

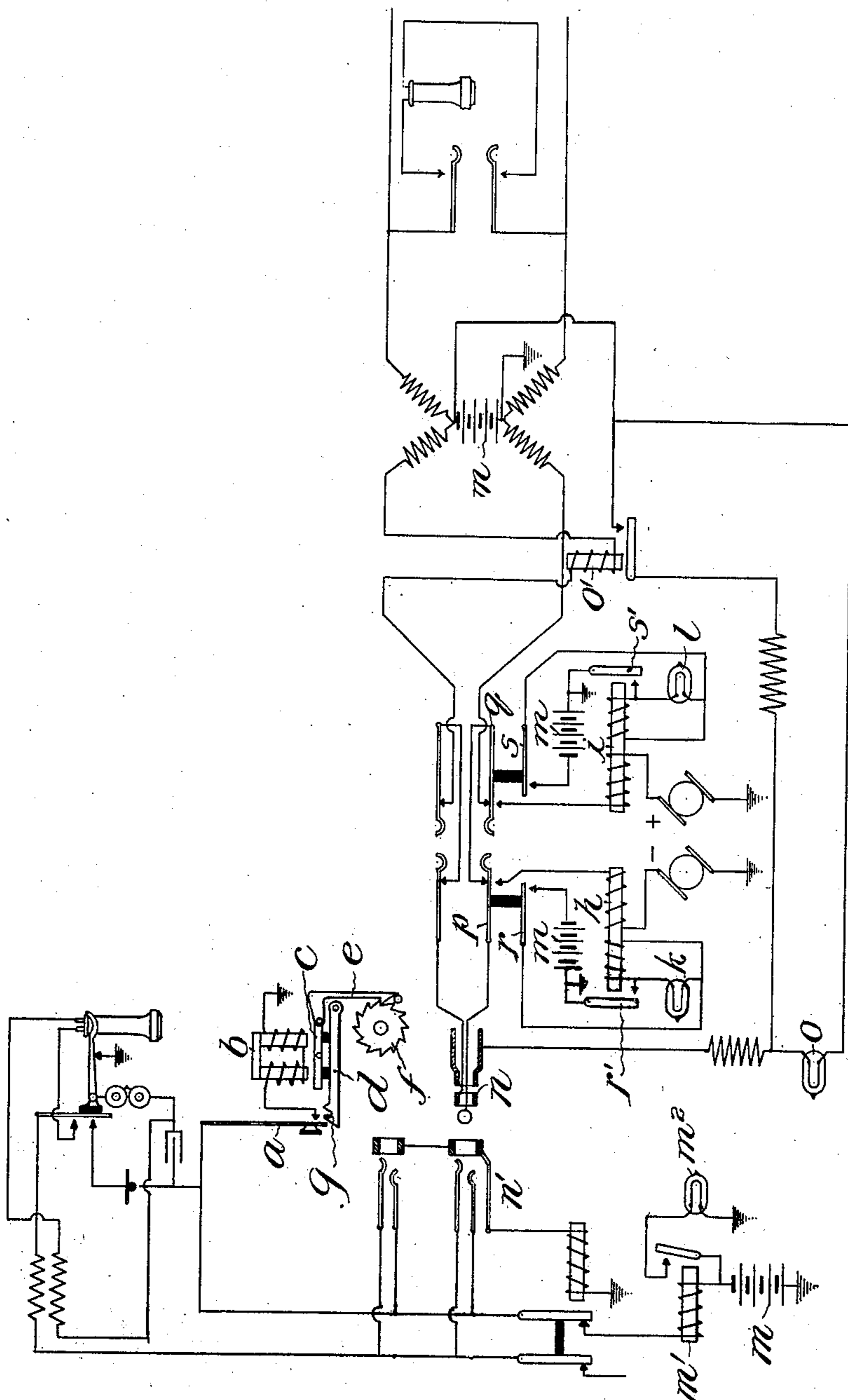
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F. R. McBERTY.

REGISTER SIGNAL FOR MEASURED SERVICE TELEPHONE EXCHANGE SYSTEMS.

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Witnesses:

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UNITED STATES PATENT OFFICE.

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REGISTER-SIGNAL FOR MEASURED-SERVICE TELEPHONE-EXCHANGE SYSTEMS.

No. 828,419.

Specification of Letters Patent.

Patented Aug. 14, 1906.

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To all whom it may concern:

Be it known that I, FRANK R. McBERTY, a citizen of the United States, residing at Evanston, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Register-Signals for Measured-Service Telephone-Exchange Systems, of which the following is a full, clear, concise, and exact description.

My invention relates to telephone-exchange systems of the measured-service class, in which a register or coin-collector is provided at each subscriber's station, operated and controlled by the joint work of the subscriber and operator. When the operator sends current over the line to control the coin or register, as the case may be, it is especially desirable that she should have some check-signal, so that she may be advised that the particular work intended has been done as, for example, the deposit of the coin, the return of the coin, or the movement or non-movement of the register.

My invention relates to special apparatus for doing this work and includes a substation-meter circuit and a locking-relay for the operator, the construction and arrangement being such that when the operator sends current to cause the register or coin-collector to move or operate in any particular way she will receive a signal back, indicating that the work has been performed, and in case the operator repeats the act immediately thereafter her signal-back indicator will remain inert. Thus there will be a double check kept upon the behavior of the register or coin-collector.

The prior art is shown in Patent No. 665,874 to Albert M. Bullard, granted January 15, 1901. I mention also Patent No. 728,309 to Charles E. Scribner, of May 19, 1903.

My invention will be more readily understood by reference to the accompanying drawing.

The subscriber's switching apparatus is of the usual construction and is connected by a telephone-line circuit with the central office switchboard in the well-known way.

At the substation I have shown a register comprising the push-key *a*, the polarized electromagnet *b*, the centrally-pivoted armature *c* thereof, and the lever *d*, the latter be-

ing adapted to be thrown out of engagement with the key *a* whenever the armature *c* is rocked in either direction.

It will be observed that when the push-key *a* is closed the catch *g* of the lever *d* engages the said key to hold the same closed, and thus maintain the circuit through the electromagnet until the magnet becomes excited to tilt its armature *c*. When the armature is rocked anticlockwise, the pawl *e*, carried by the armature, will act to turn the ratchet-wheel *f* in the same direction, and when the said armature is rocked clockwise the pawl will ride over the teeth of the ratchet-wheel, and so will not advance the wheel. We will consider the ratchet-wheel *f* as the means whereby power is applied to do whatever work is desired, whether in a register or in a coin-collector. My invention resides more particularly in the relays *h* and *i*, the lamp-signals *k* and *l* and the circuits thereof, and the combination of said relays and circuits with the substation service-meter. The subscriber in order to signal presses upon the push-key *a*, thus closing circuit of the battery *m* through line-relay *m'* to ground through the polarized electromagnet *b*. The line-signal *m*² is thus displayed, and the operator inserts answering-plug *n* into answering-jack *n'*, and, connecting her telephone, is now in communication with the subscriber, who will have taken down his receiver. The insertion of the plug has served to cut off the line-signal and bring the supervisory signal *o* into position. When the conversation is finished, the subscriber will restore his receiver to the switch, thus withdrawing the transmission-current from the line. The relay *o'* thus being made neutral allows its armature to fall away and open the shunt around supervisory signal *o*. This is a well-known and standard arrangement of line and supervisory signals. While the operator is doing the work of answering the call and making connection with the line called for, the circuit from the key *a* remains closed through the electromagnet to ground. The operator having completed the connection with the line of the subscriber called for will proceed to operate the register. The electromagnet being excited as key *p* is depressed, the armature will be tilted to move the pawl

and so rotate the ratchet-wheel *f* in the positive or anticlockwise direction. In case the line wanted was busy or there was failure to complete connection the operator will send
 5 current of the plus sign by depressing key *q*. This will oscillate the armature-lever *c* in the clockwise direction, and the ratchet *f* will not be turned. The locking-lever *d* will, however,
 10 as previously stated, be thrown away from engagement with the push-button, so that the circuit at the push-button will now be open.

As previously indicated, my invention is designed to provide a check-signal for the op-
 15 erator in order that she may have a signal before her to indicate whether or not the signaling-current, minus or plus, as the case may be, has accomplished the desired result in the movement of the ratchet-wheel *f* or whatever
 20 mechanical medium is employed for doing the work of keeping tally. This desired result I effect by means of the relays *h* *i* and the signals *k* *l*, the said signals being controlled each by its corresponding relay. It will be
 25 observed that when key *p* is depressed the contact *r* is closed to battery *m* through the signal-lamp *k*. The closing of current through one of the coils of relay *h* acts to close the relay-contact at *r'*. The two contacts at *r* and
 30 *r'* are thus closed at the same time and the remaining coil of the relay is brought into multiple arc with the signal-lamp *k*, and thus the armature of relay *h* is locked in position to hold the signal *k* displayed as long as the key
 35 *p*, and consequently the contact-spring *r*, remains depressed. The signal *k* is thus maintained in displayed position, so as to be observed by the operator. As a matter of pre-
 40 caution or further test the operator, after seeing the signal, works the key *p* a second time, and in case the register has operated as it should the circuit will be open at the push-
 45 key *a*, and hence relay *h* will not be operated and the signal *k* will not be displayed this second time.

The description of relay *h* applies equally to relay *i*—that is to say, the line wanted being found busy, key *q* is depressed, closing
 50 contact *s* to battery, the contact *s'* of relay *i* will be closed by the current of plus sign sent through the polarized electromagnet of the register, and the signal *l* will be displayed and held displayed. The operator may then ma-
 55 nipulate key *q* a second time, and in case the work has been properly done at the register the circuit will be found open at push-key *a*, and the relay *i* will not be magnetized on this second manipulation, and there will be no
 60 glow of the lamp *l*.

The special features of the service-meter with respect to closing the circuit by push-
 65 key *a* and releasing the same by the movement of lever *d* whenever the armature *c* is rocked form no part of the present invention. My invention herein therefore does not in-

clude the special features of the service-meter except as combined with the locking-relays *h* and *i* or one of them.

I have described the key *p* as connected with the branch including the minus current. 70 It is of course evident that plus current sent through the polarized relay *h* might be adapted to give the positive signal or signal that the meter had been worked to count one tally or to deposit a coin. For convenience of illus- 75 tration the battery *m* has been illustrated at four different places in the drawing. In practice a single storage battery is employed.

While I have shown the signal-lamps *k* and *l* in multiple arc with the second coils, respec- 80 tively, of their relays, I do not wish to limit myself to such arrangement, since other modifications will suggest themselves to those familiar with the subject.

I claim—

1. A relay having two coils, one coil being 85 included in a circuit containing a source of current and an electromagnet, said circuit extending from a central office to a substa- 90 tion, two points of control being included in said circuit, one point at a central station and the other at the meter of the substation, the electromagnet being a part of said meter; the other coil of said relay being included in a lo- 95 cal circuit having two points of control, one point being adapted to be closed when the point of control at the central station of the circuit through the first-mentioned coil is closed, and the other point of control of the 100 local circuit being closed on the attraction of the armature when the relay is excited, in combination with a signal-lamp controlled by the relay; whereby the operator is notified by the continuous glowing of the lamp of the making of a tally at the meter, substantially 105 as and for the purpose specified.

2. A relay having two coils, one coil being 110 included in a circuit containing a source of current and an electromagnet, said circuit extending from a central office to a substa- 115 tion, two points of control being included in said circuit, one point at a central station and the other at the meter of the substation, the electromagnet being a part of said meter, the other coil of said relay being included in a 120 local circuit having two points of control, one point being adapted to be closed when the point of control at the central station of the circuit through the first-mentioned coil is closed, and the other point of control of the 125 local circuit being closed on the attraction of the armature when the relay is excited, in combination with a signal-lamp; whereby the operator is notified by the continuous glow- ing of the lamp of the making of a tally at the meter, substantially as and for the purpose specified.

3. The combination with the cord-circuit of a measured-service telephone-exchange 130 system, of a pair of relays, each relay having

a separate coil included in a different branch circuit for directing current to a subscriber's meter, the current through said branches being of opposite polarity; separate keys for closing at will either of said circuits or branches to the line which extends to a subscriber's station-meter, each key controlling in addition a separate contact of a local circuit belonging to the relay thereof, a second contact for each local circuit which is closed when the relay thereof is excited, and second windings, one for each relay, and a signal-lamp for each, the said winding and lamp of a particular relay being included in the local circuit; whereby the operator is informed of the actions of the meter, substantially as and for the purpose specified.

4. The combination at the central station of a telephone-exchange, of two relays, each relay having two windings, one winding of each being included in a different branch circuit, each branch including a source of current, the current in each branch being of a different polarity from that of the other branch, said branches being adapted to be closed at will to a line leading from the central office to a subscriber's station, said line being utilized for transmission of voice-currents, in combination with the said meter, including a polarized electromagnet, a centrally-pivoted armature therefor, a locking-lever *d* moved thereby when the armature is oscillated in either direction, a key or circuit-closer *a* for controlling the circuit through the meter, with which the locking-lever is adapted to engage, said circuit-closer being adapted to be closed and locked in position by the act of the subscriber, and to be released on current of either polarity being directed through the polarized magnet, said relays being each provided with its own local circuit including a second winding, two contacts or points of control in said local circuit, one of said contacts, as *r* or *s*, being closed when

the branch containing the main winding of the relay thereof is directed to line, and the other contact, as *r'* or *s'*, being adapted to be closed or left open accordingly as the circuit is found complete or incomplete at the switch *a* of the meter.

5. In a telephone toll system, the combination with a subscriber's line-circuit and a local circuit at the central station, of a meter at the substation including a locking-switch contact in the line-circuit adapted to be closed by the subscriber in setting the meter, and an electromagnet adapted to open said contact in restoring the meter, a switch at the central office under the control of the operator, having contacts in both line and local circuits and a test-signal at the central office controlled by an electromagnet adapted to be energized by currents in both line and local circuits and to be locked in said local circuit.

6. In a telephone toll system, the combination with a subscriber's line-circuit and a local circuit at the central station, of a meter at the substation including a locking-switch contact in the line-circuit adapted to be closed by the subscriber in setting the meter, and an electromagnet adapted to open said contact in restoring the meter, a switch at the central office under the control of the operator, having contacts in both line and local circuits, and a test-signal at the central office controlled by an electromagnet, said electromagnet having two windings, one included in said line-circuit and one included in said local circuit, the local circuit also including a contact of said electromagnet.

In witness whereof I hereunto subscribe my name this 19th day of August, A.D. 1905.

FRANK R. McBERTY.

Witnesses:

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