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(54) **COMBINATION LOCK HAVING A SECOND LOCK MECHANISM**

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(73) Assignee: **Sinox Co., Ltd.**, Chung-Ho (TW)

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Filed: **Feb. 26, 2004**

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E05B 65/48 (2006.01)
E05B 37/02 (2006.01)

(52) **U.S. Cl.**
CPC . ***E05B 37/02*** (2013.01); *Y10S 70/63* (2013.01)
USPC **70/71**; 70/284; 70/285; 70/74; 70/DIG. 63

(58) **Field of Classification Search**
USPC ..... 70/21, DIG. 63, 284, 285, 68–72, 74
See application file for complete search history.

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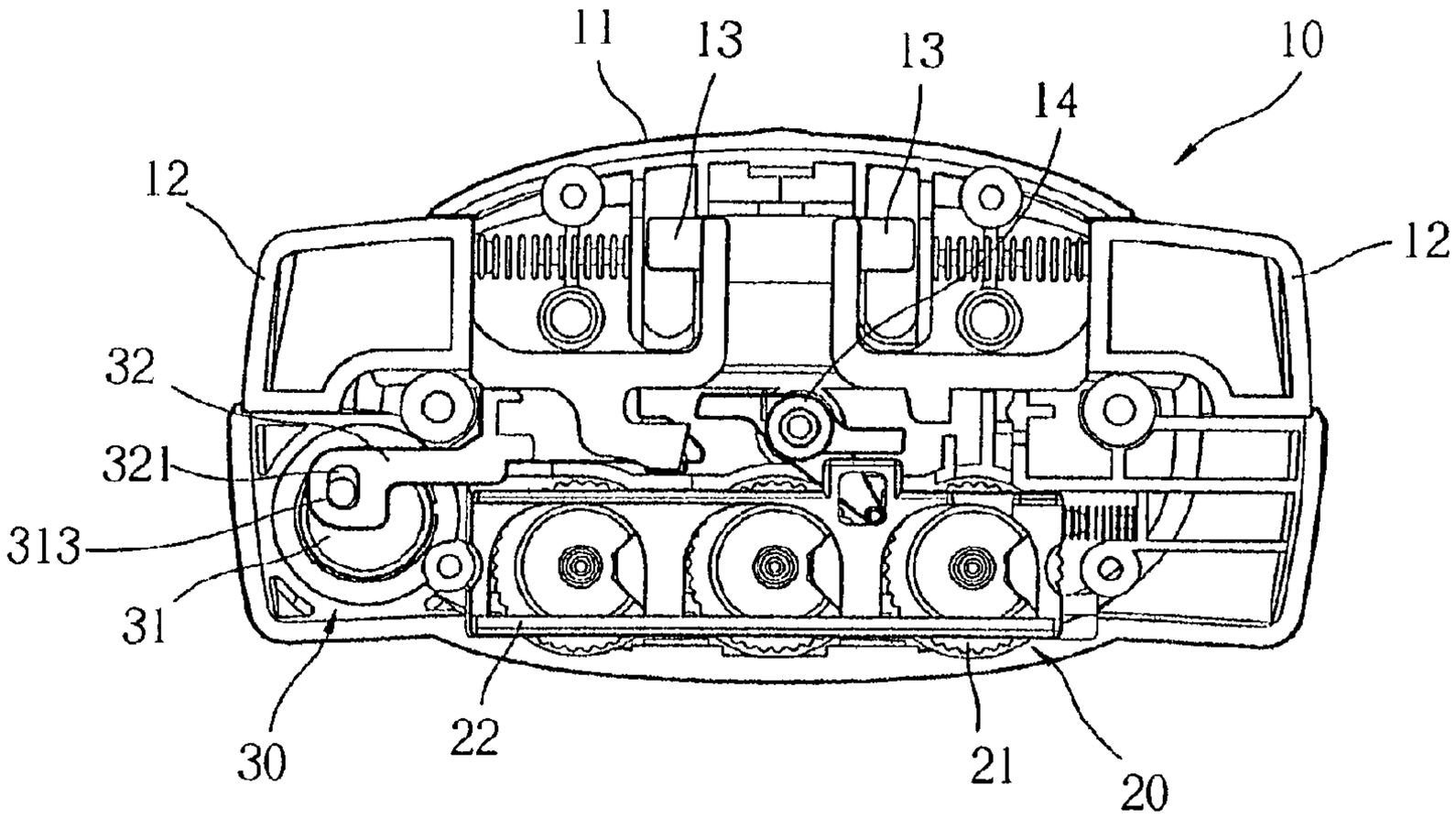
Primary Examiner — William Doerrler

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(57) **ABSTRACT**

A combination lock having a combination lock mechanism and a key lock mechanism. The combination lock mechanism is able to unlock and lock the combination lock by switching a plurality of dials exposed on the surface of the combination lock, while the key lock mechanism allows the user to unlock the combination lock with a key.

15 Claims, 18 Drawing Sheets



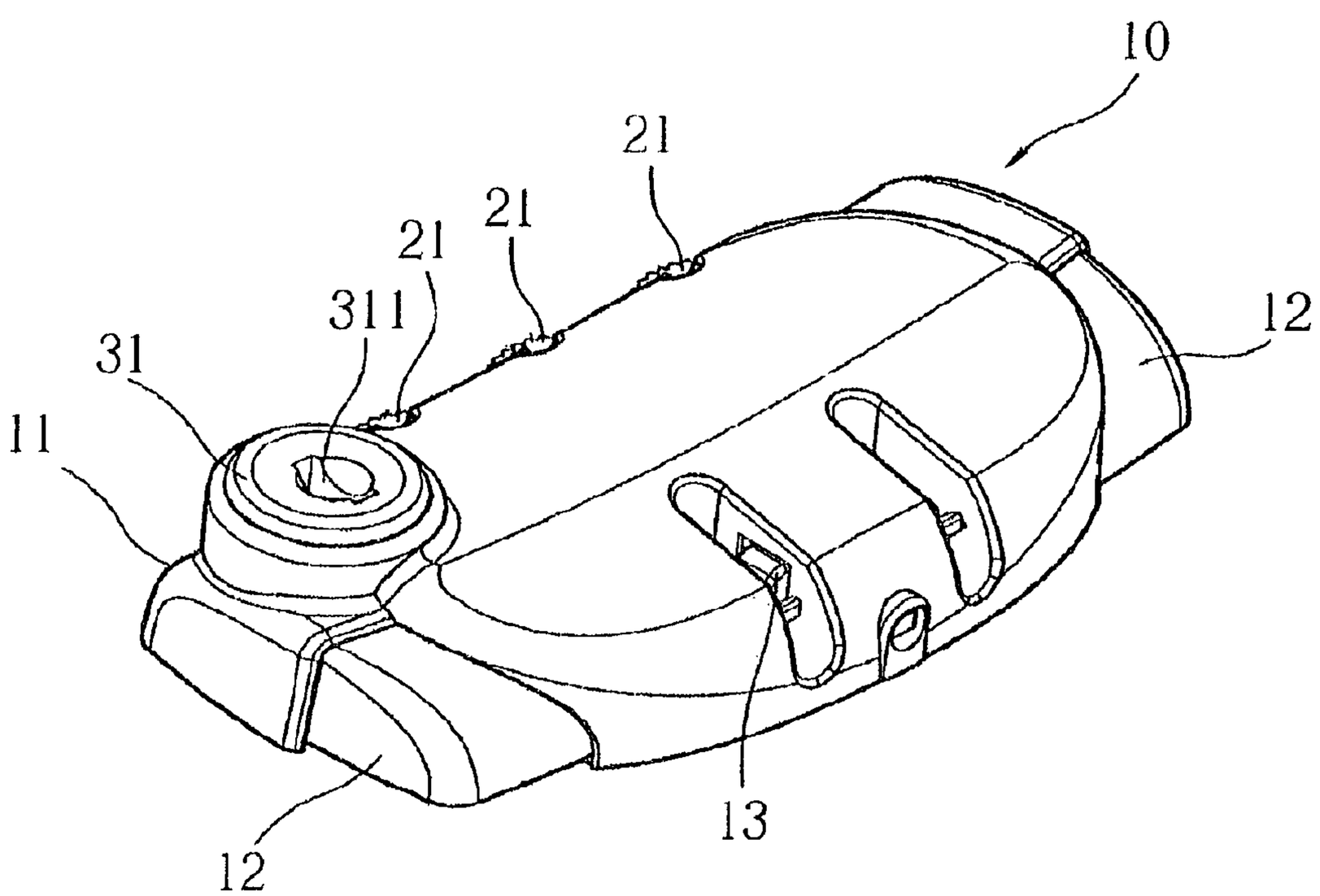


Fig. 1

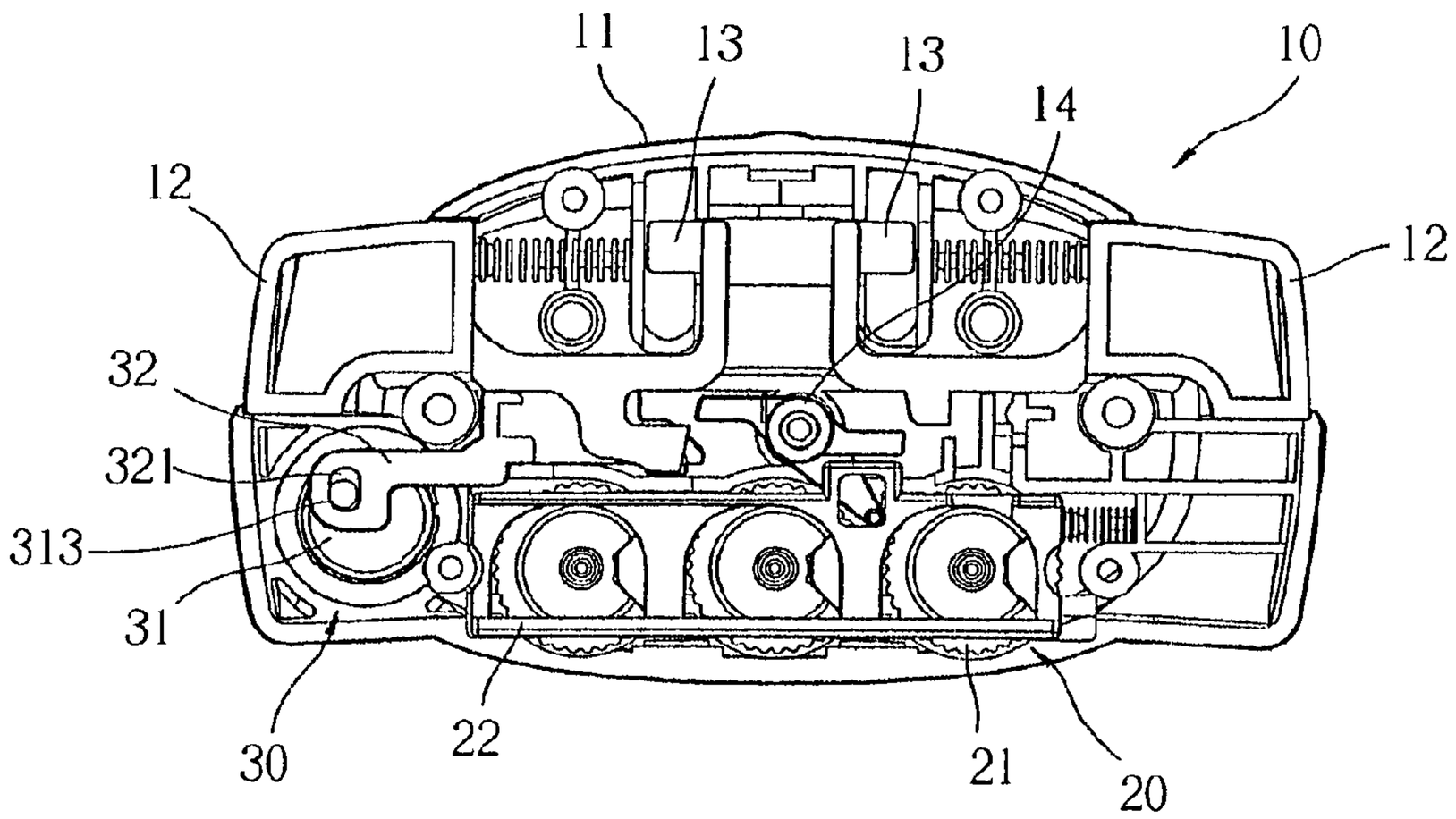


Fig. 2

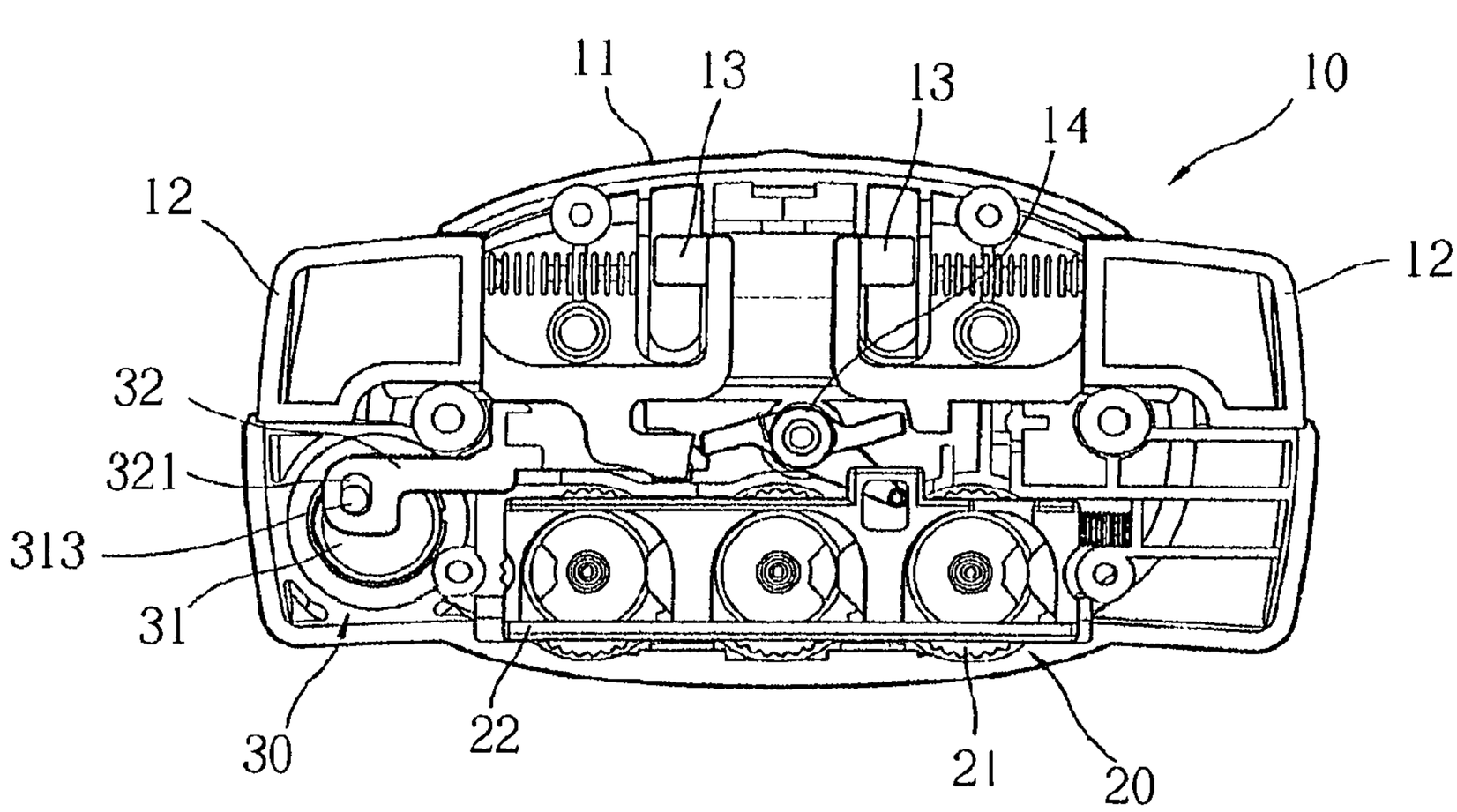


Fig. 3

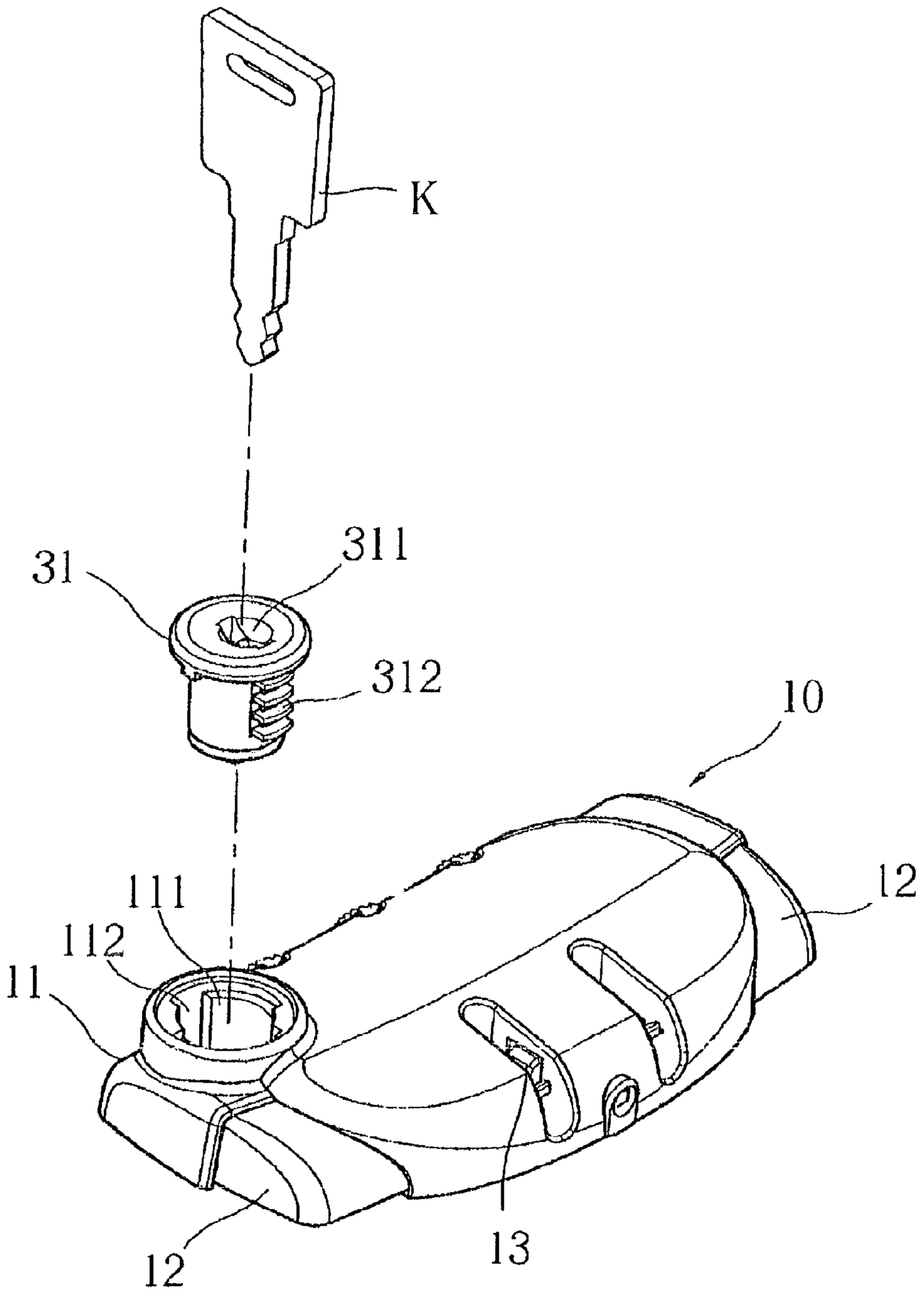


Fig. 4

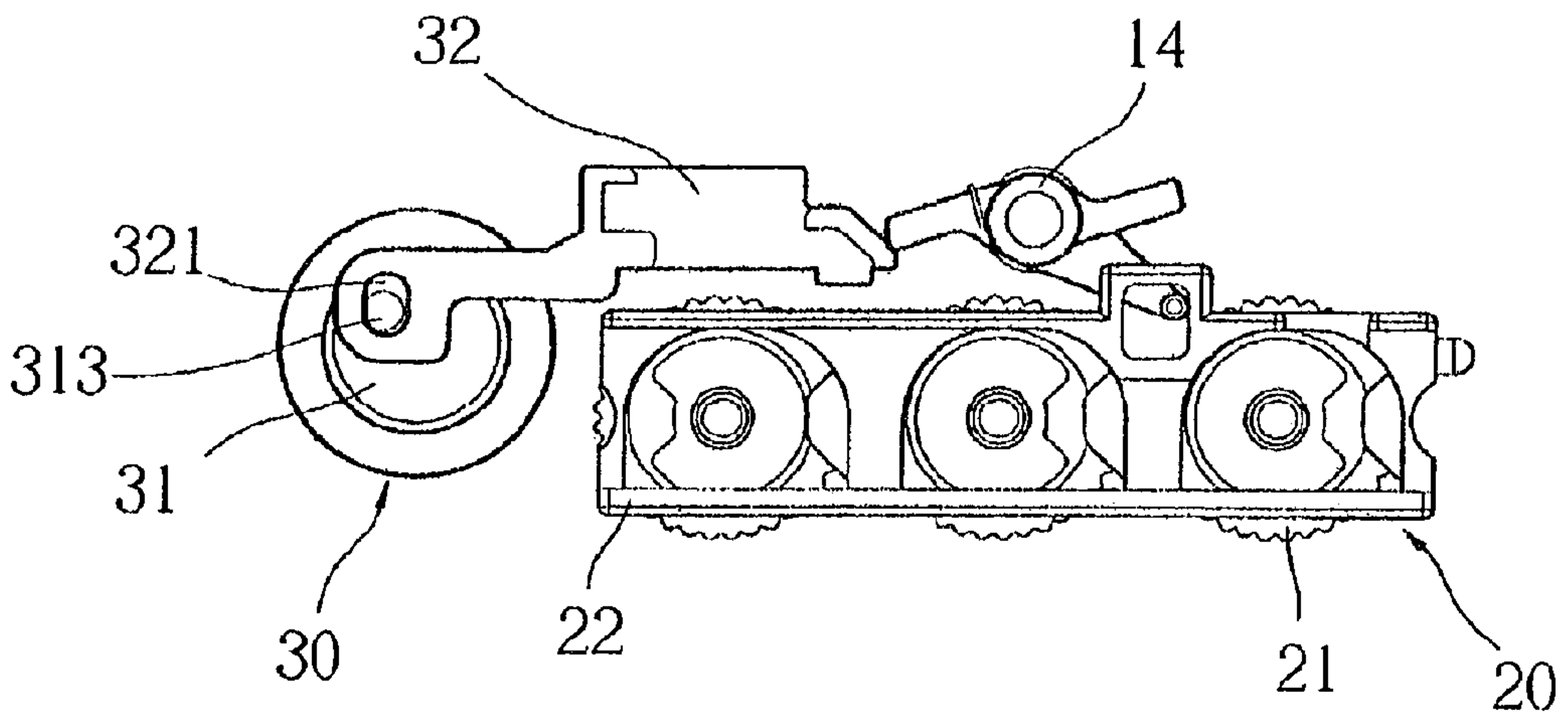


Fig. 5

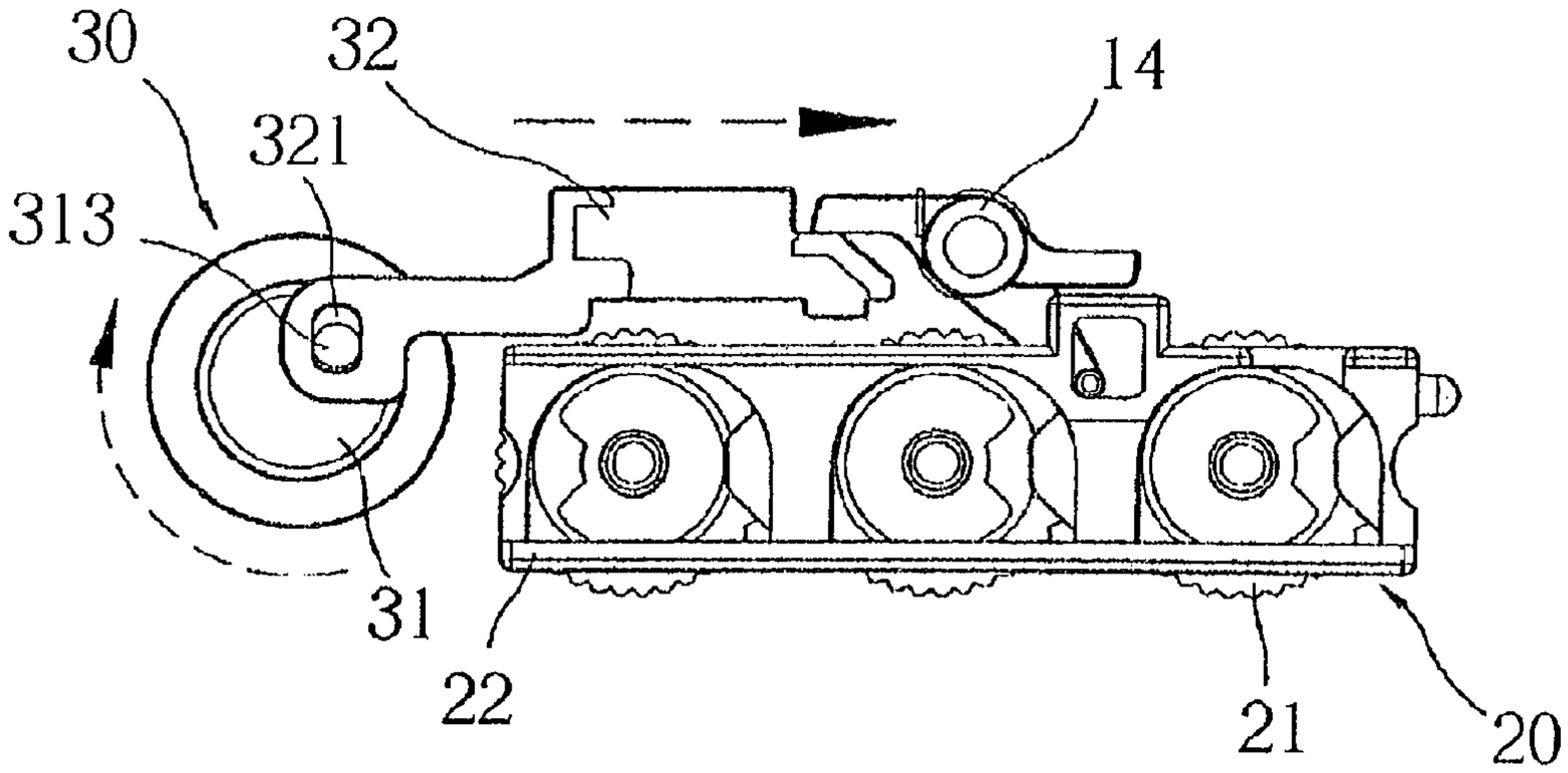


Fig. 6

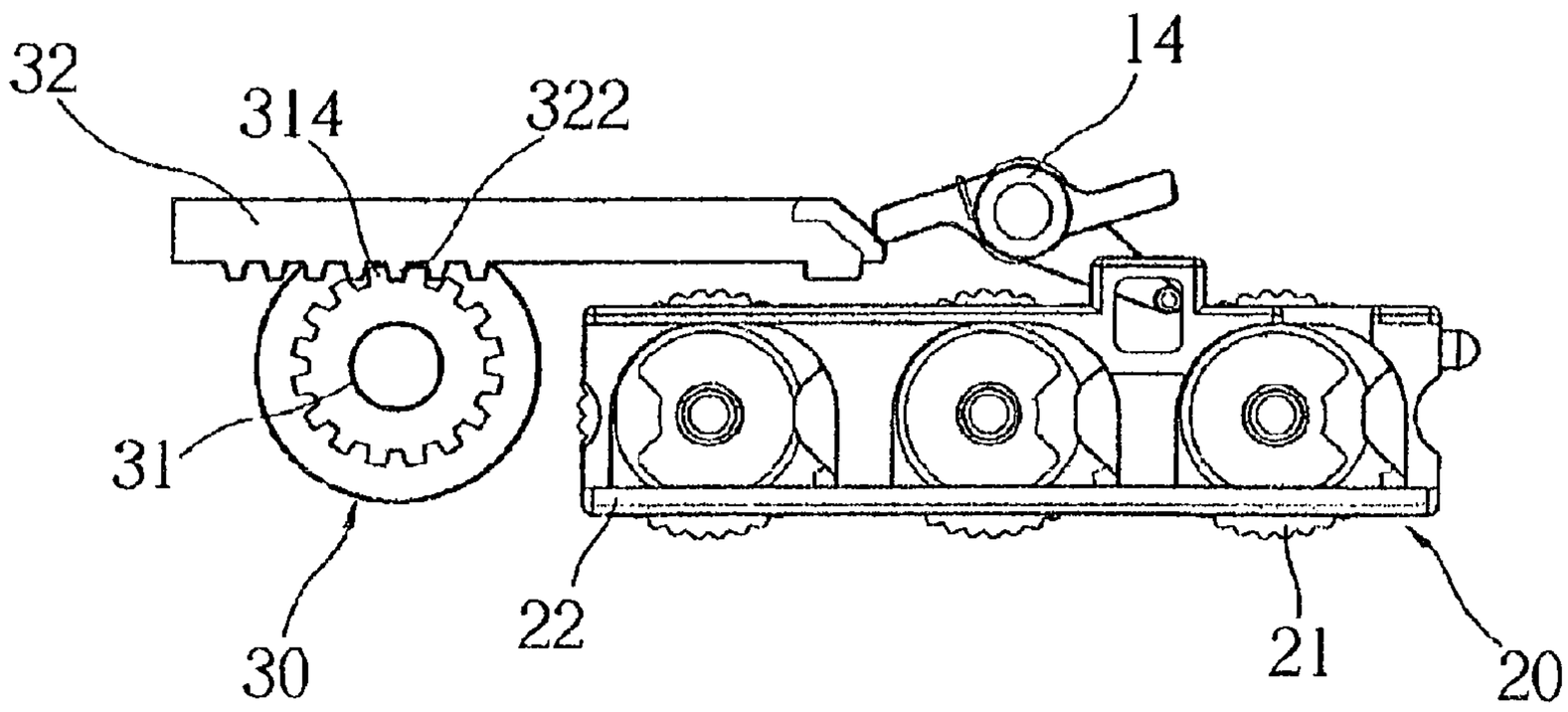


Fig. 7

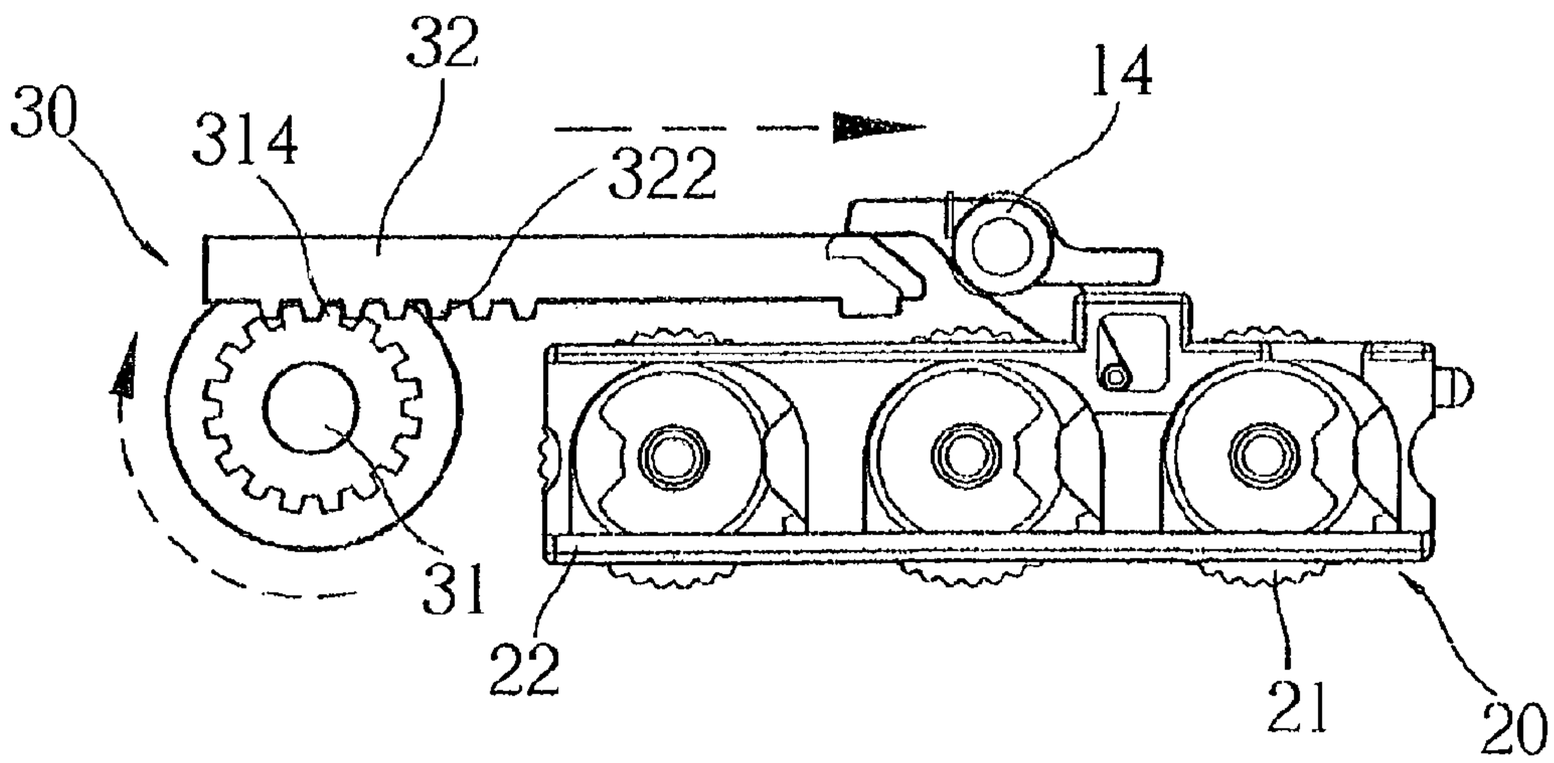


Fig. 8

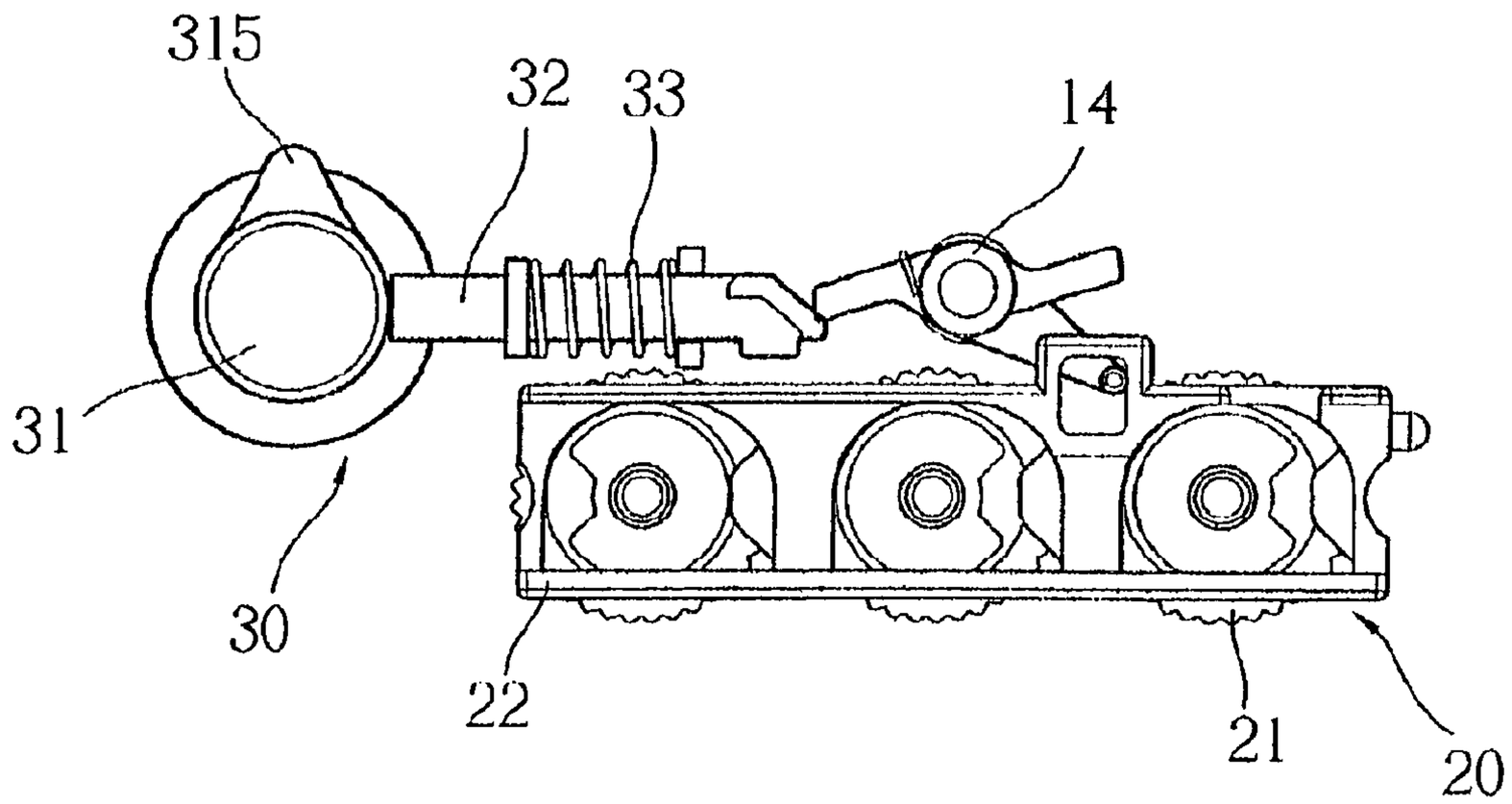


Fig. 9

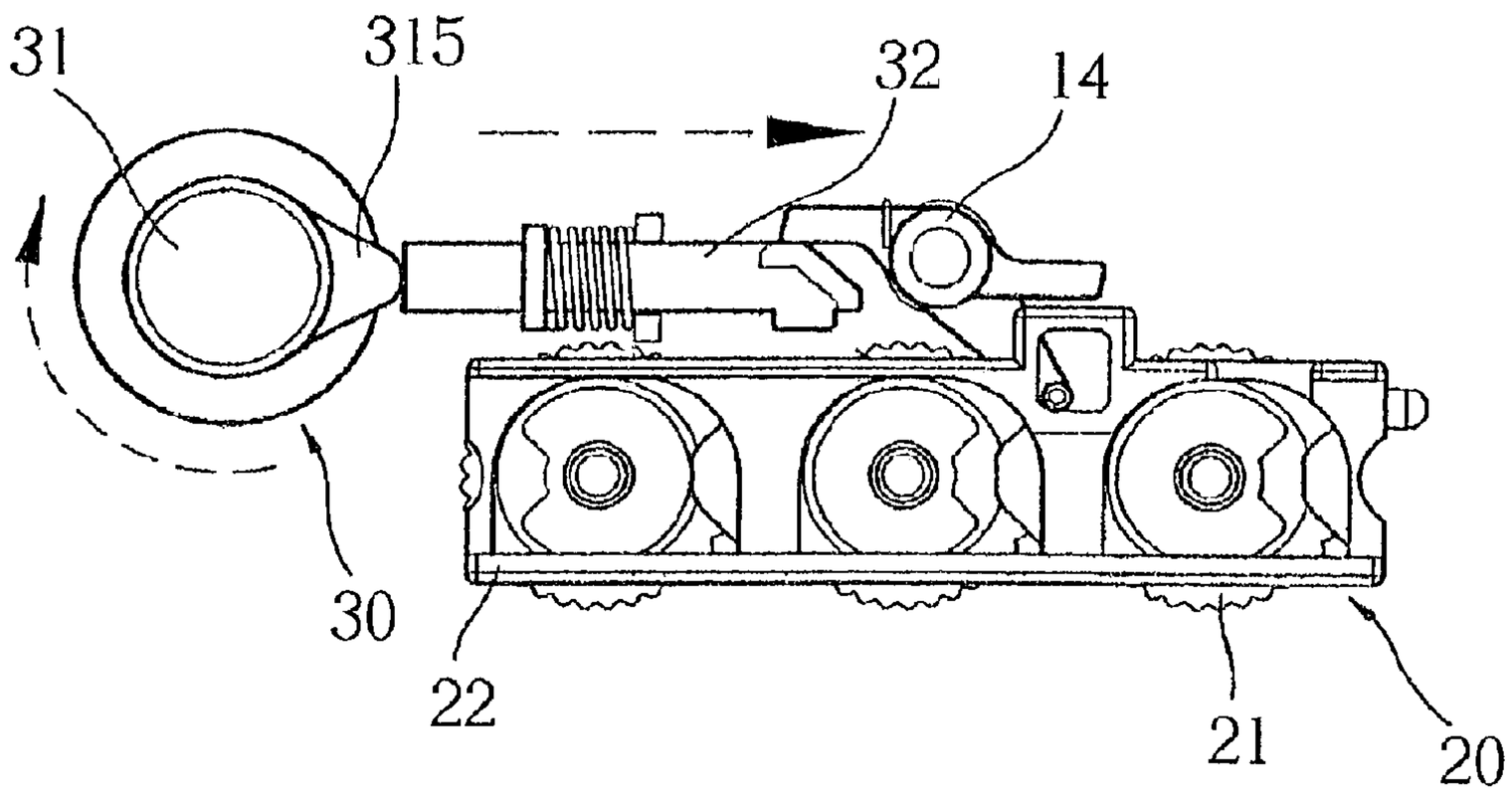


Fig. 10

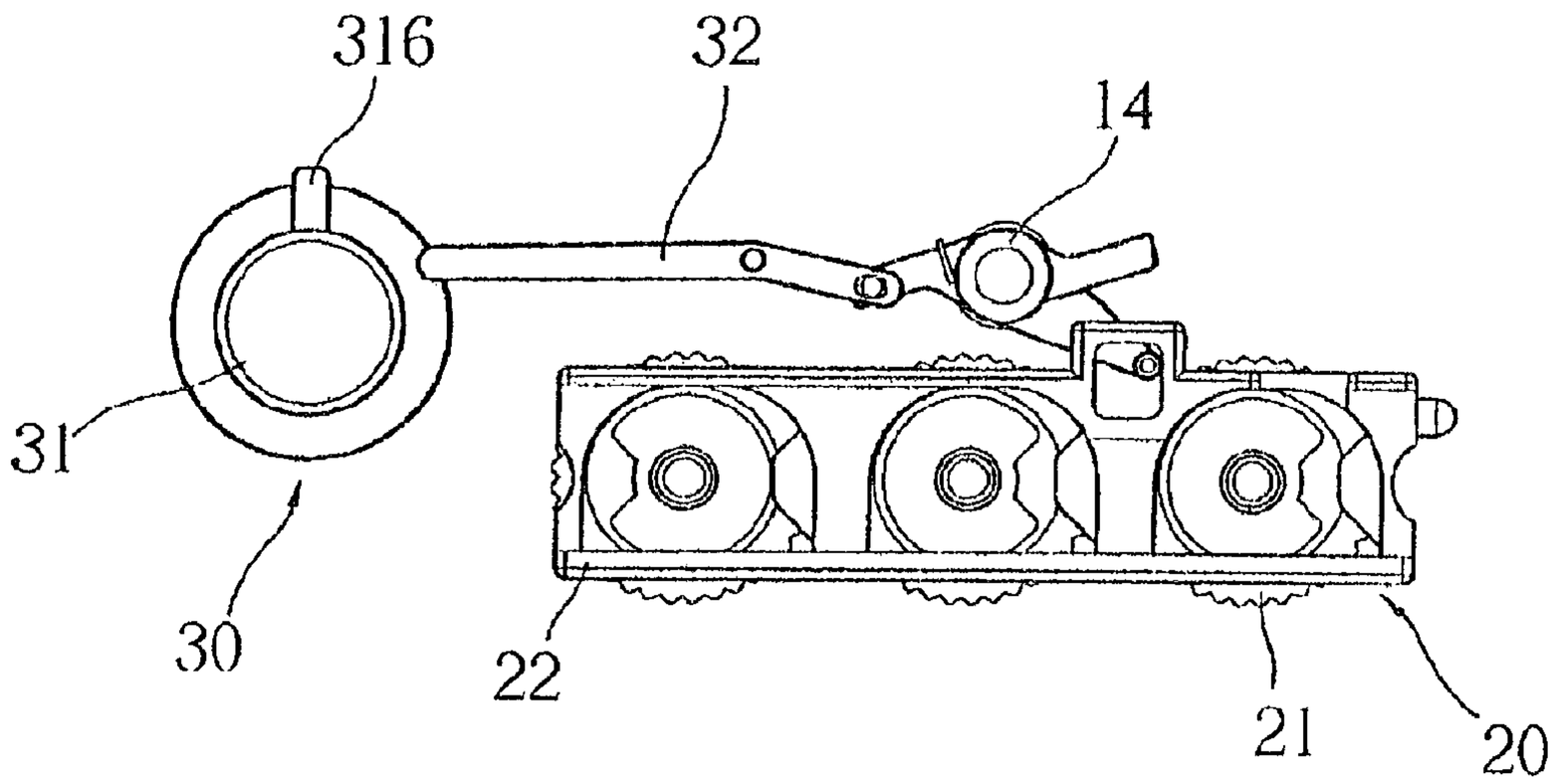


Fig. 11

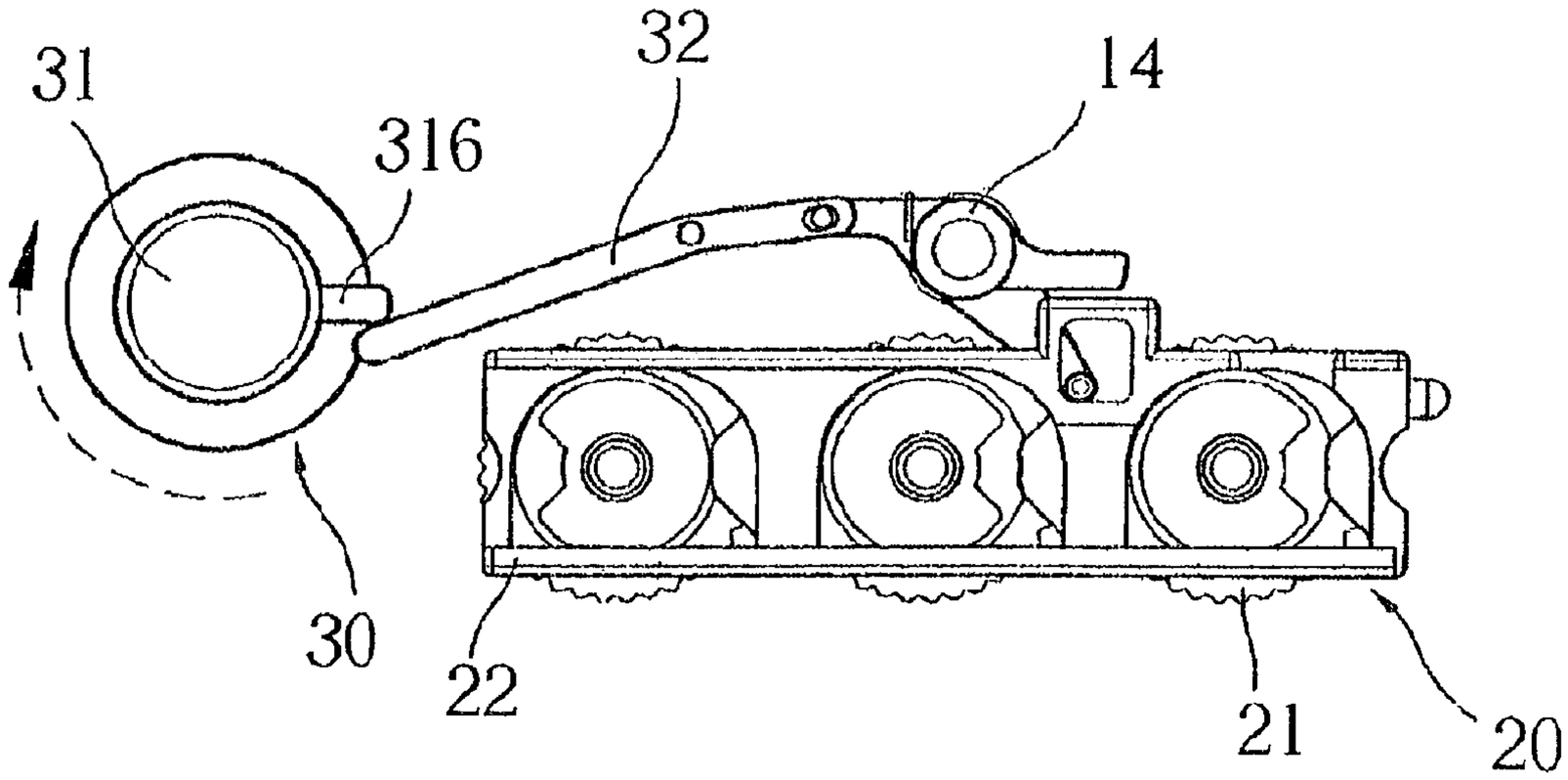


Fig. 12

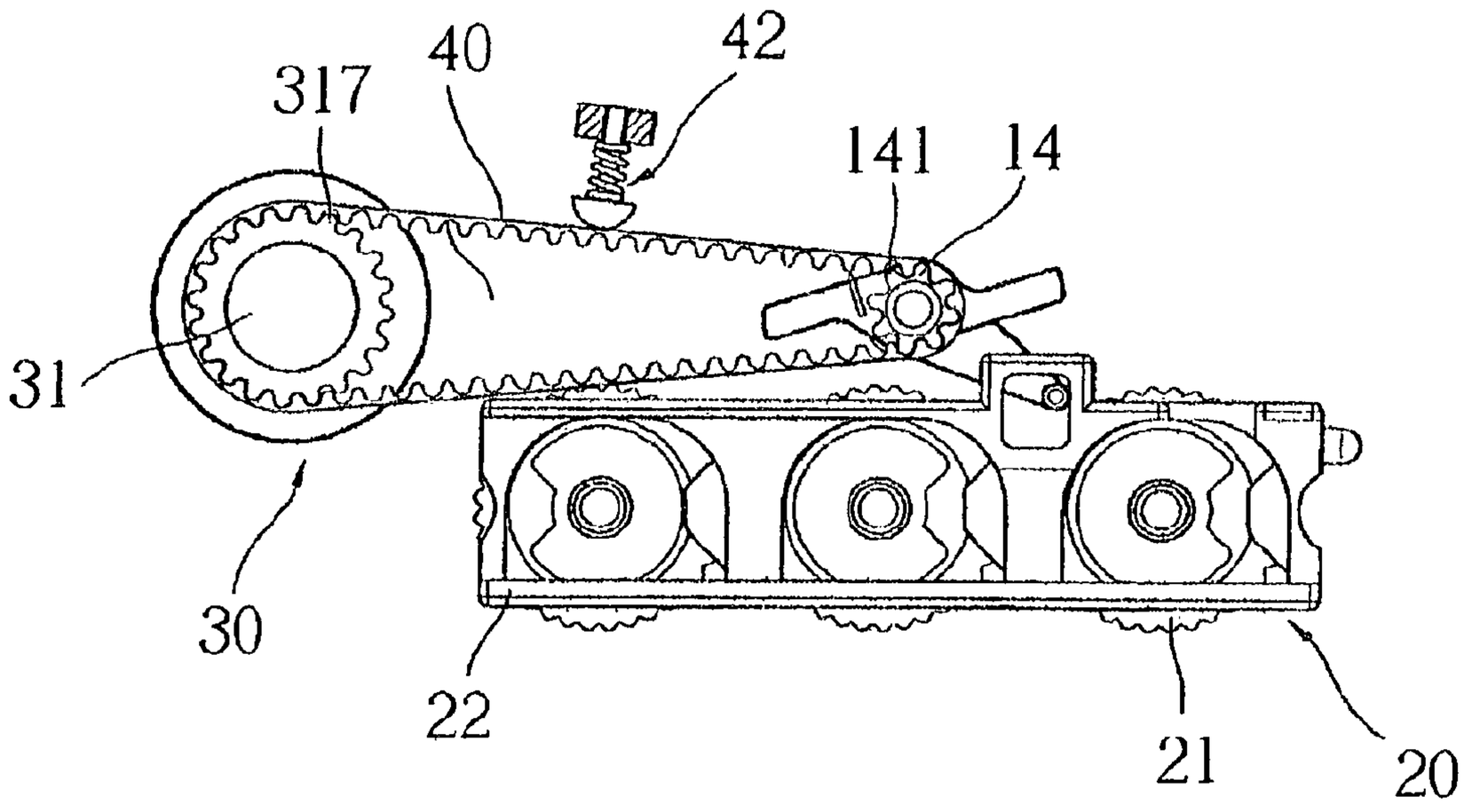


Fig. 13

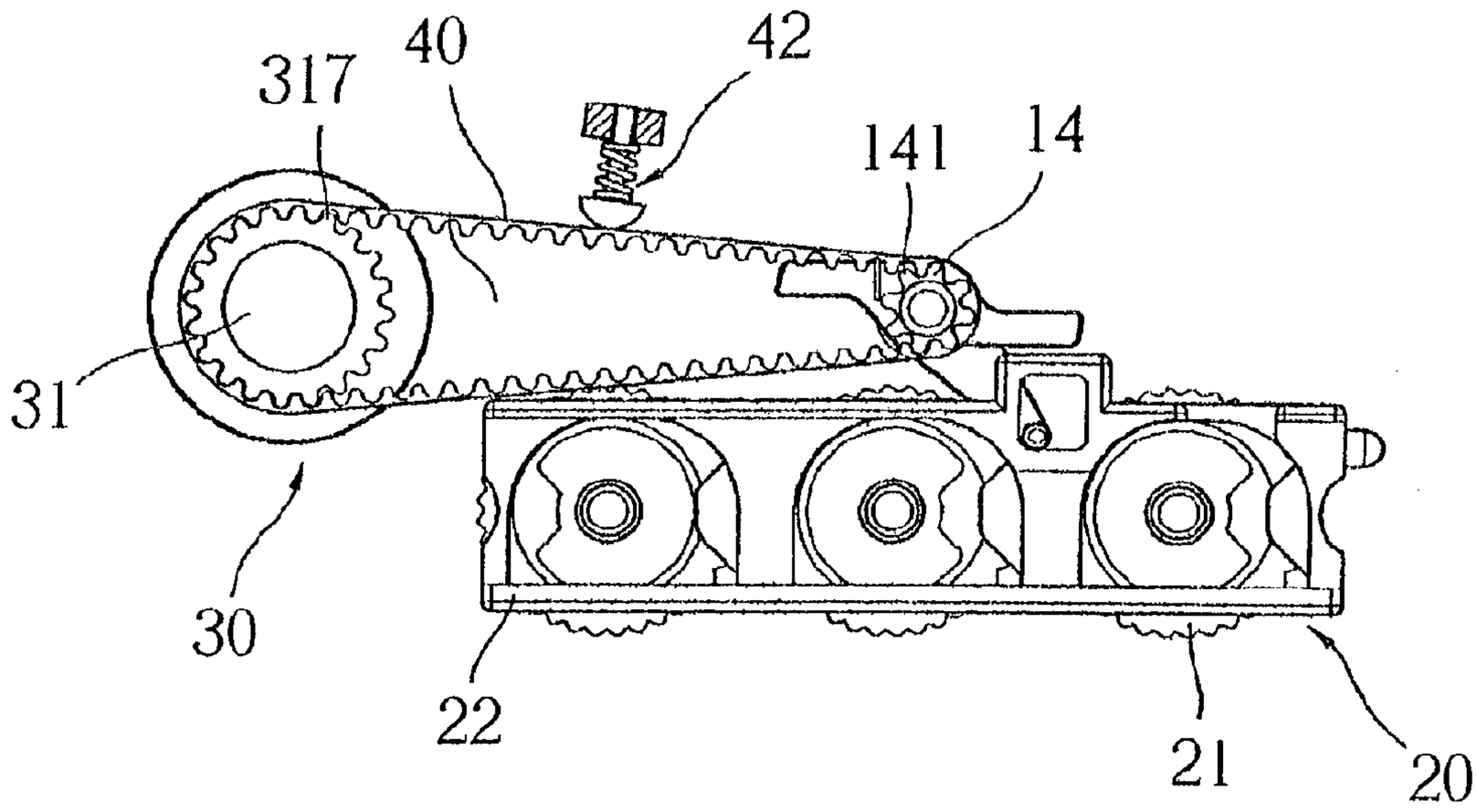


Fig. 14

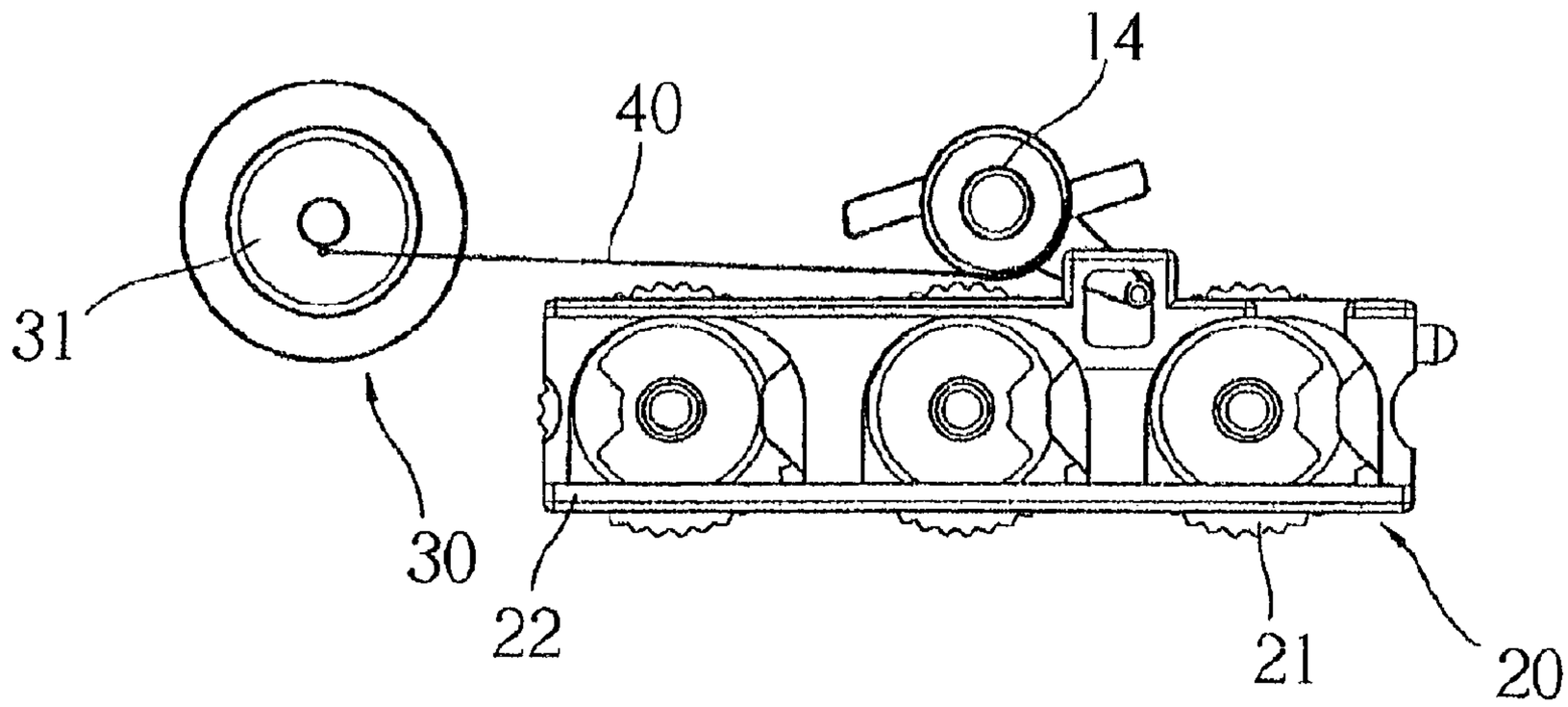


Fig. 15

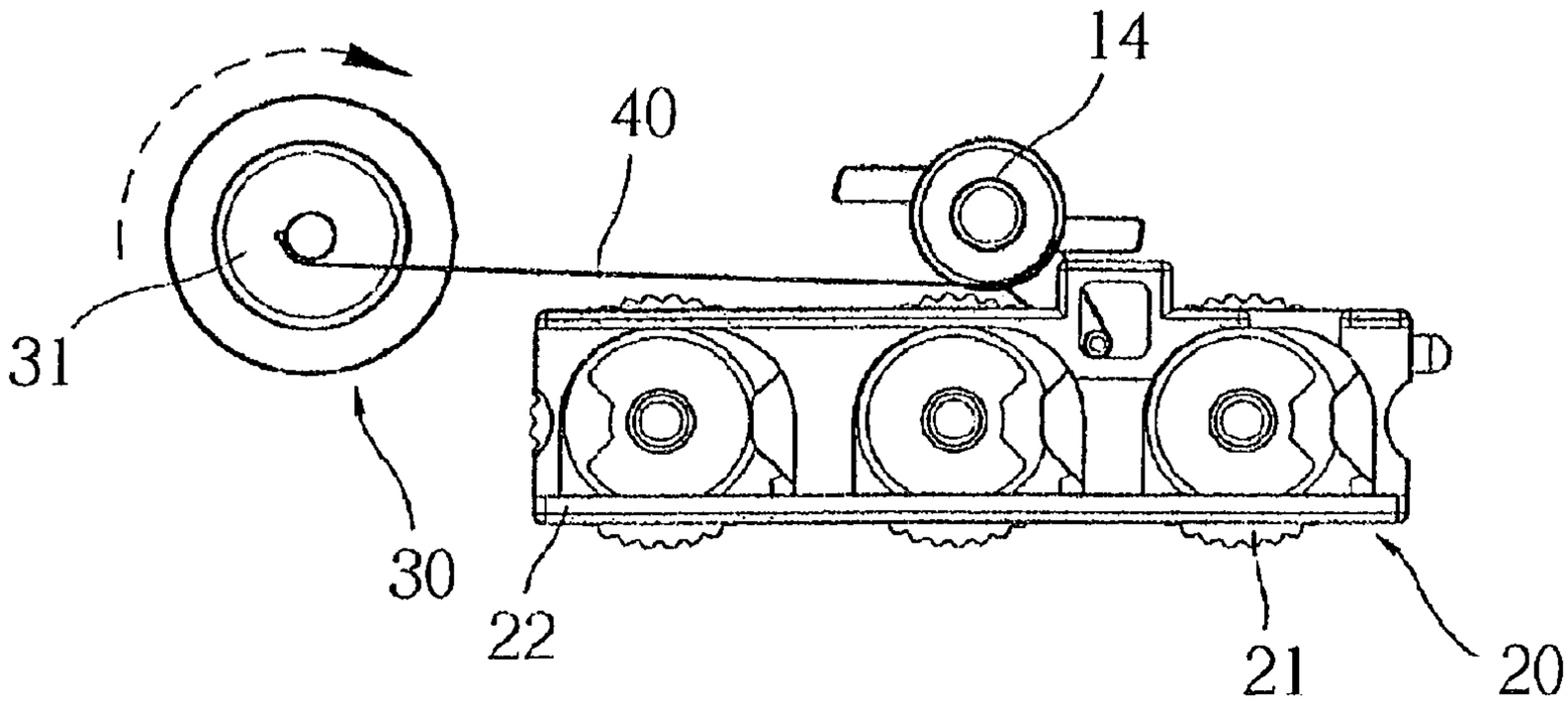


Fig. 16

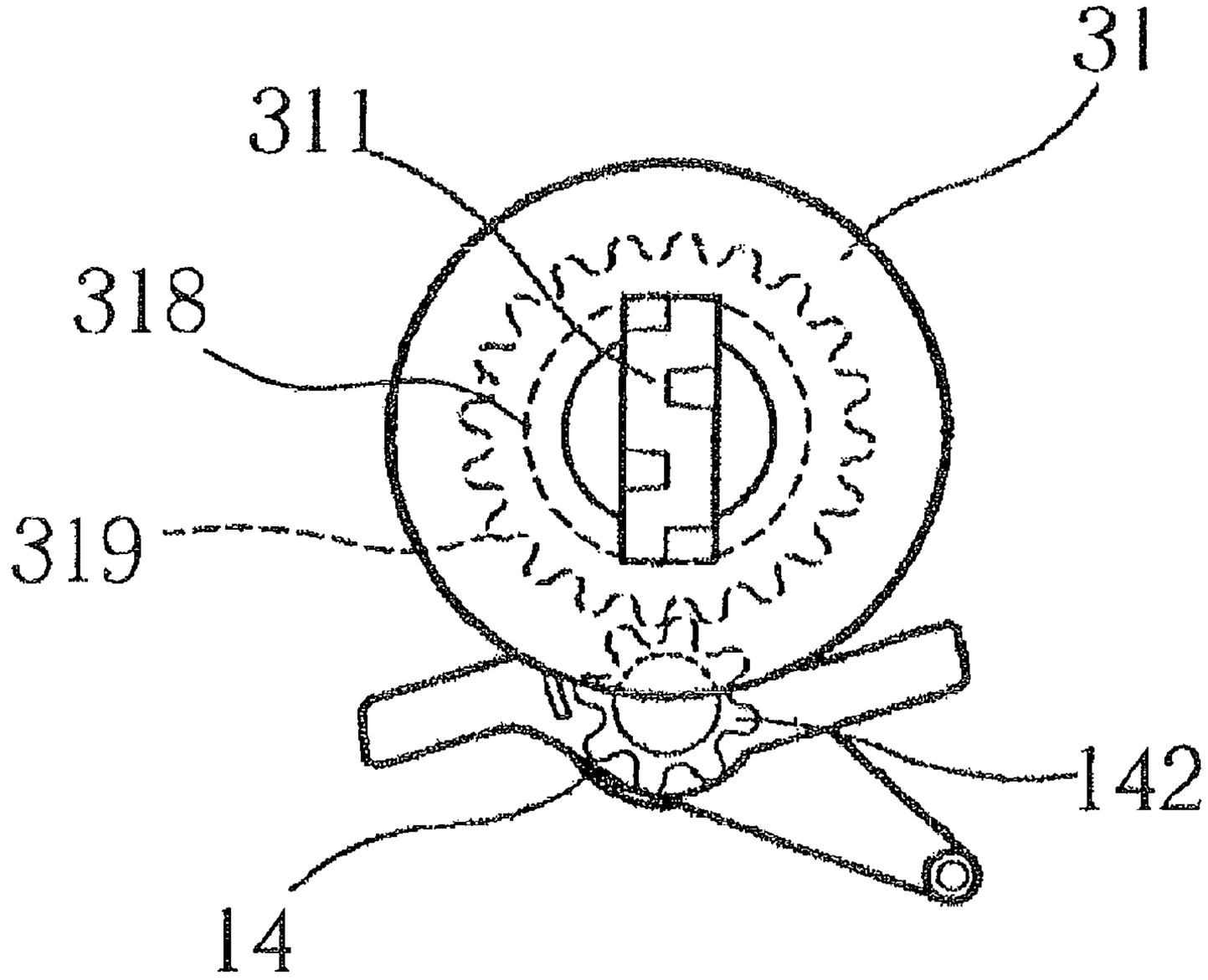


Fig. 17

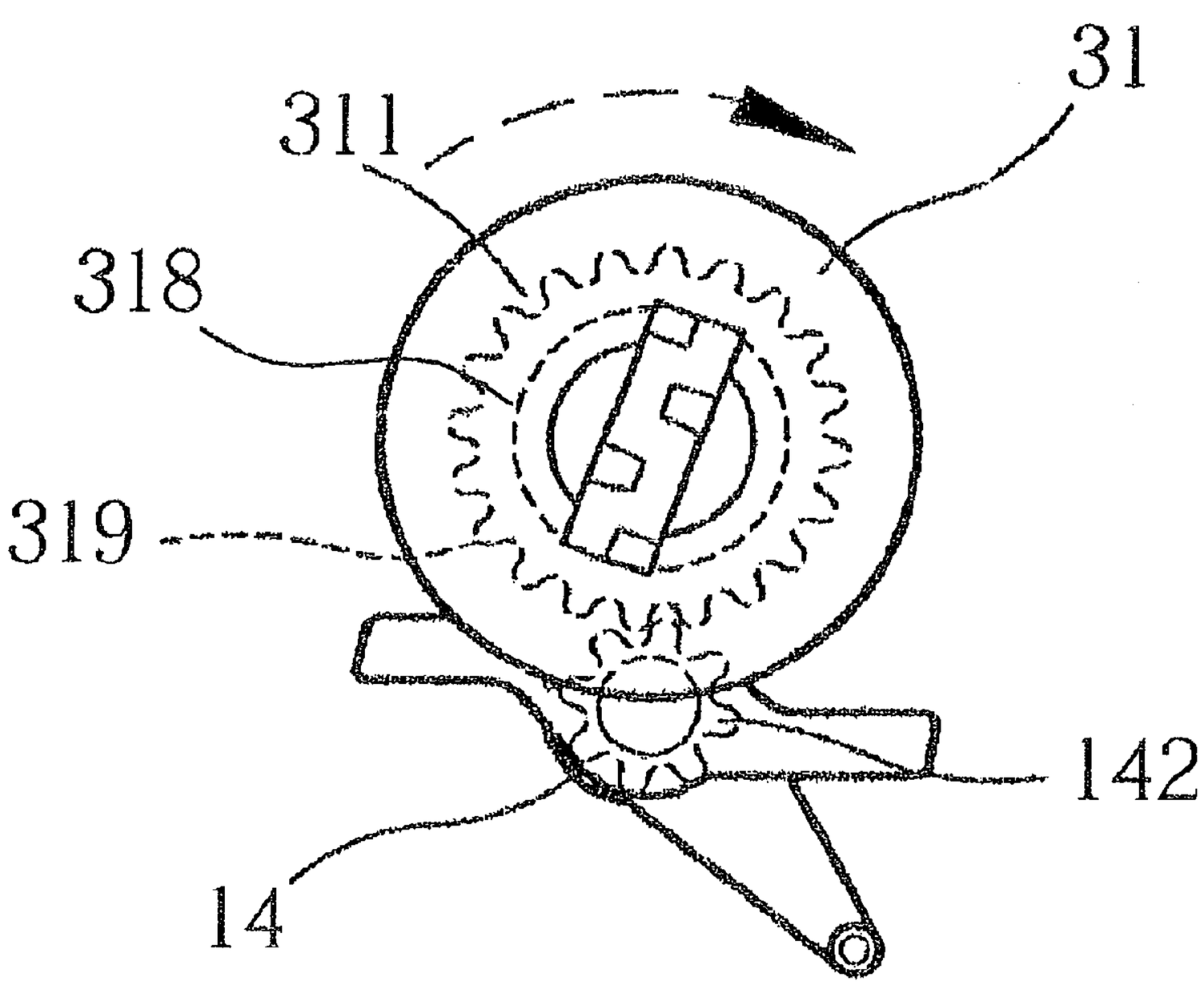


Fig. 18

COMBINATION LOCK HAVING A SECOND LOCK MECHANISM

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue; a claim printed with strikethrough indicates that the claim was canceled, disclaimed, or held invalid by a prior post-patent action or proceeding.

BACKGROUND OF INVENTION

1. Field of the Invention

The present invention relates to a combination lock having a second lock mechanism, and more particularly, to a combination lock combining a combination lock mechanism with a key lock mechanism for securing a zipper.

2. Description of the Prior Art

In U.S. Pat. No. 5,557,954, a zipper lock positioned on one side of a zipper for locking a pull tab of the zipper is disclosed. The above-mentioned zipper lock has a combination lock mechanism. The combination lock mechanism includes a plurality of dials exposed on one side of the zipper lock. By switching the dials, the combination lock mechanism is therefore locked or unlocked. The advantage of the combination lock is that the user can unlock it without any special tools or keys as long as he remember the combination code. However, if the user forgets the combination code, the zipper lock can only be unlocked through trial and error, or by destructive means.

It can be seen that the combination lock mechanism is convenient. However, it is also annoying if the user forgets the combination code.

SUMMARY OF INVENTION

It is therefore a primary objective of the claimed invention to improve the disadvantage of the combination lock mechanism.

According to the claimed invention, a combination lock having a second lock mechanism is disclosed. The combination lock of the present invention combines a combination lock mechanism with a key lock mechanism. The combination lock mechanism is able to unlock and lock the combination lock, while the key lock mechanism allows the user to unlock the combination lock with a key.

These and other objectives of the present invention will no doubt become obvious to those of ordinary skill in the art after having read the following detailed description of the preferred embodiment that is illustrated in the various figures and drawings.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a schematic diagram illustrating a lock of the present invention.

FIG. **2** and FIG. **3** are exploded views of the lock shown in FIG. **1**.

FIG. **4** is an exploded view of a sleeve and a lock housing shown in FIG. **1**.

FIG. **5** to FIG. **18** are schematic diagrams illustrating different embodiments of the present invention.

DETAILED DESCRIPTION

Please refer to FIG. **1** to FIG. **3**. FIG. **1** is a schematic diagram illustrating a lock of the present invention; FIG. **2** and FIG. **3** are exploded views of the lock shown in FIG. **1**. As shown in FIG. **1** to FIG. **3**, the lock includes a lock body **10**, a first lock mechanism **20** and a second lock mechanism **30**. The first lock mechanism **20** is a combination lock mechanism, while the second lock mechanism **30** is a key lock mechanism.

The lock body **10** includes a lock housing **11**, two push-buttons **12**, and a lock tongue **13**. The push-buttons **12** and the lock tongue **13** are in relation with each other and are positioned in the lock housing **11**. The push-buttons **12** can be depressed by a force, such as by fingers, so that the lock tongue **13** is shifted to a locking position (as shown in FIG. **2**) or a releasing position (as shown in FIG. **3**).

In addition, the lock body **10** further includes a stopping member **14**. The stopping member **14** can make a linear movement or a rotary movement relative to the lock housing **11**. The stopping member **14** can be shifted to a first position for constraining the lock tongue **13** in the locking position (as shown in FIG. **3**), or the stopping member **14** can be shifted to a second position for releasing the constraint of the lock tongue **13** (as shown in FIG. **2**).

The first lock mechanism **20** is a combination lock mechanism including a plurality of dials **21** and a shifting plate **22** positioned in the lock body **10**. The shifting plate **22** can be shifted to an unlocking position (as shown in FIG. **2**) or a locking position (as shown in FIG. **3**) by switching the plurality of dials **21**. The shifting plate **22** and the stopping member **14** operate interactively. When the shifting plate **22** is shifted toward the locking position, the stopping member **14** will be moved correspondingly to the first position so that the lock tongue **13** is constrained. On the other hand, when the shifting plate **22** is shifted back to the unlocking position, the stopping member **14** will be moved correspondingly *to the second position* to release the constraint of the lock tongue **13**.

Since the technology of combination lock mechanism is well known, further details are not repeated here. Comparing to the conventional combination lock, the present invention includes a second lock mechanism **30**. The second lock mechanism **30** allows the lock of the present invention to be unlocked in an alternative way. In such case, the lock of the present invention can be locked by the first lock mechanism **20**, but can be unlocked by both the first lock mechanism **20** and the second lock mechanism **30**.

The second lock mechanism **30** includes a sleeve **31** and a linking member **32** in relation with each other. The sleeve **31** further includes a keyhole **311** for allowing a key "K" to be inserted and for being rotated by the key "K" such that the linking member **32** is shifted and forces the stopping member **14** to change positions.

When the key "K" is not inserted into the keyhole **311**, the sleeve **31** and the lock housing **11** are not allowed to move. Once the key "K" is inserted into the keyhole **311**, the sleeve **31** is free to rotate relative to the lock housing **11**. Please refer to FIG. **4**. FIG. **4** is an exploded view of the sleeve **31** and the lock housing **11**. The sleeve **31** includes a plurality of discs **312** which protrude out of the sleeve **31** in normal condition. Accordingly, the lock housing **11** includes a cavity **111** having a groove **112** for containing the discs **312**. In such case, the sleeve **31** is not free to rotate since the discs **312** are inserted into the groove **112**. When the key "K" is inserted into the keyhole **311**, the discs **312** are drawn back, and the sleeve **31** is free to rotate relative to the lock housing **11**.

The sleeve **31** further includes a protrusion **313**, while the linking member **32** includes a long hole **321** for receiving the protrusion **313**. Please refer to FIG. **5** and FIG. **6**. FIG. **5** and FIG. **6** are schematic diagrams showing how the sleeve **31** and the linking member **32** interact. As shown in FIG. **5** and FIG.

6, the protrusion **313** is in an eccentric position of the long hole **321** such that the linking member **32** will move linearly when the sleeve **31** rotates. When the stopping member **14** is driven by the shifting plate **22** to shift to the first position, the linking member **32** is able to shift the stopping member **14** to the second position so that the constraint of the lock tongue **13** is released.

Therefore, the unlocking action of the lock can be performed by utilizing either the combination lock mechanism or the key lock mechanism.

Please refer to FIG. **7** and FIG. **8**. FIG. **7** and FIG. **8** are schematic diagrams illustrating another embodiment of the present invention. As shown in FIG. **7** and FIG. **8**, the sleeve **31** and the linking member **32** respectively have gears **314** and **322** meshing with each other. Therefore, the sleeve **31** and the linking member **32** operate by means of mesh transmission.

Please refer to FIG. **9** and FIG. **10**. FIG. **9** and FIG. **10** are schematic diagrams illustrating another embodiment of the present invention. As shown in FIG. **9** and FIG. **10**, the sleeve **31** has a cam **315** connected to the linking member **32** so that the sleeve **31** and the linking member **32** are operated correspondingly. In this embodiment, the linking member **32** further includes a resilient member **33** for providing the linking member **32** with a recovering ability such that the linking member **32** and the cam **315** remain in contact.

Please refer to FIG. **11** to FIG. **12**. FIG. **11** and FIG. **12** are schematic diagrams illustrating another embodiment of the present invention. As shown in FIG. **11** and FIG. **12**, the linking member **32** is pivotally connected to the lock housing **11**, and the sleeve **31** includes a lever **316**. The lever **316** triggers one end of the linking member **32**, and thereby the opposite end of the linking member **32** forces the stopping member **14** to the second position. It is worth noticing that the linking member **32** and the stopping member **14** can be connected to each other. For example, as shown in FIG. **11** and FIG. **12**, the linking member **32** is connected to the eccentric position of the stopping member **14**.

Please refer to FIG. **13** and FIG. **14**. FIG. **13** and FIG. **14** are schematic diagrams illustrating another embodiment of the present invention. As shown in FIG. **13** and FIG. **14**, the sleeve **31** and the stopping member **14** can be connected by means of a flexible transmission member **40**. The flexible transmission member **40** is a circular member, such as a belt, a rack, or a chain, connected to both the sleeve **31** and the stopping member **14**. Therefore, the sleeve **31** and the stopping member **14** are moved by frictional force. In addition, if the sleeve **31**, the stopping member **14**, and the flexible transmission member **40** include respective gears **317**, **141**, and gear teeth **41**, then the sleeve **31** and the stopping member **14** can be moved by means of mesh transmission. Further, the flexible transmission member **40** can be modulated by a tension modulator **42** for adjusting the tightness.

Please refer to FIG. **15** and FIG. **16**. FIG. **15** and FIG. **16** are schematic diagrams illustrating another embodiment of the present invention. As shown in FIG. **15** and FIG. **16**, the flexible transmission member **40** can also be a linear belt connected to both the sleeve **31** and the stopping member **14**.

Please refer to FIG. **17** and FIG. **18**. FIG. **17** and FIG. **18** are schematic diagrams illustrating another embodiment of the present invention. Differing from the other embodiments, the stopping member **14** is triggered directly by the sleeve **31** in this embodiment. As shown in FIG. **17** and FIG. **18**, the sleeve **31** includes an extension part **318** rotating simultaneously with the sleeve **31** and triggering the stopping member **14**. For example, the extension part **318** and the stopping member **14**

include respective gears **319** and **142**, so that the sleeve **31** and the stopping member **14** are transmitted by means of mesh transmission.

In conclusion, the present invention provides a lock combining a combination lock mechanism with the key lock mechanism. Therefore, instead of only being unlocked by the combination lock mechanism, the lock of the present invention can also be unlocked by the key lock mechanism.

Those skilled in the art will readily observe that numerous modifications and alterations of the device may be made while retaining the teachings of the invention. Accordingly, the above disclosure should be construed as limited only by the metes and bounds of the appended claims.

What is claimed is:

1. A combination lock having a second lock mechanism comprising:

a lock body comprising at least a push-button and a lock tongue in relation with each other, the lock tongue having a locking position and a releasing position;

a stopping member, positioned in the lock body, having a first position for constraining the lock tongue in the locking position and a second position for releasing constraint of the lock tongue;

a first lock mechanism comprising a plurality of dials and a shifting plate installed in the lock body, the shifting plate and the dials moving correspondingly, the shifting plate having a **[**clamping**]** *locking* position for **[**constraining**]** the stopping member *to move* to **[**remain in**]** the first position and a unlocking position for releasing the stopping member **[**from being constrained**]** *to the second position*; and

a second lock mechanism comprising a sleeve and a linking member installed in the lock body and in relation with each other, the sleeve having a keyhole for allowing a key to be inserted and for being rotated by the key such that the linking member is shifted and forces the stopping member to change positions.

2. The combination lock of claim **1** wherein the linking member is coupled to an eccentric position of the sleeve at one end.

3. The combination lock of claim **1** wherein the sleeve and the linking member operate by means of mesh transmission.

4. The combination lock of claim **1** wherein the sleeve has a cam operatively connected to the linking member such that the sleeve and the linking member move correspondingly.

5. The combination lock of claim **4** wherein the linking member has a resilient member for providing a recovering ability such that the linking member and the cam remain in contact.

6. The combination lock of claim **1** wherein the stopping member is pivotally positioned in the lock body and is rotated for changing positions.

7. The combination lock of claim **6** wherein the linking member is coupled to an eccentric position of the stopping member.

8. The combination lock of claim **1** wherein the linking member is pivotally positioned in the lock body and the sleeve has a lever for moving the linking member.

9. A combination lock having a second lock mechanism comprising:

a lock body comprising at least a push-button and a lock tongue in relation with each other, the lock tongue having a locking position and a releasing position;

a stopping member, positioned in the lock body, having a first position for constraining the lock tongue in the locking position and a second position for releasing constraint of the lock tongue;

a first lock mechanism comprising a plurality of dials and a shifting plate installed in the lock body, the shifting plate and the dials moving correspondingly, the shifting plate having a **[**clamping**]** *locking* position for **[**constraining**]** the stopping member to **[**remain in**]** *move to* the first position and a unlocking position for releasing the stopping member **[**from being constrained**]** *to the second position*; and

a second lock mechanism comprising a sleeve and a flexible transmission member positioned in the lock body, the sleeve having a keyhole for allowing a key to be inserted and for being rotated by the key, the flexible transmission member being respectively connected to the sleeve and the stopping member such that the sleeve **[**rotates**]** actuates the flexible transmission member and the stopping member simultaneously for changing positions of the stopping member.

10. The combination lock of claim **9** wherein the flexible transmission member is a generally circular member positioned around the sleeve and the stopping member.

11. The combination lock of claim **10** wherein the flexible transmission member, the sleeve, and the stopping member operate by means of mesh transmission.

12. The combination lock of claim **9** wherein the flexible transmission member is a linear belt respectively connected to the sleeve and the stopping member.

13. The combination lock of claim **9** wherein the flexible transmission member is modulated by a tension modulator.

14. A combination lock having a second lock mechanism comprising:

a lock body comprising at least a push-button and a lock tongue in relation with each other, the lock tongue having a locking position and a releasing position;

a stopping member, positioned in the lock body, having a first position for constraining the lock tongue in the locking position and a second position for releasing constraint of the lock tongue;

a first lock mechanism comprising a plurality of dials and a shifting plate installed in the lock body, the shifting plate and the dials moving correspondingly, the shifting plate having a **[**clamping**]** *locking* position for **[**constraining**]** the stopping member to **[**remain in**]** *move to* the first position and a unlocking position for releasing the stopping member **[**from being constrained**]** *to the second position*; and

a sleeve, positioned in the lock body, having a keyhole for allowing a key to be inserted and for being rotated by the key, the sleeve further comprising an extension part for forcing the stopping member to change positions when the sleeve rotates.

15. The combination lock of claim **14** wherein the extension part and the stopping member operate by means of mesh transmission.

* * * * *