# An illumination sound box

## Field of the invention

The present invention relates to a sound box with illumination effect.

## Background of the invention

Sound box is an important multimedia system device in the home electronics. If put the sound box in the proper position on the room and connect it to the audio output, a sound field with reduction and fidelity is achieved. And a power amplifier realizes rendering effect of kinds of voices. Recently, a sound box is usually served as an audio part of the multimedia system and used separately. As with the wavelength of the sounds, to achieve better and reliable resonance effect by the sound box, the size and the shape of the sound box is difficult to change, it occupies certain space indoors. As simplicity is the secular trend in the interior design, the spirit is to make the amount of the devices less with small size and hidden character. So the space the sound box occupied is the necessary content to improve. But as can be seen from above, it goes against with the characteristic of a sound box. So how to reduce the space the sound box occupied is the technical problem to solve in the interior design.

## Summary of the invention

To overcome the problems that the existing sound box is big in size, space occupying and bad simplicity household environment, the technical proposal of the present invention is as below:

An illumination sound box includes:

A box body, which is disposed with a resonance cavity and an assembly hole connected to the resonance cavity;

A speaker part, which is fixed to the box body and assembled to the assembly hole to close the assembly hole；and

A moving element, which is removably connected to the box body, an illumination source is disposed in the moving element;

The moving element is disposed with a first fixation position in the box body, the box body is disposed with a light transmission area for light diffuse transmission when the moving element is situated in the first fixation position, the light transmission area is disposed with a part visible from outside the box body; the moving element is disposed with a second fixation position in the box body for the light source to illuminate out of the light transmission area.

In another preferred embodiment, the moving element is a foldable cover, which is disposed on the outside of the box body and foldable and coupled to the box body; the moving element is connected to the box body by a tightening first hinge; the foldable cover is disposed with a light source in the side faced to the box body.

In another preferred embodiment, the light transmission area includes two part, one part is situated in a first exterior area corresponding to the light source when the foldable cover is situated in the first fixation position, the first fixation position is the position where the foldable cover is folded and coupled to the exterior of the box body; the other part is situated in a second exterior area when the light of the light source is intersecting with the box body after the light is passing through the first exterior area; the second exterior area is made from diffuse transmission material.

In another preferred embodiment, the entire body of the box body is made from diffuse commission material.

In another preferred embodiment, the box body is disposed with a connector, the connector is movably connected to the box body by a tightening second hinge; the foldable cover is connected

to the connector by the first hinge.

In another preferred embodiment, the moving element is cooperated to the interior of the box body, the box body is disposed with a light window on the surface; the light source is away from the light window when the moving element is situated in the first fixation position; the light source is cooperated to the light window when the moving element is situated in the second fixation position, the light is transmitted from the light window.

In another preferred embodiment, the speaker part includes:

A speaker unit, which includes a chassis rack and a chassis;

A passive diaphragm, which includes a diaphragm body and an elastic ring to support the diaphragm body; thereinto

The assembly hole is closed by the chassis and the passive diaphragm in the box body.

an assembly base is fixed in the assembly hole in the exterior of the box body; the assembly base is disposed with a cavity and a sound bore to connect the cavity and the exterior; the cavity is connected to the speaker part and the cavity is disposed with a baffle to reflect the sound wave.

In another preferred embodiment, the light source is an LED light source.

In another preferred embodiment, the box body is disposed with a chargeable power supply to supply power to the speaker part and the light source.

In another preferred embodiment, the box body is disposed with a radio receiver module to receive and process the audio signal.

In another preferred embodiment, the box body is disposed with a control module to modulate the illumination effect of the light source according to the audio signal; the control module is connected to the light source and the speaker part.

The advantageous effects of the present invention are:

1. The box body is a multi-function component, it has functions as below: served as a resonance cavity of the sound box, a rack of a removable light source and a main body with gentle light, it can be severed as a sport light and a gentle light in both, it has all functions of the table top lightings, in another hand, it is even more a sound box, making well combination of the sound box and the lighting and reducing the space a sound box and a lighting occupying.

3. The box body is disposed with a connector, the foldable cover is connected to the connector by a first hinge to form an expansion foldable structure to make it expanding the space and make the light source in the foldable cover obtaining a partial illumination and a sport illumination, it makes the illumination function of the sound box even better.

3. A moving element is disposed inside the box body, making the box body with least components, simplicity and small space occupying.

**Brief description of the drawings**

The present invention will be further described with the drawings and embodiments:

Fig.1 illustrates the side view of the first embodiment of the present invention;

Fig.2 illustrates the enlargement of partial side view of the fig.1 near the assembly base 40;

Fig.3 illustrates the side view of the second embodiment;

Fig.4 illustrates partial side view of the second embodiment in another state;

Fig.5 illustrates the side view of the third embodiment;

Fig.6 illustrates another side view of the third embodiment;

Fig.7 illustrates the side view of the fourth embodiment;

Fig.8 illustrates the side view of the fifth embodiment when the moving tray 24 of the moving

element is situated in the first fixation position;

Fig.9 illustrates the side view of the fifth embodiment when the moving tray 24 is situated in the second fixation position.

**Detailed description of the embodiment**

The first embodiment

Refer to the fig.1 and fig.2 of the side view of the first embodiment.

The box body 10 of the first embodiment is a spherical shape, the entire body is made from scattering and diffuse transmission material, which can be a light transmission plastic made from light diffusing agent, such as PMMA or PC. The box body 10 is disposed with a resonance cavity inside and an assembly hole 19 connected to the resonance cavity. That is to say, the resonance cavity is separated from outside of the box body 10 except the assembly hole 19.

The moving element in this embodiment is a foldable cover 20, which is disposed outside the box body 10. The external shaped of the foldable cover 20 is the same as that of the box body 10. The foldable cover 20 is foldable and coupled to the box body 10 and fixably connected to the box body 10 by a tightening first hinge 21. In the fig.1, the reference sign 20' is the foldable cover 20 when it is unfolded in the second fixation position. A light source 23 (as well as a light source 23' in unfolded state) is assembled in one side of the foldable cover 20 faced to the box body 10.

A speaker part is disposed in the lower of the box body 10. the speaker part includes a speaker unit 31 and a passive diaphragm 32. The speaker part is fixed to the box body 10 and closed the assembly hole 19. The speaker unit 31 is loaded in the assembly hole 19. That is to say, in this assembly position, the resonance cavity inside the box body 10 is separated from the exterior and in resonance with the speaker unit.

The box body 10 is dispose with a light transmission area, which includes a first exterior area 15 and a second exterior area 16. When the folded cover 20 is folded and coupled to the box body 10 and situated in the first fixation position as figured in the fig.1, the light of the light soured 23 can transmit to the first exterior area 15. As the entire body of the box body 10 is made from light scattering material, the light will pass through the first exterior area 15, reach to the second exterior area 16 through the resonance cavity and transmit out of the second exterior area 16 to form a visible part from the exterior of the box body 10.

As can be seen, the box body 10 is a multi-functional component. When the foldable cover 20 is unfolded and situated in the second fixation position, the light source 23 can be adjusted by the first hinge 21 to make the light spot on a proper position out of the light transmission area. When the foldable cover 20 is unfolded and coupled to the box body 10 and situated in the first fixation position, the light source 23

There are other characters in this embodiment. The speaker part includes a speaker unit 31 and a passive diaphragm 32. The speaker unit 31 includes a chassis rack and a chassis. The passive diaphragm 32 includes a diaphragm body 35 and an elastic ring 36 to support the diaphragm body. The chassis and the passive diaphragm 32 close the box body 10 in the assembly hole 19. So the proposal has a better sound effect. As the passive diaphragm 32 can be served as a resonance part, which enhances the base effect of the sound box great. For convenience to place, an assembly base 40 is fixed to the assembly hole 19 of the box body 10. The assembly base 40 has a cavity 43 and a sound whole 42 connected the cavity 43 and the exterior space. The cavity 43 is connected to the speaker part and it is disposed with a baffle 41to reflect the sound wave of the speaker part out of the sound hole 42. The shape can make this entire device placed on the floor or the table.

The second embodiment:

Fig.3 and fig.4 illustrate the structure of the second embodiment of the present invention.

The box body 10 of the second embodiment is similar to that of the first embodiment. The entire body of the box body 10 is made from light diffuse and light transmission material. The assembly base 40 and the speaker unit of this embodiment are similar to that of the first embodiment. It also disposed with a baffle 41, a cavity 41, a passive diaphragm 32 and a speaker unit 31. That is to say, the structure of the sound box of the second embodiment is similar to that of the first embodiment.

The difference is that, there are several foldable covers 20 and corresponding light sources 23 in this embodiment. So as can be seen in the fig.4, the moving element of this embodiment is also formed with foldable covers 20. These foldable covers 20 are circling arranged and open like a petal. When it is situated in the first fixation position as figured in the fig.3, the foldable covers 20 are folded and coupled to the box body 10, so the light of the light sources 23 are transmitted into the box body 10 to make the light transmission area of the box body 10 illuminate with a gentle light effect. When it is situated in the second fixation position as figured in the fig.4, the foldable covers 20 are open to make the light of the light sources 23 are transmitted to the area outside the box body 10 to form a partial and gathered lighting. The embodiment can be served as a hang illumination sound box.

The third embodiment:

Fig.5 and fig.6 illustrate the structure of the third embodiment.

The box body 10 of this embodiment is a cylindrical shape and placed on a working surface. A foldable cover 20 with same section is disposed in upper of the box body 10. the foldable cover 20 is a moving element , which can be unfolded with the light source 23 fixed inside to a second fixation position as figured with the reference signs 20’ and 23’ by a first hinge 21. When the foldable cover 20 is folded to the box body 10 and situated in the first fixation position, the light of the light source 23 is transmitted to the first exterior area 15, in this embodiment, which is made from a transparent material to achieve a most transmission efficiency. When the light is passing through the first exterior area 15, most of it is transmitted to the second exterior area 16, which is made from light diffuse material. At last, the second exterior area 16 is directly visible from the exterior of the box body 10. The entire second exterior area 16 has a gentle light effect all over. When the foldable cover 20 is open up, the light source 23’ can be adjusted to illuminate to a certain area.

Combining with the fig.6, the box body 10 is disposed with a connector 11, which is removably connected to the box body 10 by a tightening second hinge 22. The foldable cover 20 can connected to the connector 11 by a tightening first hinge 21. It is formed to be an expansion foldable structure expanded by the foldable cover 20. The light source 23 in the foldable cover 20 can obtain a local and spot light effect, which enhances the illumination function of the sound box. To reduce the size and the heat, the light source 23 is an LED light source.

The fourth embodiment:

Fig.7 illustrates the side view of the fourth embodiment of the present invention.

This embodiment is similar to the third embodiment. The foldable cover 20 as a moving element is removably connected to the connector 11 by the first hinge 21, and the connector 11 is removably connected to the box body 10 by the second hinge.

In this embodiment, there are several LED light sources 23 fixed on the bottom surface of the foldable cover 20. The box body 10 is disposed with two assembly holes 19; the speaker unit 31

and the passive diaphragm 32 are separately fixed to the two assembly holes 19. As the directivity of the base is weak, the passive diaphragm 32 for compensation can be assembled in the different position from the speaker unit 31 to reduce the complexity of the entire device.

The fifth embodiment:

Fig.8 and fig.9 illustrates the fifth embodiment of the present invention.

The box body 10 and the speaker part of this embodiment are similar to that of the second embodiment. This embodiment can be served as a pendent lamp. The entire body of the box body 10 is made from light diffuse and light transmission material, which is similar to that of the second embodiment. The assembly base 40 and the speaker unit are similar to that of the second embodiment. It is also disposed with a baffle 41, a cavity 43, a passive diaphragm 32 and a speaker unit 31.

The moving element of this embodiment is a moving tray 24. The moving tray 24 is coupled to the interior of the box body 10. a light window 17 is disposed on the surface of the box body 10. As figured in the fig.8, the moving tray 24 is situated in the first fixation position. The light source 23 is away from the light window 17; the light 27 of the light source 23 is mostly diffused out of the box body to form a gentle light effect. In the fig.9, the moving tray 24 is situated in the second embodiment; the light source 23 is coupled to the light window 17, making the light straightly transmitted out of the light window 17 but not of other light transmission area of the box body 10. It makes the light source 23 with spot light effect. The moving tray 24 is a hidden moving element, making the exterior structure of the entire device simple and less space occupying.

Although the present invention has been described with reference to the preferred embodiments thereof for carrying out the patent for invention, it is apparent to those skilled in the art that a variety of modifications and changes may be made without departing from the scope of the patent for invention which is intended to be defined by the appended claims.

## Claims

1. An illumination sound box, wherein includes:
A box body, which is disposed with a resonance cavity and an assembly hole connected to the resonance cavity;
A speaker part, which is fixed to the box body and assembled to the assembly hole to close the assembly hole；and
A moving element, which is removably connected to the box body, an illumination source is disposed in the moving element;
The moving element is disposed with a first fixation position in the box body, the box body is disposed with a light transmission area for light diffuse transmission when the moving element is situated in the first fixation position, the light transmission area is disposed with a part visible from outside the box body; the moving element is disposed with a second fixation position in the box body for the light source to illuminate out of the light transmission area.

2. An illumination sound box according to the claim 1, wherein the moving element is a foldable cover, which is disposed on the outside of the box body and foldable and coupled to the box body; the moving element is connected to the box body by a tightening first hinge; the foldable cover is disposed with a light source in the side faced to the box body.

3. An illumination sound box according to the claim 2, wherein the light transmission area includes two part, one part is situated in a first exterior area corresponding to the light source when the foldable cover is situated in the first fixation position, the first fixation position is the position where the foldable cover is folded and coupled to the exterior of the box body; the other part is situated in a second exterior area when the light of the light source is intersecting with the box body after the light is passing through the first exterior area; the second exterior area is made from diffuse transmission material.

4. An illumination sound box according to the claim 3, wherein the entire body of the box body is made from diffuse commission material.

5. An illumination sound box according to the claim 2, wherein the box body is disposed with a connector, the connector is movably connected to the box body by a tightening second hinge; the foldable cover is connected to the connector by the first hinge.

6. An illumination sound box according to the claim 1, wherein the moving element is cooperated to the interior of the box body, the box body is disposed with a light window on the surface; the light source is away from the light window when the moving element is situated in the first fixation position; the light source is cooperated to the light window when the moving element is situated in the second fixation position, the light is transmitted from the light window.

7. An illumination sound box according to one of the claim 1 to claim 6, wherein the speaker part includes:
A speaker unit, which includes a chassis rack and a chassis;
A passive diaphragm, which includes a diaphragm body and an elastic ring to support the

diaphragm body; thereinto
The assembly hole is closed by the chassis and the passive diaphragm in the box body.

8. An illumination sound box according to any one of the claim 1 to claim 6, wherein an assembly base is fixed in the assembly hole in the exterior of the box body; the assembly base is disposed with a cavity and a sound bore to connect the cavity and the exterior; the cavity is connected to the speaker part and the cavity is disposed with a baffle to reflect the sound wave.

9. An illumination sound box according to any one of the claim 1 to claim 6, wherein the light source is an LED light source.

10. An illumination sound box according to any one of the claim 1 to claim 6, wherein the box body is disposed with a chargeable power supply to supply power to the speaker part and the light source.

11. An illumination sound box according to any one of the claim 1 to claim 6, wherein the box body is disposed with a radio receiver module to receive and process the audio signal.

12. An illumination sound box according to any one of the claim 1 to claim 6, wherein the box body is disposed with a control module to modulate the illumination effect of the light source according to the audio signal, the control module is connected to the light source and the speaker part.