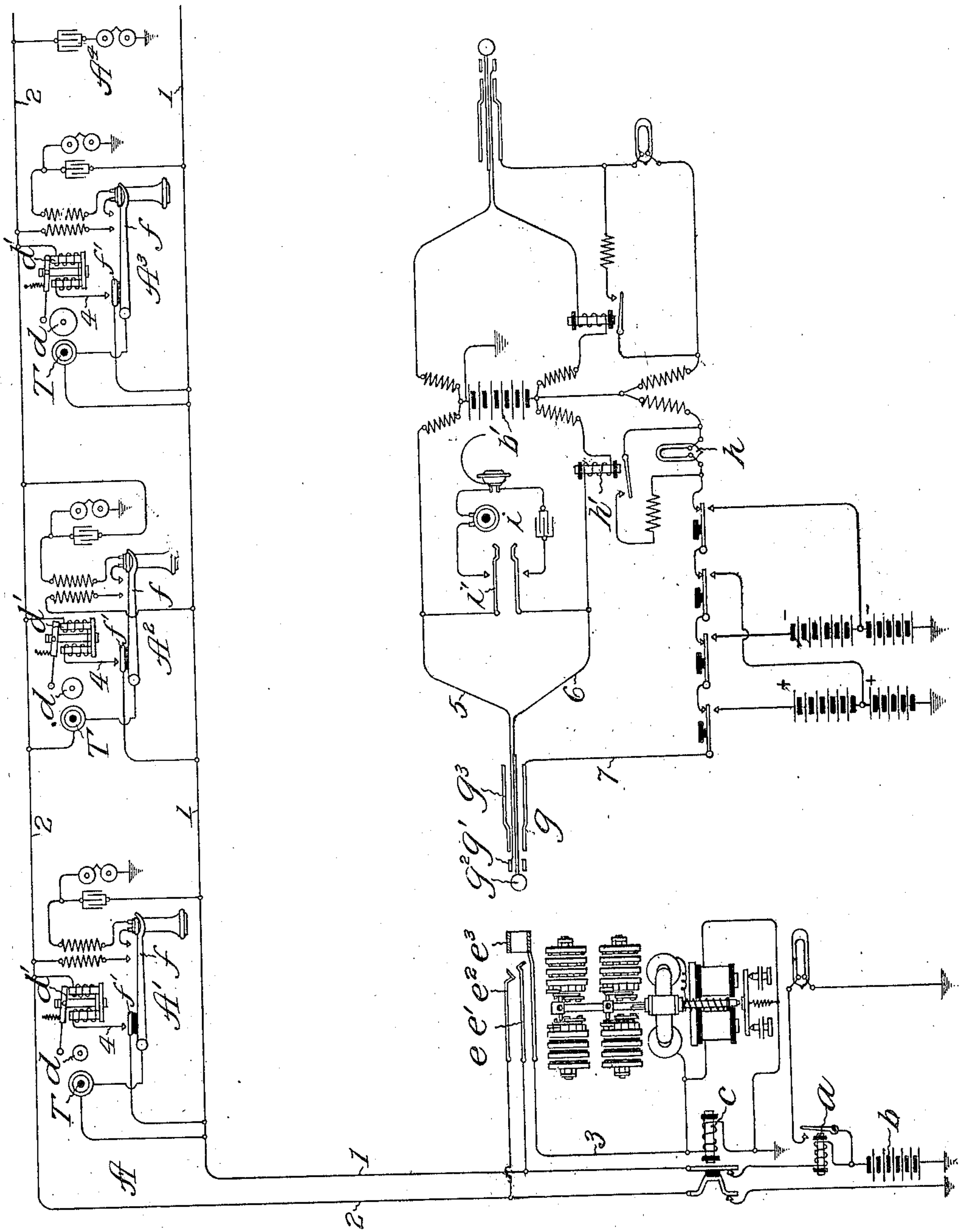


No. 822,466.

PATENTED JUNE 5, 1906.

J. L. McQUARRIE.  
 SIGNALING SYSTEM FOR PARTY TELEPHONE LINES.  
 APPLICATION FILED DEC. 10, 1904.



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# UNITED STATES PATENT OFFICE.

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## SIGNALING SYSTEM FOR PARTY TELEPHONE-LINES.

No. 822,466.

Specification of Letters Patent.

Patented June 5, 1906.

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*To all whom it may concern:*

Be it known that I, JAMES L. McQUARRIE, a citizen of the United States, residing at South Orange, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Signaling Systems for Party Telephone-Lines, of which the following is a full, clear, concise, and exact description.

My invention relates to party-line telephone systems, and has for its object to provide an improved organization of circuits and apparatus whereby the central-office operator upon making connection with a party-line in response to a call may readily ascertain the particular subscriber calling.

My invention contemplates the provision of distinctive signal devices at the substations of such a party-line for indicating to the operator which one of the substation telephone instruments of the party-line is in use or which subscriber is calling for connection, the operator being provided with a suitable receiving device which she may connect with the line to receive the peculiar signal produced at any station.

More particularly, the invention contemplates such a distinctive signal device at each substation of the party-line arranged to be brought into operative relation to the line upon the removal of the telephone-switch at such station in initiating a call. The operator is provided with a connection-switch adapted when closed to connect the link conductors of her cord-circuit with the line, such link conductors having associated therewith a source of current adapted to operate the signal device at the substation whose telephone is in use upon the closure of the connection-switch. The signal-receiving device is associated with the link conductors to receive the signal produced at the calling-station. This arrangement is of particular advantage where it is desired to make a charge for each call initiated by each substation of the party-line, since it enables the operator to ascertain which subscriber is calling and should be charged.

I will describe my invention more particularly by reference to the accompanying drawing, which is a diagram of a four-party-line

telephone system organized and equipped in accordance with my invention.

The party-line A extends in two limbs 1 2 from the four substations A' A<sup>2</sup> A<sup>3</sup> A<sup>4</sup> to the central office and thence through the contacts of a cut-off relay c, limb 1 extending therefrom through the usual line-signal controlling-magnet a to the free pole of grounded central-office battery b, while limb 2 is connected directly to earth. The line is provided at the central office with the usual spring-jack terminal e, having long and short line-springs e' e<sup>2</sup> connected with the limbs 1 2, respectively, together with a thimble e<sup>3</sup>, forming the terminal of a conductor 3, extending to earth through the winding of the usual cut-off relay c.

The apparatus at each substation is of the type commonly employed in central-battery party-line systems, except that each station is equipped with a distinctive signal-producing device, such as a single-stroke bell d, located adjacent to the transmitter T and having an operating-magnet d' included in a bridge 4 of the line-circuit controlled at a normally open special contact f' of the telephone-switch f. The bells at the different stations may have different tones, so that the operator may recognize the characteristic signal of any particular one of the substations.

The central-office operator is provided with the usual pair of link conductors 5 6, terminating at the ring and tip contacts g' g<sup>2</sup>, respectively, of an answering-plug g, adapted for insertion in the spring-jack e of the party-line, the said plug and spring-jack constituting a connection-switch which when closed is adapted to unite the link conductors with the line. The sleeve g<sup>3</sup> of plug g forms the terminal of a conductor 7, leading from the free pole of a battery b', included in a bridge of the link conductors 5 6, said sleeve being adapted to register with the thimble of spring-jack e to complete a circuit for the cut-off relay c. The conductor 7 includes the usual supervisory signal h, controlled by a supervisory relay h' in the link conductor 6, said supervisory relay being adapted to respond to the telephone-switch of the calling subscriber during connection.

Each of the signal devices at the substa-



tions is arranged to be unresponsive to current from battery *b*, normally connected with the line, but is adapted when the telephone at any such station is removed to be operated upon the closure of the connection-switch by current from battery *b'*, associated with the link conductors. The magnet of each of the signal-bells *d* may be polarized and biased, so as not to respond to current from battery *b*, which is normally connected with the line at the central office, and the battery *b'* may be so connected with the link conductors that upon the closure of the connection-switch current therefrom will traverse the magnet at the substation calling in proper direction to operate the same and sound the bell. A signal-receiving device *i* is associated with said link conductors, by means of which the operator may receive the distinctive signal indicating the particular substation whose telephone is in use, said signal-receiving device consisting, preferably, of an operator's telephone set, the connection whereof with the link conductors is controlled by a switch-key *i'*.

While I have shown for convenience of illustration two batteries marked *b b'*, it will be understood, of course, that in practice these would be one and the same battery.

The operation of the system may be briefly outlined as follows: Assume that subscriber at station *A*<sup>3</sup> desires an exchange connection. Upon removing the receiver from the switch-hook at his station the line-circuit is completed in the usual manner to display the line-signal. At the same time the distinctive signal-producing device at such substation is brought into operative relation to the line—that is, upon the closure of the contact *f'* by the telephone-switch the bridge 4 of the line is completed, which includes the signal-bell, said bell, as before stated, being unresponsive to the central-office battery *b*, normally connected with the line. The operator upon observing the display of the line-signal inserts her answering-plug into the spring-jack *e* of the line and closes the switch *i'* to bring her telephone set or signal-receiving device into association with the link conductors. The closure of the local circuit 7 3, including the cut-off relay, effects the energization of such relay to disconnect the line-signaling apparatus from the line in the usual manner without, however, affecting the service-meter magnet *m'*. The battery *b'*, associated with the cord-circuit, is now connected with the limbs 1 2 of the line, and current therefrom passes through the signal-producing device at the substation *A*<sup>3</sup> which is operated thereby, giving a distinctive signal or tone which will be communicated through the agency of the substation-transmitter over the line to the operator's signal-receiving device *i*. The operator will accordingly know by this charac-

teristic signal that station *A*<sup>3</sup> is the one whose telephone is in use.

I claim—

1. The combination with a telephone-line extending from a plurality of substations to a central office, of a distinctive electrically-actuated signal-producing device at each substation, a telephone-switch at each station and means controlled thereby for operatively associating the signal-producing device at that station with the line in the use of the telephone, a source of current, means at the central office for controlling the application of current to the line to operate the signal device of any substation the telephone of which is in use, and a signal-receiving device connected with the line at the central office responsive to said signal-producing device, whereby the particular telephone in use is indicated.

2. The combination with a telephone-line extending from a plurality of substations to a central office, of distinctive audible signal-producing devices, one at each substation, means at each station for transmitting an audible signal over the line; an operator's signal-receiving device associated with the line at the central office responsive to such signals, a source of current at the central office and means at the central office for applying current from said source to the line, to operate the signal device at any busy station, whereby the particular telephone in use is indicated to the central-office operator.

3. The combination with a telephone-line extending from a plurality of substations to a central office, of a number of signal-bells of distinctive tone, one at each substation, a telephone-switch at each station controlling the connection of the signal-bell at that station with the line, a source of current, means at the central office for controlling the application of current to the line to operate the signal-bell at any station the telephone of which is in use, means at each substation for transmitting the signal produced over the line, and a signal-receiving device connected with the line at the central office responsive to said signal, whereby the particular telephone in use is indicated to the central-office operator.

4. The combination with a telephone-line extending from a plurality of substations to a central office, of a number of signal-bells of distinctive tone, one at each substation, a normally open bridge of the line at each substation including the signal-bell thereof, a telephone-switch at each substation controlling said bridge, link conductors at the central office, a connection-switch for uniting said link conductors with the line, a source of current connected with said link conductors adapted upon the closure of said connection-switch to operate the signal-bell of the station whose telephone is in use, a transmitter



at the substation for transmitting the signal over the line, and a telephone associated with the link conductors adapted to receive said signal; whereby the particular telephone in use is indicated to the central-office operator.

5 5. The combination with a telephone-line extending from a plurality of substations to a central office, of distinctive signal-producing devices, one at each substation, an operator's  
10 signal-receiving device associated with the line at the central office and responsive to said signal-producing devices, a source of current at the central office, and an operator's

plug and plug-circuit at the central office for connecting said source of current and signal-  
15 receiving device with the line, the current from said source operating the signal-producing device at a busy station.

In witness whereof I hereunto subscribe my name this 28th day of November, A. D. 20  
1904.

JAMES L. McQUARRIE.

Witnesses:

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A. NEIL CLARK.