

March 19, 1963

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3,082,295

PANORAMIC MIXER

Filed Feb. 12, 1960

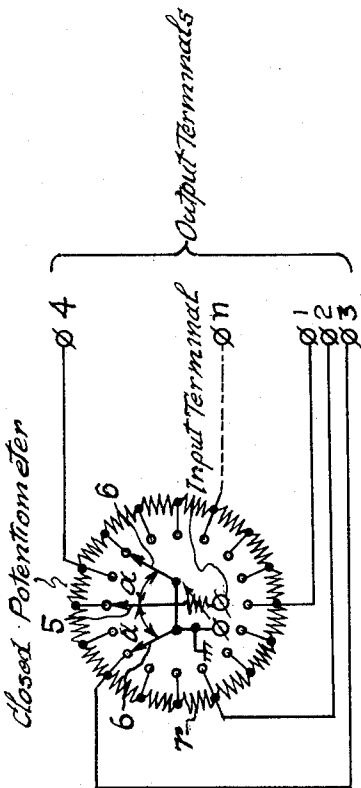


Fig. 1

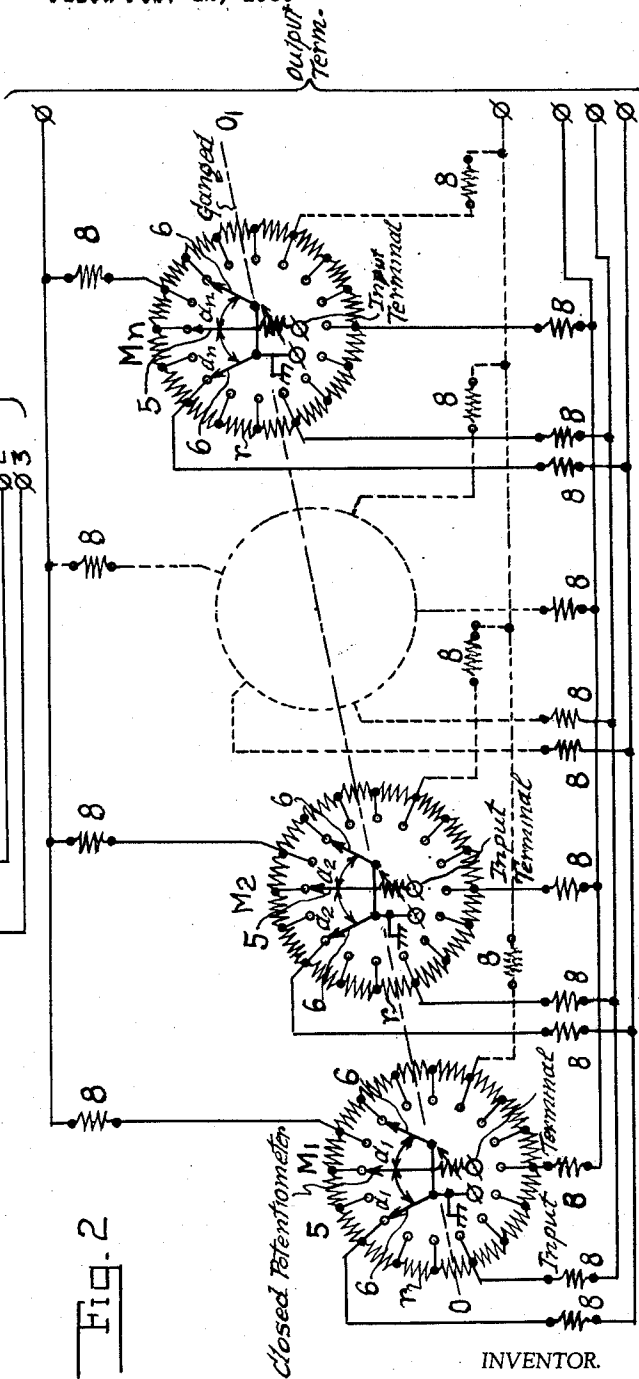


Fig. 2

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Filed Feb. 12, 1960, Ser. No. 10,833

4 Claims. (Cl. 179-1)

The present invention relates to an audio signal mixer for selectively distributing a signal from a single channel source to a plurality of output channels.

In a multi-channel system of sound transmission, the stereophonic effect is obtained by employing separate microphones in each recording channel and respective loudspeakers for sound reproduction.

Shifting of the sound source in the operating zone of the microphones, connected in the above manner, provides, upon reproduction, a resulting effect of sound localization by the respective loudspeakers.

In a number of cases, for example, in taking cine-panoramic, wide frame, wide screen and other types of films with multi-channel sound, it is frequently convenient and practical to record sound by the usual single-channel method followed by multi-channel rerecording of the sound. In this case, the recorded signal may be distributed between all or several channels with a predetermined degree of sound localization in conformity with the wish of the producer.

This objective may be attained with the help of an audio signal mixer constructed in accordance with this invention.

The existing types of audio signal mixers for this purpose, represented by open potentiometers, do not offer the possibility of creating the effect of shifting the sound source along the entire perimeter of the hall, or along any closed line of location of loudspeakers, and the degree of sound localization remains constant.

The audio signal mixer of this invention is free from these shortcomings.

To create the effect of shifting the sound source along the entire perimeter of the hall, this audio signal mixer is represented by a closed potentiometer which has output taps, the number of which is the same as the number of desired reproduction channels. The potentiometer is supplied with three moving contacts which are shifted simultaneously. One of these contacts is connected to the input signal source, while the other two are grounded.

The degree of sound localization may be changed by making the outer contacts movable with respect to the center contact.

It is possible to use several potentiometers, the like output taps of which are connected in parallel to the like reproduction channels, the moving contacts being ganged by suitable means for simultaneous operation. This type of audio signal mixer makes it possible to obtain the stereophonic effect from a single signal source.

A further increase in the creative possibilities may be obtained by connecting into each input channel of a plurality of potentiometers, ganged for simultaneous operation, a single closed potentiometer.

Further objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawing wherein:

FIG. 1 is a diagrammatic view showing a single closed potentiometer constructed in accordance with this invention, together with the input and output connections for using the same as an audio signal mixer; and

FIG. 2, a diagrammatic view showing a modified ar-

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angement utilizing a plurality of closed potentiometers connected in parallel.

FIG. 1 shows the circuit of a closed potentiometer consisting of a plurality of resistors "r" connected in series with output taps 1, 2, 3 . . . n to which are connected audio-frequency output channels which may for instance, be connected to recording amplifiers of a multi-channel magnetic sound recorder or amplifiers directly driving loudspeakers, the number of such amplifiers being sufficient to obtain the desired distribution of the sound as well as providing a stereophonic effect.

Three movable contacts are provided in the potentiometer: center contact 5 being connected to the input signal source and two outer contacts 6 being grounded.

The signal is consequently fed only to the channels connected to the output taps in the potentiometer sector between contacts 6-5-6.

The angle between the shifting contacts may assume any values within the limits $n > \alpha > 0$, which varies the number of channels simultaneously receiving the signal; the degree of sound source localization is thus changed.

The value of resistance r depends upon electrical parameters of the stages in which the mixer is connected, and also depends upon the α angle.

The effect of stereophonic movement through an arc may be obtained by means of several single closed potentiometers, the movable contacts of which are ganged for simultaneous operation by a shaft O-O or by other suitable means. The circuit for this modified system is shown in FIG. 2. The matching of potentiometers $M_1, M_2 \dots M_n$ is provided by loading resistors 8.

Single closed potentiometers, not shown in the circuit of FIG. 2, may be connected into each input channel of the potentiometers ganged for simultaneous operation.

Changing the order of connecting the output channels to the mixer, both in the single-channel mixer and in the multi-channel stereophonic mixer provides added possibilities of control.

To adjust the level of the input signals a suitable attenuator may be connected into each input circuit.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is shown in the drawing and described in the specification, but only as indicated in the appended claims.

What is claimed is:

1. An audio signal mixer comprising a closed potentiometer, a plurality of output taps on said potentiometer at angularly spaced points, said output taps being connected to a plurality of output channels, a first movable contact connected to an input signal source and a pair of movable contacts movable simultaneously with and in fixed angular relationship with said first movable contact, said pair of contacts being grounded and one of said pair of contacts being disposed on one side of said movable contact and the other of said pair of movable contacts being disposed on the opposite side of said first movable contact.

2. An audio signal mixer as defined in claim 1 in which the angular spacing between said pair of movable contacts and said first movable contact may be varied.

3. An audio signal mixer as defined in claim 1 in which the output taps of a plurality of closed potentiometers are connected in parallel to the output channels, a separate input channel being connected to the first movable contact of each potentiometer and means for simultaneously moving all of the movable contacts.

4. An audio signal mixer as defined in claim 1 including a single closed potentiometer and a plurality of

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closed potentiometers, the output taps of said single potentiometer being connected to the first movable contacts of said plurality of potentiometers, the output taps of said plurality of potentiometers being connected in parallel to the output channels and means for simultaneously moving all of the movable contacts on said plurality of potentiometers. 5

4**References Cited in the file of this patent****UNITED STATES PATENTS**

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