



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**14.12.2022 Bulletin 2022/50**

(51) International Patent Classification (IPC):  
**B25H 3/02 (2006.01)**

(21) Application number: **22151585.1**

(52) Cooperative Patent Classification (CPC):  
**B25H 3/02**

(22) Date of filing: **14.01.2022**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**  
Designated Extension States:  
**BA ME**  
Designated Validation States:  
**KH MA MD TN**

(72) Inventors:  
• **Li, Wenquan**  
**Ningbo, 315201 (CN)**  
• **Fu, Yiqiao**  
**Ningbo, 315201 (CN)**

(30) Priority: **11.06.2021 CN 202121315213 U**  
**18.11.2021 US 202117530216**

(74) Representative: **karo IP**  
**karo IP Patentanwälte**  
**Kahlhöfer Rößler Kreuels PartG mbB**  
**Platz der Ideen 2**  
**40476 Düsseldorf (DE)**

(71) Applicant: **Ningbo E-Power Engine Technology Co. Ltd.**  
**315201 Ningbo (CN)**

(54) **A LATCH STRUCTURE**

(57) A latch structure comprising an elastic pull latch is disclosed. The top of the elastic pull latch includes a latch bar configured with a latch groove. The elastic pull latch also includes an elastic boss that moves in and out of the latch cover of the pull latch. On both sides of a box, an elastic pull latch is provided at the top and a catch groove having a catch affixed to the lower edge is pro-

vided at the bottom. When two boxes are stacked together, the catch in the catch groove of the upper box is snapped into the latch groove of the elastic pull latch of the lower box to securely connect the two boxes. When the latch is released, the catch of the upper box blocks the elastic boss of the latch of the lower box to prevent the latch from retracting inwards.

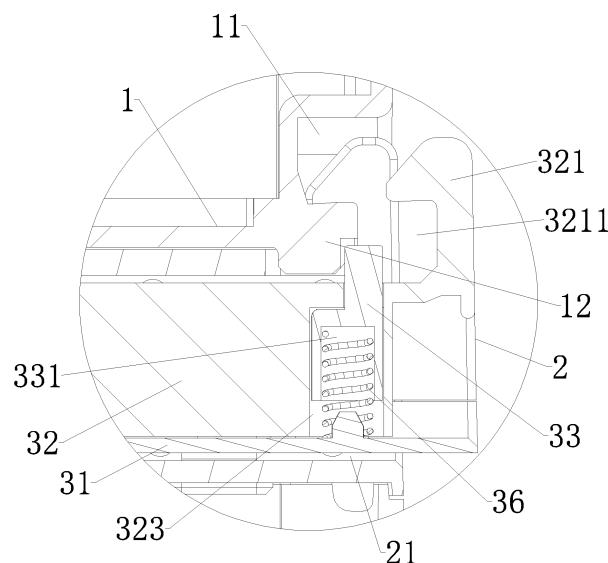


FIG. 9

## Description

**[0001]** The present disclosure relates to a latch structure for connecting a first object with a second object. More specifically, the present disclosure relates to a latch structure that can be used to separably connect and/or lock two objects together.

**[0002]** When objects such as boxes, crates, or pallets that are stacked one above another, adjacent stacked objects can be joined together by a latch to improve the stability of the stacked-up objects. However, when separating the stacked items, the latch structures known in the prior art are inconvenient to unlatch. Usually, the uppermost item must be unlatched from the adjacent item immediately below it by two hands, before it can be released and removed from the stack. This is often inconvenient.

**[0003]** Accordingly, in view of the above-mentioned defects of prior art latches, the purpose of the present disclosure is to provide an improved latch structure.

**[0004]** The present disclosure discloses a latch structure that can be used on a carrier such as a box or crate. The left and right sides of the cover of the carrier are each provided with an elastic pull latch that can be pulled out. The elastic pull latch has one sidewall that extends over the upper surface of the latch to form a straight edge above the upper surface. The top portion of the straight edge may be referred to as a latch bar and is configured with a latch groove with an inward opening. An elastic boss capable of moving vertically is mounted inside the elastic pull latch. When assembled, the upper end of the elastic boss extends out of the upper surface of the latch. The left and right sides at the bottom of the carrier are each configured with a catch groove, and a catch is provided on the lower edge of the catch groove.

**[0005]** When multiple carriers of the same or similar structures are stacked one above another, a catch at the bottom of the upper carrier of two adjacent carriers is snapped into the latch groove of an elastic pull latch located on the cover of the lower carrier. The bottom side of the catch of the upper carrier touches and depresses the elastic boss of the elastic pull latch of the lower carrier. After the elastic pull latch of the lower carrier is pulled out, the elastic boss rises above and extends out of the upper surface of the latch so it becomes blocked by the catch. As such, the elastic pull latch is held on the outer side of the catch. The elastic pull latch remains in a pulled-out position and is prevented from moving inwards.

**[0006]** In some embodiments, the left and right sides of the cover of a carrier are each provided with a chute with an outward opening. The elastic pull latch is arranged inside the chute with the side wall of the elastic pull latch being exposed outside the carrier. The end of the elastic pull latch that is exposed outside the carrier is also referred to as the outer end of the elastic pull latch.

**[0007]** In some embodiments, the top portion of the straight edge of the side wall is provided with a latch bar, and the latch groove is located on an inner side of the

latch bar.

**[0008]** In some embodiments, an upper end of the latch bar has a slope on its inner side.

**[0009]** In some embodiments, when two carriers of the same structure are stacked one above another, on each side of the stacked-up carriers the latch bar of the lower carrier is snapped into the catch groove of the upper carrier and the catch of the upper carrier is snapped into the latch groove of the lower carrier.

**[0010]** In some embodiments, a first spring extending horizontally is fitted inside the elastic pull latch. A stop piece is connected to the first spring and is mounted on the elastic pull latch. The first spring is retained by the stop piece and a side wall of the elastic pull latch. The bottom surface of the elastic pull latch has an elongated through-hole extending horizontally. The stop piece is in sliding-fit with the elongated through-hole and can slide along the elongated through-hole. The lower end of the stop piece extends outside the elongated through-hole.

The chute on the upper cover of the carrier has a snap-in hole shaped to match the lower end of the stop piece so that the lower end of the stop piece can be snapped into the snap-in hole. In some embodiments, the elastic pull latch may be configured with multiple first springs, for example two first springs as shown in Fig. 3, and multiple corresponding through-holes.

**[0011]** In some embodiments, a second spring extending vertically is mounted inside the elastic pull latch, for example, on the lower inner surface of the elastic pull latch, and is connected to the elastic boss. The elastic boss may be situated on top of the second spring. The upper surface of the elastic pull latch has an opening allowing the top of the elastic boss to pass through.

**[0012]** In some embodiments, the elastic pull latch is internally provided with an accommodating slot for housing the elastic boss. The lower end of the elastic boss may include a spring recess with a downward opening for housing the second spring.

**[0013]** In some embodiments, the bottom side of the catch of the upper carrier of two adjacent carriers is in contact with and presses onto the top of the elastic boss of the elastic pull latch of the lower carrier. When the elastic pull latch of the lower carrier is pulled outwards, the elastic boss of the elastic pull latch moves outwards. After the elastic boss moves away from the catch and moves upwards from underneath the bottom of the catch, the catch blocks the elastic boss so that the elastic boss is held on the outer side of the catch and the latch is prevented from retracting inwards.

**[0014]** In some embodiments, the carrier may be a box, a trunk, a crate, or a pallet.

**[0015]** One of the advantages of the latch structure disclosed in the present disclosure is that, when stacked carriers need to be separated, each elastic pull latch can be pulled out using one hand and will remain in a pulled-out state without retracting so that other elastic pull latches can be released one by one. In this way, stacked up carriers can be released and unlatched "single-handed-

ly," literally speaking, making the latch more convenient to use.

**[0016]** The present disclosure discloses a specific latch structure, comprising a carrier, wherein left and right sides of an upper end of the carrier are each provided with an elastic pull latch that can be pulled out; an upper end of the elastic pull latch has a catch groove with an inward opening; an elastic boss capable of moving vertically is mounted in the elastic pull latch; an upper end of the elastic boss extends out of the upper end of the carrier; left and right sides of a lower end of the carrier are each provided with a latch groove, and a catch is provided in a lower end of the latch groove; when at least two carriers of the same structure are stacked one above another, the catch at the lower end of one of two adjacent carriers is snapped into the catch groove of the elastic pull latch at the upper end of the other carrier, and a bottom portion of the catch depresses the elastic boss; and after the elastic pull latch of the lower carrier of the two adjacent carriers is pulled out, the elastic boss is retained on an outer side of the catch.

**[0017]** In an embodiment of said specific latch structure, left and right sides of the upper cover are each provided with a chute with an outward opening; the elastic pull latch is arranged in the chute; and an outer end of the elastic pull latch is exposed outside the carrier.

**[0018]** In an embodiment of said specific latch structure of paragraph [0017], wherein a top portion of the outer end of the elastic pull latch is provided with a latch bar, and the catch groove is located on an inner side of the latch bar.

**[0019]** In an embodiment of said specific latch structure of paragraph [0018], wherein an upper end of the latch bar has a slope on an inner side.

**[0020]** In an embodiment of said specific latch structure of paragraph [0018], when at least two carriers of the same structure are stacked one above another, the latch bar of one of adjacent carriers is snapped into the latch groove of the other carrier.

**[0021]** In an embodiment of said specific latch structure of paragraph [0017], a first spring extending horizontally is mounted in the elastic pull latch; a stop piece is further mounted in the elastic pull latch; the first spring is retained between the stop piece and an inner wall of the elastic pull latch; the bottom portion of the elastic pull latch has an elongated through-hole extending horizontally; the stop piece is in sliding fit with the elongated through-hole; a lower end of the stop piece penetrates through the elongated through-hole; the chute has a snap-in hole correspondingly shaped to the lower end of the stop piece; and the lower end of the stop piece is snapped into the snap-in hole.

**[0022]** In an embodiment of said specific latch structure of paragraph [0016], wherein a second spring extending vertically is mounted in the elastic pull latch; the elastic boss is disposed over the second spring; and the upper end of the elastic pull latch has a penetrating hole allowing the upper end of the elastic boss to penetrate through.

**[0023]** In an embodiment of said specific latch structure of paragraph [0022], the elastic pull latch is internally provided with an accommodating slot; the elastic boss is arranged in the accommodating slot; the lower end of the elastic boss has a spring recess with a downward opening; and the second spring is arranged in the spring recess.

**[0024]** In an embodiment of said specific latch structure of paragraph [0016], wherein a bottom portion of the catch of one of two adjacent carriers is in contact with a top portion of the elastic boss of the other carrier; when the elastic pull latch is pulled outwards, the elastic boss moves outwards; and after the top portion of the elastic boss is separated from the bottom portion of the catch, the elastic boss moves upwards, so that the elastic boss is retained on the outer side of the catch.

**[0025]** In an embodiment of said specific latch structure of any one of paragraphs [0016] - [0024], the carrier is a box.

**[0026]** These and other features of the present disclosure will become readily apparent upon further review of the following specification and drawings. In the drawings, like reference numerals designate corresponding parts throughout the views. Moreover, components in the drawings are not necessarily drawn to scale, the emphasis instead being placed upon clearly illustrating the principles of the present disclosure.

Fig. 1 is a schematic diagram of a carrier configured with a latch of the present disclosure;

Fig. 2 is a schematic diagram showing the bottom of a carrier provided with a latch of the present disclosure;

Fig. 3 is a schematic diagram of an overall structure of an elastic pull latch of the present disclosure;

Fig. 4 is a schematic diagram of an internal structure of a pull latch of the present disclosure;

Fig. 5 is a schematic diagram of a carrier cover configured with a pull latch of the present disclosure;

Fig. 6 is a schematic diagram showing two boxes joined together by two latches of the present disclosure;

Fig. 7 is an enlarged view of region A in Fig. 6;

Fig. 8 is a schematic diagram showing two boxes unlatched from each other when the latches are released; and

Fig. 9 is an enlarged view of region B in Fig. 8.

**[0027]** Embodiments of the disclosure are described more fully hereinafter with reference to the accompany-

ing drawings, in which preferred embodiments of the disclosure are shown. The various embodiments of the disclosure may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the disclosure to those skilled in the art.

**[0028]** In referring to Fig. 1 - Fig. 9, the present disclosure discloses a latch structure that can be used on a carrier such as a trunk or a box. These terms may be used interchangeable herein and are not intended to limit the manner of how the disclosed device is used or the scope of the disclosure. The left and right sides of the cover 2 of the carrier are each provided with an elastic pull latch 3 that can extend outwards when pulled. The top of the elastic pull latch 3 is a latch bar 321, which has a latch groove 3211 with an inward opening. An elastic boss 33 capable of moving vertically is mounted in the elastic pull latch 3. The top of the elastic boss 33 extends out of the upper surface of the carrier. The left and right sides of the bottom of the carrier are each provided with a catch groove 11. A catch 12 resembling a rectangular block or a ridge is provided on the lower edge of the catch groove 11.

**[0029]** When at least two carriers of the same or similar structure are stacked one above another, the catch 12 at the bottom of an upper carrier is snapped into the latch groove 3211 of the elastic pull latch 3 on the upper cover 2 of the lower carrier, and the bottom surface of the catch 12 on the upper carrier touches and depresses the elastic boss 33 of the pull latch 3 on the lower carrier. After the elastic pull latch 3 of the lower carrier is pulled out, the elastic boss 33 moves upwards and is then blocked by the catch 12. The pull latch 3 is being prevented from retracting inwards and is held on the outer side of the catch 12. See Fig. 8 and Fig. 9 for reference.

**[0030]** When one carrier is stacked above another carrier, the catch 12 on the bottom of the upper carrier is snapped into the latch groove 3211 of the elastic pull latch 3 located on the cover 2 of the lower carrier. The bottom side of the catch 12 depresses the elastic boss 33. See Fig. 6 and Fig. 7. After the elastic pull latch 3 of the lower carrier is pulled out, the elastic boss 33 is held on the outer side of the catch 12 because the catch 12 blocks the elastic boss 33 preventing the pull latch 3 from moving inwards.

**[0031]** As shown in Fig. 1 and Fig. 5, the left and right sides of the upper cover 2 of a carrier are each provided with a chute 21 with an outward opening. The elastic pull latch 3 is arranged inside the chute 21 on the cover 2. The outer end of the elastic pull latch 3 remains outside the chute 21.

**[0032]** As shown in Fig. 3, a top portion of the outer end of the elastic pull latch 3 includes a latch bar 321 that sticks outside the pull latch cover 32. The latch groove 3211 is located on the inner side of the latch bar 321. The upper end of the latch bar 321 has a slope 3212 on

the inner side, the side that faces the interior of the pull latch cover 32. In some embodiments, the slope 3212 matches the slope of the catch groove 11 as shown in Fig. 7. When one box is stacked above another box, the latch bar 321 of the lower box is snapped into the catch groove 11 of the upper box, as shown in Fig. 7. Because the upper end of the latch bar 321 is shaped into a slope 3212, when the catch 12 of the upper box is in contact with the slope 3212 of the latch bar 321 of the lower box, the elastic pull latch 3 is pushed outwards to snap the catch 12 into the latch groove 3211 of the pull latch and snap the latch bar 312 into the catch groove 11.

**[0033]** As shown in Figs. 3-5, two first springs 34 extending horizontally are mounted in the elastic pull latch 3. Two stop pieces 35 are mounted in the elastic pull latch 3. Each of the first springs 34 is retained between a stop piece 35 and an inner wall of the elastic pull latch 3. The bottom portion of the elastic pull latch 3 has two elongated through-holes 311 extending horizontally. The stop pieces 35 are in sliding-fit with the elongated through-holes 311 and can slide through the through-holes 311. The lower end of each stop piece 35 passes through and comes out of the elongated through-holes 311. The chute 21 on the upper cover 2 of the box is internally provided with a snap-in hole 211 shaped to match the lower end of the stop piece 35. The lower end of the stop piece 35 can be snapped into the snap-in hole 211. When the elastic pull latch 3 is pulled outwards, the stop piece 35 stays inside the snap-in hole 211 and the first spring 34 becomes compressed.

**[0034]** As shown in Fig. 4, a second spring 36 extending vertically is mounted in the elastic pull latch 3 and the elastic boss 33 is situated on the second spring 36. The upper surface of the elastic pull latch 3 has an opening 322, allowing the top of the elastic boss 33 to pass through. In the embodiments shown in Figs. 7 and 9, the elastic pull latch 3 is internally provided with an accommodating slot 323. The elastic boss 33 is arranged in the accommodating slot 323. The lower end of the elastic boss 33 includes a spring recess 331 with a downward opening. The second spring 36 is housed in the spring recess 331.

**[0035]** In Fig. 6 and Fig. 7, two boxes are stacked one on top of the other. The boxes are securely latched together using two elastic pull latches 3. When in a locked position, the bottom of the catch 12 of the upper box is in contact with the top of the elastic boss 33 of the lower box, and the second spring 36 underneath the elastic boss 33 is compressed. When the latch is released as shown in Fig. 8 and Fig. 9, the elastic pull latch 3 is pulled outwards and the elastic boss 33 moves outwards. After the elastic boss 33 moves away from the catch 12, the elastic boss 33 is pushed upward by the compressed second spring 36. See Fig. 9. When in a released position, the elastic boss 33 is held on the outer side of the catch 12 and the elastic pull latch 3 remains in a pulled-out state.

**[0036]** As shown in Figs. 3 and 4, the elastic pull latch

3 includes a base 31 and a pull latch cover 32 on top of the base 31. The accommodating slot 323 (see Fig. 7), the opening 322, and the latch bar 321 are arranged in or on the pull latch cover 32. The elongated through-hole or through-holes 311 are formed in the base 31.

**[0037]** In some embodiments, when a plurality of boxes are stacked one above another, the catch 12 of an upper box can directly snap into the latch groove 3211 of a lower box, as shown in Fig. 7 and Fig. 8. When the stacked boxes need to be separated, the elastic pull latches 3 can be released one by one, instead of being released one pair at a time by both hands. In this way, the stacked boxes can be separated and removed more conveniently. After the upper box is removed, the elastic boss 33 in the elastic pull latches 3 of the lower box is no longer held by the catch 12. The elastic pull latch 3 of the lower box is automatically reset by the compressed first springs 34.

**[0038]** In sum, a latch structure comprising an elastic pull latch is disclosed. The top of the elastic pull latch includes a latch bar configured with a latch groove. The elastic pull latch also includes an elastic boss that moves in and out of the latch cover of the pull latch. On both sides of a box, an elastic pull latch is provided at the top and a catch groove having a catch affixed to the lower edge is provided at the bottom. When two boxes are stacked together, the catch in the catch groove of the upper box is snapped into the latch groove of the elastic pull latch of the lower box to securely connect the two boxes. When the latch is released, the catch of the upper box blocks the elastic boss of the latch of the lower box to prevent the latch from retracting inwards.

**[0039]** Although the disclosure is illustrated and described herein with reference to specific embodiments, the disclosure is not intended to be limited to the details shown. Rather, various modifications may be made in the details within the scope and range of equivalents of the claimed features.

#### REFERENCE SIGNS

#### **[0040]**

1 box body  
11 catch groove  
12 catch

2 (carrier) cover  
21 chute  
211 snap-in hole

3 elastic pull latch  
31 base  
311 elongated through-hole  
32 pull latch cover  
321 latch bar  
3211 latch groove  
3212 slope

322 opening  
323 accommodating slot  
33 elastic boss  
331 spring recess  
5 34 first spring  
35 stop piece  
36 second spring

#### 10 Claims

1. A latch structure for connecting a first object with a second object; comprising:

15 an elastic pull latch, wherein the elastic pull latch includes a latch cover,  
a base, an elastic boss mounted on the base, and a latch bar that extends above the latch cover and is configured with a latch groove; and  
20 a catch that is affixed inside a catch groove;

wherein the elastic pull latch is installed on the first object and the catch groove is provided on the second object with the catch affixed to the lower edge of the catch groove;

wherein the latch cover is configured with an opening to accommodate the top of the elastic boss, and the top of the elastic boss is configured to move through the opening of the latch cover;

wherein when the catch is snapped into the latch groove of the elastic pull latch and the top of the elastic boss is pressed into the opening by the catch, the latch is fastened to securely connect the first object and the second object; and wherein when the latch is released, the elastic boss moves out of the opening and is blocked by the catch to prevent the elastic pull latch from retracting inwards.

2. A latch structure as defined in claim 1, wherein when the latch is fastened, the latch bar is snapped into the catch groove.

3. A latch structure as defined in claim 2, wherein the elastic pull latch is arranged inside a chute on the first object; and an outer end of the elastic pull latch is exposed outside the chute on the first object.

4. A latch structure as defined in claim 3, wherein the latch bar is located on a top portion of the outer end of the elastic pull latch, and the latch groove is located on an inner side of the latch bar.

5. A latch structure as defined in claim 4, wherein an upper end of the latch bar has a slope shape on an

inner side.

6. A latch structure as defined in claim 3, wherein one or more first springs extending horizontally are mounted in the elastic pull latch, a stop piece is attached to each of the one or more first springs and is further mounted in the elastic pull latch, each of the first springs is retained between the stop piece and an inner wall of the elastic pull latch;
  - 5
  - 10
  - 15
  - 20

wherein the base of the elastic pull latch is configured with one or more elongated through-holes extending horizontally, each stop piece is in sliding fit with each elongated through-hole with a lower end of each stop piece passing through the elongated through-hole; and wherein the chute has one or more snap-in holes, each shaped to match the lower end of the stop piece to allow the lower end of the stop piece to be snapped into the snap-in hole.
7. A latch structure as defined in claim 1, wherein a second spring extending vertically is mounted in the elastic pull latch; wherein the elastic boss is situated on the second spring; and wherein the opening on the latch cover of the elastic pull latch allows the top of the elastic boss to pass through.
  - 25
8. A latch structure as defined in claim 7, wherein the elastic pull latch is internally provided with an accommodating slot for housing the elastic boss; wherein the lower end of the elastic boss has a spring recess with a downward opening; and wherein the second spring is arranged in the spring recess.
  - 30
  - 35
9. A latch structure as defined in claim 1, wherein when the latch is fastened, a bottom portion of the catch is in contact with a top portion of the elastic boss; wherein when the elastic pull latch is pulled outwards, the elastic boss moves outwards; and wherein after the elastic boss moves away from the bottom portion of the catch, the elastic boss moves upwards and the elastic boss is held by the catch on the outer side of the catch.
  - 40
  - 45
10. A latch structure as defined in any one of the preceding claims, wherein the first object and the second object are boxes stacked on top of each other.
  - 50
  - 55

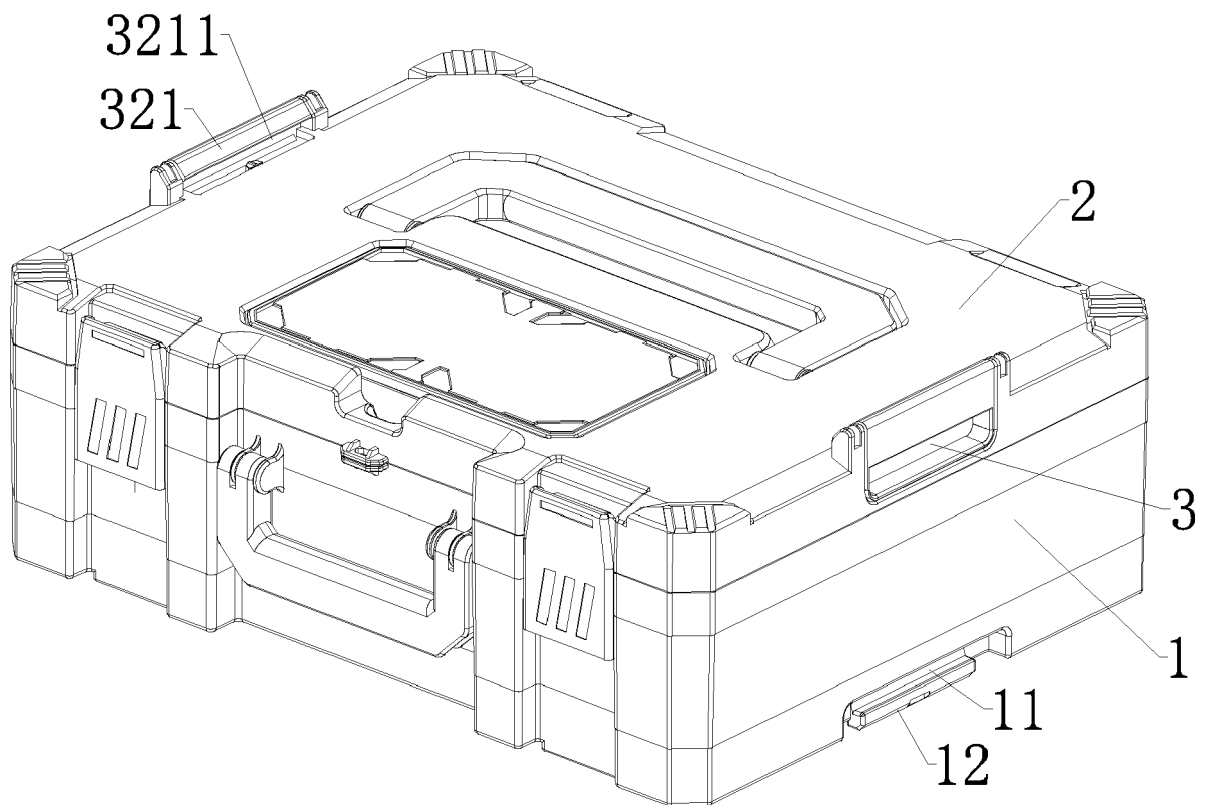


FIG. 1

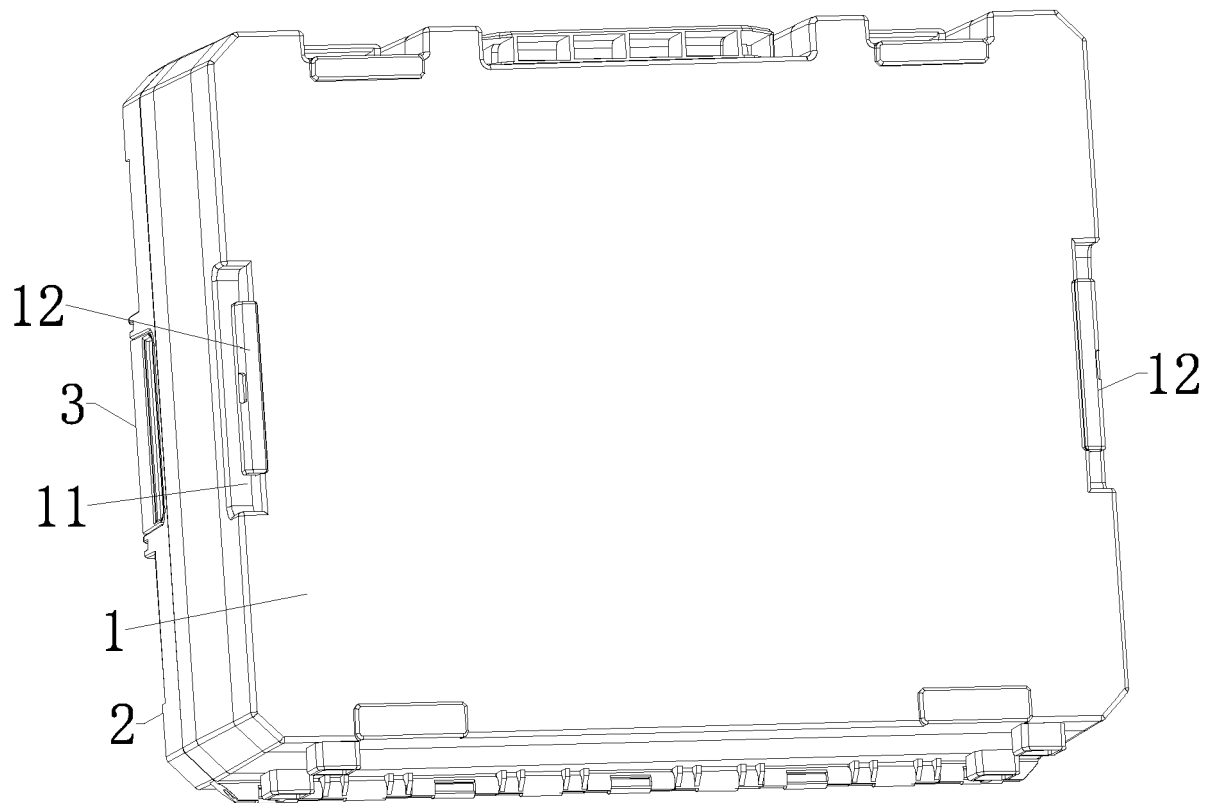


FIG. 2



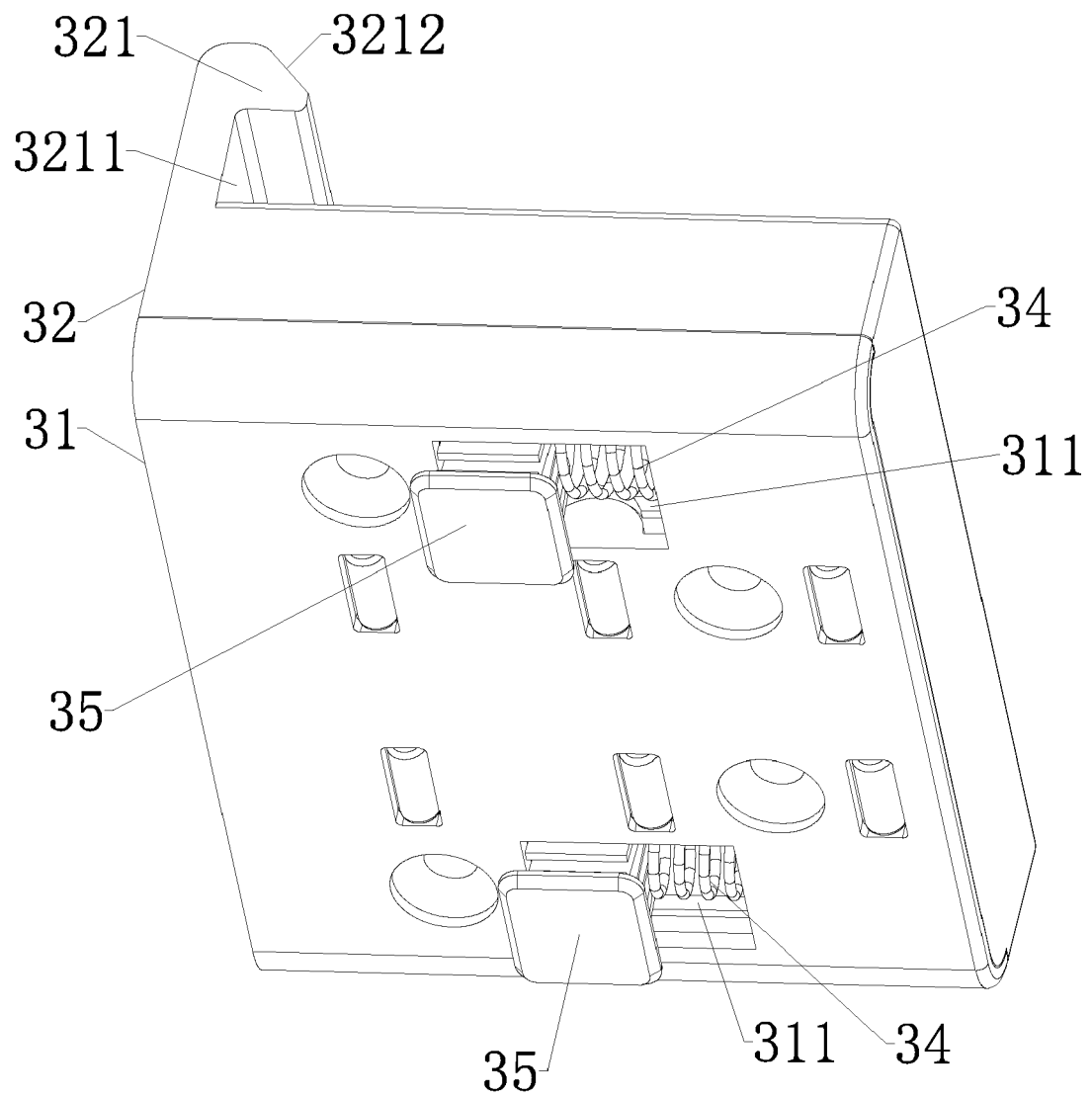


FIG. 3

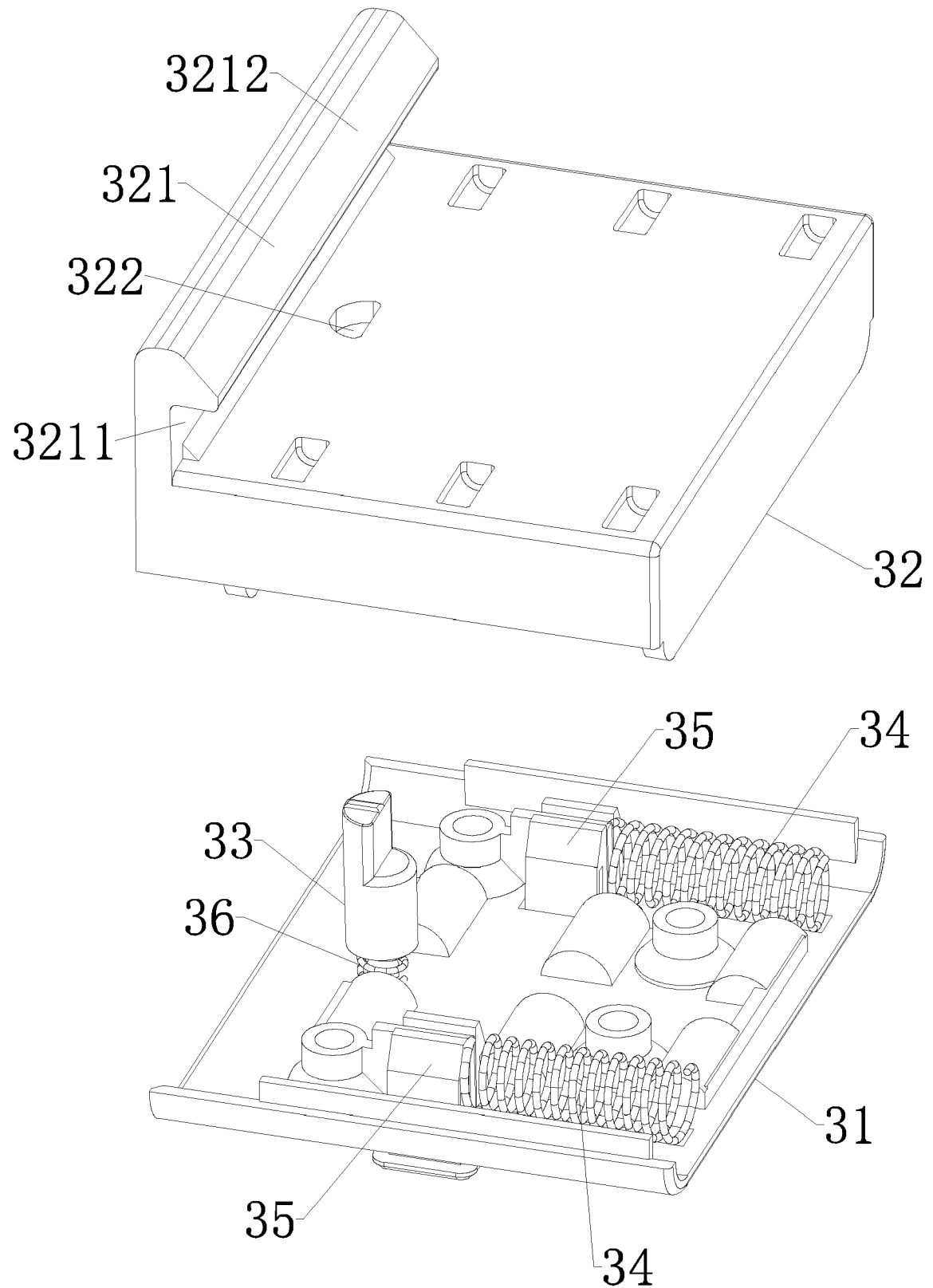


FIG. 4

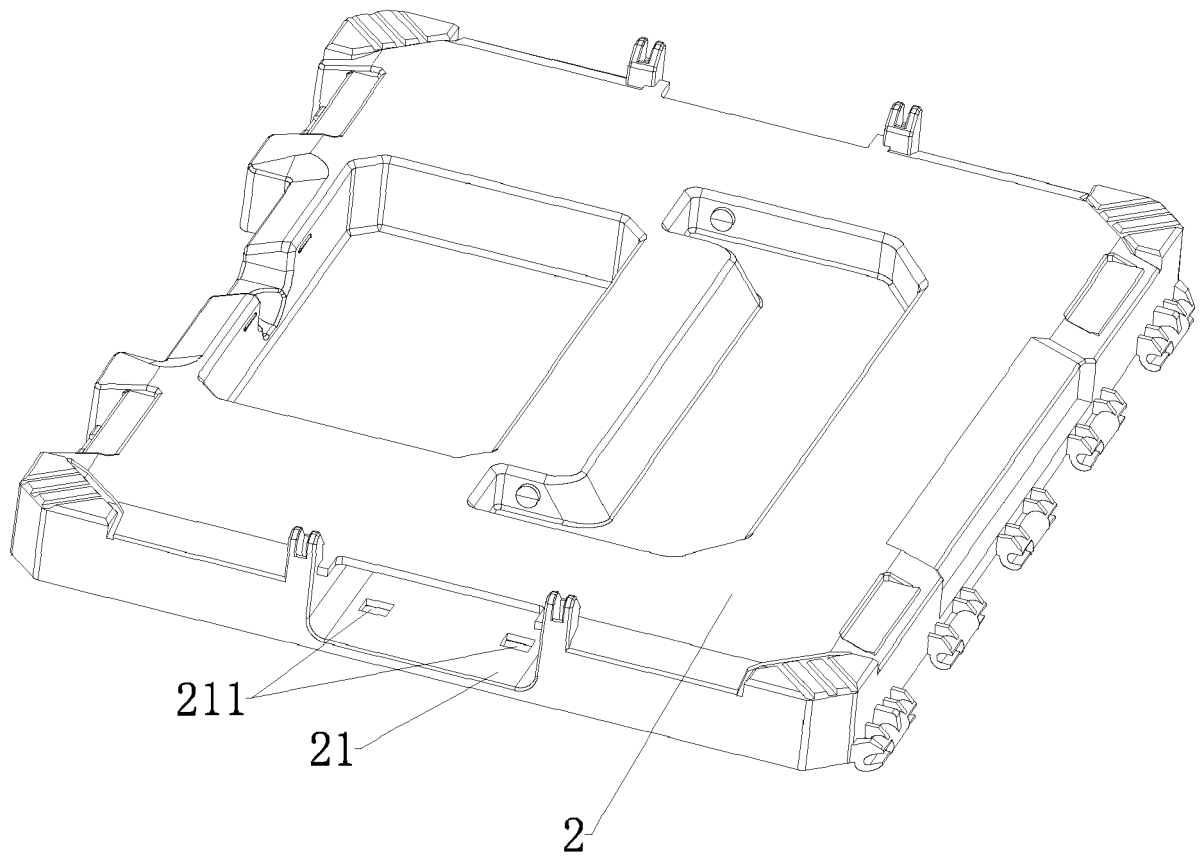


FIG. 5

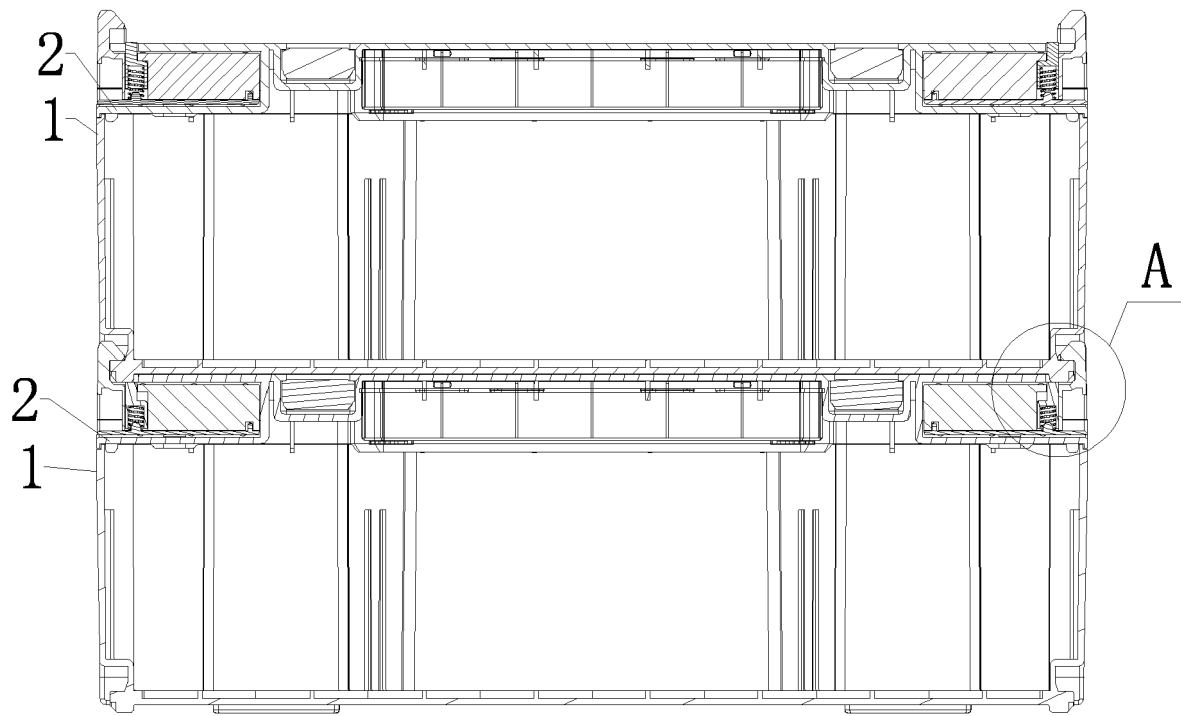


FIG. 6

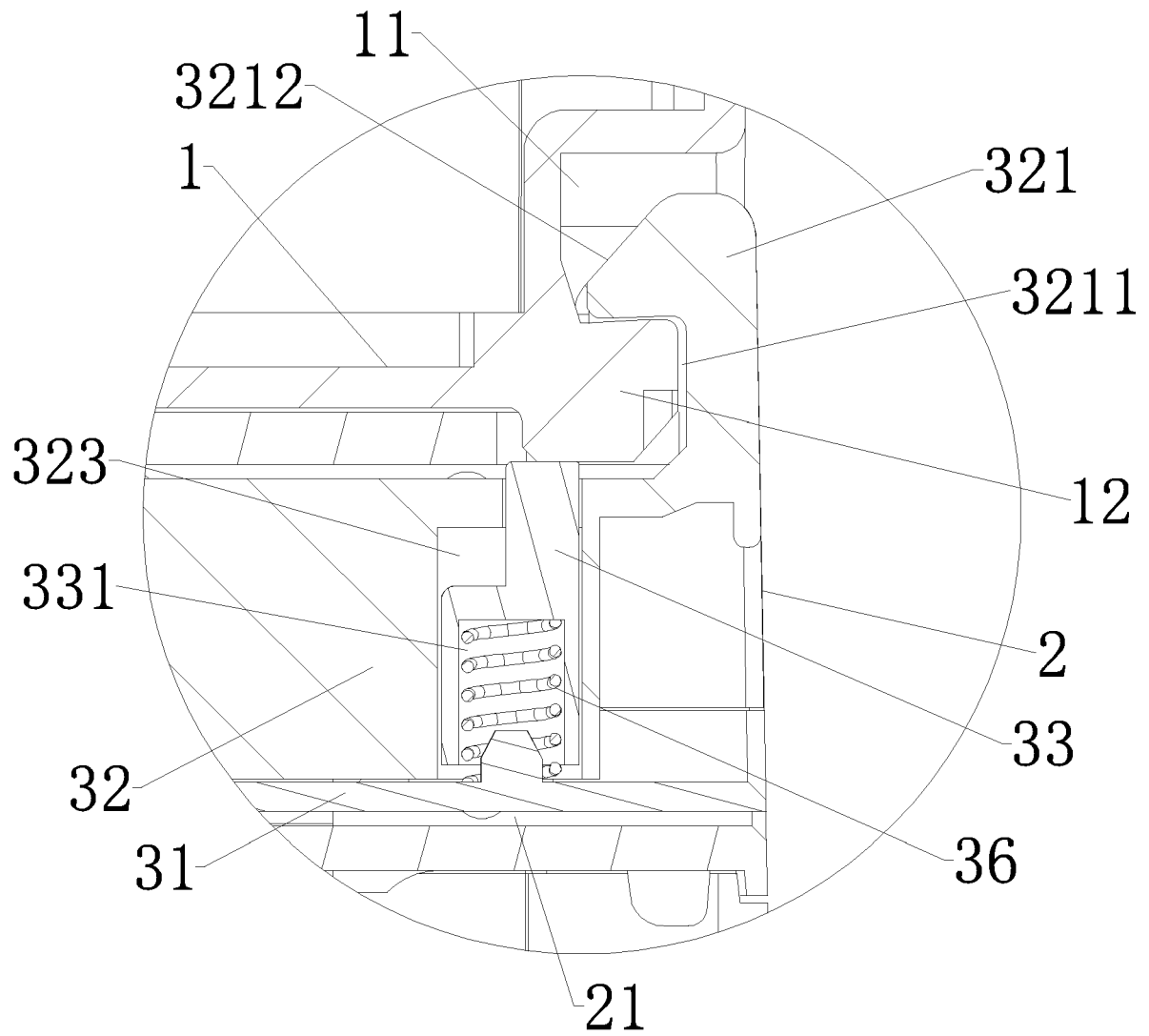


FIG. 7

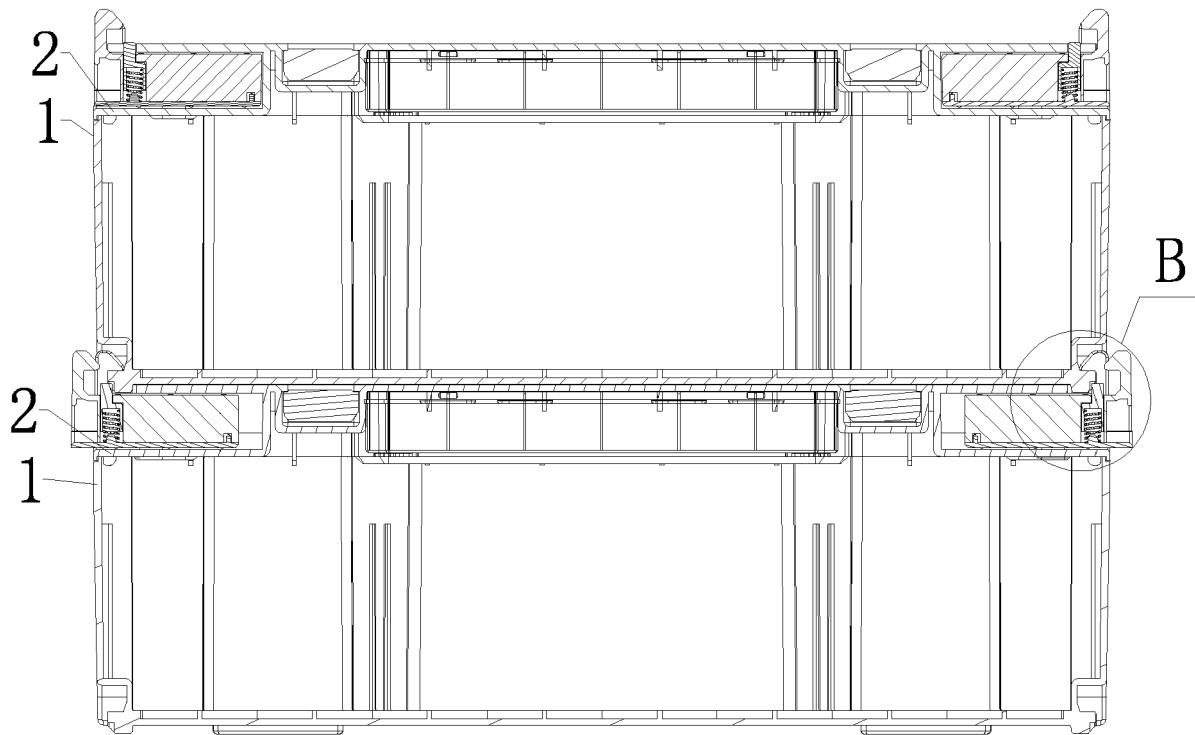


FIG. 8

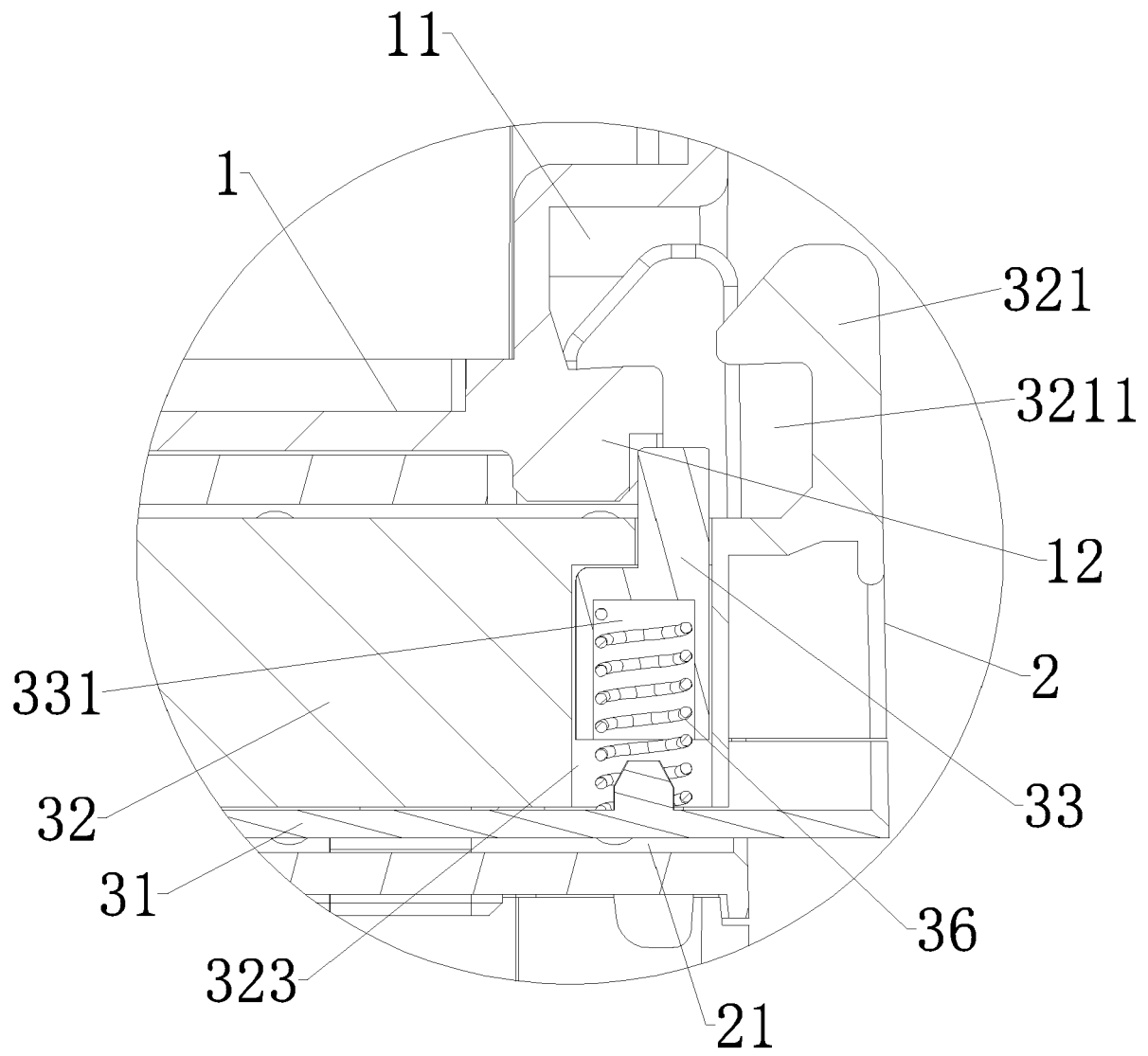


FIG. 9



## EUROPEAN SEARCH REPORT

Application Number

EP 22 15 1585

5

10

15

20

25

30

35

40

45

50

55

1

EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2020/298392 A1 (BARUCH DANNY [IL] ET AL) 24 September 2020 (2020-09-24) * paragraphs [0003] - [0009], [0039] - [0045]; figures *	1-5, 9, 10	INV. B25H3/02
X	US 9 725 209 B1 (BEN-GIGI ZION [IL]) 8 August 2017 (2017-08-08) * columns 2,3; figures *	1-3, 6, 9, 10	
A	DE 20 2015 005752 U1 (PLASTON AG [CH]; ROTHENBERGER AG [DE]) 21 November 2016 (2016-11-21) * abstract; figures *	1-10	
A	US 2017/166352 A1 (HOPPE CHRISTOPHER S [US] ET AL) 15 June 2017 (2017-06-15) * paragraphs [0031] - [0041]; figures *	1-10	
A	US 2008/307835 A1 (GRENIER JEAN-PIERRE [CA] ET AL) 18 December 2008 (2008-12-18) * abstract; figures *	1-10	
			TECHNICAL FIELDS SEARCHED (IPC)
			B25H
The present search report has been drawn up for all claims			
Place of search <b>The Hague</b>		Date of completion of the search <b>27 June 2022</b>	Examiner <b>David, Radu</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	



**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 22 15 1585

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

27-06-2022

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
<b>US 2020298392 A1</b>	<b>24-09-2020</b>	<b>NONE</b>	
<b>US 9725209 B1</b>	<b>08-08-2017</b>	<b>NONE</b>	
<b>DE 202015005752 U1</b>	<b>21-11-2016</b>	<b>AU 2016309923 A1</b>	<b>22-02-2018</b>
		<b>DE 112016003733 A5</b>	<b>09-05-2018</b>
		<b>DE 202015005752 U1</b>	<b>21-11-2016</b>
		<b>EP 3337645 A1</b>	<b>27-06-2018</b>
		<b>EP 3670102 A1</b>	<b>24-06-2020</b>
		<b>ES 2775533 T3</b>	<b>27-07-2020</b>
		<b>US 2018220758 A1</b>	<b>09-08-2018</b>
		<b>US 2020329837 A1</b>	<b>22-10-2020</b>
		<b>WO 2017028845 A1</b>	<b>23-02-2017</b>
<b>US 2017166352 A1</b>	<b>15-06-2017</b>	<b>CN 206913108 U</b>	<b>23-01-2018</b>
		<b>CN 207290035 U</b>	<b>01-05-2018</b>
		<b>TW M551603 U</b>	<b>11-11-2017</b>
		<b>TW M555839 U</b>	<b>21-02-2018</b>
		<b>US 2017166352 A1</b>	<b>15-06-2017</b>
		<b>US 2022161413 A1</b>	<b>26-05-2022</b>
<b>US 2008307835 A1</b>	<b>18-12-2008</b>	<b>EP 2130451 A1</b>	<b>09-12-2009</b>
		<b>US 2008307835 A1</b>	<b>18-12-2008</b>