

(19)



(11)

EP 4 242 404 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
13.09.2023 Bulletin 2023/37

(51) International Patent Classification (IPC):
E05D 3/02 (2006.01) E05D 3/18 (2006.01)

(21) Application number: **22187942.2**

(52) Cooperative Patent Classification (CPC):
**E05D 3/02; E05D 3/18; E05Y 2800/10;
E05Y 2900/302**

(22) Date of filing: **29.07.2022**

(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 MK MT NL NO
PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(72) Inventors:
• **ZHAO, Jianxun**
Foshan, Guangdong 528311 (CN)
• **ZHANG, Junjie**
Foshan, Guangdong 528311 (CN)
• **ZHU, Wenbin**
Foshan, Guangdong 528311 (CN)

(30) Priority: **09.03.2022 CN 202220523534 U**
09.03.2022 CN 202210236070

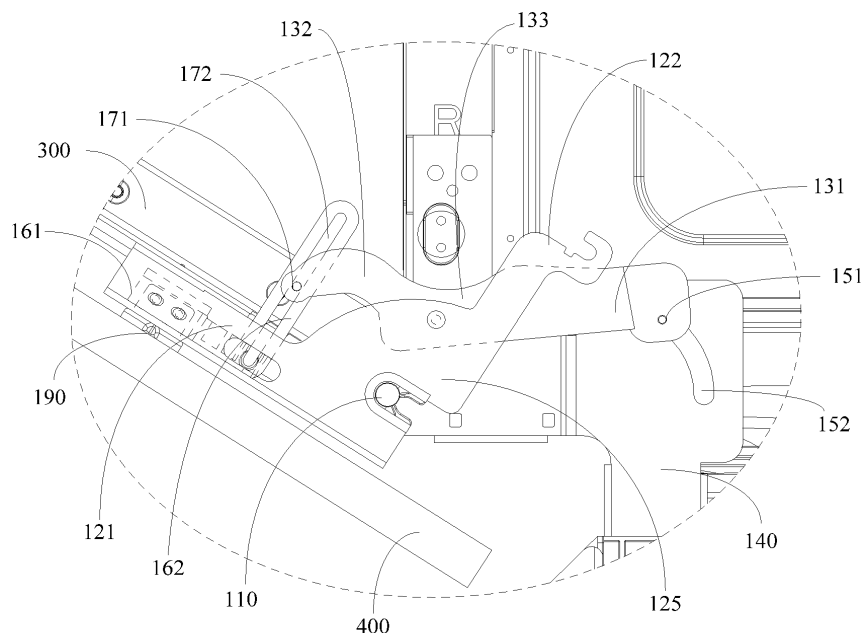
(74) Representative: **Whitlock, Holly Elizabeth Ann et al**
Maucher Jenkins
Seventh Floor Offices
Artillery House
11-19 Artillery Row
London SW1P 1RT (GB)

(71) Applicant: **Foshan Shunde Midea Washing
Appliances Mfg. Co., Ltd.**
Foshan, Guangdong 528311 (CN)

(54) HINGE AND ELECTRICAL DEVICE

(57) Disclosed are a hinge and an electrical device. The hinge includes a rotating shaft; a hinge arm provided on the rotating shaft and being rotatable relative to the main body, the hinge arm being connected the door body to the main body; a drive arm rotatably connected to the hinge arm; a mounting member, a first guide mechanism being provided between the mounting member and the

drive arm; and a moving member connected to the panel and being movable relative to the door body, a second guide mechanism being provided between the moving member and the drive arm. The first guide mechanism and the second guide mechanism guide the drive arm to drive the panel to move relative to the door body in response to the door body being rotated.

**FIG. 4**

Description**TECHNICAL FIELD**

5 **[0001]** The present disclosure relates to the field of electrical appliances, in particular to a hinge suitable for a front panel of an electrical appliance and an electrical device including the hinge.

BACKGROUND

10 **[0002]** In some embedded electrical appliances with revolving doors, decorative hanging boards are usually installed on the revolving doors, so that the overall style of the electrical appliance is more compatible with the surrounding environment.

[0003] Taking a dishwasher as an example, the built-in dishwasher is usually embedded in the cabinet, and a decorative hanging board covering the front of the dishwasher is installed on the outside of the revolving door.

15

SUMMARY

[0004] The main purpose of the present disclosure is to provide a hinge and an electrical device including the hinge, so that the outer side panel of the door body can move up relative to the door body during the opening process of the revolving door.

20

[0005] In order to achieve the objective, the present disclosure provides a hinge connected to a door body and a main body to make the door body rotatable relative to the main body, a movable panel is stacked on one side of the door body, and the panel moves relative to the door body in response to the door body being rotated, the hinge includes:

25

a rotating shaft;

a hinge arm provided on the rotating shaft and being rotatable relative to the main body, the hinge arm being connected the door body to the main body;

a drive arm rotatably connected to the hinge arm;

a mounting member, a first guide mechanism being provided between the mounting member and the drive arm; and

30

a moving member connected to the panel and being movable relative to the door body, a second guide mechanism being provided between the moving member and the drive arm;

the first guide mechanism and the second guide mechanism guide the drive arm to drive the panel to move relative to the door body in response to the door body being rotated.

35

[0006] In an embodiment, when the door body is rotated, the drive arm moves along with rotation of the hinge arm, and the first guide mechanism restricts the drive arm from rotating along with the rotation of the hinge arm.

[0007] In an embodiment, rotational connection between the drive arm and the hinge arm is spaced from the rotating shaft, and the drive arm revolves around the rotating shaft along with the rotation of the hinge arm in response to the door body being rotated.

40

[0008] In an embodiment, the drive arm has a first drive end, a second drive end and a middle section between the first drive end and the second drive end, the first guide mechanism is provided between the first drive end and the mounting member, the second guide mechanism is provided between the second drive end and the moving member, and the middle section is rotatably connected to the hinge arm.

[0009] In an embodiment, when the door body is rotated to open the main body, at least the second drive end approaches the door body.

45

[0010] In an embodiment, the first guide mechanism includes a first guide pin and a first guide groove, one of the drive arm and the mounting member is provided with the first guide pin, the other one of the drive arm and the mounting member is provided with the first guide groove, the first guide pin is inserted into the first guide groove, and the first guide pin moves along an extension direction of the first guide groove in response to the door body being rotated.

50

[0011] In an embodiment, the first guide groove extends from the main body toward the door body.

[0012] In an embodiment, the second guide mechanism makes the moving member and the drive arm rotate relative to each other in response to the door body being rotated, to guide the moving member to move along with movement of the drive arm.

55

[0013] In an embodiment, the second guide mechanism includes a second guide pin and a second guide groove, one of the drive arm and the mounting member is provided with the second guide pin, the other one of the drive arm and the mounting member is provided with the second guide groove, the second guide pin is inserted into the second guide groove, and the second guide pin moves along an extension direction of the second guide groove in response to the door body being rotated.

[0014] In an embodiment, the second guide groove extends along a stacking direction between the panel and the door body.

[0015] In an embodiment, the moving member is slidably connected to the hinge arm, to make the panel move relative to the door body.

[0016] In an embodiment, the hinge arm includes a first arm connected to the door body, the first arm is provided with a sliding groove, and the moving member is slidably provided in the sliding groove.

[0017] In an embodiment, the moving member includes a sliding portion and a guide portion connected to the sliding portion, the sliding portion is slidably installed in the sliding groove, the sliding portion is connected to the panel, and the guide portion protrudes outward from a notch of the sliding groove, and is connected to the drive arm through the second guide mechanism.

[0018] In an embodiment, the first arm is provided with an escape groove on a side facing the panel, and the moving member is connected to the panel at the escape groove.

[0019] In an embodiment, the hinge arm includes a first arm and a second arm, the first arm is connected to the door body, and the second arm is elastically connected to the main body.

[0020] In an embodiment, an included angle is formed between the first arm and the second arm, a connection portion is formed at an intersection of the first arm and the second arm, and the connection portion is connected to the rotating shaft.

[0021] In an embodiment, the rotating shaft connects the mounting member and the hinge arm; and/or the mounting member is provided on the main body.

[0022] In order to achieve the above objective, the present disclosure provides an electrical device, including a hinge, the hinge including:

a rotating shaft;

a hinge arm provided on the rotating shaft and being rotational relative to the main body, the hinge arm being configured to connect the door body and the main body;

a drive arm rotatably connected to the hinge arm;

a mounting member, a first guide mechanism being provided between the mounting member and the drive arm; and a moving member connected to the panel and being movable relative to the door body, a second guide mechanism being provided between the moving member and the drive arm;

the first guide mechanism and the second guide mechanism guide the drive arm to drive the panel to move relative to the door body when the door body is rotated.

[0023] In an embodiment, the electrical device further includes:

a main body having an inner cavity;

a door body rotatably connected to the main body through the hinge to open or close the inner cavity; and

a panel movably provided on one side of the door body;

the first guide mechanism matches with the second guide mechanism, such that when the door body is rotated to open the inner cavity, the drive arm moves along with the rotation of the hinge arm, the first drive end of the drive arm moves along the first guide groove of the first guide mechanism and approaches the door body, the second drive end of the drive arm moves along the second guide groove of the second guide mechanism and drives the moving member to move in the direction away from the hinge, such that the panel moves relative to the door body in a direction away from the hinge.

[0024] In an embodiment, the electrical device is a dishwasher.

[0025] In an embodiment, the dishwasher further includes a basket provided in the inner cavity.

[0026] In technical solutions of the present disclosure, the hinge connects the door body and the main body. A panel is provided on one side of the door body. When the door body is rotated to open the main body, the hinge arm and the drive arm are driven to rotate, the arrangement of the first guide mechanism and the second guide mechanism can convert the rotation of the drive arm into the movement of the moving member, and the moving member is linked with the panel, so that the panel can move upward with the opening of the door. The hinge provided by the present disclosure has the characteristics of simple and reliable transmission, easy manufacture and low production cost.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] In order to more clearly illustrate the embodiments of the present disclosure or the technical solutions in the prior art, the following briefly introduces the accompanying drawings that need to be used in the description of the embodiments or the prior art.

FIG. 1 is a schematic structural view of a dishwasher according to an embodiment of the present disclosure, wherein a hinge is in a first state.

FIG. 2 is an enlarged schematic structural view of portion A in FIG. 1.

FIG. 3 is a schematic structural view of the dishwasher in FIG. 1, wherein the hinge is in a second state.

FIG. 4 is an enlarged schematic structural view of portion B in FIG. 3.

FIG. 5 is a schematic structural view of the dishwasher in FIG. 1, wherein the hinge is in a third state.

FIG. 6 is an enlarged schematic structural view of portion C in FIG. 5.

FIG. 7 is a partial disassembly schematic structural view of the dishwasher in FIG. 1.

FIG. 8 is an enlarged schematic structural view of portion D in FIG. 7.

FIG. 9 is an enlarged schematic structural view of portion E in FIG. 7.

FIG. 10 is a perspective view of a hinge arm in FIG. 1.

FIG. 11 is a perspective view of a drive arm in FIG. 1.

FIG. 12 is a perspective view of a moving member in FIG. 1.

Description of reference signs

reference sign	name	reference sign	name
1	dishwasher	151	first guide pin
100	hinge	152	first guide groove
110	rotating shaft	160	moving member
120	hinge arm	161	sliding portion
121	first arm	162	guide portion
122	second arm	170	second guide mechanism
123	sliding groove	171	second guide pin
124	escape groove	172	second guide groove
125	connection portion	180	guide member
130	drive arm	181	guide rail
131	first drive end	182	guide groove
132	second drive end	190	connecting member
133	middle section	200	main body
140	mounting member	300	door body
150	first guide mechanism	400	panel

[0028] The realization of the objective, functional characteristics, and advantages of the present disclosure are further described with reference to the accompanying drawings.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0029] It should be noted that if there is a directional indication (such as up, down, left, right, front, rear...) in the embodiments of the present disclosure, the directional indication is only used to explain the relative positional relationship, movement, etc. of the components in a certain posture (as shown in the drawings). If the specific posture changes, the directional indication will change accordingly.

[0030] In addition, the descriptions associated with, e.g., "first" and "second," in the present disclosure are merely for descriptive purposes, and cannot be understood as indicating or suggesting relative importance or impliedly indicating the number of the indicated technical feature. Therefore, the feature associated with "first" or "second" can expressly or impliedly include at least one such feature. Besides, the meaning of "and/or" appearing in the disclosure includes three parallel scenarios. For example, "A and/or B" includes only A, or only B, or both A and B. Besides, the technical solutions between the various embodiments can be combined with each other, but they must be based on the realization of those of ordinary skill in the art. When the combination of technical solutions is contradictory or cannot be achieved, it should be considered that such a combination of technical solutions does not exist, nor is it within the scope of the present

disclosure.

[0031] In some embedded electrical appliances with revolving doors, decorative hanging boards are usually installed on the revolving doors, so that the overall style of the electrical appliance is more compatible with the surrounding environment. However, this may cause the decorative hanging board to interfere with the ground or other structures below when the revolving door is opened. In order to avoid such interference, the decorative hanging board may slide relative to the revolving door, so that during the opening process of the revolving door, the decorative hanging plate slides upward to avoid the lower end of the decorative hanging board from colliding with the ground or other structures. However, this usually needs to be equipped with a complex transmission structure such as multi-stage gears, which is difficult to process, high in production cost, easily stuck by foreign objects, and has low reliability.

[0032] In order to solve the above technical problem, the present disclosure provides a hinge 100, during the rotation and opening process of the door body 300 (equivalent to a revolving door), the hinge 100 can realize that the outer panel 400 (equivalent to the decorative hanging board) moves upward (upward, that is, toward the top of the door body 300), for example, slides upward, or translates upward, and during the rotation and closing process of the door body 300, the panel 400 is reset accordingly. The hinge 100 can be applied to furniture, and can also be applied to the built-in electrical device, such as built-in dishwashers 1, built-in ovens, and the like.

[0033] The present disclosure also provides an electrical device including the hinge 100. In an embodiment, the electrical device is a dishwasher 1, the dishwasher 1 has an inner cavity for loading tableware, a basket is provided in the inner cavity, and the tableware is loaded in the basket. As shown in FIG. 1 to FIG. 12, in the following embodiments, a dishwasher 1 is taken as an example to describe the structure of the electrical device and the hinge 100 in detail.

[0034] The built-in dishwasher 1 is usually embedded in the cabinet, and a decorative hanging board covering the front of the dishwasher 1 is installed on the outside of the revolving door. The material or design style of the decorative hanging board is usually the same as the door panel of the cabinet, so that the dishwasher 1 and the cabinet form a beautiful whole in appearance and play a decorative role. The size of the decorative hanging board can be designed according to the shape of the adjacent cabinets to meet the needs of users. In some occasions, the length of the decorative hanging board needs to be designed to be longer to cover the dishwasher 1 more completely, such that the outer side of the dishwasher 1 and the adjacent cabinet door panel are more unified and beautiful, but this may cause the lower end of the decorative hanging board to interfere with the cabinet body or the ground when the revolving door of the dishwasher 1 is opened, causing inconvenience to the user.

[0035] It should be noted that the description of the orientation in the present disclosure is only applicable to the orientation description of the electrical device in the normal use state after the installation is completed, and does not include the orientation of the electrical device in the state of production, assembly or transportation. The horizontal direction refers to a direction substantially parallel to the horizontal plane, and the up-down direction refers to a direction substantially parallel to the direction of gravity, or a direction that forms a certain angle with the direction of gravity and is not perpendicular to each other.

[0036] As shown in FIG. 1 to FIG. 2 and FIG. 7 to FIG. 8, the electrical device of the present disclosure includes a hinge 100. The hinge 100 includes a rotating shaft 110, a hinge arm 120, a drive arm 130, a mounting member 140 and a moving member 160. The hinge arm 120 is provided on the rotating shaft 110 and is rotational relative to the main body 200. The hinge arm 120 is configured to connect the door body 300 and the main body 200. The drive arm 130 is rotatably connected to the hinge arm 120. A first guide mechanism 150 is provided between the mounting member 140 and the drive arm 130. The moving member 160 is connected to the panel 400 and is movable relative to the door body 300, and a second guide mechanism 170 is provided between the moving member 160 and the drive arm 130. The first guide mechanism 150 and the second guide mechanism 170 guide the drive arm 130 to drive the panel 400 to move relative to the door body 300 when the door body 300 is rotated.

[0037] In technical solutions of the present disclosure, the hinge 100 connects the door body 300 and the main body 200. A panel 400 is provided on one side of the door body 300. When the door body 300 is rotated to open the main body 200, the hinge arm 120 and the drive arm 130 are driven to rotate, the arrangement of the first guide mechanism 150 and the second guide mechanism 170 can convert the rotation of the hinge arm 120 into the movement of the moving member 160, and the moving member 160 is linked with the panel 400, so that the panel 400 can move upward with the opening of the door body 300. The hinge 100 provided by the present disclosure has the characteristics of simple and reliable transmission, easy manufacture and low production cost.

[0038] In addition, the electrical device further includes: a main body 200 having an inner cavity; a door body 300 rotatably connected to the main body 200 through the hinge 100 to open or close the inner cavity; and a panel 400 movably provided on one side of the door body 300. The first guide mechanism 150 matches with the second guide mechanism 170, such that when the door body 300 is rotated to open the inner cavity, the drive arm 130 moves along with the rotation of the hinge arm 120, the first drive end 131 of the drive arm 130 moves along the first guide groove 152 of the first guide mechanism 150 and approaches the door body 300, the second drive end 132 of the drive arm 130 moves along the second guide groove 172 of the second guide mechanism 170 and drives the moving member 160 to move in the direction away from the hinge 100, such that the panel 400 moves relative to the door body 300 in

a direction away from the hinge 100.

[0039] In the present disclosure, the main body 200 may be a housing structure of an electrical device, or may be a body of the electrical device, for example, the body of the built-in dishwasher 1. The main body 200 is formed with an inner cavity, the inner cavity has an opening, and the opening can be formed in any part of the main body 200, for example, formed on the top or any side of the main body 200. For ease of understanding, in the following embodiments, the opening is formed on the side of the main body 200 and the opening is disposed forward as an example for description.

[0040] The door body 300 is connected to the main body 200 and is movably provided relative to the opening, to open and cover the opening during its moving stroke. The door body 300 can move relative to the main body 200 in various ways, such as translation and/or flip. In an embodiment, the door body 300 has an installation end and a moving end which are oppositely arranged along the board surface thereof, the installation end is rotatably mounted on one side of the opening, and the rotation axis of the installation end extends along the length direction of the side of the opening, such that the moving end can be rotated toward the opening to cover the opening, and can be rotated away from the opening to open the opening. For example, when the electrical device is installed and placed in the up-down direction, the bottom end of the door body 300 constitutes the installation end. The top end of the door body 300 constitutes the moving end, the bottom end of the door body 300 constitutes the installation end, and the hinge 100 is disposed at the lower end of the installation end. When the opening is disposed forward as described above, the turning direction of the door body 300 is also the front-rear direction. In some embodiments, the door body 300 may be turned forward to open the opening, and turned backward to cover the opening.

[0041] The panel 400 is movably provided on one side of the door body 300. Since both the panel 400 and the door body 300 are generally arranged in a plate shape, the two are equivalent to being stacked along the thickness direction, that is, the front panel surface of the door body 300 and the rear panel surface of the panel 400 are at least partially stacked, and the door body 300 and the panel 400 have movable strokes that are substantially translated along the laminated board surface. In some embodiments, the door body 300 can be set to translate relative to the panel 400. Generally, however, the panel 400 is translated relative to the door body 300 as an example for description, and the panel 400 is translated along the front panel surface of the door body 300. For ease of understanding, the moving direction of the panel 400 relative to the door body 300 is defined as the first direction below.

[0042] For those skilled in the art, when the door body 300 is opened, that is, during the moving stroke in which the moving end rotates away from the opening, the panel 400 moves in a direction away from the installation end along the front panel of the door body 300. During the movable stroke in which the moving end rotates close to the opening, the panel 400 moves along the front panel surface of the door body 300 toward the direction close to the installation end. The panel 400 may be a decorative hanging board, or may be other plate-like structures that can move relative to the door body 300. In this embodiment, since the panel 400 moves from the installation end to the moving end as the door body 300 rotates and opens, it is possible to avoid interference and collision between one end of the panel 400 close to the installation end and surrounding structures, such as cabinets, floors, and the like.

[0043] In the present disclosure, the first guide mechanism 150 and the second guide mechanism 170 guide the drive arm 130 to drive the panel 400 to move relative to the door body 300 when the door body 300 is rotated.

[0044] As described above, it can be understood that, the movement stroke of the door body 300 rotation includes the open of the door body 300 and the closing of the door body 300. When the door body 300 rotates, the drive arm 130 rotates relative to the panel 400, that is, as long as either the drive arm 130 and the panel 400 can rotate relative to the other, it can be regarded as a rotational connection. When the door body 300 is opened, because the hinge arm 120 is directly or indirectly connected to the door body 300, the door body 300 can drive the hinge arm 120 to move. A first guide mechanism 150 is provided between the mounting member 140 and the drive arm 130, and a second guide mechanism 170 is provided between the drive arm 130 and the moving member 160, such that the first guide mechanism 150 and the second guide mechanism 170 act together on the drive arm 130, thereby urging the drive arm 130 to rotate relative to the panel 400 and drive the panel 400 to move relative to the door body 300.

[0045] When the door body 300 rotates, the drive arm 130 moves along with the rotation of the hinge arm 120, and the first guide mechanism 150 restricts the drive arm 130 from rotating along with the rotation of the hinge arm 120. For example, during the opening stroke, since the hinge arm 120 is rotatably connected to the drive arm 130 (e.g., rotatably connected through a pin). When the hinge arm 120 rotates, it can drive the drive arm 130 to approach the door body 300, so it is considered that the drive arm 130 moves with it, this movement can also be regarded as following rotation to a certain extent, and restricting the rotation of the drive arm 130 along with the rotation of the hinge arm 120 can be understood as the inconsistency of the movement range of the drive arm 130 and the hinge arm 120. For example, the drive arm 130 and the hinge arm 120 can rotate relative to each other. It may be that the drive arm 130 does not rotate while the hinge arm 120 rotates, or the rotation range of the drive arm 130 is smaller than the rotation range of the hinge arm 120. It is also possible that the rotation direction of the drive arm 130 is different from the rotation direction of the hinge arm 120 (the drive arm 130 rotates in an opposite direction relative to the hinge arm 120), or the drive arm 130 is restricted to reciprocate in a straight line while the hinge arm 120 rotates. It is equivalent to applying a constraint to the drive arm 130 when the hinge arm 120 rotates, so that when the hinge arm 120 moves along with the rotation of the

hinge arm 120, it cooperates with the second guide mechanism 170, such that the drive arm 130 approaches the door body 300, when the door body 300 is opened, the panel 400 is urged to move relative to the door body 300 in the direction away from the hinge 100, and when the door body 300 is closed, the panel 400 is urged to move relative to the door body 300 in the direction of the hinge 100.

[0046] Besides, when the door body 300 rotates, the second guide mechanism 170 makes the moving member 160 and the drive arm 130 rotate relative to each other, to drive the moving member 160 to move along with the movement of the drive arm 130. That is to say, the second guide mechanism 170 acts as a reversing mechanism, which can convert the rotational movement of the hinge arm 120 into the movement of the moving member 160 through the drive arm 130. The function of the second guide mechanism 170 can be embodied not only in the switching between the two motion forms of rotation and translation, but also in the switching of the direction of movement, the limitation of the amount of movement, etc., such that when the door body 300 is opened, the entire rotation stroke of the drive arm 130 just drives the panel 400 to move to the set position relative to the door body 300. When the door body 300 is closed, the entire rotation stroke of the drive arm 130 just drives the panel 400 to move to the reset position relative to the door body 300.

[0047] Compared with the technical solution in the prior art in which the panel 400 moves with the opening or closing of the door body 300 by using structures such as multi-stage gear transmission, the technical solution provided in this embodiment can be achieved only through the restraint between the hinge arm 120, the drive arm 130, the mounting member 140 and the moving member 160 in the hinge 100. The linkage between the rotation of the door body 300 and the movement of the panel 400 can be realized, the structure of the hinge 100 is simple and reliable, and the structure of the hinge 100 is easy to manufacture, the production cost is low, the transmission is simple, the jamming phenomenon is not easy to occur, and the reliability is high.

[0048] In the present disclosure, the hinge 100 connects the door body 300 and the main body 200, and is disposed closer to the installation end than the moving end. The hinge 100 connects the panel 400. The hinge 100 can convert the rotation of the door body 300 relative to the main body 200 into driving the panel 400 to translate relative to the door body 300, such that the door opening and closing actions of the door body 300 form a linkage with the translational relocation and reset actions of the panel 400, and no additional driving device is required, which is helpful for simplifying the structure and reducing energy consumption.

[0049] In the hinge 100, the rotating shaft 110 may be provided on the rotation axis of the installation end of the door body 300. Based on this, according to actual needs, the installation end can be further arranged to be rotated and mounted on the main body 200 through the rotating shaft 110. In addition, the hinge arm 120 is rotatably mounted on the main body 200 through the rotating shaft 110. In some embodiments, the rotating shaft 110 may be spaced apart from the rotation axis of the installation end. In general, the position of the rotating shaft 110 may not be limited, as long as the hinge arm 120 can be rotated relative to the main body 100. For example, the rotating shaft 110 is fixed on the mounting member 140, the mounting member 140 is disposed on the main body 100, and the hinge arm 120 is rotatably disposed on the rotating shaft 110. That is, the rotating shaft 110 connects the mounting member 140 and the hinge arm 120 (the rotating shaft 110 is fixed on the mounting member 140, and the hinge arm 120 is rotatably connected to the rotating shaft 110, or the rotating shaft 110 is fixed on the hinge arm 120, and the rotating shaft 110 is rotatably connected to the mounting member 140).

[0050] As shown in FIG. 3 to FIG. 4 and FIG. 10, in an embodiment, the hinge arm 120 includes a first arm 121, a second arm 122, and a connection portion 125 connecting the first arm 121 and the second arm 122. The first arm 121 is connected to the door body 300, the second arm 122 is connected to the main body 200, and the connection portion 125 is connected to the rotating shaft 110.

[0051] Based on the above, the first arm 121, the connection portion 125 and the second arm 122 can be arranged to extend in line, so that the hinge arm 120 is generally in the shape of a straight arm. However, since the hinge arm 120 is disposed near the installation end, when the door body 300 moves to form a corner with the main body 200, the hinge arm 120 is provided at the corner. In order to adjust the moment arm of the hinge arm 120, in one embodiment, the first arm 121 and the second arm 122 may be further arranged at an angle, and a connection portion 125 is formed at the intersection of the first arm 121 and the second arm 122, such that the hinge arm 120 is generally arranged in a curved shape, which can better adapt to the installation environment of the above-mentioned corner, and achieve better force transmission.

[0052] The first arm 121 may be fixedly connected to the door body 300. The connection mode of the two is not limited, and may be one or more of screw fixing, snap fixing, adhesive fixing and adsorption fixing. In some embodiments, as shown in FIG. 10, threaded holes are provided at the corresponding positions of the first arm 121 and the door body 300, the first arm 121 and the threaded hole on the door body 300 are sequentially connected by a screw member, to realize the connection and fixation between the first arm 121 and the door body 300.

[0053] The second arm 122 can be elastically connected to the main body 200. Generally, the second arm 122 can be connected to the main body 200 by elastic structures such as a pull cord and/or a tension spring. Based on this, the second arm 122 may be provided with a hook portion, the second arm 122 is detachably connected to the elastic structure such as the pull cord and/or the tension spring through the hook portion, which is more convenient for disassembly and

fixation.

[0054] The connection portion 125 is provided with a shaft hole, the shaft hole may be provided with a notch on one side, and the rotating shaft 110 is rotatably matched with the shaft hole. The connection portion 125 may further be provided with a reinforcing rib protruding from the periphery of the shaft hole, and the reinforcing rib can increase the connection and matching strength of the shaft hole.

[0055] In addition, the drive arm 130 is rotatably connected to the hinge arm 120. In some embodiments, as shown in FIG. 3 to FIG. 4 and FIG. 11, the drive arm 130 has a first drive end 131, a second drive end 132 and a middle section 133 located between the first drive end 131 and the second drive end 132. The first drive end 131 and the second drive end 132 may be arranged opposite to each other, or may be arranged at intervals of any angle. The first drive end 131 is closer to the main body 200, and the first guide mechanism 150 is disposed between the first drive end 131 and the mounting member 140. The second drive end 132 is closer to the door body 300, the second guide mechanism 170 is disposed between the second drive end 132 and the moving member 160, and the middle section 133 is rotatably connected to the hinge arm 120.

[0056] As such, the movable stroke of the first drive end 131 is restricted by the first guide mechanism 150. It can be understood that, since the panel 400 has a movable stroke relative to the door body 300, when the door body 300 rotates, the movement of the hinge arm 120 causes the force of the drive arm 130 to change the position. The first guide mechanism 150 constrains the drive arm 130, so that the rotation trajectory and the rotation stroke amount of the drive arm 130 can be defined. It can be understood that under the constraint of the first guide mechanism 150, the drive arm 130 rotates relative to the hinge arm 120 to a preset stroke, which drives the second drive end 132 to change its position. The position change of the second drive end 132 may be a linear trajectory or an arc-shaped trajectory. The setting of the second guide mechanism 170 is to restrict the linear translation of the moving member 160 along the first direction, to achieve the purpose of linking the panel 400 to translate along the first direction through the opening and closing movement of the door body 300.

[0057] In this embodiment, during the rotation stroke of the door body 300, the drive arm 130 rotates along with the rotation of the hinge arm 120. That is, the hinge arm 120 is rotationally connected to the drive arm 130, and through the rotational connection between the two, the purpose of linking the drive arm 130 to rotate with the hinge arm 120 is achieved.

[0058] In some embodiments, the drive arm 130 is rotatably mounted on the hinge arm 120 through a rotation connection shaft. The rotation connection shaft may be coaxially disposed with the rotating shaft 110, which is equivalent to making the drive arm 130 rotate around the rotating shaft 110 along with the rotation of the hinge arm 120.

[0059] In some embodiments, the rotational connection of the drive arm 130 is spaced from the rotating shaft 110, so that when the door body 300 rotates, the drive arm 130 revolves around the rotating shaft 110 along with the rotation of the hinge arm 120. In this way, the drive arm 130 can follow the hinge arm 120 to move toward the door body 300, the drive arm 130 is approached in the first direction as a whole, which is more helpful for driving the moving member 160 to translate in the first direction.

[0060] In an embodiment, when the door body 300 is rotated to open the main body 200, at least the second drive end 132 of the drive arm 130 approaches the door body 300. Since the second drive end 132 is connected to the moving member 160 and the second guide mechanism 170 is connected therebetween, when it is ensured that at least the second drive end 132 on the drive arm 130 is close to the door body 300, that is, the second drive end 132 can realize the movement of the moving member 160 in the first direction through the second guide mechanism 170.

[0061] The specific structures of the first guide mechanism 150 and the second guide mechanism 170 are not limited in this embodiment, for example, which can be a sliding pin and a sliding groove that cooperate with each other, as long as the constraint on the drive arm 130 can be realized and the drive arm 130 can be driven to move. When the door body 300 is opened, through the setting of the first guide mechanism 150 and the second guide mechanism 170, the movement trajectory of the first drive end 131 gradually approaches the door body 300. When the hinge arm 120 is rotated and opened, the drive arm 130 can drive the second drive end 132 to drive the panel 400 to move relative to the door body 300 along the first direction and away from the installation end. On the contrary, when the door body 300 is closed, the moving end rotates close to the main body 200. Through the setting of the first guide mechanism 150 and the second guide mechanism 170, during the process of rotating and closing the hinge arm 120, the drive arm 130 can drive the second drive end 132 to drive the panel 400 to move relative to the door body 300 along the first direction and the direction close to the installation end, the movement trajectory of the first drive end 131 gradually moves away from the direction of the door body 300.

[0062] It can be understood that the first guide mechanism 150 may be provided between the drive arm 130 and the main body 200, for example, the sliding pin or sliding groove is directly formed on the main body 200, and the sliding groove or sliding pin is correspondingly provided on the drive arm 130. With this arrangement, the hinge 100 has fewer components and occupies a smaller space, which is beneficial to maximizing the size of the electrical device.

[0063] The first guide mechanism 150 is provided with a sliding pin or a sliding groove 123 through a mounting member 140 provided separately from the main body 200. The mounting member 140 may be connected to the main body 200 by means of bolts, welding or the like. Compared with the technical solution of directly processing on the main body 200,

in this embodiment, the mounting member 140 provided separately is used to cooperate with the drive arm 130, the first guide mechanism 150 is provided between the mounting member 140 and the drive arm 130, so that the hinge 100 is easier to manufacture and has a lower production cost. In addition, the structure of the existing electrical device can be used, and there is no need to re-open the mold, which reduces the cost of research and development, and is also

beneficial to the application of different materials for the hinge 100 and the main body 200.

[0064] As shown in FIG. 1 and FIG. 3 to FIG. 5, in some embodiments, the mounting member 140 may be fixedly connected to the main body 200 through structural connections such as bolts. The first guide mechanism 150 includes a first guide pin 151 and a first guide groove 152 respectively disposed on the drive arm 130 and the mounting member 140. In some embodiments, the first guide pin 151 may be provided on the first drive end 131 of the drive arm 130, the first guide groove 152 may be provided on the mounting member 140. In some embodiments, the first guide pin 151 may be provided on the mounting member 140, and the first guide groove 152 may be provided on the first drive end 131 of the drive arm 130. As long as the cooperation between the first drive end 131 and the mounting member 140 can be realized. The first guide pin 151 matches with the first guide groove 152 (inserted into each other), such that when the door body 300 is opened, the movement trajectory of the second drive end 132 gradually approaches the direction of the door body 300. On the contrary, during the closing stroke of the door body 300, the movement trajectory of the second drive end 132 gradually moves away from the door body 300.

[0065] Through the above structural arrangement, during the opening stroke of the door body 300, when the first drive end 131 of the drive arm 130 is pulled to move in a direction close to the door body 300, the rotation is also restricted by the cooperation of the first guide pin 151 and the first guide groove 152. Thus, the second drive end 132 of the drive arm 130 is driven to drive the moving member 160 to move in the direction of the moving end of the door body 300. On the contrary, during the closing stroke of the door body 300, when the first drive end 131 of the drive arm 130 is moved in a direction close to the main body 200, the rotation is also restricted by the cooperation of the first guide pin 151 and the first guide groove 152, therefore, the second drive end 132 of the drive arm 130 is driven to drive the moving member 160 to move in the direction of the door body 300 toward the installation end. In this embodiment, the linkage between the opening or closing of the door body 300 and the movement of the panel 400 along the door body 300 can be realized through the arrangement of the first guide pins 151 and the first guide grooves 152. The structure is simple and reliable. Compared with complex transmission structures such as multi-stage gears, it is not easy to be stuck, easy to manufacture, and low in production cost.

[0066] In this embodiment, as shown in FIG. 1 to FIG. 6, the first guide pin 151 is disposed on the first drive end 131, the first guide groove 152 is disposed on the mounting member 140, and the first guide groove 152 is bent from the main body 200 toward the door body 300. The specific shape of the first guide groove 152 can be various, for example, it can be a straight line or an arc shape, or a combination of a straight line and an arc shape, as long as the drive arm 130 can be restricted. During the process of opening or closing the hinge arm 120, the second drive end 132 of the drive arm 130 may drive the moving member 160 to move along the door body 300 toward the installation end or the moving end.

[0067] As described above, the first guide groove 152 may be linear (the whole is linear without obvious bending). When the first guide groove 152 is linear, the first guide groove 152 may extend laterally or be inclined from the main body 200 toward the door body 300. Compared with the linear shape, the curved first guide groove 152 may have lower resistance to a certain extent, and according to the design, the movement of the panel 400 may be non-uniform. For example, in this embodiment, the first guide groove 152 extends in an arc shape, to make the sliding of the first guide pin 151 smoother and avoid the occurrence of jamming.

[0068] Besides, it is possible to simply adapt the shape of the first guide groove 152 to meet the design requirements of the movement stroke of the panel 400 relative to the door body 300, such as adapting to the installation environment of different electrical equipment and the way of opening the door, the first guide groove 152 is divided into different groove segments, and the shapes and extending directions of at least part of the groove segments can be set differently, not only can a variety of stroke designs be realized, but also easy to realize, with low R&D cost and high reliability.

[0069] Similarly, as shown in FIG. 1 to FIG. 6, the second guide mechanism 170 includes a second guide pin 171 and a second guide groove 172, and the second guide pin 171 is inserted into the second guide groove 172. In this embodiment, the second guide groove 172 may be provided on the moving member 160, and the second guide pin 171 may be provided on the second drive end 132 of the drive arm 130 or near the second drive end 132. In other embodiments, the second guide groove 172 may also be provided on the drive arm 130, and the second guide pin 171 may be provided on the moving member 160. In this embodiment, the second guide groove 172 is matched (inserted) with the second guide pin 171.

[0070] Further, the second guide groove 172 extends along the stacking direction between the panel 400 and the door body 300. That is, the second guide groove 172 extends along the thickness direction of the panel 400 and the door body 300. It can be understood that when the second drive end 132 of the drive arm 130 moves toward the door body 300 following the movement of the middle section 133, can be decomposed to have components along the first direction and along the above-mentioned stacking direction. When the second guide grooves 172 extend along the stacking direction, equivalent to decomposing the component of the second drive end 132 along the first direction and the

component along the stacking direction, the component along the stacking direction is consumed by the sliding connection of the second guide pin 171 and the second guide groove 172, the remaining component along the first direction pushes the moving member 160 to move along the first direction as a whole, and then pushes the panel 400 to move relative to the door body 300 along the first direction.

[0071] The moving member 160 can be directly slidably connected to the door body 300, that is, an elongated slot may be provided on the door body 300 or at the connection between the door body 300 and the panel 400, and the moving member 160 slides along the elongated slot. In this embodiment, as shown in FIG. 2, FIG. 4 and FIG. 6, the moving member 160 is slidably connected to the hinge arm 120 to realize the movement of the panel 400 relative to the door body 300. It can be understood that the first arm 121 of the hinge arm 120 can be fixed relative to the door body 300. When the moving member 160 slides relative to the first arm 121 of the hinge arm 120, that is, the moving member 160 slides relative to the door body 300, the panel 400 connected to the moving member 160 can also translate relative to the door body 300. The moving member 160 is slidably connected to the hinge arm 120, such that at least the moving member 160 and the hinge arm 120 in the hinge 100 can be pre-installed to form a whole, which is beneficial to the compact structure of the hinge 100, at the same time, compared with the solution that needs to install the first arm 121 and the moving member 160 to the door body 300 one by one, it is helpful to simplify the installation operation.

[0072] In an embodiment, the hinge arm 120 includes a first arm 121 for connecting with the door body 300, the first arm 121 is provided with a sliding groove 123, and the moving member 160 is slidably arranged on the sliding groove 123. Please refer to FIG. 10 and FIG. 11, the second arm 122 and the connection portion 125 of the hinge arm 120 are generally plate-shaped and can be overlapped with the drive arm 130. The first arm 121 of the hinge arm 120 may have a block-like structure, and the block-like structure is provided with the sliding groove 123 penetratingly disposed along the first direction. In some embodiments, the first arm 121 of the hinge arm 120 can be bent in sequence by the plate body to enclose and define the sliding groove 123. In this way, the sliding groove 123 can be in the shape of a circumferentially closed hole, such that the moving member 160 slidably connected therewith can be accommodated in the closed area during the sliding process, which helps to increase the stability of the installation between the moving member 160 and the sliding groove 123.

[0073] In an embodiment, the moving member 160 includes a sliding portion 161 and a guide portion 162 connected to each other, the sliding portion 161 is slidably installed in the sliding groove 123, the guide portion 162 protrudes outward from the notch of the sliding groove 123 and is connected to the drive arm 130 through the second guide mechanism 170.

[0074] The sliding portion 161 is slidably connected to the sliding groove 123 and is connected to the panel 400. It can be understood that the sliding portion 161 is generally arranged in a block shape, and the outer size and shape of the sliding portion 161 are adapted to the inner size and shape of the sliding groove 123.

[0075] The sliding groove 123 can basically limit the sliding track of the sliding portion 161. However, in order to further increase the sliding accuracy and stability of the sliding portion 161, the first arm 121 may further define a guide groove on one side of the sliding groove 123 that is consistent with the extending direction of the sliding groove 123. The sliding portion 161 is protruded with a sliding protrusion corresponding to the guide groove, and the sliding protrusion is slidably connected to the guide groove. On the contrary, a guide groove that is consistent with the extending direction of the sliding groove 123 is provided on one side of the sliding portion 161, the sliding groove 123 is provided with a sliding protrusion corresponding to the guide groove, and the sliding protrusion can also be slidably connected and matched with the guide groove.

[0076] Since the moving member 160 needs to be directly or indirectly connected to the panel 400. In one embodiment, the first arm 121 is configured to be disposed between the door body 300 and the panel 400. The side facing the panel 400 is provided with an escape groove 124, and the moving member 160 and the panel 400 are connected at the escape groove 124. The escape groove 124 communicates with the sliding groove 123, and the sliding portion 161 of the moving member 160 can at least partially protrude outward from the escape groove 124 and be connected to the panel 400. In some embodiments, the hinge 100 further includes a connecting member 190, the connecting member 190 penetrates the escape groove 124 and connects the sliding portion 161 and the panel 400.

[0077] The specific structure of the connecting member 190 is not limited in this design. In one embodiment, please refer to FIG. 8, the connecting member 190 can be generally arranged in a plate shape. The connecting member 190 has a first wall surface connected to the moving member 160 and a second wall surface connected to the panel 400. According to the different orientations of the moving member 160 relative to the panel 400, the first wall surface and the second wall surface may be arranged opposite to each other, or arranged at a cross angle. In this embodiment, in the connecting member 190, the plate segment forming the first wall surface and the plate segment forming the second wall surface are arranged substantially vertically.

[0078] The guide portion 162 protrudes outward from the sliding groove 123, and as described above, the guide portion 162 is used for connecting with the second drive end 132 of the drive arm 130 through the second guide mechanism 170. In this embodiment, the guide portion 162 may be provided with the second guide groove 172.

[0079] In addition, since the moving member 160 is disposed closer to the installation end of the door body 300, in

order to increase the stability of the movement of the panel 400 relative to the door body 300, please refer to FIG. 7 and FIG. 9, in one embodiment, the hinge 100 or the electrical device further includes a guide member 180. The guide member 180 is disposed between the door body 300 and the panel 400, and is disposed closer to the moving end than the installation end. The guide member 180 includes a guide rail 181 and a guide groove 182, one of the guide rail 181 and the guide groove 182 is provided on the door body 300, the other of the guide rail 181 and the guide groove 182 is provided on the panel 400, the guide rail 181 extends along the first direction, and the guide groove 182 is slidably connected to the guide rail 181. The guide rail 181 can be protruded from the door body 300, one end of the guide rail 181 extends from the door body 300 toward the panel 400 and then bends and extends along the first direction. The panel 400 is provided with a convex hull toward the door body 300. The convex hull is provided with the guide groove 182 along the first direction. When the door body 300 is in a closed state, the guide groove 182 may be located on the side of the guide rail 181 close to the installation end. During the opening stroke of the door body 300, the moving member 160 drives the panel 400 to translate in the direction of the moving end, drives the guide groove 182 to fit on the guide rail 181 from the free end of the guide rail 181, and slides relative to the guide rail 181 following the translation of the panel 400.

[0080] Besides, based on any one of the above embodiments, the rotating shaft 110 can connect the hinge arm 120 to the main body 200, or the rotating shaft 110 can connect the hinge arm 120 to the mounting member 140. When the rotating shaft 110 is connected to the hinge arm 120 and the mounting member 140, the mounting member 140 provided separately is used to cooperate with the hinge arm 120, the hinge 100 is more independent, easier to manufacture, and lower in production cost. The structure of the existing electrical device can be used, and there is no need to re-open the mold, which reduces the cost of research and development, and is also beneficial to the application of different materials for the hinge 100 and the main body 200.

Claims

1. A hinge (100), connected to a door body (300) and a main body (200) to make the door body (300) rotatable relative to the main body (200), wherein a movable panel is stacked on one side of the door body (300), and the panel (400) moves relative to the door body (300) in response to the door body (300) being rotated, wherein the hinge (100) comprises:
 - a rotating shaft (110);
 - a hinge arm (120) provided on the rotating shaft (110) and being rotatable relative to the main body (200), the hinge arm (120) being connected the door body (300) to the main body (200);
 - a drive arm (130) rotatably connected to the hinge arm (120);
 - a mounting member (140), wherein a first guide mechanism (150) is provided between the mounting member (140) and the drive arm (130); and
 - a moving member (160) connected to the panel (400) and being movable relative to the door body (300), wherein a second guide mechanism (170) is provided between the moving member (160) and the drive arm (130); wherein the first guide mechanism (150) and the second guide mechanism (170) guide the drive arm (130) to drive the panel (400) to move relative to the door body (300) in response to the door body (300) being rotated.
2. The hinge (100) of claim 1, wherein the drive arm (130) moves along with rotation of the hinge arm (120) in response to the door body (300) being rotated, and wherein the first guide mechanism (150) restricts the drive arm (130) from rotating along with the rotation of the hinge arm (120).
3. The hinge (100) of claim 1, wherein rotational connection between the drive arm (130) and the hinge arm (120) is spaced from the rotating shaft (110), and the drive arm (130) revolves around the rotating shaft (110) along with the rotation of the hinge arm (120) in response to the door body (300) being rotated.
4. The hinge (100) of claim 1, wherein the drive arm (130) has a first drive end (131), a second drive end (132) and a middle section (133) between the first drive end (131) and the second drive end (132), wherein the first guide mechanism (150) is provided between the first drive end (131) and the mounting member (140), wherein the second guide mechanism (170) is provided between the second drive end (132) and the moving member (160), and wherein the middle section (133) is rotatably connected to the hinge arm (120).
5. The hinge (100) of claim 4, wherein at least the second drive end (132) approaches the door body (300) in response to the door body (300) being rotated to open the main body (200).

6. The hinge (100) of claim 1, wherein the first guide mechanism (150) comprises a first guide pin (151) and a first guide groove (152), wherein one of the drive arm (130) and the mounting member (140) is provided with the first guide pin (151), wherein the other one of the drive arm (130) and the mounting member (140) is provided with the first guide groove (152), wherein the first guide pin (151) is inserted into the first guide groove (152), and wherein the first guide pin (151) moves along an extension direction of the first guide groove (152) in response to the door body (300) being rotated.
7. The hinge (100) of claim 6, wherein the first guide groove (152) extends from the main body (200) toward the door body (300).
8. The hinge (100) of claim 1, wherein the second guide mechanism (170) makes the moving member (160) and the drive arm (130) rotate relative to each other in response to the door body (300) being rotated, to guide the moving member (160) to move along with movement of the drive arm (130).
9. The hinge (100) of claim 1, wherein the second guide mechanism (170) comprises a second guide pin (171) and a second guide groove (172), wherein one of the drive arm (130) and the mounting member (140) is provided with the second guide pin (171), wherein the other one of the drive arm (130) and the mounting member (140) is provided with the second guide groove (172), wherein the second guide pin (171) is inserted into the second guide groove (172), and the second guide pin (171) moves along an extension direction of the second guide groove (172) in response to the door body (300) being rotated., optionally, wherein the second guide groove (172) extends along a stacking direction between the panel (400) and the door body (300).
10. The hinge (100) of claim 1, wherein the moving member (160) is slidably connected to the hinge arm (120), to make the panel (400) move relative to the door body (300).
11. The hinge (100) of claim 10, wherein the hinge arm (120) comprises a first arm (121) connected to the door body (300), wherein the first arm (121) is provided with a sliding groove (123), and wherein the moving member (160) is slidably provided in the sliding groove (123), optionally, wherein the moving member (160) comprises a sliding portion (161) and a guide portion (162) connected to the sliding portion (161), wherein the sliding portion (161) is slidably installed in the sliding groove (123), wherein the sliding portion (161) is connected to the panel (400), and wherein the guide portion (162) protrudes outward from a notch of the sliding groove (123), and is connected to the drive arm (130) through the second guide mechanism (170), or, wherein the first arm (121) is provided with an escape groove on a side facing the panel (400), and the moving member (160) is connected to the panel (400) at the escape groove.
12. The hinge (100) of claim 1, wherein the hinge arm (120) comprises a first arm (121) and a second arm (122), wherein the first arm (121) is connected to the door body (300), and wherein the second arm (122) is elastically connected to the main body (200), optionally, wherein an included angle is formed between the first arm (121) and the second arm (122), wherein a connection portion (125) is formed at an intersection of the first arm (121) and the second arm (122), and wherein the connection portion (125) is connected to the rotating shaft (110).
13. The hinge (100) of any one of claims 1 to 12, wherein:
- the rotating shaft (110) connects the mounting member (140) and the hinge arm (120); and/or
- the mounting member (140) is provided on the main body (200).
14. An electrical device comprising the hinge (100) of any one of claims 1 to 13, optionally, further comprising:
- a main body (200) having an inner cavity;
- a door body (300) rotatably connected to the main body (200) through the hinge (100) to open or close the inner cavity; and
- a panel (400) movably provided on one side of the door body (300);
- wherein the first guide mechanism (150) matches with the second guide mechanism (170), such that when the door body (300) is rotated to open the inner cavity, the drive arm (130) moves along with the rotation of the hinge arm (120), the first drive end (131) of the drive arm (130) moves along the first guide groove (152) of the first guide mechanism (150) and approaches the door body (300), the second drive end (132) of the drive arm (130) moves along the second guide groove (172) of the second guide mechanism (170) and drives the moving member (160) to move in the direction away from the hinge (100), such that the panel (400) moves relative to

the door body (300) in a direction away from the hinge (100).

- 15.** The electrical device of claim 14, wherein the electrical device is a dishwasher (1), optionally, wherein the dishwasher (1) further comprises a basket provided in the inner cavity.

5

10

15

20

25

30

35

40

45

50

55

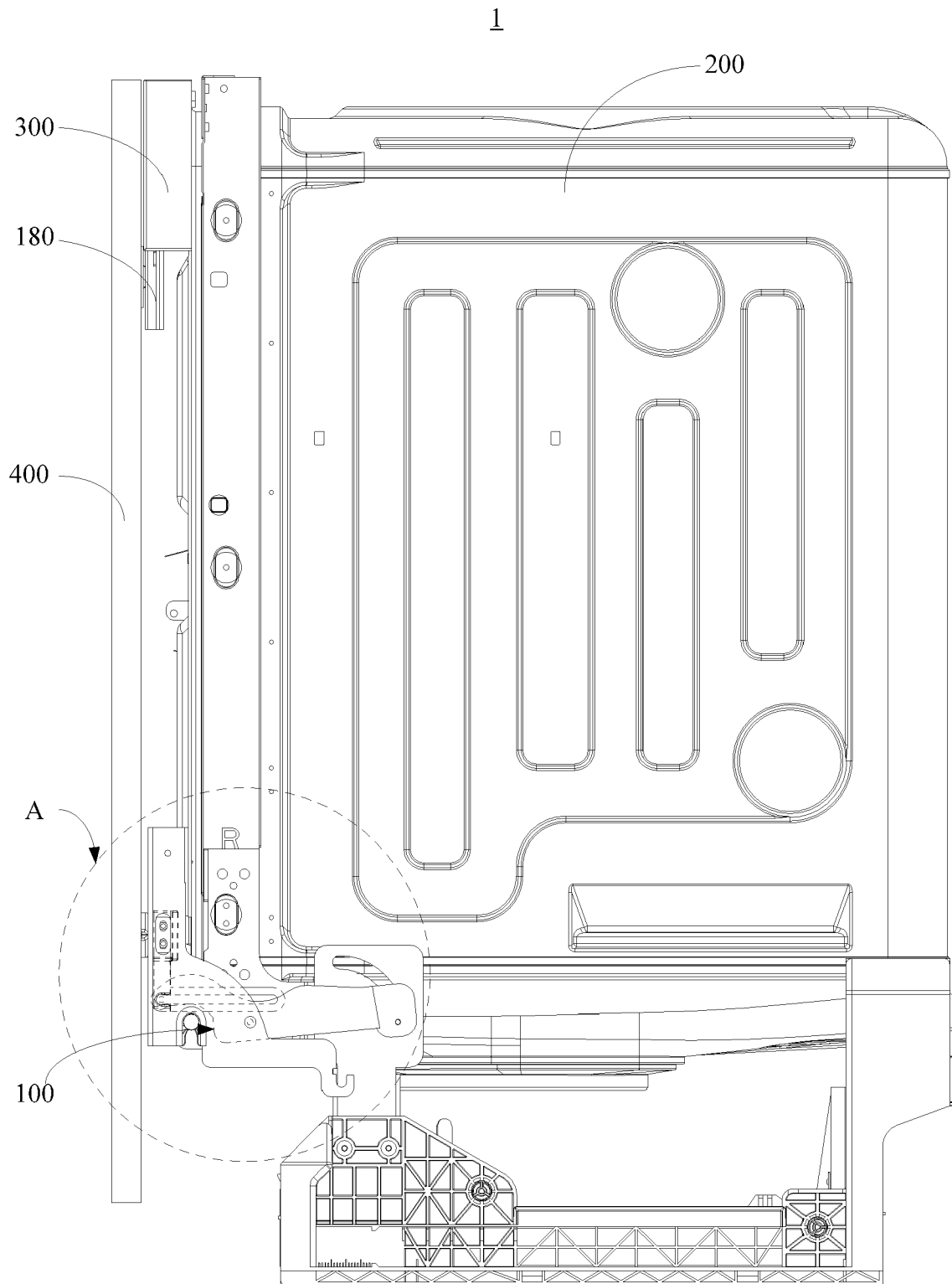


FIG. 1

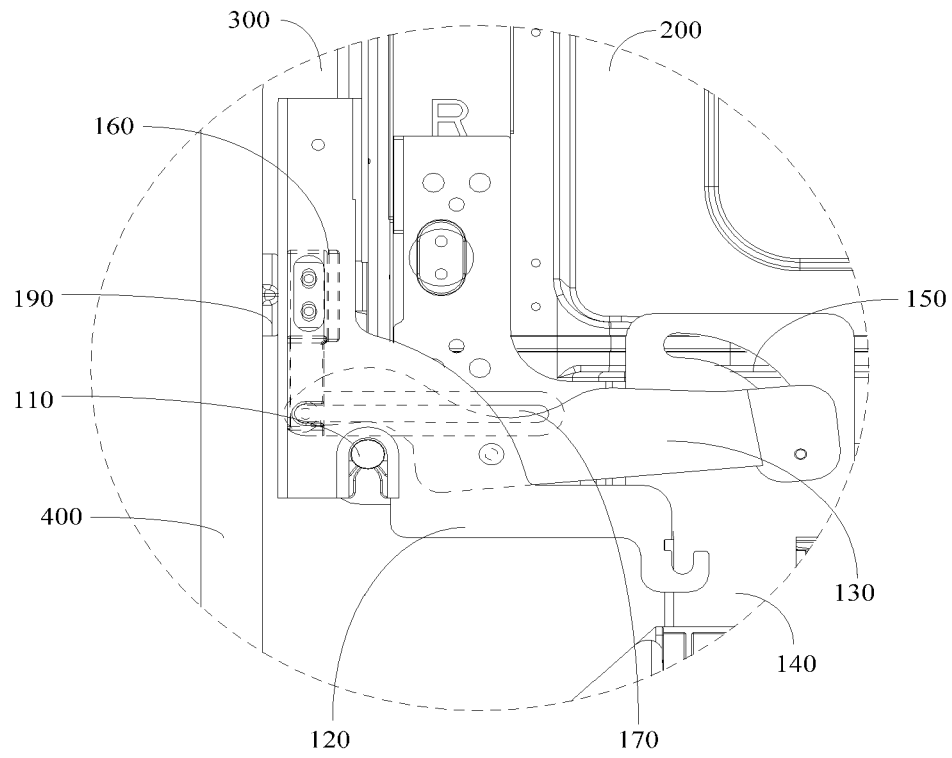


FIG 2

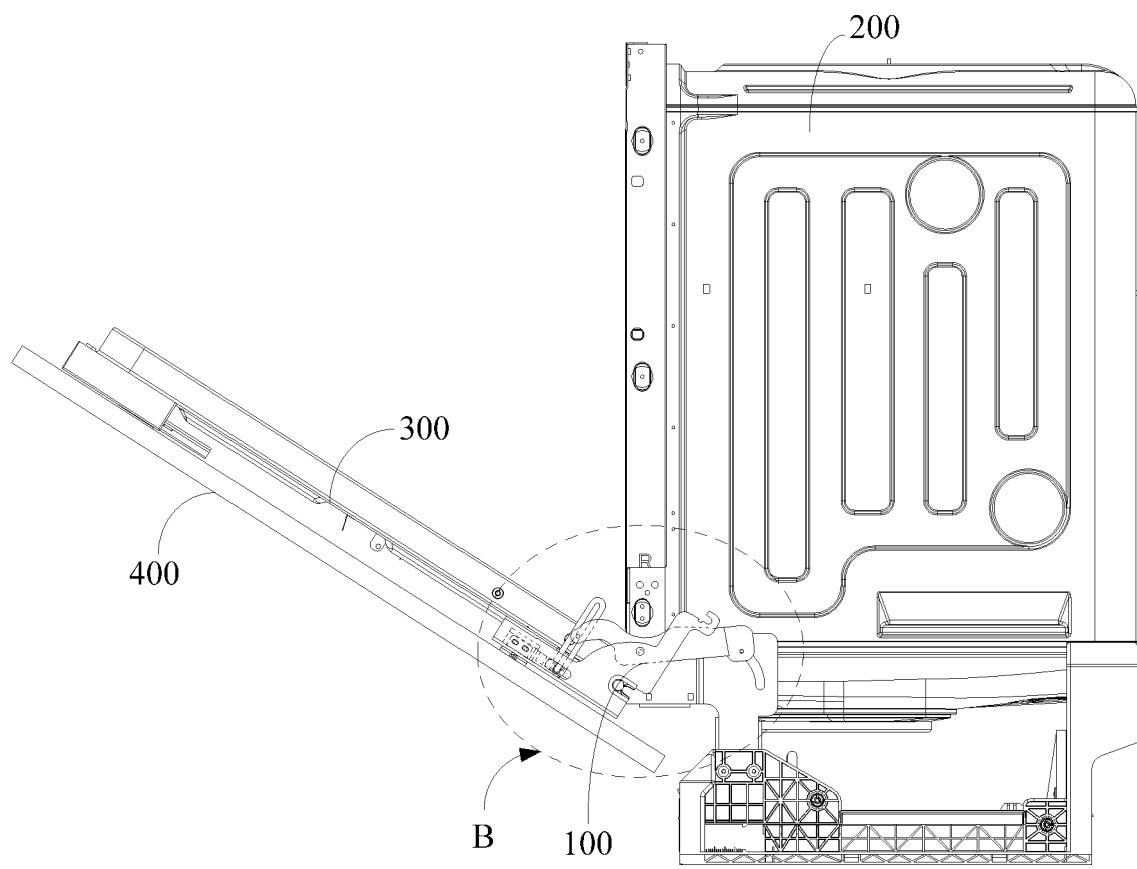


FIG 3

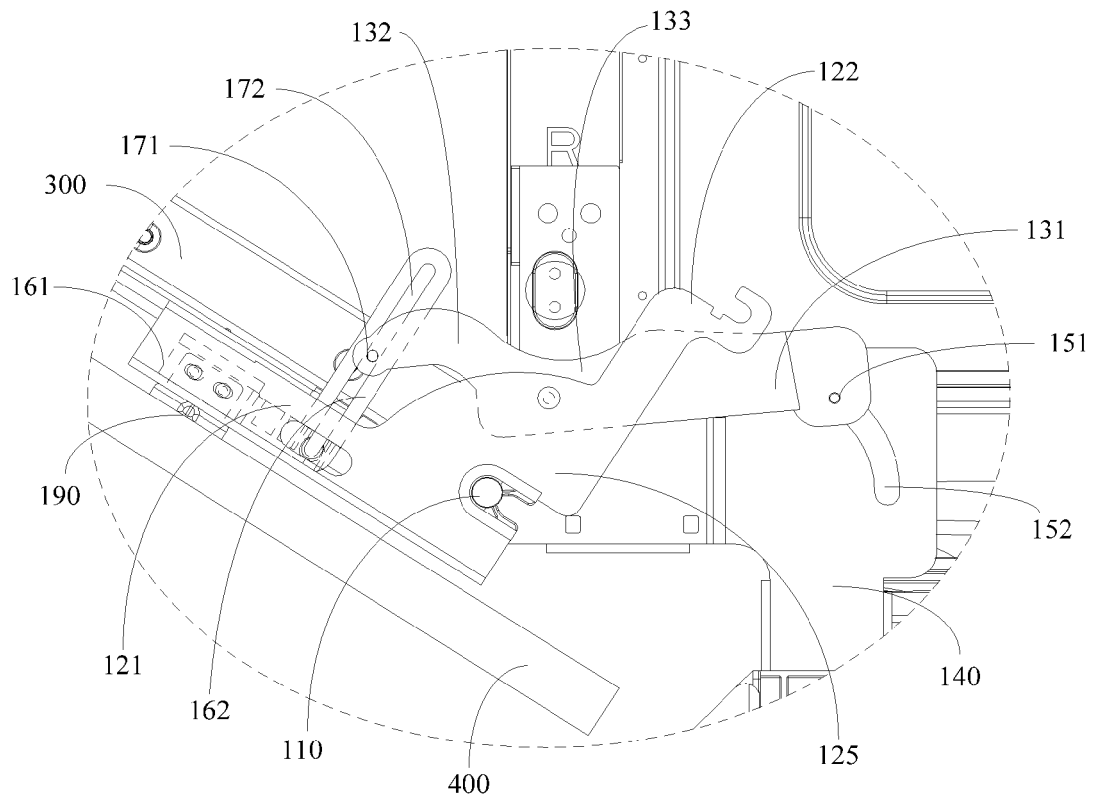


FIG. 4

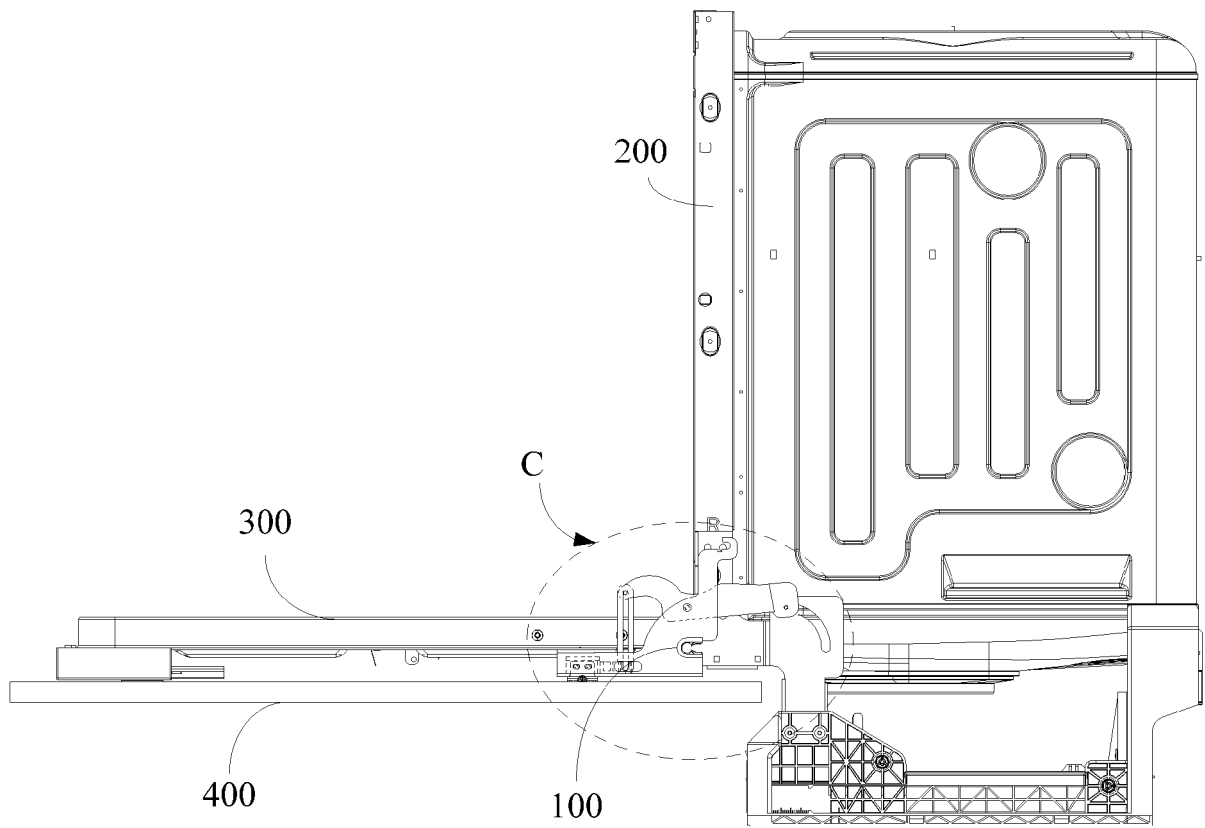


FIG. 5

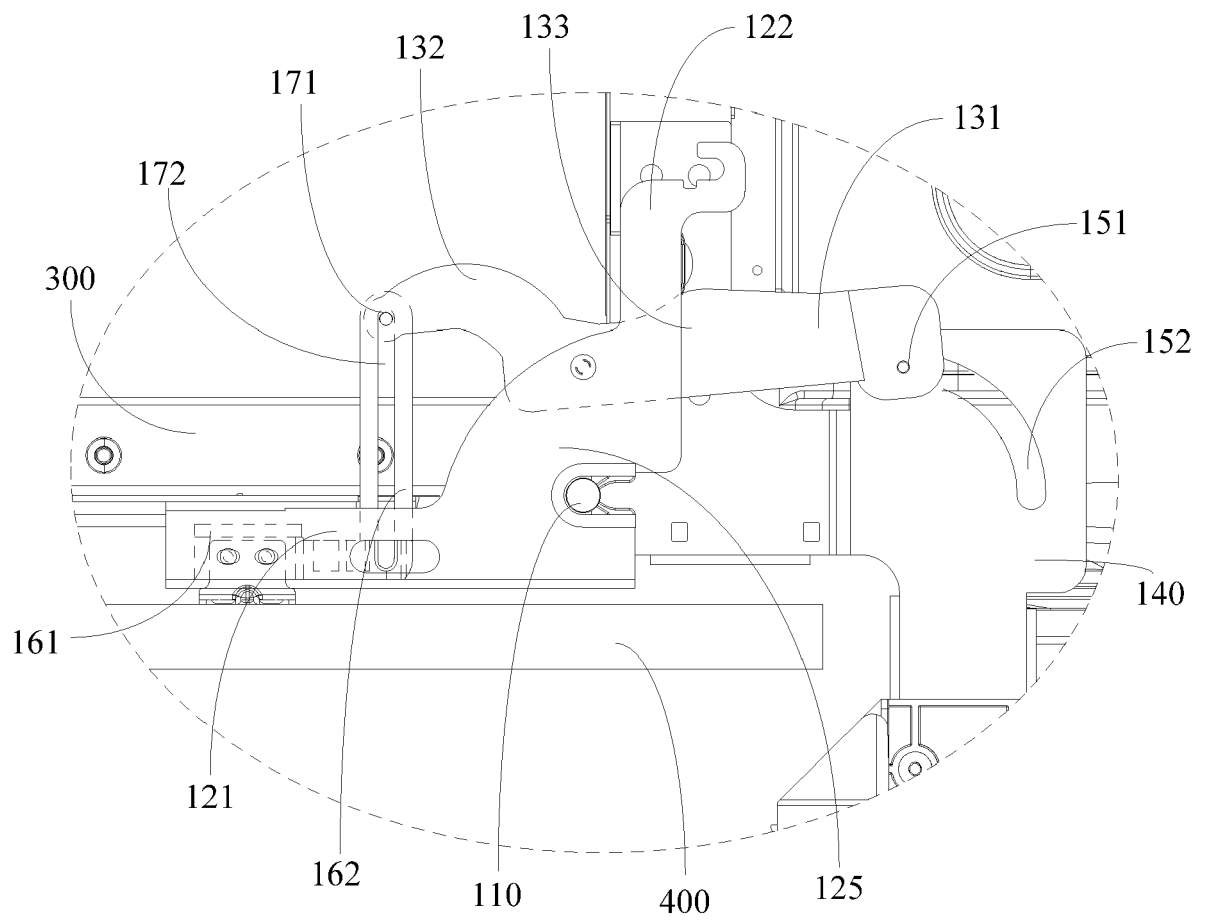


FIG. 6

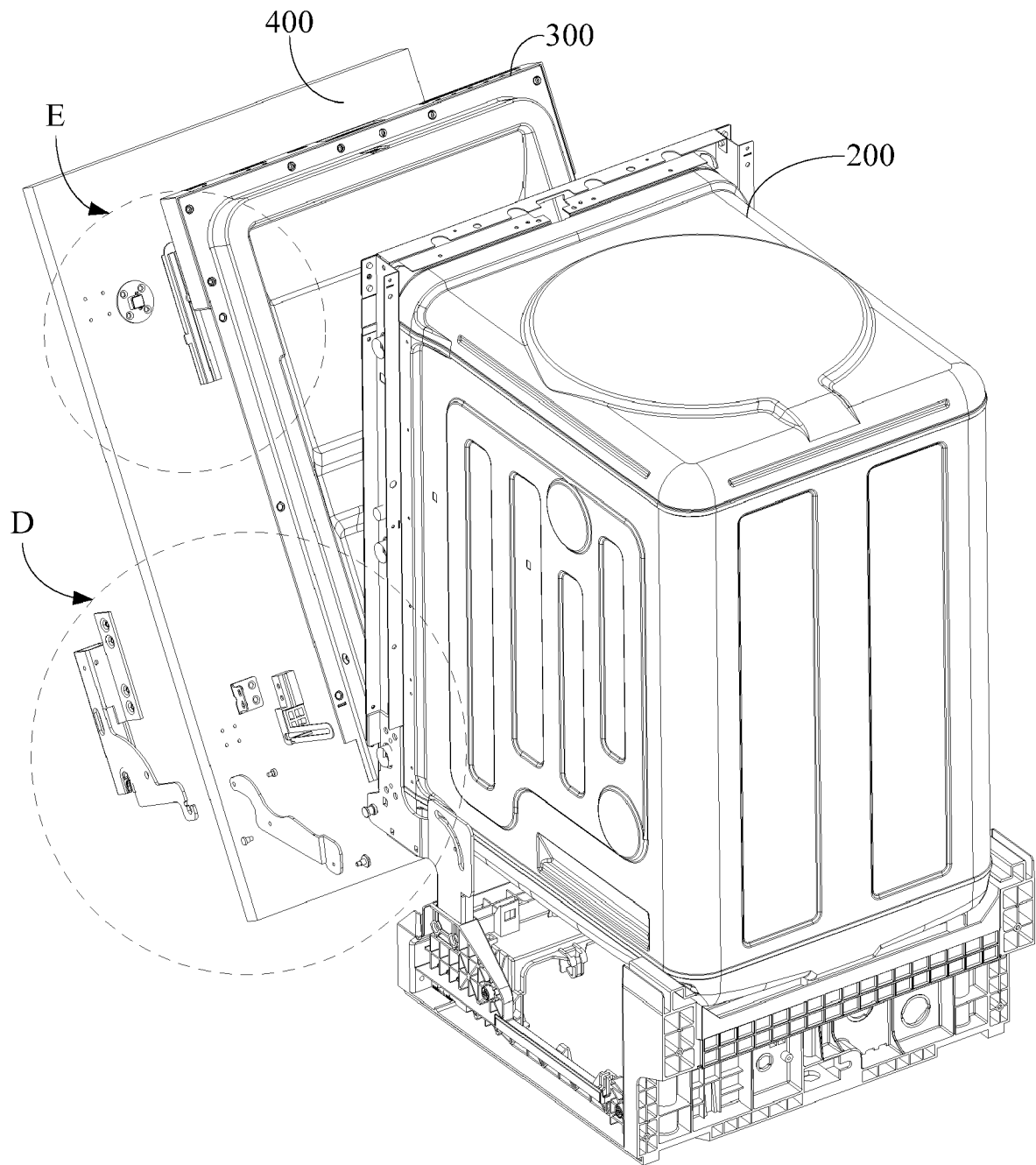


FIG. 7

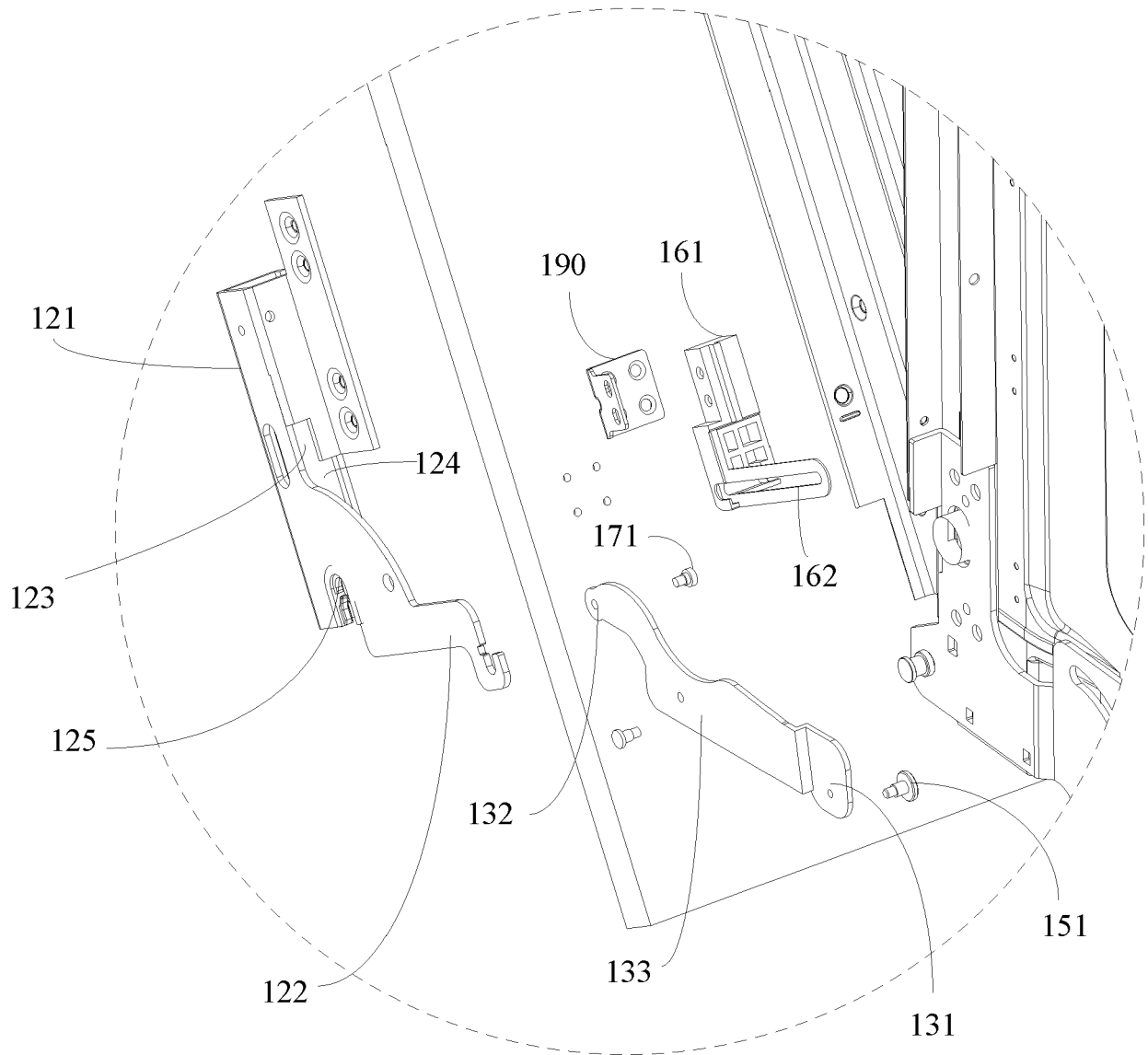


FIG. 8

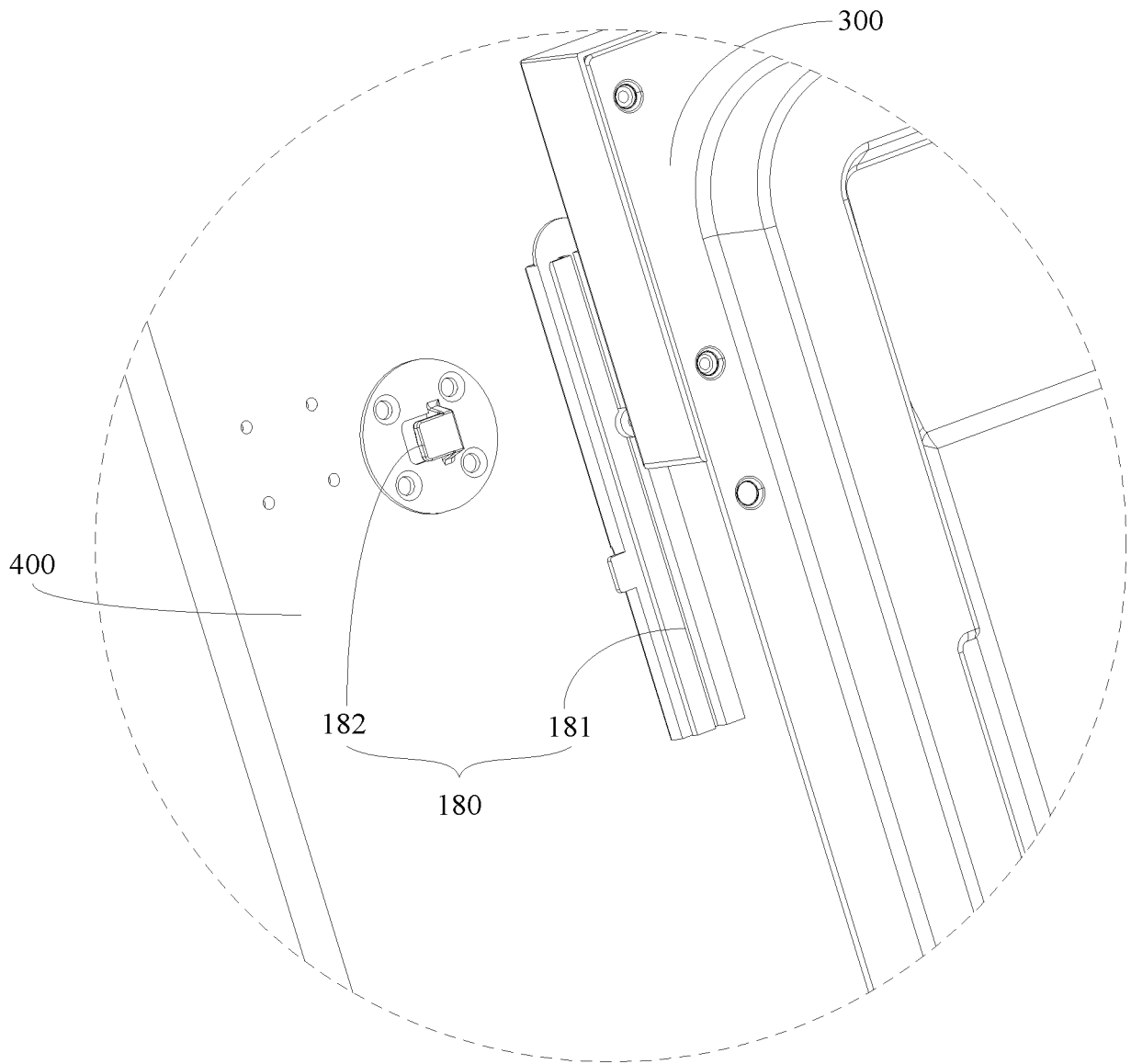


FIG 9

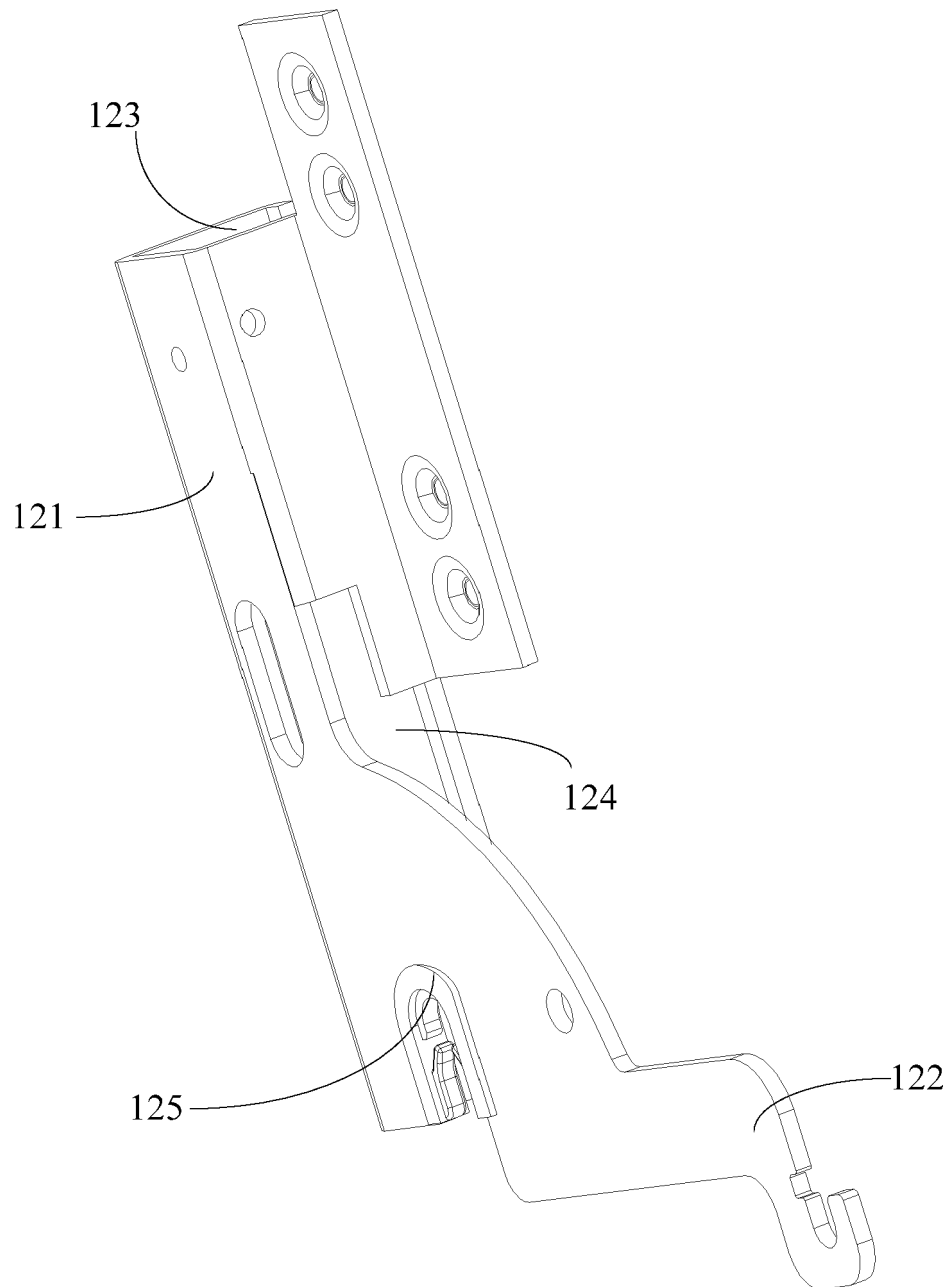


FIG. 10

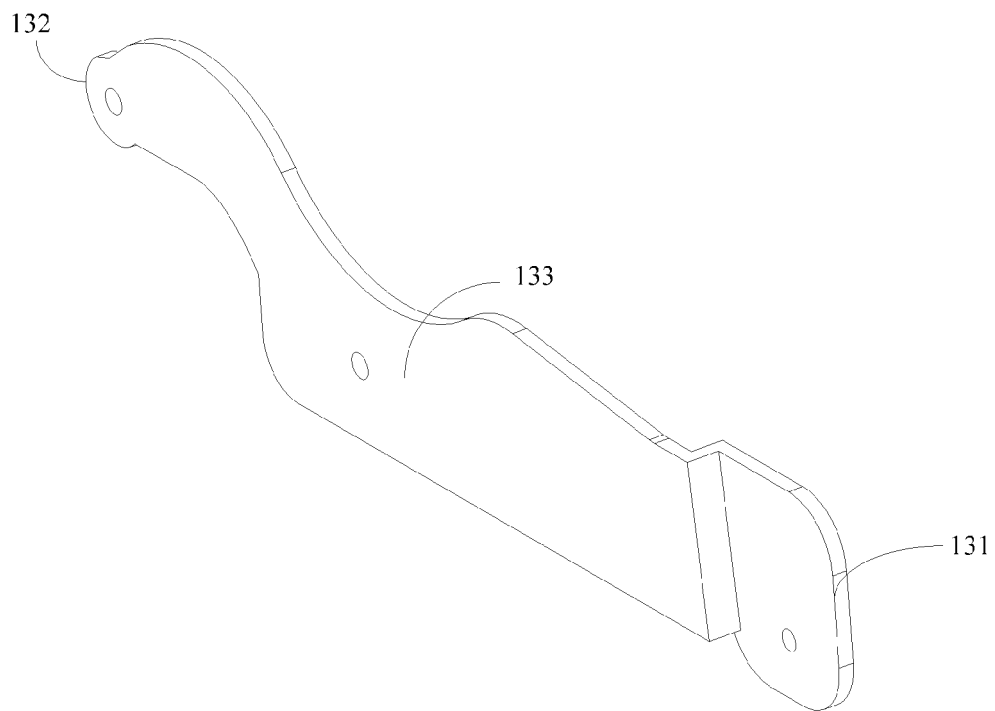


FIG. 11

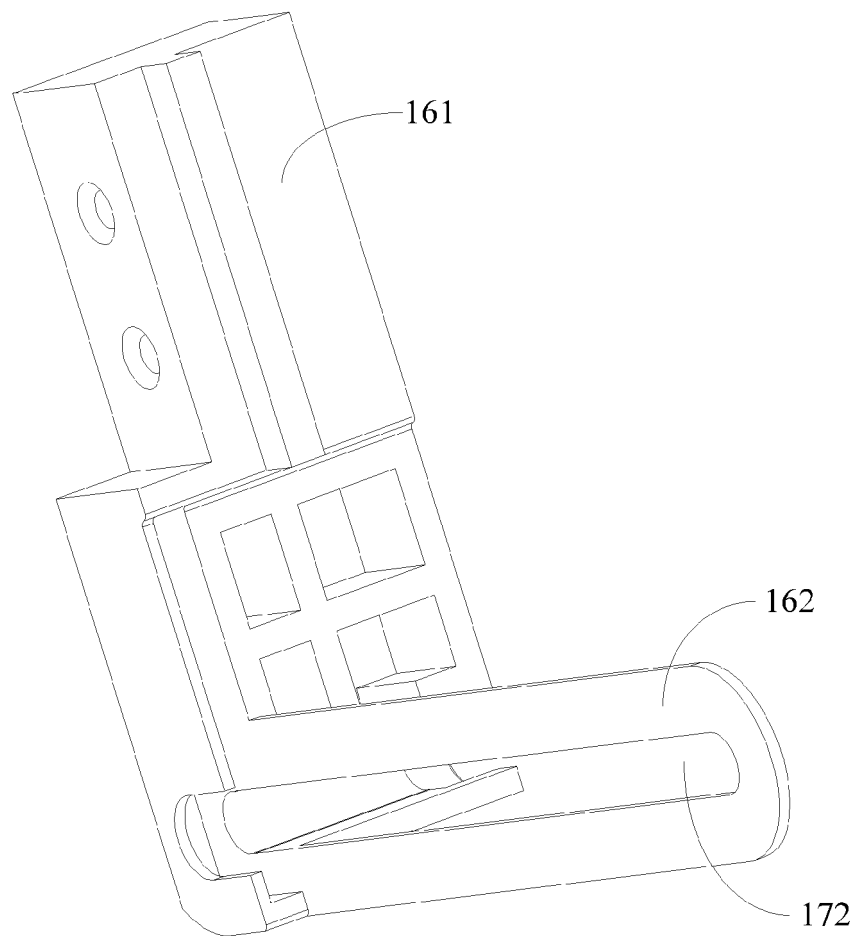


FIG. 12



EUROPEAN SEARCH REPORT

Application Number

EP 22 18 7942

5

10

15

20

25

30

35

40

45

50

55

1

EPO FORM 1503 03.82 (P04C01)

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	US 10 244 920 B2 (NUOVA STAR SPA [IT]) 2 April 2019 (2019-04-02) * figures * * column 2, line 52 - column 5, line 13 * -----	1-15	INV. E05D3/02 E05D3/18
X A	EP 3 108 791 A1 (INDESIT CO SPA [IT]) 28 December 2016 (2016-12-28) * paragraphs [0019] - [0029] * * paragraphs [0035] - [0041] * * paragraph [0047] * * claims 1,15 * * figures * -----	1-5, 8, 10-15 6, 7, 9	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 3 August 2023	Examiner Mund, André
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	

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

EP 22 18 7942

5 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.

03-08-2023

10	Patent document cited in search report	Publication date	Patent family member(s)	Publication date
	US 10244920 B2	02-04-2019	EP 3219244 A1 US 2017260785 A1	20-09-2017 14-09-2017
15	EP 3108791 A1	28-12-2016	NONE	
20				
25				
30				
35				
40				
45				
50				
55				

EPO FORM P0459

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