

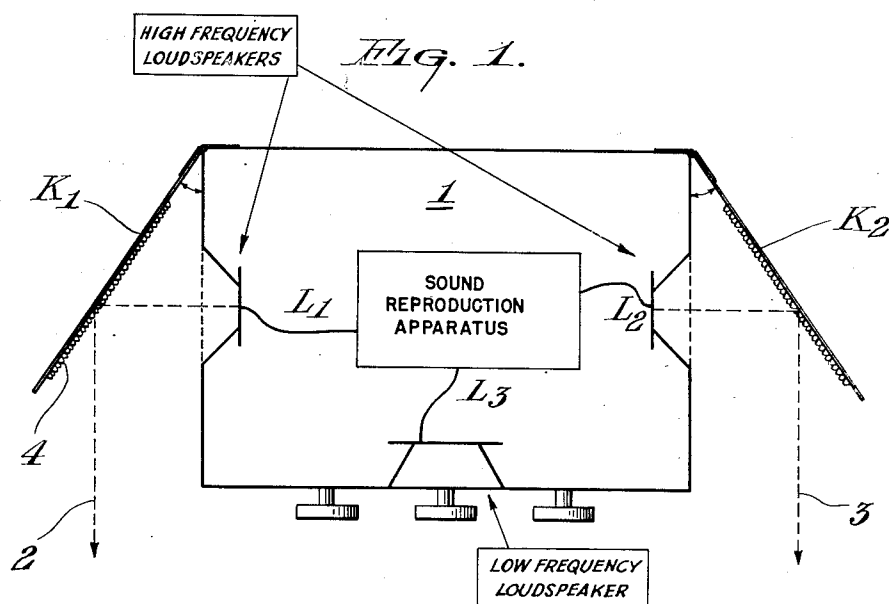
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K. DE BOER

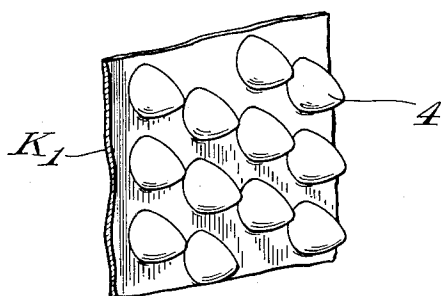
2,610,694

STEREOPHONIC REPRODUCTION APPARATUS

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*Fig. 2.*



INVENTOR.  
KORNELIS DE BOER  
BY  
*[Signature]*  
ATTORNEY.

## UNITED STATES PATENT OFFICE

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STEREOPHONIC REPRODUCTION  
APPARATUS

Kornelis de Boer, Eindhoven, Netherlands, assignor, by mesne assignments, to Hartford National Bank and Trust Company, Hartford, Conn., as trustee

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5 Claims. (Cl. 181-31)

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This invention relates to stereophonic reproducing apparatus in which at least two spaced loudspeakers are used. Such apparatus may be used, for example, in radio or phonograph sets.

The spacing between the loudspeakers is known to be very important in producing a stereophonic effect. The larger the spacing is, the greater is the effect. It may also be desirable to vary the spacing in view of variations in size of the original sound source. If, for example, the sound of a large band or orchestra is being reproduced, it is desirable to increase the volume of the sound image during reproduction over that of a small orchestra.

Generally, it is most desirable to minimize the size of the reproduction apparatus in order to obtain a compact arrangement. Prior attempts in achieving this goal in stereophonic reproducing systems include the mounting of two loudspeakers on extension panels, which were preferably fitted on the front wall, to vary the spacing between the loudspeakers in accord with the desired stereophonic effect.

However, this form of construction has the disadvantage that the construction of these panels must be relatively heavy and consequently, they are more costly than is necessary. Furthermore, the supply wires for the loudspeakers have to follow the sliding movement continuously so that when in regular use, the wires may be damaged and broken.

One of the objects of the present invention is to achieve the aforesaid goal in stereophonic reproduction apparatus having a variable stereophonic effect. According to the invention, at least one of the loudspeakers is housed in one of the side walls of the cabinet so as to be stationary. Pivotaly mounted on the same side wall is a hinged panel which covers the loudspeaker but which is swingable to open positions to reflect the sound oscillations coming from this loudspeaker primarily in about the same direction as that in which the sound is emanated from the other loudspeakers housed in the cabinet. This panel may be simply hinged to the rear of the side wall of the apparatus so as to be movable with respect to the loudspeaker mounted on said side wall.

The hinged panels used preferably have sound distributing elements fitted to their inner sides so that correct reproduction is ensured in all directions, because, as is well known, even the high tones, which are radiated by the loudspeaker at a smaller angle than the low tones, are distributed in this case.

In order that the invention may be clearly

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understood and readily carried into effect, it will now be set forth more fully with reference to the accompanying drawing in which:

Fig. 1 is a diagrammatic plan representation of an embodiment of the invention by way of example; and

Fig. 2 is a perspective view of a fragment of one of the panels shown in Fig. 1 to show the sound distributing elements more clearly.

Referring to Figure 1 of the drawing, reference numeral 1 designates a radio receiver set in which is enclosed stereophonic reproducing apparatus as shown diagrammatically by legend. Loudspeakers  $L_1$  and  $L_2$ , which are high frequency loudspeakers for the high tones, are fitted in the two side walls. Low frequency loudspeaker  $L_3$  is housed in the front wall and reproduces frequencies, for example, below 300 cycles per second.

The side walls can be covered by hinged panels  $K_1$  and  $K_2$ . In the out-position, it is preferred that the angle between the panel and the side wall does not exceed  $60^\circ$  and in any event, it should be less than  $90^\circ$ . These panels  $K_1$  and  $K_2$  reflect the sound emanating from loudspeakers  $L_1$  and  $L_2$  respectively, primarily in about the same direction as that in which the sound is emanated from loudspeaker  $L_3$ .

In order that the high tones radiated by the loudspeakers  $L_1$  and  $L_2$  may be evenly distributed, the side panels  $K_1$  and  $K_2$  are preferably provided with sound distributing elements 4, such as small cones and the like as more clearly illustrated in Figure 2 for example.

What I claim is:

1. Stereophonic reproduction apparatus, comprising a cabinet structure having a front wall and side walls, a plurality of loudspeakers, at least one of said loudspeakers being for high frequency sound production and housed in one of said side walls so as to be stationary, a covering for said one of said loudspeakers comprising a hinged panel attached to said cabinet structure, at least another of said loudspeakers being for low frequency sound production and housed in said front wall, said hinged panel being swingable to a position in front of said one of said loudspeakers for reflecting the sound oscillations coming therefrom primarily in about the same direction as that in which the sound is radiated from said another of said loudspeakers, said hinged panel being provided on its inner side with sound distributing elements.

2. Stereophonic reproduction apparatus, comprising a cabinet structure having a front wall

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and a pair of side walls, a loudspeaker housed in each one of said walls, said loudspeakers housed in said side walls being for high frequency sound production and said loudspeaker housed in said front wall being for low frequency sound production, a hinged panel attached to each of said side walls and positioned to substantially cover one of said high frequency sound production loudspeakers housed therein, said hinged panels being movable to positions for reflecting the sound oscillations coming from said high frequency sound production loudspeakers primarily in about the same direction as that in which the sound is radiated from said low frequency sound production loudspeaker, each of said hinged panels being provided on its inner side with sound distributing elements.

3. Stereophonic reproduction apparatus comprising a cabinet structure having a front wall and side walls, reproduction apparatus housed in said cabinet structure, a plurality of loudspeakers, at least one of said loudspeakers being for low frequency sound reproduction and housed in said front wall for directing sound in one direction, means separately connecting said low frequency loudspeaker to said reproduction apparatus to form therewith a stereophonic component channel, at least another of said loudspeakers being for high frequency sound production and housed in one of the side walls so as to be stationary and for directing sound at an angle to said first direction, other means separately connecting said high frequency loudspeaker to said reproduction apparatus to form therewith another stereophonic component channel, a covering for said high frequency loudspeaker comprising a sound reflecting hinged panel attached to said side wall of said cabinet structure in which one of said loudspeakers is located, said hinged panel being swingable to a position in front of said one of said loudspeakers for reflecting the sound oscillations coming therefrom primarily in about the same direction as that in which the sound is radiated from said low frequency loudspeaker.

4. Stereophonic reproduction apparatus comprising a cabinet structure having a front and a pair of side walls, a loudspeaker housed in each one of said walls, the loudspeaker housed in said front wall being for low frequency sound production and directing sound in a first direction, the loudspeakers housed in said side walls being for high frequency sound production and each directing

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ing sound at an angle to said first direction, a sound deflecting hinged panel attached to each of said side walls and positioned to substantially cover the loudspeakers housed therein, said hinged panel being movable to positions for reflecting the sound oscillations coming from said high frequency sound production loudspeakers primarily in about the same direction as that in which the sound is radiated from said low frequency sound production loudspeaker.

5. Stereophonic reproduction apparatus comprising a cabinet having a front wall and side walls, a reproduction apparatus housed in said cabinet, at least one loudspeaker for high frequency sound production and housed in one of said walls so as to direct sound in a first direction, at least another loudspeaker for low frequency sound production and housed in another of said walls so as to direct sound at an angle to said first direction, means separately connecting each of said loudspeakers to said reproduction apparatus to form therewith a pair of stereophonic component channels, a sound reflecting hinged panel attached to that side wall on which one of said loudspeakers has been secured and positioned to substantially cover said loudspeaker, said hinged panel being swingable to a position in front of said loudspeaker in the side wall for reflecting the sound oscillations coming therefrom primarily in about the same direction as that in which the sound is radiated from the other loudspeaker.

KORNELIS DE BOER.

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