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(54) **CLASP FOR WATCH**

(57) The present invention relates to a clasp (100) for watch comprising a buckle releasing system (60) and a length adjusting mechanism for adjusting the length of a watch strap, comprising a button plate (10), a moving part (30), and a lever system (20) interposed between the button plate (10) and the moving part (30), wherein a first end (26a) of the lever system (20) is arranged functionally in contact next to the button plate (10), and a second end (26b) of the lever system (20) is provided with a rack (28), wherein a plurality of stop structures (32) are provided on the moving part (30), wherein the rack (28) is urged to be engaged with one of the stop structures (32) at a time, thereby allowing the adjustment of the length of the watch strap.

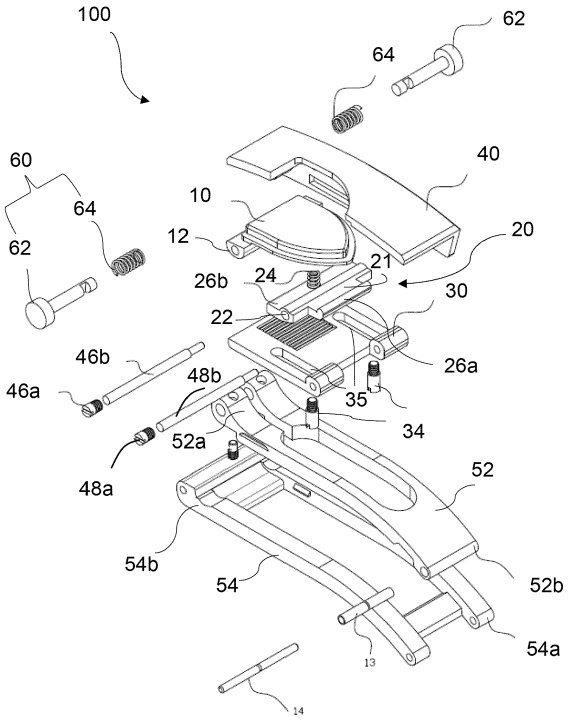


**FIGURE 1**

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## Description

### Technical Field of the Invention

**[0001]** The present invention relates to the field of timepiece, in particular to a watch. More specifically, it relates to a watch clasp (or buckle) where the length of the strap is adjustable.

### Background Art

**[0002]** Compared to a conventional watch clasp, recent watch clasps may be fitted with a mechanism or a device for adjusting the length of a watch.

**[0003]** At present, there are several ways how a watch strap can be adjusted. As a classic example, for metal watch straps such as stainless-steel watch straps, the length of the strap can be adjusted by adding or removing links for the perfect fit.

**[0004]** Patent document WO 2014114404 for example describes a watch strap that is adjustable through its links, by means of a structure in the form of two half-links that are movable relative to one another. Such method of length adjustment of straps is not only inconvenient but also troublesome in a way that the adjustment requires the use of tool. Moreover, it requires the disassembly and re-assembly of the straps which could further contribute to the damage or wear of the watch strap.

**[0005]** It is therefore envisaged to provide an improved clasp for length adjustment mechanism which allows user to adjust the strap length conveniently.

### Summary of the invention

**[0006]** The inventors of the present invention have found out at least a part of or complete remedy for the above-discussed problems. The proposed new watch clasp allows the user to adjust the watch clasp not only easily, but also prevents the user to accidentally activate the adjustment of the watch clasp. In addition, the invention provides a way of informing the user when the strap is adjusted through the adjustment sound (e.g., "click" sound) resulted from the length adjustment mechanism.

**[0007]** In a first aspect, it relates to a clasp for watch comprising a length adjusting mechanism for adjusting the length of a watch strap, comprising a button plate, a moving part, and a lever system interposed between the button plate and the moving part,

wherein a first end of the lever system is arranged functionally in contact next to the button plate, and a second end of the lever system is provided with a rack,

wherein a plurality of stop structures are provided on the moving part, wherein the rack is urged to be engaged with one of the stop structures at a time, thereby allowing the adjustment of the length of the watch strap.

**[0008]** According to an embodiment, the lever system comprises a fulcrum provided to a handle in between the first end and the second end, the lever system comprises at least one spring element, wherein the spring element is provided to the second end of the lever system, arranged in such a way that the spring element in its natural state pushes against the second end of the lever system such that the rack of the lever system is engaged with one of the stop structures. The spring element increases the engaging force of the rack with the stop structure.

**[0009]** According to an embodiment, two or more spring elements are provided to the lever system, preferably arranged linearly in a longitudinal axis of the lever system, arranged in such a way that the two or more spring elements in its natural state pushes against the second end of the lever system such that the rack of the lever system is engaged with one of the stop structures with a higher engaging force. This allows a higher engaging force between the rack and the stop structure, thereby lowering the chances where the user may accidentally activate the length adjustment mechanism. Moreover, as the combined higher compression force of the two or more springs lead to a louder mechanical adjustment sound, hence allowing the user to hear the length adjustment easily.

**[0010]** According to an embodiment, the length adjustment mechanism is arranged in a way that when a force is applied to the button plate, the first end of the lever system which is functionally in contact thereto is pushed to one direction such as to the same direction where the force is applied, and the second end of the lever system is moved to an opposite direction and causing the at least one spring element to tense, thereby allowing the rack to be temporarily disengaged from the stop structure; when the force is removed, the at least one spring element returns to its natural state, allowing the rack to engage again with one of the stop structures.

**[0011]** According to an embodiment, the lever system is sandwiched in between the moving part and the button plate, arranged generally parallel to each other, and from top to bottom.

**[0012]** According to an embodiment, a housing cover is provided to mechanically connect the button plate, the lever system, and the moving plate for length adjustment of the watch strap.

**[0013]** According to an embodiment, the clasp comprises a first folding arm and a second folding arm that are foldable and positioned beneath the moving part, wherein a first longitudinal end of the first folding arm is mechanically connected to the housing cover, and a second longitudinal end of the first folding arm is pivotally connected to a first longitudinal end of the second folding arm.

**[0014]** According to an embodiment, a buckle releasing system is provided to each opposite side of the housing cover, wherein both the buckle releasing systems pro-

vided to the housing cover are functionally connected to the first longitudinal end of the first folding arm.

**[0015]** According to an embodiment, when both the buckle releasing systems are pressed simultaneously, the second end of the second folding arm is released from the housing cover, thereby allowing the first folding arm and the second folding arm to be unfolded.

**[0016]** According to an embodiment, the stop structures are provided in form of a plurality of trenches, arranged parallel to each other, perpendicular to the longitudinal axis of the clasp.

**[0017]** According to an embodiment, each of the stop structures comprises a bearing surface complementary or almost complementary to the bearing surface of the rack, wherein the bearing surface of the stop structure, when viewed from a longitudinal cross section of the clasp, comprises at least a first surface, a second surface or more.

**[0018]** According to an embodiment, the first surface is a vertical line and the second surface is an oblique line, forming an angle.

**[0019]** According to an embodiment, the bearing surface of the stop structure comprises at least a first surface, a second surface or more, wherein the first surface and the second surface are oblique lines, resembling a wedge having an angle; or the first surface is a vertical line and the second surface is a horizontal line and the third surface is a vertical line, resembling a block shape; or the first surface is a vertical line and the second surface is a curved line, resembling a truncated cone which is truncated perpendicular from the base of the cone.

**[0020]** By "about" or "approximately" in relation to a given numerical value, it is meant to include numerical values within 10% of the specified value. All values given in the present disclosure are to be understood to be complemented by the word "about" unless it is clear to the contrary from the context.

**[0021]** The indefinite article "a" or "an" does not exclude a plurality, thus should be treated broadly.

**[0022]** The term "movable part" refers to one of the two parts arranged to be able to perform the relative movement. In this description, the same designation is used and the other of the two parts ("supporting part") may be treated similar by other annotation e.g., "housing cover". Since it is a relative movement between two parts and/or two assemblies, which part is considered the "movable part" is only a matter of convention. This designation is arbitrary as it is a relative displacement and therefore is clear for skilled person. Usually, the smaller of the two parts is named as the movable part, the other part often having the mechanism for closing and opening the clasp, for example in the form of hinged blades, or having a housing. The supporting part can be made up of several components in order to allow the relative movement to take place.

**[0023]** In the context of the present invention, the "movable part" could be called the "first movable part" and the "supporting part" could be called the "second movable part", the first and second movable parts being capable of relative movement in the longitudinal direction. Nevertheless, the term "housing cover" may reflect more precisely in the present application and can be used synonym as supporting part.

## Brief Description of Drawings

**[0024]** The present invention will be explained in more detail, by way of example, with reference to the drawings in which:

Figure 1 schematically shows a perspective view of a clasp in an exploded view according to a first embodiment of the invention.

Figure 2A shows a perspective view of the clasp according the first embodiment.

Figure 2B shows a schematic top view of the clasp according the first embodiment.

Figure 2C shows a schematic bottom view of the clasp according the first embodiment.

Figure 3A shows a schematic longitudinal cross-sectional view of the clasp according the first embodiment.

Figure 3B is a closed-up view of the Figure 3A.

Figure 3C is a simplified extract of a longitudinal cross-section view of the moving part according to the first embodiment.

Figure 4A shows a schematic cross-sectional view of the clasp according the first embodiment where the cross-section is perpendicular to the longitudinal of the clasp, as indicated by the dotted line in Figure 2B.

Figure 4B shows a perspective half transparent view of the clasp according to the first embodiment without the housing cover.

Figure 5 shows a perspective view of the clasp according to a second embodiment.

Figure 6 shows a perspective view of the clasp according to a third embodiment.

Figure 7 shows a perspective view of the clasp according to a fourth embodiment.

Figure 8 shows a perspective view of the clasp according to a fifth embodiment.

Figure 9 shows a perspective view of the clasp ac-

cording to a sixth embodiment.

Description of Details of the Invention

**[0025]** Present invention allows the watch strap to be adjusted according to the need of a user. Of course, it is foreseen that similar length adjustment mechanism and clasp can be provided to other concepts, such as a bracelet or other wearable pieces.

**[0026]** In general, clasp for length adjustment of the watch comprises at least two parts arranged so as to be able to perform a relative movement in the longitudinal direction with respect to each other. Each of the two parts may have a fastening device. A first fixing device is intended to be connected to a first watch strap, and the second fixing device is intended to be connected to a second watch strap. In this configuration, the relative movement mentioned above causes the fastening elements to move closer or further apart and thus shortens or lengthens the useful length of the watch.

**[0027]** Typically, the movable part and the supporting part (e.g., housing cover), together, cooperate by means of an engaging member, such as a notch sequence, a rack, and/or a toothing, for example, on the one hand; and a trench-like structure, a jaw, a groove, a pit, or a lock, on the other hand, intended to cooperate with the engaging member in order to determine discrete values of useful length. In the present description, the engaging member is named as rack while the groove is named as stop structure. These two elements may preferably have a complementary engaging surface. Alternatively, they may have a complementary engaging surface on at least one face.

**[0028]** Clasp 100 shown in Figures 1 to 4 relates to a first embodiment clasp according to the present invention. The clasp 100 is intended to be connected to two strands of a watch (not shown) in a known manner, in particular to the free ends of the strands. The clasp 100 comprises a base for instance a moving part 30, elongated in the longitudinal direction of the bracelet and slightly curved over at least part of its length to better fit the shape of a wearer's wrist.

**[0029]** As can be seen in the exploded view of Figure 1, the clasp 100 comprises a button plate 10, a lever system 20, a moving part 30, a housing cover 40, a first folding arm 52 and a second folding arm 54, as well as other components which will be further elaborated beneath.

**[0030]** The clasp 100 comprises a button plate 10 which generally designed as an activator for the length adjustment mechanism of a strap. As the goal of the present invention aims to allow the user to adjust the length of the strap easily, the button plate 10 is preferably provided to a located can be reached easily. Moreover, when taking the human factor of ergonomics into account, the button plate 10 can preferably be provided as a large surface element, allowing its user to activate the strap length adjustment mechanism with only one rack, for instance via a thumb or an indexing rack.

**[0031]** The lever system 20 is provided in between the button plate 10 and the moving part 30. The lever system 20 comprises a handle 21 having a first end 26a and a second end 26b, wherein the first end 26a of the lever system 20 is arranged functionally in contact with the button plate 10, and a second end 26b of the lever system 20 is provided with a rack 28. Thanks to the arrangement of the handle 21 to its support, in its natural state, the first end 21a is configured to be in contact with the button plate 10 while the rack 28 is engaged with one of the stop structures 32 provided on the moving part 30. This is made possible via for instance a pivoting mechanism where the handle 21 is pivoted to the clasp 100 in such a way that the first end is urged to be in contact with the button plate 10, while the second end 21b is provided with a rack 28 is urged into one of the stop structures 32.

**[0032]** To this end, it is disclosed that the clasp 100 comprises a supporting part which acts to connect and stabilize different parts. The housing cover 40 for instance described in the present invention can be considered as a supporting part. A plurality of holes or openings e.g., 60a, 46a and 48a as shown in the Figure 2A can be provided to the housing cover 40. As an example, a first channel 12 is provided to the button plate 10, in which screw elements 46a, 46b can be used to mechanically connect the button plate 10 with the housing cover 40. Similarly, a second channel 22 is provided to the lever system 20, in which screw elements 48a, 48b can be used to mechanically connect the lever system 20 with the housing cover 40. Further, the moving part 30 can be connected to the housing cover 40 for instance via an elongated groove provided on each longitudinal sides of the housing cover 40. In other words, the moving part 30 is inserted to the grooves, and the two pillars 34 which are provided within the grooves 35 found within the moving part 30 are served as stopper to limit the movement of the moving part 30.

**[0033]** To this end, it is disclosed that the length of the grooves 35 may correspond to the distance of the combined stop structures 32 e.g., from the first stop structure to the last stop structure.

**[0034]** Figure 2A also depicts a buckle releasing system 60 is provided to the clasp 100, wherein a button 62 of said system 60 is provided on each opposite side of the longitudinal housing cover 40. In this connection, it is mentioned that both the buckle releasing systems 60 are connected to the housing cover 40, wherein they are functionally connected to the first longitudinal end 52a of the first folding arm 52 via button 62 and a spring element 64 (shown in the Figure 1). These elements 62, 64 can be inserted through a channel via an opening 65 such that the folding arms are mechanically connected to the clasp 100 via the housing cover 40. When user presses simultaneously the buttons 62, the buckle can be released such that the watch can be put on or taken off from the wrist.

**[0035]** Figure 2B shows a top view of the clasp 100

according to the first embodiment of the invention, wherein the housing cover 40 comprises a generally rectangular shape which outlines predominantly the shape of the clasp 100. The buckle releasing systems 60 are provided to the sides closed to one longitudinal end of the clasp 100 while the button plate 10 is provided centrally on top of the housing cover 40. Figure 2C illustrates a bottom view of the clasp 100 where the first folding arm 52 and the second folding arm 54 can be seen tucked underneath of the housing cover 40 of the clasp 100.

**[0036]** Figure 3A depicts a longitudinal cross-sectional view of the clasp 100 according to the first embodiment. The clasp 100 comprises a housing cover 40 which serves to connect different components of the length adjustment mechanism, comprising such as a button plate 10, a lever system 20 and a moving plate 30. To this end, it is also disclosed that the length adjustment mechanism may also be realized with the buckle releasing system 60 comprising a first folding arm 52 and a second folding arm 54.

**[0037]** Figure 3B is a closed-up view of the Figure 3A in order to elaborate the length adjustment mechanism in a more detailed manner. When a user wishes to adjust the length of the strap, such as to loosen the watch strap, the button plate 10 which is located on top of the clasp 100 is pressed downwards. To this end, it is disclosed that the button plate 10 is mechanically supported by the housing cover 40 via a channel 12. Sitting directly beneath of the button plate 10 is the lever system 20 which is supported through another channel 22 to the housing cover 40. Through this channel 22 a fulcrum is provided to the handle 21 of the lever system 20. The handle 21 comprises a first end 26a, on one end of the handle 21, configured to be in contact with the button plate 10; whereas a second end 26b, on an opposite end of the first end 26a of the handle 21 (opposite side over the fulcrum), is provided with a rack 28. Due to the configuration of the handle 21, the rack 28 is urged to engage with one of the stop structures 32 of the moving part 30.

**[0038]** In order to increase the engaging force of the rack 28 with the stop structure 32, a spring element 24 can further be provided to the lever system 20. The spring element 24 can be provided on top of the rack 28, wherein one longitudinal end of the spring element 24 is connected to the button plate 10 while another longitudinal end of the spring element 24 is connected with the second end 26b of the handle 21. In its nature state, the spring element 24 is constantly exerting its force towards the second end 26b of the handle 21 such that the rack 28 is urged and engaged with the stop structure 32. Thanks to the higher engaging force, accidental activation of the length adjustment can be avoided.

**[0039]** When the button plate 10 is pressed by the user, the first end 26a of the handle 21 moves downwards and consequently the second end 26b of the handle 21 moves upwards according to the lever principle. This allows the rack 28 to be temporarily disengaged with the stop structure 32. At the same time, the spring element 24 is tensed. The user could then pull the watch strap translationally such that when the force on the button plate 10 is removed, the rack 28 is then engaged with another stop structure 32 (e.g., towards left).

**[0040]** When the user wishes to tighten the watch strap, due to the surface geometry of the stop structure according to this embodiment, the watch strap can simply be pushed towards the direction of button 62 of the buckle releasing system 60 without needing to press the button plate 10.

**[0041]** Figures 4A and 4B show the buckle releasing system 60 of the clasp 100. The buckle releasing system 60 is provided on both longitudinal side of the clasp 100. The buckle releasing system 60 comprises a button 62 and a spring element 64. When both the buttons 62 are being pressed by the user, the buttons 62 move translationally and subsequently pushes the holding screws which are positioned at the longitudinal end of the buttons 62, thereby allowing the unfolding of the first folding arm 52 and the second folding arm 54.

**[0042]** Figure 5 shows a second embodiment of the invention, wherein two spring elements 24 are provided to the lever system 20. The spring elements 24 can be provided side by side on the second end 26b of the handle 21, in between the button plate 10 and the handle 21. This allows a higher engaging force between the rack 28 and the stop structure 32, thereby lowering the chances where the user may accidentally activate the length adjustment mechanism. Moreover, such higher resistant force allows a louder adjustment sound. This allows the user to hear more easily how many steps of the strap length have been adjusted.

**[0043]** As an example, a combined of at least 1 N compression spring force, or preferably at least 2 N or 5 N compression spring force can be provided to the lever system 20 to allow a louder adjustment sound when the rack 28 is transiting from a stop structure 32 to another.

**[0044]** Figure 6 demonstrates a third embodiment of the invention, wherein the stop structures 32 of the moving part 30 as well as the rack 28 of the lever system 20 are provided with different geometry compared to the first embodiment (Figure 3C).

**[0045]** As can be seen in the simplified schematic of Figure 3C, the moving part 30 is provided with a number of stop structures 32 which resemble trenches, wherein the trenches are aligned generally perpendicular to the longitudinal axis of the clasp 100. The stop structures 32 comprises a first surface profile that is vertical 32a and followed by a second surface profile 32b that is inclined which, together, form an angle $\alpha$. The angle is preferably between 20° and 50°, or preferably between 25° and 35°. The incline surface 32b has the advantage that the strap can be tightened by simply pushing the strap towards the direction of buckle releasing system 60 without needing to press the button plate 10.

**[0046]** Figure 6 shows a third embodiment according to the present invention where the stop structures 32 or also known as trenches are provided in form of rectan-

gular cube. Of course, a square cube can also be foreseen as a further embodiment. Stop structure 32 provided in this form can be served to prevent accidental adjustment (e.g., tightening or lengthening) of the strap, as the rack 28 has to be lifted up temporarily and then engage again the rack 28 with another stop structure 32. Moreover, this embodiment has the advantage of producing louder and clearer adjustment sound as the engagement force between the rack 28 and the stop structure 32 are greater. In addition, this embodiment also allows the strap to be tightened without needing to press on the button plate 10 thanks to the arrangement of the lever system 20 according to the present invention but only when loosening the strap.

**[0047]** To this end, the rack 28 may be provided in a form complementary to the surface profile of the stop structure 32 as explained above e.g., Figure 6. Alternative, the rack 28 can be provided to have at least one surface profile that matches to the stop structure 32. This is illustrated for example in the Figure 7 where the first surface profile of the rack 28 is vertical and the second surface profile of the rack 28 is curved. This embodiment allows the rack 28 to engage with different stop structures 32 when adjusting the strap's length thanks to the curved surface of the rack 28.

**[0048]** Figure 8 is a fourth embodiment where the rack 28 is identical to the third embodiment. In this embodiment, the rack 28 that is provided at the second end 26b of the handle 21 comprises a surface that matches completely with the surface profile of the stop structures 32. This embodiment has the advantage of allowing a smooth transition when the rack 28 moves from one stop structure 32 to another as the peaks of the stop structures are removed while allowing a greater engagement force compared to the embodiment shown in the Figure 3A.

**[0049]** Figure 9 shows a fifth embodiment of the invention where the stop structures 32 comprises a plurality of trenches, having a vertical surface profile 32a and an inclined surface profile 32b, wherein a horizontal surface profile 32c is connecting the strop structures 32. Such stop structures 32 has the advantage of allowing the rack 28 to transit between the stop structures smoothly.

## Claims

1. A clasp (100) for watch comprising a length adjusting mechanism for adjusting the length of a watch strap, comprising a button plate (10), a moving part (30), and a lever system (20) interposed between the button plate (10) and the moving part (30),

   wherein a first end (26a) of the lever system (20) is arranged functionally in contact next to the button plate (10), and a second end (26b) of the lever system (20) is provided with a rack (28),
   wherein a plurality of stop structures (32) are provided on the moving part (30), wherein the rack (28) is urged to be engaged with one of the stop structures (32) at a time, thereby allowing the adjustment of the length of the watch strap.

2. The clasp (100) according to the claim 1, wherein the lever system (20) comprises a fulcrum (22) provided to a handle (21) in between the first end (26a) and the second end (26b), the lever system (20) comprises at least one spring element (24), wherein the spring element (24) is provided to the second end (26b) of the lever system (20), arranged in such a way that the spring element (24) in its natural state pushes against the second end (26b) of the lever system (20) such that the rack (28) of the lever system (20) is engaged with one of the stop structures (32).

3. The clasp (100) according to the claim 1 or claim 2, wherein two or more spring elements (24) are provided to the lever system (20), preferably arranged linearly in a longitudinal axis of the lever system (20), arranged in such a way that the two or more spring elements (24) in its natural state pushes against the second end (26b) of the lever system (20) such that the rack (28) of the lever system (20) is engaged with one of the stop structures (32) with a higher engaging force.

4. The clasp (100) according to any one of the preceding claims, wherein the length adjustment mechanism is arranged in a way that when a force is applied to the button plate (10), the first end (26a) of the lever system (20) which is functionally in contact thereto is pushed to one direction such as to the same direction where the force is applied, and the second end (26b) of the lever system (20) is moved to an opposite direction and causing the at least one spring element (24) to tense, thereby allowing the rack (28) to be temporarily disengaged from the stop structure (32); when the force is removed, the at least one spring element (24) returns to its natural state, allowing the rack (28) to engage again with one of the stop structures (32).

5. The clasp (100) according to any one of the preceding claims, wherein the lever system (20) is sandwiched in between the moving part (30) and the button plate (10), arranged generally parallel to each other, and from top to bottom.

6. The clasp (100) according to any one of the preceding claims, wherein a housing cover (40) is provided to mechanically connect the button plate (10), the lever system (20) and the moving plate (30) for length adjustment of the watch strap.

7. The clasp (100) according to any of the preceding claims, wherein the clasp (100) comprises a first fold-

ing arm (52) and a second folding arm (54) that are foldable and positioned beneath the moving part (30), wherein a first longitudinal end (52a) of the first folding arm (52) is mechanically connected to the housing cover (40), and a second longitudinal end (52b) of the first folding arm (52) is pivotally connected to a first longitudinal end (54a) of the second folding arm (54).

**8.** The clasp (100) according to the claim 6 or claim 7, wherein a buckle releasing system (60) is provided to each opposite side of the housing cover (40), wherein both the buckle releasing systems (60) provided to the housing cover (40) are functionally connected to the first longitudinal end (52a) of the first folding arm (52).

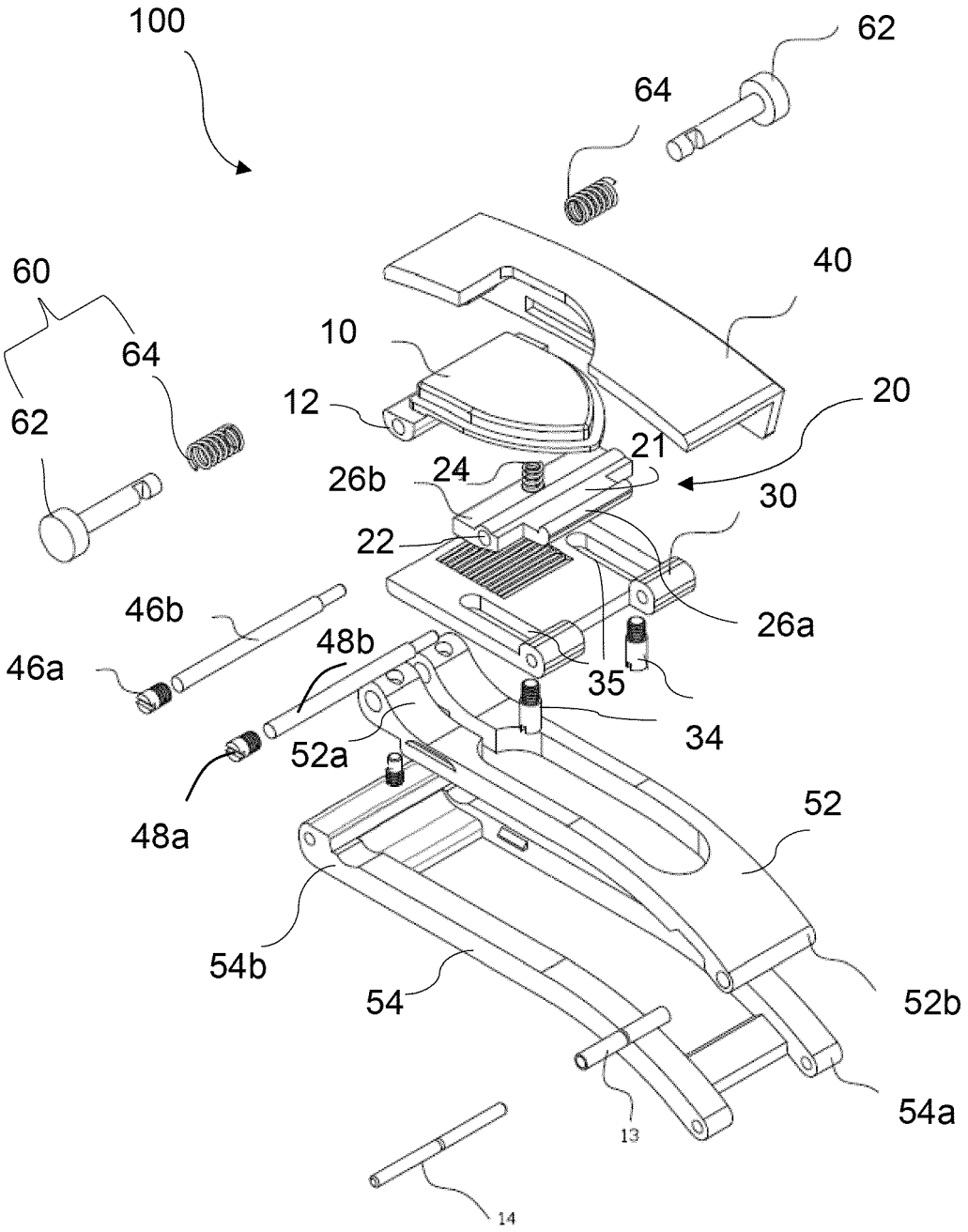
**9.** The clasp (100) according to any one of the claim 6 to claim 8, wherein when both the buckle releasing systems (60) are pressed simultaneously, the second end (54b) of the second folding arm (54) is released from the housing cover (40), thereby allowing the first folding arm (52) and the second folding arm (54) to be unfolded.

**10.** The clasp (100) according to any one of the preceding claims, wherein the stop structures are provided in form of a plurality of trenches, arranged parallel to each other, perpendicular to the longitudinal axis of the clasp.

**11.** The clasp (100) according to any one of the preceding claims, wherein each of the stop structures (32) comprises a bearing surface complementary or almost complementary to the bearing surface of the rack (28), wherein the bearing surface of the stop structure, when viewed from a longitudinal cross section of the clasp (100), comprises at least a first surface, a second surface or more.

**12.** The clasp (100) according to claim 11, wherein the first surface is a vertical line and the second surface is an oblique line, forming an angle.

**13.** The clasp (100) according to claim 11, wherein the bearing surface of the stop structure (32) comprises at least a first surface, a second surface or more, wherein the first surface and the second surface are oblique lines, resembling a wedge having an angle; or the first surface is a vertical line and the second surface is a horizontal line and the third surface is a vertical line, resembling a block shape; or the first surface is a vertical line and the second surface is a curved line, resembling a truncated cone which is truncated perpendicular from the base of the cone.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14

FIGURE 1

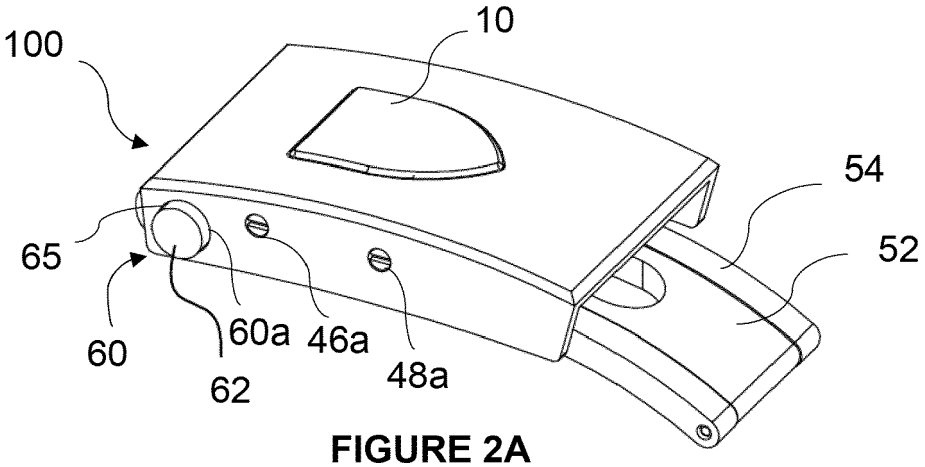


FIGURE 2A

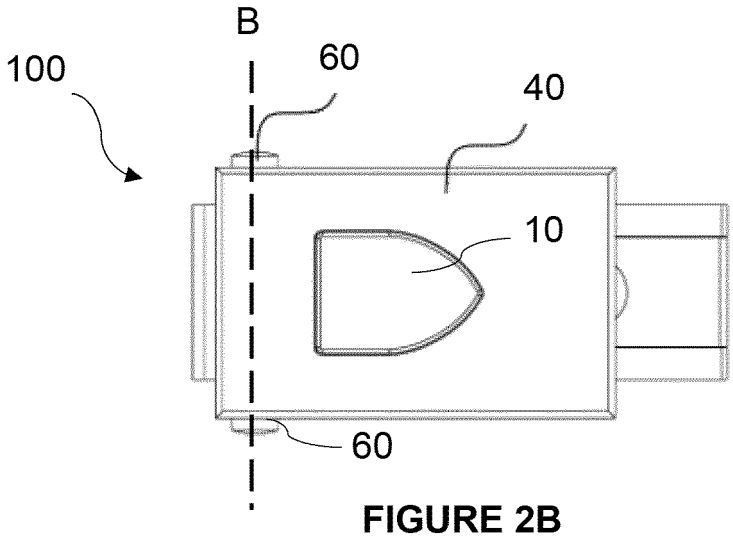


FIGURE 2B

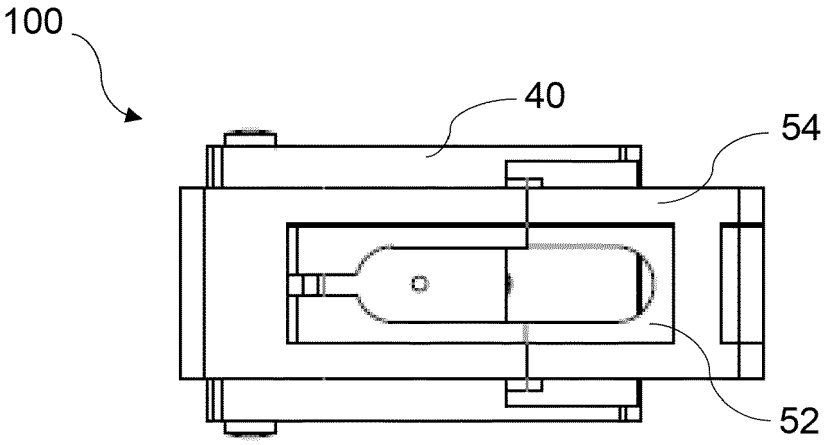


FIGURE 2C

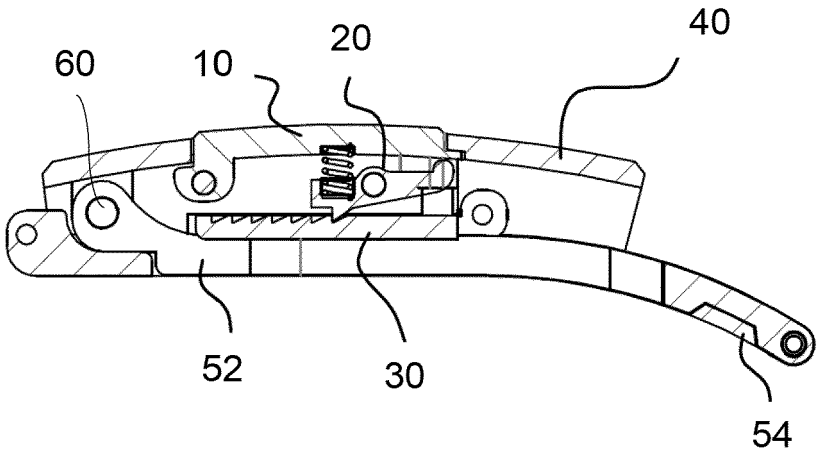


FIGURE 3A

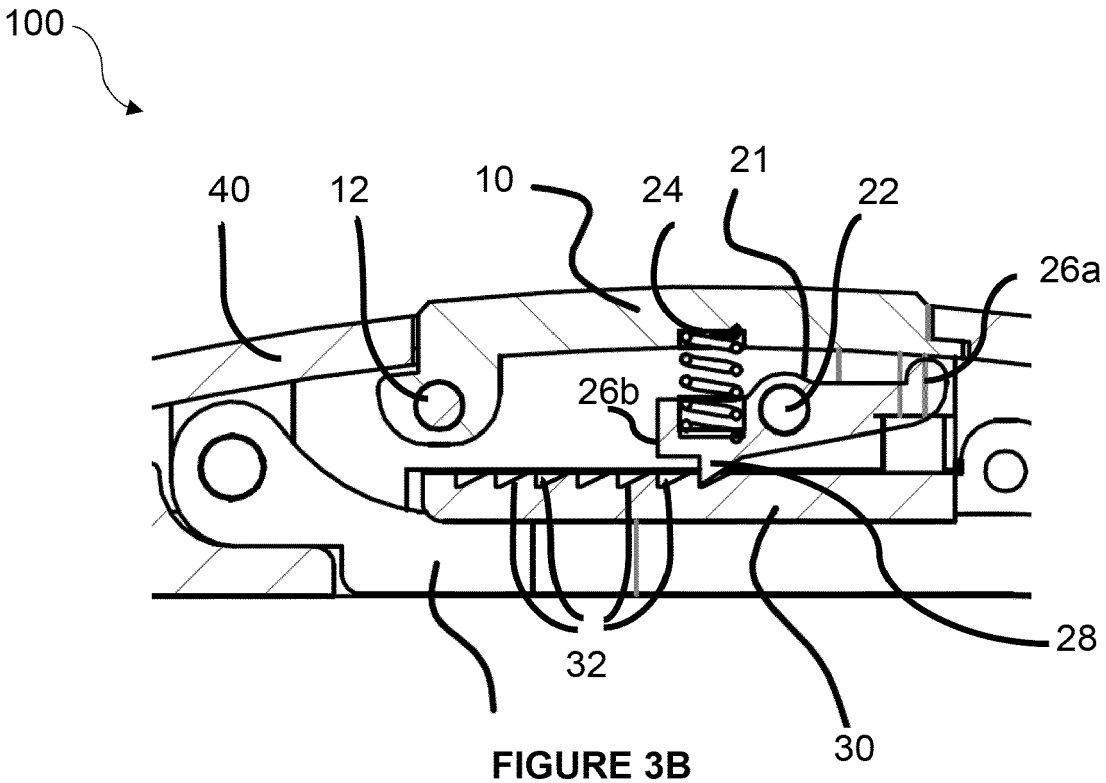


FIGURE 3B

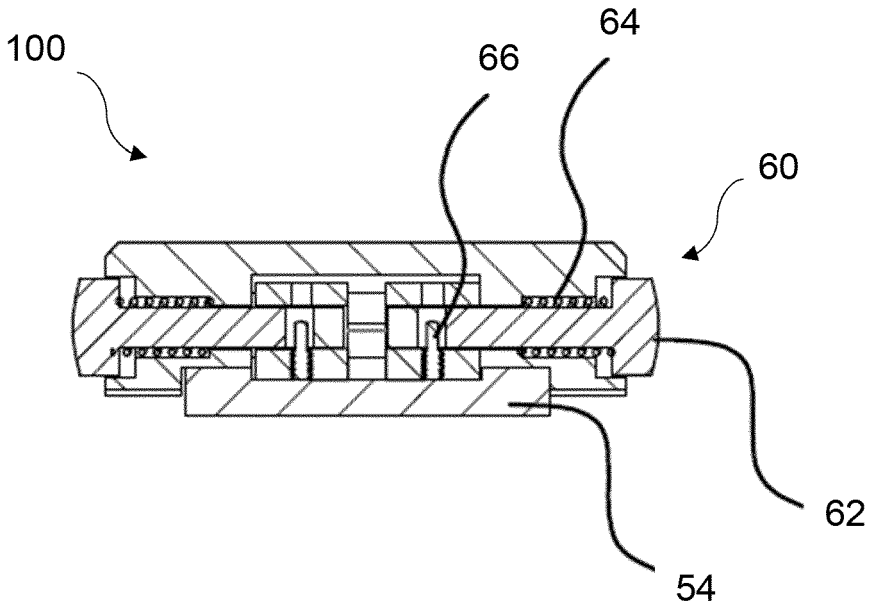


FIGURE 4A

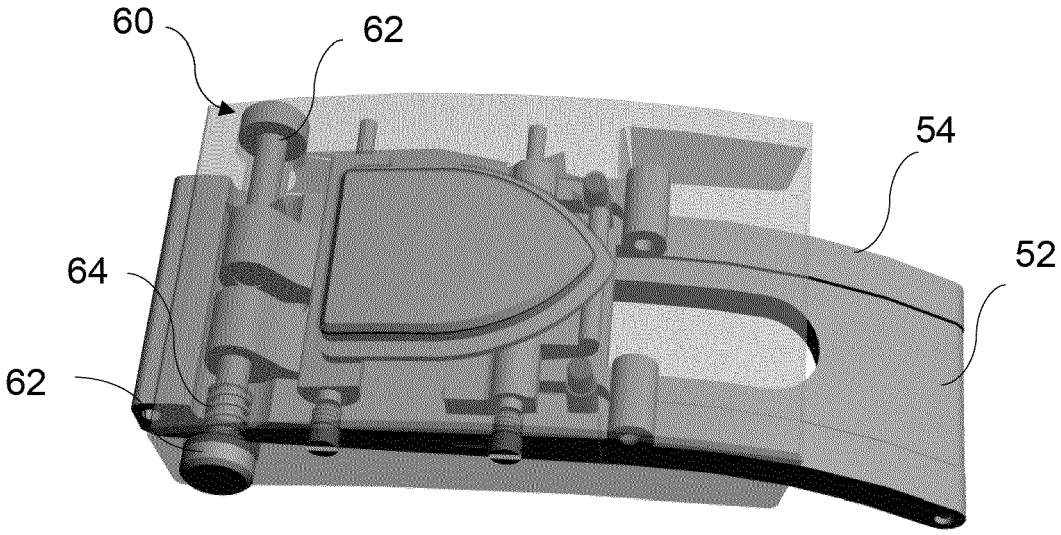


FIGURE 4B

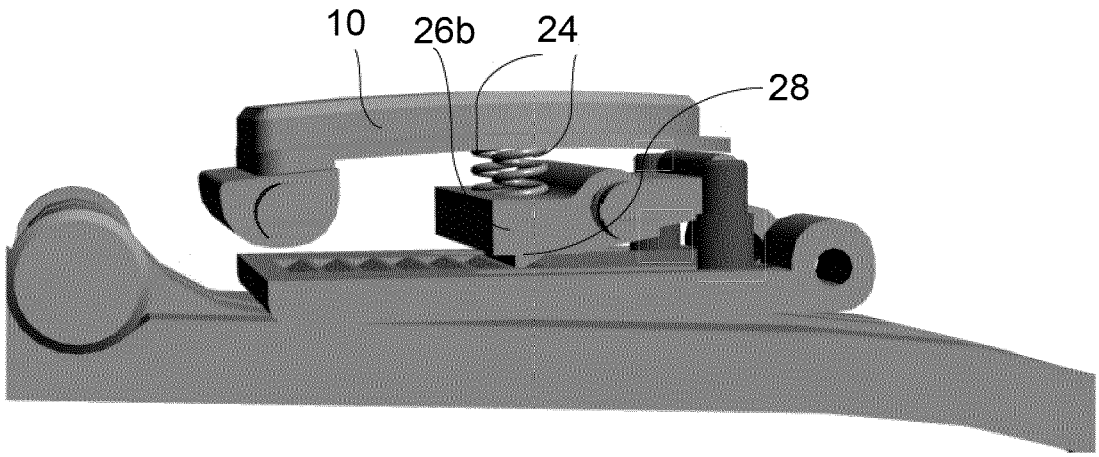


FIGURE 5

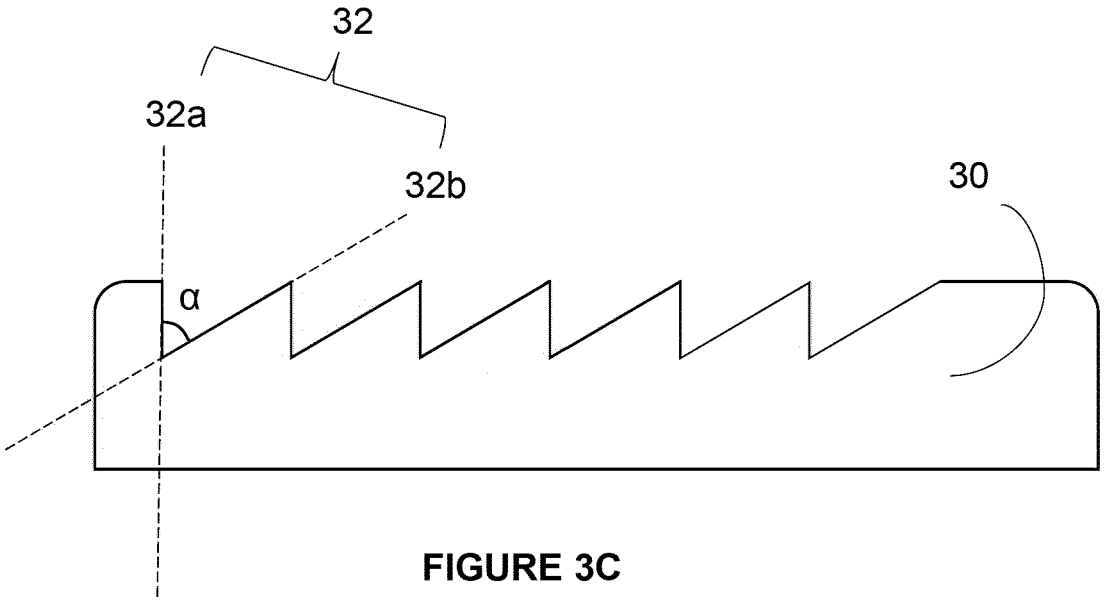


FIGURE 3C

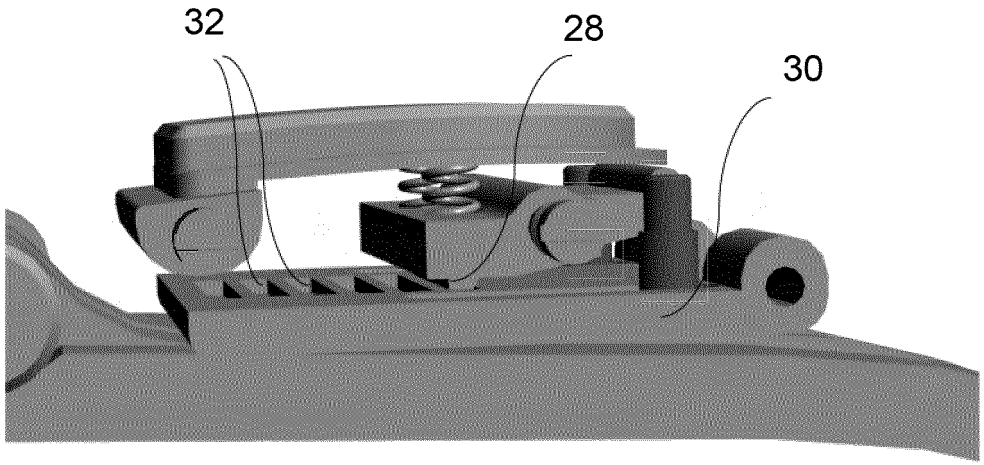


FIGURE 6

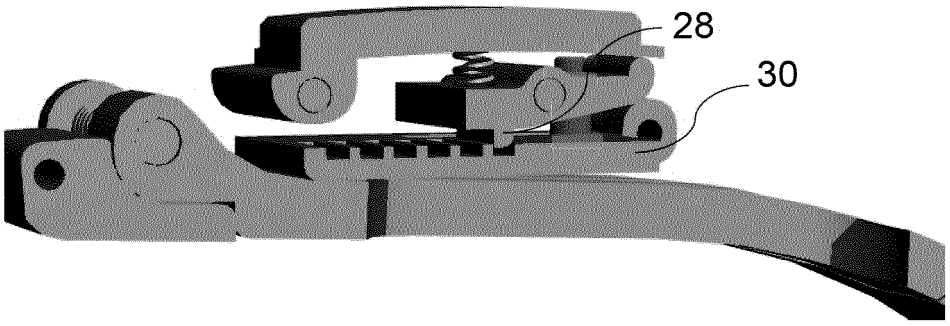


FIGURE 7

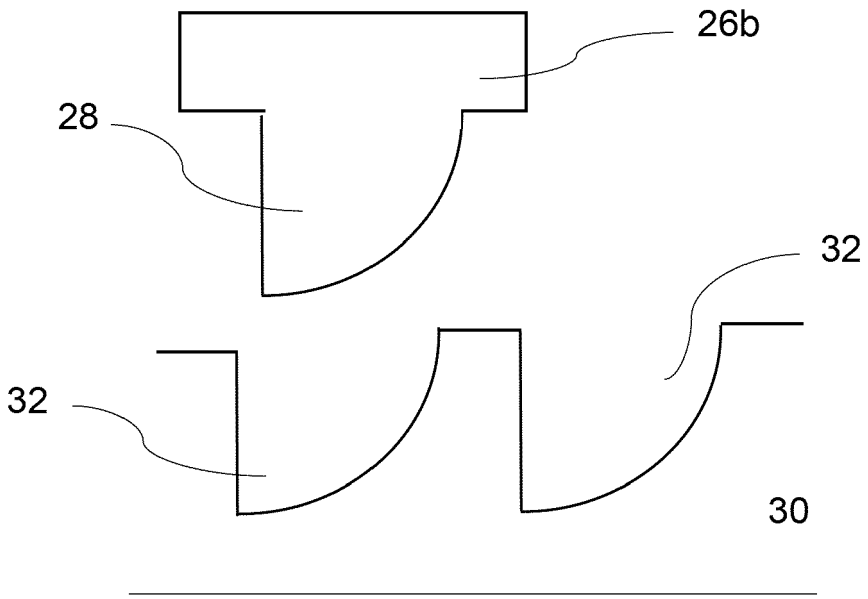


FIGURE 8

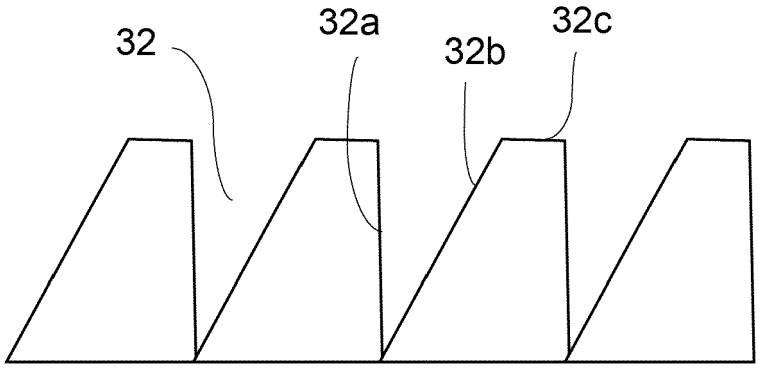


FIGURE 9

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The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 26 May 2023 | van Voorst, Frank |

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