

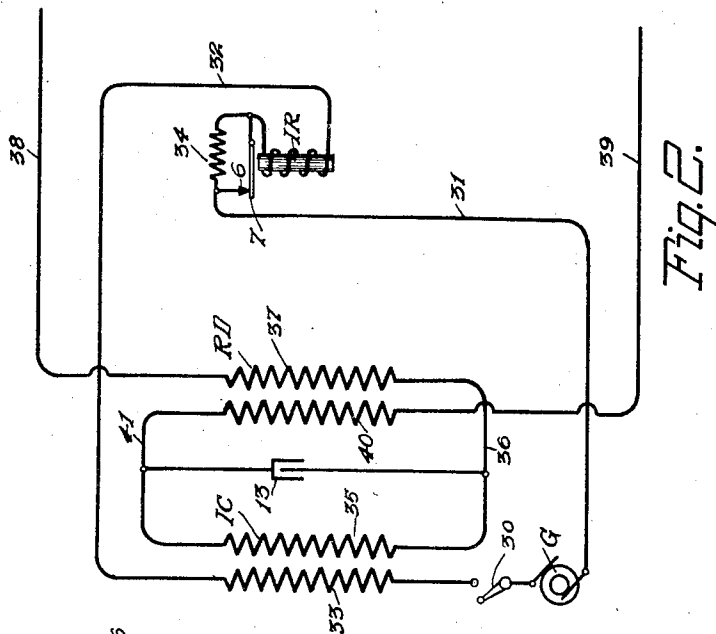
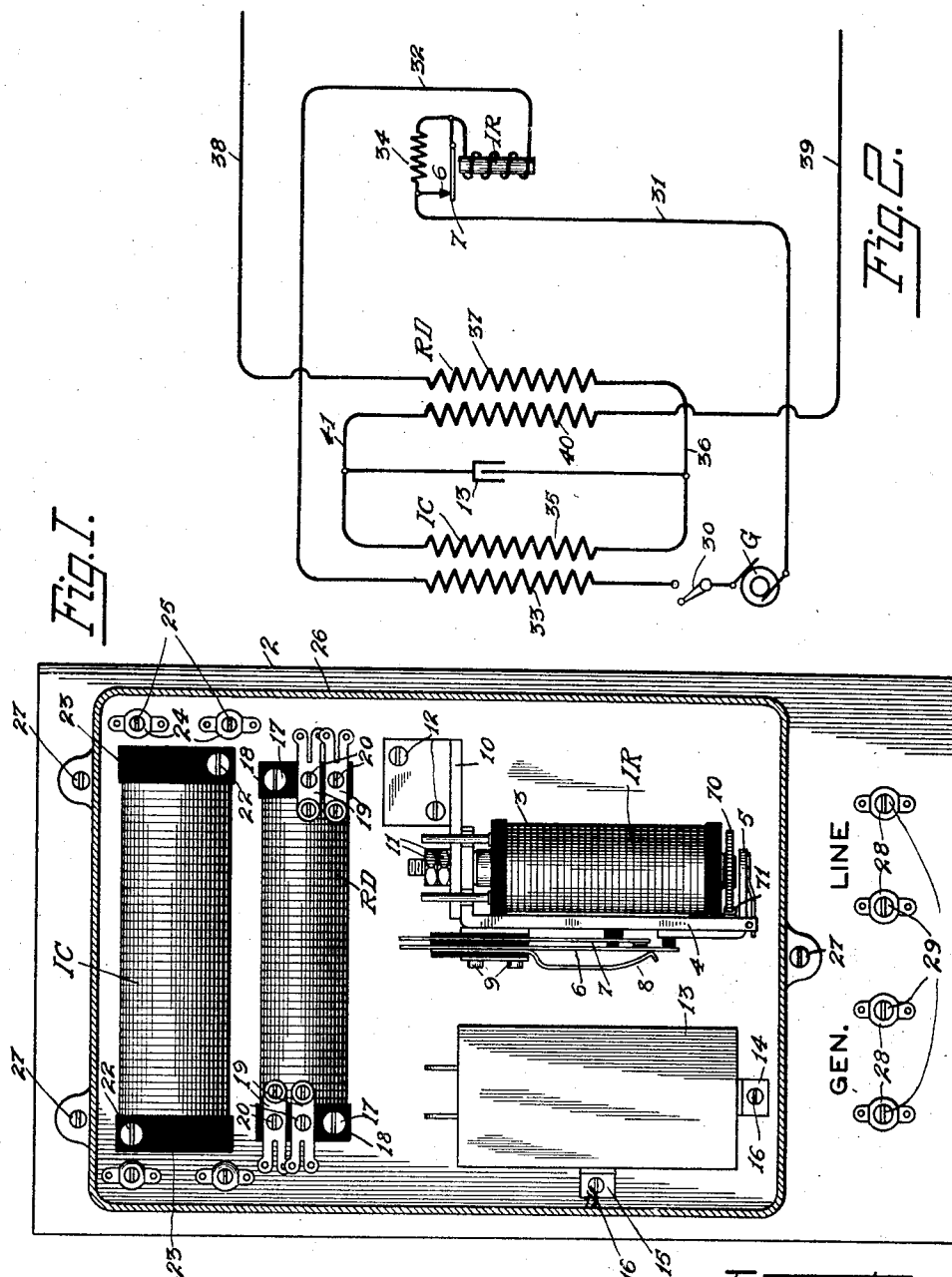
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O. F. CASSADAY

INTERRUPTER CIRCUITS

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UNITED STATES PATENT OFFICE.

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INTERRUPTER CIRCUITS.

Application filed May 21, 1919. Serial No. 298,764.

To all whom it may concern:

Be it known that I, ORMOND F. CASSADAY, a citizen of the United States of America, and residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Interrupter Circuits, of which the following is a specification.

My invention relates to interrupters and has to do most particularly with interrupters of the type which are used in connection with composite telephone and telegraph systems for signaling purposes.

Interrupters as used in systems of the above type are difficult to keep in adjustment and it is one of the essential features of a system of the above type to deliver a signaling current which will not interfere with the ordinary telegraph signals. Interrupters of the present type get out of adjustment and the current thus delivered from an interrupter out of adjustment produces trouble in the system.

An object of my invention is the construction of an interrupter and circuit of a type for use in connection with composite circuits which will remain adjusted and deliver a steady frequency of current and at the same time be simple in construction and its parts readily accessible and cheap to manufacture.

A feature of my invention is the adoption of an interrupter relay in association with an induction coil, a retardation coil and a condenser to produce a character of high frequency current, particularly adapted for use in circuits of the above character, although I do not wish to be limited to the same as my invention is applicable for other uses.

The novel features of the invention through the provision of which the above mentioned and other advantageous results are attained will be explained by reference to the accompanying drawings, in which like reference characters in the several views denote like parts, and in which—

Fig. 1 is a plan view of the interrupter of my invention with the cover in section to clearly illustrate the apparatus, and

Fig. 2 is a diagrammatic circuit arrangement operating in connection with the interrupter of my invention.

Referring now more in detail to my invention as illustrated and referring to Fig. 1,

it comprises a base or mounting plate 2 of any suitable material upon which the apparatus of my invention is mounted. An interrupted relay IR is provided, comprising an electromagnet 3, heel iron 4 and pivoted armature 5, a pair of interrupter springs 6 and 7. A tensioning spring 8 associated with the springs 6 and 7 has its free end engaging the interrupter spring 6. The interrupter springs 6 and 7 and tensioning spring 8 are mounted upon the heel iron 4 by means of the screws 9, which screws 9 have screw-threaded engagement with suitable tapped openings in the said heel iron. The armature 5 when attracted, due to the energization of relay IR, opens the interrupter contacts 6 and 7 in the usual manner for purposes as will be more fully hereinafter described. One end of the core of the relay is tapped and receives a screw-threaded member 70. The screw-threaded member is provided with a knurled portion so that the member 70 may adjustably be moved outwardly and inwardly to regulate the length of stroke of the armature 5. A spring 71 is provided for holding the member 70 in its adjusted position.

The relay IR, as a whole, is supported upon an angular bracket 10 and secured thereto by means of nuts 11, which nuts have screw-threaded engagement with the threaded portion of the core of the electromagnet coil 3, and the bracket 10 is in turn secured to the base 2 by means of the screws 12. A condenser 13 is provided and is secured to the base 2 by means of brackets 14 and 15, which brackets are secured to the condenser 13 in any suitable manner, and the brackets 14 and 15 are in turn secured to the base 2 by means of screws 16. A retardation coil RD is provided and is secured to the base 2 by means of screws 17, which pass through suitable openings in the heads 18 of the retardation coil RD and screw into the base 2. Terminals 19 are also provided for the retardation coil RD and are supported upon the heads 18 and secured thereto by means of the screws 20. An induction coil IC is also provided and is secured to the base 2 by means of the screws 22, which pass through suitable openings in the heads 23 of the induction coil IC and screw into the base 2. Terminals 24 are provided for the induction coil IC and are secured to the base 2 by means of the screws 25. A pro-

protective cover 26 is provided which covers the apparatus and is secured to the base 2 by means of the screws 27, which screws pass through suitable openings in the ears 28 of the cover 26 and screw into the base 2. Terminals 28 are provided and are secured to the base 2 by means of screws 29, the said terminals serving as connection or terminal points for external connection purposes.

Referring now to Fig. 2 in which I illustrate a circuit arrangement operating in connection with the interrupter of my invention, I will now describe the operation of the same. When the switch 30 is closed, a circuit is established for interrupter relay IR, traced from one pole of the current generator G, over conductor 31, normally closed contacts 6 and 7 of interrupter relay IR, through the winding of the interrupter relay IR, conductor 32, through the winding 33 of the induction coil IC, and through switch 30 to the other side of the generator G. The generator G may be an A. C. or a D. C. generator. I find that I obtain excellent results with my circuit arrangement in either instance. The interrupter relay IR is energized over this circuit and upon the attraction of armature 5 of the said relay IR, its normally closed contacts 6 and 7 are opened, allowing the interrupter relay to de-energize, and upon the closure of contacts 6 and 7 the interrupter relay IR is again energized. Interrupter relay IR is thus energized and de-energized, due to opening and closing of its contacts 6 and 7. The winding 34 bridged across the contacts 6 and 7 prevents the sparking of the said contacts 6 and 7. This interrupted current just traced passes through the winding 33 of the induction coil IC and induces current in the secondary winding 35 of the induction coil IC. This induced current extends from the lower terminal of the secondary winding 35 of the induction coil IC, over conductor 36, winding 37 of the retardation coil RD, conductor 38 and from conductor 38 it may pass through any suitable apparatus, such as the high frequency relay illustrated and described in a co-pending application of mine filed May 21, 1912, Serial No. 298,765, and after passing through this apparatus back over conductor 39, through the winding 40 of the retardation coil RD, and over conductor 41 to the other terminal of the winding 35 of the induction coil IC. The condenser 13 is bridged across the terminals of the windings 37 and 40 of the retardation coil RD, for purposes as will now be described. The interrupted current induced in the secondary winding 35 of the induction coil is of high frequency and builds up to a maximum and reduces to zero with great rapidity, producing a current wave with a sharp peak. Now, to smooth the wave or, in other words, reduce the peak, I bridge

the condenser across the terminals of the windings 37 and 40 of the retardation coil, so that this sharp peak is reduced, due to the charge and discharge of the condenser. The current thus smoothed by means of the condenser 13 in combination with the retardation coil RD eliminates the possibility of inductive disturbances on adjacent circuits when signaling over composite circuits.

While I have illustrated a preferred embodiment of my invention and operating in connection with a preferred circuit arrangement, I do not wish to be limited to the same as changes and modifications will readily suggest themselves to those skilled in the art, and I, therefore, aim to cover all such changes and modifications as come within the spirit and scope of the appended claims.

Having described my invention what I claim as new and desire to secure by United States Letters Patent is:

1. An interrupter circuit of the class described including a source of current, a transformer having a pair of windings, an interrupter relay in series relation with said source of current and one of the windings of said transformer, a retardation coil comprising one pair of windings, a delivery circuit, a circuit connection from one terminal of a winding of said retardation coil to a terminal of the other winding of said transformer, the other terminal of said winding of said retardation coil being connected to one arm of said delivery circuit, a second circuit connection from a terminal of the second winding of said retardation coil to the other terminal of the said last winding of said transformer, the other terminal of the second winding of said retardation coil being connected to the other arm of said delivery circuit, thus placing the windings of said retardation coil and the other winding of said transformer and the delivery circuit in series relation.
2. An interrupter circuit of the class described including a source of current, a transformer including a primary and a secondary winding, an interrupter relay serially connected with said source of current and the primary winding of the transformer, a condenser bridged across one winding of said transformer, a switch in the circuit of the other transformer winding, a retardation coil comprising a pair of windings, a delivery circuit, a circuit connection from one terminal of a winding of said retardation coil to a terminal of the secondary winding of the transformer, the other terminal of said winding of said retardation coil being connected to one arm of said delivery circuit, and another circuit connection from a terminal of the second winding of said retardation coil to the other terminal of the secondary winding of said transformer, the other terminal of

the second winding of said retardation coil being connected to the other arm of said delivery circuit, thus placing the windings of said retardation coil and the secondary winding of said transformer and the delivery circuit in series relation.

3. An interrupter circuit of the class described including a source of current, a transformer including a primary and a secondary winding, an interrupter relay serially connected with said source of current and the primary winding of the transformer, a switch controlling the circuit of said interrupter relay, a coil bridged across the contacts of said interrupter relay, a retardation coil comprising a pair of windings, a delivery circuit, a circuit connection from one terminal of a winding of said retardation coil to a terminal of the secondary winding of said transformer, the other terminal of said winding of said re-

tardation coil being connected to one arm of said delivery circuit, and another circuit connection from a terminal of the second winding of said retardation coil to the other terminal of the secondary winding of said transformer, the other terminal of the second winding of said retardation coil being connected to the other arm of said delivery circuit, thus placing the windings of said retardation coil and the secondary winding of said transformer and the delivery circuit in series relation, and a condenser bridged across said delivery circuit between said secondary winding of said transformer and the windings of said retardation coil.

Signed by me at Chicago, in the county of Cook and State of Illinois, this 19th day of May, 1919.

ORMOND F. CASSADAY.