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B. S. McCUTCHEN

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PUBLIC ADDRESS SYSTEM

Filed Dec. 12, 1925

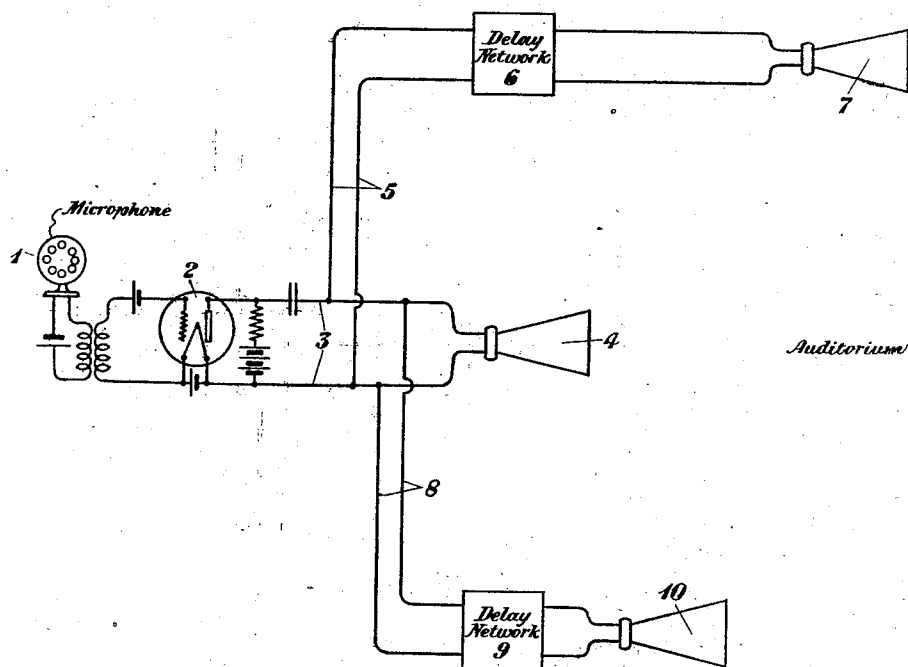


Fig. 1

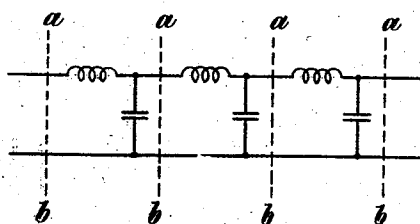


Fig. 2

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## UNITED STATES PATENT OFFICE.

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## PUBLIC-ADDRESS SYSTEM.

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This invention relates to communication systems, and more particularly to improvements in so-called public address system in which one or more loud speakers may be utilized.

In systems of this type it may take an appreciable length of time for the voice of the speaker to travel from the platform to the various parts of the auditorium or grounds on which the address is being delivered. In instances wherein a loud speaker might be located at a considerable distance from the platform this acoustic delay in the air path of the speech might cause a bad blurring or echo effect to a listener near the loud speaker. Accordingly it is one of the primary objects of this invention to introduce an electrical delay in the circuit of the loud speaker to compensate for the acoustic delay to the speech existing in the air path. With such an arrangement the listener will not receive the speech from the horn in advance of the direct speech from the speaker with the attendant bad effect, but will receive the speech from the horn in the same phase with and at the same time as the direct speech from the speaker. The arrangements of the invention also provide distinct advantages from the standpoint of flexibility of location of the loud speakers for with the arrangements of the invention the loud speakers may be located at much greater distances than heretofore from the speaker. The greater distance at which the loud speaker may be located tends to reduce the existence of singing in the apparatus and hence the loud speakers may be operated at higher volume levels. Accordingly, the arrangements of the invention tend to reduce singing, allow increased volume in the operation of the loud speakers, and also afford greater flexibility in their location. Other objects and features of the invention will appear more fully from the detailed description thereof hereinafter given.

The invention may be more fully understood from the following description, together with the accompanying drawing, in the Figures 1 and 2 of which the invention is illustrated. In Fig. 1 is a circuit diagram of one form of the arrangements of the invention and in Fig. 2 are shown details of the electrical retarding devices.

In Fig. 1 is shown a microphone, or transmitter, 1 which might be located at a plat-

form or any desirable spot of an auditorium, or grounds, on which an address or other message or musical composition is to be delivered. The microphone may be connected to an amplifier 2. The output circuit of the amplifier is shown as circuit 3. Connected to circuit 3 is the circuit 5 leading to the loud speaker 7 which would be located at some distance away from the microphone and speaker. If the distance from the microphone at which the loud speaker 7 is located is found to be great enough so that an acoustic delay in the air path will cause the direct speech to arrive at this position sufficiently later than the speech from the loud speaker 7 to cause a blurring or echo effect, the delay network 6 will be inserted in circuit 5 to compensate for this delay. In the case of a loud speaker, such as 4, located in close proximity to the microphone no such delay circuit would be provided. The loud speaker 4 might even be omitted if desired. Associated with circuit 3 might be other circuits, such as the circuit 8, leading to other loud speakers, such as 10, located at other positions on the grounds. A delay network, such as 9, might be found desirable in the circuit 8 if the loud speaker 10 were located at a sufficient distance from the speaker and microphone 1. In Fig. 2 is shown a suitable type of delay network to be utilized in the loud speaker circuits, such as 5 and 8. The delay networks consist of a number of sections comprising inductance and capacity in series. The individual sections are shown between the dotted lines a, b. The delay networks, such as 6 and 9, will comprise a variable number of these sections depending upon the amount of acoustic delay in the air path which they are desired to compensate.

While the arrangements of the invention have been illustrated in certain specific forms which are deemed desirable, it is understood that they are capable of embodiment in many other widely varied forms without departing from the spirit of the invention as defined by the appended claims.

What is claimed is:

1. In a public address system a transmitter circuit, a plurality of circuits associated therewith including loud speaking receivers located at various distances from said transmitter, and delay networks in certain of said circuits.

2. In a public address system a circuit including a transmitter, a loud speaking receiver in said circuit located in close proximity to said transmitter, a second circuit associated with said first circuit and including a loud speaking receiver located at a relatively greater distance from said transmitter than said first loud speaking receiver, and electrical retarding means in said second circuit.

3. A circuit including a transmitter, an amplifier and a loud speaking receiver, said loud speaking receiver being located in relatively close proximity to said transmitter, a second circuit associated with said first circuit and including a loud speaking receiver located at a relatively greater distance from said transmitter than said first receiver, and means in said second circuit to so retard the

currents transmitted thereover that both of said loud speaking receivers will operate in the same phase.

4. A circuit including a transmitter and a loud speaking receiver, said loud speaking receiver being located at a distance from said transmitter so great that an appreciable difference will exist between the acoustic delay in the air path between said transmitter and said loud speaking receiver and the electrical delay in said circuit interconnecting said transmitter and said loud speaking receiver, and means for introducing electrical delay in said circuit to compensate for the acoustic delay in the air path.

In testimony whereof, I have signed my name to this specification this 10th day of December, 1925.

BRUNSON S. McCUTCHEN.