

1,037,053.

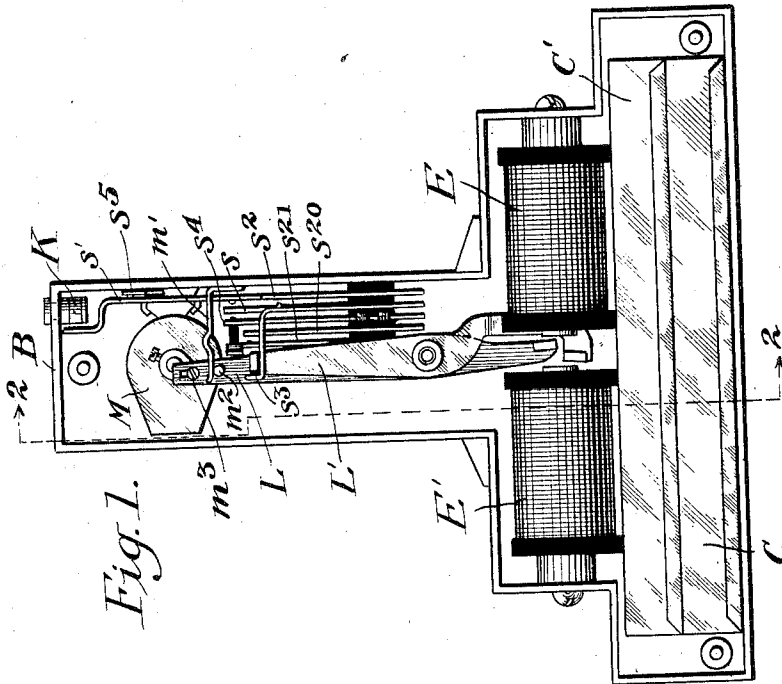


Fig. 1.

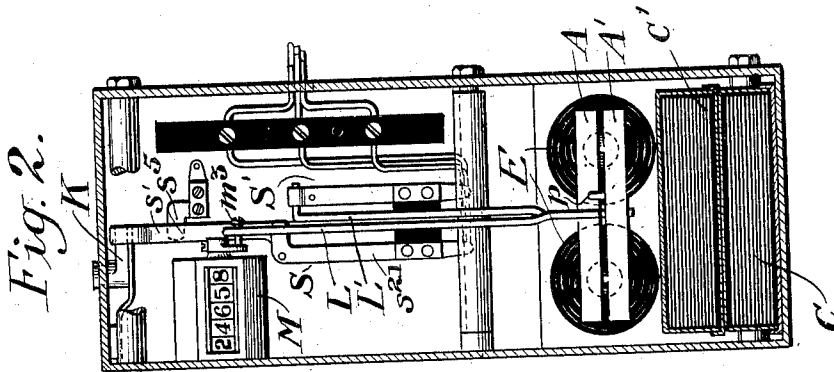


Fig. 2.

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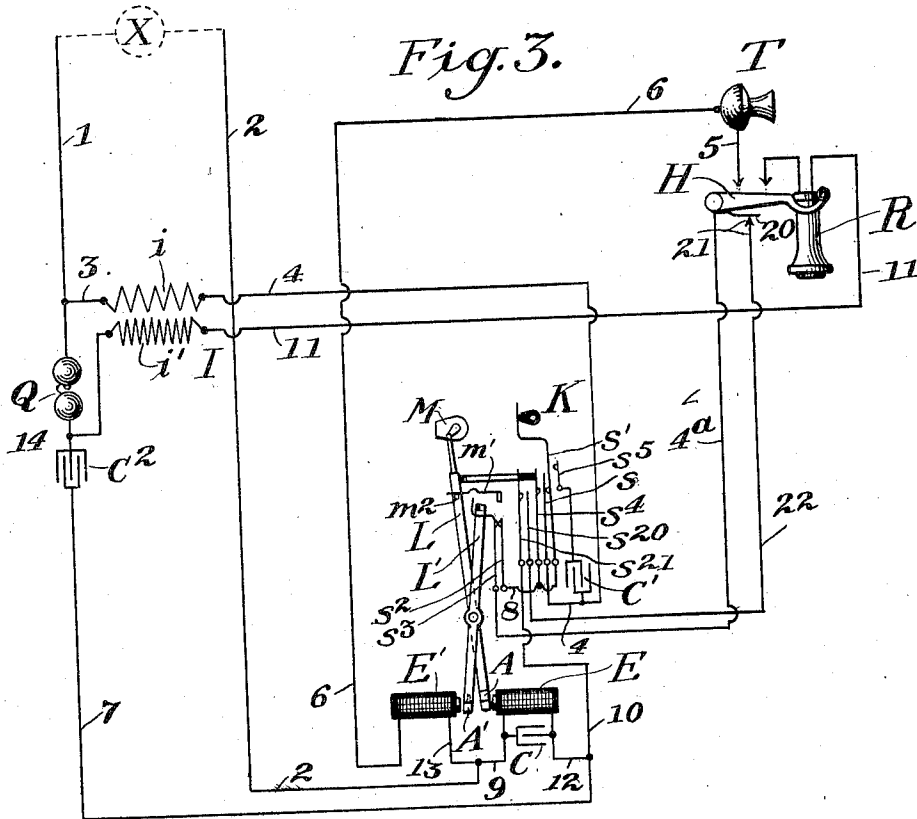
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 TELEPHONE CALL REGISTER.
 APPLICATION FILED APR. 17, 1911.

Patented Aug. 27, 1912.

2 SHEETS—SHEET 2.

1,037,053.



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UNITED STATES PATENT OFFICE.

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TELEPHONE-CALL REGISTER.

1,037,053.

Specification of Letters Patent.

Patented Aug. 27, 1912.

Application filed April 17, 1911. Serial No. 621,587.

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-Call Registers, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to telephone call registers and is in the nature of an improvement on the invention described in my prior applications Serial No. 554,557, filed April 9, 1910, Serial No. 579,496, filed August 29, 1910, and Serial No. 595,285, filed December 2, 1910.

The object of the present invention is to simplify the apparatus and circuits and increase their efficiency in certain particulars which will be pointed out.

There are two principal features in this invention, a meter and a lockout. The function of the meter is to register the number of originating calls at a substation which have been answered by the called subscriber, and the function of the lockout is to enable the subscriber to place his telephone in or out of operative condition for originating calls, at will. The meter comprises a counting device worked by a pair of magnets acting upon actuating means in opposite directions, whereby the use of the retractile spring, as well as uncertainty in operation, is avoided. The meter magnets are included in branch wires forming part of the substation circuits, and the calls are registered by means of special current such as ringing current transmitted from the central office by the operator after the connections are completed and the calls answered. The lockout device is an arrangement of contact springs controlled by the same pair of magnets and by a key in the possession of the subscriber.

My invention is illustrated in the accompanying drawings in which—

Figure 1 is a side view of the mechanism, and Fig. 2 is a sectional view on the line 2-2 of Fig. 1. Fig. 3 is a diagram of the substation circuits.

Referring to the drawings, and especially to Figs. 1 and 2, M is the meter, in the form of a numerical counter of a well known type, in which the units disk is changed at each forward stroke of the lever *m*, and

succeeding disks are changed to give multiples of complete rotations of the units disk. This portion of the mechanism is not in itself a part of my invention, except as it forms an element of the combination. The so-called Veeder meter is illustrated for convenience. The lever *m* is actuated by a lever L moved in one direction by electromagnet E and in the other direction by electromagnet E'. The magnet E has its windings shunted by a condenser C, in order to remove its impedance from the talking circuit. Adjacent to the meter are two sets of springs S and S'. The springs S are acted upon by the lever L, and the springs S' are acted upon by the twin lever L', each of these levers carrying an armature A, and both armatures being controlled by the same electromagnets.

The mechanism is inclosed in a casing B which has a lid not shown, but supposed to cover the exposed face in Fig. 1. This lid may be fitted with a lock or seal so that it can be opened only by authorized persons.

Referring now to Fig. 3, 1-2 represent the line wires entering the substation from the central office X, which is equipped with the usual line jacks, plugs, cords and other apparatus common in centralized battery exchanges, and as shown in my prior applications above referred to. At the substation the talking circuit is the standard common battery circuit illustrated in my said applications, and commonly known as the Bell substation circuit. The receiver R, transmitter T, switch hook H, condenser C² and coil I are the same as those commonly employed. They will therefore not be described in detail.

A special pair of contacts 20 and 21 are provided in the instrument, closed by the switch hook when the receiver is hung thereon. These constitute the only feature of novelty in the instrument equipment.

The circuits of the meter and lockout will be best understood by stating the operation in detail as follows: In originating a call, the subscriber closes his line circuit at the switch hook by way of: line wire 1, 3, 4, s, s', 8, s², s³, 4^a, H, 5, T, 6, E', 13 and back over line wire 2. This energizes the line relay at the central office and the operator gets the number and completes the connection in the usual manner. When the called subscriber answers the operator sends ring-

ing current over the line which energizes magnet E' over the same circuit already traced. Owing to the relatively high resistance of the ringing circuit including the ringer Q and the magnet E, the positive operation of the magnet E' by ringing current is not interfered with. The energization of E' pulls over both levers L and L', the lever L operating the meter M to register the call. When the ringing current is taken off, L is held in its actuating position by a spring or latch m'. When the subscriber is called from the central station, the lock-out being off as shown in Fig. 3, the circuit of actuating magnet E' just mentioned, is opened at contacts s², s³ during the continuance of each ringing period by the attraction of the lever L' by the magnet E. Therefore the magnet E' is not energized by the ringing current at this time and the meter which is connected to the lever L when the lockout is off, is not actuated upon the answering of the called subscriber during a ringing period, and upon the cessation of ringing current, talking may proceed as usual.

When it is desired to change over to a lockout the cam K is turned by means of a suitable key, which permits the spring s' to retract, opening contact between s' and s and closing the pair s'-s⁵, and the meter M thrown out of gear either by removing the crank pin m³ or by means actuated by the turning of cam K to disable the operating mechanism within the meter. Assuming that the above change has been made, a person at this substation cannot originate a call as the line circuit before traced is now open at contacts s-s' which circuit, however, is closed to ringing current through condenser C', and contacts s⁵-s'. The operator in calling rings over the following circuit: line wire 1, Q, 14, 7, 12, E, 9 and back over line wire 2. This actuates lever L' to open contacts s²-s³ which are again closed when the ringing ceases or at each interval in ringing. After the subscriber raises his receiver, ringing current, at the next ringing period, energizes magnet E' in the following circuit: 1, 3, i, 4 C', s⁵, s' 8, s², s³, 4^a, H, 5, T, 6, E', 13, and back over line wire 2. The energization of magnet E' pulls over lever L which closes contacts s-s⁴ and s²⁰-s²¹. The subscriber's primary or battery supply circuit is now completed as follows: line wire 1, 3, i, 4, s, s⁴, 8, s², s³, 4^a, H, 5, T, 6, E', 13 and back over line wire 2. The closure of this circuit notifies the operator that the called subscriber has answered, the ringing ceases, and the circuit last traced is maintained by the lever L being held in its operating position as before described. At the end of conversation, when the subscriber hangs up, the magnet E is energized by current, from the central station, over the

following path: central station X, line wire 1, 3, i, 4, s, s⁴, 8, s², s³, 4^a, H, 20, 21, 22, s²⁰, s²¹, 10, 12, E, 9 and back over line wire 2 to X. The energization of magnet E actuates both levers L and L'. The lever L, being thus restored to its normal position as shown, opens the circuit last traced, at s-s⁴ and s²-s³, whereupon the magnet E becomes deenergized which permits lever L' to be restored to its normal position as shown. In order that the circuit through magnet E will not be opened at s²-s³ before the lever L has had time to reach its normal position, the lever L' is prevented from being actuated by said magnet previous to L by the plug p shown in Figs. 1 and 2.

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

1. In a telephone exchange system, a lock-out device comprising the following instrumentalities: a switch adapted to close or open the circuit for calling central and for conversation, and to maintain the same closed or open when operated, a key adapted to open and close said switch as determined by the subscriber, and an electromagnet also adapted to control the switch and itself controlled by signaling current from the central office, whereby the station may be rendered continuously dead for originating calls but may still be controlled to receive calls.

2. In a telephone exchange system, a meter device, a lever for actuating the same, two controlling magnets for said lever acting in opposite directions, a lockout device, a key and a second lever jointly controlling said lockout device, and an armature on said second lever acted on by the same magnets, together with means to hold the metering lever after actuation.

3. A telephone exchange system comprising a central office and connected subscribers' stations having a call register and lock-out comprising a meter, actuating means for the same responsive to current over the line to actuate the meter, means holding the meter in actuated position, and normally inoperative releasing means rendered operative upon actuation of said meter and placed under the control of the subscriber.

4. A telephone exchange system comprising a central office and connected subscriber's station having a call register and lock-out comprising a meter, electromagnetic actuating means for the same responsive to current over the line to actuate the meter, means holding the meter in actuated position, and normally inoperative electromagnetic releasing means and a circuit for the same rendered operative upon the actuation of the meter and placed under the control of the subscriber.

5. A telephone exchange system comprising a central office and connected sub-

scribers' stations having a lock-out key and circuit control means by which the station is rendered inoperative for outgoing calls, additional means for automatically rendering said station operative for incoming calls when said lockout is on, means maintaining said station operative when so rendered as aforesaid, and normally inoperative releasing means rendered operative upon the actuation of said additional circuit controlling means and placed under the control of the subscriber.

6. A telephone exchange system comprising a central office and a connected subscriber's station having a lockout key and circuit control means by which the station is rendered inoperative for outgoing calls, additional means for automatically rendering said station operative for incoming calls when said lockout is on, means maintaining said station operative when so rendered as aforesaid, normally inoperative releasing means rendered operative upon the actuation of said additional circuit controlling means and placed under the control of the subscriber, and a meter operatively connected with the said additional circuit controlling means, and means disconnecting the meter from said circuit controlling means when said lock-out is on as aforesaid.

7. A telephone exchange system comprising a central office and a connected subscriber's station, having a call register and lockout comprising a meter, actuating means for the same responsive to ringing current to actuate the meter, means holding the meter in actuated position, and normally inoperative releasing means rendered operative upon actuation of said meter and placed under the control of said subscriber.

8. In a telephone exchange system, a central office and a connected subscriber's station, having a call register and lockout comprising a meter, actuating means for the same responsive to current over the line, and a lockout key and contacts operatively associated with both the meter and actuating means and the subscriber's circuits, and adapted to be operated to simultaneously render both the meter and the substation circuits inoperative.

9. In a telephone exchange system, a central office and connected subscriber's station, having a call register and lockout comprising a meter, two controlling magnets for said meter, one of said magnets being adapted to register a call on said meter, a lockout device controlled by a lockout key

and the said electromagnet jointly, means to hold the meter in actuated position, and means whereby said second electromagnet when actuated releases the meter from actuated position and restores the lockout device to normal.

10. In a telephone exchange system, a central office and a connected subscriber's station having a register call and lockout device at the station comprising means for rendering the talking circuit of the station inoperative for outgoing calls, additional means for rendering said talking circuit operative to incoming calls, said additional means comprising an electromagnet responsive to ringing current sent over the line and located in a portion of the talking circuit together with means constituting a path for ringing current through said inoperative talking circuit, and contacts adapted when closed to bridge said last named means, means adapted to maintain said talking circuit operative when so rendered, and releasing means and circuit therefor placed under the control of the subscriber when the talking circuit is rendered operative as aforesaid.

11. In a telephone exchange system, a central station and connected subscriber's station having a talking circuit and a plurality of multiplied paths for the completion of the same, one of said paths being adapted to enable the said circuit and another to disable the same when used to complete the circuit, and actuating means responsive to ringing current in the disabled talking circuit to close an enabling multiple path for the same.

12. In a telephone exchange system a central station and connected subscriber's station having a talking circuit, and multiplied paths for the completion of the same, one of which paths disables the same and another of which enables the same, a lockout control key for completing the talking circuit through either of said paths at will, a third path in multiple with the first two and adapted to enable said talking circuit when closed, and actuating means responsive to ringing current in the inoperative talking circuit to close said third multiple path.

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

CHARLES V. RICHEY.

Witnesses:

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JAMES H. MARR.