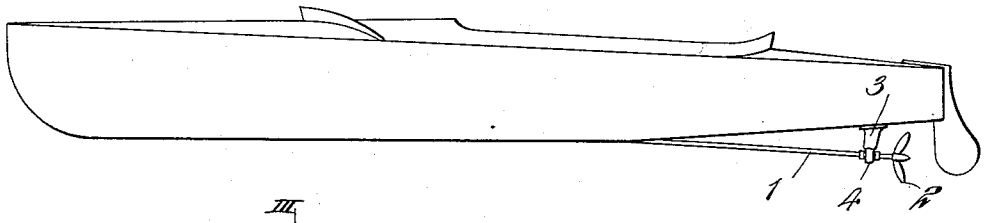
R. A. PATRICK.

PROPELLER SHAFT HANGER.

APPLICATION FILED FEB. 15, 1911.

1,175,288. Patented Mar. 14, 1916.

Fig. 1.



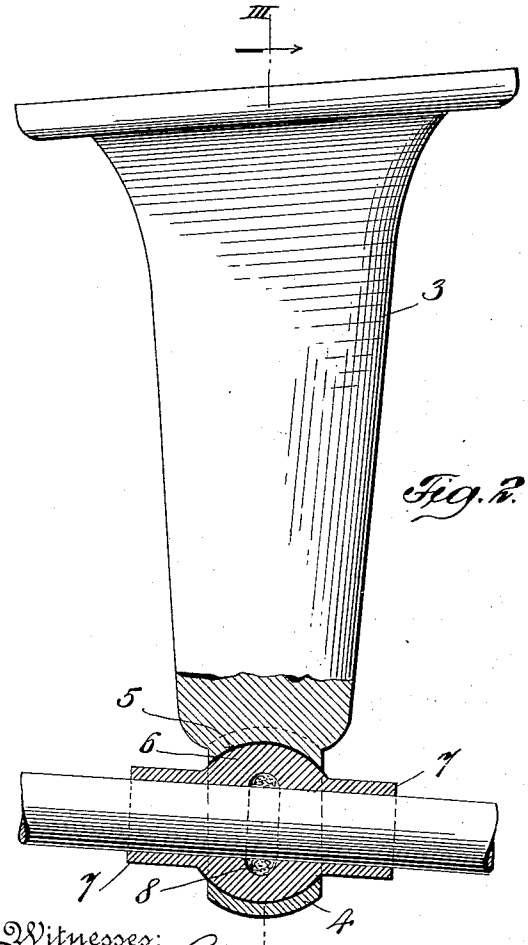


Fig. 2.

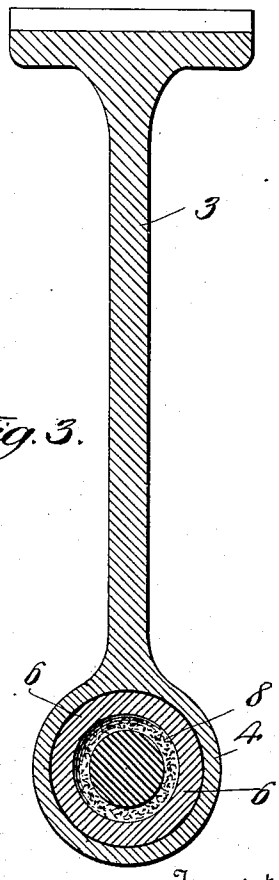


Fig. 3.

Witnesses:
Julius H. Smith
A. E. Patterson.

Inventor
Robert A. Patrick
By his Attorneys
David Davis

THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ROBERT ALFRED PATRICK, OF FREEPORT, NEW YORK, ASSIGNOR TO COLUMBIAN BRASS FOUNDRY, OF FREEPORT, NEW YORK, A CORPORATION OF NEW YORK.

PROPELLER-SHAFT HANGER.

1,175,288. Specification of Letters Patent. Patented Mar. 14, 1916.

Application filed February 15, 1911. Serial No. 608,739.

To all whom it may concern:

Be it known that I, ROBERT A. PATRICK, a subject of the King of Great Britain, and a citizen of Canada, residing at Freeport, county of Queens, and State of New York, have invented certain new and useful Improvements in Propeller-Shaft Hangers, of which the following is a specification.

The propeller shaft in a motor boat usually extends downwardly and rearwardly near the stern of the boat, and projects a considerable distance below the boat hull. To support the shaft just forward of the propeller a shaft hanger or strut is secured to the boat body and carries a shaft bearing. Heretofore it has been difficult to secure the proper alinement of the shaft in said bearing and to maintain such alinement through the varying stresses which are brought on the shaft and on the boat hull. Particularly in high-speed motor boats it is difficult to maintain the proper alinement of the propeller shaft and the shaft hanger or strut which extends below the boat body. This is difficult, first, by reason of the great vibration in the boat body of high speed boats; and second, because of the tendency of the boat body to buckle or to be slightly distorted longitudinally. These two causes bring about a change in the angular relation of the axial line of the propeller shaft and the boat body. It is, therefore, manifest that in those forms of struts or shaft hangers in which the shaft bearing is rigidly fixed there is a constant binding or crowding of the shaft in said bearing. Another objection to this rigid form of shaft hanger is the difficulty of alining the bearing with the shaft in the first instance, that is to say in the installation of the shaft and the shaft hanger.

It is the main object of this invention to provide a shaft hanger in which the bearing is mounted as a universal or ball-and-socket joint so that the bearing will automatically adjust itself to the proper alinement with the shaft.

Another object of the invention is to provide such a ball-and-socket connection between the bearing and the strut or shaft hanger and at the same time permanently connect the bearing with the shaft hanger without employing bolts or nuts, or a separable or two-part inclosing means.

A further object of the invention is to provide a bearing having a spherical enlargement and to cast about said spherical enlargement a one-piece hanger or strut and to maintain between the hanger and the said spherical enlargement sufficient space to permit of the universal movement of the bearing in the hanger.

A further object of the invention is to provide a simple and practical method of casting the hanger or strut about the bearing so that the bearing will be loosely inclosed by the hanger but will be permanently connected thereto.

Other important objects and advantages of the invention will appear hereinafter.

In the drawings: Figure 1 is a side elevation of a motor boat fitted with my improved shaft hanger; Fig. 2 a side elevation of the shaft hanger, the shaft bearing and the inclosing portion of the hanger being shown in vertical sectional view; Fig. 3 a vertical transverse sectional view of the hanger and the bearing taken on the line III—III of Fig. 2.

Referring to the various parts by numerals, 1 designates the propeller shaft, and 2 the propeller on the rear end thereof. The shaft hanger 3 is bolted to the under side of the boat near the stern thereof and is formed with the tubular portion 4 at its lower end. The interior of this tubular part is concave, and fitting snugly therein is the spherical enlargement 6 of the shaft bearing 7. The spherical enlargement of the bearing is designed to have a universal movement within the shaft hanger so that the axial line of the bearing may be varied with respect to the axis of the tubular part of the hanger. The bearing 7 is formed with the annular interior cavity 8 designed to receive lubricating material.

The hanger is cast about the tubular enlargement of the bearing so that the two parts are permanently connected together while at the same time the bearing may be swung in the hanger to vary its angular relation with respect to the hanger.

The advantages of a shaft hanger of the construction just described are manifest. The bearing is secured in place in the hanger without the use of bolts or nuts or other clamping means, and the hanger or strut is reduced to the smallest possible dimensions consistent with the required strength for safety, and all projecting bolts and nuts and other fastening means are dispensed with. The bearing is free to adjust itself to the angle of the propeller shaft; may vibrate with said shaft or swing sufficiently to follow the alinement of the shaft throughout any slight distortion or buckling of the boat. It is manifest, therefore, that with a bearing constructed as I have described the shaft will be at all times efficiently supported at its rear end and there will be no binding or crowding of the shaft in the bearing.

In order that I may cast the shaft hanger or strut about the bearing part I first finish the bearing by turning it in a lathe or otherwise operating thereon to render the enlargement 6 spherical. This spherical enlargement is then coated to the required depth with graphite or plumbago, or similar lubricating material which will not be vaporized by the heat of the molten metal which is to be poured about the bearing. The bearing piece with its coating of graphite, or similar material, is then heated in order to expand it and free the coating from any surplus moisture therein which might be vaporized by the molten metal. While the bearing piece is in this heated condition it is placed in a mold and the strut or hanger cast about it while it is hot. The ends of the bearing piece are filled with suitable material to prevent any possibility of metal flowing therein. It will of course be understood that under ordinary conditions the metal will not flow outside of the proper mold cavities formed for it. I preferably cast the strut of metal which is capable of a slight stretching or extension while it is cooling. I have found that manganese bronze gives very satisfactory results in this respect. By using such a metal, heating the bearing piece to expand it and providing the coating of plumbago or similar material, the cast metal strut or hanger is prevented from binding or becoming fixed to the bearing piece. The plumbago forms a lubricating spacing means between the bearing piece and the strut which is not destroyed by the molten metal but which at the same time is not bound either to the molten metal or to the bearing piece. When the parts are cooled said plumbago coating acts in the manner of a lubricant between the two metal parts, so that the bearing part may be moved within the strut or hanger sufficiently to arrange its axial line coincident with the axial line of the propeller shaft. It is manifest that when the strut or hanger has cooled the bearing part is permanently locked within the tubular part of the hanger and that it will not require any form of fastening or securing means to retain it therein.

It is to be noted that by first heating the bearing part before the strut or hanger is cast about it the said bearing part will be expanded and its contraction while cooling will to a large extent permit of the contraction of the hanger in cooling without causing the hanger to bind rigidly on the bearing. It is also to be noted that by reason of the coating of plumbago or other suitable material the metal of the hanger does not contact with the metal of the bearing, and that, therefore, the two metals can not become fixed to each other. The coating or non-fusible spacing material will undoubtedly be slightly compressed or forced out from between the two parts by reason of the cooling of the metal of the hanger, thereby relieving to some extent the strain on the metal of the hanger. In addition, the metal of the hanger must be such that it will be capable of a slight stretching while cooling so that as it contracts around the spherical part of the bearing the tubular part of the hanger will not be broken but will be slightly expanded to accommodate itself to the enlargement of the bearing.

It is manifest that without the use of some non-fusible spacing material between the bearing and the hanger the two parts would be rigidly locked together when the metal of the hanger cooled.

While I have found plumbago or graphite to be an excellent non-fusible and non-vaporizing spacing means for coating the spherical part of the bearing I do not wish to be limited to the use of these materials as any material of that nature may be employed.

It is also manifest that while the invention is particularly well-adapted to shaft hangers or struts for the propeller shafts of motor boats it may be used for other purposes and I do not wish to be limited in this respect.

The process of manufacturing shaft hangers described herein will form the subject matter of a divisional application in which application the process will be claimed.

Having thus fully described my invention what I claim as new, and desire to secure by Letters Patent is:

A shaft hanger comprising a rigid strut in the form of a thin vertical web formed with an integral substantially horizontal tubular retaining part at its lower end, said tubular part having a continuous annular wall and being circular in transverse section and concave in longitudinal section to adapt it to receive a spherical part, the axis of said tubular part being in a vertical plane pass-

ing centrally and longitudinally through the strut, and a one-piece tubular bearing part formed with a spherical enlargement permanently inclosed within the continuous integral wall of the tubular part of the strut and having a working fit therein, said bearing part being capable of a universal movement within the tubular part of the strut whereby said tubular bearing part will assume the required angle to adapt itself to the shaft extending therethrough.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

ROBERT ALFRED PATRICK.

Witnesses:
J. ALEXANDER WHITTON,
LLOYD R. CUTLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."