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EUROPEAN PATENT APPLICATION

(43) Date of publication:
20.01.2016 Bulletin 2016/03

(51) Int Cl.:

B41J 13/10^(2006.01)

(21) Application number: 15176523.7

(22) Date of filing: 13.07.2015

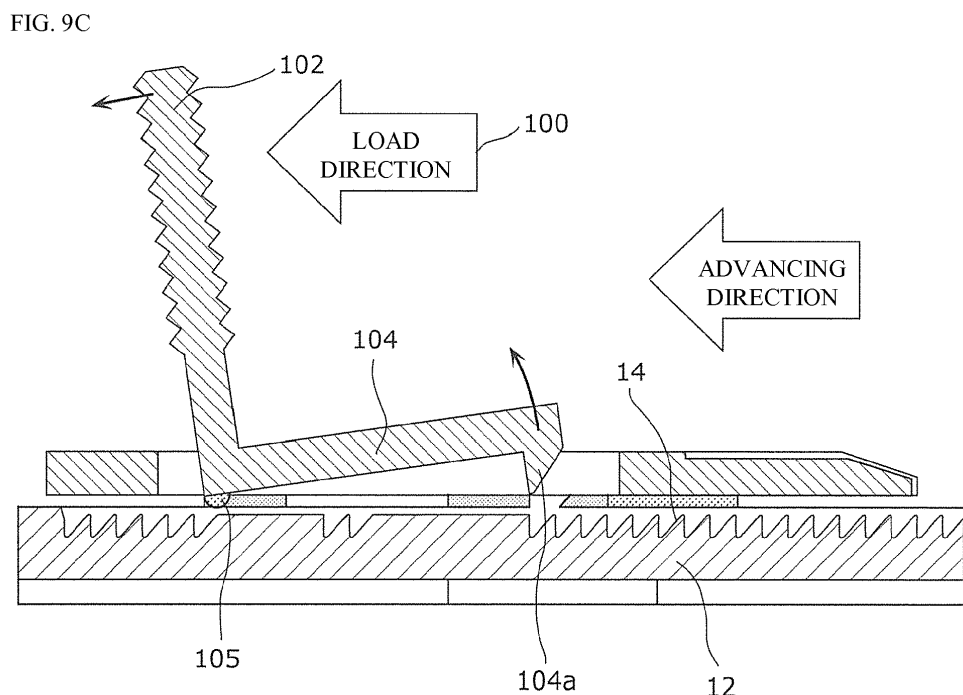
(84) Designated Contracting States: AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR Designated Extension States: BA ME Designated Validation States: MA	(71) Applicant: Funai Electric Co., Ltd. Daito city Osaka 574-0013 (JP) (72) Inventor: Tani, Toshiro Osaka, Osaka 574-0013 (JP) (74) Representative: Osha Liang 2, rue de la Paix 75002 Paris (FR)
(30) Priority: 14.07.2014 JP 2014144125	

(54) PRINTER AND PAPER GUIDE

(57)

A printer including a fixed guide and a movable guide that regulates a position of a paper on the placement surface of a placement section (12). The movable guide (100) slides in a first direction along the placement surface. The placement section (12) includes recessed parts (14) aligned in the first direction. The movable guide (100) includes a wall section; a lever (102) that extends in a second direction; and a raised part (104a) that engages with one of the recessed parts (14). The raised

part engages with the recessed part more firmly when the raised part moves to the other side in the first direction. The raised part (104a) releases the engagement with recessed part when the raised part is turned by a force applied to the lever (102) to the other side in the first direction, and the raised part turns by using an end part of the placement surface side of the lever (102) as a fulcrum.



Description

[Technical Field]

[0001] The present invention generally relates to a printer and a paper guide.

[Background Art]

[0002] Conventional sheet feeding devices to supply paper to a printer and the like, comprise a paper guide member that can perform positioning to accommodate each of a plurality of paper sizes by sliding in the width direction of the paper to perform positioning of an end portion of one size of paper among a plurality of sizes (see Patent Literature 1). With this paper guide member, a locking projection for determining a position in the width direction of the paper is provided, and the locking of the locking projection in a locking groove regulates so that the paper guide is unable to move in the width direction. Further, the user releases the lock between the locking projection and the locking groove by pressing a pressure lever of the paper guide and performs positioning of the paper guide member by sliding the paper guide member to both sides in the width direction.

[Citation List]

[Patent Literature]

[0003] [Patent Literature 1] Japanese Unexamined Patent Application Publication No. 1995-285681

[0004] However, the user must press the pressure lever when sliding the paper guide member, and when sliding to one side in the width direction, and also when sliding to the other side. Therefore, it is necessary to slide while pressing the pressure member of the paper guide member when sliding the paper guide member, and there are times when the direction to press the pressure lever and the direction to move the paper guide member do not match. Therefore, the user must move the paper guide member using two or more fingers.

[Summary of the Invention]

[0005] A printer in accordance with one or more embodiments can perform the positioning of the movable guide without imposing a burden on the user.

[0006] According to one or more embodiments of the present invention, a paper guide may comprise: a placement section comprising a placement surface where a paper is placed; a fixed guide that regulates a position of one end of the paper placed on the placement surface; and a movable guide that slides in a first direction along the placement surface and regulates a position on the other end of the paper, wherein the placement section may include a plurality of recessed parts aligned in the first direction in a region where the movable guide slides

on the placement surface, the movable guide may comprise: a wall section that faces the fixed guide in the first direction and regulates the other end of the paper; a lever that extends in a second direction; and a raised part that engages with one of the plurality of recessed parts, the raised part may engage with the one recessed part more firmly when the raised part moves to the other side in the first direction than when the raised part moves to one side in the first direction, the raised part may be formed on one side in the first direction, the raised part may release the engagement with the one recessed part when the raised part is turned by a force applied to the lever to the other side in the first direction, and the raised part may turn by using an end part of the placement surface side of the lever as a fulcrum.

[0007] According to one or more embodiments of the present invention, the movable guide may cause the raised part to cross over the one recessed part when a force is applied to the lever to the one side in the first direction and move to the one side in the first direction, and may cause the engagement of the raised part to the one recessed part to be released when a force is applied to the lever to the other side in the first direction and moves to the other side in the first direction.

[0008] As a result, because the raised part moves more easily when moving to one side in the first direction on the plurality of recessed parts than when moving to the other side, if, for example, a force of a predetermined size is applied to the raised part toward one side in the first direction, it can move to one side in the first direction. That is, if a force of a predetermined size is applied to the lever towards one side in the first direction, the movable guide moves to the one side in the first direction. However, the raised part is inhibited from moving to the other side in the first direction even if a force of the same predetermined size is applied because the raised part is more firmly caught on the plurality of recessed parts to the other side in the first direction than when moving to the one side.

[0009] According to this configuration, because the engagement between the raised part and the predetermined recessed part is released by the raised part being turned using an end part of the placement surface side of the lever as a fulcrum when the force to the other side in the first direction is applied to the lever, the movable guide can be moved to the other side in the first direction even if a force to the other side in the first direction is applied to the movable guide.

[0010] That is, when a pressure toward one side in the first direction is applied to the lever, the user can move the movable guide to the one side in the first direction. Moreover, when a pressure toward the other side in the first direction is applied to the lever, the user can also move the movable guide to the other side in the first direction. In this manner, because the movable guide causes the direction of the applied force by the user to match the direction for moving, the user can move the movable guide by applying a force on the movable guide in only

one direction. Therefore, the user can move the guide without a burden.

[0011] According to one or more embodiments of the present invention, each of the plurality of recessed parts may be a groove having a V shaped cross section that comprises a first surface on the one side in the first direction and a second surface on the other side in the first direction, an angle formed between the first direction and the first surface may be smaller than an angle formed between the first direction and the second surface, the raised part may be a rib having a V shaped cross section that comprises a third surface and a fourth surface, and when the raised part is engaged with the one recessed part, the third surface may contact the first surface and the fourth surface contacts the second surface.

[0012] As a result, a simple configuration can be implemented where at least one of the plurality of recessed parts or the raised part is formed so that the raised part is caught into the predetermined recessed part to the plurality of recessed parts more firmly when moving to the other side in the first direction than when moving to the one side in the first direction.

[0013] According to one or more embodiments of the present invention, the raised part and the fulcrum on the movable guide may be formed in different positions in the third direction intersecting the first direction, and the plurality of recessed parts may be formed on the placement surface except in a region where the fulcrum slides.

[0014] As a result, because the fulcrum is formed to be in a different position in the third direction than the plurality of recessed parts, the distance from the placement surface of the fulcrum can be fixed. That is, fixing the distance from the placement surface of the fulcrum slightly to the position of the movable guide in the first direction allows the engagement between the raised part and the predetermined recessed part to be released if the size of the force applied to the lever is applied toward the other side in the first direction is always a predetermined size regardless of the position on the movable guide. That is, the engagement between the raised part and the predetermined recessed part can be prevented from releasing even if the user applies a force in a predetermined size. As a result, if the user applied a fixed force regardless of the position on the movable guide, the guide can be moved to the other side in the first direction.

[0015] According to one or more embodiments of the present invention, the movable guide further may comprise: a catching section continuous to the lever and that extends to the one side in the first direction from the lever; and a base section continuous to the lever and that extends at least in the first direction from a position that differs in the third direction from the catching section of the lever, wherein the raised part may be formed on the catching section on the one side in the first direction from the lever.

[0016] According to one or more embodiments of the present invention, the lever may be connected to the base

section and the catching section, and may be elastically deformed in a direction approaching the base section and causes the catching section to turn according to an inclination of the lever when a force is applied to the other side in the first direction.

[0017] As a result, because the lever and the base section elastically deform when a force is applied to the lever, and the catching section turns according to the inclination of the lever, when the force applied to the lever is gone, the elastic deformation returns to the original position. Therefore, releasing the hand of the user returns the inclination of the lever to the original position. As a result, the catching section returns to the original position from the turned state. Therefore, the raised part of the catching section and the recessed part are engaged again. Accordingly, the movement of the movable guide is regulated at the predetermined position when the force applied to the lever at the predetermined position in the first direction is gone.

[0018] According to one or more embodiments of the present invention, the lever may comprise a protrusion that projects from the lever to the placement surface, the fulcrum may be the lever, the catching section and the base section may have a gap between the placement surface, and the protrusion and the raised part may support the movable guide on the placement surface.

[0019] As a result, because a gap is provided between the placement surface and the catching section as well as the base section, and because the catching section turns using the protrusion as the fulcrum, the distance for the turning of the catching section can be large even with a small deformation amount of elastic deformation between the lever and the base section. For this reason, the engagement between the raised part and the predetermined recessed part can be released by a small force, and a large burden applied between the lever and the base section can be reduced. Thereby, it can prevent the movable guide from damage.

[0020] According to one or more embodiments of the present invention, the placement section may comprise a slit that extends in the first direction, the base section may comprise a hook that passes through the slit, and the hook may slide in the first direction on the slit and the hook may prevent the base section from separating from the placement surface, and the hook may be disposed closer to the one side in the first direction than to the fulcrum.

[0021] As a result, because the hook is positioned more to one side in the first direction than the fulcrum of the lever, the base section can be prevented from floating in a direction away from the placement surface even if a force is applied on the lever towards the other side in the first direction.

[0022] According to one or more embodiments of the present invention, the raised part may be disposed more to the other side in the first direction than the wall section.

[0023] Therefore, the paper can be prevented from being placed over the raised part. Accordingly, for example,

the turning of the raised part can be performed without interference from the paper even if the paper is placed over the base section.

[0024] According to one or more embodiments of the present invention, a printer may comprise a placement section comprising a placement surface where a media is placed; a fixed guide that regulates a position of one end of the media; and a movable guide that slides in a first direction along the placement surface and regulates a position on the other end of the media, wherein the placement section may include a plurality of recessed parts aligned in the first direction in a region where the movable guide slides on the placement surface, the movable guide may comprise a wall section that faces the fixed guide in the first direction and regulates the other end of the media; and a raised part that engages with one of the plurality of recessed parts, and the raised part may engage with the one recessed part more firmly when the raised part moves to the other side in the first direction than when the raised part moves to one side in the first direction.

[0025] According to one or more embodiments of the present invention, a paper guide may comprise a placement section comprising a placement surface where a paper is placed; a fixed guide that regulates a position of one end of the paper; and a movable guide that slides in a first direction along the placement surface and regulates a position on the other end of the paper, wherein the placement section may include a plurality of recessed parts aligned in the first direction in a region where the movable guide slides on the placement surface, the movable guide may comprise a wall section that faces the fixed guide in the first direction and regulates the other end of the paper; and a raised part that engages with one of the plurality of recessed parts, and the raised part may engage with the one recessed part more firmly when the raised part moves to the other side in the first direction than when the raised part moves to one side in the first direction.

[0026] The printer according to one or more embodiments of the present invention can perform the positioning of the movable guide without imposing a burden on the user.

[Brief Description of Drawings]

[0027]

FIG. 1 is a perspective view illustrating an external appearance of the printer according to one or more embodiments of the present invention.

FIG. 2 is a perspective view illustrating an external appearance of the printer according to one or more embodiments of the present invention.

FIG. 3 is an illustration of the printer removing the top surface of the printer and the internal structure of the printer according to one or more embodiments of the present invention.

FIG. 4A is an enlarged diagram of the paper guide without paper placed therein according to one or more embodiments of the present invention.

FIG. 4B is an enlarged diagram of the paper guide with paper placed therein according to one or more embodiments of the present invention.

FIG. 5A is a perspective view of the movable guide when viewing from the front side according to one or more embodiments of the present invention.

FIG. 5B is a perspective view of the movable guide when viewing from the rear side according to one or more embodiments of the present invention.

FIG. 6 is an enlarged view in a region A1 of FIG. 5B according to one or more embodiments of the present invention.

FIG. 7 is a cross-sectional view of A-A in FIG. 4A according to one or more embodiments of the present invention.

FIG. 8 is a diagram viewing from the rear surface side, a section where the movable guide is disposed within the placement section according to one or more embodiments of the present invention.

FIGS. 9A is a cross-sectional view of B-B in FIG. 4A according to one or more embodiments of the present invention.

FIGS. 9B is a cross-sectional view of B-B in FIG. 4A according to one or more embodiments of the present invention.

FIGS. 9C is a cross-sectional view of B-B in FIG. 4A according to one or more embodiments of the present invention.

FIG. 10 is an enlarged view of the region A2 in FIG. 9B according to one or more embodiments of the present invention.

[Detailed Description of Embodiments]

[0028] Embodiments of the present invention will be described in detail hereinafter with reference to drawings. In embodiments of the invention, numerous specific details are set forth in order to provide a more thorough understanding of the invention. However, it will be apparent to one of ordinary skill in the art that the invention may be practiced without these specific details. In other instances, well-known features have not been described in detail to avoid obscuring the invention.

(An Example)

(Printer External Structure)

[0029] First, an external structure of a printer 2 according to one or more embodiments of the present invention will be described with reference to FIGS. 1 and 2. FIGS. 1 and 2 are perspective views respectively illustrating an appearance of the printer according to one or more embodiments of the present invention.

[0030] As illustrated in FIGS. 1 and 2, the printer 2 may

be an inkjet printer that prints, for example, by ejecting ink onto a paper 4. That is, the printer 2 may comprise a printing unit not shown for printing by ejecting ink. The paper 4 is an example of a recording media (media). The paper 4 may be, for example, a regular paper, a photo paper, a post card, or the like.

[0031] The printer 2 may comprise a casing 6. A feed port 8 is provided at an upper end part of a rear surface 6a of the casing 6 to feed the paper 4 to be printed into the casing 6. The paper 4 is inserted into the feed port 6 from above. A feed tray 10 is further fixed to the upper end part of the rear surface 6a of the casing 6 so as to support the paper 4, inserted into the feed port 8, from the rear side. The feed tray 10 extends obliquely upward from the feed port 8.

[0032] A substantially rectangular discharge port 13 is provided on a front surface 6b of the casing 6 to discharge the paper 4 printed to the outside of the casing 6. A substantially rectangular cover member 11 is provided on the discharge port 13 such that it can be opened and closed.

[0033] The cover member 11 is a plate-like member that can block the discharge port 13 and is disposed at a lower end part of the discharge port 13 while also being rotatable in the open direction that opens the discharge port 13 as well as in the closed direction that closes the discharge port 13 centering around a rotation axis extending in a substantially horizontal direction (X axis direction). As illustrated in FIG. 1, the cover member 11 extends slightly inclined in the vertical direction when closed. As illustrated in FIG. 2, the cover member 11 extends in a substantially horizontal direction from the lower end part of the discharge port 13 when open, and functions as a discharge tray to support the paper 4 discharged from the discharge port 13 from below. An operation panel 21 is provided on a top surface 6c of the casing 6 to execute the operation of the printer 2 (e.g., turning on and off, initiating printing, and the like).

(Paper Guide)

[0034] Next, a description of a paper guide 1 in the printer 2 will be given.

[0035] FIG. 3 is an illustration of the printer 2 removing the top surface 6c of the printer 2 and the internal structure of the printer 2. FIG. 3 is a diagram for describing the paper guide 1 for placing the paper 4 to feed into the printer 2. FIG. 4A is an enlarged diagram of the paper guide without paper placed therein. FIG. 4B is an enlarged diagram of the paper guide with paper placed therein.

[0036] As illustrated in FIG. 3, the paper guide 1 is provided on the rear surface side of the printer 2. The paper guide 1 has a movable guide 100 for placing the paper 4 in a predetermined position in a first direction (X axis direction). The paper guide 1 may comprise a placement section 12, a fixed guide 18, and a movable guide 100.

[0037] The placement section 12 has a placement sur-

face S1 (see FIG. 4A described below) where the paper is placed. The placement section 12 is provided on the rear surface 6a of the casing 6, and a surface where the paper 4 of the feed tray 10 is placed and the placement surface S1 of the placement section 12 are connected so as to be flush. Further, as illustrated in FIG. 4A, a plurality of recessed parts 14 that are aligned in the X axis direction is formed in a region where the movable guide 100 slides on the placement surface S1. A slit 16 extending in the X axis direction is provided in the placement section 12.

[0038] The fixed guide 18 regulates a position of one end (an end part of the positive side in the X axis direction) of the paper 4 placed on the placement surface S1 as illustrated in FIG. 4B. Specifically, the fixed guide 18 is provided on the rear surface 6a of the casing 6 and is a plate-like member provided erect in a perpendicular direction to the X axis direction from the rear surface 6a (placement surface S1). The fixed guide 18 is formed continuous on the rear surface 6a of the casing 6.

[0039] The movable guide 100 is provided so as to be slidable in the X axis direction with respect to the placement surface S1. The movable guide 100 regulates the position of the other end of the paper 4 (an end part of the negative side in the X axis direction).

Next, a configuration of the movable guide 100 will be described.

[0040] FIG. 5A is a perspective view of the movable guide when viewing from the front side. FIG. 5B is a perspective view of the movable guide when viewing from the rear side. FIG. 6 is an enlarged view in a region A1 of FIG. 5B.

[0041] The movable guide 100 specifically has a wall section 101, a lever 102, and a base section 103. The wall section 101, lever 102, and base section 103 in the movable guide 100 according to the present embodiment are integrally formed.

[0042] The wall section 101 faces the fixed guide 18 in the X axis direction and regulates the other end of the paper 4 (see FIG. 4). The wall section 101 extends more to the positive side in the Y axis direction than the base section 103 and forms a Y-Z surface. The wall section 101 regulates the other end of the paper 4 by the Y-Z surface.

[0043] The lever 102 extends in a second direction (Z axis direction) intersecting with the placement surface S1. Specifically, the lever 102 is a plate-like member extending in the Z axis direction from a region along the Y axis direction of the base section 103. The lever 102 is parallel to the Y-Z surface that intersects in the X axis direction and is formed continuous from the base section 103. Further, with the lever 102, a catching section 104 extending towards the positive side from the lever 102 in the X axis direction is formed continuous on the lever 102. Although a detailed description is provided below, the lever 102 has a function to turn the catching section

104 towards the positive side in the Z axis direction by being inclined to the negative side in the X axis direction in relation to the base section 103.

[0044] The catching section 104 extends towards the positive side in the X axis direction from both positions of the ends in the Y axis direction of the end part of the placement surface S1 of the lever 102. In other words, two catching sections 104 are provided on the lever 102. Further, a raised part 104a is formed on the catching section 104 as illustrated in FIG. 5B at a position apart from the lever 102 to the positive side in the X axis direction. The raised part 104a is provided in a position that is more to the negative side in the X axis direction than the wall section 101.

[0045] The base section 103 is provided so as to be slidable in the slit 16 of the placement section 12. The base section 103 is continuous to the lever 102 and extends towards both sides in a first direction (X axis direction) from a different position in a third direction (Y axis direction) from the catching section 104 of the lever 102. Further, the base section 103 is formed so as to surround the periphery of the catching section 104. That is, as illustrated in FIG. 6, the slit 108 is formed in a region between the catching section 104 and the base section 103 except a region that is connected to the lever 102. In other words, the catching section 104 and the base section 103 are formed so as to be separated from each other. Accordingly, the catching section 104 is configured so as to turn independently from the base section 103 according to the inclination of the lever 102.

[0046] Furthermore, a protrusion 105 projecting towards the placement surface S1 on the extension of the lever 102 is formed on the rear side (side of the placement surface S1) of the base section 103 as illustrated in FIGS. 5B and 6, and functions as the fulcrum when the catching section 104 turns at the time the lever 102 is inclined. In other words, it can be even said that the protrusion 105 is formed on the end part of the placement surface S1 side of the lever 102. Also, the raised part 104a and the protrusion 105 formed on the catching section 104 is formed with a region R1 and a region R2 that are different in the Y axis direction respectively. In addition, hooks 106, 107, and projections 109, 110 are formed on the rear side of the base section 103 so as to be slidable in the X axis direction with respect to the placement section 12.

Next, the hooks 106, 107, and the projections 109, 110 will be described.

[0047] FIG. 7 is a cross-sectional view of A-A in FIG. 4A. FIG. 8 is a diagram viewing from the rear surface side, a section where the movable guide is disposed within the placement section.

[0048] As illustrated in FIG. 7, the slit 16 and the hook 106 are formed on the rear side of the base section 103 so that the base section 103 is not separated from the placement surface S1 while passing through the slit 16

and movable in the X axis direction with respect to the slit 16. The hook 106 is located in the positive side in the X axis direction more to the protrusion 105 functioning as the fulcrum of the lever 102 (see FIG. 6). Further, the hook 107 is formed on the rear side of the base section 103 so as to be slidable in the X axis direction with respect to the upper end of the placement section 12 while hooking the upper end of the placement section 12. Furthermore, the projections 109 and 110 are formed on the rear side of the base section 103 so as to be movable in the X axis direction with respect to the slit 16 while interposing into the slit 16 (see FIG. 8). The hook 106 and the projections 109, 110 are formed in a region R3 differing in the Y axis direction from the regions R1 and R2 (see FIG. 6). In other words, the hook 106, and projections 109, 110 are formed lining alongside in the X axis direction so as to function as the guide that is movable in the X axis direction with respect to the slit 16.

[0049] The movable guide 100 is regulated a position with respect to the X axis direction of the placement section 12 at the predetermined position by engaging the raised part 104a provided at the catching section 104 into a predetermined recessed part within a plurality of recessed parts 14 formed on the placement surface S1 of the placement section 12. Next, a relationship between the raised part 104a and the plurality of recessed parts 14 will be described with reference to FIGS. 9A to 9C, and FIG. 10.

FIGS. 9A to 9C are a cross-sectional view of B-B in FIG. 4A. More specifically,

[0050] FIG. 9A is a diagram to describe when applying a load onto the positive side in the X axis direction with respect to the lever 102. FIG. 9B and FIG. 9C are diagrams to describe when applying a load onto the negative side in the X axis direction with respect to the lever 102. FIG. 10 is an enlarged view of the region A2 in FIG. 9B. More specifically, FIG. 10 (a) is an enlarged view of the region A2 in FIG. 9B, and FIG. 10(b) is a further enlarged portion of FIG. 10(a).

[0051] As illustrated in FIGS. 9A to 9C and 10, the raised part 104a contacts the predetermined recessed part at both sides in the X axis direction while the raised part 104a is engaged with the predetermined recessed part within the plurality of recessed parts 14. Further, each of the plurality of recessed parts 14 is a V-shaped groove in the cross-section having a first surface S21 of the positive side in the X axis direction and a second surface S22 of the negative side in the X axis direction as illustrated in FIG. 10. Further, the angle $\theta 1$ between the X axis direction and the first surface S21 is smaller than the angle $\theta 2$ between the X axis direction and the second surface S22. The raised part 104a is a V-shaped rib in the cross-section having a third surface S11 contacting the first surface S21 and a fourth surface S12 contacting the second surface S22 while engaging with the predetermined recessed part. In other words, the plu-

rality of recessed parts 14 and the raised part 14a are formed so that the raised part 104a is caught into the predetermined recessed part with respect to the plurality of recessed parts 14 more firmly when moving to the negative side in the X axis direction than when moving to the positive side in the X axis direction.

[0052] Because the raised part 104a and the plurality of recessed parts 14 are formed as described above, when a force is applied onto the positive side in the X axis direction with respect to the lever 102, the movable guide 100 can be moved to the positive side in the X axis direction when the raised part 104a crosses over the predetermined recessed part as illustrated in 9A.

[0053] Meanwhile, the raised part 104a and the plurality of recessed parts 14 are formed so that the raised part 104a while being engaged is caught firmly into the plurality of recessed parts 14 when moving to the negative side in the X axis direction as described above. Therefore, when the raised part 104a is engaged with the predetermined recessed part, the moving guide 100 is less movable to the negative side in the X axis direction. That is, for example, even when a load of the wall section 101 of the movable guide 100 is applied onto the negative side in the X axis direction by the paper 4 placed, the movable guide 100 is less movable to the negative side in the X axis direction because the raised part 104a is firmly engaged to the predetermined recessed part.

[0054] Thus, as illustrated in FIGS. 9B and 9C, when a force is applied towards the negative side in the X axis direction with respect to the lever 102, the raised part 104a turns by using the protrusion 105 of the end part of the placement surface S1 side of the lever 102 as a fulcrum. In other words, the catching section 104 is able to turn independently from the base section 103, and turn in a direction away from the recessed part by using the protrusion 105 as the fulcrum. Accordingly, the engagement between the raised part 104a and the predetermined recessed part is released. That is, the raised part 104a is formed in a position apart from the positive side in the X axis direction of the lever 102 so as to be released the engagement with the predetermined recessed part by turning in the direction to be away from the predetermined recessed part. In other words, the movable guide 100 can be moved to the negative side in the X axis direction due to the release of the engagement between the raised part 104a and the predetermined recessed part when a force is applied towards the negative side in the X axis direction with respect to the lever 102.

[0055] Further, when a force is applied towards the negative side in the X axis direction, the lever 102 is elastically deformed in a direction where the lever 102 and the base section 103 mutually approach, and also the base section 103 and the catching section 104 are continuous so that the catching section 104 is turned according to the inclination of the lever 102. In other words, when the force applied to the lever 102 is gone, the elastic deformation returns to the original position, and therefore, the inclination of the lever 102 returns to the original

position. Accordingly, the catching section 104 returns to the original position from the turning state. Therefore, the raised part 104a of the catching section 104 and the recessed part are engaged again. Accordingly, the movement of the movable guide 100 is regulated at the predetermined position when the force applied on the lever 102 at the predetermined position in the X axis direction is gone.

[0056] Further, the movable guide 100 is provided with a gap between the placement surface S1 and the catching section 104 as well as the base section 103 by being supported on the placement surface S1 by the protrusion 105 and the raised part 104. Therefore, even if the amount of elastic deformation between the lever 102 and the base section 103 is small, the distance for turning the catching section 104 can be increased. For this reason, the engagement between the raised part 104a and the predetermined recessed part can be released by a small force, and a large burden applied between the lever 102 and the base section 103 can be reduced. Thereby, it can prevent the movable guide 100 from damage.

[Effect]

[0057] According to the printer 2 described in this embodiment, because the raised part 104a moves more easily when moving to plus side in the X axis direction with respect to the plurality of recessed parts 14 than when moving to the negative side, if, for example, a force of a predetermined size is applied to the raised part 104a toward the plus side in the X axis direction, it can move to the positive side in the X axis direction. That is, if a force of a predetermined size is applied to the lever 102 towards the positive side in the X axis direction, the movable guide 100 moves to the positive side in the X axis direction. However, the raised part 104a is inhibited from moving to the negative side in the X axis direction even if a force of the same predetermined size is applied because the raised part is more firmly caught on the plurality of recessed parts 14 to the negative side in the X axis direction than when moving to the positive side.

[0058] With this type of configuration, when a force is applied to the lever 102 toward the negative side in the X axis direction, the raised part 104a turns using the end part of the placement surface S1 side of the lever 102 as a fulcrum, and the engagement between only the raised part 104a and the predetermined recessed part is released. Therefore, even if a force is applied to the lever 102 toward the negative side in the X axis direction, the user can move the movable guide 100 to the negative side in the X axis direction.

[0059] That is, when a pressure toward the positive side in the X axis direction is applied to the lever 102, the user can move the movable guide 100 to the positive side in the X axis direction. Further, when a pressure toward the negative side in the X axis direction is applied to the lever 102, the user can also move the movable guide 100 to the negative side in the X axis direction. In

this manner, because the movable guide 100 is configured so that the direction of the applied force by the user matches the direction for moving, the user can move the movable guide by applying a force on the movable guide in only one direction. Therefore, the user can move the guide without a burden.

[0060] Further, according to the printer 2 described in this embodiment, each of the plurality of recessed parts 14 have a first surface S21 and a second surface S22 and is a groove having a V-shaped cross section. The angle θ_1 formed by the X axis direction and the first surface S21 is smaller than the angle θ_2 formed by the X axis direction and the second surface S22. Further, the raised part 104a is a V-shaped rib in the cross-section having a third surface S11 contacting the first surface S21 and a fourth surface S12 contacting the second surface S22 while engaging with the predetermined recessed part. Therefore, a simple configuration can be implemented where the plurality of recessed parts 14 and the raised part 14a are formed so that the raised part 104a is caught into the predetermined recessed part with respect to the plurality of recessed parts 14 more firmly when moving to the negative side in the X axis direction than that of when moving to the positive side in the X axis direction.

[0061] Further, according to the printer 2 described in this embodiment, because the fulcrum is formed to be in a different position in the Y axis direction than the plurality of recessed parts 14, the distance from the placement surface S1 of the fulcrum can be fixed. Therefore, if the force applied to the lever 102 toward the negative side in the X axis direction is always a fixed size, the engagement between the raised part 104a and the predetermined recessed part can be released. That is, the engagement between the raised part 104a and the predetermined recessed part can be prevented from releasing even if the user applies a force in a predetermined size. By this, if the user applies a fixed force regardless of the position on the movable guide 100, the movable guide 100 can be moved to the negative side in the X axis direction.

[0062] Further, according to the paper guide 1 described in this embodiment, because the hook 106 is positioned more to positive side in the X axis direction than the fulcrum of the lever 102, the base section 103 can be prevented from floating in a direction away from the placement surface S1 even if a force is applied on the lever 102 towards the negative side in the X axis direction.

[0063] Further, according to the printer 2 described in this embodiment, because the raised part 104a is provided more to the negative side in the X axis direction than the wall section 101, the paper 4 can be prevented from being placed over the raised part 104a. Therefore, for example, the turning of the raised part 104a can be performed without interference from the paper 4 even if the paper 4 is placed over the base section 103.

(Modified Example)

[0064]

(1) The printer 2 according to one or more embodiments of the present invention described above, the paper guide 1 is formed so as to be provided on the rear surface 6a of the casing 6 which is provided continuously to the feed tray 10; however, it is not limited thereto. For example, the paper guide may be provided in the paper cassette as a feed tray for placing papers to be fed.

(2) In the printer 2 according to one or more embodiments of the present invention described above, a plurality of recessed parts 14 is a groove having a V-shape in the cross section while having the first surface S21 and the second surface S22 respectively; however it is not limited thereto. That is, it may be sufficient if satisfying that the raised part contacts the predetermined recessed part at both sides in the X axis direction, and also the angle between the X axis direction and normal direction at the contact in the positive side in the X axis direction of the raised part is smaller than the angle between the X axis direction and the normal direction at the contact in the negative side in the X axis direction of the raised part. For this reason, at least one of the plurality of recessed parts or the raised part is formed so that the raised part is caught into the predetermined recessed part with respect to the plurality of recessed parts more firmly when moving to the other side in the first direction than when moving to one side in the first direction.

[0065] Furthermore, the embodiment described above and the modified examples may be combined respectively. Also, the features of the embodiments and examples described above can be combined with each other according to various combinations, not limited to the specific combinations disclosed herein.

[0066] Although the disclosure has been described with respect to only a limited number of embodiments, those skilled in the art, having benefit of this disclosure, will appreciate that various other embodiments may be devised without departing from the scope of the present invention. Accordingly, the scope of the invention should be limited only by the attached claims.

[Explanation of References]

[0067]

1	paper guide
2	printer
4	paper
6	casing
6a	rear surface
6b	front surface

6c	top surface
8	feed port
10	feed tray
11	cover member
12	placement section
13	discharge port
14	a plurality of recessed parts
15	rotation axis
16	slit
18	fixed guide
21	operation panel
100	movable guide
101	wall section
102	lever
103	base section
104	catching section
104a	raised part
105	protrusion
106, 107	hook
108	slit
109, 110	projection
S11	third surface
S12	fourth surface
S21	first surface
S22	second surface

Claims

1. A printer comprising:

a placement section (12) comprising a placement surface (S1) where a media (4) is placed; a fixed guide (18) that regulates a position of one end of the media (4); and a movable guide (100) that slides in a first direction along the placement surface (S1) and regulates a position on the other end of the media (4), wherein the placement section (12) includes a plurality of recessed parts (14) aligned in the first direction in a region where the movable guide (100) slides on the placement surface, the movable guide (100) comprises:

a wall section (101) that faces the fixed guide (18) in the first direction and regulates the other end of the media; and a raised part (104a) that engages with one of the plurality of recessed parts (14), and the raised part (104a) engages with the one recessed part more firmly when the raised part moves to the other side in the first direction than when the raised part moves to one side in the first direction.

2. The printer according to claim 1, wherein the movable guide (100) comprises a lever (102) that

extends in a second direction, the raised part (104a) crosses over the one recessed part when a force is applied to the lever (102) to the one side in the first direction, and the engagement of the raised part (104a) to the one recessed part is released when a force is applied to the lever (102) to the other side in the first direction.

3. The printer according to claim 2, wherein the raised part (104a) is formed on one side in the first direction, the raised part (104a) releases the engagement with the one recessed part when the raised part (104a) is turned by a force applied to the lever (102) to the other side in the first direction, and the raised part (104a) turns by using an end part of the placement surface side of the lever (102) as a fulcrum.

4. The printer according to any one of claims 1 to 3, wherein each of the plurality of recessed parts (14) is a groove having a V shaped cross section that comprises a first surface (S21) on the one side in the first direction and a second surface (S22) on the other side in the first direction, an angle ($\theta 1$) formed between the first direction and the first surface (S21) is smaller than an angle ($\theta 2$) formed between the first direction and the second surface (S22), the raised part (104a) is a rib having a V shaped cross section that comprises a third surface (S11) and a fourth surface (S12), and when the raised part (104a) is engaged with the one recessed part, the third surface (S11) contacts the first surface (S21) and the fourth surface (S12) contacts the second surface (S22).

5. The printer according to any one of claim 3 or 4, wherein the raised part (104a) and the fulcrum on the movable guide (100) are formed in different positions in a third direction intersecting the first direction, and the plurality of recessed parts (14) is formed on the placement surface (S1) except in a region where the fulcrum slides.

6. The printer according to claim 5, wherein the movable guide (104a) further comprises:

a catching section (104) continuous to the lever (102) and that extends to the one side in the first direction from the lever; and a base section (103) continuous to the lever (102) and that extends at least in the first direction from a position that differs in the third direction from the catching section (104) of the lever, wherein

the raised part (104a) is formed on the catching section (104) on the one side in the first direction from the lever (102).

7. The printer according to claim 6, wherein the lever (102) is connected to the base section (103) and the catching section (104), and is elastically deformed in a direction approaching the base section (103) and causes the catching section (104) to turn according to an inclination of the lever (102) when a force is applied to the other side in the first direction. 5 10
8. The printer according to claim 6 or 7, wherein the lever (102) comprises a protrusion (105) that projects from the lever (102) to the placement surface (S1), the fulcrum is the lever (102), a gap is provided between the catching section (104) and the placement surface (S1) and between the base section (103) and the placement surface (S1), and the protrusion (105) and the raised part (104a) supports the movable guide (100) on the placement surface (S1). 15 20 25
9. The printer according to any one of claims 6 to 8, wherein the placement section (12) comprises a slit (16) that extends in the first direction, the base section (103) comprises a hook (106) that passes through the slit, and the hook (106) slides in the first direction on the slit (16) and prevents the base section (103) from separating from the placement surface (S1), and is disposed closer to the one side in the first direction than to the fulcrum. 30 35 40
10. The printer according to any one of claims 1 to 9, wherein the raised part (104a) is disposed more to the other side in the first direction than the wall section (101). 45
11. A paper guide comprising:
 - a placement section (12) comprising a placement surface (S1) where a paper (4) is placed; 50
 - a fixed guide (18) that regulates a position of one end of the paper (4); and
 - a movable guide (100) that slides in a first direction along the placement surface (S1) and regulates a position on the other end of the paper (4), wherein 55
 - the placement section (12) includes a plurality of recessed parts (14) aligned in the first direction in a region where the movable guide (100)

slides on the placement surface, the movable guide (100) comprises:

- a wall section (101) that faces the fixed guide (18) in the first direction and regulates the other end of the paper; and
- a raised part (104a) that engages with one of the plurality of recessed parts (14), and

the raised part (104a) engages with the one recessed part more firmly when the raised part moves to the other side in the first direction than when the raised part moves to one side in the first direction

FIG. 1

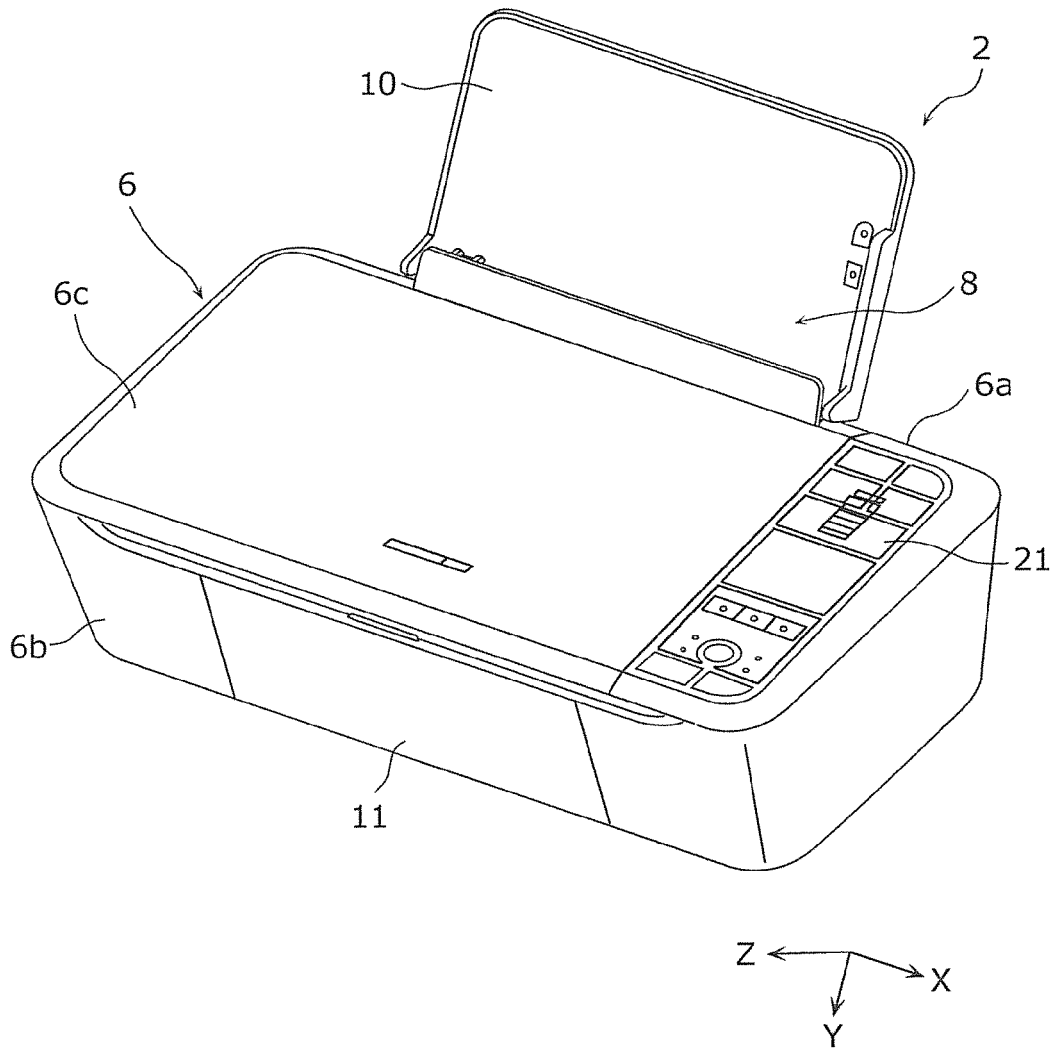


FIG. 2

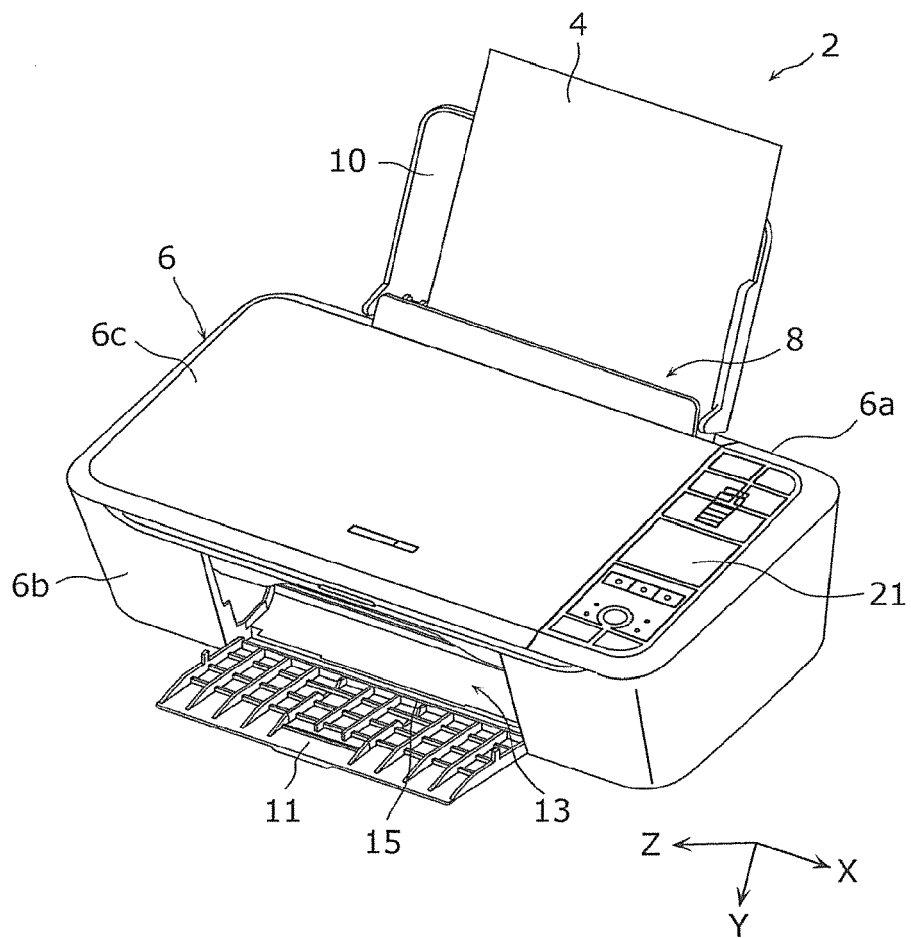


FIG. 3

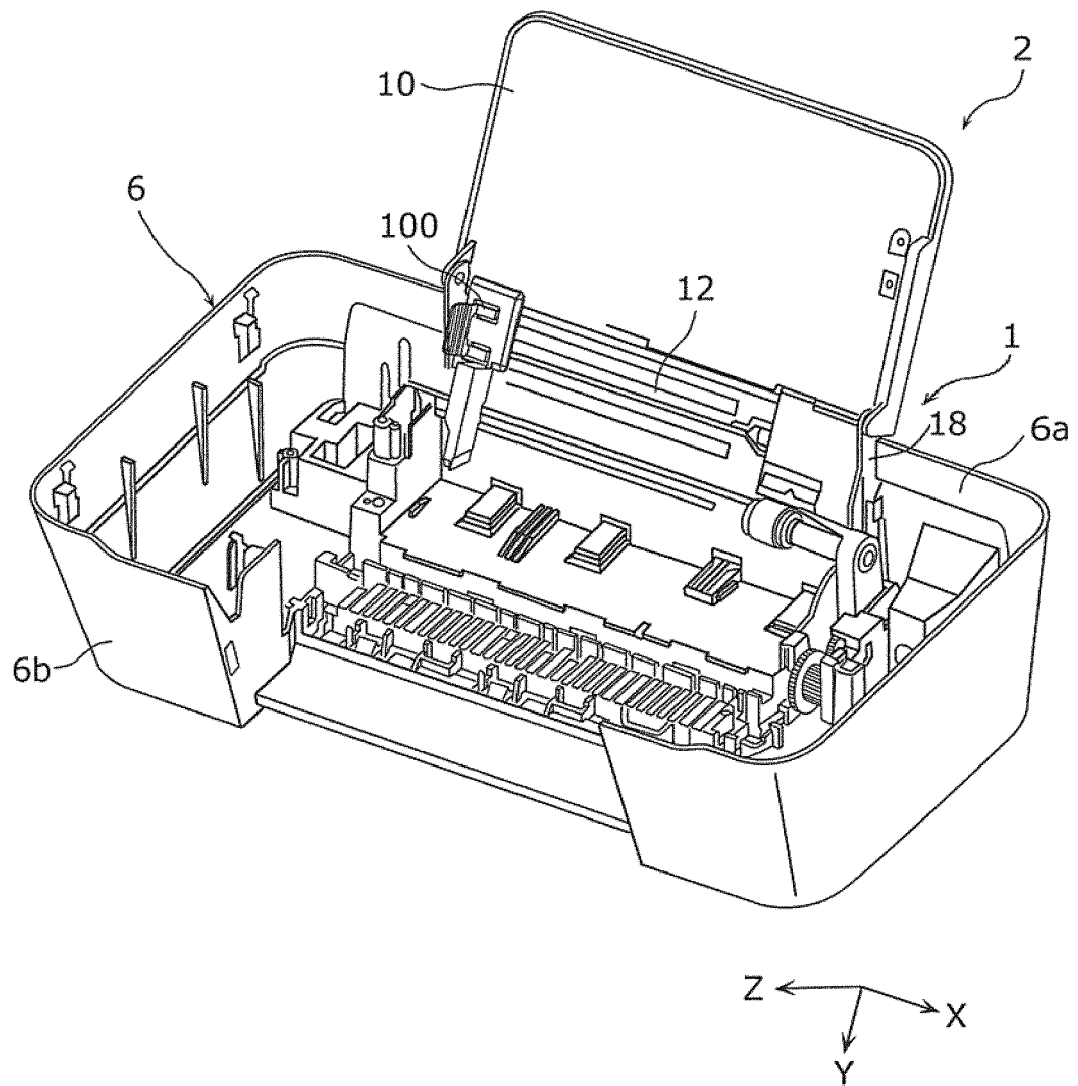


FIG. 4A

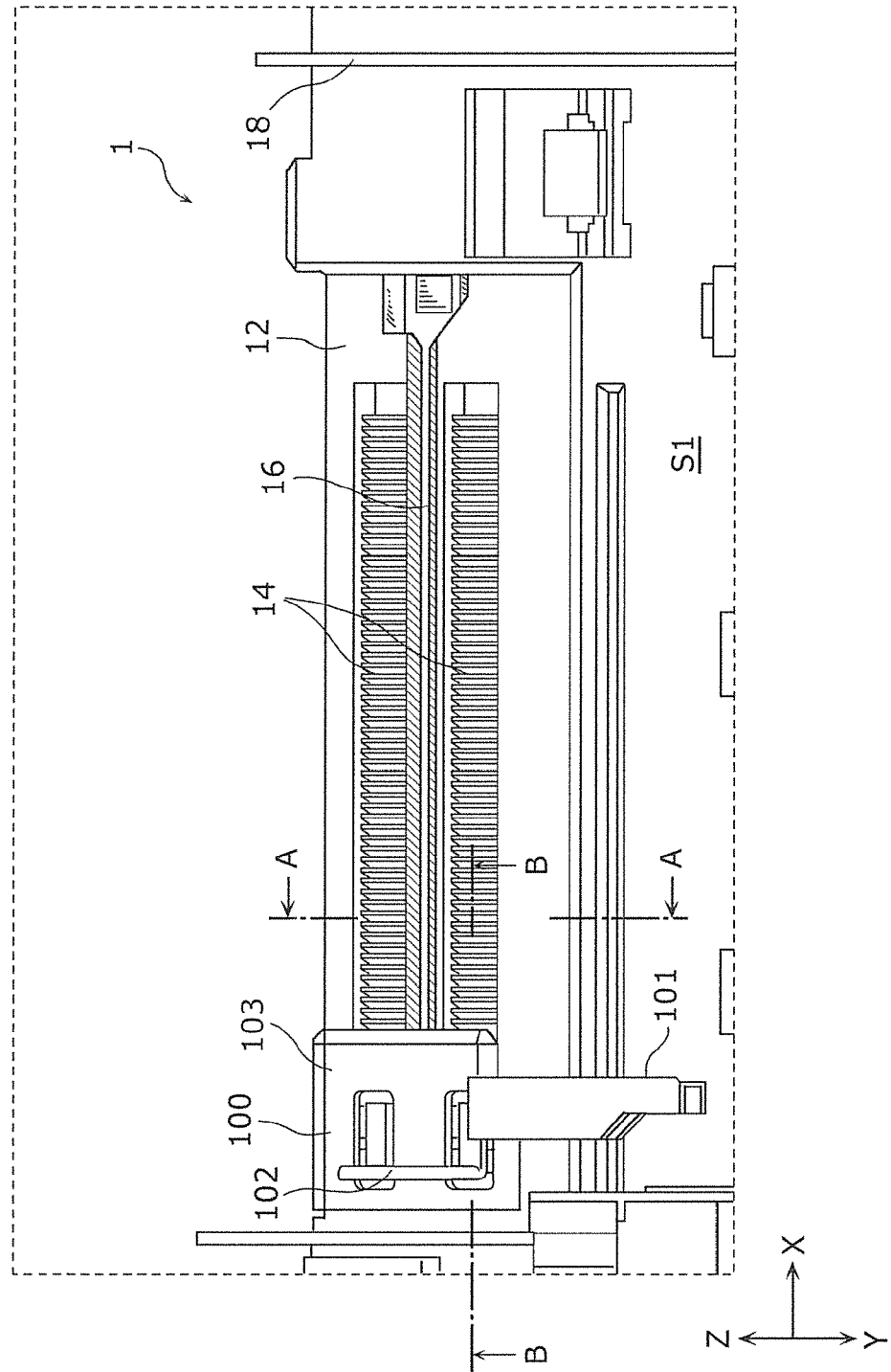


FIG. 4B

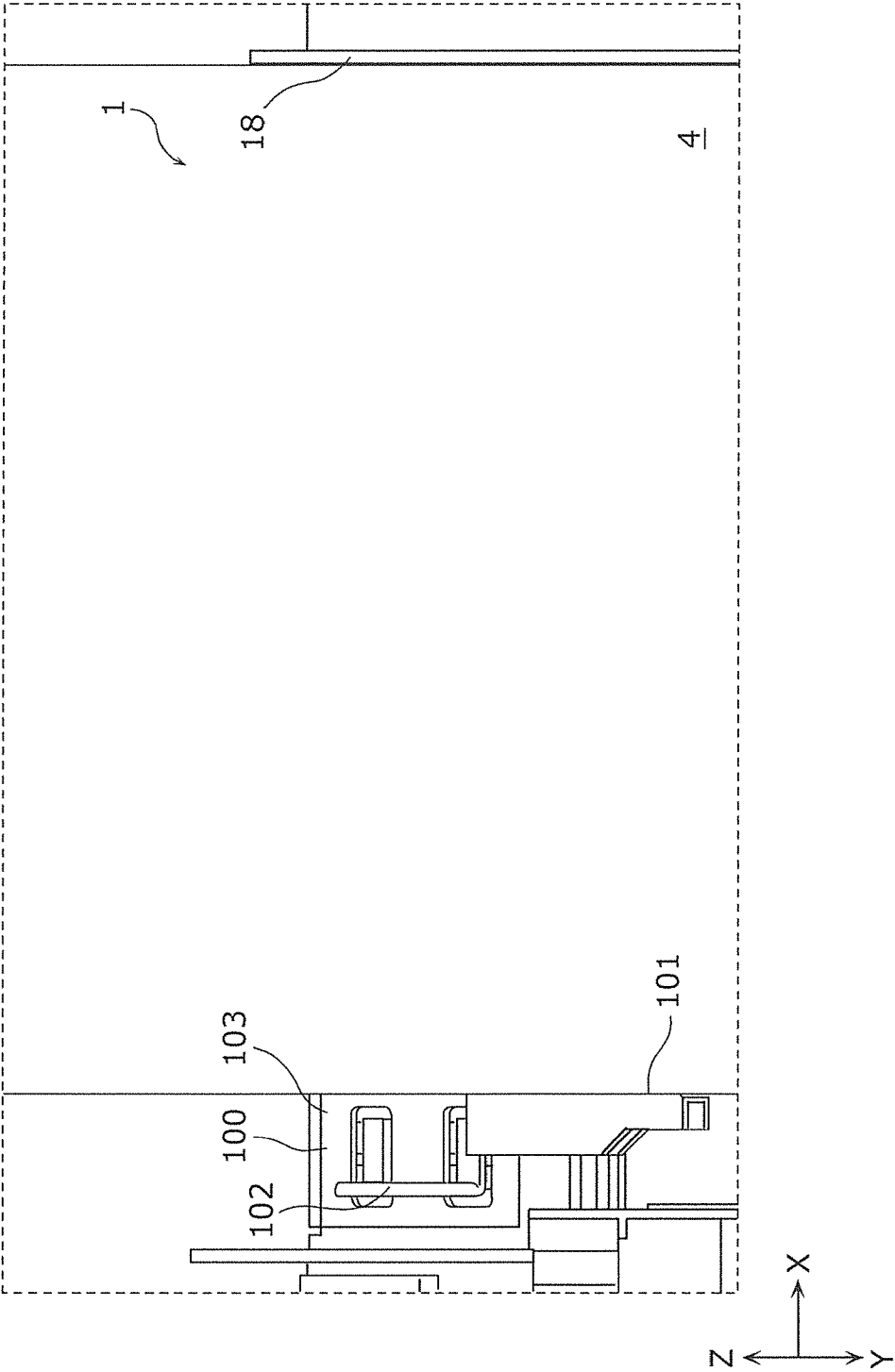


FIG. 5A

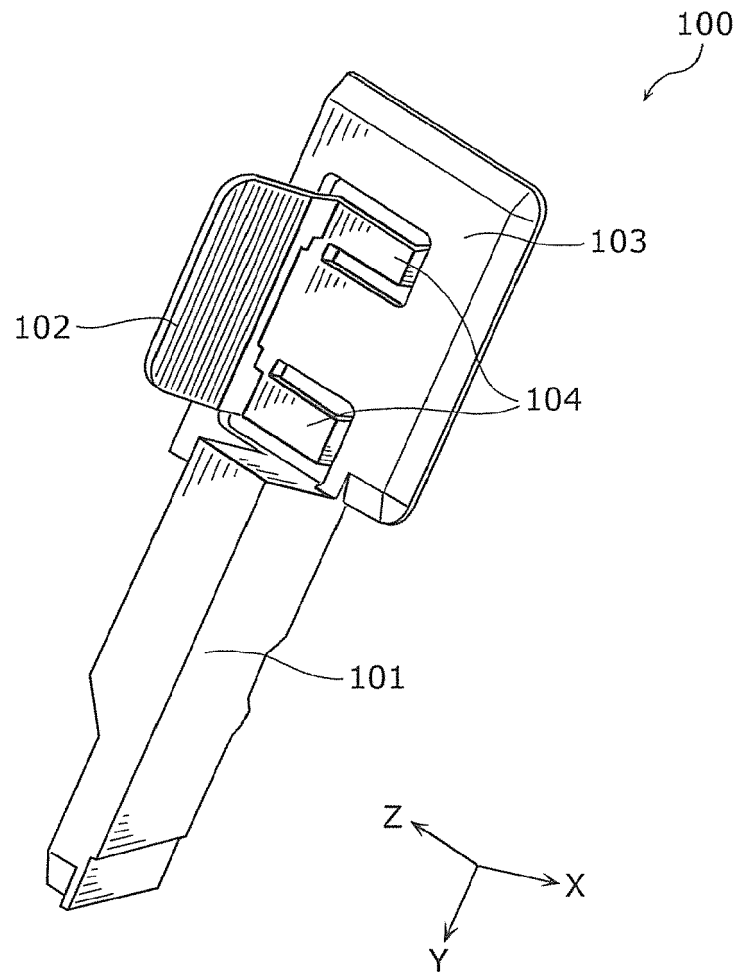


FIG. 5B

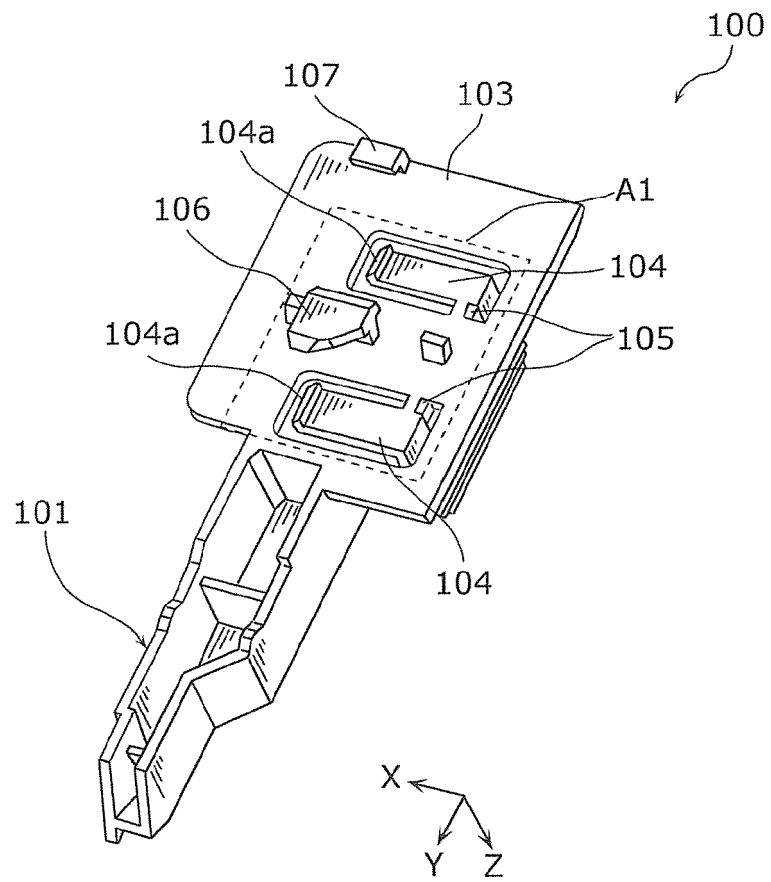


FIG. 6

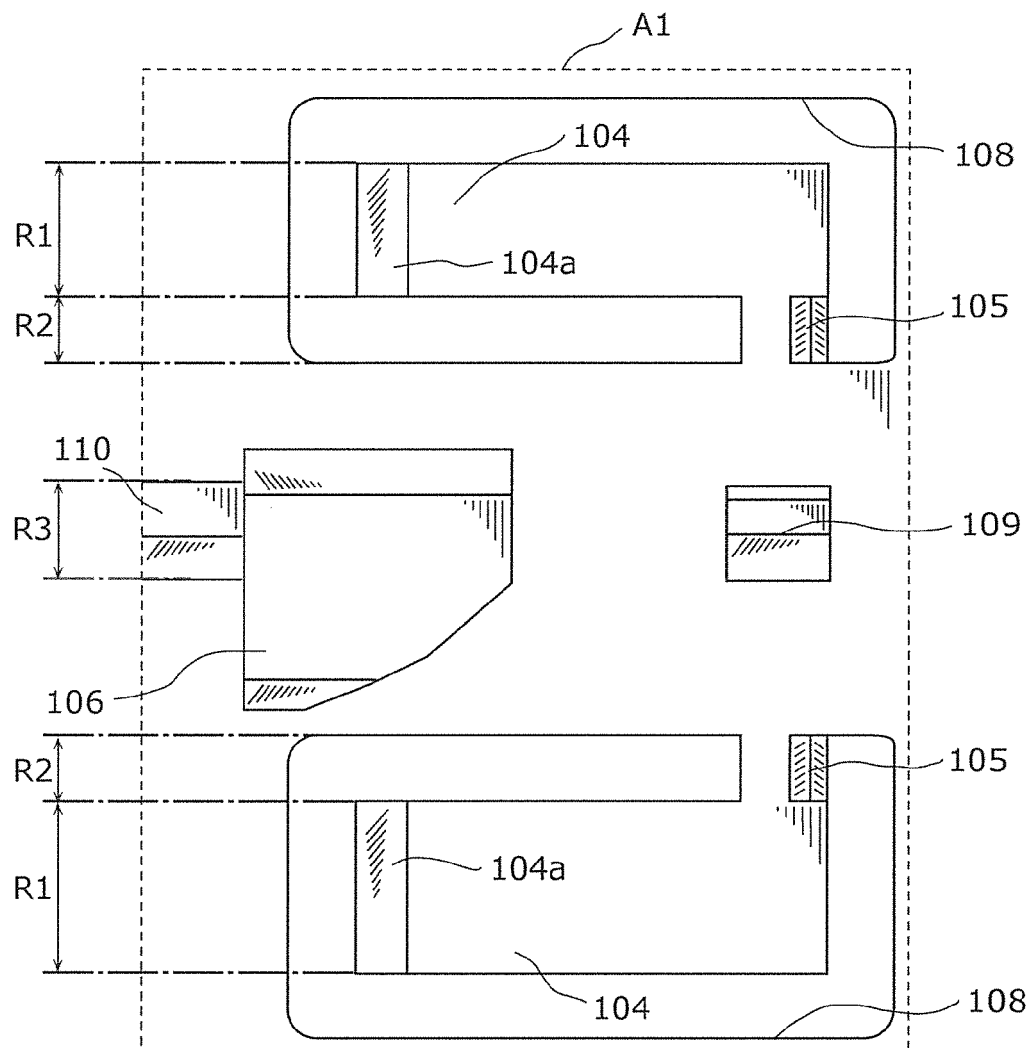


FIG. 7

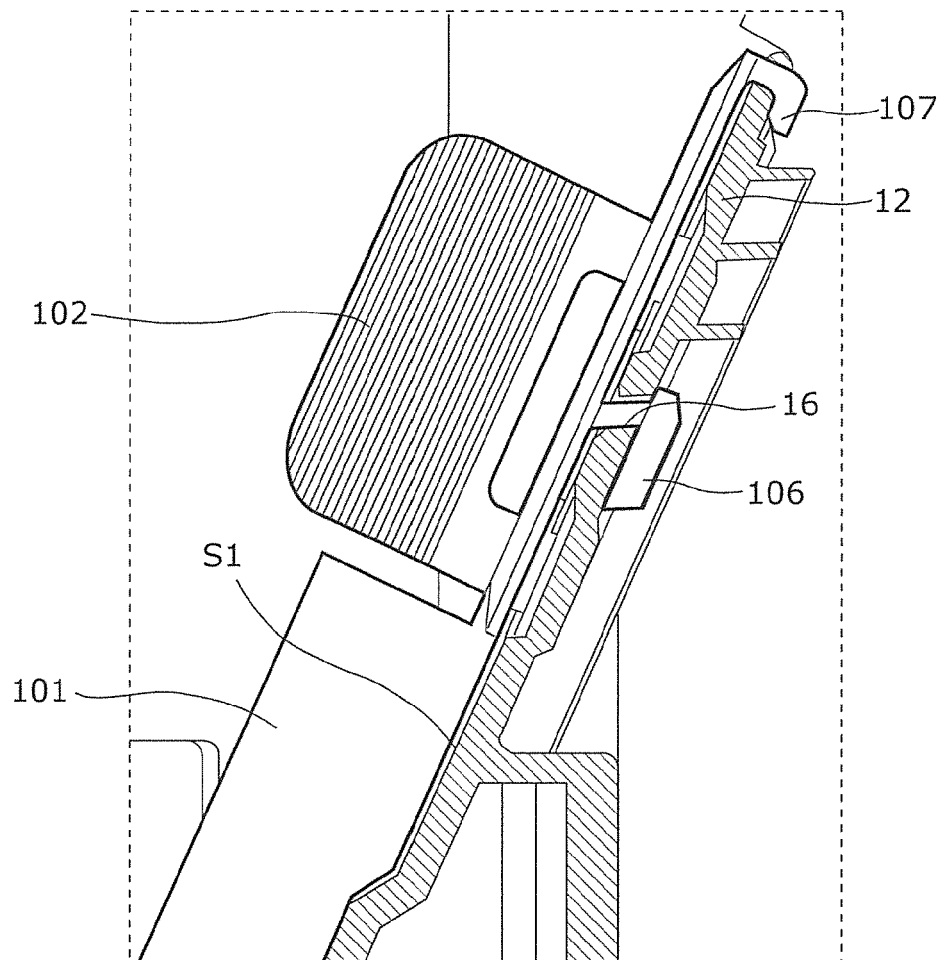


FIG. 8

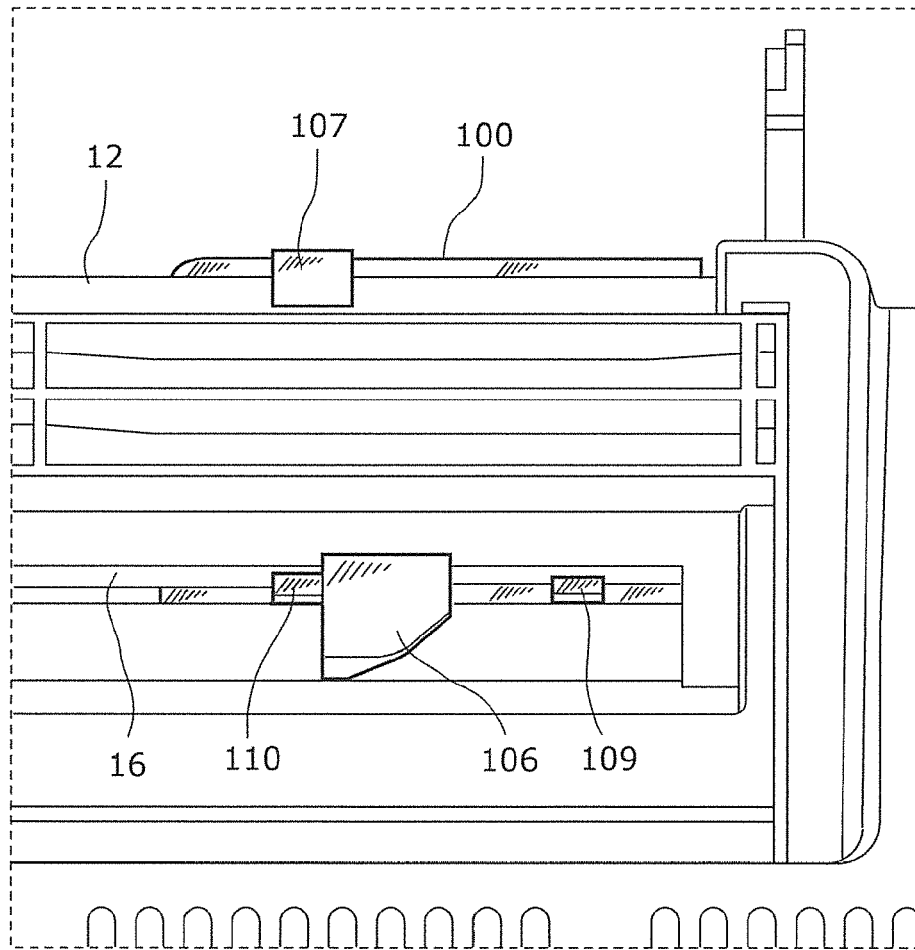


FIG. 9A

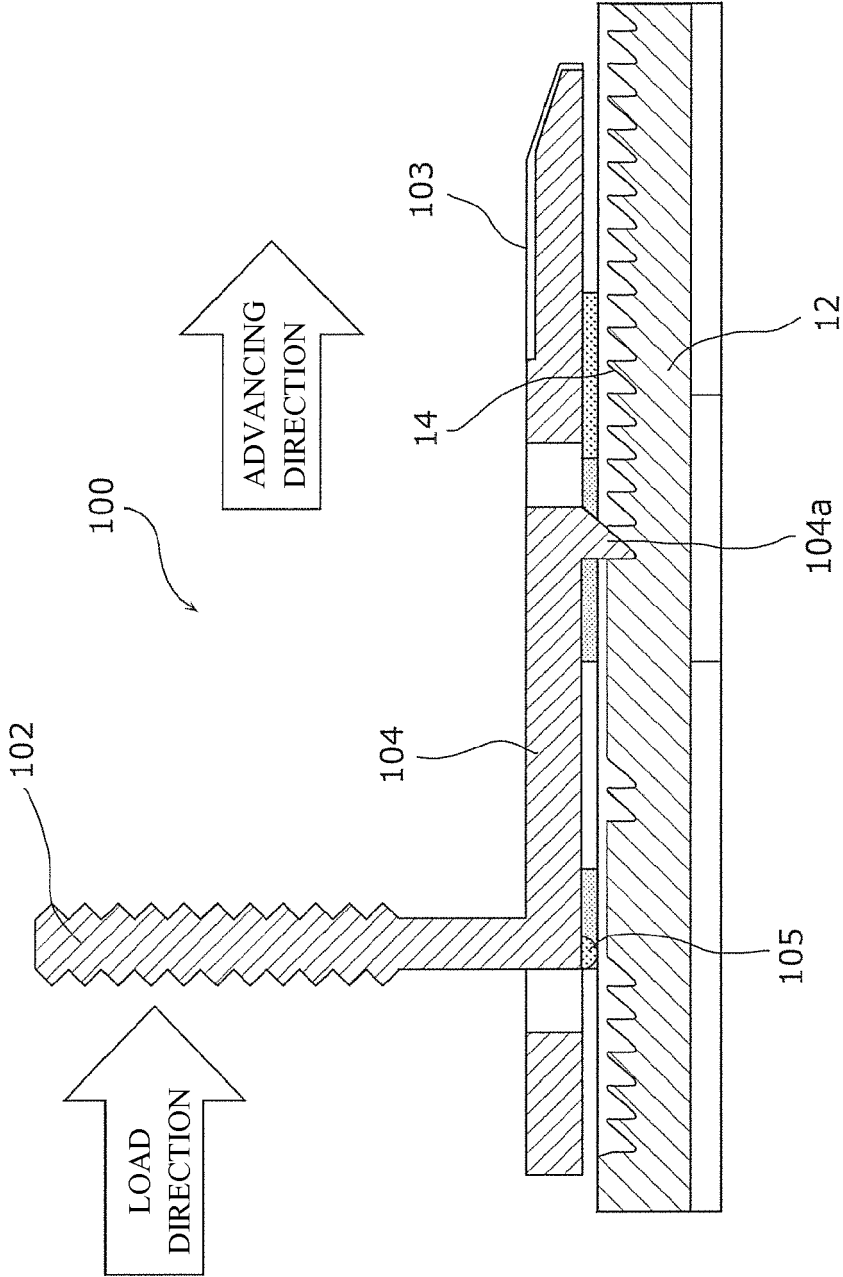


FIG. 9B

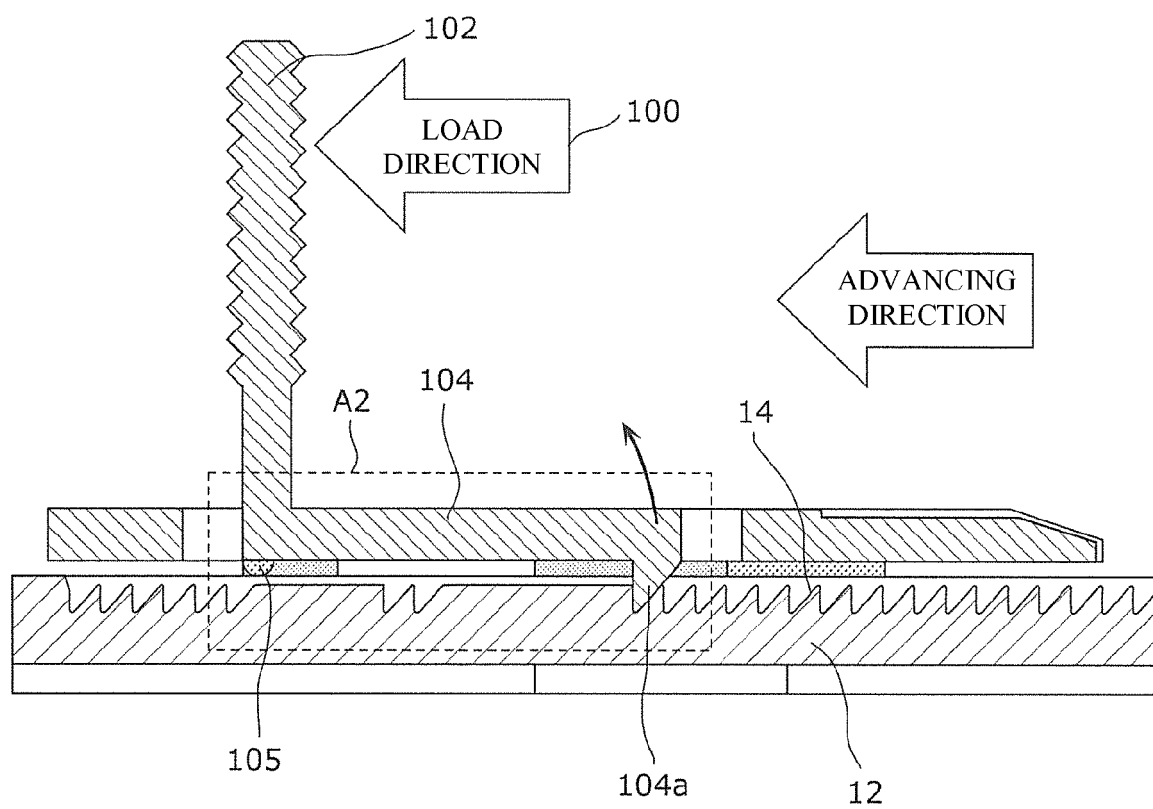


FIG. 9C

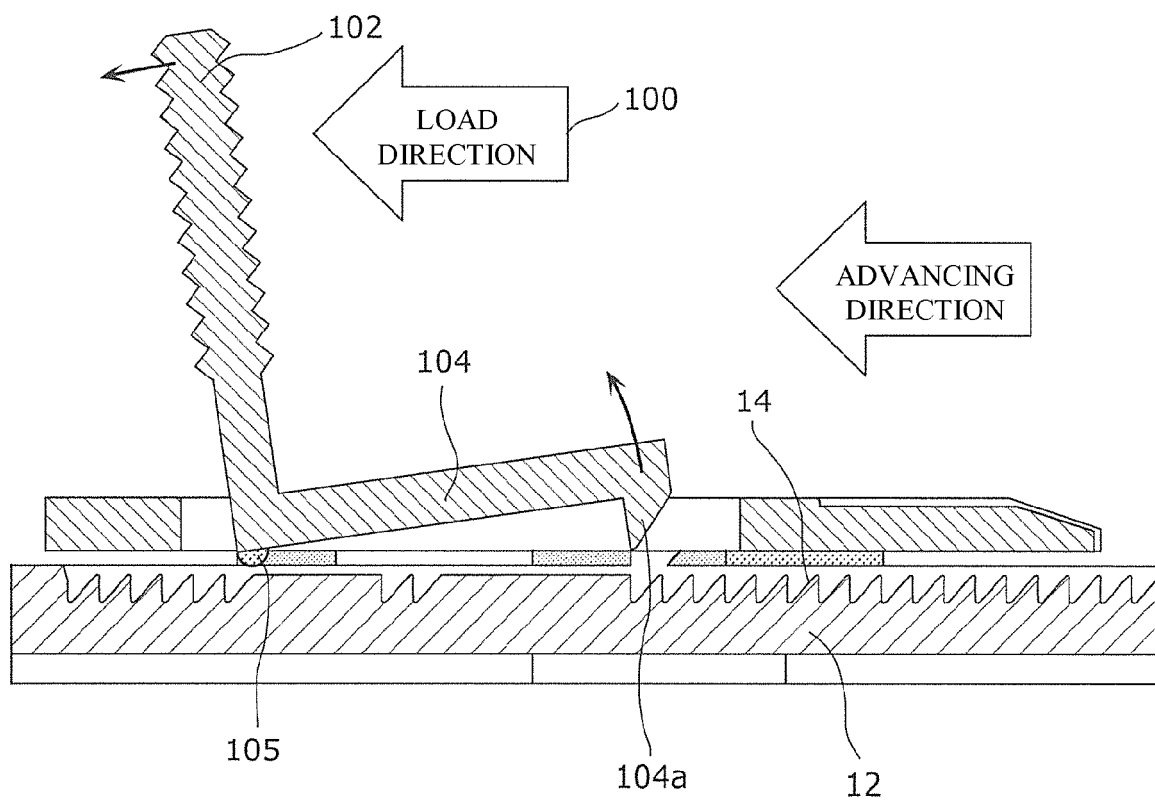
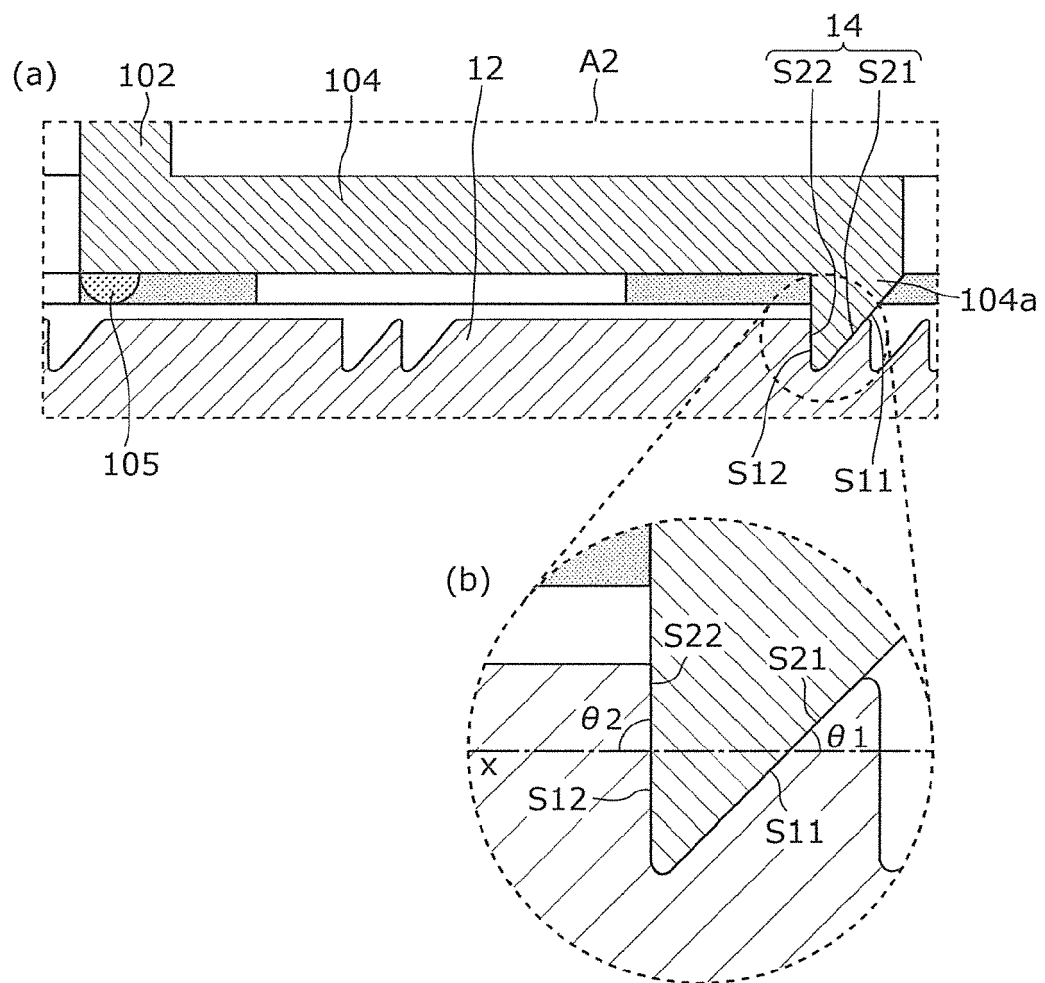


FIG. 10



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 7285681 A [0003]