No. 789,814. PATENTED MAY 16, 1905.

M. K. McGRATH.

INTERRUPTER.

APPLICATION FILED OCT. 21, 1904.

Fig. 1

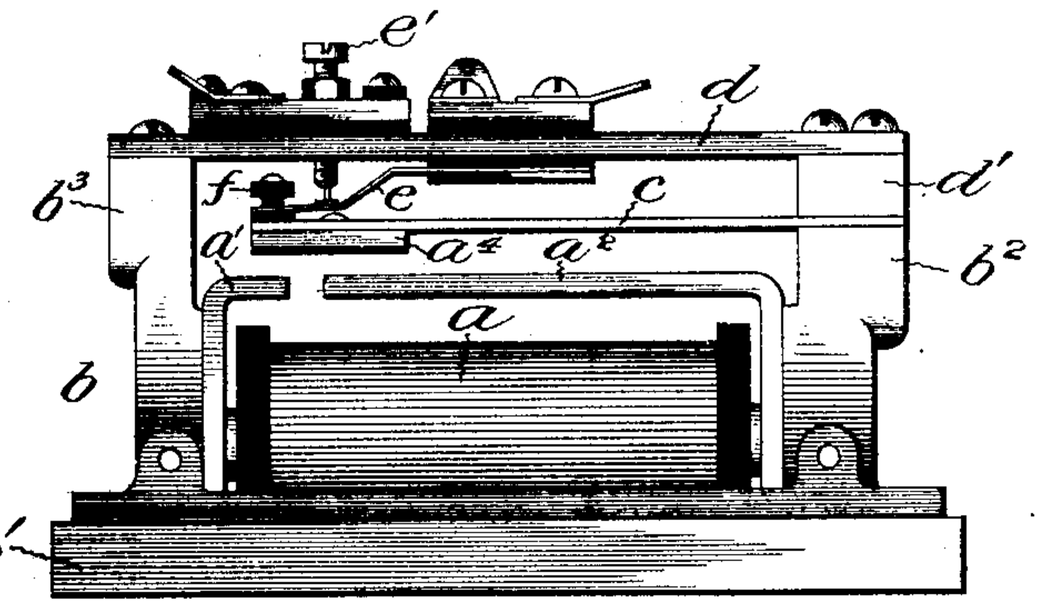


Fig. 2.

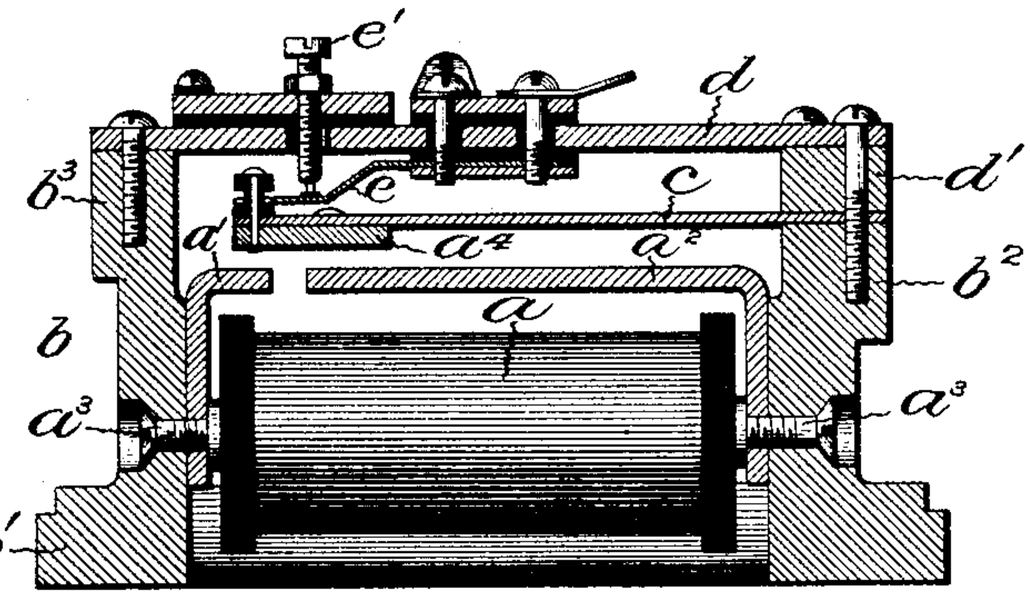


Fig. 3.

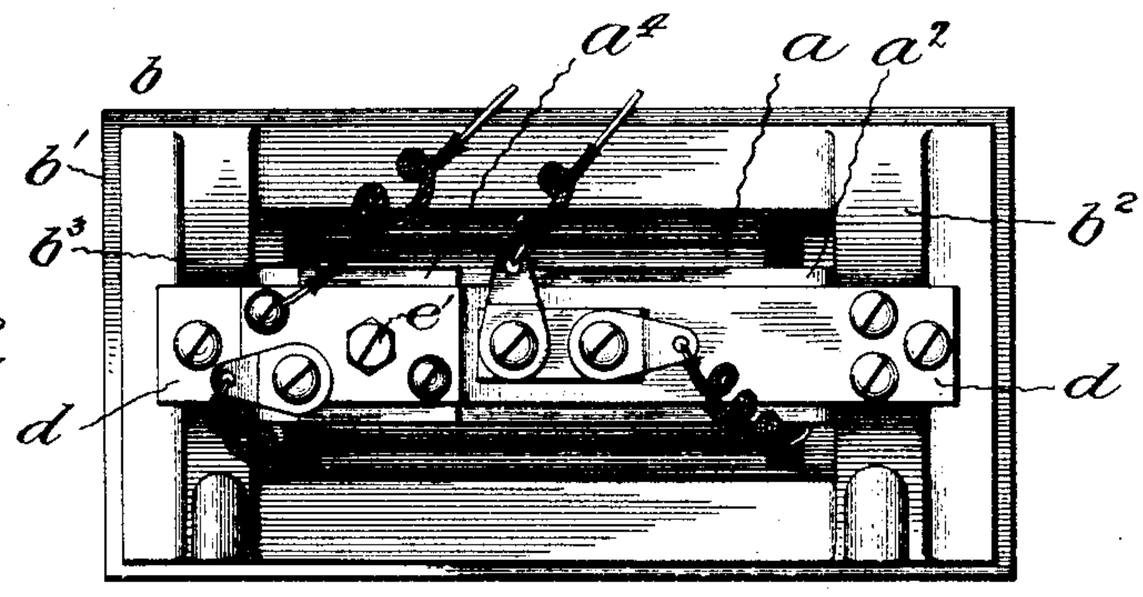
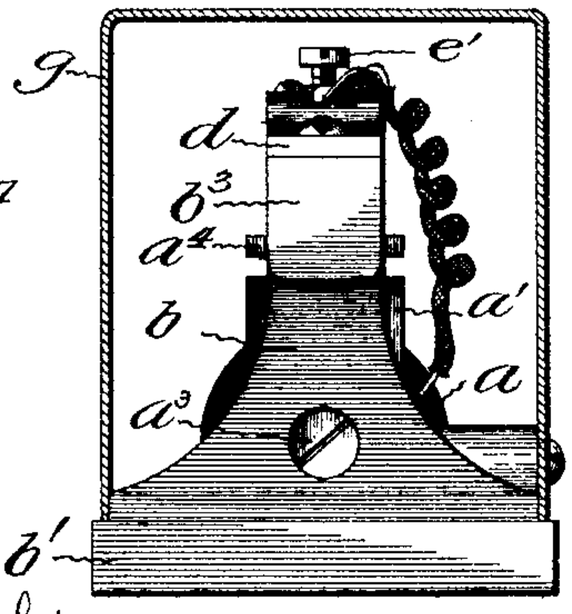


Fig. 4



Witnesses:
John G. Roberts
Irving Mac Donald.

Inventor:
Maurice K. McGrath,
By Baxter & Tanner
Attys.

No. 789,814. Patented May 16, 1905.

UNITED STATES PATENT OFFICE.

MAURICE K. McGRATH, OF ANTWERP, BELGIUM, ASSIGNOR TO WESTERN ELECTRIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

INTERRUPTER.

SPECIFICATION forming part of Letters Patent No. 789,814, dated May 16, 1905.

Application filed October 21, 1904. Serial No. 229,498.

To all whom it may concern:

Be it known that I, MAURICE K. McGRATH, a citizen of the United States, residing at Antwerp, Belgium, have invented a certain new and useful Improvement in Interrupters, of which the following is a full, clear, concise, and exact description.

My invention relates to an interrupter for electric circuits adapted to be used in connection with the circuit of the primary winding of an induction-coil to interrupt or vary the passage of direct current in the primary circuit, and thereby create a rapidly-alternating current in the secondary winding of the coil.

Circuit-interrupters used in association with an induction-coil, as above described, have been found very convenient for use with substation telephone sets of telephone-lines for signaling purposes. For example, substation telephone sets, which are used for effecting telephone communication over a telegraph-line, have been equipped with such apparatus, the high-frequency alternating current induced in the secondary winding of the induction-coil by the action of the interrupter in primary circuit being imposed upon the line to operate the signal-bell at the substation desired, such current in no wise disturbing the telegraphic apparatus connected with the line or affecting the condition of the line with respect to the normal currents flowing therein. In connection with composite systems of this character it is customary to employ telephone sets in which the interrupter is mounted in close association with the call-receiving apparatus of the station, this usually comprising a sensitive and delicately-adjusted relay responsive to the high-frequency calling-currents which may be developed at other stations of the line and a powerful vibrating bell in a local circuit controlled by the sensitive relay; but it has been found that in such an association of apparatus when the interrupter is of the ordinary type the strong vibration of the armature of the interrupter causes the whole set to vibrate, and the motion being communicated to the sensitive relay actuates it, and thus brings about a misleading operation of the call-receiving device. It has, furthermore, been found that if the powerful call-receiving bell is actuated during the operation of the interrupter incident to calling another station the vibrations of the bell mechanism are transmitted to the interrupter and interfere with the proper development of the high-frequency calling-current, probably by bringing about a vibratory movement of the contact parts of the interrupter, which tends to retard or accelerate the making and breaking of the contact and to lengthen or shorten the periods during which the circuit is closed.

My invention is directed particularly to the production of a circuit-interrupter having its operating parts so arranged that their vibration is not communicated to surrounding objects and external vibration is not communicated to them. To this end I interpose between the operating parts of the interrupter and the support to which the interrupter is secured in common with the other associated devices a heavy non-resilient body, which takes up the vibration and prevents its passage either to or from the vibrating parts.

I will describe my invention particularly by reference to the accompanying drawings, wherein—

Figure 1 is a side view in elevation of a circuit-interrupter embodying my invention. Fig. 2 is a vertical sectional view of the interrupter. Fig. 3 is a plan view, and Fig. 4 is an end view, thereof.

The same letters of reference are used to designate the same parts in each of the figures of the drawings.

The interrupter is provided with a heavy metal frame *b*, which supports the electromagnet, its armature, and the contact parts operated by the armature. The frame is made of a heavy non-resilient metal which is incapable of being thrown into vibration by the rapid movement of the armature of the interrupter or by external impulses, thus serving to localize the vibration and isolate the operating parts of the interrupter from outside disturbances. I prefer to make the frame of lead, which I find fully meets the above requirements.

The frame b may comprise a rectangular base b', having two upright posts or standards b^2 b^3 at opposite ends thereof, between which is placed the electromagnet a and its return pole-pieces a' a^2. The ends of the core and pole-pieces of said magnet are secured to said posts in any suitable way, as by screws a^3 a^3 passing through the posts and pole-pieces and into the ends of the core of the magnet in the order named. The said pole-pieces are preferably L-shaped and extend along the upper side of the magnet, with their free ends brought close together, but separated by an air-space, as shown. An armature a^4 is movably mounted above them and is adapted when attracted to bridge the gap between the ends of said pole-pieces, and so complete the magnetic circuit of the magnet. The armature a^4 may be mounted upon the free end of a flat spring c, which is secured at its opposite end to the standard b^2 of the frame, said spring preferably lying above and in a plane parallel to that of the portion of the pole-pieces a' a^2 extending along the side of the magnet.

The armature a^4 is arranged to operate in its movement a pair of contacts, which are carried upon a bridge-piece d, uniting the two standards b^2 b^3 of the frame b, a block or filler d', resting upon the standard b^2 on top of the flat spring c, the bridge-piece being secured to said block preferably by screws which pass through the bridge-piece, block d', end of spring c, and into the upright b^2.

The contacts operated by armature a^4 may comprise a spring e, secured to the under side of said bridge, and an adjustable contact-screw e', passing through the bridge and normally resting in engagement with said spring. The armature carries an insulating-button f, adapted to engage the spring e and move the same out of engagement with its anvil e' when said armature is attracted. The contacts e e' are included serially in the circuit of the winding of magnet a, so as to make and break the circuit through said magnet and through apparatus, such as the primary winding of an induction-coil, which might be included in circuit therewith in accordance with the well-known practice.

A inclosing cover g may be provided for the interrupter, as illustrated in Fig. 4.

I claim—

1. In an interrupter, the combination with a heavy frame of non-resilient metal, of an electromagnet and return pole-pieces therefor supported by said frame, the free ends of said pole-pieces lying in proximity to one another, a spring secured at one end to said frame, an armature for said magnet carried upon the opposite end of said spring over the ends of said pole-pieces, and contacts operated by the armature in its movement.

2. In an interrupter, the combination with a heavy frame of non-resilient metal comprising a base having an upright standard at each end, a magnet and return pole-pieces therefor supported between said standards, the free ends of said pole-pieces lying in proximity to one another, a spring secured at one end to one of said standards, an armature for said magnet mounted upon the free end of said spring over the ends of said pole-pieces, and contacts operated in the movement of said armature.

3. In an interrupter, the combination with a heavy lead frame comprising a base and an upright standard at each end of said base, of a magnet and L-shaped pole-pieces therefor secured between said standards, said pole-pieces extending along the upper side of said magnet with their free arms close together in the same plane, the ends of said pole-pieces being slightly separated, a flat spring secured at one end to one of the standards of said frame and lying above and substantially parallel to the free arms of said pole-pieces, an armature mounted upon the free end of said spring, a bridge-piece uniting said standards, and contact mechanism mounted upon said bridge-piece adapted to be operated by the armature in its movement.

4. In an interrupter, the combination with a heavy lead frame comprising a base and an upright standard at each end of said base, of a magnet and L-shaped pole-pieces therefor, supported between said standards, said pole-pieces extending along the upper side of said magnet with their free ends lying opposite one another in the same plane, a flat spring secured at one end to one of said standards and extending above the pole-pieces in a plane parallel to the free ends of said pole-pieces, an armature mounted upon the free end of said spring over the ends of said pole-pieces, a bridge-piece uniting the standards of the frame, a contact-spring mounted upon the under side of said bridge-piece, a contact-anvil for said spring also carried by said bridge, and an insulating-button carried by said armature adapted to engage said spring and separate the same from its anvil when the armature is attracted.

5. In an interrupter, the combination with a heavy lead frame comprising a rectangular base, and an upright post at each end thereof, of a magnet and pole-pieces therefor supported between the posts of said frame, the free ends of said pole-pieces being brought close together but separated by an air-space, an armature movably mounted above the ends of said pole-pieces, a bridge-piece uniting said posts, and a contact-piece mounted upon said bridge-piece and arranged to be operated by said armature in its movement.

6. In an interrupter, the combination with a frame comprising a base and an upright post at each end thereof, of a magnet and pole-pieces therefor supported between the posts of said frame, the free ends of said pole-pieces being brought close together but separated

by an air-space, an armature movably mounted above the ends of said pole-pieces, a bridge-piece uniting said posts, and contact mechanism mounted upon said bridge and arranged to be operated by said armature in its movement.

7. The combination with an electromagnet, of an armature arranged to be thrown into rapid vibration by said magnet, and a support for said armature of non-resilient metal, whereby the vibrations of the armature are prevented from being communicated to surrounding objects.

8. The combination with an electromagnet, of an armature therefor, arranged to be thrown into rapid vibration by said magnet, switch parts adapted to be operated by said armature, and a non-resilient support for said armature and switch parts.

In witness whereof I have hereunto subscribed my name this 29th day of September, A. D. 1904.

MAURICE K. McGRATH.

Witnesses:
G. De Lersy,
A. Claessens.