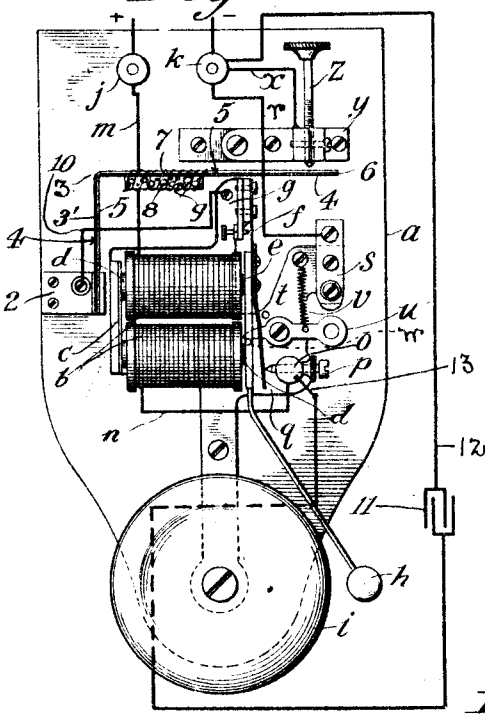
A. DI LEGGE.

CIRCUIT CLOSER FOR GAS ALARMS

APPLICATION FILED MAY 14, 1914.

1,185,211. Patented May 30, 1916.

Fig. 1.



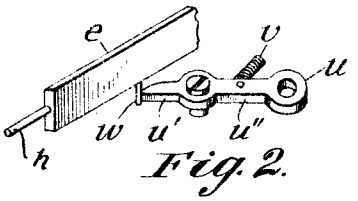
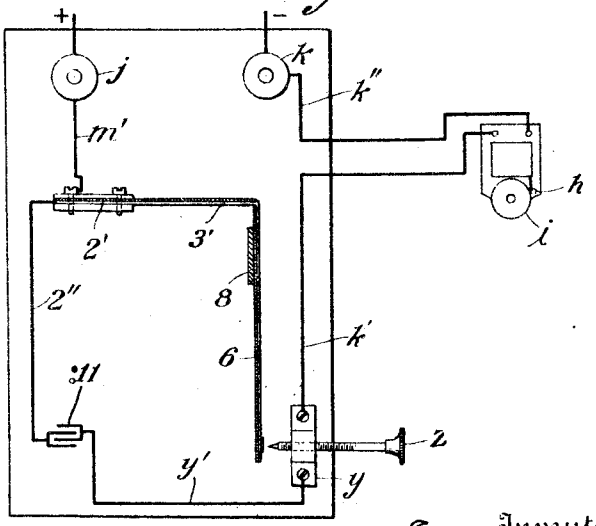


Fig. 2.

Fig. 3.



Witnesses:
M. Reimer
Harry E. Hebig

Inventor
Armando Di Legge
By his Attorney
James Hamilton

UNITED STATES PATENT OFFICE.

ARMANDO DI LEGGE, OF NEW YORK, N. Y.

CIRCUIT-CLOSER FOR GAS-ALARMS.

1,185,211. Specification of Letters Patent. Patented May 30, 1916.

Application filed May 14, 1914. Serial No. 838,423.

To all whom it may concern:

Be it known that I, ARMANDO DI LEGGE, a subject of the King of Italy, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Circuit-Closers for Gas-Alarms, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements in circuit closers for devices for giving an alarm when there is present a dangerous mixture of poisonous gas (such as illuminating gas) and air; and an object of this invention is to provide a circuit closer for gas alarms which will be simple in construction, comparatively cheap in manufacture and efficient, reliable and sensitive in operation and use.

In the drawings illustrating the principle of this invention and the best mode now known to me of applying that principle, Figure 1 is an elevation of my new circuit closer for gas alarms; Fig. 2 is a detail showing the support for the circuit-making lever; and Fig. 3 is a diagrammatic view of a simplified construction.

Upon the baseboard *a* are mounted the coils *b* of an electro-magnet *c* the cores *d* of which are opposed to the armature *e*. This armature *e* is fastened to a flexible strip or leaf-spring *f* by which the armature is suspended from the bracket *g*. The lower end of the armature *e* carries the striker *h* which is arranged to strike against the bell or gong *i* when the electro-magnet *c* is energized. One pole of an electric battery (or other source of current) is connected to the binding-post *j* while the other pole of the same battery (not shown) is connected to the binding-post *k*. One end of the coils or spools *b* is connected to the binding-post *j* by the wire *m* while the other end of these coils *b* (which are in series) is connected by the wire *n* to the post *o*. Through a threaded hole in the latter there is screwed a contact-pin *p* which normally contacts with a leaf-spring *q* that is fastened to the armature *e*. From the binding-post *k* there leads a branch or divided circuit as follows: The wire *r* joins electrically the binding-post *k* to the contact-plate *s*. Upon the bracket-plate *t* there is pivoted a circuit-making lever or automatic switch *u* to which is attached one end of a spring *v* the other end of which is fastened to the bracket-plate *t*. The toe *u'* of the lever *u* normally rests upon a pin *w* which projects from the armature *e* and is supported by the pin *w*, so that the circuit is normally kept open. When, however, the armature *e* is attracted by the electro-magnet *c*, the toe *u'* is deprived of the support of the pin *w*, whereupon the spring *v* pulls up the arm *u''* of the lever *u* and brings it into contact with the plate *s*; and at the same time the toe *u'* is thrown into electrical contact with the post *o*. The other branch of the divided circuit from the binding-post *k* comprises the connecting wire *x* which joins electrically the binding post *k* and the plate *y* in which there is mounted the screw *z* susceptible of being given a fine adjustment. In the bracket 2 there is fastened one branch or leg 3' of an L-shaped bi-metallic strip 3. This bi-metallic strip is preferably made of strips of zinc and steel soldered together. In the leg 3' the zinc strip 4 is on the outside (that is, on the left of the leg 3' as shown in Fig. 1); while in the horizontal part or arm 6 of the L-shaped strip, the steel strip 5 lies on the outside (that is, on the upper side, as the arm 6 is shown in Fig. 1). The arm 6 projects beneath the lower end of the screw *z* and is separated therefrom by a short distance. To the arm 6 there is bound by palladium wire 7 small bits 8 of oxid of palladium and small bits 9 of porous charcoal, which may be made by extinguishing a piece of burning wood by plunging the same in mercury. As shown in Fig. 1, the exid of palladium 8 and the charcoal 9 is bound to the lower or zinc-strip side of the bi-metallic arm 6. The bracket 2 is connected by the wire 10 with the bracket-plate *g*.

The operation of the gas-alarm hereinbefore described is as follows: When the proportions of gas and air have become substantially one part of gas in one hundred parts of air, the charcoal and the oxid of palladium absorb the gas with evolution of heat. This heat is transmitted to the bi-metallic arm 6. The coefficient of expansion due to heat is greater in the case of zinc than of steel; and since the zinc strip 4 is soldered to the steel strip 5, the extension of the zinc strip results in the free end of the arm 6 curving toward the point of the screw *z*; and when the proportion of gas has thus become sufficiently great, this curvature of the free end of the arm 6 becomes so great that contact is made between the screw *z*

and the arm 6, thereby completing the electric circuit through the coils of the electromagnet c. The armature e is now attracted, whereby the toe u' of the lever u is deprived of its support. The spring v pulls up the arm u'' into contact with the plate s and throws the toe u' into contact with the post o. This makes or completes the circuit through the other branch of the divided circuit and the bell will continue to ring. Of course, the bell may be placed at any desired distance from the point where it is desired to guard against the formation of a poisonous mixture of gas and air.

In order to prevent sparking upon the breaking of the electric circuit of the bell, a condenser 11 is provided. This condenser 11 is connected by the wire 12 with the binding-post k and by the wire 13 with the post o. The condenser 11 will be preferably used upon circuits in which there is a high voltage.

In Fig. 3 there is shown a diagrammatic representation of the electrical connections of a simplified form of the apparatus. The binding-post j is connected by the wire m' with the bracket 2′ in which is fastened the leg 3 of the L-shaped bi-metallic switch to the arm 6 of which there are fastened, as before, bits of carbon and oxid of palladium diagrammatically shown at 8. The bracket-plate 2′ is connected by a wire 2″ with a condenser 11 which is connected by a wire y' with a plate y in which is mounted the screw z. The contact-plate y is connected by a wire k' with the electric bell i, which is, by the wire k'', connected to the post k. The arm 6 is preferably made about twice the length of the leg 3 of the bi-metallic strip. The leg 3′ of the latter takes no active part in the closing of the circuit, when an escape of gas occurs. The function of this leg 3′ is to compensate or neutralize the variation in length of the arm 6 due to temperature changes that daily, even hourly, take place in the atmosphere surrounding the instrument as whole, or in short, due to variations in what is commonly known as room temperature. When gas escapes, the arm 6, which carries the gas-absorbing mass 8, 9, is the active element in the closing of the circuit through the alarm bell, in which function the leg 3′ does not participate at all except as a mere conductor.

I claim:

In a gas-alarm, a pair of circuit-terminals; a bent bimetallic switch device having two branches in which the position of the metals is reversed, the end of one of said branches being normally out of contact with one of said circuit-terminals; and a gas-absorbing mass which in the presence of gas imparts heat to the last-named branch and causes the same to expand and close the circuit between said terminals.

In testimony whereof I have hereunto set my hand at the borough of Manhattan, city, county and State of New York this ninth day of May, A. D., 1914, in the presence of the two undersigned witnesses.

ARMANDO DI LEGGE.

Witnesses:

ARMANDO BACCAI,

BENO MICHELE.