

PUSH BUTTON SWITCH

FIELD OF THE INVENTION

[0001] The present invention relates to the field of a switch, and in particular to a push
5 button switch.

BACKGROUND OF THE INVENTION

[0002] At present, switches sold in the market are substantially rocker switches. This kind
of rocker switch is generally composed of a push button assembly and a swing assembly.

10 When the push button assembly is pressed, a swing shaft of the swing assembly is deflected
by pressing, and a rocker under the swing shaft is deflected in the opposite direction at the
same time, allowing the contact of the rocker to touch a terminal assembly so as to realize the
turning on or the turning off of the switch.

[0003] The rocker switch has two optional operating positions, such that one end of the
15 push button is high and the other end thereof is low. When the switch is turned on/off, the
process of subjecting a force is more complicated. When the push button assembly is pressed
by a finger, the force being subjected is gentle at the beginning. However, a resistance force
being subjected may be increased abruptly due to the reaction of the deflection of the swing
shaft and the rocker, and therefore the operating process appears to be very stiff.

SUMMARY OF THE INVENTION

[0004] Embodiments of the present invention provide a push button switch capable of
converting a rotating movement of the push button to a straight-line movement so that the
operating process of the push button switch is smooth and stable.

25 [0005] A push button switch includes a rocker switch assembly, a shifter and a push button
assembly;

wherein the rocker switch assembly includes a driving spring 01, a rocker 02 and a
swing rod 03, the shifter includes a commutating tooth 11, a commutating tooth returning
spring 12 and a positioning tooth 13, and the push button assembly includes a push button 21
30 and a push button returning spring 22;

wherein the positioning tooth 13 includes a diverging tooth 131 and a stopping tooth 132, and the positioning tooth 13 is located on the backside of the push button 21;

wherein the commutating tooth 11 is located below the positioning tooth 13, one end of the commutating tooth 11 is connected with the swing rod 03 and the other end thereof mates with the positioning tooth 13;

wherein one end of the driving spring 01 is connected with the swing rod 03 and the other end thereof is connected with the rocker 02; and

wherein one end of the commutating tooth returning spring 12 is connected with the commutating tooth 11 and the other end thereof is connected with the swing rod 03.

[0006] It can be seen from the above technical solutions that embodiments of the present invention have advantages as follows:

The present invention includes a driving spring 01, a rocker 02, a swing rod 03, a push button 21, a push button returning spring 22 and a shifter, wherein the shifter includes a commutating tooth 11, a commutating tooth returning spring 12 and a positioning tooth 13, and the positioning tooth 13 includes a diverging tooth 131 and a stopping tooth 132. The positioning tooth 13 is located on the backside of the push button 21. The commutating tooth 11 is located below the positioning tooth 13, wherein one end of the commutating tooth 11 is connected with the swing rod 03 and the other end thereof mates with the positioning tooth 13. One end of the driving spring 01 is connected with the swing rod 03 and the other end thereof is connected with the rocker 02. One end of the commutating tooth returning spring 12 is connected with the commutating tooth 11 and the other end thereof is connected with the swing rod 03. Since the push button switch in the present embodiment is added a shifter on the basis of a conventional rocker switch, with the commutating tooth 11 of the shifter mating with the positioning tooth 13, which enables a rotating movement of the rocker switch assembly to be converted to a straight-line movement of the push button 21, such that the turning on and the turning off of the push button switch can be realized through a simple linear movement of the push button 21, allowing the operating process to be smooth and meanwhile maintaining the stability of the push button switch.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] For more clearly illustrating the technical solutions of embodiments of the present invention, drawings referred to describe the embodiments will be briefly described hereinafter. Apparently, the drawings in the following description are only several embodiments of the present invention, and for the person skilled in the art, other drawings may be obtained based on these drawings without any creative efforts.

[0008] Figure 1 is a partially sectional view of a push button switch according to an embodiment of the present invention;

[0009] Figure 2 is a schematic view of a commutating tooth returning spring in a shifter according to an embodiment of the present invention;

[0010] Figure 3 is a schematic view of the push button switch in a turning on state according to an embodiment of the present invention;

[0011] Figure 4 is a schematic view of the push button switch in a driving state according to an embodiment of the present invention; and

[0012] Figure 5 is a schematic view of the push button switch in a turning off state according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0013] The technical solutions in the embodiments of the present invention will be described clearly and completely hereinafter in conjunction with the drawings in the embodiments of the present invention. Apparently, the described embodiments are only a part of the embodiments of the present invention, rather than all embodiments. Based on the embodiments of the present invention, all other embodiments, made by the person skilled in the art without any creative efforts, will fall into the protection scope of the present invention.

[0014] Embodiments of the present invention provide a push button switch capable of converting a rotating movement of the push button to a straight-line movement so that the operating process of the push button switch is smooth and stable.

[0015] The technical solutions of the present invention will be described in detail in conjunction with specific embodiments hereinafter, please refer to Figures 1 to 5.

[0016] A switch button, as shown in Figure 1, includes a rocker switch assembly, a shifter

and a push button assembly, wherein the rocker switch assembly includes a driving spring 01, a rocker 02 and a swing rod 03; the shifter includes a commutating tooth 11, a commutating tooth returning spring 12 and a positioning tooth 13; the push button assembly includes a push button 21 and a push button returning spring 22. The positioning tooth 13 includes a diverging tooth 131 and a stopping tooth 132, and the positioning tooth 13 is located on the backside of the push button 21. The commutating tooth 11 is located below the positioning tooth 13, wherein one end of the commutating tooth 11 is connected with the swing rod 03 and the other end thereof mates with the positioning tooth 13. One end of the drive spring 01 is connected with the swing link 03 and the other end thereof is connected with the rocker 02. One end of the commutating tooth returning spring 12 is connected with the commutating tooth 11 and the other end thereof is connected with the swing link 03.

[0017] The push button switch in the present embodiment is added a shifter on the basis of a conventional rocker switch, which enables the rotating movement of the rocker switch assembly to be converted to the straight-line movement of the push button 21.

[0018] The rocker switch assembly includes a driving spring 01, a rocker 02 and a swing rod 03. One end of the driving spring 01 is connected with the swing rod 03 and the other end thereof is connected with the rocker 02.

[0019] Specifically, one end of the driving spring 01 can be connected with the center of the swing rod 03. The driving spring 01 can be adapted to control the movement of the rocker 02 and the swing rod 03, wherein one end of the rocker 02 can be hinged to the body of the push button switch. It is to be noted that the hinge joint between the rocker 02 and the body of the push button switch is performed by means of a hinge, so that the rocker 02 and the push button switch body are not fixedly connected but can move relative to each other. The swing rod 03 may be deflected when being pressed on one side, and the driving spring 01 may also be effected by the pressing, so that the rocker 02 is deflected as well. At this time, the contact of the rocker 02 may touch a terminal assembly so as to realize the turning on or the turning off of the push button switch.

[0020] The shifter of the present embodiment is capable of converting a rotating movement to a straight-line movement. The shifter is located between the rocker switch assembly and the push button assembly, and mates or is connected with the rocker switch assembly and the push button assembly.

[0021] The shifter includes a commutating tooth 11, a commutating tooth returning spring 12 and a positioning tooth 13, wherein the positioning tooth 13 is located on the backside of the push button 21 and includes a diverging tooth 131 and a stopping tooth 132. The commutating tooth 11 is located below the positioning tooth 13, wherein one end of the commutating tooth 11 is connected to the swing rod 03 and the other end thereof mates with the positioning tooth 13. The commutating tooth 11 can be hinged to the swing rod 03 so as to ensure that the commutating tooth 11 can be deflected freely to both sides.

[0022] Preferably, the shifter can include at least two commutating teeth 11. In the present embodiment, since the number of the positioning tooth 13 may be corresponding to that of the commutating tooth 11, the positioning tooth 13 can include at least two diverging teeth 131 and at least two stopping teeth 132. The diverging tooth 131 and the stopping tooth 132 may be adapted to control the movement of the commutating tooth 11, wherein the diverging tooth 131 may be adapted to drive the commutating tooth 11, and the stopping tooth 132 may be adapted to limit the movement of the commutating tooth 11. It is to be noted that the numbers of the commutating tooth 11 and the positioning tooth 13 are not limited in the present embodiment. The positioning tooth 13 can be composed of a diverging tooth 131, a stopping tooth 132, a stopping tooth 132 and a diverging tooth 131 in the order from left to right, that is, the diverging teeth 131 are located on the backside of the push button at both ends thereof, and the stopping teeth 132 are located between the two diverging teeth 131.

[0023] Optionally, as shown in Figure 2, Figure 2 is a schematic view of the commutating tooth returning spring. One end of the commutating tooth returning spring 12 is connected with the commutating tooth 11 and the other end thereof is connected with the swing rod 03. The commutating tooth returning spring 12 is a returning spring of the commutating tooth 11. When the commutating tooth 11 is rotated by a force, the commutating tooth returning spring 12 can reset the commutating tooth 11. The other end of the commutating tooth returning spring 12 can be fitted tightly to the swing rod 03 so as to ensure the stability of the commutating tooth returning spring 12. The commutating tooth returning spring 12 can be tightly fitted with the commutating tooth 11, a spring guide groove in the commutating tooth 11 can be designed in a taper shape so as to ensure the returning of the commutating tooth 11 advantageously.

[0024] Optionally, the positioning tooth 13 of the shifter can mate with the commutating

tooth 11 so that the push button switch is capable of converting the rotating movement of the rocker switch assembly to the straight-line movement of the push button 21. The commutating tooth 11 can mesh with the positioning tooth 13 to brake each other. It is to be noted that, the meshing means that the commutating tooth 11 and the positioning tooth 13 can contact and
5 get stuck with each other. That is, the commutating tooth 11 can move freely at both ends of the diverging teeth 131 of the positioning tooth 13, and the stopping tooth 132 can limit the range of the movement of the commutating tooth 11 towards the middle area.

[0025] Preferably, in order to allow the positioning tooth 13 to better brake the commutating tooth 11 so as to ensure the reliability of the push button switch, the height of
10 the stopping tooth 132 is greater than that of the diverging tooth 131 in the positioning tooth 13 of the present embodiment.

[0026] The push button assembly includes a push button 21 and a push button returning spring 22, wherein the push button returning spring 22 is a returning spring of the push button 21. After the push button 21 is moved by a force, and if the push button 21 is pressed again,
15 the push button returning spring 22 can reset the push button 21.

[0027] The positioning tooth 13 includes a diverging tooth 131 and a stopping tooth 132, and the positioning tooth 13 is located on the backside of the push button 21. The commutating tooth 11 is connected with the swing rod 03, with the commutating tooth 11 being located below and mating with the positioning tooth 13. One end of the driving spring
20 01 is connected with the swing rod 03 and the other end thereof is connected with the rocker 02. One end of the commutating tooth returning spring 12 is connected with the commutating tooth 11 and the other end thereof is connected with the swing rod 03.

[0028] The returning of the commutating tooth 11, the returning of the push button 21 and the controlling of movement of the swing rod 03 and the rocker 02 can be respectively
25 realized by the commutating tooth returning spring 12, the push button returning spring 22 and the driving spring 01 in the present embodiment.

[0029] The specific movement process of the push button switch in the present embodiment is described in detail in the following.

[0030] The present embodiment will be illustrated by an example having two commutating
30 teeth 11, two diverging teeth 131 and two stopping teeth 132.

[0031] Specifically, as shown in Figure 3, Figure 3 is a schematic view of the push button switch in a turning on state in the present embodiment. At this time, the left end of the swing rod 03 is tilted upwards. the commutating tooth 11 on the left comes into contact with the end of the diverging tooth 131 located above the commutating tooth 11, and the rocker 02 is deflected leftwards such that the contact of the rocker 02 may touch the terminal assembly to turn on the switch.

[0032] As shown in Figures 4 and 5, Figure 4 is a schematic view of the push button switch in a driving state in the present embodiment, and Figure 5 is a schematic view of the push button switch in a turning off state in the present embodiment. When the push button 21 is pressed, the push button 21 may move downwards and the positioning tooth 13 located on the backside of the push button 21 will move downwards with the push button 21. At this time, since the diverging tooth 131 on the left in the positioning tooth 13 comes into contact with the commutating tooth 11 on the left, the diverging tooth 131 may press the commutating tooth 11 during the downward moving of the push button 21, such that the commutating tooth 11 plunges between the diverging tooth 131 and the stopping tooth 132 and continues to be pressed by the push button 21. Since the commutating tooth 11 is connected with the swing rod 03, such that the left end of the swing rod 03 is deflected downwards and the right end thereof is deflected upwards. At this time, the commutating tooth 11 on the left goes away from the positioning tooth 13 as the left end of the swing rod 03 is deflected downwards and the commutating tooth 11 on the right may come into contact with the diverging tooth 131 on the right as the right end of the swing rod 03 is deflected upwards. due to one end of the driving spring 01 being connected with the swing rod 03 and the other end thereof being connected with the rocker 02, and since the deflection of the swing rod 03 may press the driving spring 01 and the driving spring 01 may urge the rocker 02 to deflect rightwards, the contact of the rocker 02 goes away from the terminal assembly to turn off of the switch.

[0033] When the push button 21 is pressed again, during the downward moving of the push button 21, the positioning tooth 13 located on the backside of the push button 21 may press the commutating tooth 11 to urge the right end of the swing rod 03 to deflect downwards and urge the rocker 02 to deflect leftwards, such that the contact of the rocker 02 may touch the terminal assembly to turn on the switch. Reference may be made specifically to Figure 3.

[0034] It is to be noted that, the swing rod 03, during deflecting, has a constant variation

amount of its ends in the horizontal direction when its rotation angle is certain, which enables the variation range of the position of the diverging tooth 131 to be constant, thereby enabling the switch to be more reliable. It is to be noted that the rotation angle of the swing rod 03 is not limited in the present embodiment.

- 5 **[0035]** Wherein, the push button switch in the present embodiment further includes a push button panel 3, an upper shell 4 and an installation bottom case 5. Wherein, the push button panel 3 is adapted to install the push button 21, and the installation bottom case 5 is adapted to install the push button switch assembly. Reference may be made to the prior art for details, which will not be described herein.
- 10 **[0036]** In conclusion, the present invention includes a driving spring 01, a rocker 02, a swing rod 03, a push button 21, a push button returning spring 22 and a shifter, wherein the shifter includes a commutating tooth 11, a commutating tooth returning spring 12 and a positioning tooth 13. The positioning tooth 13 includes a diverging tooth 131 and a stopping tooth 132 and the positioning tooth 13 is located on the backside of the push button 21. The
- 15 commutating tooth 11 is located below the positioning tooth 13, wherein one end of the commutating tooth 11 is connected with the swing rod 03 and the other end thereof mates with the positioning tooth 13. One end of the driving spring 01 is connected with the swing rod 03 and the other end thereof is connected with the rocker 02. One end of the commutating tooth returning spring 12 is connected with the commutating tooth 11 and the other end
- 20 thereof is connected with the swing rod 03. Since the push button switch in the present embodiment is added a shifter on the basis of a conventional rocker switch, with the commutating tooth 11 of the shifter mating with the positioning tooth 13, which enables the rotating movement of the rocker switch assembly to be converted to the straight-line movement of the push button 21, such that the turning on and the turning off of the push
- 25 button switch may be realized through a simple linear movement of the push button 21. This will allow the operating process to be smooth, meanwhile maintain the stability of the push button switch, and improve the user's experience. In addition, the push button switch in the present embodiment has a small volume and low cost.

- 30 **[0037]** A push button switch according to the present invention is described above in detail, and for an ordinary skilled in the art, according to the concept of the embodiment of the present invention, variations may be made both in the specific embodiments and in the

application scope. To sum up, the content of the specification should not be construed as the limitation to the present invention.

CLAIMS

1. A push button switch, comprising:

a rocker switch assembly, a shifter and a push button assembly;

5 wherein the rocker switch assembly comprises a driving spring (01), a rocker (02) and a swing rod (03), the shifter comprises a commutating tooth (11), a commutating tooth returning spring (12) and a positioning tooth (13), and the push button assembly comprises a push button (21) and a push button returning spring (22);

10 the positioning tooth (13) comprises a diverging tooth (131) and a stopping tooth (132), and the positioning tooth (13) is located on the backside of the push button (21);

the commutating tooth (11) is located below the positioning tooth (13), one end of the commutating tooth (11) being connected with the swing rod (03) and the other end thereof mating with the positioning tooth (13);

15 one end of the driving spring (01) is connected with the swing rod (03) and the other end thereof is connected with the rocker (02); and

one end of the commutating tooth returning spring (12) is connected with the commutating tooth (11) and the other end thereof is connected with the swing rod (03).

2. The push button switch according to claim 1, wherein

20 the height of the stopping tooth (132) is greater than that of the diverging tooth (131).

3. The push button switch according to claim 1, wherein

the commutating tooth (11) is hinged to the swing rod (03).

25 4. The push button switch according to any one of claims 1 to 3, wherein

the commutating tooth (11) is meshed with the positioning tooth (13).

5. The push button switch according to any one of claims 1 to 3, wherein the shifter comprises at least two commutating teeth (11).

6. The push button switch according to claim 5, wherein

5 the number of the positioning tooth (13) corresponds to that of the commutating tooth (11), and the positioning tooth (13) comprises at least two diverging teeth (131) and at least two stopping teeth (132), the stopping teeth (132) being located between the two diverging teeth (131).

10 7. The push button switch according to any one of claims 1 to 3, wherein

the positioning tooth (13) of the shifter mates with the commutating tooth (11) so that the push button switch is capable of converting a rotating movement of the rocker switch assembly to a straight-line movement of the push button (21).

15 8. The push button switch according to any one of claims 1 to 3, further comprising:

a push button panel (3), an upper shell (4) and an installation bottom case (5);

wherein the push button panel (3) is adapted to install the push button (21), and the installation bottom case (5) is adapted to install the push button switch.