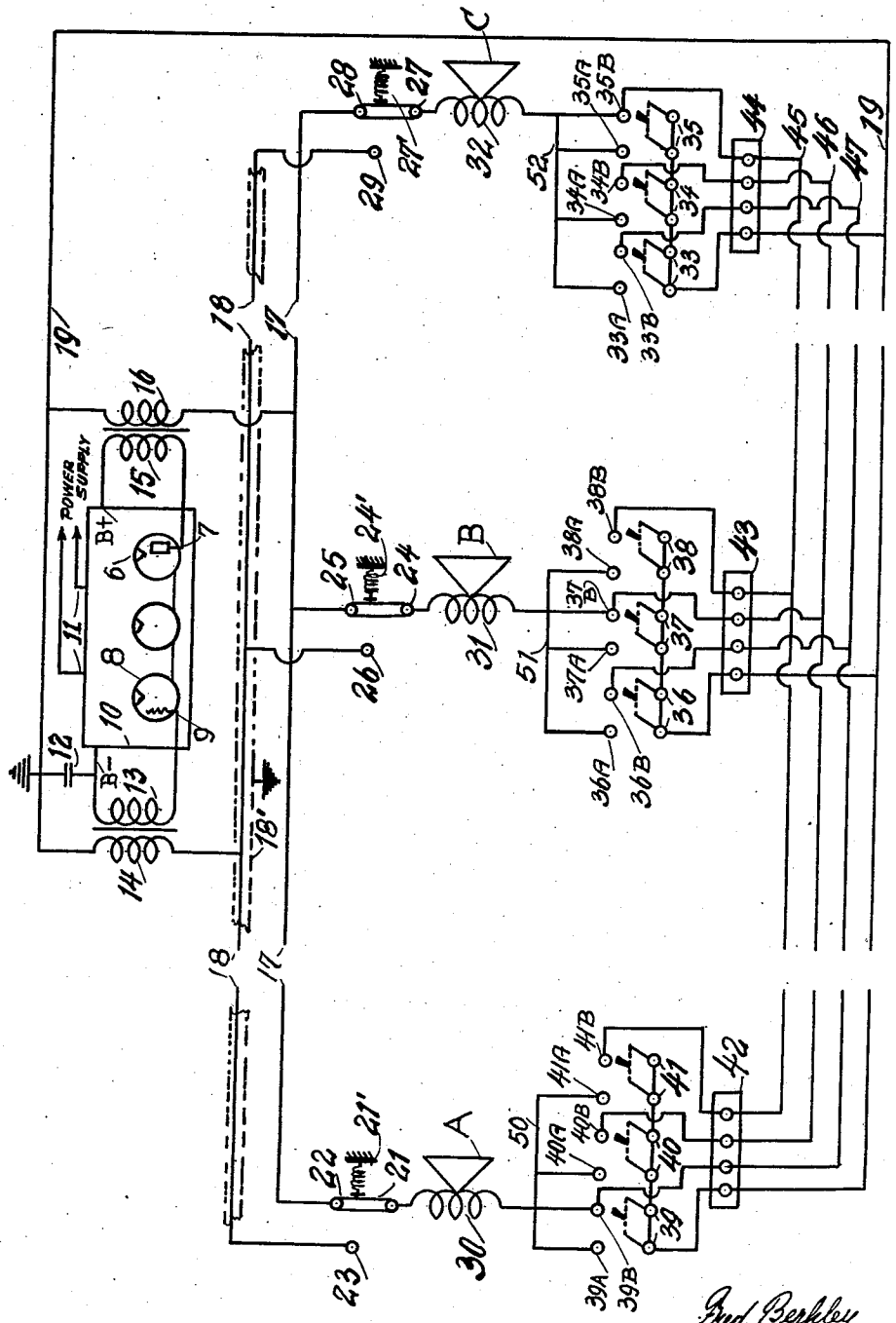
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INTERCOMMUNICATION SYSTEM

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INTERCOMMUNICATION SYSTEM

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The present invention relates to intercommunication systems and more particularly to intercommunication systems of the type employing one common or central amplifier and two or more remote stations.

One of the primary objects of this invention is to provide a system of simple circuit design with a minimum of interstation conductors and with all remote stations employing the same central amplifier for amplifying either incoming or outgoing signals from or to any remote station and any system where privacy is not of prime importance.

Another object of this invention is to bias all remote stations, so as to be always in a receiving position for any incoming signal. The remote stations to be preferably of the permanent magnet type having a voice coil suspended in a permanent magnetic field.

A still further object of this invention is to use the permanent magnet loud speaker, by means of a single pole single throw switch, as either receiving or transmitting means for each remote station.

Yet a further object of this invention is to provide a remote station selector switch of the two pole single throw type, enabling an operator of any remote station to select and communicate with any other remote station in a system, without requiring the operator of the second remote station to throw or to close any selector switch, but only to displace the single pole switch at the second remote in order to answer the first remote station's call.

Still another object of this invention is to provide a paging feature, whereby an operator of any remote station by means of the station selector switches may call and communicate with all other remote stations, simultaneously and thereby establish, what is known in the communication field, as a round table form of communication.

Further objects and advantages will become apparent from the following description and by reference to the accompanying drawing which shows a complete intercommunication system to which this invention relates.

A central amplifier of the conventional type, having input and output transformers, also three remote stations are shown with each remote station's own switching means, and interstation conductors. Although three remote stations are shown to better illustrate this invention, it is understood, however, that any number of remote stations may be used in a system to which this invention relates, by adding loud speakers, switching means and interstation conductors.

Numeral 10 designates the standard amplifier, the numeral 11 indicating the amplifier's power supply (not shown). A capacity 12 of suitable value is provided to eliminate stray coupling and to establish a ground path between the common conductor 19 and the B— of the power supply.

The input transformer's secondary coil 13 connects with one end to the B— of the power supply and with its other end to the signal grid 9 of the amplifier's first vacuum tube 8. The primary coil 14 connects with one end to the common conductor 19 and with its other end to conductor 18. Conductor 18 extends to switch positions 23, 26, and 29, respectively, of the remote stations A, B, and C. The conductor 18 is preferably of the shielded type and is so indicated by 18'. All ground symbols in the drawing refer back to the common conductor 19 and not to the power supply B—. No actual connection exists between the common conductor 19 and the power supply B— except through capacity 12. The primary coil 15 of the output transformer connects with one end to the B+ of the power supply and with its other end to the output or plate terminal 7 of the amplifier's last or power tube 6.

One end of the secondary coil 16 of the output transformer, connects to the common conductor 19 and the other end with conductor 17.

The conductor 17 extends to switch positions 22, 25, and 28. The single pole single throw change-over switches 21, 24, and 27 are biased into a certain position by means of a spring as indicated by numerals 21', 24', and 27'. Voice coils 30, 31, and 32 have one end connected to the common poles of switches 21, 24, and 27, respectively. The remote stations selector switches are indicated by the numerals 39, 40, and 41 for the first remote station A; 36, 37, and 38 for the second remote station B; and 33, 34 and 35 for the third remote station C. These selector switches are identical electrically and may be of any convenient type so long as they have a double pole single throw action. Such switches are obtainable in many forms in the open market. Numerals 42, 43 and 44 indicate terminal strips for interstation conductors 45, 46, 47 and common 19.

Referring back to switches 39, 40 and 41 it can be seen that all poles are connected in parallel and also to common conductor 19. One position 39a, 40a and 41a, respectively, of switches 39, 40 and 41 are joined by a conductor 50 to the free end of voice coil 30. Conductor 47 from

the second position 39b of switch 39 joins the like position 36b and 33b, respectively of switches 36 and 33. Again one position 36a, 37a and 38a, respectively of switches 36, 37 and 38 are joined by a conductor 51 to voice coil 31 and one position 33a, 34a and 35a, respectively of switches 33, 34, and 35 are also joined by a conductor 52 to voice coil 32. Conductors 45, 46, like conductor 47 connect together all like positions on all selector switches, thus putting a switch positions in parallel. However, voice coil 30 connects to the first position 39b of switch 39, voice coil 31 connects to the second position 37b of switch 37 and voice coil 32 connects to the second position 35b of switch 35. When referring to first, second and third switch positions, it is, of course, understood, that when having a plurality of selector switches they would be grouped and a station number would have to be assigned to each of the switches, and therefore reference has been made to the selector switches as first, second and third in a group.

By referring to the drawing it can be seen that any number of additional remote stations may be connected in a system of this type by adding receiving and transmitting means (loud speaker as described) with additional selector switches and additional interstation conductors and by advancing each additional remote station's voice coil to the position of the added selector switch and interstation conductor.

Should operator of remote station A, containing voice coil 30, desire to communicate with remote station C containing voice coil 32, it is only necessary for the operator of the remote station A to throw selector switch 41 into closed position, thereby connecting the voice coil 32 and voice coil 30, to the common conductor 19 and thereby placing voice coils 30 and 32 across the output transformer's secondary coil 16.

Displacing the pole 21 from position 22 to position 23 will place the voice coil 30 directly across the primary coil of input transformer 14. It is, of course, understood that power has been supplied to the amplifier. Any sound striking the voice coil 30 will be amplified by the amplifier 10 and reproduced by voice coil 32. After the operator of remote station A has finished his call and lets the pole of switch 21 return to its original position by means of the spring 21', voice coil 30 will again be placed across the output transformer coil 16. The operator of remote station C containing voice coil 32 can now displace pole of switch 27 and thereby place the voice coil 32 across the input transformer's primary 14. Any sound striking the voice coil 32 will be amplified by the amplifier 10 and will be reproduced by the remote station A in voice coil 30. After completing all communications, both operators of the remote stations A and C must let their respective switches return to their original positions. It is now clear that in any remote station the voice coils of the permanent magnet loud speakers are used as either receiving or transmitting means, by operating change-over switches 21, 24 and 27.

Another type of intercommunication as previously mentioned may be effected by an operator of any remote station by closing all selector switches and thereby closing all return leads of all remote stations to the common conductor 19; and by operating the change-over switch, may call all remote stations simultaneously and all remote stations may take part in the conversation by operating their respective change-over switches 21, 24, 27. After all communications are completed all selector switches must be opened in order to clear all lines and again allow for individual selection of remote stations.

It is understood that a light indicator system for each of the stations may be provided, which may be similar to that disclosed in copending application Serial No. 309,202, filed December 14, 1939.

While only a single embodiment of the invention has been described, it is not contemplated that the principles of the invention should be limited thereto. Other modifications will suggest themselves to those skilled in the art and it is contemplated that the present invention be limited only by the claims appended hereto.

What is claimed as new and desired to be secured by Letters Patent, is:

1. In an intercommunication system, the combination of a central amplifier, a plurality of remotely located stations, each of said stations having loud speaker means adapted for receiving and transmitting, and switch means at each of said stations for controlling communication circuits between stations, through their respective loud speaker means and said central amplifier, said switch means being operable to a position in which communication circuits are closed between stations.

2. In an intercommunication system, the combination of a plurality of remotely located stations, a central amplifier, signal receiving and transmitting means at each of said stations, a first switch means at each of said stations for controlling communication circuits between stations and said central amplifier, said switch means normally occupying positions in which the communication circuits are open and operable for closing said communication circuits, and a second switch means at each of said stations and being normally positioned such that the signal receiving and transmitting means of each station after operating said first switch means thereby closing communication circuits between stations, are held in receiving position across the output of said central amplifier.

3. In an intercommunication system, the combination of a plurality of remotely located stations, a central amplifier, signal receiving and transmitting means at each of said stations, switch means including multipole switches at each of said stations for controlling communication circuits between stations and said central amplifier, said switch means normally occupying positions in which the communication circuits are open and operable for closing said communication circuits, and a single pole switch at each of said stations and being normally positioned such that the signal receiving and transmitting means of each station after operating said switch means thereby closing communication circuits between stations, are held in receiving position across the output of said central amplifier.

4. In an intercommunication system, the combination of a central amplifier, a plurality of stations, loud speaker receiving and transmitting means at each of said stations, means including two pole single throw switches at each of said stations for controlling communication circuits between stations and said central amplifier, said switches normally occupying positions in which the communication circuits are open, and means including a single pole single throw switch at each of said stations so biased

that the loud speaker receiving and transmitting means of each station are placed in receiving position across the output of said central amplifier when one or more of said two pole single throw switches controlling the communication circuits are diplaced from their normal open positions to closed positions.

5. In an intercommunication system, the combination of two or more stations, loud speaker receiving and transmitting means at each of said stations, interstation conductors and a common conductor, means including two pole single throw switches at each of said stations for controlling communication circuits between two or more of said stations through said interstation conductors and said common conductor, said switches being normally open and operable to closed positions to connect said loud speaker receiving and transmitting means of two or more of said stations to said common conductor and thereby placing the loud speaker receiving and transmitting means of said two or more of said stations to receiving positions.

6. In an intercommunication system, the combination of two or more stations, receiving and transmitting means at each of said stations, interstation conductors and a common conductor, switch means at each of said stations for controlling communication circuits between two or more of said stations through interstation conductors and said common conductor, said switch means being normally open and operable to closed positions to connect said receiving and transmitting means of two or more of said stations to said common conductor and thereby placing said receiving and transmitting means of said two or more of said stations to receiving positions.

7. In an intercommunicating system the combination of a common amplifier having input and output circuits, two or more stations, each having transmitting and receiving means, means including multipole switches for each station at all of said stations for controlling communication circuits between stations, and a single pole switch at each of said stations so biased as to normally place the receiving and transmitting means of such station into receiving position when one or more of said communication circuits are closed by means of their respective switches, and being operable to a second position to transfer the receiving and transmitting means of such station from the output of said common amplifier to its input.

8. In an intercommunication system the combination of a common amplifier, two or more stations, each station having loud speaker receiving and transmitting means including a plurality of multipole switches, said switches normally in open position, an interstation conductor for each of said switches, and a common conductor for all of said switches, said interstation and common conductors being connected to said switches at like positions in all of said stations, means including a single pole switch for each of said stations adapted when in normal position to connect the loud speaker receiving and transmitting means of such station to the output circuit of said amplifier to thereby close a communication circuit, when any one or more of said multipole switches are displaced from normal open to closed positions.

9. In an intercommunication system, the combination of a common amplifier, two or more remote stations, each station having loud speaker means including a plurality of multipole switches so arranged as to be normally in open positions and operable to closed positions to close communication circuits of two or more stations, each station having a single pole switch so biased as to place its loud speaker means across the output of said amplifier when one or more of said two pole switches are closed, said single pole switch when being displaced from its original position to a second position transferring said loud-speaker means from the output of said amplifier to the input of said amplifier as transmitting means.

10. In an intercommunication system, the combination of two stations, receiving and transmitting means at each of said stations, interstation conductors and a common conductor, switch means at each of said stations for controlling the communication circuit between said two stations through said interstation conductors and said common conductor, said switch means being normally open and operable to closed position to connect the receiving and transmitting means of said two stations to said common conductor and thereby placing the receiving and transmitting means of said two stations to receiving positions.

11. In an intercommunication system the combination of a common amplifier having input and output circuits, two stations, each station having receiving and transmitting means including a multipole switch for each station, said switches normally in open positions, an interstation conductor for each of said switches, and a common conductor for all of said switches, said interstation and common conductors being connected to said switches at like positions in both stations, a single pole switch for each of said stations adapted when in normal position to connect the receiving and transmitting means of such station to the output circuit of said amplifier for receiving purpose when one of said multipole switches is closed.

12. In an intercommunication system the combination of a common amplifier having input and output circuits, two stations, each station having receiving and transmitting means including a multipole switch for each station, said switches normally in open positions, an interstation conductor for each of said switches, and a common conductor for all of said switches, said interstation and common conductors being connected to said switches at like positions in both stations, a single pole switch for each of said stations adapted to transfer said receiving and transmitting means to the input of said amplifier for transmitting purpose when one of said multipole switches is closed.

13. In an intercommunication system the combination of a common amplifier having input and output circuits, two stations, each station having receiving and transmitting means including a multipole switch for each station, said switches normally in open positions, an interstation conductor for each of said switches, and a common conductor for all of said switches, said interstation and common conductors being connected to said switches at like positions in both stations, a single pole switch for each of said stations adapted when in normal position to connect the receiving and transmitting means of such station to the output circuit of said amplifier for receiving and when displaced from its normal position to a second position to transfer said receiving and transmitting means to the input circuit of said amplifier for transmitting pur-

pose, when one of said multipole switches is closed.

14. In an intercommunication system, the combination of a plurality of remotely located stations, a central amplifier, signal receiving and transmitting means at each of said stations, a first switch means at each of said stations for controlling communication circuits between stations and said central amplifier, said switch means operable for closing said communication circuits, and a second switch means at each of said stations and being positionable so that the signal receiving and transmitting means of each station after operating said first switch means thereby closing communication circuits between stations, are held in receiving position across the output of said central amplifier.

15. In an intercommunication system, the combination of a central amplifier, a plurality of stations, loud speaker receiving and transmitting means at each of said stations, switch means at each of said stations for controlling communication circuits between stations and said central amplifier, said switch means normally occupying positions in which the communication circuits are open, and means including a single pole single throw switch at each of said stations so biased that the loud speaker receiving and transmitting means of each station are placed in receiving position across the output of said central amplifier when one or more of said switch means controlling the communication circuits are displaced from their normal open positions to closed positions.

16. In an intercommunication system, the combination of a common amplifier, two or more stations, loud speaker receiving and transmitting means at each of said stations, interstation conductors and a common conductor, switch means at each of said stations for controlling communication circuits between two or more of said stations through said amplifier said interstation conductors and said common conductor, said switch means being normally open and operable to closed positions to connect said loud speaker receiving and transmitting means of two or more of said stations to said common conductor and thereby placing the loud speaker receiving and transmitting means of said two or more of said stations to receiving positions.

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