Sept. 2, 1941. R. F. MALLINA 2,254,378

TELEPHONE SYSTEM

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FIG. 2

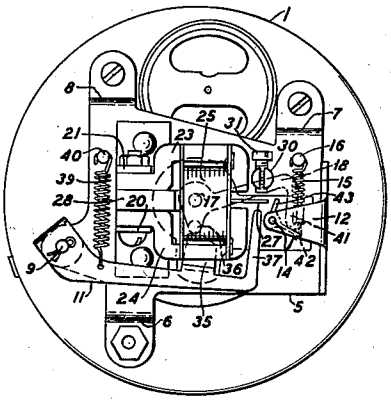

FIG. 1

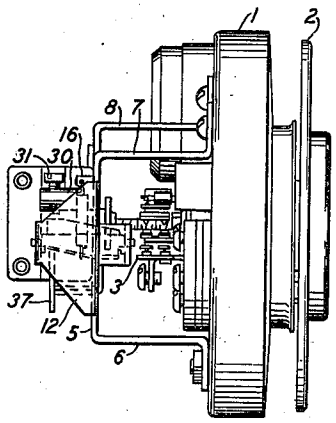

FIG. 3

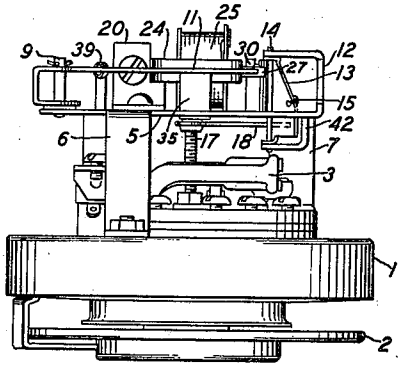

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FIG. 4

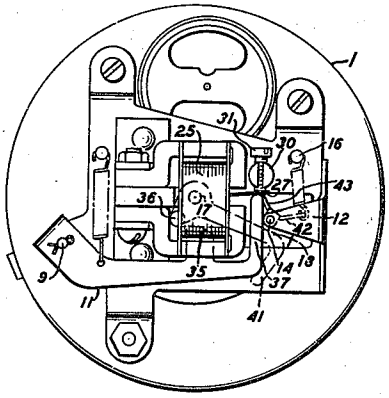


FIG. 5

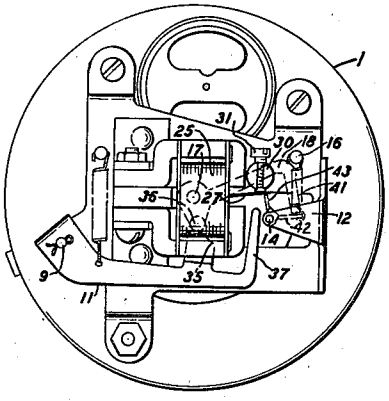


FIG. 6

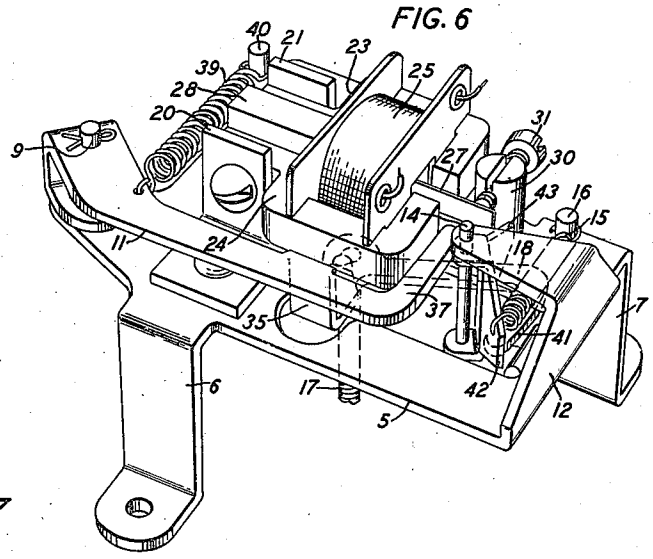
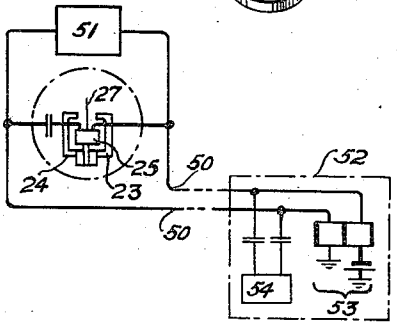


FIG. 7



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Patented Sept. 2, 1941 2,254,378

UNITED STATES PATENT OFFICE

2,254,378

TELEPHONE SYSTEM

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Application February 2, 1940, Serial No. 316,867

8 Claims. (Cl. 179—90)

This invention relates to signaling devices and particularly to impulse dials for use in telephone systems.

The objects are to combine with the usual function of an impulse transmitter or dial the added function of identifying the calling subscribers on party lines, and to simplify and otherwise improve the structure of these devices.

Heretofore party line systems have been provided in which the plucking of a reed at a subscriber's station causes electrical oscillations corresponding to the natural frequency of the plucked reed to be produced and transmitted over the line and arrangements have been provided at the central office for identifying a calling party by such oscillations. In these systems the reed may act when plucked in an electromagnetic field to cause said field to set up corresponding oscillations in a coil surrounding the reed and connected to the line for the transmission of said oscillations to the central office and the plucking of the reed may be controlled by the operation of the dial.

It is a feature of the present invention to improve such devices having a reed in the magnetic field surrounded by a coil, by providing means for tensioning the reed and locking it in the tensioned position when the dial is moved from normal and tripping the reed to permit it to vibrate at its natural frequency when the dial is returned to normal after the dial pulses have been produced.

This invention has been illustrated in the accompanying drawings in which:

Fig. 1 shows the side view of a standard dial structure in which the invention has been incorporated;

Fig. 2 shows a rear view of this dial;

Fig. 3 shows a bottom view of this dial;

Figs. 4 and 5 show various positions of the applicant's mechanism during the operation thereof as applied to this dial structure viewed from the rear of the dial structure; while

Fig. 6 shows a perspective view of the applicant's invention as applicable to a standard dial.

Fig. 7 shows the applicant's invention as applied to a telephone circuit shown in diagrammatic form.

Referring now to the drawings, 1 indicates the housing of a standard dial and 2 the finger plate that may be rotated to operate the mechanism in the housing 1 to produce and send digits by the interrupter springs, generally indicated by the numeral 3. The standard mechanism for transmitting dial pulses has not been shown in great detail as such parts are well known in the art.

On the back of the housing 1 is located the mechanism incorporating the applicant's invention. This mechanism consists of the main bracket 5 having downwardly projecting lugs 6, 7 and 8 which secure the bracket 5 to the housing 1 by means of screws as shown. On a pin 9 on bracket 5 is rotatably mounted a lever 11. Between the U-shaped projection 12 of the bracket 5 and the main portion thereof is mounted a trigger 13 on the pin 14. This trigger 13 is held in a normal position by a spring 15 connected at one end to the trigger and at the other end to a pin 16 mounted on the main portion of the bracket 5. On the main shaft 17 of the dial structure which rotates with the dial 2 is mounted a bracket 18, and it will be explained hereinafter, how these brackets 11, 18 and trigger 13 cooperate. On the main portion of the bracket 5 is mounted, by means of two uprights 20 and 21, two permanent magnets 23 and 24 which are placed on opposite sides of a coil 25 which, in turn, is secured by one of its spoolheads to the permanent magnets 23 and 24. Inside of this coil 25 is located a vibrating reed 27 which at one end is connected by means of an enlarged portion 28 between the two permanent magnets 23 and 24, while the free end of this reed 27 is cooperating with the trigger 13 in a manner as will hereinafter be described. At the upper side looking at Fig. 2, is located a pin 30 having a screw 31 which is used as a backstop for the reed 27 when it is tensioned as will be described presently.

The normal positions of the two levers 11 and 18 and the trigger 13 are shown in Fig. 2. The lever 11 is normally located so that it will have its projection 35 engage the pin 36 on the lever 18 to hold the projection 37 on this lever 11 out of engagement with the reed 27 and is maintained in this position by the tension of a holding spring 39 which is fastened at one end to the lever 11 and at the other end to pin 40 secured to the bracket 5. The lever 18 has the angular projection 41 which normally engages the arm 42 of the trigger 13 to hold the trigger arm 43 out of engagement with the reed 27 against the tension of the spring 15. The operation of the mechanism is as follows: When the operator actuates the dial 2 to send impulses, the lever 18 will rotate in the counter-clockwise direction looking at Figs. 2, 4 and 5, and thus cause the pin 36 to disengage projection 35 of lever 11 and permit lever 11 to cause its projection 37 to engage the reed 27. The tension of spring 39 will thus cause lever 11 to tension the reed 27 and force it against screw 31. It will be noted also

that the projection 41 on the lever 18 will disengage itself from the arm 42 of the trigger 13 so as to permit the trigger to be rotated under tension of spring 15 to have its trigger arm 43 enter below or in front of the tensioned reed 27 to prevent this reed from returning to normal or lock it so that it is not free to vibrate under these circumstances. In Fig. 4, the lever 18 has been shown in an advanced position with the lever 11 and trigger 13 in the position in which the trigger locks the reed in a tensioned position. As is well known the dial on its return to normal will send the usual impulses by operating on the interrupter springs 3. Now, therefore, when the dial returns to normal and immediately after the impulses have been sent and slightly before the dial has returned completely to normal, the lever 18 will first cause its pin 36 to engage projection 35 on the lever 11 and return this lever to normal position, thus bringing the projection 37 out of reach of the reed 27. The projection 41 then engages the arm 42 on the trigger and returns the trigger to normal position causing the arm 43 to be removed from under the tensioned reed 27 and thus unlocks the reed 27 to permit it to vibrate at its natural frequency. Fig. 5 shows the lever 11 as having been returned to normal position out of reach of the reed 27 and the lever 18 is shown in position to engage the trigger arm 42 by its projection 41 to remove the arm 43 from the reed. This dial structure may be included at a substation as shown in Fig. 7 with the coil 25 connected across the line conductors 50 leading from a substation apparatus 51 to a central office 52 where the line may be associated with a source of current 53 and a suitable means 54 for identifying the station. When therefore the reed 27 is vibrated at its natural frequency as described above in the electromagnetic field introduced by the permanent magnets 23 and 24, it causes electrical oscillations of a corresponding frequency to be induced in the coil 25 which then may be transmitted over the line 50 to the central office to means 54 where these oscillations may identify the calling line. As an example of the use of the applicant's device in connection with a specific telephone system for identifying calling stations, the copending application by M. E. Mohr, Serial No. 316,903, filed on even date with the present application may be mentioned. In this case a party line system has been disclosed in which oscillations produced by dial and reed structures of this or similar types may be employed for identifying calling subscribers by the different frequencies of the oscillations as produced at different stations.

What is claimed is:

1. In a calling device, an operating member, means responsive to the actuation of said member for producing different series of impulses, a coil, a circuit therefor, a vibratory reed in said coil, means for storing energy in said reed operative in response to the movement of said operating member from normal and for releasing said reed to vibrate at its natural frequency on the return of said member to normal after it has produced a series of impulses to cause oscillations corresponding to said natural frequency to be produced in said circuit.

2. In a calling device, a dial, means responsive to the actuation of the dial for producing different series of impulses, a coil, a circuit therefor, a vibratory reed in said coil, a lever mechanism for tensioning said reed operative in response to the movement of the dial from normal and for tripping said reed to vibrate at its natural frequency on the return of said dial to normal to cause oscillations corresponding to said natural frequency to be produced in said circuit.

3. In a calling device, an operating member, means responsive to the actuation of said member for producing different series of impulses, a coil, a circuit therefor, a vibratory reed in said coil, means operative in response to the operation of said operating member from its normal position to tension and lock the reed in a tensioned position and operative in response to the return of the operating member to normal position after it has produced a series of impulses for releasing said reed to vibrate at its natural frequency to produce electrical oscillations corresponding to said natural frequency in said circuit.

4. In a calling device, a dial, means responsive to the actuation of the dial for producing different series of impulses, a coil, a circuit therefor, a vibratory reed in said coil, a lever associated with said dial, a lever mechanism, a tripping finger mechanism, said first lever being actuated in response to the movement of the dial from a normal position to release said lever mechanism to tension the reed and to release said tripping finger mechanism to lock the reed in its tensioned position and being actuated in response to movement of the dial back to the normal position to restore the second lever mechanism and restore the tripping finger mechanism to trip the tensioned reed to permit it to vibrate at its natural frequency to produce electrical oscillations corresponding to said natural frequency in said circuit.

5. In a calling device, a dial, means responsive to the acuation of the dial for producing different series of impulses, a coil, a circuit therefor, a vibratory reed in said coil, a lever associated with said dial, a lever mechanism, a tripping finger mechanism, said first lever being actuated in response to the movement of the dial from a normal position to release said second lever mechanism to tension the reed and to release said tripping finger mechanism to lock the reed in its tensioned position and being actuated in response to the movement of the dial back to the normal position to restore the lever and tripping finger mechanisms to trip the tensioned reed to permit it to vibrate at its natural frequency to produce electrical oscillations corresponding to said natural frequency in said circuit, said releasing and restoring of the lever and tripping finger mechanisms taking place after the dial has produced a series of impulses.

6. In a calling device, a dial, means responsive to the actuation of the dial for producing different series of impulses, a coil, a circuit therefor, a vibratory reed in said coil, a lever associated with said dial, a second lever, a spring associated with second lever, said second lever being held in normal position against the tension of said spring out of engagement with said reed by said first lever when the dial is in normal position, a trigger finger, a spring associated with said finger, said finger being held in a normal position out of engagement with said reed by said first lever against the tension of said associated spring when the dial is in normal position, said first lever being actuated in response to the movement of the dial from a normal position to permit said second lever to move from its normal position under tension of the associated spring for tensioning the reed and to permit said tripping finger to move from its normal position under tension of its

associated spring to lock the reed in its tensioned position and being actuated in response to the movement of the dial back to the normal position to restore the second lever to normal against the tension of its associated spring and to restore the tripping lever to normal position against the tension of its associated spring to trip the tensioned reed to permit it to vibrate at its natural frequency to produce electrical oscillations corresponding to said natural frequency in said circuit.

7. In a calling device, a dial, a coil, a circuit therefor, a vibratory reed in said coil and mechanism for tensioning said reed operative in response to the movement of the dial from normal and for tripping said reed to vibrate in response to the return of the dial to normal to cause oscillations to be produced in said circuit.

8. In a calling device, a dial, a coil, a circuit therefor, a vibrating reed in said coil, permanent magnets associated with said coil and reed, means for energizing said coil, means for tensioning said reed in response to the operation of said dial from normal and for releasing said reed in response to the return of the dial to normal to cause said reed to vibrate in an electromagnetic field introduced by said magnets to cause electrical oscillations to be induced in said coil and transmitted over said circuit.

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