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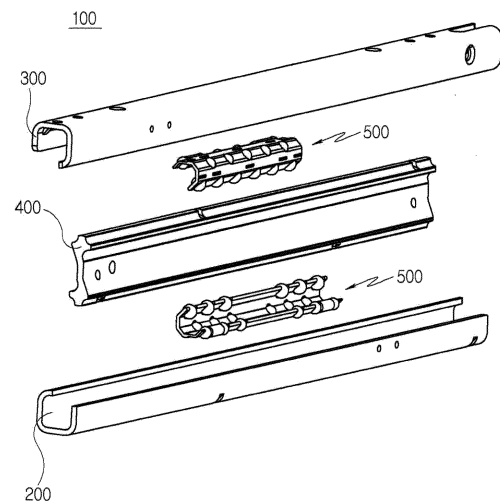
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(54) **SLIDING DEVICE FOR DRAWER**

(57) The present disclosure relates to a sliding device for a drawer capable of reinforcing rigidity while reducing noise during operation by mixing and using a plurality of slide balls having different tensile strengths, and includes: a fixed rail fastened and fixed to a main body, a movable rail fastened and fixed to a storage body, and sliding on the fixed rail, an intermediate rail disposed between the fixed rail and the movable rail to guide the sliding movement of the movable rail, and ball assemblies disposed between the intermediate rail and the fixed rail and between the intermediate rail and the movable rail, respectively to move to be slidable, and provided with a plurality of slide balls having different tensile strengths, the slide ball having a large tensile strength being disposed at the outermost side thereof. According to such a configuration, it is possible to reduce the noise using the slide ball having the low tensile strength as a whole, and to reinforce rigidity using the slide ball having the large tensile strength in a portion to which a shock load is applied.

[FIG. 2]



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Description

[Technical Field]

[0001] The present disclosure relates to a sliding device for a drawer, and more particularly, to a sliding device for a drawer capable of reinforcing rigidity while reducing noise during operation by mixing and using a plurality of slide balls having different tensile strengths.

[Background Art]

[0002] Generally, a sliding device for a drawer is provided between a main body and a storage body and is used so that the storage body is easily drawn out from or drawn into from the main body when the user opens and closes the storage body.

[0003] The sliding device for the drawer is provided in a double-fold folding type and a triple-fold folding type. Here, in the triple-fold folding type, a fixed rail is fastened to the inner surface of the main body, and a movable rail is fastened to the outer surface of the storage body. In addition, an intermediate rail is provided between the fixed rail and the movable rail, and a plurality of slide balls are disposed between the intermediate rail and the fixed rail and between the intermediate rail and the movable rail to perform a rolling motion. According to such a configuration, the intermediate rail and the movable rail are supported by the fixed rail to slide together with the storage body.

[0004] In addition, a conventional sliding device for a drawer uses slide balls made of the same materials. For example, the slide ball made of metal or plastic is used.

[0005] However, if the slide ball made of metal is used, there are problems in that loud noise is generated when the storage body is moved, which causes discomfort to the user, and if the slide ball made of plastic is used, the slide ball is easily broken.

[DISCLOSURE]

[Technical Problem]

[0006] The present disclosure is intended to solve the above problems, and an object of the present disclosure is to provide a sliding device for a drawer capable of reinforcing rigidity while reducing noise during operation by mixing and using a plurality of slide balls having different tensile strengths.

[Technical Solution]

[0007] In order to achieve the object, a sliding device for a drawer according to a preferred exemplary embodiment of the present disclosure includes: a fixed rail fastened and fixed to a main body; a movable rail fastened and fixed to a storage body, and sliding on the fixed rail; an intermediate rail disposed between the fixed rail and the movable rail to guide the sliding movement of the movable rail; and ball assemblies disposed between the intermediate rail and the fixed rail and between the intermediate rail and the movable rail, respectively to slide, and provided with a plurality of slide balls having different tensile strengths, the slide ball having a large tensile strength being disposed at the outermost side thereof.

[0008] The intermediate rail may include: a plate part disposed between the fixed rail and the movable rail; and contact parts provided at both sides of the plate part along the longitudinal direction, respectively, and formed with rolling surfaces so that the slide balls of the ball assembly are partially accommodated, and a plurality of rolling surfaces may be formed to be spaced apart from each other along the circumferential direction thereof at each of one side and the other side of the plate part.

[0009] The ball assembly may include: a retainer provided in a 'U' shape, and formed with a plurality of through holes at regular intervals in the longitudinal direction at both ends and edges thereof; a first slide ball inserted into a first through hole formed in the end of one side of the retainer, and disposed on a first rolling surface formed to be curved at the edge of one side of the contact part; a second slide ball inserted into a second through hole formed in the edge of the retainer, and disposed on a second rolling surface formed to be curved at the edge of the other side of the contact part; and a third slide ball inserted into a third through hole formed in the end of the other side of the retainer, and disposed on a third rolling surface formed to be curved at the lower side of the second rolling surface.

[0010] Here, the retainer may have the first through hole and the third through hole which are provided on the same line, and also have the second through hole which is provided between the first through hole and the third through hole.

[0011] In addition, the first rolling surface, the second rolling surface, and the third rolling surface may be formed to

be curved at the same diameters, and the first slide ball, the second slide ball, and the third slide ball may also be provided at the same diameters.

[0012] Alternatively, the first rolling surface and the second rolling surface may be formed to be curved at the same diameters, and the third rolling surface may be formed to be curved at a larger diameter than that of the second rolling surface, and the first slide ball and the second slide ball may be provided at the same diameters, and the third slide ball may also be provided at a larger diameter than that of the second slide ball.

[0013] In addition, the ball assembly may also have the slide balls disposed at both side ends which are larger in tensile strength than the slide balls located at the center side, among the plurality of first slide balls and third slide balls.

[0014] In addition, the ball assembly may also have the slide balls disposed at both side ends which are larger in tensile strength than the slide balls located at the center side, among the plurality of second slide balls.

[0015] Furthermore, the ball assembly may also have the slide balls having different tensile strengths whose difference is 400 MPa or more.

[0016] More specifically, the ball assembly may have the slide ball having a large tensile strength which is made of a material having the tensile strength of 405 to 2500 MPa, and also have the slide ball having a small tensile strength which is made of a material having the tensile strength of 5 to 150 MPa.

[0017] The fixed rail and the movable rail may further include: stoppers formed to protrude from the inner circumferential surfaces of the fixed rail and the movable rail, and limiting the movement so that the ball assembly slides only within a predetermined region.

[0018] In addition, the intermediate rail may further include: a stopper limiting the movement so that the ball assembly slides only within a predetermined region.

[Advantageous Effects]

[0019] The sliding device for the drawer according to the present disclosure may reduce noise using the slide ball having the low tensile strength as a whole, and reinforce rigidity using the slide ball having the large tensile strength in the portion to which the shock load is applied.

[Description of Drawings]

[0020]

FIG. 1 is a perspective diagram schematically illustrating a sliding device for a drawer according to an exemplary embodiment of the present disclosure.

FIG. 2 is an exploded perspective diagram schematically illustrating the sliding device for the drawer according to the exemplary embodiment of the present disclosure.

FIG. 3 is a side diagram schematically illustrating the sliding device for the drawer according to the exemplary embodiment of the present disclosure.

FIG. 4 is a perspective diagram schematically illustrating a fixed rail and a movable rail excerpted from the sliding device for the drawer according to the exemplary embodiment of the present disclosure.

FIG. 5 is a side diagram schematically illustrating an intermediate rail excerpted from the sliding device for the drawer according to the exemplary embodiment of the present disclosure.

FIG. 6 is a perspective diagram schematically illustrating an intermediate rail excerpted from the sliding device for the drawer according to the exemplary embodiment of the present disclosure.

FIG. 7 is a plane diagram schematically illustrating a retainer excerpted from the sliding device for the drawer according to the exemplary embodiment of the present disclosure.

FIG. 8 is a diagram schematically illustrating a load-applied state of the sliding device for the drawer according to the exemplary embodiment of the present disclosure.

FIG. 9 is a front diagram and a rear diagram schematically illustrating a state where a ball assembly is disposed on the intermediate rail in the sliding device for the drawer according to the exemplary embodiment of the present disclosure.

FIG. 10 is a diagram schematically illustrating a sliding device for a drawer according to another exemplary embodiment of the present disclosure.

FIG. 11 is a diagram schematically illustrating a sliding device for a drawer according to still another exemplary embodiment of the present disclosure.

[Best Mode]

[0021] In order to help the understanding of the features of the present disclosure, a sliding device for a drawer

according to an exemplary embodiment of the present disclosure will be described in more detail below.

[0022] In adding the reference numerals to the components of each of the accompanying drawings in order to help the understanding of the exemplary embodiments described below, it is noted that the same components have the same reference numerals as possible even though they are displayed on different drawings. In addition, in the description of the present disclosure, if it is determined that detailed descriptions of related well-known structures or functions may obscure the gist of the present disclosure, detailed descriptions thereof will be omitted.

[0023] Hereinafter, specific exemplary embodiments of the present disclosure will be described with reference to the accompanying drawings.

[0024] FIGS. 1 to 3 are a perspective diagram, an exploded perspective diagram, and a side diagram schematically illustrating a sliding device for a drawer according to an exemplary embodiment of the present disclosure.

[0025] In addition, FIG. 4 is a perspective diagram schematically illustrating a fixed rail and a movable rail excerpted from the sliding device for the drawer, and FIGS. 5 and 6 are a side diagram and a perspective diagram schematically illustrating an intermediate rail excerpted from the sliding device for the drawer, and FIG. 7 is a plane diagram schematically illustrating a retainer excerpted from the sliding device for the drawer.

[0026] In addition, FIG. 8 is a diagram schematically illustrating a load state applied to the sliding device for the drawer, and FIG. 9 is a front diagram and a rear diagram schematically illustrating a state where the ball assembly is disposed on the intermediate rail in the sliding device for the drawer.

[0027] Referring to FIGS. 1 to 9, a sliding device for a drawer 100 according to an exemplary embodiment of the present disclosure includes a fixed rail 200 fastened and fixed to a main body 10, a movable rail 300 fastened and fixed to a storage body 20 and sliding on the fixed rail 200, an intermediate rail 400 disposed between the fixed rail 200 and the movable rail 300 to guide the sliding movement of the movable rail 300, and ball assemblies 500 disposed between the intermediate rail 400 and the fixed rail 200 and between the intermediate rail 400 and the movable rail 300, respectively to move to be slidable and provided with a plurality of slide balls having different tensile strengths, the slide ball having a large tensile strength being disposed at the outermost portion thereof.

[0028] That is, the present disclosure may dispose a slide ball made of a material having a relatively small tensile strength at the center side of the sliding device, and a slide ball made of a material having a relatively large tensile strength at the outermost side thereof, thereby reducing noise during driving compared to a sliding device using only a slide ball made of a material having a large tensile strength, and reinforcing rigidity compared to a sliding device using only a slide ball made of a material having a small tensile strength.

[0029] The fixed rail 200 is fastened to the inner surface of the main body 10 and fixed in position, and the movable rail 300 is fastened to the outer surface of the storage body 20 and provided to move to be slidable on the fixed rail 200 to draw into or draw out the storage body 20.

[0030] In addition, the inner circumferential surfaces of the fixed rail 200 and the movable rail 300 are formed with a fixed rail stopper 210 and a movable rail stopper 310 which are formed to protrude inward, respectively to limit the movement so that the ball assembly 500 slides only within a predetermined region.

[0031] That is, as illustrated in FIG. 4, a pair of the fixed rail stopper 210 and a pair of the movable rail stopper 310 are provided and are formed to be spaced apart from each other at regular intervals, respectively. According to such a configuration, the ball assembly 500 slides only between the fixed rail stoppers 210 and between the movable rail stoppers 310.

[0032] The intermediate rail 400 includes a plate part 410 disposed between the fixed rail 200 and the movable rail 300, and contact parts 420 provided at both sides of the plate part 410 along the longitudinal direction and formed with rolling surfaces so that the slide ball of the ball assembly 500 is partially accommodated. Here, three rolling surfaces are formed to be spaced apart from each other along the circumferential direction at each of one side and the other side of the plate part 410, and provided so that the plurality of slide balls roll and are in contact with the rolling surface.

[0033] More specifically, referring to FIG. 5, the contact parts 420 are formed at the upper side and the lower side of the plate part 410, and the contact part 420 formed at the upper side is formed to be reversely symmetrical to the contact part 420 formed at the lower side. That is, the three rolling surfaces are formed along the circumferential direction at the upper side of the plate part 410, and the three rolling surfaces are formed along the circumferential direction at the lower side of the plate part 410.

[0034] Here, referring to FIG. 6, the rolling surfaces are composed of a first rolling surface 421 formed to be curved at the edge of one side of the contact part 420, a second rolling surface 422 formed to be curved at the same diameter as the first rolling surface 421 at the edge of the other side of the contact part 420, and a third rolling surface 423 formed to be curved at a larger diameter than that of the second rolling surface 422 at the lower side of the second rolling surface 422. That is, the slide balls having the same diameters are disposed on the first rolling surface 421 and the second rolling surface 422, and the slide balls having a larger diameter are disposed on the third rolling surface 423.

[0035] In addition, the intermediate rail 400 is provided with an intermediate rail stopper 430 which limits the movement so that the ball assembly 500 slides only within a predetermined region.

[0036] More specifically, a pair of the intermediate rail stoppers 430 are provided and disposed to be spaced apart

from each other at a regular interval, and formed to protrude from the plate part 410 toward the first rolling surface 421. That is, the intermediate rail stoppers 430 are formed to have a separation distance longer than the length of the ball assembly 500, so that the ball assembly 500 is provided to move to be slidable between the intermediate rail stoppers 430.

[0037] In addition, as illustrated in FIG. 8, the intermediate rail stopper 430 formed at the upper side of the plate part 410 is formed to be inversely symmetrical to the intermediate rail stopper 430 formed at the lower side of the plate part 410. That is, the intermediate rail stopper 430 formed at the upper side of the plate part 410 is formed to be biased to the left side with respect to the drawing, and the intermediate rail stopper 430 formed at the lower side of the plate part 410 is formed to be biased to the right side with respect to the drawing. Of course, a gap between the intermediate rail stoppers 430 formed at the upper side of the plate part 410 and a gap between the intermediate rail stoppers 430 formed at the lower side of the plate part 410 may also be formed differently.

[0038] The intermediate rail stopper 430 thus formed may limit the maximum drawn-out distance of the storage body by limiting the movement region of the ball assembly 500 together with the fixed rail stopper 210 and the movable rail stopper 310.

[0039] The ball assembly 500 includes a retainer 510 provided in a 'U' shape and formed with a plurality of through holes at regular intervals in the longitudinal direction at both ends and edges, a first slide ball 520 inserted into a first through hole 511 formed in the end of one side of the retainer 510 and disposed on the first rolling surface 421, a second slide ball 530 inserted into a second through hole 512 formed at the edge of the retainer 510, provided at the same diameter as the first slide ball 520, and disposed on the second rolling surface 422, and a third slide ball 540 inserted into a third through hole 513 formed in the end of the other side of the retainer 510, provided to have a larger diameter than that of the second slide ball 530, and disposed on the third rolling surface 423.

[0040] More specifically, referring to FIG. 7, the retainer 510 has the first through holes 511 which are formed in the end of one side at regular intervals along the longitudinal direction, the second through holes 512 which are formed in the edge at regular intervals along the longitudinal direction, and the third through holes 513 which are formed in the end of the other side at regular intervals along the longitudinal direction.

[0041] Here, the first through hole 511 and the third through hole 513 are provided on the same line, and the second through hole 512 is provided between the first through hole 511 and the third through hole 513. According to such a configuration, a load point may be dispersed and thus the load applied to the sliding device 100 for the drawer by the storage body may be dispersed, thereby reinforcing the rigidity of the sliding device for the drawer.

[0042] Referring to FIG. 8, the ball assembly 500 has the first slide ball 520 and the second slide ball 530 which are provided at the same diameters, and the third slide ball 540 which is provided larger in diameter than the first slide ball 520.

[0043] When a storage object is stored in the storage body 20, as illustrated in FIG. 8, a rotational force R is applied clockwise and thus load P larger than those of the first slide ball 520 and the second slide ball 530 is applied to the third slide ball 540. Particularly, if a heavy storage object is accommodated in the storage body 20, a larger load is applied to the third slide ball 540 by the rotational force R, thereby increasing wear and damage of the third slide ball 540.

[0044] Accordingly, the third slide ball 540 and the third rolling surface 423 are provided to have a larger diameter than those of the first slide ball 520 and the first rolling surface 421, thereby increasing a rolling contact area of the third slide ball 540. Accordingly, the intensive load applied between the movable-rail 300 and the third slide ball 540 and between the third slide ball 540 and the third rolling surface 423 may be dispersed, thereby reducing wear and damage of the third slide ball 540.

[0045] Referring to FIG. 9, the ball assembly 500 has the slide balls 521, 541 disposed at both side ends of the plurality of first slide balls 520 and third slide balls 540 which are made of a material having the tensile strength larger than that of the slide balls 522, 542 located at the center side of the ball assembly 500.

[0046] In addition, the ball assembly 500 may also be provided with the slide balls 531 disposed at both side ends of the plurality of second slide balls 530 having the tensile length larger than that of the slide ball 532 located at the center side of the ball assembly 500.

[0047] That is, the ball assembly 500 may be configured so that only the first and third slide balls 520, 540 of the first to third slide balls 520, 530, 540 have the slide balls 521, 541 located at both side ends which are made of a material having a large tensile strength, or all of the first to third slide balls 520, 530, 540 have the slide balls 521, 531, 541 located at both side ends which are made of a large tensile strength. Accordingly, it is possible to select the number of slide balls used made of a material having a large tensile strength in consideration of the required rigidity according to the use of the storage body.

[0048] Here, a material having a difference in tensile strength of 400 MPa or more among the slide balls having different tensile strengths may be selected and applied to the ball assembly 500.

[0049] More specifically, the slide ball having the large tensile strength may be made of a material having the tensile strength of 405 to 2500 MPa, and the slide ball having the small tensile strength may be made of a material having a tensile strength of 5 to 150 MPa.

[0050] For example, a slide ball made of iron having a tensile strength of 600 MPa and a slide ball made of polyacetal

resin (POM) having a tensile strength of 100 MPa are used, and a comparison of noises generated in the sliding device in the case of using only the slide ball made of iron and the case of mixing and using the slide ball made of iron and the slide ball made of polyacetal resin is shown in Table below.

[0051] In Table 1 below, a Comparative Example is a case where only the slide ball made of iron is used.

[0052] In addition, in Example 1, for all of the first to third slide balls 520, 530, 540, the slide balls 521, 531, 541 located both side ends thereof used the slide balls made of iron, and the slide balls 522, 532, 542 located at the center side thereof used the slide balls made of polyacetal resin.

[0053] In addition, in Example 2, for only the first and third slide balls 520, 540, the slide balls 521, 541 located at both side ends used the slide balls made of iron, and the slide balls 522, 542 located at the center side and the second slide ball 530 used the slide balls made of polyacetal resin.

[Table 1]

	Comparative Example	Example 1		Example 2	
	[dB]	[dB]	Improvement rate	[dB]	Improvement rate
ISO Loudness	4.4	3.9	11%	2.5	56%

[0054] As shown in Table 1, in the Comparative Example, a noise of 4.4 dB was generated during operation, and in Example 1, a noise of 3.9 dB was generated, thereby improving the noise by 11%. In addition, in Example 2, it may be seen that a noise of 2.5 dB was generated, thereby improving the noise by 56%.

[0055] Accordingly, the slide balls located at both side ends may use the slide ball made of a material having a relatively large tensile strength such as iron, thereby reinforcing rigidity, and the slide ball located at the center side may use the slide ball made of a material having a relatively low tensile strength such as polyacetal resin, thereby reducing the generation of noise, compared to the case where all of the slide balls use the slide balls made of iron.

[0056] FIG. 10 is a diagram schematically illustrating a sliding device for a drawer according to another exemplary embodiment of the present disclosure.

[0057] Referring to FIG. 10, a sliding device for a drawer according to another exemplary embodiment of the present disclosure is provided to have the same configuration as the sliding device for the drawer according to the exemplary embodiment of the present disclosure described with reference to FIGS. 1 to 9, and only a difference is that the first rolling surface, the second rolling surface, and the third rolling surface are formed to be curved at the same diameters and the first slide ball, the second slide ball, and the third slide ball are provided at the same diameters.

[0058] That is, the sliding device for the drawer according to another exemplary embodiment of the present disclosure is provided so that the first to third slide balls have the same diameters.

[0059] FIG. 11 is a diagram schematically illustrating a sliding device for a drawer according to still another exemplary embodiment of the present disclosure.

[0060] A sliding device for a drawer according to still another exemplary embodiment of the present disclosure is provided to have the same configuration as the sliding device for the drawer according to the exemplary embodiment of the present disclosure described with reference to FIGS. 1 to 9, and a difference is the number of arrangements of the slide balls.

[0061] That is, as illustrated in FIG. 11A, the sliding device for the drawer according to still another exemplary embodiment of the present disclosure may have the slide balls disposed on the contact part which are provided in a two-column state, or as illustrated in FIG. 11B, also have the slide balls disposed on the contact part which are provided in a four-column state.

[0062] As described above, although the present disclosure has been described by the limited exemplary embodiments and drawings, it is natural that the present disclosure is not limited thereto and various modifications and changes are possible by those skilled in the art to which the present disclosure pertains without departing from the technical spirit of the present disclosure and the equivalent scope of the claims set forth below.

Claims

1. A sliding device for a drawer comprising:

- a fixed rail fastened and fixed to a main body;
- a movable rail fastened and fixed to a storage body, and sliding on the fixed rail;
- an intermediate rail disposed between the fixed rail and the movable rail to guide the sliding movement of the movable rail; and

ball assemblies disposed between the intermediate rail and the fixed rail and between the intermediate rail and the movable rail, respectively to move to be slidable, and provided with a plurality of slide balls having different tensile strengths, the slide ball having a large tensile strength being disposed at the outermost side thereof.

- 5 **2.** The sliding device for the drawer of claim 1,
wherein the intermediate rail comprises:

a plate part disposed between the fixed rail and the movable rail; and
contact parts provided at both sides of the plate part along the longitudinal direction, respectively, and formed
10 with rolling surfaces so that the slide balls of the ball assembly are partially accommodated, and
wherein a plurality of rolling surfaces are formed to be spaced apart from each along the circumferential direction
thereof at each of one side and the other side of the plate part.
- 15 **3.** The sliding device for the drawer of claim 2,
wherein the ball assembly comprises:
a retainer provided in a '┐' shape, and formed with a plurality of through holes at regular intervals in the
longitudinal direction at both ends and edges thereof;
a first slide ball inserted into a first through hole formed in the end of one side of the retainer, and disposed on
a first rolling surface formed to be curved at the edge of one side of the contact part;
20 a second slide ball inserted into a second through hole formed in the edge of the retainer, and disposed on a
second rolling surface formed to be curved at the edge of the other side of the contact part; and
a third slide ball inserted into a third through hole formed in the end of the other side of the retainer, and disposed
on a third rolling surface formed to be curved at the lower side of the second rolling surface.
- 25 **4.** The sliding device for the drawer of claim 3,
wherein the retainer has the first through hole and the third through hole which are provided on the same line, and
the second through hole which is provided between the first through hole and the third through hole.
- 30 **5.** The sliding device for the drawer of claim 3,
wherein the first rolling surface, the second rolling surface, and the third rolling surface are formed to be curved at
the same diameters, and
wherein the first slide ball, the second slide ball, and the third slide ball are provided at the same diameters.
- 35 **6.** The sliding device for the drawer of claim 3,
wherein the first rolling surface and the second rolling surface are formed to be curved at the same diameters, and
the third rolling surface is formed to be curved at a larger diameter than that of the second rolling surface, and
wherein the first slide ball and the second slide ball are provided at the same diameters, and the third slide ball is
provided at a larger diameter than that of the second slide ball.
- 40 **7.** The sliding device for the drawer of claim 3,
wherein the ball assembly has the slide balls disposed at both side ends which are larger in tensile strength than
the slide balls located at the center side, among the plurality of first slide balls and third slide balls.
- 45 **8.** The sliding device for the drawer of claim 7,
wherein the ball assembly has the slide balls disposed at both side ends which are larger in tensile strength than
the slide balls located at the center side, among the plurality of second slide balls.
- 50 **9.** The sliding device for the drawer of claim 1,
wherein the ball assembly has the slide balls having different tensile strengths whose difference is 400 MPa or more.
- 55 **10.** The sliding device for the drawer of claim 1,
wherein the ball assembly has the slide ball having a large tensile strength which is made of a material having the
tensile strength of 405 to 2500 MPa, and the slide ball having a small tensile strength which is made of a material
having the tensile strength of 5 to 150 MPa.
- 11.** The sliding device for the drawer of claim 1,
wherein the fixed rail and the movable rail further comprise:

stoppers formed to protrude from the inner circumferential surfaces of the fixed rail and the movable rail, and limiting the movement so that the ball assembly slides only within a predetermined region.

12. The sliding device for the drawer of claim 1,

5 wherein the intermediate rail further comprises:

a stopper limiting the movement so that the ball assembly slides only within a predetermined region.

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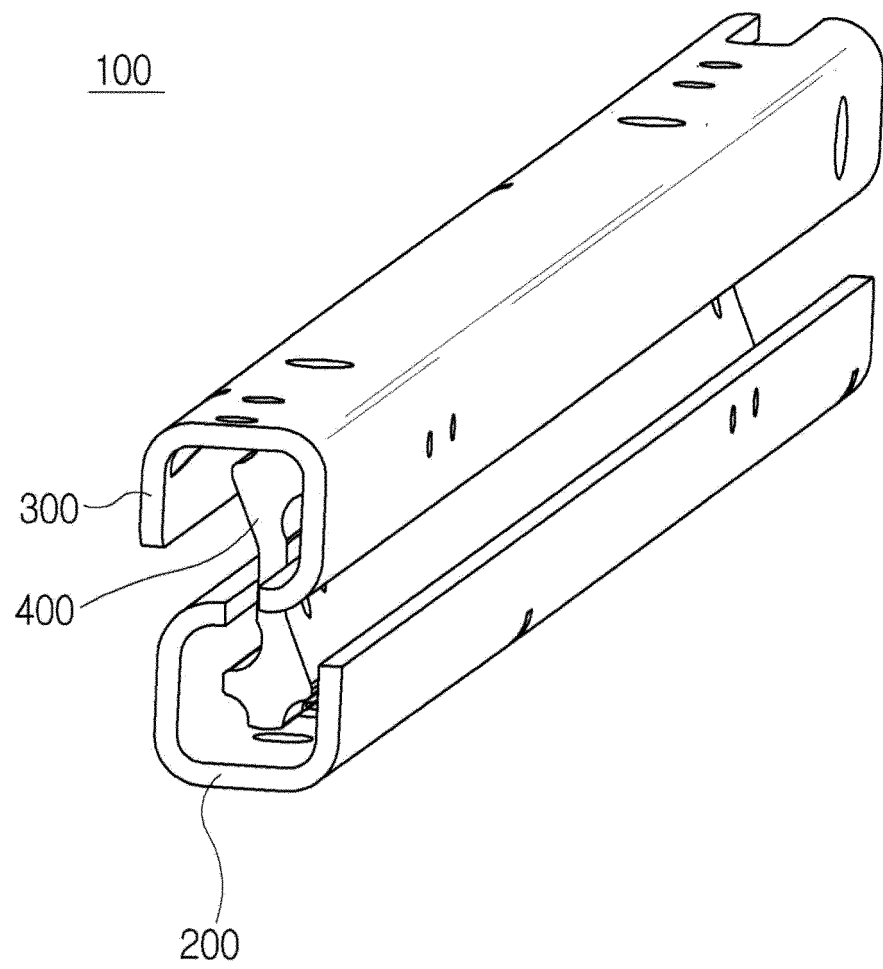
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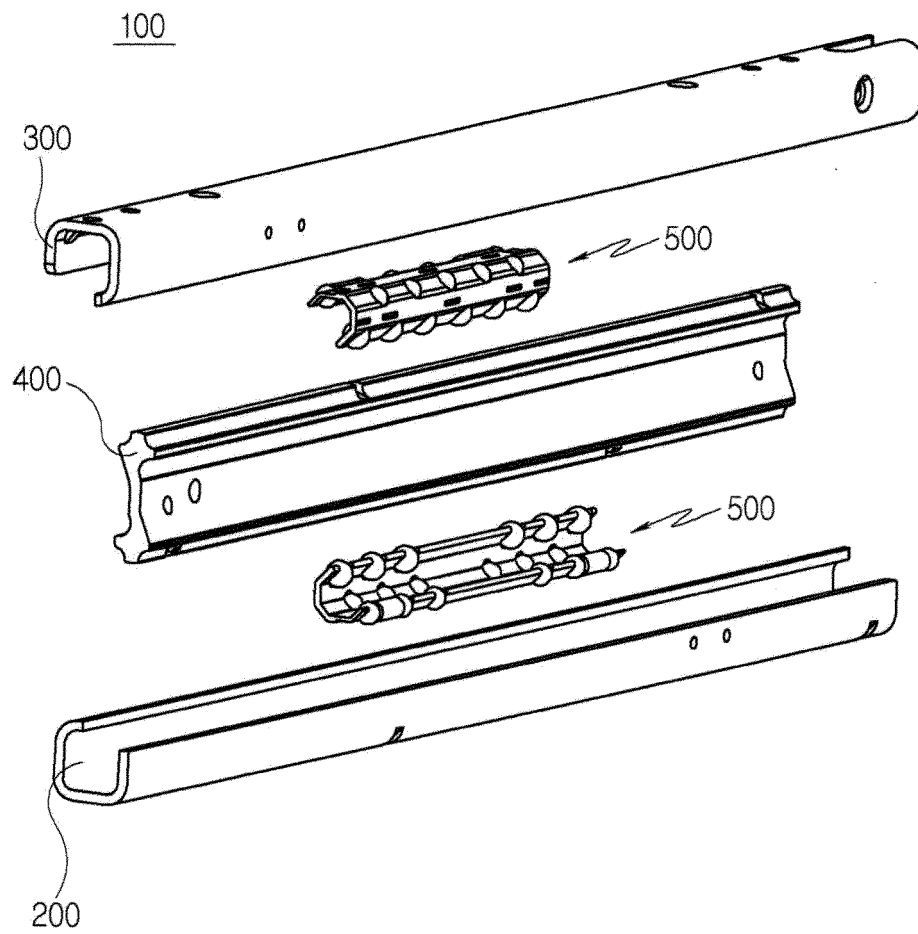
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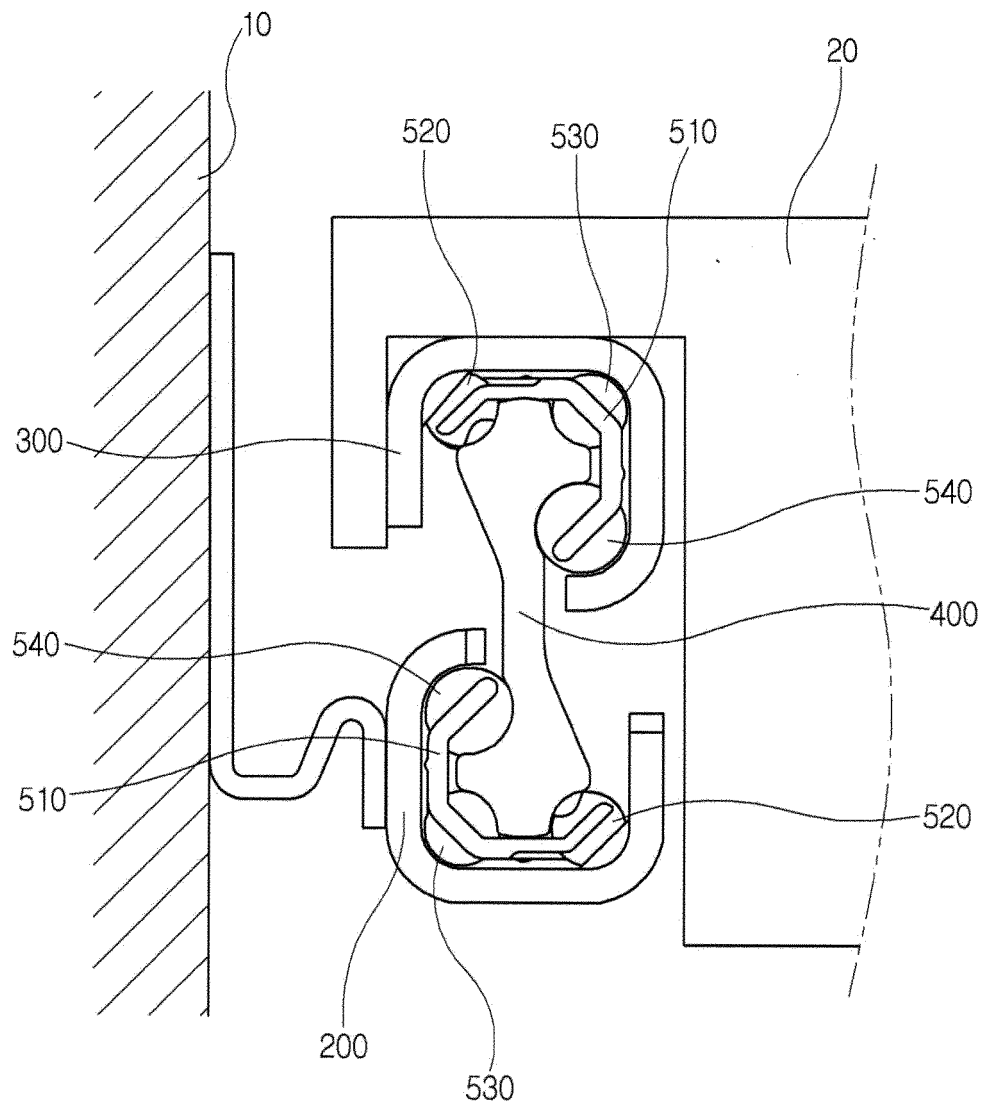
[FIG. 1]



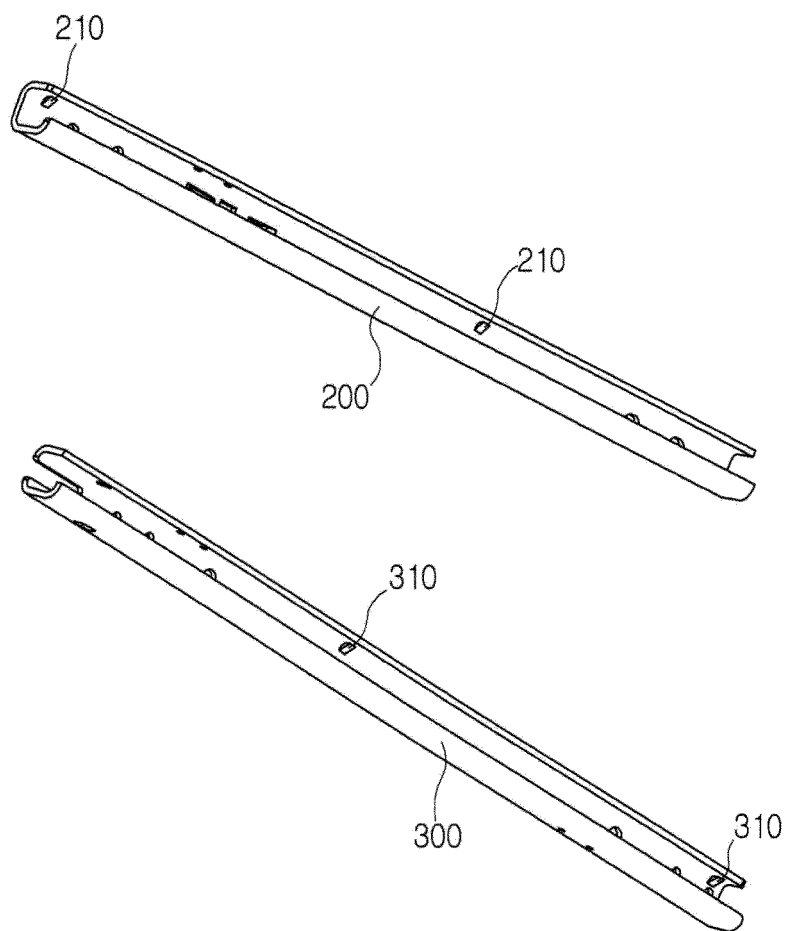
[FIG. 2]



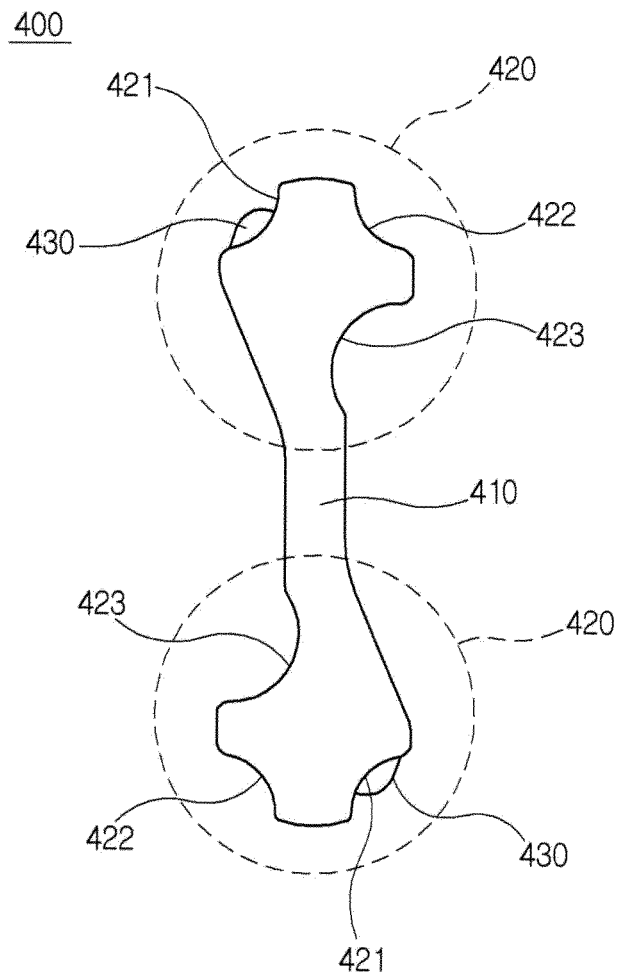
[FIG. 3]



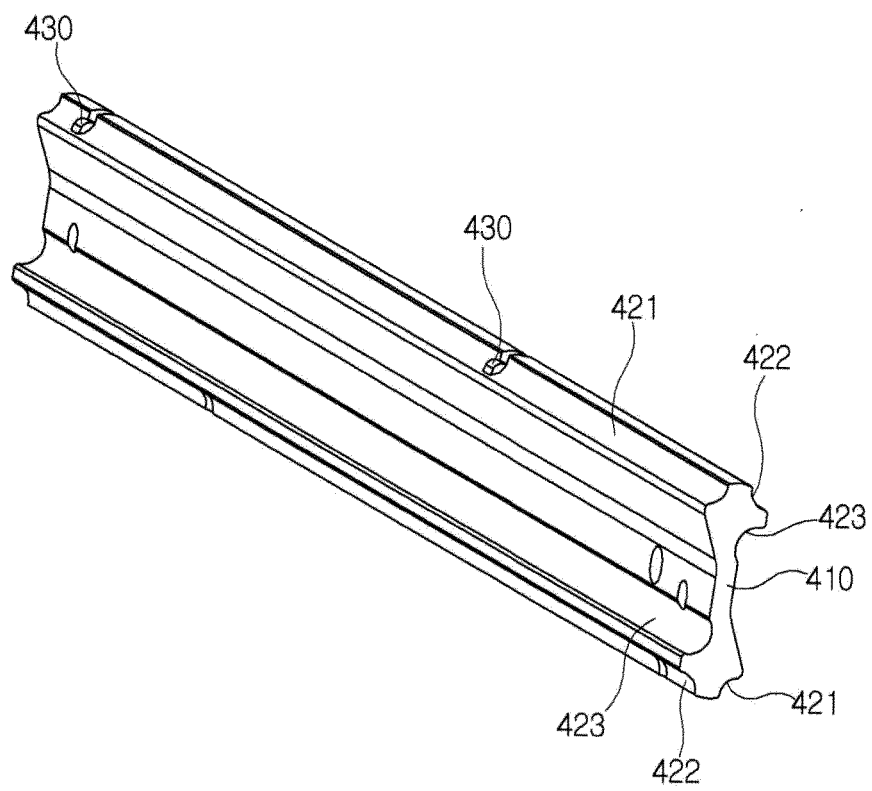
[FIG. 4]



[FIG. 5]

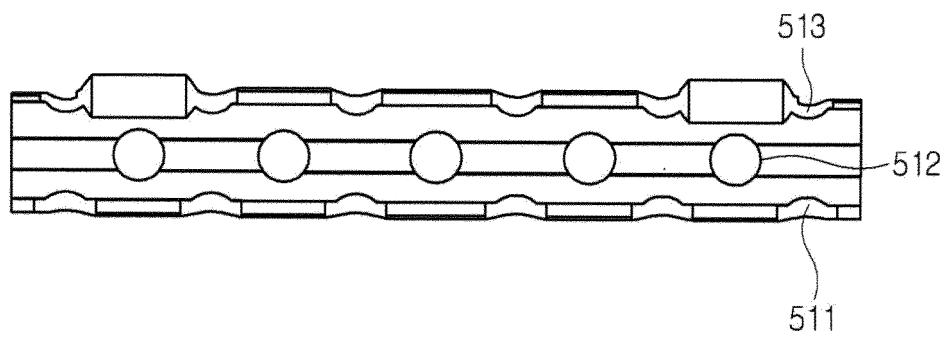


[FIG. 6]

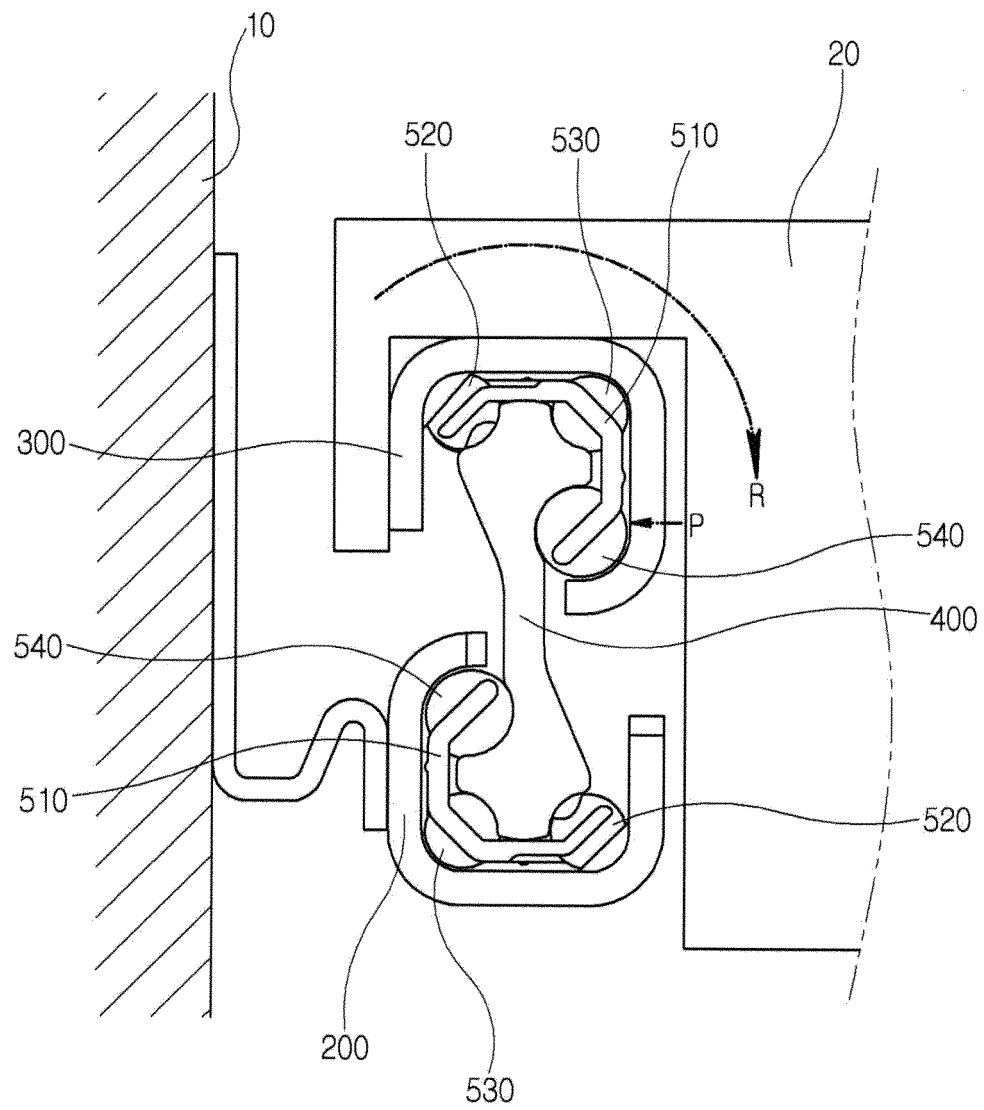


[FIG. 7]

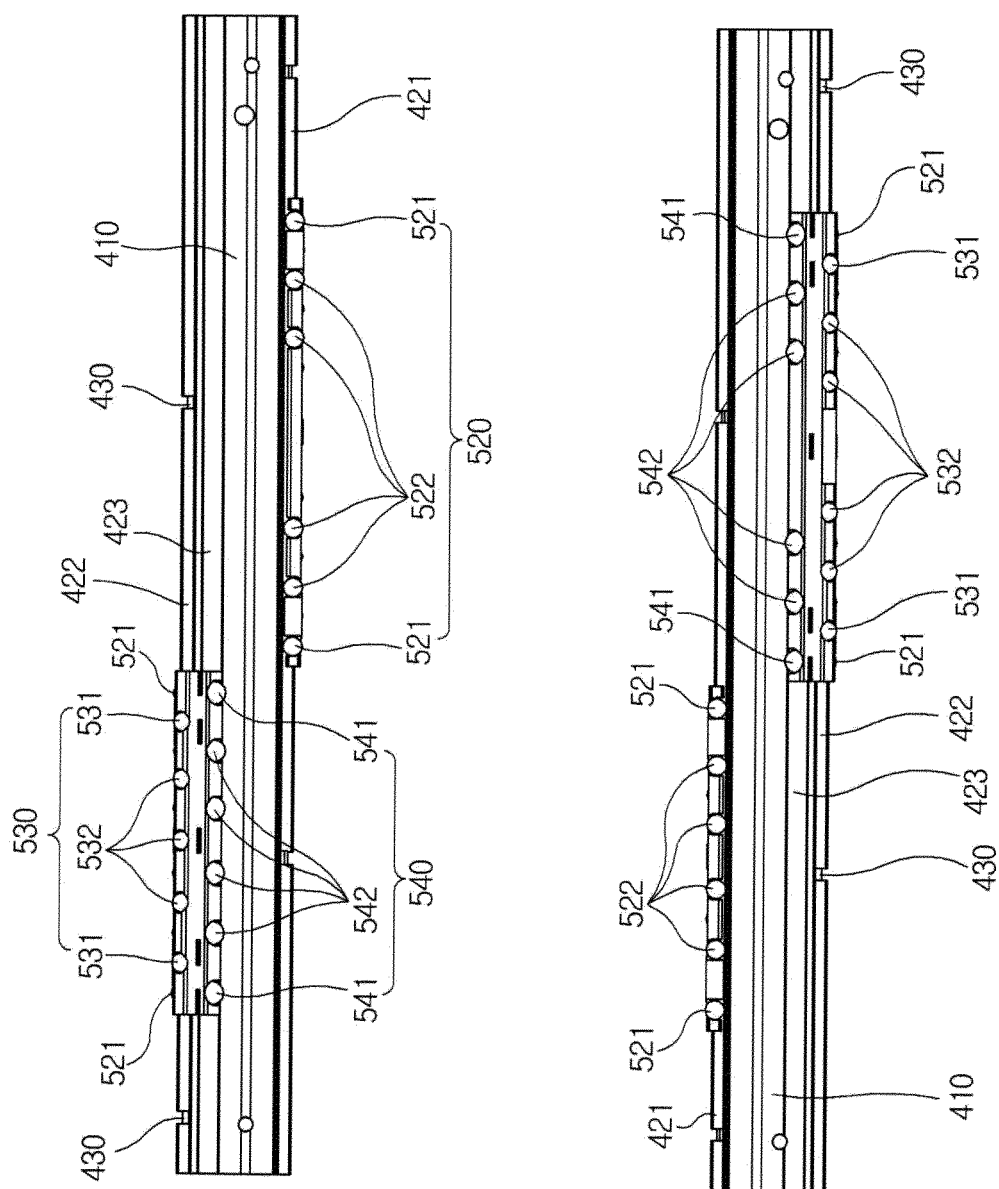
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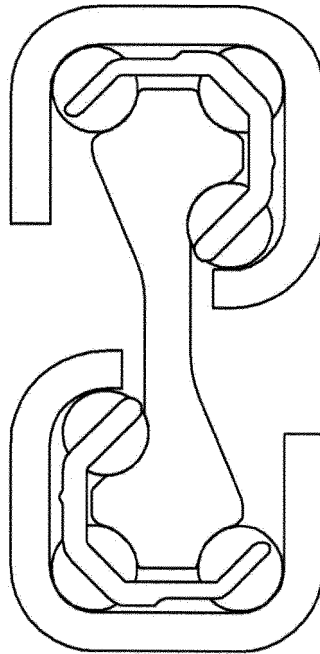
[FIG. 8]



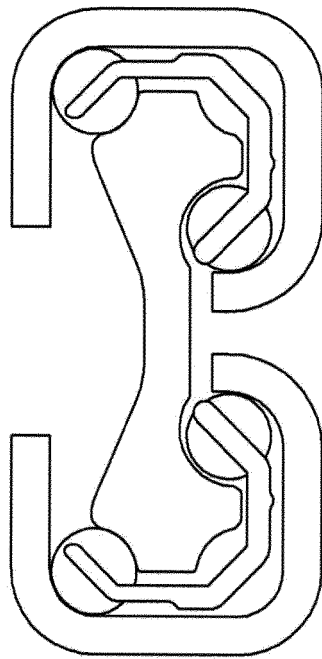
[FIG. 9]



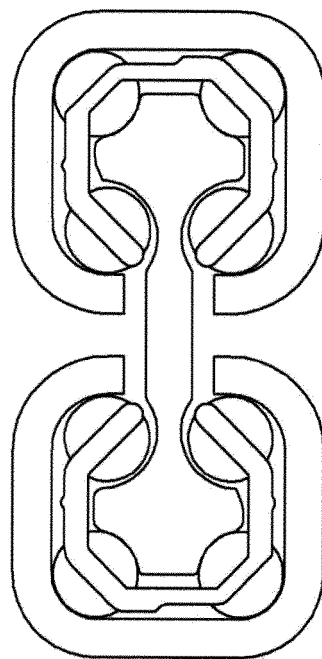
[FIG. 10]



[FIG. 11]



(a)



(b)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2018/016806

A. CLASSIFICATION OF SUBJECT MATTER

A47B 88/437(2017.01)i, A47B 88/473(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)

A47B 88/437; A23B 7/10; A47B 88/04; A47B 88/493; A47B 88/473

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

Korean utility models and applications for utility models: IPC as above

Japanese utility models and applications for utility models: IPC as above

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

eKOMPASS (KIPO internal) & Keywords: drawer, furniture, withdrawal, slide, ball, roller, strength and material

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 10-0897920 B1 (PARK, Yoon Sig et al.) 18 May 2009 See paragraphs [0022]-[0033] and figures 4-5, 7.	1-12
Y	US 2013-0193824 A1 (SCHOCK METALLWERK GMBH.) 01 August 2013 See paragraphs [0070], [0072] and figures 7-8.	1-12
A	KR 10-2003-0037040 A (WINIAMANDO INC.) 12 May 2003 See claim 1 and figures 3-5.	1-12
A	KR 20-0291086 Y1 (CHUNG, Doo Young) 09 October 2002 See abstract and figure 1.	1-12
A	JP 07-039430 A (KNAPE & VOGT MANUFACTURING CO.) 10 February 1995 See claim 1 and figure 2.	1-12

☐ 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

"E" earlier application or patent but published on or after the international filing date

"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

"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

"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

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

12 APRIL 2019 (12.04.2019)

Date of mailing of the international search report

12 APRIL 2019 (12.04.2019)

Name and mailing address of the ISA/KR


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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR2018/016806

Patent document cited in search report	Publication date	Patent family member	Publication date
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