

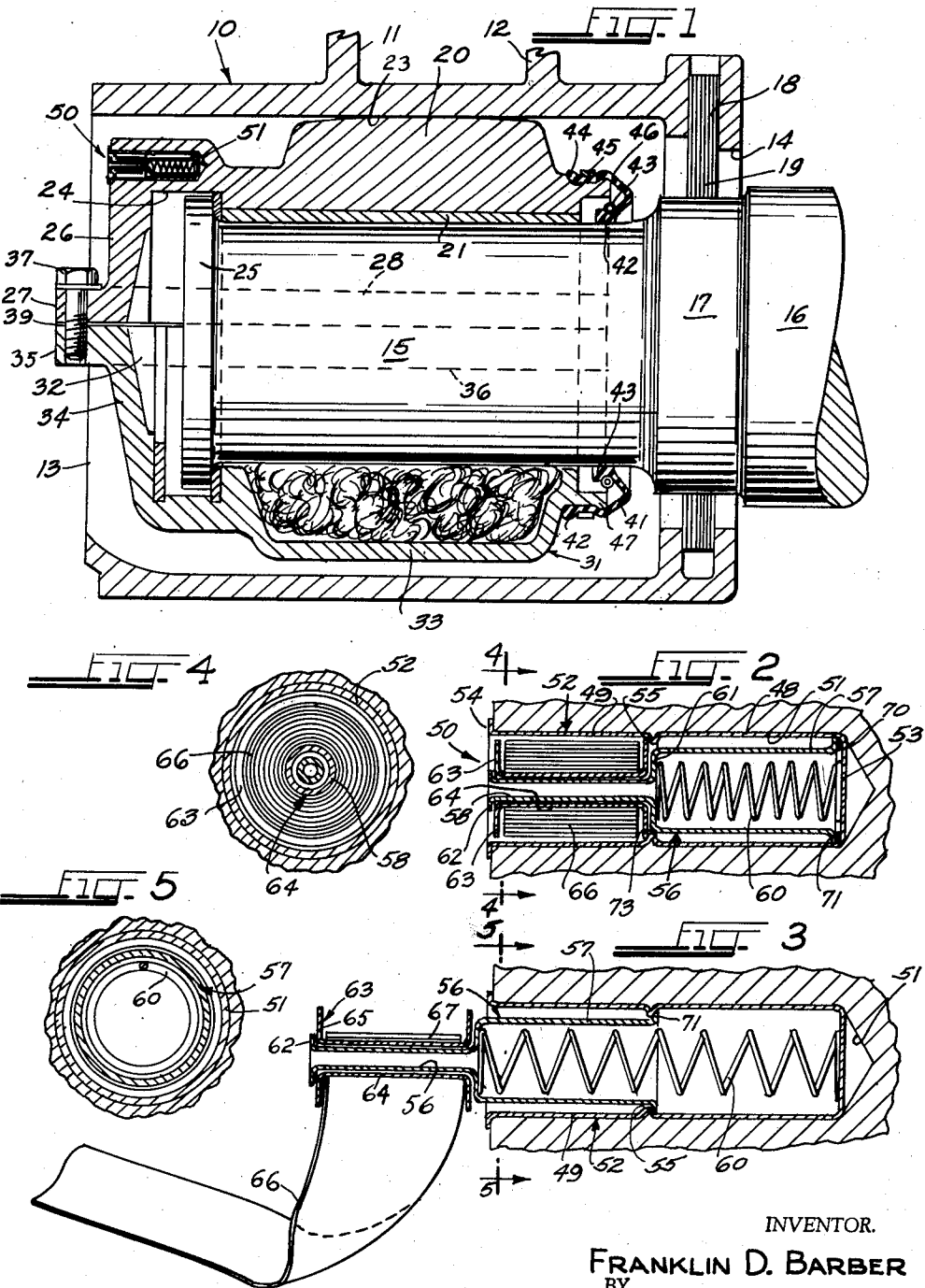
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HOT BEARING SIGNAL

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HOT BEARING SIGNAL

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The improved bearing signal comprising the present invention has been designed for use primarily as a journal box bearing signal for indicating the presence of a so-called "hot box" of a railway car truck. The invention is, however, capable of other uses and the same may if desired, be employed, with or without modification, for indicating the overheated condition of a journal bearing regardless of the nature of the bearing or the structure with which it is associated. However, it is designed particularly for use on a moving vehicle wherein the air currents incident to the movement of the vehicle are utilized to unfurl a visible signal and impart motion thereto, whereby it becomes more noticeable.

The invention is concerned generally with railway axle journal bearings and more particularly the sealed-in or reservoir type wherein the bearing portion of the axle is substantially completely enclosed within a reservoir, the latter consisting of a journal bearing member and a trough-like casing member which cooperates with the bearing member to enclose the axle journal and maintain the latter in running contact with a supply of lubricant which is disposed within the trough-like casing. The reservoir thus formed is disposed within the usual surrounding journal box casing which otherwise is dry with the entire supply of lubricant for the journal bearing being disposed within the inner reservoir. The reservoir is available for inspection or replacement of lubricant through the usual opening at the front of the journal box, the usual hinged lid and the adjacent open end of the journal being cut away, whereby the journal bearing may be clearly visible to a casual observer. Therefore, the presence of visible smoke in the vicinity of a journal box has been relied upon to detect an overheated condition of the journal bearing. However, the existence of such smoke is indicative of the fact that the journal is grossly overheated and in many instances when the existence of such a condition has made itself known to a trainman aboard the train or an observer on the ground, considerable damage may have resulted therefrom.

The present invention is designed to overcome the above noted limitations that are attendant upon the use of conventional journal bearings and toward this end it contemplates the provision of a novel form of a visual signaling device which may be manufactured as original equipment or which may be applied to existing installations and which, when installed in a journal bearing, will indicate the presence of an overheated condition long before the bearing has become heated to the danger point. In its broadest aspect, the invention makes use of a member which is movably mounted in the journal bearing member or brass. It is yieldingly held in a retracted position on said member by means of a spot of solder, Babbitt metal, or other low melting alloy. In the event that the bearing becomes heated to a degree above the melting point of the solder, babbitt or other retaining alloy, the latter will melt whereupon the movable member will be projected from its retracted position and caused to operate a signal which preferably gives a visible indication of the overheated condition. In the illustrated form of the invention, a visible signal is given, this signal being

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effected by the projection of a rotatable spool or reel outwardly of the journal bearing box into the slip stream of the railway car and a ribbon or streamer or a series of such devices initially coiled or wound upon the spool will, when caught in the slip stream, become unwound so as to flutter in the slip stream and thus give the desired visual indication of the overheated condition.

The provision of a signaling device of the character briefly outlined above being among the principal objects of the invention, it is a further object to provide such a signaling device which is capable of reuse in the same or in a different journal box assembly to indicate the existence of an overheated condition. By such an arrangement an inspector or other trainman having a supply of the signal devices in his possession may quickly and with facility remove the signal device from an overheated journal box and install another one therein after which the train may proceed on its way. A similar and related object of the invention is to provide a device of this character which is small and compact and which assumes the form of a package type unit or cartridge designed for insertion into and removal from a small recess or pocket provided in the front end of the journal bearing member, the unit being frictionally receivable within the pocket without requiring the use of attachment screws or other fastening devices.

The provision of a signaling device of the character set forth above which is extremely simple in its construction and which may, in the main, be manufactured of light sheet metal stampings or principally of molded plastic material and which therefore is inexpensive to produce; one which is possessed of a minimum number of parts particularly moving parts and which therefore is foolproof and unlikely to get out of order; one which, when installed, assumes an out-of-the-way position and will not interfere with any of the moving parts of the journal box structure; and one which otherwise is well adapted to perform the services required of it, are further desirable features which have been borne in mind in the production and development of the present invention.

Numerous other objects and advantages of the invention, not at this time enumerated, will become more readily apparent as the nature of the same is better understood.

In the accompanying drawing forming a part of this specification a preferred embodiment of the invention has been shown.

In the drawing:

Fig. 1 is a fragmentary longitudinal sectional view taken substantially centrally through a journal box construction embodying the principles of the present invention.

Fig. 2 is an enlarged fragmentary detailed longitudinal sectional view taken substantially centrally through the signaling device of the present invention and showing the same operatively installed within a recess or pocket provided for it in the journal bearing member.

Fig. 3 is a sectional view similar to Fig. 2 showing the signal device with the parts thereof in their operative extended position.

Fig. 4 is a sectional view taken substantially along the line 4—4 of Fig. 2, and

Fig. 5 is a sectional view taken substantially along the line 5—5 of Fig. 3.

Referring now to the drawings in detail and in particular to Fig. 1, the invention is shown herein as being associated with the journal construction disposed within a journal box 10 of a railway car truck. The journal box illustrated herein is more or less of conventional design and construction, although certain minor modifications thereof have been resorted to to adapt the same to accommodation of the present signal device. The journal box is cast integrally with the truck side frame as indicated

at 11 and 12. The conventional outer end wall of the journal box and its hinged lid or cover plate has been omitted and the end of the present journal 10 is completely open as indicated at 13. At the opposite end, the journal box is provided with an opening 14 to receive an axle journal 15 of a conventional wheel axle 16. The axle 16 is provided with a dust guard bearing 17 disposed between the axle journal 15 and the axle body 16. A dust guard slot 18 is aligned with the dust guard bearing 17 and is adapted to receive a conventional wooden dust guard 19, the function of the latter being to prevent the ingress of dirt or other foreign material into the journal box 10 through the opening 14.

The bearing assembly for the axle journal 15 includes an upper journal bearing member 20 of block form and comprising a unitary metal casting formed with a concave underneath surface 21 adapted to seat on the top surface of the axle journal 15. A journal bearing liner 22 formed of babbit or other suitable bearing metal is interposed between the bearing member 20 and journal 15 and rests on top of the axle journal 15. The journal bearing block 20 is provided with the usual "flat" which engages the underneath surface of the upper wall 23 of the journal box 10, which wall, as previously stated, is integrally cast with the truck frame. The forward end region of the bearing member 20 is internally recessed as at 24 to accommodate an end collar 25 provided on the end of the axle journal 15. The extreme outer end of the bearing member 20 forwardly of the recess 24 extends downwardly as at 26 and is formed with an outwardly extending bolting flange 27 which merges with similar outwardly extending bolting flanges 28 provided at the sides of the lower rim of the inverted trough-shaped bearing members 20. It is to be noted that the width of the internal recess 24 is somewhat in excess of the width of the end collar 25 so that a clearance is provided which will permit a limited amount of axial movement of the journal bearing relative to the axle journal 15.

The journal bearing member serves to support a lubricant reservoir designated in its entirety at 31 which will at all times maintain an adequate supply of lubricant, free from contamination, in contact with the axle journal 15. The lubricant reservoir 31 is in the form of a casting which is of trough-shaped configuration and which is substantially complementary to the bearing member 20 insofar as its shape is concerned. The reservoir is thus semi-cylindrical in transverse cross-section and is formed with curved sidewalls, only one of which is shown at 32, and a curved bottom 33. The reservoir 31 is further formed with a front wall 34 having an outwardly extending bolting flange 35 formed at its upper edge, this flange merging with similar flanges 36 provided along the upper rim or edge of the side walls 32. The various bolting flanges 27, 28 of the bearing member 20 are adapted to be secured to the corresponding bolting flanges 35, 36 of the reservoir 31, suitable clamping flanges 35, 36 of the reservoir 31, suitable clamping bolts 37 extending through the upper flanges and being threadedly received in the lower flanges. A gasket 39 of suitable gasket-forming material is interposed between the two sets of flanges for sealing purposes. At the right hand end of the bearing structure, the bearing member 20 and its attached reservoir 31 are sealed to the polished surface of the bearing journal 15 against egress of the lubricant contained within the reservoir by means of a flexible sleeve 41 of ring-like configuration and having a thickened inner edge portion 42 clamped around the periphery of the axle journal 15 by means of a garter spring 43 and an outer beaded rim or edge 44, the material of the flexible ring being clamped to the outer surface of the bearing member 20 and its adjacent reservoir 31 by means of a split clamping band 45 or the like. Both the bearing member 20 and the reservoir 31 are formed with inwardly extending semi-

circular flange portions 46 and 47 respectively which are spaced from the cylindrical surface of the journal bearing 15 and within the confines of which the inner thickened edge portion 42 of the sealing ring 41 and the garter spring 43 are disposed.

The lubricant which is adapted to be contained within the reservoir 31 may be of any suitable commercially available type as for example a hydrocarbon lubricating oil or the like. Where clear lubricating liquid is employed, the level of the liquid in the reservoir 31 will be maintained well above the lowermost level of the rotating axle journal 15. In the illustrated form of the invention, the reservoir is shown as containing a suitable fibrous material which acts to absorb a portion of the lubricant and prevent sloshing or turbulence of the same within the reservoir.

In the event that the bearing assembly becomes overheated due to the frictional forces involved, a signal assembly which has been designated in its entirety at 50 and which, in the main, forms the subject matter of the present invention is associated with the bearing member 20 and operates when this contingency arises to render a visual signal indicating the existence of such an overheated condition.

Referring now additionally to Figs. 2, 3, 4 and 5, the outer end face of the bearing member 20 is formed with a relatively deep cylindrical socket 51 of small proportions and in which socket the assembled signaling device 50 of the present invention is adapted to fit snugly with a fairly tight frictional fit as will be described hereinafter. The signaling device 50 involves in its general organization a tubular outer casing 52 the rear end of which is closed by an end wall 53 and the forward end of which is open to provide an outwardly flanged rim 54 adapted to bear against the front face of the bearing member 20 when the tubular casing 52 is inserted within the socket 51 to limit the extent of such insertion of the casing into the socket. The medial regions of the tubular casing 52 substantially midway between its ends is formed with an inwardly extending bead or rib 55 for purposes that will be made clear presently, this bead 55 dividing the casing 52 into a rear section 48 and a front section 49. Slidably disposed within the outer casing 52 is a tubular piston 56 which establishes communication between the outside atmosphere and the inner end wall 53 of the casing 52 so as to prevent the creation of a partial vacuum within the casing during the outward movement of the piston 56. The said piston has a cylindrical rear portion 57 of relatively large diameter and a coaxial cylindrical forward portion 58 of relatively small diameter. The portion 57 of the piston 56 is substantially coextensive longitudinally with the portion of the outer cylindrical member 52 which exists rearwardly of the rib 55 and the diameter of the enlarged rear portion 56 is slightly less than the minimum diameter of the rib 55 so that this rear portion of the inner cylindrical member 56 may move from a retracted position wherein it is contained wholly within the rear section 48 of the outer tubular member to an advanced position wherein it is contained substantially wholly within the confines of the forward section 49 of the outer cylindrical member. A coil spring 60 is disposed within the enlarged portion 57 of the inner member 56 and normally urges the inner member forwardly within the outer member to its advanced position therein.

The enlarged rear portion 57 of the inner member 56 is joined to the reduced forward portion 58 thereof by a radial shoulder 61 and this shoulder, in combination with a laterally turned flange 62 on the forward end of the reduced portion 58 serves to retain a spool member 63 in a centered position between the shoulder 61 and flange 62 on the reduced portion 58, this latter portion constituting a hollow spindle on which the spool member 63 is rotatable. The spool member 63 is in the form of a metal stamping having a hollow central spool post 64 and

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radial end flanges 65, the radial extent of which is such that the spool 63 as a whole may be nested within the cylindrical confines of the outer section 49 of the tubular casing 52 when the inner member 56 is nested within the latter casing. Spirally wound on the post portion 64 of the spool member 63 is an elongated length of, preferably brightly colored, fabric material 66, this material being in the form of a ribbon or streamer of a width substantially equal to the distance between the spool end flanges 65 so that the ribbon will substantially fill the space existing within the spool confines between these two flanges. The inner end of the coiled ribbon is suitably attached to the spool center post 64 as for example by a suitable adhesive 67 while the outer end of the coiled ribbon is left free so that the ribbon may readily be uncoiled when the same is projected into the slipstream of air at the side of the railroad car as will be described presently.

As best illustrated in Fig. 2, the inner unit 56 is maintained in its retracted position within the outer unit 52 against the action of the coiled spring 60 by means of a low melting point metallic bonding material 70 such as solder, Babbitt metal or the like, the solder being applied on the one hand to the peripheral regions of the inner wall 53 of the outer tubular member 52 and on the other hand to a short radial out-turned flange 71 which is provided on the extreme inner rim of the section 57 of the tubular piston 56 and serving by its engagement with the casing to maintain the piston centered therein. The solder 70 may be applied in spots or it may be coextensive with the flange 71. In structures made of plastic or other nonmetallic material the solder or other fusible material may be in the form of a plug, bolt or rivet extending through the wall of the cylinder 51 in a position to engage the retractable cylinder 57 or its flange 71. It is to be noted that the overall radial extent of the flange 71 is greater than the radial extent of the circular opening 73 afforded by the central rib 55 so that this latter rib will engage the radial flange 71 when the inner member 56 is projected outwardly under the influence of the spring 60 as shown in Fig. 3. The rib 55 thus constitutes a retainer to prevent complete ejection of the inner member 56 from the outer casing 52 when the inner member is released for forward movement under the influence of the spring 60. It is to be noted from an inspection of Fig. 3 that when the radial flange 71 engages the inwardly extending rib 55, the enlarged section 57 of the inner member 56 will have shifted forwardly and become transferred from the rear or inner section 48 of the outer member 52 to the forward or outer section 49 of this outer member. At the same time the tubular spindle 64 will be projected outwardly beyond the forward rim portion of the outer casing 52 where, when the railway car is in motion, it will extend into the slipstream of air so that the ribbon 56 carried on the rotatable spool 63 will become unwound in a manner that will be described presently.

In the operation of the signaling device, as previously described, one of the package units 50 is inserted within the cylindrical wall of the socket 51 provided in the front end face of the bearing member 20 and is pushed therein until the radial flange 54 engages the end face of the member 70. The device will remain encased in the socket 51 indefinitely until such time as a "hot box" condition obtains wherein the bearing member 20 becomes overheated due to the frictional forces developed within the bearing when insufficient lubricant is present within the reservoir 31. At such time as the melting point of the solder or other bonding material 70 is exceeded in the metal of the bearing member 20 in the vicinity of the socket 25, the bonding metal will melt thus releasing the inner spool retaining member 56 and this member, under the influence of the spring 60 will be projected forwardly until such time as the radial flange 71 engages the inwardly extending bead 55. The spindle 64 which supports the spool assembly including the spool 63 and the

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ribbon 66 which is coiled thereon will be projected outwardly into the slipstream of air moving rearwardly relative to the forwardly moving railway car. As soon as the stream of air engages the freely rotatable spool assembly 63 the frictional force of the air on the periphery of the ribbon coil will cause the ribbon to unwind in the form of a trailing streamer such as has been illustrated in Fig. 3, the streamer being readily visible to the trainmen or other onlookers either on the train or on the ground. It is contemplated that the ribbon or streamer 66 will be either white or of some bright color. If desired it may be iridescent or fluorescent so that it will readily show up in the darkness. After the presence of a hot box has been ascertained by virtue of the present signaling device, the train may be brought to a stop and the trainman will proceed to the defective journal box assembly, withdraw the unit 50, remedy the hot box condition and, before the train proceeds on its way, he will insert a fresh cartridge type unit in the socket 51.

In compliance with Title 35, U.S. Code, Section 22, a preferred form of the invention has been shown in the drawings and described herein, but it should be distinctly understood that the invention is not limited to the specific disclosures made, and that the appended claims should be construed as broadly as the prior art will permit.

I claim:

1. In combination with a stationary metal bearing for a rotatable shaft, a signal device for giving a visual indication of a rise in the temperature of said bearing above a predetermined maximum degree, said device comprising a tubular casing secured to said bearing, a tubular piston establishing communication between the outside atmosphere and the inner end wall of said casing and slidably supported in said casing with capacity for movement between a retracted inoperative position and an advanced forward operative position, a normally inactive signal carried within said casing on a free floating spool rotatably mounted on said tubular piston, resilient means normally urging said piston toward its advanced forward position, means for limiting the forward movement of said piston, a bonding material securing said piston to the casing in said retracted inoperative position and having a melting point at least as low as said predetermined maximum temperature whereby, upon the heat softening of the bonding material, the piston is projected under the influence of said resilient means to its advanced forward position and thereby moves said signal outwardly from said casing to give a visual indication of the heated condition of said bearing.

2. The combination set forth in claim 1 wherein the means for limiting forward movement of the piston comprises an internal projection on said tubular casing in the medial region thereof and a cooperating radial projection on said piston adjacent the rear end thereof designed for engagement with said internal projection to limit the forward position of the piston.

3. The combination set forth in claim 2 wherein an internal shoulder is formed on said piston and wherein said resilient means comprises a coil spring disposed within the tubular piston to bear at one end against the inner wall of said casing and at its other end against said internal shoulder formed on the piston.

4. The combination set forth in claim 3 wherein said piston is formed with an end portion of reduced diameter and the said spool is journaled on said reduced end portion of the piston.

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