SWITCH AND SOCKET INCLUDING THE SWITCH

FIELD OF THE INVENTION

[0001] The embodiments of the present invention generally relate to the field of switch, and more specifically relate to a switch with a new structure and a socket comprising the switch.

BACKGROUND OF THE INVENTION

[0002] For switch in the prior art, the spring of the switch usually works directly on the silver bridge plate, wherein the direction of the force might change during the process, thus causing bouncing phenomenon between the silver bridge plate and the plug bush, which may cause arcing, spark ablation, and electrical corrosion there between. Therefore, in the prior art, the switch is uneven loaded and electrical fault is prone to occurrence.

[0003] Moreover, for sockets comprising the switch in the prior art, the switch with conventional structure will make the layout of the socket complex with a long transmission circuit. As shown in Fig. 1, socket 100 in the prior art includes a firing line component (L pole) 101, a null line component (N pole) 102 and a ground pole 103. The firing line component 101 and the null line component 102 in Fig. 1 are distinctly different in structure and the layout is complex during assembling with a long transmission line. As the firing line, the null line and the ground line are all different in structure, error is likely to occur during the assembling process.

SUMMARY OF THE INVENTION

[0004] In view of the above defects existing in the prior art, in one aspect, the embodiments of the present invention provide a switch, which comprises: a silver bridge plug bush assembly, comprising a flexible silver bridge plate; a swing rod, coupled to the silver bridge plug bush assembly; and a spring, one end of which is connected to the silver bridge plug bush assembly and the other end is connected to the swing rod.

[0005] In an embodiment of the present invention, the swing rod is arranged to be coupled to one end of the flexible silver bridge plate.

[0006] In an embodiment of the present invention, the silver bridge plug bush assembly comprises a groove holding the spring.

[0007] In an embodiment of the present invention, the spring is arranged to rotate on the silver bridge plug bush assembly.

[0008] In an embodiment of the present invention, the swing rod comprises a groove holding the spring.

[0009] In an embodiment of the present invention, the spring is arranged to rotate in the groove.

[0010] In an embodiment of the present invention, the flexible silver bridge plate is arranged to achieve on/off of the switch with its own flexibility and the external force.

[0011] In an embodiment of the present invention, the spring is arranged to cause the swing rod to rotate in one direction under pressure and cause the swing rod to apply force on the flexible silver bridge plate, thus turning off the switch.

[0012] In an embodiment of the present invention, the swing rod is arranged to turn off the switch under force from the opposite direction.

[0013] In an embodiment of the present invention, the swing rod is further arranged to cause the silver points on the silver bridge to be separated from the silver points in the terminal assembly of the switch under force from the opposite direction. The flexible silver bridge plate returns to its original state with its own flexibility and the force from the opposite direction further causes the flexible silver bridge plate on the swing rod to deform further so as to turn off the switch.

[0014] In an embodiment of the present invention, the silver bridge plug bush assembly further comprises a plug bush connected to the flexible silver bridge plate.

[0015] In another aspect, the embodiments of the present invention provide a switch which comprises: a flexible silver bridge plate; a terminal assembly, to which one end of the flexible silver bridge plate is fixed; an swing rod, coupled to the flexible silver bridge plate; and a spring, both ends of which are fixed on the housing of the switch and the middle of which is coupled to the swing rod.

[0016] In still another aspect, there is provided a socket in the embodiments of the present invention, comprising the above switch and a plurality of identical terminal assemblies.

[0017] In an embodiment of the present invention, a silver bridge plug bush assembly and a terminal assembly form a firing line pole component, and another silver bridge plug bush assembly and another terminal assembly form a null line pole component.

[0018] In an embodiment of the present invention, the firing line pole component and the null line pole component are symmetrically arranged.

[0019] In another aspect, the embodiments of the present invention provide a method for assembling the switch comprising a silver bridge plug bush assembly, an swing rod and a spring, wherein the silver bridge plug bush assembly comprises a flexible silver bridge plate, the method comprising: causing the swing rod to be coupled to the silver bridge plug bush assembly; and causing one end of the spring to be connected to the silver bridge plug bush assembly and the other end of the spring to be connected to the swing rod.

[0020] In an embodiment of the present invention, causing the swing rod to be coupled to the silver bridge plug bush assembly comprises coupling the swing rod to one end of flexible silver bridge plate.

[0021] In an embodiment of the present invention, the method further comprises enabling the spring to rotate on the silver bridge plug bush assembly.

[0022] In an embodiment of the present invention, the method further comprises enabling the spring to rotate relative to the swing rod.

[0023] In an embodiment of the present invention, the method further comprises realizing on/off of the switch with flexible silver bridge plate's own flexibility and the external force.

[0024] In an embodiment of the present invention, the method further comprises causing the swing rod to rotate in one direction when the spring is under pressure and causing the swing rod to apply force on the flexible silver bridge plate, thus turning off the switch.

[0025] In an embodiment of the present invention, the method further comprises turning off the switch when the swing rod is under force from the opposite direction.

[0026] In an embodiment of the present invention, turning off the switch in the method comprises: subjecting the swing rod to force from the opposite direction so that the silver points on the silver bridge are separated from the silver points in the terminal assembly of the switch. The flexible silver bridge plate returns to its original state with its own flexibility, and the force from the opposite direction further applies on the swing rod to cause the flexible silver bridge plate to deform further so as to turn off the switch.

[0027] In another aspect, there is provided a method for assembling the switch

in the embodiments of the present invention, comprising a flexible silver bridge plate, a terminal assembly, an swing rod and a spring, the method comprising: causing one end of the flexible silver bridge plate to be connected to the terminal assembly; causing the swing rod to be coupled to the flexible silver bridge plate; and causing both ends of the spring to be fixed on the housing of the switch and the middle of the spring to be coupled to the swing rod.

[0028] These and the other aspects of the present invention are obvious with reference to the embodiments described in the following context and will be explained referring to the embodiments described in the following context. Moreover, those skilled in the art will understand that two or more of the above options, embodiments and/or any manner that may be deemed applicable by aspects of the present invention can be combined.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] Embodiments of the present invention are shown in figures in an exemplary rather than limiting way. In the Figures:

[0030] Fig.1 illustrates a structural layout of the socket in the prior art;

[0031] Fig. 2a illustrates a side view of the switch according to an embodiment of the present invention which is in a closed position;

[0032] Figs. 2b-2c illustrate side views of the swing rod in rotation of the switch according to an embodiment of the present invention;

[0033] Fig. 2d illustrates a side view of the switch according to an embodiment of the present invention which is in a opened position;

[0034] Figs. 3a and 3b illustrate side views of the switch according to another embodiment of the present invention which is in closed and opened position, respectively;

[0035] Figs. 4a and 4b illustrate a view of the switch according to an embodiment of the present invention which is used for a panel switch;

[0036] Fig. 5a illustrates a perspective view of a socket comprising the switch according to an embodiment of the present invention;

[0037] Fig. 5b illustrates a top view of the socket comprising the switch according to an embodiment of the present invention;

[0038] Fig. 6 illustrates a explosive view of the socket according to Fig. 5; and

[0039] Figs. 7a-7d illustrate product drawings of the socket according to Fig. 5

from a closed position to a opened position, respectively.

[0040] It should be noted that the items to be represented by the same reference sign in different figures have the same structural features and the same function. If explanation has already been made to the function and/or structure of the component, it should not be explained in the detailed description. The figures are solely exemplary not in accordance with the proportion. For the sake of clarity, some dimension has been exaggerated.

DETAILED DESCRIPTION OF EMBODIMENTS

[0041] Reference will be made to the drawings in the following detailed description. Drawings form a part of the specification and are shown as a manner with which the embodiments of the present invention can be implemented. It should be understood that other embodiments may also be used or changed structurally or logically without departing from the scope defined by the claims.

[0042] Description of the embodiments is not for the purpose of limiting. Particularly, steps of the embodiments described below may be combined with steps of other embodiment.

[0043] Figs. 2a-2d illustrate side view of the switch according to an embodiment of the present invention from a closed position to a opened position, respectively.

[0044] As shown in Fig. 2a, a switch 200 comprises a silver bridge plug bush assembly 201, a spring 202, an swing rod 203 and a terminal assembly 204, wherein the terminal assembly 204 is comprised of a connection terminal and a plate with silver point; the silver bridge plug bush assembly 201 comprises a plus bush and a flexible silver bridge plate which can be combined through butt-welding, with rivet or in any other proper ways. 203-1 and 203-2 in the Figure are tendon in swing rod 203.

[0045] As shown in the figures, one end of the spring 202 is connected to the silver bridge plug bush assembly 201 and the other end is connected to the swing rod 203. Thus, the force of the spring 202 is applied on the flexible silver bridge plate of the silver bridge plug bush assembly 201 through the swing rod 203.

[0046] In an embodiment, the end of the spring 202 that is connected to the silver bridge plug bush assembly 201 can slide on the silver bridge plug bush assembly. The spring 202 can be connected to the silver bridge plug bush assembly

201 through a buckle, etc.. Additionally, in another embodiment, the swing rod 203 comprises the groove holding the spring 202. The end of the spring that is connected to the swing rod 203 may be of a smooth round shape, and the smooth end may slide in the groove of the swing rod 203 which is used for holding the spring 202 in.

[0047] Switch 200 shown in Fig. 2a is in a closed position. Under this condition, the spring 202 is compressed and its force causes the tendon 203-1 of the swing rod 203 to press the flexible silver bridge plate in the silver bridge plug bush assembly 201 and the silver points on the flexible silver bridge plate to contact that of the terminal assembly 204, thus turning off switch 200.

[0048] When the external force drives the swing rod 203 to rotate clockwise (different directions may also be possible in some embodiments), the side view of the switch may be shown in Figs. 2b and 2c. In Fig. 2b, tendon 203-1 of the swing rod 203 does not press on the flexible silver bridge plate. Silver points are separated under the bouncing force of the silver bridge or driven by tendon 203-2 of the swing rod 203 and continue to drive the swing rod 203. The flexible silver bridge plate then returns to the free state under its own bouncing force, as shown in Fig. 2c.

[0049] The swing rod 203 will be driven further and its tendon 203-2 will drive the flexible silver bridge plate to bend upwards until the switch 200 is in a opened state (as shown in Fig. 2d). The process of the switch running from the opened position to the closed position is similar to the above process which can be shown in the order of Figs. 2d-2a.

[0050] With the arrangement of spring and swing rod, the switch can be better stressed and the flexible silver bridge plate reduces bounces between silver points of the active contact and the static contact, thereby improving electrical property.

[0051] Figs. 3a and 3b illustrate side views of the switch 300 according to another embodiment of the present invention in the closed and opened positions, respectively. Switch 300 comprises a silver bridge plug bush assembly 301, a spring 302, an swing rod 303 and a terminal assembly 304, wherein a terminal assembly 304 is comprised of a connection terminal and a plate with silver point; the silver bridge plug bush assembly 301 comprises a plus bush and a flexible silver bridge plate which can be combined through butt-welding, with rivet or in any other proper ways.

[0052] In some embodiments, switch 200 as shown in Figs. 2a-2d can be a panel switch for a socket, and switch 300 as shown in Figs. 3a and 3b may be rocker switch for a socket.

[0053] Figs. 4a and 4b illustrate a view of the switch according to the embodiments of the present invention which is used for a panel switch 400. The panel switch 400 may be a panel switch applied in households or in buildings to control lights or electric appliance, etc.. The panel switch 400 comprises a combination 401 of the flexible silver bridge plate and the terminal assembly, a spring 402 and a swing rod 403, wherein the terminal and the flexible silver bridge plate can be combined through butt-welding, with rivet or in any other proper ways.

[0054] In this embodiment, one end of the flexible silver bridge plate is fixed on the terminal assembly and the swing rod 403 is coupled to the flexible silver bridge plate. Both ends of the spring 402 are fixed on the housing of the switch or other fixing apparatus. The middle of the spring is coupled to the swing rod 403.

[0055] The operation of the panel switch 400 is identical to that of switch 200 and 300, namely, to apply the force of the spring 402 on the flexible silver bridge plate though an swing rod 403, so that switch 400 can be better stressed.

[0056] Figs. 5a and 5b illustrate a perspective view and a top view of the socket 500 according to the embodiments of the present invention comprising the switch, respectively. Fig. 6 illustrates an explosive view of the socket shown in Fig. 5. As shown in Figs. 5a and 6, the socket 500 comprises a silver bridge plug bush assembly 501, a spring 502, a swing rod 503, a terminal assembly 504 and a ground pole component 505.

[0057] In socket 500 as shown in Fig. 5b, the electrode component of socket 500 can be divided into a null line pole component 51, a firing line pole component 52 and a ground pole component 53. The null line pole component 51 comprises a silver bridge plug bush assembly 501 and a terminal assembly 504 and the firing line pole component 52 also comprises a silver bridge plug bush assembly 501 and a terminal assembly 504 identical to the firing line pole component 51. In one embodiment, the firing line pole component and the null line pole component are symmetrically arranged.

[0058] In some embodiments, the null line pole component 51, the firing line pole component 52 and the ground pole component 53 of the socket 500 are arranged on the same line and the null line pole component 51 and the firing line pole component 52 are symmetrically arranged on the two end of the ground pole component 53. The layout is simple and clear with a shorter transmission circuit.

[0059] Figs. 7a-7d illustrate the product views of the socket 500 shown in Fig.

5 from the closed position to the opened position, respectively. The operation process of the switch of the socket and that of switch 200 as shown in Fig. 2 is the same, thus omitted here.

[0060] The socket comprising a switch according to the embodiments of the present invention with the arrangement of a spring and an swing rod causes the spring force of the switch to be applied on the flexible silver bridge plate through the swing rod, so that the flexible silver bridge plate is pressured more reasonably. The flexible silver bridge plate reduces bounces and improves electrical performance. Moreover, the firing line pole component and the null line pole component are the same, which makes it possible for compatible utilization, thus facilitating production. The assembly process is also simple and the utilization rate of the components is improved. The simple structure of the symmetrical arrangement of the firing line pole component and the null line pole component reduces the malfunction probability of the socket and the switch.

[0061] In an embodiment, there is provided a method of assembling the switch in the embodiments of the present invention. The switch comprises a silver bridge plug bush assembly, a swing rod and a spring, wherein the silver bridge plug bush assembly comprises a flexible silver bridge plate. The method comprises: coupling the swing rod to the terminal assembly of the silver bridge plug bush assembly; and connecting one end of the spring to the silver bridge plug bush assembly and the other end of the spring to the swing rod.

[0062] In another embodiment, there is provided a method of assembling the switch in the embodiments of the present invention. The switch comprises a silver bridge plug bush assembly, a swing rod and a spring, wherein the silver bridge plug bush assembly comprises a flexible silver bridge plate. The method comprises: coupling the swing rod to the terminal assembly of the silver bridge plug bush assembly; and connecting one end of the spring to the silver bridge plug bush assembly and the other end of the spring to the swing rod.

[0063] In an embodiment, coupling the swing rod to the silver bridge plug bush assembly comprises coupling the swing rod to one end of the flexible silver bridge plate.

[0064] In an embodiment, the method further comprises: enabling the spring to rotate on the silver bridge plug bush assembly.

[0065] In an embodiment, the method further comprises: enabling the spring to

rotate relative to the swing rod.

[0066] In an embodiment, the method further comprises: realizing on/off of the switch with the flexibility of the flexible silver bridge plate and the external force.

[0067] In an embodiment, the method further comprises: causing the swing rod to rotate in one direction when the spring is under pressure, and causing the swing rod to apply force on the flexible silver bridge plate, thereby turning off the switch.

[0068] In an embodiment, the method further comprises: when the swing rod is subjected to force from the opposite direction, the switch is turned off.

[0069] In an embodiment, there is provided a method of assembling the switch. The switch comprises a flexible silver bridge plate, a terminal assembly, a swing rod and a spring. The method comprises: connecting one end of the flexible silver bridge plate to the terminal assembly; coupling the swing rod to the flexible silver bridge plate; and fixing two ends of the spring on the housing of the switch and coupling the middle of the spring to the swing rod.

[0070] Though the present invention has been described in combination with several embodiments, the present invention is not limited hereto, but covers varied obvious modifications and equivalent arrangements which all fall under the scope of protection of the appended claims. Though features of the embodiments of the present invention are expressed in a specific manner of combination in the claims; it should be assumed that the features are implemented in any form of combination and order.

WHAT IS CLAIMED IS:

1. A switch, comprising:
   a silver bridge plug bush assembly, comprising a flexible silver bridge plate;
   a swing rod, coupled to the silver bridge plug bush assembly; and
   a spring, one end of the spring is connected to the silver bridge plug bush assembly and the other end of the spring is connected to the swing rod.

2. The switch according to Claim 1, wherein the swing rod is arranged to be coupled to one end of the flexible silver bridge plate.

3. The switch according to Claim 1, wherein the silver bridge plug bush assembly comprises a groove holding the spring.

4. The switch according to Claim 3, wherein the spring is arranged to rotate on the silver bridge plug bush assembly.

5. The switch according to Claim 1, wherein the swing rod comprises a groove holding the spring.

6. The switch according to Claim 5, wherein the spring is arranged to rotate in the groove.

7. The switch according to Claim 1, wherein the flexible silver bridge plate is arranged to realize on/off of the switch with its own flexibility and the external force.

8. The switch according to Claim 2, wherein the spring is arranged to cause the swing rod to rotate in one direction when the spring is under pressure, and cause the swing rod to apply force on the flexible silver bridge plate, thereby turning off the switch.

9. The switch according to Claim 7, wherein the swing rod is arranged to turn off the switch when it is subjected to force from the opposite direction.

10. The switch according to Claim 9, wherein the swing rod is further arranged to cause the silver points on the silver bridge to be separated from the silver points in the terminal assembly of the switch under force from the opposite direction, the flexible silver bridge plate returns to its original state with its own flexibility, and the force from the opposite direction further causes the flexible silver bridge plate on the swing rod to deform further so as to turn off the switch.

11. The switch according to Claim 1, wherein the silver bridge plug bush assembly further comprises a plug bush connected to the flexible silver bridge plate.

12. A switch, comprising:
a flexible silver bridge plate;
a terminal assembly, one end of the flexible silver bridge plate is fixed on the terminal assembly;
a swing rod, coupled to the flexible silver bridge plate; and
a spring, both ends of the spring are fixed on the housing of the switch and the middle of the spring is coupled to the swing rod.

13. A socket, comprising the switch according to any of Claims 1-9 and comprising a plurality of identical terminal assemblies.

14. The socket according to Claim 13, wherein a silver bridge plug bush assembly and a terminal assembly form a firing line pole component, and another silver bridge plug bush assembly and another terminal assembly form a null line pole component.

15. The socket according to Claim 14, wherein the firing line pole component and the null line pole component are arranged symmetrically.

16. A method for assembling a switch, the switch comprising a silver bridge plug bush assembly, a swing rod and a spring, wherein the silver bridge plug bush assembly comprises a flexible silver bridge plate, the method comprising:
coupling the swing rod to the silver bridge plug bush assembly; and
connecting one end of the spring to the silver bridge plug bush assembly, and

connecting the other end of the spring to the swing rod.

17. The method according to Claim 16, wherein coupling the swing rod to the silver bridge plug bush assembly comprises: coupling the swing rod to one end of the flexible silver bridge plate.

18. The method according to Claim 16, further comprising: enabling the spring to rotate on the silver bridge plug bush assembly.

19. The method according to Claim 16, further comprising: enabling the spring to rotate relative to the swing rod.

20. The method according to Claim 16, further comprising: realizing on/off of the switch with the flexibility of the flexible silver bridge plate and an external force.

21. The method according to Claim 17, further comprising: causing the swing rod to rotate in one direction when the spring is under pressure, and causing the swing rod to apply force on the flexible silver bridge plate, thereby turning off the switch.

22. The method according to Claim 21, further comprising: turning off the switch when the swing rod is subjected to force from the opposite direction.

23. The method according to Claim 21, wherein turning off the switch comprises: subjecting the swing rod to force from the opposite direction so that silver points on the silver bridge are separated from the silver points in the terminal assembly of the switch, the flexible silver bridge plate returns to its original state with its own flexibility, and the force from the opposite direction is further applied on the swing rod so that the flexible silver bridge plate is deformed further, thereby turning off the switch.

24. A method for assembling a switch, the switch comprising a flexible silver bridge plate, a terminal assembly, a swing rod and a spring, the method comprising:
connecting one end of the flexible silver bridge plate to the terminal assembly;

coupling the swing rod to the flexible silver bridge plate; and

fixing both ends of the spring on the housing of the switch and coupling the middle of the spring to the swing rod.