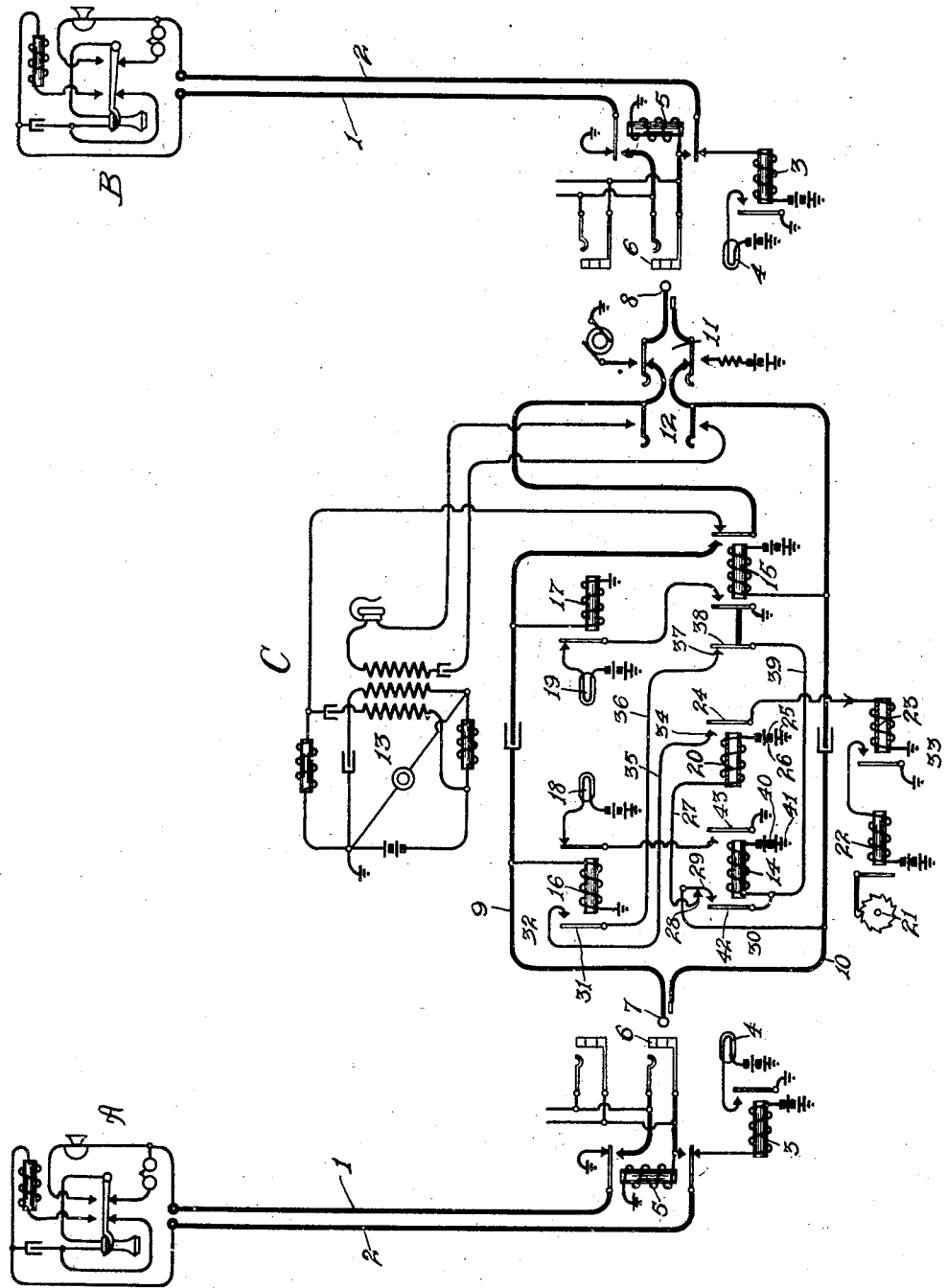


R. I. UTTER.
 CALL ANSWERING METER FOR CORD CIRCUITS.
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1,246,362.

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UNITED STATES PATENT OFFICE.

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CALL-ANSWERING METER FOR CORD-CIRCUITS.

1,246,362.

Specification of Letters Patent.

Patented Nov. 13, 1917.

Application filed May 18, 1914. Serial No. 839,196.

To all whom it may concern:

Be it known that I, RICHARD I. UTTER, 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 cord circuits for telephone systems equipped with measuring apparatus, and relates more particularly to the provision of cord circuits of this character having a call registering meter associated therewith.

My invention contemplates in its preferred form the use of a meter and the provision of circuit arrangements of such character that a call is registered upon the meter whenever the answering plug of the cord circuit is inserted in a jack provided however that the telephone receiver of the connected line has been removed from its hook so that the line is actually in talking condition. My invention furthermore contemplates the provision of means whereby a second registration as the plug is being removed is prevented. My invention further contemplates the provision of means whereby objectionable clicks are prevented in subscribers' instruments, due to the use of common meter mechanism for each position.

I will explain one form which my invention may take more in detail by referring to the accompanying drawing illustrating a system diagrammatically.

In this drawing I show two substations A and B united respectively by conductors 1 and 2 with a central station C. The subscribers' lines terminate at the central station in apparatus consisting of the line relay 3 for controlling the lamp 4 and the cut off relay 5, together with the jacks 6. The operation of this apparatus is well understood by those skilled in the art and it is thought needs no further description.

At the central station I have provided a cord circuit, there being but one illustrated as typical, which cord circuit has the answering plug 7 and the calling plug 8 united by tip and sleeve strands 9 and 10 respectively. The cord circuit is provided with the customary ringing key 11 and listening key 12 associated with the operator's set 13. There is provided at each extremity of the

cord circuit a sleeve relay respectively the answering sleeve relay 14 and the calling sleeve relay 15. Also there is the answering supervisory relay 16 and the calling supervisory relay 17 controlling respectively the circuit through the supervisory lamps 18 and 19. I further provide with each cord circuit a slow release relay 20 which as will presently appear controls the operations of a meter or counter 21. This meter is directly actuated by the magnet 22, which magnet is controlled by the slow release relay 23, the slow release relay in turn being connected to the armature 24 of the relay 20. The relay 23 and the magnet 22 are common to a number of cord circuits in an operator's position.

Now should the answering plug 7 be inserted for instance within the jack 6, and assuming that the receiver at the substation A had been removed, then the insertion of this plug will establish a circuit which may be traced from the ground at 25 through battery 26, relay 20, conductor 27, back contact 28, contact spring 29, conductor 30 to the sleeve strand 10 through the relay 5 to ground. Thereupon the clearing out relay 16 is energized, closing circuit between its armature 31 and its front contact 32. Thus a further circuit is established thereupon which may be traced from the ground at 33, slow release relay 23, armature 24, front contact 34, conductor 35, contact 32, armature 31, conductor 36, back contact 37, armature 38, of the relay 15, conductor 39, relay 14, battery 40, to ground at 41, thus energizing the sleeve relay 14 and causing it to attract its armatures 42 and 43.

It will of course be readily apparent to those skilled in the art that while more than one battery is shown, yet that is only for illustrative purposes as one battery may answer. The armature 43 controls the circuit leading to the supervisory lamp 18 as well understood. Circuit is thus established through the slow release relay 23, which thereupon actuates the magnet 22 to register a call upon the counter 21. The attraction of the armature 42 breaks the circuit through the relay 20 at the contacts 28 and 29, but connects the sleeve relay 14 to the sleeve strand 10. Thus it will be seen that a call is registered upon the meter 21 whenever the plug is inserted provided the receiver

of the connected line is in talking position. The apparatus controlling the meter 21 is not influenced at all by the condition of the calling end of the cord circuit except so far as the contacts 37 and 38 are concerned, and the purpose of these contacts will be presently explained.

It will thus be seen that each answered connection is registered. Now a second registration when the relay 14 releases its armature 42 as when the plug is withdrawn from the jack, is prevented by the release of the armature 31 of the relay 16, which occurs the moment the talking circuit at the substation A is broken, and which always precedes the removal of the plug 7. The purpose of carrying the circuit of the relay 23 through the contacts 37 and 38 is to prevent objectionable clicks in the circuits of other cords of the same position.

It will be noted that the circuit to the relay 23 is broken whenever the calling plug 8 is in a jack, thus disconnecting absolutely any common apparatus of a position from the cord circuit.

From what has been described the nature of my invention will be clear to those skilled in the art, and it will also be clear that modifications may readily be made without departing from the spirit of my invention.

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 two-conductor cord circuit adapted for association therewith, a meter for said cord circuit, automatic means controlled by the insertion of the answering plug of said cord circuit into a jack of said line and controlled by the operative condition of the subscriber's line to actuate said meter and means for preventing further operations of said meter while said plug and jack are connected.

2. A system of the character described comprising a subscriber's line, a cord circuit adapted for association therewith, a meter for said cord circuit, means controlled by the insertion of a plug in a jack and controlled by the operative condition of the subscriber's line to actuate said meter, and means associated with said cord circuit and controlling said first aforesaid means to prevent objectionable clicks between cord circuits of the same operator's position.

3. A system of the character described comprising a subscriber's telephone line, a cord circuit, a meter associated with said cord circuit, an answering end relay controlled by the insertion of the plug in the jack for controlling said meter, and an answering supervisory relay controlled by the condition of the subscriber's line to likewise control said meter conjointly with said first

aforesaid relay, said meter being actuated when said relays are in their operative condition.

4. A system of the character described comprising a subscriber's telephone line, a cord circuit, a meter associated with said cord circuit, a slow release relay adapted to be energized momentarily responsive to the insertion of the plug in the jack for controlling said meter, and a relay controlled by the condition of the subscriber's line to likewise control said meter conjointly with said first aforesaid relay, said meter being actuated when said relays are in their operative condition.

5. A system of the character described comprising a subscriber's telephone line, a cord circuit, a meter associated with said cord circuit, a slow release relay controlled by the insertion of the plug in the jack for controlling said meter, a relay controlled by the condition of the subscriber's line to likewise control said meter conjointly with said first aforesaid relay, said meter being actuated when said relays are in their operative condition, and a self-locking relay operable upon actuation of said two first aforesaid relays to cause the deenergization of said first aforesaid relay.

6. A system of the character described comprising a subscriber's telephone line, a cord circuit, a meter associated with said cord circuit, a slow release relay controlled by the insertion of the plug in the jack for controlling said meter, a relay controlled by the condition of the subscriber's line to likewise control said meter conjointly with said first aforesaid relay, said meter being actuated when said relays are in their operative condition, and a self-locking relay operable upon actuation of said two first aforesaid relays to cause the deenergization of said first aforesaid relay, and to connect a source of current with said cord circuit.

7. A system of the character described comprising a subscriber's telephone line, a cord circuit, a meter associated with said cord circuit, a slow release relay controlled by the insertion of the plug in the jack for controlling said meter, a relay controlled by the condition of the subscriber's line to likewise control said meter conjointly with said first aforesaid relay, said meter being actuated when said relays are in their operative condition, a self-locking relay operable upon actuation of said two first aforesaid relays to cause the deenergization of said first aforesaid relay, and to connect a source of current with said cord circuit, and means controlled by a called subscriber's line to render the meter circuit inoperative.

8. A telephone system comprising a calling subscriber's line, a link circuit for connection thereto, a meter for said link circuit adapted to be operated each time that

said link circuit is used to establish a connection, automatic means responsive to the connection of said link circuit to said calling line for causing the operation of said meter and for preventing further operations of said meter.

9. In a telephone system, the combination of a link circuit and a pair of connected telephone lines, a meter associated with said link circuit and common to said lines, and means comprising subscriber and operator control means for operating said meter and for preventing further operation of said meter, said means being independent of the control of the called subscriber.

10. In a telephone system, the combination of a calling subscriber's line and a two-conductor link circuit, a pair of answering supervisory relays for said link circuit, means for controlling one of said supervisory relays over said subscriber's line, a meter control device, and a circuit for said meter control device including contacts of said supervisory relays.

11. A telephone system including subscribers' telephone lines, a link circuit for connection to said lines, a pair of answering supervisory relays for said link circuit, a meter for registering the connections of said link circuit to said lines, and a circuit for said meter including contacts of said answering supervisory relays.

12. A telephone system comprising a subscriber's line, a plurality of link circuits adapted for association therewith, a meter control magnet associated with said link circuits, multiple connections from said control magnet to said link circuits, automatic means controlled by the connection of one of said link circuits to one of said lines for closing a circuit through one of said multiple connections, and means responsive to the connection of said link circuit to another line for opening said circuit.

13. A telephone system comprising a calling subscriber's line, a plurality of link circuits adapted to be connected thereto, a meter control device associated with said link circuits and having multiple connections thereto, and automatic means responsive to the connection of the plug of one of said link circuits to the jack of said line to close a circuit through one of said multiple connections to actuate said meter control device.

14. A telephone system comprising a call-

ing subscriber's line, a cord circuit adapted to be connected thereto, a meter for said cord circuit, automatic means responsive to the insertion of the answering plug of said cord circuit into a jack of said line and controlled over said subscriber's line to actuate said meter, and means for preventing a further operation of said meter until the said plug and jack are disconnected.

15. A telephone system including a subscriber's telephone line, a cord circuit for connection to said telephone line provided with a pair of answering supervisory relays and a calling supervisory relay, a meter for said link circuit, and a circuit for said meter including contacts of said supervisory relays.

16. In a telephone system the combination of a subscriber's line and a link circuit, of a pair of supervisory relays for said link circuit, an auxiliary relay adapted to be momentarily energized, a meter for said link circuit, and a circuit for said meter including contacts of said relays.

17. A telephone system including subscribers' telephone lines, link circuits for connection to said lines, a meter common to said link circuits, a pair of answering supervisory relays for each of said link circuits, and circuits for said meter controlled by the said answering supervisory relays.

18. A telephone system including calling subscribers' telephone lines, a plurality of link circuits for connection to said lines, a pair of supervisory relays for each of said link circuits, a meter common to said link circuits, and means controlled by the supervisory relays of any of said link circuits for operating said meter.

19. A telephone system including operators' link circuits, a meter common to said link circuits, a pair of supervisory relays for each of said link circuits, and a relay controlled by any one of said pairs of supervisory relays for operating said meter.

20. In a telephone system, the combination with a plurality of link circuits, of a meter common to said link circuits, a pair of relays for each of said link circuits, and circuits for said meter including contacts of said relays.

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

RICHARD I. UTTER.

Witnesses:

B. O'BRIEN,
M. R. ROCHFORD.