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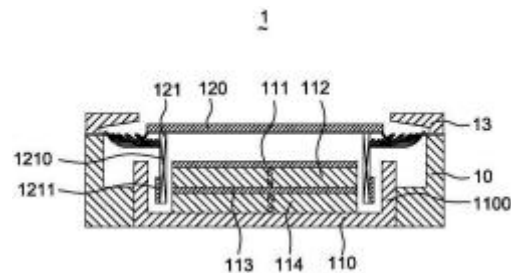
Claims 1 page Description 3 pages Drawings 2 pages

(54) Utility Model Title

Loudspeaker

(57) Abstract

The present utility model relates to a loudspeaker, which comprises a magnetic circuit system for generating a magnetic field and a vibration system driven by the magnetic circuit system to produce vibrations. The vibration system comprises a vibrating diaphragm and a voice coil that drives the vibrating diaphragm to vibrate and produce sound. The magnetic circuit system comprises a magnetic yoke and a series of components superimposed from top to bottom at the central position of the magnetic yoke: a first main pole core, a first main magnetic steel, a second main pole core, a second main magnetic steel, and continuing up to an n^{th} main pole core and an n^{th} main magnetic steel. The n is an integer greater than or equal to 2, and wherein the magnetic poles of the same polarity between adjacent main magnetic steels are arranged oppositely. The loudspeaker provided by the present utility model is superimposed with multiple magnetic steels in the middle of the voice coil, significantly improving the electromechanical conversion efficiency and enhancing the sensitivity of the loudspeaker.



1. A loudspeaker, comprising a magnetic circuit system for generating a magnetic field and a vibration system driven by the magnetic circuit system to produce vibrations. The vibration system comprises a vibrating diaphragm and a voice coil that drives the vibrating diaphragm to vibrate and produce sound, characterized in that the magnetic circuit system comprises a magnetic yoke and a series of components superimposed from top to bottom at the central position of the magnetic yoke: a first main pole core, a first main magnetic steel, a second main pole core, a second main magnetic steel, and continuing up to an n^{th} main pole core and an n^{th} main magnetic steel, where n is an integer greater than or equal to 2, and wherein the magnetic poles of the same polarity between adjacent main magnetic steels are arranged oppositely.

2. The loudspeaker according to Claim 1, characterized in that the voice coil comprises a voice coil bobbin and a winding group secured to the voice coil bobbin, and the voice coil bobbin is made of any one of the materials: paper, plastic, or metal.

3. The loudspeaker according to Claim 2, characterized in that the voice coil bobbin is made of metallic microlattice material.

4. The loudspeaker according to Claim 1, characterized in that the magnetic circuit system is further arranged with a secondary magnetic steel arranged on the magnetic yoke and surrounding the voice coil, and a secondary pole core attached to the surface of the secondary magnetic steel. The magnetic poles of the secondary magnetic steel are arranged horizontally, and the magnetic pole at one end of the secondary magnetic steel, which is close to the main magnetic steel, is different from the corresponding magnetic pole of the adjacent main magnetic steel.

5. The loudspeaker according to Claim 1, characterized in that the loudspeaker further comprises a frame and a front cover that arranged with the frame to form a containment space to accommodate the aforementioned vibration system and magnetic circuit system.

6. The loudspeaker according to Claim 2, characterized in that the voice coil is in a balanced position, the winding group is located between the plane where the upper surface of the first main magnetic steel is located and the plane where the lower surface of the n^{th} main magnetic steel is located.

7. The loudspeaker according to Claim 1 or 6, characterized in that the n equals 2.

Loudspeaker

[Technical Field]

[0001] The present utility model relates to a field of electroacoustic transduction, specifically to a loudspeaker.

[Background]

[0002] In the wake of rapid technological advancements, the popularity of audio equipment is increasing, and people's demands for audio equipment are not limited to just video and audio playback; they also require greater reliability from audio equipment. Especially with the arrival of the 3G era, mobile multimedia technology has also advanced, leading many audio devices to feature various entertainment functions, such as video playback, digital photography, gaming, GPS navigation, etc. This has necessitated that the electronic components embedded in audio equipment become increasingly precise and compact.

[0003] In audio equipment, a loudspeaker is a common electronic component primarily used for playing audio signals. However, in existing loudspeakers, there is one piece of magnetic steel in the middle of the voice coil, which results in a lower electromechanical conversion efficiency of the magnetic circuit.

[0004] Therefore, it is necessary to provide a new type of loudspeaker.

[Summary of the Utility Model]

[0005] The purpose of the present utility model is to provide a loudspeaker, which is configured to address the technical problem of the existing loudspeaker having only one piece of magnetic steel in the middle of the voice coil, resulting in insufficient electromechanical conversion efficiency of the magnetic circuit.

[0006] To address the above technical problem, the present utility model provides a loudspeaker, comprising a magnetic circuit system for generating a magnetic field and a vibration system driven by the magnetic circuit system to produce vibrations. The vibration system comprises a vibrating diaphragm and a voice coil that drives the vibrating diaphragm to vibrate and produce sound. The magnetic circuit system comprises a magnetic yoke and a series of components superimposed from top to bottom at the central position of the magnetic yoke: a first main pole core, a first main magnetic steel, a second main pole core, a second main magnetic steel, and continuing up to an n^{th} main pole core and an n^{th} main magnetic steel, where n is an integer greater than or equal to 2, and wherein the magnetic poles of the same polarity between adjacent main magnetic steels are arranged oppositely.

[0007] Preferably, the voice coil comprises a voice coil bobbin and a winding group secured to the voice coil bobbin, and the voice coil bobbin is made of any one of the materials: paper, plastic, or metal.

[0008] Preferably, the voice coil bobbin is made of metallic microlattice material.

[0009] Preferably, the magnetic circuit system is further arranged with a secondary magnetic steel arranged on the magnetic yoke and surrounding the voice coil, and a secondary pole core attached to the surface of the secondary magnetic steel. The magnetic poles of the secondary magnetic steel are arranged horizontally, and the magnetic pole at one end of the secondary magnetic steel, which is close to the main magnetic steel, is different from the corresponding magnetic pole of the adjacent main magnetic steel.

[0010] Preferably, the loudspeaker further comprises a frame and a front cover that arranged with the frame to form a containment space to accommodate the aforementioned vibration system and magnetic circuit system.

[0011] Preferably, the voice coil is in a balanced position, the winding group is located between the plane where the upper surface of the first main magnetic steel is located and the plane where the lower surface of the nth main magnetic steel is located.

[0012] Preferably, the n equals 2.

[0013] Beneficial effect of the present utility model: The loudspeaker provided by the present utility model is superimposed with multiple magnetic steels in the middle of the voice coil, significantly improving the electromechanical conversion efficiency and enhancing the sensitivity of the loudspeaker.

[Brief Description of the Drawings]

[0014] FIG. 1 is an exploded view of the loudspeaker of the present utility model;

[0015] FIG. 2 is a section view of the loudspeaker shown in FIG. 1;

[0016] FIG. 3 is a section view of another embodiment of the loudspeaker of the present utility model.

[Detailed Description of the Embodiments]

[0017] A more detailed description of the present utility model is provided as below in conjunction with the accompanying drawings and embodiments. The following embodiments are intended to illustrate the present utility model but are not intended to limit the scope of the present utility model.

[0018] As shown in FIG. 1 and FIG. 2, the present utility model provides a loudspeaker 1, which comprises a bobbin 10, a magnetic circuit system 11 arranged within the bobbin 10, and a vibration system 12, as well as a front cover 13 that forms a containment space to accommodate the vibration system 12 and the magnetic circuit system 11. The magnetic circuit system 11 is configured to generate a magnetic field, and the vibration system 12 is driven in the magnetic field to produce vibrations, thereby emitting sound.

[0019] The vibration system 12 comprises a vibrating diaphragm 120 and a voice coil 121 that drives the vibrating diaphragm 120 to vibrate and produce sound. The voice coil 121 comprises a voice coil bobbin 1210 and a winding group 1211 secured to the voice coil bobbin 1210. The voice coil bobbin 1210 is made of any one of the materials: paper, plastic, or metal. In a preferred embodiment of the present utility model, the voice coil bobbin 1210 is made of metallic microlattice material, which is a metal microlattice composed of interconnected hollow tubes, featuring strong compressive strength and good absorption characteristics. For example, the metallic microlattice material can be formed from interconnected hollow nickel metal tubes.

[0020] The magnetic circuit system 11 comprises a magnetic yoke 110 secured to the bobbin 10 and a series of components superimposed from top to bottom at the central position of the magnetic yoke 110: a first main pole core 111, a first main magnetic steel 112, a second main pole core 113, a second main magnetic steel 114, and continuing up to the nth main pole core and nth main magnetic steel. The N is an integer greater than or equal to 2, and wherein the magnetic poles of the same polarity between adjacent main magnetic steels are arranged oppositely. In the embodiment, n is taken as 2 to clearly describe the present utility model to enable those skilled in the art to easily understand the technical solutions of the present utility model.

[0021] The magnetic poles of the same polarity between the first main magnetic steel 112 and the second main magnetic steel 114 are arranged oppositely. Since there is a second main pole core 113 between the first main magnetic steel 112 and the second main magnetic steel 114, the magnetic line of force generated by the first main magnetic steel 112 and the second main magnetic steel 114 will converge in the second main pole core 113 and be directed to the magnetic gap around it, thereby allowing the voice coil 121 in the magnetic gap to experience a greater magnetic field force, effectively enhancing the driving force of the voice coil 121 and improving the sensitivity of the loudspeaker 1. To ensure that the voice coil 121

experiences the strongest magnetic field, preferably, when the voice coil is in a balanced position, the winding group 1211 is located between the plane where the upper surface of the first main magnetic steel 112 is located and the plane where the lower surface of the n^{th} main magnetic steel is located. Since in the embodiment, N is taken as 2, the winding group 1211 is located between the plane where the upper surface of the first main magnetic steel 112 is located and the plane where the lower surface of the second main magnetic steel 114 is located.

[0022] The magnetic yoke 110 further comprises a flange 1100 arranged parallel to and spaced from the voice coil 121. To increase the BL value of the magnetic circuit system, in another embodiment, as shown in FIG. 3, the magnetic circuit system 11 is further arranged with a secondary magnetic steel 115 arranged on the magnetic yoke 110 and surrounding the voice coil 121, and a secondary pole core 116 attached to the surface of the secondary magnetic steel 115. This dual magnetic circuit design aims to increase the BL value of the magnetic circuit system 11. The magnetic poles of the secondary magnetic steel 115 are arranged horizontally, and the magnetic pole at one end of the secondary magnetic steel 115, which is close to the main magnetic steel, is different from the corresponding magnetic pole of the adjacent main magnetic steel. In the embodiment, the N poles of the first main magnetic steel 112 and the second main magnetic steel 114 are arranged oppositely, so the magnetic pole of the secondary magnetic steel 115 close to the first main magnetic steel 112 and the second main magnetic steel 114 is S pole.

[0023] The loudspeaker 1 provided by the present utility model is superimposed with multiple magnetic steels in the middle of the voice coil 121, significantly improving the electromechanical conversion efficiency and enhancing the sensitivity of the loudspeaker 1.

[0024] The above described are only some good embodiments of the present utility model; it should be noted that, for a person of ordinary skill in the art, several improvements may be made without departing from the innovative ideas of the present utility model; but these improvements shall also be considered as the protection scope of the present utility model.

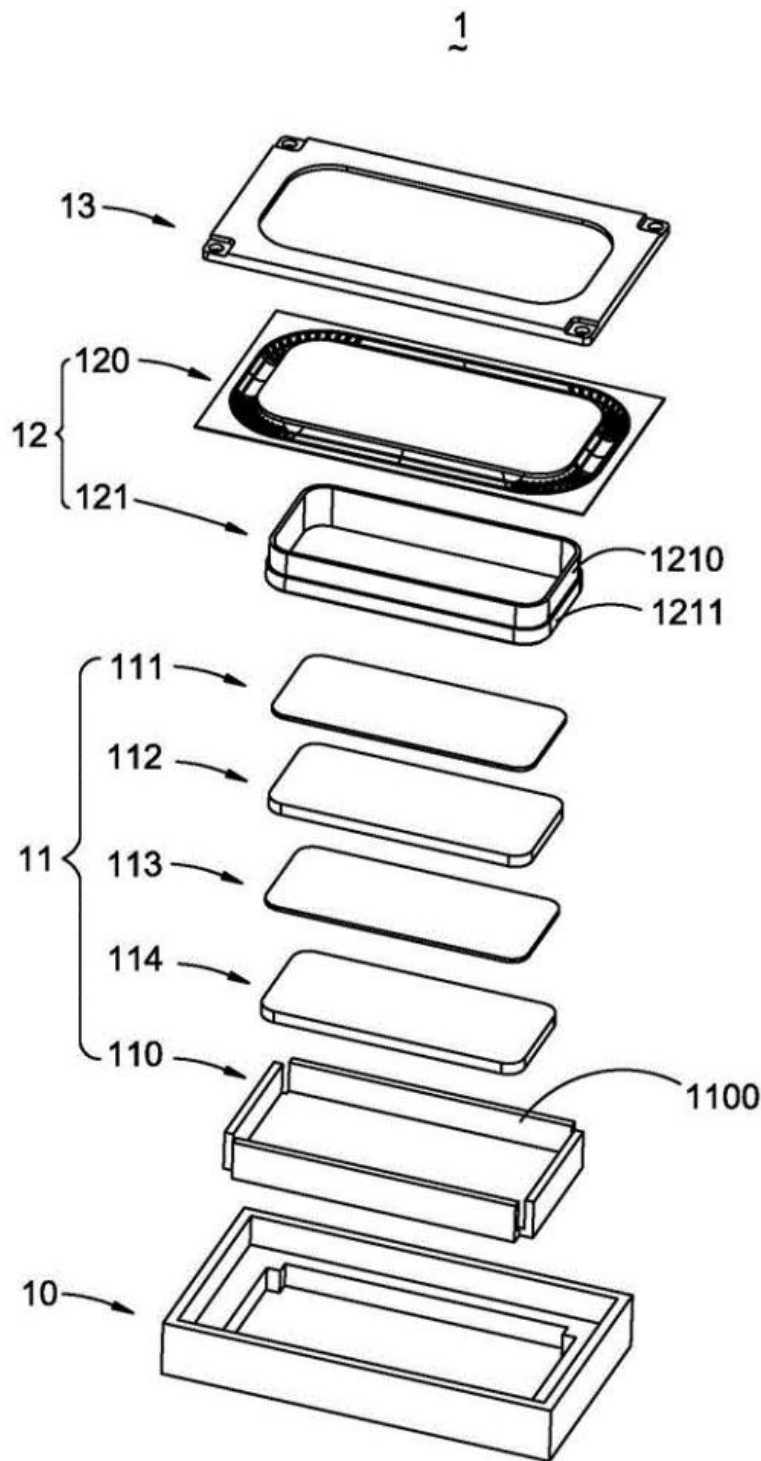


FIG. 1

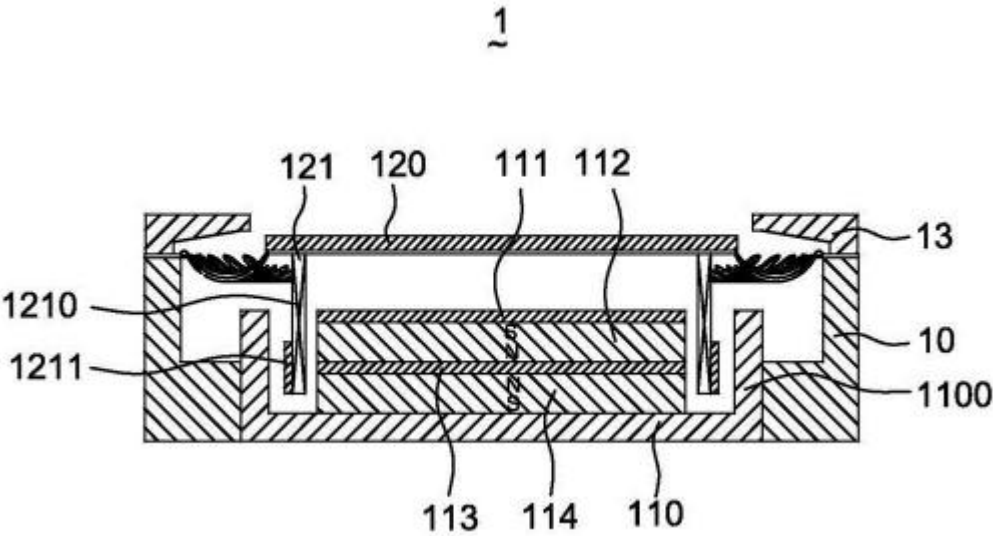


FIG. 2

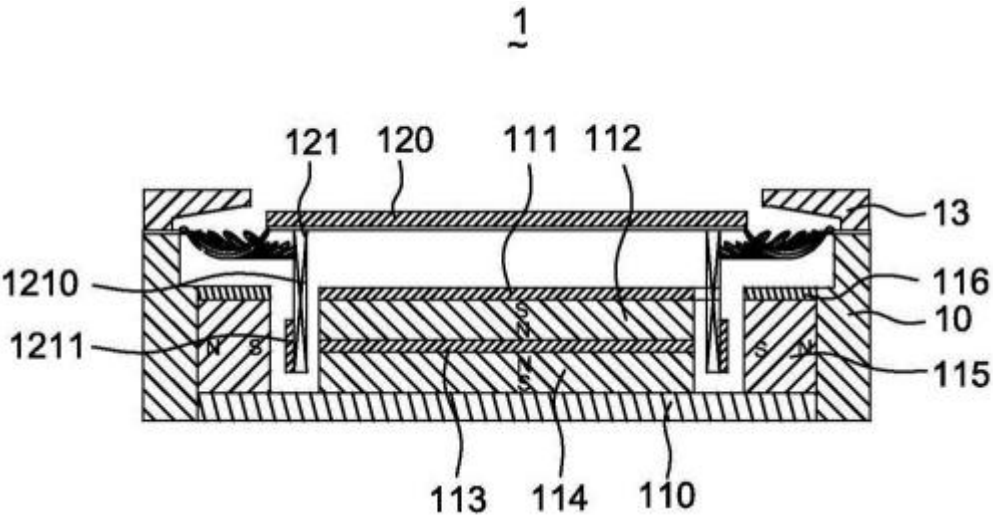


FIG. 3

TRANSLATION CERTIFICATION

Date: 2025/01/26

To whom it may concern:

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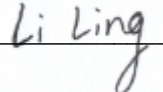
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