

1,016,564.

J. L. HOGAN, JR.
BREAK KEY.
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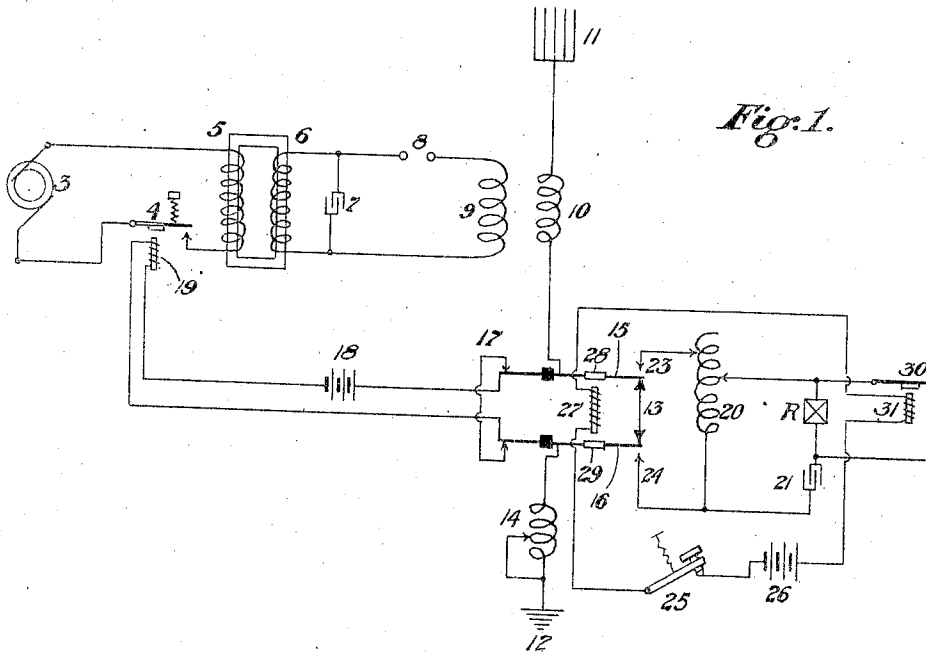


Fig. 1.

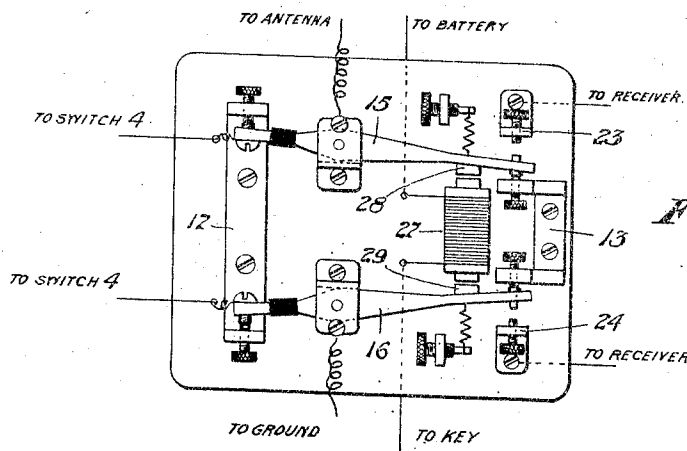


Fig. 2.

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BREAK-KEY.

1,016,564.

Specification of Letters Patent.

Patented Feb. 6, 1912.

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To all whom it may concern:

Be it known that I, JOHN L. HOGAN, JR., a citizen of the United States, residing at Brant Rock, in the State of Massachusetts, have invented a certain new and useful Break-Key for Telegraph Apparatus, of which the following is a specification.

My invention relates to electric signaling apparatus, and especially to apparatus for wireless signaling in which there are associated with the same antenna both a sending circuit and a receiving circuit.

The primary object of the invention is to provide mechanism by which the sending key, in the operation of sending, automatically isolates the receiving instruments and protects the operator and the receiving circuit from injury by the source of power.

I have illustrated the invention in one simple form in the accompanying drawing, in which—

Figure 1 is a diagram of associated sending and receiving circuits for wireless telegraphy, with switches embodying my invention. Fig. 2 is a plan of the protecting switch employed.

It is manifestly desirable for a telegraph operator engaged in sending messages to be able at practically the same time to listen to messages being sent by others, for various reasons; at the same time it is dangerous to have the receiving circuit or instruments connected to the antenna while sending and in using high power sending apparatus it has become quite necessary to insure the operator against injury that might result from having both the sending and receiving apparatus simultaneously connected to the antenna. The receiving apparatus ought to be completely and with certainty isolated from the antenna while sending; and while it has been heretofore attempted by shunting some part of the receiver circuits by means of a break key, this does not isolate the receiver, and moreover is open to the objection that an incomplete closure of the shunting switch would leave the receiver exposed to full charge from the antenna. Entire safety and certainty are only to be attained by so arranging it that the act of depressing the sending key will, before connecting the sending circuit at all, necessarily and completely isolate the receiving circuit.

In the form of apparatus shown in the

drawing for illustration, the source of current 3, is in circuit with a magnetically operated switch 4 and the primary 5 of a transformer. The secondary 6 of this transformer supplies power to an oscillating circuit comprising condenser 7, spark gap 8, and the primary 9 of a transformer, of which the secondary 10 is in circuit with the antenna 11. When sending, the antenna circuit is completed to ground 12 through shunt 13 and the variable inductance coil 14. But this circuit cannot be completed until both the switch lever arms 15 and 16 are in contact with the shunt 13, at which time the rear ends of said lever arms are in contact with a second shunt 17 in circuit with battery 18 and the solenoid 19 operating switch 4 in the primary circuit. Therefore it is plain that only when this latter condition is obtained can the energy from the source be transmitted to the antenna.

The receiving circuit, shown simplified for purposes of illustration, consists of the inductance coils 20, condenser 21, and the detector R. This circuit is connected with the antenna only when the switch arms 15 and 16 are drawn by their retractile springs to rest respectively on the contacts 23 and 24. The operating key 25 is in circuit with a battery 26 and an electromagnet 27, arranged to act upon armatures 28 and 29 on the switches 15 and 16 respectively, so that the act of closing the key 25 energizes the solenoid 27 and moves these arms to close the shunt 13 as heretofore described. A simple form of construction for these switches and their mountings, is shown in Fig. 2. It will be observed that the effect of closing the signaling key 25 is first to cut out the receiving circuit, and that until this is done, so as to completely isolate the receiver from the antenna circuit, the arms 15 and 16 can not close on the shunt 13, so as to ground the antenna direct rather than through the receiver, nor can the shunt 17 be connected so as to allow the solenoid 19 to close the switch 4 completing the primary sending circuit. It is therefore impossible for the latter circuit to be closed, or the antenna to be charged, until after the receiving circuit has been isolated and both the instruments and the operator thereby protected. As an additional precaution I prefer also to shunt the detector R, as for example by means of a switch 30 operated

by solenoid 31 in the same circuit with the sending key 25 and battery 26. This is for the purpose of protecting the receiver from any oscillations that might be picked up from the sending inductances by the receiving tuning apparatus, even though the latter be conductively isolated.

The device described does not depend upon the perfection of contact of any switch; the isolation of the receiving instruments is accomplished as a necessary preliminary to the act of closing the sending circuit, by which the antenna is energized. The invention is not limited to the particular mechanism here described for doing this.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent, is the following:

1. The combination with a sending circuit and a receiving oscillating circuit and an antenna associated with both said circuits, of a break key adapted to entirely isolate the receiving circuit from the antenna from ground and afterward close the sending circuit, whereby the antenna is energized, substantially as described.

2. In wireless telegraph apparatus, the combination with a sending circuit and a sending key, of a receiving apparatus and a switch operated by the sending key to cut off the receiving oscillation circuit from both the radiator and the ground before connecting the radiator with the sending circuit.

3. A break key for wireless telegraph apparatus which includes sending and receiving circuits, comprising a switch and means controlled thereby operating to first isolate the receiving circuit by short-circuiting its

antenna and ground connections, then to complete the antenna circuit and then to close the sending circuit, all in one motion, substantially as described.

4. A switching device for wireless telegraphy apparatus including sending and receiving oscillation circuits, said device adapted at one end to alternately connect and disconnect the receiving oscillation circuit both with the antenna and the ground and the other end of said device adapted to close the sending control circuit after disconnecting the antenna and ground from the receiving oscillation circuit, substantially as described.

5. The combination with a source of power, an oscillatory sending circuit, and a grounded antenna connected therewith, of an oscillating receiving circuit, a sending key and a switch adapted to connect the receiving circuit with the antenna in one position, and in another position to completely isolate the receiving circuit from the antenna and from the ground and afterward complete the sending circuit, substantially as described.

6. The combination with a sending circuit and a receiving circuit, of a break-key and a signaling key located in a circuit independent of the sending circuit, said two keys arranged to short-circuit and completely isolate the receiving circuit before causing the closure of the sending circuit, substantially as described.

In testimony whereof I have hereunto signed my name in the presence of the two subscribed witnesses.

JOHN L. HOGAN, JR.

Witnesses:

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F. W. H. CLAY.