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(54) **BRACKET AND STORAGE RACK SYSTEM**

(57) A bracket (100) and a storage rack system. The bracket (100) is used in a storage rack system to connect a carrier component and includes a connecting portion (101) and a plurality of mating portions. The connecting portion (101) is provided at one end of the bracket (100), and the mating portions are of at least two different structures. The mating portions are configured to be able to connect carrier components of at least two different structures. The storage rack system includes upright columns (300), horizontal beams (400), and brackets (100) and carrier components as defined above. The upright columns (300) are detachably connected to the horizontal beams (400), and the brackets (100) are connected at one end to the upright columns (300). The carrier components are connected to the brackets (100). The brackets (100) are configured to be able to connect carrier components of at least two different structures.

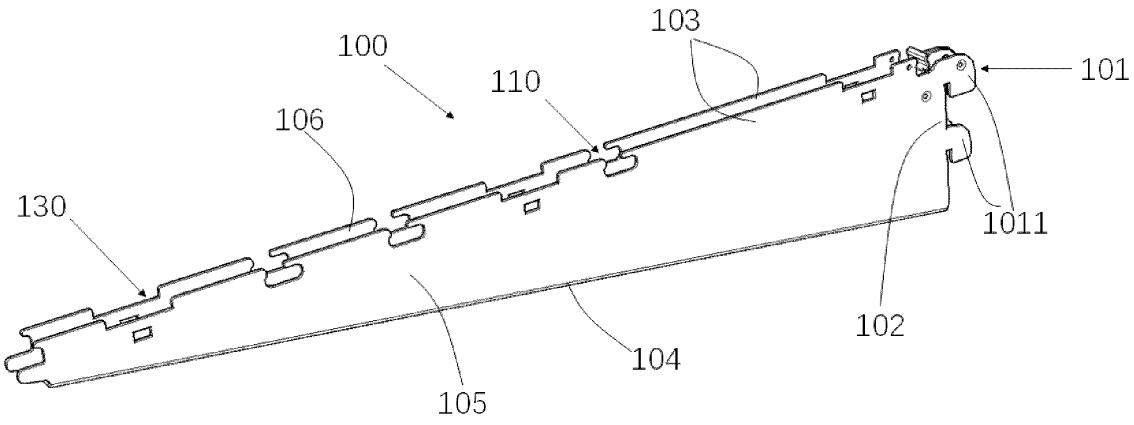

Fig. 1

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Description

Field of the Invention

[0001] The present application relates to mechanical systems for fixing and coupling and, in particular, to a bracket and a storage rack system.

Description of the Prior art

[0002] Storage racks are commonly used in our daily life usually for storage of clothes, daily necessities and the like in household applications and goods and products in commercial scenarios. Storage racks adapted to be mounted to a vertical surface are popular among and widely used by supermarkets and shopping malls because of less space occupied. Such a storage rack is often formed by mounting several brackets to a vertical wall or panel surface and then horizontally placing shelves on the brackets. In another common form of such storage racks, brackets are fastened to horizontal beams or upright columns fixedly mounted to a wall or panel surface, and shelves are in turn mounted to the brackets.

[0003] In both forms, shelves are secured to brackets that are fixed to upright or horizontal supports. Generally, the brackets are adapted to the shelves, i.e., the shelves require the brackets to be structured accordingly. For example, the shelves may be mesh shelves, and in this case, the structure of the brackets would be suitable for replacement of such shelves, but not of, for example, wood shelves, cabinets or drawers. In other words, each type of bracket in conventional storage rack systems can be suitably used with only a single type of shelf, and different types of shelves require the use of different types of brackets.

[0004] Therefore, those skilled in the art are directing their efforts towards developing a bracket, which has a wider scope of application and can be suitably used with different types of shelves, dispensing with the need for replacement or retrofit of brackets when a different type of shelf is to be used.

Summary of the Invention

[0005] The above-described problem is solved by a bracket provided in the present application, which is used in a storage rack system to connect a carrier component and comprises a connecting portion and a plurality of mating portions, wherein the connecting portion is provided at one end of the bracket; the plurality of mating portions are of at least two different structures; and the plurality of mating portions are configured to be able to connect carrier components of at least two different structures.

[0006] Further, the bracket may comprise a first side, and a second side and a third side both extending from the first side in a lengthwise direction of the bracket, wherein the connecting portion is provided at the first side and the mating portions are provided at the second side and the third side.

[0007] Further, a first mating portion may be provided at the second side and configured to be able to connect a mesh-like carrier component.

[0008] Further, the first mating portion may comprise a first notch for receiving a rod-like component of the mesh-like carrier component, the first notch defining an opening for passage of the rod-like component therethrough.

[0009] Further, the opening of the first notch may be located at one end of the first notch, wherein the first notch defines, at the other end, a receptacle for receiving the rod-like component, and a projection is formed above the receptacle.

[0010] Further, a second mating portion may be provided at the third side and configured to be able to connect a plate-like carrier component.

[0011] Further, the second mating portion may comprise a through hole extending from the third side of the bracket to the second side of the bracket and a fastener passed through the through hole, the fastener configured to be inserted into the plate-like carrier component.

[0012] Further, a third mating portion may be provided at the second side and configured to be able to connect a carrier component defining a storage space.

[0013] Further, the third mating portion may comprise a second notch allowing snap-engagement of a first clasp therein, the second notch provided at the second side, the first clasp configured to clasp a wall of the bracket that defines the second notch and be able to connect the carrier component defining the storage space.

[0014] Further, the first clasp may comprise a first side wall and a second side wall, which oppose each other, the first side wall and the second side wall joined to each other at the top by a top wall, the first side wall and the second side wall defining a gap therebetween, in which a wall of the bracket that defines the second notch is able to be inserted, the second side wall configured to connect a drawer-like carrier component.

[0015] Further, an opening of the second notch may extend at both ends toward the interior of the second notch, thereby defining a first extension and a second extension, a side of the first extension facing a bottom of the second notch defining a slanted surface which is configured to be slanted upward with respect to the bottom of the second notch.

[0016] Further, a fourth mating portion may be provided at the third side and configured to be able to connect a hook-like carrier component.

[0017] Further, the fourth mating portion may comprise at least one through slot at the third side, which mates with a snap tongue of the hook-like carrier component.

[0018] Further, the bracket may comprise a first arm wall and a second arm wall, which are arranged in opposition to each other, the first arm wall and the second arm wall joined to each other at the bottom by a bottom wall, the first arm wall and the second arm wall of the same structure.

[0019] Further, the bracket may be substantially triangular and comprise a first mating portion connecting a mesh shelf-like carrier component, a second mating portion connecting a plate-like carrier component, a third mating portion connecting a drawer-like carrier component and a fourth mating portion connecting a hook-like carrier component, wherein the first mating portion and the third mating portion are provided at the second side and the second mating portion and fourth mating portion are provided at the third side.

[0020] Further, the bracket may comprise a first arm wall and a second arm wall, which are integrally formed by bending, or may consist of a single sheet.

[0021] The present application also provides a storage rack system comprising upright columns, horizontal beams, and brackets and carrier components as defined above, the upright columns detachably connected to the horizontal beams, the brackets connected at one end to the upright columns, the carrier components connected to the brackets, wherein the brackets are configured to be able to connect the carrier components that are of at least two different structures.

[0022] Further, the carrier components may be any one or more of mesh shelves, plate-like shelves, storage components defining a storage space and hanging hooks.

[0023] Further, at least one of the brackets may be configured to connect carrier components of two different structures.

[0024] Further, the brackets may be provided at one end with lugs and the upright columns may be provided with slots, the lugs detachably inserted in the slots.

[0025] Compared with the prior art, the storage rack system of the present application has the benefits as follows:

1. The structurally different mating portions enable the bracket to connect carrier components of different structures, making the bracket multi-functional and usable in a wider range of applications.
2. Using such brackets in a storage rack system allows carrier components of different structures to be used in the storage rack system, such as mesh shelves, plate-like shelves, drawers and hanging hooks, in any combination. This enables the storage rack system to be used in a more flexible way and dispenses with the need for manufacturing brackets of various structures, resulting in reductions in manufacturing and assembly costs.
3. Using such brackets in a storage rack system allows carrier components of different structures to be readily replaced, without requiring the replacement of brackets, resulting in higher assembly efficiency and lower replacement cost.

[0026] Below, the concept, structural details and resulting effects of the present application will be further described with reference to the accompanying drawings to provide a full understanding of the objects, features and effects of the application.

Brief Description of the Drawings

[0027]

Fig. 1 is a schematic structural view of a bracket according to a first embodiment of the present application.
Fig. 2 is a schematic structural view of Fig. 1, taken from another angle.
Fig. 3 is a schematic structural view of the bracket being connected to a mesh shelf according to the first embodiment.
Fig. 4 is a schematic structural view of first and third mating portions of the support arm according to the first embodiment.
Fig. 5 is a schematic partial view of Fig. 3.
Fig. 6 is a schematic exploded view of Fig. 3.
Fig. 7 is a schematic structural view of a stop element.
Fig. 8 schematically illustrates the stop element being connected to the bracket.
Fig. 9 schematically illustrates the bracket being connected to a plate-like shelf.
Fig. 10 is a schematic exploded view of the bracket and the plate-like shelf.
Fig. 11 schematically illustrates the bracket being connected to a drawer.
Fig. 12 is a schematic partial view of Fig. 11.
Fig. 13 is a schematic exploded view of Fig. 12.
Fig. 14 is a schematic structural view of a first clasp.
Fig. 15 is a schematic structural view of Fig. 14, taken from another angle.
Fig. 16 schematically illustrates a first clasp which connects the bracket to a drawer.
Fig. 17 is a schematic structural view of a second notch according to another embodiment.
Fig. 18 schematically illustrates the second notch of Fig. 17 being connected to a clasp.
Fig. 19 is a schematic structural view of a second clasp according to another embodiment.
Fig. 20 schematically illustrates a hanging hook being connected to the support arm.
Fig. 21 is a schematic exploded view of Fig. 20.
Fig. 22 is a schematic partial view of Fig. 20.
Fig. 23 is a schematic structural view of a cover component and the bracket.
Fig. 24 is a schematic exploded view of Fig. 23.
Fig. 25 is a schematic structural view of a bracket according to a second embodiment of the present application.
Fig. 26 is a schematic structural view of the bracket of Fig. 25 and a mesh shelf.
Fig. 27 is a schematic exploded view of Fig. 26.
Fig. 28 is a schematic partial view of Fig. 26.
Fig. 29 is a schematic structural view of a storage

rack system according to the present application.
Fig. 30 is a schematic structural view of Fig. 29, taken from another angle.

[0028] In the figures: 100 bracket; 101 connecting portion; 1001 sheet; 1011 lug; 102 first side; 103 second side; 104 third side; 105 first arm wall; 106 second arm wall; 107 bottom arm wall; 108 first stop notch; 109 second stop notch;

110 first mating portion; 111 first notch; 112 opening; 113 receptacle; 114 projections;
120 second mating portion; 121 through hole; 122 fastener; 130 third mating portion; 131 second notch; 1311 first extension; 1312 second extension; 1313 slanted surface; 1314 locking stud; 132 first clasp; 1321 first side wall; 1322 second side wall; 1323 top wall; 1324 gap; 1325 through hole; 1326 elastic portion; 1327 locking hole;
140 fourth mating portion; 141 through slot; 150 notch; 151 second clasp; 152 plate-like component; 155 through hole; 156 recess;
210 mesh shelf; 211 transverse rod-like component; 212 longitudinal rod-like component; 220 stop element; 221 washer; 222 stop tab; 223 storage space; 224 trailing end; 230 plate-like shelf; 240 carrier component defining storage space; 241 side panel; 250 hanging hook; 251 hang bar; 252 first snap tongue; 253 second snap tongue; 254 projection; 255 hook portion; 260 cover component; 300 upright column; 301 slot; 400 horizontal beam.

Detailed Description of the Preferred Embodiments

[0029] A few preferred embodiments of the present application are described more fully below with reference to the accompanying drawings so that techniques thereof will become more apparent and more readily understood. The application can be embodied in various different forms and its scope is in no way limited to the embodiments disclosed herein.

[0030] Throughout the figures, structurally identical elements are indicated with the same reference numerals, and structurally or functionally similar elements are indicated with like reference numerals. The dimensions and thickness of each element in the drawings are shown arbitrarily, and the present application is not limited to any particular dimension or thickness of any element. In the figures, where appropriate, the thicknesses of some elements may be somewhat exaggerated for clarity. As used herein in connection with the orientation of Fig. 1, the term "vertical direction" refers to a direction that is the same or opposite to the direction of naturally occurring gravity, e.g., as indicated by each of the arrows A, B in Fig. 26. The term "horizontal direction" refers to a natural, horizontal direction, e.g., as indicated by each of the arrows C, D, E, F in Fig. 26. As used herein in connection with a horizontal direction, the term "transverse" refers to a direction parallel to a horizontal beam, e.g., as indicated by each of the arrows C, D in Fig. 19. As used herein in connection with a horizontal direction, the term "longitudinal" refers to a direction perpendicular to a "transverse" direction, e.g., as indicated by each of the arrows E, F in Fig. 26. As used herein to describe a bracket or shelf, the term "trailing direction" refers to a direction toward an upright column, e.g., as indicated by the direction F in Fig. 26, and the term "leading direction" refers to a direction away from an upright column, e.g., as indicated by the direction E in Fig. 26. When an upright column is vertically mounted, a vertical dimension of every slot in the upright column is defined as its "length", and its horizontal dimension is defined as its "width". A vertical dimension of every lug, washer and rib is defined as its "length", and its horizontal dimension is defined as its "thickness".

I. Bracket

[0031] As shown in Figs. 1, 2 and 4, the present application provides a bracket 100, which is provided in a storage rack system to support a carrier component in the storage rack system. One end of the bracket 100 defines a connecting portion 101, through which the bracket 100 can be connected to an upright column 300 or horizontal beam 400 of the storage rack system. The bracket 100 also defines a mating portion which can be connected to the carrier component, thereby connecting the carrier component to the bracket 100 and allowing goods to be then stored on the carrier component.

[0032] The carrier component may be of various structures. For example, the carrier component may be a mesh shelf 210 in the form of a mesh consisting of multiple interwoven struts. Alternatively, the carrier component may be a plate-like shelf 230 in the form of a storage plate made of wood, plastic, metal, etc. Still alternatively, the carrier component may be a drawer-like structure, which may be mated with the bracket 100 through a guide rail, or connected to the bracket 100 using fasteners. Yet still alternatively, the carrier component may be a hanging hook 250. Depending on its structure, the carrier component may be connected to the bracket 100 in different ways. In the present application, the mating portions of the bracket 100 are of at least two different structures, which can be connected to carrier components of different structures. In conventional storage rack systems, each bracket defines only one type of mating portion and therefore can be connected to only a defined single type of carrier component. When a different type of carrier component is to be used, replacement with another bracket with a corresponding type of mating portion is necessary. In contrast, according to the present application, as the bracket 100 can accommodate carrier components of at least two different structures, replacement between these differently-structured carrier components can be made simply without requiring replacement of the bracket 100. It will be understood that the bracket 100

may define mating portions of three or more types and can be thus used in a wider range of applications, without departing from the scope of the present application. For example, in the embodiment shown in Figs. 1, 2 and 4, the bracket 100 defines a first mating portion 110, a second mating portion 120, a third mating portion 130 and a fourth mating portion 140. The first mating portion 110 can be connected to a first mating component 210, such as a carrier component in the form of a mesh shelf. The second mating portion 120 can be connected to a second mating component 230, such as a plate-like carrier component. The third mating portion 130 can be connected to a third mating component, which can be in turn connected to a drawer-like, cage-like or basket-like or other carrier component 240 defining a storage space. The fourth mating portion 140 can be connected to a fourth mating component 250, such as a hook-like carrier component. In the shown embodiment, any two, three or four of the first 110, second 120, third 130 and fourth 140 mating portions may be included. It will be understood that, in the shown embodiment, other mating portions may also be included in addition to those shown.

Example 1

[0033] Figs. 1 to 21 show a first embodiment. Referring to Fig. 1, the bracket 100 is generally triangular and defines, on its shortest side (first side 102), a connecting portion 101 for connecting the bracket 100 to an upright column 300 or horizontal beam 400. The other two sides, namely, a second side 103 and a third side 104, both extend from the first side 102 and form an acute angle therebetween. As viewed in the orientation of the figure, the upper side is the second side 103, and the lower side is the third side 104. It will be understood that the shape of the bracket 100 is not limited to being triangular, as described herein, and may be any other suitable shape, such as quadrilateral.

[0034] The bracket 100 includes a first arm wall 105 and a second arm wall 106, which are substantially parallel to each other. It also includes a bottom arm wall 107 attached to the bottom of both the first arm wall 105 and the second arm wall 106. The first arm wall 105 and the second arm wall 106 are of the same substantially triangular shape. The first arm wall 105 and the second arm wall 106 are substantially of the same structure, and only one of them is described below as an example.

[0035] The connecting portion 101 of the bracket 100 includes a lug 1011 protruding from the first side 102 of the bracket 100. The lug 1011 can be inserted into a slot 301 in the upright column 300 or horizontal beam 400, thereby securely connecting the bracket 100 thereto. It will be understood that the connecting portion 101 may be alternatively provided in the form of, for example, a fastener structure which can connect the bracket 100 to the upright column 300 or horizontal beam 400.

[0036] As shown in Figs. 3 and 4, the bracket 100 defines, on the second side 103 that is to be brought into direct contact with a carrier component, a first mating portion 110 for connecting a mesh shelf 310. Specifically, the first mating portion 110 includes a number of first notches 111, which are provided at the second side 103 in a row along its lengthwise direction. During use, transverse rod-like components 211 of the mesh shelf 210, which are perpendicular to the bracket 100, are passed through openings 112 of the first notches 111 and pushed down into the first notches 111 so that the mesh shelf 210 is prevented from sliding in the lengthwise direction of the bracket 100. In some implementations, the openings 111 of the first notches 111 has a dimension in the lengthwise direction of the bracket 100, which is smaller than a length of the first notches 111. The openings 112 are defined at one end of the first notches 111, and receptacles 113 are defined at the other end of the first notches 111. After the rod-like components of the mesh shelf 210 enter the openings 112, the mesh shelf 210 may be pushed so that the rod-like components are further urged into the receptacles 113 (see Fig. 5). Projections 114 above the receptacles 113 can block the mesh shelf 210 from dislodgement from the bracket 100, increasing the stability of the mesh shelf 210 on the bracket 100.

[0037] For a storage rack system employing such mesh shelves 210, the stability of the mesh shelves 210 on the brackets 100 is one of the main factors that influence the load capacity of the storage rack system. Referring to Fig. 3, the mesh shelf 210 is made up of multiple parallel transverse rod-like components 211 and multiple parallel longitudinal rod-like components 212. Specifically, the transverse rod-like components 211 may be arranged under the longitudinal rod-like components 212 so that they cross each other to form a mesh-like structure. The bracket 100 defines, at an edge thereof opposite to the connecting portion 101 (i.e., at a leading end of the bracket 100), a first stop notch 108. Also, the bracket 100 defines a second stop notch 109 around the connecting portion (i.e., at a trailing end of the bracket 100). Both the first stop notch 108 and the second stop notch 109 are curved, semi-closed structures. The first stop notch 108 is obliquely open upward toward the leading end, while the second stop notch 109 is obliquely open upward toward the trailing end. When a transverse rod-like component 211 of the mesh shelf 210 is received in the first stop notch 108 so as to be brought into contact with the bottom of the first stop notch 108, the first stop notch 108 can stop the mesh shelf 210 from moving toward the trailing end. The transverse rod-like components 211 can be received in the receptacles 113 of the first notches 111. In this configuration, one of the transverse rod-like components 211 of the mesh shelf 210 is received in the second stop notch 109. Stopped by the second stop notch 109, the mesh shelf 210 cannot move toward the leading end. In order to additionally stabilize the mesh shelf 210 on the bracket 100, a stop element 220 may be provided at the trailing end of the bracket 100 to secure the mesh shelf 210 (see Figs. 3 and 6). As shown in Fig. 7, the stop element 220 includes two

washers 221 and a curved stop tab 222. The two washers 221 are substantially parallel, and are joined by a trailing end 224 of the stop tab 222, to each other. As shown in Figs. 6 and 7, the washers 221 are shaped similarly to the lug 1011. Equally-sized holes may be provided at aligned locations of the lug 1011 and the washers 221, and the washers 221 may be fixed to the lug 1011 by screws inserted in the holes. The fixation may be accomplished otherwise, for example, by welding or riveting. It will be understood that, in the latter case, it is unnecessary to provide the holes in the lug 1011 and washers 221. The stop element 220 is made of a metal or plastic material with a certain degree of elasticity. The stop tab 222 is curved, and a curved portion of it defines a receptacle 223. When the stop element 220 is fixedly connected to the bracket 100, the receptacle 223 of the curved stop tab 222 can receive a transverse rod-like component 211, as shown in Fig. 8. Specifically, an external force may be applied to deflect the stop tab 222 to increase a radius of curvature of the curved contour of the stop tab 222 to expand the receptacle 223 that it defines to allow the transverse rod-like component 211 to be received therein. After the force is removed, the stop tab 222 restores its original shape due to its elasticity. That is, the radius of curvature of the curved contour of the stop tab 222 decreases. Accordingly, the receptacle 223 defined by the curved contour shrinks, stopping the transverse rod-like component 211 within the stop tab 222.

[0038] As shown in Figs. 2, 9 and 10, a second mating portion 120 is used to connect a plate-like shelf 230. The plate-like shelf 230 is an integral, continuous, flat plate and may be generally made of wood, plastic, metal, or the like. If the plate-like shelf 230 is directly placed on the bracket 100, it tends to slide on the bracket 100 in its lengthwise direction and cannot reside stably thereon. The second mating portion 120 can be used to fix the plate-like shelf 230 to the bracket 100, increasing its stability on the bracket 100. The second mating portion 120 includes at least one through hole 121 vertically extending through the bottom arm wall and a fastener 122 which can be inserted in the through hole. For example, the fastener 122 may be a long nail, which can be inserted into the through hole 121 from the bottom of the bracket upwards. After a pointed tip of the long nail is passed through the through hole, the nail may be hammered to drive the tip into the plate-like shelf 230. Alternatively, the fastener 122 may be a screw, which may be passed through the through hole 121 and screwed into the plate-like shelf 230.

[0039] As shown in Figs. 1, 11 12 and 13, a third mating portion 130 is used to connect a carrier component 240 defining a storage space, such as a drawer-like carrier component shown in the illustrated example. As shown in Figs. 1 and 4, the third mating portion 130 includes at least one second notch 131 in the bracket 100, which can mate with a third mating component implemented as a first clasp 132. In use, the first clasp 132 is snap-engaged in the second notch 131, and a fastener is then used to connect the first clasp 132 to a side panel 241 of the carrier component 240, thereby securing the carrier component 240. The second notch 131 is recessed from the first side 102 of the bracket 100. As shown in Figs. 14 and 15, the first clasp 132 includes a first side wall 1321 and a second side wall 1322, which oppose each other. Top ends of the first side wall 1321 and the second side wall 1322 are joined to each other by a top wall 1323. The first side wall 1321 and the second side wall 1322 define a gap 1324 therebetween, which allows the clasp to be snap-engaged in the second notch 131 of the bracket 100. The fastener is passed through a through hole 1325 extending through the second side wall 1322 in its thickness direction and is then connected to the side panel 241 of the carrier component 240. In some implementations, as shown in Fig. 14, the first clasp 132 further includes an elastic portion 1326 provided on a surface of the second side wall 1322 facing the first side wall 1321. As shown in Fig. 16, when the first clasp 132 is received in the second notch 131, the elastic portion 1326 abuts against a wall around the second notch 131, thereby securely snap-engaging the first clasp 132 in the second notch 131. It will be understood that the carrier component 240 may be implemented as a drawer (see Fig. 11), cage-like carrier component, basket-like carrier component or other carrier component that defines an internal storage space. All these carrier components 240 have a storage space in which goods can be stored. That is, they all have an internal volume for storage of goods.

[0040] In another implementation, the at least one second notch 131 may be structured as shown in Fig. 17. Opposite end portions of an opening of the second notch 131 extend toward the interior of the second notch 131, thus defining a first extension 1311 and a second extension 1312. A surface of the first extension 1311 facing the bottom of the second notch 131 is configured as a slanted surface 1313. With this configuration, as shown in Fig. 18, the first clasp 132 must be held obliquely at an angle before it can be inserted into the second notch 131. The angle the first clasp 132 must be held obliquely may be substantially equal to an angle the surface 1313 is slanted. Once received in the second notch 131, the first clasp 132 will be blocked by the first extension 1311 and the second extension 1312 from dislodgement from the second notch 131, thereby stabilizing the carrier component. That is to say, blocked by the first extension 1311 and the second extension 1312, the carrier component 240 must be deployed or removed obliquely, rather than perpendicularly to the lengthwise direction of the bracket. Preferably, the second notch 131 is arranged around the connecting portion 101 and structure as shown.

[0041] In another implementation, the first clasp 132 is structured as shown in Fig. 19. In the example of Fig. 19, the first clasp 132 includes only a first side wall 1321 and a second side wall 1322. Top ends of the first side wall 1321 and the second side wall 1322 are joined to each other by a top wall 1323. The first side wall 1321 and the second side wall 1322 define a gap 1324 therebetween, in which

a side wall of the bracket that defines the second notch 131 can be received. The first side wall 1321 is elastic and can be biased toward the second side wall 1322. Once snap-engaged in the second notch 131, the first side wall 1321 is biased toward the second side wall 1322 and thereby firmly engaged with the side wall of the bracket that defines the second notch 131. Preferably, a locking hole 1327 is provided on the first side wall, and a locking stud 1314 which can mate with the locking hole 1327 is provided on the side wall of the bracket that defines the second notch 131 (see Fig. 16). The locking stud 1314 is spherical, projects toward the side wall of the bracket and can snap into the locking hole 1327.

[0042] As shown in Figs. 2 and 20, a fourth mating portion 140 is used to connect a hanging hook 250. As shown in Figs. 21 and 22, the fourth mating portion 140 includes two through slots 141 provided at the bottom of the bracket in correspondence with two respective snap tongues on the hanging hook 250, namely, a first snap tongue 252 and a second snap tongue 253. The first snap tongue 252 of the hanging hook 250 has a projection 254 projecting in a leading direction of the bracket 100. After the first snap tongue 252 and the second snap tongue 253 of the hanging hook are passed through the respective through slots 141, the hanging hook 250 can be moved in the leading direction of the bracket 100 to bring the projections 254 into abutment with the bottom of the bracket 100, thereby securely hanging the hanging hook 250 on the bracket 100. It will be understood that the fourth mating portion 140 may also be provided as a threaded hole, and a fastener such as a screw may be used to fix the hanging hook 250 to the bracket 100. The hanging hook 250 includes a hook portion 255. Two hanging hooks 250 may be provided in parallel and opposition to each other, and a hang bar 251 may be horizontally placed on both the hook portions 255 of the hanging hooks 250

[0043] In some implementations, as shown in Figs. 23 and 24, a cover component 260 may be provided on the bracket 100, which covers the entire mesh shelf 210 to not only provide protection but also allow goods to be stored thereon.

[0044] When the bracket 100 of the first embodiment is used in a storage rack system, carrier components of different structures may be arranged thereon, as required. As shown, examples of the carrier components may include mesh shelves 210, plate-like shelves 230, hanging hooks 250 and other carrier components 250 defining a storage space. Alternatively, carrier component(s) of the same single structure may be arranged on the bracket 100. In the case, the carrier component(s) may be replaced with carrier component(s) of a different structure, as required, without requiring replacement of the bracket.

[0045] The bracket 100 of the first embodiment includes two side walls 103, which may be formed by bending a single sheet of material.

Example 2

[0046] As shown in Fig. 25, a bracket according to a second embodiment differs from that of the first embodiment in consisting of a single sheet 1001. The single sheet may be of the same structure as the first arm wall 105 or the second arm wall 106 in the bracket of the first embodiment. The sheet 1001 may define, at its second side 103, a notch 150 for mating with a carrier component. Around the second side 103, there is provided a through hole 155, through which a fastener may be passed and connected to the carrier component. A through hole (not shown) is provided in the sheet 1001, which extends from the second side 103 to a third side 104, and a fastener may be passed through the through hole and connected to a plate-like shelf 230. The notch 150 can mate with a first clasp 132 for connecting a drawer 240.

[0047] In one implementation, as shown in Figs. 26, 27 and 28, the bracket 100 of the second embodiment is provided with a second clasp 151, which can mate with the notch 150 by snap engagement therein. The second clasp 151 defines a recess 156 for receiving a transverse rod-like component 211 of a mesh shelf 210, and the mesh shelf 210 is covered with a plate-like component 152.

[0048] It will be understood that the bracket of the second embodiment can also define the first, second, third and fourth mating portions of the first embodiment. The connecting portion 101 and the stop element 220 of the first embodiment are also applicable to the second embodiment. The brackets of the two embodiments can be connected to a horizontal beam or upright column in the same way. The second clasp 151 of the second embodiment can also be used in the first embodiment to connect a carrier component.

II. Storage Rack System

[0049] As shown in Figs. 29 to 30, the present application provides a storage rack system 10 including upright columns 300, horizontal beams 400, brackets 100 as discussed above and carrier components arranged on the brackets 100.

[0050] The horizontal beams 400 are usually fixed to a vertical surface, such as a wall surface or a panel surface. The horizontal beams 400 are usually conventional standard products, which are elongate in shape. In use, the horizontal beams 400 are often fixed to a vertical surface and not relocated once fixed. The structure of the storage rack system can be structurally modified mainly by adding new upright columns 300, or removing or relocating some upright columns 300. Therefore, the upright columns 300 are detachable and movable. Each bracket 100 is connected, by the connecting portion on its one end, to an upright column 300. In some embodiments, the brackets 100 may also be connected to the horizontal beams 400. The structurally different mating portions of

the brackets 100 can be connected to carrier components of different structures. For example, in the example shown in Fig. 26, carrier components including mesh shelves 210, drawers 240, plate-like shelves 230 and hanging hooks 250 can be arranged on the brackets 100. Carrier components of different structures may be arranged on opposite sides of one or more brackets 100. For example, as shown in portion X of Fig. 26, a bracket 100 is connected to a mesh shelf 210 on one side and to a drawer 240 on the other side. As shown in portion Y of Fig. 26, a plate-like shelf 230 is arranged on and connected to a bracket 100, and a hanging hook 250 is arranged under and connected to the bracket 100.

[0051] It will be understood that the storage rack system may be provided with carrier components of the same single structure, which may be replaced with carrier components of a different structure without requiring replacement of the brackets 100.

[0052] As shown in Figs. 6 and 8, the upright columns 300 define slots 301, and the lugs 1011 of the brackets 100 can be fixed in the slots 301.

[0053] It is to be noted that the foregoing embodiments are merely several representative embodiments of the present invention and are not intended to limit the scope of the invention in any sense. Any and all embodiments obtained from simple substitutions or variations are intended to be embraced in the scope of the invention. The various technical features of the foregoing embodiments may be combined in any way. Although not all such combinations have been described above for the sake of brevity, any of them is considered to fall within the scope of this specification as long as there is no contradiction between the technical features.

[0054] Although a few preferred specific embodiments of the present application have been described in detail above, it will understood that those of ordinary skill in the art can make various modifications and changes thereto based on the concept of the present application without exerting any creative effort. Accordingly, all variant embodiments that can be obtained by those skilled in the art through logical analysis, inference or limited experimentation in accordance with the concept of the present invention on the basis of the prior art are intended to fall within the scope as defined by the appended claims.

Claims

1. A bracket used in a storage rack system to connect a carrier component, **characterized in** comprising a connecting portion and a plurality of mating portions, wherein the connecting portion is provided at one end of the bracket; the plurality of mating portions are of at least two different structures; and the plurality of mating portions are configured to be able to connect carrier components of at least two different structures.

2. The bracket of claim 1, **characterized in** comprising a first side, and a second side and a third side both extending from the first side in a lengthwise direction of the bracket, wherein the connecting portion is provided at the first side and the mating portions are provided at the second side and the third side.

3. The bracket of claim 2, **characterized in that** a first mating portion is provided at the second side and configured to be able to connect a mesh-like carrier component.

4. The bracket of claim 3, **characterized in that** the first mating portion comprises a first notch for receiving a rod-like component of the mesh-like carrier component, the first notch defining an opening for passage of the rod-like component therethrough.

5. The bracket of claim 4, **characterized in that** the opening of the first notch is located at one end of the first notch; the first notch defines, at the other end, a receptacle for receiving the rod-like component; and a projection is formed above the receptacle.

6. The bracket of claim 2, **characterized in that** a second mating portion is provided at the third side and configured to be able to connect a plate-like carrier component.

7. The bracket of claim 6, **characterized in that** the second mating portion comprises a through hole extending from the third side of the bracket to the second side of the bracket and a fastener passed through the through hole, the fastener configured to be inserted into the plate-like carrier component.

8. The bracket of claim 2, **characterized in that** a third mating portion is provided at the second side and configured to be able to connect a carrier component defining a storage space.

9. The bracket of claim 8, **characterized in that** the third mating portion comprises a second notch allowing snap-engagement of a first clasp therein, the second notch provided at the second side, the first clasp configured to clasp a wall of the bracket that defines the second notch and be able to connect the carrier component defining the storage space.

10. The bracket of claim 9, **characterized in that** the first clasp comprises a first side wall and a second side wall, which oppose each other, the first side wall and the second side wall joined to each other at the top by a top wall, the first side wall and the second side wall defining a gap therebetween, in which a wall of the bracket that defines the second notch is able to be inserted, the second side wall configured to connect a drawer-like carrier component.

11. The bracket of claim 9, **characterized in that** an opening of the second notch extends at both ends toward an interior of the second notch, thereby defining a first extension and a second extension, a side of the first extension facing a bottom of the second notch defining a slanted surface which is configured to be slanted upward with respect to the bottom of the second notch.

12. The bracket of claim 2, **characterized in that** a fourth mating portion is provided at the third side and configured to be able to connect a hook-like carrier component.

13. The bracket of claim 12, **characterized in that** the fourth mating portion comprises at least one through slot at the third side, which mates with a snap tongue of the hook-like carrier component.

14. The bracket of claim 1, **characterized in** comprising a first arm wall and a second arm wall, which are arranged in opposition to each other, the first arm wall and the second arm wall joined to each other at the bottom by a bottom wall, the first arm wall and the second arm wall of the same structure.

15. The bracket of claim 2, **characterized in** being substantially triangular and comprising a first mating portion connecting a mesh shelf-like carrier component, a second mating portion connecting a plate-like carrier component, a third mating portion connecting a drawer-like carrier component and a fourth mating portion connecting a hook-like carrier component, wherein the first mating portion and the third mating portion are provided at the second side and the second mating portion and fourth mating portion are provided at the third side.

16. The bracket of claim 1, **characterized in** comprising a first arm wall and a second arm wall, which are integrally formed by bending, or consisting of a single sheet.

17. A storage rack system, **characterized in** comprising upright columns, horizontal beams, and brackets and carrier components as defined in any of claims 1 to 15, the upright columns detachably connected to the horizontal beams, the brackets connected at one end to the upright columns, the carrier components connected to the brackets, wherein the brackets are configured to be able to connect the carrier components that are of at least two different structures.

18. The storage rack system of claim 17, **characterized in that** the carrier components are any one or more of mesh shelves, plate-like shelves, carrier components defining a storage space and hanging hooks.

19. The storage rack system of claim 17, **characterized in that** at least one of the brackets is configured to connect carrier components of two different structures.

20. The storage rack system of claim 17, **characterized in that** the brackets are provided at one end with lugs and the upright columns are provided with slots, the lugs detachably inserted in the slots.

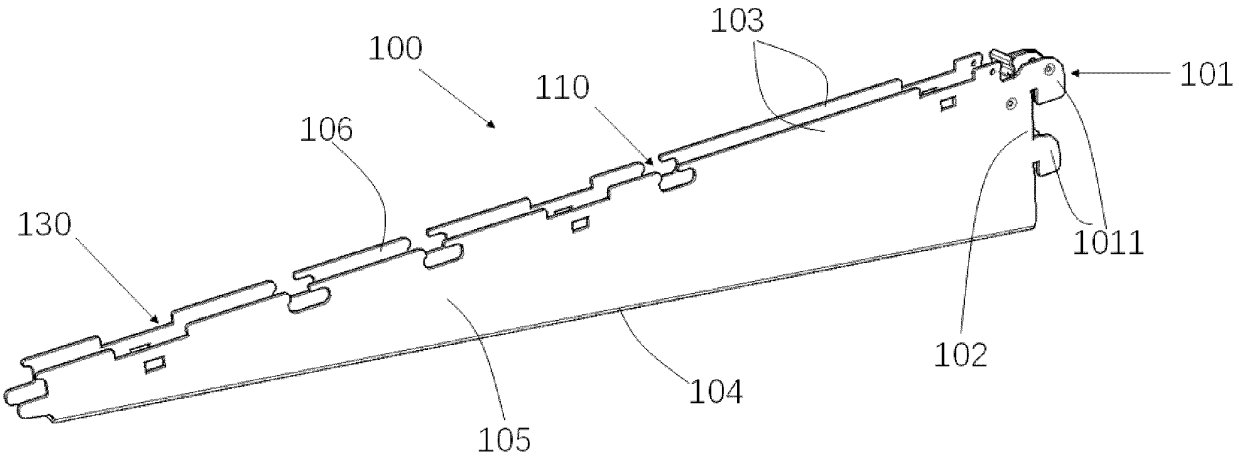


Fig. 1

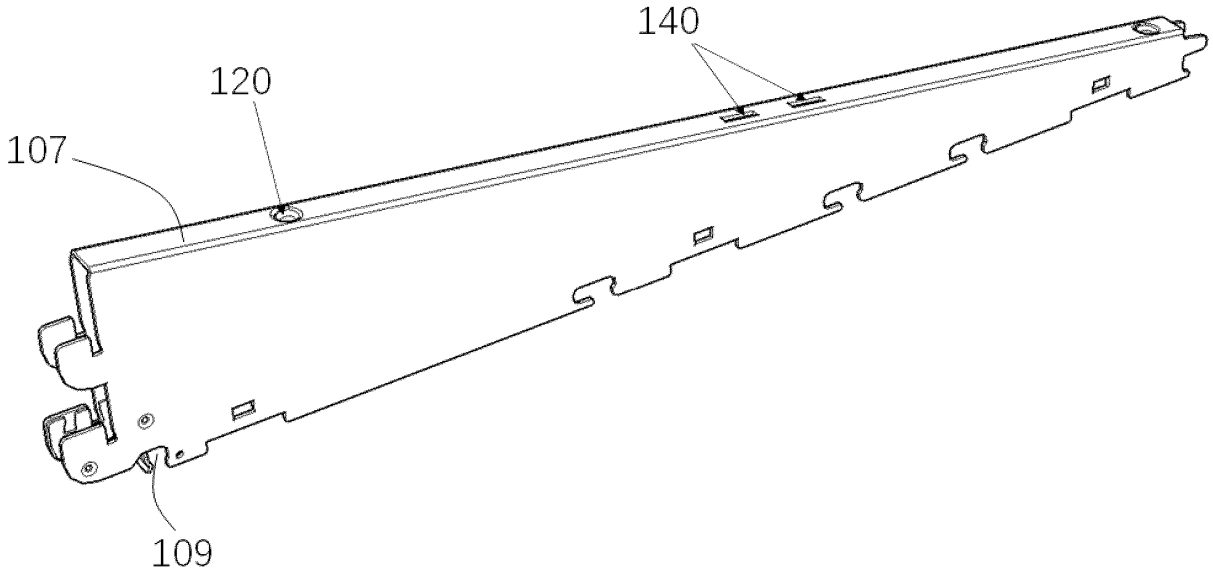


Fig. 2

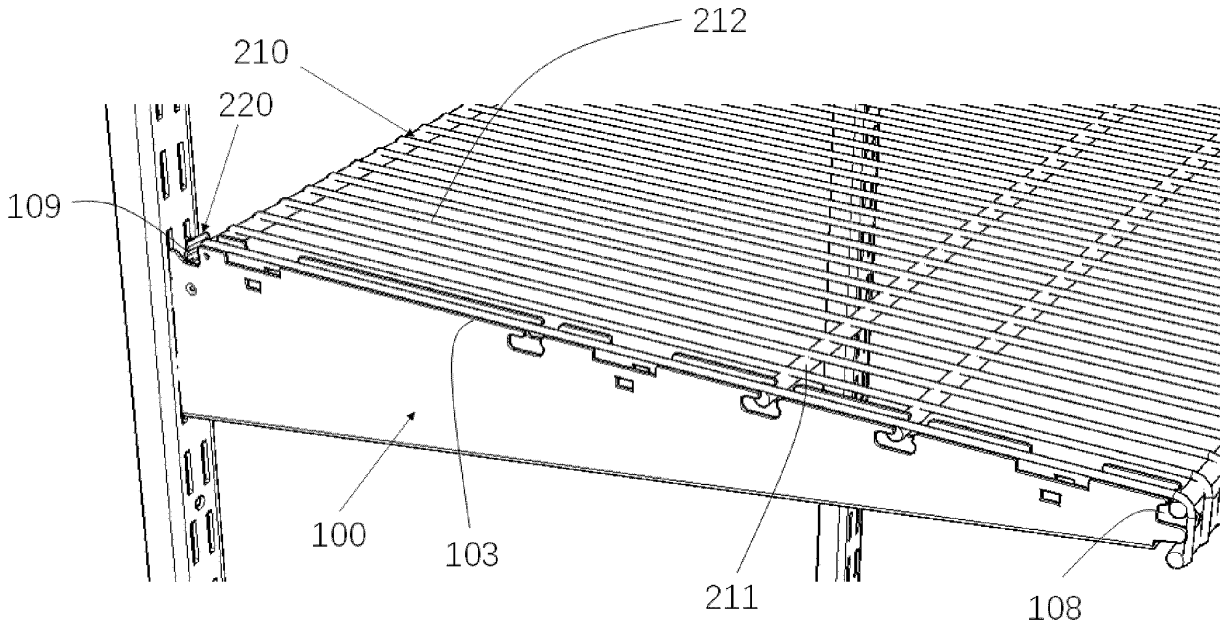


Fig. 3

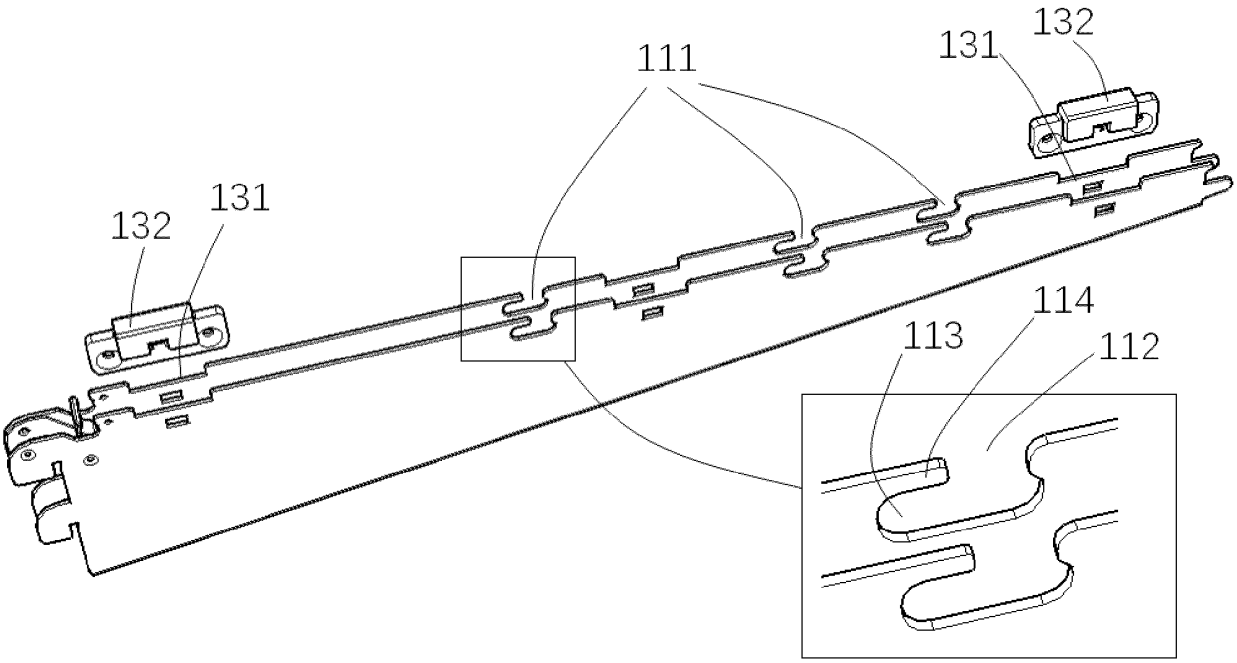


Fig. 4

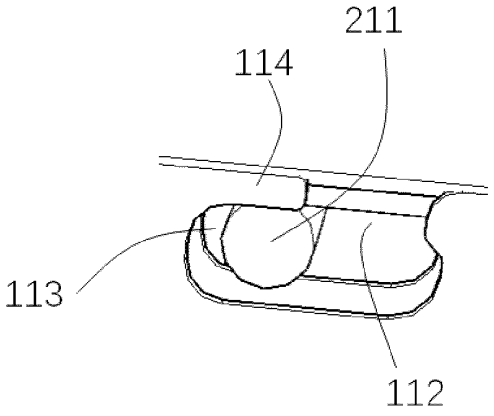
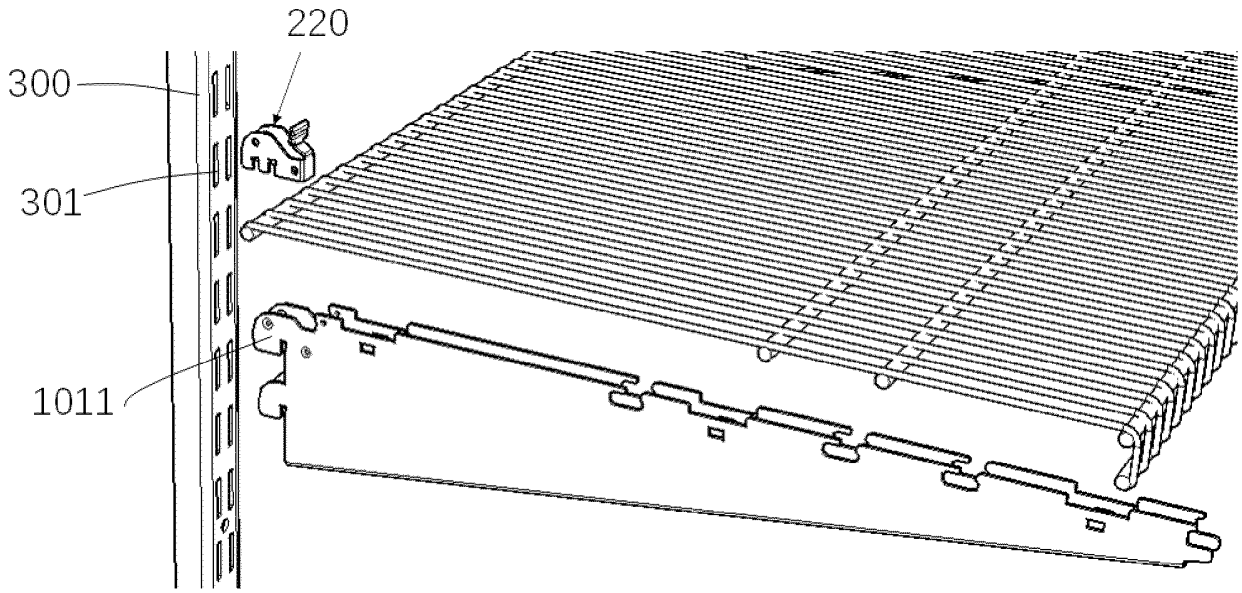


Fig. 5



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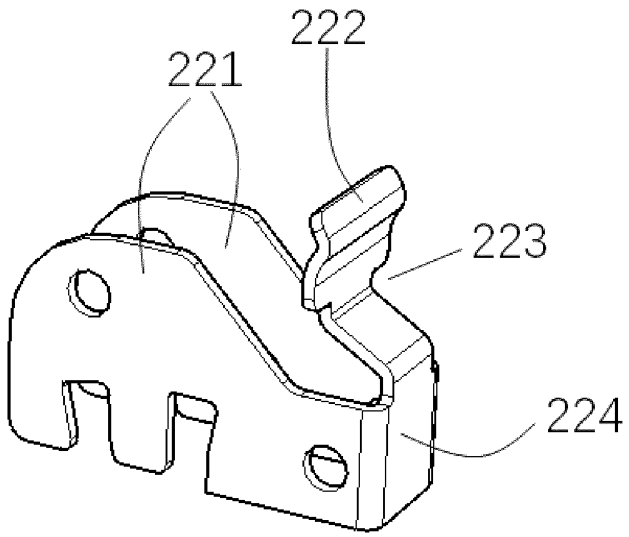

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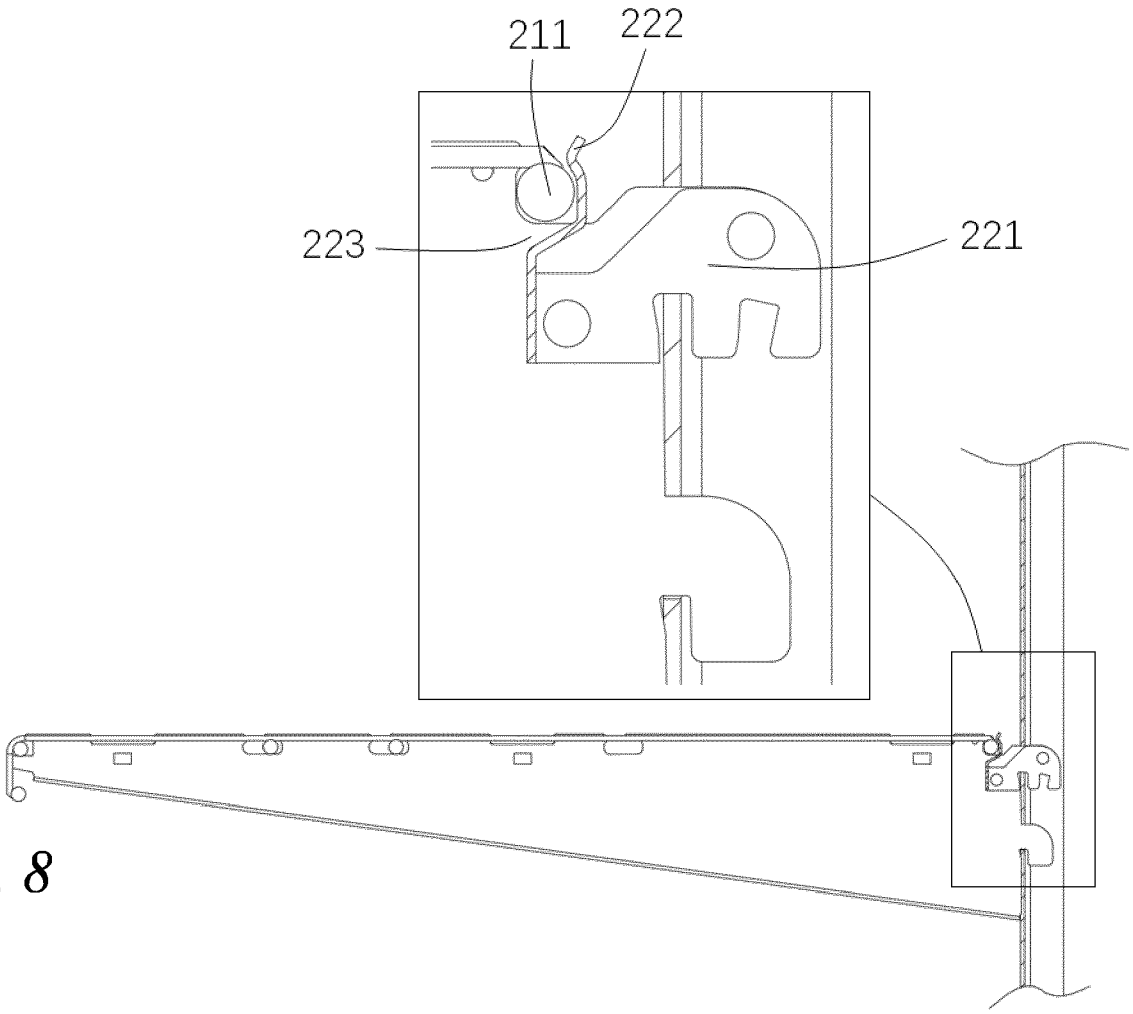


Fig. 8

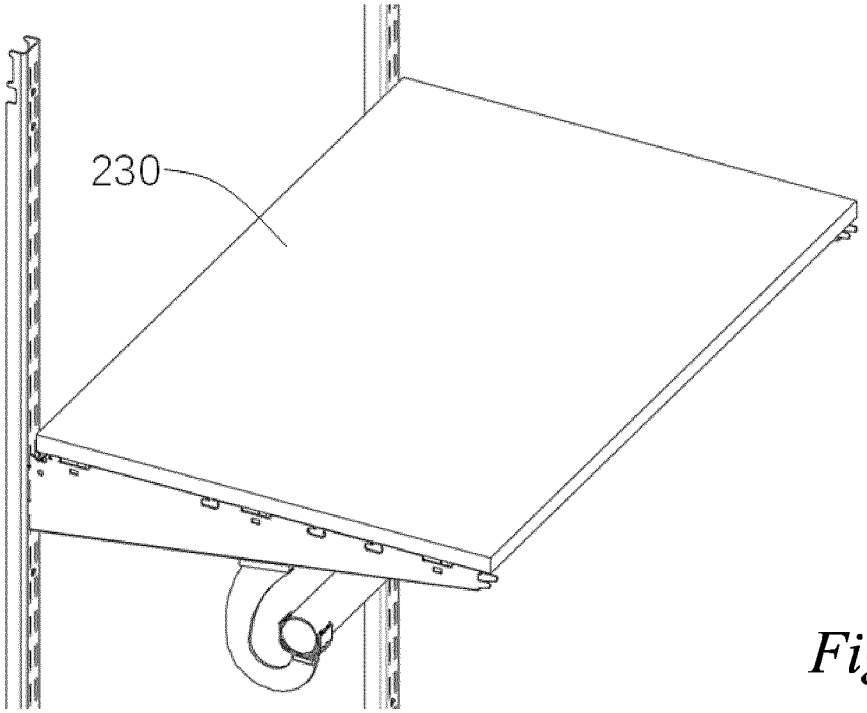
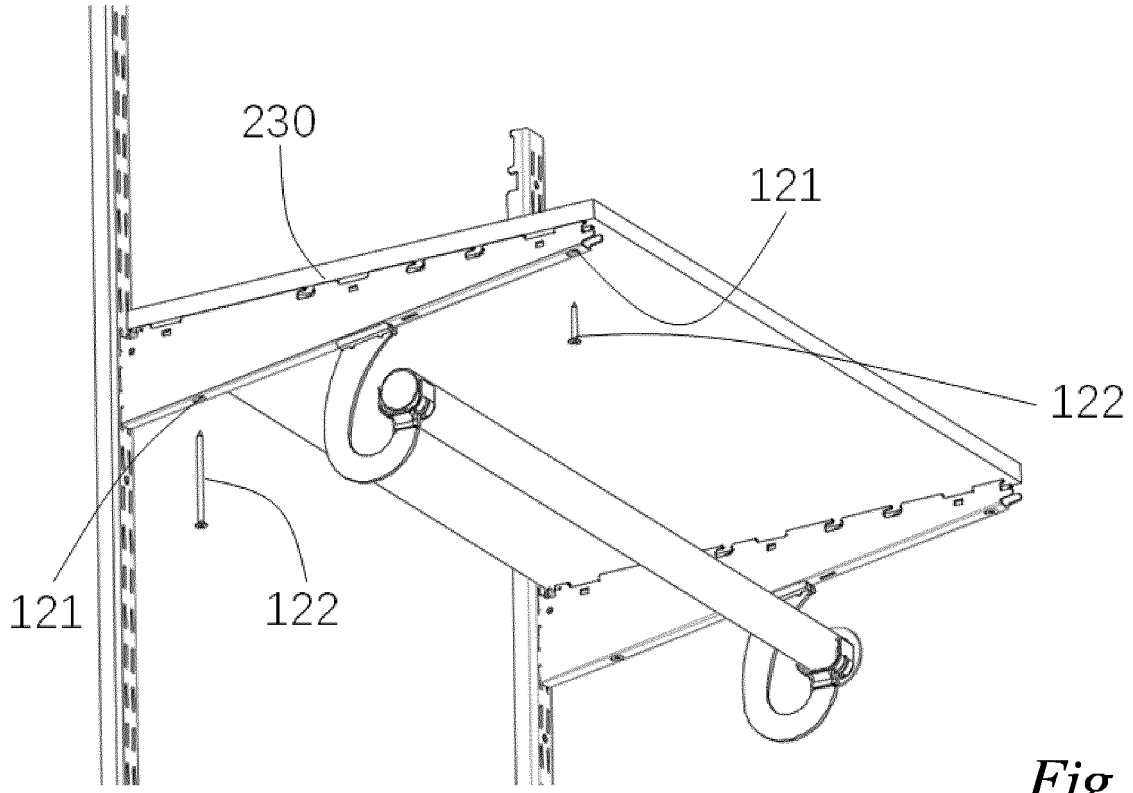


Fig. 9



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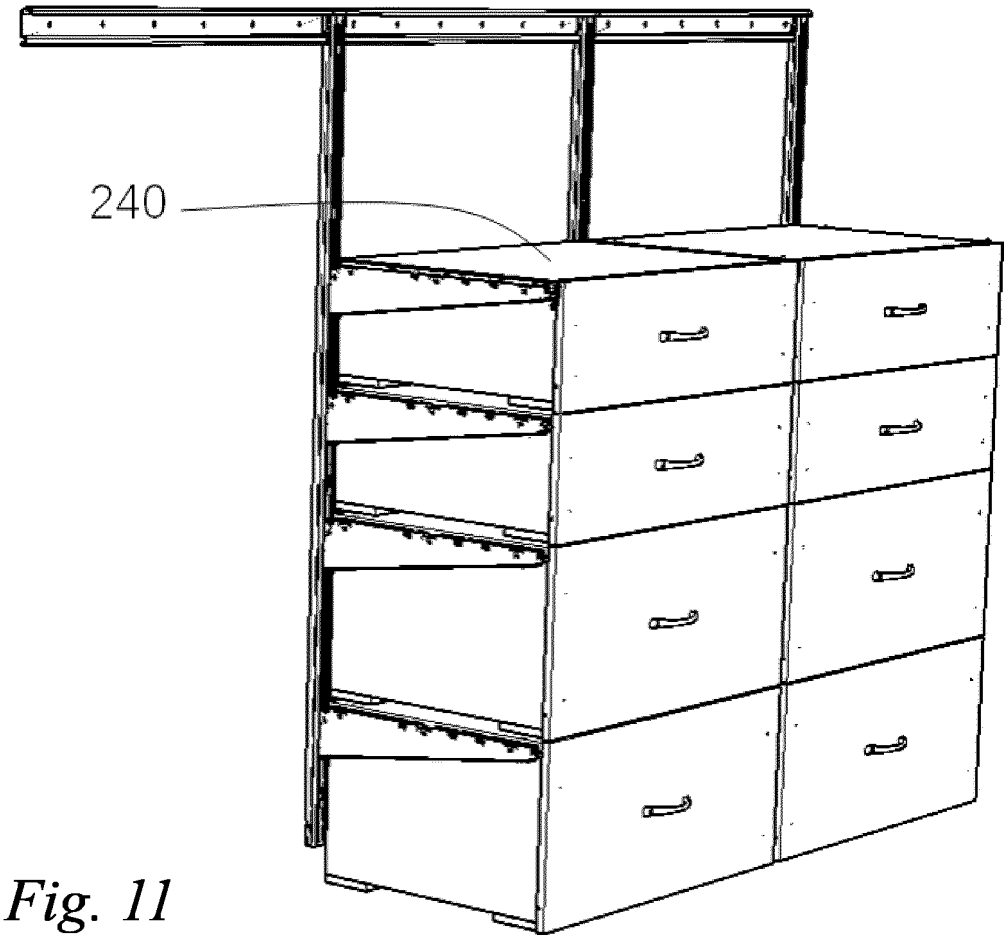

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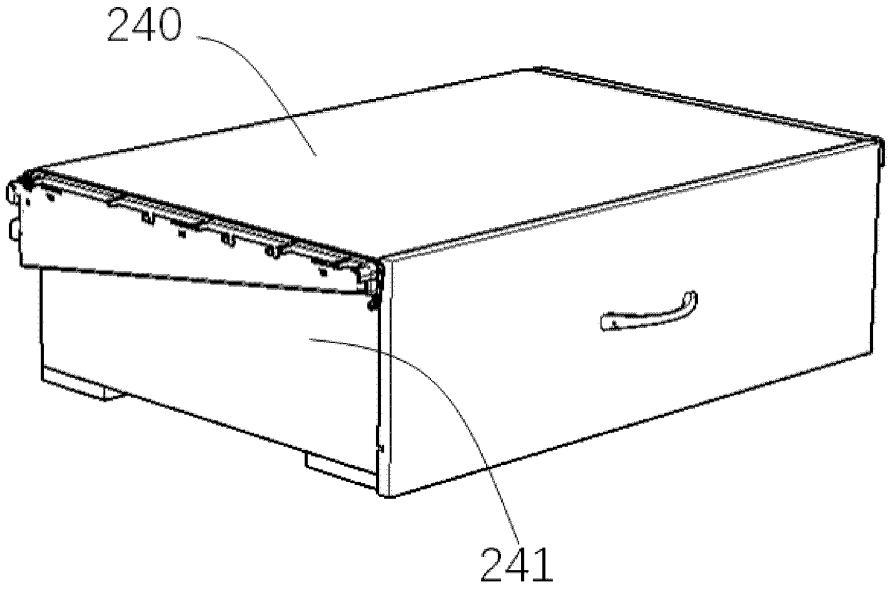

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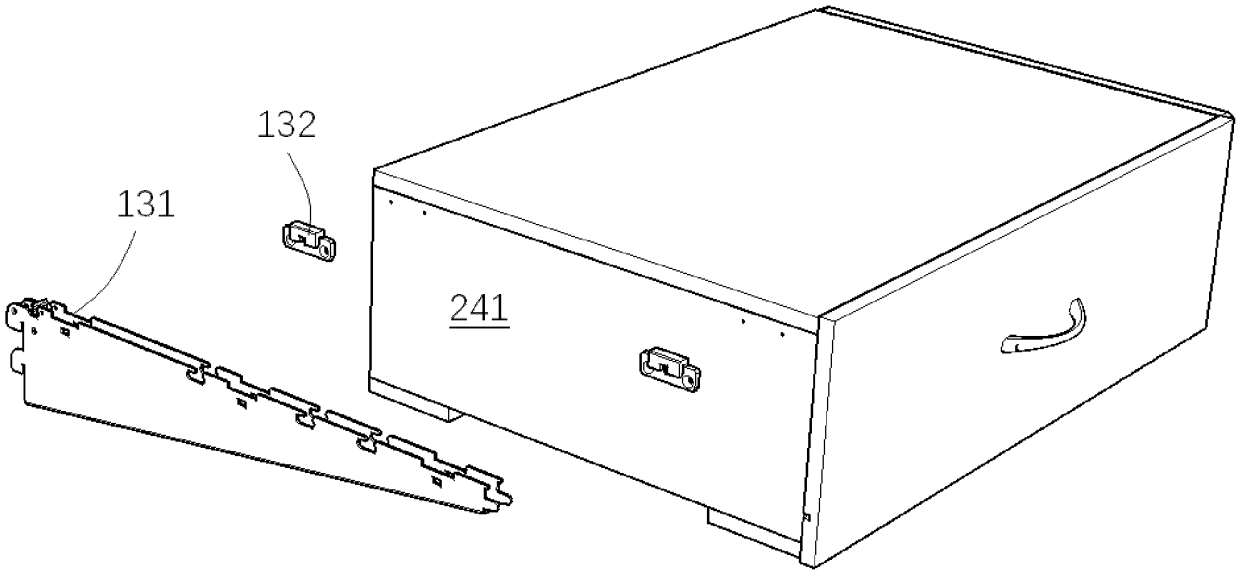
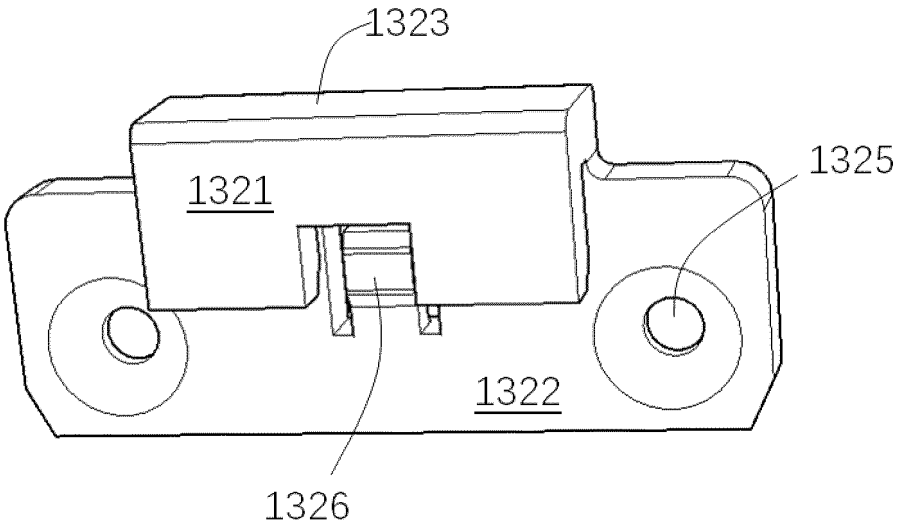


Fig. 13



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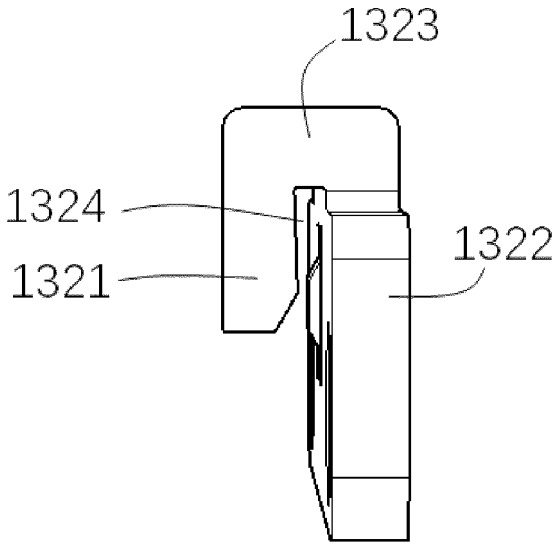

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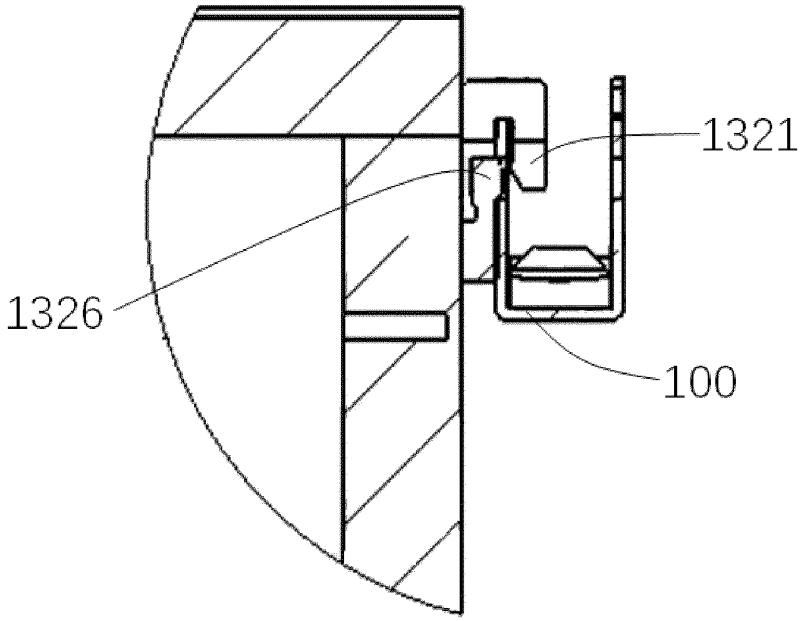

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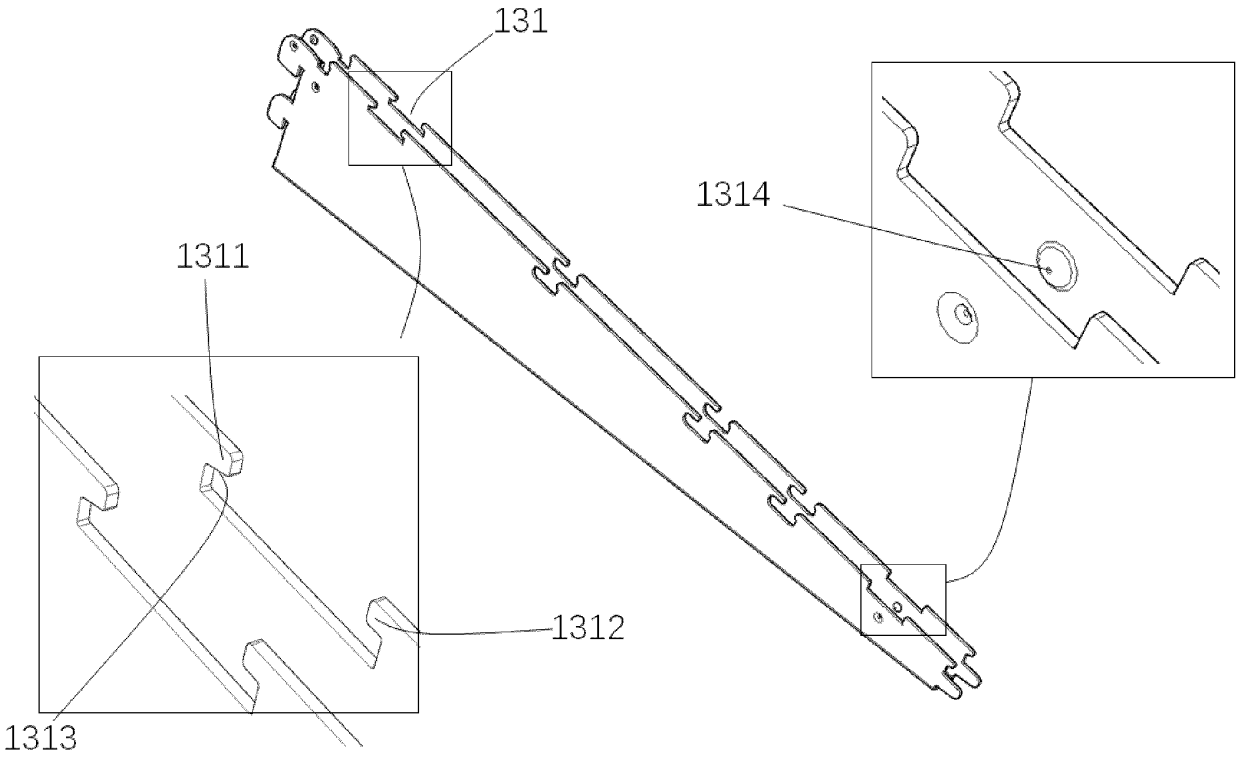

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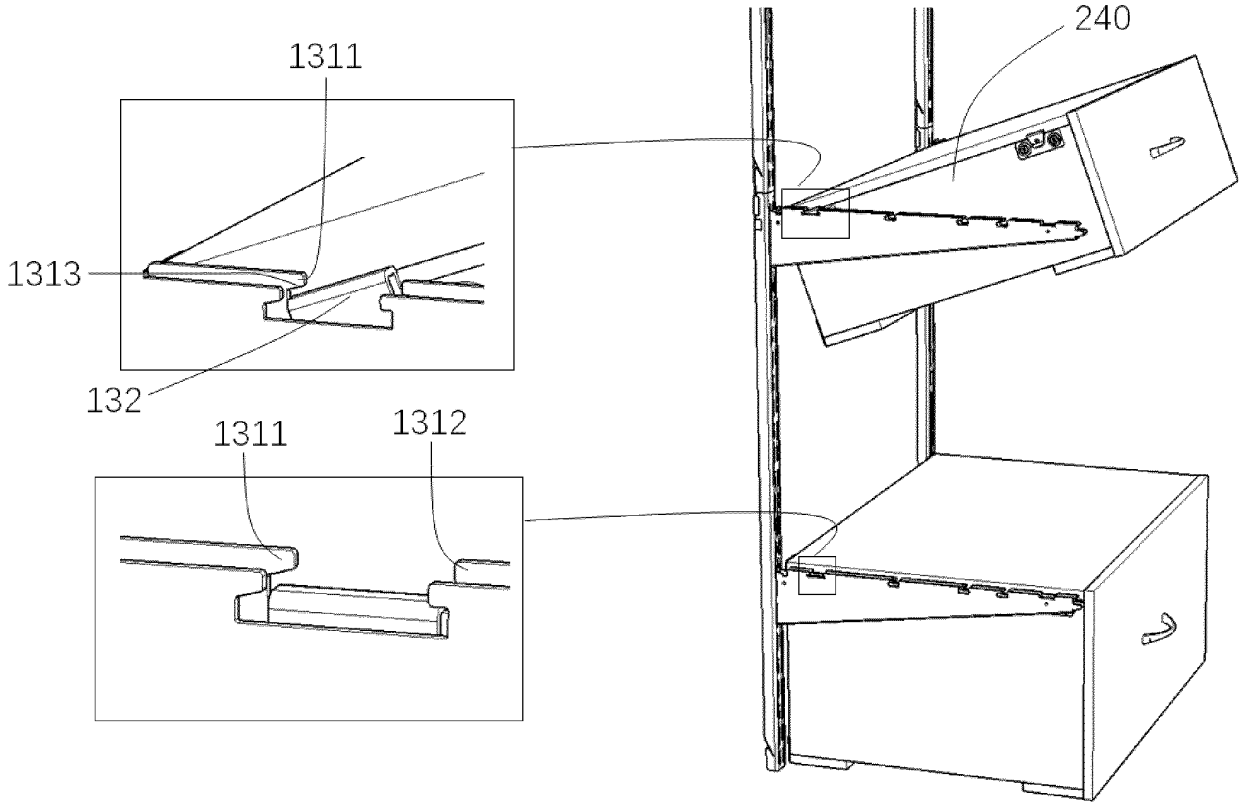

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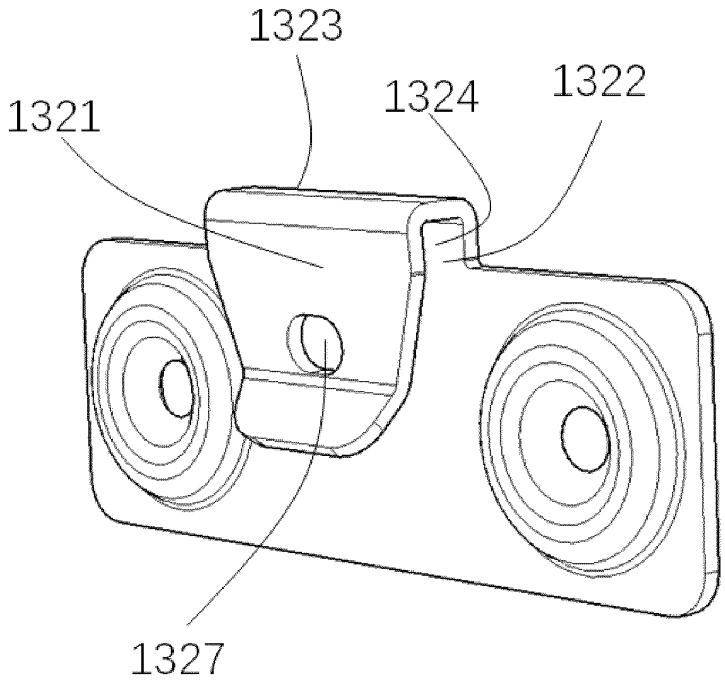


Fig. 19

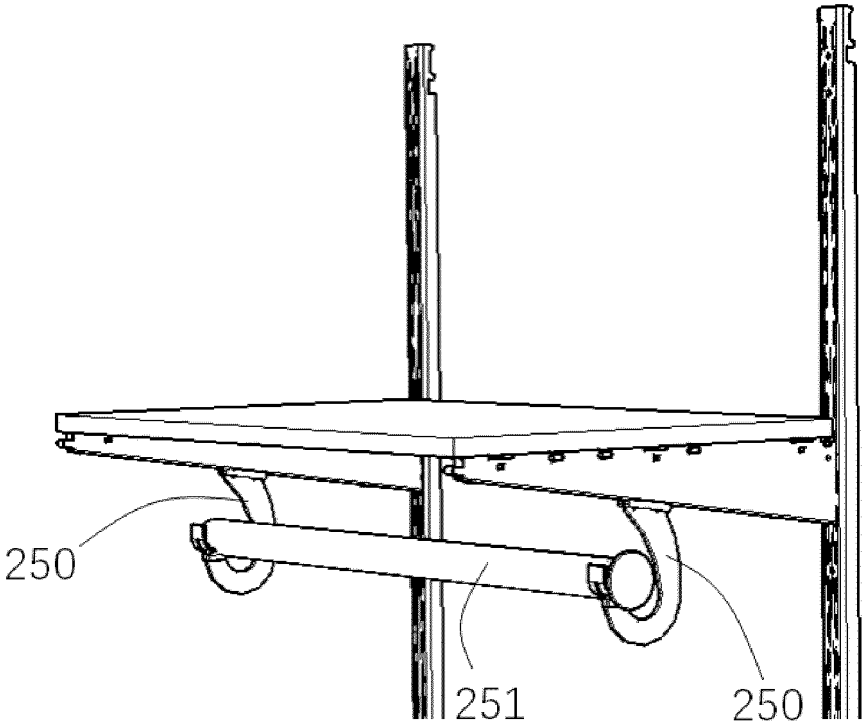


Fig. 20

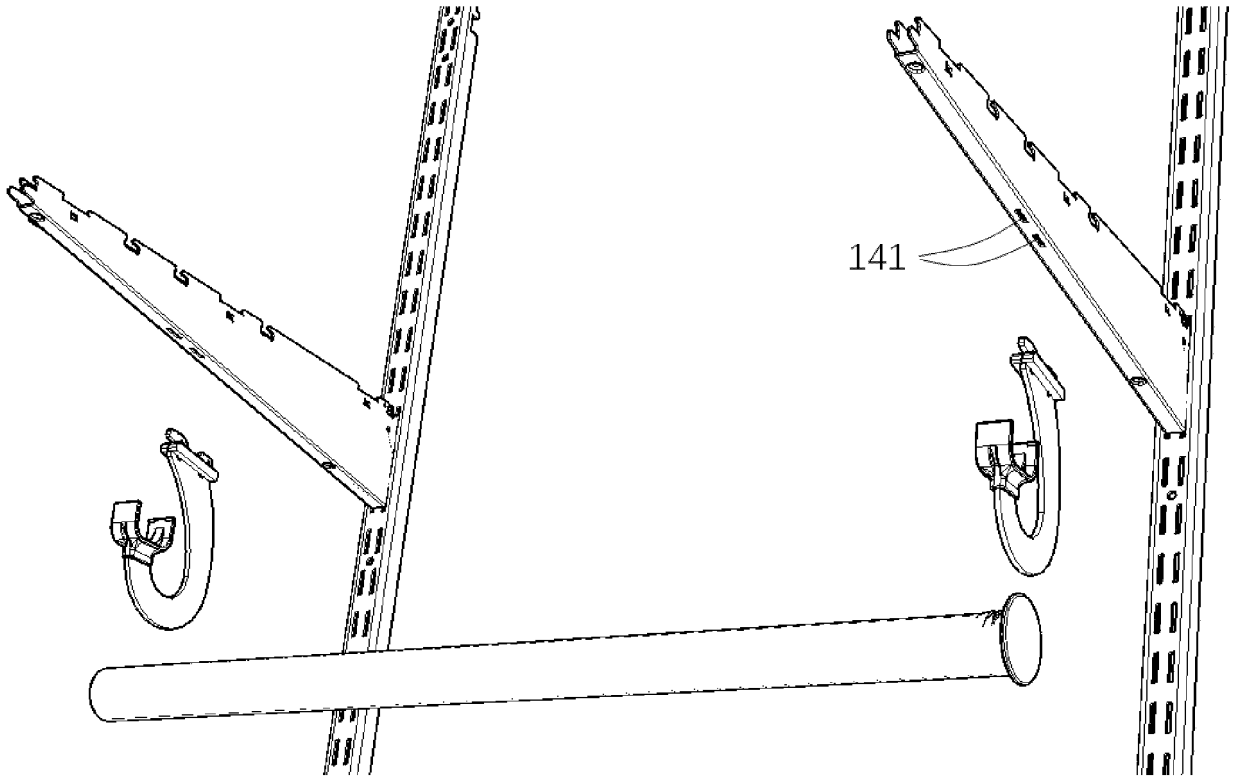


Fig. 21

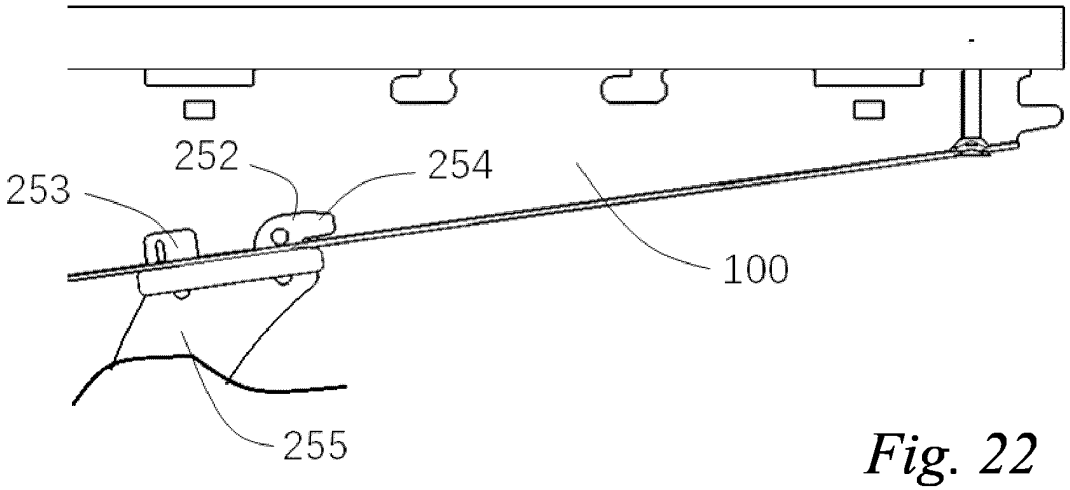


Fig. 22

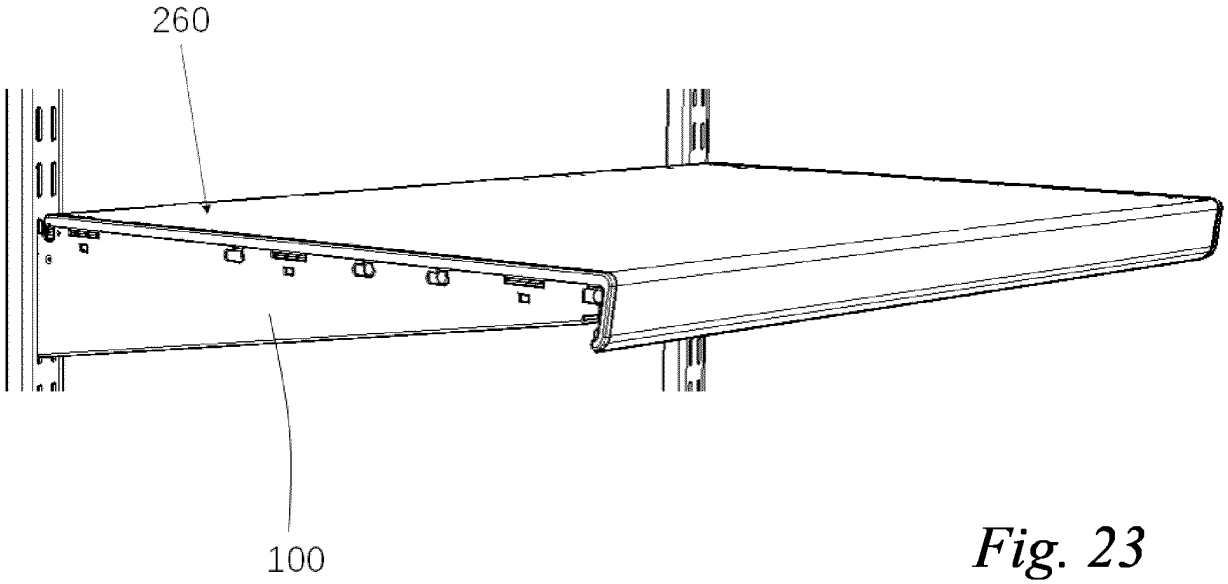


Fig. 23

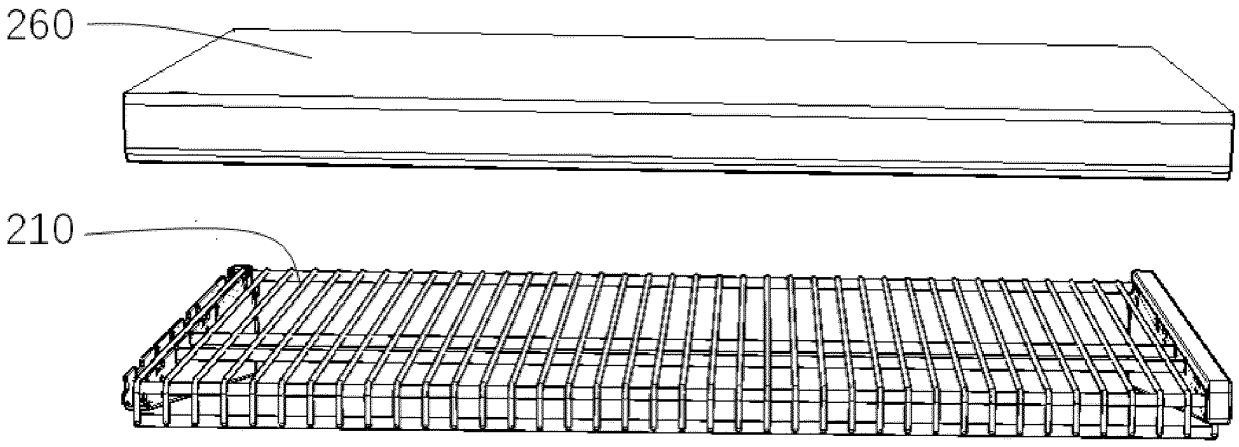


Fig. 24

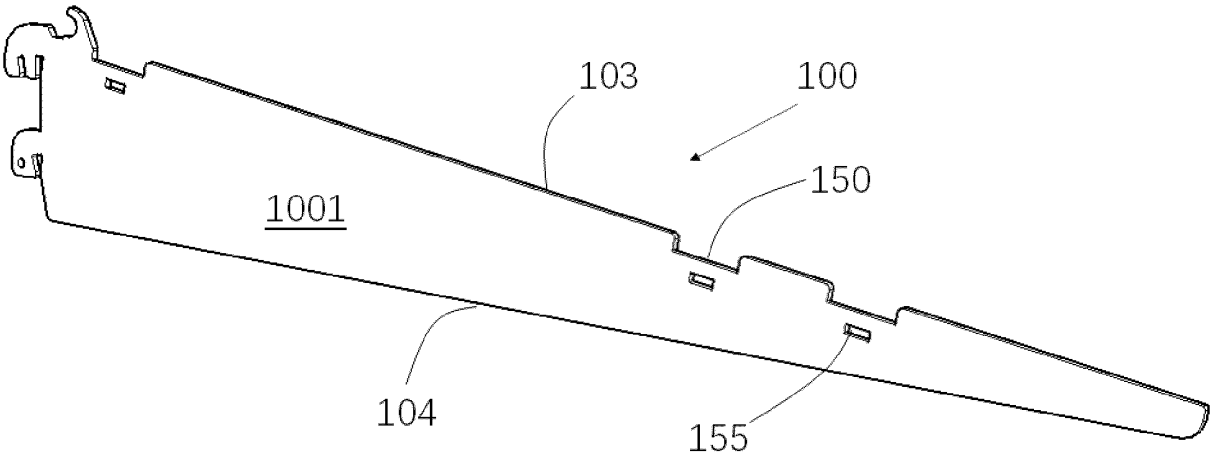


Fig. 25

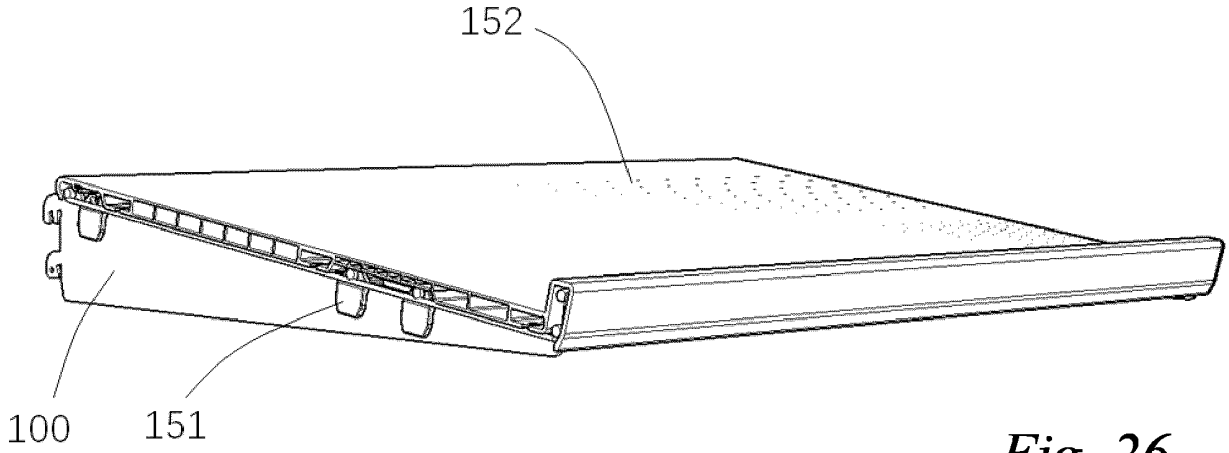
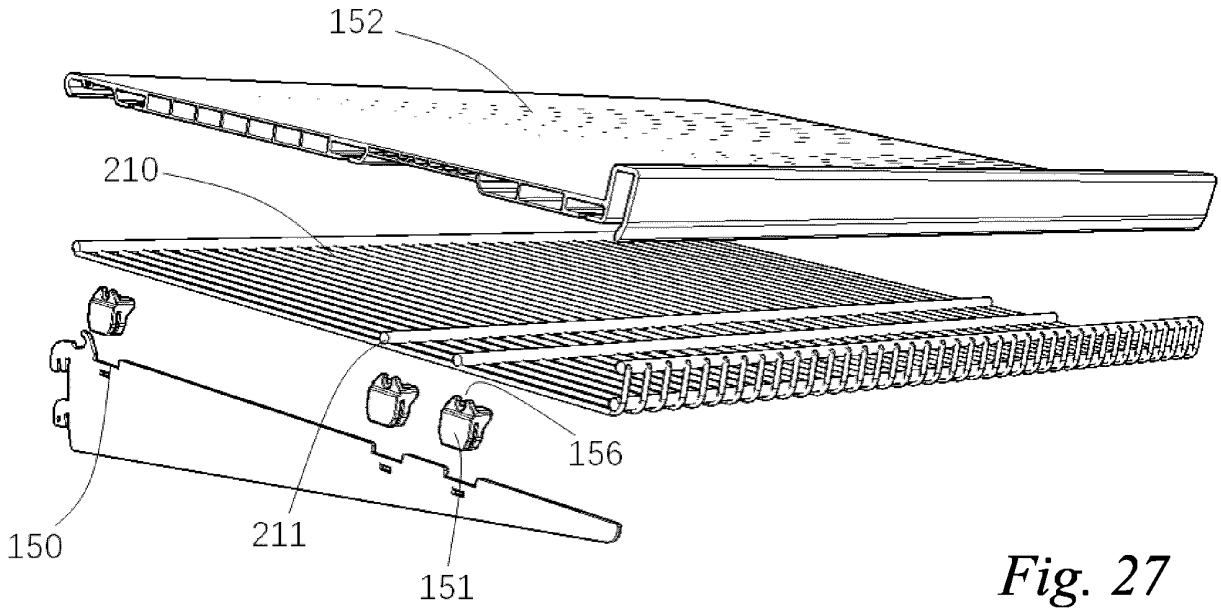


Fig. 26



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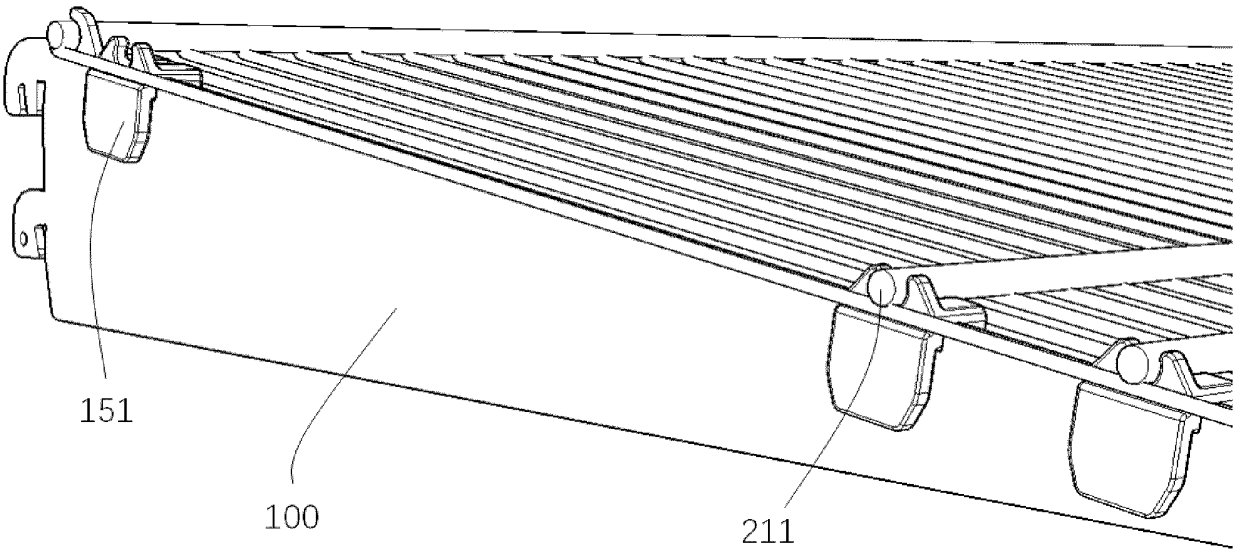

Fig. 28

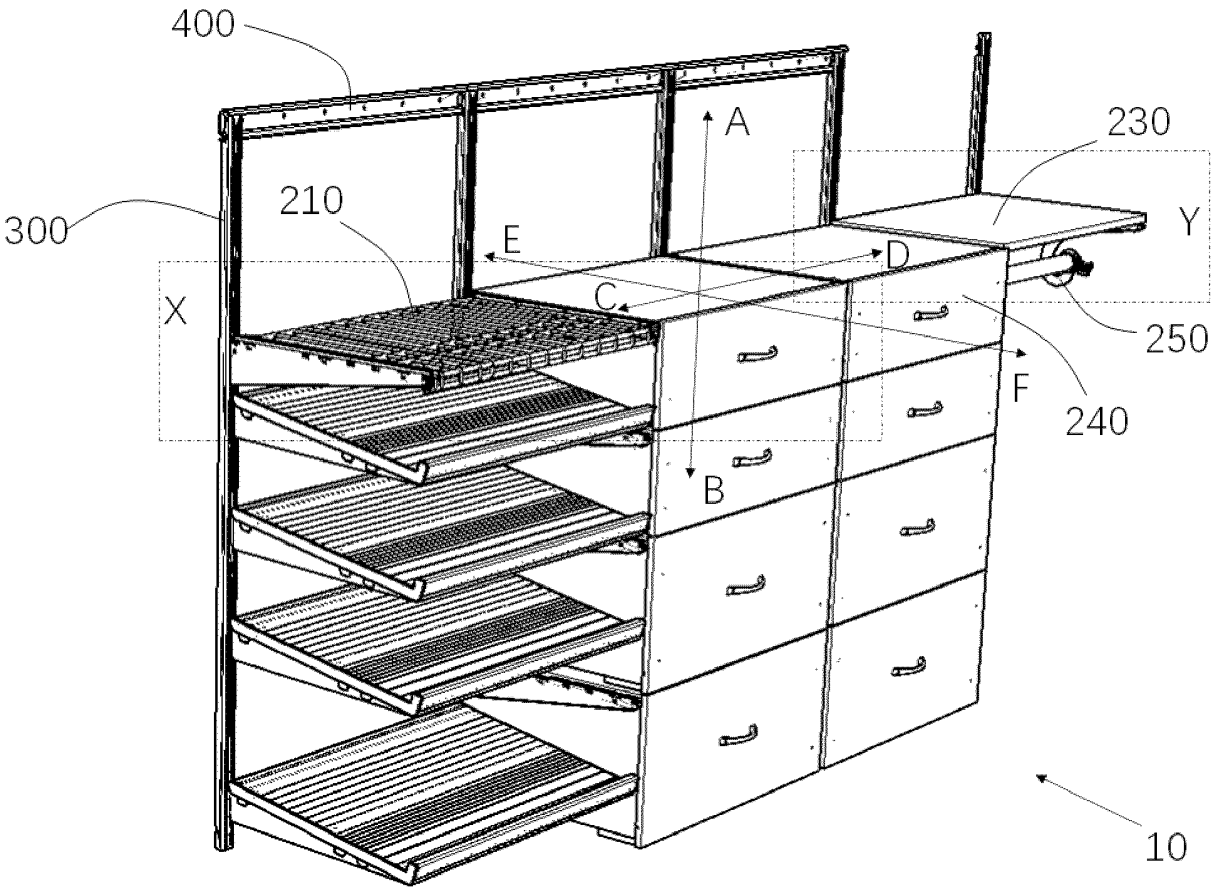

Fig. 29

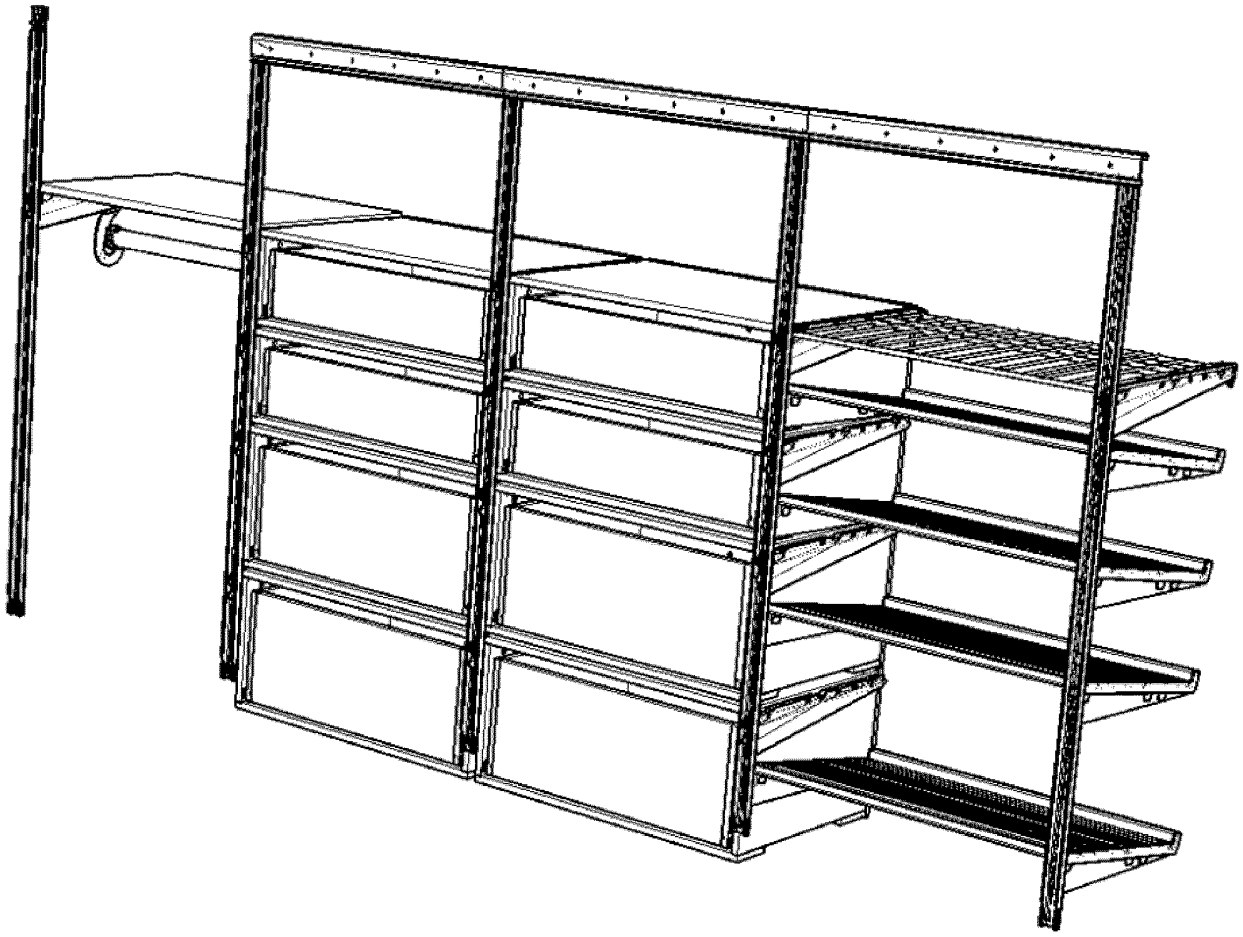

Fig. 30

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/081323

A. CLASSIFICATION OF SUBJECT MATTER

A47B 96/06(2006.01)i; A47B 96/02(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)

A47B

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, CNTXT, VEN: 置物板, 置物架, 支架, 支撑架, 承载部件, 承载架, 货架, 托架, 凹槽, 卡槽, 弧形, 卡合, 卡片, 勾, 钩, 抽屉, shel+, rack+, tray, crate+, support+, slot+, groove+, panel+, hook+, drawer

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 211154632 U (HANGZHOU LIANHE TOOL MANUFACTURING CO., LTD. et al.) 04 August 2020 (2020-08-04) description, paragraphs 3-78, and figures 1-17	1-20
X	CN 112690595 A (HANGZHOU LIANHE TOOL MANUFACTURING CO., LTD. et al.) 23 April 2021 (2021-04-23) description, paragraphs 3-78, and figures 1-17	1-20
A	CN 210672659 U (ZHONGSHAN CANDOR ELECTRICAL APPLIANCE CO., LTD.) 05 June 2020 (2020-06-05) entire document	1-20
A	US 2004020884 A1 (ELFA SWEDEN AB) 05 February 2004 (2004-02-05) entire document	1-20
A	EP 2783599 A1 (DIY ELEMENT SYSTEM GMBH) 01 October 2014 (2014-10-01) entire document	1-20
A	WO 2007090301 A1 (VISPLAY INTERNATIONAL AG et al.) 16 August 2007 (2007-08-16) entire document	1-20

☐ 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	Date of mailing of the international search report
23 November 2022	**29 November 2022**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/081323

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	211154632	U	04 August 2020	None			
CN	112690595	A	23 April 2021	None			
CN	210672659	U	05 June 2020	None			
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				DE	202006001900	U1	30 March 2006

Form PCT/ISA/210 (patent family annex) (January 2015)