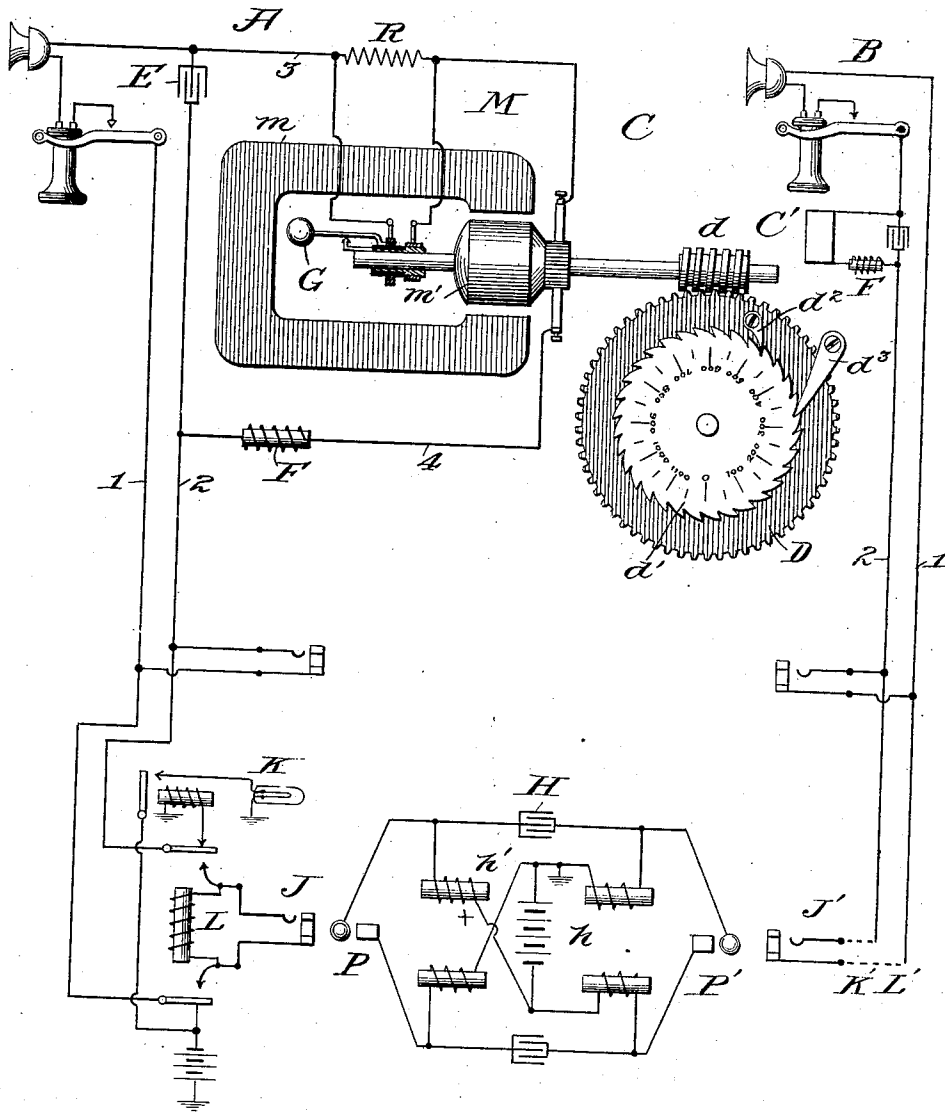


R. H. MANSON.  
 TELEPHONE METER SYSTEM AND APPARATUS.  
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946,380.

Patented Jan. 11, 1910.



Witnesses:

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# UNITED STATES PATENT OFFICE.

RAY H. MANSON, OF ELYRIA, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE  
DEAN ELECTRIC COMPANY, OF ELYRIA, OHIO, A CORPORATION OF OHIO.

TELEPHONE METER SYSTEM AND APPARATUS.

946,380.

Specification of Letters Patent.

Patented Jan. 11, 1910.

Application filed April 18, 1907. Serial No. 369,016.

To all whom it may concern:

Be it known that L. RAY H. MANSON, a citizen of the United States, residing at Elyria, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in Telephone Meter Systems and Apparatus, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to telephone meter systems and apparatus in general, and particularly to such as are designed and constructed for measuring and registering the duration or length of time the telephone is in use, as distinguished from the number of times it is used.

The principal object of the present invention is to provide an electrically driven registering meter connected to the line circuit of the telephone instruments and designed to be operated by current flowing in a certain direction in the line.

In my companion application Serial No. 369,015 I have disclosed a system in which the meter motor is driven by current flowing in the line in either direction, so that when a connection is made between two subscribers whose instruments are equipped with such apparatus, the meter of the called subscriber will be operated as well as that of the calling subscriber.

According to my present invention, the meter motor is reversible and so connected to the recording mechanism that when operating in one direction the registering mechanism will be actuated, but when operated in the other direction by a flow of current in the line in the reverse direction the registering mechanism will remain inactive. To accomplish this result I provide an electric motor for the meter having a constant or separately excited field, so that when the direction of current through the armature is reversed the direction of rotation of the armature will also be reversed. In combination with this construction, I provide at the central office a cord circuit in which the source of current is connected to the answering plug in a direction opposite to that in which it is connected to the calling plug.

With these and other features in view, the invention consists in the novel apparatus and circuit connections and their combinations hereinafter described, and illustrated

in the accompanying drawing in which the figure shows in diagram two subscribers' stations together with the central office circuit terminals and connecting cord circuit, the meter apparatus at one station being shown in enlarged detail.

Referring to the drawing, A represents the calling subscriber's station, and B the called subscriber's station, each being provided with the usual transmitting and receiving instruments. Station A is connected by line wires 1 and 2 with the answering jack J at the central office. Any preferred line indicator and cut-off, represented by K and L, respectively, may be employed at the central office in connection with jack J, those shown being of a well known type which need not be described, as they form no part of the present invention.

The meter C comprises an electric motor M having a permanent or separately excited field magnet *m* and an armature *m*<sup>1</sup>. The armature *m*<sup>1</sup> is geared by worm *d* to a large gear wheel D of the registering mechanism. Concentric with gear wheel D or otherwise mounted in relation thereto is a dial disk *d*<sup>1</sup> adapted to be engaged by a pawl *d*<sup>2</sup> mounted upon gear wheel D and driven thereby when said gear wheel rotates in a given direction, but to pass idly thereover when said gear wheel is rotated in the opposite direction. A stop pawl *d*<sup>3</sup> also engages the teeth of the dial disk *d*<sup>1</sup> to positively prevent the rotation of the latter in a backward direction.

The armature of the motor M is connected in series with the line by leads 3 and 4, and a condenser E is bridged across the terminals of these motor leads. An inductive resistance or choking coil F is preferably inserted in the armature circuit of the motor to choke back and eliminate any noises that might be produced and impressed upon the line from the commutator of the motor.

In order to provide a constant speed for the motor I employ a regulating resistance, shown diagrammatically at R, and controlled in any suitable manner, such as by a centrifugal governor G mounted upon or controlled by the armature shaft of the motor. This regulating resistance R is normally short circuited through the contacts of governor G, but when the speed of the motor exceeds a predetermined limit this

short circuit is opened and the resistance R thereby becomes effective to reduce the speed.

At the central office the cord circuit is represented at H and is of the well known 4-relay type, the connection from battery *h* to the answering plug P being reversed with respect to the connection with the calling plug P<sup>1</sup>. When plug P is inserted in the jack therefore, current will flow to line in a direction opposite to that in which it will flow over a line into which the plug P<sup>1</sup> is inserted.

The operation of the system is as follows:  
 15 When the calling subscriber at substation A removes his receiver from the hook, current will flow from the line battery at central through line wire 1, transmitting and receiving instrument at station A, motor lead  
 20 3, motor armature *m*<sup>1</sup>, motor lead 4, inductive resistance F, and return to battery by line wire 2. This will supply current to the transmitter and receiver and start the rotation of the motor in the direction to  
 25 operate the registering dial *d*<sup>1</sup>. When the operator inserts plug P into jack J the line battery is removed by the cut-off relay L in the usual manner and current flows from the cord battery *h* in the  
 30 same direction from the positive side *h*<sup>1</sup> of battery, sleeve of plug P, sleeve spring of jack J, line wire 1, motor armature *m*<sup>1</sup>, and line wire 2, as before, and return to battery by tip of plug P, thereby continuing the rotation of armature M in the same  
 35 direction and driving the registering dial *d*<sup>1</sup>. When the calling plug P<sup>1</sup> is inserted in the calling jack J<sup>1</sup> of subscriber B, current from battery H will flow to that line from tip of plug P<sup>1</sup> in a direction opposite  
 40 to that of current in the line of subscriber A just traced, returning to battery by the sleeve of plug P<sup>1</sup>. When the called subscriber B removes his receiver from the  
 45 hook therefor, the motor of his meter C<sup>1</sup>, which is similar to that shown in connection with station A, will be operated in the reverse direction and his disk D will revolve  
 50 idly without driving the registering mechanism or dial disk *d*<sup>1</sup> at the station. In this arrangement, therefore, it will be seen that the time is charged against the calling subscriber as long as his receiver is off the hook, the meter of the called subscriber remaining  
 55 unaffected. Of course this arrangement can be reversed if desired, so that the charge will be made against the called subscriber. Moreover, when desired, a line battery of insufficient strength to operate the  
 60 meter motor may be employed so that the time charged will not begin until the operator at central plugs in to answer the call.

Various changes in details of construction and arrangements of parts may be  
 65 made without departing from the spirit of

my invention, and these I wish it to be understood fall strictly within the scope and purview thereof.

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

1. In a common battery telephone system, a line circuit, speech transmitting and receiving instruments, a time registering device, and an electric motor energized from said circuit and connected to said time registering device to operate the same only upon the flow of current in a predetermined direction in said circuit.

2. In a common battery telephone system, a line circuit, speech transmitting and receiving instruments, a time registering device, an electric motor energized from said circuit and connected to said time registering device to operate the same only upon the flow of current in a predetermined direction in said circuit, and a connection closed during the use of said instruments to complete said circuit.

3. In a telephone system, a time registering device, a rotary electric motor for driving the same, speech transmitting and receiving instruments, a circuit connection completed during the use of said instruments to operate said motor, and a connection between said motor and time registering device arranged to operate said device upon one direction of rotation only of the motor armature.

4. In a telephone system, a line circuit, speech transmitting and receiving instruments, a time registering device, an electric motor having its field independent of said circuit and its armature energized from said circuit, and a gear connection between said motor armature and time registering device arranged to operate the latter in one direction of rotation only, whereby the meter will register when current flows over said line in a given direction but will not register when current flows over the line in the opposite direction.

5. In a telephone system, a subscriber's station and a central office, a line circuit, an electric motor connected to said circuit, a registering device arranged to register upon the rotation of said motor in one direction only, and means controllable by the operator at the central office to impress upon the line current of either direction.

6. In a telephone system, a plurality of subscribers' stations and a central office, line circuits connecting said stations with the central office, an electric motor connected to each of lines to be connected and capable of rotation in opposite directions, a registering device arranged to be driven by said motor to register upon the rotation of said motor in one direction only, and a connecting circuit at the central office for said lines

adapted to impress current of opposite direction upon the connected line to rotate said motors in opposite direction.

7. In a telephone system, a line circuit, 5 speech transmitting and receiving instruments associated therewith, a time registering device, an electric motor energized from said circuit and connected to said time registering device to operate the same only upon the flow of current in a predetermined direction in said circuit, and a condenser bridged 10 across the motor terminals.

8. In a telephone system, a line circuit, 15 speech transmitting and receiving instruments associated therewith, a time registering device, an electric motor energized from said circuit and connected to said registering device to operate the same only upon the

flow of current in a predetermined direction in said circuit, and an inductive resistance 20 in series with the armature of said motor.

9. In a telephone system, a line circuit, speech transmitting and receiving instruments, a time registering device, and a direct 25 current electric motor energized from said circuit and connected to said time registering device to operate the same only upon the flow of current in a predetermined direction in said circuit.

In testimony whereof I affix my signature 30 in presence of two witnesses.

RAY H. MANSON.

Witnesses:

A. J. ROBERTS,  
GEO. A. SCOVILLE.