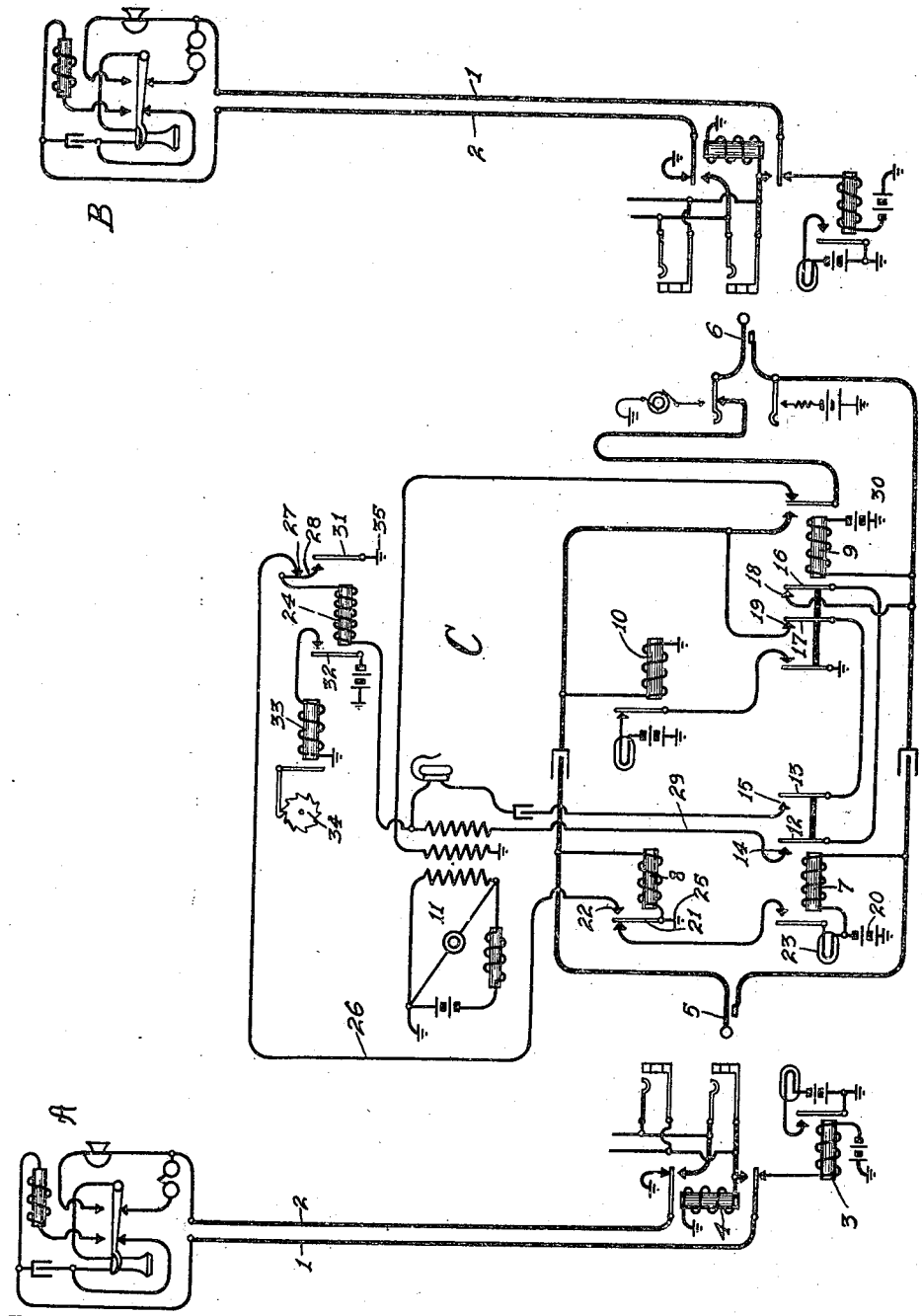
H. D. CURRIER.

CALL ANSWERING METER FOR CORD CIRCUITS.

APPLICATION FILED SEPT. 19, 1914. RENEWED JULY 7, 1916.

1,251,967. Patented Jan. 1, 1918.



Witnesses:

George E. Mueller

W. Bergholm

Inventor:

Hiram D. Currier.

By Curtis B. Camp.

Attorney

UNITED STATES PATENT OFFICE.

HIRAM D. CURRIER, OF CHICAGO, ILLINOIS, ASSIGNOR TO KELLOGG SWITCHBOARD & SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

CALL-ANSWERING METER FOR CORD-CIRCUITS.

1,251,967. Specification of Letters Patent. Patented Jan. 1, 1918.

Application filed September 19, 1914, Serial No. 862,465. Renewed July 7, 1916. Serial No. 107,974.

To all whom it may concern:

Be it known that I, HIRAM D. CURRIER, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Call-Answering Meters for Cord-Circuits, of which the following is a specification.

My invention relates to call answering meters for cord circuits and has for its object the provision of an improved circuit arrangement and improved apparatus for actuating such a meter.

In one form of use of my invention it is applied to a telephone switchboard to count the number of calls initiated by subscribers and is familiarly styled in the art as a peg count metering system. My improved apparatus as associated with a cord circuit comprises in its preferred form a locking relay which actuates the meter and at the same time prevents reactuation due to subsequent movement of the switchhook either on the part of the called subscriber or calling subscriber.

I will describe this particular form which my invention may take by referring to the accompanying drawing which represents diagrammatically a telephone system equipped with my improved metering service.

In this drawing I show two substations A and B as united respectively by means of line conductors 1 and 2 with a central exchange C. The substation has the usual common battery apparatus as is clear from the illustration and the line circuit of each line terminates in the line relay 3 and cut off relay 4, all as well understood. I have also illustrated a cord circuit having answering plug 5 and the calling plug 6 suitably provided with answering supervisory relays 7 and 8 and calling supervisory relays 9 and 10. An operator's set 11 is adapted for association with the cord circuit through the agency of the relay 7 by virtue of the switch elements 12 and 13 and their corresponding front contacts 14 and 15. This cord circuit is adapted again for disconnection upon actuation of the relay 9 by virtue of the switch elements 16 and 17 and their corresponding back contacts 18 and 19.

Assuming now that the subscriber at station A has initiated a call, thereby operating the relay 3, then the insertion of the plug 5 will actuate the relay 4 and the relay 7 by reason of the inclusion of the battery 20 as readily apparent. At the same time the subscriber at station A having the receiver removed, the relay 8 is energized, thus attracting its armature 21 and closing circuit with its front contact 22, thereby opening the circuit to the supervisory lamp 23. The insertion of the plug 5 completes a circuit from a locking relay 24, which circuit can be traced from the ground at 25 through armature 21, contact 22, conductor 26, normal contact 27 of the relay 24, spring contact 28, through the 4000 ohm relay 24, by way of conductor 29, contact 14, contact spring 12, contact spring 16, contact 18, relay 9, through battery to ground at 30. The relay 24 is thus actuated to attract its armature 31 and also its armature 32. The relay 9 at this time does not operate, due to the high resistance of the locking relay 24. The attraction of the armature 32 closes a circuit from battery through the meter magnet 33, thus actuating the meter 34. The attraction of the armature 31 however completes a locking circuit from the relay 24 which can be traced from the ground at 35 by way of armature 31, spring contact 28, relay 24, conductor 29, over the previously traced circuit to the ground at 30. Repeated successive actuations of the switchhook at the substation A will thus not cause additional actuations of the relay 24.

After the plug 6 has been inserted, the relay 9 is actuated thereupon breaking the connection to the relay 24 at the contacts 16 and 18, thus permitting relay 24 to restore and preventing its successive actuation so long as plug 6 remains within the jack of the called subscriber.

After the termination of conversation and before the disconnection of the answering and calling plugs, should the calling subscriber at substation A wish to recall the subscriber thereat flashes the switch-hook which, in turn, flashes the supervisory signal 23, as is well understood. The operator noting the signal flashing withdraws the calling plug 6 from the connected jack of the called line and thereby connects her operator's set 11 to the cord conductors to inquire the wants of the recalling subscriber. The withdrawal of the calling plug brings about the deënergization of the relay 9 and the

closing of normal contact 16 again establishes an energizing circuit for the locking relay 24 over the circuit previously described. The relay 24 brings about the operation of the meter magnet 33 to operate the register 34 once and again locks up, as previously described, to prevent further operation of the register should the recalling subscriber continue to flash his switchhook. The insertion of the calling plug 6 into the jack of the called line opens the circuit of relay 24 and its successive actuations are prevented as long as plug 6 remains in the connected jack.

From what has been described the nature of my invention will be clear and it will also be clear that the specific illustration herein is for illustrative purposes only.

Having however thus described one form which my invention may take, what I claim as new and desire to secure by Letters Patent is:

1. A system of the character described comprising a subscriber's line, a cord circuit adapted for association therewith, a meter for the answering side of said cord circuit, means including a self-locking relay controlled by the insertion of a plug in a jack and by the operative condition of the calling subscriber's line to actuate said meter, and a relay associated with said cord circuit controlled by the insertion of the calling plug in a jack to prevent reactuation of said relay during the continuance of said connection.

2. A system of the character described comprising a subscriber's line, a cord circuit adapted for association therewith, a meter for the answering side of said cord circuit, means including a self-locking relay controlled by the insertion of a plug in a jack and by the operative condition of the calling subscriber's line to actuate said meter, and a relay associated with said cord circuit controlled by the insertion of the calling plug in a jack to prevent reactuation of said relay during the continuance of said connection, said means including a calling supervisory relay.

3. A telephone system comprising a subscriber's line, a link circuit for connection therewith, a meter for said link circuit, a relay for controlling said meter, automatic means including a pair of answering supervisory relays for actuating said relay, and means controlled by the insertion of the calling plug of said link circuit in a jack to prevent reactuation of said meter control relay.

4. A telephone system comprising a calling subscriber's line, a link circuit for connection therewith, a meter associated with said link circuit, a control relay for actuating said meter, means including an answering tip and an answering sleeve relay for actuating said meter control relay, and a relay controlled by the connection of said link circuit to a called subscriber's line for preventing the reactuation of said meter control relay.

5. A telephone system comprising a calling and a called subscriber's line, a link circuit for connecting said lines, a meter for said link circuit, a control relay for actuating said meter, means controlled by the connection of said link circuit to the said calling subscriber's line and by the operative condition of said calling subscriber's line to actuate said meter control relay, and means responsive to the connection of said link circuit to said called subscriber's line for rendering the said meter control relay ineffective.

6. A system of the character described comprising a calling subscriber's line, a cord circuit adapted for association therewith, a meter for said cord circuit, and automatic means controlled by the insertion of a plug in a jack and by the operative condition of the calling subscriber's line to actuate said meter, said means including a self-locking relay controlled by a pair of answering supervisory relays.

7. A telephone system including a subscriber's line, a link circuit for connection therewith, a service meter associated with said link circuit, different means for operating said service meter depending upon whether the call to be registered is an original call or a recall.

8. A telephone system including a calling and a called subscriber's line, a link circuit provided with an answering and a calling terminal for connecting said lines, a service meter for said link circuit, means dependent upon the operative condition of said calling line and upon the insertion of said answering terminal into the jack of the said calling line for operating the said service meter, and means depending upon the operative condition of said calling line and the removal of the said calling terminal from the jack of said called line for re-operating said service meter.

9. A telephone system comprising a calling and a called line, a link circuit for connecting said lines, a meter associated with said link circuit, means controlled by the connection of said link circuit to said calling line for operating said meter, and means controlled by the disconnection of said link circuit from said called line for subsequently operating the said meter to register a recall.

10. A telephone system comprising subscribers' lines, a link circuit for interconnecting said lines, a service meter associated with said link circuit, means including circuits controlled by the answering terminal of said link circuit for operating said meter,

and means including circuits controlled by the calling terminal of said link circuit for again operating the said meter.

11. A telephone system including a calling and a called subscriber's line, a link circuit provided with a pair of terminals for connecting said lines, a service meter for said link circuit, means controlled by the insertion of one of said terminals into the jack of said calling line for operating said service meter, and means controlled by the disconnection of the other of said terminals from the jack of said called line for again operating said service meter.

12. A telephone system comprising a calling and a called subscriber's line, a link circuit provided with a pair of terminal plugs for connecting said lines, a service meter associated with said link circuit, means including apparatus controlled by one terminal of said link circuit for operating said meter, and means including apparatus controlled by the other terminal of said link circuit for subsequently operating the said meter.

13. An operator's link circuit provided with a pair of terminals, a pair of supervisory relays associated with one of said terminals, a supervisory relay associated with the other of said terminals, means for energizing the said pair of supervisory relays for operating a service meter, and means for subsequently deënergizing the said third supervisory relay for re-operating the said service meter.

14. A telephone system including an operator's link circuit provided with an answering and a calling terminal, a pair of supervisory relays associated with the answering terminal thereof, a third supervisory relay associated with the calling terminal thereof, a service meter associated with the said link circuit, means for energizing all of said supervisory relays, means controlled by the energization of the supervisory relays associated with the answering terminal of said link circuit for operating the said service meter, and means controlled by the subsequent deënergization of the supervisory relay associated with the calling end of said link circuit for again operating the said service meter.

15. An operator's link circuit provided with a pair of terminals, a pair of supervisory relays associated with one of said terminals, a supervisory relay associated with the other of said terminals, a service meter, means for energizing the said pair of supervisory relays for operating said service meter, means for energizing said other supervisory relay for preventing further actuation of said service meter, and means for subsequently deënergizing said third supervisory relay for re-operating said service meter.

16. An operator's link circuit provided with a pair of terminals, supervisory relays associated with one of said terminals, a supervisory relay associated with the other of said terminals, a service meter, subscriber controlled means for energizing one of said first supervisory relays to operate said service meter, means for energizing said supervisory relay associated with the other of said terminals to render said subscriber controlled means inoperative, and operator controlled means for deënergizing said last supervisory relay to re-operate said service meter.

17. A telephone system including an operator's link circuit, an operator's telephone associated with said link circuit, a service meter, means responsive to the connection of said operator's telephone with said link circuit to operate said service meter, means controlled by the disconnection of said operator's set from said link circuit for rendering inoperative the control circuit of said service meter, and means for reconnecting said operator's telephone to said link circuit for re-operating said service meter.

18. A telephone system including an operator's link circuit, an operator's telephone for connection with said link circuit, a service meter, means for operating said service meter controlled by the connection of said operator's telephone with said link circuit, and means for disconnecting said operator's telephone from said link circuit thereby rendering the operating circuit for said service meter inoperative.

Signed by me at Chicago, county of Cook and State of Illinois, in the presence of two witnesses.

HIRAM D. CURRIER.

Witnesses:
GEORGE E. MUELLER,
M. R. ROCHFORD.