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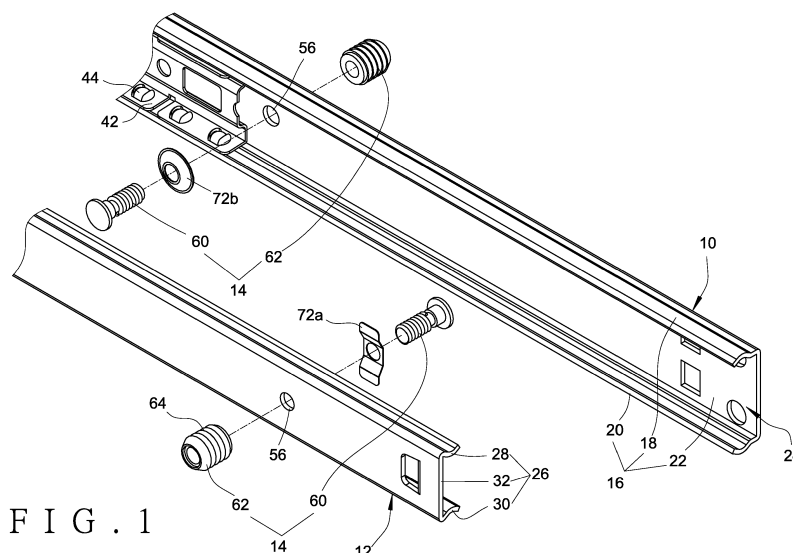
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Amended claims in accordance with Rule 137(2) EPC.

(54) **Slide assembly**

(57) A slide assembly includes a first rail (10), a second rail (12) and at least one positioning device (14). The first rail (10) has a first elongate body (16). The second rail (12) is longitudinally slidable relative to the first rail (10) and has a second elongate body (26). At least one of the first elongate body (16) and the second elongate body (26) has an installation hole (56). The at least one

positioning device (14) has a support member (60) and a fixing member (62). The support member (60) transversely extends through the installation hole (56) so as to be transversely and movably connected to the at least one of the first elongate body (16) and the second elongate body (26). The fixing member (62) is fixed to a portion of the support member (60).



**FIG. 1**

## Description

### FIELD OF THE INVENTION

[0001] The present invention relates to a slide assembly, and more particularly, to a slide assembly capable of quickly installed between a cabinet and a drawer.

### BACKGROUND OF THE INVENTION

[0002] U.S. Patent No. 5,457,867 to Maberry et al. discloses a slide assembly and is incorporated herein by reference, which uses rollers 24, 40 as sliding media and comprises a cabinet member 14 and a drawer member 38 slidably connected to the cabinet member 14. When assembling, the cabinet member 14 is fixed to a cabinet panel 12 by a pair of bushings 16, 18 and a pair of screws 20A, 20B, and the drawer member 38 is fixed to a side of a drawer 36 such that the drawer 36 is slidably connected to the cabinet member 14 by the drawer member 38 and easily slides relative to the cabinet panel 12.

[0003] The slide assembly using the rollers 24, 40 mentioned above allows a larger assembly tolerance between the drawer 36 and the cabinet panel 12, so that, for the furniture manufacturers, the precision for the drawer 36 and the cabinet panel 12 can be compromised and needs not to be compared with industrial precision. Therefore, the slide assemblies using rollers 24, 40 are widely used on furniture combinations. Nevertheless, the slide assemblies using the rollers 20, 24 have restriction of the loads. Furthermore, as to compensate the assembly tolerance, the slide assemblies are not easily to be combined with soft-closing or push-open design to increase their values.

[0004] U.S. Patent No. 5,895,101 to Cabrales et al. discloses a slide assembly and is incorporated herein by reference, which uses ball bearings as sliding media. The ball bearings have higher standard of precision and can bear relative high load, so that they are welcomed by customers. Furthermore, the ball bearings can be combined with soft-closing design, such as the disclosure of U.S. Patent No. 6,712,435 B2 to Kim et al. However, the high precision of the ball bearings makes them to be squeezed by the drawer and the cabinet when the assembly tolerance between the drawer and the cabinet is beyond the permissible range of the slide assembly. This will result awkward operation of the drawers.

[0005] U.S. Publication No. 2013/0106271 A1 to Anderson et al. discloses a rail assembly having at least one fixed member 56 and at least one floating member 54 and is incorporated herein by reference. The at least one fixed member 56 is transversely fixed to a drawer slide, and the at least one floating member 54 is transversely and slidably connected to the fixed member 56. This arrangement permits a relatively large assembly tolerance between the drawer and the cabinet.

[0006] However, once the floating member 54 has a quality flaw such as the floating member is broken or the

assembly tolerance between the drawer and the cabinet is too large, the floating member 54 might drop from the fixed member 56, and thus, the position to which the whole set of the rail assembly is installed does not permit to have the relative large tolerance between the drawer and the cabinet.

[0007] The present invention intends to provide a slide assembly that has a support member which is able to move a limited distance so as to compensate the displacement because of installation tolerance.

### SUMMARY OF THE INVENTION

[0008] The present invention relates to a slide assembly, which comprises a first rail, a second rail and at least one positioning device. The first rail has a first elongate body. The second rail is longitudinally slidable relative to the first rail and has a second elongate body, wherein at least one of the first elongate body and the second elongate body has an installation hole. The at least one positioning device has a support member and a fixing member. The support member transversely extends through the installation hole so as to be transversely and movably connected to the at least one of the first elongate body and the second elongate body, and wherein the fixing member is securely connected to a portion of the support member.

[0009] Preferably, a ball bearing retainer is disposed between the first and second rails and has a plurality of ball bearings retained thereby so as to facilitate sliding movement of the second rail relative to the first rail.

[0010] Preferably, a third rail is slidably connected between the first and second rails. A first ball bearing retainer is disposed between the first and third rails and has a plurality of first ball bearings retained thereby so as to facilitate sliding movement of the third rail relative to the first rail. A second ball bearing retainer is disposed between the second and third rails and has a plurality of second ball bearings retained thereby so as to facilitate sliding movement of the second rail relative to the third rail.

[0011] Preferably, the support member has a head portion, a body portion and a neck portion which extends between the head portion and the body portion. The neck portion of the support member is at least partially fitted within the installation hole and has a length larger than a depth of the installation hole such that the support member is transversely movable relative to the at least one of the first elongate body and the second elongate body.

[0012] Preferably, a resilient member is disposed between the support member and the at least one of the first elongate body and the second elongate body so as to provide a force to keep the support member at a pre-set position.

[0013] Preferably, the slide assembly further comprises a connection frame. The connection frame has a slot and at least one latch. A distal end of the first rail is inserted into the slot of the connection frame.

**[0014]** The present invention will become more obvious from the following description when taken in connection with the accompanying drawings which show, for purposes of illustration only, a preferred embodiment in accordance with the present invention.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

**[0015]**

FIG. 1 is an exploded view of a slide assembly in accordance with a preferred embodiment of the present invention;

FIG. 2 is a perspective view of the slide assembly in accordance with the preferred embodiment of the present invention;

FIG. 3 is a cross sectional view of the slide assembly in accordance with the preferred embodiment of the present invention, taken along a line A-A in FIG. 2;

FIG. 4 is a side view of a three-stage slide assembly in accordance with a preferred embodiment of the present invention, and

FIG. 5 is a cross section view of a slide assembly in accordance with a preferred embodiment of the present invention, wherein the slide assembly is installed between a cabinet and a drawer.

## **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

**[0016]** Referring to FIGS. 1 and 2, the slide assembly of a preferred embodiment of the present invention comprises a first rail 10, a second rail 12, and at least one positioning device 14.

**[0017]** The first rail 10 has a first elongate body 16. The first elongate body 16 has a first wall 18, a second wall 20 opposite to the first wall 18, and a side wall 22. The side wall 22 extends between the first and second walls 18, 20 so that a path 24 is bounded by the first wall 18, the second wall 20 and the side wall 22.

**[0018]** The second rail 12 has a second elongate body 26 which is slidably received in the path 24 of the first rail 10, so that the second rail 12 is longitudinally movable relative to the first rail 10. In detail, the second elongate body 26 has a top wall 28, a bottom wall 30 opposite to the top wall 28, and an intermediate wall 32 extending between the top and bottom walls 28, 30. Preferably, the slide assembly further has a connection frame 36. The connection frame 36 has a slot 38 and at least one latch 40, and a distal end 34 of the first rail 10 is inserted into the slot 38 of the connection frame 36 such that the first rail 10 can be fixed to a cabinet (not shown) by the at least one latch 40 of the connection frame 36.

**[0019]** Preferably, referring to FIG. 3, a ball bearing retainer 42 is disposed between the first and second rails 10, 12 and has a plurality of ball bearings 44 retained thereby so as to facilitate sliding movement of the second rail 12 relative to the first rail 10, thus forming a two-stage

ball bearing slide assembly.

**[0020]** Preferably, as shown in FIG. 4, the slide assembly further comprises a third rail 46, a first ball bearing retainer 48 and a second ball bearing retainer 52. The third rail 46 is slidably connected between the first and second rails 10, 12. The first ball bearing retainer 48 is disposed between the first and third rails 10, 46 and has a plurality of first ball bearings 50 retained thereby so as to facilitate sliding movement of the third rail 46 relative to the first rail 10. The second ball bearing retainer 52 is disposed between the second and third rails 12, 46 and has a plurality of second ball bearings 54 retained thereby so as to facilitate sliding movement of the second rail 12 relative to the third rail 46. Therefore, a three-stage ball bearing slide assembly is formed.

**[0021]** Furthermore, at least one of the side wall 22 of the first elongate body 16 of the first rail 10 and the intermediate wall 32 of the second elongate body 26 of the second rail 12 has at least one installation hole 56 defined therein, and at least one of the side wall 22 of the first elongate body 16 of the first rail 10 and the intermediate wall 32 of the second elongate body 26 of the second rail 12 has at least one positioning device 14 disposed thereon. The at least one positioning device 14 has a support member 60 and a fixing member 62. The support member 60 transversely extends through the installation hole 56 so as to be transversely and movably connected to the at least one of the first elongate body 16 and the second elongate body 26, and the fixing member 62 is securely connected to a portion of the support member 60. In detail, the fixing member 62 has a plurality of hook-shaped annular ribs 64 protruding from an outside thereof, and the fixing member 62 and the support member 60 are connected to each other by way of threading, riveting, or any known method.

**[0022]** Specifically, the support member 60 has a head portion 66, a body portion 68, and a neck portion 70 extending between the head portion 66 and the body portion 68. The neck portion 70 of the support member 60 is at least partially fitted within the installation hole 56 and is movable along a depth direction of the installation hole 56. Furthermore, a length S of the neck portion 70 is larger than a depth L of the installation hole 56 such that the support member 60 is allowed to transversely move relative to the at least one of the first elongate body 16 and the second elongate body 26 within a range restricted to the length S of the neck portion 70. It is noted that the positioning device 14 can be selectively disposed on one of the first and second elongate bodies 16, 26 or on both of the first and second elongate bodies 16, 26. The purpose is that the support member 60 is transversely movable relative to the slide assembly.

**[0023]** Preferably, a resilient member 72a, 72b is disposed between the support member 60 and the at least one of the first elongate body 16 and the second elongate body 26 so as to provide a force to keep the support member 60 at a pre-set position. The resilient member 72a, 72b can be a flat spring, a compression spring or

other resilient members which can keep the support member 60 at the pre-set position.

[0024] FIG. 5 further shows an embodiment of the present invention. In this embodiment, the first elongate body 16 of the first rail 10 and the second elongate body 26 of the second rail 12 each have a positioning device 14 disposed thereon. When in use, the fixing member 62 of the positioning device 14 disposed on the first elongate body 16 of the first rail 10 is installed to a cabinet 74, and the fixing member 62 of the positioning device 14 disposed on the second elongate body 26 of the second rail 12 is installed to a drawer 76, such that the slide assembly is installed between the cabinet 74 and the drawer 76. Since the fixing members 62 are securely connected to their respective support members 60 which are allowed to move transversely relative to the first and second elongate bodies 16, 26, when an assembly tolerance  $d$  is formed between the cabinet 74 and the drawer 76, the fixing members 62 are able to transversely move together with their respective support members 60 within a range to compensate the assembly tolerance  $d$ .

[0025] Preferably, the fixing member 62 and the support member 60 are securely connected to form an integral member, which has better structural strength, so as to avoid the fixing member 62 from deformation, broken and dropping from the support member 60 because of quality flaw or over-load. Therefore, the slide assembly in accordance with the preferred embodiment of the present invention compensates the assembly tolerance  $d$  and thus facilitate rolling movement of the ball bearings 44 retained by the ball bearing retainer 42.

[0026] While we have shown and described the embodiment in accordance with the present invention, it should be clear to those skilled in the art that further embodiments may be made without departing from the scope of the present invention.

## Claims

### 1. A slide assembly comprising:

a first rail (10) having a first elongate body (16);  
a second rail (12) being longitudinally slidable relative to the first rail (10) and having a second elongate body (26), wherein at least one of the first elongate body (16) and the second elongate body (26) has an installation hole (56); and  
at least one positioning device (14) having a support member (60) and a fixing member (62), the support member (60) transversely extending through the installation hole (56) so as to be transversely and movably connected to the at least one of the first elongate body (16) and the second elongate body (26), and wherein the fixing member (62) is securely connected to a portion of the support member (60).

2. The slide assembly as claimed in claim 1, further comprising a ball bearing retainer (42) disposed between the first and second rails (10, 12), wherein the ball bearing retainer (42) has a plurality of ball bearings (44) retained thereby so as to facilitate sliding movement of the second rail (12) relative to the first rail (10).

3. The slide assembly as claimed in claim 1, further comprising a third rail (46), a first ball bearing retainer (48) and a second ball bearing retainer (52), wherein the third rail (46) is slidably connected between the first and second rails (10, 12); the first ball bearing retainer (48) is disposed between the first and third rails (10, 46) and has a plurality of first ball bearings (50) retained thereby so as to facilitate sliding movement of the third rail (46) relative to the first rail (10); and the second ball bearing retainer (52) is disposed between the second and third rails (12, 46) and has a plurality of second ball bearings (54) retained thereby so as to facilitate sliding movement of the second rail (12) relative to the third rail (46).

4. The slide assembly as claimed in claim 1, wherein the support member (60) has a head portion (66), a body portion (68) and a neck portion (70) which extends between the head portion (66) and the body portion (68), the neck portion (70) of the support member (60) is at least partially fitted within the installation hole (56) and has a length ( $S$ ) larger than a depth ( $L$ ) of the installation hole (56) such that the support member (60) is transversely movable relative to the at least one of the first elongate body (16) and the second elongate body (26).

5. The slide assembly as claimed in claim 1, further comprising a resilient member (72a, 72b) disposed between the support member (60) and the at least one of the first elongate body (16) and the second elongate body (26) so as to provide a force to keep the support member (60) at a pre-set position.

6. The slide assembly as claimed in claim 1, further comprising a connection frame (36), wherein the connection frame (36) has a slot (38) and at least one latch (40), and a distal end (34) of the first rail (10) is inserted into the slot (38) of the connection frame (36).

## Amended claims in accordance with Rule 137(2) EPC.

### 1. A slide assembly comprising:

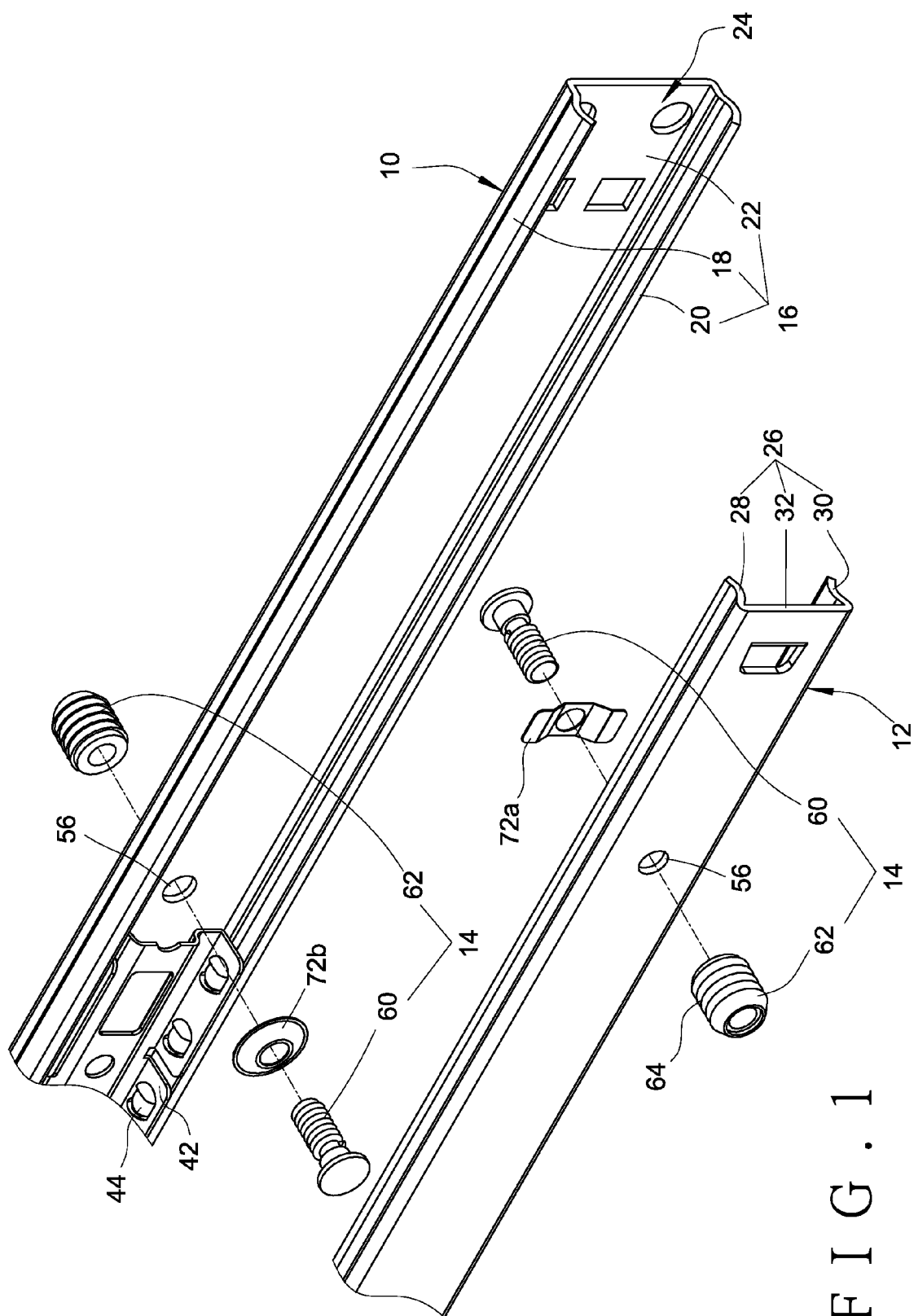
a first rail (10) having a first elongate body (16);  
a second rail (12) being longitudinally slidable relative to the first rail (10) and

having a second elongate body (26), wherein at least one of the first elongate body (16) and the second elongate body (26) has an installation hole (56); and

at least one positioning device (14) having a support member (60) and a fixing member (62), **characterized in that** the support member (60) is transversely and movably connected to the at least one of the first elongate body (16) and the second elongate body (26) by extending through the installation hole (56), and the fixing member (62) is securely connected to a portion of the support member (60) and able to transversely move together with the support member (60) relative to the at least one of the first elongate body (16) and the second elongate body (26).

connection frame (36) has a slot (38) and at least one latch (40), and a distal end (34) of the first rail (10) is inserted into the slot (38) of the connection frame (36).

2. The slide assembly as claimed in claim 1, further comprising a ball bearing retainer (42) disposed between the first and second rails (10, 12), wherein the ball bearing retainer (42) has a plurality of ball bearings (44) retained thereby.
3. The slide assembly as claimed in claim 1, further comprising a third rail (46), a first ball bearing retainer (48) and a second ball bearing retainer (52), wherein the third rail (46) is slidably connected between the first and second rails (10, 12); the first ball bearing retainer (48) is disposed between the first and third rails (10, 46) and has a plurality of first ball bearings (50) retained thereby so as to facilitate sliding movement of the third rail (46) relative to the first rail (10); and the second ball bearing retainer (52) is disposed between the second and third rails (12, 46) and has a plurality of second ball bearings (54) retained thereby.
4. The slide assembly as claimed in claim 1, wherein the support member (60) has a head portion (66), a body portion (68) and a neck portion (70) which extends between the head portion (66) and the body portion (68), the neck portion (70) of the support member (60) is at least partially fitted within the installation hole (56) and has a length (S) larger than a depth (L) of the installation hole (56) such that the support member (60) is transversely movable relative to the at least one of the first elongate body (16) and the second elongate body (26).
5. The slide assembly as claimed in claim 1, further comprising a resilient member (72a, 72b) disposed between the support member (60) and the at least one of the first elongate body (16) and the second elongate body (26).
6. The slide assembly as claimed in claim 1, further comprising a connection frame (36), wherein the



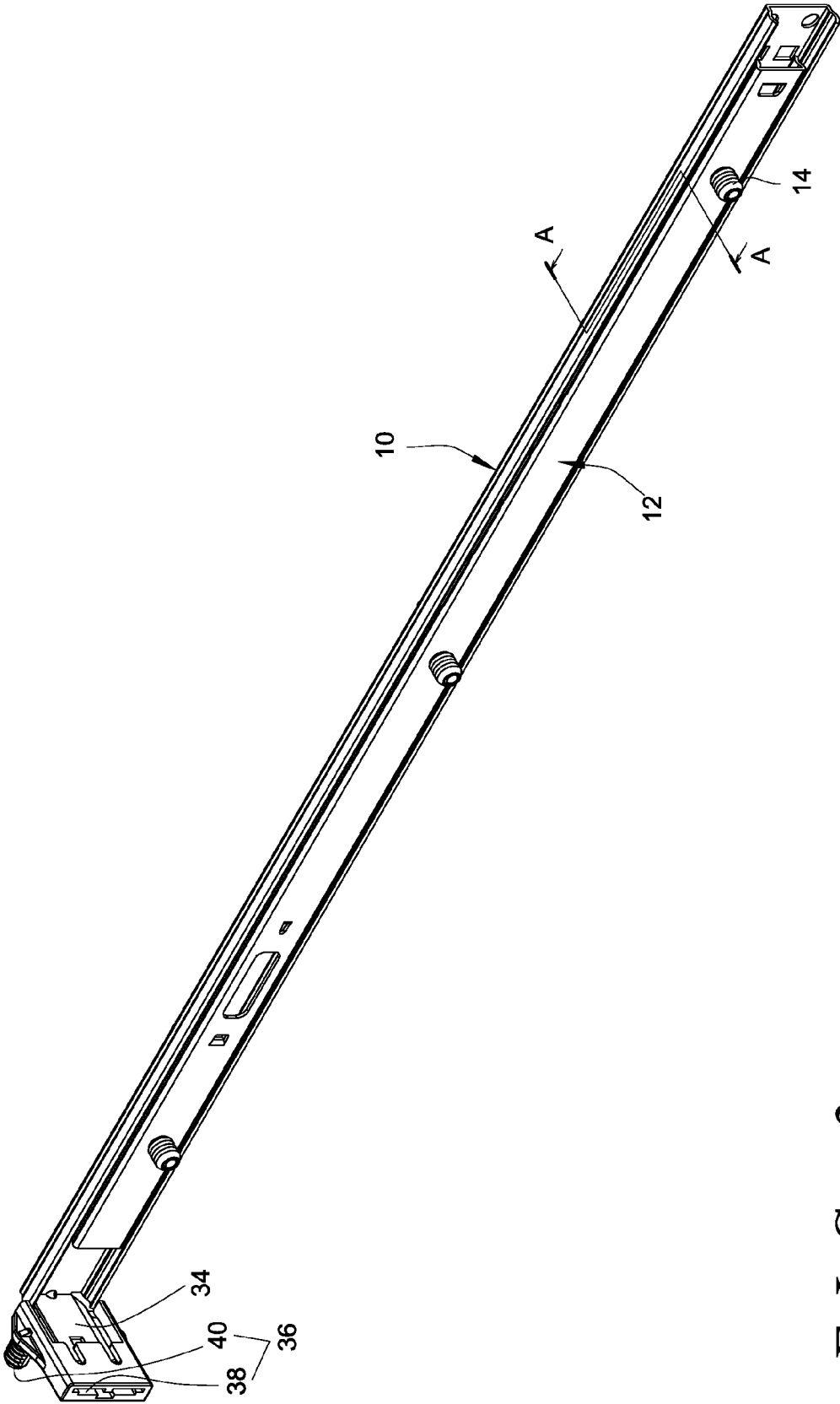
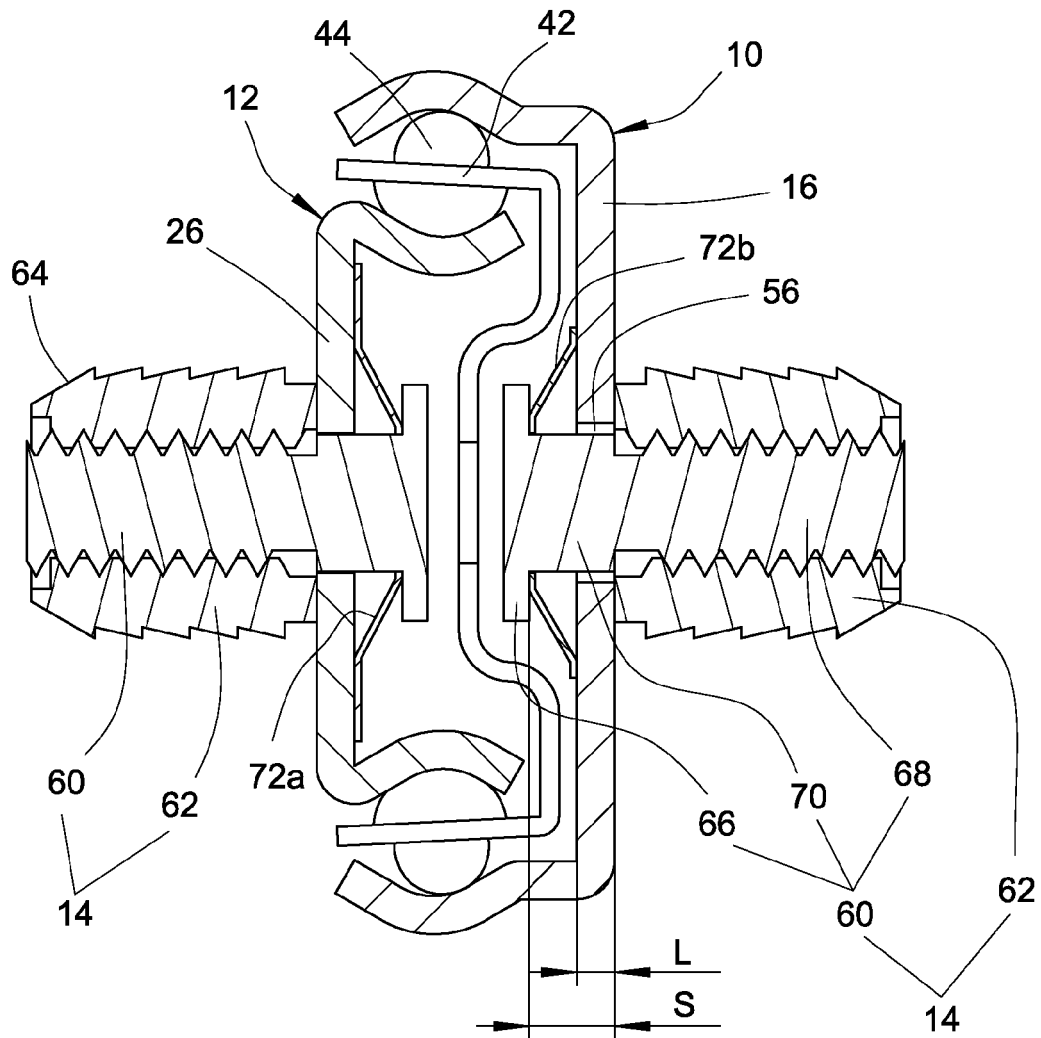


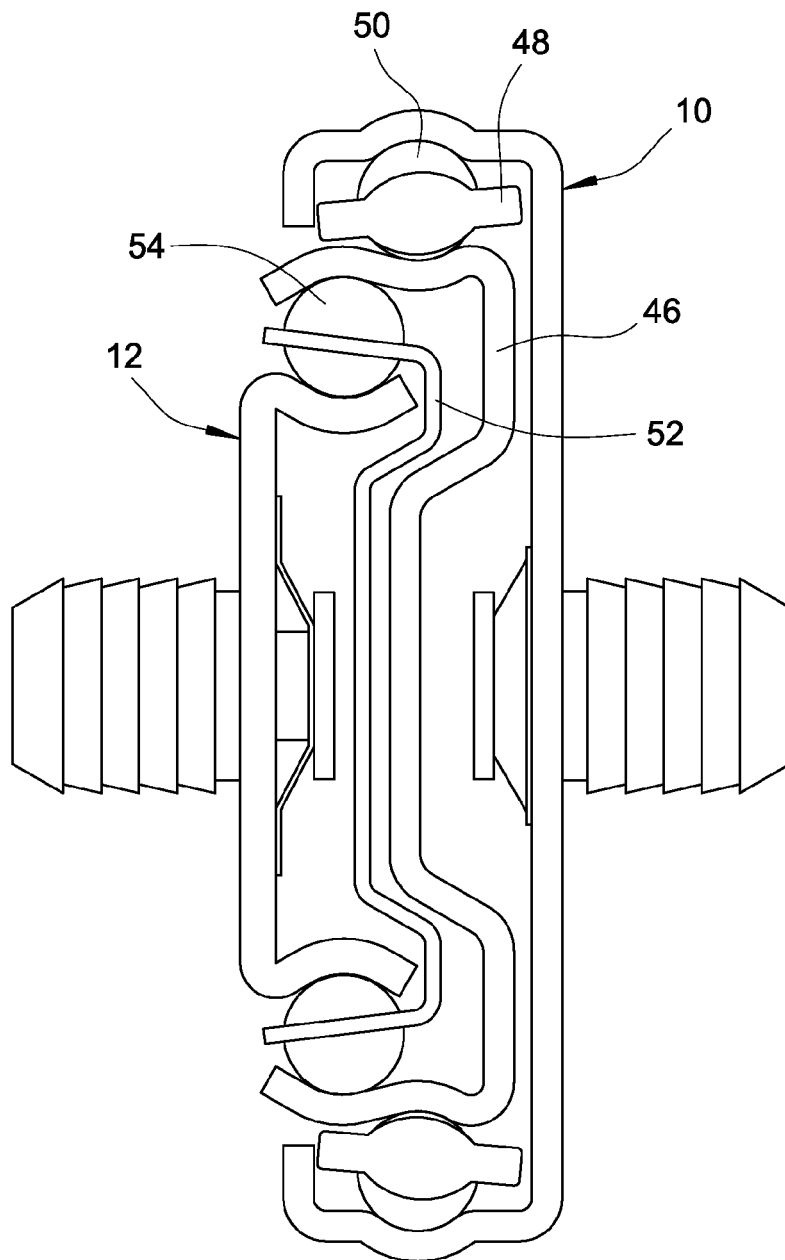
FIG. 2



A - A

FIG. 3





F I G . 4

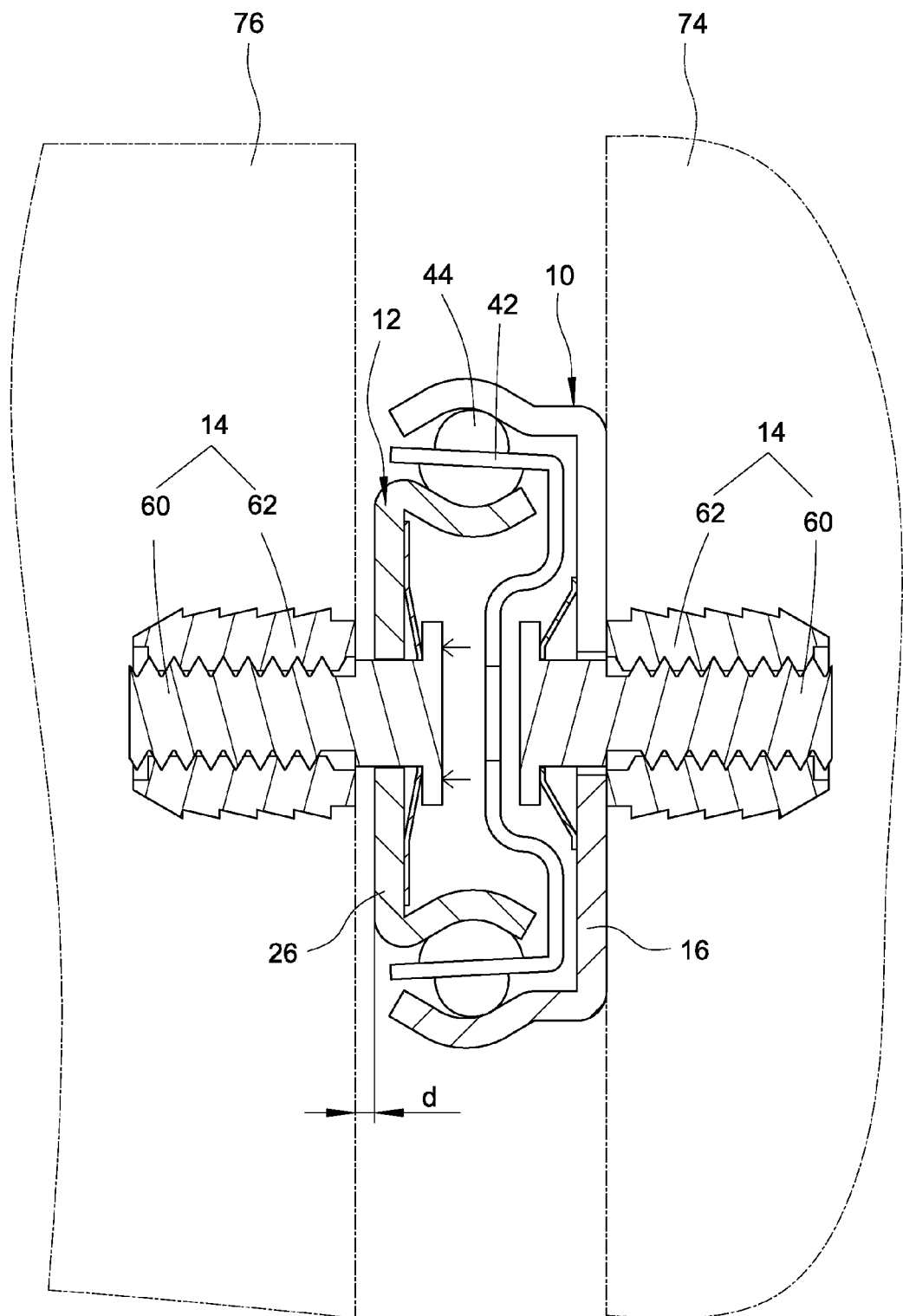


FIG. 5



## EUROPEAN SEARCH REPORT

 Application Number  
 EP 14 15 3014

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2010/023125 A1 (HETTICH PAUL GMBH & CO KG [DE]; SCHRUBKE LARS [DE]; MEYER BERND [DE]) 4 March 2010 (2010-03-04)	1-5	INV. A47B88/04
Y	* page 1, line 11 - page 13, line 26; figures 1-12 *	6	
X	DE 198 48 855 A1 (FULTERER GMBH [AT]) 29 April 1999 (1999-04-29)	1-5	
X,D	US 2013/106271 A1 (ANDERSON BRADLY [US] ET AL) 2 May 2013 (2013-05-02)	1-4	
Y	* paragraph [0002] - paragraph [0053]; figures 1-17B *	6	
Y	US 2002/180321 A1 (CHEN KEN-CHING [TW] ET AL) 5 December 2002 (2002-12-05)	6	TECHNICAL FIELDS SEARCHED (IPC) A47B F16B
	* paragraph [0001] - paragraph [0018]; figures 1-4 *		
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 16 June 2014	Examiner Kohler, Pierre
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 14 15 3014

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16-06-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2010023125 A1	04-03-2010	CN 102137606 A	27-07-2011
		DE 102008044922 A1	27-05-2010
		EP 2330944 A1	15-06-2011
		RU 2011111306 A	10-10-2012
		WO 2010023125 A1	04-03-2010
-----			
DE 19848855 A1	29-04-1999	AT 408409 B	26-11-2001
		CH 693492 A5	15-09-2003
		DE 19848855 A1	29-04-1999
		IT T0980894 A1	26-04-1999
-----			
US 2013106271 A1	02-05-2013	CA 2793551 A1	27-04-2013
		US 2013106271 A1	02-05-2013
-----			
US 2002180321 A1	05-12-2002	NONE	
-----			

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- US 5457867 A, Maberry [0002]
- US 5895101 A, Cabrales [0004]
- US 6712435 B2, Kim [0004]
- US 20130106271 A1, Anderson [0005]