Aug. 6, 1946. T. C. GERNER 2,405,541

METHOD AND APPARATUS FOR REPAIRING PROPELLER SHAFT HOUSINGS

Filed March 18, 1946

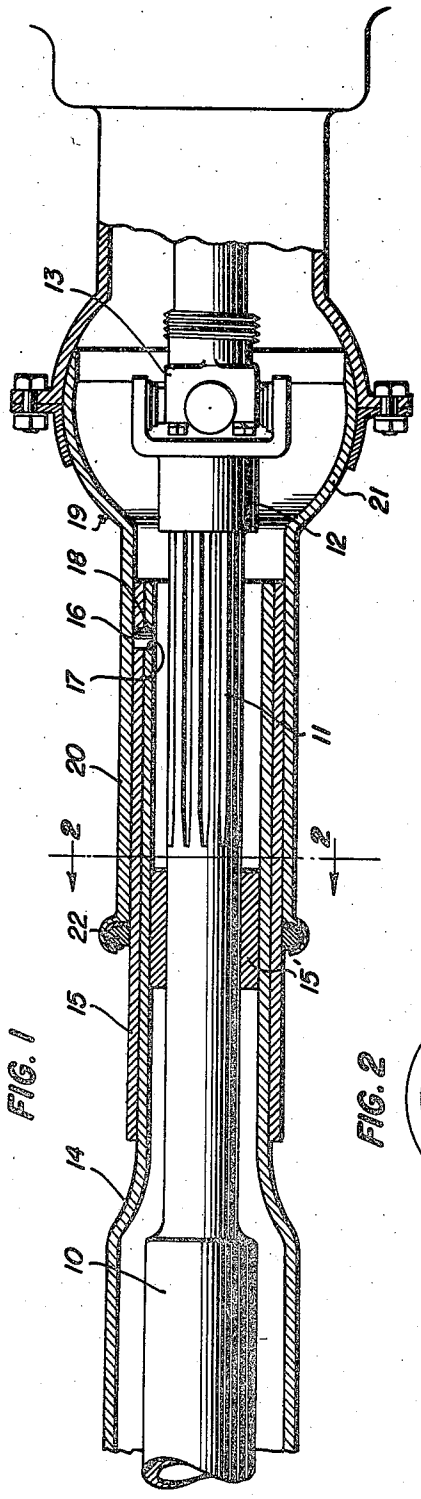


FIG. 1

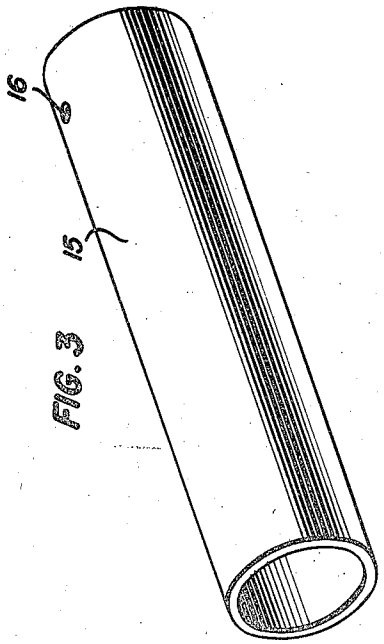


FIG. 3

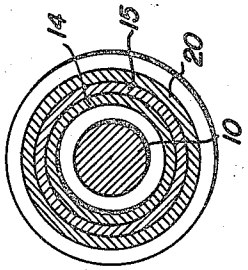


FIG. 2

Inventor

THEODORE C. GERNER

By Clarence A. O'Brien and Harvey B. Jacobson

Attorneys

Patented Aug. 6, 1946 2,405,541

UNITED STATES PATENT OFFICE

2,405,541

METHOD AND APPARATUS FOR REPAIRING PROPELLER SHAFT HOUSINGS

Theodore C. Gerner, Oklahoma City, Okla.

Application March 18, 1946, Serial No. 655,315

19 Claims. (Cl. 64—3)

1

This invention relates to a method and means for repairing a propeller shaft housing and has for its primary object to restore a propeller shaft housing which has become worn at its junction with the universal joint bell housing, to its original oil tight condition.

Another object is to facilitate such repair without requiring that the propeller shaft and propeller shaft housing be disconnected from the differential gearing.

The above and other objects may be attained by employing this invention which embodies among its features a propeller shaft housing containing a propeller shaft which projects beyond one end of the housing, a universal joint on the projecting end of the propeller shaft, a bushing adapted to fit over the end of the housing beyond which the propeller shaft extends, and a bell housing adapted to fit over the bushing and partially enclose the universal joint.

Other features include removing the bell housing from a worn propeller shaft housing, enclosing the worn end of the propeller shaft housing in a bushing, and fitting an oversized bell housing on the bushing to enclose a universal joint carried on the projecting end of the propeller shaft.

In the drawing:

Figure 1 is a fragmentary longitudinal sectional view through a propeller shaft housing at its junction with a bell housing for enclosing the universal joint of the propeller shaft,

Figure 2 is a transverse sectional view taken substantially along the line 2—2 of Figure 1, and

Figure 3 is a perspective view of the repair bushing.

Referring to the drawing in detail a propeller shaft 10 of conventional form is provided adjacent one end with conventional longitudinal splines 11 over which the splined socket 12 of one element of a universal joint 13 is fitted. The opposite end of the propeller shaft is connected in a conventional manner to the differential of the vehicle upon which the device is used. Encircling the propeller shaft 10 is the conventional propeller shaft housing 14 carrying near the end of the shaft formed with the splines a bearing bushing 15' in which the propeller shaft 10 rotates. Under normal conditions the universal joint 13 is housed within a bell housing which slips over the end of the propeller shaft housing 14 adjacent the splined end 11 of the shaft 10. Due to the road shocks and vibrations experienced at the junction of the bell housing with the propeller shaft housing 14 the external surface of the propeller shaft housing becomes worn to such

2

an extent that lubricant which may be contained within the housing 14 and the bell housing becomes lost through leakage at the worn points. Heretofore when repairs were to be made it has been necessary to remove the propeller shaft 10 and the housing 14 from its position in a vehicle and to either turn down the surface of the housing 14 and enclose the turned surface in a bushing, and then fit the new housing thereover. Such procedures are of necessity laborious and costly and require that the vehicle under repair remain out of service for long periods of time.

In employing this invention I enclose the worn end of the propeller shaft housing 14 in an elongated bushing 15 having a pin receiving opening 16 adjacent one end. The housing 14 is drilled as at 17 to form an opening therein which aligns with the opening 16 in the bushing 15 and after placing the bushing 15 in proper position over the worn end of the housing 14 I introduce a pin 18 into the aligned openings 16 and 17 in order to lock the parts secured together. Having thus prepared a new surface of larger diameter at the end of the propeller shaft housing 14 I employ an oversized bell housing designated generally 19 comprising a cylindrical neck portion 20 of an internal diameter snugly to fit over the bushing 15 and having at one end a flared semi-spherical enclosure 21 which is adapted partially to enclose the universal joint 13. The end of the neck 20 opposite that carrying the semi-spherical enclosure 21 is provided with a conventional seal 22 which forms an oil tight junction between the bell housing and the bushing or sleeve 15.

From the foregoing it will be seen that a repair to a propeller shaft housing 14 may be easily and quickly accomplished by merely drilling one radial opening 17 in the housing, and then slipping the sleeve or bushing 15 over the worn end of the housing. The bushing 15 is of such length as to effectively cover the worn area of the housing 14 so as to form a fluid tight joint which will preclude the escape of lubricant between the housing and bushing.

That such repairs may easily and quickly be made without requiring the removal of the propeller shaft and the propeller shaft housing from connection with the differential of the vehicle is obvious and consequently great saving of labor and time is effected.

While in the foregoing there has been shown and described the preferred embodiment of this invention it is to be understood that minor changes in the details of construction combination and arrangement of parts may be resorted

to without departing from the spirit and scope of the invention as claimed.

I claim:

1. A method of repairing a propeller shaft housing which has become worn at its junction with its universal joint bell housing, which includes removing the worn bell housing, fastening an enlarged external bearing surface upon and embracing the warm portion of said propeller shaft housing about its entire circumference, and fitting an oversize bell housing on said bearing surface.

2. A method of repairing a propeller shaft housing which has become worn at its junction with its universal joint bell housing, which includes removing the worn bell housing, applying an enlarged external bearing surface upon the worn surface of said propeller shaft housing, rigidly securing said bearing surface to the worn surface of said propeller shaft housing and fitting an oversize bell housing on said bearing surface.

3. A method of repairing a propeller shaft housing which has become worn at its junction with its universal joint bell housing, which includes removing the worn bell housing, fastening an enlarged external bearing surface upon the worn surface of said propeller shaft housing, rigidly securing said bearing surface to the worn surface of said propeller shaft housing and fitting an oversize bell housing on said bearing surface, and applying a lubricant-retaining packing and sealing means between said oversize bell housing and said bearing surface.

4. A repair unit for a propeller shaft housing including a bushing of uniform external diameter engageable upon the worn portion of a propeller shaft housing, fastening means for rigidly securing said bushing upon the worn portion of said housing, and a sleeve engageable with a universal joint housing and journaled upon said bushing.

5. A repair unit for a propeller shaft housing including a bushing engageable upon the worn portion of a propeller shaft housing, fastening means for rigidly securing said bushing upon the worn portion of said housing, and a sleeve engageable with a universal joint housing and journaled upon said bushing, said sleeve enclosing said fastening means.

6. A repair unit for a propeller shaft housing including a bushing engageable upon the worn portion of a propeller shaft housing, fastening means for rigidly securing said bushing upon said worn portion of said housing, and a sleeve engageable with a universal joint housing and journaled upon said bushing, and a lubricant-retaining, packing and sealing means interposed between said bushing and said sleeve.

7. In combination with a universal joint bell housing and a propeller shaft housing journaled therein, a repair unit compensating for wear in said housings, including means directly embracing the worn surface of said propeller shaft housing, said means constituting a journal upon said propeller shaft housing of enlarged, uniform diameter, and said journal being slidably engaged in said universal joint bell housing.

8. In combination with a universal joint bell housing and a propeller shaft housing journaled therein, a repair unit compensating for wear in said housings, including means directly embracing the worn surface of said propeller shaft housing, said means constituting a journal upon said propeller shaft housing of enlarged, uniform diameter, said journal being slidably engaged in said universal joint bell housing, and fastening means for rigidly securing said means on the worn surface of said propeller shaft housing.

9. In combination with a universal joint bell housing and a propeller shaft housing journaled therein, a repair unit compensating for wear in said housings, including means directly embracing the worn surface of said propeller shaft housing, said means constituting a journal upon said propeller shaft housing of enlarged, uniform diameter, said journal being slidably engaged in said universal joint bell housing, and fastening means for rigidly securing said means adjacent the worn surface of said propeller shaft housing, said fastening means being enclosed by said universal joint bell housing.

10. In combination with a universal joint bell housing and a propeller shaft housing journaled therein, a repair unit compensating for wear in said housings, including means directly embracing the worn surface of said propeller shaft housing, said means constituting a journal upon said propeller shaft housing of enlarged, uniform diameter, and said journal being slidably engaged in said universal joint bell housing, and a lubricant-retaining packing and sealing means interposed between said means and said universal joint bell housing.

11. In combination with a universal joint bell housing and a propeller shaft housing journaled therein, a repair unit compensating for wear in said housings, including means directly embracing the worn surface of said propeller shaft housing, said means constituting a journal upon said propeller shaft housing of enlarged, uniform diameter, said journal being slidably engaged in said universal joint bell housing, fastening means for rigidly securing said means adjacent the worn surface of said propeller shaft housing, said fastening means being enclosed by said universal joint bell housing, and a lubricant-retaining packing and sealing means interposed between said means and universal joint bell housing.

12. A repair unit for reconditioning the worn connection of a propeller shaft housing with a universal joint bell housing, consisting of a pair of telescoping, relatively slidable sleeves, one of said sleeves having a bore of a diameter slightly less than and an external diameter greater than the unworn diameter of a propeller shaft housing for snugly receiving the worn portion thereof, said other sleeve having a spherical surface for snug swiveling engagement within a universal joint housing.

13. A repair unit for reconditioning the worn connection of a propeller shaft housing with a universal joint bell housing, consisting of a pair of telescoping, relatively slidable sleeves, one of said sleeves having a bore of a diameter slightly less than and an external diameter greater than the unworn diameter of a propeller shaft housing for snugly receiving the worn portion thereof, said other sleeve having a spherical surface for snug swiveling engagement within a universal joint housing, and means for fastening said one of said sleeves rigidly to said worn portion of said propeller shaft housing.

14. A repair unit for reconditioning the worn connection of a propeller shaft housing with a universal joint bell housing, consisting of a pair of telescoping, relatively slidable sleeves, one of said sleeves having a bore of a diameter slightly less than the unworn diameter of a propeller shaft housing for snugly receiving the worn portion thereof, said other sleeve having a spherical surface for snug swiveling engagement within a

universal joint housing, and a lubricant-retaining sealing and packing means associated with said telescoping sleeves.

15. A repair unit for reconditioning the worn connection of a propeller shaft housing with a universal joint bell housing, consisting of a pair of telescoping, relatively slidable sleeves, one of said sleeves having a bore of a diameter slightly less than the unworn diameter of a propeller shaft housing for snugly receiving the worn portion thereof, said other sleeve having a spherical surface for snug swiveling engagement within a universal joint housing, and a lubricant-retaining sealing and packing means interposed between said telescoping sleeves.

16. A repair unit for reconditioning the worn connection of a propeller shaft housing with a universal joint bell housing, consisting of a pair of telescoping, relatively slidable sleeves, one of said sleeves having a bore of a diameter slightly less than the unworn diameter of a propeller shaft housing for snugly receiving the worn portion thereof, said other sleeve having a spherical surface for snug swiveling engagement within a universal joint housing, and a lubricant-retaining sealing and packing means carried by an annular groove in one of said telescoping sleeves and spaced from the worn end of said propeller shaft housing.

17. A repair unit for reconditioning the worn connection of a propeller shaft housing with a universal joint bell housing, consisting of a pair of telescoping, relatively slidable sleeves, one of said sleeves having a bore of a diameter slightly less than the unworn diameter of a propeller shaft housing for snugly receiving the worn end

thereof, said other sleeve having a spherical surface for snug swiveling engagement within a universal joint housing, alined apertures in said one of said sleeves and the worn end of said propeller shaft housing, and a fastening means engaging said apertures.

18. A repair unit for reconditioning the worn connection of a propeller shaft housing with a universal joint bell housing, consisting of a pair of telescoping, relatively slidable sleeves, one of said sleeves having a bore of a diameter slightly less than the unworn diameter of a propeller shaft housing for snugly receiving the worn end thereof, said other sleeve having a spherical surface for snug swiveling engagement within a universal joint housing, alined apertures in said one of said sleeves and the worn end of said propeller shaft housing, and a fastening means engaging said apertures, said fastening means being enclosed by said other of said sleeves.

19. A device for reconditioning propeller shaft housings and universal joint bell housings consisting of a first means directly engaging and surrounding the worn surface of a propeller shaft housing and provided with an external bearing surface of enlarged diameter and length, fastening means rigidly attaching said first means to said worn surface, a second means slidingly received upon said first means, said second means constituting a universal joint bell housing, and a sealing means received in an annular groove in said second means and engaging said first member in axially spaced relation to said worn surface.

THEODORE C. GERNER.