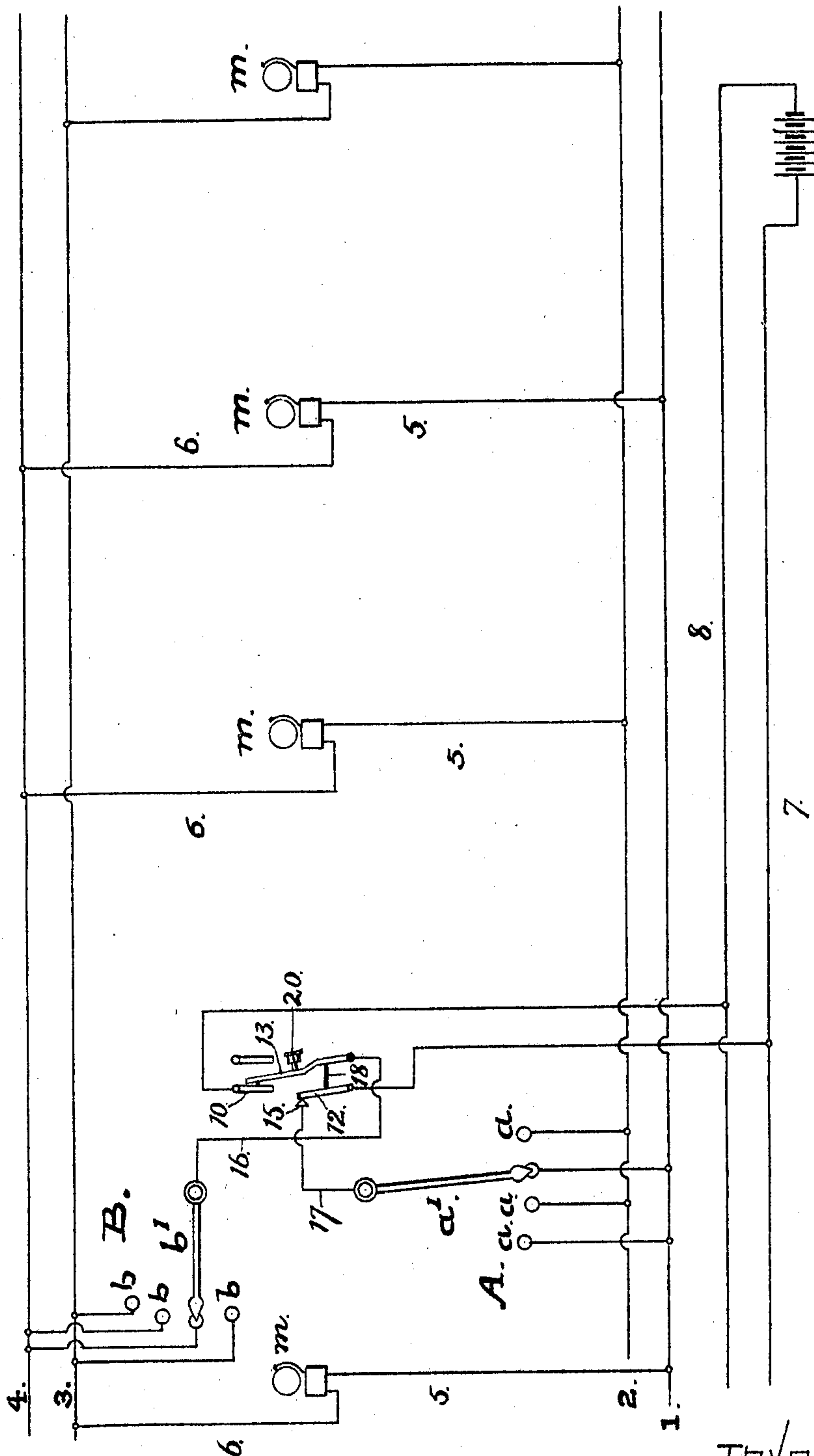


No. 804,182.

PATENTED NOV. 7, 1905.

A. K. ANDRIANO & H. HERBSTRIIT.  
METALLIC CIRCUIT FOR OPERATING SIGNALING DEVICES.

APPLICATION FILED MAR. 6, 1905.



Witnesses.

*Arthur D. Slee*  
*M. Regner*

Inventors

*Albert Rod Andriano*  
*and Hermann Herbstritt*  
*by E. E. Hobson atty.*

# UNITED STATES PATENT OFFICE.

ALBERT KOCH ANDRIANO AND HERMANN HERBSTTRITT, OF SAN FRANCISCO, CALIFORNIA.

## METALLIC CIRCUIT FOR OPERATING SIGNALING DEVICES.

No. 804,182.

Specification of Letters Patent.

Patented Nov. 7, 1905.

Application filed March 6, 1905. Serial No. 248,729.

*To all whom it may concern.*

Be it known that we, ALBERT KOCH ANDRIANO, a citizen of the United States of America, and HERMANN HERBSTTRITT, a subject of the German Emperor, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Metallic Circuits for Operating Signaling Devices, of which the following is a specification.

This invention relates to improvements made in electrical circuits and means for selecting and operating thereon electrically-actuated devices, such as an electrical bell or signal or other means for communication between one station and another selected station over a metallic circuit.

The invention is applicable more especially to telephone systems wherein a plurality of stations are connected by separate metallic circuits each composed of a direct conductor and a return-conductor, and each station is provided with selecting devices or switches, by means of which a metallic circuit composed of one of the conductors for the direct and another for the return side of the circuit can be formed between one station and another.

The object of the invention is to prevent the main circuit-lines or any portion of the lines or conductors that form the circuit between one station and another from receiving current or being affected by the current from the battery or other source of energy employed to operate the circuit to such a degree or extent as to produce an electrical condition on other lines or conductors that may be utilized for adjacent circuits, and thereby operate or disturb the operation of the electrical devices on such adjacent circuits.

To such end and object chiefly the invention consists in the construction, arrangement, and combination of direct conductors, return-conductors, selecting devices, and circuit-closing means, and a battery or source of electrical energy normally disconnected from the conductors and connectible therein for use through the selecting devices, as hereinafter described, and pointed out in the claims.

The accompanying drawing, to which reference is made in the following description, illustrates one application of our invention to

metallic circuits connecting a plurality of stations, each having an electrical bell or signaling device and switches or means for forming and operating at will a metallic circuit with any other station in the system. The drawing represents diagrammatically station No. 1 connected in circuit with station No. 3 and in the act of communicating with that station through the bell or signaling device.

In applying our invention to a system of this kind, in which every station has its own line-selecting device, two lines or conductors that are individual to the station have terminals at contact-points in switching devices at every other station, and through the medium of these switching devices one of the lines or conductors is selected for the direct conductor and another for the return-conductor of the station with which communication is desired. For example, the lines 1 2, used as direct conductors, have line-terminals *a* in the direct-line switch A, and the lines 3 4, used as return-conductors, have corresponding terminals *b* in the return-line switch B. By setting the movable members *a'* *b'* of the two switches to the lines individual to the selected station with which communication is desired the two lines or conductors selected will constitute a metallic circuit of which the direct line of the call-receiving station will form one side and the return-line of that station will form the other side. To these two lines or conductors which are individual to the station a bell *m* or other electrically-actuated device is permanently connected by a lead 5, tied to the main line or conductor on one side and by a connection 6 running to the other conductor. The battery or other source of energy employed is not directly connected with or into either line or conductor of the circuit, but is situated in a normally open circuit having two conductors 7 8 leading from opposite sides or poles and provided with terminals in a circuit-closing means at each station having a stationary stop 10, forming the terminal of the line 8, and a second movable contact-stop 12, forming the terminal of the line 7. At these two stops the battery-circuit stands normally open at every station; but at the time of use when the current is required for operating the circuit connection is made through these stops 10 12 by connecting the movable member of



one line-switch  $a'$  into one stop and the corresponding member of the other line-switch  $b'$  into the other stop. For this purpose the movable member  $b'$  of the line-switch B is  
 5 connected into the movable stop 13 of the key 20 by a connection 16, and the additional movable stop 12, situated behind the movable stop 13 of the key, is arranged to make contact at the time of closing the key with a  
 10 third stop 15, that forms the terminal of a connection 17, leading from the movable member  $a'$  of the other line-switch. The contact-stop 12 is placed for convenience behind the movable stop 13 of the key, so that the same  
 15 movement of the key will close and complete the connection between one line-conductor and the side 8 of the battery-circuit and between the other line-conductor and the remaining side 7 of that circuit. In this arrangement of the circuit-closing means the  
 20 stop 12 should be insulated from the stop 13, as indicated at 18. The effect of this arrangement is to disconnect and separate the source of current from all the conductors of the main  
 25 circuits under all conditions, excepting at the instant that the circuit is closed at the key. At all other times, the lines being opened and disconnected from the battery, the current is prevented from setting up or producing either  
 30 by conduction or induction a disturbing effect on any of the lines that are employed for main circuits.

The operation of completing the circuit for calling one station from another is illustrated  
 35 in the diagram, where the subscriber at station No. 1 has made connection with station No. 3 by setting his switches  $a'$   $b'$  on the proper line-terminals. On pressing the key 20 one side of the battery will be closed on the conductor 4 through the connection 8, the stop  
 40 10, the movable stop 13, and the connection 16, running to the return-switch  $b'$ , thence out over the line 4 and through the connection 6 at station No. 3 to the bell, thence from  
 45 which the connection 5 continues the circuit to the direct conductor 1. Over that line leading to the calling-station the circuit is completed through the switch  $a'$  at that station and the connection 17 to the fixed stop 15.  
 50 As the movable stop 12 touches the stop 15 at the moment that the key is closed against the stop 10, the circuit will be completed over the conductors specified and through the battery, and the bell-signal or other device which  
 55 is connected in the circuit between the two line-conductors will be operated.

It will be evident that by using coils of sufficiently high resistance for the electromagnets of the bells or other signaling devices  
 60 there will be no disturbance or improper action of the other electrical devices on those adjacent circuits that may have for a member one or the other, but not both of the main-

line conductors. By using coils of sufficiently high resistance for the electromagnets of the  
 65 bells or interposing proper resistance in the connections between the bell or other device and the conductors of the main circuit the flow of the current on those selected conductors which are closed on the battery at the time of  
 70 completing a circuit through the line-switches will act only upon those bells or devices that are connected into the selected line-conductors, it being understood that the current supplied from the battery is of sufficient strength to  
 75 operate the electrical devices through one of such resistances, but will be incapable of acting upon the other devices with which a circuit might be set up at the same time in an indirect manner by passing through the con-  
 80 ductors of several stations, one or the other of which may constitute the direct or the return side of the circuit that happens to be directly connected with the battery by its switching devices.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. A system of conductors for operating electrical devices between stations comprising  
 90 a plurality of wires arranged between the stations, means for selecting any one wire for use as a direct conductor of a circuit individual to a station and another wire for use as the return-conductor of that circuit, an electrically-  
 95 operated device permanently connected into the direct conductor and the return-conductor individual to a station, a source of current normally disconnected from the wires or conductors and circuit-closing means for connecting the selected direct conductor of a circuit  
 100 into one side of the source of electricity and the return-conductor of said circuit into the remaining side.

2. The combination of a series of direct conductors and return-conductors arranged to  
 105 form metallic circuits between stations, a direct-line switch and a return-line switch at each station for connecting the station by a metallic circuit with another selected station and an electrically-operated device at each station permanently connected into the direct line and the return-line individual to the station, a source of current normally disconnected from all the direct lines and return-lines, and circuit-closing means for connecting at will one  
 115 side of the said source of current into the selected direct line and the remaining side into the selected return-line of a circuit.

3. The combination of a series of direct conductors and return-conductors arranged to  
 120 form metallic circuits between stations, a direct-line switch and a return-line switch for completing a metallic circuit between one station and another station by selecting the direct line and the return-line individual to that station, an electrically-operated device at each  
 125

station permanently connected into its direct  
line and its return-line, a source of current  
normally disconnected from all the direct lines  
and return-lines and means for connecting at  
5 will the direct-line switch of a station into one  
side of said source of current and its return-  
line switch into the remaining side of the  
source of current.

In testimony whereof we have hereunto set  
our names to this specification in the presence 10  
of two subscribing witnesses.

ALBERT KOCH ANDRIANO.

HERMANN HERBSTRIIT.

Witnesses:

EDWARD E. OSBORN.

M. REGNER.