

A COAXIAL SPEAKER

Technical Field

[0001] The present invention relates to the technical field of loudspeaker technology, especially a coaxial speaker.

Background

[0002] The coaxial speaker is such a loudspeaker that two speakers, i.e. a tweeters and a subwoofer, are installed on the same axis for playing high pitch and mid-bass respectively. As the two speakers are coincided in the diaphragm surface and are very close to the sound source in physical positioning, the sound field positioning is very ideal for replaying music.

[0003] As illustrated in Figure 1, the bass speaker unit of the current coaxial loudspeaker includes: a columnar bass U iron 11, a bass magnet 12 inside the bass U iron, a bass magnetizer sheet 13 placed on the upper part of the bass magnet 12, a bass coil 14 set on the gap between the bass U iron 11 and the bass magnet 12, a bass diaphragm 15, an dangling edge 16 and a support 17. Wherein, the bass coil 14 is twined on the wrapping column 18 of bass coil; one end of the bass diaphragm 15 is connected to the edge 16, the other end is connected to the wrapping column 18 of bass coil. One end of edge 16 is connected to the support 17, the other end is connected to the bass diaphragm 15; one end of the support 17 is connected to the edge 16, the other end is connected to the bass U iron 11. The bass U iron 11, the bass magnet 12 and the bass magnetizer sheet 13 constitute a complete magnetic circuit together and provide a uniform magnetic field for bass coil 14.

[0004] The tweeter unit includes: a columnar treble U iron 21, a treble magnet 22 inside the treble U iron, a treble magnetizer sheet 23 set on the treble magnet 22, treble coils 24 and treble diaphragm 25 both set in the gap between the treble U iron 21 and the treble magnet 22. Wherein, the treble coils 24 are twined on the wrapping column 26 of the treble coil. Both sides of the edge of the treble diaphragm 25 are extend to the treble mid-seat 27 and fixed thereon. The treble U iron 21, treble magnet 22 and treble magnetic sheets 23 together constitute a complete magnetic circuit which provides uniform magnetic field for the treble coil 24. The tweeter unit is supported by the treble mid-seat 27 and its treble U iron 21 is set in the treble mid-seat 27. A treble support table 29 is provided on the bass magnetizer sheet 13 through a cushion 28 and inserted into the bass magnet 12. The cushion 28 can be applied or not applied, according to the actual space of the coaxial loudspeaker.

[0005] However, with respect to the coaxial loudspeaker mentioned above, as there is a gap between the tweeter unit and the woofer unit, the magnetic circuit space of the bass speaker unit is not completely closed. Since the treble mid-seat 27, the treble support table 29 and the bass magnetizer sheet 13 are not contact with the wrapping column of bass coil 18, there leaves a certain gap which is communicated with the air outside. When the bass coil vibrates, the bass coil will drive the movement of air and cause part of the gas stream flow through the said gap. The efficiency of the speakers bass vibration will be not enough because leaking are too much, thereby affecting the sound effect of the coaxial speakers.

Content of the invention

[0006] Therefore, the technical problem to be solved for the present invention is: providing a coaxial loudspeaker in order to overcome the defects of the coaxial loudspeaker described in the prior art of the background, thus to improve the sound quality of the coaxial speaker.

[0007] Hence, the coaxial speaker disclosed by the present invention, includes a woofer unit and a tweeter unit, wherein a flexible and elastic inner edging is provided between the said woofer unit and the said tweeter unit to form a relative sealed magnetic circuit space for the woofer unit.

[0008] The said woofer unit includes a wrapping column of bass coil for twining bass coil, a bass diaphragm and an edge. One side of the bass diaphragm is set on the wrapping column of bass coil and the other side is connected to the edge. The said tweeter unit includes a wrapping column of treble coil for twining treble coil and a treble diaphragm. Both sides of the treble diaphragm are set on the wrapping column of treble coil. Both sides of the edge of the treble diaphragm extend from the treble wrapping column to treble mid-seat for supporting the tweeter unit and fixing thereon. One end of the said elastic inner edging is set on the bass diaphragm and the other end of is set on the treble mid-seat.

[0009] The said elastic inner edging is $\cap$ -shaped, both sides of it are provided with an outward outer edge and an outward inner edge for the sake of fixing and connection.

[0010] The outer edge and inner edge of the said elastic inner edging are integrated.

[0011] The coaxial speaker of the present invention overcomes the problem of the poor sound quality because the magnetic circuit space of the woofer unit is not completely closed due to the

gap between the woofer unit and tweeter unit, through providing a relative sealed magnetic circuit space for the woofer unit by setting a flexible and elastic inner edging which can form a relative sealed magnetic circuit space for the woofer unit between the tweeter unit and the woofer unit. With respect to the said coaxial speakers of the present invention, when the bass coil vibrates and drives the air flow, the elastic inner edging will be driven by the air and cause the effect of pulling air flow and thus improve the effect of bass. At the same time, adding the elastic inner edging increases the area of the bass vibration effectively, therefore richer sound effects are provided.

BRIEF DESCRIPTION OF FIGURES

[0012] Figure 1 is a section view about structure of the coaxial speaker in the prior art;

[0013] Figure 2 is a three-dimensional structure diagram of the coaxial speakers disclosed by the embodiment according to the present invention;

[0014] Figure 3 is a top view about structure of the coaxial loudspeaker shown in Figure 2;

[0015] Figure 4 is a section view about structure in A-A direction of the coaxial speaker shown in Figure 3;

[0016] Figure 5 is a cross-sectional explosive view of the coaxial loudspeaker shown in Figure 4.

Detailed description of the embodiments

[0017] Detailed description will be given in conjunction with the accompanying drawings of the present invention in the following text.

[0018] As illustrated in Figure 2 to Figure 5, the present embodiment shows a coaxial loudspeaker comprising: a bass speaker unit and a tweeter unit.

[0019] Wherein, the bass speaker unit includes: a columnar bass U iron 31, a bass magnet 32 inside the bass U iron 31, a bass magnetizer sheet 33 placed on the upper part of the bass magnet 32, bass coils 34 set on the gap between the bass U iron 31 and the bass magnet 32, a bass diaphragm 35, an dangling edge 36 and a support 37. Wherein the bass coils 34 are

twined on the wrapping column 38 of bass coil, one end of the bass diaphragm 35 is connected to the edge 36, the other end is connected to the wrapping column 38 of bass coil. One end of edge 36 is connected to the support 37, the other end is connected to the bass diaphragm 35; one end of the support 37 is connected to the edge 36, the other end is connected to the bass U iron 31. The bass U iron 31, the bass magnet 32 and the bass magnetizer sheet 33 constitute a complete magnetic circuit together and provide a uniform magnetic field for bass coil.

[0020] Wherein the tweeter unit includes: a columnar treble U iron 41, a treble magnet 42 inside the treble U iron, a treble magnetizer sheet 43 set on the treble magnet 42, treble coil 44 and treble diaphragm 45 both set in the gap between the treble U iron 41 and the treble magnet 42. Wherein, the treble coils 44 are twined on the wrapping column 46 of treble coil. The two sides of the edge of the treble diaphragm 45 extend to the treble mid-seat 47 and fixed thereon.

[0021] Treble U iron 41, treble magnet 42 and treble magnetic sheets 43 together constitute a complete magnetic circuit which provides uniform magnetic field for the treble coils. The tweeter unit is supported by the treble mid-seat 47 and its treble U iron 41 is set in the treble mid-seat 47. A treble support table 49 is provided on the bass magnetizer sheet 33 through a cushion 48 and inserted into the bass magnet 32. The cushion 48 can be applied or not applied according to the actual space of the coaxial loudspeaker.

[0022] In the present embodiment, a flexible and elastic inner edging is provided between the woofer unit and the tweeter unit which can form a relative sealed magnetic circuit space for the woofer unit. Therefore, the present invention overcomes the problem of the poor sound quality caused by the magnetic circuit space of the woofer unit which is not completely closed because there is a gap between the woofer unit and tweeter unit. In other words, since the treble mid-seat, the treble support table and the bass magnetizer sheet are not contact with the wrapping column of bass coil, there leaves a certain gap which is communicated with the air outside.

[0023] In detail, both sides of the treble diaphragm 45 are provided on the wrapping column 46 of treble coil, both sides of edge of the treble diaphragm 45 extend from the treble wrapping column 46 to treble mid-seat 47 for supporting the tweeter unit and fixing it on the treble mid-seat 47. One end of the elastic inner edging 50 is set on the bass diaphragm and the other end of is set on the treble mid-seat 47. Elastic inner edging 50 and the two sides of the tweeter diaphragm 45 can be overlapped and fixed on the treble mid-seat 47 or fixed respectively without overlapping. Elastic inner edging 50 is $\cap$ -shaped, both sides of it are provided with outward outer edge 51 and outward inner edge 52 for the sake of fixing and connection. The

outward outer edge 51 is connected to the bass diaphragm 35 and the outward inner edge 52 is connected to the treble mid-seat 47. The outward outer edge 51 and the outward inner edge 52 fix the elastic inner edging 50. In the present embodiment, the outer edge and inner edge of the elastic inner edging are integrated.

[0024] Therefore, it forms a relative sealed magnetic circuit space among the bass diaphragm 35, the wrapping column of bass coil 38, the bass U iron 31, the bass magnet 32, the bass magnetizer sheet 33, the elastic inner edging 50 and the treble mid-seat 47. When the bass coils 34 vibrate and drive the air flow, the elastic inner edging 50 will be driven by the air and cause the effect of pulling air flow and thus improve the effect of bass. At the same time, adding the elastic inner edging 50 increases the area of the bass vibration effectively, therefore richer sound effects are provided.

[0025] In conclusion, the coaxial speaker of the present invention, make a relative sealed magnetic circuit space for the woofer unit by setting a flexible and elastic inner edging which can form a relative sealed magnetic circuit space for the woofer unit between the tweeter unit and the woofer unit, which overcome the problem of the poor sound quality because the magnetic circuit space of the woofer unit is not completely closed due to the gap between the woofer unit and tweeter unit. The said coaxial speakers of the present invention, when the bass coils vibrate and drive the air flow, the elastic inner edging will be driven by the air and cause the effect of pulling air flow and thus improve the effect of bass. At the same time, adding the elastic inner edging increases the area of the bass vibration effectively, therefore richer sound effects are provided.

[0026] The context mentioned above is only a preferred embodiment of the present invention and it shall not be deemed as the limitation of the invention. Any modifications, substitution to same object, improvements within the spirit and principles of the present invention shall be in the scope of the protection.

CLAIMS

1. A coaxial speaker, including a woofer unit and a tweeter unit, wherein a flexible and elastic inner edging is provided between the said woofer unit and the said tweeter unit to form a relative sealed magnetic circuit space for the woofer unit.
2. The coaxial speaker according to Claim 1, wherein the said woofer unit includes a wrapping column of bass coil for twining bass coil, a bass diaphragm and a dangling edge, one side of the bass diaphragm is set on the wrapping column of bass coil and the other side is connected to the edge; the said tweeter unit includes a wrapping column of treble coil for twining treble coil and a treble diaphragm, both sides of the treble diaphragm are set on the wrapping column of treble coil, both sides of the edge of the treble diaphragm extend from the treble wrapping column to the treble mid-seat for supporting the tweeter unit and fixed thereon, one end of the said elastic inner edging is set on the bass diaphragm and the other end is set on the treble mid-seat.
3. The coaxial speaker according to claim 2, wherein the said elastic inner edging is a $\cap$ -shaped, both sides of it are provided with an outward outer edge and an outward inner edge for the sake of fixing and connection.
4. The coaxial speaker according to claim 3, wherein the outer edge and the inner edge of the said elastic inner edging are integrated.