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(54) **KEYSWITCH, KEYBOARD AND KEYSWITCH MANUFACTURING METHOD THEREOF**

(71) Applicant: **DARFON ELECTRONICS CORP.**, Taoyuan (TW)

(72) Inventors: **Pen-Hui Liao**, Taoyuan (TW); **Chin-Hung Lin**, Taoyuan (TW); **Hsin-Hung Liu**, Taoyuan (TW); **I-Chu Kuo**, Taoyuan (TW); **Yu-Ming Huang**, Taoyuan (TW)

(73) Assignee: **DARFON ELECTRONICS CORP.**, Taoyuan (TW)

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G06F 3/02 (2006.01)
H01H 13/88 (2006.01)

(52) **U.S. Cl.**

CPC ***H01H 3/12*** (2013.01); ***G06F 3/0202*** (2013.01); ***H01H 3/125*** (2013.01); ***H01H 13/88*** (2013.01);

(Continued)

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CPC H01H 3/12; H01H 2/125; H01H 13/88; H01H 2215/042; H01H 2221/04; G06F 3/0202

(Continued)

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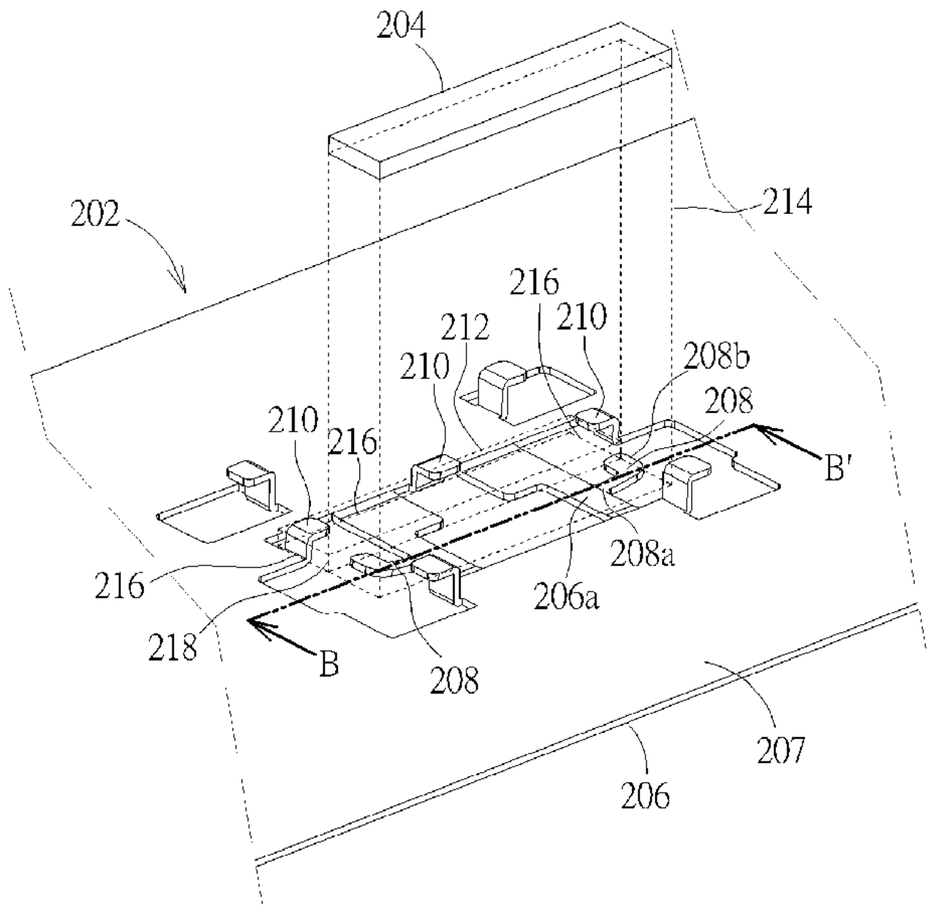
Primary Examiner — Kenneth Whittington

(74) *Attorney, Agent, or Firm* — Winston Hsu

(57) **ABSTRACT**

A keyswitch includes a cap, a support structure, a first magnet, and a baseplate having a bending arm protruding from the baseplate and a support rib extending horizontally to form a receiving space with the bending arm. The support structure includes a first support member pivoted to the baseplate and against the cap and a magnetic permeable plate extending from the first support member and being above the receiving space. The first magnet is inserted into the receiving space to be supported by the support rib and be pressed by the bending arm. When the cap is pressed to make the magnetic permeable plate away from the first magnet as the first support member rotates, the cap moves to a pressed position. When the cap is released, a magnetic attraction force between the magnetic permeable plate and the first magnet drives the magnetic permeable plate to approach the first magnet.

22 Claims, 19 Drawing Sheets



(52) **U.S. Cl.**
CPC ... *H01H 2215/042* (2013.01); *H01H 2221/04* (2013.01)

(58) **Field of Classification Search**
USPC 200/341, 344; 335/205
See application file for complete search history.

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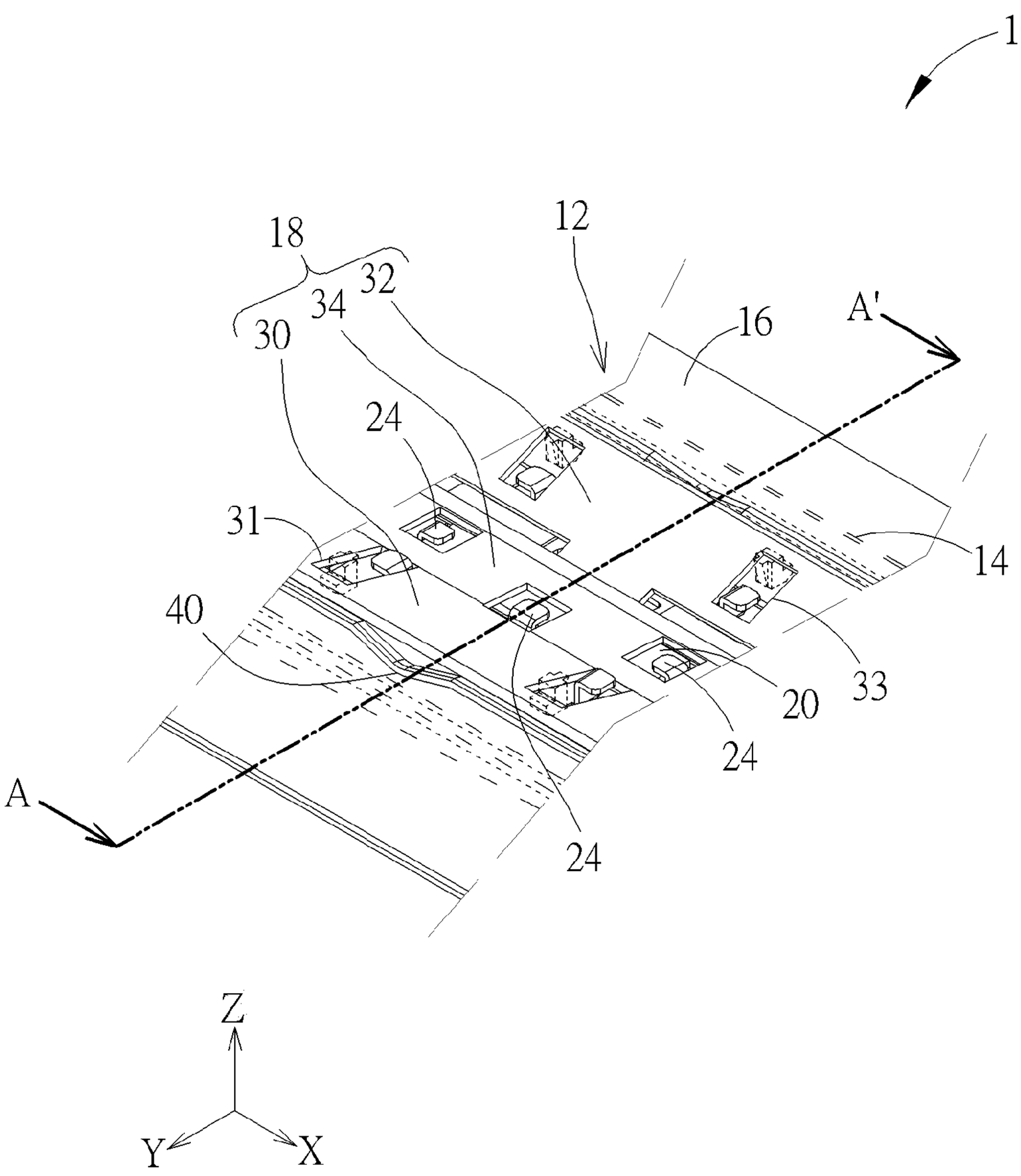


FIG. 1

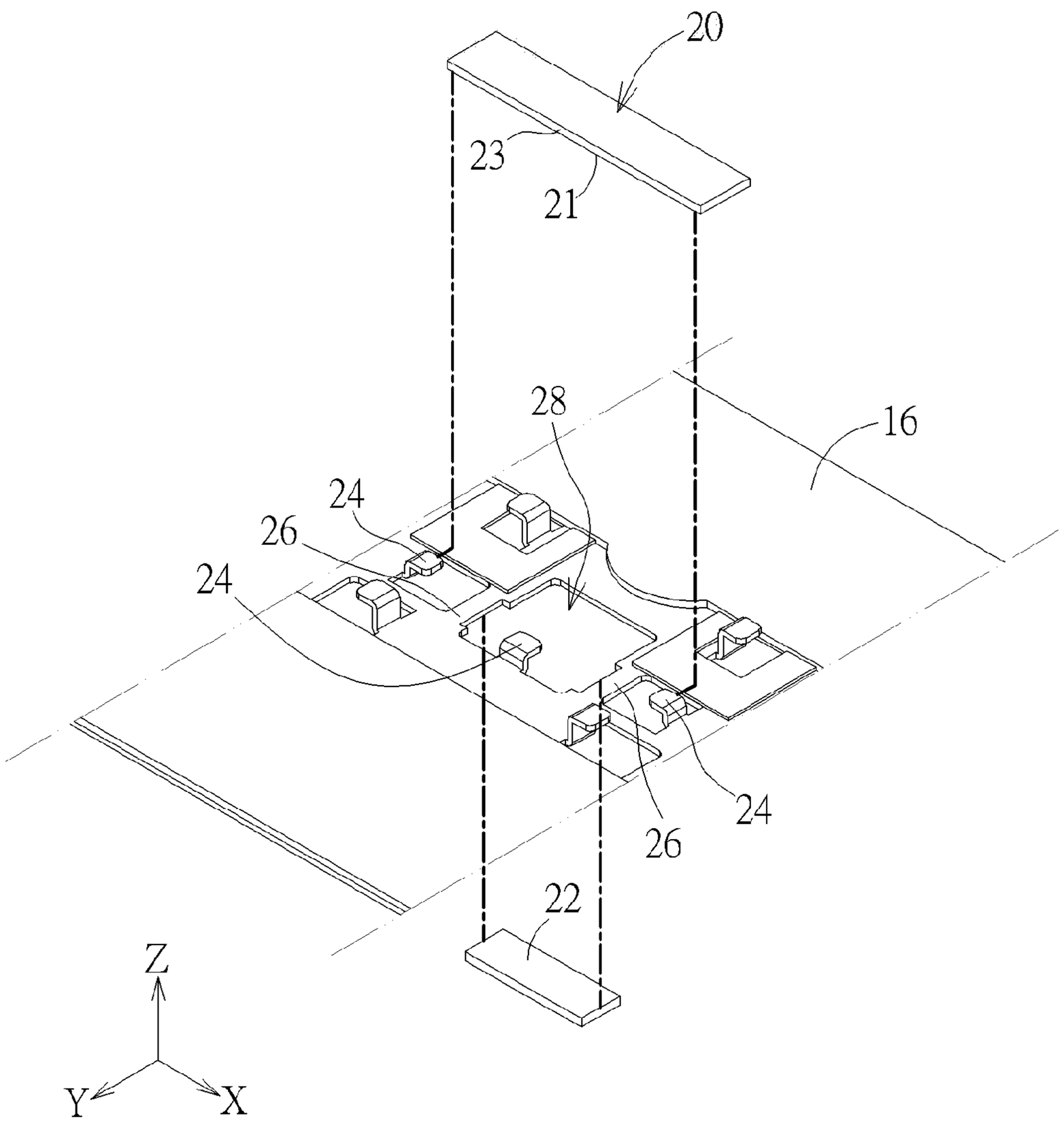
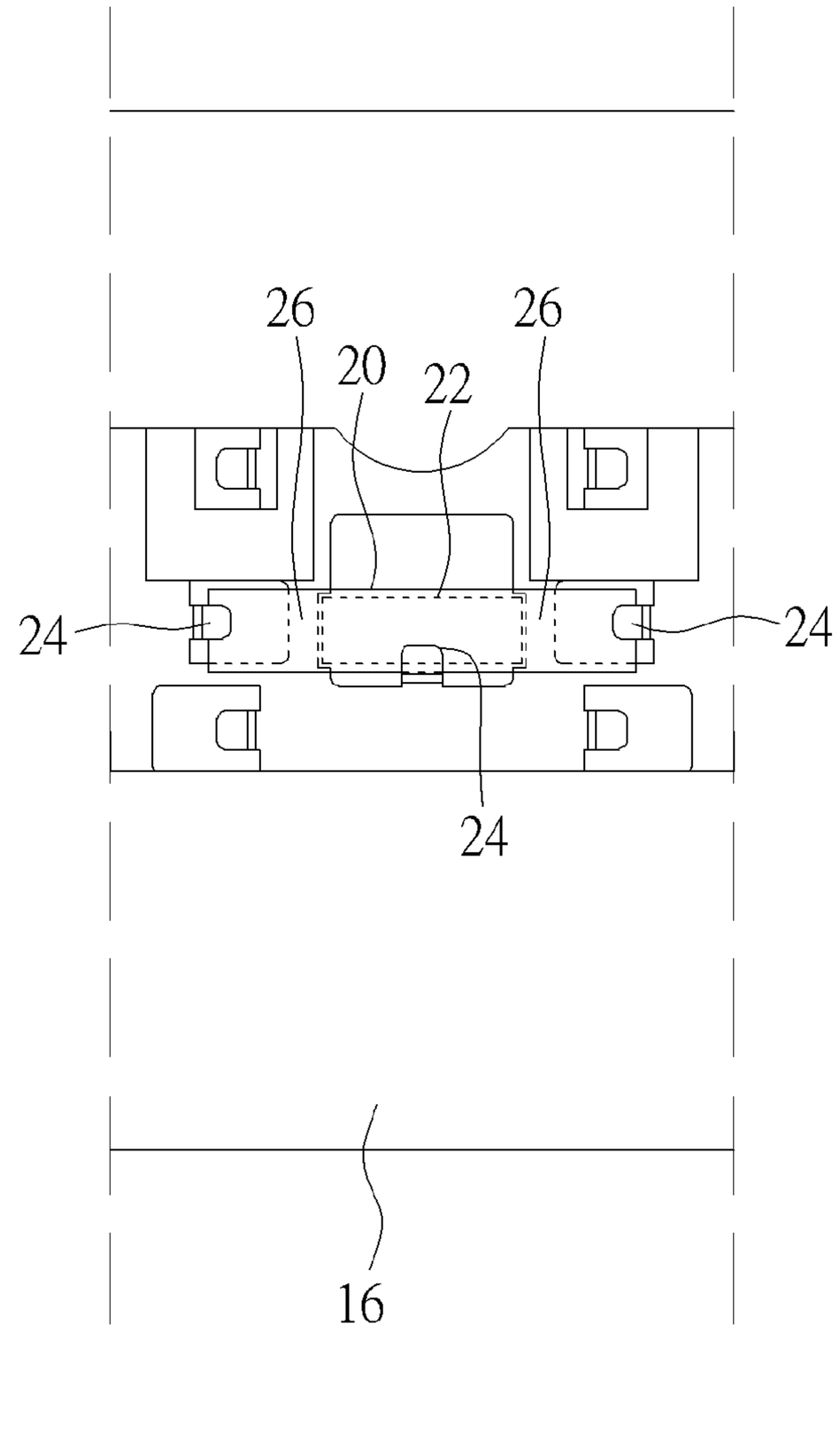


FIG. 2



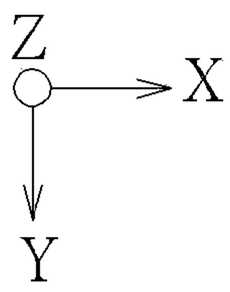


FIG. 3

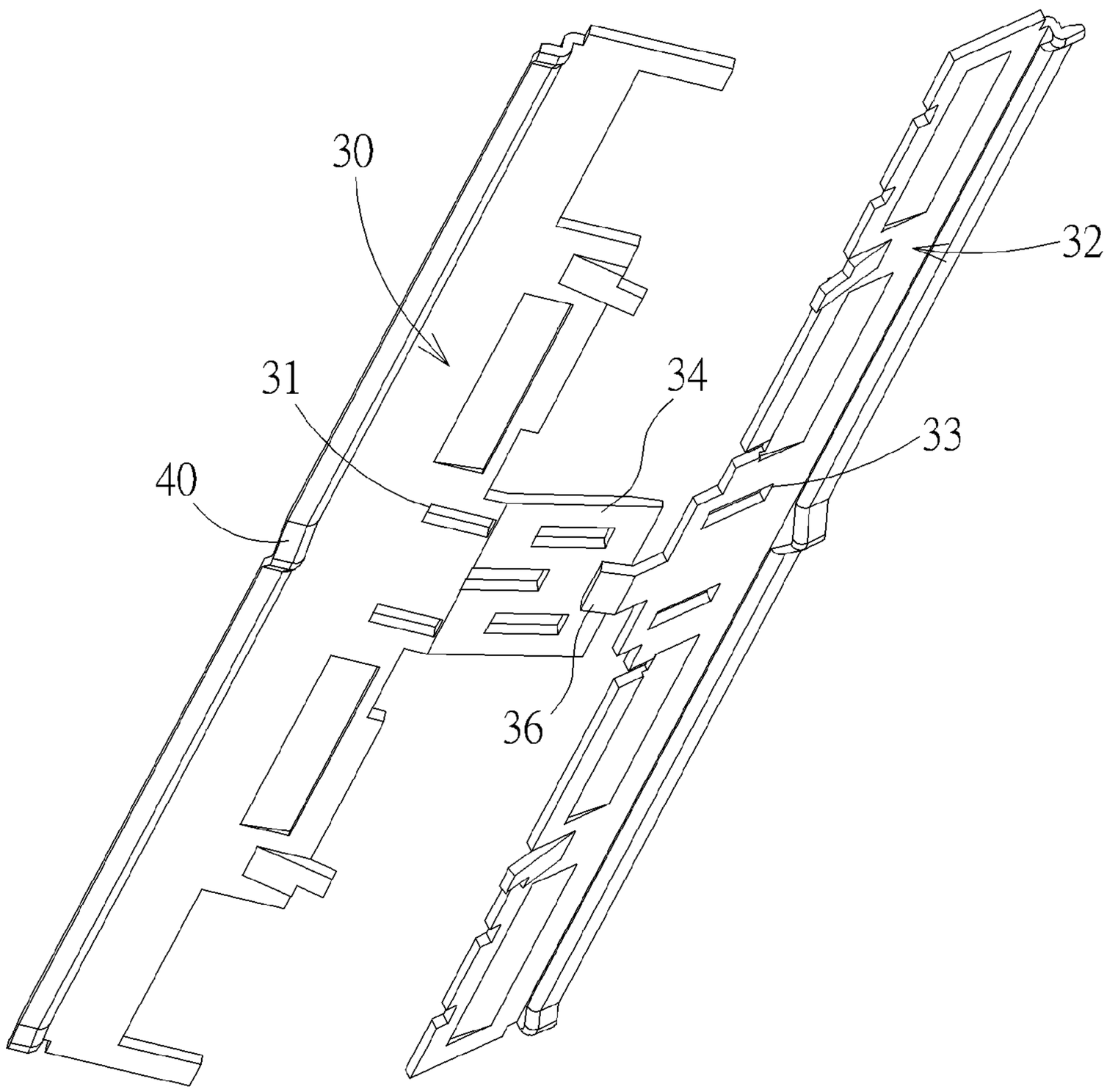


FIG. 4

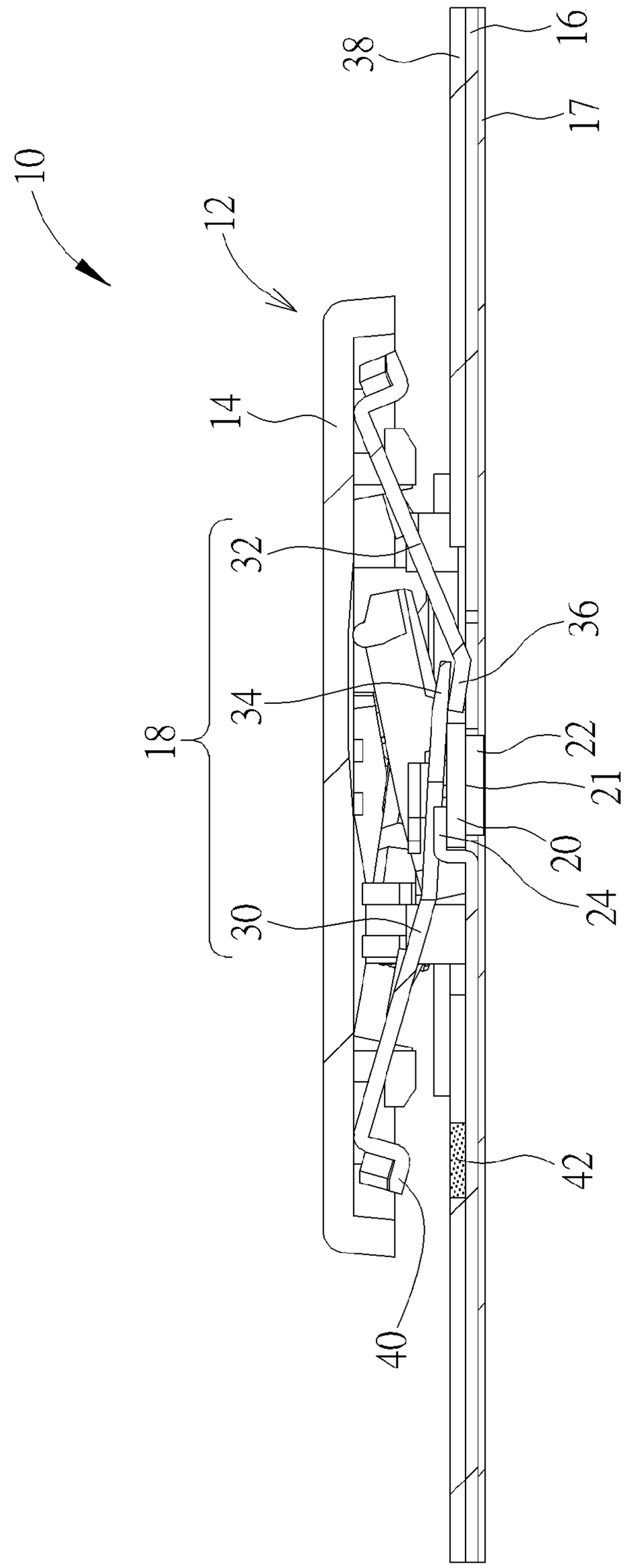


FIG. 5

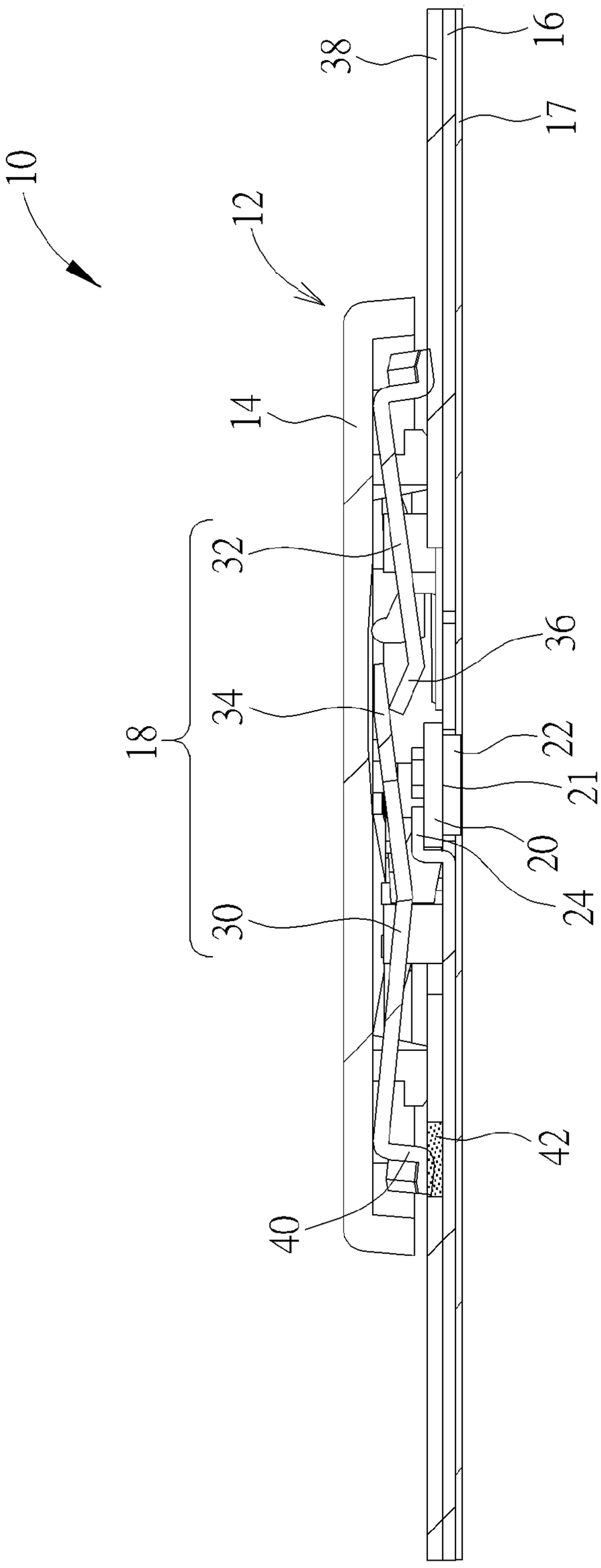


FIG. 6

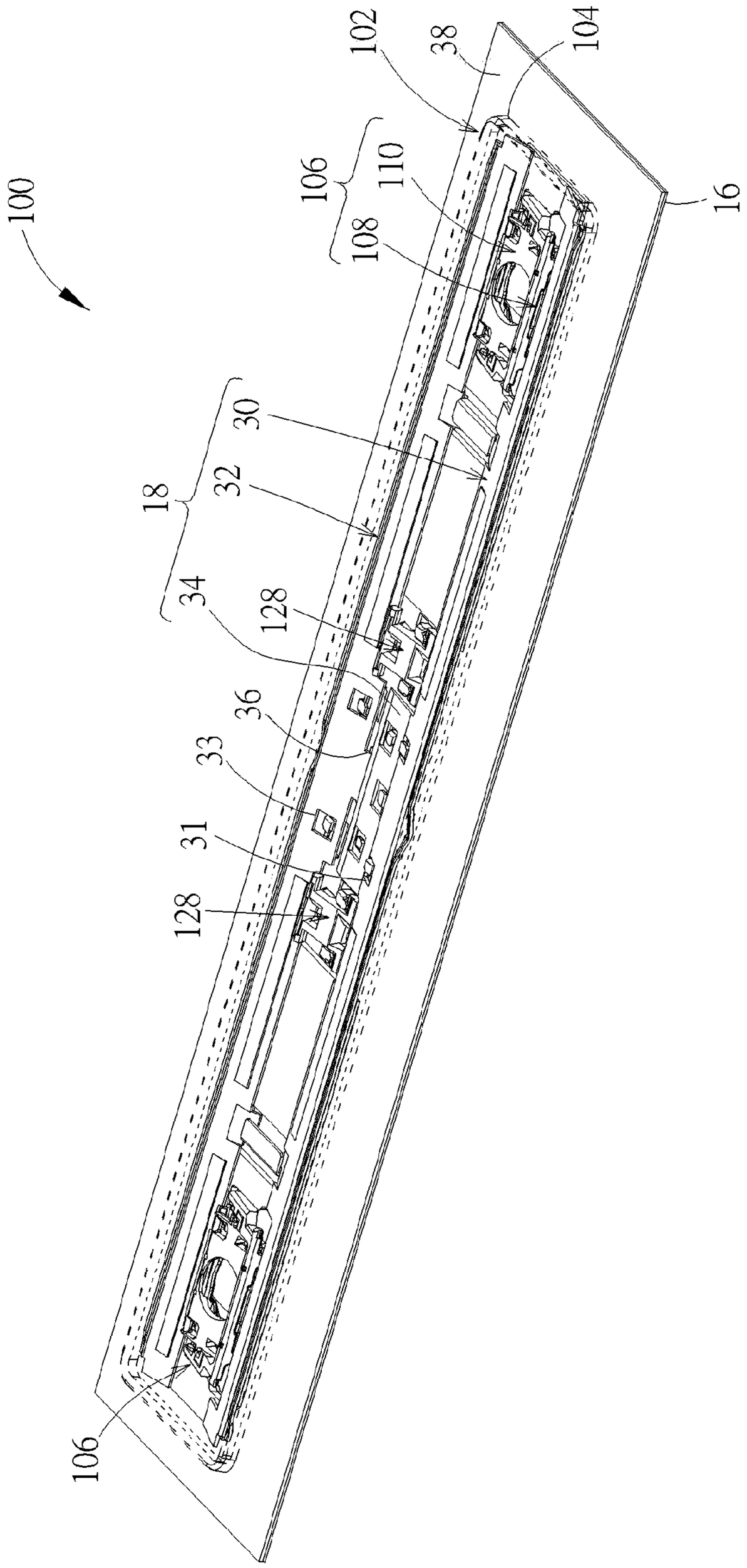


FIG. 7

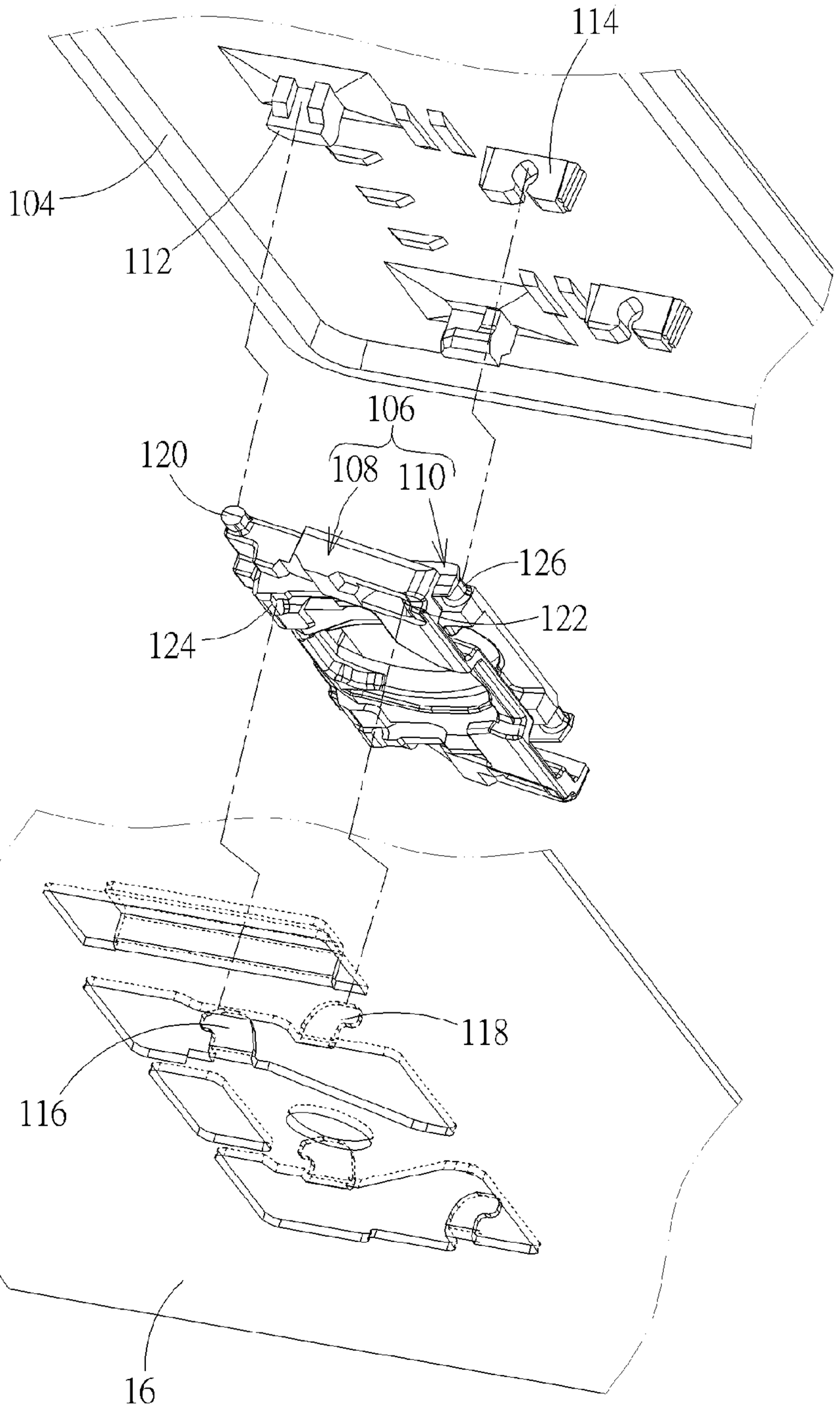


FIG. 8

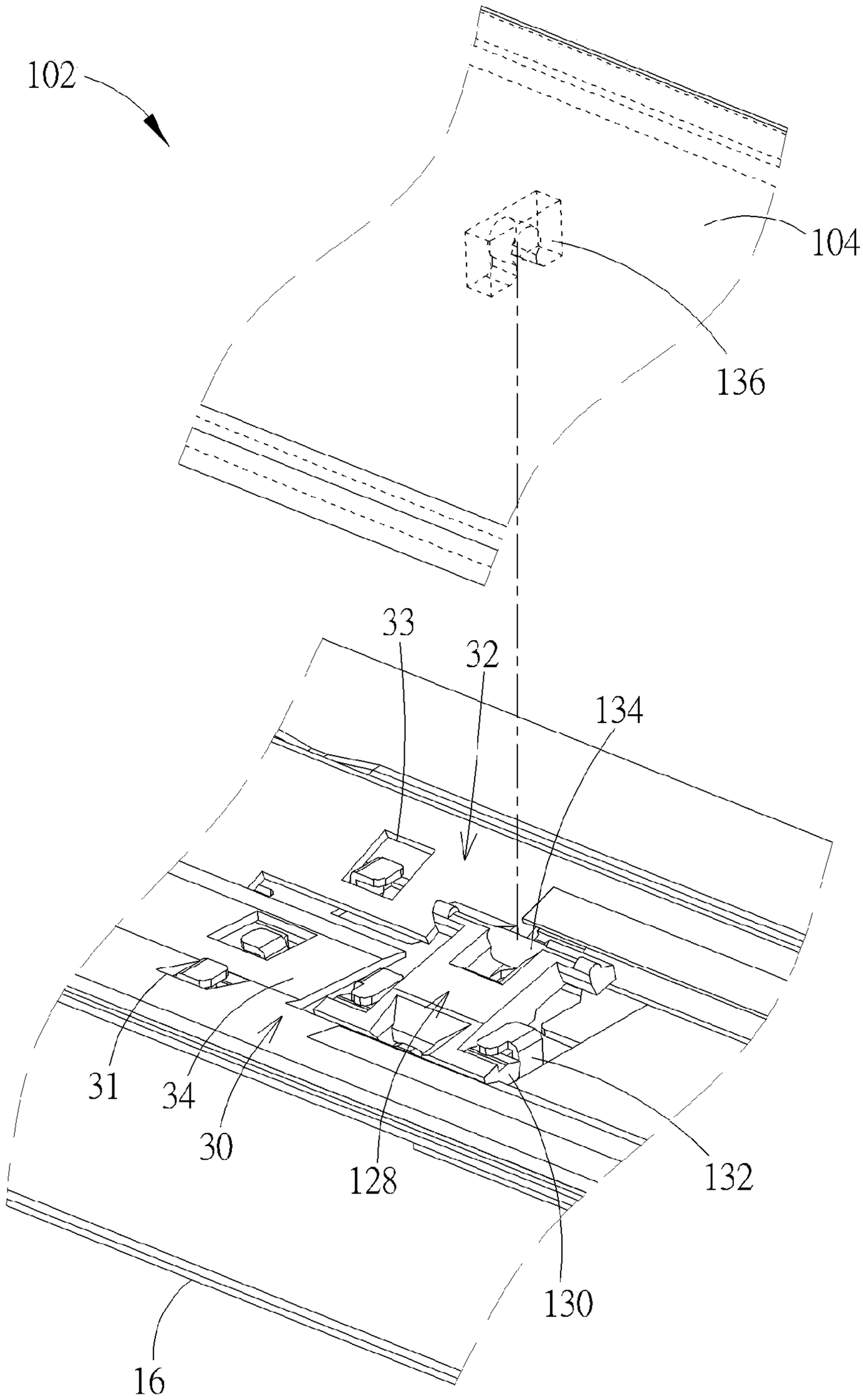


FIG. 9

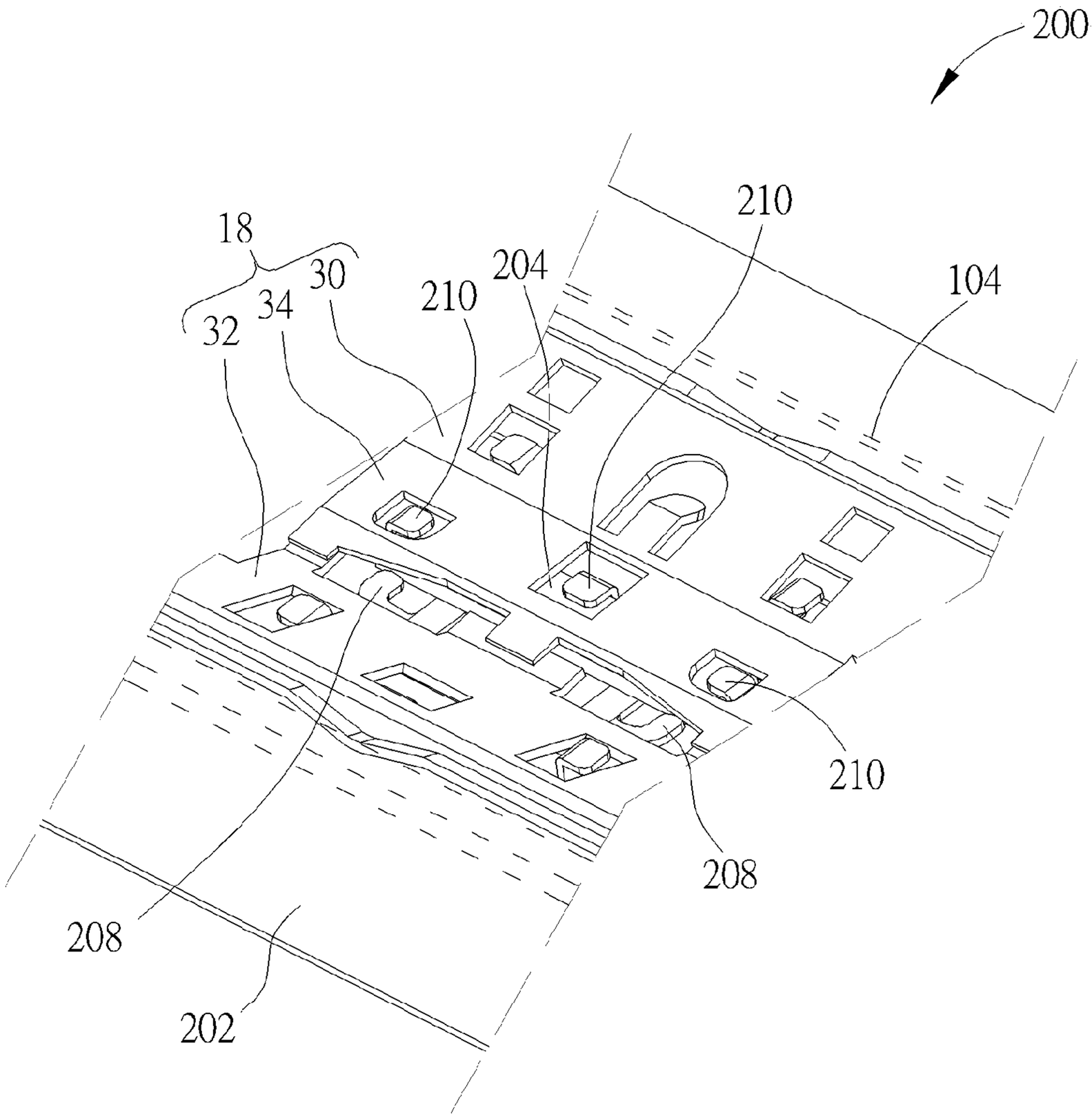


FIG. 10

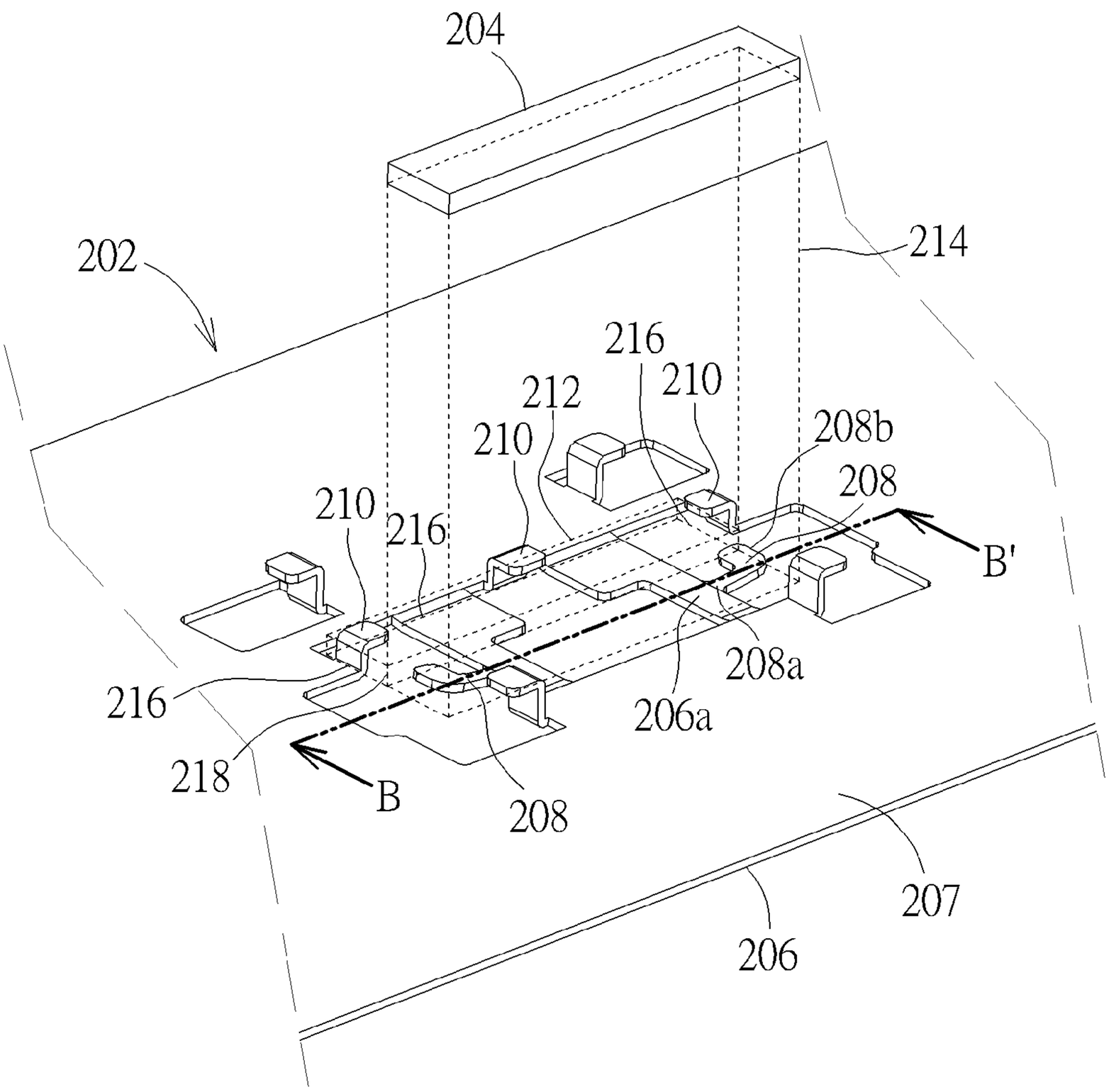

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FIG. 11

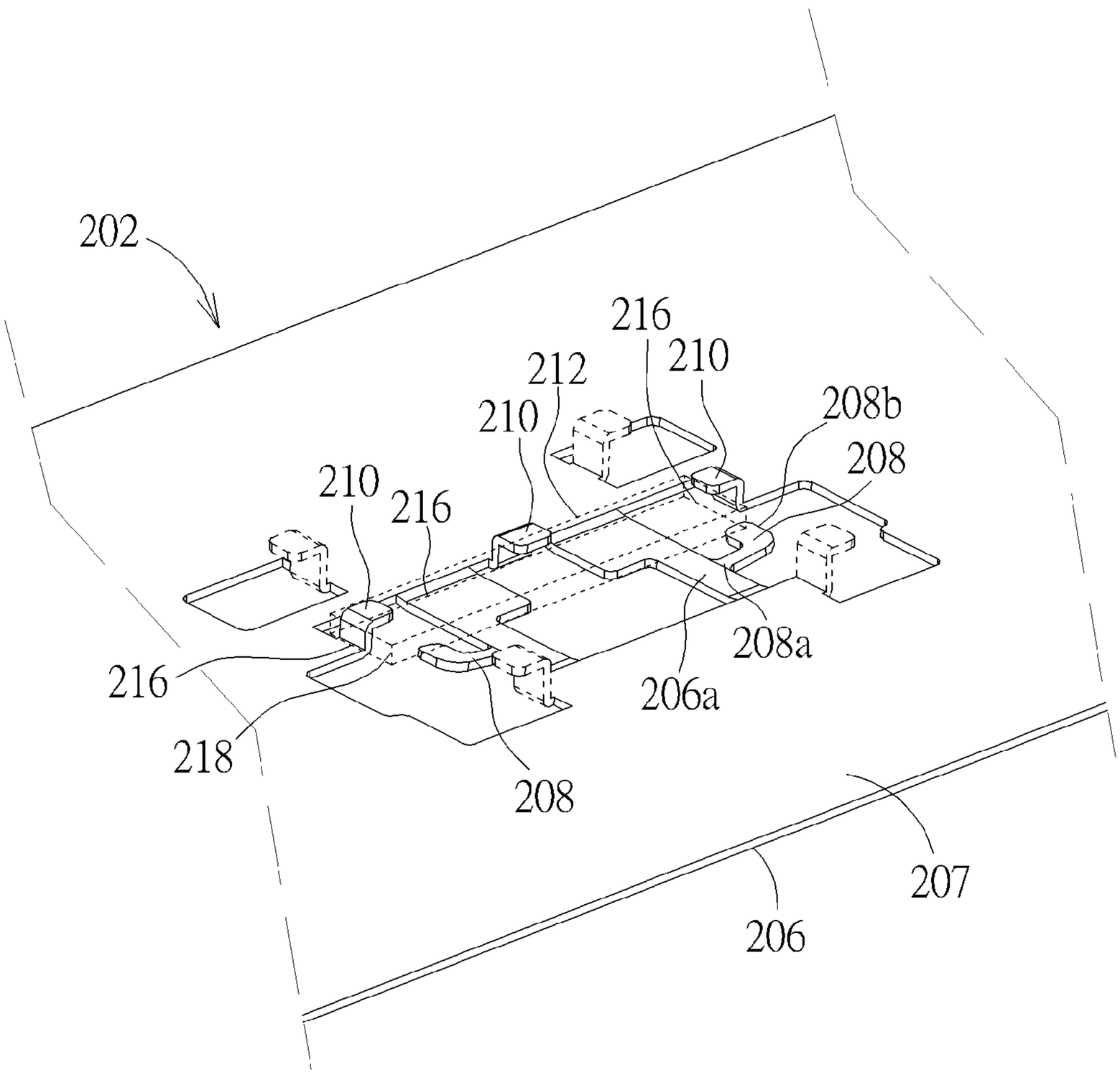
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FIG. 11A

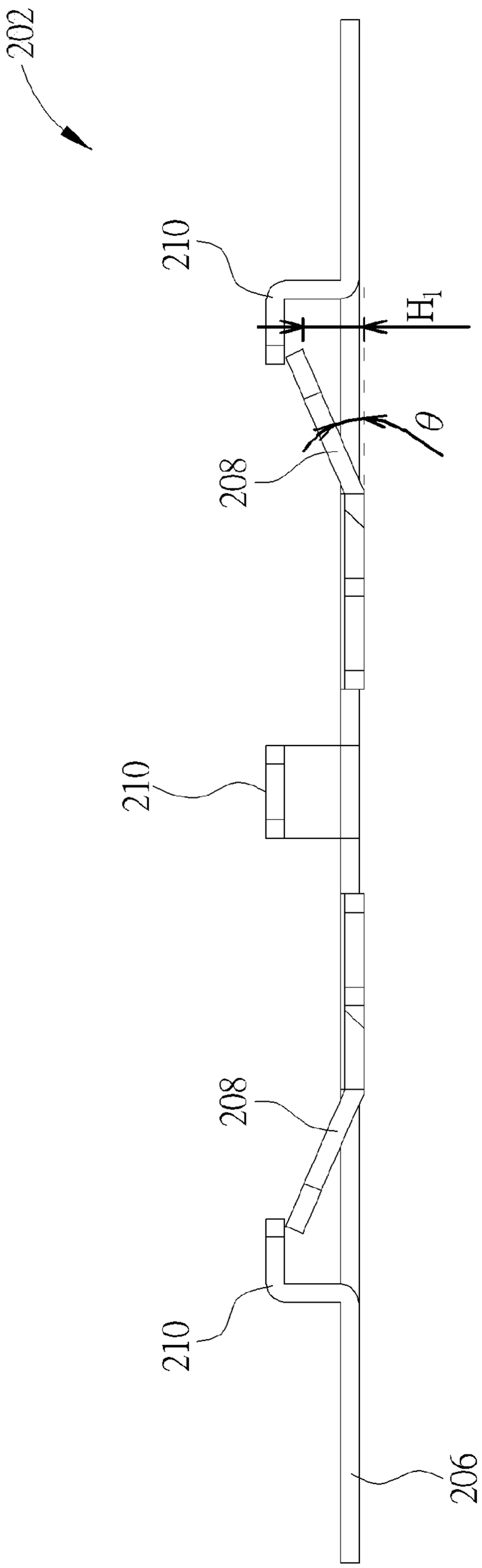

FIG. 12

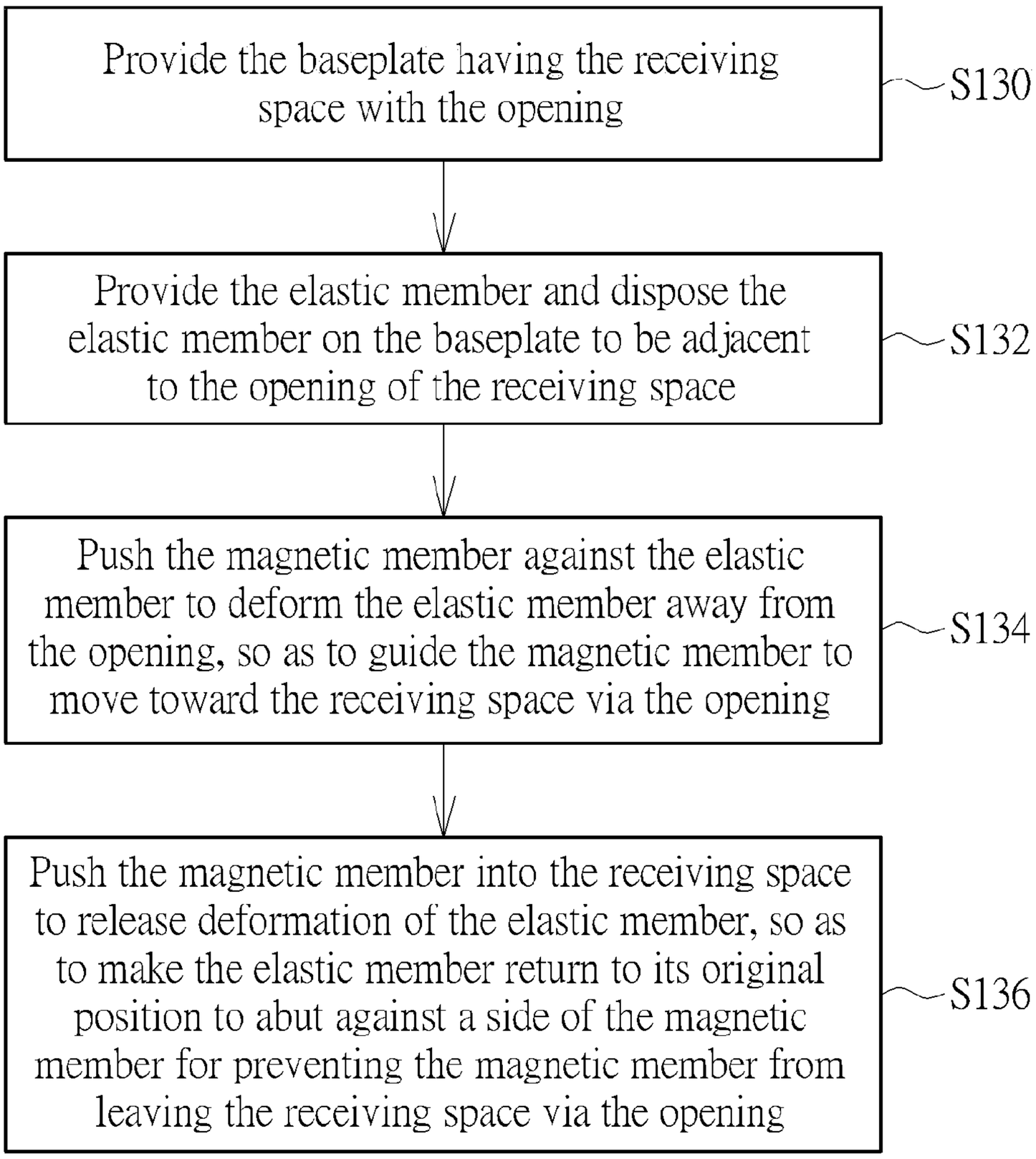
Provide the baseplate having the receiving space with the opening
S130
Provide the elastic member and dispose the elastic member on the baseplate to be adjacent to the opening of the receiving space
S132
Push the magnetic member against the elastic member to deform the elastic member away from the opening, so as to guide the magnetic member to move toward the receiving space via the opening
S134
Push the magnetic member into the receiving space to release deformation of the elastic member, so as to make the elastic member return to its original position to abut against a side of the magnetic member for preventing the magnetic member from leaving the receiving space via the opening
S136

FIG. 13

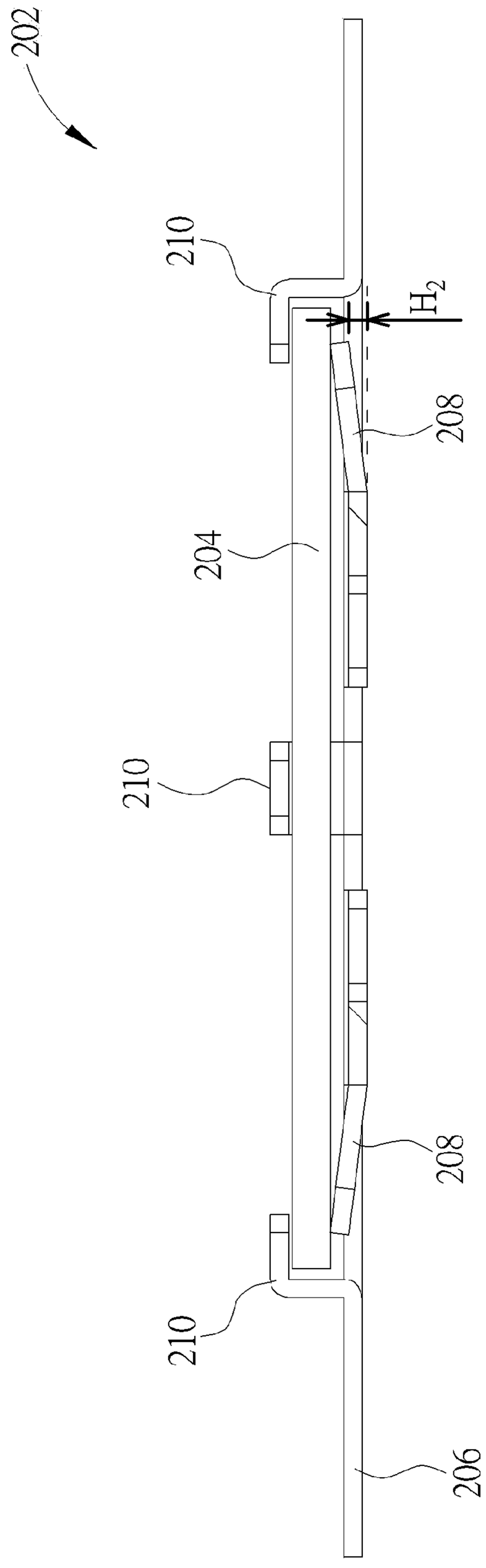

FIG. 14

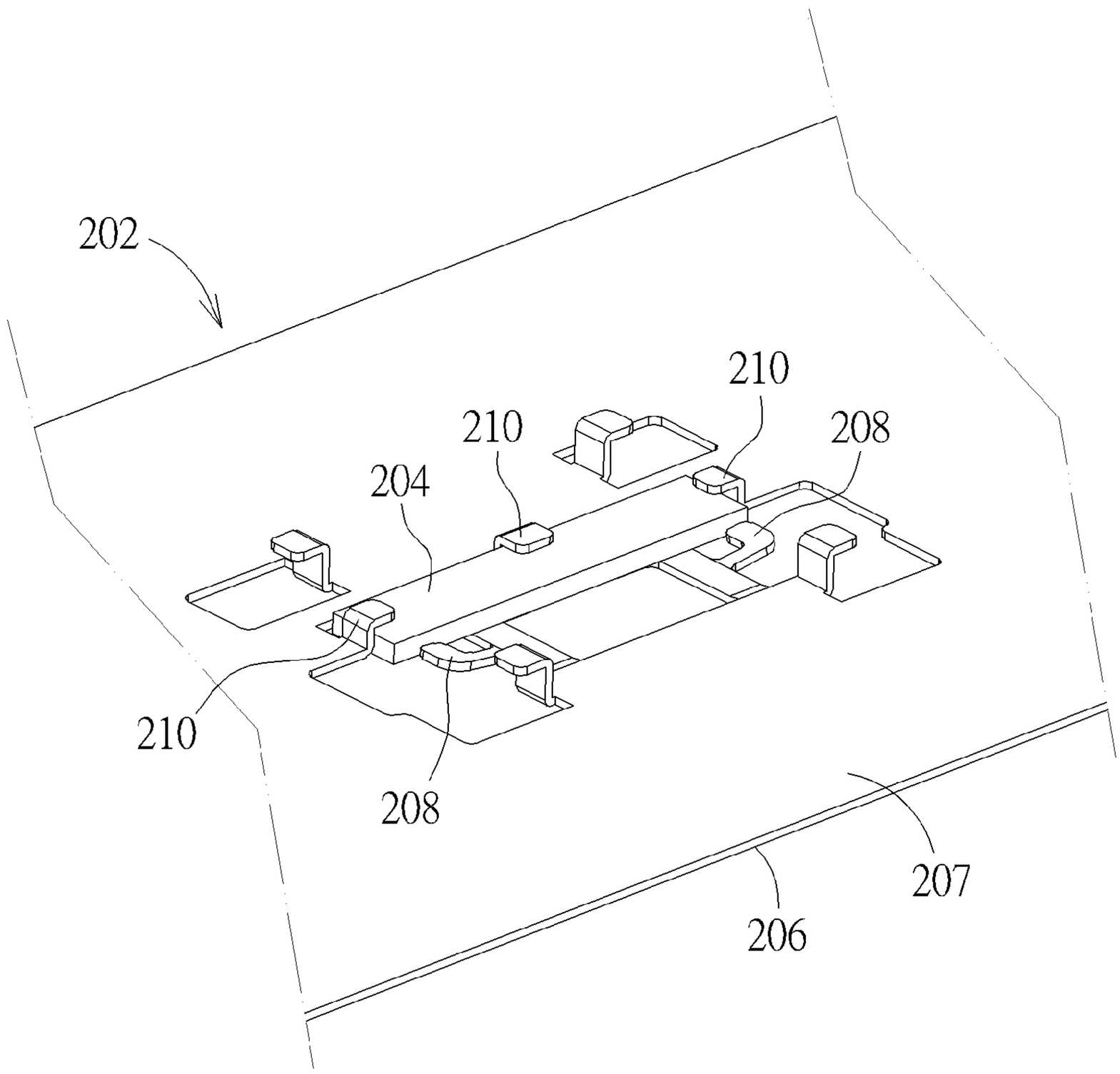

FIG. 15

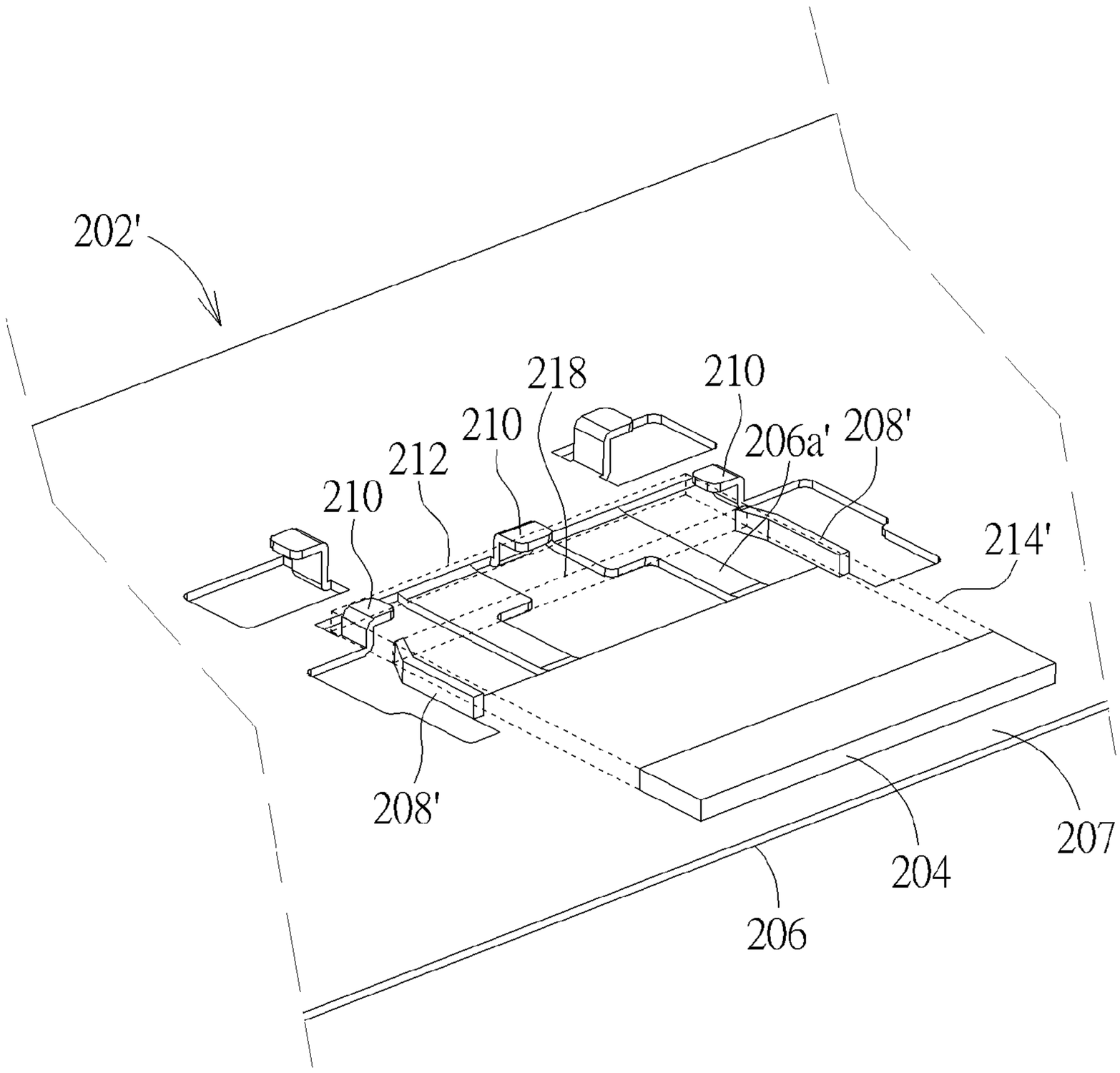

FIG. 16

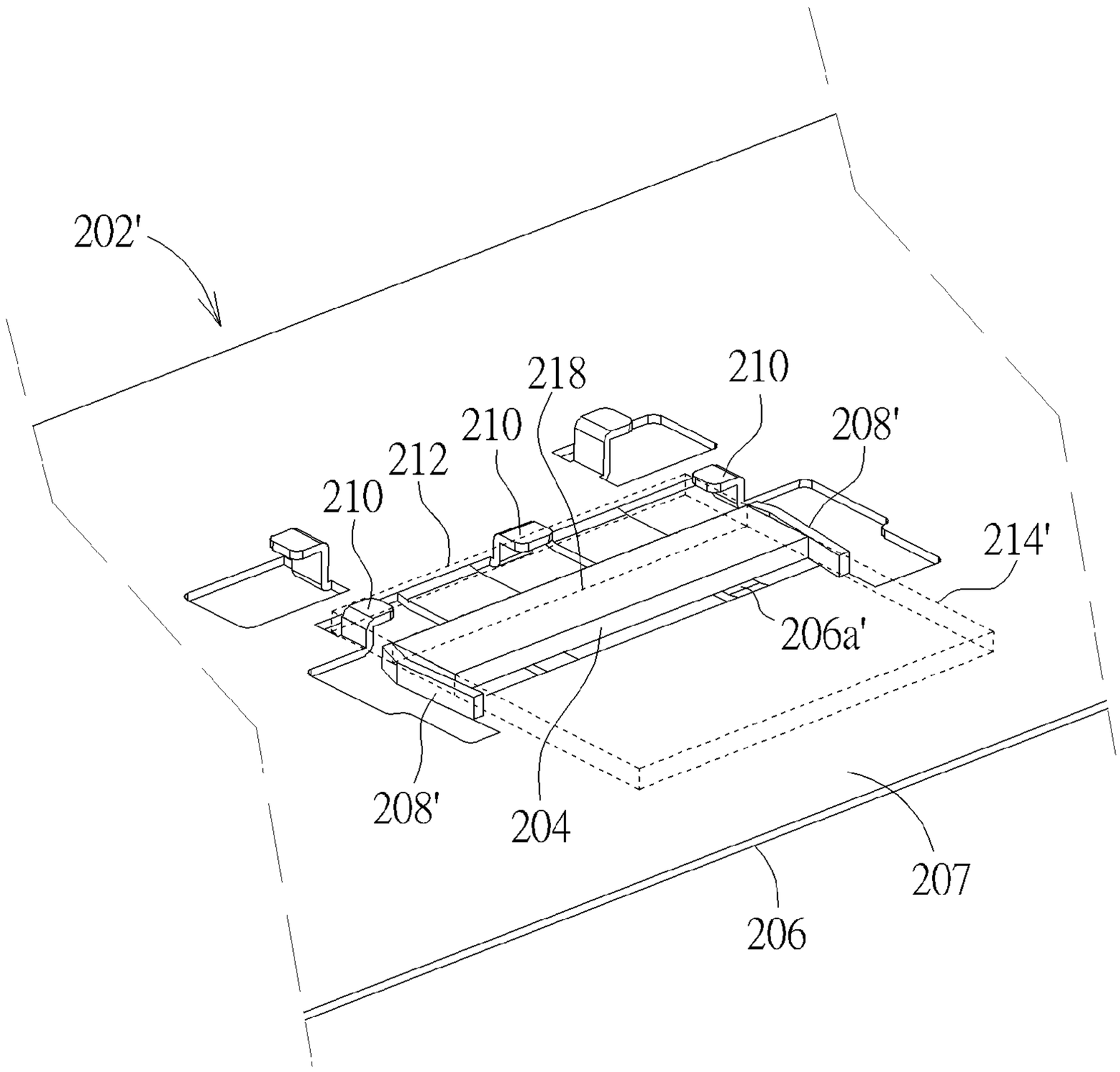

FIG. 17

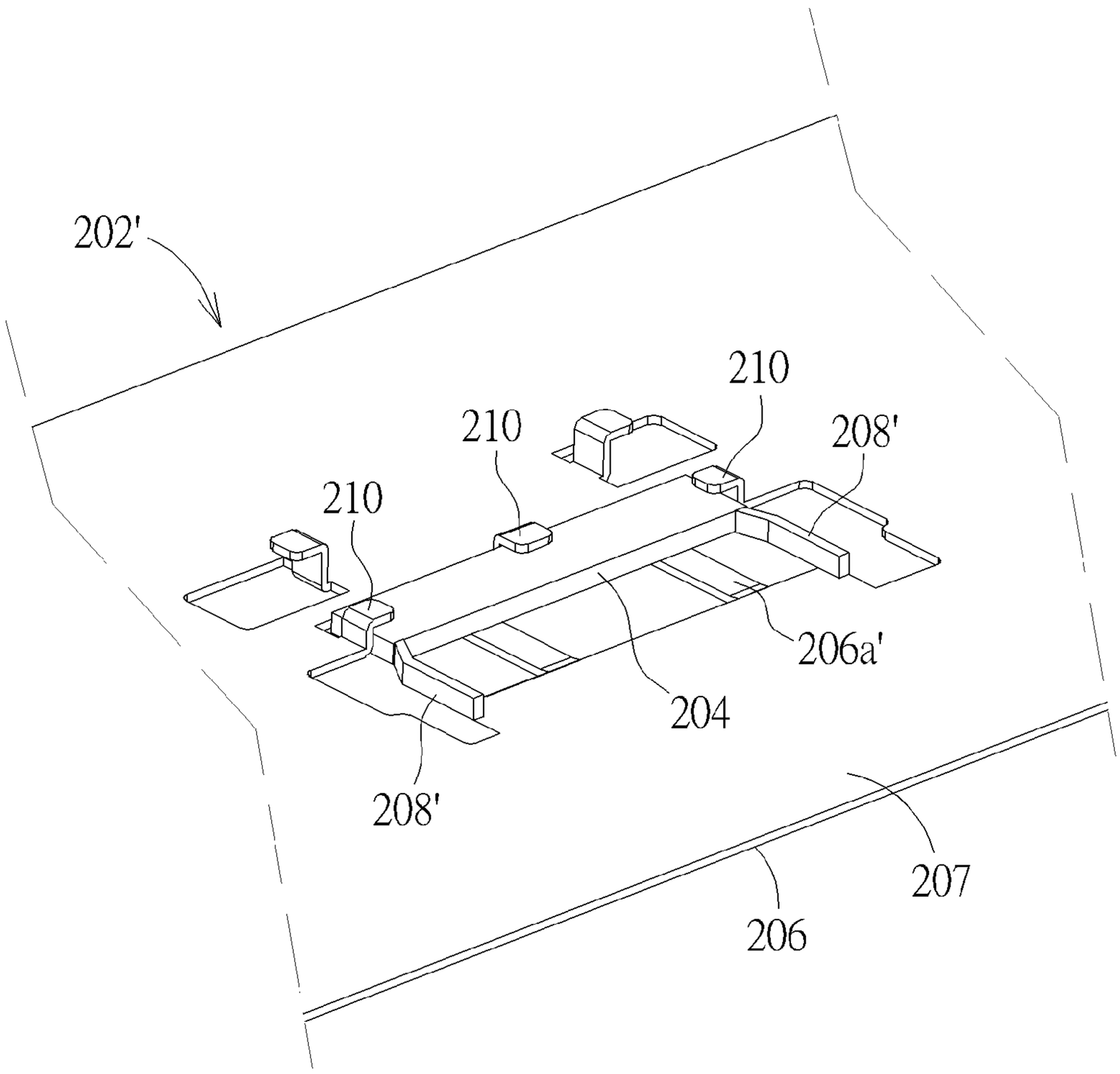

FIG. 18

KEYSWITCH, KEYBOARD AND KEYSWITCH MANUFACTURING METHOD THEREOF

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 THE INVENTION

1. Field of the Invention

The present invention relates to a keyswitch, a keyboard and a keyswitch manufacturing method thereof, and more specifically, to a keyswitch inserting a magnet into a receiving space cooperatively formed by a support rib and a bending arm on a baseplate laterally for fixing the magnet on the baseplate, a keyboard and a keyswitch manufacturing method thereof.

2. Description of the Prior Art

A keyboard, which is the most common input device, can be found in variety of electronic apparatuses for users to input characters, symbols, numerals and so on. Furthermore, consumer electronic products and industrial machine tools are all equipped with a keyboard for performing input operations.

A conventional keyswitch usually utilizes assembly of a scissor support structure and an elastic member to provide a cap with an elastic force for driving the cap to return to a released position. However, since the scissor mechanical design adopted by the scissor support structure requires more space so as to further increase the overall height of the keyswitch, it is disadvantageous to the thinning design of the keyswitch. A conventional method for solving the aforesaid problem is to utilize a magnetic attraction force generated by magnetic members respectively disposed on a support structure and a baseplate as a returning force of the cap instead of the aforesaid scissor mechanical design. However, in the aforesaid magnetic attraction design, it is not easy to position the magnetic members on the baseplate if the baseplate is made of low intensity magnetic material or non-magnetic material (e.g. plastic), so as to cause a time-consuming and strenuous assembly process.

SUMMARY OF THE INVENTION

The present invention provides a keyswitch including a baseplate, a cap, a support structure, and a first support member. The baseplate extends along a plane defined by an X-axis and a Y-axis perpendicular to each other and has at least one bending arm and at least one support rib. A Z-axis is perpendicular to the X-axis and the Y-axis. The at least one bending arm protrudes from the baseplate along the Z-axis. The at least one support rib extends along the plane defined by the X-axis and the Y-axis to form a receiving space cooperatively with the at least one bending arm. The support structure is disposed between the baseplate and the cap. The support structure includes a first support member and a magnetic permeable plate. The first support member is movably connected to the baseplate and the cap to make the cap move with the support structure between a released position and a pressed position. The magnetic permeable plate extends from the first support member and is positioned above the receiving space. The first magnet is laterally inserted into the receiving space along the plane defined by the X-axis and the Y-axis. The first magnet has a bottom surface and a lateral surface. The bottom surface is supported by the at least one support rib. The lateral surface is pressed by the at least one bending arm laterally. When the cap is released, a magnetic attraction force between the first magnet and the magnetic permeable plate keeps the cap at the released position. When the cap is pressed by an external force to make the magnetic permeable plate away from the first magnet with rotation of the first support member, the cap moves from the released position toward the pressed position.

The present invention further provides a keyboard including a baseplate and a plurality of keyswitches. The baseplate extends along a plane defined by an X-axis and a Y-axis perpendicular to each other and has at least one bending arm and at least one support rib. A Z-axis is perpendicular to the X-axis and the Y-axis. The at least one bending arm protrudes from the baseplate along the Z-axis. The at least one support rib extends along the plane defined by the X-axis and the Y-axis to form a receiving space cooperatively with the at least one bending arm. The plurality of keyswitches is disposed on the baseplate. At least one of the plurality of keyswitches includes a cap, a support structure, and a first magnet. The support structure is disposed between the baseplate and the cap. The support structure includes a first support member and a magnetic permeable plate. The first support member is movably connected to the baseplate and the cap to make the cap move with the support structure between a released position and a pressed position. The magnetic permeable plate extends from the first support member and is positioned above the receiving space. The first magnet is laterally inserted into the receiving space along the plane defined by the X-axis and the Y-axis. The first magnet has a bottom surface and a lateral surface. The bottom surface is supported by the at least one support rib. The lateral surface is pressed by the at least one bending arm laterally. When the cap is released, a magnetic attraction force between the first magnet and the magnetic permeable plate keeps the cap at the released position. When the cap is pressed by an external force to make the magnetic permeable plate away from the first magnet with rotation of the first support member, the cap moves from the released position to the pressed position.

The present invention further provides a keyswitch manufacturing method for manufacturing a keyswitch. The keyswitch provides a pressing resistance force or a returning force to a cap via a magnetic attraction force of a magnetic member. The keyswitch manufacturing method includes providing a baseplate having a receiving space having an opening located at a side of the receiving space not facing the cap, providing an elastic member disposed on the baseplate to be adjacent to the opening, pushing the magnetic member against the elastic member to deform the elastic member away from the opening so as to guide the magnetic member to move toward the receiving space via the opening, and pushing the magnetic member into the receiving space to release deformation of the elastic member, so as to make the elastic member return to its original position to abut against a side of the magnetic member for preventing the magnetic member from leaving the receiving space via the opening.

The present invention further provides a keyswitch. The keyswitch includes a cap, a baseplate, a support structure,

and a magnetic member. The baseplate has a main body, an elastic member, a plurality of blocking members, a receiving space, and an assembly path space. The main body partially extends under the receiving space. The elastic member is disposed on the main body and extends into the assembly path space. The elastic member has a first height in an undeformed state. The assembly path space has at least one blocking side and an opening. The plurality of blocking members is disposed at the at least one blocking side. The opening is disposed at a position different from the at least one blocking side. The support structure is disposed between the baseplate and the cap. The support structure includes a first support member and a magnetic permeable plate. The first support member is movably connected to the baseplate and the cap to make the cap move with the support structure between a released position and a pressed position. The magnetic permeable plate extends from the first support member and is positioned above the receiving space. The magnetic member passes through the opening along the assembly path space to enter the receiving space where the plurality of blocking members engages with the magnetic member. During the magnetic member passes through the opening, the magnetic member enters the assembly path space to deform the elastic member to a second height lower than the first height, so as to allow the magnetic member to pass through the opening along the assembly path space. After the magnetic member passes through the opening, the magnetic member leaves the assembly path space to release deformation of the elastic member, so as to make the elastic member return to the first height for preventing the magnetic member from leaving the receiving space via the assembly path space. When the cap is released, a magnetic attraction force between the magnetic member and the magnetic permeable plate keeps the cap at the released position. When the cap is pressed by an external force to make the magnetic permeable plate away from the magnetic member with rotation of the first support member, the cap moves from the released position toward the pressed position.

The present invention further provides a keyswitch includes a cap, a baseplate, a support structure, and a magnetic member. The baseplate has a main body, an elastic member, a plurality of blocking members, a receiving space, and an assembly path space. The main body partially extends under the receiving space. The elastic member is disposed on the main body and extends into the assembly path space. The elastic member has a first interference in an undeformed state with the assembly path space. The assembly path space has at least one blocking side and an opening. The plurality of blocking members is disposed at the at least one blocking side. The opening is disposed at a position different from the at least one blocking side. The support structure is disposed between the baseplate and the cap. The support structure includes a first support member and a magnetic permeable plate. The first support member is movably connected to the baseplate and the cap to make the cap move with the support structure between a released position and a pressed position. The magnetic permeable plate extends from the first support member. The magnetic member passes through the opening along the assembly path space to enter the receiving space where the plurality of blocking members engages with the magnetic member. During the magnetic member passes through the opening, the magnetic member enters the assembly path space to deform the elastic member to have a second interference with the assembly path space, so as to allow the magnetic member to pass through the opening along the assembly path space, and the second interference is less than the first interference. After the magnetic member passes through the opening, the magnetic member leaves the assembly path space to release deformation of the elastic member, so as to make the elastic member return to have the first interference for preventing the magnetic member from leaving the receiving space via the assembly path space. When the cap is released, a magnetic attraction force between the magnetic member and the magnetic permeable plate keeps the cap at the released position. When the cap is pressed by an external force to make the magnetic permeable plate away from the magnetic member with rotation of the first support member, the cap moves from the released position toward the pressed position.

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

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a partial enlarged diagram of a keyboard according to an embodiment of the present invention.

FIG. **2** is an exploded diagram of a baseplate, a first magnet and a second magnet in FIG. **1**.

FIG. **3** is a top view of the first magnet and the second magnet in FIG. **2** being disposed on the baseplate.

FIG. **4** is an enlarged diagram of a first support member and a second support member in FIG. **1** from another viewing angle.

FIG. **5** is a cross-sectional diagram of the keyboard in FIG. **1** along a cross-sectional line A-A'.

FIG. **6** is a cross-sectional diagram of a cap in FIG. **5** being pressed.

FIG. **7** is a diagram of a keyboard according to another embodiment of the present invention.

FIG. **8** is an exploded diagram of the baseplate, a cap, and a scissor support mechanism in FIG. **7**.

FIG. **9** is a partial enlarged exploded diagram of a keyswitch in FIG. **7**.

FIG. **10** is a partial diagram of a keyswitch according to another embodiment of the present invention.

FIG. **11** is a diagram showing that a magnetic member in FIG. **10** has not been assembled with a baseplate yet.

FIG. **11**A is a diagram of the baseplate in FIG. **11**.

FIG. **12** is a cross-sectional diagram of the baseplate in FIG. **11** along a cross-sectional line B-B'.

FIG. **13** is a flowchart of a keyswitch manufacturing method according to an embodiment of the present invention.

FIG. **14** is a cross-sectional diagram of an elastic member in FIG. **12** being deformed by pushing of the magnetic member.

FIG. **15** is a diagram of the elastic member in FIG. **14** returning to its original position to abut against a side of the magnetic member.

FIG. **16** is a diagram showing that the elastic member has not been assembled with a baseplate yet according to another embodiment of the present invention.

FIG. **17** is a diagram of the magnetic member in FIG. **16** deforming an elastic member.

FIG. **18** is a diagram of the elastic member in FIG. **17** returning to its original position to abut against a side of the magnetic member.

DETAILED DESCRIPTION

Please refer to FIG. **1**, which is a partial enlarged diagram of a keyboard **10** according to an embodiment of the present

invention. For clearly showing the mechanical design of a keyswitch **12**, a cap **14** is briefly depicted by dotted lines in FIG. **1**. As shown in FIG. **1**, the keyboard **10** includes a plurality of keyswitches **12** (only one keyswitch **12** shown in FIG. **1**, but not limited thereto) and a baseplate **16**. The plurality of keyswitches **12** is disposed on the baseplate **16** for a user to perform input operations. The keyswitch **12** includes the cap **14**, a support structure **18**, a first magnet **20**, and a second magnet **22**. The keyboard **10** could be applied to a portable electronic device with a foldable mechanism composed of an upper cover and a lower casing (e.g. a notebook or a foldable keyboard device).

Please refer to FIG. **1**, FIG. **2**, FIG. **3**, FIG. **4**, FIG. **5**, and FIG. **6**. FIG. **2** is an exploded diagram of the baseplate **16**, the first magnet **20** and the second magnet **22** in FIG. **1**. FIG. **3** is a top view of the first magnet **20** and the second magnet **22** in FIG. **2** being disposed on the baseplate **16**. FIG. **4** is an enlarged diagram of a first support member **30** and a second support member **32** in FIG. **1** from another viewing angle. FIG. **5** is a cross-sectional diagram of the keyboard **10** in FIG. **1** along a cross-sectional line A-A'. FIG. **6** is a cross-sectional diagram of the cap **14** in FIG. **5** being pressed. The baseplate **16** extends along a plane defined by an X-axis and a Y-axis perpendicular to each other and has at least one bending arm **24** (three shown in FIG. **2**, but not limited thereto) and at least one support rib **26** (two shown in FIG. **2**, but not limited thereto). A Z-axis is perpendicular to the X-axis and the Y-axis. The bending arm **24** protrudes from the baseplate **16** along the Z-axis. The support rib **26** extends along the plane defined by the X-axis and the Y-axis to form a receiving space **28** cooperatively with the bending arm **24**. The support structure **18** is disposed between the baseplate **16** and the cap **14**. The cap **14** is movable between a released position as shown in FIG. **5** and a pressed position as shown in FIG. **6** relative to the baseplate **16** via the support structure **18**. To be more specific, the support structure **18** includes the first support member **30**, the second support member **32** opposite to each other, and a magnetic permeable plate **34**. The first support member **30** is movably connected to the baseplate **16** and the cap **14** (e.g. the baseplate **16** and the cap **14** is partially disposed through a first opening portion **31** of the first support member **30** to make the first support member **30** movably connected to the baseplate **16** and the cap **14**, but not limited thereto). The magnetic permeable plate **34** extends from the first support member **30** and is positioned above the receiving space **28**. The second support member **32** is movably connected to the baseplate **16** and the cap **14** (e.g. the baseplate **16** and the cap **14** is partially disposed through a second opening portion **33** of the second support member **32** to make the second support member **32** movably connected to the baseplate **16** and the cap **14**, but not limited thereto). An abutting portion **36** extends from the second support member **32** toward the first support member **30** to support the magnetic permeable plate **34** (as shown in FIG. **4**).

In this embodiment, as shown in FIG. **2**, FIG. **3**, FIG. **4**, FIG. **5**, and FIG. **6**, the keyswitch **12** adopts a magnetic returning design. The first magnet **20** is laterally inserted into the receiving space **28** along the plane defined by the X-axis and the Y-axis to be supported by the support rib **26** and laterally abut against the bending arm **24**, so as to be fixed on the baseplate **16** (as shown in FIG. **3**, the keyswitch **12** could adopt the design that the bending arm **24** and the support rib **26** clamp the first magnet **20** cooperatively in a tightly fitting manner, but not limited thereto). In other words, the first magnet **20** has a bottom surface **21** and a lateral surface **23**. The bottom surface **21** is supported by the support rib **26**. The lateral surface **23** is pressed by the bending arm **24** laterally. The second magnet **22** is magnetically attracted to the bottom surface **21** of the first magnet **20** opposite to the support structure **18** (as shown in FIG. **5**) to enhance a magnetic attraction force for the magnetic permeable plate **34**. When the cap **14** is released, the magnetic attraction force generated by the first magnet **20** and the second magnet **22** keeps the cap **14** at the released position as shown in FIG. **5**. When the cap **14** is pressed by an external force to make the magnetic permeable plate **34** away from the first magnet **20** with rotation of the first support member **30** and the second support member **32** relative to the baseplate **16** and keep the abutting portion **36** tilted, the cap **14** moves from the released position as shown in FIG. **5** to the pressed position as shown in FIG. **6** with the support structure **18** to complete the triggering operation and execute a corresponding input function. When the external force is released, the magnetic attraction force makes the magnetic permeable plate **34** return to be adjacent to the first magnet **20**. Accordingly, the cap **14** could move from the pressed position as shown in FIG. **6** back to the released position as shown in FIG. **5** with the support structure **18**, so that the cap **14** could automatically return to its original position.

To be noted, the second support member **32** and the second magnet **22** could be omissible components for simplifying the mechanical design of the keyswitch **12** and reducing the space occupied by the support structure and the magnet. Furthermore, in practical application, the keyboard **10** could further include a mylar film **17**. The mylar film **17** is attached under the baseplate **16** (as shown in FIG. **5** and FIG. **6**), so that the second magnet **22** could be disposed on the bottom surface **21** of the first magnet **20** more steadily.

The triggering design of the cap **14** could be as shown in FIG. **4**, FIG. **5**, and FIG. **6**. The keyswitch **10** could further include a membrane circuit board **38**. The first support member **30** has a protruding point **40**. The membrane circuit board **38** is disposed on the baseplate **16** and has a triggering switch **42** corresponding to the protruding point **40**. In such a manner, when the cap **14** moves to the pressed position as shown in FIG. **6** relative to the baseplate **16** via the support structure **18**, the protruding point **40** presses the triggering switch **42** for triggering the membrane circuit board **38** to complete the triggering operation and execute a corresponding input function. The aforesaid triggering design could also be applied to the second support member **32**, and the related description could be reasoned from analogy according to the aforesaid embodiment and omitted herein.

In summary, the present invention adopts the design that the magnet is laterally inserted into the receiving space formed by the support rib and the bending arm on the baseplate. Accordingly, even if the baseplate is made of low intensity magnetic material (or non-magnetic material), the keyswitch provided by the present invention could fix the magnet on the baseplate steadily, to solve the prior art problem that positioning the magnetic member on the baseplate is not easy if the baseplate is made of low intensity magnetic material or non-magnetic material (e.g. plastic), so that the present invention could improve convenience of the keyboard in assembly and manufacturing.

It should be mentioned that the aforesaid design could be applied to a keyswitch with a longer length (or called a multiple-width keyswitch). For example, please refer to FIG. **7** and FIG. **8**. FIG. **7** is a diagram of a keyboard **100** according to another embodiment of the present invention. FIG. **8** is an exploded diagram of the baseplate **16**, a cap **104**, and a scissor support mechanism **106** in FIG. **7**. For clearly

showing the mechanical design of the keyswitch **102**, the cap **104** is briefly depicted by dotted lines in FIG. **7**. Components both mentioned in this embodiment and the aforesaid embodiment represent components with similar structures or functions, and the related description is omitted herein. The keyboard **100** includes a plurality of keyswitches **102** (only one shown in FIG. **7**) and the baseplate **16**. The keyswitch **102** is disposed on the baseplate **16** for a user to perform a corresponding input operation. The keyswitch **102** includes the cap **104**, at least one scissor support mechanism **106** (two shown in FIG. **7**, but not limited thereto), the support structure **18**, the first magnet **20** and the second magnet **22**. To be noted, the first magnet **20** and the second magnet **22** are not shown in FIG. **7**, and the related description could be as shown in FIG. **2** and FIG. **3**.

In this embodiment, the first support member **30**, the second support member **32**, and the cap **104** could be strip-shaped. The scissor support mechanism **106** is located between the first support member **30** and the second support member **32** and is movably connected to the cap **104** and the baseplate **16**. To be more specific as shown in FIG. **8**, the scissor support mechanism **106** could include a first frame **108** ad a second frame **110**. The cap **104** could have a first sliding slot **112** and a first engaging slot **114**. The baseplate **16** could have a second sliding slot **116** and a second engaging slot **118**. The first frame **108** could have a first sliding portion **120** and a first pivot portion **122**. The first sliding portion **120** is slidably disposed in the first sliding slot **112**, and the first pivot portion **122** is rotatably connected to the second engaging slot **118**. The second frame **110** could have a second sliding portion **124** and a second pivot portion **126**. The second sliding portion **124** is slidably disposed in the second sliding slot **116**, and the second pivot portion **126** is rotatably connected to the first engaging slot **114**. In such a manner, during the cap **104** moves between the released position and the pressed position, the aforesaid connection design could generate the effect that a side portion of the cap **104** could move together with a center portion of the cap **104** via the first frame **108** and the second frame **110**. Furthermore, the aforesaid connection design could also increase the pull-out force of the cap **104** via connection of the first sliding portion **120** and the first sliding slot **112** and connection of the second pivot portion **126** and the first engaging slot **114** to efficiently solve the prior art problem that the cap of the conventional multiple-width keyswitch could fall off easily.

In practical application, the keyswitch **100** could further utilize an auxiliary support to improve the motion steadiness of the cap **104**. For example, please refer to FIG. **7** and FIG. **9**. FIG. **9** is a partial enlarged exploded diagram of the keyswitch **102** in FIG. **7**. As shown in FIG. **7** and FIG. **9**, the keyswitch **102** could further include at least one auxiliary support **128** (two shown in FIG. **7**, but not limited thereto). The auxiliary support **128** is disposed between the cap **104** and the baseplate **16** and is alternately arranged with the scissor support mechanism **106**. The auxiliary support **128** is movably connected to the baseplate **16** and the cap **104**. To be more specific in this embodiment, the auxiliary support **128** could have a first engaging structure **130** corresponding to the baseplate **16**, and the baseplate **16** could have a second engaging structure **132** corresponding to the first engaging structure **130**. The first engaging structure **130** is engaged with the second engaging structure **132** (e.g. via the structural engagement design of the sliding portion (could be regarded as the first engaging structure **130**) and the sliding slot (could be regarded as the second engaging structure **132**) as shown in FIG. **9**, but not limited thereto), to make the auxiliary support **128** movably connected to the baseplate **16**. Furthermore, the auxiliary support **128** could have a third engaging structure **134** corresponding to the cap **104**, and the cap **104** could have a fourth engaging structure **136** corresponding to the third engaging structure **134**. The third engaging structure **134** is engaged with the fourth engaging structure **136** (e.g. via the structural engagement design of the pivot portion (could be regarded as the third engaging structure **134**) and the engaging slot (could be regarded as the fourth engaging structure **136**) as shown in FIG. **9**, but not limited thereto), to make the auxiliary support **128** movably connected to the cap **104**.

Furthermore, the present invention could utilize an elastic member to prevent the magnetic member from falling out of the baseplate. For example, please refer to FIG. **10**, FIG. **11**, FIG. **11**A, and FIG. **12**. FIG. **10** is a partial diagram of a keyswitch **200** according to another embodiment of the present invention. FIG. **11** is a diagram showing that a magnetic member **204** in FIG. **10** has not been assembled with a baseplate **202** yet. FIG. **11**A is a diagram of the baseplate **202** in FIG. **11**. FIG. **12** is a cross-sectional diagram of the baseplate **202** in FIG. **11** along a cross-sectional line B-B'. For clearly showing the mechanical design of the keyswitch **200**, the cap **104** is briefly depicted by dotted lines in FIG. **10**. Components both mentioned in this embodiment and the aforesaid embodiments represent components with similar structures or functions, and the related description is omitted herein. As shown in FIG. **10**, FIG. **11**, FIG. **11**A, and FIG. **12**, the keyswitch **200** includes the cap **104**, the support structure **18**, the baseplate **202**, and the magnetic member **204**. The baseplate **202** has a main body **206**, at least one elastic member **208** (two elastic members **208** extends obliquely and symmetrically as shown in FIG. **11**, but not limited thereto), a plurality of blocking members **210**, a receiving space **212**, and an assembly path space **214**. The main body **206** has an extending portion **206**a located under the receiving space **212** (as shown in FIG. **11**). The elastic member **208** is disposed on the main body **206** and extends into the assembly path space **214** and has a first height H_1 in an undeformed state as shown in FIG. **12**. The receiving space **212** has at least one blocking side **216** (three shown in FIG. **11**, but not limited thereto) and an opening **218**. The blocking member **210** is disposed at the blocking side **216**. The opening **218** is disposed at a position different from the blocking side **216**, meaning that the opening **218** is located at a horizontal side of the receiving space **212**. In this embodiment, the assembly path space **214** extends upward from an upper surface **207** of the main body **206**, and the elastic member **208** extends obliquely along the main body **206** and is preferably L-shaped. A width of a root portion **208**a of the elastic member **208** connected to the main body **206** is less than a width of a tail portion **208**b of the elastic member **208** (but not limited thereto), so that the elastic member **208** could deform easily due to the small width of the root portion **208**a and the tail portion **208**b could fix the magnetic member **204** steadily in the receiving space **212** due to the large width of the tail portion **208**b. Furthermore, an angle θ between the elastic member **208** and the baseplate **206** could preferably be less than 45° (but not limited thereto), so as to make the elastic member **208** have less deformation to decrease an external force needed for assembly of the magnetic member **204**. As for description for other related structural designs of the keyswitch **200** (e.g. the cap triggering design, the scissor mechanical design, the auxiliary frame design, etc.), it could be reasoned by analogy according to the aforesaid embodiments and omitted herein.

Via the aforesaid designs, the magnetic member **204** could enter the receiving space **212** to be located under the magnetic permeable plate **34** according to the keyswitch manufacturing method of the present invention. Accordingly, the keyswitch **200** could provide a pressing resistance force or a returning force to the cap **104** via the magnetic attraction force of the magnetic member **204**. In brief, please refer to FIG. **11**, FIG. **12**, FIG. **13**, FIG. **14**, and FIG. **15**. FIG. **13** is a flowchart of a keyswitch manufacturing method according to an embodiment of the present invention. FIG. **14** is a cross-sectional diagram of the elastic member **208** in FIG. **12** being deformed by pushing of the magnetic member **204**. FIG. **15** is a diagram of the elastic member **208** in FIG. **14** returning to its original position to abut against a side of the magnetic member **204**. As shown in FIG. **11**, FIG. **12**, FIG. **13**, FIG. **14**, and FIG. **15**, after providing the baseplate **202** (Step S**130**) and disposing the elastic member **208** on the baseplate **202** to be adjacent to the opening **218** (Step S**132**), the magnetic member **204** could be pushed against the elastic member **208** (Step **5134**) to deform the elastic member **208** away from the opening **218**, so as to guide the magnetic member **204** to move toward the receiving space **212** via the opening **218**. To be more specific, in Step **5134**, the magnetic member **204** could pass through the opening **218** along the assembly path space **214** to enter the receiving space **212** where the plurality of blocking members **210** engages with the magnetic member **204** (i.e. the magnetic member **204** is constrained by the plurality of blocking members **210** and an extending portion **206**a of the baseplate **206** in the receiving space **212**). During the magnetic member **204** passes through the opening **208**, the magnetic member **204** enters the assembly path space **214** to deform the elastic member **208** from the first height H_1 as shown in FIG. **12** to a second height H_2 as shown in FIG. **14** on the baseplate **206**. The second height H_2 is lower than the first height H_1 to allow the magnetic member **204** to pass through the opening **218** along the assembly path space **214**. Finally, in Step **5136**, the magnetic member **204** could be pushed to enter the receiving space **212** to release deformation of the elastic member **208**, so as to make the elastic member **208** return to its original position to abut against a side of the magnetic member **204** (as shown in FIG. **15**) for preventing the magnetic member **204** from leaving the receiving space **212** via the opening **218**. In other words, after the magnetic member **204** passes through the opening **218**, the magnetic member **204** leaves the assembly path space **214** to release deformation of the elastic member **208**, so as to make the elastic member **208** return to the first height H_1 for blocking the magnetic member **204** from leaving the receiving space **212** via the assembly path space **214**. In such a manner, the keyswitch **200** provided by the present invention could efficiently prevent the magnetic member **204** from falling out of the baseplate **202**.

After the aforesaid process for disposing the magnetic member **204** in the receiving space **212** is completed, the keyswitch **200** could provide a pressing resistance force or a returning force to the cap **104** via the magnetic attraction force of the magnetic member **204**. In brief, when the cap **104** is released, the magnetic attraction force between the magnetic member **204** and the magnetic permeable plate **34** keeps the cap **104** at the released position. When the cap **104** is pressed by an external force to make the magnetic permeable plate **34** away from the magnetic member **204** with rotation of the first support member **30** and the second support member **32**, the cap **104** moves from the released position toward the pressed position with the support structure **18**. When the external force is released, the aforesaid magnetic attraction force drives the magnetic permeable plate **34** to approach the magnetic member **204** to make the cap **104** move from the pressed position to the released position with rotation of the first support member **30** and the second support member **32**. As for more detailed description for the aforesaid components, it could be reasoned by analogy according to the aforesaid embodiments and omitted herein.

It should be mentioned that the structural design of the elastic member is not limited to the aforesaid embodiment, meaning that the present invention could adopt the design the elastic member could deform laterally. For example, please refer to FIG. **16**, which is a diagram showing that the elastic member **204** has not been assembled with a baseplate **202'** yet according to another embodiment of the present invention. Components both mentioned in this embodiment and the aforesaid embodiments represent components with similar structures or functions, and the related description is omitted herein. Furthermore, the related designs for the keyswitch including the elastic member **204** and the baseplate **202'** (e.g. the support structure design, the cap triggering design, the scissor mechanical design, the auxiliary frame design, etc.) could be reasoned by analogy according to the aforesaid embodiments and omitted herein. The baseplate **202'** has the main body **206**, at least one elastic member **208'** (two elastic members **208'** disposed symmetrically on the main body **206** as shown in FIG. **16**, but not limited thereto), the plurality of blocking members **210**, the receiving space **212**, and an assembly path space **214'**. The elastic member **208'** is disposed on the main body **206** and extends into the assembly path space **214'**. The elastic member **208'** has a first interference in an undeformed state with the assembly path space **214'** as shown in FIG. **16**. In this embodiment, the assembly path space **214'** extends planarly on the upper surface **207** of the main body **206**, and the elastic member **208'** bends inwardly along the assembly path space **214'**. Furthermore, the main body **206** has an extending portion **206**a' located under the receiving space **212**.

Via the aforesaid designs, the magnetic member **204** could pass through the opening **218** along the assembly path space **214'** to enter the receiving space **212** where the plurality of blocking members **210** engages with the magnetic member **204** (i.e. the magnetic member **204** is constrained by the plurality of blocking members **210** and the extending portion **206**a' in the receiving space **212**). In brief, please refer to FIG. **16**, FIG. **17**, and FIG. **18**. FIG. **17** is a diagram of the magnetic member **204** in FIG. **16** deforming the elastic member **208'**. FIG. **18** is a diagram of the elastic member **208'** in FIG. **17** returning to its original position to abut against a side of the magnetic member **204**. As shown in FIG. **16**, FIG. **17**, and FIG. **18**, during the magnetic member **204** passes through the opening **208**, the magnetic member **204** enters the assembly path space **214'** to deform the elastic member **208'** to have a second interference with the assembly path space **214'** as shown in FIG. **17**. The second interference as shown in FIG. **17** is less than the first interference as shown in FIG. **16** to allow the magnetic member **204** to pass through the opening **218** along the assembly path space **214'**. After the magnetic member **204** passes through the opening **218**, the magnetic member **204** leaves the assembly path space **214'** to release deformation of the elastic member **208'**, so as to make the elastic member **208'** return to have the first interference as shown in FIG. **16** for blocking the magnetic member **204** from leaving the receiving space **212** via the assembly path space **214'**. In

such a manner, the present invention could efficiently prevent the magnetic member **204** from falling out of the baseplate **202'**.

Those skilled in the art will readily observe that numerous modifications and alterations of the device and method 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 keyswitch comprising:

a baseplate extending along a plane defined by an X-axis and a Y-axis perpendicular to each other and having at least one bending arm and at least one support rib, a Z-axis being perpendicular to the X-axis and the Y-axis, the at least one bending arm protruding from the baseplate along the Z-axis, the at least one support rib extending along the plane defined by the X-axis and the Y-axis to form a receiving space cooperatively with the at least one bending arm;

a cap;

a support structure disposed between the baseplate and the cap, the support structure comprising a first support member and a magnetic permeable plate, the first support member being movably connected to the baseplate and the cap to make the cap move with the support structure between a released position and a pressed position, the magnetic permeable plate extending from the first support member and being positioned above the receiving space; and

a first magnet laterally inserted into the receiving space along the plane defined by the X-axis and the Y-axis, the first magnet having a bottom surface and a lateral surface, the bottom surface being supported by the at least one support rib and the lateral surface being pressed by the at least one bending arm laterally;

wherein when the cap is released, a magnetic attraction force between the first magnet and the magnetic permeable plate keeps the cap at the released position;

when the cap is pressed by an external force to make the magnetic permeable plate away from the first magnet with rotation of the first support member, the cap moves from the released position toward the pressed position.

2. The keyswitch of claim **1** further comprising:

a second magnet magnetically attracted to the bottom surface of the first magnet opposite to the support structure.

3. The keyswitch of claim **1** further comprising:

a mylar film attached under the baseplate.

4. The keyswitch of claim **1** further comprising:

at least one auxiliary support disposed between the cap and the baseplate and alternately arranged with the support structure, the at least one auxiliary support being movably connected to the baseplate and the cap.

5. The keyswitch of claim **1**, wherein the keyswitch further comprises a membrane circuit board, the first support member has a protruding point, the membrane circuit board is disposed on the baseplate and has a triggering switch corresponding to the protruding point, and when the cap is pressed to the pressed position, the protruding point triggers the triggering switch.

6. The keyswitch of claim **1**, wherein the support structure further comprises a second support member opposite to the first support member and movably connected to the baseplate and the cap, an abutting portion extends from the second support member toward the first support member to support the magnetic permeable plate, and when the cap is pressed by the external force to make the magnetic permeable plate away from the first magnet with rotation of the first support member and the second support member and keep the abutting portion tilted, the cap moves from the released position to the pressed position with the support structure.

7. The keyswitch of claim **6**, wherein the cap, the first support member, and the second support member are strip-shaped, the keyswitch further comprises at least one scissor support mechanism, and the at least one scissor support mechanism is located between the first support member and the second support member and is movably connected to the cap and the baseplate.

8. A keyboard comprising:

a baseplate extending along a plane defined by an X-axis and a Y-axis perpendicular to each other and having at least one bending arm and at least one support rib, a Z-axis being perpendicular to the X-axis and the Y-axis, the at least one bending arm protruding from the baseplate along the Z-axis, the at least one support rib extending along the plane defined by the X-axis and the Y-axis to form a receiving space cooperatively with the at least one bending arm; and

a plurality of keyswitches disposed on the baseplate, at least one of the plurality of keyswitches comprising:

a cap;

a support structure disposed between the baseplate and the cap, the support structure comprising a first support member and a magnetic permeable plate, the first support member being movably connected to the baseplate and the cap to make the cap move with the support structure between a released position and a pressed position, the magnetic permeable plate extending from the first support member and being positioned above the receiving space; and

a first magnet laterally inserted into the receiving space along the plane defined by the X-axis and the Y-axis, the first magnet having a bottom surface and a lateral surface, the bottom surface being supported by the at least one support rib and the lateral surface being pressed by the at least one bending arm laterally;

wherein when the cap is released, a magnetic attraction force between the first magnet and the magnetic permeable plate keeps the cap at the released position;

when the cap is pressed by an external force to make the magnetic permeable plate away from the first magnet with rotation of the first support member, the cap moves from the released position toward the pressed position.

9. The keyboard of claim **8**, wherein the at least one of the plurality of keyswitches further comprises:

a second magnet magnetically attracted to the bottom surface of the first magnet opposite to the support structure.

10. The keyboard of claim **8** further comprising:

a mylar film attached under the baseplate.

11. The keyboard of claim **8**, wherein the at least one of the plurality of keyswitches further comprises:

at least one auxiliary support disposed between the cap and the baseplate and alternately arranged with the support structure, the at least one auxiliary support being movably connected to the baseplate and the cap.

12. The keyboard of claim **8**, wherein the keyboard further comprises a membrane board, the first support member has a protruding point, the membrane circuit board is disposed on the baseplate and has a triggering switch corresponding

to the protruding point, and when the cap is pressed to the pressed position, the protruding point triggers the triggering switch.

13. The keyboard of claim **8**, wherein the support structure further comprises a second support member opposite to the first support member and movably connected to the baseplate and the cap, an abutting portion extends from the second support member toward the first support member to support the magnetic permeable plate, and when the cap is pressed by the external force to make the magnetic permeable plate away from the first magnet with rotation of the first support member and the second support member and keep the abutting portion tilted, the cap moves from the released position to the pressed position with the support structure.

14. The keyboard of claim **13**, wherein the cap, the first support member, and the second support member are strip-shaped, the keyswitch further comprises at least one scissor support mechanism, and the at least one scissor support mechanism is located between the first support member and the second support member and is movably connected to the cap and the baseplate.

15. A keyswitch manufacturing method for manufacturing a keyswitch, the keyswitch providing a pressing resistance force or a returning force to a cap via a magnetic attraction force of a magnetic member, the keyswitch manufacturing method comprising:

providing a baseplate, the baseplate having a receiving space, the receiving space having an opening located at a side of the receiving space not facing the cap;

providing an elastic member disposed on the baseplate to be adjacent to the opening;

pushing the magnetic member against the elastic member to deform the elastic member away from the opening, so as to guide the magnetic member to move toward the receiving space via the opening; and

pushing the magnetic member into the receiving space to release deformation of the elastic member, so as to make the elastic member return to its original position to abut against a side of the magnetic member for preventing the magnetic member from leaving the receiving space via the opening.

16. A keyswitch comprising:

a cap;

a baseplate having a main body, an elastic member, a plurality of blocking members, a receiving space, and an assembly path space, the main body partially extending under the receiving space, the elastic member being disposed on the main body and extending into the assembly path space, the elastic member having a first height in an undeformed state, the **[**assembly path space**]** *receiving space* having at least one blocking side and an opening, the plurality of blocking members being disposed at the at least one blocking side, the opening being disposed at a position different from the at least one blocking side;

a support structure disposed between the baseplate and the cap, the support structure comprising a first support member and a magnetic permeable plate, the first support member being movably connected to the baseplate and the cap to make the cap move with the support structure between a released position and a pressed position, the magnetic permeable plate extending from the first support member and being positioned above the receiving space; and

a magnetic member;

wherein **[**the magnetic member passes through the opening along the assembly path space to enter the receiving space where the plurality of blocking members engages with the magnetic member;

during the magnetic member passes through the opening, the magnetic member enters the assembly path space to deform**]** the elastic member *is deformed* to a second height *when the magnetic member is located within the assembly path space and neighboring to the opening, and the second height is* lower than the first height**[**, so as to allow the magnetic member to pass through the opening along the assembly path space**]**;

[after the magnetic member passes through the opening, the magnetic member leaves the assembly path space to release**]** deformation of the elastic member *is released when the magnetic member is positioned in the receiving space and engaged with the plurality of blocking members*, so as to make the elastic member return to the first height for preventing the magnetic member from leaving the receiving space via the assembly path space;

when the cap is released, a magnetic attraction force between the magnetic member and the magnetic permeable plate keeps the cap at the released position; when the cap is pressed by an external force to make the magnetic permeable plate away from the magnetic member with rotation of the first support member, the cap moves from the released position toward the pressed position.

17. The keyswitch of claim **16**, wherein the assembly path space extends upward from an upper surface of the main body.

18. The keyswitch of claim **16**, wherein the elastic member extends obliquely along the main body, and an angle between the elastic member and the main body is less than 45'.

19. The keyswitch of claim **16**, wherein the support structure further comprises a second support member opposite to the first support member and movably connected to the baseplate and the cap, an abutting portion extends from the second support member toward the first support member to support the magnetic permeable plate, and when the cap is pressed by the external force to make the magnetic permeable plate away from the magnetic member with rotation of the first support member and the second support member and keep the abutting portion tilted, the cap moves from the released position to the pressed position with the support structure.

20. A keyswitch comprising:

a cap;

a baseplate having a main body, an elastic member, a plurality of blocking members, a receiving space, and an assembly path space, the main body partially extending under the receiving space, the elastic member being disposed on the main body and extending into the assembly path space, the elastic member having a first interference in an undeformed state with the assembly path space, the **[**assembly path space**]** *receiving space* having at least one blocking side and an opening, the plurality of blocking members being disposed at the at least one blocking side, the opening being disposed at a position different from the at least one blocking side;

a support structure disposed between the baseplate and the cap, the support structure comprising a first support member and a magnetic permeable plate, the first support member being movably connected to the base-

plate and the cap to make the cap move with the support structure between a released position and a pressed position, the magnetic permeable plate extending from the first support member and being positioned above the receiving space; and

a magnetic member;

wherein [the magnetic member passes through the opening along the assembly path space to enter the receiving space where the plurality of blocking members engage with the magnetic member;

during the magnetic member passes through the opening, the magnetic member enters the assembly path space to deform] the elastic member *is deformed* to have a second interference with the assembly path space[, so as to allow the magnetic member to pass through the opening along the assembly path space] *when the magnetic member is located within the assembly path space and neighboring to the opening*, and the second interference is less than the first interference;

[after the magnetic member passes through the opening, the magnetic member leaves the assembly path space to release] deformation of the elastic member *is released when the magnetic member is positioned in the receiving space and engaged with the plurality of blocking members*, so as to make the elastic member return to have the first interference for preventing the magnetic member from leaving the receiving space via the assembly path space;

when the cap is released, a magnetic attraction force between the magnetic member and the magnetic permeable plate keeps the cap at the released position; when the cap is pressed by an external force to make the magnetic permeable plate away from the magnetic member with rotation of the first support member, the cap moves from the released position toward the pressed position.

21. The keyswitch of claim **20**, wherein the assembly path space extends planarly on an upper surface of the main body, and when the magnetic member enters the receiving space, the magnetic member is constrained by the plurality of blocking members and an extending portion of the main body under the receiving space.

22. The keyswitch of claim **20**, wherein the support structure further comprises a second support member opposite to the first support member and movably connected to the baseplate and the cap, an abutting portion extends from the second support member toward the first support member to support the magnetic permeable plate, and when the cap is pressed by the external force to make the magnetic permeable plate away from the magnetic member with rotation of the first support member and the second support member and keep the abutting portion tilted, the cap moves from the released position to the pressed position with the support structure.

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