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(54) **PROTECTIVE DEVICE FOR THE DRIVE UNIT OF A WATERCRAFT**

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(57) **ABSTRACT**

A protective device (14) for the drive unit (10) of a watercraft such as a sport motor boat, a fishing vessel or the like, especially having a Z-drive. In order to prevent barnacle infestation and fouling of the drive unit (10) while the watercraft lies in the water, the protective device (14) is configured as a housing (16) with at least two dimensionally stable housing shell parts (18), which, in the mutually connected closed state, for the seal-tight enclosure of the drive unit (10) to be protected, bear in a seal-tight manner one against the other with their closing edges (22), which correspond to one another in shape, and with an opening edge (24) against the hull of the watercraft, the housing shell parts (18) consisting of a lightproof material.

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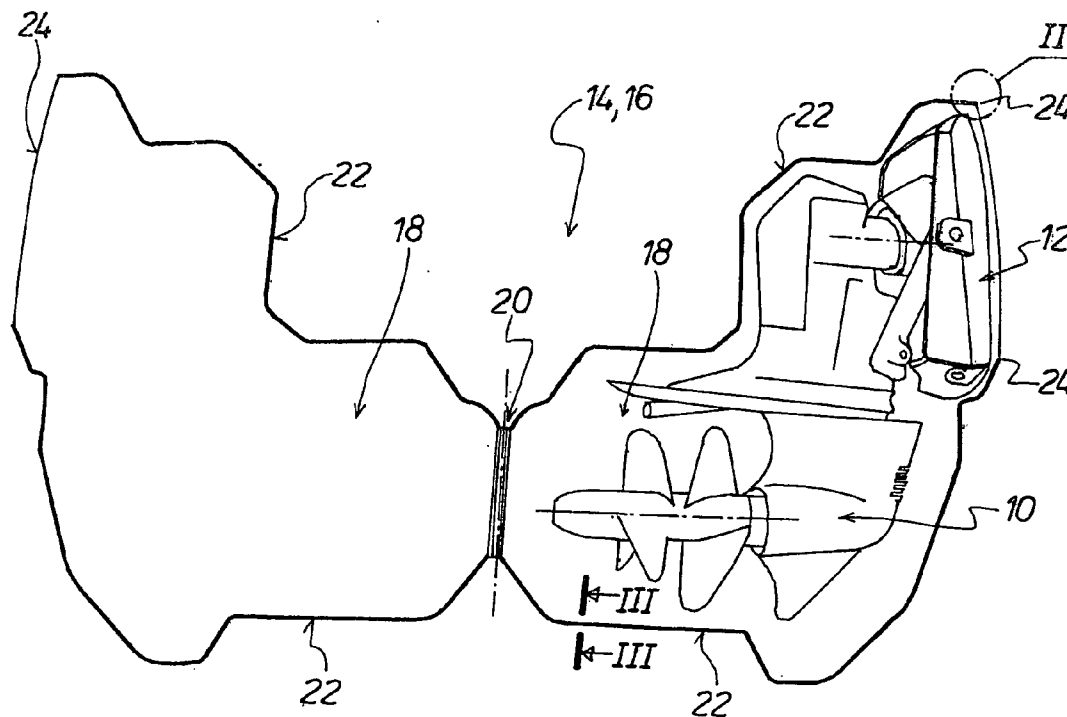
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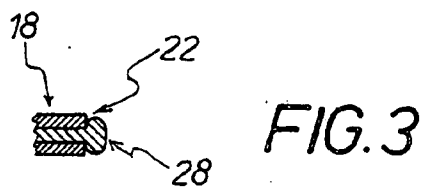
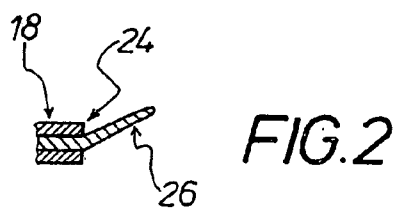
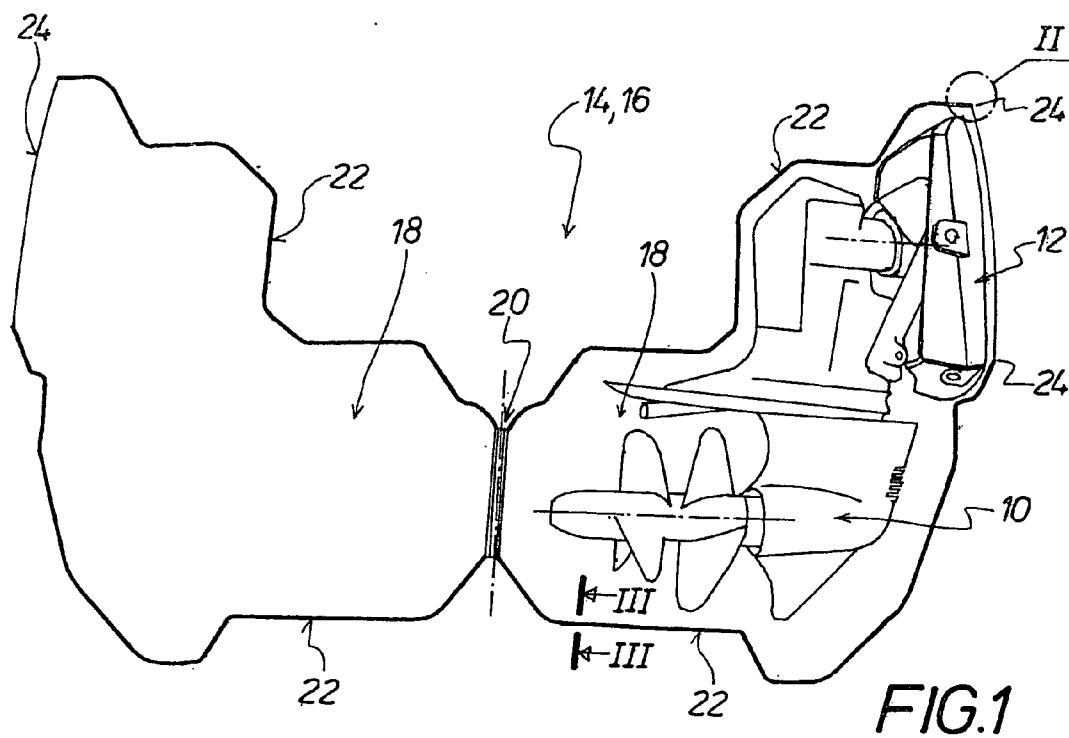
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### PROTECTIVE DEVICE FOR THE DRIVE UNIT OF A WATERCRAFT

[0001] The invention relates to a protective device for the drive unit of a watercraft such as a sport boat, in particular a sport motor boat, a fishing vessel or the like, having a Z-drive, the protective device being configured as a housing with dimensionally stable housing shell parts, which, in the mutually connected closed state, enclose the drive unit to be protected and bear one against the other with their closing edges, which correspond to one another in shape.

[0002] From the abovementioned DE 43 40 131 C2, a protective device for the drive unit of a watercraft such as a sport boat, in particular a sport motor boat, a fishing vessel or the like, especially having a Z drive, is known, the protective device being configured as a housing with dimensionally stable housing shell parts, which, in the mutually connected closed state, enclose the drive unit to be protected and bear one against the other with their closing edges, which correspond to one another in shape.

[0003] This known protective device serves to protect the drive unit while the watercraft is transported or stored on a trailer, i.e. when the watercraft is standing on land or is in transit on a road. This protective device serves to protect against mechanical actions from outside, against weather influences and against contamination of the high-value parts of the drive unit. When the watercraft is standing on land, this known device also forms an anti-theft protection. This known protective device does not serve as protection against barnacle infestation or against fouling of the drive unit of the watercraft when this is in the water.

[0004] A protective device for protecting a drive unit of a watercraft against weather influences and against mechanical actions from outside when the watercraft is out of the water, i.e. is standing on a trailer or on a storage cradle on land, is known from U.S. Pat. No. 5,660,136. This known protective device has inflatable chambers, so that, in the non-usage state, it is collapsible into a small volume. This known protective device also offers protection against injuries which might be suffered from the sharp edges of the drive unit during storage on land. This known protective device, too, offers no protection against barnacle infestation and against fouling.

[0005] From DE-PS 90 330, a protective device is known which is intended for ship's screws and which serves to prevent water creepers and flotsam, such as logs and the like, from getting wrapped in the screw of the ship's drive unit and from possibly causing shaft or propeller blade fractures. This known protective device consists of a two-part wire-mesh cage, so that the propeller enclosed by a known protective device of this kind is wetted by the water, with the result that barnacle infestation and fouling cannot be prevented with this known protective device.

[0006] JP 09249193 A discloses only a protective device for a propeller of a watercraft, to protect the propeller against barnacle infestation and fouling. A protective device for protecting a complete drive unit of a watercraft is not disclosed by this prior art.

[0007] Watercraft such as sport motor boats, fishing vessels or the like, which lie in the water for several days or weeks and are not moved, i.e. run, are exposed in the underwater region to barnacle infestation and fouling. Light

irradiation and solar irradiation reinforce said barnacle infestation and fouling. As a result of such barnacle infestation and fouling, drag is considerably increased, resulting in raised fuel consumption.

[0008] In order to prevent such barnacle infestation and fouling in the underwater region, antifouling coatings are known, by means of which the underwater region of a watercraft of the type stated in the introduction can be effectively protected. This applies, in particular, to that hull surface area of the respective watercraft which is in the water. Such antifouling coatings involve abrasive paints, which are rubbed off in very small quantities during travel, whereby barnacle infestation and fouling is prevented. Abrasive antifouling coatings of this type are suitable, however, only for the hull surfaces and appendages, but not for moving parts such as the drive unit, for example a Z-drive or similar drives which contain moving parts and rubber sleeves, shaft-sealing rings, hydraulic mechanism, etc. For these there are no special coatings, i.e. they cannot be reliably protected against barnacle infestation and fouling.

[0009] In the light of these factors, the object of the invention is to provide a protective device of the type stated in the introduction, which is of simple configuration and with which barnacle infestation and fouling of a drive unit for a watercraft, such as a sport or fishing boat, is prevented while this lies in the water.

[0010] This object is achieved according to the invention by virtue of the features of claim 1, in that the housing shell parts consist of a lightproof material and are intended with their closing edges to enclose the drive unit in a seal-tight manner and have an opening edge which is intended to bear in a sealing manner against the hull of the watercraft, the opening edge having a lip seal and the housing shell parts having on their closing edges a sealing element.

[0011] The protective device according to the invention, i.e. the housing comprising the housing shell parts, can be fitted to the drive unit of the watercraft in a simple and time-saving manner both out of the water and in the water, the housing surrounding on all sides the drive unit projecting from the hull of the watercraft and bearing closely against the hull, so that, in the active state of the protective device, i.e. when the watercraft is in the water, an exchange of water between the surrounding water and the interior of the housing is prevented or is negligibly small and, in particular, a light irradiation and solar irradiation onto the drive unit are prevented, whereby barnacle infestation and fouling of the drive unit is prevented even when the watercraft lies in the water for several days or weeks without being run.

[0012] The housing of the protective device according to the invention can have two housing shell parts, which are mutually connected by means of a hinge. It has here proved expedient for the hinge to be provided on edge portions, remote from the opening edges, of the closing edges of the two housing shell parts.

[0013] In order to be able to fit the protective device according to the invention, i.e. the housing comprising housing shell parts, in a problem-free and time-saving manner around the drive unit to be protected against barnacle infestation and fouling, it is preferred if the housing with its housing shell parts is at least matched approximately in shape to the form of the drive unit.

[0014] The housing shell parts consist of a water-resistant, i.e. preferably saltwater-resistant synthetic material. This can be constituted, for example, by glass-fiber reinforced plastic or acrylonitrile-butadiene-styrene or some other suitable synthetic material suitable for producing shell-shaped structures, i.e. for the production of the housing shell parts.

[0015] According to the invention, a lip seal is provided on the opening edge of the housing shell parts. With the aid of the lip seal, the protective device according to the invention can be sealed off against the hull of the respective watercraft.

[0016] Similarly, according to the invention, a sealing element is provided on the closing edges of the housing shell parts.

[0017] The lip seal on the opening edge of the housing shell parts and/or the sealing element on the closing edge of the housing shell parts can be produced, directly in the production of the housing shell parts, integrally with the latter. Another option is to fix the lip seal and/or the sealing elements later to the housing shell parts.

[0018] According to the invention, the housing comprising the shell parts can be fastenable to the drive unit, to be protected, of the watercraft. This applies to watercraft having a V-drive or a Z-drive. Particularly in watercraft having a Z-drive disposed on the stern of the watercraft, it is expedient for the housing of the protective device according to the invention to be fastenable to the stern plate of the Z-drive to be protected, which stern plate is fastened to the stern of the watercraft.

[0019] Further details, features and advantages derive from the following description of an illustrative embodiment, represented diagrammatically in the drawing, of the protective device according to the invention for a Z-drive of a watercraft such as a sport boat or a fishing vessel, wherein:

[0020] FIG. 1: shows a representation of a Z-drive, in combination with a protective device according to the invention which has a housing comprising two housing shell parts,

[0021] FIG. 2: shows a representation of the detail II in FIG. 1 on a larger scale, and

[0022] FIG. 3: shows a section along the sectional line III-III in FIG. 1 on an enlarged scale.

[0023] FIG. 1 shows a drive unit 10, which is configured as a Z-drive. The Z-drive has a stern plate 12, by which it is fastenable or fastened to the stern of a watercraft (not illustrated) such as a sport motor boat, a fishing vessel or the like. The drive unit 10 can be protected by means of the protective device 14 against barnacle infestation and fouling. The protective device 14 has a housing 16 consisting of two housing shell parts 18, which are inversely identical in shape. The two housing shell parts 18 are mutually connected by means of a hinge 20. In FIG. 1, the housing 16 is shown open. The two housing shell parts 18 can be folded about the hinge 20 so as to enclose the drive unit 10 in a

lightproof manner. In the closed state of the housing 16, the two housing shell parts 18 bear closely one against the other with their inversely matched closing edges 22. The closing edges 22 extend from the common hinge 20 to a respective opening edge 24, which is matched in shape to the edge of the stern plate 12.

[0024] FIG. 2 illustrates diagrammatically and not to scale, in a sectional representation, a portion of said opening edge 24, which has a lip seal 26. With the lip seal 26, the housing 16 bears in the closed state closely and in a seal-tight manner against the stern plate 12 or against the stern of a watercraft (not represented) such as a sport motor boat, a fishing vehicle or the like.

[0025] FIG. 3 illustrates diagrammatically and not to scale, in a sectional representation, a portion of the closing edge 22, which has a sealing element 28 to seal off the housing shell parts 18 in the closed state of the housing 16.

[0026] The housing 16 can be fastenable to the drive unit 10, in particular to the stern plate 12 of the drive unit 10. This fastening can be realized by clamps, screws or the like.

1. A protective device for the drive unit of a watercraft such as a sport boat, in particular a sport motor boat, a fishing vessel or the like, especially having a Z-drive, the protective device being configured as a housing with two dimensionally stable housing shell parts, which are mutually connected by means of a hinge and, in the mutually connected closed state, enclose the drive unit to be protected and bear one against the other with their closing edges, which correspond to one another in shape, wherein the housing shell parts consist of a lightproof material and are intended with their closing edges to enclose the drive unit in a seal-tight manner and have an opening edge which is intended to bear in a sealing manner against the hull of the watercraft, characterized in that the opening edge has a lip seal and the housing shell parts have on their closing edges a sealing elements, and in that the hinge is provided on edge portions, remote from the opening edges, of the closing edges of the two housing shell parts.

2. The protective device as claimed in claim 1, characterized in that the housing with its housing shell parts is matched approximately in shape to the form of the drive unit.

3. The protective device as claimed in claim 1, characterized in that the housing shell parts consist of glass-fiber reinforced plastic or acrylonitrile-butadiene-styrene.

4. The protective device as claimed in claim 1, characterized in that the housing is fastenable to the drive unit, to be protected, of the watercraft.

5. The protective device as claimed in claim 4, characterized in that the housing is fastenable to the stern plate of the drive unit to be protected, which stern plate is fastened to the stern of the watercraft.

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