APPARATUS FOR STEREOPHONIC SOUND REPRODUCTION

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Fig. 1.

Fig. 2.

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In stereophonic recording and reproduction of sound it is necessary that both the microphones and the loudspeakers should be arranged so that they are relatively spaced from each other in order that there may be a distinctly perceptible difference of volume and/or tone in the sound produced in each of the loudspeakers. If on the reproduction side a correct representation of the record or picked up sound is to be obtained, the conditions under which the record or picked up sound was obtained have to be taken into account as much as possible. That is to say the position of the microphones relatively to the original source or sources of sound must be simulated as much as possible at the loudspeaker end. In addition, the position and the extensiveness of the audience and also the distance of the audience from the loudspeakers will be important so as to ensure that the audience receives a correct impression of the stereophonic effect. In all cases in which the conditions under which the sound was recorded are completely known, it will be possible to take the desiderata into account. Thus for example the more distant the audience is, the larger will have to be the spacing between the loudspeakers in order that the same impression of space effect may be received by the audience.

However, cases are imaginable in which on the reproduction side there is ignorance of the conditions under which the stereophonic record was obtained, as for example in the case of radio-telephonic sound transmission or of playing stereophonic gramophone records. In such cases sound reproduction will generally ensue under conditions not corresponding to those during recording. It has been found that the possibility of correctly correlating the conditions under which reproduction is effected, to the conditions during recording, are of prime importance for the effect of the stereophonic reproduction.

According to the invention, for this purpose the apparatus for stereophonic sound reproduction is characterized by a cabinet in which the electric part of the apparatus is housed, and by at least two relatively adjustable loudspeakers integral with this cabinet and each communicating with one of the channels of the electric apparatus.

The use of this cabinet with adjustable loudspeakers permits varying the conditions on the reproduction side as desired so that an optimum effect of the stereophonic reproduction may be produced on the audience. If the size of the audience and the distance from the reproduction apparatus renders it necessary the loudspeakers may be given a larger relative spacing. Preferably, they are adequately fitted on the cabinet so as to allow their relative spacing to exceed the largest dimension of the cabinet.

The construction herebefore described may be applied to sound reproduction apparatus of differing kinds, such as wireless sets for the reception and reproduction of two channels which jointly form a stereophonic sound transmission. The invention is also applicable to gramophone reproduction apparatus either in conjunction with a projected image or not.

It is known to fit one or more loudspeakers on the cabinet of sound reproduction apparatus, for example a wireless set, that they are adjustably fitted on a panel constructionally associated with the cabinet of the set. These well-known constructions have for their purpose to obviate the difficulties inherent in the directional effect of the radiated sound waves which increases with frequency, by displacement of the loudspeaker. In contradistinction to this prior knowledge, the invention has for its object to bring out in optimum manner the stereophonic effect based on the directional effect of the reproduced sound waves.

In order that the invention may be clearly understood and readily carried into effect it will now be described more fully with reference to the accompanying drawing in which one embodiment is illustrated.

Figure 1 is a front perspective view of an apparatus for stereophonic reproduction of sound embodying the present invention, and

Figure 2 is a rear perspective view of the apparatus shown in Figure 1 but on a reduced scale.

Referring to the figures of the drawing, 1 designates the cabinet of a wireless set. This wireless set comprises two channels for electric transmission of the received modulated carrier wave or waves to the loudspeakers. Depending on the used system of radio-telephonic transmission of a plurality of channels, these channels may either be united in the high-frequency part of the apparatus or not. The low-frequency part is separated and comprises two individual channels for the supply of at least two loudspeakers 4 and 5 spaced some distance apart.

The cabinet is provided on the front side with two slidable panels 2 and 3 which, in the form of sliding doors, are adapted to close the front side of the cabinet. The rear side of the cabinet is closed by the usual panel 10 having the conventional aperture 12 wherein. The thickness of
the panels is such as to enable each of them to accommodate a loudspeaker 4 and 5 respectively. These loudspeakers are connected to the electric part of the wireless set by means of flexible leads. For the reproduction of stereophonically transmitted radio broadcasting the panels 2 and 3 and the loudspeakers 4 and 5 housed therein may be pushed apart in order to correlate the spacing between the loudspeakers to the conditions during recording and reproduction. With a usual cabinet length of 80 cms. the centre lines of the loudspeakers 4 and 5 are about 40 cms. spaced apart when the panels are completely pushed in. This arrangement suffices for the reproduction of music from a trio or of one or two speakers from a small studio when at the same time the audience is at a distance of no more than one metre from the wireless set. With the same conditions on the recording side and the presence of a plurality of auditors distributed about a large living room so that the distance from the loudspeakers can increase to 4 meters the two panels 2 and 3 have each to be pushed out at least half. For the reproduction of large orchestras it is preferable that the two panels should always be pushed apart as far as possible so that the spacing between the loudspeakers is about 1.5 m. At the back of the slidable panels 2 and 3 are arranged a tuning knob 7 and a tuning dial 8 for the control of the wireless set. The panels 2 and 3 consequently also serve as closing doors for the cabinet of the set.

The panels 2 and 3 are also edge screens for the loudspeakers 4 and 5. The panels are therefore not entirely closed at their rear sides, but coated with a partially sound damping substance such for example as a perforated card-board plate or a coarse-meshed fabric. The surface of these panels is important in connection with the frequency characteristic of the loudspeaker, particularly for the reproduction of the low tones. In order that the size of the panels, and thus also the height dimension of the cabinet, may be limited, the loudspeakers 4 and 5 are only intended for the reproduction of the frequency band above 250 cycles/sec. For the frequency band below 250 cycles/sec. the cabinet of the set comprises one loudspeaker 8 which is only supplied from one of the channels of the stereophonic sound transmission. This is not detrimental to the stereophonic effect because due to the absence of the directional effect the sound waves below 250 cycles/sec. practically do not assist in the stereophonic effect. The cabinet has itself suffi-

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