

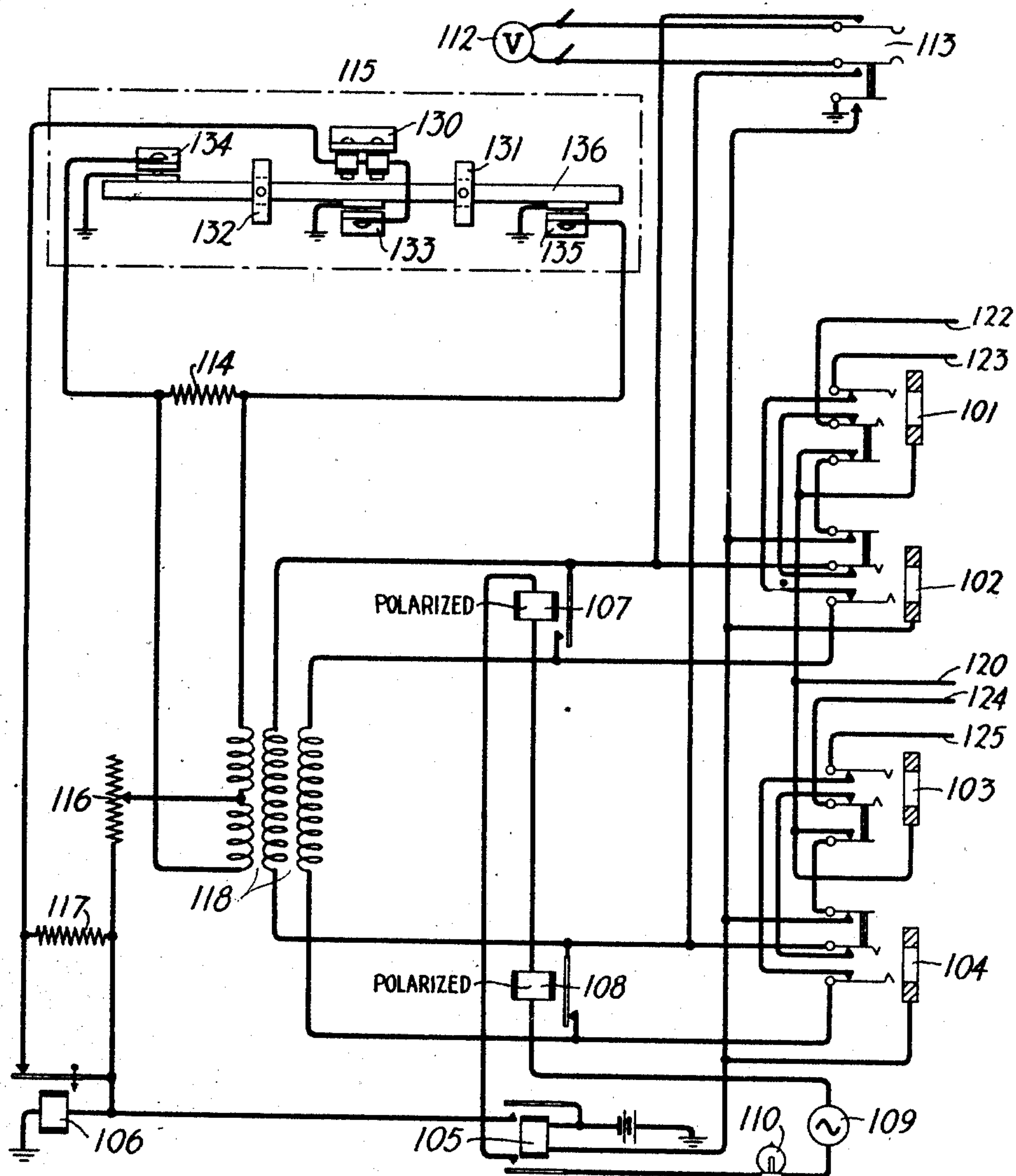
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RELAY COMMUTATOR

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UNITED STATES PATENT OFFICE.

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RELAY COMMUTATOR.

Application filed September 11, 1926. Serial No. 134,820.

This invention relates to telephone systems and more particularly to the provision of improved commutating means for signaling current generators.

5 In accordance with the present invention the distribution of signaling current to different portions of the operating circuit is accomplished by the use of a relay commutator comprising a pair of single contact polarized
10 relays controlled from a source of low frequency alternating current. The current generator is associated with an outgoing circuit having a plurality of branches by means of a transformer having a plurality of output
15 windings. The relays connect pairs of output windings in series to alternately short-circuit the branches of the outgoing circuit in order to provide interrupted signaling current to one branch at a time and to maintain
20 the impedance balance in other branches.

A clearer conception of the aspects of the present invention may be had from the following description and attached drawing.

25 The invention is described and shown as embodied in a system for providing voice frequency signaling current in toll switching systems and in connection with a mechanical oscillator for generating voice frequency current of the type disclosed in the application
30 of F. M. Weise, Serial No. 91,201, filed February 27, 1926.

This type of oscillator is composed of a mechanically tuned reed 136 supported at two points 131 and 132 and vibrating between
35 two carbon buttons 134 and 135. The reed 136 is caused to vibrate at its natural frequency by an electromagnet 130 and a carbon button 133 located at the center of the reed. In order to prolong the life of the carbon
40 buttons a start relay 105 is used which is controlled by the signaling key at any operator's position.

When ground is connected to start lead 120, relay 105 operates over a circuit including
45 contacts of jacks 101 and 102 or jacks 103 and 104 and closes a circuit from battery on its upper front contact, back contact of relay 106, winding of magnet 130 to ground through carbon button 133. The current in
50 this circuit deflects bar 136 strongly in order to insure the starting of the vibrator. The circuit also extends through starting impulse relay 106 to ground, but as relay 106 is slow to operate, the circuit for magnet 130 traced
55 above is maintained momentarily and is then

opened at the back contact of relay 106 leaving resistance 117 in series with magnet 130, thereby causing a sudden reduction in the current through the vibrator magnet permitting reed 136 to start oscillating. The operation of relay 105 also closes a circuit for
60 polarized relays 107 and 108 from low frequency source 109 through lamp 110, lower front contact of relay 105, windings of relays 107 and 108, back to source 109. As
65 these relays are polarized they operate during one half of each cycle of current and release during the other half cycle. When these relays are normal a circuit is closed from conductor 122, tip contacts of jacks 101
70 and 102, middle winding of transformer 118, back contact of relay 108, right winding of transformer 118, ring contacts of jacks 102 and 101 to conductor 123. At the same time a shunt is connected across conductors 124
75 and 125 over a circuit from conductor 124, jacks 103 and 104, back contact of relay 108, tip contacts of jacks 104 and 103.

When relays 107 and 108 operate, a shunt is connected across conductors 122 and 123
80 traced through the front contact of relay 107 and current is connected to conductors 124 and 125 over a circuit from conductor 124, tip contacts of jacks 103 and 104, middle winding of transformer 118, front contact
85 of relay 107, right winding of transformer 118 to the ring contacts of jacks 103 and 104. The current from transformer 118 is thereby alternately connected first to one set of jacks and a shunt is placed across the other and
90 then to the other set of jacks while the first is shunted. The substitution of this shunt for the signaling generator serves to maintain the impedance balance when using repeaters and thus improves the operation of the toll
95 signaling. This arrangement therefore provides interrupted signaling current to a plurality of toll lines, while maintaining the impedance during the silent period. It also short circuits any noise current, which may
100 be present on one toll line and which might mask the silent period, thereby preventing its transmission to other toll lines to which signal currents are simultaneously being supplied over the same signaling conductors.

105 The pair of jacks, for example 101 and 102, in conjunction with suitable patching cords, permit variation of the interconnection of signaling circuits and signaling sources. Jack 102, for example, permits supplying current
110

from the generator shown to other outgoing circuits, while jack 101 permits supplying conductors 122 and 123 with signaling current from another source, (not shown). When a
 5 patching connection has been made to another load circuit such as 122 and 123 by the insertion of one plug of a three conductor patching cord into a jack such as 101 and the
 10 insertion of the other plug of such patching cord into jack 102, relay 105 is energized by ground on the conductor such as 120 extended through the sleeve of jack such as 101, the sleeve conductor of the patching cord, the sleeve of jack 102 to the winding of relay 105.
 15 Rheostat 116 is provided to control the potential of the output current from transformer 118 by adjusting the direct current flow through the carbon buttons 134 and 135. The voltmeter key 113 and the voltmeter 112
 20 are used for checking the amount of output current from the middle winding of transformer 118. As the right and middle windings of transformer 118 have the same electrical characteristics and are connected in
 25 series when used in the circuit, the reading on the voltmeter 112 will be one-half the output potential. When the voltmeter key 113 is operated, ground on its lower contact is connected to the start lead through relay 105,
 30 thereby causing the circuit to function as has been described above.

While the invention has been disclosed in connection with tool telephone systems, it may be applied to other types of signaling systems.

35 What is claimed is:

1. A system comprising a source of current, a circuit having a plurality of equivalent branches, means for coupling said source to said circuit, electromagnetic means for alternately short-circuiting certain of said
 40 branches while connecting said source to the remainder of said branches and connecting said source to said certain of said branches while short-circuiting the said remainder of said branches, and a separate source of current for intermittently operating said electromagnetic means.

2. A telephone system comprising a source of current, a circuit having a plurality of equivalent branches, electromagnetic means for alternately coupling said source to half of said plurality of branches and simultaneously short-circuiting the other half of said

branches, and a source of current of a different character for operating said electromagnetic means. 55

3. A system comprising a source of current, a circuit having a plurality of equivalent branches, electromagnetic means, a control circuit for energizing said means to alternately couple and short-circuit said source of current with relation to said plurality of branches, and a separate source of current for energizing said means. 60

4. In a system comprising a source of current, a circuit having a plurality of branches, a transformer for coupling said source of current to said circuit, said transformer having a single input winding and a plurality of output windings, one output winding connected to one side of all of the branches of said circuit and the other output winding connected to the other side of all of the branches of said circuit, and a pair of polarized relays for connecting said output windings in series in opposite directions to supply signaling current alternately to the branches of said circuit. 65 70 75

5. In a system comprising a source of current, a circuit having a plurality of equivalent branches, means for coupling said source to said circuit, electromagnetic relays, a separate source of alternating current for intermittently operating said relays, said relays serving to control said coupling means to intermittently couple said source to one of the branches of said circuit and to short-circuit the remainder of said branches. 80 85

6. In a signalling system, a source of signalling current, a transformer having a primary winding connected to said source of current and a pair of secondary windings, two load circuits connected to the terminals of said secondary windings, a relay for each load circuit, each relay having an armature and contact arranged to short-circuit its associated load circuit and means to periodically operate said relays to alternately short-circuit each of said load circuits, whereby signalling current is alternately supplied over the other of said load circuits. 90 95 100

In witness whereof, I hereunto subscribe my name this 8th day of September A. D., 1926.

HAROLD M. PRUDEN.