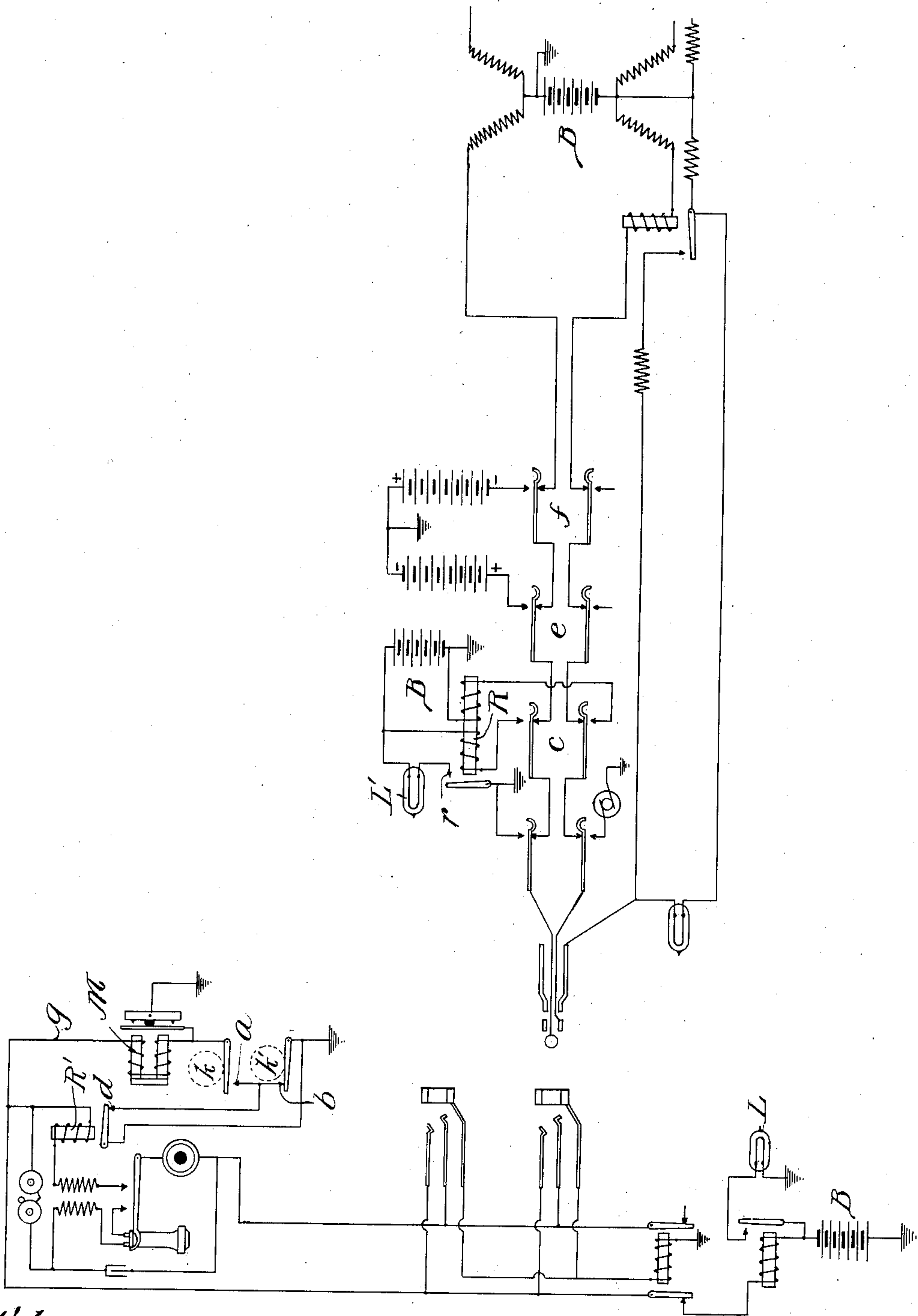


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PATENTED FEB. 26, 1907.

J. L. McQUARRIE.
CIRCUIT FOR COIN COLLECTORS.
APPLICATION FILED FEB. 13, 1906.



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UNITED STATES PATENT OFFICE.

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CIRCUIT FOR COIN-COLLECTORS.

No. 845,111.

Specification of Letters Patent.

Patented Feb. 26, 1907.

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To all whom it may concern:

Be it known that I, JAMES L. McQUARRIE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Circuits for Coin-Collectors, of which the following is a full, clear, concise, and exact description.

My invention relates to a coin-collecting telephone system; and its object is to provide an improved arrangement of line-and-cord circuit for use with coin-collectors where the deposit of one or more coins may be required.

My invention provides means for testing to determine whether the subscriber has deposited the coins required of him, and also means for enabling the operator at the central office to refund the coins or deposit them in the cash-box without aid from the subscriber.

One feature of my invention consists of a differential test-relay which is in a balanced condition when the requisite number of coins have been deposited by the subscriber, but which is otherwise in an unbalanced condition, said relay controlling a signal at the central office.

A further feature of my invention consists of a relay at the subscriber's station, controlling a shunt about coin-actuated contacts, whereby the operator is enabled to dispose, in the usual manner, of coins deposited in the coin-receiving apparatus.

My invention may be readily understood by reference to the accompanying drawing, which is a diagrammatic view showing a line-and-cord circuit embodying my invention, and illustrating, by means of conventional symbols, the apparatus at a subscriber's station and at the central office.

The cord-and-line circuit in connection with which I have chosen to illustrate my invention are of well-known types and hence a detailed description of the familiar features thereof is unnecessary.

Referring to the drawing, the branch circuit *g* from the tip side of the line is provided with the usual polarized magnet *M* for controlling the disposal of a coin or coins *k k'* deposited by the subscriber in his coin-receiving apparatus. Two sets of coin-actuated contacts *a b* are included in the branch circuit, the former being normally open and the

latter normally closed. The deposit of the first coin *k* closes contact *a* and grounds said branch circuit, thereby operating signal *L* at the central office in the usual manner. In cases where two coins are required for a connection the deposit of the second coin *k'* opens the contact *b*.

The lighting of the lamp *L* indicates in the usual manner the deposit of the first coin. By operating the test-key *c* the operator at the central office can determine whether or not a second coin has been deposited in response to her request.

A differentially-wound relay *R* has one winding on each side of the common battery *B*. When the test-key *c* is operated, the circuit is closed from the positive terminal of the grounded battery *B* through one winding of the relay *R*, the tip side of the line, through the subscriber's set, the ring side of the line, the other winding of the relay *R*, to the negative terminal of the battery. In case the second coin has been deposited, removing the ground from the branch circuit *g*, the differential relay *R* is balanced, and hence does not attract its armature, and contact *r* remains open. The lamp *L'* therefore does not light, and the operator is informed thereby that the second coin has been deposited. In case the second coin has not been deposited the branch circuit *g* is grounded through contact *b*, and, as is apparent, the relay *R* being unbalanced its armature closes contact *r*, and lamp *L'* is lighted.

In order that when two coins have been deposited they may be refunded to the subscriber or directed to the cash-box in the usual manner by the operator at the central office operating-key *e* or *f*, respectively, I have provided means for closing the branch circuit *g* to ground when the subscriber hangs up his receiver. A shunt about contact *b* is normally closed. The shunt-circuit is controlled at contact *d*, however, by the relay *R'*, which is in series with the subscriber's set, and which therefore attracts its armature when the subscriber's receiver is off its hook. Said shunt-circuit is open at contact *d* when the subscriber is requesting a connection, and does not interfere, therefore, with the proper testing for the second coin by the operator at the central office, as previously described. When the subscriber hangs up

his receiver, the relay R' is deenergized, the contact *d* is thereupon closed, and the branch circuit *g*, which includes the magnet M, is grounded. The operator can by manipulating key *e* or *f* refund or deposit the coins *k* and *k'*, as the case may be.

Having thus described my invention, I claim—

1. In a telephone system, the combination with a telephone-line, including a source of current and a subscriber's set, of a branch circuit thereof including an electromagnet, coin-operated mechanism controlled by said magnet, and a relay connected with the subscriber's set for controlling the continuity of said branch circuit.

2. The combination with a telephone-line including a source of current and a subscriber's set, of a coin-receiving apparatus, a branch circuit of the telephone-line having switches actuated by coins deposited in the coin-receiving apparatus, an electromagnet in said branch circuit for controlling the disposal of said coins, and a relay connected with the subscriber's set adapted to control the continuity of said branch circuit.

3. The combination with a telephone-line including a source of current and a subscriber's set, of a coin-receiving apparatus, a branch circuit of the telephone-line having a switch adapted to be opened and a switch adapted to be closed by coins deposited in said coin-receiving apparatus, a shunt about said latter switch, and a relay in series with the subscriber's set adapted to control said shunt.

4. The combination with a telephone-line extending from a subscriber's station to a central office, of a branch circuit at the subscriber's station having coin controlled contacts, a differentially-wound relay for testing the continuity of said branch circuit, a signal at the central office controlled by said relay, and means for connecting the winding of the relay with the terminals of said telephone-line.

5. The combination with a telephone-line extending from a subscriber's station to a central office, of a grounded branch circuit having coin-controlled contacts, a differentially-wound test-relay, a circuit therefor including a battery, one pole of which is grounded, the windings of said relay being on opposite sides of the battery, a signal at the central office controlled by said relay, and

means for connecting the circuit of said relay with the terminals of said telephone-line.

6. The combination with a telephone-line extending from a subscriber's station to a central office, of a coin-receiving apparatus at the subscriber's station, a branch circuit of the telephone-line having a switch adapted to be opened and a switch adapted to be closed by coins deposited in said coin-receiving apparatus, a differentially-wound relay for testing the continuity of said branch circuit, a signal at the central office controlled by said relay, and means for connecting the windings of the relay with the terminals of said telephone-line.

7. In a telephone system; a telephone-line extending from a subscriber's station to a central office, a coin-receiving apparatus at the subscriber's station, a branch circuit of the telephone-line having contacts controlled by coins deposited in said coin-receiving apparatus, an electromagnet in said branch circuit for controlling the disposal of said coins, a relay connected with the subscriber's set and adapted to control the continuity of said branch circuit when coins have been deposited to actuate said contacts, a differentially-wound relay for testing for said coins, a signal at the central office controlled by said relay, and means for connecting the windings of the test-relay with the terminals of the telephone-line.

8. The combination with a telephone-line extending from a subscriber's station to a central office, of a coin-receiving apparatus at the subscriber's station, a grounded branch circuit of the telephone-line having a switch adapted to be opened and a switch adapted to be closed by coins deposited in said coin-receiving apparatus, a differentially-wound test-relay, a circuit therefor including a battery, one pole of which is grounded, the windings of said relay being on opposite sides of the battery, a signal at the central office controlled by said relay, and means for connecting the circuit of said relay with the terminals of said telephone-line.

In witness whereof I hereunto subscribe my name this 7th day of February, A. D. 1906.

JAMES L. McQUARRIE

Witnesses:

GEO. WILLIS PIERCE,
FRANK C. LOCKWOOD.