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(56) Documents Cited:

**CN 203742308 U CN 203603626 U
CN 203271500 U CN 104453611 A
DE 202014000301 U1 US 6554326 A
JPS6141760**

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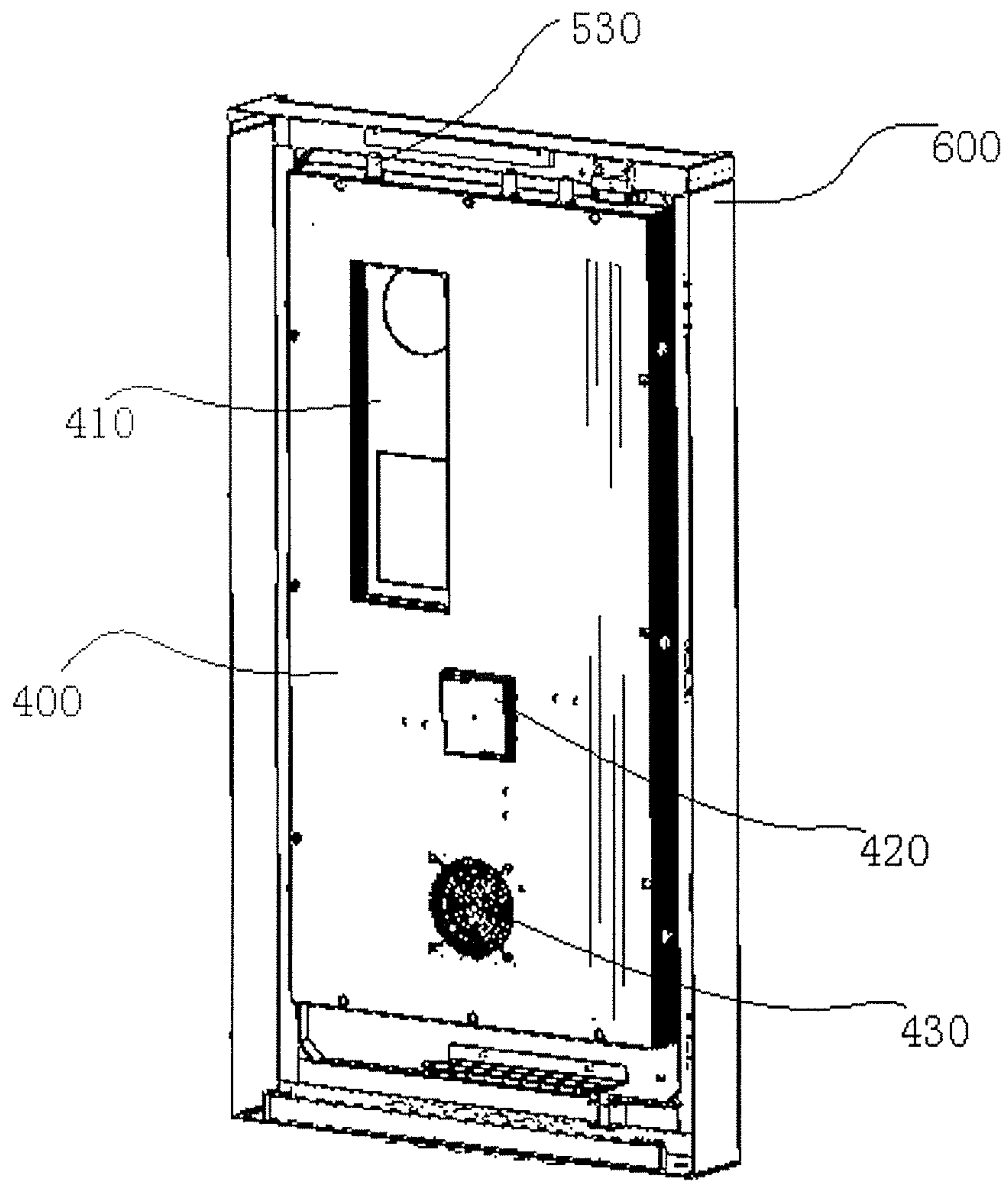


Fig. 1

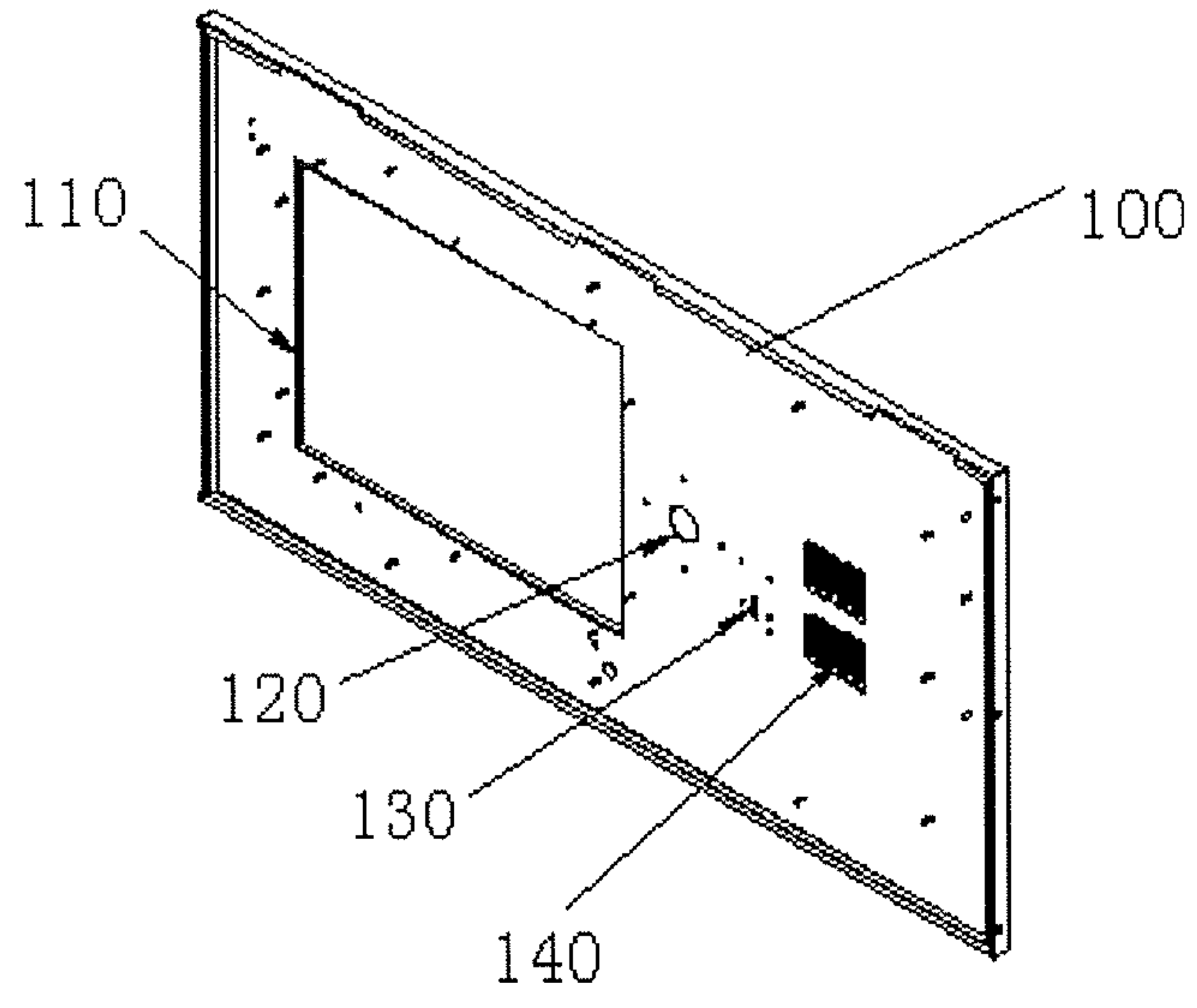


Fig. 2

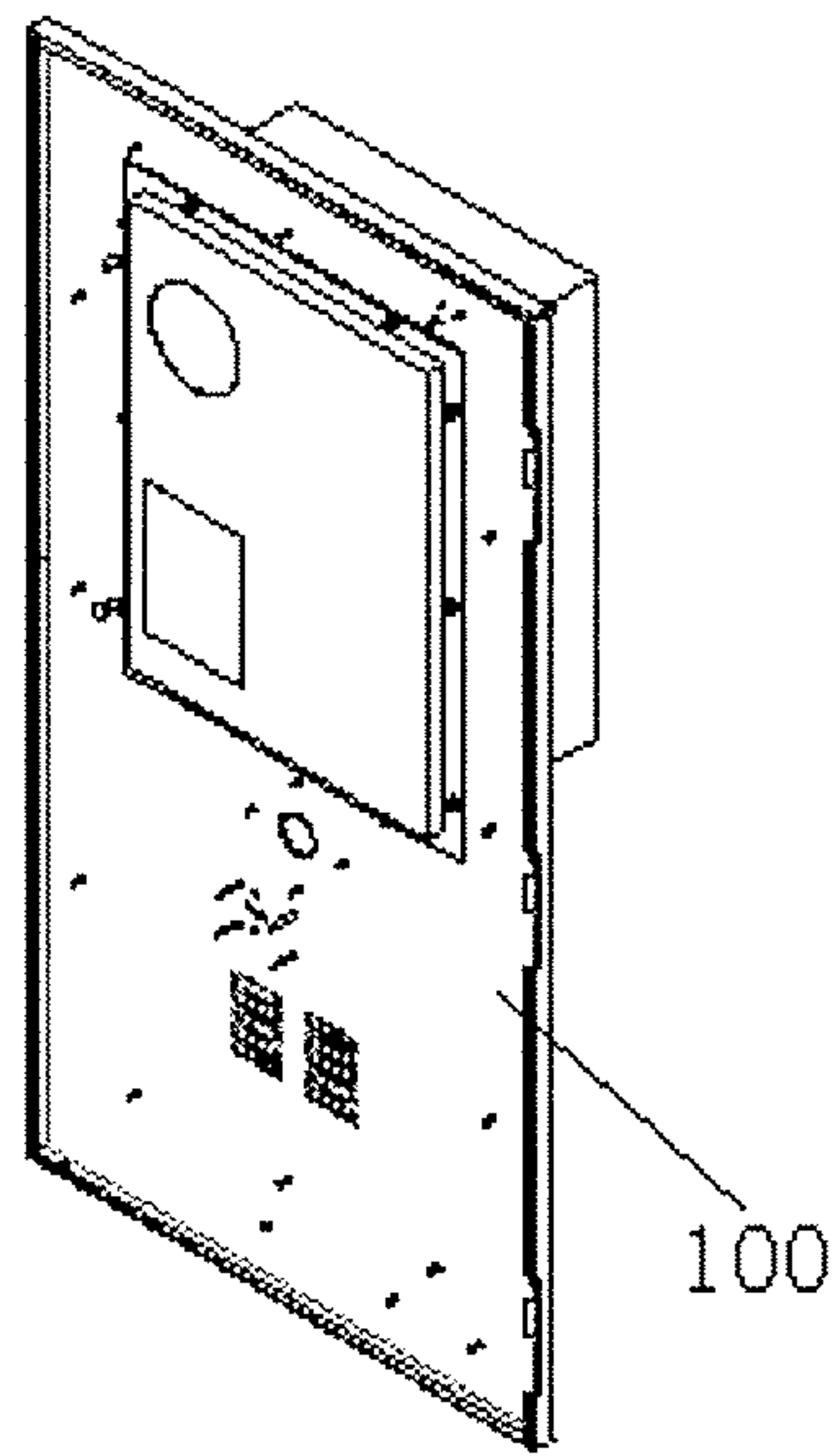


Fig. 3

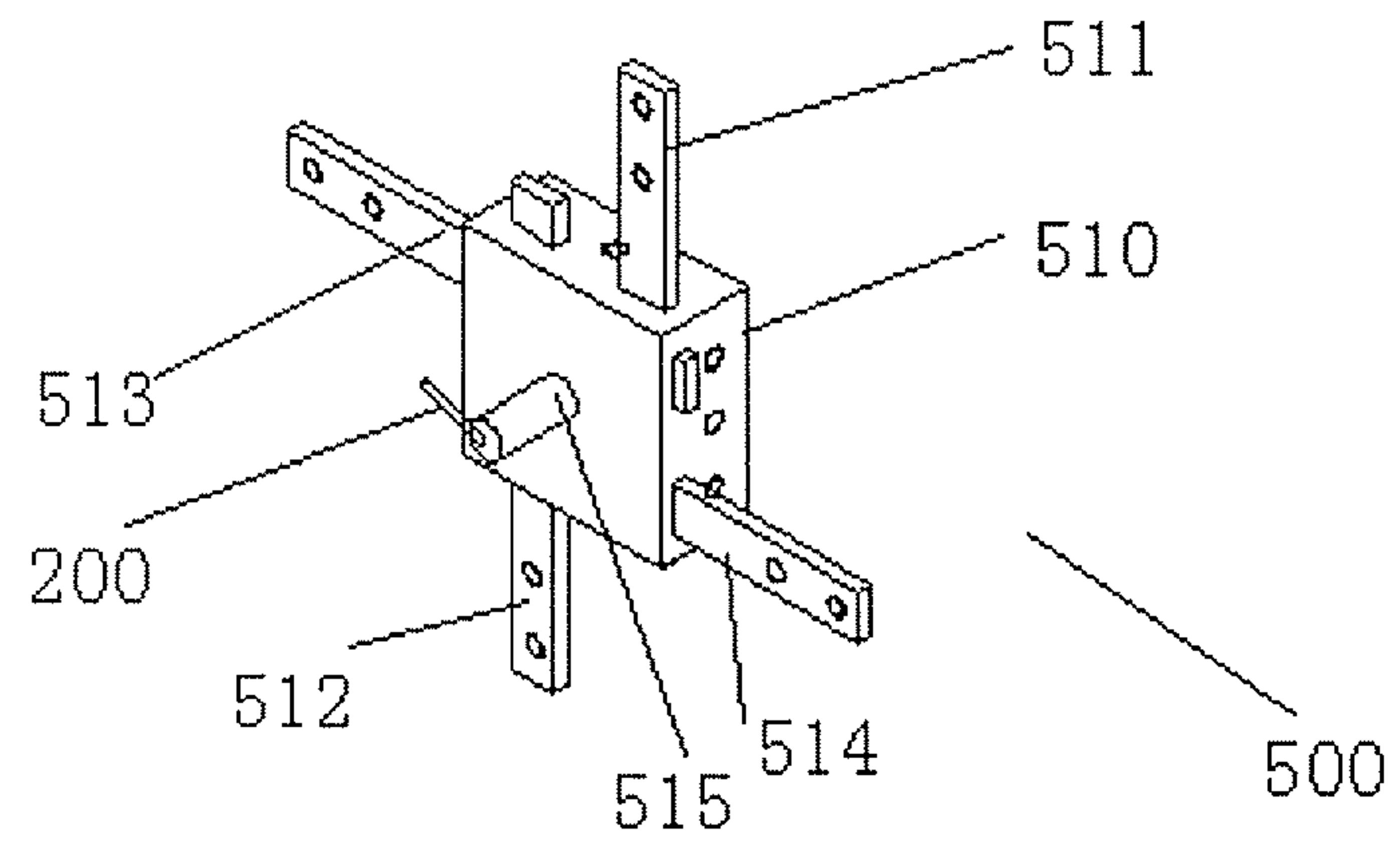


Fig. 4

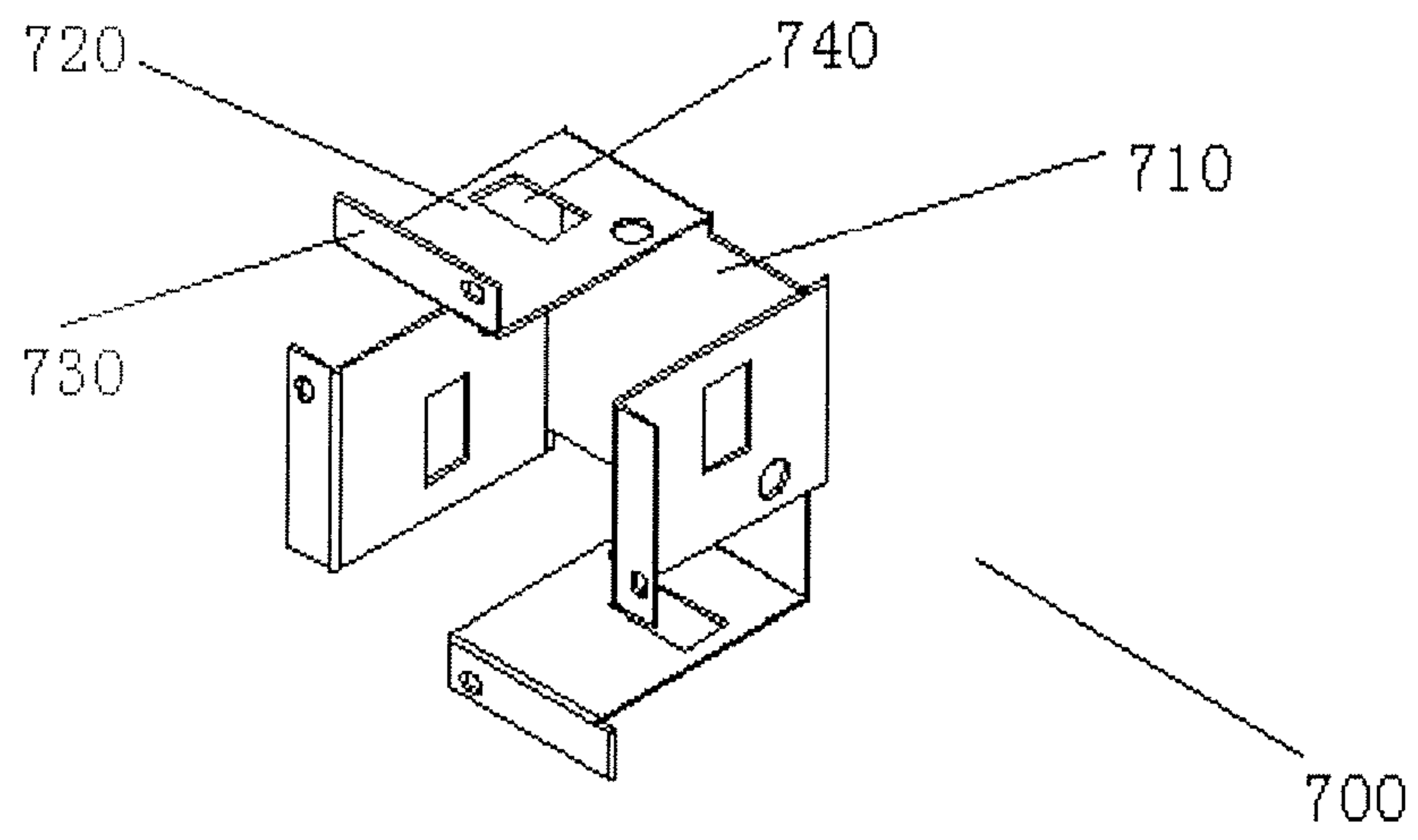


Fig. 5

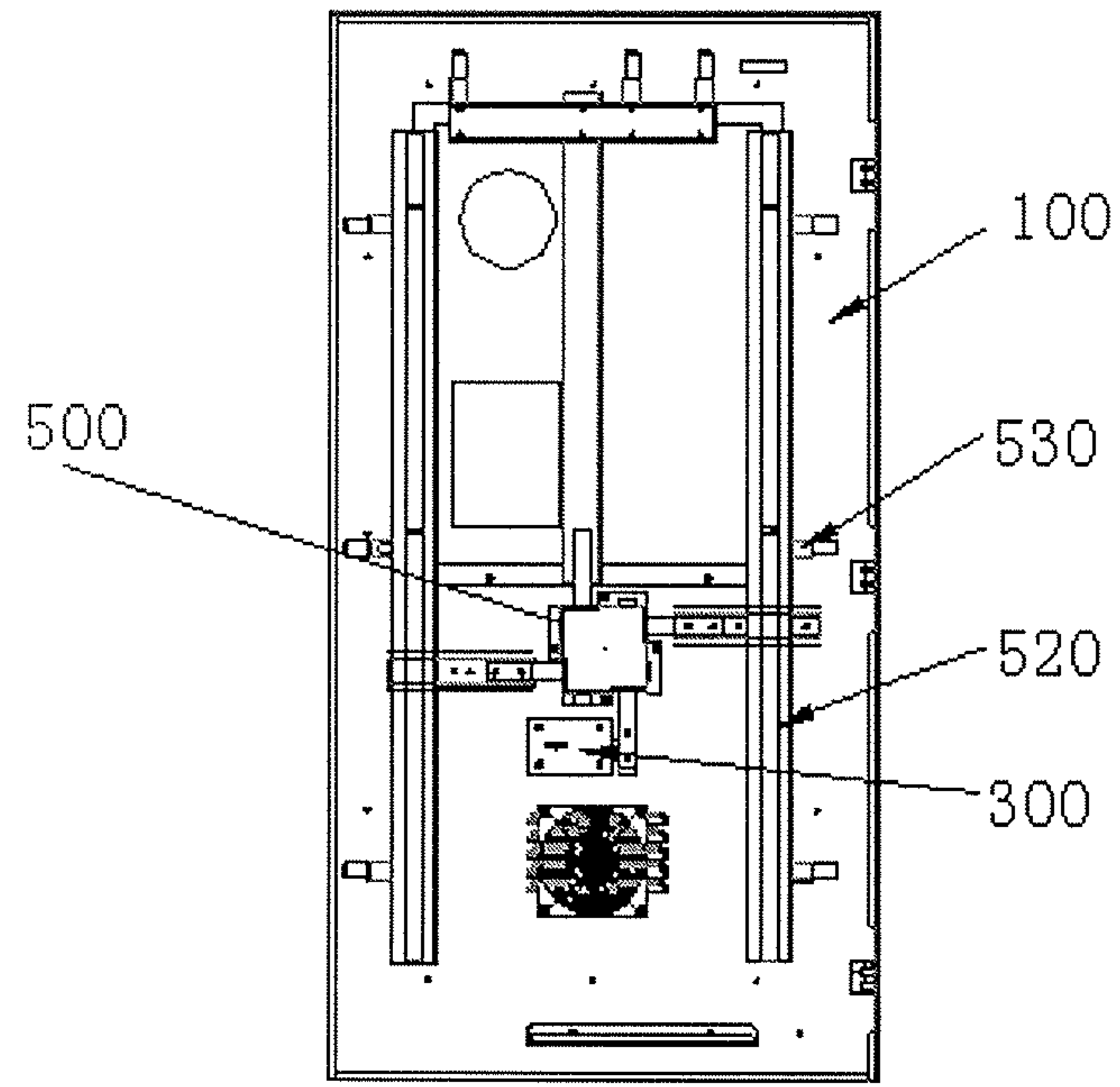


Fig. 6

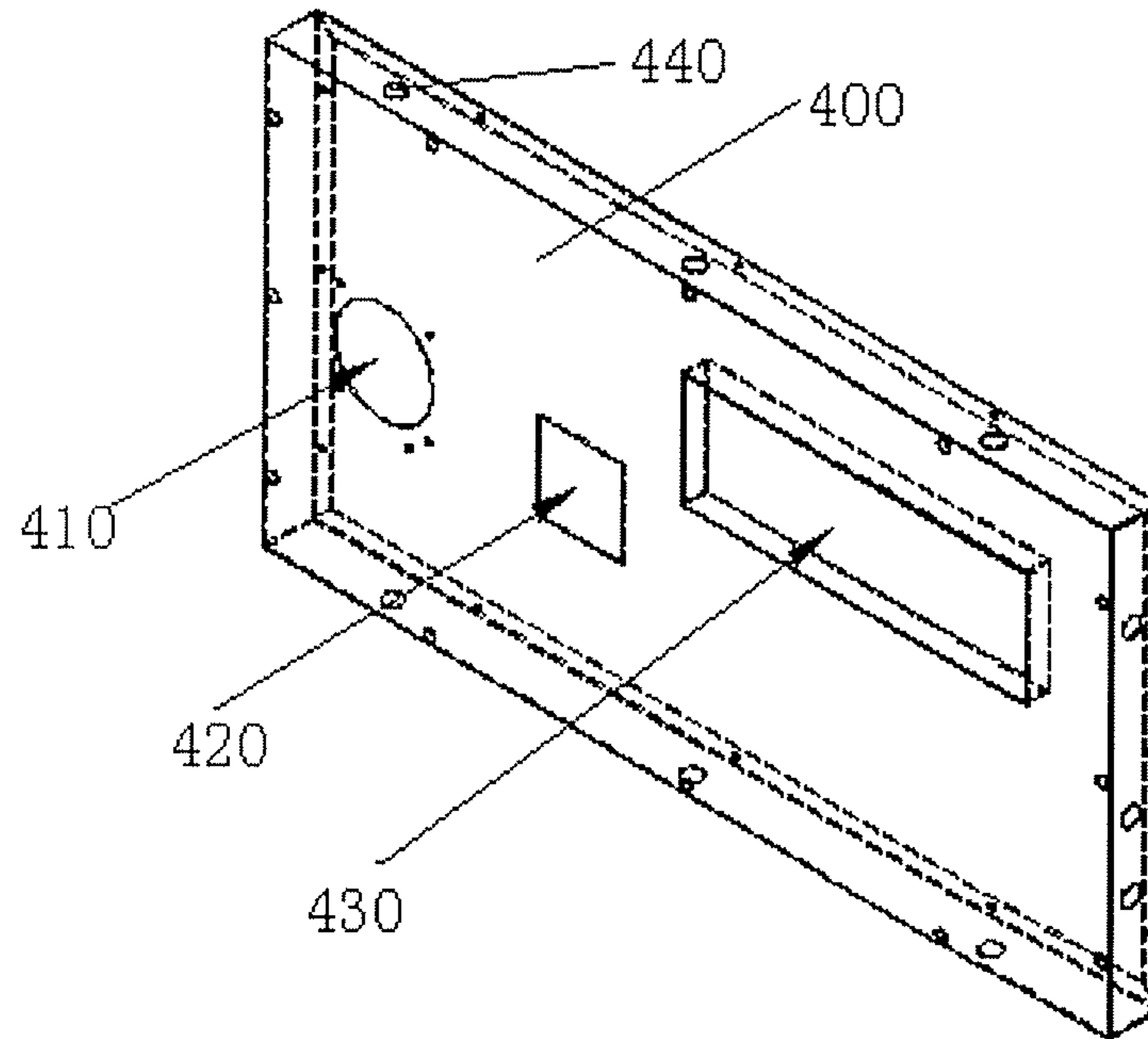


Fig. 7

ANTI-THEFT DEVICE FOR 4G MOBILE COMMUNICATION OUTDOOR CABINET

Technical Field

The invention relates to an anti-theft device, and in particular to an anti-theft device for a 4G mobile communication outdoor cabinet.

Background Art

In 2013, the Ministry of Industry and Information awarded "LTE/the fourth generation digital honeycomb mobile communication services (TD-LTE)" business permit to China Mobile Communications Corporation, China Telecommunications Corporation and China United Network Communications Corporation. At the same time, the Ministry of Industry and Information clearly put forward that it would allow the relevant enterprises to take tests to symmetrically verify the development mode of the LTE FDD and TD-LTE hybrid networking according to the enterprise application. Since this year, the domestic TD-LTE network construction and industry development have achieved preliminary success.

Since China's TD-LTE has been commercial for half year, it has covered more than 300 cities throughout the country, and there are more than 330,000 base stations and above 6,500,000 households of users. At the end of the year, the TD-LTE will cover the vast majority of main urban areas, common urban areas and counties of the prefecture-level cities and the hotspot covering of the part of villages and towns can be achieved. The China Telecom's TD-LTE and the China Unicom's TD-LTE network will also cover the large and medium-sized cities across the country. By the end of 2014, there will be more than 500,000 national 4G base stations. As the 4G network develops and the large-scale 4G base stations are established, the 4G communication outdoor cabinet has a broad development prospect.

At present, the outdoor cabinet on the market mainly adopts a three-point

locking structure, i.e., the cabinet door is locked through a lock tongue, an upper lock rod and a lower lock rod. This locking mode is simple in structure, but has low strength, so it is easy to prize up from the outside to steal the parts in the cabinet.

Summary of the Invention

In order to solve the problems of the above outdoor cabinet, the invention aims at providing an anti-theft device for a 4G mobile communication outdoor cabinet.

In order to achieve the above object, the technical scheme of the invention is as follows:

An anti-theft device for a 4G mobile communication outdoor cabinet, wherein the anti-theft device includes:

a cabinet door panel, wherein the cabinet door panel is arranged on the door of the outdoor cabinet, the cabinet door panel is provided with a four-directional heaven-and-earth lock, the four-directional heaven-and-earth lock is provided with an upper lock rod, a lower lock rod, a left lock rod and a right lock rod respectively, the upper lock rod, the left lock rod and the right lock rod are connected with a transmission lock rod respectively, the transmission lock rod is provided with a plurality of first lock tongues, and each first lock tongue can contact with the inner side of the door frame of the outdoor cabinet respectively;

a revolving handle, wherein the revolving handle is matched with and connected with the four-directional heaven-and-earth lock, and the revolving handle can drive the transmission lock rod on the four-directional heaven-and-earth lock through the four-directional heaven-and-earth lock;

an auxiliary lock, wherein the auxiliary lock is arranged on the cabinet door panel, the auxiliary lock is provided with a second lock tongue, and the second lock tongue is matched with and connected with the lower lock rod; and

an access panel, wherein the access panel is arranged on the door of the outdoor cabinet and covers the cabinet door panel, the four sides of the access panel are provided with a plurality of through holes matched with the first lock tongue

respectively, and the first lock tongue can pass through the through hole to contact with the inner side of the door frame of the outdoor cabinet.

In a preferable embodiment of the invention, the cabinet door plate is provided with an air-conditioning installing port, a four-directional heaven-and-earth lock installing port, an auxiliary lock installing port and a hydrogen discharging fan installing port respectively.

In a preferable embodiment of the invention, the anti-theft device further comprises a lock box, the lock box comprises a panel, the four sides of the panel are perpendicularly provided with baffles respectively, each baffle is perpendicularly provided with a connecting plate, each baffle passes through the four-directional heaven-and-earth lock installing port respectively and fixed on the cabinet door plate through the connecting plate, and the four-directional heaven-and-earth lock is fixed on the panel.

In a preferable embodiment of the invention, each baffle is provided with a square hole respectively, the upper lock rod, the left lock rod and the right lock rod pass through the square hole to connect with the transmission lock rod respectively, and the lower lock rod passes through the square hole to contact with the second lock tongue on the auxiliary lock.

In a preferable embodiment of the invention, the top end of the transmission lock rod is provided with a connecting hole respectively.

In a preferable embodiment of the invention, the lock tongue is welded by a jointing element and round steel, the jointing element is matched with and connected with the connecting hole, and the round steel can contact with the inner side of the door frame of the outdoor cabinet.

In a preferable embodiment of the invention, the access panel is provided with an air outlet of an air conditioner or a heat exchanger and an inlet and an outlet of a cable.

Through the above technical scheme, the invention has the beneficial effects as follows:

According to the invention, the structure is simple, the anti-theft device is arranged on the door of the outdoor cabinet, various maintenance operations can be conveniently performed when the cabinet door opens, the anti-theft device does not occupy the installing space of the device in the cabinet when the cabinet door closes, which does not neither affect the normal operation of the device not affect the connection between the outdoor cabinet and the outer component.

According to the invention, the whole strength is high, the upper direction, the lower direction, the left direction and the right direction of the cabinet door are all clamped to prevent from prizing up the cabinet door from outside, thereby greatly improving the safety of the outdoor cabinet.

Brief Description of the Drawings

In order to more clearly illustrate the embodiments of the invention or the technical scheme in the prior art, the embodiments or the drawings as required to use in the description of the prior art are simply introduced hereinafter. Obviously, the drawings in the description hereinafter are only some embodiments in the invention. Those common skilled in the art can further acquire other drawings according to these drawings at the premise without giving creative work.

Fig. 1 is a schematic structural diagram of the invention;

Fig. 2 is a schematic structural diagram of cabinet door panel;

Fig. 3 is a fitting installation drawing of a cabinet door panel and an air conditioner;

Fig. 4 is a schematic structural diagram of a four-directional heaven-and-earth lock;

Fig. 5 is a schematic structural diagram of a lock box;

Fig. 6 is a fitting installation drawing of a cabinet door panel and a four-directional heaven-and-earth lock; and

Fig. 7 is a schematic structural diagram of an access panel.

Detailed Description of the Preferred Embodiments

In order to enable the technological means achieved by the invention, creative features, reached object and effect to be prone to understand, the invention is further illustrate hereinafter with reference to the specific diagram forms.

See Fig. 1 to Fig. 7, an anti-theft device for a 4G mobile communication outdoor cabinet provided in the invention includes a cabinet door panel 100, a revolving handle 200, an auxiliary lock 300 and an access panel 400.

The cabinet door panel 100 takes the shape of rectangle, the whole side is smaller than the size of the door of the outdoor cabinet, the cabinet door panel is installed on the cabinet door for installing a locking device, and the cabinet door is controlled to open and close through the locking device, so that the safety is improved.

The locking device includes a four-directional heaven-and-earth lock 500, which can lock the four directions of the door of the outdoor cabinet with tremendous breakage-proof function.

The four-directional heaven-and-earth lock 500 specifically includes a main lock body 510, the four directions of the main lock body 510 are provided with an upper lock rod 511, a lower lock rod 512, a left lock rod 513 and a right lock rod 514, the middle portion of the main lock body 510 is provided with a linkage rod 515, the interlocking rod 515 is linked with the upper lock rod 511, the lower lock rod 512, the left lock rod 513 and the right lock rod 514 respectively, and the upper lock rod 511, the lower lock rod 512, the left lock rod 513 and the right lock rod 514 can be driven to move when the linkage rod 515 rotates.

The top ends of the upper lock rod 511, the left lock rod 513 and the right lock rod 514 are connected with a transmission lock rod 520 respectively, the transmission lock rod 520 is provided with a plurality of first lock tongues 530 respectively. In this way, the transmission lock rod 520 can drive the first lock tongue 530 to extend and retract when the linkage rod 515 rotates.

For convenience in motion, a groove is arranged below the transmission lock

rod 520, the cabinet door panel 100 is installed with an idler wheel, and the transmission lock rod 520 can slide through the idler wheel.

The first lock tongue 530 is used for locking the cabinet door and is specifically welded by a jointing element and round steel, the jointing element is matched with and connected with a connecting hole on the transmission lock rod 520, and the round steel can contact with a door frame 600 of the outdoor cabinet. In this way, the first lock tongue 530 can contact with the inner side of the frame 600 when the transmission lock rod 520 pushes the first lock tongue 530 to extend so as to achieve the locking between the cabinet door and the door frame 600.

The cabinet door panel 100 is provided with an air-conditioning installing port 110, a four-directional heaven-and-earth lock installing port 120, an auxiliary lock installing port 130 and a hydrogen discharging fan installing port 140 respectively.

The air conditioner can be installed from the air-conditioning installing port 110 to outside and fixed with screws pressed and riveted on the door panel. During fixation, a fastening mode of a flat washer, an elastic washer and a hexagon nut is adopted. The structure is firm, thereby effectively preventing looseness due to vibration when the air conditioner is running.

The four-directional heaven-and-earth lock installing port 120 can be used for installing the four-directional heaven-and-earth lock 500, the auxiliary lock installing port 130 is used for installing the auxiliary lock 300, and the hydrogen discharging fan installing port 140 is used for installing a hydrogen discharging fan.

As the cabinet door panel 100 is wholly a panel, and the parts of the four-directional heaven-and-earth lock 500 are more, are uneasy to install on the cabinet door panel and also are inconvenient to use on the cabinet door panel 100, a lock box 700 is arranged on the cabinet door panel 100 according to the invention.

The lock box 700 is used for installing the four-directional heaven-and-earth lock 500 and is convenient for the four-directional heaven-and-earth lock 500 to use on the cabinet door panel 100, the lock box 700 mainly includes a panel 710, four sides of the panel 710 are perpendicularly provided with baffles 720 respectively,

each baffle is perpendicularly provided with a connecting plate 730, each baffle 720 passes through the four-directional heaven-and-earth lock installing port 120 respectively and is fixed on the cabinet door panel 100 through the connecting plate 730, so that the lock box 700 can be integrally fixed on the cabinet door panel 100;

A screw hole can be opened in the panel 710, the four-directional heaven-and-earth lock 500 is fixed on the panel 710, and the linkage rod 515 can pass through the screw hole;

Each baffle 720 is opened with a square hole 740 respectively, and the upper lock rod 511, the lower lock rod 512, the left lock rod 513 and the right lock rod 514 can pass through the square hole 740 to match with and connect with the transmission lock rod 520.

The revolving handle 200 is arranged on the linkage rod 515, the linkage rod 515 can be driven by rotating the revolving handle 200 to rotate, so as to achieve the interlocking.

The locking device further includes an auxiliary lock 300, the auxiliary lock 300 is installed on the cabinet door panel 100 through the auxiliary lock installing port 130 and located below the four-directional heaven-and-earth lock 500;

The auxiliary lock 300 is used for limiting the working condition of the four-directional heaven-and-earth lock 500, the auxiliary lock 300 is provided with a second lock tongue, the second lock tongue can contact with the lower lock rod 512, when the second lock tongue contacts with the lower lock rod 512 by rotating the auxiliary lock 300, the second lock tongue will position the lower lock rod 512, the four-directional heaven-and-earth lock 500 cannot work at this time, and when the second lock tongue is separated from the lower lock rod 512, the four-directional heaven-and-earth lock 500 can work.

The access panel 400 is wholly a cuboid in the shape of opening and is installed on the cabinet door panel 100 to cover the cabinet door panel 100, and the access panel 400 is used for protecting the cabinet door panel 100 and the locking device on the cabinet door panel 100, so as to avoid a thief from damaging from

outside.

The access panel 400 is provided with an air outlet 410 of an air conditioner or a heat exchanger, a lock box hole 420, a hydrogen discharging hole 430 and an inlet and an outlet of a cable.

The air outlet 410 of the air conditioner or the heat exchanger can be convenient to discharge the hot gas produced from the air-conditioner or the heat exchanger, the lock box hole 420 is used for fixing the lock box 700, the hydrogen discharging hole 430 is convenient for the hydrogen discharging fan to discharge gas, and the inlet and outlet of the cable is convenient for wiring.

The four sides of the access panel 400 are provided with a plurality of through holes 440 matched with the first lock tongue 530 respectively, and the first lock tongue 530 can pass through the through hole 440 to contact with the inner side of the door frame 600 of the outdoor cabinet.

The specific working steps of the invention are as follows:

After closing the cabinet door, the revolving handle 200 rotates to drive the linkage rod 515 to rotate, the upper lock rod 511, the lower lock rod 512, the left lock rod 513 and the right lock rod 514 can be driven to move when the linkage rod 515 rotates, the transmission lock rod 520 will push the first lock tongues 530 in three directions to extend, and the first lock tongue 530 passes through the through hole 440 in the access panel 400 to clamp inside the cabinet door frame 600;

At this time, the key will lock the auxiliary lock 300 to complete the lock of the cabinet door, each side of the locked cabinet door has the lock tongue to clamp inside the door frame 600, and each side is fixed by the plurality of first lock tongues 530, the structure is firm, the locking is reliable, and the cabinet door can be effectively prevented from being prized up from the outside of the cabinet;

When needing to open the cabinet door, the auxiliary lock 300 needs to be opened by the key, the second lock tongue on the auxiliary lock 300 is separated from the lower lock rod 512, at the this time, the revolving handle 200 can rotate, and the four-directional heaven-and-earth lock 500 can work, so as to retract the

first lock tongue 530.

The above shows and describes the basic principle and main features of the invention as well as the advantages of the invention. Those skilled in the art should understand the invention is not limited by the above-mentioned embodiments. The description of the above-mentioned embodiments and the specification is only to note the principle of the invention. The invention will also have various changes and improvements without departing from the premise of the spirit and the scope of the invention. These changes and improvements all pertain to the scope of the invention as required for protection. The scope of protection as required in the invention is determined by the attached claims and the equivalents thereof.

Claims

1. An anti-theft device for a 4G mobile communication outdoor cabinet, wherein the anti-theft device comprises:

a cabinet door plate, wherein the cabinet door plate is arranged on the door of the outdoor cabinet, the cabinet door plate is provided with an air-conditioning installing port, a four-directional heaven-and-earth lock installing port, an auxiliary lock installing port, a hydrogen discharging fan installing port and a four-directional heaven-and-earth lock, the four-directional heaven-and-earth lock is provided with an upper lock rod, a lower lock rod, a left lock rod and a right lock rod respectively, the upper lock rod, the left lock rod and the right lock rod are connected with a transmission lock rod respectively, each transmission lock rod is provided with a plurality of first lock tongues, and each first lock tongue can contact with the inner side of the door frame of the outdoor cabinet respectively;

a revolving handle, wherein the revolving handle is matched with and connected with the four-directional heaven-and-earth lock, and the revolving handle can drive each transmission lock rod on the four-directional heaven-and-earth lock through the four-directional heaven-and-earth lock;

an auxiliary lock, wherein the auxiliary lock is arranged on the cabinet door plate, the auxiliary lock is provided with a second lock tongue, and the second lock tongue is matched with and connected with the lower lock rod;

an access panel, wherein the access panel is arranged on the door of the outdoor cabinet and covers the cabinet door plate, the four sides of the access panel are provided with a plurality of through holes matched with the first lock tongue respectively, and the first lock tongue can pass through the through hole to contact with the inner side of the door frame of the outdoor cabinet; and

a lock box, the lock box comprises a panel, the four sides of the panel are perpendicularly provided with baffles respectively, each baffle is perpendicularly provided with a connecting plate, each baffle passes through the four-directional

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heaven-and-earth lock installing port respectively and fixed on the cabinet door plate through the connecting plate, and the four-directional heaven-and-earth lock is fixed on the panel.

2. The anti-theft device for the 4G mobile communication outdoor cabinet according to claim 1, wherein each baffle is provided with a square hole respectively, the upper lock rod, the left lock rod and the right lock rod pass through the square hole to connect with each transmission lock rod respectively, and the lower lock rod passes through the square hole to contact with the second lock tongue on the auxiliary lock.

3. The anti-theft device for the 4G mobile communication outdoor cabinet according to claim 1, wherein the top end of each transmission lock rod is provided with a connecting hole respectively.

4. The anti-theft device for the 4G mobile communication outdoor cabinet according to claim 3, wherein the lock tongue is welded by a jointing element and round steel, the jointing element is matched with and connected with the connecting hole, and the round steel can contact with the inner side of the door frame of the outdoor cabinet.

5. The anti-theft device for the 4G mobile communication outdoor cabinet according to claim 1, wherein the access panel is provided with an air outlet of an air conditioner or a heat exchanger and an inlet and an outlet of a cable.