

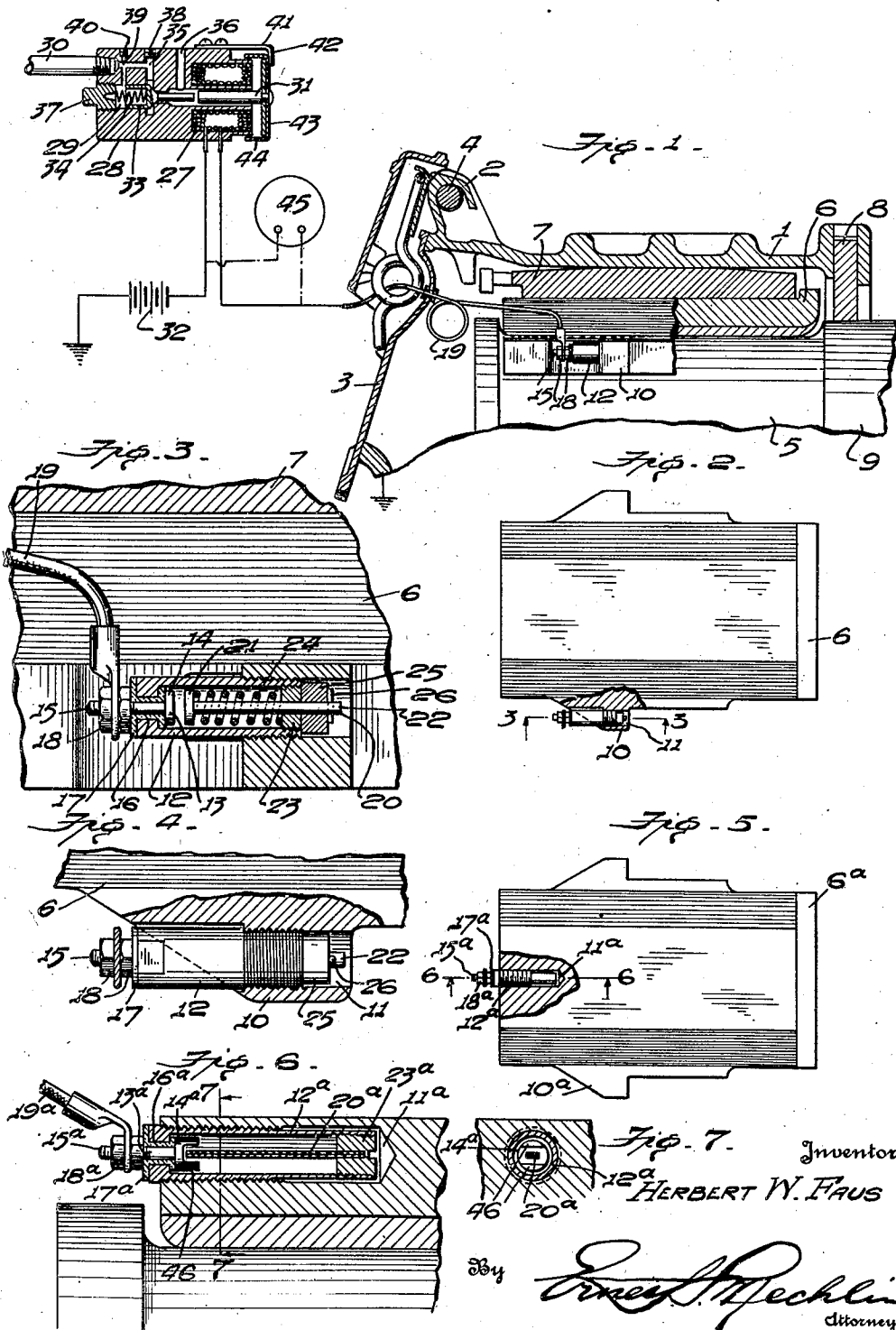
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HOT BOX CONTROL

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HOT BOX CONTROL

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This invention relates to means for controlling hot boxes, and more particularly to means acting automatically for stopping a railway train upon the development of a hot box on any one of the vehicles in said train.

The principal object of my invention, generally considered, is the provision of a railway vehicle journal bearing provided with means for completing an electric circuit when said bearing reaches a predetermined temperature, or upon the development of a hot box, said circuit actuating a valve releasing compressed air from the train line to thereby apply the brakes to stop the train, and/or an indicator showing the engineman or other member of the train that there is a hot box.

Another object of my invention is the provision of the bearings on railway vehicles, both locomotives and cars, with normally open electrical contact devices which are closed in any desired manner when the bearings develop hot boxes or reach predetermined temperatures, said devices, upon closing, completing electric circuits which are adapted to release compressed air from the train line and apply the brakes, and/or give warning so that the train may be stopped.

Other objects and advantages of the invention relating to the particular arrangement and construction of the various parts will become apparent as the description proceeds.

Referring to the drawing illustrating my invention, the scope whereof is defined by the appended claims:—

Figure 1 is a fragmentary, vertical, sectional view of a journal box, an enclosed journal, and associated parts embodying my invention.

Figure 2 is a plan of the journal bearing or brass illustrated in Figure 1, a part being shown in section to more clearly disclose an embodiment of my invention.

Figure 3 is a vertical sectional view on the line 3—3 of Figure 2, looking in the direction of the arrows.

Figure 4 is a fragmentary view corresponding to Figure 2, but showing an en-

largement of one of the bearing lugs carrying a contact device embodying my invention.

Figures 5 and 6 are views corresponding, respectively, to Figures 2 and 3, but showing a modification.

Figure 7 is a transverse sectional view on the line 7—7 of Figure 6, looking in the direction of the arrows.

Hot bearings or "hot boxes", as they are generally called, are a frequent cause of derailments and train delays on railways today. A great many failures in connection with train operation are caused by hot boxes, and on account of the possibility of serious wrecks, there is always the chance that loss of life, as well as property damage, will follow from a hot box. It is the duty of the train crew and other railway employees to stop the train and remedy the hot box upon its development, but on account of the increase in the length of trains and speed of operation, as well as for other reasons, it is difficult to detect hot boxes until serious damage has occurred.

I have, therefore, invented a device adapted to apply the brakes of the train upon the development of a hot box, or upon the journal bearing reaching a predetermined elevated temperature. Instead of applying the brakes automatically, my device may be adapted to operate a warning device in the cab of the locomotive, or other suitable location, or may be adapted to operate an indicator in addition to applying the brakes, so that the cause of the brake application will be announced.

Referring to the drawing in detail, like parts being designated by like reference characters, there is shown a journal box 1 provided with a hinge lug 2 and a lid 3 pivotally connected to said lug, as by means of a hinge pin or pintle 4. Received in the box is an associated journal 5 normally in engagement with a brass or bearing 6 between which and the top of the box is disposed a usual form of wedge 7. The lid 3 closes the outer opening in the box, and a dust guard 8 of any desired character may close the inner opening around the axle 9.

In the embodiment of my invention illustrated in Figures 1 to 4, inclusive, one of the lugs 10 on the brass 6 has an aperture 11 therethrough, said aperture receiving, and the lug being threadably connected with, a tube 12, desirably formed of metal such as brass. One end of said tube, preferably the outer end, has an electrical contact member or device 13, preferably formed of metal such as brass, and comprising a head 14 and a shank or stem 15 passing through an opening 16 in the tube 12 and insulated therefrom, as by means of any suitable heat resisting electrical insulating material 17. The outer end of the stem 15 is threaded and has applied thereto nuts 18 serving to connect one end of an electrical wire or cable 19 thereto. The cable 19 may pass out of the box through a suitable, preferably insulated, opening in the lid 3 or box proper 1.

The tube 12 has received in the other end a second electrical contact element or device 20 comprising a head 21 and a stem or shank 22, said stem 22 being slidable in and passing through a preferably metal plug 23 threaded into the corresponding end of the tube 12, a spring 24 normally acting between the head 21 and the plug 23 for urging the contact device 20 into engagement with the contact device 13. In order to normally hold the heads of the contact elements 13 and 20 in spaced relation, a fusible device or washer 25 fits over the end of the stem 22, a cotter or other retaining device 26 being employed passing through the end of the stem 22 to engage the outer end of the fusible member 25 and hold the head 21 away from the head 14 against the pressure of the actuating spring 24.

The electric wire or cable 19 is desirably connected to a solenoid 27 preferably forming part of an electrically actuated valve device 28 formed with an air chamber 29 connected to the train line or air brake system of the associated car, as by means of a pipe 30. The solenoid 27 surrounds an armature 31, and when energized, upon melting of the fusible element 25 to cause the contact members 13 and 20 to engage and thereby complete the circuit from ground through the journal box 1, bearing 6, contact device 20, contact device 13, cable 19, solenoid 27, battery or other source of electromotive force 32 to ground, said solenoid moves to the left and engages the stem of the air valve 33, forcing said valve to the left against the pressure of the retaining spring 34, allowing air to escape from the passage 35, past the valve 33, and through the exhaust opening 36 to the atmosphere.

The valve device 28 is preferably provided with a plug 37 closing the chamber receiving the valve 33 and allowing for the replacement and repair of said valve, as well as providing for an adjustment on the

spring 34. The outer end of the air passage 35 is desirably closed by a plug 38 and the end of the air passage 39 leading to the valve chamber 29 is likewise closed by a plug 40, thereby providing access to said air passages for cleaning or other purposes. The armature 31 is held in place and prevented from undesired outward movement by means of a retainer plate 41, said plate having an angular extension 42 overlying a plate 43 on the armature 31, said plate 43 having angular extensions 44 overlying the body of the valve device 29 and serving to properly guide the armature 31, as well as completing the magnetic circuit around the solenoid.

If it is desired to have a signal in the cab denoting a hot box instead of the valve device 28 for applying the brakes on the train, the cable or electric wire 19 may connect with such a device 45, as shown in Figure 1, instead of the device 28. It will also be clear that, if desired, such a warning device may be employed in addition to the air valve device, and thereby indicate a hot box visually, or in any other desired manner, as well as by stopping the train.

Referring now to the embodiment of my invention illustrated in Figures 5, 6 and 7, a preferably metal tube 12^a is provided threadably engaging the stem and received in a corresponding cavity 11^a, said cavity either being in the lug 10^a of the brass, as in the previous embodiment, or in the main body of the brass, as illustrated. As in the previous embodiment, the tube 12^a is provided with a contact member 13^a having a head 14^a and a stem or shank 15^a received in an opening 16^a through the end of the tube 12^a and insulated therefrom by heat-resisting insulation 17^a. Nuts 18^a serve for the connection of an electric wire or cable 19^a, which cable is adapted for connection with a valve device 28 and battery 32 and/or an indicator 45, as in the previous embodiment.

The other end of the tube 12^a receives a strip of thermometal or bimetallic device 20^a desirably attached to a plug 23^a threaded into the tube 12^a and adapted, when the associated bearing reaches a predetermined temperature, to make electrical contact with the head 14^a of the contact device 13^a and complete the circuit through the compressed air valve device 28 and/or indicator 45.

A preferred way is illustrated for accomplishing this result, although it will be understood that the result may be accomplished in other suitable ways. The head 14^a of the contact device 13^a is shown bifurcated or provided with prongs 46 normally straddling the thermometal strip 20^a and so spaced therefrom that when the bearing 6^a and associated strip 20^a become heated to a predetermined temperature, the metal strip

bends and engages one of the prongs 46, completing the circuit through the compressed air valve device and/or indicator 45, as fully described in connection with the previous embodiment.

From the foregoing disclosure, it will be seen that I have devised means for controlling hot boxes particularly adapted for use on railway rolling stock, said means comprising a contact-making device preferably associated with the journal bearing or brass and causing an electrically connected compressed air valve to allow air to escape and apply to brakes and/or actuate an indicator showing a hot box. Although I have shown the contact device in the first embodiment applied to one of the lugs on the brass, and in the second embodiment applied to the center or body portion of the brass, it will be understood that either device may be applied in any convenient or desired location in the brass.

The composition of the fusible washer or device 25 may be such that it melts and causes the brakes to be applied prior to permanent injury of the journal and associated bearing. It has been determined that American Railway Association standard car axle steel will successfully withstand temperatures up to at least 400° F. without permanent injury. Therefore, the device which I have invented is adapted to cause the application of the brakes when the bearing reaches a temperature of, say, 200° F. For this purpose, an alloy consisting of 25% tin, 25% lead, and 50% bismuth, which will melt at 200° F., may be employed. If it is desired to refrain from applying the brakes until a higher temperature has been reached, say, 240° F., the washer 25 may be made of an alloy containing 40% tin, 10% lead, and 50% bismuth.

Although preferred embodiments of my invention have been illustrated, it will be understood that modifications may be made within the spirit and scope of the appended claims.

I claim:—

1. In combination with a bearing, a tube threadably connected thereto, a contact element at one end of said tube, a cooperating contact element normally spaced from and spring pressed toward said first-mentioned contact element, a fusible plug preventing release of said second contact element, said plug being adapted to melt when the bearing reaches a predetermined temperature and allow the spring to press the second contact

element into engagement with the first to complete an electric circuit, a solenoid energized upon completion of said circuit, an armature actuated upon energization of said solenoid, and a valve actuated by said armature for releasing compressed air.

2. A bearing, a spring pressed contact device normally held in open position by a washer adapted to melt when the bearing reaches a predetermined temperature and permit said device to be closed to complete an electric circuit, a solenoid energized upon completion of said circuit, an armature actuated upon energization of said solenoid, and a valve opened by said armature upon actuation thereof for releasing compressed air.

3. A bearing, alined spring-urged contact members, normally kept from engagement by an element fusible to allow said members to contact, for completing an electric circuit upon heating of the bearing to a predetermined temperature, and an indicator actuated by said circuit for showing the development of a hot box.

4. A bearing, a spring pressed contact device normally held in open position by a fusible element adapted to melt when the bearing reaches a predetermined temperature, thereby permitting said device to engage a longitudinally alined contact and complete an electric circuit, in combination with an indicator actuated by said circuit for showing that a hot box has developed.

5. In combination with a bearing, a pronged contact, a bimetallic strip normally secured at one end and with the other end disposed in open position between the prongs of said contact and adapted to bend and engage said contact to complete an electric circuit when heated to a predetermined temperature, and an indicator actuated upon completion of said circuit to show that a hot box has developed.

6. In a railway vehicle, a bearing, a pronged contact member associated with said bearing, a bi-metallic strip secured at one end and with the other normally disposed between but out of contact with the prongs of said contact member and adapted to bend and engage one of said prongs to complete an electric circuit when the associated bearing is heated to a predetermined temperature, a solenoid in said circuit for energization upon completion thereof, an armature actuated by said solenoid, and a valve opened upon actuation of said armature for applying the brakes on the vehicle.

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