June 1, 1926. 1,587,125

O. M. LEICH

TELEPHONE SIGNAL SYSTEM

Filed Jan. 21, 1924 2 Sheets-Sheet 1

Fig. 1.

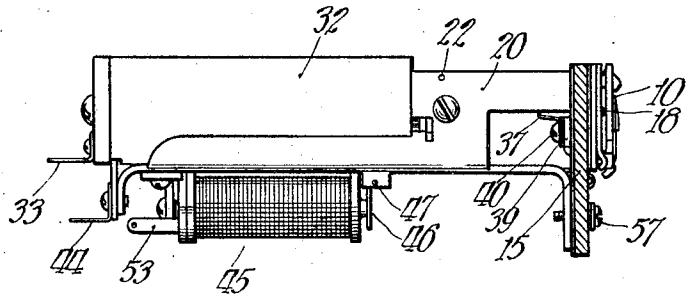
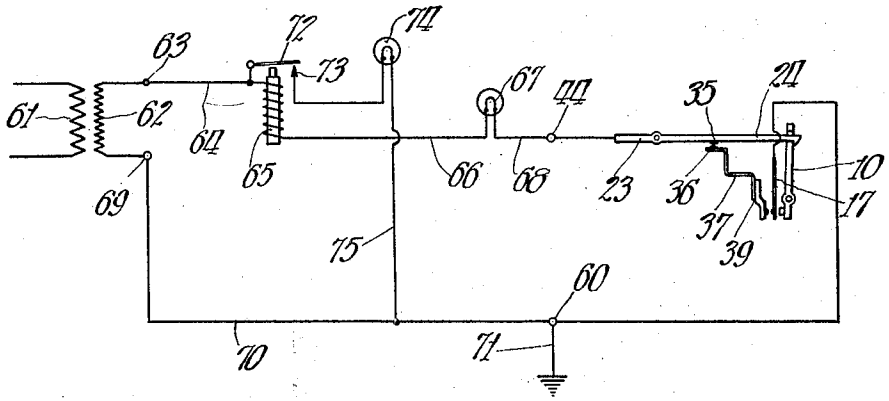



Fig. 5.




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June 1, 1926. **1,587,125**

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Filed Jan. 21, 1924 2 Sheets-Sheet 2

Fig. 2.

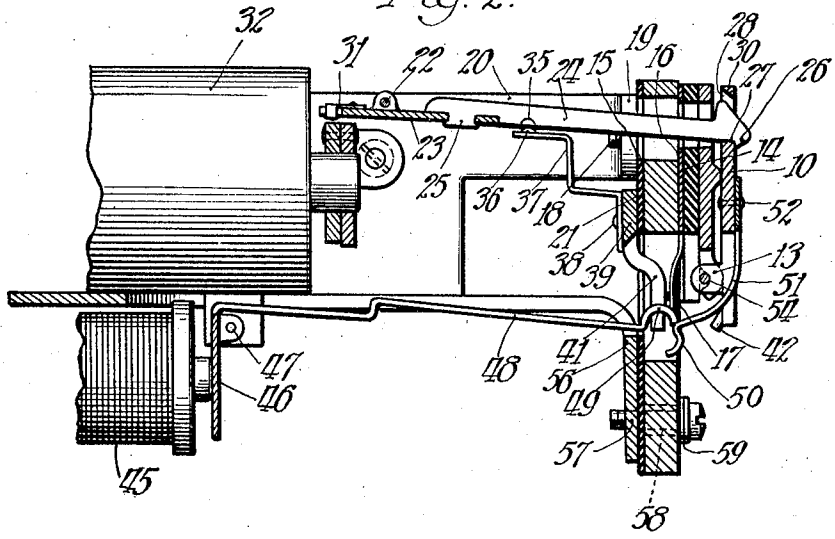



Fig. 3.

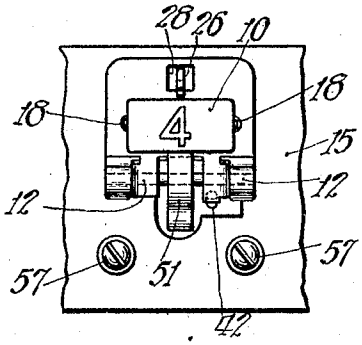



Fig. 4.

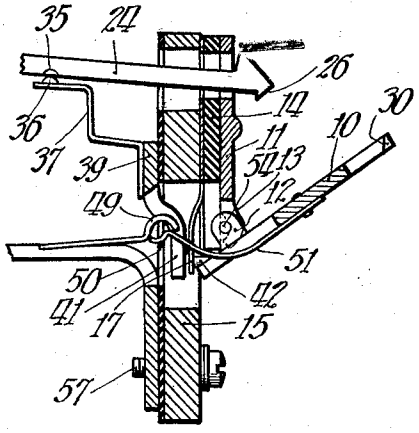
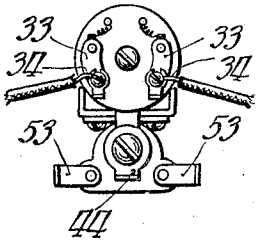



Fig. 6.




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Patented June 1, 1926. 1,587,125

# UNITED STATES PATENT OFFICE.

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## TELEPHONE SIGNAL SYSTEM.

Application filed January 21, 1924. Serial No. 687,517.

My invention relates to signal systems and more particularly to means for recalling the operator.

It is a purpose of my invention to provide means in a signal system wherein a signal light and drop are operated when a subscriber rings off or completes a call whereby the operator's attention is called to the fact that the subscriber is attempting to signal the operator before the operator has performed the necessary act to restore the drop to its upright position and to extinguish the signal lamp.

It is a further purpose of the invention to provide means operated by the subscriber from his station to interrupt the flow of current through the signal light associated with the drop when the drop is in a down position, whereby the operator's attention is called to the fact that the subscriber is trying to signal the operator although the operator has not yet performed the necessary act to restore the drop and extinguish the light.

In the embodiment shown said means comprises a contact member moved to circuit making position by engagement of the drop therewith when in its down position and a contact co-operating with the drop holding arm when in its depressed position assumed thereby when the drop is not in engagement therewith, said contact co-operating with said arm being so arranged that the contact between said arm and contact member is broken when the holding member or arm is actuated toward drop releasing position.

Other objects and advantages of the invention will appear as the description of the accompanying drawings proceeds. However, I desire to have it distinctly understood that I do not intend to limit myself to the exact details shown or described but that I intend to include as part of my invention all such obvious changes and modifications of parts as would occur to a person skilled in this art and as would fall within the scope of the claims.

In the drawings:

Fig. 1 is a view in side elevation of my improved drop construction to be used in my signal system, showing the framework upon which the drops are mounted in section;

Fig. 2 is an enlarged vertical sectional view partly in elevation of my improved drop mechanism;

Fig. 3 is a front elevation thereof;

Fig. 4 is a fragmentary, vertical section of the drop mechanism in a down position;

Fig. 5 is a diagram of the circuit used in my improved signal system; and

Fig. 6 is a rear end view of the mechanism shown in Fig. 1.

Referring in detail to the drawings, in Figs. 1 to 4, inclusive, is shown a drop 10 which is pivotally mounted on the plate 11 by means of the pivot ears 12 receiving the pivot pin 54, mounted between the hooklike portions 13 on the plate 11 and the insulating plate 14. The insulating member 14 and plate 11 are mounted on the frame member 15 by means of suitable securing devices such as the screws 18. Mounted between the insulating material 14 and the frame member 15 is a spring contact member 16 having the resilient end portion 17, said member 16 being insulated from the plate 11 by means of the insulating material 14. The screws 18 are also provided with the customary insulating means for insulating the same from the members 15 and 16. Said screws 18 extend through suitable ears 19 provided on the side frame members 20 of the drop mechanism frame. Said frame is insulated from the frame member 15 by means of a layer of insulating material 21. The frame 15 is a portion of the switchboard frame and is preferably grounded thereon.

Pivotally mounted on the cross pin 22 extending between the side members 20 is the armature 23 which has the drop holding hook arm 24 secured thereto in any suitable manner, as by means of the headed lug 25 shown in Fig. 2. The member 24 is provided with a hook portion 26 adapted to engage the corner 27 of the member 10 at the opening 28 and is further provided with a beveled portion 29 which is adapted to engage with the beveled face 30 of the opening 28 to force said drop 10 out of its upright position when the hook is released or moves upwardly. The hook member 24 moves upwardly when the armature is pulled down at the rear end 31 thereof due to the action of the electromagnet 32, as is customary. The electromagnet 32 is provided with a pair of terminals 33 to which the conduc-

tors 34 are connected, said conductors 34 being a part of the signal circuit over which current impulses may be sent in any well known or desired manner for energizing the electromagnet 32. However, the device is particularly intended for use on telephone lines where the operator is called by operating a magneto by turning a handle on the telephone. Thus, the generating of the current by the magneto will pull down the rear end of the armature and release the drop. In this operation of the drop the action is substantially the same as is commonly the case.

When the drop is operated and is in a down position as in Fig. 4, however, without providing some other means, it would be impossible to call the operator's attention to the fact that the operator is being signaled by a subscriber. In order to make this possible a contact 35 is provided on the arm 24 and a contact 36 co-operating therewith is provided on the spring contact member 37 which is riveted at 38 to the bracket 39, said bracket being insulated from the frame 15 by means of the insulating material 21. The bracket 39 is held in position by means of the screws 40 which are insulated from said bracket and enter the frame 15. The bracket 39 is provided with a depending off-set extension 41 which is aligned with the spring contact 17 and the drop 10 is provided with a rearwardly extending lug 42 which is adapted to engage the spring 17 to move the same into engagement with the arm 41 on the bracket 39 when the drop 10 is in the position shown in Fig. 4, the frame 15 being provided with a suitable opening 43 in which the members 41 and 17 are situated and into which the lug 42 is adapted to enter.

It will be seen that when the drop is in the position shown in Fig. 4 and the hook arm 24 is down, as shown in said figure, the circuit through the device will lead from the terminal 44, which is in electrical contact with the frame member 20, through said frame 20 and pivot pin 22 to the hook arm 24; through the contacts 35 and 36 to the resilient contact member 37; through said resilient contact member 37 to the bracket 39, and from the finger or arm 41 on said bracket to the spring contact 17 and from said spring contact to the frame 15.

The apparatus shown is also provided with a drop restoring electromagnet 45 provided with an armature 46 pivoted on the frame at 47 and having a forwardly extending arm 48 provided with a hook end 49 that is adapted to engage with the hooklike end portion 50 on the curved arm 51 riveted at 52 to the drop 10. When the drop is in down position, as shown in Fig. 4, the member 49 will be in engagement with the member 50 and when the armature 46 is attracted upon energizing the electromagnet in any suitable manner the arm 48 will be moved downwardly causing the hook 49 to engage with the curved end 50 on the member 51, thus raising the drop 10 and causing the same to engage with the latch or hook member on the end of the hook arm 24, whereupon said drop member will be held in its up position, thus breaking the circuit at the spring contact 17 and between the contacts 35 and 36.

The electromagnet 45 is provided with a pair of terminals 53 to which are secured suitable conductors which may be connected with the operator's plug circuit or in any other desired manner.

The frame for supporting said mechanism is further provided with a depending ear 56 through which the securing member 57 passes for holding the said framework on the switchboard framework member 15. The securing member 57 is insulated from the framework member 15 by means of a suitable insulating sleeve 58, the washer 59 and the insulating layer 21, thus being insulated in substantially the same manner as are the other securing screws.

Referring now to the circuit diagram shown in Fig. 5, the drop is indicated by the numeral 10, as in the other figures of the drawing, and the hook arm by the numeral 24, the armature being indicated by the numeral 23 as in the other figures. The contact 44 in Fig. 5 corresponds to the contact 44 in the other figures of the drawings and the contact indicated by the numeral 60 in Fig. 5 corresponds to the frame 15 of the switchboard as shown in the other figures of the drawings. In the diagram the spring contact 17 is indicated as being electrically connected with the terminal 60.

Means for operating suitable means such as a signal lamp is provided, this being any customary source of current, or, as shown in the diagram, the transformer comprising the primary 61 and the secondary 62. Leading from one terminal 63 of the secondary 62 is a conductor 64 which leads to the relay 65, the purpose of which will be explained below, from which the conductor 66 leads to the signal lamp 67 which is electrically connected with the terminal 44 by means of the conductor 68. The other terminal 69 of the secondary 62 is provided with a conductor 70 leading to the contact 60 which may be grounded, as indicated at 71, if desired. The relay 65 is provided with an armature 72 engaging with the contact 73 to close the circuit through the signal lamp 74 when the relay 65 is energized, the said signal lamp 74 being connected with the contact 60 by means of the conductor 75.

It will, accordingly, be seen that when the drop 10 is down and the hook arm member

24 drops, the circuit is completed through the contacts 35 and 36, through the members 37 and 39 and the spring contact 17 to the terminal 60 and from said terminal to the secondary 62 of the transformer, thus causing the signal lamp 67 to be lighted and the signal or pilot lamp 74 will also be lighted due to the action of the relay 65, it being, of course, understood that a relay is provided, for operating the lamp 74, in each of the signal circuits having a lamp 67 therein. With the drop in the down position it would, in ordinary devices of this character, be impossible to call the attention of the operator to the fact that a subscriber is signaling the operator. However, by provision of the contacts 35 and 36, it will be evident that when the armature 23 is pulled down by energizing the coil 32 of the electromagnet by means of the magneto operated by the subscriber or in any other well known manner, the contact between the members 35 and 36 will be broken, thus causing the lamp 67 and the pilot lamp 74 to flash, thus signaling the operator even though the drop has not been restored to its vertical position shown in Fig. 5.

Having thus described my invention what I desire to claim and secure by United States Letters Patent is:

1. In a device of the character described, a signal member having a normal tendency to move to and remain in one position, a signal lamp normally lighted when said signal member is in said position, a movable member for holding said signal member in the other position, means for moving said movable member to release said signal member and means associated with said movable member interrupting the supply of current to said lamp when said movable member is moved to signal member releasing position after said signal member has been released.

2. In a device of the character described, a signal member having a normal tendency to move to and remain in one position, a signal lamp normally lighted upon movement of said signal member to said position, an electromagnet, a member for holding said signal member in the other position moving with the armature of said electromagnet, a contact thereon in the circuit of said signal lamp, and a contact co-operating therewith to close the signal lamp circuit, said contacts being separated when said armature is attracted by said magnet.

3. In a signal system, a drop, a signal lamp lighted by said drop upon assuming a down position, means for operating said drop from a remote point, and means for flashing said lamp by operation of said means after said drop is down.

4. In a device of the character described, a member having a normal tendency to move to and remain in one position, a signal lamp normally lighted when said member is in said position, a movable member for holding said first mentioned member in the other position, means for moving said movable member to release said first mentioned member and means associated with said movable member interrupting the supply of current to said lamp when said movable member is moved to a position for releasing said first member after said first member has been released.

In witness whereof, I hereunto subscribe my name this 4th day of January, A. D., 1924.

OSCAR M. LEICH.