No. 671,813. Patented Apr. 9, 1901.

R. G. CALLUM.

TEMPERATURE ALARM AND INDICATOR FOR CAR AXLE BOXES.

(Application filed Oct. 5, 1899.)

(No Model.)

Fig. 1.

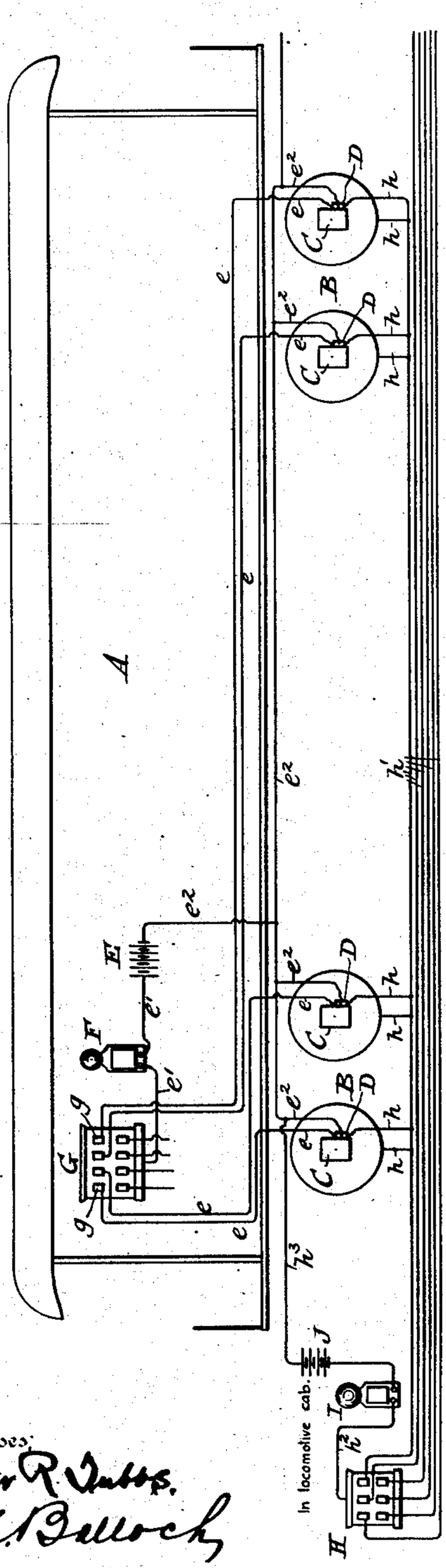


Fig. 4.

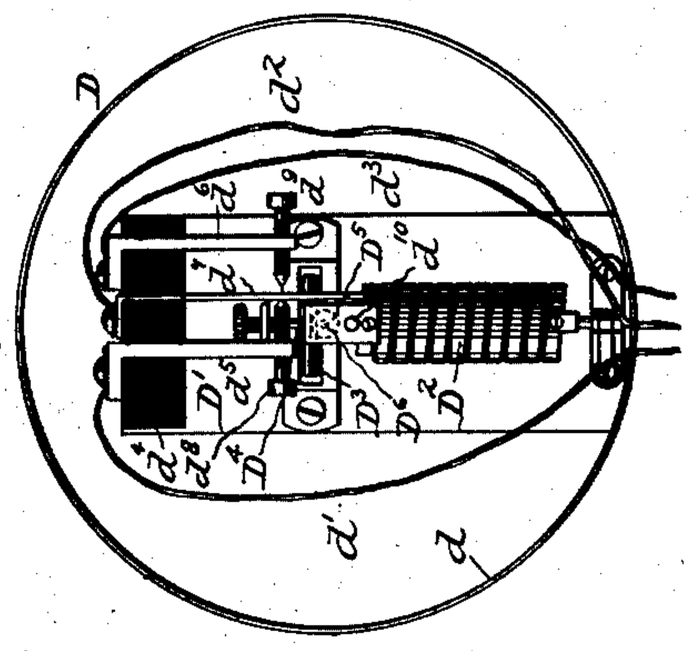


Fig. 3.

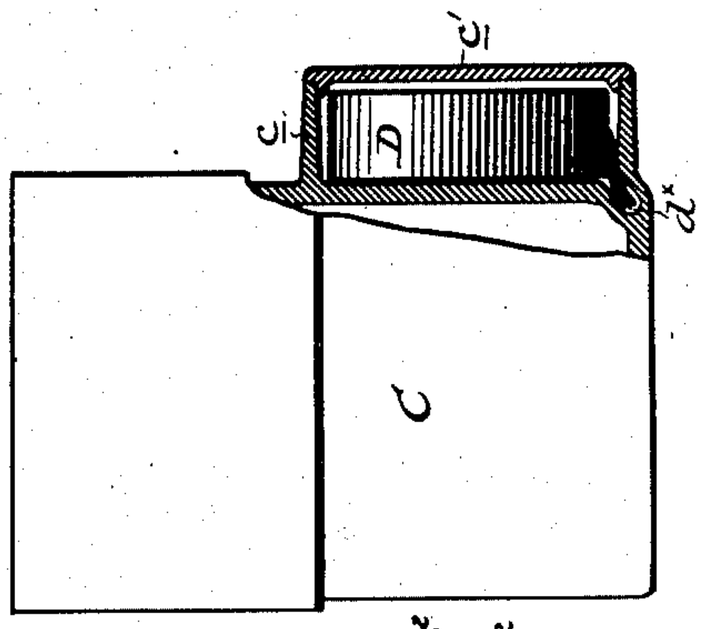
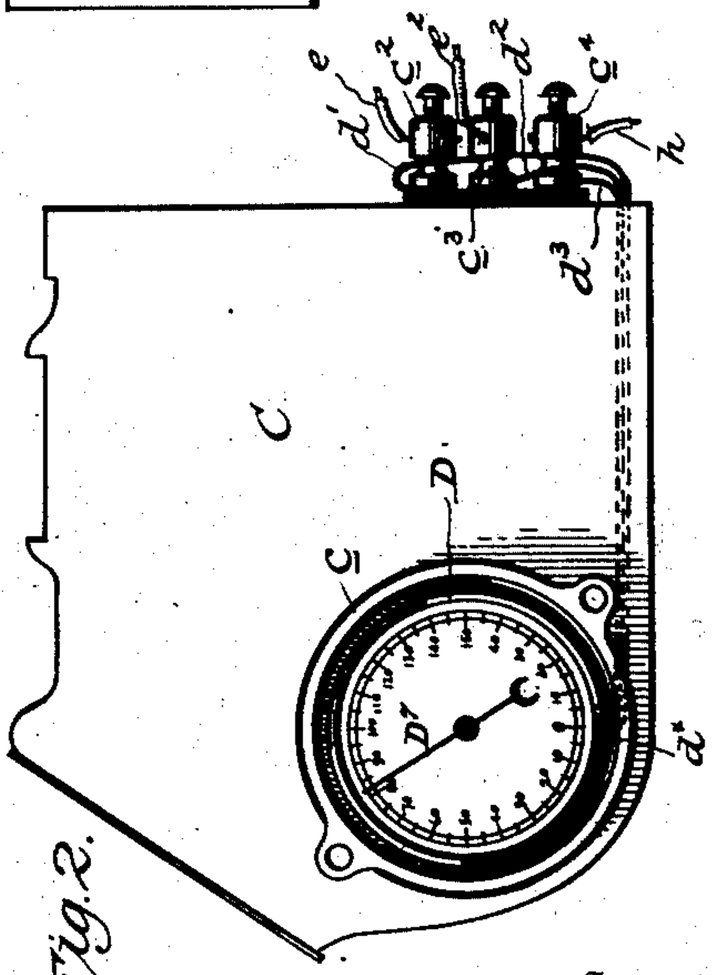


Fig. 2.



Witnesses:
Walter R. Dubbs.
E. A. Bullock.

Inventor;
Robert G. Callum,
by Sidney P. Hollingsworth
Attorney.

UNITED STATES PATENT OFFICE.

ROBERT G. CALLUM, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO THE CALLUM FIRE SIGNAL COMPANY, OF SAME PLACE.

TEMPERATURE ALARM AND INDICATOR FOR CAR AXLE-BOXES.

SPECIFICATION forming part of Letters Patent No. 671,813, dated April 9, 1901.

Application filed October 5, 1899. Serial No. 732,682. (No model.)

To all whom it may concern:

Be it known that I, ROBERT G. CALLUM, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Temperature Alarms and Indicators for Car Axle-Boxes; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to a temperature alarm and indicating system designed to be applied to railway-car axle-boxes, whereby the conductor, brakeman, or engineer of a railway-train will receive warning by an audible signal within the car or the cab of the locomotive that the temperature of one or more of the axle-boxes is dangerously high, and by a visual signal the particular car and the individual axle-box on that car calling for attention will be indicated.

It often occurs on trains at the present day, especially such as travel at high speeds, that one or several of the axle-boxes on the cars heat through friction resulting from poor and inadequate lubrication or other causes, which, if not attended to immediately, will continue to heat to such a degree as to cause the packing and lubricating material within the axle-box to take fire, the result being delayed trains, interruption of traffic by possible burning of the car itself, causing great alarm and even danger to the passengers, as well as serious loss to the railroad company.

So far as I am aware no successful means has yet been devised to overcome the annoyance and danger of a "hot box," the great desideratum being to discover in its incipiency the abnormal increase in temperature of the axle-box and correct the evil at that time, before the heat gets sufficiently high to volatilize the lubricating material and cause it to ignite.

The defects above noted I have overcome by applying to or in close proximity to each axle-box on a car a thermostat arranged to operate a circuit-changer in an independent closed circuit with a bell and an annunciator drop and battery on said car. Each car of a train is not only equipped in this manner, but the circuit-changers of the thermostats on all the axle-boxes of each car are in open circuit with a bell and an annunciator in the cab of the locomotive. Each circuit-changer is so adjusted as to open the closed circuit at a predetermined degree of heat, which is usually much higher than that to which the axle-box is exposed under normal conditions. Opening one of the closed circuits causes the bell to ring and the indicating-drop of the annunciator within the car on that circuit to fall, thus disclosing which axle-box requires attention. Should, however, no attention be paid to the warning thus given and the temperature of the axle-box continues to rise, the circuit-changer will close the open circuit through the cab-annunciator before it reaches the danger-point, which point can be set on the circuit-changer to any degree desired. Closing the open circuit will cause the annunciator-drop in the cab of the locomotive to fall and show the engineer on which car an overheated journal-box may be found. On observing this signal the engineer will stop his train and have the defect attended to.

In the drawings, Figure 1 is a diagram of a railway-car, showing thermostats applied to the axle-boxes and the closed circuits from them to a battery, a bell, and an annunciator within the car and to open-circuit connections through similar instruments in the cab of the locomotive. Fig. 2 is a side elevation of a car axle-box, showing the thermostat in place thereon and the circuit-wires leading therefrom. Fig. 3 is a front elevation of the car axle-box partly broken away, and Fig. 4 is a view of the interior of the thermostat.

Referring to the drawings, A indicates a car supported on wheels B, the axles of which have their journals supported in the usual boxes C. Cast with or attached to one side of each journal-box is an outwardly-extending annular flange *c*, covered by a cap *c'*, secured to the flange *c* by screws or other means, and within the circular recess thus formed and bearing against the side of the axle-box is fixed a thermostat D, the internal arrangement of which is illustrated in Fig. 4. With-

in the thermostat-casing is a circuit-changer D′, hereinafter described, from which lead three wires d', d^2, and d^3 to binding-posts c^2, c^3, and c^4, screwed to but insulated from the axle-box. I have shown the wires as passing through a hole formed near the bottom of the axle-box, the object of this arrangement being to carry the wires to the inner side of the axle-box without exposing them and where they will be safe from molestation.

The thermostat is inclosed in a case d, the face of which carries a dial and a circular scale divided into degrees. A thermostat-coil D^2 of the usual character is fixed at one end within the case, its opposite end being secured to a toothed sector D^3 on a shaft D^4. The sector D^3, which oscillates as the coil D^2 is expanded and contracted by the temperature of the surrounding air, turns a pinion D^5 on a shaft D^6, projecting through the face of the case d, on which shaft a pointer D^7 is fastened. Screwed to the case d above the coil D^2 is a circuit-changer D′, constructed of an insulated block d^4, having two metallic arms d^5 d^6 depending therefrom and a metallic spring-finger d^7 extending downwardly between and below the lower ends of said arms. Two screws d^8 d^9 are threaded into the arms d^5 d^6, respectively. A pin d^{10} in the toothed sector D^3 gradually approaches the lower end of the spring-finger d^7 as the coil D^2 expands by heat imparted to the air within the case D and to the case itself from the side of the axle-box. The screw d^8 is so adjusted that the pin d^{10} will strike the spring-finger d^7 and open the closed circuit the instant the axle-box becomes overheated, the degree of heat to which the axle-box is raised before this action takes place being regulated by the screw. As the temperature of the axle-box increases the pin d^{10} will push the spring-finger d^7 away from the screw d^8 and into contact with the screw d^9 and establish a circuit through the wires d^2 d^3.

Within each car is placed a battery E, a bell F, and an annunciator G, the latter having as many annunciator-drops as there are axle-boxes on the car. From the binding-post c^2 of each axle-box C a wire e is connected to the electromagnet of one of the annunciator-drops g, while a wire e' common to all the electromagnets connects them through the bell F to the battery E. A return-wire e^2 from the battery leads to the binding-post c^3 on each axle-box C. A closed independent circuit is thus formed between the battery through each circuit-closer D′ in the thermostat-box, one of the annunciator-drops g, and the bell F.

A wire h from each binding-post c^4 of each axle-box on a car is connected to a wire h', which leads directly to an annunciator H, placed in the cab of the locomotive which draws the train. From the annunciator H another wire h^2 leads through a bell I to a battery J, from whence the return-circuit is made through a wire h^3 to the binding-posts c^3 on the axle-boxes. Each car of a train being thus equipped, when an axle-box becomes so hot as to close this circuit, which is a normally open one, leading to the locomotive, the bell J will ring and the annunciator H indicate on which car a hot box is to be found. It will be observed that the attention of the engineer is not called to the individual axle-box which is thus overheated, but to the car on which the box is carried, and only after the conductor and brakeman had been notified. The engineer's signal being only an emergency one it is deemed sufficient to indicate to him the number of the car and not the particular axle-box which is defective.

Any well-known or readily-arranged means for connecting the lead-wires h' when the cars are coupled may be used. If desired, they can run through the usual bell-cord on the train.

Having thus described my invention, I claim—

1. The combination of a thermostat secured to or near each axle-box of a car, a circuit-controller in proximity to each thermostat, an electric circuit from each circuit-controller to an annunciator in the car, and a second circuit common to all the circuit-controllers on the car or train extending to the cab of the attached locomotive, substantially as set forth.

2. In combination with a car axle-box, a thermostat, a closed electric circuit through an indicator placed within a car, said closed circuit adapted to be opened when the heat of the axle-box reaches a predetermined degree, and an open circuit also controlled by the thermostat for closing said open circuit through an indicator in the cab of a locomotive when the temperature reaches a predetermined higher degree of heat, substantially as set forth.

3. In a temperature-indicator for car axle-boxes, the combination of a thermostat secured to or near each axle-box of a car, independent circuits each being controlled by a thermostat, an annunciator within the car having a drop for each circuit, a second circuit including an annunciator in the cab of an attached locomotive and controlled by any one of the thermostats on the car, and means for opening and closing the circuits, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT G. CALLUM.

Witnesses:
M. G. ANDERSON,
W. TAYLOR.