S. CABOT.

RELAY.

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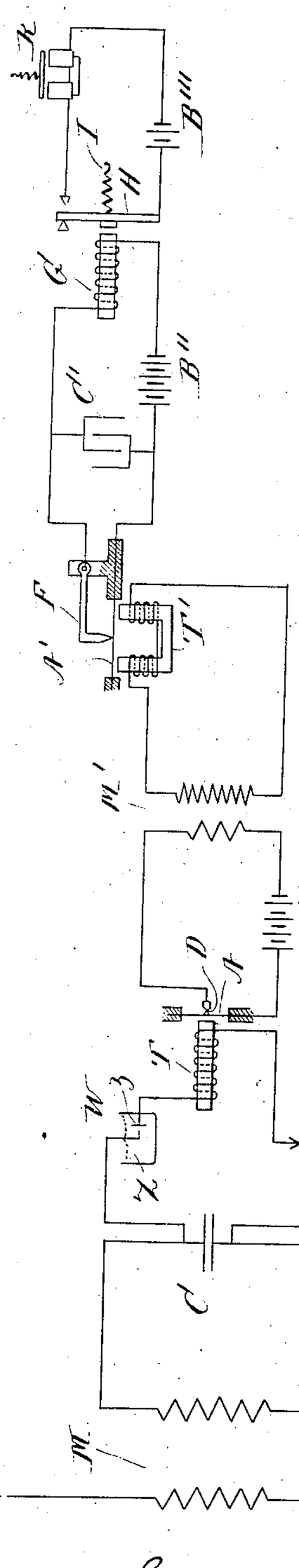
916,840.

Patented Mar. 30, 1909.



WITNESSES=

G. A. Higgins.

Patrick J. Conroy.

INVENTOR=

Sewall Cabot

by Browne & Woodworth

Atty's.

UNITED STATES PATENT OFFICE.

SEWALL CABOT, OF BROOKLINE, MASSACHUSETTS, ASSIGNOR TO STONE TELEGRAPH AND TELEPHONE COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

RELAY.

No. 916,840. Specification of Letters Patent. Patented March 30, 1909.

Application filed November 20, 1906. Serial No. 344,238.

To all whom it may concern:

Be it known that I, SEWALL CABOT, a citizen of the United States, and a resident of Brookline, in the county of Norfolk and State of Massachusetts, have invented a new and useful Improvement in Relays, of which the following is a specification.

My invention relates to electrical relays, and especially to relays adapted to be operated by feeble electrical currents.

The object of my invention is to provide a relay which may be operated by the minute electrical currents developed in the local receiving circuit of a wireless telegraph receiving system which includes a sensitive oscillation detector, and which in turn may control a signal indicating device which could not directly be operated by said oscillation detector, such, for example, as a telegraph sounder.

In the drawings which accompany and form a part of the present specification, the figure represents in diagram one simple embodiment of my invention associated in one of many possible ways with the local receiving circuit of a wireless telegraph receiving system.

A′ represents an armature, herein shown as a diaphragm, and T′ is an electromagnet arranged to operate upon said armature or diaphragm.

F is a contact member, preferably of easily fusible metal and which may be provided with a point, making electrical contact with said armature and shown in the present case as pivoted to a support and resting with its pointed terminal upon the diaphragm A′, being held in contact therewith by gravity. The battery B″ and the electromagnet G, which may be a signal indicating device, are included in series with the contact member F and diaphragm or armature A′. The electromagnet G may be provided with an armature H electrically connected with the battery B‴ and sounder K, or other suitable signal indicating device. The condenser C′ which preferably is one of relatively large capacity, for example, one microfarad, is connected directly across the terminals of the contact member F and the diaphragm A′.

When the member F is raised out of contact with the diaphragm A′, the condenser C′ will be charged by the battery B″, and when the member F is again brought into contact with the diaphragm A′, the condenser C will discharge across the contact, formed between F and A. This discharge, being unimpeded by the resistance of a battery or resistance coil, will slightly fuse the contact member to the diaphragm and greatly reduce the resistance of said contact, thus permitting the current from the battery B″ to energize the magnet G. The energization of the magnet G will cause the armature H to be brought against its front stop, thereby opening the circuit of the sounder K. The device is now in condition for use. In such condition, feeble electrical currents developed in the windings of the magnet T′ will operate upon the armature or diaphragm A′, thereby breaking the electrical connection between F and A′ or at least greatly increasing the resistance of the contact therebetween. This results in opening the circuit of the magnet G or at least in greatly reducing the flow of current in said circuit, so that by the proper adjustment of the retractile spring I, the armature H will be retracted and close the circuit of the sounder K. If the current flowing through the windings of the magnet T′ be a vibratory current, it is possible so to adjust the apparatus that the sounder K will remain energized during the flow of said current. Upon the cessation of current flow through the windings of the magnet T′, the discharge of the condenser C′ across the contact between the members F and A′ will again slightly fuse said members together, thereby closing the circuit of the magnet or relay G sufficiently to permit the latter to attract its armature and open the circuit of the sounder K.

While a number of ways of associating the magnet T′ and its associated apparatus and circuits with the local circuit of a wireless telegraph receiving system will readily occur to those skilled in the art, I have, for the purpose of more completely disclosing my invention, shown the same associated therewith through the interposition of a current amplifying device. The current amplifying device may consist as shown of a telephone relay consisting of a magnet T and diaphragm A, the latter closing the circuit of the battery B′ and primary of the transformer M′ through the carbon contacts D. The windings of the magnet T′ are herein shown as connected in series with the secondary of said transformer M′, which may be

a step-up transformer. The telephone relay T is connected in series with the oscillation detector W, the secondary winding of the oscillation transformer M and a portion of the potentiometer resistance R. The oscillation detector may be of any suitable type and is herein shown as consisting of an anode Z placed in close juxtaposition to a cathode *z* of much greater area than the anode and both immersed in a suitable electrolyte. When electrical oscillations are developed by electromagnetic signal waves in the elevated receiving conductor system, consisting of the elevated conductor V and the primary of the transformer M, earthed at E, high frequency electrical oscillations are developed therein and their energy is translated to the resonant receiving circuit which includes the condenser C and the secondary of said transformer M. By the accumulative action of electrical resonance the difference of potential developed across the terminals of the condenser C varies the resistance of the oscillation detector and enables the current from the battery B to flow from the positive terminal thereof through the secondary of the transformer M to the anode Z, thence to the cathode *z*, through the winding of the telephone T and a portion of the resistance R, and thence back to the battery B. The energization of the telephone T and the resulting vibration of its diaphragm A will produce a pulsating current in the circuit of the primary of the transformer M′ which will be converted into an alternating current in the secondary thereof, thereby causing the magnet T′ to operate upon its armature A′ and throw the latter into rapid vibration at a rate determined by the nature of the current flowing through the windings of said magnet. The contact member F′ is of such nature that its inertia prevents it from following the vibrations of the armature or diaphragm A′. The minute welding of the contact between F′ and A′ is thus mechanically interrupted and the resistance of the circuit which includes the windings of the magnet G thereby is so greatly increased that an inappreciable amount of current will flow through said windings and practically deënergize said magnet, permitting the armature H to fall back and close the circuit of the sounder K.

I do not wish to be limited to the precise arrangements of apparatus and circuits herein described and diagrammatically illustrated in the drawing for the purpose of more fully disclosing my invention, inasmuch as my invention may be subjected to a wide range of variation without departing from the principle thereof.

I claim,

1. In combination, an armature, an electromagnet arranged to operate upon said armature, a contact member of easily-fusible metal making electrical contact with said armature, a circuit including said armature and said contact member, a source of electrical energy in said circuit and a condenser connected across the terminals of said armature and contact member.

2. In combination, a diaphragm, an electromagnet arranged to vibrate said diaphragm, a contact member of easily-fusible metal resting upon said diaphragm, a circuit including said diaphragm and said contact member, a source of electrical energy in said circuit and a condenser connected across the terminals of said diaphragm and contact member.

3. In combination, a diaphragm, an electromagnet arranged to vibrate said diaphragm, a contact member of easily-fusible metal resting upon said diaphragm, a circuit including said diaphragm and contact member, a source of electrical energy and an electromagnet in said circuit, and a condenser connected across the terminals of said diaphragm and contact member.

4. In combination, a diaphragm, an electromagnet arranged to vibrate said diaphragm, a contact member of easily-fusible metal resting upon said diaphragm, a circuit including said diaphragm and said contact member, a source of electrical energy and a relay in said circuit, a condenser connected across the terminals of said diaphragm and contact member, and a circuit including a source of electrical energy and a signal-indicating device controlled by said relay.

5. In combination, a diaphragm, an electromagnet arranged to vibrate said diaphragm, a contact member of easily-fusible metal resting upon said diaphragm, a circuit including said diaphragm and said contact member, and a source of electrical energy and an electromagnet included in said circuit.

In testimony whereof, I have hereunto subscribed my name this 19th day of Nov. 1906.

SEWALL CABOT.

Witnesses:
CHARLES C. KURTZ,
GEO. K. WOODWORTH.