

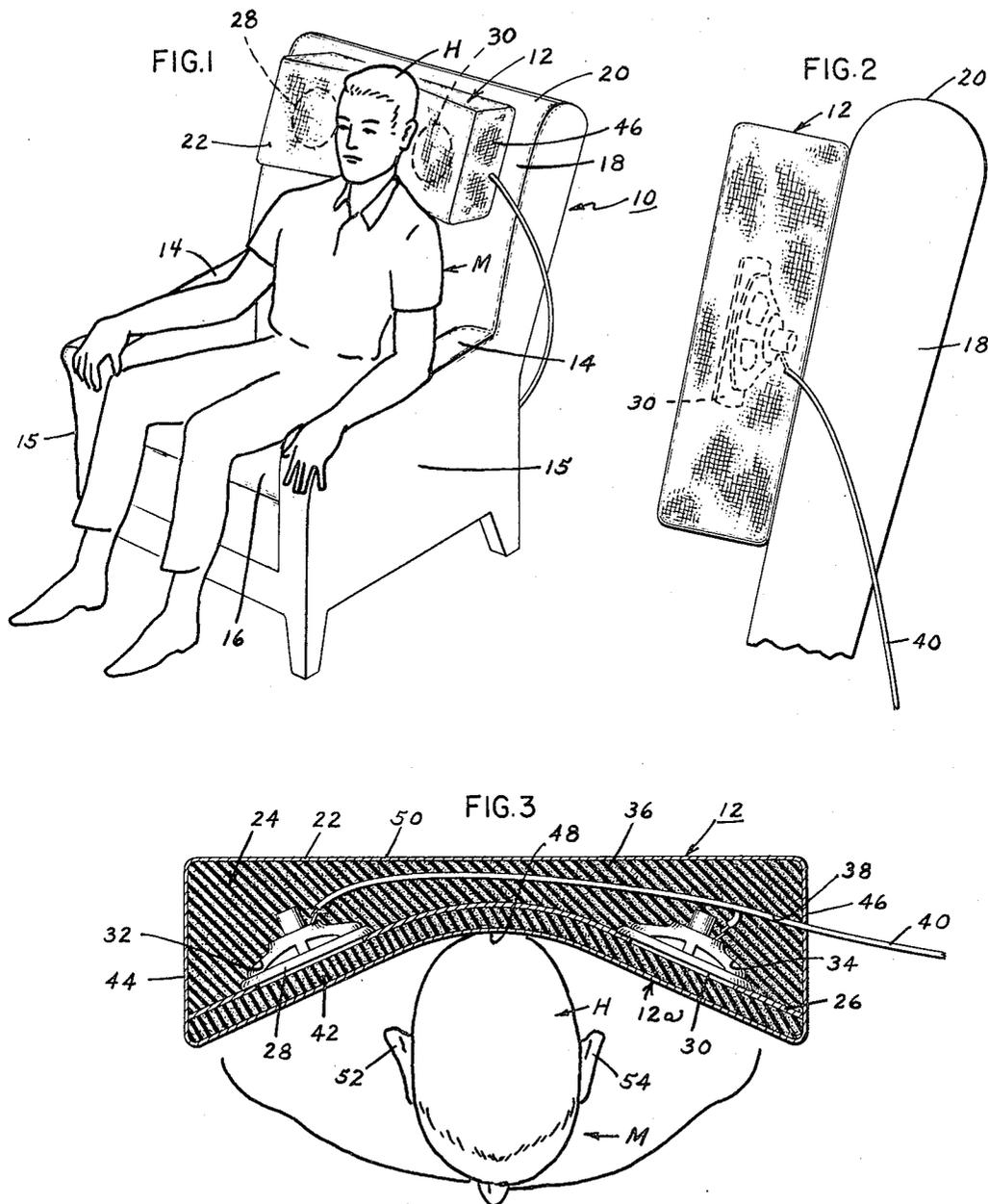
May 21, 1968

E. M. LANZARA

3,384,719

STEREOPHONIC SPEAKER ARRANGEMENT

Filed Oct. 21, 1964



INVENTOR:
EDWARD M. LANZARA,
BY *Thomas A. Briody*
HIS ATTORNEY.

1

2

3,384,719

STEREOPHONIC SPEAKER ARRANGEMENT

Edward M. Lanzara, Decatur, Ill., assignor to General Electric Company, a corporation of New York
 Filed Oct. 21, 1964, Ser. No. 405,349
 4 Claims. (Cl. 179-146)

ABSTRACT OF THE DISCLOSURE

A headrest of resilient composition that has a right loudspeaker means and a left loudspeaker means located and arranged therein in such a manner as to enable the transmission of near field sound from the right loudspeaker means to the right ear of a person reposing on the headrest, and the transmission of near field sound from the left loudspeaker means to the left ear of such a person.

This invention relates to an improved loudspeaker arrangement, and more particularly to a stereophonic loudspeaker arrangement which includes a plurality of speakers arranged to reproduce a stereophonic audio response.

One form of high fidelity sound reproduction which has met with widespread acclaim is the stereophonic type of sound reproduction. To effect this type of sound reproduction, it is important that the system should include two or more loudspeakers which are connected to separate channels of a stereophonic type amplification device, and are spacially arranged in such a manner as to provide the audio impression to the listener that the sound emanates from two or more directions. For obtaining the desired stereophonic audio effect, most prior art speaker systems have required, in general, the use of relatively expensive speaker enclosures. Also, many prior art speaker enclosures have been of bulky or complex construction, thereby limiting their flexibility of application. Accordingly, an important object of the present invention is to provide an improved stereophonic loudspeaker arrangement which is simplified in construction and economical in cost.

Another object of my invention is to obtain an improved stereophonic loudspeaker arrangement which is very efficient in operation and allows the listener to concurrently repose and listen to stereophonic sound.

An additional object of my invention is to provide an improved headrest which serves as an enclosure and support for a pair of stereophonically adapted loudspeakers.

A further object of my invention is to provide an improved chair which includes a resilient headrest that serves as an enclosure for a pair of stereophonically adapted speakers.

Still another object of my invention is to provide an improved economical stereophonic loudspeaker enclosure which lends itself to a substantial increase in low frequency response for the listener.

In carrying out my invention, in one form thereof, I provide an armchair which includes a resilient headrest. The headrest is appropriately disposed on the armchair to cushion the back of the head of a person desirous of hearing stereophonic sound. Within the headrest first and second loudspeaker means are located. The first loudspeaker means is disposed near one ear of a person reposing on the chair so that sound from the first loudspeaker means readily emanates to the one ear. The second loudspeaker means is disposed near the other ear of a person reposing on the chair so that sound from the second loudspeaker means readily emanates to the other ear of the person. The headrest is located relative to the head of the person to facilitate the direct transmission

of low frequency mechanical vibrations from the first and second loudspeaker means to the head, when the head rests upon the headrest. With such a simplified loudspeaker arrangement, private enjoyment of stereophonic sound may be readily enjoyed in convenient, comfortable and economical fashion.

Further aspects of my invention will become apparent hereinafter, and the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which I regard as my invention. The invention, however, as to organization and method of operation, together with further objects and advantages thereof, may best be understood by reference to the following description, when taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of an armchair embodying one form of my invention, and showing a male person reposing thereon;

FIG. 2 is a fragmentary side view of the armchair of FIG. 1, showing the right side of the headrest illustrated in FIG. 1; and

FIG. 3 is a fragmentary plan view showing in section the headrest of the armchair of FIG. 1, the arrangement of the loudspeakers in the headrest, and the mode of repose of a person's head on the headrest.

Referring first to FIG. 1, as shown therein, I have provided an armchair 10 comprising a headrest 12; and a male person M is seated upon the armchair 10 so that his head H effectively reposes on the approximate center of headrest 12.

The armchair 10 is preferably of the general type wherein a pair of parallel armrests 14 are provided at side walls 15 to facilitate the resting of the right and left arms of the person M thereon, and it includes a generally horizontal main cushion 16 upon which the posterior of the person M is accommodated. In the illustrated armchair 10, there is also provided an upwardly directed rear portion 18 which is inclined upwardly and rearwardly (as indicated in FIG. 2) from the back of cushion 16 to accommodate the back of the person M.

The horizontal cushion 16 and vertical cushion portion 18 of the armchair 10 are preferably constructed from a resilient comfortable material of the type well known in the art, such as, for example, sponge rubber.

In accordance with the teaching of the present invention, the armchair 10 differs substantially from prior art armchairs of the type heretofore described, in that it includes near top 20 of the rear cushion portion 18, a resilient headrest 12. The headrest 12 is, thus, located on the front of vertical cushion portion 18, directly behind the rear of the head H of person M. As shown in FIG. 1, headrest 12 has a generally rectangular external covering 22, an internal body 24 (FIG. 3) of soft pliable resilient material, a relatively flat rigid support 26 encased within body 24 and covering 22, and a pair of loudspeakers 28 and 30 positioned within associated cavities 32 and 34 of body 24.

The headrest 12 is suitably attached to the upper front section of vertical cushion 18 of the chair, such as by being stitched thereto, and the entire headrest is preferably first assembled before being secured to the armchair 10, for enabling the headrest 12 to be appropriately positioned on the arm chair relative to the head of a person most likely to repose on the armchair 10.

The covering 22 may be made from a readily washable fabric, and it is slightly larger than the shape of internal body 24 so that it may receive therein the external shape of body 24.

Body 24 may be made from a spongy synthetic material such as polyurethane, and it includes a main section 36 with the cavities 32, 34 formed therein for receiving loudspeakers 28 and 30, as well as suitable tunnels

such as tunnel 38 (FIG. 3) for passage of speaker leads 40 to the exterior of the headrest 12.

To enable the headrest 12 to effectively enclose and position the loudspeakers 28 and 30 in their respective accommodating cavities 32 and 34, the loudspeakers are secured to the flat support 26 in a suitable fashion (not shown). Support 26 is constructed from a flat sheet of substantially rigid material, such as Masonite, and it is preferably bowed in the manner illustrated in FIG. 3; so that when the loudspeakers 28, 30 are positioned in their cavities 32, 34 they are directed in convergent relationship toward the head H of the person M reposing on the headrest 12.

After the loudspeakers 28 and 30 have been positioned in their cavities 32, 34, and the supporting sheet 26 has been positioned, as shown in FIG. 3 in front of these speakers, a relatively thin slab 42 of the body 24 is then suitably arranged in front of sheet 26 to form an internal frontal part of the headrest unit.

As shown in FIG. 3, the front wall 12a of the headrest 12 has a shallow bowed configuration. Thus, the interior of the headrest includes right and left body portions which have a gradually diminishing thickness between end walls 44, 46 and the gently curved central front portion 48. The back wall 50 of headrest 12, which contiguously engages the rear portion 18 of the armchair, is substantially flat.

To enable the loudspeakers 28, 30 of headrest 12 to be readily operated by a remote stereophonic phonograph (not shown) or other stereophonic reproduction system (also not shown), the leads 40 would have a considerable external length.

Turning now to an explanation of the operation and utility of my improved armchair 10 and its stereophonically operable headrest, attention is directed to FIG. 3. As shown therein, the male person M is seated comfortably on armchair 10, with the back of his head H engaging and resting against the central front portion 48 of the headrest 12. The loudspeakers 28 and 30 are each of the same identical construction, and in one particularly successful embodiment of my invention they are 6½ inch type speakers.

In accordance with an important aspect of my invention, the right ear 52 of person M is disposed adjacent to loudspeaker 28 and at a distance therefrom of less than the diameter of loudspeaker 28. Thus, with a 6½" diameter loudspeaker 28, the right ear 52 of the person M is disposed at a distance of between zero and 6½ inches from the loudspeaker 28. As a result of this proximity of right ear 52 to speaker 28, the right ear 52 readily receives the type of sound often referred to by those skilled in the art as "near field" sound because it is only audible in proximity to the loudspeaker. Thus, this "near field" sound referred to, is effectively residual to the proximate environs of the loudspeaker, and is cancelled at substantial distances from the loudspeaker. In view of the proximity characteristic of this particular type of sound, it is also referred to by present day acousticians as "proximal sound."

In further accordance with my invention, the left ear 54 of person M is disposed adjacent to loudspeaker 30 and at a distance therefrom of less than the diameter of loudspeaker 30. Thus, with a 6½" diameter loudspeaker 30, the left ear 54 of the person M is disposed at a distance of between zero and 6½ inches from the loudspeaker 30. As a result of this proximity of speaker 30, the left ear 54 readily receives the "near field" type of sound in the same manner as previously set forth for right ear 52.

A further important aspect of my invention embraces the direct transmission of relatively low frequency vibrations to the back of the head H of person M, via the Masonite supporting sheet 26. Thus, when the back of the head H of person M compresses front slab 42 of the headrest body 24 into engagement with the rigid sheet 26, the latter serves as a transmission media for directly focus-

ing relatively low frequency vibrations upon the skull bone of the person M.

As previously mentioned, the headrest 12 of armchair 10 is designed for effective use with a stereophonic phonograph or some other suitable stereophonic reproducer. When the leads 40 of the individual speakers 28 and 30 are connected to such a source, the right and left ears 52 and 54, respectively, receive the audio output from the right and left channels respectively of the stereophonic output. In accordance with the present invention, a significant increase in low frequency response (e.g. below 400 cycles per second) will be noted by the listener M. This improved response, for the illustrated embodiment incorporating 2—6½ inch speakers, is due in part to the effective transmission of low frequency mechanical vibrations to the head of the person M. The improved response is also attributable to the proximate orientation of the ears of the listener M with respect to the stereophonically adapted loudspeakers 28 and 30.

By using the armchair type headrest 12 of my invention, the benefits of "private" type stereophonic listening readily accrue to a listener who is also comfortably reposed. Thus, to enable the stereophonic listener to engage in conversation, all he needs to do while sitting in chair 10, is to bend or lean forward so his ears 52, 54 are outside of the "near field" of sound transmission.

It will now, therefore, be understood that in accordance with the present invention I have provided an improved stereophonic sound reproducing loudspeaker arrangement which effectively also functions as a comfortable part of an armchair. It shall also be realized that the improved loudspeaker enclosing device of my invention is simplified and economical in construction.

While in accordance with the patent statutes, I have described what at present is considered to be the preferred embodiment of my invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from my invention, and I, therefore, aim in the following claims to cover all such equivalent variations as fall within the true spirit and scope of this invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A stereophonic sound producing device including a loudspeaker enclosure comprising a headrest of resilient material for receiving the back of the head of a person desirous of hearing stereophonic sound, first and second stereophonically adapted loudspeaker means associated with said headrest, said first loudspeaker means being disposed closely adjacent to a right ear of said person so that stereophonic sound may be readily transmitted from said first loudspeaker means to said right ear, said second loudspeaker means being disposed closely adjacent to the left ear of said person so that stereophonic sound may be readily transmitted from said second loudspeaker means to said left ear, and means in said headrest of said loudspeaker enclosure located relative to the head of said person to facilitate the direct transmission of low frequency mechanical vibrations from said first and second loudspeaker means to the head of said person upon reposure of the back of the head of said person on said headrest, thereby to provide an effective stereophonic response from said device.

2. A stereophonic sound producing device including a loudspeaker enclosure comprising a headrest of resilient material for receiving the back of the head of a person desirous of hearing stereophonic sound, first and second stereophonic loudspeakers associated with said headrest, said first and second loudspeakers having first and second diameters, respectively, said first loudspeaker being disposed closely adjacent to the right ear of said person and at a distance of less than the first diameter thereby to facilitate the transmission of near field sound to said right ear from said first loudspeaker, said second loudspeaker being disposed closely adjacent to the left ear

5

of said person and at a distance of less than the second diameter thereby to facilitate the transmission of near field sound to said left ear from said second loudspeaker, and means in said headrest located relative to the head of said person and relative to said first and second loudspeakers for directly transmitting low frequency mechanical vibrations from said first and second loudspeakers to the head of said person when the back of the head reposes on the headrest.

3. The device of claim 2 wherein the means for transmitting low frequency mechanical vibrations to the head is a rigid sheet connected mechanically to said first and second loudspeakers.

4. The device of claim 2 wherein the front of the headrest is bow-shaped to provide a pair of convergent front faces, said first loudspeaker being ensconced in said head-

6

rest and directed toward one of said front faces and said second loudspeaker being ensconced in said headrest and directed toward the other one of said front faces.

References Cited

UNITED STATES PATENTS

2,908,766	10/1959	Taylor	-----	179—146
3,230,320	1/1966	Kerr	-----	179—146
3,290,450	12/1966	Majoros	-----	179—146

FOREIGN PATENTS

827,306	2/1960	Great Britain.
1,014,167	8/1957	Germany.

15 WILLIAM C. COOPER, *Primary Examiner.*