

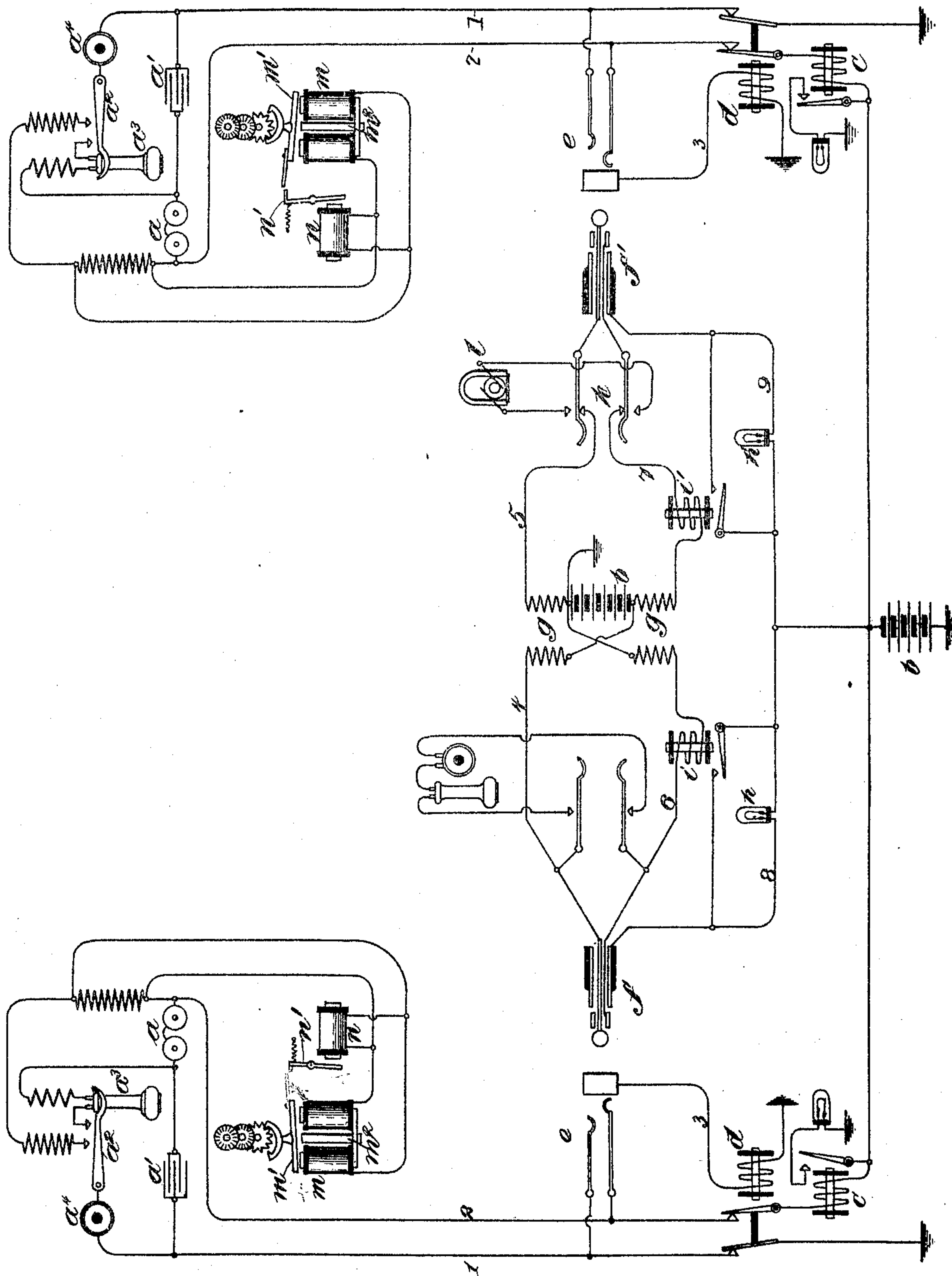
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C. E. SCRIBNER.
SERVICE METER FOR TELEPHONE LINES.

APPLICATION FILED APR. 9, 1900.

NO MODEL.



Witnesses:
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UNITED STATES PATENT OFFICE.

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SERVICE-METER FOR TELEPHONE-LINES.

SPECIFICATION forming part of Letters Patent No. 776,429, dated November 29, 1904.

Application filed April 9, 1900. Serial No. 12,107. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SCRIBNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Service-Meters for Telephone-Lines, of which the following is a full, clear, concise, and exact description.

This invention is a service-meter or locking appliance for stations of telephone-lines designed to be operated by currents applied through the telephone-line to register or record calls which are answered by the attendant at the central office.

The novel features of the invention are addressed to preventing the operation of the service-meter and the false registration of calls by currents of different character than that for which the instrument is designed, particularly such as calling-currents in the line.

To this end the invention comprises a main actuating-magnet for the service-meter and means for applying a continuous or steady current for exciting it and an auxiliary locking-magnet constructed in any suitable way to be responsive to such currents only as are not designed to operate the register, such as the calling-currents in the line, and controlling a catch or other locking device for maintaining the position of the armature of the actuating-magnet unchanged during the presence of such current in the line.

The invention is illustrated in the attached drawing, which represents diagrammatically a telephone-line extending between a substation and a central office, a call-bell, telephones, and a service-meter or connection-register at the substation and means at the central office for applying to the line either a current for ringing the bell or a current for operating the service-meter.

The appliances at the substation and at the central office, with the exception of the service-meter, are of usual and well-known character. The line conductors 1 and 2 are provided at the substation with a circuit through a polarized call-bell a and a condenser a' . A telephone-supporting switch a^2 controls a cir-

cuit through the receiving-telephone a^3 and transmitting-telephone a^4 to close a bridge of the line-circuit, including these instruments in shunt of the bell and condenser. At the central office the line conductors are connected with the poles of a battery b or other source of current, one of the line conductors leading through the magnet of a line-signal c . The connection of the line conductors with the battery is controlled by a cut-off relay d . A spring-jack e is furnished for the line, with two line-springs which form normally open terminals of the line conductors and an insulated test-ring which constitutes the normally open terminal of a branch conductor 3, grounded at one terminal, which includes the magnet of the cut-off relay. Pairs of plugs f and f' are provided for uniting lines by means of their spring-jacks, two of the three contacts of each of the two plugs forming the terminals of the plug-circuit 4567, which is connected with the battery b through the windings of a repeating-coil g . The remaining contact-pieces of the two plugs constitute terminals of conductors 8 and 9, respectively, leading from the battery b , which include supervisory signals h and h' , referring to the plugs f and f' . These signals are controlled by supervisory relays i and i' , included in conductors 6 and 7 of the plug-circuit, each being in this position responsive to current which is determined by the telephone-switch of the line with which the plug is connected. These relays control the signals associated with the plugs by means of shunts about the signals. A calling-key k is interposed in the plug-circuit for breaking the circuit between the plugs f and f' and applying the poles of a generator l of alternating or pulsating current to the line-contacts of plug f' .

The service-meter at the subscriber's station consists of a main or actuating magnet m , a centrally-pivoted armature m' , a permanent magnet m^2 for constantly polarizing the armature, a locking-magnet n and an armature n' therefor, a catch controlled or carried by the armature n' , arranged to engage a part carried by the armature m' , and a train of count-

ing mechanism with an escapement or verge connection with the armature m' . The magnet m may be connected serially in the circuit with the telephones. The magnet n may be
 5 connected in multiple with the magnet m . The cores of magnet m should be surrounded by copper sheaths to prevent the quick response of the magnet to varying currents.

For operating the service-meter thus dis-
 10 posed to register calls from the substation which attain response at the central office the connections of the answering-plug f with the battery b are made in a reverse manner from those of the plug f' with the same battery, so
 15 that when the answering-plug is inserted into a spring-jack of the line it applies to the line a current of the opposite polarity to that which is produced in the line by the insertion of the calling-plug f' . Taking the telephone
 20 from its switch for use at the subscriber's station permits the closure of the circuit of the line through the telephones and the magnets of the service-meter. The battery b there-
 25 upon produces a current in the circuit which excites the line-signal c and indicates the call to the attendant. The flow of current from battery b through the actuating-magnet of the meter draws the armature m' into one po-
 30 sition preliminary to actuating the wheel-train to register the use of the telephone. The force of the retractile spring acting upon the armature of magnet n is so adjusted that the cur-
 35 rent from the battery b shall fail to operate it or shall at least hold it so feebly that the superior force of magnet m may move the ar-
 40 mature m' in spite of the slight tendency of magnet n to lock it. When now the operator in answering the call inserts the answering-plug in the spring-jack of the calling-line, the
 45 polarity of the current in the line is reversed, the main magnet m draws its polarized armature m' into its alternate position, and thus moves the counting-train to register the an-
 50 swered call. When connection is made with the line shown in response to a call from a different line—that is, when the line provided with the service-meter is called for—the plug f' applies to the line the same polarity of cur-
 55 rent as that which flows normally in the line at the mere taking of the telephone. Hence the establishment of connection with the line when it is called for leaves the service-meter in its normal position, in which it does not register the connection. If, however, on hear-
 60 ing the ringing of the bell at the station when a line is being called by the operator by means of the calling-key k applying a pulsating or alternating current to the line, the called sub-
 65 scriber should take his telephone for use, the calling-current will find circuit through the telephone-bridge and through the magnets m and n , connected therewith. My present in-
 vention aims particularly to prevent or avoid the operation of the service-meter under such
 circumstances. The ringing-current is of

greater electromotive force than that of bat-
 tery b , besides being of rapidly intermittent or alternating character. This ringing-cur-
 rent acting on the magnet n throws the ar-
 70 mature into vibration, whereby the catch car-
 ried by the armature is moved into the path of the armature m' at each pulsation of cur-
 rent. Being of lower impedance, the mag-
 net n receives a greater proportion of the
 75 impressed varying current than the magnet
 m , and the magnet m being by reason of the
 copper sheath about its cores or other means
 for preventing the quick charging of its cores
 is magnetized to a smaller extent by equal
 80 current. These differences in characteristic
 action of the magnets m and n permit the
 magnet n to lock the armature m' , and thus
 to prevent the movement of the counting-
 train.

Having thus described my invention, I claim 85
 as new and desire to secure by Letters Patent—

1. The combination with a service-meter and a circuit therefor, of means at the cen-
 90 tral station for applying currents of different
 character, an actuating-magnet responsive to
 all such currents, a counting mechanism as-
 sociated therewith, and a blocking-magnet
 adapted to prevent the actuation of the count-
 95 ing mechanism, said blocking-magnet being
 responsive to current of one kind only, sub-
 stantially as described.

2. In a service-meter the combination with
 a counting-train, of an actuating-magnet
 therefor constructed to respond sluggishly to
 100 varying current, and a locking-magnet adapt-
 ed to lock the armature of said actuating-mag-
 net in position capable of quick response to
 calling-currents through it, both of said mag-
 105 nets being connected with the circuit of a tele-
 phone-line, said locking-magnet being unre-
 sponsive to the normal steady currents of the
 line, as described.

3. The combination with a telephone-cir-
 110 cuit, a call-bell in the circuit, telephones and
 a telephone-switch and a circuit through the
 telephones closed by the telephone-switch, and
 means for applying in the telephone-circuit
 either varying calling-current or steady cur-
 115 rent of either polarity, a service-meter hav-
 ing two magnets, both connected with the cir-
 cuit through the telephones to be closed by
 the telephone-switch, one of said magnets be-
 ing adapted for response to steady currents,
 and being adapted to actuate the counting
 120 mechanism, and the other of said magnets be-
 ing constructed for quick response to calling-
 currents and to remain inactive when traversed
 by the steady currents of the line, and a latch
 controlled by said quick-responding magnet
 adapted to lock the armature of the other 125
 magnet in place, and means for imparting per-
 manent polarity to the armature of the actu-
 ating-magnet, substantially as described.

4. The combination with a telephone-line
 130 extending from a substation to a central office,

of a connection-register having a polarized
actuating-magnet connected with the line-cir-
cuit, means at the central office for applying
varying current and steady current to the line,
5 devices connected with the line at the substa-
tion adapted for operation by such currents,
and an electromagnetic locking device at the
substation responsive to the varying currents
and arranged to block the mechanism of the
10 connection-register, to prevent the operation

thereof, said locking device being constructed
to remain inactive under the influence of the
normal steady currents in the line.

In witness whereof I hereunto subscribe my
name this 9th day of February, A. D. 1900. 15

CHARLES E. SCRIBNER.

Witnesses:

ELLA EDLER,
DUNCAN E. WILLETT.