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**Sliding window roller assembly**

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**ABSTRACT**

The present application discloses a sliding window roller assembly, comprising a housing, a first roller shell and a second roller shell movably arranged in the housing, a balance slider movably arranged between the first roller shell and the second roller shell, and an adjusting assembly arranged against the second roller shell on a right side in the housing for pushing the second roller shell. The sliding window roller assembly enables adaptive adjustment of the relative positions between the first and second roller shells to accommodate a deviated angle between a window sash and a sliding rail. Consequently, the weight of the window sash is uniformly distributed across the roller system, ensuring smooth, jam-free operation and significantly enhancing user experience through optimized force transmission and stability.

(To be published with FIG. 1)

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DRAWINGS

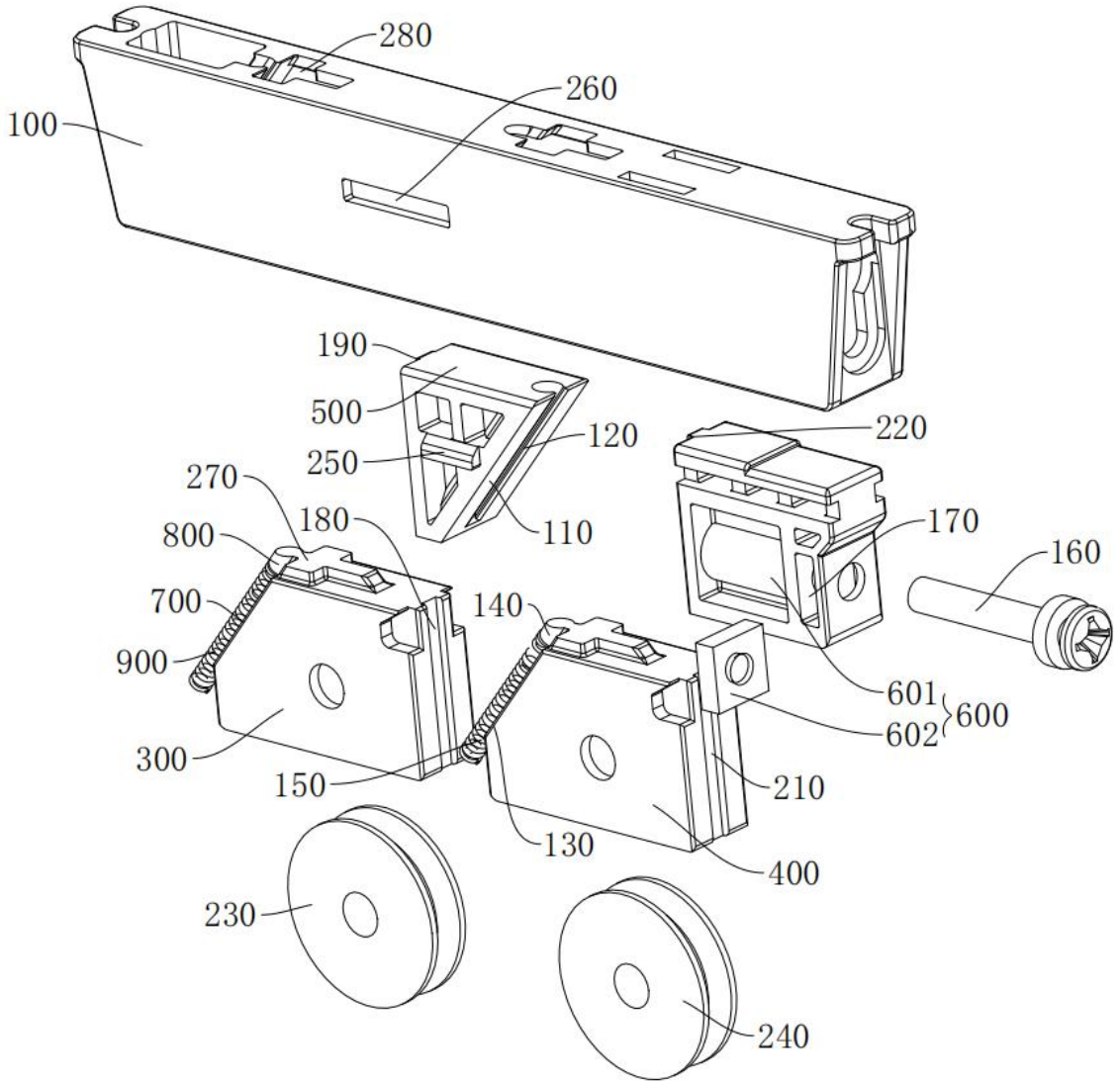


FIG. 1

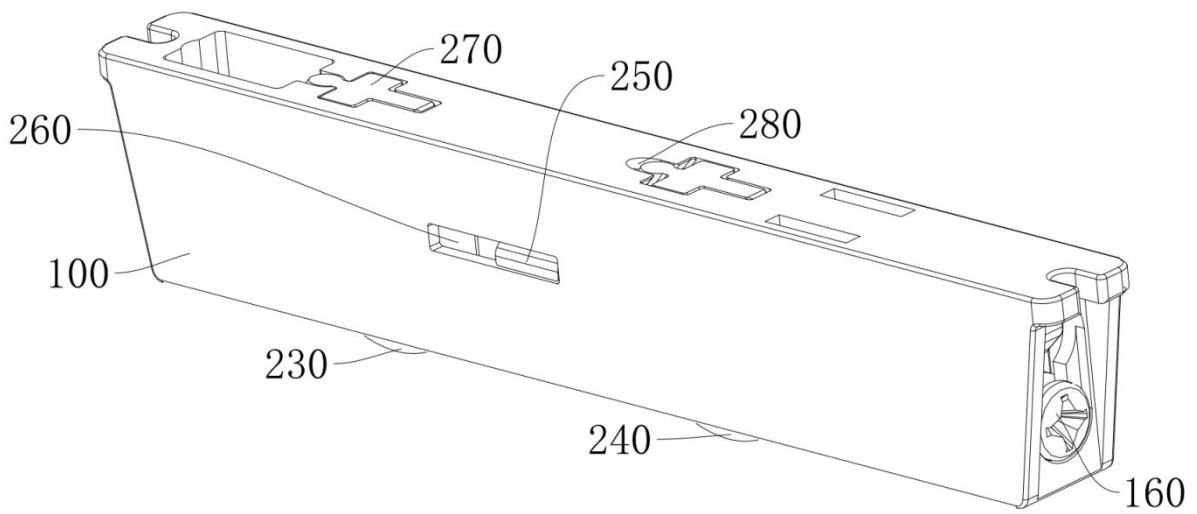


FIG. 2

## SLIDING WINDOW ROLLER ASSEMBLY

### TECHNICAL FIELD

The present application relates to the technical field of rollers, in particular to a sliding window roller assembly.

### BACKGROUND

Sliding windows, also known as sash windows, are a common window design widely used in residential and commercial buildings. They are characterized by window sashes that move along a horizontal rail, saving space and facilitating ventilation. A roller assembly is a critical component that enables smooth and silent sliding of the sliding windows. The roller assembly is usually made of metal or plastic and is designed with bearings to reduce friction. A high-quality roller assembly enhances the window's service life, operational experience as well as its sealing performance and safety.

In existing sliding window roller assemblies, two rollers may only adjust their vertical positions synchronously. However, in practical applications, a window sash and a lower sliding rail may not be completely parallel, and if the rollers fail to accommodate an included angle between the window sash and the sliding rail, it results in a stuttering or uneven sliding motion of the window sash, detracting from the user experience.

### SUMMARY

To this end, the present application aims to provide a roller assembly for sliding window, which can solve a problem that the rollers cannot adapt to an included angle between a window sash and a sliding rail, so that the sash slides more smoothly instead of being stuck.

The object of the present application is implemented by employing the following technical scheme.

A sliding window roller assembly, includes a housing, a first roller shell and a second roller shell movably arranged inside the housing, a balance slider movably arranged between the first roller shell and the second roller shell, and an adjusting assembly arranged against the second roller

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shell on a right side in the housing for pushing the second roller shell, wherein the first roller shell and the second roller shell are of an identical structure, and wherein, a left side of the first roller shell is provided with a first inclined surface, a first plunger is fixedly arranged on an upper end of the first inclined surface, the first plunger is integrally formed with a bump convexly arranged on a top surface of the first roller shell, and a second spring is sleeved at a lower end of the first plunger, and a left side of the second roller shell is provided with a second inclined surface, a second plunger is fixedly arranged on an upper end of the second inclined surface, the second plunger is integrally formed with a bump convexly arranged on a top surface of the second roller shell, and a first spring is sleeved at a lower end of the second plunger; and a left side surface of the balance slider is vertical and fixedly arranged with a first convex strip, and a right side surface of the balance slider is an inclined surface and is provided with a first slot.

In accordance with an embodiment of the present application, a wall inclined to the right is arranged in the housing, the wall is provided with a second slot, and the first inclined surface is adjacent to the wall and is capable of sliding along a surface of the wall.

15 In accordance with an embodiment of the present application, the second inclined surface is adjacent to the right side surface of the balance slider and is capable of sliding along the right side surface.

20 In accordance with an embodiment of the present application, the adjusting assembly is configured to drive the second inclined surface to slide along the balanced inclined surface when being screwed into the housing, so that the second roller shell moves downward to the lower left and the first spring is compressed.

25 In accordance with an embodiment of the present application, the balance slider is configured to balance an extruding force and act on the first roller shell when being extruded by the second roller shell, so that the first roller shell moves downward to the lower left and the second spring is compressed.

In accordance with an embodiment of the present application, a top surface of the housing is provided with positioning holes.

In accordance with an embodiment of the present application, the bump is configured to be engaged and fitted with the positioning holes in a form-fitting manner.

30 In accordance with an embodiment of the present application, the adjusting assembly comprises an adjusting slider and an adjusting nut, the adjusting slider is movably arranged in the housing, the adjusting nut is fixedly arranged in the adjusting slider, an adjusting screw is rotatably

arranged outside the housing, the adjusting slider is internally provided with a hole, a screw stem of the adjusting screw passes through the housing and is screwed into the hole of the adjusting slider, and the adjusting nut is movably arranged on the screw stem of the adjusting screw.

In accordance with an embodiment of the present application, a right side of the adjusting slider is provided with a limiting groove, and the adjusting nut is fixedly arranged in the limiting groove.

In accordance with an embodiment of the present application, a right end of the first roller shell in a vertical direction is provided with a first groove, and a first convex strip on a left side of the balance slider is capable of being inserted into the first groove.

In accordance with an embodiment of the present application, a right end of the second roller shell in a vertical direction is provided with a second groove, a second convex strip is fixedly arranged on a left side of the adjusting assembly, and the second convex strip is capable of being inserted into the second groove.

In accordance with an embodiment of the present application, a first rotating wheel is rotatably arranged on the first roller shell, a second rotating wheel is rotatably arranged on the second roller shell, and the first rotating wheel and the second rotating wheel pass through and protrude from a bottom of the housing.

In accordance with an embodiment of the present application, sliding protrusions are fixedly arranged on both sides of the balance slider, a sliding slot is arranged on a side surface of the housing, and the sliding protrusions are capable of sliding in the sliding slot.

The present application has the following beneficial effects. The sliding window roller assembly of the present application achieves self-balancing functionality by incorporating a first roller shell and a second roller shell movably disposed within the housing, with a balance slider movably positioned between them. This configuration enables adaptive adjustment of the relative positions between the first and second roller shells to accommodate a deviated angle between a window sash and a sliding rail. Consequently, the weight of the window sash is uniformly distributed across the roller system, ensuring smooth, jam-free operation and significantly enhancing user experience through optimized force transmission and stability.

The above features and advantages and other features and advantages of the present disclosure are readily apparent from the following detailed description of the best modes for carrying out the disclosure when taken in connection with the accompanying drawings.

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## BRIEF DESCRIPTION OF THE DRAWINGS

The drawings are illustrative and not intended to limit the subject matter defined by the claims. Exemplary aspects are discussed in the following detailed description and shown in the accompanying drawings in which:

FIG. 1 is an exploded view of a roller assembly according to an embodiment of the present application;

FIG. 2 is a schematic diagram of an overall structure of the present application when springs are in an uncompressed state;

FIG. 3 is a schematic diagram of the overall structure of the present application when the springs are in a maximum compressed state;

FIG. 4 is a sectional drawing of FIG. 2;

FIG. 5 is a sectional drawing of FIG. 3;

FIG. 6 is a schematic structural diagram of a balance slider according to the present application;

15 FIG. 7 is a schematic structural diagram of an adjusting slider according to the present application; and

FIG. 8 is a schematic structural diagram of a first roller shell and a second roller shell according to the present application.

In the drawings, reference numerals as followings:

20 100 housing;

200 second slot;

300 first roller shell;

400 second roller shell;

500 balance slider;

25 600 adjusting assembly; 601 adjusting slider; 602 adjusting nut;

700 first inclined surface;

800 first plunger;

900 second spring;

110 balance inclined surface; 120 first slot; 130 second inclined surface; 140 second plunger;

150 first spring; 160 adjusting screw; 170 limiting groove; 180 first groove; 190 first convex strip;  
210 second groove; 220 second convex strip; 230 first rotating wheel; 240 second rotating  
wheel; 250 sliding protrusion; 260 sliding slot; 270 bump; and 280 positioning hole.

## 5 DETAILED DESCRIPTION OF THE EMBODIMENTS

The present application will be further explained in detail with reference to the drawings and  
embodiments.

As shown in FIG. 1 to FIG. 8, a sliding window roller comprises a housing 100. A left side in  
the housing 100 is provided with a second slot 200 inclined to the right, a first roller shell 300 and a  
second roller shell 400 are movably arranged within the housing 100, a balance slider 500 is  
movably arranged between the first roller shell 300 and the second roller shell 400, an adjusting  
assembly 600 is arranged against the second roller shell 400 on a right side in the housing 100 for  
pushing the second roller shell 400.

A first inclined surface 700 is arranged on a left side of the first roller shell 300, the first  
15 inclined surface 700 is capable of sliding along an outer wall of the second slot 200, a first plunger  
800 is fixedly arranged on the first inclined surface 700, the outer wall of the second slot 200 is  
provided with a guide opening, the first plunger 800 is inserted into the second slot 200 through the  
guide opening and slides in the second slot 200, a second spring 900 is arranged in the second slot  
200, one end of the second spring 900 is sleeved on the first plunger 800, and the other end of the  
20 second spring is fixedly arranged on a bottom surface of the second slot 200.

A balance inclined surface 110 is arranged on a right side of the balance slider 500, and a first  
slot 120 is provided on the balance inclined surface 110.

A second inclined surface 130 is arranged on a left side of the second roller shell 400, the  
second inclined surface 130 is capable of sliding along an outer wall of the first slot 120, a second  
25 plunger 140 is fixedly arranged on the second inclined surface 130, the outer wall of the first slot  
120 is provided with a guide opening, the second plunger 140 is inserted into the first slot 120  
through the guide opening and slides in the first slot 120, a first spring 150 is arranged in the first  
slot 120, one end of the first spring 150 is sleeved on the second plunger 140, and the other end of  
the first spring is fixedly arranged on a bottom surface of the first slot 120.

30 When in use, the sliding window roller assembly is installed on a sliding rail beneath the  
sliding window. Due to potential angular deviations between the sliding window and the sliding  
rail, the adjusting assembly 600 is actuated to move leftward, applying pressure against the second

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roller shell 400 and thus the second shell 400 is pushed. As the second inclined surface 130 slides along the outer wall of the first slot 120, a horizontal force on the second plunger 140 resolves into a directional force along a direction of the first slot 120. Guided by an opening on the outer wall of the first slot 120, the second plunger 140 moves toward the bottom surface of the first slot 120, while extruding and compressing the first spring 150, so that the second roller shell 400 moves downward to the lower left. In this case, the second roller shell 400 activates the balance slider 500 to move to the left to engage the first roller shell 300. As the first inclined surface 700 slides along the outer wall of the second slot 200, a horizontal force on the first plunger 800 resolves into a directional force along a direction of the second slot 200. Guided by an opening on the second slot 200, the first plunger 800 moves toward the bottom surface of the second slot 200, while extruding and compressing the second spring 900, so that the first roller shell 300 moves downward to the lower left. The adjustment process terminates when both the first roller shell 300 and the second roller shell 400 establish simultaneous contact with the sliding rail, ensuring the alignment of a line connected by their geometric centers with the longitudinal axis of the sliding rail. This configuration achieves self-balancing of the sliding window roller assembly through kinematic compensation for angular misalignment.

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Preferably, the adjusting assembly 600 comprises an adjusting slider 601 and an adjusting nut 602. The adjusting slider 601 is movably arranged in the housing 100, the adjusting nut 602 is fixedly arranged in the adjusting slider 601, an adjusting screw 160 is rotatably arranged outside the housing 100, the adjusting slider 601 is internally provided with a hole, a screw stem of the adjusting screw 160 passes through the housing 100 and is screwed into the hole of the adjusting slider 601, and the adjusting nut 602 is movably arranged on the screw stem of the adjusting screw 160.

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When in use, the adjusting screw 160 may be screwed by an user, that is, the adjusting screw 160 is rotated outside the housing 100, so that the adjusting nut 602 moves along the screw stem of the adjusting screw 160, and the adjusting slider 601 is driven to move.

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Preferably, a right side of the adjusting slider 601 is provided with a limiting groove 170, with the adjusting nut 602 securely positioned in the limiting groove 170. This configuration offers the following advantages. The right-side placement relative to the adjusting slider 601 may reduce a length of the adjusting screw 160 while ensuring the adjusting screw 160 pushes the adjusting slider 601 to move to the left, thus optimizing material usage and cost efficiency. At the same time, this arrangement method facilitates installation of the adjusting nut 602 and improves an installation efficiency.

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Preferably, a right end of the first roller shell 300 in a vertical direction is provided with a first groove 180, a first convex strip 190 is fixedly arranged on a left side of the balance slider 500, and the first convex strip 190 is inserted into the first groove 180. By arranging the first groove 180 and the first convex strip 190 which are matched with each other, lateral movement of the balance slider 500 is more stable.

Preferably, a right end of the second roller shell 400 in a vertical direction is provided with a second groove 210, a second convex strip 220 is fixedly arranged on a left side of the adjusting assembly 600, and the second convex strip 220 is inserted into the second groove 210. By arranging the second groove 210 and the second convex strip 220 which are matched with each other, the adjusting assembly 600 moves more smoothly when extruding the second roller shell 400.

Preferably, a first rotating wheel 230 is rotatably arranged on the first roller shell 300, a second rotating wheel 240 is rotatably arranged on the second roller shell 400. The first rotating wheel 230 and the second rotating wheel 240 pass through and protrude from a bottom of the housing 100.

15 Preferably, a sliding protrusion 250 is fixedly arranged on each side of the balance slider 500, a sliding slot 260 is arranged on a side surface of the housing 100, and the sliding protrusion 250 is configured to slide in the corresponding sliding slot 260. When installing the sliding window roller assembly, the heights of the first roller shell 300 and the second roller shell 400 may be adjusted by manually pulling the sliding protrusions 250 to assist in installation.

20 Preferably, a bump 270 is fixedly arranged on a top surface of the first roller shell 300 and the second roller shell 400, and a top of the housing 100 is provided with positioning holes 280 matched with the corresponding bumps 270. When installing the first roller shell 300 and the second roller shell 400, the bumps 270 may be inserted into the positioning holes 280, thereby facilitating precise alignment of these two components during assembly.

25 Specifically, the process according to an embodiment of the present application is as follows.

During installation, the sliding window roller assembly is mounted onto the sliding rail beneath the sliding window. To compensate for angular deviations between the window sash and sliding rail, an user rotates the adjusting screw 160 to drive the adjusting nut 602 to move to the left to apply pressure against the second roller shell 400. This action compresses the first spring 150 via  
30 an axial displacement of the second plunger 140, so that the second roller shell 400 moves to the lower left. In this case, the second roller shell 400 engages the balance slider 500, inducing leftward displacement of the balance slider 500, and the first roller shell 300 moves to the lower left as the first plunger 800 extrudes the second spring 900. Adjustment ceases when both the first rotating

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wheel 230 and the second rotating wheel 240 establish simultaneous contact with the sliding rail, ensuring longitudinal alignment of their geometric centers with the rail axis. This configuration achieves self-balancing through kinematic compensation for angular misalignment. For fine adjustment, an user may manually actuate the sliding protrusions 250 during screw rotation, with vertical adjustment of the first and/or second rotating wheel limited to a maximum range of 14mm.

The sliding window roller assembly of the present application achieves self-balancing functionality through a kinematic design comprising a first roller shell 300 and a second roller shell 400 movably mounted within the housing 100, with a balancing slider 500 interposed between them. This configuration enables adaptive adjustment of the relative positions between the first and second roller shells to compensate for angular deviations between the window sash and the sliding rail. By maintaining geometric alignment of the roller system with the rail axis, the present application ensures uniform force distribution across the roller assembly during sash operation, thereby providing smooth, consistent sliding performance that enhances overall user experience.

15 Those described above are merely preferred embodiments of the present application, but are not intended to limit the present application. Any modifications, equivalents, and/or improvements made without departing from the contents of the present application shall all fall within the protection scope of the claims.

**CLAIMS**

1. A sliding window roller assembly comprising a housing (100),  
a first roller shell (300) and a second roller shell (400) movably arranged inside the housing  
(100),

5 a balance slider (500) movably arranged between the first roller shell (300) and the second  
roller shell (400); and

an adjusting assembly (600) arranged against the second roller shell (400) on a right side in  
the housing (100) for pushing the second roller shell (400);

characterized in that,

10 the first roller shell (300) and the second roller shell (400) are of an identical structure;

wherein, a left side of the first roller shell (300) is provided with a first inclined surface (700),  
a first plunger (800) is fixedly arranged on an upper end of the first inclined surface (700), the first  
plunger (800) is integrally formed with a bump (270) convexly arranged on a top surface of the first  
roller shell (300), and a second spring (900) is sleeved at a lower end of the first plunger (800);

15 a left side of the second roller shell (400) is provided with a second inclined surface (130), a  
second plunger (140) is fixedly arranged on an upper end of the second inclined surface (130), the  
second plunger (140) is integrally formed with a bump (270) convexly arranged on a top surface of  
the second roller shell (400), and a first spring (150) is sleeved at a lower end of the second plunger  
(140); and

20 a left side surface of the balance slider (500) is vertical and fixedly arranged with a first  
convex strip (190), and a right side surface of the balance slider (500) is an inclined surface (110)  
and is provided with a first slot (120).

25 2. The sliding window roller according to claim 1, wherein a wall inclined to the right is  
arranged in the housing (100), the wall is provided with a second slot (200), and the first inclined  
surface (700) is adjacent to the wall and is capable of sliding along a surface of the wall.

3. The sliding window roller according to claim 1, wherein the second inclined surface (130)  
is adjacent to the right side surface of the balance slider (500) and is capable of sliding along the  
right side surface.

30 4. The sliding window roller according to claim 1, wherein the adjusting assembly (600) is  
configured to drive the second inclined surface (130) to slide along the balanced inclined surface  
(110) when being screwed into the housing, so that the second roller shell (400) moves downward

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to the lower left and the first spring (140) is compressed.

5. The sliding window roller according to claim 4, wherein the balance slider (500) is configured to balance an extruding force and act on the first roller shell (300) when being extruded by the second roller shell (400), so that the first roller shell (300) moves downward to the lower left and the second spring (900) is compressed.

6. The sliding window roller according to claim 1, wherein a top surface of the housing (100) is provided with positioning holes (260, 280).

7. The sliding window roller according to claim 1, wherein the bump (270) is configured to be engaged and fitted with the positioning holes (260, 280) in a form-fitting manner.

8. The sliding window roller according to claim 1, wherein the adjusting assembly (600) comprises an adjusting slider (601) and an adjusting nut (602), the adjusting slider (601) is movably arranged in the housing (100), the adjusting nut (602) is fixedly arranged in the adjusting slider (601), an adjusting screw (160) is rotatably arranged outside the housing (100), the adjusting slider (601) is internally provided with a hole, a screw stem of the adjusting screw (160) passes through the housing (100) and is screwed into the hole of the adjusting slider (601), and the adjusting nut (602) is movably arranged on the screw stem of the adjusting screw (160).

9. The sliding window roller according to claim 8, wherein a right side of the adjusting slider (601) is provided with a limiting groove (170), and the adjusting nut (602) is fixedly arranged in the limiting groove (170).

10. The sliding window roller according to claim 1, wherein a right end of the first roller shell (300) in a vertical direction is provided with a first groove (180), and a first convex strip (190) on a left side of the balance slider (500) is capable of being inserted into the first groove (180).

11. The sliding window roller according to claim 1, wherein a right end of the second roller shell (400) in a vertical direction is provided with a second groove (210), a second convex strip (220) is fixedly arranged on a left side of the adjusting assembly (600), and the second convex strip (220) is capable of being inserted into the second groove (210).

12. The sliding window roller according to claim 1, wherein a first rotating wheel (230) is rotatably arranged on the first roller shell (300), a second rotating wheel (240) is rotatably arranged on the second roller shell (400), and the first rotating wheel (230) and the second rotating wheel (240) pass through and protrude from a bottom of the housing (100).

13. The sliding window roller according to claim 1, wherein sliding protrusions (250) are fixedly arranged on both sides of the balance slider (500), a sliding slot (260) is arranged on a side

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surface of the housing (100), and the sliding protrusions (250) are capable of sliding in the sliding slot (260).

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DRAWINGS

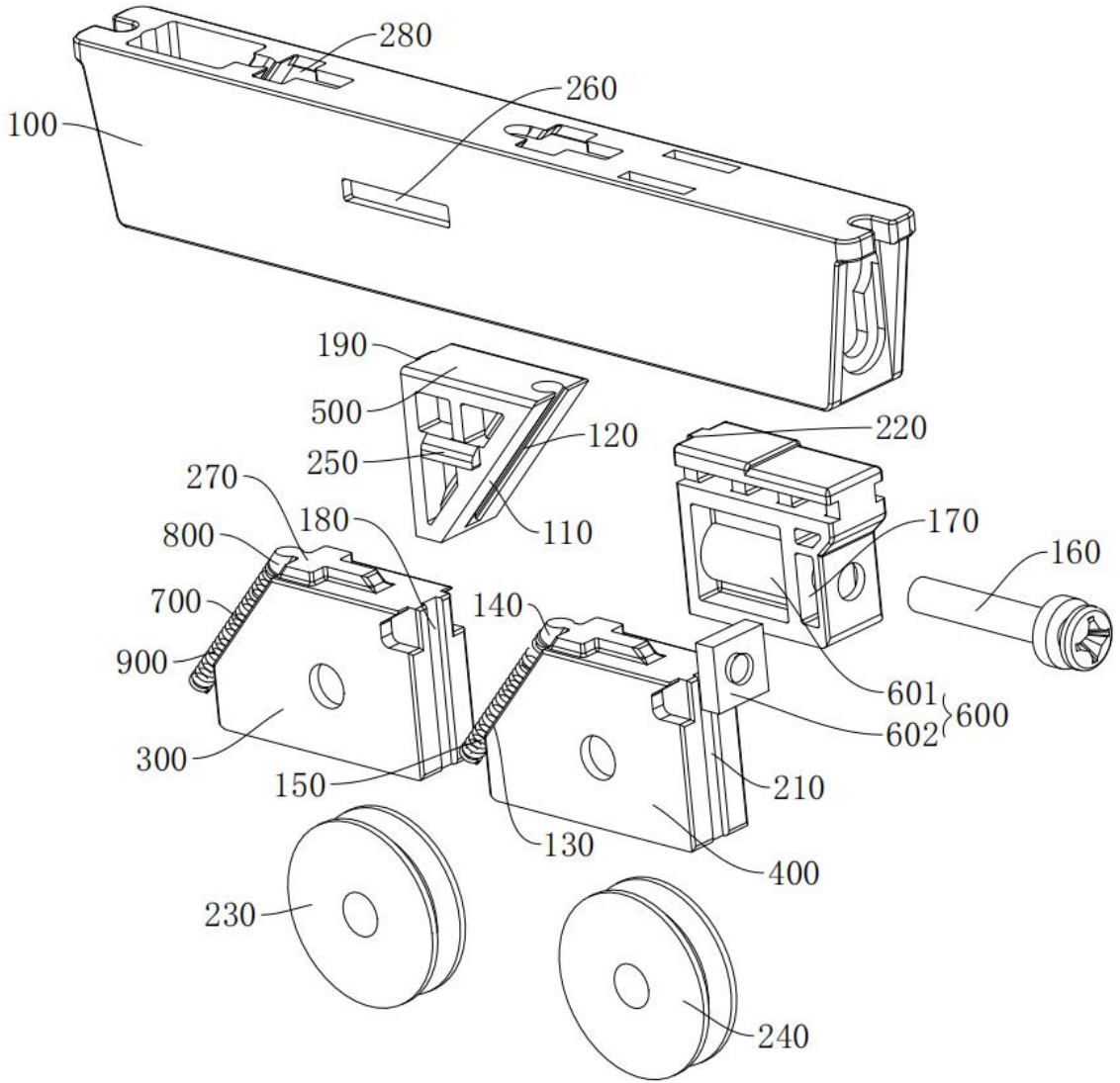


FIG. 1

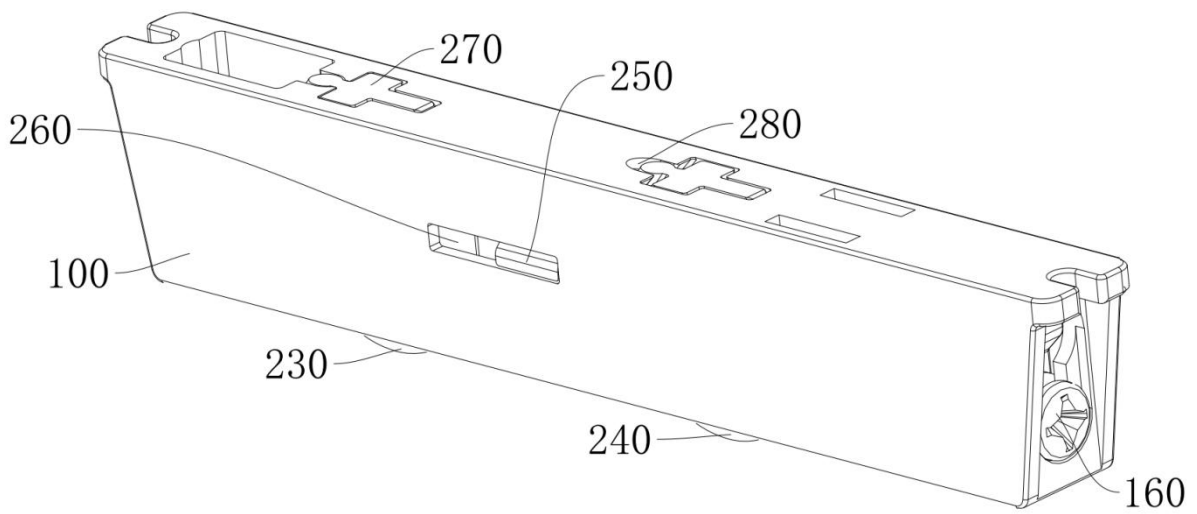


FIG. 2

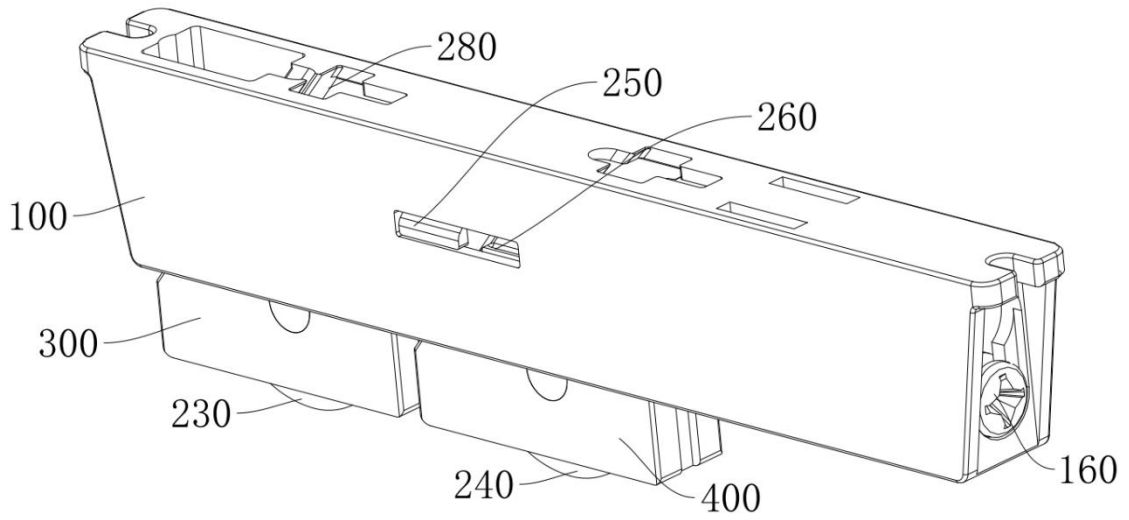


FIG. 3

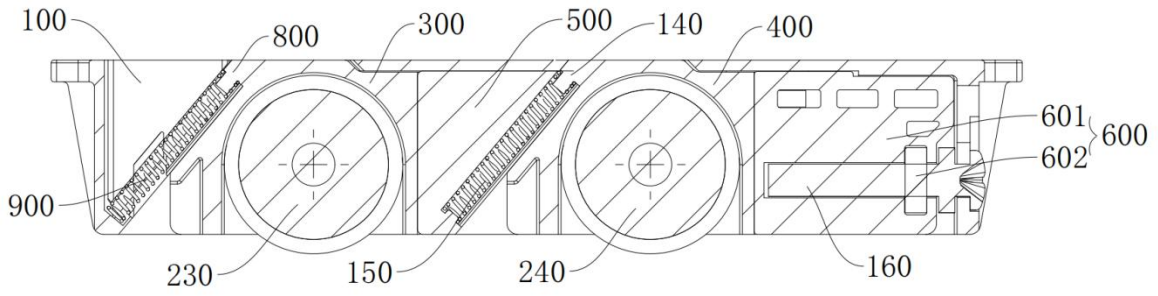


FIG. 4

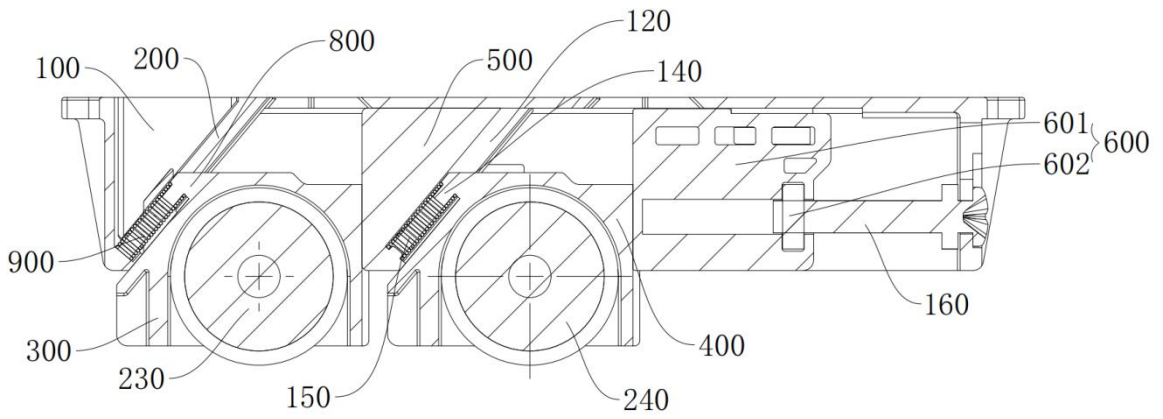


FIG. 5

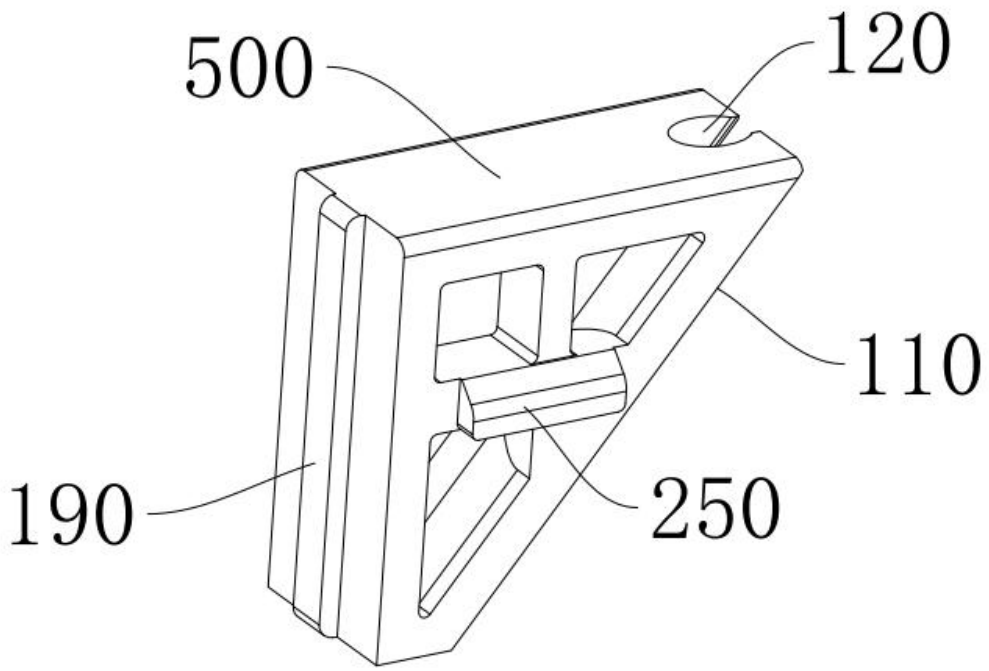


FIG. 6

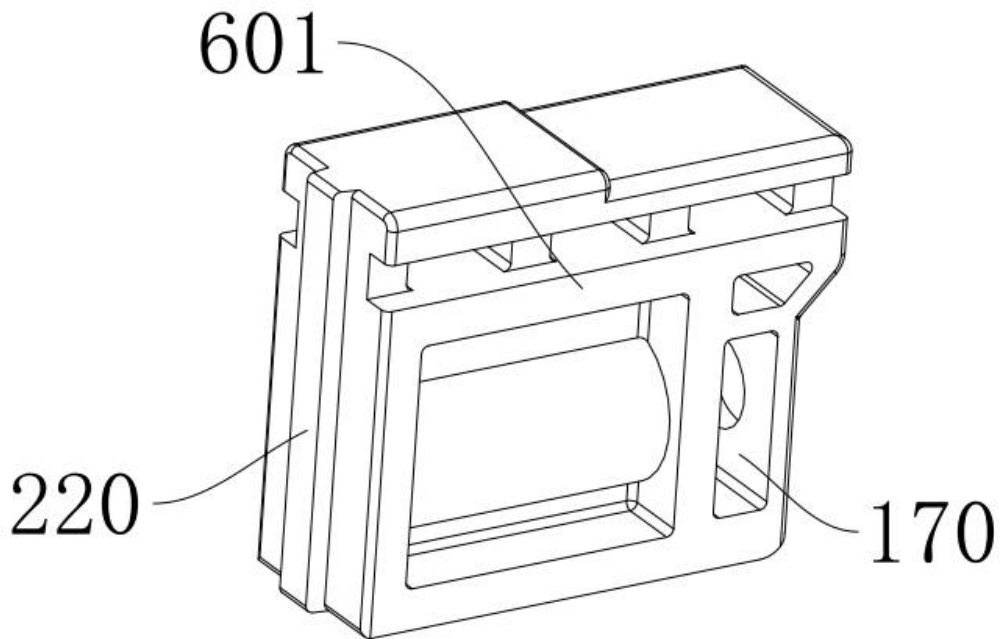


FIG. 7

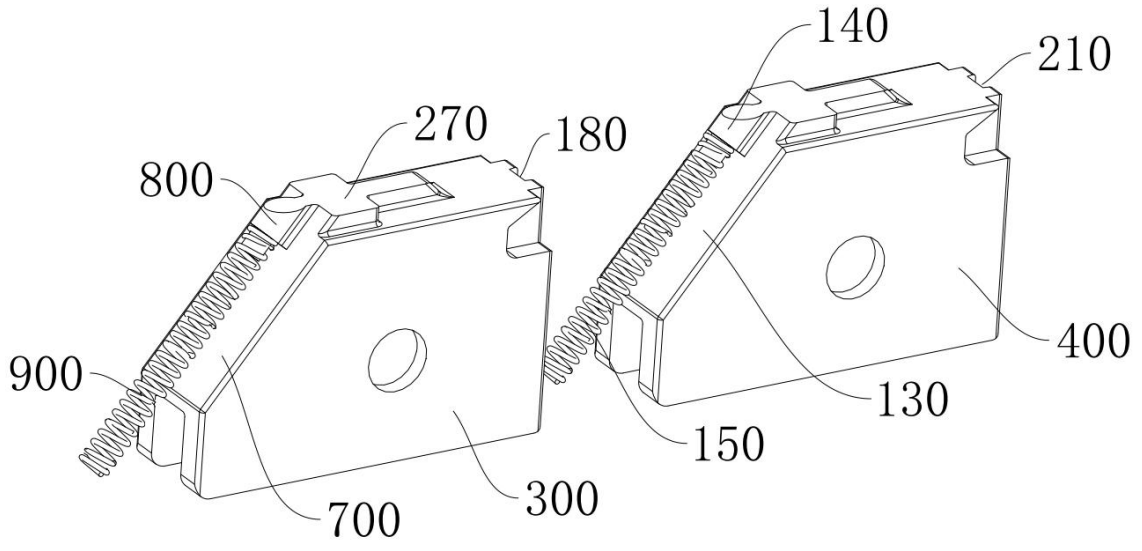


FIG. 8