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(54) **Surroundless piston-driven vibrating speaker**

(57) Disclosed is a surroundless piston-driven vibrating speaker, the main structure of which is composed of an improved vibrating system, a supporting system and an external magnet system. The forementioned vibrating system comprises a voice cone, a voice

coil and a central damper. The forementioned supporting system comprises a shell frame 1 with air holes, a floating locating damper 6, a sound absorption cotton material 8, a damper fixing ring and a dust preventing cover 13. The forementioned external magnet system comprises a ferrite core, an upper plate and a T-yoke.

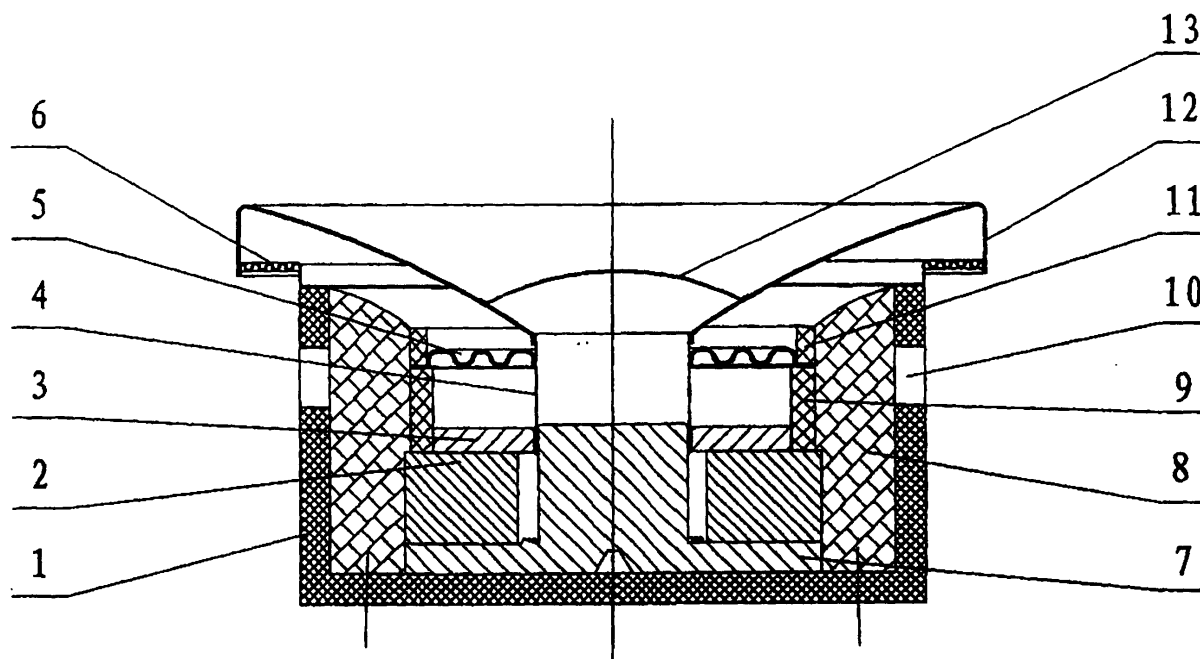


FIG. 1

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Description

Field of the invention

[0001] The present invention relates to a vibrating speaker in the technical field of electromagnetism and particularly to a surroundless piston-driven vibrating speaker.

Background of the invention

[0002] Currently, no technical document files or reports similar technical solution and there are not any products in the market or used in other products; the present technology most similar to the invention is "long stroke speaker", the patent no. of which is 00117592.0. This technology abandons the so called surround in speaker supporting system, and adopts "cone frame" at the middle part of "cone". The vibrating system adopts double "voice coil" structure. Its magnetic circuits system uses two magnetically controlled switches to control magnet function effects.

Summary of the invention

[0003] It is the principle object of the present invention to provide a surroundless piston-driven vibrating speaker with a new structure, so that it can get rid of the constraints of the surround in conventional speakers, avoid the bad effects like significant distortion of even resonance waves, friction, cacophony, etc., which are caused by nonlinear movement generated by the unsteadiness of surround materials and non-concentric installation, suppress the resonance of frame during major dynamic vibration of the speaker, decrease the depth of installation, eliminate the standing wave on the back of cone, decrease the general damp coefficient, and purify the timbre.

[0004] In order to accomplish the main object, the following technical solutions were adopted in the present invention. According to the present invention, the surroundless piston-driven vibrating speaker comprises an improved vibrating system, a supporting system, and an external magnet system, wherein the improved vibrating system comprises a voice cone 12 in the shape of "7", a voice coil 4, a central damper 5, wherein the supporting system comprises a shell frame 1 with air vents 10, a floating locating damper 6, a sound absorption cotton material 8, a damper fixing ring and a dust preventing cover 13.

[0005] Further, the technical problem solved by the present invention can also be settled by the following technical solutions.

[0006] The forementioned surroundless piston-driven vibrating speaker, wherein the voice coil 4 is a cylindrical voice coil or flat voice coil with a frame, or a no bobbin voice coil without a frame, attached at the top of the inner circle of the cone.

[0007] The forementioned surroundless piston-driven vibrating speaker, wherein the shell frame 1 has one or more air vents 10.

[0008] The forementioned surroundless piston-driven vibrating speaker, wherein the floating locating damper 6 is a wave like plate in the shape of round circle, the outer side of which is attached at the back of the edge of the voice cone 12, while the inner side is attached at the upper side of the outer side of the shell 1.

[0009] The forementioned surroundless piston-driven vibrating speaker, wherein the sound absorption cotton material 8 is attached in the empty space between the voice cone 12 and the shell 1.

[0010] The forementioned surroundless piston-driven vibrating speaker, wherein the damper fixing ring comprises an upper locating ring 11 and a lower locating ring 9. They have the same inner diameter which is bigger than that of the central damper 5. Their outer diameter is same as that of damper 5. The lower locating ring 9 is attached above the magnet chip 2; the central damper 5 is attached above the lower locating ring 9; the upper locating ring 11 is attached above the central damper 5.

[0011] Comparing to the present technology, the present invention has significant advantages and better effects. It can be shown by the forementioned technical solution that:

[0012] The present invention is apparently different from the conventional technical solutions. It employs a voice cone and a voice coil in the vibrating system, a locating damper in the supporting system and a central damper to compose there points (in one) coaxial resonance, and uses multi-level supporting and fixing to ensure that the vibration of speaker generate linear piston movement.

[0013] The present invention employs surroundless design in the vibrating system, so that it totally gets rid of the constrain of the surround in conventional speakers. It forms coaxial three-points locating linkage sound and directs the whole vibrating system to generate linear sounding movement by connecting the floating locating damper supported from the bottom, the central damper and the voice cone. In the whole voice conformity mechanism, besides the function of locating, the floating locating damper also functions as a second vibration facilitator. It gives the speaker better compliance, and greatly decreases the general damp coefficient. Different from the edge of surround in conventional speaker, which doesn't vibrate when sounding, the special designed voice cone ensures the vibrating sounding of the whole cone and improves the sensitivity and the voice consistency of the whole apparatus. The sound absorption cotton in the supporting system eliminating the standing wave on the back of the cone, together with a self-sealing shell which has vents, composes the back voice box of medium frequency speaker. The present invention forms independent median voice box after all components installed. There is no need to design the voice box separately. This makes the installation and

design flexible and convenient. The air flow inside the speaker is buffered, thus disperses the standing wave and bad back reflect caused by the air flow on the back of the speaker, improves the frequency property of sound absorption cotton to get better frequency curve, and makes the speaker work independently without any additional outer condition; also, smooth frequency curve and box effect of big volume sound box can be obtained, which makes the shortcomings of conventional sealed sound box and small volume sound box, such as high Q value, dry sound and unsmooth frequency curve.

[0014] In conclusion, the surroundless piston-driven vibrating speaker according to the present invention provides, in the field with the limited technical developing space, significant improvement both in structure and function. It makes sufficient technical improvement and is feasible and easy to use, thus it has indeed improved function that makes it practical to use. It is a novel and improved practical design.

[0015] The specific implementation of the present invention can be shown using the following embodiments, with reference to the drawings attached.

Brief Description of the Drawings

[0016]

FIG. 1 is a cross-sectional view of the present invention.

FIG. 2 is a front of the present invention.

FIG. 3 is a plan view of the present invention.

FIG. 4 is a bottom view of the present invention.

Embodiment:

[0017] With reference to the drawings and preferred embodiment, according to the present invention, the surroundless piston-driven vibrating speaker and its implementation, structure, attributes and functions, is the illustrated in detail as follows.

[0018] A surroundless piston-driven vibrating speaker of the present invention, including: a shell and a vibrating voice generating part. The vibrating voice generating part mainly comprises an improved vibrating system, a supporting system and an external magnet system.

[0019] As shown in FIG. 1, the shell frame 1 is made of metal like copper or aluminum, or plastic, with air vents 10 at the side. The number of the forementioned air vents 10 should be between 1 and 10. It is 6 in this embodiment.

[0020] External magnet system is composed of a ferrite core 2, an upper plate 3 and a T-yoke 7. The forementioned ferrite core 2 is evenly installed between the upper plate 3 and the T-yoke 7. The forementioned T-yoke 7 is installed in the loop part of the voice coil 4.

[0021] Voice cone' which is in the shape of "7", is attached in a way that its inner side of the outer edge is connected with the outer side of the floating locating

damper 6, and its outer side of the inner edge is connected with the upper side of the frame of the voice coil 4. The inner side of the floating locating damper 6 is attached to the outer side of the upper end of the shell frame!; the frame of the voice coil 4 is around the central pole of the T-yoke.

[0022] The lower locating ring of damper 9 and the upper locating ring of damper 11 are made of metal like copper or aluminum, or plastic. The forementioned locating ring 9 and 11 has the same inner diameter, and their outer diameter is same as that of damper. The lower locating ring 9 is attached above the ferrite core 2; the damper 5 is attached above the lower locating ring 9; the upper locating ring 11 is attached above the damper 5. The upper' lower locating ring are installed clipping the outer edge of the central damper 5 at both the upper and the lower end. The damper 5 is a rippled laminate in circle shape which is made of foam, rubber, cotton adhesive plaster' silk adhesive plaster, or compound adhesive plaster with carbon fibre or fiberglass.

[0023] The sound absorption cotton material 8 is made of plastic foam or foamed resin. It is used to fill in the space between the voice cone 12, the shell 1, the ferrite core 2 and the locating ring.

[0024] The forementioned dust preventing cover is normal dust preventing cover for speaker. It is installed on the voice cone 12, covering the voice coil 4.

[0025] Although preferred embodiments of the present invention have been described for illustrative purposes, those skilled in the art will understand that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

Claims

1. A surroundless piston-driven vibrating speaker, **characterised in that** the main structure has an external magnet system; the main structure also comprises a improved vibrating system and supporting system; the forementioned improved vibrating system comprises a voice cone (12) in the shape of "7", a voice coil (4), a central damper (5); the forementioned supporting system comprises a shell frame (1) with air vents, a floating locating damper (6), a sound absorption cotton material (8), a damper fixing ring and a dust preventing cover (13).
2. The surroundless piston-driven vibrating speaker as claimed in claim 1, wherein the forementioned shell frame (1) has one or more air vents.
3. The surroundless piston-driven vibrating speaker as claimed in claim 1 or 2, wherein the forementioned voice coil (4) is a cylindrical voice coil or flat voice coil with a structure, or a no bobbin voice coil

without a frame, attached at the top of the inner edge of cone; the forementioned central damper (5) is a rippled laminate in circle shape, the outer edge of which is attached at the lower part of the outer edge of the voice cone (12).

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4. The surroundless piston-driven vibrating speaker as claimed in any one of claims 1 to 3, wherein the forementioned floating locating damper (6) is a rippled laminate in circle shape, the outer circle edge of which is attached on the back of edge of the voice cone (12), while the inner circle edge of which is attached at the upper edge of the outer edge of the shell (1).

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5. The surroundless piston-driven vibrating speaker as claimed in any one of claims 1 to 4, wherein the forementioned sound absorption cotton material 8 is filled in the space between the voice cone (12) and the shell (1).

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6. The surroundless piston-driven vibrating speaker as claimed in any one of claims 1 to 5, wherein the forementioned damper fixing ring comprises an upper locating ring (11) and a lower locating ring (9) having the same inner diameter which is bigger than that of the central damper (5), and having an outer diameter which is same as that of the central damper (5) and the lower locating ring (9) is attached above the ferrite core (2); the damper (5) is attached above the lower locating ring (9); the upper locating ring (11) is attached above the damper (5).

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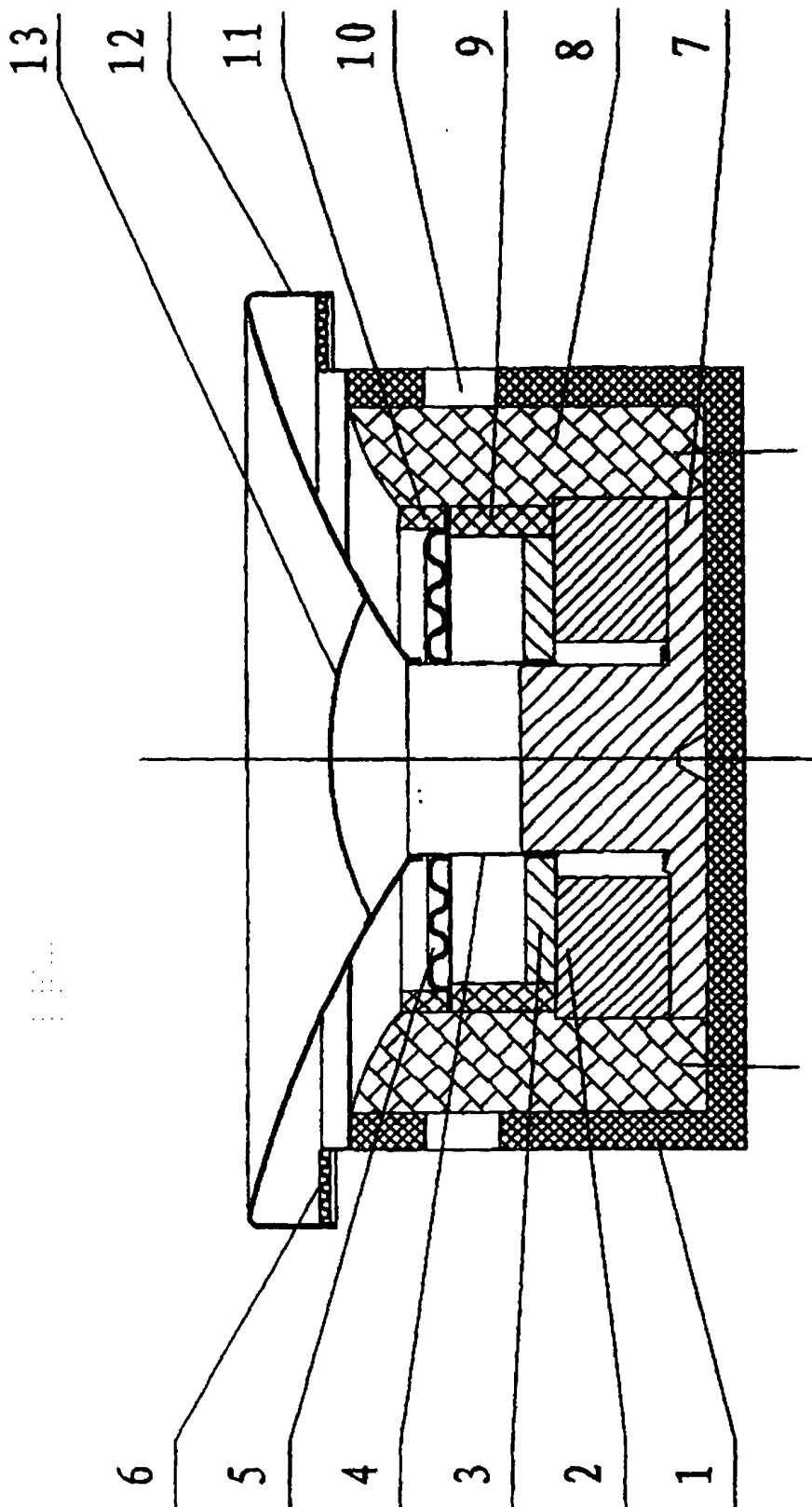


FIG. 1

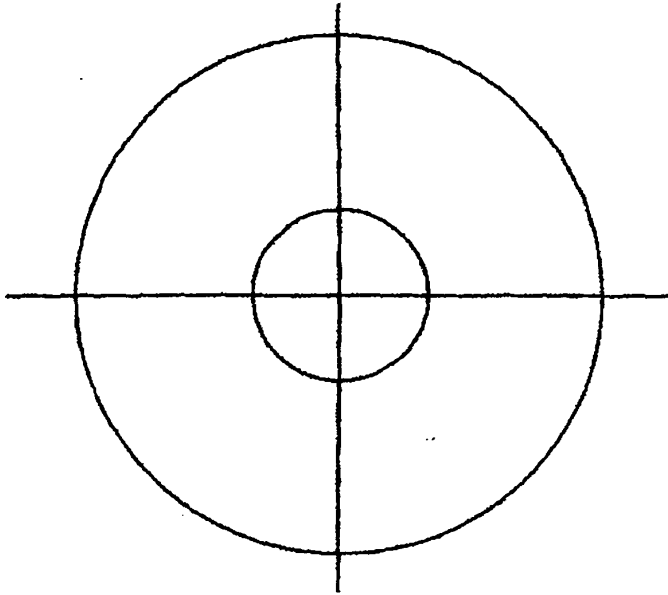


FIG. 3

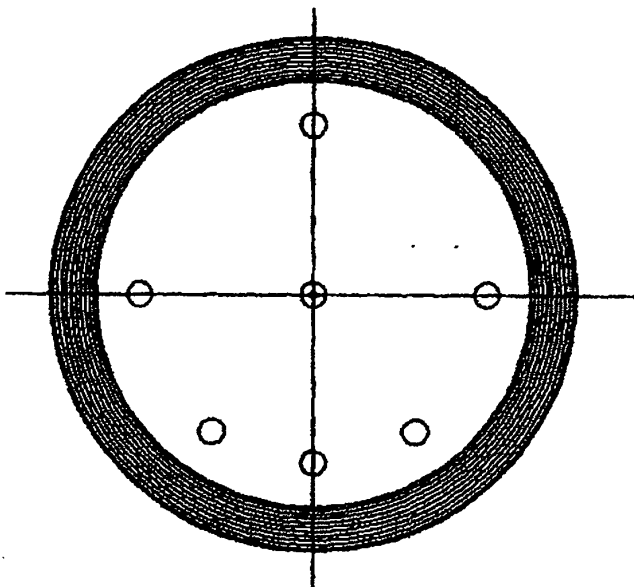


FIG. 4

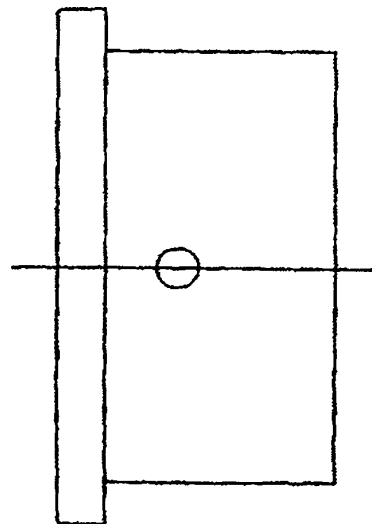


FIG. 2