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(54) ACOUSTIC PLAYBACK SYSTEM WITH IMPROVED SEALING

(57) An acoustic playback system is disclosed. The acoustic playback system can comprise an outer housing having aperture, a speaker box located within the outer housing and spaced away from the outer housing, the speaker box comprising a driver having an output facing towards the aperture, and a flexible gasket connecting the speaker box with the outer housing and surrounding the aperture and the output, wherein the flexible gasket provides at least a semi-air permeable seal.

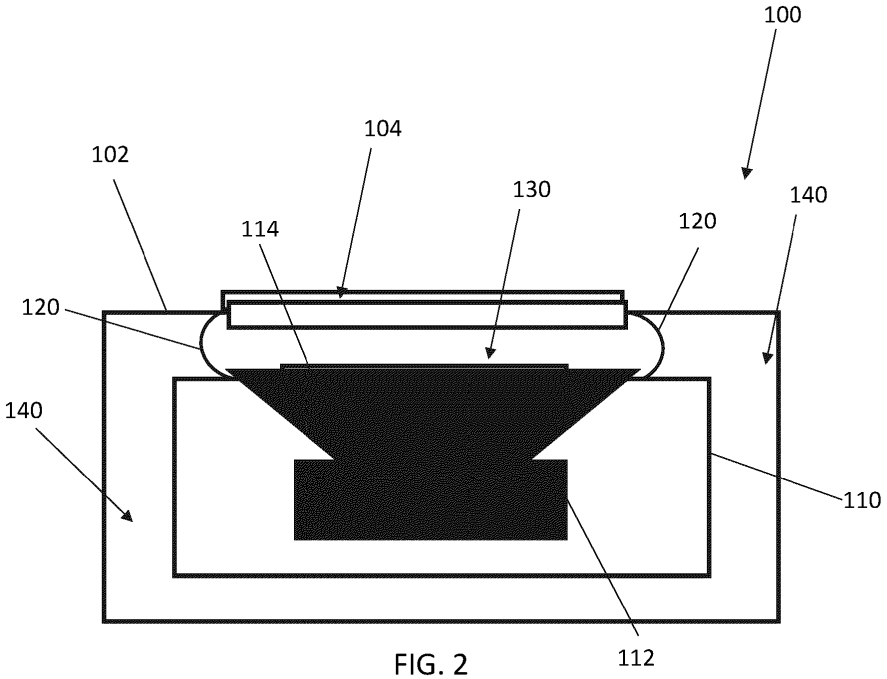

FIG. 2

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Description

TECHNICAL FIELD

[0001] The present application relates to the field of acoustic playback systems. In particular, the present application relates to an acoustic playback system having a gasket (such as a flexible gasket) to provide at least a semi-air permeable seal.

BACKGROUND

[0002] As shown in FIGS. 1A-1B, implementations of acoustic playback systems 1 known in the art have the inner box 10 be separate from the outer box 20 (and/or a chassis). This separation can enable a reduction of transfer of mechanical vibrations between the speaker box 10 and the outer housing 20. However, when this "box-in-a-box" solution is applied, a problem arises as there is now a volume of air 50 between the inner box 10 (e.g., speaker box with driver 15) and outer box 20 (e.g., outer housing).

[0003] This partly encapsulated air 50 between inner box 10 and outer box 20 shown in Fig. 1A can cause various acoustical resonances (such as standing wave(s) 30 and/or Helmholtz resonances 40) which size, spread and amount is depending on the implemented dimensions. Examples of these resonances - but not limited to - can be half wave standing waves across the front volume (in case of parallel walls), Helmholtz resonances as a function of the compliance of the air in the rear cavity and acoustic mass of the side cavity and front cavity, but also more complex resonance patterns can emerge.

[0004] These resonances can have a significant negative effect on the acoustical output - e.g. making the amplitude response impaired by significant peaks and dips - of the acoustic playback system 1 and therefore it is advantageous to avoid them.

[0005] Certain prior art acoustic playback systems have added a rigid wall 60 surrounding the inner box 10 and connected to the outer box 20, as shown in FIG. 1B. While this iteration can prevent the acoustical resonances, it would be detrimental to the reduction of mechanical vibrations, as the rigid wall 60 would transmit vibrations, so this is not a viable solution.

SUMMARY

An acoustic playback system:

[0006] In an aspect of the present application, an acoustic playback system is disclosed. The acoustic playback system includes an outer housing having an aperture. The acoustic playback system includes a speaker box. The speaker box is located within the outer housing. The speaker box is spaced away from the outer housing. The speaker box comprises a driver. The driver can have an output facing towards the aperture. The acoustic playback system includes a flexible gasket. The flexible gasket can be connecting the speaker box with the outer housing. The flexible gasket can be surrounding the aperture. The flexible gasket can be surrounding the output. The flexible gasket can provide at least a semi-air permeable seal.

[0007] Thereby, an improved acoustic playback system can be provided. Advantageously, the disclosed acoustic playback system can reduce and/or eliminate the transferring of mechanical energy vibrations from the speaker box to the outer housing (and vice versa). This can prevent deterioration of the audio from the acoustic playback system.

[0008] Moreover, the disclosed acoustic playback system can prevent unwanted resonances from occurring (e.g., standing wave(s) and/or Helmholtz resonances) due to the encapsulated air between the speaker box and the outer housing. Accordingly, the quality of the audio from the acoustic playback system can be improved.

[0009] In other words, the improved acoustic playback system can ensure a minimum of vibration transfer while also having an acoustically sealed coupling.

[0010] Accordingly, the acoustic playback system disclosed herein has improved acoustics, allowing for a better user experience.

[0011] Disclosed herein are embodiments of an acoustic playback system (e.g., acoustic playback device, acoustical playback system, audio reproduction system, audio reproduction device). In one or more example acoustic playback systems, the acoustic playback system can be one of a sound bar, a speaker, a video bar, a loudspeaker, and a subwoofer. The acoustic playback system can be and/or include a communication bar, a satellite speaker, a Bluetooth speaker, a built-in monitor and/or television speaker, and a speaker phone. The acoustic playback system can be and/or include one or more speakers. In one or more example acoustic playback systems, the acoustic playback system is a video bar.

[0012] The acoustic playback system includes an outer housing. The outer housing can form an outer perimeter of the acoustic playback system. The outer housing can be shaped as desired for different aesthetic looks of the acoustic playback system.

[0013] The outer housing can include an aperture (e.g., hole, lumen, opening, gap). The outer housing can include at least one aperture. The aperture can be configured to allow audio and/or sound to escape the acoustic playback system. The aperture can span a thickness of the outer housing. The size and shape of the at least one housing can vary. The outer housing can include a plurality of apertures in certain examples.

[0014] Optionally, the acoustic playback system can include further housings (e.g., intermediate housing, chassis, secondary housing) contained within the outer housing (e.g., contained by the outer housing, at least partially surrounded by the outer housing). In one or more

example acoustic playback systems, the acoustic playback system further includes a chassis. The chassis can be located within the outer housing. The chassis can have a chassis aperture. The speaker box can be suspended within the chassis.

[0015] In certain embodiments, the chassis is connected to the outer housing. For example, a rigid connection can be used to connect the chassis with the outer housing.

[0016] If used, the chassis can act as a multi-purpose structural element. For example, the chassis can provide inner structure to the acoustic playback system. The chassis aperture can be aligned with the aperture of the outer housing.

[0017] The acoustic playback system further includes a speaker box. The speaker box can be located within the outer housing (e.g., contained by the outer housing, at least partially surrounded by the outer housing). If a chassis is used, the speaker box can be located within the chassis housing (e.g., contained by the outer chassis, at least partially surrounded by the outer chassis). The speaker box can optionally be located within any further housings if included in the acoustic playback system. The speaker box can be configured to retain one or more drivers for outputting an audio. The speaker box may contain further electronic hardware as well.

[0018] The speaker box can be suspended within the outer housing. In other words, the speaker box can be suspended within the outer housing to allow movement of the speaker box without transferring vibrations to the outer housing.

[0019] The speaker box can be suspended within the chassis. In other words, the speaker box can be suspended within the chassis to allow movement of the speaker box without transferring vibrations to the chassis.

[0020] The speaker box can be located within the outer housing (and/or chassis), for example, via one or more suspension parts. The suspension parts can include a soft material, e.g. rubber or silicone. The one or more suspension parts can have different stiffnesses in different direction. For example, the one or more suspension parts can be configured to keep the speaker box position while still being able to move in the direction of the driver.

[0021] The speaker box can be spaced away from the outer housing (or the chassis). Accordingly, air can be located between the speaker box and the outer housing (or between the speaker box and the chassis). In certain implementations, there may be air around the entirety of the speaker box between the speaker box and the outer housing (or between the speaker box and the chassis). For example, air can be located in a volume (e.g., cavity) between the speaker box and the outer housing (or the chassis).

[0022] The acoustic playback system can include a driver (e.g., speaker driver, primary driver, acoustic driver). For example, the speaker box can include the driver. As used herein, a driver can be, for example, a transducer and/or an audio source. For example, the driver can be a speaker. The driver can be configured to output audio (e.g., sound, audio signal, noise). The audio may be an audio configured for listening by a user of the acoustic playback system.

[0023] The driver can have an output. The driver can be configured to output the audio via the output. The output can be configured to face the aperture (and/or the chassis aperture if used). For example, the audio output by the output can exit the acoustic playback system via the aperture. If a chassis is used, the audio output by the output can exit the acoustic playback system via both the chassis aperture and the aperture.

[0024] The acoustic playback system includes a gasket. The gasket can be a flexible gasket. For example, the flexible gasket can be bendable. The flexible gasket can be configured to bend and/or flex without breaking. In certain implementations, the flexible gasket can be configured to deform elastically via an applied stress and return to an original shape when the applied stress is removed. The flexible gasket can be configured to reduce and/or eliminate the transference of vibrations, such as from the speaker box. The flexible gasket can be, for example, a rubber and/or a plastic. In certain implementation, the flexible gasket can be compress to around 90% of its volume. As an example, the flexible gasket can be formed from a material having a shore measurement of 50A. In other words, the flexible gasket can be made of a shore 50A material.

[0025] In one or more example acoustic playback devices, the flexible gasket is configured to reduce transmission of mechanical vibrations from the speaker box to the outer housing. In one or more example acoustic playback devices, the flexible gasket is configured to prevent transmission of mechanical vibrations from the speaker box to the outer housing. In certain example, the flexible gasket can be configured to prevent transmission of mechanical vibrations from the speaker box to the chassis. The flexible gasket can be configured to reduce and/or prevent audio (e.g., soundwaves) from passing through the flexible gasket.

[0026] The flexible gasket can be configured to provide a seal ensuring a simple acoustic transition from a diaphragm of the driver to the front of the acoustic playback system (e.g., to the aperture). By placing the flexible gasket, in certain examples there is no acoustical connection to the surrounding volumes and therefore no sound pressure and hence no resonances will be activated. This results in a vastly improved frequency response of the acoustic playback system.

[0027] In one or more example acoustic playback systems, the flexible gasket can reduce the volume where audio can travel in the acoustic playback system. For example, the flexible gasket can form a cavity around the output and can prevent audio from passing through the flexible gasket. The flexible gasket can prevent the audio from travelling into the space between the outer housing and the speaker box (or between the chassis and the

speaker box).

[0028] The flexible gasket can form a cavity between the output of the driver and the aperture of the outer housing. The cavity can have a volume smaller than a total volume between the speaker box and the outer housing.

[0029] The flexible gasket can form a seal around the output of the driver. The flexible gasket can form a seal around a portion of the speaker box. The flexible gasket can form a seal around the aperture of the outer housing. The flexible gasket can form a seal around a portion of the outer housing.

[0030] In one or more example acoustic playback systems, the flexible gasket is a silicone gasket. In one or more example acoustic playback systems, the flexible gasket is a foam gasket. In one or more example acoustic playback systems, the flexible gasket is a polychloroprene gasket. In one or more example acoustic playback systems, the flexible gasket is a thermoplastic elastomer.

[0031] The flexible gasket can be configured to connect the speaker box with the outer housing. In other words, the flexible gasket can provide a connection between the speaker box with the outer housing. Further connections can be included between the outer housing and the flexible gasket. The flexible gasket can be configured to structurally connect the speaker box with the outer housing.

[0032] In certain implementations where the acoustic playback system includes further housings, the flexible gasket can be configured to connect the speaker box with the outer housing by connecting the speaker box with one or more of the further housings.

[0033] The flexible gasket can be configured to surround the aperture and the output. The flexible gasket can be configured to partially surround the aperture. The flexible gasket can be configured to partially surround the at output. The flexible gasket can be configured to fully surround the aperture. The flexible gasket can be configured to fully surround the at output.

[0034] In one or more examples, the flexible gasket provides at least a semi-air permeable seal. In other words, the flexible gasket can allow at least some air to pass through and/or around the flexible gasket. The flexible gasket can provide acoustic impedance. The flexible gasket can provide significant acoustic impedance. For example, the flexible gasket can allow air to pass through the flexible gasket while reducing and/or preventing sound waves from passing through the flexible gasket. For example, the material of the flexible gasket can reduce the amount of air, and sound, from passing through.

[0035] In one or more example acoustic playback systems, the flexible gasket provides an air-tight seal. In other words, the flexible gasket provides an air-impermeable seal. For example, the material of the flexible gasket can prevent air, and sound, from passing through.

[0036] In one or more example acoustic playback systems, the flexible gasket has a thickness of 0.5mm or less. The flexible gasket can have a thickness of, for examples, 0.1, 0.2, 0.3, 0.4, or 0.5mm.

[0037] In one or more example acoustic playback systems, the flexible gasket is configured to seal the driver against the speaker box. In other words, the flexible gasket is configured to seal the driver with the speaker box. In other words, the flexible gasket is configured to seal the driver towards the speaker box.

[0038] For example, the flexible gasket is configured to form a seal between the speaker box and the driver on a first end of the flexible gasket and the aperture on a second end of the flexible gasket.

[0039] In one or more example acoustic playback systems, the outer housing comprises a flange. The flange can extend inwards from the outer housing. For example, the flange can extend towards the speaker box. The flange can at least partially surround the aperture. The flexible gasket can connect between the speaker box and the flange.

[0040] In one or more example acoustic playback systems, the flexible gasket is configured to reduce a cavity space between the output of the driver and the aperture. In other words, the audio from the driver is blocked by the flexible gasket. The flexible gasket can be used to prevent the audio from leaving the cavity space formed by the flexible gasket into other air between the speaker box and the outer housing. This reduces resonance of the audio, thereby improving the sound quality of the acoustic playback system.

[0041] In one or more example acoustic playback systems, the flexible gasket is configured to provide support for the speaker box. For example, the flexible gasket can be configured to suspend the speaker box within the outer housing.

[0042] The invention is set out in the appended set of claims.

BRIEF DESCRIPTION OF DRAWINGS

[0043] The aspects of the disclosure may be best understood from the following detailed description taken in conjunction with the accompanying figures. The figures are schematic and simplified for clarity, and they just show details to improve the understanding of the claims, while other details are left out. Throughout, the same reference numerals are used for identical or corresponding parts. The individual features of each aspect may each be combined with any or all features of the other aspects. These and other aspects, features and/or technical effect will be apparent from and elucidated with reference to the illustrations described hereinafter in which:

FIGS. 1A-1B show schematics of an acoustic playback system of the prior art,

FIG. 2 shows a schematic of an example acoustic playback system according to the disclosure,

FIG. 3 shows a schematic of an example acoustic playback system according to the disclosure,

FIGS. 4A-4G show schematics of example acoustic playback systems according to the disclosure,

FIG. 5 shows a schematic of an example acoustic playback system according to the disclosure,

FIG. 6 shows an example acoustic playback system according to the disclosure, and

FIG. 7 shows an amplitude response graph including an example acoustic playback system according to the disclosure.

[0044] The figures are schematic and simplified for clarity, and they just show details which are essential to the understanding of the disclosure, while other details are left out. Throughout, the same reference signs are used for identical or corresponding parts.

[0045] Further scope of applicability of the present disclosure will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the disclosure, are given by way of illustration only. Other embodiments may become apparent to those skilled in the art from the following detailed description.

DETAILED DESCRIPTION OF EMBODIMENTS

[0046] The detailed description set forth below in connection with the appended drawings is intended as a description of various configurations. The detailed description includes specific details for the purpose of providing a thorough understanding of various concepts. However, it will be apparent to those skilled in the art that these concepts may be practiced without these specific details. Several aspects of the apparatus and methods are described by various blocks, functional units, modules, components, circuits, steps, processes, algorithms, etc. (collectively referred to as "elements"). Depending upon particular application, design constraints or other reasons, these elements may be implemented using electronic hardware, computer program, or any combination thereof.

[0047] The electronic hardware may include micro-electronic-mechanical systems (MEMS), integrated circuits (e.g. application specific), microprocessors, microcontrollers, digital signal processors (DSPs), field programmable gate arrays (FPGAs), programmable logic devices (PLDs), gated logic, discrete hardware circuits, printed circuit boards (PCB) (e.g. flexible PCBs), and other suitable hardware configured to perform the various functionality described throughout this disclosure, e.g. sensors, e.g. for sensing and/or registering physical properties of the environment, the device, the user, etc. Computer program shall be construed broadly to mean instructions, instruction sets, code, code segments, program code, programs, subprograms, software modules, applications, software applications, software packages, routines, subroutines, objects, executables, threads of execution, procedures, functions, etc., whether referred to as software, firmware, middleware, microcode, hardware description language, or otherwise.

[0048] The present application relates to the field of acoustic playback devices. Examples of an acoustic playback device can include a sound bar, a speaker, a video bar, a loudspeaker, and a subwoofer.

[0049] FIG. 2 shows a schematic of an example acoustic playback system according to the disclosure. As shown, the acoustic playback system 100 includes an outer housing 102 having an aperture 104. The aperture 104 provides an opening in the outer housing 102 for audio to leave the acoustic playback system 100.

[0050] Further, the acoustic playback system 100 includes a speaker box 110 located within the outer housing 102 and spaced away from the outer housing 102. In other words, the speaker box 110 is suspended within the outer housing 102. The speaker box can include a driver 112 having an output 114 facing towards the aperture 104. The driver 112 can output audio via the output 114 through the aperture 104.

[0051] Further, the acoustic playback system includes a gasket, such as flexible gasket 120. The flexible gasket 120, as shown, connects the speaker box 110 with the outer housing 102. Further, the flexible gasket 120 surrounds the aperture 104 and the output 114. The flexible gasket 120 provides at least a semi-air permeable seal. In certain examples, the flexible gasket 120 can have a thickness of 0.5mm or less.

[0052] Advantageously, the flexible gasket 120 provides a barrier (e.g., sound barrier, acoustic barrier) between the space 130 in front of the output 114 and the suspension space 140 between the speaker box 110 and the outer housing 102. In other words, the flexible gasket is configured to reduce a cavity space (e.g., space 130) between the output 114 of the driver 112 and the aperture 104.

[0053] This prevents the audio from the output 114 from entering the suspension space 140, thereby greatly reducing reverberations and reflections. Further, the flexible gasket 120 is configured to prevent transmission of mechanical vibrations from the speaker box 110 to the outer housing 102. Accordingly, a user will have a greatly improved listening experience from the acoustic playback system 100.

[0054] The flexible gasket 120 can be an air-tight seal. This can prevent any air from passing between the space 130 and the suspension space 140. For example, the flexible gasket can be a silicone gasket and/or a foam gasket and/or combinations thereof.

[0055] Further, the flexible gasket 120 can seal the driver 112 against the speaker box 110.

[0056] FIG. 3 shows a schematic of an example acous-

tic playback system according to the disclosure. The acoustic playback system 200 can include any and/or all of the features discussed above with respect to acoustic playback system 100 of FIG. 2.

[0057] As shown, the acoustic playback system 200 can further include a chassis 202. The chassis can be located within the outer housing 102. The chassis 202 can include a chassis aperture 204. The chassis aperture 204 can be generally aligned with the aperture 104. As shown, the speaker box 110 can be suspended within the chassis 202. The flexible gasket 120 can connect the speaker box 110 with the chassis 202. Alternatively, the flexible gasket 120B may connect the chassis 202 with the outer housing 102. Further, both flexible gasket 120A and flexible gasket 120B can be used.

[0058] FIGS. 4A-4G show schematics of example acoustic playback systems according to the disclosure. As shown in FIGS. 4A-4G, the shape and/or dimensions of the flexible gasket can vary depending on the design of the particular outer housing 102. The acoustic playback systems 400 shown in FIGS. 4A-4G can include any and/or all features discussed above with respect to FIGS. 2-3. The flexible gasket 410 shape, size, and/or material can be dependent on not just outer housing 406, but also speaker box 408 design, chassis (if used), speaker driver mounting etc.

[0059] For example, FIGS. 4A-4D illustrate a speaker box that includes a front extension 402. The flexible gasket 410 can seal against the front extension 402.

[0060] Further, FIGS. 4B-4D illustrate an acoustic playback system 400 where the outer housing 406 includes a flange 404 extending inwards from the outer housing 406. The flange 404 can at least partially surround the aperture 104 and the flexible gasket 410 can connect between the speaker box 408 and the flange 404.

[0061] As shown, the flexible gasket 410 can include different configurations and/or positions depending on the particular construction of the outer housing 406 and/or the speaker box 408 and/or the acoustic playback system 400.

[0062] FIGS. 4E-4G illustrate further examples of acoustic playback systems 400 according to the disclosure. As shown, the flexible gasket 410 can have different configurations depending on the particular dimensions of the speaker box 408 and/or the outer housing 406.

[0063] FIG. 5 shows a schematic of an example acoustic playback system according to the disclosure.

[0064] The acoustic playback system 500 can include any and/or all of the features discussed above with respect to FIGS. 2-4G.

[0065] The acoustic playback system 500 further includes suspension components 502 for suspending the speaker box 110 within the outer housing 102. The flexible gasket 120 can be configured to act as both a seal and a suspension for the speaker box 110. For example, the flexible gasket 120 is configured to provide support for the speaker box 110. The location for the suspension components 502 can vary as shown by locations 502A.

[0066] FIG. 6 shows an example acoustic playback system according to the disclosure. Specifically, FIG. 6 illustrates an outer view of the acoustic playback system 600 according to the disclosure. The acoustic playback system 600 can include each and/or every component discussed with respect to FIGS. 2-5. As shown, the flexible gasket 120 seals between the outer housing 102 and the speaker box 110. As shown, the flexible gasket 120 fully surrounds the speaker driver, specifically the output.

[0067] FIG. 7 shows an amplitude response graph including an example acoustic playback system according to the disclosure. Grey line 702 illustrates the amplitude response of an acoustic playback system without the disclosed flexible seal. Black line 704 illustrates the amplitude response of an acoustic playback system according to the disclosure.

[0068] Fig. 7 illustrates how embodiments of the disclosed acoustic playback system has a much smoother response curve. Some benefits of this smoother response curve include:

- Better sound quality (e.g., more balanced tonal balance and lack of resonances is an advantage)
- Easier to pass certification requirements
- Subsequent equalization to a specific (flat) target is significantly easier
- Better working conditions for an echo canceller (which typically is most efficient if there are no significant amplitude differences closely space in frequency and also not resonances)
- Easier to set production test limits which again can aid in ensuring higher production quality

[0069] It is intended that the structural features of the devices described above, either in the detailed description and/or in the claims, may be combined with steps of the method, when appropriately substituted by a corresponding process.

[0070] As used, the singular forms "a," "an," and "the" are intended to include the plural forms as well (i.e. to have the meaning "at least one"), unless expressly stated otherwise. It will be further understood that the terms "includes," "comprises," "including," and/or "comprising," when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof. It will also be understood that when an element is referred to as being "connected" or "coupled" to another element, it can be directly connected or coupled to the other element, but an intervening element may also be present, unless expressly stated otherwise. Furthermore, "connected" or "coupled" as used herein may include wirelessly connected or coupled. As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items. The steps of

any disclosed method are not limited to the exact order stated herein, unless expressly stated otherwise.

[0071] It should be appreciated that reference throughout this specification to "one embodiment" or "an embodiment" or "an aspect" or features included as "may" means that a particular feature, structure or characteristic described in connection with the embodiment is included in at least one embodiment of the disclosure. Furthermore, the particular features, structures or characteristics may be combined as suitable in one or more embodiments of the disclosure. The previous description is provided to enable any person skilled in the art to practice the various aspects described herein. Various modifications to these aspects will be readily apparent to those skilled in the art.

[0072] The claims are not intended to be limited to the aspects shown herein but are to be accorded the full scope consistent with the language of the claims, wherein reference to an element in the singular is not intended to mean "one and only one" unless specifically so stated, but rather "one or more." Unless specifically stated otherwise, the term "some" refers to one or more.

Claims

1. An acoustic playback system (100, 200, 400, 500) comprising:

   an outer housing (102) having an aperture (104);
   a speaker box (110) located within the outer housing (102) and spaced away from the outer housing (102), the speaker box (110) comprising a driver (112) having an output (114) facing towards the aperture (104); and
   a flexible gasket (120) connecting the speaker box (110) with the outer housing (102) and surrounding the aperture (104) and the output (114);
   wherein the flexible gasket (120) provides at least a semi-air permeable seal.

2. The acoustic playback system (100) of claim 1, wherein the flexible gasket (120) provides an airtight seal.

3. The acoustic playback system (100)of any one of the previous claims, wherein the flexible gasket (120) is a silicone gasket.

4. The acoustic playback system (100)of any one of the previous claims, wherein the acoustic playback system (100) is a video bar.

5. The acoustic playback system (100)of any one of the previous claims, wherein the flexible gasket (120) is configured to seal the driver (112) with against the speaker box (110).

6. The acoustic playback system (100) of any one of the previous claims, wherein the flexible gasket (120) is a foam gasket.

7. The acoustic playback system (400) of any one of the previous claims, wherein the outer housing (406) comprises a flange (404) extending inwards from the outer housing (406), the flange (404) at least partially surrounding the aperture (104), and wherein the flexible gasket (410) connects between the speaker box (408) and the flange (404).

8. The acoustic playback system (400) of any one of the previous claims, wherein the flexible gasket (120) is configured to reduce a cavity space between the output (114) of the driver (112) and the aperture (104).

9. The acoustic playback system (100) of any one of the previous claims, wherein the flexible gasket (120) is configured to prevent transmission of mechanical vibrations from the speaker box (110) to the outer housing (102).

10. The acoustic playback system (100) of any one of the previous claims, wherein the flexible gasket (120) is configured to provide support for the speaker box (110).

11. The acoustic playback system (100) of any one of the previous claims, further comprising a chassis (202) located within the outer housing (102) and having a chassis aperture (204), wherein the speaker box (110) is suspended within the chassis (202).

12. The acoustic playback system (100) of any one of the previous claims, wherein the flexible gasket (120) has a thickness of 0.5mm or less.

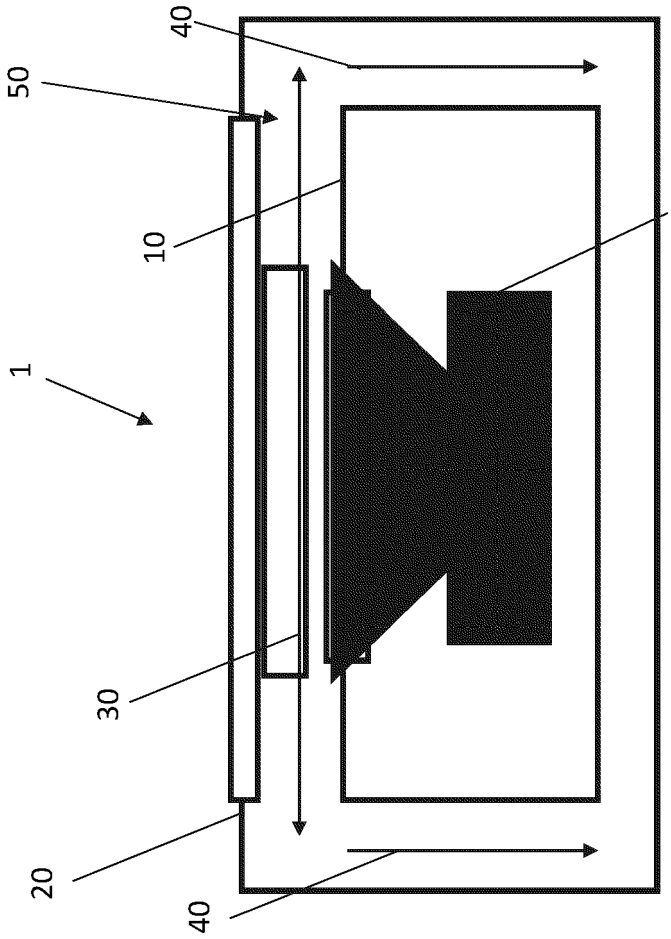

FIG. 1A

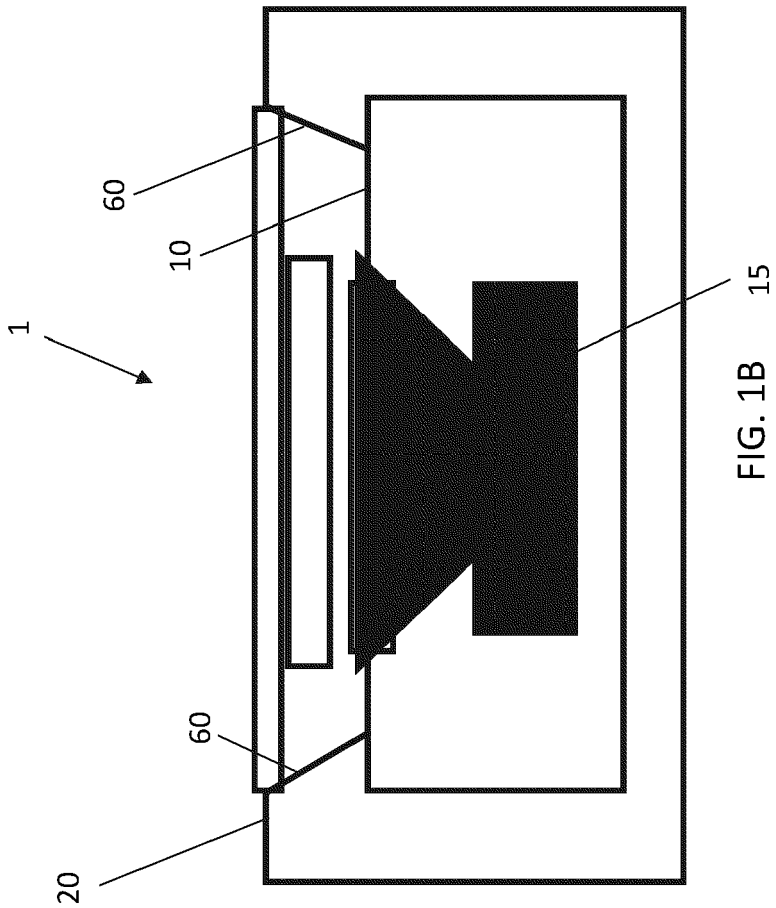

FIG. 1B

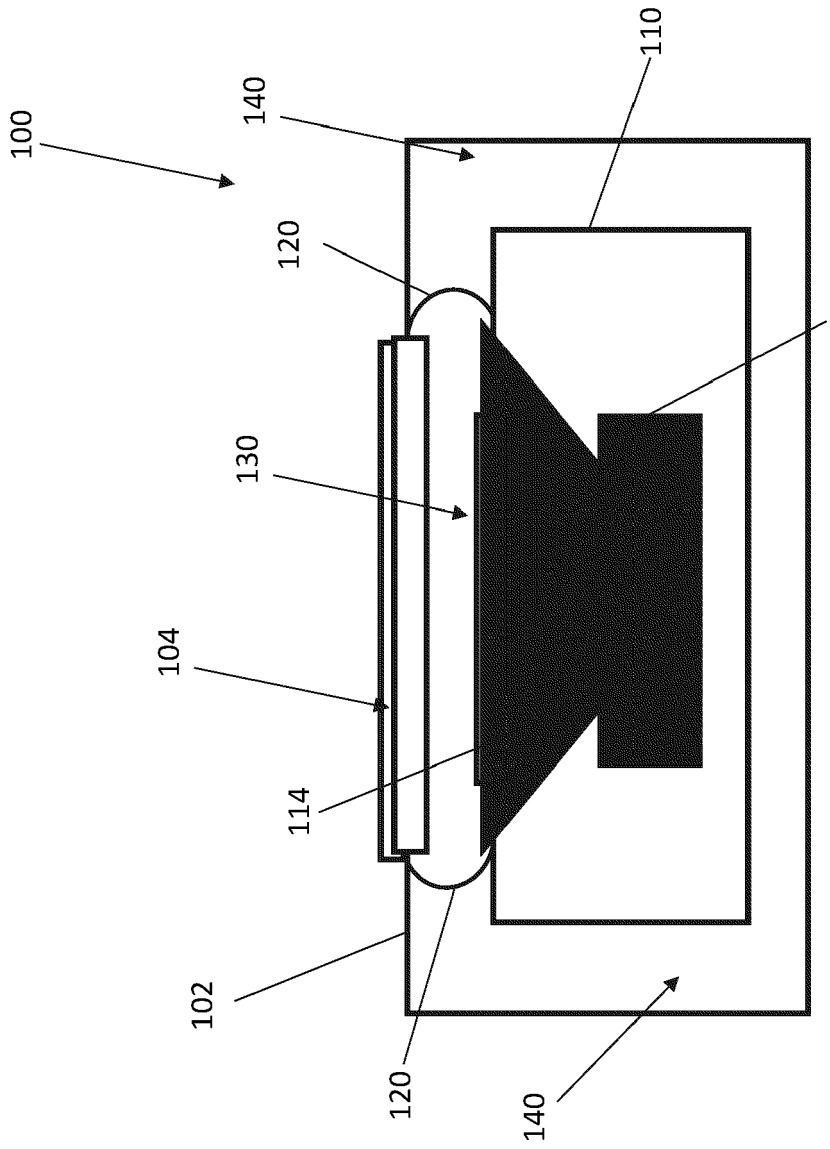

FIG. 2

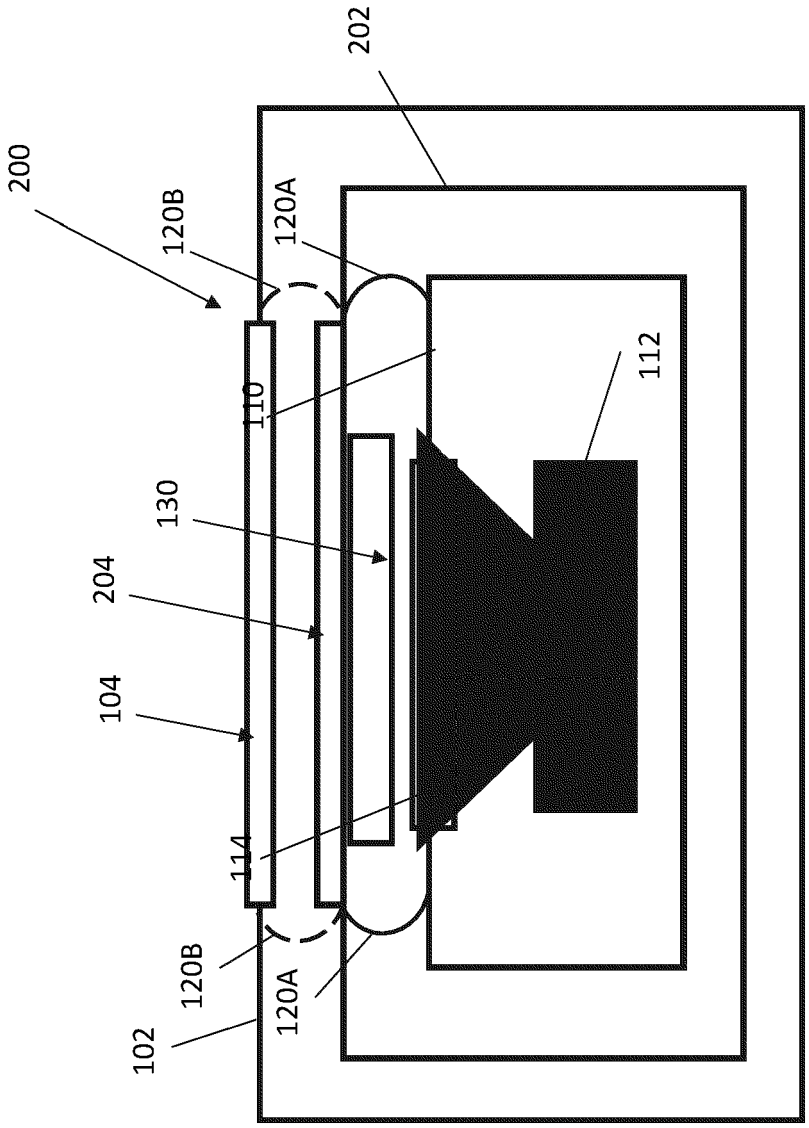

FIG. 3

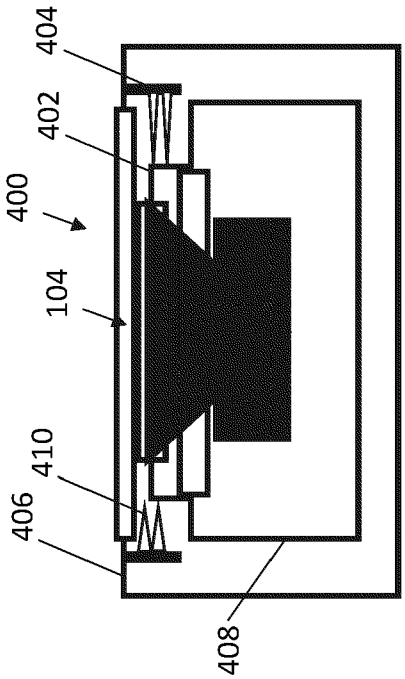

FIG. 4B

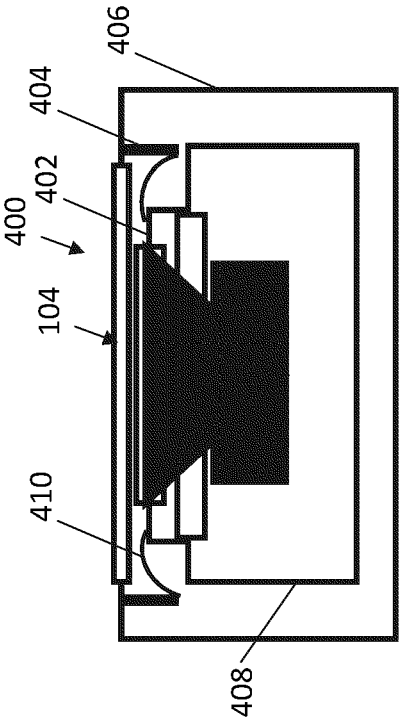

FIG. 4D

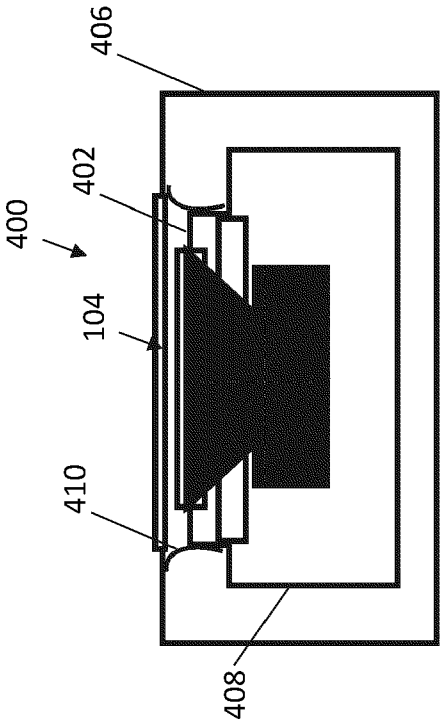

FIG. 4A

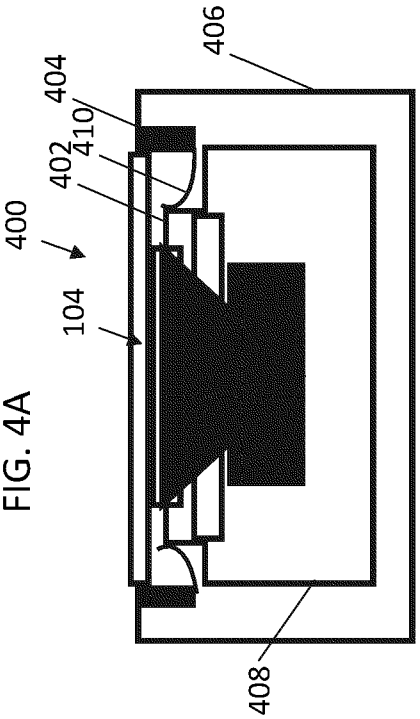

FIG. 4C

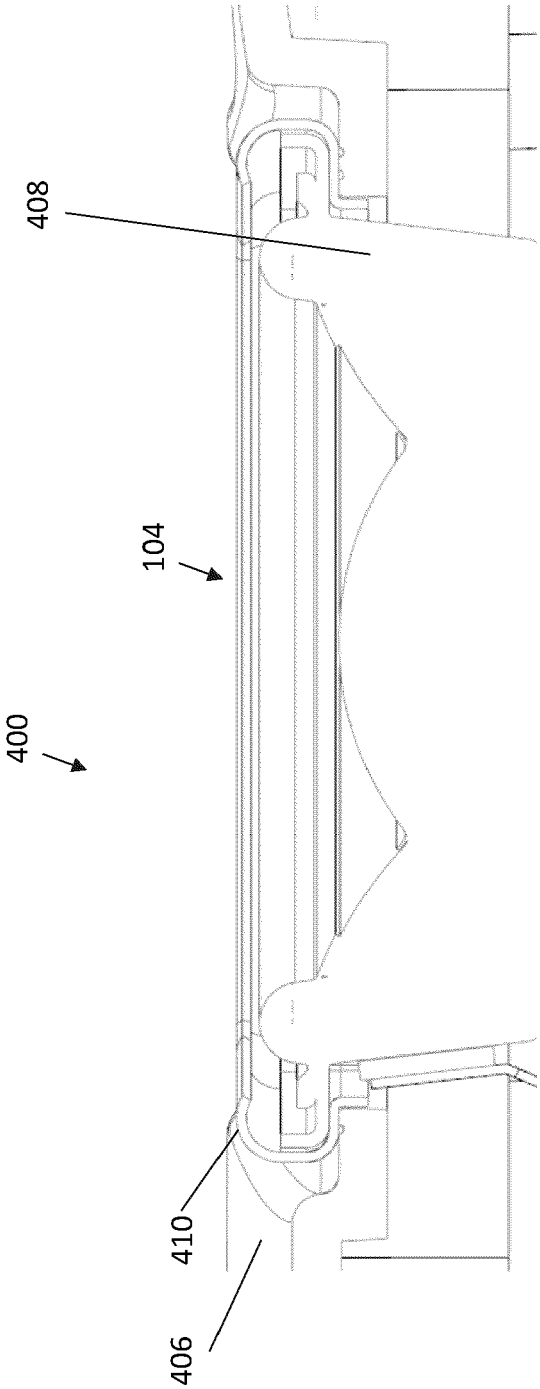

FIG. 4E

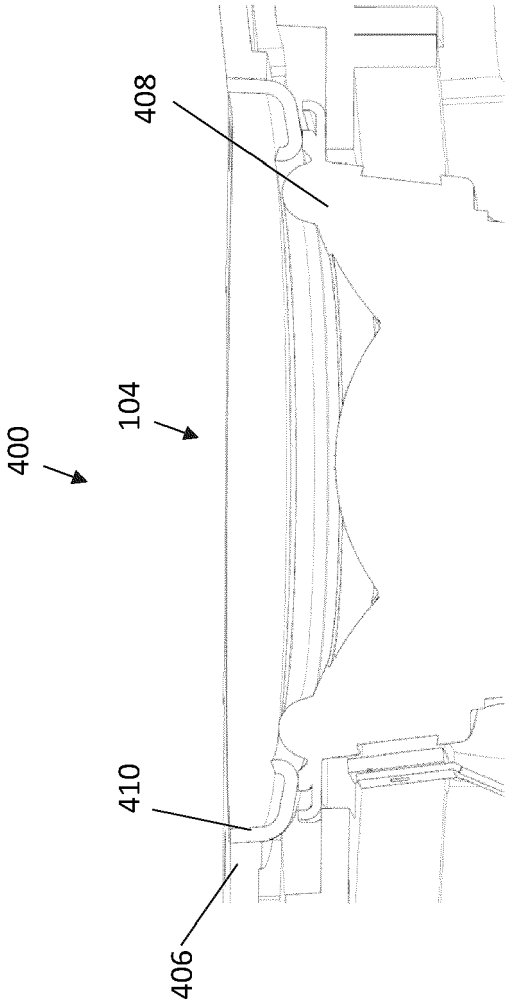

FIG. 4F

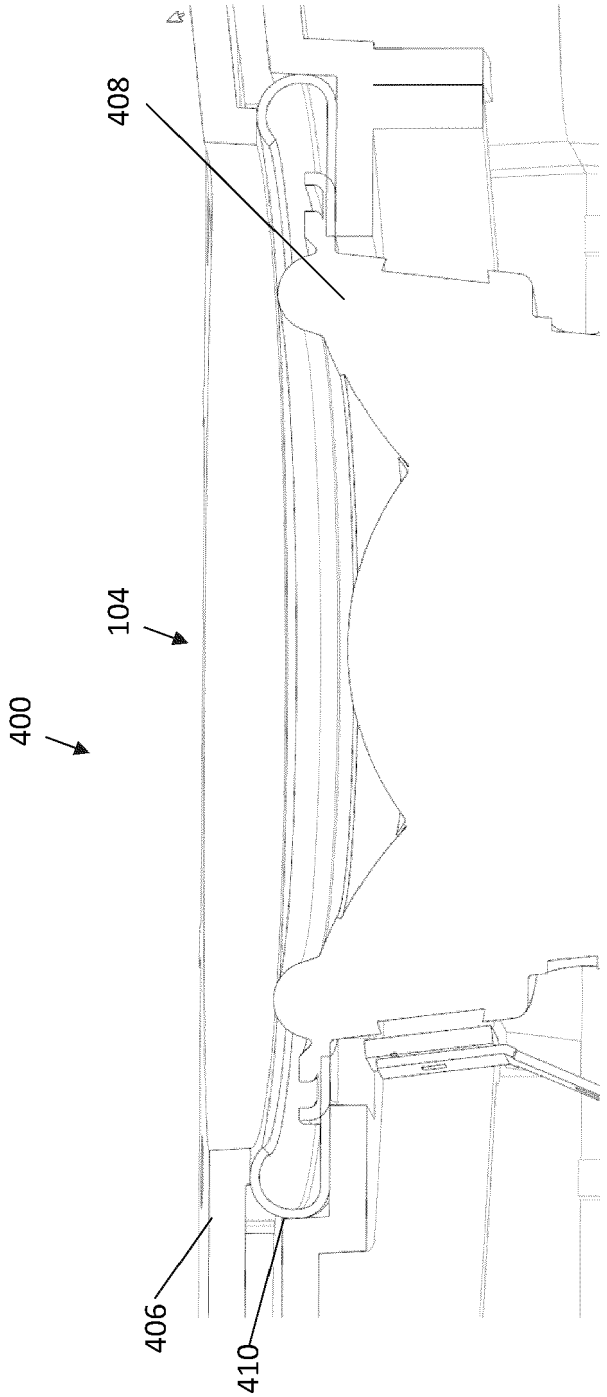

FIG. 4G

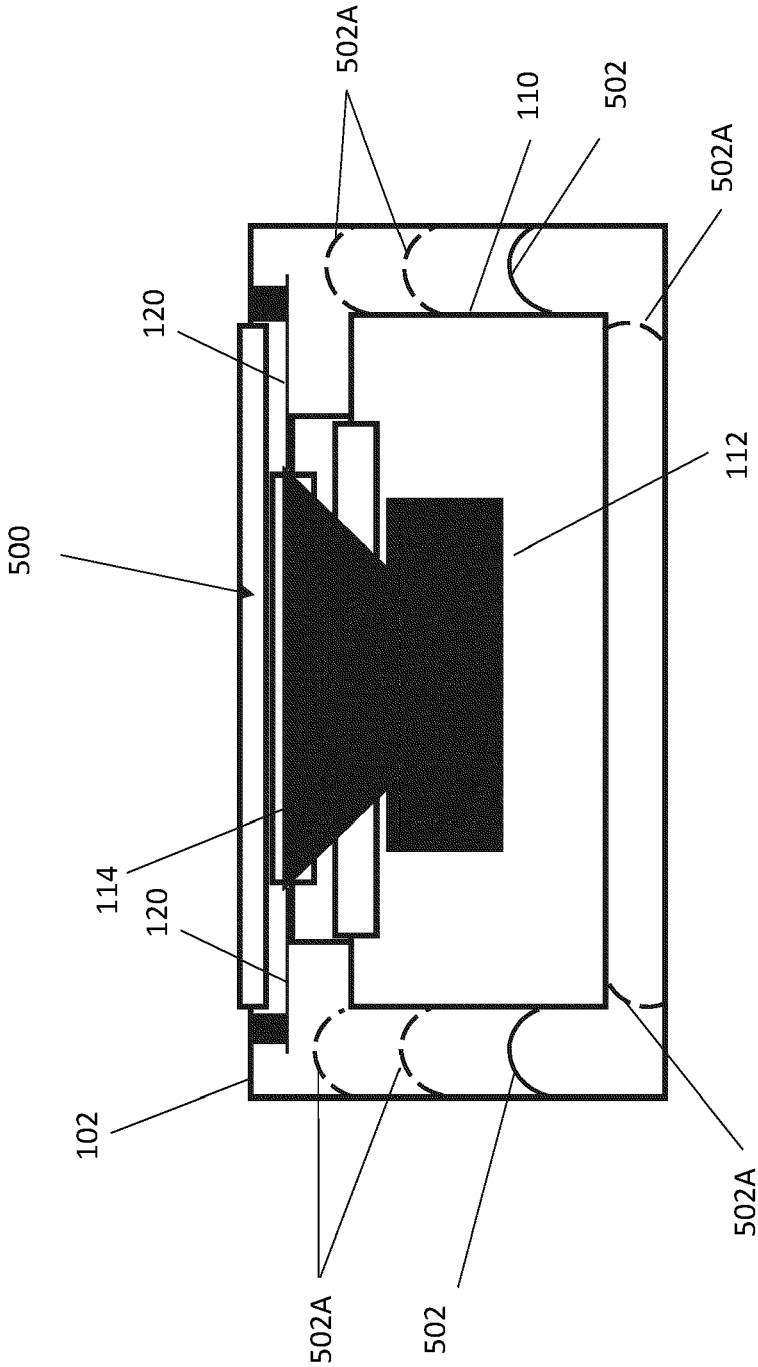

FIG. 5

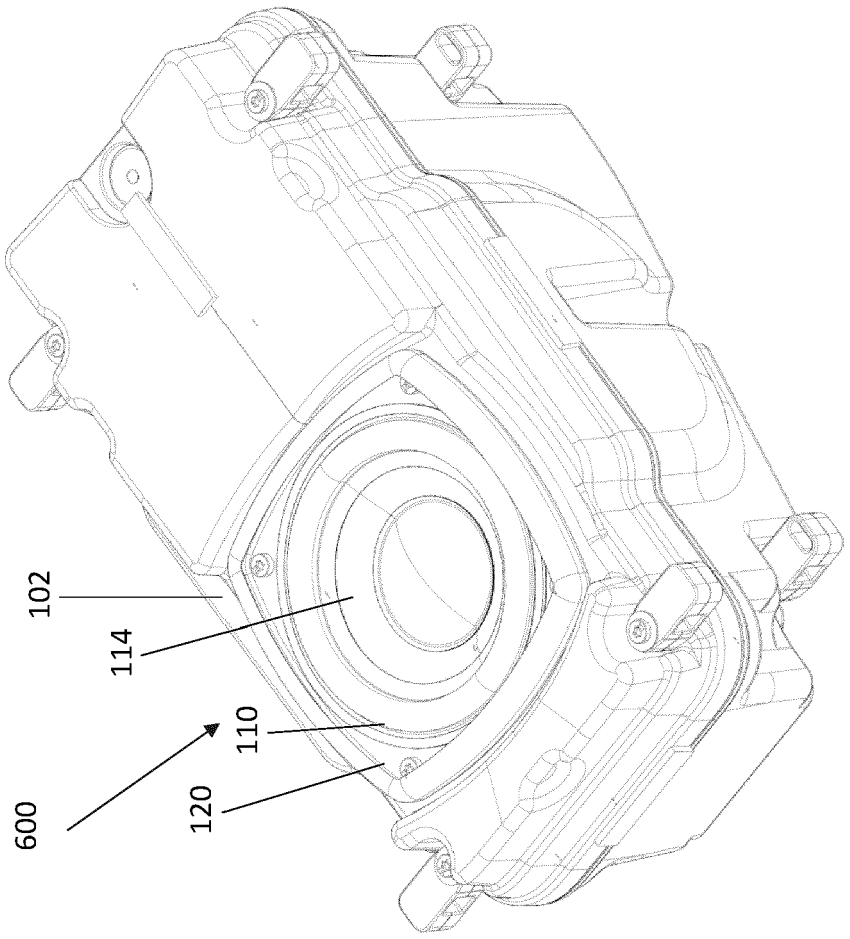

FIG. 6

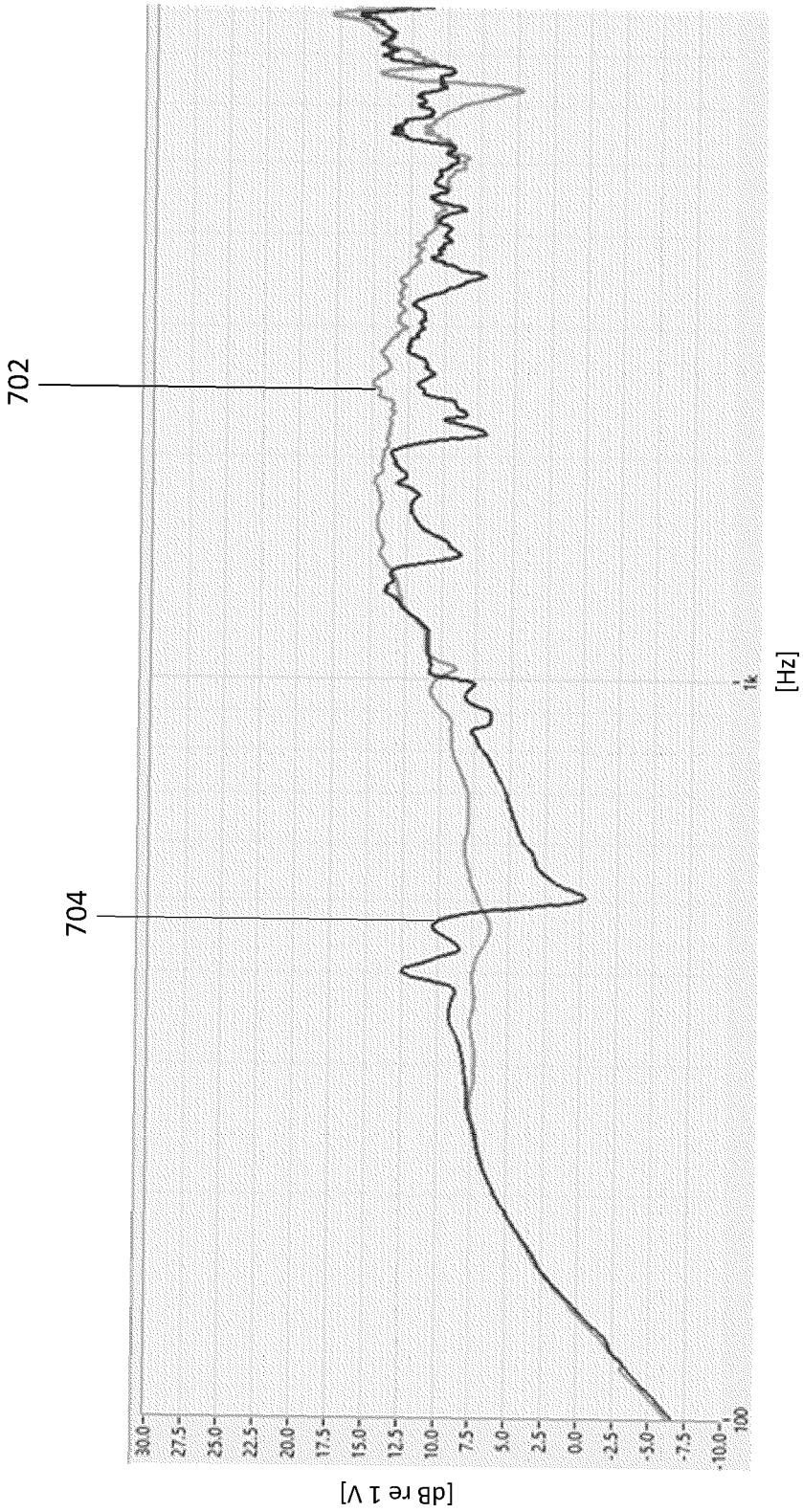
702
704
[dB re 1 V]
30.0
27.5
25.0
22.5
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0
-2.5
-5.0
-7.5
-10.0
100
1k
[Hz]

FIG. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 23 21 9613

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	30 April 2024	Moscu, Viorel

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