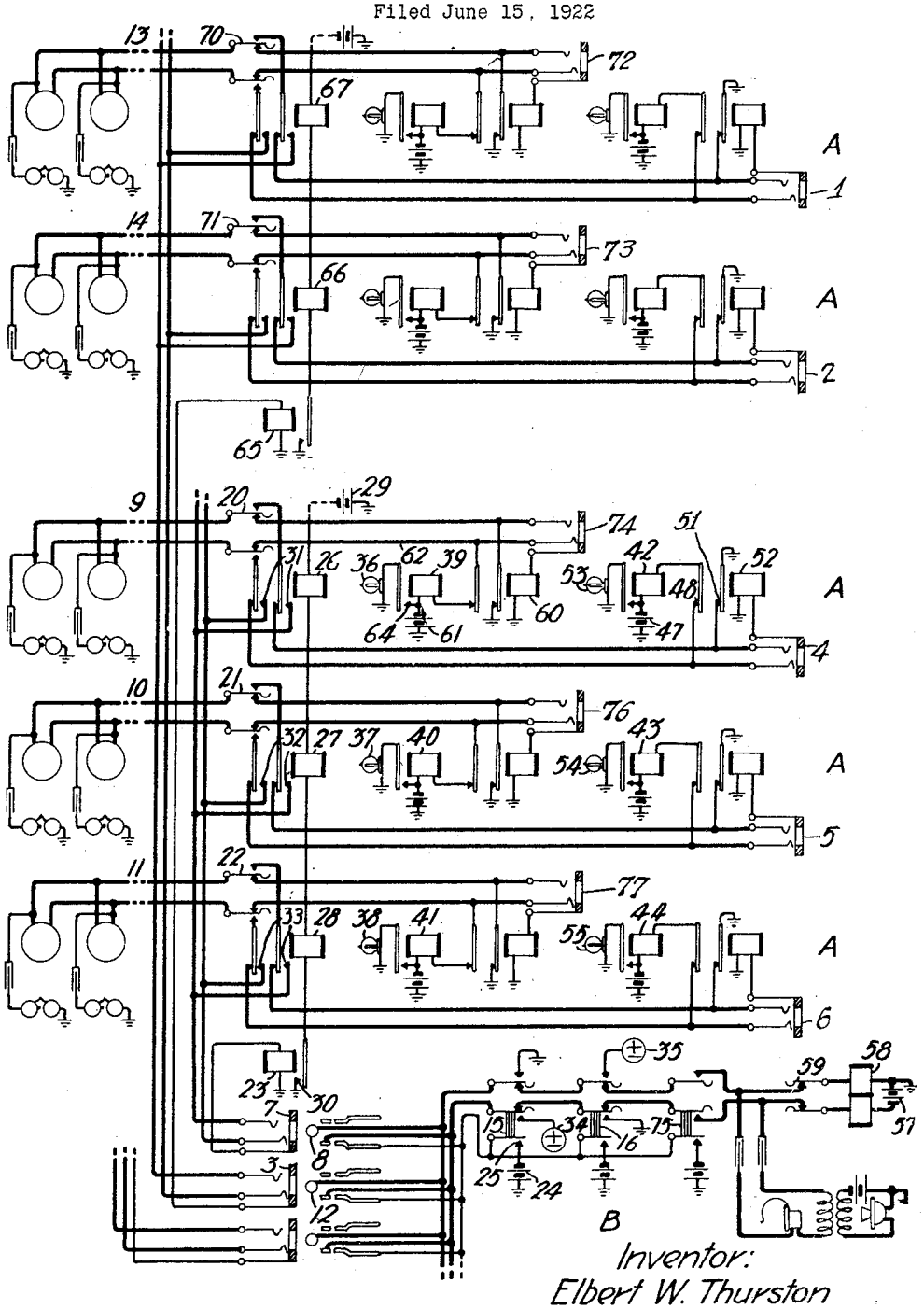
June 22 , 1926. 1,589,444

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TELEPHONE EXCHANGE SYSTEM

Filed June 15, 1922



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Patented June 22, 1926. 1,589,444

UNITED STATES PATENT OFFICE.

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TELEPHONE-EXCHANGE SYSTEM.

Application filed June 15, 1922. Serial No. 568,401.

This invention relates to telephone exchange systems and more particularly to systems in which a number of subscribers' lines may be grouped together for common conversation.

It is frequently desirable that information of an important character be transmitted to a certain group of individuals with the least possible delay. An example of this is the case where an executive in charge of a department in a business organization may desire to convey, by telephone, to each of his assistants, some information of common interest. Other examples are found in connection with police and fire departments, especially in small communities. It is often desirable to inform members of a volunteer fire department of the existence and whereabouts of a fire. A police official may desire to communicate with each of the stations in his jurisdiction and send out orders that are common to the stations. In such cases as are enumerated, it is advantageous to establish, quickly, a common connection between the official's or executive's telephone and all of the telephones of those in his immediate jurisdiction, thereby avoiding the loss of time and inconvenience which would result from establishing individual telephone connections.

It is, therefore, an object of this invention to accomplish the foregoing result in an improved and inexpensive manner.

In accordance with a feature of this invention, method and means are provided whereby the talking battery and supply to the grouped stations may be disconnected to exclude noise which might otherwise be introduced by the station transmitters while a general order is being delivered.

Another feature of this invention resides in a signaling arrangement whereby the operator, after simultaneously signaling a subscriber on each line of a group of lines, is informed by a signal individual to each line located at a common point when the corresponding called subscriber responds.

These and other features not specifically mentioned will clearly appear from the following specification and the accompanying drawing, in which the figure shows the preferred embodiment of the invention.

A plurality of two party subscribers' lines are shown terminating in jacks 1 and 2 and associated with a grouping jack 3. Another group of two party lines is shown with the lines terminating at jacks 4, 5 and 6, and associated with a grouping jack 7. Each grouping jack is adapted to be connected through a cord circuit B to a common operator's telephone set as shown. By the insertion of any plug of cord circuit B such as plug 8, in any of the jacks 4, 5, or 6, the operator may converse individually with the subscriber associated with lines 9, 10 or 11, respectively, or by inserting the same or any other plug into jack 7, the operator may converse simultaneously with the subscribers associated with the line 9, 10 and 11. By the insertion of any plug such as plug 12 into either of the jacks 1 or 2 individual connections may be effected between the operator's set and the subscribers associated with the lines 13 and 14, respectively, or by inserting the same or any other plug into jack 3 the operator may deliver a common message to both subscribers on lines 13 and 14. Other grouping jacks and plugs are disclosed to show that the system is not limited to the subscribers' lines shown, but may be extended to an indefinite number of subscribers. The jacks 72, 73, 74, 76 and 77 are located at the regular answering positions whereas the grouping jacks 7, 3, etc. and jacks 1, 2, 4, 5 and 6 are located at a grouping position A.

It is thought that the invention will be more fully comprehended from the following description of the operation of the system illustrated in the drawing. It is obvious that the operator may at will establish an individual connection with any subscriber, and as this connection is effected in the usual manner and is well known to those skilled in the art, it is thought unnecessary to describe the establishment of such a connection here.

Assuming that the operator desired to converse simultaneously with the subscribers located on lines 9, 10 and 11, which lines terminate in a common grouping jack 7 at the operator's position A, the operator inserts plug 8 into jack 7 and actuates the keys 20, 21 and 22 associated with the lines 9, 10 and 11, respectively, and then operates a ringing key 15. This operation establishes the following circuit for relay 23: from battery 24, contact 25 of key 15, sleeve

contacts of plug 8 and jack 7, and winding of relay 23 to ground. The operation of relay 23 establishes a series circuit for relays 26, 27 and 28, from battery 29, windings of relays 26, 27 and 28 serially connected, and contact 30 of relay 23 to ground.

The operation of relays 26, 27 and 28 closes contacts 31, 32 and 33, respectively, associated therewith, thereby connecting the tip and ring conductors associated with lines 9, 10 and 11, respectively, to the tip and ring conductors of grouping jack 7. The subscribers' telephones associated with lines 9, 10 and 11 are now in electrical connection with the link circuit B.

In operating key 15 a source of ringing current 34 is connected to the ring conductor, and ground is placed on the tip conductor of plug 8. Ringing current will accordingly be sent over an obvious circuit to operate one set of bells on the lines 9, 10 and 11, and then the operator will release key 15 and operate the key 16. By so doing the ringing current supply 35 is connected to the tip conductor, and ground is placed on the ring conductor of plug 8, thereby causing the actuation of another set of bells on the lines 9, 10 and 11. This alternate operation of keys 15 and 16 effects a two-party ringing arrangement.

After operating, alternately, the keys 15 and 16, the operator returns these keys to normal. Upon answering the bell signals associated with lines 9, 10 and 11, the subscribers remove their receivers, thereby establishing circuits for their respective line relays 42, 43 and 44. The circuits for each of these relays are the same and it will be necessary to trace but one circuit; to operate relay 42 the subscriber removes his receiver and bridges the conductors of line 9 so that a circuit is established from battery 47, the winding of relay 42, contact 48 of relay 52, left normal contact of relay 26, lower alternate contact of key 20, apparatus at subscriber's line 9, upper alternate contact of key 20, right normal contact of relay 26, contact 51 of relay 52 to ground. Relay 42 in operating causes the signal lamp 53 to light over an obvious circuit, informing the operator of the response of the subscriber at station 9. Signal lamps 54 and 55 are illuminated in the same manner upon the operation of relays 43 and 44, respectively.

It is to be noted that when the keys 15 and 16 were returned to normal, the circuit for relay 23 was interrupted and the relays 26, 27 and 28 were accordingly released so that the operator's telephone is disconnected from the subscribers' lines and each line reconnected to the circuit including the line and cutoff relays at the grouping position A, so that the signal lamp at this position A may be lighted. If for any reason a subscriber has not responded to his call, as will be shown by the unlighted lamp at the grouping position associated with the subscriber's line, the operator may ring the party individually in the following manner. Assuming that the subscriber at station 10 has failed to respond, the operator will disengage plug 8 from jack 7 and insert it in jack 5 and operate the keys 15 or 16 as before. The circuit for this individual ringing is obvious and need not be traced. Assuming that all subscribers have responded and the plug 8 is still inserted in jack 7, the operator operates the talking key 75. As in the case of keys 15 and 16, a circuit will again be established for relay 23, by the operation of which relays 26, 27 and 28 will again operate to group the lines 9, 10 and 11 with the operator's set through grouping jack 7 and talking key 75. The operator is now in position to deliver the message that is of common interest to the grouped subscribers.

Talking current for the grouped stations is fed from battery 57 through the coils 58. In case it is not necessary for the subscribers at the grouped stations to reply, however, the operator may eliminate the side tone at the grouped stations and thereby improve the transmission, by cutting off the battery supply to the grouped lines by operating the key 59.

If the operator at a regular answering position desires to establish an individual connection with any one station the procedure is as follows. Assuming all the apparatus to be in normal condition and that connection with station 9 is desired, the regular operator will insert any plug associated with her set, (not shown), into jack 74 and operate key 15. This operation will energize the bell of the corresponding subscriber on line 9 over an obvious circuit. During the ringing of the subscriber, the regular line relay 39 is disconnected from the line by the energization of relay 60 over an obvious circuit. The operator returns the ringing key 15 to normal and the subscriber lifts his receiver in response to the signal received. In returning the ringing key to normal, relay 60 is deenergized, thereby connecting the line relay 39 to the line associated with the subscriber's line 9. In removing the receiver, the conductors of the line 9 are bridged as before, and the following circuit for relay 39 established: from ground, through battery 61, windings of relay 39, left normal contact of relay 60, lower normal contact of key 20, telephone apparatus of line 9, upper normal contact of key 20, right normal contact of relay 60 to ground. Relay 39 is thereby energized and closes its contact 64 and establishes a circuit for lamp 36, from ground, battery 61, contact 64, filament of lamp 36 to ground. The operator

recognizing the signal operates her talking key and is now in position to talk to the station 9.

It will be observed from the foregoing description that separate sets of line and cutoff relays are employed at the grouping position and the regular answering position.

The lines 13 and 14 may be similarly grouped for common conversation by the insertion of a plug, such as 12, in the jack 3, thereby completing a circuit for relay 65, which in turn establishes an energizing circuit for relays 66 and 67, thereby connecting the lines 13 and 14 to the operator's telephone, subsequent to the operation of grouping keys 70 and 71. The procedure in the case of lines 13 and 14 is the same as that in connection with stations 9, 10 and 11.

It is obvious from the foregoing description that the lines 9, 10, 11, 13 and 14 may be simultaneously rung and conversed with by the insertion of plugs 8 and 12 in jacks 7 and 3, respectively.

By the circuit arrangement disclosed and described, it is evident that there can be any number of subscribers' lines in a group and associated with a common grouping jack, and that the number of grouping jacks which may be associated with an operator's telephone is only limited by the number of plugs multipled therewith, so that the system herein described and disclosed has unlimited scope in the number of lines that may be grouped for simultaneous talking and simultaneous ringing.

What is claimed is:

1. In a telephone exchange system wherein telephone stations are provided with means for both transmitting and receiving messages, the method of broadcasting a message which comprises connecting a plurality of stations together, simultaneously calling said stations and preventing transmission from said stations during the boardcasting of a message.

2. In a telephone system, a group of lines terminating at a central office, an operator's telephone set, a source of talking current, means for grouping the lines and simultaneously connecting the telephone set and source of current to said lines, and independent means for disconnecting the source of current from said lines while the telephone set remains connected to said line.

3. In a telephone system, a group of subscribers' lines, an operator's station including an operator's telephone set, means for connecting said lines to said operator's telephone set, means including a battery for transmission of messages from any one of said subscribers' lines to said operator's telephone set, means for simultaneously talking or simultaneously ringing from said operator's position over said subscribers' lines and means for disconnecting said battery to prevent the transmission of messages from said lines.

4. In a telephone system, a group of subscribers' lines, an operator's station, means for connecting all of said lines to said operator's station and for transmitting messages between the subscribers on said lines and the operator's station in both directions and means for disabling the means for transmitting messages from the subscribers' to the operator's position.

5. In a telephone system, a plurality of groups of lines, a terminal for each line, a terminal for each group of lines, a link circuit, a plurality of terminals for the link circuit, and means controlled by the connection of a plurality of link circuit terminals with a plurality of the line group terminals for associating all lines of the corresponding groups with the link circuit and for disconnecting the individual terminals from such lines.

6. In a telephone system, a plurality of subscribers' lines, a station for each line, a normally connected terminal individual to each line, a normally disconnected terminal individual to each line, a normally disconnected terminal common to the lines, switching means individual to each line for disconnecting therefrom the normally connected terminal and connecting thereto the normally disconnected individual terminal, and means controlled thereby for connecting the common terminal with the lines.

7. In a telephone system, a plurality of lines, a station for each line, a normally connected terminal individual to each line, a normally disconnected terminal individual to each line, a normally disconnected terminal common to the lines, switching means individual to each line for disconnecting therefrom the normally connected individual terminal and connecting thereto the normally disconnected individual terminal, and means controlled thereby for disconnecting the second mentioned individual terminal from the line and connecting thereto the common terminal.

8. In a telephone system, a central office, a plurality of lines terminating thereat, a plurality of terminals individual to each line, switching means for selectively associating the terminals with the line, a terminal common to the lines, a link circuit, and means controlled by the switching means for associating all of the lines with the common terminal when the link circuit is connected therewith.

9. In a telephone system, a central office, a plurality of lines terminating thereat, a plurality of terminals individual to each line, switching means for selectively associating the terminals with the line, a ter-

minal common to the lines, a link circuit, and means controlled by the switching means for associating all of the lines with the common terminal when the link circuit is connected therewith and for disconnecting all of the individual terminals connected to the line.

10. In a telephone system, a plurality of subscribers' lines terminating at the central office, an operator's position, an operator's telephone set thereat, a source of current to supply current for the telephone transmitters of subscribers' lines, means to group the lines and extend them to the operator's position and connect the source and telephone set thereto, and a switch to disconnect the source from the grouped lines while leaving the operator's set connected thereto.

11. In a telephone system, a plurality of subscribers' lines arranged in groups, a relay for each group, a line common to the subscribers' lines of each group and terminating in a jack, means controlled by each group relay to connect the subscribers' lines of each group to the corresponding common line, means to connect said jacks together, and a switch to control said relays.

In witness whereof, we hereunto subscribe our names this 8th day of June A. D., 1922.

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