H. VON KRAMER & G. KAPP.

RESONATING RELAY.

APPLICATION FILED APR. 11, 1912.

1,067,823.

Patented July 22, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

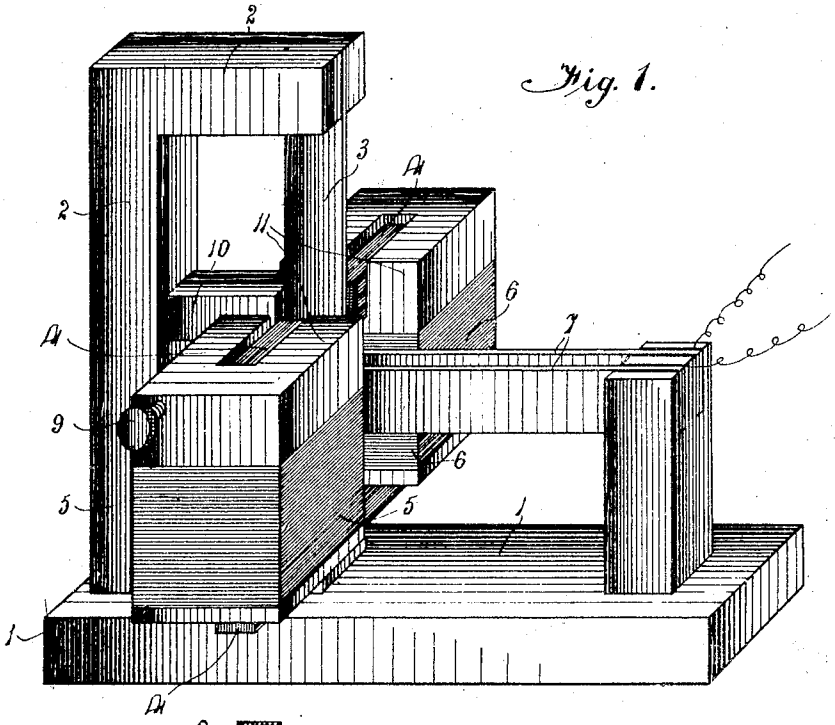
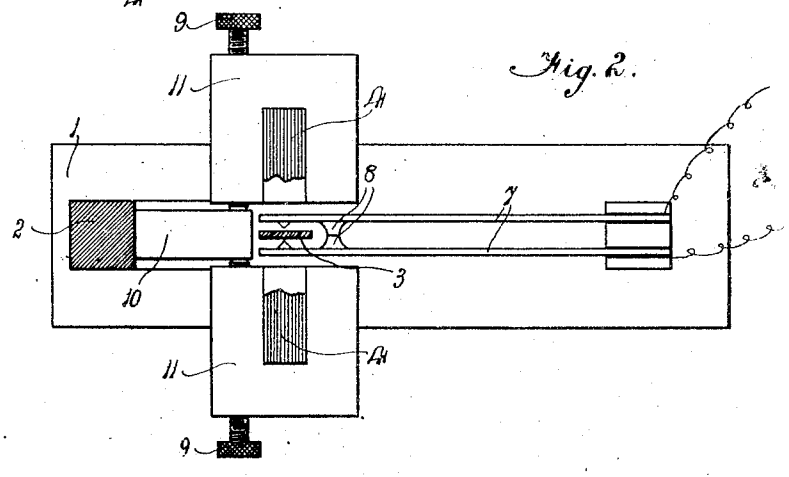


Fig. 2.



WITNESSES

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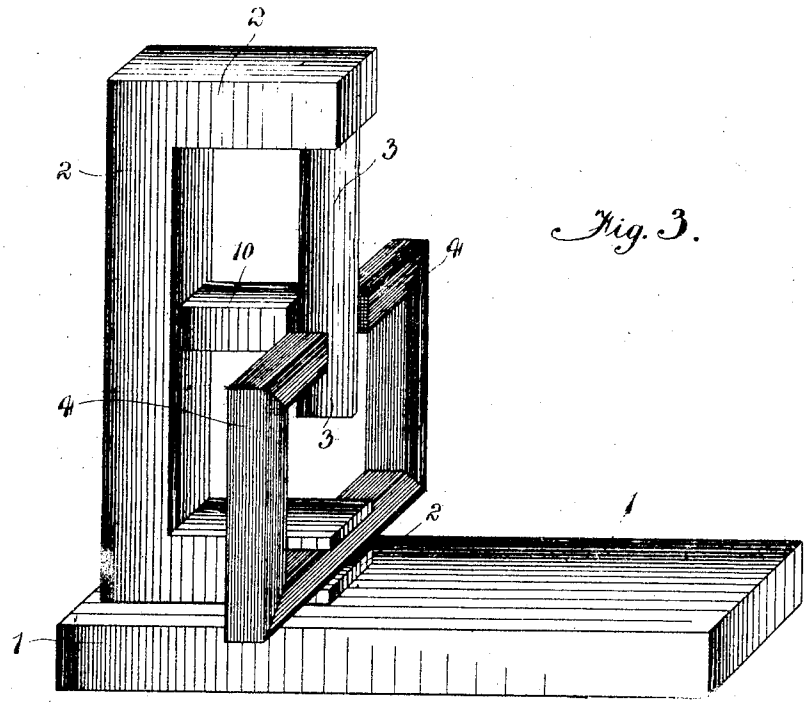


Fig. 3.

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UNITED STATES PATENT OFFICE.

HANS VON KRAMER AND GISBERT KAPP, OF BIRMINGHAM, ENGLAND.

RESONATING RELAY.

1,067,823. Specification of Letters Patent. Patented July 22, 1913.

Application filed April 11, 1912. Serial No. 690,194.

To all whom it may concern:

Be it known that we, HANS VON KRAMER and GISBERT KAPP, subjects of the King of Great Britain, residing at 21 Wood End Road, Erdington, Birmingham, and Pen-y-coed, Pritchatts Road, Edgbaston, Birmingham, respectively, in the county of Warwick, England, have invented a new and useful Resonating Relay; and we do hereby declare the following to be a full, clear, and exact description of the same.

Our invention comprises improvements in relay contact devices and refers to that class of such which employ a vibratory reed controlled by an electro magnet or magnets the winding of which is part of a controlling circuit.

The relay contact device is so constructed as to be operated by feeble alternating currents for the purpose of opening or closing a local electric circuit, and comprises a steel or equivalent reed tuned to the frequency of the alternating current and firmly fixed at one end to one pole of the permanent magnet, while its free end is situated between two symmetrical extensions of the other pole, and it is the object of our present invention to improve the construction and operation of said relay.

According to our invention the relay is provided with means whereby the air gap between each of the polar extensions and the reed may be independently and separately adjusted; in combination with an improved form of contact device including two flanking contact springs forming part of a local circuit and so tuned that when the relay reed vibrates the flanking contact springs are so moved as to open their circuit.

Referring to the drawings:—Figure 1. is a perspective view of the improved polarized relay. Fig. 2. is a plan of same with the polar extremities broken away to show the flanking contact springs. Fig. 3. illustrates the magnet and polar extensions forming the skeleton of the complete relay.

In carrying our invention into practice as illustrated upon the accompanying drawings the relay consists of an insulated base 1 to which is secured a permanent horse shoe magnet 2 to the upper end of which the fixed end of the steel reed 3 is secured, the free end of the reed projecting downwardly. To the lower end of the magnet the core 4 is secured, this core being laminated and preferably in the form of thin wires in order to avoid eddy currents. Around this core the electromagnet coils 5—6 are wound, these two coils being in series and forming part of the circuit in which the feeble alternating current occurs which is intended to work the relay. The extremities of the cores form one pole of the permanent magnet while the other pole is at the upper end, *i. e.* at the point at which the fixed end of the reed is secured.

The steel reed is tuned to the periodicity of the alternating current in the controlling circuit, and obviously when an alternating current is passed through the coils it will cause the reed to vibrate between the extremities of the cores, and it will be clear that the maximum amplitude of the excursion of the reed to each side will be obtained by an alternating current having a periodicity per second corresponding with the natural period of vibration of the reed.

The vibrating reed is employed for closing or opening a local circuit and in the accompanying drawings we have illustrated it as it is employed for opening a circuit.

At either side of the reed are two flanking contact springs 7 but out of contact and insulated therefrom as by ruby contacts, these springs 7 being however horizontally disposed and having a natural period of vibration different to the reed 3, these two springs 7 having projections 8 and together forming the engaging contacts of the circuit which is to be opened by the relay.

When an alternating current is passed through the coils the reed is caused to vibrate which causes the springs 7 to also vibrate but at a much slower rate than the reed 3, and it will be obvious that when these two springs 7 vibrate they will move out of mutual contact.

It will be obvious that for the relay to work with the extremely feeble alternating currents of the order specified, an extremely accurate adjustment of the air gap between the cores and reed will be required. For this purpose the cores are provided with ivory or other insulated members 11 through which pass set screws 9, the extremities of these screws engaging a brass or equivalent extension or attachment 10 of the permanent magnet. The adjustment is affected by tightening up one or both of the screws, the effect of tightening up a screw being to force the core outwardly and to correspondingly enlarge the air gap.

Claims:—

1. In a relay contact device operated by feeble alternating currents for the purpose of controlling a local circuit, the combination of a permanent magnet; a reed tuned to the periodicity of the alternating current in the controlling circuit and having its one end firmly fixed to one pole of said magnet; symmetrical polar extensions on the second pole of said magnet and terminating on either side of the free end of said reed; coils around said polar extensions in series with each other and forming part of the controlling circuit; and two flanking contact springs forming part of the local circuit and having a natural period of vibration different to the reed and mounted on either side of said reed; and arranged that when the reed vibrates the flanking contact springs, are knocked apart to control a second circuit; for the purpose specified and substantially as set forth.

2. In a relay contact device operated by feeble alternating currents for the purpose of controlling a local circuit, the combination of a permanent magnet; a reed tuned to the periodicity of the alternating current in the controlling circuit and having one end fixed to one pole of the magnet; symmetrical polar extensions on the second pole of the magnet and terminating on opposite sides of the free end of said reed; coils around said polar extensions and forming a part of the controlling circuit; a pair of flanking springs having a natural vibration different to that of said reed and mounted so as to vibrate respectively on opposite sides of said free end and to be vibrated by the vibration of said free end; and conductors for a local circuit adapted to be controlled by said vibration.

3. In a relay contact device operated by feeble alternating currents for the purpose of controlling a local circuit the combination of a permanent magnet, a reed tuned to the periodicity of the alternating current in the controlling circuit and having its one end firmly fixed to one pole of said magnet, symmetrical extensions of the second pole of said magnet and terminating on either side of the free end of said reed, coils around said polar extensions in series with each other and forming part of the controlling circuit, a contact device controlled by the vibrations of the said reed, insulated blocks carried by each of the polar extensions, adjustable set screws carried by said blocks and abutting against a fixed part of the relay, so arranged that when the screws are operated the air gap between each of the polar extensions and the reed may be independently adjusted; for the purpose specified and substantially as set forth.

4. In a relay contact device operated by feeble alternating currents for the purpose of controlling a local circuit the combination of a permanent magnet, a reed tuned to the periodicity of the alternating current in the controlling circuit and having its one end firmly fixed to one pole of said magnet, symmetrical extensions of the second pole of said magnet and terminating on either side of the free end of said reed, coils around said polar extensions in series with each other and forming part of the controlling circuit, two flanking contact springs forming part of the local circuit having a natural period of vibration different to the reed and mounted on either side of said reed; so arranged that when the reed vibrates the flanking contact springs are knocked apart to open their circuit; for the purpose specified and substantially as set forth.

5. In a relay contact device operated by feeble alternating currents for the purpose of controlling a local circuit the combination of a permanent magnet, a reed tuned to the periodicity of the alternating current in the controlling circuit and having its one end firmly fixed to one pole of said magnet, symmetrical extensions of the second pole of said magnet and terminating on either side of the free end of said reed, coils around said polar extensions in series with each other and forming part of the controlling circuit, a contact device controlled by the vibrations of the said reed, insulated blocks carried by each of the polar extensions, adjustable set screws carried by said blocks and abutting against a fixed part of the relay; so arranged that when the screws are operated the air gap between each of the polar extensions and the reed may be independently adjusted, and two flanking contact springs forming part of the local circuit having a natural period of vibration different to the reed and mounted on either side of said reed; so arranged that when the reed vibrates the flanking contact springs are knocked apart to open their circuit; for the purpose specified and substantially as set forth.

In testimony whereof, we have signed our names to this specification in the presence of two subscribing witnesses.

HANS VON KRAMER.
GISBERT KAPP.

Witnesses:
HAROLD J. HONESTER,
NORMAN S. BARLOW.