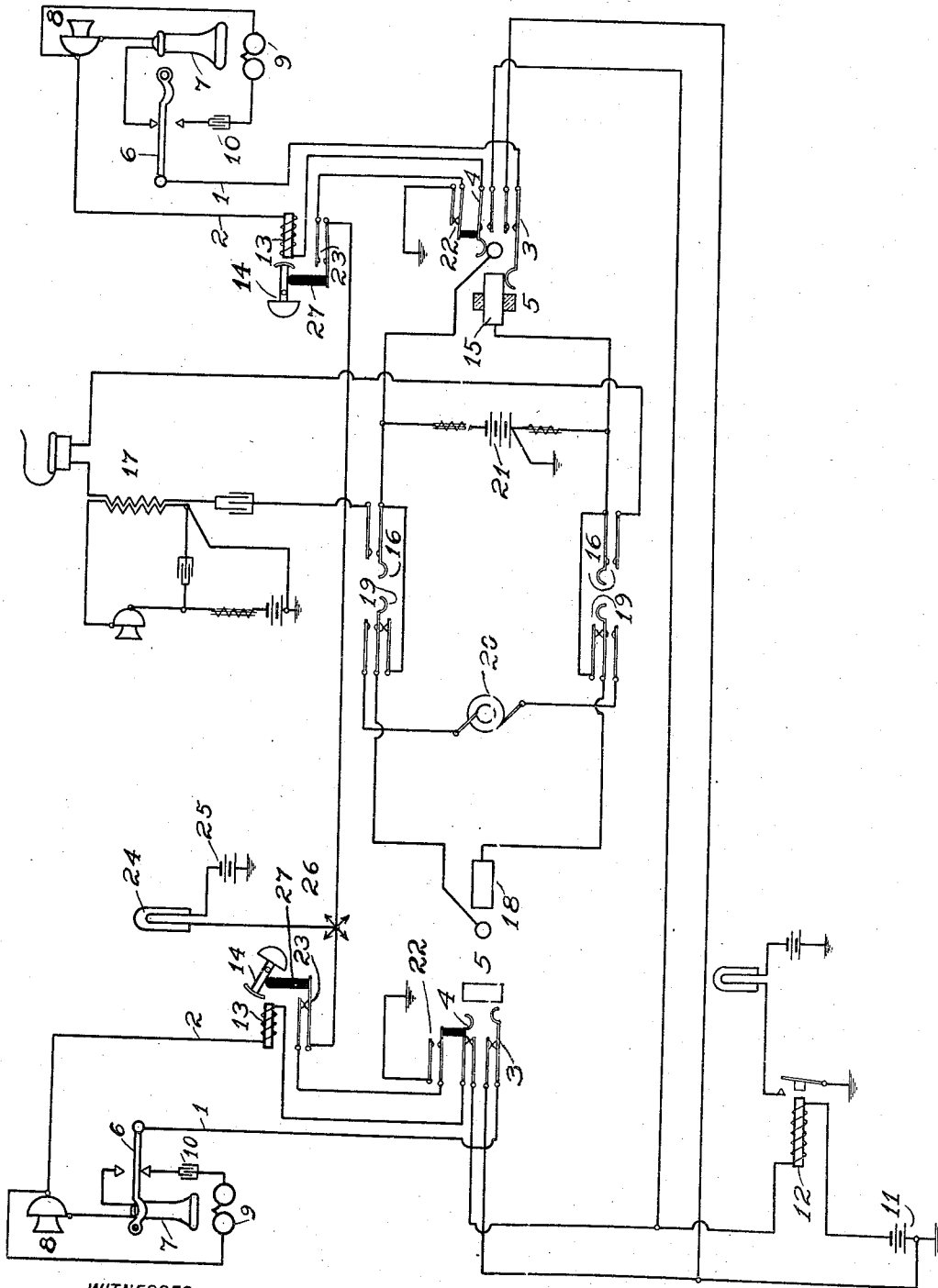


M. L. JOHNSON.
TELEPHONY.

APPLICATION FILED AUG. 10, 1911.

1,045,034.

Patented Nov. 19, 1912.



WITNESSES:

Etta L. White
Max S. Rosowicz

INVENTOR
MORTON L JOHNSON

BY *G. L. Gray*
ATTORNEY

UNITED STATES PATENT OFFICE.

MORTON L. JOHNSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO CORWIN TELEPHONE MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

TELEPHONY.

1,045,034.

Specification of Letters Patent.

Patented Nov. 19, 1912.

Application filed August 10, 1911. Serial No. 643,338.

To all whom it may concern:

Be it known that I, MORTON L. JOHNSON, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Telephony, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to telephone exchange systems and resides in the provision of a pilot clearing out indicator under the control of line signal devices when employed as clearing out indicators.

I will explain my invention more fully by reference to the accompanying drawing showing the preferred embodiment thereof and which illustrates two common battery lines extending from telephone stations to an exchange.

Each telephone line extends by its limbs 1 and 2 from substations to an exchange where these limbs terminate in line springs 3 and 4 of a spring jack 5. The apparatus at each of the substations to which the lines 1, 2 extend includes a telephone switch hook 6 connected with the line 1, a telephone receiver 7, a telephone transmitter 8, a signal receiving bell 9, and a condenser 10 in the signal bell bridge. The normal contact of the switch hook 6 serves to complete the connection of the signal bell bridge between the sides of the telephone line when the receiver is upon the switch hook and the alternate contact of the switch hook serves to establish the telephone bridge when the receiver is off its switch hook.

In initiating a call a circuit is established at the receiver switch hook and its alternate contact which may be traced from the upper pole of the battery 11, the winding of the line pilot relay 12, which is well known to those skilled in the art, the line spring 4 and its contact, the winding of the line signal device 13, the telephone transmitter 8 at the calling station, the telephone receiver 7 at that station, the associate switch hook 6, the limb 1 of the line, the line spring 3 and its contact, back to the battery 11. As a result of this operation the armature 14 of the line signal device is turned on its pivot to display a visual line or calling signal to the operator. The operator, in re-

sponse to this signal, inserts the answering plug 15 of a link circuit into the jack 5 of the calling line (which may be assumed to be the line illustrated at the right of the drawing) and thereafter operates a listening key which may be the usual listening key 16 illustrated, to include her telephone set 17 in circuit with the line to ascertain the connection desired. Assuming that a connection is to be established between the calling line shown at the right of the drawing and the line shown at the left of the drawing, the operator inserts the connecting plug 18 that is companion to the plug 15 into the jack of the wanted line and operates the usual ringing key 19 to include the calling generator 20 in bridge of the cord circuit and thereby in circuit with the signal receiver 9 at the station to be called. When the plugs are inserted in the jacks a battery 21 is included in circuit with both lines so that the calling party's signal device 13 continues to be included in circuit as long as the telephone receiver at the calling station is off its hook. Each spring jack is provided with a switch 22 that is arranged to have its contacts closed when a plug is inserted in the jack, as illustrated at the right of the drawing.

Each line signal device 13 has a switch 23 whose contacts are closed when the signal device is deenergized which is when the telephone receiver of the associate line is upon its switch hook as illustrated at the left in the drawing. When the receiver is free of its switch hook the contacts of the associate switch 23 are open as illustrated at the right of the drawing. The switches 22, 23 of each line are in serial relation with the clearing out pilot signal 24, this pilot signal being common to the switches 22, 23 of a plurality of lines. The conductor in which the common clearing out pilot signal 24 is included and which conductor is common to the switches 22, 23 of the lines, includes a grounded battery 25 and is connected with a conductor 26 that extends to the lower contacts of the switches 23. The armatures of the signal devices 13 operate these lower contacts through the intermediation of insulating fingers 27 when said armatures are attracted, the resilience of the lower contacts permitting their restoration when the armatures are released. Circuit is established through the clearing out pilot signal 24 when

a plug is inserted within a line jack and when the associate line signal 13 is deenergized, which is when the telephone receiver of the associate station is on its hook.

5 This circuit is opened at the switch 22, previously closed by the plug, when said plug is withdrawn from its jack. This circuit is also opened at the switch 23 with the plug in or out of its jack when the telephone receiver of the line to which the jack belongs is free of its switch hook. Thus the pilot clearing out signal 24 is displayed whenever a telephone receiver at a connected station is restored upon its hook and the signal it conveys is effaced when there are no plugs in the jacks associated therewith whereby there is provided a pilot clearing out signal that is jointly governed by the line signal devices and connecting links, when such line signal devices are themselves used as clearing out signal devices in established connections.

While I have herein shown and particularly described the preferred embodiment of my invention I do not wish to be limited to the precise details of construction and circuit arrangement as changes may readily be made without departing from the spirit of the invention.

Having thus described my invention, I claim as new and desire to secure by Letters Patent the following:—

1. A telephone exchange system including telephone lines extending from telephone stations to an exchange; link connectors for connecting lines in conversation; a signal device individual to and in such association with each line that it is within the control of the telephone station apparatus to convey call initiating signals and to act as a clearing out indicator when its line has been connected with; a pilot clearing out signal device common to a plurality of the aforesaid signal devices and adapted to be controlled thereby; and means governed by the link connectors for bringing the pilot clearing out signal device within the control of a line signal device when the line to which said line signal device belongs is connected with a link connector.

2. A telephone exchange system including telephone lines extending from telephone stations to an exchange; link connectors for connecting lines in conversation; a signal device individual to and in such association with each line that it is within the control

of the telephone station apparatus to convey call initiating signals and to act as a clearing out indicator when its line has been connected with; a source of current at the exchange for operating said signal devices, the telephone stations having switch hooks adapted when supporting the receivers to exclude said source of current from circuit with said signal devices and when free of the telephone receivers to include said source of current in circuit with said signal devices; a pilot clearing out signal device common to a plurality of the aforesaid signal devices and adapted to be controlled thereby; and means governed by the link connectors for bringing the pilot clearing out signal device within the control of a line signal device when the line to which said line signal device belongs is connected with a link connector.

3. A telephone exchange system including telephone lines extending from telephone stations to an exchange and there terminating in line jacks; link connectors for connecting lines in conversation and provided with plugs for insertion in said line jacks; a signal device individual to and in such association with each line that it is within the control of the line station apparatus to convey call initiating signals and to act as a clearing out indicator when its line has been connected with; a pilot clearing out signal device common to a plurality of the aforesaid signal devices; each line having two switches individual thereto and in serial relation with said pilot signal device, one of said switches being governed by the signal device individual to the associate line and having its contacts opened when this signal device is energized and closed when this signal device is deenergized, the second switch being governed by the plug of a connecting link and having its contacts closed thereby when said plug is inserted within the associate line jack, there being a source of current for inclusion in circuit with said clearing out pilot signal device, such circuit being established when the contacts of said switches are closed at the same time.

In witness whereof, I hereunto subscribe my name this 24th day of July A. D., 1911.

MORTON L. JOHNSON.

Witnesses:

E. L. WHITE,
G. L. CRAGG.