

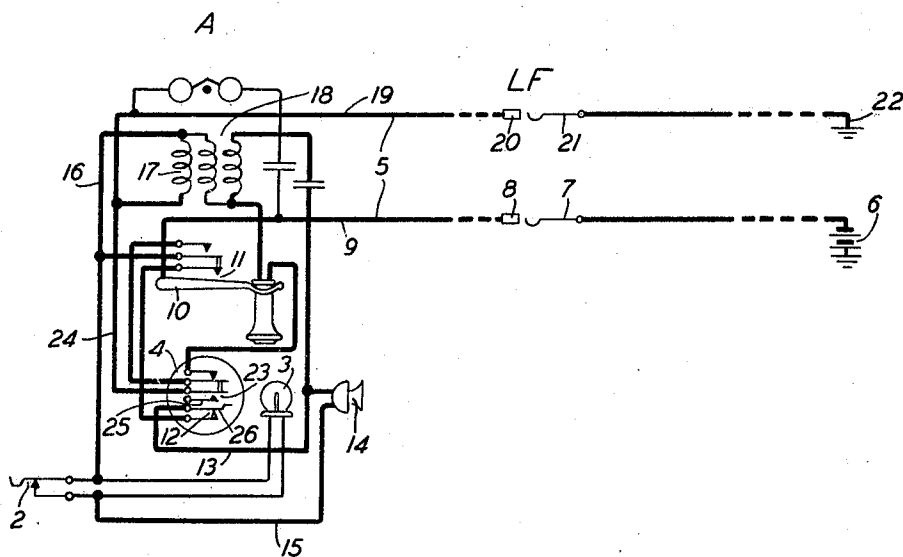
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TELEPHONE SYSTEM

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TELEPHONE SYSTEM

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This invention relates to telephone subscribers' substation equipment and more particularly to means for illuminating the calling dials located at telephone substations.

5 It is not uncommon practice, particularly in present day apartments and private dwellings to locate telephone equipment in foyers or other dimly lighted areas. With the advent of the calling dial it became essential
10 that subscribers' subsets be provided with illumination sufficiently powerful to enable the subscriber to readily see the dial digits and locate the finger wheel-holes corresponding to the digits.

15 To meet this requirement various schemes have been devised which in general resulted in the location of a lamp in close proximity with the dial and lighting the lamp by way of the telephone receiver switchhook contacts
20 from a current source, either storage batteries, the house current supply or in some cases, from the central office battery by way of the telephone line wires. This last mentioned method of lighting the lamp has been found
25 to be the most desirable, but it has also introduced circuit difficulties, which heretofore, rendered such a system impracticable. Bridging the telephone line wires with a resistance element in the nature of a lamp
30 for lighting the dial disturbs the electrical characteristics of the dialing loop to such an extent as to materially interfere with the character of the pulses transmitted by the dial.

35 It is accordingly, the object of this invention to permit the lighting of a telephone dial lamp over the telephone line without interference with the pulses transmitted by the dial or in any other way affecting the established
40 telephone connection.

This object is attained in accordance with a feature of the invention by the provision of an organization of circuits and apparatus
45 which operates to effect the lighting of the dial lamp over the telephone line wires only during the period when the calling dial is in its normal position and at all other times electrically disassociate the lamp from the line.

50 The invention will be readily understood

from the following detailed description made with reference to the accompanying drawing which discloses a telephone substation circuit embodying the features of this invention, the
55 outgoing line wires of which are shown, schematically, connected to ground and battery at a central office.

A subscriber at station A desiring to establish a telephone connection with another subscriber actuates key 2 which normally short-
60 circuits lamp 3, and removes the receiver from its switchhook prior to actuating the calling dial 4. Upon the removal of the receiver from its switchhook a line finder LF functions in a well known manner to connect the
65 line 5 with the automatic switches at the central office.

A circuit is now established which may be traced from grounded battery 6 at the central office, brush 7 and terminal 8 of the line
70 finder LF, conductor 9, receiver switch-hook 10, switchhook contacts 11, dial contacts 12 of dial 4, conductor 13, transmitter 14, conductor 15, filament of lamp 3, conductor 16,
75 winding 17 of induction coil 18, conductor 19, terminal 20 and brush 21 of line finder LF, to ground at 22. The lamp 3 lights in this circuit.

Applicant makes no claims as to what method is employed in mounting the lamp 13
80 on the dial 4. It is only necessary that the lamp be associated with the dial in such a manner that, when lighted, it illuminates the characters of the dial.

With lamp 3 lighted, the subscriber at station A can readily locate the finger hole, in
85 the finger wheel, corresponding to the first digit to be dialed.

Having inserted the finger in the desired hole the subscriber moves the dial off normal
90 to set the dial.

It will be noted that when the dial is moved off normal, the off-normal contacts 23 of the dial are closed and connected in series with the dialing contacts 12 so that the lamp 3
95 which, until now, was bridged across the line conductors 9 and 19, is short-circuited by the serially connected contacts 3 and 12 of the dial. The short-circuiting path may be traced from line conductor 19, conductor 24,
100

dial off-normal contacts 23, off-normal spring 25, dialing contacts 12, receiver switchhook contacts 11, receiver switchhook 10, to line conductor 9. The lamp 3, accordingly is extinguished when the dial is moved off normal and is electrically removed from the line conductors. This condition maintains until the dial has been rotated sufficiently far for the subscriber's finger to engage the dial finger stop in the well known manner. Upon removal of the finger from the finger hole the dial returns to normal causing the actuation of the pulsing spring 26 in the well known manner, which results in the transmission of a set of pulses corresponding in number to the digit dialed.

The fact that the pulsing contacts 12, which were included in the short-circuiting path hereinbefore traced, are repeatedly opened does not disturb the unlighted condition of lamp 3 as these contacts are connected in the original energizing circuit for the lamp so that when the contacts 12 are opened by the return of the dial to normal the lamp 3 is disconnected from the line and when the contacts 12 are closed the lamp is effectively short-circuited by these contacts in series with the off-normal contacts 23.

When the dial actually reaches its normal position contacts 12 are closed and contacts 23 are opened so that the original energizing circuit for lamp 3 is reestablished and the lamp lighted. The subscriber may then readily locate the finger hole corresponding to the next digit to be dialed. The same series of operations just described is repeated for each actuation of the dial.

When the subscriber has dialed a complete set of digits the key 2 is restored causing the lamp 3 to be short-circuited by the key contacts. The lamp is therefore extinguished. In order to insure that the key 2 is restored after the dialing operation it may be made non-locking so that when the subscriber proceeds to use the telephone the hand will be released from the key and the key will automatically restore.

It is evident from the foregoing description that applicant has devised a novel method of controlling the illumination of a telephone dial in which the central office battery is employed as the energizing source for the lamp and in which the lamp in no way interferes with the transmission of dial pulses or with the transmission of speech.

What is claimed is:

1. A telephone substation, a telephone line incoming to said substation, a dial associated with said line, a lamp adapted when lighted, to illuminate said dial, and means for causing said lamp to be lighted over said telephone line when said dial is in its normal position only.

2. A telephone substation, a telephone line incoming to said substation, a dial associated

with said line, a lamp for lighting said dial, means for causing said lamp to be lighted over said telephone line when said dial is in its normal position and means responsive to the movement of said dial from its normal position for extinguishing said lamp and maintaining said lamp extinguished for all off-normal positions of said dial.

3. A telephone substation, a telephone line incoming to said substation, a dial associated with said line, a lamp for lighting said dial, means responsive to the initiation of a call at said substation for associating said lamp with said telephone line and means responsive to the movement of said dial from its normal position for electrically disassociating said lamp from said line and maintaining said lamp electrically disassociated from said line for all off-normal positions of said dial.

4. A telephone substation, a telephone line incoming to said substation, a dial associated with said line, a lamp adapted when lighted, to illuminate said dial, a source of current associated with said line, means effective upon the initiation of a call at said substation for causing said lamp to be energized by current from said source and means responsive to the actuation of said dial for rendering said lamp inoperative.

5. A telephone substation, a telephone line incoming to said substation, a dial associated with said line, means for illuminating said dial, means for energizing said illuminating means over said telephone line and means controlled by the actuation of said dial for rendering said illuminating means inoperative.

6. In a telephone system, a telephone line terminating at one end at a subscriber's station and at the other end at a central office, a source of current at said central office, a lamp at said station, a dial at said station, means at said station for operatively associating said lamp with said line to be energized by current from said source, and means including the dialing contacts of said dial for rendering said lamp inoperative when said dial is in a position other than its normal position.

7. In a telephone system, a substation, a central office, a line interconnecting said substation and said central office, a source of current at said central office, a dial at said substation, a lamp adapted when lighted, to illuminate said dial, manually operable switching means at said substation for effectively connecting said lamp to said line whereupon said lamp is energized by current from said source, and means controlled by said dial for alternately short-circuiting said lamp and opening the energizing circuit thereof during the actual transmission of pulses by said dial.

8. In a telephone system, a telephone line

interconnecting a dial substation and a central office, a source of current at said central office, a dial lamp at said dial substation, means at said substation for connecting
5 said lamp with said line to be energized by current from said source, and means for electrically disassociating said lamp from said line when the dial at said substation is off normal.

10 9. In a telephone system, a telephone line interconnecting a dial substation and a central office, a source of current at said central office, a dial lamp at said dial substation, means at said substation for connecting said
15 lamp with said line to be energized by current from said source, and a dial, said dial adapted when actuated to electrically disassociate said lamp from said line and maintain said lamp electrically disassociated from
20 said line for all off-normal positions of said dial.

10. In a telephone system, a substation, a central office, a telephone line interconnecting said substation and said central office, a
25 source of current at said central office, a dial at said substation, a lamp at said substation adapted when lighted to illuminate said dial, a key normally short-circuiting said lamp, switching means including said key for re-
30 moving the short circuit and connecting said lamp to said telephone line whereupon said lamp is energized by current from said source, and means effective upon an off-normal movement of said dial for electrically
35 disassociating said lamp from said line.

11. A telephone substation, a telephone line incoming to said substation, a dial associated with said line, a lamp for lighting said
40 dial, means for causing said lamp to be lighted over said telephone line when said dial is in its normal position and means responsive to the movement of said dial from its normal position for extinguishing said
45 lamp, said means acting automatically to re-light said lamp when said dial returns to normal position.

12. In combination, a telephone dial adapted to transmit a series of sets of impulses, a light source associated with said dial and
50 means for automatically energizing said light source after the transmission of each set of impulses.

13. In combination, a telephone dial adapted to transmit a series of sets of impulses, a
55 light source associated with said dial and means for automatically energizing said light source after the transmission of each set of impulses and for maintaining said light source deenergized during the transmission
60 of each set of impulses.

In witness whereof, I hereunto subscribe my name this 26th day of January, 1932.

ROBERT W. HARPER.