

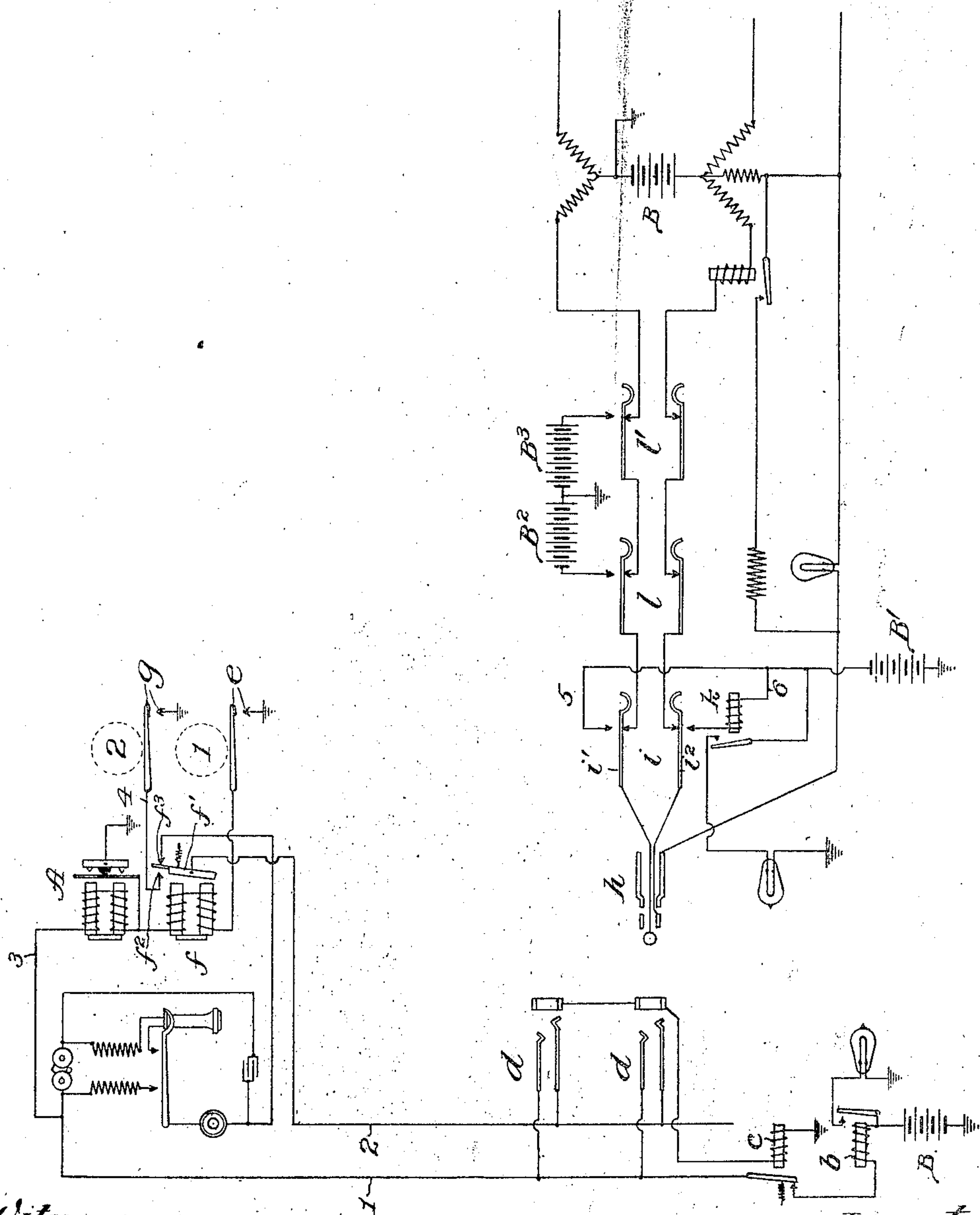
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J. L. McQUARRIE & H. M. CRANE.

CIRCUIT FOR COIN COLLECTORS.

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# UNITED STATES PATENT OFFICE.

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## CIRCUIT FOR COIN-COLLECTORS.

No. 845,112.

Specification of Letters Patent.

Patented Feb. 26, 1907.

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*To all whom it may concern:*

Be it known that we, JAMES L. McQUARRIE and HENRY M. CRANE, citizens of the United States, residing at Chicago and New York, in the counties of Cook and New York and States of Illinois and New York, respectively, 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.

Our invention relates to a telephone-payment system; and its object is to provide an improved arrangement of circuits and apparatus for use in coin-collecting systems where the deposit of one or more coins by a calling subscriber is required.

Our invention provides means whereby the central-office operator may test a calling-line to determine whether the subscriber has deposited the coins required of him and also means whereby the operator may dispose of the deposited coins as occasion demands.

In an embodiment of our invention a relay is provided in a ground branch from the line at the substation, said branch being completed by contacts operated by the first coin required of the subscriber. A second branch from said circuit to ground is controlled jointly by contacts actuated by said relay when energized and by the second deposited coin. The operator at the central office is provided with link conductors and connection-switches for uniting said conductors with the line, and a test-key is associated with each pair of link conductors adapted to connect a grounded source of current with the line to operate said relay, said test-key being also adapted to associate with the circuit of the line a test-signal which responds upon the closure of said second branch by the sets of contacts operated by the relay and second coin to current from said source, thereby indicating the presence of a second coin. Electromagnetic mechanism is provided at the substation for depositing the coins, said mechanism being adapted to be operated under the control of the central-office operator by current from suitable sources associated with the link conductors.

We will describe our invention particularly by reference to the accompanying drawing, which illustrates the preferred embodiment thereof, reserving for the appended

claims a statement of the parts, improvements, and combinations which we consider novel with us.

The telephone-line shown extends in two limbs 1 2 from a substation to a central office, conductor 1 extending through the contacts of the usual cut-off relay *c* to the free pole of a grounded battery *B*, the usual line-relay *b* being included in conductor 1 between the cut-off relay contacts and the battery. The limb 2 is in the particular type of telephone-circuit with which we have chosen to illustrate our invention, shown open at the central office, both conductors 1 2, however, being connected with the usual spring-jacks *d d* at the central office.

A branch conductor 3 at the substation extends from the limb 1 of the line through a polarized coin-distributing electromagnet *A* to ground through a pair of contacts *e*, which are adapted to be closed by the first coin deposited, said conductor also including a relay *f*. It will be apparent that the completion of branch 3 by the deposit of a coin completes a circuit for the line-relay *b*, polarized magnet *A*, and relay *f* being unresponsive to current from the battery *B* at the central station.

A branch conductor 4 extends from the open limb 2 of the line through armature *f'* of relay *f* and its normally open front contact *f<sup>2</sup>* to ground, said conductor also including normally open contacts *g*, adapted to be closed by a second coin. Thus the relay *f* in branch 3 from the limb 1 of the line controls jointly with the contacts *g* the continuity of the conductor 4 from the limb 2 of the line. The relay *f* controls at its back contact *f<sup>3</sup>* a break in the transmitter-circuit, the armature of said relay when unattracted being drawn by a spring against said contact.

At the central station, the operator is provided with a plug *h*, connected with the usual link conductors and source of current. The plug *h* and spring-jack *d* constitute a connection-switch for uniting the link conductors with the line.

A test-key *i* is associated with the link conductors and is adapted to connect the free pole of grounded battery *B'* with both of said link conductors, and so to both sides of the line. The test-key is provided with contact-levers *i' i''*, connected with the tip and ring



contacts, respectively, of the plug *h*, the outer contacts of said levers *i*<sup>1</sup> *i*<sup>2</sup> being connected by conductors 5 6, respectively, with the free pole of battery B', poled oppositely to battery B, so as to operate relay *f* when its circuit is completed. In the conductor 6 is located an electromagnetic test-signal *k*, adapted to respond to current from battery B' when a circuit therefor is completed over line conductor 2 and branch 4 to earth. The coin-distributing magnet is arranged to be unresponsive to current from battery B'. The operator is provided with the usual keys *l* and *l'* in association with the link conductors for applying current of higher voltage from batteries B<sup>2</sup> B<sup>3</sup>, respectively, to the link conductors to operate the coin-distributing magnet A and effect the distribution of the deposited coin or coins.

The operation of the system may be briefly described as follows: The subscriber to make a call deposits a coin, closing contacts *e* and completing a grounded circuit including the line-signal *b*, which will indicate to the operator that a connection is desired. The operator will thereupon insert plug *h* into spring-jack *d* and ascertain the wants of the subscriber. If but a single coin is required for the desired connection, the operator will proceed in the usual manner; but if a second coin is required the operator after asking the subscriber to deposit such coin will operate her test-key *i* to ascertain whether or not her request has been complied with. The closing of the contact-levers *i*<sup>1</sup> *i*<sup>2</sup> of the test-key *i* against their outer contact-anvils applies current from the free pole of battery B' by way of conductors 5 6 to both limbs 1 2 of the line, current flowing over limb 1 to branch conductor 3, and thence to ground through the contacts *e*. The coin-distributing magnet A will not be operated by this current; but relay *f* will respond and complete the continuity of branch conductor 4 from limb 2 of the line, providing, of course, the contacts *g* are closed by the second deposited coin. In such event the current from battery B' applied to line conductor 2 will pass through contacts *f*<sup>1</sup> *f*<sup>2</sup> of relay *f* to ground through the contacts *g*, closed by the second coin, and the electromagnetic test-signal *k* in conductor 6 will be operated, informing the operator that the subscriber has deposited a second coin. The relay *f* in drawing up its armature breaks the transmitter-circuit, so that the test-signal will not be operated in case a second coin has not been deposited by current passing over conductor 2 through the substation bridge and branch 3 to earth. The operator may now proceed with the connection in the usual manner.

We claim—

1. The combination with a line-circuit, of a branch from one limb of said circuit to

ground, coin-actuated contacts controlling said branch, a coin-distributing magnet in said branch, a second branch from the other limb of said circuit to ground, contacts controlling said branch, a test-signal in the circuit of said second branch, means for applying test-current from a grounded source in the circuit of said second branch to operate said signal, the operation of said signal being dependent upon the closure of said contacts of the second branch, and means associated with the circuit for operating said coin-distributing magnet.

2. The combination with a circuit, of a relay in a branch of said circuit, a second branch of said circuit, toll-operated mechanism controlling at one point the continuity of said second branch, said relay controlling at another point the continuity of said branch, a source of current adapted to be connected with said circuit, and a signal associated with said circuit and responsive upon the closure of said second branch to current from said source.

3. The combination with a line-circuit, of a relay in a branch from said circuit to a return-conductor, a second branch from said circuit to said return-conductor, a contact actuated by said relay and a coin-actuated contact jointly controlling said second branch, a source of current connected to said return-conductor and adapted to be applied to said circuit to operate said relay, and a signal device associated with said circuit and responsive under the control of said contacts to current from said source.

4. The combination with a line-circuit, of a relay in a coin-controlled branch from one side of the circuit to a return-conductor, a second branch from the other side of said circuit to said return-conductor controlled jointly by said relay and contacts closed by a second coin, a test-signal in the circuit of said second branch, and means for applying current from a source connected to said return-conductor to both sides of the circuit to cause said signal to indicate the presence of said second coin.

5. The combination with the line-circuit, of a relay in a coin-controlled branch from one side of the circuit to ground, a polarized coin-distributing magnet in said branch, a second branch from the other side of said circuit to earth controlled jointly by said relay and contacts closed by a second coin, an electromagnetic signal associated with the circuit of said second branch, means for applying current to both sides of the circuit to operate said relay and cause said signal to indicate the presence of said second coin, and means for applying current to said circuit to operate said polarized coin-distributing magnet to dispose of both said coins.

6. The combination with a telephone-line extending in two limbs from a substation to



a central office, of a source of current and a line-signal connected with one limb of the line at the central office, the other limb being open, a coin-controlled ground branch from said first-mentioned limb of the line at the substation controlling said line-signal, a relay in said branch, a ground branch from the other or open limb of said line controlled jointly by said relay and contacts operated by a second coin, link conductors at the central office, a connection-switch for uniting said link conductors with the line, a test-key associated with said link conductors for applying current from a grounded source to both limbs of the line, and an electromagnetic test-signal adapted to be connected by said key between said battery and the link conductor connected with the other or open limb of said line; whereby said signal indicates the presence of said second coin.

7. The combination with a telephone-line extending in two limbs from a substation to a central office, a source of current and a line-signal connected with one limb of the line at the central office, the other limb being open, a ground branch from said first-mentioned limb of the line at the substation, coin-actuated contacts controlling the continuity of said branch and the display of said line-signal, a polarized coin-distributing electromag-

net in said branch unresponsive to said source of current, a relay in said branch, a ground branch from the other or open limb of said line, contacts operated by a second coin and contacts controlled by said relay jointly controlling said second branch, link conductors at the central office, a connection-switch for uniting said link conductors with the line, a test-key associated with said link conductors for applying current from a grounded source to both limbs of the line to operate said relay, said coin-distributing magnet being unresponsive to said current, an electromagnetic test-signal adapted to be connected by said test-key between said source of current and the link conductor connected with the open limb of said line to indicate the presence of a second coin, and sources of current adapted to be associated with the link conductors to operate said polarized coin-distributing magnet to dispose of said coins.

In witness whereof we hereunto subscribe our names this 6th day of February, A. D. 1906.

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