ADAPTER AND RAIL SOCKET

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is a national stage of international application No. PCT/CN2023/133550, filed on November 23, 2023, which claims priority to Chinese Patent Application No. 202310635523.2, filed on May 31, 2023, and entitled "ADAPTER AND RAIL SOCKET", and Chinese patent application No. 202310635524.7, filed on May 31, 2023, and entitled "ADAPTER AND RAIL SOCKET", the disclosures of which are herein incorporated by reference in their entireties.

TECHNICAL FIELD

[0002] The present disclosure relates to the field of electric apparatus technologies, and more particularly, to an adapter and a rail socket.

BACKGROUND

[0003] A rail socket is a new type of socket, which can effectively improve the flexibility of power supply.

SUMMARY

[0004] The embodiments of the present disclosure provide an adapter and a rail socket. The technical solutions are as follows.

[0005] According to some embodiments of the present disclosure, an adapter is provided. The adapter includes a body, a rotating member and a transmission assembly;

[0006] wherein the body includes a housing, a plug bush assembly, a driven swing member and a conductive swing arm, wherein the plug bush assembly is disposed in the housing, the driven swing member is rotatably connected to the housing, the conductive swing arm is connected to the driven swing member, such that the conductive swing arm is unfolded or folded;

[0007] the rotating member is rotatably connected to the housing and disposed on a side, away from the conductive swing arm, of the housing;

[0008] the transmission assembly is disposed in the housing, the transmission assembly has elasticity, and fits with the rotating member and the driven swing member; and

[0009] the adapter is configured to rotate the rotating member, such that the driven swing member is driven by an elastic potential energy of the transmission assembly to drive the conductive swing arm to rotate relative to the housing.

[0010] In some embodiments of the present disclosure, the transmission assembly, the driven swing member and the plug bush assembly are at least partially disposed on the same plane.

[0011] In some embodiments of the present disclosure, the plug bush assembly is disposed in the middle of the housing, and the transmission assembly and the driven swing member are disposed between an inner wall of the housing and the plug bush assembly around the plug bush assembly.

[0012] In some embodiments of the present disclosure, the body further includes a separation frame;

[0013] the separation frame is disposed in the housing to separate an internal space of the housing into a first space and a second space; and

[0014] the plug bush assembly is disposed in the first space, and the transmission assembly and the driven swing member are disposed in the second space.

[0015] In some embodiments of the present disclosure, the separation frame includes a partition plate and a plug bush seat;

[0016] wherein the plug bush seat is disposed in the middle of the partition plate, the plug bush seat has an open end and a closed end, the open end and the closed end of the plug bush seat are disposed on two opposite sides of the partition plate, respectively, one side of the partition plate and a frame wall at the open end of the plug bush seat form the first space, and the other side of the partition plate and a frame wall at the closed end of the plug bush seat form the second space; and

[0017] the plug bush assembly is disposed in the plug bush seat.

[0018] In some embodiments of the present disclosure, the transmission assembly includes a driving swing member and an elastic member; and

[0019] a portion of the driving swing member is disposed in the second space and rotatably connected to the housing, and the other portion of the driving swing member is disposed in the first space and fits with the rotating member, the elastic member is disposed in the second space,

and the elastic member is compressed between the driving swing member and the driven swing member.

[0020] In some embodiments of the present disclosure, the driving swing member, the elastic member and the driven swing member are arranged along an inner wall of the housing.

[0021] In some embodiments of the present disclosure, a distance between a rotation axis of the driving swing member and a rotation axis of the driven swing member ranges from 25.2 mm to 27.2 mm.

[0022] In some embodiments of the present disclosure, a swing angle between the driving swing member and the driven swing member ranges from 34° to 38°.

[0023] In some embodiments of the present disclosure, a distance between the rotation axes of the two driven swing members ranges from 47.5 mm to 48.5 mm.

[0024] In some embodiments of the present disclosure, in an unfolded state and a folded state, an axis of the elastic member is arc-shaped, and symmetrical about a connecting line between the driving swing member and the driven swing member;

[0025] in the unfolded state, the elastic member is compressed in an arc shape on one side of the connecting line between the driving swing member and the driven swing member, in the folded state, the elastic member is compressed in an arc shape on the other side of the connecting line between the driving swing member and the driven swing member, and in a case where the conductive swing arm is switched between the unfolded state and the folded state, the elastic member is compressed in an S shape at the connecting line between the driving swing member and the driven swing member; and

[0026] in a case where the elastic member is switched between the unfolded state and the folded state, a moving distance of the arc top of the axis of the elastic member ranges from 10 mm to 12 mm.

[0027] In some embodiments of the present disclosure, the driving swing member includes a crank and a first mounting member;

[0028] wherein the crank is rotatably disposed in the housing, and a rotation axis of the crank is parallel to a rotation axis of the rotating member, one end of the crank fits with the rotating member, and the other end of the crank is connected to the first mounting member and abutted against the elastic member.

[0029] In some embodiments of the present disclosure, the first mounting member is a rod member, and the first mounting member is perpendicular to the rotation axis of the rotating member; and

[0030] the elastic member is sleeved over the first mounting member.

[0031] In some embodiments of the present disclosure, the driving swing member includes a first matching member; and

[0032] a second matching member is disposed on an inner wall of the rotating member, and the second matching member is connected to the first matching member.

[0033] In some embodiments of the present disclosure, the driven swing member includes a rotating shaft and a second mounting member;

[0034] the rotating shaft is rotatably plugged with the housing, and the rotation axis of the rotating shaft is parallel to the rotation axis of the rotating member;

[0035] the conductive swing arm is located outside the housing, and the conductive swing arm is connected to one end of the rotating shaft;

[0036] the second mounting member is disposed in the housing, and the second mounting member is connected to one end of the rotating shaft; and

[0037] the elastic member is abutted against the second mounting member.

[0038] In some embodiments of the present disclosure, a guide groove is disposed in the partition plate; and

[0039] the driving swing member is movably plugged in the guide groove.

[0040] In some embodiments of the present disclosure, the separation frame further includes a guide portion; and

[0041] one end of the guide portion is connected to at least one of the partition plate and the closed end of the plug bush seat, and the other end of the guide portion extends away from the partition plate.

[0042] According to some embodiments of the present disclosure, a rail socket is provided. The rail socket includes a rail, and the adapter as described above.

BRIEF DESCRIPTION OF DRAWINGS

[0043] To describe the technical solutions in the embodiments of the present disclosure more clearly, the following briefly introduces the accompanying drawings required for describing the

embodiments. Apparently, the accompanying drawings in the following description show merely some embodiments of the present disclosure, and a person of ordinary skill in the art may still derive other drawings from these accompanying drawings without creative efforts.

[0044] FIG. 1 is a schematic structural diagram of a rail socket according to some embodiments of the present disclosure;

[0045] FIG. 2 is a schematic structural diagram of an adapter according to some embodiments of the present disclosure;

[0046] FIG. 3 is a schematic diagram of a conductive swing arm in an unfolded state according to some embodiments of the present disclosure;

[0047] FIG. 4 is a schematic diagram of the conductive swing arm in a folded state according to some embodiments of the present disclosure;

[0048] FIG. 5 is a sectional view of the adapter according to some embodiments of the present disclosure;

[0049] FIG. 6 is a schematic structural diagram of a separation frame according to some embodiments of the present disclosure;

[0050] FIG. 7 is a schematic diagram of an internal structure of a plug bush assembly according to some embodiments of the present disclosure;

[0051] FIG. 8 is a schematic diagram of an internal structure of the plug bush assembly according to some embodiments of the present disclosure;

[0052] FIG. 9 is a schematic structural diagram of a driving swing member according to some embodiments of the present disclosure;

[0053] FIG. 10 is a schematic structural diagram of a driven swing member according to some embodiments of the present disclosure; and

[0054] FIG. 11 is a schematic assembly diagram of the plug bush assembly according to some embodiments of the present disclosure.

DETAILED DESCRIPTION

[0055] In order to make the objectives, technical solutions and advantages of the present disclosure clearer, a further detailed description are to be made to the embodiments of the present disclosure below with reference to the accompanying drawings.

[0056] In related art, the rail socket includes an adapter and a rail. The rail has conductive slide rails extending along a length direction of the rail. The conductive slide rails are electrified, and a conductive swing arm that can be unfolded or folded is disposed on a side of the adapter. The adapter can be inserted into the rail. By unfolding the conductive swing arm, the conductive swing arm is in contact with the conductive slide rails, and the adapter is energized accordingly. Because the adapter can be plugged into any location on the rail, the adapter supplies power to electric appliances in a plurality of positions, thereby improving the flexibility of power supply.

[0057] However, in related arts, the internal space layout of the adapter is unreasonable, which is not conducive to the design of slim and lightweight adapters.

[0058] Embodiments of the present disclosure provides a rail socket. FIG. 1 is a schematic structural diagram of the rail socket. Referring to FIG. 1, the rail socket in the present embodiment includes a rail 100 and an adapter 200.

[0059] The adapter 200 is plugged into the rail 100. The adapter 200 is plugged into any position on the rail 100. Through the electrical connection between the adapter 200 and the rail 100, the adapter 200 can be energized, thereby effectively improving the flexibility of the adapter 200 in use.

[0060] In order to achieve a slim and lightweight design of the adapter 200, it is found based on the analysis for products in the related technologies that a drive structure configured to drive the conductive swing arm in the adapter 200 occupies a layer of space in the adapter 200 alone, and other structures in the adapter 200 need to be arranged in another layer of space, resulting in relatively large thickness of the adapter 200. In view of this, the present disclosure provides an adapter. FIG. 2 is a schematic structural diagram of the adapter. In conjunction with FIG. 2, the adapter in the present embodiment includes a body 10, a rotating member 20 and a transmission assembly 30.

[0061] The body 10 includes a housing 110, a plug bush assembly 120, a driven swing member 130 and a conductive swing arm 140. The plug bush assembly 120 is disposed in the housing 110. The driven swing member 130 is rotatably connected to the housing 110. The conductive swing arm 140 is connected to the driven swing member 130, such that the conductive swing arm 140 can be unfolded (see FIG. 3) or folded (see FIG. 4). The rotating member 20 is rotatably connected to the housing 110 and disposed on a side, away from the conductive swing arm 140, of the housing 110. The transmission assembly 30 is disposed in the housing 110, and the transmission assembly

30 has elasticity, and fits with the rotating member 20 and the driven swing member 130. The adapter is configured to rotate the rotating member 20, such that the driven swing member 130 is driven by the elastic potential energy of the transmission assembly 30 to drive the conductive swing arm 140 to rotate relative to the housing 110.

[0062] Embodiments of the present disclosure provide an adapter, which can be plugged in any location of the rail 100. In the case that the adapter has been plugged, the rotating member 20 is screwed, such that the rotating member 20 rotates relative to the housing 110. During the rotation process of the rotating member 20, because the transmission assembly 30 fits with the rotating member 20 and the driven swing member 130, the transmission assembly 30 moves accordingly and accumulate elastic potential energy by itself. In the case that the elastic potential energy accumulated by the transmission assembly 30 exceeds a threshold, the driven swing member 130 can be driven to move, the driven swing member 130 drives the conductive swing arm 140, which is connected to the driven swing member 130, to be unfolded, and the conductive swing arm 140 is then in contact with the conductive slide rails in the rail 100, thereby achieving the power supply of the rail 100 to the adapter. In the case that the adapter needs to be detached, the rotating member 20 is screwed again to control the folding of the conductive swing arm 140, making it easier to detach the adapter from the rail 100.

[0063] Because the transmission assembly 30 is relatively concise in structure, and is conducive to its own miniaturization design, such that the internal space layout of the adapter 200 is reasonably planned more conveniently, thereby achieving the slim and lightweight design of the adapter 200.

[0064] Upon the measurement of a finished product, the adapter according to the embodiments of the present disclosure can reduce the thickness ranging from 30 mm to 25 mm compared with the adapter in the related art, that is, a 5 mm reduction effect in thickness is achieved.

[0065] In the present embodiment, the transmission assembly 30, the driven swing member 130 and the plug bush assembly 120 are at least partially disposed on the same plane.

[0066] Because the transmission assembly 30, the driven swing member 130 and the plug bush assembly 120 are at least partially located on the same plane, the adapter can be prevented from having an excessively large thickness due to the stacking of the transmission assembly 30, the driven swing member 130 and the plug bush assembly 120 within the housing 110, which is conducive for the slim and lightweight design of the adapter.

[0067] In the present embodiment, the plug bush assembly 120 is disposed in the middle of the housing 110, and the transmission assembly 30 and the driven swing member 130 are disposed between an inner wall of the housing 110 and the plug bush assembly 120 around the plug bush assembly 120.

[0068] In the above embodiments, the housing 110 provides an accommodating space for the plug bush assembly 120. The transmission assembly 30 and the driven swing member 130 are disposed between the inner wall of the housing 110 and the plug bush assembly 120, which is equivalent that the transmission assembly 30 and the driven swing member 130 are arranged close to the edge of the housing 110. Therefore, the middle position of the housing 110 is given to the plug bush assembly 120, allowing the plug bush assembly 120 to be disposed in the middle of the housing 110. In this way, the transmission assembly 30, the driven swing member 130 and the plug bush assembly 120 are disposed in the same layer of space, and the transmission assembly 30, the driven swing member 130 and the plug bush assembly 120 are not needed to be disposed in different layers of space due to insufficient space, thereby effectively reducing the thickness of the adapter and making the adapter slimmer.

[0069] For example, the body 10 further includes a panel 160. The panel 160 is connected to the housing 110 to cover an opening on the housing 110. Jacks 161 are disposed on the panel 160 and opposite to the plug bush assembly 120. The rotating member 20 is disposed between the panel 160 and the housing 110.

[0070] In the above embodiments, the panel 160 is configured to cover the opening on the housing 110 to protect various components in the housing 110. The rotating member 20 is disposed between the panel 160 and the housing 110, which is equivalent that unnecessary shaking of the rotating member 20 during rotation is avoided by the stable clamping of the panel 160 and the housing 110 to the rotating member 20.

[0071] For example, the rotating member 20 is an annular structural member, one side of the rotating member 20 is sleeved on an outer peripheral wall of the housing 110, the other side of the rotating member 20 is sleeved on the panel 160, and the outer peripheral wall of the rotating member 20 has anti-slip grains which facilitate the user to screw the rotating member 20.

[0072] In the present embodiment, the body 10 further includes a separation frame 150. The separation frame 150 is disposed in the housing 110 to separate an internal space of the housing 110 into a first space 111 (see FIG. 5) and a second space 112 (see FIG. 5). The plug bush assembly

120 is disposed in the first space 111, and the transmission assembly 30 and the driven swing member 130 are disposed in the second space 112.

[0073] In the above embodiments, through the separation frame 150, the internal space of the housing 110 can be divided into two parts, namely the first space 111 and the second space 112. In this way, the internal space of the housing 110 can be allocated more reasonably, which is conducive to the slim and lightweight design of the adapter, and also can avoid the problem of interference among various components due to the high internal integration of the adapter. The internal space of the housing 110 is mainly used to accommodate the plug bush assembly 120, the transmission assembly 30 and the driven swing member 130. The plug bush assembly 120 is disposed in the first space 111, and the transmission assembly 30 and the driven swing member 130 are disposed in the second space 112, such that a charged portion can be separated from an uncharged portion, and a stationary portion is also separated from a moving portion, thereby effectively improving the rationality and reliability of the internal distribution of the adapter.

[0074] FIG. 6 is a schematic structural diagram of the separation frame 150. In conjunction with FIG. 6, the separation frame 150 in the present embodiment includes a partition plate 151 and a plug bush seat 152. The plug bush seat 152 is disposed at the middle of the partition plate 151. The plug bush seat 152 has an open end and a closed end. The open end and the closed end of the plug bush seat 152 are disposed on two opposite sides of the partition plate 151 respectively. One side of the partition plate 151 and a frame wall at the open end of the plug bush seat 152 form the first space 111, and the other side of the partition plate 151 and a frame wall at the closed end of the plug bush seat 152 form the second space 112. The plug bush assembly 120 is disposed in the plug bush seat 152.

[0075] In the above embodiments, the partition plate 151, as a main body of the separation frame 150, can separate the internal space of the housing 110 into an upper space and a lower space, that is, make a general separation. The plug bush seat 152 is disposed in the middle of the partition plate 151, such that the partition plate 151 acts as a stable support for the plug bush seat 152. The plug bush seat 152 is configured to accommodate the plug bush assembly 120 and can provide a stable mounting base for the plug bush assembly 120. Because the open end and the closed end of the plug bush seat 152 are respectively disposed on two opposite sides of the partition plate 151, the plug bush seat 152 occupies both the upper space on one side of the partition plate 151 and the

lower space on the other side of the partition plate 151, such that the plug bush assembly 120 has sufficient accommodating space.

[0076] In the present embodiment, the first space 111 is formed by one side of the separation frame 150, an inner side wall of the housing 110, an inner side wall of the rotating member and the panel 160. The second space 112 is formed by the other side of the separation frame 150, the inner side wall of the housing 110 and an inner bottom surface of the housing 110.

[0077] It is worth noting that a first side of the partition plate 151, an inner wall of the plug bush seat 152 and an outer wall of the plug bush seat 152 disposed on a first side of the partition plate 151 together constitute the first space 111. Therefore, the plug bush assembly 120 disposed in the plug bush seat 152 is also disposed in the first space 111. A second side of the partition plate 151 and an outer wall of the plug bush seat 152 disposed on a second side of the partition plate 151 together constitute the second space 112.

[0078] FIG. 7 and FIG. 8 are schematic diagrams of an internal structure of the plug bush assembly. The difference is that FIG. 7 shows the driven swing member130 in a folded state, and FIG. 8 shows the driven swing member 130 in an unfolded state. In conjunction with FIG. 6 and FIG. 8, the transmission assembly 30 in the present embodiment includes a driving swing member 310 and an elastic ember 320, wherein a portion of the driving swing member 310 is disposed in the second space 112 and rotatably connected to the housing 110, and the other portion of the driving swing member 310 is disposed in the first space 111 and fits with the rotating member 20. The elastic member 320 is disposed in the second space 112, and the elastic member 320 is compressed between the driving swing member 310 and the driven swing member 130.

[0079] In the above embodiments, the driving swing member 310 is configured to fit with the rotating member 20 to rotate together with the rotating member 20. The elastic member 320 is configured to generate an elastic deformation under the action of the driving swing member 310, so as to accumulate elastic potential energy. The elastic member 320 releases its elastic potential energy to drive the driven swing member 130 to rotate together, thereby driving the conductive swing arm 140 to be unfolded or folded.

[0080] During the unfolding and folding process of the conductive swing arm 140, the elastic member 320 can play the role of transmitting a force, so as to convert the swing of the driving swing member 310 into the swing of the driven swing member 130. Because the driving swing member 310 and the driven swing member 130 are independent of each other, and the elastic

member 320 has elasticity, at the beginning of the user driving the driving swing member 310 to move through the rotating member 20, the elastic member 320 accumulates elastic potential energy, and the driven swing member 130 remains stationary. In the case that the elastic potential energy of the elastic member 320 accumulates to a critical point, the elastic member 320 quickly bounces the driven swing member 130, such that the conductive swing arm 140 is quickly switched to the unfolded state or the folded state. That is, a speed of the user to operate the rotating member 20 is only related to an elastic potential energy accumulation speed and an elastic energy release speed of the elastic member 320, and is independent of a moving speed of the driven swing member 130, as well as a speed at which the conductive swing arm 140 is switched to the unfolded state and the folded state. The conductive swing arm 140 is always driven by the elastic member 320 to be quickly switched between the unfolded state and the folded state, thereby achieving the rapid power on and off of the rail and effectively avoiding an arcing problem.

[0081] For example, a rotation axis of the driving swing member 310, a rotation axis of the driven swing member 130 and a rotation axis of the rotating member 20 are all perpendicular to the partition plate 151.

[0082] Because a portion of the driving swing member 310 is disposed in the first space 111 and the other portion thereof is disposed in the second space 112, the driving swing member 310 needs to penetrate through the partition plate 151, in order to avoid interference between the driving swing member 310 and the partition plate 151 in the rotation process. In the present embodiments, a guide groove 153 is disposed in the partition plate 151, and the driving swing member 310 is movably plugged into the guide groove 153.

[0083] In the above embodiments, the driving swing member 310 penetrates through the guide groove 153, and the guide groove 153 can provide sufficient movement space for the driving swing member 310 without the problem of interference between the driving swing member 310 and the partition plate 151.

[0084] For example, the guide groove 153 is arc-shaped, and the center of the guide groove 153 is disposed on the rotation axis of the driving swing member 310. In this way, the guide groove 153 has a guidance effect, enhancing the rotation stability of the driving swing member 310.

[0085] Continuing to FIG. 7 and FIG. 8, in the present embodiments, the driving swing member 310, the elastic member 320 and the driven swing member 130 are arranged along the inner wall of the housing 110.

[0086] In the above embodiments, the driving swing member 310, the elastic member 320 and the driven swing member 130 are all arranged along the inside of the housing 110, so as to give a middle space of the housing 110 to the plug bush assembly 120 as much as possible, thereby avoiding the problem of interference between the driving swing member 310, the elastic member 320 and the driven swing member 130 during their movements and the plug bush assembly 120.

[0087] For example, a distance between the rotation axis of the driving swing member 310 and the rotation axis of the driven swing member 130 ranges from 25.2 mm to 27.2 mm.

[0088] By designing the distance between the rotation axis of the driving swing member 310 and the rotation axis of the driven swing member130 as the above value, a sufficient space is provided between the driving swing member 310 and the driven swing member 130 to accommodate the elastic member 320, thereby avoiding an insufficient elastic deformation of the elastic member 320.

[0089] In the present embodiment, in the unfolded state and the folded state, an axis of the elastic member 320 is arc-shaped, and symmetrical relative to a connecting line between the driving swing member 310 and the driven swing member 130.

[0090] In the unfolded state, the elastic member 320 is compressed in an arc shape on one side of the connecting line between the driving swing member 310 and the driven swing member 130. In the folded state, the elastic member 320 is compressed in an arc shape on the other side of the connecting line between the driving swing member 310 and the driven swing member 130. In the case that the conductive swing arm 140 is switched between the unfolded state and the folded state, the elastic member 320 is compressed in an S shape between the driving swing member 310 and the driven swing member 130.

[0091] In the case that the conductive swing arm 140 is switched between the unfolded state and the folded state, a moving distance of the arc top of the axis of the elastic member 320ranges from 10 mm to 12 mm.

[0092] In the above embodiments, a shape of the axis of the elastic member 320 corresponds to the shape of the elastic member 320. In the case that the elastic member 320 is a straight line type, the axis of the elastic member 320 is a straight line. In the case that the elastic member 320 is arc-shaped, the axis of the elastic member 320 is an arc line. In the unfolded state, the arc top of the axis of the elastic member 320 is a point where the axis of the elastic member 320 is closest to the inner wall of the housing 110. In the folded state, the arc top of the axis of the elastic member 320

is a point where the axis of the elastic member 320 is furthest from the housing 110. The movement distance of the arc top of the axis of the elastic member 320 is designed as the above value, which not only ensures a movement range of the elastic member 320 that is enough to drive the conductive swing arm 140 to fully contact the conductive slide rails in the rail, but also avoids the interference between the movement range of the elastic member 320 and the plug bush assembly 120.

[0093] In the folded state, the rotating member 20 is screwed along a first direction, one end of the rotating member 20 with the elastic member 320 rotates, and the other end of the elastic member 320 is temporarily maintained in the folded state through the conductive swing arm 140 connected to the driven swing member 130. As the rotating member 20 rotates, the elastic member 320 is S-shaped, and the elastic member 320 instantly releases its own accumulated elastic potential energy, promotes the driven swing member 130 to rotate rapidly, and drives the conductive swing arm 140 to rotate and unfold rapidly, such that the adapter changes to the unfolded state.

[0094] In the unfolded state, the rotating member 20 is screwed along a second direction opposite to the first direction, one end of the rotating member 20 with the elastic member 320 rotates, and the other end of the elastic member 320 is temporarily maintained in the unfolded state via the conductive swing arm 140 connected to the driven swing member 130. As the rotating member 20 rotates, the elastic member 320 is S-shaped, and the elastic member 320 instantly releases its own accumulated elastic potential energy, promotes the driven swing member 130 to rotate rapidly, and drives the conductive swing arm 140 to rotate and fold rapidly, such that the adapter changes to the folded state.

[0095] For example, a plane in which the elastic member 320 is disposed is perpendicular to the rotation axis of the driving swing member 310 and the rotation axis of the driven swing member 130.

[0096] In the above embodiments, the elastic member 320 is arranged in such a way that the elastic member 320 can swing on the same plane as the driving swing member 310 and the driven swing member 130, so as to ensure that the elastic member 320 is not separated from the driving swing member 310 and the driven swing member 130 during the swinging process, thereby effectively improving the reliability of the adapter.

[0097] For example, a swing angle between the driving swing member 310 and the driven swing member 130 ranges from 34° to 38°.

[0098] In the above embodiments, the design idea of the swing angle is similar to the design idea of the movement distance of the arc top of the axis of the elastic member 320. This design can not only ensure the swing amplitude of the driven swing member 130, which is enough to drive the conductive swing arm 140 to fully contact the conductive slide rails in the rail 100, but also avoid excessive swing amplitude, resulting in interference between the driving swing member 310 as well as the driven swing member 130 and the plug bush assembly 120.

[0099] FIG. 9 is a schematic structural diagram of the driving swing member. In conjunction with FIG. 9, the driving swing member 310 in the present embodiment includes a crank 311 and a first mounting member 312. The crank 311 is rotatably disposed in the housing 110, and a rotation axis of the crank 311 is parallel to a rotation axis of the rotating member 20. One end of the crank 311 fits with the rotating member 20, and the other end of the crank 311 is connected to the first mounting member 312 and abutted against the elastic member 320.

[0100] In the above embodiments, one end of the crank 311 fits with the rotating member 20. In the case that the rotating member 20 rotates, the crank 311 is driven to rotate together, such that the other end of the crank 311 drives the first mounting member 312 to swing. Under the driving of the first mounting member 312, the elastic member 320 swings accordingly and transmits an acting force to the driven swing member 130, such that the driven swing member 130 is unfolded (see FIG. 8) or folded (see FIG. 7) relative to the housing 110.

[0101] Referring to FIG. 9 again, for example, the crank 311 includes a rotating seat 3111 and a handle portion 3112. One end of the rotating seat 3111 is rotatably connected to the housing 110, the other end of the rotating seat 3111 is connected to the handle portion 3112, and the handle portion 3112 is perpendicular to a rotation axis of the rotating seat 3111. In the case that the rotating member 20 rotates, the handle portion 3112 is driven by the rotating member 20, such that the rotating seat 3111 rotates accordingly.

[0102] In some examples, a shaft is disposed on the inner wall of the housing 110, and the rotating seat 3111 is rotatably sleeved over the shaft, thereby achieving rotatable connection between the rotating seat 3111 and the housing 110.

[0103] In other examples, a groove is disposed on the inner wall of the housing 110, and the rotating seat 3111 is rotatably socketed in the groove, thereby achieving rotatable connection between the rotating seat 3111 and the housing 110.

[0104] In the present embodiment, the first mounting member 312 is a rod member, the first mounting member 312 is perpendicular to the rotation axis of the rotating member, and the elastic member 320 is sleeved over the first mounting member 312.

[0105] In the above embodiments, because the first mounting member 312 is the rod member, the elastic member 320 is sleeved outside the first mounting member 312, thereby effectively improving the installation firmness of the elastic member 320 on the first mounting member 312. In addition, because the first mounting member 312 is perpendicular to the rotation axis of the rotating member 20, the first mounting member 312 swings on a plane perpendicular to the rotation axis of the rotating member 20 during the rotation process of the driving swing member 310 together with the rotating member 20, such that the acting force is easily transmitted to the elastic member 320, and the elastic member 320 obtains sufficient acting force and produce elastic deformation, thereby driving the driven swing member 130 to be unfolded or folded relative to the housing 110.

[0106] For example, there is an acute angle between the first mounting member 312 and the handle portion 3112. In this way, the first mounting member 312 and the handle portion 3112 are closer, that is, the structure of the driving swing member 310 is more compact, such that more space is provided for the plug bush seat 120, thereby facilitating the arrangement of the plug bush assembly 120.

[0107] For example, the first mounting member 312 is a prismatic rod, a cylindrical rod, or the like, which is not limited in the present disclosure.

[0108] In some embodiments, the first mounting member 312 is a barb, and the first mounting member 312 is buckled together with the elastic member 320.

[0109] Referring to FIG. 9 again, the driving swing member 310 in the present embodiment further includes a first matching member 313, a second matching member 210 is disposed on the inner wall of the rotating member 20 (see FIGS. 7 and 8), and the second matching member 210 is connected to the first matching member 313.

[0110] In the above embodiments, the driving swing member 310 fits with the rotating member 20 each other through the first matching member 313 and the second matching member 210, such

that the rotating member 20 can drive the driving swing member 310 to rotate. In addition, because the second matching member 210 is disposed on the inner wall of the rotating member 20, the second matching member 210 is easier to fit with the first matching member 313 disposed in the housing 110.

[0111] In some examples, the first matching member 313 is a shaft member, and is parallel to the rotation axis of the rotating member 20. The second matching member 210 is a shifting fork, the second matching member 210 is perpendicular to the rotation axis of the rotating member 20, and the second matching member 210 is movably sleeved over the first matching member 313.

[0112] Because the shaft member is parallel to the rotation axis of the rotating member 20, and the shifting fork is perpendicular to the rotation axis of the rotating member 20, the shaft member and the shifting fork are perpendicular to each other. In this way, the shaft member is plugged into an opening of the shifting fork. In the case that the shifting fork rotates together with the rotating member 20, the shaft member is toggled to rotate at the same time, thereby playing the role of driving the driving swing member 310.

[0113] For example, the crank 311, the first mounting member 312 and the first matching member 313 are integrated structural members, which not only improve the structural integrity of the driving swing member 310, but also improve the manufacturing efficiency of the driving swing member 310.

[0114] In other examples, the first matching member 313 is a ball head, the second matching member 210 is a ball bushing, and the ball head is movably plugged into the ball bushing. The design of the first matching member 313 and the second matching member 210 in this way can also achieve the same effect, which is not repeated herein.

[0115] FIG. 10 is a schematic structural diagram of the driven swing member. In conjunction with FIG. 10, the driven swing member 130 in the present embodiment includes a rotating shaft 131 and a second mounting member 132. The rotating shaft 131 is rotatably plugged with the housing 110, and the rotation axis of the rotating shaft 131 is parallel to the rotation axis of the rotating member 20. The conductive swing arm 140 is disposed outside the housing 110, and the conductive swing arm 140 is connected to one end of the rotating shaft 131. The second mounting member 132 is disposed in the housing 110, and the second mounting member 132 is connected to one end of the rotating shaft 131. The elastic member 320 is abutted against the second mounting member 132.

[0116] In the above embodiments, the rotating shaft 131 is rotatably plugged into the housing 110, a first end of the rotating shaft 131 is disposed in the housing 110 and connected to the second mounting member 132, and a second end of the rotating shaft 131 is disposed outside the housing 110 and connected to the conductive swing arm 140. In the case that the elastic member 320 swings under the driving of the driving swing member 310, the second mounting member 132 is subject to an elastic force of the elastic member 320 and swings accordingly, such that the conductive swing arm 140 is driven by the rotating shaft 131 to swing, and further, the driven swing member 130 is unfolded (see FIG. 8) or folded (see FIG. 7) relative to the housing 110.

[0117] For example, a distance between the rotation axes of the two driven swing members 130 ranges from 47.5 mm to 48.5 mm.

[0118] In the above embodiments, the rotation axis of the driven swing member 130 is the rotation axis of the rotating shaft 131, and the two rotating shafts 131 are parallel to each other. By designing the distance between the rotation axes of the two driven swing members 130 as the above value, a more sufficient space is provided between the two driven swing members 130 to accommodate the plug bush assembly 120.

[0119] In some examples, the second mounting member 132 is a rod member, the second mounting member 132 is perpendicular to the rotation axis of the rotating member 20, and the elastic member 320 is sleeved over the second mounting member 132.

[0120] In the above embodiments, because the second mounting member 132 is the rod member, the elastic member 320 is sleeved over the second mounting member 132, thereby effectively improving the installation firmness of the elastic member 320 on the second mounting member 132. In addition, because the second mounting member 312 is perpendicular to the rotation axis of the rotating member 20, the second mounting member 312 swings on a plane perpendicular to the rotation axis of the rotating member 20 In the case that the elastic member 320 applies an elastic force to the second mounting member 132, such that the elastic member 320 can sufficiently apply the elastic force on the second mounting member 132, thereby driving the driven swing member 130 to be unfolded or folded relative to the housing 110.

[0121] For example, there is an acute angle between the second mounting member 132 and the conductive swing arm 140. In this way, the driven swing member 130 is more suitable for the driving swing member 310, thereby improving the overall compatibility of the transmission assembly 30.

[0122] For example, the second mounting member 132 is a prismatic rod, a cylindrical rod, or the like, which is not limited in the present disclosure.

[0123] In some embodiments, the second mounting member 132 is a barb, and the second mounting member 132 is buckled together with the elastic member 320.

[0124] See FIG. 6 again, the plug bush seat 152 in the present embodiment includes a live line frame 1521, a null line frame 1522 and a ground line frame 1523. The live line frame 1521 and the null line frame 1522 are disposed on two opposite sides of the ground line frame 1523 respectively. The live line plug bush 121 (see FIG. 11) of the plug bush assembly 120 is disposed in the live line frame 1521, a null line plug bush 122 (see FIG. 11) of the plug bush assembly 120 is disposed in the null line frame 1522, and a ground line plug bush 123 (see FIG. 11) of the plug bush assembly 120 is disposed in the ground line frame 1523.

[0125] In the above embodiments, the live line plug bush 121, the null line plug bush 122 and the ground line plug bush 123 are accommodated by the live line frame 1521, the null line frame 1522 and the ground line frame 1523 respectively, thereby ensuring the electrical safety. In addition, because the live line frame 1521 and the null line frame 1522 are disposed on two opposite sides of the ground line frame 1523, the arrangement of the live line frame 1521, the null line frame 1522 and the ground line frame 1523 are relatively compact.

[0126] In the present embodiment, the live line plug bush 121 corresponds to a set of the driving swing member 310, the elastic member 320, the driven swing member 130 and the conductive swing arm 140. The null line plug bush 122 corresponds to another set of the driving swing member 310, the elastic member 320, the driven swing member 130 and the conductive swing arm 140. The two sets are identical in structure and are center symmetrical relative to the rotation axis of the rotating member 20.

[0127] The conductive member is disposed in the conductive swing arm 140. One end of the conductive member extends from one end, away from the driven swing member 130, of the conductive swing arm 140 as a conductive contact so as to be electrically connected to the conductive slide rails of the rail 100. The other end of the conductive member extends along the conductive swing arm 140 and the driven swing member 130, and extends out of one end, away from the conductive swing arm 140, of the driven swing member 130 so as to be electrically connected to the plug bush assembly 120. In the case that the conductive swing arm 140 corresponds to the live line plug bush 121, the conductive member is electrically connected to the

live line plug bush 121. In the case that the conductive swing arm 140 corresponds to the null line plug bush 122, the conductive member is electrically connected to the null line plug bush 122. In this way, power is drawn from the adapter 200 on the rail 100.

[0128] For example, the conductive member is a copper structural member so as to ensure the conductivity of the conductive member.

[0129] Referring to FIG. 6 again, the separation frame 150 in the present embodiment further includes a guide portion 154. One end of the guide portion 154 is connected to at least one of the partition plate 151 and the closed end of the plug bush seat 152, and the other end of the guide portion 154 extends away from the partition plate 151.

[0130] In the above embodiments, the guide portion 154 is disposed on a side, away from the open end of the plug bush seat 152, of the partition plate 151 and extends from the partition plate 151 or the closed end of the plug bush seat 152. In the case that the adapter slides on the rail 100, the guide portion 154 can be plugged into a sliding groove on a guide rail, and the sliding groove extends along a length direction of the rail 100. Therefore, through the cooperation between the guide portion 154 and the sliding groove, a guiding effect can be achieved for the sliding of the adapter, such that the adapter always slides along the length direction of the rail 100.

[0131] For example, the partition plate 151, the plug bush seat 152 and the guide portion 154 are integrated structural members.

[0132] In this way, the structure of the separation frame 150 is more compact, which effectively reduces the size of the separation frame 150, and facilitates achieving the slim and lightweight design of the adapter. In addition, the integrated structure also has the advantages of high structural integrity and high manufacturing efficiency.

[0133] For example, a guide sleeve 113 is disposed on the outer wall of the housing 110, and the guide portion 154 is plugged in the guide sleeve 113.

[0134] In the above embodiments, the guide sleeve 113 is sleeved over the guide portion 154, which can effectively improve the structural strength of the guide portion 154 and avoid the problem of breakage of the guide portion 154 during the sliding process of the adapter.

[0135] In the present embodiment, the body 10 further includes a protective door 170, which is disposed in the first space 111 and between the plug bush assembly 120 and the panel 160, and the protection door 170 is opposite to the jacks 161 on the panel 160.

[0136] In the above embodiments, the protective door 170 is arranged to effectively improve the safety of the adapter in use.

[0137] The technical or scientific terms as used in the present disclosure should have the meanings as commonly understood by a person of ordinary skill in the art of the present disclosure, unless otherwise defined. The words "first", "second", “third” and similar terms used in the description and claims of the present disclosure do not denote any order, quantity, or importance, and are merely used to distinguish different components. Similarly, words such as "a" or "one" do not denote a quantitative limit, but rather the existence of at least one. The word "include", “comprise” or similar terms mean that elements or objects appearing before the term "include” or “comprise” cover the listed elements or objects and its equivalents appearing after the term "include” or “comprise”, while other elements or objects are not excluded. The word "connected to" or "connected with" and similar terms are not limited to physical or mechanical connections, and may include electrical connection and the connection may be direct or indirect. "Upper", "lower", “left”, “right” and the like are only used to indicate the relative positional relationship, and when the absolute position of a described object changes, the relative positional relationship may also change accordingly.

[0138] The foregoing descriptions are merely optional embodiments of the present disclosure, and are not intended to limit the present disclosure. Within the spirit and principles of the present disclosure, any modifications, equivalent substitutions, improvements, or the like, should be within the protection scope of the present disclosure.

Claims

1. An adapter, comprising a body (1), a rotating member (20) and a transmission assembly (30);

wherein the body (10) comprises a housing (110), a plug bush assembly (120), a driven swing member (130) and a conductive swing arm (140), wherein the plug bush assembly (120) is disposed in the housing (110), the driven swing member (130) is rotatably connected to the housing (110), the conductive swing arm (140) is connected to the driven swing member (130), such that the conductive swing arm (140) is unfolded or folded;

the rotating member (20) is rotatably connected to the housing (110) and disposed on a side, away from the conductive swing arm (140), of the housing (110);

the transmission assembly (30) is disposed in the housing (110), the transmission assembly (30) has elasticity, and fits with the rotating member (20) and the driven swing member (130); and

the adapter is configured to rotate the rotating member (20), such that the driven swing member (130) is driven by an elastic potential energy of the transmission assembly (30) to drive the conductive swing arm (140) to rotate relative to the housing (110).

2. The adapter according to claim 1, wherein the transmission assembly (30), the driven swing member (130) and the plug bush assembly (120) are at least partially disposed on the same plane.

3. The adapter according to claim 1, wherein the plug bush assembly (120) is disposed in the middle of the housing (110), and the transmission assembly (30) and the driven swing member (130) are disposed between an inner wall of the housing (110) and the plug bush assembly (120) around the plug bush assembly (120).

4. The adapter according to any one of claims 1 to 3, wherein the body (10) further comprises a separation frame (150);

the separation frame (150) is disposed in the housing (110) to separate an internal space of the housing (110) into a first space (111) and a second space (112); and

the plug bush assembly (120) is disposed in the first space (111), and the transmission assembly (30) and the driven swing member (130) are disposed in the second space (112).

5. The adapter according to claim 4, wherein the separation frame (150) comprises a partition plate (151) and a plug bush seat (152);

wherein the plug bush seat (152) is disposed in the middle of the partition plate (151), the plug bush seat (152) has an open end and a closed end, the open end and the closed end of the plug bush seat (152) are disposed on two opposite sides of the partition plate (151) respectively, one side of the partition plate (151) and a frame wall at the open end of the plug bush seat (152) form the first space (111), and the other side of the partition plate (151) and a frame wall at the closed end of the plug bush seat (152) form the second space (112); and

the plug bush assembly (120) is disposed in the plug bush seat (152).

6. The adapter according to claim 5, wherein the transmission assembly (30) comprises a driving swing member (310) and an elastic member (320); and

a portion of the driving swing member (310) is disposed in the second space (112) and rotatably connected to the housing (110), and the other portion of the driving swing member (310) is disposed in the first space (111) and fits with the rotating member (20), the elastic member (320) is disposed in the second space (112), and the elastic member (320) is compressed between the driving swing member (310) and the driven swing member (130).

7. The adapter according to claim 6, wherein the driving swing member (310), the elastic member (320) and the driven swing member (130) are arranged along an inner wall of the housing (110).

8. The adapter according to claim 6, wherein a distance between a rotation axis of the driving swing member (310) and a rotation axis of the driven swing member (130) ranges from 25.2 mm to 27.2 mm.

9. The adapter according to claim 6, wherein a swing angle between the driving swing member (310) and the driven swing member (130) ranges from 34° to 38°.

10. The adapter according to claim 6, wherein a distance between the rotation axes of the two driven swing members (130) ranges from 47.5 mm to 48.5 mm.

11. The adapter according to claim 6, wherein in an unfolded state and a folded state, an axis of the elastic member (320) is arc-shaped, and symmetrical about a connecting line between the driving swing member (310) and the driven swing member (130);

in the unfolded state, the elastic member (320) is compressed in an arc shape on one side of the connecting line between the driving swing member (310) and the driven swing member (130), in the folded state, the elastic member (320) is compressed in an arc shape on the other side of the connecting line between the driving swing member (310) and the driven swing member (130), and in a case where the conductive swing arm (140) is switched between the unfolded state and the folded state, the elastic member (320) is compressed in an S shape at the connecting line between the driving swing member (310) and the driven swing member (130); and

in a case where the conductive swing arm (140) is switched between the unfolded state and the folded state, a moving distance of the arc top of the axis of the elastic member (320) ranges from 10 mm to 12 mm.

12. The adapter according to claim 6, wherein the driving swing member (310) comprises a crank (311) and a first mounting member (312);

wherein the crank (311) is rotatably disposed in the housing (110), and a rotation axis of the crank (311) is parallel to a rotation axis of the rotating member (20), one end of the crank (311) fits with the rotating member (20), and the other end of the crank (311) is connected to the first mounting member (312) and abutted against the elastic member (320).

13. The adapter according to claim 12, wherein the first mounting member (312) is a rod member, and the first mounting member (312) is perpendicular to the rotation axis of the rotating member (20); and

the elastic member (320) is sleeved over the first mounting member (312).

14. The adapter according to claim 12, wherein the driving swing member (310) further comprises a first matching member (313); and

a second matching member (210) is disposed on an inner wall of the rotating member (20), and the second matching member (210) is connected to the first matching member (313).

15. The adapter according to claim 6, wherein the driven swing member (130) comprises a rotating shaft (131) and a second mounting member (132);

the rotating shaft (131) is rotatably plugged with the housing (110), and the rotation axis of the rotating shaft (131) is parallel to the rotation axis of the rotating member (20);

the conductive swing arm (140) is disposed outside the housing (110), and the conductive swing arm (140) is connected to one end of the rotating shaft (131);

the second mounting member (132) is disposed in the housing (110), and the second mounting member (132) is connected to one end of the rotating shaft (131); and

the elastic member (320) is abutted against the second mounting member (132).

16. The adapter according to claim 6, wherein a guide groove (153) is disposed in the partition plate (151); and

the driving swing member (310) is movably plugged in the guide groove (153).

17. The adapter according to claim 5, wherein the separation frame (150) further comprises a guide portion (154); and

one end of the guide portion (154) is connected to at least one of the partition plate (151) and the closed end of the plug bush seat (152), and the other end of the guide portion (154) extends away from the partition plate (151).

18. A rail socket, comprising a rail (100) and the adapter (200) as defined in any one of claims 1 to 17.