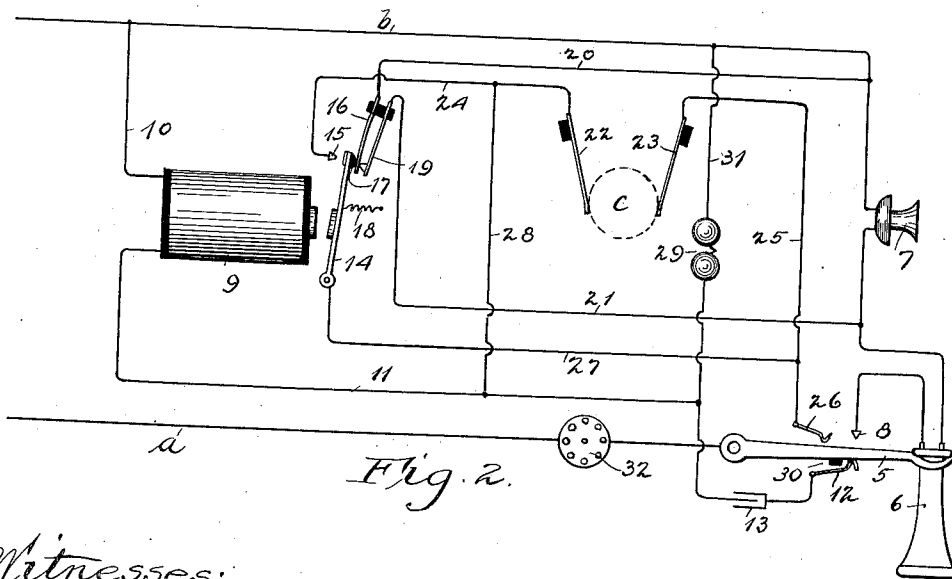
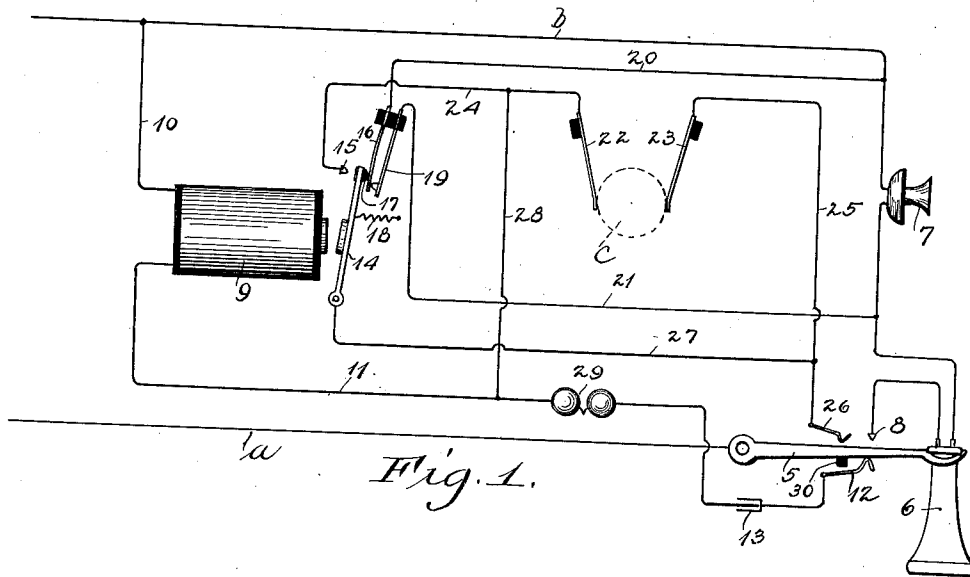


G. A. GRAVES.
 COIN CONTROLLED TELEPHONE SYSTEM.
 APPLICATION FILED JULY 17, 1911.

1,056,021.

Patented Mar. 18, 1913.



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UNITED STATES PATENT OFFICE.

GEORGE A. GRAVES, OF LA GRANGE, ILLINOIS.

COIN-CONTROLLED TELEPHONE SYSTEM.

1,056,021.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed July 17, 1911. Serial No. 638,825.

To all whom it may concern:

Be it known that I, GEORGE A. GRAVES, a resident of La Grange, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Coin-Controlled Telephone Systems, of which the following is a specification.

My invention relates to coin controlled telephone systems, and particularly to coin controlled telephone substations, and its object is to provide improved arrangement of apparatus at sub-stations for controlling in a simple and efficient manner the operativeness of the telephone apparatus and to prevent operation of the telephone apparatus until a coin has been deposited.

The invention contemplates the association of a relay with the sub-station telephone apparatus, which relay is normally inert and which then actuates contact mechanism for controlling circuits for disabling the telephone apparatus and preferably to close a short circuit about the transmitter. When a coin is deposited a circuit is momentarily closed through the relay, and upon energization of the relay a holding circuit is substituted therethrough, and this holding circuit is controlled by the receiver hook to be again opened to release the relay when the receiver is hung on the hook.

My invention is particularly adaptable for use in connection with automatic telephone exchange systems.

The invention is clearly illustrated on the accompanying drawing, in which—

Figure 1 diagrammatically represents sub-station apparatus and controlling circuits therefor, and Fig. 2 shows a modified arrangement.

In the figures the receiver hook 5 for supporting the receiver 6 is connected with line conductor *a*. The receiver 6 and the transmitter 7 are included serially in line conductor *b*, which conductor terminates in the upper switch hook contact 8 disconnected from the hook when the hook is down to keep the line normally open. A relay 9 has one terminal connected through conductor 10 with line conductor *b*, and its other terminal is connected through conductor 11 with the lower switch hook contact 12, this conductor 11 including a condenser 13. The lower switch hook contact 12 normally engages the switch hook, but the condenser 13 will prevent the flow of direct current through the relay. Associated

with relay armature 14 is a front contact 15 and circuit controlling spring 16. When the armature is retracted it is disconnected from its front contact 15 and the insulating lug 17 is pressed against spring 16 by force of retractile spring 18, and spring 16 is held in electric engagement with contact spring 19. Spring 16 connects through conductor 20 with the line conductor *b* and one side of the transmitter 7, while contact spring 19 connects through conductor 20 with line conductor *b* at the other side of the transmitter, so that when contacts 16 and 19 are in engagement the transmitter will be short-circuited and will be inoperative. Contact terminals 22 and 23 are diagrammatically illustrated, which in practice are interposed in a slot for the passage of a coin *c*. In practice, the coin is dropped in the slot and passes between the contact terminals 22 and 23 to only momentarily engage therewith. Terminal contact 22 connects through conductor 24 with the front contact 15 of the armature, and terminal contact 23 connects through conductor 25 with the upper contact spring 26 associated with the switch hook. The armature connects through conductor 27 with conductor 25, and a conductor 28 connects between conductors 24 and 11 to directly connect front contact 15 with one terminal of the relay. As illustrated on Fig. 1, a signal bell 29 is included serially in conductor 11 between the connection of conductor 28 through conductor 11 and the condenser 13. The arrangement of contact springs 12 and 26 with reference to the switch hook is such that when the switch hook is raised it will engage with contact spring 26 before finally disengaging from spring 12, a stop 30 being provided against which the switch hook rests when down and against which the spring 12 impinges after the switch hook makes contact with spring 26 in raising.

The operation is now clear. Normally no direct current can flow through relay 9 on account of the condenser 13 and its circuit. The relay armature is therefore retracted and closes engagement of springs 16 and 19, thereby closing the circuit about the transmitter. If, now, the subscriber at the sub-station desires to talk with a party, he raises the receiver from the hook to call central, circuit being closed through the sub-station through conductor *a*, switch hook, contact 8, receiver 6, conductor 21, contact springs

19 and 16, conductor 20, and line conductor *b*. The short circuit being about the transmitter the subscriber cannot talk to central to ask for the desired connection, but must first deposit a coin. When such coin is deposited and travels past and in engagement with contacts 22 and 23 the circuit will be entirely closed through the wire relay as follows: from line conductor *b*, relay 9, conductor 28, contact 22, the coin, contact 23, conductor 25, contact spring 26, the switch hook, line conductor *a*, and through the central station battery, not shown. Before the coin leaves the contacts 22 and 23 the relay will have been energized to attract its armature against its front contact 15 away from springs 16 and 19. The short circuit about the transmitter is thus removed and a holding circuit closed through the relay from line conductor *b*, through conductor 10, relay 9, conductor 11, conductor 28, conductor 24, front contact 15, armature 14, conductor 27, contact spring 26, switch hook 5 and line conductor *a*. So long, therefore, as the switch hook is up the holding circuit will be closed to keep the relay energized, and the transmitter in operative condition. The subscriber can now signal central and will get the desired connection. When through talking the receiver is re-placed on the hook and contacts 8 and 26 disengaged from the hook and connection restored between the hook and spring 12, the conditions being then normal. Suppose that a subscriber of sub-station in Fig. 1 is called by another subscriber. The central exchange operator would of course send alternating or pulsating ringing current over the line, this current at the sub-station flowing from line conductor *b*, relay 9, signal bells 29, condenser 13, contact spring 12, switch hook 5, and line conductor *a*. The relay is designed to respond to such alternate current flow, and its armature would be attracted against its front contact, and as soon as the subscriber removes the receiver in response to the signaling bell 29 the holding circuit for the relay will be closed, continuous line current will flow through the holding circuit, and the short circuit will be removed from the transmitter, so that the subscriber can talk with the calling party. Thus, when the subscriber is called his telephone apparatus is automatically put into telephonic condition, whereas when the subscriber is calling he cannot use his telephone apparatus until he has deposited a coin.

In Fig. 2 the arrangement is substantially the same as in Fig. 1, except that the signaling bell 29 is connected in parallel with the relay 9 to be included in conductor 31 connecting between line conductor *b* and conductor 11. In the arrangement in Fig. 2 I have also shown diagrammatically selective apparatus 32 included serially in

line conductor *a*, this arrangement of Fig. 2 being particularly useful and desirable in connection with automatic telephone exchange systems. Normally the relay is de-energized and the shunt closed about the transmitter. If the subscriber desires to call another party he raises the switch hook by removing the receiver 6, thereby closing the following circuit through the sub-station: from line conductor *b*, conductor 20, the closed contact springs 16 and 19, conductor 21, the receiver, contact 8, the switch hook, the selective apparatus 32, and line conductor *a*, the line conductors *a* and *b* being connected to battery at the central exchange. The subscriber can now actuate the selective apparatus 32 to set up the connections at the automatic central exchange for the desired party, which party will then automatically be called in a known manner which forms no part of this invention. If the calling subscriber receives a response on the called subscriber he then puts his telephone apparatus in operative condition by depositing a coin, the passage of this coin past contacts 22 and 23 momentarily closing the circuit through relay 9, as described in connection with Fig. 1, and the armature then engaging the contact 15, the holding circuit through relay 9 will be closed and the short circuit about the transmitter then kept open, and the parties can hold telephonic communication. As the holding circuit includes an upper switch hook contact, this circuit will be open and the relay restored to normal upon re-hanging of the receiver at the calling sub-station. If the sub-station in Fig. 2 is called there will be alternating or pulsating current flow through the relay and also through the signaling bell 29 connected in parallel with the relay, and the ringing current being maintained until the called subscriber raises his receiver, the holding circuit will close to maintain the relay in energized condition to keep the shunt circuit open. Therefore, when the subscriber is called his telephone apparatus is automatically put into the operative condition, and when he calls he must deposit a coin in order to put his telephone apparatus in operative condition. In both the arrangements shown the relay is constructed so that its characteristics, such as resistance and impedance, will properly cooperate with the other apparatus, particularly the signaling bell, so that both the relay and bell can operate efficiently at all times.

I thus provide very simple sub-station arrangement in which the passage of a coin controls the operativeness of the telephone apparatus for outgoing calls, and in which the telephone apparatus is automatically rendered operative for incoming calls, and the arrangement is particularly adaptable

for sub-stations connected with automatic telephone exchange systems.

5 I do not of course desire to be limited to the precise construction, arrangement and operation which I have shown and described, as changes are of course possible which would still come within the scope of the invention, and I therefore claim the following:

10 In a coin controlled system for telephonic apparatus, the combination with telephonic apparatus of a disabling circuit therefor, a relay having an armature which when retracted closes said disabling circuit, a pri-
15 mary energizing circuit for said relay, con-

tacts for said energizing circuit adapted to be engaged by a coin to close said circuit, a holding circuit for said relay, attraction of the relay armature causing closure of said relay circuit and opening of the disabling circuit, and a main switch controlling both said primary energizing circuit and said holding circuit.

In witness whereof, I hereunto subscribe my name this 14th day of July, A. D., 1911. 25

GEORGE A. GRAVES.

Witnesses:

CHARLES J. SCHMIDT,
NELLIE B. DEARBORN.