

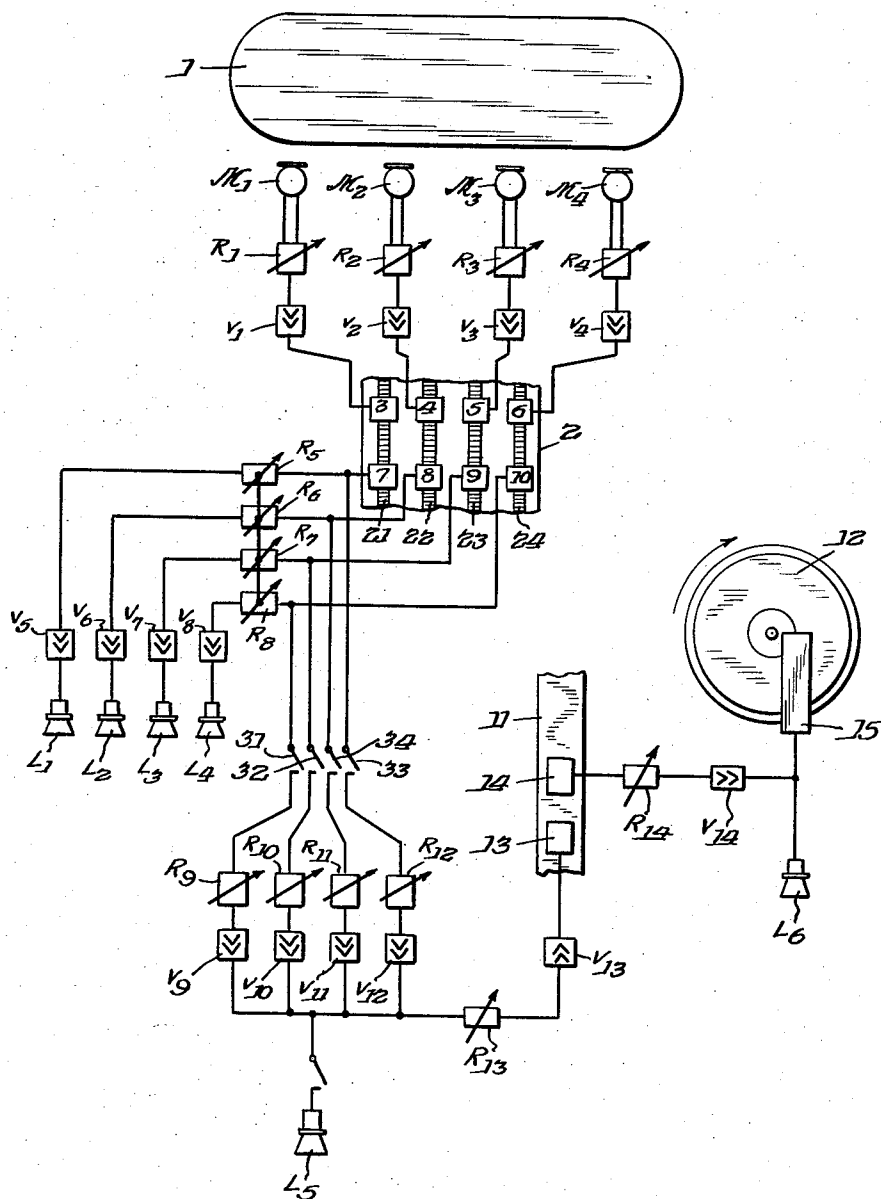
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APPARATUS FOR RECORDING ORCHESTRAL SOUND

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APPARATUS FOR RECORDING ORCHESTRAL SOUND

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5 Claims. (Cl. 179—100.1)

This invention is concerned with a method of and apparatus for recording sound, especially orchestral music and the like.

In the recording of orchestral music and the like, upon gramophone records or tape, it was customary until now to use a plurality of microphones disposed opposite the orchestra, so as to obtain after mixing of the sounds from the individual microphones, a faithful and artistically high-grade reproduction. An intermediate magnetic carrier was for this purpose employed. Upon the magnetic track of this intermediate carrier were recorded the currents coming from the individual microphones, after mixing such currents, the mixed sounds being acoustically controlled during the recording thereof. This control made it possible for the operator to regulate separately, by means of suitable regulators, the currents coming from the individual microphones, thereby as desired or necessary emphasizing or weakening the currents coming from one or the other of the microphones. This known procedure or method has proved suitable and has been generally accepted in practice.

In accordance with the invention, a further improvement is effected by initially carrying out the recording upon the intermediate carrier on multiple tracks thereof which are respectively associated with the recording devices, for example, with the microphones. The sounds which are in this manner separately recorded are thereupon delivered to a mixing device, by reproduce heads respectively associated with the magnetic tracks, the mixing device permitting separate regulation of the currents delivered by the individual magnetic heads. The sounds which are in this manner regulated are mixed and recorded. The individual microphone currents are thereby in known manner advantageously separately regulated during the recording which is effected with simultaneous acoustic control. This control may be carried out by reproducing the individual microphone currents, or rather the recordings thereof, during the recording, mixed, on a single loudspeaker. It is however recommended to allot to each microphone a separate loudspeaker which reproduces the corresponding recording upon the associated magnetic track, and to arrange these loudspeakers spatially in accordance with the disposition of the microphones in such a manner, that the operator hears a stereophonic reproduction of the orchestra which is as faithful as possible.

After the sounds recorded by the individual microphones are recorded upon the various magnetic sound tracks of the intermediate carrier, there will be effected the mixing of these sounds, whereby the sounds coming from the individual sound tracks may be separately independently regulated.

It is in this manner possible to rectify shortcomings of the regulation resulting during the recording, for example, due to lack of time, and to obtain thereby an artistically particularly high-grade reproduction of the orchestra after the mixing of the currents coming from the individual magnetic sound tracks. The mixture produced in this

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way is thereupon transmitted either directly to the gramophone record or to a tape.

It is recommended, especially in the production of gramophone records and the like mechanical recordings, to carry out the recording of the mixed sound complex initially in known manner upon a multiple track intermediate magnetic sound carrier and to use the resulting recording for the production of the gramophone records. Accordingly, two intermediate sound carriers are used for the production of gramophone records, one of said carriers being a multiple track carrier and the other a single track carrier.

The various objects and features of the invention will appear from the description which is rendered below with reference to the accompanying drawing showing in diagrammatic representation a preferred embodiment of the invention.

In the drawing, numeral 1 indicates a single unitary sound source, for example, an orchestra. Facing the orchestra are four recording microphones M_1-M_4 . Associated with each microphone is a regulator, as indicated at R_1-R_4 . The regulated microphone currents are amplified in respectively associated amplifiers shown at V_1-V_4 . Numeral 2 indicates an intermediate magnetic recorder or carrier providing for four magnetic sound tracks 21-24. This carrier moves during the recording underneath the record heads 3-6 which record the sounds coming from the individual microphones M_1-M_4 , separately upon the tracks 21-24. The sounds being recorded are in the above noted manner acoustically controlled by the use of the regulators R_1-R_4 , which are adjustable by the operator.

This acoustic control may be effected in various ways. Particularly suitable is the control by means of reproduce heads indicated at 7-10. The currents produced by these reproduce heads, responsive to motion of the intermediate carrier 2 relative thereto, are respectively conducted to the amplifiers V_5-V_8 and are respectively reproduced by the associated loudspeakers L_1-L_4 , which may be preferably individually switched in and out by suitable switching means omitted from the drawing to keep it simple. The placement of these loudspeakers corresponds sensibly to the placement of the microphones M_1-M_4 so that they reproduce the sounds of the orchestra faithfully and stereophonically.

In the lines from the reproduce heads 7-10 to the amplifiers V_5-V_8 , there are provided regulators R_5-R_8 which are suitably mutually coupled so that they may be adjusted in common to desired identical values, by common handle means or the like, thereby avoiding distortion of the sound complex to be recorded, coming from the microphones M_1-M_4 . The sound complex accordingly remains unaltered, that is, the reproduction by the loudspeakers L_1 to L_4 is effected without emphasis or weakening of one or the other recordings from the individual sound tracks.

After producing the intermediate sound carrier 2 as above described, the recorded sounds are mixed. Switches 31-34 are for this purpose provided, which are closed, while the loudspeakers L_1-L_4 are disconnected if desired. The currents produced responsive to motion of the magnetic tape underneath the reproduce heads 7-10, are respectively conducted to the amplifiers V_9-V_{12} by way of the regulators R_9-R_{12} . The output currents from these amplifiers are mixed and, if desired, suitably reamplified in common, may be reproduced in a loudspeaker L_5 . The listening operator is now in a position to regulate the individually recorded sounds of the corresponding sound tracks 21-24 by adjustment of the regulators R_9-R_{12} , independent of the original recording thereof, so as to produce a particularly high-grade reproduction of the orchestral sounds.

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The sound mixture thus produced may be recorded upon the intermediate magnetic carrier 11 or directly upon the gramophone record 12, if desired, with repeated regulation by the regulator R_{13} and amplification at V_{13} .

The recording of the sound mixture upon the intermediate magnetic carrier 11, by means of the record head 13 is, however, preferred. This recording may be controlled by the use of a reproduce head 14. The currents coming from this reproduce head may be regulated by means of the regulator R_{14} , thereupon amplified at V_{14} , and may serve, as schematically indicated in the drawing, for acoustic reproduction in the loudspeaker L_6 and for actuation of the cutting mechanism 15 for the record disk 12.

It may be mentioned that the recording devices, shown as single microphones, may be respectively formed by several microphones which may, for example, be connected in parallel.

In carrying out the invention, it may be desirable to play back the multiple track intermediate carrier in a separate apparatus, to the sound carrier having the single sound track. It is further recommended to use for an intermediate carrier a perforated film, that is, a film having sprocket perforations along one or both margins, preferably a longitudinally split normal film, carrying the four sound tracks, and to drive it with a speed customary for such sound films.

Changes may be made within the scope and spirit of the appended claims.

I claim:

1. In a system for recording sounds emanating from a single unitary source such as an orchestra, means forming a plurality of first transmission channels for simultaneously picking up sounds emanating from spatially separated portions of said single sound source and for transmitting such sounds, a magnetic carrier, a record head for each first channel cooperating with said magnetic carrier for simultaneously recording upon respectively different tracks thereof the sounds respectively transmitted over said first transmission channels, a plurality of second transmission channels, a reproduce head for each second channel cooperating with said magnetic carrier for respectively picking up the sounds recorded

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on the tracks thereof by said first-named record heads, means in each second transmission channel for separately regulating the sounds picked up by the corresponding reproduce heads, means for mixing the sounds transmitted over said second transmission channels, and means for recording said mixed sounds on a single reproduce member as a unitary reproduction of said sound source.

2. A system and cooperation of parts according to claim 1, comprising loudspeakers disposed in a spatial arrangement simulating that of the spatially separated portions of said sound source for audibly producing the sounds picked up by said reproduce heads.

3. A system and cooperation of parts according to claim 1, comprising a loudspeaker for reproducing said mixed sounds incident to the recording thereof as a unitary production of said sound source.

4. A system and cooperation of parts according to claim 1, comprising loudspeakers disposed in a spatial arrangement simulating that of the spatially separated portions of said sound source for audibly producing the sounds picked up by said reproduce heads, and a loudspeaker for reproducing said mixed sounds incident to the recording thereof as a unitary production of said sound source.

5. A system and cooperation of parts according to claim 1, wherein the means for recording said mixed sounds comprises a further magnetic carrier, means for recording the mixed sounds upon said further carrier, means for picking up the mixed sounds from said further carrier, a record disk, means for impressing upon said disk the mixed sounds picked up from said further magnetic carrier, and a loudspeaker for reproducing said mixed sounds incident to impressing such sounds upon said record disk.

References Cited in the file of this patent

UNITED STATES PATENTS

2,083,385	Maxfield	June 8, 1937
2,246,593	Israel	June 24, 1941
2,273,866	Holst	Feb. 24, 1942
2,733,301	Bradbury	Jan. 31, 1956