

ADJUSTABLE AND SEMI-AUTOMATIC DOOR-CLOSING DEVICE

1. Field of the Invention

The present invention relates to a door-closing device, and more particularly to an adjustable and semi-automatic door-closing device.

5 2. Description of Related Art

A conventional sliding door substantially comprises a sliding rail, a door panel, a wheel assembly, and a buffering device. The wheel assembly is mounted between the sliding rail and the door panel to enable the door panel to slide along the rail smoothly. The rail has two clamping members mounted respectively on
10 two ends of the rail and can clamp the wheel assembly to hold the door panel at an open or a closed position.

The buffering device substantially comprises a cylinder, a spring, and an actuator. When the actuator is actuated, the cylinder will be extended or retracted slowly to provide a buffering effect to the door panel and to keep noise from
15 occurring. Furthermore the user can also avoid being pinched by the door panel.

However, the conventional sliding door is operated manually, so the operation of the conventional sliding door is laborious. To push or pull the door panel to slide relative to the sliding rail is inconvenient.

To overcome the shortcomings, the present invention tends to provide a
20 door-closing device to mitigate or obviate the aforementioned problems.

The main objective of the invention is to provide a door-closing device which can close a door panel of a sliding door semi-automatically.

The door-closing device has a base, a rail, multiple adjusting members, and multiple positioning elements. The base is elongated and has a top, a side,

and at least one positioning segment formed on the side and extending longitudinally along the base. The rail is elongated, is mounted on the base, and has an opening defined in a bottom of the rail. The adjusting members are mounted on the rail and are adjustably connected with the top of the base to make
 5 the rail inclined relative to the base. The positioning elements are mounted slidably and detachably on the at least one positioning segment on the base at spaced intervals and are connected detachably with a top of the rail.

Other objects, advantages and novel features of the invention will become more apparent from the following detailed description when taken in
 10 conjunction with the accompanying drawings.

IN THE DRAWINGS

Fig. 1 is a front view of a door-closing device in accordance with the present invention;

Fig. 2 is a perspective view of the door-closing device in Fig. 1;

15 Fig. 3 is an enlarged partial perspective view of the door-closing device in Fig. 1;

Fig. 4 is an enlarged partial front view of the door-closing device in Fig. 1;

20 Fig. 5 is a side view in partial section of the door-closing device along the line 5-5 in Fig. 4; and

Fig. 6 is an operational front view of the door-closing device in Fig. 1.

With reference to Figs. 1 to 3, and 6, a door-closing device in accordance with the present invention comprises a base 10, a rail 20, multiple adjusting members 30, multiple positioning elements 40, multiple adjusting assemblies 50,

multiple fixing assemblies 60, and multiple securing bolts 70.

With reference to Figs. 2 and 3, the base 10 is elongated and has a top, a side, and at least one positioning segment 11. The at least one positioning segment 11 is formed on the side and extends longitudinally along the base 10.

5 Preferably, the at least one positioning segment 11 is implemented as two in amount. The two positioning segments 11 are spaced from each other, and each positioning segment 11 has a groove defined in the positioning segment 11.

In addition, the base 10 further has two adjusting holes 12 and multiple securing holes 13. The adjusting holes 12 are defined through the top of the base
10 10 at two positions that are respectively adjacent to two ends of the base 10, and the adjusting holes 12 are threaded. The securing holes 13 are defined through the top of the base 10 at spaced intervals.

With reference to Figs. 2 and 5, the rail 20 is elongated, is mounted on the base 10, and has an opening defined in a bottom of the rail 20. In addition, the
15 rail 20 further has two inner sides facing each other and two sliding segments 21 formed respectively on the two inner sides at positions that are adjacent to the opening of the rail 20.

With reference to Figs. 2 and 3, the adjusting members 30 are mounted on the rail 20 and are adjustably connected with the top of the base 10 to make
20 the rail 20 inclined relative to the base 10. Preferably, the multiple adjusting members 30 are implemented as two in amount, are bolts, and are connected with the base 10 at two positions that are respectively adjacent to the two ends of the base 10. The two adjusting members 30 are screwed respectively with the two adjusting holes 12. One of the two adjusting members 30 is screwed with

one of the two adjusting holes 12 at a position that is adjacent to a head of said adjusting member 30. Accordingly, the distance between an end of the base 10 and the rail 20 can be shortened.

The other one of the two adjusting members 30 is screwed with the other
 5 one of the two adjusting holes 12 at a position that is away from a head of said other adjusting member 30. Accordingly, the distance between an end of the base 10 and the rail 20 can be prolonged, and the rail 20 is inclined relative to the base 10. The inclined angle between the rail 20 and the base 10 can be adjusted by screwing or unscrewing the adjusting members 30 based on the needs of the user.
 10 Consequently, the speed of closing a door panel can also be adjusted accordingly.

With reference to Figs. 3 to 5, the positioning elements 40 are mounted slidably and detachably on the at least one positioning segment 11 on the base 10 and are connected detachably with a top of the rail 20. Each positioning element 40 has an assembling segment 41 and an adjusting segment 42 connected with
 15 the assembling segment 41 to form the positioning element 40 in an L-shape. The assembling segment 41 of each positioning element 40 is mounted detachably on the top of the rail 20. The adjusting segment 42 of each positioning element 40 has a slot 421 defined through the adjusting segment 42 at a position corresponding to the two positioning segments 11 on the base 10.

20 The adjusting assemblies 50 correspond to the positioning elements 40 in amount, and each adjusting assembly 50 comprises an adjusting nut 51 and an adjusting bolt 52. The adjusting nut 51 of each adjusting assembly 50 is mounted slidably in the groove of one of the positioning segments 11 on the base 10. The adjusting bolt 52 of each adjusting assembly 50 is mounted through the slot 421

in the adjusting segment 42 of a corresponding one of the positioning elements 40 and is screwed with the adjusting nut 51 of the adjusting assembly 50.

The fixing assemblies 60 correspond to the positioning elements 40 in amount, and each fixing assembly 60 comprises a fixing bolt 61 and a fixing nut 62. The fixing bolt 61 of each fixing assembly 60 is mounted through the top of the rail 20 and the assembling segment 41 of a corresponding one of the positioning elements 40. The fixing nut 62 of each fixing assembly 60 abuts the assembling segment 41 of a corresponding one of the positioning elements 40 and is screwed with the fixing bolt 61 of the fixing assembly 60.

With reference to Figs. 2 and 6, the securing bolts 70 correspond to the securing holes 13 in amount and are mounted respectively through the securing holes 13 to secure the base 10 onto an object 80, such as a ceiling.

With reference to Figs. 2, 5, and 6, after the base 10 is secured to the object 80 by the securing bolts 70, the rail 20 is then connected with and inclined relative to the base 10 by the adjusting members 30. The positioning elements 40 are then connected to the base 10 and the rail 20 by the adjusting assemblies 50 and the fixing assemblies 60, such that the connection between the base 10 and the rail 20 is further enhanced. During the assembling process, the adjusting nuts 51 are mounted respectively in the two positioning segments 11 on the base 10 based on the desired inclined angle of the rail 20 and are slid longitudinally along the base 10. The adjusting bolts 52 are mounted respectively through the slots 421 in the adjusting segments 42 of the positioning elements 40 and are screwed with the adjusting nuts 51. Accordingly, the door-closing device is arranged on the object 80.

Consequently, a door panel 91 of a sliding door is connected with the door-closing device. The door panel 91 has two wheel assemblies 92 and a buffering device 93. The two wheel assemblies 92 mounted on the top of the door panel 91 are mounted respectively slidably in the two sliding segments 21
5 in the rail 20. The heights of the wheel assemblies 92 can be adjusted to enable the bottom of the door panel 91 to be flush with the horizontal line.

With the inclination of the rail 20 relative to the base 10, an opened door panel 91 can automatically move to the original position where the door panel 91 is closed by the weight of the door panel 91. Accordingly, the operation of the
10 sliding door is labor-saving and convenient.

CLAIMS

1. A door-closing device comprising:

a base (10) being elongated and having

5 a top;

a side; and

at least one positioning segment (11) formed on the side and
extending longitudinally along the base (10);

a rail (20) being elongated, mounted on the base (10), and having an
10 opening defined in a bottom of the rail (20);

multiple adjusting members (30) mounted on the rail (20) and adjustably
connected with the top of the base (10) to make the rail (20) inclined relative to
the base (10); and

multiple positioning elements (40) mounted slidably and detachably on
15 the at least one positioning segment (11) on the base (10) at spaced intervals and
connected detachably with a top of the rail (20).

2. The door-closing device as claimed in claim 1, wherein the multiple
adjusting members (30) are implemented as two in amount, are bolts, and are
20 connected with the base (10) at two positions that are respectively adjacent to
two ends of the base (10);

the base (10) further has two adjusting holes (12) defined through the top
of the base (10) at two positions that are respectively adjacent to the two ends of
the base (10), and the two adjusting holes (12) are threaded;

the two adjusting members (30) are screwed respectively with the two adjusting holes (12);

one of the two adjusting members (30) is screwed with one of the two adjusting holes (12) at a position that is adjacent to a head of said adjusting member (30); and

the other one of the two adjusting members (30) is screwed with the other one of the two adjusting holes (12) at a position that is away from a head of said other adjusting member (30) so as to make the rail (20) inclined relative to the base (10).

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3. The door-closing device as claimed in claim 2, wherein

the at least one positioning segment (11) is implemented as two in amount, and each positioning segment (11) has a groove defined in the positioning segment (11);

each positioning element (40) has an assembling segment (41) and an adjusting segment (42) connected with the assembling segment (41) to form the positioning element (40) in an L-shape;

the assembling segment (41) of each positioning element (40) is mounted detachably on the top of the rail (20);

the adjusting segment (42) of each positioning element (40) has a slot (421) defined through the adjusting segment (42) at a position corresponding to the two positioning segments (40) on the base (10);

the door-closing device further comprises multiple adjusting assemblies (50) corresponding to the positioning elements (40) in amount, and each

adjusting assembly (50) comprises an adjusting bolt (52) and an adjusting nut (51);

the adjusting nut (51) of each adjusting assembly (50) is mounted slidably in the groove of one of the positioning segments (11) on the base (10);

5 and

the adjusting bolt (52) of each adjusting assembly (50) is mounted through the slot (421) in the adjusting segment (42) of a corresponding one of the positioning elements (41) and is screwed with the adjusting nut (51) of the adjusting assembly (50).

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4. The door-closing device as claimed in claim 3 further comprising multiple fixing assemblies (60) corresponding to the positioning elements (40) in amount, and each fixing assembly (60) comprising a fixing bolt (61) and a fixing nut (62); wherein

15 the fixing bolt (61) of each fixing assembly (10) is mounted through the top of the rail (20) and the assembling segment (41) of a corresponding one of the positioning elements (40); and

the fixing nut (62) of each fixing assembly (60) abuts the assembling segment (41) of a corresponding one of the positioning elements (40) and is
20 screwed with the fixing bolt (61) of the fixing assembly (60).

5. The door-closing device as claimed in claim 4, wherein the base (10) further comprises multiple securing holes (13) defined through the top of the base (10) at spaced intervals;

the door-closing device further comprises multiple securing bolts corresponding to the securing holes in amount and mounted respectively through the securing holes to secure the base onto an object.

5 6. The door-closing device as claimed in claim 5, wherein the rail further has two inner sides facing each other and two sliding segments formed respectively on the two inner sides at positions that are adjacent to the opening of the rail.

10 7. The door-closing device as claimed in claim 1, wherein
the at least one positioning segment is implemented as two in amount,
and each positioning segment has a groove defined in the positioning segment;
each positioning element has an assembling segment and an adjusting
segment connected with the assembling segment to form the positioning element
15 in an L-shape;

the assembling segment of each positioning element is mounted detachably on the top of the rail;

the adjusting segment of each positioning element has a slot defined through the adjusting segment at a position corresponding to the two positioning
20 segments on the base;

the door-closing device further comprises multiple adjusting assemblies corresponding to the positioning elements in amount, and each adjusting assembly comprises an adjusting bolt and an adjusting nut;

the adjusting nut of each adjusting assembly is mounted slidably in the

groove of one of the positioning segments on the base; and

the adjusting bolt of each adjusting assembly is mounted through the slot in the adjusting segment of a corresponding one of the positioning elements and is screwed with the adjusting nut of the adjusting assembly.

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8. The door-closing device as claimed in claim 7 further comprising multiple fixing assemblies corresponding to the positioning elements in amount, and each fixing assembly comprising a fixing bolt and a fixing nut; wherein

the fixing bolt of each fixing assembly is mounted through the top of the rail and the assembling segment of a corresponding one of the positioning elements; and

the fixing nut of each fixing assembly abuts the assembling segment of a corresponding one of the positioning elements and is screwed with the fixing bolt of the fixing assembly.

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9. The door-closing device as claimed in claim 8, wherein the base further comprises multiple securing holes defined through the top of the base at spaced intervals;

the door-closing device further comprises multiple securing bolts (70) corresponding to the securing holes (13) in amount and mounted respectively through the securing holes (13) to secure the base (10) onto an object.

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10. The door-closing device as claimed in any one of claims 1 to 9, wherein the rail (20) further has two inner sides facing each other and two sliding segments (21) formed respectively on the two inner sides at positions that are adjacent to the opening of the rail (20).