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(54) **SEAT FRAME AND SOFA ASSEMBLY**

(57) The present invention provides a seat frame (100) and a sofa assembly. The seat frame (100) comprises a rear panel (1), a first side wall (2), and a second side wall (3). The first and second side walls (2, 3) are arranged along the length direction (D1), and the rear panel (1) is connected between them along the width direction (D2) perpendicular to the length direction (D1) near their rear ends. The rear panel (1), the first side wall (2), and the second side wall (3) are selected from

blow molded parts, injection molded parts, extruded molded parts, or wood molded parts. Compared to traditional wooden frameworks, manufacturing the seat frame components through blow molding, injection molding, extrusion molding, or wood-plastic processes reduces the total number of components. Moreover, the manufacturing process can be automated through industrialization so that parts are often produced with a high degree of consistency.

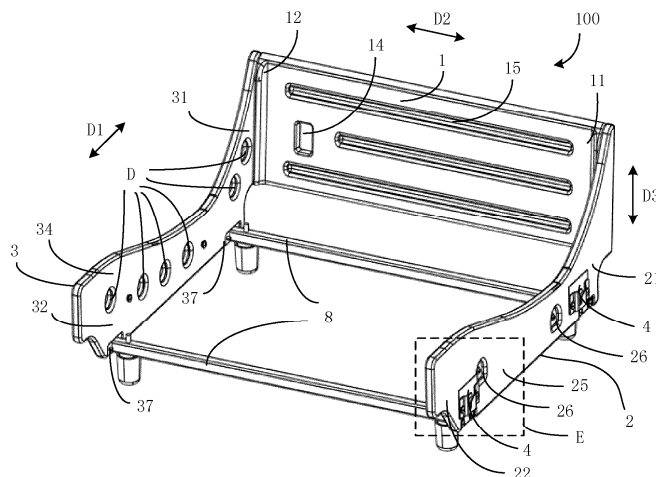


FIG.1

DescriptionTechnical Field

5 **[0001]** The present invention relates to seat frames and sofa assembly, particularly to seat frames used on sofas.

Background Technology

10 **[0002]** Sofas are essential furniture items in people's daily lives. With societal development and the improvement of material and spiritual levels, people are increasingly focusing on the humanized design and aesthetics of sofas. However, traditional wooden sofas are usually composed of multiple wooden boards assembled to form the framework supporting the main body of the sofa. Connecting these boards typically requires the use of nail guns, making the installation process rather cumbersome. Due to the large number and dispersion of components that make up the wooden framework, a substantial number of skilled workers are required to assemble the framework. Additionally, the
 15 assembly process is time-consuming and labor-intensive, resulting in low production efficiency and high labor costs. Furthermore, since the shapes and structures of the multiple wooden boards may vary, each type of board requires individual blueprint programming and layout during production, followed by processing based on the layout. This results in lower manufacturing efficiency for sofa wooden boards and incurs higher costs. Moreover, the installation and fastening work between adjoining sofa assembly is usually quite tedious when the sofa is multi-row or modular.
 20 **[0003]** Therefore, the prior art needs to improve the structure of traditional sofas, especially the frameworks of traditional wooden sofas, to simplify the manufacturing and assembly processes, enhance the aesthetics of the framework, and increase production efficiency while reducing manufacturing costs.

Summary of the Invention

25 **[0004]** The objective of the present invention is to provide a seat frame that simplifies the manufacturing and assembly processes, enhances the aesthetics of the framework, and increases production efficiency while reducing manufacturing costs.

30 **[0005]** According to one aspect of the present invention, a seat frame is provided, comprising a rear panel, a first side wall, and a second side wall. The first side wall and second side wall are arranged along the length direction, and the rear panel is connected between the first side wall and second side wall along the width direction perpendicular to the length direction, near the rear ends of the first side wall and second side wall; the rear panel, first side wall, and second side wall are selected from one or more of blow molded parts, injection molded parts, extruded molded parts, and wood molded parts.

35 **[0006]** According to the above scheme, compared to traditional wooden frameworks, manufacturing the various components of the seat frame through blow molded, injection molded, extruded molded, or wood molded processes can reduce the total number of components. Moreover, the manufacturing process can be automated through industrialization, so that parts are often produced with a high degree of consistency.

40 **[0007]** In one implementation, the seat frame further includes at least one first connector and at least one second connector that can be detachably connected. At least one first connector is set on the first outer surface of the first side wall, and at least one second connector is oppositely arranged on the second outer surface of the second side wall relative to at least one first connector.

45 **[0008]** According to the above scheme, by respectively setting the detachable first connector and second connector on the side walls of both sides of the seat frame, rapid connection and disassembly between two adjoining seat frames can be achieved. Therefore, when assembling a sofa with multiple seat frames, it can be very conveniently completed by connecting the first connector and second connector to join two adjoining seat frames.

[0009] In one implementation, one or more embedded nuts are also provided in the first side wall and second side wall, and the embedded nuts are used for installing the first connector or the second connector.

50 **[0010]** According to the above scheme, by pre-placing the embedded nuts in the mold, the first side wall and second side wall with embedded nuts can be directly obtained at the end of the processing. The embedded nuts are integrally molded with the first side wall or second side wall, which avoids the need to individually drill threaded holes in the first side wall or second side wall, thereby maintaining the structural integrity of the first side wall and second side wall and ensuring and enhancing their overall strength. Additionally, setting embedded nuts can reduce the number of parts required when assembling the seat frame, thereby lowering the complexity of the assembly process, improving
 55 assembly efficiency, and reducing labor costs.

[0011] In one implementation, the first connector includes a base plate and a connecting piece. The base plate is fixed to the first outer surface of the first side wall, and the connecting piece is fixed to the base plate. A cavity is formed between the base plate and the connecting piece to house the second connector.

[0012] In one implementation, the base plate is flat, and the connecting piece is smoothly curved.

[0013] In one implementation, the connecting piece is provided with an opening to accommodate the second connector.

[0014] In one implementation, the notch has a locking groove and a sliding groove.

[0015] In one implementation, the second connector includes fasteners connected to the second side wall, and the fasteners are constructed to slide along the sliding groove and reach the locking groove.

[0016] In one implementation, the connecting piece further includes a stopper portion.

[0017] According to the above schemes, by respectively setting detachable first connector and second connector on the side walls of both sides of the seat frame, rapid connection and disassembly between two adjoining seat frames can be achieved. Therefore, when assembling a sofa with multiple seat frames, it can be very conveniently completed by sliding the fasteners of the second connector into the sliding groove and locking groove of the first connector to connect two adjoining seat frames. Moreover, when the fasteners are attached in place, the stopper portion of the first connector located above the fasteners can prevent the fasteners from accidentally disengaging from the locking groove.

[0018] In one implementation, the first side wall has a first fixing portion.

[0019] In one implementation, the first fixing portion is a recess.

[0020] In one implementation, the second side wall has a second fixing portion.

[0021] In one implementation, the second fixing portion is a recess.

[0022] In one implementation, a shaping piece matching the recess's contour is also provided.

[0023] In one implementation, the first side wall and the second side wall also have other recesses.

[0024] According to the above schemes, recesses are provided at positions where the first side wall and second side wall connect with the main structure of the sofa or at other positions. This can enhance the structural strength of the first side wall and second side wall at these locations, effectively preventing the hollow cavities of the first side wall and second side wall from deforming or even breaking after being subjected to stress.

[0025] Prior to the inclusion of shaping pieces, the connection between the first side wall or second side wall and the main structure of the sofa is typically completed by directly passing bolts through the recess. In this case, the main structure of the sofa will apply a shear force directly to the connection of the recess, which is typically a mounting hole for allowing a bolt to pass through. Therefore, the mounting hole may break under the direct action of shear force. However, in the exemplary embodiments provided by the present invention, a shaping piece is also provided in the recess. The shaping piece can effectively support the contour of the recess and convert the shear forces originally applied at the connection between the recess and the main structure of the sofa into distributed component forces along the contour of the recess. This can effectively protect the recess, thereby reducing or avoiding the risk of fractures at the connection points of the recess.

[0026] In one implementation, the first and second ends of the rear panels are provided with protrusions. The first end of the first side wall is provided with a first receiving portion that can engage with the protrusion on the first end of the rear panels, and the first end of the second side wall is provided with a second receiving portion that can engage with the protrusion on the second end of the rear panel.

[0027] According to the above scheme, the installation process can be simplified by connecting the rear panel to the first side wall and second side wall with matching protrusions and receiving portions. It only requires engaging the protrusions with the receiving portions in place, enabling even untrained personnel to complete quick and stable installations. This connecting method can simplify the structure of the rear panel, first side wall, and second side wall, reduce production costs, and improve production efficiency. Moreover, the connection between the rear panel, first side wall, and second side wall does not require the use of screws or other fasteners, thereby enhancing the aesthetic appeal of the product and reducing the cost of components.

[0028] In one implementation, the rear panel is further provided with a groove.

[0029] In one implementation, the rear panel is further provided with a decorative sleeve, which is constructed to engage with the groove at the edges.

[0030] In one implementation, the groove has an opening and at least one protrusion located inside the opening.

[0031] In one implementation, the decorative sleeve is provided with clamping strips, which are constructed to engage with at least one protrusion.

[0032] According to the above schemes, by providing grooves on the rear panel and clamping strips on the decorative sleeve, the decorative sleeve can be easily installed onto the rear panel to partially wrap around or cover the rear panel partially. Furthermore, the groove is also provided with protrusions that can engage with the clamping strips, thereby ensuring that the decorative sleeve is firmly installed on the rear panel.

[0033] In one implementation, the seat frame further includes a support beam, which is arranged between the first side wall and the second side wall.

[0034] According to another aspect of the present invention, a sofa assembly is also provided, comprising a seat frame as described in any of the above embodiments.

Illustration of the Attached Drawing

[0035] For a better understanding of the above and other purposes, features, advantages and functions of the present invention, reference may be made to the preferred embodiments illustrated in the accompanying drawings. The same reference symbols in the accompanying drawings refer to the same components. Technicians in this field should understand that the accompanying drawings are intended to illustrate the preferred embodiments of the present invention, do not limit the scope of the invention, and that the various components in the drawings are not drawn to scale.

Figure 1 is a three-dimensional view of a seat frame in an exemplary embodiment of the present invention;
 Figure 2 is another three-dimensional view of the seat frame in an exemplary embodiment of the present invention;
 Figure 3 is a front view of the rear panel of the seat frame in an exemplary embodiment of the present invention;
 Figure 4 is a sectional view of the rear panel of the seat frame in an exemplary embodiment of the present invention;
 Figure 5 is a partially enlarged view of the region G in Figure 4;
 Figure 6 is a three-dimensional view of the rear panel of the seat frame with a decorative sleeve in an exemplary embodiment of the present invention;
 Figure 7 is a sectional view of the rear panel of the seat frame with a decorative sleeve in an exemplary embodiment of the present invention;
 Figure 8 is a partially enlarged view of the region G in Figure 7;
 Figure 9 is a three-dimensional view of the first side wall of the seat frame in an exemplary embodiment of the present invention;
 Figure 10 is a three-dimensional view of the second side wall of the seat frame in an exemplary embodiment of the present invention;
 Figure 11 is a partially enlarged view of the region E in Figure 1;
 Figure 12 is a partially enlarged view of the region F in Figure 2;
 Figure 13 is a three-dimensional view of the first connector of the seat frame in an exemplary embodiment of the present invention;
 Figure 14 is a top view of the first connector of the seat frame in an exemplary embodiment of the present invention;
 Figure 15 is a three-dimensional view of the second connector of the seat frame in an exemplary embodiment of the present invention;
 Figure 16 is a perspective view of the first side wall of the seat frame in an exemplary embodiment of the present invention;
 Figure 17 is a perspective view of the second side wall of the seat frame in an exemplary embodiment of the present invention;
 Figure 18 is a right view of the first side wall of the seat frame in an exemplary embodiment of the present invention;
 Figure 19 is a partial cross-sectional view of a first side wall of a seat frame according to an exemplary embodiment of the present invention;
 Figure 20 is a three-dimensional view of the shaping piece of the seat frame in an exemplary embodiment of the present invention;
 Figure 21 is a left view of the second side wall of the seat frame in an exemplary embodiment of the present invention;
 Figure 22 is a partial cross-sectional view of a second side wall of a seat frame according to an exemplary embodiment of the present invention;
 Figure 23 is a left view of the first side wall of the seat frame in an exemplary embodiment of the present invention;
 Figure 24 is a partial cross-sectional view of a first side wall of a seat frame according to an exemplary embodiment of the present invention;
 Figure 25 is a right view of the second side wall of the seat frame in an exemplary embodiment of the present invention;
 Figure 26 is a partial cross-sectional view of a second side wall of a seat frame according to an exemplary embodiment of the present invention;

Description of reference symbols:

[0036]

	100-	Seat frame	1-	Rear panel	11-	First end of rear panel
	12-	Second end of rear panel	13-	Protrusion	14-	Hole
	15-	Reinforcing rib	16-	Groove	161 -	Opening
5	162-	Protrusion	17-	Decorative sleeve	171-	Decorative sleeve main body
	172-	Clamping strip	2-	First side wall	21-	First end of first side wall
	22-	Second end of first side wall	23-	First receiving portion	24-	First inner surface
10	25-	First outer surface	26-	First fixing portion	27-	First fixed groove
	3-	Second side wall	31-	First end of second side wall	32-	Second end of second side wall
	33-	Second receiving portion	34-	Second inner surface	35-	Second outer surface
15	36-	Second fixing portion	37-	Second fixed groove	4-	First connector
	41-	Base plate	42-	Connecting piece	421-	First segment
	422-	Second segment	423-	Intermediate segment	4231-	Top of intermediate segment
20	4232-	Bottom of intermediate segment	424-	First bending portion	425-	Second bending portion
	426-	Locking groove	4261-	First end of locking groove	4262-	Second end of locking groove
	427-	Sliding groove	4271-	First end of sliding groove	4272-	Second end of sliding groove
25	428-	Stopper portion	5-	Second connector	51-	Spacer
	52-	Fastener	521-	Head portion	522-	First rod body
	523-	Second rod body	524-	Stepped portion	6-	Embedded nut
	7-	Shaping piece	8-	Support beam	A-	Recessed portion A
30	B-	Recessed portion B	C-	Recessed portion C	D-	Recessed portion D
	D1-	Length direction	D2-	Width direction	D3-	Height direction
	E-	Area E	F-	Area F	G-	Area G
	H-	Area H				

35 Specific Implementations

40 **[0037]** Specific implementations of the present invention will now be described in detail with concerning the accompanying drawings. The description here is only based on the preferred embodiment of the present invention. Technicians in this field may think of other ways to implement the present invention on the basis of the preferred embodiment, which also falls within the scope of the present invention.

[0038] It should be noted that the terms "up", "down", "left", "right", "top", "bottom", "inner", "outer", "inner side", "outer side", "top", and "bottom" as used herein are merely for the purpose of clearly describing the exemplary embodiments of the present invention and are not intended to limit or constrain the invention.

45 **[0039]** Figures 1 and 2 both show perspective views of the seat frame 100 in an exemplary embodiment of the present invention. As shown in the figures, the seat frame 100 includes a rear panel 1, a first side wall 2, and a second side wall 3.

50 **[0040]** For the purpose of describing the exemplary embodiment of the present invention, the length direction, width direction, and height direction of the seat frame 100 are respectively marked as D1, D2, and D3. Additionally, the length directions of the first side wall 2 and the second side wall 3 are parallel to the length direction D1 of the seat frame 100. The length direction of the rear panel 1 is parallel to the width direction D2 of the seat frame 100. The height directions of the rear panel 1, the first side wall 2, and the second side wall 3 are parallel to the height direction D3 of the seat frame 100.

55 **[0041]** Continuing with Figures 1 and 2, the first side wall 2 and the second side wall 3 both extend along the length direction D1. Moreover, the first side wall 2 and the second side wall 3 can generally take an "L" shape. That is, along the length direction D1, the first side wall 2 and the second side wall 3 have smooth portions and raised portions. Among these, the raised portions are the rear ends of the first side wall 2 and the second side wall 3.

[0042] The rear panel 1 extends along the width direction D2. The rear panel 1 is arranged between the first side wall 2 and the second side wall 3, and is connected to the rear ends of the first side wall 2 and the second side wall 3

respectively. The rear panel 1, together with the first side wall 2 and the second side wall 3, encloses a space for accommodating the main structure of the sofa (not shown).

[0043] Specifically, as shown in the figures, the first end 11 of the rear panel 1 is connected to the first end 21 of the first side wall 2, and the second end 12 of the rear panel 1 is connected to the first end 31 of the second side wall 3. The second end 22 of the first side wall 2 and the second end 32 of the second side wall 3 each form a free end.

[0044] The rear panel 1, the first side wall 2, and the second side wall 3 can have hollow cavities. They can be manufactured through molding processes. For example, the rear panel 1, the first side wall 2, and the second side wall 3 can be selected from one or more blow-molded parts, injection-molded parts, extruded-molded parts, and wood-molded parts. Preferably, the rear panel 1, the first side wall 2, and the second side wall 3 are blow molded parts.

[0045] Now referring to Figures 3, 9, and 10, the rear panel 1 has at least one protrusion 13 at its first end 11 and second end 12, respectively. Additionally, the first side wall 2 and the second side wall 3 each have at least one first receiving portion 23 and second receiving portion 33 at their respective first ends 21 and 31. The protrusion 13 and the first receiving portion 23 and second receiving portion 33 are constructed to match in number and to be detachably connectable to each other.

[0046] As shown in Figure 3, the protrusion 13 can be a dovetail or trapezoidal tenon. The tenon protrudes outwardly from the first end 11 or second end 12 of the rear panel 1 and extends along the height direction D3 over at least a portion of the rear panel 1. The length of the tenon on the side away from the first end 11 or second end 12 of the rear panel 11 is more significant than its length on the side adjoining to the first end 11 or second end 12 of the rear panel 1.

[0047] As shown in Figures 9 and 10, the first receiving portion 23 and the second receiving portion 33 can be grooves matching the shape of the tenons described above. The grooves are provided on the first inner surface 24 of the first side wall 2 or the second inner surface 34 of the second side wall 3 and extend inwardly from the first inner surface 24 or the second inner surface 34 into the interior of the first side wall 2 or the second side wall 3. Furthermore, the grooves also extend along the height direction D3 over at least a portion of the first side wall 2 or the second side wall 3.

[0048] In addition, those skilled in the art should understand that, provided the matching and detachable connection between the rear panel 1 and the first side wall and second side walls 2 and 3 can be achieved, the protrusion 13 can also be a groove. Correspondingly, the first receiving portion 23 and the second receiving portion 33 can be tenons.

[0049] Connecting the rear panel 1 to the first side wall 2 and the second side wall 3 through matching tenons and grooves simplifies the installation process. It only requires engaging the tenons with the grooves in place, enabling even untrained personnel to complete quick and stable installations. The tenon-and-groove connection structure is simple and reliable, which can simplify the structure of the rear panel 1, the first side wall 2, and the second side wall 3, reduce production costs, and improve production efficiency. Moreover, the connection between the rear panel 1, the first side wall 2, and the second side wall 3 does not require the use of screws or other fasteners, thereby enhancing the aesthetic appeal of the product and reducing the cost of components.

[0050] Additionally, compared to traditional wooden frameworks, manufacturing the components of the seat frame 100 through blow-molded can reduce the total number of components. Moreover, the manufacturing process can be automated through industrialization, so that parts are often produced with a high degree of consistency.

[0051] Returning to Figures 1 to 3, the rear panel 1 can also be provided with holes 14 and reinforcing rib 15. Among these, the holes 14 extend from the inner surface of the rear panel 1 to its outer surface, forming through hole 14 in the thickness direction of the rear panel 1. The holes 14 are used for installing the power switch of the sofa. The reinforcing rib 15 can extend along the width direction D2 over at least a portion of the rear panel 1 to enhance the structural strength of the rear panel 1. In addition, the reinforcing rib 15 can also extend along the height direction D3 or at an angle to the width direction D2 or height direction D3. As an example, as shown in the figures, the hole 14 is positioned near the second end 12 of the rear panel 1 and is substantially located at the center of the rear panel 1 along the height direction D3. The rear panel 1 further includes three reinforcing rib 15 extending along the width direction D2. Two of the reinforcing rib 15 are located near the upper and lower sides of the rear panel 1, extending from near the first end 11 of the rear panel 1 to near the second end 12 of the rear panel 1. The third reinforcing rib 15 aligns with the hole 14 in the width direction D2 and extends from near the first end of rear panel 11 to a position near the hole 14.

[0052] As shown in Figures 3 to 5, the lower edge of the rear panel 1 can also be provided with a groove 16. Figure 5 is a partially enlarged view of area G in Figure 4. The groove 16 can extend along the width direction D2 over at least a portion of the lower edge of the rear panel 1. For example, as shown in the figure, the groove 16 extends from near the first end 11 of the rear panel 1 along the width direction D2 to near the second end 12 of the rear panel 1. The groove 16 intersects the lower edge of the rear panel 1, forming an opening 161 of the groove 16, and continues to incline inward into the rear panel 1 at an angle to the height direction D3. In the width direction D2, the groove 16 forms a cavity inside that generally has a rectangular cross-sectional shape. Inside the opening 161 of the groove 16, at least one protrusion 162 can be provided protruding from its inner side wall. Multiple protrusions 162 can be evenly distributed along the inner side wall in the width direction D2. Preferably, each protrusion 162 can have a wedge-shaped form. That is, the height of each protrusion 162 protruding from the inner side wall gradually increases from the

opening of the groove 16 toward the interior of the groove 16.

[0053] As shown in Figures 6 to 8, where Figure 8 is a partially enlarged schematic view of region H in Figure 7. The rear panel 1 can further include a decorative sleeve 17 that partially wraps around the rear panel 1. The decorative sleeve 17 includes a decorative sleeve main body 171 and a clamping strip 172. The clamping strip 172 is provided along one edge of the decorative sleeve main body 171. The clamping strip 172 has a hook-shaped clamping portion. The clamping portion is constructed to interlock with multiple protrusions 162 inside the groove 16 when the edge of the decorative sleeve 17 with the clamping strip 172 is inserted into the groove 16. By providing the groove 16 on the rear panel 1 and the clamping strip 172 on the decorative sleeve 17, the decorative sleeve 17 can be easily installed onto the rear panel 1 to partially wrap around or cover the rear panel 1. Furthermore, the protrusions 162 in the groove 16 that interlock with the clamping strip 172 ensure that the decorative sleeve 17 is securely mounted on the rear panel 1.

[0054] Referring now to Figures 1, 2, 11, and 12, where Figure 11 is a partially enlarged view of area E in Figure 1, and Figure 12 is a partially enlarged view of area F in Figure 2. The first side wall 2 and the second side wall 3 respectively have a first outer surface 25 and a second outer surface 35. Additionally, the seat frame 100 can further include at least one first connector 4 provided on the first outer surface 25 and at least one second connector 5 provided on the second outer surface 35 opposite to the first connector 4. The first connector 4 and the second connector 5 are constructed to match in number and to be detachably connectable to each other. The first connector 4 and the second connector 5 can be fixed to the first side wall 2 and the second side wall 3 respectively through methods such as threaded connection, riveting, or bonding.

[0055] In an exemplary embodiment of the present invention, the number of first connectors 4 can be two. The two first connectors 4 are arranged along the height direction D3 at the same height on the first side wall 2 and are located near the first end 21 and the second end 22 of the first side wall 2, respectively.

[0056] The first connector 4 can include a base plate 41 and a connecting piece 42. The base plate 41 is fixed to the first outer surface 25, and the connecting piece 42 is fixed to the base plate 41. The shape of the base plate 41 can be flat, and the shape of the connecting piece 42 can be smoothly curved. Thus, a cavity is formed between the base plate 41 and the connecting piece 42 for housing the second connector 5.

[0057] Specifically, as shown in Figures 11, 13, and 14, the connecting piece 42 can have a first segment 421, a second segment 422, and an intermediate segment 423 located between them. The first segment 421 and the second segment 422 are coplanar, while the intermediate segment 423 is convex relative to the first segment 421 and the second segment 422. Both ends of the intermediate segment 423 incline toward the first segment 421 and the second segment 422 and connect to the ends of the first segment 421 and the second segment 422, forming a first bending portion 424 and a second bending portion 425 between the intermediate segment 423 and the first and second segments 421 and 422, respectively. When the connecting piece 42 is fixed to the base plate 41, the intermediate segment 423 of the connecting piece 42, together with the first bending portion 424 and the second bending portion 425, forms a cavity for housing the second connector 5.

[0058] Furthermore, the connecting piece 42 can also be provided with a notch to accommodate the second connector 5. Preferably, the notch can be provided on the intermediate segment 423 of the connecting piece 42.

[0059] As shown in Figures 11 and 13, the notch can include a locking groove 426 and a sliding groove 427. Both the locking groove 426 and the sliding groove 427 extend from the outer side of the intermediate segment 423 to its inner side, forming through grooves. The locking groove 426 further extends along the height direction D3 from the first end 4261 of the locking groove 426 to its second end 4262. The first end 4261 of the locking groove 426 is near the bottom 4231 of the intermediate segment 423, while the second end 4262 of the locking groove 426 is near the top 4232 of the intermediate segment 423. From the second end 4262 of the locking groove 426, the sliding groove 427 continues to extend on the intermediate segment 423 at an angle to the horizontal direction, engaging with the locking groove 426 and inclined relative to it. Thus, a stopper portion 428 is formed between the second end 4262 of the locking groove 426 and the top 4232 of the intermediate segment 423. The first end 4271 of the sliding groove 427 overlaps with the second end 4262 of the locking groove 426. The second end 4272 of the sliding groove 427 can intersect with the top 4232 of the intermediate segment 423, forming an opening at the top 4232 of the intermediate segment 423 for allowing the second connector 5 to slide in. Preferably, the sliding groove 427 can extend to the second bending portion 425 to create a larger opening.

[0060] The first segment 421 and the second segment 422 of the connecting piece 42 can also be provided with a mounting hole, and the base plate 41 can be provided with corresponding mounting holes matching those of the connecting piece 42. When installing the first connector 4, bolts can pass sequentially through the mounting hole on the connecting piece 42 and the base plate 41 to fix them to the first side wall 2.

[0061] Returning to Figures 2 and 12, the number of second connectors 5 can be two. Two second connectors 5 are arranged along the height direction D3 at the same height on the second side wall 3, located near the first end 31 and the second end 32 of the second side wall 3, respectively.

[0062] As shown in Figures 12 and 15, the second connector 5 can include a spacer 51 and a fastener 52. The

fastener 52 sequentially comprises a head portion 521, a first rod body 522, and a second rod body 523 along its own length direction. Both the first rod body 522 and the second rod body 523 have cylindrical shapes. The diameter of the first rod body 522 is greater than that of the second rod body 523, forming a stepped portion 524 at their junction. When the second rod body 523 passes through the inner hole of the spacer 51, the stepped portion 524 can abut against the spacer 51. In addition, at least a portion of the outer surface of the second rod body 523 is provided with threads for connection to the second side wall 3. The head portion 521 is located at the end of the first rod body 522 far from the second rod body 523. The head portion 521 can have a circular shape, and its diameter is greater than the dimensions of the locking groove 426 in the height direction D3 and the length direction D1. Additionally, the head portion 521 can also have elliptical, triangular, rectangular, polygonal, or other irregular shapes. In the embodiment of the present invention, the head portion 521 is hexagonal. The diameter of the inscribed circle of the hexagon is greater than the dimensions of the locking groove 426 in the height direction D3 and the length direction D1. Preferably, the head portion 521, the first rod body 522, and the second rod body 523 are coaxially arranged.

[0063] When installing the second connector 5, the spacer 51 is tightly attached to the second side wall 3, and the second rod body 523 of the fastener 52 passes through the inner hole of the spacer 51 to be threadedly connected to the second side wall 3, such that the head portion 521 and the first rod body 522 of the fastener 52 protrude outwardly from the second side wall 3 to allow detachable connection with the first connector 4 on an adjoining seat frame.

[0064] To better understand the detachable connection between the first connector 4 and the second connector 5, the process of connecting and removing the second connector 5 to and from the first connector 4 is exemplarily described below.

[0065] When connecting the second connector 5 to the first connector 4, the fastener 52 of the second connector 5 is first positioned above the connecting piece 42 of the first connector 4, while keeping the head portion 521 of the fastener 52 inside the connecting piece 42. Then, the first rod body 522 of the fastener 52 passes through the opening on the connecting piece 42 and enters the sliding groove 427. Subsequently, the fastener 52 slides inclinedly along the sliding groove 427 to the junction between the sliding groove 427 and the locking groove 426. Finally, the fastener 52 slides along the direction of extension of the locking groove 426 to the first end 4261 of the locking groove 426, reaching the bottom of the notch on the connecting piece 42. At this point, the second connector 5 is securely connected in place.

[0066] The process of removing the second connector 5 from the first connector 4 is the reverse of the above connection process and is not further elaborated here.

[0067] By providing detachable first connectors 4 and second connectors 5 on the side walls of both sides of the seat frame 100, rapid connection and disassembly between two adjoining seat frames 100 can be achieved. Therefore, when assembling a sofa with multiple seat frames 100 according to the present invention, adjoining seat frames 100 can be connected by simply sliding the second connector 5 into the first connector 4. Furthermore, when the second connector 5 is securely connected, the stopper portion 428 of the first connector 4 located above the second connector 5 can prevent the second connector 5 from accidentally disengaging from the first connector 4. Additionally, the head portion 521 of the fastener 52 is located within the cavity formed between the base plate 41 and the connecting piece 42. Since the diameter of the head portion 521 is greater than the dimensions of the locking groove 426 on the connecting piece 42, the head portion 521 can also restrict the movement of the second connector 5 relative to the first connector 4 in the width direction D2. Thus, a stable connection between two adjoining seat frames 100 can be ensured.

[0068] In the embodiment of the present invention, as shown in Figures 16 and 17, embedded nuts 6 can be provided in the first side wall 2 and the second side wall 3 for fixing the first connector 4 or the second connector 5 to the first side wall 2 or the second side wall 3. For example, when the first side wall 2 and the second side wall 3 are manufactured using a blow-molding process, the embedded nuts 6 can be pre-placed in the mold blank and integrally formed in the finished first side wall 2 or second side wall 3 during the blow-molding process.

[0069] As shown in Figure 16, the embedded nuts 6 on the first side wall 2 are located within the hollow cavity of the first side wall 2 and are closely attached to the first outer surface 25. The first outer surface 25 has a hole aligned with the embedded nuts 6 to expose the internal threaded holes of the embedded nuts 6. As shown, two embedded nuts 6 are arranged side by side near the first end 21 of the first side wall 2. Thus, when installing the first connector 4, two bolts can pass sequentially through the mounting hole on the connecting piece 42 and the base plate 41 and be threadedly connected to the embedded nuts 6, thereby fixing the first connector 4 to the first side wall 2. Similarly, two embedded nuts 6 are arranged side by side near the second end 22 of the first side wall 2, and the first connector 4 can be fixed to the first side wall 2 by threading two bolts sequentially through the connecting piece 42 and the base plate 41 and into the embedded nuts 6.

[0070] As shown in Figure 17, the embedded nuts 6 on the second side wall 3 are located within the hollow cavity of the second side wall 3 and are closely attached to the second outer surface 35. The second outer surface 35 has a hole aligned with the embedded nuts 6 to expose the internal threaded holes of the embedded nuts 6. As shown, one embedded nut 6 is provided near each of the first end 31 and the second end 32 of the second side wall 3. When

installing the second connector 5, the second rod body 523 of the fastener 52 can be threadedly connected to each embedded nut 6 to fix the second connector 5 to the second side wall 3.

[0071] By pre-placing the embedded nuts 6 in the mold blank, the first side wall 2 and the second side wall 3 with embedded nuts 6 can be directly obtained at the end of the blow-molding process. The embedded nuts 6 are integrally formed with the first side wall 2 or the second side wall 3, avoiding the need to individually drill threaded holes in the first side wall 2 or the second side wall 3, which preserves the structural integrity of the first side wall 2 and the second side wall 3 and ensures and enhances their overall strength. Furthermore, the use of embedded nuts 6 can reduce the number of parts required when assembling the seat frame 100, thereby lowering the complexity of the assembly process, improving assembly efficiency, and reducing labor costs.

[0072] In addition, the first side wall 2 can have at least one first fixing portion 26, and the second side wall 3 can have at least one second fixing portion 36 corresponding to the first fixing portion 26. The first fixing portion 26 and the second fixing portion 36 together are used to secure the seat frame 100 to the main structure of the sofa.

[0073] As shown in Figures 16, 18, and 19, the first side wall 2 has two first fixing portions 26, which can be arranged at intervals along the length direction D1. Additionally, the two first fixing portions 26 can be arranged at different heights along the height direction D3 on the first side wall 2.

[0074] The first fixing portion 26 can be constructed by recessing the first outer surface 25 of the first side wall 2 toward the first inner surface 24 and joining it with the first inner surface 24. As shown, the first fixing portion 26 forms a recess A on the first outer surface 25, which can have a window-shaped or "D"-shaped profile. The portion of the first inner surface 24 corresponding to the recess A can remain planar. Preferably, a shaping piece 7 may also be provided in the recessed portion A. As shown in Figure 20, the shaping piece 7 can be provided with a hole or nuts for fixing it to the first fixing portion 26 or the main structure of the sofa. The outer contour of the shaping piece 7 can match the contour of the recess A, supporting the recess A to enhance the structural strength of the first fixing portion 26.

[0075] As shown in Figures 17, 21, and 22, the second side wall 3 has two second fixing portions 36, which can be arranged at intervals along the length direction of the second side wall 3. Additionally, the two second fixing portions 36 can be arranged at different heights along the height direction of the second side wall 3.

[0076] Similar to the first fixing portion 26, the second fixing portion 36 can be constructed by recessing the second outer surface 35 of the second side wall 3 toward the second inner surface 34 and joining it with the second inner surface 34. The second fixing portion 36 forms a recess B on the second outer surface 35. Preferably, recess B can have the same window-shaped or "D"-shaped profile as recess A. The portion of the second inner surface 34 corresponding to recess B can remain planar. Preferably, a shaping piece 7 may also be provided in the recessed portion B.

[0077] Providing recesses at the connection points to the main structure of the sofa can enhance the structural strength of the first side wall 2 and the second side wall 3 at these locations, effectively preventing the hollow cavities of the first side wall 2 and the second side wall 3 from deforming or even breaking under stress.

[0078] Before the inclusion of the shaping piece 7, the connection between the first side wall 2 or the second side wall 3 and the main structure of the sofa is typically achieved by bolts directly passing through the recess. In this case, the main structure of the sofa will apply a shear force directly to the connection of the recess, which is typically a mounting hole for allowing a bolt to pass through. Therefore, the mounting hole may break under the direct action of shear force. However, in the exemplary embodiments provided by the present invention, the recess is further provided with a shaping piece 7. The shaping piece 7 effectively supports the contour of the recess and transforms the shear force at the connection point between the recess and the main structure of the sofa into distributed component forces along the contour of the recess. This provides effective protection for the recess and reduces or eliminates the risk of fractures at the connection points of the recess.

[0079] In addition to the recesses A and B described in the above embodiments, the first side wall 2 and the second side wall 3 can also have additional recesses.

[0080] As an example, the first side wall 2 can have at least one recess C located on its first inner surface 24. As shown in Figure 23, there are six recesses C. Two recesses C are spaced near the first end 21 of the first side wall 2, three recesses C are spaced in the intermediate portion of the first side wall 2, and the last recess C is near the second end 22 of the first side wall 2.

[0081] As shown in Figure 24, the recess C can be constructed by recessing the first inner surface 24 of the first side wall 2 toward the first outer surface 25 and joining it with the first outer surface 25. Thus, the recess C forms an indentation on the first inner surface 24. The recess C can have a circular profile. Those skilled in the art should understand that the recess C can also have non-circular profiles, such as elliptical, triangular, rectangular, polygonal, or other irregular shapes.

[0082] The second side wall 3 can also have at least one recess D located on its second inner surface 34. As shown in Figure 25, the number of recesses D is the same as the number of recesses C. Moreover, the positions of the multiple recesses D on the second side wall 3 correspond to the positions of the recesses C on the first side wall 2. Those skilled in the art should understand that the number and positions of the recesses D on the second side wall 3

can differ from those of the recesses C on the first side wall 2.

[0083] As shown in Figures 25 and 26, the recess D can be constructed by recessing the second inner surface 34 of the second side wall 3 toward the second outer surface 35 and joining it with the second outer surface 35. The profile of the recess D can be the same as that of the recess C, i.e., both can have circular profiles. However, the profile of the recess D can also differ from that of the recess C. For instance, the recess C can have non-circular profiles, such as elliptical, triangular, rectangular, polygonal, or other irregular shapes.

[0084] By recessing the inner surface of the first side wall 2 or the second side wall 3 toward the outer surface to form the recess C or D, the structural strength near the recess C or D can be effectively enhanced, thereby preventing the hollow cavities of the first side wall 2 or the second side wall 3 from deforming or breaking under stress.

[0085] In addition, the seat frame 100 can include support beams 8 arranged between the first side wall 2 and the second side wall 3. As shown in Figures 1 and 2, there are two support beams 8. One support beam 8 extends from near the first end 21 of the first side wall 2 to near the first end 31 of the second side wall 3, and the other support beam 8 extends from near the second end 22 of the first side wall 2 to near the second end 32 of the second side wall 3. The two support beams 8 are parallel to each other and extend along the width direction D2.

[0086] As shown, rectangular first fixed grooves 27 and second fixed grooves 37 for receiving and securing the ends of the support beams 8 are provided at the engagement points of the support beams 8 with the first inner surface 24 and the second inner surface 34, respectively. Preferably, additional fixing grooves can also be provided on the first outer surface 25 and the second outer surface 35 at positions corresponding to the first fixed grooves 27 and the second fixed grooves 37 to accommodate screws for securing the support beams 8 to the first side wall 2 or the second side wall 3.

[0087] In addition, the present invention provides a sofa assembly, including a main structure of the sofa and any seat frame 100 described in the above embodiments. The main structure of the sofa is fixedly connected to the seat frame 100.

[0088] The above description of various embodiments of the present invention is provided to an ordinary technician in this field for the purposes of description. The original intention is to exclude or limit the invention to the single disclosed embodiment. As above, ordinary technicians in this field taught above will understand various alternatives and modifications of the present invention. Thus, although some alternative embodiments have been described in detail, an ordinary technician in this field will understand or relatively easily develop other embodiments. The present invention is intended to include all alternatives, modifications and variations of the invention described herein, as well as other embodiments falling within the spirit and scope of the invention described above.

Claims

1. A seat frame, wherein in that the seat frame comprises a rear panel, a first side wall, and a second side wall, wherein the first side wall and the second side wall are arranged along the length direction, and the rear panel is connected between the first side wall and the second side wall along the width direction perpendicular to the length direction near the rear ends of the first side wall and the second side wall;
The rear panel, the first side wall, and the second side wall are selected from one or more of blow-molded parts, injection-molded parts, extruded-molded parts, and wood-molded parts.
2. The seat frame according to claim 1, wherein in that the seat frame further includes at least one first connector and at least one second connector that can be detachably connected, wherein the at least one first connector is provided on the first outer surface of the first side wall, and the at least one second connector is provided on the second outer surface of the second side wall opposite to the at least one first connector.
3. The seat frame according to claim 2, wherein in that the embedded nuts are further provided in the first side wall and the second side wall, and the embedded nuts are used for installing the first connector or the second connector.
4. The seat frame according to claim 2, wherein in that the first connector includes a base plate and a connecting piece, wherein the base plate is fixed to the first outer surface of the first side wall, the connecting piece is fixed to the base plate, and a cavity for accommodating the second connector is formed between the base plate and the connecting piece.
5. The seat frame according to claim 4, wherein in that the base plate is flat, and the connecting piece is smoothly curved.

6. The seat frame according to claim 5, wherein in that the connecting piece is provided with a notch for receiving the second connector.
7. The seat frame according to claim 6, wherein in that the notch has a locking groove and a sliding groove.
8. The seat frame according to claim 7, wherein in that the second connector includes a fastener connected to the second side wall, and the fastener is constructed to slide along the sliding groove and reach the locking groove.
9. The seat frame according to any one of claims 5 to 8, wherein in that the connecting piece further includes a stopper portion.
10. The seat frame according to any one of claims 1 to 3, wherein in that the first side wall includes a first fixing portion.
11. The seat frame according to claim 10, wherein in that the first fixing portion is a recess.
12. The seat frame according to any one of claims 1 to 3, wherein in that the second side wall includes a second fixing portion.
13. The seat frame according to claim 12, wherein in that the second fixing portion is a recess.
14. The seat frame according to claim 11, wherein in that the recess is further provided with a shaping piece, and the shaping piece has a contour matching the recess.
15. The seat frame according to any one of claims 1 to 3, wherein in that the first side wall and the second side wall further include additional recesses.
16. The seat frame according to any one of claims 1 to 3, wherein in that the first end and the second end of the rear panel are provided with protrusions, the first end of the first side wall is provided with a first receiving portion that can engage with the protrusion on the first end of the rear panel, and the first end of the second side wall is provided with a second receiving portion that can engage with the protrusion on the second end of the rear panel.
17. The seat frame according to any one of claims 1 to 3, wherein in that the rear panel is further provided with a groove.
18. The seat frame according to claim 17, wherein in that the rear panel is further provided with a decorative sleeve, and the decorative sleeve is constructed to engage with the groove at its edges.
19. The seat frame according to claim 18, wherein in that the groove includes an opening and at least one protrusion located inside the opening.
20. The seat frame according to claim 19, wherein in that the decorative sleeve includes a clamping strip, and the clamping strip is constructed to engage with the at least one protrusion.
21. The seat frame according to any one of claims 1 to 3, wherein in that the seat frame further includes support beams, and the support beams are arranged between the first side wall and the second side wall.
22. A sofa assembly, wherein in that the sofa assembly includes the seat frame according to any one of claims 1 to 21.

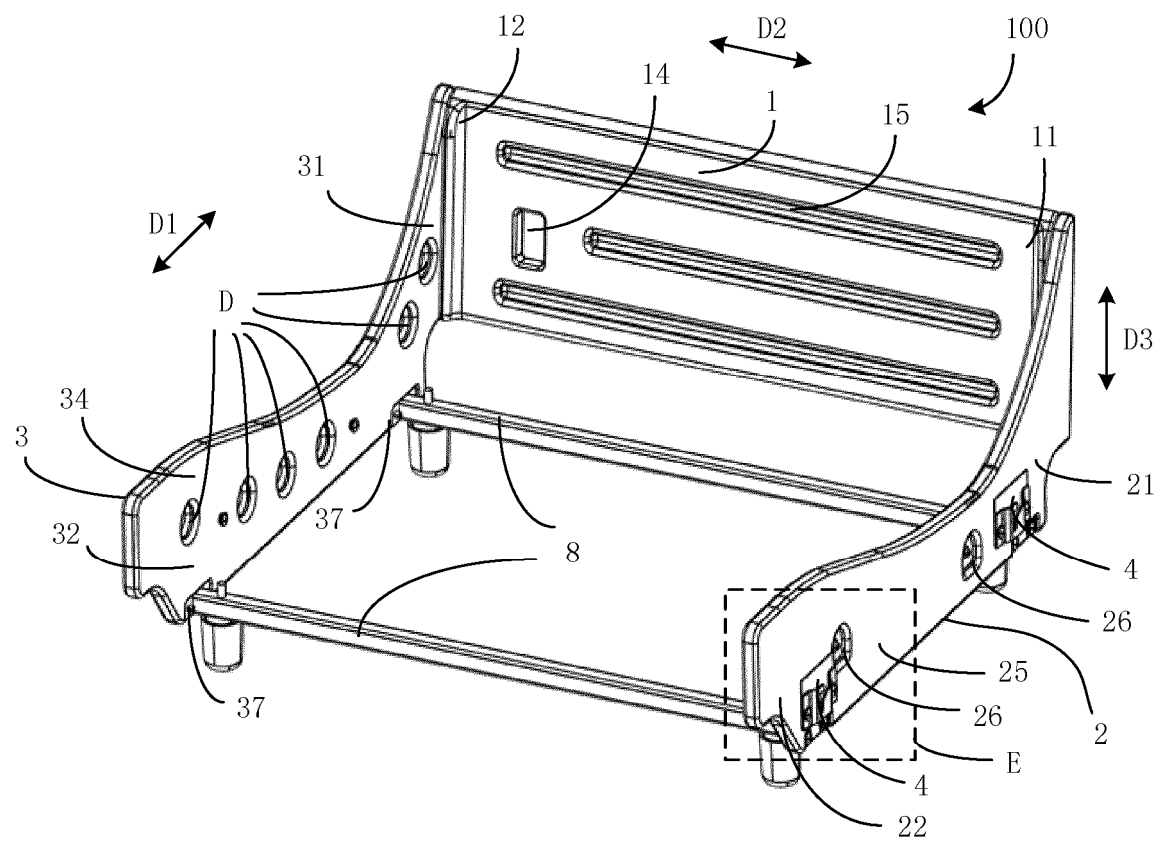


FIG.1

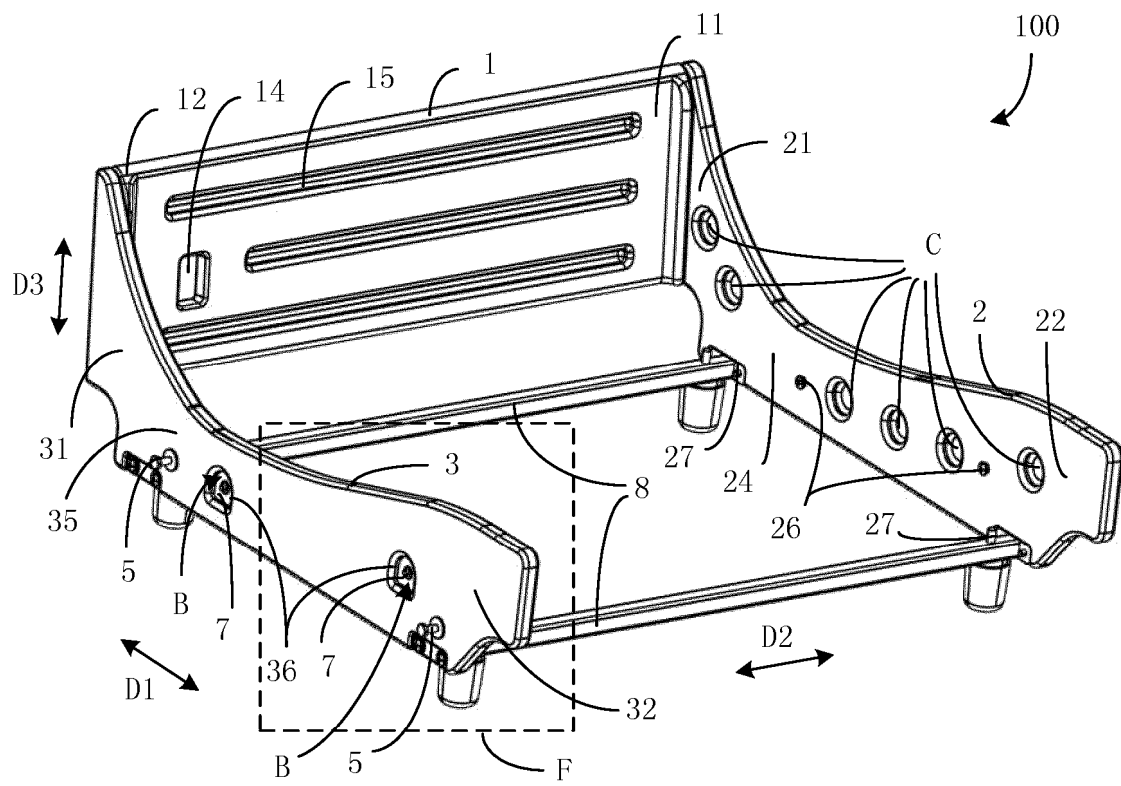


FIG. 2

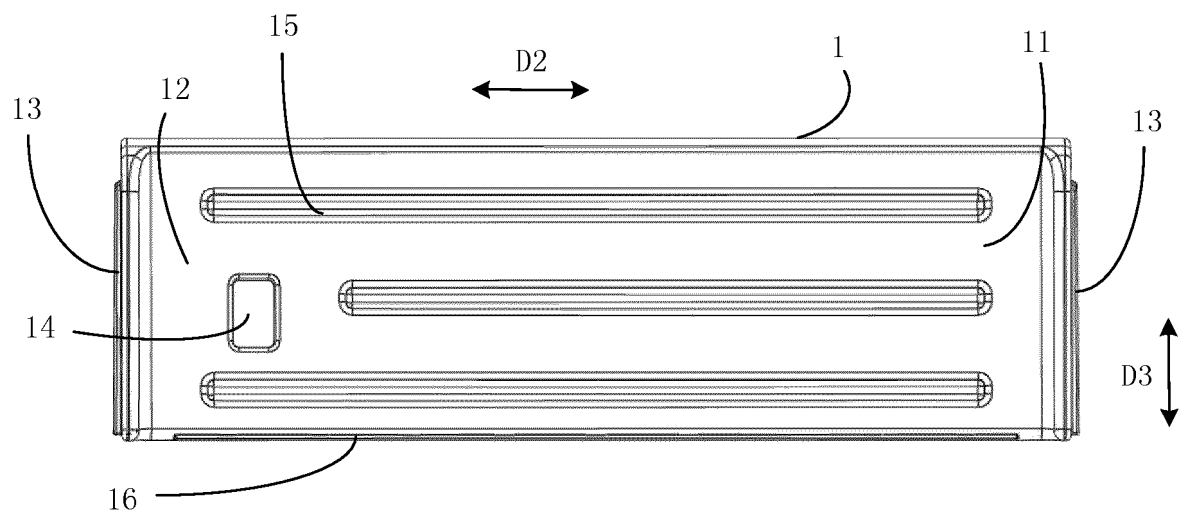


FIG. 3

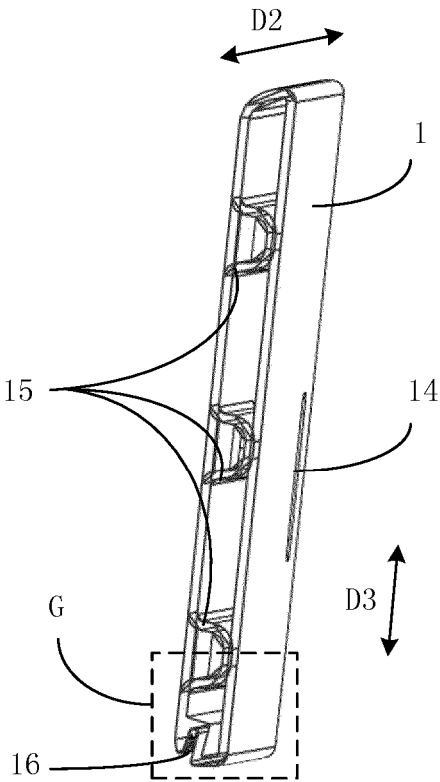


FIG. 4

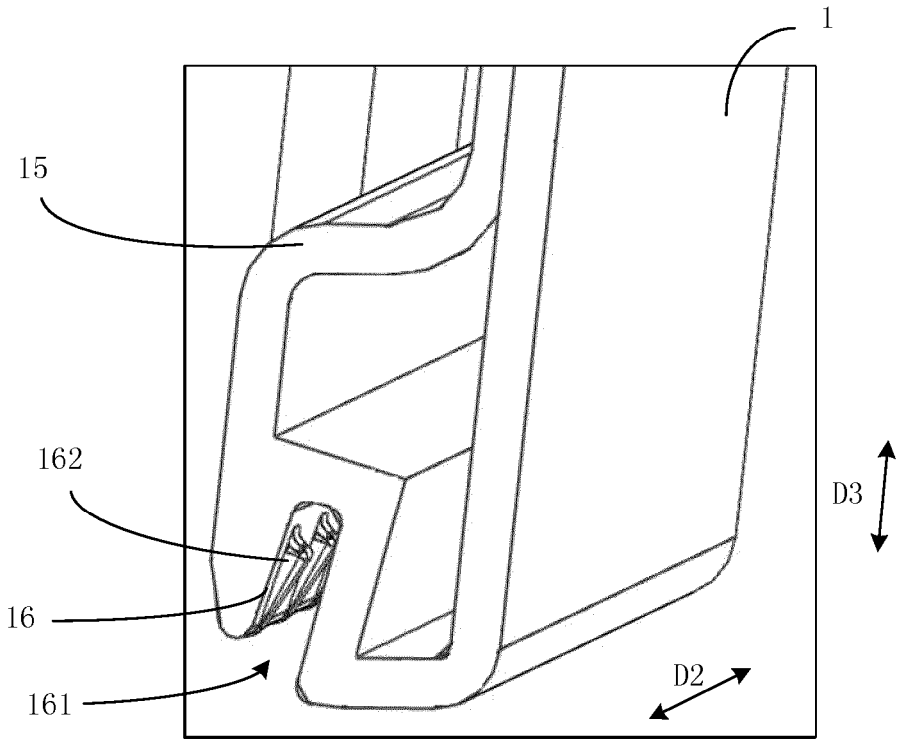


FIG. 5

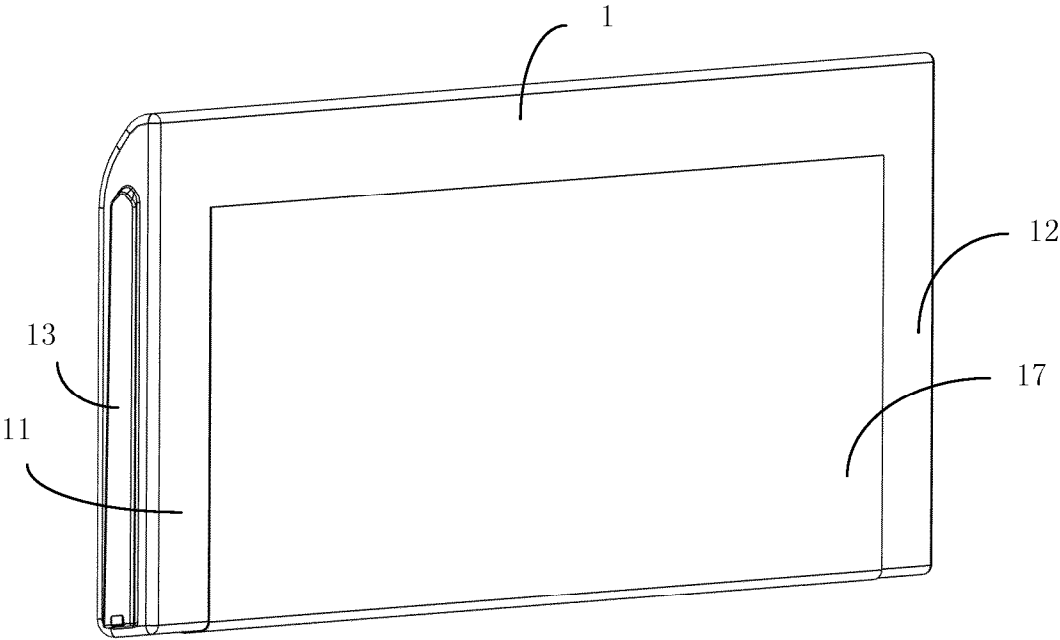


FIG. 6

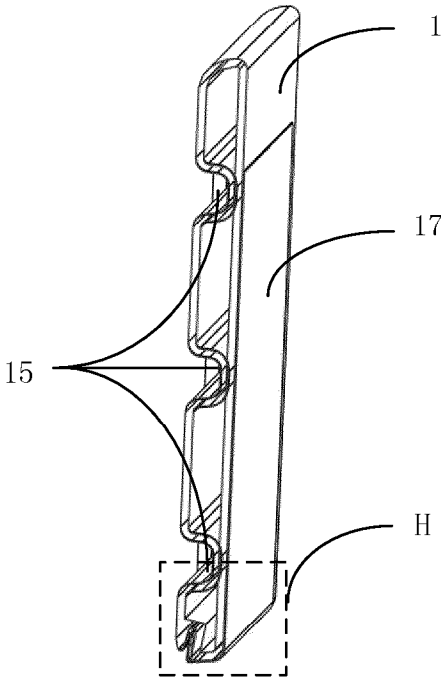


FIG. 7

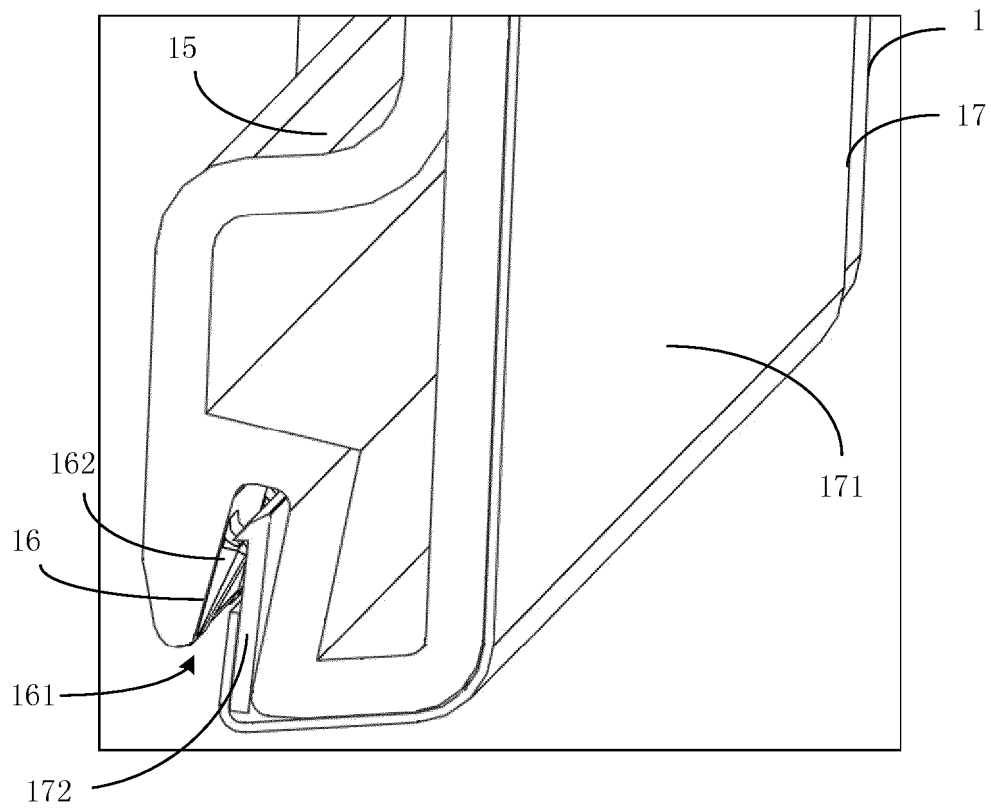


FIG. 8

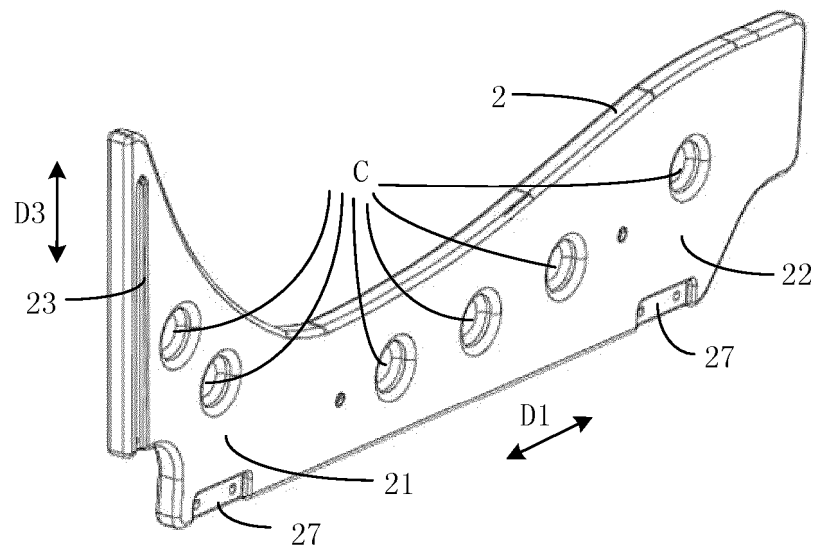


FIG. 9

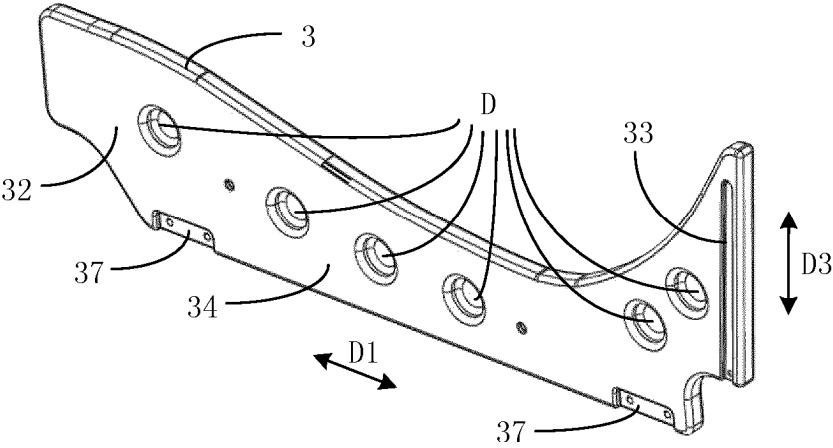


FIG. 10

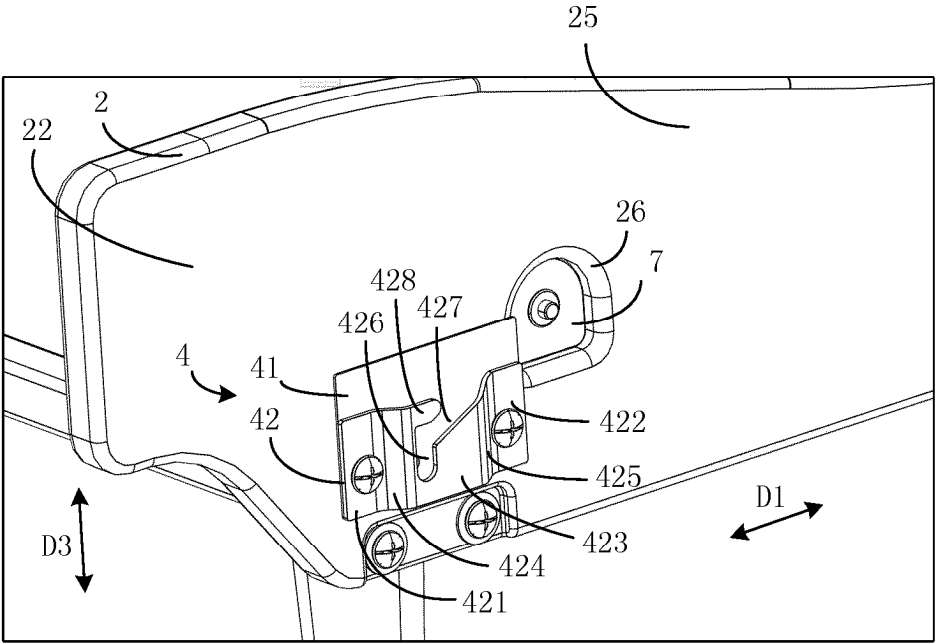


FIG. 11

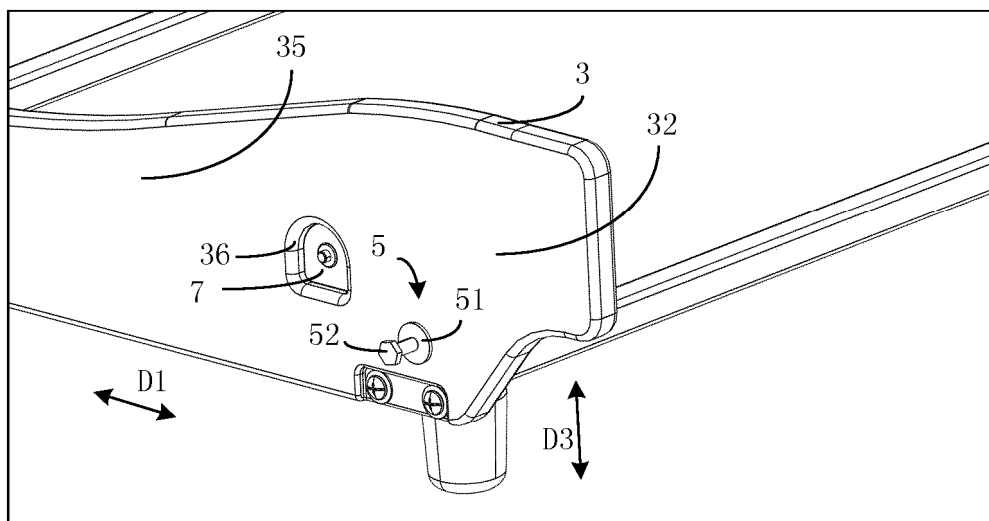


FIG. 12

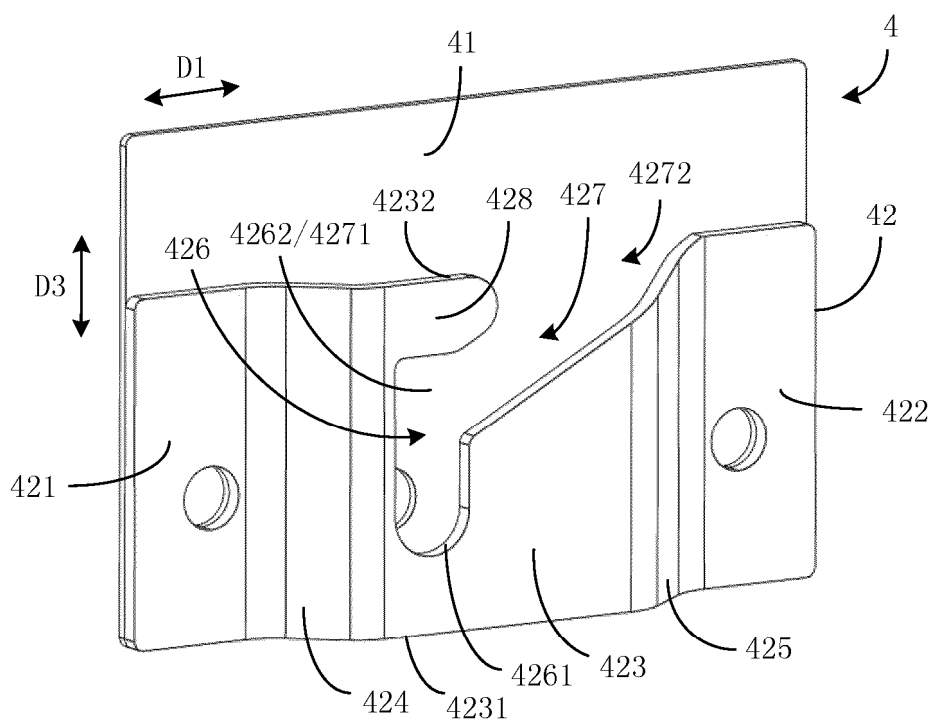


FIG. 13

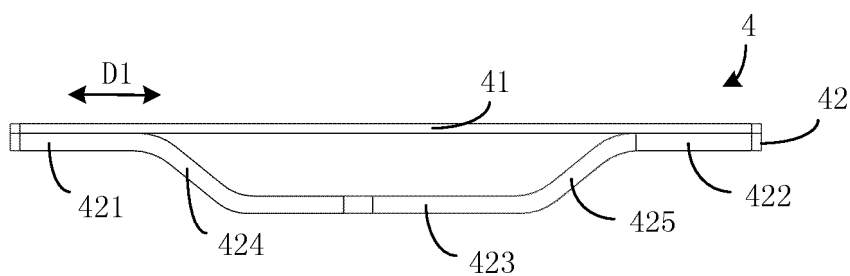


FIG. 14

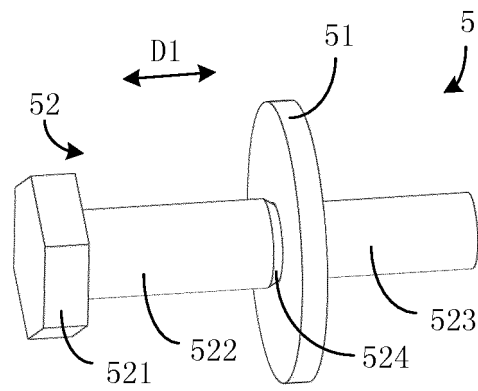


FIG. 15

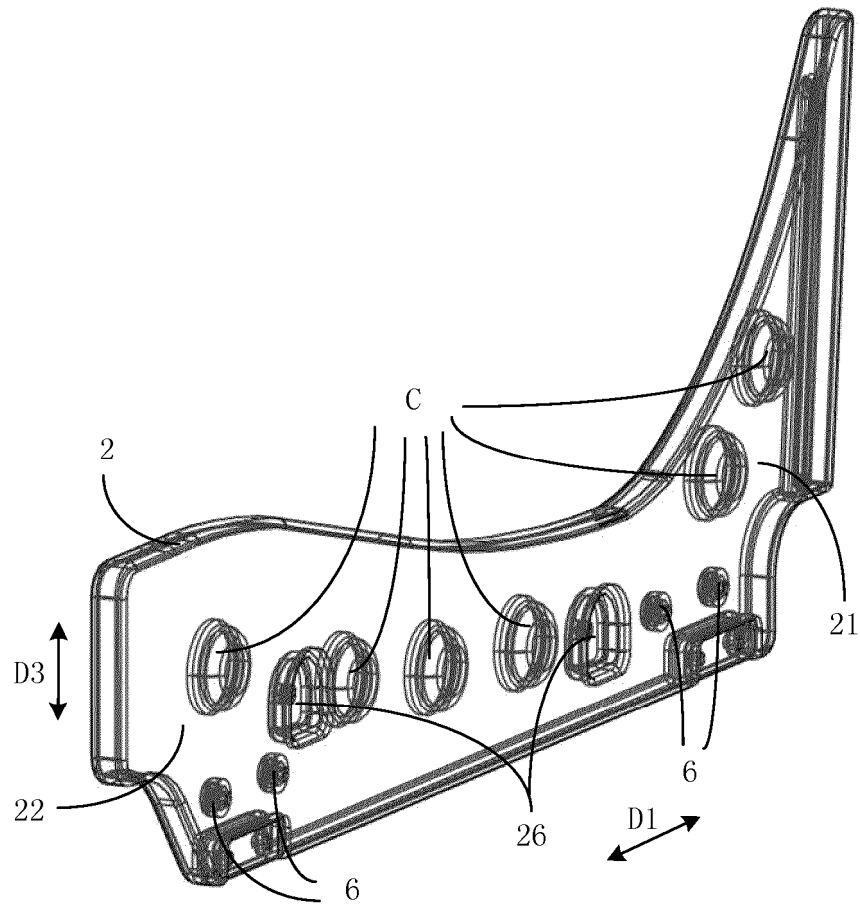


FIG. 16

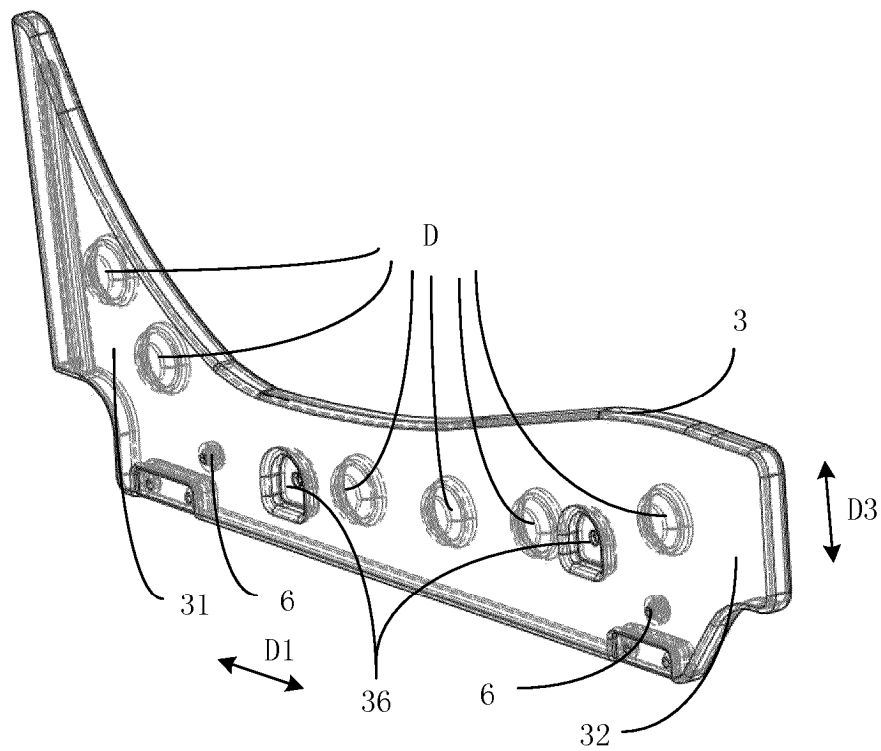


FIG. 17

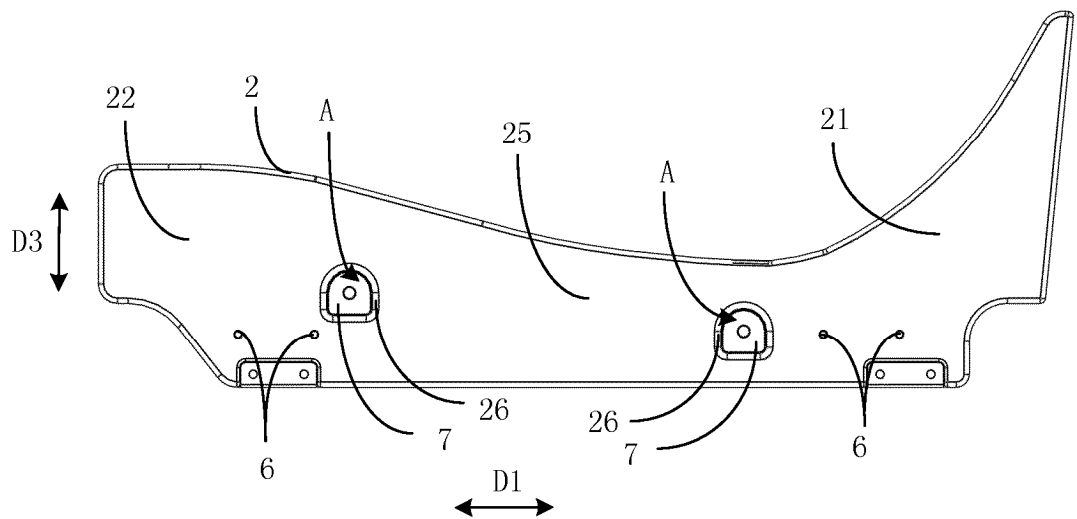


FIG. 18

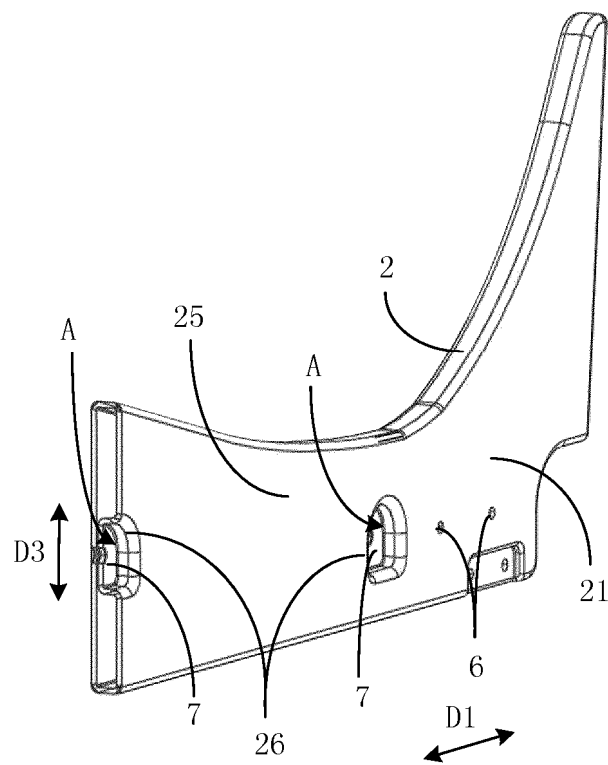


FIG. 19

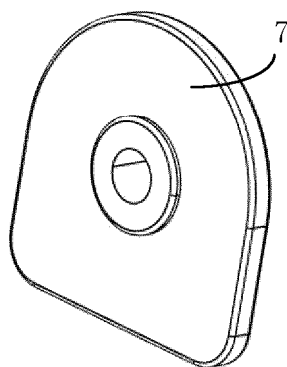


FIG. 20

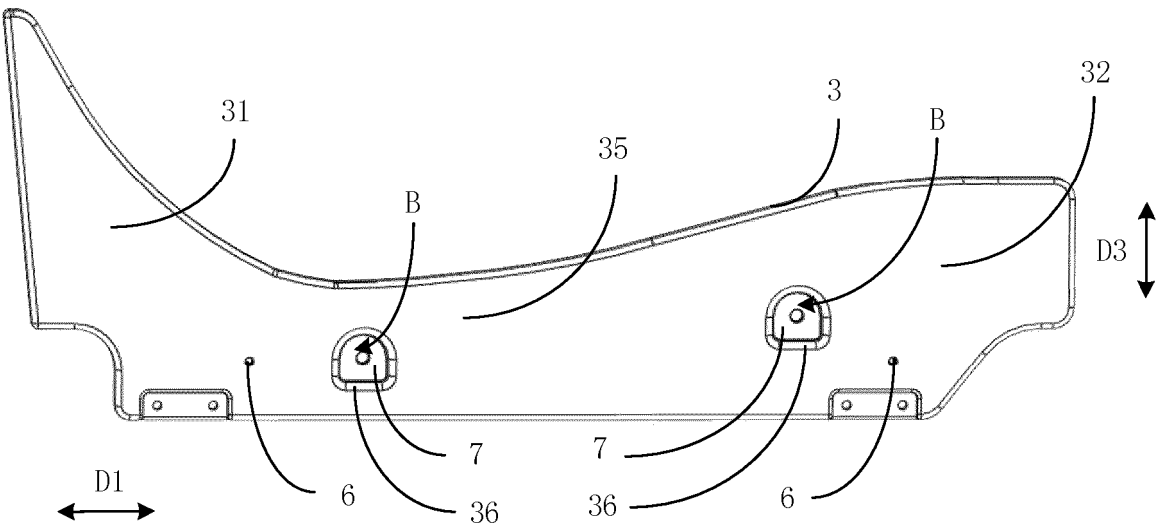


FIG. 21

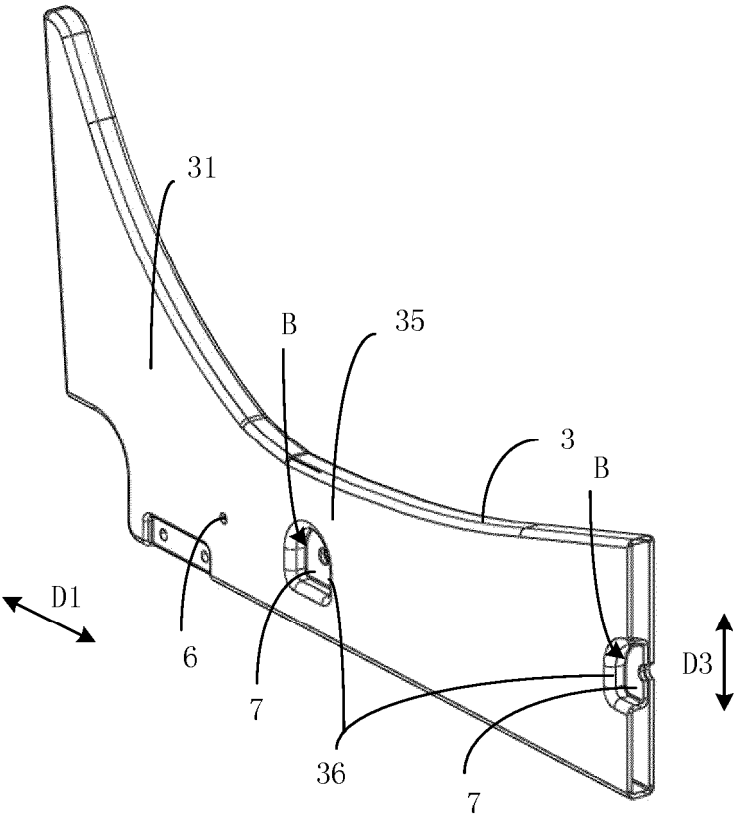
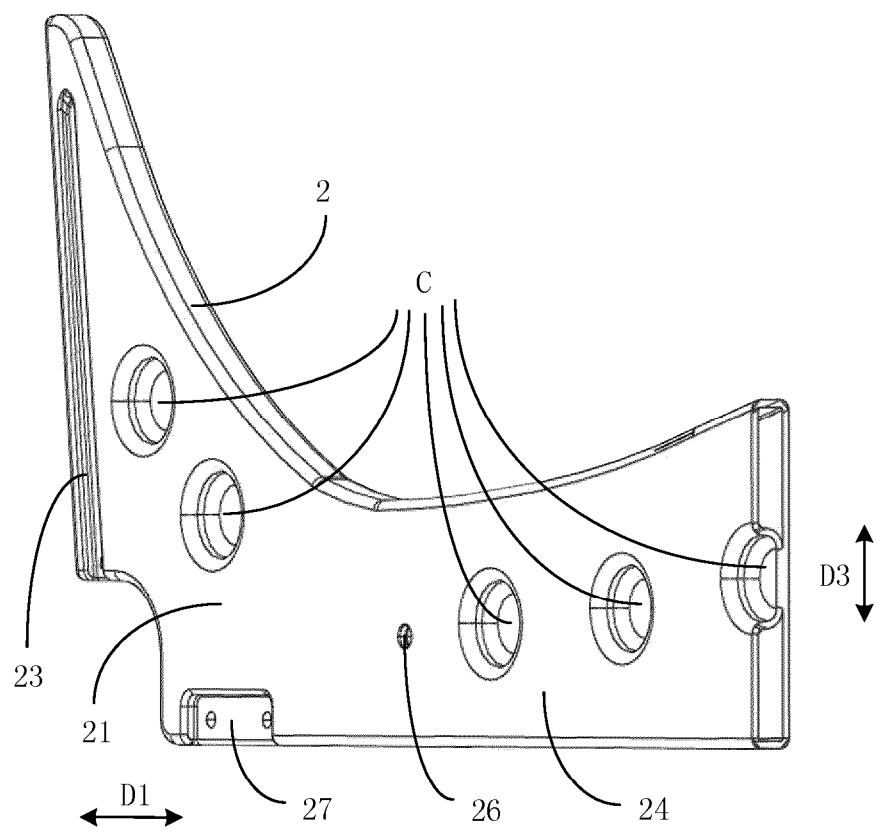
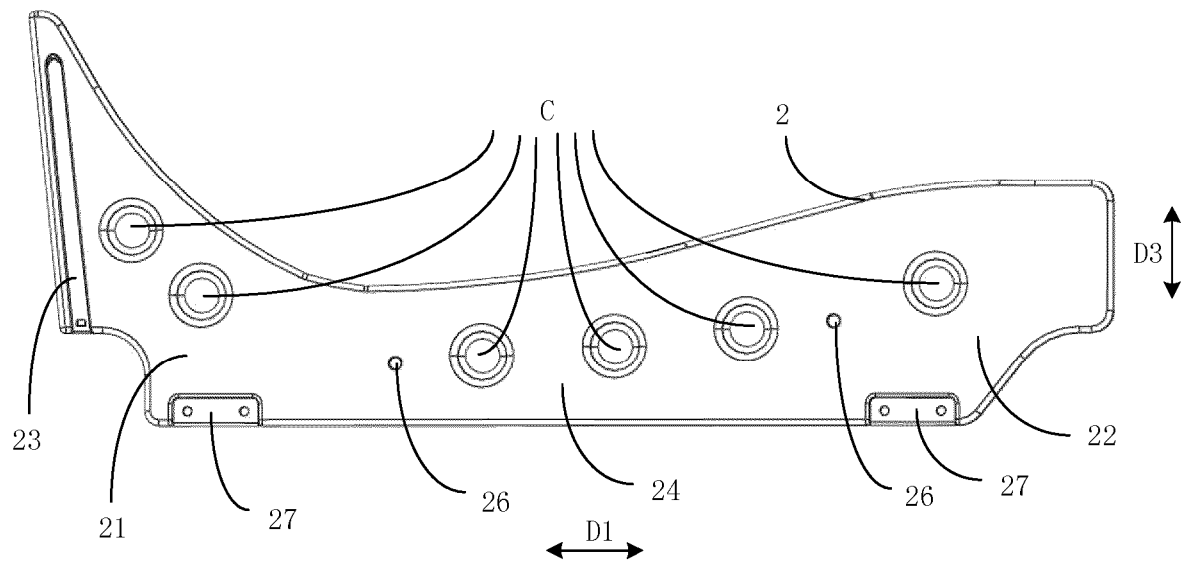


FIG. 22



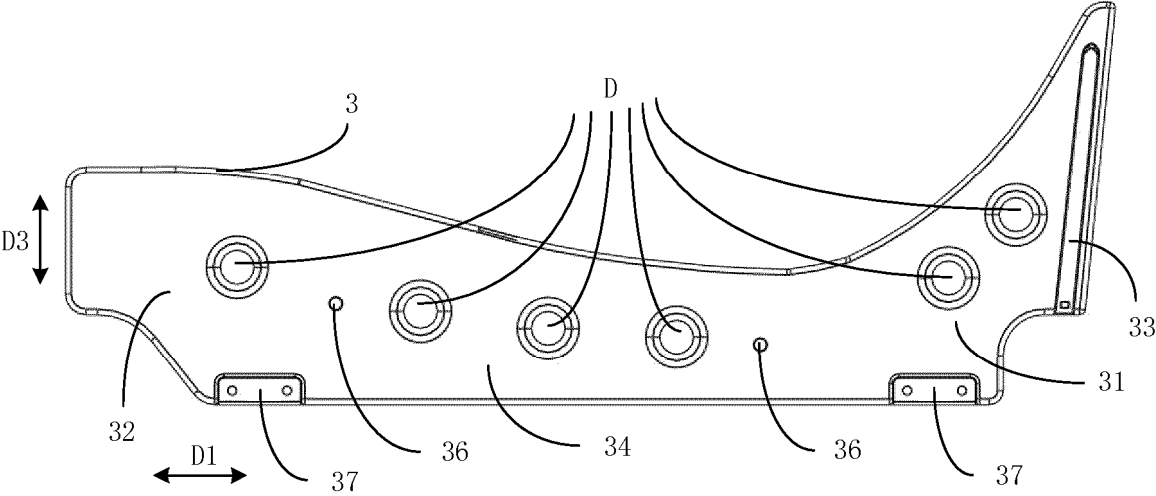


FIG. 25

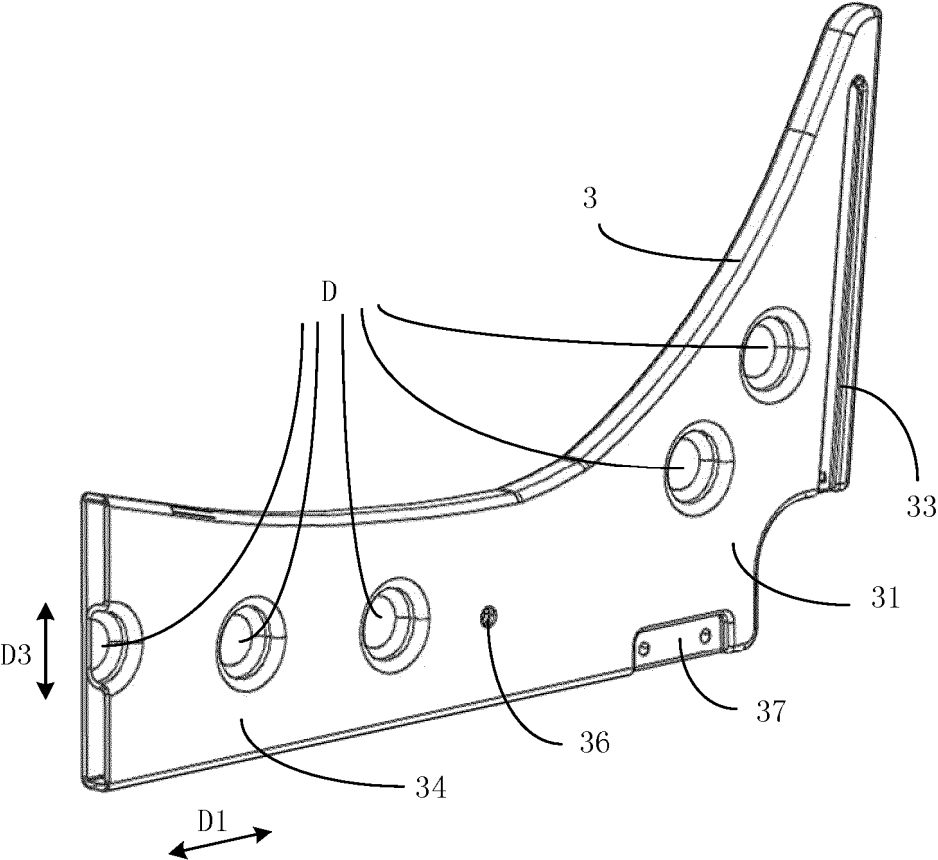


FIG. 26

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2024/090526

A. CLASSIFICATION OF SUBJECT MATTER

A47C17/00(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: A47C

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)

CNABS, VEN, ENTXT, CNTXT, CNKI, IEEE, 万方, WANFANG, 读秀, DUXIU: 沙发, 椅, 坐具, 塑, 组合, 联排, 并排, 相邻, 组合, 组装, 安装, 拼接, 插接, 锁定, 孔, 凹, 槽, 加强, 强度, 增强, 片, 支撑, 套, 装饰, 罩, 布, 卡接, 卡合, 扣接, sofa, chair, sitting, plastic, assembly, row, side-by-side, adjacent, mounting, stitching, plugging, locking, hole, recess, slot, reinforcement, strength, sheet, support, cover, trim, cloth, snap

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 212465480 U (REMACRO MACHINERY & TECHNOLOGY (WUJIANG) CO., LTD.) 05 February 2021 (2021-02-05) description, paragraphs 37-61, and figures 1-10	1, 10-16, 21, 22
Y	CN 212465480 U (REMACRO MACHINERY & TECHNOLOGY (WUJIANG) CO., LTD.) 05 February 2021 (2021-02-05) description, paragraphs 37-61, and figures 1-10	2-9, 17-20
Y	CN 216124138 U (HAINING JIUZHOU FURNITURE CO., LTD.) 25 March 2022 (2022-03-25) description, paragraphs 27-38, and figures 1-10	2-9
Y	CN 220045375 U (JASON FURNITURE (HANGZHOU) CO., LTD.) 21 November 2023 (2023-11-21) description, paragraphs 41-49, and figures 2 and 8	17-20

☒ 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
"D" document cited by the applicant in the international application	"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
"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

21 August 2024

Date of mailing of the international search report

04 September 2024

Name and mailing address of the ISA/CN

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

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2024/090526

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A	US 2018213943 A1 (BURROW, INC.) 02 August 2018 (2018-08-02) entire document	1-22

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2024/090526

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		EP 3573500 B1	16 February 2022
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