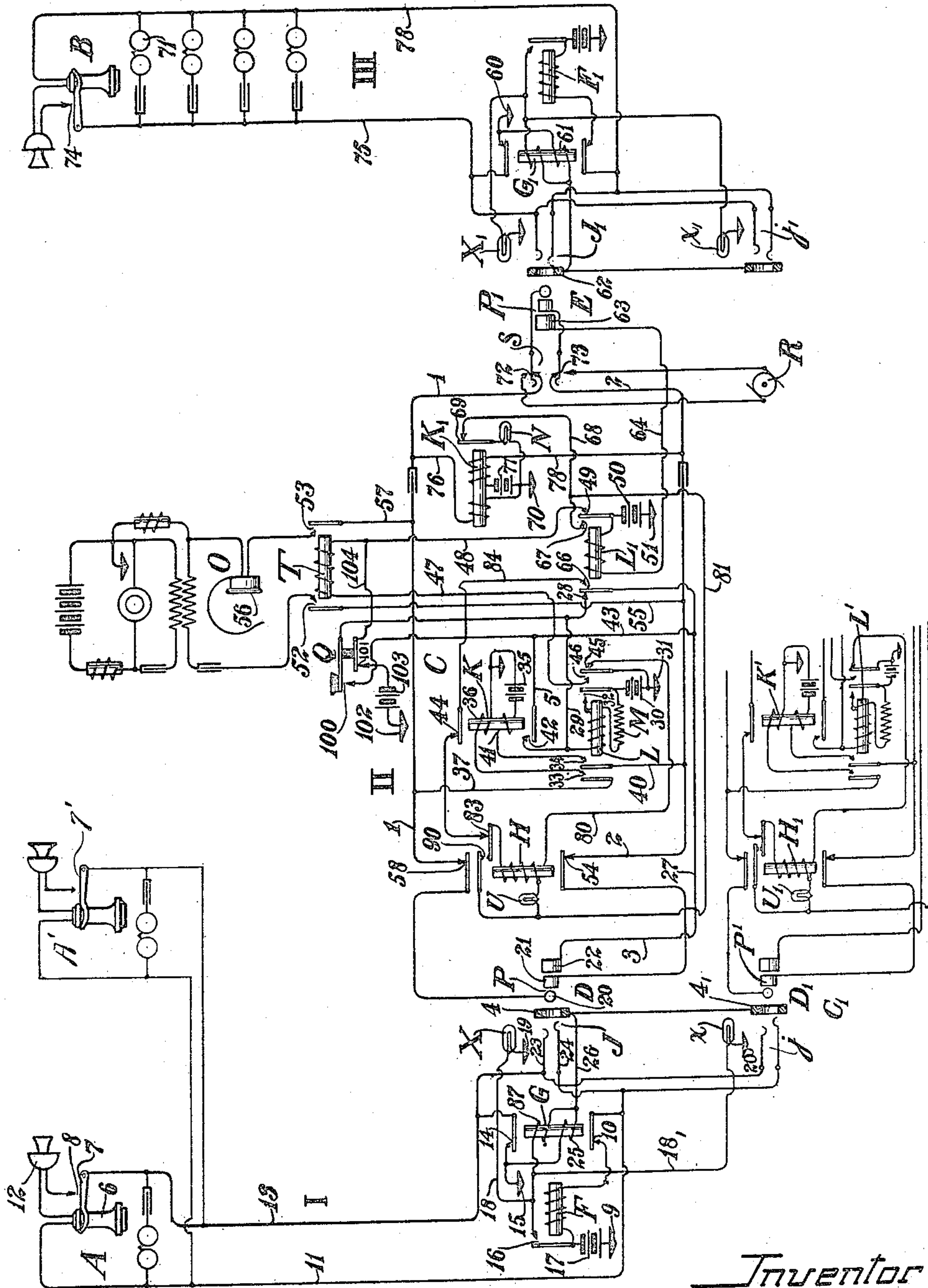


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TELEPHONE SYSTEM.
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UNITED STATES PATENT OFFICE.

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TELEPHONE SYSTEM.

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To all whom it may concern:

Be it known that I, FRANK M. SLOUGH, a citizen of the United States, residing at Elyria, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in Telephone Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to telephone systems and to improvements therein, for the purposes of performing certain useful functions in attaining useful objects which will be apparent from a description of an embodiment of the invention, such as shown in the accompanying drawing.

One of the objects of my invention is to provide means whereby an electrical potential suitable for causing a busy test is placed upon the terminals of a line when the subscriber comes in upon the line, without causing any disturbance in the apparatus of the subscriber.

Another object of my invention is to provide means controlled by the subscriber upon making a recall for disconnecting the telephone interconnecting means, so as to release the line for a new call.

These and other objects of my invention will probably be better understood from a description of an embodiment of the invention.

The drawing shows diagrammatically a telephone system embodying my invention.

Referring now to the embodiment illustrated in the drawing, at I is shown a telephone line which leads from a substation shown at A to a main station shown at II. Although but two substations are shown upon the line I, it is obvious that any number may be connected thereto. For the purpose of this description, this line will be spoken of as the calling line, it being assumed that the calls, whose operation will be described, are initiated by the subscriber at A. At III is shown a second telephone line leading from a plurality of substations, one of which is shown at B, to the main station. The line III will be spoken of as the called line. The main station shown at II is equipped with operators' telephone line

interconnecting apparatus, here shown as a cord circuit C, which includes a pair of talking strands 1 and 2 and a third strand 3. An operator's telephone set is shown at O and a source of ringing current is shown at R.

The interconnecting means employed in the embodiment of my invention illustrated is shown as a cord circuit C. Switches are provided for connecting the cord circuit to telephone lines, here shown as a switch D, which will hereinafter be spoken of as the answering switch, and a switch E which will hereinafter be spoken of as the calling switch. In the embodiment of my invention shown, these switches consist of plugs and jacks, the lines terminating in multiple jacks which coöperate with the plugs P and P₁ in which the strands of the cord circuit terminate for the purpose of making the connections. The multiple jacks of the line I are shown at J and j, and the multiple jacks of the line III are shown at J₁ and j₁. These jacks consist of a plurality of terminal contacts, some of which, here spoken of as ring contacts, are shown at 4 and 4₁.

Assuming that the subscriber at A desires to talk with the subscriber at B, the line relay F is actuated, which closes a circuit including the line lamps X and x, which indicates to the operator at station II that the subscriber at A desires a call. The actuation of the relay F also closes a circuit through the differential windings of the magnet of the relay G, placing an electrical potential upon the terminals 4 and 4₁, so that any operator testing the line I after the subscriber comes upon the same, will receive a busy test, indicating that the line is busy and preventing the interruption or interference with the call initiated by the subscriber A. The windings of the magnet relay G being differential, this relay will not be actuated at this time. One of the operators observing the illumination of one of the line lamps of the line I will answer the same by inserting a plug into one of the jacks of said line. Assuming that the operator controlling the cord C operates the switch D by inserting the plug P into the jack J, a circuit will be completed for the relays G and L through the contacts of the relay L₁. The relay K will also be ener-

gized over the talking strands of the cord and the line I. The relay K will complete a circuit for the magnets of the relays L and G through the conductor 5 independently of the contacts of the relay L₁.

When the relay L was energized, a circuit was completed for the relay T, which operated, connecting the operator's set to the cord circuit and placing her in communication with the subscriber at A. The operator having learned that it is the subscriber at B that is wanted, tests the line III, and assuming that it is found idle, operates the switching device E by inserting the plug P₁ into the jack J₁, thereby completing circuits for the magnets G₁ and L₁. The cut-off relay G₁ acts in a well known manner to disconnect the line relay F₁, and the line lamps X₁ and x₁ from the line III. The magnet of relay L₁ interrupts the circuit of the relay T, thereby causing the disconnection of the operator's set from the cord circuit. This relay also closes contacts in the circuit of the supervisory lamp N, which is now lighted. The operator then depresses the ringing key S, connecting the ringing generator to the line III, for the purpose of calling the subscriber at B. The subscriber at B hearing this signal responds, causing the actuation of the relay K₁, which interrupts the circuit of the supervisory lamp N, which is now extinguished. The subscribers are now connected together over the lines and through the talking strands of the cord circuit. They converse, and at the termination of the conversation, the retirement of their sets interrupts the circuits of the relays K and K₁, which become de-energized, whereupon the lamp N is lighted, indicating to the operator the retirement of the subscriber at B. The lamp U will also be lighted, indicating to the operator the retirement of the subscriber at A.

It frequently happens in the operation of telephone systems that the operator is busy and does not immediately take down the disconnections, and in the old systems, the subscriber at A is unable to secure a recall at once, because he is unable to control the line lamps of his line. However, in the embodiment illustrated the interruption of the circuit of the relay K, when the subscriber at A retired, caused the opening of the conductor 5 and the breaking of the circuit through the relays G and L, thereby releasing the line lamps and line relay F of the line I.

Assuming now that the subscriber at A desires a recall, or to initiate a call before the cord is disconnected from the line I, the subscriber can close the line and thereby a circuit for the relay F, which is actuated, causing the operation of the line lamp as before, and in addition, completing a circuit through the disconnect relay H, which

is actuated, interrupting the talking strands of the cord circuit and completing a locking circuit for itself, thereby making it possible for the operator controlling C, or any other operator, to answer the recall. This may be done by the operator who controls the cord circuit C₁, by closing the switch D₁.

A detailed description of the operation of the embodiment of my invention illustrated in the drawings is as follows: The subscriber at A removes the receiver 6 from the receiver hook 7, which being spring pressed upward, rises and closes the hook switch 8, completing a circuit through the magnet of the line relay F, as follows: ground 9—magnet of F—switch 10—conductor 11—6—transmitter at 12—switch 8—conductor 13—switch 14—to ground at 15. The magnet of F is energized, closing the switch 16 and completing circuit connections, including the line lamps, as follows: ground at 9—battery 17—switch 16—over the conductors 18 and 18₁, and the lamps X and x in multiple—to ground at 19 and 20. The closing of the switch 16 also completed a circuit as follows: ground 9—17—16—the windings of the magnet G—to ground at 15. The windings of G, however, are differential and will not cause the actuation of the contacts controlled thereby under these conditions. However, the contacts 4 and 4₁ will be energized, so that if a test is made upon this line after the switch 8 is closed, the line will test busy, in order to avoid another operator interfering with the call initiated by the subscriber at A, which sometimes happens in the systems used at present, causing considerable confusion, owing to two or more operators connecting with the line A at the same time. In the system of my invention, no disturbance is caused at A when such test is made.

Assuming that the operator controlling the cord C answers the call, by employing the cord C, the switch D is operated in the embodiment shown, by inserting the plug P into the jack J, the tip contact 20, sleeve contact 21 and the ring contact 22 of the plug P registering and making electrical contact respectively with the tip spring 23, the sleeve spring 24 and the ring 4 of the jack. By the closing of the switch D a circuit is completed for the magnets of the relays G and L, as follows: ground 15—winding 25 of the magnet of relay G—conductor 26—4—22—conductor 27—switch 28—conductor 29—winding of L—the resistance device M—battery 30—to ground at 31. Current flowing through this circuit will cause the actuations of the magnets G and L. The actuation of G causes the opening of the switches 10 and 14, and the disconnection of the line relay and line lamps from the line I, thereby removing the control of the same from the subscriber, which will en-

dure as long as the relay G is energized. The energization of the magnet of the relay L closes a switch 32, shunting the device M, whereby the "call is captured" by the operator controlling the cord C in a manner well understood, and which constitutes no part of my invention. The magnet of the relay L also closes the switches 33 and 34, placing the relay K across the cord circuit. A circuit is now completed for the relay K, as follows: from battery 35—through winding 36 of K—conductor 37—I—20—23—13—7—8—12—11—24—21—2—40—switch 34—winding 41—back to battery. The magnet of the relay K will be actuated closing a switch 42 in the conductor 5, and thereby completing a new circuit for the relays L and G, which is as follows: ground 31—battery 30—32—L—42—5—conductor 43—27—22—4—26—25—back to ground at 15. The magnet K also opens a switch 44 in the circuit of the relay H, for a purpose to be described. The magnet L also opens a switch 45 in the circuit of the relay H, for a purpose to be described and closes a switch 46 in the circuit of the magnet of T, which circuit will be completed, as follows: 31—46—conductor 47—magnet of T—conductor 48—switch 49—battery 50—to ground 51. The magnet of T will be energized, closing the switches 52 and 53, and connecting the operator's set O in circuit with the subscriber's set at A, whereby the operator communicates with the subscriber A and learns that the subscriber at A desires to talk with the subscriber at B. The circuit including the sets at A and O is as follows: receiver 6 at station A—11—24—21—switch 54—conductor 2—conductor 55—switch 52—receiver 56—switch 53—conductor 57—1—switch 58—20—23—13—7—8—12—back to 6—battery being supplied to this circuit from the source 35 over the conductors 37 and 40 and through the coils of the magnet of the relay K.

Assuming that the operator tests the line III and finds it idle, the switching device E is operated by inserting the plug P₁ into the jack J₁, the contacts of the plug and jack registering and making electrical contact in a manner similar to that described in connection with the plug P and jack J. A circuit will be completed through the magnets G₁ and L₁, as follows: ground 60—winding 61 of G₁—contact 62—contact 63—conductor 64—L₁—50—51. G₁ becomes energized, disconnecting the line relay F₁ and the line lamps X₁ and Z₁ from the line III in the same manner as described in connection with the line I. The magnet of L₁ is energized opening the switch 28 and interrupting the first-described circuit of G and L which passed therethrough and closes a switch 66 in the circuit of the magnet H for a purpose to be described. The magnet

of L also opens a switch 49 in the circuit of the relay T previously described and causing the deenergization of the relay T which results in the opening of the switches 52 and 53 and the disconnection of the operator from the cord. The magnet of L₁ also closes a switch 67 in the circuit of the supervisory lamp N, which now becomes lighted over the following circuit: 51—50—67—conductor 68—switch 69—N—to ground at 70. The operator now signals the subscriber at B by depressing the ringing key S and connecting the ringing machine R in circuit with the signal 71 of the subscriber at B by closing the switches 72 and 73. When the subscriber at B responds, the switch 74 will be closed and the relay K₁ will be energized over the following circuit: 74—line conductor 75—through the tip spring and tip contact of the switching device E—the conductor 1—the conductor 76—through the windings of the magnet of the relay K₁ and the battery 77—the conductor 78—conductor 2—through the switching device E and the line conductor 78. The relay K₁ opens the switch 69 and extinguishes the lamp N.

Upon the termination of the conversation, the subscribers retire, placing their receivers upon their hooks. As shown at A, the receiver 6 is placed upon the hook 7, which opens the hook switch 8, interrupting the circuit of the magnet K and causes the switches controlled thereby to assume the positions illustrated in the drawing. The circuit of the magnet of the relay K₁ will likewise be interrupted by the retirement of the subscriber at B, the switch 69 being closed, and causing the illumination of the lamp N. The retirement of the subscriber at A and the subsequent deenergization of the magnet of the relay K causes the opening of the circuits of the magnets G and L at 42, so that they become deenergized, the magnet G releasing its contacts, so that they return to the position shown in the drawing and reconnect the line relay and line lamps of the line I to the line, thereby restoring the control thereof to the subscriber upon the line I. The switches 44 and 45 in the circuit of the magnet H are also closed and the lamp U is lighted over the following circuit: 31—45—conductor 80—lamp U—conductor 81—67—50—to 51, furnishing a signal to indicate to the operator that the subscriber at A has retired. It frequently happens that for some time the operator does not observe the disconnect signals, or is too busy to withdraw the plugs from the jacks, and in the meantime the subscriber at A desires another call, or a recall, as it is frequently spoken of. As explained, the line signaling apparatus of the line I has been restored to the subscriber at A who desiring a recall again removes the receiver 6 from the hook 7, thereby closing the switch 8 and

causing the actuations of the lamps X and α as before.

In addition, a circuit is completed for the relay H, as follows: 31—45—conductor 80—
 5 H—switch 83—44—conductor 84—switch 66—conductor 27—contacts 22 and 4—conductor 26—winding 87 of G—switch 16—battery 17—to ground at 9. The magnet of the relay H is energized by current flowing
 10 over this circuit, interrupting the strands 1 and 2 of the cord circuit C by opening the switches 54 and 58 and opening the switch 83 and closing a switch 90 in the locking circuit of the magnet H, which is independent of the line circuit apparatus of the line I. This circuit is as follows: 31—45—
 15 80—H—90—conductor 81—67—50—back to ground at 51. The continuity of the connecting device C being now interrupted, the call may be answered by any operator without interference. Assuming that another operator controlling the cord C₁ answers the call, the switch D₁ is closed by inserting the plug P' into the jack j, whereupon the operation would be the same as described before in connection with the cord C. If, however, the operator employing the cord C desires to answer the re-call of the subscriber A and therein to employ the cord C, she
 20 may do so by operating a switching device Q, which closes switches 100 and 101. The closing of the switch 101 completes a circuit through the relay T, as follows: ground 102—battery 103—switch 101—conductor
 25 104—T—47—46—to ground 31—reenergizing the magnet T and placing the operator in communication with the subscriber, as has previously been described. The closing of the switch 100 completes circuits for the
 30 magnets L and G, as follows: 31—30—M—L—29—100—43—27—22—4—26—25—15—causing the energization thereof, the magnet of L breaking the circuit of the relay H at 45. After this the operation will proceed
 35 as previously explained. Whenever the operator takes down the connections by withdrawing the plugs P and P₁ from the jacks in which they are employed, the circuit of the relay L₁ will be opened and this relay
 40 deenergized, interrupting the circuit of the relay H, whereupon the apparatus will be restored to normal. I prefer to make the relay H slow operating and the relay L, fast releasing, to guard against incorrect operation. This may be done in any of a number
 45 of well known ways.

It will also be obvious that the automatic disconnect will be operated should the subscriber at A' initiate a call and that the
 50 operation will be the same as if the subscriber at A had initiated a recall, except, of course, it will now be controlled by the hook switch at A' instead of the hook switch 7.

65 It will be appreciated that one or more of

the sources of current illustrated in the drawing may be in fact the same source, it being more convenient to illustrate the source at various positions, in order to prevent complications in making the diagram. It
 70 will also be appreciated that numerous and extensive departures may be made from the embodiment illustrated, as well as the details employed in illustrating the same, without departing from the spirit of the invention, such embodiment and details
 75 having been illustrated for the purpose of better describing the invention.

I claim:—

1. In a telephone system, the combination
 80 of a telephone line, a subscriber's device at a substation on said line by the operation of which the subscriber may initiate a call or a recall, telephone line interconnecting mechanism, a switch for connecting said
 85 mechanism to said telephone line, means for operatively disconnecting said mechanism from the line without disturbing said switch and apparatus for causing
 90 said means to operate to cause such disconnection when the subscriber initiates a recall.

2. In a telephone system, the combination of a telephone line, subscribers' devices at a
 95 substation on said line operated when a subscriber controlling the same initiates calls and recalls, telephone line interconnecting mechanism, a switch for connecting said mechanism to said telephone line, a relay for
 100 operatively disconnecting said mechanism from the line, without disturbing said switch and apparatus for causing said relay to operate to cause such disconnection when the subscriber initiates a recall.

3. In a telephone system, the combination
 105 of a telephone line, subscribers' devices at a substation on said line operated when a subscriber controlling the same initiates calls and recalls, a cord circuit and a switch for connecting said cord to said line, a relay for
 110 operatively disconnecting said cord from the line, without disturbing the switch and apparatus for causing said relay to operate to cause such disconnection when the subscriber initiates a recall.
 115

4. In a telephone system, the combination of a telephone line, a substation on said line, including a receiver hook switch controlled by the subscriber and by means of which calls and recalls are initiated, a cord circuit,
 120 a plug and jack switch for connecting said cord to said line, a relay for severing the talking strands of the cord circuit, without withdrawing the plug from the jack and apparatus for causing said relay to
 125 operate to cause the interruption of the talking strands when the subscriber operates the hook switch to initiate a recall.

5. In a telephone system, the combination of a telephone line, substation apparatus on
 130

said line, including a switch, a relay associated with the line controlled by said switch, a cord circuit, a second switch for connecting the cord to the line, a disconnect relay
 5 for interrupting the talking strands of the cord circuit without operating the second switch and means including said first-named relay and said switch for causing the actuation of said second-named relay when the
 10 subscriber initiates a recall.

6. In a telephone system, the combination of a telephone line, subscribers' devices at a substation on said line controlled by the subscriber and operated when the subscriber
 15 retires or initiates calls and recalls, telephone line interconnecting mechanism, a switch for connecting said mechanism to said telephone line, means for operatively disconnecting said mechanism from the line
 20 without disturbing said switch, apparatus for conditioning said means for operation when the subscriber retires, and apparatus for causing the operation of said means to cause such disconnection when the sub-
 25 scriber initiates a recall.

7. In a telephone system, the combination of a telephone line, a substation set on said line, including devices operated by the subscriber when the subscriber retires or
 30 initiates a call or a recall, telephone line interconnecting mechanism adapted to be connected to said telephone line, means for operatively disconnecting said mechanism from the line, apparatus for conditioning
 35 said means for causing such disconnection when the subscriber retires and apparatus for causing said means to operate to cause such disconnection when the subscriber initiates a recall.

8. In a telephone system, the combination of a telephone line including a subscriber's hook switch operated when the subscriber
 40 retires or when the subscriber initiates a call or a recall, a cord circuit and a switch for connecting the cord to the telephone line, a relay for interrupting the talking strands of the cord circuit, apparatus operated when
 45 the subscriber retires for conditioning said relay to operate to cause the interruption of such strands and apparatus operated when the subscriber initiates a recall to cause the actuation of said relay to cause the inter-
 50 ruption of the talking strands.

9. In a telephone system, the combination
 55 of a telephone line, including contacts of a subscriber controlled switch operated by the subscriber when the subscriber retires, or when the subscriber initiates a call or a recall, a cord circuit, a switch for connecting
 60 the cord to the line, a relay adapted to interrupt the talking strands of the cord circuit, a circuit for said relay, apparatus operated when the subscriber retires to condition said circuit for completion and apparatus oper-
 65 ated when the subscriber initiates a recall

for completing the circuit of said relay and causing the same to operate to interrupt the talking strands of the cord circuit.

10. In a telephone system, the combination of a telephone line, including a switch op- 70
 erated by the subscriber when the subscriber retires or when calls or recalls are initiated by the subscriber, a cut-off relay in the line circuit of the telephone line, a cord circuit, a circuit for said cut-off relay, closed during 75
 the conversational period, means controlled by the subscriber and operated when the subscriber retires for interrupting the circuit of the cut-off relay, a disconnect relay for inter- 80
 rupting the talking strands of the cord circuit and means for causing the actuation of said disconnect relay to interrupt the talk-
 ing strands of the cord circuit when the subscriber initiates a recall.

11. In a telephone system, the combination 85
 of a telephone line including devices under the control of the subscriber and operated when the subscriber retires from the line or initiates a call or a recall, line signaling means associated with the line normally un- 90
 der the control of the subscriber, telephone line interconnecting mechanism adapted to be connected to the line, means operated when said mechanism is connected to the line for withdrawing the control of the line 95
 signal apparatus from the subscriber and apparatus operated when the subscriber retires to restore the control of the line signal apparatus to the subscriber and apparatus for operatively disconnecting said mechanism 100
 from said line when the subscriber initiates a recall.

12. In a telephone system, the combination of a telephone line, including contacts of a
 105 subscriber's switch, a line relay controlled by said subscriber's switch, a cord circuit, a relay for interrupting the talking strands of the cord circuit and a circuit for said relay controlled by said line relay.

13. In a telephone system, the combination 110
 of a telephone line, substation apparatus on said line controlled by a subscriber, line circuit apparatus at the main station associated with said line, telephone line interconnecting mechanism, a switch for connecting said 115
 mechanism to said line, means for operatively disconnecting said mechanism from said line without disturbing said switch and devices in said line circuit apparatus controlled by the subscriber governing said 120
 means.

14. In a telephone system, the combination of a telephone line, substation apparatus on
 125 said line controlled by a subscriber, a main station, line circuit apparatus associated with the telephone line and located at the main station, telephone line interconnecting mechanism at the main station, a switch for connecting said mechanism to the line, means
 130 for operatively disconnecting said mecha-

nism from said line without disturbing said switch, means controlled by the subscriber for conditioning said first-named means for operation and devices in said line circuit apparatus controlled by the subscriber for causing the operation of said disconnect means.

15. In a telephone system, the combination of a telephone line, including contacts of a receiver hook switch controlled by the subscriber, a main station, line circuit apparatus including a line relay controlled by the subscriber associated with the telephone line and located at the main station, a cord circuit, a plug and jack switch for connecting the cord to the telephone line, said cord including talking strands, a relay for interrupting the talking strands without withdrawing the plug from the jack, a circuit for said last named relay, a relay controlling said circuit governed by the subscriber for conditioning said circuit for operation, and means including said line relay for completing said circuit and causing said relay to operate to interrupt the talking strands of the cord circuit without disturbing said switch.

16. In a telephone system, the combination of a telephone line including line conductors, a testing terminal and a cut-off relay associated with the line and means including a winding of said cut-off relay independent of the line conductors for placing an electrical potential on said testing terminal whenever the line is in use.

17. In a telephone system, the combination of a telephone line including line conductors, substation telephone apparatus on the line, a testing terminal and a cut-off relay associated with the line and a circuit independent of the line conductors including a winding of said cut-off relay for placing a potential on said terminal whenever the substation apparatus is in use.

18. In a telephone system, the combination of a telephone line including line conductors, substation apparatus in bridge of said line, a testing terminal associated with the line, a line relay, a line signal and a cut-off relay associated with said line and a circuit independent of the line conductors including a winding of said cut-off relay for placing a potential on said terminal whenever the substation bridge is closed.

19. In a telephone system, the combination of a telephone line including line conductors, a testing terminal and a cut-off relay associated with the line and means including differential windings of said cut-off relay independent of the line conductors for placing an electric potential on said testing terminal whenever the line is in use.

20. In a telephone system, the combination of a telephone line, substation apparatus on said line, a testing terminal associated with said line, a line relay controlled

over said line, a cut-off relay controlling said line relay and a circuit controlled by the line relay including a winding of the cut-off relay for placing a potential on said terminal when said line is busy.

21. In a telephone system, the combination of a telephone line, a substation on said line, a main station, a terminal for said line at said main station, line connecting mechanism at the main station, and switching means for connecting said mechanism to said line, a circuit for placing an electrical potential on said terminal when said line is busy, a line relay controlled by the substation apparatus controlling said circuit, a cut-off relay having a winding in said circuit and means controlled by said switching means for completing a circuit through said cut-off relay.

22. In a telephone system, a cord circuit, a line circuit and a second cord circuit, a switch to connect said first named cord circuit to said line circuit, a sub-station connected to said line circuit, electromagnetic apparatus in said cord circuit under the control of said sub-station apparatus, a disconnect signal controlled by said sub-station apparatus and associated with said first named cord circuit, a switch to subsequently associate said second named cord circuit with said telephone line, and means jointly controlled by said substation apparatus and said second named cord circuit switch to alter the character of the disconnect signal.

23. In a telephone system, the combination of a plurality of telephone lines, calling subscriber devices on said lines by which calls are initiated, telephone line interconnecting mechanism, means for connecting a telephone line to said mechanism to place said mechanism in conversational relation with a calling subscriber, means for operatively disconnecting said mechanism from said line circuit without disturbing said first named means, and apparatus for causing said means to operate to cause said disconnection when a second calling subscriber on the same line initiates a call.

24. In a telephone system, the combination of a plurality of telephone lines, calling subscriber devices on said lines by which calls are initiated, telephone line interconnecting mechanism, means for connecting a telephone line to said mechanism to place said mechanism in conversational relation with a calling subscriber, means for operatively disconnecting said mechanism from said line without disturbing said first named means and apparatus for causing said means to operate to cause said disconnection when a second calling subscriber on the same line initiates a call after the termination of the conversation initiated by the first calling subscriber.

25. In a telephone system, the combina-

tion of first calling subscriber apparatus and second calling subscriber apparatus, telephone line interconnecting mechanism and means for connecting said mechanism with said calling subscribers, means for operatively disconnecting said mechanism from said subscribers without disturbing said first named means and apparatus for causing said means to operate to cause said disconnection when a second calling subscriber on the same line initiates a call only after the termination of a call participated in by the first calling subscriber. 10

In witness whereof, I have hereunto signed my name this 20th day of July, 1915. 15
FRANK M. SLOUGH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."