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(71) Applicant: **Leng, Luhao**
Xiamen, Fujian 361100 (CN)

(72) Inventor: **Leng, Luhao**
Xiamen, Fujian 361100 (CN)

(74) Representative: **Verscht, Thomas Kurt Albert**
Josephsburgstrasse 88 A
81673 München (DE)

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(54) **CHAIR BACK STRUCTURE AND FOLDING CHAIR**

(57) A chair back structure (10) and a backrest chair using the chair back structure (10). The chair back structure (10) comprises a backrest plate (12) and a fixing frame (14) used for supporting the backrest plate (12); at least the upper edge of the backrest plate (12) is folded backwards to form a fixing flange (122); the fixing frame (14) is provided with a mounting clamping groove (141) corresponding to the fixing flange (122); the backrest plate (12) is a vacuum thermoformed board; undercut convex teeth (124) formed by vacuum thermoforming or die pressing are arranged on the surface of the fixing flange (122); the fixing flange (122) is inserted into the mounting clamping groove (141); the undercut convex teeth (124) are clamped with the edge of the mounting clamping groove (141) so as to limit the fixing flange (122) from being separated from the mounting clamping groove (141).

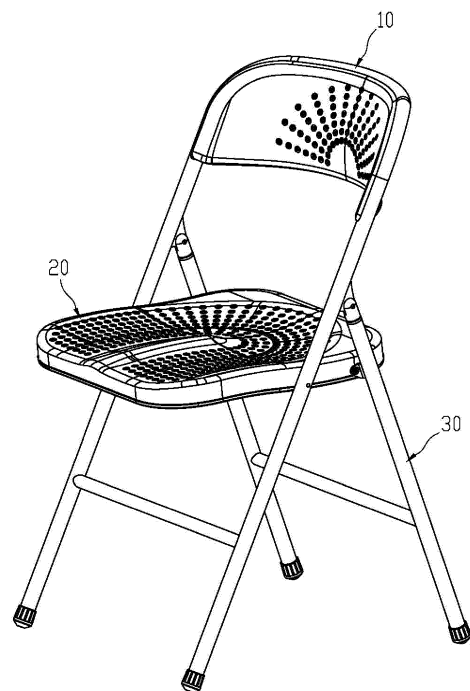


FIG. 1

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Description

FIELD OF THE DISCLOSURE

[0001] The present disclosure relates to a chair backrest structure and a foldable chair using the chair backrest structure.

BACKGROUND OF THE DISCLOSURE

[0002] A chair backrest structure combining a plastic backrest plate with a metal steel pipe is very common, the plastic backrest is either locked to the metal steel pipe through bolts, or mounting holes are reserved on the plastic backrest to be connected to the metal steel pipe by plugging. The locking method using the bolts can easily damage the plastic backrest, and the fixation method by plugging through the mounting holes is not firm, regardless of the method, the plastic backrest is required to be thicker, otherwise bolt holes and the mounting holes cannot be reliably formed. Therefore, the existing chair backrest structure that combines the plastic backrest with the metal steel pipe has technical problems of poor structural stability and relatively high production cost.

BRIEF SUMMARY OF THE DISCLOSURE

[0003] The present disclosure provides a chair backrest structure and a backrest chair using the chair backrest structure with good structural stability, and production of product is effectively reduced. The technical solution of the present disclosure to solve the technical problem is described as follows.

[0004] A chair backrest structure, it comprises a backrest plate and a fixed frame for supporting the backrest plate, the backrest plate is a plastic element, the fixed frame is a metal element, at least an upper edge of the backrest plate is folded backward to form a fixed flange, the fixed frame comprises an installation slot corresponding to the fixed flange, the backrest plate is a vacuum-formed plastic plate, a surface of the fixed flange comprises inverted protruding teeth formed by vacuum-forming or by molding, the fixed flange is disposed in the installation slot, and the inverted protruding teeth are buckled to an edge of the installation slot to limit the fixed flange from being separated from the installation slot.

[0005] After the inverted protruding teeth are disposed in the installation slot together with the fixed flange, the inverted protruding teeth are buckled to the edge of the installation slot, so that the fixed flange is firmly connected to the fixed frame. The backrest plate of the present disclosure uses a vacuum-formed plastic plate with a thin thickness and a low cost, and the inverted protruding teeth directly formed on the vacuum-formed plastic plate can be easily inserted into the installation slot during assembly, which is easy to assemble.

[0006] In a preferred embodiment: the upper edge and

left and right edges of the backrest plate are all folded backward to form the fixed flange, and the inverted protruding teeth are arranged on the fixed flange at even intervals from beginning to end. Therefore, a connection between the backrest plate and the fixed frame is more firm.

[0007] In a preferred embodiment: the inverted protruding teeth are located on an upper surface of the fixed flange. In this way, when assembled, it is convenient for an operator to observe and operate, which improves efficiency of assembly.

[0008] In a preferred embodiment: a lower edge of the backrest plate comprises a vacuum-formed plastic curved edge facing backward. The vacuum-formed plastic curved edge can effectively improve strength of the backrest plate.

[0009] In a preferred embodiment: a thickness of the backrest plate is 0.7-3 mm.

[0010] In a preferred embodiment: the fixed frame comprises supporting sections with left-right symmetry and a mounting section connected to top ends of the two supporting sections, the upper edge of the backrest plate is arc-shaped, a shape of the mounting section of the fixed frame cooperates with a shape of the upper edge of the backrest plate, and the installation slot extends from a top of one of the supporting sections to a top of another one of the supporting sections after passing through the mounting section. Therefore, a connection between the backrest plate and the fixed frame is more firm.

[0011] In a preferred embodiment: the fixed frame further comprises a lateral rod connected between lower parts of the two supporting sections.

[0012] In a preferred embodiment: a hinge sheet is disposed on a rear side of the supporting sections and below the backrest plate. It is convenient for a hinge connection between the hinge sheet and a chair leg to form a foldable chair.

[0013] A backrest chair, it comprises a chair backrest structure, the chair backrest structure comprises a backrest plate and a fixed frame for supporting the backrest plate, the backrest plate is a plastic element, the fixed frame is a metal element, at least an upper edge of the backrest plate is folded backward to form a fixed flange, the fixed frame comprises an installation slot corresponding to the fixed flange, the backrest plate is a vacuum-formed plastic plate, a surface of the fixed flange comprises one or more inverted protruding teeth formed by vacuum-forming or by molding, the fixed flange is disposed in the installation slot, and the one or more inverted protruding teeth are buckled to an edge of the installation slot to limit the fixed flange from being separated from the installation slot.

[0014] In a preferred embodiment: the backrest chair is foldable.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The present disclosure will be further described

below in conjunction with the accompanying drawings and embodiments.

FIG. 1 illustrates a perspective view of a backrest chair in an unfolded state.

FIG. 2 illustrates a perspective view of the backrest chair shown in FIG. 1 in a folded state.

FIG. 3 illustrates a perspective view of a chair backrest structure of the backrest chair shown in FIG. 1.

FIG. 4 illustrates an exploded view of a backrest plate and a fixed frame of the chair backrest structure shown in FIG. 3 before assembly.

FIG. 5 illustrates a sectional view of the backrest plate shown in FIG. 4.

FIG. 6 illustrates a sectional view of the fixed frame shown in FIG. 4.

FIG. 7 illustrates a sectional view of the chair backrest structure shown in FIG. 3.

FIG. 8 illustrates a perspective view of an X-shaped foldable chair in Embodiment 2.

Figure 9 is a sectional view of the X-shaped foldable chair shown in FIG. 8 at a connection position between a seat plate and a chair leg (a front chair leg).

DETAILED DESCRIPTION OF THE EMBODIMENTS

EMBODIMENT 1:

[0016] Referring to FIGS. 1 and 2, a backrest chair of the present disclosure is a foldable backrest chair. The backrest chair comprises a chair backrest structure 10, a seat plate structure 20 and chair legs 30, a bottom of the chair backrest structure 10 also has a supporting function to cooperate with the chair legs 30 to be steadily placed on ground so as to support the seat plate structure 20. A connection relationship and a folding operation principle between the chair backrest structure 10, the chair legs 30, the seat plate structure 20 are existing technologies and will not be further described.

[0017] Referring to FIGS. 3-7, the chair backrest structure 10 comprises a backrest plate 12 and a fixed frame 14 for supporting the backrest plate, the backrest plate 12 is a plastic element, and the fixed frame 14 is a metal element. At least an upper edge of the backrest plate 12 is folded backward to form a fixed flange 122, and the fixed frame 14 comprises an installation slot 141 corresponding to the fixed flange. The backrest plate 12 is a vacuum-formed plastic plate, and a surface of the fixed flange 122 comprises one or more inverted protruding teeth 124 formed by vacuum-forming or by molding. During assembly, the fixed flange 122 is disposed in the installation slot 141, and the one or more inverted protruding teeth 124 are buckled to an edge of the installation slot 141 to limit the fixed flange from being separated from the installation slot.

[0018] As the backrest plate 12 is the vacuum-formed plastic plate, during the assembly, a bent angle of the fixed flange 122 can therefore be easily adjusted, and the

one or more inverted protruding teeth 124 can also be easily squeezed to pass through the installation slot 141, after the assembly is complete, the one or more inverted protruding teeth 124 are buckled to the fixed frame 14.

[0019] In this embodiment, the one or more inverted protruding teeth 124 are multiple and are arranged at intervals along a length direction of the fixed flange 122.

[0020] Preferably, the upper edge and left and right edges of the backrest plate 12 are all folded backward to form the fixed flange 122, and the inverted protruding teeth 124 are arranged on the fixed flange 122 from beginning to end at even intervals.

[0021] Preferably, the inverted protruding teeth 124 are located on an upper surface of the fixed flange 122. The inverted protruding teeth 124 are in a sharp angle shape protruding upward.

[0022] Preferably, a lower edge of the backrest plate 12 comprises a vacuum-formed plastic curved edge 126 facing backward. The backrest plate 12 is integrally vacuum formed, and a formation is easy.

[0023] Preferably, a thickness of the backrest plate 12 is 0.7-3 mm.

[0024] Preferably, the fixed frame 14 comprises supporting sections 142 with left-right symmetry and a mounting section 144 connected to top ends of the two supporting sections 142, the upper edge of the backrest plate 12 is arc-shaped, a shape of the mounting section 144 of the fixed frame 14 cooperates with a shape of the upper edge of the backrest plate 12, the installation slot 141 extends from a top of one of the supporting sections 142 to a top of another one of the supporting sections 142 after passing through the mounting section 144. In this way, the fixed flange of the upper edge and the left and right edges of the backrest plate 12 can be inserted into the installation slot to achieve buckle-fastening.

[0025] Preferably, the fixed frame 14 further comprises a lateral rod 146 connected between lower parts of the two supporting sections.

[0026] Preferably, hinge sheets 148 are disposed on a rear side of the supporting sections 142 and below the backrest plate, and the hinge sheets are configured to be pivotally connected to the chair legs 30.

EMBODIMENT 2:

[0027] This embodiment uses the chair backrest structure 10 of Embodiment, a displacement structure between chair legs and a seat plate of the foldable chair is improved, stability of the foldable chair is improved with a simple structure, and a sliding part slides smoothly to be folded easily.

[0028] Referring to FIG. 8, the X-shaped foldable chair comprises the seat plate 20, two front chair legs 14 with left-right symmetry and two rear chair legs 30 with left-right symmetry, a connection method between the front chair legs 14 and the seat plate 20 is a rotatable hinged and slidable connection, a connection method between the rear chair legs 30 and the seat plate 20 is a rotatable

hinged connection, and the positional relationship and the folding principle of the seat plate 20, the front chair legs 14, and the rear chair legs 30 are existing technologies. A creative point of the present disclosure is the displacement structure between the front chair legs 14 and the seat plate 20, that is, the rotation and the sliding movement. It should be understood that the technical solution of the present disclosure can be adopted if the connection method between the rear chair legs 30 and the seat plate 20 requires a rotatable and slidable connection, of course, if the connection between the front chair legs 14, the rear chair legs 30 and the seat plate 20 requires the rotatable and slidable connection. The displacement structure between the chair legs and the seat plate is described in detail using a structure shown in FIGS. 1 and 2.

[0029] Referring to FIGS. 8 and 9, the front chair legs 14 are disposed with connecting shafts 40, the seat plate 20 is disposed with sliding seats 50 configured to slide back and forth, the sliding seats 50 are further rotatably connected to the connecting shafts 40, therefore, the sliding seats 50 and the seat plate 20 together with the connecting shafts 40 rotate and slide relative to the front chair legs 14.

[0030] The sliding seats 50 are U-shaped, and plastic linings 60 shaped as a U are disposed in the sliding seats, the plastic linings 60 are attached to inner surfaces of the sliding seats, the sliding seats 50 are sleeved on a side edge of the seat plate 20 from bottom to top, so that bottom edges of the plastic linings 60 abut bottoms of the side edge of the seat plate 20. The plastic linings 60 comprise pressing edges 62, the side edge of the seat plate 20 comprise a positioning step 22, and the pressing edges 62 abut an upper side of the positioning step 22 to limit the sliding seats 50 in a vertical direction, preventing the sliding seats 50 from being separated from the side edge of the seat plate 20 in the vertical direction.

[0031] Preferably, bottom surfaces, also referred to as the bottom edges, of the plastic linings 60 comprise supporting ribs 64 protruding upward, and the supporting ribs 64 abut a lower side of the positioning step 22. Therefore, the pressing edges 62 and the supporting ribs 64 cooperate to clamp the positioning step 22 up and down.

[0032] Preferably, the seat plate 20 comprises a vacuum-formed panel 20-2 and a supporting frame 20-4, an outer side of the vacuum-formed panel 20-2 comprises a surrounding edge 26 vertically extending downward, the supporting frame 20-4 is disposed along an inner surface of the surrounding edge 26, and the positioning step 22 is disposed on an inner surface of the supporting frame 20-4.

[0033] Preferably, a bottom of the supporting frame 20-4 is folded outward to form a C-shaped hook 18, and a bottom end of the surrounding edge is disposed in the C-shaped hook 18 to be tightly pressed and secured by the C-shaped hook.

[0034] Preferably, the bottom surfaces of the plastic

linings 60 comprise sliding grooves 66 corresponding to the C-shaped hook 28, and the C-shaped hook is matched with and installed in the sliding grooves.

[0035] Preferably, side edges of the plastic linings 60 opposite to the pressing edges comprise positioning flanges 68, side edges of the plastic linings 60 where the pressing edges 62 are located laterally block the positioning step 12 from an inner side, and the positioning flanges 68 laterally block an outer edge of the seat plate 20 from an outer side. Therefore, the sliding seats can be prevented from shaking left and right.

[0036] Preferably, the plastic linings 60 are buckled to the sliding seats 50.

[0037] Preferably, the connecting shafts 40 are fixedly hinged to the front chair legs 14.

[0038] The aforementioned description is merely preferred embodiments of the present disclosure, and the scope of the disclosure is not limited thereto, thus, it is intended that the present disclosure cover equivalent variations and modifications provided they are made based on the specification and the scope of the present disclosure.

INDUSTRIAL APPLICABILITY

[0039] The present discloses a chair backrest structure and a backrest chair having the chair backrest structure, the chair backrest structure comprises a backrest plate and a fixed frame for supporting the backrest plate, the backrest plate is a plastic element, the fixed frame is a metal element, at least an upper edge of the backrest plate is folded backward to form a fixed flange, the fixed frame comprises an installation slot corresponding to the fixed flange, the backrest plate is a vacuum-formed plastic plate, a surface of the fixed flange comprises one or more inverted protruding teeth formed by vacuum-forming or by molding, the fixed flange is disposed in the installation slot, and the one or more inverted protruding teeth are buckled to an edge of the installation slot to limit the fixed flange from being separated from the installation slot. The one or more inverted protruding teeth are buckled to the edge of the installation slot, so that the fixed flange is firmly connected to the fixed frame. The backrest plate uses the vacuum-formed plastic plate with a thin thickness and a low cost, and the one or more inverted protruding teeth directly formed on the vacuum-formed plastic plate can be easily disposed in the installation slot during assembly, which is easy to assemble and has industrial applicability.

Claims

1. A chair backrest structure, it comprises a backrest plate and a fixed frame for supporting the backrest plate, the backrest plate is a plastic element, the fixed frame is a metal element, at least an upper edge of the backrest plate is folded backward to form a fixed

- flange, **characterized in that:** the fixed frame comprises an installation slot corresponding to the fixed flange, the backrest plate is a vacuum-formed plastic plate, a surface of the fixed flange comprises inverted protruding teeth formed by vacuum-forming or by molding, the fixed flange is disposed in the installation slot, and the inverted protruding teeth are buckled to an edge of the installation slot to limit the fixed flange from being separated from the installation slot.
2. The chair backrest structure according to claim 1, **characterized in that:** the upper edge and left and right edges of the backrest plate are all folded backward to form the fixed flange, and the inverted protruding teeth are arranged on the fixed flange at even intervals from beginning to end.
 3. The chair backrest structure according to claim 2, **characterized in that:** the fixed frame comprises supporting sections with left-right symmetry and a mounting section connected to top ends of the two supporting sections, the upper edge of the backrest plate is arc-shaped, a shape of the mounting section of the fixed frame cooperates with a shape of the upper edge of the backrest plate, and the installation slot extends from a top of one of the supporting sections to a top of another one of the supporting sections after passing through the mounting section.
 4. The chair backrest structure according to claim 3, **characterized in that:** the fixed frame further comprises a lateral rod connected between lower parts of the two supporting sections.
 5. A foldable chair, it comprises: the backrest according to any one of claims 1-4, a chair leg, a seat plate; a structure between the chair leg and the seat plate of the foldable chair comprises a sliding seat and a connecting shaft, the sliding seat is slidably connected to a side edge of the seat plate, the connecting shaft is disposed on the chair leg, the sliding seat is rotatably connected to the connecting shaft, the sliding seat is U-shaped, a plastic lining shaped as a U is disposed in the sliding seat, the plastic lining is attached to an inner surface of the sliding seat, the sliding seat is sleeved on the side edge of the seat plate from bottom to top, the plastic lining comprises a pressing edge, the side edge of the seat plate comprises a positioning step, and the pressing edge abuts an upper side of the positioning step to limit the sliding seat in a vertical direction to prevent the sliding seat from being separated from the side edge of the seat plate in the vertical direction.
 6. The foldable chair according to claim 1, **characterized in that:** a bottom surface of the plastic lining comprises a supporting rib protruding upward, and the supporting rib abuts a lower side of the positioning step.
 7. The foldable chair according to claim 5 or 6, **characterized in that:** the seat plate comprises a vacuum-formed panel and a supporting frame, an outer side of the vacuum-formed panel comprises a surrounding edge vertically extending downward, the supporting frame is disposed along an inner surface of the surrounding edge, and the positioning step is disposed on an inner surface of the supporting frame.
 8. The foldable chair according to claim 7, **characterized in that:** a bottom of the supporting frame is folded outward to form a C-shaped hook, and a bottom end of the surrounding edge is disposed in the C-shaped hook to be tightly pressed and secured by the C-shaped hook.
 9. The foldable chair according to claim 7, **characterized in that:** a bottom surface of the plastic lining comprises a sliding groove corresponding to the C-shaped hook, and the C-shaped hook is matched with and installed in the sliding groove.
 10. The foldable chair according to claim 6, **characterized in that:** a side edge of the plastic lining opposite to the pressing edge comprises a positioning flange, a side edge of the plastic lining where the pressing edge is located laterally blocks the positioning step from an inner side, and the positioning flange laterally blocks an outer edge of the seat plate from an outer side.
 11. A displacement structure of the foldable chair between the chair leg and the seat plate according to claim 5, **characterized in that:** the plastic lining is buckled to the sliding seat.
 12. The displacement structure of the foldable chair between the chair leg and the seat plate according to claim 5, **characterized in that:** the connecting shaft is fixedly hinged to the chair leg.

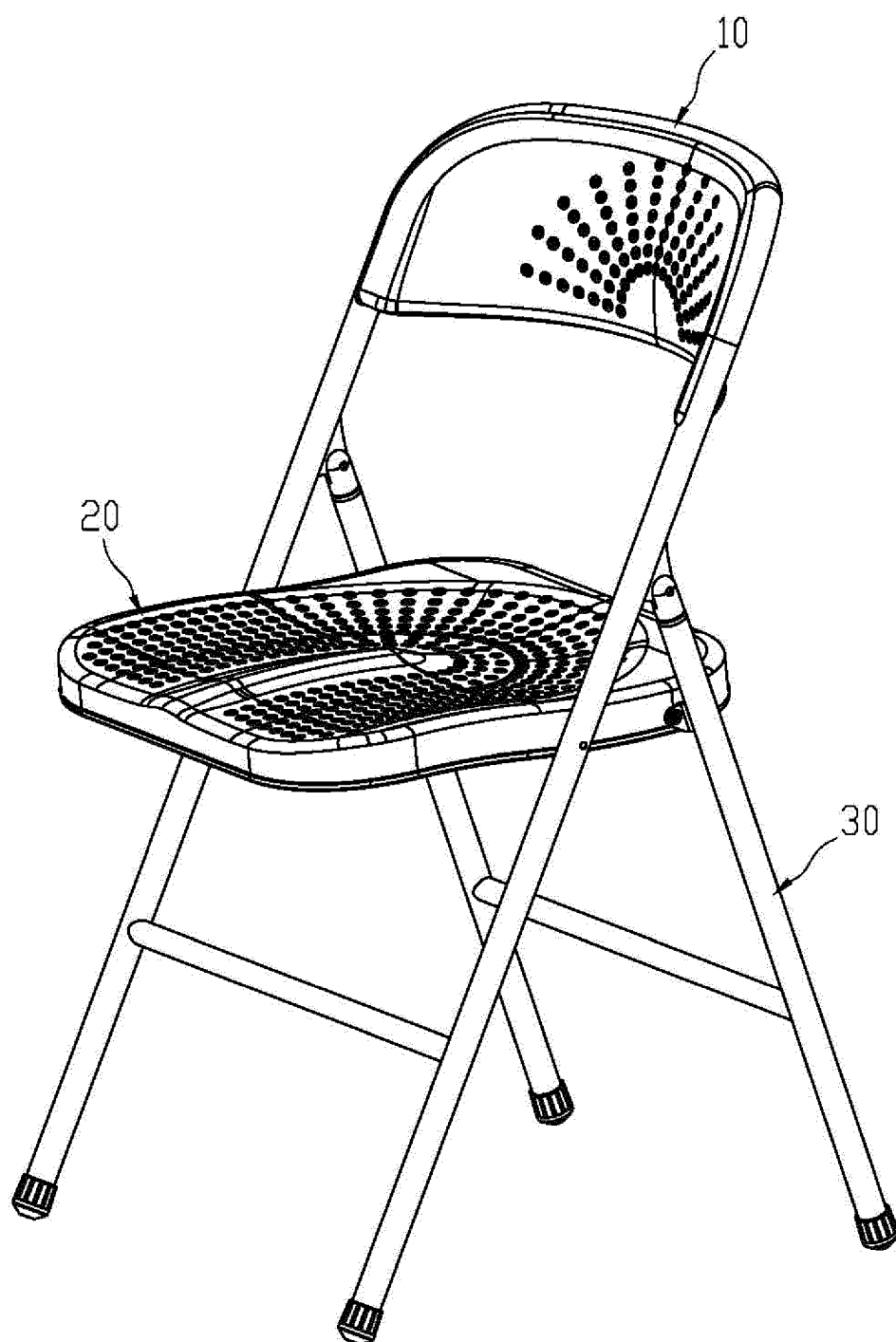


FIG. 1

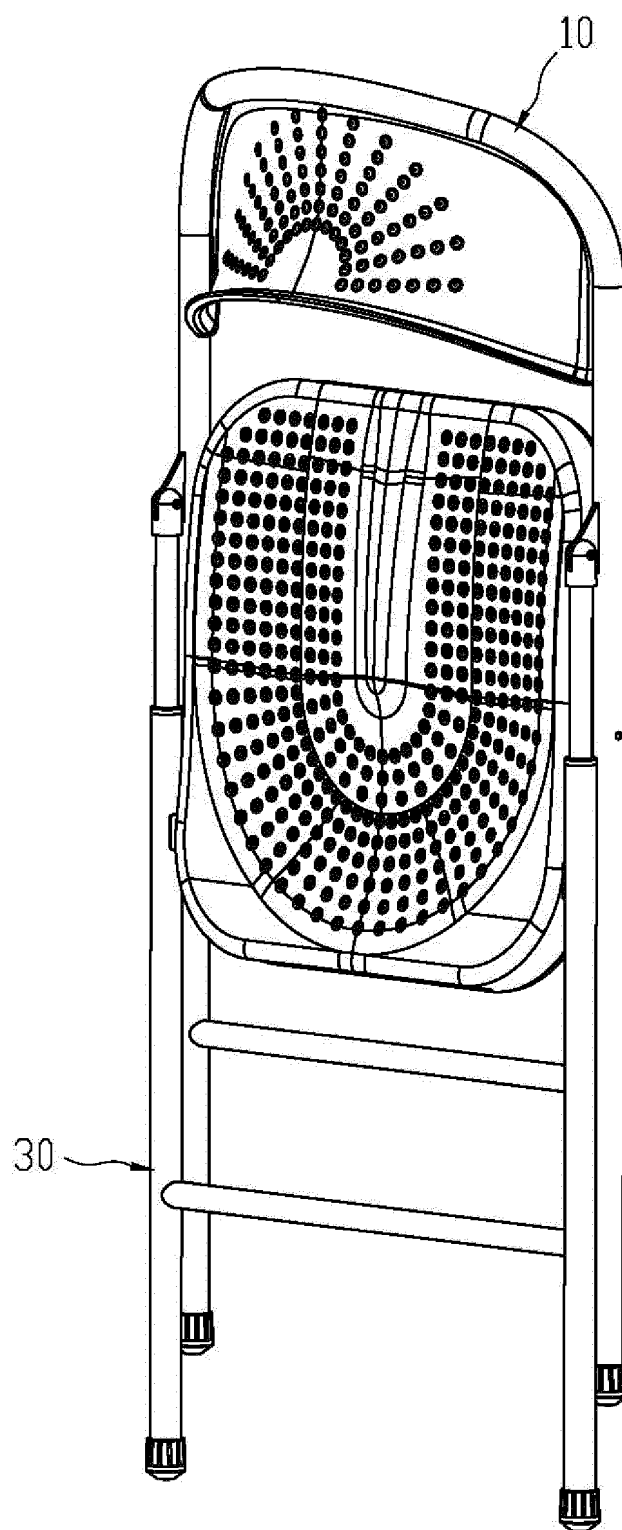


FIG. 2

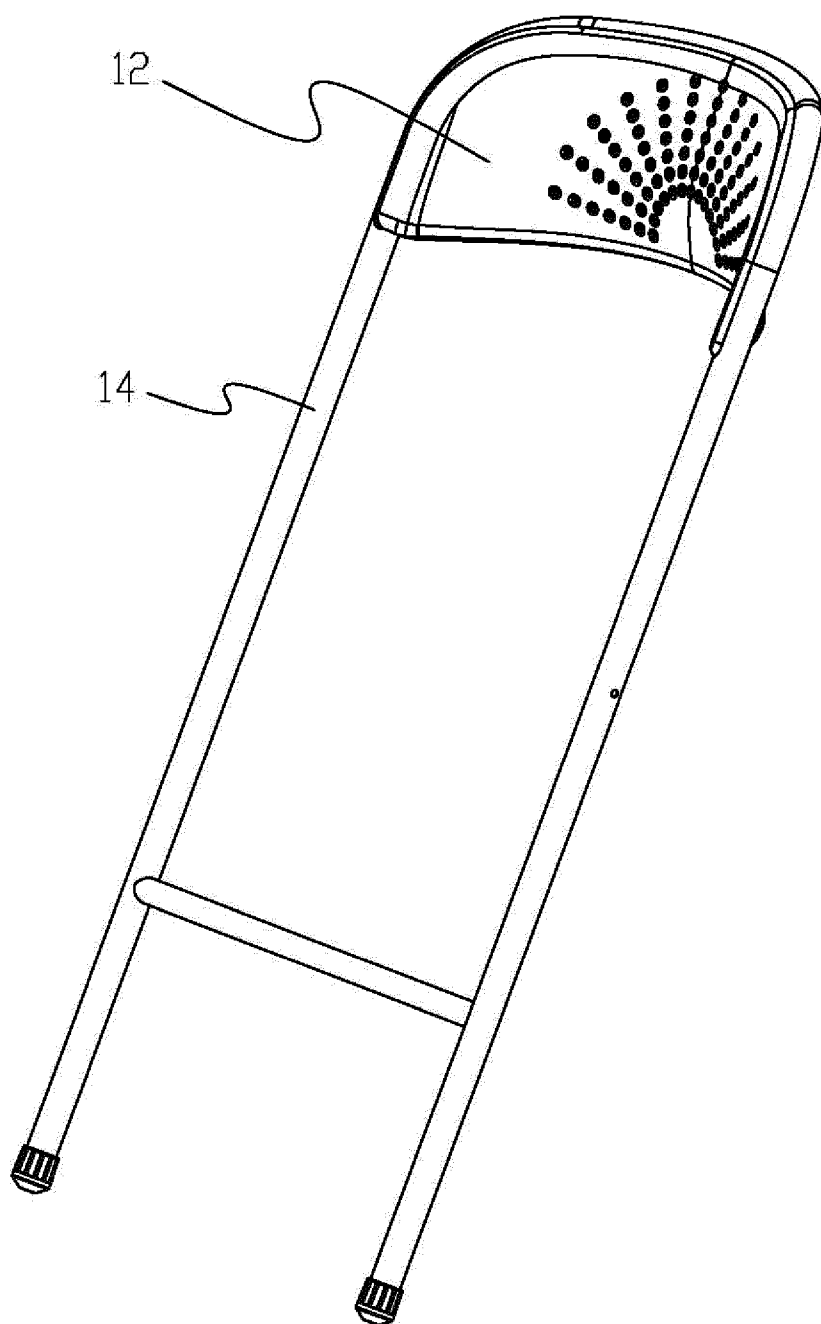


FIG. 3

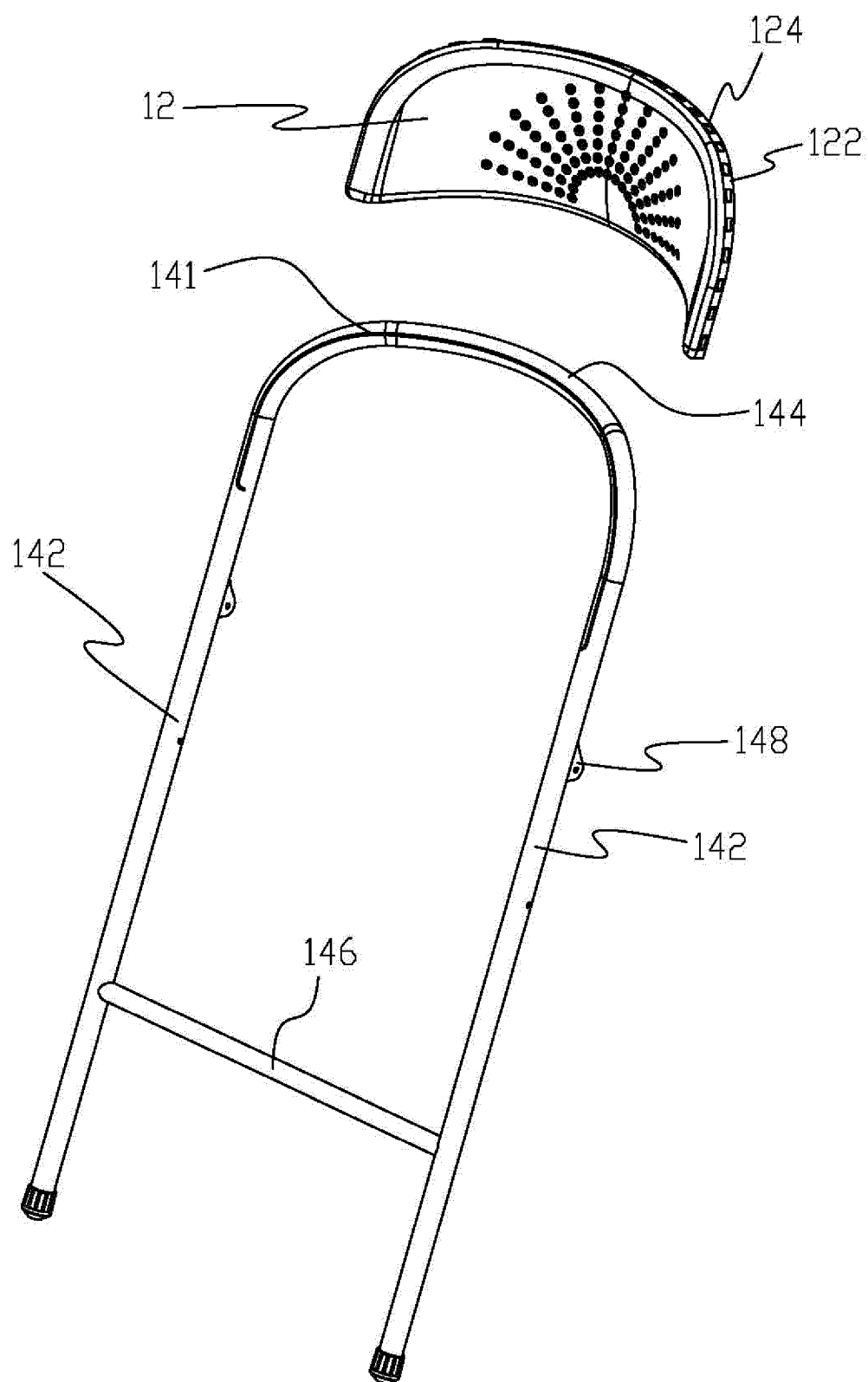


FIG. 4

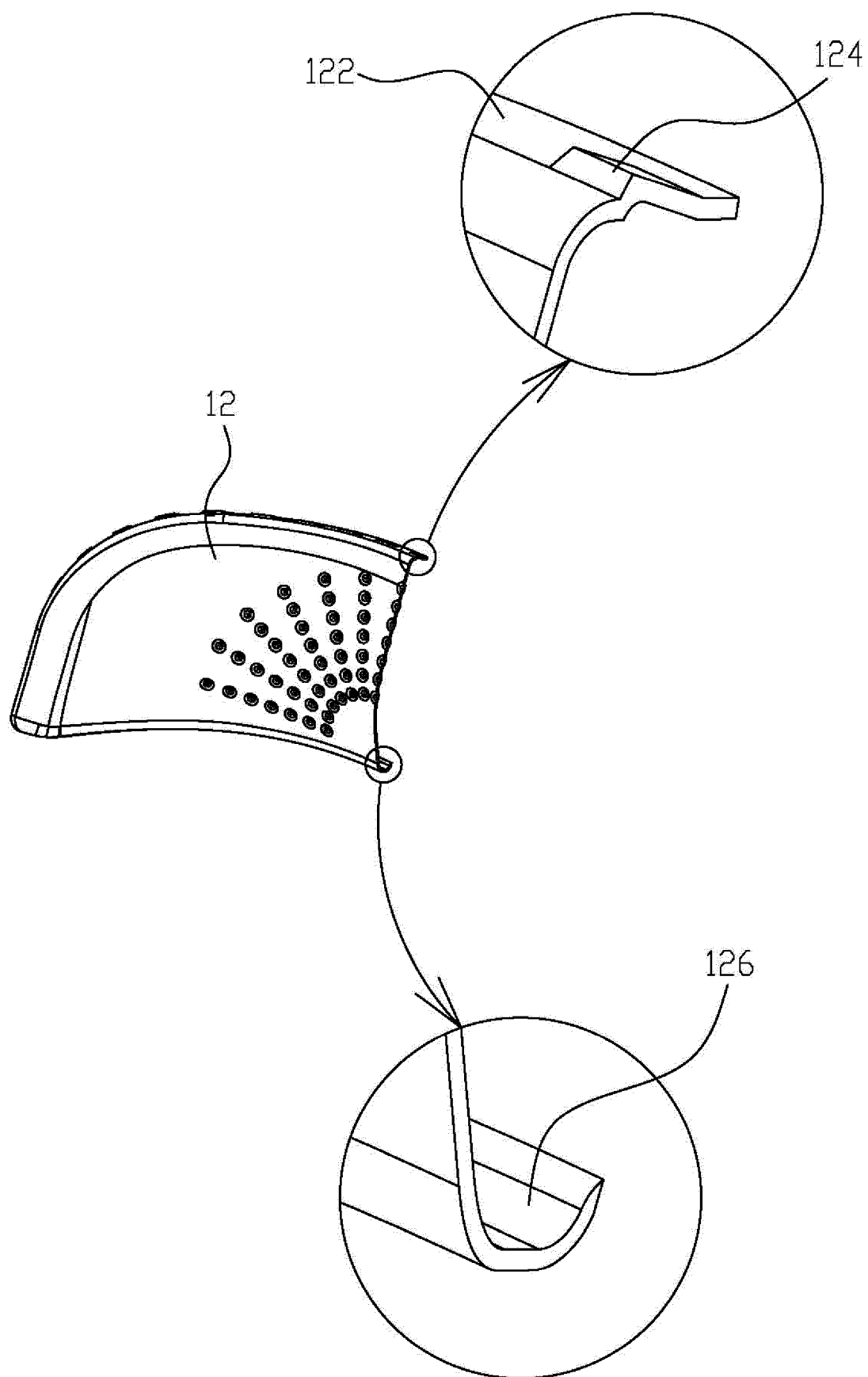


FIG. 5

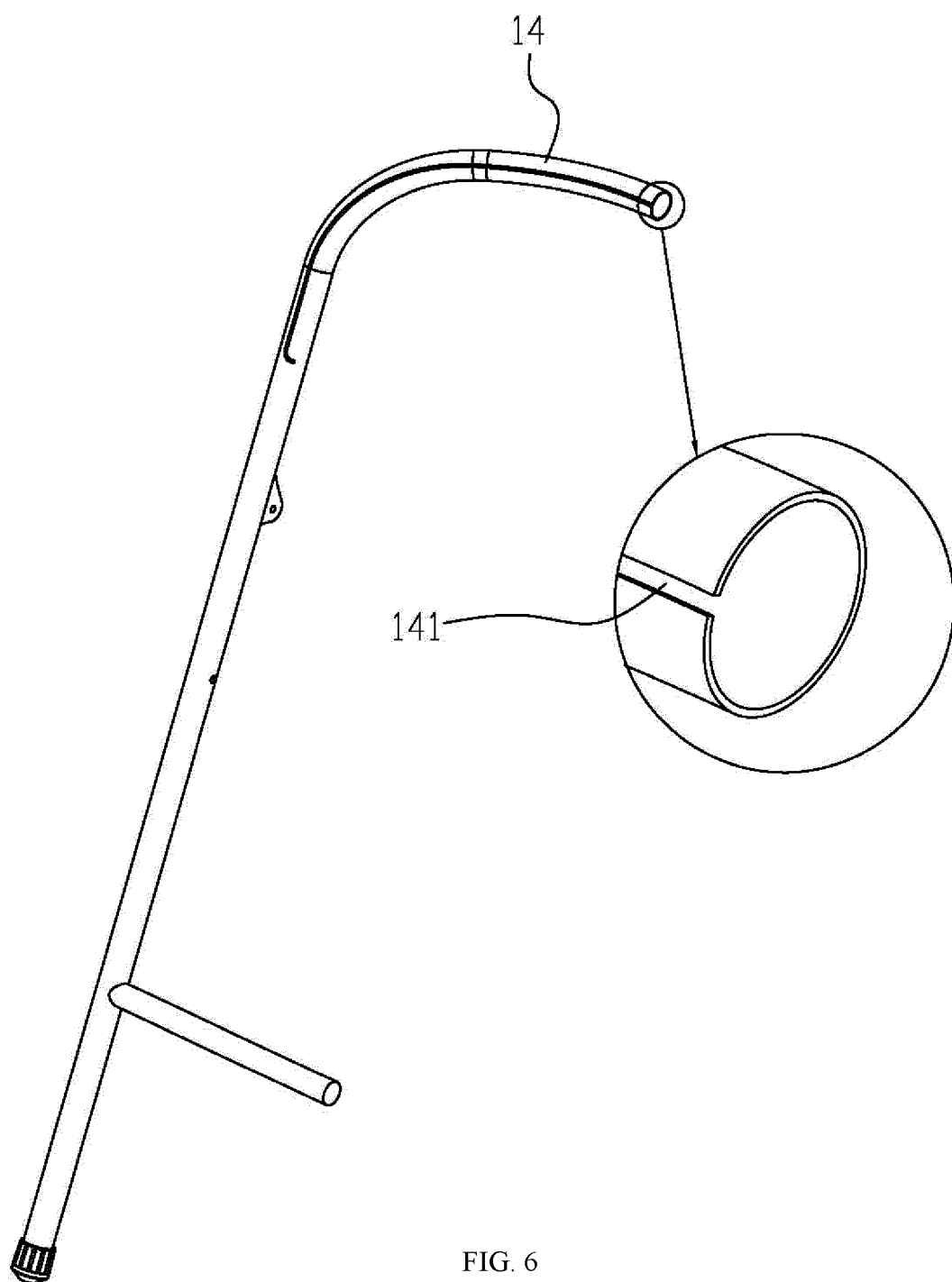


FIG. 6

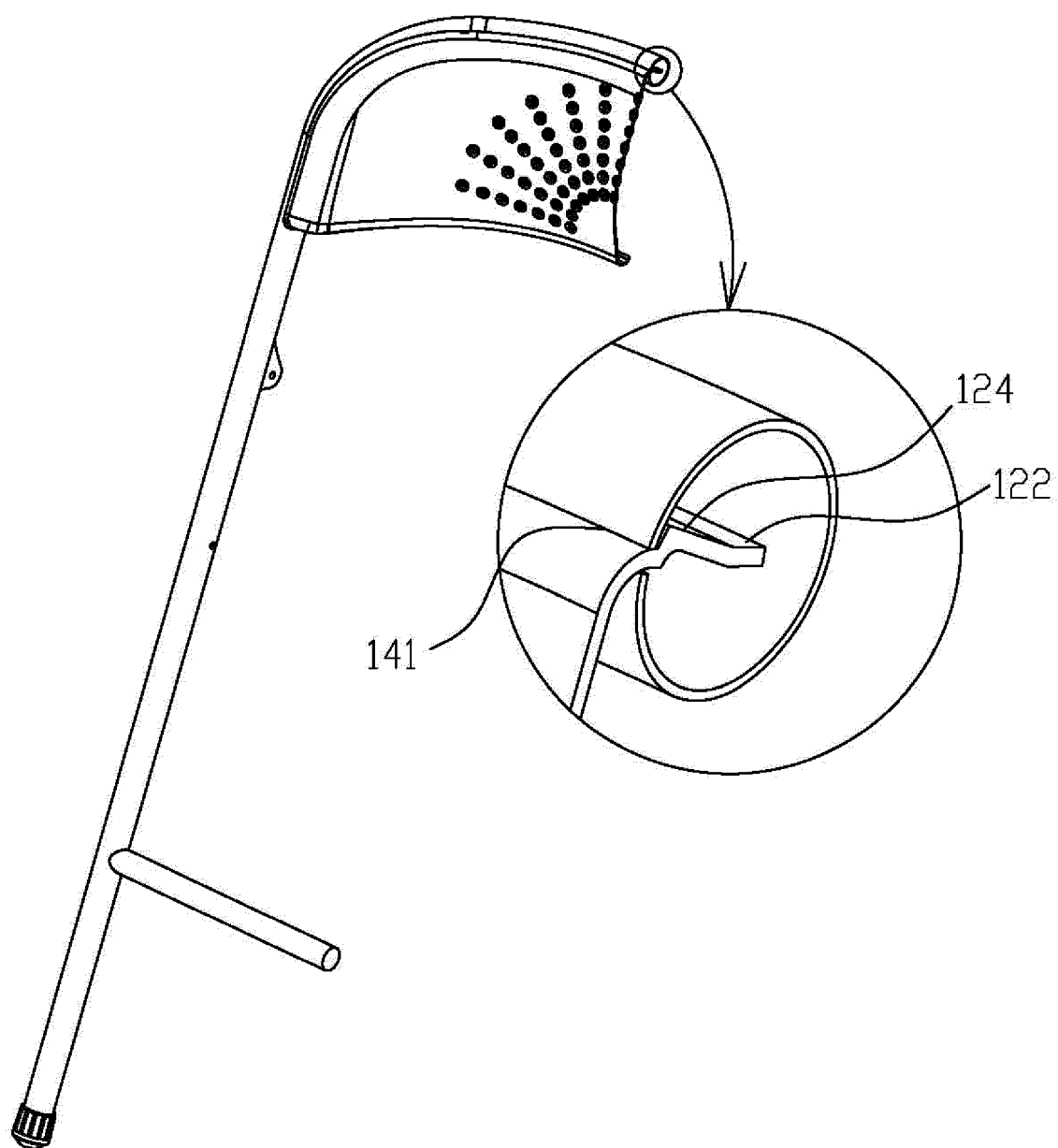


FIG. 7

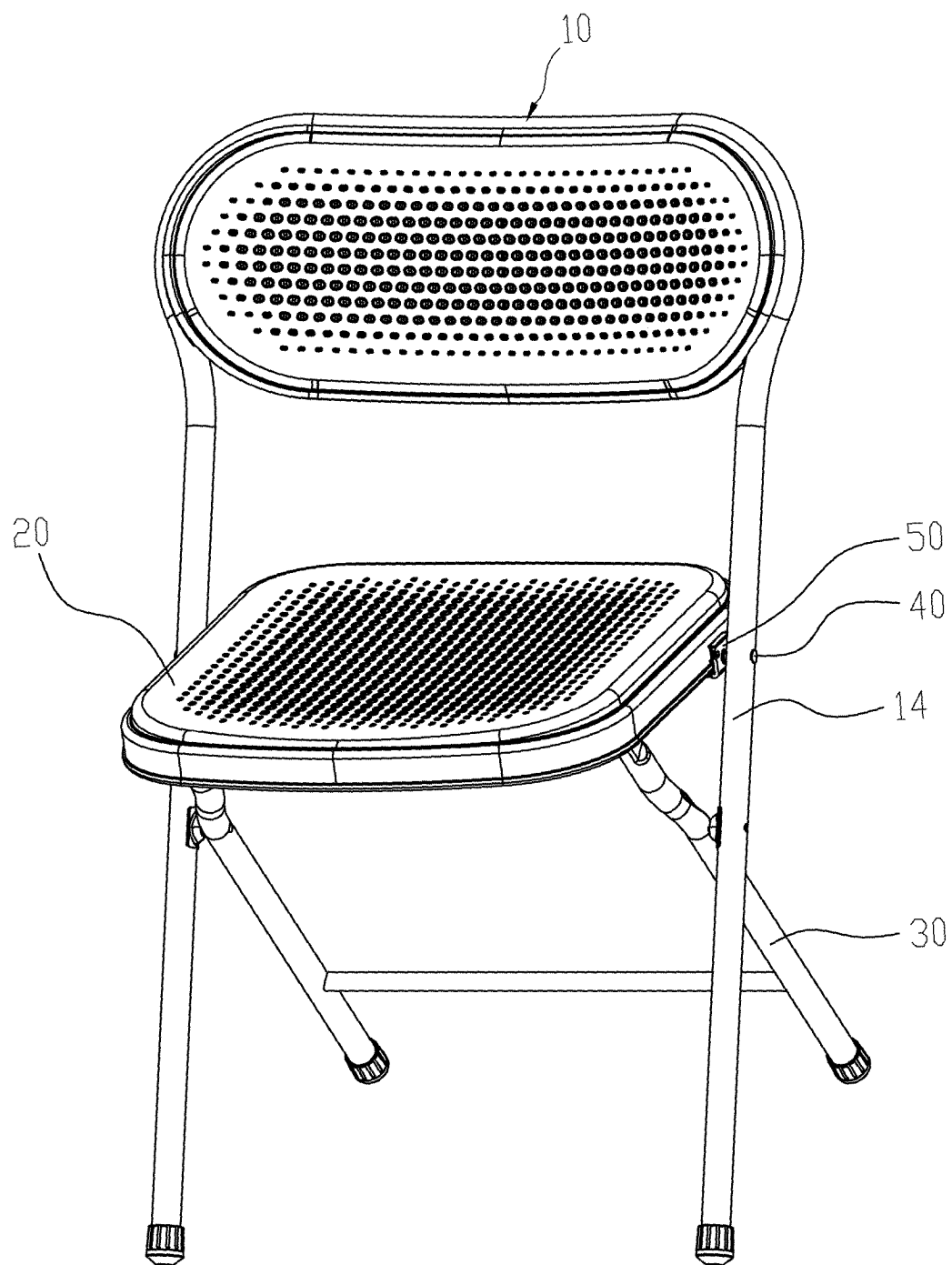


FIG. 8

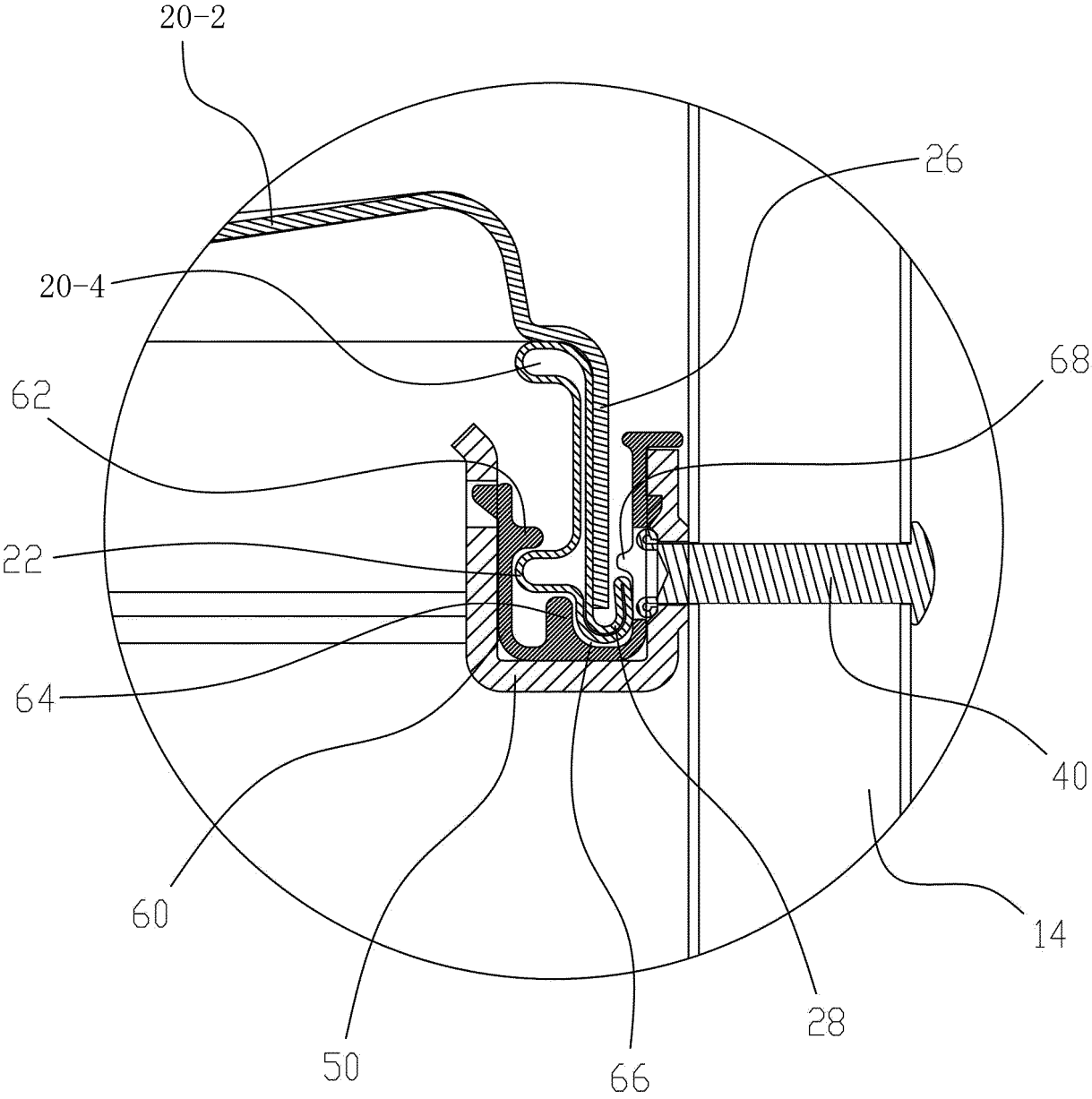


FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/072947

A. CLASSIFICATION OF SUBJECT MATTER

A47C7/00(2006.01)i; A47C7/40(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)

CNTXT; VEN; ENTXTC; ENTXT: 凹槽, 弹性卡, 弹性凸, 卡槽, 塑胶卡, 塑胶凸, 凸, 橡胶卡, 橡胶凸, 椅子, 折叠, chair, back, backrest, plastic, groove, convex, slid+, fold+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 112535371 A (NEW TEC INTEGRATION (XIAMEN) CO., LTD.) 23 March 2021 (2021-03-23) description, paragraphs 0024 and 0032-0037, and figures 10-11	1-12
Y	CN 202135994 U (CHEN MIN) 08 February 2012 (2012-02-08) description, paragraph 0030, and figures 2-3	1-12
Y	CN 2678465 Y (LENG LUHAO) 16 February 2005 (2005-02-16) description, page 3, line 19 to page 4, line 26, and figures 1-10	5-12
PX	CN 217408279 U (NEW TEC INTEGRATION (XIAMEN) CO., LTD.) 13 September 2022 (2022-09-13) description, paragraphs 0023-0033, and figures 1-7	1-4

☐ 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
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"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 12 June 2023	Date of mailing of the international search report 13 June 2023
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.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2023/072947

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)		Publication date (day/month/year)
CN	112535371	A	23 March 2021	None		
CN	202135994	U	08 February 2012	WO	2012167651 A1	13 December 2012
CN	2678465	Y	16 February 2005	None		
CN	217408279	U	13 September 2022	None		