(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 950 280 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
02.12.2015 Bulletin 2015/49

(51) Int Cl.:
G07D 11/00 *(2006.01)*

(21) Application number: **15168888.4**

(22) Date of filing: **22.05.2015**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA

(30) Priority: **30.05.2014 JP 2014111927**

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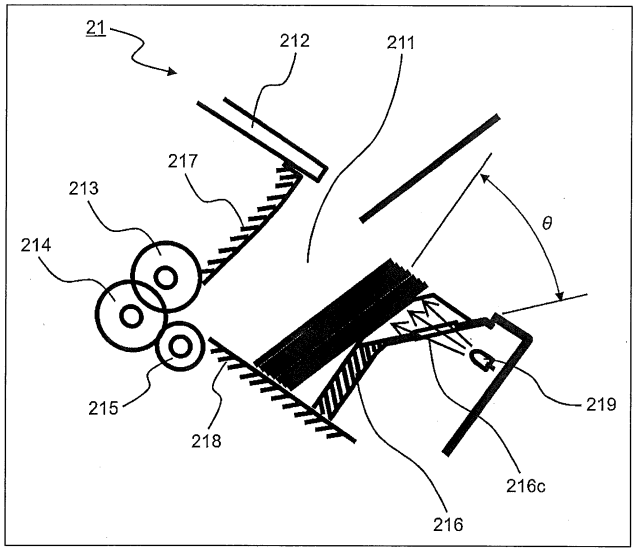
(54) BILL HANDLING APPARATUS

(57) An object of the present invention is to improve the visibility of bills in a cash inlet/outlet having a downward slope toward the front of the apparatus. The present invention includes a container (211) configured to contain bills fed into the apparatus and bills fed out from the apparatus, and a forward part in a stacking direction of the bills is leaning downward; an illuminator (219) configured to emit visible light, the illuminator being adjacent to the front of the container; and a holding member having a recess (216b) with a first transmitting section (216c) configured to transmit the visible light emitted from the illuminator, and having projections (216a) for holding the bills contained in the container.

FIG.9



EP 2 950 280 A1

Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a bill handling apparatus.

[0002] A bill handling apparatus is implemented in, for example, an automated teller machine (ATM), which is installed in a financial institution, a retail outlet, a station, or the like, and in which transactions are conducted by users operating the machine. A bill handling apparatus serves as a bill conveyor between a bill container in a cashbox and a cash inlet/outlet for holding bills received from and provided to users.

[0003] The cash inlet/outlet has an illuminator (e.g., a lamp) for illuminating contained bills. The illuminator provides the improved visibility of bills and prevents bills from being left in the cash inlet/outlet. As such a technique, JP-A-2004-139614 describes "illumination lamps are provided on the right and left of a deposit section that receives bills from users at deposits and bills fed out from the apparatus at withdrawals, and the lamps light when a deposit slot for bills is opened by driving the shutter of the bill deposit section."

[0004] The deposit/withdrawal machine described in JP-A-2004-139614 has a cash inlet/outlet with a downward slope toward the front of the apparatus (toward the user), and the inlet/outlet has an illuminator adjacent to the rear of the apparatus. An illuminator adjacent to the rear of an apparatus would illuminate the front of the apparatus, and this is undesirable because the light could strike the user's eyes.

[0005] On the other hand, an illuminator adjacent to the front of an apparatus would illuminate the rear of the apparatus, and thus the light is prevented from striking the user's eyes. However, bills contained in the cash inlet/outlet lean toward the front of the apparatus (i.e., toward the illuminator), and thus the light from the illuminator is blocked by a stack of the bills. As a result, improving the visibility of bills is difficult.

SUMMARY OF THE INVENTION

[0006] An object of the present invention is to improve the visibility of bills in a cash inlet/outlet having a downward slope toward the front of the apparatus.

[0007] To achieve the object, the present invention includes a container configured to contain bills fed into the apparatus and bills fed out from the apparatus, and a forward part in a stacking direction of the bills is leaning downward; an illuminator configured to emit visible light, the illuminator being adjacent to the front of the container; and / or a holding member having a recess with a first transmitting section configured to transmit the visible light emitted from the illuminator, and having projections for holding the bills contained in the container.

[0008] The present invention provides the improved visibility of bills. This invention also prevents bills from being left in a cash inlet/outlet.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

Fig. 1 is a perspective view of an automated teller machine according to Embodiment 1;
Fig. 2 is a functional block diagram of the automated teller machine according to Embodiment 1;
Fig. 3 is a configuration diagram of a bill handling apparatus according to Embodiment 1;
Fig. 4 is a functional block diagram of the bill handling apparatus Embodiment 1;
Fig. 5 illustrates a deposit operation according to Embodiment 1;
Fig. 6 illustrates the deposit operation according to Embodiment 1;
Fig. 7 illustrates the deposit operation according to Embodiment 1;
Fig. 8 illustrates a withdrawal operation according to Embodiment 1;
Fig. 9 illustrates the details of a cash inlet/outlet according to Embodiment 1;
Fig. 10 illustrates the details of a rest plate according to Embodiment 1;
Fig. 11 illustrates the details of a cash inlet/outlet according to Embodiment 3;
Fig. 12 illustrates the details of a cash inlet/outlet according to Embodiment 4; and
Fig. 13 illustrates the operation of an illuminating device according to Embodiment 5.

DESCRIPTION OF THE EMBODIMENTS

(Embodiment 1)

[0010] A first embodiment will now be described in detail with reference to Figs. 1 to 10. Fig. 1 is a perspective view of an automated teller machine (ATM). The ATM 1 includes a bill handling apparatus 2, a bankbook handling apparatus 3, a receipt printing apparatus 4, a card handling apparatus 5, and an operating apparatus 6.

[0011] The bill handling apparatus 2 handles bills. The bill handling apparatus 2 conducts transactions such as depositing, withdrawing, and distinguishing of bills via a cash inlet/outlet 21 that receives bills inserted by users and discharges bills to users. In addition, a bill container for storage of bills is provided under the bill handling apparatus 2. The bill container is surrounded by a cashbox case. The configuration of the bill handling apparatus will be described in detail later.

[0012] In deposit transactions of the ATM 1, the bill handling apparatus 2 conveys bills inserted in the cash inlet/outlet 21 by a user to the bill container and puts the bills in this container. In withdrawal transactions of the ATM 1, the bill handling apparatus 2 takes bills out of the bill container, conveys the bills to the cash inlet/outlet 21,

and dispenses the bills to a user. In this way, the bill handling apparatus 2 puts bills inserted by a user and bills provided to a user in the cash inlet/outlet 21 and conveys bills between the cash inlet/outlet 21 and the bill container.

[0013] The bankbook handling apparatus 3 handles bankbooks. The bankbook handling apparatus 3 receives and discharges a bankbook used in transactions, enters items in an inserted bankbook, reads information from a magnetic stripe on a bankbook, and writes information to a magnetic stripe.

[0014] The receipt printing apparatus 4 issues transaction receipts. The receipt printing apparatus 4 discharges a receipt showing printed transactions via a receipt slot.

[0015] The card handling apparatus 5 handles magnetic stripe cards and IC cards. The card handling apparatus 5 receives and discharges a user's cash card used in transactions via a card slot. The card handling apparatus 5 also reads information from a magnetic stripe and an IC chip on a card and writes information in a magnetic stripe and an IC chip.

[0016] The operating apparatus 6 is a liquid crystal display (LCD), for example. The operating apparatus 6 includes a display on which transactions and an operation guide are displayed for users, and an input device used for entering PIN numbers and selecting transactions. The input device may be of various types such as buttons and a touch panel. Such a touch panel may be overlaid on the LCD.

[0017] Although not shown in Fig. 1, a coin handling apparatus may be provided for depositing, withdrawing, and distinguishing of coins.

Fig. 2 is a functional block diagram of the ATM 1. The above-mentioned apparatuses in the ATM 1 are connected via a bus 7 to a main-body controller 8 and perform required operations under the control of the main-body controller 8. These apparatuses are supplied with electric power from a power supply (not shown).

Fig. 3 is a configuration diagram of the bill handling apparatus 2. The right side of the drawing is adjacent to the front of the apparatus (to the user), and the direction of gravitational force is downward. The bill handling apparatus 2 includes the cash inlet/outlet 21, a distinguishing apparatus 22, a temporary repository 23, a returning temporary repository 24, bill containers 25a to 25e, a bill channel 26, and a cashbox A.

[0018] The cash inlet/outlet 21 is provided at the front of the bill handling apparatus 2 and contains bills inserted by users and bills provided to users. The cash inlet/outlet 21 has a downward slope from the rear toward the front of the apparatus.

[0019] The cash inlet/outlet 21 includes a container 211 for containing bills, a shutter 212 for opening/closing the container 211, a separation roller 213 for separating bills in the container 211, a feed roller 214 for feeding separated bills, and a sheet roller 215 for accumulating bills. The cash inlet/outlet 21 also has an illuminator 219 at the front of the apparatus for illuminating bills in the container 211.

[0020] The container 211 contains bills fed into and fed out from the apparatus and has a structure that a forward part in a stacking direction of the bills is leaning downward.

[0021] The distinguishing apparatus 22 acquires the denominations, genuineness, and conditions of conveyed bills to perform discrimination. The distinguishing apparatus 22 discriminates bills conveyed from the front to the rear of the apparatus and bills conveyed from the rear to the front of the apparatus. The discrimination is performed by reading the pattern of a bill with an image sensor (sensor) and processing the read image. The distinguishing apparatus 22 then determines the conveyance destination of the received bill based on the discrimination result about the denomination and genuineness of the bill (e.g., whether the bill is accepted by the ATM 1 or returned to the user).

[0022] The distinguishing apparatus 22 is capable of distinguishing between bills having the same denomination, genuineness, or condition by reading the unique information on each bill (e.g., the serial number printed on a bill).

[0023] The temporary repository 23 is provided at the rear of the bill handling apparatus 2. The temporary repository 23 temporarily stores some of the received bills until the completion of a transaction. The bills stored in the temporary repository 23 are bills determined in the distinguishing apparatus 22 to be accepted by the ATM 1. The temporary repository 23 accumulates bills conveyed through the bill channel 26 described later, separates the accumulated bills, and feeds the individual bills to the bill channel 26.

[0024] The returning temporary repository 24 is provided at the rear of the bill handling apparatus 2 and under the temporary repository 23. The returning temporary repository 24 temporarily stores some of the received bills until returning these stored bills. The bills stored in the returning temporary repository 24 are bills determined in the distinguishing apparatus 22 to be returned to the user. The returning temporary repository 24 accumulates and feeds bills similarly to the temporary repository 23.

[0025] The bill containers 25a to 25e are containers (stackers) for each containing corresponding bills classified in accordance with the denominations. When containing bills, accumulators (not shown) in the bill containers 25a to 25e accumulate bills received from the bill channel 26. When feeding bills, separators (not shown) in the bill containers 25a to 25e separate the accumulated bills and feed the individual bills to the bill channel 26. Note that the accumulator and the separator may be combined together (separator/accumulator).

[0026] The bill containers 25a to 25e may be removable from the bill handling apparatus 2 and used for supplying and collecting bills to and from other bill containers. In management, one of the bill containers 25a to 25e may be used for management such as collecting counterfeit bills or containing bills left by a user (left bills).

[0027] The bill channel 26 is a path through which bills are conveyed. The bill channel 26 includes multiple conveyance rollers, conveyor belts, and guide plates. A junction point has a gate for redirecting bills being conveyed. The conveyance rollers and conveyor belts are motor-driven and convey bills at any rate in any direction. The bill channel 26 has multiple sensors for monitoring the status of conveying bills and for detecting a paper jam (bill jam).

[0028] The cashbox A is a metal case having a thickness of 20 to 50 mm and intended to prevent the bill containers from being robbed. That is, it is only necessary that the cashbox A contain at least the bill containers 25a to 25e, although Fig. 3 shows the distinguishing apparatus 22, the temporary repository 23, and the returning temporary repository 24, in addition to the bill containers 25a to 25e. The cashbox A has a door with a lock. In management of the bill containers 25a to 25e and maintenance of the bill handling apparatus 2, the bill containers 25a to 25e and the bill handling apparatus 2 can be drawn out by opening the door.

[0029] Fig. 4 is a functional block diagram of the bill handling apparatus 2. The above-mentioned units in the bill handling apparatus 2 are connected to a bill controller 27 and perform required operations under the control of the bill controller 27. That is, the bill controller 27 receives commands from the main-body controller 8 via the bus 7 of the ATM 1 and controls each unit and components on the basis of the commands. The bill controller 27 performs required operations under the control of the main-body controller 8. These units are supplied with electric power from the power supply (not shown).

[0030] The deposit operation in the bill handling apparatus 2 will now be described. Figs. 5 to 7 illustrate the deposit operation in the bill handling apparatus 2. Fig. 5 illustrates the conveyance from the cash inlet/outlet 21 to the temporary repository 23 or the returning temporary repository 24. Fig. 6 illustrates the conveyance from the returning temporary repository 24 to the cash inlet/outlet 21. Fig. 7 illustrates the conveyance from the temporary repository 23 to the bill containers 25a to 25e. In these drawings, arrows on the bill channel 26 denote the directions of bill conveyance.

[0031] If the operating apparatus 6 detects the selection of a deposit transaction, the main-body controller 8 instructs the bill handling apparatus 2 to start the deposit operation. The bill controller 27 then performs the deposit operation.

[0032] First, the bill controller 27 controls the shutter 212 to be open (or retreats the shutter covering the top of the container 211). The status is in a standby state until a bill is inserted into the container 211. In the standby state, the illuminator 219 illuminates the inner space of the container 211 and the place where bills are inserted. After detecting the insertion of a bill into the container 211 using a sensor (not shown), the bill controller 27 controls the shutter 212 to be closed (or causes the shutter to cover the top of the container 211).

[0033] Next, the bill controller 27 controls the operation of a rest plate 216 to align the bills in the container 211. After that, the bill controller 27 controls the separation roller 213 to separate the bills contained in the container 211 and controls the feed roller 214 to feed the separated bills. As a result, the bills contained in the container 211 are individually delivered to the bill channel 26.

[0034] As shown in Fig. 5, the bill controller 27 controls the bill channel 26 to cause the bills fed in from the cash inlet/outlet 21 to pass through the distinguishing apparatus 22. The distinguishing apparatus 22 acquires the denomination, genuineness, and condition of each conveyed bill, discriminates the bills, and determines the conveyance destination on the basis of the result of the discrimination. The bill controller 27 then controls the bill channel 26 to convey the bills exiting the distinguishing apparatus 22 to the temporary repository 23 or the returning temporary repository 24 on the basis of the result of the discrimination. Specifically, the bill controller 27 controls the gate to switch such that bills determined to be acceptable are conveyed via a path to the temporary repository 23 and bills determined to be returned are conveyed via a path to the returning temporary repository 24. The temporary repository 23 and the returning temporary repository 24 receive and contain the bills conveyed through the bill channel 26.

[0035] After all the bills inserted in the cash inlet/outlet 21 are conveyed, the bill controller 27 controls the bill channel 26 to return the bills accumulated in the returning temporary repository 24 and individually fed out, to the cash inlet/outlet 21 as shown in Fig. 6. The cash inlet/outlet 21 then receives the bills from the bill channel 26 and takes the bills in the container 211 using the feed roller 214, while aligning and accumulating the bills using the sheet roller 215. After all the bills accumulated in the returning temporary repository 24 are conveyed to the cash inlet/outlet 21, the bill controller 27 controls the shutter 212 to be open. As a result, the bills are returned to the user.

[0036] After the user's final confirmation of the amount of money and the depositing concludes the transaction, the bill controller 27 controls the bill channel 26 to cause the bills accumulated in the temporary repository 23 and individually fed out, to pass through the distinguishing apparatus 22 as shown in Fig. 7. The distinguishing apparatus 22 acquires the denomination, genuineness, and condition of each conveyed bill again, discriminates the bills, and determines the conveyance destination on the basis of the result of the discrimination. The bill controller 27 then controls the bill channel 26 to convey the bills exiting the distinguishing apparatus 22 to one of the bill containers 25a to 25e on the basis of the result of the

discriminant. It is noted that, for example, one of the bill containers 25a to 25e may be dedicated to collecting counterfeit bills determined by the genuineness determination.

[0037] Next, the withdrawal operation in the bill handling apparatus 2 will be described. Fig. 8 illustrates the withdrawal operation in the bill handling apparatus 2.

[0038] If the operating apparatus 6 detects the selection of a withdrawal transaction, the main-body controller 8 instructs the bill handling apparatus 2 to start the withdrawal operation. The bill controller 27 then performs the withdrawal operation.

[0039] First, the bill controller 27 controls the bill channel 26 to cause bills accumulated in the bill containers 25a to 25e and individually fed out to pass through the distinguishing apparatus 22. The bill containers 25a to 25e each feed a predetermined number of bills depending on the amount of withdrawal money at different times. The distinguishing apparatus 22 acquires the denomination, genuineness, and condition of each conveyed bill, discriminates the bills, and determines the conveyance destination on the basis of the result of the discrimination. The bill controller 27 then controls the bill channel 26 to convey, to the cash inlet/outlet 21, the bills determined to be sent to the cash inlet/outlet 21. If the distinguishing apparatus 22 finds a bill undesirable to be conveyed to the cash inlet/outlet 21, corresponding one of the bill containers 25a to 25e further feeds a bill of the same denomination.

[0040] The cash inlet/outlet 21 then receives the bills from the bill channel 26 and takes the bills in the container 211 using the feed roller 214, while aligning and accumulating the bills using the sheet roller 215. After a number of bills corresponding to the amount of the withdrawal money are conveyed from the containers 25a to 25e to the cash inlet/outlet 21, the bill controller 27 controls the shutter 212 to be open. As a result, the bills are dispensed to the user.

[0041] The structure of the cash inlet/outlet 21 will now be described in detail. Fig. 9 illustrates the details of the structure of the cash inlet/outlet 21. The right side of the drawing is adjacent to the front of the apparatus (to the user), and the direction of gravitational force is downward.

[0042] As described with reference to Fig. 3, the cash inlet/outlet 21 includes the container 211 for containing bills, the shutter 212 for opening/closing the container 211, the separation roller 213 for separating bills in the container 211, the feed roller 214 for feeding separated bills, and the sheet roller 215 for accumulating bills. The container 211 defines a bill-containing area by the rest plate 216 at a front position of the apparatus, a stack guide 217 at a rear position of the apparatus compared with the rest plate 216, a bottom plate 218 at a lower position, and side plates (not shown) at side positions.

[0043] The cash inlet/outlet 21 has a structure sloping toward the front of the apparatus with respect to the horizontal plane to facilitate inserting and removing bills by users. Since the entire cash inlet/outlet 21 is sloping toward the front of the apparatus side, bills contained in the container 211 lean against the rest plate 216 due to the gravity.

[0044] Fig. 10 illustrates the structure of the rest plate 216. The rest plate 216 has projections 216a at both sides and a recess 216b at the center. The projections 216a support bills leaning against the rest plate 216 due to the gravity. A level difference between the recess 216b and the projections 216a defines a space adjacent to the center of a bill. A user can look in the space defined between the recess 216b and a stack of bills to check the bills within a viewing angle θ.

[0045] The cash inlet/outlet 21 also has the illuminator 219 for illuminating bills. The cash inlet/outlet 21 is sloping toward the front of the apparatus; hence, if the illuminator 219 is provided at a position adjacent to the rear of the apparatus (to the stack guide 217) for illuminating bills, light is applied to a position adjacent to the front of the apparatus, and thus a space between the stack guide 217 and a stack of bills is illuminated. In other words, no light is applied to a bill surface viewable to a user, which unfortunately leads to no improved visibility of bills. Furthermore, light could strike the user's eyes, and thus it is undesirable to provide the illuminator 219 at a position adjacent to the rear of the apparatus.

[0046] In contrast, if the illuminator 219 is provided at a position adjacent to the front of the apparatus for illuminating bills, light applied to the bill surface is blocked by a stack of the bills because the bills lean against the rest plate 216 due to the gravity. In this case, passing light along the recess 216b of the rest plate 216 allows the unsupported central area of the bills to be illuminated.

[0047] In addition, a part of the recess 216b of the rest plate 216 is provided with a transmitting section 216c for transmitting visible light, and the illuminator 219 is provided closer to the front of the apparatus than the rest plate 216, and thereby light from the illuminator passes through the transmitting section 216c. As a result, an area allowing a user to see bills and a viewing angle θ become larger, as well as the distance between the illuminator 219 and bills become closer, which leads to a sufficient amount of light to the space.

[0048] It is noted that the illuminator 219 may be fixed at a position closer to the front of the apparatus than the rest plate 216 is, or may be movable with the rest plate 216 by, for example, incorporating the illuminator 219 in the rest plate 216. The transmitting section 216c may be a through hole provided in the rest plate 216, or may be a transparent plate inserted in the rest plate 216.

[0049] Such structure provides the improved visibility of bills in the cash inlet/outlet 21, improves the operability at deposits/withdrawals, and prevents bills from being left in the cash inlet/outlet. Furthermore, the illuminator 219 closer to the front of the apparatus than the rest plate 216 illuminates bills through the transmitting section 216c; consequently, the illuminator 219 is closer to bills, a sufficient amount of light is readily ensured, and visibility

is improved. In addition, this can be expected to provide a power saving effect.

(Embodiment 2)

[0050] A second embodiment will now be described in detail. The present embodiment involves a different feature about the transmitting section 216c of the rest plate 216 according to the first embodiment, although the other components are the same as those of the first embodiment.

[0051] The transmitting section 216c according to the present embodiment, which is a transparent plate inserted in the rest plate 216, has a print of a pattern, an arrow, or the like associated with a bill in a certain area of the transmitting section 216c. The print area blocks visible light. In other words, assuming that an area of the transmitting section 216c with no print is a first area, while an area with a print is a second area, the second area has a visible light transmittance lower than the first area. Note that a part corresponding to such a second area may be processed by printing a halftone dot pattern or the like thereon in order to scatter light, or by other methods (e.g., pasting a scattering sheet).

[0052] Light applied by the illuminator 219 to the transmitting section 216c with a print can function as a guide light that indicates the bill insertion position, in addition to illuminating bills. Such a guide light is conventionally positioned away from the container 211 of the cash inlet/outlet 21, and it is unfortunately difficult to intuitively perceive the insertion position. In contrast, the present embodiment allows the bill insertion position to be indicated inside the container 211, which facilitates the intuitive perception of the insertion position. In addition, if the ATM 1 handles coins, a bill-associated pattern printed on the transmitting section 216c can prevent erroneous insertion caused by confusing a deposit slot for bills with a deposit slot for coins.

[0053] According to the present embodiment, the additional guide function in the cash inlet/outlet 21 clearly indicates the bill insertion position to prevent erroneous insertion of bills or coins, which leads to further improved operability, in addition to the advantages of the first embodiment.

(Embodiment 3)

[0054] A third embodiment will now be described in detail. The present embodiment involves a different feature about the shutter 212 according to the first embodiment, although the other components are the same as those of the first embodiment.

[0055] Fig. 11 illustrates the details of the structure of a cash inlet/outlet in the present embodiment. The shutter 212 has a transmitting section 212a that transmits visible light. When the shutter 212 is closed, some of light from the illuminator 219 passes through the transmitting section 212a to function as a guide light that indicates the bill insertion position. Furthermore, as in the second embodiment, a clearer guide is achieved by providing the transmitting section 212a with a print of a pattern, an arrow, or the like and/or a light scattering capability.

[0056] In this manner, providing the shutter 212 with the transmitting section 212a leads to clear indication of the bill insertion position before a user inserts a bill into the container 211 of the cash inlet/outlet 21, which achieves further improved operability.

(Embodiment 4)

[0057] A fourth embodiment will now be described in detail. The present embodiment involves a different feature about the illuminator 219 according to the first embodiment, although the other components are the same as those of the first embodiment.

[0058] Fig. 12 illustrates the details of the structure of a cash inlet/outlet in the present embodiment. The illuminator 219 illuminates an upper space of the shutter 212 to project a pattern, an arrow, or the like on a bill being inserted into the cash inlet/outlet 21. For example, the illuminator 219 is composed of multiple light emitting diodes, and the optical axis of some of the illuminator 219 is inclined upward from the container 211. The transmitting section 216c on the optical axis is provided with a print of a pattern, an arrow, or the like. Alternatively, the thickness of an area of the transmitting section 216c on which a pattern, an arrow, or the like is printed may be varied to refract some of light from the illuminator 219 upward from the container 211.

[0059] In this manner, projecting a pattern, an arrow, or the like on a bill being inserted into the cash inlet/outlet 21 allows for supporting the insertion of bills.

(Embodiment 5)

[0060] A fifth embodiment will now be described in detail. The present embodiment involves a different operation of the illuminator 219 according to the first embodiment, although the structure is the same as that of the first embodiment.

[0061] After bills are returned in a deposit operation or bills are contained in the container 211 in a withdrawal operation, the bill controller 27 controls the illuminator 219 to light to illuminate the bills and controls the shutter 212 to be open (S101). After opening the shutter 212, the bill controller 27 may control the illuminator 219 to light to illuminate the bills. Then, the bill controller 27 activates a timer (S102), and determines whether any bills remain in the container 211 after a predetermined time has elapsed (i.e., whether any bills are left) depending on the output result from a sensor (not shown) of the cash inlet/outlet 21 (S103, S104). If all bills are extracted from the container 211 within a predetermined time period, the bill controller 27 controls the shutter 212 to be closed and controls the illuminator 219 to be turned off (S 105). If bills remain in the container 211 after a predetermined

time has elapsed, the bill controller 27 controls the illuminator 219 to shift from lighting to blinking.

[0062] This draws a user's attention to the cash inlet/outlet 21 and allows the user to be notified of bills being left. That is, this embodiment can improve a function of preventing bills from being left at deposit and withdrawal operations.

[0063] The present invention is not limited to these embodiments and may be variously modified. For example, the above-described embodiments have been described in detail for clear understanding of the present invention, and this invention is not necessarily limited to the embodiments with all the described components. Some components of the above-described embodiments may be replaced with components of other embodiments, whereas the above-described embodiment may additionally have components of other embodiments. For some components of each embodiment, other components may be added, deleted, or substituted.

Claims

1. A bill handling apparatus (2) built in an automatic teller machine (1), the apparatus **characterized by** comprising:

a container (211) configured to contain bills fed into the apparatus and bills fed out from the apparatus, and a forward part in a stacking direction of the bills is leaning downward;
an illuminator (219) configured to emit visible light, the illuminator being adjacent to front of the container; and
a holding member configured to have a recess (216b) with a first transmitting section (216c) configured to transmit the visible light emitted from the illuminator, and having projections (216a) for holding the bills contained in the container.

2. The bill handling apparatus according to claim 1, wherein
the first transmitting section has a first area and a second area having a visible light transmittance lower than a visible light transmittance of the first area.

3. The bill handling apparatus according to claim 1, further comprising:

a shutter (212) configured to open/close the container; and
a second transmitting section (212a) configured to transmit visible light applied from the illuminator when the second transmitting section is above the container.

4. The bill handling apparatus according to claim 1, wherein
the apparatus comprises a plurality of the illuminators, and
the apparatus inclines an optical axis of a part of the illuminator upward from the container.

5. The bill handling apparatus according to claim 1, further comprising
a controller configured to control the apparatus, the controller controlling the illuminator to light, and if bills remain in the container, the controller controlling the illuminator to shift from lighting to blinking after a predetermined time has elapsed.

FIG.1

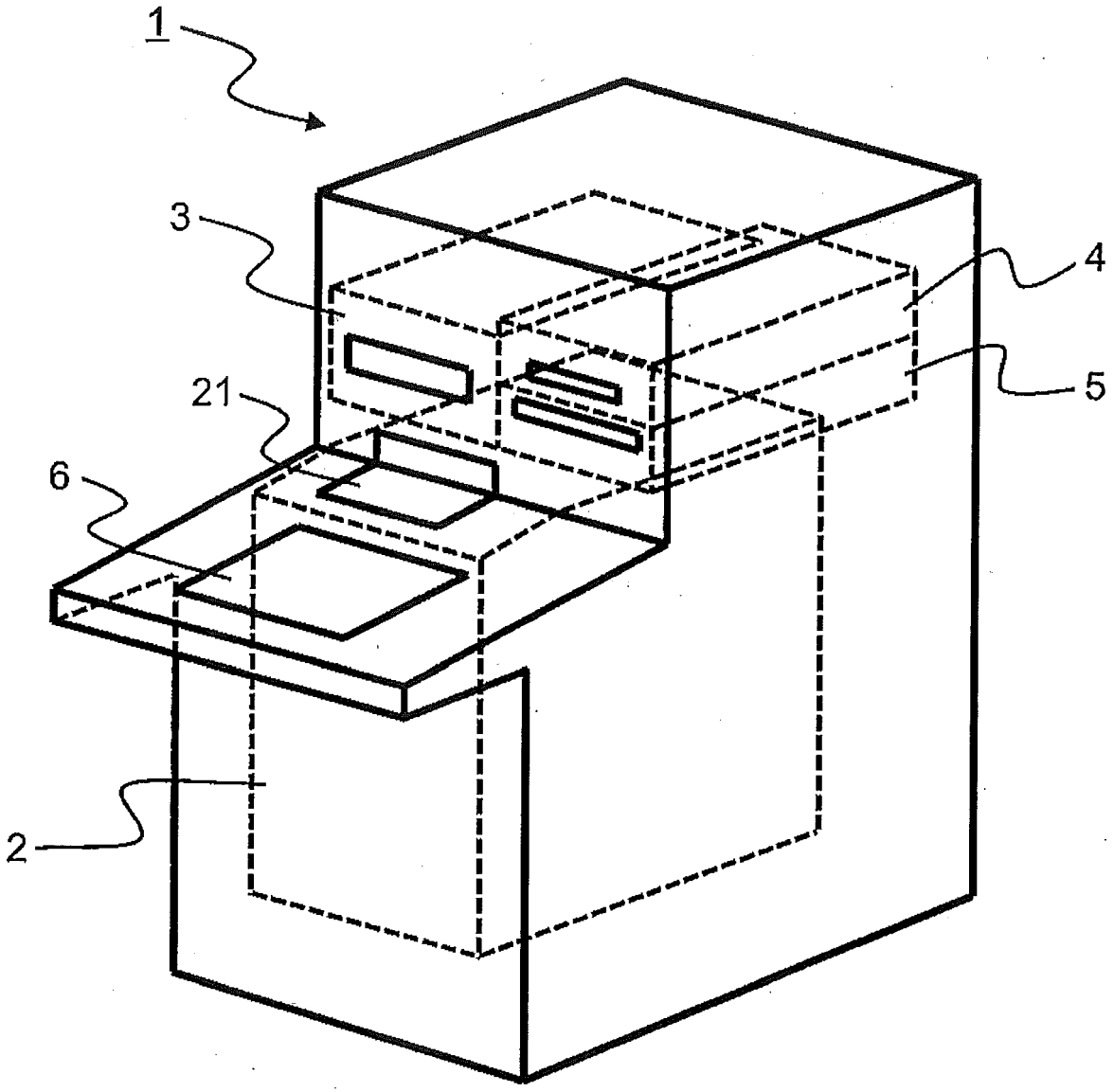


FIG.2

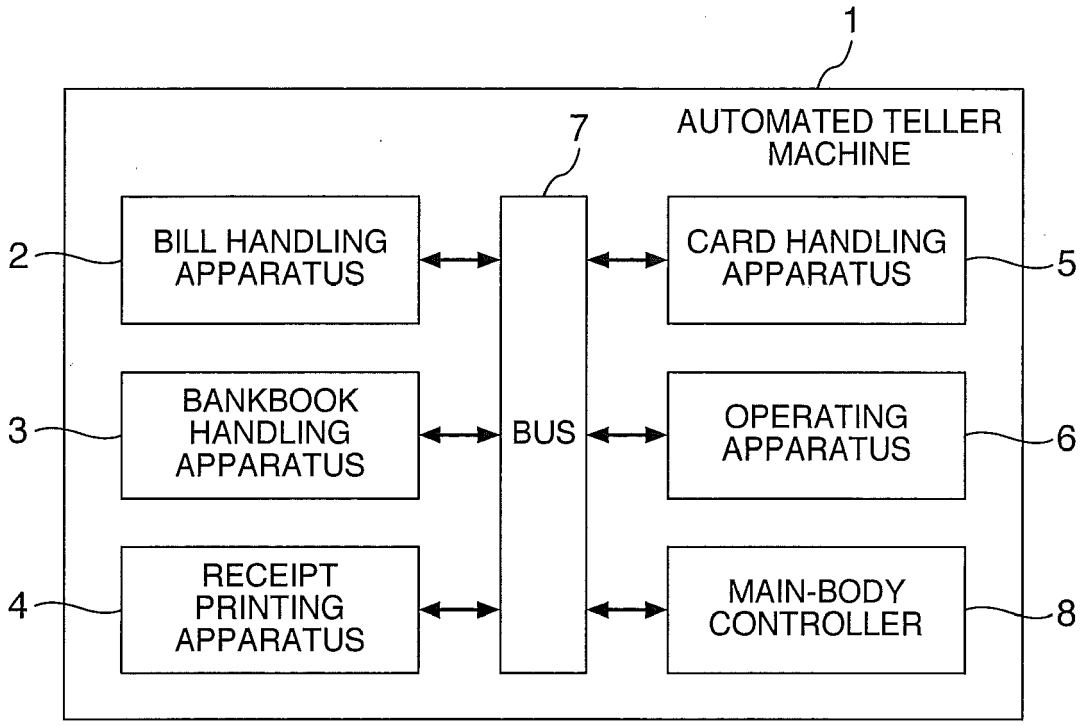

1
AUTOMATED TELLER MACHINE
7
BILL HANDLING APPARATUS
2
BANKBOOK HANDLING APPARATUS
3
RECEIPT PRINTING APPARATUS
4
BUS
CARD HANDLING APPARATUS
5
OPERATING APPARATUS
6
MAIN-BODY CONTROLLER
8

FIG.3

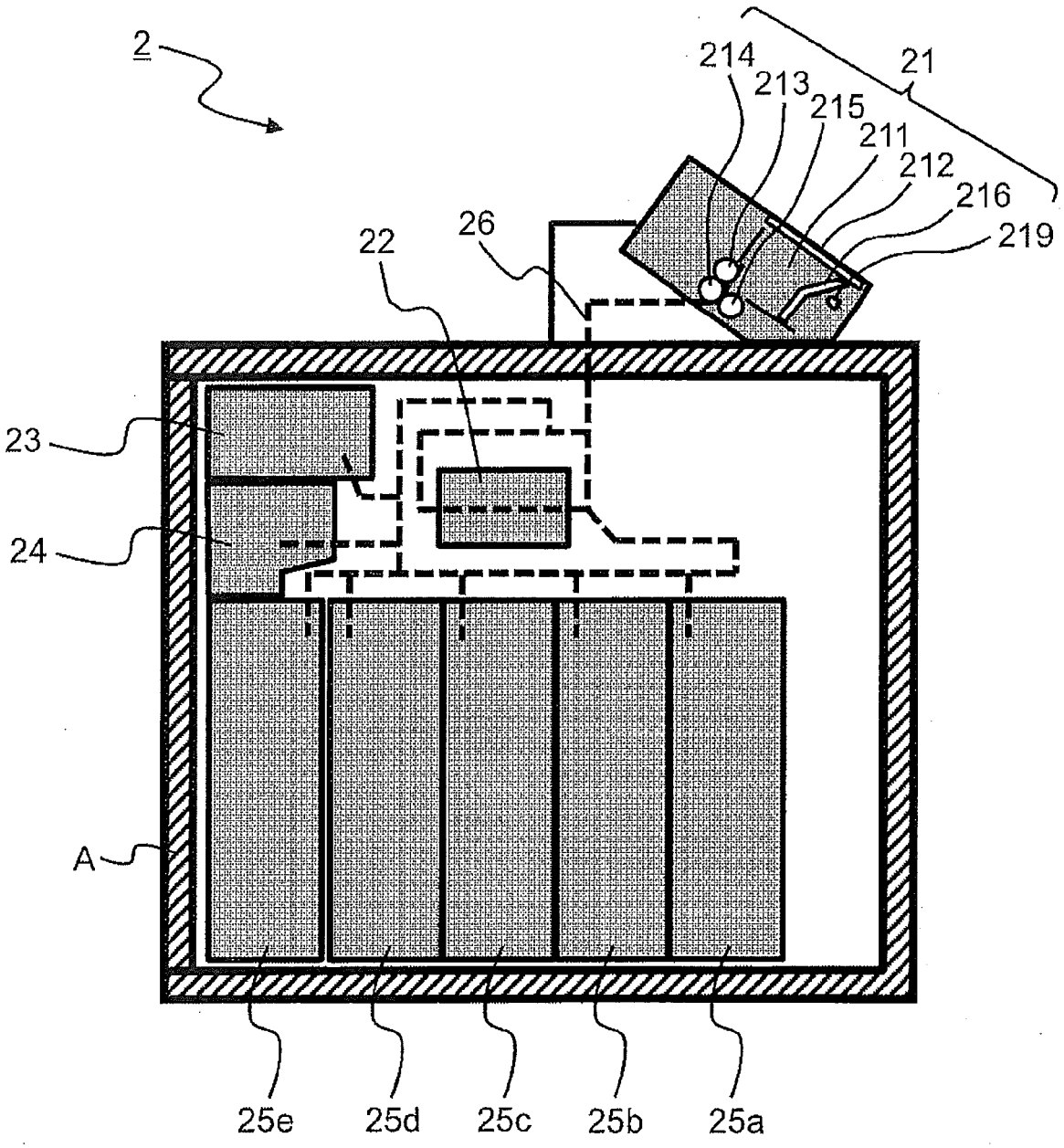


FIG.4

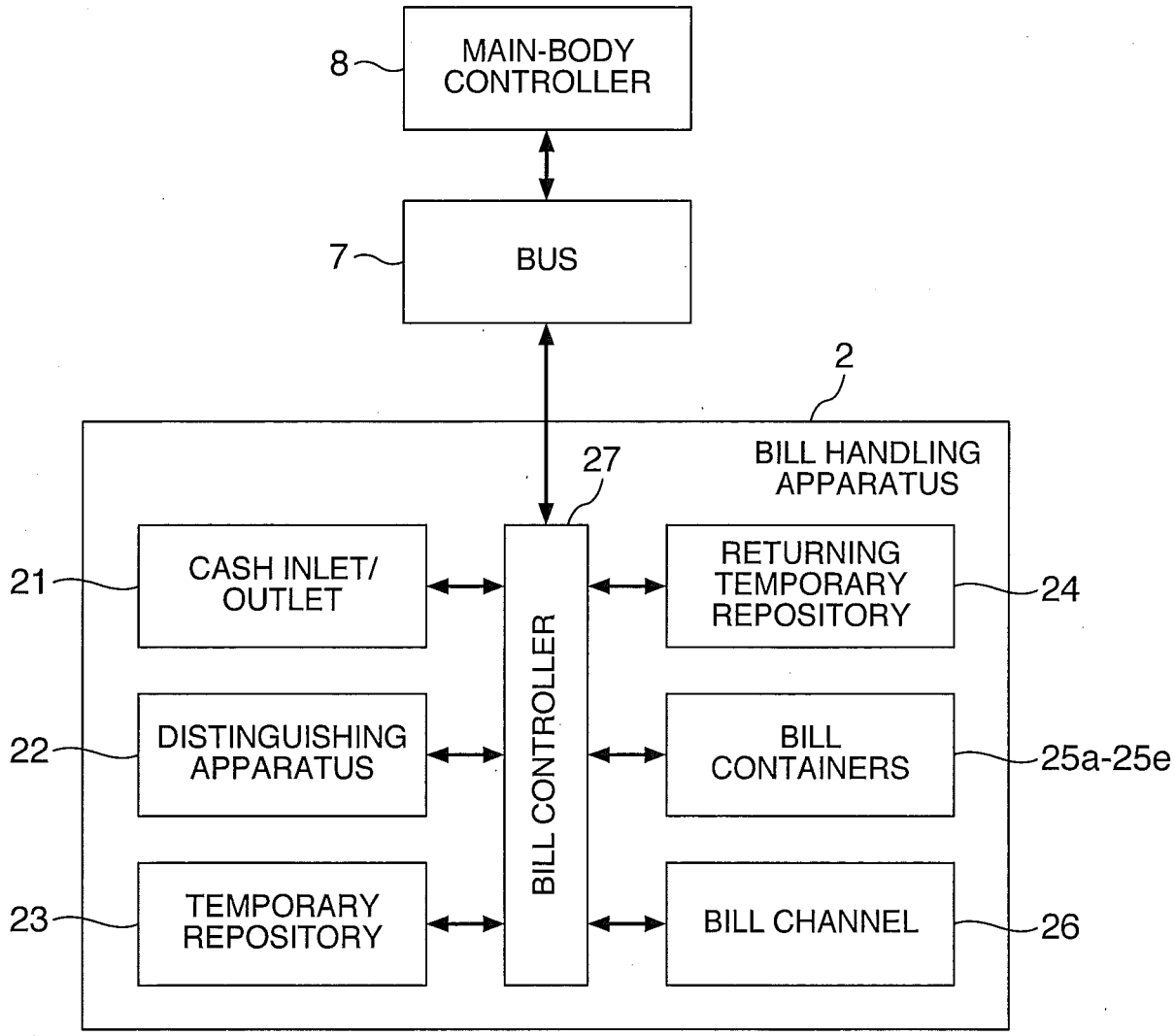

8
MAIN-BODY CONTROLLER
7
BUS
2
BILL HANDLING APPARATUS
27
BILL CONTROLLER
21
CASH INLET/ OUTLET
22
DISTINGUISHING APPARATUS
23
TEMPORARY REPOSITORY
RETURNING TEMPORARY REPOSITORY
24
BILL CONTAINERS
25a-25e
BILL CHANNEL
26

FIG.5

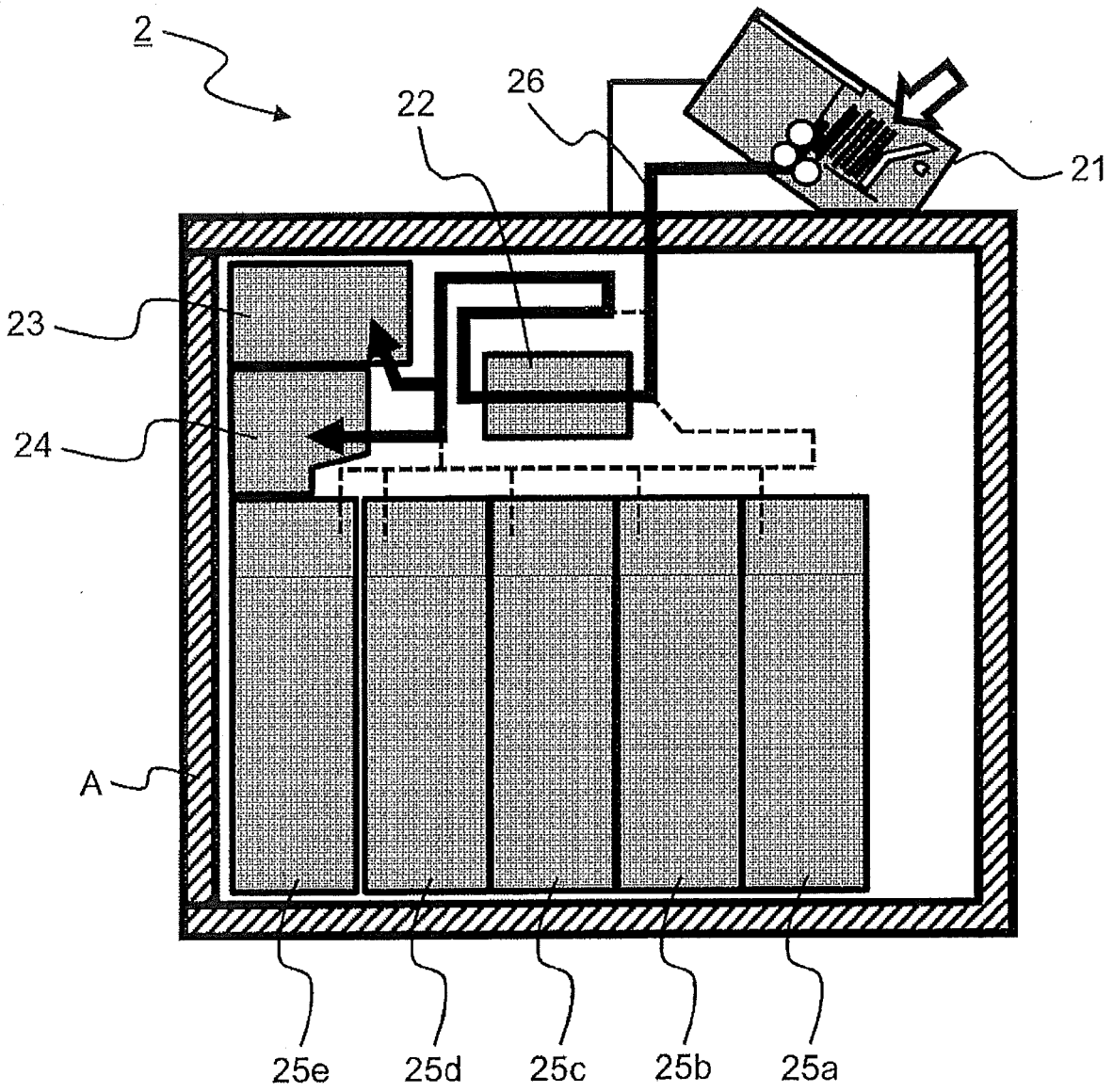


FIG.6

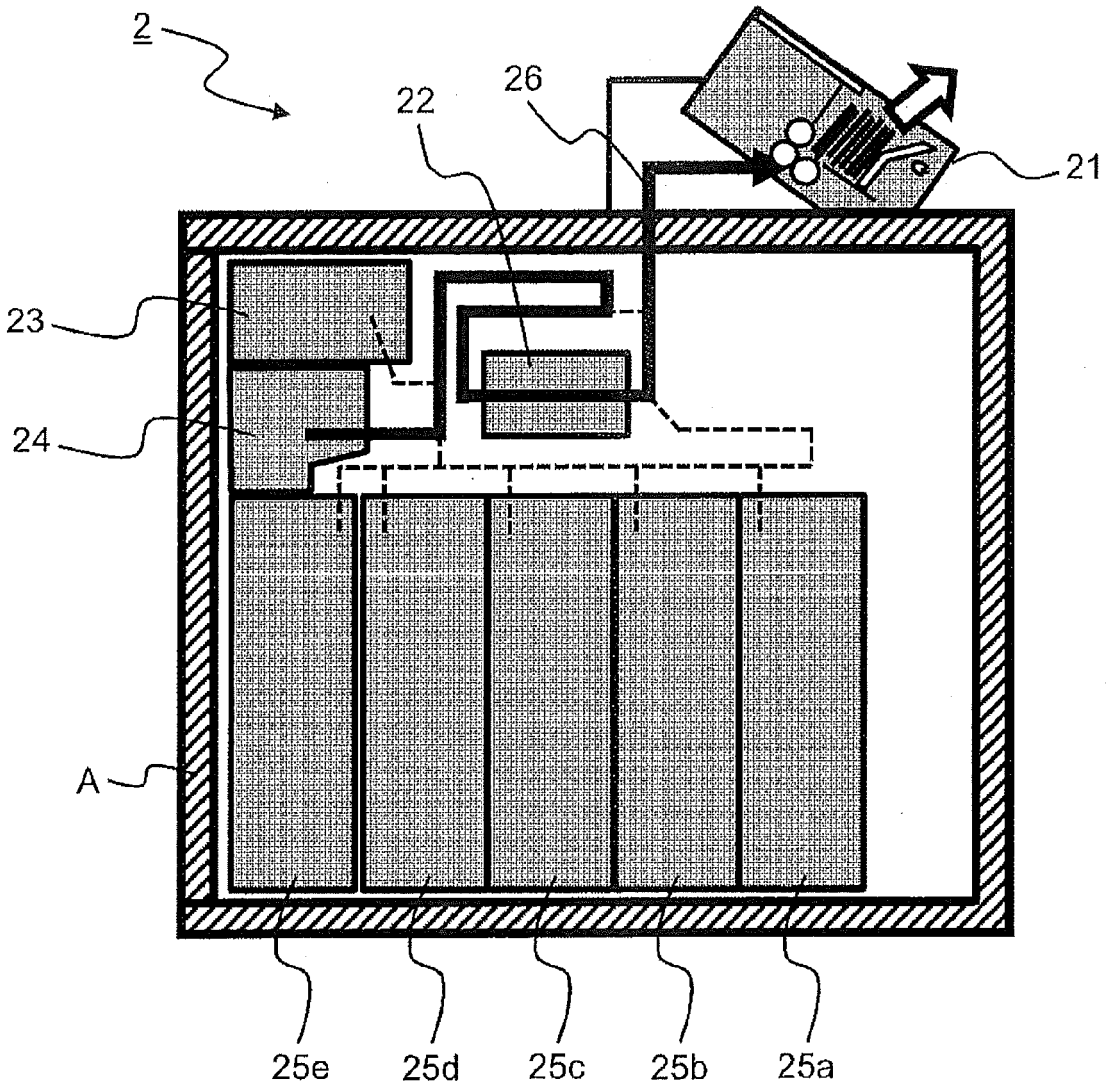


FIG.7

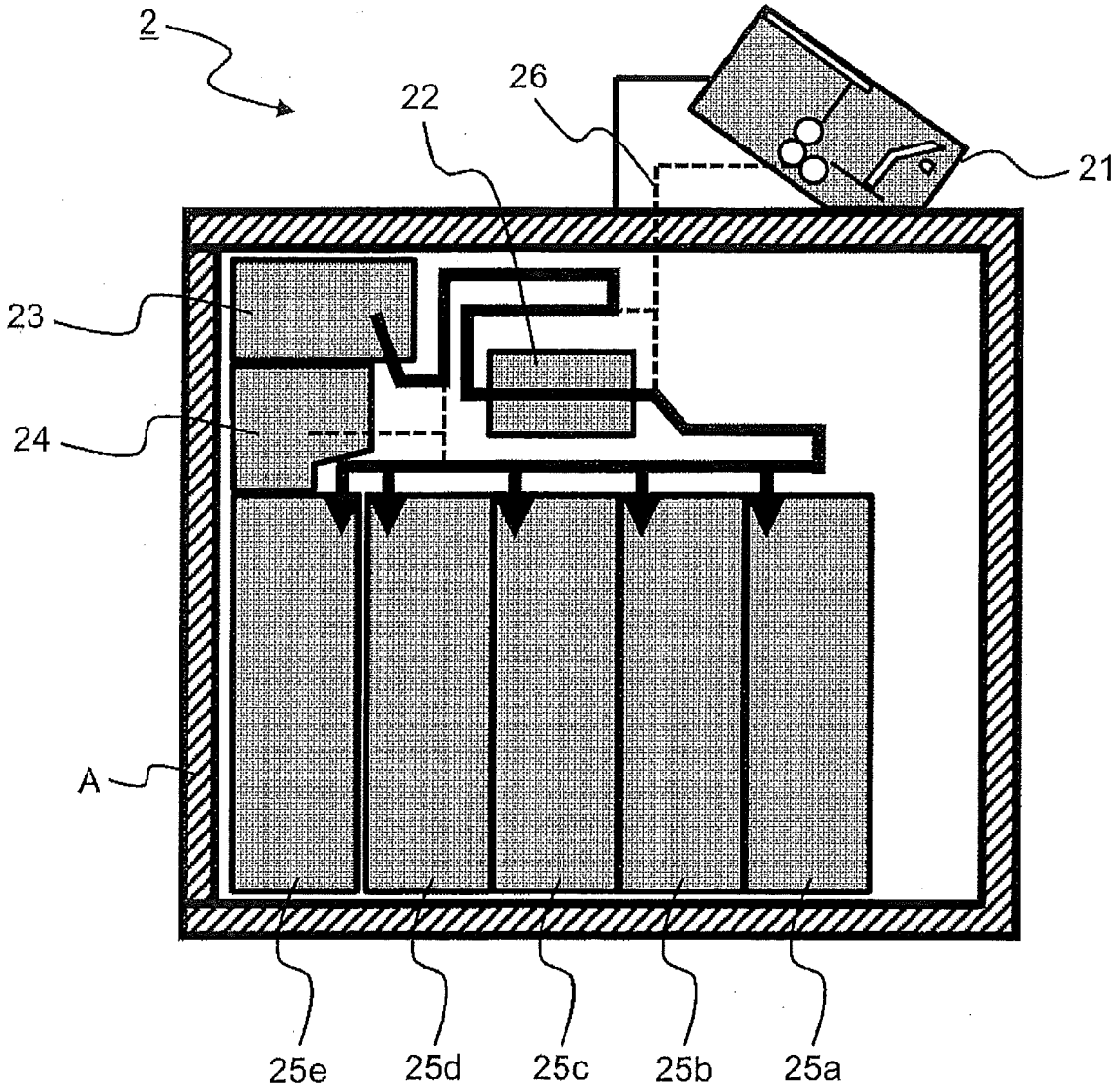


FIG.8

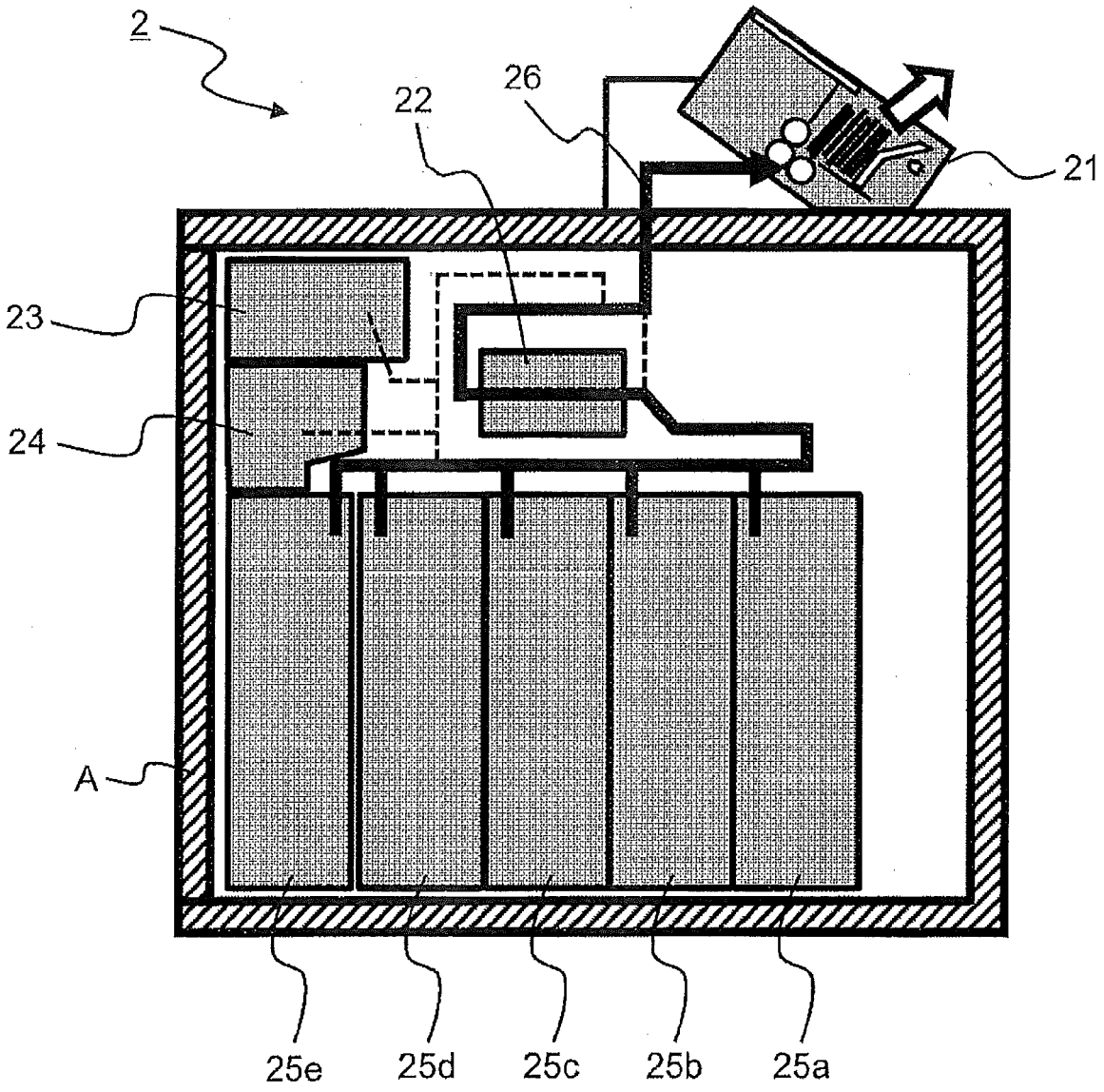


FIG.9

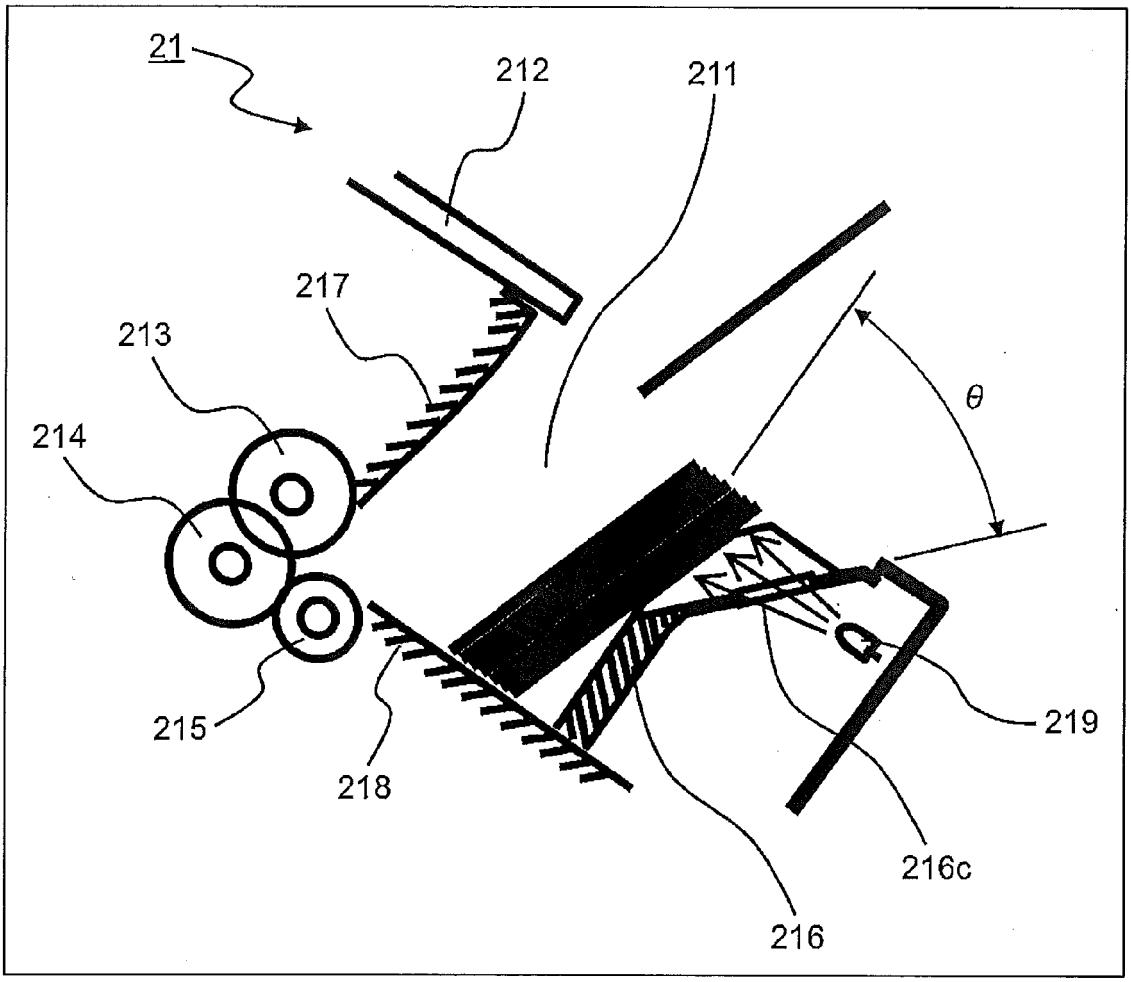


FIG.10

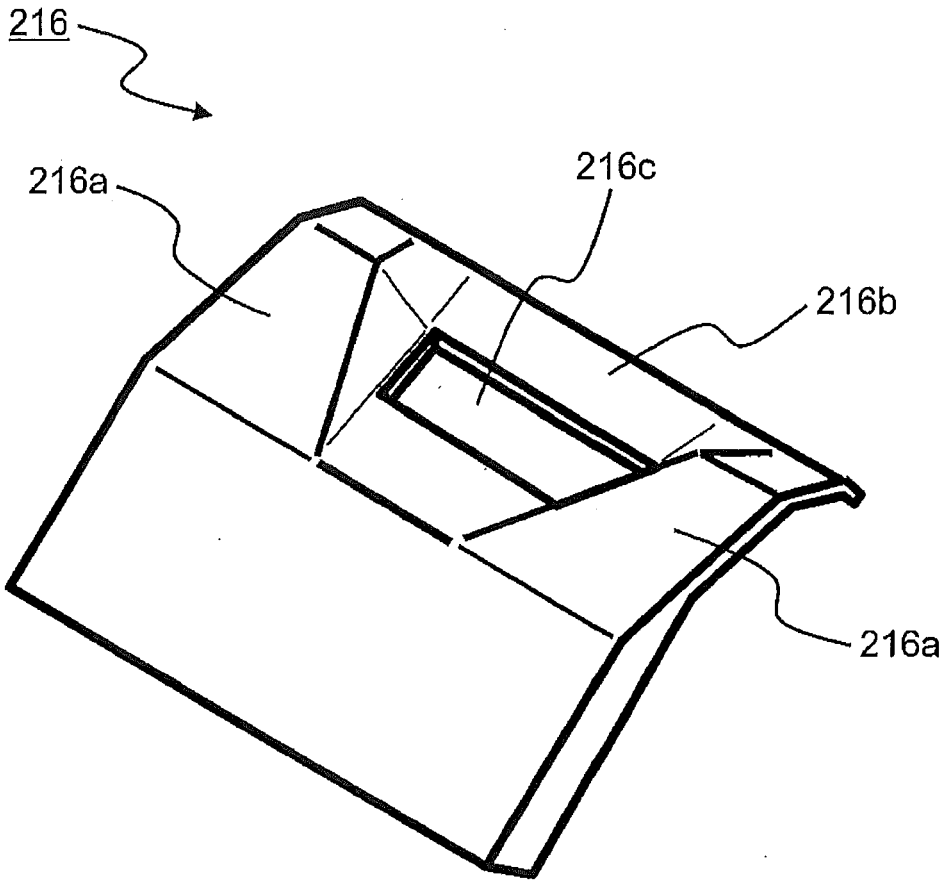


FIG.11

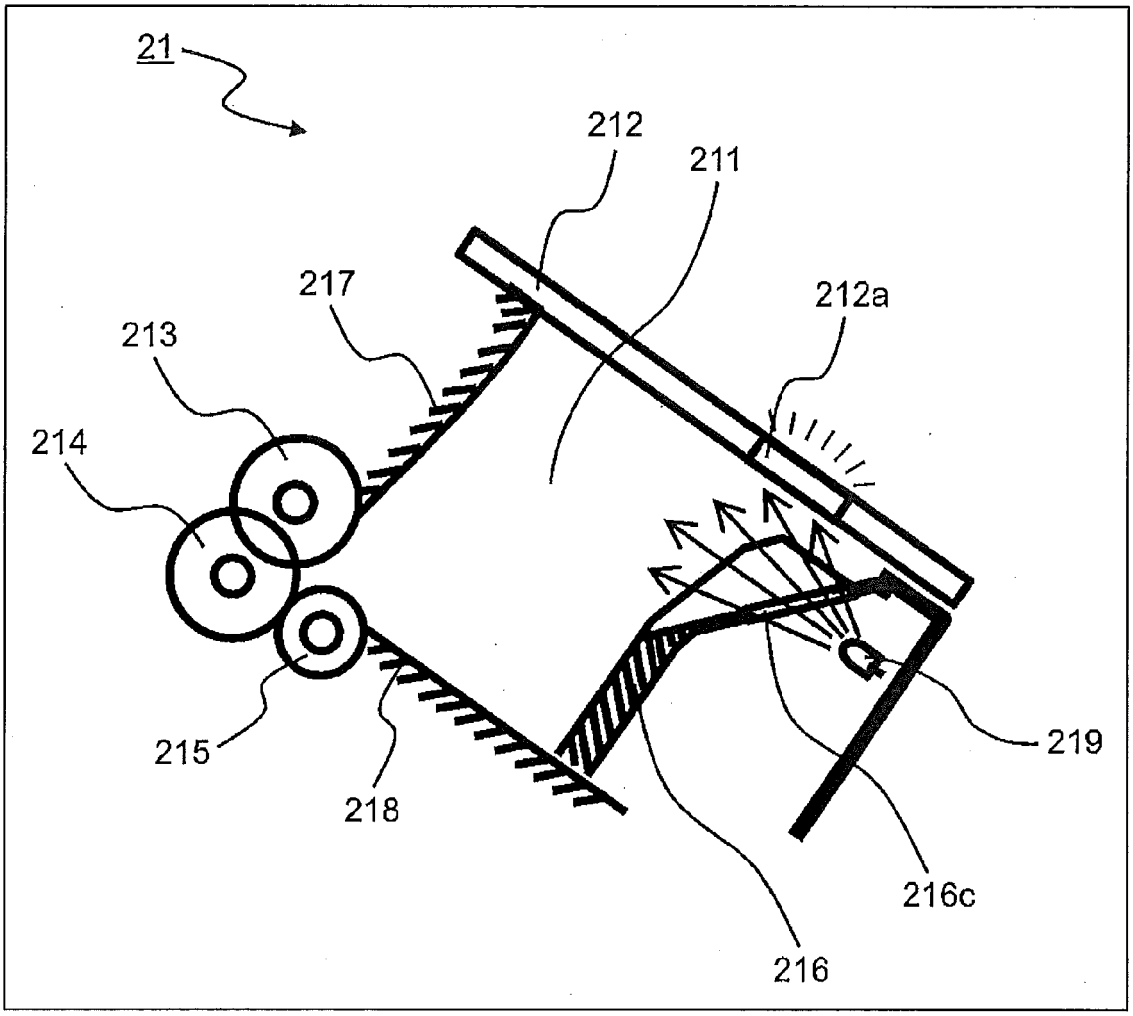


FIG.12

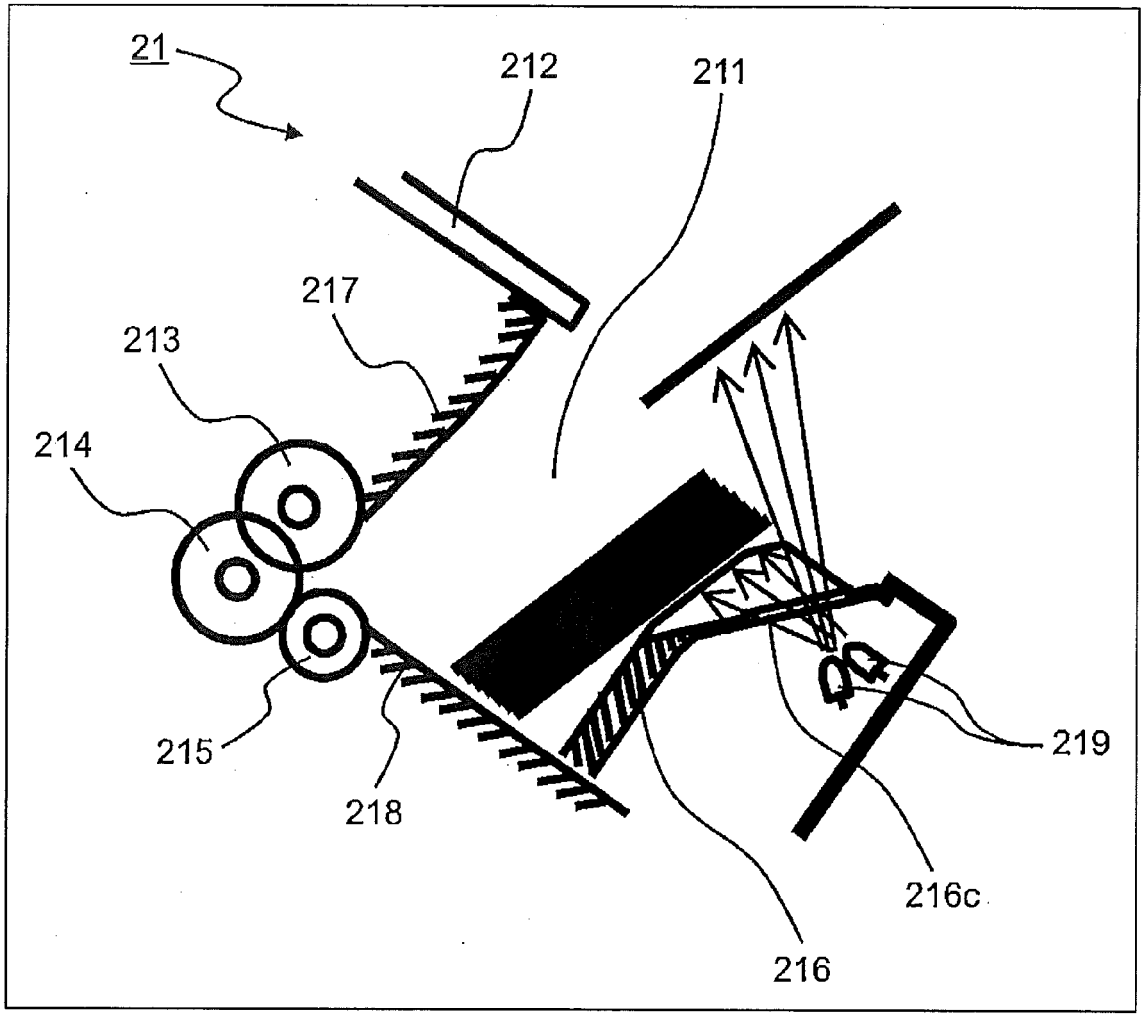
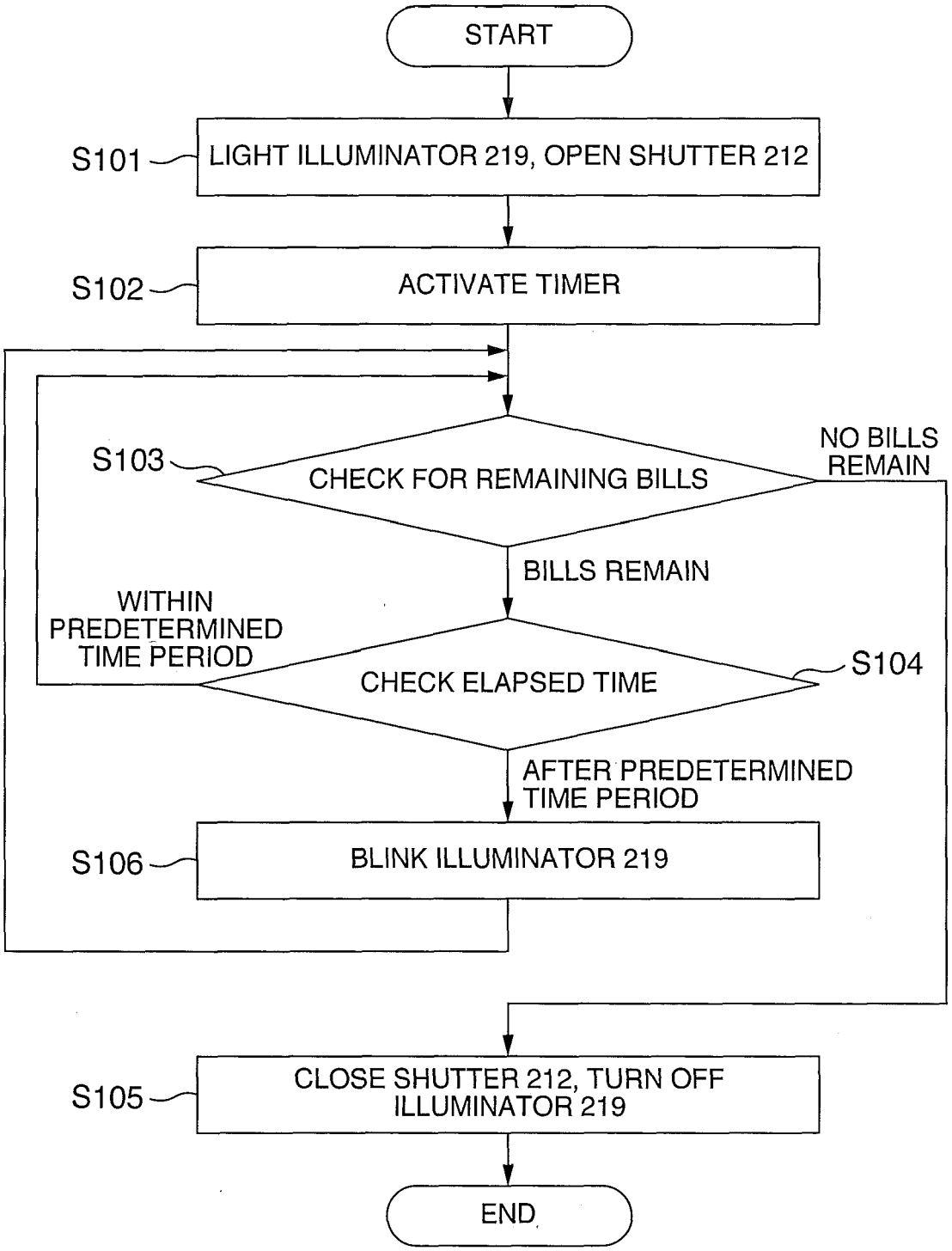


FIG.13


START
S101
LIGHT ILLUMINATOR 219, OPEN SHUTTER 212
S102
ACTIVATE TIMER
S103
CHECK FOR REMAINING BILLS
NO BILLS REMAIN
BILLS REMAIN
WITHIN PREDETERMINED TIME PERIOD
CHECK ELAPSED TIME
S104
AFTER PREDETERMINED TIME PERIOD
S106
BLINK ILLUMINATOR 219
S105
CLOSE SHUTTER 212, TURN OFF ILLUMINATOR 219
END

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EUROPEAN SEARCH REPORT

Application Number
EP 15 16 8888

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	29 September 2015	Lindholm, Anna-Maria

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