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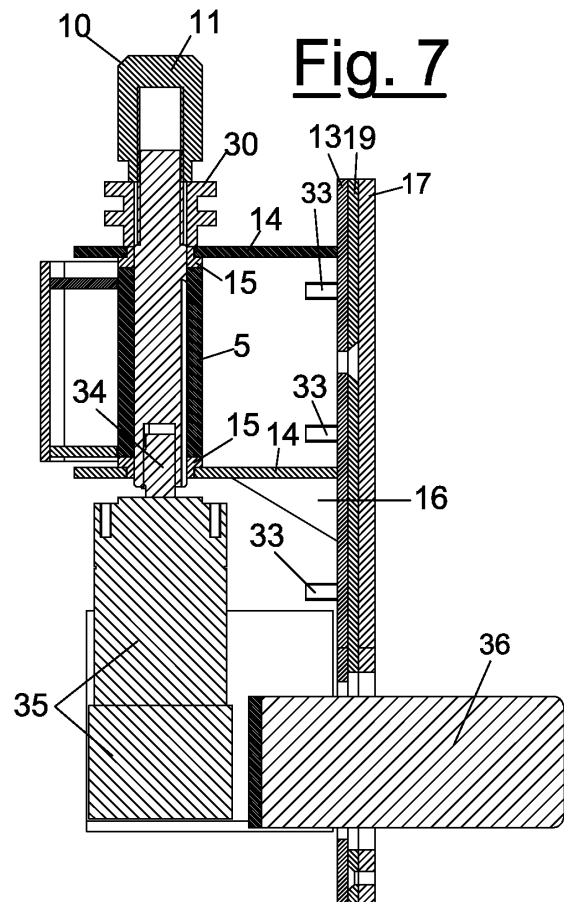
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(54) **Safety mechanism, in particular for movement devices used on boats**

(57) A safety mechanism, in particular for movement devices used on boats, such as motor-driven hinges for sliding doors of hulls, adapted for allowing the quick and safe release of a main movement pin (10) of the hinge, in the event of danger and/or damage, comprising a knurled knob (11), associated to the movement pin (10), the rotation of which allows raising the main body of the pin (10) which, in this way, comes out of the hub (5) and detaches the contact portion from the pinion (34) of the gearmotor (35), the latter in turn connected to the electrical motor (36) for moving the pin (10).



Description

[0001] The present invention relates, in general, to a safety mechanism for movement devices used on boats.

[0002] More in particular, the invention relates to a quick release mechanism for the pins that impart the motion to the motor-driven hinges used in the movement of sliding doors on board of the boats.

[0003] As known, the above-mentioned motor-driven hinges allow the opening and closing actuation of the sliding doors, according to a direction substantially parallel to the longitudinal development of the boat, ensuring complete adaptability and adhesion to the hull, thanks to the use of suitable adjustment means mounted on board of the hinge.

[0004] The sliding doors still existing on the boats provide for the use, for the movement thereof, of a guide track, generally located on top of the access opening, on which gearing adapted for guiding the door panel in a direction parallel to the opening slides.

[0005] However, such embodiment exhibits considerable installation difficulties; moreover, it is necessary to provide for the installation of the above-mentioned guide tracks, which besides implying considerable production and operating costs, of course, require a significant space, to be provided laterally to the access opening, for the mounting thereof.

[0006] Finally, the proposed solution cannot ensure perfect seal of the closing panel at the access opening, since it does not allow adapting such panel to the boat hull, once the panel has been mounted.

[0007] Further, in the movement mechanisms of the known type is not possible to obtain a quick and safe release of the elements that transmit the motion, in the event of impending hazards, such as inundations, boat damages, etc.

[0008] The object of the present invention therefore is to obviate the disadvantages mentioned above and in particular, to obtain a safety mechanism, in particular for movement devices used for actuating the sliding doors of boats, which should allow the manual actuation of the sliding door, also in the event of failure of the movement device for accidental reasons, such as inundation or boat damage, in order to avoid impending hazards.

[0009] Another object of the invention is to obtain a safety mechanism, in particular for movement devices used on boats, which should be highly effective, reliable and functional, and at relatively low cost, as compared to the traditional solutions, in relation to the advantages achieved.

[0010] These and other objects are achieved by a safety mechanism, in particular for movement devices used on boats, according to the annexed claim 1; the further dependent claims include other detailed technical features.

[0011] Further features and advantages of the present invention will appear more clearly from the following description relating to an indicative and preferred but non-

limiting example of embodiment thereof, and from the annexed drawings, wherein:

- figure 1 shows a perspective overall view of a motor-driven hinge, adapted for constituting the movement device used on boats, according to the present invention;
- figure 2 shows a top view of the adjustable hinge of figure 1, according to the invention;
- figure 3 shows a side, partly section and partly cut-away view of the adjustable hinge of figure 1, according to the invention;
- figure 4 shows a section view taken along line IV-IV of figure 3;
- figure 5 shows a section view taken along line V-V of figure 3;
- figure 6 shows a section view taken along line VI-VI of figure 3, which shows the safety mechanism, according to the invention, in detail;
- figure 7 shows a section view taken along line VII-VII of figure 2, also adapted for illustrating in detail the safety mechanism, in particular for movement devices used on boats, according to the present invention. It is noted that the following description and the annexed figures, relating to a preferred embodiment, refer to a special application of the safety mechanism and of the movement device, according to the present invention, and in particular, they refer to a use for sliding doors of boats.

[0012] It is also clear that, alternatively and without distinction, the safety mechanism and the movement device, subject of the present invention, can be further applied also to different types of products and in any case, they can be made for all those systems adapted for moving doors, panels or extended surfaces in general.

[0013] With particular reference to the above figures 1-7, the movement device usable on pleasure boats, according to the invention, essentially consists of a single motor-driven and adjustable hinge, the construction details of which are shown in figures 1-5.

[0014] In particular, the above hinge comprises a series of L shaped longitudinal plates, such as a top plate 1, overlapped, at the end of the installation, by a cover protection 1B, in turn secured to plate 1 by pins 9, a middle plate 1A and a bottom plate 2, enclosed into respective vertical plates, an inner one (since, when the hinge is installed, it is arranged in front of the inner portion of the sliding door), generically indicated with reference numeral 3, and an outer one (whose surface, when the hinge is installed, is visible from the inside hull of the boat), generically indicated with reference numeral 4.

[0015] The plates of the L shaped hinges indicated with reference numerals 1, 1A and 2 are laterally connected, on one side, to a first main movement pin 10, provided with a hub 5 and with a top knurled knob 11 and mounted at a vertical fixing wall or bulkhead, provided at the access opening, closable by the sliding door, of the hull; on the

other side, plates 1, 1A and 2 are fastened to a second pin 12, mounted at the inner portion of the sliding door.

[0016] Pin 12 is seated into a perforated bar 6, through a guide bush 7, whereas the main movement pin 10 receives the motion from the electrical motor 36 (fixed to the hinge structure through the fixing plate 18), through gearmotor 35 and is keyed into hub 5, thanks to the interposition of a guide bush 15.

[0017] Respective chain tightener plates 8, fixed to plate 1 through relevant welded nuts 37 and screws 38, are positioned on top plate 1 of the hinge, at the point of contact of the sides of the L, and used as pre-tensioners of a dual roll chain 42, which develops on the entire surface of plate 1, according to the path indicated in detail in figure 3, between the respective dual pinions, indicated with reference numeral 30, of the main movement pin 10 and of pin 12 arranged at the side of the sliding door.

[0018] Such chain timing system prevents unavoidable clearance and oscillations of the system and contributes to obtaining a parallel movement of the sliding door, which remains aligned relative to the hull, during the movement, also ensuring the adhesion of the above sliding door to the hull, in closed door position over time.

[0019] The motor-driven hinge is further provided with a plate 20, adjacent pin 12 and always at the side fixed to the sliding door, also sliding through guides 28 on the door, which is connected to pin 12 through tongue 21; the vertical sliding of plate 20 takes place through the adjustment pin 26, which slides inside the threaded block 27 and is kept into position by the threaded washer 29.

[0020] The adjustment pin 26 further supports a block 25, which is welded to plate 43, in turn integrally fixed to the circular plate 23, adapted for the side adjustment of the hinge relative to sliding door 54.

[0021] Adjacent the circular plate 23 there are connected further circular plates, having the same shape and same dimensions as the above plate 23; in particular, there is a circular plate 22, fixed to the sliding door of the boat, and a circular plate 24, arranged between the two plates 22, 23, adapted for the vertical adjustment of door 54.

[0022] The above circular plates 22, 23, 24 exhibit, at predetermined and suitable positions, a series of slots, inside which there are inserted respective adjustment screws.

[0023] In particular, the screws indicated with reference numeral 31 are welded on the intermediate plate 24 and protrude from plate 23, thanks to the presence of the concentric slots 55, and, similarly, the screws indicated with reference numeral 32 are welded on the end plate 22 and also protrude from plate 23, thanks to the presence of the concentric slots 56; in the latter case, considering the more extended size of slots 56, it is also possible to use one or more covering washers 40 to lock screws 32.

[0024] Similarly, the hinge is fixed to the boat hull through further overlapped plates; in particular, a shaped plate 13 can be seen, which is connected through

tongues 14 and reinforcement square 16 to hub 5 of the movement pin 10.

[0025] Also plate 13 is provided with slots 57, usable for the side and/or angular adjustment of the hinge, and is overlapped to a further plate 19, having the same shape and dimensions as plate 13 and usable for the vertical adjustment of the hinge, on which screws 33, which protrude from the concentric slots 57, are welded; also in this case, it is possible to use one or more covering washers 41 of slots 57 and one or more locking nuts 39 for screws 33.

[0026] Adjacent to plate 19, finally, there is provided an end connecting plate 17, fixed and screwed to the boat hull, on which plates 13, 19 are adjustable into position, through screws 33.

[0027] With special reference to the annexed figures 6 and 7, the main movement pin 10 of the motor-driven hinge is provided, as said, with a knurled knob 11, which can be actuated from the outside by a user, in order to release the body of pin 10 from the electrical motor 36 and from gearmotor 35.

[0028] In fact, rotating knob 11 raises the body of pin 10, which protrudes from hub 5, thus releasing pinion 34 associated to gearmotor 35.

[0029] In this way, in the event of faults of the movement device, caused for example by inundations and/or damages of the same device that cause the lock of the electrical motor 36, it is possible to quickly and safely release the movement pin 10 from the motor, thus being capable of manually pushing the hinge portion that rotates during the opening and/or closing movement of the sliding door.

[0030] In this way, it is possible to manually cause the door opening and/or closing, preventing hazards to the safety of the users that, in the event of inundations and/or damages, may be trapped into the cabin.

[0031] Moreover, the use of the self-centering plates or disks, arranged at the ends of the motor-driven hinge, respectively fixed to the sliding door and to the boat hull, allows making suitable manual adjustments of the above hinge, relative to the sliding door and to the boat hull, according to predetermined angles and in the three space directions; such adjustments, that can be manually made by the respective screws 31, 32, 33, are also repeatable over time, in order to obtain the utmost adaptability of the device to the hull, even in the case the movement device of the sliding door and/or the structure of the hull undergo deformations and/or crookedness over time, which cause undesired clearance and oscillations of the door at the access opening.

[0032] Moreover, the parallel movement of the sliding door relative to the boat hull is further ensured, as already described, by the chain system, which allows a synchronous and precise movement of the shaped vertical plates 3 and 4 of the hinge, so as to obtain a precise alignment of the inner portion of the door, both during the closing step and during the opening step of the access opening.

[0033] The features of the safety mechanism, in par-

particular for movement devices used on boats, which is the subject of the present invention, as well as the advantages thereof, appear clearly from the above description. [0034] Finally, it is clear that several more variations can be made to the subject safety mechanism without departing from the novelty principles of the inventive idea, as well as it is clear that in the practice of the invention materials, shapes and sizes of the illustrated details may be whatever according to the requirements and the same may be replaced with technically equivalent ones.

Claims

1. A safety mechanism, in particular for movement devices used on boats, said movement devices being adapted for allowing the opening and closing actuation of doors and/or panels according to a direction substantially parallel to the longitudinal development of the boat and for ensuring complete adaptability and adhesion of said doors and/or panels to the boat hull, said movement devices further comprising at least one shaped hinge, which is fixed, at a first end thereof, to at least one portion of the boat hull, and, at a second end thereof, to at least one portion of the door and/or panel, said hinge being actuable by at least one movement pin (10), motor-driven by at least one electrical motor (36) and arranged at the end of the hinge fixed to said portion of the boat hull, and at least one return pin (12), arranged at the end of the hinge fixed to said portion of the door and/or panel, **characterised in that** said motor-driven movement pin (10) is manually actuable in shifting, through at least one knob (11) available to the user, so as to release the bottom of the pin (10) from a pinion (34), mounted on a gearmotor (35) of said electrical motor (36).
2. A safety mechanism according to claim 1, **characterised in that** said shifting movement of the motor-driven pin (10) is carried out in the event of lock of the electrical motor (36), so as to manually actuate a rotating portion of hinge and, consequently, the door and/or closing panel, in the event of failures and/or impending hazards.
3. A safety mechanism according to claim 1, **characterised in that**, at said first and second ends of said hinge, there are provided respective first plates or disks (17, 22), fixed and integral, respectively, to said portion of the hull and to said portion of the door and/or panel, said first plates or disks (17, 22) being constrained to further plates or disks (13, 19, 23, 24), which are overlapped, at least partly, to said first plates or disks (17, 22), by the interposition of adjustment means (31, 32, 33), fixed to at least one of said plates or disks (13, 17, 19, 22, 23, 24) and seated inside shaped slots (55, 56, 57) obtained on said

plates or disks (13, 17, 19, 22, 23, 24).

4. A safety mechanism according to claim 3, **characterised in that** said hinge exhibits a structure comprising a series of L shaped plates (1, 1A, 2) and enclosed by vertical closing plates (3, 4), said L shaped plates (1, 1A, 2) being connected to respective tongues (14, 21) for the connection to at least one of said plates or disks (13, 17, 19, 22, 23, 24).
5. A safety mechanism according to claim 4, **characterised in that** said movement pin (10) and said return pin (12) include respective pinions (30), on which at least one roll chain (42) engages, arranged on top of at least one of said L shaped plates (1, 1A, 2) and having a development that follows the geometry of said L shaped plate (1, 1A, 2).
6. A safety mechanism according to claim 5, **characterised in that** said roll chain (42) takes on a suitable tightening thanks to the use of respective chain tightener plates (8), provided with adjustment means (37, 38), arranged on said L shaped plate (1, 1A, 2).
7. A safety mechanism according to claim 3, **characterised in that** at the end of the hinge fixed to said portion of the door and/or panel, there is provided at least one sliding plate (20), at least partly overlapped to said plates or disks (13, 17, 19, 22, 23, 24), contained within suitable sliding guides (28) and actuable by a relevant adjustment pin (26).
8. A safety mechanism according to claim 3, **characterised in that** said plates or disks (13, 17, 19, 22, 23, 24) exhibit, at least in pairs, same shape and dimensions.
9. A safety mechanism according to claim 3, **characterised in that** said adjustment means (31, 32, 33) allows adjusting the setup of said door and/or panel in the three-dimensional space, according to the three orthogonal axes and according to predetermined angles.
10. A safety mechanism according to claim 7, **characterised in that** said adjustment pin (26) exhibits at least one block (25) integral to at least one shaped plate (43), which is in turn fixed to at least one of said plates or disks (13, 17, 19, 22, 23, 24) arranged at the end of the hinge fixed to said portion of the door and/or panel.

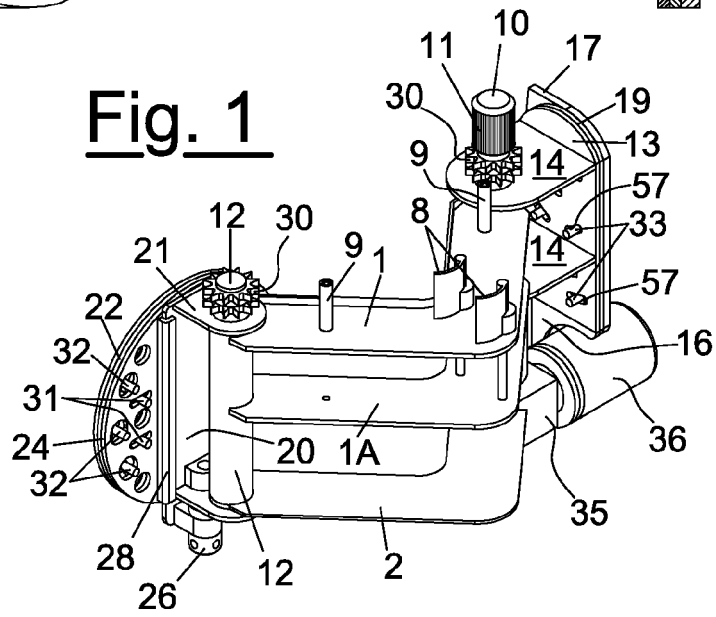
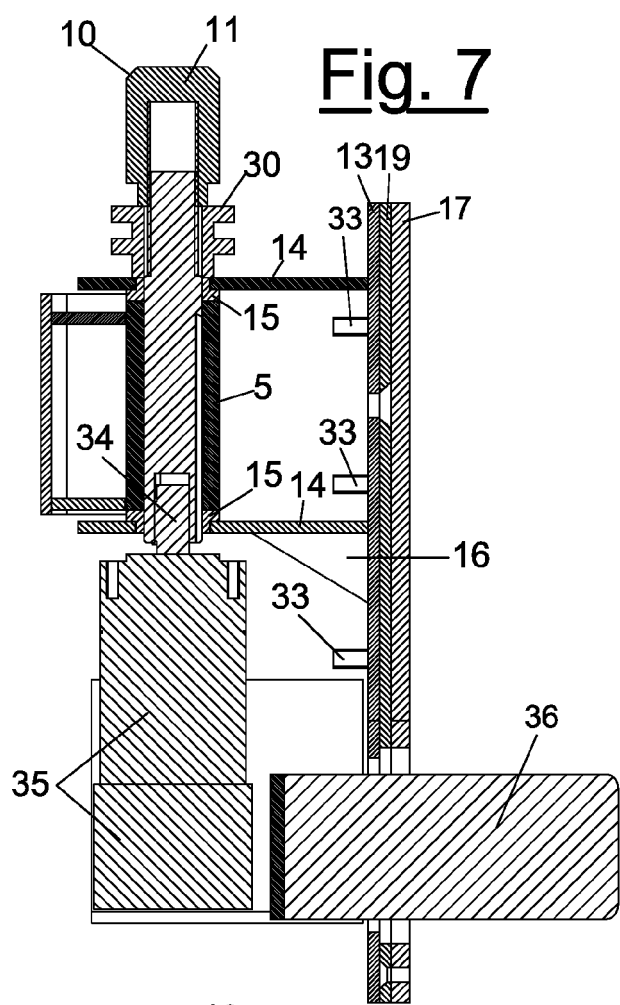
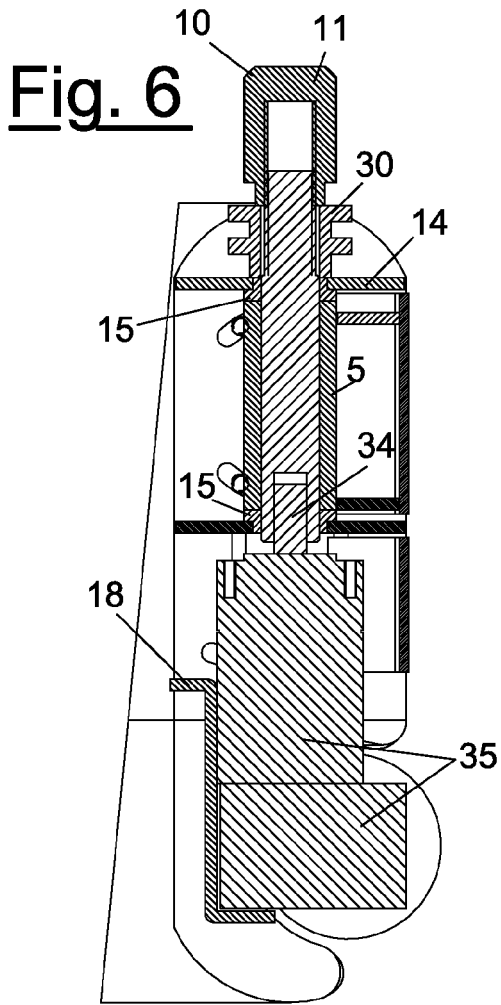


Fig. 4

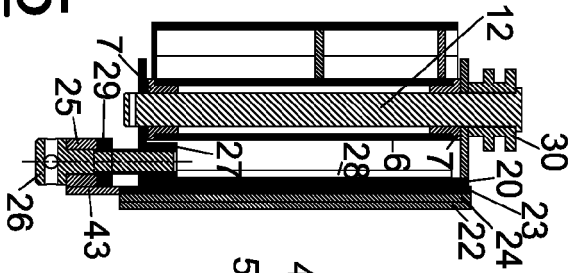


Fig. 5

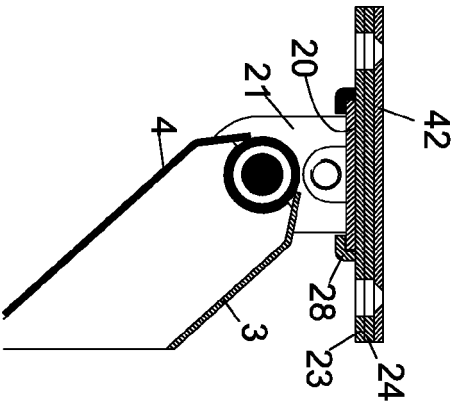


Fig. 3

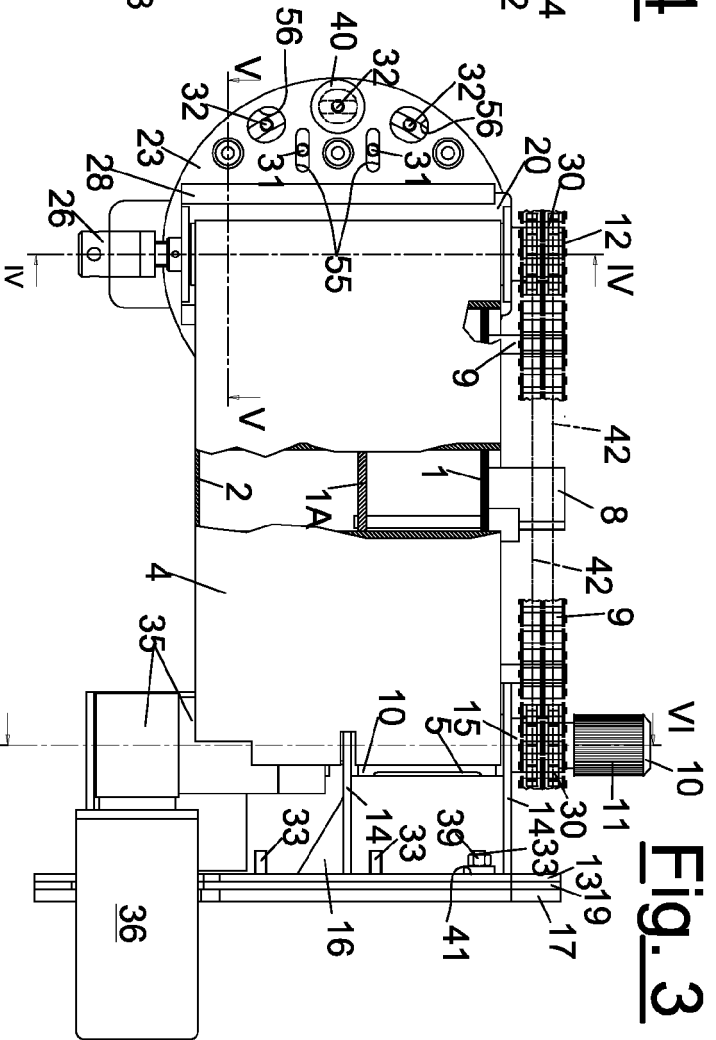


Fig. 2

