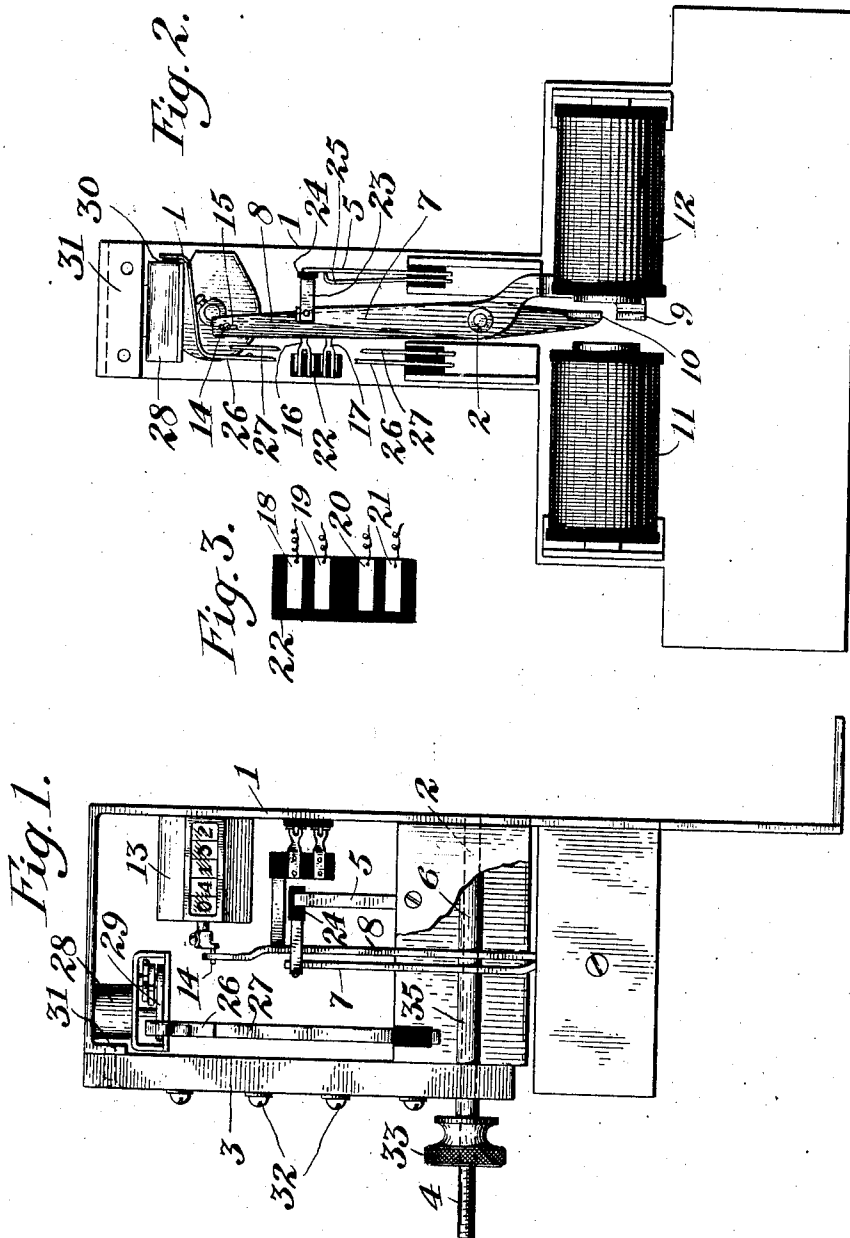


C. V. RICHEY.
 TELEPHONE REGISTER AND LOCK-OUT DEVICE.
 APPLICATION FILED SEPT. 19, 1912

1,063,599.

Patented June 3, 1913.

3 SHEETS—SHEET 1.



Witnesses

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 James H. Marr

Inventor

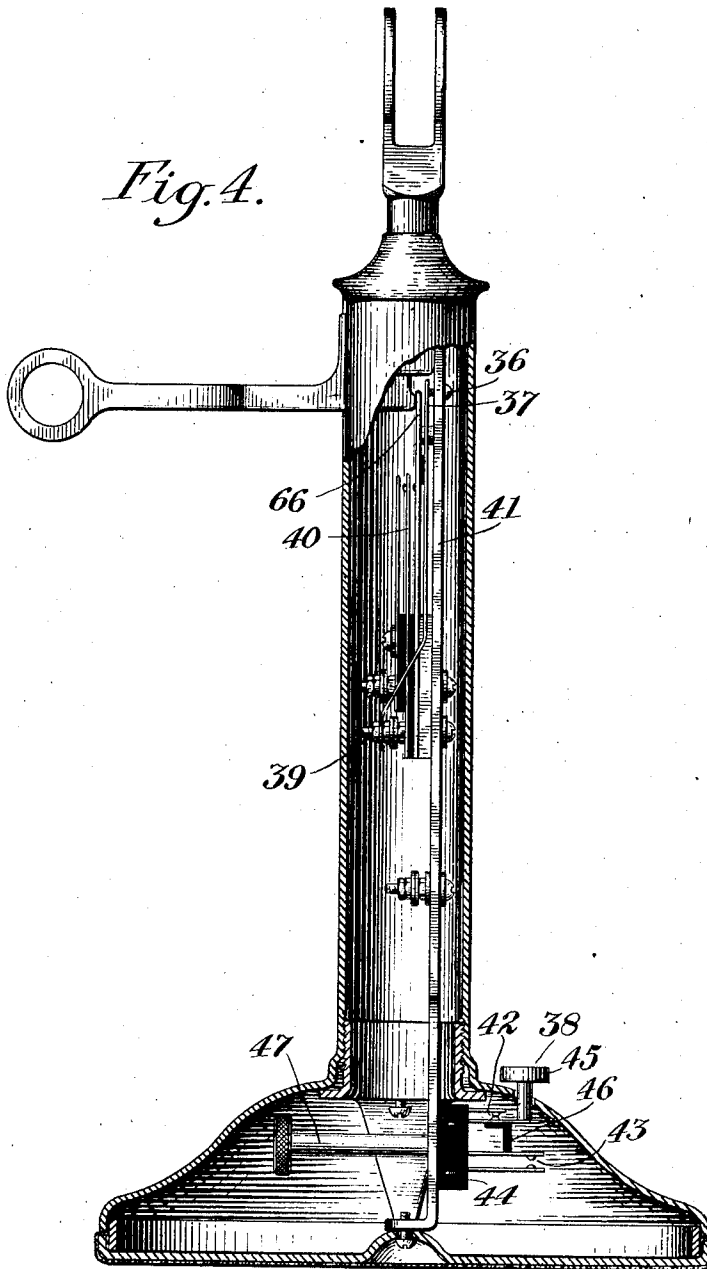
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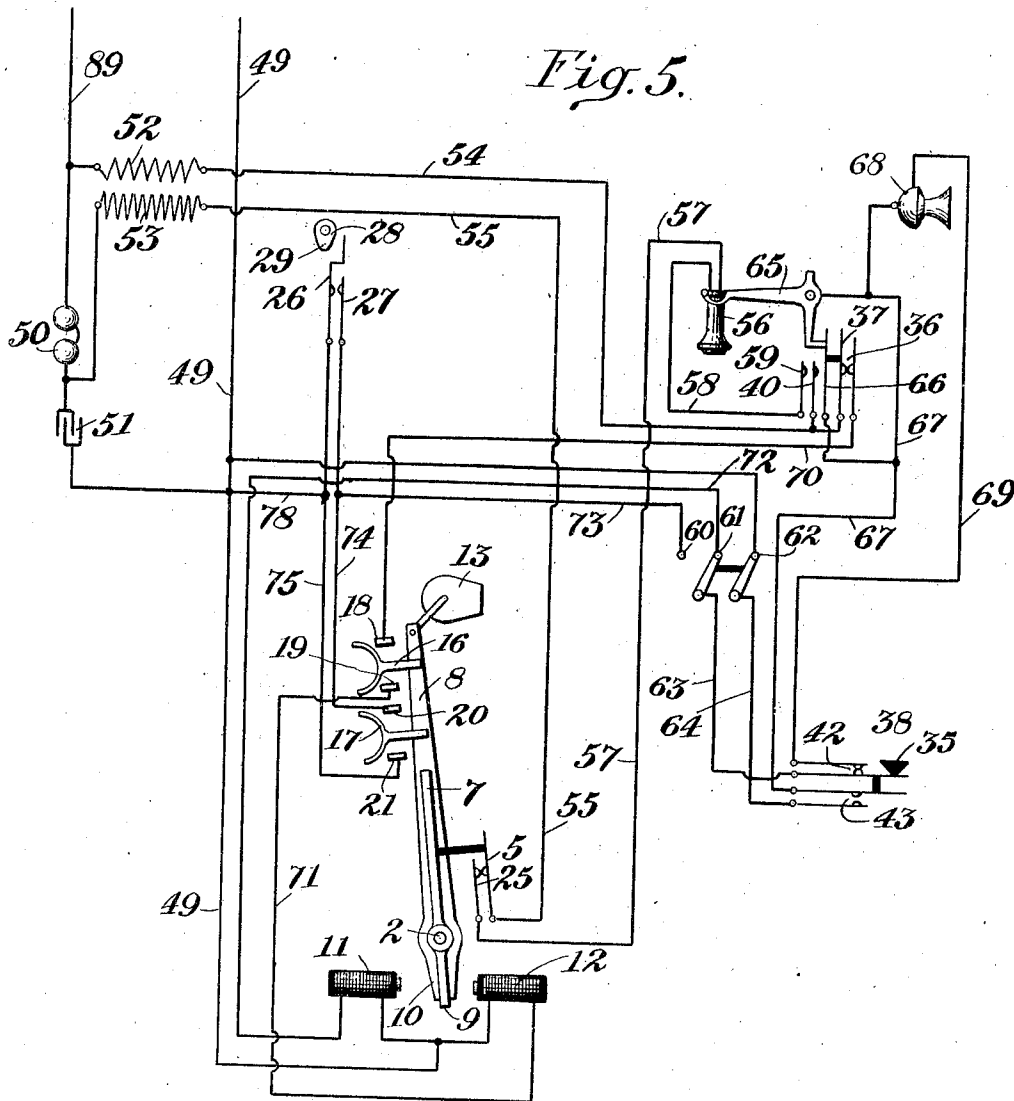
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3 SHEETS-SHEET 3.



Witnesses

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UNITED STATES PATENT OFFICE.

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TELEPHONE REGISTER AND LOCK-OUT DEVICE.

1,063,599.

Specification of Letters Patent.

Patented June 3, 1913.

Application filed September 19, 1912. Serial No. 721,185

To all whom it may concern:

Be it known that I, CHARLES V. RICHEY, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Telephone Registers and Lock-Out Devices, of which the following is a specification, reference being had to the accompanying drawing.

My invention relates to telephone call register and lockout systems and is in the nature of an improvement on my prior invention Patent No. 1,037,053, granted August 27, 1912.

The object of the present invention is to simplify and reduce the number of operations required to be performed by the subscriber.

Another object of the invention is to provide means whereby a failure of the apparatus to operate is indicated to the operator at the central office.

Further objects of the invention are to simplify and increase the efficiency of the apparatus and circuits in various ways which will be hereinafter pointed out.

In the operation of the present invention as a call registering system, a subscriber at a substation equipped with the device, becomes connected with the central office operator in the usual manner by removing his receiver from the switch-hook. The operator finding the wanted subscriber available, completes the connection, and when the called subscriber answers, sends ringing current over the line to the calling substation which actuates the register to register the connection. The actuation of the register also partially completes a restoring circuit controlled by a normally closed contact of the switch-hook. At the end of the conversation the calling subscriber restoring his receiver completes the restoring circuit which restores the actuating mechanism of the meter to normal, thus preparing it for the registration of the next call. The restoration of the meter mechanism opens the restoring circuit. Inasmuch as the restoring circuit cannot be completed unless the register mechanism is in operated position, and as all current supplied to the substation comes from the central office, the operator is notified of the closure of the restoring circuit indicating that the call has been reg-

istered and is also notified of the subsequent opening of the restoring circuit which indicates that the meter mechanism is in normal condition.

In the operation of my invention as a lockout system, a party attempting to make a call cannot signal the central office operator by merely raising the receiver, but must actuate a special key provided for the purpose. Upon actuation of the key, the transmitter circuit is opened and the line circuit is closed through the receiving apparatus only, so that the operator is signaled by the usual closure of the line circuit, and the subscriber can hear her ask for the number, but can make his wants known only by repeated operations of the key. Such a condition indicates to the operator that a call is being made from a lockout station by an unauthorized person, and in order to ascertain his wants, the operator sends ringing current over the line to the calling substation which disables the lockout device so that the subscriber can talk to the operator. If the connection desired is a permissible or unchargeable one, such as an emergency call, the operator completes the connection in the usual way. The actuation of the lockout disabling mechanism partially completes the restoring circuit controlled through a normally closed contact of the switch hook, so that when the calling subscriber hangs up the receiver, the lockout mechanism is restored. The restoration of the lockout mechanism again opens the restoring circuit, the closing and opening of the restoring circuit being indicated to the operator for the same reasons and in the same manner as above mentioned.

My invention is illustrated in the accompanying drawings in which—

Figure 1 is a front elevation with part broken away. Fig. 2 is a side elevation with the terminal block removed. Fig. 3 is an enlarged detail view of a contact block. Fig. 4 is a front elevation of a desk stand partly in section. Fig. 5 is a diagram of the substation circuits and apparatus in normal position.

Referring to Figs. 1, 2 and 3, 1 is the mounting frame to which is rigidly secured a shaft 2 extending therefrom through the terminal block 3 and is provided with threads 4 at the projecting end. The lever

8 is rigidly connected to the sleeve 6 which is mounted to turn on the shaft 2 with sufficient friction to hold the lever 8 in its operated position, after operation, until positively restored in the manner hereafter described. The lever 7 is mounted to turn loosely about the shaft 2 and is normally held in position, shown, by the spring 5. The levers 7 and 8 are each provided at their lower extremities with armatures 9 and 10 respectively, adapted to be acted upon by either of the magnets 11 and 12. Motion is transmitted from the lever 8 to a meter 13 by means of a pin 14 and elongated eye 15 at the upper extremity of the lever. This means of transmission is so arranged that the meter is actuated to register a call each time the armature 10 is attracted by the magnet 11. Near the upper end of the lever 8 are mounted two short-circuiting or bridging brushes 16 and 17 insulated from each other and from the lever and adapted to bridge the contacts 18-19 and 20-21 respectively whenever the armature 10 is attracted by the magnet 11. The brushes 16 and 17 normally rest on the insulation block 22 out of engagement with their respective contacts. The upper end of the lever 7 carries an arm 23 which bears against the spring 5 through a tip 24 of insulating material. The spring 5 normally holds the lever 7 in the position shown and makes electrical contact with the spring 25. In operation the magnet 11 upon energization attracts both armatures 9 and 10. The attraction of armature 10 actuates the meter 13 and brings the brushes 16 and 17 into engagement with their respective contacts, while the attraction of armature 9 actuates the lever 7 to separate the springs 5 and 25. The deenergization of the magnet 11 permits the lever 7 to restore and the contact springs 5 and 25 to again engage, the lever 8 however remaining in its actuated position on account of the frictional bearing between the sleeve 6 and the shaft 2. The contact springs 26 and 27 constitute a part of the lockout mechanism and are controlled by a barrel lock 28, the bolt 29 of said lock being adapted to engage the upper end of the movable spring 26 through a block of insulating material 30, and to move the spring 26 sufficiently to engage the other contact spring 27. The lock 28 is operated in the usual manner by a key in the possession of the subscriber.

The terminal block 3 is secured to an angle 31 of the frame 1 and is provided with suitable terminal connective means such as the screw posts 32. A knurled nut 33 is provided at the threaded end of the shaft 4 and is adapted to be screwed tight against the sleeve 35 to vary the resistance offered to the movements of the lever 8.

A suitable cover or casing (not shown)

is provided to inclose the entire mechanism except the indicating window of the meter 13.

In Fig. 4 is shown a portion of the standard Bell telephone desk stand equipped with extra normally closed switch-hook contacts 36 and 37, and the calling key 38. These are the only additions necessary to the standard equipment. The additional spring 37 is mounted on the post 39 in permanent electrical contact with the existing spring 40, while the complementary contact 36 is inserted in the mounting plate 41 projecting through into engagement with the spring 37 and is insulated from the mounting plate by suitable insulating means such as the usual insulating bushing.

The key 38 is assembled as a unit and consists of a pair of normally closed contact springs 42 and a pair of normally open contact springs 43, secured within an insulating block 44. The terminals of the lower members of the said contact springs are shown projecting forward from the insulating block, and similarly the terminals of the upper members (not shown) project rearwardly from the far side of the insulating block. The shank of the button 45 abuts on the lower member of the contact springs 42 so that a downward movement of the button will separate said contact springs and close the contact springs 43, movement being transmitted from the lower member of contact springs 42 to the upper member of contact springs 43 through the insulating stud 46. The whole device is secured to the mounting plate 41 by means of a thumb screw 47.

From the foregoing it will be seen that the only alteration necessary to the existing substation equipment is the drilling of a hole at the upper and the lower ends of the mounting plate 41 to receive the contact member 36 and the bolt of the thumb screw 47 respectively.

For the sake of clearness there have been no circuit connections shown in the mechanical views, Figs. 1, 2, 3 and 4, such connections however being shown in the diagram of the substation circuits (Fig. 5) in which the essential parts of the apparatus are conventionally shown and correspondingly numbered.

Referring to Fig. 5, 89 and 49 are the line wires leading from the central office. The ringer 50 and condenser 51 are permanently bridged across the line wires in series.

52 and 53 are the primary and secondary windings respectively of an induction coil. Primary winding 52 has one terminal connected to the line wire 89 and the other terminal connected through conductor 54 in multiple to a normally open switch hook contact member 40 and a normally closed contact member 37. The secondary coil 53

has one terminal connected between the ringer 50 and the condenser 51 and the other terminal thereof is connected to one terminal of the receiver 56 by way of conductors 55 and 57, and normally closed contact springs 5—25. The other terminal of the receiver 56 is connected to the line wire 89 by way of conductors 58 and 54 and normally open contact members 59—40. The contact springs 26 and 27 controlled by the bolt 29 of the lock 28, together with the contacts 20—21 adapted to be bridged by the brush 17 upon the movement of lever 8 toward the right, constitute the lock-out device.

The normally closed switch-hook contacts 36—37 and the normally open contacts 18—19 are included in series in the restoring circuit, which is the energizing circuit of the restoring magnet 12, which is adapted to be energized by battery current from the central office. The magnet 11 is adapted to be energized by ringing current from the central office and has its circuit normally opened at the switch-hook contact 40. The binding posts 60, 61 and 62 are provided for changing connections in adapting the circuits for use with the lockout device.

The circuits and apparatus are shown in normal condition and arranged for the control of the call registering device. When it is desired to change from the call registering system to the lockout system, the wires 63 and 64 are disconnected from the contact studs 61 and 62 and connected to the contact studs 60 and 61 respectively.

The operation as a call registering system is as follows: the subscriber desiring a connection raises the receiver 56 from the switch-hook 65 which completes the line circuit as follows: line wire 89, 52, 54, 40, 66, 67, transmitter 68, wire 69, contact 42 of the calling key, wire 63, 64, magnet 11, back over line wire 49. The magnet 11 is so wound that it will not become energized in this circuit, but is adapted to be energized only by the ringing current. The closure of the line circuit as described signals the operator at the central office through means of the usual line signaling apparatus, whereupon the operator listens-in on the line to ascertain the wants of the calling subscriber. The circuit above traced is the subscriber's battery supply circuit and includes the primary winding 51 of the induction coil and the transmitter 68. The circuit of the voice currents may be traced as follows: line wire 89, 51, 54, 40, 59, receiver 56, 57, contact springs 25—5, 55, secondary winding 53, condenser 51 to line wire 49. The operator ascertaining the number wanted completes the desired connection and when the called party answers, the operator sends ringing current over the line to the calling substation, which ringing current traverses the

magnet 11 by way of the circuit previously traced through said magnet. The magnet 11 is thereupon energized and attracts both armatures 9 and 10. The attraction of armature 9 moves the lever 7 to the right which opens the contacts 5—25 and interrupts the receiver circuit. The lever 7 remains in its actuated position only so long as the magnet 11 remains energized, after which it restores under tension of spring 5, whereby the receiver circuit remains open only so long as the ringing current endures, thus preventing chattering of the receiver during ringing or during the actuation of the registering device. The attraction of armature 10 causes the upper portion of the lever 8 to swing over to the right which operates the meter 13 to register one call and at the same time brings the brushes 16 and 17 into engagement with the contacts 18—19 and 20—21, respectively. The lever 8 remains in this position after the deenergization of magnet 11 due to the absence of any retractile spring, and the friction of the contacts and lever bearing. The connection of contacts 18—19 partially completes the circuit of restoring magnet 12 which circuit includes the contacts 36—37, now opened by virtue of the receiver being off the hook. After the removal of ringing current from the line, the circuits are in condition for carrying on conversation.

When the calling subscriber restores his receiver at the end of the conversation, the switch-hook 65 operates to open contacts 59, 40 and 66, and close contacts 66—67, whereupon the restoring circuit is completed and the restoring magnet 12 energized by battery current from the central office over the following path: line wire 89, 52, 54, 37, 36, 70, 18, 16, 19, 71, magnet 12 and back over line wire 49. The energization of magnet 12 attracts armature 10 and throws lever 8 over toward the left, which moves the brushes 16 and 17 out of engagement with their respective contacts and sets the registering device 13 in position to register the next call. The removal of the connection between contacts 18—19, opens the restoring circuit, whereupon current ceases to flow over the line, which notifies the operator through the usual means that disconnection is desired, and that the call has been properly registered. Should the lever 8 fail to restore, the restoring circuit would remain closed and the operator would be notified of the fact by the continued closure of the line circuit through the restoring circuit. It will be seen that during the period of time between the opening of contact between springs 40 and 66 and the closure of contacts 36—37, the line circuit will be opened, which will cause a flicker of the operator's supervisory lamp, indicating to the operator the completion of the restor-

ing circuit. To change over from the register system to the lockout system, the wires 63 and 64 are disconnected from the contact studs 61 and 62 and connected to the contact studs 60 and 61 respectively, and the lockout 28 is operated to open the contact springs 26 and 27. With these changes the operation is as follows: the person attempting to make a call cannot signal central by merely raising the receiver 56 from the hook 65, as the line circuit is opened at contacts 26—27. In order to signal the operator it is necessary that the calling party actuate key 38 which opens the contact at 42 and closes the contact at 43. The closure of contact 43 completes a signaling circuit which may be traced as follows: line wire 89, 52, 54, 40, 66, 67, 43, 64, 72, 11 and back over line wire 49. The operator perceiving the signal connects with the line to ascertain the wants of the calling party who can hear her ask the number but can not talk to the operator as the circuit of the transmitter 68 is opened at contacts 42 and 26—27. Such condition indicates to the operator that a call is being made by an unauthorized person from the locked-out substation, whereupon the operator applies ringing current to the line which traverses the magnet 11 through the following circuit: line wire 89, 52, 54, 40, 66, 67, 43, 64, 72, 11 and back over line wire 49. The energization of magnet 11 actuates the levers 7 and 8 in the same manner as before described which brings the brush 17 into engagement with the contacts 20—21 so that when the calling party releases the key 35 the transmitter circuit is completed over the following path: line wire 89, 52, 54, 40, 66, 67, transmitter 68, 69, 42, 63, 73, 74 contacts 20—21, 75, 76 and back over line wire 49. The completion of this circuit enables the calling party to communicate with the operator and if the call is a permissible or unchargeable one the operator completes the connection in the usual manner. During conversation the circuits remain in the condition last described and at the end of the conversation when the receiver 56 is restored to the hook 65 the switch hook contacts operate to complete the restoring circuit and restore the lever 8 in the same manner as before described. The restoration of the lever 8 again opens both the locking circuit and the receiver circuit at contacts 20—21 and 18—19 respectively. The closure of the restoring circuit and the restoration of the lever 8 are indicated to the operator through the same means and in the same manner as before described. When the subscriber desires to permit free use of the telephone he disables the lock-out device by operating the lock 28 to close the springs 26—27 which shunts the contact 20—21 and renders the

use of the key 38 and lever 8 unnecessary. It is to be noted that during the time that the substation is locked out, complete connection can be established only through the actuation of lever 8 which will also actuate the register. Thus, means are provided whereby the subscriber will have a record of all the answered, incoming calls made during his absence.

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

1. In a telephone exchange system, a combined substation lockout device and register comprising the usual transmitter and receiver circuits, a register and register actuating means, said actuating means being responsive to ringing current over the line, and normally closed contacts in said receiver circuit adapted to be opened during the energization of said actuating means by ringing current, whereby buzzing of the receiver is prevented.

2. In a telephone exchange system, a combined lockout and register substation equipment comprising the usual transmitter and receiver circuits, a register and actuating means therefor responsive to ringing current over the line, and contacts in said receiver circuit biased to a normally closed position and adapted to be momentarily opened during the application of ringing current as aforesaid.

3. In a telephone exchange system, a lockout and register substation equipment comprising the usual transmitter and receiver circuits, a registering device, actuating means therefor in the transmitter circuit responsive to ringing current over the line, and normally closed contacts in the receiver circuit under the control of said actuating means whereby the receiver circuit is opened when ringing current is applied as aforesaid.

4. In a telephone exchange system, a lockout and register substation equipment comprising the usual transmitter and receiver circuits, the register and actuating means therefor responsive to ringing current over the line, restoring means for said register operative upon replacing the receiver upon its hook, and means independent of the receiver hook for making and breaking the talking circuit, whereby the operator may be signaled before restoring the register.

5. In a telephone exchange system, a lockout and register substation equipment comprising the usual transmitter and receiver circuits, a lockout comprising normally closed contacts in the transmitter circuit which may be opened at will, means for momentarily closing the line circuit to give the operator an emergency signal independently of the transmitter, and means at the substation responsive to current of a distinctive character and under the control of

the operator to enable the disabled transmitter circuit at will, whereby conversation may proceed in emergency conditions in spite of the lockout.

5 6. In a telephone exchange system, a lockout and register substation equipment comprising the usual transmitter and receiver circuits, a lockout comprising normally closed contacts in the transmitter circuit
10 adapted to be locked open at will, normally closed contacts in multiple with said lockout contacts together with actuating means therefor responsive to ringing current over the line, and means independent of the
15 transmitter circuit whereby the operator may be signaled in emergency to enable the talking circuit through the application of ringing current as aforesaid.

20 7. In a telephone exchange system comprising a lockout and register substation equipment including the usual transmitter and receiver circuits, a lockout including normally closed contacts adapted to be locked open at will to disable the transmitter
25 circuit, an auxiliary emergency signaling circuit including electromagnetic means for enabling said disabled transmitter circuit, and normally open manually controlled signaling contacts, said electromagnetic
30 actuating means being responsive to current of a distinctive character only.

8. In a telephone exchange system comprising a lockout and register substation equipment comprising the usual transmitter
35 and receiver circuits in multiple across the lines, actuating means for a register responsive to current of a distinctive character only over the line and connected across the line separately from said receiver and
40 transmitter, a lockout comprising normally closed contacts in the transmitter circuit which may be opened and maintained open at will, and normally open contacts in the

circuit of said actuating means operable at will by the subscriber to close the line circuit for signaling the operator independently of said transmitter circuit. 45

9. In a telephone exchange system, a lockout and register substation equipment comprising the usual transmitter and receiver
50 circuits, actuating means for a register through which the transmitter circuit is normally completed, a circuit in shunt to said actuating means through which the circuit of the transmitter may be shifted when
55 desired, said shunt circuit being jointly controlled by a lockout device and said actuating means, and means independent of said transmitter circuit for thereafter closing the circuit of said actuating means. 60

10. In a telephone exchange system, a lockout and register substation equipment comprising the usual transmitter and receiver circuits, actuating means for a register normally in said transmitter circuit and
65 operable by ringing current over the line, restoring means for the register in a circuit closed when the receiver is replaced upon its hook, an independently operable circuit in shunt to said restoring means, and means for
70 closing and opening said circuit to signal the operator independently of the receiver hook, circuit terminals arranged for shifting said register actuating means from the transmitter circuit to the control of said circuit closing
75 means of the shunt circuit, together with an auxiliary circuit for said transmitter jointly controlled by said register actuating means and the lockout device.

In testimony whereof I affix my signature 80
in presence of two witnesses.

CHARLES V. RICHEY.

Witnesses:

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