

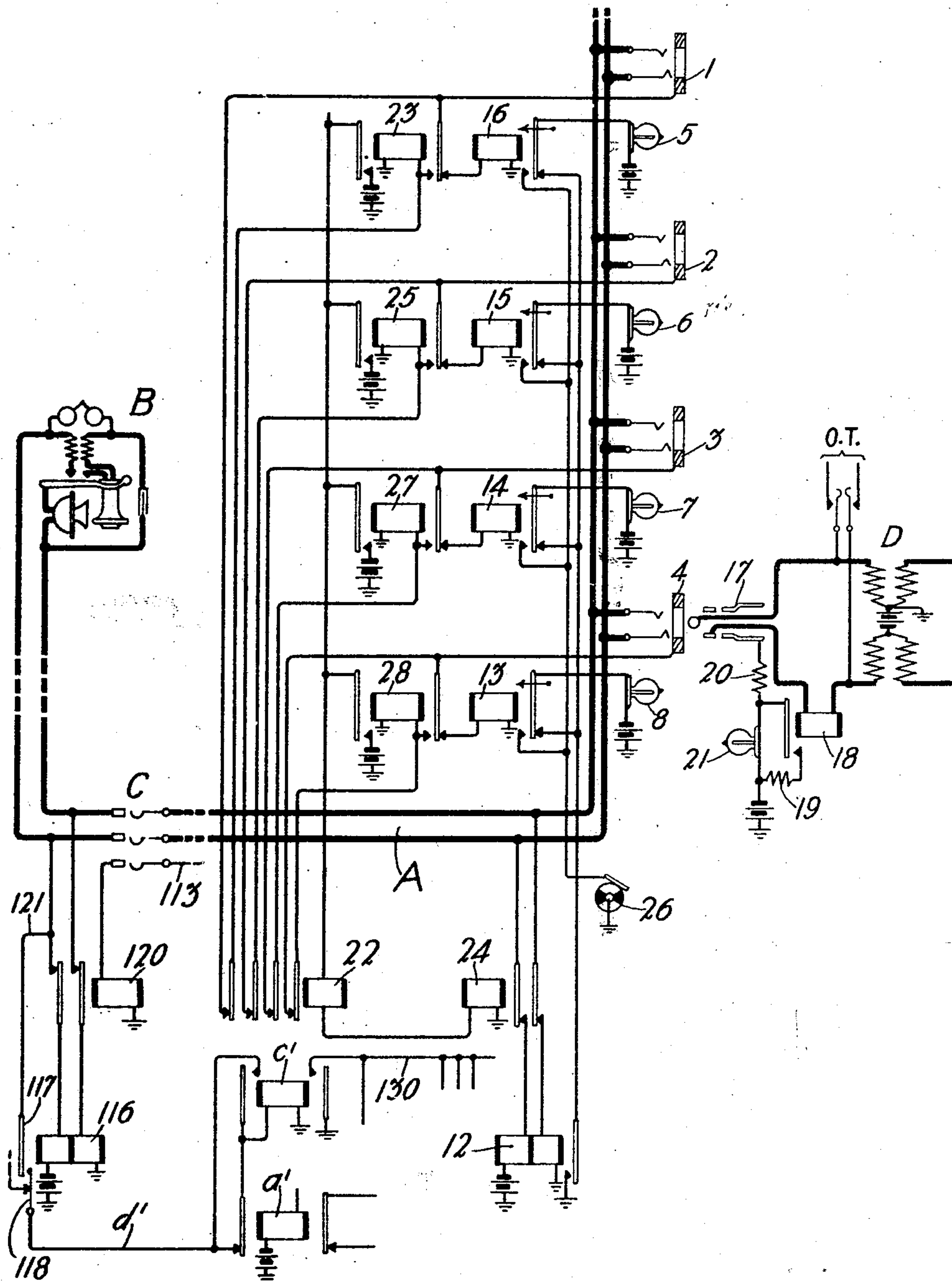
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H. M. BASCOM

SIGNALING SYSTEM

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SIGNALING SYSTEM.

Application filed May 10, 1922. Serial No. 559,855.

To all whom it may concern:

Be it known that I, HENRY M. BASCOM, residing at Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in Signaling Systems, of which the following is a specification.

This invention relates to improvements in signaling systems and has particular reference to improved means for controlling a signaling device for a telephone transmission line.

In known systems it has been proposed to multiple a plurality of answering jacks located at various operators' positions to a transmission line and provide each jack with a signaling device, such as a lamp, which is operated when the transmission line is taken for use. Any one of the operators at the various positions at which the signaling devices are operated may respond to a call on the transmission line whereupon certain conditions are established whereby any other operator attempting to answer the call will be informed that it has already been answered.

An object of the present invention is to operate a signaling device in response to a change in condition on a transmission line and to operate another signaling device when more than one connection is made to said line in response to such change in condition.

Another object is to operate a plurality of signaling devices associated with a number of terminals of a transmission line in response to a change in condition on said line and to operate one of said devices in a characteristic manner should connections be established to more than one of said terminals in response to said change in condition.

The above and other objects will more clearly appear from the following detailed description taken in connection with the accompanying drawing which illustrates a preferred embodiment of the inventive idea.

In carrying out the invention, a plurality of transmission lines or trunks to which a group of subscribers' lines has access are terminated at an exchange where they are multiplied to a number of answering operators' positions. One of these transmission lines is illustrated at A and is multiplied at one end to a plurality of answering jacks such as 1, 2, 3 and 4, each of which appears before a different operator's position. In

connection with the line A there is shown one of a number of subscribers' substations B having access to said line. In practice, the number of transmission lines to which a group of subscribers' lines has access is preferably less than the number of lines in said group. Each transmission line has associated therewith a selecting switch generally indicated by C. This switch may be a line switch or a line finder. In the present instance, the switch is illustrated as a line finder which is operated upon the initiation of a call at a substation such as B, to hunt for the terminals of the calling line which are multiplied to the contact bank of the switch. For a complete understanding of the operation of the line finder reference is made to Patent No. 1,231,013 issued to Charles L. Goodrum on June 26, 1917.

The jacks or terminals 1, 2, 3, and 4 have associated therewith, respectively, the signaling devices 5, 6, 7, and 8 preferably in the form of lamps all of which are lighted when the transmission line A is taken for use. Each of the operators before the various answering jacks is provided with a number of cord circuits such as shown at D, for responding to calls on the transmission lines terminating at said jacks. These cord circuits may be of any preferred form and in the present case only so much of a cord circuit is illustrated as is necessary to an understanding of the invention. The first operator that connects the cord circuit D to one of the answering jacks, in response to the lighting of the various lamps, causes the extinguishment of these lamps to indicate at the other operators' positions that the call has been answered. It may happen, however, that more than one of the operators may connect their cord circuits to different jacks in answer to the call in which event the first operator to plug in would receive the call and the signaling devices associated with the other jacks which had been plugged into would then operate in a characteristic or distinctive manner to inform the operators before the latter jacks that the call had been answered by some other operator. It will thus be seen that in response to the first change in condition on the transmission line A, that is when the line is seized by a calling subscriber, the signaling devices multiplied to said line will be operated; that said signaling devices will be disabled in

response to a second change in condition on said line, as when the first operator answers the call; and that in response to a third change in condition on said line, that is
 5 when other operators connect their cord circuits to the line, the signaling devices before the latter operators will be operated in a characteristic or distinctive manner.

It is believed that the invention will be
 10 fully understood from the following detailed description of the operation.

When a subscriber at substation B initiates a call by removing the receiver from its switch hook an obvious circuit is established for line relay 116 which, in closing
 15 its contacts 117 and 118, operates relay *c'* over a circuit extending from battery through the left hand winding of relay 116, left hand contact of relay 120, conductor
 20 121, contacts 117, 118, conductor *d'*, left hand contact of relay *a'* and winding of relay *c'* to ground. Relay *c'* energizes and grounds the common start wire 130. The grounding of the wire 130 initiates the operation of an idle line finder such as C
 25 associated with line A in a manner which is fully described in the above mentioned patent. The brushes of the switch C are now wiped over terminals of the subscribers' lines served by said switch and
 30 upon engagement of the test brush of the switch with the associated terminal of the calling line B a circuit is established over the conductor 113 for the cut-off relay 120
 35 which energizes to cause the release of the line relay 116 and the consequent disconnection of the ground from the starter wire 130. The line finder is then brought to rest on the terminals of the calling line which
 40 is now extended over the line A to the exchange at which the latter line terminates. The connection of the line A to the subscriber's line B causes the operation of the transmission line relay 12 over an obvious
 45 circuit through the substation apparatus at B whereupon ground is connected through the contact of relay 12 and from thence in parallel through the normal contacts of relays 13, 14, 15, and 16 and the lamps 5, 6,
 50 7 and 8 to grounded battery. These lamps, which appear before different operators' positions, are all lighted in the circuits established therefor and the lighting of these lamps indicates to the various operators that
 55 a call is awaiting attention on the line A.

Assuming that the operator before whom the jack or terminal 1 and the associated lamp 5 appears is the first to insert the
 60 plug 17 of a cord circuit D into jack 1 in response to the lighting of the lamp 5, a circuit is then established for the supervisory relay 18 of said cord circuit extending from grounded battery through the lower left hand winding of the repeating
 65 coil of said cord circuit, the winding of

relay 18, the ring contacts of plug 17 and jack 1, from thence over the transmission line through the first and second brushes of the switch C and the substation apparatus B, the tip contacts of jack 1 and plug
 70 17 and the upper left hand winding of the repeating coil of cord circuit D to ground. Relay 18 operates in this circuit and in closing its contact establishes a circuit extending from grounded battery through the resistance 19, contact of relay 18, the resistance 20, the sleeve contacts of plug 17 and
 75 jack 1 and from thence in parallel through the normal contact of relay 23 and winding of relay 16, and the outermost contact of relay 22 and winding of relay 23 to ground. The supervisory lamp 21 is also included in the circuit just traced but the parallel relation of the resistance 19 thereto is such
 80 as to prevent the lighting of said lamp. The relay 16, and other similar relays, are made slow to operate, as indicated by the arrows intersecting the armatures of said relays and pointing in the direction the armatures are slow to move, but relay 23 will
 85 immediately close its alternate contacts in response to the establishment of the circuit through the winding of said relay. Therefore, when the normal contact of relay 23 is opened the circuit through the winding
 90 of relay 16 is discontinued before the relay 16 has become fully energized, thus preventing the opening of the normal contact of the latter relay. When relay 23 operates, a locking circuit is established therefor
 95 extending from ground through the winding and right hand alternate contact of relay 23 and from thence to grounded battery over the energizing circuit for said relay. Upon closure of the left hand contact of
 100 relay 23 a circuit is established extending from grounded battery through said contact and from thence through the windings of relays 22 and 24 in series to ground. Relays 22 and 24 both operate and the energization of the latter opens the energizing circuit for relay 12 which thereupon restores
 105 to remove ground from its contact, thus opening the circuits and causing the extinguishment of the lamps 5, 6, 7 and 8. The operation of relay 22 disconnects the windings of relays 25, 27 and 28 from the sleeves of jacks 2, 3 and 4, respectively, so
 110 that none of these relays will be operated should the plugs of cord circuits be inserted into said jacks.
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 120

Let it now be assumed that another operator inserts the plug 17 of a cord circuit into jack 2 immediately following the connection of a cord circuit to Jack 1 by the first
 125 operator, to answer the call. In this instance the supervisory relay 18 of the cord circuit connected to jack 2 is operated as previously described to establish a circuit from battery through resistances 19 and 20,
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the sleeve contacts of plug 17 and jack 2 and from thence through the normal contact of relay 25 to ground through the winding of relay 15. It will be recalled that when the cord circuit was connected to jack 1 by the first operator to answer the call, relay 23 was also included in the circuit through the resistances 19 and 20, but in the case of an operator subsequently establishing a connection with the transmission line, as for instance, through the jack 2, the relay 25 is not operated due to the fact that the circuit therefor is now open at the next to the outermost contact of relay 22 which latter relay is at this time energized. Therefore, relay 25 will not open at its normal contact the circuit for relay 15 and the latter relay will have sufficient time to energize and close its alternate contact. When this occurs and the interrupter 26 is in the proper position a circuit is established from ground through a conducting segment of the continuously operated interrupter 26, the alternate contact of relay 15 and the lamp 6 to grounded battery. As the interrupter 26 rotates this circuit is intermittently opened and closed to flash the lamp 6 and thus provide a characteristic or distinctive indication to the operator who has plugged into jack 2 that another operator has already answered the call, whereupon the second operator to answer removes the plug 17 from the jack with which it is connected. It is believed to be apparent that this same operation will take place if more than one operator attempts to answer the call subsequent to the answering thereof by the first operator. When this occurs the lamps, before the various operators who have made connections with the line, will flash. When these operators remove the plugs from the jacks the relays such as relays 13, 14 and 15 are released to open the alternate contacts thereof and thus open the circuits for the various lamps 6, 7 and 8 to permanently extinguish the same, the circuits for lighting these lamps being now opened by the energization of relay 12.

When the subscriber at substation B terminates the call by replacing his receiver upon its switch hook the supervisory relay 18 is released and the supervisory lamp 21 lighted in a manner which is well understood. The operator observing the lighted condition of the lamp 21, removes the plug 17 from jack 1 and thereby causes the release of relay 23 followed by the deenergization of relays 22 and 24 whereupon the apparatus is again restored to normal.

What is claimed is:

1. In a signaling system, a transmission line, a plurality of terminals therefor, signals associated with said terminals, means for operating said signals in response to a change in condition on said line, and means

for operating one of said signals in a characteristic manner should connections be established to more than one of said terminals.

2. In a signaling system, a transmission line, a plurality of terminals therefor, a signal individual to each terminal, means for operating one of said signals in response to a change in condition on said line, and means operable when connections are established to more than one of said terminals for operating signals individual to one or more of said terminals in a distinctive manner.

3. In a signaling system, a transmission line, a plurality of terminals therefor, a signaling device for each terminal, means responsive to a change in condition on said transmission line for operating said devices, and means operable when connections are established to more than one of said terminals in response to said change in condition to intermittently operate one or more of said signaling devices.

4. In a signaling system, a transmission line, a plurality of operators' positions for said line, signals at said positions, means responsive to a change in condition on said line for operating said signals, and means operable when more than one operator responds to said change in condition to actuate the signal at a certain operator's position in a characteristic manner.

5. In a signaling system, a transmission line, a plurality of operators' positions for said line, signals at said positions, means responsive to a change in condition on said line for operating said signals, and means for intermittently operating one of said signals when more than one operator responds to said change in condition.

6. In a signaling system, a transmission line, a plurality of terminals for said line, signaling devices for said terminals, means responsive to a change in condition on said line for operating said signaling devices, means operable to disable said signaling devices when a connection is established to one of said terminals, and means for changing the condition of one of said signaling devices when a connection is established to another of said terminals.

7. In a signaling system, a transmission line, a plurality of terminals for said line, signaling devices for said terminals, means responsive to a change in condition on said line for operating one of said signaling devices, means to disable said signaling device when a connection is established to one of said terminals, and means for changing the condition of another of said signaling devices when a connection is established to another of said terminals.

8. In a signaling system, a transmission line, a plurality of terminals for said line, a signaling device for each terminal, means responsive to a change in condition on said

line for operating one of said signaling devices, means responsive to another change in condition on said line for disabling said signaling device, and means responsive to a third change in condition of said line for intermittently operating a different one of the first named signaling devices.

9. In a signaling system, a transmission line, a plurality of terminals for said line, a signaling device for each terminal, means responsive to a change in condition on said line for operating one of said signaling devices, means responsive to another change in condition on said line for disabling said signaling device, and means for intermittently operating one of said signaling devices when a connection is established to another of said terminals.

10. In a signaling system, a transmission line, a plurality of terminals therefor, signaling devices for said terminals, means responsive to a change in condition on said line for operating one of said signaling devices, means to disable said signaling device when a connection is established to one of said terminals, and means for intermittently operating another of said signaling devices when a connection is established to another of said terminals.

11. In a signaling system, a transmission line, a plurality of terminals for said line, a signaling device for each terminal, means responsive to a change in condition on said transmission line for operating the signaling device for one of said terminals, means responsive to a connection through the said terminal for disabling said signaling device, and means responsive to a connection to another of said terminals for intermittently operating the signaling device associated with said other terminal.

12. In a signaling system, a transmission line, a plurality of terminals for said line, a signaling device for each terminal, means responsive to a change in condition on said transmission line for operating said signaling device, means operable upon the establishment of a connection to one of said terminals for rendering said devices inoperative and means controlled by the establishment of a connection to another of said terminals for intermittently operating the signaling device associated with the last named terminal.

13. In a signaling system, a transmission line, a plurality of terminals for said line, a visible signal for each terminal, means responsive to a change in condition on said line for operating said visible signals, means to disable said signals in response to a connection to one of said terminals, and means for again operating a signal associated with

a different terminal in response to another change in condition on said transmission line.

14. In a signaling system, a transmission line, a plurality of terminals therefor, a visible signal for each terminal, means responsive to a change in condition on said line for operating one of said signals, means to disable said signal when a connection is established to one of said terminals, and means for operating a different signal should another connection be established to another of said terminals during the establishment of the first connection.

15. In a signaling system, a line terminating in a plurality of operators' positions, a signal at each position adapted to be operated upon the seizure of said line at its originating end, means controlled at one of said positions for restoring all of said signals, and means at certain of said positions for reoperating the corresponding signals subsequent to the actuation of said first means.

16. In a signaling system, a line terminating in a plurality of terminals, a signal for each of said terminals, means responsive to a call incoming over said line for actuating said signals, and means responsive to the seizure of said line by way of one of said terminals for restoring said signals to normal and preparing certain thereof for actuation in a different manner.

17. In a signaling system, a line terminating in a plurality of terminals, a signaling device for each of said terminals, means responsive to the seizure of said line at one end for operating said signaling devices in a certain manner, and means responsive to the seizure of said line at the other end by way of one of said terminals for restoring said signaling devices to normal and preparing certain thereof for operation in another manner.

18. In a signaling system, a line terminating at one end in a plurality of terminals, a signaling device for each of said terminals, means responsive to the seizure of said line at the other end for operating said signaling devices in a certain manner, and means responsive to the seizure of said line at the first end by way of one of said terminals for restoring said signaling devices to normal, preventing the signaling devices at the other of said terminals from operating in said certain manner, and for preparing said signaling devices at the other of said terminals to operate in a different manner.

In testimony whereof, I have signed my name to this specification this 5th day of May, 1922.

HENRY M. BASCOM.