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COMPLETE SPECIFICATIONS INNOVATION PATENT

# SLIDING WINDOW & DOOR LOCK

INVENTOR: MR GHASSAN HADDAD

G.J.N.R. HOLDINGS PTY LTD (ACN 135 397 312)

## TECHNICAL FIELD

**[0001]** This disclosure relates generally to lock mechanisms, and in particular, to a lock for sliding windows and doors, especially for Australian and New Zealand standard windows with the frame width of 25mm.

## BACKGROUND

[0002] The approaches described in this section could be pursued but are not necessarily approaches that have been previously conceived or pursued. Therefore, unless otherwise indicated, it should not be assumed that any of the approaches described in this section qualify as prior art merely by virtue of their inclusion in this section.

[0003] Sliding windows and doors are very convenient in daily use. Due to peculiarities of their designs, they gain a main and unquestionable advantage over hinged casement windows and doors, since they allow one to economically use free space of any rooms.

[0004] Typically, the sliding windows and doors are provided with rotational locks. However, the dimensions of current market rotational locks do not efficiently satisfy necessary requirements for the majority of the sliding windows and doors, since they are too wide and cumbersome. In this regard, they have virtually no possibility of being able to be fitted within the interior of 25 mm window frames. Therefore, they are mounted outside on a window frame, which creates a nuisance when using them in the sliding windows. Furthermore, the market rotational locks are weak and steady. This can lead to the accidental and undesirable opening of the sliding windows and doors.

[0005] In view of at least the above stated problems, there is a need for providing a new type of lock mechanisms capable of being mounted within the interior of the sliding windows and doors and providing strong and reliable clamping between the sliding windows and doors.

## SUMMARY

**[0006]** This summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter.

**[0007]** In accordance with various embodiments and the corresponding disclosure thereof, a locking system for sliding windows and doors is provided. The main components of the system are a first body configured to be mounted within the frame of a first sliding window sash, the first body having an elongated bulk form with a hollow, a sliding mechanism configured to be mounted within the first body, a locking mechanism configured to be mounted within the first body, and a second body configured to be mounted within the frame of a second sliding window sash, the second body having a bulk form with a relief.

**[0008]** According to one embodiment, the sliding mechanism comprises: a sliding member configured to slide within the hollow of the first body, an engaging member, a holding member for holding the engaging member, the holding member having a through-hole, and a screw bolt for attaching the engaging member and the holding member to the sliding member.

**[0009]** According to one more embodiment, the locking mechanism comprises: a locking barrel configured to receive a key, a fixing member providing with a spring, the fixing member being configured to be inserted in the through-hole of the holding member, thereby providing fixation of the sliding member, and a pushing member for pushing the fixing member out of the through-hole of the holding member.

**[0010]** According to yet one embodiment, the hollow of the second body is configured to receive the engaging member of the sliding mechanism.

**[0011]** According to other embodiments, the locking mechanism can be in two states, namely 'lock' and 'unlock' states. When the locking mechanism is in the 'lock' state, the fixing member is in the through-hole of the holding member, and the engaging member of the sliding mechanism of the first body is in the relief of the second body. When the locking mechanism is in the 'unlock' state, the fixing member is pushed out of the through-hole of the holding member by pressing the spring with the aid of the pushing member, and the engaging member of the sliding mechanism of the first body is released from the relief of the second body by sliding the sliding member within the hollow of the first body.

**[0012]** To the accomplishment of the foregoing and related ends, the one or more aspects comprise the features hereinafter fully described and particularly pointed out in the claims. The following description and the drawings set forth in detail certain illustrative features of the one or more aspects. These features are indicative, however, of but a few of the various ways in which the principles of various aspects may be employed, and this description is intended to include all such aspects and their equivalents.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0013] Embodiments are illustrated by way of example and not limitation in the figures of the accompanying drawings, in which like references indicate similar elements and in which:

[0014] **Figure 1** illustrates a locking system for sliding windows and doors according one exemplary embodiment;

[0015] **Figures 2A-C** illustrate different views of a first body of the system shown in **FIG. 1** according to some exemplary embodiments;

[0016] **Figures 3-8** illustrate isometrical perspective views of some members of a sliding mechanism and a locking mechanism mounted in the first body shown in **FIGs. 2A-C** according to some exemplary embodiments;

[0017] **Figures 9A-C** illustrate different views of a second body of the system shown in **FIG. 1** according to some exemplary embodiments.

## DETAILED DESCRIPTION

**[0018]** The following detailed description includes references to the accompanying drawings, which form a part of the detailed description. The drawings show illustrations in accordance with example embodiments. These example embodiments, which are also referred to herein as “examples” are described in enough detail to enable those skilled in the art to practice the present subject matter. The embodiments can be combined, other embodiments can be utilized, or structural, logical and electrical changes can be made without departing from the scope of what is claimed. The following detailed description is, therefore, not to be taken in a limiting sense, and the scope is defined by the appended claims and their equivalents.

**[0019]** In this document, the terms “a” or “an” are used, as is common in patent documents, to include one or more than one. In this document, the term “or” is used to refer to a nonexclusive “or”, such that “A or B” includes “A but not B”, “B but not A”, and “A and B”, unless otherwise indicated. Furthermore, all publications, patents, and patent documents referred to in this document are incorporated by reference herein in their entirety, as though individually incorporated by reference. In the event of inconsistent usages between this document and those documents so incorporated by reference, the usage in the incorporated reference(s) should be considered supplementary to that of this document; for irreconcilable inconsistencies, the usage in this document controls.

**[0020]** The embodiments disclosed herein relate to a locking system for sliding windows and doors. As used hereinafter, the term ‘sliding window/door’ relates to a window/door whose sashes/leaves are opened by sliding vertically or horizontally. The system disclosed below is especially advised to be used in the Australian and New Zealand standard sliding windows and doors with the frame width of 25 mm. However, those skilled in the art would understand that such system can be also mounted in the sliding windows and doors of other types.

[0021] Referring now to the drawings, **FIG. 1** illustrates an exemplary locking system **100** mounted in the sliding window. As shown, the system **100** comprises a first body **102** mounted on the front of a frame **104** in a first window sash and a second body **106** mounted on the butt end of a frame **108** in a second window sash. As also can be seen from **FIG. 1**, the first body **102** has an elongated form with two hollows **110** and **112**. The hollow **110** is engaged by a sliding mechanism **114**. The sliding mechanism **114** includes an engaging member **116**. The detailed description of the sliding mechanism **114**, namely its assignment and the disclosure of all its members, will be given below. The hollow **112** is assigned to facilitate opening the sliding window, i.e. a user can put his/her finger(s) in the hollow **112** when he/she pushes the first window sash away from the second window sash. The first body **102** also comprises a locking mechanism **118**. Similarly, the assignment of the locking mechanism **118** and the disclosure of all its members will be presented below. The second body **106** is made such that it is capable of receiving the engaging member **116** of the sliding mechanism **114**. The first and second bodies are preferably made of plastic, polymer and copolymer materials, though they can be made of other materials, such as metal, alloy of metals, wood, their combinations, depending on application.

[0022] Although the engaging member **116** shown in **FIG. 1** is upwardly bended, it should be apparent for those skilled in the art that the engaging member **116** can be also downwardly bended depending on particular designs of the second body **106** which should receive the engaging member **116**.

[0023] In one embodiment, the system **100** can be used for sliding doors. In this case, it should be mounted in two adjacent door leaves.



[0024] **FIGs. 2A-C** illustrates different views of the first body **102** comprising the sliding mechanism **114** and the locking mechanism **118**.

[0025] **FIG. 2A** is the front view of the first body **102**. As shown, the first body **102** has two openings **202** at its ends. These openings are assigned to be used when binding the first body **102** to a sliding window frame. In the example shown in **FIG. 1**, the first body **102** is bounded, e.g. by self-tapping screws, to the front of the frame **104**.

[0026] **FIG. 2B** is the sectional view of the first body **102** made by cutting the first body **102** along the dash-and-dot line shown in **FIG. 2A**. This sectional view illustrates all members of the sliding mechanism **114** and the locking mechanism **118**. As shown, the sliding mechanism **114** consists of a sliding member **204** configured to slide within the hollow **110** of the first body **102**, the engaging member **116**, a holding member **206** for holding the engaging member **116**, the holding member **206** having a through-hole **208**, a screw bolt **210** for attaching the engaging member **116** and the holding member **206** to the sliding member **204**. As for the locking mechanism **118**, it includes a locking barrel **212** configured to receive a key, a fixing member **214** providing with a spring **216**, the fixing member **214** being configured to be inserted in the through-hole **208** of the holding member **206**, and a pushing member **218** for pushing the fixing member **214** out of the through-hole **208** of the holding member **206**. All members of the sliding mechanism **114** and the locking mechanism **118** are made of metal materials or alloys thereof. It is desirable to use aluminum as the main material of each of the above-mentioned members of the sliding mechanism **114** and the locking mechanism **118**, since it has light weight, and therefore, the window sashes providing with such aluminum members will be easily opened.

[0027] In one embodiment, the first body **102** can comprise a locking display **220** assigned to indicate when the engaging member **116** is received by the second body **106**. Such a locking display can be made as a piece of any colored plastic.

[0028] **FIG. 2C** is the isometrical view of the first body **102**. This view illustrates the sliding member **204**, the engaging member **116** and the locking barrel **212**.

[0029] The figures which will be shortly listed below illustrate separately isometrical views of some members comprised in the sliding mechanism **114** and the locking mechanism **118**, namely:

[0030] **FIG. 3** illustrates the isometrical view of the engaging member **116**;

[0031] **FIG. 4** illustrates the isometrical view of the sliding member **204**;

[0032] **FIG. 5** illustrates the isometrical view of the holding member **206**;

[0033] **FIG. 6** illustrates the isometrical view of the fixing member **214**;

[0034] **FIG. 7** illustrates the isometrical view of the pushing member **218**;

[0035] **FIG. 8** illustrates the isometrical view of the locking display **220**.

[0036] Now, the second body **106** will be minutely discussed.

[0037] **FIGs. 9A-C** illustrates different views of the second body **106**.

[0038] **FIG. 9A** is the front view of the second body **106**.

As shown, the second body **106** comprises two openings **902** and a relief **904**. Similar to the openings **202** of the first body **102**, these openings **902** are also assigned to be used when binding the second body **106** to a sliding window frame. In the example shown in **FIG. 1**, the second body **106** is bounded, e.g. by self-tapping screws, to the butt end of the frame **108**. The relief **904** is made such that it can be capable of receiving the engaging member **116** of the sliding mechanism **114** in the first body **102**. For this purpose, the relief **904** can have a hole **906** which the engaging member **116** is inserted into. The hole **906** is shown better in the isometrical view of the second body **106**.

**[0039] FIG. 9B** is the side view of the second body **106**. This view clearly demonstrates the form of the relief **904**.

**[0040] FIG. 9C** is the isometrical view of the second body **106**. From this view, it is clearly seen how the engaging member **116** enters the hole **906** of the relief **904**.

**[0041]** Those skilled in the art would understand that the relief **904**, including the hole **906**, can be made in other different forms which will be more suitable for particular designs of the sliding windows and doors.

**[0042]** In one embodiment, the surface of the second body **106**, with respect to which the relief **906** may be configured as a cavity, is made with roughness. This roughness provides better clamping when the frame **104** of the first window sash and the frame **108** of the second window sash are pressed to each other.

**[0043]** The operational principle of the locking system **100** consists in the following. When the locking mechanism **118** is in a 'lock' state, the fixing member **214** is in the through-hole **208** of the holding member **206**, and the engaging member **116** of the sliding mechanism **114** of the first body **102** is in the hole **906** of the second body **106**. In the 'lock' state of the locking mechanism **118**, the sliding member **204** is fixed in the hollow **110** of the first body **102** such that the locking display **220** becomes visible, thereby showing that the sliding window or door is locked. Once the locking mechanism **118** passes in an 'unlock' state, the fixing member **214** is pushed out of the through-hole **208** of the holding member **206** by pressing the spring **216** with the aid of the pushing member **218**, and the engaging member **116** of the sliding mechanism **114** of the first body **102** is released from the hole **906** of the second body **106** by sliding the sliding member **204** within the hollow **110** of the first body **102**, thereby hiding the locking

display 220.

**[0044]** In one embodiment, the 'lock' state of the locking mechanism **118** is provided by the clockwise rotation of the key in the locking barrel **212**, while the 'unlock' state of the locking mechanism **118** is achieved by the counterclockwise rotation of the key in the locking barrel **212**, or vice versa.

**[0045]** Thus, the locking system for the sliding windows and doors has been disclosed. The system has an advantage over currently existing rotational locking systems in that it can be mounted in the sliding windows and doors with the small width of frames, such as the Australian and New Zealand standard sliding windows and doors. At the same time, the system provides very strong and reliable clamping between two window sashes/door leaves.

**[0046]** Although embodiments have been described with reference to specific example embodiments, it will be evident that various modifications and changes can be made to these example embodiments without departing from the broader spirit and scope of the present application. Accordingly, the specification and drawings are to be regarded in an illustrative rather than a restrictive sense.

## CLAIMS

1. A locking system for a sliding window having a first frame and a second frame, the locking system comprising:

a first body configured to be mounted within the first frame of the sliding window, the first body has the form of a single elongated plate of irregular shape having a hollow arranged on a front side of the plate;

a sliding mechanism configured to be mounted within the first body, the sliding mechanism comprising:

- a sliding member configured to slide within the hollow of the first body;
- an engaging member;
- a holding member for holding the engaging member, the holding member having a through-hole; and
- a screw bolt for attaching the engaging member and the holding member to the sliding member;

a locking mechanism attached to the first body, the locking mechanism comprising:

a locking barrel configured to receive a key, wherein the locking barrel is accessible for the key from the front side of the plate;

a fixing member provided with a spring, the fixing member being configured to be inserted in the through-hole of the holding member, thereby providing fixation of the sliding member; and

a pushing member connected with the locking barrel and configured to push the fixing member out of the through-hole of the holding member, wherein the fixing member is pushed out of the through-hole of the holding member by the pushing member, when rotation of the key actuates the locking barrel; and

a second body configured to be mounted within the second frame of the sliding window, the second body having a bulk form with a relief, the relief of the second body is configured to receive the engaging member of the sliding mechanism; and

wherein, when the locking mechanism is in a 'lock' state, the fixing member is in the through-hole of the holding member, and the engaging member of the sliding mechanism of the first body is in the relief of the second body; and

wherein, when the locking mechanism is in an 'unlock' state, the locking barrel is in the actuated state by the key, the pushing member presses the spring, the fixing member is pushed out of the through-hole of the holding member, and the engaging member of the

sliding mechanism of the first body is moveable within the relief of the second body by sliding the sliding member within the hollow of the first body.

2. The system of claim 1, further comprising a locking display assigned to indicate that the engaging member is in the relief of the second body, wherein the locking display includes a colored plate.

3. The system of claim 1, wherein the first body has a supplementary hollow assigned to facilitate opening the sliding window.

4. The system of claim 1, wherein the relief of the second body has a hole, the hole is configured to receive at least a part of the engaging member of the sliding mechanism.

5. The system of claim 1, wherein the 'lock' state of the locking mechanism is provided by the clockwise rotation of the key in the locking barrel, and the 'unlock' state of the locking mechanism is provided by the counter clockwise rotation of the key in the locking barrel, or vice versa.

## ABSTRACT

A locking system for sliding windows and doors is provided. The system has an advantage over currently existing rotational locking systems in that it can be mounted in the sliding windows and doors with the small width of frames, such as the Australian and New Zealand standard sliding windows and doors. At the same time, the system provides very strong and reliable clamping between two window sashes/door leaves.



FIG.1

100

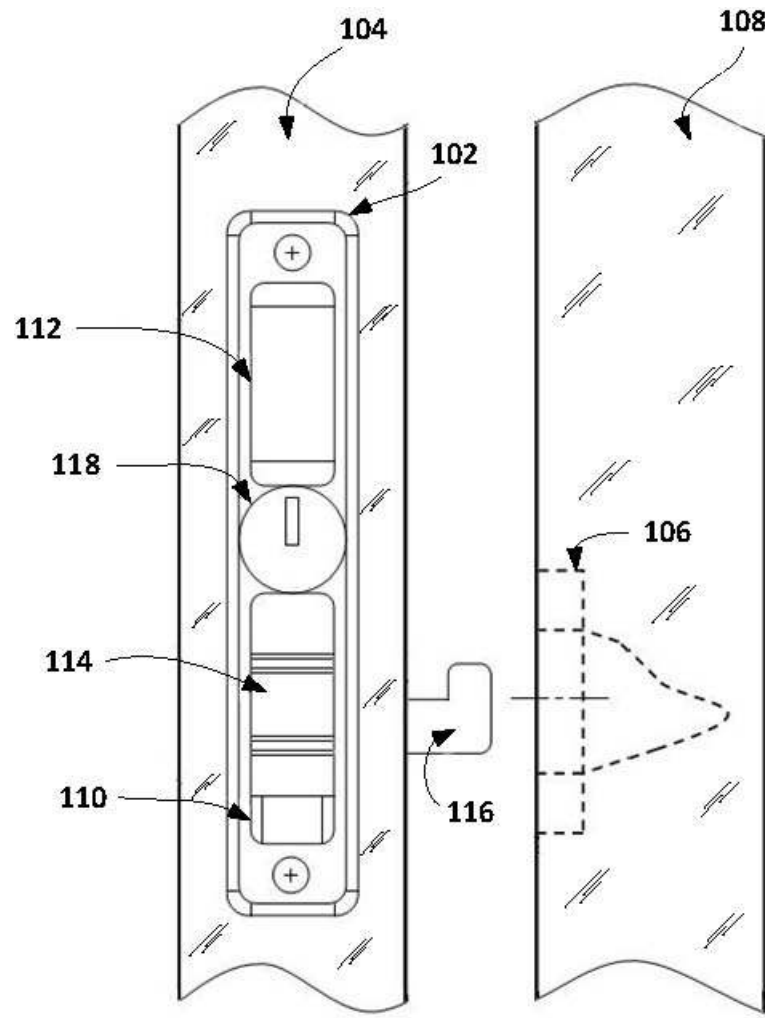
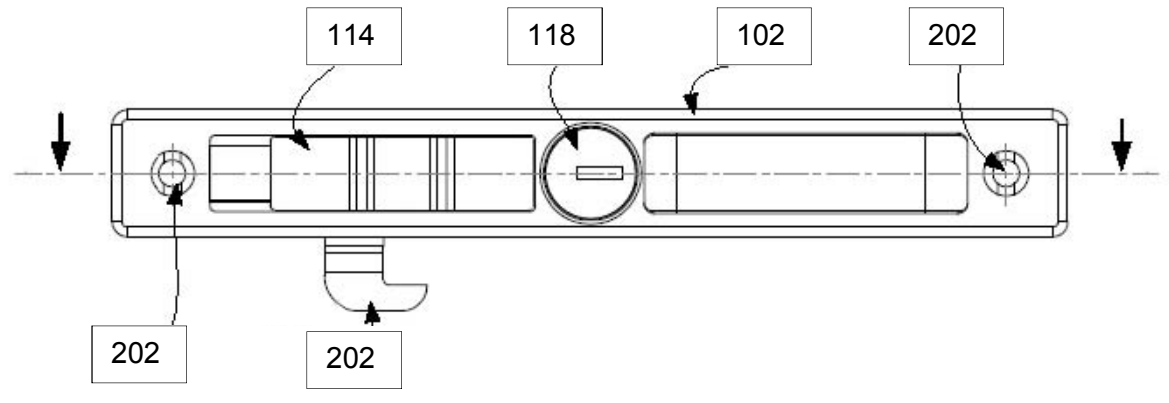


FIG.2A



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FIG.2B

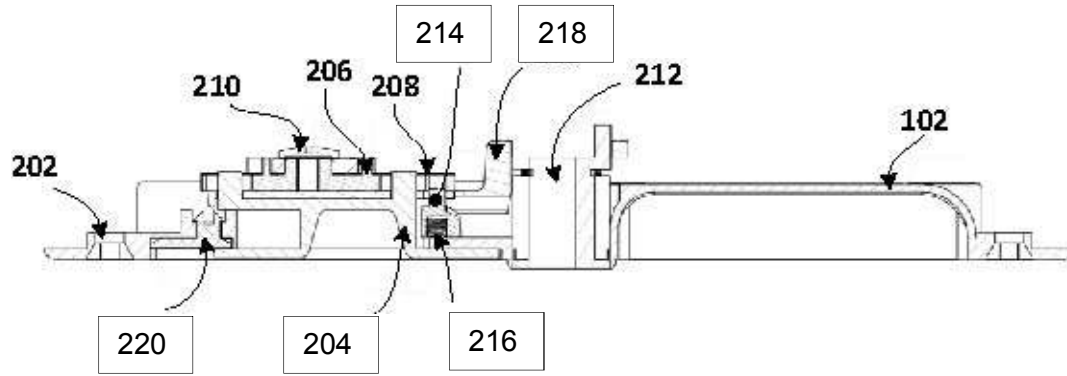


FIG.2C

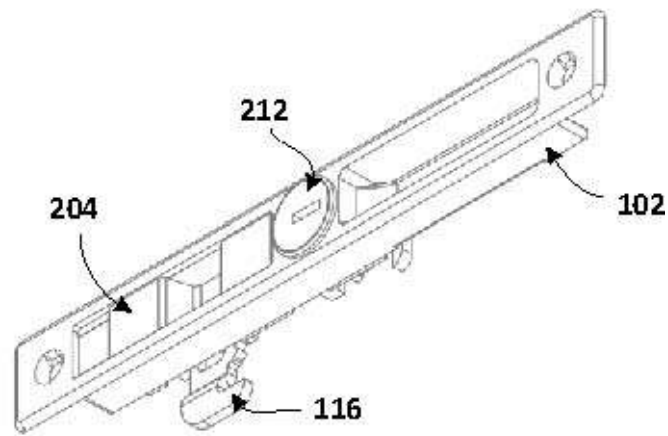


FIG.3

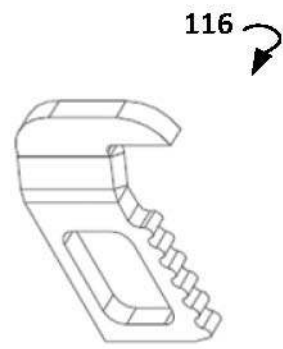


FIG.4

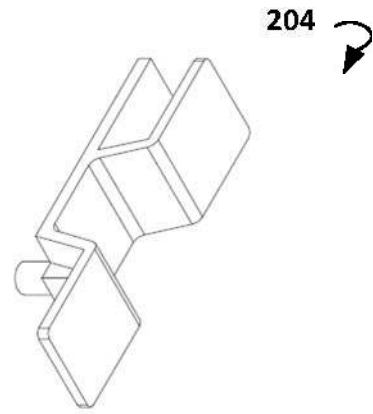


FIG.5

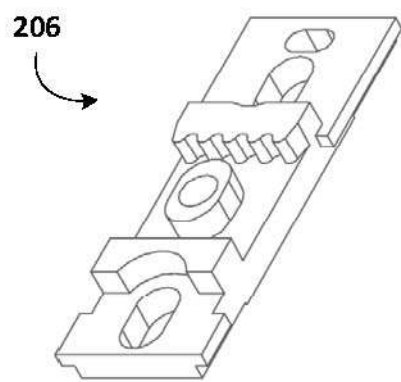


FIG.6

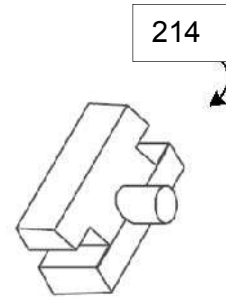


FIG.7

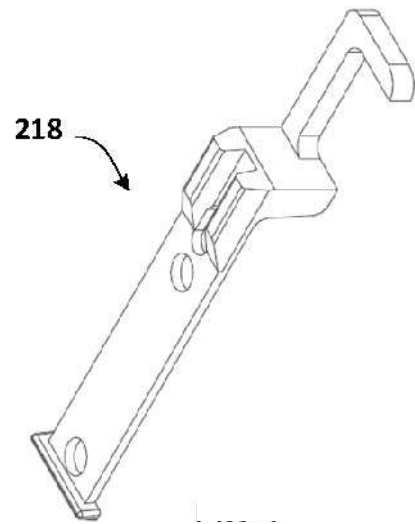
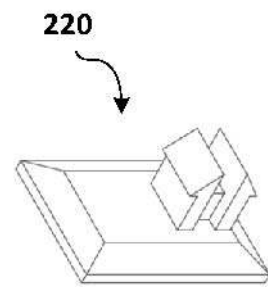


FIG.8



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FIG.9A

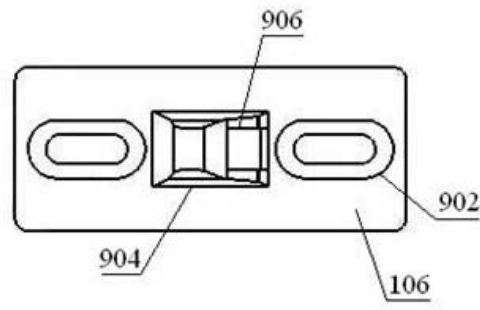


FIG.9B

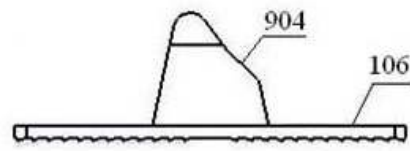


FIG.9C

