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(54)

BOTTLE CAP LOCK

(57)

Provided is a bottle cap lock, including a main body, having an identification module, a micro-electromagnetic valve, and a battery pack; two clips, arranged on a periphery of the main body and stuck against ears of the two clips by tenons so that inner hooks of the two clips able to fix at the bottle mouth; the two clips being hinged, the ear of one of the two clips having a through hole for the tenon to pass through, and the ear of the other clip having a groove for accommodating the tenon; and a bottle plug, arranged at the bottom of the main body to seal the mouth of the bottle; when the identity recognition module judges that the person matches the preset identity, the identification module energizes the micro-electromagnetic valve to suck in the tenon to withdraw from the ears of the two clips and become unlocked.

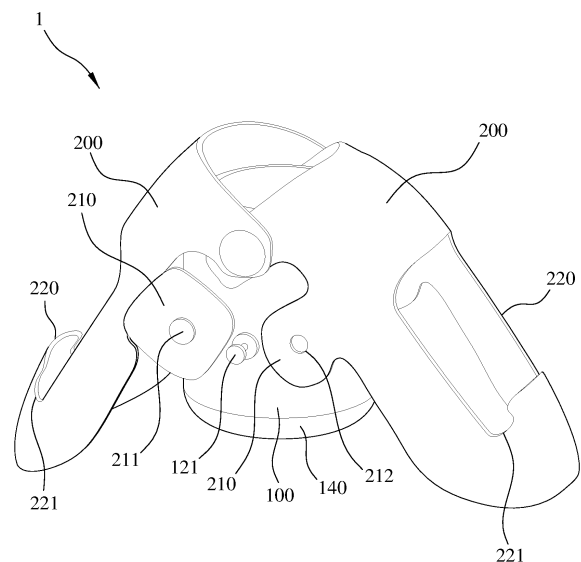


FIG. 1

Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the priority of Chinese patent application No. 202320950849.X, filed on April 25, 2023, which is incorporated herewith by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The present invention relates generally to a bottle cap lock, using a mechanical tenon and a clip as a bottle cap lock and adopting an identification module to control the mechanical tenon, especially to a bottle cap lock used on the mouth of a bottled container that has been opened but not used up, and the bottle cap lock can only be opened by recognizing a preset specific object.

2. The Prior Arts

[0003] Inconvenient situations often encountered in daily life for various bottled containers after opening: for example, most of the red wine is sealed with a cork. When the bottle is opened but not finished, because the cork is hard to be reused, many people cannot find a suitable bottle cap; another example is the fear of medicine being accidentally taken, drunk, or stolen in a hotel; fear of being drugged, accidentally drunk, or stolen for bottled water or beverages that have been opened in public places; mistake, misuse, and mis-mixing; in the hospital, the medicines that have been opened are afraid of being taken, stolen, or mixed by mistake; in families, the opened bottles of alcohol, chemicals, and medicines are afraid of being taken or swallowed by family members or children, and so on; therefore, there must be a bottle cap lock that recognizes a preset specific object before opening.

[0004] The existing practice is like US Patent Publication No. US20190177054A1, "VACUUM WINE BOTTLE STOPPER AND CAP, AND METHOD OF USE", which aims to provide a bottle cap lock and method of use that can vacuum and seal the bottle. However, the invention is found that if the air in the bottle is evacuated by vacuum method and then sealed, it is still unavoidable that the wine will volatilize to compensate the vacuum, and the sealing effect will be gradually weakened so that the bottle cap lock can be disassembled and pulled out. That is to say, the main problems to be solved are: 1. The existing bottle cap lock cannot be locked for a long time; 2. The function of opening the bottle cap lock cannot be opened without identifying the preset object; 3. It is impossible to detect whether the bottle cap lock has been tampered or damaged by others; 4. The size of the bottle cap is too large; 5. Part of the accessories are not replaceable, so that the bottle cap lock can replace the lost accessories

and cannot be used for a long time.

SUMMARY OF THE INVENTION

5 Technical Issues:

[0005] The purpose of the present invention is to provide a bottle cap lock that can only be opened by identifying a preset specific object.

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Means of Solution:

[0006] In order to achieve the objective, the bottle cap lock provided by the present invention includes: a main body, provided with an identification module, a micro-electromagnetic valve, and a battery pack, all electrically connected to each other for obtaining power supply; two clips, arranged on a periphery of the main body and stuck against ears of the two clips by tenons so that inner hooks of the two clips are able to fix the mouth of the bottle; the two clips being are hinged to each other and having a buckle part to fix a mouth of a bottle, the ear of one of the two clips having a through hole for the tenon to pass through, and the ear of the other clip having a groove for accommodating the tenon, the through holes overlapping another under the groove; and a bottle plug, arranged at a bottom of the main body to seal the mouth of the bottle; wherein, when the bottle cap lock being in a locked state, the tenon presses against the ears of the two clips to allow the inner hooks of the two clips to fix the mouth of the bottle; when the identification module determines that a person who opens the bottle matches a preset identity, the identification module energizes the micro-electromagnetic valve to suck the tenon, so that the tenon is withdrawn from the ears of the two clips; the bottle cap lock becomes in an unlocked state at this moment, and the two clips being released from the mouth of the bottle and the bottle plug being pulled out.

[0007] The tenon is breakable or durable.

[0008] The tenon of the micro-electromagnetic valve is a screw.

[0009] The identification module further comprises a fingerprint recognition device, a printed circuit board (PCB), and a microcontroller (MCU), and the fingerprint recognition device, the PCB and the MCU are electrically connected for fingerprint recognition, and the PCB is electrically connected with the battery pack for obtaining power supply.

[0010] The fingerprint recognition device may be an optical fingerprint sensor or a capacitive fingerprint sensor.

[0011] The identification module further comprises a radio frequency identification system (RFID), a printed circuit board (PCB) and a microcontroller (MCU), the RFID, the PCB and the MCU is electrically connected for RFID and tag identification, and the PCB is electrically connected with the battery pack for obtaining power supply.

[0012] The identification module further comprises a near field communication system (NFC), a printed circuit board (PCB) and a microcontroller (MCU), the NFC, the PCB and the MCU are electrically connected for near field communication read and tag identification, and the NFC is electrically connected with the battery pack for obtaining power supply.

[0013] The present invention also provides a method for using a bottle cap lock, including: S 1: setting a preset identity in the identification module in the main body; S2: making the identification module perform identity recognition, if the identity not matching (NG) the preset identity, the next step will not be performed and no action will be taken; if the identity matching the preset identity (OK), S3 will be performed; S3: energizing the micro-electromagnetic valve and the battery pack in the body; S4: making the micro-electromagnetic valve suck in the tenon; S5: opening/pressing the two clips; S6: powering off the micro-electromagnetic valve in the main body and the battery pack; and S7: making the micro-electromagnetic valve pop out the tenon and starting over from S2.

[0014] The identification module further comprises a fingerprint recognition device, a printed circuit board (PCB), and a microcontroller (MCU), and the fingerprint recognition device, the PCB and the MCU are electrically connected for fingerprint recognition.

[0015] The fingerprint recognition device may be an optical fingerprint sensor (CMOS image sensor, CIS) or a capacitive fingerprint sensor.

[0016] The identification module further has a radio frequency identification system (RFID), a printed circuit board (PCB) and a microcontroller (MCU), the RFID, the PCB and the MCU is electrically connected for RFID and tag identification, and the PCB is electrically connected with the battery pack for obtaining power supply.

[0017] The identification module further has a near field communication system (NFC), a printed circuit board (PCB) and a microcontroller (MCU), the NFC, the PCB and the MCU are electrically connected for near field communication reader and tag identification, and the NFC is electrically connected with the battery pack for obtaining power supply.

The effect of the present invention:

[0018] In summary, the bottle cap lock provided by the present invention can obtain power by electrically connecting the main body, the identification module, the micro-electromagnetic valve, and the battery pack; the two clips are arranged around the periphery of the main body and snapping against the ears of the two clips by means of the tenons so that the inner hooks of the two clips fix the mouth of the bottle. The two clips can be hinged to each other and have buckle to fix at the mouth of the bottle. The ear of one of the two clips has a through hole for the tenon to pass through, and the ear of the other clip has a groove for receiving the tenon. The through holes can overlap under the groove; and set the bottle

plug on the bottom of the main body to seal the mouth of the bottle; wherein, when the bottle cap lock is in the locked state, the tenon snaps against the ears of the two clips so that the inner hook of the two clips can fix at the mouth of the bottle, and when the identification module judges that the person to open the bottle matches the preset identity, the micro-electromagnetic valve is energized to suck in the tenon, so that the tenon is withdrawn from the ears of the two clips. At this time, the bottle cap lock is in an unlocked state, and the two clips are released. The mouth of the bottle can be removed and the bottle plug can be pulled out, completely preventing the bottled container from being opened, drunk, used, stolen, mixed or taken by mistake.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The present invention will be apparent to those skilled in the art by reading the following detailed description of a preferred embodiment thereof, with reference to the attached drawings, in which:

FIG. 1 is a perspective schematic view of a bottle cap lock;

FIG. 2 is a schematic side view of the bottle cap lock;

FIG. 3 is a schematic view of an embodiment of the bottle cap lock;

FIG. 4 is a schematic view of an embodiment of the bottle cap lock;

FIG. 5 is a schematic view of an embodiment of the bottle cap lock;

FIG. 6 is the flowchart of an embodiment of the method for using bottle cap lock;

FIG. 7 is a flowchart of an embodiment of a method for using bottle cap locking;

FIG. 8 is a flowchart of an embodiment of a method for using bottle cap locking; and

FIG. 9 is a flowchart of an embodiment of a method for using bottle cap lock.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0020] The inventive concept will be explained more fully hereinafter with reference to the accompanying drawings in which exemplary embodiments of the inventive concept are shown. Advantages and features of the inventive concept and methods for achieving the same will be apparent from the following exemplary embodiments, which are set forth in more details with reference to the accompanying drawings. However, it should be noted that the present inventive concept is not limited to the following exemplary embodiments, but may be implemented in various forms. Accordingly, the exemplary embodiments are provided merely to disclose the inventive concept and to familiarize those skilled in the art with the type of the inventive concept. In the drawings, exemplary embodiments of the inventive concepts are not lim-

ited to the specific examples provided herein and are exaggerated for clarity.

[0021] The terminology used herein is used to describe particular embodiments only, and is not intended to limit the present invention. As used herein, the singular terms "a" and "the" are intended to include the plural forms as well, unless the context clearly dictates otherwise. As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items. It will be understood that when an element is referred to as being "connected" or "coupled" to another element, it can be directly connected or coupled to the other element or intervening elements may be present.

[0022] Similarly, it will be understood that when an element (e.g., a layer, region, or substrate) is referred to as being "on" another element, it can be directly on the other element or intervening elements may be present. In contrast, the term "directly" means that no intervening elements are present. It should be further understood that when the terms "comprising" and "including" are used herein, it is intended to indicate the presence of stated features, steps, operations, elements, and/or components, but does not exclude one or more other features, steps, operations, elements, components, and/or the presence or addition of groups thereof.

[0023] Furthermore, exemplary embodiments in the detailed description are set forth in cross-section illustrations that are idealized exemplary illustrations of the present inventive concepts. Accordingly, the shapes of the exemplary figures may be modified according to manufacturing techniques and/or tolerable errors. Therefore, the exemplary embodiments of the present inventive concept are not limited to the specific shapes shown in the exemplary figures, but may include other shapes that may be produced according to the manufacturing process. The regions illustrated in the figures have general characteristics and are used to illustrate specific shapes of elements. Therefore, this should not be considered limited to the scope of this creative concept.

[0024] It will also be understood that, although the terms "first," "second," "third," etc. may be used herein to describe various elements, these elements should not be limited by these terms. These terms are only used to distinguish each element. Thus, a first element in some embodiments could be termed a second element in other embodiments without departing from the teachings of the present creation. Exemplary embodiments of aspects of the present inventive concept illustrated and described herein include their complementary counterparts. Throughout this specification, the same reference numbers or the same designators refer to the same elements.

[0025] Furthermore, example embodiments are described herein with reference to cross-sectional and/or planar views, which are illustrations of idealized example illustrations. Accordingly, deviations from the shapes shown, for example, caused by manufacturing techniques and/or tolerances, are expected. Accordingly, the exemplary embodiments should not be considered lim-

ited to the shapes of the regions shown herein, but are intended to include deviations in shapes resulting from, for example, manufacturing. Thus, the regions illustrated in the figures are schematic and their shapes are not intended to illustrate the actual shape of a region of a device and are not intended to limit the scope of example embodiments.

[0026] There are six main factors affecting whether the bottle cap lock can meet a user's needs. first, the liquid in the bottle volatilizes with time, which will cause the bottle lock to gradually loosen, resulting in poor locking effect for a long time; second, the safety of identifying whether the person opening the bottle is a permitted person; third, the user's awareness of whether the bottle cap lock has been tampered or damaged; fourth, the bottle cap lock should be convenient to use, such as light, thin and compact; fifth, the use of replaceable part for easy maintenance for extending the service life; sixth, an easy way to identify the identity of the bottle cap lock to improve the practicability and convenience of the bottle cap lock.

[0027] As described in the previous technical prior art, the bottle cap lock technology mainly used at present is still limited to the practice of vacuumizing the inside of the bottle, for example: TWM538544U, "ELECTRICAL VACUUM-PUMPING DEVICE", CN107380700B, "An Anti-tamper bottle stopper with pumping type seal", CN215827375U, "Wine stopper capable of being vacuumized", etc. In other words, the bottle cap locked by vacuumizing the inside of the bottle is a common usual method used by those skilled in the art. Alternatively, another approach is to improve the structure of the wine bottle plug to enhance its sealing performance, for example: CN213293292U, "Wine bottle plug with good sealing effect", CN212074939U, "Novel wine bottle plug". However, none of the aforementioned solutions can overcome the following problems at the same time in the prior art: 1. The existing bottle cap lock cannot be locked for a long time; 2. The function to identify the person opening the bottle cap lock; 3. The capability to detect whether the bottle cap lock has been tampered or damaged by others; 4. The size of the bottle cap lock is too large; 5. Parts are not replaceable, so that the bottle cap lock cannot be used for a long time.

[0028] In particular, a solution that can identify and judge whether the person opening the bottle is allowed is an urgent issue to be solved in the field of bottle cap locks. In order to break through the limits of the existing technology, the present innovation aims to provide innovations not limited to the vacuum sealing method, and try different sealing solutions for bottle cap locks, which beyond the usual means used by those skilled in the art.

[0029] The above is the core idea of the present invention. The following will clearly and completely describe the implementation modes in the embodiments of the present invention in conjunction with the accompanying drawings in the embodiments of the present invention. Obviously, the described embodiments are only a part of the present invention examples, instead of exhaustive.

Based on the embodiments of the present invention, all other embodiments obtained by those skilled in the art without making progressive creations belong to the protection scope of the present invention.

[0030] In the following description, a lot of specific details have been set forth in order to fully understand the present invention, but the present invention can also be implemented in other ways that are different from those described here, and those skilled in the art can do so without violating the connotation of the present invention. Under the circumstances, similar extension or modification is performed, and the present invention is not limited by the specific embodiments disclosed below.

[0031] Secondly, the present invention is described in detail in combination with the schematic diagrams. When describing the embodiments of the present invention in detail, for the convenience of explanation, the schematic diagrams are only examples, which should not limit the protection scope of the present invention here.

[0032] As shown in FIG. 1, FIG. 2 and FIG. 5, an embodiment of the bottle cap lock 1 provided by the present invention is suitable for bottled containers, such as, wine bottles, medicine bottles, beverage bottles, etc., and the opened bottled containers are to be resealed, and the person to re-open the bottle must be identified to be allowed to open the bottle through the identification module 110. The bottle cap lock 1 provided by the present invention includes: a main body, provided with an identification module 110, a micro-electromagnet valve 120, and a battery pack 130, and all the components are electrically connected to each other for obtaining power supply, and the micro-electromagnet valve 120 is a linear electromagnet, relying on direct current (DC) to generate magnetism and becoming non-magnetic when power is off, and able to cooperate with other parts to attract when power is on, and pop up when power is off, like springs. The size of the micro-electromagnetic valve 120 is 7mm high x 5mm wide x 16mm long and the weight is 1.2g, with a configurable power-on duration, for example: 1-10s. The two clips 200 are arranged around the main body and pressed against the ears 210 of the two clips 200 by the tenon 121 so that the two inner hook 221 of the clip 200 fixes at the mouth of the bottle. The two clips 200 can be hinged to each other and have a buckle 220 to fix at the mouth of the bottle. The ear 210 of one of the two clips 200 has a through hole 212 for the tenon 121 to pass through, and the inner surface of the ear 210 of the other clip 200 has a groove 211 for accommodating the tenon 121, and the through holes 212 can overlap each other under the groove 211. A bottle plug 140 is arranged at the bottom of the main body to seal the mouth of the bottle. The bottle plug 140 is made of a replaceable elastic element, which may include but not limited to food-grade sponge, rubber, silicone, Plastic, foam, polydimethylsiloxane (PDMS), polyimide (PI), etc., or any combination thereof. When the bottle cap lock 1 is in the locked state, the tenon 121 snaps against the ears 210 of the two clips 200 to allow the inner hooks 221 of the

two clips 200 to fix at the mouth of the bottle. When the identification module 110 judges that the person to open the bottle matches the preset identity, the identification module 110 energizes the micro-electromagnetic valve 120 to suck in the tenon 121, so that the tenon 121 withdraws from the ears 210 of the two clips 200 so that the bottle cap lock 1 is becoming in the unlocked state, and the two clips 200 can release the mouth of the bottle and pull out the bottle plug 140, achieving the function of identifying the identity of the person to open the bottle and judging whether the bottle is allowed to be opened.

[0033] In order to clearly present the differences of the various embodiments of the present invention, when introducing each embodiment, the same elements or descriptions will be omitted, and only the differences will be specially introduced. As shown in FIG. 1, FIG. 2 and FIG. 4, in the embodiment, the tenon 121 can be breakable or durable. When the tenon 121 is breakable, the person to open the bottle can feel that the tenon 121 is broken and damaged and know that the bottle lock has been tried to open by others. When the tenon 121 is durable, the person to open the bottle can detect the deformation of the tenon 121 and know that the bottle cap lock has been tried to open by others.

[0034] As shown in FIG. 1, FIG. 3 and FIG. 4, in another embodiment, the tenon 121 of the micro-electromagnetic valve 120 can be a screw, which can be used as a way to open the micro-electromagnetic valve when it is worn out after long-term use, or if the bottle cap lock is damaged by others, and the screw is a replaceable accessory.

[0035] As shown in FIG. 5, in a preferred embodiment, the battery pack 130 can be a 3V-6V power supply, and the identification module 110 further comprises a fingerprint recognition device 111, a printed circuit board (PCB) 150 and a microcontroller (MCU) 160 and are electrically connected to each other. The fingerprint recognition device 111 can be an optical fingerprint sensor (CMOS image sensor, CIS) or a capacitive fingerprint sensor. When the person to open the bottle presses the fingerprint on the top of the bottle cap lock 1 for (optical/capacitive) fingerprint identification, the MCU 160 can verify and control the connection/disconnection of the battery pack 130 according to at least one set of fingerprints recorded by the preset identity. If the MCU 160 recognizes the fingerprint of the person to open the bottle matches (OK) at least one set of fingerprints recorded by the preset identity, then the circuit of the battery pack 130 becomes conductive and connected. If not matching (NG), the battery pack 130 is controlled to be disconnected; the PCB is connected to the battery pack 130 and the micro-electromagnetic valve 120 respectively, and the micro-electromagnetic valve 120 can be powered on/off to be responsible for the push and pull of the tenon 121, so as to achieve the function of identifying the identity of the person who opened the bottle with fingerprint recognition and judging whether to allow the bottle to be opened.

[0036] As shown in FIG 5, in a preferred embodiment,

the battery pack 130 can be a power supply of 8V-18V, and the identification module 110 further comprises a radio frequency identification system (RFID) 112, a printed circuit board (PCB) 150 and a microcontroller (MCU) 160, and are electrically connected to each other. The RFID 112 may include, but not limited to, an RFID tag and/or an RFID reader. When the RFID 112 performs identification through the RFID reader and tag on the bottle cap lock 1, the MCU 160 can control the battery pack 130 to connect or disconnect according to the identification result of the RFID 112. If the electronically stored information contained in the RFID tag matches the preset identity (ID) setting of the aforementioned RFID reader, the identification result is correct, and the MCU 160 controls the access of the battery pack 130. If the electronically stored information contained in the RFID tag does not match the preset identity (ID) setting of the RFID reader, the identification result is an error, and the MCU 160 controls the battery pack 130 to become disconnected. The PCB 150 can be connected to the battery pack 130 and the micro-electromagnetic valve 120 respectively, and the micro-electromagnetic valve 120 can be powered on/off to be responsible for the push and pull of the tenon 121, achieving the function of the RFID 112 of identifying the identity of the person to open the bottle and judging whether to allow the bottle to be opened.

[0037] As shown in FIG. 5, in a preferred embodiment, the battery pack 130 can be a 3V-6V power supply, and the identification module 110 further comprises a near field communication system (NFC) 113, a printed circuit board (PCB) 150 and a microcontroller (MCU) 160, and are electrically connected to each other, and the NFC 113 may include, but not limited to, an NFC reader and/or an NFC writer, which can read a non-contact tag. The NFC reader supports various non-contact tags, such as, FeliCa ISO 14443, Mifare Classic 1k, MIFARE DESFire, MIFARE Ultralight, and other supported card types. The NFC writer helps to write information or records on RFID or NFC chip cards or devices in NDEF format. When the person to open the bottle is identified over the bottle cap lock 1 through the NFC 113, the MCU 160 can control the connection/disconnection of the battery pack 130 according to the identification result of the NFC 113. If the electronically stored information contained in the non-contact tag matches the preset identity (ID) of the NFC setting, the identification result is correct, and the MCU 160 controls the battery pack 130 to become connected and conductive. If the electronically stored information contained in the non-contact tag does not match the preset identity (ID) of the NFC 113 setting, the identification result is an error, and the MCU 160 controls the battery pack 130 to be disconnected. The PCB 150 is connected to the battery pack 130 and the micro-solenoid valve 120 respectively, and the micro-electromagnetic valve 120 can be energized or powered off and is responsible for the push and pull of the tenon 121, achieving the function of identifying the identity of the person to open the bottle with the NFC 113 and judging whether to allow the bottle

to be opened.

[0038] As shown in FIG. 6, in a preferred embodiment, the method of using bottle cap lock 1 provided by the present invention is suitable for bottled containers, such as, wine bottles, medicine bottles, beverage bottles, etc., and the opened bottled containers is to be re-opened. Through the identification module 110 to determine whether the person to open the bottle is allowed to open the bottle, the method of using the bottle cap lock 1 provided by the present invention includes: S1: configuring a preset identity in the identification module 110 in the main body 100; S2: the identification module 110 performing identity recognition, if not matching the preset identity (NG), it does not proceed to the next step and does not take any action; if matching the preset identity (OK), then proceed to S3; S3: energizing the micro-electromagnetic valve 120 and the battery pack 130 in the main body 100; S4: the micro-electromagnetic valve 120 sucking in the tenon 121; S5: opening/pressing the two clips 200; S6: disconnecting the micro-electromagnetic valve 120 in the main body 100 from the battery pack 130; and S7: the micro-electromagnetic valve 120 popping out the tenon 121, and starting from S2 again.

[0039] As shown in FIG. 7, in a preferred embodiment, the method of using the bottle cap lock 1 provided by the present invention includes: S1: configuring the fingerprint of the preset identity in the identification module 110 in the main body 100; S2: the identification module 110 performing (optical/capacitive) fingerprint recognition; if not matching the preset fingerprint (NG), it does not proceed to the next step and does not take any action; if matching the preset fingerprint (OK), proceed to S3-S7.

[0040] As shown in FIG. 8, in a preferred embodiment, the method of using the bottle cap lock 1 provided by the present invention includes: S1: configuring RFID information of the preset identity in the identification module 110 in the main body 100; S2: the identification module 110 performing the identity recognition by matching the RFID reader and RFID tag; if not matching the preset identity (NG), it does not proceed to the next step and does not take any action; if matching the preset identity (OK), proceed to S3-S7.

[0041] As shown in FIG. 9, in a preferred embodiment, the method of using the bottle cap lock 1 provided by the present invention includes: S1: configuring an NFC identity in the identification module 110 in the main body 100; S2: the identification module 110 performing identification through the NFC reader and tag for identity recognition; if not matching the preset identity (NG), it does not proceed to the next step and does not take any action; if matching the preset identity (OK), proceed to S3-S7.

[0042] Finally, the technical characteristics of the present invention and the technical effects that can be achieved are summarized as follows:

[0043] First, the main body of the bottle cap lock and the two clips switch between the locked state and the unlocked state through the micro-electromagnetic valve, which can open and lock the bottle plug on the mouth of

the bottle for a long time, avoiding the problem that the bottle change lock is gradually loosened due to liquid volatilization in the bottle to affect the vacuum sealing of the bottle cap lock over time, and is reliable.

[0044] Second, the size of the micro-electromagnetic valve in the body of the bottle cap lock is thin and short, which reduces the space occupied in the main body and improves the overall portability and convenience of the bottle cap lock.

[0045] Third, the identification module in the main body of the bottle cap lock identifies whether the person to open the bottle is a person that is allowed to open the bottle, which is safe.

[0046] Fourth, the tenon of the micro-electromagnetic valve in the main body of the bottle cap lock can be easily broken (destroyed when broken) or solid (destroyed when deformed), and it can be detected whether the bottle cap lock has been opened before or not.

[0047] Fifth, the tenon of the micro-electromagnetic valve in the body of the bottle cap lock can be easily replaced, so as to provide easy the maintenance to extend service life.

[0048] Sixth, the bottle cap lock can be selectively matched with different types of identification modules, and can be flexibly adjusted according to different needs and applications, which is flexible.

[0049] In summary, the bottle cap lock provided by the present invention not only overcomes the obstacles described in the prior art, but also provides a thin and small bottle cap lock to seal the mouth of the bottle, identify the identity to lock and unlock, and use replaceable parts for easy maintenance, which provide users with safe and reliable storage options for bottled containers.

[0050] Although the present invention has been described with reference to the preferred embodiments thereof, it is apparent to those skilled in the art that a variety of modifications and changes may be made without departing from the scope of the present invention which is intended to be defined by the appended claims.

Claims

1. A bottle cap lock, comprising:

a main body, provided with an identification module, a micro-electromagnetic valve, and a battery pack all electrically connected to each other for obtaining power supply;

two clips, arranged on a periphery of the main body and stuck against ears of the two clips by tenons so that inner hooks of the two clips are able to fix a mouth of a bottle; the two clips being hinged to each other and having a buckle part to fix the mouth of the bottle, the ear of one of the two clips having a through hole for the tenon to pass through, and the ear of another clip having a groove for accommodating the tenon, the

through holes overlapping each other under the groove; and

a bottle plug, arranged at a bottom of the main body to seal the mouth of the bottle;

wherein when the bottle cap lock is in a locked state, the tenon presses against the ears of the two clips to allow the inner hooks of the two clips to fix the mouth of the bottle; when the identification module determines that a person who opens the bottle matches a preset identity, the identification module energizes the micro-electromagnetic valve to suck the tenon, so that the tenon is withdrawn from the ears of the two clips; the bottle cap lock becomes in an unlocked state at this moment, and the two clips are released from the mouth of the bottle and the bottle plug is pulled out.

2. The bottle cap lock according to claim 1, wherein the tenon is breakable or durable.

3. The bottle cap lock according to claim 1, wherein the tenon of the micro-electromagnetic valve is a screw.

4. The bottle cap lock according to claim 1, wherein the identification module further comprises a fingerprint recognition device, a printed circuit board (PCB), and a microcontroller (MCU), and the fingerprint recognition device, the PCB and the MCU are electrically connected for fingerprint recognition, and the PCB is electrically connected with the battery pack for obtaining power supply.

5. The bottle cap lock according to claim 4, wherein the fingerprint recognition device is an optical fingerprint sensor or a capacitive fingerprint sensor.

6. The bottle cap lock according to claim 1, wherein the identification module further comprises a radio frequency identification system (RFID), a printed circuit board (PCB) and a microcontroller (MCU), the RFID, the PCB and the MCU is electrically connected for RFID and tag identification, and the PCB is electrically connected with the battery pack for obtaining power supply.

7. The bottle cap lock according to claim 1, wherein the identification module further comprises a near field communication system (NFC), a printed circuit board (PCB) and a microcontroller (MCU), the NFC, the PCB and the MCU are electrically connected for near field communication read and tag identification, and the NFC is electrically connected with the battery pack for obtaining power supply.

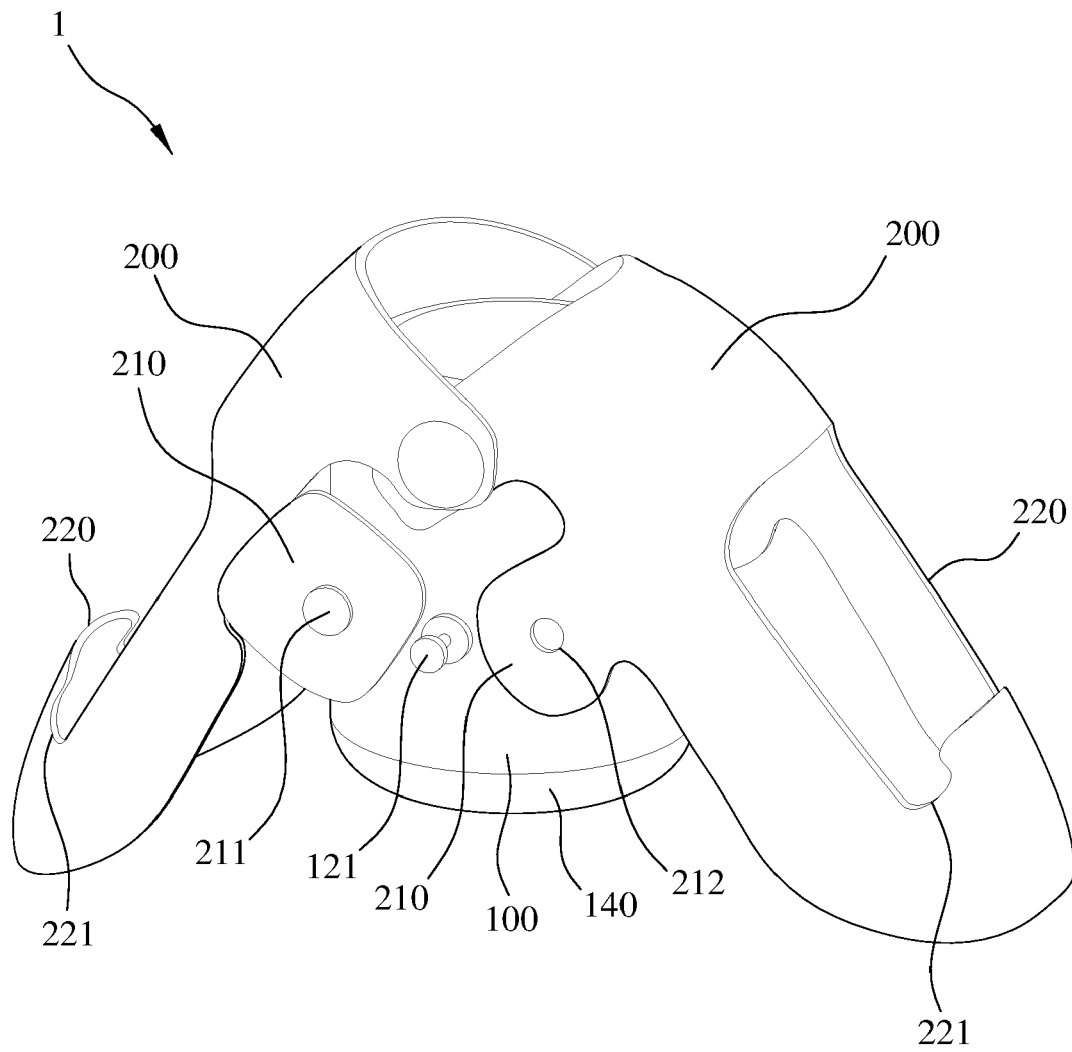


FIG. 1

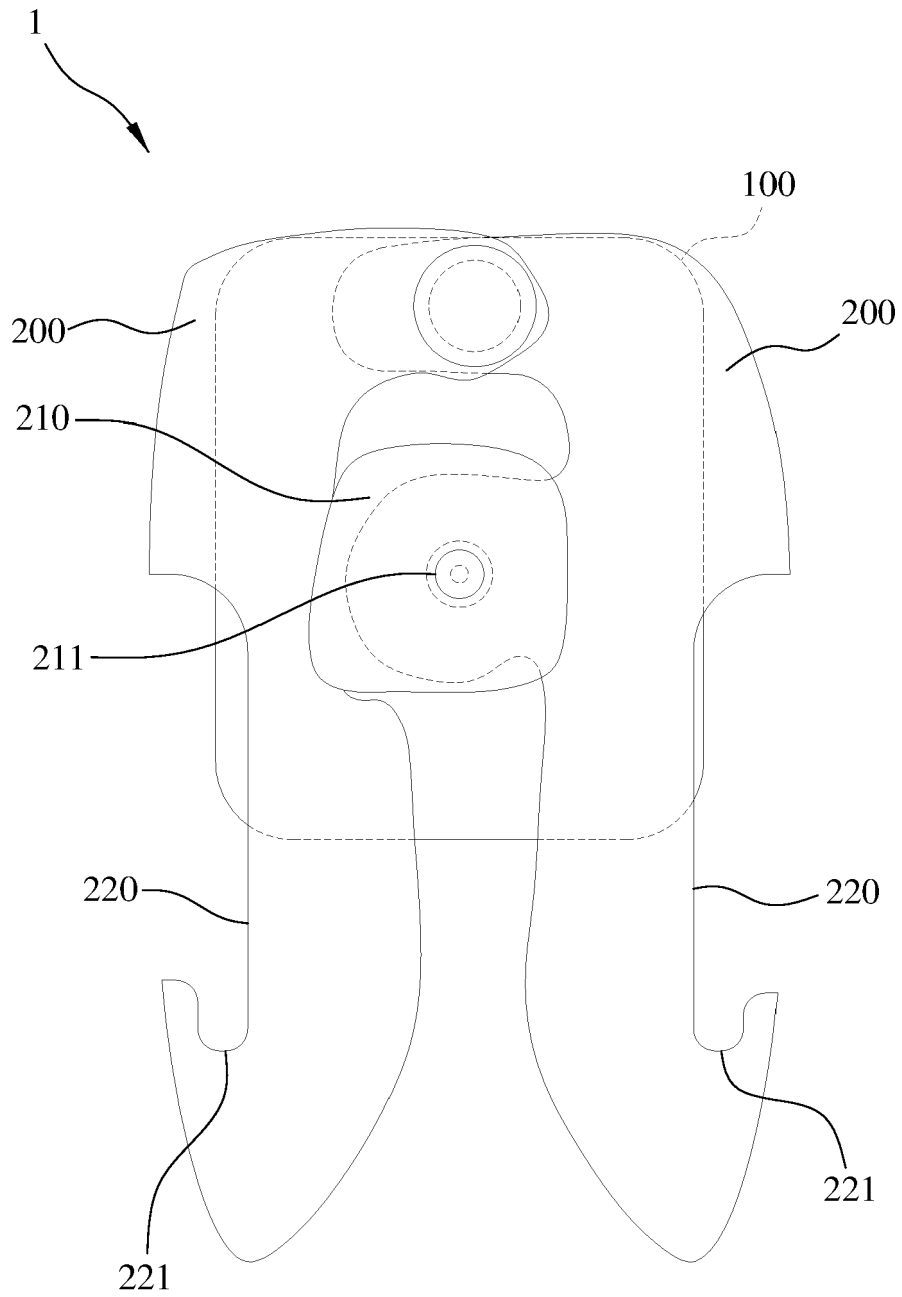


FIG. 2

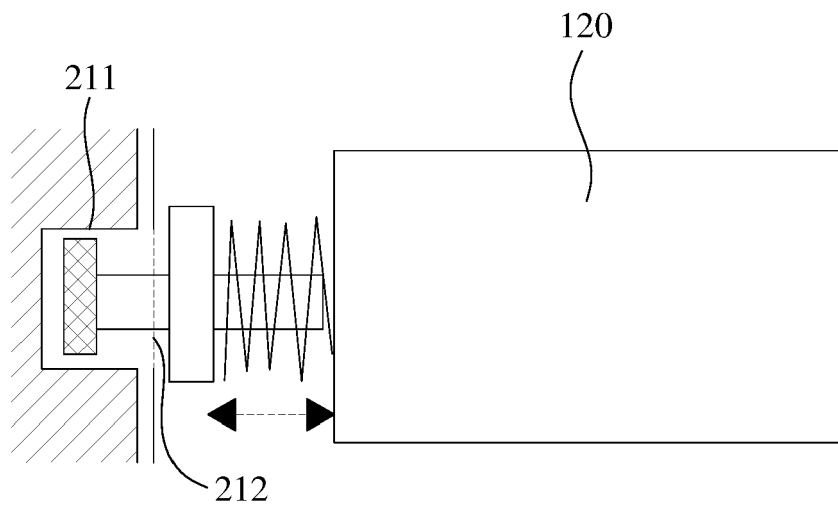


FIG. 3

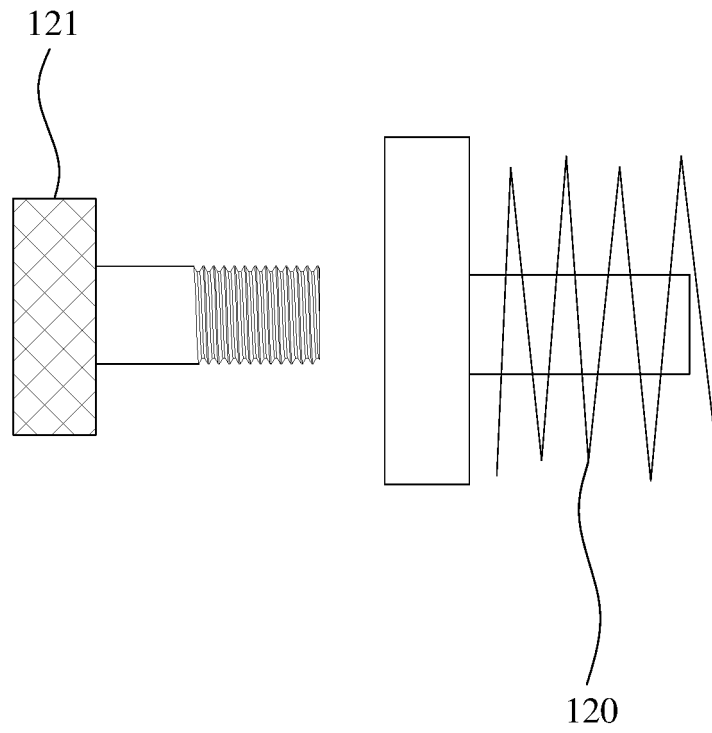


FIG. 4

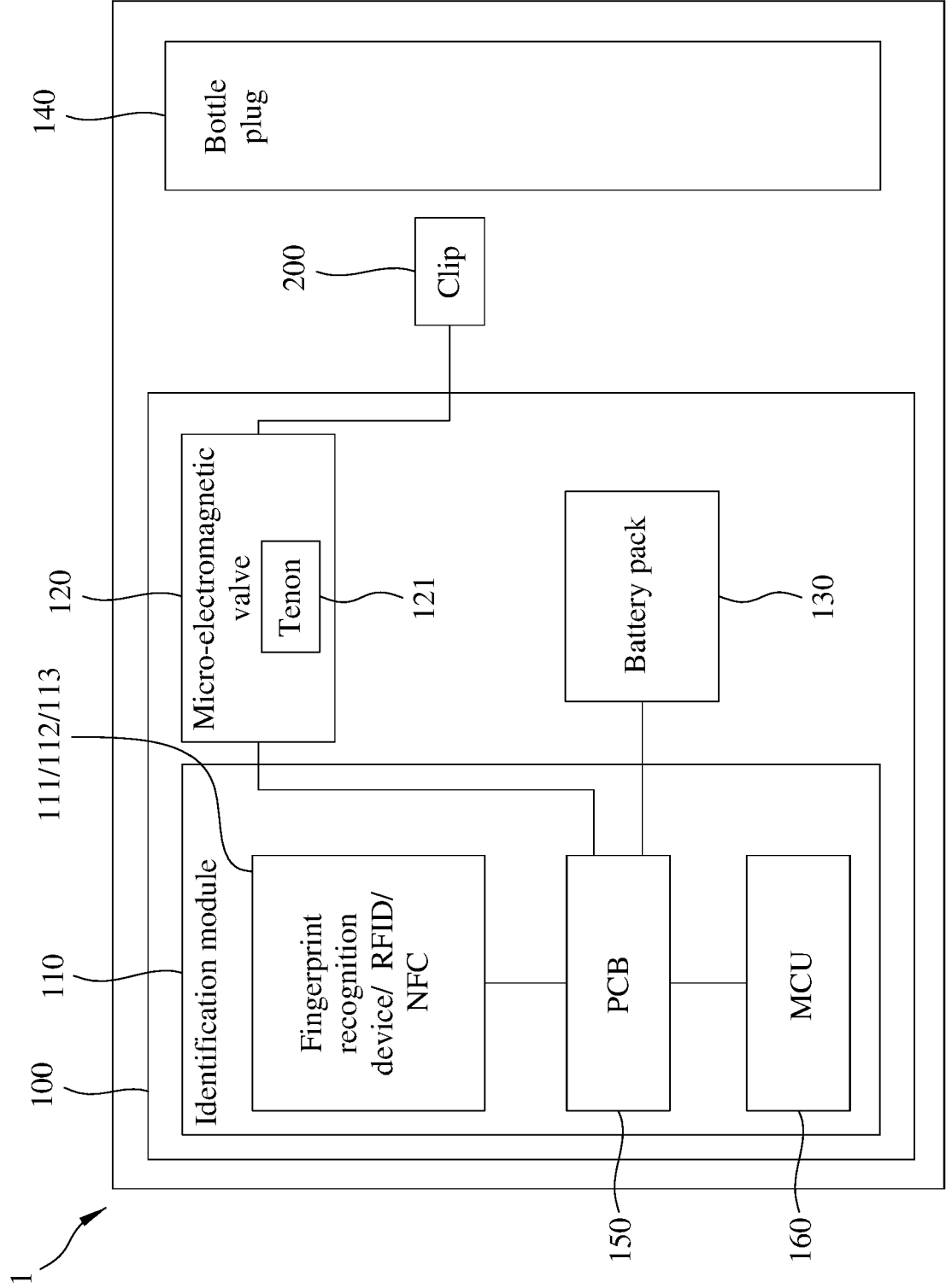
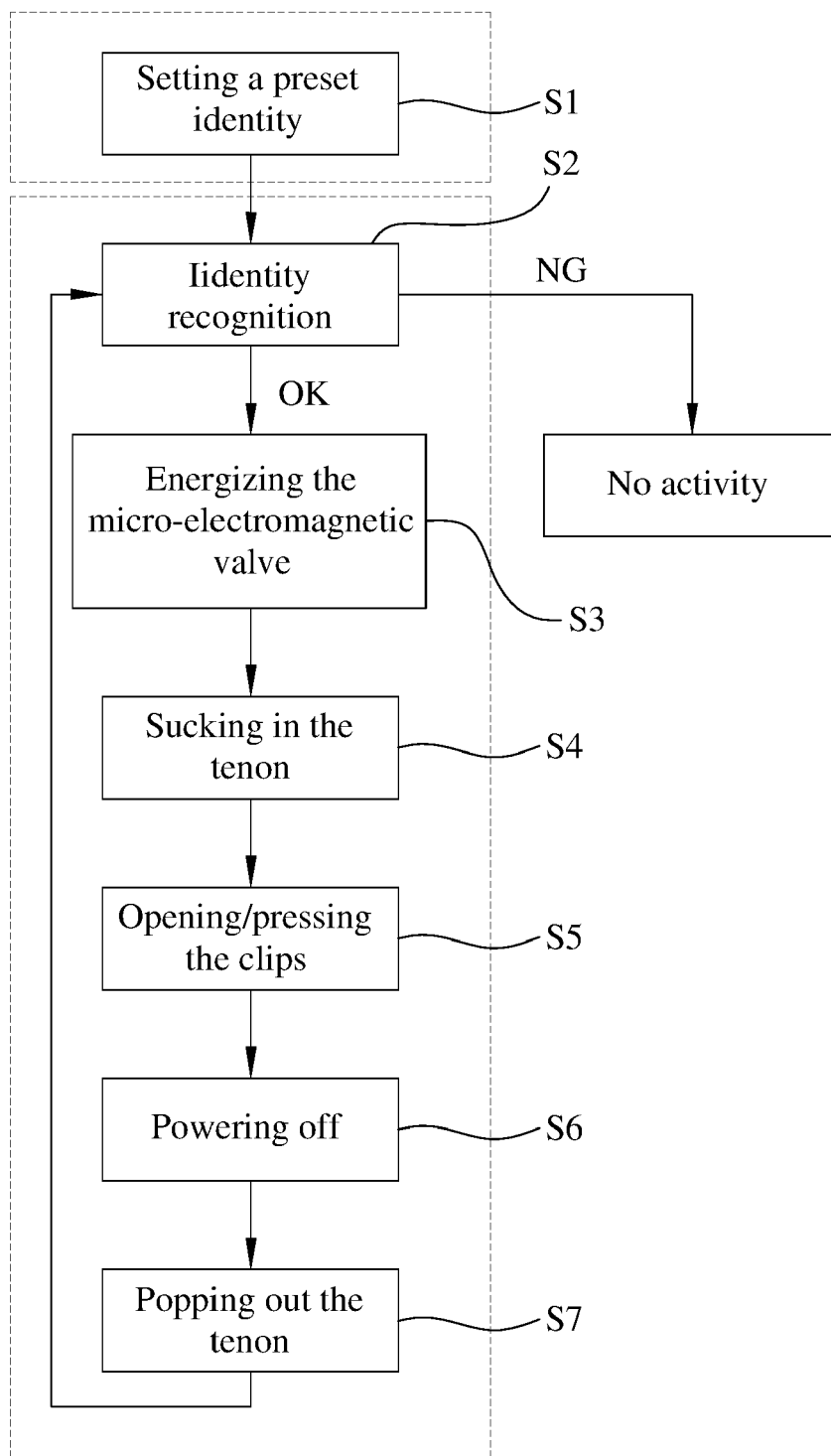
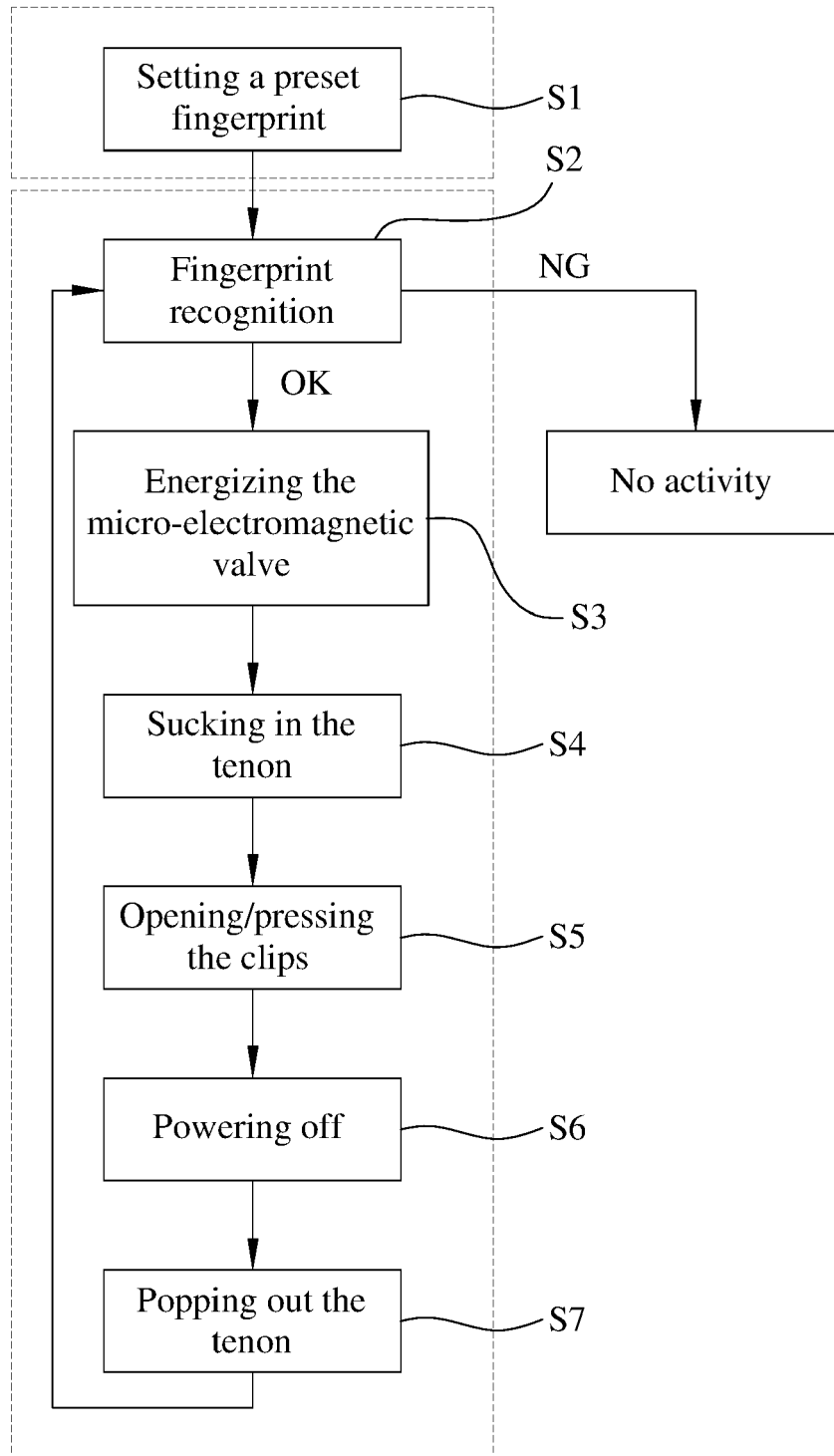
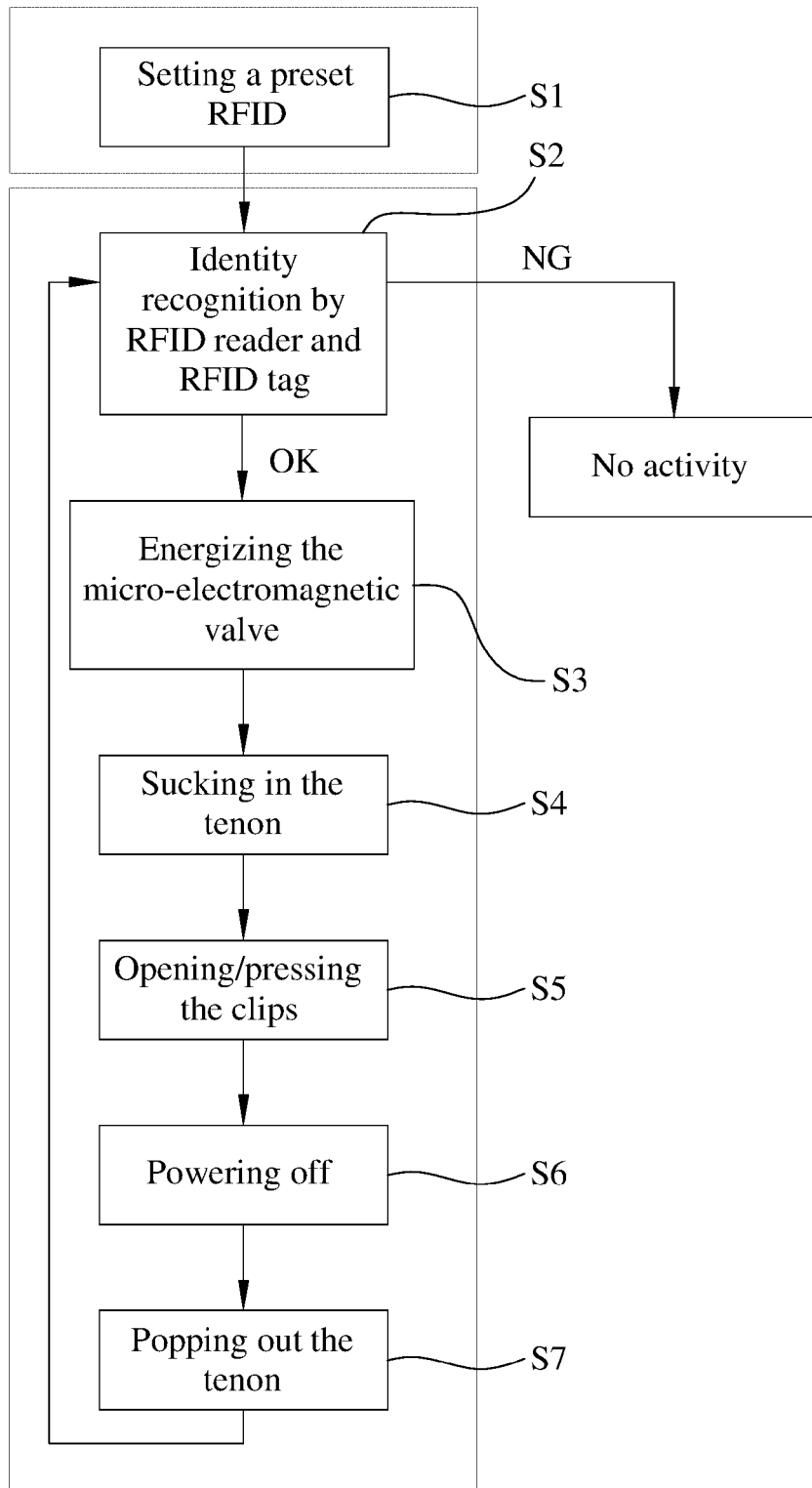
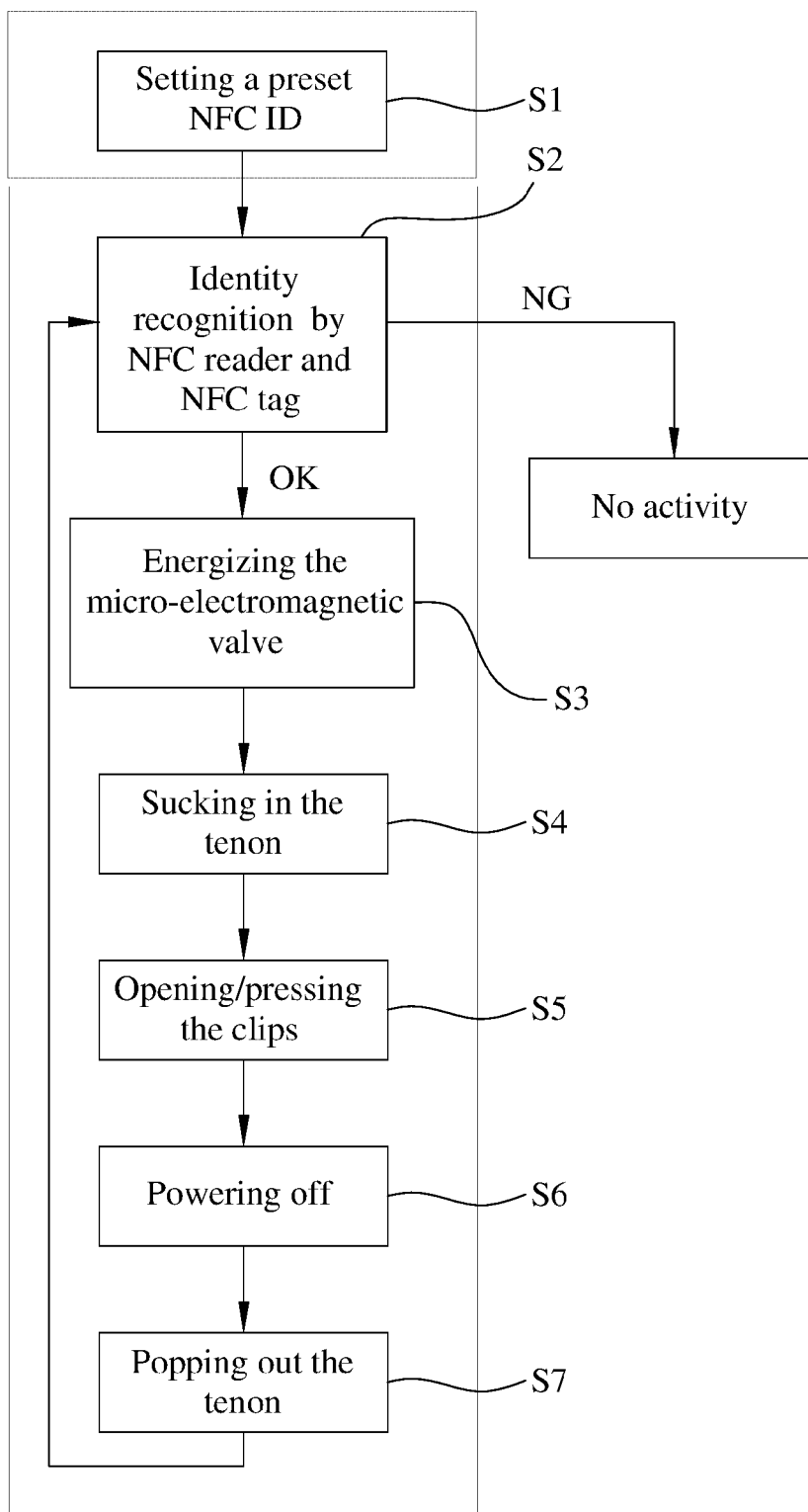


FIG. 5

**FIG. 6**

**FIG. 7**

**FIG. 8**

**FIG. 9**



EUROPEAN SEARCH REPORT

Application Number

EP 23 19 7277

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			TECHNICAL FIELDS SEARCHED (IPC)
			B65D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 30 January 2024	Examiner Sacepe, Nicolas
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