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(54) SINGLE GEAR TYPE GUIDE MECHANISM FOR DRAWER DRAWING

(57) A single gear type guide mechanism for drawer drawing, comprising a fixed rail assembly (1), a movable rail assembly (2), and a middle rail assembly (4). The fixed rail assembly (1) and the middle rail assembly (4) are fitted in interlayers. The interlayers in which the middle rail assembly (4) and the movable rail assembly (2) are fitted are provided with sliding assemblies. A movable rail rack (20) is fixed on the movable rail assembly (2). A synchronous gear (40) is rotatably fixed on the middle rail assembly (4). One end of the synchronous gear (40) is engageably connected to the tooth wall of the movable rail rack (20), and the other end of the synchronous gear (40) is engageably connected to a fixed rail rack (10). The fixed rail rack (10) is fixed on the fixed rail assembly (1). The fixed rail rack (10) and the movable rail rack (20) are parallel to each other and disposed along the sliding direction of the movable rail assembly (2) and the middle rail assembly (4). Multiple guide rails are connected by means of gear engagement, so as to implement smooth linkage, reduce the noise during opening or closing by means of slide rails, and make the force applied during the entire opening or closing process uniform, thereby providing better use experience.

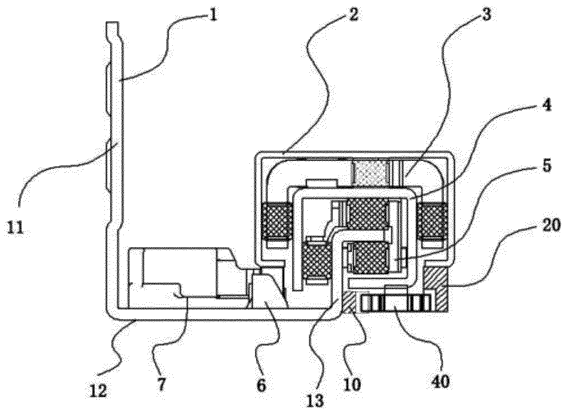

FIG. 1

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Description

TECHNICAL FIELD

[0001] The disclosure relates to drawer guide rail devices, in particular to a single-gear guide mechanism for pushing and pulling a drawer.

BACKGROUND

[0002] During the opening or closing process of a drawer with three sections of hidden slide rails, the pulling force and pushing force are not uniform and the pulling speed and pushing force are inconsistent. So abnormal noise will be generated, and the user experience will be poor.

[0003] Therefore, there is an urgent need to develop a drawer multi-section guide rail device that can maintain a substantially uniform speed and force and reduce abnormal noise during the process of opening or closing the drawer.

SUMMARY

[0004] The object of the disclosure is to provide a single-gear guide mechanism for pushing and pulling a drawer, so as to solve the above-mentioned problems in the background art.

[0005] To achieve the above object, the present disclosure provides the following technical solutions: A single-gear guide mechanism for pushing and pulling a drawer, including a fixed rail assembly, a movable rail assembly, and a middle rail assembly; wherein the middle rail assembly is slidably clamped on the fixed rail assembly; the movable rail assembly fixedly connecting to the drawer is slidably clamped on the middle rail assembly; characterized in that a sliding assembly is provided in each of a gap between the fixed rail assembly and the middle rail assembly and a gap between the middle rail assembly and the movable rail assembly; a movable rail rack is fixed on the movable rail assembly; a synchronous gear is rotatably provided on the middle rail assembly; one end of the synchronous gear is engaged with the movable rail rack, and an other end of the synchronous gear is engaged with a fixed rail rack; and the fixed rail rack is fixed on the fixed rail assembly; the fixed rail rack and the movable rail rack are parallel to each other and are arranged along a sliding direction of the movable rail assembly and the meddle rail assembly.

Further, the sliding assembly includes an upper ball retainer assembly slidably clamped between the movable rail assembly and the middle rail assembly, and a lower ball retainer assembly slidably clamped between the fixed rail assembly and the middle rail assembly; wherein each of a wall of the upper ball retainer assembly and a wall of the lower ball retainer assembly is provided with through holes; the through holes are rotatably provided with balls which are in a rolling contact with walls of the movable rail assembly and the middle rail assembly as well as walls of the fixed rail assembly and the middle rail assembly.

[0006] Further, the fixed rail assembly is rotatably provided with a supporting wheel configured to slidingly support the movable rail assembly; the supporting wheel is provided on the fixed rail assembly at intervals along a moving direction of the movable rail assembly.

[0007] Further, the fixed rail assembly includes a mounting plate, a supporting plate and a snap plate; the mounting plate is fixed on a slot wall of a drawer slot of a cabinet, and the supporting plate is horizontally fixed on a bottom of the mounting plate; the snap plate is vertically fixed on an extension end of the supporting plate; a top of the snap plate is provided with a horizontal plate configured to support the middle rail assembly.

[0008] Further, the middle rail assembly is sleeved on the snap plate, the movable rail assembly is sleeved on a top surface and front and rear side walls of the middle rail assembly; the sliding assembly is provided on each of an inner wall of the middle rail assembly, a side wall of the snap plate, a top surface and a bottom surface of of the horizontal plate, and top surfaces and front and rear outer walls of the movable rail component and the middle rail component.

[0009] Compared with the prior arts, the beneficial effects of the present disclosure are as follows:

The multi-section guide rails in the present disclosure are connected by gear meshing connection, which can realize smooth linkage and reduce the noise and the entire pushing and pulling force during the opening or closing process of the drawer. In such a way, a better experience is achieved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

FIG. 1 is a structural schematic diagram of a first embodiment of a single-gear guide mechanism for pushing and pulling a drawer.

FIG. 2 is a bottom perspective view of the single-gear guide mechanism for pushing and pulling a drawer.

FIG. 3 is a top perspective view of the single-gear guide mechanism for pushing and pulling a drawer.

FIG. 4 is an enlarged view of portion A in FIG. 3.

FIG. 5 is a top perspective view of the single-gear guide mechanism for pushing and pulling a drawer installed in a drawer and a drawer slot of a cabinet.

FIG. 6 is a bottom perspective view of the single-gear guide mechanism for pushing and pulling a drawer installed in the drawer and the drawer slot of the cabinet.

FIG. 7 a structural schematic diagram of a second embodiment of a single-gear guide mechanism for pushing and pulling a drawer.

In the figures: 1, fixed rail assembly; 10, fixed rail rack; 11, mounting plate; 12, supporting plate; 13, snap plate; 2, movable rail assembly; 20, movable rail rack; 3, upper ball retainer assembly; 30, through hole; 31, ball; 4, middle rail assembly; 40, synchronous gear; 5, lower ball retainer assembly; 6, supporting wheel; 7, buffer assembly.

DETAILED DESCRIPTION

[0011] The technical solutions in the embodiments of the present disclosure will be clearly and completely described below with reference to the accompanying drawings in the embodiments of the present disclosure. Obviously, the described embodiments are only a part of the embodiments of the present disclosure, but not all of the embodiments. Based on the embodiments of the present disclosure, all other embodiments obtained by those of ordinary skill in the art without creative efforts shall fall within the protection scope of the present disclosure.

Embodiment 1

[0012] Referring to FIGS. 1 to 6, in an embodiment of the present disclosure, a single-gear guide mechanism for pushing and pulling a drawer includes a fixed rail assembly 1, a movable rail assembly 2 and a middle rail assembly 4. The middle rail assembly 4 is slidably clamped on the fixed rail assembly 1. The movable rail assembly 2 fixedly connecting to a drawer is slidably clamped on the middle rail assembly 4. A sliding assembly is provided in each of a gap between the fixed rail assembly 1 and the middle rail assembly 4 and a gap between the middle rail assembly 4 and the movable rail assembly 2. The movable rail rack 20 is fixed on the movable rail assembly 2. A synchronous gear 40 is rotatably provided on the middle rail assembly 4. One end of the synchronous gear 40 is engaged with the movable rail rack 20, and an other end of the synchronous gear 40 is engaged with the fixed rail rack 10; and the fixed rail rack 10 is fixed on the fixed rail assembly 1. The fixed rail rack 10 and the movable rail rack 20 are parallel to each other and are arranged along a sliding direction of the movable rail assembly 2 and the meddle rail assembly 4. The sliding assembly includes an upper ball retainer assembly 3 slidably clamped between the movable rail assembly 2 and the middle rail assembly 4 and a lower ball retainer assembly 5 slidably clamped between the fixed rail assembly 1 and the middle rail assembly 4. Each of a wall of the upper ball retainer assembly 3 and a wall of the lower ball retainer assembly 5 is provided with through holes 30; the through holes 30 are rotatably provided with balls 31 which are in a rolling contact with walls of the movable rail assembly 2 and the middle rail assembly 4 as well as walls of the fixed rail assembly 1 and the middle rail assembly 4. The balls 31 are configured to slidably support an outer wall of the fixed rail assembly 1 and an inner wall of the middle rail assembly 4, as well as an inner wall of the movable rail assembly 2 and an outer wall of the middle rail assembly 4, such that the middle rail assembly 4 can be sleeved on the fixed rail assembly 1 for sliding, and the movable rail assembly 2 can be sleeved on the middle rail assembly 4 for sliding.

[0013] The fixed rail assembly 1 is rotatably provided with a supporting wheel 6 configured to slidingly support the movable rail assembly 2. The supporting wheel 6 is provided on the fixed rail assembly 1 at intervals along a moving direction of the movable rail assembly 2. The supporting wheel 6 can improve sliding smoothness of the movable rail assembly 2.

The fixed rail assembly 1 includes a mounting plate 11, a supporting plate 12 and a snap plate 13. The mounting plate 11 is fixed on a slot wall of a drawer slot of a cabinet, and the supporting plate 12 is horizontally fixed on a bottom of the mounting plate 11. The snap plate 13 is vertically fixed on an extension end of the supporting plate 12. A top of the snap plate 13 is provided with a horizontal plate configured to support the middle rail assembly 4. The mounting plate 11 is configured to fix the fixed rail assembly 1 as a whole. The supporting plate 12 is configured to provide a mounting support surface for the movable rail assembly 2 and the middle rail assembly 4. The snap plate 13 is configured to slidably clamped to the middle rail assembly 4.

[0014] The middle rail assembly 4 is sleeved on the snap plate 13, the movable rail assembly 2 is sleeved on a top surface and front and rear side walls of the middle rail assembly 4. The sliding assembles are provided on an inner wall of the middle rail assembly 4, a side wall of the snap plate 13, a top surface and a bottom surface of of the horizontal plate, and top surfaces and the front and rear outer walls of the movable rail component 2 and the middle rail component 4. A buffer assembly 7 is provided on a top of the supporting plate 12.

[0015] The working principle of the present disclosure is as follows: in actual use, the fixed rail assembly 1 is installed on two side walls of the drawer slot of the cabinet, and the movable rail assembly 2 is fixed on each side of the bottom surface of the drawer. The fixed rail assembly 1 is provided with a fixed rail rack 10, the middle rail assembly 4 is provided with a synchronous gear 40, and the movable rail assembly 2 is provided with a movable rail rack 20. When the movable rail assembly 2 operates, the movable rail rack 20 on the movable rail assembly 4 drives the synchronous gear 40 on the middle rail assembly 4 to rotate, and the synchronous gear 40 meshes with the fixed rail rack 10 on the fixed rail assembly 1, thereby pushing the middle rail assembly 4 to move at half of a speed of the movable rail assembly 2. It can reduce the noise and balance an entire opening or closing force during opening or closing of the drawer, thereby achieving a better experience.

Embodiment 2

[0016] Please refer to FIG. 7, the differences between Embodiment 2 and Embodiment 1 are as follows.

[0017] The movable rack 20, the synchronous gear 40 and the fixed rail rack 10 are installed at an area near the inner side of the snap plate 13. A bottom edge of the inner side wall of the middle rail assembly 4 is slidably supported on the top surface of the movable rack 20. The supporting wheel 6 is omitted. The movable rail rack 20, the synchronous gear 40 and the fixed rail rack 10 are moved to a side of the mounting plate 11, such that the overall pressure of the fixed rail assembly 1 are transferred to the side of the mounting plate 11. The supporting plate 12 is prevented from being deformed by the gravity of the drawer, thereby improving the durability of the fixed rail assembly 1, and reducing the number of components.

[0018] It will be apparent to those skilled in the art that the present disclosure is not limited to the details of the above-described exemplary embodiments, and the present disclosure may be embodied in other specific forms without departing from the spirit or essential characteristics of the disclosure. Therefore, the embodiments are to be regarded in all respects as illustrative and not restrictive, and the scope of the disclosure is to be defined by the appended claims rather than the foregoing description. All changes within the meaning and scope of the equivalents of the claims are included in the present disclosure. Any reference signs in the claims shall not be construed as limiting the involved claim.

[0019] In addition, it should be understood that although this specification is described in terms of embodiments, not each embodiment only includes one independent technical solution. The description is only for clarity, and those skilled in the art should take the specification as a whole, the technical solutions in each embodiment can also be appropriately combined to form other embodiments that can be understood by those skilled in the art.

Claims

1. A single-gear guide mechanism for pushing and pulling a drawer, comprising

   a fixed rail assembly (1),
   a movable rail assembly (2), and
   a middle rail assembly (4); wherein
   the middle rail assembly (4) is slidably clamped on the fixed rail assembly (1); the movable rail assembly (2) fixedly connecting to the drawer is slidably clamped on the middle rail assembly (4);
   characterized in that
   a sliding assembly is provided in each of a gap between the fixed rail assembly (1) and the middle rail assembly (4) and a gap between the middle rail assembly (4) and the movable rail assembly (2); a movable rail rack (20) is fixed on the movable rail assembly (2); a synchronous gear (40) is rotatably provided on the middle rail assembly (4); one end of the synchronous gear (40) is engaged with the movable rail rack (20), and an other end of the synchronous gear (40) is engaged with a fixed rail rack (10); and the fixed rail rack (10) is fixed on the fixed rail assembly (1); the fixed rail rack (10) and the movable rail rack (20) are parallel to each other and are arranged along a sliding direction of the movable rail assembly (2) and the meddle rail assembly (4).

2. The single-gear guide mechanism of claim 1, **characterized in that** the sliding assembly comprises

   an upper ball retainer assembly (3) slidably clamped between the movable rail assembly (2) and the middle rail assembly (4), and
   a lower ball retainer assembly (5) slidably clamped between the fixed rail assembly (1) and the middle rail assembly (4); wherein
   each of a wall of the upper ball retainer assembly (3) and a wall of the lower ball retainer assembly (5) is provided with through holes (30);
   the through holes (30) are rotatably provided with balls (31) which are in a rolling contact with walls of the movable rail assembly (2) and the middle rail assembly (4) as well as walls of the fixed rail assembly (1) and the middle rail assembly (4).

3. The single-gear guide mechanism of claim 1, **characterized in that** the fixed rail assembly (1) is rotatably provided with a supporting wheel (6) configured to slidingly support the movable rail assembly (2); the supporting wheel (6) is provided on the fixed rail assembly (1) at intervals along a moving direction of the movable rail assembly (2).

4. The single-gear guide mechanism of any one of claims 1-3, **characterized in that** the fixed rail assembly (1) comprises a mounting plate (11), a supporting plate (12) and a snap plate (13); the mounting plate (11) is fixed on a slot wall of a drawer slot of a cabinet, and the supporting plate (12) is horizontally fixed on a bottom of the mounting plate (11); the snap plate (13) is vertically fixed on an extension end of the supporting plate (12); a top of the snap plate (13) is provided with a horizontal plate configured to support the middle rail assembly (4).

5. The single-gear guide mechanism of claim 4, **characterized in that** the middle rail assembly (4) is sleeved on the snap plate (13), the movable rail assembly (2) is sleeved on a top surface and front and rear side walls of the middle rail assembly (4); the

sliding assembly is provided on each of an inner wall of the middle rail assembly (4), a side wall of the snap plate (13), a top surface and a bottom surface of of the horizontal plate, and top surfaces and front and rear outer walls of the movable rail component (2) and the middle rail component (4).

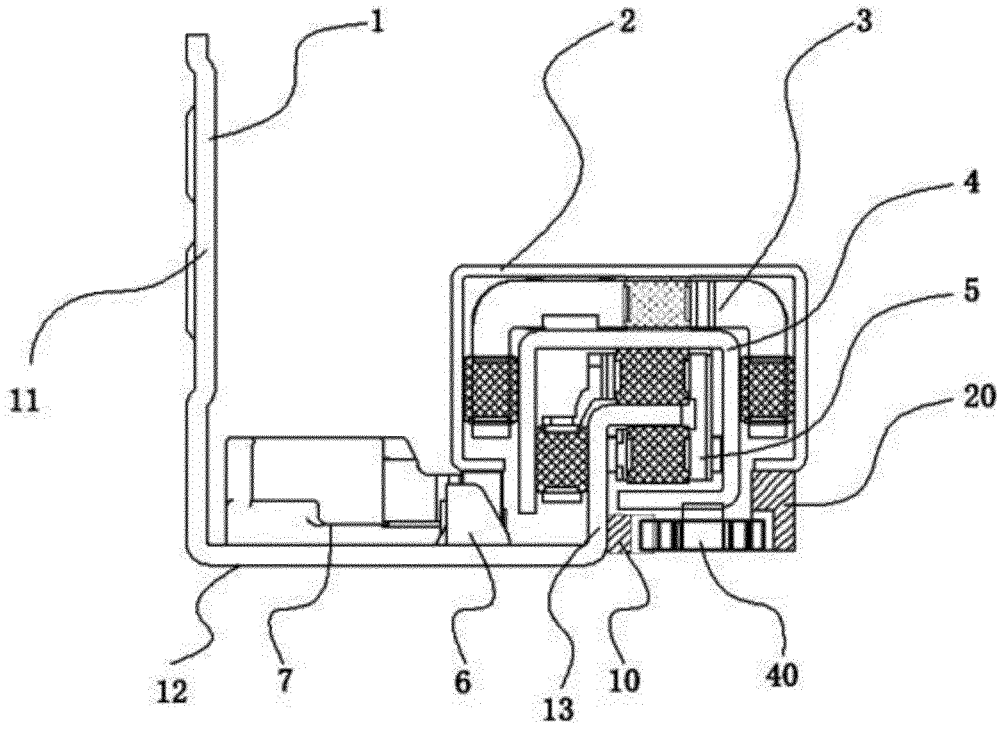

FIG. 1

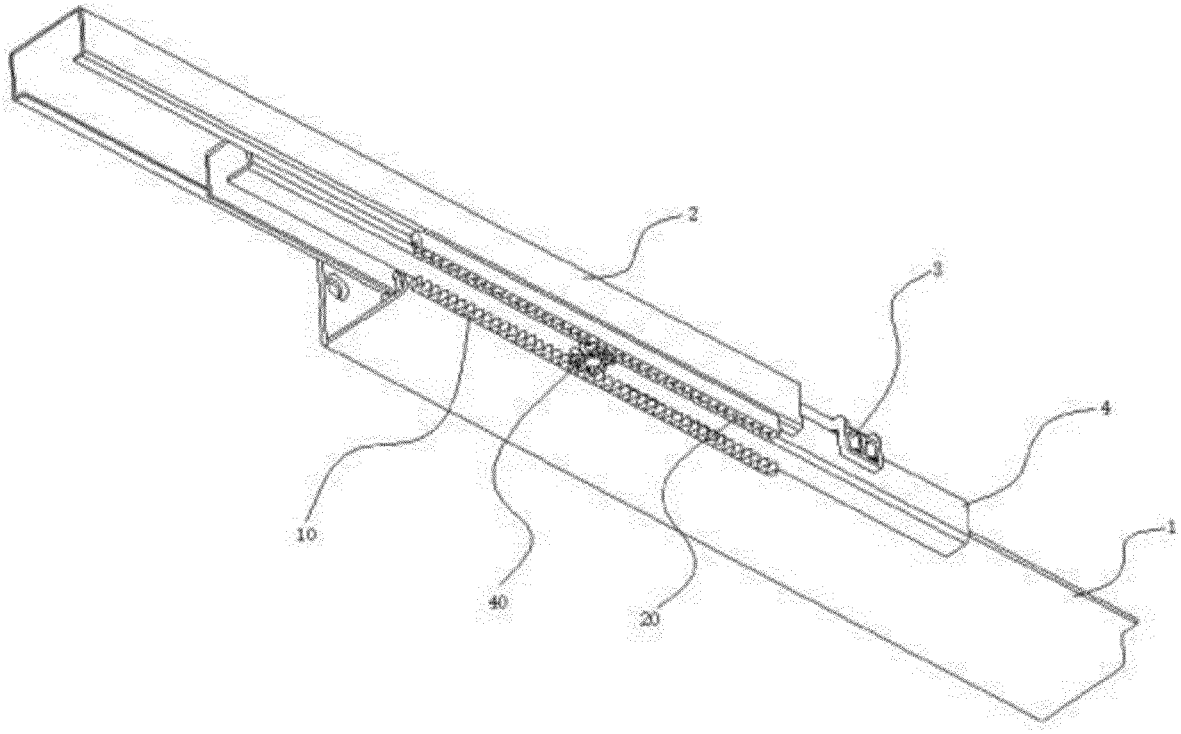

FIG. 2

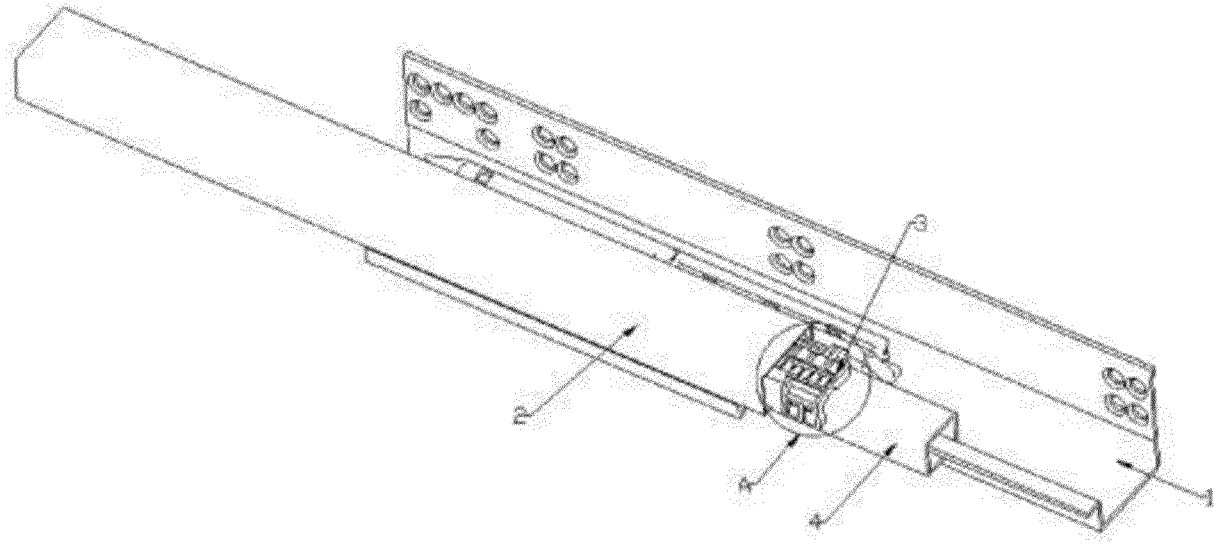

FIG. 3

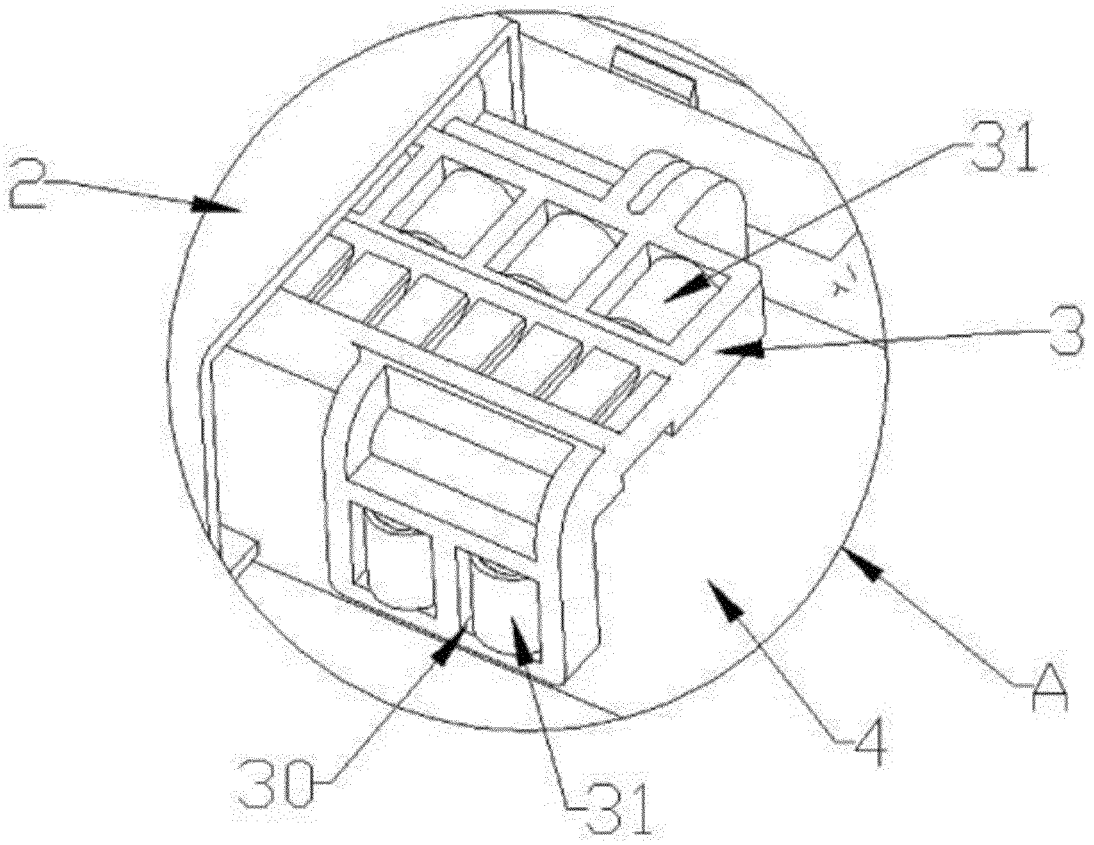

FIG. 4

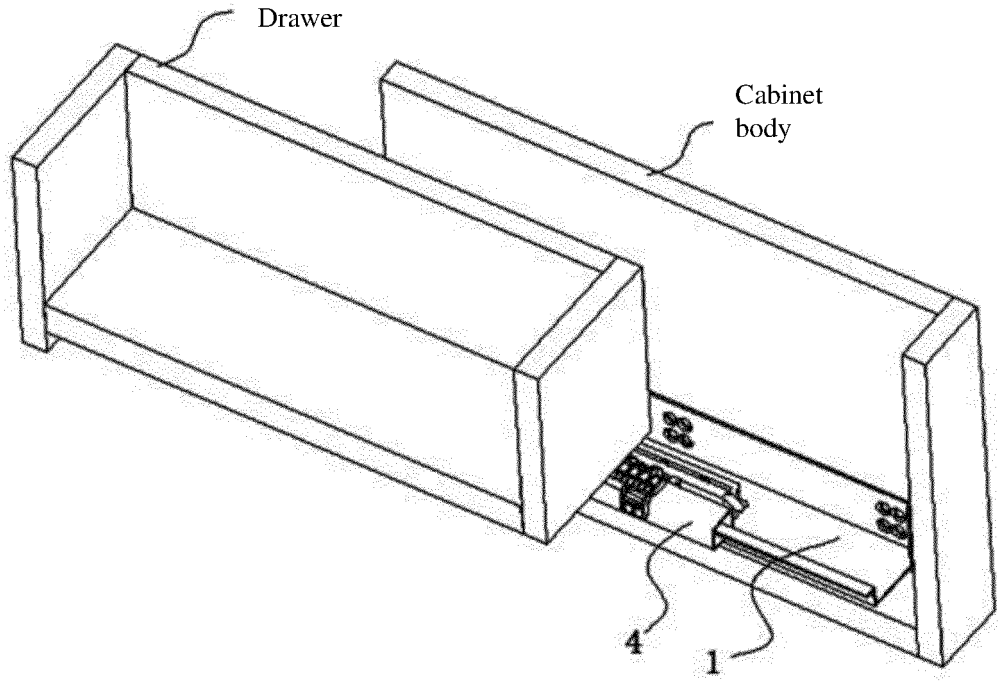

FIG. 5

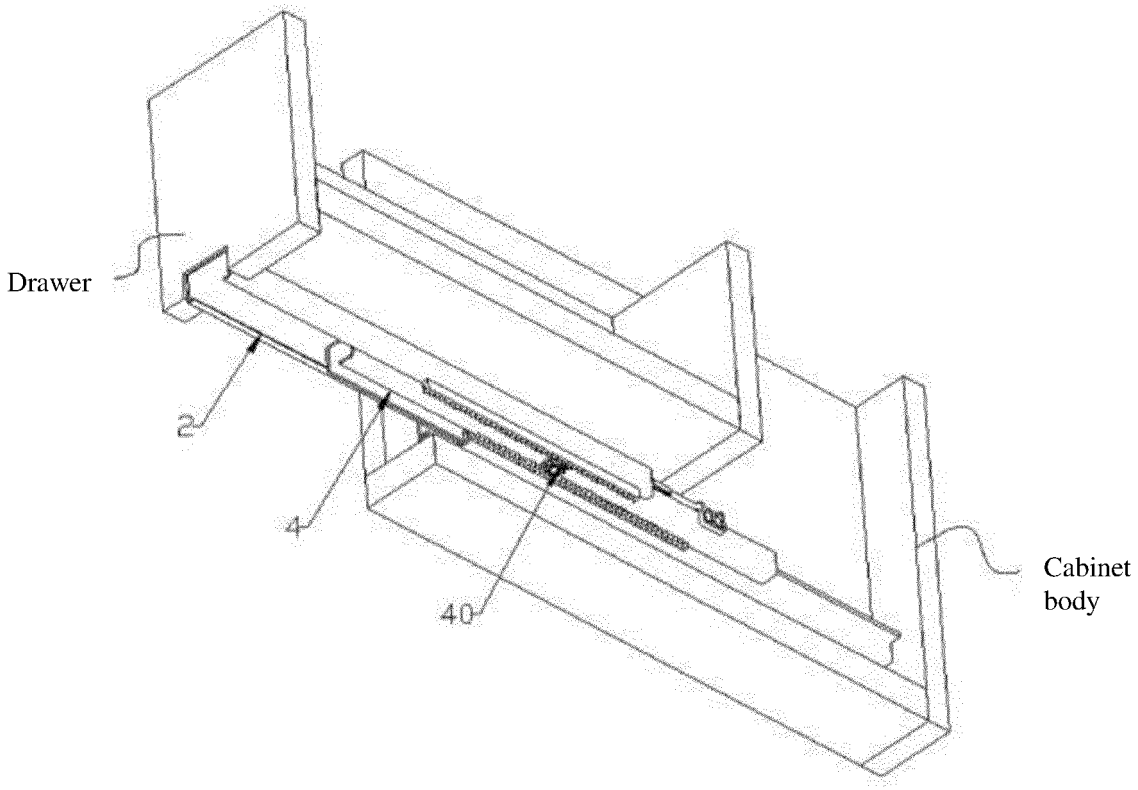

FIG. 6

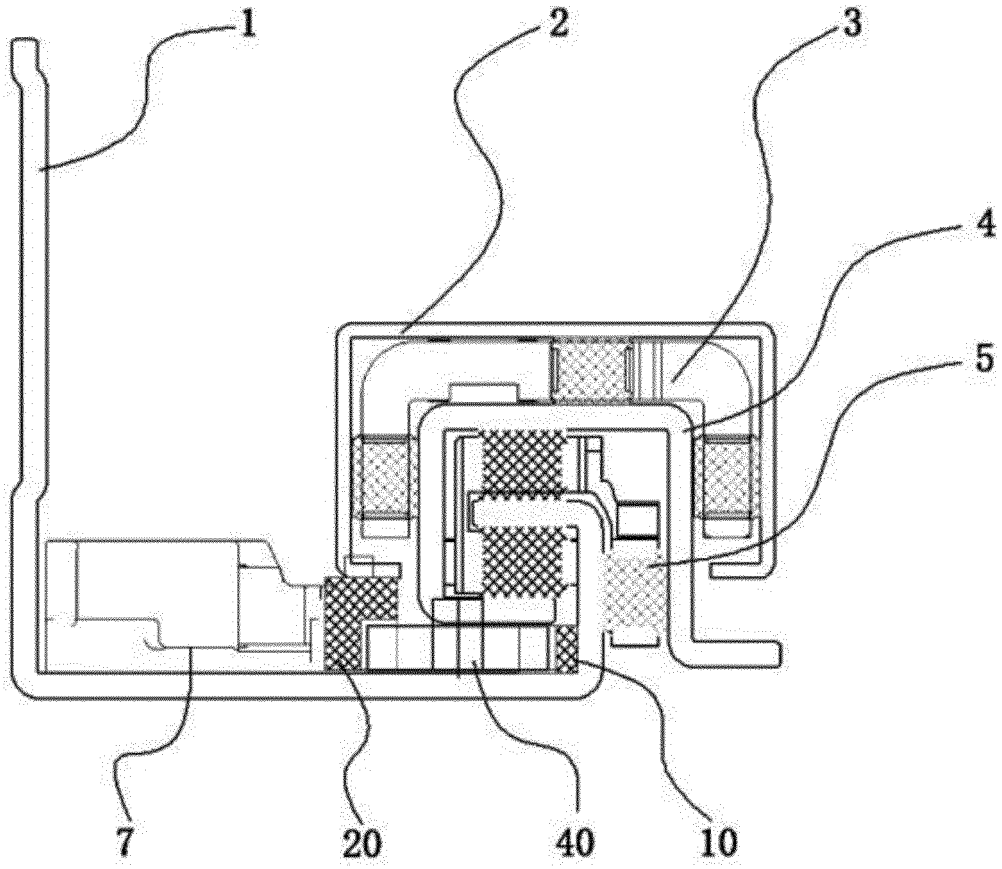

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/094617

A. CLASSIFICATION OF SUBJECT MATTER

A47B 88/40(2017.01)i; A47B 88/49(2017.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A47B88/-

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI; EPODOC; CNKI; CNPAT: 抽屉, 抽拉, 轮式, 引导, 同步, 齿轮, 齿条, 拟合, 固定, 活动, 滑动, 导轨, gear, guide, drawer, fixed, rail, race, movable, slid+, synchronous

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	CN 110464142 A (GUANGDONG KUBO PRECISION TECH CO., LTD.) 19 November 2019 (2019-11-19) description, paragraphs [0004]-[0027], and figures 1-7	1-5
A	CN 110367713 A (GUANGDONG TAIMING METAL PRODUCTS CO., LTD.) 25 October 2019 (2019-10-25) entire document	1-5
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A	CN 1362866 A (JULIUS BLUM GMBH) 07 August 2002 (2002-08-07) entire document	1-5
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A	EP 3378354 A1 (KING SLIDE WORKS CO., LTD. et al.) 26 September 2018 (2018-09-26) entire document	1-5

☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
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Date of the actual completion of the international search	Date of mailing of the international search report
02 September 2020	**28 September 2020**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088** **China**	Authorized officer
Facsimile No. **(86-10)62019451**	Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/094617

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2020/094617

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CN	208807874	U	03 May 2019	None			

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