

No. 656,996

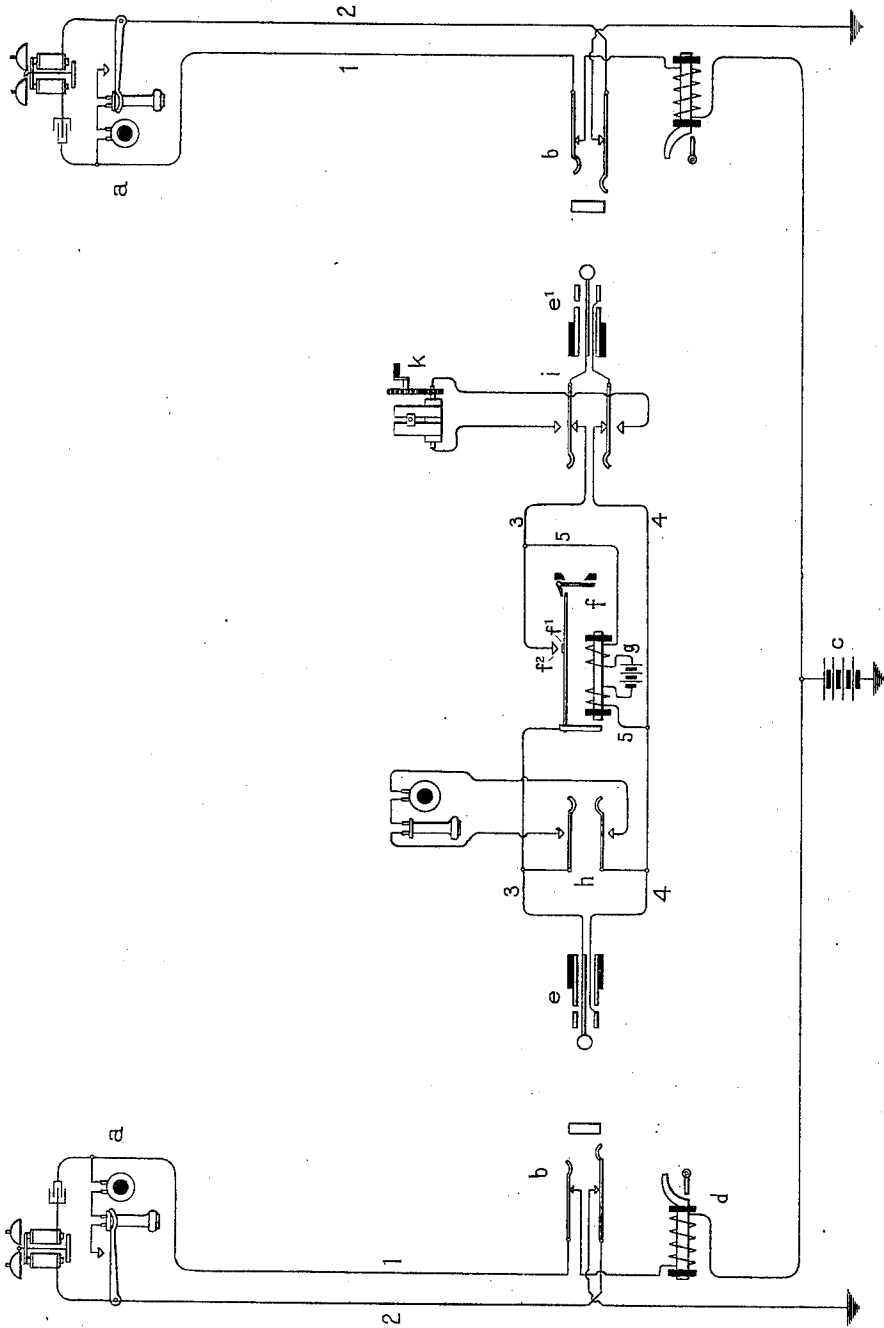
Patented Aug. 28, 1900.

F. R. McBERTY.

SUPERVISORY SIGNAL FOR TELEPHONE SWITCHBOARDS.

(Application filed July 25, 1898.)

(No Model.)



Witnesses:

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# UNITED STATES PATENT OFFICE.

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## SUPERVISORY SIGNAL FOR TELEPHONE-SWITCHBOARDS.

SPECIFICATION forming part of Letters Patent No. 656,996, dated August 28, 1900.

Application filed July 25, 1898. Serial No. 686,821. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK R. McBERTY, a citizen of the United States, residing at Evanston, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Supervisory Signals for Telephone-Switchboards, (Case No. 71,) of which the following is a full, clear, concise, and exact description.

This invention concerns the supervising appliances associated with link conductors for uniting telephone-lines in switchboards. Its object is to provide a single supervising-indicator with means for bringing the indicator at one time under the control of one of the lines and subsequently under the control of both of the lines to indicate in the first instance the response of the called subscriber and in the second instance the discontinuance of conversation.

In supervising telephonic communications by means of signals automatically controlled from the stations of the united lines an operator needs to be informed only as to the moment of response of the called subscriber after she has completed connection with a line and has transmitted a call-signal and the replacement of the telephones on the switches at both stations when conversation is finished, to be followed by severing connection between the lines. In systems of circuits for telephone-switchboards heretofore devised providing for such supervision it has been common to associate a supervisory signal with each of the united lines, each signal being responsive only to the line with which it is directly associated, in which case the response of the called subscriber is indicated to the operator by the display or concealment of the signal associated with the called line, while the discontinuance of conversation is signified by the display or disappearance of the signals associated with both lines. The present invention contemplates simplified mechanism for attaining the same result—namely, a single electromagnetic signal in a bridge of the plug-circuit or link conductors for uniting lines, together with a source of current and switch contacts closed when the signal is excited, which complete a normally-open break in the plug-circuit between the bridge

and the calling station. Thus after connection has been established with a line called for the signal is in electrical connection or association only with that line and is responsive to current produced in the line when the telephone at the station thereof is taken for use; but after its initial response, which signifies the answer of the called party, it is brought into electrical connection with both lines, and its disappearance is conditional upon the cessation of current in both lines at the termination of conversation.

The invention is illustrated in the attached drawing.

At each substation *a* the line-circuit may be normally complete through a bell and a condenser. The receiving and transmitting telephones at each station are in an open branch of the circuit in shunt of the bell which is controlled by a telephone-switch, being closed while the telephone is in use. The conductors of each line are led to the usual line-contacts of a spring-jack *b* in a telephone-switchboard. From the switch-contacts of this spring-jack they are extended to the grounded pole and to the free pole, respectively, of a source of current *c*, the magnet-winding of an individual-line signal *d* being introduced in the extension of line conductor 1.

In the switchboard pairs of plugs *e* and *e'* are furnished for uniting lines, the like contacts of the two members of a pair being connected together through conductors 3 and 4, of which the former is normally broken. A wire 5 forms a bridge of the plug-circuit. This conductor traverses the two windings of the electromagnet of a visible signal *f*, which is associated with the plugs in the switchboard and contains a battery *g*, interposed between the windings. These windings should be of high impedance to prevent the shunting of telephonic current through the bridge. An arm of signal *f*, connected with the armature, operates a pair of switch-contacts *f'* *f*<sup>2</sup>, which it is adapted to close together when the magnet is excited. These switch-contacts control the continuity of conductor 3 toward the answering-plug *e* of the pair. The plugs and plug-circuit are connected with the usual operator's listening-

key *h* for connecting a telephone into circuit with the answering-plug *e* and with a calling key *i* for looping a source *k* of calling current into the circuit of plug *e'*, at the same time  
 5 breaking the normal conductors leading toward the mate plug *e*.

A subscriber's call for connection is given automatically in the act of taking the telephone at the substation for use, this act serving to complete a low-resistance circuit of the  
 10 line at the substation, whereby current is permitted to flow from the central battery, as *c*, through the line-signal *d* to cause the display of the signal. To answer this call, the operator inserts plug *e* into the spring-jack *b* and  
 15 manipulates the listening-key *h*, thus bringing her telephone into circuit with the telephone of the calling subscriber. Having ascertained the subscriber's want, the operator completes the connection by inserting plug *e'*  
 20 into the spring-jack of the line called for and rings the bell at the called station by the use of key *i*. After the transmission of the calling current the apparatus is in the following condition: The circuit toward the calling station  
 25 is incomplete, being broken at the separated contacts *f'* *f*<sup>2</sup> of the signal *f*. The battery *g* is in a circuit made up of a portion of conductors 3 and 4 and the line conductors 1  
 30 and 2 to the called station, which includes the magnet-windings of the signal *f*, but which is broken at the telephone-switch at the substation. When the subscriber at the called station in response to the ringing of  
 35 the bell at the station takes the telephone from its switch to answer the call, this circuit last traced is completed and the magnet of signal *f* conceals its indicator. The same movement of the armature of the magnet  
 40 which effects this function also closes the circuit of battery *g* to the calling station. Thereafter the excitement of the controlling-magnet of the signal is maintained by current to either the called or the calling station, and  
 45 hence the signal can become displayed only upon the breaking of the circuits at both these stations by the replacement of both telephones on their switches. Hence after the transmission of the calling current the  
 50 continued display of the indicator of signal *f* shows the operator that the called subscriber has not yet responded to the call, and the disappearance of the target finally indicates such response. The subsequent appearance  
 55 of the signal signifies the termination of conversation over the connection and constitutes a call for disconnection.

The invention is defined in the following claims:

1. The combination with two telephone-  
 60 lines united by conductors into a continuous circuit and a telephone-switch at each station for closing the line during the use of the telephone, the circuit of said united lines being  
 65 broken at one point, of an electromagnet in a closed circuit together with a source of current in one of the lines, a supervisory signal controlled by the electromagnet, and switch-contacts of the magnet closed when the magnet  
 70 is excited adapted to complete the break in the circuit, as described.

2. The combination with telephone-lines, a switch at each station adapted to complete the corresponding line-circuit in the use of  
 75 the telephone, and link conductors for conductively uniting the lines into a continuous circuit, of an electromagnetic signal together with a source of current in a bridge of said  
 80 link conductors, a normal break in one of said conductors, and switch-contacts of the electromagnet closed when the magnet is excited controlling the said break, as described.

3. The combination with a calling and a called line, a telephone-switch at the station  
 85 of each line for closing the line-circuit in the use of the telephone, and plugs and a plug-circuit for uniting the calling with the called line, of a magnet of high impedance together  
 90 with the source of current in a bridge of the plug-circuit, a signal-indicator controlled by the magnet, and switch-contacts of the magnet controlling a break in a conductor of the  
 95 plug-circuit between said bridge and the calling station, substantially as described.

4. The combination with two telephone-  
 95 lines, a switch at the station of each line for controlling current in the line in the use of the telephone, link conductors for uniting the lines, of a bridge of the link conductors and  
 100 a source of current therein, an electromagnet in the path of current from said source to the called station, and a supervisory signal controlled by the magnet, said magnet being normally unresponsive to current in the other  
 105 line, and means actuated by the magnet when excited adapted to bring it under the control of current in the calling line, substantially as described.

In witness whereof I hereunto subscribe  
 my name this 22d day of June, A. D. 1898. 110  
 FRANK R. MCBERTY.

Witnesses:

ELLA EDLER,  
 MYRTA F. GREEN.