

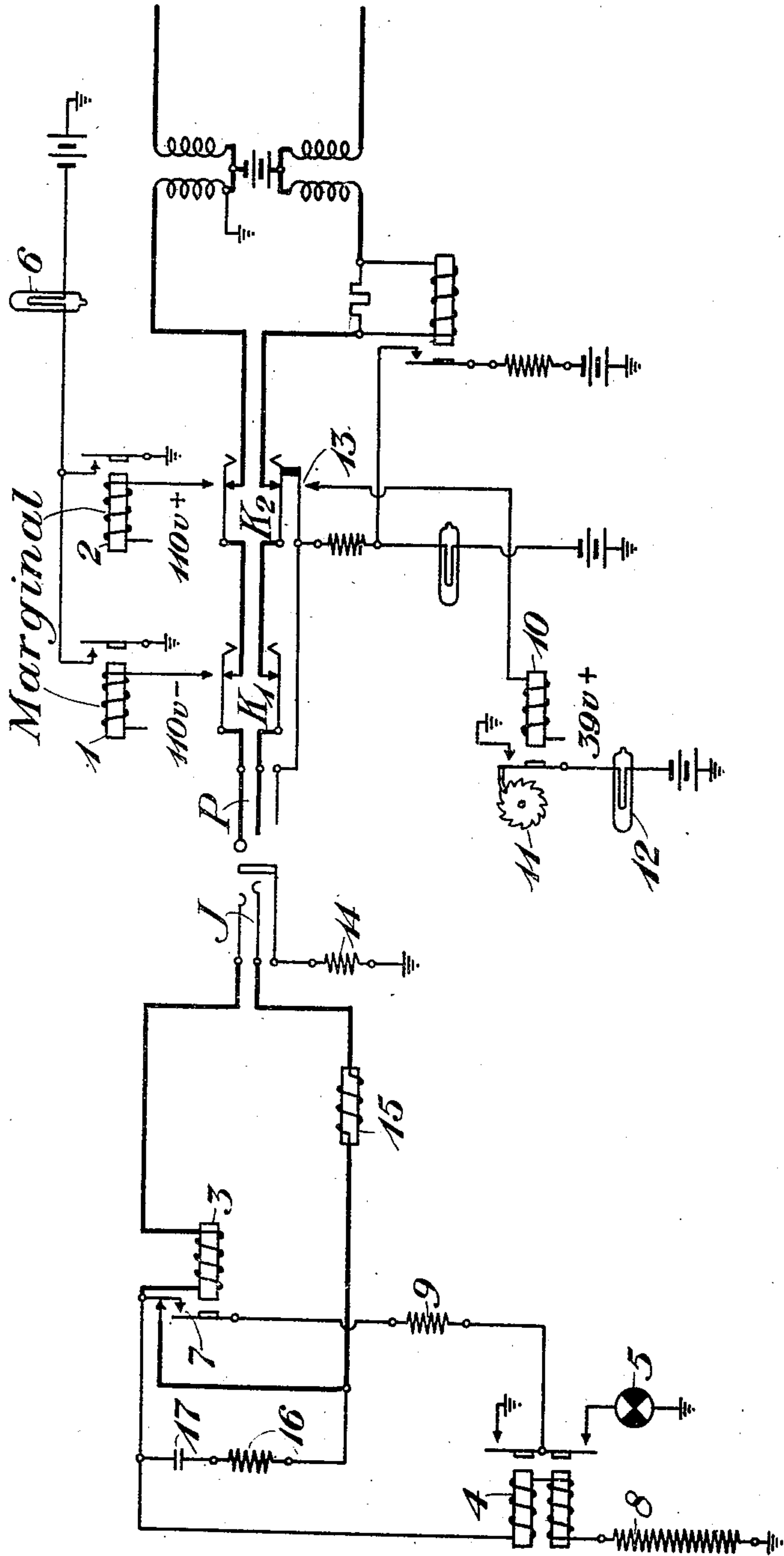
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TESTING CIRCUIT FOR MEASURED SERVICE APPARATUS.

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TESTING-CIRCUIT FOR MEASURED-SERVICE APPARATUS.

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To all whom it may concern:

Be it known that I, JOHN DAVIDSON, JR., residing at Montclair, in the county of Essex and State of New Jersey, have invented certain Improvements in Testing-Circuits for Measured-Service Apparatus, of which the following is a specification.

This invention relates to testing apparatus and more particularly to equipment for testing the various apparatus associated with an operator's cord circuit.

It is one of the objects of this invention to provide a testing equipment, which, when associated with a cord circuit, will determine whether the coin collect and coin return equipment of the cord circuit is functioning properly. Another object of this invention is to provide a testing equipment, which, when associated with a cord circuit, will determine whether the coin register equipment of the cord circuit is functioning properly. Other and further objects of the invention will be clear from the detailed description to be given later.

In the usual type of switchboard it is often found desirable to test apparatus associated with the operator's cord circuit, such as coin return or coin collect apparatus, without connecting the cord circuit directly to apparatus in actual service, such as a coin box at a subscriber's station. For this purpose it is found desirable as shown in this invention to provide the switchboard with special jacks leading to apparatus adapted to simulate the operation of equipment which the apparatus associated with the cord circuit would be connected with in practical service.

In the drawing is shown one of these special jacks, J, connected to a testing apparatus adapted to simulate the operation of an ordinary coin box. In this testing apparatus is shown an ordinary relay 3 and a polarized relay 4 having its armature normally biased to its neutral position. When the polarized relay 4 is actuated by a current of one polarity it serves to throw its armature so as to close a circuit through the resistance 9 directly to ground and when actuated by current of an opposite polarity serves to throw its armature so as to close a circuit through the resistance 9 to an interrupter 5 and ground. The resistance 9 serves to prevent the relay 4 from becoming short circuited upon the actuation of relay

4. Associated with the polarized relay 4 is a resistance 8 of such a value that a potential causing a current flow therethrough to actuate the relay 4 will be sufficient to actuate a coin control apparatus. Connected to the sleeve contact of jack J is a resistance 14 of a value adapted to simulate the resistance of the customary message register apparatus. An inductance 15, a resistance 16 and a capacity 17 are provided in the testing apparatus to simulate an ordinary subscriber's line.

In the circuit leading from the plug P is shown the usual apparatus associated with an ordinary operator's cord circuit. As is well known and in accordance with the common practice, the operation of the key K_1 controls the action of a marginal relay 1 with which is associated a source of negative potential of suitable voltage, for example 110 volts, for operating the ordinary coin return apparatus of a coin box. The operation of the key K_2 controls the action of a marginal relay 2 with which is associated a source of positive potential of suitable voltage, as for example 110 volts, for operating the ordinary coin collect apparatus of a coin box. Under control of the lower make contact of the key K_2 is a register relay 10 with which is associated a source of positive potential of suitable voltage, for example 39 volts, for operating the ordinary message register apparatus. Under control of either marginal relay 1 or marginal relay 2 is a signal lamp 6. Under control of the register relay 10 is a signal lamp 12.

If the cord circuit is now associated with the testing apparatus by inserting the plug P into the jack J and the key K_1 is operated the proper functioning of the coin return apparatus of the cord circuit will be indicated by the glowing of the signal lamp 6. If the plug P is inserted in the jack J and the key K_2 is operated the proper functioning of the coin collect apparatus of the cord circuit will be indicated by the flashing of the signal lamp 6 and the proper functioning of the message register apparatus of the cord circuit will be indicated by the glowing of the signal lamp 12.

With this brief description of the apparatus in mind the invention may now be more fully understood from a description of the operation.

To test the coin return apparatus of the cord circuit, the plug P is inserted into the jack J and the coin return key K_1 is operated, thereby applying a negative potential of 110 volts to the tip strand of the cord over a circuit from the 110 volt source, winding of relay 1, upper make contact of key K_1 , tip contacts of plug P and jack J, winding of relay 3, windings of polarized relay 4, resistance 8 to ground. Upon the proper functioning of the negative potential source and the closing of the above described circuit the polarized relay 4 will become energized and close its upper contact. Relay 3 will also become energized and pulls up its armature to close contact 7, whereby a shunt about relay 4 will be closed over contact 7, low resistance 9, upper armature and contact of relay 4 to ground. This shunt will reduce the total resistance of the circuit in a manner similar to that of an actual coin apparatus so that the current flow through relay 1 will be increased sufficiently to energize this relay, which is marginal, and cause it to pull up its armature and close the circuit through the signal lamp 6. The operation of the signal lamp serves to indicate the proper functioning of the coin return apparatus.

To test the coin collect apparatus of the cord circuit, the plug P is inserted into the jack J and the coin collect key K_2 is operated to apply a positive potential of 110 volts to the tip strand of the cord, over a circuit from a 110 volt source, winding of relay 2, upper make contact of key K_2 , upper normal contact of key K_1 , tip contacts of plug P and jack J, winding of relay 3, winding of polarized relay 4, resistance 8 to ground. The closing of this circuit causes relay 4 to become energized and to close its lower contact. Relay 3 is also energized and pulls up its armature to close contact 7, whereby a shunt about relay 4 will be intermittently closed through contact 7, resistance 9, armature and lower contact of relay 4, to interrupter 5 and ground. This shunt will so reduce the total resistance in the circuit in a manner similar to that of the actual coin apparatus that the current flow through relay 2 will be sufficiently increased to energize said relay, which is marginal. The energization of relay 2 serves to close a circuit through the signal lamp 6, which due to the interrupter 5 will be caused to flash, thus indicating that the coin collect apparatus is functioning properly.

To test the message register apparatus of the cord circuit the plug P is inserted into the jack J and the key K_2 is operated thereby closing a circuit from a 39 volt source, winding of relay 10, lower make contact 13 of key K_2 , sleeve contacts of plug P and jack J, through resistance 14 to ground. The resistance 14 is of such a value that a

potential causing a sufficient current flow therethrough to operate the magnet 10 must be of sufficient value to operate a message register over the sleeve contact of an actual line. The closing of the circuit will cause the register relay 10 to become energized and thereby cause a circuit to be closed through the signal lamp 12, thus indicating that the message register apparatus is functioning properly.

While the invention has been disclosed as embodied in certain specific arrangements, it is to be understood that this embodiment may be widely varied without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:

1. In a testing system, the combination with a telephone cord circuit and its associated apparatus including a marginal relay, a source of current therefor and a signal controlled by said relay; of a local test circuit including a resistance; means for connecting said marginal relay through a talking conductor of said cord circuit to said test circuit; and automatically operated means included in said test circuit for shunting said resistance and thereby varying the current flow through said marginal relay.

2. In a testing system, the combination with a telephone cord circuit and its associated apparatus including a key associated therewith for controlling the application of measured service controlling current; of a local test circuit; means for associating said cord circuit by means of its talking conductors with said test circuit; and means controlled by said test circuit for indicating at the operator's position the proper application of measured service current upon the actuation of said key.

3. In a testing system, the combination with a telephone cord circuit and its associated apparatus including a marginal relay, a source of current therefor and a signal controlled thereby; of a local test circuit adapted to simulate the resistance of an ordinary coin box apparatus; means for connecting said marginal relay through said cord circuit to said test circuit; and relay means included in said test circuit and operative, only when said source of current is of sufficient value to operate an actual coin control apparatus, for varying the resistance of said test circuit and thereby varying the current flow through said marginal relay.

4. In a testing system, the combination with a telephone cord circuit and its associated apparatus including keys for controlling the application of measured service current; of a local test circuit comprising a high resistance circuit including a polarized relay, a lower resistance shunt circuit

and an interrupter; means for associating said cord circuit with said test circuit; means associated with said polarized relay and actuated upon the operation of one of
5 said controlling keys for closing said shunt circuit through said interrupter and actuated upon the operation of the other of said controlling keys for closing said shunt circuit without interruption.
10 5. In a testing system, the combination with a telephone cord circuit and its associated apparatus including a plurality of marginal relays, sources of measured service current therefor, and signals controlled
15 thereby; of a local test circuit including a polarized relay with its armature normally biased to a neutral position, a resistance associated therewith and adapted to simulate the resistance of the coin control apparatus of an ordinary coin box; means for connect- 20 ing said marginal relays through said cord circuit to said test circuit, whereby said sources of measured service current will operate said polarized relay; means under the control of said polarized relay for shunting 25 said resistance and thereby varying the current flow through said marginal relays; and means for indicating the action of said relays.
In testimony whereof, I have signed my 30 name to this specification this 19th day of June, 1917.

JOHN DAVIDSON, JR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."