

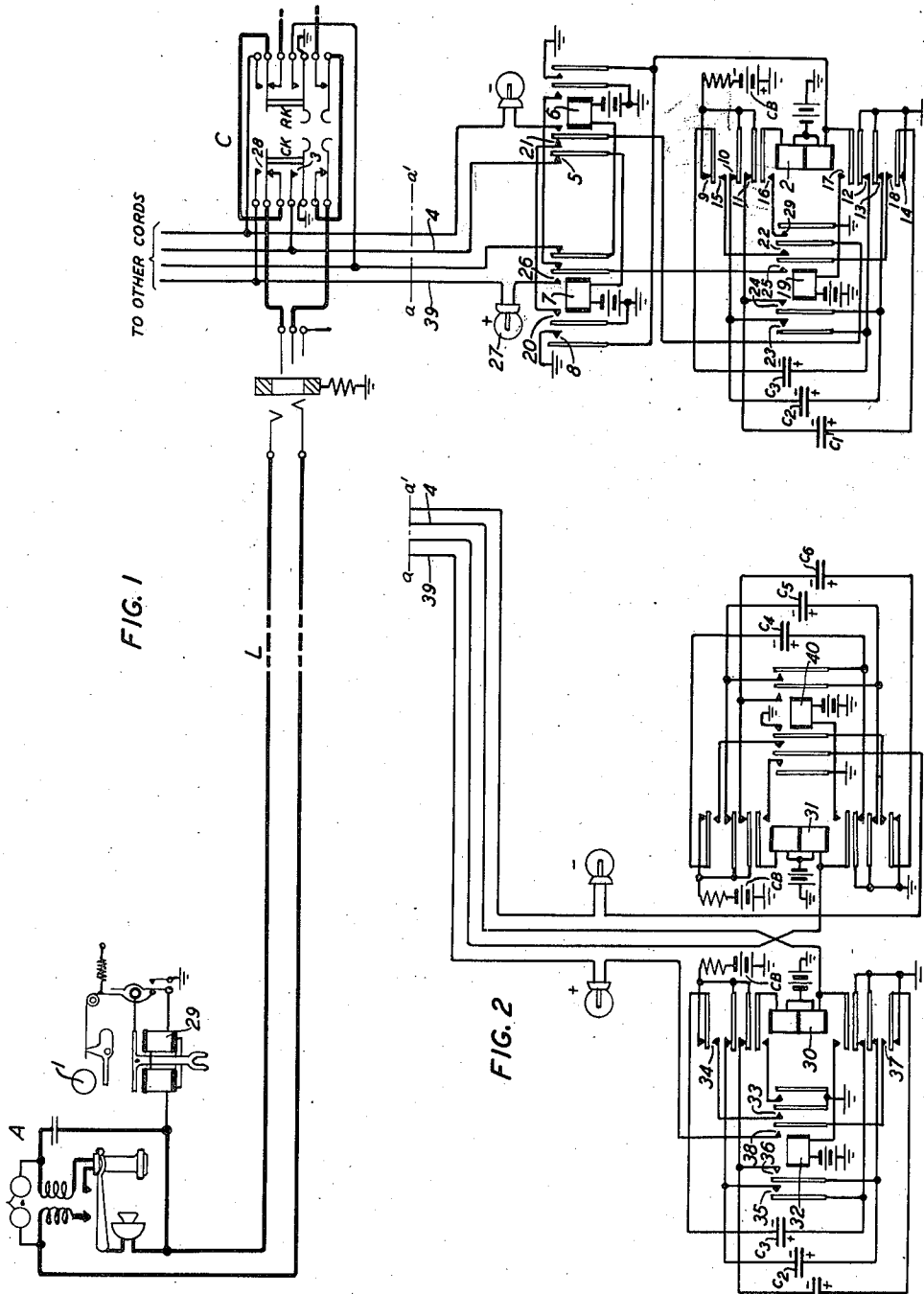
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PREPAYMENT COIN BOX SYSTEM

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PREPAYMENT COIN BOX SYSTEM

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This invention relates to prepayment coin box telephone systems in which a coin is deposited in a device at a station, and held in suspense therein, to initiate a call, which coin is later "collected" or "refunded" depending on whether the desired connection is completed or not, said coin collection or return being accomplished by a polarized electromagnet controlled from the central office by means of a relatively high voltage direct current transmitted over the line in either of two directions, in practice of the general order of 110 volts.

Systems of the above character usually employ an auxiliary coin battery at the exchange which is separate and distinct from the regular, low voltage central office battery and in small exchanges where only a small number of coin box lines are in service, the expense of maintaining such an auxiliary current supply may be unduly high.

An object of the present invention, therefore, is to provide means whereby the regular low voltage central office battery may also serve to supply the higher potential current for controlling the collection or return of coins at coin box stations.

A feature of the invention whereby the foregoing object is obtained resides in employing a plurality of high capacitance condensers, for example, of the electrolytic type, which are normally connected in parallel across the central office battery and charged thereby and in a switching arrangement whereby these condensers may be connected in series-aiding to the line at the time of coin disposal.

The invention will be understood from the following description and accompanying drawing which shows in Fig. 1 a coin subscriber's line and a portion of an operator's cord circuit, arranged in accordance with the present invention, adapted to be connected thereto and to control the disposition of coins thereover. Fig. 2 shows a modification of a portion of Fig. 1.

Referring to the drawing, Fig. 1 represents a subscriber's line L extending from a coin subscriber's station A to, and terminating in, a jack at the central office together with a portion of the answering end of an operator's link circuit C adapted to be connected to said line and having associated therewith a source of high voltage coin potential in accordance with the present invention which source comprises a single group of three condensers having a relatively large current storing capacity, as for example the type known as electrolytic condenser, which condensers are normally connected in multiple to the central office battery and charged thereby. In addition to the condensers the necessary switches are shown for disconnecting said condensers from the battery and selectively applying them in series-aiding in either polar direction between one conductor of the line and ground over which

circuit the connected condensers may discharge to actuate an electromagnet associated with the coin box mechanism at the subscriber's station, and Fig. 2 represents an alternative coin potential source comprising two, similar groups, of three condensers each, both of which groups have their individual units connected in multiple to the central office battery, together with switching apparatus for disconnecting either group from the battery and connecting the respective elements thereof in series-aiding in a predetermined polar direction between one side of the line and ground.

A description of the operation of the circuit arrangement of the present invention follows:

It will first be assumed that the subscriber at station A has deposited a coin 1 in the usual manner thereby attracting the attention of the operator at the central office who at the request of the subscriber has established a desired connection with the line of another subscriber, not shown, and at some later stage of the connection desires either to collect the coin or return it to the calling subscriber, which operations are effected, as well understood, by the application of a relatively high potential direct current impulse to the line.

In case the coin is to be collected, a positive polarity impulse is applied to the line and if the coin is to be returned to the subscriber a negative polarity impulse is applied.

In the present invention (Fig. 1), the source of the foregoing coin control potential resides in condensers C₁, C₂ and C₃, which are normally charged in parallel from the grounded central office battery CB in an obvious circuit, which include normal contacts of relay 2.

If we assume that the operator desires to collect the coin 1 at station A she will operate the collect key CK of her link circuit C thereby completing the following circuit, ground, contacts 3 of CK, conductor 4, contact 5 of relay 6 and winding of relay 7 to battery. Relay 7 operates thereby completing, at its contacts 8, a circuit to operate relay 2 over its lower winding. Relay 2 in operating opens its contacts 9-14 and closes its contacts 15-18 thereby disconnecting condensers C₁, C₂ and C₃ from battery CB, operating relay 19 over contact 17 of relay 2, and connecting condensers C₁, C₂ and C₃ in series-aiding between ground and the tip conductor of the line in a positive direction in the following circuit, ground, contacts 20 of relay 7, contacts 21 of relay 6, contacts 22 of relay 19, contacts 15 of relay 2, negatively charged plate of condenser C₃, positively charged plate of condenser C₂, contact 23 of relay 19, negatively charged plate of condenser C₂, positively charged plate of condenser C₂, contact 24 of relay 19, negative plate of condenser C₁, positive plate of condenser C₁, contact 18 of relay 2, contact 25 of relay 19, contact 26 of relay 7, current

limiting resistance lamp 27, and contacts 28 of key CK and the tip of the line L to ground through the winding of magnet 29 at station A to cause its operation, due to the discharge of the condensers in the circuit, in such a manner as to cause the coin 1 to be deposited in the cash box.

When relay 19 operated it closed at its contacts 29 a locking circuit for relay 2 including its upper winding. Release of key CK releases relays 7 and 19 followed by the release of relay 2, thereby reconnecting condenser C₁—C₃ in multiple across the battery CB.

In case the coin is to be returned instead of collected the key RK is operated, thereby immediately operating relay 6, instead of 7, followed by the operation of relays 2 and 19 thereby disconnecting the condensers from the battery, as before, but now due to the operated condition of relay 6, and the released condition of relay 7, the connection of the condenser with respect to the line is reversed so that the negative plate of condenser C₃ is connected to the line and the positive plate of condenser C₁ is grounded.

In central offices where the frequency of calls from coin box stations, and the consequent demand for coin control potentials, exceeds the ability of a single group of condensers to satisfy these requirements, two groups of condensers as shown in Fig. 2 may be employed, one group being used for coin collection only, and the other group for coin return only. In such an event the four conductors of Fig. 2, shown terminating in the broken lines a—*a'*, are connected to the four conductors leading to the link circuit C in place of the four conductors extending from the previously described potential source of Fig. 1.

In the arrangement of Fig. 2, condensers C₁—C₆ are normally connected in multiple with the central office battery CB over contacts of relays 30 and 31.

Operation of the collect key CK grounds conductor 4 at contacts 3 of the key thereby operating relay 30 over its lower winding, which relay in operating extends its operating ground to relay 32 which thereupon operates.

Relay 30 disconnects condensers C₁, C₂ and C₃ from battery CB and a circuit is now completed from ground, contacts 33 of relay 32, contacts 34 of relay 30, to the negative plate of condenser C₃. The positive plate of condenser C₃ is connected to the negative plate of condenser C₂ over contacts 35 of relay 32, the positive plate of condenser C₂ is connected over contacts 36 of relay 32 to the negative plate of condenser C₁, and the positive plate of C₁ is connected over contacts 37 of relay 30, contacts 38 of relay 32, conductor 39, and contacts 28 of key CK to the tip of the line L. Condensers C₁ to C₃ being connected in series-aiding with the positively charged plate of C₁ to the line, the discharge impulse which follows will be in a positive direction thereby causing the coin 1 to be collected. When relay 32 operates, it also completes a locking circuit for relay 30 which includes its upper winding.

Operation of key RK causes the successive operation of relays 31 and 40 to cause condensers C₄—C₆ to be disconnected from battery CB and connected in series-aiding with the negative plate of condenser C₄ connected to the line and the positive plate of C₆ connected to ground.

What is claimed is:

1. In a common battery telephone system, an exchange, a calling line having a coin device associated therewith, a link circuit at said ex-

change adapted to be connected to said line, a central office battery for supplying talking and signaling current to said line and link circuit, a plurality of condensers normally connected across said battery and charged thereby, and switching means associated with said link circuit adapted when operated to disconnect said condensers from said battery and to connect them in series-aiding relation to said line to actuate said coin device.

2. In a common battery telephone system, an exchange, a calling line having a coin disposal device associated therewith and adapted to be controlled thereover, a link circuit at said exchange adapted to be connected to said line, an exchange battery for supplying talking and signaling current to said line and link circuit, a plurality of condensers divided into two groups and normally connected in parallel with each other and said battery, and selective switching means associated with said link for connecting either group to said line in series-aiding relation, to the exclusion of said battery, the connection of each group to the line being effected in such a manner that said groups will discharge into said line in opposite directions.

3. In a telephone system, an exchange, a calling line having a coin device associated therewith, said device being adapted to receive a coin and hold it in suspense therein and to dispose of said coin in either of two different manners responsive to a unidirectional current impulse, in a particular polar direction, over said line, a link circuit at said exchange adapted to be connected to said line, an exchange battery, a plurality of condensers normally connected in multiple with said battery and charged thereby, and selective switching means associated with said link circuit adapted when operated to disconnect said condenser from said battery and connect them in series-aiding relation to said line in either polar direction.

4. In a telephone exchange system comprising a paystation equipped with an electrically actuated coin disposal device, means for operating said device comprising a source of direct current whose voltage is less than that required to actuate said device, a plurality of condensers normally connected to said source and charged thereby, and means for disconnecting said condensers from said source and for connecting them in series-aiding relation to said device.

5. In a paystation telephone exchange system, employing electrically actuated coin disposal devices at the stations, means for actuating said devices comprising a plurality of condensers each of which is normally maintained charged to a predetermined potential less than the voltage required to operate said devices, and switching means for selectively connecting said charged condensers in series-aiding relation to a desired one of said devices.

6. The combination in a telephone system having a central battery of a given potential, of lines each connected at its distant end to a coin disposal device responsive only to a potential higher than that of said battery, with means for operating said coin disposal devices by transient currents derived from said battery by condensers and a switching arrangement for charging said condensers in parallel from said battery and discharging said condensers in series into said lines.

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