Nov. 4, 1958 G. W. ACHUFF ET AL 2,859,069

PROTECTIVE APPARATUS FOR HOT BOXES

Filed March 1, 1957

FIG. 1

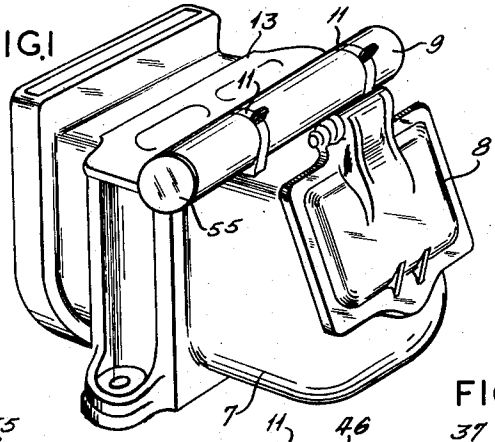


FIG. 3

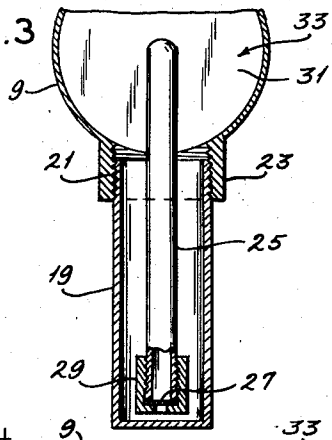


FIG. 2

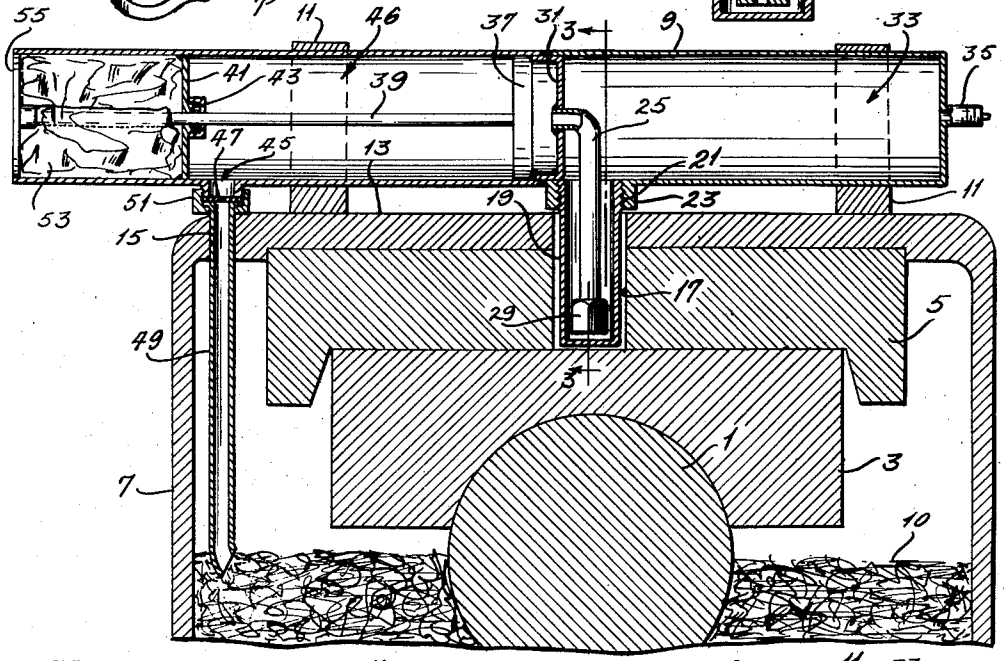
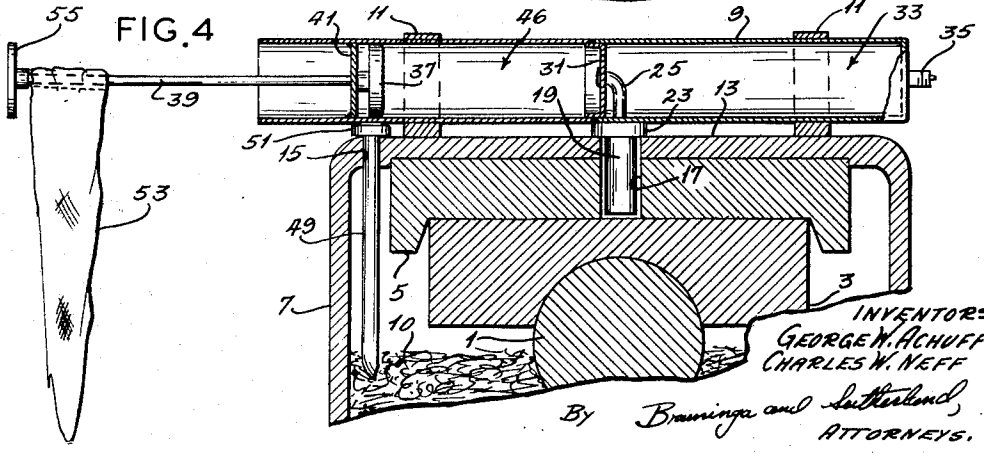


FIG. 4



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PROTECTIVE APPARATUS FOR HOT BOXES

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9 Claims. (Cl. 308—1)

This invention relates to railroad car journal boxes, and more particularly to means for detecting and temporarily counteracting a potentially unsafe condition at a car axle journal.

It will be understood that the car axles are usually journalled within a box containing oil-saturated cotton waste. For the most part, this arrangement has proved satisfactory, and it has the attraction of low cost in comparison with other journalling systems. The main disadvantage is that such a journal box will overheat upon rare occasions, and the journal may then freeze or otherwise become damaged. Without some means of detecting an incipient overheating condition, the damage may progress undetected until a serious accident occurs.

There have been various proposals for detecting such overheating and providing for temporary lubrication, but it is significant that little, if any, commercial use has occurred. It is thought that such prior proposals have suffered from high installation costs, perhaps to an extent that they become more costly than alternative journalling sysems. Accordingly, one of the objects of the present invention is to provide a self-contained device which is readily installed on new or old cars at a cost sufficiently low to justify commercial use. Among the several other objects of the invention may be noted the provision of such a device which will withstand the severe usage to which railroad cars are put; the provision of a device of this character which is not likely to become damaged during the regular maintenance of journal boxes; and the provision of a protective device of this character which can be readily replaced or removed, when so desired.

Other features of the invention will be in part apparent from and in part pointed out in the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of a journal box illustrating apparatus embodying features of this invention;

Fig. 2 is a cross section of the journal box and protective apparatus taken in a direction transverse of the car axle;

Fig. 3 is a view taken on the line 3—3 of Fig. 2; and

Fig. 4 is a view similar to that of Fig. 2 but showing the apparatus with the parts moved to their actuated positions in response to an overheated bearing.

Referring now to the drawings, a portion 1 of a car axle is shown journalled in a bearing 3 which is mounted in a retainer block 5. These parts are enclosed in a conventional journal box 7 having a door 8 affording access to the oil-saturated waste 10, which lubricates the bearing. This general type of journalling assembly is found in the great majority of railroad cars, hence represents the typical situation to be dealt with regarding hot box problems.

The present invention recognizes that it is highly inconvenient, if not impractical, to modify this system in any significant respect, but the invention provides an accessory which can be added and removed with a minimum of effort in those cases where a hot box condition would cause severe trouble.

The device is completely contained within a strong but simple housing 9 of cylindric shape, which can be secured by brackets 11 on the top 13 of the journal box. One or more such brackets may be readily fastened to the box, as by means of screws, or the housing itself might have ears formed thereon, by which it is secured directly to the journal box. A hole 15 is drilled through the top wall of the box at one end clear of the retainer block 5 and bearing 3, and another hole 17 is drilled through the top of the box and the retainer block to the bearing. The passage 17 is adapted to admit a sealed tube or hollow projection 19, which is threaded at 21 within a fitting 23 welded to the housing intermediate its ends. This hollow projection contains a temperature-responsive valve, which may be inexpensively formed from fusible metal. For example, a short length of tubing 25 extends downwardly within the projection 19 and a fusible disc 27 is secured in sealing relationship over the tube 25 by means of a nut 29. When the temperature rises to a point such that the fusible element is melted or otherwise weakened, the seal is broken.

The tube 25 is sealed at its other end in a diaphragm 31, which itself is sealed to the inner wall of the housing at a point forward of the projection 19. The portion 33 rearwardly of diaphragm 31 constitutes a chamber containing a supply of compressed air or other gas. As such, the back portion 33 of the housing functions as a power unit, and if desired, an air valve 35 may be provided for replenishing the compressed air supply, should it tend to leak or should the device be actuated. The portion of the cylinder forward of the diaphragm 31 serves as a pneumatic power unit containing a piston 37 with a rod 39 extending forwardly through a second diaphragm 41, which may have a fitting 43 through which the rod 39 extends in relatively oil-sealed sliding relationship.

The second diaphragm 41 is disposed forwardly of a port 45 so that the portion between the two diaphragms may serve as a chamber 46 containing supply of lubricant. The lubricant is initially retained by means of a frangible disc 47, such as might be formed of aluminum foil. A discharge pipe 49 otherwise extends from the port 45 and through the hole 15 in the journal box so that the lubricant will be fed onto the axle. It may be noted that a threaded nut 51 may be utilized to secure the pipe 49 and frangible disc 47. The portion of the housing forwardly of the second diaphragm 41 serves as a container for a flag 53, which is initially contained within the housing. A disc or cap 55 is fastened to the end of drive rod 39 as to be close to the housing when the piston 37 is in its retracted position adjacent the first diaphragm 31, and the flag 53 is then loosely contained within a housing.

When installed, the temperature-responsive element is disposed adjacent or preferably contiguous with the bearing 3, and the lower portion of the hollow projection 19 may contain a small supply of oil so as to improve the heat transfer from the exterior of the bearing to the fusible element 27. The oil discharge pipe 49 extends through the other opening 15 in the journal box to a convenient point for feeding lubricant to the axle.

If an incipient hot box condition then develops, the rise in bearing temperature will result in destruction of the air seal at the fusible metal element 27, whereupon the compressed air is discharged from its chamber 33 against the piston 37. As the piston is driven forwardly, the lubricant within its chamber 46 is ejected to break the frangible disc 47 and pass through the discharge pipe

to the bearing. This is desirable since many hot box conditions occur merely from lack of lubricant. In other words, this temporary supply of lubricant may be sufficient to halt further temperature rise and protect the bearing for a time sufficient to permit its detection, as will be apparent.

As the piston is driven forwardly, the forward end 55 thereof is projected from the housing carrying the flag 53 with it. The flag may be of a colored cloth so that as it flaps from the journal box, it serves as a means of quickly identifying the incipient hot box condition. Those skilled in the art will ready understand that it is customary railroad practice for the personnel at various points along the route to watch the journal boxes of passing trains.

From the foregoing description, it is apparent that those skilled in the art will understand the structure, function and mode of operation of the invention herein disclosed, and appreciate the advantages thereof. Although one embodiment has been disclosed in detail, it is to be understood that the invention is not limited thereto, but the drawings and description thereof are to be understood as being merely illustrative. It is realized that many modifications and variations will present themselves to those skilled in the art without departing from the spirit of this invention or the scope thereof as set forth in the appended claims.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

1. In a railroad journal box having a contained bearing, the improvement comprising protective apparatus having a housing, a lubricant chamber formed within said housing, a piston mounted within said lubricant chamber, said lubricant chamber having a discharge port leading from one side of said piston and a pressurized-gas connection to the chamber on the other side of said piston, said housing further including a chamber containing a supply of pressurized gas, and temperature-responsive valve means interposed between said supply of pressurized gas and said gas connection to the lubricant chamber, said temperature-responsive valve means being of a character such as to release gas to the piston in the lubricant chamber when the temperature exceeds a predetermined value.

2. Protective apparatus as set forth in claim 1, wherein said discharge port is initially closed by means of a frangible member.

3. Protective apparatus as set forth in claim 1, wherein said piston further includes a rod projecting from said lubricant chamber, said rod carrying a warning element at its end, and said warning element being normally disposed within said housing when the piston is in a retracted position and being projected from said housing when the piston is advanced by gas pressure upon opening of said temperature-responsive valve means.

4. A self-contained protective device for railroad journal boxes having a bearing, comprising a cylindrical housing having a first chamber containing a supply of compressed air, a second chamber containing a supply of lubricant, and a third chamber containing an alarm element; normally-closed temperature-sensitive valve means interposed between said first and second chambers and adapted to be disposed so as to be responsive to a temperature rise at the bearing of the journal box, a piston disposed within said second chamber in a retracted position adjacent said first chamber, said piston having a rod extending through said second chamber to said third chamber, said alarm element being mounted upon said rod within said third chamber so as to be normally concealed when the piston is in its retracted position and to be projected from the housing when the piston is advanced.

5. A protective device as set forth in claim 4, wherein said cylindric housing is adapted to be mounted upon the top of the journal box and includes a hollow depending projection which is adapted to be received through a hole in the top of the journal box so as to be positionable adjacent the bearing, said temperature-sensitive valve means disposed in said hollow projection.

6. A protective device as set forth in claim 5, wherein said temperature-sensitive valve means includes a tube extending from a point adjacent the bottom of said hollow projection to said second chamber, said hollow projection being in communication with said first chamber, and a fusible element normally sealing said tube.

7. A protective device as set forth in claim 5, wherein said hollow projection contains a heat conductive liquid.

8. A protective device as set forth in claim 5, wherein said rod has a protective cap fastened to its free end which normally closes the housing.

9. A self-containing protective device for railroad journal boxes comprising an elongate housing having a first chamber containing a power unit, a second chamber containing a supply of lubricant, and a third chamber containing an alarm device; piston means disposed in the lubricant and alarm chambers, and temperature-responsive means adapted to release the energy of the power unit against said piston means in response to a rise in temperature, thereby to eject the lubricant from its chamber and to eject the alarm device from its chamber.

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