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(54) **Medium issue apparatus**

(57) A medium issue apparatus supplies a plurality of continuous medium on a single transport path for issuing the medium. In a medium issue apparatus, a first medium set section and a second medium set section are disposed in parallel. In order to lead the continuous

medium set in the second medium set section smoothly to the transport path of an issue unit disposed on or beneath the first medium set section, guide mechanisms are provided for guiding the continuous medium obliquely in a twisted manner, so as to lead to a medium insert section of the apparatus.

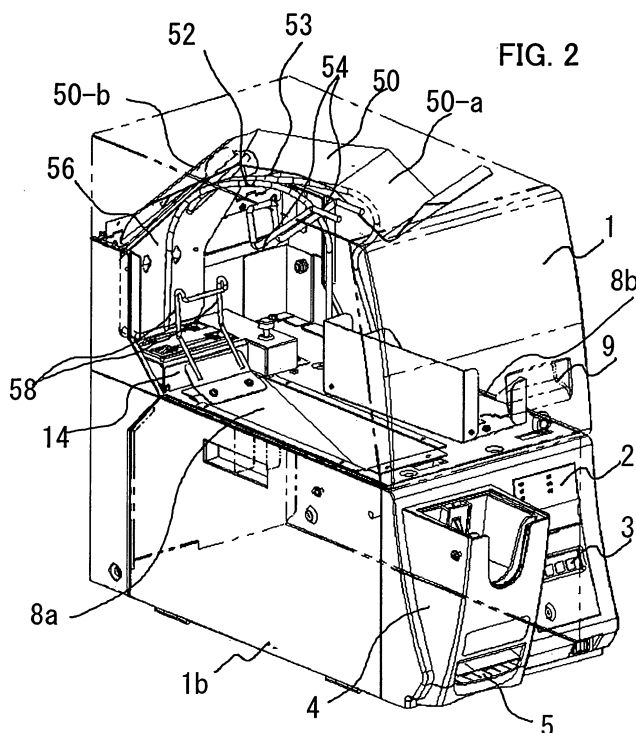


FIG. 2

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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is based upon and claims the benefit of priority from the prior Japanese Patent Application No. 2004-162286, filed on May 31, 2004, the entire contents of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

1.FIELD OF THE INVENTION

[0002] The present invention relates to a medium issue apparatus issuing the medium by cutting continuous medium, and performing record processing, etc. on the cut medium, and more particularly a medium issue apparatus suitable for issuing tickets having data recorded thereon, in case of issuing a large quantity of tickets or using a plurality of kinds of medium.

2. DESCRIPTION OF THE RELATED ART

[0003] As an automatic processing technique has been developed in recent years, an automatic issue apparatus is employed for issuing tickets including boarding passes, train tickets, and the like. In order to process the tickets automatically, recording machine-readable data in the form of magnetic data, etc. as well as printing out on the ticket is carried out.

[0004] Under such requirements, the automatic issue apparatus uses medium for the tickets having magnetic data areas, and issues the tickets after recording data (including boarding date, flight number, departure time, seat position, passenger name, etc. in an exemplary case of the boarding pass), as well as printing these data for visualization. In recent years, it has been required for the automatic issue apparatus to handle a plurality of kinds of tickets (for example, tickets of different airline companies).

[0005] FIGS. 14 and 15 are explanation diagrams of the conventional medium issue apparatus. FIG. 14 is a top view of the conventional medium issue apparatus, and FIG. 15 is a side view thereof. As shown in FIGS. 14 and 15, because the tickets for issue are equivalent to bank notes, continuous fanfold paper 100 is used as accommodated form, instead of cut sheets. In the figure, packing boxes 110, 112 for accommodating continuous fanfold paper 100 are shown. The continuous fanfold paper for the tickets to be issued is led into a medium inlet 130 of an automatic issue apparatus 122.

[0006] The automatic issue apparatus 122 is disposed, for example, on a table 120, and feeds the led medium and separates with a non-illustrated cutter. Thus the cut tickets are produced. Thereafter, a magnetic recording unit 124 records data magnetically on the cut tickets, and a printer 126 prints out data on the

tickets. The tickets are then forwarded to an outlet 128.

[0007] As such, in an apparatus which automatically issues tickets or the like including airline tickets, in case of issuing a large quantity of tickets, using a plurality of kinds of medium, medium contained in a plurality of packing boxes 110, 112 of the apparatus 122 are set in advance. These medium are placed in parallel with a medium inlet (transport path) 130 and in the upper position of the line extended therefrom. Namely, as shown in FIGS. 14 and 15, conventionally the medium are placed underneath the apparatus in parallel with the medium inlet (transport path) 130 and in the upper position of the extended line (for example, refer to Japanese Laid-open Patent No. 5-314333), or placed in the upper position of the apparatus in the similar way (for example, refer to Japanese Laid-open Patent No. 9-069172).

[0008] However, according to the conventional method in which a plurality of packing boxes for accommodating the medium are placed in series in either the lower or upper position of the apparatus, a sufficient length is needed in the depth direction of the apparatus (horizontal direction in FIG. 14). This causes the apparatus long in the depth direction, which requires a large installation area of the issue apparatus, and also a large space for the apparatus operation. Also, miniaturization of the apparatus itself is impeded.

SUMMARY OF THE INVENTION

[0009] Accordingly, it is an object of the present invention to provide a medium issue apparatus for preventing the apparatus operation space from being increased even when providing a plurality of medium packing sections.

[0010] It is another object of the present invention to provide a medium issue apparatus for miniaturizing the apparatus itself even when providing a plurality of medium packing sections.

[0011] It is still another object of the present invention to provide a medium issue apparatus preventing mutual interference between medium or deformation of the medium, even when providing a plurality of medium packing sections with a space-saving structure for the apparatus operation space.

[0012] In order to achieve the above-mentioned objects, according to the present invention, a medium issue apparatus feeds continuous medium from a medium set section, cuts the medium, and thereafter performs recording on the cut medium and issues the medium. The medium issue apparatus includes: a medium issue unit issuing the medium by cutting the continuous medium on a transport path injected from an inlet, performing recording on the cut medium; and a medium supply unit guiding the continuous medium from the medium set section to the inlet. The medium supply unit further includes: a first medium set section disposed in either the upper position or the lower position of the transport path of the medium issue unit; a second me-

dium set section disposed in parallel with one medium set section; and a guide mechanism guiding the continuous medium from the first medium set section to the inlet, and guiding the continuous medium from the second medium set section to the inlet obliquely in a twisted manner.

[0013] According to the present invention, because of disposing the continuous medium in parallel, it is possible to reduce the operation space. Further, with such parallel disposition, it is possible to lead the continuous medium set in the second set section smoothly to the transport path of the issue unit disposed in the upper or lower position of the first medium set section, since the guide mechanism is provided so as to guide the continuous medium to the medium inlet of the apparatus obliquely in a twisted manner.

[0014] According to the present invention, it is preferable that the guide mechanism includes a guide member guiding the continuous medium from the first medium set section to the inlet along one side, and also guiding the continuous medium from the second medium set section to the inlet along the other side obliquely in a twisted manner.

[0015] According to the present invention, it is preferable that the guide member includes a first guide member guiding the continuous medium from the first medium set section to the inlet along one side, and guiding the continuous medium from the second medium set section to the inlet along the other side; and a second guide member guiding the continuous medium from the second medium set section to the inlet along the other side obliquely in a twisted manner, in cooperation with the first guide member.

[0016] According to the present invention, it is preferable that the guide mechanism further includes a third guide member guiding the continuous medium on the other side of the second guide member, from the second medium set section to the inlet along the other side obliquely in a twisted manner, in cooperation with the second guide member.

[0017] According to the present invention, it is preferable that the guide mechanism further includes a fourth guide member regulating the path of the continuous medium in the vicinity of the inlet, in cooperation with the first guide member.

[0018] According to the present invention, it is preferable that the inlet includes a first inlet injecting the continuous medium from the first medium set section; and a second inlet injecting the continuous medium from the second medium set section. The fourth guide member includes a fifth guide member regulating the path of the continuous medium fed from the first medium set section in the vicinity of the first inlet, in cooperation with the first guide member, and a sixth guide member regulating the path of the continuous medium fed from the second medium set section in the vicinity of the first inlet, in cooperation with the first guide member.

[0019] According to the present invention, it is prefer-

able that the guide mechanism further includes a seventh guide member for guiding the returned continuous medium to the first medium set section, in cooperation with the first guide member.

[0020] According to the present invention, it is preferable that the guide mechanism further includes an eighth guide member for guiding the returned continuous medium to the second medium set section, in cooperation with the second guide member.

[0021] According to the present invention, it is preferable that the medium supply unit is disposed in the upper position of the medium issue unit.

[0022] According to the present invention, it is preferable that the first medium set section is so constituted as to set the continuous medium obliquely against the medium issue unit.

[0023] According to the present invention, it is preferable that the second medium set section is so constituted as to set the continuous medium in parallel to the medium issue unit.

[0024] According to the present invention, it is preferable that the first and second medium set sections accommodate continuous fanfold medium separable along perforation lines.

[0025] According to the present invention, it is preferable that the medium issue unit includes a feed mechanism having the inlet and a cutter, a recording mechanism recording on the cut medium, and an ejection mechanism ejecting the recorded medium, respectively disposed on the transport path.

[0026] According to the present invention, it is preferable that the feed mechanism includes a plurality of inlets, passages leading the continuous medium from the plurality of inlets to a common transport path, the cutter disposed on the common transport path, and a transport member feeding and holding the continuous medium on the passages.

[0027] Further scopes and features of the present invention will become more apparent by the following description of the embodiments with the accompanied drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028]

FIG. 1 shows an outer view of a medium issue apparatus according to one embodiment of the present invention.

FIG. 2 shows a perspective view of the medium issue apparatus shown in FIG. 1.

FIG. 3 shows a top view of the medium issue apparatus shown in FIG. 1.

FIG. 4 shows a side view of the medium issue apparatus shown in FIG. 1.

FIG. 5 shows a configuration diagram of an issue unit shown in FIG. 1.

FIG. 6 shows an explanation diagram of continuous

paper feed operation in the configuration shown in FIG. 5.

FIG. 7 shows an explanation diagram of transport operation to a write standby position in the configuration shown in FIG. 5.

FIG. 8 shows an explanation diagram of magnetic recording operation onto a ticket in the configuration shown in FIG. 5.

FIG. 9 shows a write verification operation of a ticket in the configuration shown in FIG. 5.

FIG. 10 shows a perspective view of a medium supply unit shown in FIG. 1.

FIG. 11 shows a perspective view of the medium issue apparatus shown in FIG. 1 when the cover is open.

FIG. 12 shows an explanation diagram of supply operation of a first medium, according to an embodiment of the present invention.

FIG. 13 shows an explanation diagram of supply operation of a second medium, according to an embodiment of the present invention.

FIG. 14 shows a top view according to the conventional art.

FIG. 15 shows a side view according to the conventional art.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0029] The preferred embodiment of the present invention is described hereinafter in order of a medium issue apparatus, a medium issue mechanism, a parallel medium disposition mechanism, and other embodiments. However, it is noted that the scope of the present invention is not limited to the embodiments described below, but instead embraces all equivalents to the claims described.

[Medium issue apparatus]

[0030] FIG. 1 shows an outer view of a medium issue apparatus according to one embodiment of the present invention. FIG. 2 shows a perspective view of the medium issue apparatus shown in FIG. 1. Also, FIG. 3 shows a top view of the medium issue apparatus shown in FIG. 1, and FIG. 4 shows a side view of the medium issue apparatus shown in FIG. 1.

[0031] As an example of the medium issue apparatus, FIG. 1 through FIG. 4 shows an automatic ticket issue machine for issuing airline tickets or baggage tickets. As shown in FIG. 1, an automatic ticket issue machine 1 is placed on a counter table, and includes an upper portion 1a accommodating packing boxes of fanfold continuous paper, and a lower portion 1b performing issue operation while transporting each medium on a medium transport path. The front face of the lower portion 1b of automatic ticket issue machine 1, is provided with an indicator group 2 displaying operation conditions, an input key

group 3 for operation, an ejection stacker 4, and a ticket inlet 5. Meanwhile, the upper portion 1a is provided with an open handle 9. By operating this open handle, the upper portion (cover) 1a can be opened upward with a hinge 1c functioning as rotating shaft.

[0032] As shown in FIGS. 2 and 3 illustrating the internal configuration diagram and the top view of the upper portion of the apparatus, FIGS. 6 and 7 described later, and FIG. 13, a packing box set sections 8a, 8b for setting packing boxes 10, 11 accommodating fanfold continuous paper 7a, 7b are provided in parallel with the front face of the apparatus. Namely, as shown in FIGS. 2 and 3, the set section 8a of a first packing box 10 is disposed in the upper position of the a medium transport path having a width W and extending to a medium ejection stacker 5 located in the lower portion (issue unit) 1b of the apparatus. Meanwhile, the set section 8b of a second packing box 11 is disposed on top of a portion on which indicator group 2, input key group 3 and a non-illustrated circuit unit of the upper portion 1b of the apparatus are provided.

[0033] Namely, in order to actualize medium installation effectively utilizing a dead space, instead of the conventional medium installation disposed in series, the medium 10, 11 are disposed in parallel, as shown in FIGS. 2 and 3, and thus saving of the operation space is achieved.

[0034] With such a parallel disposition, as shown in FIGS. 2 and 3, it is necessary to lead fanfold continuous paper 7b in the packing box 11 being set in the second set section 8b to the transport path of the issue unit provided in the lower position of the first set section 8a. As a leading method, it may be considered to add a mechanism for sliding medium (packing boxes) 10, 11 disposed in parallel, to the horizontal direction. However, adoption of such a configuration complicates the structure, increases the number of components, and causes an increased cost.

[0035] Therefore, though details will be described later, medium 7b are guided obliquely in a twisted manner, and led to a medium insertion section of the apparatus. For this purpose, guide mechanisms 50, 52, 53, 54, 56 and 58 are provided. With these guides 50 through 58, in particular, guide plates 50, 56, and guide rods 52, 53 guide the medium 7b, so as not to produce medium deformation or cutoff at the perforation lines which may possibly be caused by oblique supply of the medium 7b, or mutual interference between the medium disposed in parallel, or cutoff at the perforation lines, jam, skew on the injected medium, etc. caused by the mutual interference.

[0036] Moreover, in a case of transporting the medium once inserted to a return direction or in a case of holding the medium at the inlet for a long time, in order to take a measure for preventing deformation (such as curl) of the medium, guides 50, 52, 54, 56 and 58 are provided.

[0037] Namely, by disposing the medium in parallel, in which two medium packing boxes are disposed in par-

allel and in the upper position of the apparatus, and by feeding the medium obliquely, space saving at the time of operation is aimed. More specifically, one medium packing box 10 is disposed on the same line of the apparatus transport path as in the conventional method, while the other medium packing box 11 is disposed in parallel with the transport path and the medium packing box 10, and the medium are supplied by guiding the medium obliquely with tilt, and in a twisted manner, toward an inlet 14 of the apparatus.

[0038] Referring to FIG. 4, the whole of medium issue apparatus 1 is explained in the following. As shown in FIG. 4, medium packing boxes 10, 11 respectively accommodating the fanfold continuous paper are set in a pair of set sections 8a, 8b disposed in parallel. In this example, further the first set section 8a having a slope to an obliquely right direction is formed, and the medium packing box 10 is housed obliquely. This structure enables housing medium packing boxes 10 in two layers.

[0039] Fanfold continuous paper 7a, 7b of each medium packing box 10, 11 is led to a feed mechanism 14 provided in the automatic issue unit of the lower portion 1b of the apparatus.

[0040] The feed mechanism 14 feeds (injects) the fanfold continuous paper for the tickets to be issued, separates by a cutter 16, and produces cut tickets. Here, since tickets for issue are equivalent to bank notes, in order to prevent forgery, etc., a ticket management number may be recorded on each ticket serially connected with perforation lines.

[0041] While the ticket having been cut is transported back and forth by a ring transport mechanism 6, data are magnetically recorded by a single magnetic head 24. Thereafter, the data are read by the magnetic head 24 and collated. If the collation result is satisfactory, the ticket concerned is printed by a thermal transfer print head 18b via a transport roller 40, and then the ticket is ejected to ejection stacker 4 by ejection roller 44 via a non-illustrated gate. Meanwhile, if the magnetic data collation does not match, the ticket concerned is rejected by a non-illustrated gate with no printout, and the ticket is led and stored into a reject box 22 via a switchback roller 42.

[0042] The ring transport mechanism 6 is constituted of a cylinder-shaped ring 60 having no rotation fulcrum; and transport belts 62, 64 and 66 disposed in such a way as to surround the circumference of ring 60. Cylinder-shaped ring 60 is held by transport belts 62, 64, 66, and rotated by driving transport belts 62, 64, 66. With this, the medium sandwiched between this ring 60 and belts 62, 64, 66 are transported along the circumference (locus) of the ring 60, together with the ring 60.

[0043] At this time, in order to hold and rotate the ring 60 by the transport belts, it is necessary to balance the ring 60. For this purpose, a plurality of transport belts 62, 64, 66 are disposed uniformly along the circumference of the ring 60. By uniformly disposing three transport belts 62, 64, 66 as shown in FIG. 4, it becomes pos-

sible to balance the ring 60 in both horizontal and vertical directions, enabling stable hold and rotation of the ring 60.

[0044] These transport belts 62, 64, 66 are commonly used for driving the ring 60 (for medium transport) and for guiding the medium. Thus, the medium can securely be held and transported, similarly to the belt transport, and medium jamming can be prevented. As such, holding the medium by the belts 62, 64, 66 and the ring 60 enables stable transport of deformed medium. Further, because the guides are eliminated and a rotation fulcrum becomes unnecessary, it becomes possible to reduce the number of components and simplify the mechanism.

[0045] In FIG. 4, the medium having been injected and cut with the cutter 16 in the feed mechanism 14 are transported to the ring transport mechanism 6. The ring transport mechanism 6 sandwiches the medium between the ring 60 and the flat belts 62, 64, 66, and transports the medium by rotation, along with a circular orbit around the circumference of the ring 60. According to the rotation direction and the positions (settings) of gates 26, 36 at this time, the medium are transported from the ejection mechanism to a succeeding unit.

[Medium issue mechanism]

[0046] Next, a medium issue mechanism in the lower portion 1b of the apparatus will be described in detail. FIG. 5 shows a detailed configuration diagram of a medium issue mechanism in the configuration shown in FIG. 4. In FIG. 5, the same parts shown in FIG. 4 are referred to by the same symbols. Feed mechanism 14 is constituted of a pair of insertion guides (inlets) 30, 31, a pair of feed rollers 32, 33, a drive motor 34 for feed rollers 32, 33, and a cutter 16.

[0047] The ring transport mechanism 6 is constituted of a cylinder-shaped ring 60 having no rotation fulcrum, and transport belts 62, 64, 66 disposed in such a way as to surround the circumference of ring 60. A first transport belt 62 is constituted of a drive pulley 75, a pair of driven pulleys 76a, 76b, and a flat belt provided thereon. Similarly, a second belt 64 is constituted of a drive pulley 70, a pair of driven pulleys 71, 72, and a flat belt provided thereon. A third transport belt 66 is constituted of a drive pulley 73, a driven pulley 74, and a flat belt provided thereon.

[0048] Transport belts 62, 64, 66 are driven by a drive motor 90 disposed inside the cylinder-shaped ring 60. These transport belts 62, 64, 66 hold the cylinder-shaped ring 60. Further, driven by the transport belts 62, 64, 66 by means of the drive motor 90, the cylinder-shaped ring 60 is rotated. With this, the medium sandwiched between this ring 60 and belts 62, 64, 66 are transported along the circumference (locus) of the ring 60, together with the ring 60.

[0049] At this time, in order to hold and rotate the ring 60 by the transport belts, a plurality of transport belts

62, 64, 66 are disposed uniformly along the circumference of the ring 60, so that the ring 60 is balanced. Since each belt 62, 64, 66 has resiliency, by uniformly disposing three transport belts 62, 64, 66, it is possible to balance the ring 60 in both horizontal and vertical directions, and thereby, stable hold and rotation of the ring 60 can be attained.

[0050] These transport belts 62, 64, 66 are commonly used for driving the ring 60 (for medium transport) and guiding the medium. This enables secure hold and transport of the medium, similarly to the belt transport, and medium jamming can be prevented. As such, holding the medium by the belts 62, 64, 66 and the ring 60 enables transport of deformed medium in a stable manner. Further, because the guides are eliminated and a rotation fulcrum becomes unnecessary, it becomes possible to reduce the number of components and simplify the mechanism.

[0051] The print mechanism 18 is constituted of a thermal head (print head) 18b; a drive motor 18d for driving operation of the thermal head 18b in the vertical direction; a thermal transfer ribbon cassette 18a; and a drive motor 18c for the thermal transfer ribbon cassette 18a. Transport rollers 40 transport tickets from the ring mechanism 6 to the print mechanism 18. Ejection rollers 44 eject a ticket to be ejected to pocket-shaped ejection stacker 4. Transport rollers 40 and ejection rollers 44 are driven by a drive motor 46.

[0052] By means of a gate shown in FIG. 4, a switch-back roller 42 transports the ticket having been rejected once to the right, and then to the left, so that the ticket is accommodated into a reject box 22.

[0053] As shown in FIG. 5, the ring transport mechanism 6 includes a magnetic read/write section 24, thus constituting a common (basic) module. Also, a plurality of types (variations) of feed mechanisms 14 are provided so as to meet apparatus usages. Further, the feed mechanism 14 is coupled to the ring transport mechanism 6. With such a modular structure, reduced labor for developing the basic portion of the apparatus can be attained.

[0054] Namely, a gate mechanism is applied to a drum-shaped rotor transport mechanism. The switchover of the transport paths for transferring the medium from/to modules/units provided before and after the transport mechanism is automatically selected depending on the rotation direction of the drum. Also, a plurality of gates are provided, and change of the settings (fixed/movable) are performed. With the above structure, it becomes possible to cope with a variety of installation conditions in a flexible manner, even using an identical unit, by changing the direction of disposition of the unit, etc., for example, by changing the injection direction or the ejection direction of the medium depending on the installation conditions.

[0055] Next, referring to FIGS. 6 through 9, the operation of the medium issue apparatus including the ring transport mechanism will be described. In FIGS. 6

through 9, the same parts shown in FIGS. 4 and 5 are referred to by the same symbols.

[0056] As shown in FIG. 6, specified continuous fanfold paper 7b is fed to the ring transport mechanism 6 via the cutter 16 by the feed mechanism 14. Further, by clockwise rotation of the ring transport mechanism 6, the continuous paper 7a is transported until the tail end of a ticket reaches a cutting position, during which the magnetic head 24 reads the magnetic stripe (a page management number, etc. recorded thereon) of the continuous fanfold paper 7b. After being transported, the continuous paper 7b is cut by the cutter 16, and separated into a cut-form (ticket) T.

[0057] Next, as shown in FIG. 7, by clockwise rotation of the ring transport mechanism 6, the separated ticket T is transported until the top end of the ticket T reaches the vicinity of the magnetic head 24. This position is termed 'write standby' position. At this time, a portion of the continuous fanfold paper 7b having not been cut by the cutter 16 is drawn away from a common transport path (transport path having cutter 16) by the feed mechanism 14, so as not to impede feed of other continuous paper.

[0058] Further, as shown in FIG. 8, by clockwise rotation of the ring transport mechanism 6, the magnetic head 24 records data magnetically on the magnetic stripe of the separated ticket T. When the tail end of the ticket reaches the magnetic head 24 by the clockwise rotation of the ring transport mechanism 6, the transport is suspended.

[0059] Finally, as shown in FIG. 9, the ticket is transported by the counterclockwise rotation of the ring transport mechanism 6 during which the data having been magnetically recorded on the magnetic stripe of the ticket T are read. The top end portion of the ticket T is then led to the direction of the print head 18 by the non-illustrated gate. When the tail end of the ticket T is detached from the magnetic head 24, the transport is suspended, and so-called verification read, in which the read data are collated with the write data, is performed. This position is termed 'verification read completion' position.

[0060] Thereafter, as described earlier in FIG. 5, if the collation result is satisfactory, the ticket T is transported to the thermal transfer print head 18, printed by the head 18, and ejected to the ejection stacker 4 via the gate. On the other hand, if the collation of the magnetic data results in inconsistency, the ticket T is rejected by the gate without printout, and then accommodated into the reject box 22. In a similar way, the fanfold continuous paper 7a is fed, cut and issued.

[Parallel medium disposition mechanism]

[0061] Next, a parallel medium disposition mechanism of the upper portion 1a of the apparatus 1, illustrated in FIGS. 1 through 4, is explained hereafter. FIG. 10 is a perspective view of the medium supply apparatus 1 shown in FIG. 1. FIG. 11 is a perspective view of the

medium issue apparatus 1 shown in FIG. 1 when the cover 1a is open. These FIGS. 10, 11 show the inside of the upper portion 1a of the medium issue apparatus 1. FIG. 12 is an explanation diagram of guide operation of the fanfold continuous paper 7a set in the first set section. Also, FIG. 13 is an explanation diagram of guide operation of the fanfold continuous paper 7b set in the second set section.

[0062] The medium set in the packing box 10 of the first set section 8a is disposed in the upper position of the apparatus, so as to achieve reduction of an operation space for the apparatus. Accordingly, in the normal ticket issue operation, the medium (fanfold continuous paper) 7a are injected into inlet 30 of the apparatus, as shown in FIG. 6. At this time, the first sheet of medium 7a is separated along the perforation line, and the remainder portion is fed back from the cutter 16 to the inlet 30, and hold.

[0063] There may be a case that the retained medium 7a produce a sharp curl when the held medium 7a are injected and held in a movable space (inside the dotted line shown in FIG. 12) which varies depending on the number of medium sheets left in the packing box 10. To avoid this, a guide rod (a fifth guide) 58 for driving medium 7a having been injected to jump is disposed on the first set section 8a side and in the vicinity of inlet 30 of feed mechanism 14, as shown in FIGS. 11 and 12. This guide rod 58 also functions as regulating the path of medium 7a, in cooperation with a guide rod 52 explained in the following.

[0064] In order to avoid interference with medium 7b in the second set section 8b described later, guide rod (a first guide) 52 is disposed. With this guide rod 52, the medium 7a in the box 10 of the first set section 8a are guided to the inside of the guide rod 52 (refer to the arrow shown in FIG. 12), and the medium 7b in the second set section 8b are guided to the outside of the guide rod 52 (refer to the arrow shown in FIG. 13). Thus the interference is avoided.

[0065] For this purpose, this guide rod 52 is of circular arc shape, being disposed in such a way that one end is positioned between the inlets 30 and 31 of the feed mechanism 14, while the other end is positioned in the second set section 8b, as shown in FIGS. 10 through 13.

[0066] Further, in case that the medium 7a are initially set to the inlet 30, or a mechanical reset operation is performed while the medium 7a remain in a set state, the medium 7a are once injected and then brought to return to the original position. The guide rod 52 prevents this medium 7a (once being output from the packing box) from reaching a transport area of the medium 7b described later. Also, by restricting the space, this guide rod 52 plays a role of preventing the medium 7a from being folded or deformed in other places than the perforation lines.

[0067] Moreover, a guide (a seventh guide) 54 is provided in the upper position of the inlet of the box 10, so that the medium being in a freely movable state and

moving to a medium return direction are securely folded in this movable space (inside the dotted line shown in FIG. 12) and accommodated into the box 10. The guide 54 flaps down the medium 7a being in the state freely movable to the return direction, and thus the medium 7a are securely folded and accommodated into the box 10.

[0068] This movable space shown in FIG. 12 is an area surrounded by the guide rod 52 and the medium remaining in the box 10. Such guide 54 works effectively because when the number of the remainder sheets decreases, the area is increased correspondingly.

[0069] Now, since the medium 7b in the packing box 10 set in the second set section 8b are not disposed on the transport path line of the apparatus, the medium 7b must be guided obliquely so as to be supplied straightly to the inlet 31.

[0070] Because the fanfold continuous paper is continuous paper separable along the perforation lines, during normal ticket issue process, the fanfold paper may possibly be cut at a perforation line due to a concentrated stress caused by being twisted in an oblique direction at the perforation lines of the folded medium. To prevent this, the medium set section 8b is disposed obliquely in some degree against the inlet 31, so that the medium 7b are forwarded smoothly to the inlet 31 of the apparatus 1 (refer to the top view shown in FIG. 3).

[0071] With regard to this obliquity, it is effective to set the medium set section 8b with a small amount of obliquity, because if the obliquity is set large, a return amount at the inlet 31 side becomes large, causing possible cut-off at the perforation lines, though the stress to the continuous paper is reduced.

[0072] Further, in order to avoid the aforementioned interference with the medium 7a, a guide rod (a second guide) 53 is provided as well as guide rod 52. This guide rod 53 has an identical locus (circular arc) to the half way of the locus of the aforementioned guide rod 52. The medium 7b are led to the inlet 31 in such a manner as sliding on the guide rods 52, 53.

[0073] Next, in the case of initial setting of the medium 7b, or when the medium 7b are fed backward caused by the aforementioned mechanical reset operation, an obliquely curled guide plate 50-b (a third guide) is provided so that the medium 7b are returned toward the direction of the medium box 11. Further, with the provision of a guide plate 56 (a sixth guide) coupled with this guide plate 50-b, together with the aforementioned guide rods 52, 53, a structure of regulating the path width of the medium 7b is introduced. This prevents the medium 7b returning upward against gravity from being folded in the middle.

[0074] Further, by providing a guide plate 50-a (an eighth guide) coupled with the guide plate 50-b, the returning medium 7b are flapped down as shown in FIG. 13, and guided so that the medium 7b are folded at the perforation lines and aligned in the medium box 11. As shown in FIG. 13, together with this guide plate 50-a, a protrusion portion 53-1 (an eighth guide) is provided on

the guide rod 53, and thereby the medium 7b fed toward the inlet 31 are restricted. With this, it is devised so that the returning the medium 7b are folded more easily.

[0075] Namely, since the medium 7b are not disposed on the transport line of the apparatus, the guides 50 (50-b), 53 and 56 are provided on the inlet 31 of the transport path, so that the medium 7b are fed straight into the inlet 31 by guiding to an oblique direction. Further, between two inlets 30, 31 to one transport path and each packing box 10, 11, guides 52, 53 are provided to avoid interference between the medium 7a, 7b. Also, the guides 50-b, 56, 58 are provided at two inlets 30, 31, so as to regulate the path on which the medium 7a, 7b are injected or ejected substantially perpendicularly.

[0076] Moreover, the guide 54 (FIG. 12), guide 50-a, and the protrusion portion 53-1 on the guide 53 are provided so that the medium 7a, 7b are smoothly folded and accommodated into the packing box 2.

[0077] The guides 53, 50-b, 52 and 56 prevent medium deformation or cutoff at the perforation lines caused by obliquely supplying the medium 7b. Also, the guides 52, 53, 56 and 58 prevent mutual interference between the medium 7a, 7b, and prevent cutoff at the perforation lines, jam, and skew of the injected medium caused by the interference.

[0078] Also, as in the apparatus according to the embodiment of the present invention, the guides 52, 54, 58, 53, 53-1 and 50-a prevent medium deformation (curl) which may be produced when the medium once injected are transported in the return direction or when the medium are retained at the inlet for a long time.

[0079] Further, as shown in FIG. 12, by forming the first set section 8a obliquely, and setting packing box 10 obliquely, it becomes easier for the medium 7a in the packing box 10 to pass through inside the guide 52, and the packing box 10 accommodating a large quantity (for example, 1, 000 sheets) of fanfold continuous paper can be set without increasing the apparatus height.

[Other embodiments]

[0080] In the aforementioned embodiments of the present invention, the medium issue apparatus using magnetic recording and print recording has been described. However, it is also applicable to other apparatuses that use other record processing by use of optics, etc. Also, although the above description is exemplified by the airline ticket issue machine, the present invention is applicable for other cut-form tickets such as train ticket, boarding pass, luggage tag, etc. Further, the present invention is also applicable for apparatuses outputting tickets, or the like, other than the ticket issue apparatus.

[0081] Further, as to guide mechanisms 50 to 58, it may not be necessary to provide guide 54, guide 50-a, and/or protrusion portion 53-1 on guide 53 when no medium transport occurs in the return direction. Similarly, the fanfold continuous paper is not limited to paper, so far as continuous medium are used. The print mecha-

nism is not limited to the thermal transfer recording. Ink jet recording is also applicable.

[0082] According to the present invention, by disposing continuous medium in parallel, the operation space can be saved. Even when the medium are disposed in parallel, in order to lead continuous medium set in the second medium set section smoothly to the transport path of the issue unit disposed in the upper or lower position of the first medium set section, guide mechanisms are provided for guiding the continuous medium obliquely in a twisted manner, so as to lead the continuous medium to a medium injection section of the apparatus.

[0083] The present invention has been described according to the embodiments. However, it is not intended to exclude any variations thereof from the scope of the invention.

Claims

1. A medium issue apparatus which feeds continuous medium from a medium set section, cuts the medium, and thereafter performs recording on the cut medium, comprising:

a medium issue unit for cutting the continuous medium on a transport path inserted from an inlet and performing recording on the cut medium; and

a medium supply unit for guiding the continuous medium from a medium set section to the inlet,

said medium supply unit comprising:

a first medium set section disposed in at least one of the upper position and the lower position of the transport path of the medium issue unit; a second medium set section disposed in parallel with the first medium set section; and a guide mechanism for guiding the continuous medium from the first medium set section to the inlet, and guiding the continuous medium from the second medium set section to the inlet obliquely in a twisted manner.

2. The medium issue apparatus according to claim 1, wherein the guide mechanism comprises a guide member for guiding the continuous medium from the first medium set section to the inlet along one side of the guide member, and also guiding the continuous medium from the second medium set section to the inlet along the other side of the guide member obliquely in a twisted manner.

3. The medium issue apparatus according to claim 1, wherein the guide member comprises:

a first guide member for guiding the continuous

medium from the first medium set section to the inlet along one side of the first guide member, and guiding the continuous medium from the second medium set section to the inlet along the other side of the first guide member; and a second guide member for guiding the continuous medium from the second medium set section to the inlet along the other side obliquely in a twisted manner, in cooperation with the first guide member.

4. The medium issue apparatus according to claim 3, wherein the guide mechanism further comprises a third guide member provided on the other side of the second guide member and for guiding the continuous medium from the second medium set section to the inlet along the other side obliquely in a twisted manner, in cooperation with the second guide member.

5. The medium issue apparatus according to claim 3, wherein the guide mechanism further comprises a fourth guide member regulating the path of the continuous medium in the vicinity of the inlet, in cooperation with the first guide member.

6. The medium issue apparatus according to claim 5, wherein the inlet comprises:

a first inlet for inserting the continuous medium from the first medium set section; and
a second inlet for inserting the continuous medium from the second medium set section,

and wherein the fourth guide member comprises:

a fifth guide member for regulating the path of the continuous medium fed from the first medium set section in the vicinity of the first inlet, in cooperation with the first guide member; and
a sixth guide member for regulating the path of the continuous medium fed from the second medium set section in the vicinity of the first inlet, in cooperation with the first guide member.

7. The medium issue apparatus according to claim 3, wherein the guide mechanism further comprises a seventh guide member for guiding a returned continuous medium to the first medium set section, in cooperation with the first guide member.

8. The medium issue apparatus according to claim 3, wherein the guide mechanism further comprises an eighth guide member for guiding a returned continuous medium to the second medium set section, in cooperation with the second guide member.

9. The medium issue apparatus according to claim 1, wherein the medium supply unit is disposed in the upper position of the medium issue unit.

10. The medium issue apparatus according to claim 1, wherein the first medium set section is so constituted as to set the continuous medium obliquely against the medium issue unit.

11. The medium issue apparatus according to claim 1, wherein the second medium set section is so constituted as to set the continuous medium in parallel to the medium issue unit.

12. The medium issue apparatus according to claim 1, wherein the first and second medium set sections accommodate continuous fanfold medium separable along perforation lines.

13. The medium issue apparatus according to claim 1, wherein the second medium set section is so constituted as to set the continuous medium obliquely against the continuous medium of the first medium set section.

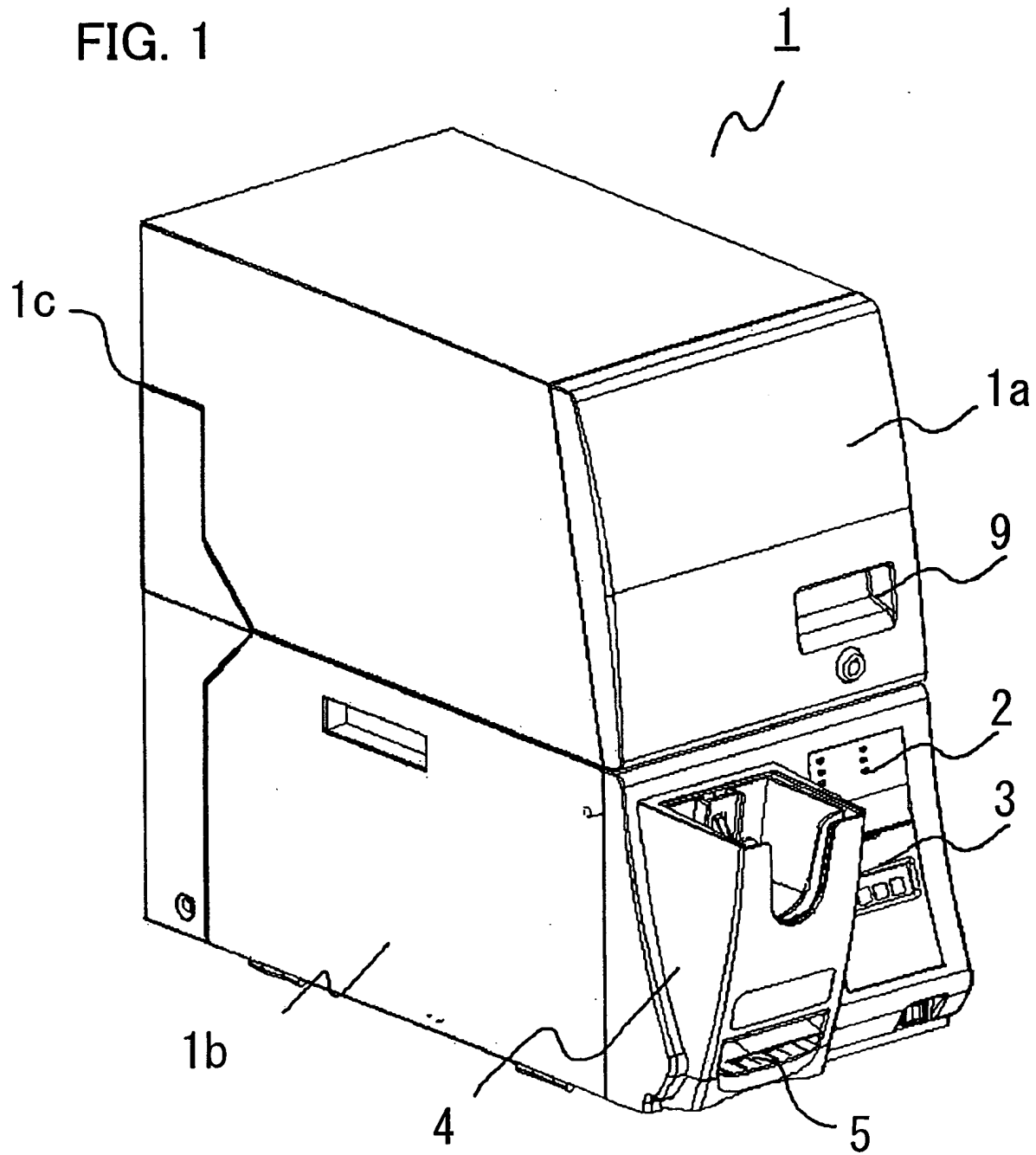
14. The medium issue apparatus according to claim 1, wherein the medium issue unit comprises:

a feed mechanism having the inlet and a cutter;
a recording mechanism for recording on the cut medium; and
an ejection mechanism ejecting the recorded medium.

15. The medium issue apparatus according to claim 14, wherein the feed mechanism comprises:

a plurality of inlets;
passages leading the continuous medium from the plurality of inlets to a common transport path;
the cutter disposed on the common transport path; and
a transport member for feeding and holding the continuous medium on the passages.

FIG. 1



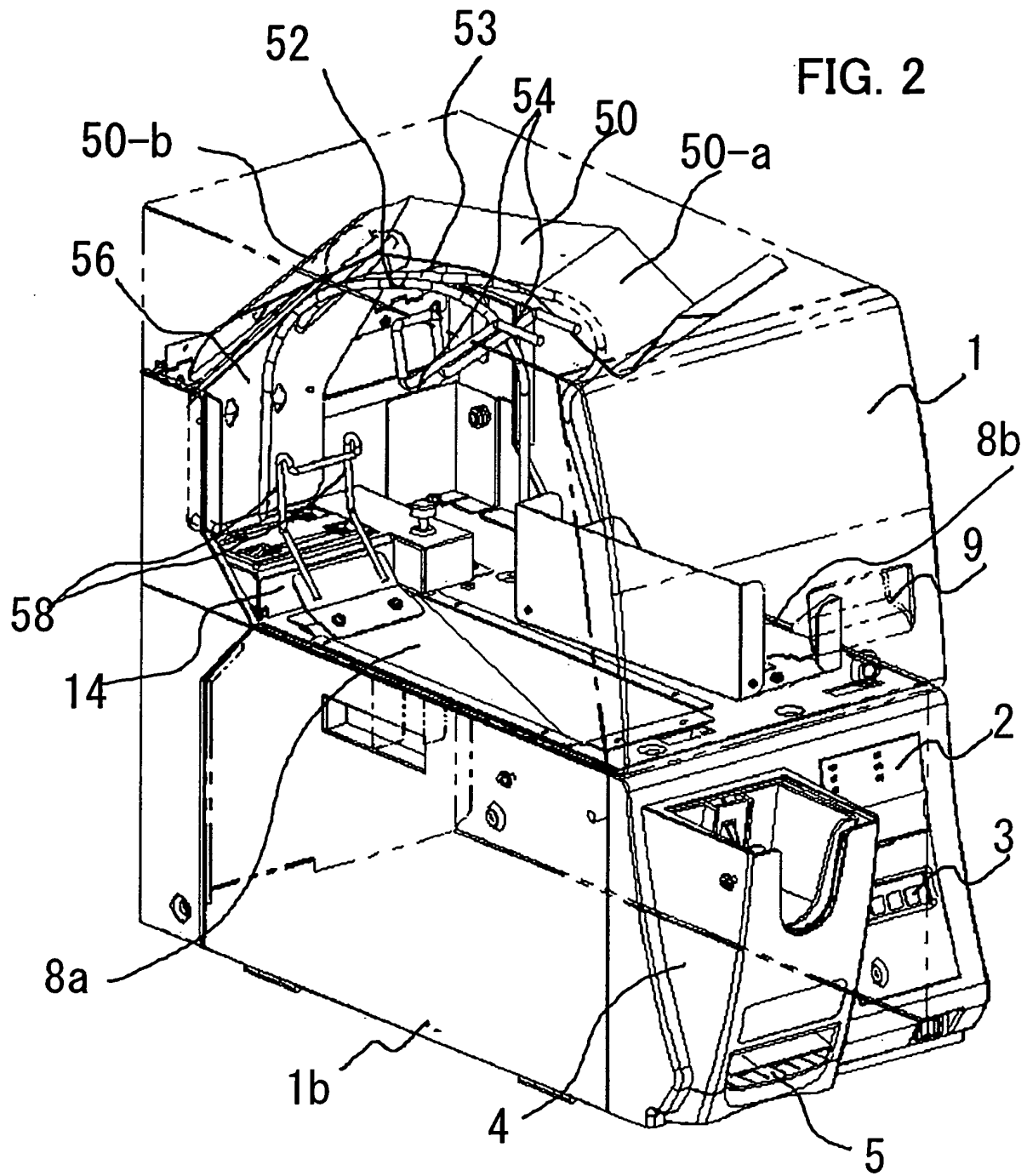
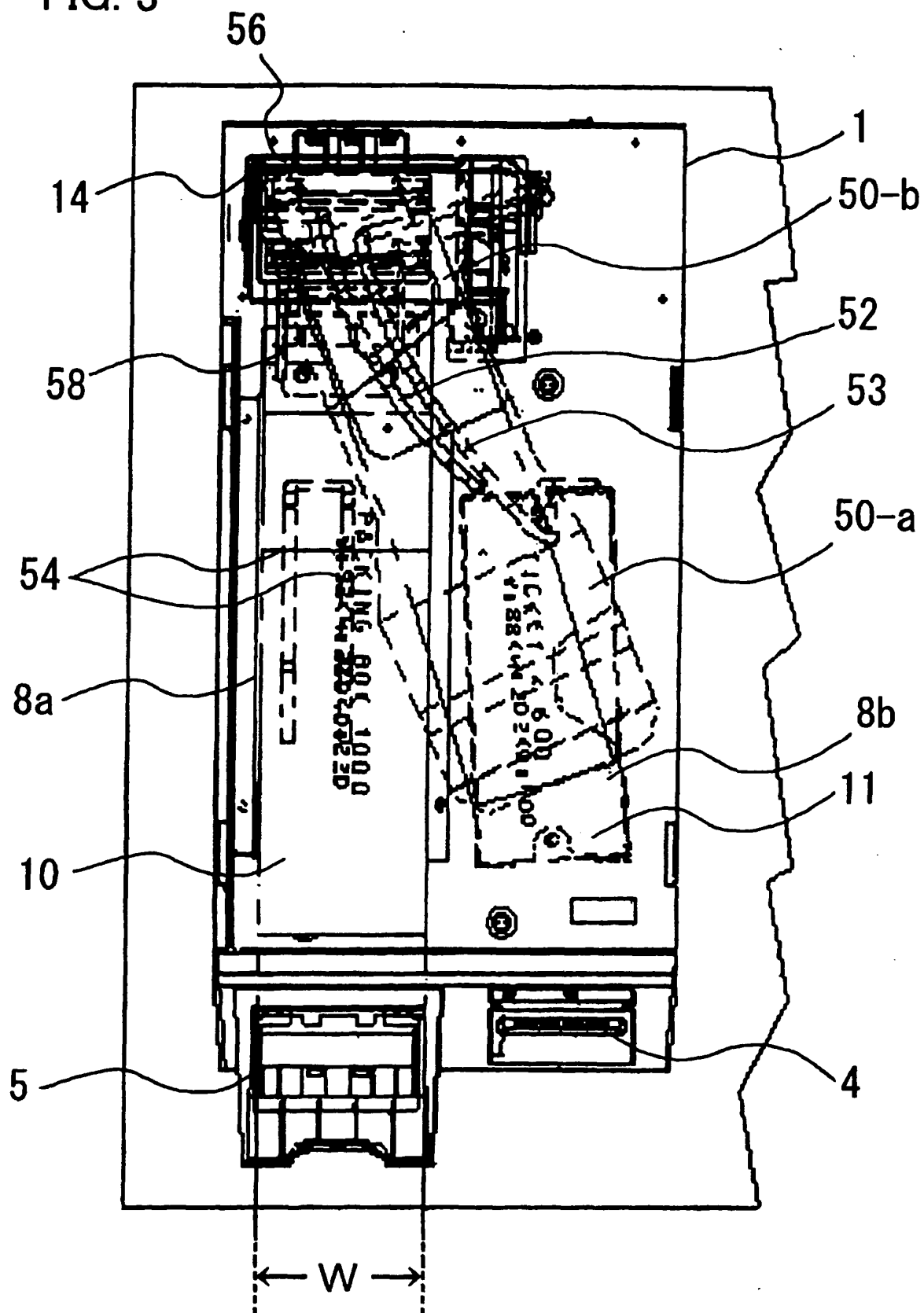
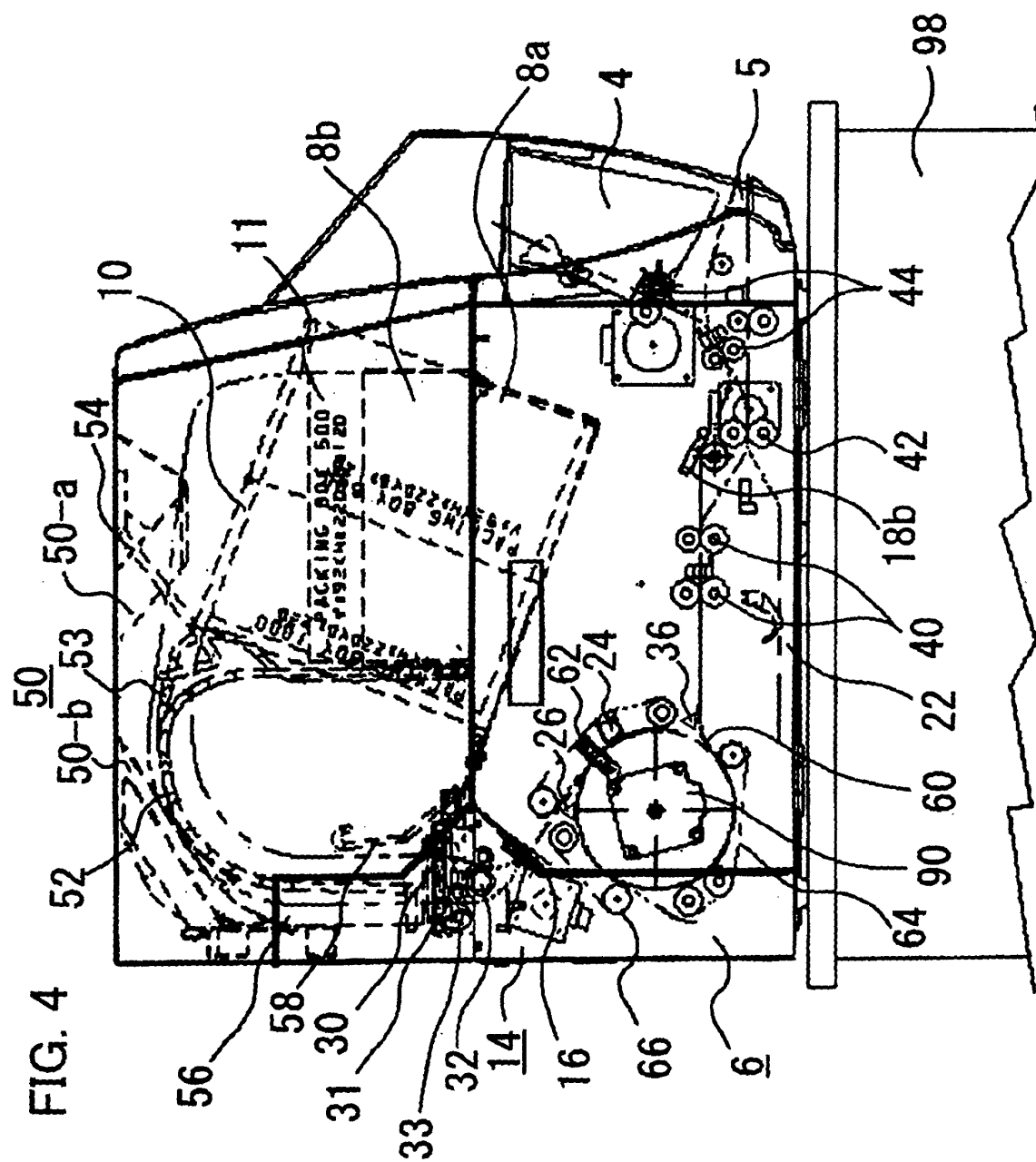
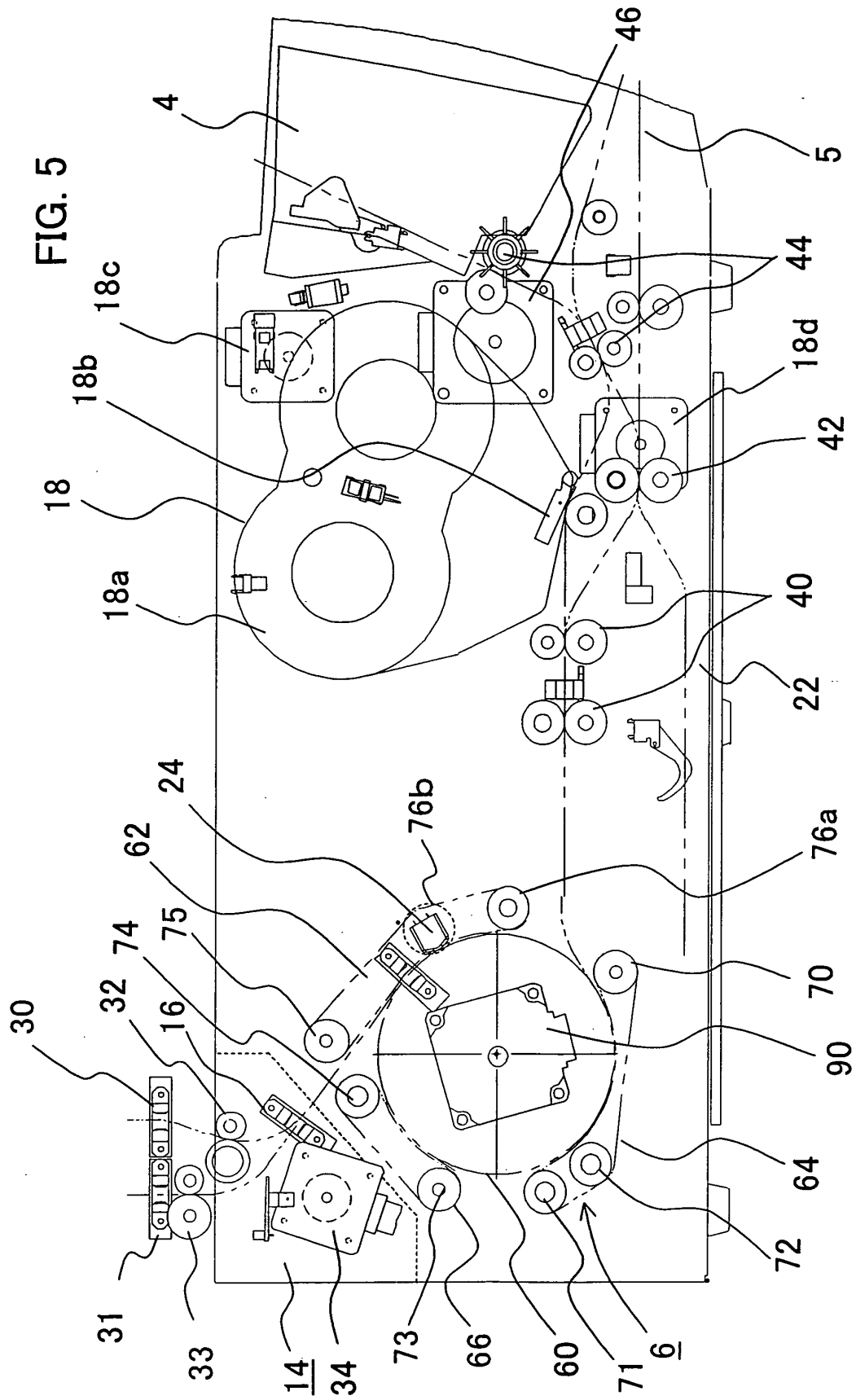


FIG. 3







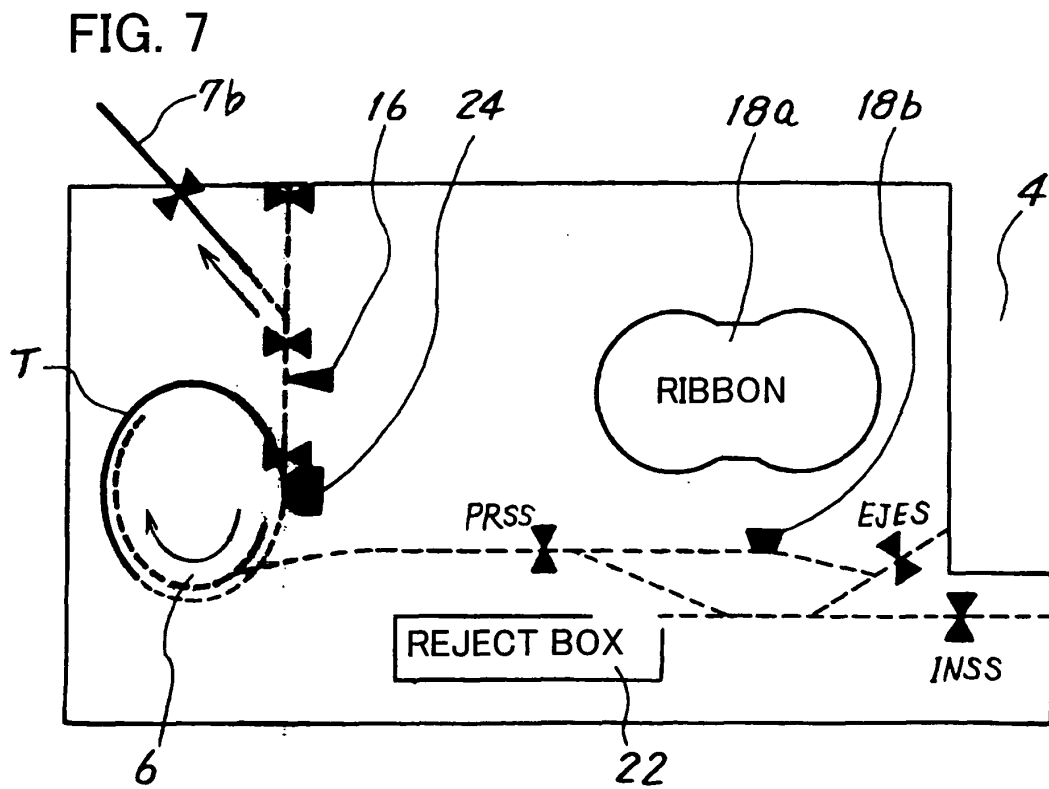
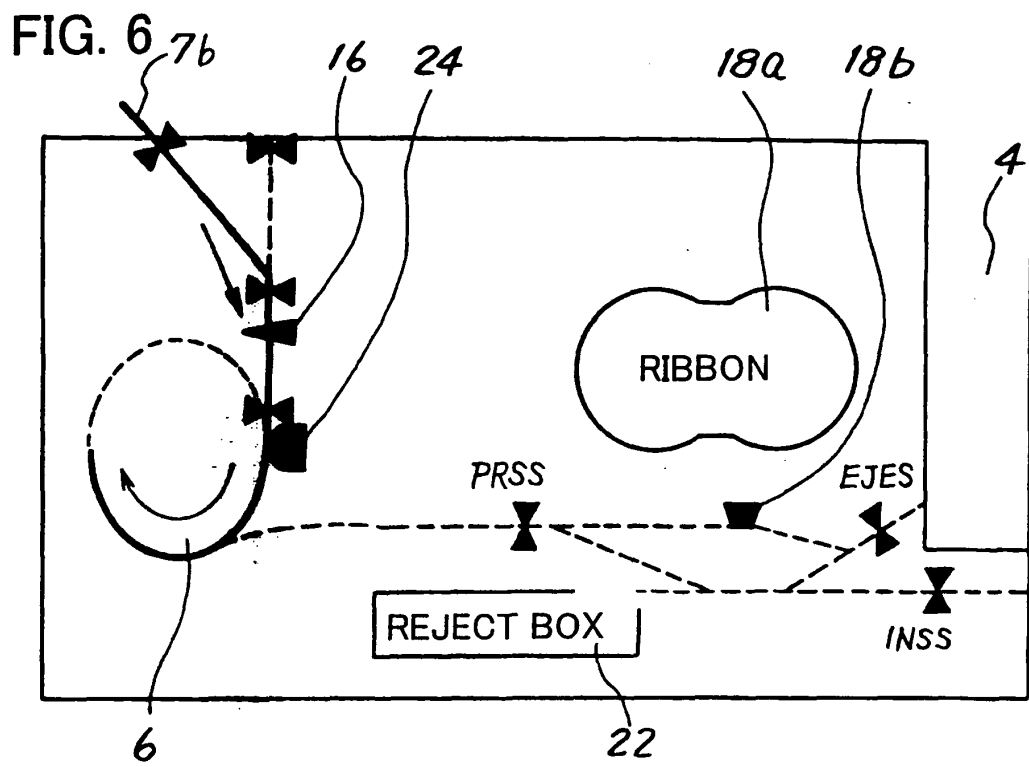


FIG. 8

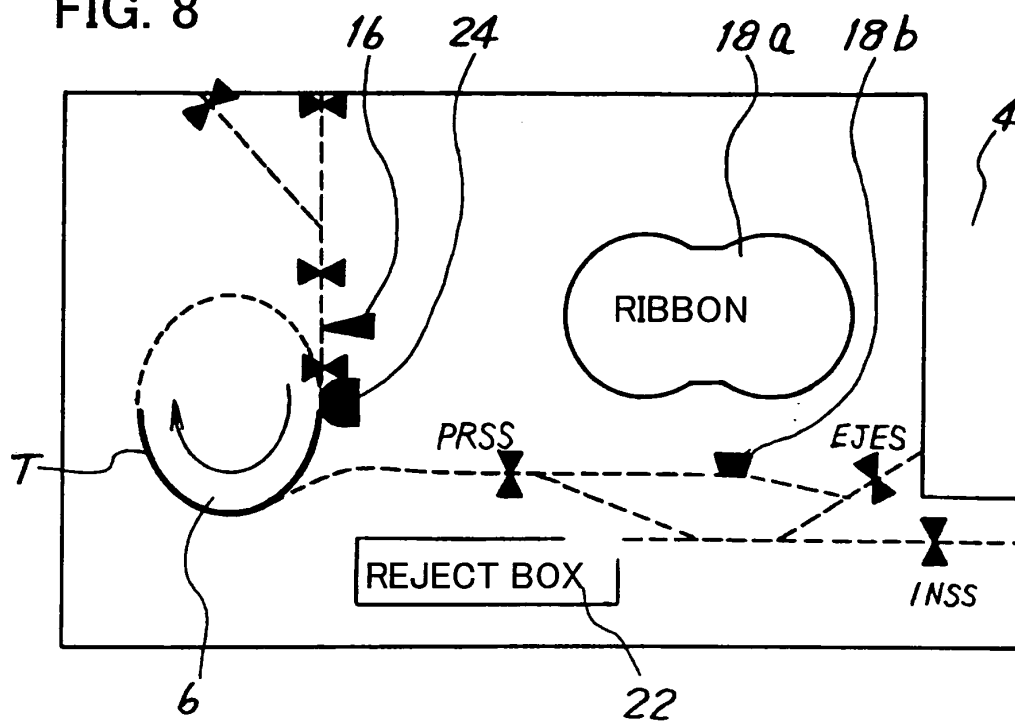


FIG. 9

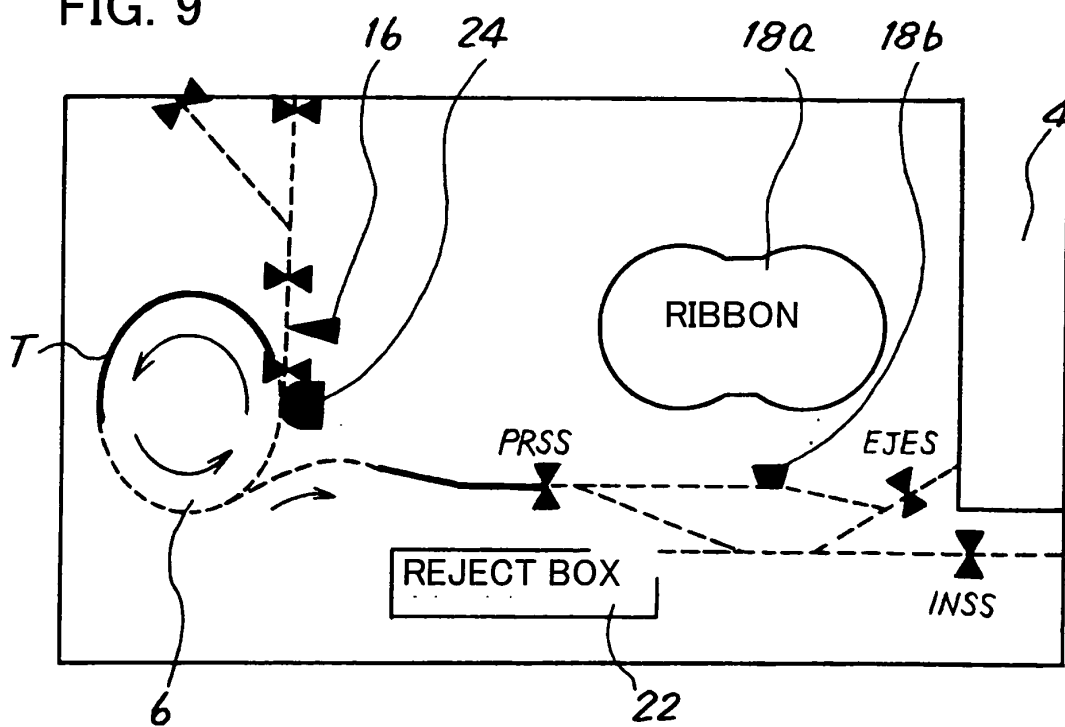


FIG. 10

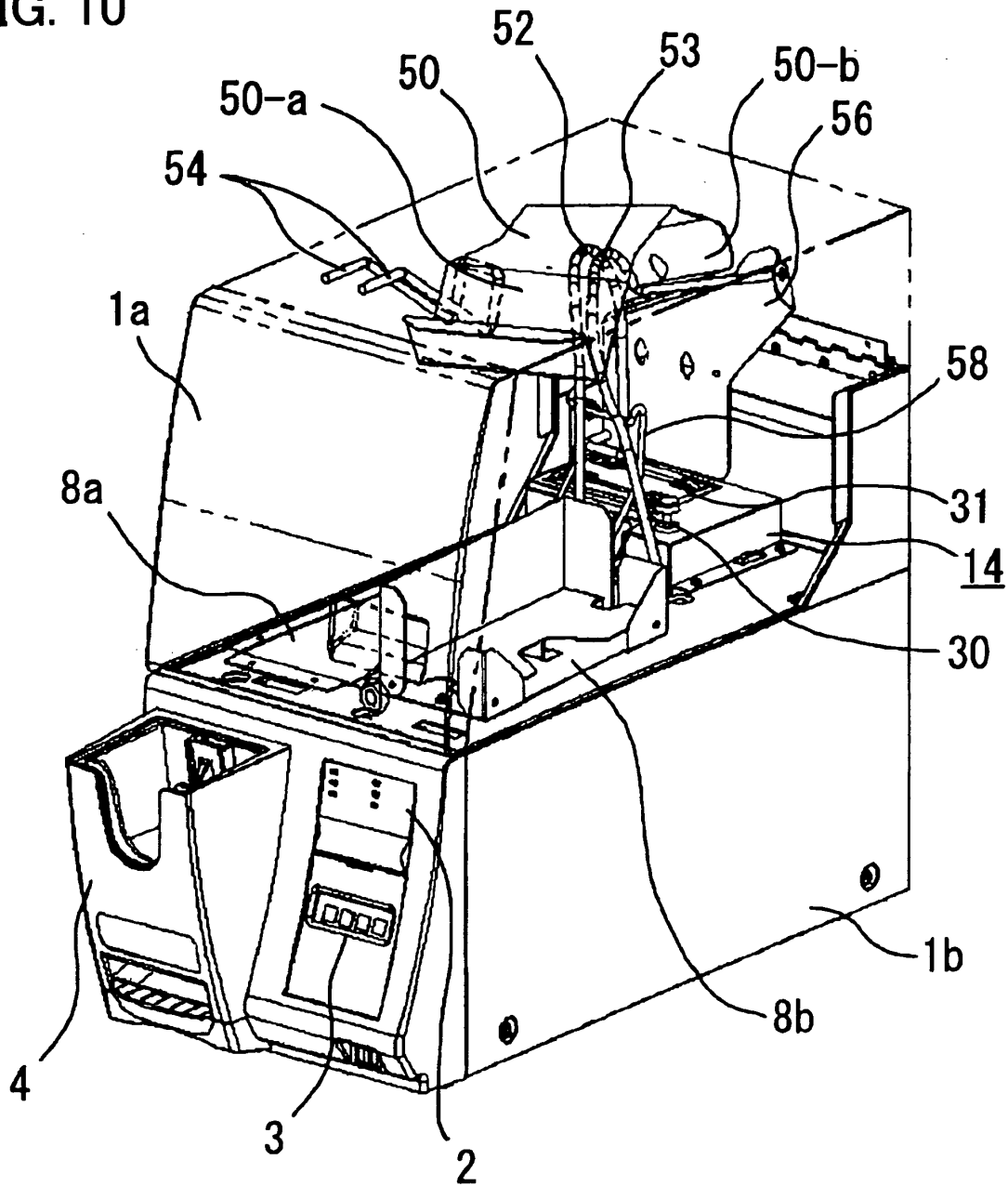


FIG. 11

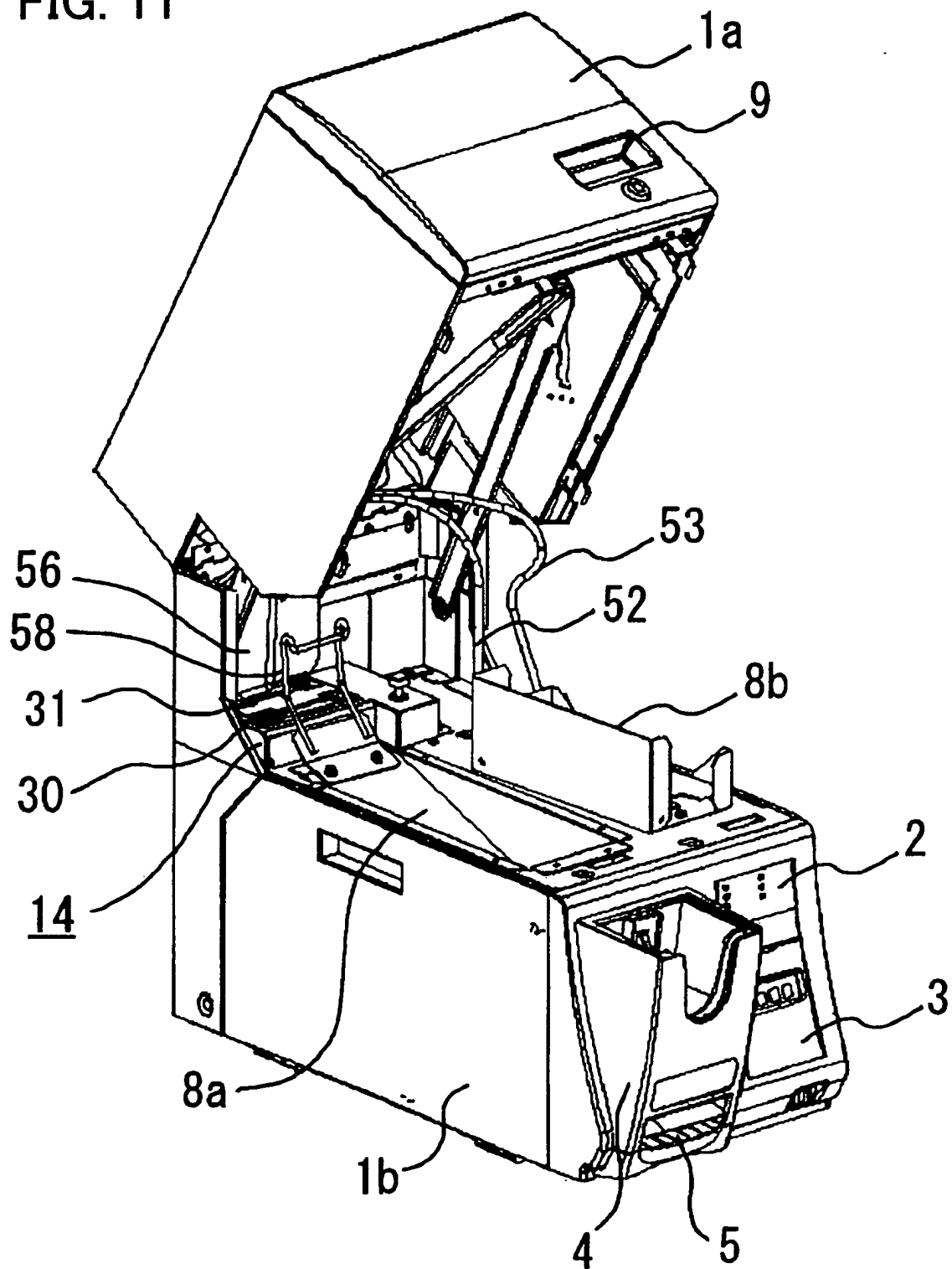


FIG. 12

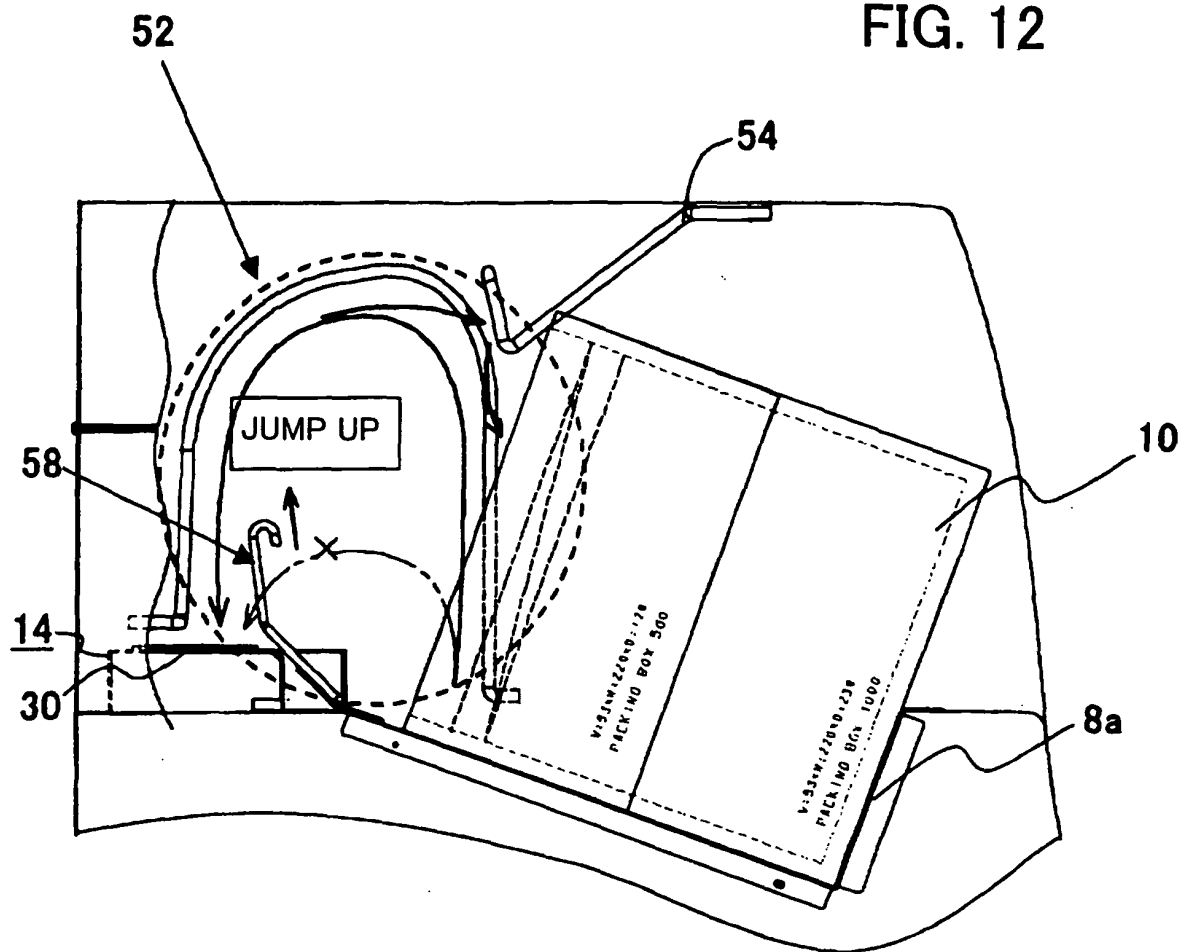


FIG. 13

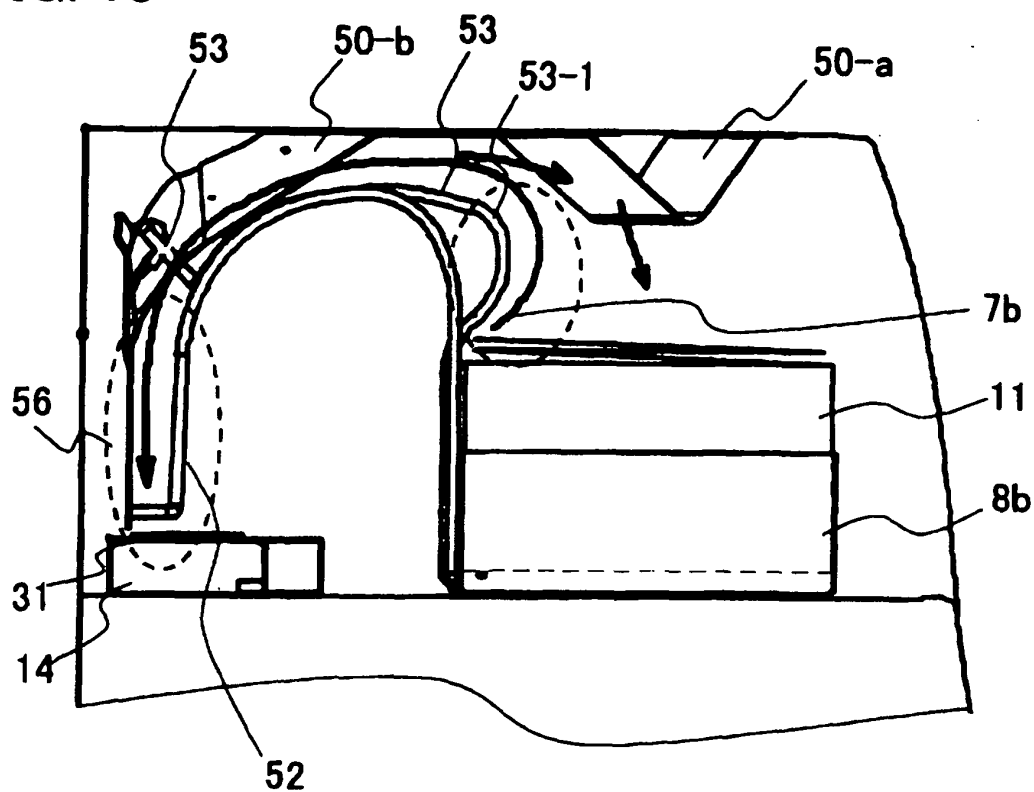
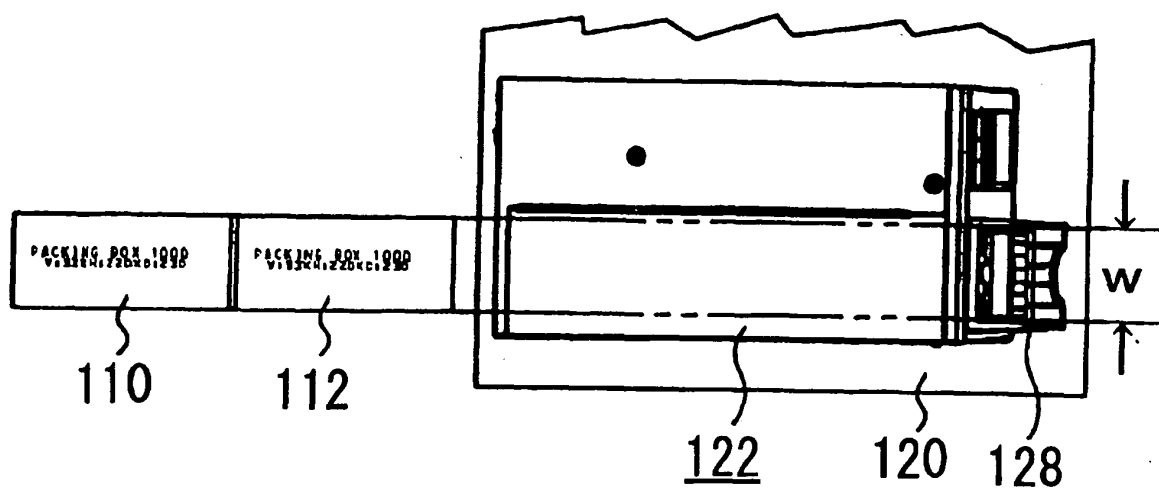
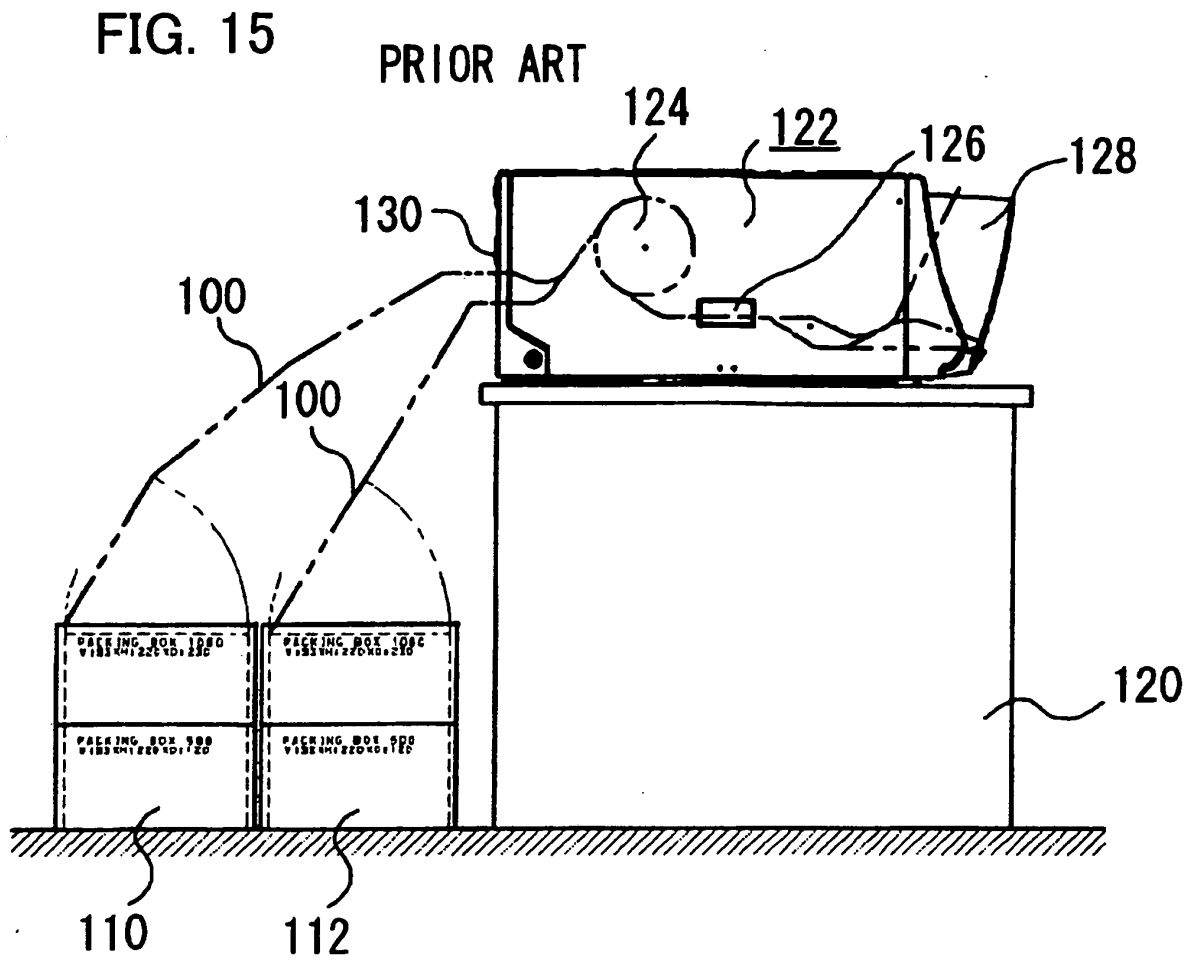


FIG. 14

PRIOR ART







European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 04 02 4936

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 26 August 2005	Examiner Paraf, E
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