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(54) **INK CARTRIDGE**

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Description**TECHNICAL FIELD**

[0001] The present invention relates to the field of ink-jet printer technologies, and in particular, to an ink cartridge.

RELATED ART

[0002] An ink-jet printer is a relatively common printing appliance. At present, laser printers have become quite popular, but because maintenance costs of the laser printers are relatively high, ink-jet printers still have a massive share of the market, especially in places such as households, shops, and offices. Ink cartridges as consumable appliances for ink-jet printing are also greatly demanded in the market.

[0003] At present, a relatively common ink cartridge is shown in FIG. 1. An ink cartridge 6 is a consumable appliance that is detachably installed in an installation structure (not shown). The ink cartridge 6 includes a handle 61, an engagement portion 62, a chip 63, an ink outlet 64, and a housing 69a. The engagement portion 62 is disposed on the handle 61, the handle 61 extends out of the housing 69a, and the handle 61 is elastic and can rotate around a fulcrum 611. The engagement portion 62 is a part that can be engaged with the installation structure, to prevent the ink cartridge 6 from moving upward, so that the engagement portion 62 is subject to a downward acting force applied by the installation structure, and the handle 61 is subject to a downward acting force. The acting force causes the handle 61 to have a downward rotational torque. Because the handle 61 extends out of the housing 69a, if the torque is applied on the handle 61 for a long time, the handle 61 may have insufficient elasticity or lose the elasticity and cannot be retained at a predetermined position. Consequently, the ink cartridge 6 is fixed at an inaccurate position and cannot be identified by the installation structure, or cannot be fixed in the installation structure. In addition, if the ink cartridge 6 is repeatedly installed multiple times, the handle 61 may lose the elasticity, finally resulting in that the ink cartridge 6 cannot be fixed in the installation structure.

[0004] US2012/056955 A1 discloses an ink cartridge which is detachably installed in an installation structure of a printing device. The ink cartridge comprises a housing and a buckle disposed on the housing.

SUMMARY

[0005] The present invention provides an ink cartridge, so that the ink cartridge can be more reliably fixed in an installation structure.

[0006] An ink cartridge is provided according to independent claim 1 and dependent claims 2 to 27.

[0007] The technical solutions provided in the present invention can achieve the following beneficial effects:

According to the ink cartridge provided in the present invention, the buckle is clamped with or separated from the force application component, so as to install the ink cartridge in the printing device or detach the ink cartridge from the printing device. A manner of fixing the ink cartridge by using the handle is abandoned. In comparison, after a manner of matching between the buckle and the force application component is used, the ink cartridge is more reliably installed, and it is less prone to a case in which the ink cartridge cannot be fixed or cannot be identified, so that the ink cartridge can be more reliably fixed in the installation structure of the printing device.

[0008] It should be understood that, the foregoing general descriptions and the following detailed descriptions are merely exemplary and are not intended to limit the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS**[0009]**

FIG. 1 is a schematic diagram of an ink cartridge in the prior art;

FIG. 2 is a schematic structural diagram of an ink cartridge according to Embodiment 1A of the present invention;

FIG. 3 is a schematic structural diagram of the ink cartridge according to Embodiment 1A of the present invention;

FIG. 4 is a schematic structural diagram of the ink cartridge according to Embodiment 1A of the present invention;

FIG. 5 is a schematic structural diagram of an ink cartridge according to Embodiment 2A of the present invention;

FIG. 6 is a schematic diagram when a buckle is located at a second position according to Embodiment 2A of the present invention;

FIG. 7 and FIG. 8 are schematic diagrams of the buckle according to Embodiment 2A of the present invention;

FIG. 9 is a schematic local diagram when the ink cartridge is installed in an installation structure according to Embodiment 2A of the present invention;

FIG. 10 is a schematic diagram of a lever, as a force application component, of the installation structure according to Embodiment 1A and Embodiment 2A of the present invention;

FIG. 11 is a schematic local diagram when an ink

cartridge is installed in an installation structure according to Embodiment 3A of the present invention;

FIG. 12 is a schematic diagram of a buckle according to Embodiment 3A of the present invention;

FIG. 13 is a schematic diagram when an ink cartridge is installed in an installation structure according to Embodiment 4A of the present invention;

FIG. 14 and FIG. 15 are schematic partial diagrams of the ink cartridge according to Embodiment 4A of the present invention;

FIG. 16 is a schematic diagram of an ink cartridge according to Embodiment 5A of the present invention;

FIG. 17 and FIG. 18 are schematic diagrams of a buckle on which a telescopic portion is disposed according to Embodiment 5A of the present invention;

FIG. 19 is a schematic local diagram when the ink cartridge is installed in an installation structure according to Embodiment 5A of the present invention;

FIG. 20 is a schematic structural diagram of an ink cartridge according to specific Embodiment C of the present invention;

FIG. 21 is a schematic structural diagram of an installation structure according to Embodiment C of the present invention;

FIG. 22 and FIG. 23 are schematic structural diagrams of a buckle according to Embodiment C of the present invention;

FIG. 24 is a schematic structural diagram when the ink cartridge is installed in the installation structure according to Embodiment C of the present invention;

FIG. 25 is a schematic structural diagram of a first state during separation between the ink cartridge and the installation structure according to Embodiment C of the present invention;

FIG. 26 is a schematic structural diagram of a second state during separation between the ink cartridge and the installation structure according to Embodiment C of the present invention;

FIG. 27 is a schematic structural diagram of an installation structure in which a widened force application component is disposed according to Embodiment C of the present invention;

FIG. 28 is a schematic diagram when an ink cartridge

is not installed in an installation structure according to Embodiment 1E;

FIG. 29 is a schematic diagram when the ink cartridge is installed in the installation structure according to Embodiment 1E;

FIG. 30 is a schematic diagram after the ink cartridge is taken out from the installation structure according to Embodiment 1E;

FIG. 31 is a schematic local diagram after the ink cartridge is taken out from the installation structure according to Embodiment 1E;

FIG. 32 is a schematic diagram of an installation structure according to Embodiment 2E;

FIG. 33 is another schematic diagram of the installation structure according to Embodiment 2E;

FIG. 34 is a schematic diagram of a force application component according to Embodiment 2E;

FIG. 35 is a schematic diagram of an ink cartridge according to Embodiment 2E;

FIG. 36 is a schematic diagram of matching between the ink cartridge and the installation structure according to Embodiment 2E;

FIG. 37 is another schematic diagram of matching between an ink cartridge and an installation structure according to Embodiment 3E;

FIG. 38 is a schematic diagram of a force application component according to Embodiment 3E;

FIG. 39 is another schematic diagram of matching between the ink cartridge and the installation structure according to Embodiment 3E;

FIG. 40 is a schematic diagram of matching between an ink cartridge and an installation structure according to Embodiment 4E; and

FIG. 41 is a schematic diagram of matching between an ink cartridge and an installation structure according to Embodiment 5E.

[0010] The accompanying drawings herein are included in the specification and form a part of the specification, show embodiments that conform to the present invention, and are used to describe the principle of the present invention together with the specification.

DETAILED DESCRIPTION

[0011] The present invention is further described in detail below by using specific embodiments with reference to the accompanying drawings.

Embodiment 1A

[0012] FIG. 2 and FIG. 3 are schematic diagrams of an ink cartridge according to Embodiment 1A. As shown in FIG. 2 and FIG. 3, an ink cartridge 2 basically has a shape of a cuboid. A person of ordinary skill in the art may understand that, according to an actual requirement, the ink cartridge 2 may have a shape such as an oval or a circle. In this embodiment, the ink cartridge 2 basically has a shape of a cuboid, and the ink cartridge 2 includes six surfaces that are respectively a first surface 2a, a second surface 2b, a third surface 2c, a fourth surface 2d, a fifth surface 2e, and a sixth surface 2f. The first surface 2a is opposite to the second surface 2b; the third surface 2c and the fourth surface 2d are opposite to each other and are basically perpendicular to the first surface 2a; and the fifth surface 2e and the sixth surface 2f are opposite to each other and are basically perpendicular to the first surface 2a and the third surface 2c.

[0013] The ink cartridge 2 includes a detent 21, a buckle 22, a chip 23, an ink outlet 24, a position limiting portion 25, an elastic component 26 (which may be defined as a first elastic component) (shown in FIG. 4), a limiting portion 27 (shown in FIG. 4), and a housing 29. The detent 21 is disposed on the fourth surface 2d, and the detent 21 has a detent surface 211, and can be engaged with a corresponding position of an installation structure 3, to prevent the ink cartridge 2 from moving upward. The chip 23 is disposed on a slope that is obliquely disposed between the first surface 2a and the third surface 2c. The chip 23 is fixed on a chip rack 23a, and includes a terminal 231 that is electrically connected to a corresponding part of the installation structure 3. The chip 23 stores information such as ink quantity information, an ink type, and a manufacturer, and can be electrically connected to a contact pin 33 of an installation structure 3 of a printer. The ink outlet 24 is a protrusion disposed on the first surface 2a, and can provide ink to the printer. The position limiting portion 25 has a position limiting surface 251, and can limit movement of the ink cartridge 2 in a left-right direction. The housing 29 includes a chamber 292 and a cover 291. The chamber 292 has an ink chamber 293 that can store ink, and the cover 291 is welded on the chamber 292, so that the ink chamber 293 can be in a sealed state.

[0014] Further, as shown in FIG. 4, the elastic component 26 may be silica gel, an elastic metal sheet, a spring, or the like, and is preferably a spring in this embodiment. The buckle 22 includes an engagement portion 221 and a limited portion 223. The elastic component 26 is connected to the buckle 22 along a stretching direction of the elastic component 26. In this way, the buckle 22 can

move along the stretching direction of the elastic component 26 under the action of an external force. Specifically, the limiting portion 27 is disposed on the housing 29 at a position opposite to the limited portion 223. An angle is formed between movement directions of the limited portion 223 and the buckle 22. When the buckle 22 moves along the stretching direction of the elastic component 26, the limited portion 223 can be clamped with or separated from the limiting portion 27. More specifically, the angle between the movement directions of the limited portion 223 and the buckle 22 may be less than 90 degrees or equal to 90 degrees or greater than 90 degrees, which can all achieve an objective of the present invention. Preferably, the limited portion 223 is inclined toward the elastic component 26 relative to a vertical direction (inclined to the left when seen from FIG. 4). This facilitates movement between the limited portion 223 and the buckle 22.

[0015] A person skilled in the art understands that, during actual application, the ink cartridge is installed in the installation structure, the installation structure is disposed in the printing device, and a force application component (not shown) is disposed at a position in the printing device (not shown) close to the engagement portion 221. The force application component is disposed opposite to the engagement portion 221, and a shape of the force application component may be designed in a matching manner according to a shape of the engagement portion 221. Using the engagement portion 221 shown in FIG. 4 as an example, in this case, the force application component may be set to have a structure including a notch or an engagement hole, so that the engagement portion 221 and the force application component can be clamped, to fix the ink cartridge in the printing device. In some other variant embodiments, the engagement portion 221 may have a regular shape such as a clamping shoulder or a hook. In addition, the force application component is correspondingly changed, to achieve an objective that the engagement portion 221 and the force application component can be engaged. Details are not described herein. Further, under the action of an external force, the force application component may be separated from the engagement portion 221, to unfix the ink cartridge from the printing device, so as to detach the ink cartridge to replace the ink cartridge. For a specific process, refer to the following descriptions.

[0016] Further, the engagement portion 221 is disposed between the elastic component 26 and the force application component. During installation of the ink cartridge, the second surface 2b is pressed to insert the engagement portion 221 into the notch or the engagement hole of the force application component, to complete installation of the ink cartridge. A person skilled in the art understands that, fixing of the ink cartridge on the printing device mainly depends on a connection between the engagement portion 221 and the force application component. Specifically, after the ink cartridge is completely installed, the limited portion 223 is separated from

the limiting portion 27, and the limited portion 223 is located between the limiting portion 27 and the force application component.

[0017] Further, during detachment of the ink cartridge, a user applies an external force on the force application component to cause the force application component to move toward a direction of the elastic component 26, so that the buckle 22 moves toward the direction of the elastic component 26 and compresses the elastic component 26. When the limited portion 223 reaches a position of the limiting portion 27, the external force applied on the force application component is removed. In this case, the force application component restores to an original position under the action of an elastic force, and the buckle 22 moves toward a direction of the force application component under the action of a resilience force of the elastic component 26. However, during restoration, the limited portion 223 is clamped with the limiting portion 27 to prevent the buckle 22 from continuing moving toward the direction of the force application component, and the force application component completely restores to the original position and is already separated from the engagement portion 221. In this case, an elastic force applied by the contact pin of the installation structure 3 on the chip 23 causes the ink cartridge 2 to bounce upward and to be detached from the installation structure 3, so as to unfix the ink cartridge from the printing device, and complete detachment of the ink cartridge. Specifically, during detachment, when the limited portion 223 is clamped with the limiting portion 27, a resilience force applied by the elastic component 26 on the limited portion 223 is greater than an acting force applied by the limiting portion 27, so that after the buckle 22 is clamped by the limiting portion 27 for a short time, the buckle 22 finally restores to a natural state. More specifically, when the ink cartridge is in an installed state, the limited portion 223 is not clamped with the limiting portion 27. When the ink cartridge is taken out, the limited portion 223 is first clamped with the limiting portion 27 and then separated from the limiting portion 27, so that when the user removes the external force, the force application component restores to the original position. The buckle 22 is clamped in the limiting portion 27 for a short time due to the limited portion 223, so that the buckle 22 is separated from the force application component. A person skilled in the art understands that, during movement of the buckle 22 toward the direction of the elastic component 26, a case in which the limited portion 223 exceeds the position of the limiting portion 27 may occur. In this case, after the external force applied on the force application component is removed, the limited portion 223 still reaches the position of the limiting portion 27 during restoration and is clamped with the limiting portion 27 for a short time. This can also achieve the objective of the present invention.

[0018] Embodiment 2A: FIG. 5 is a sectional view of an ink cartridge according to Embodiment 2A. FIG. 5 is a schematic diagram when a buckle 22 is located at a

first position (that is, located at a position of a first limiting portion 271). FIG. 6 is a schematic diagram when the buckle 22 is located at a second position (that is, located at a position of a second limiting portion 272). Specifically, the buckle 22 includes an engagement portion 221, a connection portion 222, and a limited portion 223. An elastic component 26 may be silica gel, an elastic metal sheet, a spring, or the like, and is preferably a spring in this embodiment. A limiting portion 27 includes the first limiting portion 271 and the second limiting portion 272, and the first limiting portion 271 is located between the second limiting portion and a force application component. In this embodiment, the limiting portion 27 is a groove disposed on a housing 29. The connection portion 222 abuts against the elastic component 26, the connection portion 222 abuts against the engagement portion 221, and the limited portion 223 abuts against the connection portion 222. A person skilled in the art may understand that, the connection portion 222 may not be disposed on the buckle 22. As shown in FIG. 5, when the limited portion 223 is limited by the first limiting portion 271, the buckle 22 (the limited portion 223) is located at the first position. In this case, an elastic force applied by the elastic component 26 on the buckle 22 is less than or equal to an acting force applied by the first limiting portion 271 on the limited portion 223. Therefore, the limited portion 223 on the buckle 22 is not detached from the first limiting portion 271 under the action of an elastic force, that is, the buckle 22 may be retained at the first position. As shown in FIG. 6, when the limited portion 223 is limited by the second limiting portion 272, the buckle 22 (the limited portion 223) is located at the second position. In this case, the elastic force applied by the elastic component 26 on the buckle 22 is greater than an acting force applied by the second limiting portion 272 on the limited portion 223. Therefore, when the limited portion 223 on the buckle 22 is located at the second position, the buckle 22 can only be retained at the second position for a short time, and finally, due to the elastic force of the elastic component 26, the buckle 22 (the limited portion 223) restores to the first position. A person of ordinary skill in the art may understand that, there may be one limited portion 223, or there may be multiple limited portions 223 arranged along the circumference of the connection portion 222 on the buckle 22.

[0019] Specifically, a magnitude of the elastic force of the elastic component 26 may have different changes based on designs of materials and shapes. For example, if the elastic component 26 is a metal spiral spring, factors affecting the force include a trimming die amount of a metal material, a wire diameter of the spring, a medium diameter of the spring, and an effective coil number. For another example, if the elastic component 26 is silica gel, the elastic force mainly depends on a coefficient of elasticity of a silica gel material. More specifically, an acting force between the limited portion 223 and the first limiting portion 271 may have different changes by changing material types of the limited portion 223 and the first limiting

portion 271 and controlling a depth by which the limited portion 223 is clamped in the first limiting portion 271. For example, if a distance by which the limited portion 223 extends into the first limiting portion 271 becomes longer, the acting force between the limited portion 223 and the first limiting portion 271 becomes larger; on the contrary, the acting force between the limited portion 223 and the first limiting portion 271 becomes smaller. Correspondingly, the acting force between the limited portion 223 and the second limiting portion 272 may have different changes in a similar manner. A person skilled in the art may make different changes on this basis. Details are not described herein.

[0020] FIG. 7 and FIG. 8 are schematic diagrams of the buckle according to Embodiment 2A. To ensure that the buckle 22 can be stably fixed at the first position and to balance the elastic force applied by the elastic component 26, a reinforcement portion may be disposed on the buckle 22. As shown in FIG. 7 and FIG. 8, in this embodiment, a first reinforcement portion 224 and a second reinforcement portion 225 are disposed on the buckle 22. A person of ordinary skill in the art may understand that, there may be one reinforcement portion or two or more reinforcement portions, as long as that the buckle 22 can achieve a force balance at the first position. A groove matching the first reinforcement portion 224 and the second reinforcement portion 225 is provided on a part of the housing that is connected to the first reinforcement portion 224 and the second reinforcement portion 225, to satisfy that the reinforcement portion can move in the groove in a process of taking out the ink cartridge 2. A person of ordinary skill in the art may understand that, if it is ensured that the buckle 22 can achieve a force balance, the reinforcement portion may not be disposed.

[0021] FIG. 9 is a schematic local diagram when the ink cartridge is installed in an installation structure according to Embodiment 2A. As shown in FIG. 9, a force application component does not need to be separately disposed in a printing device, but a movable lever 31 included in an installation structure 3 is used as a force application component. The first limiting portion 271 is located between the second limiting portion 272 and the force application component (that is, the lever 31). A distance from the first limiting portion 271 to the elastic component 26 is greater than a distance from the second limiting portion 272 to the elastic component 26, and a distance from the first limiting portion 271 to the lever 31 is less than a distance from the second limiting portion 272 to the lever 31. An elastic force that is applied by the elastic component 26 on the buckle 22 when the limited portion 223 is located at the second position is greater than an elastic force that is applied by the elastic component 26 on the buckle 22 when the limited portion 223 is located at the first position. A schematic diagram of the lever 31 is shown in FIG. 10. The lever 31 includes rotation axes 313 and 314, an engagement hole 311, and a push portion 312. The lever 31 can rotate around the rotation axes 313 and 314. In a state in which the ink

cartridge 2 is installed in the installation structure 3, an axial direction of the elastic component 26 (which is preferably a spring) is a horizontal direction. In a state in which the ink cartridge 2 is installed in the installation structure 3, the engagement portion 221 is engaged with the engagement hole 311 of the lever 31, to limit upward movement of the ink cartridge 2. In a process of taking out the ink cartridge 2, first, a user pushes the push portion 312 of the lever 31, the push portion 312 drives the buckle 22 to move toward a direction of the elastic component 26, and the limited portion 223 on the buckle 22 reaches the second limiting portion 272 from the first limiting portion 271, that is, the buckle 22 reaches the second position from the first position. Then, the user releases the push portion 312 of the lever 31. After a push force applied on the push portion 312 is removed, the lever 31 immediately restores to an original position. Because the limited portion 223 is limited by the second limiting portion 272 for a short time (that is, the limited portion 223 is clamped in the second limiting portion 272 for a short time), the buckle 22 can be retained at the second position for a short time. In addition, an elastic force applied by a contact pin 33 on a chip 23 causes the ink cartridge 2 to bounce upward and to be detached from the installation structure 3. Finally, the user can take out the ink cartridge 2 from the installation structure 3.

[0022] A person skilled in the art understands that, the buckle 22 shown in each of FIG. 7 and FIG. 8 and the lever 31 shown in FIG. 10 are also applicable to Embodiment 1A. Details are not described herein. Specifically, in Embodiment 2A, in a state in which the ink cartridge 2 is not installed in the installation structure 3, the limited portion 223 is limited at the first position of the first limiting portion 271 by the limiting portion 27. It may be learned from the foregoing Embodiment 1A and Embodiment 2A that, in the technical solutions of the present invention, a fixed manner of positioning the ink cartridge by using the handle in the Background is abandoned, to prevent a case in which the ink cartridge is fixed at an inaccurate position and cannot be identified by the installation structure or the ink cartridge cannot be fixed in the installation structure.

[0023] In a variant embodiment, the buckle 22 and the housing 29 may be integrally formed or separately formed and then assembled, and a requirement in the technical solution can be met as long as movement of the buckle 22 is not affected. In this embodiment, it may be learned from FIG. 5 and FIG. 9 that, the buckle 22 including the engagement portion 221 and the housing 29 are separate portions. The buckle 22 and the housing 29 may be separately manufactured and then assembled. The buckle 22 has a function of positioning the ink cartridge 2. Therefore, preferably, material hardness of the buckle 22 is higher than that of the housing 29. Preferably, the buckle 22 and the housing 29 are both obtained through injection molding and are both plastic products. Preferably, a material of the buckle 22 is ABS, and a material of the housing 29 is PP.

Embodiment 3A

[0024] FIG. 11 is a schematic local diagram when an ink cartridge 4 is installed in an installation structure 3 according to Embodiment 3A. A buckle 42 includes a first limited portion 423 and a second limited portion 426 that are disposed opposite to each other. A limiting portion 47 includes a first limiting portion 471 and a second limiting portion 472. Along a direction of an elastic component 46 toward a lever 31 (that is, a force application component), a distance from the first limiting portion 471 to the elastic component 46 is greater than a distance from the second limiting portion 472 to the elastic component 46, to ensure that during movement of an engagement portion 421 toward the elastic component 46, first, the first limited portion 423 is clamped with the first limiting portion 471, and then, the second limited portion 426 is clamped with the second limiting portion 472. Specifically, in a state in which the first limited portion 423 is limited by the first limiting portion 471, the buckle 42 is located at a first position. In this case, an elastic force applied by the elastic component 46 on the buckle 42 is less than or equal to an acting force applied by the first limiting portion 471 on the first limited portion 423, that is, the first position is a position at which the buckle 42 achieves a force balance. In a state in which the second limited portion 426 is limited by the second limiting portion 472, the buckle 42 is located at a second position. In this case, an elastic force of the elastic component 46 is greater than an acting force applied by the second limiting portion 472 on the second limited portion 426, that is, an elastic force applied by the elastic component 46 on the buckle 42 is greater than the acting force applied by the second limiting portion 472 on the second limited portion 426. That is, the buckle 42 is in an unbalanced state, and in the unbalanced state, the second limiting portion 472 is temporarily limited by the second limited portion 426, and the buckle 42 may be temporarily located at the second position, but finally, the buckle 42 restores to the first position (that is, a position of the first limiting portion 471) under the action of the elastic force of the elastic component 46. In a state in which the ink cartridge 4 is not installed in the installation structure 3, the first limited portion 423 is limited at the first position by the limiting portion 47.

[0025] FIG. 12 is a schematic diagram of the buckle according to Embodiment 3A. To ensure that the buckle 42 can be stably fixed at the first position, a reinforcement portion may be disposed on the buckle 42. As shown in FIG. 12, in this embodiment, a first reinforcement portion 424 and a second reinforcement portion 425 are disposed on the buckle 42. A groove matching the first reinforcement portion 424 and the second reinforcement portion 425 is provided on a part of the housing that is connected to the first reinforcement portion 424 and the second reinforcement portion 425, to satisfy that the reinforcement portion can move in the groove in a process of taking out the ink cartridge 4. The first limited portion

423 is connected to a connection portion 422 by using a first arm 423a, the second limited portion 426 is connected to the connection portion 422 by using a second arm 426a, and similarly, the first reinforcement portion 424 and the second reinforcement portion 425 are also connected to the connection portion 422 by using an arm.

[0026] The first limited portion 423 and the second limited portion 426 on the buckle 42 may be both disposed on a same first arm 423a. This also can achieve a technical effect of the technical solution, and the second arm 426a is omitted in this structure.

[0027] In a process of taking out the ink cartridge 4, first, a user pushes a push portion 312 of the lever 31, the push portion 312 drives the buckle 42 to move toward a direction of the elastic component 46, and the buckle 42 reaches the second position from the first position, that is, the first limited portion 423 is separated from the first limiting portion 471, and the second limited portion 426 is engaged with the second limiting portion 472. Then, the user releases the push portion 312 of the lever 31. After a push force applied on the push portion 312 is removed, the lever 31 immediately restores to an original position. Because the second limited portion 426 is limited by the second limiting portion 472 for a short time, the buckle 42 can be retained at the second position for a short time. In addition, an elastic force applied by a contact pin 33 on a chip 43 causes the ink cartridge 4 to bounce upward and to be detached from the installation structure 3. Finally, the user can take out the ink cartridge 4 from the installation structure 3.

[0028] The remaining part is similar to Embodiment 2A. Repeated descriptions are not provided herein again.

Embodiment 4A

[0029] FIG. 13 is a schematic diagram when an ink cartridge is installed in an installation structure according to Embodiment 4A. FIG. 14 and FIG. 15 are schematic partial diagrams of the ink cartridge according to Embodiment 4A. An ink cartridge 5 includes an elastic component 56, a buckle 52 (including an engagement portion 521 and a connection portion 522), a first limiting portion 571, a second limiting portion 572, and a second spring 58 (which may be defined as a third elastic component). Similar to Embodiment 3A, along a direction of the elastic component 56 toward a lever 31 (that is, a force application component), a distance from the first limiting portion 571 to the elastic component 56 is greater than a distance from the second limiting portion 572 to the elastic component 56. The buckle 52 includes a first limited portion 523 and a second limited portion 524. The first limited portion 523 is a protrusion, and can match the first limiting portion 571 on a housing, to cause the ink cartridge to be retained at a first position. The second limited portion 524 is an arcuate recess, and the second limiting portion 572 is a cylinder that has an arcuate end and that matches the second limited portion 524. In a process of taking out the ink cartridge 5, first, a user pushes a push portion

312 of the lever 31, the push portion 312 drives the buckle 52 to move toward a direction of the elastic component 56, and the buckle 52 reaches a second position from the first position, that is, the first limited portion 523 is separated from the first limiting portion 571, and the second limited portion 524 is engaged with the second limiting portion 572. Then, the user releases the push portion 312 of the lever 31. After a push force applied on the push portion 312 is removed, the lever 31 immediately restores to an original position. Because the second limited portion 524 is limited by the second limiting portion 572 for a short time, the buckle 52 can be retained at the second position for a short time. In addition, an elastic force applied by a contact pin 33 on a chip 53 causes the ink cartridge 5 to bounce upward and to be detached from the installation structure 3. Finally, the user can take out the ink cartridge 5 from the installation structure 3.

[0030] The remaining part is similar to Embodiment 3A. Repeated descriptions are not provided herein again.

[0031] A person of ordinary skill in the art may understand that, an axial direction of the second spring 58 may also be set to a horizontal direction, that is, a direction parallel to a first surface and a second surface, or may also be set to a downward inclined direction, which both can resolve a technical problem to be resolved by the technical solution, and can achieve a technical effect of the technical solution.

Embodiment 5A

[0032] FIG. 16 is a schematic diagram of an ink cartridge 7 according to Embodiment 5A of the present invention. The ink cartridge 7 includes a first surface 7a and a second surface 7b that are opposite to each other, and a third surface 7c and a fourth surface 7d that are opposite to each other. It may be learned from FIG. 16 that, different from the foregoing embodiment, a buckle 72 of the ink cartridge 7 shown in FIG. 16 includes two telescopic portions 726. A person skilled in the art understands that, for compositions of and position relationships between other parts of the ink cartridge 7, refer to FIG. 2 and FIG. 3, and details are not described herein again. Specifically, the buckle 72 includes an engagement portion 721, a connection portion 722, a limiting portion 723, and the telescopic portions 726. The two telescopic portions 726 are located at two sides of the connection portion 722, and along a direction of the second surface 7b toward the first surface 7a, the telescopic portions 726 are located below the engagement portion 721. Specifically, FIG. 17 is a schematic local diagram when the ink cartridge 7 is installed in an installation structure 3. With reference to FIG. 16 and FIG. 17, it may be learned that, the installation structure 3 includes an abutting portion 34 that is disposed opposite to the telescopic portion 726. During installation of the ink cartridge, a user presses the second surface 7b to cause the ink cartridge to move toward directions of the first surface 7a and the third surface 7c. After the telescopic portion 726 abuts

against the abutting portion 34, the abutting portion 34 applies, on the telescopic portion 726, a reacting force toward the fourth surface 7d or toward the second surface 7b and the fourth surface 7d, that is, the reacting force applied by the abutting portion 34 is toward a compression direction of an elastic component (not shown in FIG. 16 and FIG. 17). In this case, because pressure applied by the user on the second surface 7b is not removed, the reacting force applied by the abutting portion 34 finally transfers to the elastic component (not shown) and compresses the elastic component. A person skilled in the art understands that, compared with the foregoing embodiment, in this embodiment, it is more labor-saving during installation.

[0033] In another variant embodiment, according to different sizes of the installation structure, the abutting portion that matches the telescopic portion 726 may be another fixing component in the installation structure 3, as long as the abutting portion is opposite to the telescopic portion 726 during installation.

[0034] Further, FIG. 18 and FIG. 19 are schematic diagrams of the buckle 72. The telescopic portion 726 has an inverted-L shape, and the telescopic portion 726 extends downward along a vertical direction. Preferably, the abutting portion 34 is inclined relative to the telescopic portion 726. This more facilitates the abutting portion 34 to apply, on the telescopic portion 726, a reacting force toward the second surface 7b and fourth surface 7d. Preferably, reinforcement portions 724 and 725 are disposed on the buckle 72 and have functions similar to those of the reinforcement portions 224 and 225 shown in FIG. 8. Details are not described herein again. In a change, the abutting portion 34 may be parallel to the telescopic portion 726. In this way, the reacting force applied by the abutting portion 34 on the telescopic portion 726 is toward the fourth surface 7d. This can also achieve an objective of this embodiment. In another change, the telescopic portion 726 is inclined relative to the vertical direction, and correspondingly, the abutting portion 34 may be parallel to the telescopic portion 726 or may be inclined relative to the telescopic portion 726. Details are not described herein again.

Embodiment C

[0035] A person skilled in the art understands that, the ink cartridge involved in the present invention is disposed in an ink-jet printer. A main outline of the ink cartridge is formed by a housing 29. As shown in FIG. 20, the housing 29 basically has a shape of a cube. Specifically, according to an actual requirement, the housing 29 may have a shape such as an oval or a circle. More specifically, the housing 29 includes six surfaces. A first surface 2a is opposite to a second surface 2b; and a third surface 2c and a fourth surface 2d are opposite to each other and are basically perpendicular to the first surface 2a. More specifically, the housing 29 generally includes a chamber and a cover (not shown). The chamber has an

ink chamber that can store ink, and the cover is welded on the chamber, so that the ink chamber can be in a sealed state.

[0036] Further, the ink cartridge includes a first elastic component 41 connected to the housing 29. The first elastic component 41 is connected to a buckle 22 along a stretching direction. The first elastic component 41 may be silica gel, an elastic metal sheet, a spring, or the like, and is preferably a spring in this specific implementation. In this way, the buckle 22 can move along the stretching direction of the first elastic component 41. Specifically, the first elastic component 41 is disposed along a horizontal direction, and the buckle 22 can perform reciprocating movement along the horizontal direction. A specific connection manner of the buckle 22 and the first elastic component 41 is described in detail below.

[0037] Further, the buckle 22 can be engaged with or separated from a force application component 32 on the ink-jet printer. The force application component 32 is connected to the ink-jet printer by using a fourth elastic component 42. The fourth elastic component 42 is disposed opposite to the first elastic component 41, and along a vertical direction, the fourth elastic component 42 is located below the first elastic component 41. The fourth elastic component 42 may be silica gel, an elastic metal sheet, a spring, or the like, and is preferably a spring in this specific implementation. The fourth elastic component 42 may be disposed along the horizontal direction, or may be obliquely disposed relative to the horizontal direction. Specifically, under the action of an external force, the force application component 32 can rotate toward a direction of the buckle 22 in a vertical plane.

[0038] Further, in the vertical direction, a position (referred to as a "first position 321" below) at which the external force is applied on the force application component 32 is basically aligned with a position of the buckle 22, that is, relative to the first surface 2a, a height from the first position 321 to the first surface 2a is basically the same as a height from the buckle 22 to the first surface 2a. In this case, the force application component 32 compresses the buckle 22 to move along a compression direction of the first elastic component 41. Correspondingly, a position (referred to as a "second position 322" below) at which the force application component 32 is connected to the fourth elastic component 42 moves along a compression direction of the fourth elastic component 42. In addition, because the first elastic component 41 is disposed opposite to the fourth elastic component 42, movement directions of the first position 321 and the second position 322 are opposite to each other. Specifically, as shown in FIG. 20, the first position 321 is at the top of the force application component 32, and the second position 322 is at the bottom of the force application component 32. That is, the first position 321 and the second position 322 are at two sides of a rotation axis (not shown) of the force application component 32 along the vertical direction. Therefore, the movement directions of the first position 321 and the second position 322 are opposite

to each other. More specifically, when the external force is applied at the first position 321, in a state in which the force application component 32 stops rotating, when the external force is removed, the first position 321 moves toward a direction away from the buckle 22, the buckle 22 rebounds and restores to an original position under the action of the first elastic component 41, and the force application component 32 rebounds and restores to an original position under the action of the fourth elastic component 42. A movement direction when the buckle 22 restores to the original position is the same as a rotation direction when the force application component 32 restores to the original position.

[0039] In a specific embodiment, as shown in FIG. 21, the ink-jet printer includes an installation structure 3. The force application component 32 is a rotatable lever disposed on the installation structure 3. The fourth elastic component 42 is disposed on the installation structure 3. The force application component 32 is connected to the installation structure 3 by using the fourth elastic component 42. Specifically, the ink cartridge includes a chip 23, and the installation structure 3 includes a contact pin 33. The chip 23 (shown in FIG. 24) is disposed opposite to the contact pin 33. When the buckle 22 is engaged with the force application component 32, the chip 23 is in contact with the contact pin 33, and the contact pin 33 applies an upward elastic force along the vertical direction on the chip 23 and the ink cartridge. After the buckle 22 is separated from the force application component 32, the ink cartridge bounces upward under the action of the elastic force of the contact pin 33. More specifically, as shown in FIG. 20, the chip 23 is disposed on a slope that is obliquely disposed between the first surface 2a and the third surface 2c. The chip 23 is fixed on a chip rack 23a. The chip 23 includes a storage unit that stores information such as ink quantity information, an ink type, and a manufacturer, and a terminal, and the terminal can be electrically connected to the contact pin 33 on the installation structure 3. The ink outlet 24 is a protrusion disposed on the first surface 2a, and can provide ink to the ink-jet printer.

[0040] In a connection manner in this specific embodiment, FIG. 22 and FIG. 23 are detailed diagrams of the first elastic component 41 and the buckle 22. With reference to FIG. 20, it may be learned that, one part of the buckle 22 extends into the housing 29 and is clamped in the housing 29. The buckle 22 includes an engagement portion 221 and extends out of the housing 29. The part of the buckle 22 that is located in the housing 29 forms an accommodation groove (not numbered in the figure), and the first elastic component 41 is disposed in the accommodation groove. A person skilled in the art understands that, a size of the accommodation groove is adjusted, so that the size of the accommodation groove matches a size of the first elastic component 41. In this way, the first elastic component 41 may not be fixed on the buckle 22 and the housing 29, but abuts against both the buckle 22 and the housing 29. A person skilled in the

art understands that, as shown in FIG. 21, the force application component 32 may be set to have a structure including an engagement hole 323 (or a notch). The engagement portion 221 is engaged with the engagement hole 323 (or the notch), so that the buckle 22 can be engaged with the force application component, so as to fix the ink cartridge in the installation structure 3. In some other variant embodiments, the engagement portion of the buckle 22 may have a regular shape such as a clamping shoulder or a hook. In addition, the force application component 32 is correspondingly changed, to achieve an objective that the engagement portion and the force application component can be engaged. Details are not described herein.

[0041] In a variant connection manner (not shown), the first elastic component 41 is directly fixed on the third surface 2c, and then the buckle 22 is fixedly connected to the first elastic component 41. There are many specific fixing manners, for example, fixing is directly performed through welding; for another example, a fixing block are disposed on each of the third surface 2c and the buckle 22, and then the first elastic component 41 is fixed on the fixing block. These all are the prior art, and details are not described herein.

[0042] Further, during installation of the ink cartridge, the second surface 2b is pressed to cause the ink cartridge to move downward as a whole, until a state shown in FIG. 24 is reached. That is, the buckle 22 is engaged with the force application component 32. In addition, the chip 23 abuts against the contact pin 33. In this case, the contact pin 33 applies an upward resilience force on the ink cartridge, but because the engagement portion 221 is engaged with the engagement hole 323 (or the notch), the ink cartridge is fixed in the installation structure 3.

[0043] Further, when the ink cartridge needs to be detached, as shown in FIG. 24, an external force F is applied by an operator at the first position 321 of the force application component 32. Under the action of the external force F , the force application component 32 rotates, and the first position 321 of the force application component 32 moves along a direction of the buckle 22. Under the action of the force application component 32, the buckle 22 moves along a compression direction of the first elastic component 41, and the second position 322 of the force application component 32 moves along a compression direction of the fourth elastic component 42. After the external force is removed, the buckle 22 and the force application component 32 restore to the original positions at the same time, and a movement direction when the buckle 22 restores to the original position is the same as a movement direction when the first position 321 restores to the original position. In this case, provided that it is ensured that acceleration when the force application component 32 restores to the original position is greater than acceleration when the buckle 22 restores to the original position, in a process in which the buckle 22 and the force application component 32 restore to the original positions, a first state during separation between the ink

cartridge and the installation structure shown in FIG. 25 can be achieved, that is, the buckle 22 is just separated from the force application component 32, but the contact pin 33 is still not separated from the chip 23.

5 **[0044]** Further, after the first state is entered, a second state during separation between the ink cartridge and the installation structure is reached. When the buckle 22 is separated from the force application component 32, the ink cartridge bounces upward under the action of an elastic force of the contact pin 33. As shown in FIG. 26, the chip 23 no longer compress the contact pin 33, and the engagement portion 221 of the buckle 22 and the engagement hole 323 (or the notch) of the force application component 32 are misplaced, to implement complete separation between the buckle 22 and the force application component 32. In addition, the contact pin 33 causes the entire ink cartridge to bounce, and then, the ink cartridge is taken out from the installation structure 3, to complete an entire detachment process.

20 **[0045]** Further, a person skilled in the art understands that, magnitudes of the elastic forces of the first elastic component 41 and the fourth elastic component 42 affect the acceleration when the buckle 22 and the force application component 32 restore to the original positions. Factors affecting the elastic forces include specifications of the first elastic component 41 and the fourth elastic component 42 and compression degrees of the first elastic component 41 and the fourth elastic component 42. For example, if the first elastic component 41 and the fourth elastic component 42 are both metal spiral springs, and preferably, a metal material may select straight carbon steel, stainless iron, or stainless steel, the factors affecting the elastic force include a trimming die amount of the metal material, a wire diameter of the spring, a medium diameter of the spring, and an effective coil number. For another example, if the first elastic component 41 and the fourth elastic component 42 are both silica gel, the elastic force mainly depends on a coefficient of elasticity of a silica gel material. Further, under a condition that the specifications of the first elastic component 41 and the fourth elastic component 42 are given, if the first elastic component 41 and the fourth elastic component 42 are compressed to a higher degree, the elastic forces are larger.

45 **[0046]** Further, masses of the buckle 22 and the force application component 32 may be changed in a matching manner to adjust the acceleration when the buckle 22 and the force application component 32 restore to the original positions. A person skilled in the art understands that, a larger elastic force of the first elastic component 41 indicates a smaller mass of the buckle 22 and higher acceleration during restoration to the original position; or a smaller elastic force of the first elastic component 41 indicates a larger mass of the buckle 22 and smaller acceleration during restoration to the original position. Corresponding, a principle of adjusting the acceleration when the force application component 32 restores to the original position is similar to this. Details are not described

herein again.

[0047] In a preferred embodiment, initial acceleration when the force application component 32 restores to the original position is greater than initial acceleration when the buckle 22 restores to the original position. This more facilitates fast detachment of the ink cartridge. That is, at an initial stage after the external force is removed, the force application component 32 completes separation from the buckle 22. In this case, the ink cartridge bounces under the action of the elastic force of the contact pin 33, and then the ink cartridge can be taken out. Multiple specific embodiments are provided below. Specifically, in the following multiple embodiments, the first elastic component 41 has a wire diameter of 0.4 mm, a developed length of 14 mm, a medium diameter of 4.1 mm, an effective coil number of 8, and a pitch of 1.6 mm; the fourth elastic component 42 has a wire diameter of 0.4 mm, a developed length of 9 mm, a medium diameter of 2.6 mm, an effective coil number of 9, and a pitch of 1 mm; and a magnitude of the external force is 8-10 N. A person skilled in the art may derive more implementation solutions with reference to the following embodiments.

[0048] Embodiment 1: The mass of the buckle 22 is 0.31 g, and the mass of the force application component 32 is 0.45 g. After the first elastic component 41 is compressed under the action of the external force, if the external force is removed, an elastic force applied by the first elastic component 41 on the buckle 22 is 3 N, an elastic force applied by the fourth elastic component 42 on the force application component 32 is 12 N, the initial acceleration when the buckle 22 restores to the original position is 9.6 m/s², and the initial acceleration when the force application component 32 restores to the original position is 26.6 m/s².

[0049] Embodiment 2: The mass of the buckle 22 is 0.38 g, and the mass of the force application component 32 is 0.51 g. After the first elastic component 41 is compressed under the action of the external force, if the external force is removed, an elastic force applied by the first elastic component 41 on the buckle 22 is 2.5 N, an elastic force applied by the fourth elastic component 42 on the force application component 32 is 8 N, the initial acceleration when the buckle 22 restores to the original position is 6.57 m/s², and the initial acceleration when the force application component 32 restores to the original position is 15.69 m/s².

[0050] Embodiment 3: The mass of the buckle 22 is 0.38 g, and the mass of the force application component 32 is 0.51 g. After the first elastic component 41 is compressed under the action of the external force, if the external force is removed, an elastic force applied by the first elastic component 41 on the buckle 22 is 2.5 N, an elastic force applied by the fourth elastic component 42 on the force application component 32 is 10 N, the initial acceleration when the buckle 22 restores to the original position is 6.57 m/s², and the initial acceleration when the force application component 32 restores to the original position is 19.61 m/s².

[0051] Embodiment 4: The mass of the buckle 22 is 0.38 g, and the mass of the force application component 32 is 0.58g. After the first elastic component 41 is compressed under the action of the external force, if the external force is removed, an elastic force applied by the first elastic component 41 on the buckle 22 is 2.5 N, an elastic force applied by the fourth elastic component 42 on the force application component 32 is 8 N, the initial acceleration when the buckle 22 restores to the original position is 6.57 m/s², and the initial acceleration when the force application component 32 restores to the original position is 13.79 m/s².

[0052] Embodiment 5: The mass of the buckle 22 is 0.38 g, and the mass of the force application component 32 is 0.58g. After the first elastic component 41 is compressed under the action of the external force, if the external force is removed, an elastic force applied by the first elastic component 41 on the buckle 22 is 2.5 N, an elastic force applied by the fourth elastic component 42 on the force application component 32 is 10 N, the initial acceleration when the buckle 22 restores to the original position is 6.57 m/s², and the initial acceleration when the force application component 32 restores to the original position is 17.24 m/s².

[0053] Embodiment 6: The mass of the buckle 22 is 0.6 g, and the mass of the force application component 32 is 0.65 g. After the first elastic component 41 is compressed under the action of the external force, if the external force is removed, an elastic force applied by the first elastic component 41 on the buckle 22 is 2.4 N, the initial acceleration when the buckle restores to the original position is 4 m/s², an elastic force applied by the fourth elastic component 42 on the force application component 32 is 6.5 N, and the initial acceleration when the force application component 32 restores to the original position is 10 m/s².

[0054] Further, a person skilled in the art understands that, with reference to the foregoing five embodiments, it may be learned that, the elastic force applied by the first elastic component 41 on the buckle is 2.4-3 N, and the elastic force applied by the fourth elastic component 42 on the force application component 32 is 6.5-12 N. When a value of the mass of the buckle is 0.31-0.6 g, the initial acceleration when the buckle restores to the original position is 4-9.6 m/s², and when the value of the mass of the force application component 32 is 0.45-0.65 g, the initial acceleration when the force application component 32 restores to the original position is 10-26.6 m/s². It may be learned from the above that, a maximum value of the initial acceleration when the buckle restores to the original position is 9.6 m/s², it is still less than a minimum value being 10 m/s² of the initial acceleration when the force application component 32 restores to the original position. Therefore, within the foregoing value range, an objective of the present invention can be achieved. A person skilled in the art understands that, not all experimental data is listed in this specification, but according to the common sense in the art, these experimental so-

lutions can all be implemented, and details are not described herein.

[0055] In another embodiment, the mass of the buckle 22 is 0.4 g, and the mass of the force application component 32 is 0.53 g. After a first elastic component 26 is compressed under the action of the external force, if the external force is removed, an elastic force applied by the first elastic component 26 on the buckle 22 is 2.5 N, an elastic force applied by the second elastic component on the force application component 32 is 10 N, the initial acceleration when the buckle 22 restores to the original position is 6.25 m/s², and the initial acceleration when the force application component 32 restores to the original position is 18.86 m/s².

[0056] Further, when the mass of the force application component 32 needs to be increased, as shown in FIG. 27, preferably, the mass is increased by increasing a width of the first position 321. In this way, the ink cartridge can be more conveniently detached.

Embodiment 1E

[0057] As shown in FIG. 28, the ink cartridge further includes a pressing portion 28 and a second elastic component 26a. In this embodiment, the pressing portion 28 is connected to the limiting portion 27, and a through hole on the buckle 22 is used as the limited portion 223. When the ink cartridge 2 is not installed in the installation structure 3, the elastic component 26 abuts against the buckle 22, the elastic component 26 is in a compressed state, and the limiting portion 27 is engaged with the limited portion 223, to ensure that the buckle 22 is not detached from the ink cartridge 2. The limiting portion 27 abuts against the second elastic component 26a, the second elastic component 26a is in a compressed state, and another limiting mechanism (for example, a spacing groove and an active block) is used to ensure that the pressing portion 28 is not detached from the ink cartridge 2.

[0058] When the ink cartridge 2 is installed in the installation structure 3, first, the detent 21 (not shown in FIG. 28) is engaged with a corresponding part of the installation structure 3. Next, the user presses with a hand an upper surface of the pressing portion 28 (referring to an arrow direction in FIG. 28), the pressing portion 28 moves downward, and the limiting portion 27 is separated from a first wall 2231 of the limited portion 223, the buckle 22 moves towards the direction of the force application component 32, the engagement portion 221 is inserted into the engagement hole 311, the limiting portion 27 abuts against the limited portion 223, and the limiting portion 27 is limited in a state shown in FIG. 29. Then the user releases the hand, and the installation is completed.

[0059] When the ink cartridge 2 needs to be taken out from the installation structure 3, as shown in FIG. 30, the user pushes the push portion 312 in the force application component 32. The force application component 32 rotates round the rotation axes 313 and 314. A pressure

application portion 316 of the force application component 32 pushes and presses the buckle 22 to move toward the direction of the elastic component 26. In addition, when a second wall 2232 of the limited portion 223 is detached from the limiting portion 27, under the action of the elastic force of the second elastic component 26a, the limiting portion 27 moves upward, and abuts against the first wall 2231 of the limited portion 223. In this case, the user releases the hand, the force application component 32 restores to the original position, and the engagement portion 221 on the buckle 22 is detached from the engagement hole 311. In addition, the elastic force applied by the contact pin 33 on the chip 23 causes the ink cartridge 2 to bounce upward and to be detached from the installation structure 3. Finally, the user can take out the ink cartridge 2 from the installation structure 3, to reach a state shown in FIG. 31.

Embodiment 2E

[0060] FIG. 32 is a schematic diagram of another installation structure 3. The installation structure 3 includes a rotational force application component 32, an ink duct 32b, and a slot 33b. FIG. 34 is a schematic diagram of the force application component 32. In addition to same parts of the force application component in Embodiment 1A to Embodiment 5A, the force application component 32 includes an engagement hole 311 combined by a first engagement hole 3111, a second engagement hole 3112, and a third engagement hole 3113, and an engagement protrusion 315 combined by a first engagement protrusion 3151 and a second engagement protrusion 3152. FIG. 35 is a schematic diagram of the ink cartridge in this embodiment. The buckle 22 includes the connection portion 222 and the engagement portion 221 (including a first engagement portion 2211, a second engagement portion 2212, and a third engagement portion 2213 (which may be respectively engaged with the first engagement hole 3111, the second engagement hole 3112, and the third engagement hole 3113)). FIG. 36 is a schematic diagram when the ink cartridge 2 is installed in the installation structure 3.

[0061] When the ink cartridge 2 needs to be taken out from the installation structure 3, the user pushes the push portion 312 of the force application component 32, the force application component 32 rotates, and the pressure application portion 316 pushes the stressed portion 2221 on the connection portion 222, to drive the buckle 22 to move. Subsequently, a movement process described in Embodiment 1A to Embodiment 5A and Embodiment C is generated.

Embodiment 3E

[0062] The installation structure is the same as the installation structure in Embodiment 2E.

[0063] FIG. 36 and FIG. 37 are schematic diagrams in this embodiment. The ink cartridge includes a connection

tongue 226 that extends downward. The connection tongue 226 is connected to the engagement portion 221 and the connection portion 222. The engagement portion 221 includes a first engagement portion 2211 and a second engagement portion 2212 that are respectively engaged with a first engagement protrusion 3151 and a second engagement protrusion 3152.

[0064] When the ink cartridge 2 needs to be taken out from the installation structure 3, the user pushes the push portion 312 of the force application component 32, the force application component 32 rotates, and the pressure application portion 316 pushes the stressed portion 2221 on the connection portion 222, to drive the buckle 22 to move. Subsequently, a movement process described in Embodiment 1A to Embodiment 5A and Embodiment C is generated.

[0065] An unlocking manner: It may be learned from a figure in FIG. 38 (the force application component 32 in FIG. 37 is separately taken out) that, the pressure application portion 316 and the engagement protrusion 315 are located at a same side of the rotation axis 313. Therefore, when the force application component 32 rotates, movement directions of the pressure application portion 316 and the engagement protrusion 315 are a same direction. When the user releases the hand, refer to a relationship between the limiting portion and the limited portion in Embodiment 1A to Embodiment 5A: The buckle 22 moves to the right, the limiting portion is clamped with the limited portion, the buckle 22 is in a stopped state, the engagement portion 221 is detached from the engagement protrusion 315, and under the action of the elastic force of the contact pin, the ink cartridge 2 bounces, and gets rid of the installation structure 3. Refer to embodiment C: Acceleration for resilience forces of the buckle 22 and the force application component 32 is different. The engagement protrusion 315 restores to the original position before the engagement portion 221, and the two are detached. In addition, because of the acting force of the contact pin, the ink cartridge 2 bounces.

Embodiment 4E

[0066] This is applicable to the installation structure in Embodiment 2E.

[0067] FIG. 40 is a schematic diagram of matching between the ink cartridge and the installation structure according to Embodiment 4E. The engagement portion 221 and the connection portion 222 are both disposed on the handle 22b. When the ink cartridge 2 needs to be taken out from the installation structure 3, the user pushes the push portion 312 of the force application component 32, the force application component 32 rotates, and the pressure application portion 316 pushes the stressed portion 2221 on the connection portion 222, to drive the handle 22b to rotate. After the user releases the hand, acceleration for a resilience force of the force application component 32 is greater than the acceleration of the engagement portion 221. Therefore, during restoration of the

force application component 32 and the handle 22b, the two are separated, and under the action of the elastic force of the contact pin, the ink cartridge 2 bounces.

[0068] In this embodiment, the stressed portion 2221 does not need to be disposed in a manner of protruding/over protruding from the force application component 32, thereby preventing intervention between the stressed portion 2221 and parts in the printer, for example, a friction or a collision, that is caused due to over protrusion of the stressed portion 2221.

Embodiment 5E

[0069] FIG. 41 is a schematic diagram of matching between the ink cartridge and the installation structure according to Embodiment 5E. The structure described in Embodiment 4E is used, is applicable to the installation structure described in Embodiment 1A to Embodiment 5A.

[0070] Process descriptions thereof are the same as those of Embodiment 4E, and only applicable installation structures are different.

[0071] The foregoing Embodiment 4E and Embodiment 5E can resolve the following problem in the Background: Referring to FIG. 3 in the patent application with publication no. CN201620194360.4, the problem in the Background is as following: A position relationship between a pushing portion and a first buffering portion on an installation structure is that the pushing portion is located above the first buffering portion, for example, FIG. 13 in the patent application exemplarily shows a schematic partial diagram of a printer. An ink cartridge and the installation structure are placed inside the printer. If the pushing portion is disposed above the first buffering portion, intervention between the pushing portion and parts in the printer, for example, a friction or a collision is caused. To prevent generation of such a problem, heights and sizes of the installation structure and the ink cartridge need to be reduced, but a case of insufficient ink in the ink cartridge is caused.

[0072] A person of ordinary skill in the art may understand that, an axial direction of the elastic component may also be set to a horizontal direction, that is, a direction parallel to the first surface and the second surface, or may also be set to a downward inclined direction, which both can resolve a technical problem to be resolved by the technical solution, and can achieve a technical effect of the technical solution.

[0073] The scope of the invention is defined by the claims.

Claims

1. An ink cartridge (2), wherein the ink cartridge is detachably installed in an installation structure (3) of a printing device, and the ink cartridge comprises a housing (29) and a buckle (22), wherein the buckle

is disposed on the housing, the buckle is adapted to be clamped with a force application component (31; 32) of the printing device to fix the ink cartridge in the installation structure, and the buckle is adapted to be separated from the force application component, to unfix the ink cartridge from the printing device,

characterized in that,

the buckle is adapted to perform reciprocating movement along the horizontal direction, wherein the ink cartridge further comprises a first elastic component (26; 41) connected to the housing and to the buckle; the buckle comprises an engagement portion (221); the engagement portion is located between the first elastic component and the force application component; and when the force application component is subject to an acting force toward the first elastic component that is applied by a user, the buckle is adapted to be driven by the force application component to move in a direction toward the first elastic component.

2. The ink cartridge according to claim 1, wherein under the action of the force application component, a movement direction of the buckle is a horizontal direction.
3. The ink cartridge according to claim 1, wherein the buckle comprises the engagement portion and a limited portion; the engagement portion is disposed opposite to the force application component; the buckle is adapted to be driven by the force application component to move; an angle is formed between movement directions of the limited portion and the buckle; a limiting portion is further disposed on the housing at a position opposite to the limited portion; and the limiting portion is adapted to be clamped with or separated from the limited portion.
4. The ink cartridge according to claim 3, further comprising a pressing portion and a second elastic component, wherein the limiting portion is connected to the pressing portion; a through hole is provided on the buckle; the through hole forms the limited portion; one end of the pressing portion penetrates through the limited portion; the second elastic component is disposed between the housing and the pressing portion; and extension directions of the first elastic component and the second elastic component are perpendicular to each other.
5. The ink cartridge according to claim 3, wherein the limiting portion comprises a first limiting portion and a second limiting portion, and the first limiting portion is located between the second limiting portion and the force application component; and in a state in which the ink cartridge is installed in the installation structure, the limited portion is separated

from the second limiting portion and the limited portion is clamped with the first limiting portion; and in a state in which the ink cartridge is taken out from the installation structure, the limited portion is separated from the first limiting portion and the limited portion is first clamped with the second limiting portion and then separated from the second limiting portion.

6. The ink cartridge according to claim 3, wherein the limiting portion comprises a first limiting portion and a second limiting portion, and along a direction of the first elastic component toward the force application component, a distance from the first limiting portion to the first elastic component is greater than a distance from the second limiting portion to the first elastic component; and in a state in which the ink cartridge is installed in the installation structure, the limited portion is separated from the second limiting portion and the limited portion is clamped with the first limiting portion; and in a state in which the ink cartridge is taken out from the installation structure, the limited portion is separated from the first limiting portion and the limited portion is first clamped with the second limiting portion and then separated from the second limiting portion.
7. The ink cartridge according to claim 6, wherein the ink cartridge further comprises a third elastic component; the second limiting portion is a cylinder; the third elastic component is externally sleeved on the second limiting portion; the limited portion comprises a protrusion and a recess; the protrusion is adapted to stop the first limiting portion; and the recess is adapted to match the second limiting portion.
8. The ink cartridge according to claim 1, wherein the force application component is installed in the installation structure by using a second elastic component; the second elastic component is disposed opposite to the first elastic component; and along a vertical direction, the second elastic component is located below the first elastic component.
9. The ink cartridge according to claim 8, wherein the buckle comprises the engagement portion; under the action of an external force, the force application component can rotate toward a direction of the engagement portion in a vertical plane; in a state in which the force application component stops rotating, after the external force is removed, the buckle restores to an original position under the action of the first elastic component, and the force application component restores to an original position under the action of the second elastic component; and acceleration when the force application component restores to the original position is greater than acceleration when the

buckle restores to the original position.

10. The ink cartridge according to any one of claims 5, 6, and 7, wherein the ink cartridge further comprises a stressed portion disposed on the buckle.
11. The ink cartridge according to either of claims 5 and 6, wherein when the limited portion is clamped at a position of the second limiting portion, an elastic force applied by the first elastic component on the limited portion is greater than an acting force applied by the second limiting portion on the limited portion.
12. The ink cartridge according to claim 11, wherein when the limited portion is clamped at a position of the first limiting portion, an elastic force applied by the first elastic component on the limited portion is less than or equal to an acting force applied by the first limiting portion on the limited portion.
13. The ink cartridge according to claim 11, wherein the limited portion comprises a first limited portion and a second limited portion; the first limited portion and the first limiting portion are disposed opposite to each other and are adapted to be clamped with each other or separated from each other; and the second limited portion and the second limiting portion are disposed opposite to each other and are adapted to be clamped with each other or separated from each other.
14. The ink cartridge according to claim 11, wherein in a state in which the ink cartridge is not installed in the installation structure, the limited portion is limited at a position of the first limiting portion.
15. The ink cartridge according to any one of claims 9, and 12 to 14, wherein the buckle further comprises a connection portion, and the connection portion is separately connected to the first elastic component and the engagement portion.
16. The ink cartridge according to claim 15, wherein the limited portion abuts against the connection portion.
17. The ink cartridge according to any one of claims 3 to 7, wherein the formed angle between the movement directions of the limited portion and the buckle is 90 degrees.
18. The ink cartridge according to any one of claims 3 to 7, wherein the buckle further comprises at least one telescopic portion; along an installation direction of the ink cartridge, the telescopic portion is located below the engagement portion; the telescopic portion is disposed opposite to an abutting portion of the installation structure; and the telescopic portion is adapted to be in contact with or be separated from

the abutting portion.

19. The ink cartridge according to any one of claims 3 to 7, wherein the limiting portion is a groove disposed on the housing.
20. The ink cartridge according to any one of claims 3 to 7, wherein the buckle further comprises a reinforcement portion, and the reinforcement portion is adapted to match the housing.
21. The ink cartridge according to claim 9, wherein initial acceleration when the force application component restores to the original position is 10-26.6 m/s², and initial acceleration when the buckle restores to the original position is 4-9.6 m/s².
22. The ink cartridge according to claim 9, wherein a mass of the buckle is 0.31-0.6 g, and a mass of the force application component is 0.45-0.65 g.
23. The ink cartridge according to claim 9, wherein an elastic force applied by the first elastic component on the buckle is 2.4-3 N, and an elastic force applied by the second elastic component on the force application component is 6.5-12 N.
24. The ink cartridge according to claims 3 to 7, wherein the first elastic component has a wire diameter of 0.4 mm, a developed length of 14 mm, a medium diameter of 4.1 mm, an effective coil number of 8, and a pitch of 1.6 mm.
25. The ink cartridge according to claim 9, wherein the second elastic component has a wire diameter of 0.4 mm, a developed length of 9 mm, a medium diameter of 2.6 mm, an effective coil number of 9, and a pitch of 1 mm.
26. The ink cartridge according to claim 9, wherein the ink cartridge further comprises a stressed portion disposed on the buckle; the ink cartridge comprises a connection tongue that extends downward; the connection tongue is connected to the engagement portion and the connection portion; the force application component comprises a first engagement protrusion and a second engagement protrusion; the first engagement protrusion and the second engagement protrusion are adapted to abut against the engagement portion; and the force application component is adapted to interact with the stressed portion, so that the stressed portion drives the buckle to move.
27. The ink cartridge according to claim 9, wherein a handle is further disposed on the ink cartridge, and the engagement portion and the connection portion are both disposed on the handle.

Patentansprüche

1. Tintenpatrone (2), wobei die Tintenpatrone trennbar in einer Installationsstruktur (3) einer Druckvorrichtung installiert ist und die Tintenpatrone ein Gehäuse (29) und eine Schnalle (22) aufweist, wobei die Schnalle an dem Gehäuse angeordnet ist, die Schnalle angepasst ist, mit einer Kraftaufbringungskomponente (31; 32) der Druckvorrichtung zum Befestigen der Tintenpatrone in der Installationsstruktur geklemmt zu werden, und die Schnalle angepasst ist, von der Kraftaufbringungskomponente getrennt zu werden, um die Tintenpatrone von der Druckvorrichtung zu lösen,

dadurch gekennzeichnet, dass

die Schnalle angepasst ist, eine Hin-und-Herbewegung entlang der horizontalen Richtung auszuführen, wobei die Tintenpatrone ferner eine erste elastische Komponente (26; 41) aufweist, die mit dem Gehäuse und der Schnalle verbunden ist; die Schnalle einen Eingriffsabschnitt (221) aufweist; der Eingriffsabschnitt sich zwischen der ersten elastischen Komponente und der Kraftaufbringungskomponente befindet; und wenn die Kraftaufbringungskomponente einer wirkenden Kraft in Richtung der ersten elastischen Komponente unterliegt, die durch einen Benutzer aufgebracht wird, die Schnalle angepasst ist, durch die Kraftaufbringungskomponente angetrieben zu werden, sich in einer Richtung zu der ersten elastischen Komponente hin zu bewegen.
2. Tintenpatrone nach Anspruch 1, wobei unter der Wirkung der Kraftaufbringungskomponente eine Bewegungsrichtung der Schnalle eine horizontale Richtung ist.
3. Tintenpatrone nach Anspruch 1, wobei die Schnalle den Eingriffsabschnitt und einen begrenzten Abschnitt aufweist; der Eingriffsabschnitt der Kraftaufbringungskomponente gegenüber angeordnet ist; die Schnalle angepasst ist, durch die Kraftaufbringungskomponente angetrieben zu werden, sich zu bewegen; ein Winkel zwischen Bewegungsrichtungen des begrenzten Abschnitts und der Schnalle gebildet ist; ein Begrenzungsabschnitt ferner an dem Gehäuse in einer Position dem begrenzten Abschnitt gegenüber angeordnet ist; und der Begrenzungsabschnitt angepasst ist, mit dem begrenzten Abschnitt geklemmt oder davon getrennt zu sein.
4. Tintenpatrone nach Anspruch 3, ferner aufweisend einen Druckabschnitt und eine zweite elastische Komponente, wobei der Begrenzungsabschnitt mit dem Druckabschnitt verbunden ist; ein Durchgangsloch ist an der Schnalle bereitgestellt; das Durchgangsloch bildet ferner einen begrenzten Abschnitt; ein Ende des Druckabschnitts durchdringt den begrenzten Abschnitt; die zweite elastische Komponente ist zwischen dem Gehäuse und dem Druckabschnitt angeordnet; und Erstreckungsrichtungen der ersten elastischen Komponente und der zweiten elastischen Komponente sind rechtwinklig zueinander.
5. Tintenpatrone nach Anspruch 3, wobei der Begrenzungsabschnitt einen ersten Begrenzungsabschnitt und einen zweiten Begrenzungsabschnitt aufweist und sich der erste Begrenzungsabschnitt zwischen dem zweiten Begrenzungsabschnitt und der Kraftaufbringungskomponente befindet; und in einem Zustand, in dem die Tintenpatrone in der Installationsstruktur installiert ist, der begrenzte Abschnitt von dem zweiten Begrenzungsabschnitt getrennt ist und der begrenzte Abschnitt mit dem ersten Begrenzungsabschnitt geklemmt ist; und in einem Zustand, in dem die Tintenpatrone aus der Installationsstruktur genommen wird, der begrenzte Abschnitt von dem ersten Begrenzungsabschnitt getrennt ist und der begrenzte Abschnitt erst mit dem zweiten Begrenzungsabschnitt geklemmt und dann von dem zweiten Begrenzungsabschnitt getrennt wird.
6. Tintenpatrone nach Anspruch 3, wobei der Begrenzungsabschnitt einen ersten Begrenzungsabschnitt und einen zweiten Begrenzungsabschnitt aufweist, und entlang einer Richtung der ersten elastischen Komponente zu der Kraftaufbringungskomponente ein Abstand von dem ersten Begrenzungsabschnitt zu der ersten elastischen Komponente größer als ein Abschnitt von dem zweiten Begrenzungsabschnitt zu der ersten elastischen Komponente ist; und in einem Zustand, in dem die Tintenpatrone in der Installationsstruktur installiert ist, der begrenzte Abschnitt von dem zweiten Begrenzungsabschnitt getrennt ist und der begrenzte Abschnitt mit dem ersten Begrenzungsabschnitt geklemmt ist; und in einem Zustand, in dem die Tintenpatrone aus der Installationsstruktur genommen wird, der begrenzte Abschnitt von dem ersten Begrenzungsabschnitt getrennt ist und der begrenzte Abschnitt erst mit dem zweiten Begrenzungsabschnitt geklemmt und dann von dem zweiten Begrenzungsabschnitt getrennt wird.
7. Tintenpatrone nach Anspruch 6, wobei die Tintenpatrone ferner eine dritte elastische Komponente aufweist; der zweite Begrenzungsabschnitt ein Zylinder ist; die dritte elastische Komponente extern als Hülse auf den zweiten Begrenzungsabschnitt aufgebracht ist; der begrenzte Abschnitt einen Vorsprung und einen Ausschnitt aufweist; der Vorsprung angepasst ist, den ersten Begrenzungsabschnitt zu stoppen; und der Ausschnitt angepasst

- ist, zu dem zweiten Begrenzungsabschnitt zu passen.
8. Tintenpatrone nach Anspruch 1, wobei die Kraftaufbringungskomponente in der Installationsstruktur durch Verwendung einer zweiten elastischen Komponente installiert ist; die zweite elastische Komponente der ersten elastischen Komponente gegenüber angeordnet ist; und entlang einer vertikalen Richtung die zweite elastische Komponente unter der ersten elastischen Komponente platziert ist.
9. Tintenpatrone nach Anspruch 8, wobei die Schnalle den Eingriffsabschnitt aufweist; sich die Kraftaufbringungskomponente unter der Wirkung einer externen Kraft in einer vertikalen Ebene zu einer Richtung des Eingriffsabschnitts hin drehen kann; die Schnalle in einem Zustand, in dem die Kraftaufbringungskomponente aufhört, sich zu drehen, nachdem die externe Kraft entfernt wurde, unter der Wirkung der ersten elastischen Komponente in eine Ausgangsposition zurückkehrt und die Kraftaufbringungskomponente unter der Wirkung der zweiten elastischen Komponente in eine Ausgangsposition zurückkehrt; und die Beschleunigung, wenn die Kraftaufbringungskomponente in die Ausgangsposition zurückkehrt, größer ist als die Beschleunigung, wenn die Schnalle in die Ausgangsposition zurückkehrt.
10. Tintenpatrone nach einem der Ansprüche 5, 6 und 7, wobei die Tintenpatrone ferner einen belasteten Abschnitt aufweist, der an der Schnalle angeordnet ist.
11. Tintenpatrone nach einem der Ansprüche 5 oder 6, wobei, wenn der begrenzte Abschnitt in einer Position des zweiten Begrenzungsabschnitts geklemmt ist, eine elastische Kraft, die durch die erste elastische Komponente auf den begrenzten Abschnitt aufgebracht wird, größer ist als eine Wirkkraft, die durch den zweiten Begrenzungsabschnitt auf den begrenzten Abschnitt aufgebracht ist.
12. Tintenpatrone nach Anspruch 11, wobei, wenn der begrenzte Abschnitt in einer Position des ersten Begrenzungsabschnitts geklemmt ist, eine elastische Kraft, die durch die erste elastische Komponente auf den begrenzten Abschnitt aufgebracht wird, kleiner oder gleich wie eine Wirkkraft ist, die durch den ersten Begrenzungsabschnitt auf den begrenzten Abschnitt aufgebracht ist.
13. Tintenpatrone nach Anspruch 11, wobei der begrenzte Abschnitt einen ersten begrenzten Abschnitt und einen zweiten begrenzten Abschnitt aufweist; der erste begrenzte Abschnitt und der erste Begrenzungsabschnitt sich gegenüberliegend angeordnet sind und angepasst sind, aneinander geklemmt oder
- voneinander getrennt zu werden; und der zweite begrenzte Abschnitt und der zweite Begrenzungsabschnitt sich gegenüber angeordnet sind und angepasst sind, aneinander geklemmt oder voneinander getrennt zu werden.
14. Tintenpatrone nach Anspruch 11, wobei in einem Zustand, in dem die Tintenpatrone nicht in der Installationsstruktur installiert ist, der begrenzte Abschnitt in einer Position des ersten Begrenzungsabschnitts begrenzt ist.
15. Tintenpatrone nach einem der Ansprüche 9 und 12 bis 14, wobei die Schnalle ferner einen Verbindungsabschnitt aufweist, und der Verbindungsabschnitt getrennt mit der ersten elastischen Komponente und dem Eingriffsabschnitt verbunden ist.
16. Tintenpatrone nach Anspruch 15, wobei der begrenzte Abschnitt an den Verbindungsabschnitt anstößt.
17. Tintenpatrone nach einem der Ansprüche 3 bis 7, wobei der gebildete Winkel zwischen den Bewegungsrichtungen des begrenzten Abschnitts und der Schnalle 90 Grad beträgt.
18. Tintenpatrone nach einem der Ansprüche 3 bis 7, wobei die Schnalle ferner mindestens einen teleskopischen Abschnitt aufweist; sich der teleskopische Abschnitt in einer Installationsrichtung der Tintenpatrone unter dem Eingriffsabschnitt befindet; der teleskopische Abschnitt einem anstoßenden Abschnitt der Installationsstruktur gegenüber angeordnet ist; und der teleskopische Abschnitt angepasst ist, mit dem anstoßenden Abschnitt in Kontakt zu stehen oder davon getrennt zu sein.
19. Tintenpatrone nach einem der Ansprüche 3 bis 7, wobei der Begrenzungsabschnitt eine Kerbe ist, die an dem Gehäuse angeordnet ist.
20. Tintenpatrone nach einem der Ansprüche 3 bis 7, wobei die Schnalle ferner einen Verstärkungsabschnitt aufweist, und der Verstärkungsabschnitt angepasst ist, zu dem Gehäuse zu passen.
21. Tintenpatrone nach Anspruch 9, wobei die anfängliche Beschleunigung, wenn die Kraftaufbringungskomponente die ursprüngliche Position wiederherstellt, 10-26,6 m/s² beträgt, und die anfängliche Beschleunigung, wenn die Schnalle die ursprüngliche Position wiederherstellt, 4-9,6 m/s² beträgt.
22. Tintenpatrone nach Anspruch 9, wobei eine Masse der Schnalle 0,31-0,6 g beträgt und eine Masse der Kraftaufbringungskomponente 0,45-0,65 g beträgt.

23. Tintenpatrone nach Anspruch 9, wobei eine elastische Kraft, die durch die erste elastische Komponente auf die Schnalle aufgebracht wird, 2,4-3 N beträgt, und eine elastische Kraft, die durch die zweite elastische Komponente auf die Kraftaufbringungskomponente aufgebracht wird, 6,5-12 N beträgt. 5
24. Tintenpatrone nach Anspruch 3 bis 7, wobei die erste elastische Komponente einen Drahtdurchmesser von 0,4 mm, eine entwickelte Länge von 14 mm, einen mittleren Durchmesser von 4,1 mm, eine effektive Spulenzahl von 8 und einen Abstand von 1,6 mm aufweist. 10
25. Tintenpatrone nach Anspruch 9, wobei die zweite elastische Komponente einen Drahtdurchmesser von 0,4 mm, eine entwickelte Länge von 9 mm, einen mittleren Durchmesser von 2,6 mm, eine effektive Spulenzahl von 9 und einen Abstand von 1 mm aufweist. 15
26. Tintenpatrone nach Anspruch 9, wobei die Tintenpatrone ferner einen belasteten Abschnitt aufweist, der an der Schnalle angeordnet ist; die Tintenpatrone eine Verbindungszunge aufweist, die sich nach unten erstreckt; die Verbindungszunge mit dem Eingriffsabschnitt und dem Verbindungsabschnitt verbunden ist; die Kraftaufbringungskomponente einen ersten Eingriffsvorsprung und einen zweiten Eingriffsvorsprung aufweist; der erste Eingriffsvorsprung und der zweite Eingriffsvorsprung angepasst sind, an den Eingriffsabschnitt anzustoßen; und die Kraftaufbringungskomponente angepasst ist, mit dem belasteten Abschnitt zu interagieren, sodass der belastete Abschnitt die Schnalle antreibt, um sich zu bewegen. 25
27. Tintenpatrone nach Anspruch 9, wobei ein Griff ferner an der Tintenpatrone angeordnet ist und der Eingriffsabschnitt und der Verbindungsabschnitt beide an dem Griff angeordnet sind. 30

Revendications

1. Cartouche d'encre (2), dans laquelle la cartouche d'encre est installée de manière amovible dans une structure d'installation (3) d'un dispositif d'impression, et la cartouche d'encre comprend un boîtier (29) et une boucle (22), dans laquelle la boucle est disposée sur le boîtier, la boucle est adaptée pour être serrée avec un composant d'application de force (31 ; 32) du dispositif d'impression pour fixer la cartouche d'encre dans la structure d'installation, et la boucle est adaptée pour être séparée du composant d'application de force, pour détacher la cartouche d'encre du dispositif d'impression, caractérisé en ce que 45

la boucle est adaptée pour effectuer un mouvement de va-et-vient le long de la direction horizontale, dans lequel la cartouche d'encre comprend en outre un premier composant élastique (26 ; 41) relié au boîtier et à la boucle ; la boucle comprend une partie de mise en prise (221); la partie de mise en prise est située entre le premier composant élastique et le composant d'application de force ; et lorsque le composant d'application de force est soumis à une force d'action vers le premier composant élastique qui est appliqué par un utilisateur, la boucle est adaptée pour être entraînée par le composant d'application de force pour se déplacer dans une direction vers le premier composant élastique.

2. Cartouche d'encre selon la revendication 1, dans laquelle sous l'action du composant d'application de force, une direction de déplacement de la boucle est une direction horizontale. 20
3. Cartouche d'encre selon la revendication 1, dans laquelle la boucle comprend la partie de mise en prise et une partie limitée ; la partie de mise en prise est disposée à l'opposé du composant d'application de force ; la boucle est adaptée pour être entraînée par le composant d'application de force pour se déplacer ; un angle est formé entre les directions de mouvement de la partie limitée et de la boucle ; une partie de limitation est en outre disposée sur le boîtier dans une position opposée à la partie limitée ; et la partie de limitation est adaptée pour être serrée avec ou séparée de la partie limitée. 25
4. Cartouche d'encre selon la revendication 3, comprenant en outre une partie de pression et un deuxième composant élastique, dans laquelle la partie de limitation est reliée à la partie de pression ; un trou traversant est prévu sur la boucle ; le trou traversant forme la partie limitée ; une extrémité de la partie de pression pénètre à travers la partie limitée ; le deuxième composant élastique est disposé entre le boîtier et la partie de pression, et les directions d'extension du premier composant élastique et du deuxième composant élastique sont perpendiculaires l'une à l'autre. 35
5. Cartouche d'encre selon la revendication 3, dans laquelle la partie de limitation comprend une première partie de limitation et une deuxième partie de limitation, et la première partie de limitation est située entre la deuxième partie de limitation et le composant d'application de force ; et dans un état dans lequel la cartouche d'encre est installée dans la structure d'installation, la partie limitée est séparée de la deuxième partie de limitation et la partie limitée est serrée avec la première partie de limitation ; et dans un état dans lequel la cartouche d'encre est retirée de la structure d'installation, 45

- la partie limitée est séparée de la première partie de limitation et la partie limitée est d'abord serrée avec la deuxième partie de limitation puis séparée de la deuxième partie de limitation.
6. Cartouche d'encre selon la revendication 3, dans laquelle la partie de limitation comprend une première partie de limitation et une deuxième partie de limitation, et le long d'une direction du premier composant élastique vers le composant d'application de force, une distance de la première partie de limitation au premier composant élastique est supérieure à une distance de la deuxième partie de limitation au premier élastique composant ; et dans un état dans lequel la cartouche d'encre est installée dans la structure d'installation, la partie limitée est séparée de la deuxième partie de limitation et la partie limitée est serrée avec la première partie de limitation ; et dans un état dans lequel la cartouche d'encre est retirée de la structure d'installation, la partie limitée est séparée de la première partie de limitation et la partie limitée est d'abord serrée avec la deuxième partie de limitation puis séparée de la deuxième partie de limitation.
7. Cartouche d'encre selon la revendication 6, dans laquelle la cartouche d'encre comprend en outre un troisième composant élastique ; la deuxième partie de limitation est un cylindre ; le troisième composant élastique est gainé extérieurement sur la deuxième partie de limitation ; la partie limitée comprend une saillie et un évidement ; la saillie est adaptée pour arrêter la première partie de limitation ; et l'évidement est adapté pour correspondre à la deuxième partie de limitation.
8. Cartouche d'encre selon la revendication 1, dans laquelle le composant d'application de force est installé dans la structure d'installation en utilisant un deuxième composant élastique ; le deuxième composant élastique est disposé à l'opposé du premier composant élastique ; et selon une direction verticale, le deuxième composant élastique est situé sous le premier composant élastique.
9. Cartouche d'encre selon la revendication 8, dans laquelle la boucle comprend la partie de mise en prise ; sous l'action d'une force externe, le composant d'application de force peut tourner vers une direction de la partie de mise en prise dans un plan vertical ; dans un état dans lequel le composant d'application de force cesse de tourner, après que la force externe est supprimée, la boucle revient à une position d'origine sous l'action du premier composant élastique, et le composant d'application de force revient à une position d'origine sous l'action du deuxième composant élastique ; et l'accélération lorsque la composante d'application de force revient à la position d'origine est supérieure à l'accélération lorsque la boucle revient à la position d'origine.
10. Cartouche d'encre selon une quelconque des revendications 5, 6 et 7, dans laquelle la cartouche d'encre comprend en outre une partie contrainte disposée sur la boucle.
11. Cartouche d'encre selon une quelconque des revendications 5 et 6, dans laquelle lorsque la partie limitée est serrée à une position de la deuxième partie de limitation, une force élastique appliquée par le premier composant élastique sur la partie limitée est supérieure à une force d'action appliquée par la deuxième partie de limitation sur la partie limitée.
12. Cartouche d'encre selon la revendication 11, dans laquelle lorsque la partie limitée est serrée à une position de la première partie de limitation, une force élastique appliquée par le premier composant élastique sur la partie limitée est inférieure ou égale à une force d'action appliquée par la première partie de limitation sur la partie limitée.
13. Cartouche d'encre selon la revendication 11, dans laquelle la partie limitée comprend une première partie limitée et une deuxième partie limitée ; la première partie limitée et la première partie de limitation sont disposées à l'opposé l'une de l'autre et sont adaptées pour être serrées l'une avec l'autre ou séparées l'une de l'autre ; et la deuxième partie limitée et la deuxième partie de limitation sont disposées à l'opposé l'une de l'autre et sont adaptées pour être serrées avec l'une avec l'autre ou séparées l'une de l'autre.
14. Cartouche d'encre selon la revendication 11, dans laquelle dans un état dans lequel la cartouche d'encre n'est pas installée dans la structure d'installation, la partie limitée est limitée à une position de la première partie de limitation.
15. Cartouche d'encre selon une quelconque des revendications 9 et 12 à 14, dans laquelle la boucle comprend en outre une partie de raccordement, et la partie de raccordement est raccordée séparément au premier composant élastique et à la partie de mise en prise.
16. Cartouche d'encre selon la revendication 15, dans laquelle la partie limitée vient en butée contre la partie de raccordement.
17. Cartouche d'encre selon une quelconque des revendications 3 à 7, dans laquelle l'angle formé entre les directions de mouvement de la partie limitée et de la boucle est de 90 degrés.

18. Cartouche d'encre selon une quelconque des revendications 3 à 7, dans laquelle la boucle comprend en outre au moins une partie télescopique ; le long d'une direction d'installation de la cartouche d'encre, la partie télescopique est située sous la partie de mise en prise ; la partie télescopique est disposée à l'opposé d'une partie en butée de la structure d'installation ; et la partie télescopique est adaptée pour être en contact avec ou être séparée de la partie en butée. 5 10
19. Cartouche d'encre selon une quelconque des revendications 3 à 7, dans laquelle la partie de limitation est une rainure disposée sur le boîtier. 15
20. Cartouche d'encre selon une quelconque des revendications 3 à 7, dans laquelle la boucle comprend en outre une partie de renforcement, et la partie de renforcement est adaptée pour correspondre au boîtier. 20
21. Cartouche d'encre selon la revendication 9, dans laquelle l'accélération initiale lorsque le composant d'application de force revient à la position d'origine est de 10 à 26,6 m/s², et l'accélération initiale lorsque la boucle revient à la position d'origine est de 4 à 9,6 m/s². 25
22. Cartouche d'encre selon la revendication 9, dans laquelle une masse de la boucle est de 0.31 à 0.6 g et une masse du composant d'application de force est de 0.45 à 0.65 g. 30
23. Cartouche d'encre selon la revendication 9, dans laquelle une force élastique appliquée par le premier composant élastique sur la boucle est de 2.4-3 N, et une force élastique appliquée par le deuxième composant élastique sur le composant d'application de force est de 6.5-12 N. 35 40
24. Cartouche d'encre selon les revendications 3 à 7, dans laquelle le premier composant élastique a un diamètre de fil de 0.4 mm, une longueur développée de 14 mm, un diamètre moyen de 4.1 mm, un nombre effectif de bobine de 8 et un pas de 1.6 mm. 45
25. Cartouche d'encre selon la revendication 9, dans laquelle le deuxième composant élastique a un diamètre de fil de 0.4 mm, une longueur développée de 9 mm, un diamètre moyen de 2.6 mm, un nombre effectif de bobine de 9 et un pas de 1 mm. 50
26. Cartouche d'encre selon la revendication 9, dans laquelle la cartouche d'encre comprend en outre une partie sollicitée disposée sur la boucle ; la cartouche d'encre comprend une languette de raccordement qui s'étend vers le bas ; la languette de raccordement est raccordée à la partie de mise en prise et à la partie de raccordement ; le composant d'application de force comprend une première saillie de mise en prise et une deuxième saillie de mise en prise ; la première saillie de mise en prise et la deuxième saillie de mise en prise sont adaptées pour venir en butée contre la partie de mise en prise ; et le composant d'application de force est adapté pour interagir avec la partie sollicitée, de sorte que la partie contrainte entraîne le mouvement de la boucle. 55
27. Cartouche d'encre selon la revendication 9, dans laquelle une poignée est en outre disposée sur la cartouche d'encre, et la partie de mise en prise et la partie de raccordement sont toutes deux disposées sur la poignée.

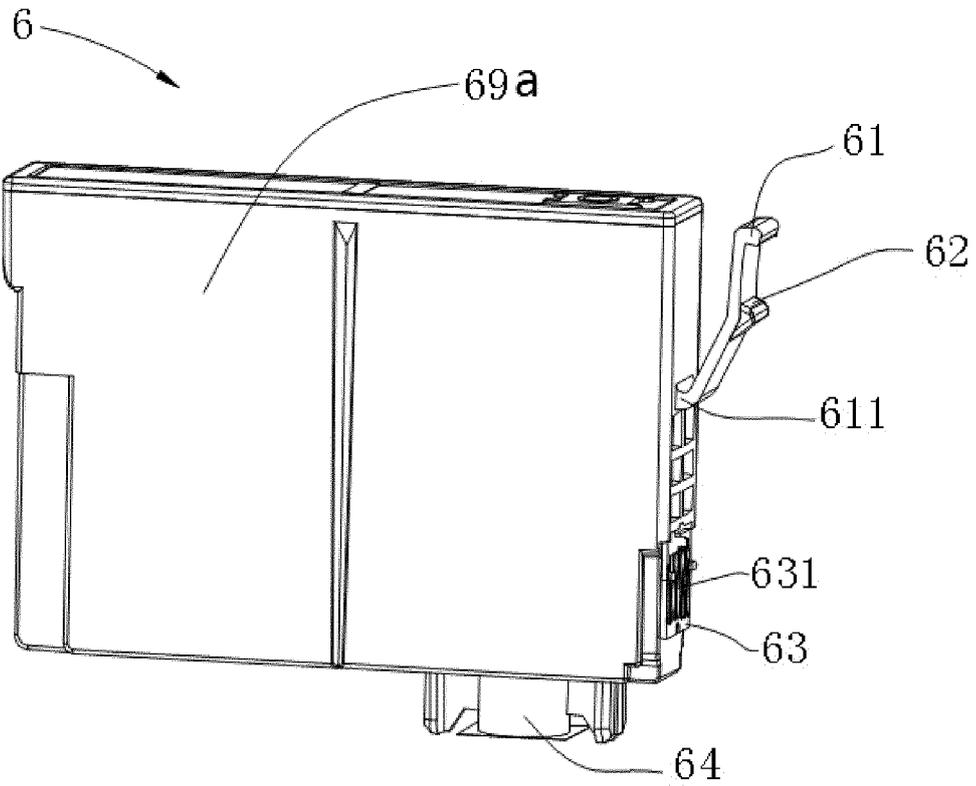


FIG. 1

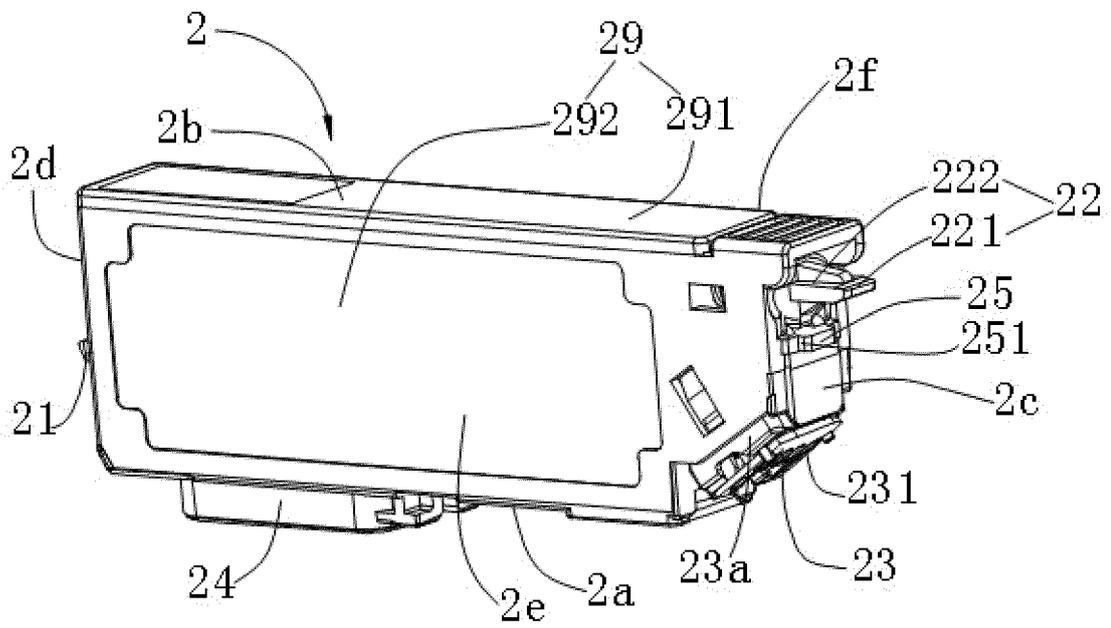


FIG. 2

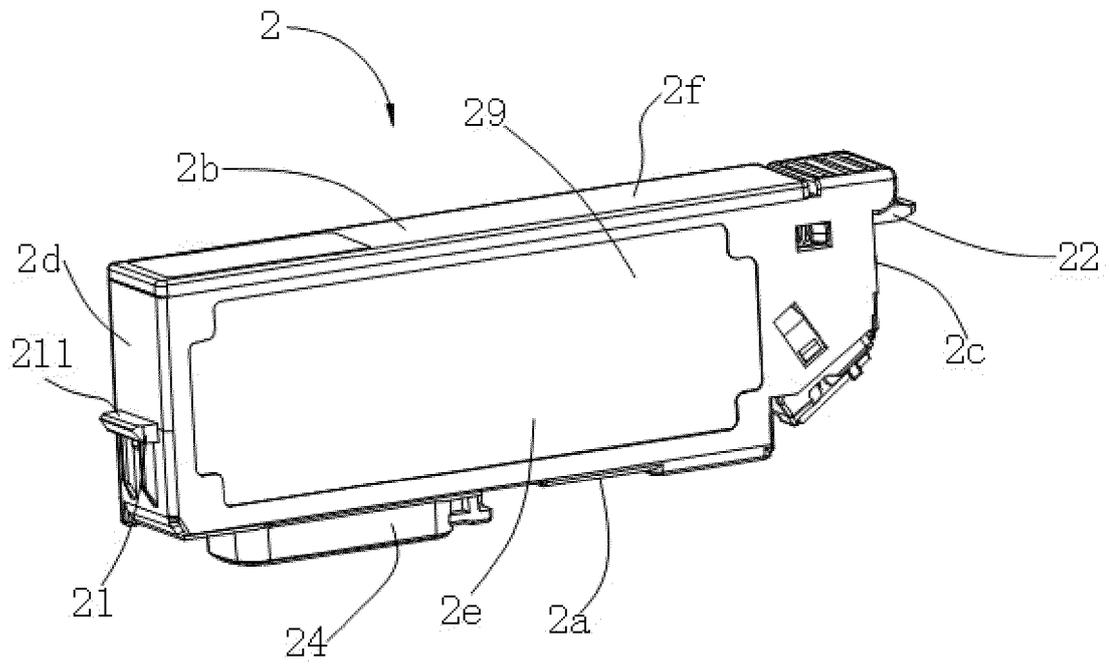


FIG. 3

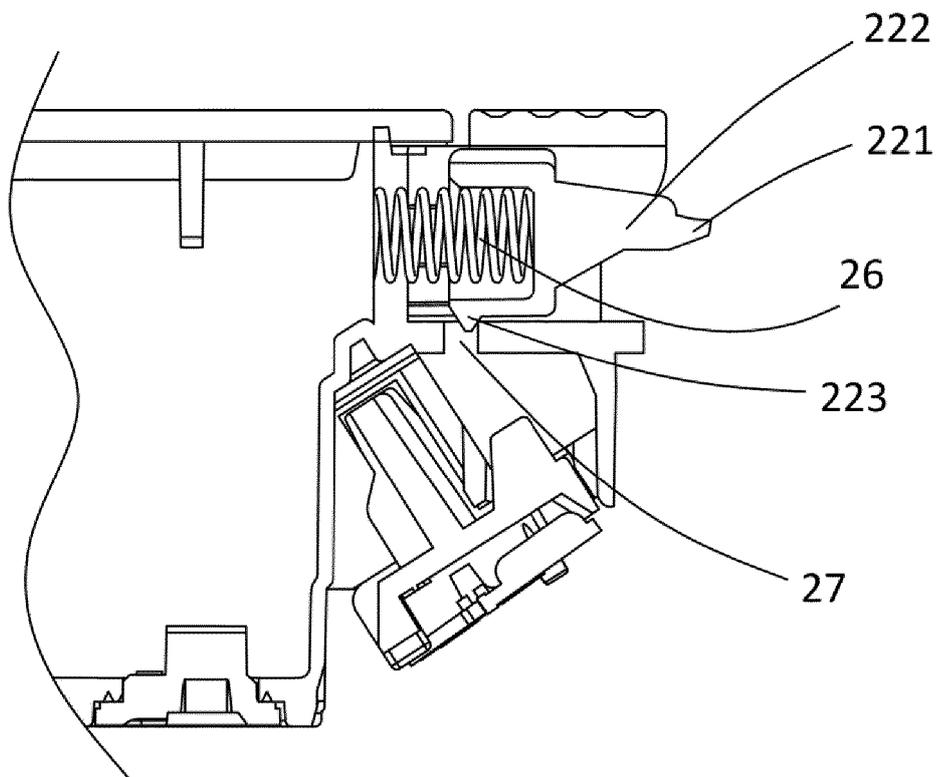


FIG. 4

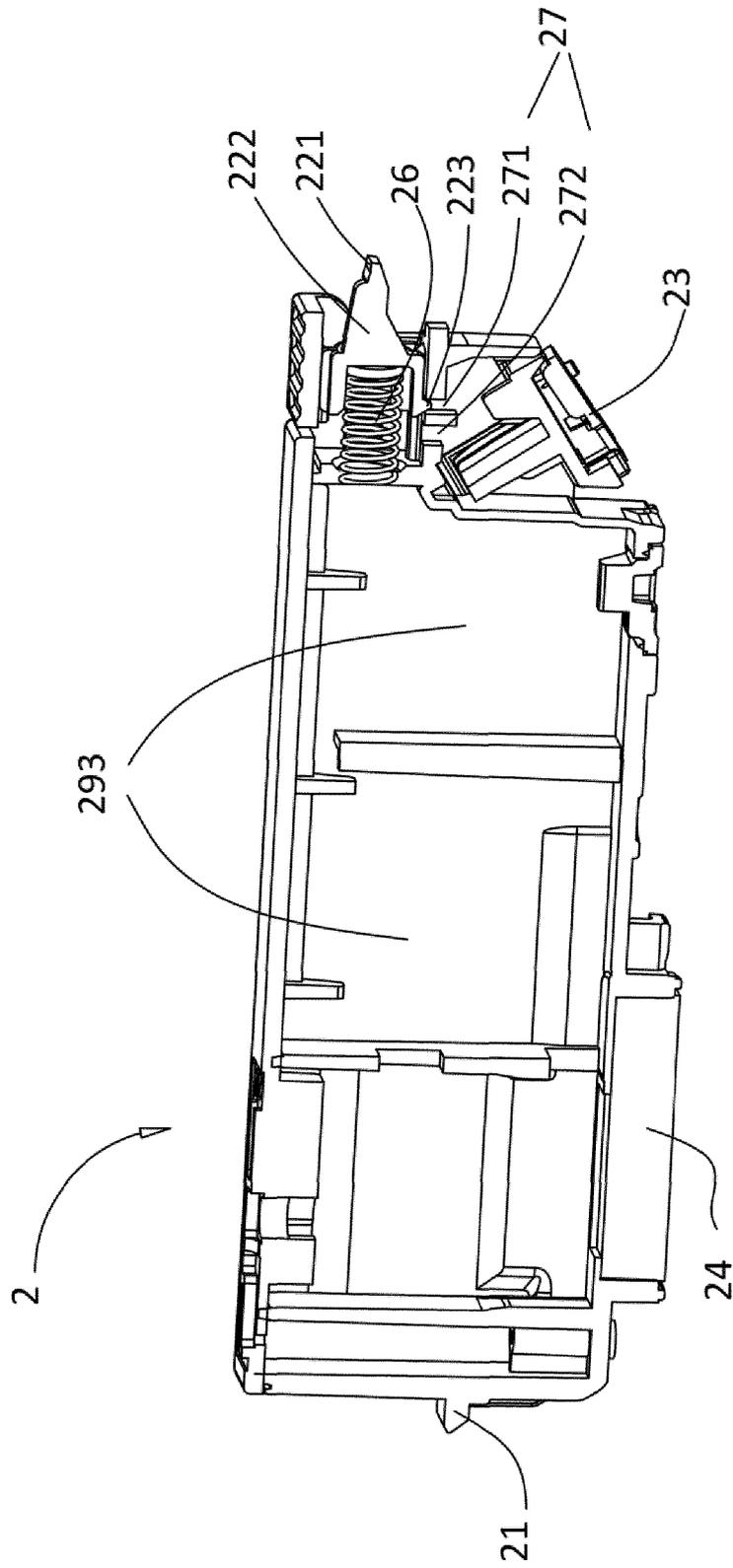


FIG. 5

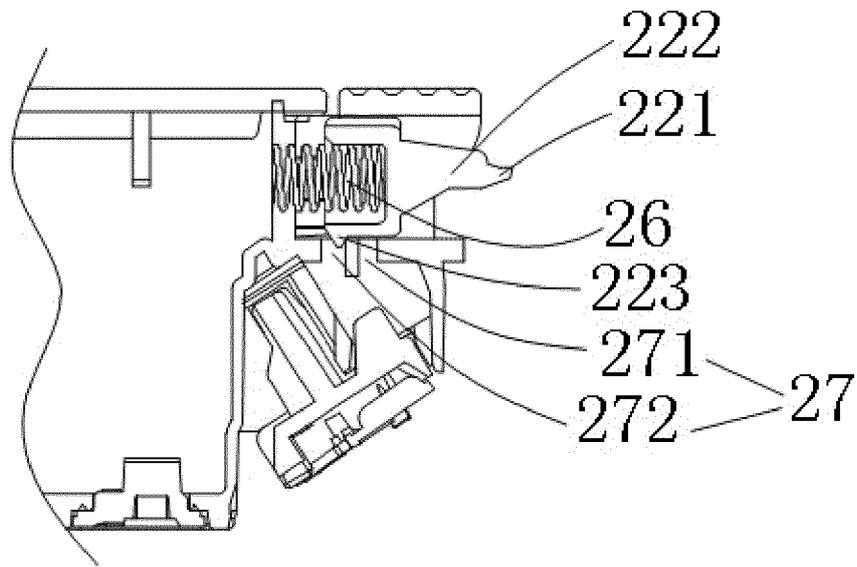


FIG. 6

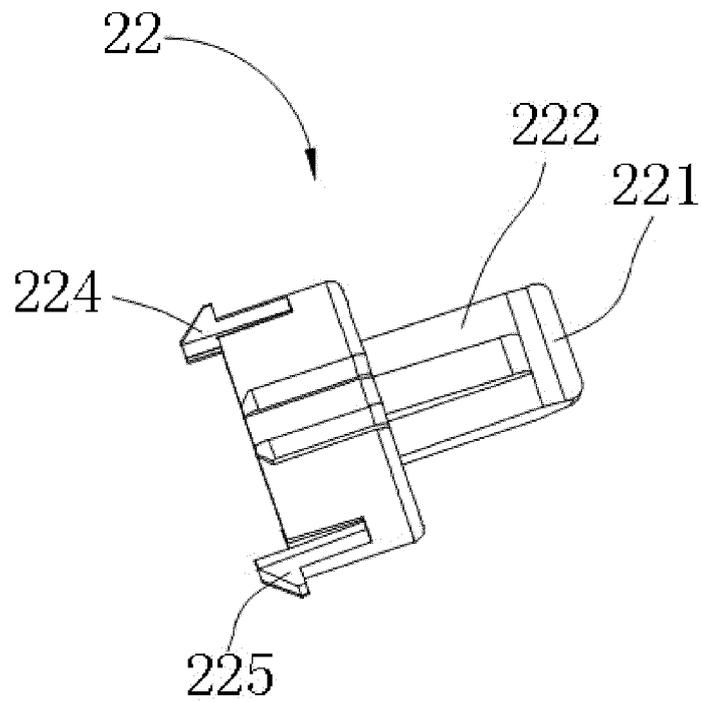


FIG. 7

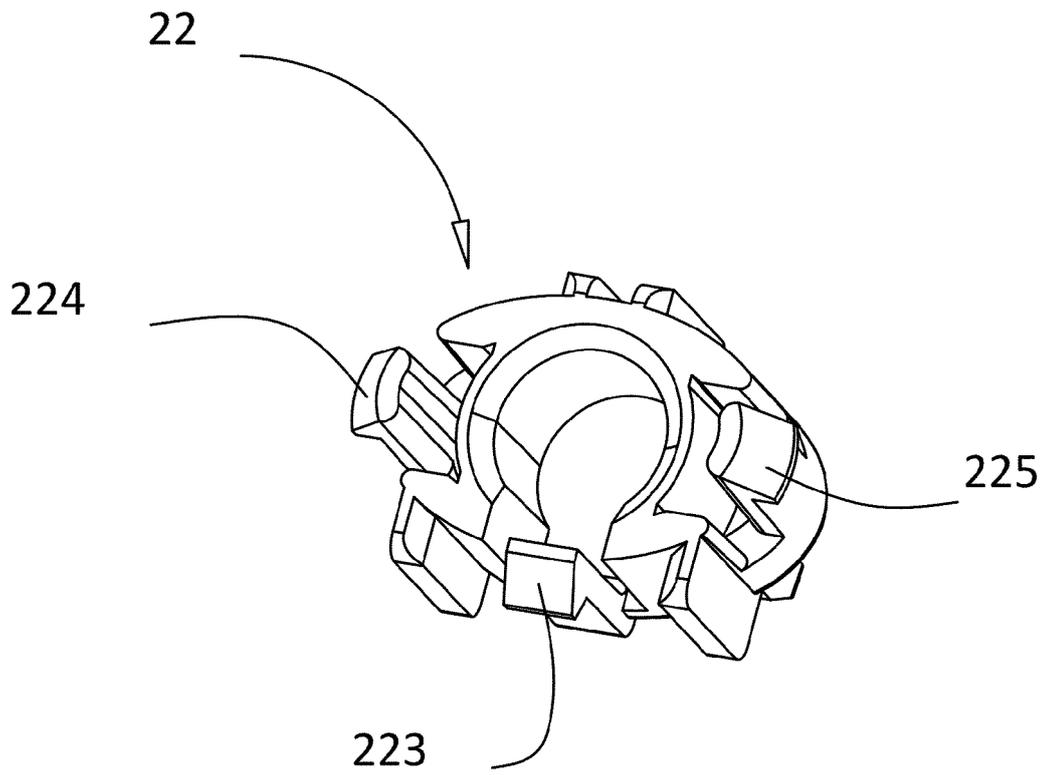


FIG. 8

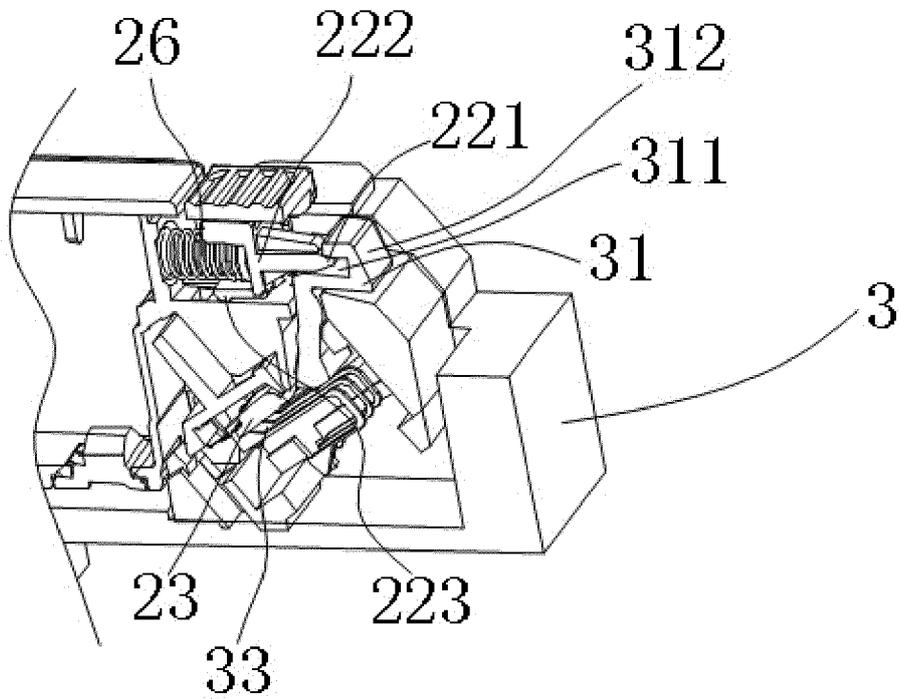


FIG. 9

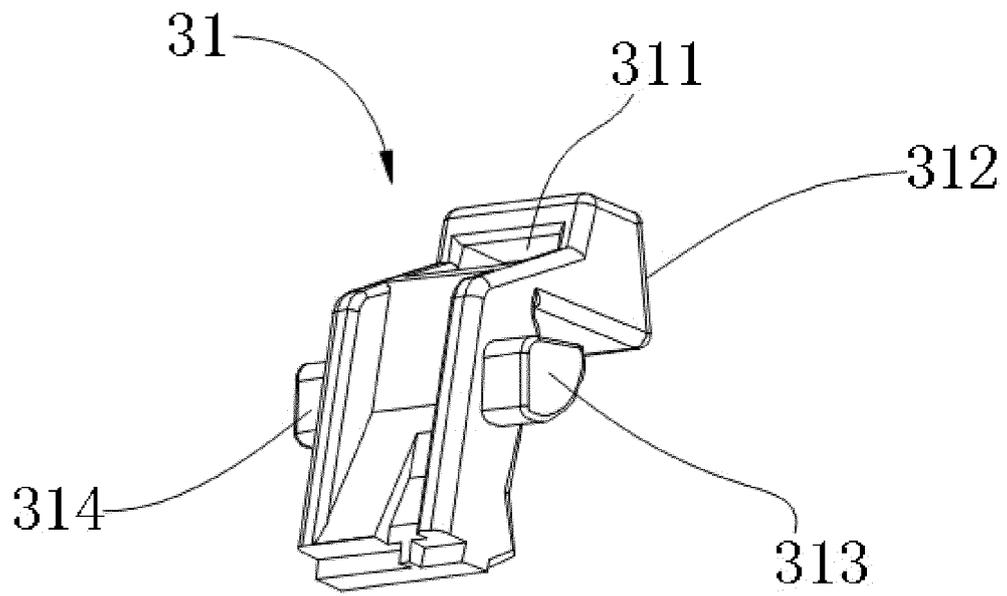


FIG. 10

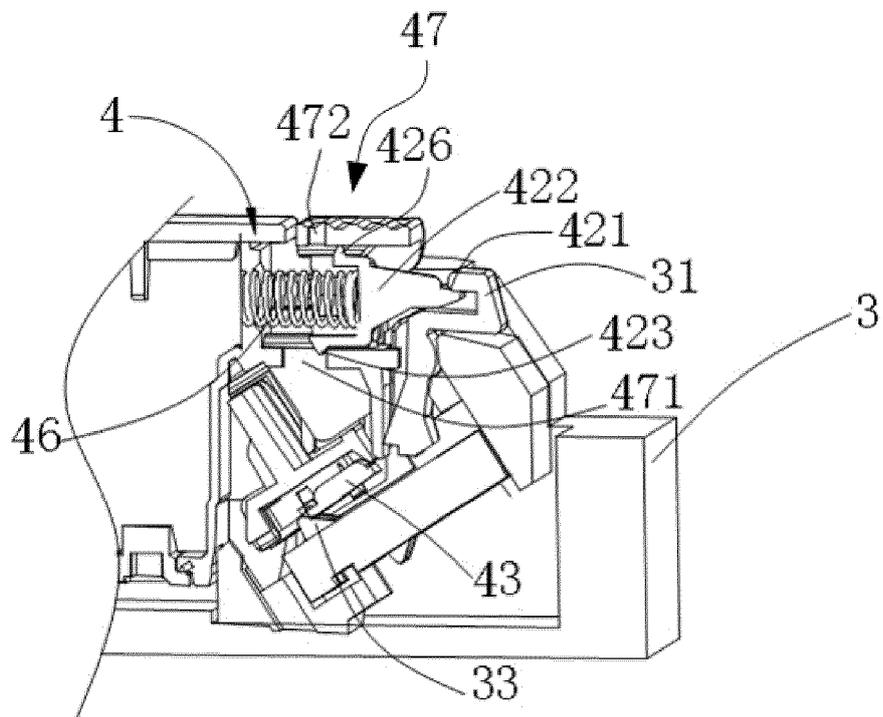


FIG. 11

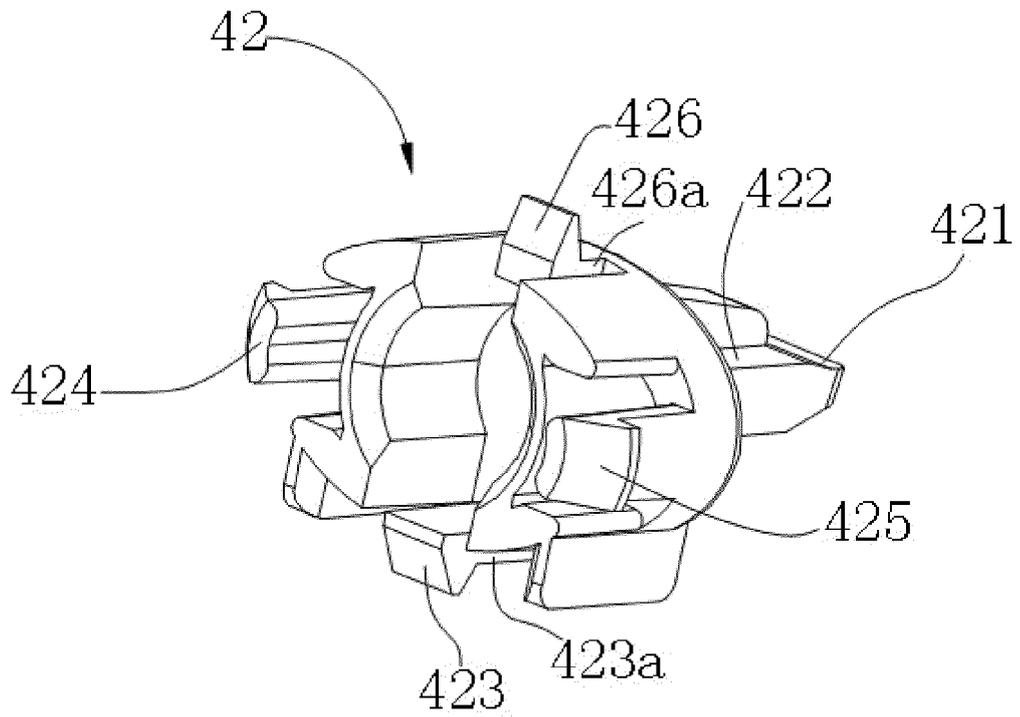


FIG. 12

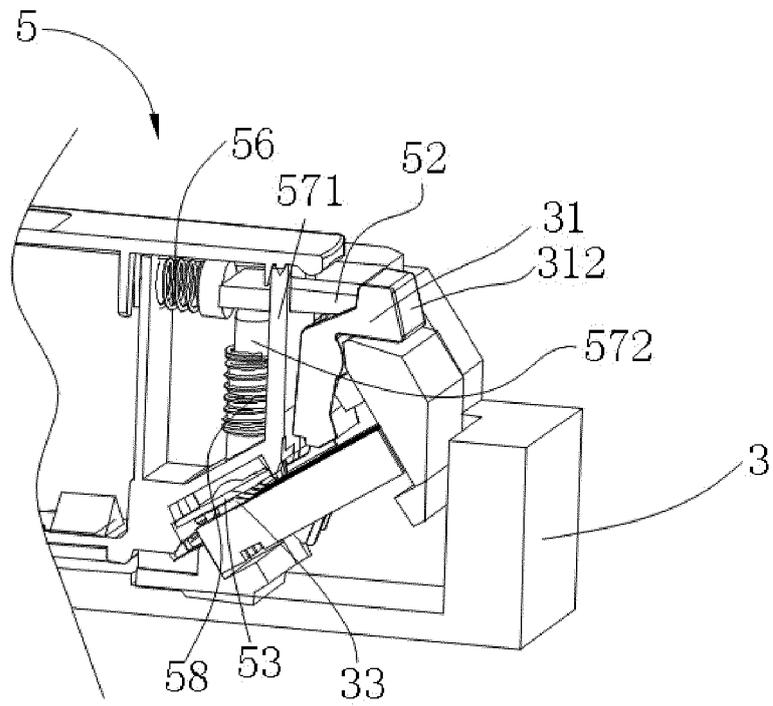


FIG. 13

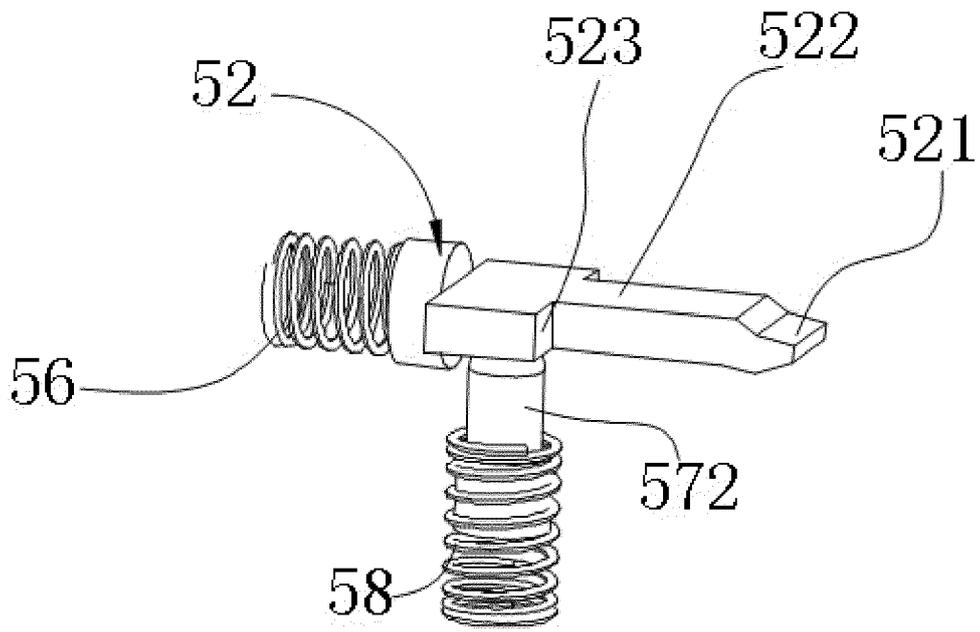


FIG. 14

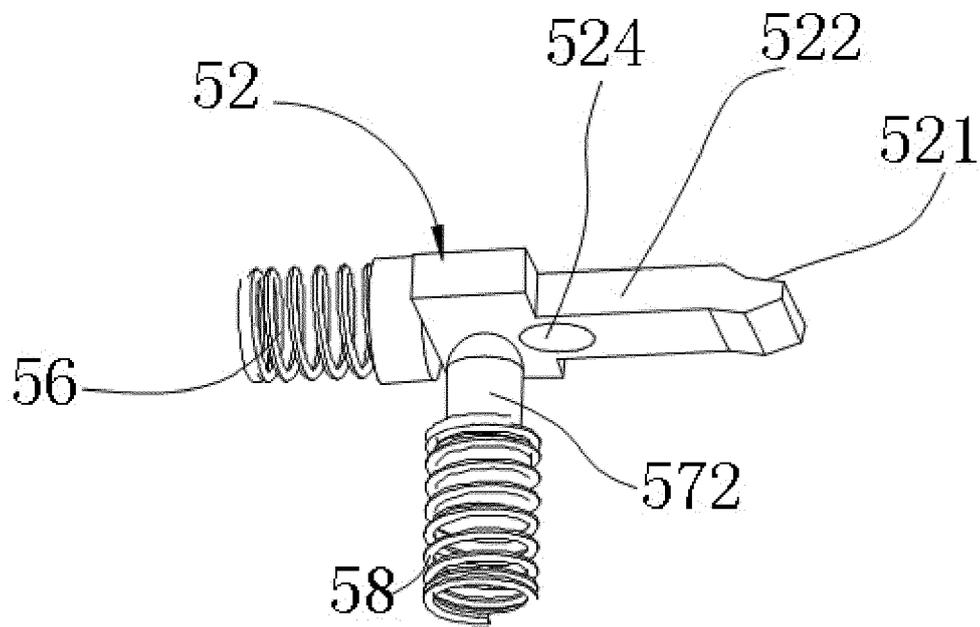


FIG. 15

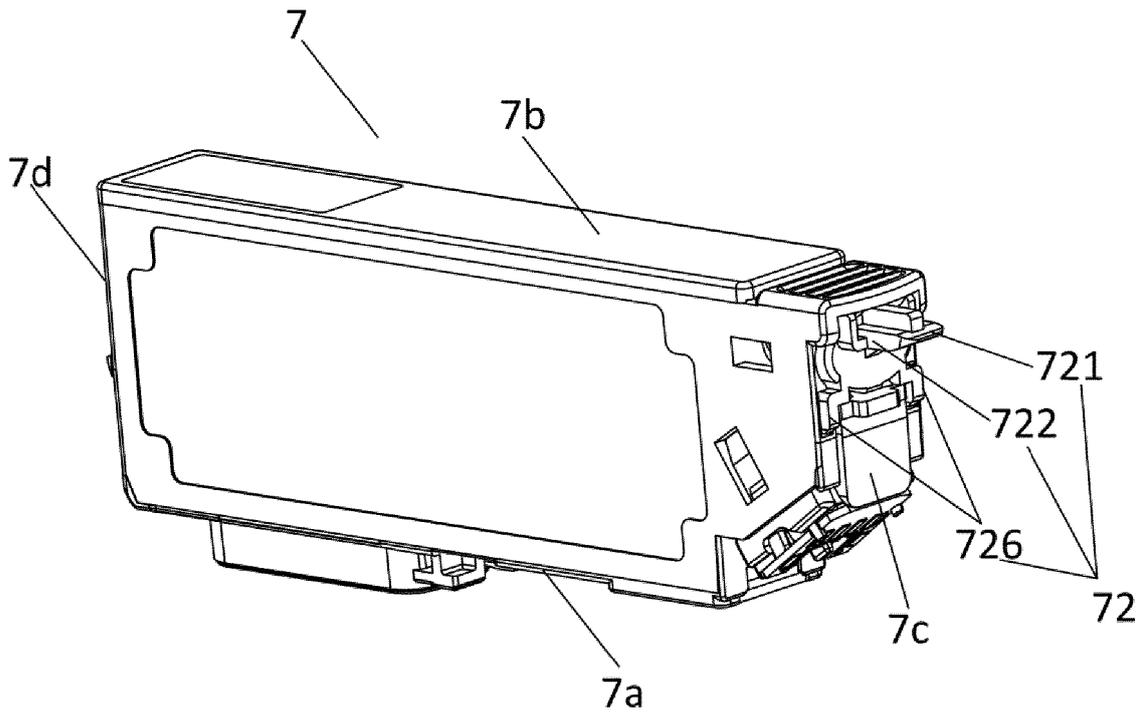


FIG. 16

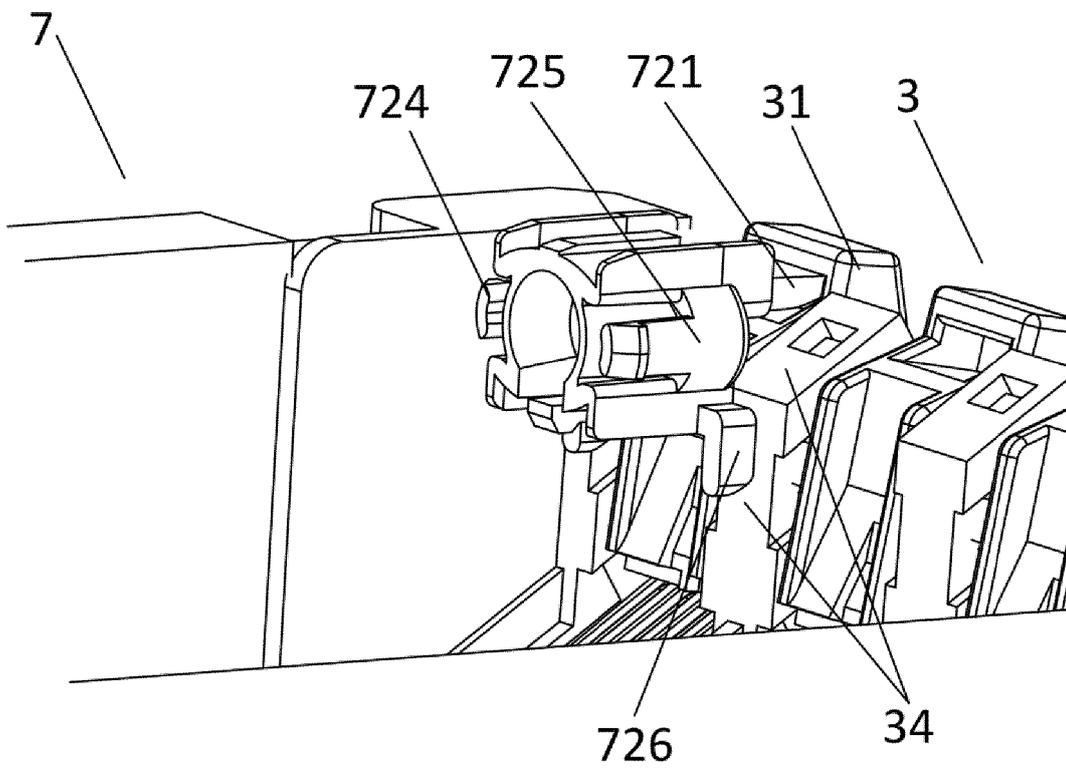


FIG. 17

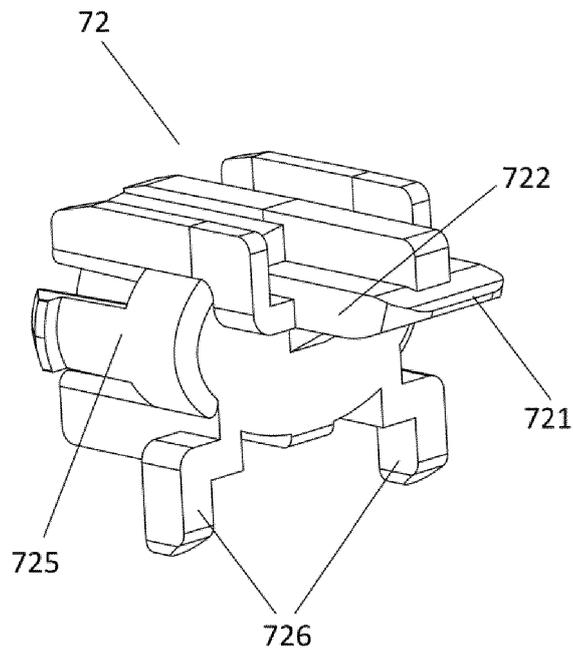


FIG. 18

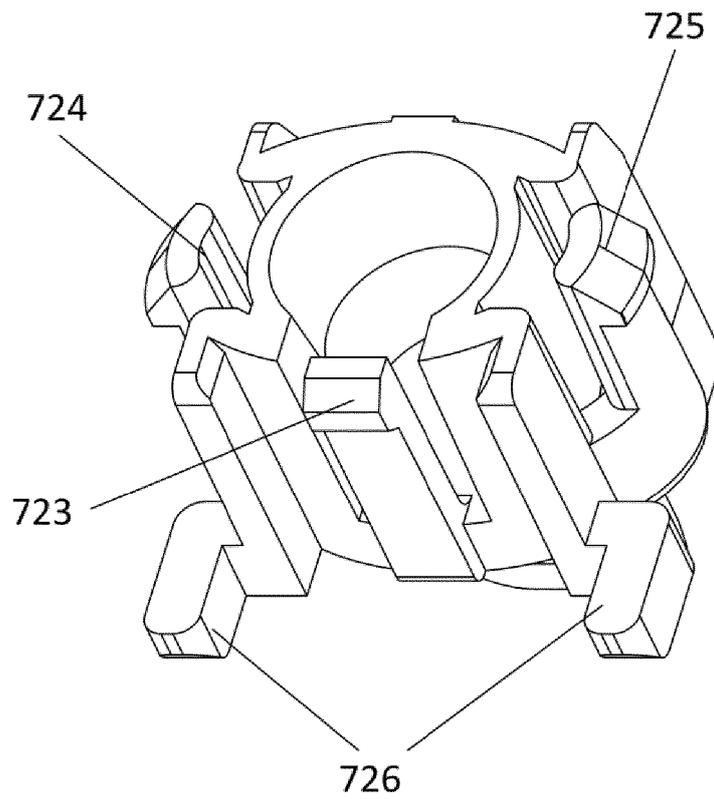


FIG. 19

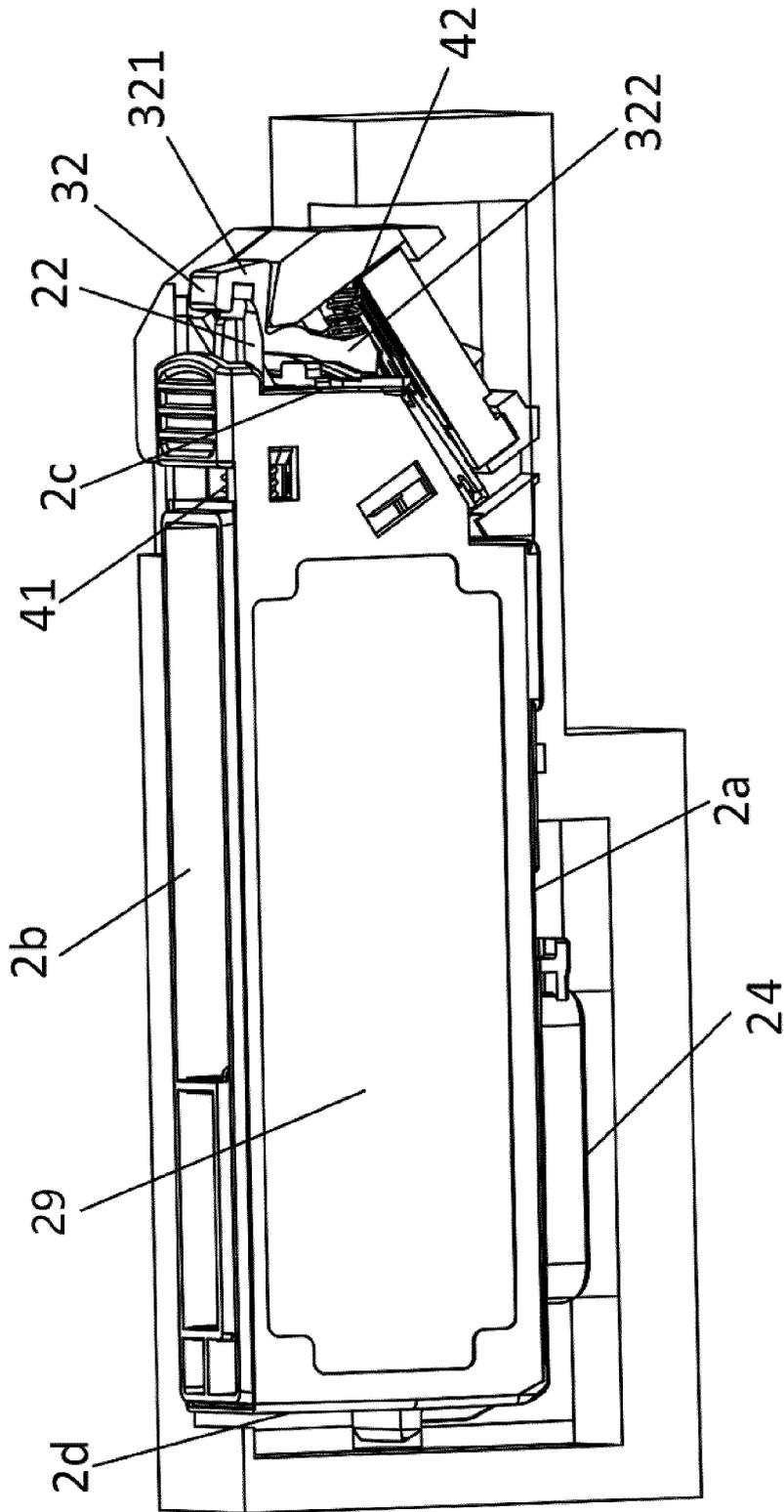


FIG. 20

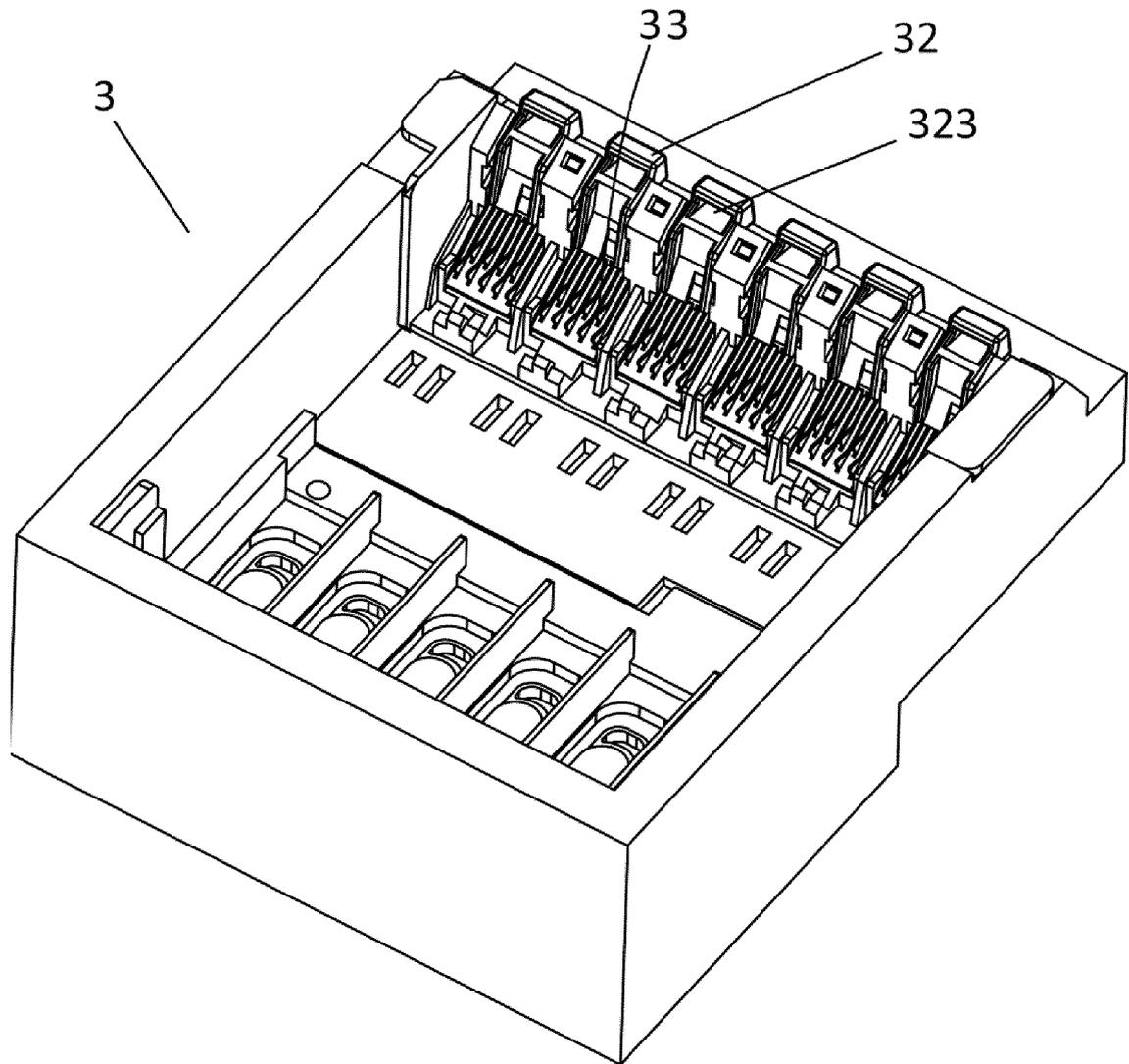


FIG. 21

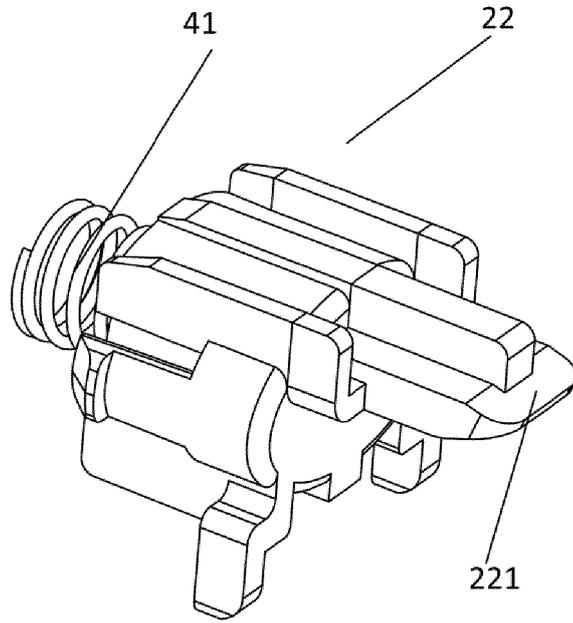


FIG. 22

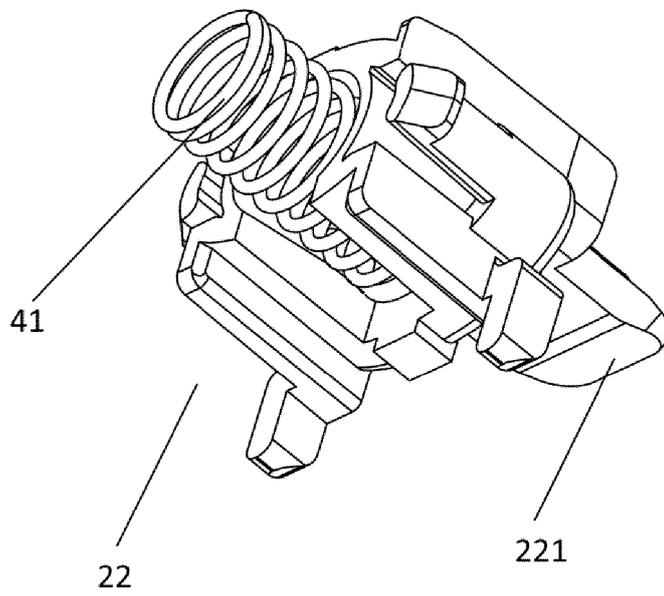


FIG. 23

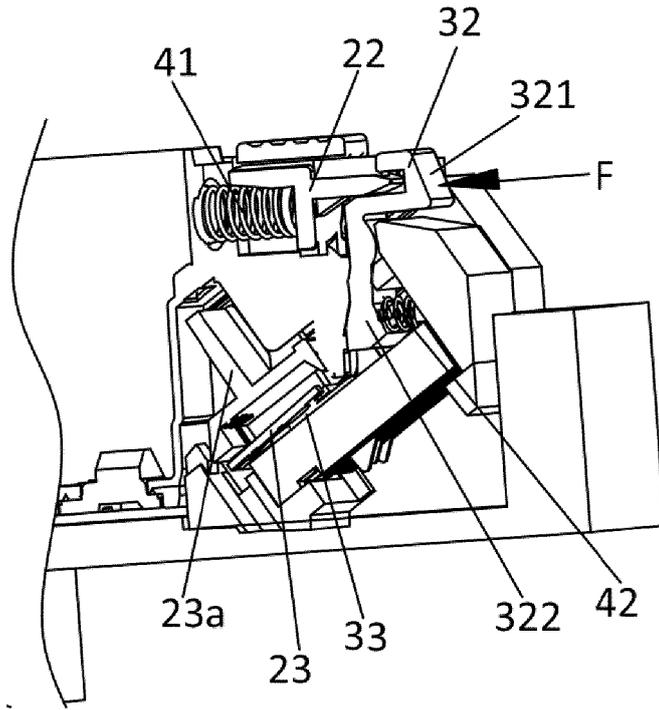


FIG. 24

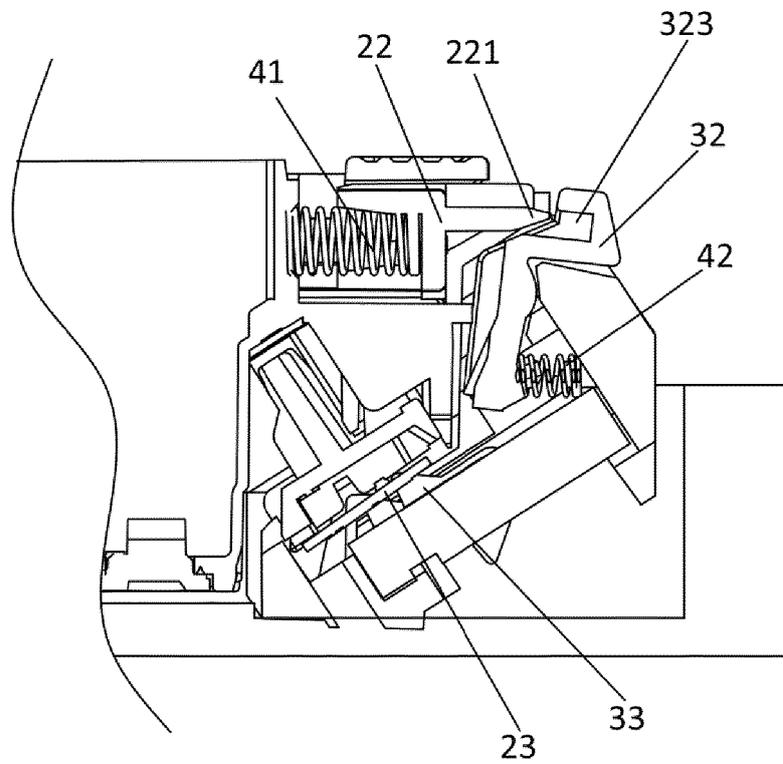


FIG. 25

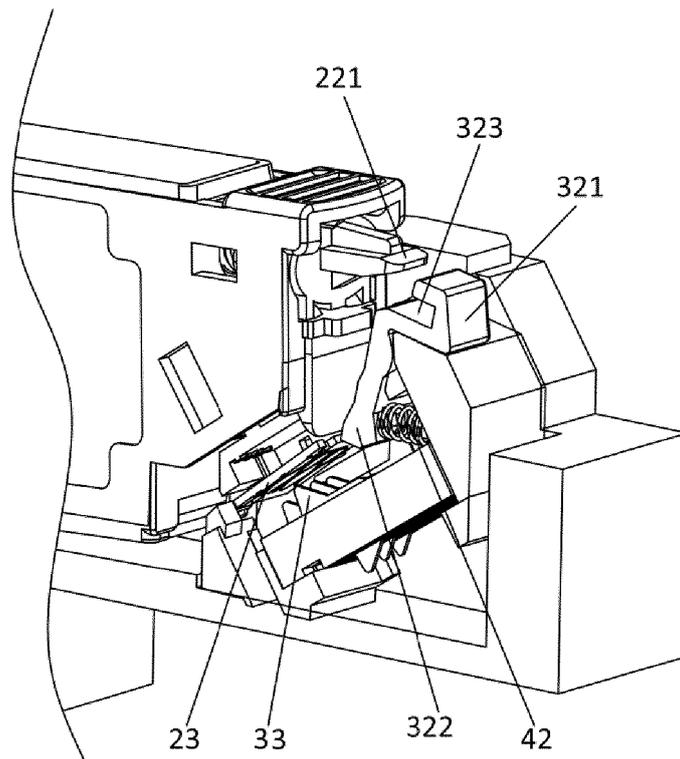


FIG. 26

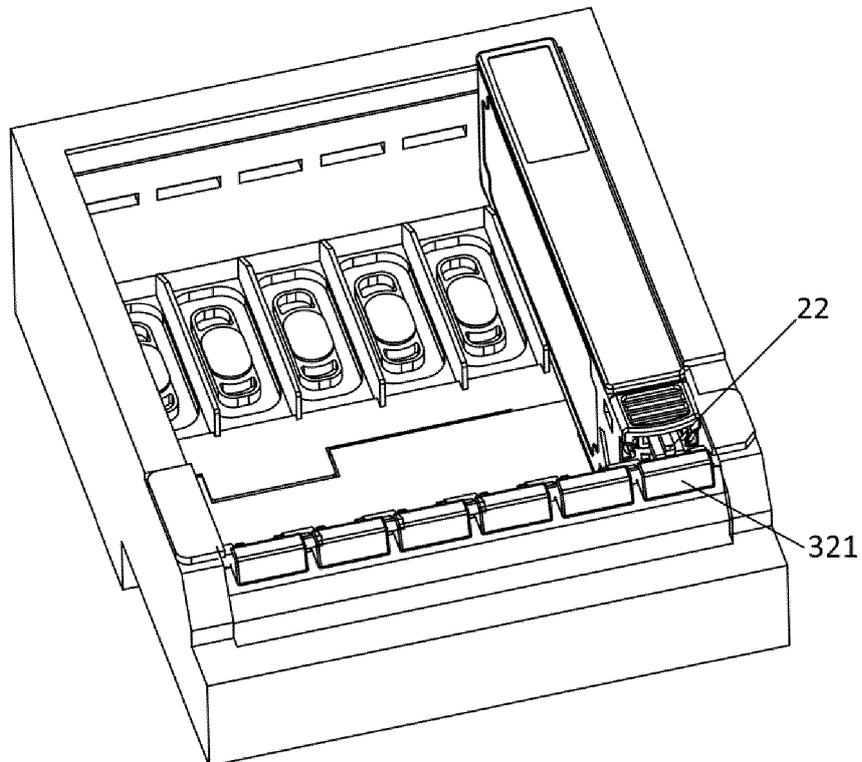


FIG. 27

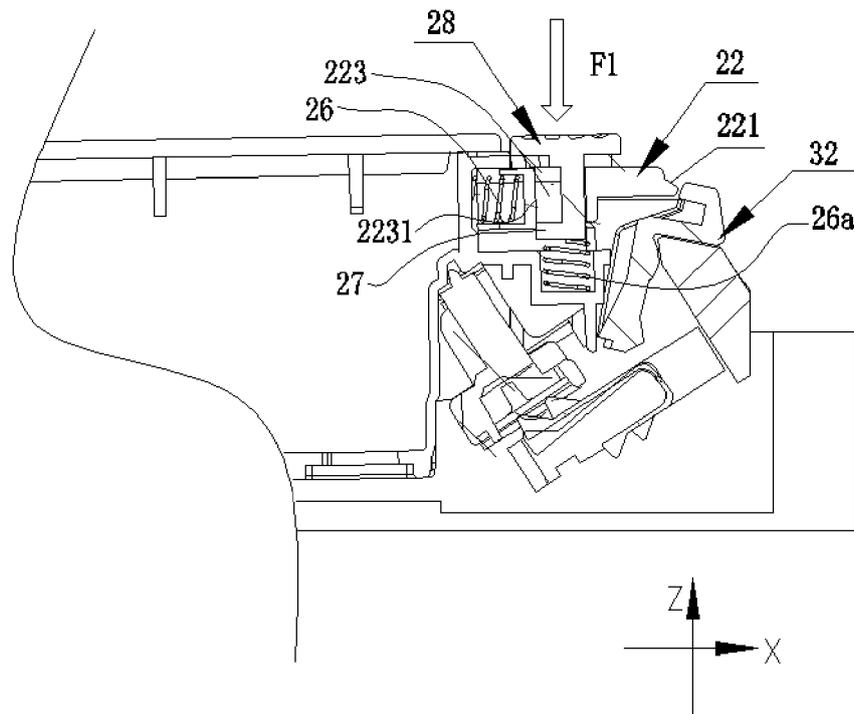


FIG. 28

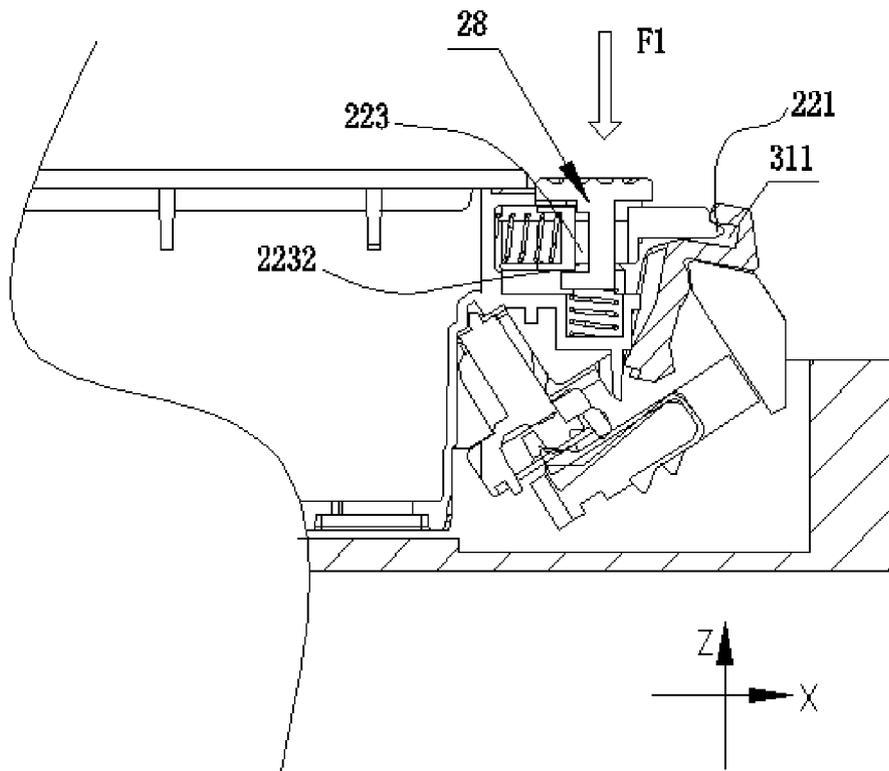


FIG. 29

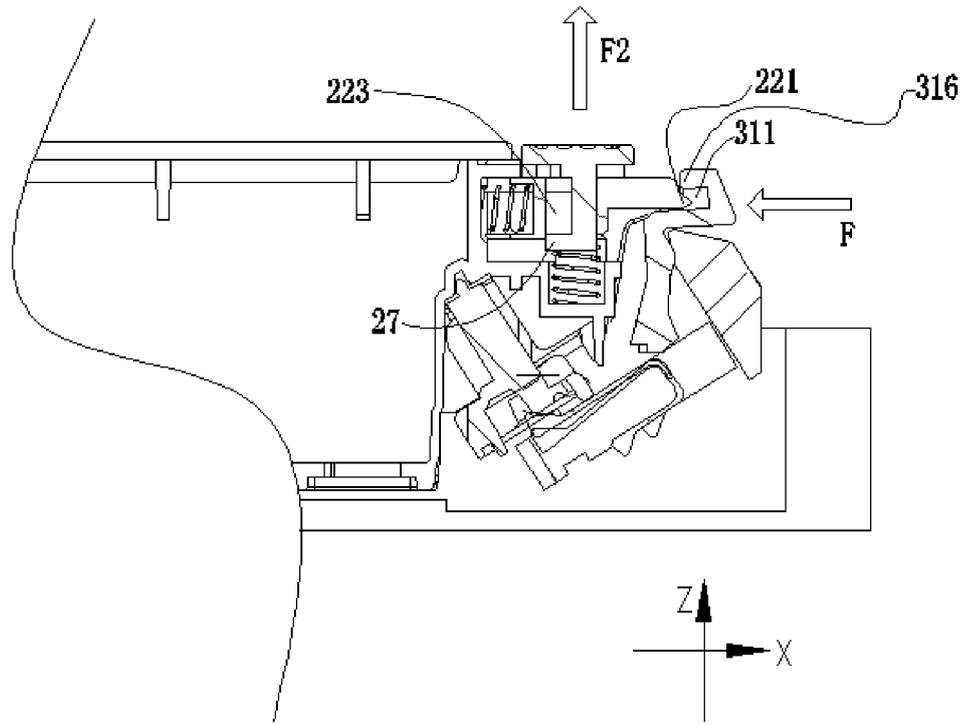


FIG. 30

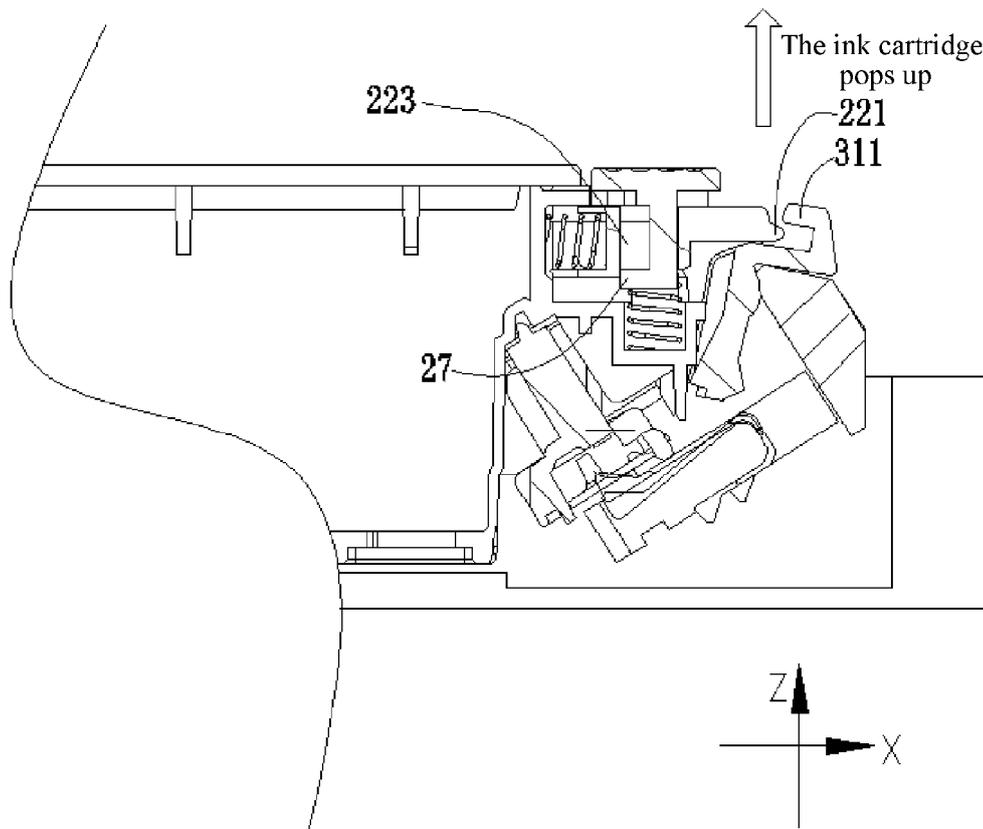


FIG. 31

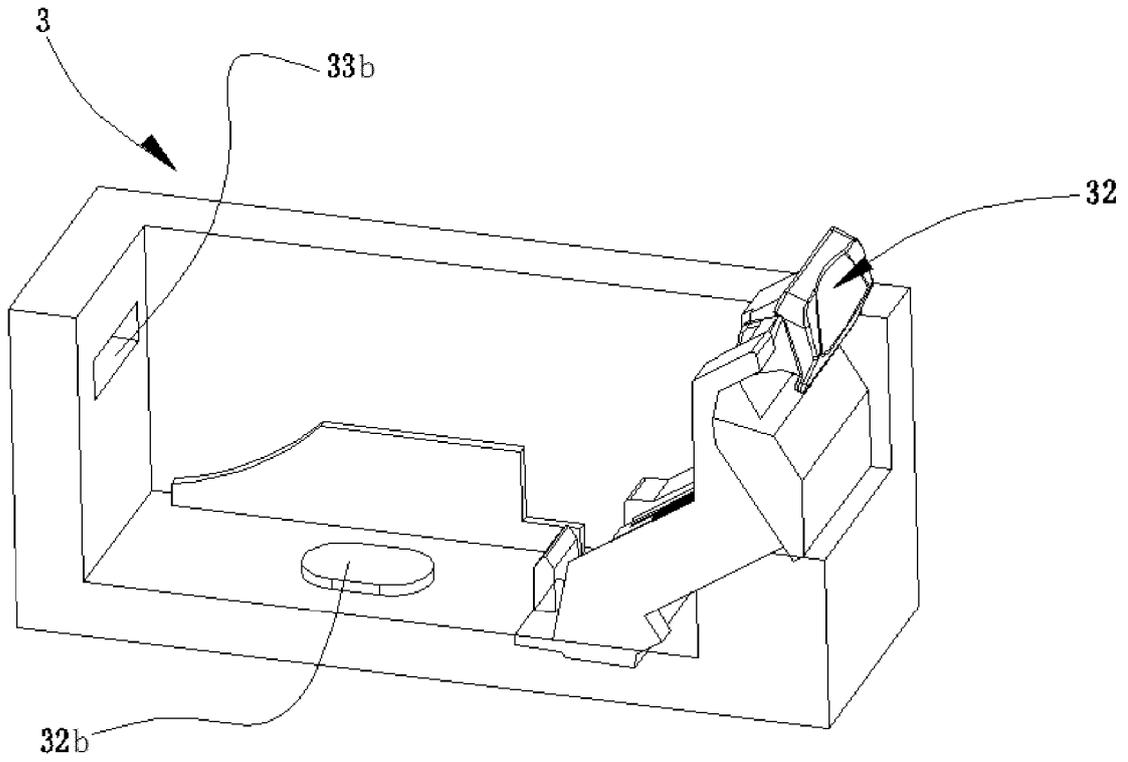


FIG. 32

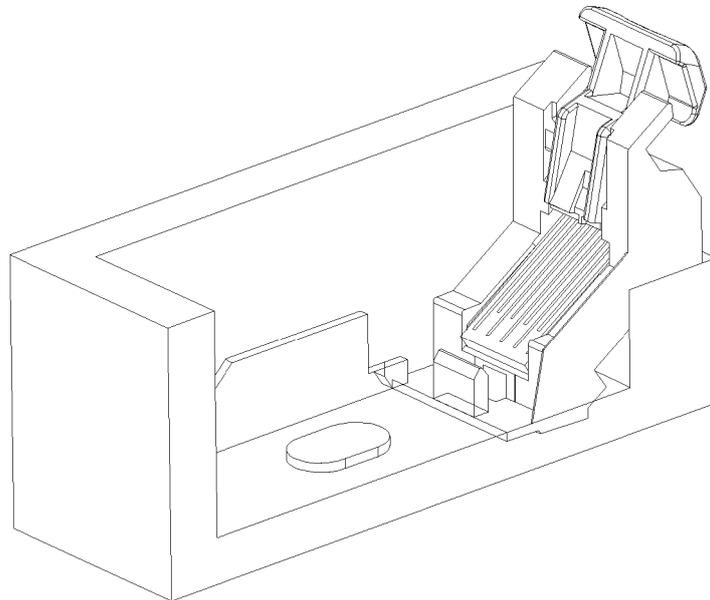


FIG. 33

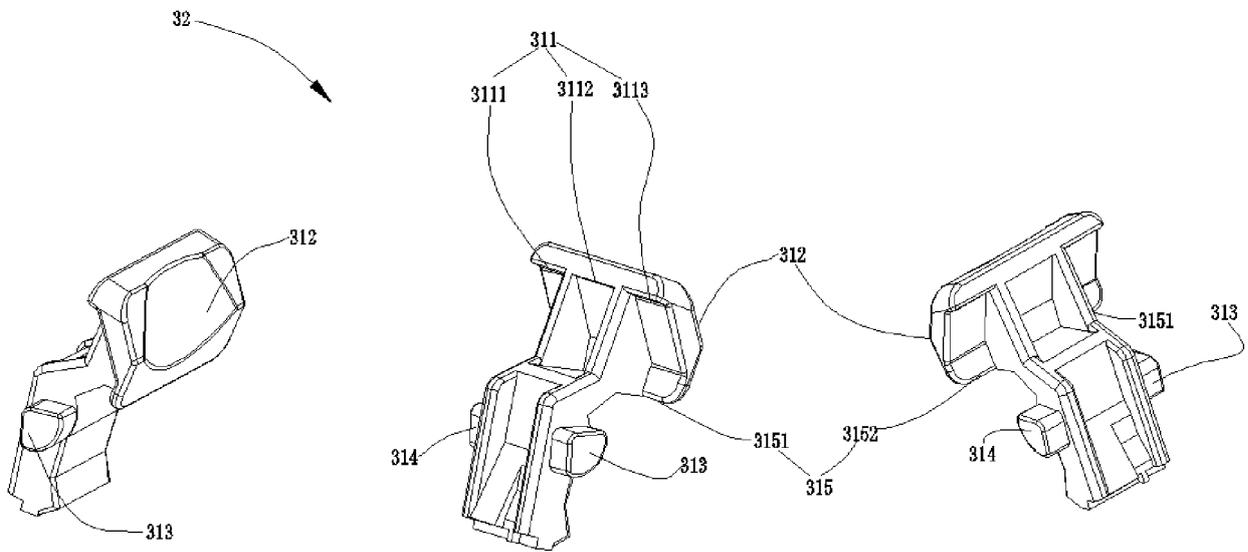


FIG. 34

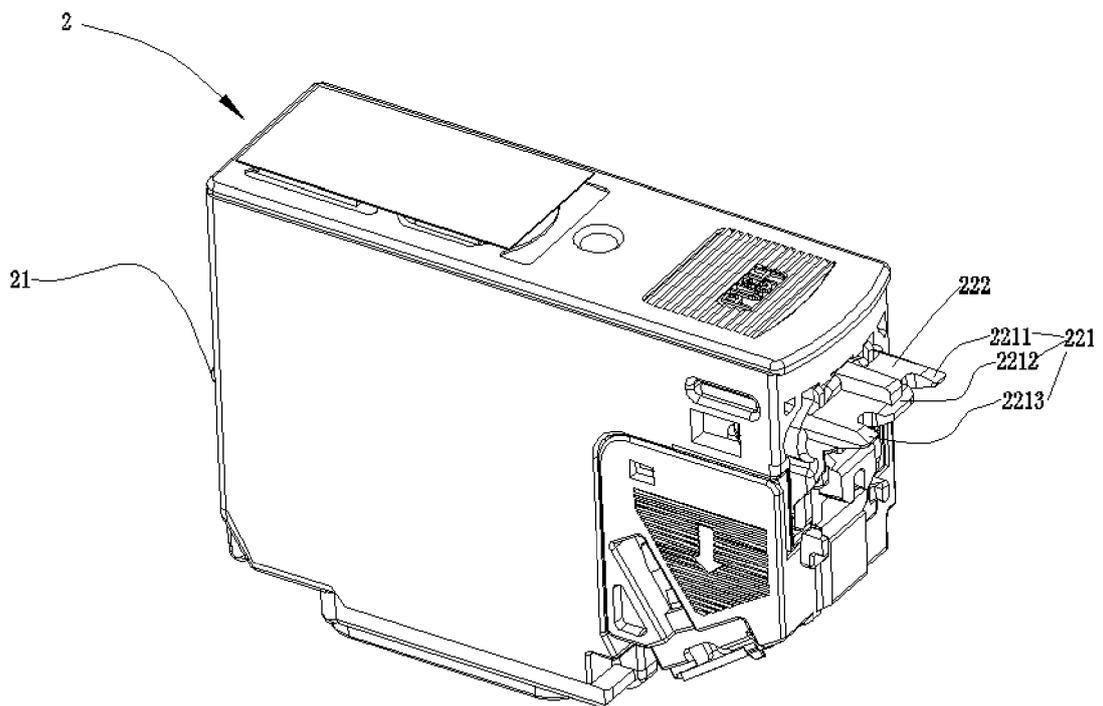


FIG. 35

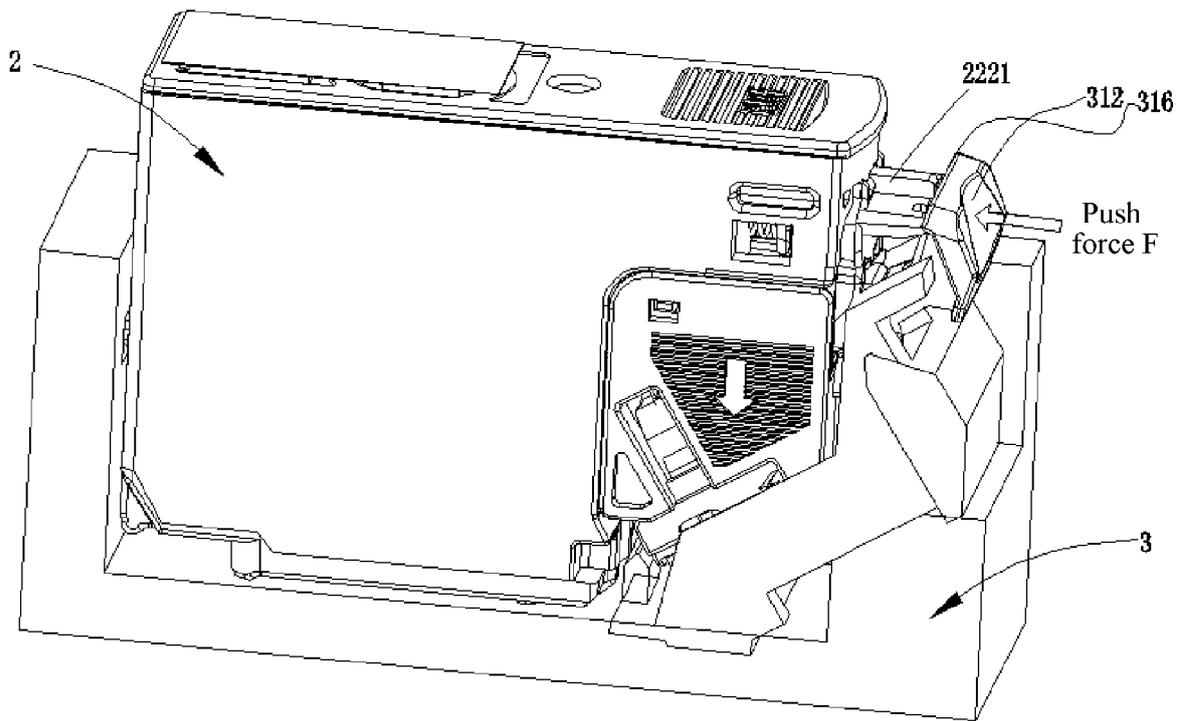


FIG. 36

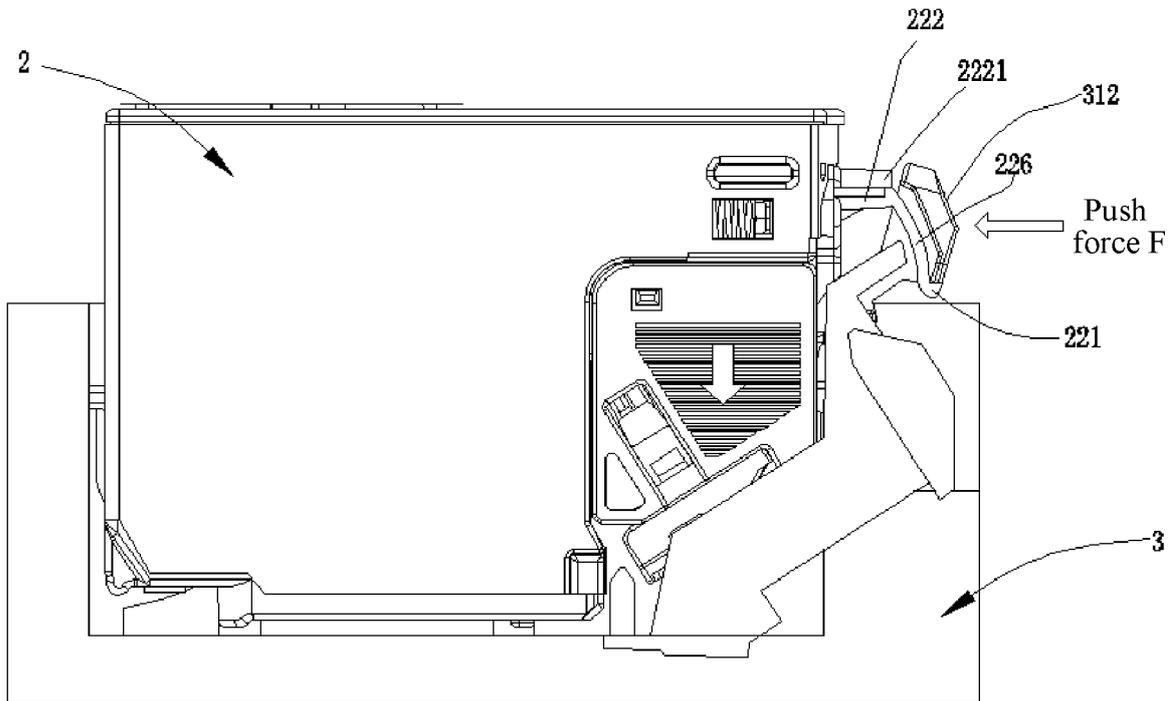


FIG. 37

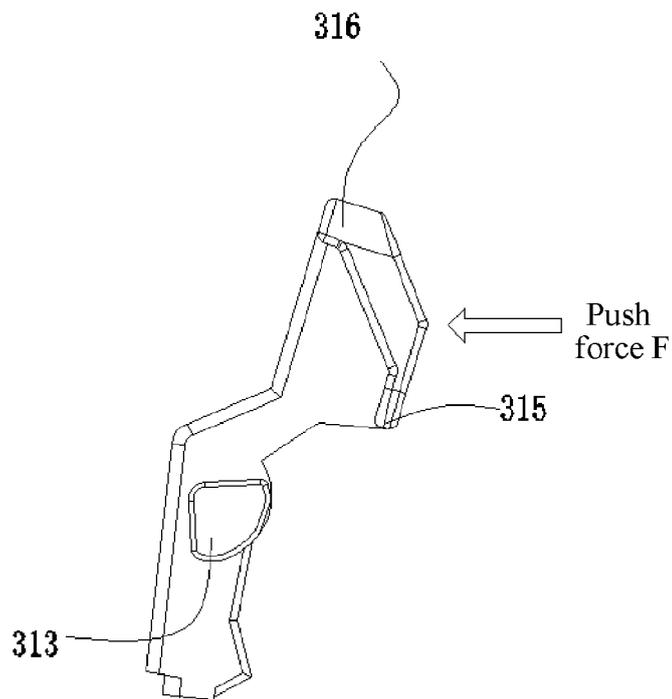


FIG. 38

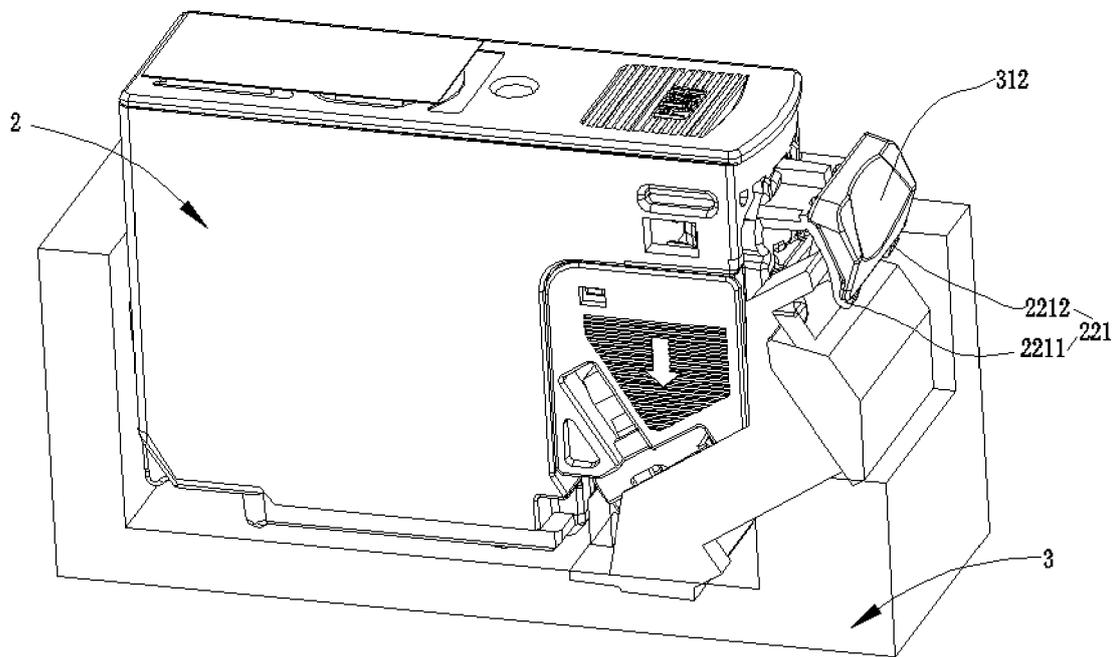


FIG. 39

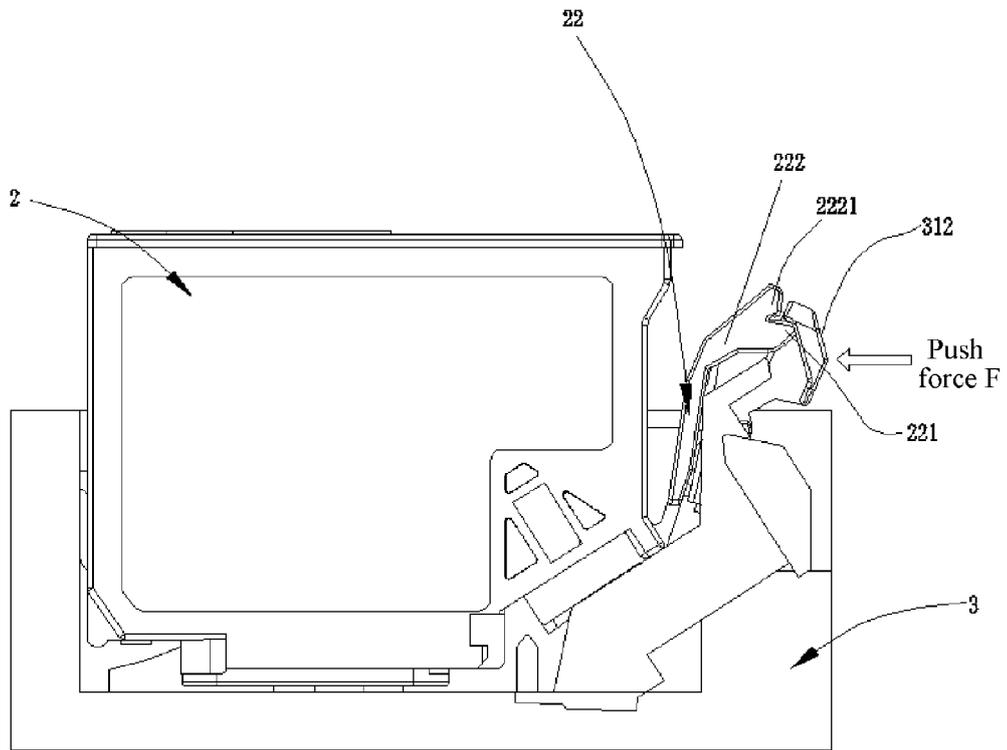


FIG. 40

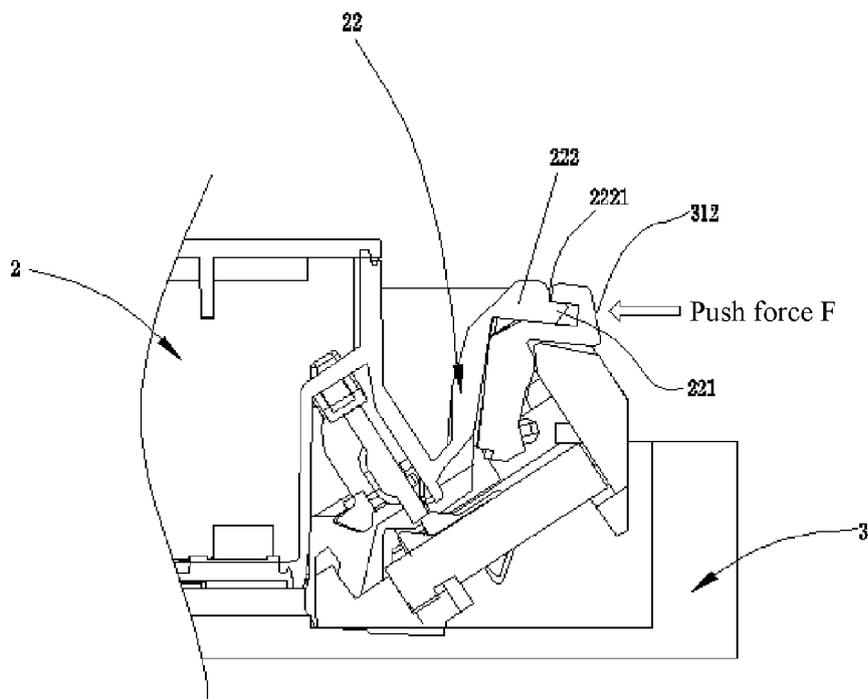


FIG. 41

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