

R. H. MANSON.
TELEPHONE METER AND CIRCUIT CONNECTION THEREFOR.
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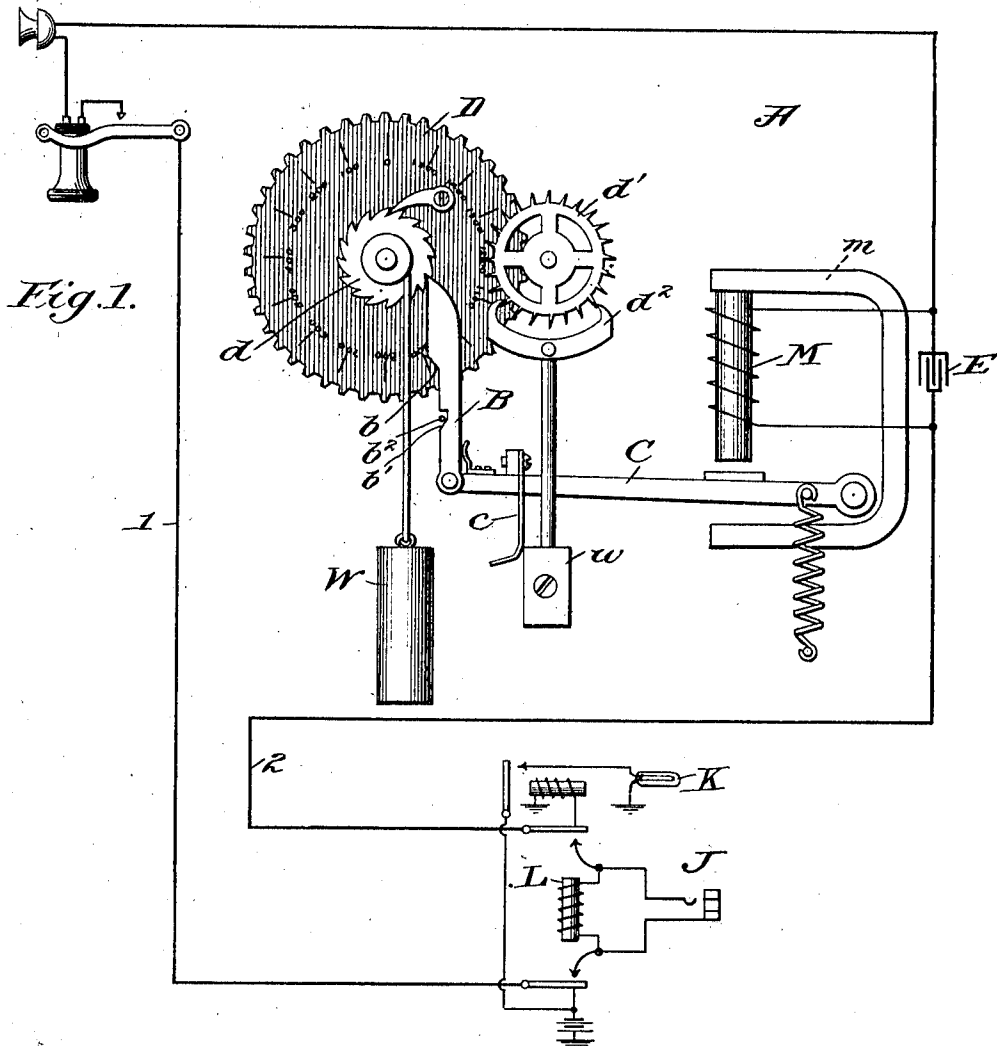
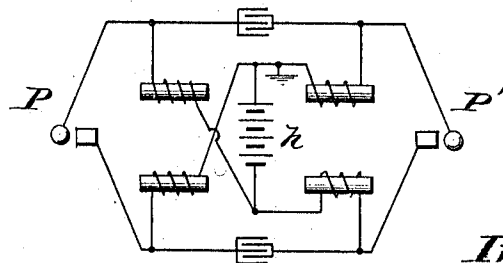


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

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TELEPHONE-METER AND CIRCUIT CONNECTION THEREFOR.

969,789.

Specification of Letters Patent. Patented Sept. 13, 1910.

Application filed April 18, 1907. Serial No. 369,019.

To all whom it may concern:

Be it known that I, 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-Meters and Circuit Connections Therefor, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to telephone meters and circuit connections therefor, and has for its object the provision of a meter operated by a clock movement or clock train and means associated with, or connected to, the circuit of the telephone instruments for starting and stopping the meter and for re-winding the driving power of the clock movement.

In carrying out my invention I provide a registering mechanism for registering the length or duration of time that the telephone instruments with which it is associated are in use. This registering mechanism is driven by a clock movement actuated by a weight or its equivalent and controlled by an escapement of any well known or preferred form. Means are provided for re-winding the weight and for starting and stopping the escapement such means being controlled by an electromagnet associated with the circuit of the telephone instruments. The electromagnet may be made responsive to the flow of current in the line irrespective of its direction, or it may be made responsive to the flow of current in one direction only, this latter arrangement adapting the meter for operation in connection with the systems disclosed in my co-pending applications, Serial Numbers 369,016, 369,017 and 369,018.

I have illustrated and described my invention as applied to a specific telephone system, but it will be understood that this application is only illustrative and that the invention is applicable to any system.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a diagrammatic view of a subscriber's station provided with my improved meter, a form of central office line terminal with its associated apparatus being also shown; and Fig. 2 is a diagram of a cord circuit which may be employed in connection with the apparatus and circuit shown in Fig. 1.

Referring to the drawings, A represents a subscriber's station provided with the usual transmitting and receiving instruments and connected by line conductors 1 and 2 with spring jack J at central office. The line signal K and cut-off relay L at central may be of any preferred type, those shown being of a well known system which need not be described.

At subscriber's station A, I have shown my meter as comprising a registering disk D arranged to be driven by a clock movement of any preferred construction, that shown including an actuating weight W connected to the ratchet wheel *b* in the usual manner. The clock movement is controlled by an escapement wheel *d*¹ and escapement *d*², the latter being timed by a small pendulum weight *w*. It will be understood that the clock movement and the escapement device may be of any preferred construction, and any well known equivalents for the actuating weight W and the escapement weight *w* may be employed, such as a main spring and a balance spring respectively.

The actuating power of the clock movement may be rewound by means of a pawl B pivoted to a lever C and controlled by an electromagnet M. The lever C also carries an arm *c* adapted to engage balance weight *w* or some part of the escapement device, so as to release or stop the escapement to start or stop the clock movement. Electromagnet M is shown as connected in series with line conductor 2, and its terminals are bridged by a condenser E. This magnet if unpolarized is responsive to the flow of current in the line circuit in either direction to attract its armature and lift lever C, or it may be made responsive to the flow of current in one direction only by the employment of a polarizing magnet *m*. Pawl B is arranged to be thrown out of engagement with ratchet *d* in any suitable way when the motive power is fully wound up, this being shown as an inclined face *b* on said pawl adapted to be engaged by weight W when in its elevated position. In order that pawl B may be swung clear of ratchet *d* after a re-winding impulse, to permit the weight to act, an inclined surface *b'* is provided which engages a fixed pin *b*² at the end of the re-winding stroke.

Any form of connecting circuit or cord circuit at the central office may be employed,

that shown being of a well known 4-relay type in which the battery is reversed with respect to the answering and calling plugs, as set forth in my application, Serial No. 369,016.

The operation of my meter when associated with a telephone system is as follows: The subscriber at station A having removed his receiver from the hook, and thereby completed his line circuit from central office, when the central office operator inserts answering plug P into jack J of that line, current will flow from battery *h* out over the line circuit, through the winding of magnet M and the transmitting and receiving instruments, thereby supplying current for the transmitting and receiving instruments and energizing magnet M which attracts its armature and lifts lever C. The lifting of lever C removes the stop arm *c* from the escapement mechanism, and thereby starts the clock movement. It also operates pawl B in contact with ratchet *d* to partly rewind the driving power or weight W, the pawl B then being thrown out of engagement with ratchet wheel *d* by the engagement of inclined surface *b*¹ with fixed pin *b*². Conversation from subscriber's station A with the central office, and with the called subscriber subsequently, may then proceed, and the meter will run continuously during the flow of current in the line and record the length of the conversation. The voice currents of course pass through the condenser E while the energizing current passes through magnet M. If the rewinding by a single impulse of lever C is insufficient, a succession of impulses may be sent from the central office, or the line circuit may be repeatedly opened and closed at the subscriber's station, to produce a sufficient winding of the weight.

It is sometimes desirable to operate the meter only during a certain connection made at or through the central office, for instance, when it is desired to charge either one or the other of two connected subscribers for a call, or to charge a subscriber for the actual time of the conversation after the through connection has been made. This may be effected by arranging the electromagnet M to respond to current flowing in a given direction only in the line circuit. To accomplish this I employ a polarizing or permanent magnet *m*, in combination with electromagnet M. Under this arrangement, in combination with the cord circuit shown in Fig. 2, it will be seen that when two subscribers are connected for conversation current will flow out over the lines from battery *h* in opposite directions, and, the electromagnets at both stations being polarized, only one of them will attract its armature and start its meter.

While I have shown and described the meter as located at the subscriber's station, this is not essential as it may be associated

with the subscriber's line circuit at any other point such as at the central office.

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

1. In a telephone meter, a time registering mechanism, a clock movement for driving the same, an escapement therefor, a releasing and stopping device for the escapement of said clock movement, a rewinding device for said clock movement, and an electromagnet arranged to control said releasing and stopping device and to operate said rewinding device.

2. In a telephone meter, a time registering mechanism, a clock movement for driving the same, an escapement therefor, releasing and stopping device for the escapement of said clock movement, a rewinding device for said clock movement, an electromagnet, and a lever controlled by said electromagnet and carrying means for rewinding the driving power of said clock movement and for controlling said releasing and stopping device.

3. In a telephone meter, a time registering mechanism, means for winding such mechanism, devices for releasing and stopping such mechanism, and a common electrically operated means for actuating such winding means and such devices.

4. In a telephone meter, a time registering mechanism, an electro-magnet, an armature for such electro-magnet, and devices carried by the armature for winding such mechanism and for releasing and stopping the same, such devices adapted to engage, wind and be disengaged from and also to start such mechanism by movement of the armature in one direction.

5. In a telephone meter, a time registering mechanism, an electro-magnet, an armature for such electro-magnet, and devices carried by the armature for winding such mechanism and for releasing and stopping the same, such devices adapted to engage, wind and be disengaged from and also to release such mechanism as the armature is attracted and to stop such mechanism when the armature is released.

6. In a telephone meter, a time registering mechanism, an electro-magnet, an armature for such electro-magnet, and devices carried by the armature for winding such mechanism and for releasing and stopping the same, such devices adapted to engage, wind and be disengaged from and also to release such mechanism by movement of the armature in one direction, such electro-magnet operable by current of a given direction only.

7. A telephone meter for use at a telephone substation consisting in time registering mechanism, a telephone line, an electromagnet connected to the telephone line extending from the substation, means for wind-

ing such mechanism, devices for releasing and stopping such mechanism, and a common electrically operated means for actuating such winding means and such devices
5 by current in the line.

8. A telephone meter for use at a telephone substation consisting in time registering mechanism, a telephone line, an electro-magnet connected to the telephone line extending from the substation, an armature
10 for such electro-magnet, and devices carried by the armature for winding such mechanism and for releasing and stopping the same, such devices adapted to engage, wind and
15 be disengaged from and also to release such mechanism by movement of the armature in one direction due to current flow from the line through such electro-magnet.

9. A telephone meter for use at a telephone substation consisting in time registering mechanism, a telephone line, an electro-magnet connected to the telephone line extending from the substation, an armature
20 for such electro-magnet, and devices carried by the armature for winding such mechanism and for releasing and stopping the same, such devices adapted to engage, wind and
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be disengaged from and also to release such mechanism as the armature is attracted and to stop such mechanism when the armature
30 is released due to the energization of such electro-magnet by current from the line.

10. A telephone meter for use at a telephone substation consisting in time registering mechanism, a telephone line, an electro-magnet connected to the telephone line extending from the substation, an armature for such electro-magnet, and devices carried by the armature for winding such mechanism and for releasing and stopping the same,
35 such devices adapted to engage, wind and be disengaged from and also to release such mechanism by movement of the armature in one direction due to current flow from the line through such electro-magnet, such electro-magnet operable by current of a given direction only.
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In testimony whereof I affix my signature in presence of two witnesses.

RAY H. MANSON.

Witnesses:

A. J. ROBERTS,
S. P. KINGSTON.