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(54) A double-turnplate switch contact device

(57) The present invention provides a double-turnplate switch contact device comprising a main turnplate, which is mounted on a rotating shaft and is provided with a connecting shaft that is driven to cause said main turnplate to rotate around said rotating shaft, and an ancillary turnplate, which is mounted on said rotating shaft concentrically with said main turnplate and is provided with a limit stop and a switch contact, wherein said main turnplate is also provided with a limit stop which is set in a place corresponding to that of the limit stop of said ancillary turnplate such that, when said main turnplate is driven to rotate around said rotating shaft, the limit stop of said main turnplate presses against the limit stop of said ancillary turnplate and drives said ancillary turnplate to rotate around said rotating shaft, thereby driving said switch contact to turn until it is opened or closed. In this way it is possible to drive said ancillary turnplate to rotate by applying an external force, thereby turning said switch contact to open or close, without changing the state of said main turnplate.

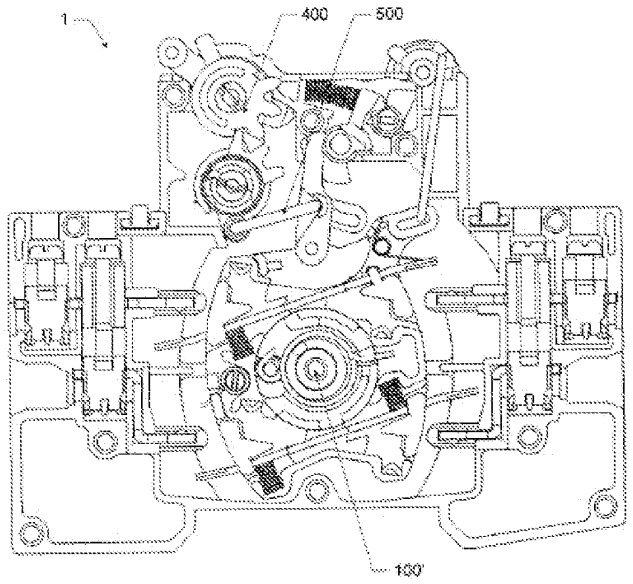

Figure 4

EP 2 009 657 A2

Description

Technical Field

[0001] The present invention relates to an electric accessory of a low-voltage switch, and more particularly to a switch contact device of a low-voltage switch.

Background Technology

[0002] In an electric accessory of a low-voltage switch, particularly an alarm switch or auxiliary switch, the switch contact is often installed on the turnplate which is driven to rotate by an external mechanism, thereby turning the switch contact to open or close.

[0003] Figure 1 is a schematic diagram showing the structure of a prior turnplate 100. Said turnplate 100 comprises a plate body 110. Said plate body 110 has a hole 112 and is rotatably installed onto a rotating shaft (not shown) on a base through said hole 112. On end of the plate body 110 of said turnplate 100 is a connecting shaft 114. Said connecting shaft 114 is connected to an external mechanism (not shown), such as a linkage mechanism. There are a plurality of pairs of positioning pieces 116 on both sides of the plate body 110 of said turnplate 100 for installation of the switch contact 120. Each said switch contact 120 is installed between a pair of said positioning pieces 116 and said switch contact is fixed to said positioning pieces 116 via a pair of positioning springs 130. During operation, the connecting shaft 114 is driven by said external mechanism (e.g. linkage mechanism) connected therewith to drive said turnplate 100 to rotate around the rotating shaft on said base through the hole 112, thereby turning the switch contact 120 installed on the plate body 110 of said turnplate 100 to open or close said switch contact 120.

[0004] However, in the abovementioned prior turnplate 100, operation of said external mechanism to rotate said turnplate 100 is required in order to turn said switch contact 120 so that said switch contact 120 opens or closes, in other words, a change in the state of the switch contact 120 requires a change in the state of said turnplate 100. However, as said turnplate 100 is connected with the external mechanism via the connecting shaft 114, a change in the state of said turnplate 100 has to be achieved by operating said external mechanism. Therefore, in actual application, the prior turnplate design cannot meet the abovementioned operation requirements of turning said switch contact 120 to open or close said switch contact 120 without changing the state of the turnplate 100 connected to the external mechanism.

Description of the Invention

[0005] The present invention provides a double-turnplate switch contact device comprising a main turnplate and an ancillary turnplate which are concentric with each other such that the ancillary turnplate can be used to turn the switch contact to open or close said switch contact, without changing the state of the main turnplate connected to the external mechanism.

[0006] In order to achieve the above objective, the present invention provides a double-turnplate switch contact device comprising a main turnplate which is mounted on a rotating shaft and which is provided with a connecting shaft that is driven to rotate said main turnplate around said rotating shaft, and an ancillary turnplate, which is mounted on said rotating shaft concentrically with said main turnplate and is provided with a limit stop and a switch contact, wherein said main turnplate is also provided with a limit stop which is set in a place corresponding to that of the limit stop of said ancillary turnplate such that, when said main turnplate is driven to rotate around said rotating shaft, the limit stop of said main turnplate presses against the limit stop of said ancillary turnplate and drives said ancillary turnplate to rotate around said rotating shaft, thereby turning said switch contact to open or close.

[0007] Said main turnplate comprises a plate body which has a hole through which the plate body can be rotatably installed onto said rotating shaft, and the connecting shaft and the limit stop of said main turnplate are mounted on said plate body. Said ancillary turnplate comprises a plate body which has a hole through which the plate body can be rotatably installed onto said rotating shaft, and the limit stop and the switch contact of said ancillary turnplate are mounted on said plate body. The plate body of said main turnplate has a projecting edge, and the plate body of said ancillary turnplate has a projecting pole. A torsion spring with two feet encompasses and sits on said projecting pole, with one foot engaging the plate body of said ancillary turnplate, preferably engaging a groove in said projecting pole, and the other foot engaging the projecting edge of said main turnplate. Positioning pieces are provided on both sides of the plate body of said ancillary turnplate for installation of said switch contact. Said switch contact is installed between a pair of said positioning pieces and is fixed to said positioning pieces via a pair of positioning springs.

[0008] The double-turnplate switch contact device of the present invention is mainly used in a low-voltage switch, such as an electric accessory, particularly an alarm switch or auxiliary switch. In said alarm switch or auxiliary switch, the double-turnplate switch contact device of the present invention is driven by operating an operation handle to drive the linkage mechanism connected therewith, thereby opening or closing said switch contact. Particularly, when the state of said operation handle is not changed or where the operation handle is inoperable causing the state of said linkage mechanism not to be changed, and further causing the state of the main turnplate of the double-turnplate switch contact device connected with said linkage mechanism not to be changed, said ancillary turnplate can be driven to rotate by an external force so that said switch contact is turned to become opened or closed without changing the state

of said main turnplate.

Description of the Drawings

[0009]

Figure 1 is a schematic diagram illustrating the structure of a typical prior turnplate for installing a switch contact;

Figure 2 is an exploded view illustrating the structure of the double-turnplate switch contact device of the present invention comprising a main turnplate and an ancillary turnplate arranged concentrically;

Figure 3 is a schematic diagram showing the structure of the main turnplate and the ancillary turnplate of the double-turnplate switch contact device after installation; and

Figure 4 is the schematic diagram showing the structure of an embodiment in which the double-turnplate switch contact device of the present invention is used in a low-pressure switch.

Embodiments

[0010] The double-turnplate switch contact device of the present invention is intended to provide a main turnplate and an ancillary turnplate arranged concentrically. Said main turnplate is connected with an external mechanism, and the switch contact is mounted on said ancillary turnplate. The main turnplate and the ancillary turnplate are fitted to each other through a limit stop and a torsion spring such that: when the main turnplate is driven by said external mechanism to rotate, the ancillary turnplate is also driven to rotate so that the switch contact is turned to become opened or closed; when it is desirable that the main turnplate is not driven by said external mechanism so that the state of the main turnplate is not changed, the ancillary turnplate can be rotated separately to turn the switch contact to open or close.

[0011] Figure 2 and figure 3 are schematic diagrams showing the structure of the exploded and assembled double-turnplate switch contact device 100' respectively. Referring to both figure 2 and figure 3, the double-turnplate switch contact device of the present invention comprises main turnplate 200 and ancillary turnplate 300 which are fitted to each other.

[0012] Said main turnplate 200 comprises a plate body 210. Said plate body 210 has a hole 212 and is rotatably mounted on a rotating shaft (not shown) of a base through said hole 212. A connecting shaft 214 is set on one end of said plate body 210. Said connecting shaft 214 is connected with an external mechanism (not shown), such as a linkage mechanism. Said main turnplate 200 is driven to rotate around the rotating shaft of said base through the hole 212 by operating said external mechanism. The plate body 210 of said main turnplate 200 is provided with a limit stop 215 and a projecting edge 217 which are fitted to said ancillary turnplate 300.

[0013] Said ancillary turnplate 300 comprises a plate body 310. Said plate body 310 has a hole 312 and is mounted on the rotating shaft of said base rotatably and concentrically with said main turnplate 200. Both sides of the plate body 310 of said turnplate 300 are provided with a plurality of pairs of positioning pieces 316 for the installation of the switch contact 320. Each of said switch contacts 320 is installed between a pair of said positioning pieces 316 and fixed to said positioning pieces 316 via a pair of positioning springs 330. One or more of said positioning springs 330 can be replaced by a positioning reed 330' or a positioning torsion spring. The plate body 310 of said ancillary turnplate 300 is also provided with a limit stop 315 set in a place corresponding to that of the limit stop 215 of the plate body 210 of said main turnplate 200. When said main turnplate 200 is driven by said external mechanism to rotate, the limit stop 215 thereof is pressed against the limit stop 315 of said ancillary turnplate 300 and drives said ancillary turnplate 300 to rotate around the rotating shaft of said base through the hole 312 such that the switch contact 320 installed on said ancillary turnplate 300 is turned so that said switch contact 320 opens or closes. The plate body 310 of said ancillary turnplate 300 is provided with a projecting pole 317 in correspondence with the projecting edge 217 on the plate body 210 of said main turnplate 200. When said main turnplate 200 and said ancillary turnplate 300 are mounted concentrically with each other with one on top of the other, a two-foot torsion spring 340 is slid onto the projecting pole 317 of said ancillary turnplate 300, wherein one foot of said torsion spring 340 engages said ancillary turnplate 300 and the other foot engages the projecting pole 217 of said main turnplate 200 (in particular as shown in figure 3). Preferably, the projecting pole 317 of said ancillary turnplate 300 is provided with a groove, and the foot of said torsion spring 340 engages said ancillary turnplate 300 by engaging the groove in the projecting pole 317. Said main turnplate 200 and the ancillary turnplate 300 are connected to each other through said torsion spring 340 such that the limit stop 215 of said main turnplate 200 is pressed against the limit stop 315 of the ancillary turnplate. When the limit stop 215 of said main turnplate 200 and the limit stop 315 of the ancillary turnplate are separated by an external force, they can be restored to press against each other by the elastic force of said torsion spring 340.

[0014] In normal operation, the connecting shaft 214 of the main turnplate 200 is driven by said external mechanism connected therewith so as to drive said main turnplate 200 to rotate around the rotating shaft of said base through the hole 212. As the limit stop 215 on the plate body 210 of said main turnplate 200 is pressed against the limit stop 315 on the plate body 310 of said ancillary turnplate 300, when said main turnplate 200 is rotated, said ancillary turnplate 300 is driven to rotate around the rotating shaft of said base through the hole 312 so that said switch contact 320 mounted on said ancillary turnplate 300 is turned to open or close said switch contact

320. When it is desirable that said switch contact 320 is driven to turn so that said switch contact 320 is opened or closed without changing the state of the main turnplate 200 connected with said external mechanism, said ancillary turnplate 300 can be driven separately by an external force to rotate to cause said switch contact 320 to turn, thereby opening or closing said switch contact 320. This can be done without changing the state of said main turnplate 200. When the external force is eliminated, the limit stop 215 of said main turnplate 200 is again pressed against the limit stop 315 of the ancillary turnplate by the strong force of said torsion spring 340.

[0015] Figure 4 presents an embodiment in which the double-turnplate switch contact device 100' of the present invention is applied in a low-pressure switch, such as alarm switch 1. In said alarm switch, an operation handle 400 is operated to drive the linkage mechanism 500 connected with it to move, thereby driving the double-turnplate switch contact device 100' of the present invention to open or close said switch contact 320. Particularly, if the state of said operation handle 400 is not changed or the operation handle 400 is not suitable for operation, requiring the state of said linkage mechanism 500 not to be changed, and further requiring the state of the main turnplate 200 of the double-turnplate switch contact device 100' connected with said linkage mechanism 500 not to be changed, it is possible to drive said ancillary turnplate 300 to rotate by an external force, thereby causing said switch contact 320 to turn until it is opened or closed. In this way said switch contact 320 is opened or closed without changing the state of said main turnplate 200.

[0016] Although the exemplary embodiments of the present invention have been described above with reference to the drawings, it should be understood that the present invention is not limited to the above-described embodiments, and other variations or adaptive modifications made by those skilled in the art according to the present invention do not depart from the scope and spirit of the present invention.

Claims

1. A double-turnplate switch contact device (100') comprising a main turnplate (200) which is mounted on a rotating shaft and is provided with a connecting shaft (214) that is driven to cause said main turnplate (200) to rotate around said rotating shaft, **characterized in that**:
   it further comprises an ancillary turnplate (300), which is mounted on said rotating shaft concentrically with said main turnplate (200) and is provided with a limit stop (315) and a switch contact (320), and said main turnplate (200) is also provided with a limit stop (215) which is set in a place corresponding to that of the limit stop (315) of said ancillary turnplate (300) such that, when said main turnplate (300) is driven to rotate around said rotating shaft, the limit stop (215) of said main turnplate (200) presses against the limit stop (315) of said ancillary turnplate (300) and drives said ancillary turnplate (300) to rotate around said rotating shaft, thereby turning said switch contact (320) so that said switch contact (320) opens or closes.

2. The double-turnplate switch contact device as claimed in claim 1, **characterized in that** said main turnplate (200) comprises a plate body (210) which has a hole (212) through which the plate body (210) can be rotatably mounted on said rotating shaft, and the connecting shaft (214) and the limit stop (215) of said main turnplate (200) are mounted on said plate body (210).

3. The double-turnplate switch contact device as claimed in claim 2, **characterized in that** said ancillary turnplate (300) comprises a plate body (310) which has a hole (312) through which the plate body (310) can be rotatably mounted on said rotating shaft, and the limit stop (315) and the switch contact (320) of said ancillary turnplate (300) are mounted on said plate body (310).

4. The double-turnplate switch contact device as claimed in claim 3, **characterized in that** the plate body (210) of said main turnplate (200) has a projecting edge (217), and the plate body (310) of said ancillary turnplate (300) has a projecting pole (317) wherein a two-foot torsion spring (340) encompasses and sits on said projecting pole (317) with one foot engaging the plate body (310) of said ancillary turnplate (300) and the other foot engaging the projecting edge (217) of said main turnplate (200).

5. The double-turnplate switch contact device as claimed in claim 4, **characterized in that** the foot of said torsion spring (340) engages the plate body (310) of said ancillary turnplate (300) by grooving the projecting pole (317) of the plate body (310) of said ancillary turnplate (300).

6. The double-turnplate switch contact device as claimed in claim 3, **characterized in that** there are positioning pieces (316) on both sides of the plate body (310) of said ancillary turnplate (300) for installation of said switch contact (320).

7. The double-turnplate switch contact device as claimed in claim 6, **characterized in that** said switch contact (320) is installed between a pair of said positioning pieces (316) and said switch contact (320) is fixed to said positioning pieces (316) via a pair of positioning springs (330).

8. The double-turnplate switch contact device as

claimed in any one of the preceding claims, **characterized in that** said double-turnplate switch contact device (100') is used in a low-voltage switch (1).

9. The double-turnplate switch contact device as claimed in claim 8, **characterized in that** said low-voltage switch (1) is an electric accessory.

10. The double-turnplate switch contact device as claimed in claim 9, **characterized in that** said electric accessory is an alarm switch or an auxiliary switch.

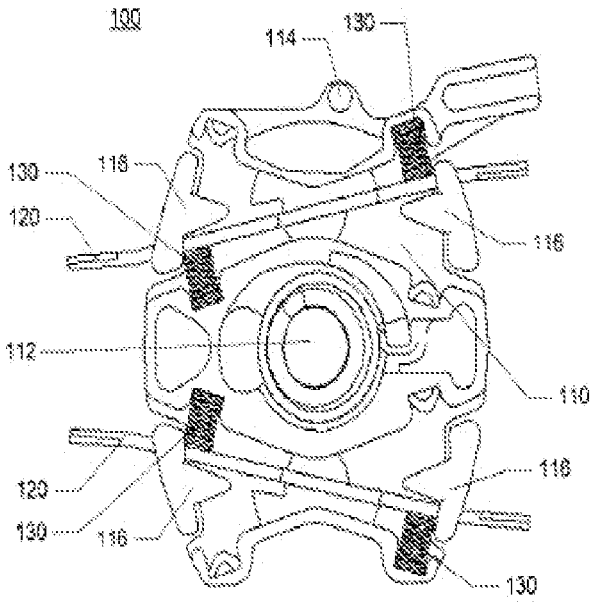

Figure 1

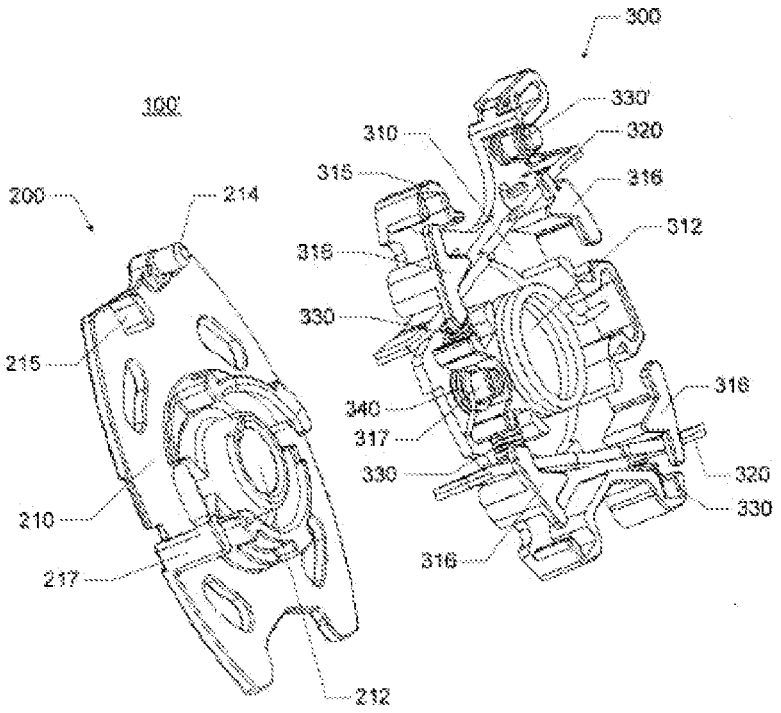
300
100'
330'
310
320
315
316
200
214
312
318
330
215
318
340
317
320
330
210
316
217
212

Figure 2

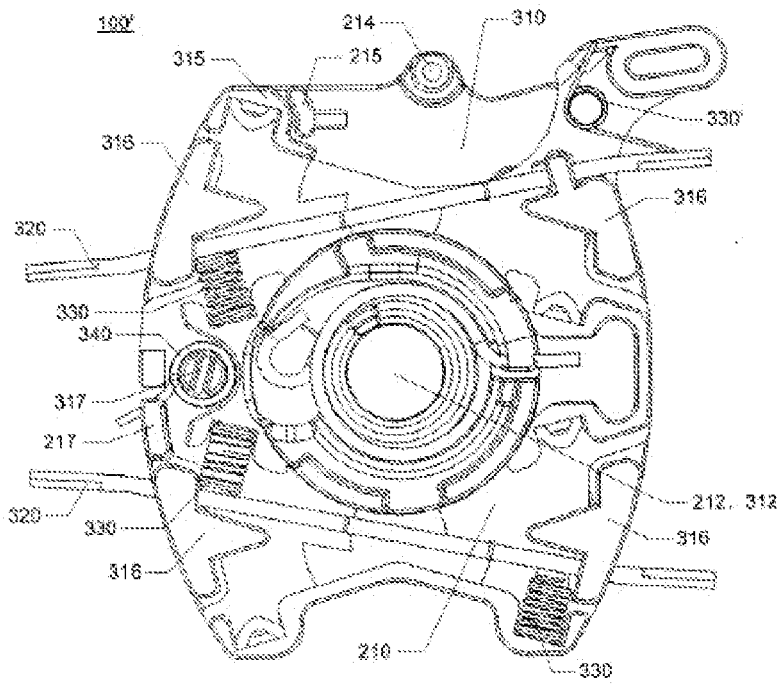
100'
214
310
315
215
330'
316
320
330
340
317
217
320
330
316
212, 312
316
210
330

Figure 3

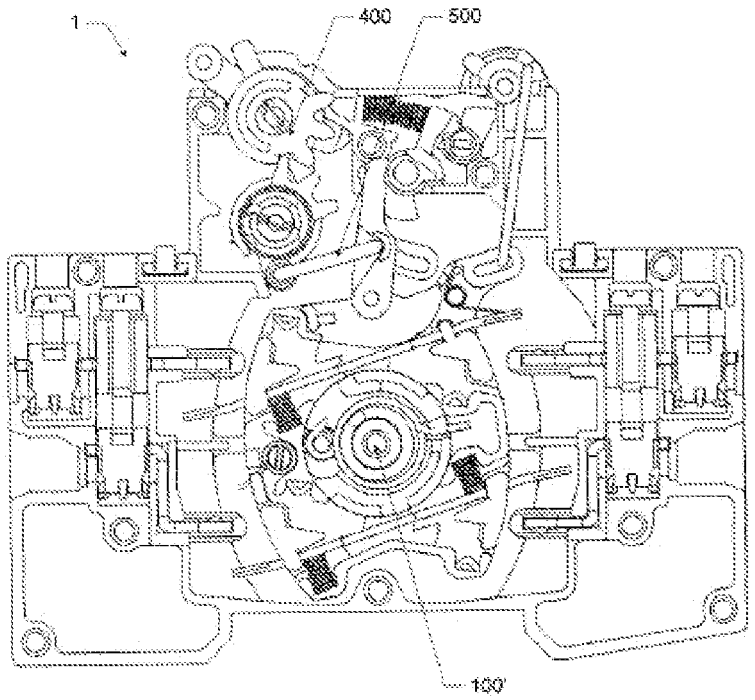

Figure 4