

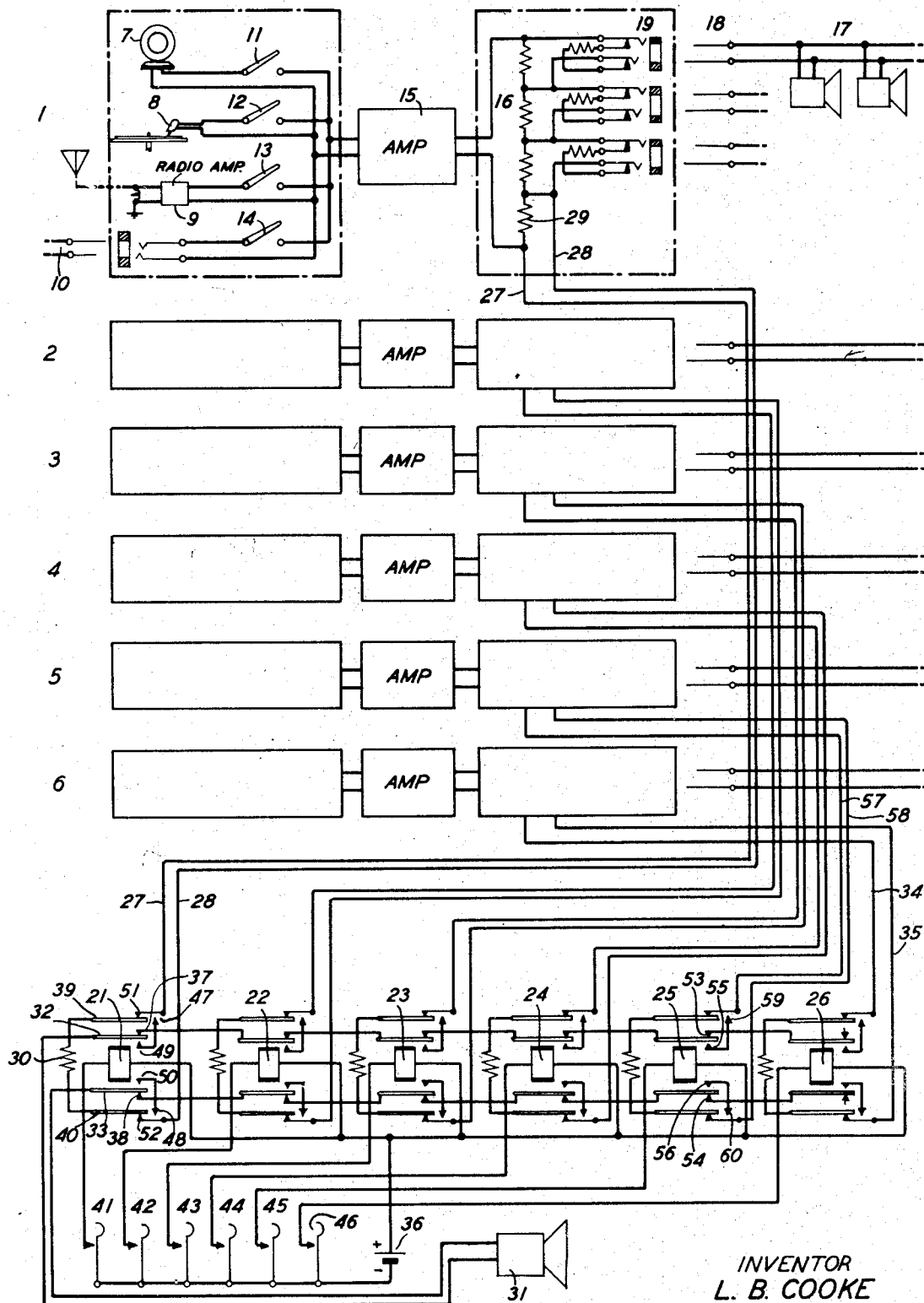
May 16, 1933.

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1,909,812

MONITORING SYSTEM

Filed Nov. 20, 1931



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MONITORING SYSTEM

Application filed November 20, 1931. Serial No. 576,270.

This invention relates to transmission systems and more particularly to monitoring arrangements for such systems.

In program distribution systems several channels are sometimes provided so that the listeners may have a choice of a number of programs at any given time. The control apparatus is usually concentrated at a central station or main control room and the several channels radiate from this station to groups of loud speakers located in various parts of the area to be covered. In such systems it is essential that the attendant in the main control room have a convenient means of checking or monitoring the operation of these various channels and it is desirable that he be able to monitor the various channels in quick succession without causing variations in the volume level or mixing two or more channels in a single loud speaker as would occur for instance if the operator should inadvertently monitor two or more channels at the same time.

It is the object of this invention to provide a monitoring system of this type.

The preferred arrangement according to the invention is to provide a single monitoring receiver and keys and relays individual to the channels to be monitored for associating the receiver with any desired channel. Associated with each relay is a substitute load for the monitoring receiver to avoid variations in program level when the receiver is connected to and disconnected from a channel.

The connections between the relays and the receiver are such that the channels can be monitored only one at a time, this being accomplished by a priority arrangement such that when one or more monitoring keys are operated before a previously operated key is released, only the channel having priority will be connected to the monitoring receiver.

These and other features of the invention

will be more clearly understood from the following detailed specification and the accompanying drawing which shows a multi-channel program distribution system having means for monitoring according to this invention.

In the drawing, the public address or program distribution system shown has six main distribution channels numbered 1 to 6. These channels may be essentially the same and they are assumed to be the same in this case so that only channel No. 1 is shown in detail. The program transmitted by one of these channels may be picked up at the scene of action by a suitable microphone 7, it may consist of phonograph records reproduced by an electric pick-up 8, it may be a radio program distributed from the radio set 9, or one transmitted to this system over a telephone or other line 10. Suitable selecting switches 11, 12, 13 and 14 permit the desired program source to be connected to the amplifier 15 which delivers its output to a multi-section potentiometer 16. Each group of loud speakers, such as 17, served by this channel is connected by a plug 18 to a jack 19 which is associated with one of the potentiometer sections. Each jack has a resistance 20 of the proper value connected across the potentiometer sections when the plug is removed so that the load on the channel is kept substantially constant.

The monitoring relays 21 to 26 are associated with the channels 1 to 6 as shown. Conductors 27, 28 for channel 1 are connected across the section 29 of the potentiometer 16 and are normally shunted at relay 21 by resistance 30 which simulates the impedance of the monitoring receiver 31. Each of the other relays 22 to 26 is similarly associated with its respective channel as indicated.

It will be readily understood that if two or more channels are simultaneously con-

needed to the monitoring receiver 31, the programs of the several channels will be heard through all the speakers associated with these channels because of the parallel connection. To avoid this possibility the receiver 31 is connected directly to armatures 32 and 33 of relay 21 of channel No. 1 with the result that this channel has priority over all the others for monitoring purposes. The receiver is connected to relays 22 to 26 through the corresponding armatures and back contacts of these relays when the relays intervening are not operated. The monitoring conductors 34, 35 of channel No. 6 are therefore connected to the receiver 31 by the operation of relay 26 only when relays 21 to 25 are all unoperated. Similarly, channel No. 5 is monitored by the operation of relay 25 only when relays 21 to 24 are all unoperated. The operation of the relays 21 to 26 is controlled by locking keys 41 to 46, each key closing a circuit for the battery 36 through its corresponding relay winding. With all the relays in the unoperated position, as shown, each channel is loaded by a resistance, such as 30 on channel No. 1, to prevent the variations in the volume level of the main speakers when the receiver 31 is connected to one of the channels.

If the operator desires to monitor channel No. 1, he merely presses key 41 which locks in the closed position so that current from battery 36 operates relay 21 and maintains it in this condition. The operation of the relay breaks contacts 37, 38 thereby disconnecting the receiver 31 from all of the other relays so that no other channel can be monitored by the subsequent operation of any of the relays 22 to 26 in response to the actuation of any of the keys 42 to 46. As the armatures 39, 40 move inwardly towards the relay, contacts 47, 48 close to prepare a circuit for conductors 27, 28 which circuit is extended by the closing of contacts 49, 50 to the receiver 31 so that the program on channel No. 1 is reproduced by the receiver. The contacts 51, 52 are preferably adjusted to break and remove the substitute load 30 from the monitoring circuit just after this circuit is completed by the closure of contacts 49, 50, the change-over being effected almost instantaneously so that no noticeable change in volume level in the main receivers can occur.

It has already been noted that with key 41 operated the subsequent operation of any or all of the other relays will not affect the monitoring of channel No. 1. Hence if another channel is to be monitored the normal procedure is to first release key 41 and then operate the key corresponding to the channel desired. In order to monitor channel No. 6 the operation of key 46 will not effect that result until all the other keys have been

released but when this channel is being monitored the subsequent operation of any one of the other keys will operate the corresponding relay to disconnect the receiver 31 from channel No. 6 and connect it to the other desired channel. For example, if key 45 is actuated, relay 25 operates to transfer the receiver circuit from contacts 53, 54 to contacts 55, 56 which are connected to the monitoring leads 57, 58 of channel No. 5 through contacts 59, 60. Then, even though keys 45 and 46 are both inadvertently left operated, a subsequent operation of key 44, or any of the other keys of the channels having priority over channels 5 and 6, will cause the channel having priority to be monitored.

The normal and proper operation of the monitoring system as already stated is to release the key of the channel being monitored prior to closing another key, but from the above description it will be apparent that in no case can the carelessness of the operator result in an impairment of the main program by paralleling two or more channels. The failure of an operator to release a key at worst results only in a continuation of monitoring on the prior channel when another channel is desired. This error would be detected immediately by the operator and he can then proceed to release the prior key to permit monitoring on the proper channel.

While the invention has been described with reference to a particular system and a particular arrangement of the monitoring circuit for purposes of illustration it will be understood that the invention is intended to be limited only by the scope of the following claims:

What is claimed is:

1. The combination with a plurality of independent program distribution channels and a receiver for monitoring the channels, of relays individual to the channels, means for selectively operating the relays, monitoring connections between the channels and the relays, and connections between one relay and the receiver including contacts on each of the other relays.

2. In a program distribution system, a central station, a plurality of distributing channels extending from the station, and monitoring means at the station comprising a receiver, relays individual to the channels, keys individual to and controlling the operation of the relays and connections between the receiver and the relays to prevent the receiver from being operated from more than one channel at a time when a plurality of keys are actuated.

3. In a program distribution system, a central station, a plurality of independent distributing channels extending from the station, a plurality of relays each associated with its corresponding channel, a key con-

trolling each relay and a monitoring receiver serially connected to the relays, each relay having contacts effective upon the operation of the relay for associating the receiver with the corresponding channel.

4. In a program distribution system, a central station, a plurality of independent distributing channels extending from the station, a plurality of relays each associated with its corresponding channel, a key controlling each relay, a monitoring receiver, a load simulating the receiver impedance associated with each relay and normally connected to each channel, connections between the receiver and one of the relays including contacts on each of the other relays, and contacts effective only when one relay is operated for connecting the receiver to the channel corresponding to the operated relay.

5. In a program distribution system the combination with a first program distributing channel, a monitoring receiver and means for associating the receiver with the channel, of a second independent channel, and means effective only when the receiver is not connected to the first channel for connecting the receiver to the second channel.

6. The combination with a plurality of independent program distribution channels and a receiver for successively monitoring the channels, of relay means connecting the receiver with one of the channels and means independent of said relay means for transferring the receiver successively to the other channels.

7. In a program distribution system, a plurality of independent distribution channels each comprising a program source, an amplifier, an output circuit for the amplifier including a multi-section potentiometer, a plurality of groups of receivers each associated with a section of the potentiometer, a monitoring receiver, a monitoring relay for each channel, monitoring conductors extending between one of the sections of each potentiometer and the corresponding relay, a key controlling each relay and contacts effective upon the operation of a relay for connecting the monitoring conductors terminated at the relay to the receiver.

8. In a program distribution system, a plurality of independent distribution channels each comprising a program source, an amplifier, an output circuit for the amplifier including a multi-section potentiometer, a plurality of groups of receivers each associated with a section of the potentiometer, and means effective when a group of receivers is disconnected from the potentiometer for maintaining substantially constant load on the amplifier, a monitoring receiver, a monitoring relay for each channel, monitoring conductors extending between one of the sections of each potenti-

ometer and the correspondingly relay and terminated at the relay by an impedance simulating the impedance of the monitoring receiver, receiver conductors serially connecting the relays with the monitoring receiver and contacts effective upon the operation of a relay for disconnecting the monitoring conductors from the receiver and connecting them to the receiver conductors.

In witness whereof, I hereunto subscribe my name this 16th day of November, 1931.

LEIGHTON B. COOKE.

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