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(54) **Holder for holding an ink tank and ink tank**

(57) The invention relates to a device for supplying ink to an recording apparatus comprising a holder for being operably secured to a retainer (4) of said recording apparatus said retainer (4) being provided with an ink receiving device (42, 43) and a terminal portion (41) connected to a processing unit, the holder (2, 102, 202, 302,

502) being formed as an at least partially open shell for receiving at least one ink tank (2, 103, 203, 303, 503) and comprising at least one contact element (21, 121, 221a, 221 b, 321, 421) provided on an outer surface (22) for contacting the terminal portion (41) provided on the retainer (4).

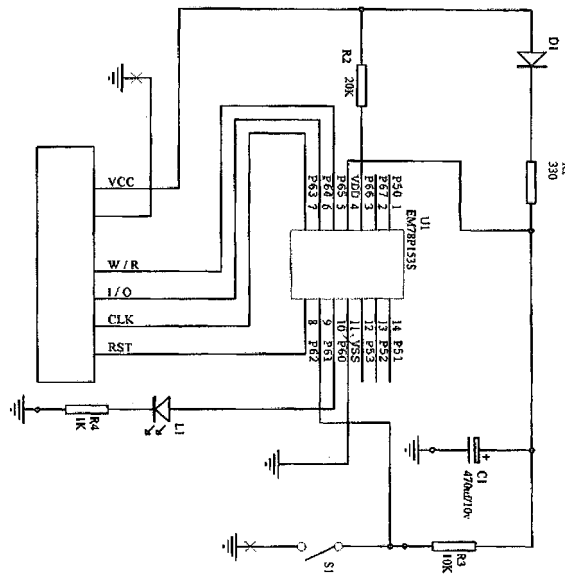


Fig. 5

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Description

[0001] The invention relates to a device for supplying ink to an ink jet recording apparatus comprising a retainer which retainer is provided with an ink receiving device. The invention further relates to a holder and an ink tank for such a device.

[0002] Ink jet recording apparatuses such as printers, plotters, copying machines, facsimile machines and the like, are widely used. Generally, such a recording apparatus has a cartridge mounting portion or retainer for detachably accepting an ink cartridge for supplying ink to a recording or print head. Various types of the recording apparatuses are known wherein most of them use one of the three technologies thermal, piezoelectric, and/or continuous. The print head or recording head may be formed integrally with the retainer, and the retainer and/or the print head may be mounted on a carriage, which is reciprocally moved relative to a print medium. In other embodiments the receiving portion is provided on a stationary part of the apparatus, wherein ink is supplied from the receiving device of the retainer to a print head via an ink tube or the like. In still another embodiment, the print head is part of the disposable ink cartridge, wherein the ink cartridge and the print head may come in two pieces, which are combined prior to mounting to the retainer.

[0003] Recently, ink cartridges have been equipped with a memory chip, e.g. for monitoring the amount of ink consumed. The memory chip is accessible through contact elements, wherein the retainer is provided with respective terminal elements connected to a processing unit on the recording apparatus and/or a computer or the like connected to the recording apparatus. For enabling a printing process, a contact between the terminal elements on the retainer and the contact elements on the ink cartridge must be guaranteed. Therefore, it is known to provide the ink cartridge and the retainer with respective engagement elements. However, due to a repeated replacement of the consumable ink cartridges, the engagement elements may be exposed to wear and/or undesired plastic deformation, which may result in a malfunction of the engagement elements.

[0004] It is an object of the present invention to provide device for reliably supplying ink to an ink jet recording apparatus.

[0005] According to a first aspect of the invention, a holder for mounting on a retainer of an ink jet recording apparatus having an ink receiving device and a terminal portion is provided, said holder being formed as an at least partially open shell for receiving at least one ink tank, and said holder comprising at least one contact element provided on an outer surface of said holder for contacting a respective terminal portion provided on the retainer.

[0006] According to this first aspect of the invention, the disposable ink cartridge is divided in two parts, namely a holder and a (disposable) ink tank. The holder is provided with contact elements for contacting the termi-

nal portion on the retainer. The (disposable) ink tank may be designed relatively simple, compared with the holder. Today, a wide range of different types of recording apparatuses are in use, different devices use different types of ink cartridges. According to the invention, for different types of recording apparatuses, different holders may be necessary, wherein different holders may be designed to receive a common ink tank. This allows a user to modify several printing apparatuses by installing respective holders and using the same ink tank or ink tanks of the same type in different printing apparatuses. Consequently, the consumer is no longer forced to remember his printer type for buying ink tanks. In addition, the costs for manufacturing a respective ink tank may be further reduced.

[0007] According to one embodiment of the present invention, the holder comprises at least one engagement element for cooperating with a respective mounting element on the retainer. In accordance with the invention, engagement elements for cooperating with the retainer of the recording apparatus are part of an intermediate element or holder and no longer part of the disposable product. The engagement element is formed so as to ensure reliably a stable contact between the contact element on the holder and the contact portion on the retainer. Shape, size and/or positioning of engagement elements and/or the contact elements provided on the holder are chosen to meet requirements of a recording apparatus. In addition, at least one connecting element may be provided on the holder for securing a respective ink tank on installation.

[0008] According to one embodiment of the present invention, a memory device is provided on said holder, wherein said at least one contact element is connected to said memory device. The memory device and the contact elements may be provided on a common circuit board or chip element.

[0009] According to another embodiment of the present invention said at least one contact element is connected to an internal contact element provided on an inner surface of said holder. The internal contact elements may be provided on any wall of said holder. The (outer) contact elements and the internal contact elements may be connected to the internal contact elements using an electrical connector. In the context of the invention, an electrical connector may be consisting of wire that electrically connects two circuit points. The internal contact elements may be provided on a circuit board on which also said memory device is provided.

[0010] According to another embodiment of the present invention at least two contact elements are provided on the outer surface of the holder, wherein a first contact element is connected to a memory device provided on said holder and the second contact element is connected to an internal contact member formed for contacting a respective contact element provided on said ink tank. In one embodiment, two internal contact members are provided which are contacting one common contact

element provided on the ink tank, wherein an electrical circuit is shorted by inserting a respective ink tank. This allows a reliable detection of an inserted ink tank.

[0011] According to another embodiment of the present invention resetting means are provided for resetting said memory device. By providing resetting means on the holder, said memory device may be reset without detaching the holder from the retainer. The resetting means may be realized as internal resetting means, wherein for example a counter is automatically reset to zero once a maximum value is reached. In another embodiment, the resetting means include an external element, which preferably, is provided on a part of the holder not accessible if the ink tank is attached to the holder. Thereby, a misuse of the external resetting element during operation is prevented.

[0012] According to another embodiment of the present invention, actuating means are provided for triggering the resetting means when mounting an ink tank on said holder and/or removing an ink tank from said holder. Resetting of said memory device may be achieved by shorting a circuit. If resetting is achieved when mounting the ink tank and/or removing the ink tank, the use of such a system is very convenient. However, in one embodiment, means may be provided for detecting if the same cartridge is re-installed without being refilled. This means may include a second memory device provided on the ink tank.

[0013] According to a second aspect of the present invention, an ink tank for mounting on said holder is provided.

[0014] According to one embodiment of the invention said ink tank is provided with at least one connecting member, in particular a positioning, fixing and/or clamping element, for co-operating with a respective connecting element of said holder.

[0015] According to one embodiment of the invention, the ink tank is provided with at least one protection member, for preventing handling of said engagement element of said holder, if the ink tank is inserted in said holder. The holder may be installed permanently in the recording apparatus, e.g. by gluing the holder to the retainer or the like. However, in most cases, the user may prefer to maintain the possibility of removing the holder. In order to avoid undesired removal of the holder when replacing the ink tank, the ink tank is provided with means which prevent a conjoint handling. As a result, the holder may only be removed from the receiving portion after the ink tank has been removed.

[0016] According to another embodiment of the present invention, the ink tank is provided with an ink supply port to be mounted on a respective ink supply needle formed on the retainer. An ink receiving device formed with an ink supply needle is typically used in a piezoelectric ink jet recording apparatus. For other printers, different receiving devices may be advantageous.

[0017] According to a third aspect of the present invention, a device for supplying ink to an recording appa-

ratus comprising a retainer which retainer is provided with an ink receiving device is provided, the device comprising at least one holder for mounting to the retainer and at least one ink tank for mounting to the holder.

[0018] According to another aspect of the invention, the holder and/or the ink tank are provided with locking elements for preventing a conjoint handling of the holder and the ink tank. As mentioned above, for the sake of convenience, it is preferable that means are provided for avoiding a removal of the holder while removing the ink tank. Further, for ensuring a stable contact between the contact elements of the holder and the contact portion on the retainer, means are provided for preventing from a conjoint installation of the two parts. Thereby, one may ensure that the holder is installed properly prior to installation of the ink tank. Of course, conjoint use of the holder and the ink tank after installation in the printer is not hindered.

[0019] In the following, embodiments of the invention will be described in detail with reference to the drawings. In the drawings, identical or like elements are denoted by the same or like reference numerals. Features of different embodiments may be combined for obtaining further embodiments.

Figure 1 is a schematic cross-sectional side view of an inventive device comprising a holder and an ink tank according to a first embodiment of the invention;

Figure 2 is a perspective schematic view of an inventive device comprising a holder and an ink tank according to a second embodiment of the invention;

Figure 3 is a perspective schematic view of an inventive device comprising a holder and an ink tank according to a third embodiment of the invention;

Figure 4 is a perspective schematic view of an inventive device comprising a holder and an ink tank according to a fourth embodiment of the invention;

Figure 5 is a schematic view of an electrical circuit for a reset;

Figure 6 is a perspective schematic view of an inventive device comprising a holder and an ink tank according to a fifth embodiment of the invention; and

Figure 7 is a perspective schematic view of an inventive device comprising a holder and an ink tank according to a sixth embodiment of the invention; and

Figure 8 is a side schematic view of a holder according to figure 7.

[0020] Figure 1 is a cross-sectional side view of a device 1 according to a first embodiment of the invention comprising a holder 2 and an ink tank 3, wherein the holder 3 is operably secured to a retainer 4 of a recording apparatus (not depicted). The retainer 4 is provided with an ink receiving device 42 comprising an ink supply needle 43, terminal portions 41 connected to a processing unit (not depicted), and mounting elements 40, 40a.

[0021] The holder 2 comprises two opposing sidewalls 22, 23 and a bottom 24. Further sidewalls, connecting the opposing sidewalls 22, 23 may be provided, but are not visible in fig. 1. On a first sidewall 22, on the right in fig. 1, the holder 2 is provided with contact elements 21 for contacting the terminal portions 41 of the retainer 4. The holder 2 is provided with engagement elements 20, 20a, which cooperate with counterparts 40, 40a of the retainer 4 so that the holder 2 is exactly positioned within the retainer 4. In the embodiment depicted in fig. 1, the bottom 24 of the holder 2 is provided with a protrusion 20a which is inserted into a recess 40a of the retainer 4. The sidewall 44 of the retainer 4 is designed as a locking element with a notch 40 for locking the holder 2 within the retainer 4. As a result, the contact elements 21 are exactly positioned with respect to their cooperating elements, i.e., the terminal portions 41 of the retainer 4.

[0022] The two sidewalls 22, 23 of the holder 2 position the ink tank 3 in a predetermined location. The holder 2 is further provided with connecting elements for retaining the ink tank 3 within the holder 2. In the embodiment depicted in figure 1, the left sidewall 23 is provided with a notch 25 facing towards the inside which cooperates with an edge of the ink tank 3. The bottom 24 of the holder 2 has an elongated hole 24a through which an ink supply port 32 of the ink tank 3 may extend for mounting the ink tank 3 to the ink receiving device 42 of the retainer 4.

[0023] As shown with a broken line 21 a in figure 1, the contact elements 21 are provided on a part of the holder 2, which is resiliently movable with respect to the terminal portion 41. If no ink tank 3 is installed, the contact elements 21 are forced apart from the terminal members 41. The ink tank 3 forces the contact elements 21 in the direction of the terminal members 41 for establishing a respective contact.

[0024] Figure 2 is a perspective schematic view of an inventive device 101 comprising a holder 102 and an ink tank 103 according to a second embodiment of the present invention. The holder 102 may be operably secured to a retainer according to figure 1 (not depicted in figure 2) of a recording apparatus. For this purpose, the holder 102 is provided with an engagement element 120, which in the depicted embodiment is formed as a lever, for cooperating with a respective mounting element (non-depicted) formed on said retainer. Further, contact elements 121 are provided on an outer-surface of the sidewall 22 of the holder 102. A number of contacts 121, their

position on the holder 2, their shape and/or their size is chosen so as to match a respective terminal portion provided on the non-depicted retainer. In the embodiment according to figure 2, contact elements 121 are provided in two parallel rows, which are in parallel to a bottom surface 24 (see figure 1) of the holder 102, wherein the number of contact elements 121 of a lower row with respect to an insertion direction I is larger than the number of contact elements 121 of an upper row. The contact elements 121 have a circular base area and are essentially aligned in one plane with the outer surface of the sidewall 22 of the holder 102. Of course, other shapes are also possible, e.g. a rectangular or star-shaped base area and/or ball-shaped or elongated contact elements. The holder 102 is formed as an open shell, wherein the depicted holder 102 comprises three sidewalls 22, 23, 26 and a bottom wall (non-visible in figure 2) forming a parallelepiped. In other embodiments the holder 102 may comprise four sidewalls and/or no bottom wall. In still another embodiment, the holder may have a different shape, e.g. a cylindrical or prism shape.

[0025] In the embodiment shown in figure 2, the contact elements 121 and the lever 120 are provided on the same sidewall 22. In other embodiments the contact elements 121 and an engagement element may be provided on different sidewalls, e.g. on opposing sidewalls as shown in figure 1. In the depicted embodiment, the sidewall 22 on which the lever 120 and the contact elements 121 are provided, is shorter in length than an adjacent sidewall 26. The two opposing sidewalls 22, 23, denoted as the left sidewall 23 and the right sidewall 22, are provided with connecting elements 125 for positioning of the ink tank 103. On an inner surface of the sidewall 26 internal contacts elements 27 are provided, which are electrically connected to the contact elements 21 provided on the outer surface of the sidewall 22 using an electrical connector such as a lead wire 28 or the like. The lead wire may be formed integrally with the holder 102 for example during an injection moulding of the holder 102. The holder 102 may be affixed to a retainer and the ink tank 103 may be mounted on the holder 102. When ink stored in the ink tank 103 is consumed, the ink tank 103 may be replaced without removing the holder 102 from the retainer.

[0026] The ink tank 103 may be mounted to the holder 102, wherein the ink tank 103 is provided with a positioning groove 35 for engaging with the connecting elements 125 of the holder 102. The depicted ink tank 103 is formed as a cuboid, wherein an integrated circuit element or chip 30 is provided on one sidewall 31 of the ink tank 3. The chip 30 comprises contact members 37, 37a for contacting the internal contact elements 27 of the holder 102 and a memory device 38.

[0027] In most cases, when manufacturing an ink tank, the manufacturer is forced to locate contact elements on the ink tank so as to match the positions of terminal members on the printer. By providing a holder 102 with internal contact elements 27, an enhanced freedom in design for

the manufacturer is given. Further, the size of internal contact elements 27 may be chosen to be larger than the size of terminal elements provided on a retainer, so as to enhance the stability of the contact. The position of internal contact elements 27 may be chosen so as to avoid any interference with the engagement elements 20 and/or the connecting elements 125.

[0028] The number of contact members 37, 37a is smaller than the number of internal contact elements 27 on the holder 102, wherein one contact member 37a is arranged for touching two contact elements 27 on the holder 102.

[0029] Figure 3 is schematic view of a device 201 comprising a holder 202 and an ink tank 203 according to a third embodiment of the invention. The device 201 is similar to the device 101 shown in figure 2. For identical or like elements identical reference signs are used and a detailed description of these elements is omitted.

[0030] The device 201 depicted in fig. 3 is provided with two memory devices 29 and 38, wherein a first memory device 29 is provided on the holder 202 and a second memory device is provided on the ink tank 203. The contact elements 221 a, 221 b provided on the surface 22 of the holder 202 are divided in two groups, wherein a first group of contact elements 221 a is electrically connected to the first memory device 29 on the holder 202 and the second group of contact elements 221 b is connected to internal contacts 27 provided on an inner surface of the sidewall 26. The two memory devices 29, 38 may be used for storing different kinds of information. For example, the amount of ink consumed may be stored in the memory device 38 provided on the ink tank 203, wherein the number of subsequently installed ink tanks and other information may be stored in the memory device 29 on the holder 202. As indicated with a broken line 229, the memory device 29 and the respective contact elements 221 a may be formed on a circuit board or chip.

[0031] The ink tank 203 is provided with a protection member 33, which in the depicted embodiment is formed as a projecting element covering the lever 120 when the ink tank 203 is mounted on the holder 202.

[0032] Figure 4 is schematic view of a device 301 comprising a holder 302 and an ink tank 303 according to a fourth embodiment of the invention. The device 301 is similar to the device 201 shown in figure 3. For identical or like elements identical reference signs are used and a detailed description of these elements is omitted. The device 301 depicted in fig. 4 is also provided with two memory devices 29 and 38, wherein the first memory device 29 is provided on the holder 302 and a second memory device is provided on the ink tank 303. Star shaped contact elements 321 provided on the outer surface of the sidewall 22 of the holder 302 are connected to internal contact elements 327a, 327b provided on an inner surface of the holder 302. The internal contact elements 327a, 327b are divided in two groups, wherein a first group of contact elements 327a is electrically connectable to respective contact members 37, 37a on the

ink tank 303 and the second group of contact elements 327b is connected to the first memory device 29 on the holder 302. The second group of contacts 327b and the memory device 29 are provided on a chip 329.

5 **[0033]** Further, an actuating element 5 comprising a push button is provided on the holder 302 for resetting the memory device 29. In the embodiment depicted in figure 4, indicating means are provided for indicating the status of the memory device 29.

10 **[0034]** In other embodiments, means for resetting the memory device 29 provided on the holder 302 may be realized so as the memory device 29 is reset when mounting the ink tank 303 to the holder 302 and/or removing the ink tank 303 from the holder 302. This may be accomplished by shorting a circuit and/or interrupting a circuit line. In still another embodiment, an automatic reset may be programmed to the chip 329, wherein for example the memory device is reset to zero, once a counter for ink droplets has reached a maximum value.

20 **[0035]** Figure 5 shows schematically an electrical circuit for realizing a reset function. The circuit comprises a microprocessor, which in the depicted embodiment is an EM78P153E. EM78P153S is an 8-bit microprocessor with low-power and high-speed CMOS.

25 **[0036]** Figure 6 is schematic view of a device 401 comprising a holder 402 and an ink tank 403 according to a fifth embodiment of the invention. The device 401 is similar to the devices shown above and for identical or like elements identical reference signs are used and a detailed description of these elements is omitted. A first group of contact elements 121 is provided on the outer surface of the sidewall 22 of the holder 402. The contact elements 121 are connected to the memory device 29. A second group of contacts elements 421 is provided on an inner surface of the holder 402 and depicted in broken lines in fig. 5. The contact elements 421 of the second group are also connected to the memory device 29. On the ink tank 403 one contact member 427 is provided, which contacts both internal contact elements 421 when the ink tank 403 is installed in the holder 402, thereby the contact elements 421 are shorted. The memory device 29 is equipped with means for resetting the memory device 29 in response to a short-circuit.

35 **[0037]** As an alternative or in addition, the internal contact elements 37 may be connected to contact elements 121 on the outside of the holder 402. Thereby, shorting the internal contact elements 37 by installing the ink tank also shorts the respective contact elements 121 on the outside of the holder 402, connected to a processing unit (not depicted) of a printing device. Hence, installation of the ink tank may be detected by the printing device, resulting in an activation of the ink tank, sending a reset signal to the memory device or the like.

40 **[0038]** Figure 7 is a schematic view of a device 501 according to a sixth embodiment of the present invention. The device 501 comprises a holder 502 on which an ink tank 503 is mounted. Figure 8 is a side view of the holder 502 according to figure 7. The holder 502 comprises a

lever 520 for cooperating with mounting elements of a non-depicted ink jet recording apparatus and a chip 529 with contact elements 421 and a memory device 529. For a better handling, the ink tank 503 is provided with a grip element 534. On the grip element a wedge element 535 is formed for preventing the lever 520 of the holder 502 from being moved as long as the ink tank 503 is mounted to the holder 502. On a sidewall 526 of the holder 502 a resilient element 525 is provided. The resilient element 525 is projecting to the inside of the holder 502 if no forces are exerted on it. Thereby the resilient element 525 is preventing an ink tank 503 from being accidentally mounted on the holder 502. The holder 502 is further provided with shoulders 524 for allowing a better installation of the holder 502 on a retainer as shown in figure 1.

[0039] It is obvious that all depicted embodiments are only exemplary and numerous modifications are possible.

Claims

1. Holder for being operably secured to a retainer (4) of a recording apparatus said retainer (4) being provided with an ink receiving device (42, 43) and a terminal portion (41) connected to a processing unit, the holder (2, 102, 202, 302, 402, 502) being formed as an at least partially open shell for receiving at least one ink tank (2, 103, 203, 303, 403, 503) and comprising at least one contact element (21, 121, 221 a, 221b, 321, 421) provided on an outer surface (22) for contacting the terminal portion (41) provided on the retainer (4).
2. Holder according to claim 1, **characterized in that** the holder is provided with at least one engagement element (20, 20a, 120, 520) for cooperating with at least one mounting element (40, 40a) provided on the retainer (4).
3. Holder according to claim 1 or 2, **characterized in that** a memory device (29) is provided on said holder (202, 302), wherein said at least one contact element (21, 221 a) is connected to said memory device (29).
4. Holder according to claim 1, 2 or 3, **characterized in that** said at least one contact element (21, 221 b) is connected to an internal contact element (27) provided on an inner surface of said holder (102, 202, 302).
5. Holder according to claim 3 or 4, **characterized in that** at least two contact elements (221a, 221b) are provided on the outer surface of said holder (202, 302), wherein a first contact element (221 a) is connected to a memory device (29) provided on said holder (202, 302) and a second contact element (221 b) is connected to an internal contact member (27) formed for contacting a respective contact element provided on an ink tank.
6. Holder according to any of the claims 3 to 5, **characterized in that** resetting means are provided for resetting said memory device (29).
7. Holder according to claim 6, **characterized in that** actuating means (5) are provided for triggering the resetting means when mounting an ink tank (203, 303, 403) on said holder (202, 302, 402) and/or removing an ink tank (203, 303, 403) from said holder (202, 302, 402).
8. Ink tank for mounting on a holder (2, 102, 202, 302, 402, 502) according to any of the claims 1 to 7.
9. Ink tank according to claim 8, **characterized in that** said ink tank (103, 203, 303, 403, 503) is provided with at least one connecting member, in particular a positioning, fixing and/or clamping element, for cooperating with a respective connecting element (25, 125) of said holder (2, 102).
10. Ink tank according to claim 8 or 9, **characterized in that** the ink tank (203, 503), is provided with at least one protection member, for preventing handling of said engagement element (120, 520) of said holder, if the ink tank (203, 503) is inserted in said holder.
11. Ink tank according to any of the claims 8 to 10, **characterized in that** the ink tank (3, 103, 203, 303, 403, 503) is provided with an ink supply port (32) to be mounted on a respective ink supply needle (43) formed on the retainer (4).
12. Ink tank according to any of the claims 8 to 11, **characterized in that** said ink tank (103, 203, 303, 403) is provided with a memory device (38).
13. Device for supplying ink to an recording apparatus comprising a retainer (4) which retainer (4) is provided with an ink receiving device (42, 43), the device (1) comprising at least one holder (2, 102,202, 302, 402, 502) for mounting to the retainer (4) according to any of the claims 1 to 7 and at least one ink tank (3, 103, 202, 303, 403, 503) for mounting to said holder (2, 102,202, 302, 403, 502).
14. Device according to claim 13, **characterized in that** said holder (502) and/or said ink tank (503) are provided with locking elements (525) for preventing a conjoint handling of said holder (502) and said ink tank (503).

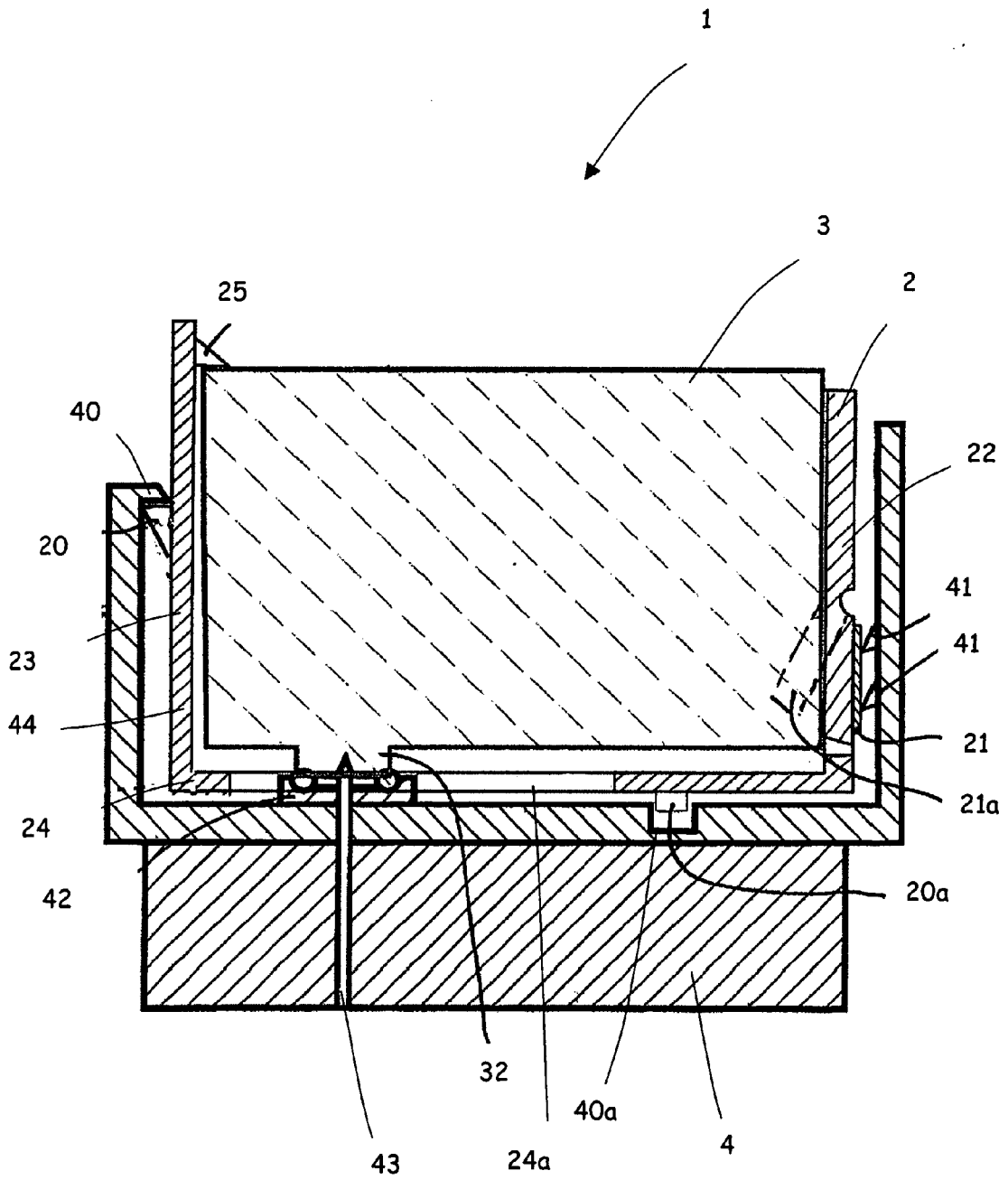


Fig. 1

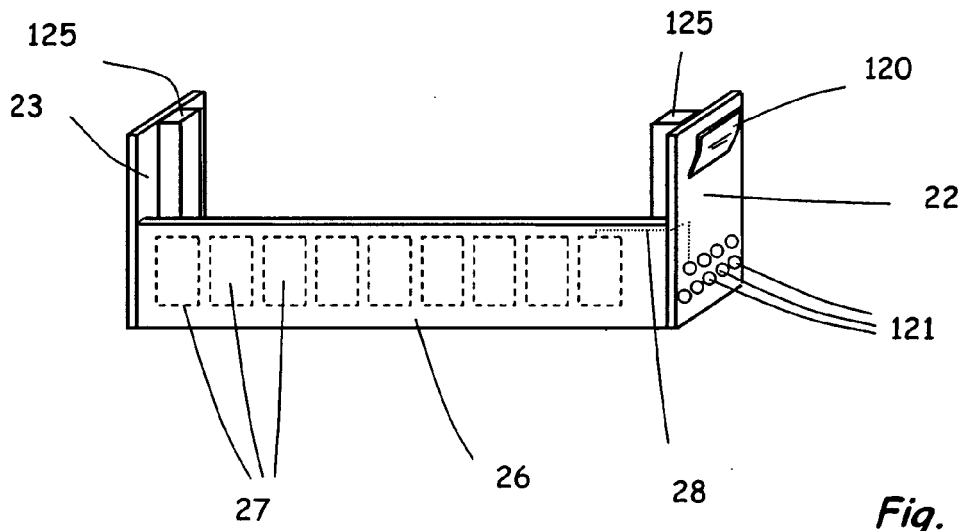
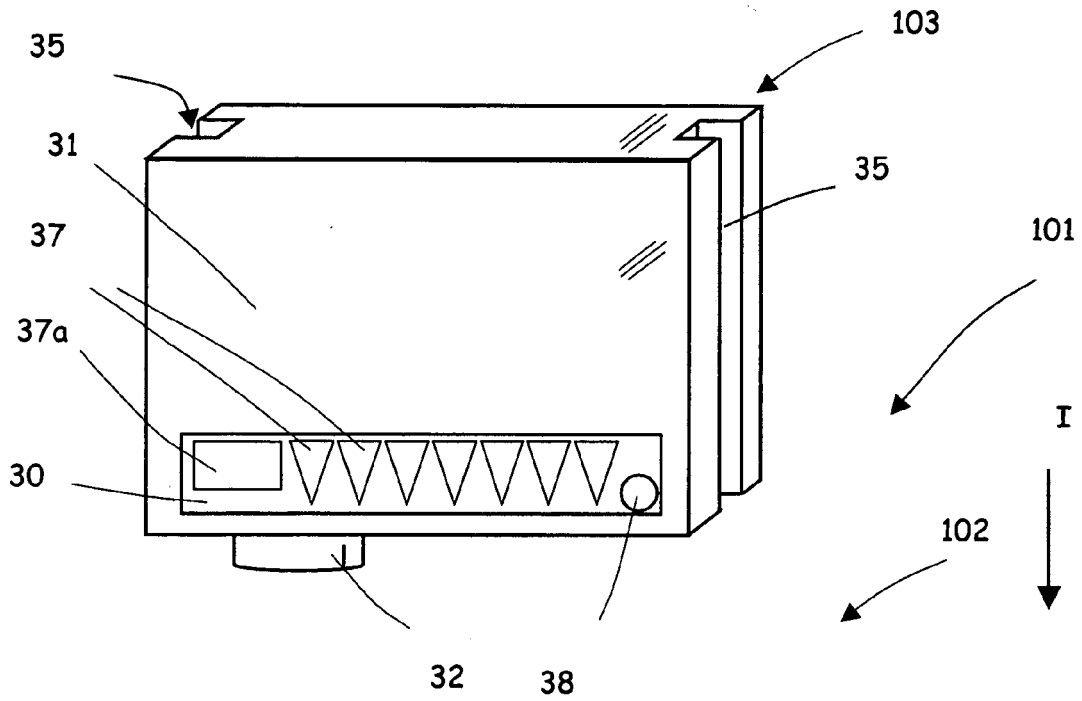


Fig. 2

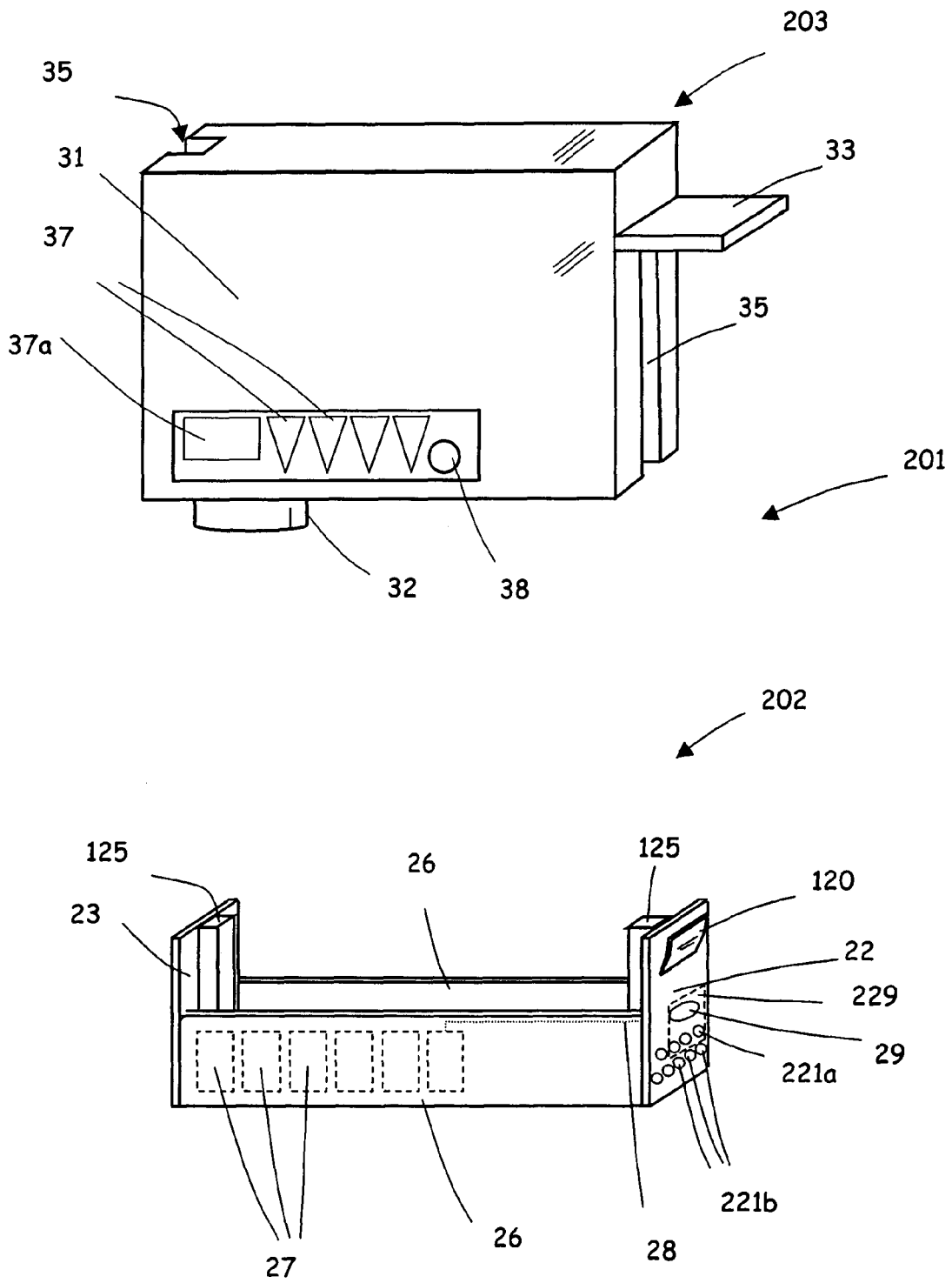


Fig. 3

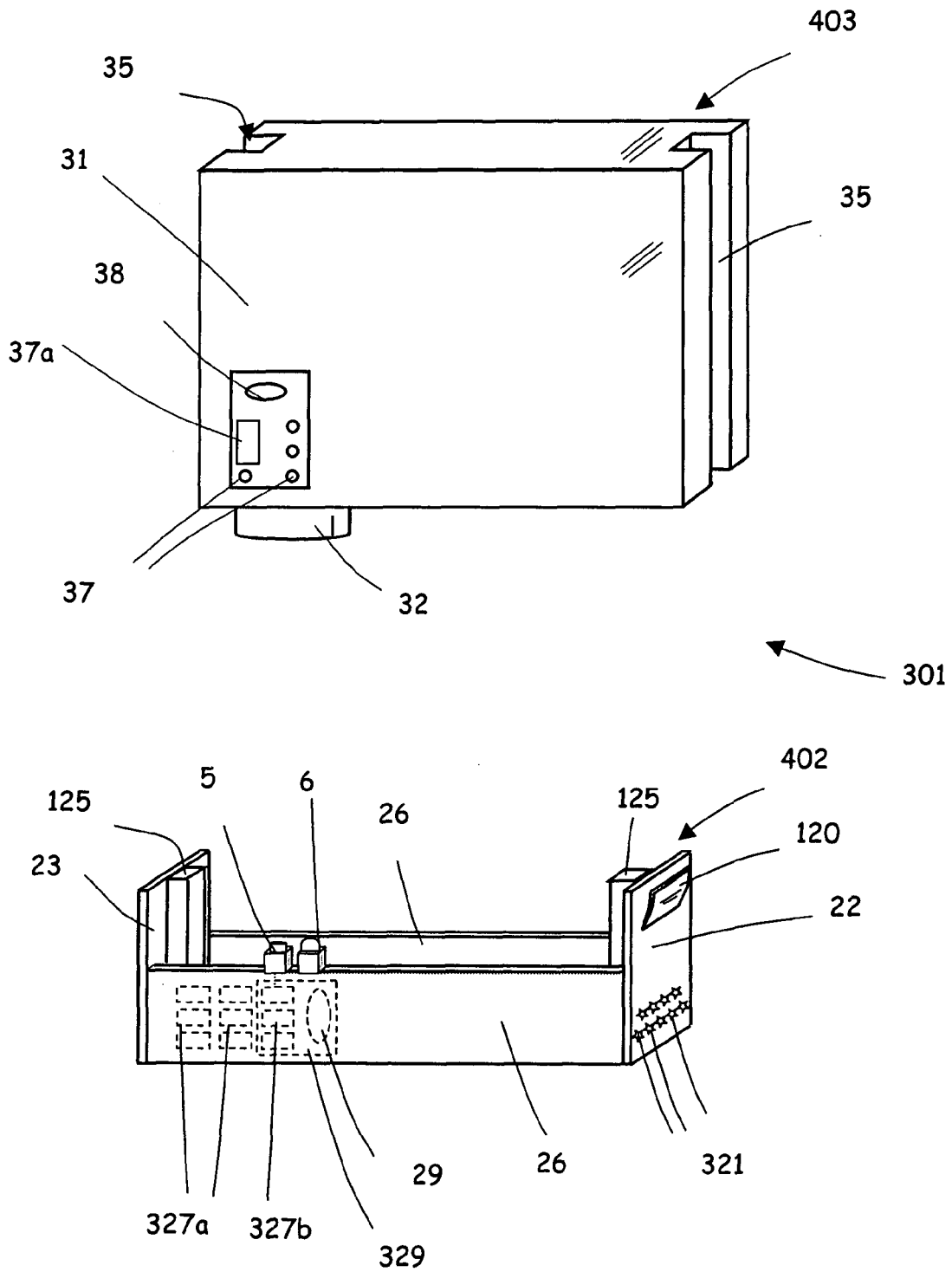


Fig. 4

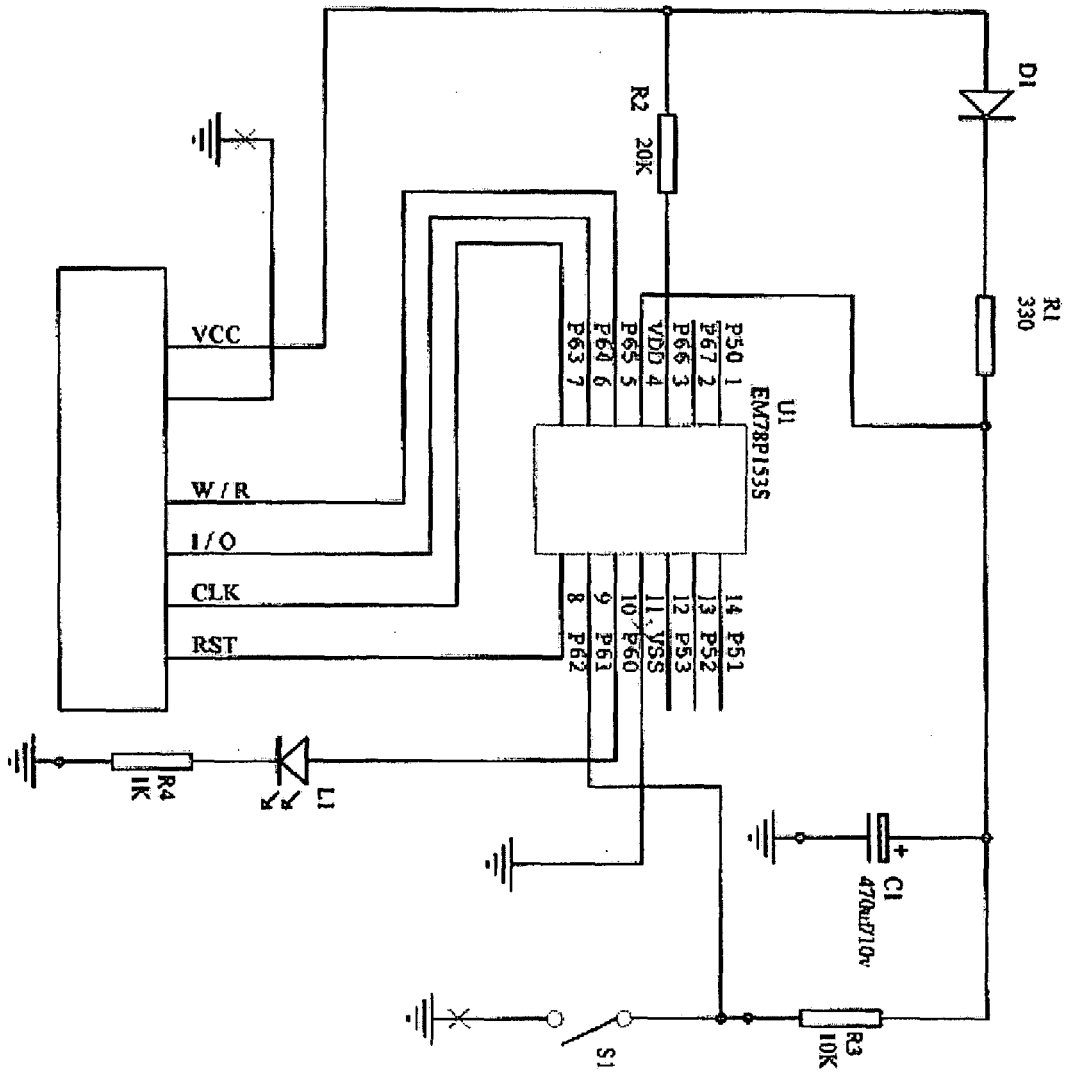


Fig. 5

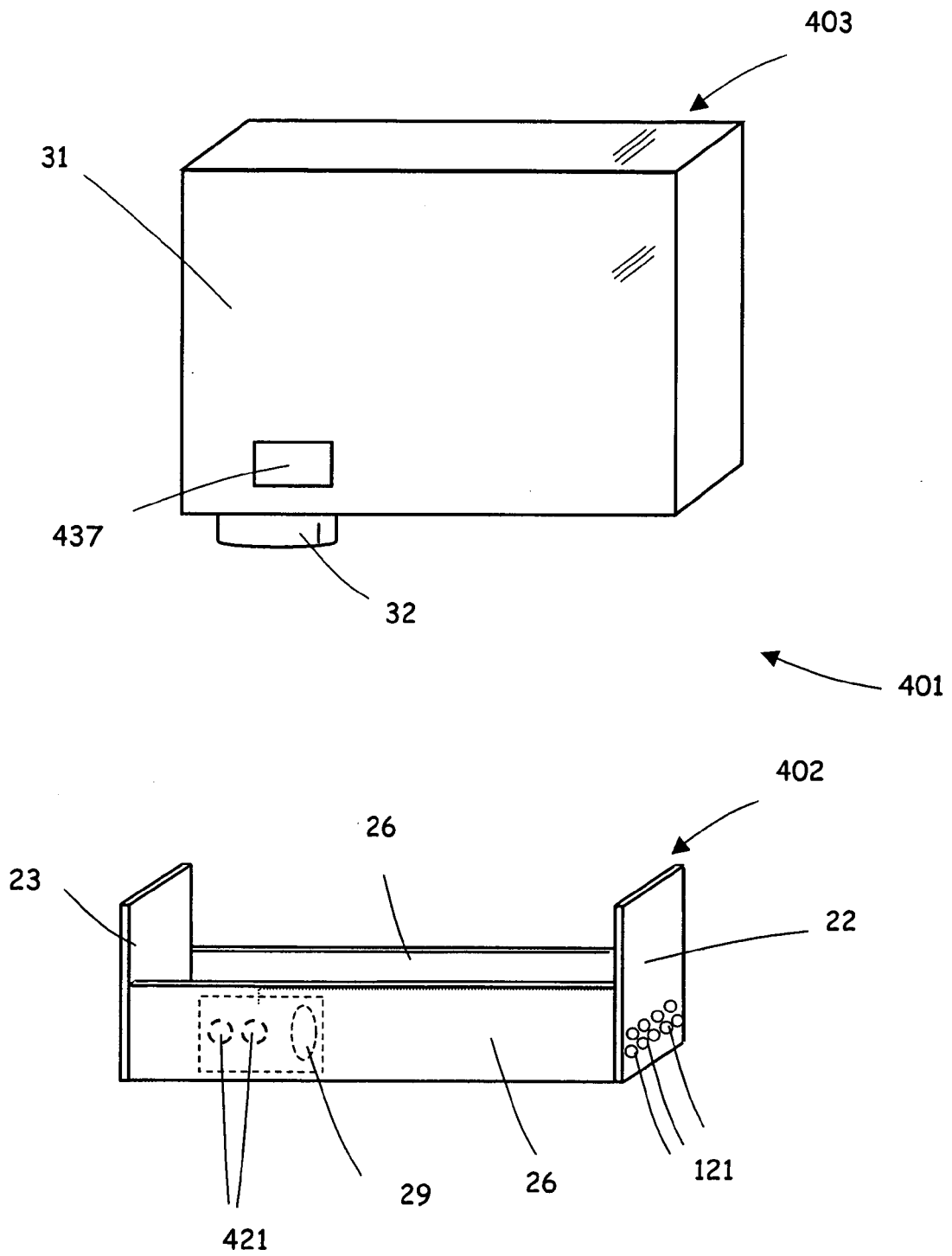


Fig. 6

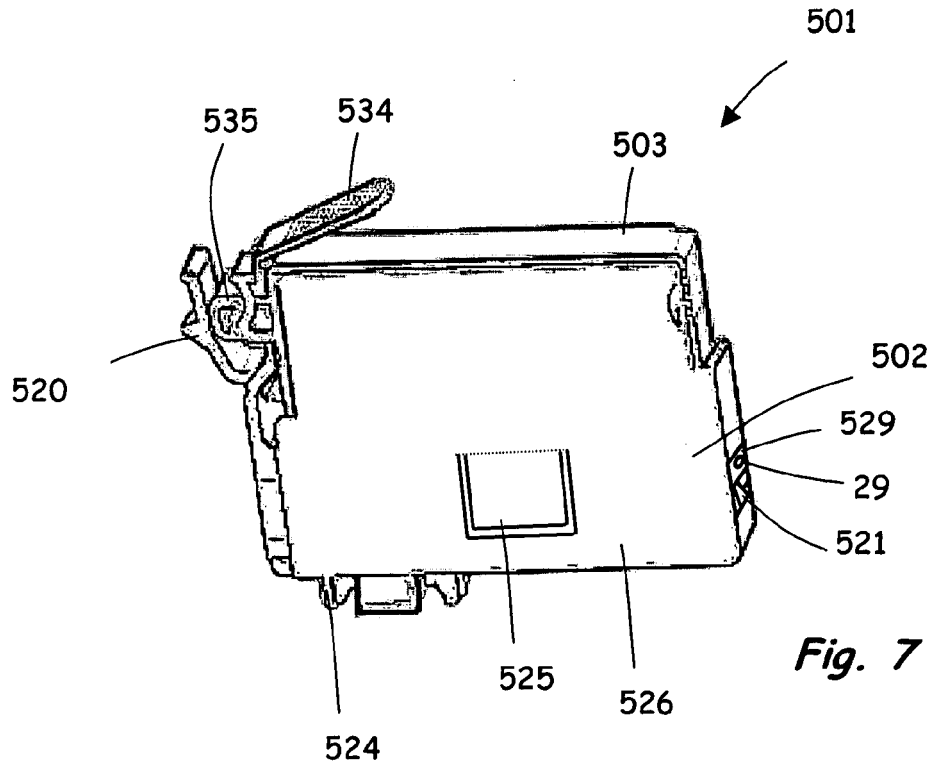


Fig. 7

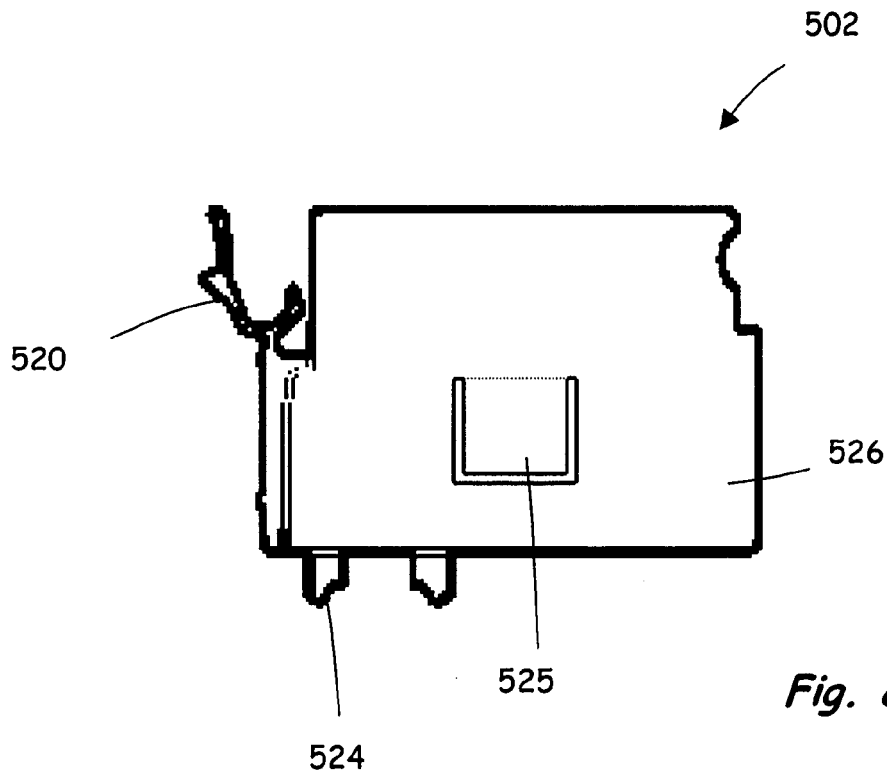


Fig. 8



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 440 261 A (CANON KK [JP]) 7 August 1991 (1991-08-07) * abstract * * page 6, line 19 - page 9, line 39 * * figures 4,5 *	1-4, 8-11,13, 14	INV. B41J2/175
X	EP 0 854 045 A (HEWLETT PACKARD CO [US]) 22 July 1998 (1998-07-22) * column 2, line 53 - column 4, line 49 * * figure 3 *	1-4,8,13	
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			TECHNICAL FIELDS SEARCHED (IPC)
			B41J
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		21 January 2008	Didnot, Benjamin
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

5 EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 07 01 5660

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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