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S. I. CORY

GROUNDED DUPLEX TELEGRAPH SYSTEM

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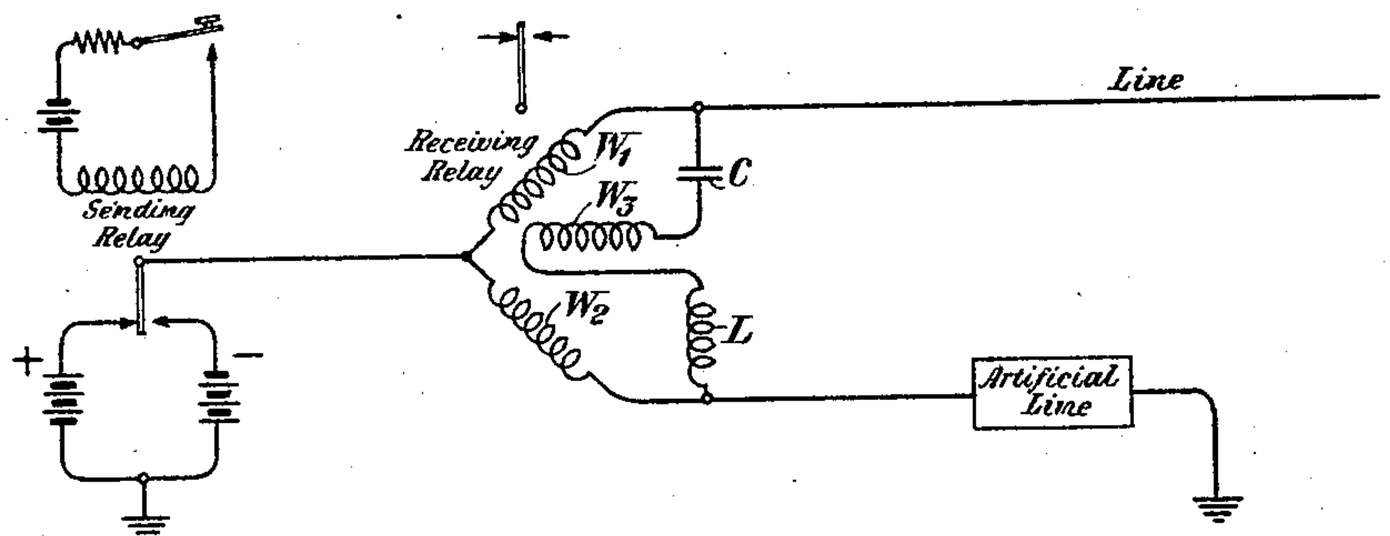

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UNITED STATES PATENT OFFICE.

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GROUNDED DUPLEX TELEGRAPH SYSTEM.

Application filed June 26, 1926. Serial No. 118,753.

This invention relates to grounded duplex telegraph systems, and has as its object the provision of improved arrangements for reducing interference with telegraph systems from alternating current power transmission systems.

It has been the practice heretofore to employ resonant shunts connected across the receiving relay windings of telegraph systems of the class to which the invention relates. These shunt circuits are tuned to the frequency of the interfering power currents, offering a low impedance to these currents and a high impedance to the signaling currents.

In accordance with the invention described hereinafter, I provide a novel circuit arrangement including a resonant shunt and affording complete protection against interfering power currents, as described more fully below.

The accompanying drawing shows in diagrammatic form as an illustration, a differential telegraph repeater including a resonant shunt arranged according to my invention. The telegraph line, the balancing artificial line, the sending relay and the connections therefor are old and well understood in the art. The resonant shunt includes the capacity C and the inductance L. In the receiving relay I connect one winding W_1, in series with the line, and a second winding W_2 in series with the artificial line. I add a third winding of this receiving relay W_3 and connect this winding in series with the capacity C and the inductance L of the resonant shunt. The capacity of C, the inductance of L, and the resistances of L and the winding W_3 are so chosen that a relatively low impedance is offered to the interfering alternating currents and a relatively high impedance to the signaling currents. The shunt is, of course, resonant at the frequency of the interfering power currents. With my arrangement, interfering currents flowing through the resonant shunt will flow through the third winding W_3 of the receiving relay, and will neutralize the effect of the interfering currents flowing through the windings W_1 and W_2. In order that this result may be secured, provision must be made that the current flowing in the winding W_3 will have the proper value and the proper phase relation. This provision is made by suitable proportioning of the resonant shunt elements C and L.

It will be understood that my improved arrangement affords a high protection against interference in the repeater from alternating power currents. Also it causes practically no undesirable effect on either outgoing or incoming telegraph signals.

It is to be noted that, while in the case of the ordinary resonant shunt, protection is secured by making the impedance of the shunt very low at the interfering frequency, with my improved arrangement protection is secured more by neutralization than by shunting, and accordingly, the effect on incoming and outgoing signals is greatly reduced.

What is claimed is:

1. In a grounded duplex telegraph system, a sending relay, a receiving relay, a line, an artificial line, and a shunt path therebetween including an inductance and a capacity, said receiving relay including an operating winding and an additional winding in series with the inductance and capacity of the shunt path, said inductance and said capacity being of such values that the shunt forms a tuned circuit resonant to interfering alternating currents in the line and the effect on incoming and outgoing signals is slight, the interfering current in the operating winding of the receiving relay being substantially neutralized by the flow of the interfering current in the additional winding.

2. In a grounded duplex telegraph system, a sending relay, a receiving relay, a line, an artificial line, and a shunt path therebetween including an inductance and a capacity, said receiving relay having a plurality of operating windings and an additional winding in series with the inductance and capacity included in the shunt path, said inductance and said capacity being of such values that the shunt forms a tuned circuit resonant to interfering alternating currents in the line and the effect on incoming and outgoing signals is slight, the interfering current in the operating windings of the receiving relay being substantially neutralized by the flow of the interfering current in the additional winding.

3. In a grounded duplex telegraph system, a sending relay, a receiving relay, a

line, an artificial line, and a shunt path therebetween including an inductance and a capacity, said receiving relay having a first winding in series with the line, a second winding in series with the artificial line, and a third winding in series with the inductance and capacity included in the shunt path, said inductance and said capacity being of such values that the shunt forms a tuned circuit resonant to interfering alternating currents in the line and the effect on incoming and outgoing signals is slight, the interfering current in the first and second windings of the receiving relay being substantially neutralized by the flow of the interfering current in the third winding.

In testimony whereof, I have signed my name to this specification this 24th day of June 1926.

SAMUEL I. CORY.