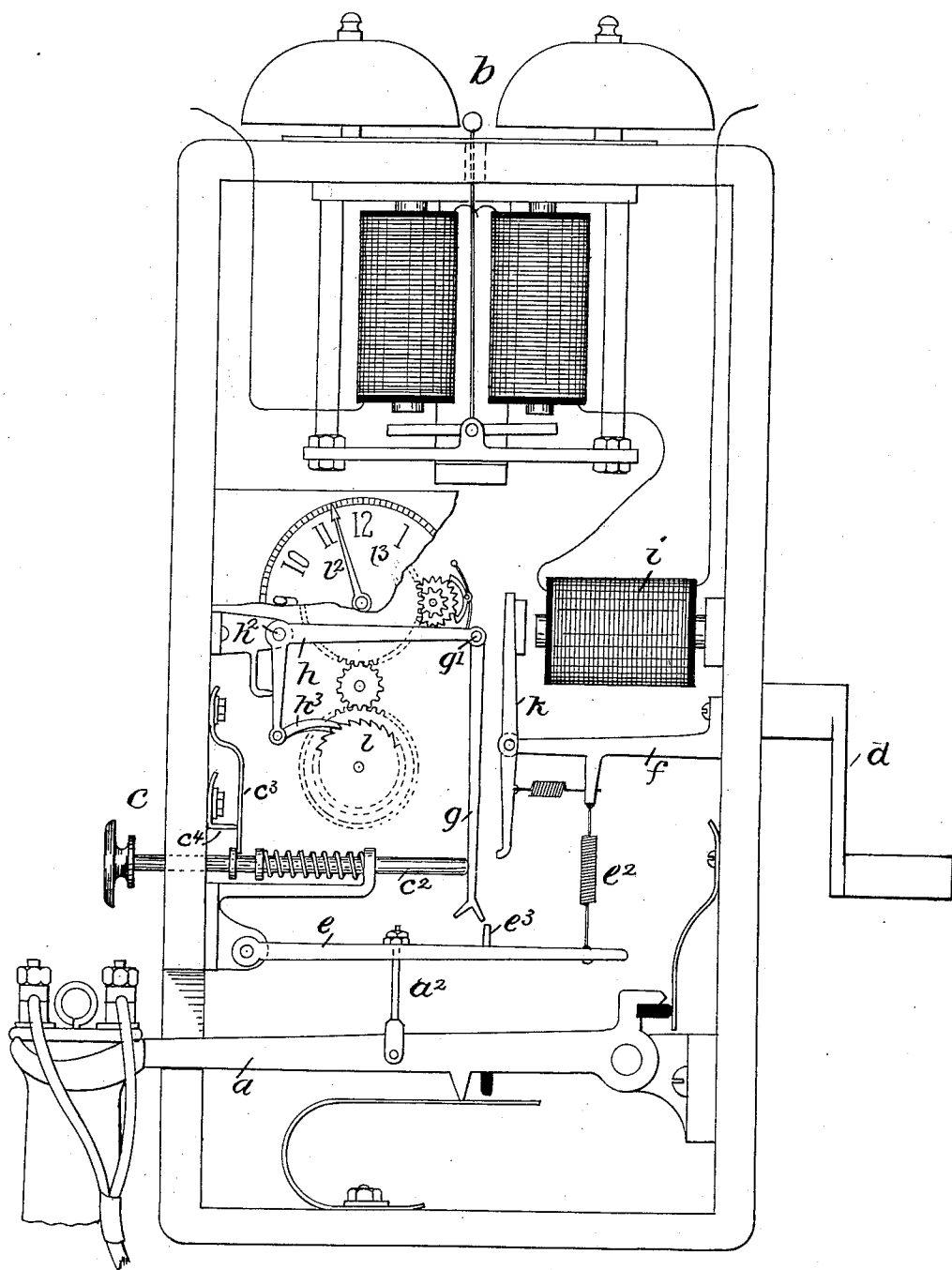


(No Model.)

S. D. FIELD.
TELEPHONE SERVICE REGISTER.

No. 558,167.

Patented Apr. 14, 1896.



Attest.

Carl Johnson
W. R. Edlin

Inventor;
Stephen D. Field
by *John D. Mann*
his attorney.

UNITED STATES PATENT OFFICE.

STEPHEN D. FIELD, OF STOCKBRIDGE, MASSACHUSETTS, ASSIGNOR TO THE
AMERICAN BELL TELEPHONE COMPANY, OF BOSTON, MASSACHUSETTS.

TELEPHONE-SERVICE REGISTER.

SPECIFICATION forming part of Letters Patent No. 558,167, dated April 14, 1896.

Application filed August 21, 1895. Serial No. 560,032. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN D. FIELD, residing at Stockbridge, in the county of Berkshire and State of Massachusetts, have invented certain Improvements in Telephone-Service Registers, of which the following is a specification.

My invention is classed with instruments for registering the service obtained through a telephone, being a device for noting and recording the time during which the telephone is in use in communications originated at the station equipped with the recording apparatus.

Generally the time-recording mechanism of this invention is adapted to be actuated by the movement of one of the telephone appliances whose position is changed during the use of the telephone; but its actuation is controlled by a part instrumental in sending a call-signal and by a device responsive to incoming signaling-currents, acting alternately. It comprises a spring-retracted lever, time-measuring mechanism, a device (which may be denominated a "link") between the lever and the time-measuring apparatus, a switch-key adapted when operated to bring the link into operative relation with the spring-retracted lever and the time-measuring mechanism, and an electromagnet acting to throw the link out of connection with the lever. The spring-retracted lever may be the switch-lever of the telephone-switch. The key may control the circuit of the signaling-generator, and the electromagnet may be placed in the line-circuit to be excited by incoming signaling-currents. When the apparatus is thus organized, an incoming current will sever the operative relation of the link to the switch-lever, so that during the use of the telephone in response to such a signal no motion will be imparted to the time registering or measuring mechanism; but in the transmission of an initial signal for the purpose of originating a connection the link will be placed in position to connect the lever with the registering mechanism, so that movement will be communicated to the registering devices

from the switch during the use of the telephone. Hence at any given time the position of the time measuring or recording device will indicate the total duration of the use of the telephone to that time. From this reading the rental or toll for the use of the telephone may be computed according to any desired method.

A form of the invention is represented in the accompanying drawing, in which the apparatus is shown mounted in the case with the usual apparatus of the magneto-signaling set. This apparatus comprises a telephone-switch *a*, a signal-bell *b*, and a push-button *c*.

The magneto-generator is not shown; but the driving-crank is represented at *d*. A link *a*², pivoted to lever *a* of the telephone-switch, associates the latter with end-pivoted lever *e*. The link is free to move upward, however, as it projects freely through an opening in lever *e*.

The lever *e* is acted upon by the retractive spring *e*², fixed to the bracket *f*, secured to the case. The lever carries an upward-projecting stud *e*³, above which depends a lever or link *g*, pivoted at *g*¹ to an arm of a bell-crank lever *h*, carried on a pivot *h*² in a fixed bracket. The lower extremity of link *g* is fork-shaped and is adapted to engage pin *e*³ when in a proper position above the pin. The stem *c*² of the push-button *c* is extended in such a way that when the button *c* is pressed in the act of sending a call-signal the forked extremity of link *g* is brought over the pin *e*³.

Fixed to the case is a magnet *i*, whose armature is carried on a lever *k*, pivoted to the bracket *f*. The lower extremity of this lever is placed near the link *g* and is adapted to engage the link *g* opposite the extremity of the plunger *c*². When, on the attraction of the magnet *i*, the lever *k* is rocked on its pivot, it operates to push the link *g* against stem *c*² in its normal position out of range of stud *e*³ as the latter rises.

The shorter arm of bell-crank lever *h* carries a pawl *h*³, which engages a ratchet-wheel to impart motion to the clock-train which constitutes the time-recording mechanism. This

may comprise the usual train of wheels and escapement and a hand l^2 , moving over a dial l^3 , subdivided into spaces corresponding to hours and minutes.

5 It will be understood that the switch-spring c^3 and its contact c^4 are the short-circuiting springs of the magneto-generator.

Magnet i is connected serially in circuit with the substation-bell b , so that an incoming signal-current traversing the bell excites magnet i also.

10 In the normal condition of the apparatus the clock mechanism is quiescent, the link g being disengaged from the lever e and the latter being held in its lower position by the weight of the telephone on the switch-hook. An incoming call, ringing the bell b , will cause the lever k to rock on its pivot and to thrust the link g out of the path of the stud e^3 into the position shown in the drawing. If now the telephone were removed from the switch-hook, the latter would permit the lever e to rise under the tension of spring e^2 , but movement will obviously not be communicated to the clock mechanism and no record of the use of the telephone will be made. When, however, an initial call is transmitted by means of the apparatus of this magneto for the purpose of originating telephone connection, the following mode of operation is followed: While the crank d of the signaling-generator is rotated the button c is pushed inward, whereby the link g is brought over the stud e^3 . After the transmission of the signal the removal of the telephone from the switch-hook permits the lever e to rise under the retraction of spring e^2 , stud e^3 engages link g , and through this link and lever h , pawl h^3 , and ratchet-wheel l it imparts movement to the clock mechanism. This movement continues as long as the telephone remains off the switch-hook, spring e^2 during this time acting as the mainspring of the clock mechanism, its impelling effect upon ratchet-wheel l being retarded by the escapement acting in the usual way. The clock mechanism would of course come to rest when spring e^2 is completely retracted; but the power of this spring is so determined that it will operate the register mechanism for a period of time much greater than any likely to be occupied in a single use of the telephone.

When the telephone is replaced on the switch-hook, the propelling force of spring e^2 is withdrawn and the motion of the clock mechanism is interrupted. Thus it will be seen that the hand l^2 of the clock will be advanced through a space corresponding to the time during which the telephone is in use each time that it is used for communication in a connection originating at the substation with the recording apparatus. No record, however, will be made of the use of the instrument in response of incoming signals.

65 The mechanism brought into operation by

the sending of a signal may obviously be utilized in connection with various kinds of recording, counting, or registering mechanism, and is intended to be covered herein broadly, as well as specifically, in connection with time-recording mechanism.

I claim as new and desire to secure by Letters Patent—

1. The combination with a lever whose position is altered during the use of the telephone transmitter or receiver, of registering mechanism, a link adapted to connect the lever with the said mechanism to communicate motion thereto, and a device controlling a signal-sending circuit, said device being adapted when actuated to bring the said link into operative connection with the lever, as described.

2. The combination with a lever whose position is altered during the use of the telephone, of time-recording mechanism, a link adapted to connect the lever with said mechanism to communicate motion thereto, a signal-receiving instrument, an electromagnet in the circuit therewith, and a device controlled by the electromagnet to move the link out of operative connection with lever, as described.

3. The combination with a spring-retracted telephone-switch lever, of time-recording mechanism, a link adapted to connect the spring-impelled lever with the recording mechanism, a push controlling the signal-sending circuit and an electromagnet in the signal-receiving circuit adapted to act oppositely upon said link to control its operative connection with the lever, as described.

4. In combination, a telephone-switch and a spring-impelled lever moving therewith, time-recording mechanism, a ratchet-wheel and pawl for communicating motion thereto, a link controlling the movement of the pawl, adapted to engage said lever, a push-button normally short-circuiting the signal-sending generator, a signal-receiving circuit and an electromagnet therein, the push-button and the electromagnet being adapted to move the link in opposite directions, into and out of operative connection with the spring-impelled lever, respectively, as described.

5. The combination with a telephone-station apparatus comprising telephones, an automatic telephone-switch, and call-sending mechanism, of a meter for indicating and registering the amount of use of the telephones, and connections between said meter and said switch and call-sending appliance, whereby the meter is set in operation by the conjoint action of the switch and call-sending appliance, and is arrested by the reverse operation of the switch, substantially as described.

6. A telephone-service register, comprising in combination a lever or device whose position is changed during the use of the telephone transmitter or receiver, register mech-

anism, actuating mechanism therefor, such
as a spring and connections, and means op-
erated during the transmission of a signal to
bring said actuating mechanism into opera-
5 tive connection with said register mechanism.

In testimony whereof I have signed my
name to this specification, in the presence of

two subscribing witnesses, this 17th day of
August, 1895.

STEPHEN D. FIELD.

Witnesses:

WILLIAM B. CLARKE,
JOHN CALLENDER.