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(54) **SLIDE RAIL BUFFERING STRUCTURE**

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(57) **ABSTRACT**

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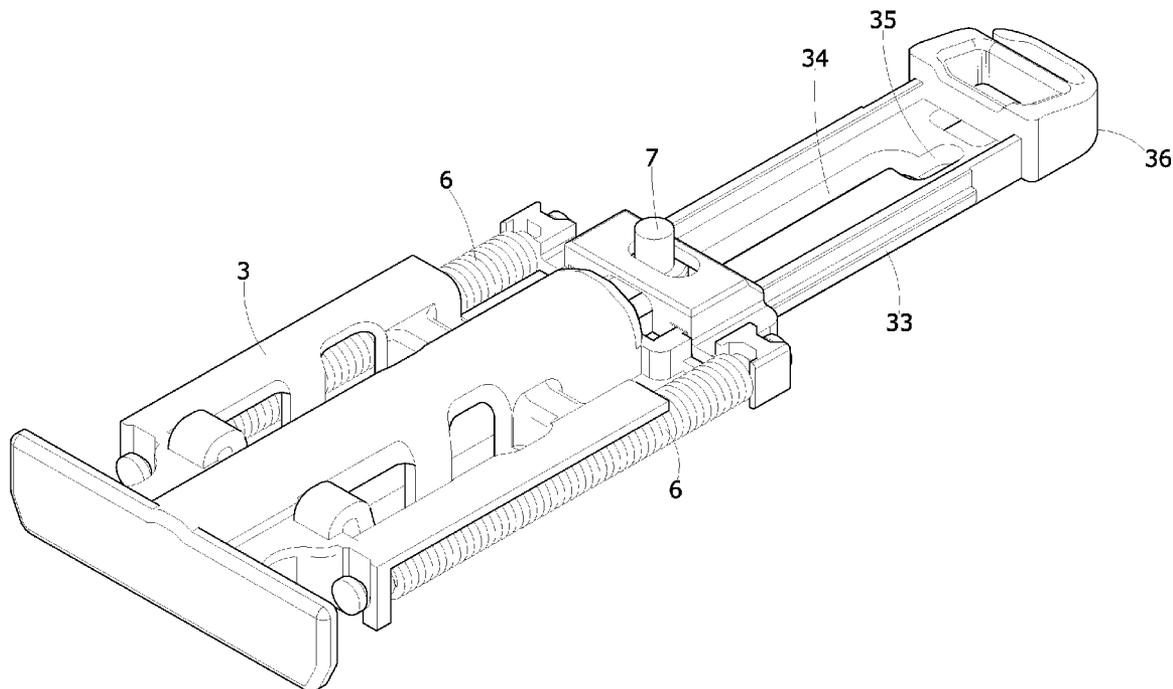
A slide rail buffering structure includes a connection board, a slidable board, a damper, a pull-resistant assembly, and a positioning bar. The positioning bar is received in a slide channel of the connection board. The slidable board is fit over the positioning bar and is set on the track portion of the connection board. The damper is received in an end of the connection board and the damper is coupled to the slidable board. The pull-resistant assembly is connected between the slidable board and the connection board and is set at an end of a rail base plate. The structure of the present invention allows the positioning bar to be caught and driven by a guide section of a rail plate to alleviate and buffer the pulling force of the connection board that is moved backward for returning so as to prevent damage caused by excessive pulling force.

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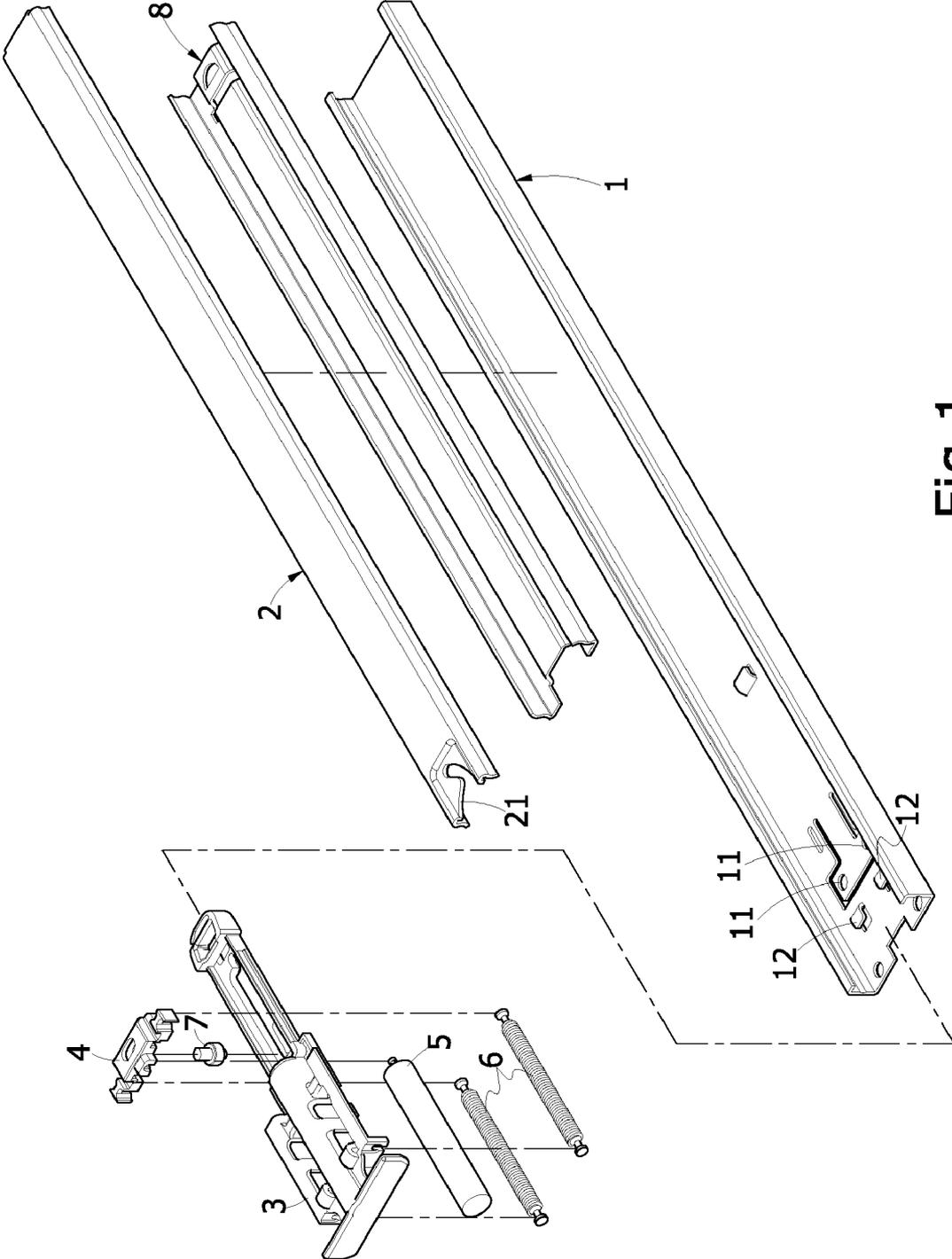


Fig. 1

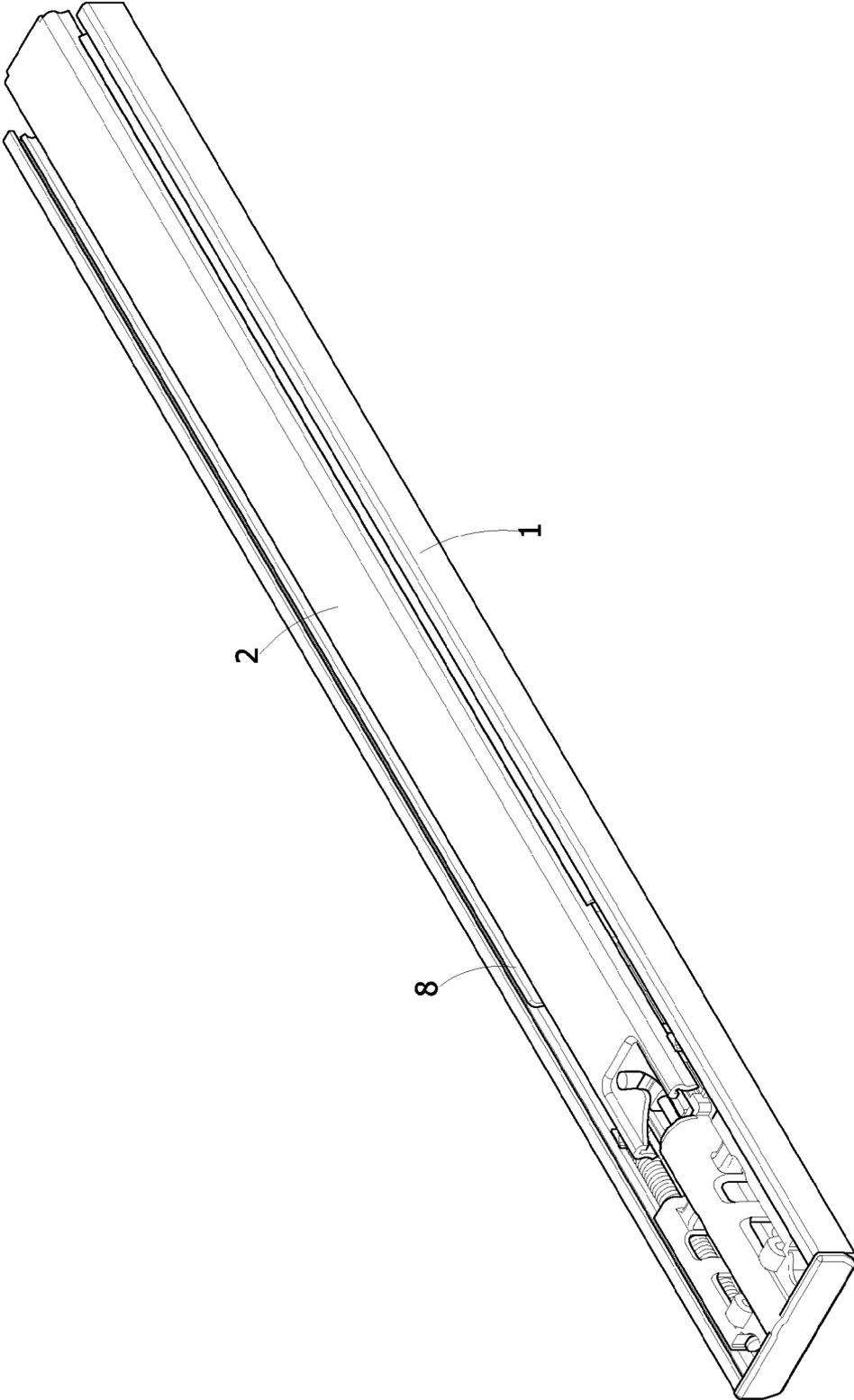


Fig.2

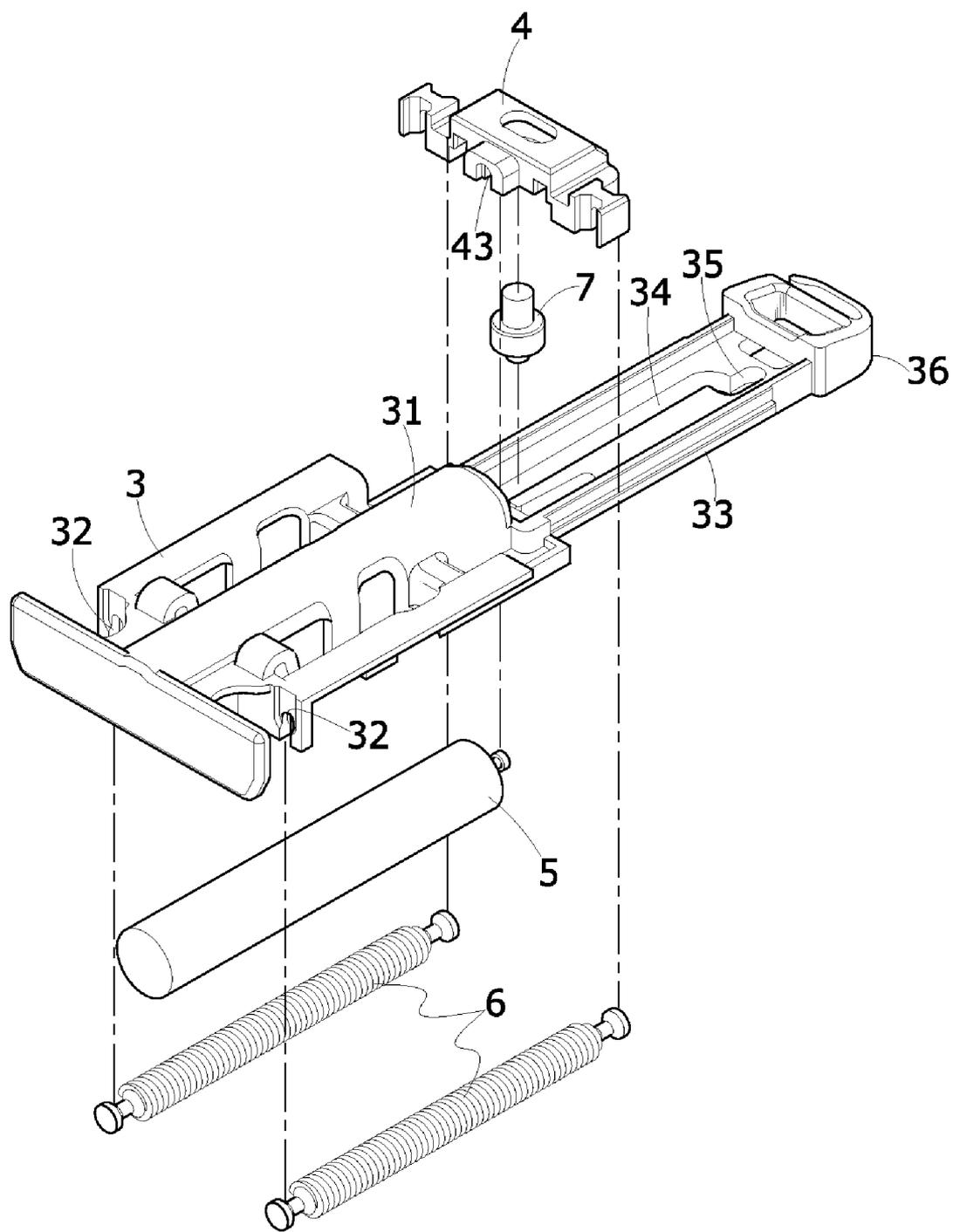


Fig.3

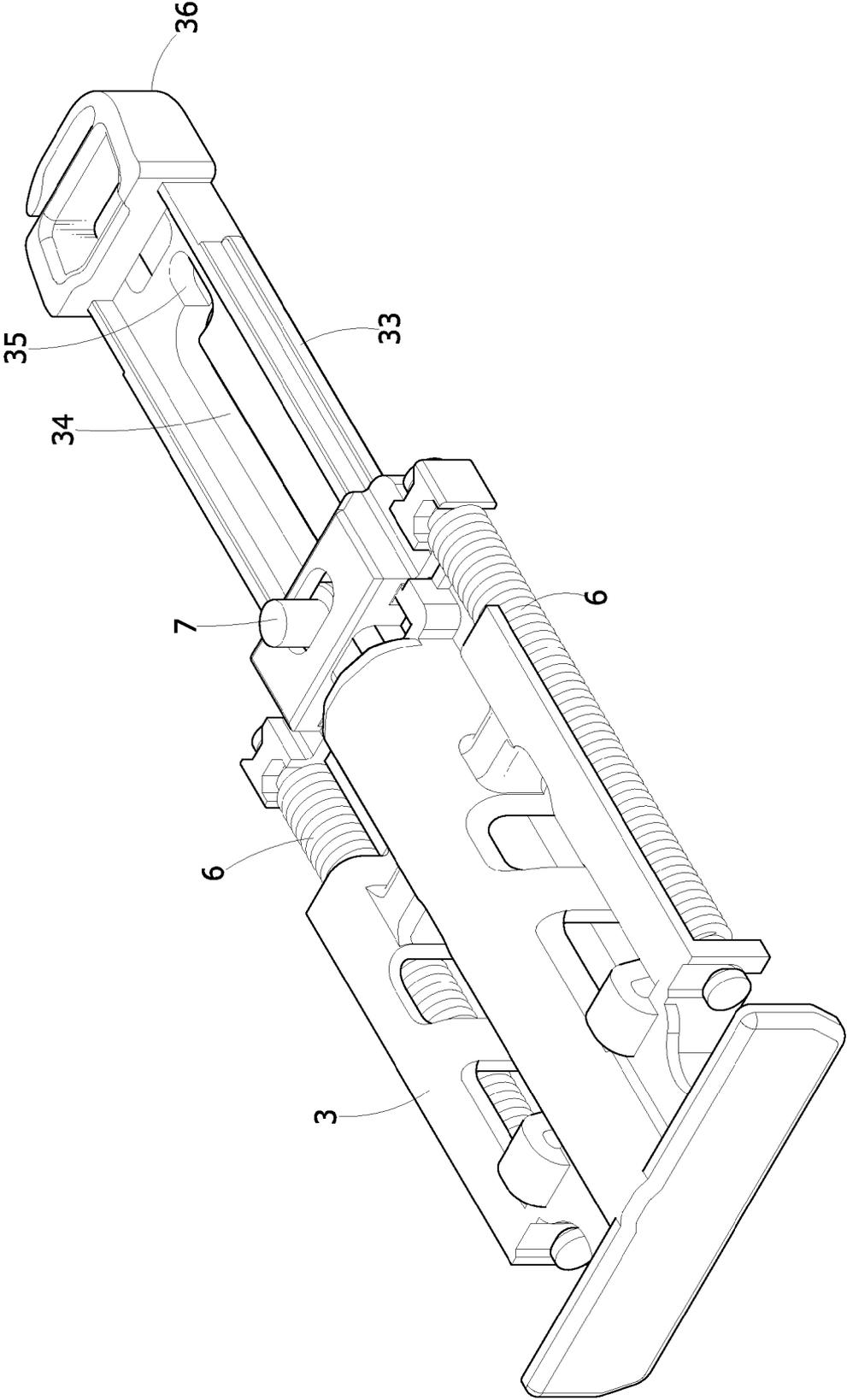


Fig.4

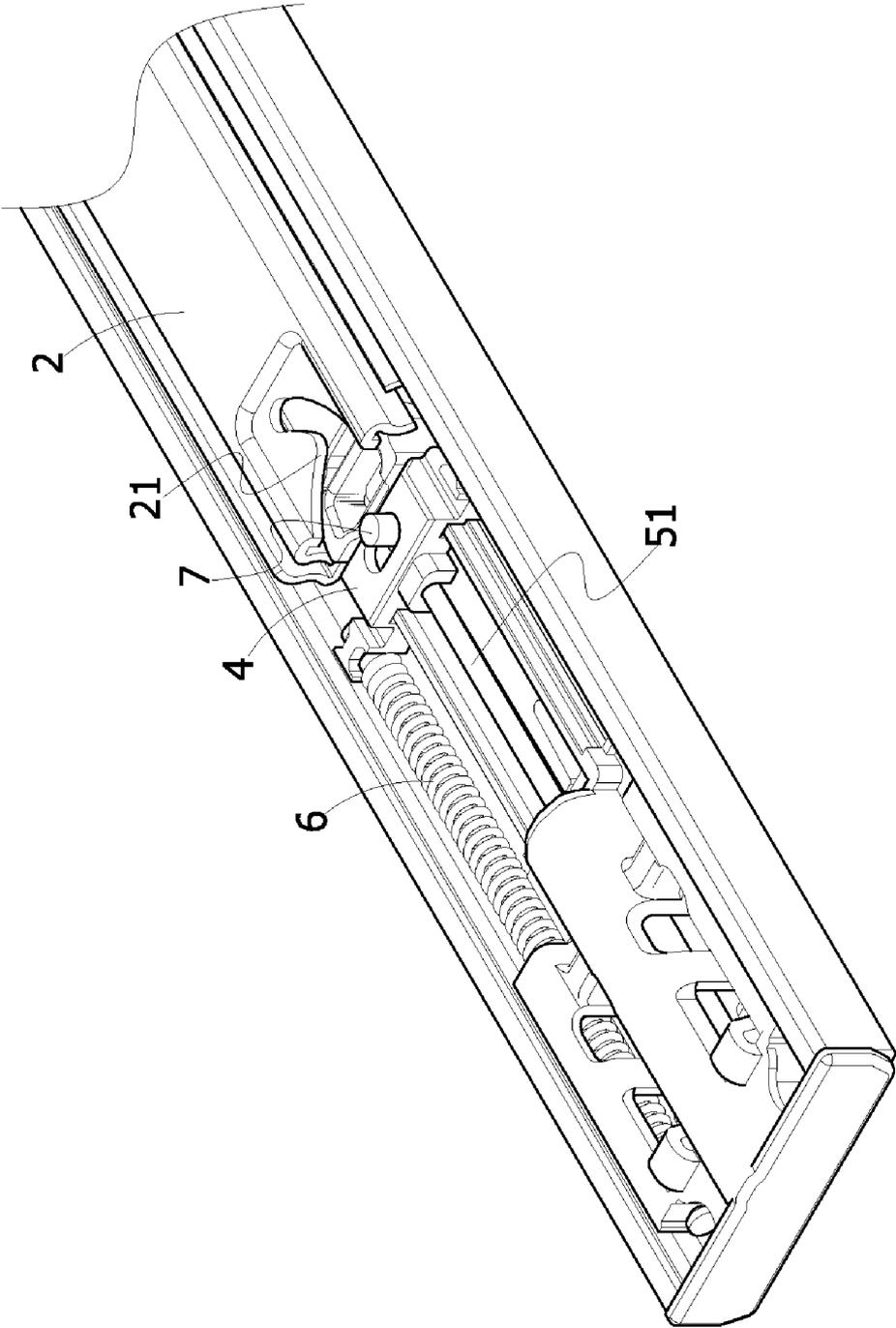


Fig. 5A

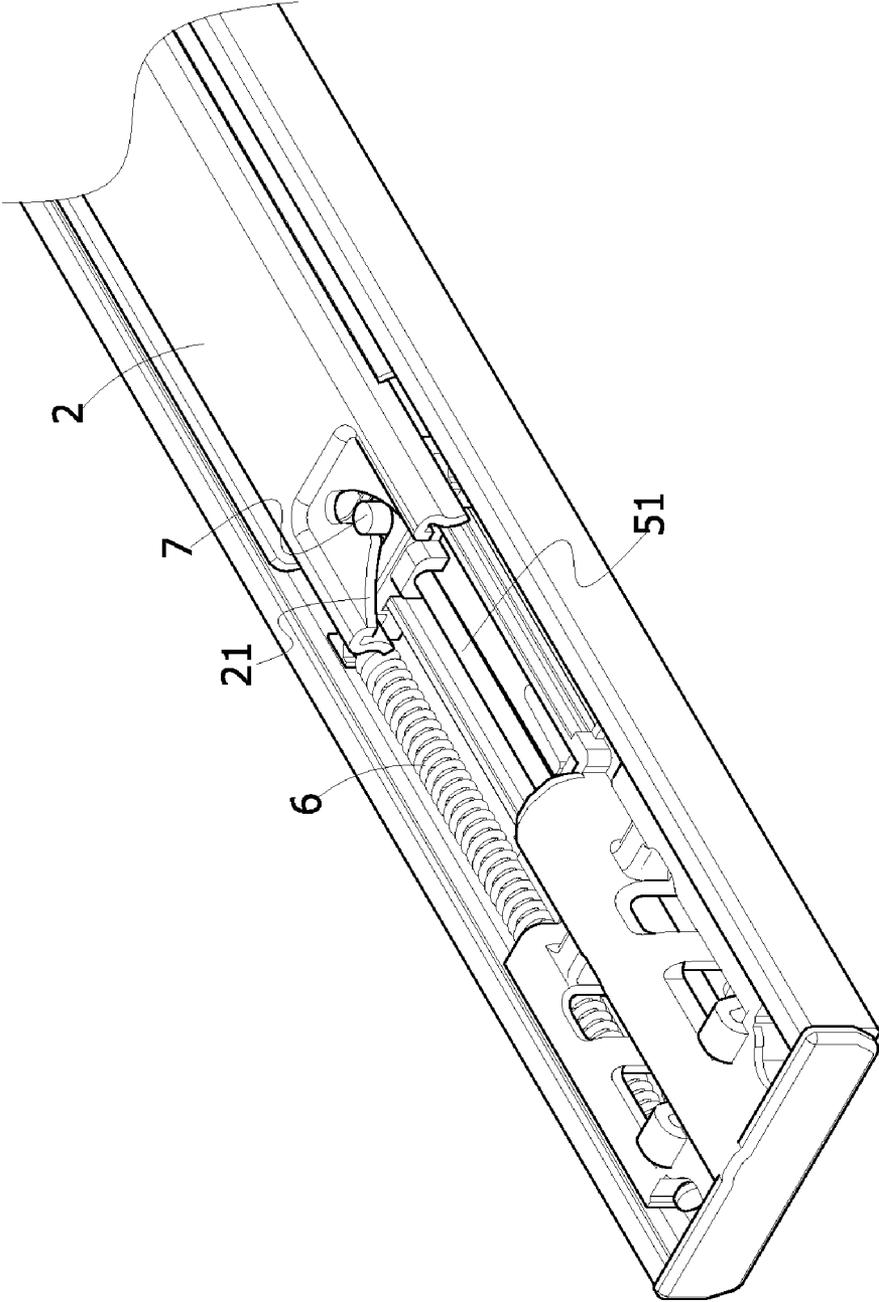


Fig. 5B

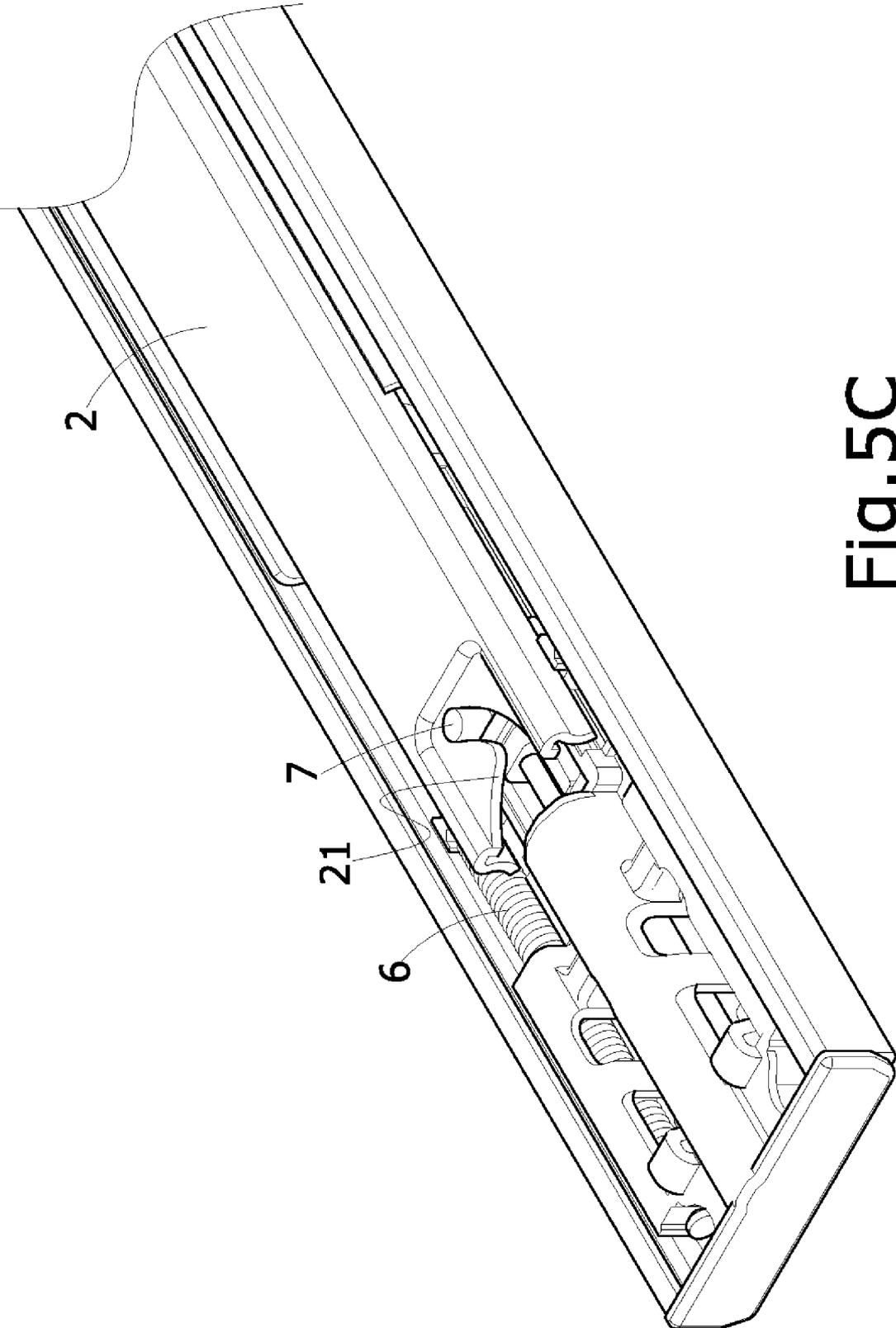


Fig. 5C

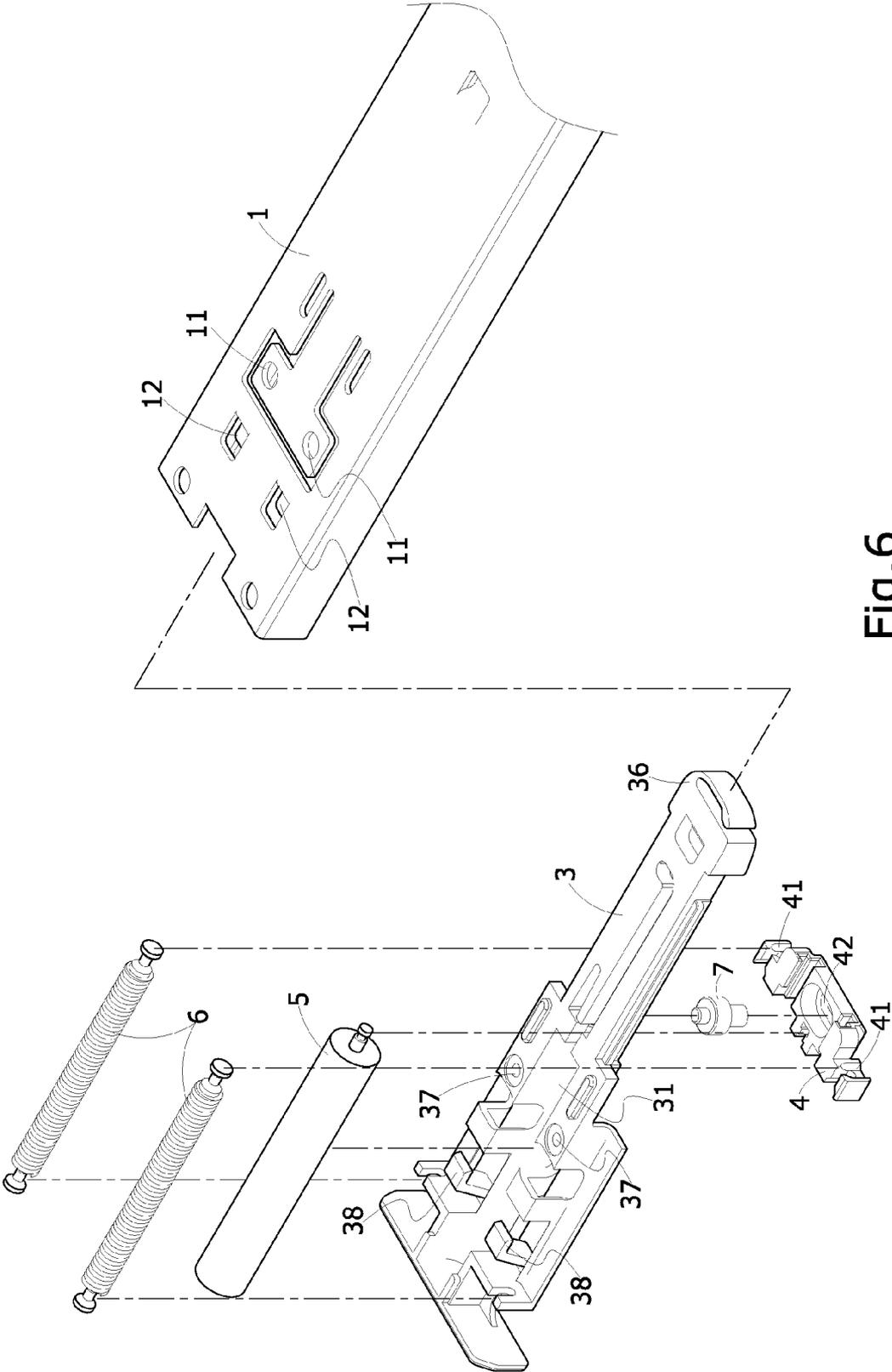


Fig.6

SLIDE RAIL BUFFERING STRUCTURE

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention generally relates to buffering technique applicable to an object having a slide rail structure, such as a drawer or a cabinet, and more particularly to a slide rail buffering structure that comprises a damper connected to a slidable board to alleviate and buffer pulling/pushing forces acting upon the slidable board.

DESCRIPTION OF THE PRIOR ART

[0002] Among devices for storing and organizing objects, a drawer is a long-developed and widely used device and finds its application everywhere. The drawer has a very simple function so that even though it has been developed for quite a long time, there is much improvement can be made of the drawer and no elaborate improvement has ever done on the drawer. The known drawer is certainly not a perfect device and thus further improvement is needed.

[0003] A conventional drawer, which is movably received in a drawer cavity defined in a cabinet, is often provided with rail-and-slide pair between the drawer and side walls of the drawer cavity. The rail and slide were conventionally made of wood and were later replaced by metal with the development of industry to reduce the friction therebetween and also improve the smoothness of withdrawing and closing operation of the drawer. Although the smoothness of operation is improved, a drawback accompanies the improvement in that when the slide rail is acted upon by an external force to return to a given position, due to the inertial force and reaction force, it is often subjected to undesired sliding motion, which leads to poor engagement between the drawer and the drawer cavity of the cabinet. To improve such a problem, a returning mechanism is provided at an end of the slide rail so that the returning mechanism may overcome the poor engagement between the drawer and the drawer cavity caused by reaction force when the slide rail is acted upon by a force to return a given position for the purposes of automatic closing.

[0004] However, such a returning mechanism shows several problems in the operation thereof:

[0005] (1) To realize fast positioning for tightly stowing the slide rail, the conventional slide rail makes use of the pulling force provided by a spring to drive backward the slide rail that is closed to a track end and to ensure that the slide rail, after long-term repeated use, may still be capable of realizing automatic returning, the pulling force of the spring is often increased, so that the impact and wearing between the slide and the rail is increased, leading to shortening of the lifespan of the slide rail.

[0006] (2) Due to the repeated impact occurring in the returning operation of the conventional slide rail, separation may easily occur due to improper assembling or incorrect application force by a user, leading to hurt of the user, such as jamming.

[0007] Apparently, the known techniques are still of insufficiency and drawbacks and further improvement is needed.

SUMMARY OF THE INVENTION

[0008] An objective of the present invention is to provide a slide rail buffering structure that provides excellent buffering effect to a slide rail in the returning course of the slide rail so as to extend the service life of the slide rail.

[0009] Another objective of the present invention is to provide a slide rail structure, which improves the coupling strength between a positioning bar and a slide block to prevent damage to the structure caused by undesired separation of parts and thus protect the safety of users.

[0010] To achieve the above objectives, the present invention provides a slide rail buffering structure, comprising: a connection board, which is mounted to a rail base plate, the connection board forming therein an accommodation channel, the connection board having a bottom having opposite sides defining fixing slots, the connection board having an end that extends to form a track portion, the track portion defining a slide channel, the slide channel having a distal end that is bent to define a holding receptacle, the track portion having a distal end forming a support; a slidable board, which is set on the track portion of the connection board, the slidable board having a bottom having opposite sides defining fixing slots and a top defining a through hole, the slidable board also forming a receiving opening in the bottom thereof, a damper, which is received in the accommodation channel of the connection board, the damper comprising a connection rod, the connection rod having an end coupled to the receiving opening of the slidable board to allow the slidable board to be movable along the track portion of the connection board; a pull-resistant assembly, which has an end engaging and fixed to the fixing slots defined in the bottom of the connection board and an opposite end engaging and fixed to the fixing slots defined in the slidable board; and a positioning bar, which is movably received in the slide channel of the track portion, the positioning bar having a top end extending through the through hole of the slidable board to guide sliding path of the slidable board, whereby when the positioning bar is caught and driven by a guide section of a rail plate, the positioning bar is guided to move out of the holding receptacle of the slide channel, and the slidable board is acted upon by a pulling force of the pull-resistant assembly to move backward for effecting a returning movement. The slidable board uses the buffering effect induced by the damper to alleviate the pulling/pushing forces that drive the rail plate to return to a given position.

[0011] The foregoing objectives and summary provide only a brief introduction to the present invention. To fully appreciate these and other objects of the present invention as well as the invention itself, all of which will become apparent to those skilled in the art, the following detailed description of the invention and the claims should be read in conjunction with the accompanying drawings. Throughout the specification and drawings identical reference numerals refer to identical or similar parts.

[0012] Many other advantages and features of the present invention will become manifest to those versed in the art upon making reference to the detailed description and the accompanying sheets of drawings in which a preferred structural embodiment incorporating the principles of the present invention is shown by way of illustrative example.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. 1 is an exploded view of a structure in accordance with a preferred embodiment of the present invention.

[0014] FIG. 2 is a perspective of the preferred embodiment of the present invention in an assembled form.

[0015] FIG. 3 is an exploded view of major components of the preferred embodiment of the present invention.

[0016] FIG. 4 is a perspective view of the major components of the preferred embodiment of the present invention in an assembled form.

[0017] FIGS. 5A-5C are perspective views demonstrating a sequence of operation of the present invention.

[0018] FIG. 6 is an exploded view of major components of the preferred embodiment of the present invention taken from a different perspective.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0019] The following descriptions are exemplary embodiments only, and are not intended to limit the scope, applicability or configuration of the invention in any way. Rather, the following description provides a convenient illustration for implementing exemplary embodiments of the invention. Various changes to the described embodiments may be made in the function and arrangement of the elements described without departing from the scope of the invention as set forth in the appended claims.

[0020] Referring to FIGS. 1, 3, and 6, an exploded view of the structure of the present invention, an exploded view of major components of the structure of the present invention, and an exploded view of major components of the structure of the present invention taken from a different perspective are respectively shown.

[0021] The present invention generally comprises a connection board 3, which is mounted to a rail base plate 1. The connection board 3 forms therein an accommodation channel 31. The connection board 3 has a bottom having opposite sides defining fixing slots 32. The connection board 3 has an end that extends to form a track portion 33, and the track portion 33 defines a slide channel 34. The slide channel 34 has a distal end that is bent sideways to define a holding receptacle 35. The track portion 33 has a distal end forming a support 36.

[0022] A slidable board 4 is set on the track portion 33 of the connection board 3. The slidable board 4 has a bottom having opposite sides defining fixing slots 41 and a top defining a through hole 42. The slidable board 4 also forms a receiving opening 43 in the bottom thereof.

[0023] A damper 5 is received in the accommodation channel 31. The damper 5 comprises a connection rod 51. The connection rod 51 has an end engaging and fixed to the receiving opening 43 formed in the bottom of the slidable board 4, whereby the slidable board 4 is movable along the track portion 33 of the connection board 3. Further, the damper 5 may comprise a pneumatic cylinder, a hydraulic cylinder, or a pneumatic/hydraulic cylinder. The damper 5 provides a sufficient buffering effect and a hydraulic cylinder may provide the best effect of buffering, which buffers pulling/pushing forces acting on the slidable board 4 to smoothen the operation thereof.

[0024] A pull-resistant assembly 6 has an end engaging and fixed to the fixing slots 32 defined in the bottom of the connection board 3 and an opposite end engaging and fixed to the fixing slots 41 defined in the bottom of the slidable board 4.

[0025] A positioning bar 7 is movably received in the slide channel 34 of the track portion 33. The positioning bar 7 has a top end extending through the through hole 42 of the slidable board 4 to guide a sliding path of the slidable board 4. Further, the pull-resistant assembly 6 comprises at least one pull-resistant spring.

[0026] Referring to FIGS. 4 and 5A-5C, a perspective view of the major components of the present invention in an

assembled form and perspective views demonstrating a sequence of operation of the present invention are shown. When the positioning bar 7 is caught by and engages a guide section 21 of a rail plate 2 to be guided thereby to move out of the holding receptacle 35 of the slide channel 34, the slidable board 4 is acted upon by a pulling force of the pull-resistant assembly 6 to move backward along the track portion 33 for effecting a returning movement. The slidable board 4 is also subjected to the buffering effect induced by the connection rod 51 of the damper 5 (see FIG. 3) to drive the rail plate 2 in a slow manner to return to a given position. The support 36 functions to constrain and position the slidable board 4 before the returning of the slidable board 4 and cooperates with the positioning bar 7 to prevent the slidable board 4 from separating from the track portion 33.

[0027] Referring to FIGS. 1 and 6, the connection board 3 forms in the bottom thereof a pair of positioning holes 37 and a pair of retention hooks 38 for respectively coupling with a pair of connection holes 11 and a pair of retention hooks 12 formed in the rail base plate 1, whereby the connection board 3 and the rail base plate 1 are securely assembled together to prevent undesired separation during the operation thereof.

[0028] Referring to FIG. 2, a perspective of the present invention in an assembled form is shown. The rail plate 2 is mounted to a seat plate 8 and is carried on the rail base plate 1 to ensure stability of movement of the rail plate 2. The components of the present invention are assembled together in a stable manner and the structural strength is enhanced to prevent damage caused by undesired separation of parts and to protect the safety of a user.

[0029] Compared to the known techniques, the slide rail buffering structure provided by the present invention offers the following advantages:

[0030] (1) The slide rail buffering structure of the present invention adopts inter-structure cooperation to provide a buffering effect to a slide rail at the time when the slide rail is in the course of returning movement.

[0031] (2) The slide rail buffering structure of the present invention improves the fastening of the structure to prevent separation of parts or undesired damage to the structure due to incorrect application of force so as to ensure operation safety.

[0032] While certain novel features of this invention have been shown and described and are pointed out in the annexed claim, it is not intended to be limited to the details above, since it will be understood that various omissions, modifications, substitutions and changes in the forms and details of the device illustrated and in its operation can be made by those skilled in the art without departing in any way from the spirit of the present invention.

I claim:

1. A slide rail buffering structure adapted to be mounted to an end of a rail base plate to correspond to a guide section of a rail plate, the slide rail buffering structure comprising:

a connection board, which is mounted to the rail base plate, the connection board forming therein an accommodation channel, the connection board having a bottom having opposite sides defining fixing slots, the connection board having an end that extends to form a track portion, the track portion defining a slide channel, the slide channel having a distal end that is bent to define a holding receptacle, the track portion having a distal end forming a support;

a slidable board, which is set on the track portion of the connection board, the slidable board having a bottom having opposite sides defining fixing slots and a top defining a through hole;

a damper, which is received in the accommodation channel of the connection board, the damper comprising a connection rod, the connection rod having an end coupled to the slidable board to allow the slidable board to be movable along the track portion of the connection board;

a pull-resistant assembly, which has an end engaging and fixed to the fixing slots defined in the bottom of the connection board and an opposite end engaging and fixed to the fixing slots defined in the slidable board; and

a positioning bar, which is movably received in the slide channel of the track portion, the positioning bar having a top end extending through the through hole of the slidable board to guide sliding path of the slidable board.

2. The slide rail buffering structure according to claim 1, wherein the connection board forms in the bottom thereof at

least one positioning hole and retention hook to enhance mounting to the rail base plate.

3. The slide rail buffering structure according to claim 1, wherein the slidable board forms a receiving opening in the bottom thereof for engaging and coupling the end of the damper.

4. The slide rail buffering structure according to claim 1, wherein the damper comprises a pneumatic cylinder.

5. The slide rail buffering structure according to claim 1, wherein the damper comprises a hydraulic cylinder.

6. The slide rail buffering structure according to claim 1, wherein, the damper comprises a pneumatic/hydraulic cylinder.

7. The slide rail buffering structure according to claim 1, wherein the pull-resistant assembly comprises at least one pull-resistant spring.

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