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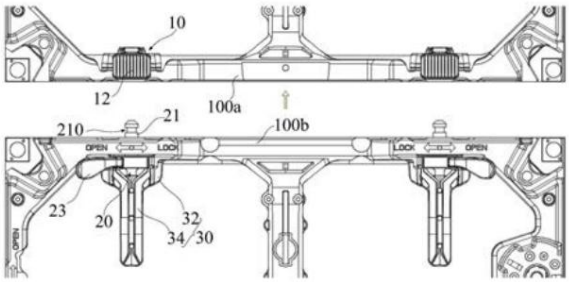
(54) Invention Name

Locking Mechanism and Display Device

(57) Abstract The

present invention relates to a locking mechanism and a display device. The locking mechanism comprises: a female lock fixedly mounted on a first component; a male lock, comprising a locking rod, which is movably mounted on a second component in the up-down direction, and during the upward movement of the locking rod, the top end of the locking rod can be inserted into the female lock and engaged with the female lock; a handle fixedly connected to the second component, and a first operating channel is provided between the handle and the locking rod, which allows the index finger to extend to the bottom end of the locking rod and lift the locking rod upward. In actual use, the handle can be held with both hands to lift the second component. Then, the index finger is used to press the abutting surface of the locking rod, so that the locking rod moves upward and inserts into the female lock and engages with the female lock. At this time, the second component is hung on the first component, and the male lock is further operated to lock, thereby realizing the splicing of the first component and the second component. In this way, only one operator is needed to complete the splicing of the two components, which improves the assembly efficiency and reduces the time and labor costs.



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1. A locking mechanism, used for assembling a first component with a second component located below the first component, characterized in that the locking mechanism comprises: a female lock, fixedly mounted on the first component; a

male lock, comprising a locking rod, wherein the locking rod is movably

mounted on the second component in an up-and-down direction, and during the upward movement of the locking rod, the top end of the locking rod can be inserted into the female lock and engaged with the female lock; a supporting surface is provided at the bottom end of the locking rod; and a handle, fixedly connected to the second component, wherein a first operating channel is provided between the handle and the locking

rod for allowing an index finger to resist the supporting surface and lift the locking rod upward when the handle is held, and the first operating channel is spaced by a preset distance between the handle and the locking rod so that the index finger can reach the supporting surface at the bottom end of the locking rod when the handle is held with both hands.

2. The locking mechanism according to claim 1, characterized in that the female lock comprises an operating handle which can be operated to

The operating handle realizes the separation of the female lock and the locking rod;

The operating handle is located above the handle, and a second operating channel is provided between the operating handle and the handle for the thumb to extend to the operating handle and operate the operating handle when the handle is held. 3. The locking mechanism according to claim 2, characterized in that the female lock

further comprises a female lock fixedly mounted on the first

The locking seat of the component, and the snap-on assembly;

The lock seat has an inner cavity and a lock hole connected to the inner cavity, the clamping assembly is arranged in the inner cavity,

The component is used for being connected with the locking rod by clamping when the locking rod moves upward and is inserted into the inner cavity through the locking hole;

The operating handle is located outside the lock seat and is connected to the clamping assembly so that the operation can be realized by operating the operating handle.

The clamping assembly is separated from the locking rod.

4. The locking mechanism according to claim 3 is characterized in that the clamping assembly comprises a hanging plate and a first elastic member; the hanging plate is provided with a clamping hole,

one end of the hanging plate passes through the lock seat and is fixedly connected to the operating handle, and the first elastic member abuts between the hanging plate and the inner wall of the lock seat to provide a pre-tightening force that makes the hanging plate have a tendency to move toward the operating handle;

The top end of the locking rod has a slot, and when the top end of the locking rod passes through the locking hole and is inserted into the engaging hole, the hanging plate can be inserted into the slot; when the operating handle is pressed, the hanging plate compresses the first elastic member and moves, so that the hanging plate is disengaged from the slot.

5. The locking mechanism according to claim 4 is characterized in that the clamping assembly also includes a top sleeve and a second elastic member; the top sleeve can be installed in the inner cavity

so as to move up and down, and is located above the hanging plate, and the second elastic member is arranged between the top sleeve and the top wall of the inner cavity to provide a pre-tightening force that causes the top sleeve to have a tendency to move closer to the hanging plate; a limiting portion is provided on the side of the top sleeve facing the hanging plate, and the limiting portion can be inserted into the

clamping hole to limit the hanging plate so that the locking rod can be inserted into the clamping hole.

6. The locking mechanism according to claim 1, characterized in that the handle includes a mounting portion and a gripping portion; the mounting portion is fixedly connected to the

second component, and a mounting position for mounting the male lock is formed on the second component; the gripping portion is fixedly connected to one side of the mounting portion and extends downward. 7. The locking

mechanism according to claim 6, characterized in that the male lock also includes a locking handle and a locking sleeve;

The locking handle can be rotatably mounted on the second component around the axis of the locking rod; the locking sleeve is sleeved on the locking rod and is threadedly connected to the locking rod, and the locking sleeve can rotate synchronously with the locking handle; the mounting portion has an opening located above the grip portion, the locking handle extends from the opening, and can be operably rotated around the locking rod in the opening, thereby driving the locking rod to move up and down along the axis to lock or release the first component and the second component. 8. The locking mechanism according to claim 7, characterized in that one end of the locking handle is fixedly connected to a rotating sleeve; the rotating sleeve is sleeved on the outer side of the locking sleeve and can rotate synchronously with the locking sleeve. 9. The locking mechanism according to claim 8, characterized in that a strip groove extending along the axis of the locking sleeve is provided on the outer side wall of the locking sleeve; a limiting protrusion is convexly provided on the inner side wall of the rotating sleeve, and the limiting protrusion extends into the strip groove so that the rotating sleeve and the locking sleeve rotate synchronously; the upper end of the strip groove is closed and the lower end is open. 10. A display device, comprising a display unit and the locking mechanism according to any one of claims 1 to 9; the first component and the second component are both mounting frames for assembling the display unit.

Locking mechanism and display device

Technical Field

[0001] The present invention relates to the field of LED display technology, and in particular to a locking mechanism and a display device.

Background

[0002] With the development of LED display technology, its application fields are becoming more and more extensive, such as large shopping malls, conference halls,

performance venues, etc. [0003] Generally, a large LED display screen is usually spliced together by multiple boxes equipped with LED display modules. In order to ensure the safety of the display screen and the display consistency after splicing, a locking mechanism needs to be set between the boxes to lock and fix them. However, when using the existing locking mechanism to assemble the boxes, at least one operator is required to lift the box so that the box is aligned with the box above it and keep it, and another operator is required to operate the locking mechanism to lock it, so as to achieve the locking and assembly of the upper and lower boxes. In this way, at least two operators are required to cooperate in the operation to achieve the locking and assembly of the upper and lower boxes, and the assembly efficiency of the boxes is low.

Invention content

[0004] Based on this, it is necessary to provide a locking mechanism and display device that improve the above defects in view of the problem that when the locking mechanism in the prior art is locked and assembled, at least two operators are required to cooperate in the operation to realize the locking and assembly of the upper and lower boxes, which has low assembly efficiency and

high time and labor costs. [0005] A locking mechanism is used for assembling a first component with a second component located below the first component, and the locking

mechanism includes: [0006] A female lock fixedly mounted on the first

component; [0007] A male lock, including a locking rod, the locking rod is movably mounted on the second component along the up-down direction, and during the upward movement of the locking rod, the top end of the locking rod can be inserted into the female lock and engaged with the female lock; the bottom end of the locking rod is provided with a

supporting surface; and [0008] A handle fixedly connected to the second component, and a first operating channel is provided between the handle and the locking rod, which allows the index finger to resist the supporting surface and lift the locking rod upward when the handle is

held. [0009] In actual use, the locking mechanism can be used to hold the handle with both hands and lift the second component so that the male lock installed on the second component is aligned with the female lock installed on the first component and maintained. Then, the index finger is used to press the abutment surface at the bottom end of the locking rod of the male lock so that the locking rod moves upward, thereby inserting the female lock and engaging with the female lock. At this time, the second component is hung on the first component through the locking rod and the female lock. The male lock can be further operated to lock, thereby realizing the splicing of the first component and the second component. In this way, when the above-mentioned locking mechanism is used to realize the splicing of the two components, only one operator is required to complete it, and the operation is simple and fast, which improves the

assembly efficiency and reduces the time and labor costs. [0010] In one embodiment, the female lock includes an operating handle, and the female lock and the lock rod can be separated by

operating the operating handle; [0011] The operating handle is located above the handle, and a second operating channel is provided between the operating handle and the handle, allowing the thumb to extend to the operating handle and press the operating handle when

holding the handle. [0012] In one embodiment, the female lock also includes a lock seat fixedly mounted on the first component, and a snap-on assembly.

[0013] The lock seat has an inner cavity and a locking hole connected to the inner cavity, the clamping assembly is arranged in the inner cavity, and the clamping assembly is used to be clamped and connected with the lock rod when the lock rod moves upward and is inserted into the inner cavity through the locking hole; [0014] The operating handle is located outside the lock seat and is connected to the clamping assembly, so that the clamping assembly can be separated from the lock rod by operating the operating handle. [0015] In one embodiment, the snap-on assembly includes a hanging plate and a first elastic member; [0016] The hanging plate is provided with a snap-on hole, one end of the hanging plate passes through the lock seat and is fixedly connected to the operating handle, and the first elastic member abuts between the hanging plate and the inner wall of the lock seat to provide a pre-tightening force that causes the hanging plate to have a tendency to move toward the operating handle; [0017] The top end of the locking rod is provided with a snap-on groove, and when the top end of the locking rod is inserted into the snap-on hole through the lock hole, the hanging plate can be snapped into the snap-on groove; when the operating handle is pressed, the hanging plate compresses the first elastic member and moves, so that the hanging plate is disengaged from the snap-on groove. [0018] In one embodiment, the clamping assembly further includes a top sleeve and a second elastic member; [0019] The top sleeve is installed in the inner cavity so as to be movable up and down and is located above the hanging plate, and the second elastic member is arranged between the top sleeve and the top wall of the inner cavity to provide a pre-tightening force that makes the top sleeve have a tendency to move toward the hanging plate; [0020] A limiting portion is arranged on one side of the top sleeve facing the hanging plate, and the limiting portion can be inserted into the clamping hole to limit the hanging plate so that the locking rod can be inserted into the clamping hole. [0021] In one embodiment, the handle includes a mounting portion and a gripping portion; [0022] The mounting portion is fixedly connected to the second component, and a mounting position for mounting the male lock is formed on the second component; [0023] The gripping portion is fixedly connected to one side of the mounting portion and extends downward. [0024] In one embodiment, the male lock further comprises a lock handle and a locking sleeve; [0025] The lock handle can be rotatably mounted on the second component around the axis of the lock rod; [0026] The locking sleeve is sleeved on the lock rod and is threadedly connected to the lock rod, and the locking sleeve can rotate synchronously with the lock handle; [0027] The mounting portion has an opening located above the grip portion, the lock handle extends from the opening, and can be operably rotated around the lock rod in the opening, thereby driving the lock rod to move up and down along the axis to lock or release the first component and the second component. [0028] In one embodiment, a third operating channel is provided between the grip portion and the lock handle, which allows the thumb to rotate the lock handle when the grip portion is gripped. [0029] In one embodiment, a rotating sleeve is fixedly connected to one end of the lock handle; [0030] The rotating sleeve is sleeved on the outer side of the locking sleeve, and can rotate synchronously with the locking sleeve. [0031] In one embodiment, the outer wall of the locking sleeve is provided with a strip groove extending along the axis of the locking sleeve; the inner wall of the rotating sleeve is provided with a limiting protrusion, and the limiting protrusion extends into the strip groove so that the rotating sleeve and the locking sleeve rotate synchronously; [0032] The upper end of the strip groove is closed and the lower end is open. [0033] In one embodiment, the male lock further includes a seat sleeve, which is arranged on the outer side of the rotating sleeve, and the top end of the seat sleeve is fixedly connected to the second component, and the inner side wall of the bottom end of the seat sleeve exten

[0034] The seat cover is provided with an avoidance opening, and the lock handle passes through the avoidance opening. [0035] In one embodiment, the side wall of the lock rod is provided with a limit groove extending along the axial direction of the lock rod; [0036] The male lock also includes a limit member, which is fixedly mounted on the second component and one end of which extends into the limit groove to prevent the lock rod from rotating around the axis. [0037] A display device, comprising a display unit and a locking mechanism as described in any of the above embodiments; [0038] The first component and the second component are both installation frames for assembling the display unit.

BRIEF DESCRIPTION OF THE DRAWINGS

[0039] FIG. 1 is a schematic diagram of the structure of a locking mechanism in an embodiment of the present invention; [0040] FIG. 2 is a schematic diagram of the structure of the handle of the locking mechanism shown in FIG. 1 from the rear perspective of the second component; [0041] FIG. 3 is a schematic diagram of the structure of the handle and the male lock of the locking mechanism shown in FIG. 1 from the front perspective of the second component; [0042] FIG. 4 is a schematic diagram of the structure of the handle of the locking mechanism shown in FIG. 1 from the front perspective of the second component; [0043] FIG. 5 is a schematic diagram of the cross-sectional structure of the male lock and the female lock of the locking mechanism shown in FIG. 1; [0044] FIG. 6 is a schematic diagram of the structure of the snap-fit connection between the male lock and the female lock of the locking mechanism shown in FIG. 1; [0045] FIG. 7 is a schematic diagram of the exploded structure of the female lock of the locking mechanism shown in FIG. 1; [0046] FIG. 8 is a schematic diagram of the exploded structure of the male lock of the locking mechanism shown in FIG. 1; [0047] FIG. 9 is a top view of the lock handle of the male lock shown in FIG. 8; [0048] FIG. 10 is a cross-sectional view of the lock handle of the male lock shown in FIG. 8.

Specific embodiments [0049]

To facilitate understanding of the present invention, the present invention will be described in more detail below with reference to the accompanying drawings. Preferred embodiments of the present invention are shown in the accompanying drawings. However, the present invention can be implemented in many different forms and is not limited to the embodiments described herein. On the contrary, the purpose of providing these embodiments is to make the understanding of the disclosure of the present invention more thorough and comprehensive. [0050] It should be noted that when an element is referred to as being "fixed to" another element, it can be directly on the other element or there can also be a central element. When an element is considered to be "connected to" another element, it can be directly connected to the other element or there can be a central element at the same time. The terms "vertical", "horizontal", "left", "right" and similar expressions used herein are for illustrative purposes only. [0051] Unless otherwise defined, all technical and scientific terms used herein have the same meaning as those generally understood by technicians in the technical field to which the present invention belongs.

The terms used in the specification of the present invention herein are only for the purpose of describing specific embodiments and are not intended to limit the present invention. The term "and/or" used herein includes any and all combinations of one or more of the related listed items. [0052] Generally, the box of the display device is spliced from top to bottom, first fixing and installing the top box, and then assembling the lower boxes in sequence. That is, after installing the upper box, the lower box is hoisted, and the upper box and the lower box are locked and fixed in sequence through a locking mechanism, thereby realizing the assembly of the boxes. However, when using the existing locking mechanism to assemble the boxes, an operator is required to lift the lower box to align it with the upper box and hold it, and another operator is required to operate the locking mechanism to lock and fix it, so as to realize the assembly of the upper box and the lower box. Therefore, at least two operators are required to cooperate in the operation to realize the assembly of the upper and lower boxes, resulting in low assembly efficiency, high time cost and labor cost.

[0053]

Therefore , it is necessary to provide a locking mechanism and a display device that improve assembly efficiency and reduce time and labor costs in view of the above problems. [0054] FIG. 1 shows

an assembly structure of a locking mechanism in one embodiment of the present invention. FIG. 2 shows the structure of the handle of the locking mechanism shown in FIG. 1 from the rear perspective of the second component. FIG. 3 shows the structure of the handle and the male lock of the locking mechanism shown in FIG. 1 from the front perspective of the second component. FIG. 4 shows the structure of the handle of the locking mechanism shown in FIG. 1 from the front perspective of the second component. For ease of description, the accompanying drawings only show structures related to the present

invention. [0055] As shown in FIG. 1, FIG. 2 and FIG. 3, a locking mechanism provided in one embodiment of the present invention is used to realize the assembly of a first component 100a and a second component 100b located below the first component 100a. It should be noted that the first component 100a and the second component 100b can be the housing of the display device or other components. And the structures of the first component 100a and the second component 100b can be the same or different. In other words, the structure and use of the first component 100a and the second component 100b are not limited to the display device. [0056] In the present embodiment, the locking mechanism includes

a female lock 10, a male lock 20 and a handle 30. The female lock 10 is fixedly mounted on the first component 100a. The male lock 20 includes a locking rod 21, which is movably connected to the second component 100b in the up-down direction. During the upward movement of the locking rod 21, the top end of the locking rod 21 can be inserted into the female lock 10 and connected with the female lock 10 by clamping. The bottom end of the locking rod 21 is provided with a supporting surface 212 (see FIG. 5), which can be used for the index finger to support and lift the locking rod 21 upward. [0057] The handle 30 is

fixedly connected to the second component 100b, and a first operation channel is provided between the handle 30 and the locking rod 21, so that the index finger can be extended to the abutting surface 212 and the locking rod 21 can be lifted upward when the handle is held, so that the handle 30 can be held with both hands to align the male lock 20 and the female lock 10 and hold them, and at the same time, the abutting surface 212 at the bottom end of the locking rod 21 can be pressed with the index finger to lift the locking rod 21 upward, so that the locking rod 21 is inserted into the female lock 10 and engaged with the female lock 10, thereby hanging the

second component 100b on the first component 100a. [0058] In actual use, the locking mechanism can be held with both hands to lift the second component 100b, so that the male lock 20 installed on the second component 100b is aligned with the female lock 10 installed on the first component 100a and held. Then, the index finger is used to press the abutting surface 212 at the bottom end of the locking rod 21 of the male lock 20, so that the locking rod 21 moves upward, thereby inserting the female lock 10 and engaging with the female lock 10. At this time, the second component 100b is hung on the first component 100a through the engaging connection between the locking rod 21 and the female lock 10, and the male lock 20 can be further operated to lock, thereby realizing the splicing of the first component 100a and the second component 100b. In this way, when the above-mentioned locking mechanism is used to realize the splicing of the two components, only one operator is required to complete it, and the operation is simple and fast, which improves the assembly efficiency

and reduces the time and labor cost. [0059] It should be noted that since the handle 30 is fixedly connected to the second component 100b, it can be integrally formed with the second component 100b, that is, the second component 100b and the handle 30 are formed by a set of molds, without the need to re-open the mold, and almost no

increase in manufacturing cost. [0060] Optionally, the first operating channel can be formed by spacing a preset distance between the handle 30 and the locking rod 21. The preset distance can be determined according to the length of the index finger to ensure that when the handle is held with both hands, the index finger can reach the abutting surface at the bottom end of the locking rod and can be pressed conveniently. Optionally, the preset distance can be 3 cm to 20 cm. Preferably, the preset distance can be 3 cm to 12 cm. In this way, the abutting surface at the bottom end of the locking rod 21 can be pressed upward more conveniently with the index finger, further reducing the difficulty of operation. Specifically in one embodiment, the distance between the handle 30 and

the locking rod 21 can be 6 cm. [0061] FIG. 5 shows the cross-sectional structure of the male lock and the female lock of the locking mechanism shown in FIG. 1. FIG. 6 shows the structure of the snap-fit connection between the male lock and the female lock of the locking mechanism shown in FIG. 1. FIG. 7 shows a schematic diagram of the exploded

structure of the female lock of the locking structure shown in FIG. 1. [0062] Referring to FIGS. 5, 6 and 7, in the embodiment of the present invention, the female lock 10 includes an operating ha

The operating handle 12 is operated to separate the female lock 10 from the locking rod 21;

[0063] The operating handle 12 is located above the handle 30, and a second operating channel is provided between the operating handle 12 and the handle 30 for the thumb to extend to the operating handle 12 and operate the operating handle 12 when the handle 30 is held. [0064] In some embodiments, the female lock 10 further comprises a lock seat 13 fixedly mounted on the first component 100a, and a snap-fit assembly (not shown). [0065] The lock seat 13 comprises an inner cavity and a lock hole 1302 communicating with the inner cavity, and the snap-fit assembly is disposed in the inner cavity, and the snap-fit assembly is used to snap-fit with the locking rod 21 when the locking rod 21 moves upward and is inserted into the inner cavity through the lock hole 1302. In this way, when the abutting surface 212 at the bottom end of the locking rod 21 is pressed by the index finger, the locking rod 21 moves upward, thereby being inserted into the lock hole 1302 and snap-fitting with the snap-fit assembly. When it is necessary to disassemble the first component 100a and the second component 100b, the snap-fit assembly can be operated to separate the snap-fit assembly from the locking rod 21. [0066] The operating handle 12 is located outside the lock seat 13 and is connected to the snap-fit assembly. The snap-fit assembly and the locking rod 21 can be separated by operating the operating handle 12. In this way, when disassembly is required, the male lock 20 is first operated to change the male lock 20 from a locked state to a released state. Then, the handle 30 is held with both hands to lift the second component 100b. At the same time, the operating handle 12 is operated with the thumb to separate the snap-fit assembly from the locking rod 21, thereby achieving the disassembly of the first component 100a and the second component 100b. [0067] Specifically in the embodiment, the snap-fit assembly includes a hanging plate 11 and a first elastic member 112. The hanging plate 11 is provided with a snap-fit hole 114 (see FIG. 7). One end of the hanging plate 11 passes through the lock seat 13 and is fixedly connected to the operating handle 12. The first elastic member 112 abuts between the hanging plate 11 and the inner wall of the lock seat 13 to provide a pre-tightening force that makes the hanging plate 11 have a tendency to move toward the operating handle 12. [0068] The top end of the lock rod 21 has a slot 210. When the top end of the lock rod 21 passes through the lock hole 1302 and is inserted into the snap-fit hole 114, the hanging plate 11 can be snapped into the slot 210 under the action of the first elastic member 112, thereby realizing the snap-fit connection between the lock rod 21 and the hanging plate 11. [0069] In this way, when the handle is held with both hands and the index finger is used to press the abutting surface 212 at the bottom end of the lock rod 21 to move the lock rod 21 upward, the top end of the lock rod 21 passes through the lock hole 1302 and then inserts into the clamping hole 114 of the hanging plate 11, so that the hanging plate 11 is clamped into the clamping groove 210 of the lock rod 21, thereby realizing the clamping connection between the male lock 20 and the female lock 10, that is, realizing the second component 100b hanging on the first component 100a. At this time, even if the handle 30 is released, the second component 100b will not fall off, so the male lock 20 can be further operated to lock and fix the first component 100a and the second component 100b. [0070] When the operating handle 12 is pressed, the hanging plate 11 can compress the first elastic member 112 under the action of the pressing force and move, so that the hanging plate 11 is separated from the lock rod 21, thereby realizing the disassembly of the first component 100a and the second component 100b. [0071] Optionally, the first elastic member 112 may be a spring. In one embodiment, in order to ensure the stability of the movement of the hanging plate 11, a plurality of first elastic members 112 may be arranged side by side. In the embodiment shown in FIG. 7, two first elastic members 112 are arranged side by side.

112.

[0072] Specifically in the embodiment, the clamping assembly further includes a top sleeve 14 and a second elastic member 15. [0073] The top sleeve 14 is movably installed in the inner cavity of the lock seat 13 along the up and down directions, and is located above the hanging plate 11. The second elastic member 15 is arranged between the top sleeve 14 and the top wall of the inner cavity to provide a pre-tightening force that makes the top sleeve 14 have a tendency to move toward the hanging plate 11. A limiting portion 140 is provided on the side of the top sleeve 14 facing the hanging plate 11, and the limiting portion 140 can be inserted into the clamping hole 114 to limit the hanging plate 110, so that the locking rod 21 can be inserted into the clamping hole 114. Therefore, when the operating handle 12 is not pressed, the top sleeve 14 is held against the hanging plate 11 by the elastic force of the second elastic member 15, so that the limiting portion 140 is inserted into the engaging hole 114, the hanging plate 11 is positioned, and the engaging hole 114 corresponds to the locking hole 1302, so that the locking rod 21 can be inserted into the engaging hole 114 to achieve engaging. [0074] In this way, when it is necessary to achieve engaging between the locking rod 21 and the hanging plate 11, and the index finger is used to press the abutting surface 212 at the bottom end of the locking rod 21, the locking rod 21 moves upward to lift the top sleeve 14 upward and insert it into the engaging hole 114, so that the limiting portion 140 is disengaged from the engaging hole 114. At this time, the hanging plate 11 is engaged in the engaging slot 210 by the elastic force of the first elastic member 112, so that the locking rod 21 and the hanging plate 11 are engaged.

[0075] When it is necessary to disengage the locking rod 21 from the hanging plate 11, hold the handle with both hands (to prevent the second component 100b from falling off after the locking rod 21 is disengaged from the snap- fitting part 11), and use the thumb to press the operating handle 12, so that the hanging plate 11 is disengaged from the slot 210, and the locking rod 21 moves downward under the action of gravity and disengages from the mother lock 10. At the same time, the top sleeve 14 moves downward under the elastic force of the second elastic part 15, so that the limiting part 140 is inserted into the snap-fitting hole to limit the hanging plate 11. [0076] Specifically in the embodiment, the lock seat 13 includes a base 130 and an upper cover 132, the base 130 is fixedly installed on the first component 100a, the upper cover 132 is fixedly installed on the base 130, and is enclosed with the base 130 to form the above-mentioned inner cavity, and the lock hole 1302 is opened on the base 130.

[0077] Please continue to refer to Figures 1 to 4. In an embodiment of the present invention, the handle 30 includes a mounting portion 32 and a gripping portion 34. The mounting portion 32 is fixedly connected to the second component 100b, and a mounting position 320 (see Figure 4) for mounting the male lock 20 is formed on the second component 100b. The gripping portion 34 is fixedly connected to one side of the mounting portion 32 and extends downward for easy gripping. [0078] Figure 8 shows the exploded structure of the male lock of the locking mechanism shown in Figure 1. Figure 9 shows a top view of the lock handle of the male lock shown in Figure 8. Figure 10 shows a cross-sectional view of the lock handle of the male lock shown in Figure 8. [0079] Please also refer to Figures 5 to 10. In some embodiments, the male lock 20 also includes a lock handle 23 (see Figure 8) and a locking sleeve 22. The lock handle 23 can be rotatably mounted on the second component 100b around the axis of the lock rod 21. The locking sleeve 22 is sleeved on the locking rod 21 and is threadedly connected to the locking rod 21, and the locking sleeve 22 can rotate synchronously with the locking handle 23. Rotating the locking handle 23 can drive the locking rod 21 to move along its own axis (i.e., in the up-down direction) to lock or release the first component 100a and the second component 100b. [0080] The mounting portion 32 has an opening 322 (see FIG. 2 and FIG. 4) located above the grip portion 34, and the locking handle 23 extends from the opening 322 and can be operably rotated around the locking rod 21 in the opening 322, thereby driving the locking rod 21 to move up and down along the axis to lock or release the first component 100a and the second component 100b. [0081] When assembling the first component 100a and the second component 100b, the handle 30 can be held with both hands to lift the second component 100b, so that the male lock 20 is aligned with the female lock 10 and is maintained. Then, the index finger is used to press the abutting surface 212 at the bottom end of the lock rod 21, so that the lock rod 21 moves upward, is inserted into the engaging hole 114, and engages with the hanging plate 11, so that the second component 100b is hung on the first component 100a. Then, the thumb is used to rotate the lock handle 23, so that the lock rod 21 moves downward and locks and fixes the first component 100a and the second component 100b. [0082] When it is necessary to disassemble the first component 100a and the second component 100b, first, the lock handle 23 is loosened to loosen the first component 100a and the second component 100b. Then, the handle 30 is held with both hands to lift the second component 100b, and the thumb is used to press the operating handle 12 of the mother lock 10 to disengage the lock rod 21 from the hanging plate 11, so that the first component 100a and the second component 100b are separated. [0083] In this way, the lock handle 23 extends out from the opening 322, so that the lock handle 23 and the grip portion 34 are located on the same side of the mounting portion 32, which facilitates the rotation of the lock handle 23. At this time, the assembly and disassembly of the first component 100a and the second component 100b only require one operator, and the operation is simple and quick. [0084] It should be noted that, in one embodiment, during the rotation of the lock handle 23, the lock handle 23 includes a locking position and a release position. When the lock handle 23 is pulled from the release position to the lock position, the locking sleeve 22 rotates and drives the lock rod 21 to move downward relative to the locking sleeve 22, thereby locking the first component 100a and the second component 100b. When the lock handle 23 is pulled from the locking position to the release position, the locking sleeve 22 rotates and drives the lock rod 21 to move upward relative to the locking sleeve 22, thereby releasing the first component 100a and the second component 100b. [0085] Optionally, the internal thread of the locking sleeve 22 and the external thread of the locking rod 21 may be trapezoidal threads, thereby effectively preventing the connection between the locking sleeve 22 and the locking rod 21 from loosening. It is understandable that the internal thread of the locking sleeve 22 and the external thread of the locking rod 21

A left-hand thread or a right-hand thread may be used, which is not limited here. [0086] Specifically in the embodiment, a third operation channel is provided between the grip portion 34 and the lock handle 23, which allows the thumb to turn the lock handle 23 to rotate when the grip portion 34 is gripped. In this way, while holding the grip portion of the handle with both hands, the lock handle 23 can be rotated by the thumb to lock or release the first component 100a and the second component 100b, which is convenient and quick to operate. [0087] Specifically in the embodiment, a rotating sleeve 230 is fixedly connected to one end of the lock handle 23. The rotating sleeve 230 is sleeved on the outer side of the locking sleeve 22 and can rotate synchronously with the locking sleeve 22. In this way, the locking sleeve 22 can be driven to rotate around the axis of the locking rod 21 by rotating the lock handle 23, thereby driving the locking rod 21 to move in the up and down directions relative to the locking sleeve 22. [0088] Please refer to FIG. 8, FIG. 9 and FIG. 10. Specifically, in the embodiment, the outer wall of the locking sleeve 22 is provided with a strip groove 220 extending along the axis of the locking sleeve 22, and the inner wall of the rotating sleeve 230 is provided with a limiting protrusion 2302, which extends into the strip groove 220 so that the rotating sleeve 230 and the locking sleeve 22 can rotate synchronously. In this way, the locking handle 23 and the locking sleeve 22 can rotate synchronously. At the same time, the strip groove 220 extending along the axis of the locking sleeve 22 is provided so that the limiting protrusion 2302 can move along the extending direction of the strip groove 220, that is, the locking sleeve 22 can move a certain distance along the axis direction of the locking rod 21 with the locking rod 21. That is, the locking rod 21 and the locking sleeve 22 can be moved upward together by pressing the abutting surface 212 at the bottom end of the locking rod 21 with the index finger, so that the locking rod 21 and the locking sleeve 22 can be connected with the clamping member 110. Furthermore, when the first component 100a and the second component 100b are disassembled, after the locking rod 21 is separated from the clamping member 110, the locking rod 21 and the locking sleeve 22 can move downward together under the action of their own weight, so that the locking rod 21 can escape from the locking hole 1302. More specifically, the upper end of the strip groove 220 is closed, and the lower end is open. In this way, the upper end of the strip groove 220 is closed, thereby preventing the locking sleeve 22 from escaping from the lower end of the rotating sleeve 230; the lower end of the strip groove 220 is open, so that the rotating sleeve 230 can be inserted from the lower end of the locking sleeve 22 into the outer side of the locking sleeve 22, so as to realize the assembly of the locking handle 23 and the locking sleeve 22. It can be understood that the locking rod 21, the locking sleeve 22 and the rotating sleeve 230 are coaxially arranged. [0089] Specifically in the embodiment, the male lock 20 also includes a seat cover 24, which is sleeved on the outer side of the rotating sleeve 230, and the seat cover 24 is fixedly connected to the second component 100b, and the inner side wall of the bottom end of the seat cover 24 extends inward to form an annular blocking portion 240 to prevent the rotating sleeve 230 from slipping out of the seat cover 24. In this way, the setting of the seat cover 24 limits the displacement of the rotating sleeve 230 in the up and down direction, and the locking sleeve 22 can move relative to the rotating sleeve 230 in the range of the strip groove 220 along the up and down direction. The seat cover 24 is also provided with an avoidance opening 242, and the lock handle 23 passes through the avoidance opening 242, and the lock handle 23 can rotate around the lock rod 21 within the range of the avoidance opening 242. Optionally, the seat cover 24 can be fixedly connected to the second component 100b by a threaded fastener. The threaded fastener can be a bolt, a screw, etc., which is not limited here. [0090] Further, the male lock 20 also includes a washer 25 sleeved on the lock rod 21 and located between the seat cover 24 and the second component 100b. In this way, the setting of the washer 25 is used to increase the force-bearing area of the seat cover 24 and the second component 100b on the one hand, to prevent the seat cover 24 and the second component 100b from directly contacting and wearing more; on the other hand, it is used to prevent the rotating sleeve from moving along the axial direction of the lock rod 21 together with the above-mentioned annular blocking portion 240. [0091] Specifically in the embodiment, the side wall of the lock rod 21 is provided with a limiting groove 214 extending along the axial direction of the lock rod 21, that is, the limiting groove 214 is in the shape of a long strip extending along the axial direction of the lock rod 21. The male lock 20 also includes a limiting member 26, which is fixedly installed on the second component 100b, and one end of which extends into the limiting groove 214 to prevent the lock rod 21 from rotating around its own axis. In this way, by setting the limit groove 214 and the limit member 26, the rotation of the locking rod 21 is limited without affecting the movement of the locking rod 21 along its axial direction. It can be understood that the length dimension of the limit groove 214 along the axial direction of the locking rod 21 is greater than or equal to the stroke of the locking rod 21 moving along its axial direction. Optionally, the limit member 26 can be a screw, a spiral, etc., which is not limited here. [0092] Based on the above-mentioned locking mechanism, the present invention also provides a display device, which includes a display unit and the locking mechanism described in any of the above embodiments. The first component 100a and the second component 100b are both installation frames for assembling the display unit.

[0093] Specifically in the embodiment, the side of the second box body 100b equipped with the display unit is the front side, and the side opposite to the front side is the back side. For ease of operation, the gripping portion is located on the side of the male lock 20 close to the back side of the second box body 100b.

[0094] Based on the above locking mechanism, the present invention also provides an assembly method using the locking mechanism for assembling the first component 100a and the second component 100b. The assembly method comprises the following steps:

[0095] hoisting and fixing the first component 100a; [0096] hoisting the

second component 100b to the bottom of the first component 100a, holding the handle 30 with both hands, thereby lifting the second component 100b, so that the male lock 20 is aligned with the female lock 10; [0097] pressing

the abutting surface 212 at the bottom end of the lock rod 21 with the index finger, so that the lock rod 21 moves upward, thereby passing through the lock hole 1302 and inserting into the clamping hole 114, and clamping and connecting with the hanging plate 11, thereby realizing that the second component 100b is hung on the

first component 100a; [0098] turning the lock handle 23 to the locking position, so as to lock the first component 100a and the second component 100b. Specifically, holding the gripping portion 34 of the handle 30 with both hands. In addition, the lock handle 23 can be turned to the

locking position with the thumb. [0099] Based on the above locking mechanism, the present invention also provides a disassembly method for disassembling the first component 100a and the second component 100b. The

disassembly method comprises the following steps: [0100] Pulling the lock handle 23 to the release position to release the first

component 100a and the second component 100b; [0101] Holding the handle 30 with both hands and pressing the operating handle 12 with the thumb to separate the lock rod 21 from the hanging plate 11, so that the lock rod 21 moves downward under the action of its own gravity and exits the lock hole 1302, thereby realizing the

disassembly of the first component 100a and the second component 100b. [0102]

Specifically, holding the gripping portion 34 of the handle 30 with both hands. [0103] The technical features of the above-mentioned embodiments can be combined arbitrarily. In order to make the description concise, not all possible combinations of the technical features in the above-mentioned embodiments are described. However, as long as there is no contradiction in the combination of these technical features,

they should be considered to be within the scope of this specification. The above - described embodiments only express several embodiments of the present invention, and the description is more specific and detailed, but it can not be interpreted as limiting the scope of the invention patent. It should be pointed out that for those of ordinary skill in the art, without departing from the inventive concept, some deformations and improvements can also be made, and these all belong to the protection scope of the present invention. Therefore, the protection scope of the patent of the present invention shall be based on the attached claims.

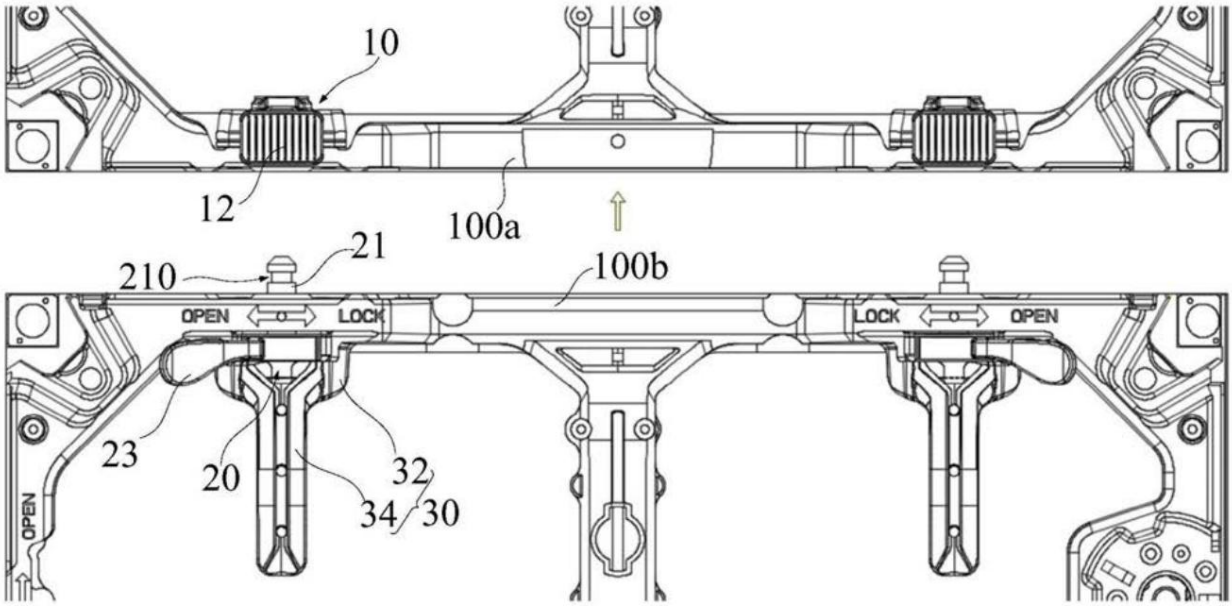

figure 1

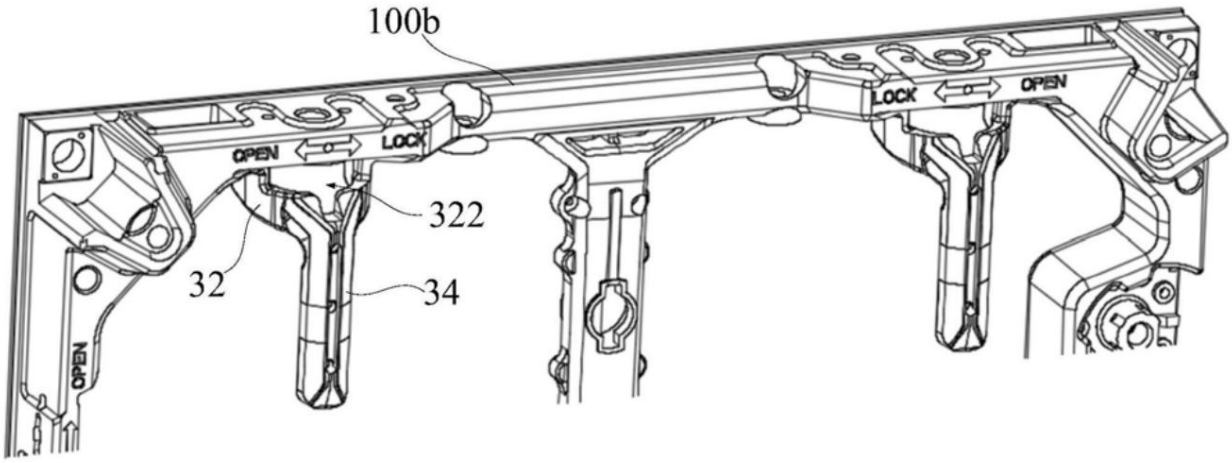

figure 2

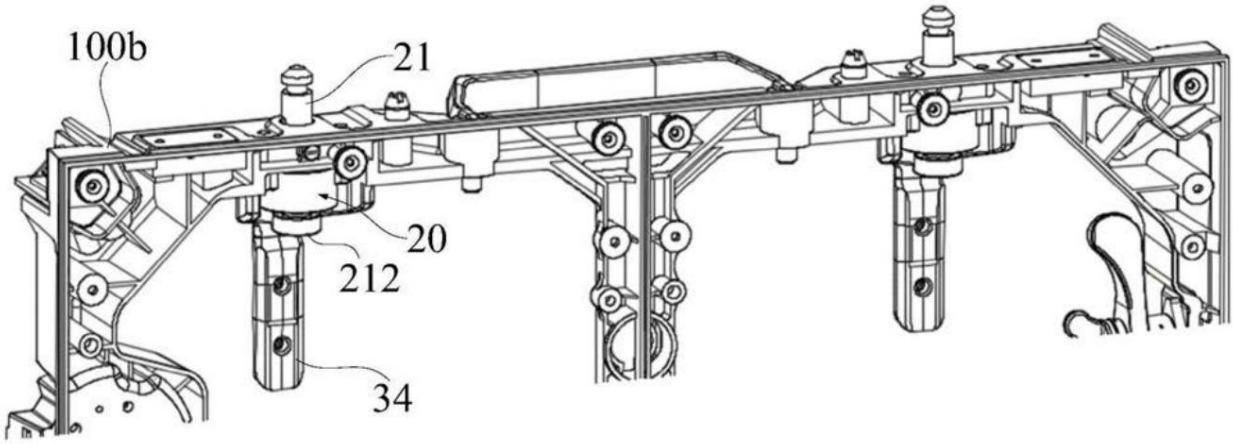

image 3

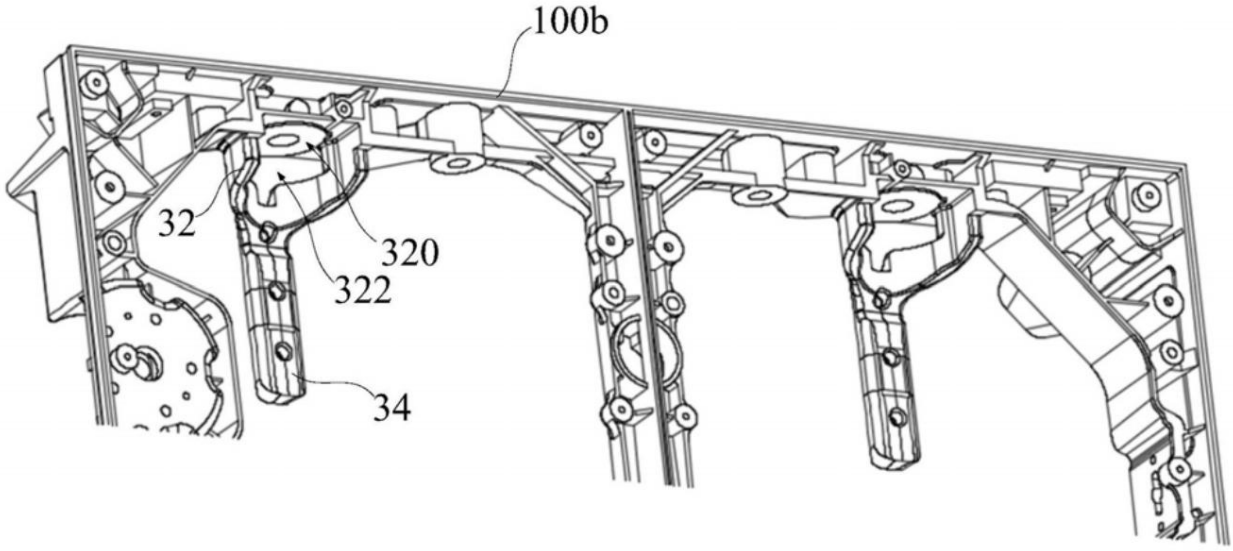

Figure 4

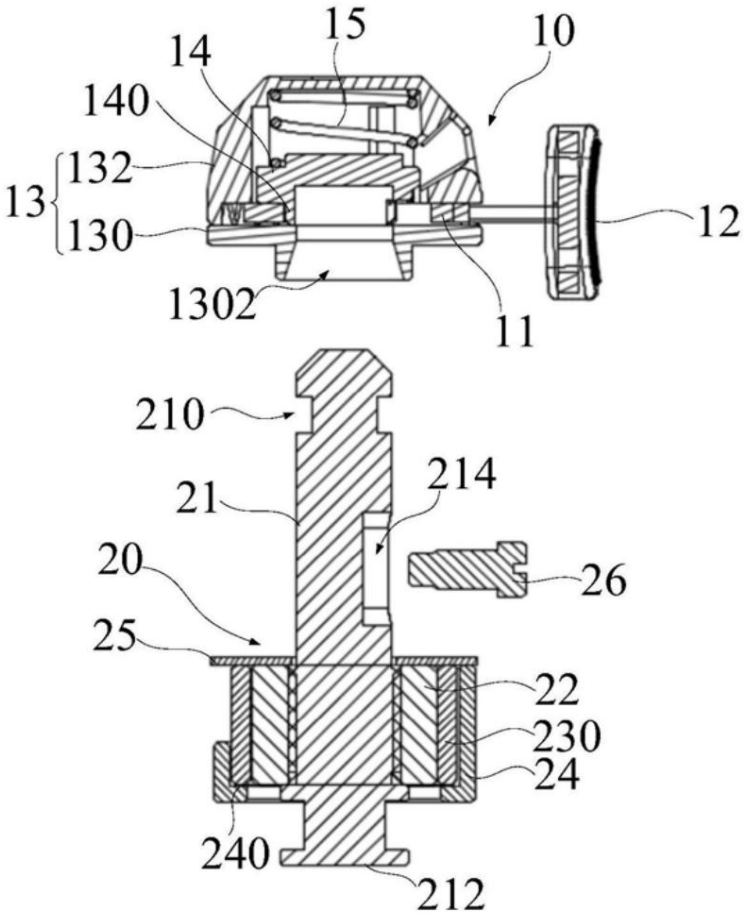
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Figure 5

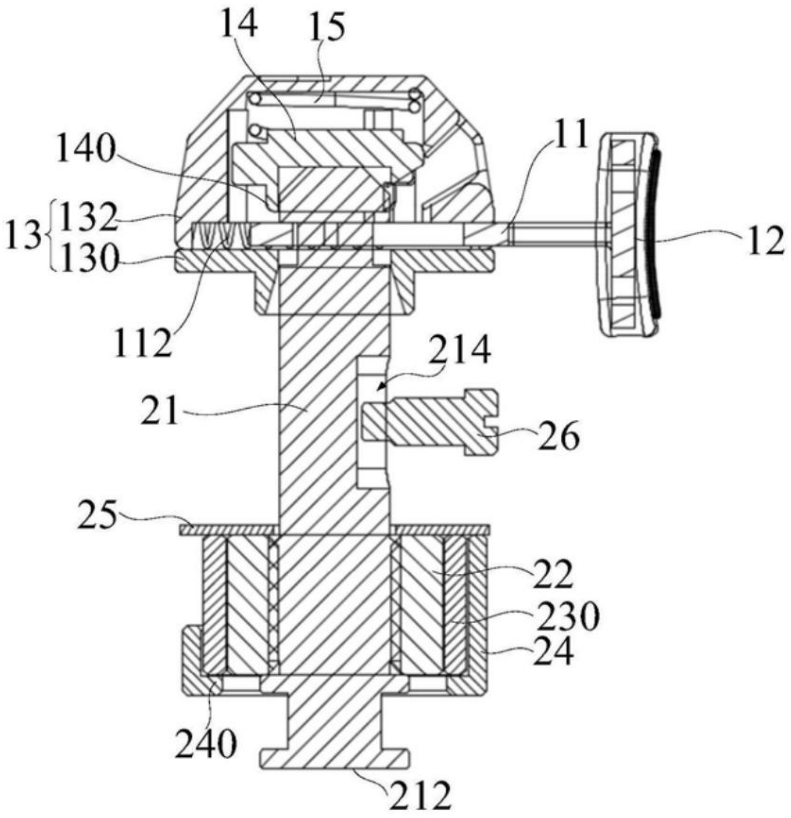

Figure 6

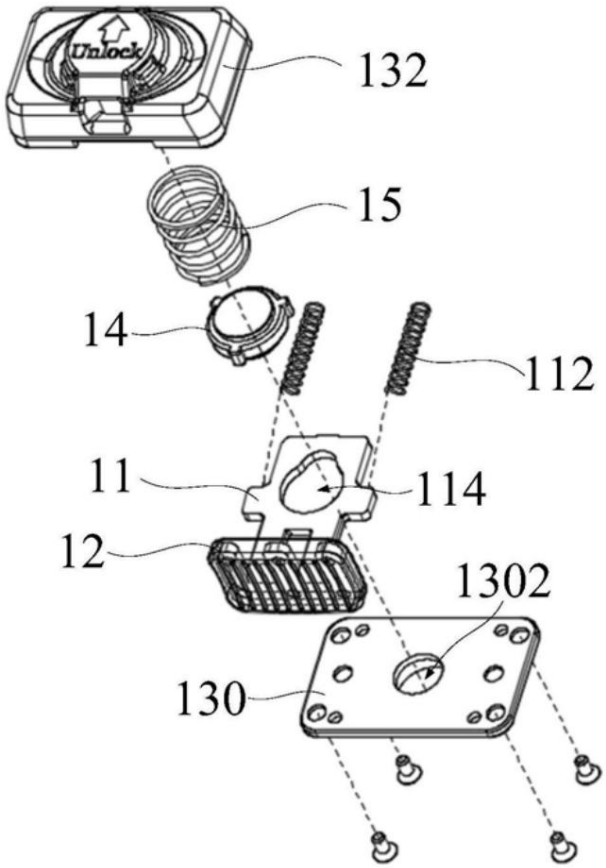

Figure 7

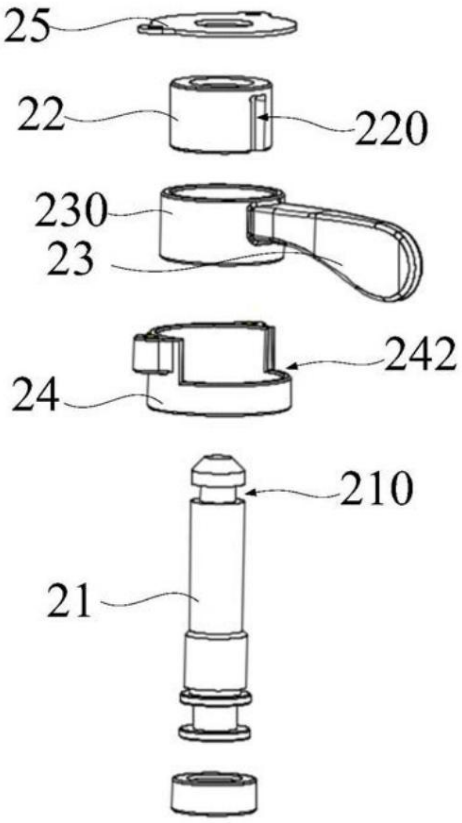

Figure 8

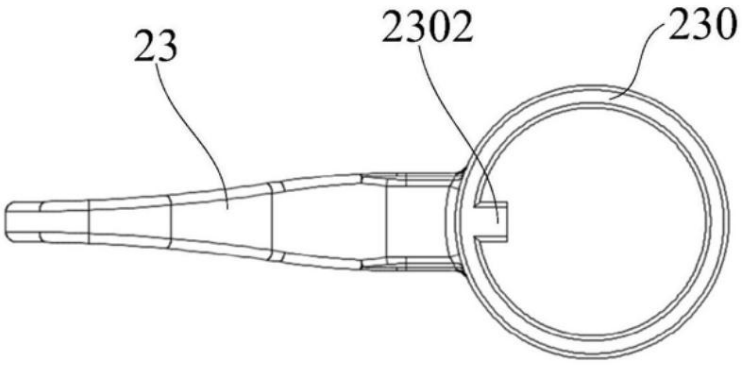

Fig. 9

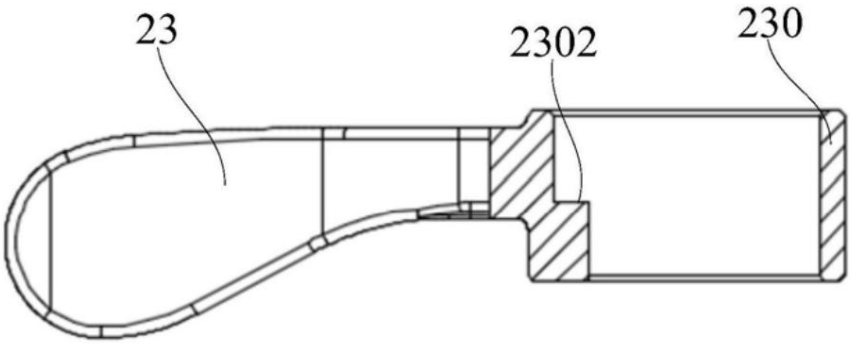

Fig.10