Jan. 12, 1937. B. O. GODFREY 2,067,839

CORROSION CHECKING DEVICE

Filed July 24, 1935

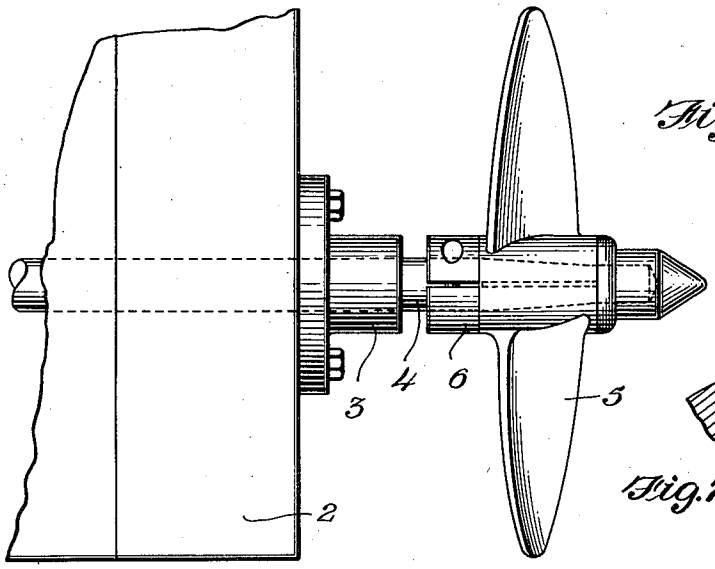


Fig. 1.

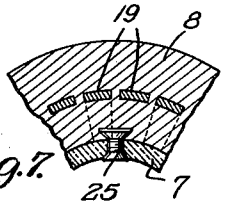


Fig. 7.

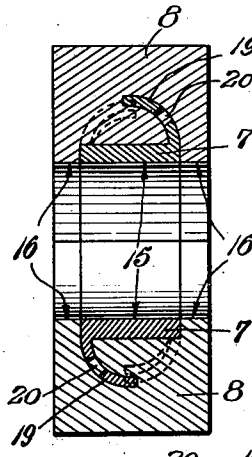


Fig. 2.

Fig. 3.

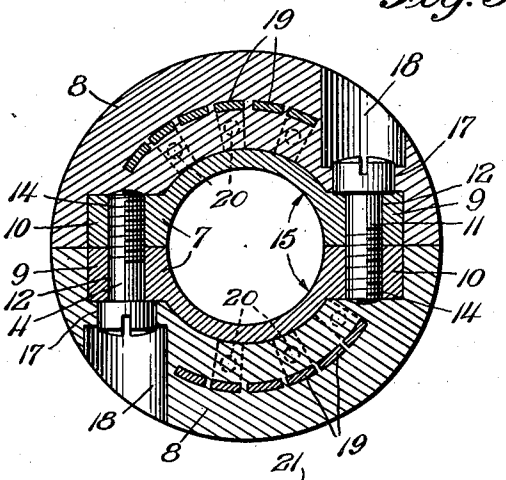
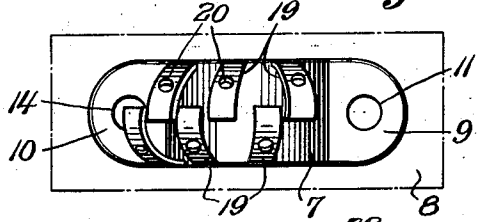


Fig. 4.



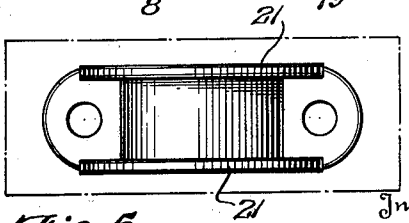


Fig. 5.

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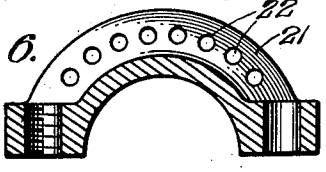


Fig. 6.

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CORROSION CHECKING DEVICE

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2 Claims. (Cl. 114—65)

The object of this invention is to prevent corrosion of boat parts such as propellers, propeller shafts, stuffing boxes, or the like, which are subject to corrosive electrolytic action, by providing a metal body in metallic circuit or contact with one or more of said parts.

A further object of this invention is to construct such metal body in the form of a sectional collar comprising a foundation of metal of substantially the same polarity as that of the metal part to which the collar is attached and anchoring the said electronegative metal to such foundation in a manner that the collar will not become loose regardless of the amount of corrosion action to which the electronegative metallic part of the collar may become subjected.

With these and other objects in view, reference will be had to the accompanying drawing, wherein:

Fig. 1 is a view in side elevation illustrating a propeller, propeller shaft, stuffing box and skeg of a boat, and with the collar comprising the invention applied to the propeller shaft,

Fig. 2 is a vertical sectional view taken through the collar longitudinally of its axis,

Fig. 3 is a vertical sectional view taken through the collar transversely of its axis,

Fig. 4 is top plan view of the core of the upper section of the collar before the same is enshrouded by the electronegative metal,

Fig. 5 is a view similar to Fig. 4 of a modified form, and

Fig. 6 is a vertical sectional view of the core section of Fig. 4.

Fig. 7 is a fragmentary detail of a modification.

In Fig. 1 of the drawing, reference numeral 2 designates the skeg or keel of a boat, 3 the stuffing box, 4 the propeller shaft, 5 the propeller, all of conventional form, and 6 the collar which forms the subject matter of this invention.

The preferred form of collar is illustrated in Figs. 2 to 4 inclusive, and said collar consists of two sections, each composed of a core 7 embedded in a zinc shroud 8. The core 7 is composed of a metal having a position in the electromotive series approximating that of the part to which the collar is to be attached to substantially avoid electrolytic action between the core and the said part. Were an all zinc split collar attached to a propeller shaft or other boat part, corrosion of the zinc would soon loosen the collar so that the same would not only rattle but would virtually lose its effectiveness for the intended purpose. By employing an attaching means of the nature described, these defects are avoided.

The zinc shroud 8 may be attached to the core 7 of each section in various ways to assure its attachment through a long period in the life of the zinc, but a very effective mode of attachment is by casting the zinc 8 upon or around the core.

Each core section 7 is formed with ears 9 and 10, and screws or bolts 11 pass freely through holes 12 in the ears 9 and screw into threaded openings 14 in the ears 10, clamping the collar sections tightly upon in non-rotative relation with the propeller shaft or other of said boat parts. These screws are of a metal having substantially the same polarity in the electromotive series as the metal of the core sections 7.

The adjacent faces of the ears 9 and 10 preferably do not tightly close together, but the inner semi-circular faces 15 of the core sections tightly engage opposite faces of the propeller shaft or like boat part throughout most, if not all, of their areas. Likewise, the adjacent faces of the zinc shroud do not tightly close together, but their faces 16 like the core faces may, though not necessarily, bind upon opposite sides of the shaft or other boat part. The metal of the shroud sections 8 is counter-sunk at 17 and 18 for free passage of the heads of the screws or bolts 11 into direct binding engagement with the core ears 9.

While satisfactory results may be obtained in a degree by simply enveloping the sides and outer faces of the core sections in zinc cast thereupon, a more positive anchoring means has been devised in the nature of fins or projections on the core sections, with which the metal of the shroud sections interlock, such interlocks being unaffected by corrosion of the zinc shroud through a long period of its life.

These interlocks comprise parallel annular series of integral ears 19 formed integrally with each core section 7 and the ears of one series being bent toward and partially into the plane of the ears of the other series and fitting between the latter ears. These ears may or may not be perforated as at 20 to afford additional interlocks for the zinc which flows into such perforations during the casting operation. This lateral bending of the ears 19 offsets centrifugal throw of the zinc when the collar is attached to a rotating propeller shaft or propeller.

The modified form illustrated in Figs. 5 and 6 is substantially the same structurally as the preferred form, except that parallel uninterrupted ribs are provided on the core sections and these are perforated at 22 to function like the perforations 20 in providing interlocks for the zinc shroud.

While zinc has been specified as constituting the metal of the shrouds 8, other metal standing on the electronegative side of the electromotive series from the metal of the parts of the boat to be protected may be employed. The core sections 8 and screws 11 may be of metal standing substantially in the same position as the metal of the part to be protected, and since such parts are usually of bronze, that metal is generally the one used. Where bronze propellers are used with steel shafts, zinc is used for the shroud 8 and a metal adopted for the core sections 8 from the electromotive series as will be best suited to insure longest life of the parts subject to corrosion.

The collar 6 is preferably clamped around the propeller shaft in metallic contact with the propeller or stuffing box, according to which is to be protected, though satisfactory results are obtainable by mounting the collar on the propeller shaft away from the propeller or stuffing box. Obviously the collar may be applied to any other boat part subject to corrosion through electrolytic action between sea-water and metals of different potentials in the electromotive series.

While two forms of anchoring means have been disclosed for securing the corrosive metal to the substantially non-corrosive core sections, it will be clear that the anchoring means is susceptible to many variations.

In practice the device has been found to be very effective for the designed purpose, and while a correct theory explaining its action may not be given, it is believed that the zinc or other metal selected from the negative end of the electromotive series, becomes the negative pole in an electrolytic circuit with the metals of the propeller, propeller shaft, and stuffing box, all of which are from the positive end of the electromotive series, the sea water acting as the electrolyte. In such a circuit corrosion is confined principally, if not entirely, to the most electronegative material, and is checked to a high degree in the other metallic parts.

Obviously, the core parts 7 could be constructed of bakelite or similar non-metallic material since their purpose is to provide a non-corrosive means for attaching the corrosive shroud 8 to the propeller shaft or other marine structure part, and the screws could be of the same non-metallic material, reinforced or not, or even of non-corrosive material relatively to the metal of the shroud. Metallic circuit is established between the corrosive shroud 8 and the propeller shaft or other part to which the collar is attached by a metallic plug or conductor 25 preferably of the same metal as the said propeller shaft or other part.

The present invention makes it unnecessary to run any exposed wires between parts, particularly to get around any non-conductive material placed between the zinc or negative metal and the metal part to be protected.

What is claimed:—

1. A collar for a propeller shaft comprising two semicircular sections each having diametrically opposite ears, means associated with the ears for tightly clamping the collar sections about said propeller shaft, said collar sections each having a radial extension having a wall portion disposed at an angle to the radius of the extension, and a metal negative in the electromotive series to the metal of the propeller shaft to be protected cast upon each collar section and enclosing the exposed outer surface thereof and its radial extension, said cast sections being provided with an opening affording access to said clamping means.

2. A collar for a propeller shaft comprising two semi-circular sections each composed of a relatively non-corrosive material, means associated with said collar sections for tightly clamping the collar sections about said propeller shaft, each of said collar sections having radial extensions along the outer edge thereof, said extensions being curved or arched inwardly from the outer edges of the collar section, their ends intermeshing, and a metal negative in the electromotive series to the metal of the propeller shaft to be protected cast upon the outer exposed surface of the collar section and enclosing the said curved radial extensions, said cast section being provided with an opening affording access to said clamping means.

BERT O. GODFREY.