

No. 694,239.

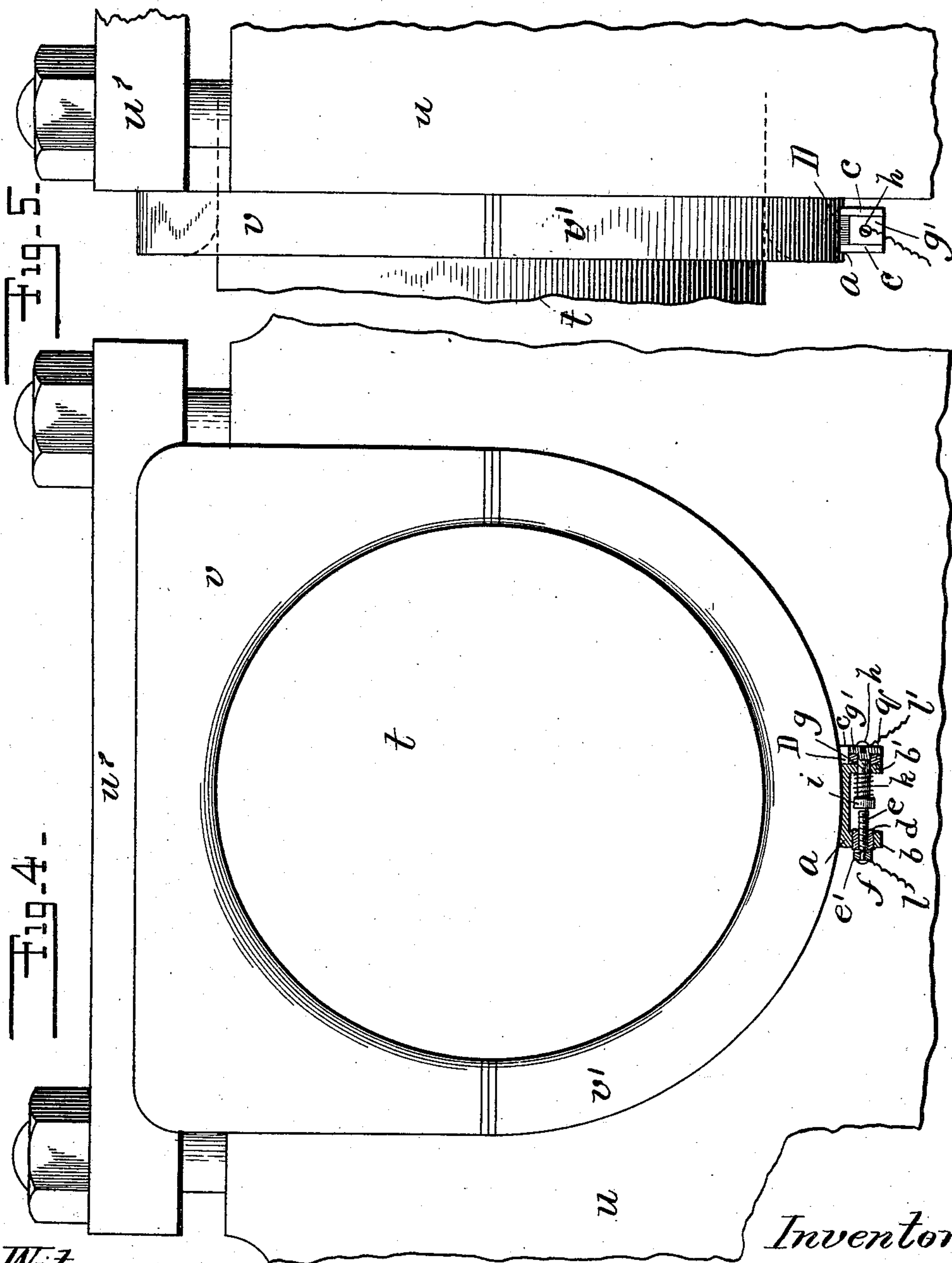
Patented Feb. 25, 1902.

H. BLACK.
THERMO-ELECTRIC ALARM.

(Application filed May 18, 1901.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses:
J. B. McGinn
J. L. Zottarelli

Inventor
Henry Black
By *Wilton L. Donny*
His Atty

UNITED STATES PATENT OFFICE.

HENRY BLACK, OF NEW YORK, N. Y.

THERMO-ELECTRIC ALARM.

SPECIFICATION forming part of Letters Patent No. 694,239, dated February 25, 1902.

Application filed May 18, 1901. Serial No. 60,826. (No model.)

To all whom it may concern:

Be it known that I, HENRY BLACK, a citizen of the United States, residing at New York city, (Manhattan,) in the county of New York and State of New York, have invented certain new and useful Improvements in Thermo-Electric Alarms; and I do hereby 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.

My invention relates to an instrument for giving an alarm of the rise of temperature in its immediate vicinity and of the heating of an object to which it is attached or with which it is in contact.

Primarily the object of the invention is to give a prompt indication of a hot journal or shaft bearing; but a further object is to provide a simple, economical, and effective apparatus that cannot readily get out of order for giving an alarm when the temperature in its immediate vicinity rises above a predetermined point.

In the accompanying drawing, Figure 1 represents a plan of my thermo-electric alarm placed in an electric circuit that connects it with an alarm-bell. Fig. 2 is a longitudinal vertical section of the contrivance, and Fig. 3 represents a block of the fusible retaining material. Fig. 4 is a front view of a journal or shaft bearing, illustrating the manner of applying the instrument to the bearing, and Fig. 5 is a side view of the same.

Referring to the drawing, *a* indicates a base-plate, preferably made out of brass on account of its high conductivity of heat and which is provided with screw-holes *a'* *a'* for the screws that fasten it to the bearing. On opposite edges of this plate and at right angles thereto ears *b b'* are formed integrally with the plate, so that these ears, and especially that one of them marked *b'*, will be of equal conductivity with the plate *a*, of which it forms a part. The ear *b* has a perforation through it in which a plug or bushing of insulating material *d*, provided with a screw-threaded hole, is inserted. The ear *b'* has side pieces *c c*, that are integral parts of it, and these side pieces form a rectangular recess *D*, which is open at the top and bottom

and also at the outer side or end. The ear *b'*, that forms the back or inner wall of the recess, has a perforation through it in line with the perforation in the ear *b* and the hole in the bushing.

e is an adjustable screw-threaded contact-piece. It is provided with a head *e'*, having a tapped hole in it to receive a binding-screw *f*, by which connection is made with one terminal of the circuit-wire.

g is a movable contact-piece that consists of a rod having on one end a flat rectangular head *g'*, that forms an integral part of it, and at the opposite end is screw-threaded to receive a collar *i*. A spiral spring *k* is wound on the rod between the ear *b'* and the collar *i*, its ends bearing against these parts, so that it tends, when unopposed, to force the contact-piece *g* toward and its end against or in contact with the point of the contact-piece *e*. The outer side of the head *g'* is provided with a tapped hole to receive a binding-screw *h* to connect the movable contact-piece with the other terminal of the circuit-wire. The head *g'* fits easily between the side pieces *c c*, so that it will slide freely in the recess when the end of the contact-piece *g* is pressed against the point of the contact-piece by the spring.

Between the head *g'* and the wall of the ear *b'* a block *q*, made from a material that melts at a comparatively low temperature, is placed in the recess and by opposing the spring prevents the contact-piece *g* from moving toward the contact-piece *e*. This block is square and sufficiently thick to hold the end of the contact-piece *g* away from the point of piece *e* when it is inserted in the recess between the head and the wall of the ear *b'*, and its edges and inner side or surface fit closely against the inner walls of the recess and make a practically air-tight contact therewith. By this means when the temperature of the walls of the recess increases by the heating of the object to which the apparatus is attached, as there is no intervening body of air, the heat is communicated directly and promptly from them to the fusible block and quickly melts it. The fusible block is perforated and the rod of the contact-piece passes through it.

To prepare the instrument for use, the col-

lar *i* is removed and the rod detached by withdrawing it from the spring and from the ear *b'*, after which it is passed through the hole in the block first and then through the perforation in the ear *b'*. The block is forced within the recess until it is in close contact with the side and rear walls thereof, and the plate *g'* also is moved in between the sides. The spring is then passed over the part of the rod that projects through the ear *b'*, and the collar is screwed on the extreme end against the spring, so that the ends of the spring bear against the ear *b'* and the collar *i*, respectively, and no play or movement is allowed the contact-piece. The terminal of a wire *l* is connected with the binding-screw *f* in the head of the adjustable contact-piece *e*, and its other end is attached to a binding-screw *r* on the electromagnet-case *n* of an electric bell *s*, and the terminal of wire *l'* is connected with the binding-screw *h* in the head of the contact-piece *g*, the other end of the said wire being connected with one pole of the battery *o*. A third wire *p* connects the other pole of the battery with another binding-screw *r'* on the electromagnet-case *n* of the electric bell *s*.

The application of the instrument to a shaft-bearing is illustrated by Figs. 4 and 5, *t* designating the shaft, *u* the pillow-block, *u'* the cap, and *v v'* the brasses. The instrument is applied to the under side of the end of the pillow-brass *v'* where it projects from the pillow-block, the under side of the base-plate *a* being adapted to fit closely against the surface of the brass where it is fastened by the screws *a' a'*.

In the operation of the instrument if the bearing becomes hot the heat will extend to the brass base-plate *a* and by it be conducted to the walls of the recess *D*, and as these grow hot the fusible block is melted, and the material runs out through the open bottom of the recess from between the plate *g'* and the back wall of the recess. The obstruction to the action of the spring being thus removed, the spring will force the end of the movable contact-piece *g* against the end of the fixed contact-piece *e*, thereby closing the electric circuit, and the alarm is given by the ringing of the electric bell. In this way the indication of a hot bearing is given promptly, as the high conductivity of the base-plate *a* and its integral parts and the low melting-point of the fusible block will cause a comparatively slight increase of temperature in the bearing to transmit sufficient heat to the base-plate *a* and the walls of the recess to melt the block, and thus an alarm is given before the bearing becomes heated to a dangerous degree.

When the instrument is used as a fire-alarm, if the fire breaks out in the part of the wall or ceiling of the apartment to which the base-plate is fastened the action will be practically the same as in the case of a hot bearing—that is, the base-plate will become hot and the heat will be conducted to the fusible block; but

if the fire breaks out at some distant point in the apartment the heat will act directly on the fusible block and melt it.

By making the contact-piece *e* adjustable it can be set so that the slightest movement of the contact-piece *g* will close the circuit. Thus when the heat is sufficient merely to melt the surfaces of the block in contact with the walls of the recess the contact-piece *g* will be allowed to move far enough to meet the point of the contact-piece *e*. The instrument can therefore be made so sensitive that when a very small increase of temperature occurs an alarm will be given.

I prefer that the fusible block should be composed of beeswax and rosin in the proportion of one part of beeswax to three parts of rosin.

I claim—

1. In a thermo-electric alarm the combination of a base-plate, a perforated ear on one side of said base-plate, an insulating-bushing fixed in the perforation, and a contact-piece provided with a head and a binding-screw inserted in the bushing, a perforated ear on the opposite side of the said base-plate having side pieces, and a recess formed thereby in the outer side of the ear, a movable contact-piece passed through the perforation in the ear and adapted to operate through the same consisting of a rod having a plate on the outer end provided with a binding-screw and a collar on the inner end, a spiral spring on the rod between the ear and the collar, and a block of fusible material placed in the recess between the plate on the outer end of the rod and the inner wall of the recess, substantially as specified.

2. In a thermo-electric alarm the combination of a base-plate, a perforated ear on one side of said base-plate, an insulating screw-threaded bushing fixed in the said perforation, a screw-threaded adjustable contact-piece provided with a head and a binding-screw passed through the said bushing, a perforated ear on the opposite side of the base-plate having side pieces and a recess formed thereby in the outer side of the ear, a movable contact-piece passed through the perforation in the recessed ear and adapted to operate through the same consisting of a rod having a plate on the outer end provided with a binding-screw and a collar on the inner end, a spiral spring on the rod between the ear and the collar, and a block of fusible material placed in the recess between the plate on the outer end of the rod and the inner wall of the recess, substantially as specified.

3. In a thermo-electric alarm the combination of a base-plate, a perforated ear on one side of the said plate, an insulated contact-piece having a head provided with a binding-screw passed through the said perforation, a perforated ear on the opposite side of the base-plate having side pieces and a recess formed thereby in the outer side of the ear,

a movable contact-piece passed through the perforation in the ear and adapted to operate through the same consisting of a rod having a plate on its outer end provided with a binding-screw and a collar on its inner end, a spiral spring on the rod between the ear and the collar, and a block of fusible material placed in the recess between the plate on the outer end of the rod and the ear and in direct and close contact with the walls of the recess, substantially as specified.

4. In a thermo-electric alarm the combination of a base-plate, a perforated ear on one side of the said plate, an insulated adjustable contact-piece having a head provided with a binding-screw passed through the said perforation, a perforated ear on the opposite side of the base-plate having rectangular side pieces, a rectangular recess formed by the ear and its side pieces, a movable contact-piece passed through the perforation in the ear and adapted to operate through the same consisting of a rod having a rectangular plate on its outer end and a separable collar on its inner end, a spiral spring on the rod between the ear and the collar, and a rectangular perforated block of fusible material placed on the rod in the recess between the plate on the outer end of the rod and the ear, and in direct and close contact with the walls of the recess, substantially as specified.

5. In a thermo-electric alarm the combination of a base-plate, a perforated ear on one side of said plate, an insulated adjustable contact-piece having a head provided with a binding-screw passed through the said perforation, a perforated ear on the opposite side of the base-plate having rectangular side pieces, a rectangular recess formed by the ear and side pieces—the said base-plate, recessed ear and side pieces being integral parts of one another—a movable contact-piece passed through the perforation in the recessed ear and adapted to operate through the same consisting of a rod having a rectangular plate provided with a binding-screw on its outer end and a collar on its inner end, a spiral spring on the rod between the ear and the collar, and a rectangular perforated block of fusible material placed in the recess between the plate on the outer end of the rod and the ear, and in direct and close contact with the walls of the recess, substantially as specified.

6. A thermo-electric alarm consisting of a base-plate, a perforated ear on one side of said base-plate, an insulated contact-piece having a head provided with a binding-screw inserted in the perforation in the ear, a perforated ear on the opposite side of the base-plate having side pieces and a recess formed thereby in the outer side of the ear, a movable contact-piece passed through the perforation in the recessed ear and adapted to operate through

the same consisting of a rod having a plate on the outer end provided with a binding-screw and a collar on the inner end, a spiral spring on the rod between the ear and the collar, and a block of fusible material placed in the recess between the plate on the outer end of the rod and the inner wall of the recess and in close and direct contact with the walls of the recess, in combination with an electric circuit, the terminals of which connect with the respective contact-pieces, and an electric bell placed in the said circuit, substantially as specified.

7. A thermo-electric alarm consisting of a base-plate, a perforated ear on one side of said base-plate, an insulated contact-piece having a head provided with a binding-screw inserted in the perforation in the ear, a recessed perforated ear on the opposite side of the base-plate, a movable contact-piece passed through the perforation in the recessed ear and adapted to operate through the same consisting of a rod having a plate on the outer end provided with a binding-screw and a collar on its inner end, a spiral spring on the rod between the collar and the ear, and a block of fusible material placed in the recess in close and direct contact with the walls of the recess, in combination with an electric circuit—the terminals of which are connected with the respective contact-pieces, an electric bell placed in the said circuit, and a journal-bearing to which the base-plate of the alarm is fastened, substantially as specified.

8. A thermo-electric alarm consisting of a base-plate, a perforated ear on one side of said base-plate, an insulated contact-piece having a head provided with a binding-screw inserted in the perforation in the ear, a recessed perforated ear on the opposite side of the base-plate, a movable contact-piece passed through the perforation in the recessed ear and adapted to operate through the same consisting of a rod having a plate on the outer end provided with a binding-screw and a collar on its inner end, a spiral spring on the rod between the collar and the ear, and a block of fusible material placed in the recess in close and direct contact with the walls of the recess, in combination with an electric circuit, the terminals of which are connected with the respective contact-pieces, an electric bell placed in the said circuit, and, the pillow-brass of a journal-bearing, to the under side of which, the base-plate of the alarm is fastened, substantially as specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

HENRY BLACK.

Witnesses:

F. C. ZOTTARELLY,
WILTON C. DONN.