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(54) **Label printer with a label peeling mechanism and a control method for the same**

Etikettendrucker mit Etikettenabziehmechanismus und Steuerverfahren dafür

Imprimante à étiquettes pourvue d'un mécanisme pour décoller les étiquettes et procédure de contrôle de celle-ci

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EP 1 619 035 B1

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Description

[0001] The present invention relates generally to a label printer for printing labels affixed to a web liner, and relates more particularly to a label printer having a label peeling mechanism for peeling labels from a web liner, and to a control method for this label printer.

[0002] Label printers are used for printing labels with such information as a product name, price, and product code (barcode) for application to products.

[0003] In the back room of a store, for example, the label printer is typically placed on a work table to print labels as the labels are affixed to the products. A label peeling mechanism (also referred to as "peeling mechanism" hereinafter) is preferably used to automatically peel the labels one by one from the web liner as the labels are printed. Label printers are also used to batch print multiple labels which are then taken to another location, such as the warehouse where the products are stored, for application to the individual products. Preferably, the same label printer can be selectively used either for former case using an automatic peeling mechanism, or in the latter case of batch label printing without use of the peeling mechanism.

[0004] A label printer with such a peeling mechanism is taught in JP-A-8-295323, for example. This label printer stores a roll of label paper having labels affixed at a constant interval to the surface of a continuous web liner in a storage compartment inside the printer. The leading end of the roll paper is fed between a print head and a platen roller so that the roll paper can be advanced and printed, and is then passed to the outside of the printer. The web liner (or simply web) is held between and conveyed by the drive platen roller and a driven peeling roller (pinch roller) that rotates following the platen roller.

[0005] This printer can be set to operate in a non-peeling mode (continuous or batch printing mode), in which the peeling mechanism is not used, or a peeling mode, in which the peeling mechanism is used. The non-peeling mode is set by passing the leading end of the roll paper (a web liner with the labels affixed) through the label discharge opening (label dispenser opening) of the peeling mechanism, and enables printing and outputting multiple labels intact on the web. The peeling mode is set by threading the leading end of the roll paper around a curved portion of the peeling mechanism before passing the end to the outside of the printer, thus enabling the peeling mechanism to peel and dispense the printed labels one by one from the web as the labels are printed.

[0006] Whether the peeling mechanism is used or not is selected by the operator opening a peeler cover, which is part of the peeling mechanism, and passing or not passing the leading end of the roll paper out through the label discharge opening.

[0007] This will be explained in more detail with reference to Fig. 12 illustrating the known peeling mechanism. To set the label paper 58 (roll paper having labels 60a, 60b affixed at a constant interval to a web liner 59) to use

the peeling mode as shown in Fig. 12A, a number of labels must first be peeled from the leading end of the label paper 58 so that only the web liner 59 is left. When the peeling mechanism is used, the web liner 59 is held and conveyed between the platen roller 50 and peeling roller 50a after the labels have been peeled. This is because the paper transport load is high around the web-bending guide 53 of the peeling mechanism, and if thick paper, such as label paper 58 having the labels intact on the web liner 59, is fed between the platen roller 50 and peeling roller 50a, the transportation load is even greater and feeding the label paper may not be possible. In addition, the labels tend to separate from the web and stick to the platen roller 50 or peeling roller 50a, and paper jams thus occur easily. As a result, a number of labels must be removed from the leading end of the label paper 58 and only the web liner 59 is fed between the platen roller 50 and peeling roller 50a.

[0008] The peeling mechanism has the web-bending guide 53 disposed in the transportation path and the label paper 58 is conveyed between the platen roller 50 and the thermal print head 51 in conjunction with a clockwise rotation of the platen roller 50. The label paper 58 is caused to curve through an acute angle along the web-bending guide 53 with the back (non-label) surface of the web facing the web-bending guide. When the label paper 58 passes over the web-bending guide 53 of this peeling mechanism, the first label 60a adhesively affixed to the front surface of the web liner 59 is unable to follow the transportation path of the web liner 59 and is thus disengaged from the web liner 59. The peeled label 60a is then discharged from the printer through a label discharge slot 55. The remaining web liner 59 follows a different transportation path, and the label 60a and web liner 59 are thus separated. This is shown in Fig. 12A.

[0009] When this peeling mechanism is used to peel labels 60a from the web liner 59 and dispense the labels 60a from the label discharge slot 55, the labels 60a are gradually peeled from the leading end thereof in the paper transport direction by routing the web liner 59 to which the labels 60a are affixed around the web-bending guide 53, and transporting the web liner 59 pauses at a position where a slight portion of the trailing end of the label 60a remains attached to the web liner 59. This is because the label 60a will fall out from the label discharge slot 55 if the label 60a is completely separated from the web liner 59. A peeled label detection sensor 56 can detect the peeled label 60a is in the label discharge slot 55.

[0010] When the label paper 58 passes the label detection sensor 57, the label detection sensor 57 detects the trailing end of the first label 60a and the leading end of the next label 60b, and the positions of the labels 60a, 60b are thus known. The label 60a can thus be stopped at the appropriate position. This operation results in the first label 60a being discharged without being printed.

[0011] The label printer then waits for the discharged label 60a to be removed from the web liner 59 as shown in Fig. 12B. The peeled-label detection sensor 56 detects

when the operator manually removes the label 60a, thus triggering the platen roller 50 to rotate counterclockwise as shown in Fig. 12C to reverse the label paper 58 and position the leading end of the next label 60b on the web liner 59 at the thermal print head 51 for printing. Note that the position shown in Fig. 12C is called the "label indexing position."

[0012] The label paper 58 is reversed because advancing the label paper 58 to where the operator can remove the discharged label (to the position shown in Fig. 12A, referred to as the "label peeling position") positions the leading end of the next label 60b beyond (that is, downstream of) the printing position of the thermal print head 51. If printing then proceeds from this position, the next label 60b will be printed from some middle part of the label. By reversing the label paper 58, however, printing can start from the leading end of the next label 60b ("label indexing position") when the print data is received.

[0013] Whether using the label printer in the peeling mode or using the label printer in the non-peeling mode, the label printer must be mechanically reinitialized (reset) when a new roll is loaded after the last label on a roll has been printed and the roll has ended. This involves positioning the leading end of the first label on the new roll to the printing position of the print head ("label indexing process") so that printing can start from the leading end of the label ("label indexing position").

[0014] More particularly, the paper transport mechanism is driven by a motor to advance the roll paper to the print head in this label indexing process. Because the label printer described above is a thermal printer, the roll paper is held between the print head and the platen roller, and the platen roller is rotated to convey the roll paper. The platen roller is disposed on the main cover side of the printer, and the print head is disposed inside the printer case.

[0015] To replace the roll paper the main cover is opened to release the platen roller from the print head, and the roll paper is passed between the platen roller and the print head. When the main cover is then closed, the roll paper is held between the platen roller and the print head, and the roll paper can be transported. The label indexing process must therefore be executed after confirming that the main cover of the label printer has been closed.

[0016] However, the label printer cannot automatically execute the label indexing process and start printing as soon as print data is received just because the main cover is detected to be in the closed position. This is because in a label printer with an on-board peeling mechanism the peeling mechanism must be opened after the main cover has been closed, the roll paper must be loaded to the transportation path used for the peeling mode or that for the non-peeling mode, as desired, and the peeling mechanism must then be closed to set the roll paper in the desired transportation path. Furthermore, because the operator loads the roll paper, the operator could close

the peeling mechanism with the paper accidentally loaded into the wrong transportation path. If the mechanical reset process and printing start with the roll paper loaded to the wrong transportation path, labels are wasted and paper jams or other problems can occur.

[0017] A problem with a label printer having a peeling mechanism as described above is thus that whether the label paper is loaded to the correct transportation path of the peeling mechanism must be confirmed, and the printer cannot be immediately and automatically mechanically reset only because the main cover and peeling mechanism cover are closed.

[0018] The label paper 58 used in a printer having a peeling mechanism has many labels 60a, 60b adhesively affixed to the surface of a continuous web liner 59. When new label paper 58 is loaded into the peeling mechanism of the printer, a number of labels must be manually removed from the leading end of the label paper 58 so that only the bare web liner 59 is passed around the web-bending guide 53. This is bothersome for the operator and wastes many labels.

[0019] Furthermore, if the leading portion of a label affixed to the web liner 59 is positioned at the distal curved portion of the web-bending guide 53 when the label paper is loaded, the leading end of that label disengages from the web liner 59 and exposes the adhesive surface of the label. This adhesive surface can then stick to an internal part of the label printer and interfere with loading the label paper.

[0020] An object of the present invention is to solve the foregoing problems and to provide a label printer having a peeling mechanism and a control method for the label printer, wherein it can be appropriately determined, whether the roll paper is loaded to the correct transportation path, when the mechanical initialization process is executed that is run when roll paper has been loaded. A further object of the present invention is to enable the label paper to be easily loaded and a label waste to be reduced.

[0021] These objects are achieved by a label printing apparatus as claimed in claim 1 and a method as claimed in claim 6. Preferred embodiments of the invention are subject-matter of the dependent claims.

[0022] The main cover detector thus detects when the main cover is closed after the operator has opened the main cover and set paper inside the label printer. The display unit of the label printer then starts to display to inform the operator that the paper must be loaded into the peeling mechanism. The operator then opens the peeling mechanism cover, sets the paper into a different transportation path depending on whether the peeling mechanism is to be used or not, and then closes the peeling mechanism cover. When the operator then operates the input unit, the label printer detects the input operation of the input unit and turns the display off, thus informing the operator that the paper has been set and enabling the control unit to run a mechanical initialization process to, for example, remove play (backlash) in the

gears of the transport mechanism. Note that the "label paper" need not really be "paper". Instead, the web liner and/or the labels may be of any material suitable for the respective purpose.

[0023] The operator can thus reliably set the paper into the paper transport path matching the printing purpose in this label printer having a peeling mechanism. The label printer has also completed the mechanical initialization process at this time, and can convey the paper by means of the paper transport mechanism for printing by the print head.

[0024] Furthermore, because the operator must specifically operate the input unit, the operator can also confirm that the paper has been correctly loaded and the label printer can reliably position the paper for printing. Problems such as the label printer running the mechanical initialization process and then immediately starting to print even though loading the paper to the peeling mechanism has not been completed can thus be prevented. An advantage of the present invention is thus that the label printer can dependably execute the mechanical initialization process and the reliability of the label printer can thus be improved.

[0025] Preferably, this label printing apparatus having a peeling mechanism also has a label detector for detecting the label position while the paper is conveyed. The control unit transports the paper to a position where an operator can remove the label while the label detector detects the position of the label in the mechanical initialization process.

[0026] When the paper is loaded and a label is located away from the print head and cannot be printed, the label paper can be advanced by the paper transport mechanism while the label detector detects the position of the label so that the operator can then remove the label. The number of labels that are wasted when loading the label paper can thus be minimized, and the labels can be easily removed.

[0027] To use the peeling mechanism, the operator can thus load only the web liner portion of the label paper after removing one label from the web liner into the paper transport path for using the peeling mechanism. This is advantageous because only the web liner portion of the label paper should be loaded into the peeling mechanism in order to reduce the load on the paper transport mechanism.

[0028] Further preferably, when the input unit detects input in this label printing apparatus, the control unit transports in reverse and positions the leading edge of a label on the paper to the print head by means of the paper transport mechanism while the label detector detects the label position, and stops the display before transportation or after transportation.

[0029] When the operator closes the peeling mechanism cover to finish setting the label paper and then operates the input unit, the next label located at the print head can be reversed and positioned with the leading edge at a printable position. Wasting labels located at a

printable position is thus eliminated. The operator can also be informed that the paper is set and ready for printing. When print data is then received, printing can begin immediately from the leading edge of the label.

[0030] Yet further preferably, this label printing apparatus also has a peeled label detector for detecting near a label discharge opening if a label is present. When the paper is set in the transportation path for using the peeling mechanism, the control unit transports the paper to a position where an operator can remove the label in the mechanical initialization process. When the peeled label detector detects that the label or the web liner is not near the label discharge opening after the input unit detects input, the control unit transports the label paper in reverse and positions the leading edge of a label on the paper to the print head by means of the paper transport mechanism while the label detector detects the label position. The display is stopped before or after the label paper is thus conveyed.

[0031] If a label is positioned away from the print head where the label cannot be printed when the input unit is operated, this aspect of the invention can advance the label to near the label discharge opening for easy removal by the operator. When the operator then loads only the web liner portion of the label paper into the transportation path, closes the peeling mechanism cover to complete loading the paper, and operates the input unit, the next label located at the print head can be reversed to a printable location, thereby eliminating label waste. The operator can also be informed that the paper is set and ready for printing. When print data is then received, printing can begin immediately from the leading edge of the label. The label printer thus waits until there is no label or web liner in the label discharge opening and the label paper is correctly loaded.

[0032] Yet further preferably, this label printing apparatus also has a communication unit for reporting to a host computer that the input unit is in an input standby state simultaneously to when the display unit starts to display. When the input unit detects input, the communication unit reports to the host computer that the input standby state of the input unit was cancelled and the display unit is simultaneously turned off.

[0033] The advantage of this aspect of the invention is that the host computer can be informed when the input unit is in a standby state waiting for input and when this standby state is cancelled. The host computer thus knows the timing for presenting a message prompting the operator to set the paper, and the timing for sending the print data to the printer.

[0034] Preferred embodiments of the present invention will be described below with reference to the accompanying figures, in which:

Fig. 1 is an external perspective view of a label printer according to a preferred embodiment of the present invention;

- Fig. 2 is a side section view showing the internal arrangement of the label printer shown in Fig. 1;
- Fig. 3 is an external perspective view showing the label paper replacement method of the label printer shown in Fig. 1;
- Fig. 4 is an external perspective view showing selecting the paper exit in the label printer shown in Fig. 1;
- Fig. 5 is a side section view of the label printer shown in Fig. 4;
- Fig. 6 is a function block diagram of the electrical control system of the label printer shown in Fig. 1;
- Fig. 7 is a flow chart of the mechanical initialization process run by the CPU shown in Fig. 6;
- Fig. 8 is a function block diagram of the electrical system of a label printer according to another embodiment of the invention;
- Fig. 9 is a flow chart of the label paper loading process run by the CPU shown in Fig. 8;
- Fig. 10 is a flow chart of the program run by the CPU shown in Fig. 6 to use the peeling mode;
- Fig. 11 shows the label transportation positions as the CPU runs the process shown in Fig. 10; and
- Fig. 12 shows a label peeling mechanism according to the prior art.

[0035] As shown in Fig. 1, a label printer 1 according to this embodiment of the invention has a printer case 2 with a basically parallelepiped shape. The top portion of the front panel of the case 2 is a stationary panel 2a fixed to the case 2, and the bottom portion is an operable panel 2b that opens and closes relative to the case 2.

[0036] A label discharge slot 3 is rendered between the panels 2a and 2b. The printed labels are dispensed through this label discharge slot 3 when the label peeling mechanism is used (that is, when the printer is in the peeling mode), and the printed label paper 8 is discharged through this label discharge slot 3 when the peeling mechanism is not used. A cover 5 of the peeling mechanism (see Fig. 4, also referred to as "peeler cover" hereinafter) is attached freely openably and closably below the label discharge slot 3 of the panel 2b. A web discharge slot 4 for discharging only the web liner 9 when the peeling mechanism is used is rendered at the bottom of the peeling mechanism cover 5. Nothing is discharged through the web discharge slot 4 when the peeling mechanism is not used. A manual paper feed switch 6 is disposed

together with one or more display LEDs 7 on the front left side of the panel 2b.

[0037] Label paper 8 has a series of many adhesive labels 10 of a specific length affixed to the front surface of a continuous web liner 9 wound into a roll. Such roll of label paper 8 is stored inside the case 2 as shown in Fig. 2. Note that the dot-dash line indicated by reference numeral P1 in Fig. 2 denotes the transportation path of the web when the peeling mechanism is used, and the dot-dash line denoted by reference numeral P2 denotes the transportation path of the labels when the peeling mechanism is used.

[0038] When the label paper is being loaded into the printer, the leading end of the label paper 8 is pulled out from the case 2 and passed between the print head 11 and the platen roller 12 to enable transporting the label paper 8 and printing the labels 10. When the peeling mechanism is used, the web liner 9 is curved acutely around a web-bending guide 13 with the back (non-label) surface of the web facing the inside of the acute angle. The web-bending guide 13 composes the peeling mechanism and forms an acutely angled curve at its distal end. The web liner 9 is held and conveyed by the drive platen roller and the driven peeler roller 12a (pinch roller) that rotates following the platen roller and constituting the paper transport mechanism, and is discharged through the web discharge slot 4.

[0039] When the label paper 8 passes over the web-bending guide 13 of this peeling mechanism, the labels 10 adhesively affixed to the front surface of the web liner 9 are unable to follow the transportation path of the web liner 9 and are thus disengaged from the web 9. The peeled labels 10 are then discharged to the outside of the printer through the label discharge slot 3. The remaining web liner 9 follows a different transportation path than the labels 10, and the labels 10 and web liner 9 are thus separated.

[0040] This label printer 1 also has a label detection sensor 17 disposed upstream of the print head 11, and a peeled-label sensor 18 disposed near the label discharge slot 3 at a position slightly above the curved end part of the web-bending guide 13.

[0041] The label detection sensor 17 detects the difference between light reflected from the label 10 and light reflected from the web liner 9 to detect the passage of the leading end or trailing end of successive labels, and can thereby determine where the current label 10 is positioned. The label detection sensor 17 could alternatively operate by detecting the difference in light passing through the web and label.

[0042] The peeled-label sensor 18 detects whether light is reflected from a label 10 to detect whether a discharged label 10 is or is not located in front of the peeled-label sensor 18. Detection signals from the label detection sensor 17 and peeled-label sensor 18 are sent to a CPU 20 of the label printer as described below.

[0043] Fig. 3 shows the panel 2b of this label printer 1 with the peeling mechanism in the condition where the

panel 2b is pulled forward and opened. This panel 2b is pulled forward and opened as shown in Fig. 3 when the end of the label paper 8 is reached and a new roll of label paper 8 is loaded into the label printer 1, and when the label paper 8 is replaced with label paper 8 of a different label length or label width. Thus opening the panel 2b provides access to the label paper 8 storage compartment, and thus enables loading or replacing the label paper 8.

[0044] Fig. 4 and Fig. 5 show how the leading end 8a of the label paper 8 is fed to the outside of the printer from the web discharge slot 4 to use the peeling mechanism.

[0045] The cover 5 of the peeling mechanism disposed between the label discharge slot 3 of the case 2 and the web discharge slot 4 is attached to open and close freely to the top part of the panel 2b. After the cover 5 is opened and the leading end 8a of the label paper 8 is passed through the web discharge slot 4 as shown in Fig. 4, closing the cover 5 sets the label paper 8 for use in the peeling mode using the peeling mechanism.

[0046] The peeling mechanism functions when the leading end 8a of the label paper 8 is pulled to the outside of the case through the web discharge slot 4. As a result, labels 10 printed by the print head 11 are conveyed with the web liner 9 to the web-bending guide 13, and the labels 10 are peeled from the web liner 9 at the curved distal end of the web-bending guide 13 and then discharged through the label discharge slot 3 as shown in Fig. 1 as the label paper 8 is conveyed further downstream with the back of the web liner 9 curving acutely around the distal end of the web-bending guide 13.

[0047] If the leading end 8a of the label paper 8 is not pulled to the outside of the printer through the web discharge slot 4 but instead is pulled to the outside of the printer through the label discharge slot 3, that is, if the label paper 8 is loaded so that the labels 10 and the web liner 9 are discharged through the label discharge slot 3, multiple consecutive labels 10 can be printed and discharged with the labels 10 intact on the web liner 9 in the non-peeling mode. Multiple labels 10 can thus be batch printed.

[0048] When the leading end 8a of the label paper 8 is pulled to the outside of the printer from the appropriate transportation path and the panel 2b is then closed, the label paper 8 is held between the print head 11 and platen roller 12. A main cover switch (16 in Fig. 6, not shown in Figs. 4 and 5) for detecting opening and closing the panel 2b is disposed at a desirable location (not shown) on the case 2.

[0049] To print labels using the peeling mechanism, the operator sets the leading end 8a of the label paper 8 to the web discharge slot 4 as shown in Fig. 4 and Fig. 5 and then closes the cover 5. A peeler cover switch (19 in Fig. 6, not shown in Figs. 4 and 5) is disposed suitably on the cover 5 to detect opening and closing the cover 5, and outputs the detection signal to the CPU 20.

[0050] As shown in the function block diagram of Fig.

6, a CPU 20 controls the operation of the label printer 1. Connected to the CPU 20 over a bus 21 are a ROM 22, a RAM 23 and other units. The ROM 22 stores some programs and data, a printing control program and a mechanical initialization program for driving the print head 11 and the drive motor 15, a peeling mode setup program, a printing process program, and character data. The RAM 23 functions as temporary storage for storing the label 10 position, received data, and print data generated therefrom, and output data. The peeling mode using the peeling mechanism and continuous printing (non-peeling) mode can alternatively be set using DIP switches (not shown) or the mode setting can be stored in flash ROM (not shown) or other nonvolatile memory.

[0051] A communication interface 25 is also connected to the bus 21, and a host computer such as a personal computer (PC) 27 is connected to the communication interface 25 through a cable 26 (it goes without saying that a wireless communication link could be employed instead). The PC 27 may have a display, and display instructions to the operator base on status data received from the label printer 1.

[0052] An input/output (I/O) unit 29 is also connected to the bus 21. Connected through the I/O unit 29 to the bus 21 are the label detection sensor 17, the peeled-label sensor 18, the print head 11, the platen roller 12, the drive motor 15, the paper feed switch 6, the main cover switch 16, the peeler cover switch 19, and LED(s) 7. Instead of one or more LEDs 7 a liquid crystals display (LCD) could be employed. In this case, it is possible to display characters.

[0053] Fig. 7 is a flow chart of the mechanical initialization process run by the CPU 20 shown in Fig. 6. When the operator has replaced the roll paper, for example, the CPU 20 executes this mechanical initialization program from ROM 22.

[0054] More specifically, the main cover switch 16 sends an OPEN signal to the CPU 20 when the operator opens the panel 2b to install roll paper 8, and the CPU 20 thus starts the mechanical initialization process. Note that a sensor may be disposed where the label paper 8 is stored and control can be based on an output from this sensor.

[0055] After the label paper 8 has been set the mechanical initialization program waits until the main cover switch 16 closes (step S1). When the main cover switch 16 closes, the label paper 8 is conveyed forward a specific distance by the platen roller 12 driven by the drive motor 15 to remove play (backlash) in the gears, for example (step S2). Preferably during step S2 the label paper 8 is advanced while the label detection sensor 17 detects the position of the label 10 so that the trailing end or the leading end of the labels can be determined, a label 10 that is positioned away from the print head 11 where the label cannot be printed can be detected, and the label 10 can be advanced to a position where the label 10 can be removed by the operator (Fig. 11A and Fig. 11B). The number of labels 10 in a non-printable po-

sition that need to be removed can thus be very small (Fig.11C).

[0056] In the peeling mode using the peeling mechanism, the web liner 9 from which unprintable labels 10 have been removed can be set to the web transportation path 9 in Fig. 2 between the platen roller 12 and peeler roller 12a. The LED 7 could also be driven to blink as a means of prompting the operator to set the label paper 8 into the transportation path for the peeling mode using the peeling mechanism or the continuous printing mode not using the peeling mechanism, and then press the paper feed switch 6 to indicate when the label paper 8 has been loaded. The PC 27 is also informed (by the status data) that the printer is waiting for the operator to press the paper feed switch 6 (step S3). The PC 27 can also display a message prompting the operator to set the label paper 8 in the desired mode. Instructions for loading the label paper 8 could also be displayed to help ensure that the operator loads the label paper 8 correctly.

[0057] The CPU 20 also determines whether the peeler cover switch 19 is open or closed and waits for the switch 19 to close (step S4). If the switch 19 is open, the operator is loading the label paper 8 and the cover 5 is not closed, and the CPU 20 therefore waits to proceed to step S5. This prevents the label indexing operation (step S7) and a subsequent printing process from running if the paper feed switch 6 is accidentally pressed while the cover 5 is open, or if the cover 5 is closed to finish loading the paper but the operator then realizes that the paper is not correctly loaded (not execute step S5).

[0058] After the CPU 20 determines that the switch 19 is closed, the CPU 20 waits for the operator to press the paper feed switch 6 (step S5).

[0059] The operator presses the paper feed switch 6 after confirming the mode indicated by the LED 7, setting the label paper 8 appropriately to the mode, closing the cover 5, and confirming that the label paper 8 is set to the desired mode.

[0060] The CPU 20 turns the LED 7 off after detecting that the paper feed switch 6 was pressed and reports (status data) to the PC 27 that the standby state waiting for the paper feed switch 6 to be pressed has been cancelled (step S6). The PC 27 thus knows that the label paper 8 is set for the desired mode, and knows the timing for preparing and sending print data to the label printer 1.

[0061] The label paper 8 is then reversed while the label detection sensor 17 detects the position of the label 10, and the next label located at the print head can thus be reversed and the leading end of the label can be returned to the printable position (label indexing process) (step S7) (Fig.11D). After step S7 the CPU 20 reads the printing control program and prints labels 10 based on the print data received from the PC 27.

[0062] Note that the sequence of steps S6 and S7 can be reversed.

[0063] The label indexing process is described in more detail below.

[0064] The peeled-label sensor 18 in this embodiment

of the invention is located downstream in the label transportation direction from the print head 11. Therefore, when the peeled-label sensor 18 detects the leading end of a label, a specific number of reverse (or forward) rotation drive pulses are supplied to the drive motor (a stepping motor) of the platen roller 12 to position the leading edge of the label at the print head 11 (Fig.11 D).

[0065] If the paper is advanced forward in step S2 and stops when the label detection sensor 17 detects the leading edge of the label, the mechanical initialization is controlled by supplying a specific number of forward rotation drive pulses to the drive motor 15 in step S7 because the label detection sensor 17 is located upstream from the print head 11 in the transportation direction.

[0066] As described above the label indexing process does not run until the paper feed switch 6 is operated. The printer is therefore prevented from running the initialization process and starting to print even though loading the label paper 8 is not completed.

[0067] Furthermore, by displaying an indication prompting the user to set the label paper 8, the operator can also easily know that the label printer 1 is not ready to print, press the paper feed switch 6 after setting the label paper 8, and thus control operation after confirming that the paper is correctly loaded.

[0068] This embodiment of the invention has the peeler cover switch 19 as described above, and the CPU 20 detects the open or closed status of this switch 19 in step S4 in Fig. 7. However, because process execution can also be controlled based on whether or not the paper feed switch 6 is pressed, the peeler cover switch 19 and step S4 are not always necessary and can be omitted. An corresponding embodiment of the invention is shown in Fig. 8 and Fig. 9.

[0069] As shown in Fig. 8, connected over a bus 21 to the CPU 20 that controls the label printer are ROM 22 for storing some programs and data, the printing control program and the mechanical initialization program, and RAM 23 that functions as temporary memory. A communication interface 25 is connected to the bus 21, and a PC 27 used as the host computer of the label printer 1 is connected through a cable 26 (or wirelessly) to the communication interface 25. An I/O unit 29 is also connected to the bus 21. Connected through the I/O unit 29 are the label detection sensor 17, the print head 11, the drive motor 15 for the platen roller 12, the paper feed switch 6, the main cover switch 16, the peeled-label sensor 18, and the LED(s) 7 (or an LCD instead). Note that a peeler cover switch 19 is not provided.

[0070] Steps S1, S2, S3, S5, S6, and S7 of the corresponding mechanical initialization program shown in Fig. 9 are identical to the steps of the same numbers in the flow chart shown in Fig. 7, while step S4 shown in Fig. 7 is omitted. As described above, the order of steps S6 and S7 can be reversed.

[0071] This embodiment of the invention enables omitting the peeler cover switch 19, and thus has the additional advantage of being able to lower the manufacturing

cost of the printer.

[0072] The flow chart in Fig. 10 shows the peeling mode setup program using the peeled-label sensor 18. The operator opens the panel 2b of the label printer 1 as shown in Fig. 3, places a new roll of label paper 8 inside the label printer 1, and sets the leading end 8a of the label paper 8 in front of the peeled-label sensor 18. When the panel 2b is then closed to hold the paper between the print head 11 and the platen roller 12, the CPU 20 reads the peeling mode setup program from ROM and runs the program.

[0073] The CPU 20 first detects the status of the main cover switch 16 and waits for the panel 2b to be closed (step S1). When the panel 2b is closed, step S1 returns Yes and control goes to step S2.

[0074] The CPU 20 then outputs a forward feed command to the drive motor 15 in step S2, and the position of the first label 10a on the web liner 9 thus advances as shown in Fig. 11A. Web transportation stops when the first label 10a affixed to the web liner 9 reaches a position where the label can be removed as shown in Fig. 11B, and control goes to step S3.

[0075] Whether the first label 10a has reached a position where it can be peeled can be calculated by the CPU 20 based on the rotary angle through which the platen roller 12 has rotated and whether the label detection sensor 17 detects the leading edge or trailing edge of the first label 10a or the leading edge or trailing edge of the next label 10b. This calculation could alternatively be based on the rotary angle of the platen roller 12 after the peeled-label sensor 18 detected the leading edge of the first label 10a.

[0076] The operator is then prompted by flashing the LED 7, for example, and the PC 27 is informed (the status data) that the CPU 20 is waiting for the paper feed switch 6 to be pressed (step S3). With the cover 5 open as shown in Fig. 4 and Fig. 5, the operator then peels the first label 10a positioned as shown in Fig. 11B from the web liner 9, passes the now-bare leading end of the web liner 9 around the web-bending guide 13 of the peeling mechanism and out through the web discharge slot 4 (the web transportation path 9 in Fig. 2 between the platen roller 12 and peeler roller 12a), closes the cover 5, and presses the paper feed switch 6.

[0077] The peeled-label sensor 18 then determines if a label is present in the label discharge slot (step S8). If the peeled-label sensor 18 determines that the first label 10a or web liner 9 is not present in the label discharge slot, the label paper 8 is loaded as shown in Fig. 11C. When the CPU 20 then detects that the paper feed switch 6 was pressed (step S5), the CPU 20 turns the LED 7 off and reports to the PC 27 that the standby state waiting for the paper feed switch 6 to be pressed has been cancelled (step S6).

[0078] The label paper 8 is then reversed while the label detection sensor 17 detects the position of the label 10, and the next label located at the print head can thus be reversed and the leading end of the label can be re-

turned to the print position (label indexing process) (step S7). If the peeled-label sensor 18 detects the first label 10a or web liner 9 at this time (step S8 returns no), operation waits until the first label 10a or the web liner 9 is removed from the label discharge slot even if the paper feed switch 6 is pressed. Operation advances to the next step only when the paper feed switch 6 is pressed after the first label 10a and web liner 9 are removed and step S8 returns Yes. This sequence ensures that the label paper 8 is correctly loaded.

[0079] Note that the sequence of steps S6 and S7 can be reversed.

[0080] The CPU 20 waits for the paper feed switch 6 to be pressed in step S5. When the CPU 20 detects that the paper feed switch 6 was pressed, the CPU 20 outputs a reverse feed command to the drive motor 15 of the platen roller 12 to position the leading edge of the next label 10b at the print head 11, and thus controls transporting the next label 10b to the label indexing position as shown in Fig. 11D. The distance from the label peeling position to the label indexing position is determined by the length of the label, and the label position can be easily calculated and controlled based on the label length, the gap between labels, and how far the platen roller 12 turns, i.e., its rotary angle. The printing process is then controlled according to the printing control program by the CPU 20.

[0081] The number of labels 10 that must be peeled before printing starts can thus be limited to the one label, that is, the first label 10a, and label waste can thus be reduced when opening the panel 2b of the label printer 1 and loading the label paper 8 with this embodiment of the invention. Loading the label paper is therefore easier because peeling a label 10 before setting the label paper is not necessary, and is also more efficient because the adhesive side of the label is not exposed when loading the paper.

[0082] It will be apparent to one with ordinary skill in the related art that the main cover, peeling mechanism cover, detection mechanism, and control mechanism of a label printer having a peeling mechanism according to the present invention shall not be limited to the arrangements described in the foregoing embodiments and can be varied in many ways without departing from the scope of the accompanying claims.

[0083] For example, the print head 11 of a label printer according to the present invention is typically a thermal print head or an inkjet print head, but the invention may as well be applied to a label printer having a different type of print head.

[0084] Although the present invention has been described in connection with the preferred embodiments thereof with reference to the accompanying drawings, it is to be noted that various changes and modifications will be apparent to those skilled in the art. Such changes and modifications are to be understood as included within the scope of the present invention as defined by the appended claims.

Claims

1. A label printing apparatus for printing on labels of a recording medium (8) wherein the recording medium (8) has a plurality of labels (10) affixed to a continuous web liner (9), comprising:
 - a main cover (2b) adapted to be moved between an open position and a closed position and allowing, in its open position, said recording medium (8) to be set inside said label printing apparatus;
 - a peeling mechanism to peel the labels (10) from the web liner (9), the peeling mechanism having a peeling mechanism cover (5) disposed at said main cover (2b) and being adapted to be moved between an open position and a closed position relative to the main cover (2b);
 - a first transportation path (P1) and a second transportation path (P2), wherein the recording medium (8) may be selectively set, when the peeling mechanism cover (5) is in its open position, onto the first or the second transportation path depending on whether the peeling mechanism is to be used or not, respectively;
 - a transport mechanism (12, 12a, 15) for conveying the recording medium (8);
 - a print head (11) for printing said labels (10);
 - a main cover detector (16) for detecting if said main cover (2b) is in its open or its closed position;
 - a control unit (20) for executing a mechanical initialization process;
 - an input unit (6) for detecting input after said mechanical initialization process has been executed; and
 - a display unit (7) adapted to start displaying when said main cover (2b) is detected in its closed position and to stop displaying when said input unit (6) detects input.
2. The apparatus of claim 1, further comprising a label detector (17) for detecting the position of a label (10) while said recording medium (8) is being conveyed; wherein said control unit (20) is adapted to cause, in said mechanical initialization process, said transport mechanism (12, 12a, 15) to transport said recording medium (8) to a position where an operator can remove said label (10) while said label detector (17) detects the position of said label (10).
3. The apparatus of claim 2, wherein said control unit (20) is adapted to cause said transport mechanism (12, 12a, 15) to transport in reverse and position the leading edge of a label (10) of said recording medium (8) at said print head (11) while said label detector (17) detects said label position, and to stop said display before said transportation or after said transportation.
4. The apparatus of claim 2, further comprising a peeled-label detector (18) for detecting if a label (10) is present at a label discharge opening (3); wherein when said recording medium (8) is set on said first transportation path (P1), said control unit (20) is adapted to cause said transport mechanism (12, 12a, 15) to transport in reverse and position the leading edge of a label (10) of said recording medium (8) at said print head (11) when said peeled-label detector (18) detects that said label (10) or said web liner (9) is not at said label discharge opening (3) after said input unit (6) detected input, and to stop said display before said transportation or after said transportation.
5. The apparatus of any of claims 1 to 4, further comprising a communication unit (25) for reporting to a host computer (27) that said input unit (6) is in an input standby state simultaneously to starting display by said display unit (7), and, when said input unit (6) detects input, reporting to said host computer (27) that said input standby state of said input unit (6) was cancelled simultaneously to stopping display by said display unit (7).
6. A method of controlling a label printing apparatus as defined in claim 1, comprising steps of:
 - a) detecting that a main cover (2b) is closed;
 - b) executing a mechanical initialization process and starting a display when said main cover (2b) is closed; and
 - c) stopping said display when input to an input unit (6) is detected.
7. The method of claim 6, wherein step b) comprises detecting the position of a label (10) while conveying said recording medium (8) to a position where an operator can remove said label (10).
8. The method of claim 7, wherein step c) comprises:
 - c1) transporting in reverse and positioning the leading edge of a label (10) of said recording medium (8) at a print head (11) after said input is detected; and
 - c2) stopping said display,
 wherein step c2) is performed before or after step c1).
9. The method of claim 7, wherein steps c) comprises:
 - c1) transporting in reverse and positioning the leading edge of a label (10) of said recording medium (8) at a print head (11) when said label

(10) or said web liner (9) is not detected at a label discharge opening (3) after input is detected when said recording medium (8) is set in a transportation path using said peeling mechanism; and
c2) stopping said display,

wherein step c2) is performed before or after step c1).

10. The method of any of claims 6 to 9, further comprising steps of:

reporting a standby state waiting for input to said input unit (6) to a host computer (27) and simultaneously starting display by said display unit (7) when said main cover (2b) is detected in a closed position; and
reporting to said host computer (27) that said input standby state was cancelled when input is detected, and simultaneously stopping display by said display unit (7).

Patentansprüche

1. Etikettendruckvorrichtung zum Drucken auf Etiketten eines Aufzeichnungsmediums (8), wobei das Aufzeichnungsmedium (8) eine Mehrzahl Etiketten (10) hat, die auf einer Endlosträgerbahn (9) angebracht werden, mit:

einer Hauptabdeckung (2b), die so ausgeführt ist, dass sie zwischen einer offenen und einer geschlossenen Position zu bewegen ist und es in ihrer offenen Position ermöglicht, dass das Aufzeichnungsmedium (8) in das Innere der Etikettendruckvorrichtung eingesetzt wird; einem Abziehmechanismus zum Abziehen der Etiketten (10) von der Trägerbahn (9), wobei der Abziehmechanismus eine Abdeckung (5) des Abziehmechanismus hat, die an der Hauptabdeckung (2b) angeordnet und so ausgeführt ist, dass sie relativ zur Hauptabdeckung (2b) zwischen einer offenen und einer geschlossenen Position zu bewegen ist;
einem ersten Transportweg (P1) und einem zweiten Transportweg (P2), wobei das Aufzeichnungsmedium (8) bei offener Abdeckung (5) des Abziehmechanismus selektiv auf den ersten oder den zweiten Transportweg eingestellt werden kann, je nachdem, ob der Abziehmechanismus benutzt werden soll oder nicht;
einem Transportmechanismus (12, 12a, 15) für den Vorschub des Aufzeichnungsmediums (8);
einem Druckkopf (11) zum Bedrucken der Etiketten (10);
einem Detektor (16) für die Hauptabdeckung

zum Detektieren, ob die Hauptabdeckung (2b) in ihrer offenen oder geschlossenen Position ist; einer Steuereinheit (20) zum Ausführen eines mechanischen Initialisierungsprozesses; einer Eingabeeinheit (6) zum Detektieren einer Eingabe, nachdem der mechanische Initialisierungsprozess ausgeführt worden ist; und einer Anzeigeeinheit (7), die so eingerichtet ist, dass die Anzeige beginnt, wenn die geschlossene Position der Hauptabdeckung (2b) erkannt wird, und die Anzeige beendet wird, wenn die Eingabeeinheit (6) eine Eingabe erkennt.

2. Vorrichtung nach Anspruch 1, die ferner einen Etikettendetektor (17) zum Detektieren der Position eines Etiketts (10) während des Vorschubs des Aufzeichnungsmediums (8) aufweist, wobei die Steuereinheit (20) so eingerichtet ist, dass sie den Transportmechanismus (12, 12a, 15) im mechanischen Initialisierungsprozess veranlasst, das Aufzeichnungsmedium (8) in eine Position zu transportieren, in der ein Bediener das Etikett (10) entfernen kann, während der Etikettendetektor (17) die Position des Etiketts (10) erkennt.

3. Vorrichtung nach Anspruch 2, bei der die Steuereinheit (20) so eingerichtet ist, dass sie den Transportmechanismus (12, 12a, 15) zum Rückwärtstransport und zum Positionieren der Vorderkante eines Etiketts (10) des Aufzeichnungsmediums (8) am Druckkopf (11) veranlasst, während der Etikettendetektor (17) die Etikettenposition erkennt, und zum Beenden der Anzeige vor oder nach diesem Transportvorgang.

4. Vorrichtung nach Anspruch 2, die ferner einen Detektor (18) für abgezogene Etiketten aufweist, um zu erkennen, ob ein Etikett (10) an einer Etikettenausgabeöffnung (3) vorhanden ist, wobei dann, wenn das Aufzeichnungsmedium (8) auf den ersten Transportweg (P1) eingestellt ist, die Steuereinheit (20) so eingerichtet ist, dass sie den Transportmechanismus (12, 12a, 15) zum Rückwärtstransport und zum Positionieren der Vorderkante eines Etiketts (10) des Aufzeichnungsmediums (8) am Druckkopf (11) veranlasst, wenn der Detektor (18) für abgezogene Etiketten erkennt, dass sich das Etikett (10) oder die Trägerbahn (9) nicht an der Etikettenausgabeöffnung (3) befindet, nachdem die Eingabeeinheit (6) eine Eingabe erkannt hat, und zum Beenden der Anzeige vor oder nach diesem Transportvorgang.

5. Vorrichtung nach einem der Ansprüche 1 bis 4, die ferner eine Kommunikationseinheit (25) aufweist, um einem Host-Computer (27) gleichzeitig mit dem Beginn der Anzeige durch die Anzeigeeinheit (7) zu melden, dass sich die Eingabeeinheit (6) in einem

Eingabebereitschaftszustand befindet, und dann, wenn die Eingabeeinheit (6) eine Eingabe erkennt, dem Host-Computer (27) gleichzeitig mit dem Beenden der Anzeige durch die Anzeigeeinheit (7) zu melden, dass der Eingabebereitschaftszustand der Eingabeeinheit (6) aufgehoben worden ist.

6. Verfahren zum Steuern einer Etikettendruckvorrichtung gemäß Anspruch 1, das die Schritte aufweist:

- a) Erkennen, dass eine Hauptabdeckung (2b) geschlossen ist;
- b) Ausführen eines mechanischen Initialisierungsprozesses und Beginnen einer Anzeige, wenn die Hauptabdeckung (2b) geschlossen ist; und
- c) Beenden der Anzeige, wenn eine Eingabe an eine Eingabeeinheit (6) erkannt wird.

7. Verfahren nach Anspruch 6, bei dem Schritt b) die Detektion der Position eines Etiketts (10) aufweist, während das Aufzeichnungsmedium (8) in eine Position vorgeschoben wird, in der ein Bediener das Etikett (10) entfernen kann.

8. Verfahren nach Anspruch 7, bei dem Schritt c) aufweist:

- c1) Rückwärts transportieren und Positionieren der Vorderkante eines Etiketts (10) des Aufzeichnungsmediums (8) zum bzw. am Druckkopf (11), nachdem die Eingabe erkannt worden ist; und
- c2) Beenden der Anzeige,

wobei Schritt c2) vor oder nach Schritt c1) ausgeführt wird.

9. Verfahren nach Anspruch 7, bei dem Schritt c) aufweist:

- c1) Rückwärts transportieren und Positionieren der Vorderkante eines Etiketts (10) des Aufzeichnungsmediums (8) zum bzw. am Druckkopf (11), wenn das Etikett (10) oder die Trägerbahn (9) nicht an einer Etikettenausgabeöffnung (3) nach dem Erkennen der Eingabe erkannt wird, wenn das Aufzeichnungsmedium (8) auf einen Transportweg eingestellt ist, bei dem der Abziehmechanismus eingesetzt wird; und
- c2) Beenden der Anzeige,

wobei Schritt c2) vor oder nach Schritt c1) ausgeführt wird.

10. Verfahren nach einem der Ansprüche 6 bis 9, ferner die Schritte aufweisend:

Melden eines Bereitschaftszustands, in dem auf eine Eingabe in die Eingabeeinheit (6) gewartet wird, an den Host-Computer (27) und gleichzeitig Beginnen der Anzeige durch die Anzeigeeinheit (7), wenn die geschlossene Position der Hauptabdeckung (2b) erkannt wird; und Melden an den Host-Computer (27), dass der Eingabebereitschaftszustand bei Erkennen der Eingabe aufgehoben wurde und gleichzeitig Beenden der Anzeige durch die Anzeigeeinheit (7).

Revendications

1. Dispositif d'impression d'étiquettes pour imprimer des étiquettes sur un support (8) d'enregistrement, dans lequel le support (8) d'enregistrement a une pluralité d'étiquettes (10) apposées sur une doublure (9) continue en bande, comprenant :

un couvercle (2b) principal conçu pour être déplacé entre une position ouverte et une position fermée et permettant dans sa position ouverte de mettre le support (8) d'enregistrement à l'intérieur du dispositif d'impression d'étiquettes ;
un mécanisme de détachement pour détacher les étiquettes (10) de la doublure (9) en bande, le mécanisme de détachement ayant un couvercle (5) de mécanisme de détachement disposé sur le couvercle (2b) principal et conçu pour être déplacé entre une position ouverte et une position fermée par rapport au couvercle (2b) principal ;
un premier trajet (P1) de transport et un deuxième trajet (P2) de transport, dans lequel le support (8) d'enregistrement peut être mis sélectivement, lorsque le couvercle (5) du mécanisme de détachement est dans sa position ouverte, sur le premier ou le deuxième trajet de transport selon que le mécanisme de détachement est utilisé ou ne l'est pas, respectivement ;
un mécanisme (12, 12a, 15) de transport pour transporter le support (8) d'enregistrement ;
une tête (11) d'impression pour imprimer les étiquettes (10) ;
un détecteur (16) principal de couvercle pour détecter si le couvercle (2b) principal est dans sa position ouverte ou dans sa position fermée ;
une unité (20) de commande pour exécuter une opération mécanique d'initialisation ;
une unité (6) d'entrée pour détecter une entrée après que l'opération mécanique d'initialisation a été exécutée ; et
une unité (7) d'affichage conçue pour faire commencer l'affichage lorsque le couvercle (2b) principal est détecté dans sa position fermée et pour arrêter l'affichage lorsque l'unité (6) d'entrée détecte une entrée.

2. Dispositif suivant la revendication 1, comprenant en outre un détecteur (17) d'étiquettes pour détecter la position d'une étiquette (10) alors que le support (8) d'enregistrement est transporté, dans lequel l'unité (20) de commande est conçue pour faire, dans l'opération mécanique d'initialisation, que le mécanisme (12, 12a, 15) de transport transporte le support (8) d'enregistrement jusqu'à une position dans laquelle un opérateur peut retirer l'étiquette (10) alors que le détecteur (17) d'étiquettes détecte la position de l'étiquette (10).
3. Dispositif suivant la revendication 2, dans lequel l'unité (20) de commande est conçue pour faire que le mécanisme (12, 12a, 15) de transport transporte en inverse et positionne le bord menant d'une étiquette (10) du support (8) d'enregistrement à la tête (11) d'impression alors que le détecteur (17) d'étiquettes détecte la position de l'étiquette et pour arrêter l'affichage avant ce transport ou après ce transport.
4. Dispositif suivant la revendication 2, comprenant en outre un détecteur (18) d'étiquettes détachées pour détecter si une étiquette (10) est présente à une ouverture (3) d'évacuation d'étiquette ; dans lequel lorsque le support (8) d'enregistrement est mis sur le premier trajet (P1) de transport, l'unité (20) de commande est conçue pour faire que le mécanisme (12, 12a, 15) de transport transporte en inverse et met en position le bord menant d'une étiquette (10) du support (8) d'enregistrement à la tête (11) d'impression lorsque le détecteur (18) d'étiquettes détachées détecte que l'étiquette (10) sur la doublure (9) en bande n'est pas à l'ouverture (3) d'évacuation d'étiquette après que l'unité (6) d'entrée a détecté une entrée, et pour arrêter l'affichage avant ce transport ou après ce transport.
5. Dispositif suivant l'une quelconque des revendications 1 à 4, comprenant en outre une unité de communication pour rapporter à un ordinateur (27) hôte que l'unité (6) d'entrée est dans un état d'entrée en attente simultanément au lancement de l'affichage par l'unité (7) d'affichage, et lorsque l'unité (6) d'entrée détecte une entrée, rapporter à l'ordinateur (27) hôte que cet état d'entrée en attente de l'unité (6) d'entrée est annulé simultanément à l'arrêt de l'affichage par l'unité (7) d'affichage.
6. Procédé de commande d'un dispositif d'impression d'étiquettes tel que défini à la revendication 1 comprenant des stades de :
- a) détection qu'un couvercle (2b) principal est fermé ;
 - b) exécution d'une opération mécanique d'initialisation et lancement d'un affichage lorsque
- le couvercle (2b) principal est fermé ; et
- c) arrêt de l'affichage lorsqu'une entrée dans l'unité (6) d'entrée est détectée.
7. Procédé suivant la revendication 6, dans lequel le stade b) comprend la détection de la position d'une étiquette (10) alors que le support (8) d'enregistrement est transporté jusqu'à une position où un opérateur peut retirer l'étiquette (10).
8. Procédé suivant la revendication 7, dans lequel le stade c) comprend
- c1) le transport en inverse et la mise en position du bord menant d'une étiquette (10) du support (8) d'enregistrement à une tête (11) d'impression après que l'entrée a été détectée ; et
 - c2) l'arrêt de l'affichage,
- dans lequel on effectue le stade c2) avant ou après le stade c1).
9. Procédé suivant la revendication 7, dans lequel le stade c) comprend
- c1) le transport en inverse et la mise en position du bord menant d'une étiquette (10) du support (8) d'enregistrement à une tête (11) d'impression lorsque l'étiquette (10) ou la doublure (9) en bande n'est pas détectée à une ouverture (3) d'évacuation d'étiquette après qu'une entrée est détectée lorsque le support (8) d'enregistrement est mis dans un trajet de transport en utilisant le mécanisme de détachement ; et
 - c2) l'arrêt de l'affichage,
- dans lequel on effectue le stade c2) avant ou après le stade c1).
10. Procédé suivant l'une quelconque des revendications 6 à 9 comprenant en outre des stades de :
- on rapporte à un ordinateur (27) hôte qu'un état d'attente attend une entrée dans l'unité (6) d'entrée et on lance simultanément un affichage par l'unité (7) d'affichage lorsque l'on détecte que le couvercle (2b) principal est dans une position fermée ; et
 - on rapporte à l'ordinateur (27) hôte que l'état d'entrée d'attente est annulé lorsque l'on détecte une entrée et en même temps on arrête l'affichage par l'unité (7) d'affichage.

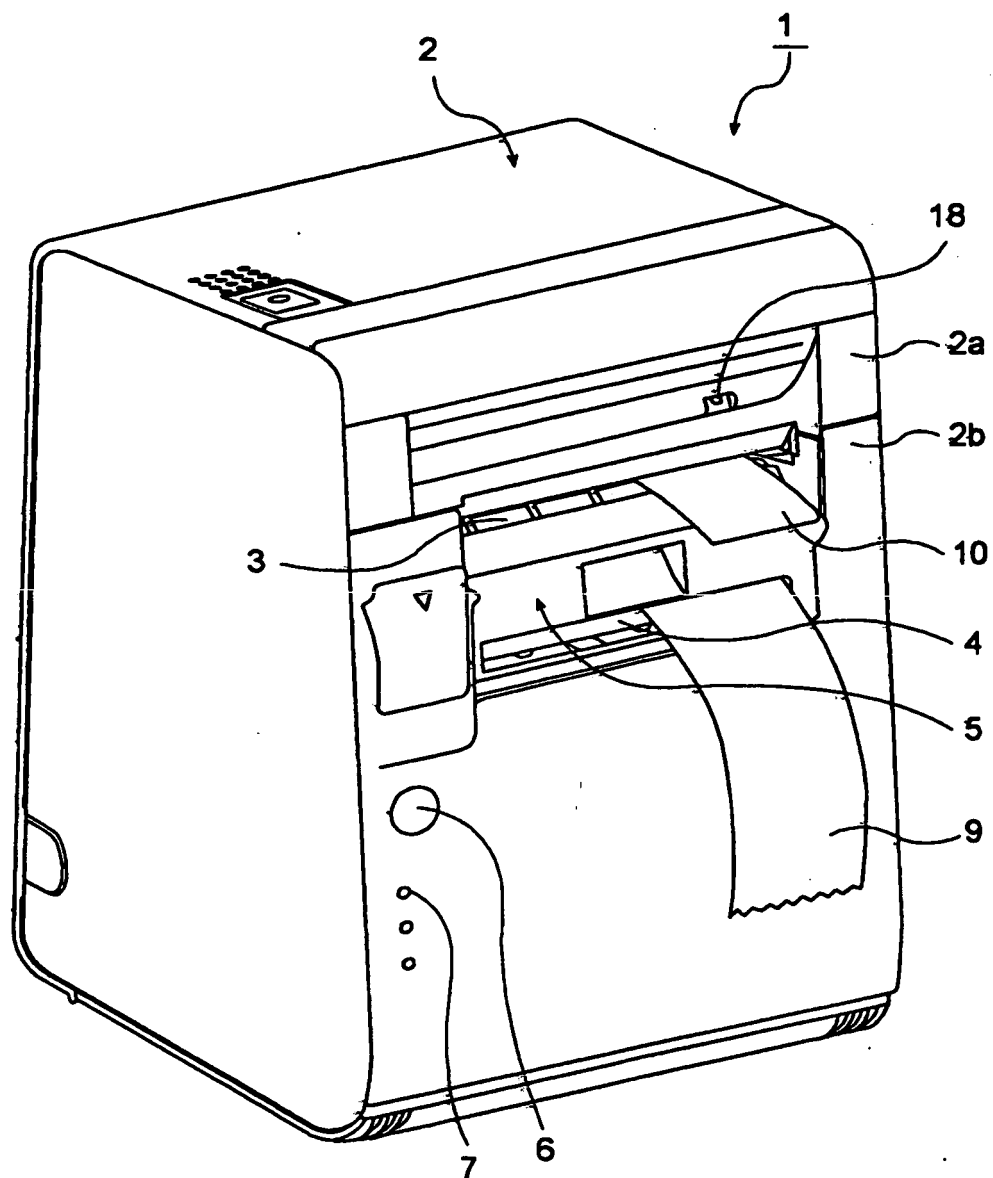


FIG. 1

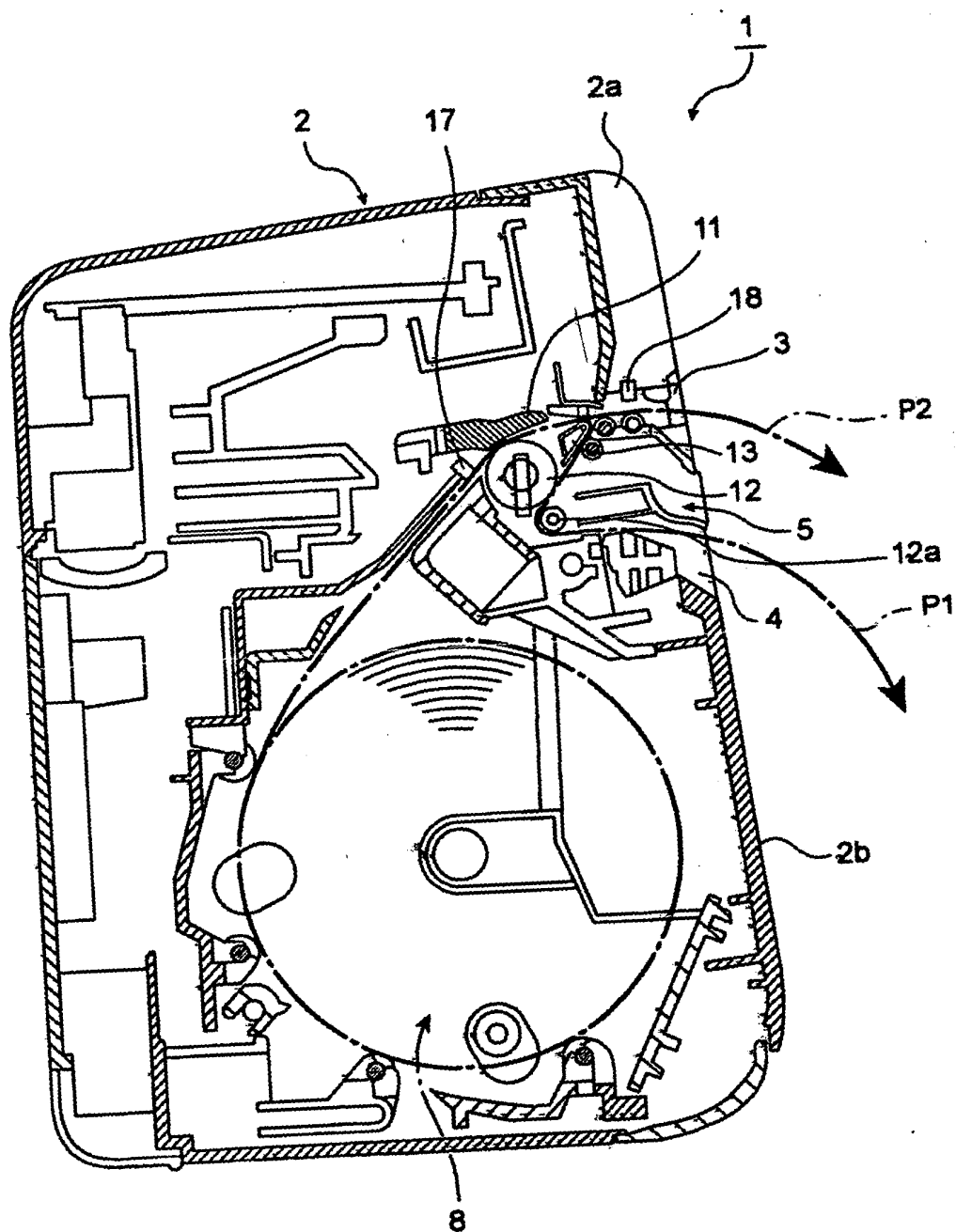


FIG. 2

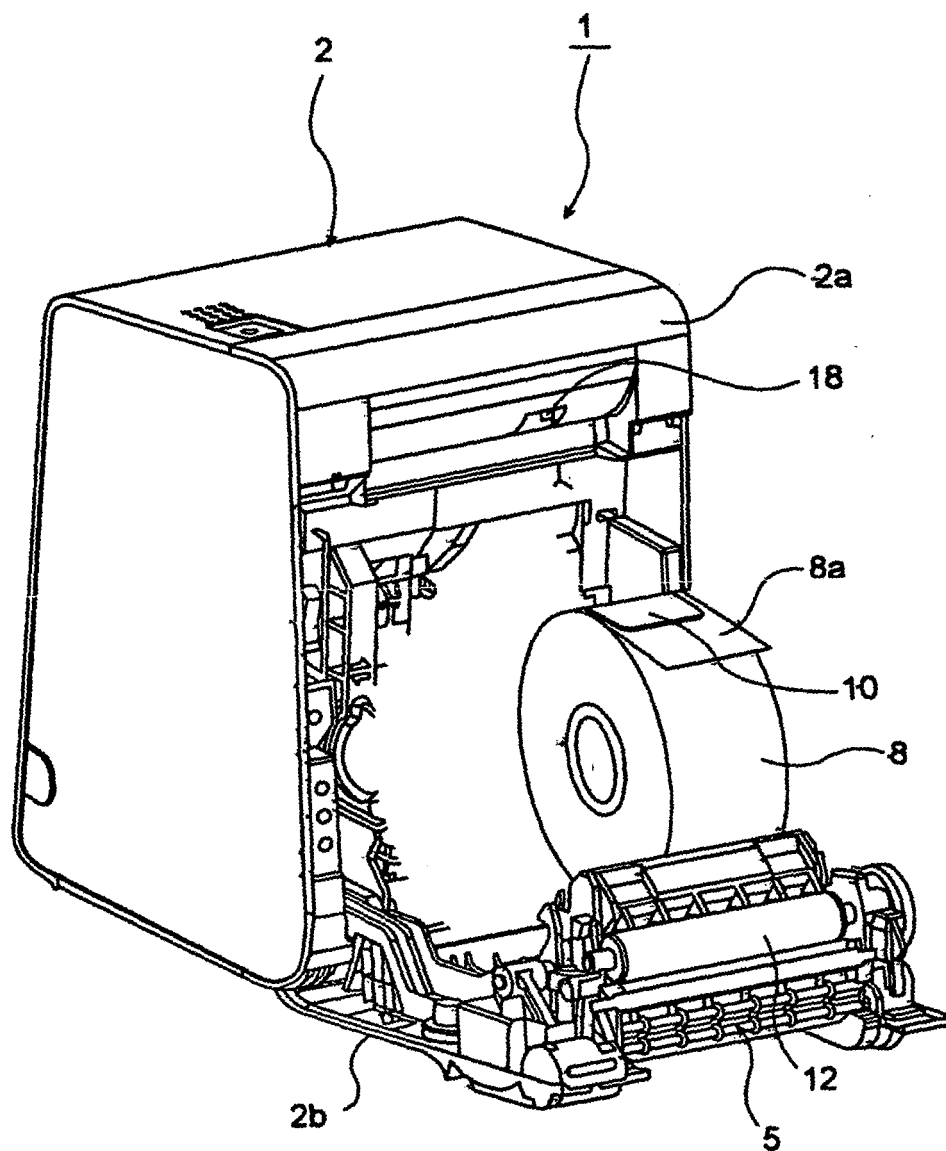


FIG. 3

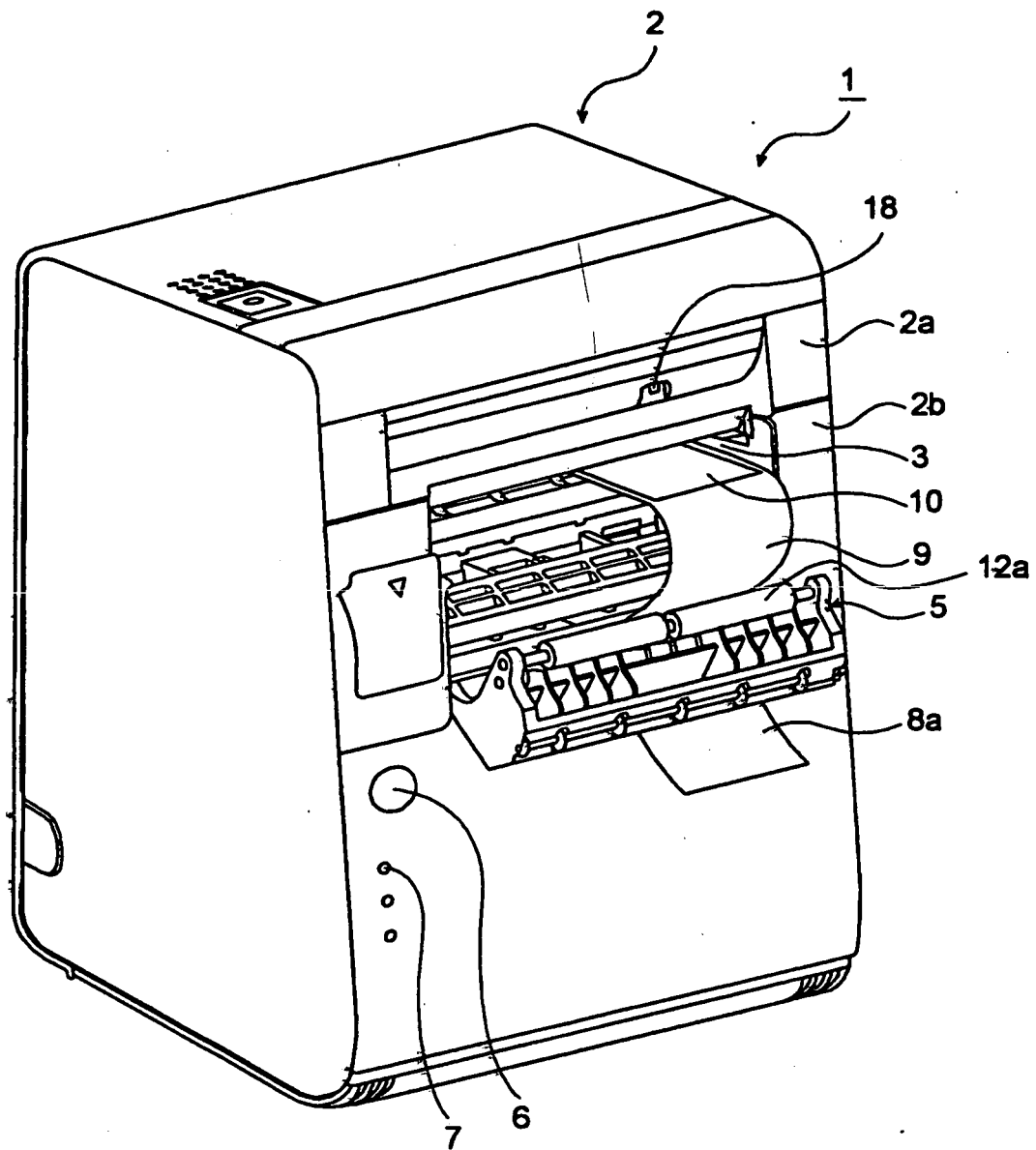


FIG. 4

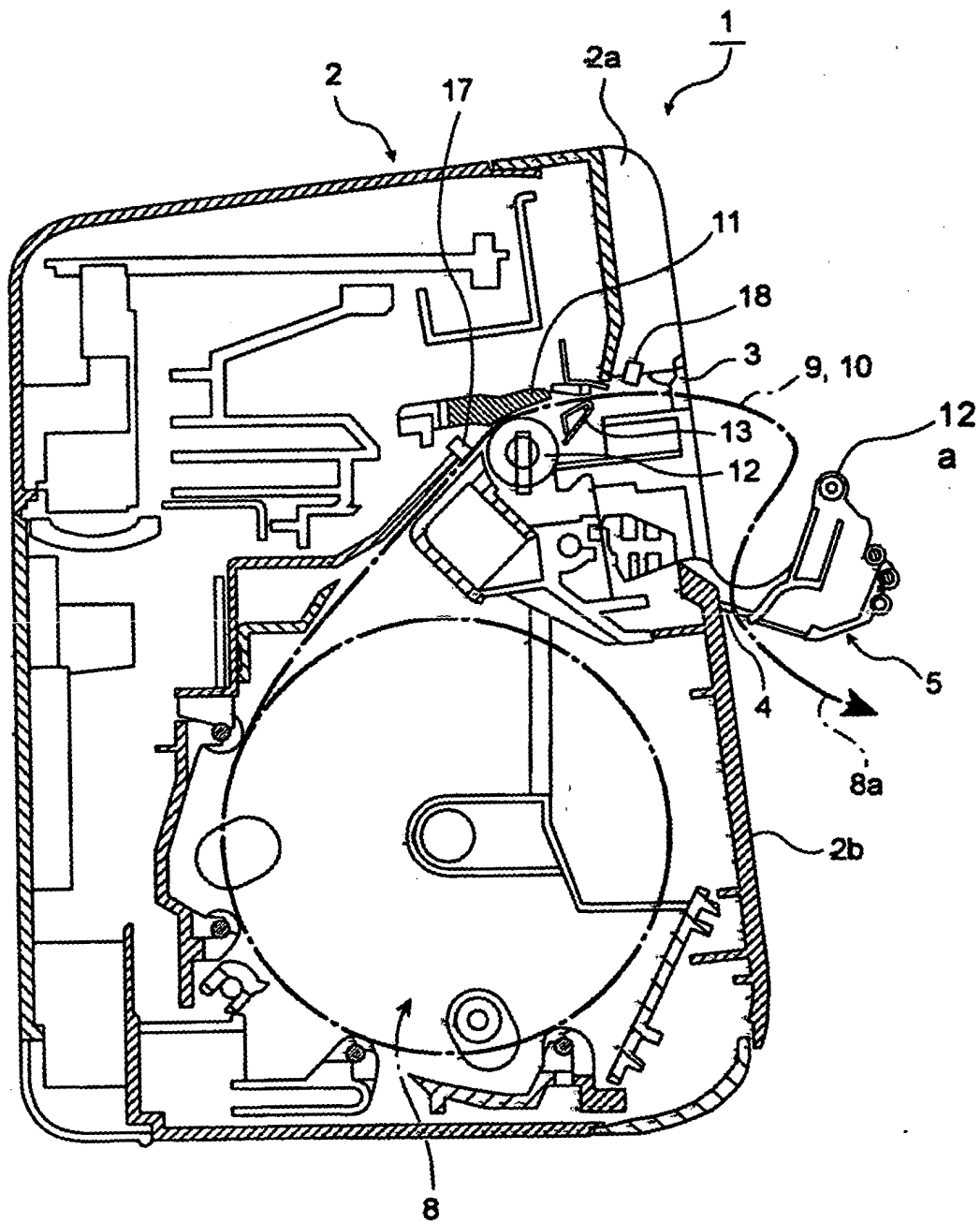


FIG. 5

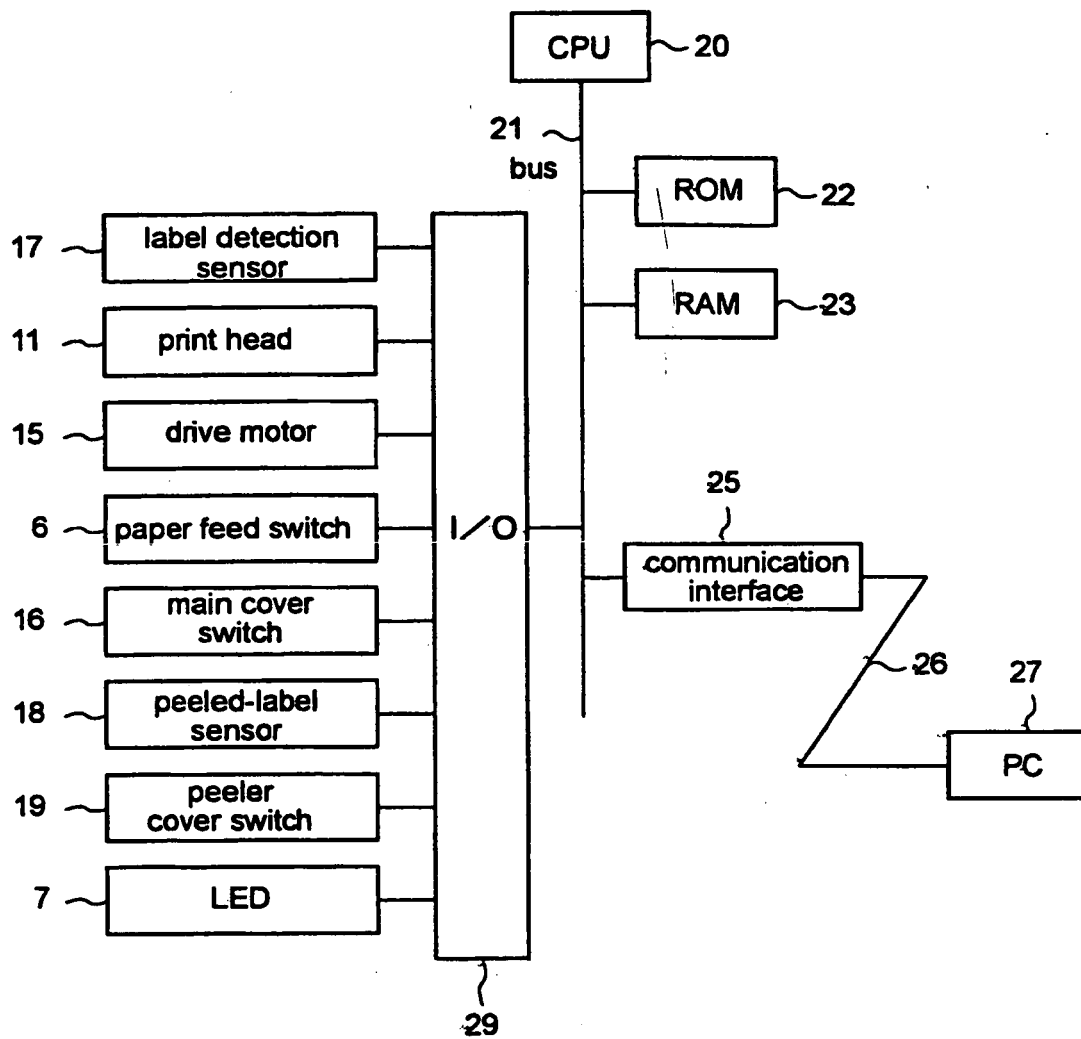


FIG. 6

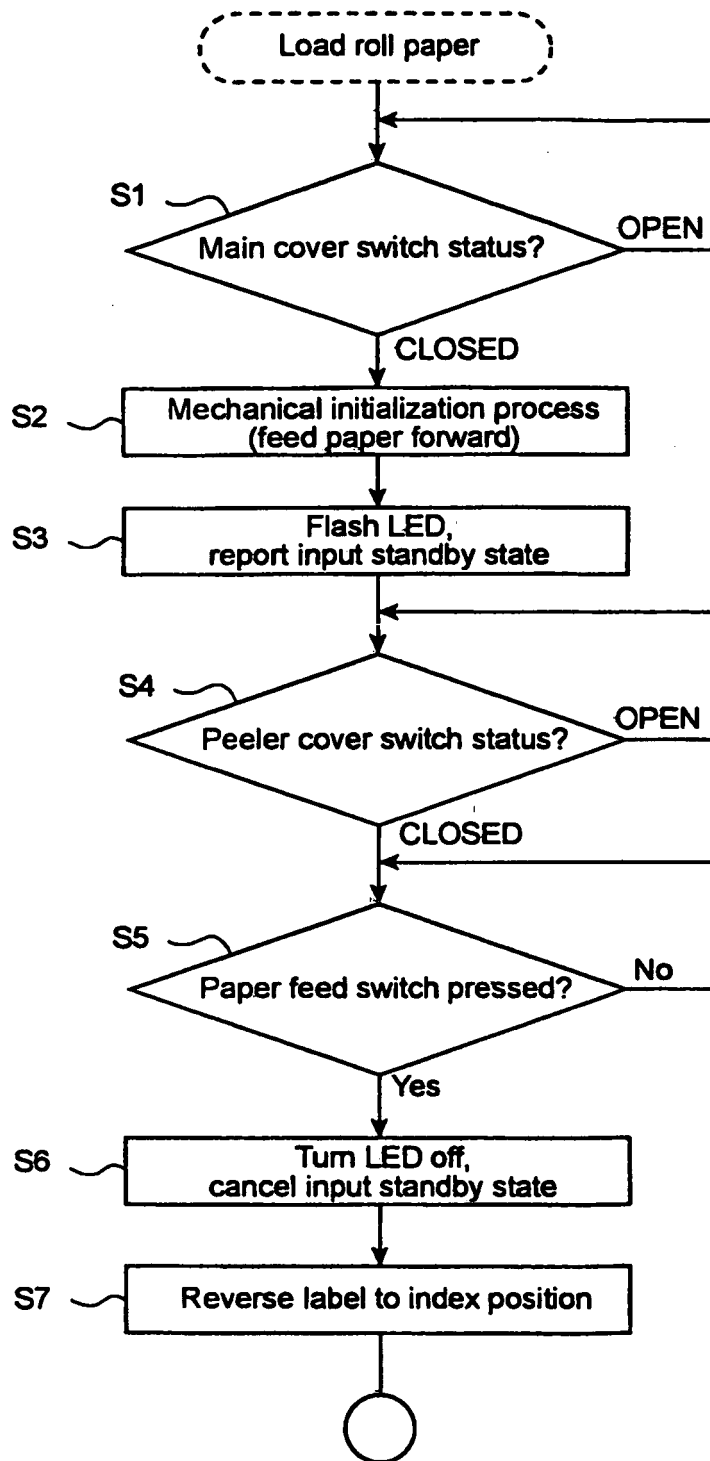


FIG. 7

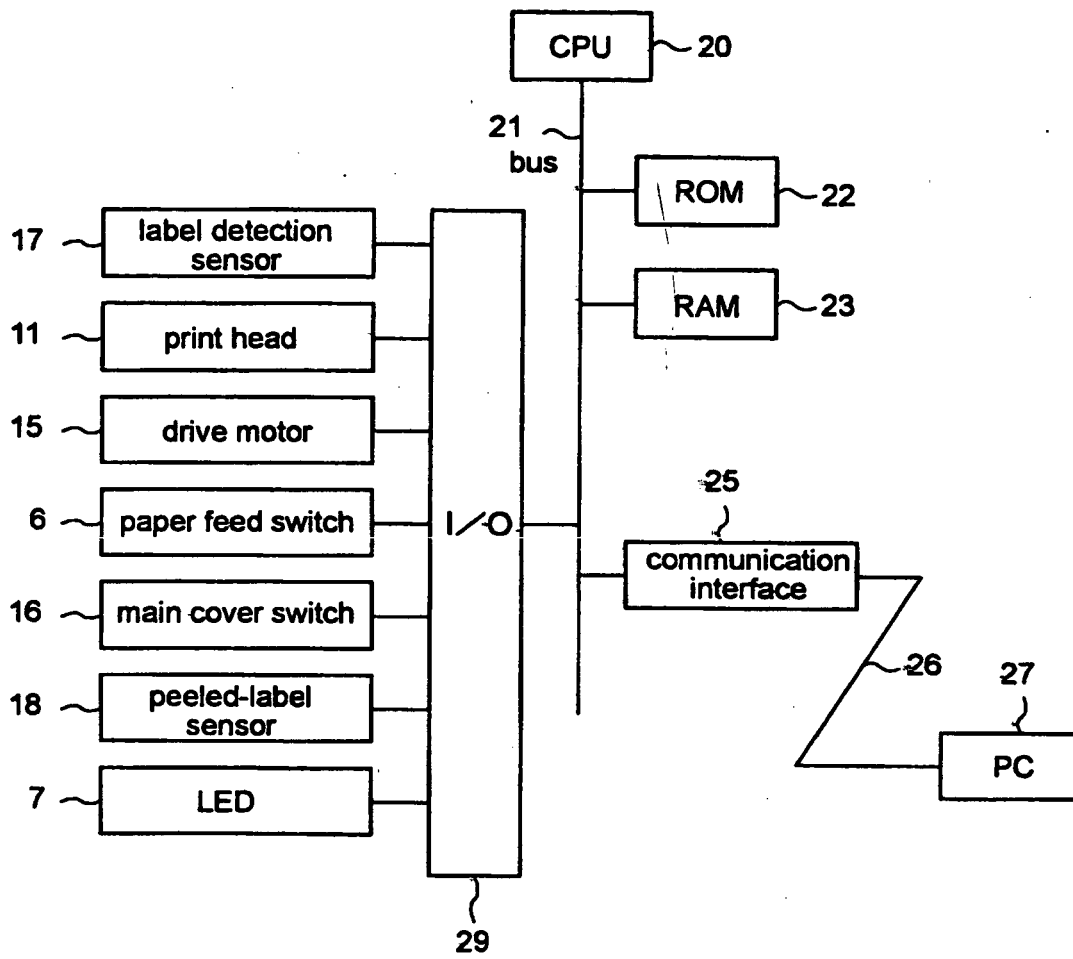


FIG. 8

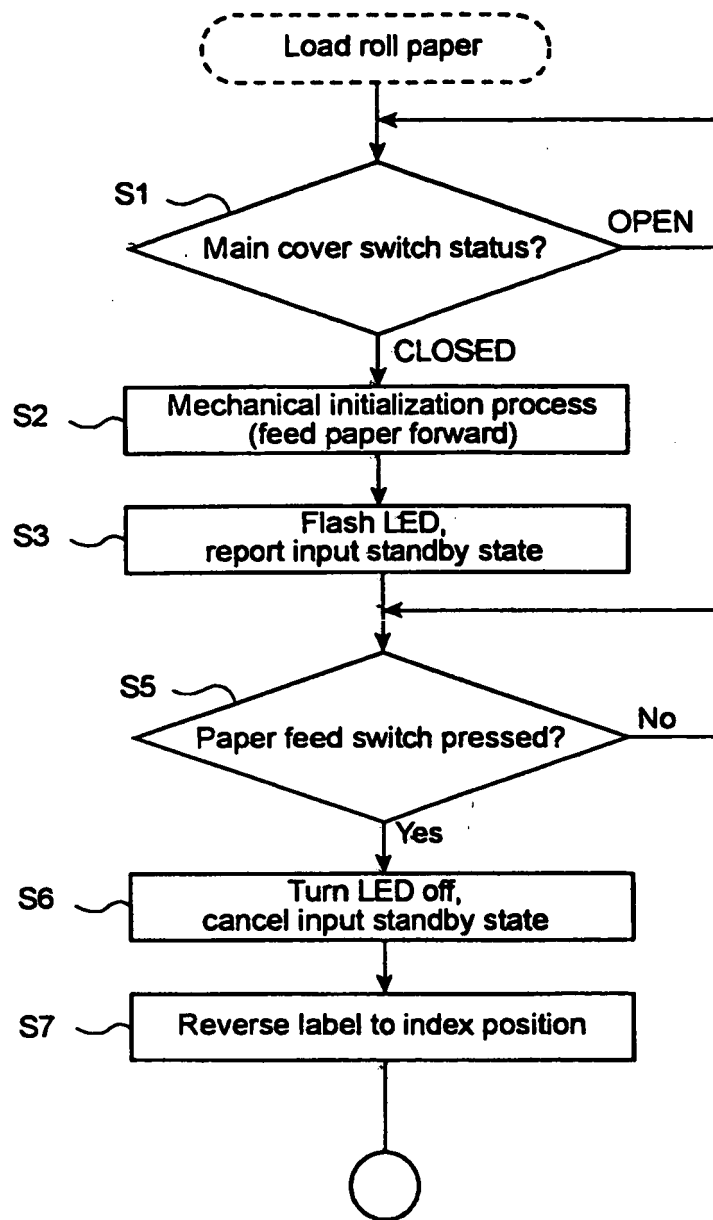


FIG. 9

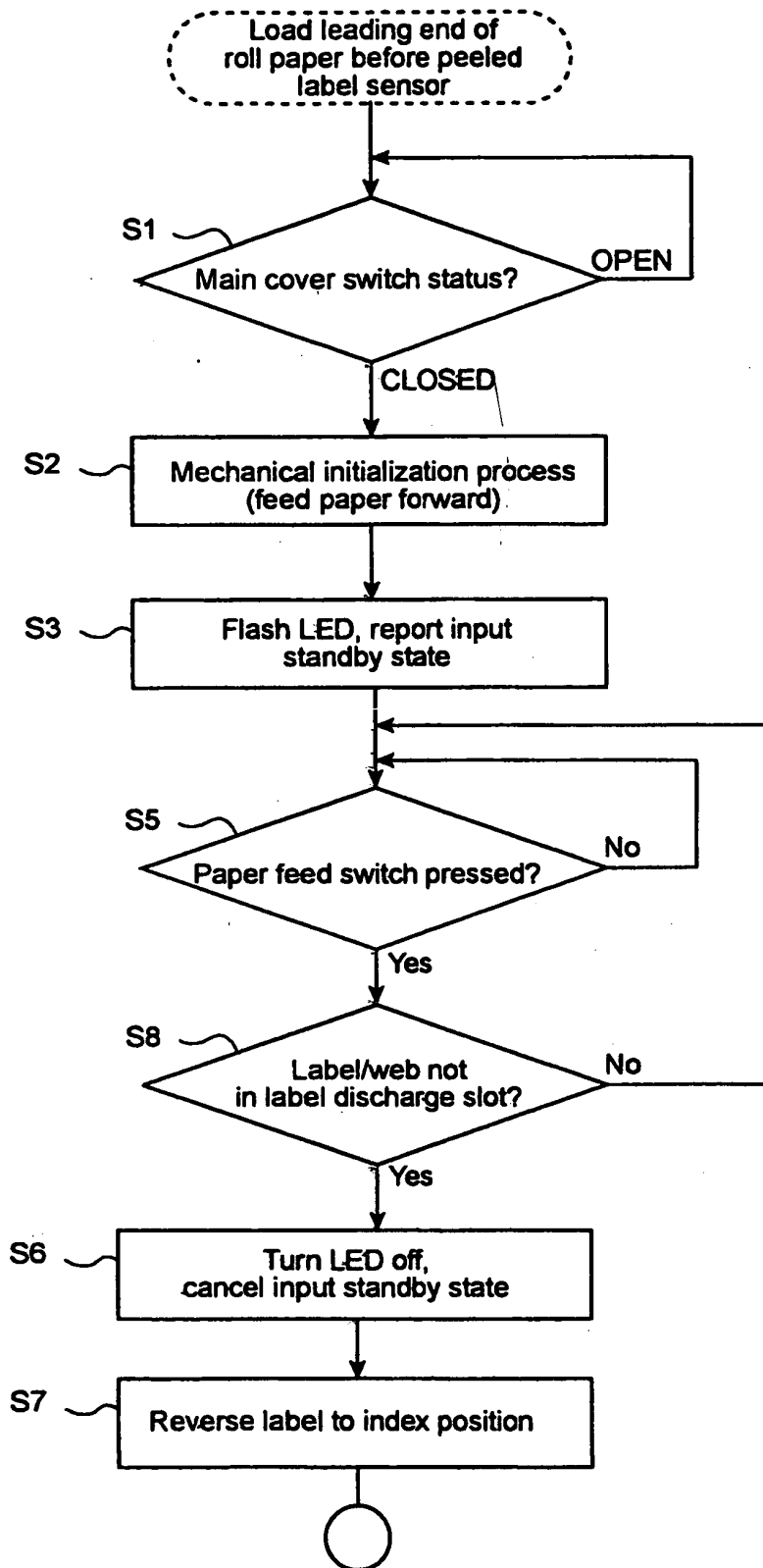


FIG.10

FIG.11A

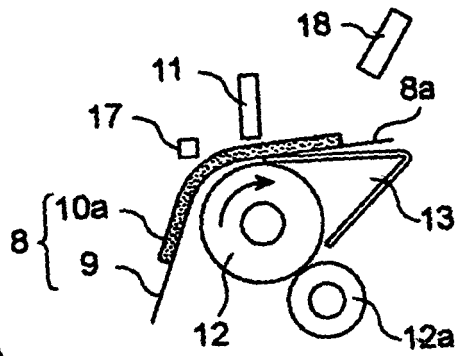


FIG.11B

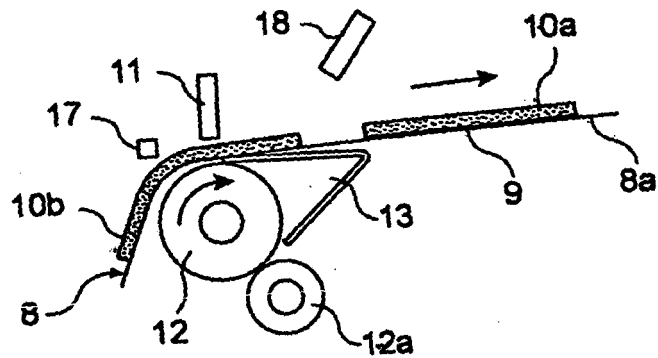


FIG.11C

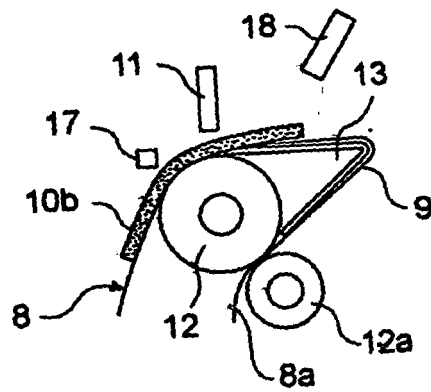
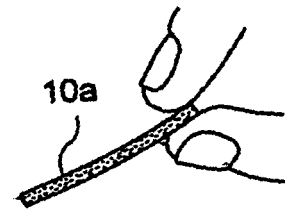
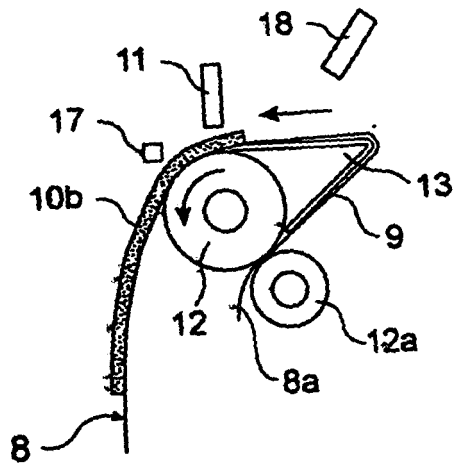


FIG.11D



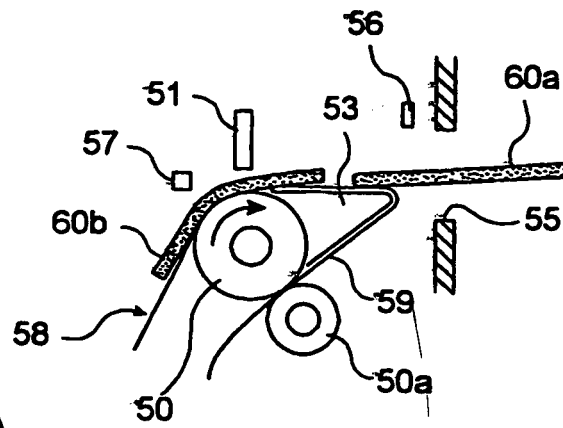


FIG. 12A

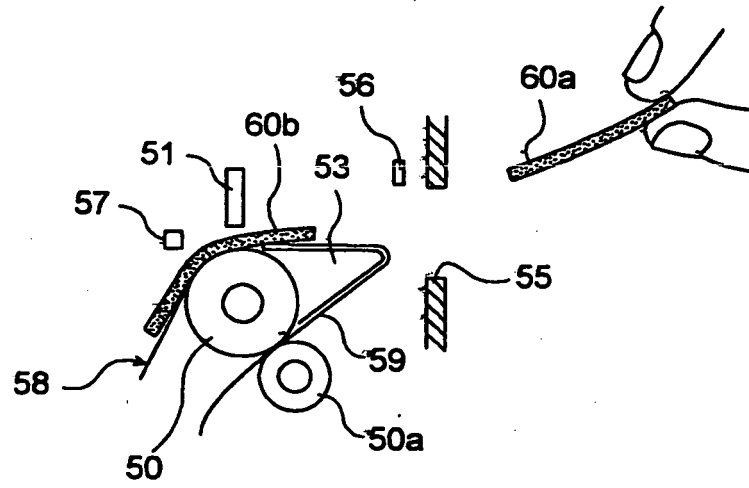


FIG. 12B

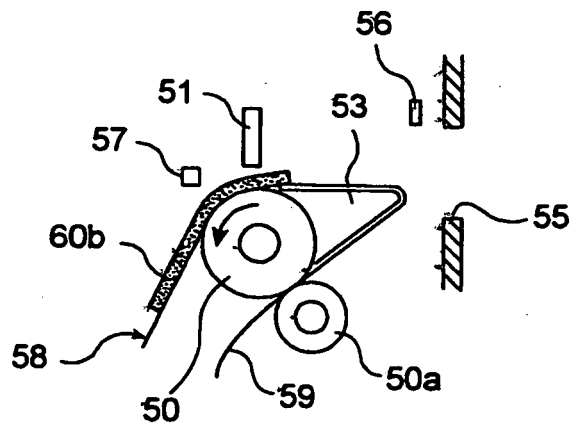


FIG. 12C

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 8295323 A [0004]