Sept. 22, 1936. J. A. FRAZIER 2,054,933

RETURN SPEECH CONTROL

Filed Jan. 8, 1934 3 Sheets-Sheet 1

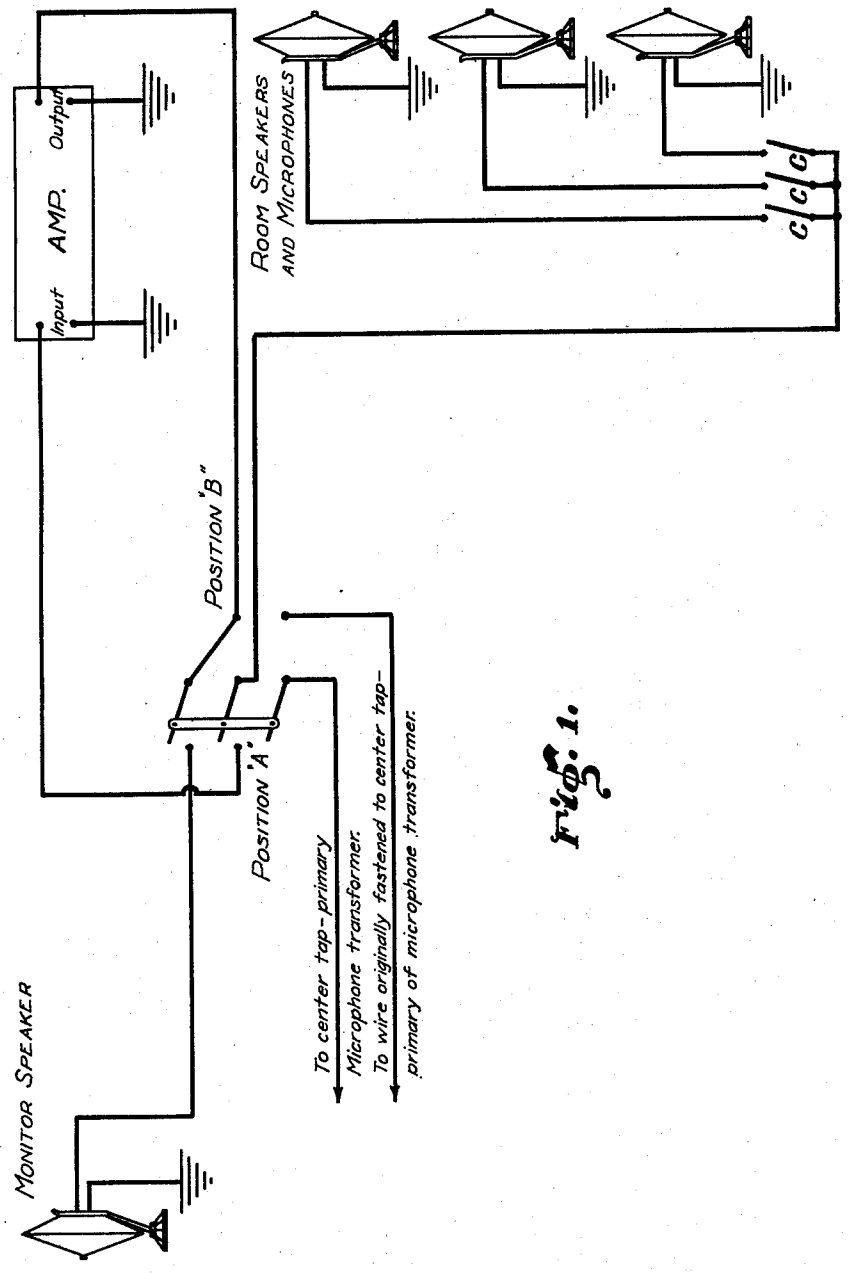


Fig. 1.

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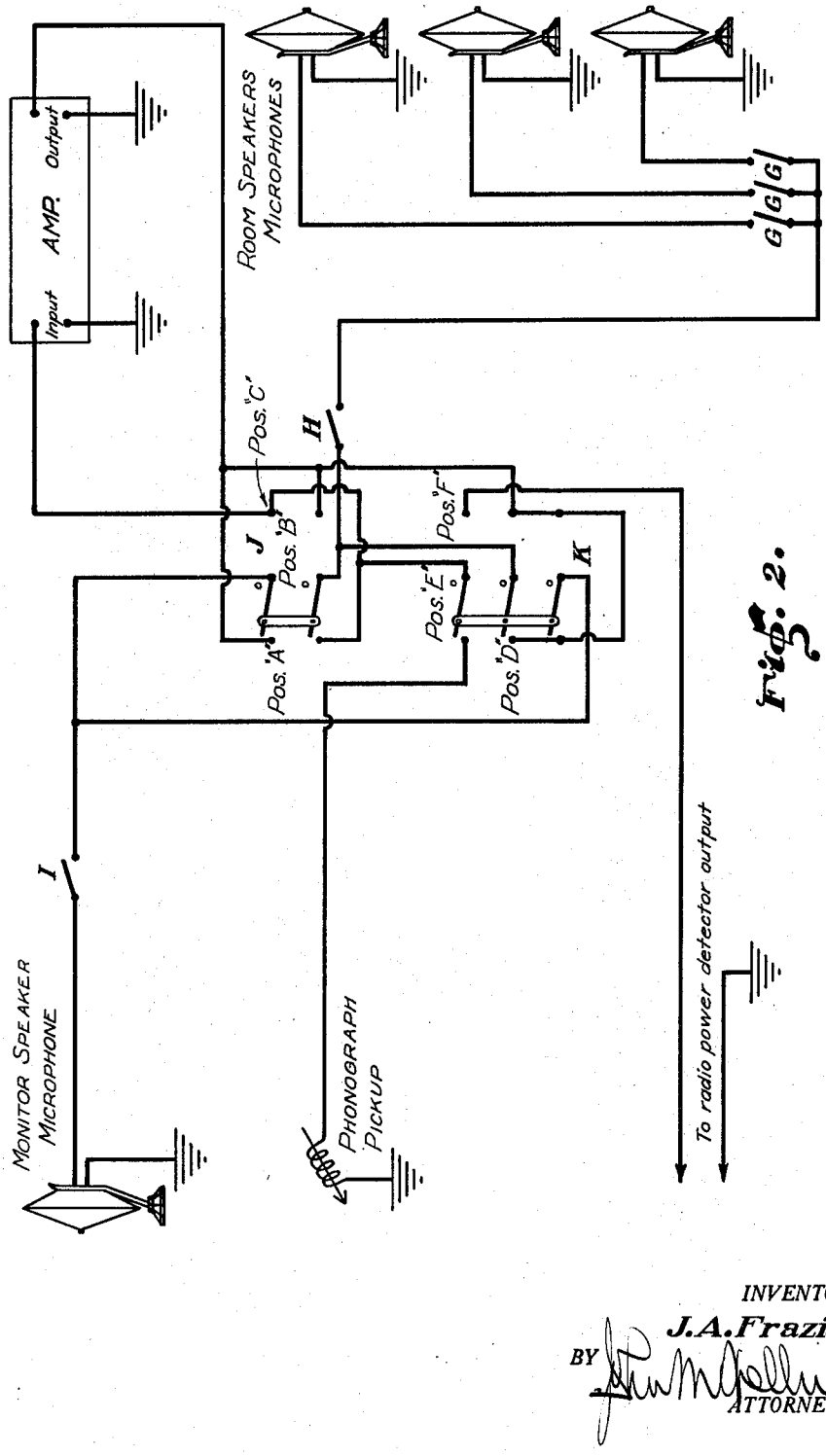


Fig. 2.

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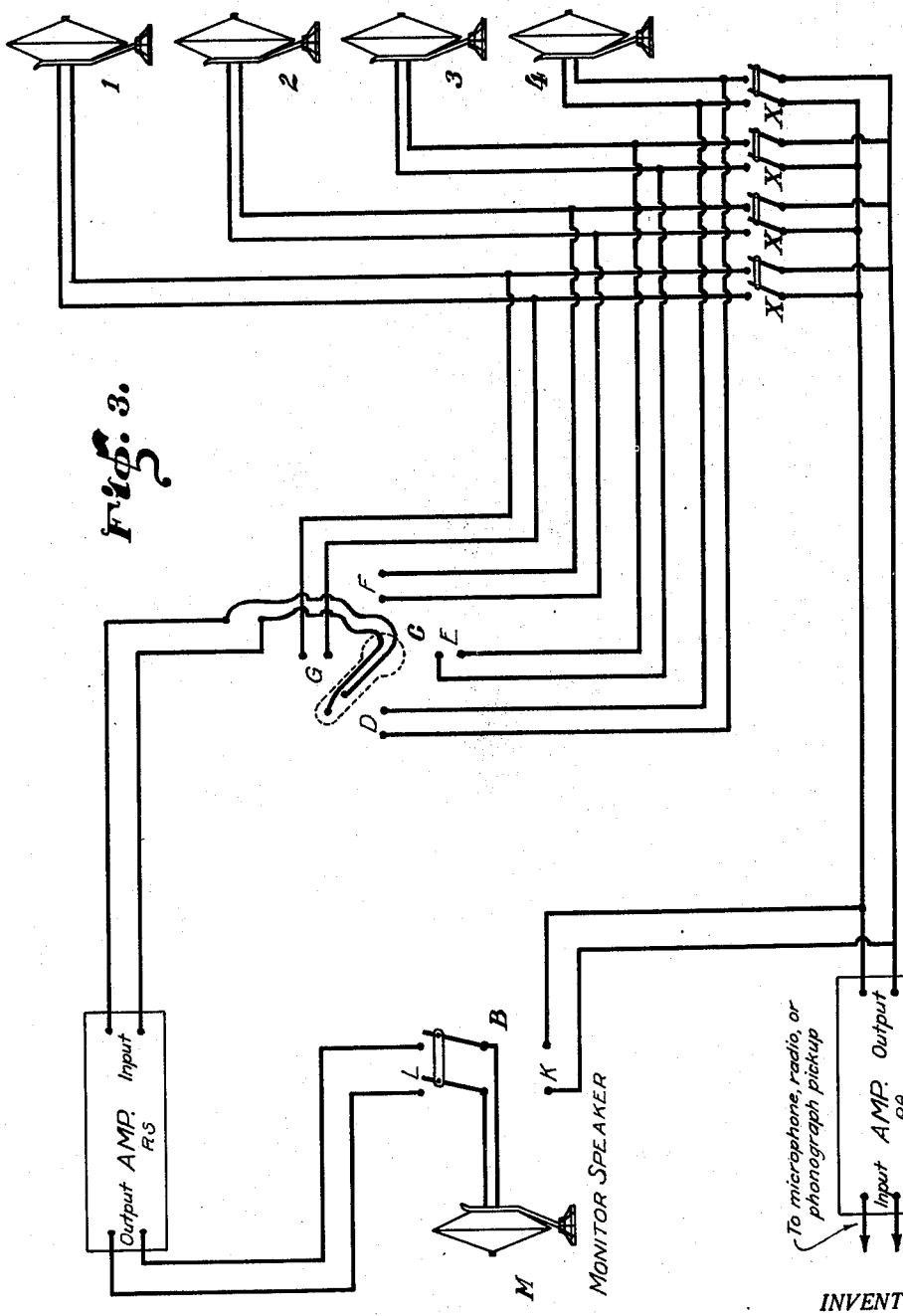


Fig. 3.

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2,054,933

RETURN SPEECH CONTROL

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Application January 8, 1934, Serial No. 705,788

2 Claims. (Cl. 179—1)

This invention relates to electrical sound transmission systems and more particularly to a system embodying the use of novel circuits, switches and arrangement of parts whereby sound may be electrically transmitted in both directions in the system at the pleasure of the person utilizing the novel controls of the system.

It is an object of the invention to provide for selective control of the transmitting and receiving stations.

A further object of the invention is the provision of novel switching arrangements whereby the system is greatly simplified and therefore easier and less expensive to manufacture.

Another object is the provision, in a monitoring system, of control devices whereby a control operator may have at all times absolute supervision of all receiving stations.

Other objects and advantages will appear in the following specification and the novel features of the invention will be particularly pointed out in the appended claims.

The development of electrical sound transmission systems and monitoring circuits has failed to provide a system allowing two directional transmission selectively controllable. The present invention is adaptable to the use of schools and other institutions where silent supervision and return speech control would be an impetus to efficiency.

The invention is illustrated in the accompanying drawings, forming part of this application, in which:

Figure 1 is a schematic drawing illustrating my invention as utilized in connection with public address systems and embodying monitor speaker and microphone controls;

Figure 2 is a view similar to that shown in Figure 1, but illustrating a modification thereof, whereby a radio power detector and a phonograph pick up may be selectively utilized; and

Figure 3 is a view similar to those above described but illustrating a further modification of the invention, wherein the control operator may selectively listen in to one of the receiving stations while not interfering in any manner with reception at the remaining stations. This modification also illustrates the use of separate amplification in the sending and receiving stations.

Referring to the drawings, which are common in the respect that the groups of loudspeakers illustrated therein are symbolic of speakers in different rooms, the number of rooms capable of being served being limited only by the capacity of the amplification units. It is, of course, to be understood that all of the various switches herein utilized are to be so placed as to centralize the control of the entire system.

In Figure 1, the control mechanism consists of one, double pole, double throw, toggle switch and one single pole, single throw toggle switch so mounted as to operate simultaneously.

The invention may be readily understood from a perusal of the following description taken in connection with the accompanying drawings and in Figure 1 the invention has been illustrated as used in connection with a public address system and is shown as being provided with a monitor speaker and microphone both provided with switches.

The operation of the system disclosed in Figure 1 is as follows:

When the control switch is in the position indicated at "A", the main line to the outside speakers is connected to the amplifier input. At this time the circuit to the microphone is open.

When the control switch is placed in the position indicated at "B", the monitor speaker is disconnected, the main line to the outside speakers is connected to the amplifier output and the circuit to the original microphone is closed.

This system accomplishes the following results: When the control switch is thrown to position "A" all of the room loudspeakers or outside speakers are connected to the amplifier input and serve as microphones only, to detect sounds throughout the rooms wherein they are located and reproduce them by means of the monitor speaker for the control operator. When the control is in position "B", the room loudspeakers are on amplifier output and serve as loudspeakers only.

The purpose of this system is to permit school superintendents and others operating the centralized control to have instantaneous two-way communication by switch selection with the various rooms wherein the speakers are located. The system also permits the selective listening in to various class room activities thereby conserving the time heretofore utilized in the personal supervision of class room activities. By the use of this

reverse amplification system, the same high gain amplification may be employed with room loudspeakers while they are serving as microphones as is used in the standard desk microphone utilized in all public address systems. By using a single unit to serve both as a loudspeaker and as a microphone, all danger of "feed back" from close proximity of microphone and speaker is entirely eliminated.

It is to be noted that no additional amplification is needed when the room speakers are used as microphones and that but a single switch is necessary for the speaker located in any one room, since the control switch disconnects the entire line from the input and connects it with the output of the amplifier.

The speaker microphones utilized in this invention are magnetic, permanent magnetic field dynamic or electro dynamic speakers when equipped with proper filtering devices in their field supplies.

In Figure 2, there is shown a system having all the qualities of the system above described but modified by the provision of a simplified arrangement of switches whereby radio, phonograph or microphone connections may selectively be made in addition to the control of the speakers as outlined in the description of the system disclosed in Figure 1.

The switching arrangement consists, as illustrated in the drawings, of one double pole double throw, three position switch "J"; one triple pole, double throw, three position switch "K" and a plurality of simple switches for the various room speakers.

When the switch "J" is in position "A", the monitor speaker is connected to the amplifier output and the main line controlling all of the room loudspeakers is connected to the amplifier input and at this time the loudspeakers are serving as microphones. When the switch J is in the position indicated at "B", no connections are made thereby. When in the position indicated at "C", the monitor speaker is connected to the amplifier input and serves as a microphone and the main line feeding the room speakers is connected to the amplifier output. Therefore, the functions of the amplifier with the control switch at position "C" are the reverse of those with the switch at position "A."

In order for the switch J to function, it is necessary to first place switch K in neutral position and likewise, the switch J should be placed in neutral position when it is desired to operate switch K.

When the switch K is in the position indicated at "D" a phonograph is connected to the amplifier input and both the monitor speaker and the main line feeding the room speakers are connected to the amplifier output. When switch K is in the position indicated at "E", no connections are made. When in the position indicated at "F", a radio receiver power detector output is connected to the amplifier input and the monitor speaker and main line feeding the room speakers are connected to the amplifier output.

From the above, it will be noted that this system is similar to that disclosed in Figure 1, but that the necessity of a desk microphone and microphone transformer have been eliminated.

In Figure 3, there is disclosed a still further modification and the particular embodiment shown in the drawings shows the system connected to a standard public address system.

The amplifier, in its preferred form, in this instance is of the three stage type of high gain and is connected directly by means of flexible wires or the like to the two contacts of a rotary switch arm C, the contacts being insulated one from the other.

When the arm is rotated, the contacts make direct connection with line points D, E, F and G, so that the corresponding room loudspeakers 1, 2, 3 and 4 are connected directly to the input of the return speech amplifier.

When the public address system is connected to all of the room speakers, through individual switches x, the contact arm C must be set in a neutral position.

A monitor speaker M is connected to the arm contacts of a double pole, double throw switch B.

When thrown to the position indicated at K, the monitor speaker is connected to the output of an amplifier PA in order to monitor programs transmitted over the public address system. When thrown to the position indicated at L, the monitor speaker is connected directly to the output of a return speech amplifier RS and must remain in this position while the operator is listening to sounds picked up by room loud speakers 1, 2, 3 or 4 as selected by the rotary switch C through the contacts D, E, F or G.

It will be noted that the system last described differs from the foregoing two modifications in that the operator may transmit radio, phonograph or public address system transmissions through the amplifier PA to the room loud speaker 4, for example, while disconnecting all remaining x switches except that one controlling speaker 4 and by then throwing switch B to position L may listen to the activities in the rooms having the speakers 1, 2 and 3 as selected through switch C.

While three forms of the invention have been shown and described herein, it will be apparent to those skilled in the art that the invention is not so limited but that various minor changes may be made therein without departing from the spirit thereof or the scope of the appended claims.

What is claimed is:

1. In a program distribution system, a plurality of independent distributing channels, a combined microphone transmitter and loud speaker receiver associated with each of said channels, an amplifier, an input circuit for the amplifier, switch means for selectively connecting the amplifier input circuit to each of the combined microphone transmitters and loud speaker receivers, and an output circuit for said amplifier, a monitoring receiver and transmitting microphone, a second amplifier being connected to a pick-up of sound transmission from an outside source, an output circuit for the second amplifier being in circuit with the combined microphone transmitters and loud speaker receivers, a second output circuit associated with the said second amplifier, and said monitoring receiver and transmitting microphone having switch means, and the said switch means adapted to connect the monitor with the first mentioned amplifier to perform as a receiver, or to connect the monitor with the second mentioned amplifier to perform as a microphone.

2. In a program system, a plurality of independent distribution channels, a combined microphone transmitter and loud speaker receiver associated with each of said channels, an amplifier, an input circuit for the amplifier, switch means for selectively connecting the amplifier input circuit to each of the combined microphone

transmitters and loud speaker receivers, and an output circuit for said amplifier, a monitoring receiver and transmitting microphone, a second amplifier being connected to a pick-up of sound transmission from an outside source, an output circuit for the second amplifier being in circuit with the combined loud speaker receivers and microphone transmitters, switch means in the output circuit of the second amplifier adapted to connect either one or all of the combined loud speaker receivers and microphone transmitters with the pick-up of sound transmission from an outside source, a second output circuit associated with the said second amplifier, the said monitoring receiver and transmitting microphone having switch means, and the said switch means adapted to connect the monitor with the first mentioned amplifier to perform as a receiver, or to connect the monitor switch with the second mentioned amplifier to perform as a microphone.

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