

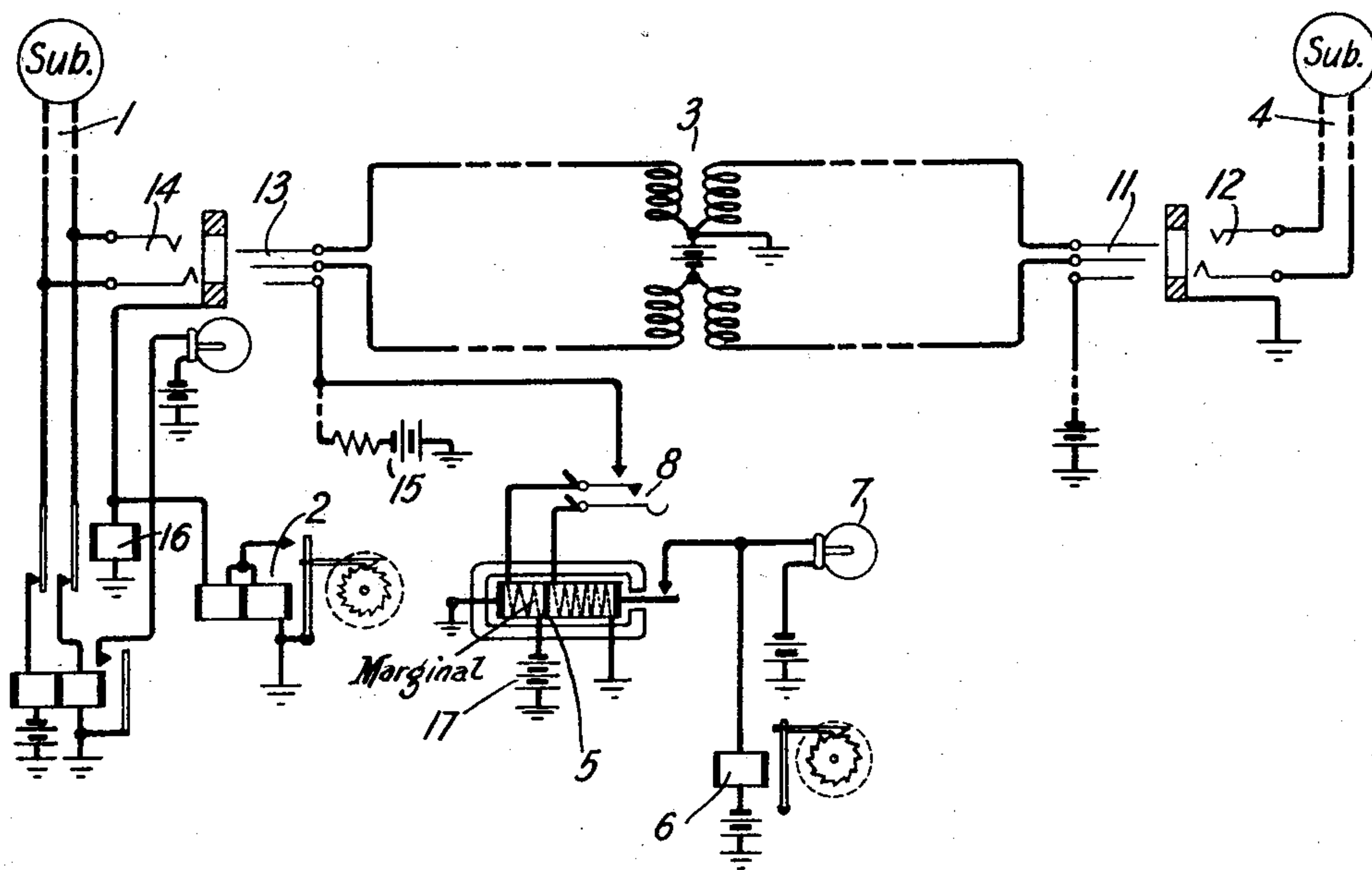
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TELEPHONE SYSTEM

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TELEPHONE SYSTEM.

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This invention relates to telephone systems and more particularly to message register circuit arrangements for such systems.

According to this invention a metering system including a subscriber's service meter and an operator's position meter, together with a key and a double wound relay at the operator's position, are so arranged that the depression of the key operates the service meter and shunts one winding of the relay without causing it to operate, and the operation of said service meter alters the shunt in such a manner as to allow the relay to actuate, in turn operating the position meter.

This arrangement improves the marginal operating characteristics of a marginal relay or electromagnetic device used in telephone systems for recording and indicating purposes. A marginal relay and a circuit therefor may be employed in message register circuits where this circuit is part of the usual sleeve circuit between a subscriber's line and a cord circuit and where it is desired to have the marginal relay operate after the usual line message register in this sleeve circuit has been actuated. The marginal relay be employed to actuate a position meter and also if desired to light a signal to indicate the actuation of the message register.

The invention has been illustrated in the accompanying drawings in which a diagrammatic presentation has been made of a calling line, a message register therefor and a called line as well as a cord circuit in which has been incorporated a marginal relay, a position meter and a signal lamp controlled by said relay and the circuit means therefor are arranged in accordance with this invention.

Referring now to the drawing, 1 indicates a calling subscriber's line; 2 a message register for recording calls made by the subscriber of this line; 3 indicates a cord circuit in diagrammatic form for connecting line 1 with a called line 4; while 5 shows a polarized marginal relay arranged to control a position meter 6 and lamp 7 when a key 8 is actuated to connect it to the sleeve circuit of cord 3.

The operation of the invention when applied to a system of this kind is as follows: On the completion of the connection of the calling line 1 to the cord circuit 3 in the usual manner, a circuit is closed from battery 15 through the sleeve circuit, the terminals of the answering plug 13 and the calling subscriber's jack 14, through the windings of the calling line message register 2 to ground. This circuit extends also through the winding of the usual cut-off relay 16 for the operation of the cut-off relay. As is well known in the art, the sleeve circuit extends through the windings of the message register 2 in order that the message register may be controlled over a portion of the sleeve circuit without however being actuated when the circuit is completed through battery 15 for the operation of the cut-off relay.

When it is desired to actuate the message register 2 to record the call over line 1 and to actuate the relay 5 to operate the position meter 6 to count the call at the position and to light the lamp 7 to indicate to the operator that the message register 2 has operated, key 8 is depressed. To cause the above operations to take place in the order mentioned, the marginal relay 5 is provided with two windings of different resistances, the left hand winding of comparatively low resistance and the right hand winding of comparatively high resistance connected in series opposition through a high voltage battery 17. The voltage of this battery 17 is higher than that of battery 15 in order to secure the operation of message register 2 in the manner hereinafter described. With this arrangement the following operations will take place when key 8 is actuated: First, the high voltage battery 17 is connected to ground through the lower resistance winding and higher resistance winding of relay 5 in series and also through the windings of the message register 2 to ground. The right hand higher resistance winding of relay 5 is thereby partially shunted and the combined resistance of the windings of message register 2 and the left hand winding of relay 5 is such as to cause the ampere turns of both windings of relay

5 to become nearly equal. This arrangement causes the operation of message register 2 as the current in the sleeve circuit is increased due to the high voltage of battery 17, but prevents the operation of relay 5 as the two windings of this relay are in opposition as hereinbefore mentioned. Upon the operation of message register 2 the right hand winding of this register is short circuited through the armature and front contact of the register to ground. When this takes place the ampere turns through the left hand winding of relay 5 become greater than the ampere turns through the right hand winding and under these conditions relay 5 will operate to attract its armature. The attraction of the armature of relay 5 causes an obvious circuit to be closed for the lighting of lamp 7 which thereby notifies the operator of the operation of the message register 2 and this armature will also close an obvious circuit for the position register 6 to cause it to become actuated to count the call.

In an arrangement of this sort the marginal relay 5, the position register 6 and the lamp 7 are common to a plurality of cord circuits, such as 3.

The relay 5 is also polarized in such a manner that the high resistance winding tends to operate the armature away from the contact. The purpose of this is to guard against a momentary operation of relay 5 at the instant the lower contacts of key 8 are closed and prior to the closure of the upper contacts of said key.

It is evident that the particular arrangement shown is only typical of the application of this invention to a particular system and that the invention may readily be used in various other systems without departing from the spirit thereof.

What is claimed is:

1. In a telephone system, a line, a meter associated therewith, a source of current, an electromagnet having a pair of windings arranged in series opposition with said source, means for placing a shunt about one of said windings and for actuating said meter, and means responsive to the actuation of said meter for changing said shunt to cause the actuation of said electromagnet.

2. In a telephone system, a line, a meter associated therewith, a source of current, an electromagnet having a high resistance winding and a low resistance winding arranged in series opposition with said source, means for partially shunting the high resistance winding to cause the ampere turns of both of the windings of said electromagnet to become substantially equal and for actuating said meter and means responsive to the actuation of said meter for further shunting said high resistance winding to

change the relative ampere turns of said windings to cause the actuation of said electromagnet.

3. In a telephone system, a line, a meter associated therewith, a source of current, an electromagnet having a high resistance winding and a low resistance winding arranged in series opposition with said source, means for partially shunting the high resistance winding to cause the ampere turns of both of the windings of said electromagnet to become substantially equal and for actuating said meter, means responsive to the actuation of said meter for further shunting said high resistance winding to change the ampere turns of both of said windings to cause the actuation of said electromagnet, and a signaling means actuated by the operation of said electromagnet to indicate the operation of the meter.

4. In a telephone system, a calling line, a called line, a meter and a cut-off relay associated with the sleeve circuit of said calling line, a cord circuit for connecting said lines, including a sleeve circuit, means responsive to the connection of the cord circuit to the calling line for actuating said cut-off relay and for preparing a circuit for said meter, a source of current, an electromagnet having two windings associated with said source of current in series opposition, means for connecting said windings to the sleeve circuits of the cord circuit and the calling line so as to cause the actuation of the meter, and means responsive to the actuation of the said meter for changing the connection of said windings through the sleeve circuits so as to cause the actuation of said electromagnet.

5. In a telephone system, a calling line, a called line, a meter associated with the sleeve circuit of the calling line, a cord circuit including a sleeve circuit and arranged for connecting said lines, means responsive to the connection of the cord circuit to the calling line for actuating said cut-off relay and for preparing a circuit for said meter, a source of current, an electromagnetic device having two windings associated with said source of current in series opposition, means for connecting said windings and source of current to said sleeve circuits to cause the actuation of said meter without the actuation of said electromagnetic device, means responsive to the connection of said electromagnetic device in the sleeve circuits and the actuation of the meter for operating said electromagnetic device, and means operated by the actuation of the electromagnetic device for indicating the operation of the meter and for recording the connection of the lines by said cord circuit.

6. In a telephone system, a line, a service meter associated therewith, a source of cur-

rent, an electromagnet having a pair of windings and a polarized armature, said windings connected in series opposition with said source, switching means for connecting
5 the service meter in shunt to one of said windings to cause the operation of said meter, and means responsive to the operation of the meter to cause said electromagnet to attract its armature.

In witness whereof, I hereunto subscribe
my name this 29th day of November, A. D.
1926.

JOSEPH W. DEHN.