

April 5, 1927.

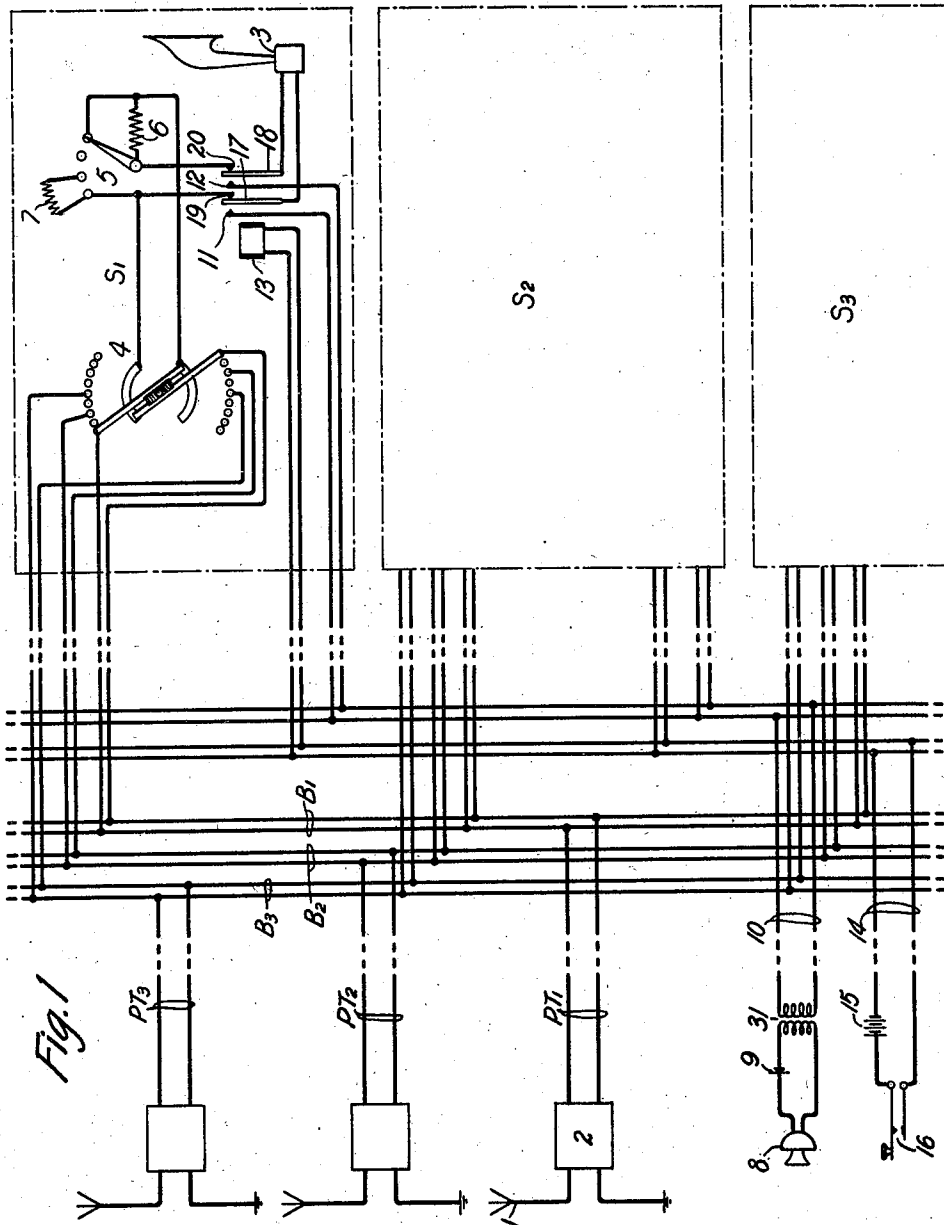
J. J. KUHN

1,623,480

TRANSMISSION SYSTEM

Filed Feb. 28, 1925

2 Sheets-Sheet 1



Inventor:
John J. Kuhn,
by *E. W. Adams* Atty

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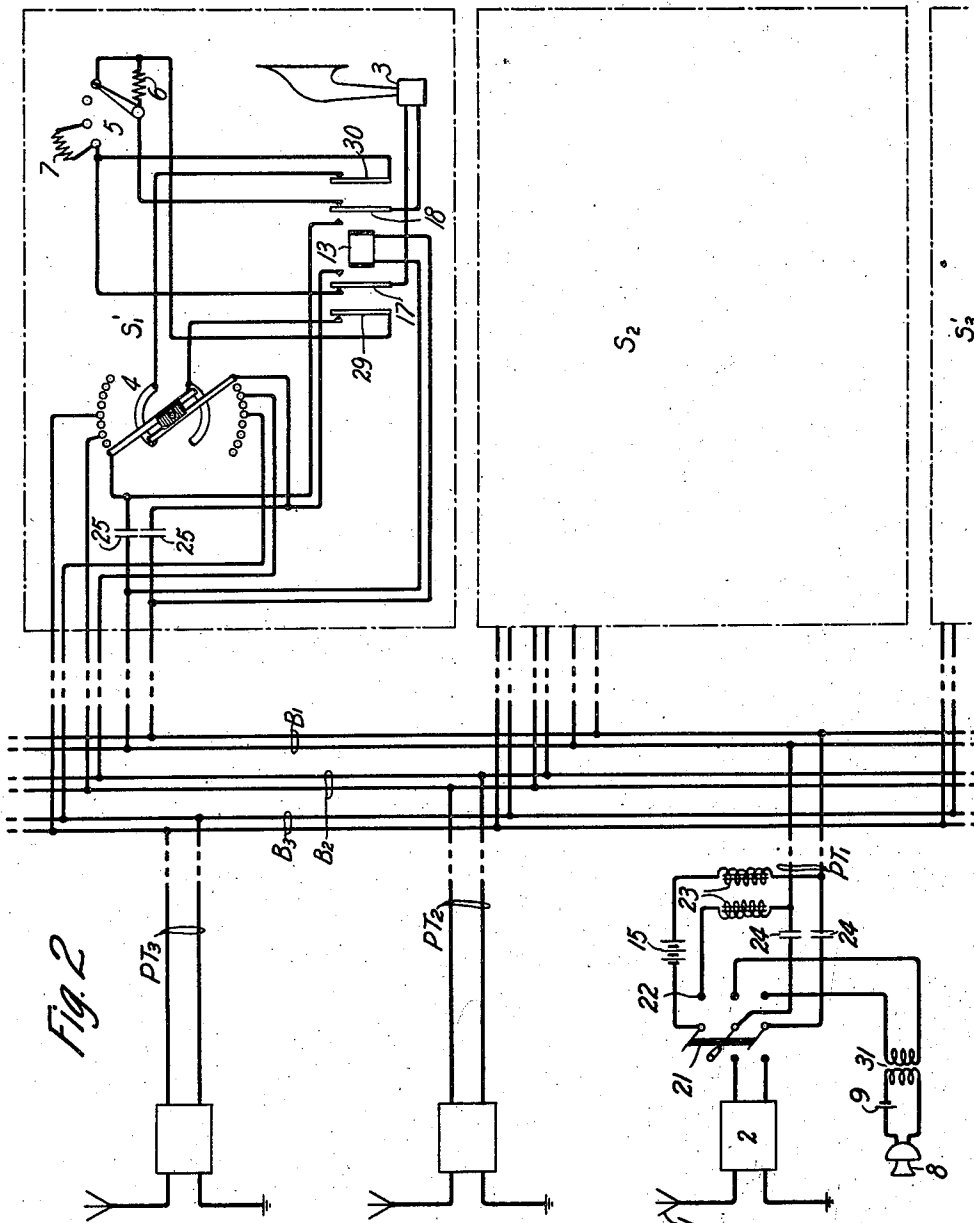
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2. Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

JOHN J. KUHN, OF ELIZABETH, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO WESTERN ELECTRIC COMPANY, INCORPORATED, A CORPORATION OF NEW YORK.

TRANSMISSION SYSTEM.

Application filed February 28, 1925. Serial No. 12,249.

This invention relates to systems for the distribution of musical and other programs over wires, and more particularly to announcing circuits associated with such systems.

The object of the invention is to enable a supervising operator or announcer to make announcements simultaneously to all subscribers connected to the system in the event that it is desired to call attention to special program features or to spread an alarm signal in an emergency.

The invention finds a particular application in what have been called apartment house radio systems. In these systems, which are described in the applicant's pending application, Serial No. 648,938 filed July 2, 1923, broadcast radio programs are received at a central station, for example, in a hotel or apartment building, and after detection and amplification are distributed by wire to subscribers' reproducing instruments in the various apartments. Several programs may be distributed simultaneously by different wire circuits any one of which may be selected by the subscriber.

By means of the present invention the operator supervising the radio reception is enabled to connect all subscribers' instruments simultaneously to an announcing microphone regardless of any connection previously made by the subscriber.

In the detailed description which follows the nature and operation of the invention will be described in connection with a program distribution system of this type. It is to be understood, however, that the invention is not limited to such systems. Other applications of the invention will be evident from the description.

Figs. 1 and 2 of the accompanying drawings illustrate in schematic form systems embodying alternative forms of the invention.

In Fig. 1, PT_1 , PT_2 , and PT_3 are three program trunks entering the central station and each carrying waves corresponding to separate programs. In the system illustrated selected radio broadcast programs are received by radio upon antennae such as 1 and are delivered to the trunks through detecting and amplifying systems such as 2. These translating systems may be of any well known type, and since they form no part of the present invention they are illustrated only conventionally. Instead of

using a radio link the program trunks may, if desired, be run directly to the studios at which the programs originate.

The program trunks are connected to main bus-bars B_1 and B_2 and B_3 from which circuits branch to the subscribers' stations, three of the latter being indicated at S_1 , S_2 and S_3 . The equipments at the subscriber station are the same. One such equipment is shown in detail in connection with station S_1 . The normal reproducing equipment comprises a loud speaking telephone 3, a program selecting switch 4 by means of which the telephone may be connected to any one of the incoming lines, and a volume control switch 5 which functions also to disconnect the telephone when it is not desired to receive the programs.

In the extreme left position of the switch 5, as viewed in the drawing, the terminals of the loud speaker are short circuited and the subscriber's line is closed through resistance 6 which is sufficiently large to prevent a short circuit of the system. In the other positions of the switch resistances 6 and 7 cooperate to vary the current intensity in the receiver so that, as the switch contact is moved step-by-step to the right, the received volume is progressively increased.

The announcer's circuit comprises a microphone 8 located at the central station, an energizing battery 9, and a repeating coil 31 through which the microphone is connected to trunk line 10. Branch lines from trunk 10 extend to each subscriber station and terminate in front contacts 11 and 12 of relays such as 13. The relays 13 at each station are connected in multiple to a common line 14 in which is included battery 15 and key 16 the latter being under the control of the operator or announcer. The subscriber's telephone is connected to armatures 17 and 18 of relay 13 and normally through back contacts 19 and 20 to the volume control switch in the program line.

With this arrangement the operator or announcer is enabled by closing key 16, and thereby operating relay 13, to transfer the connections of all of the subscribers' telephones to the announcing trunk line 10. Further, since the announcing line is connected by the operation of the relays 13 directly to the telephone instrument terminals, closure of the switch 16 connects the operator's announcing circuit with each station

receiver regardless of the condition of the subscribers' control switches 4 and 5. This feature is of especial value in connection with the transmitting of emergency alarms.

5 In the modified system of Fig. 2 one of the program trunks, for example PT_1 , is utilized as an announcing circuit, and also for the remote control of the subscribers' telephones. At the control station there is
10 provided a two-way switch 21 by means of which the program trunk may be connected either to the line bearing the incoming program or to the announcer's microphone 8. An additional contact 22 on this switch
15 serves to close a circuit through battery 15 which is applied to the line when the line is connected to the announcer's circuit. Speech currents are prevented entering the battery circuit, which is bridged across the
20 line by choke coils 23 and the battery current is prevented entering the repeating coil 11 of the announcer's circuit by line condensers 24.

One of the subscribers' stations is shown
25 in detailed schematic at S'_1 . The circuit arrangements are similar to those of the station S_1 of Fig. 1, but the operating winding of the relay 13 is bridged across the incoming line connected to program trunk PT_1 , instead of being served by a separate line. In
30 addition line condensers 25 are provided to confine the direct current for operating the relay to the relay circuit.

In the normal operation of the system the
35 switch 21 is thrown to its left hand position whereby the incoming program is delivered to the trunk PT_1 and thence through the connected branch lines to the subscribers' sets. The relay 13 is normally deenergized and the telephone receiver 3 is connected
40 through the back contacts of inner armatures 17 and 18 to the terminals of volume control switch 5 and thence through selecting switch 4 to such one of the incoming
45 lines as may be selected by the subscriber.

The line condensers 24 and 25 add their impedances to the line and hence, to maintain a high quality of transmission, they
50 should be of large capacity. For analogous reasons the impedances of relay 13 and choke coils 23 should be large.

When the central station operator, desiring to make an announcement, throws switch
55 21 to its right hand position battery is applied through trunk PT_1 and, through the connected branch lines, to the control relays 13. At each subscriber's station the energizing of relay 13 causes the telephone receiver
60 to be connected through the front contacts of armatures 17 and 18 to the terminals of the incoming line connected to trunk PT_1 , which in this arrangement now corresponds to the announcer's circuit 10 of Fig. 1. At
65 the same time the connections between switch

4 and volume control switch 5 are broken at the back contacts of additional armatures 29 and 30. This prevents the volume control switch acting as a shunt on the telephone receiver, as it might in the event that the
70 subscribers were already connected to the incoming branch line from program trunk PT_1 , and so ensures that an announcement or alarm signal will be heard.

What I claimed is:

1. In a program distributing system, a central station, an incoming program trunk terminating thereat, a plurality of subscribers' stations each including a signal reproducing instrument, lines for connecting said
80 reproducing instruments to said trunk, a signaling device at said central station, lines connecting said device to said subscribers' stations, and means at said subscribers' stations, remotely controlled from said central
85 station, for simultaneously connecting said signal reproducing instruments and said signaling device.

2. In a program distributing system, a central station, a plurality of subscribers' stations, program trunks terminating at said
90 central station, each of said program trunks being connected to said subscribers' stations by separate lines, a signal reproducing instrument at each of said subscribers' stations adapted to be connected by selective
95 switching means to any one of said lines, a signaling device at said central station, lines connecting said device to said subscribers' stations, and relay switching means at said
100 subscribers' stations, remotely controlled from the central station, whereby said signal reproducing instruments may be simultaneously connected to said signaling device.

3. A program distributing system, a central station from which a plurality of separate lines radiate to subscribers' stations, signal reproducing instruments at each subscriber's station and means for selectively
110 connecting said instruments to any one of said lines, an announcer's microphone at said central station, means for impressing speech currents therefrom upon one of said lines, and relay switching means at each subscriber's station whereby said signal reproducing instruments may be simultaneously
115 connected to the line connected to said microphone.

4. A program distributing system comprising a central station, program trunks terminating thereat, a plurality of subscribers' stations, separate lines connecting each of said trunks to said subscribers' stations, signal reproducing instruments at said subscribers' stations adapted to be connected by
120 selective switching means to any one of said lines, an announcer's microphone at said central station, means for impressing speech currents therefrom upon one of said lines, means for impressing continuous currents
125

upon said selected line, and a relay at each subscriber's station connected to said selected line, adapted to be energized by said continuous current, to connect the subscriber's
5 signal reproducing instrument and said microphone.

5. A program distributing system comprising a central station, program trunks terminating thereat, a plurality of subscribers' stations, separate lines connecting each
10 of said trunks to said subscribers' stations, signal reproducing instruments at said subscribers' stations adapted to be connected by selective switching means to any one of said

lines, an announcer's microphone at said central station, switching means at said central station for connecting one of said lines to said microphone and for simultaneously impressing a battery voltage upon said line, and a relay at each subscriber's station
20 adapted to be operated upon the application of said voltage to the selected line to connect the subscriber's signal reproducing instruments and said microphone.

In witness whereof, I hereunto subscribe
25 my name this 25th day of February A. D., 1925.

JOHN J. KUHN.