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(54) **LOCKING DEVICE**

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(57) **ABSTRACT**

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The present invention relates to a locking device primarily used for releasably joining two terminal end portions of jewelry items, although the locking device may also be used to releasably join two terminal end portions of non-jewelry items or the terminal end portions of two separate items. One embodiment of a locking device according to the present invention, for example, may comprise a first arrangement that includes at least one end portion that is at least partially open and an extension or a hole. The locking device may also comprise a second arrangement having a protrusion that is insertable into the first arrangement at the at least one end portion to place the first and second arrangements in a locked position. The locking device may also include a third arrangement that is connected to the second arrangement. In certain exemplary embodiments of the present invention, for example, when the third arrangement is acted upon, the third arrangement forces the protrusion to change in at least one of shape, size or orientation so that the protrusion is removable from the extension or the hole and cause the first and second arrangements to be in an unlocked position.

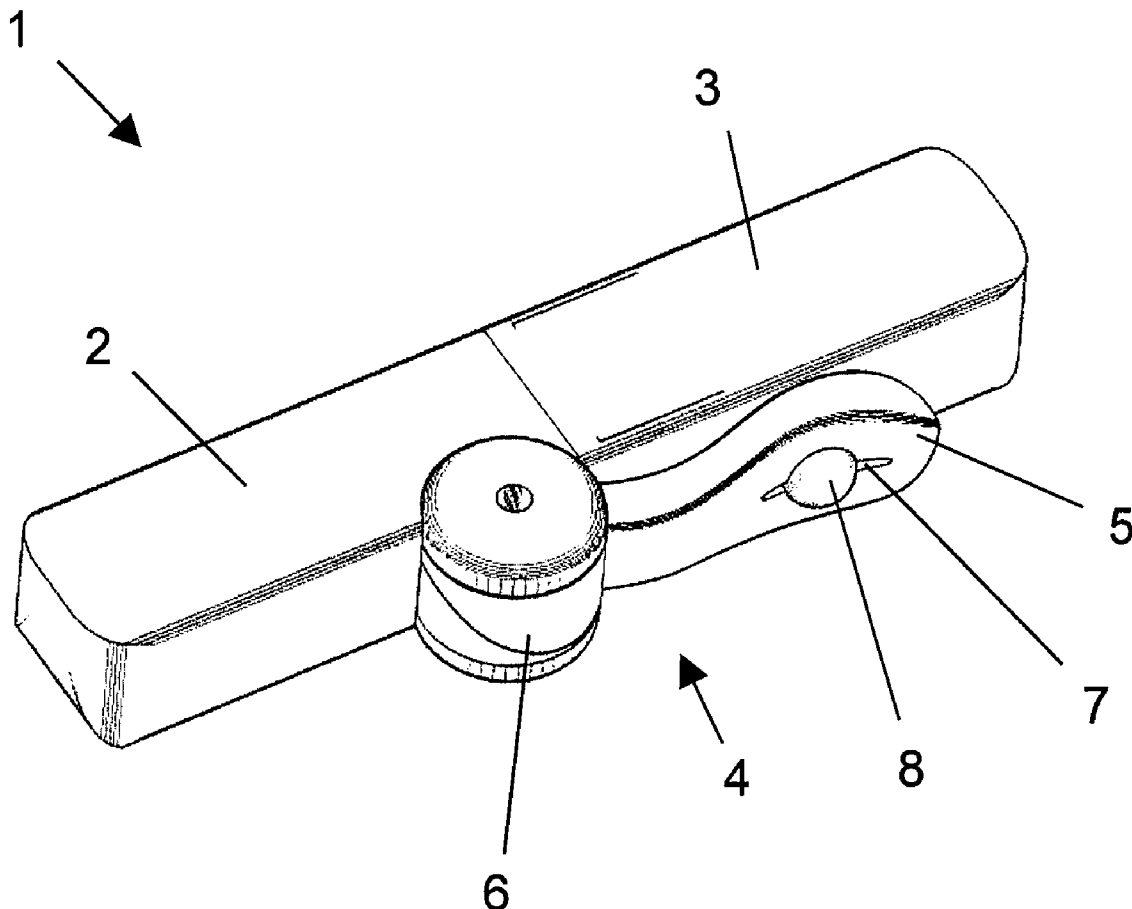
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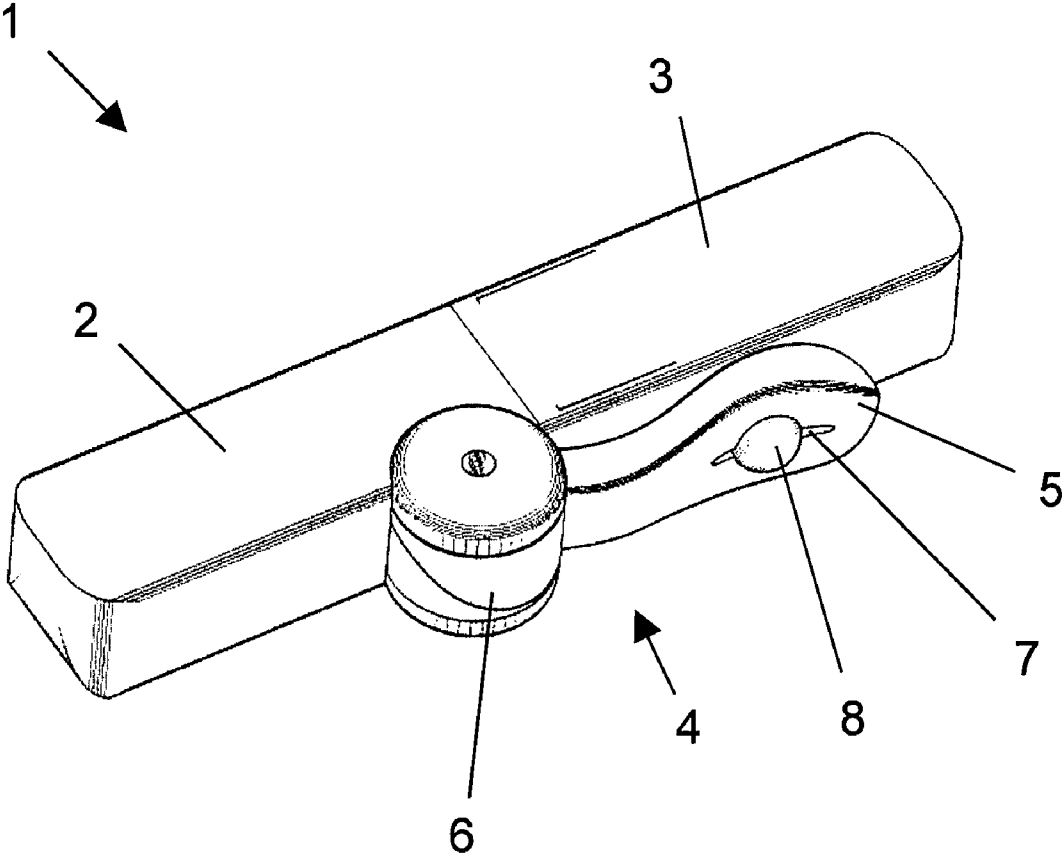


FIG. 1

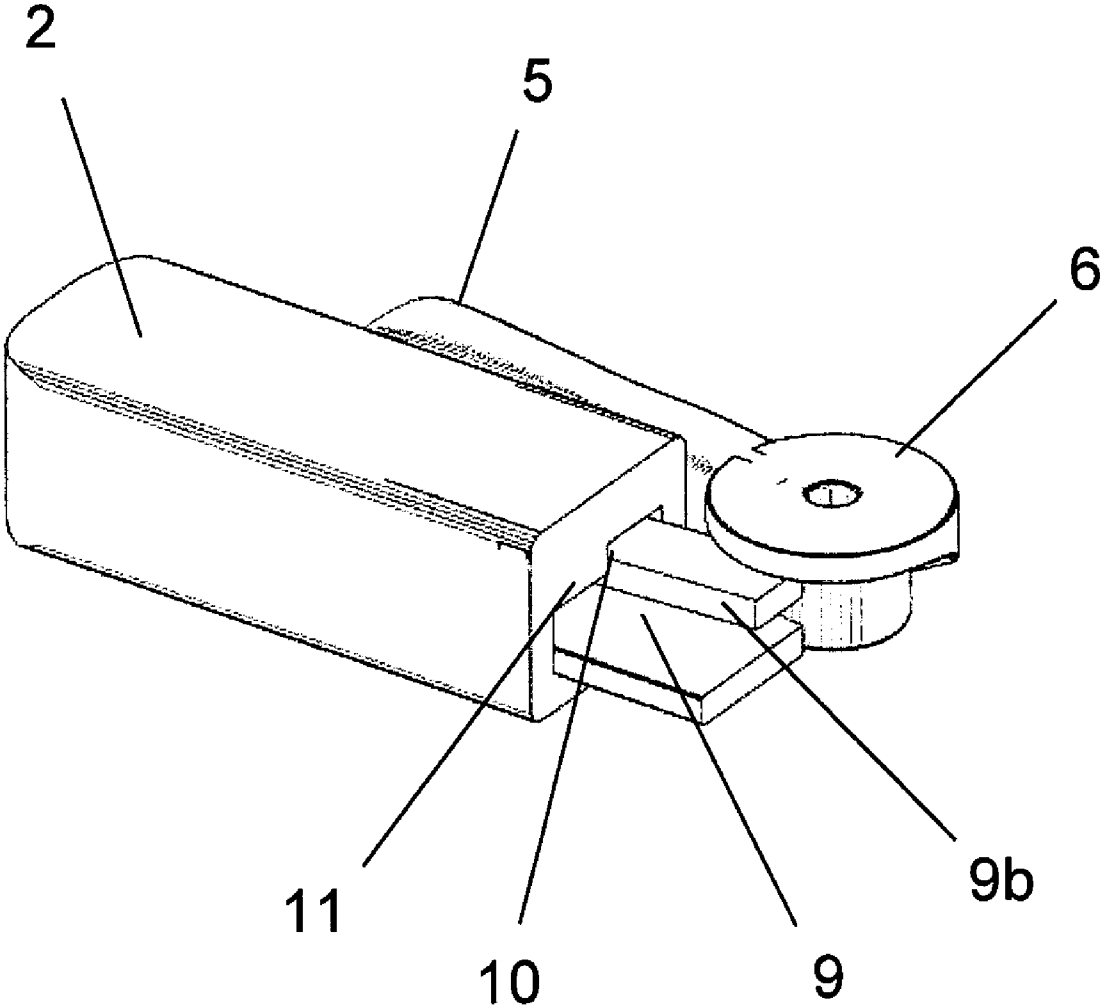


FIG. 2

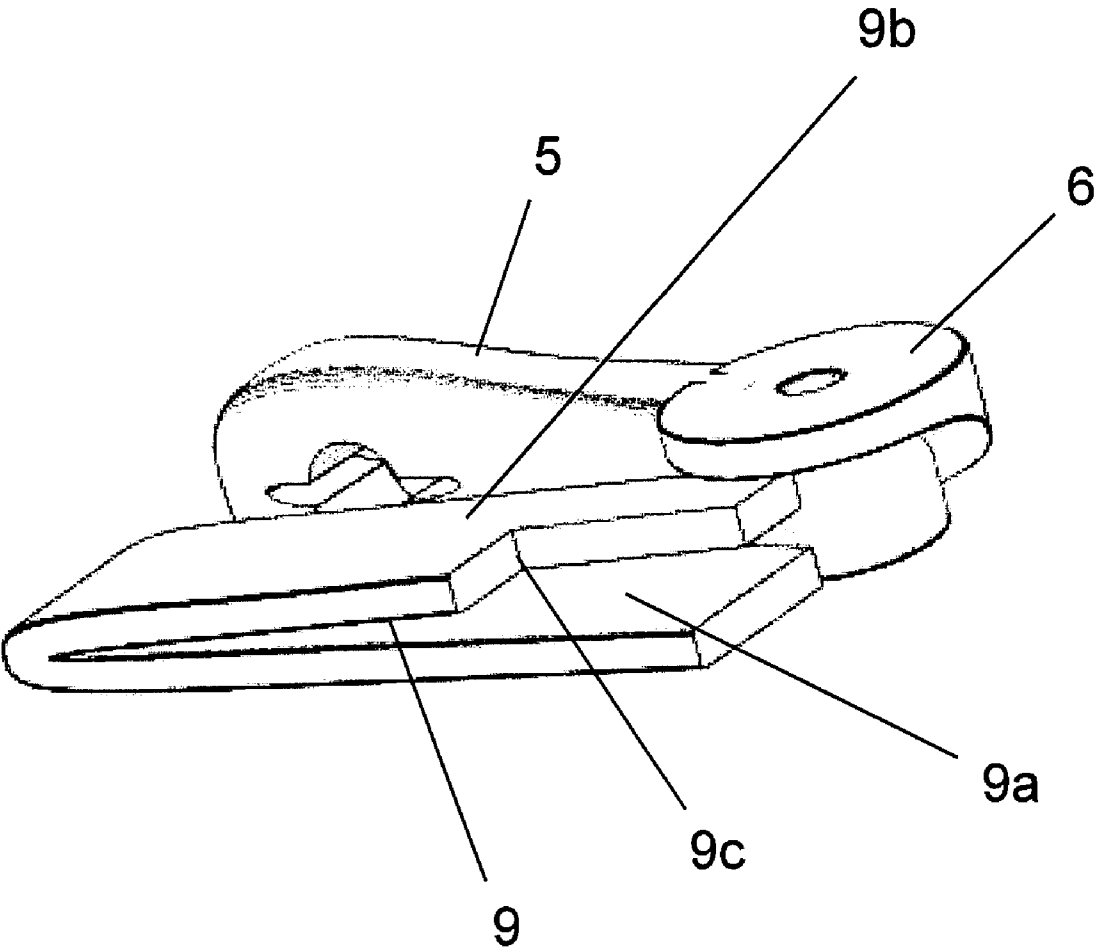


FIG. 3

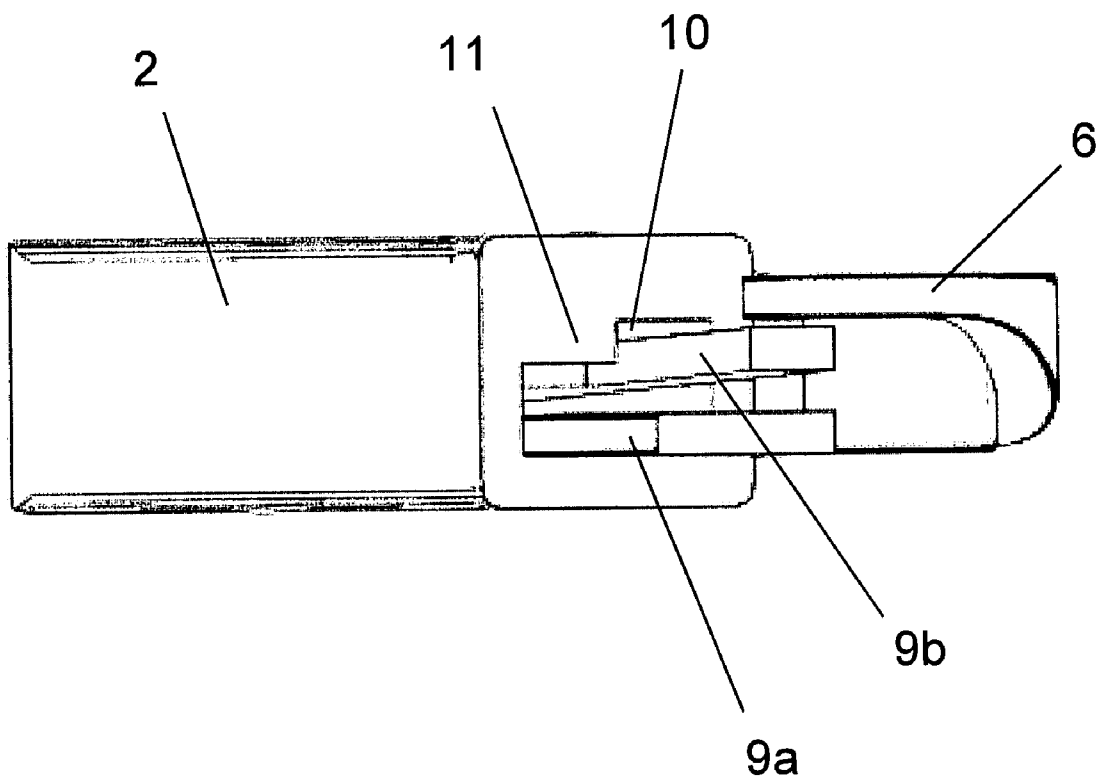


FIG. 4

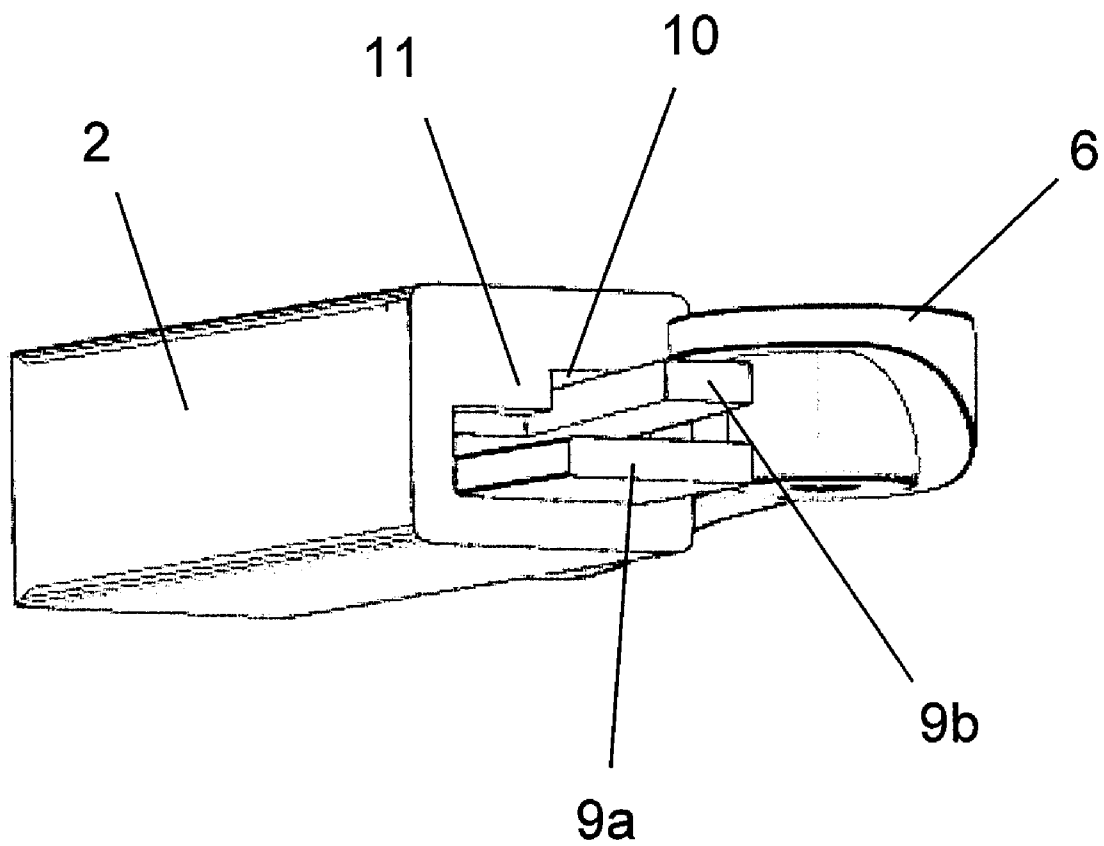


FIG. 5

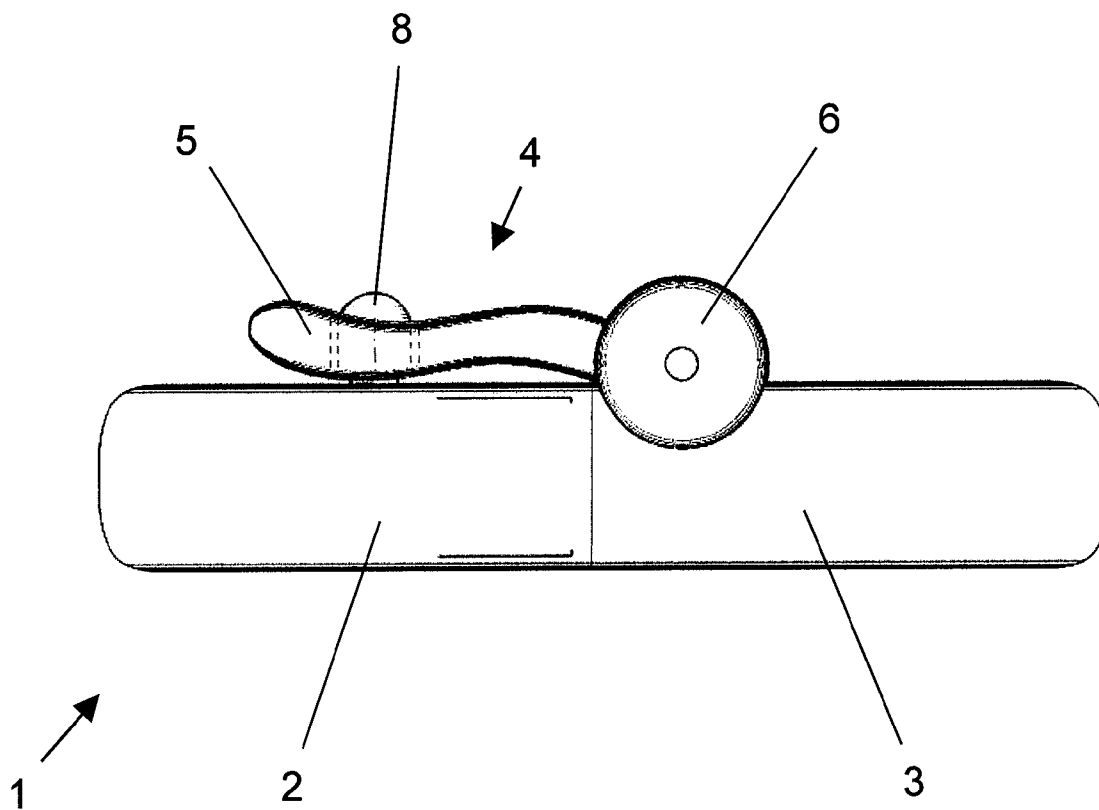


FIG. 6

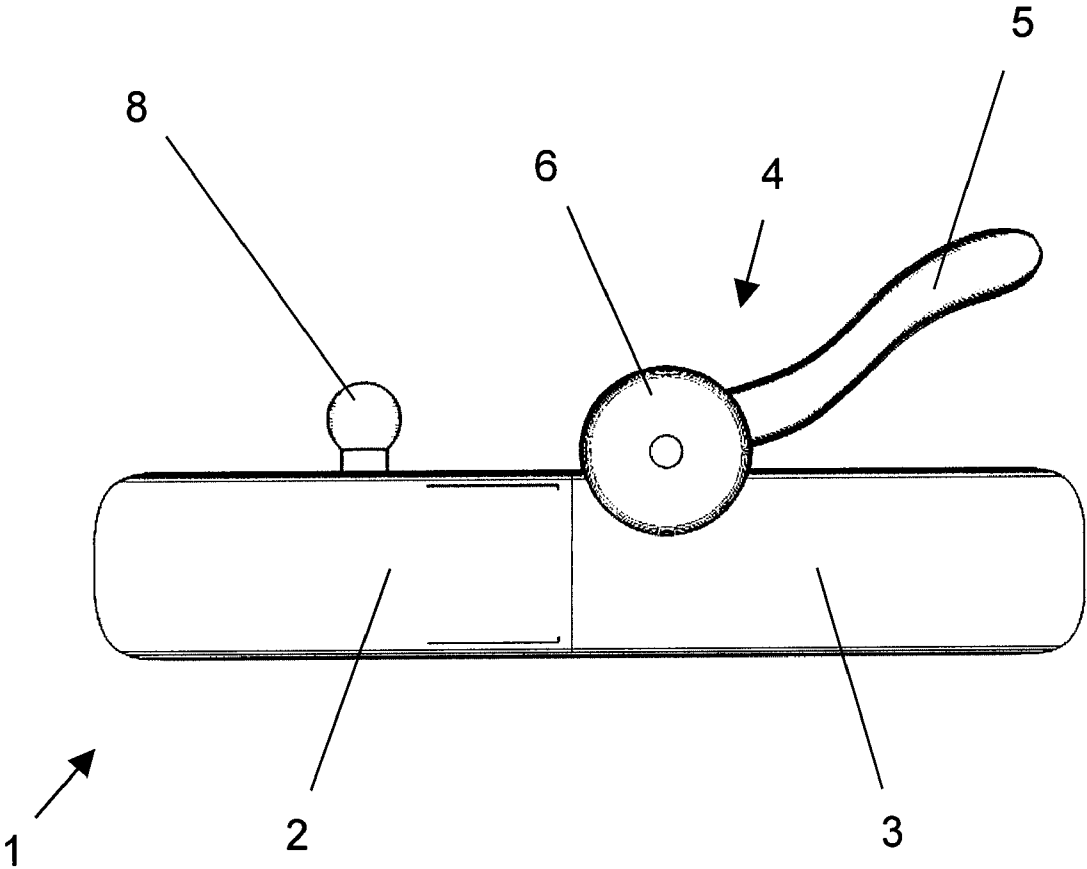


FIG. 7

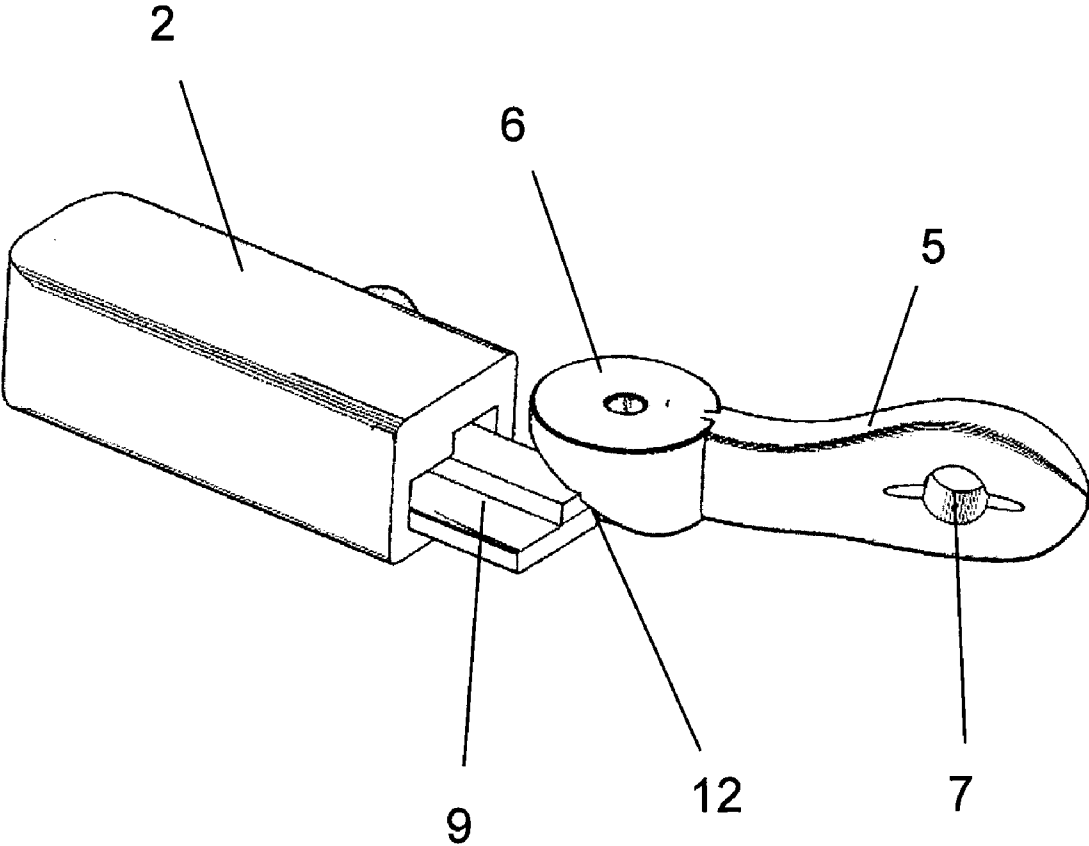


FIG. 8

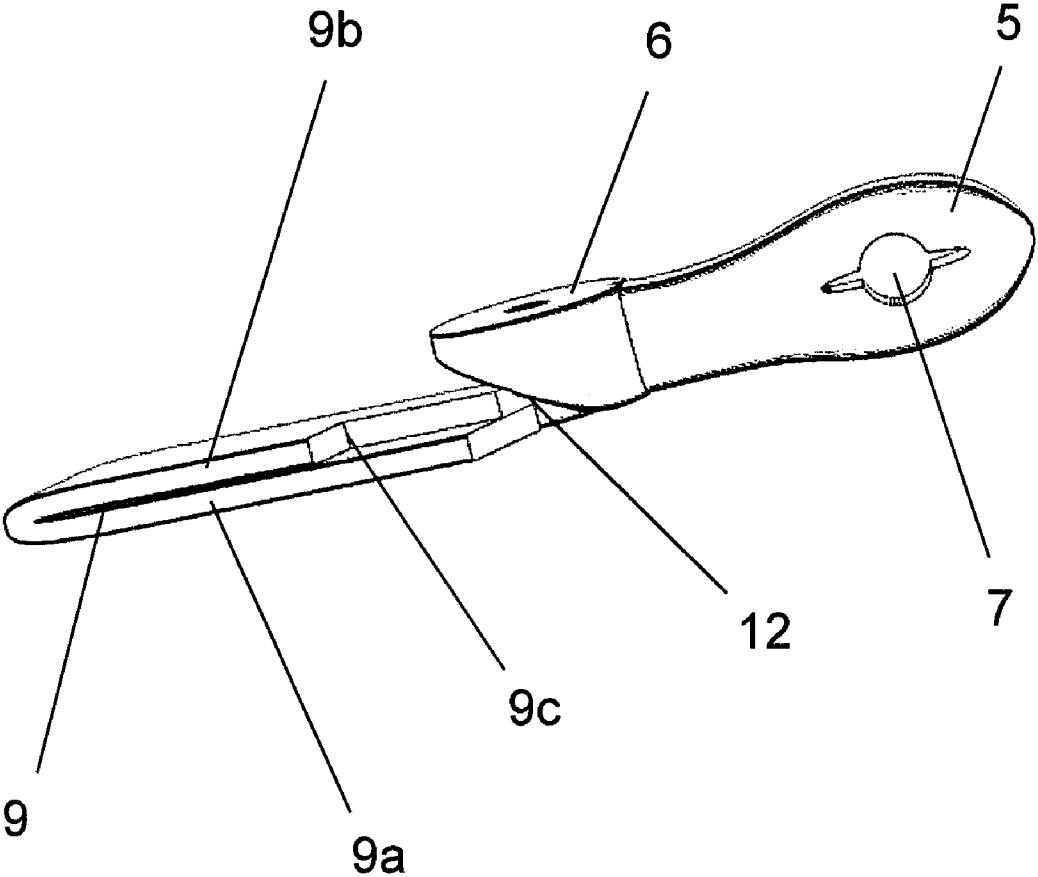


FIG. 9

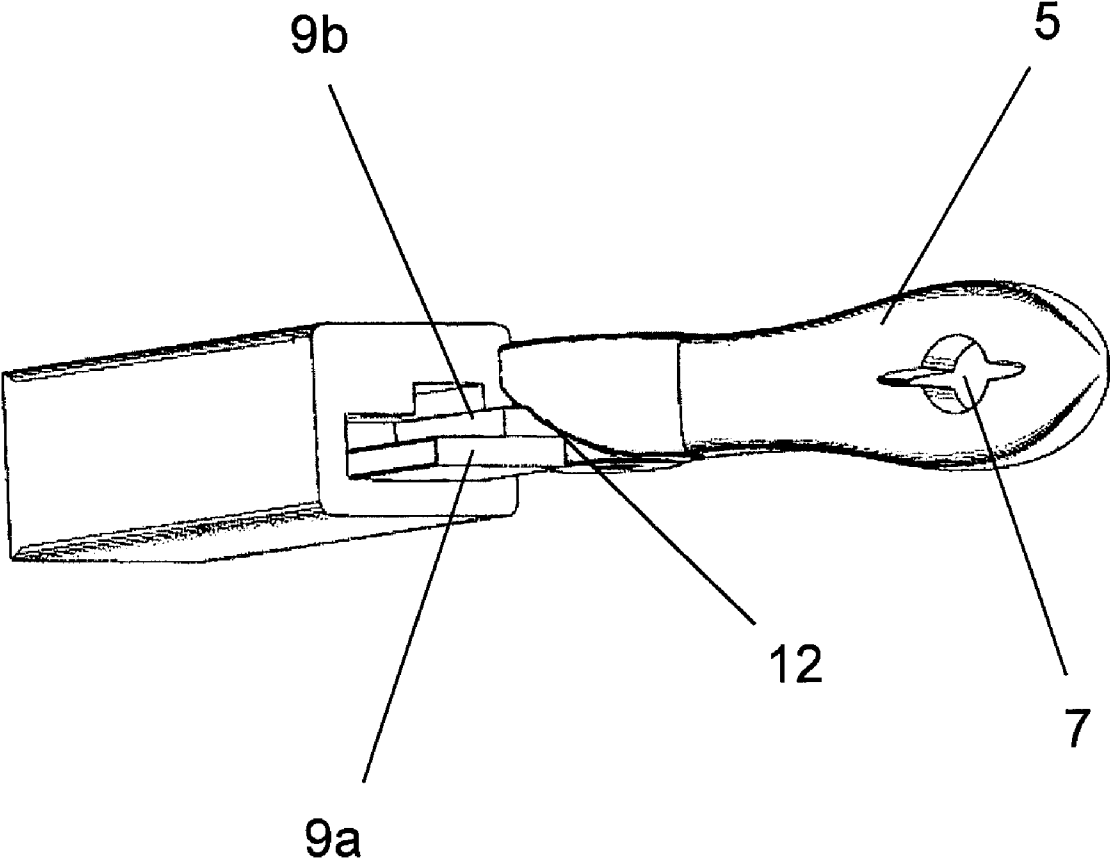


FIG. 10

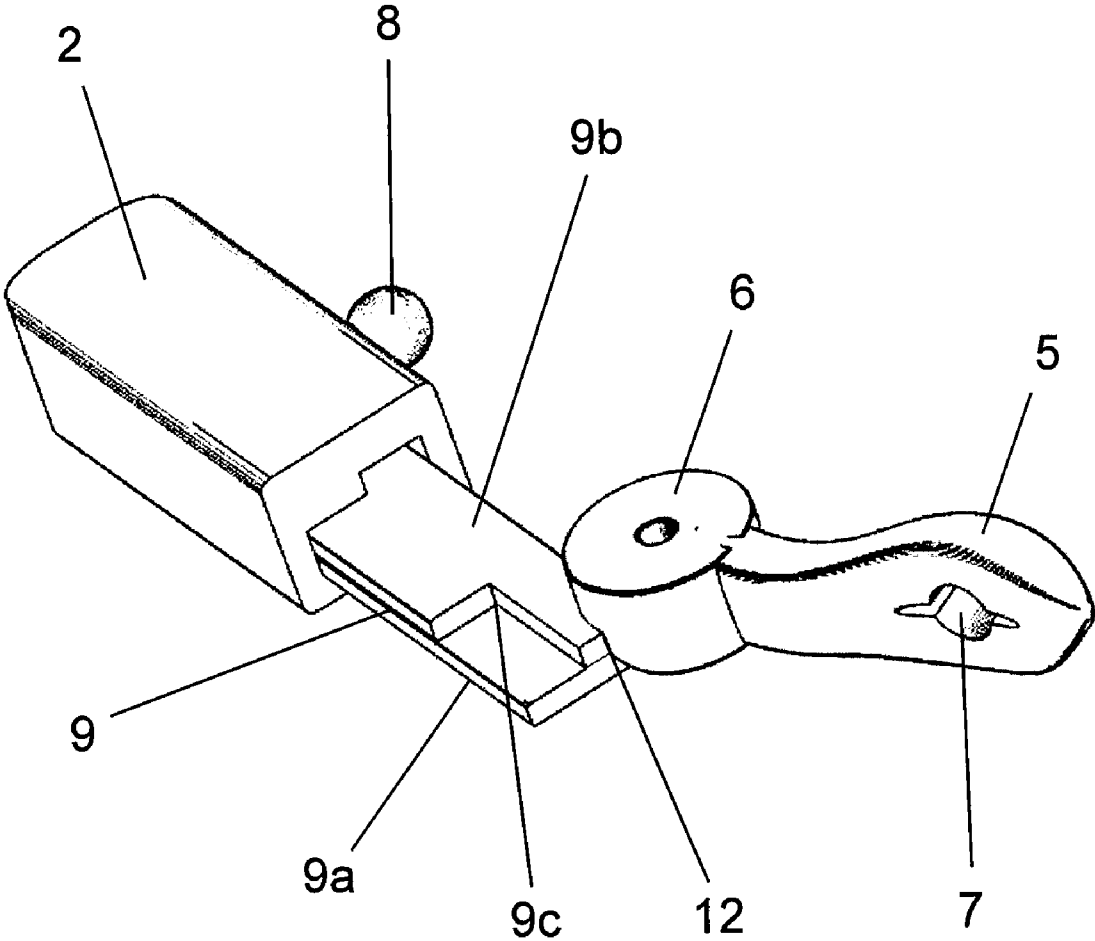


FIG. 11

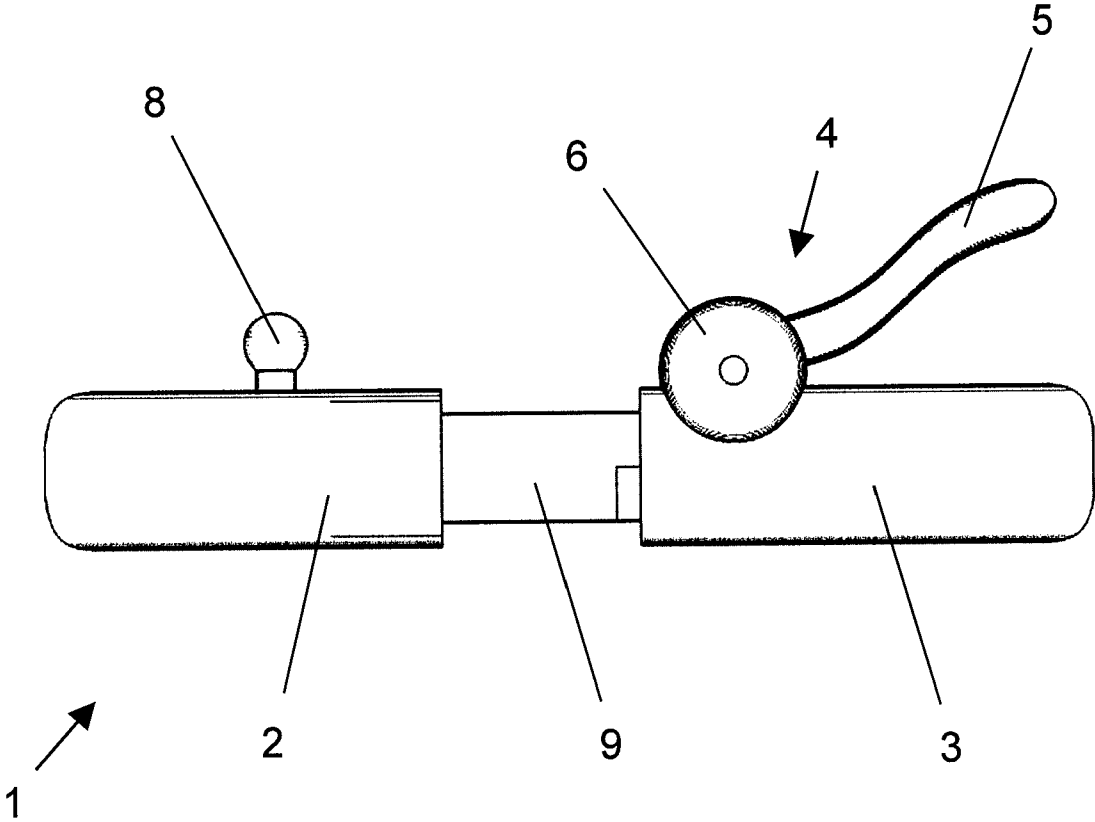


FIG. 12

LOCKING DEVICE

FIELD OF THE INVENTION

[0001] The present invention relates to a locking device. More particularly, the present invention relates to a locking device primarily used for releasably joining two ends, e.g., terminal ends of jewelry items.

BACKGROUND INFORMATION

[0002] With the various types of locking devices for jewelry items, one particular category of locking devices typically comprise a compressible tongue member that is slidably inserted into a generally rectangular socket member to releasably join two terminal ends of jewelry items. Such mechanisms are useful for minimizing or preventing unintended separation of the terminal ends of jewelry items, and thereby possible damage and/or loss thereof.

[0003] There exists certain problems with existing locking devices. One such problem can be that the locking device mechanism may not be sufficiently secure and therefore be inadvertently released, causing jewelry to be damaged or lost. Another problem with existing locking devices can be that they may be difficult to handle, operate, lock and unlock. This is generally the case when it is necessary to directly press on a tongue, or on a button type of member that presses directly on a tongue, so as to release the tongue from being held fastened in a locked position. In fact, the conventional devices may break when pressure is applied on such tongues.

SUMMARY OF EXEMPLARY EMBODIMENTS

[0004] One of the objects of the present invention is to overcome the deficiencies commonly associated with the prior art, and provide a locking device that is securely fastenable so as to not be inadvertently disengaged and that is relatively easy to handle and operate as well as a method associated therewith.

[0005] One such exemplary embodiment according to the present invention is directed to a locking device that comprises a first arrangement that may include at least one end portion that is at least partially open and an extension or a hole. The locking device may also comprise a second arrangement having a protrusion that is insertable into the first arrangement at such one end to place the first and second arrangements in a locked position. The locking device may also comprise a third arrangement that can be connected to the second arrangement. When the third arrangement is acted upon, for example, the third arrangement may force the protrusion to change at least one of shape, size or orientation so that the protrusion is removable from the extension or the hole, and may cause the first and second arrangements to be in an unlocked position.

[0006] Another exemplary embodiment according to the present invention is directed to a jewelry arrangement having a first terminal end and a second terminal end. For example, a first arrangement may be connected to the first terminal end and include (i) at least one end that is at least partially open and (ii) an extension or a hole. A second arrangement may be connected to the second terminal end and have a protrusion that is insertable into the first arrangement at the at least one end to place the first and second arrangements in a locked position. A third arrangement may be connected to the second arrangement. When the third arrangement is acted upon, for example, the third arrangement can force the protrusion to

change at least one of shape, size or orientation so that the protrusion is removable from the extension or the hole, and may cause the first and second arrangements to be in an unlocked position.

[0007] Another object of the present invention is to provide an exemplary method for releasably connecting two terminal ends of a jewelry item utilizing a locking device having a first arrangement and a second arrangement. The first arrangement can include (i) at least one end that is at least partially open and (ii) an extension or a hole, and the second arrangement may have a protrusion that is insertable into the first arrangement at the at least one end to place the first and second arrangements in a locked position, for example. The exemplary locking device may also have a third arrangement connected to the second arrangement. For example, when the third arrangement is acted upon, the third arrangement may force the protrusion to change in at least one of shape, size or orientation so that the protrusion is removable from the extension or the hole, and can cause the first and second locking arrangements to be in an unlocked position. The exemplary method can comprise, for example, the procedure of inserting the protrusion of the second arrangement into the first arrangement.

[0008] These and other objects, features and advantages of the present invention will become apparent upon reading the following detailed description of embodiments of the invention, when taken in conjunction with the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Further objects, features and advantages of the invention will become apparent from the following detailed description taken in conjunction with the accompanying Figures showing illustrative embodiments of the invention, in which:

[0010] FIG. 1 is a perspective view of one exemplary embodiment of a locking device according to the present invention where the safety clip is fastened;

[0011] FIG. 2 is a perspective view of a portion of the exemplary embodiment of the locking device shown in FIG. 1;

[0012] FIG. 3 is a perspective view of another portion of the exemplary embodiment of the locking device shown in FIGS. 1 and 2;

[0013] FIG. 4 is a top view of the exemplary embodiment of the locking device shown in FIGS. 1-3 illustrating an arrangement of a tongue spring with a protruding part of the box being held firmly together in a locked position;

[0014] FIG. 5 is a perspective view of the exemplary embodiment of the locking device shown in FIGS. 1-4 illustrating the arrangement of the tongue spring with the protruding part of the box being held firmly together in the locked position;

[0015] FIG. 6 is a side view of the exemplary embodiment of the locking device shown in FIGS. 1-5 provided in the locked position;

[0016] FIG. 7 is a side view of the exemplary embodiment of the locking device shown in FIGS. 1-6 in which a safety clip is rotated out of the locked position;

[0017] FIG. 8 is a perspective view of a portion of the exemplary embodiment of the locking device shown in FIGS. 1-7 in which the safety clip is rotated out of the locked position, as further illustrated in FIG. 7;

[0018] FIG. 9 is a perspective view of another portion of the exemplary embodiment of the locking device shown in FIGS.

1-8, in which the safety clip is rotated so a screw presses on an upper part of the tongue maintaining it;

[0019] FIG. 10 is a perspective view of the portion of the exemplary embodiment of the locking device shown in FIG. 9, in which the safety clip is rotated so the screw presses on the upper part of the tongue, maintaining it so the upper part of the tongue is lower than the protruding part of the box, and thus the tongue is loosened and released from the box;

[0020] FIG. 11 is another perspective view of the portion of the exemplary embodiment of the locking device shown in FIGS. 9 and 10; and

[0021] FIG. 12 is a side view of the exemplary embodiment of the locking device shown in FIGS. 1-11, in which the safety clip is provided in a released positioned and the tongue is loosened and released to slide from the box.

[0022] Throughout the figures, the same reference numerals and characters, unless otherwise stated, are used to denote like features, elements, components or portions of the illustrated embodiments. Moreover, while the subject invention will now be described in detail with reference to the figures, it is done so in connection with the illustrative embodiments. It is intended that changes and modifications can be made to the described embodiments without departing from the true scope and spirit of the subject invention as defined by the appended claims.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0023] FIG. 1 shows a perspective view of an exemplary embodiment of a locking device 1 according to the present invention. The locking device 1 comprises a first arrangement 2 and a second arrangement 3. Each of the first and second arrangements 2, 3 is typically connected to two separate terminal ends of a jewelry item, respectively, by any suitable joining procedure, such as, e.g., soldering, molding, etc. Such first and second arrangements 2, 3 may also be provided as parts of the jewelry item design, for example, so that the jewelry item may be manufactured such that each end terminates with one of the first and second arrangements 2, 3, respectively. Such jewelry item may be a necklace, a bracelet or a wristwatch band, for example.

[0024] It should be appreciated that although such a locking device may typically be used to releasably join terminal ends of the jewelry items, such locking device may be used to releasably join two terminal ends of other items or the terminal ends of two separate items together, as may be desired. Other such items may include e.g., hanging decorations, signs, etc. The size of the exemplary locking device may vary so as to be suitable of being used with a variety of jewelry and other items. The material used to manufacture the exemplary locking device may also be varied so as to be suitable for use with jewelry and other items. For example, the exemplary locking device may be made of 14 carat white gold so as to match a 14 carat white gold necklace with which it is to be used, 18 carat gold, platinum, silver, etc.

[0025] The exemplary embodiment of the locking device 1 as shown in FIG. 1 is provided in a locked position with the first and second arrangements 2, 3 being secured together using a safety clip 4 for fastening thereof. As shown in FIG. 1, this exemplary embodiment of the locking device 1 can include the safety clip 4, which is attached to first arrangement 2 via a screw wheel 6. Extending from the screw wheel 6 as part of the safety clip 4 is lever arm 5, which includes an open portion 7 (e.g., a through-hole) near the distal end of the

lever arm from the screw wheel 6, as shown in FIG. 1. The open portion 7 can be orientated perpendicularly to the lever arm 5 so as to be capable of securely fastening or snapping onto a knob 8, which extends perpendicularly from the second arrangement 3 so as to lock the device 1, as shown in FIG. 1.

[0026] FIG. 2 shows a perspective view of the exemplary embodiment of the present invention shown in FIG. 1, having the inner portions of first arrangement 2 exposed so as to reveal a tongue 9 (e.g. sprung member) that includes tongue members 9a and 9b. The tongue 9 may be formed from a single piece of sheet metal, for example, which can be folded back on itself to form a relatively firm portion 9a and a resilient portion 9b. The resilient portion 9b can extend at a slight angle from the fold to form a spring-like mechanism, as shown in FIG. 3. The resilient portion 9b can include a notch 9c on the distal end-portion of the resilient portion from the fold in close proximity to the screw wheel 6, as shown in FIG. 3.

[0027] FIG. 2 also shows an open end 10 of the first arrangement 2. A protruding part 11 can extend into the open end 10 so as to be congruent with the notch 9c, as shown in further detail in FIGS. 4 and 5. For example, FIGS. 4 and 5 are top and perspective views, respectively, of the exemplary embodiment of the locking device 1 shown in FIGS. 1-3. The tongue 9 is shown in FIGS. 4 and 5 in an uncompressed state, with the resilient portion 9b angling behind the protruding part 11 so as to prevent the tongue 9 from being pulled and separated from the first arrangement 2, thereby holding the first arrangement 2 firmly together with the tongue 9 in the locked position.

[0028] FIG. 6 is a side view of the embodiment of the locking device 1 shown in FIGS. 1-5, with the locking device 1 being in a locked position with respect to the first and second arrangements 2, 3. The first and second arrangements 2, 3 are secured to one another with the resilient portion 9b angling behind the protruding part 11, as shown in FIGS. 4 and 5. Additionally, the lever arm 5 is shown in its secure position, with the protrusion 8 being showed as protruding or extending through the opening 7 of the lever arm 5.

[0029] FIG. 7, similarly to FIG. 6, shows a side view of the exemplary embodiment of the locking device 1 illustrated in FIGS. 1-5. However, unlike the illustrations of FIG. 6, FIG. 7 shows that the lever arm 5 has been rotated approximately 135 degrees from its secured position (provided in FIG. 6). As the lever arm 5 is rotated, an edge 12 (shown in FIG. 8) of the screw wheel 6 is pressed against the resilient member 9b of the tongue 9 so as to press the resilient member 9b closer to (and even against) the relatively firm member 9a to be in a compressed state, as in FIGS. 8 and 9.

[0030] For example, FIG. 8 shows a perspective view of the same exemplary embodiment as illustrated in FIGS. 1-7, in which the second arrangement 3 has been removed to reveal and clearly provide the tongue 9 and the edge 12 of the screw wheel 6. FIG. 9 also shows a perspective view of the same exemplary embodiment as illustrated in FIGS. 1-7, in which both the first and second arrangements 2, 3 have been removed to clearly provide the exemplary arrangement of the tongue 9, including the relatively fixed firm member 9a, the resilient member 9b, the notch 9c, the lever arm 5, and the screw wheel 6 with the edge 12. As shown in FIG. 9, the resilient member 9b is pressed closer to and even against the relatively firm member 9a so as to allow the notch 9c on the tongue member 9b to be unobstructed and passable over the

protrusion **11** of the first arrangement **2** when pulled, thereby allowing the first and second arrangements **2, 3** to be separated from one another.

[0031] It is to be understood that the angle of rotation of the lever arm **5** may be varied in various ways depending on the exemplary embodiment in which the present invention is employed. According to further exemplary embodiments, the lever arm **5** may be otherwise transformable, translatable or rotatable in different directions and at varying angles from those shown in FIGS. **6-9**. For example, depending on the exemplary configuration, the edge **12** of the screw wheel **6** may be configured and/or mechanically linked to press the resilient member **9b** closer to and even (or parallel) against or to the relatively firm member **9a** so as to allow the notch **9c** of the resilient member **9b** to unobstructed and passable over the notch **11** of the first member portion **2** when pulled, and thereby allowing the first and second arrangements **2, 3** to be separated from one another.

[0032] FIGS. **10-12** show different views of the same exemplary embodiment illustrated in FIGS. **1-9**, except where the resilient member **9b** is provided lower than the protrusion **11** of the first arrangement **2**. This exemplary configuration facilitates the notch **9c** provided on the resilient member **9b** to be unobstructed and passable over the protrusion **11** when the first arrangement **2** is pulled away from the second arrangement **3**. The tongue **9** is thereby loosened and allowed to be pulled from the second arrangement **2** so that the first and second arrangements **2, 3** can be separated from one another.

[0033] In particular, FIG. **10** shows a perspective view of such exemplary embodiment, largely as viewed from the side, which illustrates how the edge **12** presses against the resilient member **9b** of the tongue **9** when the lever arm **5** is further rotated.

[0034] FIG. **11** shows a perspective view of this exemplary embodiment that shows the tongue **9** being freed (or unlocked) and slid (or removed) from the first arrangement **2**. The second arrangement **3** (as shown in FIG. **11**) has been removed to more clearly illustrate how the resilient member **9b** is pressed close to and even against (e.g., parallel to) the relatively firm member **9a** so that the notch **9c** on the resilient tongue member **9b** becomes unobstructed and passable over the protrusion **11** in the first arrangement **2**.

[0035] FIG. **12** shows a side view of this exemplary embodiment that also illustrates the tongue **9** being freed (or unlocked) and slid (or removed) from the first arrangement **2**. As shown in FIG. **12**, the second arrangement **3** is shown as having the tongue **9** attached thereto, thus illustrating the first and second arrangements **2, 3** being freed and separated from one other. When each of the first and second arrangements **2, 3** are connected to two separate terminal ends of a jewelry or other item, for example, such terminal ends of a jewelry or other item (via the first and second arrangements **2, 3**) can thus be freed and separated (e.g., released) from one another accordingly.

[0036] To reconnect the first and second arrangements **2, 3** to one another, and thus the two terminal ends of the jewelry or other arrangement, for example, the procedure for separating or decoupling the first and second arrangements **2, 3** can simply be reversed. However, it is not necessary to orientate the lever arm **5** before pressing the first and second arrangements **2, 3** together so that the tongue **9** slides into the first arrangement **2** orientated so that the resilient member **9b** is closer to the side of the first arrangement **2** from which the

protrusion **11** extends. For example, the first and second arrangements **2, 3** can be pressed together until notch **9c** slides past the protrusion **11**. The lever arm **5** may then be secured by rotating and pressing it towards the first arrangement **2**, so that the open portion **7** snaps onto or is secured to the knob **8**, at which point the locking device **1** is secure in a locked position.

[0037] The foregoing merely illustrates the principles of the invention. Various modifications and alterations to the described embodiments will be apparent to those skilled in the art in view of the teachings herein. It will thus be appreciated that those skilled in the art will be able to devise numerous devices, arrangements and methods which, although not explicitly shown or described herein, embody the principles of the invention and are thus within the spirit and scope of the present invention. The detailed description, given by way of example, but not intended to limit the invention solely to the specific embodiments described, may best be understood in conjunction with the accompanying Figures.

What is claimed is:

1. A locking device, comprising:

a first arrangement including (i) at least one end portion that is at least partially open and (ii) an extension or a hole;

a second arrangement having a protrusion that is insertable into the first arrangement at the at least one end portion to place the first and second arrangements in a locked position; and

a third arrangement connected to the second arrangement, wherein, when the third arrangement is acted upon, the third arrangement causes the protrusion to change in at least one of shape, size or orientation so that the protrusion is removable from the extension or the hole and cause the first and second arrangements to be in an unlocked position.

2. The locking device recited in claim **1**, wherein the protrusion has a resilient portion and a relatively fixed portion.

3. The locking device recited in claim **2**, wherein the resilient portion of the protrusion has a notch.

4. The locking device recited in claim **3**, wherein, when the first and second arrangements are provided in the locked position, the resilient portion of the protrusion extends behind the extension so that the notch presses upon or contacts the extension to prevent the protrusion from being removed from the first arrangement.

5. The locking device recited in claim **4**, wherein the third arrangement is rotatable so as to press upon or contact the resilient portion of the protrusion when rotated, and thereby facilitate the protrusion to be removed from the first arrangement.

6. The locking device recited in claim **1**, wherein the third arrangement is rotatable.

7. The locking device recited in claim **1**, wherein the third arrangement includes a lever.

8. The locking device recited in claim **1**, wherein the third arrangement includes a wheel.

9. The locking device recited in claim **1**, wherein the resilient portion of the protrusion and the relatively fixed portion of the protrusion have spring-like characteristics.

10. The locking device recited in claim **9**, wherein the protrusion is composed of one piece of metal or a single piece member, and wherein the shape of the protrusion is such that it forms an acute angle between the resilient portion and the relatively fixed portion.

11. The locking device recited in claim 1, wherein the first arrangement includes a protruding knob.

12. The locking device recited in claim 11, wherein the third arrangement is rotatable and includes a lever with a hole, and wherein the protruding knob is positioned in a vicinity of the hole when the third member is rotated.

13. The locking device recited in claim 1, wherein the first arrangement is substantially hollow.

14. The locking device recited in claim 1, wherein the locking device is connected to a jewelry item having at least two terminal ends, and wherein one of the terminal ends of the jewelry item is connected to the first arrangement, and another one of the terminal ends of the jewelry item is connected to the second arrangement.

15. The locking device recited in claim 14, wherein the terminal ends of the jewelry item are connected to the locking device by a joining arrangement.

16. The locking device recited in claim 14, wherein each of the first and second arrangements are manufactured as parts of the jewelry item.

17. The locking device recited in claim 1, wherein the first and second arrangements are connected to at least two terminal ends of a further arrangement.

18. The locking device recited in claim 1, wherein the first and second arrangements are locking arrangements.

19. A jewelry device comprising:

a first terminal end portion;

a second terminal end portion;

a first arrangement connected to the first terminal end portion, including (i) at least one end portion that is at least partially open and (ii) an extension or a hole;

a second arrangement connected to the second terminal end portion and having a protrusion that is insertable into the first arrangement at the at least one end portion to provide the first and second arrangements in a locked position; and

a third arrangement connected to the second arrangement, wherein, when the third arrangement is acted upon, the third arrangement causes the protrusion to change in at least one of shape, size or orientation so that the protrusion is removable from the extension or the hole and cause the first and second arrangements to be in an unlocked position.

20. A method for releasably connecting two terminal end portions of a jewelry item with a locking device, comprising: providing a first arrangement including (i) at least one end portion that is at least partially open and (ii) an extension or a hole,

providing a second arrangement having a protrusion that is insertable into the first arrangement at the at least one end portion to place the first and second arrangements in a locked position,

providing a third arrangement connected to the second arrangement, wherein, when the third arrangement is acted upon, the third arrangement forces the protrusion to change in at least one of shape, size or orientation so that the protrusion is removable from the extension or the hole and cause the first and second arrangements to be in an unlocked position, and

providing one ability to insert the protrusion of the second arrangement into the first arrangement.

* * * * *