United States Patent	12389118
Kind Code	B2
Date of Patent	August 12, 2025
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Lens driving device and electronic device

Abstract

A lens driving device, including a base, a support frame suspended above the base, a lens holder for mounting a lens, a pair of conductive elastic sheets, a support suspension wire, a circuit board, a focusing circuit board, a shared magnet, a focusing coil and an anti-shake coil. The conductive elastic sheets are elastically connected to the support frame and lens holder. The circuit board includes a stationary portion and a movable portion connected thereto. The support suspension wire elastically connects the conductive elastic sheet with the movable portion, and can only support the movable portion. The focusing circuit board fixedly and electrically connects the conductive elastic sheet with the stationary portion, and electrical connection is led from the circuit board, ensuring stable and reliable electrical connection between the conductive elastic sheet, focusing circuit board and circuit board. An electronic device including the lens driving device is provided.

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Appl. No.: **18/393590**

Filed: **December 21, 2023**

Prior Publication Data

Document Identifier	Publication Date
US 20250024148 A1	Jan. 16, 2025

Related U.S. Application Data

continuation parent-doc WO PCT/CN2023/106781 20230711 PENDING child-doc US 18393590

Publication Classification

Int. Cl.: **H04N23/68** (20230101); **H04N23/55** (20230101)

U.S. Cl.:

CPC **H04N23/687** (20230101); **H04N23/55** (20230101);

Field of Classification Search

USPC: None

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS (1) This application is a continuation of International Patent Application No. PCT/CN2023/106781, filed on Jul. 11, 2023. The content of the aforementioned application, including any intervening amendments made thereto, is incorporated herein by reference in its entirety.

TECHNICAL FIELD

(1) The present application relates to cameras, and more particularly to a lens driving device and an electronic device.

BACKGROUND

(2) With the development of camera technology, the lens driving device has been widely used in various camera devices. The combination of the lens driving device and various portable electronic devices, such as cell phones, video cameras, computers, etc., is even more favored by consumers.

(3) The lens driving device of the related art includes a base, a support frame, a lens holder for mounting a lens, a pair of upper elastic sheets connecting the support frame and the lens holder to suspend the lens holder within the support frame, a suspension wire connecting the support frame

and the base to suspend the support frame above the base and electrically connected to the upper elastic sheets, a focusing coil fixed to the outer side of the lens holder, a shared magnet fixed to the support frame and electrically coupled to the focusing coil to drive the lens holder to move in the direction of the optical axis, and an anti-shake coil electrically coupled to the shared magnet to drive the lens holder to move in the direction perpendicular to the optical axis. The base is provided with a conductive terminal electrically connected to the suspension wire. However, the suspension wire in this lens driving device not only plays a role in supporting the suspension arrangement, but also provides the electrical connection. In this case, the suspension wire will experience deformation when supporting the support frame to move relative to the base, which will result in easy detachment of the suspension wire from the conductive terminal, thereby affecting the reliability of the lens driving device.

(4) Therefore, it is necessary to provide a novel lens driving device to solve the above technical problems.

SUMMARY

(5) An object of the present application is to provide a lens driving device and an electronic device to solve the technical problem in the existing lens driving devices that the suspension wire also provides the electrical connection in addition to supporting the suspension arrangement, such that it will suffer deformation when supporting the support frame to move relative to the base, which will result in easy detachment of the suspension wire from the conductive terminal, thereby affecting the reliability of the lens driving device.

(6) Technical solutions of this application will be specifically described below.

(7) In a first aspect, this application provides a lens driving device, comprising: a base; a support frame suspended above the base; a lens holder suspended within the support frame and configured for mounting of a lens; a pair of conductive elastic sheets insulated from each other; a circuit board arranged on the base; an image sensor; a support suspension wire; a focusing circuit board; a shared magnet; a focusing coil; and an anti-shake coil; wherein the pair of conductive elastic sheets are elastically connected to the support frame and the lens holder; the circuit board comprises a stationary portion fixedly provided on the base and a movable portion suspended above the base and connected to the stationary portion; the image sensor is arranged on the movable portion; the support suspension wire is elastically connected to the pair of conductive elastic sheets and the stationary portion; the focusing circuit board is fixedly connected to the pair of conductive elastic sheets and the stationary portion, and is configured to electrically connect the pair of conductive elastic sheets to the stationary portion; the shared magnet is fixedly provided on the support frame; the focusing coil is fixedly provided on an outer side of the lens holder, and are electrically connected to the pair of conductive elastic sheets; the focusing coil is electrically coupled to the shared magnet to drive the lens holder to move in a direction of an optical axis; and the anti-shake coil is arranged at the movable portion, and is electrically coupled to the shared magnet to drive the movable portion to drive the image sensor to move in a direction perpendicular to the optical axis.

(8) In some embodiments, the support suspension wire is welded to the movable portion or embedded in the movable portion by injection molding, and is electrically insulated from the movable portion.

(9) In some embodiments, each of the pair of conductive elastic sheets comprises a first arm fixed to a side of the lens holder away from the base, a second arm fixed to a side of the support frame away from the base, and an elastic arm connecting the first arm with the second arm; and the number of the second arm is two, and two second arms are both provided with the support suspension wire.

(10) In some embodiments, a side of each of the pair of conductive elastic sheets is electrically connected to the focusing circuit board; each of the two second arms comprises a first arm portion close to the focusing circuit board and electrically connected to the focusing circuit board, and a second arm portion away from the focusing circuit board; the first arm portion comprises a first

conductive portion electrically connected to the focusing circuit board, a first mounting portion connected to the support suspension wire, and a first fixing portion connecting the first conductive portion with the first mounting portion; and the first fixing portion is fixedly provided on the support frame; and the second arm portion comprises a second mounting portion connected to the support suspension wire, and a second fixing portion connected to the second mounting portion; and the second fixing portion is fixedly provided on the support frame.

(11) In some embodiments, the support frame is provided with a first mounting column extending along the direction of the optical axis; and the first fixing portion and the second fixing portion are mounted to the support frame through the first mounting column; and the lens holder is provided with a second mounting column extending along the direction of the optical axis; and the first arm is mounted to the lens holder through the second mounting column.

(12) In some embodiments, the support frame is provided with an accommodating slot, and each of the pair of conductive elastic sheets is at least partially accommodated in the accommodating slot.

(13) In some embodiments, the support frame is provided with four avoidance slots extending along the direction of the optical axis; the four avoidance slots are distributed at four corners of the support frame, respectively; the number of the support suspension wire is four; and four support suspension wires are accommodated in the four avoidance slots, respectively.

(14) In some embodiments, the circuit board further comprises a flexible portion, and the flexible portion is configured to move relative to the stationary portion during movement of the movable portion in the direction perpendicular to the optical axis; and the flexible portion comprises a first portion affixed to the movable portion, a second portion connected to the first portion and extending in the direction of the optical axis, a third portion connected to the second portion and extending around the optical axis, and a fourth portion connecting the third portion with the stationary portion.

(15) In some embodiments, the focusing circuit board comprises an electrical connection portion fixed to the pair of conductive elastic sheets and electrically connected to the pair of conductive elastic sheets, a fixed connection portion fixedly provided on the support frame, and a main body portion; a first end of the main body portion of the focusing circuit board is connected to the electrical connection portion and the fixed connection portion, and a second end of the main body portion of the focusing circuit board is electrically connected to the stationary portion of the circuit board.

(16) In a second aspect, this application further provides an electronic device, comprising: a device main body; a lens; and the above lens driving device; wherein the lens is mounted to the device main body through the lens driving device.

(17) Compared to the prior art, this application has the following beneficial effects.

(18) Regarding the lens driving lens provided herein, the pair of conductive elastic sheets is elastically connected to the support frame and the lens holder, and the support suspension wire is elastically connected to the conductive elastic sheets and the movable portion, such that the support suspension wire only plays a role in supporting the movable portion. Further, the circuit board is mounted on the base, and the focusing circuit board is elastically connected to the conductive elastic sheets and the stationary portion. The conductive elastic sheets are electrically connected to the stationary portion. The electrical connection is led through the circuit board, thereby ensuring the stability and reliability of the electrical connection between the conductive elastic sheets, the focusing circuit board and the circuit board.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) FIG. **1** schematically shows a lens driving device and lens according to an embodiment of this

application.
(2) FIG. **2** is an exploded view of the lens driving device and the lens shown in FIG. **1**.
(3) FIG. **3** is a top view of the lens driving device and the lens shown in FIG. **1**.
(4) FIG. **4** is a sectional view of the lens driving device and the lens in FIG. **3** along A-A line.
(5) FIG. **5** is an enlarged view of part B in FIG. **4**.
(6) FIG. **6** schematically shows the lens driving device and the lens in FIG. **1** in the absence of a shell.
(7) FIG. **7** is an enlarged view of part C in FIG. **6**.
(8) FIG. **8** is an enlarged view of part D in FIG. **6**.
(9) FIG. **9** schematically illustrates a conductive elastic sheet in the lens driving device in FIG. **1**.
(10) FIG. **10** schematically illustrates a focusing circuit board in the lens driving device in FIG. **1**.
(11) FIG. **11** schematically illustrates a stationary portion and a flexible portion of a circuit board in the lens driving device in FIG. **1**.
(12) FIG. **12** schematically shows a first plate body of the circuit board in the lens driving device in FIG. **1**.
(13) FIG. **13** schematically shows an electronic device according to an embodiment of this application.
(14) In the drawings: **10**, lens driving device; **20**, lens; and **30**, device main body; **100**, base; **200**, support frame; **210**, mounting groove; **220**, first mounting column; **230**, accommodating slot; **240**, avoidance slot; **300**, lens holder; **310**, second mounting column; **400**, conductive elastic sheet; **410**, first arm; **420**, second arm; **421**, first arm portion; **4211**, first mounting portion; **4212**, first conductive portion; **4213**, first fixing portion; **422**, second arm portion; **4221**, second mounting portion; **4222**, second fixing portion; **430**, elastic arm; **500**, support suspension wire; **600**, circuit board; **610**, movable portion; **611**, first plate body; **6111**, placement slot; **612**, second plate body; **6121**, light avoidance hole; **620**, stationary portion; **621**, connection section; **622**, insertion section; **630**, flexible portion; **631**, first portion; **632**, second portion; **633**, third portion; **6331**, first extending section; **6332**, second extending section; **634**, fourth portion; **700**, focusing circuit board; **710**, electrical connection portion; **720**, fixed connection portion; **730**, main body portion; **810**, shared magnet; **820**, focusing coil; **830**, anti-shaking coil; **841**, first elastic sheet; **842**, second elastic sheet; **850**, image sensor; **851**, glass plate; and **900**, shell.

DETAILED DESCRIPTION OF THE EMBODIMENTS

(15) The present application will be described clearly and completely below with reference to the accompanying drawings and embodiments to make objects, technical solutions, and advantages of the present application clearer and better understood.
(16) Obviously, described herein are only some embodiments of the present disclosure, instead of all embodiments. Based on the embodiments provided herein, all other embodiments obtained by a person of ordinary skill in the art without making creative labor shall fall within the scope of the present disclosure.
(17) It should be noted that similar labels and letters indicate similar items in the following accompanying drawings, so that once an item has been defined in one accompanying drawing, it does not need to further define and explain such item in subsequent accompanying drawings.
(18) As used herein, it is to be noted that the orientation or position relationship indicated by the terms “upper”, “lower”, “inner” and “outer” is based on the orientation or positional relationship shown in the accompanying drawings, or an orientation or positional relationship in which the product is often placed. These terms are only for the purpose of facilitating and simplifying the description of the present disclosure, and are not intended to indicate or imply that the device or element referred to must have a particular orientation, be constructed and operated in a particular orientation, and is therefore not to be construed as a limitation of the present disclosure.
(19) Furthermore, the terms “first”, “second”, etc. are used only for the purpose of differentiating features, and are not to be understood as indicating or implying relative importance.

(20) It should be noted that the features in the embodiments of the present disclosure may be combined with each other in the absence of contradiction.
(21) Referring to FIGS. **1**-**8**, this application provides a lens driving device **10**, which includes a base **100**, a support frame **200**, a lens holder **300**, a pair of conductive elastic sheets **400**, a support suspension wire **500**, a circuit board **600**, an image sensor **850**, a focusing circuit board **700**, a shared magnet **810**, a focusing coil **820** and an anti-shake coil **830**.
(22) In this embodiment, the support frame **200** is suspended above the base **100**, and the lens holder **300** is suspended within the support frame **200** and configured for mounting of a lens **20**. The pair of conductive elastic sheets **400** is insulated from each other, and the conductive elastic sheets **400** are elastically connected to the support frame **200** and the lens holder **300**. The lens holder **300** is suspended within the support frame **200** through the conductive elastic sheets **400**, such that the lens holder **300** and the lens **20** arranged thereon can move up and down in the direction of an optical axis.
(23) In this embodiment, the circuit board **600** is mounted on the base **100**, and includes a stationary portion **620** fixedly provided on the base **100**, and a movable portion **610** suspended above the base **100** and connected to the stationary portion **620**. The image sensor **850** is arranged on the movable portion **610**. The support suspension wire **500** is elastically connected to the conductive elastic sheets **400** and the movable portion **610**, so as to suspend the movable portion **610** above the base **100**. The movable portion **610** is suspended between the base **100** and the support frame **200** through the support suspension wire **500**, such that the movable portion **610** can drive the image sensor **850** to move along a direction perpendicular to the optical axis.
(24) In this embodiment, the focusing circuit board **700** is fixedly connected to the conductive elastic sheets **400** and the stationary portion **620**, and electrically connects the conductive elastic sheets **400** to the stationary portion **620**. The shared magnet **810** is fixed to the support frame **200**.
(25) Further, the focusing coil **820** is fixed to an outer side of the lens holder **300**, and is electrically connected to the pair of conductive elastic sheets **400**. The focusing coil **820** is electrically coupled to the shared magnet **810** to drive the lens holder **300** to move in the direction of the optical axis, thereby realizing the autofocus function (AF) of the lens driving device **10**. The anti-shake coil **830** is electrically coupled to the shared magnet **810** to drive the movable portion **610** to drive the image sensor **850** to move in the direction perpendicular to the optical axis, thereby realizing the optical image stabilization function (OIS) of the lens driving device **10**.
(26) It can be understood that the support frame **200** and the lens holder **300** are elastically connected by the conductive elastic sheets **400**, and the support suspension wire **500** is elastically connected to the conductive elastic sheets **400** and the movable portion **610**, such that the support suspension wire **500** only plays a role in supporting the movable portion **610**. Further, the circuit board **600** is mounted to the base **100**, and the focusing circuit board **700** is fixedly connected to the conductive elastic sheets **400** and the stationary portion **620**, and electrically connects the conductive elastic sheets **400** with the stationary portion **620**. Electrical connection is led from the circuit board **600** to ensure the stability and reliability of the electrical connection of the conductive elastic sheets **400**, the focusing circuit board **700** and the circuit board **600**.
(27) Specifically, the number of the shared magnet **810** is four, and the four shared magnets **810** are provided around the focusing coil **820** and are in centrosymmetric arrangement with respect to the optical axis to form a uniform magnetic field. A magnetizing direction of the shared magnets **810** is perpendicular to the optical axis.
(28) In this embodiment, four mounting grooves **210** are formed on the support frame **200**, and are distributed at four corners of the support frame **200**, respectively. The four shared magnets **810** are fixed in the four mounting grooves **210** in one-to-one correspondence.
(29) In an embodiment, referring to FIGS. **2**, **8** and **10**, the focusing circuit board **700** includes an electrical connection portion **710** fixed and electrically connected to the conductive elastic sheets **400**, a fixed connection portion **720** fixed to the support frame **200**, and a main body portion **730**.

One end of the main body portion **730** is connected to the electrical connection portion **710** and the fixed connection portion **720**, and the other end of the main body portion **730** is electrically connected to the stationary portion **620** of the circuit board **600**, so as to enable the electrical connection between the conductive elastic sheets **400** and the circuit board **600**, and form an electric circuit between the focusing coil **820**, the conductive elastic sheets **400**, the focusing circuit board **700** and the circuit board **600**.

(30) Further, two electrical connection portions **710** are provided, and are electrically connected with the conductive elastic sheets in one-to-one correspondence. Two fixed connection portions **720** are symmetrically provided with respect to the main body portion **730**. Specifically, the focusing circuit board **700** is provided with an integrated circuit (IC) and a capacitor, and is weldedly fixed to the stationary portion **620** of the circuit board **600**.

(31) In an embodiment, referring to FIGS. **2**, **6** and **7**, the support suspension wire **500** is welded to the movable portion **610** or embedded in the movable portion **610** by injection molding, and is electrically insulated from the movable portion **610**, such that the support suspension wire **500** does not have the function of electric conduction.

(32) Further, the support suspension wire **500** may be a metal wire. A bottom of the support suspension wire **500** is welded to the base **100** or embedded in the base **100**. In some embodiments, the support suspension wire **500** may also be a plastic support part, and is welded to the circuit board **600** or embedded in the circuit board **600**.

(33) In an embodiment, referring to FIGS. **6-9**, the conductive elastic sheet **400** includes a first arm **410** fixed to a side of the lens holder **300** away from the base **100**, a second arm **420** fixed to a side of the support frame **200** away from the base **100**, and an elastic arm **430** connecting the first arm **410** with the second arm **420**, that is, the lens holder **300** is suspended within the support frame **200** through the conductive elastic sheet **400**, such that the lens holder **300** and the lens **20** mounted thereon can move up and down along the direction of the optical axis.

(34) In this embodiment, two second arms **420** of each conductive elastic sheet **400** are each provided with the support suspension wire **500**, that is, four support suspension wires **500** are provided. In an embodiment, the four support suspension wires **500** are in centrosymmetric arrangement with respect to the optical axis.

(35) In an embodiment, referring to FIGS. **6-9**, a side of each conductive elastic sheet **400** is electrically connected to the focusing circuit board **700**. The second arm includes a first arm portion **421** close to the focusing circuit board **700** and electrically connected to the focusing circuit board **700**, and a second arm portion **422** away from the focusing circuit board **700**, that is, each conductive elastic sheet **400** only has one electrical connection path to the outside.

(36) The first arm portion **421** includes a first conductive portion **4212** electrically connected to the focusing circuit board **700**, a first mounting portion **4211** connected to the support suspension wire **500**, and a first fixing portion **4213** connecting the first conductive portion **4212** with the first mounting portion **4211**; and the first fixing portion **4213** is fixedly provided on the support frame **200**, so as to enable the electrical connection to the outside through the first arm portion **421**. Specifically, the focusing circuit board **700** is a flexible board.

(37) The second arm portion **422** includes a second mounting portion **4221** connected to the support suspension wire **500**, and a second fixing portion **4222** connected to the second mounting portion **4221**; and the second fixing portion **4222** is fixedly provided on the support frame. The second arm portion **422** does not has the electrical connection path to the outside.

(38) In some embodiments, the second arm portion may also be provided with a conductive portion and a flexible board adapted to the conductive portion, so as to enable the electrical connection between the conductive elastic sheet **400** and the circuit board **600**.

(39) In an embodiment, referring to FIGS. **6** and **9**, the support frame **200** is provided with a first mounting column **220** extending along the direction of the optical axis; and the first fixing portion **4213** and the second fixing portion **4222** are mounted to the support frame **200** through the first

mounting column **220**, thereby facilitating the arrangement of the conductive elastic sheet **400** on the support frame **200**.

(40) The lens holder **300** is provided with a second mounting column **310** extending along the direction of the optical axis; and the first arm **410** is mounted to the lens holder **300** through the second mounting column **310**, so as to facilitate the arrangement of the conductive elastic sheet **400** on the lens holder **300**.

(41) Further, in this embodiment, the support frame **200** is provided with an accommodating slot **230**, and the conductive elastic sheet **400** is at least partially accommodated in the accommodating slot **230**, so as to facilitate mounting the conductive elastic sheet **400**.

(42) Specifically, the support frame **200** is further provided with four avoidance slots **240** extending along the direction of the optical axis; the four avoidance slots **240** are distributed at four corners of the support frame **200**, respectively; the number of the support suspension wire **500** is four; and four support suspension wires **500** are accommodated in the four avoidance slots **240**, respectively, so as to facilitate the arrangement of the support suspension wires **500**.

(43) In an embodiment, referring to FIGS. **2**, **4**-**6** and **11**, the circuit board **600** further includes a flexible portion **630**, and the flexible portion **630** is configured to move relative to the stationary portion **620** during movement of the movable portion **610** in the direction perpendicular to the optical axis. The flexible portion **630** includes a first portion **631** affixed to the movable portion **610**, a second portion **632** connected to the first portion **631** and extending in the direction of the optical axis, a third portion **633** connected to the second portion **632** and extending around the optical axis, and a fourth portion **634** connecting the third portion **633** with the stationary portion **620**, such that an electrical connection is led through the flexible portion **630**. Since the flexible portion **630** has a large movable degree of freedom, the stability and reliability of the electrical connection between the conductive elastic sheet **400**, the focusing circuit board **700** and the circuit board **600** can be ensured.

(44) Specifically, the flexible portion **630** and the stationary portion **620** are both a flexible plate, and the stationary portion **620** includes a connection section **621** and an insertion section **622**. The fourth portion **634** of the flexible portion **630** is connected to the insertion section **622**. The connection section **621** is fixedly provided on the base **100**, and connects the connection section **622** with the focusing circuit board **700**. The insertion section **622** is configured for inserted connection with the outside.

(45) The third portion includes a first extending section **6331** and a second extending section **6332**. The support frame **200** includes a first side surface and a second side surface connected with each other. The first extending section **6331** is connected to the second portion **632**, and extends along a plane where the first side surface is located. The second extending section **6332** is connected to the first extending section **6331**, and extends along a plane where the second side surface is located. Further, the second extending section **6332** is perpendicular to the first extending section **6331**.

(46) In an embodiment, the movable portion **610** includes a first plate body **611** and a second plate body **612**. A light-receiving side of the first plate body **611** is provided with a placement slot **6111**, in which the image sensor **850** is accommodated. A glass plate **851** is covered on an opening of the placement slot **6111**. The second plate body **612** is stacked on the first plate body **611**, and is provided with a light avoidance hole **6121** to avoid the light beams. Four anti-shake coils **830** are provided, and distributed at four corners of the second plate body **612**, respectively. Specifically, the first portion **631** of the flexible portion **630** is connected to a bottom surface of the first plate body **611**, and is electrically connected to the first plate body **611**.

(47) In an embodiment, referring to FIGS. **1** and **2**, the lens driving device **10** further includes a pair of first elastic sheets **841** and a pair of second elastic sheets **842**. The lens holder **300** is suspended within the support frame **200** through the first elastic sheets **841** and the second elastic sheets **842**. The conductive elastic sheet **400**, the first elastic sheet **841** and the second elastic sheet **842** both have a spring plate structure whose deformation direction is along the direction of the

optical axis.
(48) Specifically, a first end of each of the first elastic sheet **841** and the second elastic sheet **842** is fixed to a side of the lens holder **300** facing toward the base **100**, and a second end of each of the first elastic sheet **841** and the second elastic sheet **842** is fixed to a side of the support frame **200** facing toward the base **100**. Further, the pair of first elastic sheets **841** is in centrosymmetric arrangement with respect to the optical axis, and the pair of second elastic sheets **842** is also in centrosymmetric arrangement with respect to the optical axis. Moreover, the first elastic sheets **841** and the second elastic sheets **842** are arranged spaced apart along a circumferential direction of the optical axis.
(49) In this embodiment, the lens driving device **10** further includes a shell **900** sleeved on the support frame **200** and fixedly supported on the base **100**. The shell **900** provides protection for internal components of the lens driving device **10**. A top wall of the support frame **200** is fixedly connected to an inner wall of the shell **900** to suspend the support frame **200** above the base **100**.
(50) Referring to FIGS. **1-13**, this application further provides an electronic device, including a device main body **30**, a lens **20** and the lens driving device **10** described in any one of the above embodiments. The lens **20** is mounted to the device main body **30** through the lens driving device **10**. The electronic device can be mobile phone, camera or computer. The lens **20** includes a lens barrel fixed on the lens holder **300** and a lens group fixed in the lens barrel.
(51) Described above are only preferred embodiments of the present application, which are not intended to limit the present application. It should be noted that any variations, replacements and modifications made by those of ordinary skill in the art without departing from the spirit and scope of the present application shall fall within the scope of the present application defined by the appended claims.

Claims

1. A lens driving device, comprising: a base; a support frame suspended above the base; a lens holder suspended within the support frame and configured for mounting of a lens; a pair of conductive elastic sheets insulated from each other; a circuit board arranged on the base; an image sensor; a support suspension wire; a focusing circuit board; a shared magnet; a focusing coil; and an anti-shake coil; wherein the pair of conductive elastic sheets are elastically connected to the support frame and the lens holder; the circuit board comprises a stationary portion fixedly provided on the base and a movable portion suspended above the base and connected to the stationary portion; the image sensor is arranged on the movable portion; the support suspension wire is elastically connected to the pair of conductive elastic sheets and the stationary portion; the focusing circuit board is fixedly connected to the pair of conductive elastic sheets and the stationary portion, and is configured to electrically connect the pair of conductive elastic sheets to the stationary portion; the shared magnet is fixedly provided on the support frame; the focusing coil is fixedly provided on an outer side of the lens holder, and are electrically connected to the pair of conductive elastic sheets; the focusing coil is electrically coupled to the shared magnet to drive the lens holder to move in a direction of an optical axis; and the anti-shake coil is arranged at the movable portion, and is electrically coupled to the shared magnet to drive the movable portion to drive the image sensor to move in a direction perpendicular to the optical axis.
2. The lens driving device of claim 1, wherein the support suspension wire is welded to the movable portion or embedded in the movable portion by injection molding, and is electrically insulated from the movable portion.
3. The lens driving device of claim 2, wherein each of the pair of conductive elastic sheets comprises a first arm fixed to a side of the lens holder away from the base, a second arm fixed to a side of the support frame away from the base, and an elastic arm connecting the first arm with the second arm; and the number of the second arm is two, and two second arms are both provided with

the support suspension wire.
4. The lens driving device of claim 3, wherein a side of each of the pair of conductive elastic sheets is electrically connected to the focusing circuit board; each of the two second arms comprises a first arm portion close to the focusing circuit board and electrically connected to the focusing circuit board, and a second arm portion away from the focusing circuit board; the first arm portion comprises a first conductive portion electrically connected to the focusing circuit board, a first mounting portion connected to the support suspension wire, and a first fixing portion connecting the first conductive portion with the first mounting portion; and the first fixing portion is fixedly provided on the support frame; and the second arm portion comprises a second mounting portion connected to the support suspension wire, and a second fixing portion connected to the second mounting portion; and the second fixing portion is fixedly provided on the support frame.
5. The lens driving device of claim 4, wherein the support frame is provided with a first mounting column extending along the direction of the optical axis; and the first fixing portion and the second fixing portion are mounted to the support frame through the first mounting column; and the lens holder is provided with a second mounting column extending along the direction of the optical axis; and the first arm is mounted to the lens holder through the second mounting column.
6. The lens driving device of claim 3, wherein the support frame is provided with an accommodating slot, and each of the pair of conductive elastic sheets is at least partially accommodated in the accommodating slot.
7. The lens driving device of claim 3, wherein the support frame is provided with four avoidance slots extending along the direction of the optical axis; the four avoidance slots are distributed at four corners of the support frame, respectively; the number of the support suspension wire is four; and four support suspension wires are accommodated in the four avoidance slots, respectively.
8. The lens driving device of claim 1, wherein the circuit board further comprises a flexible portion, and the flexible portion is configured to move relative to the stationary portion during movement of the movable portion in the direction perpendicular to the optical axis; and the flexible portion comprises a first portion affixed to the movable portion, a second portion connected to the first portion and extending in the direction of the optical axis, a third portion connected to the second portion and extending around the optical axis, and a fourth portion connecting the third portion with the stationary portion.
9. The lens driving device of claim 1, wherein the focusing circuit board comprises an electrical connection portion fixed to the pair of conductive elastic sheets and electrically connected to the pair of conductive elastic sheets, a fixed connection portion fixedly provided on the support frame, and a main body portion; a first end of the main body portion of the focusing circuit board is connected to the electrical connection portion and the fixed connection portion, and a second end of the main body portion of the focusing circuit board is electrically connected to the stationary portion of the circuit board.
10. An electronic device, comprising: a device main body; a lens; and the lens driving device of claim 1; wherein the lens is mounted to the device main body through the lens driving device.