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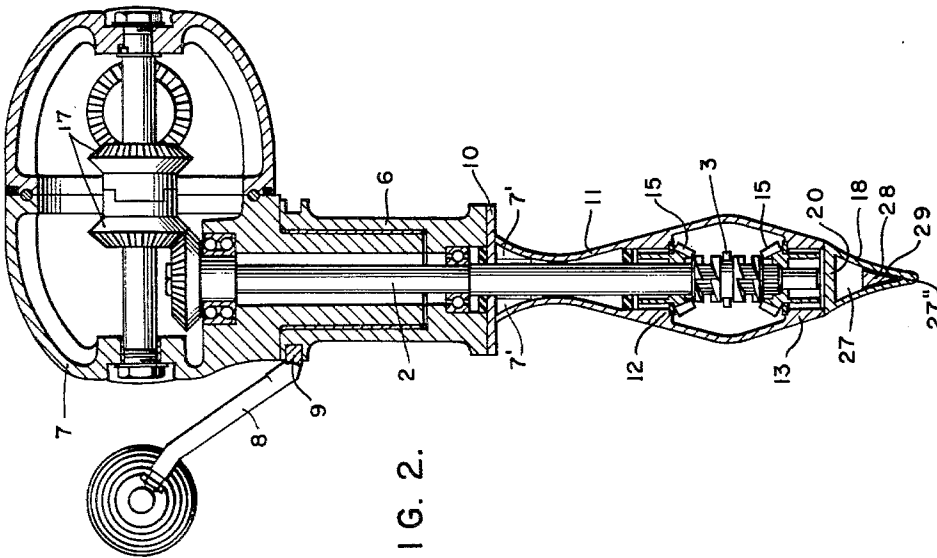
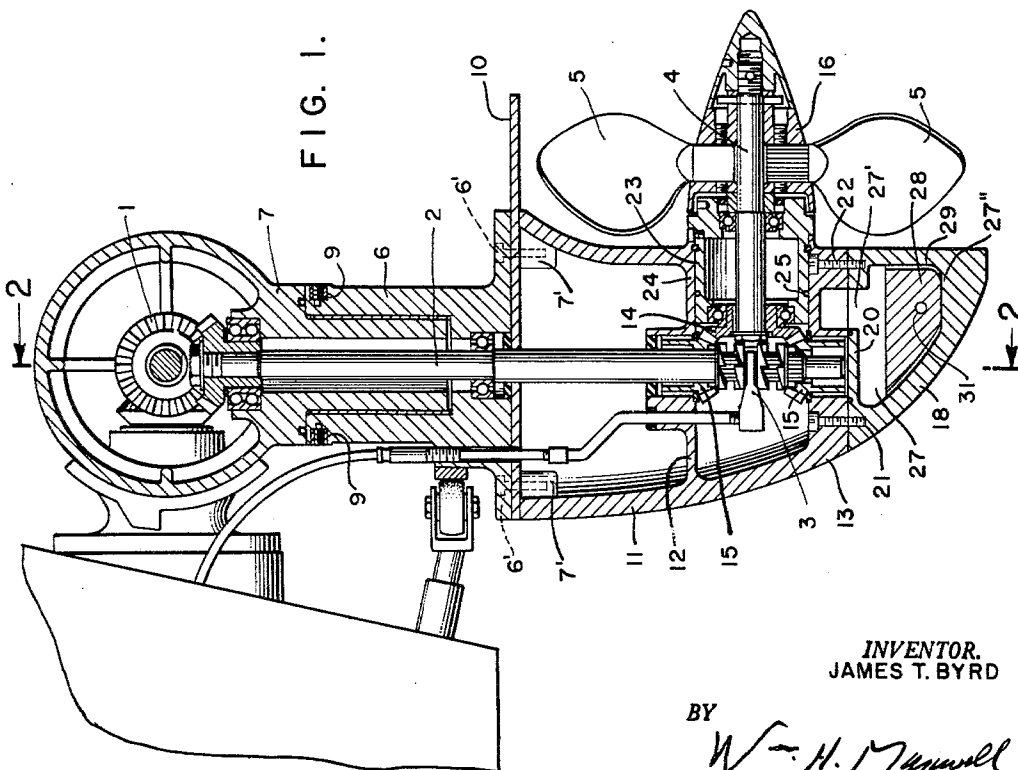
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ELECTROLYSIS PREVENTER FOR PROPELLER DRIVES

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2 Sheets-Sheet 1



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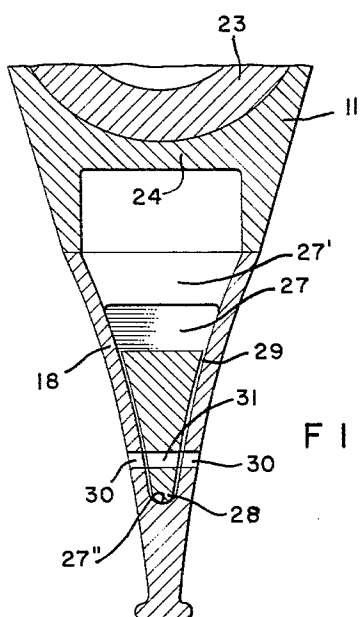


FIG. 3.

FIG. 4.

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1

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ELECTROLYSIS PREVENTER FOR PROPELLER DRIVES

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This invention relates to propeller drives for boats and the like and is particularly concerned with the phenomenon of electrolysis, it being a general object of this invention to provide for the prevention of electrolytic action upon the structure of propeller drives for boats.

Protection against electrolysis in boats and ships is practiced, a common method being to place zinc plates on the hull of the vessel in the vicinity of the propeller drive. It is usually necessary to resort to experimentation in each individual vessel, in order to find a proper location for said zinc plates, and it is usually necessary that they be properly grounded to structure within the vessel or the propeller drive. In any case, propeller drives involve metal components that are adversely affected by electrolysis, especially when operating in ocean water containing salt. It is common knowledge that galvanic action takes place, eating away metallic structure and speeding up corrosive action. For example, the metals that are commonly used, such as brass, bronze, and aluminum, are adversely affected and deteriorate rapidly, if no such protection is supplied.

The art of protecting the propeller shafting of vessels having permanent inboard power plants is referred to above and is widely practiced of necessity. However, the more recent and now highly developed art of so-called outboard drives, and the like, has not taken advantage of the known principles used in protection against electrolysis. When I refer to outboard motors and/or propeller drives I mean to include that class of boat or vessel propelling device which comprises generally, at least, a depending housing that journals a drive shaft rotating a propeller on a horizontal axis. This propeller drive may include the prime mover as an integral part thereof, or it may be a separate housing fixed or swivelly attached to the vessel and deriving power from a prime mover within the vessel. In other words, the present invention is applicable to any propeller drive "unit" involving a housing that carries the shafting for rotating a propeller and which depends from the vessel that it propels.

A feature of propeller drives of the class under consideration is the protection of the propeller per se by a skeg that precedes the propeller and which depends below the periphery of said propeller. These skegs are usually an integral part of the housing, or they can be a separate replaceable part as I prefer to construct the same. In accordance with the invention I employ the skeg for mounting a susceptible body of electrolytic material and in such a manner as to expose the same to the surrounding electrolyte. Usually, a body of susceptible material is a rectangular plate of zinc having substantial thickness, and obviously such a plate is difficult to install. For instance, if such a plate is merely superimposed upon the vessel it presents considerable drag, or alternately it must be recessed. On the contrary, the incorporation of a susceptible body of electrolytic material within the skeg, as hereinafter described, avoids the usual mounting of a cumbersome plate upon the exterior of the vessel.

An object of this invention is to provide means in a propeller drive to prevent electrolytic action upon the structure thereof.

2

Another object of this invention is to provide for the functionally proper installation of an electrolytically susceptible material cooperatively with a propeller drive and which does not encumber the vessel being propelled.

It is another object of this invention to provide for the incorporation of an electrolytically susceptible material within the streamlined configuration of a skeg on a propeller drive, all without encumbering the same.

The various objects and features of this invention will be fully understood from the following detailed description of the typical preferred form and application thereof, throughout which description reference is made to the accompanying drawings, in which:

FIGURE 1 is a vertical section view taken through a propeller drive which embodies the present invention.

FIG. 2 is a transverse sectional view taken as indicated by line 2—2 on FIG. 1.

FIG. 3 is an enlarged detailed view of a portion of the structure shown in FIG. 1.

FIG. 4 is a sectional view taken as indicated by line 4—4 on FIG. 3.

Propeller drives of the type under consideration involve generally a vertically disposed housing 6 with a lowermost section 11 that is hollow and which carries the gearing and the propeller shaft 4. Such a drive is referred to generally as an outboard drive, whether or not the prime mover is integral therewith. Therefore, I will refer to the propeller drive as an outboard drive which is composed of a gear train 17, that drives a vertical shaft 2 and that, through a reversing jaw clutch 3, in turn drives the propeller shaft 4 and the propeller blades 5. The drive is encased in the vertically disposed housing 6 carried by a gear case 7 on which the housing 6 is mounted for angular displacement by means of a steering link 8 connected to a yoke 9 mounted on the housing 6. The housing carries a cavitation plate 10. Below the cavitation plate is the hollow section 11 mounted on the housing 6 by studs 6' passing into bosses 7' on the section 11. The section 11 has a dividing wall 12 and a base 13 between which the shaft 2 and the jaw clutch 3 and propeller shaft 4 are carried. The propeller shaft 4, carrying the gear 14 driven by the gear 15 through the jaw clutch 3, carries a hub 16, on which the propeller blades are mounted. The propeller drive is characterized by a skeg 18 having a flat top wall 20. The wall 20 engages flat with and is sealed on the base 13 by means of a gasket seal 21' and held in place by means of studs 21 and 22. The wall 20 is stepped, as shown in FIG. 1, in order to accommodate the lower end portion of the shaft 2. The propeller shaft 4 is carried by spaced bearings in a sleeve 23 which fits into a tubular section 24 and is made watertight by means of gasket seals 25.

Referring specifically to the skeg 18 it is to be observed that said skeg has both a lateral and cross-sectional profile that fairs into the design configuration of the housing section 11. The said profiles of the skeg 18 can vary widely, said skeg presenting, generally, a downwardly projecting fin-shaped part. Since the housing 6 has substantial thickness at the bearing for the propeller shaft 4, the skeg has a tapering cross-sectional profile (see FIGS. 2 and 4) with opposite side walls converging to a sharp tip at its lowermost terminal end. Now, in accordance with the invention, the skeg 18 is a chambered part, being hollow as by casting it around a core (not shown), establishing a chamber 27 of downwardly tapered wedge shape. In practice, the top wall 20 is provided with an opening 27' through which the core is supported during casting of the skeg 18. Thus, the skeg 18 is a

walled part of relatively light construction and therefore of light weight, requiring but a minimum of material for its formation.

With the skeg 18 constructed as above set forth, the chamber 27 is adapted to accommodate an electrolytically susceptible body of material, such as a body 28 of zinc which is commonly employed for preventing electrolysis of other structural parts. The body 28 is applied in a molten state to the skeg 18 to occupy the chamber 27, and a sufficient quantity or volume is poured into the chamber, with the skeg 18 erect, in order to substantially occupy the chamber. In carrying out this method of assembly, i.e., pouring of molten metal into the chamber 27, said body 28 shrinks upon cooling and thereby separates from the walls of the chamber. This inherent separation is a feature of the present invention whereby an actual physical separation 29 is established surrounding the entire body 28. However, the body 28, of necessity, must rest in the chamber 27 making contact therewith as at 27', when the structure is erect and by action of gravity. In any case, the body 28 will seek a position of rest within the chamber 27, whereby mechanical and electrical contact is made between the skeg 18 and the body 28.

In carrying out the present invention, and in accordance therewith, a port 30 is provided in the skeg 18 so that there is open communication between the exterior of the skeg and the chamber 27 therein. In actual practice, the assembly of the skeg 18 and body 28 is bored as by means of drilling through the same, forming aligned ports 30 in the opposite side walls of the skeg and joined by a bore 31 extending through the body 28.

From the foregoing it will be apparent that water surrounding the entire structure, and forming the electrolyte, readily enters through the ports 30 and into the chamber 27, gaining access to the chamber by virtue of the separation 29 between the body 28 and interior walls of the chamber. As a result, the entire surface area of the body 28 is exposed to wetted contact with the water whereby it is most susceptible to electrolysis, thereby protecting the otherwise vulnerable parts of the propeller drive.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any modifications or variations that may appear to those skilled in the art and fall within the scope of the following claims.

Having described my invention, I claim:

1. An electrolysis preventer for a propeller drive having a depending housing with a powered propeller shaft projecting from the lower portion thereof and with a propeller rotated thereby, and including, a chamber formed in the lower portion of the housing, and a body of electrolytically susceptible material contained within the chamber.
2. An electrolysis preventer for a propeller drive having a depending housing with a powered propeller shaft projecting from the lower portion thereof and with a propeller rotated thereby, and including, a chamber formed in the lower portion of the housing, and a body of electrolytically susceptible material contained within the chamber, there being a port in the said housing so that the said chamber is in open communication with the exterior of the housing.
3. An electrolysis preventer for a propeller drive having a depending housing with a powered propeller shaft projecting from the lower portion thereof and with a propeller rotated thereby, and including, a chamber formed in the lower portion of the housing, and a body of electrolytically susceptible molten material cast within the chamber and separated from the walls of the chamber by shrinkage during cooling.
4. An electrolysis preventer for a propeller drive having a depending housing with a powered propeller shaft

projecting from the lower portion thereof and with a propeller rotated thereby, and including, a chamber formed in the lower portion of the housing, and a body of electrolytically susceptible molten material cast within the chamber and separated from the walls of the chamber by shrinkage during cooling, there being a port in the said housing so that the said chamber is in open communication with the exterior of the housing.

5. An electrolysis preventer for a propeller drive having a depending housing with a powered propeller shaft projecting from the lower portion thereof and with a propeller rotated thereby, and including, a skeg projecting from the housing and having a chamber formed therein, and a body of electrolytically susceptible material contained within the said chamber.

6. An electrolysis preventer for a propeller drive having a depending housing with a powered propeller shaft projecting from the lower portion thereof and with a propeller rotated thereby, and including, a skeg projecting from the housing and having a chamber formed therein, and a body of electrolytically susceptible material contained within said chamber, there being a port in the skeg and opening into said chamber so that there is open communication and access of fluid at the exterior of the skeg with the body therein.

7. An electrolysis preventer for a propeller drive having a depending housing with a powered propeller shaft projecting from the lower portion thereof and with a propeller rotated thereby, and including a skeg projecting from the housing and having a chamber formed therein, and a body of electrolytically susceptible molten material cast within said chamber and separated from the walls of the chamber by shrinkage during cooling.

8. An electrolysis preventer for a propeller drive having a depending housing with a powered propeller shaft projecting from the lower portion thereof and with a propeller rotated thereby, and including, a skeg projecting from the housing and having a chamber formed therein, and a body of electrolytically susceptible molten material cast within said chamber and separated from the walls of the chamber by shrinkage during cooling, there being a port in the skeg and opening into said chamber so that there is open communication and access of fluid at the exterior of the skeg with the body therein.

9. An electrolysis preventer for a propeller drive having a depending housing with a powered propeller shaft projecting from the lower portion thereof and with a propeller rotated thereby, and including, a chamber formed in the lower portion of the housing, and a body of electrolytically susceptible molten zinc cast within the chamber and separated from the walls of the chamber by shrinkage during cooling.

10. An electrolysis preventer for a propeller drive having a depending housing with a powered propeller shaft projecting from the lower portion thereof and with a propeller rotated thereby, and including, a skeg projecting from the housing and having a chamber formed therein, and a body of electrolytically susceptible molten zinc cast within said chamber and separated from the walls of the chamber by shrinkage during cooling.

11. An electrolysis preventer for a propeller drive having a depending housing with a powered propeller shaft projecting from the lower portion thereof and with a propeller rotated thereby, and including, a skeg projecting from the housing and having a downwardly tapered wedge-shaped chamber formed therein, and a body of electrolytically susceptible molten zinc cast within said chamber and separated from the walls of the tapered chamber by shrinkage during cooling.

12. An electrolysis preventer for a propeller drive having a depending housing with a powered propeller shaft projecting from the lower portion thereof and with a propeller rotated thereby, and including, a skeg projecting from the housing and having a chamber formed there-

in, and a body of electrolytically susceptible molten zinc cast within said chamber and separated from the walls of the chamber by shrinkage during cooling, there being a port in the skeg and opening into said chamber so that there is open communication and access of fluid at the exterior of the skeg with the body therein.

References Cited by the Examiner**FOREIGN PATENTS**

340,691	9/1921	Germany.
803,863	11/1958	Great Britain.

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