longitudinal rib 412 advantageously allows orienting the engagement element 43 to selectively travel along one of the two slides 410, during the recovery of the anchor 2, at the time of interference of the engagement element 43 with the shaft 21.

[0107] Advantageously, the longitudinal rib 412 is removably fixed to the shaft by means of first fixing means.

[0108] More in detail, the shaft 21 comprises, at least at the upper deflection end 41', an engagement seat and the longitudinal rib 412 comprises an engagement portion removably inserted in the aforesaid engagement seat, in a manner such that in case of breakage or deformations of the longitudinal rib 412, this can be substituted without having to substitute the entire shaft 21.

[0109] Advantageously, the shaft comprises one or more through holes, preferably made on the second flat face 212, below the upper deflection end 41', which are communicating with the engagement seat, and the first fixing means comprise one or more retention pins or screws inserted in the corresponding through holes and cooperating with the engagement portion of the longitudinal rib 412 in order to retain it inserted in the engagement seat.

[0110] In operation, when the anchor 2 is recovered in order to be housed within the containment peak, the shaft 21 slides within the containment body 3, along the channel 30, between the lowered position and the raised position. More in detail, when the shaft 21 enters within the channel 30 of the containment body 3, it intercepts, preferably with the introduction portion 210, the engagement element 43, and in particular the projecting nose 431 of the interference portion 430.

[0111] The projecting nose 431 is thus susceptible of sliding on the introduction portion 210 in order to be inserted within one of the two slides 410.

[0112] More in detail, the projecting nose 431 is susceptible (with the shaft 21 which translates towards the raised position) of sliding along one of the slides 410 of the conveyance portion 41, inducing the rotation of the shaft 21 around the longitudinal axis X thereof, up to reaching the lower connection end 41", where the retention rib 433 is inserted in the second groove 421 defining the guide track 420 of the guide portion 42.

[0113] In particular, when the constraint portion 432 enters into the second groove 421, the shaft 21 has been correctly rotated in the predefined orientation, and the

fluke 22 of the anchor can be correctly housed within the containment peak with the lower face 220 thereof to close the containment peak itself.

[0114] This ensures that the alignment of the shaft 21 occurs gradually, first by rotating the shaft 21 by means of the projecting nose 431, then by blocking excessive rotations of the same shaft 21 (by means of the collaboration of the first flat face 211 with the projecting nose 431 and the cooperation between the second flat face 212 and the third flat face 31) and finally by substantially entirely blocking the shaft 21 in the predefined orientation by means of the insertion of the retention rib 433 in the second narrow section 421" of the second groove 421.

[0115] The anchorage assembly thus conceived therefore attains the pre-established objects.

Claims

1. Anchorage assembly for a boat, comprising:

- an anchor (2) provided with:

- a shaft (21) extended along a longitudinal axis (X) between a first end (21'), intended to be connected to a device for lifting said boat, and a second end (21");
- a fluke (22) mechanically connected to said shaft (21);

- an elongated containment body (3), intended to be fixed to a hull (10) of said boat (100) and internally delimiting a channel (30), within which the shaft (21) of said anchor (2) is susceptible of sliding;

the shaft (21) of said anchor (2) being movable between a lowered position, in which said shaft (21) is placed outside said containment body (3) and is free to rotate around said longitudinal axis (X) and a raised position, in which said shaft (21) is placed inside said containment body (3), with a predefined orientation with respect to said containment body (3) and is substantially prevented from rotating around said longitudinal axis (X);

- guide means (4) configured for guiding the shaft (21) of said anchor (2) towards said predefined orientation during the movement from said lowered position to said raised position;

characterized in that said guide means (4) comprise:

- at least one conveyance portion (41), made on said shaft (21), and provided with two slides (410) which are extended with helical first grooves (411) in circumferentially opposite senses from a common upper deflection end (41') to a common lower connection end (41");

- at least one guide portion (42), made on said shaft (21) and provided with a guide track (420) which is extended with a second groove (421) at least from the lower connection end (41") of said conveyance portion (41), along said shaft (21), substantially parallel to the longitudinal direction (X);
- at least one engagement element (43) fixed to said containment body (3) and projecting inside said channel (30);

the engagement element (43) of said guide means (4) being configured for interfering at least with the conveyance portion (41) of said guide means (4) and rotating the shaft (21) of said anchor (2) in said predefined orientation, wherein at least part of said engagement element (43) is inserted in the second groove (421) of said guide track (420) in order to stably retain said shaft (21) in said predefined orientation.

2. Anchorage assembly for a boat according to claim 1, **characterized in that** said shaft (21) comprises at least one first flat face (211) and said second groove (421) of said guide track (420) being made on the first flat face (211) of said shaft (21).
3. Anchorage assembly for a boat according to claim 1 or 2, **characterized in that** said shaft (21) comprises a second flat face (212) placed diametrically opposite the second groove (421) of said guide portion (42).
4. Anchorage assembly for a boat according to claim 3, **characterized in that** said containment body (3) has substantially tubular shape and comprises a third flat face (31), susceptible of being opposite the second flat face (212) of said shaft (21).
5. Anchorage assembly for a boat according to any one of the preceding claims, **characterized in that** the engagement element (43) of said guide means (4) is in the form of an elongated fin and is extended substantially parallel to the channel (30) of said containment body (3).
6. Anchorage assembly for a boat according to any one of the preceding claims, **characterized in that** said engagement element (43) comprises an interference portion (430), provided with a projecting nose (431), intended to interfere with the conveyance portion (41) of said guide means (4), and a constraint portion (432), intended to at least partially engage the guide track (420) of said guide portion (42) in order to prevent further rotations of said shaft (21) when it is situated in said predefined orientation.
7. Anchorage assembly for a boat according to any one

of the preceding claims, **characterized in that** said containment body (3) is extended between a lower access opening (3') and an upper access opening (3''), susceptible of being directed towards an internal portion of the hull (100) of said boat (10); said containment body (3) comprising at least one section with narrow diameter (32), placed in proximity to said upper access opening (3'') and diametrically opposite said engagement element (43) in order to push said shaft (21) towards said engagement element (43).

8. Anchorage assembly for a boat according to any one of the preceding claims, **characterized in that** said conveyance portion (41) comprises, at said upper deflection end (41'), a longitudinal rib (412), parallel to said longitudinal axis (X), placed to separate said two slides (410).
9. Anchorage assembly for a boat according to claim 8, **characterized in that** said longitudinal rib (412) is removably fixed to said shaft (21) by means of first fixing means.
10. Anchorage assembly for a boat according to any one of the preceding claims, **characterized in that** said engagement element (43) is removably fixed to said containment body (3) by means of second fixing means.

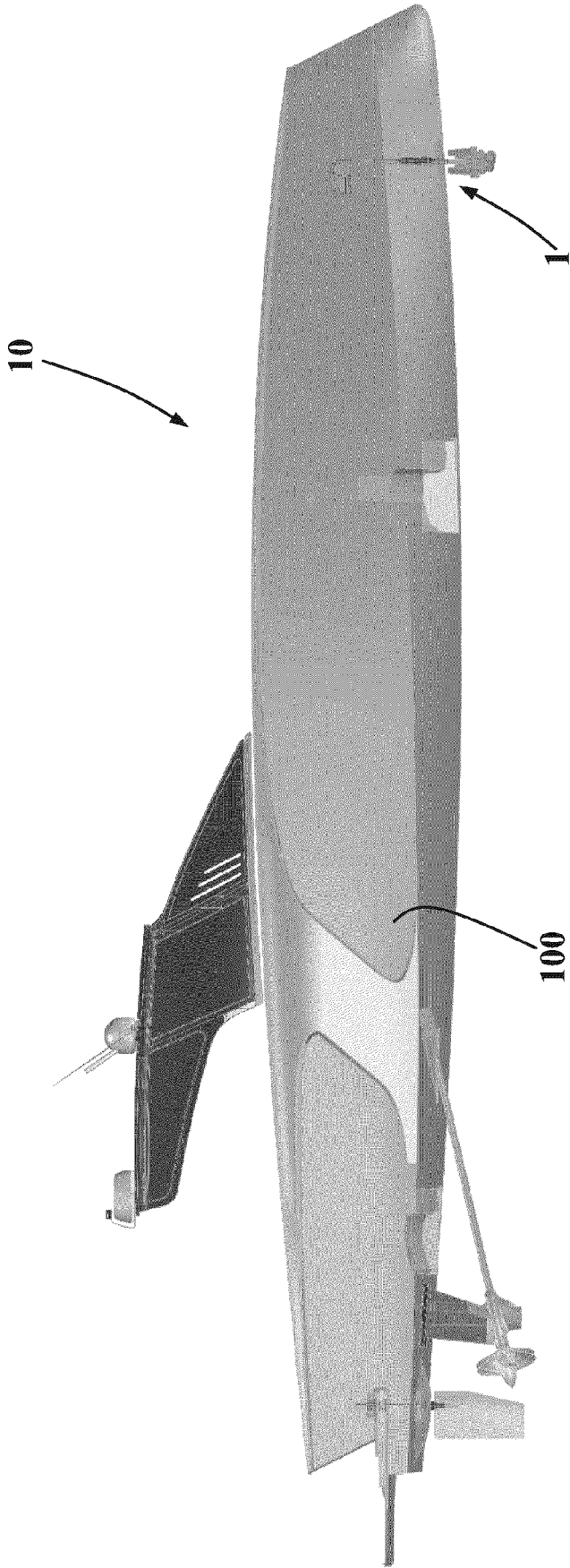


Fig. 1

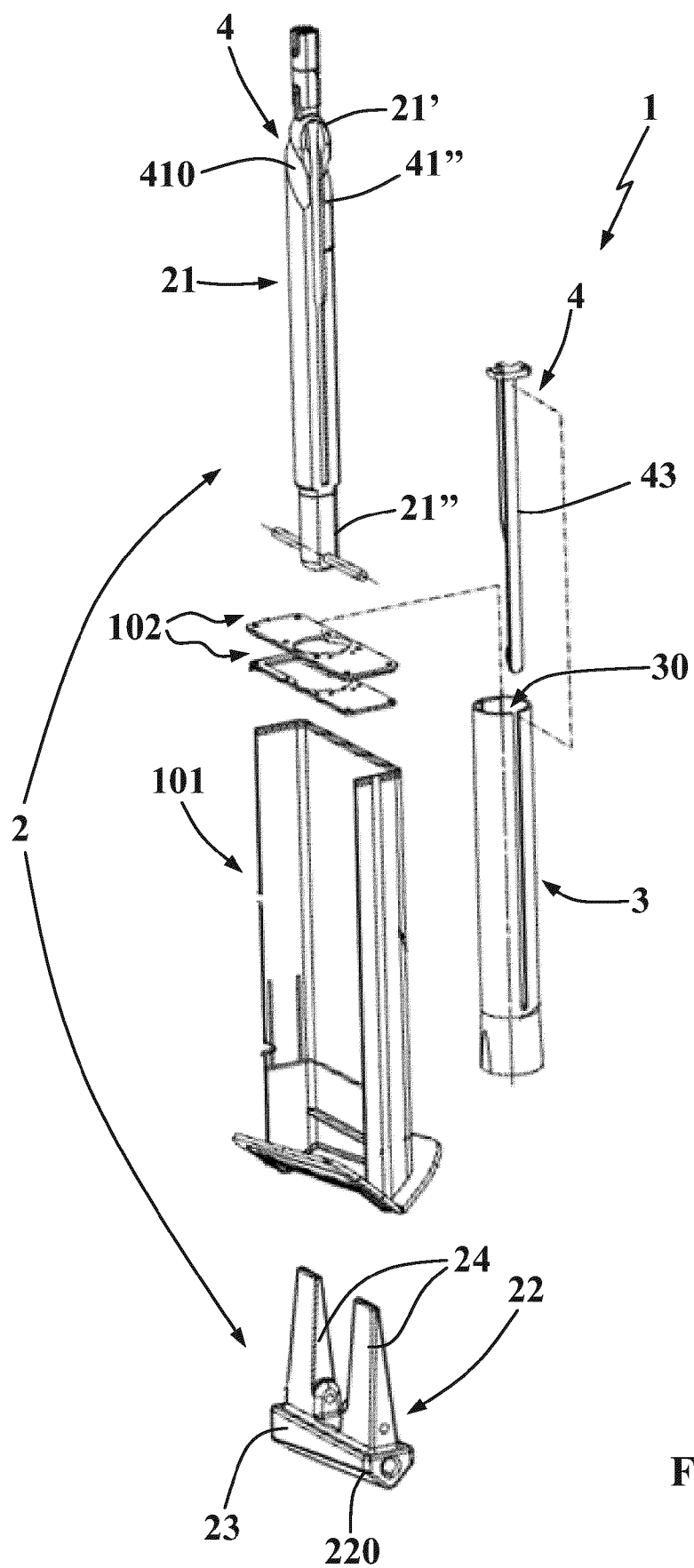


Fig. 2

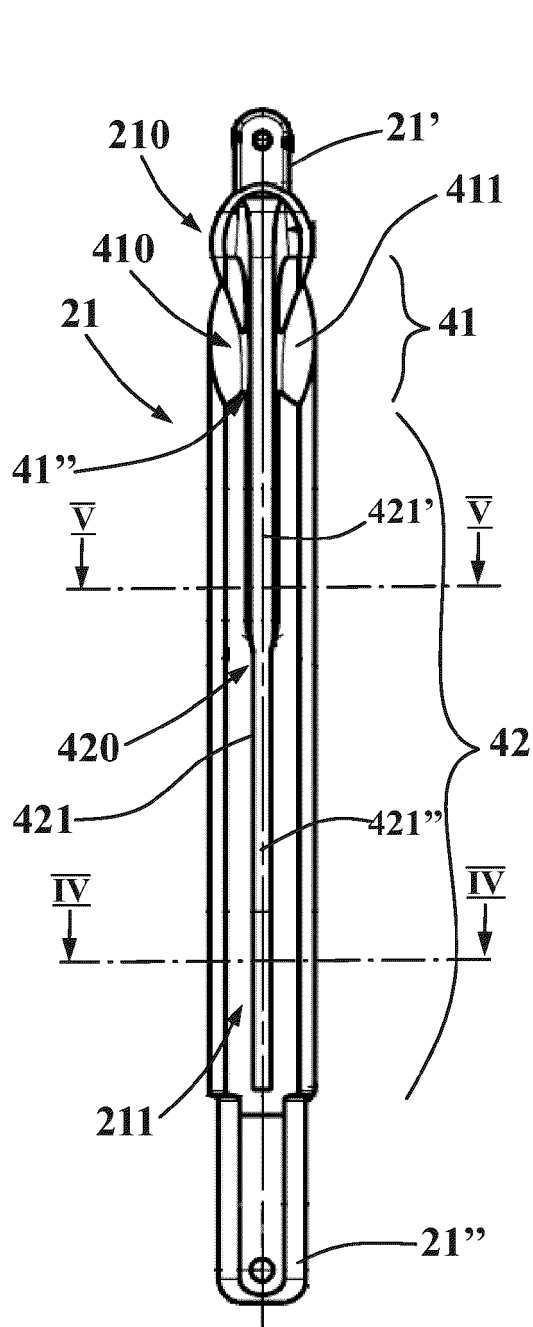


Fig. 3A

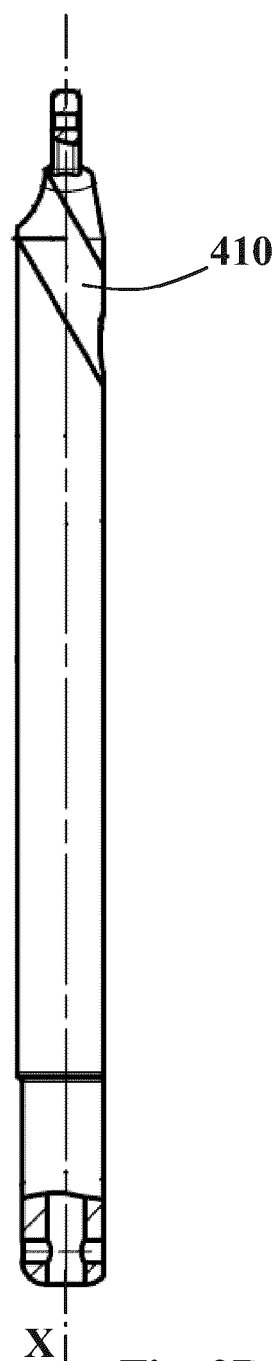


Fig. 3B

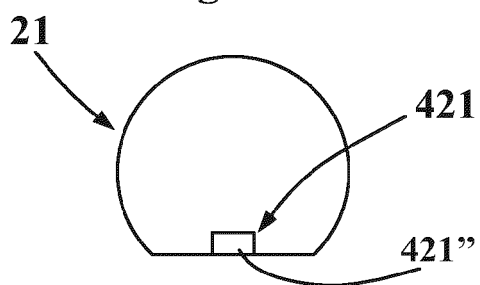


Fig. 4

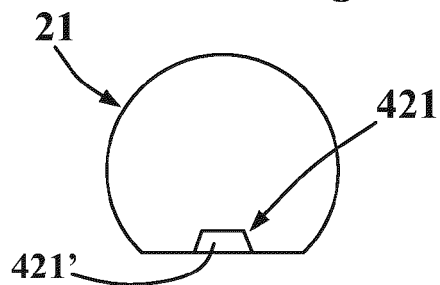


Fig. 5

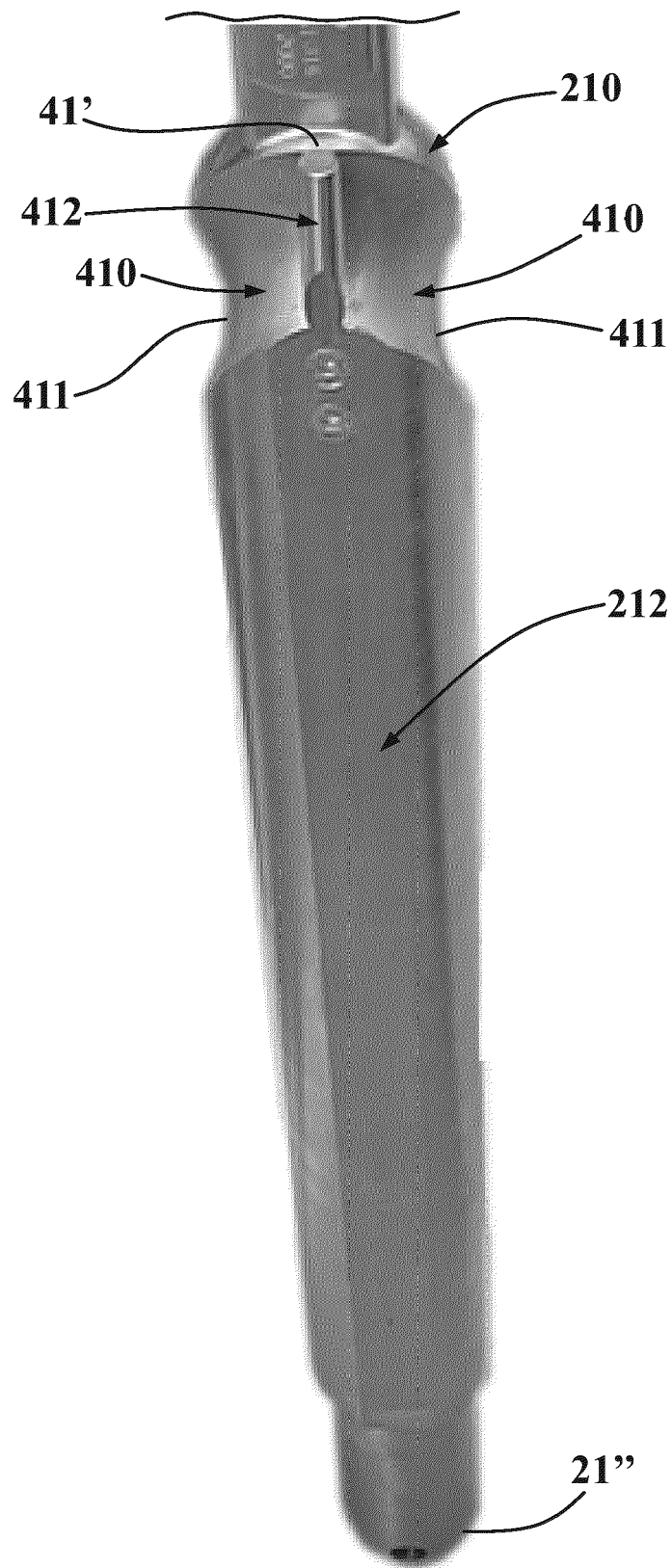


Fig. 6

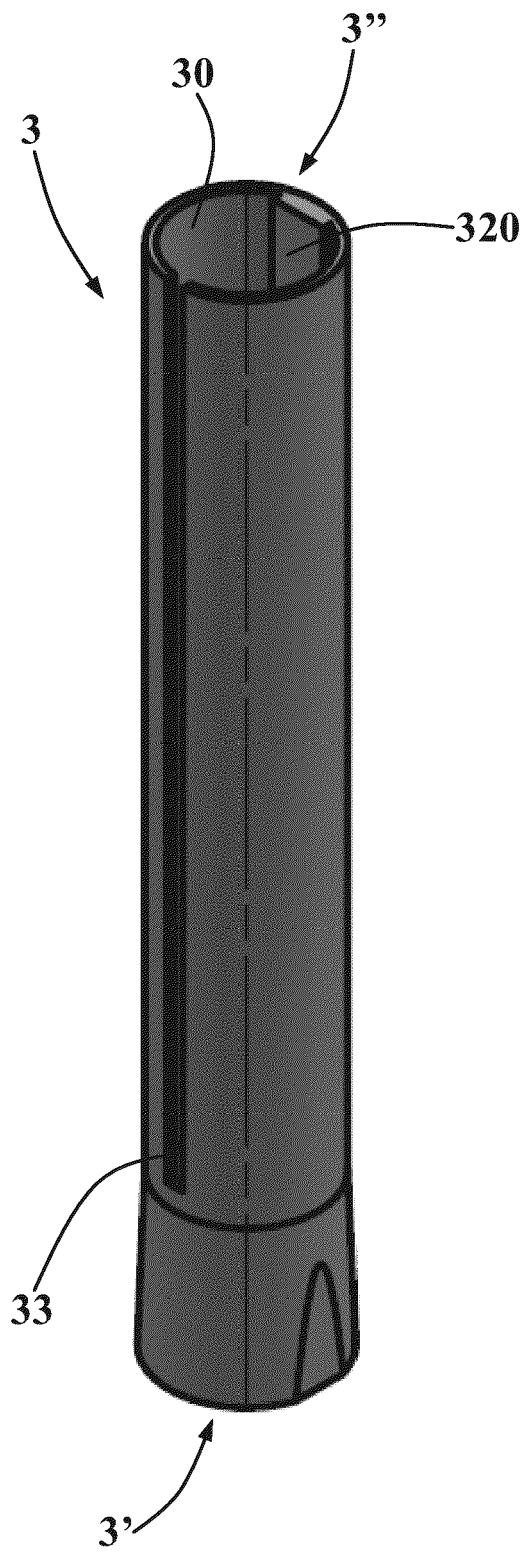


Fig. 7

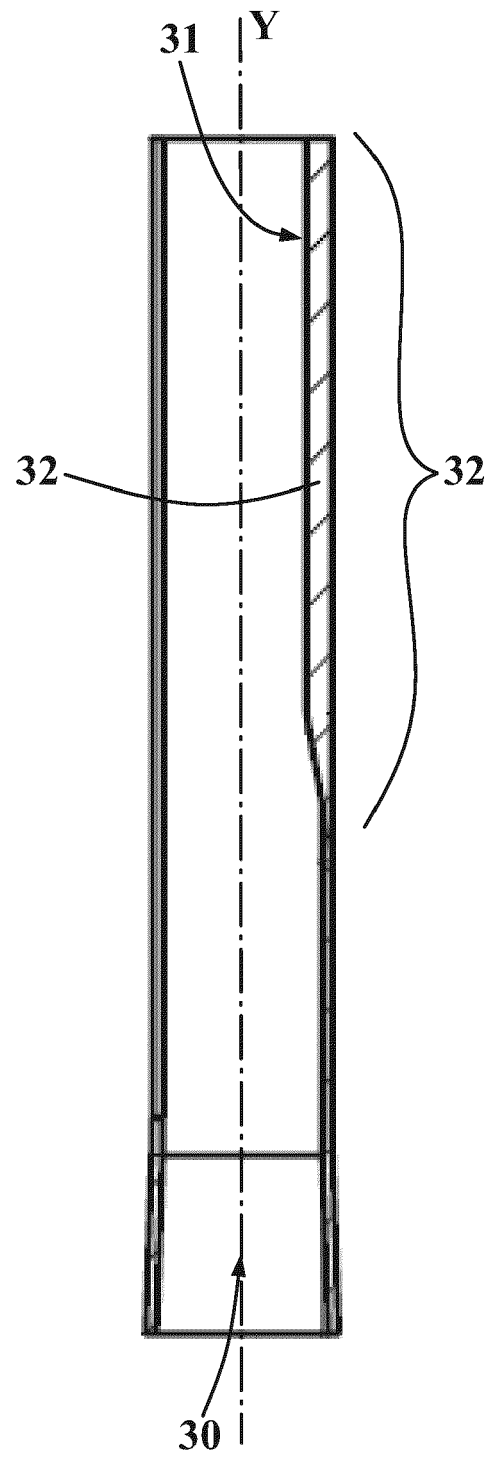


Fig. 8

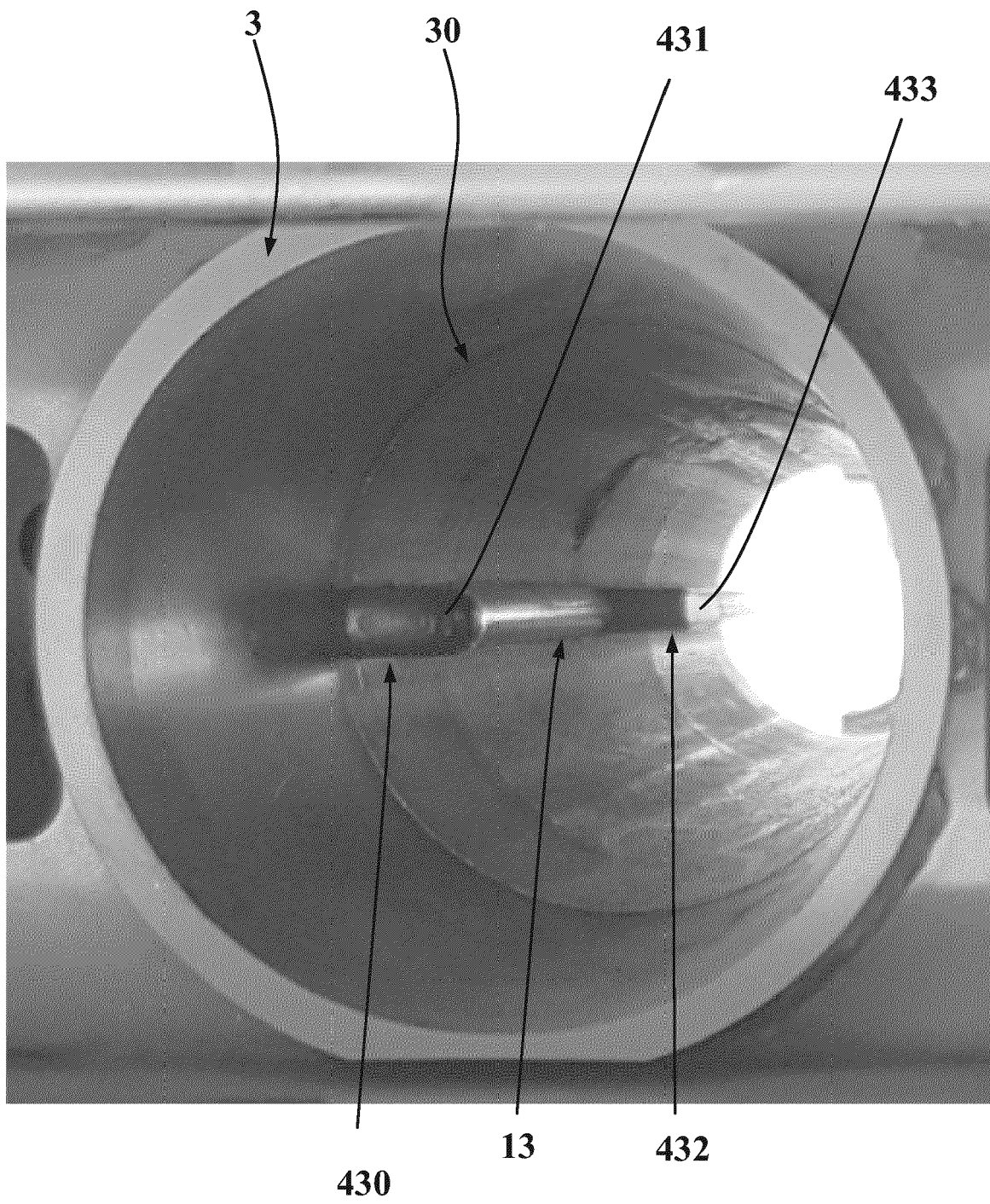


Fig. 9

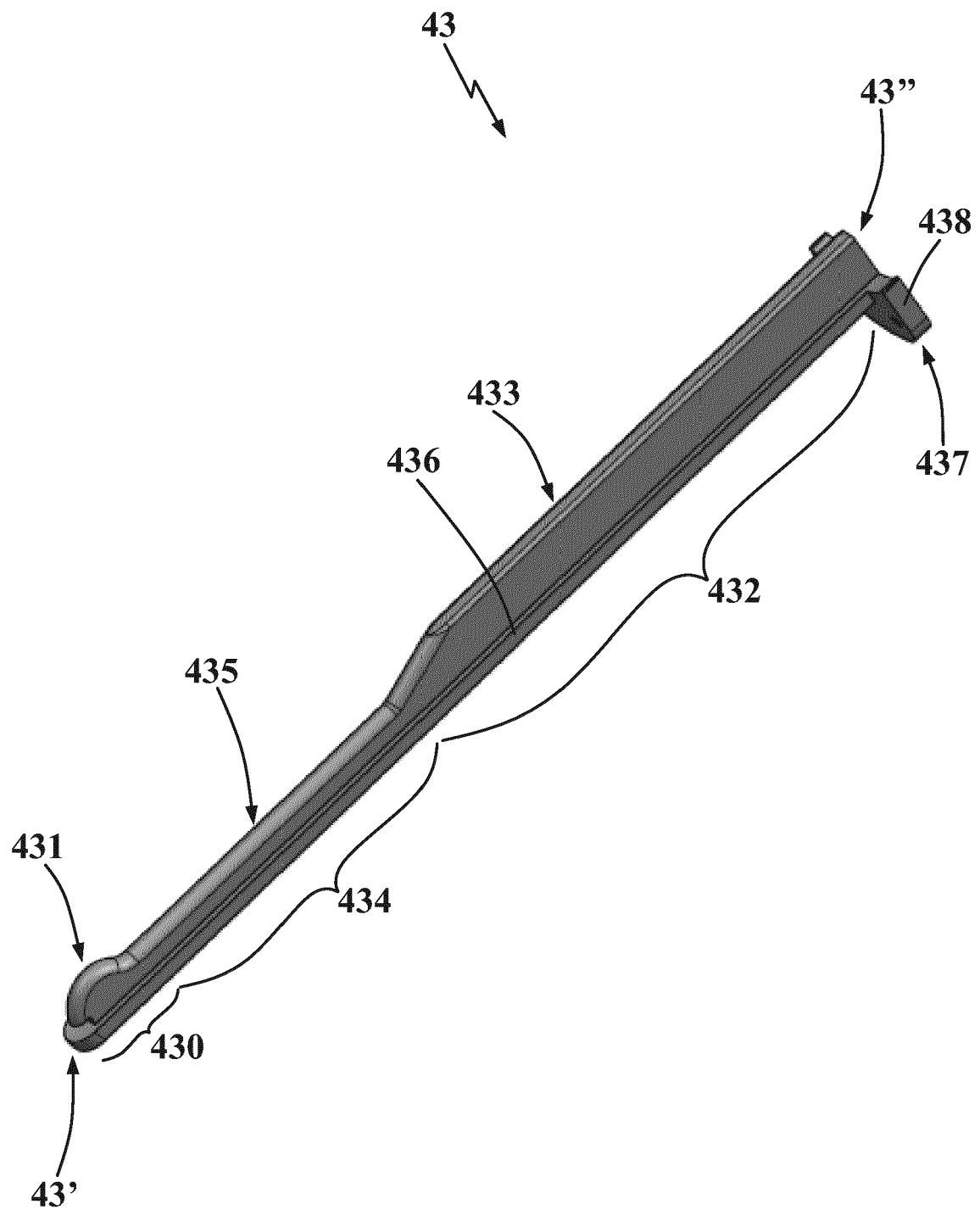


Fig. 10



EUROPEAN SEARCH REPORT

Application Number

EP 22 17 6352

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2012/143897 A1 (MANSON ANCHORS LTD [NZ]; YOUNG STEPHEN ANDREW [NZ] ET AL.) 26 October 2012 (2012-10-26) * figures * * page 18, line 29 - page 23, line 15 * & EP 2 699 471 A1 (MANSON ANCHORS LTD [NZ]) 26 February 2014 (2014-02-26) -----	1-10	INV. B63B21/22
			TECHNICAL FIELDS SEARCHED (IPC)
			B63B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		23 September 2022	Westland, Paul
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			

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ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 22 17 6352

5 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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23-09-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2012143897 A1	26-10-2012	EP 2699471 A1	26-02-2014
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REFERENCES CITED IN THE DESCRIPTION

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- EP 2699471 A [0012] [0014]