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(54) **Loudspeaker stabilizer**

(57) An apparatus (100) for stabilizing and retaining a speaker with respect to a surface, comprising a stabilizing portion (120) to stabilize the speaker; and immobi-

lizing means (130), connected to said stabilizer portion, to immobilize the speaker, and retain it in a desired position.

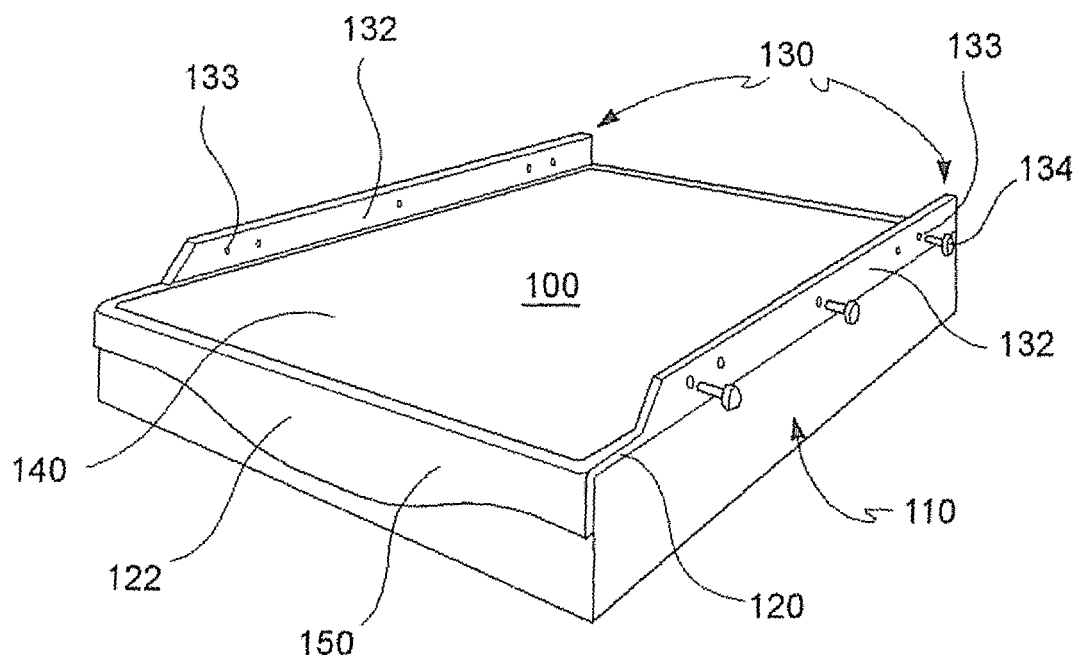


FIG. 1

Description

[0001] The present invention relates to a loudspeaker stabilizing system. More particularly, the invention relates to an apparatus, system and a method for stabilizing a loudspeaker.

Background

[0002] In recording studios, loudspeakers are most often placed directly on shelves or on various types of stands. When the loudspeaker is activated, energy from the loudspeaker causes the loudspeaker to vibrate, which in turn causes the shelf to resonate, due to direct acoustic coupling. This causes unwanted resonant frequencies to pollute the signal and results in forward energy loss, resulting in a reduced transient response.

[0003] Recording studio engineers and audio enthusiasts have been trying to achieve high quality sound reproduction by seeking out the very best loudspeakers to suit their musical preferences. In an illustrative case of a studio engineer, once a speaker has been selected, the engineer will typically bring his speaker to various studios in effort to provide a "starting point" for consistent and repeatable sound reproduction. The impact of uncontrollable factors such as room acoustics and speaker placement may be minimized by using near field monitors. These are generally mounted on top of a mixing console, within, for example, two meters of the engineer's sitting position so that the direct sound generated by the loudspeakers dominates over and above any reflected or ambient sound within the room.

[0004] It is well documented that speakers, when placed on top of a solid surface such as a desk, shelf, speaker-stand or mixing console, will couple with the mechanical structure, which imparts a sonic signature to the speakers. For instance, a shelf may resonate at 100 Hz (100 cycles per second) when a bass note is played by the loudspeaker. As a consequence of the mechanical coupling between the speaker and the shelf, a 100 Hz peak will also be audible. One solution to this problem has been to isolate a loudspeaker from the mechanical structure by utilizing a soft urethane foam pad. Others have also presented options such as placing the loudspeaker on top of sand granules as a means to decouple the device and/or by suspending the speaker in the air with wires.

[0005] In all these cases, the loudspeaker is "suspended" to prevent the transfer of energy and therefore to eliminate resonance phenomena. But this in itself creates a new problem. The speaker is no longer stable, since it is left to "float" or sway. The float or sway condition causes a movement of the speaker in response to the energy impulse to be transformed by the loudspeaker and introduced into the sound to be reproduced; in other terms, there is an impairment of the transient response of the loudspeaker. This problem may be understood by imagining the recoil generated by a rifle, when fired. The en-

ergy during the explosion forces the bullet out of the barrel while the rifle itself recoils back reducing the forward energy. If one were to fix the rifle so that the recoil would be eliminated, it would at once increase the forward energy but likely destroy the rifle after repeated use.

[0006] A loudspeaker is basically made of an electromagnetic motor that drives a piston. As the speaker is energized with current, the piston moves to create sound. The sharper the transient wave, the more quickly and precisely the speaker should react. When the loudspeaker is suspended or placed on the top of a "movable" or "soft" material, the forward momentum that would normally produce a distinct transient is softened (reduced) as the speaker recoils backwards. The result is a less distinct transient. This affects both low frequencies which produce bass and punch, and high frequencies which convey spatial information. Accordingly, there is a need for new apparatus, system and method for stabilizing a loudspeaker.

Summary of the invention

[0007] There is presented an apparatus, method and/or loudspeaker stabilizing system that isolates a loudspeaker from offensive tones caused by mechanical coupling while reducing the recoil that is introduced when the loudspeakers is suspended.

[0008] The invention comprises one or more of the following features:

- an isolation portion to isolate the speaker from a surface;
- a stabilizing portion provided between the speaker and a surface with respect to which the speaker has to be stabilized;
- immobilizing means, connected to said stabilizing portion, to hold and immobilize the speaker in a desired position with respect to the stabilizing portion;
- a retaining portion provided between the speaker and the stabilizing portion to dampen the stabilizing portion;
- attachment means to a surface, or to a wall, or to a ceiling;
- wire means for suspending directly or indirectly the speaker to the ceiling;
- supporting and/or hooking means, provided at the base of said isolation portion, when the apparatus is suspended through wire means.

[0009] According to an embodiment, said attachment means comprises said wire means and said supporting and/or hooking means.

[0010] According to another embodiment, said attachment means comprises a bracket for attachment to a wall.

[0011] In accordance to a preferred embodiment, the stabilizing portion comprises multiple layers, platforms, or elements of different mass to prevent resonance.

[0012] With respect to one or more of the portions, a

hole, a change in mass, a change in size, and/or a change in shape may be provided to prevent resonance.

[0013] In one general aspect, an apparatus for stabilizing a speaker with respect to a surface comprises: a stabilizing portion placed on an isolation portion, which is put on the surface from which the speaker has to be isolated; immobilizing means, constrained to the stabilizing portion, wherein such immobilizing means holds and immobilizes the speaker in a desired position with respect to the stabilizing portion.

[0014] According to a further embodiment, the apparatus further comprises a retaining portion provided between the speaker and the stabilizing portion to dampen the stabilizing portion.

[0015] According to a further embodiment, the apparatus further comprises a resonance preventing portion to introduce impedance mismatch with respect to the stabilizing portion.

[0016] In another general aspect, an apparatus for stabilizing a speaker with respect to a surface comprises: an isolation portion which isolates the speaker from the surface to prevent the transfer of energy; and a stabilizing portion which requires more energy to set into motion, relative to that of the isolation portion, to reduce the recoil of the speaker and increase the momentum of sound produced by the speaker.

[0017] In yet another general aspect, a speaker system comprises:

a speaker;

and a speaker stabilizer for stabilizing the speaker with respect to a surface, comprising an isolation portion to isolate the speaker from the surface; and a stabilizing portion provided between the speaker and the isolation portion to stabilize the speaker; and immobilizing means, constrained to said stabilizing portion, to hold and immobilize the speaker in a desired position with respect to the stabilizing portion.

[0018] According to an embodiment, the isolation portion is put on the surface from which the speaker has to be isolated, which acts as a base for the speaker stabilizer.

[0019] According to an embodiment, the speaker stabilizer is provided to a base of the speaker.

[0020] According to an embodiment, the mass of the speaker stabilizer may be different than that of the speaker to prevent resonance.

[0021] In another general aspect, an apparatus for stabilizing a speaker with respect to a wall comprises: a stabilizing portion placed on an isolation portion, which is put on a bracket suitable to be attached to a wall; immobilizing means, constrained to the stabilizing portion, wherein such immobilizing means holds and immobilizes the speaker in a desired position with respect to the stabilizing portion.

[0022] According to a further embodiment, the apparatus further comprises a retaining portion provided be-

tween the speaker and the stabilizing portion to dampen the stabilizing portion.

[0023] According to a further embodiment, the apparatus further comprises a resonance preventing portion to introduce impedance mismatch with respect to the stabilizing portion.

[0024] In yet another general aspect, a speaker system comprises:

a speaker;

and a speaker stabilizer for stabilizing the speaker with respect to a wall, according to one of the previously described embodiments of an apparatus for stabilizing a speaker with respect to a wall.

[0025] In another general aspect, an apparatus for stabilizing a speaker with respect to a ceiling comprises: a stabilizing portion; immobilizing means, constrained to said stabilizing portion, wherein the immobilizing means holds and immobilizes the speaker in a desired position with respect to the stabilizing portion; and said immobilizing means are suitable to be attached to a ceiling by wire means in such a way to hang the apparatus and the speaker constrained to the apparatus, without the need of a base surface.

[0026] According to a further embodiment of the above described apparatus for stabilizing a speaker with respect to a ceiling, the apparatus further comprises a retaining portion provided between the speaker and the stabilizing portion to dampen the stabilizing portion.

[0027] According to a further embodiment, the apparatus for stabilizing a speaker with respect to a ceiling comprises: a stabilizing portion to which immobilizing means is constrained; wherein said immobilizing means holds and immobilizes the speaker in a desired position with respect to the stabilizing portion; said stabilizing portion is put on an isolation portion which is put on a supporting plate, which is provided with attachments to wire means for suspending to the ceiling the apparatus and the speaker constrained to the apparatus.

[0028] According to a further embodiment, the apparatus for stabilizing a speaker with respect to a ceiling comprises: a stabilizing portion to which immobilizing means is constrained; wherein said immobilizing means holds and immobilizes the speaker in a desired position with respect to the stabilizing portion; said immobilizing means is provided with attachments to springs for suspending to the ceiling the apparatus and the speaker constrained to the apparatus.

[0029] In yet another general aspect, a speaker system comprises:

a speaker;

and a speaker stabilizer for stabilizing the speaker with respect to a ceiling, according to one of the previously described embodiments of an apparatus for stabilizing a speaker with respect to a ceiling.

[0030] In still another general aspect, a method of stabilizing a speaker with respect to a surface comprises: providing an isolation portion to isolate the speaker from the surface; providing a stabilizing portion between the speaker and the isolation portion to stabilize the speaker; and providing immobilizing means, constrained to said stabilizing portion, to hold and immobilize the speaker with respect to the stabilizing portion.

[0031] In still another general aspect, a method of stabilizing a speaker with respect to a wall comprises: providing a bracket suitable to be attached to a wall; providing an isolation portion to isolate the speaker from the bracket; providing a stabilizing portion between the speaker and the isolation portion to stabilize the speaker; and providing immobilizing means, constrained to said stabilizing portion, to hold and immobilize the speaker with respect to the stabilizing portion.

[0032] In still another general aspect, a method of stabilizing a speaker with respect to a ceiling comprises: providing a stabilizing portion; providing immobilizing means, constrained to said stabilizing portion, to hold and immobilize the speaker with respect to the stabilizing portion; providing wire means, attached to said immobilizing means, to suspend to a ceiling the apparatus and the speaker constrained to the apparatus.

[0033] Other features will become apparent to those skilled in the art from the following detailed description, which, taken in conjunction with the attached drawing(s), discloses exemplary embodiments of the invention.

Brief description of the drawings

[0034]

Fig. 1 is a diagram illustrating an exemplary speaker stabilizer according to the present invention for stabilizing a speaker with respect to a surface.

Fig. 2 and Fig. 3 show further embodiments of a speaker stabilizer according to the present invention for stabilizing a speaker with respect to a surface.

Fig. 4 shows an exemplary system according to the present invention, comprising a speaker and speaker stabilizer for stabilizing a speaker with respect to a surface.

Fig. 5 shows a further exemplary speaker stabilizer according to the present invention for stabilizing a speaker with respect to a ceiling.

Fig. 6 shows a further embodiment of a speaker stabilizer according to the present invention for stabilizing a speaker with respect to a ceiling.

Fig. 7 is a diagram illustrating a further exemplary system according to the present invention, comprising a speaker and speaker for stabilizing a speaker with respect to a ceiling.

[0035] Throughout the drawings and the description, the same drawing reference numerals will be understood to refer to the same elements, features, and structures.

Detailed description of preferred embodiments

[0036] The following detailed description is provided to assist the reader in gaining a comprehensive understanding of the apparatuses, methods and/or systems described herein. Accordingly, various changes, modifications, and equivalents of the apparatuses, systems and/or methods described herein will be suggested to those of ordinary skill in the art. Also, descriptions of well-known functions and constructions are omitted to increase clarity and conciseness.

[0037] Fig. 1 is a diagram illustrating an exemplary speaker stabilizer 100 for stabilizing a speaker (shown in fig. 3) with respect to a surface. As illustrated in fig. 1, the speaker stabilizer comprises: an isolation portion 110; a stabilizing platform portion 120; immobilizing means 130, connected to said stabilizing portion; a retaining surface portion 140; and an impedance or resonance preventing portion 150.

[0038] The isolation portion 110 may act as, for example, a base medium. The isolation portion 110 may be any type of dampening material and may be produced in various shapes to meet the demands, and angled to direct the speaker (shown in fig. 3) to the optimum listening position. In the example of fig. 1, the isolation portion 110 mechanically isolates the speaker (shown in fig. 3) and the stabilizing portion 120 from hard surfaces which in turn could resonate and introduce artefact into the sound field. In one implementation, the isolation portion 110 may be produced using a high-density urethane foam but may also be produced using any type of energy-absorbing substance, such as soft, isolation or dampening material, spring or other insulating substance such as sand (granular). The isolation portion 110 may decouple the speaker from the hard surfaces such as a desk, shelf, or meter bridge to prevent resonance from the speaker transferring to, for example, the desk, and stops the resonant frequency of the desk from interfering with a musical playback of the speaker. The isolation portion 110 also acts to provide vibration damping for the stabilizing platform 120.

[0039] The stabilizing platform portion 120 provides mass to the speaker system to provide a stabilizing effect. The stabilizing platform portion 120 may be of any heavy rigid mass or any material whose weight will provide a stabilizing effect to the speaker system. In one implementation, the stabilizing platform portion 120 may be produced from steel, lead, concrete, granite, stone, or any other heavy material whose weight will sufficiently increase the overall mass of the speaker system. For example, heavy 6 mm laser-cut steel may be used to implement the stabilizing platform portion 120. When the speaker is stationary, the energy transfer to the speaker is forward and not lost due to the soft underpad. This improves the transient response which in turn improves the bass performance, sonic detail, and depth of field. As shown in fig. 1, a flange 122 may be provided to further increase the mass. The flange 122 may increase the

weight while keeping the physical footprint smaller and/or used to control the ratio in mass of a speaker to speaker stabilizer (100) to a predetermined ratio. In the example of fig. 1, the stabilizing platform portion 120 is dampened by sandwiching it between an isolation portion 110 and the retaining surface portion 140 as a means to reduce and prevent resonance or ringing. In further embodiments, this may be further augmented by introducing impedance changes in the medium such as changing the mass in various locations by, for example, cutting holes in the stabilizing platform portion 120, increasing the mass in certain areas and/or by altering the shape of the stabilizing platform portion 120.

[0040] The immobilizing means 130 is provided to hold and immobilize the speaker in a desired position with respect to the stabilizing portion. According to a preferred embodiment, such immobilizing means comprises at least one anchor retainer plate, connected to the stabilizing portion, provided with attachment devices suitable to hold and immobilize the speaker in a vice-like and adjustable way.

[0041] According to exemplary embodiment shown in fig. 1, such immobilizing means 130 comprises two side anchor retainer plates 132, each of which provided with several screw holes 133, where several screws 134 are used to secure a loudspeaker in place by tightening the screws against the loudspeaker. Loudspeakers of various sized can be secured, because the screws 134 can be more or less tightened for this purpose. The screws 134 can be adjusted to precisely "aim" a particular loudspeaker to be stabilized and to allow the loudspeaker to be placed in different positions (e.g., "rotated" with respect to an axis perpendicular to a base surface).

[0042] According to a particular embodiment, the anchor retainer plates 132 employ an angular cut to eliminate ringing or self-resonance.

[0043] In a further particular embodiment, some of the screw holes 133 may be used to secure a safety chain the loudspeaker.

[0044] In accordance with a further embodiment, the immobilizing means may be exploited to achieve a further advantageous effect, in addition to its main function of holding and immobilizing the speaker in a desired position: such immobilizing means, in particular the anchor plates 132, may further increase the mass and weight while keeping the physical footprint smaller. In fact, once respected the basic specifications of the anchor plates 132 (necessary to achieve the main function of "immobilizing means"), there are still degrees of freedom in the size, form, weight of such anchor plates, to be properly used in the design of the speaker stabilizer to control the ratio in mass of a speaker to speaker-stabilizer to a predetermined ratio, that is to further improve the stabilizer performances. In other terms, the selection of a value for the mass, and/or for the form of the plates allows to "tune" the apparatus design in order to properly prevent resonance.

[0045] The retaining surface portion 140 may serve to

receive the speaker (shown in fig. 3). In one embodiment, the retaining surface portion 140 may provide additional dampening of the stabilizing platform portion 120. The retaining surface portion 140 may be any form of applied surfacing material that may dampen the stabilizing platform portion 120 while providing added friction for the speaker. According to an embodiment, the retaining surface platform can be a no-slip-pad on the upper surface of the apparatus. The no-slip-pad can be implemented for example as a coating with a thin non-slip neoprene pad or any other type of treatment that can increase friction. The retaining surface platform 140 and its thickness may be provided as to provide a cushion for the speaker to prevent sliding around, while ensuring a positive coupling to the stabilizing platform portion 120.

[0046] The impedance or resonance preventing portion 150 may be provided to prevent resonance. In the example of fig. 1, the flange 122 is also cut to an irregular shape to prevent the chance of the flange 122 vibrating or ringing at a specific frequency, and serves as the impedance or resonance preventing portion 150. The standing waves or resonance of the stabilizing platform 120 and the flange 122 is further reduced by providing an irregular shape or altering the size. In the example of fig. 1, the occurrence of standing waves or resonance of the stabilizing platform portion 120 is dampened by the isolation portion 110, by the immobilizing retainer means 140. To further reduce the opportunity for vibration, the irregularly shaped front flange 122 is provided which adds an uneven mass to the stabilizing platform portion 120. This makes it difficult for a standing wave to exist as the inner vibrations cannot reach a stable or predictable resonating frequency. The front flange 122 is also dampened by the adjacent isolation portion 110.

[0047] Fig. 2 shows a further embodiment of the invention, including an isolation portion 110, a stabilizing portion 120, immobilizing means 130, and a resonance preventing portion 150, wherein said elements 110, 120, 130, 150 are the same as described for fig. 1.

[0048] Fig. 3 shows a further embodiment of the invention, which differs from the ones describes in fig. 1 and 2 because the isolation portion is shaped in such a way to allow the stabilizing portion 120 being not parallel to the base surface, i.e., being "angled" (angle α) with respect to said surface. This can be exploited in cases where the optimum position of the loudspeaker has to be "angled" e.g., with respect to a floor (and therefore, with respect to a listening position). This can be realized thanks to the function performed by the immobilizer means 130, that can properly hold a loudspeaker also in the mentioned "angled" position. Thanks to this feature, the loudspeaker can be angled both "up" and "down" with respect to a plane parallel to a floor.

[0049] Fig. 4 shows an exemplary system according to the present invention, comprising a speaker 200 and a speaker stabilizer 100 according to the embodiment described in fig. 1.

[0050] Fig. 5 shows a further exemplary speaker sta-

bilizer embodiment according to the present invention for stabilizing a speaker with respect to a ceiling. The apparatus in fig. 5 comprises:

- a stabilizing portion 120, characterized for example as described in the embodiment of fig. 1;
- immobilizer means 130, characterized for example as described in the embodiment of fig. 1;
- wire means 160 for suspending to the ceiling, including wires 161 and hanging points 162; four wires attached via four hanging points to the stabilizing platform body are shown in the exemplary embodiment of fig. 5. In a further embodiment, the hanging points 162 are attached to the anchor plates of the immobilizing means 130. In another embodiment, the number of wires is different from four.

[0051] In accordance with the embodiment shown in fig. 5, the speaker stabilizer (and therefore the speaker) are suspended through suspending means, for example cables, for example to the ceiling, at a desired height and angle for optimum placement.

[0052] Fig. 6 shows a further exemplary speaker stabilizer embodiment according to the present invention for stabilizing a speaker with respect to a ceiling. The apparatus in fig. 6 comprises:

- a stabilizing portion 120, characterized for example as described in the embodiment of fig. 1;
- immobilizer means 130, characterized for example as described in the embodiment of fig. 1;
- an isolation portion 110, characterized for example as described in the embodiment of fig. 1, below the stabilizing portion;
- a supporting plate 170, provided at the base of said isolation portion;
- wire means 160 for suspending to the ceiling, including wires 161 and hanging points 162; four wires attached via four hanging points to the supporting plate 170 are shown in the exemplary embodiment of fig. 6.

[0053] In accordance with the embodiment shown in fig. 6, the speaker stabilizer (and therefore the speaker) are suspended through suspending means, for example cables, for example to the ceiling, at a desired height and angle for optimum placement.

[0054] Fig. 7 shows an exemplary system according to the present invention, comprising a speaker 200 and a speaker stabilizer 100 according to the embodiment described in fig. 5.

[0055] While the construction of a speaker stabilizer has been shown to comprise two to seven components, it will be understood that this is only an illustration of one of the many embodiments of the present invention. In one implementation, a speaker stabilizer may comprise three components or layers: an isolation component or layer; a stabilization platform component or layer; and a

retaining surface component or layer. In another implementation, for example, additional isolation or stabilization may be achieved by adding additional component(s) or layer(s) to the speaker stabilizer design. For example, two different steel plates may be provided as a single assembly to form the stabilizing platform portion, or multiple layers of steel or other stabilizing mass may be used to introduce a greater degree of "impedance mismatch". Even greater effect may be achieved by providing each plate, layer, or mass element of different weight (mass) as the energy will not sympathetically vibrate between them, that is, the vibration will be out of sync due to different resonant frequency.

[0056] Still yet in another implementation, a speaker stabilizer may comprise the use of an isolation medium with a stabilizing platform that is in turn coated with a non-slip surface. In another implementation, a speaker stabilizer may comprise a support and isolation structure. By increasing the mass of the stabilizing platform support and isolation structure, the speaker is presented with a stable platform that requires more energy to set into motion, relative to that of, for example, an isolation portion, while being isolated by the isolation portion of the structure.

[0057] Yet in another implementation, a predetermined mass relationship of, for example, a speaker stabilizer, a stabilizing platform portion of the stabilizer, a front flange of the stabilizer, anchor retainer plates, and the speaker is provided to create an impedance mismatch or unpredictable set of mass variants that will prevent resonance. For example, a speaker stabilizer is provided to have a different mass than that of the speaker so that they will not vibrate in sympathy. As a further example, a speaker stabilizer may be provided such that a speaker to speaker-stabilizer mass of 4:1 is achieved, for example, providing a speaker stabilizer with 5 Kg in weight for a loudspeaker with 20 Kg in weight. Indeed, the higher the mass of the apparatus in comparison to the loudspeaker, the greater is its effect. According to a particular embodiment, as a particular advantageous case, it has been found that when one follows a 1 to 4 ratio, whereby the mass of the apparatus is $\frac{1}{4}$ the mass of the loudspeaker, the resulting effect is very satisfactory.

[0058] Furthermore, while the use of loudspeakers in recording industry is disclosed, it is understood that the present invention applies to the use of loudspeakers in all types of listening environments and applications including residential audio systems, commercial sound, and the like. It is understood that the term loudspeaker or speaker is used interchangeably and it can refer to individual devices (or drivers), and complete systems consisting of an enclosure incorporating one or more drivers and additional electronics. It is also understood that the present invention may be produced in a variety of ways. As an illustrative embodiment, one or more components or layers of a speaker stabilizer may be laminated, or integrated in a structure such that, for example, a

portion of the structure isolates a speaker while another portion stabilizes the speaker, while another portion immobilizes the speaker. Moreover, in a speaker system, a speaker stabilizer of the present invention may be applied to a loudspeaker itself, for example, introduces as a base of the loudspeaker.

[0059] According to certain embodiments described above, movement caused by the speaker, and the ensuing counter-effect, i.e., recoil, are significantly reduced. A given medium may resonate at one or more frequency based in its size, shape, mass and the energy that may excite it. By controlling the size, shape, mass, and form a speaker stabilizer and its elements, as described above, the outcome is clearer more distinct audio throughout the listening range.

[0060] In accordance with an embodiment, the apparatus for stabilizing a speaker with respect to a surface, comprises an isolation portion to isolate the speaker from the surface; a stabilizing portion provided between the speaker and the isolation portion to stabilize the speaker.

[0061] In accordance with a further embodiment, the stabilizing portion includes a non slip surface to receive the speaker.

[0062] In accordance with another embodiment, the stabilizing portion requires more energy to set into motion, relative to that of the isolation portion, to stabilize the speaker.

[0063] In accordance with a further embodiment, the apparatus further comprises a retaining portion provided between the speaker and the stabilizing portion to dampen the stabilizing portion.

[0064] In accordance with a further embodiment, the apparatus further comprises a resonance preventing portion to introduce impedance mismatch with respect to the stabilizing portion.

[0065] In accordance with another embodiment, with respect to one or more of the portions of the apparatus, a hole, a change in mass, a change in size, and/or a change in shape is provided to prevent resonance.

[0066] According to another embodiment, the stabilizing portion comprises multiple layers, platforms, or elements of different mass to prevent resonance.

[0067] According to a further embodiment, the isolation portion is a layer comprising any one of a urethane foam, spring, and sand granular.

[0068] In accordance with another embodiment, the stabilizing portion is a layer comprising any one of a steel, lead, concrete, granite and stone.

[0069] In accordance with another embodiment, an apparatus for stabilizing a speaker with respect to a surface, comprises an isolation portion which isolates the speaker from the surface to prevent the transfer of energy; and a stabilizing portion which requires more energy to set into motion, relative to that of the isolation portion, to reduce the recoil of the speaker and increase the momentum of sound produced by the speaker.

[0070] According to a further embodiment, the speaker system comprising: a speaker; a speaker stabilizer for

stabilizing the speaker with respect to a surface, comprising: an isolation portion to isolate the speaker from the surface; and a stabilizing portion provided between the speaker and the isolation portion to stabilize the speaker.

[0071] According to a further embodiment, the speaker system further comprises a retaining portion between the speaker and the stabilizing portion to dampen the stabilizing portion.

[0072] According to a further embodiment, the speaker system comprises a stabilizing portion requires more energy to set into motion, relative to that of the isolation portion, to stabilize the speaker.

[0073] According to another embodiment, the speaker stabilizer is provided to a base of the speaker.

[0074] According to another embodiment, in the speaker system, the mass of the speaker stabilizer is different than that of the speaker to prevent resonance.

[0075] According to a further embodiment, the ratio of mass of the speaker and speaker-stabilizer is 4:1.

[0076] In accordance with an embodiment of the present invention, a method of stabilizing a speaker with respect to a surface, comprises: providing an isolation portion to isolate the speaker from the surface; and providing a stabilizing portion between the speaker and the isolation portion to stabilize the speaker.

[0077] According to another method embodiment, said method further comprises providing a retaining portion between the speaker and the stabilizing portion to dampen the stabilizing portion.

[0078] In accordance with another method embodiment, the providing of the stabilizing portion requires more energy to set into motion, relative to that of the isolation portion, to stabilize the speaker.

[0079] In accordance with a further method embodiment, the providing of the isolation and stabilizing portions comprise providing a hole, a change in mass, a change in size, and/or a change in shape with respect to one or more of the portions to prevent resonance.

[0080] According to another method embodiment, said method further comprises providing a resonance preventing portion to introduce impedance mismatch with respect to the stabilizing portion.

[0081] According to another method embodiment, said method further comprises providing a stabilizing portion wherein multiple layers, platforms, or elements of different mass to prevent resonance are comprised.

[0082] A number of exemplary embodiments have been described above. Nevertheless, it will be understood that various modifications may be made. For example, suitable results may be achieved if the described techniques are performed in a different order and/or if components in a described system architecture, device, or circuit are combined in a different manner and/or replaced or supplemented by other components or their equivalents.

Claims

1. An apparatus (100) for stabilizing and retaining a speaker with respect to a surface, comprising:
 - a stabilizing portion (120) to stabilize the speaker; and
 - immobilizing means (130), connected to said stabilizer portion, to immobilize the speaker, and retain it in a desired position.
2. The apparatus of claim 1 further comprising an isolation portion (110) between the stabilizing portion (120) and said surface.
3. The apparatus of claim 2, wherein the isolation portion (110) isolates the speaker from the surface to prevent the transfer of energy; and the stabilizing portion (120) requires more energy to set into motion, relative to that of the isolation portion (110), to reduce the recoil of the speaker and increase the momentum of sound produced by the speaker.
4. The apparatus according to any of the previous claims, further comprising attachment means to a surface, or to a ceiling, or to a wall.
5. The apparatus according to any of the previous claims, further comprising a bracket for connecting the apparatus to a wall.
6. The apparatus according to any of the previous claims, further comprising wire means (160) suitable to be connected to immobilizer means and to suspend the apparatus to a ceiling.
7. The apparatus of claim 6 further comprising a supporting plate (170), where hanging points (162) are attached where wire means (160) are attached to suspend the apparatus to a ceiling.
8. The apparatus of claims 6 or 7 wherein the wire means (160) are springs.
9. The apparatus according to any of the previous claims, further comprising retainer means (140) between the speaker and the stabilizing portion (110).
10. The apparatus according to any of the previous claims, further comprising a resonance preventing portion (150) to introduce impedance mismatch with respect to the stabilizing portion (120).
11. The apparatus according to any of previous claims, wherein in one or more of the portions of the apparatus, a hole, a change in mass, a change in size, and/or a change in shape is provided to prevent resonance.
12. A system comprising a speaker (200) and the speaker stabilizer (100) according to any of the previous claims.
13. A method of stabilizing a speaker with respect to a surface, the method comprising:
 - providing a stabilizing portion (120) to stabilize the speaker; and
 - providing immobilizing means (130), connected to said stabilizer portion, to immobilize the speaker, and retain it in a desired position.
14. The method of claim 13, further comprising providing an isolation portion (110) between the stabilizing portion (110) and the surface with respect to which the speaker has to be stabilized.
15. The method of claim 13 or 14, further comprising providing attachment means to a surface, or to a ceiling, or to a wall.

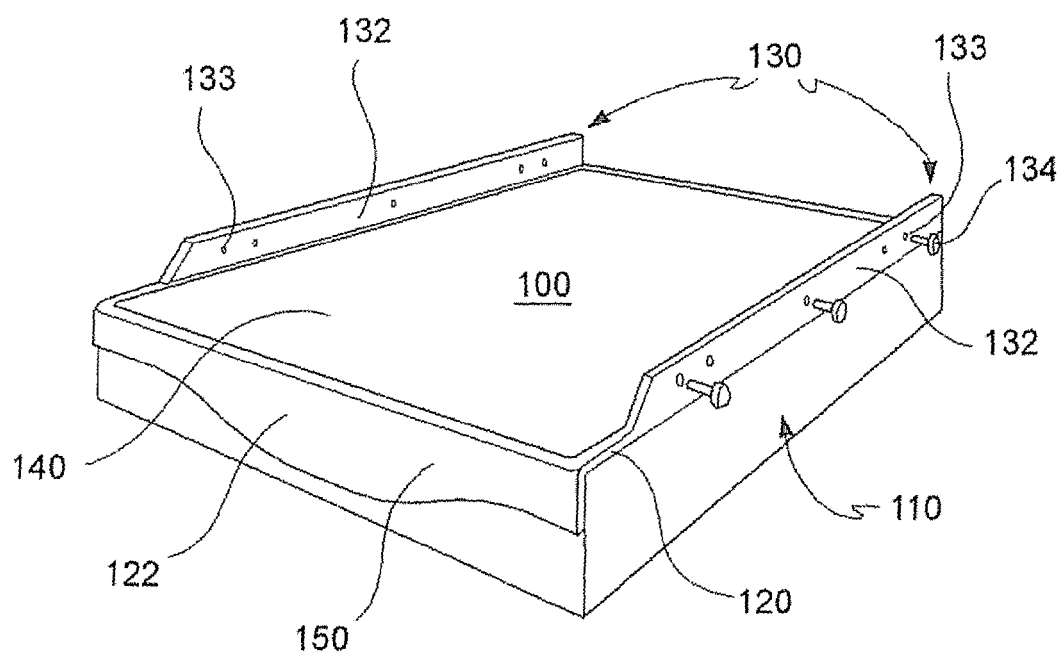


FIG. 1

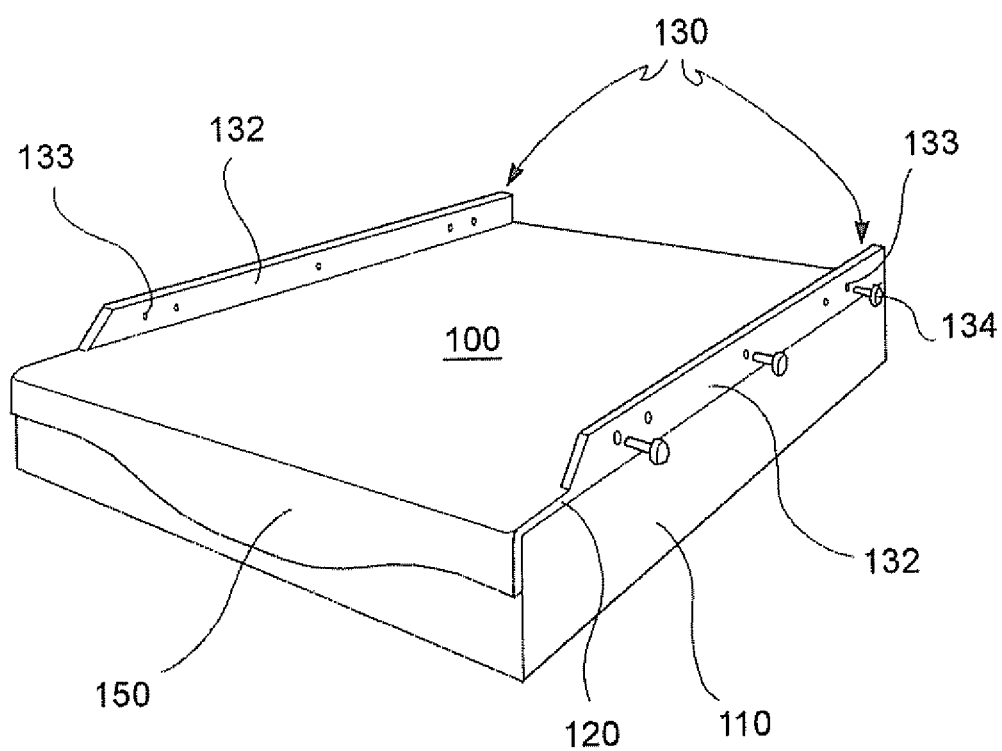


FIG. 2

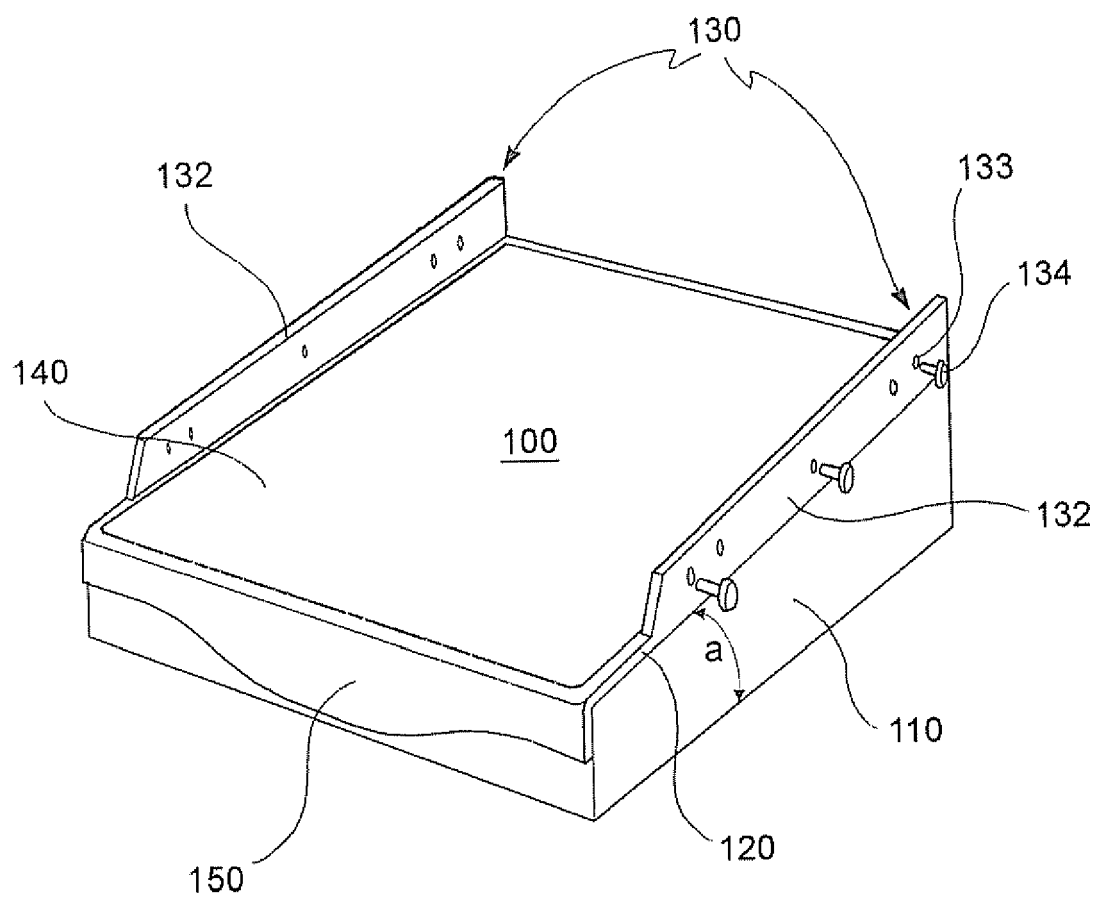


FIG. 3

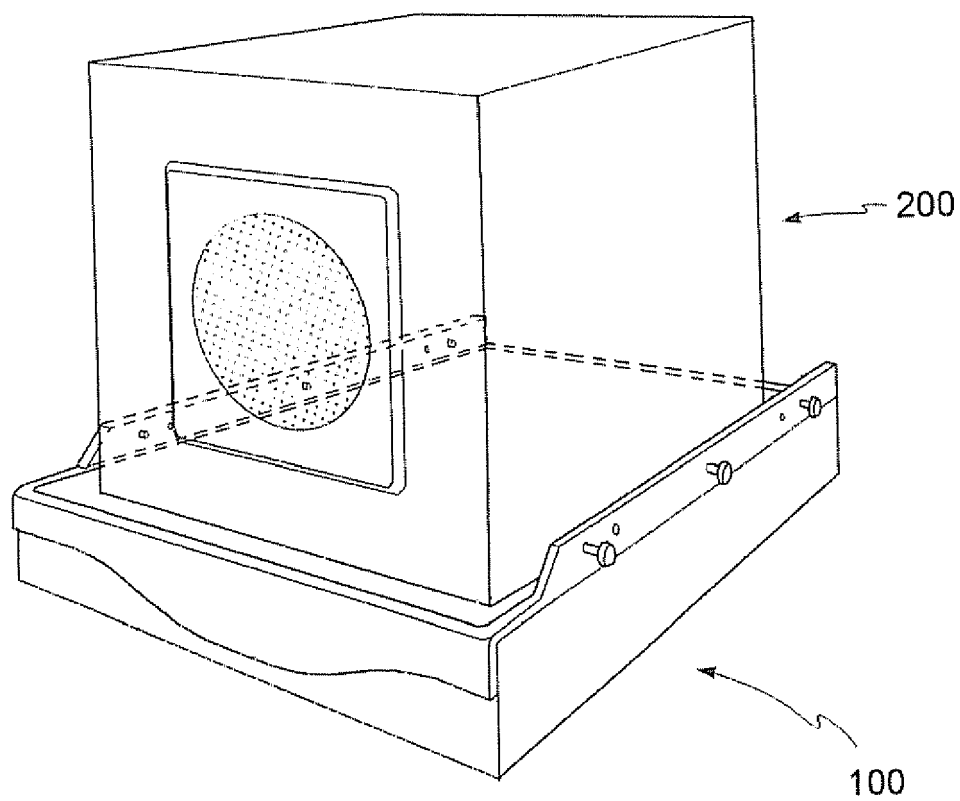


FIG. 4

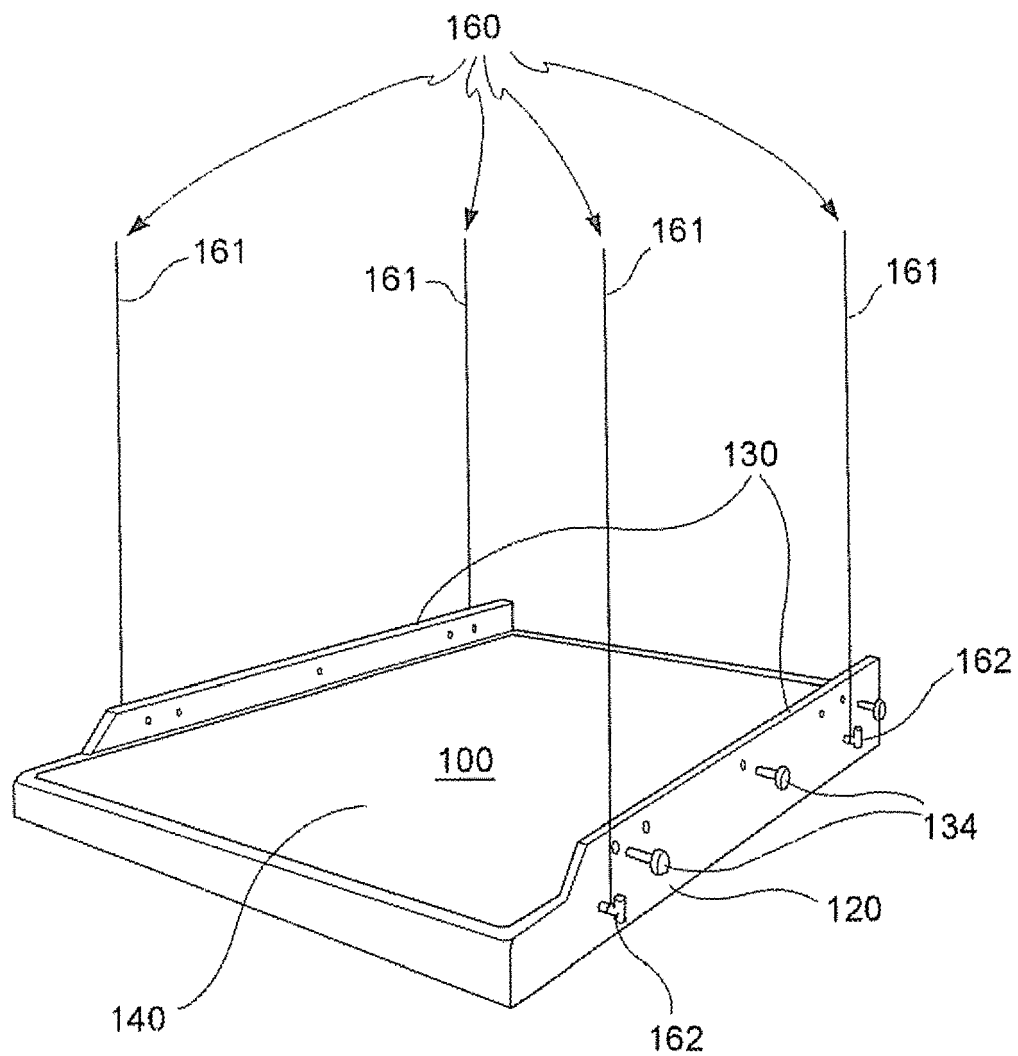


FIG. 5

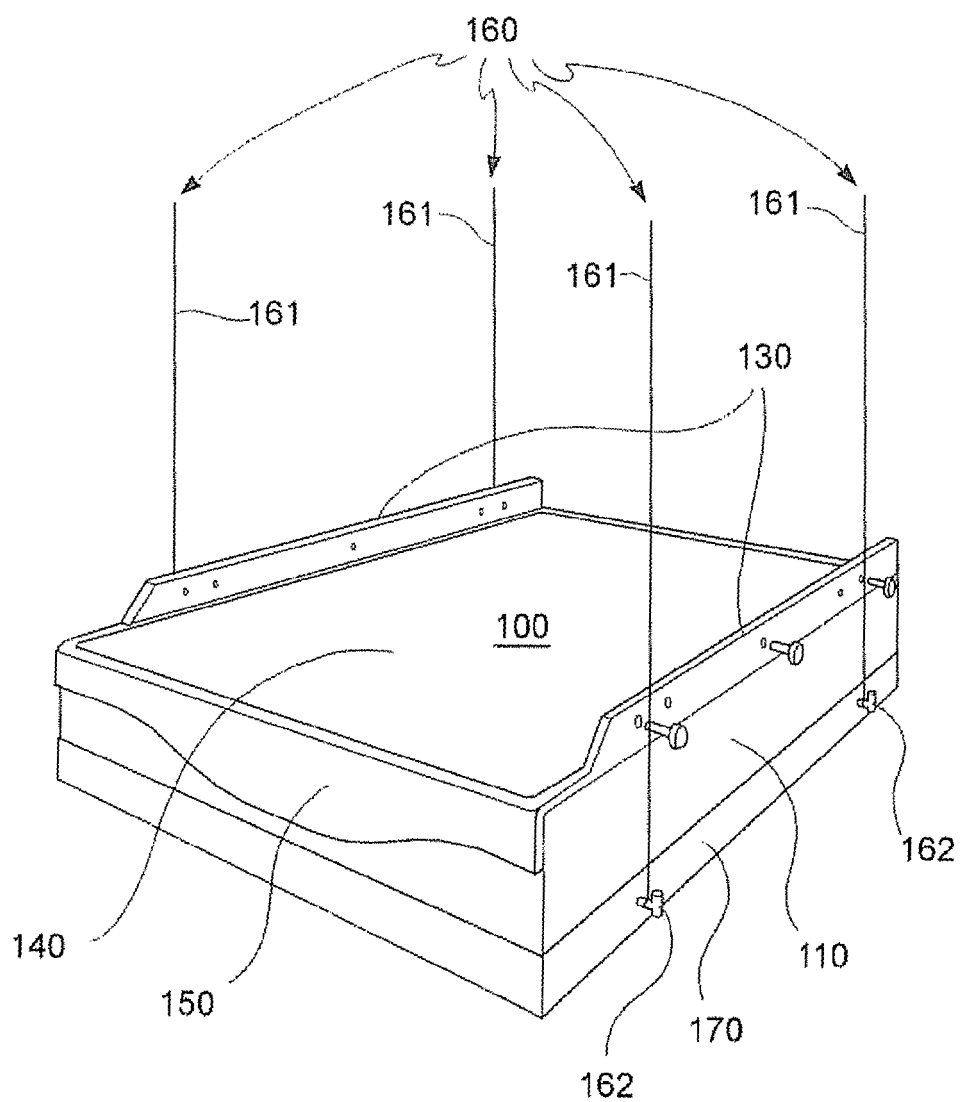


FIG. 6

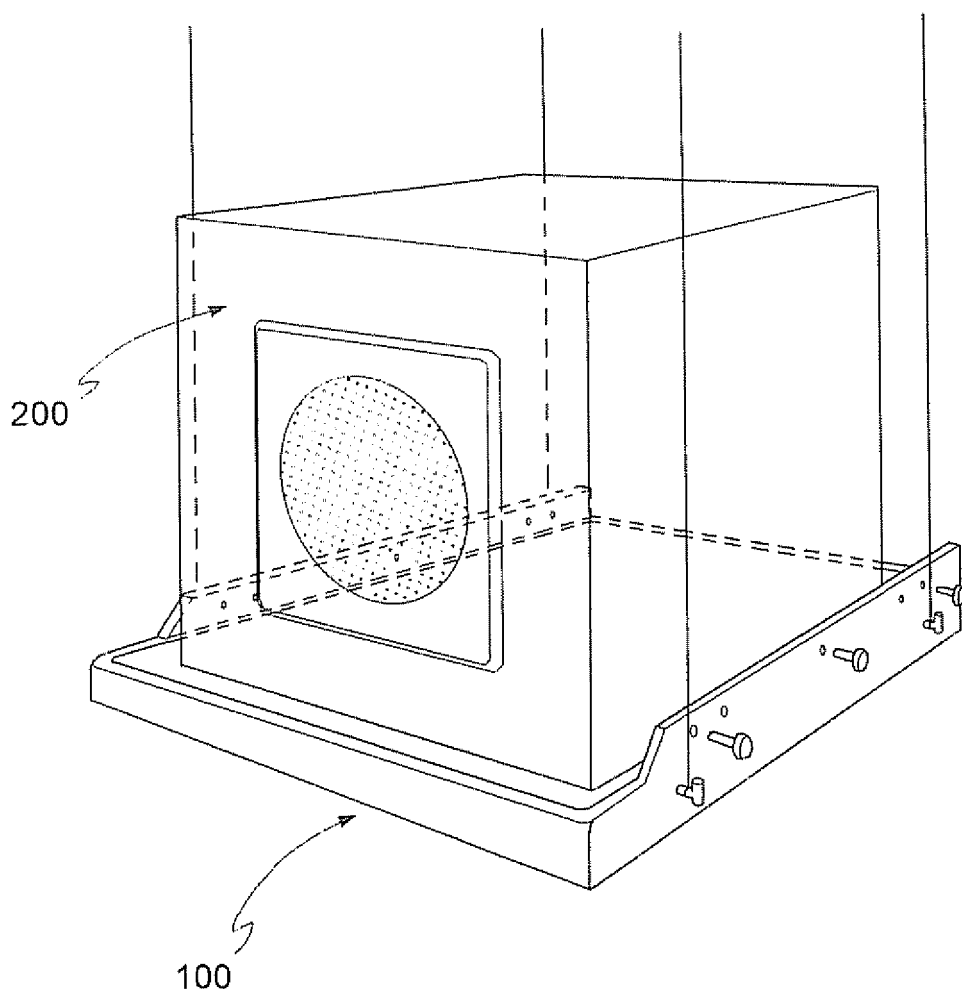


FIG. 7



EUROPEAN SEARCH REPORT

Application Number
EP 09 15 2923

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 24 July 2009	Examiner Zanti, Patrizio
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