(No Model.)

J. VON DER KAMMER.

MAGNETIC CIRCUIT CLOSER.

No. 426,024. Patented Apr. 22, 1890.

Fig. 1.

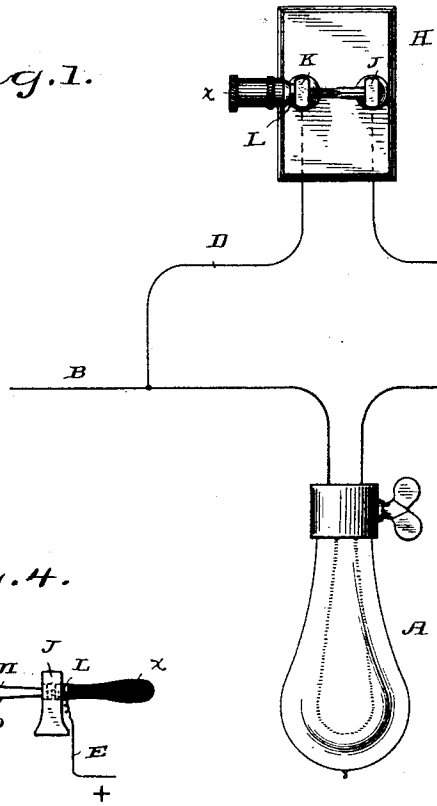


Fig. 7.

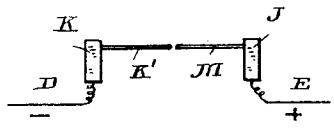


Fig. 4.

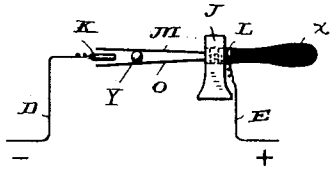


Fig. 5.

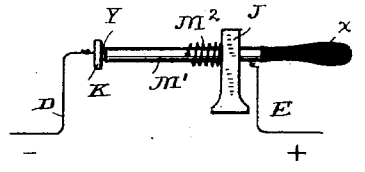


Fig. 2.

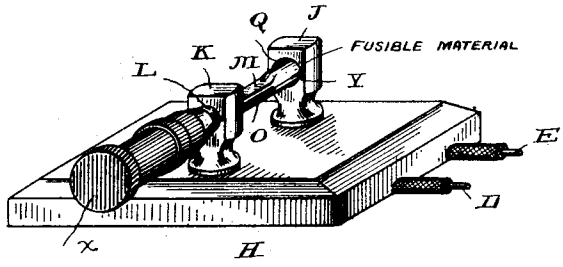


Fig. 3.

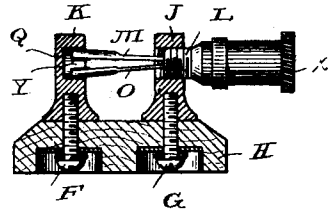
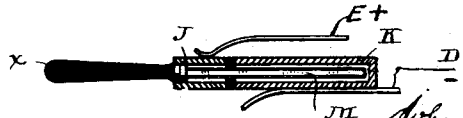


Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN VON DER KAMMER, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO JAMES WARD PACKARD, OF SAME PLACE.

MAGNETIC CIRCUIT-CLOSER.

SPECIFICATION forming part of Letters Patent No. 426,024, dated April 22, 1890.

Application filed April 25, 1889. Serial No. 308,562. (No model.)

To all whom it may concern:

Be it known that I, JOHN VON DER KAMMER, a subject of the Emperor of Germany, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Magnetic Circuit-Closers; 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 consists in the within-described automatic circuit-closer for electric circuits, of which circuit-closer a magnet forms a part or element.

In the drawings, Figure 1 shows in diagram my circuit-closer placed in a shunt-circuit about an incandescent lamp. Fig. 2 shows a preferred form of circuit-closer in perspective. Fig. 3 is a vertical sectional view taken on the line of the axis of the plug X of Fig. 2. Figs. 4, 5, 6, and 7 represent modifications of my invention.

As is well known, it is necessary where a number of electric lamps or other electric devices are in circuit in series to have some form of automatic circuit-closer placed in a shunt-circuit about each lamp, which circuit-closer shall act upon the breaking of the lamp or on the destruction of the main circuit from any other cause. I have found that a magnet when used in such an automatic circuit-closer in the manner hereinafter to be described gives certain advantages, which I will set forth at length hereinafter.

A represents the lamp, which is one of a number arranged in series in the main circuit, of which the wires B and C represent a portion.

D and E are the wires of a shunt-circuit about the lamp A. Within this shunt-circuit is included the automatic circuit-closer, the preferred form of which is illustrated in Figs. 1, 2, and 3.

H is any suitable insulating-base, in which the metallic plugs K and J are placed. These plugs are connected by screws F and G, Fig. 3, with the terminals D and E of the shunt-circuit.

In one of the metallic plugs J is mounted a bifurcated spring contact-piece, having the two branches M and O. This bifurcated spring is set in the plug X, and is adjustable forward and back by means of the screw-thread L, which also affords metallic contact between the bifurcated spring and the plug J. The other plug K has a recess Q, into which the ends of the bifurcated spring may be inserted by turning the plug X. Normally the two branches of the bifurcated spring-terminal are held together by a suitable film Y of any fusible material. When the lamp A breaks, a spark is formed between the terminals of the bifurcated spring and the recessed plug K, which spark melts the fusible material and permits the branches M and O to separate, and thereby furnish broad metallic contact between their sides and the sides of the recess Q of the plug K. This completes the shunt-circuit and allows the other parts of the system of electrical connections to remain in operation in spite of the destruction of the lamp A.

So far my invention does not differ from that described in the application for patent filed by me April 25, 1889, of even date herewith, and serially numbered 308,561; but I have found that when the terminals of an open shunt-circuit are placed within the field of force of a magnet, the lines of force in which field coincide with or are parallel to or substantially parallel to the path which the spark must traverse, the spark will be formed across a break of much greater distance than when there is no such field of force present. This magnetic field is created, of course, by the presence of a magnet, which obviously may be a permanent magnet or an electro-magnet placed in a shunt-circuit. In the preferred forms of construction which I have illustrated one or both of the terminals are permanent magnets, thereby creating their own magnetic field.

In the form of my invention illustrated in Figs. 1, 2, and 3 the branches M and O of the bifurcated spring-terminal form a horseshoe-magnet. In Fig. 4 a similar arrangement is shown, except that the tendency of the branches M and O as there arranged is to close together upon the other contact K, which

is placed between them. This tendency is normally counteracted by the fusible material Y, which is placed between the branches and adjacent to the terminal K, so that it will be melted upon the formation of the spark, as above set out.

In Fig. 5 an ordinary bar-magnet M′ is shown. This slides in the post J and forms one terminal of the broken shunt-circuit. K is the other terminal, and the fusible material Y interposed between them must also be a substance of high resistance, such as paper, isinglass, or some other practical insulating material, which must also be fusible or combustible. The spring M^2 tends to close the circuit by forcing the magnet M′ against the terminal K. This tendency is opposed by the substance Y until the passage of a spark destroys or removes the said substance and permits the circuit to close in the usual manner.

The advantages of my invention are evident. Experiment has shown that with currents of the same intensity a spark will jump a distance three or four times greater when the terminals are in a magnetic field than when they are unaffected by magnetic influences. Consequently in the various arrangements of circuit-closer herein illustrated, and in all others operating on the same principle, a much less careful adjustment of the terminals is necessary where my invention is used than under ordinary circumstances. In the second place, the certainty of action is greatly increased. With the low-tension currents used in incandescent electric lighting a very nice adjustment of the terminals is necessary in order that the distance between them shall be sufficiently small to permit the passage of the spark, and even with the most careful adjustment the devices frequently fail to operate. With my invention the successful operation of the circuit-closer can be counted upon, and without the necessity of the nice adjustment referred to, for the obvious reason that the spark will jump a greater distance, as stated.

While I have mainly illustrated my invention as applied to spring-operated circuit-closers, it is evident that it could be applied to any of the forms known to those skilled in the art. Thus in the form illustrated in Fig. 6, where the terminal M is a plug coated with a film of fusible conducting material, which, when the spark passes, melts and permits of the closure of the circuit through the action of the natural forces of cohesion, which draw the molecules of molten material together, and, collecting in a globule, bridges over the chasm and forms a permanent connection, closing the shunt-circuit, if my invention is employed and the terminals are placed within a magnetic field by making the plug M a magnet or otherwise, the spark will pass more easily across a wider chasm, with the resulting consequences of an increased certainty of action of the device and a decreased necessity for nice adjustment. Fig. 7 shows a still simpler arrangement, where the fusion of one or both of the poles themselves permits of the fusion of a globule and of the consequent bridging of the chasm and completion of the circuit. K′ is an extension of the binding-post K and forms one terminal of the circuit-closer.

Having therefore described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. In an automatic circuit-closer for shunt-circuits, the spring-operated magnet, which forms one terminal of the open shunt-circuit, in combination with the other terminal and any suitably-arranged piece of fusible material which holds the spring-operated magnet normally out of contact with the other terminal, substantially as described.

2. In an automatic circuit-closer for shunt-circuits, the combination of the magnet, which forms one terminal of the open shunt-circuit, the other terminal, and a suitable material situated elsewhere than between the operative faces of the terminals, which on the passage of the spark will act to permit the closure of the circuit, substantially as described.

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

JOHN VON DER KAMMER.

Witnesses:
JAS. W. PACKARD,
JAMES BOYLAN.