

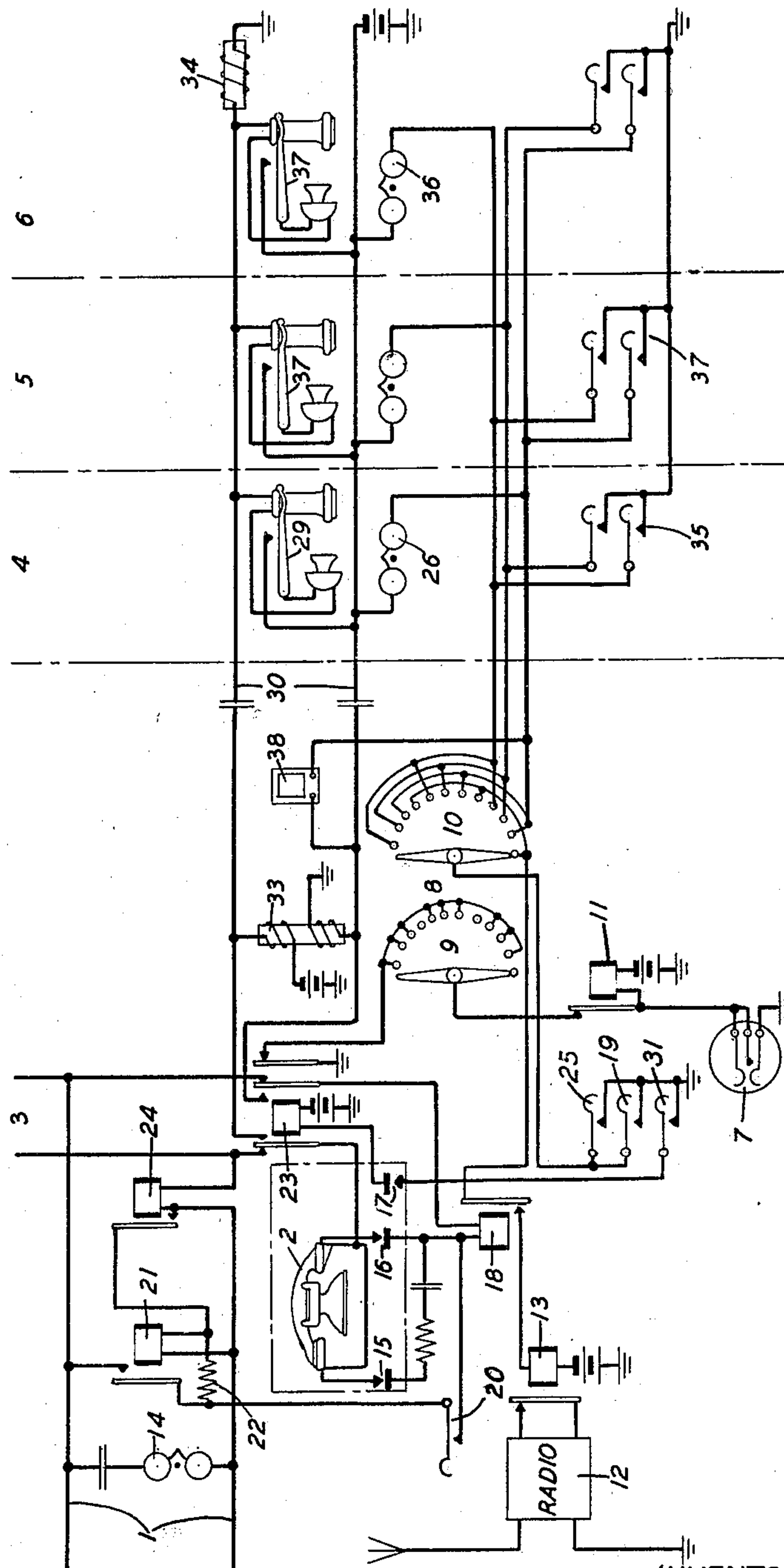
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COMMUNICATION SYSTEM

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COMMUNICATION SYSTEM

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This invention relates to communication systems and particularly to systems combining both telephone and radio service, and its object is to prevent the radio set from interfering with the use of the telephone.

Radio sets in operation often disturb the user of a telephone, and a telephone conversation often has to be interrupted while the radio set is being silenced. It is a feature of this invention to overcome these inconveniences in a system where a subscriber's telephone set is normally connected to an outgoing line and may be connected to another line, by providing an arrangement whereby the subscriber by lifting the receiver off its support causes means to be automatically operated to silence the radio set, regardless of which line a telephone set is connected to at the time. To accomplish this, a relay is included in the telephone circuit so that when the receiver is removed from its support, current from a source associated with a connected line causes this relay to operate. The operation of the relay in turn causes the operation of another relay which controls the silencing of the radio set by opening the loud speaker circuit or otherwise disable the set. A key is included in the circuit for the latter relay normally closing the circuit therefor. This key may be manipulated to open the circuit for this relay in case it is not desirable to control the radio set by the telephone.

This invention has been illustrated in the accompanying drawing in connection with a private branch exchange telephone system.

Referring to the drawing, line 1 incoming from a central office terminates in a telephone set 2. At 3 are shown connections for an extension telephone. At stations 4, 5 and 6 are shown telephone sets located at different parts of the house, such as a pantry, garage or bedroom. At 7 is shown a dial for selecting stations 4, 5, or 6 by means of the step by step switch 8 having terminal banks 9 and 10 controlled by stepping magnet 11. At 12 is shown diagrammatically a radio set which may be controlled by relay 13.

Calls incoming over line 1 cause the bell 14 to ring, and the subscriber at telephone 2

will then lift his hand set from the switch-hook to close contacts 15, 16 and 17, to connect the telephone set to line 1. It will be noted that the circuit for the telephone 2 to line 1 extends through the winding of relay 18, which is thereby operated to partially close a circuit for the control relay 13. If the radio set 12 is switched on and the subscriber decided to disable it he will depress key 19 and thereby complete a circuit for relay 13 from battery, winding of this relay, armature and front contact of relay 18, normal terminal and brush of switch bank 10, key 19 to ground. Relay 13 in operating opens the circuit for the radio set which is thereby silenced as long as the subscriber desires it to be. When the subscriber replaces his hand set, relay 18 is released to release relay 13 to again switch on the radio set 12.

If the subscriber desires to cut off the radio set automatically each time he removes the hand set from the hook he may arrange to have the key 19 permanently closed so that relay 13 will operate each time relay 18 is operated.

If the subscriber desires to hold the line 1 while talking to any of the parties at the extension stations 4, 5 or 6 he will depress key 20 and thereby include relay 21 in a bridge across the line from the ring conductor, winding of relay 21, resistance 22, key 20, winding of relay 18, inner right hand armature and back contact of relay 23, to the tip conductor. As long as the hand set remains off the hook, however, relay 21 will not operate due to the short-circuit for this relay through the armature and front contact of relay 24 which is included in the line and operated while the hand set is off the hook. When the subscriber replaces the hand set, relay 21 will operate and close a locking circuit for itself through its armature and front contact, resistance 22 and its winding between the tip and ring conductors to hold the line engaged.

To establish a connection to any one of the parties at the extension stations 4, 5 or 6 under the above mentioned circumstances the subscriber at 2 must first depress the key 31 and thereafter again remove his hand set

from the hook. This closes an obvious circuit for relay 23. Relay 23 in operating connects the hand set to the conductors 30 inductively, to which the telephone sets at stations 4, 5 and 6 are connected. In order now to complete the connection to a particular station, the subscriber must use dial 7 to dial a single number 1, 2 or 3 depending on whether he wants station 4, 5 or 6. If station 4 is desired, the subscriber will dial one impulse to operate the stepping magnet 11 once to have the brush of bank 10 engage the first terminal of this bank. The subscriber will then depress key 25. A circuit is thereby closed to actuate bell 26 from battery, bell 26, first terminal and brush of bank 10, key 25 to ground. The party at station 4 answers this call by removing his receiver from the hook 29 thereby causing the telephone circuit to be connected across the tip and ring conductors 30. Talking battery for hand set 2 will be supplied from battery and ground through retardation coil 33, and talking battery for the subscriber at 4 will be supplied from battery and ground through retardation coil 34.

If any one of the parties at 4, 5 or 6 decides to call any other of the parties a corresponding key is depressed. For example, if the party at 4 decides to call the party at 6 he will depress key 35 and thereby close a circuit for the bell 36 and connection between the parties may be established by lifting the receivers from hooks 29 and 37.

If the party at 5 desires to call the subscriber of set 2 he will depress key 37 and thereby close a circuit for buzzer 38 which will be heard by the subscriber of set 2 and this subscriber answers the call by depressing key 31 and lifts the hand set off the hook and thereby operate relay 23 to connect his set with conductors 30. It will be noted that bell 26 will also be actuated in this case so that the party at 4 may listen in if he so desires.

To restore the step by step switch 8 to a normal position, of which three have been shown, the subscriber hangs up his hand set 2 and thereby causes the release of relay 23. A circuit is thereby completed from battery through the stepping magnet 11, and its armature and back contact to the brush of bank 9 to the first terminal to ground at the outer right hand armature and back contact of relay 23. Magnet 24 will then be alternately operated and released to cause the switch to advance to the next normal position on the fifth terminal.

If the subscriber decides to disable the radio set while talking to a party at 4, 5 or 6 he may momentarily replace the hand set on the hook and thereby cause the switch 8 to be advanced to a normal position. When the switch has been advanced to the next normal position he may again remove the hand

set from the hook and operate key 19 to cause the operation of the relay 13. It will be noted that relay 18 is included in the line to the stations 4, 5 and 6 and receives operating current from the battery and ground supplied to retardation coil 33, so that the circuit for relay 13 will be completed in this case the same as when the subscriber is connected to the line 1.

Although this invention has been illustrated only in connection with one type of system, it may readily be applied to other systems without departing from the spirit thereof.

What is claimed is:

1. A system comprising two lines, a telephone set normally connected with one of said lines, means for connecting said telephone set to the other line, means operative at will in response to the lifting of the receiver off the hook of the telephone set for actuating said connecting means to connect said telephone set to said other line, a radio set and means associated with said telephone set and responsive to the lifting of the receiver off the hook of said set and operative over whichever line is connected to the telephone set at the time for disabling said radio set.

2. A system comprising two lines, a telephone set normally connected to one of said lines, means for connecting said telephone set to the other line, means operative at will in response to the lifting of the receiver off the hook of the telephone set for actuating said connecting means to connect said telephone set to said other line, a radio set, a key, and means responsive to the lifting of the receiver off the hook of said telephone set and to the operation of the key and operative over whichever line is connected to the set at the time for disabling said radio set.

3. A system comprising two lines, a telephone set normally connected to one of said lines, a relay, a key, means responsive to the lifting of the receiver off the hook of the telephone set and the operation of the key for actuating said relay to connect said telephone set to said other line, a radio set, and means associated with said telephone set and responsive to the lifting of the receiver off the hook of said telephone set and operative over whichever line is connected to the set at the time for disabling said radio set.

4. A system comprising two lines, a telephone set normally associated with one of said lines, means for connecting said telephone set to the other line, means operative at will in response to the lifting of the receiver off the hook of the telephone set for actuating said connecting means to connect said telephone set to said other line, a relay, means for actuating said relay in response to the lifting of the receiver off the hook of said telephone set and operative over whichever

line is connected to the set at the time, a radio set and means responsive to the actuation of said relay for disabling said radio set.

5. A system comprising two lines, a telephone set normally associated with one of said lines, means for connecting said telephone set to the other line, means operative at will in response to the lifting of the receiver off the hook of the telephone set for actuating said connecting means to connect said telephone set to said other line, a relay, means for actuating said relay in response to the lifting of the receiver off the hook of said telephone set and operative over whichever line is connected to the set at the time, a radio set, and relay means for controlling said radio set responsive to the actuation of said first mentioned relay.

6. A system comprising two lines, a telephone set normally associated with one of said lines, means for connecting said telephone set to the other line, means operative at will in response to the lifting of the receiver off the hook of the telephone set for actuating said connecting means to connect said telephone set to said other line, a relay, means for actuating said relay in response to the lifting of the receiver off the hook of said telephone set and operative over whichever line is connected to the set at the time, a radio set, a key, and means responsive to the actuation of said relay and the operation of said key for controlling the radio set.

7. A system comprising two lines, a telephone set normally associated with one of said lines, means for connecting said telephone set to the other line, means operative at will in response to the lifting of the receiver off the hook of said telephone set for actuating said connecting means to connect said telephone set to said other line, a relay in circuit with said telephone set, means for actuating said relay in response to the lifting of the receiver off the hook of said telephone set and operative over whichever line said circuit is connected to at the time, a radio set, and means responsive to the actuation of said relay for controlling said radio set.

8. A system comprising two lines, a telephone set, a radio set, means for disabling said radio set, said telephone set and said means for disabling the radio set being normally connected through the conductors of one line, means for connecting said telephone set and said means for disabling the radio set through the conductors of the other line, means for making said connecting means operative at will under control of the switchhook of the telephone set, said means for disabling the radio set being operative over the conductors of either line depending on which line is connected to the telephone set and under control of the switchhook of the telephone set.

9. A system comprising two lines, a tele-

phone set, a radio set, a relay for disabling said radio set, said telephone set and said relay being normally connected to the conductors of one line, a second relay for connecting said telephone set and said first mentioned relay to the conductors of the other line, means for placing the operation of said second mentioned relay at will under control of the switchhook of the telephone set, and means for operating said first mentioned relay over the conductors of either line depending on which line is connected to the telephone set and under control of the telephone set.

10. A system comprising two lines, a telephone set, a radio set, a first relay, a second relay, a circuit for said second relay, manually operated means for placing said circuit under the control of said first relay, means for disabling said radio set controlled by said second relay, a third relay, a circuit for said third relay manually operated means for placing the first relay and the circuit for said third relay under the control of the switchhook of the telephone set, and means controlled by said third relay for disconnecting one line and connecting the other line to the telephone set.

In testimony whereof, I have signed my name to this specification this 3rd day of October, 1930.

CARROLL O. BICKELHAUPT.

In testimony whereof, I have signed my name to this specification this 6th day of October, 1930.

CECIL E. PENUEL.

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