

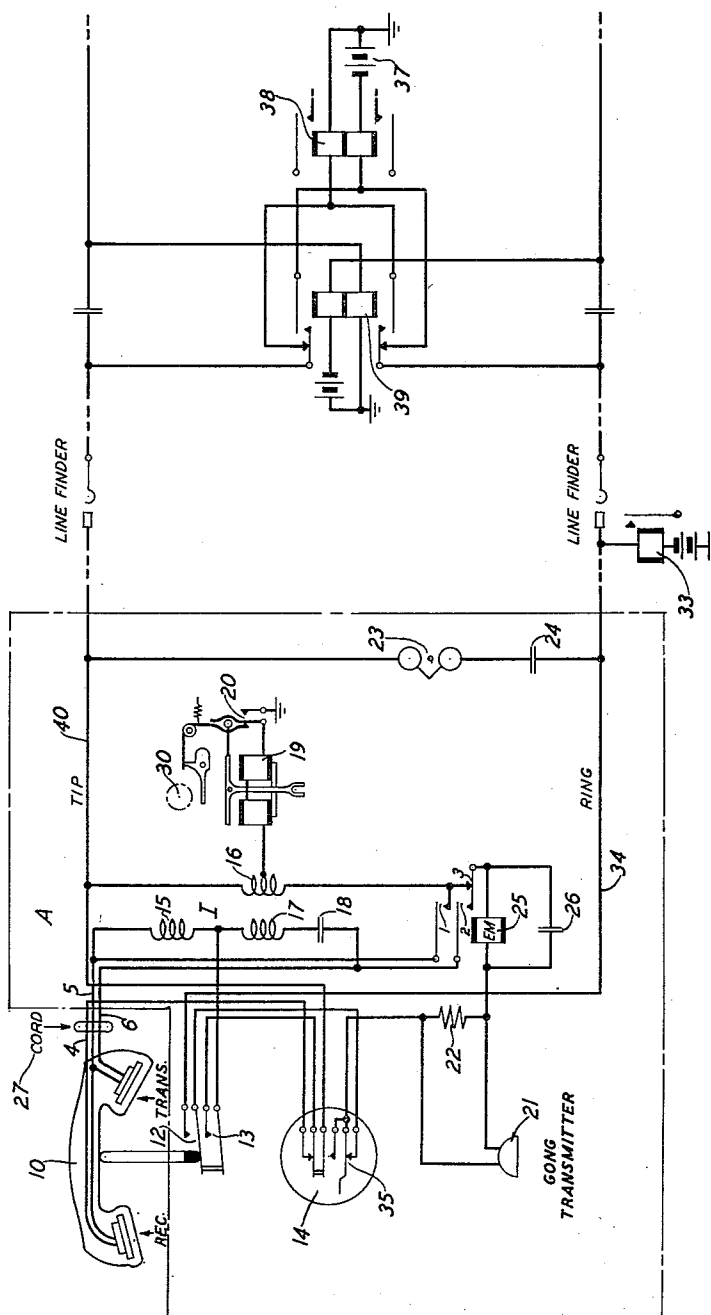
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FRAUDULENT GROUND CORRECTIVE FOR COIN COLLECTOR CIRCUIT

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FRAUDULENT GROUND CORRECTIVE FOR COIN COLLECTOR CIRCUIT

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This invention relates to telephone systems and particularly to systems involving coin-operated subsets of the prepayment type.

In such systems, attempts are made frequently to obtain telephone service fraudulently, that is, by resorting to practices which, in their effects, simulate the required call-originating deposit of a coin or coins at the coin box station. The operating companies have devised expedients for coping with such situations and, in general, have succeeded in eliminating or substantially minimizing the effects of such fraudulent practices. However, with the increasing use of the so-called grounded telephone booth and the adoption of the ten-cent minimum toll charge, it has become evident that in some circumstances certain expedients, heretofore effective, can be circumvented and telephone service obtained by combining the deposit of a single coin, such as a nickel, in the coin receptacle with the application of a fraudulent ground at the substation. It is apparent that the cord, transmitter and receiver are the only elements of the telephone circuit at the substation which are readily accessible to the user for such purposes. The grounding of such elements would result in the flow of starting current without the operation of the coin trigger contacts which, in the normal and intended use of the station equipment, is required.

It is the object of this invention to guard against fraudulent operation of telephone coin box stations and more particularly to render the fraudulent grounding of accessible instrumentalities at a coin box station ineffective to simulate the deposit of a coin or coins at the station.

This object is attained in accordance with a feature of the invention by modifying a standard substation circuit of the coin-controlled type in such a manner that the normal starting current must flow through the coin trigger contacts over a path which is inaccessible to and cannot be altered by the customer.

Another feature of the invention contemplates a normally disabled telephone handset and its associated cord and means for enabling such instrumentalities which is dependent for its functioning upon the closure of the coin trigger contacts. Thus, initiation of a call at the coin box station is entirely dependent on coin trigger operation which, in turn, is dependent on a proper coin deposit.

These and other features of the invention will be readily understood from the following detailed description when read with reference to the accompanying drawing, the single figure of which includes a circuit diagram of a coin box telephone substation of the prepay type involving the features of this invention, and illustrates schematically that minimum of central office equipment which is required for an adequate description and complete understanding of the invention.

Enclosed in the area defined by the broken line outline of the drawing there are schematically illustrated the essential elements of a substation circuit of the coin-operated type which are usually housed in such a manner as to be inaccessible to the telephone user. These elements are the switchhook contacts 12 and 13 of handset 10, the

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contacts of dial 14, induction coil I consisting of windings 15, 16 and 17, condenser 18, coin magnet 19 with its coin-operated, or trigger contacts 20, gong transmitter 21 and its associated shunting resistance 22, and the telephone ringer 23 and its associated condenser 24. The handset 10 including the usual microphone and receiver and its associated cord 27 are exposed to the user and, therefore, accessible to him for tampering. The substation elements thus far identified are well known as are also the functions performed thereby. No further description of these elements is required and no further reference will be made thereto except incidentally in the detailed description of the operation of the circuit to be made hereinafter.

The substation circuit also includes an electromagnet 25 which is shunted by condenser 26 and controls the three contacts 1, 2 and 3. The sequence of operation of the contacts of electromagnet 25 requires contacts 1 and 2 to make, or close, before the contact 3 opens when the winding of electromagnet 25 is energized, as will be described presently. Upon the deenergization of the electromagnet, contact 3 closes before contacts 1 and 2 open. As is indicated on the drawing, the electromagnet 25 is also housed so as to be inaccessible to the telephone user.

It will be observed that conductors 4, 5 and 6 comprise the telephone cord 27 at the substation and this cord is the only wiring which is available to the telephone user for tampering purposes. It has been determined that this cord and one or more of the encased conductors can be fraudulently grounded to simulate the application of ground potential thereto by the deposit of a coin. Obviously, telephone service obtained in this manner could result in serious loss of revenue. The transmitter and receiver elements of the handset, being exposed, are similarly subject to misuse.

The circuits to the transmitter and receiver of handset 10 are normally open at contacts 2 and 1, respectively, of electromagnet 25 and the winding of the electromagnet is connected normally to a tap on coil 16 by way of electromagnet contact 3, the said tap connecting with the windings of coin disposal magnet 19 which are adapted to have ground potential applied thereto incident to the closure of the coin trigger contacts 20 at the substation.

Obviously, due to the normal open circuit condition of the transmitter and receiver of handset 10 the coin box station is disabled until such time as relay 25 operates. The circuit for this relay is isolated from any instrumentality at the substation which may be fraudulently grounded, such as the cord 27. It is equally obvious that the circuit to relay 25 cannot be completed except by way of the coin-operated contact 20.

The circuit operates in the following manner: Assuming a coin 30 is deposited in the coin box receptacle at the substation A incident to the initiation of a call thereat, a circuit is established which may be traced from grounded battery, through the winding of line relay 33 at the central office, ring conductor 34, switchhook contacts 12, contacts 35 of dial 14, resistance 22 and the parallel-connected gong 21, winding of relay 25 and its normally closed contact 3, the lower section of coil 16, windings of coin disposal magnet 19, coin contacts 20 to ground. Relay 25 may or may not operate in this circuit depending upon the magnitude of the current. Whether it does or not at this time is immaterial.

The central office equipment now functions in the well-known manner to cause the line finder to operate and seize the calling line whereupon loop current from the source 37 at the central office is transmitted over the line causing relay 25 to operate in a circuit which may be traced from grounded battery 37 through the lower winding of relay 38, the lower normally closed contacts of relay 39, the ring brush and terminal of the line finder, the ring conductor 34, switchhook contacts 12, dial con-

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tacts 35, resistance 22 and gong 21, winding of relay 25 and its associated normally closed contact 3, coil 16, tip conductor 40, tip terminal and brush of the line finder, upper normally closed contacts of relay 39, upper winding of relay 38 to ground.

Relay 25, operating in this circuit, closes contacts 1 and 2 and opens contact 3 in the sequence hereinbefore indicated. Contacts 1 and 2 complete the connection of the transmitter and receiver elements of handset 10 and the associated cord 27 with the line thus enabling the handset. Contact 3 which originally shunted these elements is, as stated, open.

In order to maintain the connection in the event the switchhook is "flashed," or when a coin collection or refund operation is performed in the process of continuing or establishing a call, continuity is preserved by the requirement that contact 3 of relay 25 shall make before contacts 1 and 2 open upon deenergization of relay 25. Dialing remains unaffected since the pulsing circuit shunts the entire apparatus.

From the foregoing description of the illustrated embodiment of applicant's invention, it is apparent that any fraudulent ground applied to the transmitter or receiver of handset 10 or to the conductors 4, 5 or 6 of the cord 27 is ineffective to initiate a call at the substation. It is equally apparent that a call can be originated only if the coin trigger contact 20 is operated.

What is claimed is:

1. In a telephone system, in which the application of ground potential to a line conductor at a coin-box substation is required in order to initiate a call at the substation, the combination of a central office, a source of talking battery thereat, a line extending from said central office, a telephone coin-box station on said line comprising a subset, all of the components of which, other than the handset, and including the terminals of said line are enclosed in a housing and thus rendered inaccessible to the telephone user, a multiconductor cord for connecting said handset to the interiorly housed subset components, the conductors of said cord and said handset elements comprising the only instrumentalities accessible to the telephone user for the application of ground potential thereto, and means for rendering the application of ground potential to said accessible instrumentalities ineffective to complete a call-initiating circuit to said central office battery by way of the conductors of said cord comprising a relay located within said housing, and normally open contacts controlled thereby, said contacts terminating the conductors of said cord and adapted to extend them to said line when said relay is operated, coin-operated contacts located within said housing, and means responsive to the deposit of a coin at said coin-box station for operating said coin-operated contacts to complete an energizing circuit for said relay which includes said line, said coin-operated contacts and said central office battery whereby said relay operates and the conductors of said cord are extended to said line and said handset is connected to said central office battery solely by the operation of said coin-operated contacts.

2. The combination, in a telephone system, of a line extending between a central office and a substation, a source of direct current at the central office, and a telephone set at the substation including a handset, a relay having a winding, a normally closed contact and a pair of normally open contacts, the winding and normally

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closed contact of said relay being connected in series relation with said source of current by way of said line, and the normally open contacts of said relay maintaining said handset isolated from said line, and means at said substation including coin-operated contacts for completing an energizing circuit for the winding of said relay which includes the normally closed contact of said relay, said coin-operated contacts, said line and said source of direct current.

3. In a telephone system, a telephone substation, a central office, a line extending between said central office and said substation, a housing at said substation, a source of direct current at said central office, a handset including a microphone and a receiver located at said substation externally of said housing, a relay located within said housing having a normally closed contact and a pair of normally open contacts, the winding and normally closed contact of said relay being connected in series relation with said source of current by means of said line, and the normally open contacts of said relay maintaining said handset isolated from said line, a cord connecting the externally located handset with the normally open contacts of said relay, and coin-operated means located internally of said housing adapted to complete an operating circuit for said relay from said central office direct-current source whereby said normally open contacts are closed to connect said handset to said line within said housing.

4. The combination, in a telephone system, of a subscriber station, a central office, a line interconnecting said subscriber station and said central office, a telephone set at said station including a transmitter, a source of direct current at said central office for supplying speech current to the transmitter of said telephone set, a closable connection between said transmitter and said line including a normally opened switching contact, a relay at said substation for closing said switching contact to thereby connect said transmitter and said central office source of direct current, a normally open energizing circuit for said relay including said central office source of direct current, said line and the winding of said relay, coin-operated contacts adapted to be closed by the deposit of a coin at said substation for completing said energizing circuit to said relay, whereupon said relay operates to close said normally open switching contact in said closable circuit and said transmitter is connected to said central office source of direct current solely in response to the operation of said coin-operated contacts, and a locking circuit for said relay including said central office source of direct current, said switching contact and said transmitter and excluding said coin-operated contacts.

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