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(71) Applicant: **Seiko Instruments Inc.**
Chiba-shi, Chiba (JP)

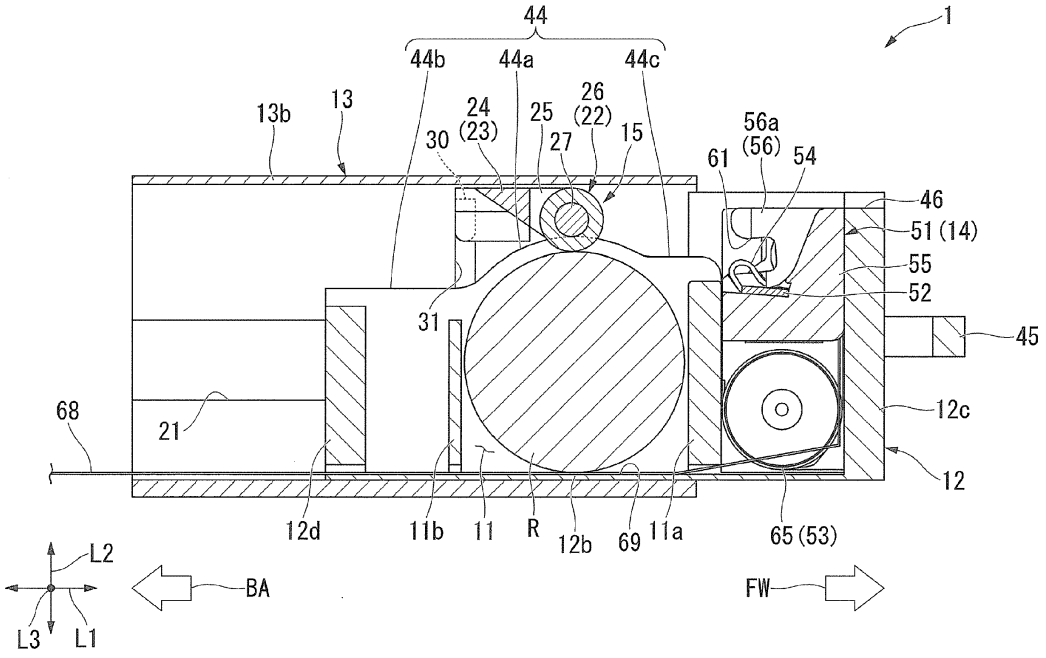
(72) Inventor: **Sudo, Shinichi**
Chiba-shi,, Chiba (JP)

(74) Representative: **Miller Sturt Kenyon**
9 John Street
London WC1N 2ES (GB)

(54) Drawer type thermal printer

(57) A thermal printer (1) comprises: a drawer body (12) having a recording paper storage part (11) that stores recording paper; a frame body (13) supporting the drawer body (12) slidably between a drawn-out position where the recording paper storage part (11) is open and a housed position where the recording paper storage part (11) is closed; a head unit (14) provided on the drawer body (12) and having a thermal head (52); and a platen roller (22) provided on the frame body (13) and that feeds paper when releasably assembled with the head unit (14) in the housed position, wherein the head unit (14) includes a platen driving mechanism (53) that is connected to the platen roller (22) when the platen roller (22) is assembled with the head unit (14) in the housed position and that drives the platen roller (22).

FIG.8



EP 2 853 405 A1

Description

BACKGROUND

1. Field of the Invention

[0001] The present invention relates to a thermal printer.

2. Description of the Related Art

[0002] As a printer used to print various labels, receipts, tickets, etc., there is a conventionally known thermal printer printing on recording paper that changes color when subjected to heat (thermal paper). Thermal printers can be made small in size and light in weight and have a simple structure without use of toner, ink, or the like. Thus, thermal printers are widely used in a cash register system of POS, ECR, etc. or on portable terminals or vehicles.

[0003] Meanwhile, among the thermal printers described above, on-vehicle thermal printers used for taxi meters, tachographs, etc. are required to fit in a standard area such as single DIN in instrument panels of vehicles.

[0004] Therefore, there is a known thermal printer of a drawer type described in Japanese Unexamined Patent Application Publication No. 2002-67435 as an on-vehicle thermal printer. More specifically, the thermal printer described in the document includes a drawer body having a recording paper storage part and a frame body that supports the drawer body slidably. On the drawer body, a platen roller that feeds recording paper stored in the recording paper storage part and a platen unit having a platen driving mechanism (such as a motor or a gear transmission mechanism) for driving the platen roller are mounted. On the other hand, on the frame body, a head unit having a thermal head is mounted.

[0005] However, in the structure described in the document, the platen driving mechanism is mounted on the drawer body and the thermal head is mounted on the frame body. Therefore, wirings and the like have to be drawn to both of the platen driving mechanism and the thermal head separately. The layout characteristics are thus low unfortunately. In addition, in thermal printers of a drawer type, platen driving mechanisms including a motor have to be provided in positions that do not cause interference with the drawer body when they are provided on the frame body side, making it difficult to make thermal printers small in size.

[0006] From these points, in the art, a thermal printer that is made small in size and is capable of improving layout characteristics of wirings and the like has been desired.

SUMMARY OF THE INVENTION

[0007] (1) A thermal printer according to one aspect of the present invention comprises: a drawer body having a recording paper storage part that stores recording paper; a frame body supporting the drawer body slidably between a drawn-out position where the recording paper storage part is open and a housed position where the recording paper storage part is closed; a head unit provided on the drawer body and having a thermal head; and a platen roller provided on the frame body and that feeds paper when releasably assembled with the head unit in the housed position, wherein the head unit includes a platen driving mechanism that is connected to the platen roller when the platen roller is assembled with the head unit in the housed position and that drives the platen roller.

[0008] According to this structure, both of the thermal head and the platen driving mechanism of the platen roller are mounted on the head unit provided on the drawer body, allowing wirings from a flexible board etc. to the thermal head and the platen driving mechanism to be drawn together. Thus, layout characteristics can be improved. In addition, it is not necessary to position a driving means such as a motor on the frame body side because the above-described head unit is provided on the drawer body side. Thus, the thermal printer can be made small in size without causing interference between the frame body and the drawer body. (2) In the thermal printer according to the one aspect of the present invention, the frame body has a platen frame supporting the platen roller rotatably, and the platen frame moves along an opening direction of the recording paper storage part along with slide movement of the drawer body.

[0009] According to this structure, since the platen frame is structured movably along the opening direction of the recording paper storage part along with slide movement of the drawer body, the thermal printer is capable of suppressing interference between the platen roller and the recording paper during slide movement of the drawer body while it is made small in size in the opening direction of the recording paper storage part. (3) In the thermal printer according to the one aspect of the present invention, the head unit preferably includes: a roller storage part storing both ends of the platen roller in the housed position, a latch mechanism holding the both ends of the platen roller stored in the roller storage part, and a biasing means biasing the thermal head toward the platen roller, wherein a biasing direction of the biasing means and a sliding direction of the drawer body intersect with each other.

[0010] According to this structure, since the biasing direction of the biasing means of the thermal head and the sliding direction of the drawer body intersect with each other, consideration of biasing force of the biasing means is not required for holding force of the latch mechanism. In other words, it is possible to prevent biasing force of the biasing means from releasing the assembly between the head unit and the platen unit unexpectedly and then prevent releasing of the lock between the drawer body and the frame body. As a result, the thermal printer of a drawer type can be provided without changing holding

force of the latch mechanism.

[0011] As described above, the thermal printer according to the one aspect of the present invention can have improved layout characteristics of wirings and the like while it is made small in size.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Embodiments of the present invention will now be described by way of further example only and with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view illustrating a thermal printer with its drawer body in a housed position;
FIG. 2 is a perspective view of the thermal printer with the drawer body in a drawn-out position;
FIG. 3 is a sectional view taken along the line A- A of FIG. 1;
FIG. 4 is a perspective view of a head unit and a platen unit;
FIG. 5 is a perspective view of the drawer body as seen from the rear thereof;
FIG. 6 is a sectional view taken along the line B- B of FIG. 1;
FIG. 7 is a sectional view corresponding to FIG. 3 illustrating the drawn-out position of the drawer body;
FIG. 8 is a sectional view corresponding to FIG. 3 illustrating the drawer body upon open/close operation;
FIG. 9 is a view for illustrating a state where the head unit and the platen unit are assembled and is a sectional view corresponding to FIG. 6; and
FIG. 10 is a view for illustrating a state where the head unit and the platen unit are assembled and is a sectional view corresponding to FIG. 6.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013] An embodiment of the present invention is hereinafter described with reference to the accompanying drawings.

[0014] FIG. 1 is a perspective view of a thermal printer 1 with its drawer body 12 in a housed position, and FIG. 2 is a perspective view of the thermal printer 1 with the drawer body 12 in a drawn-out position. FIG. 3 is a sectional view taken along the line A- A of FIG. 1. As illustrated in FIGS. 1 to 3, the thermal printer 1 of this embodiment is mounted on, for example, a tachograph that records operation states of a vehicle such as a speed, and is embedded in an instrument panel of a vehicle, which is not illustrated. The thermal printer 1 is configured to print operation states recorded by the tachograph on recording paper P such as thermal paper so as to output the operation states. The recording paper P is set in the thermal printer 1 in a state of roll paper R wound into a roll shape and printing is performed on a part drawn from the roll paper R. As illustrated in FIG. 3, the recording paper P in this embodiment is wound with its thermosensitive color developing surface facing outward in a radial direction of the roll paper R.

[0015] More specifically, the thermal printer 1 includes a drawer body 12 having a roll paper storage part (recording paper storage part) 11, a frame body 13 that supports the drawer body 12 slidably, a head unit 14 provided on the drawer body 12 side, and a platen unit 15 provided on the frame body 13 side. In this embodiment, the recording paper P is discharged forward FW where the lower right side is the front side (in a direction of an arrow FW), the upper left side is the back side (in a direction of an arrow BA), the upper side is the upper side, and the lower side is the lower side in the example illustrated in FIG. 1, where the sides are with respect to the sheet. A direction that is orthogonal to a forward/backward direction L1 and a vertical direction L2 is indicated by a left/right direction L3. Thus, each direction may appear differently in the respective drawings.

[0016] The frame body 13 is formed in a square cylindrical shape opening in the forward/backward direction L1 and is sized, for example, to fit in single DIN standard. In the inner surfaces of a pair of side walls 13a of the frame body 13 facing each other in the left/right direction L3, guide grooves 21 for guiding slide movement of the drawer body 12 extend along the forward/backward direction L1 respectively.

[0017] FIG. 4 is a perspective view of the head unit 14 and the platen unit 15. As illustrated in FIG. 4, the platen unit 15 is mounted on the front part of the frame body 13 and is releasably assembled with the head unit 14 along with slide movement of the drawer body 12. More specifically, the platen unit 15 includes a platen roller 22 that feeds recording paper, and a platen frame 23 that supports the platen roller 22 rotatably.

[0018] The platen frame 23 includes a base 24 that is formed in a C shape opening forward in a top planar view and that extends along the left/right direction, and a pair of side wall parts 25 extending forward from both ends of the base 24 in the left/right direction L3.

[0019] The platen roller 22 is arranged to have the outer surface being in contact with a thermal head 52 on the head unit 14 side with the recording paper P therebetween when the platen unit 15 and the head unit 14 are assembled in the housed position of the drawer body 12 (state in FIGS. 1 and 3). The thermal head 52 will be described later. More specifically, the platen roller 22 is formed by covering a platen shaft 27 with a roller body 26 made of rubber or the like. The platen roller 22 is housed between the side wall parts 25 of the platen frame 23, and is supported by the side wall parts 25 via bearing members 28 provided on both ends of the platen shaft 27 (only one of the bearing members 28 on one end side is illustrated in the view).

[0020] To the other end of the platen shaft 27, a driven gear 29 is fixed. The driven gear 29 is connected to a platen driving mechanism 53 of the head unit 14 to be described later when the platen unit 15 is assembled with

the head unit 14.

[0021] On the base 24 of the platen frame 23, projecting piece parts 30 projecting outward in the left/right direction L3 are formed. The respective projecting piece parts 30 are formed in a plate shape having the thickness direction in the forward/backward direction L1 and inserted in long holes 31 (refer to FIG. 1) formed in the respective side walls 13a of the frame body 13. The long holes 31 have the longitudinal direction in the vertical direction L2 and support the platen unit 15 movably along the vertical direction L2 (in the opening direction of the roll paper storage part 11).

[0022] FIG. 5 is a perspective view of the drawer body 12 as seen from the rear thereof. As illustrated in FIG. 5, the drawer body 12 is formed in a box shape opening upward and sized such that the drawer body 12 can be housed in the frame body 13. On the outer surfaces of a pair of side walls 12a of the drawer body 12 facing each other in the left/right direction L3, guide rails 41 projecting outward in the left/right direction L3 respectively extend along the forward/backward direction L1. The respective guide rails 41 are housed in the corresponding guide grooves 21 in the left/right direction L3 of the above-described guide grooves 21, so that the drawer body 12 slides along the guide grooves 21.

[0023] At the rear part in the drawer body 12, the roll paper storage part 11 for housing the roll paper R is provided. The roll paper storage part 11 opens upward similarly to the drawer body 12 and houses the roll paper R rotatably with its width direction aligned with the left/right direction L3. More specifically, the roll paper storage part 11 is defined by a front and rear plate parts 11a and 11b facing each other in the forward/backward direction L1, a pair of side plate parts 11c facing each other in the left/right direction L3, and a bottom wall 12b of the above-described drawer body 12. The side plate parts 11c have a rear end positioned backward of the rear plate part 11b. The upper edges of the respective side plate parts 11c constitute guide parts 44 that guide the bearing members 28 of the above-described platen unit 15 to the head unit 14.

[0024] Each of the guide parts 44 includes a bulged part 44a that is formed at a position where the roll paper storage part 11 is positioned along the forward/backward direction L1 and that bulges upward, a rearward extension part 44b that extends rearward from the rear end of the bulged part 44a, and a forward extension part 44c that extends forward from the front end part of the bulged part 44a. The bulged part 44a is shaped in an arc shape that is convex upward and has a height along the vertical direction L2 larger than the maximum outer diameter of the roll paper R. The rearward extension part 44b and the forward extension part 44c extend along the forward/backward direction L1 in parallel to each other. The forward extension part 44c is positioned upward of the rearward extension part 44b and has the length in the forward/backward direction L1 shorter than that of the rearward extension part 44b. The bearing members 28 of the platen roller 22 are structured to slide on the guide parts 44 along with sliding of the drawer body 12.

[0025] The drawer body 12 of this embodiment is structured slidably with respect to the frame body 13 in the forward/backward direction L1 between the drawn-out position (state of FIG. 2) where the opening of the roll paper storage part 11 is open and the housed position (state of FIG. 1) where the opening of the roll paper storage part 11 is closed. In the drawn-out position illustrated in FIG. 2, the opening of the roll paper storage part 11 is open upward. In this state, for example, the roll paper R can be put into the roll paper storage part 11. On a front wall 12c of the drawer body 12, a handle 45 projecting forward is provided. The handle 45 is formed in a C shape in a top planar view, and the both ends thereof are fixed to the front wall 12c. Users can slide the drawer body 12 easily by holding the handle 45.

[0026] In the upper edge of the front wall 12c of the drawer body 12, a recessed part 46 depressed downward is formed. The design is made to form a slight gap in the vertical direction L2 between the recessed part 46 and an upper wall 13b of the frame body 13 in the stored position of the drawer body 12 illustrated in FIGS. 1 and 3. The recording paper P is drawn forward FW from the roll paper storage part 11 utilizing the gap. Thus, the above-described gap functions as a discharge port 47 of recording paper P. In addition, on the opening edge of the discharge port 47, a blade part, which is not illustrated, is formed. The drawer body 12 and the frame body 13 are locked by assembling the head unit 14 and the platen unit 15 in the stored position (this will be described in detail later).

[0027] As illustrated in FIGS. 4 and 5, the head unit 14 is provided forward of the roll paper storage part 11 in the drawer body 12 and fixed to the inner surface of the front wall 12c. More specifically, the head unit 14 includes a head frame 51, the thermal head 52 supported by the head frame 51, the platen driving mechanism 53, and latch mechanisms 54.

[0028] The head frame 51 is formed in a C shape opening rearward in a top planar view. More specifically, the head frame 51 includes a base 55 extending along the left/right direction L3, and a pair of side wall parts 56 provided on both sides of the base 55 in the left/right direction L3. As illustrated in FIG. 3, the base 55 is formed in an L shape in a sectional view as seen in the left/right direction L3, and the front part of the base 55 is fixed to the upper part of the front wall 12c in the drawer body 12.

[0029] At the rear end edges of the respective side wall parts 56, roller storage parts 61 depressed forward are formed. In the roller storage parts 61, the above-described bearing members 28 of the platen roller 22 are individually stored. In the side wall parts 56, on a side wall part 56a on one side, a projecting plate part 62 (refer to FIG. 4) projecting downward from the base 55 is formed. The roller storage parts 61 and the forward extension parts 44c of the above-described guide parts 44 have the same height along the vertical direction L2. In

other words, the forward extension parts 44c function as a guide for guiding the bearing members 28 into the roller storage parts 61.

[0030] The thermal head 52 is formed in a plate shape having a thickness direction in the vertical direction L2 rearward of the base 55 and extends along the left/right direction L3 (the width direction of the recording paper P). On the upper surface of the thermal head 52, a plurality of heat generating elements (not illustrated) arranged in a line along the left/right direction L3 is provided. The thermal head 52 is biased upward (biasing direction) by a biasing means, which is not illustrated.

[0031] FIG. 6 is a sectional view taken along the line B-B of FIG. 1. As illustrated in FIG. 6, each of the latch mechanisms 54 is structured by a wire or the like, which is bent so as to be elastically deformable in the vertical direction L2. The latch mechanisms 54 are provided in a pair inside the respective side wall parts 56 in a manner that the distal end parts thereof face the insides of the respective roller storage parts 61 from below thereof The respective latch mechanisms 54 hold the bearing members 28 of the above-described platen roller 22 between the latch mechanisms 54 and the inner peripheral edges of the roller storage parts 61 in the stored position of the drawer body 12. Thus, the head unit 14 and the platen unit 15 are assembled, and the drawer body 12 and the frame body 13 are locked in the stored position. The head unit 14 may include a detection unit, which is not illustrated, configured to detect whether the bearing members 28 of the platen roller 22 are locked to the latch mechanisms 54.

[0032] As illustrated in FIG. 5, the platen driving mechanism 53 for rotationally driving the platen roller 22 is provided on the side of a side wall part 56a, which is one of the side wall parts 56. More specifically, the platen driving mechanism 53 includes a motor for platen 65 and a gear transmission mechanism 66 connected to the motor for platen 65.

[0033] The motor for platen 65 is fixed to the projecting plate part 62 on the one side wall part 56a in the lower part of the base 55. The gear transmission mechanism 66 is structured such that the driven gear 29 of the platen roller 22 meshes therewith when the platen unit 15 is assembled with the head unit 14. Thus, rotary driving force of the motor for platen 65 is transmitted to the platen roller 22 through the gear transmission mechanism 66 and the driven gear 29.

[0034] In addition, as illustrated in FIG. 5, to the above-described thermal head 52 and the motor for platen 65, a flexible board 68 is connected. The flexible board 68 branches at the distal end part (front end part) and the resultant branches are connected respectively to the thermal head 52 and the motor for platen 65, while a part other than the distal end part is integrally laid rearward. More specifically, the flexible board 68 penetrates through the front plate part 11 a and the rear plate part 11b and is laid rearward along the bottom wall 12b of the drawer body 12. In addition, the flexible board 68 penetrates through a rear wall 12d of the drawer body 12 and is drawn outside the drawer body 12.

[0035] The proximal end (rear end part) of the flexible board 68 is connected to a control unit, which is not illustrated, inside the instrument panel of a vehicle. Thus, to the thermal head 52 and the motor for platen 65, power, control signals, etc. are input through the flexible board 68. As illustrated in FIG. 5, in the bottom wall 12b of the drawer body 12, a recessed part 69 depressed downward extends along the forward/backward direction L1, and the flexible board 68 is housed in the recessed part 69. Thus, interference between the flexible board 68 and the roll paper R is suppressed in the roll paper storage part 11.

[0036] Next, operation of the above-described thermal printer 1 will be described. FIGS. 7 and 8 are sectional views corresponding to FIG. 3, FIG. 7 illustrates the drawn-out position of the drawer body 12, and FIG. 8 illustrates a state in opening/closing operation. First, operation in closing operation of the drawer body 12 will be described. As illustrated in FIG. 7, the roll paper R is put into the roll paper storage part 11 of the drawer body 12 in a state where the drawer body 12 is in the drawn-out position, and the drawer body 12 is subjected to the closing operation toward the stored position. More specifically, some length of the recording paper P is drawn outside the drawer body 12 through the recessed part 46 of the drawer body 12. While keeping the recording paper P drawn outside the drawer body 12, the drawer body 12 is pushed rearward.

[0037] At this time, along with rearward slide movement of the drawer body 12, the bearing members 28 of the platen roller 22 (or alternatively the projecting piece part 30 of the platen unit 15) slide on the guide parts 44 of the drawer body 12. More specifically, the bearing members 28 of the platen roller 22 slide on the rearward extension part 44b of the drawer body 12 and then approach the bulged part 44a. As illustrated in FIG. 8, sliding of the bearing members 28 of the platen roller 22 on the bulged part 44a moves the platen frame 23 (the projecting piece part 30) upward (in a direction away from the roll paper storage part 11) in the long holes 31. Thus, the drawer body 12 is pushed rearward in a state where the whole of the platen unit 15 is moved upward to avoid the roll paper storage part 11.

[0038] When the bearing members 28 of the platen roller 22 get over the apexes of the bulged parts 44a, the platen frame 23 moves downward in the long holes 31, and the whole of the platen unit 15 moves downward at the same time. Thereafter, the bearing members 28 of the platen roller 22 arrive on the forward extension parts 44c and come into contact with the forward extension parts 44c slidably thereon. Thus, bearing members 28 are guided into the roller storage parts 61 of the head unit 14.

[0039] FIGS. 9 and 10 are views for illustrating a state where the head unit 14 and the platen unit 15 are assembled and are sectional views corresponding to FIG. 6. As

illustrated in FIG. 9, along with slide movement of the drawer body 12, the bearing members 28 of the platen roller 22 are guided into the roller storage parts 61 of the head unit 14 and then move to push and widen the space between the roller storage parts 61 and the latch mechanisms 54 as illustrated in FIG. 10. More specifically, the latch mechanisms 54 are pushed in, in a direction against the biasing force (downward), whereby the bearing members 28 of the platen roller 22 enter into the roller storage parts 61 of the head unit 14.

[0040] As illustrated in FIG. 6, when the bearing members 28 of the platen roller 22 get over the latch mechanisms 54, the latch mechanisms 54 move back upward, making the bearing members 28 held in the roller storage parts 61. Thus, the platen unit 15 is assembled with the head unit 14 and the drawer body 12 is locked in the stored position. At this time, the assembly of the platen unit 15 and the head unit 14 causes meshing of the driven gear 29 connected to the platen roller 22 and the gear transmission mechanism 66 provided on the head unit 14 side, allowing transmission of torque from the motor for platen 65 to the platen roller 22. In the stored position of the drawer body 12, the recording paper P is sandwiched between the platen roller 22 and the thermal head 52 and is drawn outside the thermal printer 1 through the discharge port 47.

[0041] Next, various types of information are printed on the recording paper P. Driving of the motor for platen 65 transmits driving power of the motor for platen 65 to the driven gear 29 through the gear transmission mechanism 66, thereby rotating the platen roller 22. Thus, the recording paper P sandwiched between the platen roller 22 and the thermal head 52 can be fed. At the same time, a control signal corresponding to print data is output to the thermal head 52, appropriately causing the heat generating elements to generate heat. Thus, various characters, figures, and the like can be clearly printed on the recording paper P being fed. Thereafter, the recording paper P after printing is fed outside the thermal printer 1 through the discharge port 47. As described above, the recording paper P of this embodiment is wound with its thermosensitive color developing surface facing outward in a radial direction of the roll paper R. Therefore, the recording paper P drawn through the discharge port 47 is curled upward. Therefore, printing in this state causes the recording paper P to be continuously fed upward through the discharge port 47, facilitating users to recognize printed information. In order to cut the recording paper P, a part of the recording paper P drawn outside the thermal printer 1 through the discharge port 47 is pulled down being in contact with the blade part, which is not illustrated. Thus, the recording paper P is cut.

[0042] Next, operation in opening operation of the drawer body 12 will be described. First, the handle 45 of the drawer body 12 is held, and the drawer body 12 is drawn out forward via the handle 45. As illustrated in FIGS. 9 and 10, the bearing members 28 of the platen roller 22 then move to push and widen the space between the roller storage parts 61 and the latch mechanisms 54. More specifically, the latch mechanisms 54 are pushed in a direction against biasing force (downward), whereby the bearing members 28 of the platen roller 22 are detached from the insides of the roller storage parts 61 of the head unit 14, and assembly between the platen unit 15 and the head unit 14 is released. At this time, the release of the assembly between the platen unit 15 and the head unit 14 disconnects the connection between the driven gear 29 of the platen roller 22 and the gear transmission mechanism 66 provided on the head unit 14 side and interrupts transmission of torque from the motor for platen 65 to the platen roller 22.

[0043] When the drawer body 12 is further drawn forward after the release of the assembly between the platen unit 15 and the head unit 14, the drawer body 12 slides forward along the guide grooves 21 of the frame body 13. At this time, operation opposite to the above-described closing operation slides the drawer body 12 forward with the bearing members 28 (or alternatively the projecting piece part 30 of the platen unit 15) sliding on the guide parts 44 of the drawer body 12. Thus, the drawer body 12 is drawn forward in a state where the whole of the platen unit 15 is moved upward to avoid the roll paper storage part 11. Thereafter, when the bearing members 28 of the platen unit 15 arrive on the rearward extension part 44b, the drawer body 12 arrives at the drawn-out position. Thus, the roll paper R can be taken out from the roll paper storage part 11 or can be replaced.

[0044] As described above, in this embodiment, the head unit 14 provided on the drawer body 12 side includes the platen driving mechanism 53 that is connected to the platen roller 22 and drives the platen roller 22 when the platen unit 15 and the head unit 14 are assembled in the stored position. According to this structure, both of the thermal head 52 and the platen driving mechanism 53 of the platen roller 22 are mounted on the head unit 14 side, allowing wirings from the flexible board 68 etc. to the thermal head 52 and the platen driving mechanism 53 to be drawn together. Thus, layout characteristics can be improved. In addition, this embodiment does not require to position driving means such as a motor on the frame body 13 side because the above-described head unit 14 is provided on the drawer body 12 side. Thus, the thermal printer 1 can be made small in size without causing interference between the frame body 13 and the drawer body 12.

[0045] Further, since the platen frame 23 is movable along the opening direction of the roll paper storage part 11 along with slide movement of the drawer body 12 in this embodiment, interference between the platen roller 22 and the roll paper R during sliding of the drawer body 12 is avoided even with the reduced height of the thermal printer 1 in the vertical direction L2.

[0046] Further, since the biasing direction (vertical direction L2) by a biasing means for the thermal head 52 and the sliding direction (forward/backward L2) of the drawer body 12 are orthogonal to each other in this em-

bodiment, consideration of biasing force of the biasing means is not required for holding force (biasing force) of the latch mechanisms 54. In other words, it is possible to prevent biasing force of the biasing means from releasing the assembly between the head unit 14 and the platen unit 15 unexpectedly and then prevent releasing of the lock between the drawer body 12 and the frame body 13. As a result, the thermal printer 1 of a drawer type can be provided without changing holding force of the latch mechanisms 54.

[0047] Note that, the technical scope of the present invention is not limited to the above-described embodiment and various changes are possible without departing from the scope of the present invention as defined by the appended claims. For example, in the above-described embodiment, various mechanisms such as the mechanism for assembling the head unit 14 and the platen unit 15 described in the embodiment can be appropriately changed in design. In addition, in the above-described embodiment, the thermal printer is designed as an on-vehicle thermal printer, and the size thereof is set to fit in single DIN standard, for example, but use and size are not limited thereto and the thermal printer can be formed for various uses and in various sizes.

[0048] Further, a recording paper guide or the like for guiding the recording paper P drawn out from the roll paper R to the thermal head 52 may be formed on the upper edge of the front plate part 11a, the head frame 51, or the like. Further, in the above-described embodiment, the structure where the drawer body 12 and the frame body 13 are locked in the drawn-out position by assembling the head unit 14 and the platen unit 15 has been described, but any other structure is possible. For example, a lock mechanism for the drawer body 12 and the frame body 13 may be separately provided.

[0049] In addition, in the above-described embodiment, the structure where the motor for platen 65 is positioned lower than the thermal head 52 has been described, but the position is not limited thereto. The above-described embodiment has been described with the opening direction of the roll paper storage part 11 set upward, but the direction is not limited thereto and the opening direction of the roll paper storage part 11 may be set to the forward/backward direction L1 or the left/right direction L3.

Claims

1. A thermal printer (1) comprising:

a drawer body (12) having a recording paper storage part (11) for storing recording paper (R);
a frame body (13) supporting the drawer body slidably between a drawn-out position where the recording paper storage part is open and a housed position where the recording paper storage part is closed;
a head unit (14) provided on the drawer body and having a thermal head (52); and
a platen roller (22) provided on the frame body and for feeding paper when releasably assembled with the head unit in the housed position,
wherein the head unit includes a platen driving mechanism (65) that is connected to the platen roller when the platen roller is assembled with the head unit in the housed position and for driving the platen roller.

2. A thermal printer according to claim 1, wherein
the frame body (13) has a platen frame (23) supporting the platen roller rotatably, and
the platen frame is configured to move along an opening direction (L2) of the recording paper storage part along with slide movement of the drawer body.

3. A thermal printer according to claim 1 or claim 2, wherein
the head unit preferably includes:

a roller storage part (61) for storing both ends of the platen roller in the housed position,
a latch mechanism (54) for holding the both ends of the platen roller stored in the roller storage part, and
a biasing means for biasing the thermal head toward the platen roller,

wherein a biasing direction (L2) of the biasing means and a sliding direction (L1) of the drawer body intersect with each other.

FIG.1

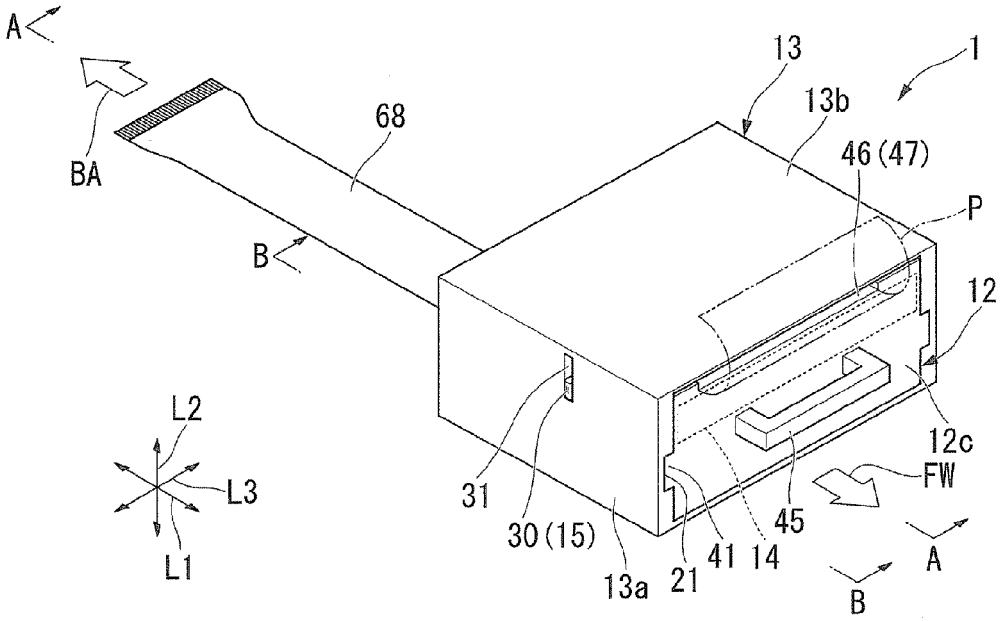

A
BA
68
B
13
1
13b
46 (47)
P
12
12c
FW
A
B
L2
L3
L1
31
30 (15)
13a
21
41
14
45

FIG.2

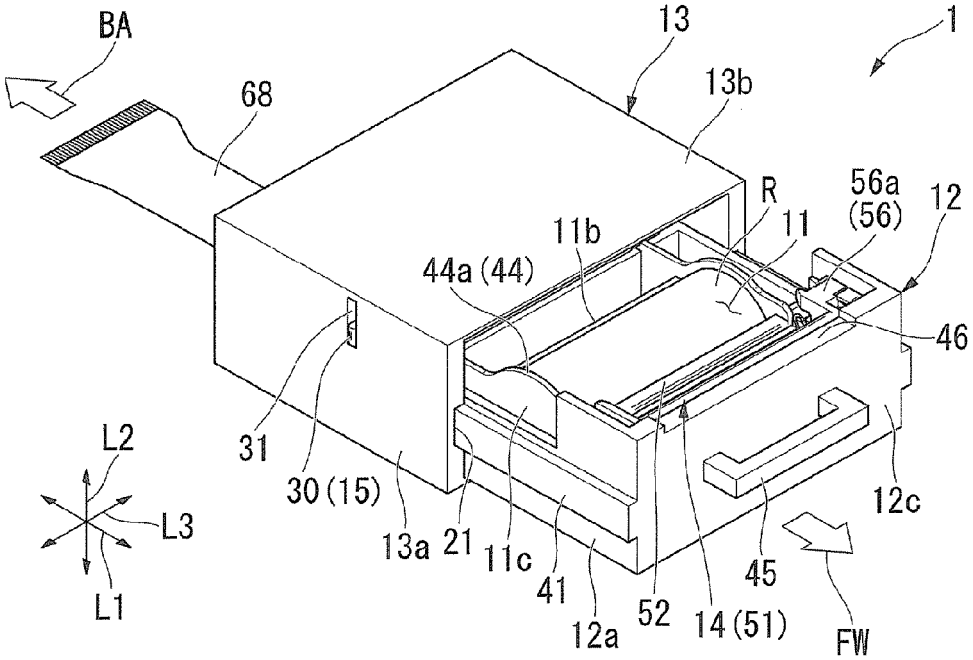

BA
68
13
1
13b
R
11
56a
(56)
12
11b
44a (44)
46
L2
L3
L1
31
30 (15)
13a
21
11c
41
12a
52
14 (51)
45
12c
FW

FIG.3

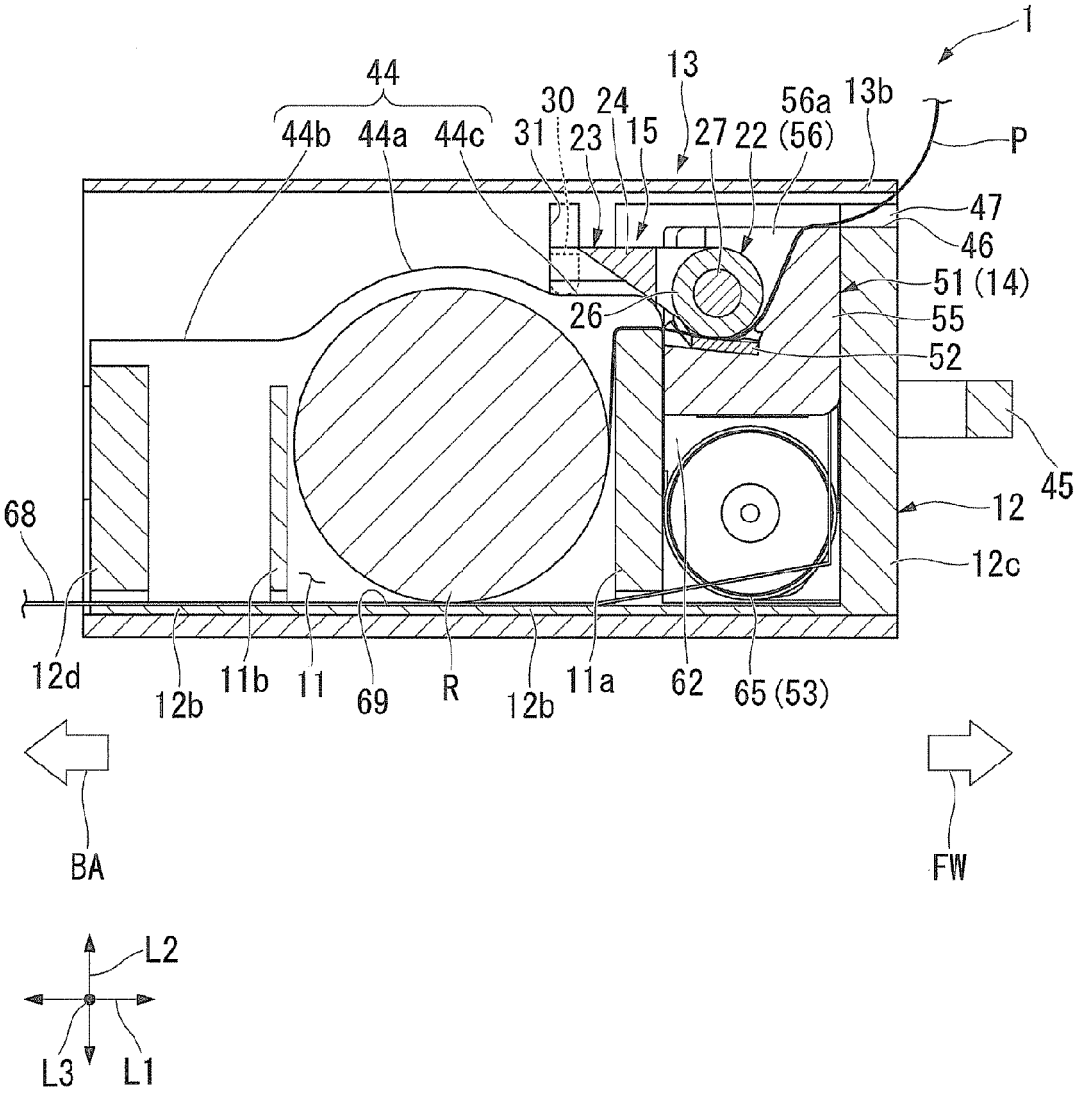

1
44
44b
44a
44c
30
31
24
23
15
13
27
22
56a
(56)
13b
P
47
46
51 (14)
55
52
26
45
12
12c
68
12d
12b
11b
11
69
R
12b
11a
62
65 (53)
BA
FW
L2
L3
L1

FIG.4

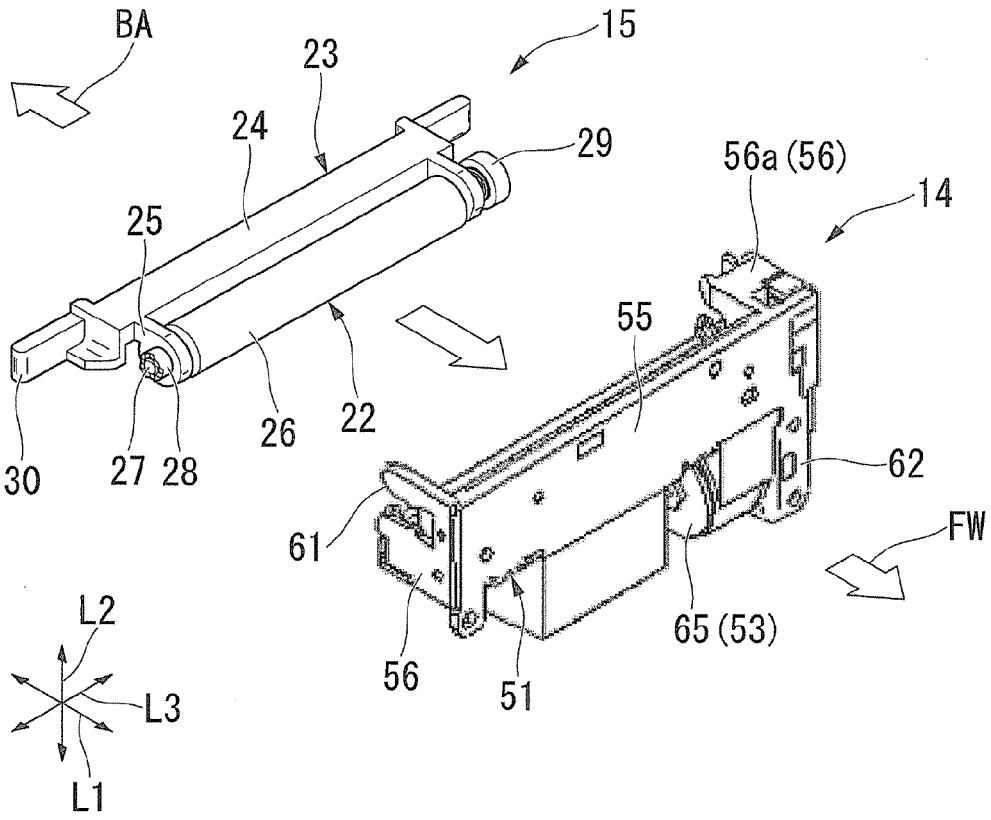

BA
15
23
24
29
56a (56)
14
25
55
62
FW
61
30
27
28
26
22
65 (53)
56
51
L2
L3
L1

FIG.5

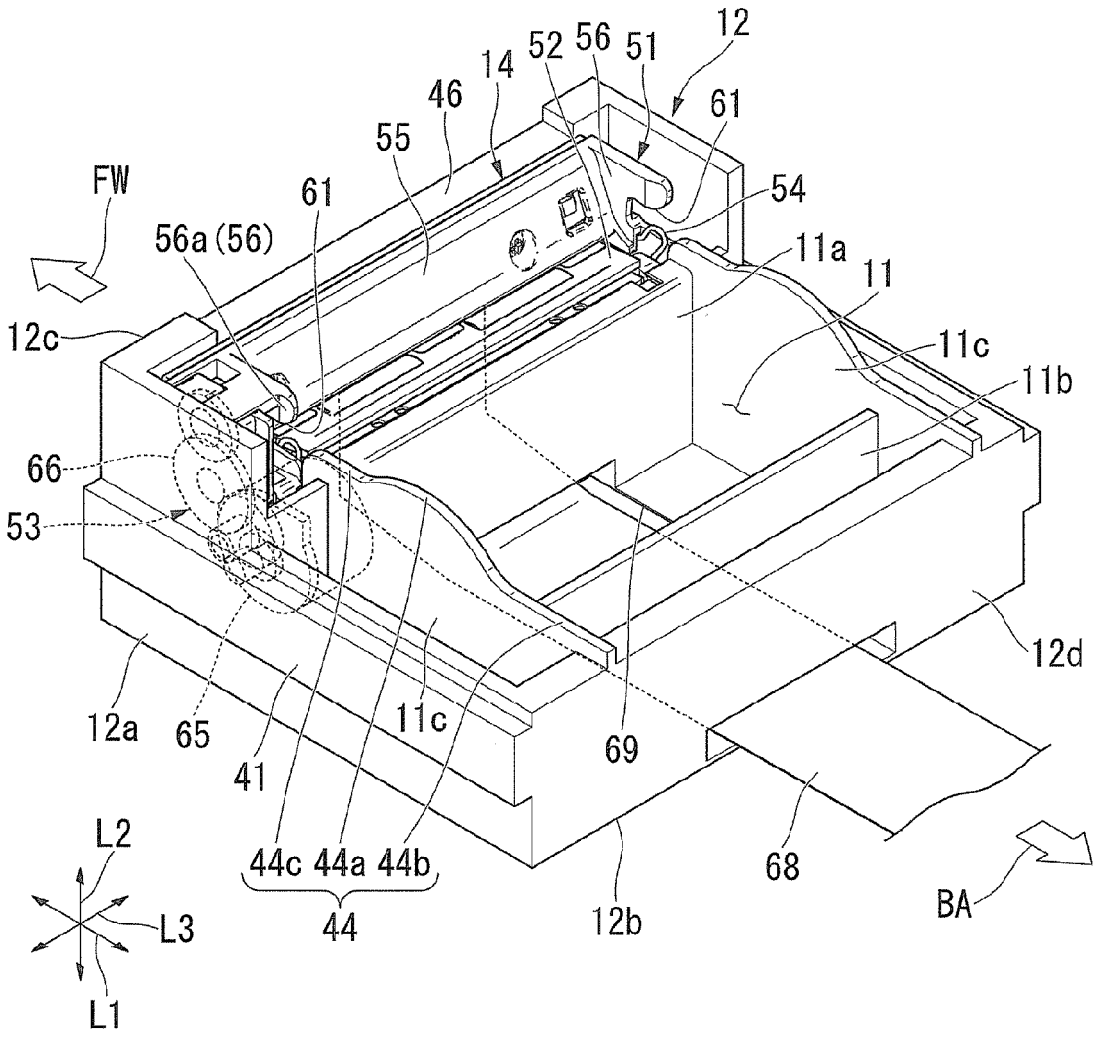

12
52
56
51
14
46
55
61
61
54
FW
56a (56)
11a
11
12c
11c
11b
66
53
12d
12a
65
41
11c
69
68
L2
44c 44a 44b
44
12b
BA
L3
L1

FIG.6

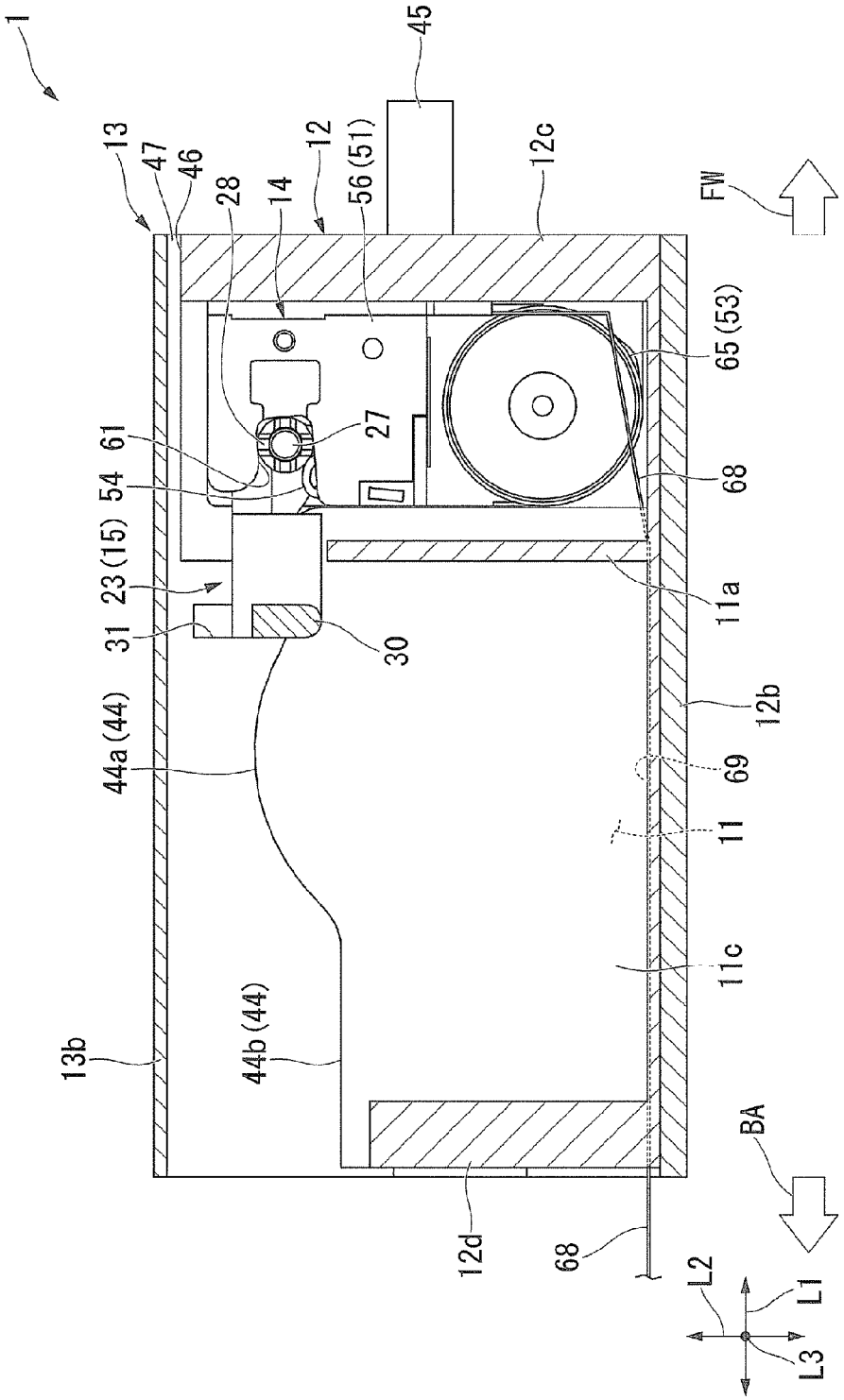

1
45
13
47
46
28
14
12
56 (51)
12c
FW
65 (53)
61
27
54
68
23 (15)
31
30
11a
12b
44a (44)
69
11
11c
13b
44b (44)
BA
12d
68
L2
L1
L3

FIG.7

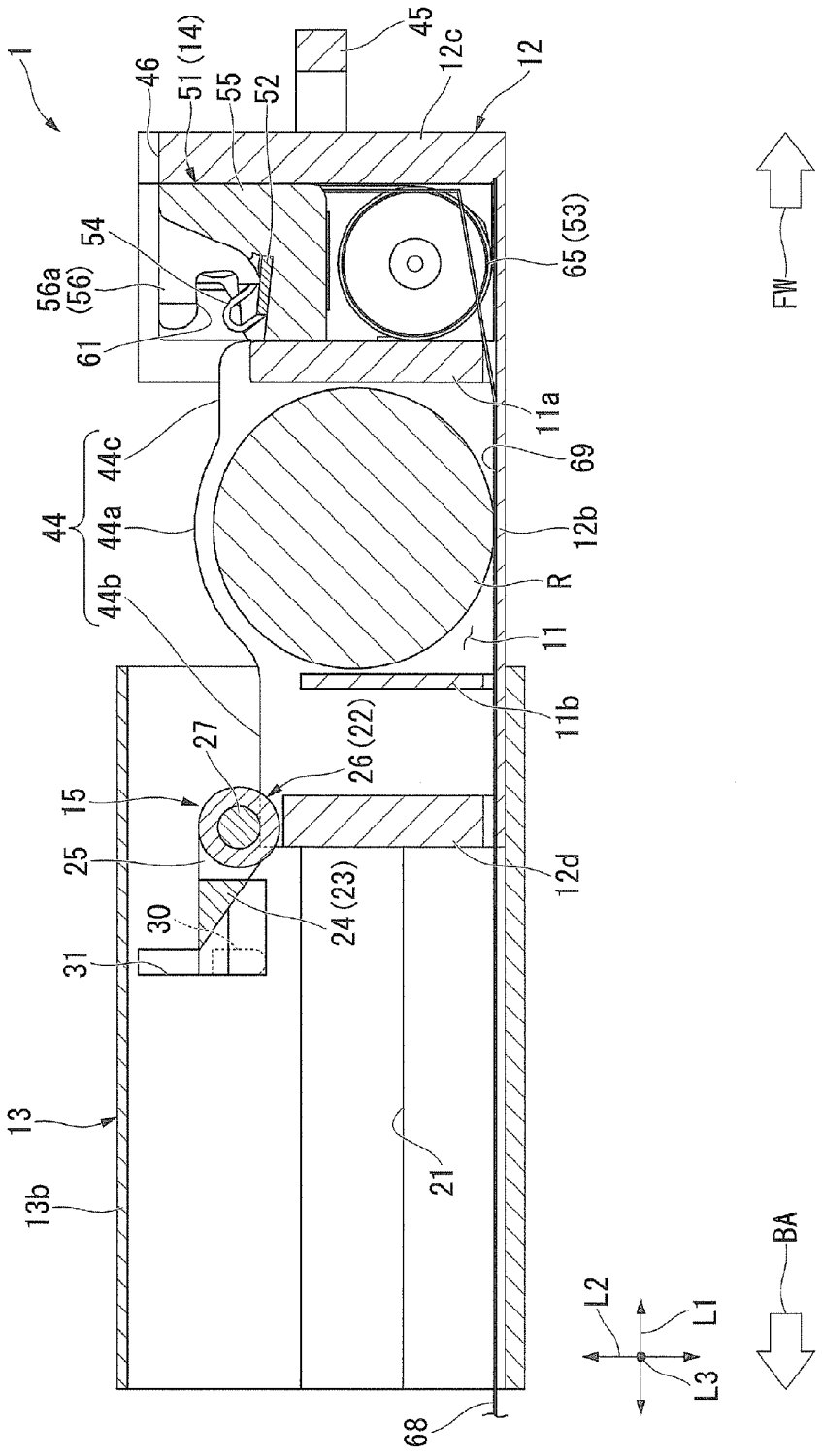
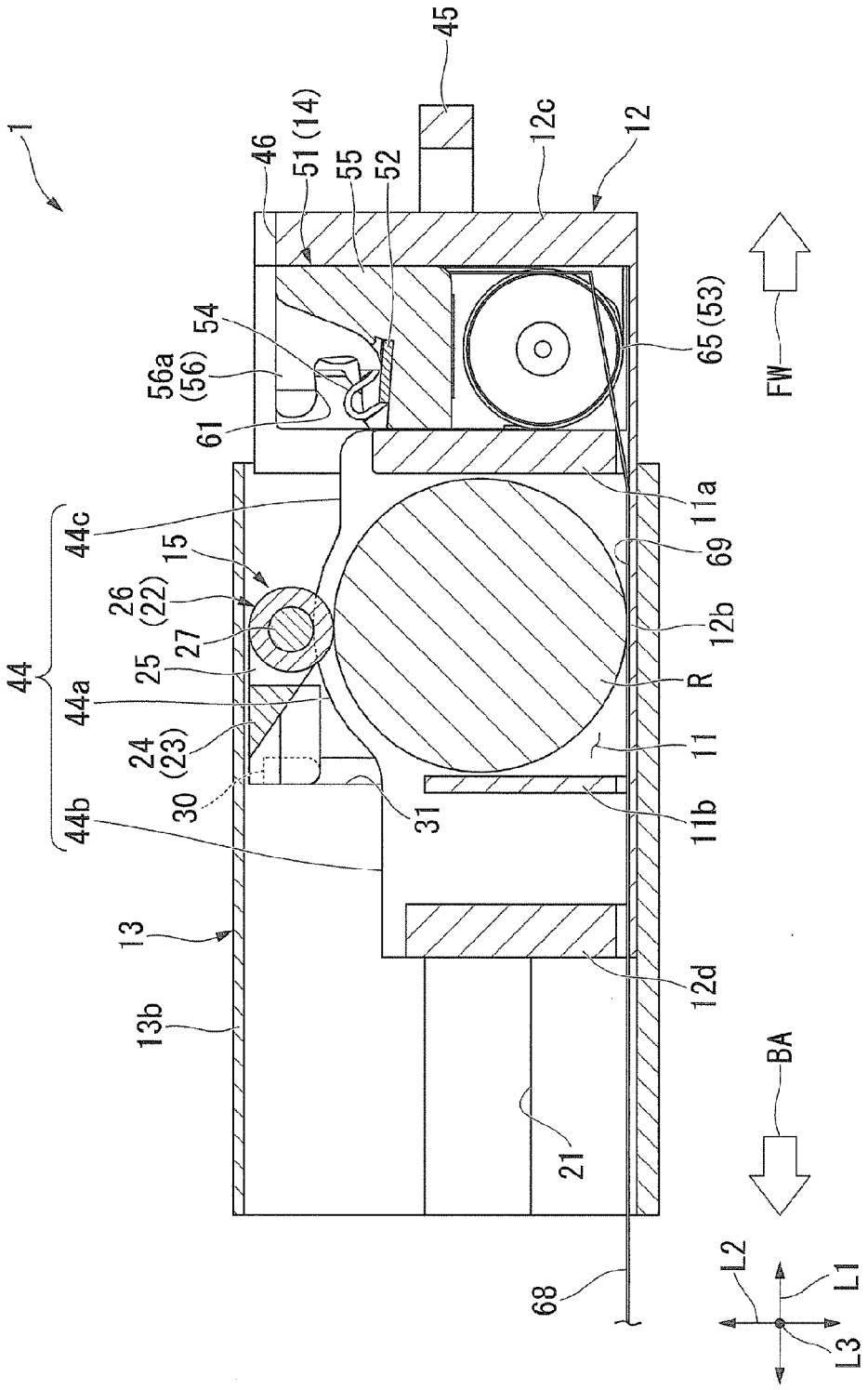

1
46
51 (14)
55
52
45
12c
12
54
56a
(56)
61
65 (53)
FW
11a
69
44c
44
44a
44b
12b
R
11
11b
27
26 (22)
15
25
30
31
24 (23)
12d
13
13b
21
68
L2
L1
L3
BA

FIG.8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45
46
51 (14)
55
52
12c
12
54
56a (56)
61
65 (53)
FW
44c
15
26 (22)
27
25
44
44a
24 (23)
30
31
44b
11a
69
12b
R
11
11b
13
13b
12d
21
BA
68
L2
L1
L3

FIG.9

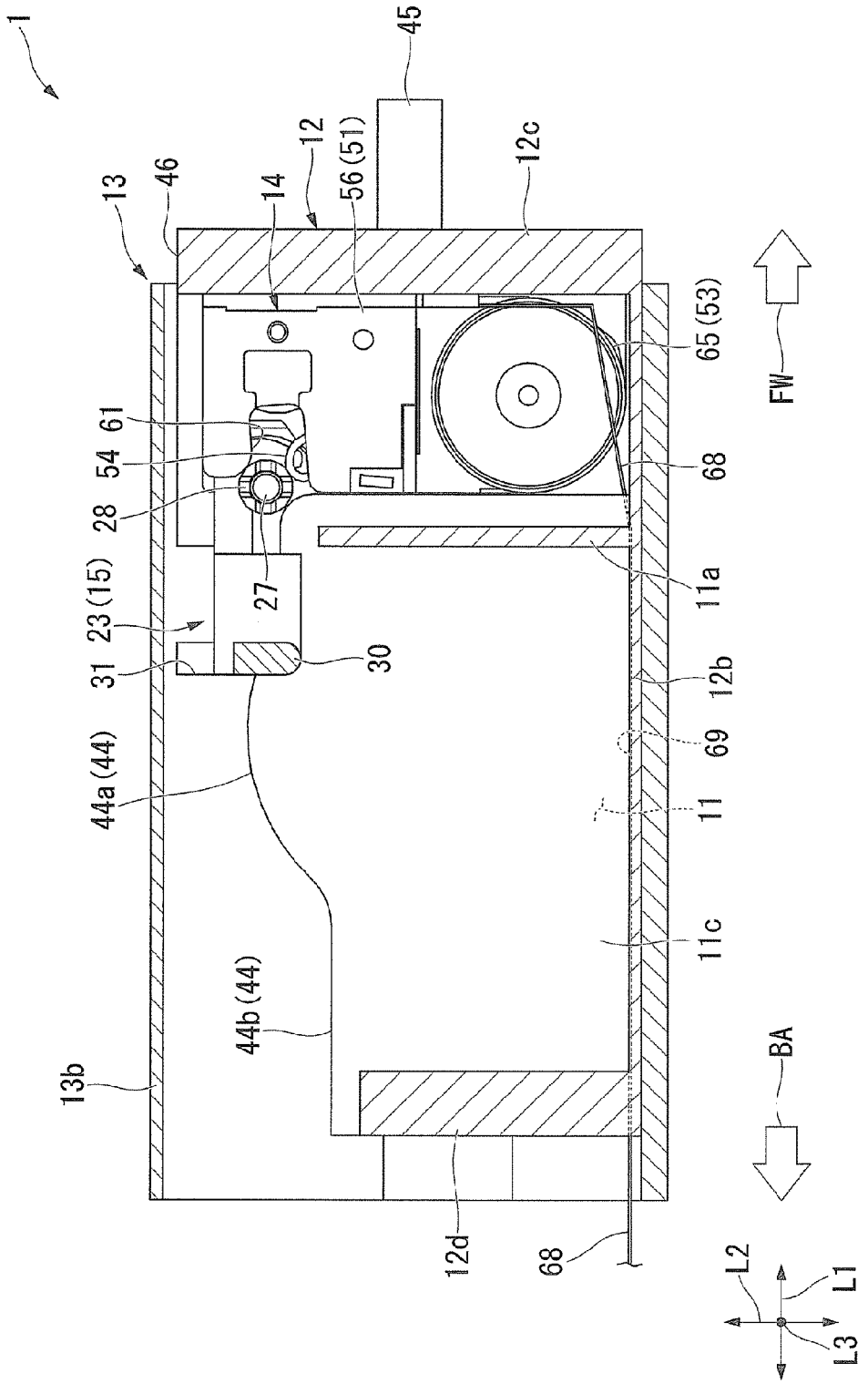
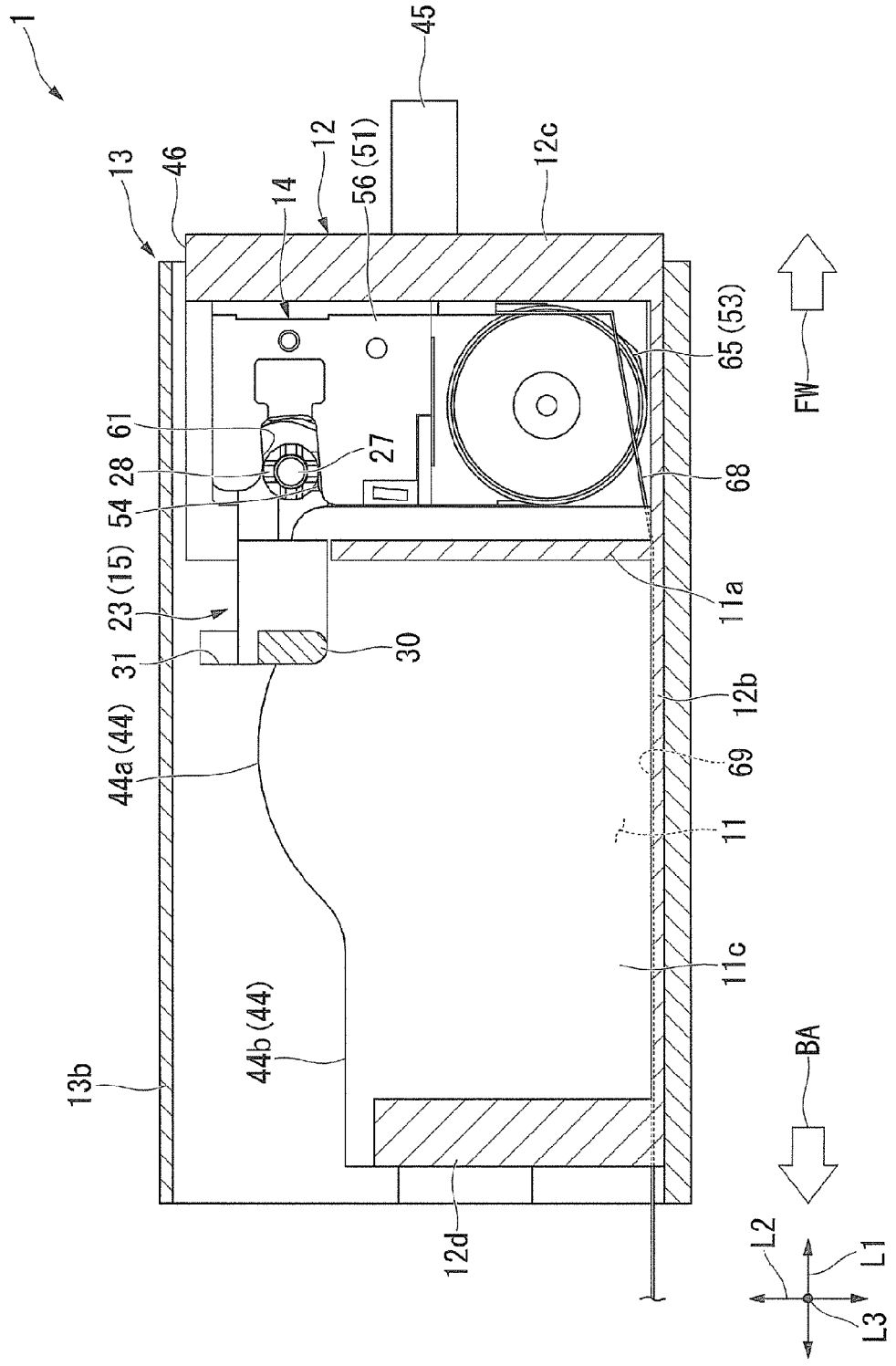

1
45
12
56 (51)
12c
13
46
14
65 (53)
FW
61
54
28
27
68
23 (15)
31
30
11a
12b
44a (44)
69
11
11c
44b (44)
13b
BA
12d
68
L2
L1
L3

FIG.10


1
45
13
46
14
12
56 (51)
12c
65 (53)
FW
61
27
28
54
68
23 (15)
11a
31
30
12b
44a (44)
69
11
11c
44b (44)
13b
BA
12d
L2
L1
L3

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EUROPEAN SEARCH REPORT

Application Number
EP 14 18 6702

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 918 222 A1 (MANNESMANN VDO AG [DE]) 26 May 1999 (1999-05-26) * paragraph [0009] - paragraph [0015]; figures 1-3 *	1	INV. B41J11/04 B41J11/14 B41J15/04
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B41J
G07C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21 January 2015	Van Oorschot, Hans

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