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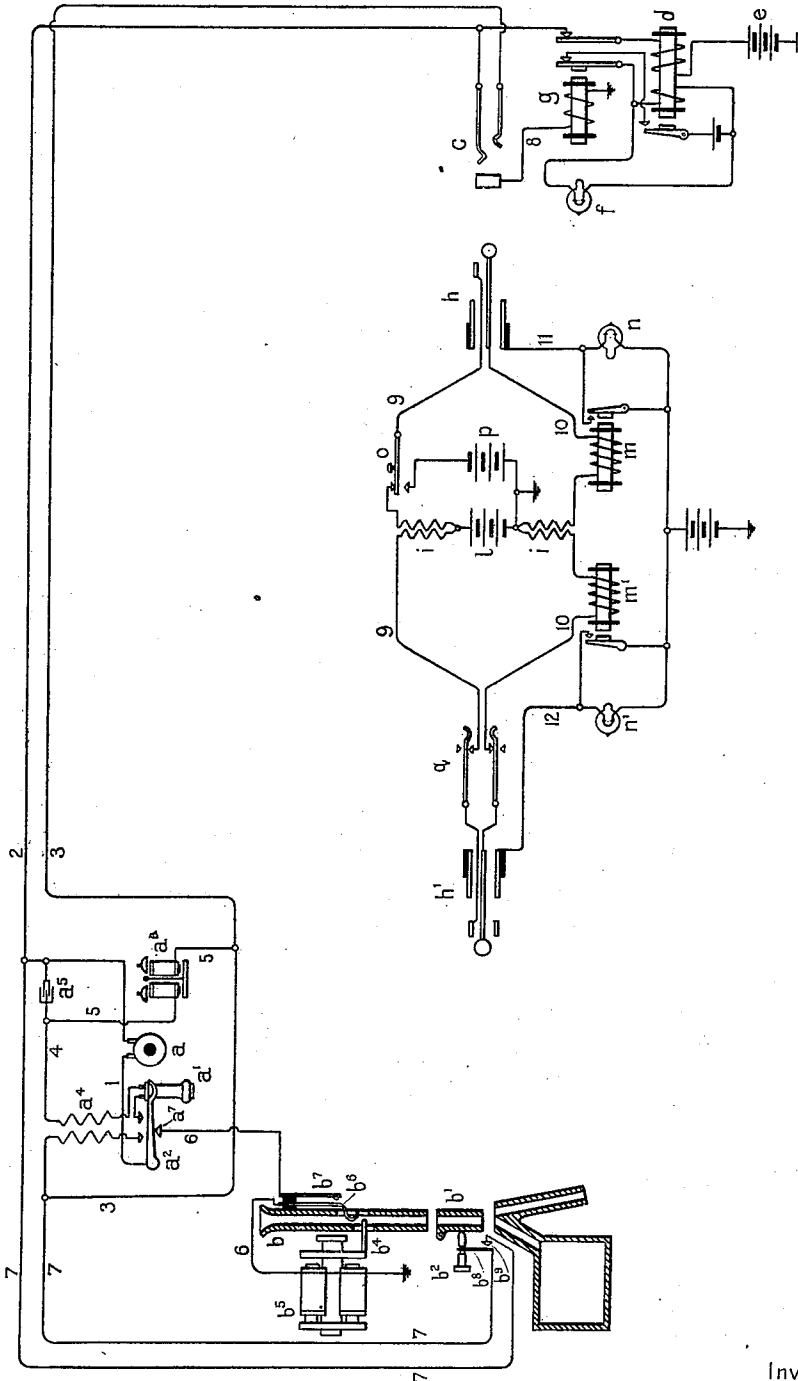
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C. E. SCRIBNER & F. R. McBERTY.

TOLL COLLECTING APPLIANCE FOR TELEPHONE PAY STATIONS.

(Application filed Apr. 12, 1899.)

(No Model.)



Witnesses:

C. E. Scribner
W. A. Leach

Inventors:

Charles E. Scribner,
Frank R. McBerty.

By *George P. Barton*,
Attorney.

UNITED STATES PATENT OFFICE.

CHARLES E. SCRIBNER, OF CHICAGO, AND FRANK R. McBERTY, OF EVANSTON, ILLINOIS, ASSIGNORS TO THE WESTERN ELECTRIC COMPANY, OF CHICAGO, ILLINOIS.

TOLL-COLLECTING APPLIANCE FOR TELEPHONE PAY-STATIONS.

SPECIFICATION forming part of Letters Patent No. 650,488, dated May 29, 1900.

Application filed April 12, 1899. Serial No. 712,766. (No model.)

To all whom it may concern:

Be it known that we, CHARLES E. SCRIBNER, residing at Chicago, and FRANK R. McBERTY, residing at Evanston, Cook county, State of Illinois, citizens of the United States, have invented a certain new and useful Improvement in Toll-Collecting Appliances for Telephone Pay-Stations, (Case Nos. 475 and 477,) of which the following is a full, clear, concise, and exact description.

This invention applies to pay-stations of telephone-exchange systems and concerns the operations of initiating and receiving calls at the station, of depositing or refunding tolls for the use of the telephone, and of supervising in the central office the various acts of the user.

It consists in a combination of devices and circuits permitting the association of the toll-box or coin-collecting appliance of the pay-station with the supervising and signaling mechanism of telephone-switchboards such as are commonly in use in an operative organization capable of attaining a high degree of efficiency and reliability in the use of the pay-station.

The principal features of novelty in the present invention are the following: a signaling-circuit between the pay-station and the central station, a source of current at the central station applied to the line, a relay in the circuit and a secondary signal controlled by the relay, a local circuit of the relay also controlled thereby to maintain the continued excitement of the relay when once magnetized, together with a device in the coin-chute for receiving the coin to close the signaling-circuit when a coin is deposited and a telephone-switch to open the circuit thus closed when the telephone is brought into use, the combination, with a metallic telephone-line and a ground-return therefor, of a grounded circuit formed of a portion of the line, containing an individual or line signal at the central office and controlled by a deposited coin at the pay-station, a telephone-switch for breaking the ground-circuit, and a metallic circuit containing a supervisory signal at the central office, controlled by the telephone-switch,

whereby a connection may be originated only on the deposit of a coin, but the connection may be supervised without the aid of the coin. The invention includes other details of secondary importance, which will be made clear in the following description.

The drawing attached hereto illustrates the system of our invention. It represents in simple form the apparatus of a telephone pay-station, a line leading therefrom to a central office, and signaling and supervising mechanism at the central office.

The telephones a and a' at the substation are placed in a circuit of well-known arrangement for permitting the supply of current for exciting the transmitting-telephone from the central office. The circuit is controlled by the usual telephone-switch a^2 . When the telephone is in its position of use, a circuit 1 is formed from line-wire 2, through the transmitting-telephone a and one winding of an induction-coil a^4 , to the line-wire 3, and a shunt 4 is closed about the transmitting-telephone, which includes the receiving-telephone a' , together with a condenser a^5 , both circuits being closed by switch-contacts in the telephone-switch. A polarized bell a^6 , of high impedance, is connected in a conductor 5 in such a way that the conductor 5 and a portion of wire 4 form a permanent bridge including the bell a^6 , together with the condenser a^5 .

The coin-collecting mechanism at the pay-station consists of a coin-chute b , leading to a cash-box, a portion b' of the coin-chute (which I term the "deflector") being made manually movable by means of button b^2 and being adapted to deflect the coin into a coin-chute leading to the exterior of the box. A stop b^4 projects into the path of the coin in the fixed portion of the chute. The stop is controlled by the armature of the polarized magnet b^5 , which is normally retained by a light spring in position to thrust the stop into the coin-chute. A light contact-spring b^6 or equivalent device projects into the path of the coin where the latter is brought to rest upon the movable stop. The contact-spring is associated with a contact-anvil b^7 , against which it is thrust when the spring is moved

outward by a coin in the chute. The push-button b^2 , which actuates the deflector, actuates also a switch-spring b^8 to move it into contact with its anvil b^9 when the deflector is in position to divert the coin into the refunding-chute. The magnet b^5 and the normally-separated switch-springs $b^6 b^7$ are included serially in the wire 6, leading from ground to the contact a^7 of the telephone-switch, through the agency of which the wire is brought into connection with line-wire 2 when the telephone rests on its switch. The spring b^8 and its contact b^9 control a break in a bridge 7 between the line conductors 2 and 3. The line conductors 2 and 3 lead at the central office to the line contact-pieces of a spring-jack c in a telephone-switchboard. A normal extension of the line conductor 2 leads also through the magnet-winding of a relay d and a battery e to earth. The relay d controls a local circuit which includes a source of current and a secondary line-signal f , associated with the spring-jack c in the switchboard. The relay carries a special winding which is connected in multiple with a signal-lamp. The local circuit and the normal extension of the line are controlled by the two pairs of switch-contacts of a cut-off relay g , whose magnet is in a portion 8 of a circuit local within the exchange, which becomes closed in the establishment of connection with the line. Thus the relay g is adapted to break the normal ground extension of the line conductor 2 and interrupt the current through the signal-lamp and the special winding of the line-relay d when a plug is inserted in the spring-jack of a line.

The operator is provided with the usual pairs of plugs h and h' , which form the terminals of a plug-circuit 9 10. The sleeve-contacts of the plugs, which are adapted to bring the line conductors 2 into union, are inductively united by wire 9 through the agency of two mutually-inductive windings of repeating-coil i . The tip-contacts of the plug are likewise united through the conductor 10, which includes other inductively-related windings of the repeating-coil. A bridge of the plug-circuit is formed, which includes a battery l . The terminal of the battery adjacent to the conductor 10 of the plug-circuit is grounded. Conductor 10 of the plug-circuit traverses the magnet-windings of two relays m and m' , one at each side of the repeating-coil. These relays control supervisory signals n and n' , which are associated with the plugs h and h' , respectively, in the switchboard through the agency of shunt-circuits about the lamps, which are themselves in conductors 11 and 12, which terminate in contact-pieces of plugs h and h' , respectively, which register with the ring-contacts of the spring-jacks. Thus the insertion of any plug in a jack closes a local circuit which includes both the cut-off relay of the corresponding line and the supervisory signal associated with the plug. The portion of conductor 9 leading from the plug h trav-

erses the normally-closed switch-contacts of a key o , which is adapted when depressed to break the circuit to battery l and to close it through a battery p of opposite polarity.

The plug-circuits are furnished with calling keys q for applying calling current to the calling plugs and with listening-keys for connecting the operator's telephone with the plug-circuit. The latter have been omitted from the drawing to avoid unnecessary complication thereof.

When a call originates with another line for the pay-station, connection is completed with the line to the pay-station by means of plug h' of a pair in the usual way. Calling current applied by key q finds circuit through line conductor 2, the bridge 4 5 of the line, and line conductor 3, ringing the polarized bell a^6 , the condenser in the circuit forming no obstacle to the alternating calling current. The insertion of the calling plug in the spring-jack of the line called for closes the local circuit 8 12, whereby the line-relay is disconnected from the line conductor and current is produced for exciting the supervisory lamp n' . The lamp remains lighted as long as the relay m' is inert; but when the user of the telephone, responding to the call, takes the telephone for use the switch a^2 closes a bridge of the line including the transmitting-telephone and one winding of the induction-coil, whereby a current is permitted to flow from battery l through the circuit thus completed, the supervisory relay m' being in the path of the current. The relay closes a shunt about the supervisory lamp, and thus indicates to the operator the taking of the telephone at the substation. It will be noted that under this condition the telephone apparatus becomes fully operative without the aid of any deposited coin. When, on the other hand, a call is to be originated at the pay-station, a coin must be placed in the coin-chute b as a preliminary to making the call. The coin falls upon the stop b^4 and presses the spring b^6 outward, whereby a circuit is completed from the battery e through line conductor 2 and the ground branch 6 at the substation, which excites the relay d . The relay, attracting its armature, closes the local circuit of the secondary signal, and thus both lights the signal and produces a current in the special winding of the relay, which maintains the excitement of the relay without further dependence on the condition of the line-circuit. The operator answering the call inserts plug h into the spring-jack c , thus applying the battery l to line conductor 2, bringing the supervisory relay m into association with line conductor 3, and closing the local circuit 8 11. The cut-off relay g breaks the local circuit of the secondary line-signal and severs the connection of the relay d with the line conductor 2. The polarity of magnet b^5 is such with reference to the currents from batteries e and l that the magnet cannot be operated through the action of those bat-

teries. The user of the telephone may at any time after the deposit of the toll remove his telephone, and after the reply of the operator he may give his order for the required connection. The removal of the telephone from its switch disconnects the temporary ground branch 6 at the substation and closes a bridge of the line, which permits the excitement of the supervisory relay *m* and brings about the extinction of the supervisory signal *n*. If the required connection is obtained, the operator awaits the termination of conversation, which is indicated to her by the lighting of the hitherto-shunted signal-lamps *n* and *n'*, consequent on the breaking of the bridges at the substations. The operator then presses the key *o*, thereby applying a current of reverse polarity to the normal current through the ground branch 6, whereby the magnet *b*⁵ is excited and caused to withdraw the stop *b*⁴ from the path of the coin in the coin-chute and permit the coin to drop into the cash-box. If, on the other hand, the required connection cannot be made, the operator, on determining this fact, instructs the user of the telephone to replace the telephone on its switch and then to press the button *b*², in order that she may return the deposited coin. The replacement of the telephone on its switch is indicated by the supervisory signal *n*, which becomes lighted through the breaking of the bridge at the substation. The pressure of the button *b*² to actuate the deflector *b*¹ is indicated by the disappearance of the supervisory signal, inasmuch as the movement of the deflector incidentally closes a bridge 7 of the line-circuit, which permits current to flow from the battery *l* throughout the metallic circuit to again excite the supervisory relay *m*. Observing the disappearance of the supervisory signal, the operator depresses key *o* and releases the coin at the pay-station, which falls through the coin-chute and is diverted by the deflector into the channel through which it is returned to the user of the instrument.

It will be understood by those skilled in telephony that a coin-collecting appliance is to be considered the equivalent of various other appliances for insuring payment for the use of the telephone, such as devices requiring the deposit of a purchased blank or token or for operating registering mechanism the count from which is made the basis of a charge for the use of the telephone. This invention of course applies to any such form of apparatus for insuring payment for the use of the telephones, the requirement for combining the invention with such apparatus being merely that a pair of switch-springs *b*⁶ *b*⁷ shall be associated with a part moved by the user of the telephone as a preliminary to its use.

We claim as our invention—

1. The combination with a telephone-line to a telephone pay-station, of a call-origina-

ing signal-circuit, a coin-chute at the substation and a switch therein actuated by a coin adapted to complete the said signal-circuit, a telephone-switch at the substation and contacts thereof adapted to break the signal-circuit when the telephone is in use, a magnet at the central office and a secondary signal controlled thereby, and a winding of the magnet in a circuit controlled by switch-contacts thereof; whereby the deposit of a coin displays a signal which the use of the telephone does not efface, as described.

2. The combination with a metallic-circuit telephone-line to a pay-station, of a coin-receiving device at the pay-station and a switch therein closed by a coin in the said device, a grounded signaling-circuit including one of the line conductors controlled by the switch in said coin-receiving device and by switch-contacts of the telephone-switch closed when the telephone is not in use, a relay in the grounded signaling-circuit at the central office and a secondary signal controlled thereby, and a local battery-circuit including a winding of the relay also controlled thereby, as described.

3. The combination with a telephone-line and a normally-open return-circuit associated therewith, of a relay together with a source of current in a circuit closed at the central office between said line and return-circuit, a secondary signal and a local circuit controlled by the relay, and a magnet-winding of the relay connected with said local circuit, and means for breaking the circuit of the relay in making connection with the line, a coin-collecting device at the substation and a switch therein actuated by a deposited coin adapted to make connection between said line and said return-circuit, and a telephone-switch adapted to break the connection thus formed, as described.

4. The combination with a metallic-circuit telephone-line and a ground-return therefor, of a line-signal in a circuit formed of a portion of the line and the ground-return together with a source of current, and a coin-collecting device actuated by a deposited coin to close the said circuit, a telephone-switch at the substation controlling a bridge of the metallic circuit, link conductors for making connection with the line, and a supervisory signal together with a source of current in the link conductor adapted for association with the other line conductor of the metallic circuit, as described.

5. The combination with a metallic-circuit telephone-line and a ground-return therefor, a source of current in a circuit between the line and the ground-return, and a line-signal in the circuit, a coin-collecting appliance at the substation adapted to complete a circuit of the line signal and the source of current when a coin is deposited; link conductors for making connection with the line, a ground on the link conductor adapted for connection

with that line conductor which is normally
not grounded, and a supervisory signal in the
same link conductor; whereby the initial call
is dependent on the deposit of a coin, but
5 the supervision of the line is independent of
the coin, as described.

In witness whereof we hereunto subscribe

our names this 4th day of February, A. D. .
1899.

CHARLES E. SCRIBNER.
FRANK R. McBERTY.

Witnesses:

ELLA EDLER,
NELLIE COLLINS.