(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 297 000 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
27.12.2023 Bulletin 2023/52

(21) Application number: **23155573.1**

(22) Date of filing: **08.02.2023**

(51) International Patent Classification (IPC):
G09F 9/30 *(2006.01)* ***G09F 9/33*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
G09F 9/301; G09F 9/33

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

(30) Priority: **23.06.2022 CN 202221590018 U**

(71) Applicant: **Unilumin Group Co., Ltd.**
Shenzhen, Guangdong 518103 (CN)

(72) Inventors:
- **Zeng, Junzhang**
  Shenzhen, 518103 (CN)
- **Yu, Gang**
  Shenzhen, 518103 (CN)
- **Tian, Shoujin**
  Shenzhen, 518103 (CN)

(74) Representative: **Monteiro Alves, Inês**
Alameda Dos Oceanos, Nº 41K-21
Parque das Nações
1990-207 Lisboa (PT)

(54) MECHANISM FOR ADJUSTING CURVATURE OF DISPLAY SCREEN AND DISPLAY SCREEN

(57) Disclosed are a mechanism for adjusting the curvature of the display screen and a display screen. The mechanism for adjusting the curvature of the display screen includes a sliding (1), a fixing base (2), a connecting base (3) and a handle (4), the sliding (1) is slidably sleeved on the fixing base (2), the fixing base (2) and the sliding (1) are respectively hinged with a connecting base (3) in a direction away from each other; the handle (4) is connected to the fixing base (2), a limiting assembly (5) for abutting the sliding (1) is provided inside the handle (4); a movable pressing piece (41) is further provided on the handle (4), and the pressing piece (41) is configured to drive the limiting assembly (5) away from the sliding (1).

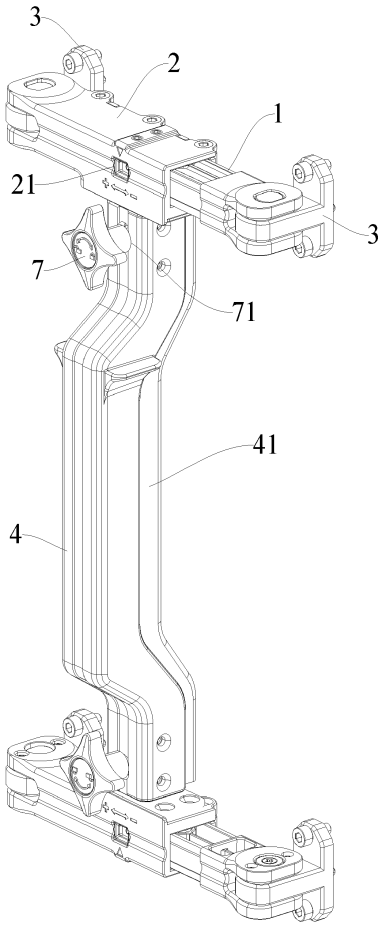

FIG. 1

EP 4 297 000 A1

Description

TECHNICAL FIELD

[0001] The present disclosure relates to the technical field of light-emitting diode (LED) display, and in particular, to a mechanism for adjusting a curvature of a display screen and a display screen.

BACKGROUND

[0002] In recent years, with the rapid development of LED display technology, the LED display is more popular and widely used, and users' requirements for LED display become higher and higher. In some occasions, a curved screen is required for the best display effect, the existing splicing method of the curved screen is to firstly fix multiple LED display units on a cabinet to form an LED display module, and then use an arc lock on the cabinet to change a connection angle of the adjacent LED display modules, to realize the splicing of curved screens. However, the arc lock is difficult to be operated and takes a lot of time.

SUMMARY

[0003] The technical problem to be solved by the present disclosure is to provide a mechanism for adjusting the curvature of the display screen with a new structure and a display screen thereof.

[0004] In order to address the above technical problem, the present disclosure provides a mechanism for adjusting the curvature of the display screen, including: a sliding piece, a fixing base, connecting bases and a handle, the sliding piece is slidably sleeved on the fixing base, an end of the fixing base away from the sliding piece is hinged with one connecting base, and an end of the sliding piece away from the fixing base is hinged with another connecting base; the handle is connected to the fixing base, provided inside with a limiting assembly for abutting against the sliding piece, and provided with a movable pressing piece, and the pressing piece is configured to drive the limiting assembly to be away from the sliding piece.

[0005] In an embodiment, the limiting assembly includes a first elastic piece and a limiting rod, one end of the first elastic piece is abutted against the limiting rod, another end of the first elastic piece is abutted against the handle to drive one end of the limiting rod into the fixing base for abutting against the sliding piece.

[0006] In an embodiment, a side of the pressing piece close to the handle is provided with a driving slope, and the limiting rod is provided with a fitting portion fit with the pressing piece, and the driving slope is slidably abutted against the fitting portion, and an end of the driving slope away from the pressing piece is sloped toward the fixing base.

[0007] In an embodiment, the side of the pressing piece close to the handle is provided with two driving bumps, and a surface of each driving bump away from the fixing base is the driving slope, and the limiting assembly is provided between the two driving bumps.

[0008] In an embodiment, the mechanism for adjusting the curvature of the display screen further includes a second elastic piece, one end of the second elastic piece is abutted against the handle, another end of the second elastic piece is abutted against the pressing piece to drive the pressing piece to move away from the handle.

[0009] In an embodiment, the mechanism for adjusting the curvature of the display screen further includes a locking piece, the locking piece penetrates through a side wall of the handle and is threadedly connected to the limiting assembly, and the locking piece is further provided with an abutting boss for abutting against the handle.

[0010] In an embodiment, a side of the sliding piece is provided with a plurality of limiting grooves fit with an end of the limiting rod, and the plurality of limiting grooves are provided at intervals in a sliding direction of the sliding piece.

[0011] In an embodiment, the mechanism for adjusting the curvature of the display screen further includes a rack detachably connected to the sliding piece, the limiting groove is provided on the rack.

[0012] In an embodiment, the side of the sliding piece is provided with an angle mark, and a window is opened on a side wall of the fixing base corresponding to the angle mark.

[0013] In order to address the above technical problem, the present disclosure further provides a display screen, including: an LED display module, a control box, a mounting frame and the mechanism for adjusting the curvature of the display screen, the control box is fixed to the LED display module, the mounting frame is fixed to an edge of the LED display module, and one connecting base is fixed to the mounting frame, another connecting base is fixed to the control box.

[0014] In technical solutions of the present disclosure, the mechanism for adjusting the curvature of the display screen can adjust the curvature of the LED display module through a relative sliding distance between the sliding piece and the fixing base, to obtain curved screens with different curvatures, the adjustment is more convenient, and a versatility of the LED display module is improved. The two connecting bases are respectively hinged with the sliding piece and the fixing base, which is conducive to a relative sliding between the sliding piece and the fixing base, and improves the flexibility of adjusting the curvature of the display screen module; the limiting assembly is abutted against the sliding piece to prevent the sliding piece from sliding relative to the fixing base, so that the mechanism for adjusting the curvature of the display screen turns to a locked state, to fix the curvature of the LED display module and improve the stability of the curved screen. The movable pressing piece is pressed to drive the limiting assembly to separate from the sliding piece, so that the sliding piece can slide relative to the fixing base to adjust the curvature of the LED

display module, and the operation is simple and convenient.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

FIG. 1 is an overall schematic structural view of a mechanism for adjusting a curvature of a display screen according to an embodiment of the present disclosure.

FIG. 2 is a schematic cross-sectional view of the mechanism for adjusting the curvature of the display screen according to an embodiment of the present disclosure.

FIG. 3 is a partial exploded view of the mechanism for adjusting the curvature of the display screen according to an embodiment of the present disclosure.

FIG. 4 is another partial exploded view of the mechanism for adjusting the curvature of the display screen according to an embodiment of the present disclosure.

FIG. 5 is a rear view of the mechanism for adjusting the curvature of the display screen according to an embodiment of the present disclosure.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0016] As shown in FIG. 1 to FIG. 5, the first embodiment of the present disclosure provides a mechanism for adjusting the curvature of the display screen, including a sliding piece 1, a fixing base 2, a connecting base 3 and a handle 4, the sliding piece 1 is slidably sleeved on the fixing base 2, an end of the sliding piece 1 away from the fixing base 2 is hinged with one connecting base 3, and an end of the sliding piece 1 away from the fixing base 2 is hinged with another connecting base 3; the handle 4 is connected to the fixing base 2, provided inside with a limiting assembly 5 for abutting against the sliding piece 1, and provided with a movable pressing piece 41, and the pressing piece is configured to drive the limiting assembly 5 away from the sliding piece 1. Each of two ends of the handle 4 is connected with a fixing base 2, and the fixing base 2, the sliding piece 1 and the limiting assemblies 5 correspond to each other one by one. When in use, the two connecting bases 3 are connected to the LED display module 81 by screws. An end of the sliding piece 1 away from the fixing base 2 is provided with a limiting pins 12, and an end of the fixing base 2 away from the sliding piece 1 is provided with a limiting pins 12. The connecting base 3 is provided with a curved groove 31 that fits with the limiting pins 12 to limit the rotation stroke of the connecting base 3. When the curvature of the LED display module 81 needs change, force is applied to the pressing piece 41 to make the pressing piece 41 to move in a direction close to the handle 4, to drive the limiting assembly 5 to retract into the handle 4, that is, the limiting assembly 5 is no longer abutted against the sliding piece 1, and then the sliding piece 1 can be pulled to make the two connecting bases 3 to move away from or close to each other, the curvature of the LED display module 81 can thus be adjusted, then the pressing piece 41 can be released, so that the limiting assembly 5 can extend into the fixing base 2 and abut against the sliding piece 1, the sliding piece 1 is prevented from sliding relative to the fixing base 2, to lock the curvature of the LED display module 81.

[0017] As shown in FIG. 2 to FIG. 3, the limiting assembly 5 includes a first elastic piece 51 and a limiting rod 52, one end of the first elastic piece 51 is abutted against the limiting rod 52, another end of the first elastic piece is abutted against the handle 4 to drive one end of the limiting rod 52 into the fixing base 2 for abutting against the sliding piece 1. In the embodiment, the first elastic piece 51 is a spring. When the pressing piece 41 is forced to move towards the handle 4, the limiting rod 52 will be driven by the pressing piece 41 to retract into the handle 4, and the first elastic piece 51 is pressed at this time. When the pressing piece 41 is released, the first elastic piece 51 will apply an elastic force on the limiting rod 52 to drive one end of the limiting rod 52 to extend into the fixing base 2 until it abuts against the sliding piece 1, so that the limiting rod 52 automatically resets.

[0018] As shown in FIG. 3, a side of the pressing piece 41 close to the handle 4 is provided with a driving slope 421, and the limiting assembly 5 is provided with a fitting portion 521 fit with the pressing piece 41, the driving slope 421 is slidably abutted against the fitting portion 521, and an end of the driving slope 421 away from the pressing piece 41 is sloped toward the fixing base 2. When the pressing piece 41 moves towards the handle 4, the driving slope 421 will abut against the fitting portion 521, to apply a force in a direction away from the fixing base 2 on the fitting portion 521, to drive the limiting rod 52 to separate from the sliding piece 1, and the curvature of the display screen can be changed by adjusting the sliding piece 1. The driving connection between the pressing piece 41 and the limiting assembly 5 is simple, which is beneficial to improve the adjustment efficiency and reduce the production cost of the mechanism for adjusting the curvature of the display screen.

[0019] The side of the pressing piece 41 close to the handle 4 is provided with two driving bumps 42, and a side of the driving bump 42 away from the fixing base 2 is the driving slope 421, and the limiting assembly 5 is provided between the two driving bumps 42. In the embodiment, the fitting portion 521 is a pin shaft, and the pin shaft radially penetrates through the limiting rod 52, and each of the driving slopes 421 on the two driving bumps 42 can be slidingly abutted against one end of the pin shaft. When the pressing piece 41 is forced to move towards the handle 4, the driving slope 421 on the pressing piece 41 is abutted against the fitting portion 521 to apply a component force on the limiting rod 52 in the direction away from the fixing base 2, to drive the

limiting rod 52 to retract into the handle 4. Two driving bumps 42 apply force to the limiting assembly 5 at the same time, which can balance the force on both sides of the limiting assembly 5, so that it is conducive to preventing the limiting assembly 5 from deviation during the movement, to cause that the limiting assembly 5 cannot precisely abut against a preset position on the sliding piece 1.

[0020] As shown in FIG. 3, the mechanism for adjusting the curvature of the display screen further includes a second elastic piece 43, one end of the second elastic piece 43 is abutted against the handle 4, another end of the second elastic piece 43 is abutted against the pressing piece 41 to drive the pressing piece 41 to move away from the handle 4. In the embodiment, the second elastic piece 43 is a spring. The handle 4 and the pressing piece 41 are limited by a screw, and the second elastic piece 43 is sleeved on the screw for guidance. When the pressing piece 41 is forced to move towards the handle 4, the second elastic piece 43 is pressed; when the pressing piece 41 is not forced to move toward the handle 4, the second elastic piece 43 applies elastic force to drive the pressing piece 41 to move and reset.

[0021] As shown in FIG. 1 and FIG. 2, the mechanism for adjusting the curvature of the display screen further includes a locking piece 7, the locking piece 7 penetrates through a side wall of the handle 4 and is threadedly connected to the limiting assembly 5, the locking piece 7 is further provided with an abutting boss 71 for abutting against the handle 4. The locking pieces 7 correspond to the limiting assembly 5 one by one. A threaded hole fit with the locking piece 7 is provided on the limiting rod 52. The handle 4 is provided with a long hole for the locking piece 7 to pass through, and the length direction of the long hole is parallel to the sliding direction of the limiting rod 52, so that the locking piece 7 can follow the limiting rod 52 to move. A knob is provided at the end of the locking piece 7 away from the limiting rod 52, which is convenient for the user to grasp, and increases the rotational torque, reduces the difficulty of operation, and improves the user experience and the knob forms the abutting boss 71. When it is necessary to lock the relative positional relationship between the limiting rod 52 and the handle 4 to keep the limiting rod 52 in a state of abutting against the sliding piece 1 or away from the sliding piece 1, it is only necessary to rotate the locking piece 7, so that the abutting boss 71 on the locking piece 7 moves in a direction close to the handle 4 until abutting against the surface of the handle 4, then the friction between the abutting boss 71 and the handle 4 can be used to prevent the limiting rod 52 from moving continuously, so that the mechanism for adjusting the curvature of the display screen can keep in a locked state or freely adjustable state.

[0022] As shown in FIG. 4, a side of the sliding piece 1 is provided with a plurality of limiting grooves 61 that fit with the ends of the limiting rods 52, and the plurality of limiting grooves 61 are provided at intervals along a sliding direction of the sliding piece. By snapping the limiting rod 52 into the limiting groove 61 at different positions, the sliding piece 1 can be kept different lengths extending out from the fixing base 2, so that the display screen can maintain the current curvature.

[0023] The mechanism for adjusting the curvature of the display screen further includes a rack 6 detachably connected to the sliding piece 1, and the limiting groove 61 is provided on the rack 6. An accommodating groove for accommodating the rack 6 is provided on the side of the sliding piece 1, and the rack 6 is screwed into the accommodating groove. The limiting groove 61 is provided on the rack 6, so that the rack 6 and the sliding piece 1 are produced and processed separately, thus the rack 6 and the sliding piece 1 can be made of different materials to meet the needs of different structural strengths, which is conducive to reducing the difficulty of production.

[0024] As shown in FIG. 1 and FIG. 4, an angle mark 11 is provided on the side of the sliding piece 1, and a window 21 is opened on the side wall of the fixing base 2 corresponding to the angle mark 11. The window 21 is opened on the side wall of the fixing base 2 away from the LED display module 81 for easy observation by the user. The angle mark 11 can make the user intuitively know the curvature of the adjusted LED display module 81, the adjustment is more convenient, to improve the adjustment efficiency.

[0025] As shown in FIG. 5, the embodiment further provides a display screen, including an LED display module 81, a control box 82, a mounting frame 83, and the mechanism for adjusting the curvature of the display screen, and the control box 82 is fixed to the LED display module 81, the central axis of the control box 82 is parallel to the mounting frame 83, and the mounting frame 83 is fixed to an edge of the LED display module 81; the two sides of each control box 82 are respectively provided with a mechanism for adjusting the curvature of the display screen, and the connecting base 3 hinged with the fixing base 2 or the sliding piece 1 on each mechanism for adjusting the curvature of the display screen is fixed to the mounting frame 83 and the control box 82 respectively.

[0026] In summary, the present disclosure provides a display screen arc adjustment, which can adjust the curvature of the LED display module through the relative sliding distance between the sliding piece and the fixing base, to obtain curved screens with different curvatures, the adjustment is more convenient, and a versatility of the LED display module is improved. The two connecting bases are respectively hinged with the sliding piece and the fixing base, which is conducive to the relative sliding between the sliding piece and the fixing base, and improves the flexibility of adjusting the curvature of the display screen module; by extending from the handle, the limiting assembly is abutted against the sliding piece to prevent the sliding piece from sliding relative to the fixing base, so that the mechanism for adjusting the curvature

of the display screen turns to a locked state, to fix the curvature of the LED display module and improve the stability of the curved screen. The movable pressing piece is pressed to drive the limiting assembly to be retracted into the handle, so that the sliding piece can slide relative to the fixing base to adjust the curvature of the LED display module, and the operation is simple and convenient. The first elastic piece can drive the limiting rod to automatically reset; the second elastic piece can drive the pressing piece to automatically reset; the locking piece can keep the mechanism for adjusting the curvature of the display screen in a locked state or a free adjustment state. The angle mark can make the user intuitively know the curvature of the adjusted LED display module, the adjustment is more convenient, which is conducive to improving the adjustment efficiency.

[0027] The above descriptions are only the embodiments of the present disclosure and are not intended to limit the scope of the present disclosure. All equivalent transformations made by using the contents of the description and drawings of the present disclosure, or direct or indirect application in the relevant technical fields, are included in the scope of the present disclosure.

Claims

1. A mechanism for adjusting a curvature of a display screen, **characterized by** comprising:

   a sliding piece (1);
   a fixing base (2);
   connecting bases (3); and
   a handle (4),
   wherein the sliding piece (1) is slidably sleeved on the fixing base (2), an end of the fixing base (2) away from the sliding piece (1) is hinged with one connecting base (3), and an end of the sliding piece (1) away from the fixing base (2) is hinged with another connecting base (3);
   the handle (4) is connected to the fixing base (2), provided inside with a limiting assembly (5) for abutting against the sliding piece (1), and provided with a movable pressing piece (41), and the pressing piece (41) is configured to drive the limiting assembly (5) to be away from the sliding piece (1).

2. The mechanism for adjusting the curvature of the display screen of claim 1, wherein the limiting assembly (5) comprises a first elastic piece (51) and a limiting rod (52);
   one end of the first elastic piece (51) is abutted against the limiting rod (52), another end of the first elastic piece (51) is abutted against the handle (4) to drive one end of the limiting rod (52) into the fixing base (2) for abutting against the sliding piece (1).

3. The mechanism for adjusting the curvature of the display screen of claim 2, wherein a side of the pressing piece (41) close to the handle (4) is provided with a driving slope (421), and the limiting rod (52) is provided with a fitting portion (521) fit with the pressing piece (41), and the driving slope (421) is slidably abutted against the fitting portion (521), and an end of the driving slope (421) away from the pressing piece (41) is sloped toward the fixing base (2).

4. The mechanism for adjusting the curvature of the display screen of claim 3, wherein the side of the pressing piece (41) close to the handle (4) is provided with two driving bumps (42), and a surface of each driving bump (42) away from the fixing base (2) is the driving slope (421), and the limiting assembly (5) is provided between the two driving bumps (42).

5. The mechanism for adjusting the curvature of the display screen of claim 1 to 4, further comprising:

   a second elastic piece (43),
   wherein one end of the second elastic piece (43) is abutted against the handle (4), and another end of the second elastic piece (43) is abutted against the pressing piece (41) to drive the pressing piece (41) to move away from the handle (4).

6. The mechanism for adjusting the curvature of the display screen of claim 1 to 5, further comprising:

   a locking piece (7),
   wherein the locking piece (7) penetrates through a side wall of the handle (4) and is threadedly connected to the limiting assembly (5), and the locking piece (7) is further provided with an abutting boss (71) for abutting against the handle (4).

7. The mechanism for adjusting the curvature of the display screen of claim 2, wherein a side of the sliding piece (1) is provided with a plurality of limiting grooves fit with an end of the limiting rod (52), and the plurality of limiting grooves are provided at intervals in a sliding direction of the sliding piece (1).

8. The mechanism for adjusting the curvature of the display screen of claim 7, further comprising:

   a rack (6) detachably connected to the sliding piece (1),
   wherein the limiting groove is provided on the rack (6).

9. The mechanism for adjusting the curvature of the display screen of any one of claims 1 to 8, wherein the side of the sliding piece (1) is provided with an angle mark (11), and a window (21) is opened on a

side wall of the fixing base (2) corresponding to the angle mark (11).

10. A display screen, **characterized by** comprising:

an LED display module (81);
a control box (82);
a mounting frame (83); and
the mechanism for adjusting the curvature of the display screen of any one of claims 1 to 9;
wherein the control box (82) is fixed to the LED display module (81), the mounting frame (83) is fixed to an edge of the LED display module (81), and one connecting base (3) is fixed to the mounting frame (83), and another connecting base (3) is fixed to the control box (82).

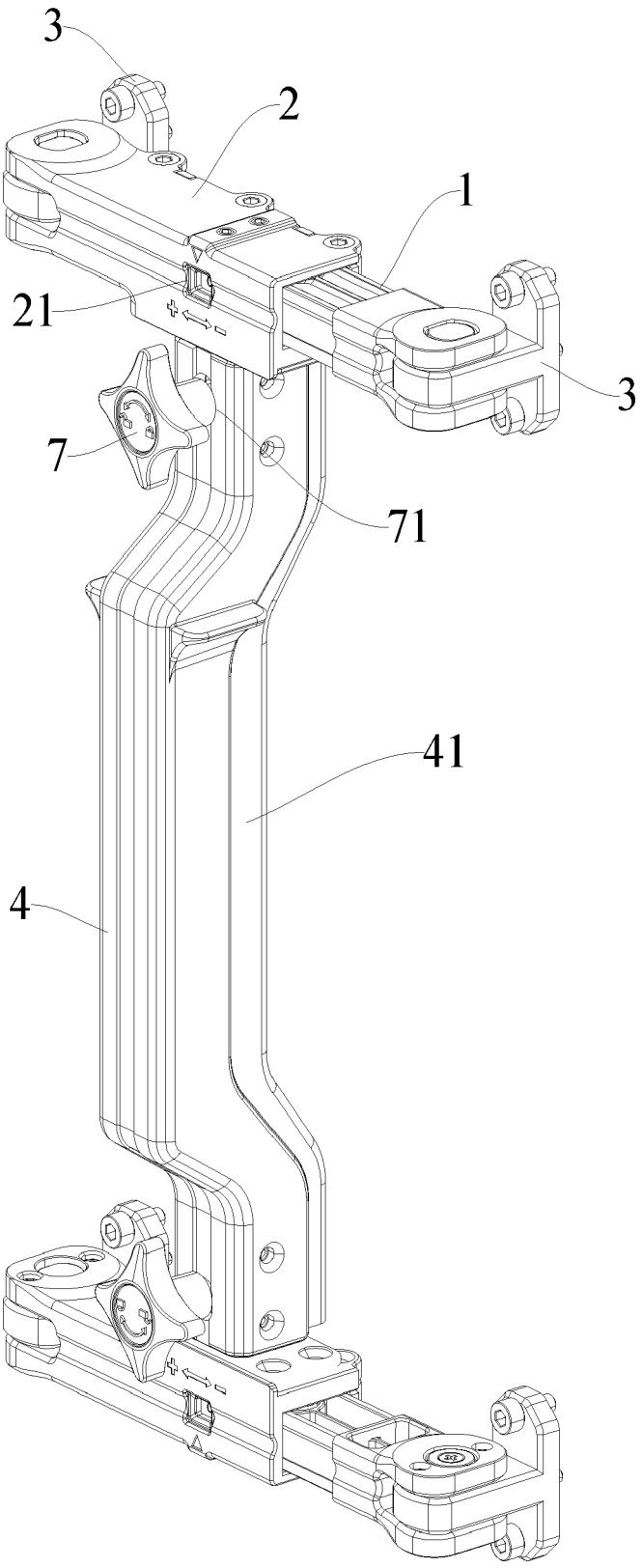

FIG. 1

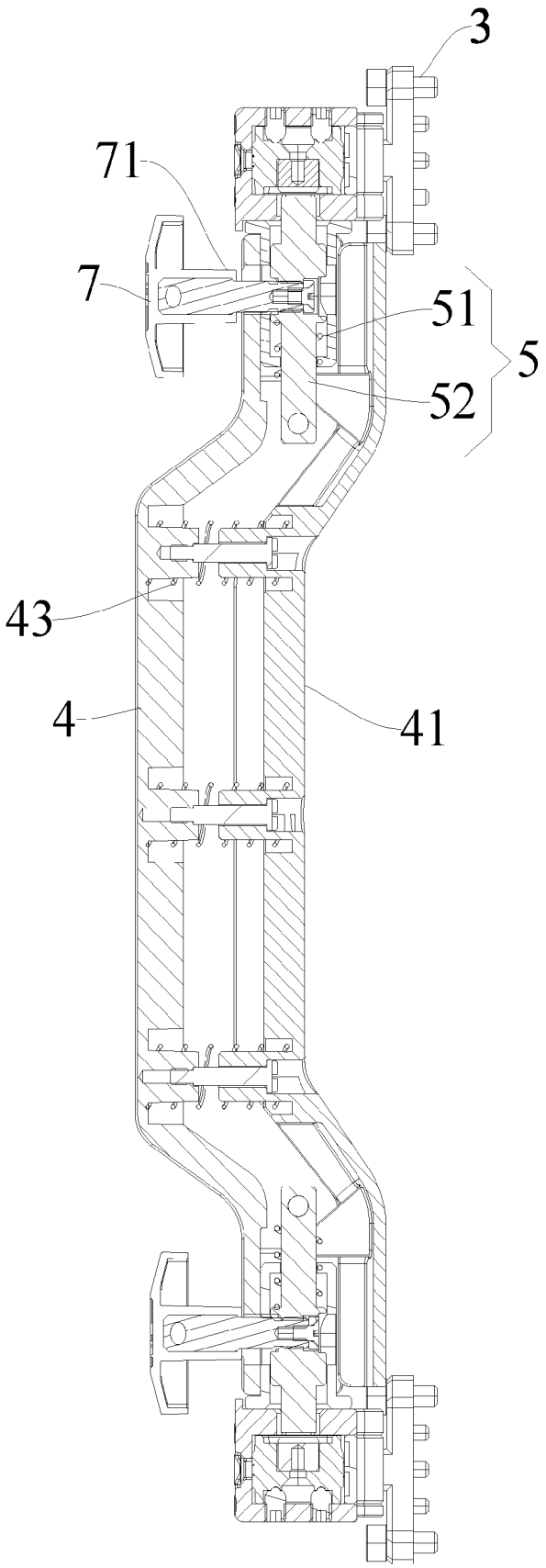

FIG. 2

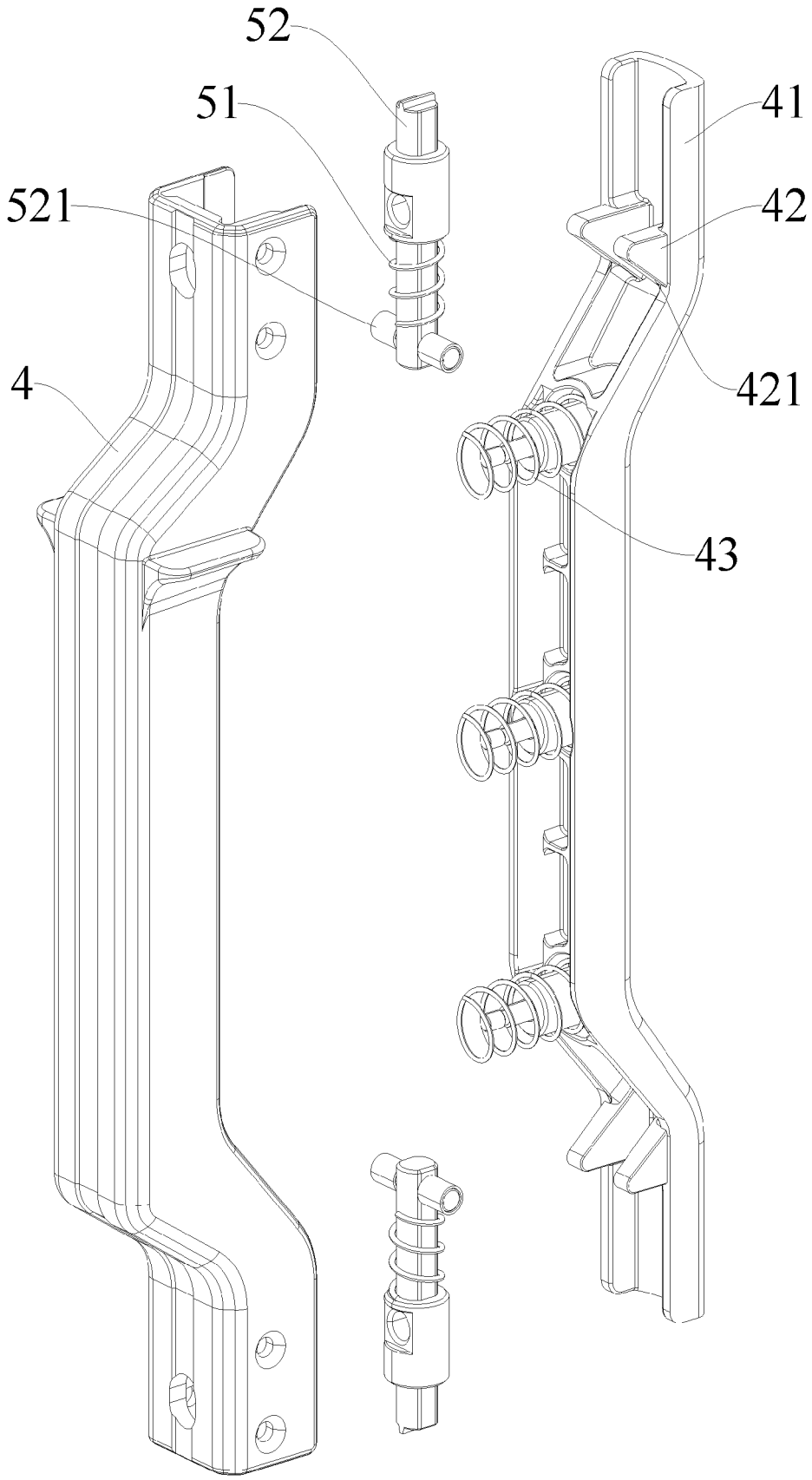

FIG. 3

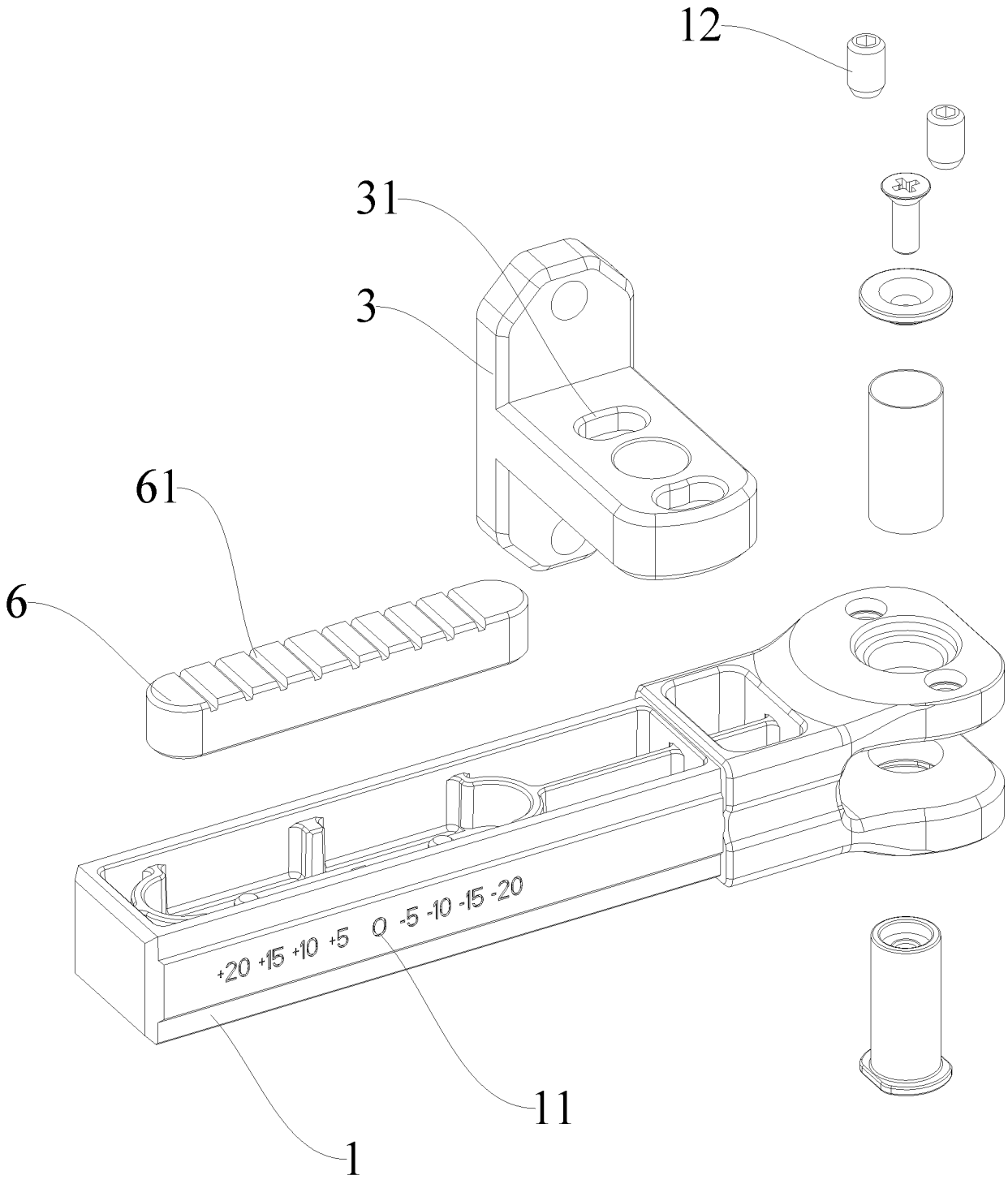

FIG. 4

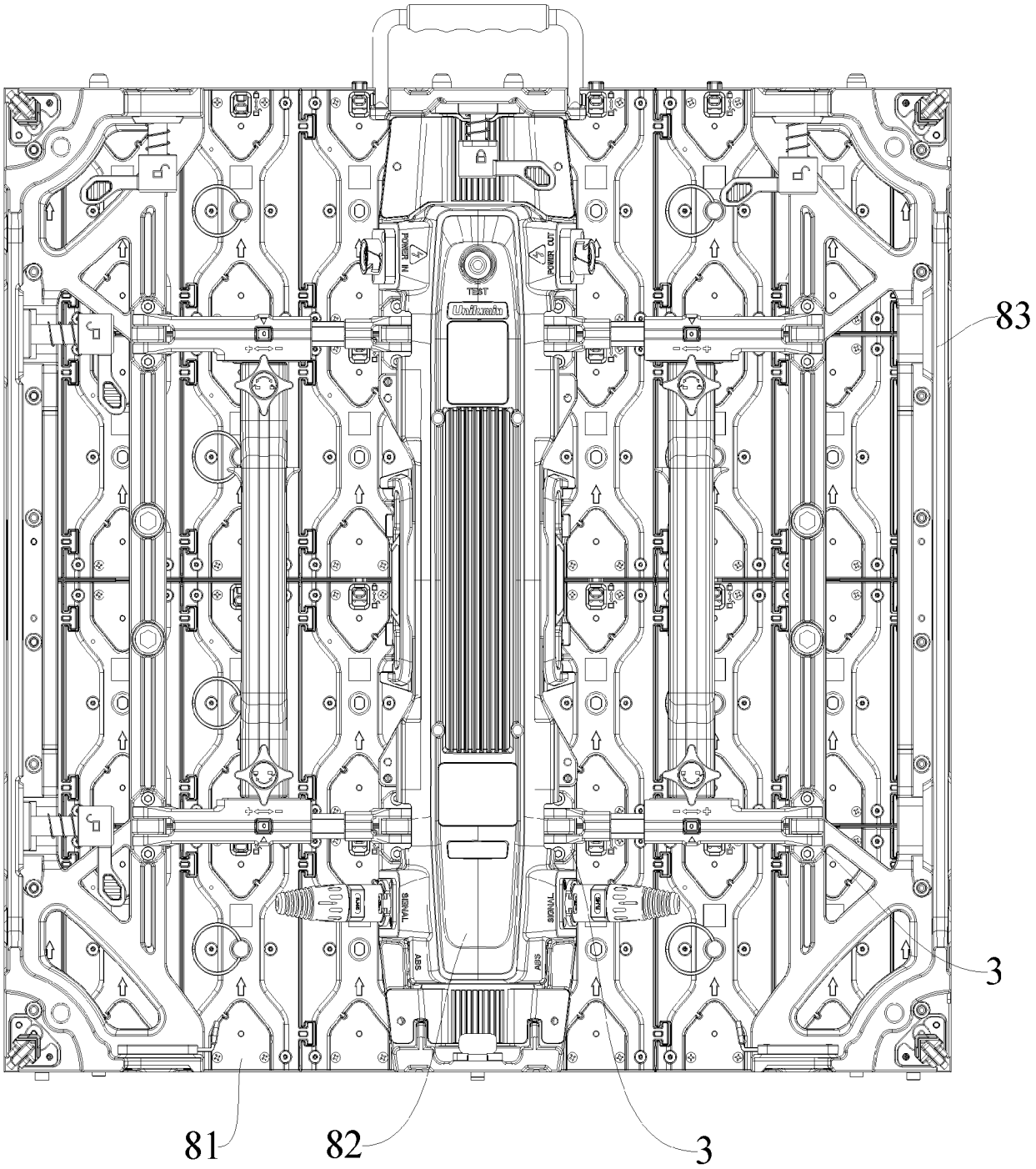

FIG. 5

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 23 15 5573

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	CN 104 008 707 B (HEBEI LIXIANG HUIKE ELECTRONIC EQUIPMENT CO LTD) 7 September 2016 (2016-09-07)	1-4,6,9, 10	INV. G09F9/30 G09F9/33
A	* abstract; figures 1-11 *	5,7,8	
X	WO 2021/217954 A1 (ROE VISUAL CO LTD [CN]) 4 November 2021 (2021-11-04) * abstract; figures 1-5 *	1-10	
A	CN 204 926 690 U (SHENZHEN AOTO ELECTRONICS CO) 30 December 2015 (2015-12-30) * abstract; figures 1-13 *	1-10	
A	CN 109 147 591 A (SHENZHEN GLOSHINE TECH CO LTD) 4 January 2019 (2019-01-04) * abstract; figures 1-18 *	1-10	
A	CN 102 829 305 A (SHENZHEN TOP TECHNOLOGY CO LTD) 19 December 2012 (2012-12-19) * abstract; figures 1-11 *	1-10	
			TECHNICAL FIELDS SEARCHED (IPC) G09F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	27 October 2023	Zanna, Argini

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 23 15 5573

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

27-10-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 104008707 B	07-09-2016	NONE	
WO 2021217954 A1	04-11-2021	CN 111402749 A	10-07-2020
		WO 2021217954 A1	04-11-2021
CN 204926690 U	30-12-2015	NONE	
CN 109147591 A	04-01-2019	NONE	
CN 102829305 A	19-12-2012	NONE	

EPO FORM P0459

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