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(72) Inventor: **Wojciech, Radzki**
05-462 Wiazowna / Poland (PL)

(74) Representative: **Pawlowski, Adam**
Eupatent.PL
Al. Kosciuszki 23/25
90-418 Lodz (PL)

(71) Applicant: **Drukarnia "ELLERT" Sp. z o.o.**
05-462 Wiazowna (PL)

(54) **A foldable display stand with shelves**

(57) A display stand with shelves, foldable from a flat transport configuration to a working configuration, in which it has a form of a box with side walls (120, 130), a back wall (110) and shelves (140). The main plane of the shelves (140) is formed by at least two layers (141, 142) of cardboard, between which there are placed base portions (151) of first attachment elements (150), the first attachment elements (150) having attachment portions (152) which extend from the side edges (143) of the shelves via openings (144) made near the side edges (143) of the shelves. The main plane of the side walls

(120, 130) is formed by at least two layers (121, 122) of cardboard, between which there are placed base portions (161) of second attachment elements (160), the second attachment elements (160) having attachment portions (162) which extend from the internal surface of the side wall (120, 130) via openings (123) made in the internal layer (121) of the side wall (120, 130). The shelves are permanently and pivotably fixed to the back wall (110) and are detachably mountable to the side walls (120, 130) by the attachment elements (150, 160) when the stand is folded to the working configuration.

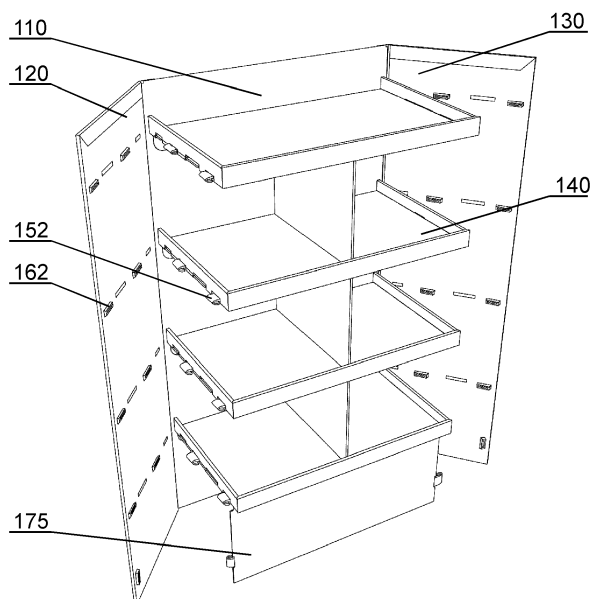


Fig. 4

Description

[0001] The present invention relates to foldable display stands with shelves.

[0002] One advantage of foldable display stands with shelves with respect to plastic stands is that they can be manufactured at low cost in small batches. They are also lightweight and can be easily transported. When designing such stands, particular attention should be paid to the stability and durability of the construction, as well as the ease of mounting and demounting. Usually, the increased usability in one area is achieved at the cost of decreased usability in another area.

[0003] A European patent application EP 1031304 presents a cardboard stand with shelves positioned in a box comprising side walls, external back wall and front walls formed of one cardboard sheet, and an internal movable back wall formed of another cardboard sheet. The shelves are fastened by gluing its back support flaps with the internal back wall. In addition, the shelves further comprise edge support flaps which can be glued with the side walls only in the working configuration. The stand can be converted from a flat transport configuration to a working configuration by vertically adjusting the internal back wall.

[0004] A European patent EP 1421879 presents a cardboard stand, which is convertible from a flat transport configuration to a working configuration, in which it has a form of a box with side walls and a back wall with shelves mounted within the walls, wherein the shelves are made of separate sheets of cardboard and are mounted on supports integral with the support construction of the box and are mounted by flaps in openings of the back wall. The side edges of the shelves are not supported.

[0005] A European patent application EP 2255703 presents a cardboard stand, which is convertible from a flat transport configuration to a working configuration, in which it has a form of a box with side walls and a back wall with shelves mounted within the walls, wherein the main surface of each shelf comprises a hinge, which folds during the transition from the working configuration to the transport configuration. This weakens the main surfaces of the shelves.

[0006] The aim of the present invention is to provide a foldable display stand, which can be easily converted between a transport configuration and a working configuration, having shelves which provide good support for load.

[0007] The object of the invention is a display stand with shelves, foldable from a flat transport configuration to a working configuration, in which it has a form of a box with side walls, a back wall and shelves. The main plane of the shelves is formed by at least two layers of cardboard, between which there are placed base portions of first attachment elements, the first attachment elements having attachment portions which extend from the side edges of the shelves via openings made near the side edges of the shelves. The main plane of the side walls

is formed by at least two layers of cardboard, between which there are placed base portions of second attachment elements, the second attachment elements having attachment portions which extend from the internal surface of the side wall via openings made in the internal layer of the side wall. The shelves are permanently and pivotably fixed to the back wall and are detachably mountable to the side walls by the attachment elements when the stand is folded to the working configuration.

[0008] Preferably, the attachment portions of the attachment elements have an elongated shape and are parallel to the main plane of the shelves.

[0009] Preferably, the base portions of the attachment elements have in the main plane an area larger than the area of the attachment portions.

[0010] Preferably, the base portions of the attachment elements are perforated.

[0011] Preferably, the base portions of the attachment elements are fixed between the layers of cardboard by adhesive substance.

[0012] Preferably, the attachment portions of the first attachment elements are insertable into the attachment portions of the second attachment elements in a direction substantially parallel to the main plane of the shelves in the working configuration.

[0013] Preferably, the attachment portions of the first attachment elements have a resilient element attachable by snapping in the attachment portion of the second attachment elements and a protruding element for deforming the resilient element by the user in order to release the snap between the resilient element and the attachment portion.

[0014] Preferably, the second attachment elements comprise blocking elements for limiting the deformation of the external surface of the cardboard layer in the direction towards the shelves.

[0015] Preferably, the shelves comprise a vertical front wall and vertical side walls, which are adjacent in the working configuration to the side walls of the stand.

[0016] Preferably, the depth (D1) of the shelves is larger than the depth (D2) of the side walls.

[0017] Preferably, the working configuration between the shelves there are mounted vertical reinforcing walls.

[0018] Preferably, the vertical reinforcing walls are pivotably fixed to one of the shelves and are detachably fixable to another shelf in mounting openings in the top surface of the shelves.

[0019] Preferably, the side walls are made of cardboard blanks separate from the cardboard blank of the back wall.

[0020] Preferably, the side walls are joined with the shelves by foldable joints providing rising of the shelves while the side walls are folded while transforming the stand from the working configuration to the transport configuration.

[0021] Preferably, the foldable joints comprise a first element formed by a cutout of the internal layer of the side wall, foldable at a 45° angle with respect to the main

plane of the shelves in the working configuration of the stand and a second element formed by a cardboard blank, having a first portion fixed to the first element and a second portion, separated by bending lines from the first portion and placed between cardboard layers of the shelf and wider than an opening adjacent to the edge of the shelf, via which the first portion protrudes.

[0022] The object of the invention is shown by means of exemplary embodiments on a drawing, in which:

Figs. 1 and 2 show a first embodiment of the stand in a working configuration in a front and a rear view, Fig. 3 shows the first embodiment of the stand in a transport configuration in a front view,

Fig. 4 shows the first embodiment of the stand during its conversion from the transport configuration to the working configuration,

Fig. 5 shows a cardboard blank for forming the side wall of the first embodiment,

Fig. 6 shows a cardboard blank for forming the shelf of the first embodiment,

Fig. 7 shows the first attachment element,

Fig. 8 shows the second attachment element,

Figs. 9 and 10 show a second embodiment of the stand in a working configuration in a front and a rear view,

Figs. 11 and 12 show the second embodiment of the stand in a transport configuration in a front and a rear view,

Fig. 13 shows the second embodiment of the stand during its conversion from the transport configuration to the working configuration,

Fig. 14 shows a cardboard blank for forming a side wall of the second embodiment,

Fig. 15 shows a cardboard blank for forming a shelf of the second embodiment,

Fig. 16 shows a cardboard blank for forming the second portion of the foldable joint of the second embodiment.

[0023] In the drawings, dashed lines represent bending lines, whereas continuous lines represent edges and cutout lines. The hatched areas represent areas wherein adhesive is applied for connecting cardboard layers.

[0024] The stand according to the invention is made of cardboard, preferably of corrugated cardboard.

[0025] The stand according to the invention is foldable from a flat transport configuration as shown in Fig. 3 for the first embodiment and in Figs. 11 and 12 for the second embodiment, to a working configuration as shown in Figs. 1 and 2 for the first embodiment and in Figs. 9 and 10 for the second embodiment. In the working configuration, the stand has a form of a box with side walls 120, 130, a back wall 110 and shelves 140. The intermediate phase between the transport configuration and the working configuration is shown in Figs. 4 and 13. In the transport configuration the shelves are directed downwards, and the side walls 120, 130 are folded to the back and face

the back wall 110, therefore the stand has a relatively flat form, which does not occupy much space to be transported. To facilitate production of the stand, the side walls 120, 130 can be made of cardboard blanks separate with respect to the cardboard blank of the back wall 110 and can be connected to the back wall 110 by means of hinge elements 124, 134.

FIRST EMBODIMENT

[0026] The main plane of the shelves 140 is formed by at least two layers 141, 142 of cardboard, as shown in Fig. 6, indicating a cardboard blank from which the shelf 140 is made. Between the layers 141, 142 there are mounted first attachment elements 150, shown in details on Fig. 7. To simplify the drawing, the attachment elements 150, 160 are not shown in Fig. 3. The first attachment elements 150 have a base portion 151 and an attachment portion 152. The base portion 151 is fixed between the layers 141, 142, for example by glue. A perforated area of the base portion 151 facilitates adhesion of glue between this portion and the cardboard layers 141, 142. The base portion 151 is situated in such position between the layers 141, 142 that the attachment portion 152 extends above the side edge 143 of the shelf via an opening 144 made close to the side edge 143. Therefore, in order to assemble the shelves, the base portions 151 of the attachment elements 150 are placed on a flat blank, the adhesive or other fixing means are applied, and next the blank is folded to obtain the shelf 140, having side edges 143 from which attachment portions 152 extend. Due to the fact that in the main plane of the shelf the area of the base portion 151 is larger than the area of the attachment portion 152, the attachment element 150 is fixed well within the shelf 140 and does not move, keeping stable connection of the shelves in the working configuration. In order to improve the rigidity of the shelves, additional cardboard blanks may be inserted between the layers 141, 142, to form three- or four- etc. layered shelves.

[0027] The side walls 120, 130 are also formed by at least two layers 121, 122 of cardboard, as shown in Fig. 5. Between the cardboard layers 121, 122 there are fixed second attachment elements 160, shown in details on Fig. 8. The second attachment elements 160 have a base portion 161 and an attachment portion 162. The base portion 161 is fixed between layers 121, 122, for example by glue. The perforated surface of the base portion 161 facilitates bonding of glue to this portion and to the cardboard layers 121, 122. The base portion 161 is placed in such position between layers 121, 122, that the attachment portion 162 extends above the internal surface of the side wall 120 via openings 123 made in the internal layer 121 of the side wall. Therefore, to assemble the side walls, the base portions 161 of elements 160 are positioned on a flat blank, adhesive or other fixing means are applied, and next the blank is folded to obtain the side wall 120 which has an internal layer from which at-

attachment portions 162 protrude. Due to the fact that in the main plane of the side wall, the area of the base portion 161 is larger than the area of the attachment portion, the attachment element 160 is fixed well in the side wall 120 and does not move, providing good holding of the shelves in the working configuration. In order to provide better rigidity of the side walls, additional cardboard blanks can be positioned between the layers 121, 122, to obtain three- or four- etc. layered walls.

[0028] The shelves 140 are pivotably fixed to the back wall 110 via a hinge element 149, which allows folding them to a flat position in a transport configuration and to set them at an angle, preferably at a right angle, to the back wall 110, in a working configuration. In the working configuration the shelves are releasably attached to the side walls 120, 130 by attachment elements 150, 160. In the embodiment shown in Figs. 1-6, on each side edge of each shelf 140 there are mounted two attachment elements 150, but other embodiments are possible as well, wherein on each side edge of a shelf 140 there would be a single attachment element 150, preferably closer to the front part of the stand than to the back part of the stand, or more than two attachment elements 150, arranged preferably in parallel and equidistantly along the depth of the side wall.

[0029] The attachment portions 152 of the first attachment elements 150 have a resilient element 153, which in the working configuration is inserted to the opening in the attachment portion 162 of the second attachment elements 160, and is attached thereto by snapping. Detachment of the elements 150, 160 is possible by pressing a protruding element 154, which causes deformation of the resilient element 153, release of the snap and allows removing thereof from the attachment portion 162.

[0030] The attachment portions 152, 162 of the attachment elements 150, 160 have an elongated shape and in the working configuration are parallel to the main plane of the shelves 140, which allows to spread the load of the shelf along its side edge, providing stable holding and equal distribution of load along the side edge.

[0031] The second attachment elements 160 comprise blocking elements 163 for limiting the deformation of the external surface of the cardboard layer 121 towards the shelves 140, as the cardboard layer 121 is positioned between the blocking element 163 and the base portion 161. Therefore, the deformations of the cardboard layer 121 do not hamper insertion of the attachment elements 151 into the attachment elements 162.

[0032] The shelves may comprise a vertical front wall 145 and vertical side walls 146, 147, which in the working configuration are adjacent to the side walls 120, 130 of the stand, providing rigidity of the shelves in the main plane.

[0033] The shelves 140 may have a depth D1 larger than the depth D2 of the side walls 120, in particular if they are reinforced by the vertical walls 145, 146, 147, which allows placing more goods on the stand.

[0034] The stand can be further reinforced by vertical

reinforcing walls 170 mounted in the working configuration between the shelves 140. Each reinforcing wall 170 can be pivotably fixed to one shelf 140, preferably the upper shelf, and releasably to the other shelf 140, preferably the lower shelf, in mounting openings 148 made in the main plane of the shelf 140. When the stand is transformed to the working configuration, after the shelves 140 are moved upwards, the reinforcing walls 170 automatically move downwards, and in order to fix them appropriately, the tongues of the walls 170 have to be inserted to the mounting openings 148 of the lower shelf.

[0035] Below the lowest shelf 140 a support 175 can be mounted, connected pivotably with the lowest shelf 140 and releasably with the side walls by means of attachment elements 150, 160, having a height equal to the height of the lowest shelf and thereby providing support for the lowest shelf 140.

20 SECOND EMBODIMENT

[0036] The second embodiment, as shown in Figs. 9-16, is equivalent to the first embodiment shown in Figs. 1-6, with the following differences.

[0037] In the second embodiment, the shelves 140 are attached to the side walls 120, 130 by means of foldable joints 180. The foldable joints 180 cause automatic rising of the shelves 140 when the stand is transformed from the transport configuration to the working configuration and automatic falling of the shelves when the stand is transformed from the working configuration to the transport configuration. The foldable joints are positioned close to the back wall 110 of the stand.

[0038] The foldable joints 180 comprise a first element 181, which is formed by a cutout fragment of the interlay layer 121 of the side wall 120, 130. That fragment is pivotable at a 45° angle with respect to the main plane of the shelves 140 in the working configuration of the stand. The second element 182 of the foldable joints 180 is formed by a separate blank, having a first portion 184 which is fixed to the first element 181, for example by glue, and a second portion 185 which is loosely inserted between the layers 141, 142 of the shelves. The second portion 185 is separated from the first portion 184 by bending lines 186, which allow deformation of the foldable joint 180 while the stand is transformed, as shown in the drawing. The second portion 185 is wider than the first portion 184 and wider than the opening 183 next to the side edge of the shelves 140, so that it does not slip out from between the layers 141, 142 of the shelves.

[0039] Therefore, when assembling the shelves 140, the second elements 182 of the foldable joints 180 are placed on one layer of the cardboard in parallel with the attachment element 150, and next the shelf is assembled. Next, after the shelf 140 is fixed to the back wall 110, the second elements 182 are fixed to the first elements 181 in the side walls 120, 130.

[0040] Therefore, the stand according to the second

embodiment has on each side edge of each shelf a foldable joint 180 and at least one attachment element 150 for supporting the side edges of the shelf 140 on the side walls 120, 130 of the stand.

[0041] The stand according to the invention has a construction which allows easy transformation between the transport configuration and the working configuration, by folding the side walls and rising the shelves and attaching the shelves to the side walls by attachment elements. The shelves are fixed to the back wall and to the side walls, which provides good support for their load.

Claims

1. A display stand with shelves, foldable from a flat transport configuration to a working configuration, in which it has a form of a box with side walls (120, 130), a back wall (110) and shelves (140), **characterized in that**

- the main plane of the shelves (140) is formed by at least two layers (141, 142) of cardboard, between which there are placed base portions (151) of first attachment elements (150), the first attachment elements (150) having attachment portions (152) which extend from the side edges (143) of the shelves via openings (144) made near the side edges (143) of the shelves,
- the main plane of the side walls (120, 130) is formed by at least two layers (121, 122) of cardboard, between which there are placed base portions (161) of second attachment elements (160), the second attachment elements (160) having attachment portions (162) which extend from the internal surface of the side wall (120, 130) via openings (123) made in the internal layer (121) of the side wall (120, 130),
- wherein the shelves are permanently and pivotably fixed to the back wall (110) and are detachably mountable to the side walls (120, 130) by the attachment elements (150, 160) when the stand is folded to the working configuration.

2. The stand according to claim 1, **characterized in that** the attachment portions (152, 162) of the attachment elements (150, 160) have an elongated shape and are parallel to the main plane of the shelves (140).
3. The stand according to claim 1 or 2, **characterized in that** the base portions (151, 161) of the attachment elements (150, 160) have in the main plane an area larger than the area of the attachment portions (152, 162).
4. The stand according to any of previous claims, **characterized in that** the base portions (151, 161) of the

attachment elements (150, 160) are perforated.

5. The stand according to any of previous claims, **characterized in that** the base portions (151, 161) of the attachment elements (150, 160) are fixed between the layers of cardboard (141, 142, 121, 122) by adhesive substance.
6. The stand according to any of previous claims, **characterized in that** the attachment portions (152) of the first attachment elements (150) are insertable into the attachment portions (162) of the second attachment elements (160) in a direction substantially parallel to the main plane of the shelves (140) in the working configuration.
7. The stand according to any of previous claims, **characterized in that** the attachment portions (152) of the first attachment elements (150) have a resilient element (153) attachable by snapping in the attachment portion (162) of the second attachment elements (160) and a protruding element (154) for deforming the resilient element (153) by the user in order to release the snap between the resilient element (153) and the attachment portion (162).
8. The stand according to any of previous claims, **characterized in that** the second attachment elements (160) comprise blocking elements (163) for limiting the deformation of the external surface of the cardboard layer (121) in the direction towards the shelves (140).
9. The stand according to any of previous claims, **characterized in that** the shelves (140) comprise a vertical front wall (145) and vertical side walls (146, 147), which are adjacent in the working configuration to the side walls (120, 130) of the stand.
10. The stand according to any of previous claims, **characterized in that** the depth (D1) of the shelves (140) is larger than the depth (D2) of the side walls (120, 130).
11. The stand according to any of previous claims, **characterized in that** the in the working configuration between the shelves (140) there are mounted vertical reinforcing walls (170).
12. The stand according to claim 11, **characterized in that** the vertical reinforcing walls (170) are pivotably fixed to one of the shelves (140) and are detachably fixable to another shelf (140) in mounting openings (148) in the top surface of the shelves (140).
13. The stand according to any of previous claims, **characterized in that** the side walls (120, 130) are made of cardboard blanks separate from the cardboard

blank of the back wall (110).

14. The stand according to any of previous claims, **characterized in that** the side walls (120, 130) are joined with the shelves (140) by foldable joints (180) providing rising of the shelves while the side walls (120, 130) are folded while transforming the stand from the working configuration to the transport configuration.

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15. The stand according to claim 14, **characterized in that** the foldable joints (180) comprise a first element (181) formed by a cutout of the internal layer (121) of the side wall (120, 130), foldable at a 45° angle with respect to the main plane of the shelves (140) in the working configuration of the stand and a second element (182) formed by a cardboard blank, having a first portion (184) fixed to the first element (181) and a second portion (185), separated by bending lines (186) from the first portion (184) and placed between cardboard layers (141, 142) of the shelf (140) and wider than an opening (183) adjacent to the edge (143) of the shelf (140), via which the first portion (184) protrudes.

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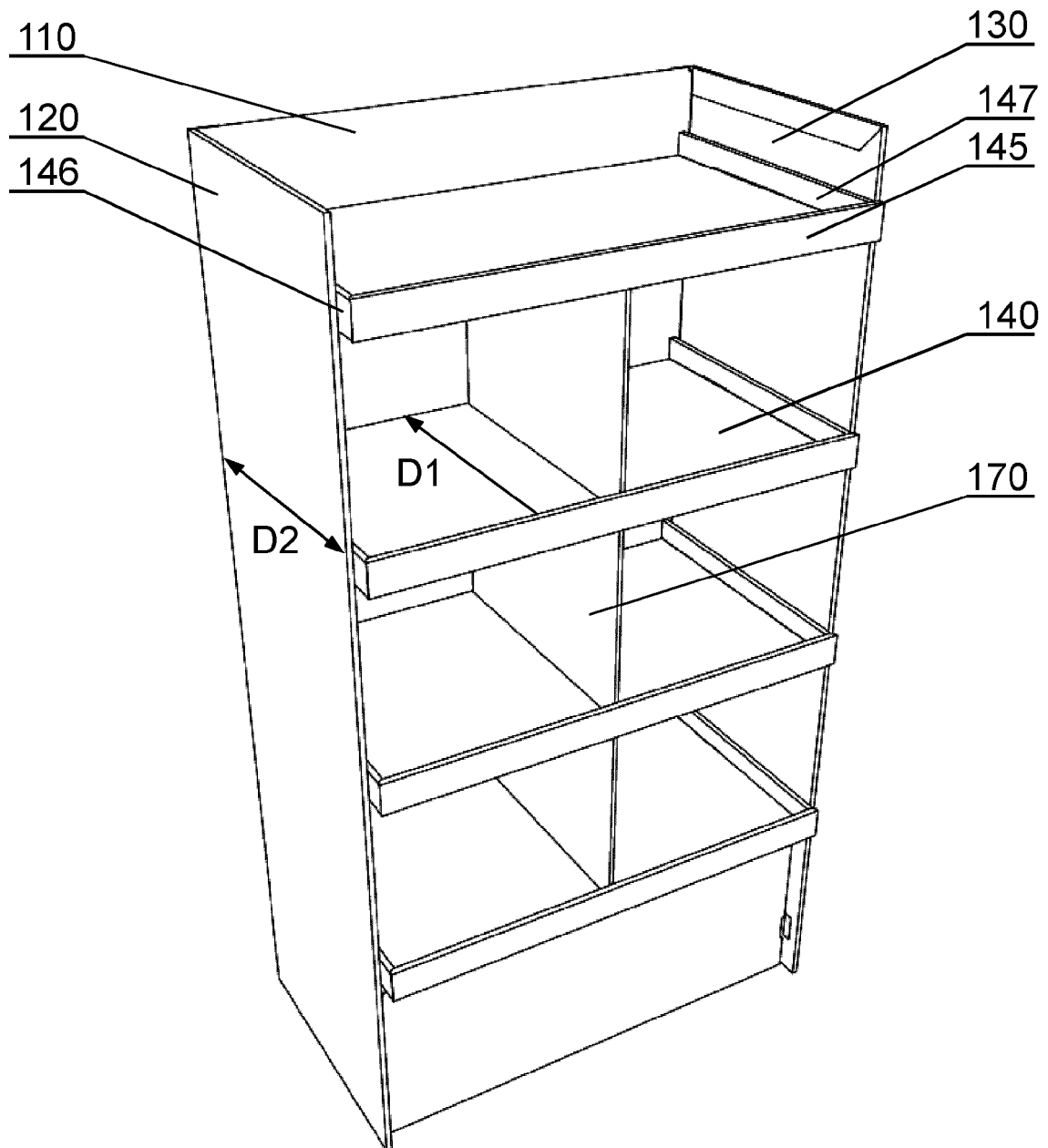


Fig. 1

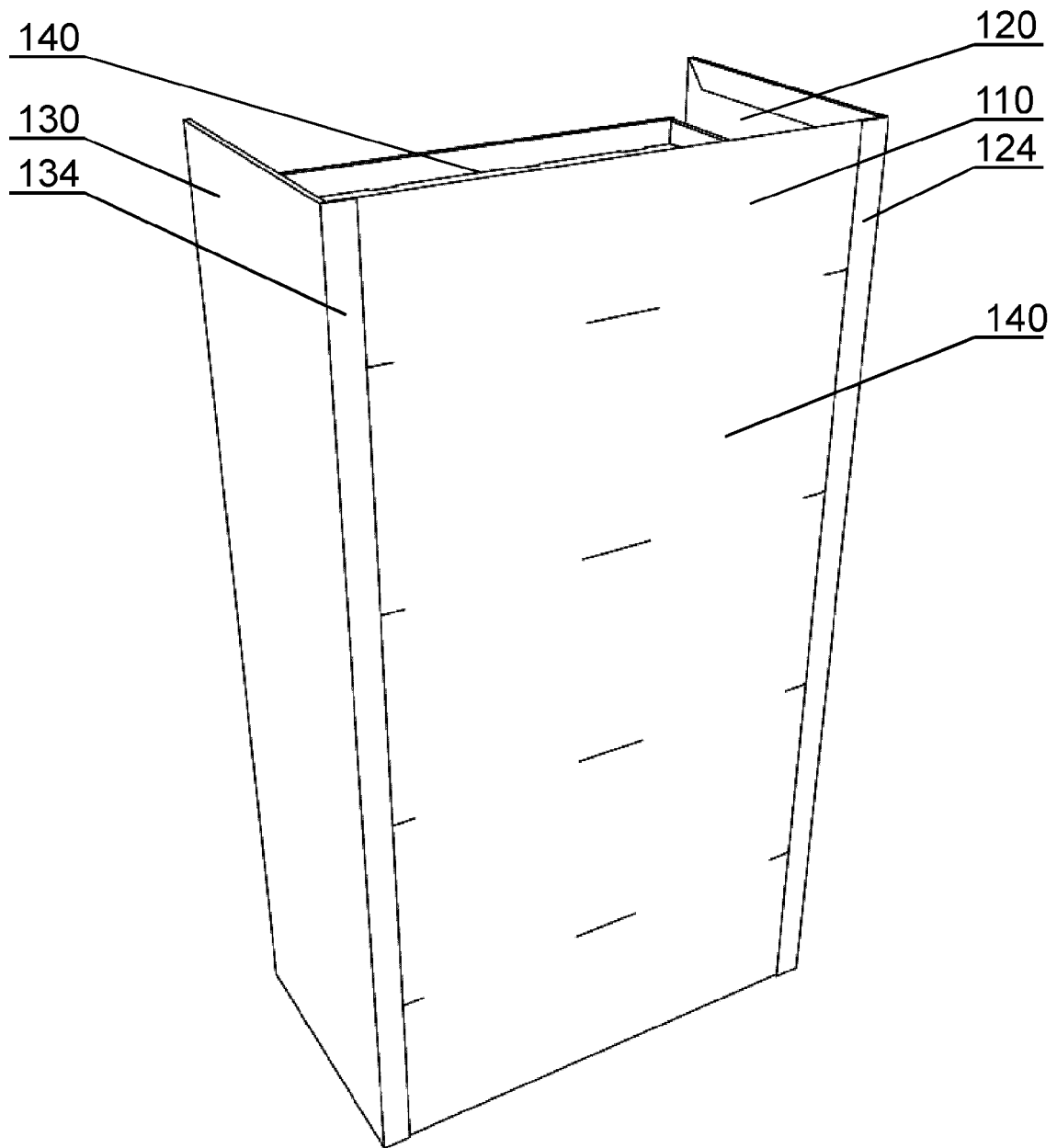


Fig. 2

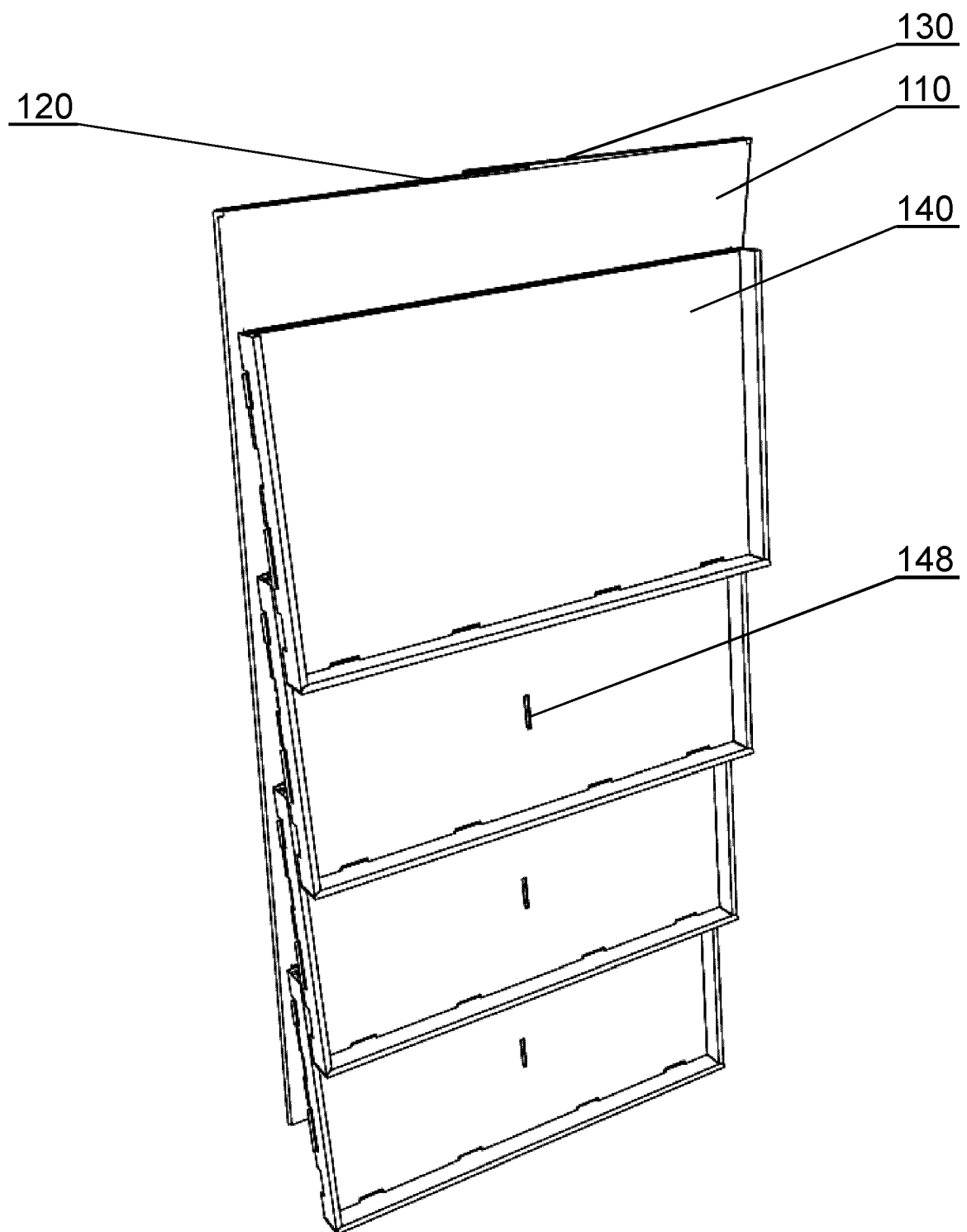


Fig. 3

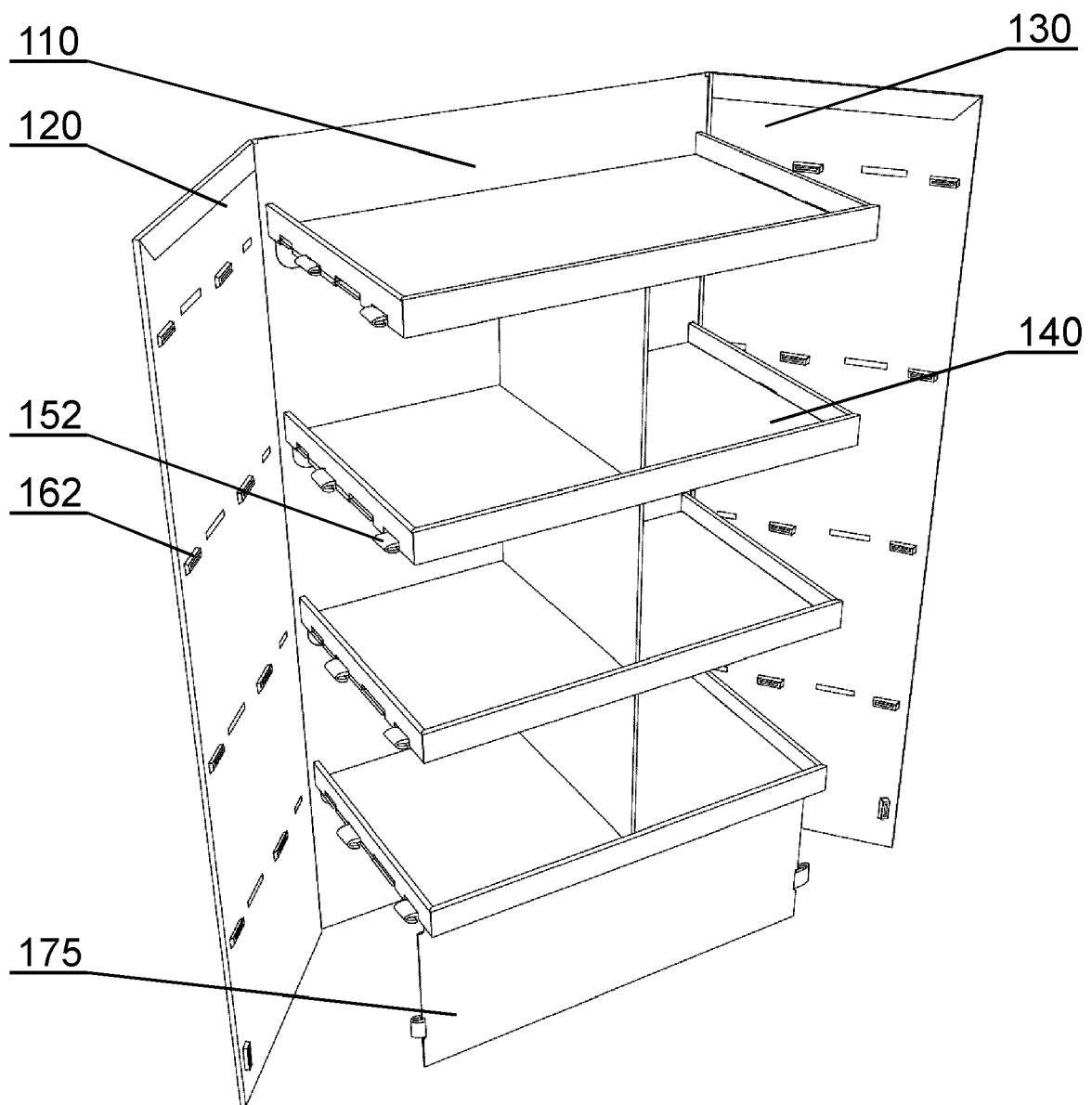


Fig. 4

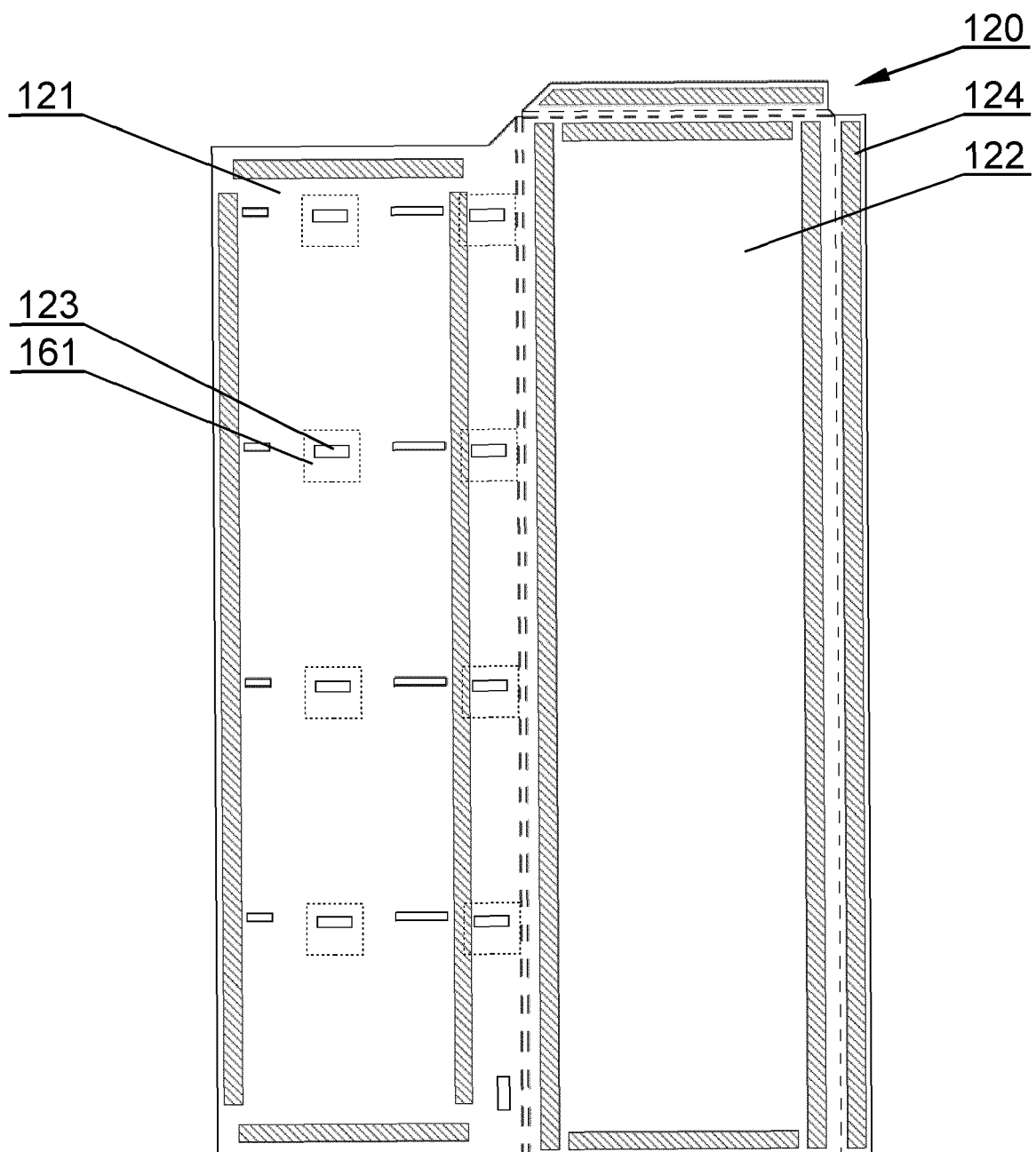


Fig. 5

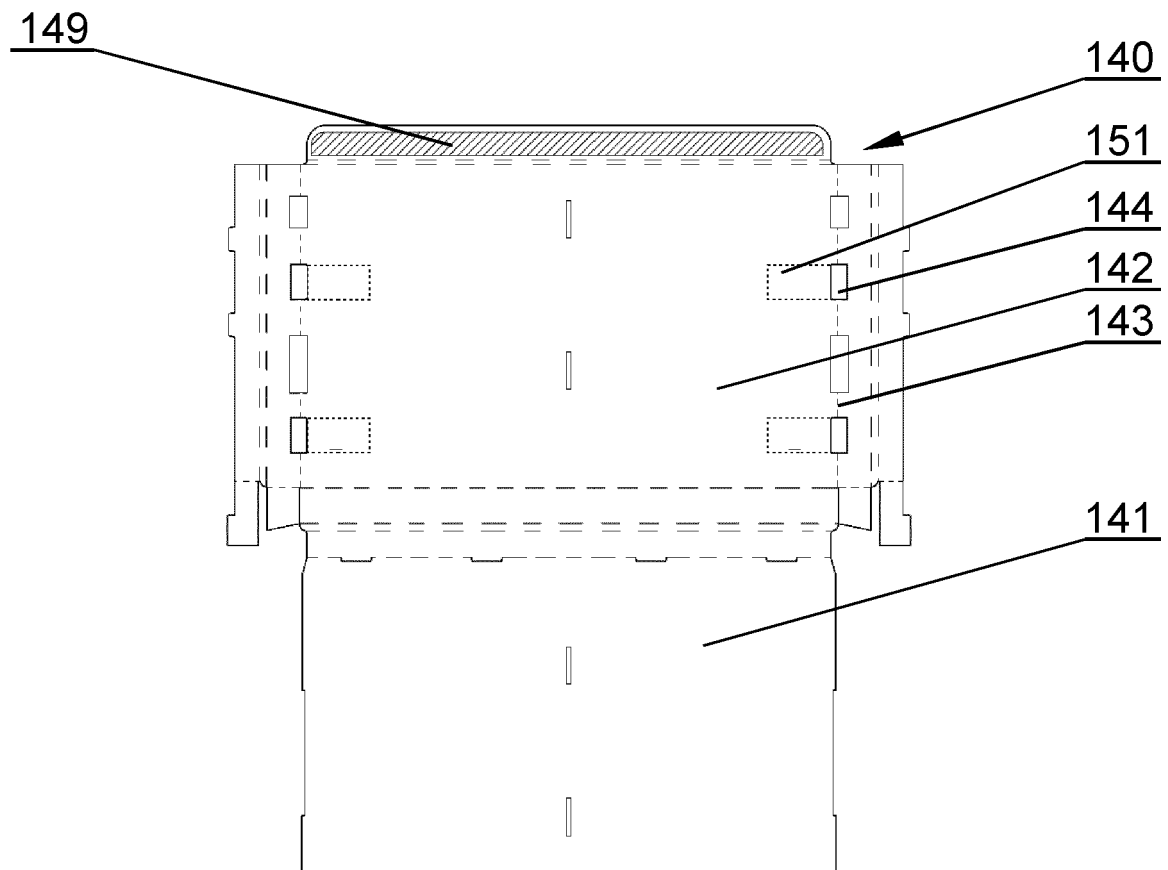


Fig. 6

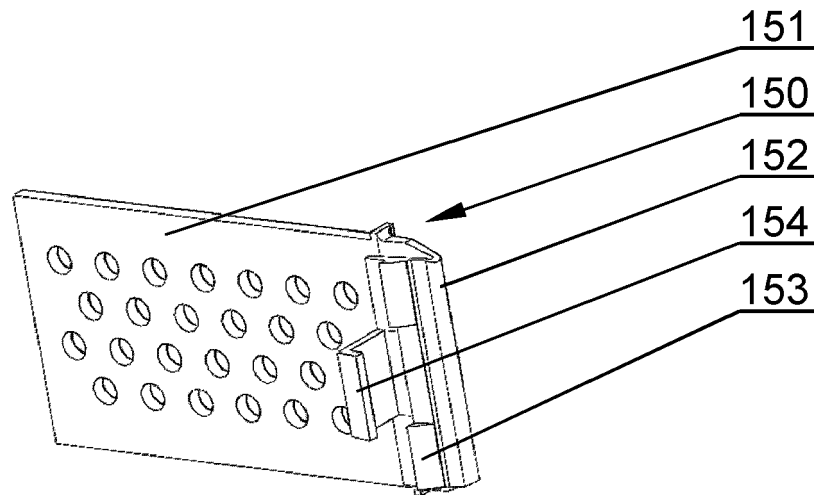


Fig. 7

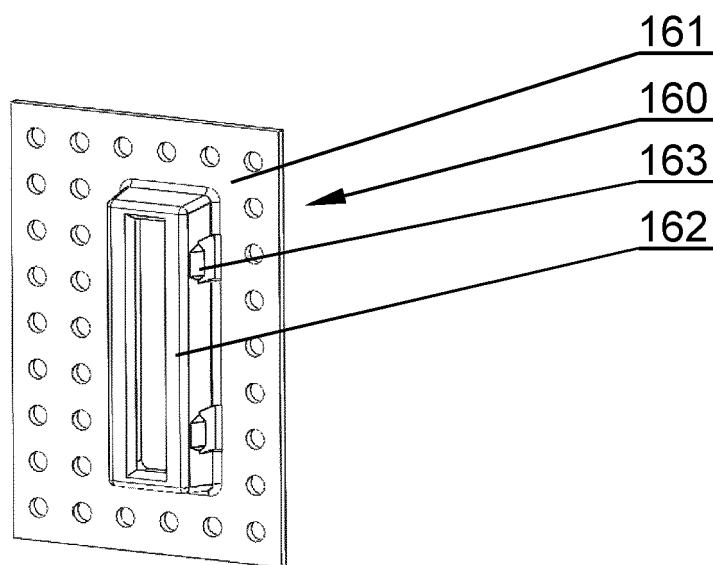


Fig. 8

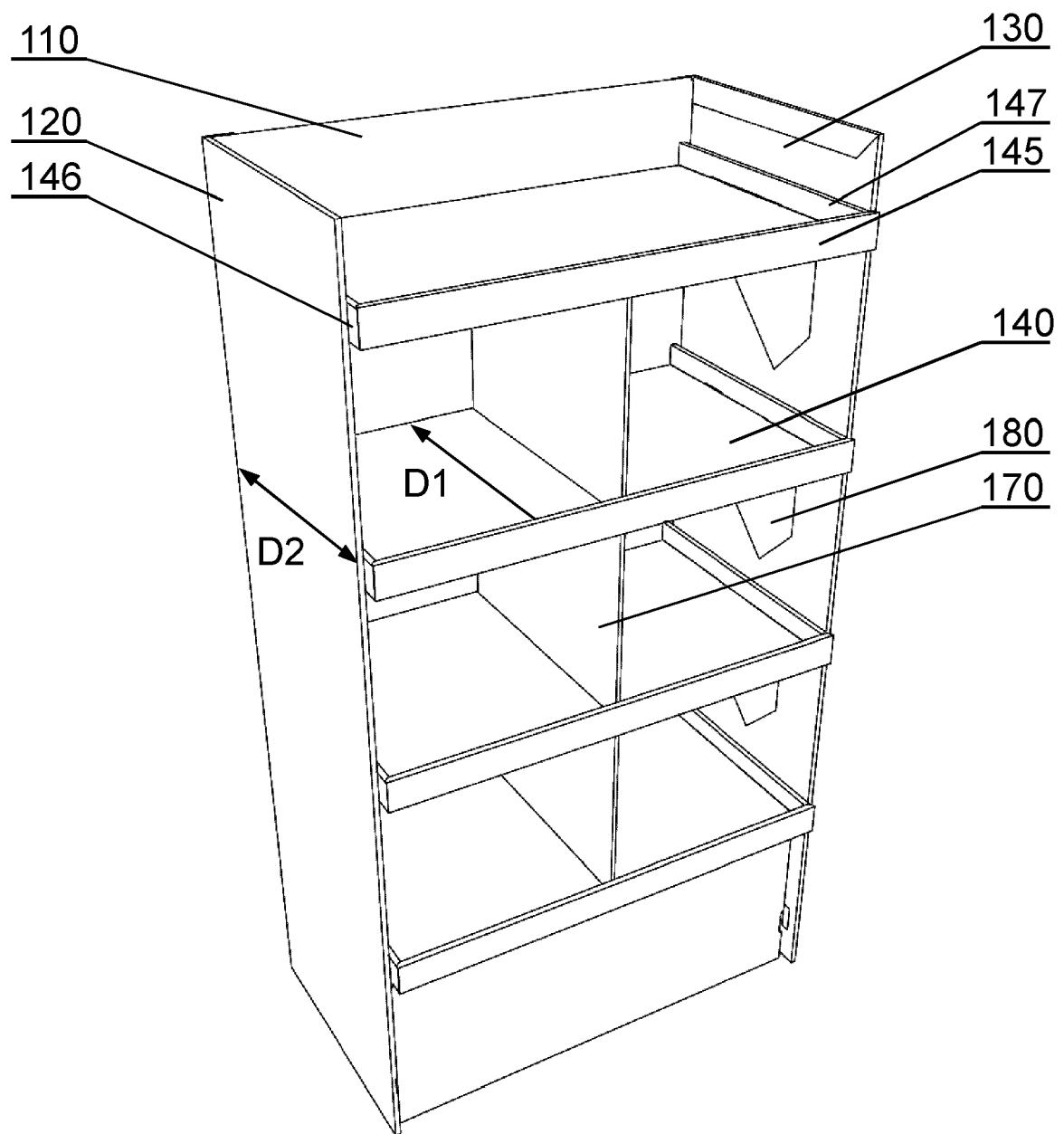


Fig. 9

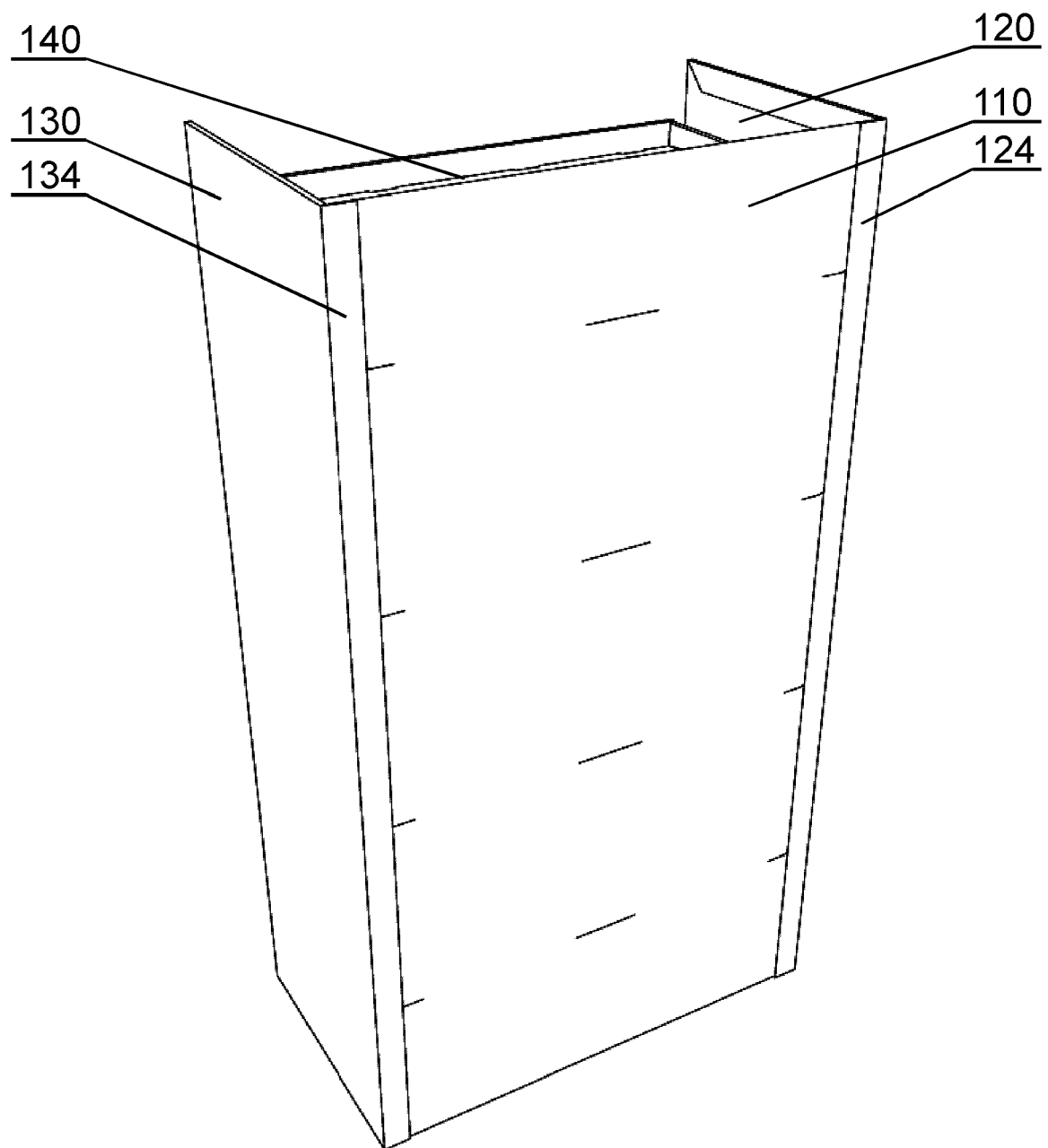


Fig. 10

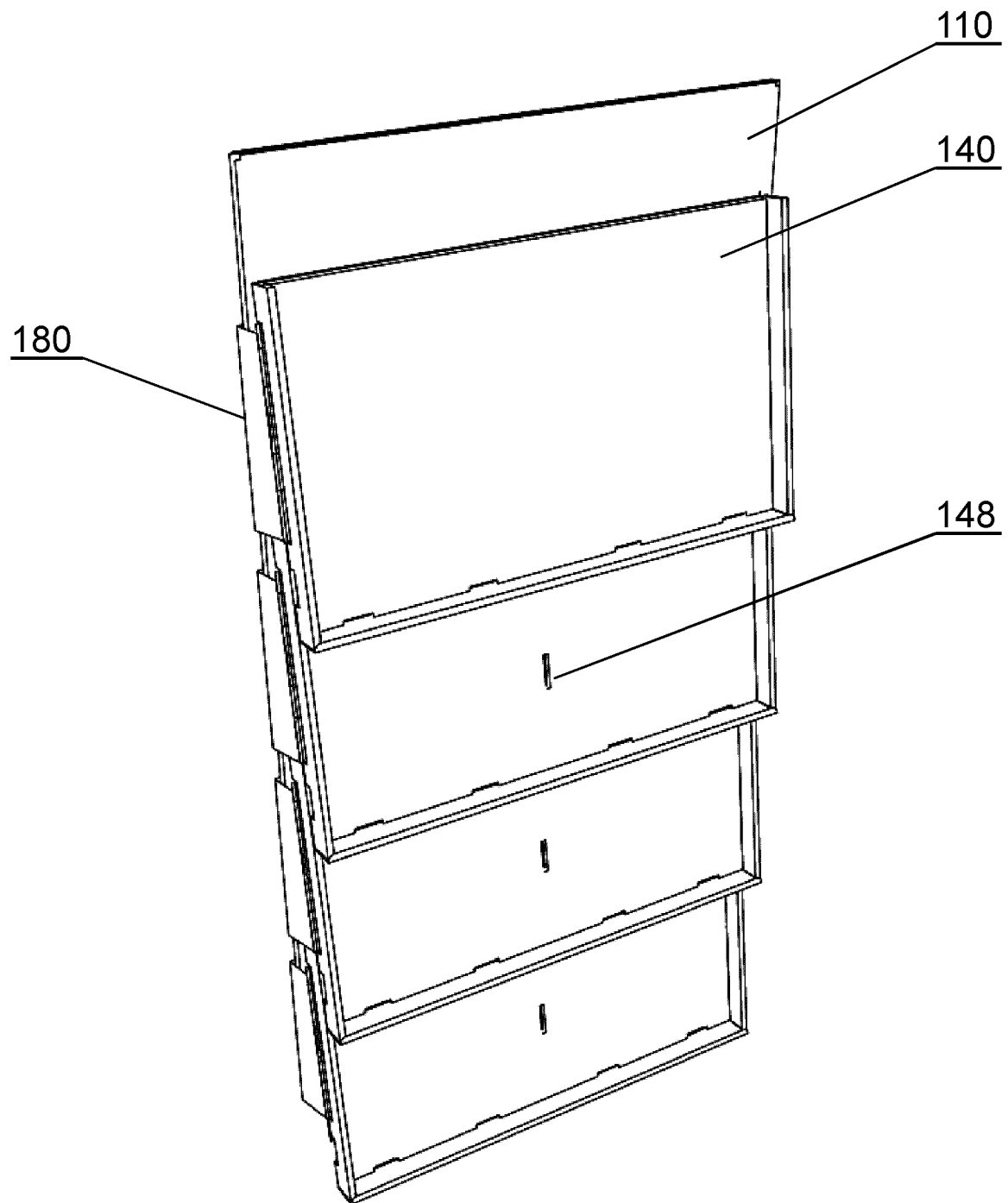


Fig. 11

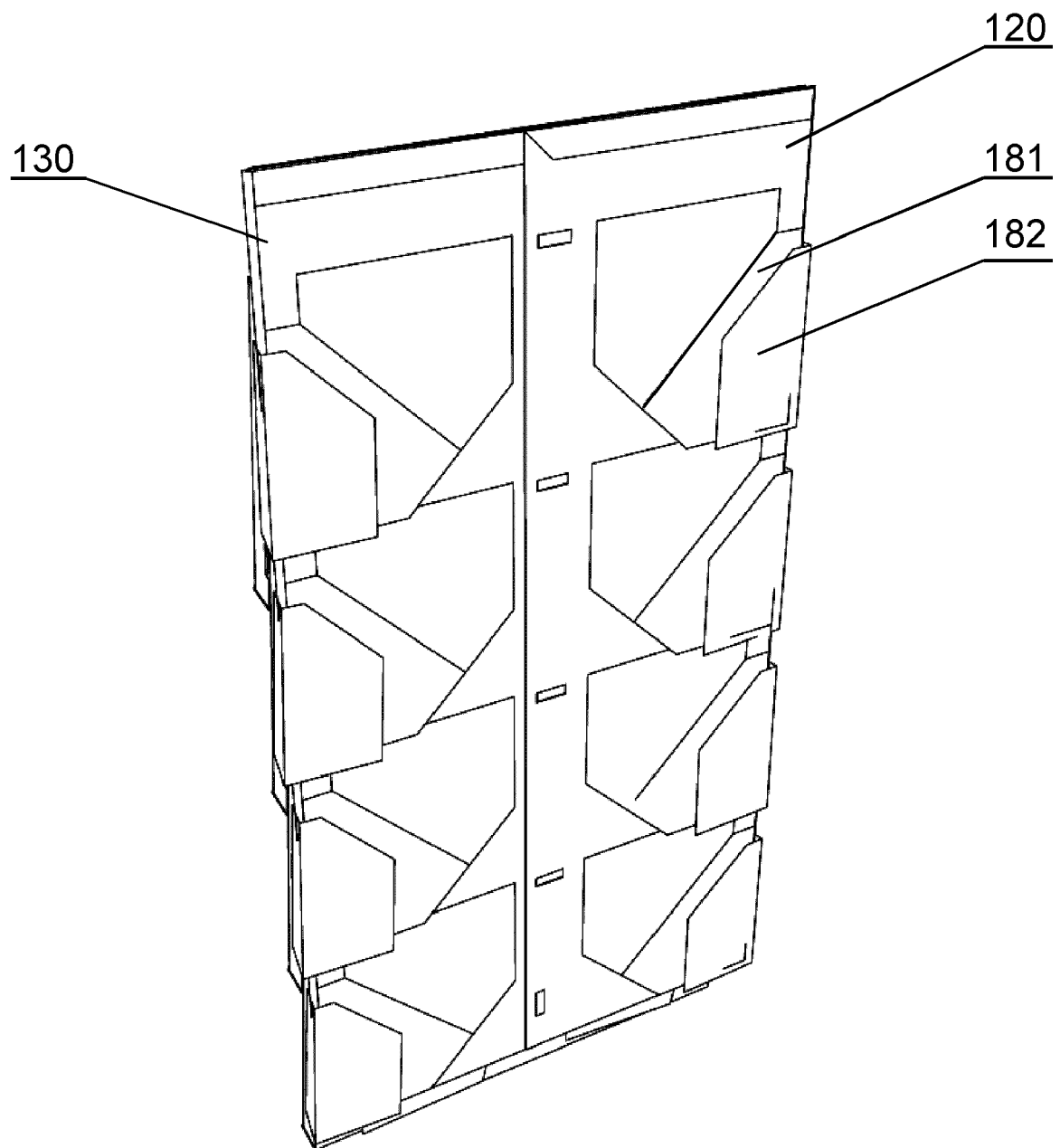


Fig. 12

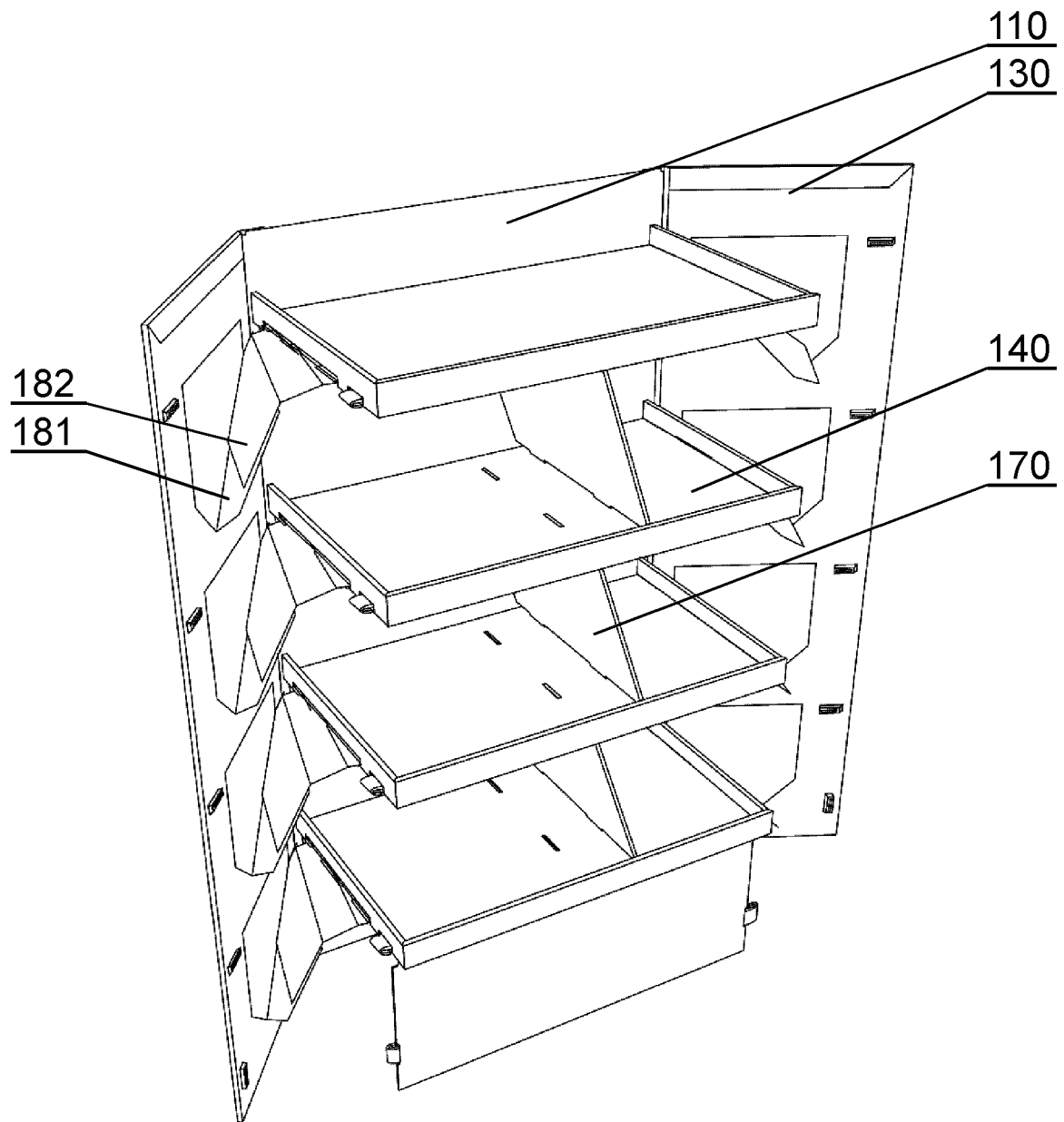


Fig. 13

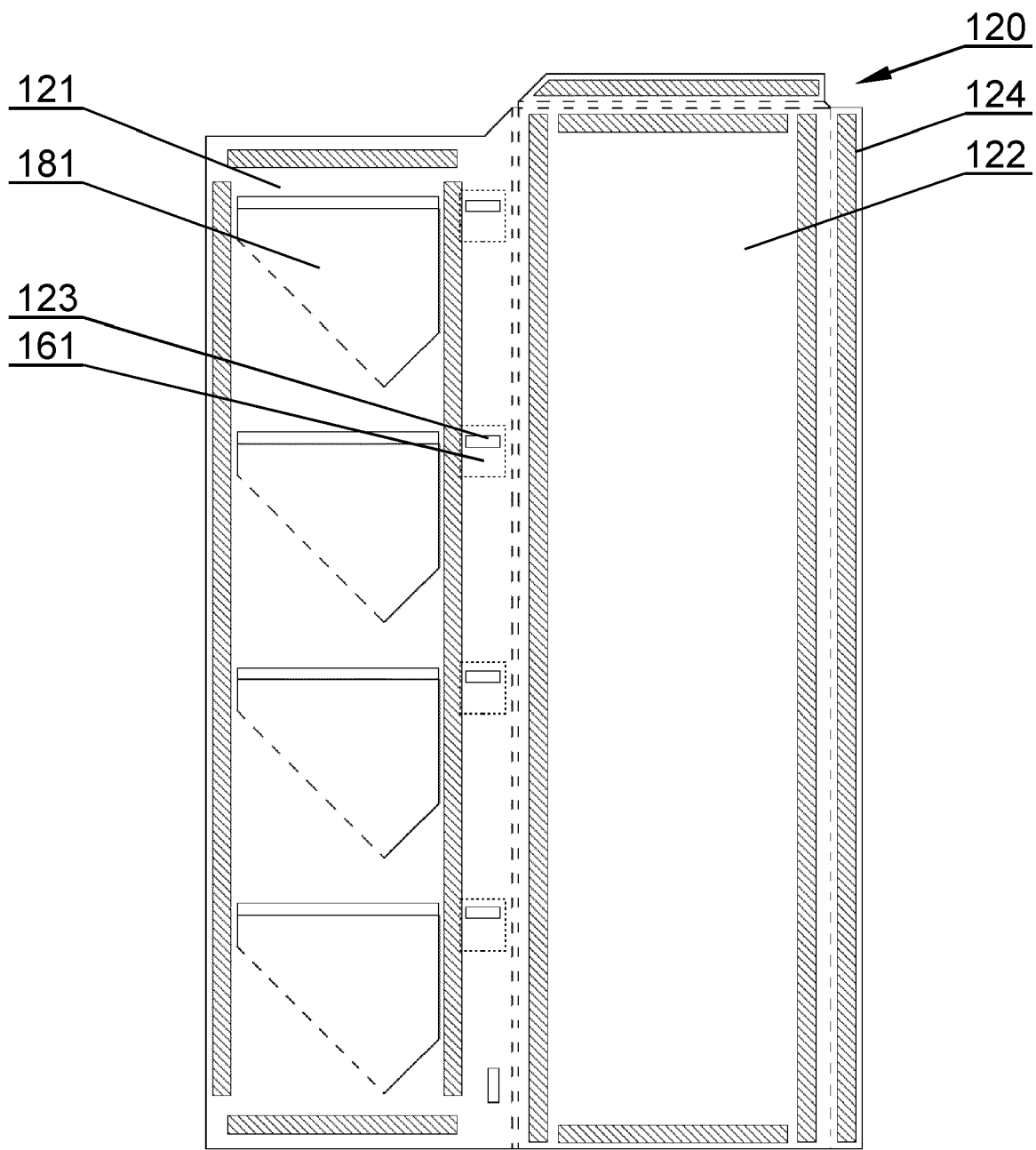


Fig. 14

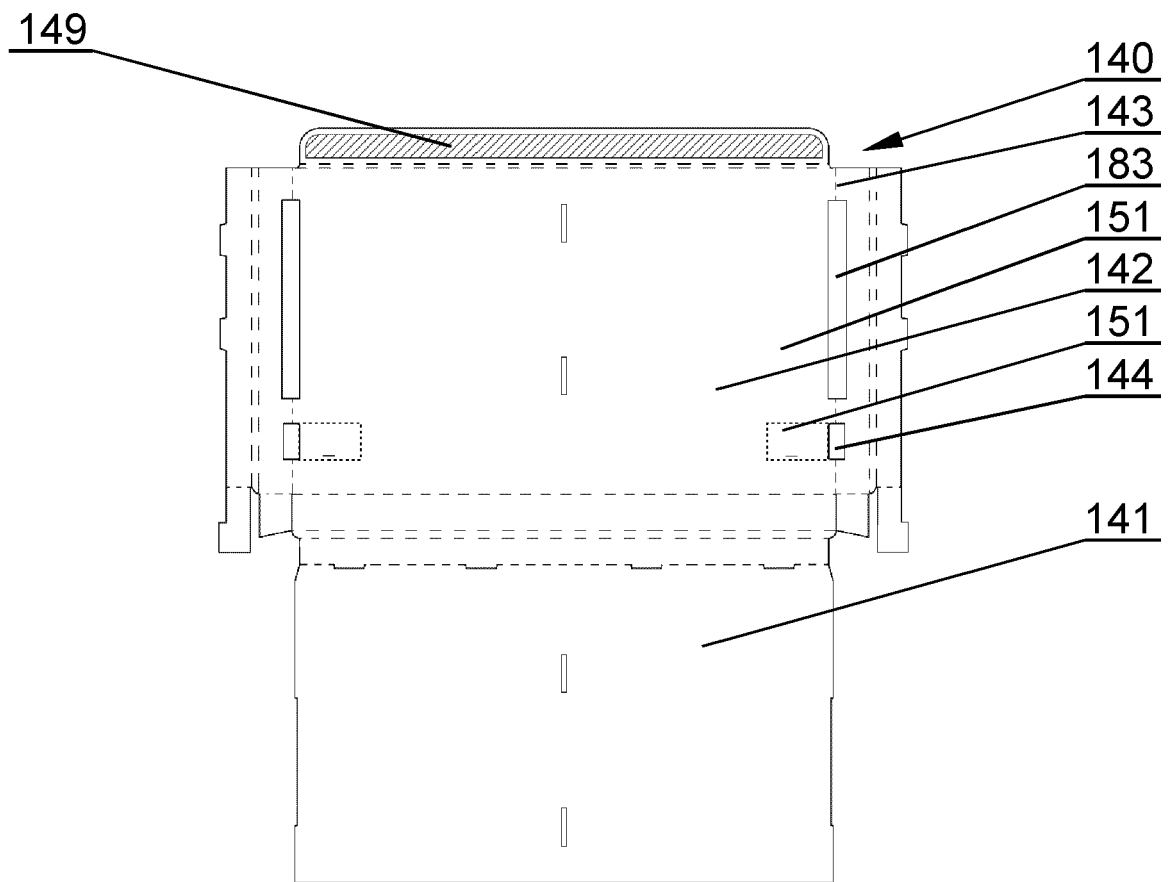


Fig. 15

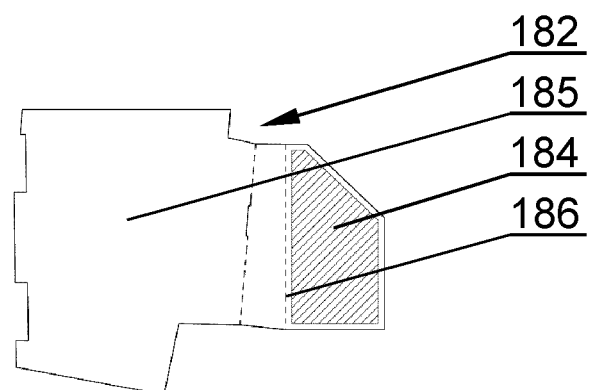


Fig. 16



EUROPEAN SEARCH REPORT

Application Number
EP 11 46 1541

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 33 24 553 A1 (SCHROETER & BAKE GMBH CO KG [DE]) 17 January 1985 (1985-01-17) * the whole document *	1-15	INV. A47F5/11
X	US 4 929 116 A (MAHL ROBERT R [US]) 29 May 1990 (1990-05-29) * the whole document *	1-15	
X	US 4 582 003 A (VALERO KENNETH W [US]) 15 April 1986 (1986-04-15) * the whole document *	1-15	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47F A47B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 2 April 2012	Examiner Cardan, Cosmin
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EPO FORM 1503 03.82 (P04C01)

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

EP 11 46 1541

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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02-04-2012

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 3324553	A1	17-01-1985	NONE	
US 4929116	A	29-05-1990	NONE	
US 4582003	A	15-04-1986	NONE	

EPO FORM P0459

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

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- EP 1421879 A [0004]
- EP 2255703 A [0005]