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H. R. HUMPHREYS

2,329,050

STUFFING BOX

Filed Aug. 19, 1942

Fig. 1

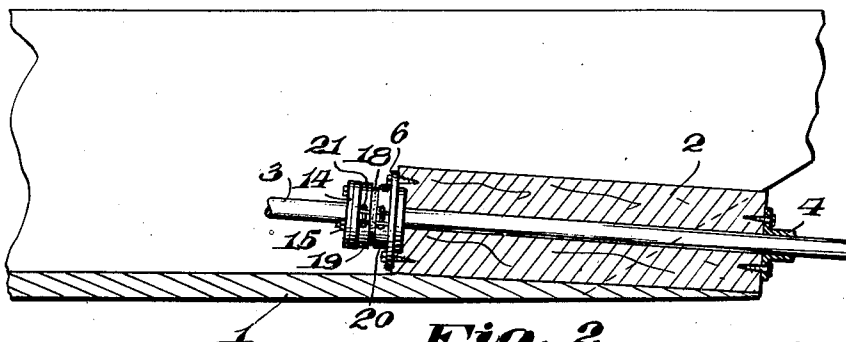


Fig. 2

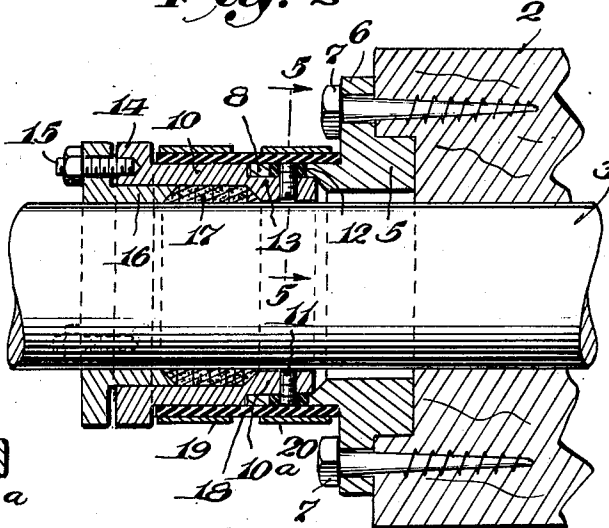


Fig. 5

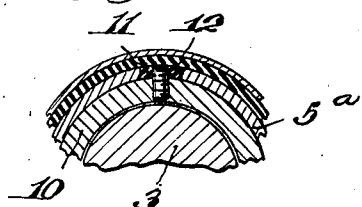
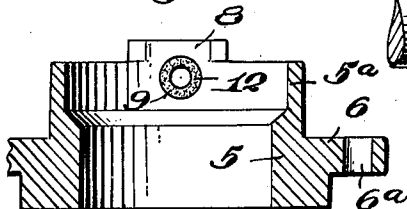


Fig. 6

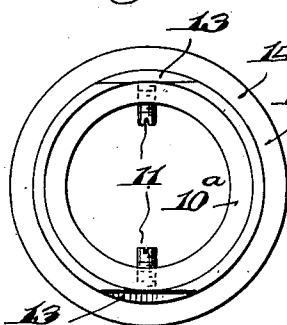
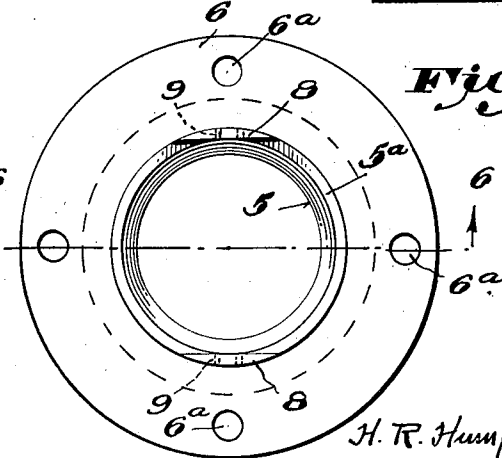


Fig. 3

Fig. 4



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STUFFING BOX

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4 Claims. (Cl. 286—15)

This invention relates to stuffing boxes for rotary shafts, and more particularly for the propeller shafts of boats.

Where a stuffing box of the usual or conventional type is rigidly secured to a suitable support, as, for example, the shaft log of a boat, it has been found that the vibration of the shaft frequently causes such box to break loose from the support. In order to remedy this, it has been proposed to construct the stuffing box in two annular sections, one of which is rigidly secured to the support and the other of which is longitudinally spaced from the first and carries the packing gland, the two sections being connected by a flexible tube, incapable of transmitting vibrations from one section to the other. Where, however, as in constructions previously proposed, such flexible tube constitutes the sole connection between the sections of the stuffing box, difficulty has been experienced due to the fact that the frictional drag of the packing on the rotating shaft tends to exert a torsional strain on the tube, and twist the same.

An object of the present invention is, therefore, to devise a construction which, while employing a stuffing box comprising two sections united by a flexible tube, as heretofore, provides means for so connecting said sections that no torsional strain is exerted on said tube.

A further object is to provide a connection which, while achieving the above result, also prevents the transmission of vibrations from one section to the other.

To this end, the invention, in its preferred form, contemplates the provision of a yielding or cushioned, interlocking connection between the adjacent ends of the stuffing box sections.

In order that the invention may be readily understood, reference is had to the accompanying drawing, forming part of this specification, and in which:

Fig. 1 is a fragmentary longitudinal section through the stern of a boat showing the propeller shaft and my improved stuffing box in elevation;

Fig. 2 is a fragmentary longitudinal section on an enlarged scale through the stuffing box and associated parts;

Fig. 3 is an end view of one of the stuffing box sections;

Fig. 4 is a similar view of the other of said sections;

Fig. 5 is a fragmentary transverse section substantially on the line 5—5 of Fig. 2, looking in the direction of the arrows; and

Fig. 6 is a transverse section on the line 6—6 of Fig. 4, looking in the direction of the arrows, parts being broken away.

Referring to the drawing in detail, the hull of the boat is indicated at 1, and the usual shaft log at 2. 3 indicates the propeller shaft, shown as passing through the usual stern bearing 4, secured to the rear end of the log.

As stated in the preamble, my improved stuffing box comprises two separately formed annular sections. The rear section is designated by the reference character 5 and is provided with a securing flange 6, supported upon the end of the log 2 and fastened thereto as by means of lag screws 7 passing through holes 6^a.

As more clearly shown in Figs. 4 and 6, the forward end of this section of the stuffing box is of enlarged internal diameter, as indicated at 5^a, and is preferably provided with a pair of marginal, longitudinally projecting ears or lugs 8 having a flattened internal face. A radial hole or opening 9 is formed in the portion 5^a adjacent each ear or lug 8, for a purpose hereinafter described.

The other or forward section of the stuffing box is shown at 10, and is formed at its rear end with a portion 10^a snugly fitting the shaft 3 and having an external surface which freely telescopes in the portion 5^a of the section 5. This portion 10^a of the section 10 carries a pair of radially disposed screw studs 11 adapted to enter the holes or openings 9 in the section 5. These holes are considerably larger than the studs 11 and a yieldable bushing 12, of soft material, is preferably interposed between each of the studs and the walls of the opening.

Thus the screw studs 11, openings 9, in which they engage, and the interposed yieldable bushings 12, constitute a cushioned interlocking connection between the two sections of the stuffing box.

Adjacent the exterior of the portion 10^a the external surface of the section 10 is cut away or flattened in the region of the studs 11, as indicated at 13 in Fig. 3. These flattened areas cooperate with the flat faced lugs 8 to insure the assembling of the two sections in proper angular relation, so that the studs will register with the openings 9.

The forward end of the section 10 is preferably provided with a thickened flange 14, adapted to receive bolts 15, serving to secure a follower or gland 16 in position to hold and compress the usual packing 17, in order to provide a water-tight joint.

It will be understood that the adjacent end portions of the two sections have cylindrical outer surfaces of substantially the same diameter, and surrounding these aligned cylindrical portions is a short piece of flexible tubing 18, such, for example, as rubber or canvas hose. This tubing is tightly clamped to the respective sections by means of split rings or bands 19 and 20, having ends constructed to be drawn together by means of screws 21, after the manner of ordinary hose clamps.

In assembling the sections of my improved stuffing box, the studs 11 are backed out into the position shown in Fig. 3. The tube 18 is then slipped into position over one section, and the two sections thereupon telescoped together. By means of a suitable tool, the studs are then screwed outwardly so as to enter the bushed openings 9, as shown in Figs. 2 and 5, and so that their inner ends are flush with or below the interior of the portion 10^a. The hose clamps are then suitably tightened around the tubing so as to provide a water-tight joint. The packing gland having been removed or loosened, the assembled sections are then slipped over the shaft and the section 5 secured to the log. Then when the packing gland is tightened up, any leakage of water past the stuffing box is effectively prevented.

It will be understood that the frictional drag of the packing 17 on the rotating shaft would tend to exert torsional strain upon the tube 18, and twist the same, were it not for the interlocking connection between the sections, comprising the studs 11. These studs, however, effectively prevent any substantial relative angular displacement between the two sections, and thus protect the tube 18 from any torsional strain.

By reference to Fig. 2, it will be seen that the internal diameter of the section 5 is considerably larger than the diameter of the shaft 3, so that ample clearance is provided therebetween. Although any vibration of the shaft is of course imparted to the section 10 of the stuffing box, this vibration is not transmitted to the fixed section 5, because of the fact that the only connection between the sections is through the flexible tubing 18 and the yieldable bushings or cushions 12. Thus, while I employ a piece of flexible tubing for connecting the sections, I provide means for preventing any torsional strain from being exerted on this tubing, such means at the same time preventing the transmission of vibrations from one section to the other.

Owing to the simple construction and ease of assembly of my improved stuffing box, it is adapted for use on practically all sizes of propeller shafts, and entirely eliminates the difficulties heretofore encountered.

What I claim is:

1. The combination with a shaft log, of a stuffing box comprising two separately formed annular sections having adjacent cylindrical portions of substantially the same external diameter, means for rigidly securing one section to said shaft log, a packing gland carried by the other section, a flexible tube surrounding said cylindrical portions and forming a water-tight joint therewith, and a cushioned interlocking connection between said sections.

2. A stuffing box for rotary shafts comprising a pair of annular sections having straight sided telescoping adjacent ends by which they are held in substantial alignment and formed with cylindrical outer surfaces of substantially the same diameter, means for rigidly supporting one section, a packing gland carried by the other section, a flexible tube surrounding and tightly fitting said cylindrical surfaces, and means so connecting said telescoping ends as to prevent both substantial relative angular displacement thereof and transmission of vibrations from one to the other.

3. A stuffing box for rotary shafts comprising a pair of annular sections having loosely telescoping adjacent ends and formed with cylindrical outer surfaces of substantially the same diameter, means for rigidly supporting one section, a packing gland carried by the other section, a flexible tube surrounding and tightly fitting said cylindrical surfaces, and means connecting said telescoping ends comprising a radial stud carried by one section and engaging an opening in the other section larger than said stud, and a yieldable bushing interposed between said stud and the walls of said opening.

4. The combination with a rotary shaft, of a stuffing box through which said shaft passes, said stuffing box comprising two separately formed annular sections having aligned cylindrical surfaces, a flexible tube surrounding and secured to said cylindrical surfaces, means for rigidly supporting one of said sections, a packing gland carried by the other section and snugly engaging said shaft, whereby the frictional drag on said packing gland would tend to twist said tube, and means for limiting the torsional strain exerted on said tube.

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