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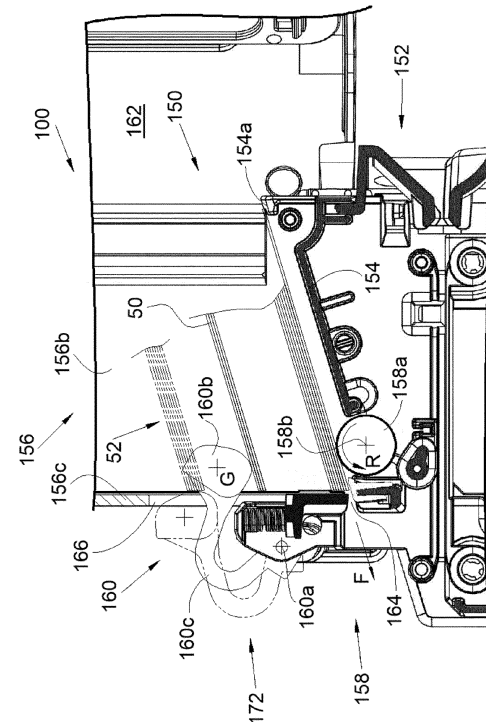
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(54) **CARD FEEDER FOR A CARD PROCESSING MACHINE**

(57) A card feeder (150) including a frame (152), a reservoir (156) receiving a stack (52) of cards (50), a separation system (158) including a separation roll (158a), a ballast (160) movable on the frame (152) between a support position on the top of the stack (52) and a stowed position on one side of the stack (52), a door (162) movable on the frame (152) between an open position and a closed position, a transmission system for moving the ballast (160) from the support position into the stowed position when the door (162) passes from the closed position into the open position, and a return system (172) arranged so as to return the ballast (160) back to the support position when it is in the stowed position.

[Fig. 3]



Description

TECHNICAL FIELD

[0001] The present invention relates to a card feeder for a card processing machine, as well as a processing machine including such a card feeder.

PRIOR ART

[0002] There are processing machines designed to process plastic cards, such as bank cards. Such a processing machine is, for example, a printer which prints a pattern on the card, or an encoding machine which encodes a chip on the card. For this purpose, the processing machine is equipped with a processing module which acts on the card.

[0003] To process such cards on a large scale, it is known to use a card feeder upstream of the processing module.

[0004] In general, such a card feeder includes a reservoir where the cards are stacked on top of one another and a separation system which picks the cards one after another while separating them. Different separation systems have been implemented, but they are not always satisfactory, and it is therefore necessary to find a card feeder with a different separation system.

DISCLOSURE OF THE INVENTION

[0005] An object of the present invention is to provide a card feeder for a card processing machine which has means for ensuring good support on a drive roll.

[0006] To this end, a card feeder for a processing machine is proposed, said card feeder including:

a frame,

a reservoir at the base of which a tray is arranged and, above the tray, a support intended to receive a stack of cards,

a separation system including a separation roll arranged at the level of the tray and a drive system arranged so as to move the separation roll in rotation,

a ballast movably mounted on the frame between a support position in which the ballast bears on the top of the stack and a stowed position in which the ballast is on one side of the stack,

a door mounted movable on the frame between an open position enabling access to the reservoir and a closed position preventing access to the reservoir,

a transmission system arranged so as to move the ballast from the support position into the stowed position when the door passes from the closed posi-

tion into the open position, and

a return system arranged so as to return the ballast back to the support position when it is in the stowed position.

[0007] Advantageously, the ballast is mounted movable in rotation about a tilting axis parallel to the axis of the separation roll, the tilting axis is arranged so that the center of gravity of the ballast is vertically above the tilting axis and horizontally between the tilting axis and the reservoir, when the ballast is in the stowed position, and the return system is gravity.

[0008] Advantageously, the transmission system includes:

a cam secured to the door,

a shaft secured to the ballast parallel to the tilting axis and offset with respect to the latter, and

a slider mounted movable in translation on the frame parallel to a direction of translation and including a stop forming a follower element for the cam where the slider moves from a first position corresponding to a support position of the ballast into a second position corresponding to the stowed position of the ballast, when the cam moves from the closed position into the open position, and having a housing in which said shaft is accommodated, and where the housing is arranged so as to prevent any movement parallel to the direction of translation between the slider and the shaft, and enable movements perpendicular to the direction of translation between the slider and the shaft.

[0009] The invention also proposes a card processing machine including a card feeder according to one of the preceding variants, a processing module, and a transport system including means for moving the cards from the card feeder to the processing module.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The above-mentioned features of the invention, as well as others, will appear more clearly upon reading the following description of one embodiment, said description being made with reference to the appended drawings, wherein:

Fig. 1 is a schematic illustration of a processing machine according to the invention;

Fig. 2 is a perspective and front view of a card feeder according to the invention;

Fig. 3 is a side view according to the arrow III and in section through a vertical plane of the card feeder of

Fig. 2;

Fig. 4 is a side view according to the arrow IV of the card feeder of Fig. 2;

Fig. 5 is a top view in section according to the plane V-V of the card feeder of Fig. 4; and

Fig. 6 is a sectional view of the card feeder of Fig. 5 by the plan VI-VI.

DETAILED DISCLOSURE OF SOME EMBODIMENTS

[0011] In the following description, the terms relating to a position are considered with reference to a processing machine 100 including a card feeder 150 according to the invention, where the processing machine 100 is in the position of use, i.e., as shown in Fig. 1.

[0012] The processing machine 100 includes a card feeder 150 according to the invention, a processing module 102, and a transport system 104 which includes means for moving the cards from the card feeder 150 to the processing module 102, where the means conventionally include rolls which pinch the cards and motors which drive the rolls in rotation. Thus, the processing module 102 is downstream of the card feeder 150 with respect to the direction of movement D of the cards by the transport system 104. For example, the processing module 102 is a printer or an encoding module, etc. The processing module 102 and the transport system 104 will not be described in more detail because they can take on any form known to a person skilled in the art.

[0013] Figs. 2 to 6 show the card feeder 150 from different angles. The card feeder 150 includes a frame 152 which is secured to the frame of the processing machine 100. The frame 152 of the card feeder 150 may be a portion of the frame of the processing machine 100 or an attached and fixed element.

[0014] The card feeder 150 includes a reservoir 156 which is herein delimited by three vertical walls 156a-c, namely a back wall 156c and two lateral walls 156a-b arranged on either side of the back wall 156c. These vertical walls 156a-c are secured to the frame 152 and thus form, when viewed from above, a U-like shape, where the lateral walls 156a-b form the branches of the U-like shape and where the back wall 156c forms the bottom of the U-like shape.

[0015] In the lower part, the reservoir 156 has a tray 154 which forms the base of the reservoir 156 and above which a support 154a is provided which serves as a support for a stack 52 of cards, such as plastic cards, 50 placed thereon. Thus, the stack 52 of cards 50 is formed by a vertical stack of cards 50 which are placed flat on top of one another and over the support 154a. Thus, the stack 52 of cards 50 is arranged between the vertical walls 156a-c and over the support 154a. The installation of the support 154a with a reduced surface area relative to the tray 154 allows minimizing the frictions

of the cards 50 when they move.

[0016] The card feeder 150 also includes a door 162 which is movably mounted on the frame 152 and which forms the fourth wall of the reservoir 156. Thus, the door 162 is movably mounted on the frame 152 between an open position, enabling access to the inside of the reservoir 156 and the deposition of cards 50 on the support 154a, and a closed position, preventing access to the reservoir 156 while enclosing the cards 50 in the reservoir 156, and vice versa. Thus, the door 162 closes the U-like shape formed by the vertical walls 156a-c.

[0017] In the embodiment of the invention disclosed herein, the door 162 is movable in rotation about a door axis 162a, herein vertical.

[0018] In the lower portion of the reservoir 156, the card feeder 150 also includes a separation system 158 which is arranged so as to separate the cards 50 stored in the reservoir 156 from each other, while moving them successively through the bottom wall 156c according to a drive direction F which is then extended by direction of movement D.

[0019] The separation system 158 includes a separation roll 158a which is arranged at the level of the tray 154 according to a direction transverse to the drive direction F. The separation roll 158a is mounted movable in rotation on the frame 152 about its axis 158b. Thus, the cards 50 are in contact with the top of the separation roll 158a and the top of the support 154a.

[0020] The separation system 158 also includes a drive system, such as a motor, mounted on the frame 152, which is arranged so as to drive the separation roll 158a in rotation in the direction of the arrow R to drive the card 50 following the drive direction F. The processing machine 100 or the card feeder 150 includes a control unit arranged so as to control the drive system according to the needs.

[0021] Thus, the stack 52 of cards 50 rests on the separation roll 158a and the support 154a, and the separation is thus performed from below the stack 52, i.e., the separation roll 158a drives the card 50 which is the lowest, i.e., which rests on the separation roll 158a and the support 154a, to pull it out of the stack 52 and move it following the drive direction F through the bottom wall 156c through a window 164 that the bottom wall 156c has for this purpose.

[0022] Conventionally, the window 164 is sized in height to let only one card 50 pass through at a time.

[0023] The separation roll 158a drives the card 50 up to the transport system 104 which handles it to transfer it to the processing module 102 and expel it from the machine 100 after processing.

[0024] To assist in the separation of the cards 50 by the separation roll 158a, the support 154a is arranged so that the lowest card 50 has an orientation with a descending slope towards the separation roll 158a.

[0025] The card feeder 150 also includes a ballast 160 which is movably mounted on the frame 152 between a support position (continuous lines in Fig. 3) and a stowed

position (phantom lines in Fig. 3).

[0026] In the support position, the ballast 160 bears on the top of the stack 52, i.e., on the card 50 which is the highest, and in the stowed position, the ballast 160 is on one side of stack 52, herein at the front of the stack 52, without pressing on the stack 52. The support position of the ballast 160 varies according to the number of remaining cards 50.

[0027] Thus, in the support position, the ballast 160 is in the reservoir 156 and, in the stowed position, it is outside the reservoir 156. Between the support position and the stowed position, the ballast 160 passes through the bottom wall 156c via a passage 166 that the bottom wall 156c has for this purpose above the window 164.

[0028] In the support position, the ballast 160 presses the cards 50 against the separation roll 158a to assist with the separation.

[0029] In the stowed position, the ballast 160 does not bear on the cards 50 and it is the cumulative weight of the cards 50 of the stack 52 which acts to press the cards 50 against the separation roll 158a.

[0030] According to a particular embodiment, the weight of the ballast 160 is equivalent to the weight of 15 ± 3 cards.

[0031] The card feeder 150 also includes a transmission system 170 which is arranged so as to move the ballast 160 from the support position into the stowed position when the door 162 passes from the closed position into the open position. Thus, when a user opens the door 162, the ballast 160 passes into the stowed position to allow free access above the support 154a and the separation roll 158a in order to enable removal of a stack 52 of cards 50.

[0032] When the deposited stack 52 of cards 50 is relatively high, i.e., above the ballast 160, said ballast 160 remains stuck in the stowed position due to the fact that it bears against the side of the stack 52 (cf. the stowed position in Fig. 3), herein the front of the stack 52, and this support prevents it from returning back to the support position.

[0033] As the stack 52 decreases, the card 50 that is the highest in the stack 52 goes down. When this card 50 passes below the level of the ballast 160, said ballast 160 is then free to return back to its support position by bearing on said highest card 50 and following it as it descends.

[0034] Moreover, the transmission system 170 is not intended to bring the ballast 160 back to the support position, so as not to force the ballast 160 against the stack 52 when the door 162 passes from the open position into the closed position.

[0035] To ensure the return of the ballast 160 back to the support position, the card feeder 150 includes a return system 172 which is arranged so as to automatically return the ballast 160 back to the support position when it is in the stowed position. This return system 172 is different from the transmission system 170 so as not to link the return of the ballast 160 to closure of the door 162.

[0036] With such an arrangement, the ballast 160 assists in picking the cards 50 by the separation system 158, without hindering the placement of the cards 50 in the reservoir 156 and without forcing the ballast 160 against the stack 52.

[0037] In the embodiment of the invention shown in Figs. 3 and 6, the ballast 160 is mounted movable in rotation about a tilting axis 160a directed according to a transverse direction, i.e. parallel to the axis 158b of the separation roll 158a.

[0038] In this case, the ballast 160 includes a weight 160b and two arms 160c which are secured to the weight 160b and where each is mounted movable in rotation about the tilting axis 160a.

[0039] The tilting axis 160a is arranged so that the center of gravity G of the ballast 160, i.e., herein of the weight 160b and of the arms 160c, is vertically above the tilting axis 160a and horizontally between the tilting axis 160a and the reservoir 156, and therefore the stack 52, when the ballast 160 is in the stowed position.

[0040] Thus, in this position, gravity tends to bring the ballast 160 back into the support position when the ballast 160 no longer bears against the stack 52. As the height of the stack 52 decreases, the pressure exerted by the ballast 160 will increase.

[0041] Thus, in this embodiment, the return system 172 is gravity which is exerted on the ballast 160 at its center of gravity G.

[0042] In another embodiment, a spring may be arranged so as to return the ballast 160 back to the support position when it is moved away.

[0043] In the embodiment of the invention described herein, the transmission system 170 includes a slider 174 which is mounted movable in translation on the frame 152 parallel to a direction of translation T perpendicular to the tilting axis 160a, and herein generally horizontal.

[0044] In the embodiment of the invention described herein, the translational movement is achieved by fastening the slider 174 on the frame 152 by two fastening screws 174a which are screwed into the frame 152 through oblong holes 174b that pass through the slider 174, and where the major axis of each oblong hole 174b is parallel to the direction of translation T.

[0045] Of course, it is possible to achieve this translational movement by other means, such as rails for example.

[0046] Moreover, the slider 174 is linked to the ballast 160 via a sliding pivot connection 176. To this end, the transmission system 170 includes a shaft 176a secured to the ballast 160 and a housing 176b which is formed in the slider 174.

[0047] The shaft 176a is herein parallel to the tilting axis 160a but offset with respect to the latter. Thus, any movement of the shaft 176a will drive the ballast 160 in rotation about the tilting axis 160a and vice versa.

[0048] The housing 176b is sized so as to prevent any movement parallel to the direction of translation T between the slider 174 and the shaft 176a and to authorize

movements perpendicular to the direction of translation T, herein vertical movements, between the slider 174 and the shaft 176a.

[0049] Thus, as soon as the slider 174 moves according to the translation direction T, the shaft 176a is forced to move at the same time and, due to the rotation of the ballast 160 about the tilting axis 160a, the shaft 176a moves perpendicular to the direction of translation T in the housing 176b.

[0050] Conversely, as soon as the shaft 176a moves in rotation under the effect of the ballast 160, the slider 174 is forced to move at the same time according to the direction of translation T and the shaft 176a moves perpendicular to the direction of translation T in the housing 176b.

[0051] Thus, the slider 174 moves between a first position corresponding to the support position of the ballast 160 when there is no longer any card 50 in the reservoir 156 and a second position corresponding to the stowed position of the ballast 160.

[0052] The transmission system 170 also includes a cam 162b secured to the door 162 and which therefore moves with it during movement thereof between the open and closed positions.

[0053] The slider 174 includes a stop 174c which forms a follower element for the cam 162b when the latter moves from the closed position into the open position. Thus, the cam 162b and the stop 174c are arranged so that the stop 174c follows the cam 162b during movement thereof from the closed position into the open position and the slider 174 then passes from the first position (support position of the ballast 160) into the second position (stowed position of the ballast 160), but the stop 174c and therefore the slider 174 are not forced to follow the cam 162b during movement of the latter from the open position into the closed position.

[0054] The cam 162b is herein in the form of a circle arc coaxial with the door axis 162a, and the stop 174c is in the form of a wall of the slider 174c, where the wall is positioned so as to be pushed by the cam 162b during movement thereof from the closed position into the open position and so as to thus move the slider 174 from the first position into the second position.

[0055] The operation is then as follows from the closed position of the door 162 and from the support position of the ballast 160 and into the first position of the slider 174.

[0056] A user manipulates the door 162 to place it in the open position. The cooperation between the cam 162b and the stop 174c forces the slider 174 to move into the second position, and the cooperation between the housing 176b and the shaft 176a causes movement of the ballast 160 into its stowed position. The user can then deposit the cards 50 in the reservoir 156.

[0057] The user manipulates the door 162 to set it in the closed position. The cam 162b does not act on the stop 174c which therefore remains in the same position due to the fact that the ballast 160 is blocked by the stack 52. As the stack decreases, the ballast 160 will pivot about the

tilting axis 160a while moving from the stowed position into the support position and while driving the shaft 176a, and, due to the cooperation of the shaft 176a with the housing 176b, the slider 174 will move towards its first position.

Claims

1. A card feeder (150) for a processing machine (100), the card feeder (150) comprising:

- a frame (152);
- a reservoir (156) at the base of which a tray (154) is arranged, and above the tray (154), a support (154a) intended to receive a stack (52) of cards (50);
- a separation system (158) including a separation roll (158a) arranged at a level of the tray (154) and a drive system arranged so as to move the separation roll (158a) in rotation;
- a ballast (160) movably mounted on the frame (152) between a support position in which the ballast (160) bears on a top of the stack (52) of cards (50) and a stowed position in which the ballast (160) is on one side of the stack (52) of cards (50);
- a door (162) movably mounted on the frame (152) between an open position enabling access to the reservoir (158) and a closed position preventing access to the reservoir (158);
- a transmission system (170) arranged so as to move the ballast (160) from the support position into the stowed position when the door (162) passes from the closed position into the open position; and
- a return system (172) arranged so as to bring the ballast (160) back into the support position when it is in the stowed position.

2. The card feeder (150) according to claim 1, wherein the ballast (160) is mounted movable in rotation about a tilting axis (160a) parallel to an axis (158b) of the separation roll (158a), wherein the tilting axis (160a) is arranged so that a center of gravity (G) of the ballast (160) is vertically above the tilting axis (160a) and horizontally between the tilting axis (160a) and the reservoir (156) when the ballast (160) is in the stowed position, and wherein the return system (172) is gravity.

3. The card feeder (150) according to claim 2, wherein the transmission system (170) comprises:

- a cam (162b) secured to the door (162) and moveable therewith between the open position and the closed position;
- a shaft (176) secured to the ballast (160) par-

allel to the tilting axis (160a) and offset with respect to the tilting axis; and

- a slider (174) mounted movable in a direction of translation (T) on the frame (152) and including a stop (174c) forming a follower element for the cam (162b), wherein the slider (174) moves from a first position corresponding to the support position of the ballast (160) into a second position corresponding to the stowed position of the ballast (160) when the cam (162b) moves from the closed position into the open position, and the slider (174) having a housing (176b) in which the shaft (176a) is accommodated, wherein the housing (176b) is arranged so as to prevent any movement parallel to the direction of translation (T) between the slider (174) and the shaft (176a) and enable movement perpendicular to the direction of translation (T) between the slider (174) and the shaft (176a).

4. A card processing machine (100) comprising a card feeder (150) according to one of the preceding claims, a processing module (102), and a transport system (104) including means for moving the cards (50) from the card feeder (150) to the processing module (102).

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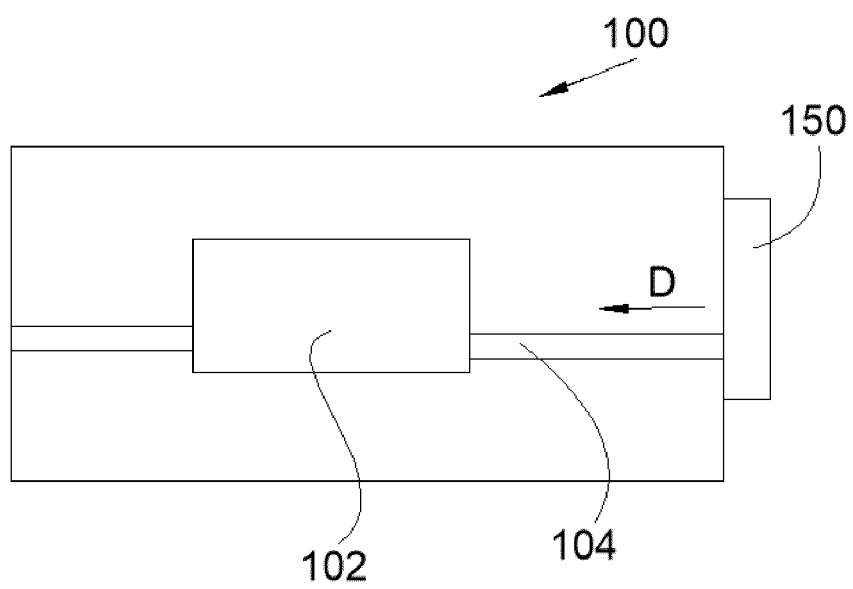
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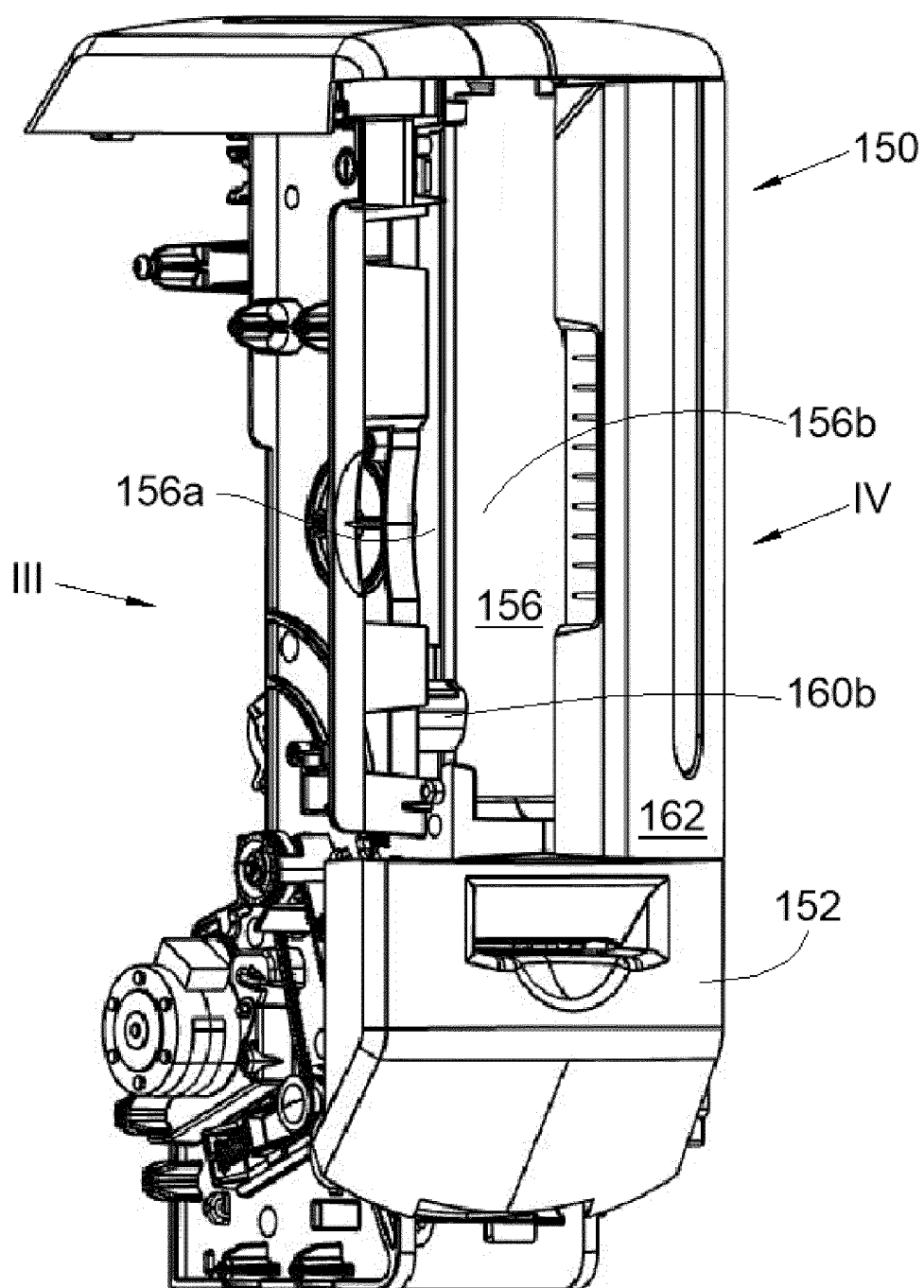
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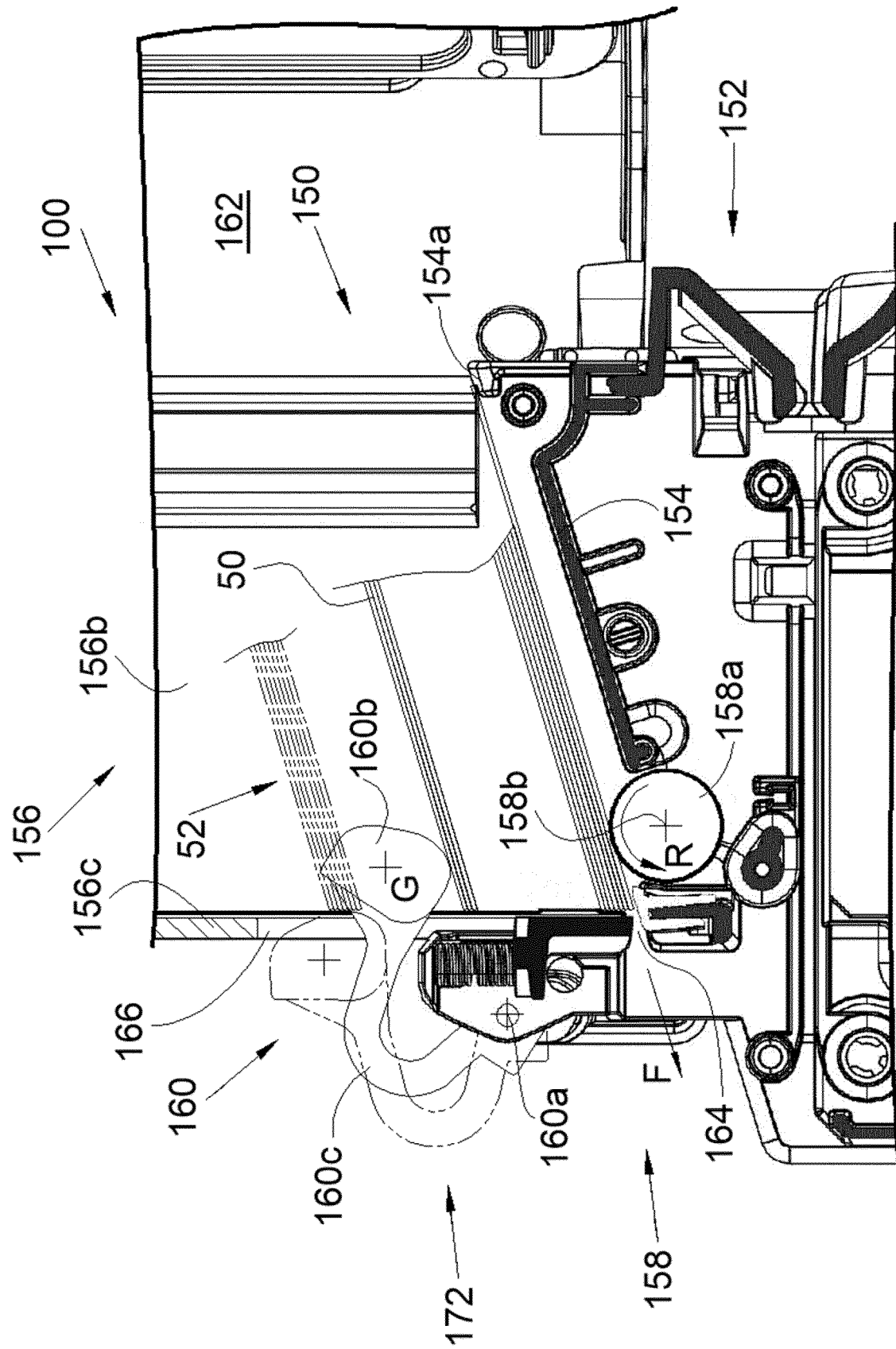
[Fig. 1]



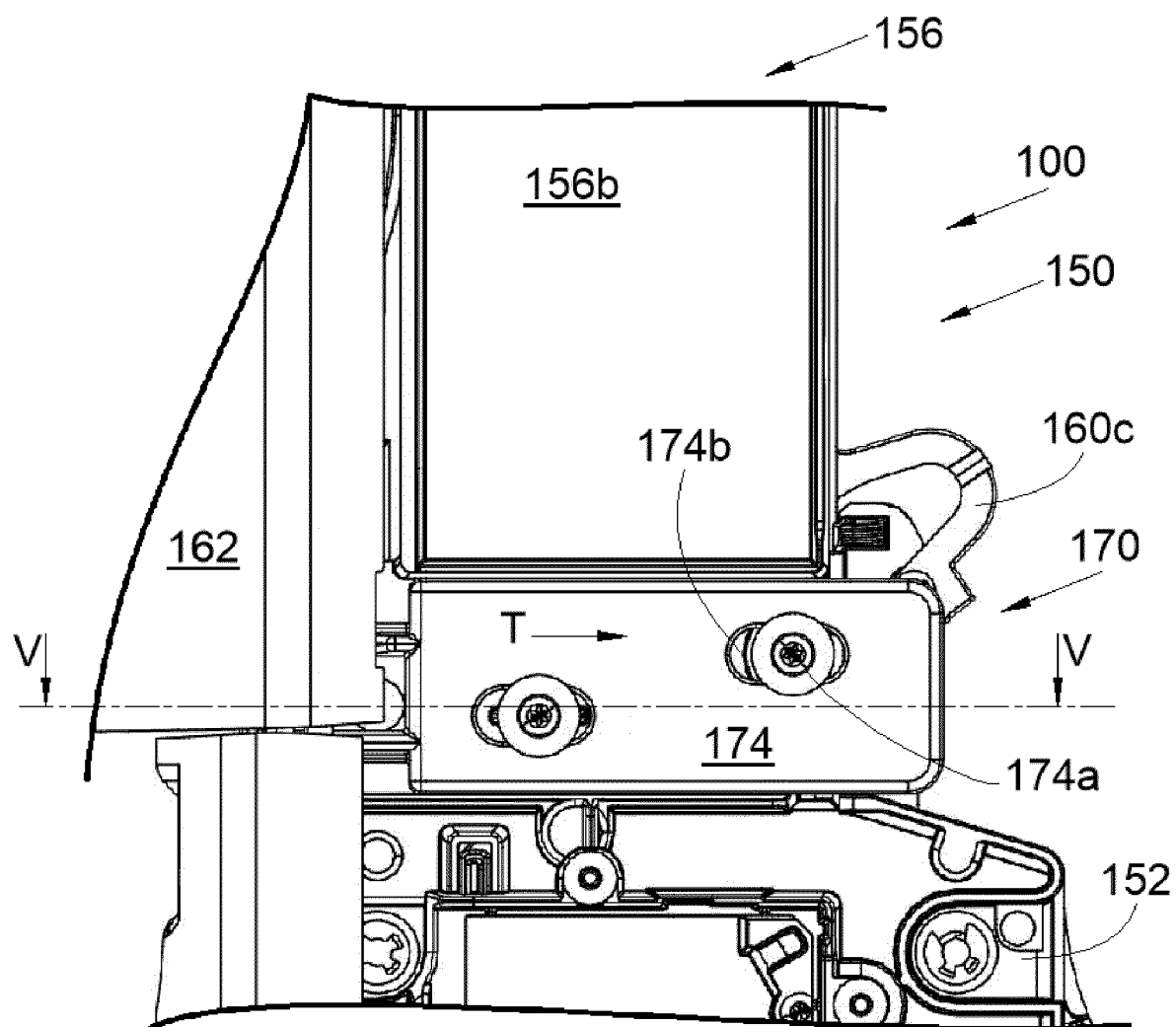
[Fig. 2]



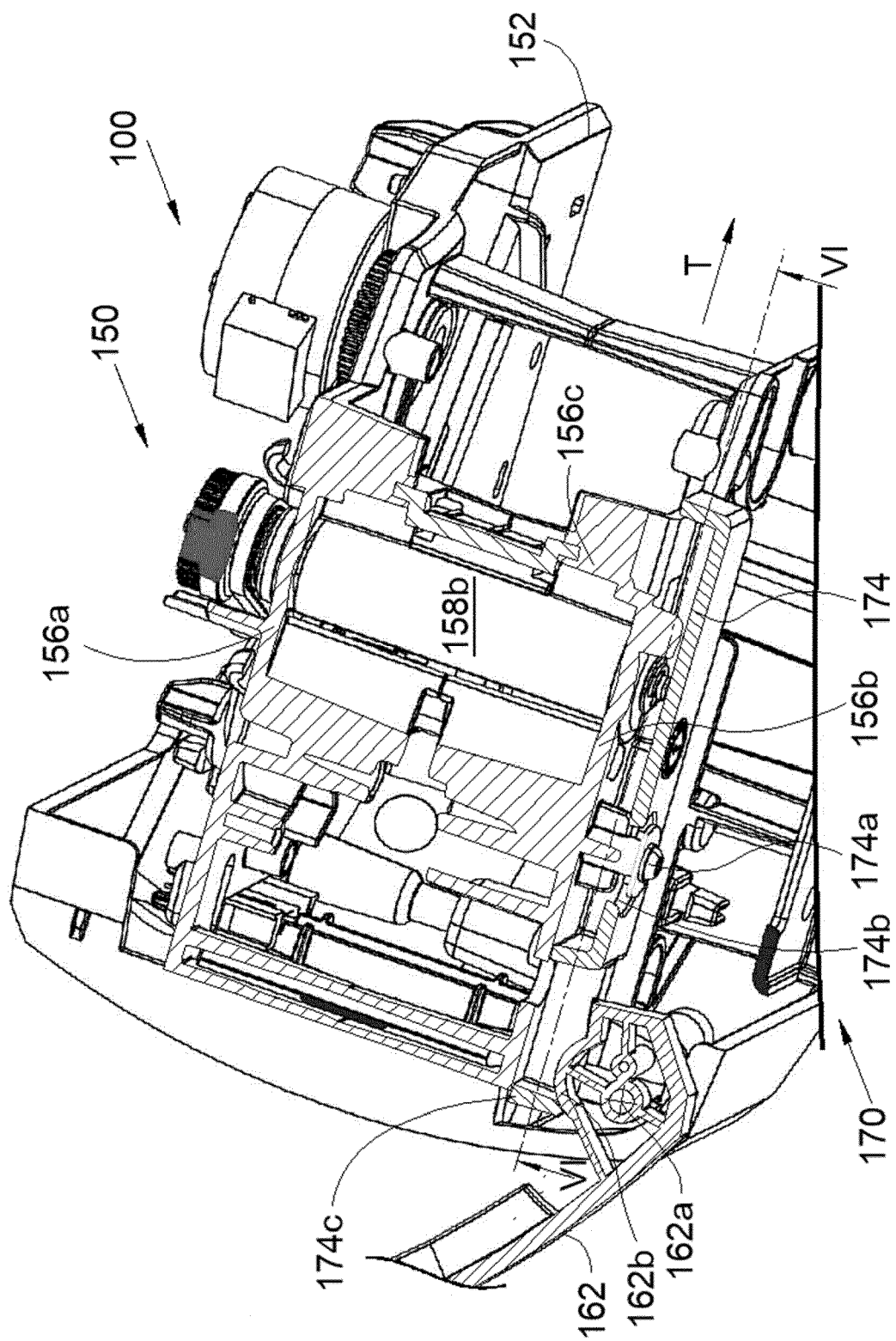
[Fig. 3]



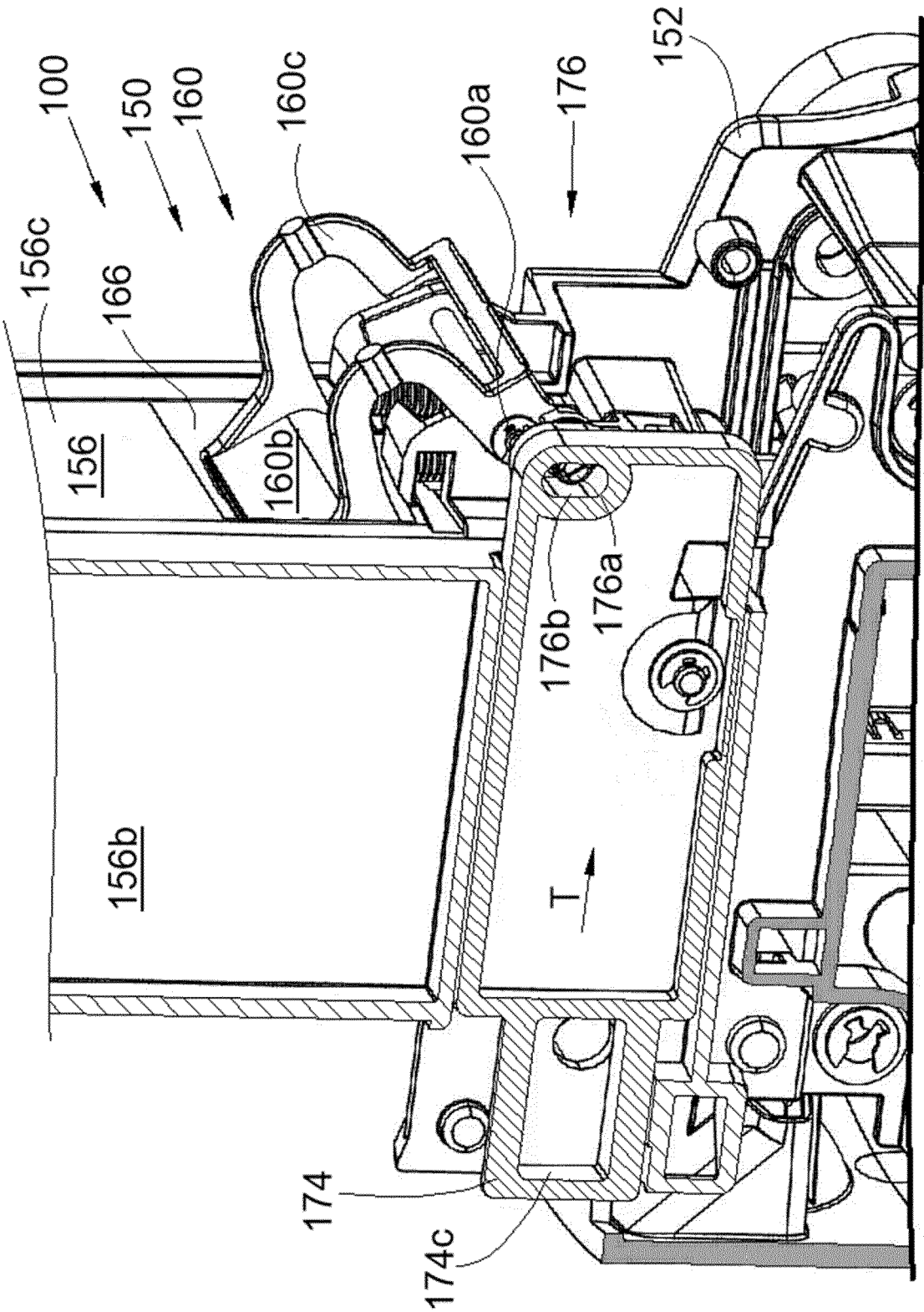
[Fig. 4]



[Fig. 5]



[Fig. 6]





EUROPEAN SEARCH REPORT

Application Number

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X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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