



(11)

EP 4 818 446 A1

(12)

EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:
07.10.2026 Bulletin 2026/41

(51) International Patent Classification (IPC):
E05D 13/00 (2006.01)

(21) Application number: **23960012.5**

(86) International application number:
PCT/CN2023/138285

(22) Date of filing: **13.12.2023**

(87) International publication number:
WO 2025/112109 (05.06.2025 Gazette 2025/23)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

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(30) Priority: **01.12.2023 CN 202311644192**

(54) **GUIDE ROLLER STRUCTURE OF BYPASS SLIDING DOOR AND CABINET BODY HAVING SAME**

(57) The present invention discloses a guide roller structure for coplanar sliding door and a cabinet having the same, including: a first guide roller mechanism configured to slide along a first guide track on an inner side of a sliding door body; a second guide roller mechanism configured to slide along a second guide track on an upper side wall or a lower side wall inside a cabinet body; a first support member, an end of the first support member being connected to the first guide roller mechanism; a second support member, an end of the second support member being hinged to an opposite end of the first support member, and an opposite end of the second

support member being hinged to the second guide roller mechanism; where the first support member and/or the second support member is provided with a limiting structure for limiting a hinge rotation angle, so that a maximum angle remains constant during sliding of the first guide roller mechanism and/or during sliding of the second guide roller mechanism. The present invention may solve the problem of space occupation of a guide roller inside a cabinet, and at the same time, a limiting structure is provided at a hinge joint, so that the guide roller remains relatively stable during sliding, thereby improving stability during movement of the sliding door body.

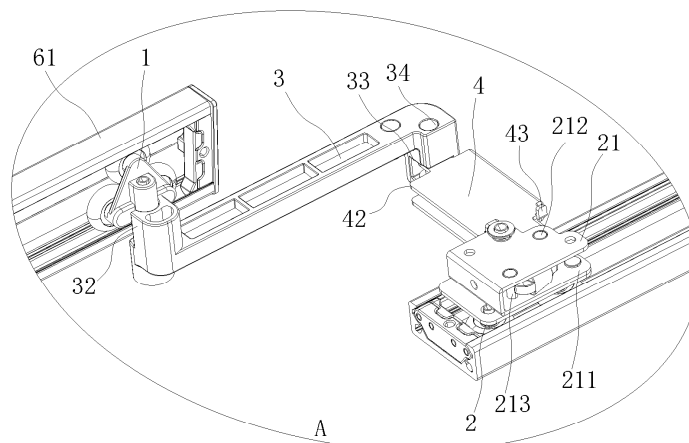


FIG. 4

Description

TECHNICAL FIELD

[0001] The present invention relates to the technical field of guide rollers for coplanar sliding door bodies, and in particular, to a guide roller structure for coplanar sliding door and a cabinet having the same.

BACKGROUND

[0002] Among various opening modes of home cabinet doors, the sliding door body is a relatively common mode with a high space utilization rate, and is greatly favored. When a sliding door body is closed with multiple door panels, all the door panels are in a same plane, the cabinet has good airtightness, and the appearance is neat and attractive. When the sliding door body is opened, the door panels are staggered with each other; therefore, a track along which the door panels move during opening needs to meet specific requirements.

[0003] For a sliding door body, the sliding of the door body needs to be completed by rollers, and the rollers are mounted at upper and lower ends of the door body, where rollers at one end play a guiding role for the door body, and rollers at the other end play a load-bearing and pushing/pulling role for the door body. In existing rollers playing a guiding role, in order to prevent jamming, the connection between a fixing box and a guide connecting rod is movable; therefore, when the door panel is opened, an end of the door panel provided with the guide roller is prone to shaking, affecting use experience and structural stability. A solution in an existing patent, as shown in patent CN111119630A, adopts two support mechanisms for stable sliding, and the structure is complex and occupies a relatively large internal space of the cabinet, causing certain discomfort to a user in use of the cabinet.

SUMMARY

[0004] In order to overcome at least one of the defects described in the prior art, the present invention provides a guide roller structure for a coplanar sliding door and a cabinet having the same. The space occupation problem of the guide roller in the cabinet may be solved, and a limiting structure is provided at a hinge joint, which may limit a hinge angle, so that relative stability of a first support member and a second support member is maintained when the guide roller slides, thereby improving stability of a sliding door body during movement.

[0005] The technical solution adopted by the present invention to solve the problem is as follows:

[0006] A guide roller structure for a coplanar sliding door, including: a first guide roller mechanism, the first guide roller mechanism configured to slide along a first guide track on an inner side of a sliding door body; a second guide roller mechanism, the second guide roller mechanism configured to slide along a second guide

track on an upper side wall or a lower side wall in a cabinet body; a first support member, an end of the first support member connected to the first guide roller mechanism; a second support member, an end of the second support member hinged to an opposite end of the first support member, and an opposite end of the second support member hinged to the second guide roller mechanism; where the first support member and/or the second support member is provided with a limiting structure configured to limit a hinge rotation angle, so that a maximum angle between the first support member and the second support member remains constant when the first guide roller mechanism slides and/or the second guide roller mechanism slides.

[0007] By adopting the above solution, when the first guide roller mechanism and the second guide roller mechanism slide in the same direction, rotation between the first support member and the second support member is limited by the limiting structure, thereby achieving a stable support effect, ensuring that the first guide roller mechanism and the second guide roller mechanism do not shake during sliding, and the overall structure is aesthetically pleasing and occupies less space.

[0008] Further, a connection between the end of the first support member and the first guide roller mechanism is provided with a compliant structure, the compliant structure including a first extension edge and a second extension edge located on two sides of a hinge joint, and in the first extension edge and the second extension edge, one abuts against the first guide roller mechanism, and the other has a gap with the first guide roller mechanism, so that the first support member has space to rotate in a direction distal to the first guide roller mechanism.

[0009] By adopting the above solution, the gap may provide a certain rotation fine-tuning space between the first guide roller mechanism and the first support member, to prevent the problem of guide roller jamming and improve smoothness of guide roller sliding.

[0010] Further, the limiting structure includes a second limiting structure located at the opposite end of the first support member or the end of the second support member, the second limiting structure including a third extension edge and a fourth extension edge located on two sides of the hinge joint, and/or the limiting structure includes a third limiting structure located at the opposite end of the second support member, the third limiting structure including a fifth extension edge and a sixth extension edge located on two sides of the hinge joint.

[0011] By adopting the above solution, the rotation angle between the first support member and the second support member may be limited, so when the first guide roller mechanism and the second guide roller mechanism slide in one direction, relative stability between the first support member and the second support member may be maintained, thereby providing a stable support effect.

[0012] Further, the third extension edge and the fourth extension edge control a maximum angle of rotation between the second support member and the first sup-

port member to be 90°, and/or the fifth extension edge and the sixth extension edge control a maximum angle of rotation between the second support member and the second guide roller mechanism to be 90°.

[0013] By adopting the above solution, it is beneficial to control a maximum hinge rotation range between the second support member and the second guide roller mechanism to be 90°, achieving rotation stability between the first support member and the second support member, and between the second support member and the second guide roller mechanism, thereby completing a folding or extending effect.

[0014] Further, the second support member and the second guide roller mechanism are provided with an elastic stay, an end of the elastic stay is rotatably connected to the second support member, and an opposite end is rotatably connected to the second guide roller mechanism, and the elastic stay is configured to provide, to the end of the second support member, a support force that prevents rotation in a sliding direction of the second guide roller mechanism.

[0015] By adopting the above solution, a certain pushing force may be provided to the second support member when the first guide roller mechanism and the second guide roller mechanism slide, thereby maintaining a constant hinge angle between the second support member and the second guide roller mechanism.

[0016] Further, the elastic stay includes: an assembly housing, an end of the elastic assembly being recessed to form an accommodating cavity, and an opposite end being provided with a first bayonet, the first bayonet being rotatably connected to the second guide roller mechanism; an insertion member, an end of the insertion member inserted into the accommodating cavity, and an opposite end being provided with a second bayonet, the second bayonet being rotatably connected to the second support member; an elastic member, the elastic member located between the accommodating cavity and the insertion member, configured to provide elastic force to both sides.

[0017] By adopting the above solution, stable elastic forces on two sides may be provided.

[0018] Further, an assembly plate is further provided between the second support member and the second guide roller mechanism, the assembly plate having an assembly cavity, and the opposite end of the second support member and the elastic stay are located in the assembly cavity.

[0019] By adopting the above solution, the assembly plate is used to limit a direction of the elastic force of the elastic stay, and hinge stability between the second support member and the second guide roller mechanism, avoiding a force perpendicular to the direction of the elastic force of the elastic stay caused by excessive force during rotation.

[0020] Further, the first guide roller mechanism and the second guide roller mechanism each include: a roller base plate; at least two rollers, the rollers assembled on the roller base plate, and wheel axes of the rollers

perpendicular to the roller base plate, and the two or more rollers having relatively stable guide surfaces, configured to roll along side walls of the first guide track or the second guide track.

[0021] By adopting the above solution, by designing the first guide roller mechanism and the second guide roller mechanism to have two guide surfaces, the first guide roller mechanism and the second guide roller mechanism may slide more stably in the first guide track and the second guide track, with more uniform force, thus leading to a smoother sliding effect.

[0022] A cabinet with guide roller structure for coplanar sliding door, including a cabinet body, a sliding door body, a first guide track, a second guide track, a load-bearing guide track, a load-bearing roller assembly, and a guide roller structure for coplanar sliding door, where the load-bearing guide track is assembled at a bottom of the cabinet body, the first guide track is mounted on an upper side wall within the cabinet body, the second guide track is mounted above an inner side wall of the sliding door body, a lower portion of the sliding door body is connected to the load-bearing roller assembly, the load-bearing roller assembly slides along the load-bearing guide track, configured to drive the sliding door body to move, and the first support member and the second support member maintain a certain angle and slide along the first guide track and/or the second guide track, configured to provide sliding guidance for an upper portion of the sliding door body.

[0023] By adopting the above solution, the angle between the first support member and the second support member may be controlled to remain stable upon the sliding door body opening and translating, thereby providing a stable support and guide function for the sliding door body, greatly improving the opening stability of the sliding door body, and reducing shaking of the sliding door body itself.

[0024] Further, an adjustable stop is provided proximate to an end within the second guide track, a recess configured to accommodate the second support member is reserved between the adjustable stop and the end portion, the adjustable stop is configured to control a maximum sliding distance of the second guide roller mechanism in the second guide track, so that a sliding distance of the sliding door body upon opening or closing is equal to a sum of a distance of the first guide roller mechanism sliding in the first guide track, a distance of the first guide roller mechanism sliding in the second guide track, and an arc length distance of the second support member rotating relative to the second guide roller mechanism, and the sliding door body retracts into the cabinet upon being retracted by the load-bearing roller assembly, so that the second support member rotates into the recess and aligns with the second guide track.

[0025] By adopting the above solution, a folding and retracting effect of the second support member may be achieved.

[0026] In summary, a guide roller structure for coplanar sliding door and a cabinet having the same provided by the present invention have the following technical effects:

[0027] 1. By providing a limiting structure at an end junction of the first support member and/or an end junction of the second support member, the rotation angle between the first support member and the second support member may be kept convenient upon the first guide roller mechanism and/or the second guide roller mechanism sliding, thereby improving support stability of the first support member and the second support member for the sliding door body, and reducing shaking of the sliding door body during the door opening process;

[0028] 2. By providing an elastic stay between the second support member and the second guide roller mechanism, a certain abutting force may be provided for the second support member, preventing the second support member from retracting and rotating during the sliding process, and improving support stability of the second support member upon the sliding door body being in a closed state;

[0029] 3. The connection structure of the first support member and the second support member is simple, occupies a small space in the cabinet, and accounts for a relatively small proportion of the space exposed to a user's field of view, greatly improving the user's experience.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030]

FIG. 1 is a schematic three-dimensional structural diagram of a cabinet of an embodiment of the present invention;

FIG. 2 is a schematic three-dimensional structural diagram of a bottom of the cabinet of an embodiment of the present invention;

FIG. 3 is a schematic three-dimensional structural diagram of a guide roller of an embodiment of the present invention;

FIG. 4 is an enlarged view of area A in FIG. 3;

FIG. 5 is a schematic exploded structural diagram of the guide roller of an embodiment of the present invention;

FIG. 6 is an enlarged view of area B in FIG. 5;

FIG. 7 is an enlarged view of area C in FIG. 5;

FIG. 8 is an enlarged view of area D in FIG. 5;

FIG. 9 is a state diagram of a guide roller structure in an open door state of an embodiment of the present invention;

FIG. 10 is a state diagram of the guide roller structure in a closed door state of an embodiment of the present invention.

[0031] The meanings of the reference signs are as follows: 1, first guide roller mechanism; 11, roller base plate; 12, roller; 13, first guide roller hinge portion; 131,

first guide roller hinge shaft; 14, resisting platform; 2, second guide roller mechanism; 21, assembly plate; 211, assembly cavity; 212, first hinge shaft; 213, second hinge shaft; 3, first support member; 31, first support member hinge portion; 32, compliant structure; 321, first extension edge; 322, second extension edge; 33, right-angle rotation slot; 34, first support member hinge shaft; 4, second support member; 41, second support member hinge head; 42, second limiting structure; 421, third extension edge; 422, fourth extension edge; 43, third limiting structure; 431, fifth extension edge; 432, sixth extension edge; 44, third hinge shaft; 5, cabinet body; 51, second guide track; 511, recess; 52, load-bearing guide track; 53, load-bearing roller assembly; 6, sliding door body; 61, first guide track; 7, limiting stopper; 8, adjustable stop; 9, elastic stay; 91, assembly housing; 911, first bayonet; 92, insertion member; 921, second bayonet; 93, elastic member.

DETAILED DESCRIPTION

[0032] For better understanding and implementation, the following will clearly and completely describe and discuss the technical solutions in the embodiments of the present invention in conjunction with the accompanying drawings of the present invention. Obviously, the described here are only some examples of the present invention, not all examples. Based on the embodiments of the present invention, any other embodiments obtained by a person of ordinary skill in the art without making creative efforts shall fall within the protection scope of the present invention.

[0033] To facilitate the understanding of the embodiments of the present invention, the following will further explain by taking specific embodiments as examples in conjunction with the accompanying drawings, and each embodiment does not constitute a limitation on the embodiments of the present invention.

[0034] In the description of the present invention, it should be noted that the terms such as "upper", "lower", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "inner", "outer" and the like indicating orientations or positional relationships are based on the orientations or positional relationships shown in the drawings, and are only for the convenience of describing the present invention and simplifying the description, rather than indicating or implying that the device or element referred to must have a specific orientation, be constructed and operated in a specific orientation, and therefore should not be construed as limiting the present invention.

[0035] Unless otherwise defined, all technical and scientific terms used herein have the same meanings as commonly understood by a person skilled in the art to which the present invention belongs. The terms used in the description of the present invention herein are only for the purpose of describing specific embodiments, and are not intended to limit the present invention.

[0036] Referring to FIG. 1-FIG. 10, the present inven-

tion discloses a guide roller structure for coplanar sliding door, including a first guide roller mechanism 1, a second guide roller mechanism 2, a first support member 3, and a second support member 4, where the first guide roller mechanism 1 is configured to slide along a first guide track 61 on an inner side of a sliding door body 6, and the second guide roller mechanism 2 is configured to slide along a second guide track 51 on an upper side wall or a lower side wall inside a cabinet body 5; the mounting directions of the first guide track 61 and the second guide track 51 are consistent, a height direction of the cabinet body 5 is defined as a Z-axis direction, a direction in which the sliding door body 6 extends out of or enters the cabinet body 5 when opening or closing the door is defined as a Y-axis direction, and a moving direction in which the sliding door body 6 translates to be folded with another sliding door body 6 is defined as an X-axis direction, then the first guide track 61 and the second guide track 51 are provided along the Z-axis direction, an end of the first support member 3 is connected to the first guide roller mechanism 1; an end of the second support member 4 is hinged to an opposite end of the first support member 3, and an opposite end of the second support member 4 is hinged to the second guide roller mechanism 2; where the first support member 3 and/or the second support member 4 is provided with a limiting structure for limiting a hinge rotation angle, so that when the first guide roller mechanism 1 slides and/or the second guide roller mechanism 2 slides, a maximum angle between the first support member 3 and the second support member 4 remains constant, such that when the first guide roller mechanism 1 and the second guide roller mechanism 2 slide in the same direction, specifically upon the sliding door body 6 sliding along the X-axis direction to open the door, the rotation between the first support member 3 and the second support member 4 may be restricted by the limiting structure, thereby achieving a stable supporting effect, ensuring that the first guide roller mechanism 1 and the second guide roller mechanism 2 do not shake during sliding, and the overall structure is aesthetically pleasing and occupies less space.

[0037] The first guide roller mechanism 1 and the second guide roller mechanism 2 each include a roller base plate 11 and at least two rollers 12, the rollers 12 are assembled on the roller base plate 11, and the shafts of the rollers 12 are perpendicular to the roller base plate 11, the two or more rollers 12 have relatively stable guide surfaces, configured to roll along the side walls of the first guide track 61 or the second guide track 51. In the present embodiment, the rollers 12 are provided as three, by designing the first guide roller mechanism 1 and the second guide roller mechanism 2 to have two guide surfaces, the first guide roller mechanism 1 and the second guide roller mechanism 2 may contact the side walls on both sides simultaneously when sliding in the first guide track 61 and the second guide track 51, resulting in more stable sliding, more uniform force, and thus a

more stable sliding effect. In some implementations, only one roller 12 may be provided on the roller base plate 11, which may also satisfy the sliding effect.

[0038] At a connection between the end of the first support member 3 and the first guide roller mechanism 1 is provided a compliant structure 32, the compliant structure 32 includes a first extension edge 321 and a second extension edge 322 located on two sides of the hinged position, one of the first extension edge 321 and the second extension edge 322 abuts against the first guide roller mechanism 1, and the other leaves a gap with the first guide roller mechanism 1, so that the first support member 3 has space to rotate in a direction away from the first guide roller mechanism 1. Since the sliding door body 6 always remaining parallel to the cabinet body 5 during opening or closing the door would cause jamming of the door, the gap enables a certain fine-tuning rotation space between the first guide roller mechanism 1 and the first support member 3, so as to prevent the problem of guide roller jamming and improve the smoothness of the guide roller sliding.

[0039] Specifically, in the present embodiment, as shown in FIGS. 3 to 6, the track groove of the first guide track 61 faces inward along the Y-axis towards the cabinet body 5, the first guide roller mechanism 1 slides in the X-axis direction along the track groove of the first guide track 61, limiting stoppers 7 are provided at two ends of the track groove of the first guide track 61 to prevent the first guide roller mechanism 1 from sliding out of the track groove of the first guide track 61, a first guide roller hinge portion 13 is provided on a back side of a roller base plate 11 of the first guide roller mechanism 1, the first guide roller hinge portion 13 is provided with a first guide roller hinge shaft 131 along the Z-axis direction, an end of the first support member 3 is provided with a first support member hinge portion 31 hinged to the first guide roller hinge shaft 131, the compliant structure 32 is located at an end of the first support member 3, the compliant structure 32 extends along the first support member hinge portion 31 towards the back side of the roller base plate 11 of the first guide roller mechanism 1 to form a first extension edge 321 and a second extension edge 322, abutting platforms 14 configured to abut against the first extension edge 321 and the second extension edge 322 are respectively provided at two sides of the first guide roller hinge portion 13, between the first extension edge 321 and the second extension edge 322, the first extension edge 321 is longer than the second extension edge 322, the first extension edge 321 may always abut against the abutting platform 14 of the first guide roller mechanism 1 when the sliding door body 6 is closing, thereby making the first support member 3 always parallel to the first guide track 61 when the sliding door body 6 is closing; a gap may be left between the second extension edge 322 and the abutting platform 14 of the first guide roller mechanism 1, so that an opposite end of the first support member 3 may slightly rotate in a direction proximate to the first guide track 61 when the sliding door

body 6 is opening, until the second extension edge 322 abuts against the abutting platform 14 of the first guide roller mechanism 1, and a rotation angle range within which the first support member 3 may slightly rotate is 10°-30°, so as to ensure that the first support member 3 does not contact the first guide track 61 when the sliding door body 6 is opening.

[0040] The limiting structure includes a second limiting structure 42 located at an opposite end of the first support member 3 or an end of the second support member 4, the second limiting structure 42 includes a third extension edge 421 and a fourth extension edge 422 located at two sides of the hinge position, the third extension edge 421 and the fourth extension edge 422 control a maximum angle of rotation between the second support member 4 and the first support member 3 to be 90°, and may limit the rotation angle between the first support member 3 and the second support member 4 within a range from 0° to 90°, thus when the first guide roller mechanism 1 and the second guide roller mechanism 2 slide in one direction, relative stability between the first support member 3 and the second support member 4 may be maintained, thereby providing a stable support effect.

[0041] Specifically, in the present embodiment, as shown in FIG. 3, FIG. 4, FIG. 7 and FIG. 8, the second limiting structure 42 is located at an end of the second support member 4, an opposite end of the first support member 3 is provided with a recessed right-angle rotation groove 33, a first support member hinge shaft 34 is provided in the right-angle rotation groove 33, an end of the second support member 4 is provided with a second support member hinge head 41 that is inserted into the right-angle rotation groove 33 and hinged to the first support member hinge shaft 34, the second limiting structure 42 includes a third extension edge 421 and a fourth extension edge 422 located at two sides of the second support member hinge head 41, configured to abut against edges at two sides of the right-angle rotation groove 33, so that the rotation angle between the first support member 3 and the second support member 4 is within a range from 0° to 90°, when the sliding door body 6 is opened, the first support member 3 and the second support member 4 rotate open to 90°, at this time the sliding door body 6 moves in an opening direction, the third extension edge 421 abuts against the edge at one side of the right-angle rotation groove 33, and may keep the rotation angle between the first support member 3 and the second support member 4 kept at 90° unchanged.

[0042] Furthermore, the limiting structure includes a third limiting structure 43 located at an opposite end of the second support member 4, the third limiting structure 43 includes a fifth extension edge 431 and a sixth extension edge 432 located at two sides of the hinge position, the fifth extension edge 431 and the sixth extension edge 432 control a maximum angle of rotation between the second support member 4 and the second guide roller mechanism 2 to be 90°, which facilitates controlling the hinge

rotation range between the second support member 4 and the second guide roller mechanism 2, and achieves that the second support member 4 rotates to be perpendicular or parallel to the sliding direction of the second guide roller mechanism 2.

[0043] Specifically, in the present embodiment, as shown in FIG. 3, FIG. 4, and FIGS. 7-10, a track groove of the second guide track 51 is oriented inwardly along the Z axis toward the cabinet body 5, the second guide roller mechanism 2 slides along the track groove of the second guide track 51 in the X axis direction, two ends of the track groove of the second guide track 51 are provided with limiting stoppers 7 configured to prevent the second guide roller mechanism 2 from sliding out of the track groove of the second guide track 51, an end of the track groove of the second guide track 51 proximate to a closing movement direction is provided with an adjustable stop 8, a recess 511 configured to accommodate the second support member 4 is reserved between the adjustable stop 8 and an end portion of the track groove of the second guide track 51, configured to enable the second support member 4 to achieve a retraction effect after the sliding door body 6 slides to a closed state, and after retraction, the second support member 4 is aligned with the second guide track 51; the adjustable stop 8 is configured to control a maximum sliding distance of the second guide roller mechanism 2 in the second guide track 51, so that a distance slid by the sliding door body 6 during opening or closing is equal to a sum of a distance slid by the first guide roller mechanism 1 on the first guide track 61, a distance slid by the first guide roller mechanism 2 on the second guide track 5, and an arc length distance of rotation of the second support member 4 relative to the second guide roller mechanism 2, a back side of the roller base plate 11 of the second guide roller mechanism 2 is assembled with an assembly plate 21, the assembly plate 21 has an assembly cavity 211, the assembly cavity 211 is provided with a first hinge shaft 212 and a second hinge shaft 213 penetrating through the assembly cavity 211, the first hinge shaft 212 is configured to be hinged to an opposite end of the second support member 4, a fifth extension edge 431 and a sixth extension edge 432 of the third limiting structure 43 are respectively located at two sides of the hinged connection between the second support member 4 and the first hinge shaft 212, configured to respectively abut against side edges of the assembly cavity 211, so as to control a hinged angle range between the second support member 4 and the assembly plate 21 within 0°-90°. Upon the sliding door body 6 opening, the second support member 4 rotates from the recess 511 to a position perpendicular to the second guide track 51, and at this time, the fifth extension edge 431 abuts against an edge of the assembly plate 21; upon the sliding door body 6 closing, an end of the second support member 4 rotates into the recess 511 of the second guide track 51 until the sixth extension edge 432 abuts against the edge of the assembly plate 21, at which point the retraction effect of the second

support member 4 is completed, and closing is completed.

[0044] It should be noted that, since a rotatable space between the first support member 3 and the first guide roller mechanism 1 is not large, and the first guide track 61 and the second guide track 51 remain parallel all the time, the minimum included angle between the first support member 3 and the second support rod may not be 0°.

[0045] Since each hinged position in the open state of the sliding door body 6 is resisted by a limiting structure, a stable state may be achieved, and because forces are opposite during closing, it is also necessary to provide a structure that prevents the hinged positions from rotating easily. Therefore, an elastic stay 9 is provided between the second support member 4 and the second guide roller mechanism 2, an end of the elastic stay 9 is rotatably connected to the second support member 4, and an opposite end is rotatably connected to the second guide roller mechanism 2, and the elastic stay 9 is configured to provide a support force to an end of the second support member 4 that avoids rotation in a sliding direction toward the second guide roller mechanism 2, capable of providing a certain pushing force for the second support member 4 when the first guide roller mechanism 1 and the second guide roller mechanism 2 slide, thereby keeping a hinged angle between the second support member 4 and the second guide roller mechanism 2 unchanged.

[0046] Specifically, in the present embodiment, as shown in FIG. 4, FIG. 7, and FIG. 8, an opposite end of the second support member 4 is provided with a third hinge shaft 44 in a direction toward the second hinge shaft 213, the elastic stay 9 includes an assembly housing 91, an insertion member 92, and an elastic member 93 located therebetween, an end of the first elastic assembly is recessed inward to form an accommodating cavity, and an opposite end is provided with a first bayonet 911, the first bayonet 911 is rotatably snap-fitted with the third hinge shaft 44, an end of the insertion member 92 is inserted into the accommodating cavity, and an opposite end is provided with a second bayonet 921, the second bayonet 921 is rotatably snap-fitted with the third hinge shaft 44 of the second support member 4; the elastic member 93 is located between the accommodating cavity and the insertion member 92, configured to provide elastic force for both sides, in the present embodiment, the elastic member 93 employs two springs. The elastic stay 9 is clamped in the assembly cavity 211 of the assembly plate 21, configured to limit an elastic force direction of the elastic stay 9, while improving a hinged stability between the second support member 4 and the second guide roller mechanism 2, thereby avoiding a force perpendicular to the elastic force direction of the elastic stay 9 when rotation force is too large. When the sliding door body 6 is closing, an end of the second support rod moves in the closing direction under a pushing force of the first support rod, at this time, the elastic stay 9 at an opposite end of the second support rod may provide an elastic force for the second support rod to

prevent the end of the second support rod from rotating toward a position proximate to the second guide track 51, until the second guide roller mechanism 2 slides to the adjustable stop 8, at which point a force on the end of the second support rod rotating toward a position proximate to the second guide track 51 is greater than the elastic force provided by the elastic stay 9, thereby causing the end of the second support rod to rotate toward the recess 511 of the second guide track 51 to complete the retraction effect.

[0047] Referring to FIGS. 1-4, the present invention further relates to a cabinet with guide roller structure for coplanar sliding door, including a cabinet body 5, a sliding door body 6, a first guide track 61, a second guide track 51, a load-bearing guide track 52, a load-bearing roller assembly 53 and a guide roller structure for coplanar sliding door, the load-bearing guide track 52 is assembled at a bottom of the cabinet body 5, the first guide track 61 is mounted on an upper side wall inside the cabinet body 5, the second guide track 51 is mounted above an inner side wall of the sliding door body 6, a lower portion of the sliding door body 6 is connected to the load-bearing roller assembly 53, the load-bearing roller assembly 53 slides along the load-bearing guide track 52 to drive the sliding door body 6 to move, the sliding door body 6 is pulled out upon door opening, driving the first guide track 61 to move in a door opening direction, at this time the first guide roller mechanism 1 is blocked and pulled by a limiting stopper 7 at an end of the first guide track 61, so that the first support member 3 and the second support member 4 are in a pulled-open state, at this time the first support member 3 and the second support member 4 maintain a certain angle to drive the second guide roller mechanism 2 to slide along the second guide track 51 until the sliding door body 6 is fully opened; upon the sliding door body 6 closing, it drives the first guide track 61 to move in a door closing direction, at this time the first guide roller mechanism 1 slides to an opposite end of the first guide track 61, and is blocked and pulled by the limiting stopper 7 at the opposite end, the first support member 3 and the second support member 4 are kept at an unchanged angle by the elastic force of the elastic stay 9, and at the same time push the second guide roller mechanism 2 to slide along the second guide track 51, until abutting against the adjustable stop 8, then the first support member 3 and the second support member 4 start to retract, pushing the sliding door body 6 into the cabinet body 5 to complete a door closing state. The first support member 3 and the second support member 4 maintain a certain angle to slide along the first guide track 61 and/or the second guide track 51, to provide sliding guidance for the upper portion of the sliding door body 6, which may keep the angle between the first support member 3 and the second support member 4 stable upon the sliding door body 6 translating when opening the door, thereby providing a stable supporting and guiding function for the sliding door body 6, greatly improving the door opening stability of the sliding

door body 6, and reducing the shaking of the sliding door body 6 itself during door opening and closing.

[0048] In summary, a guide roller structure for coplanar sliding door and a cabinet having the same provided by the present invention have the following technical effects:

[0049] 1. By providing a limiting structure at the end junction of the first support member 3 and/or the end junction of the second support member 4, the rotation angle between the first support member 3 and the second support member 4 may be kept unchanged upon the first guide roller mechanism 1 and/or the second guide roller mechanism 2 sliding, thereby improving the support stability of the first support member 3 and the second support member 4 for the sliding door body 6, and reducing the shaking of the sliding door body 6 during door opening;

[0050] 2. By providing an elastic stay 9 between the second support member 4 and the second guide roller mechanism 2, a certain abutting force may be provided to the second support member 4 to prevent the second support member 4 from retracting and rotating during sliding, thereby improving the support stability of the second support member 4 upon the sliding door body 6 being in a closed state;

[0051] 3. The connection structure between the first support member 3 and the second support member 4 is simple, occupies small space inside the cabinet, and has a small proportion exposed in the user's field of view, greatly improving the user experience.

[0052] The technical means disclosed in the solutions of the present invention are not limited to the technical means disclosed in the above implementations, and also include technical solutions formed by any combination of the above technical features. It should be pointed out that for those of ordinary skill in the art, several improvements and modifications may be made without departing from the principle of the present invention, and these improvements and modifications are also considered as the protection scope of the present invention.

Claims

1. A guide roller structure for coplanar sliding door, comprising:

a first guide roller mechanism (1), configured to slide along a first guide track (61) on an inner side of a sliding door body (6);

a second guide roller mechanism (2), configured to slide along a second guide track (51) on an upper side wall or a lower side wall inside a cabinet body (5);

a first support member (3), an end of the first support member (3) connected to the first guide roller mechanism (1);

a second support member (4), an end of the second support member (4) hinged to an oppo-

site end of the first support member (3), and an opposite end of the second support member (4) hinged to the second guide roller mechanism (2);

wherein the first support member (3) and/or the second support member (4) is provided with a limiting structure configured to limit a hinged rotation angle, such that a maximum angle between the first support member (3) and the second support member (4) remains constant upon the first guide roller mechanism (1) sliding and/or the second guide roller mechanism (2) sliding.

2. The guide roller structure for coplanar sliding door according to claim 1, wherein a connection between the end of the first support member (3) and the first guide roller mechanism (1) is provided with a compliant structure (32), the compliant structure (32) comprising a first extension edge (321) and a second extension edge (322) located on two sides of the connection, one of the first extension edge (321) and the second extension edge (322) abutting against the first guide roller mechanism (1), and the other one of the first extension edge (321) and the second extension edge (322) is provided with a gap with the first guide roller mechanism (1), so that the first support member (3) is provided with a space to rotate in a direction distal to the first guide roller mechanism (1).

3. The guide roller structure for coplanar sliding door according to claim 2, wherein the limiting structure comprises a second limiting structure (42) located at the opposite end of the first support member (3) or an end of the second support member (4), the second limiting structure (42) comprising a third extension edge (421) and a fourth extension edge (422) located on two sides of a hinge, and/or the limiting structure comprises a third limiting structure (43) located at the opposite end of the second support member (4), the third limiting structure (43) comprising a fifth extension edge (431) and a sixth extension edge (432) located on two sides of a hinge.

4. The guide roller structure for coplanar sliding door according to claim 3, wherein the third extension edge (421) and the fourth extension edge (422) control a maximum angle of rotation between the second support member (4) and the first support member (3) to be 90°, and/or the fifth extension edge (431) and the sixth extension edge (432) control a maximum angle of rotation between the second support member (4) and the second guide roller mechanism (2) to be 90°.

5. The guide roller structure for coplanar sliding door according to claim 4, wherein the second support

member (4) and the second guide roller mechanism (2) are provided with an elastic stay (9), an end of the elastic stay (9) is rotatably connected to the second support member (4), an opposite end of the elastic stay (9) is rotatably connected to the second guide roller mechanism (2), and the elastic stay (9) is configured to provide a supporting force for an end of the second support member (4) to avoid rotation in a sliding direction of the second guide roller mechanism (2).

6. The guide roller structure for coplanar sliding door according to claim 5, wherein the elastic stay (9) comprises:

an assembly housing (91), an end of the first elastic assembly being recessed inward to form an accommodating cavity, an opposite end of the first elastic assembly being provided with a first bayonet (911), the first bayonet (911) being rotatably connected to the second guide roller mechanism (2);

an insertion member (92), an end of the insertion member (92) inserted into the accommodating cavity, an opposite end of the insertion member (92) being provided with a second bayonet (921), the second bayonet (921) being rotatably connected to the second support member (4);
an elastic member (93), the elastic member (93) located between the accommodating cavity and the insertion member (92), configured to provide elastic force for both.

7. The guide roller structure for coplanar sliding door according to claim 6, wherein an assembly plate (21) is further provided between the second support member (4) and the second guide roller mechanism (2), the assembly plate (21) having an assembly cavity (211), and the opposite end of the second support member (4) and the elastic stay (9) are located in the assembly cavity (211).

8. The guide roller structure for coplanar sliding door according to claim 1, wherein the first guide roller mechanism (1) and the second guide roller mechanism (2) each comprise:

a roller base plate (11);
at least two rollers (12), the rollers (12) assembled on the roller base plate (11), and wheel axles of the rollers (12) being perpendicular to the roller base plate (11), the two or more rollers (12) having two opposite guide surfaces configured to roll along two side walls of the first guide track (61) or the second guide track (51).

9. A cabinet with guide roller structure for coplanar sliding door, comprising a cabinet body (5), a sliding

door body (6), a first guide track (61), a second guide track (51), a load-bearing guide track (52), a load-bearing roller assembly (53), and the guide roller structure for coplanar sliding door according to any one of claims 1 to 8, wherein the load-bearing guide track (52) is assembled at a bottom of the cabinet body (5), the first guide track (61) is mounted on an upper side wall inside the cabinet body (5), the second guide track (51) is mounted above a side wall on an inner side of the sliding door body (6), a lower portion of the sliding door body (6) is connected to the load-bearing roller assembly (53), the load-bearing roller assembly (53) slides along the load-bearing guide track (52) configured to drive the sliding door body (6) to move, and the first support member (3) and the second support member (4) maintain a certain angle to slide along the first guide track (61) and/or the second guide track (51), configured to provide sliding guidance for an upper portion of the sliding door body (6).

10. The cabinet with guide roller structure for coplanar sliding door according to claim 9, wherein in a track groove of the second guide track (51), an adjustable stop (8) is provided at an end proximate to a door-closing movement direction, a recess (511) for accommodating the second support member (4) is reserved between the adjustable stop (8) and the end, the adjustable stop (8) is configured to control a maximum sliding distance of the second guide roller mechanism (2) in the second guide track (51), such that a sliding distance of the sliding door body (6) during door-opening or door-closing equals a sum of a sliding distance of the first guide roller mechanism (1) in the first guide track (61), a sliding distance of the first guide roller mechanism (2) in the second guide track (51), and an arc length of rotation between the second support member (4) and the second guide roller mechanism (2), upon the sliding door body (6) being contracted by the load-bearing roller assembly (53), the sliding door body (6) contracts inwardly, so that the second support member (4) rotates into the recess (511) and aligns with the second guide track (51).

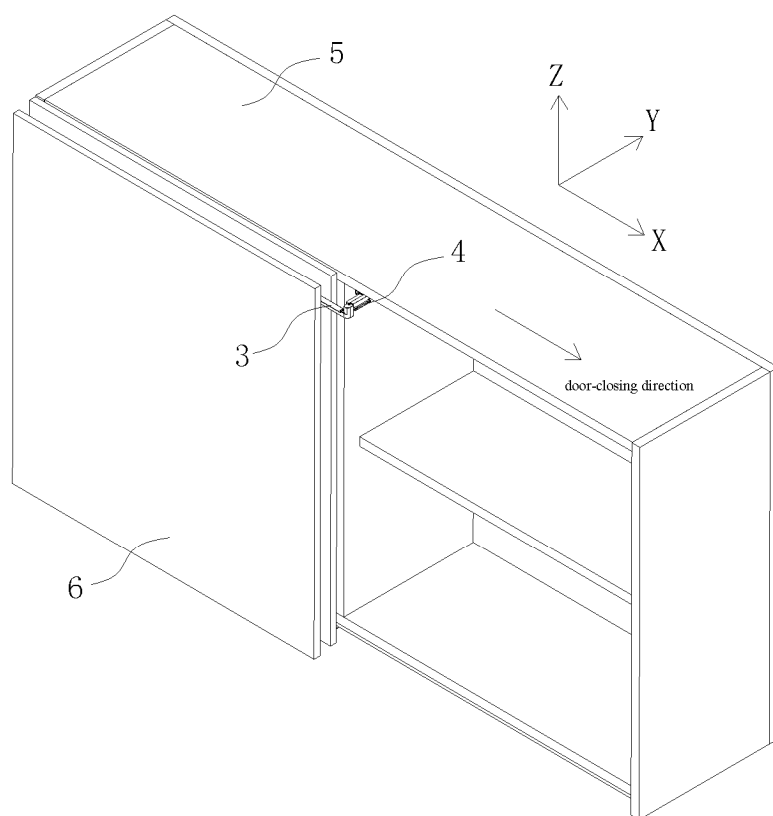


FIG. 1

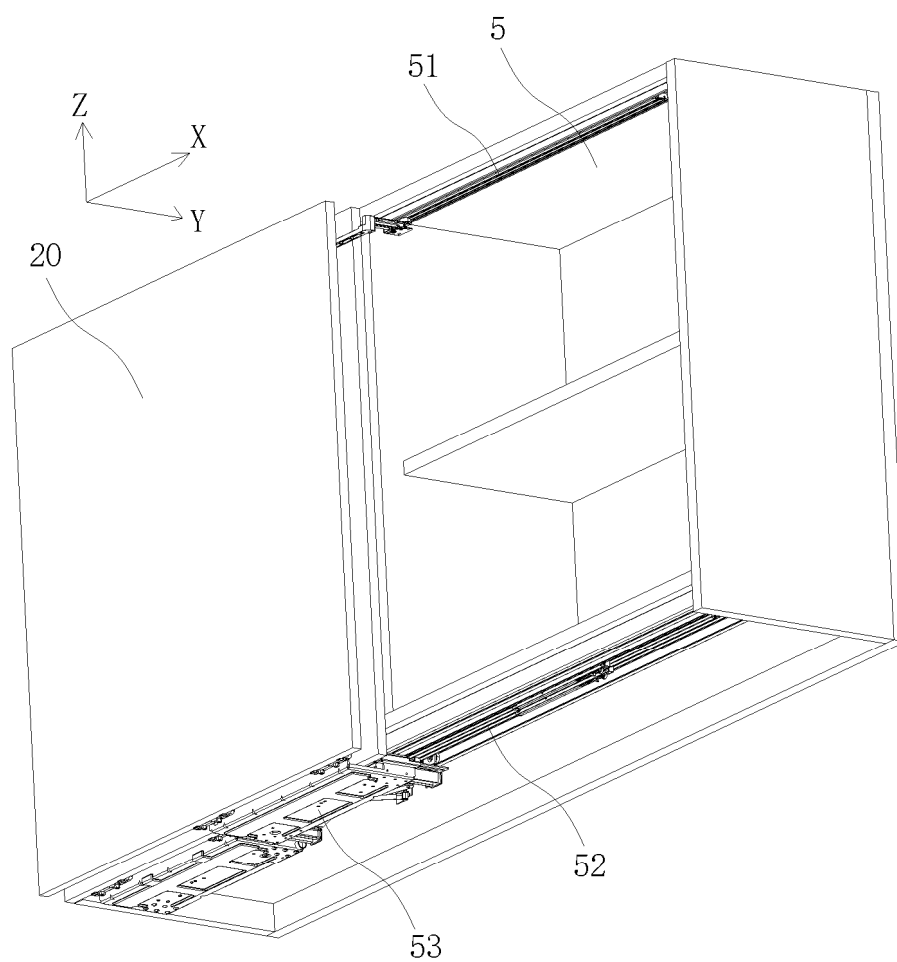


FIG. 2

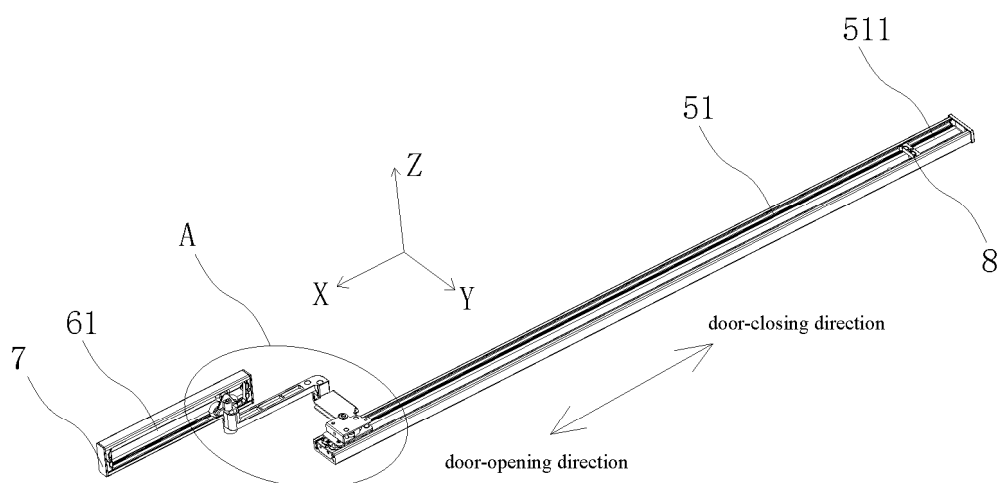


FIG. 3

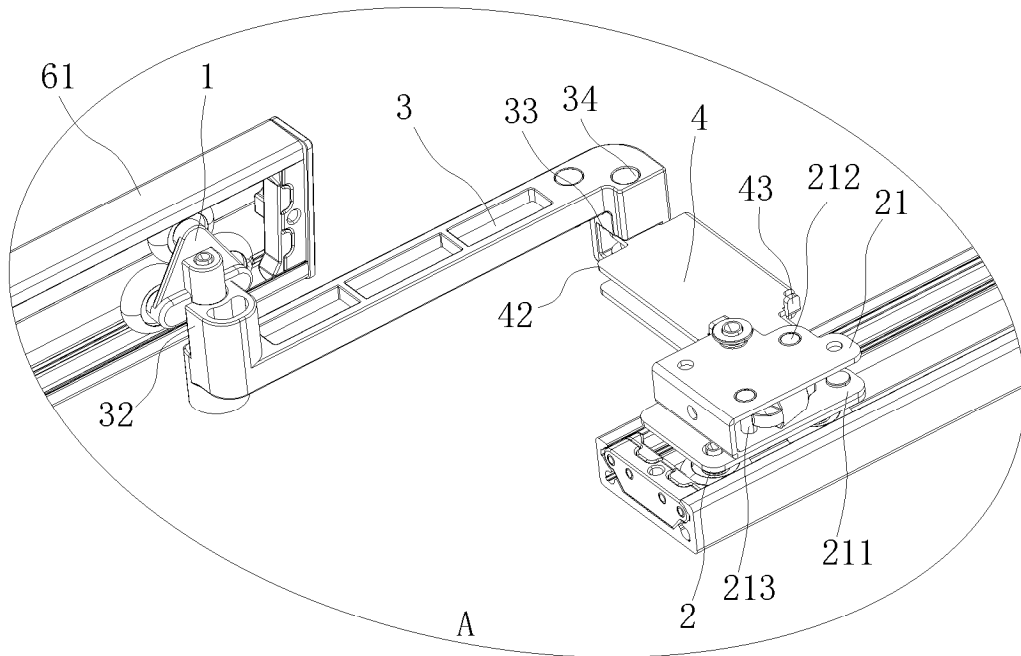


FIG. 4

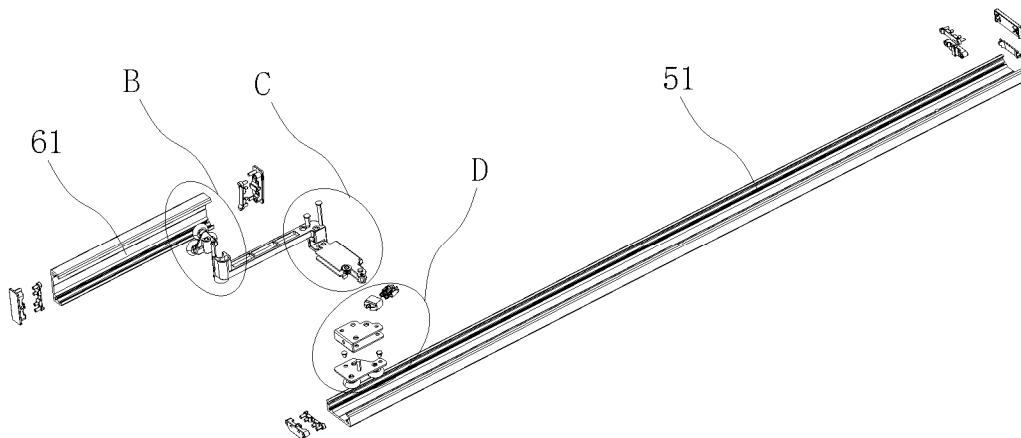


FIG. 5

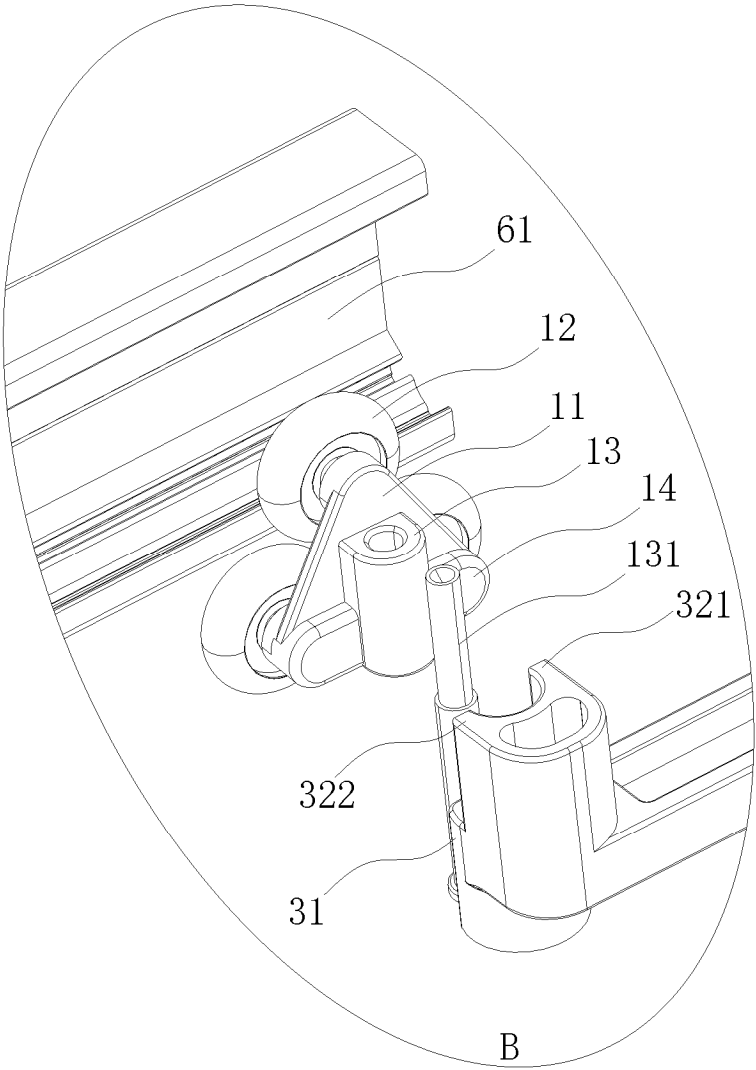


FIG. 6

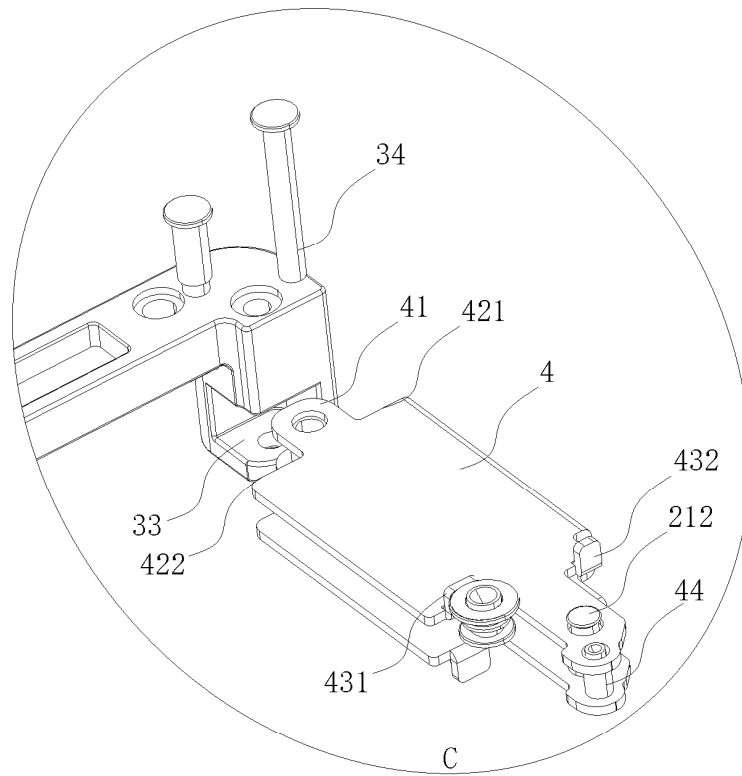


FIG. 7

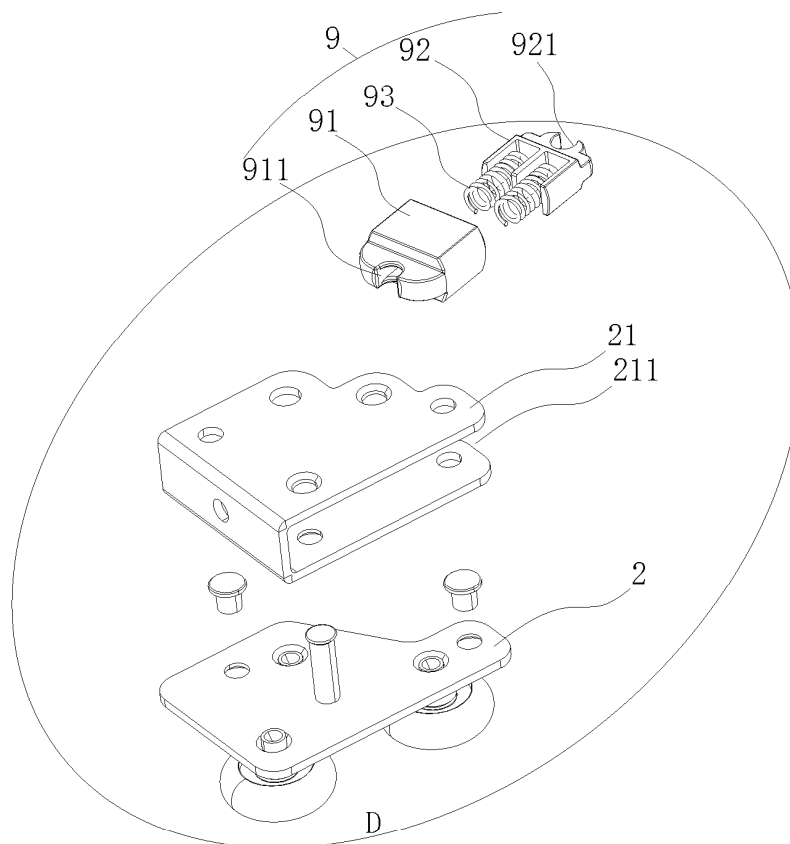


FIG. 8

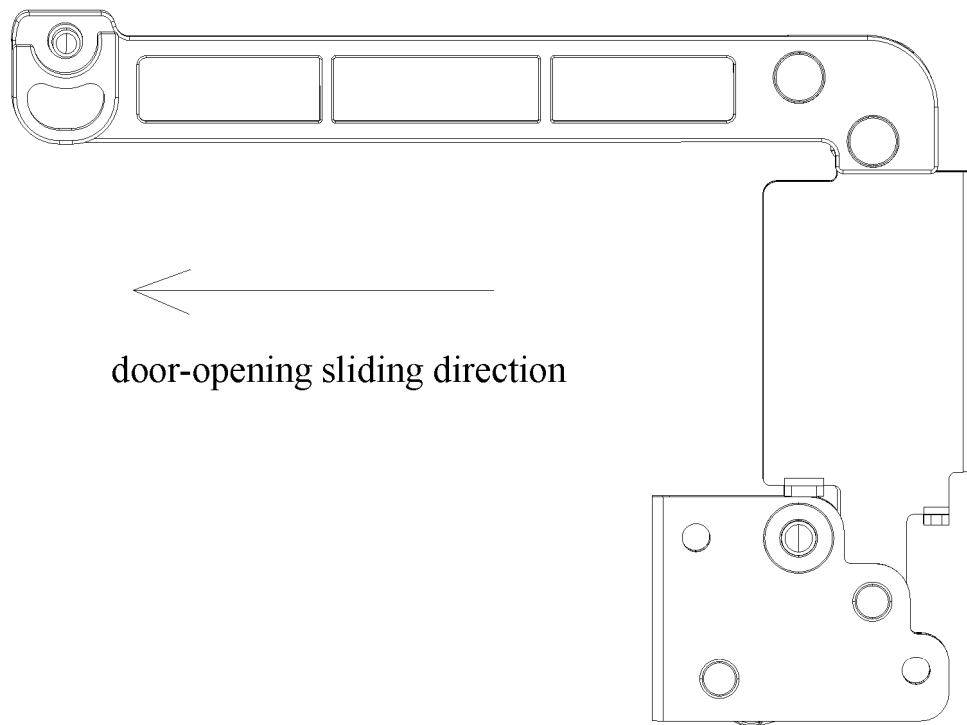


FIG. 9

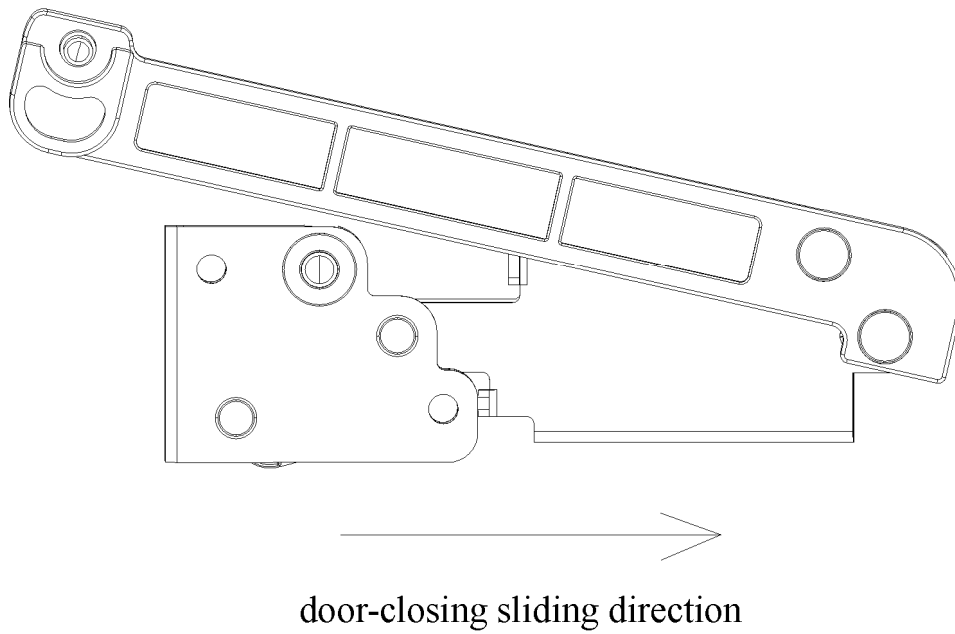


FIG. 10

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/138285

A. CLASSIFICATION OF SUBJECT MATTER

E05D13/00(2006.01)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)

IPC: E05D, E05F, E06B

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)

DWPI, CNABS, CNTXT, CJFD, GBTXT, CATXT, SGTXT, ATTXT, EPTXT, LEXTXT, USTXT, CHTXT, WOTXT: 推拉门, 轮, 轨, 第二, 支撑, 铰接, 间隙, 转动, 最大, 角度, 弹性, 抵接, 卡口, 滑轮, 承重, 柜, 对齐, push 2D pull, door, wheel, rail, second, support, hinge, clearance, turn, maximum, angle, elastic, resist, bayonet, pulley, load bearing, cabinet, alignment

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 204984036 U (GUANGDONG TUTTI HARDWARE CO., LTD.) 20 January 2016 (2016-01-20) description, paragraphs 0028-0043, and figures 1-14	1-10
PX	CN 117449721 A (GUANGDONG OPK SMART HOME TECHNOLOGY CO., LTD.) 26 January 2024 (2024-01-26) claims 1-10	1-10
PX	CN 221236590 U (GUANGDONG OPK SMART HOME TECHNOLOGY CO., LTD.) 28 June 2024 (2024-06-28) claims 1-10	1-10
A	CN 112360283 A (GUANGDONG TUTTI HARDWARE CO., LTD.) 12 February 2021 (2021-02-12) entire document	1-10
A	US 3510983 A (BARA INDUSTRIES CORP.) 12 May 1970 (1970-05-12) entire document	1-10

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

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"E" earlier application or patent but published on or after the international filing date	"&" document member of the same patent family
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

15 July 2024

Date of mailing of the international search report

24 July 2024

Name and mailing address of the ISA/CN

China National Intellectual Property Administration (ISA/
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China No. 6, Xitucheng Road, Jimengqiao, Haidian District,
Beijing 100088

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2023/138285

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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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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2023/138285

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CN	117449721	A	26 January 2024		None				
CN	221236590	U	28 June 2024		None				
CN	112360283	A	12 February 2021		CN	213807219	U	27 July 2021	
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					GB	1271987	A	26 April 1972	
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Form PCT/ISA/210 (patent family annex) (July 2022)

REFERENCES CITED IN THE DESCRIPTION

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