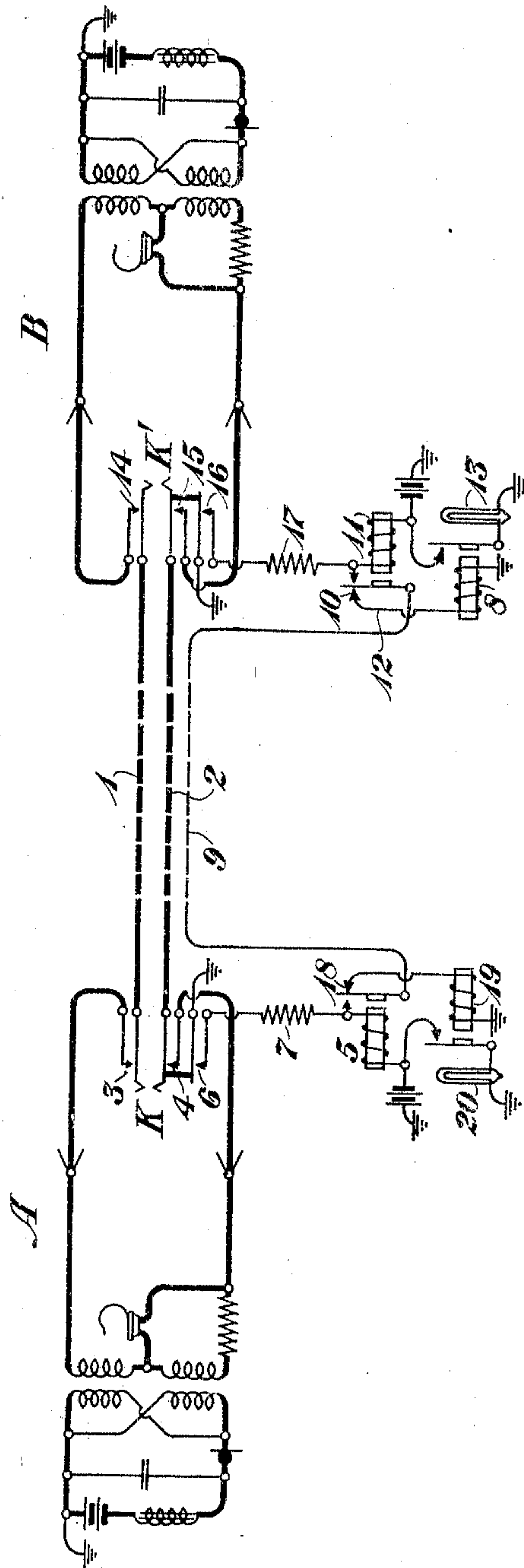


1,372,042.

W. A. RHODES.
DESK OPERATOR'S CIRCUITS.
APPLICATION FILED DEC. 5, 1918.

Patented Mar. 22, 1921.



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DESK OPERATOR'S CIRCUITS.

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Specification of Letters Patent.

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Application filed December 5, 1918. Serial No. 265,437.

To all whom it may concern:

Be it known that I, WILLIAM A. RHODES, residing at New York, in the county of New York and State of New York, have invented certain Improvements in Desk Operators' Circuits, of which the following is a specification.

This invention concerns telephone systems wherein interconnection between different stations, such as information desks, wire chiefs' desks, repair clerks' desks or the like is desired. In such interconnections it is customary to provide the stations with keys which upon manipulation serve to signal a station to which connection is desired by any suitable means, such as lamps, and the operator at the signaled station in responding will also operate a similar key to connect her telephone apparatus to the trunk. In such systems some confusion has arisen by the operators at either of the stations neglecting to immediately restore their apparatus to normal at the termination of the connection thus causing false signals. One of the objects of this invention is to prevent signals of this character.

Another object consists in the provision of a two way automatic signaling arrangement whereby the same circuits and equipment are employed at both ends and either end is adapted to be associated with any of the above mentioned stations without change in the circuit arrangements. Other and further objects of the invention will herein-
after appear.

In the accompanying drawing is diagrammatically illustrated one embodiment of this invention.

At A and B are shown stations provided with listening keys or circuit controllers K and K¹, respectively, and other apparatus appertaining to an operator's station. The stations A and B are interconnected by the usual trunk conductors 1 and 2.

It will be assumed that an operator at station A desires connection with station B. In such case the key K is operated and connects the telephone set at station A with the talking circuit by means of the contacts 3 and 4 in the usual manner. The operation of the key K also energizes the relay 5 by a path from ground, contact 6 of key K, resistance 7, winding of relay 5 to grounded battery. The armature of relay 5 is then attracted and an energizing circuit for re-

lay 8 at station B is thereupon completed from grounded battery, winding of relay 5 and its armature, signaling conductor 9, armature and contact 10 of relay 11, conductor 12, winding of relay 8 to ground. Upon the completion of this circuit the relay 5 is locked. The energization of relay 8 causes the lamp 13 to be illuminated and notice is thereupon given the operator at station B, who actuates the key K¹ and connects her telephone set to the talking conductors 1 and 2, by means of the key contacts 14 and 15, in a manner similar to that described in connection with the actuation of the key K at station A. The key K¹ upon actuation also energizes relay 11 in a manner similar to relay 5 by a circuit from ground, contact 16, resistance 17, winding of relay 11 to grounded battery. The armature of relay 11 is then attracted and breaks its contact at 10, deenergizing relay 8, and the lamp signal 13 is retired in an obvious manner. The energization of relay 11 also provides a new path for current for relay 5 at station A, and this relay accordingly will remain operated after key K is released and before key K¹ is released. A locking circuit is provided for relay 11 from grounded battery, through the winding of said relay and its front contact and armature signaling conductor 9, front contact and armature of relay 5, resistance 7, contact 6 of key K to ground.

Should the operator at station B desire to communicate with station A, the same order of operations would occur as that described in connection with station A. Upon the depression of the key K¹ the telephone set would be connected to the talking conductors 1 and 2 through the contacts 14 and 15. The relay 11 would also be energized by a path for current from ground, contact 16, resistance 17, through the winding of said relay to grounded battery. The armature of relay 11 would thus be attracted and cause the relay 19 at station A to be energized by the following circuit: grounded battery winding and armature of relay 11 over the signaling conductor 9, armature of relay 5, winding of relay 19 to ground. The armature of relay 19 would then be attracted causing the lighting of lamp 20 and attracting the attention of the operator at station A in the usual way, who would then manipulate the key K. Upon the operation of

the key K the relay 5 is energized by a circuit from contact 6 of said key, resistance 7, winding of relay 5, to grounded battery. The armature of said relay is thus caused to break the circuit at contact 18 and retire the lamp 20. The relays 5 and 11 are now locked over circuits previously traced and remain so until the telephone apparatus is disconnected from both ends of the trunks and the circuit is returned to normal.

From the above described circuit arrangement, it will be seen that the relays 5 and 11 are each under the joint control of keys K and K¹ at the two ends of the trunk so that both keys must be restored before these relays will be released. Were it not for the locking circuits above described if the operator at station B should restore the key K¹ before the operator at station A restored the key K, relay 11 would be released and a circuit for relay 8 would again be closed to cause a false operation of the lamp 13. It will also be apparent that by this arrangement either end of the trunk is adapted to be associated with any station without change in equipment.

While there is shown and described herein one preferred form of the invention by way of illustration, it is understood that it is not limited or confined to the precise details herein described and delineated, as modification and variation may be made within the scope of the claims without departing from the spirit of the invention.

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

1. In a telephone system, a trunk extending between two stations, a controlling relay and a signal responsive relay associated with the trunk at each station, means responsive to the connection of telephone apparatus to the trunk at either station to actuate the signal responsive relay at the other station, means responsive to the connection of telephone apparatus to the trunk at said other station to operate the controlling relay thereat to open the circuit of the signal responsive relay, and means to maintain the controlling relay operated until the telephone apparatus is disconnected from both ends of the trunk.

2. In a telephone system, a trunk extending between two stations, a controlling relay and a signal responsive relay associated with the trunk at each station, means responsive to the connections of telephone apparatus to the trunk at either station to operate the controlling relay thereat, means responsive to the operation of said controlling relay to operate the signal responsive relay at the other station, means responsive to the connection of telephone apparatus to the trunk at said other station to operate the controlling relay thereat to open the circuit of the

signal responsive relay, and means to maintain said controlling relays operated until the telephone apparatus is disconnected from both ends of the trunk.

3. In a telephone system, a trunk extending between two stations and comprising talking conductors and a signaling conductor, a controlling relay and a signal responsive relay associated with the trunk at each station, means responsive to the connection of telephone apparatus to the trunk at one station to operate the signal responsive relay at the other station over said signaling conductor, means responsive to the connection of telephone apparatus to the trunk at said other station to operate the controlling relay thereat to open the circuit of said signal responsive relay, and means to maintain said controlling relay operated until the telephone apparatus is disconnected from both ends of the trunk.

4. In a telephone system, a trunk extending between two stations and comprising talking conductors and a signaling conductor, a controlling relay and a signal responsive relay associated with the trunk at each station, means responsive to the connection of telephone apparatus to the trunk at one station to operate the controlling relay thereat, means responsive to the operation of said controlling relay to operate the signal responsive relay at the other station over said signaling conductor, means responsive to the connection of telephone apparatus to the trunk at said other station to operate the controlling relay thereat to open the circuit of said signal responsive relay and means to maintain said controlling relays operated until the telephone apparatus is disconnected from both ends of the trunk.

5. In a telephone system, a trunk extending between two stations and comprising talking conductors and a signaling conductor, a controlling relay and a signal responsive relay associated with the trunk at each station, means responsive to the connection of telephone apparatus to the trunk at one station, to operate the signal responsive relay at the other station over said signaling conductor, means responsive to the connections of telephone apparatus to the trunk at said other station to operate the controlling relay thereat to open the circuit of said signal responsive relay, and means to lock up said controlling relay over said signaling conductor.

6. In a telephone system, a trunk extending between two stations and comprising talking conductors and a signaling conductor, a controlling relay and a signal responsive relay associated with the trunk at each station, means responsive to the connection of telephone apparatus to the trunk at one station to operate the controlling relay thereat, and means responsive to the opera-

tion of the controlling relay to operate the
signal responsive relay at the other station
and to lock up the controlling relay over the
signaling conductor, means responsive to the
5 connection of telephone apparatus to the
trunk at said other station to operate the
controlling relay thereat to open the circuit

of said signal responsive relay, and means to
lock up said controlling relay over said sig-
naling conductor.

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In testimony whereof, I have signed my
name to this specification this third day of
December, 1918.

WILLIAM A. RHODES.