

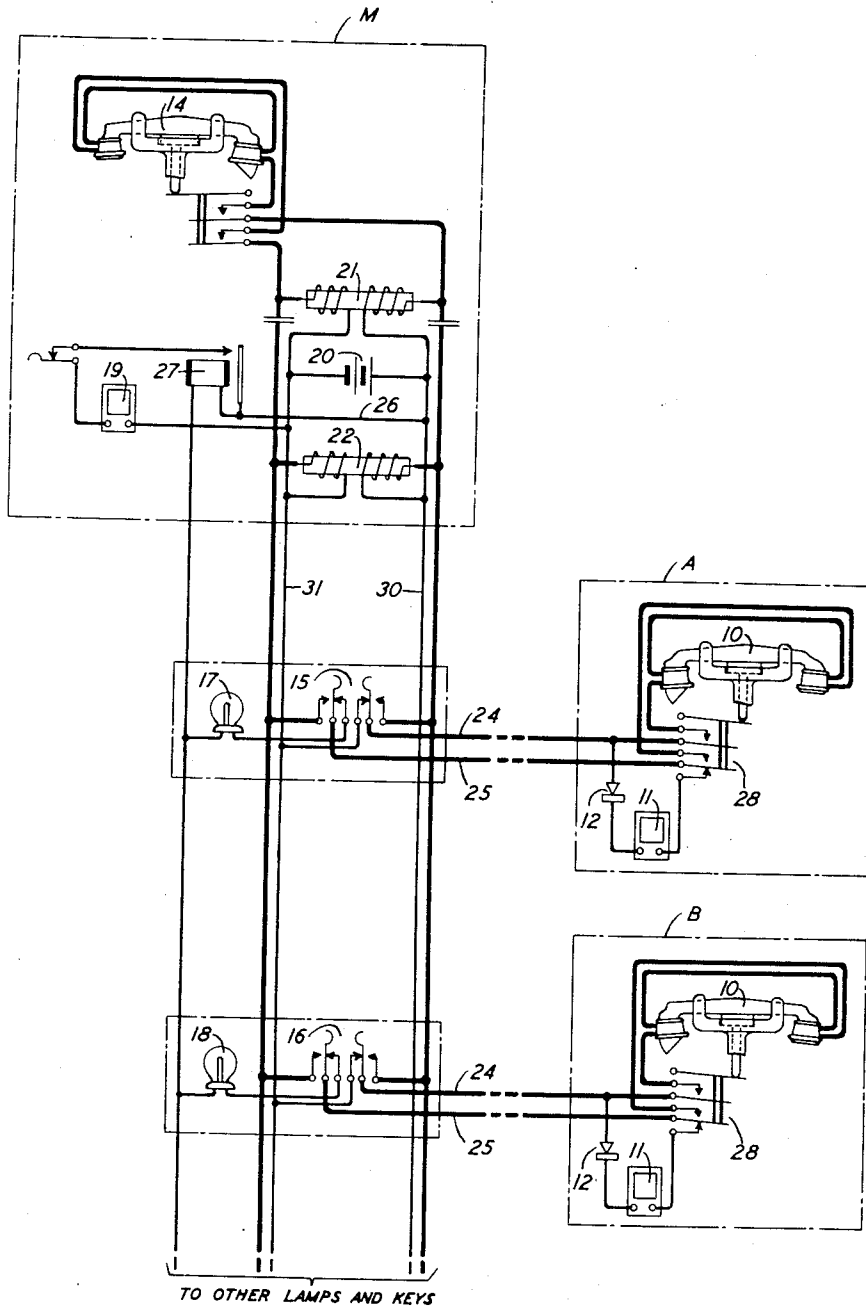
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TELEPHONE SYSTEM

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TELEPHONE SYSTEM

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6 Claims. (Cl. 179—40)

This invention relates to telephone systems and more particularly to that type of system generally known as common battery systems.

Common battery telephone systems of the type in general use today are characterized by a centrally located source of energy which supplies the talking current necessary for the entire system, that is, for the equipment at the central plant or telephone exchange as well as for the equipment located at the various subscribers' stations of the system.

In the past, such systems have employed alternating current for signaling in one or both directions in order to obtain the manifest advantages of utilizing but two wires for both signaling and talking purposes. In smaller installations, such as might be found in rural or suburban districts where the number of subscribers to be served is relatively small, in the so-called private branch exchanges and particularly in that type of system known as house or intercommunicating systems, the cost of equipment required to furnish alternating current for signaling purposes had to be carefully balanced against the expense of furnishing a third wire to each station and using direct current for signaling purposes.

It is the object of this invention to provide an inexpensive and efficient system of communication which is particularly suitable for use in small rural districts, in small private branch exchanges and is equally well adapted for local intercommunication service.

This object is attained in accordance with a feature of the invention by the provision of a telephone system which permits two way signaling and talking battery to be supplied to the subscribers' stations over but two wires and obviates the need of such expensive equipment incident to the use of alternating current for signaling purposes. More specifically, this object is attained by means of a unidirectional current conducting device or rectifier which is located at each station and is connected in series with the signaling apparatus located thereat.

The invention will be readily understood from the following detailed description made with reference to the accompanying drawing which discloses an executive's private telephone system consisting of a master station and two subordinate stations, there being a rectifier connected in series with the signaling device at each of the latter.

Each of the subordinate stations A and B is provided with a telephone handset 10, a sig-

naling device or buzzer 11 and a unidirectional current conducting device 12 connected in series with the buzzer 11.

At the master station M there are provided a telephone handset 14, a pair of switching keys 15 and 16, visual signaling devices 17 and 18 and an audible signaling device or buzzer 19. Battery 20, located at the master station M supplies talking current to the telephone apparatus at station M through repeating coil 21 and to the telephone apparatus at stations A and B through repeating coil 22. Each subordinate station is connected to the master station by way of the two line wires 24 and 25.

Under normal circuit conditions, that is with both keys 15 and 16 unactuated, a circuit may be traced from the positive terminal of battery 20, conductor 26, winding of relay 27, filament of lamp 17, left hand normal contacts of key 15, conductor 25, switch contacts 27 associated with handset 10 at station A, buzzer 11, rectifier 12, conductor 24, right hand normal contacts of key 15, conductor 31, to the negative terminal of battery 20. Under this condition the signal lamp 17 at station M and the buzzer 11 at station A do not operate due to the fact that rectifier 12 is poled in such a direction as to prevent the flow of current in the circuit just traced. A similar circuit from battery 20 and including the normal contacts of key 16, lamp 18 and the buzzer circuit at station B exists and in like manner, the signaling devices do not function.

Should the subscriber at station M desire to communicate with the subscriber at station A, key 15 located at station M and individual to station A is actuated and the handset 14 removed from its mounting. A circuit is thereby established extending from the positive terminal of battery 20, right hand winding of repeating coil 22, conductor 30, right hand alternate contacts of key 15, conductor 24, rectifier 12, buzzer 11, contacts 27 of handset 10, conductor 25, left hand alternate contacts of key 15, conductor 31, left hand winding of repeating coil 22, to the negative pole of battery 20. Under this condition buzzer 11 at station A operates due to the fact that the current in the circuit just traced is in the proper direction to be passed by the rectifier 12. Through the operation of key 15 and the removal of the handset 14 at station M the transmitter and receiver at the master station are connected across the line conductors 24 and 25 leading to station A. Upon hearing the buzzer signal, the subscriber

at station A removes the handset 10 from its support whereupon the two stations are telephonically connected together. The talking battery for the telephone at station A is supplied from battery 20 by way of the repeating coil 22 and the line wires 24 and 25 whereas the same battery furnishes the equipment at station M with current by way of the repeating coil 21. The removal of the handset at station A opens the signaling circuit at contacts 27. Upon completion of conversation both handsets 14 and 10 are replaced and key 15 restored to normal.

To signal the subscriber at station B key 16, instead of key 15 is operated.

Should a subscriber at a subordinate station, such as station B, desire to communicate with the subscriber at the master station M, the handset 10 at station B is removed from its support, causing the signaling circuit to be opened and the transmitter and receiver to be bridged across the line conductors 24 and 25. A circuit may now be traced from the positive terminal of battery 20, conductor 26, winding of relay 27, filament of lamp 18, left hand normal contacts of key 16, conductor 25, through the closed loop at substation B, conductor 24, right hand normal contacts of key 16, conductor 31 to the negative terminal of battery 20. Relay 27 operates in this circuit causing the buzzer 19 to be operated in an obvious circuit as an audible signal. Lamp 18 also lights as a visual signal and identifies the calling station.

In answering this call the subscriber at station M actuates key 16 associated with the lighted lamp 18 and removes the handset 14 from its support. The actuation of key 16 opens the circuit to lamp 18 and relay 27, whereupon the lamp is extinguished and the buzzer 19 silenced. With the handsets 10 and 14 removed from their supports and key 16 actuated the subscribers at stations B and M are connected for communication purposes. At the termination of conversation the handsets 10 and 14 are replaced and the key 16 restored to normal.

It is evident from the foregoing that applicant has devised a cheap, economical and efficient common battery telephone system wherein but two wires are utilized for the transmission of speech currents as well as of direct current in both directions for signaling purposes. Though applicant has elected to disclose his invention as applied to an executive's private telephone system, it is readily apparent to those skilled in the art how the invention may be applied to house or intercommunicating systems as well as to those common battery systems wherein connections are established by an operator at a private branch exchange or a central office. It is also evident that in place of the battery 20, rectified alternating current may be employed without departing from the spirit or scope of the invention.

What is claimed is:

1. In a telephone system, a first station, a second station, signaling devices at said stations, a source of direct current located at said first station, two wires normally connected with said direct current source and interconnecting said stations, said signaling devices being normally

connected in series with each other by means of said wires and means located at said second station for rendering said signaling devices inoperative when normally connected together in series.

2. In a telephone system, a first station, a second station, signaling devices at said stations, a source of direct current located at said first station, two wires normally connected with said direct current source and interconnecting said stations, said signaling devices being normally connected in series with each other by means of said wires and a unidirectional current conducting device located at said second station and included in said series circuit for rendering said signaling devices inoperative when normally connected together in series.

3. In a telephone system, a first station, a second station, signaling devices at said stations, a source of direct current located at said first station, two wires normally connected with said direct current source and interconnecting said stations, said signaling devices being normally connected in series with each other by means of said wires, a unidirectional current conducting device located at said second station and included in said series circuit for rendering said signaling devices inoperative when normally connected in series and means at said first station for reversing the association of said wires with said direct current source to effect the operation of the signaling device at said second station.

4. In a common battery telephone system, a calling station, a called station, a link circuit including but two wires interconnecting said stations and means located at one of said stations for rendering possible the transmission of direct current from the common battery in either direction over said two wires for signaling purposes, said two wires constituting a speech channel between said stations.

5. In a common battery telephone system, a calling station, a called station, a link circuit including but two wires interconnecting said stations and a unidirectional current conducting device connected in the signal circuit of one of said stations for rendering possible the transmission of direct current from the common battery in either direction over said wires for signaling purposes, said two wires constituting a speech channel between said stations.

6. In a common battery telephone system, a first station, a second station, two wires interconnecting said stations for the transmission of speech currents from the common battery, a signaling circuit at one of said stations normally bridged across said wires by way of a contact controlled by the telephone at said station and including a rectifier poled in such a manner as to normally prevent the transmission of direct current from said common battery and means at another of said stations for reversing the polarity of said common battery with respect to said rectifier to effect the transmission of direct current therefrom and energize the signaling circuit located at said station when said telephone is in its normal condition.

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