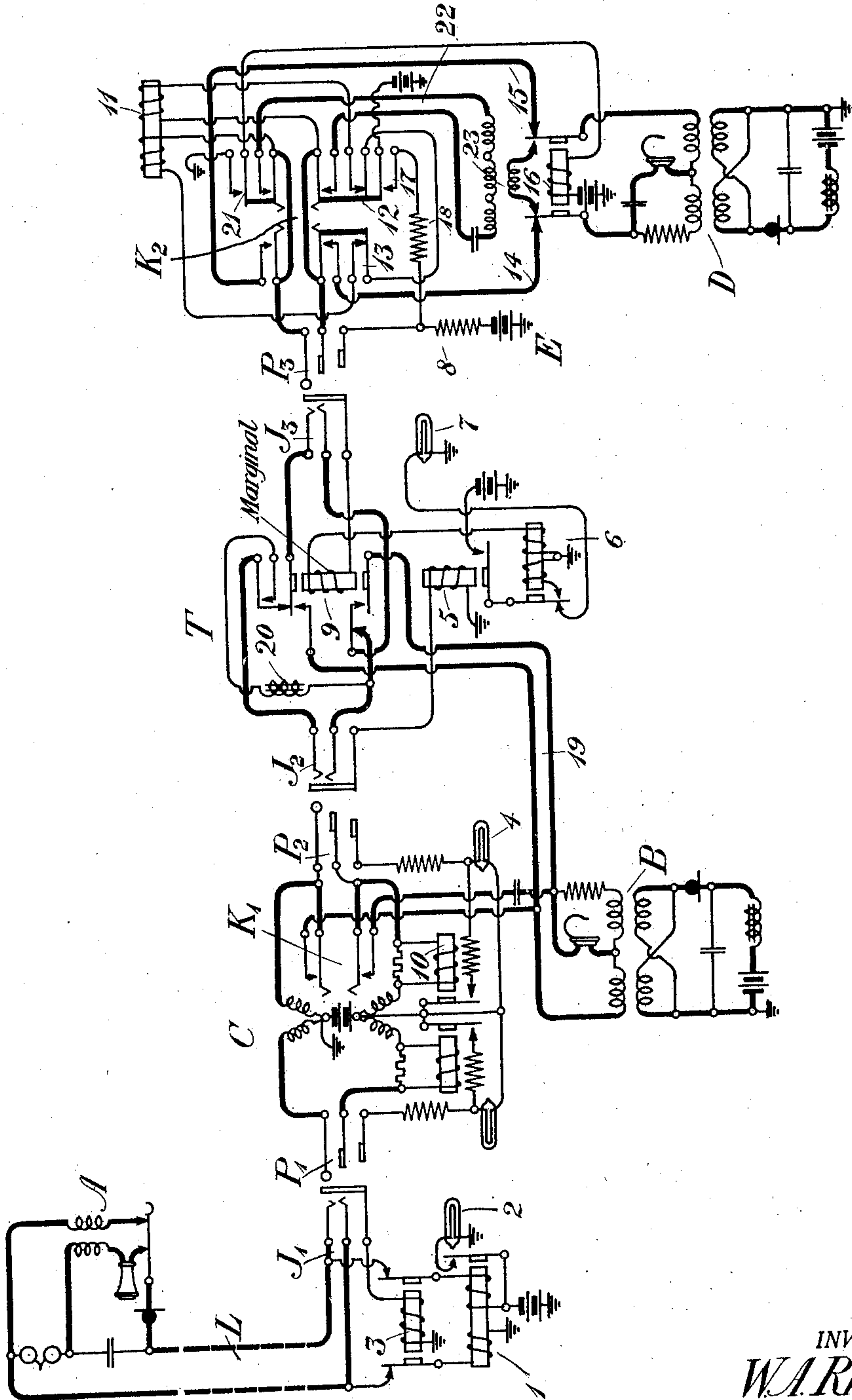


W. A. RHODES.
DESK OPERATOR'S CIRCUITS.
APPLICATION FILED DEC. 5, 1918.

1,389,596.

Patented Sept. 6, 1921.



INVENTOR.
W. A. Rhodes
BY *G. E. Folk.*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

WILLIAM A. RHODES, OF NEW YORK, N. Y., ASSIGNOR TO AMERICAN TELEPHONE AND TELEGRAPH COMPANY, A CORPORATION OF NEW YORK.

DESK OPERATOR'S CIRCUITS.

1,389,596.

Specification of Letters Patent.

Patented Sept. 6, 1921.

Application filed December 5, 1918. Serial No. 265,436.

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 Operator's Circuits, of which the following is a specification.

This invention relates to telephone circuits, and more particularly to trunking arrangements for connecting a subscriber's line terminating at a switchboard with a special position such as an information operator's desk.

Heretofore it has been the practice when circumstances arise rendering it necessary to connect a subscriber to some special operator such as an information operator, to arrange a trunk between the A operator's position and the special operator's position, so that the A operator may connect the subscriber through the usual cord circuit to the special operator's position over the trunk. The special operator in response to the incoming call on the trunk, then ascertains the number of the party desired by the subscriber and signals the A operator by flashing the latter's supervisory lamp.

This method of operation is unsatisfactory, not only because the A operator does not always notice the flashing of the lamp, but for further reason that the operation of the information operator's flashing key may cause annoying clicks in the waiting subscriber's receiver.

It is the object of the present invention to eliminate these difficulties, and provide a more direct method of communication between the A operator and the information operator. These results are accomplished by so arranging the trunk between the A operator's position and the special operator's position, that by the operation of a special key at the latter position, the trunk will be disconnected from the calling end of the cord circuit and connected directly over a circuit somewhat similar to an order wire to the telephone set of the A operator who set up the connection. The information or special operator can then communicate directly with the A operator to inform her of the number to which the subscriber should be connected. The arrangement pos-

sesses a further advantage in that the conversation between the A operator and the special operator, is not heard by the subscriber.

The invention may now be more fully understood by reference to the following description when read in connection with the accompanying drawing, the figure of which constitutes a circuit diagram of one embodiment of the invention.

Referring to the drawing, a subscriber's substation A is connected by means of a line L to a central office, where it terminates before an A operator's board in a jack J_1 . At the A operator's position, the cord circuit C, having answering and calling plugs P_1 and P_2 respectively, may be used to complete connections from the subscriber's line L to other subscribers' lines or to trunks such as T. The cord circuit C is provided with a key K_1 , whereby the A operator's set B may be connected to the cord circuit, in the usual manner. A special trunk T terminates at the A operator's board in a jack J_2 , and at its opposite end terminates in a jack J_3 located at the desk of the special operator, such as the information operator. The information operator is provided with an operator's telephone set D and an operator's circuit E, which may be connected to a plug P_3 by operating a key K_2 , so that by inserting the plug P_3 in the jack J_3 and operating the key K_2 , the information operator's telephone set may be connected to the trunk. The key K_2 is so arranged that when thrown in one position a marginal relay in the trunk is operated to disconnect the trunk from the jack J_2 and connect it over a special circuit to the A operator's set, so that the information operator is connected directly to the A operator, and can communicate to the latter the information necessary in completing the call of the subscriber. In order to prevent undue transmission loss due to shunting the A operator's set by means of this special connection to the information operator's set, the circuit is arranged in accordance with this invention so that the connection between the two telephone sets is of high impedance.

The invention may now be understood from a description of the operation which is

as follows: The subscriber at A, upon removing his receiver from the switch hook operates the line relay 1 in the usual manner to actuate the line signal 2. The A operator, upon observing the signal, inserts the plug P_1 of the cord circuit C in the jack J_1 , thereby operating the cut-off relay 3 to extinguish the line signal. By throwing the key K_1 , the A operator's telephone set B is bridged across the cord circuit in the usual manner, and the A operator is put in communication with the calling subscriber. Upon ascertaining that the circumstances are such that the calling subscriber should be connected to a special operator such as an information operator, the plug P_2 of the cord circuit is inserted in the jack J_2 of the trunk T leading to the information operator's position. A circuit is thereby completed over the sleeve contacts of the plug P_2 and the jack J_2 for the supervisory lamp 4 of the cord circuit and the relay 5 of the trunk T. Relay 5 upon being energized completes a circuit over its front contact and the back contact of relay 6 to lamp 7 at the information operator's desk, said lamp apprising the information operator that a call is waiting upon the trunk. The information operator then inserts the plug P_3 in the jack J_3 completing a circuit from battery, through resistance 8, over the sleeve contacts of the plug P_3 and the jack J_3 , through the winding of marginal relay 9 and through the right hand winding of relay 6 to ground. Relay 9 being marginal is not operated, but relay 6 is operated over this circuit and upon attracting its armature opens the circuit of the lamp 7 and completes a locking circuit from battery over the front contact of relay 5, front contact of relay 6 and through the left winding of said relay to ground. Relay 6, therefore, remains operated so long as the plug P_3 remains in the jack J_3 and as long as plug P_2 remains in jack J_2 .

When the plug P_3 was inserted in jack J_3 a circuit for the supervisory relay 10 of the cord circuit C was established from battery through the winding of relay 10, ring contacts of plug P_2 and jack J_2 , lower back contact of marginal relay 9, ring contacts of jack J_3 and plug P_3 , right hand winding of coil 11, contact 12 of key K_2 , contact 13 of said key, left hand winding coil 11, tip contacts of plug P_3 and jack J_3 , upper back contact of marginal relay 9, tip contacts of jack J_2 and plug P_2 to ground.

The supervisory relay 10 being operated over the circuit just traced, shunts the supervisory lamp 4 and extinguishes it, indicating to the A operator that the information operator has answered the call. The bridge through the windings of coil 11, it will be noted, passes in series over contacts 12 and 13 of the key K_2 , so that the operation of

said key to either the right or the left opens the bridge. By throwing the key K_2 to the left, the bridge through the coil 11 is opened, and the talking conductors of the plug P_3 are connected over the make contacts of the key, and over conductors 14 and 15 and back contacts of relay 16, to the operator's set at D. The substitute path thus provided maintains the supervisory relay actuated, and furthermore establishes an operative talking connection between the information operator and the calling subscriber.

In case the calling subscriber desires to be placed in connection with another subscriber whose number does not appear in the directory, the information operator, after ascertaining the number of the desired subscriber, may throw the key K_2 to the right, thereby connecting battery over the contact 17 of said key, through the resistance 18 to the sleeve contact of the plug in parallel with battery through the resistance 8. The current flow over the sleeve circuit is thereby increased to such an extent that the marginal relay 9 is operated to disconnect the end of the trunk T terminating in the jack J_3 from the end terminating in jack J_2 , and connect the end terminating in the jack J_3 over conductors 19 to the A operator's set B. The operation of the relay 9 bridges a coil across the tip and ring contacts of the jack J_2 , so that the supervisory relay 10 remains operated and the lamp 4 is not affected by this operation. The information operator, upon throwing the key K_2 to the right, opens the bridge through coil 11 at contact 12 and at contact 21 completes a circuit for the relay 16. The tip and ring contacts of the plug P_3 are now connected over make contacts of the key K_3 , conductors 22, transformer 23 and front contacts of the relay 16 to the information operator's set D. The secondary winding of transformer 23 with the condenser forms a high impedance bridge, so that the connection of the information operator's set to the A operator's set B, over conductors 19, does not cause undue transmission loss due to the shunting of the A operator's set in case said set is at that moment bridged across some other cord circuit in answering a call from another subscriber. Furthermore this arrangement of the circuit has an additional advantage in that it reduces the transmission between the two operators to a value suitable for a short trunk connection.

The information operator may now communicate to the A operator who originally handled the call, the number of the subscriber desired by the calling operator at station A, whereupon the A operator removes the plug P_2 from the jack J_2 and inserts it in the jack of the desired subscriber. This results in the deenergization of the relay 5 which in turn unlocks the re-

lay 6. The information operator, by withdrawing the plug P_3 from the jack J_3 , opens the circuit through marginal relay 9 and the right hand winding of the relay 6, so that the apparatus is restored to normal.

By means of the arrangement above disclosed, a simple method of handling calls between an A operator's board and an information operator's position is provided, and while the invention is disclosed as embodied in a specific form, it will be obvious that the principles thereof may be embodied in many other organizations widely different from that illustrated, without departing from the spirit of the invention as defined in the following claims.

What is claimed is:

1. In a telephone system, a subscriber's line, an A operator's position, a trunk leading from the A operator's position to a special operator's position, a link circuit at the A operator's position for switching said line into connection with other lines or with said trunk, means whereby the special operator's set may be associated with said trunk over a low impedance path in response to a connection established therewith, and means whereby when said line is connected to said trunk the special operator may establish a high impedance connection between her set and A operator's set over said trunk and independent of said link circuit.

2. In a telephone system, a subscriber's line, an A operator's position, a trunk leading from the A operator's position to a special operator's position, a link circuit at the A operator's position for switching said line into connection with other lines or with said trunk, means whereby the special operator's set may be associated with said trunk over a low impedance path in response to a connection established therewith, and means whereby the special operator may associate her set with said trunk over a high impedance path to the exclusion

of the subscriber's line while said line is connected to said trunk.

3. In a telephone system, a subscriber's line, an A operator's position, a trunk leading from the A operator's position to a special operator's position, a link circuit at the A operator's position for switching said line into connection with other lines or with said trunk, means whereby the special operator's set may be associated with said trunk over a low impedance path in response to a connection established therewith, means whereby the special operator may switch said trunk from connection with said link circuit and into connection with the A operator's set, and whereby the special operator's set may be associated with said trunk over a high impedance path during such connection.

4. In a telephone system, a subscriber's line; a trunk leading to a special operator's position, means whereby said line may be connected to said trunk, means to associate the special operator's set with said trunk over a low impedance path in response to said connection, and means whereby when said line is connected to said trunk the special operator's set may be connected to a connecting operator's set over a high impedance path including said trunk.

5. In a telephone system, a subscriber's line; a trunk leading to a special operator's position, means whereby said line may be connected to said trunk, means to associate the special operator's set with said trunk over a low impedance path in response to said connection, and means whereby when said line is connected to said trunk a high impedance connection may be established over said trunk between the special operator's set and a connecting operator's set.

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

WILLIAM A. RHODES.