S. PATERSON.

SUPERVISORY CONTROL CIRCUITS FOR TELEPHONE SYSTEMS.

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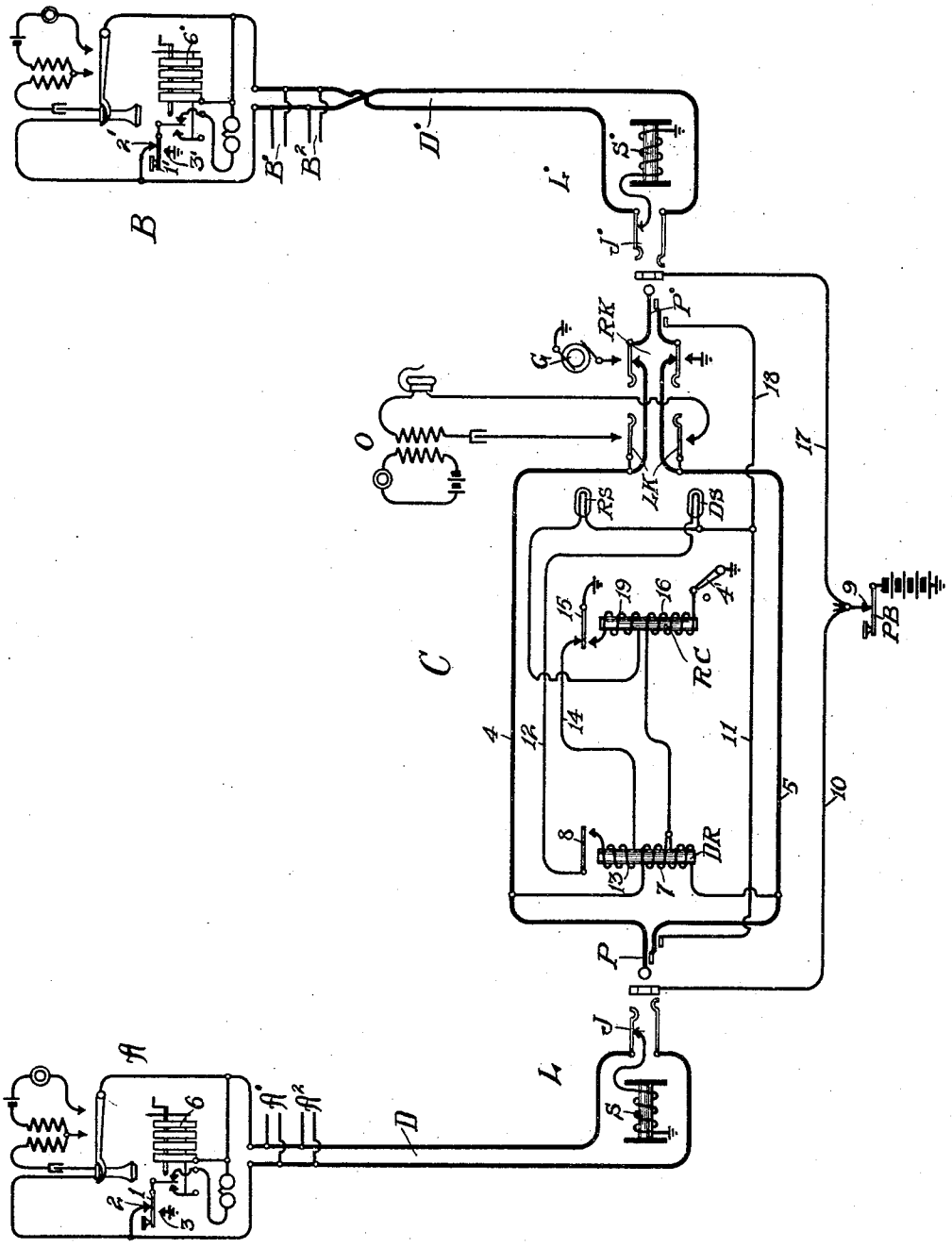

Witnesses:

George E. Mueller

Wm. Borghalm.

Inventor:

Samuel Paterson

By Curtis B Camp

Attorney

UNITED STATES PATENT OFFICE.

SAMUEL PATERSON, OF KENTON, MANITOBA, CANADA, ASSIGNOR TO KELLOGG SWITCHBOARD AND SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SUPERVISORY CONTROL-CIRCUITS FOR TELEPHONE SYSTEMS.

1,269,499. Specification of Letters Patent. **Patented June 11, 1918.**

Application filed October 17, 1914. Serial No. 867,213.

To all whom it may concern:

Be it known that I, SAMUEL PATERSON, residing at Kenton, in the District of Brandon and Province of Manitoba, Canada, have invented certain new and useful Improvements in Supervisory Control-Circuits for Telephone Systems, of which the following is a specification.

My invention relates to supervisory signal control circuits for telephone exchanges and is directed more particularly to systems employing magneto substations. The main object of my invention is to provide separate clearing-out and recall signals for the operator's cord circuit, which signals may be independently operated from a connected magneto substation. In the preferred embodiment of my invention I provide clearing-out or disconnect and recall signal control relays for the cord circuit in combination with clearing-out or disconnect and recall signals which may be independently operated from a connected substation. For the purpose of controlling these signals I provide a well-known form of substation having a generator which may be connected in bridge of the telephone line or have one of its terminals grounded and the other terminal connected to one limb of the line. I also preferably connect the line drop to one of the limbs of the line and ground it so that a subscriber by grounding his hand generator by the use of a push button can operate the line drop without giving any indication of his call at any of the other substations connected to his line.

The figure shows a cord circuit at a central exchange, arranged to connect two magneto substations.

When lines are connected by the cord circuit the subscriber at a connected substation by pressing his key and actuating his hand generator as is usual for signaling the central operator, will actuate the recall signal. Should the subscriber actuate his hand generator without pressing the grounding key as is usual for ring-off purposes, he will actuate the clearing-out signal without effecting the recall signal. In this way the operator may distinguish between a clearing-out and recall operation of the substation generator.

Referring now in general to my invention as illustrated, it comprises a well-known form of magneto substation A and in addition to the usual equipment I provide a grounding key 1 having a normally closed contact 2 and normally open grounded contact 3. The substation A terminates at the exchange in a simple drop and jack line circuit L which comprises a signal S and jack J. The substation A is preferably located on a party line and to this end I have shown party line taps A^1 and A^2. The grounding key 1 at the substation is used when signaling the exchange so that when the hand generator at the substation A is operated, and the key 1 operated to close the normally open contact 3, the central office is called secretly, or the key used to recall the operator as will be more fully described in the following specification.

A cord circuit C is provided and comprises an answering plug P and a calling plug P^1 connected by the heavily marked conductors 4 and 5. A listening key LK is shown which when operated bridges the operator's telephone O to the cord conductors 4 and 5 and a ringing key RK is also shown and when operated connects the ringing generator G. A disconnect relay DR is provided which controls the disconnect signal DS and a recall relay RC is also provided which controls the recall signal RS which signal is preferably a colored lamp to distinguish from the disconnect signal. A push button circuit breaker PB is provided which is preferably common to all jacks and used for effacing the recall lamp without removing the connected plugs. A switch 4′ is provided which normally connects ground to the cord but when thrown to its alternate position removes ground so as to provide an ungrounded cord for certain connections.

To the right of the drawing I have shown a magneto substation B similar to that of A and also terminating at the exchange in a line circuit L^1 similar to that of L. The substation B is preferably located on a party line and I have shown the party line taps B^1 and B^2.

Having described in general the apparatus as illustrated I will now describe the operation of my invention.

Assuming now that the subscriber at the substation A wishes to converse with the subscriber at the substation B, the subscriber A removes his receiver and oper-

ates the grounding key 1 to close the grounded contact 3 and at the same time operates the hand generator 6. The signal S at the exchange is operated, the circuit being traced from ground through the generator, tip line limb, normally closed contacts of the jack J, through the winding of the drop signal 5 to ground, actuating the drop. The operator inserts the plug P into the jack J and throws her listening key LK to ascertain the wants of the calling subscriber. The operator upon testing and finding the line of B idle inserts the plug P^1 into the jack J^1, operates the ringing key RK to connect ringing current to the called line. The circuit of the ringing current is traced from the ungrounded pole of the generator G, closed contact of the ringing key RK, tip contacts of the plug P^1 and jack J^1 through the call bell of the called substation, normally closed contact 2^1, sleeve contacts of the jack J^1 and plug P^1 to ground. The called subscriber having answered, the two subscribers are now in conversational circuit, the talking circuit being traced over the heavily marked conductors.

The subscribers having finished conversation they replace their receivers upon their respective switch-hooks. The subscriber at substation A having replaced his receiver operates the hand generator 6 to send current through the winding 7 of the relay DR, the circuit being traced from the generator to the line limb, tip contacts of the jack J and plug P, conductor 4, winding 7, conductor 5, sleeve contacts of the plug P and jack J, line limb, normal contact 2, back to the generator. The energization of the relay DR closes its alternate contact 8 and establishes a circuit for the clearing-out signal DS the circuit being traced from battery to normal contact 9 of the push button circuit breaker PB, conductor 10, third contacts of the jack J and plug P, conductor 11, through the signal DS, conductor 12, alternate contact 8, winding 13, conductor 14 to ground at normal contact 15, lighting the signal DS. The subscriber at the substation B also operates his generator sending current through winding 7. The operator noting the signal DS knows disconnection is desired and removes plugs P and P^1 from the connected jacks J and J^1, thus opening the circuit for relay DR which deënergizes and effaces the signal DS thus placing the cord circuit C in condition for other connections.

Assuming as before that the two subscribers A and B have finished conversation and that subscriber at substation A has given the disconnect signal as before described to light the signal DS and assuming further that the subscriber at B wishes to recall, the subscriber at the substation B operates the grounding key as usual in calling and at the same time operates the hand generator 6^1. If the operator has not removed the plugs this operation of the generator establishes a circuit for the recall relay RC traced from ground at switch 4', the winding 16 of relay RC, upper half of winding 7, conductor 4, normal contact of ringing key RK, tip contacts of the plug P^1 and jack J^1, line limb, generator 6^1 to ground at alternate contact 3^1 of the grounding key 1^1. This causes the energization of relay RC which closes its alternate contact 15 establishing an energizing circuit for recall signal RS and locking circuit for RC traced from battery, normal contact 9 of button PB, conductors 10, 17, third contacts of the jacks and plugs, the conductors 11, 18, through the signal RS, winding 19 to ground at alternate contact 15. The interruption of normal contact 15 effaces or prevents the lighting of the disconnect signal DS and the operator noting the lighted recall signal RS throws her listening key LK and inquires as to the wants of the party recalling. To efface signal RC the operator actuates switch PB to open its normal contact 9 to deënergize the relay RC to efface signal RS.

In the preferred form of my invention I use a lamp signal but it is to be understood that my invention is not to be limited thereto. I also contemplate using my invention in other ways than that shown and therefore I do not desire to be limited to the exact structure as shown and described but aim to cover all that which comes within the spirit and scope of the appended claims.

Having described my invention, what I claim as new and desire to secure by United States Letters Patent, is—

1. A telephone system comprising telephone lines, an operator's link circuit for connecting to said lines, disconnect and recall relays for the link circuit, and control circuits whereby said relays may be operated selectively from a connected substation.

2. A telephone system comprising telephone lines, an operator's link circuit having a terminal plug for connecting to said lines, disconnect and recall relays for the link circuit, and grounded and metallic control circuits whereby said relays may be operated selectively from a connected substation.

3. A telephone system comprising telephone lines, an operator's link circuit having a terminal plug for connecting to said lines, a disconnect relay connected in bridge of the talking conductors of the link circuit, a recall relay having one terminal of its winding grounded and the other terminal thereof connected to a central point of the disconnect relay winding, and control circuits whereby said relays may be operated selectively from a connected substation.

4. A telephone system including subscribers' telephone lines, an operator's link circuit for connecting a pair of said lines in conversational circuit, a disconnect signal and a recall signal for said link circuit, means controlled over one of the connected lines for operating said disconnect signal, and means controlled over the other of said connected lines for effacing said disconnect signal and for operating the said recall signal.

5. A telephone system including a subscriber's telephone line, substation apparatus connected thereto provided with a switch hook, a link circuit for connection to said telephone line, a disconnect signal and a recall signal for said link circuit, and means independent of said switch hook controlled from the said substation for selectively operating said signals.

6. A telephone system comprising subscribers' telephone lines, an operator's link circuit for connecting said lines in conversational circuit, disconnect and recall relays individual to the said link circuit, and means controlled by a connected one of said subscribers for selectively operating said relays.

7. In a telephone system the combination with a plug ended link circuit connected to a subscriber's telephone line, of a disconnect and a recall signal individual to said link circuit, circuit closing means for closing a bridge across said line, means independent of said closing means for operating one of said signals, and means controlled from said substation for subsequently operating the other of said signals, and for effacing the first of said signals.

8. A telephone system comprising subscribers' telephone lines, an operator's link circuit for connecting said lines, disconnect and recall relays individual to the link circuit, and means controlled by the connected subscribers for selectively operating said relays.

9. A telephone system comprising telephone lines, an operator's link circuit for connecting said lines, a disconnect relay and a recall relay normally connected to a conductor of said operator's link circuit, and means controlled from the substation of a connected one of said telephone lines for selectively operating said relays whereby the disconnect signal or the recall signal may be operated.

10. A telephone system including a subscriber's telephone line, substation apparatus connected to said line including a switch for bridging the substation receiver across said line, a pair of signals for said link circuit, and means operable after said substation switch has disconnected said receiver from in bridge of said line to selectively operate said signals.

11. A telephone system comprising telephone lines, an operator's link circuit for connecting said lines, a disconnect signal and a recall signal for said link circuit, means included in the link circuit and controllable from the substation of a connected one of said lines for operating said signals, and means controlled from the other one of said lines for thereafter operating the other of said signals and for effacing the said first signal.

12. A telephone system including a calling and a called subscriber's line, a link circuit for connecting said lines in conversational circuits, a pair of signals for said link circuits, means controlled from the calling substation to operate one of said signals, and means controlled from the called substation for effacing said signal and for operating the other of said signals.

13. A telephone system including a pair of subscriber's telephone lines, a link circuit for connecting said lines in conversational circuit, a pair of signals for said link circuit, means controlled over one of said lines for operating one of said signals, and means controlled over the other of said lines for effacing said signal and for operating the other of said signals.

Signed by me at Kenton in the District of Brandon, Province of Manitoba in the Dominion of Canada, in the presence of two witnesses.

SAMUEL PATERSON.

Witnesses:
GEO. JONES,
FRANK ROEWE.