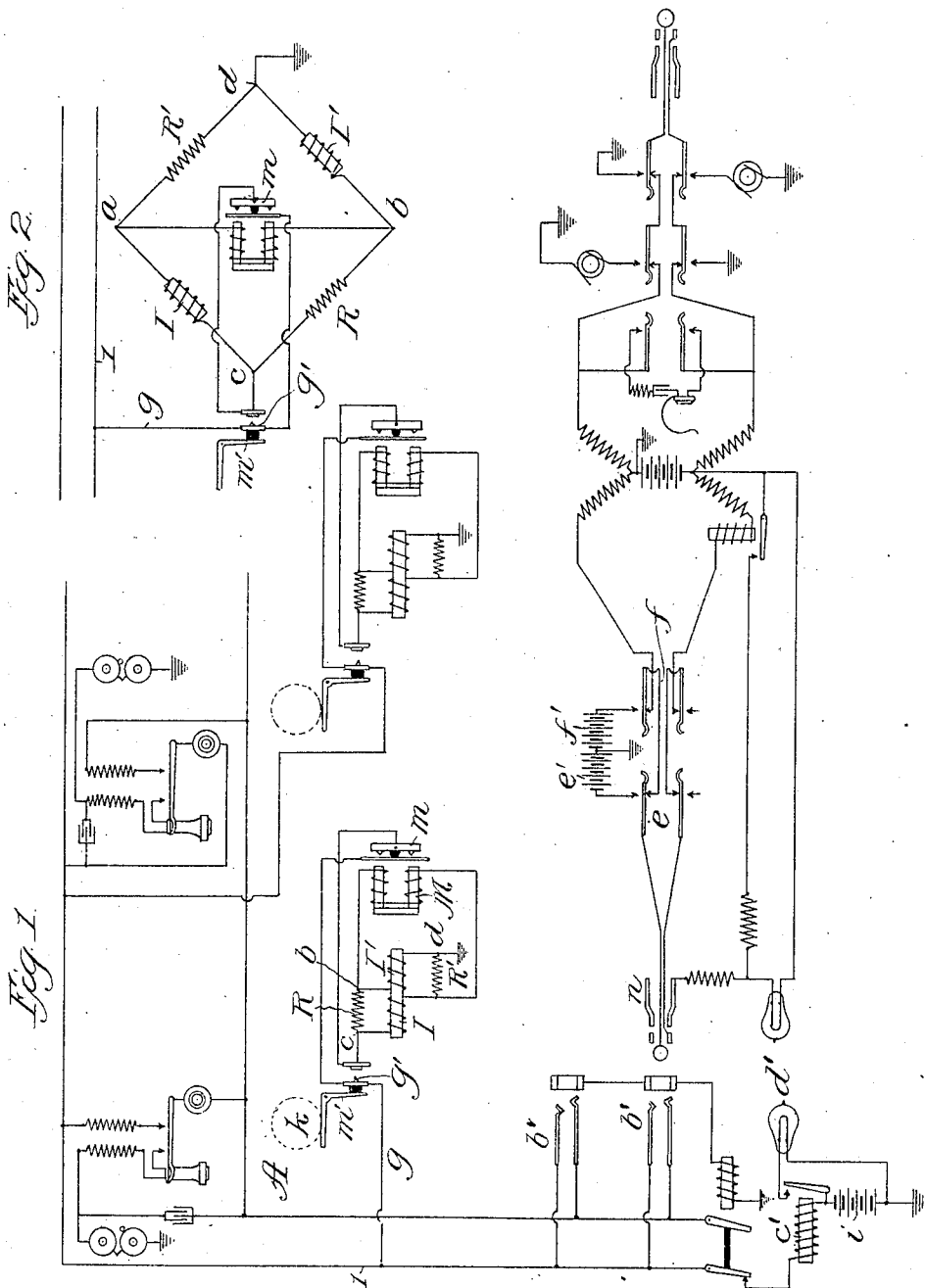


No. 851,838.

PATENTED APR. 30, 1907.

J. G. ROBERTS.  
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. 851,838.

Specification of Letters Patent.

Patented April 30, 1907.

Application filed February 13, 1906. Serial No. 300,932.

*To all whom it may concern:*

Be it known that I, JOHN G. ROBERTS, 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 means for preventing an accidental disposal of a coin deposited by a subscriber in his coin receiving apparatus, and at the same time leaving the final disposition of the coin under the control of the operator at the central office without aid from the subscriber.

My invention constitutes an improvement in a well-known system in which the deposit of a coin in a coin receiving apparatus at the subscriber's station closes a circuit and operates a signal at the central office. The subsequent disposition of the coin is under the control of a polarized electromagnet whose armature is normally maintained in a central position, but which is adapted to tilt to one side or the other according to the direction in which the electric current flows through the coils of the magnet. Means are provided at the central office whereby the operator may impress upon the line current of the proper sign to throw the armature of the polarized electromagnet in a direction to deposit the coin in the cash box or to return it to the subscriber, as desired. In the systems in common use the electromagnet and its armature are designed to operate only when the operator impresses a high voltage positive or negative constant current on the line. In practice, however, it has been found that pulsating or alternating currents, such as are used in ringing, may so affect the electromagnet as to cause a fluttering of its armature in such a way as to accidentally displace the coin. This is especially true in a party line system.

My invention contemplates the provision of means for preventing the flow of current through the polarized electromagnet except when current of the proper sign is impressed upon the line by the operator for the express purpose of disposing of the coin.

My invention may be readily understood by reference to the accompanying drawings, in which

Figure 1 is a diagrammatic view illustrating by means of conventional symbols the apparatus at the subscriber's stations and the central office, together with the telephone line circuit for a party line system; and Fig. 2 is a simplified diagrammatic view of the circuits of the coin receiving apparatus, in which my invention is clearly shown.

Like parts are designated by similar letters of reference throughout the several views.

The central switchboard and the circuits connecting the subscriber's telephones thereto, with which I have chosen to illustrate my invention are of a well-known type and a description thereof is unnecessary. The branch circuit from the tip side of the line through the pair of contacts  $g'$  comprises four arms and a bridged connection, arranged in the form of a Wheatstone bridge, as shown more clearly in Fig. 2. Inductive windings  $I$   $I'$  are included in one pair of opposite arms, the other two arms including non-inductive windings  $R$   $R'$ , the arrangement being such that no two similar windings are included in adjacent arms.

The bridge connection includes the coin-controlled magnet  $M$ . With such an arrangement it is possible to so balance the impedance in the arms that the points  $a$  and  $b$  will be at practically the same potential when an alternating or pulsating current, such as is used in ringing, passes through the windings in parallel to ground. This balance is secured by making the resistance of the non-inductive winding  $R$  considerably higher than that of winding  $I$ , and likewise the resistance of  $R'$  higher than that of  $I'$ . It is apparent that with such arrangement when direct current is impressed on the circuit, the drop in potential, being dependent upon the resistance, would be considerably less in  $I$  and  $I'$  than in  $R$  and  $R'$ , respectively. The points  $a$  and  $b$  would no longer be at the same potential and current would flow through the coin controlling magnet  $M$ .

The windings  $I$  and  $I'$  are shown in Fig. 2 as on separate cores. They may, however, be wound on a single core, as shown in Fig. 1, thus producing a more compact form of the device.

My invention may be used with any of the usual coin receiving apparatus operated by a polarized electromagnet, such for example as is shown in United States Letters Patent

No. 665,874, granted January 15th, 1901, to Albert M. Bullard. A showing or description of such apparatus is deemed unnecessary, it being understood that mechanism is provided whereby the tilting of the armature *m* of the electromagnet *M* disposes of the coin in the usual way.

The operation of the system, in which I have shown my invention embodied, is as follows: When a subscriber at station A, for example, desires a connection, he deposits a coin *k* in the coin receiving apparatus at his station. Said coin actuates the rocking lever *m'* and closes contacts *g'*. A circuit is thus closed from ground, at the central office, through battery *i*, relay *c'*, line 1, branch conductor *g*, contacts *g'* to point *c*, at which point the current divides, part going through the branch including point *a* and the other through the branch including point *b*, uniting at *d*, and from thence to ground at the subscriber's station A. The magnet *M* is so constructed as not to attract its armature *m* except when energized by a current of high voltage, and hence the current flowing through said magnet, due to the difference in potential between points *a* and *b* produced by the low voltage battery *i*, is insufficient to operate the armature *m*. Upon the closure of contacts *g'*, the relay *c'* attracts its armature and closes the circuit containing the lamp *d'*, or other signal at the central office. The operator, observing the signal, inserts her answering plug *n* into the spring-jack *b'*, ascertains the connection wanted, and rings up the called for subscriber in the usual manner. As hereinbefore stated, the resistances *I*, *R*, *I'* and *R'* are so arranged that when ringing currents pass through the circuit the points *a* and *b* are at practically the same potential, and hence no current passes through the electromagnet *M* and the accidental operation of the coin-controlling mechanism is prevented. The operator next presses the key *e* or *f*, according to whether it is desired to refund the coin or deposit it in the cash box, sending a direct and steady current of high voltage from battery *e'* or *f'* respectively, over the line *g*. Owing to the arrangement of the resistances *I*, *R*, *I'* and *R'*, the points *a* and *b* are no longer at the same potential, and current sufficient to actuate armature *m* now flows through the magnet *M* and the tilting of the armature releases the coin, which falls into the cash box or is refunded to the subscriber, as the case may be.

Having thus described my invention, I claim:—

1. The combination with a circuit having a portion divided into two parallel branches, of a magnet in a bridge of said branches, mechanism operated by said magnet when energized, a source of direct and a source of alternating current each adapted to be con-

nected with said circuit, and means for preventing alternating current from producing an operative difference of potential at the terminals of said magnet, whereby the magnet responds only to direct current.

2. The combination with a circuit having parallel branches, of a magnet in a bridge of said branches, mechanism operated by said magnet when energized, a source of direct and a source of alternating current each adapted to be connected with said circuit, and non-inductive and inductive resistances in adjacent arms respectively of said parallel branches, said dissimilar resistances having equal impedance and unequal resistance.

3. In a telephone system, the combination with a circuit having parallel branches, of an inductive and a non-inductive resistance in each branch of said circuit arranged so that no two similar resistances are adjacent to each other, a bridge of said branches connected in a point in each branch between said resistances, a magnet in the bridge, mechanism operated by said magnet when energized, and a source of direct and a source of alternating current each adapted to be connected with said circuit.

4. The combination with a signaling circuit having parallel branches, of a source of current and an indicating device included in said circuit, a pair of normally open contacts in said circuit a switch for closing said contacts to actuate the indicating device, of a magnet in a bridge of said parallel branches, means for impressing a ringing current upon the circuit, means for preventing said ringing current from producing an operative difference of potential at the terminals of said magnet, means at the central office for impressing upon the circuit positive or negative current, whereby the magnet is energized, and means actuated by the energization of said magnet to control the operation of said switch.

5. The combination with a signaling circuit having parallel branches, of a source of current and an indicating device included in said circuit, a pair of normally open contacts in said circuit a switch for closing said contacts to actuate the indicating device, an electromagnet in a bridge of said parallel branches, inductive resistances included in two of the arms of said parallel branches, non-inductive resistances in the remaining arms thereof, no two similar resistances being in adjacent arms, means at the central office for impressing positive or negative current upon the circuit, whereby the electromagnet is energized, and means actuated by the energization of said magnet to control the operation of said switch.

6. In a telephone system, the combination with a signaling circuit including a signal device at the central office and having a por-

tion divided into two parallel branches at the subscriber's station, of a pair of contacts in said circuit, a switch for altering the relations of said contacts and thereby to change the condition of the circuit and thus to actuate the indicating device, a polarized magnet in a bridge of said parallel branches, a source of direct and a source of alternating current each adapted to be connected with the signaling circuit, means for preventing alternating current from producing an operative difference of potential at the terminals of said magnet, whereby the magnet responds only to direct current, and mechanism operated by the armature of said magnet to control the operation of said switch.

7. The combination with a signaling circuit having parallel branches, of a source of current and an indicating device in said circuit, a pair of normally open contacts in said circuit a switch for closing said contacts to actuate the indicating device, an electro-

magnet in a bridge of said parallel branches, inductive resistance included in two of the arms of said parallel branches, non-inductive resistance in the remaining arms thereof, no two similar resistances being in adjacent arms, the resistances in the arm of one branch and the adjacent arm of the other branch possessing equal impedance but unequal resistance, means at the central office for impressing positive or negative current upon the circuit, whereby the electromagnet is energized, and means actuated by the energization of said magnet to control the operation of said switch.

In witness whereof, I, hereunto subscribe my name this 26th day of January A. D., 1906.

JOHN G. ROBERTS.

Witnesses:

ROY T. ALLOWAY,  
E. F. BEAUBIEN.