March 9, 1937. A. J. PARISSI 2,073,585

TELEPHONE SYSTEM

Filed Dec. 11, 1933

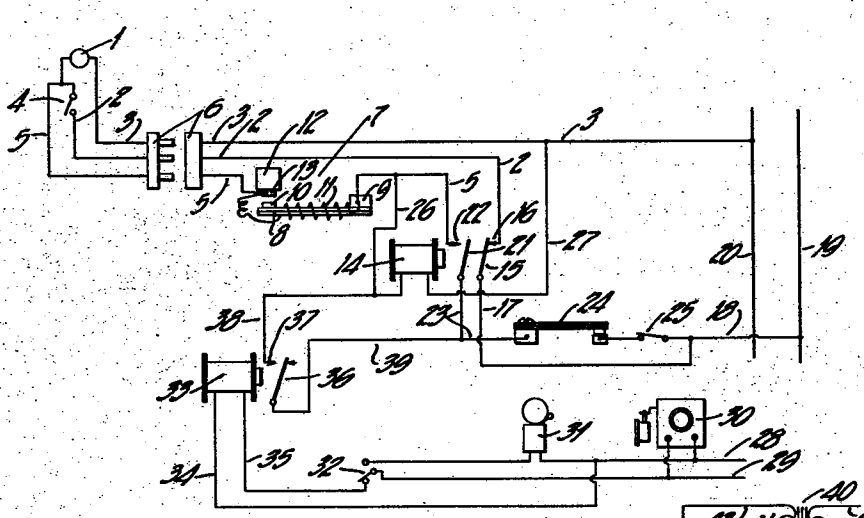


FIG. 1

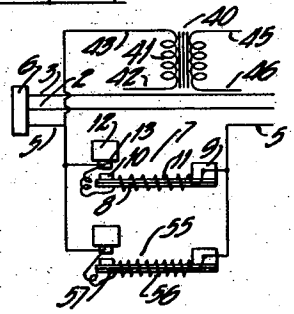


FIG. 3

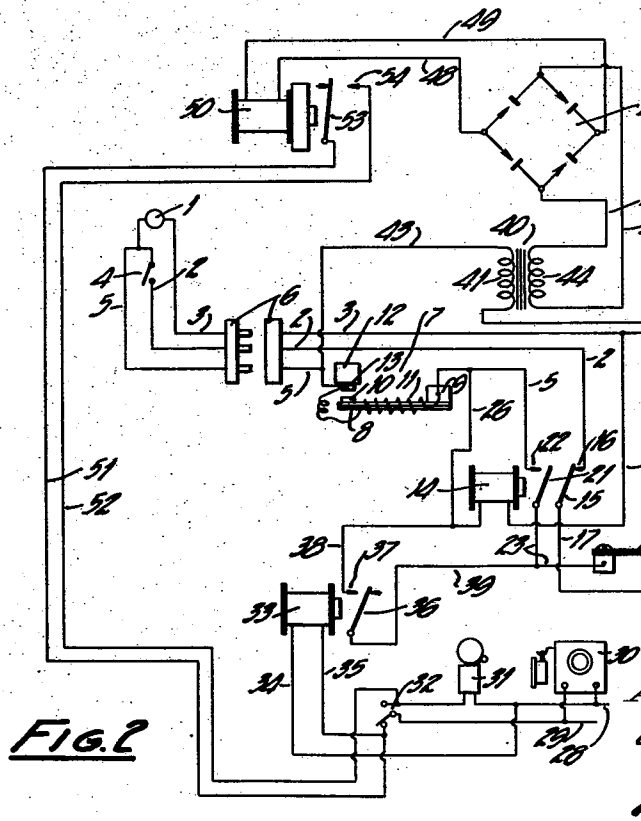


FIG. 2

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TELEPHONE SYSTEM

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Application December 11, 1933, Serial No. 701,747

18 Claims. (Cl. 179—84)

My invention more particularly relates to visual types of signals and circuits associated therewith and with a telephone system, the general arrangements being similar to those described and illustrated in my pending application Serial No. 670,715 which was filed in the Patent Office on or about May 12, 1933, of which this present application is a continuation in part.

In many instances, quietness must be maintained with an exception, however, extended to signaling and alarm devices. My invention, therefore, has for a first object the provision of a signaling device which overcomes the inherent disadvantages of audible signaling devices and further provides a "silent alarm" which is equally as efficacious in many instances as audible signaling devices and more so in others.

Another object of my invention resides in the provision of means for producing a predetermined change in the normal operating characteristics of an incandescent lamp to signal a person within the visual range thereof. A further object lies in the provision of the above mentioned means together with an automatic control circuit for an incandescent lamp which is normally manually controlled for illuminating purposes whereby an intermittent illumination thereof may be effected irrespective of the operating position of the manual control for said lamp.

It will be noted, as hereinafter more specifically pointed out, that my invention contemplates the association with a telephone signaling circuit of a lighting circuit or separate circuit which relies on a source of power other than that feeding the signaling circuit. In such cases where an independent power supply is relied upon, it is most desirable to provide for and insure continuity of service so that one type of signal or another will be given. For example, the power may fail in the lighting circuit which is associated with the signaling circuit or the incandescent lamp which is used for signaling purposes may be either removed or burned out. Under such circumstances, obviously, no visual signal would appear upon an operation of said signaling circuit.

A still further object of my invention, therefore, resides in the provision of an associated electric lighting circuit and a signaling circuit arranged normally to produce a visual signal upon an operation of the signaling circuit and automatically to sound an audible signal in the event of failure of operation of said visual signal.

With these and other objects in view, my invention includes the novel elements, combinations and arrangements thereof described below and illustrated in the accompanying drawing in which—

Fig. 1 is a wiring diagram of a circuit employed in one embodiment of my invention;

Fig. 2 is a wiring diagram of a circuit employed in another embodiment thereof; and

Fig. 3 is a fragmentary wiring diagram illustrating a further automatic control means and its adaptation to my electrical circuits.

Like reference characters indicate like parts throughout the drawing.

In the drawing, I have illustrated preferred embodiments of my invention wherein a signaling circuit and an electric lighting circuit are associated through suitable electrical means to predeterminately operate an incandescent lamp in response to an energization of said signaling circuit. By the use of the term energization, I mean to imply the presence of a current impulse or series of current impulses in the signaling circuit which would normally serve to operate an audible signaling device. In the drawing, the signaling circuit is diagrammatically represented as the subscriber's station end of a telephone circuit.

Referring to Fig. 1, an incandescent lamp 1 is included in a normal electric lighting circuit comprising the two legs 2 and 3 and optionally a switch 4 which may be of the usual type embodied lamp sockets. A third leg 5 completes the lamp circuit and serves to connect from the lamp side of the switch 4 to one terminal of a three pronged plug, the legs 2 and 3 being connected to the other two terminals thereof. The plug and socket therefor, illustrated at 6, provides a readily accessible connection for the incandescent lamp 1 which may be used as a reading light or for any other desired purpose. Obviously, this plug and socket is purely an optional element to lend flexibility to my device and forms no part of this present invention. Hence, for clearness, I have designated the respective conductors leading both to the socket and to the plug by the same reference characters, that is, the numerals 2, 3 and 5.

A current intermitting device indicated generally at 7 is interposed in the leg 5 of the lamp circuit. It is to be understood that though I have shown a specific form of current intermitting device, I do not wish to be limited thereto but merely illustrate thereby an example of the means which I employ to obtain a desired operation of my device. The current intermitting device shown comprises a bimetallic element 8 one end of which is secured to a terminal block 9, the other end thereof being free to move and bearing a contact 10. A wire of suitable ohmic resistance is coiled about the bimetallic element as at 11. A second terminal block 12 bears a contact 13 with which the contact 10 is adapted to contact when the bimetallic element 8 is warped due to the heat developed and radiated

by the resistance coil 11. It will be noted that the contacts 10 and 13 are normally spaced from each other, but that the resistance wire or coil 11 is connected between the contact 13 and the terminal block 9. Furthermore, the terminal blocks 9 and 12 are interposed in the leg 5 of the lamp circuit. That is to say, normally, the resistance coil 11 is connected in series in the circuit. Hence, when current flows through the resistance wire it will generate and radiate sufficient heat to cause the bimetallic element 8 to warp towards the terminal block 12, whereupon the contacts 10 and 13 will touch, causing the resistance element 11 to be shunted by the bimetallic element itself. A closed circuit will be maintained between the terminal blocks 9 and 12 until contacts 10 and 13 are drawn apart due to the cooling and retraction of the bimetallic element towards its normal position.

I have provided means comprising a relay 14 which is adapted to be operated alternatively to close the normal lighting circuit to the lamp or establish a closed circuit through the current intermitting device, incandescent lamp and further associated mechanisms. The relay 14 is illustrated as comprising a double armature to indicate that two entirely independent circuits may be established thereby. Obviously, a single armature, bearing severally insulated contacts, would be entirely satisfactory. In the normal, unenergized position of the relay, as illustrated, one conducting segment 15 of the armature rests in contact with one terminal 16 of the relay to which is connected the leg 2 of the lamp circuit. The conducting segment 15 is connected through the conductors 17 and 18 to one side 19 of the lighting service mains 19 and 20. The leg 3 which forms the common return in the lamp circuit completes the normal lighting circuit to the incandescent lamp 1. When the relay 14 is energized due to the operation of means, hereinafter described, which is associated therewith and with the signaling circuit, the armature is picked up, thereby breaking the circuit through the segment 15 and terminal 16 and establishing an independent circuit through the conducting segment 21 of the armature which is held by the relay in contact with the terminal 22 thereof. The third leg 5 of the lamp circuit, which includes the current intermitting device 7, is connected to the terminal 22 of the relay 14. The segment 21 of the armature is connected, first through the conductor 23, which has included therein a thermostatic switch 24 and a manually operable reset switch 25, and thence through the conductor 18 to one leg 19 of the service mains. It is to be understood that the service mains 19 and 20 are connected to a suitable source of supply, not illustrated.

The coil of the relay 14 is connected to maintain a current flow therethrough when the armature has been picked up. This connection is accomplished through a conductor 26 which connects one end of the coil to the leg 5 or terminal 22 of the relay and a conductor 27 which connects the other end of the coil to the common return leg 3 of the lamp circuit. Hence the relay 14 will automatically maintain a circuit through the leg 5 to the incandescent lamp after an initial energization thereof.

The thermostatic switch 24 comprises a bimetallic element interposed in series in the conductor 23 and normally forming a path for the flow of current therethrough. After a predetermined interval of time, heat, generated by the passage of current through said element, causes the same to warp and open the circuit associated therewith.

The switch 25 which in its normal position is closed is additionally interposed in series with switch 24 in conductor 23 to provide means whereby a person responding to the visual signal may reset the device, that is to say switch 25 serves to open the circuit through the conductor 23 and relay 14 so that the armature thereof will return to its normal position and re-establish the normal lighting circuit to the incandescent lamp.

A signaling circuit, herein diagrammatically represented as a subscriber's station, comprises the trunk lines 28 and 29, subscriber's set 30 and annunciator or bell 31.

A double contact switch 32 is interposed in the signaling circuit whereby either the visual or audible signaling means may be selected and associated with the signaling circuit. In one position, the switch 32 connects the bell 31 in the signaling circuit, while in its alternative position, the coil of the relay 33 is connected through the conductors 34 and 35 to the trunks 28 and 29. When the relay 33 is energized a current carrying segment of its armature 36 contacts with terminal 37 of the relay thereby establishing one leg of a circuit, to wit: conductor 38 which connects the coil of relay 14 to terminal 37 of the relay 33, the armature 36 thereof, conductor 39 which extends from the armature to conductor 23, and thence to one side 19 of the service mains 19 and 20. The other leg of the circuit established by the relay 33 comprises the conductor 27 which connects the other side of the coil of relay 14 to the common return leg 3 of the lamp circuit.

The operation of the above described circuit is as follows. Assuming that switch 32 is in the position wherein the relay 33 is connected in the signaling circuit, an energization or flow of current through said circuit causes the armature of the relay 33 to be picked up and contact with the terminal 37 thereof. This establishes a circuit through the coil of relay 14 as hereinbefore described. When, however, the current in the signaling circuit is cut off and relay 33 becomes unenergized, relay 14 automatically maintains itself in the circuit initially established therethrough by the operation of relay 33. The automatic operation is effected through the medium of the conductor 26. After the armature 14 is attracted by the pole piece of the relay 14 and contacts with the terminal 22 thereof, conductor 26 serves to feed current back through the coil of the relay from the circuit established through its armature. Hence only a limited operation of the signaling circuit is necessary to effect an operation of my visual signaling device for a much greater period of time.

The relay 14 normally serves to establish the normal electric lighting circuit to the incandescent lamp 1 as hereinbefore described. When, however, it is energized through an operation of relay 33, the normal lighting circuit is interrupted and a circuit is established to said lamp through conductors which include the current intermitting device 7, thermostatic switch 24 and reset switch 25. It will be remembered under all conditions that the leg 3 forms the common return leg of the lamp circuit.

From the foregoing it will be apparent that the incandescent lamp employed as a means for emitting a visual signal may normally be used as a reading light or for any other illuminating pur-

pose. Furthermore, the visual signal will appear irrespective of the position of switch 4. For example, assuming that switch 4 is closed and lamp 1 illuminated, an energization of the signal circuit will operate relay 33 and in turn relay 14 to cut out leg 2 of the normal lighting circuit, interpose leg 5 and establish the lamp signaling circuit. Hence an intermittent illumination of the lamp will occur though the lamp, at the time of energization of said signaling circuit, was being used for illuminating purposes.

The thermostatic switch 24 which is in circuit with the current intermitting device 7 automatically limits the time interval of operation of the lamp signaling circuit. Switch 25 provides a manual means for accomplishing the same result as switch 24, the latter being intended, to operate only in the event a signal is not answered and switch 25 opened.

Furthermore, it is to be understood that I do not wish to limit my lamp signaling circuit to a circuit comprising a current intermitting device as illustrated, but may rely on an operation of a relay such as relay 14 to effect a change in the normal operating characteristics of the lamp circuit whereby a visual signal is obtained.

In the above described circuit illustrated in Fig. 1 of the drawing, it will be noted that the operation of my signaling system is conditioned on two things, a substantially continuous power supply to the service mains 19 and 20 and non-failure of the incandescent lamp. In Fig. 2 I have diagrammatically represented a device which eliminates the above conditions and insures an emission of one type of signal or another. This device, which is a preferred modification of my invention, comprises substantially the circuit illustrated in Fig. 1, hence the same reference characters are used in Fig. 2 to indicate parts therein corresponding to those in Fig. 1.

Referring now to Fig. 2, a supervisory circuit is associated with the incandescent lamp circuit and is operable to effect an operation of the audible signaling device herein represented as an annunciator or bell in the signaling circuit. The supervisory circuit, in the embodiment illustrated, comprises a transformer 40, the primary 41 of which is connected by conductors 42 and 43 to conductor 18 and conductor 5, respectively. It will be noted that the connections for transformer 40 as illustrated provide an uninterrupted path for the flow of current therethrough and connect the primary 41 thereof in parallel with the alternatively operable legs of the incandescent lamp circuit. The transformer is a step down transformer having a ratio, for example, of 110/8 volts, depending on the voltage impressed on the service mains 19 and 20. The secondary 44 of transformer 40 is connected through conductors 45 and 46 to a rectifier indicated generally at 47, which is preferably of the oxide type. The rectifier 47 serves to supply substantially 8 volt direct current through conductors 48 and 49 to a retarded or slow release relay 50. Conductors 51 and 52 are connected respectively to the contact terminals of switch 32 and the armature 53 and terminal 54 of relay 50. Hence, when the relay 50 is unenergized the armature 53 thereof contacts with terminal 54 and the bell 31 is automatically connected in the signaling circuit irrespective of the position of switch 32. When, however, the relay 50 is energized the circuit is opened therethrough and bell 31 is cut out of circuit.

The operation of this modification of my device with respect to the control of the electric lighting circuit by the signaling circuit to produce a visual signal is precisely the same as hereinbefore described in connection with the circuit illustrated in Fig. 1. However, with the addition of the supervisory circuit a failure of the lighting circuit to provide a visual signal does not render the device inoperative. Assume, for example, that a power failure occurs in the service mains 19 and 20, obviously there will be no power supplied to the transformer 40 and hence the supervisory circuit will be unenergized. Armature 53 of relay 50 will, therefore, rest in contact with terminal 54 thereby connecting the bell 31 in the signalling circuit.

When the lighting circuit forming one element of my invention is unimpaired and the lamp 1 extinguished, the transformer 40 is energized, current flows through the rectifier 47 and rectified or direct current energizes relay 50 thereby maintaining an open circuit through the armature thereof. Should the signaling circuit be energized, relay 33 and in turn relay 14 will be actuated to open the normal lighting circuit to lamp 1 and to associate the lamp signaling circuit therewith. Due to the fact that the contacts of the current intermitting device 7 are normally spaced, the transformer remains energized. Current flowing through the device 7, as hereinbefore described, operates to make and break a direct circuit therethrough to lamp 1, causing an intermittent illumination thereof. When a direct circuit is made through the device 7 the transformer is shunted, hence, the normal operation of the device 7 effects a periodic energization of transformer 40. Relay 50, however, is preferably of the slow release type and is designed to maintain the armature in circuit opening position during the periodic intervals when the transformer 40 is unenergized. Obviously, should the transformer remain unenergized, for a longer period than the lag of the relay 50 permits, the armature 53 will contact with terminal 54 and connect the bell 31 in the signaling circuit. In other words the supervisory circuit only operates to sound an audible signal when a failure of the lamp signaling circuit occurs.

By tracing the circuit of the primary of the transformer 40, it will be noted that the lamp 1 is continuously in circuit therewith. Hence, if the lamp 1 be removed or burned out an open circuit exists and transformer 40 is unenergized. In this event, of course, the supervisory circuit operates to connect the audible signaling device in the signaling circuit. Under normal conditions when the lamp 1 is in circuit, the filament thereof serves to complete the primary circuit of the transformer with no illumination thereof. However when the lamp is illuminated as, for example, by an operation of switch 4, the transformer is shunted thereby and becomes unenergized.

In conjunction with the foregoing described circuits, my invention contemplates the inclusion of a further automatic device for insuring the emission of an audible signal in the vent of failure of the incandescent lamp signaling circuit. This device is illustrated in Fig. 3 wherein only a portion of the associated circuit is illustrated. The device indicated generally at 55 comprises elements substantially similar to those constituting the current intermitting device 7 except that the resistance element 56, coiled about the bimetallic element 57 thereof, has a substantially greater ohmic resistance, than that of the current intermitting device 7. Furthermore, the de-

vice 55 is preferably connected in parallel with device 7 as illustrated whereby it is normally partly shunted by the resistance element 11 and wholly shunted by the bimetallic element 8 of the device 7. However, should the first device 7 remain open due to some mechanical failure thereof, current will not be shunted by the bimetallic element 8 of device 7 and hence the resistance element 56 of device 55 will continue to heat up until the bimetallic element 57 operates to close a circuit therethrough. This device 55 is also preferably designed to maintain a closed circuit therethrough during an interval of time sufficient to cause the supervisory circuit to connect the audible signalling device in the signaling circuit. Hence, upon a failure of the current, intermitting device to operate, an audible signal is given, which incidentally indicates that the visual signaling circuit and associated controls therefor should be inspected.

In the foregoing description I have referred to a normal lighting circuit. This is to be understood as referring to the circuit established by relay 14 when unenergized. The lamp signaling circuit is that circuit established by the relay 14 when in its actuated position; and the lamp circuit comprises the normal lighting circuit and lamp signaling circuit.

Furthermore, it is to be understood that I do not wish to limit myself to the specific means set forth to accomplish the desired results, for it is evident that other suitable electrical means may be substituted for those illustrated and described. Likewise, variations in the specific circuit structures set forth may be made with results equally as efficacious as those attained in the associated circuits illustrated.

Hence, while I have illustrated circuits and associated means as the preferred embodiments of my invention and described the same in conjunction therewith, it is to be understood that the words which I have used are words of description and not of limitation and that changes within the purview of the appended claims may be made without departing from the true scope and spirit of my invention in its broader aspects.

What I claim is:

1. In a telephone system, a first electrical circuit comprising telephone trunk lines having an audible signaling device connectible therewith, a second electric circuit including a visual signaling device, means connected in said first mentioned circuit and operable in response to an energization thereof for controlling said second circuit and means connected in series with said visual signaling device and operable upon a failure of current flow therethrough to connect said audible signaling device in said first mentioned circuit.

2. In a telephone system, a first electrical circuit comprising telephone trunk lines having an audible signaling device connectible therewith, a second electric circuit including a visual signaling device, means connected in said first mentioned circuit and operable in response to an energization thereof for controlling said second circuit, means connected in series with said visual signaling device and operable upon a failure of current flow therethrough to connect said audible signaling device in said first circuit, and means for maintaining said controlled second circuit for a predetermined interval of time.

3. In a telephone system, a first electrical circuit comprising telephone trunk lines having an audible signaling device connectible therewith, a second, electric lighting circuit including a visual signaling device, means connected in said first mentioned circuit and operable in response to an energization thereof for controlling said second circuit, means connected in series with said visual signaling device and operable upon a failure of current flow therethrough to connect said audible signaling device in said first mentioned circuit and means for maintaining said controlled circuit after an initial energization of the first mentioned means.

4. In a telephone system, a first electrical circuit comprising telephone trunk lines having an audible signaling device connectible therewith, a second, electric lighting circuit including a visual signaling device, means connected in said first mentioned circuit and operable in response to an energization thereof for controlling said second circuit, means connected in series with said visual signaling device and operable upon a failure of current flow therethrough to connect said audible signaling device in said first mentioned circuit, means for maintaining said controlled circuit after an initial energization of the first mentioned means, and means for opening said controlled circuit.

5. In a telephone system, a first electrical circuit comprising telephone trunk lines having an audible signaling device connectible therewith, a second, electric lighting circuit including a visual signaling device, means connected in said first mentioned circuit and operable in response to an energization thereof for controlling said second circuit, means connected in series with said visual signaling device and operable upon a failure of current flow therethrough to connect said audible signaling device in said first circuit, means for maintaining said controlled circuit after an initial energization of the first mentioned means and automatic means for limiting the time interval of control.

6. In a telephone system, a first electrical circuit comprising telephone trunk lines having an audible signaling device connectible therewith, a second electric circuit including a visual signaling device and means comprising a current intermitting device connectible therein, means operable in response to an energization of said first circuit for connecting said current intermitting device in said second circuit and means connected in series with said visual signaling device and operable upon a failure of current flow therethrough to connect said audible signaling device in said first circuit.

7. In a telephone system, a first electrical circuit comprising telephone trunk lines, a second, electric lighting circuit including a visual signaling device, a switch for controlling the same and a normally open shunt circuit around said switch, and means connected in said first mentioned circuit and operable in response to an energization thereof for opening the circuit through said switch and closing said shunt circuit whereby a controlled operation of said visual signaling device is effected irrespective of the operating position of said switch.

8. In a telephone system, a first electrical circuit comprising telephone trunk lines, a second, electric lighting circuit including a visual signaling device, a switch for controlling the same and a normally open shunt circuit around said switch, means connected in said first mentioned circuit and operable in response to an energization thereof for opening the circuit through said switch and closing said shunt circuit whereby a controlled operation of said visual signaling de-

vice is effected irrespective of the operating position of said switch, and means for opening said shunt circuit.

9. In a telephone system, a first electrical circuit comprising telephone trunk lines, a second, electrical lighting circuit including a visual signaling device, a switch for controlling the same and a normally open shunt circuit around said switch, means connected in said first mentioned circuit and operable in response to an energization thereof for opening the circuit through said switch and closing said shunt circuit whereby a controlled operation of said visual signaling device is effected irrespective of the operating position of said switch, and means for maintaining said shunt circuit after an initial energization of the first mentioned means.

10. In a telephone system, a first electrical circuit comprising telephone trunk lines, a second electric lighting circuit including a visual signaling device, a switch for controlling the same and a normally open shunt circuit around said switch, means connected in said first mentioned circuit and operable in response to an energization thereof for opening the circuit through said switch and closing said shunt circuit whereby a controlled operation of said visual signaling device is effected irrespective of the operating position of said switch, means for maintaining said shunt circuit after an initial energization of the first mentioned means, and means for discontinuing said maintained circuit.

11. In a telephone system, a first electrical circuit comprising telephone trunk lines, a second, electric lighting circuit including a visual signaling device, a switch for controlling the same and a normally open shunt circuit around said switch, means connected in said first mentioned circuit and operable in response to an energization thereof for opening the circuit through said switch and closing said shunt circuit, means for maintaining said shunt circuit after an initial energization of the first mentioned means and automatic means for limiting the time interval of control.

12. In a telephone system, a first electrical circuit comprising telephone trunk lines, a second, electric lighting circuit including an incandescent lamp, a switch for controlling the same and a normally open shunt circuit around said switch including an automatic current intermitting device and means connected in said first mentioned circuit and operable in response to an energization thereof for opening the circuit through said switch and closing said shunt circuit.

13. In a telephone system, a first electrical circuit comprising telephone trunk lines having an audible signaling device connectible therewith, a second, electric lighting circuit including a visual signaling device, a switch for controlling the same and a normally open shunt circuit around said switch, means connected in said first mentioned circuit and operable in response to an energization thereof for opening the circuit through said switch and closing said shunt circuit, and means connected in said shunt circuit and operable upon a failure of current flow therethrough to connect said audible signaling device in said first mentioned circuit.

14. In a telephone system, a first electrical circuit comprising trunk lines having an audible signaling device connectible therewith, a second, electric lighting circuit including a visual signaling device, a switch for controlling the same and a normally open shunt circuit around said switch including a current responsive means operable to connect said audible signaling device in said first mentioned circuit and means connected in said first mentioned circuit and operable in response to an energization thereof for opening the circuit through said switch and closing said shunt circuit whereby said current responsive means is connected in series with said visual signaling device and operates upon a failure of current flow therethrough to connect said audible signaling device in said first mentioned circuit.

15. In a telephone system, a first electrical circuit comprising trunk lines having an audible signaling device connectible therewith, an incandescent lamp, a normal lighting circuit therefor and a control circuit connectible therewith, means connected in said first mentioned circuit and operable in response to an energization thereof for interrupting said normal lighting circuit and closing said control circuit and means connected in said control circuit and operable upon a failure of current flow therethrough to connect said audible signaling device in said first circuit.

16. In a telephone system, a first electrical circuit comprising trunk lines having an audible signaling device connectible therewith, an incandescent lamp, a normal lighting circuit therefor and a control circuit connectible therewith, means connected in said first mentioned circuit and operable in response to an energization thereof for interrupting said normal lighting circuit and closing said control circuit and a supervisory circuit inductively coupled with said control circuit including means operable upon a failure of current flow therethrough to connect said audible signaling device in said first mentioned circuit.

17. In a telephone system, a first electrical circuit comprising trunk lines having an audible signaling device connectible therewith, an incandescent lamp, a normal lighting circuit therefor and a control circuit connectible therewith including a current intermitting device, means connected in said first mentioned circuit and operable in response to an energization thereof for opening said normal circuit and closing said control circuit and means connected in said control circuit and operable upon a failure of current flow therethrough to connect said audible signaling device in said first mentioned circuit.

18. In a telephone system, a first electrical circuit comprising telephone trunk lines having an audible signaling device connectible therewith, a second electric circuit including a visual signaling device, means connectible in said first mentioned circuit and operable in response to an energization thereof for controlling said lighting circuit, manually operable means for optionally connecting said audible signaling device or the first mentioned means in said first electrical circuit and means connected in series with said visual signaling device and operable upon a failure of current flow therethrough to connect said audible signaling device in said first circuit when said visual signal has been selected for operation.

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