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(54) **Apparatus for supporting a stack of recording media**

Vorrichtung zur Unterstützung eines Stapels von Aufzeichnungsmedien

Appareil destiné à supporter une pile de supports d'enregistrement

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Description

[0001] The invention relates to an apparatus for supporting a stack of recording media in a media feeding device for an image forming apparatus. In particular, the invention relates to an apparatus which can compensate for a variation in thickness of the stack.

[0002] Many printing tasks require forming an image on recording media having non-uniform thickness. For example, media comprising cut outs, media incorporating ID cards or envelopes all have non uniform thicknesses. Many image forming apparatuses incorporate or connect to media feeding devices capable of feeding such media into the image forming apparatus. Such media feeding devices generally comprise at least one media tray for holding the media and a feeding mechanism for feeding the media from the tray into the image forming apparatus. Typically, media trays will include one or more moveable fences for fencing the media on one or more sides and a moveable base arranged to move towards the feeding mechanism as the stack of recording media in the tray depletes.

[0003] When multiple recording media are arranged in a stack, the non-uniformity of the recording media adds up. This may result in the stack tilting (i.e. a difference in thickness of the stack between one end of the stack and opposite end), sagging (i.e. curvature of the stack between regions having different thicknesses) or a combination of both. The variation in thickness of the recording medium stack can cause problems with feeding each individual recording medium into an image forming apparatus, such as a printer, because most conventional feeding systems require the topmost recording medium in the stack to be presented in a substantially flat manner to the feeding mechanism.

[0004] US 7,458,574 B2 discloses a apparatus for supporting a stack of recording media having a non-uniform thickness in a media feeding device for an image forming apparatus. The apparatus comprises a pivotable first support surface ("pivoting tray") and a variable second support surface ("valley removal mechanism"). The angle of the first support surface changes as a moveable base of the feeding device rises, thus compensating for a tilt of the stack in a length direction of the recording media. The second support surface provides variable support to a central portion of the stack, across its full width, to compensate for a sag in the length direction of the stack.

[0005] However, the device of US 7,458,574 B2 remains unsuitable for supporting a stack of recording media having a variation in thickness in two mutually perpendicular directions. For example, a stack of recording media that tilts in a first direction and sags in a second direction perpendicular to the first direction will not be presented in a substantially flat manner using the device of US 7,458,574 B2.

[0006] EP 1 318 090 A2 discloses a paper feeding apparatus having the features of the precharacterising portion of claim 1.

[0007] The invention aims to at least partially address one or more of the problems discussed above.

[0008] The invention is defined by the appended claims.

[0009] Further features and advantages of the invention will be described below with reference to exemplary embodiments and the accompanying drawings, in which:

Figure 1 shows a perspective view of an apparatus according to an embodiment;
Figure 2 shows an example of a recording medium;
Figures 3a and 3b are schematic side views of the apparatus according to an embodiment, illustrating the function of the first support surface in compensating for a variation of a thickness of the stack of recording media in a first direction; and
Figures 4a and 4b are schematic front views of the apparatus according to an embodiment, illustrating the function of the second support surface and the first support surface in compensating for a variation of a thickness of the stack of recording media in a second direction.
Figures 5a and 5b respectively show an exploded view and a non-exploded view illustrating the pivot member and how it may attach to a fence of a media feeding device.

[0010] Figure 1 shows a perspective view of an apparatus 100 according to an embodiment of the present invention for supporting a stack of bangtail envelopes. A bangtail envelope 200 is shown in Figure 2.

[0011] The apparatus 100 is for supporting a stack S of recording media in a media feeding device 300 for an image forming apparatus. The apparatus 100 comprises a first support surface 101 for supporting a first portion of the lower most recording medium of the recording media stack S, wherein the first support surface 101 is pivotable about a first axis 102, so as to compensate for a variation of the thickness of the recording media stack S in a first direction D1. The apparatus also comprises a second support surface 103 for supporting a second portion of the lower most recording medium of the recording media stack S, wherein the second support surface 103 is configured to support the lower most recording medium such that the lower most recording medium has a curvature in a direction parallel to the first axis, so as to compensate for a variation of the thickness of the recording media stack in a second direction D2 perpendicular to the first direction D1. The first support surface 101 and the second support surface 103 may be attached to a base plate 104 of the apparatus 100.

[0012] The bangtail envelope 200 comprises a conventional envelope part 201 with an attached additional flap 202 that may be torn off, e.g. via a perforated line 203. The flap 202 may be inserted into the envelope part 201 and sealed. The additional flap 202 of the bangtail envelope 200 is a single sheet thick, however the perim-

eter 204 of the conventional envelope part may be up to three sheets thick in places. Therefore a stack of bangtail envelopes tilts in a first direction D1 corresponding to the direction of the additional flap 202 relative to the conventional envelope part 201 and sags in the perpendicular direction D2.

[0013] The apparatus 100 may be fitted to a media feeding device 300 for an image forming apparatus. Such a media feeding device 300 may comprise a movable base 301 arranged to move in a stack direction of the recording media stack S. The base 301 may be arranged to rise as the recording media stack S depletes. Such a media feeding device 300 may include one or more movable fences 302 for fencing the media on one or more sides for example, two side fences and a rear fence. The media feeding device 300 may also include a front fence 304. The base 301 may be arranged rise independently of the fences. The base 301 may be moved by at least one electric motor controlled by at least one sensor. The motor may be configured to raise the base 301 until a top most sheet of the recording medium is sensed by the sensor. The position of the sensor may correspond to a desired position of the top most sheet of the stack S. The base 301 and fences may form part of a tray which is removable from the image forming apparatus.

[0014] Such a media feeding device 300 may further comprise a feeding unit 303 for feeding a topmost recording medium of the recording media stack S. To reliably feed a recording medium without damaging it, the feed mechanism requires the top most recording medium to be presented with at least its leading edge flat and horizontal. The feeding unit 303 may be a roller which uses friction for gripping and moving the topmost recording medium or alternatively may use electrostatic attraction or suction to grip the topmost recording medium. The media feeding device 300 may be a large capacity tray of a printer such as Ricoh Company, Ltd model RT 5010, RT 5040, RT 5020 or RT 5050.

[0015] The apparatus 100 may be placed on the base 301 of the media feeding device 300. The apparatus 100 may further comprise a pivot member 105 for pivotably supporting the first support surface 101 about a second axis 106 parallel to the first axis 102. The pivot member 105 (and second axis 106) may be fixed to a part of the media feeding device 300 which does not move as the base 301 rises, for example the pivot member 105 may be fixed to a fence 302 of the media feeding device 300.

[0016] As shown in Figure, 3 the apparatus according to an embodiment is fitted to a media feeding device 300, which includes a base 301, a rear fence 302 and a feeding unit 303, by placing the base plate 104 of the apparatus 100 on the base 301 of the media feeding device 300 and fixing a pivot member 105 having a second axis 106 to the rear fence 302 of the media feeding device 300.

[0017] As shown in Figures 5a and 5b, the pivot member 105 may be provided with an attachment part 107 which can be attached the rear fence 302 of the media feeding device 300, for example using bolts, pins or plugs 108. The attachment part 107 may include one or more bores through which one or more pins 108 can pass. The rear fence 302 of the media feeding device may include corresponding bores into which the pins 108 may be inserted, thus enabling fixing of the pivot member 105 to the rear fence 302 as shown in Figure 5b.

[0018] A supporting part of the pivot member 105 may support part of the first support surface 101 of the apparatus 100. The second axis 106 may pass through the supporting part of the pivot member. The supporting part of the pivot member 105 may be attached to the attachment part 107. The supporting part of the pivot member 105 may extend between two extensions of the attachment part 107, thus may be in a cut-out section of the pivot member 105. The supporting part of the pivot member 105 may be a metal rod for example. The supporting part of the pivot member 105 may slideably support the first support surface 101 such that the first support surface 101can slide over the surface of the supporting part of the pivot member 105 to allow relative movement between the first support surface 101 and the pivot member 105 (and second axis 106).

[0019] The part of the first support surface 101 supported by the pivot member 105 may be narrower in a direction parallel to the second axis 106, compared to the rest of the first support surface 101. The part of the first support surface 101 supported by the pivot member 105 may pass through the cut-out section of the pivot member 105. This arrangement can be seen in Figures 3a and 3b.

[0020] During operation of the image forming apparatus, the feeding unit 303 feeds a topmost recording medium of the recording media stack S. As the stack S depletes, the base 301 rises to move the next topmost sheet closer to the feeding unit 303. The apparatus may be fitted to the media feeding device such that as the base 301 rises, the relative positions of the first and second axes 102, 106 in the stack direction change, so that the first support surface 101 pivots about the first and second axes 102, 106 to change the angle of the first support surface 101. The first axis 102 may be in a fixed position in the stack direction relative to the base 301 to allow the relative positions of the first and second axes 102, 106 in the stack direction change as the base 301 rises. The position in a direction perpendicular to the first axis 102 and the stack direction of one of the first axis 102 and the second axis 106 may be fixed relative to the first support surface 101 and the position in a direction perpendicular to the first axis 102 and the stack direction of the other of the first axis 102 and the second axis 106 may be arranged to change relative to the first support surface 101.

[0021] As shown in Figure 3, the first axis 102 of the apparatus 100 according to an embodiment is fixed relative to the first support surface 101 whereas the pivot member 105 is configured to slideably support the first support surface 101 so that the first support surface 101 is able to move relative to the second axis 106. As the

base 301 of the media feeding device 300 rises, the first support surface 101 pivots about the first axis 102 and slideably pivots about the second axis 106, thus changing the angle of the first support surface 101 as the stack S depletes.

[0022] The first support surface 101 is able to compensate for a variation of the thickness of the recording media stack S in a first direction D1. If, for example, the recording media stack S is thicker at one end than the opposite end, the topmost recording medium and the lowermost recording medium of the media stack S are not parallel. The difference in the angle between the topmost recording medium and lowermost recording medium is compensated for by the angle of the pivotable first support surface 101. As the first support surface 101 pivots from a maximum of a pivotable range to a minimum of a pivotable range, the angle of the first support surface 101 changes so that as the stack S depletes and the angle between the topmost recording medium and the lowermost recording medium decreases, the angle of the first support surface 101 changes accordingly. This is illustrated in Figure 3 in relation to an embodiment of the invention.

[0023] The second support surface 103 is able to compensate for a variation of the thickness of the recording media stack in a second direction D2 perpendicular to the first direction. If, for example, the recording media stack S is thicker at the edges than in the centre, the stack S will sag in the centre. By supporting the lowermost recording media such that it has a curvature in a direction parallel to the first axis 102 means that the curvature imparted by the second support surface 103 negates the sag of the recording media stack S. This is illustrated in Figure 4 in relation to an embodiment of the invention.

[0024] The second support surface 103 may be longer in a direction perpendicular to the first axis 102 than in a direction parallel to the first axis 102. The second support surface 103 may be a ridge around which the recording media stack S is arranged to curve. The second support surface 103 may be substantially rectangular as viewed in a stack direction. The edges of the second support surface 103 may be curved so as not to damage the lowermost recording medium of the recording media stack S. Such an arrangement is shown in Figure 1 in relation to an embodiment of the invention.

[0025] The second support surface 103 may be positioned at one end of the apparatus 100 in a direction perpendicular to the first axis 102 and the stack direction. This end may correspond to the position of a feeding unit 303 of a media feeding device 300. In relation to the embodiment shown in the Figures, the feeding unit 303 is positioned at the front and centre of the media feeding device 300, above the stack S. Therefore, the second support member 103 is positioned at the front and centre of the apparatus 100 so as to support the recording media stack S such that the top most medium is flat at least at a position of the feeding unit 303.

[0026] The first support surface 101 may be pivotable relative to the second support surface 103. A portion of the first support surface 101 may be adjacent to a portion of the second support surface 103 in a direction of the first axis 102. As the first support surface 101 pivots from a maximum of a pivotable range to a minimum of a pivotable range, the distance in the stack direction between the portion of the first support surface 101 adjacent to a portion of the second support surface 103 and the portion of the second support surface 103 may decrease. Thereby the amount of curvature imparted to the recording media stack S by the second support surface 103 may be controlled by the angle of the pivotable first support surface 101. This is illustrated in Figure 4 in relation to an embodiment.

[0027] A maximum curvature of the lowermost recording medium of the recording media stack S may correspond to a maximum of a pivotable range of the first support surface 101. A minimum curvature of the lowermost recording medium of the recording media stack S may correspond to a minimum of a pivotable range of the first support surface 101. At the minimum of a pivotable range of the first support surface 101, the first support surface 101 and the second support surface 103 may lie in the same plane. Therefore, when the stack size is small, for example only a single recording medium, the stack S is supported in a substantially flat manner. The first axis 102 may be positioned at or close to an end of the second support surface 103 in a direction perpendicular to the first axis 102 and the stack direction and the first support surface 101 may extend in both directions away from the first axis 102 to provide the above features.

[0028] An edge 108 of the portion of the first support surface 101 adjacent to the portion of the second support surface 103, which is furthest from the portion of the second support surface 103, may be tapered. Thereby the amount of curvature of the lowermost recording medium of the recording media stack S imparted by the second support surface 103 can be further controlled. As the first support surface 101 pivots from a maximum of a pivotable range to a minimum of a pivotable range, the width of the combined support from the first and second support surfaces 101,103, of the lowermost recording medium of the stack S, in the second direction D2, becomes wider, thus reducing the amount of curvature of the lowermost recording medium. This is illustrated in Figure 4, in relation to an embodiment.

[0029] A portion of the first support surface 101 may lie adjacent to a portion of the second support surface 103 in both directions parallel to the first axis 102, i.e. a portion of the first support surface 101 may be located on both sides of the portion of the second support surface 103. The portions of the first support surface 101 on each side of the second support surface 13 may be symmetrical or asymmetrical depending on the specific variation of the thickness of the recording media stack S in the second direction D2 that the second support surface 103 must compensate for. The first support surface 101 may include a gap G arranged to at least partially surround

the second support surface 103.

[0030] As shown in Figure 1, the apparatus 100 according to an embodiment is symmetrical about a plane perpendicular to the first axis 102. A gap G in the centre of the first support surface 101 accommodates the second support surface 103. Figure 4 illustrates how the pivoting of the first support surface 101 relative to the second support surface 103 and the tapered edges 108 of the first support surface 101 control the curvature imparted to the recording media stack S by the second support surface 103. Figure 4 shows that as the first support surface 101 pivots, the contact point of the lowermost envelope on the first support surface 101 widens as the stack S depletes. Therefore, the curvature of the stack S is adjusted appropriately to match the reduction in sag of the stack S as the stack S depletes.

[0031] The invention allows a larger stack of recording media to be processed by an image forming apparatus in a single batch than would otherwise be possible. This improves the efficiency of high speed image forming processes.

[0032] Variations of the above described embodiment are possible in light of the above teachings. It is to be understood that the invention may be practised otherwise than specifically described herein without departing from the scope of the invention as defined by the appended claims.

Claims

1. An apparatus for supporting a stack (5) of recording media in a media feeding device for an image forming apparatus, the apparatus comprising:

a first support surface (101) for supporting a first portion of the lowermost recording medium of the recording media stack (5), wherein the first support surface (101) is pivotable about a first axis (102), so as to compensate for a variation of the thickness of the recording media stack (5) in a first direction (D1); and

a second support surface (103) for supporting a second portion of the lowermost recording medium of the recording media stack (5), wherein the second support surface (103) is configured to support the lowermost recording medium such that the lowermost recording medium has a curvature in a direction parallel to the first axis (102), so as to compensate for a variation of the thickness of the recording media stack in a second direction (D2) perpendicular to the first direction (D1); **characterised by**

a pivot member (105) for pivotably supporting the first support surface (101) about a second axis (106) parallel to the first axis (102),

wherein the position in a direction perpendicular to the first axis (102) and the stack direction of one of the first axis (102) and the second axis (106) is fixed relative to the first support surface (101); and

the position in a direction perpendicular to the first axis (102) and the stack direction of the other of the first axis (102) and the second axis (106) is arranged to change relative to the first support surface (101).

2. The apparatus of claim 1, wherein the position of the first axis (102) is fixed relative to the first support surface (101).

3. The apparatus of any of the preceding claims wherein the first support surface (101) extends on both sides of the first axis (102).

4. The apparatus of any of the preceding claims, wherein the first support surface (101) is pivotable relative to the second support surface (103).

5. The apparatus of any of the preceding claims, wherein at a minimum of a pivotable range of the first support surface (101) the first support surface (101) and the second support surface (103) lie in the same plane.

6. The apparatus of any of the preceding claims, wherein the position in the stack direction of the second support surface (103) relative to the first axis (102) is fixed.

7. The apparatus of any of the preceding claims, wherein a portion of the first support surface (101) is adjacent to a portion of the second support surface (103) in a direction of the first axis (102), on at least one side.

8. The apparatus of claim 7, wherein an edge of the portion of the first support surface (101) furthest from the portion of the second support surface (103) is tapered.

9. The apparatus of any of the proceeding claims, wherein the second support surface (103) is longer in a direction perpendicular to the first axis (102) and the stack direction than in a direction parallel to the first axis (102).

10. A method of supporting a stack (5) of recording media in a media feeding device for an image forming apparatus, the method comprising:

supporting a first portion of the lowermost recording medium of the recording media stack (5) on a first support surface (101), wherein the first support surface (101) is pivotable about a first axis (102), so as to compensate for a vari-

ation of the thickness of the recording media stack (5) in a first direction (D1); and
supporting a second portion of the lowermost recording medium of the recording media stack (5) on a second support surface (103) such that the lowermost recording medium has curvature in a direction parallel to the first axis (102), so as to compensate for a variation of the thickness of the recording media stack (5) in a second direction (D2) perpendicular to the first direction (D1); **characterised by**
pivotably supporting the first support surface (101) about a second axis (106) parallel to the first axis (102) with a pivot member (105);
wherein the position in a direction perpendicular to the first axis (102) and the stack direction of one of the first axis (102) and the second axis (106) is fixed relative to the first support surface (101); and
the position in a direction perpendicular to the first axis (102) and the stack direction of the other of the first axis (102) and the second axis (106) is arranged to change relative to the first support surface (101).

11. A system for feeding a stack of recording media in a media feeding device for an image forming apparatus, the system comprising:

the apparatus for supporting a recording media stack (5) of any of claims 1 to 9;
a recording medium feeding unit (303) for feeding a topmost recording medium of the recording media stack (5); and
a base (301) on which the apparatus for supporting a recording media stack is positioned, the base (301) being moveable in a stack direction of the recording media stack (5) and configured to rise as the recording media stack (5) depletes; **characterised in that**:
as the base (301) rises, the relative positions of the first and second axes (102, 106) in the stack direction change so that the first support surface (101) pivots about the first and second axes (102, 106) to change the angle of the first support surface (101).

12. An image forming apparatus for forming an image on a recording medium from a recording media stack, the apparatus comprising:

an image forming unit for forming an image on the recording medium;
the apparatus for supporting a recording media stack (5) of any of claims 1 to 9;
a recording medium feeding unit (303) for feeding a topmost recording medium of the recording media stack (5) to the image forming unit; and
a base (301) on which the apparatus for supporting a recording media stack is positioned, the base (301) being moveable in a stack direction of the recording media stack (5) and configured to rise as the recording media stack (5) depletes; **characterised in that**:
as the base (301) rises, the relative positions of the first and second axes (102, 106) in the stack direction change so that the first stack support surface (101) pivots about the first and second axes (102, 106) to change the angle of the first support surface (101).

13. A method of feeding a stack (5) of recording media into an image forming apparatus, the method comprising:

supporting a stack (5) of recording media according to the method of claim 10;
feeding a topmost recording medium of the recording media stack (5); and **characterised by**:
moving the first and second axes (102, 106) relative to each other as the media stack (5) depletes so that the first support surface (101) pivots about the first and second axes (102, 106) to change the angle of the first support surface (101).

14. A method of forming an image on a recording medium from a recording media stack, the method comprising:

supporting a stack (5) of recording media according to the method of claim 10;
feeding a topmost recording medium of the recording media stack (5) to an image forming unit;
forming an image on the recording media fed into the image forming unit; and
characterised by:
moving the first and second axes (102, 106) relative to each other as the media stack depletes so that the first support surface (101) pivots about the first and second axes (102, 106) to change the angle of the first support surface (101).

Patentansprüche

1. Gerät zum Tragen eines Stapels (5) von Aufzeichnungsmedien in einer Medienzufuhrvorrichtung für ein Bilderzeugungsgerät, wobei das Gerät Folgendes umfasst:

eine erste Tragfläche (101) zum Tragen eines ersten Abschnitts des untersten Aufzeichnungsmediums des Aufzeichnungsmedienstapels (5), wobei die erste Tragfläche (101) um eine erste

Achse (102) schwenkbar ist, um eine Variation der Dicke des Aufzeichnungsmedienstapels (5) in einer ersten Richtung (D1) auszugleichen; und

eine zweite Tragfläche (103) zum Tragen eines zweiten Abschnitts des untersten Aufzeichnungsmediums des Aufzeichnungsmedienstapels (5), wobei die zweite Tragfläche (103) konfiguriert ist, um das unterste Aufzeichnungsmedium zu tragen, sodass das unterste Aufzeichnungsmedium eine Krümmung in einer Richtung hat, die parallel zu der ersten Achse (102) ist, um eine Variation der Dicke des Aufzeichnungsmedienstapels in einer zweiten Richtung (D2) auszugleichen, die senkrecht zu der ersten Richtung (D1) ist; **gekennzeichnet durch**

ein Schwenkelement (105) zum schwenkbaren Tragen der ersten Tragfläche (101) um eine zweite Achse (106), die parallel zu der ersten Achse (102) ist,

wobei die Position in einer Richtung, die senkrecht zu der ersten Achse (102) ist, und die Stapelrichtung von einer der ersten Achse (102) und der zweiten Achse (106) relativ zu der ersten Tragfläche (101) befestigt ist; und

die Position in einer Richtung, die senkrecht zu der ersten Achse (102) ist, und die Stapelrichtung von der anderen der ersten Achse (102) und der zweiten Achse (106) angeordnet ist, um sich relativ zu der ersten Tragfläche (101) zu verändern.

2. Gerät nach Anspruch 1, wobei die Position der ersten Achse (102) relativ zu der ersten Tragfläche (101) befestigt ist.

3. Gerät nach einem der vorhergehenden Ansprüche, wobei sich die erste Tragfläche (101) an beiden Seiten der ersten Achse (102) erstreckt.

4. Gerät nach einem der vorhergehenden Ansprüche, wobei die erste Tragfläche (101) relativ zu der zweiten Tragfläche (103) schwenkbar ist.

5. Gerät nach einem der vorhergehenden Ansprüche, wobei bei einem Minimum eines Schwenkbereichs der ersten Tragfläche (101), die erste Tragfläche (101) und die zweite Tragfläche (103) in der gleichen Ebene liegen.

6. Gerät nach einem der vorhergehenden Ansprüche, wobei die Position in der Stapelrichtung der zweiten Tragfläche (103) relativ zu der ersten Achse (102) befestigt ist.

7. Gerät nach einem der vorhergehenden Ansprüche, wobei ein Abschnitt der ersten Tragfläche (101) benachbart zu einem Abschnitt der zweiten Tragfläche (103) in einer Richtung der ersten Achse (102) an mindestens einer Seite ist.

8. Gerät nach Anspruch 7, wobei eine Kante des Abschnitts der ersten Tragfläche (101), die am weitesten von dem Abschnitt der zweiten Tragfläche (103) entfernt ist, verjüngt ist.

9. Gerät nach einem der vorhergehenden Ansprüche, wobei die zweite Tragfläche (103) in einer Richtung, die senkrecht zu der ersten Achse (102) ist, und der Stapelrichtung länger als in einer Richtung ist, die parallel zu der ersten Achse (102) ist.

10. Verfahren des Tragens eines Stapels (5) von Aufzeichnungsmedien in einer Medienzufuhrvorrichtung für ein Bilderzeugungsgerät, wobei das Verfahren Folgendes umfasst:

Tragen eines ersten Abschnitts des untersten Aufzeichnungsmediums des Aufzeichnungsmedienstapels (5) an einer ersten Tragfläche (101), wobei die erste Tragfläche (101) um eine erste Achse (102) schwenkbar ist, um eine Variation der Dicke des Aufzeichnungsmedienstapels (5) in einer ersten Richtung (D1) auszugleichen; und

Tragen eines zweiten Abschnitts des untersten Aufzeichnungsmediums des Aufzeichnungsmedienstapels (5) an einer zweiten Tragfläche (103), sodass das unterste Aufzeichnungsmedium eine Krümmung in einer Richtung hat, die parallel zu der ersten Achse (102) ist, um eine Variation der Dicke des Aufzeichnungsmedienstapels (5) in einer zweiten Richtung (D2) auszugleichen, die senkrecht zu der ersten Richtung (D1) ist; **gekennzeichnet durch**

schwenkbares Tragen der ersten Tragfläche (101) um eine zweite Achse (106), die parallel zu der ersten Achse (102) ist, mit einem Schwenkelement (105);

wobei die Position in einer Richtung, die senkrecht zu der ersten Achse (102) ist, und die Stapelrichtung von einer der ersten Achse (102) und der zweiten Achse (106) relativ zu der ersten Tragfläche (101) befestigt ist; und

die Position in einer Richtung, die senkrecht zu der ersten Achse (102) ist, und die Stapelrichtung von der anderen der ersten Achse (102) und der zweiten Achse (106) angeordnet ist, um sich relativ zu der ersten Tragfläche (101) zu verändern.

11. System zum Zuführen eines Stapels von Aufzeichnungsmedien in einer Medienzufuhrvorrichtung für ein Bilderzeugungsgerät, wobei das System Folgendes umfasst:

das Gerät zum Tragen eines Aufzeichnungsmedienstapels (5) nach einem der Ansprüche 1 bis 9;
eine Aufzeichnungsmedium-Zufuhreinheit (303) zum Zuführen eines obersten Aufzeichnungsmediums des Aufzeichnungsmedienstapels (5); und
eine Basis (301), auf der das Gerät zum Tragen eines Aufzeichnungsmedienstapels positioniert ist, wobei die Basis (301) in einer Stapelrichtung des Aufzeichnungsmedienstapels (5) bewegbar ist und konfiguriert ist, um anzusteigen, während sich der Aufzeichnungsmedienstapel (5) leert;
dadurch gekennzeichnet, dass:
während die Basis (301) ansteigt, sich die relativen Positionen der ersten und zweiten Achse (102, 106) in der Stapelrichtung verändern, sodass die erste Tragfläche (101) um die erste und zweite Achse (102, 106) schwenkt, um den Winkel der ersten Tragfläche (101) zu verändern.

12. Bilderzeugungsgerät zum Erzeugen eines Bildes auf einem Aufzeichnungsmedium von einem Aufzeichnungsmedienstapel, wobei das Gerät Folgendes umfasst:

eine Bilderzeugungseinheit zum Erzeugen eines Bildes auf dem Aufzeichnungsmedium;
das Gerät zum Tragen eines Aufzeichnungsmedienstapels (5) nach einem der Ansprüche 1 bis 9;
eine Aufzeichnungsmedium-Zufuhreinheit (303) zum Zuführen eines obersten Aufzeichnungsmediums des Aufzeichnungsmedienstapels (5) zu der Bilderzeugungseinheit; und
eine Basis (301), auf der das Gerät zum Tragen eines Aufzeichnungsmedienstapels positioniert ist, wobei die Basis (301) in einer Stapelrichtung des Aufzeichnungsmedienstapels (5) bewegbar ist und konfiguriert ist, um anzusteigen, während sich der Aufzeichnungsmedienstapel (5) leert;
dadurch gekennzeichnet, dass:
während die Basis (301) ansteigt, sich die relativen Positionen der ersten und zweiten Achse (102, 106) in der Stapelrichtung verändern, sodass die erste Tragfläche (101) um die erste und zweite Achse (102, 106) schwenkt, um den Winkel der ersten Tragfläche (101) zu verändern.

13. Verfahren zum Zuführen eines Stapels (5) von Aufzeichnungsmedien in ein Bilderzeugungsgerät, wobei das Verfahren Folgendes umfasst:

Tragen eines Stapels (5) von Aufzeichnungsmedien nach dem Verfahren nach Anspruch 10;
Zuführen eines obersten Aufzeichnungsmediums des Aufzeichnungsmedienstapels (5); und
gekennzeichnet durch:
Bewegen der ersten und zweiten Achse (102, 106) relativ zueinander, während sich der Medienstapel (5) leert, sodass die erste Tragfläche (101) um die erste und zweite Achse (102, 106) schwenkt, um den Winkel der ersten Tragfläche (101) zu verändern.

14. Verfahren des Erzeugens eines Bildes auf einem Aufzeichnungsmedium von einem Aufzeichnungsmedienstapel, wobei das Verfahren Folgendes umfasst:

Tragen eines Stapels (5) von Aufzeichnungsmedien nach dem Verfahren nach Anspruch 10;
Zuführen eines obersten Aufzeichnungsmediums des Aufzeichnungsmedienstapels (5) zu einer Bilderzeugungseinheit;
Erzeugen eines Bildes auf dem Aufzeichnungsmedium, das in die Bilderzeugungseinheit zugeführt wird; und
gekennzeichnet durch:
Bewegen der ersten und zweiten Achse (102, 106) relativ zueinander, während sich der Medienstapel leert, sodass die erste Tragfläche (101) um die erste und zweite Achse (102, 106) schwenkt, um den Winkel der ersten Tragfläche (101) zu verändern.

Revendications

1. Appareil destiné à supporter un empilement (5) de supports d'enregistrement dans un dispositif d'apport de supports pour un appareil de formation d'image, l'appareil comprenant :

une première surface de support (101) destinée à supporter une première partie du support d'enregistrement le plus bas de l'empilement de supports d'enregistrement (5), la première surface de support (101) étant capable de pivoter autour d'un premier axe (102), de façon à compenser une variation de l'épaisseur de l'empilement de supports d'enregistrement (5) dans une première direction (D1) ; et
une deuxième surface de support (103) destinée à supporter une deuxième partie du support d'enregistrement le plus bas de l'empilement de supports d'enregistrement (5), la deuxième surface de support (103) étant conçue pour supporter le support d'enregistrement le plus bas de sorte que le support d'enregistrement le plus bas présente une courbure dans une direction parallèle au premier axe (102), de façon à compenser une variation de l'épaisseur de l'empilement de supports d'enregistrement dans une deuxième direction (D2) perpendiculaire à la première direction (D1) ; **caractérisé par**

un élément de pivot (105) destiné à supporter en pivotement la première surface de support (101) autour d'un deuxième axe (106) parallèle au premier axe (102),
la position dans une direction perpendiculaire au premier axe (102) et à la direction d'empilement de l'un du premier axe (102) et du deuxième axe (106) étant fixe par rapport à la première surface de support (101) ; et
la position dans une direction perpendiculaire au premier axe (102) et à la direction d'empilement de l'autre du premier axe (102) et du deuxième axe (106) étant agencée pour changer par rapport à la première surface de support (101).

2. Appareil de la revendication 1, dans lequel la position du premier axe (102) est fixe par rapport à la première surface de support (101).

3. Appareil de l'une quelconque des revendications précédentes, dans lequel la première surface de support (101) s'étend des deux côtés du premier axe (102).

4. Appareil de l'une quelconque des revendications précédentes, dans lequel la première surface de support (101) est capable de pivoter par rapport à la deuxième surface de support (103).

5. Appareil de l'une quelconque des revendications précédentes, dans lequel, à un minimum de la plage de pivotement de la première surface de support (101), la première surface de support (101) et la deuxième surface de support (103) de trouvent dans le plan.

6. Appareil de l'une quelconque des revendications précédentes, dans lequel la position dans la direction d'empilement de la deuxième surface de support (103) par rapport au premier axe (102) est fixe.

7. Appareil de l'une quelconque des revendications précédentes, dans lequel une partie de la première surface de support (101) est adjacente à une partie de la deuxième surface de support (103) dans une direction du premier axe (102), sur au moins un côté.

8. Appareil de la revendication 7, dans lequel un bord de la partie de la première surface de support (101) le plus éloigné de la partie de la deuxième surface de support (103) est évasé.

9. Appareil de l'une quelconque des revendications précédentes, dans lequel la deuxième surface de support (103) est plus longue dans une direction perpendiculaire au premier axe (102) et à la direction d'empilement que dans une direction parallèle au premier axe (102).

10. Procédé de support d'un empilement (5) de supports d'enregistrement dans un dispositif d'apport de support d'enregistrement, le procédé comprenant :

le support d'une première partie du support d'enregistrement le plus bas de l'empilement de supports d'enregistrement (5) sur une première surface de support (101), la première surface de support (101) étant capable de pivoter autour d'un premier axe (102), de façon à compenser une variation de l'épaisseur de l'empilement de supports d'enregistrement (5) dans une première direction (D1) ; et
le support d'une deuxième partie du support d'enregistrement le plus bas de l'empilement de supports d'enregistrement (5) sur une deuxième surface de support (103) de sorte que le support d'enregistrement le plus bas présente une courbure dans une direction parallèle au premier axe (102), de façon à compenser une variation de l'épaisseur de l'empilement de supports d'enregistrement dans une deuxième direction (D2) perpendiculaire à la première direction (D1) ;
caractérisé par
le support en pivotement de la première surface de support (101) autour d'un deuxième axe (106) parallèle au premier axe (102) avec un élément de pivot (105) ;
la position dans une direction perpendiculaire au premier axe (102) et à la direction d'empilement de l'un du premier axe (102) et du deuxième axe (106) étant fixe par rapport à la première surface de support (101) ; et
la position dans une direction perpendiculaire au premier axe (102) et à la direction d'empilement de l'autre du premier axe (102) et du deuxième axe (106) étant agencée pour changer par rapport à la première surface de support (101).

11. Système d'apport d'un empilement de supports d'enregistrement dans un dispositif d'apport de supports d'enregistrement pour un appareil de formation d'image, le système comprenant :

l'appareil destiné à supporter un empilement de supports d'enregistrement de l'une quelconque des revendications 1 à 9 ;
une unité d'apport de support d'enregistrement (303) destinée à apporter le support d'enregistrement le plus haut de l'empilement de supports d'enregistrement (5) ;
une base (301) sur laquelle est positionné l'appareil destiné à supporter un empilement de supports d'enregistrement, la base (301) étant mobile dans une direction d'empilement de l'em-

pilement de supports d'enregistrement (5) et conçue pour s'élever à mesure que l'empilement de supports d'enregistrement (5) diminue ; **caractérisé en ce que** :
à mesure que la base (301) s'élève, les positions relatives des premier et deuxième axes (102, 106) dans la direction d'empilement changent de sorte que la première surface de support (101) pivote autour des premier et deuxième axes (102, 106) pour changer l'angle de la première surface de support (101).

12. Appareil de formation d'image destiné à former une image sur un support d'enregistrement provenant d'un empilement de supports d'enregistrement, l'appareil comprenant :

une unité de formation d'image destinée à former une image sur le support d'enregistrement ;
l'appareil destiné à supporter un empilement de supports d'enregistrement (5) de l'une quelconque des revendications 1 à 9 ;
une unité d'apport de support d'enregistrement (303) destinée à apporter un support d'enregistrement le plus haut de l'empilement de supports d'enregistrement (5) à l'unité de formation d'image ; et
une base (301) sur laquelle est positionné l'appareil destiné à supporter un empilement de supports d'enregistrement, la base (301) étant mobile dans une direction d'empilement de l'empilement de supports d'enregistrement (5) et conçue pour s'élever à mesure que l'empilement de supports d'enregistrement diminue ; **caractérisé en ce que** :
à mesure que la base (301) s'élève, les positions relatives des premier et deuxième axes (102, 106) dans la direction d'empilement changent de sorte que la première surface de support (101) pivote autour des premier et deuxième axes (102, 106) pour changer l'angle de la première surface de support (101).

13. Procédé d'apport d'un empilement (5) de supports d'enregistrement dans un appareil de formation d'image, le procédé comprenant :

le support d'un empilement (5) de supports d'enregistrement selon le procédé de la revendication 10 ;
l'apport d'un support d'enregistrement le plus haut de l'empilement de supports d'enregistrement (5) ; et **caractérisé par** :
le déplacement des premier et deuxième axes (102, 106) l'un par rapport à l'autre à mesure que l'empilement de supports (5) diminue de sorte que la première surface de support (101) pivote autour des premier et deuxième axes (102, 106) pour changer l'angle de la première surface de support (101).

14. Procédé de formation d'une image sur un support d'enregistrement provenant d'un empilement de supports d'enregistrement, le procédé comprenant :

le support d'un empilement (5) de supports d'enregistrement selon le procédé de la revendication 10 ;
l'apport du support d'enregistrement le plus haut de l'empilement de supports d'enregistrement (5) à une unité de formation d'image ;
la formation d'une image sur les supports d'enregistrement apportés dans l'unité de formation d'image ; et
caractérisé par :
le déplacement des premier et deuxième axes (102, 106) l'un par rapport à l'autre à mesure que l'empilement de supports d'enregistrement diminue de sorte que la première surface de support (101) pivote autour des premier et deuxième axes (102, 106) pour changer l'angle de la première surface de support (101).

Fig. 1

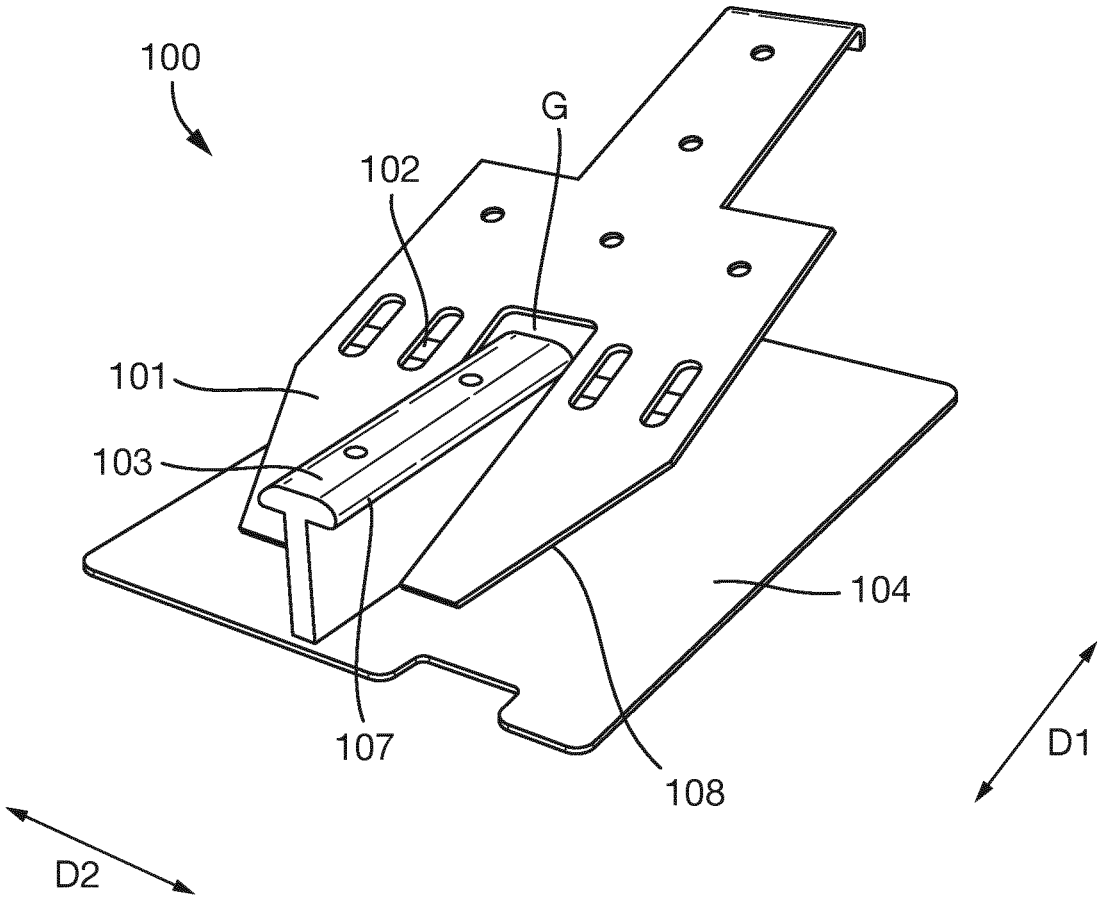


Fig. 2

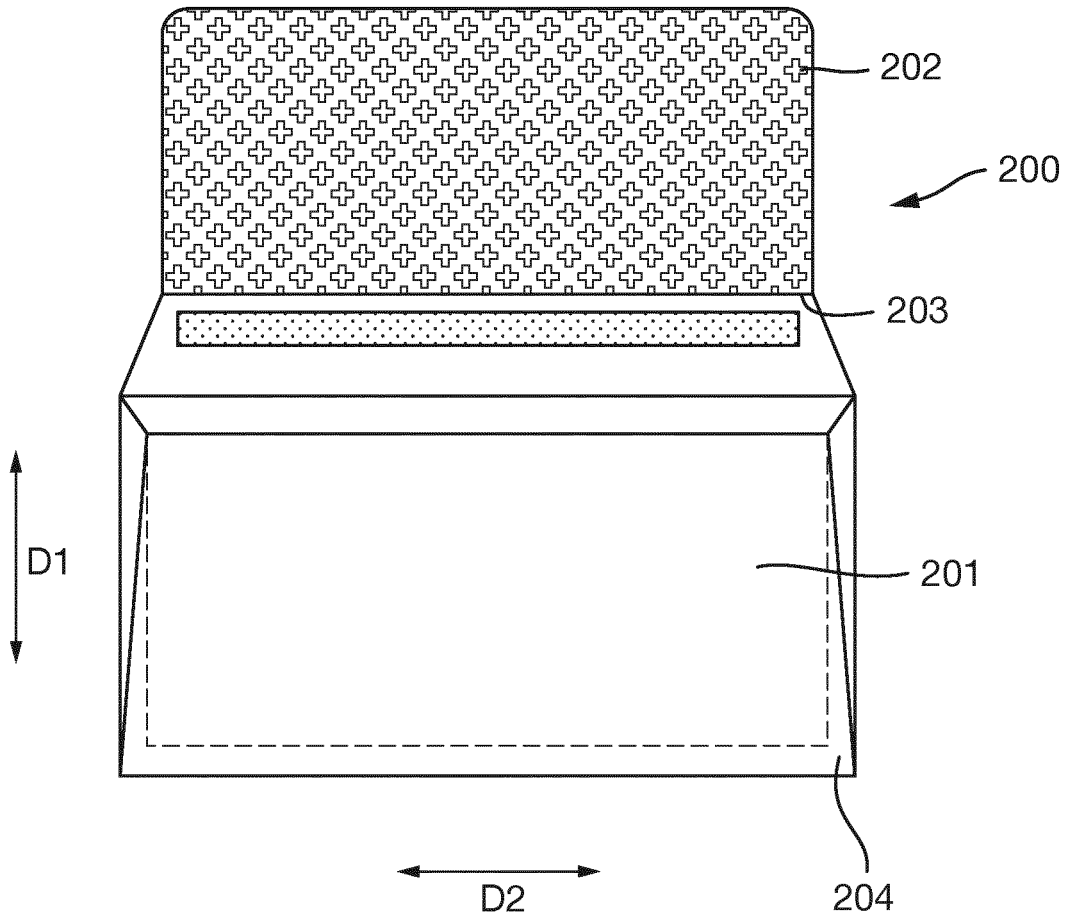


Fig. 3b

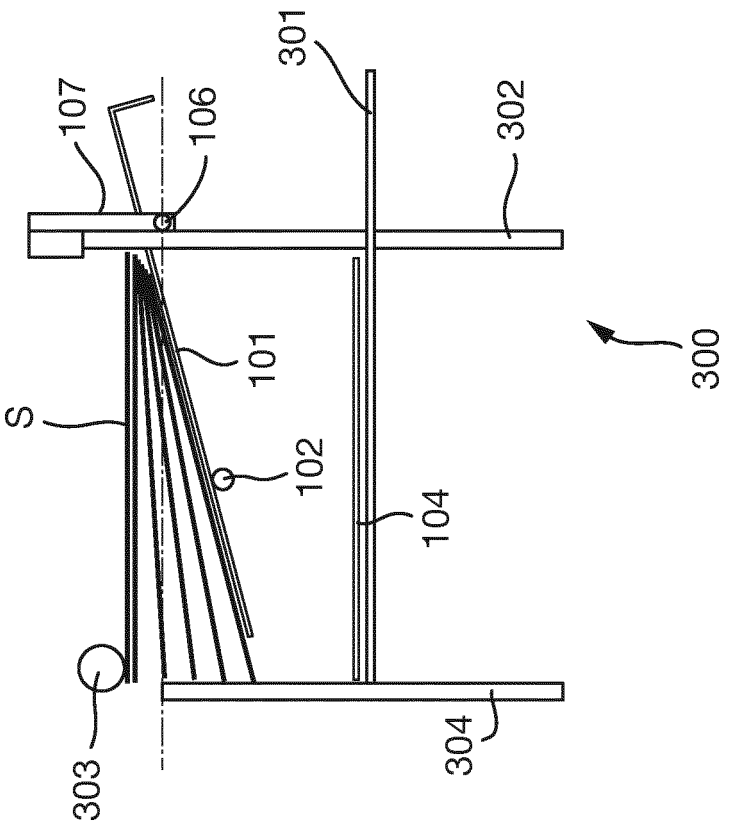

301
107
106
302
101
S
102
104
300
303
304

Fig. 3a

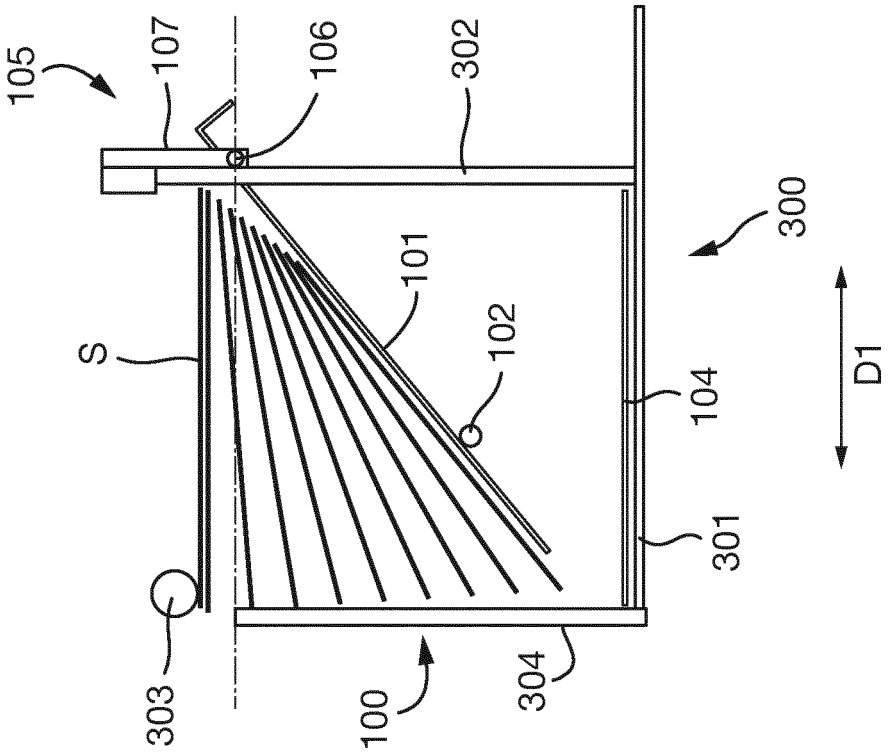

105
107
106
302
300
101
S
102
104
D1
301
303
100
304

Fig. 4a

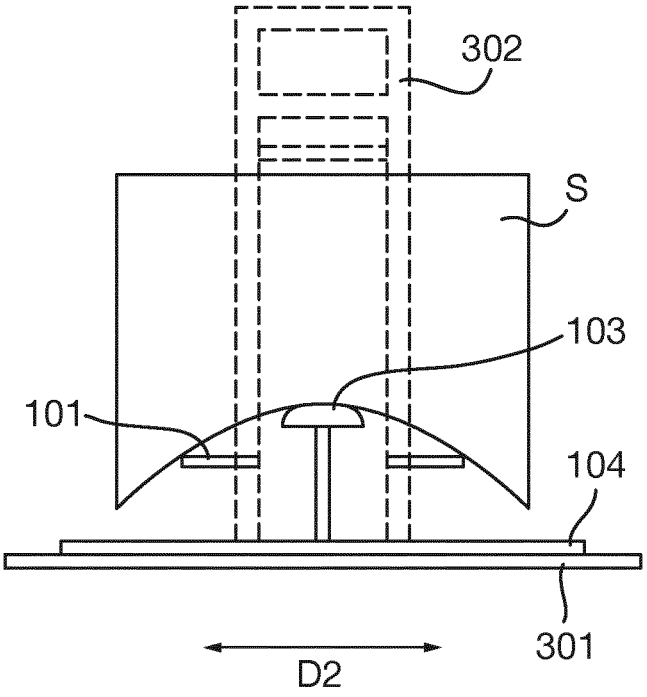


Fig. 4b

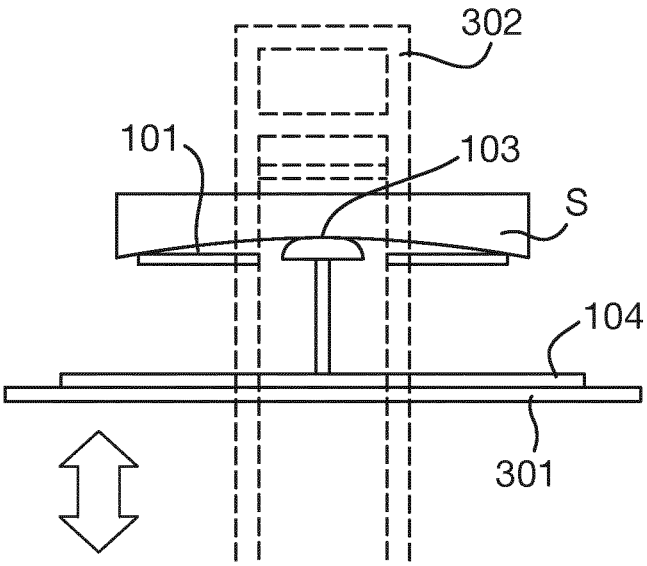


Fig. 5a

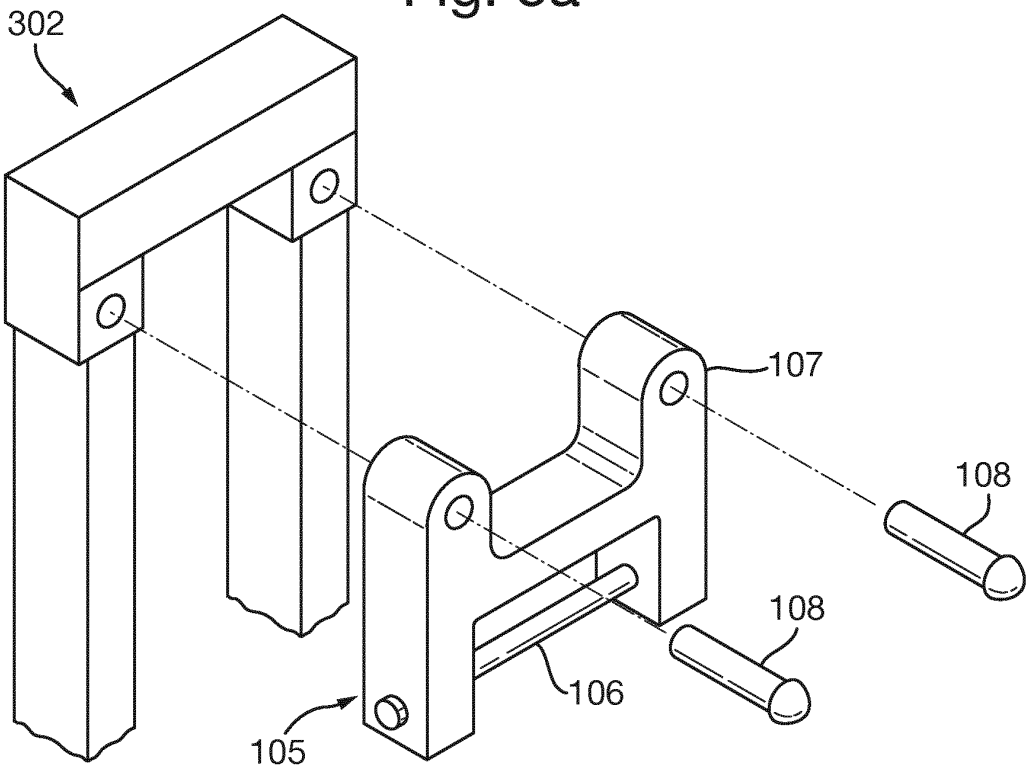
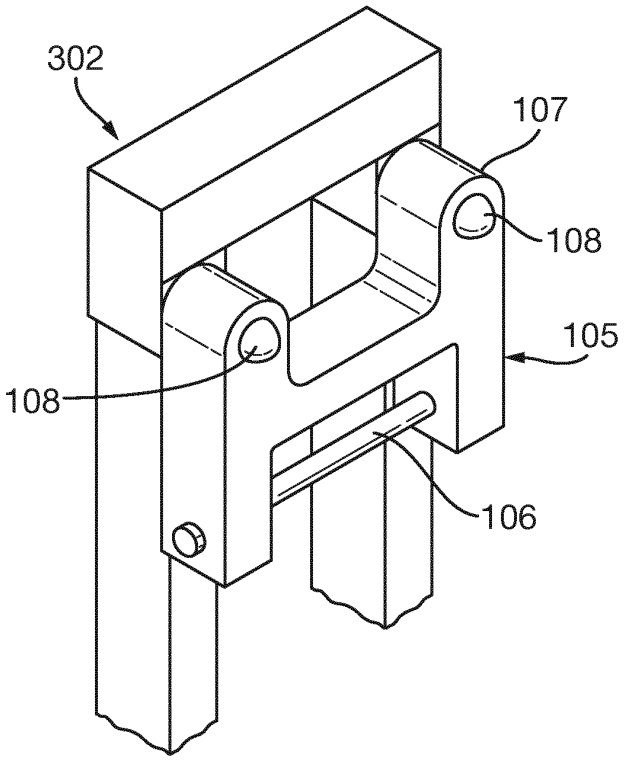


Fig. 5b



REFERENCES CITED IN THE DESCRIPTION

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- EP 1318090 A2 **[0006]**