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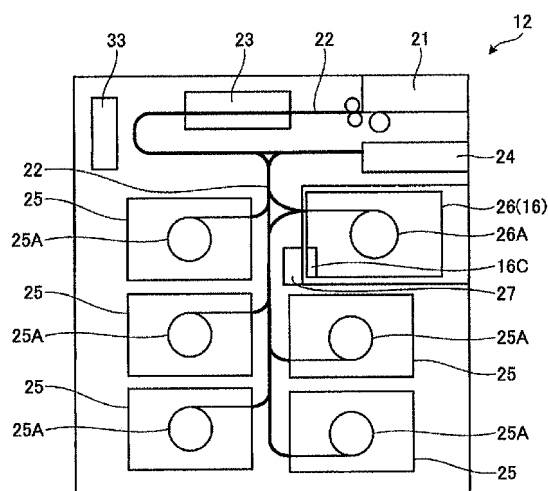
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(54) **BILL STORAGE AND PAYOUT DEVICE, AND BILL OUTPUT METHOD IN SAME**

(57) Disclosed is a device comprising a conveyor unit (22) that conveys a bill inserted from an insertion opening (21) for inserting bills from outside; an identification unit (23) that identifies a denomination of the bill inserted from the insertion opening and sorts normal/defective bills according to whether the bill is normal or defective; a recycling stacker (25) for storing the bill conveyed by the conveyor unit, based on identification results of the identification unit, and for feeding the stored bill to the conveyor unit; and a control unit (33) for controlling a drive of the recycling stacker and the conveyor unit to discharge from a discharge opening (24) in a transacted amount of a debit settlement, normal bills stored in the recycling stacker, when a bill output instruction is detected for the transacted amount in the debit settlement. The device complies with a stipulation in ECB Article 6, while increasing a number of saved normal bills.

FIG.2



Description

TECHNICAL FIELD

[0001] The present invention relates to a banknote storing and dispensing apparatus such as a cash settlement apparatus that realizes operations such as accepting inserted merchandise purchase money and dispensing change coins/banknotes at a checkout counter such as a cash register in a store, and a banknote discharging method for the banknote storing and dispensing apparatus.

BACKGROUND ART

[0002] A system that has been known in the art includes a cash register such as a POS (point-of-sales) register that is installed at a checkout counter of a retail store such as a supermarket and a convenience store or a service store such as a restaurant, and that is connected to a cash settlement apparatus such as a coin depositing/dispensing machine and a banknote depositing/dispensing machine (see Patent Document 1, for example).

[0003] A cash settlement apparatus disclosed in Patent Document 1 has not only a merchandise cash transaction function that includes accepting inserted purchase money and discharging change banknotes but also a bank account transaction function that includes discharging withdrawal money with cashback service and loan money with loan service to a customer. The merchandise cash transaction function corresponds to a cash settlement function of paying a merchandise price with cash when purchasing merchandise. The bank account transaction function includes a service of discharging cashback money to the customer. That is, when merchandise payment is to be made at the same time as withdrawing money from a bank account or taking out a loan, the withdrawal money or the loan money is not discharged to the outside as it was originally designated, but money, the amount of which is calculated by subtracting the merchandise price from the designated amount of the withdrawal money or the loan money, is discharged as cashback money.

[0004] For example, when a merchandise purchase of JPY 5,000 is to be made and also JPY 30,000 is to be withdrawn from a bank account, the cash settlement apparatus having the bank account transaction function discharges a cashback amount of JPY 25,000, which is a resultant amount of the merchandise price JPY 5,000 subtracted from the withdrawal amount of JPY 30,000.

[0005] In the technique disclosed in Patent Document 1, the cashback amount is discharged by using the bank account transaction function thereby discharging the cashback amount that is calculated by subtracting the amount of the merchandise price from the withdrawal amount from the bank account at the time of merchandise purchase. The customer can thereby make a withdrawal from the bank account and allocate part of this withdrawal

amount to the merchandise price.

[0006] Another conventional cash settlement apparatus that has been known in the art has a function of re-using part of deposited banknotes as change banknotes (see Patent Document 2, for example). This cash settlement apparatus recognizes the deposited banknotes, and when the deposited banknotes are fit banknotes, the cash settlement apparatus stores the deposited fit banknotes into a stacker. If any of the deposited banknotes is a significantly damaged unfit banknote, the cash settlement apparatus stores the deposited unfit banknote into a reject stacking unit.

[0007] Consequently, in the technique disclosed in Patent Document 2, upon determining the deposited banknote to be a fit banknote based on the recognition result of the deposited banknote, the deposited banknote can be reused as a change banknote, and when the deposited banknote is an unfit banknote, the deposited banknote can be collected.

[Conventional Art Documents]

[Patent Documents]

[0008]

[Patent Document 1] Japanese Patent Application Laid-open No. 11-250350 (see Abstract and paragraphs 0024 to 0049)

[Patent Document 2] Japanese Patent No. 3295288 (see Claim 1 and FIG. 2)

DISCLOSURE OF INVENTION

[0009] In the Euro zone in Europe, ECB Article 6 (Article 6 of the Council Regulation (EC) No. 1138/2001 of 28 June 2001) is applied to monetary transactions in any financial institution, such as bank account transactions including bank account withdrawal services and loan services. The ECB Article 6 requires that fit banknotes be used when discharging any banknotes to a customer in a monetary transaction in a financial institution. In recent years, not only the merchandise cash transaction function of discharging change banknotes to the customer but also the bank account transaction function of withdrawing from the bank account and making a loan is available on a cash settlement apparatus in the distribution industry. In light of this, it is highly possible that, from the year 2011, use of fit banknotes for discharging banknotes starts to be required not only in the monetary transaction in the financial institution but also in the bank account transaction in the distribution market.

[0010] The conventional cash settlement apparatus, discharges banknotes in a bank account transaction without distinguishing whether the banknotes are fit banknotes or unfit banknotes. However, from the year 2011 and on, discharging of an unfit banknote in the bank account transaction may become against the requirement

of ECB Article 6.

[0011] In addition, to comply with the requirement of ECB Article 6, the number of fit banknotes stored in a cash settlement apparatus in the distribution market needs to be increased. With increasing demand of fit banknotes, there is a concern that the distribution market may become short of fit banknotes and unable to offer any bank account transaction services.

[0012] Furthermore, the conventional cash settlement apparatus sorts the deposited banknotes into fit banknotes and unfit banknotes and stores them separately. Because the fit banknotes are circulated as change banknotes while the unfit banknotes are not circulated as change banknotes, the conventional cash settlement apparatus cannot deal with shortage of fit banknotes.

[0013] The present invention has been conceived in light of the above. It is an object of the present invention to provide a banknote storing and dispensing apparatus that discharges fit banknotes in a banknote account transaction while increasing the number of fit banknotes held inside, and a banknote discharging method for such a banknote storing and dispensing apparatus.

[MEANS TO SOLVE THE PROBLEMS]

[0014] To achieve the above object, a banknote storing and dispensing apparatus according to an aspect of the present invention includes an inlet through which a banknote is inserted from outside; a transport unit that transports the banknote inserted through the inlet; a recognition unit that recognizes a denomination kind and a fitness kind for distinguishing a fit banknote and an unfit banknote of the banknote inserted through the inlet; a denomination-wise storing and feeding unit that stores therein the banknote transported by the transport unit based on a recognition result obtained by the recognition unit, and feeds out the stored banknote to the transport unit; an outlet through which the banknote fed out by the denomination-wise storing and feeding unit and transported by the transport unit is discharged to the outside; a discharging instruction detecting unit that detects a fit banknote discharging instruction to discharge fit banknotes for a transaction amount of a bank account transaction by using the fit banknotes, or a mixed banknote discharging instruction to discharge mixed banknotes that include at least one of the fit banknote and the unfit banknote for a transaction amount of a merchandise cash transaction by using mixed banknotes that include at least either one of the fit banknotes and the unfit banknotes; and a control unit that, upon the discharging instruction detecting unit detecting the fit banknote discharging instruction, drives and controls the denomination-wise storing and feeding unit and the transport unit such that the fit banknotes, which correspond to the transaction amount of the bank account transaction and are stored in the denomination-wise storing and feeding unit, are discharged through the outlet.

[0015] In the banknote storing and dispensing appa-

ratus, upon the discharging instruction detecting unit detecting the mixed banknote discharging instruction, the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that the unfit banknotes, which correspond to the transaction amount of the merchandise cash transaction and are stored in the denomination-wise storing and feeding unit, are preferentially discharged as the mixed banknotes through the outlet.

[0016] The banknote storing and dispensing apparatus further includes a memory unit that, upon sequentially storing the banknotes in the denomination-wise storing and feeding unit, records the fitness kind of the banknotes and storage position information, which represents a storage position of the banknotes, in association with each other, based on the recognition result obtained by the recognition unit. Moreover, the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that, when the unfit banknotes, which are designated as the corresponding transaction amount of the merchandise cash transaction and are stored in the denomination-wise storing and feeding unit, are to be preferentially discharged through the outlet as the mixed banknotes, if a load of feeding the designated unfit banknotes from the denomination-wise storing and feeding unit to the transport unit exceeds a predetermined load based on the storage position information of the unfit banknotes recorded in the memory unit, the fit banknotes, which correspond to the designated unfit banknotes and are stored in the denomination-wise storing and feeding unit, are discharged through the outlet, instead of the designated unfit banknotes.

[0017] The banknote storing and dispensing apparatus further includes a memory unit that, upon sequentially storing banknotes in the denomination-wise storing and feeding unit, records the fitness kind of the banknotes and storage position information, which represents a storage position of the banknote, in association with each other, based on the recognition result obtained by the recognition unit. Moreover, the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that, when the unfit banknotes, which are designated as the corresponding transaction amount of the merchandise cash transaction and are stored in the denomination-wise storing and feeding unit, are to be preferentially discharged through the outlet as the mixed banknotes, if a load of feeding the designated unfit banknotes from the denomination-wise storing and feeding unit to the transport unit exceeds a predetermined load based on the storage position information of the unfit banknotes recorded in the memory unit, instead of the designated unfit banknotes, unfit banknotes of the same amount and of lower denominations that are stored in the denomination-wise storing feeding unit are discharged through the outlet.

[0018] In the banknote storing and dispensing apparatus, the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit

such that, when the unfit banknote, which is designated as the corresponding transaction amount of the merchandise cash transaction and is stored in the denomination-wise storing and feeding unit, is to be preferentially discharged through the outlet, if there is not the designated unfit banknote in the denomination-wise storing and feeding unit, instead of the designated unfit banknotes, unfit banknotes of the same amount and of lower denominations that are stored in the denomination-wise storing and feeding unit are discharged through the outlet.

[0019] In the banknote storing and dispensing apparatus, the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that, even when an unfit banknote preference mode is set in which the unfit banknotes, which correspond to the transaction amount of the merchandise cash transaction and are stored in the denomination-wise storing and feeding unit, are preferentially discharged as the mixed banknotes through the outlet, if the fit banknotes are inserted through the inlet in the merchandise cash transaction, fit banknotes, which correspond to the transaction amount of the merchandise cash transaction and are stored in the denomination-wise storing and feeding unit, are discharged through the outlet.

[0020] In the banknote storing and dispensing apparatus, upon the discharging instruction detecting unit detecting the mixed banknote discharging instruction, the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that banknotes, which correspond to the transaction amount of the merchandise cash transaction and are stored in the denomination-wise storing and feeding unit, are discharged through the outlet as the mixed banknotes.

[0021] In the banknote storing and dispensing apparatus, upon the discharging instruction detecting unit detecting the mixed banknote discharging instruction, the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that fit banknotes, which correspond to the transaction amount of the merchandise cash transaction and are stored in the denomination-wise storing and feeding unit, are preferentially discharged as the mixed banknotes through the outlet.

[0022] In the banknote storing and dispensing apparatus, when discharging through the outlet banknotes, which correspond to the transaction amount of the merchandise cash transaction and are stored in the denomination-wise storing and feeding unit, as the mixed banknotes, the control unit selectively sets one of an unfit banknote preference mode in which unfit banknotes corresponding to the transaction amount are preferentially discharged, a fitness-kind independent mode in which banknotes corresponding to the transaction amount are discharged regardless of a fitness kind thereof, and a fit banknote preference mode in which fit banknotes corresponding to the transaction amount are preferentially discharged.

[0023] In the banknote storing and dispensing apparatus,

the unfit banknote preference mode, the fitness-kind independent mode, and the fit banknote preference mode are selectively set based on denomination kinds of the banknotes corresponding to the transaction amount of the merchandise cash transaction that are stored in the denomination-wise storing and feeding unit.

[0024] The banknote storing and dispensing apparatus further includes a banknote collecting unit that collects a designated banknote. Moreover, the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that the unfit banknotes stored in the denomination-wise storing and feeding unit are preferentially transported to the banknote collecting unit.

[0025] The banknote storing and dispensing apparatus further includes a banknote collecting unit that collects a designated banknote. Moreover, the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that a designated number of unfit banknotes for each denomination kind out of the banknotes stored in the denomination-wise storing and feeding unit are preferentially transported to the banknote collecting unit.

[0026] The banknote storing and dispensing apparatus further includes a banknote collecting unit that collects a designated banknote. Moreover, the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that unfit banknotes corresponding to a designated total amount out of the banknotes stored in the denomination-wise storing and feeding unit are preferentially transported to the banknote collecting unit.

[0027] The banknote storing and dispensing apparatus further includes a banknote collecting unit that collects a designated banknote. Moreover, the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that an amount of unfit banknotes that exceeds a designated total amount out of the banknotes stored in the denomination-wise storing and feeding unit are preferentially transported to the banknote collecting unit.

[0028] The banknote storing and dispensing apparatus further including a banknote collecting unit that collects a designated banknote. Moreover, the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that a number of unfit banknotes that exceeds a designated number of each denomination kind out of the banknotes stored in the denomination-wise storing and feeding unit are preferentially transported to the banknote collecting unit.

[0029] In the banknote storing and dispensing apparatus, upon determining based on the recognition result obtained by the recognition unit that the banknote inserted through the inlet in the merchandise cash transaction is a fit banknote, the control unit awards incentive points to a customer's memory medium of the merchandise cash transaction.

[0030] In the banknote storing and dispensing apparatus,

ratus the outlet is used to reject and return the banknote inserted through the inlet, and the control unit drives and controls the transport unit such that, upon determining based on the recognition result obtained by the recognition unit that the banknote inserted through the inlet in the merchandise cash transaction is an unfit banknote, the unfit banknote is transported to the outlet.

[0031] Moreover, to achieve the above objects, a banknote discharging method according to another aspect of the present invention is realized by a banknote storing and dispensing apparatus that includes an inlet through which a banknote is deposited from outside, a transport unit that transports the banknote inserted through the inlet, a recognition unit that recognizes a denomination kind and a fitness kind for distinguishing a fit banknote and an unfit banknote of the banknote inserted through the inlet, a denomination-wise storing and feeding unit that stores therein the banknote transported by the transport unit based on a recognition result obtained by the recognition unit and feeds out the stored banknote to the transport unit, and an outlet through which the banknote fed by the denomination-wise storing and feeding unit and transported by the transport unit is discharged to the outside. The banknote discharging method includes detecting a fit banknote discharging instruction to discharge fit banknotes for a transaction amount of a bank account transaction, or a mixed banknote discharging instruction to discharge mixed banknotes that include at least one of the fit banknote and the unfit banknote for a transaction amount of a merchandise cash transaction; and driving and controlling the denomination-wise storing and feeding unit and the transport unit such that, upon detecting the fit banknote discharging instruction at the detecting, fit banknotes, which correspond to the transaction amount of the bank account transaction that are stored in the denomination-wise storing and feeding unit, are discharged through the outlet.

[0032] Moreover, to achieve the above objects, a banknote storing and dispensing apparatus according to still another aspect of the present invention includes an inlet through which a banknote is deposited from outside; a transport unit that transports the banknote inserted through the inlet; a recognition unit that recognizes a denomination kind and a new/old version for distinguishing a new version banknote and an old version banknote of the banknote inserted through the inlet; a denomination-wise storing and feeding unit that stores therein the banknote transported by the transport unit based on a recognition result obtained by the recognition unit, and feeds out the stored banknote to the transport unit; an outlet through which the banknote fed out by the denomination-wise storing and feeding unit and transported by the transport unit is discharged to the outside; a discharging instruction detecting unit that detects a new version banknote discharging instruction to discharge new version banknotes or a mixed version banknote discharging instruction to discharge mixed version banknotes that include at least one of the new version banknote and the

old version banknote; and a control unit that drives and controls the denomination-wise storing and feeding unit and the transport unit such that, upon the discharging instruction detecting unit detecting the new version banknote discharging instruction, new version banknotes stored in the denomination-wise storing and feeding unit are discharged through the outlet, and upon the discharging instruction detecting unit detecting the mixed banknote discharging instruction, the mixed version banknotes stored in the denomination-wise storing and feeding unit are discharged through the outlet.

[ADVANTAGES OF THE INVENTION]

[0033] According to an aspect of the present invention, in a banknote storing and dispensing apparatus, banknotes inserted through an inlet are stored in a denomination-wise storing and feeding unit regardless of their fitness kind. Consequently, unfit banknotes as well as fit banknotes can be reused for banknote discharging, and the number of fit banknotes held inside the apparatus can thereby be increased. In the banknote storing and dispensing apparatus according to the present invention, upon detecting a fit banknote discharging instruction regarding a transaction amount of a bank account transaction, fit banknotes corresponding to the transaction amount of the bank account transaction that are stored in the denomination-wise storing and feeding unit are discharged through an outlet. Consequently, the fit banknotes can be discharged at banknote discharging in the bank account transaction, and therefore the requirement of ECB Article 6 can be complied with.

[0034] According to another aspect of the present invention, upon detecting a mixed banknote discharging instruction regarding a transaction amount of a merchandise cash transaction, the banknote storing and dispensing apparatus preferentially discharges the unfit banknotes corresponding to the transaction amount of the merchandise cash transaction that are stored in the denomination-wise storing and feeding unit, as mixed banknotes through the outlet. Consequently, the unfit banknotes are discharged at banknote discharging in the merchandise cash transaction. An outflow of fit banknotes therefore can be suppressed, and the number of fit banknotes held inside the apparatus can be increased.

[0035] According to still another aspect of the present invention, in the banknote storing and dispensing apparatus, for example, if a significant load is imposed to preferentially discharge unfit banknotes corresponding to the transaction amount of the merchandise cash transaction as the mixed banknotes through the outlet, fit banknotes corresponding to the unfit banknotes are discharged through the outlet instead of the unfit banknotes. Consequently, the customer can be swiftly provided with banknotes corresponding to the transaction amount of the merchandise cash transaction.

[0036] According to still another aspect of the present invention, in the banknote storing and dispensing appa-

ratus, for example, if a significant load is imposed to preferentially discharge unfit banknotes corresponding to the transaction amount of the merchandise cash transaction as the mixed banknotes through the outlet, unfit banknotes of the same amount and of lower denominations are discharged through the outlet instead of the original unfit banknotes. Consequently, the customer can be swiftly provided with the banknotes corresponding to the transaction amount of the merchandise cash transaction.

[0037] According to still another aspect of the present invention, in the banknote storing and dispensing apparatus, when unfit banknotes corresponding to the transaction amount of the merchandise cash transaction are to be preferentially discharged as mixed banknotes through the outlet but there are insufficient unfit banknotes, unfit banknotes of the same amount and of lower denominations are discharged through the outlet instead of the original unfit banknotes. Consequently, the customer can be swiftly provided with the banknotes corresponding to the transaction amount of the merchandise cash transaction.

[0038] According to still another aspect of the present invention, in the banknote storing and dispensing apparatus, even when an unfit banknote preference mode, in which unfit banknotes corresponding to the transaction amount of the merchandise cash transaction are preferentially discharged as mixed banknotes through the outlet, is set, if fit banknotes are inserted through the inlet in the merchandise cash transaction, fit banknotes corresponding to the transaction amount of the merchandise cash transaction are discharged through the outlet. Consequently, a customer who has used fit banknotes in the merchandise cash transaction can be provided with fit banknotes for change.

[0039] According to still another aspect of the present invention, in the banknote storing and dispensing apparatus, upon detecting a mixed banknote discharging instruction regarding a transaction amount of a merchandise cash transaction, banknotes corresponding to the transaction amount of the merchandise cash transaction are discharged as the mixed banknotes through the outlet regardless of their fitness kind. Consequently, in the merchandise cash transaction, the customer can be swiftly provided with banknotes corresponding to the transaction amount of the merchandise cash transaction regardless of their fitness kind.

[0040] According to still another aspect of the present invention, in the banknote storing and dispensing apparatus, upon detecting the mixed banknote discharging instruction regarding a transaction amount of a merchandise cash transaction, fit banknotes corresponding to the transaction amount of the merchandise cash transaction are preferentially discharged as the mixed banknotes through the outlet. Consequently, for example, when sufficient fit banknotes are held in the apparatus, the customer can be provided with fit banknotes for change in the merchandise cash transaction.

[0041] According to still another aspect of the present

invention, in the banknote storing and dispensing apparatus, one of the unfit banknote preference mode, a fitness-kind independent mode, and a fit banknote preference mode can be selectively set when discharging banknotes corresponding to the transaction amount of the merchandise cash transaction as the mixed banknotes through the outlet. Consequently, various discharging modes can be freely set when banknotes corresponding to the transaction amount of the merchandise cash transaction are to be discharged through the outlet.

[0042] According to still another aspect of the present invention, in the banknote storing and dispensing apparatus, the unfit banknote preference mode, the fitness-kind independent mode, and the fit banknote preference mode can be selectively set for each of the denominations of the banknotes corresponding to the transaction amount of the merchandise cash transaction. Consequently, various discharging modes can be freely set for each of the denominations of the banknotes corresponding to the transaction amount.

[0043] According to still another aspect of the present invention, in the banknote storing and dispensing apparatus, the unfit banknotes stored in the denomination-wise storing and feeding unit can be preferentially transported to a banknote collecting unit. Consequently, the unfit banknotes can be preferentially collected.

[0044] According to still another aspect of the present invention, in the banknote storing and dispensing apparatus, a designated number of unfit banknotes for each denomination kind out of the banknotes stored in the denomination-wise storing and feeding unit can be preferentially transported to the banknote collecting unit. Consequently, a designated number of unfit banknotes for each denomination kind can be preferentially collected.

[0045] According to still another aspect of the present invention, in the banknote storing and dispensing apparatus, a designated total amount of unfit banknotes out of the banknotes stored in the denomination-wise storing and feeding unit can be preferentially transported to the banknote collecting unit. Consequently, the designated total amount of unfit banknotes can be preferentially collected.

[0046] According to still another aspect of the present invention, in the banknote storing and dispensing apparatus, an exceeding amount of unfit banknotes that exceeds a designated total amount out of the banknotes stored in the denomination-wise storing and feeding unit can be preferentially transported to the banknote collecting unit. Consequently, an exceeding amount of unfit banknotes that exceeds the designated total amount can be preferentially collected.

[0047] According to still another aspect of the present invention, in the banknote storing and dispensing apparatus, the number of unfit banknotes that exceeds a designated number of each denomination out of the banknotes stored in the denomination-wise storing and feeding unit can be preferentially transported to the banknote collecting unit. Consequently, the number of unfit bank-

knoves that exceeds the designated number of each denomination can be preferentially collected.

[0048] According to still another aspect of the present invention, in the banknote storing and dispensing apparatus, incentive points are awarded onto a memory medium of a customer of the merchandise cash transaction when the customer inserts fit banknotes through the inlet in the merchandise cash transaction. Consequently, the customer of the merchandise cash transaction is encouraged to insert fit banknotes, and the number of fit banknotes held in the apparatus can thereby be increased.

[0049] According to still another aspect of the present invention, in the banknote storing and dispensing apparatus, when the banknotes inserted through the inlet are unfit banknotes in the merchandise cash transaction, the unfit banknotes can be transported to the outlet. Consequently, insertion of unfit banknotes is rejected, while insertion of fit banknotes is aroused in the merchandise cash transaction. The number of fit banknotes held in the apparatus can thereby be increased.

[0050] According to still another aspect of the present invention, with a banknote discharging method realized by the banknote storing and dispensing apparatus, the banknotes inserted through the inlet are stored in the denomination-wise storing and feeding unit regardless of their fitness kind. Consequently, the fit banknotes held in the apparatus can be increased by reusing the unfit banknotes as well as the fit banknotes for discharging banknotes. With the banknote discharging method according to the present invention, upon detecting the fit banknote discharging instruction regarding the transaction amount of the bank account transaction, the fit banknotes corresponding to the transaction amount of the bank account transaction that are stored in the denomination-wise storing and feeding unit are discharged through the outlet. Consequently, the fit banknotes are discharged at banknote discharging in the bank account transaction, and the requirement of ECB Article 6 can be complied with.

[0051] According to still another aspect of the present invention, in the banknote storing and dispensing apparatus, the banknotes inserted through the inlet can be stored in the denomination-wise storing and feeding unit regardless of their new/old version. Consequently, old version banknotes as well as new version banknotes are reused for discharging banknotes, and the number of new version banknotes held in the apparatus can thereby be increased.

BRIEF DESCRIPTION OF DRAWINGS

[0052]

FIG. 1 is a block diagram of a structure of an in-store fund management system according to an embodiment.

FIG. 2 is an explanatory diagram of an internal struc-

ture of a banknote processing unit of a cash settlement apparatus.

FIG. 3 is a block diagram of an internal structure of the cash settlement apparatus.

FIGS. 4A to 4C are explanatory diagrams of different services offered by the cash settlement apparatus. FIG. 5 is an explanatory diagram of an internal structure of a cash depositing/dispensing apparatus.

FIG. 6 is a block diagram of an internal structure of the cash depositing/dispensing apparatus.

FIG. 7 is an explanatory diagram showing a relationship for transporting a transport cassette between the cash settlement apparatus and the cash depositing/dispensing apparatus.

FIG. 8 is a flowchart of a processing operation of a change dispensing process performed by a control unit of the cash settlement apparatus.

FIG. 9 is a flowchart of a processing operation of a banknote replenishing process performed by a control unit of the cash depositing/dispensing apparatus.

FIG. 10 is a flowchart of a processing operation of a stored-banknotes breakdown information storing process performed by the control unit of the cash settlement apparatus.

FIG. 11 is a flowchart of a processing operation of a stored-banknotes breakdown information acquiring process performed by the control unit of the cash depositing/dispensing apparatus.

FIG. 12 is an explanatory diagram of an internal structure of the transport cassette.

BEST MODE(S) FOR CARRYING OUT THE INVENTION

[0053] Exemplary embodiments of a banknote storing and dispensing apparatus and a banknote discharging method of the banknote storing and dispensing apparatus according to the present invention are explained in detail below with reference to the accompanying drawings.

[0054] First, an outline of the present embodiment is explained. In a cash settlement apparatus or the like that is used in the distribution market, the number of fit banknotes stored in the device can be increased by reusing, at banknote discharging, unfit banknotes as well as fit banknotes that are inserted through an inlet. Furthermore, by discharging fit banknotes that correspond to a transaction amount through an outlet in a bank account transaction, the requirement of the ECB Article 6 therefore can be complied with even in the cash settlement apparatus or the like.

[Embodiments]

[0055] FIG. 1 is a block diagram of a structure of an in-store fund management system according to the present embodiment. An in-store fund management system 1 shown in FIG. 1 includes POS registers 11, cash settle-

ment apparatuses 12, a self-checkout register unit 11A, a cash depositing/dispensing apparatus 13, an ATM 14, a collecting machine 15, and a transport cassette 16. The POS register 11 is installed at a checkout counter. The POS register 11 corresponds to an operator-attended register that manages items purchased by a customer by using its POS function and performs payment processes for the purchased items face-to-face. The cash settlement apparatus 12 is installed adjacent to the POS register 11. Cash for the price of the items registered by the POS register 11 or the like is inserted through an inlet of a cash settlement apparatus 12, and change money, which is the amount calculated by subtracting the price of the items from a deposited amount of cash, is discharged through an outlet of the cash settlement apparatus 12. The cash settlement apparatus 12 includes a banknote processing unit 12A that discharges change banknotes of change money and a coin processing unit 12B that discharges change coins of the change money. The self-checkout register unit 11A is also installed at the checkout counter. The self-checkout register unit 11A is configured integrally with the POS register 11, the cash settlement apparatus 12, a weighing apparatus for prevention of fraud, and the like so that a customer can check the items out by himself/herself. The self-checkout register unit 11A corresponds to an unattended checkout unit that manages items purchased by the customer and performs payment processes for the purchased items. The cash depositing/dispensing apparatus 13 manages in-store cash funds in accordance with denominations and fitness through all the cash settlement apparatuses 12 of the store. The ATM 14 corresponds to an automatic cash dispenser that offers in-store banking services. The collecting machine 15, which will be described later, is installed at the entrance of the store, for example. The collecting machine 15 collects unfit banknotes from customers, and returns the same amount of fit banknotes as that of the collected unfit banknotes to the customers. Upon a delivery request from the store, an armored car services 17 collects, for example, sales proceeds out of the in-store cash fund managed by the cash depositing/dispensing apparatus 13, and delivers the collected sales proceeds to a financial institution. In addition, upon a delivery request from the store, the armored car services 17 delivers reserve money for store operation in accordance with denomination kinds and fitness kinds.

[0056] FIG. 2 is an explanatory diagram of an internal structure of the banknote processing unit 12A of the cash settlement apparatus 12. This banknote processing unit 12A is referred to as the cash settlement apparatus 12 hereinafter in the explanation. FIG. 3 is a block diagram of an internal structure of the cash settlement apparatus 12. The cash settlement apparatus 12 shown in FIG. 2 includes an inlet 21, a transport unit 22, a recognition unit 23, an outlet 24, recycling stackers 25, a transport cassette 26, a reader/writer 27, and a control unit 33.

The inlet 21 is an opening through which banknotes are inserted into the cash settlement apparatus 12. The

transport unit 22 is a conveyer belt or the like that transports the banknotes along a transport path running from the inlet 21 to the recycling stackers 25, the transport cassette 26, and the outlet 24. Not-shown diverters are arranged at diverting points of the transport path. When a not-shown tracking sensor detects a tip end of a banknote that is being transported, a not-shown solenoid is driven to sort the transported banknote.

[0057] The recognition unit 23 is arranged on the transport path and recognizes kinds of the banknotes inserted through the inlet 21. In addition to seven denomination kinds in the case of euro banknotes, namely, 5 euro, 10 euro, 20 euro, 50 euro, 100 euro, 200 euro, and 500 euro, the kinds of banknotes also include authenticity classifications, namely, genuine banknotes and counterfeit banknotes, and fitness classifications, namely, fit banknotes and unfit banknotes. The fitness classifications are determined in compliance with the ECB. The banknote kinds also include face/back classifications, namely, face-up banknotes and face-down banknotes, and print versions, namely, new version banknotes and old version banknotes for each denomination.

[0058] The recycling stackers 25 store therein the banknotes inserted through the inlet 21 in accordance with designated denominations, and feed the stored banknotes out when discharging them through the outlet 24. A tape and reel system is used for the recycling stackers 25 so that each banknote is wound together with the tape around a reel 25A. In an example of the cash settlement apparatus 12 shown in FIG. 2, five recycling stackers 25 are arranged.

[0059] The transport cassette 26 includes a designated banknote collecting unit 26A that collects designated banknotes to be collected, and an IC tag 16C that is stuck to a surface of the cassette to read stored-banknotes breakdown information that will be described later from the IC tag 16C. The tape and reel system is used for the designated banknote collecting unit 26A. The outlet 24 is structure from where the banknotes discharged from the recycling stacker 25 as described above are discharged, and also from where rejected banknotes are discharged to outside of the cash settlement apparatus 12 based on recognition results of the banknotes inserted through the inlet 24. The reader/writer 27 reads and writes the stored-banknotes breakdown information and the like from and in the IC tag 16C stuck to the transport cassette 26.

[0060] As shown in FIG. 3, the cash settlement apparatus 12 includes a communication interface 31, a memory unit 32, and the control unit 33. The communication interface 31 connects the POS register 11 to the cash depositing/dispensing apparatus 13 via a not-shown network in such a manner as to allow mutual communications between the POS register 11 and the cash depositing/dispensing apparatus 13. The memory unit 32 stores therein and manages, for each recycling stacker 25 and the transport cassette 26, storage positions, denomination kinds, and fitness kinds of the banknotes

stored in the recycling stackers 25 and the transport cassette 26. The memory unit 32 also stores therein and manages current inventory amount information of the banknotes in the cash settlement apparatus 12 for each denomination kind and each fitness kind.

[0061] The control unit 33 includes a discharging instruction detecting unit 41, a drive control unit 42, a memory control unit 43, a change calculating unit 44, an information creating unit 45, and an identifying unit 46. The discharging instruction detecting unit 41 detects a banknote discharging instruction for a transaction amount of a merchandise cash transaction (mixed banknote discharging instruction) or a banknote discharging instruction for a transaction amount of a bank account transaction (fit banknote discharging instruction). The merchandise cash transaction and the bank account transaction are started in response to a predetermined operation of a not-shown operation unit. The mixed banknote discharging instruction is an instruction that is issued when mixed banknotes that include at least one of a fit banknote and an unfit banknote are to be discharged. The fit banknote discharging instruction is an instruction that is issued when only fit banknotes are to be discharged.

[0062] In the merchandise cash transaction, or in other words, for cash settlement, cash is inserted through the inlet 21 to make a merchandise purchase so that the change calculating unit 44 calculates the amount of change by subtracting a merchandise price from the inserted cash amount. The services of the cash settlement apparatus 12 are explained with reference to FIGS. 4A to 4C. As shown in FIG. 4A, when the cash settlement is to be made with the inserted cash amount of 100 euro and the merchandise price of 20 euro, the cash settlement apparatus 12 discharges 80 euro as change banknotes through the outlet 24. In this case, the banknotes can be fit ones or unfit ones. In the bank account transaction with cashback service, the change calculating unit 44 calculates a cashback amount by subtracting the merchandise price from a withdrawal amount or a loan amount when making a merchandise purchase. When a debit settlement is made with the withdrawal amount of 100 euro and the merchandise price of 20 euro, the cash settlement apparatus 12 discharges the cashback amount of 80 euro that is obtained by subtracting the merchandise price from the withdrawal amount, in fit banknotes through the outlet 24, as shown in FIG. 4B. When the withdrawal amount of 100 euro is withdrawn with cashback service, the cash settlement apparatus 12 discharges the withdrawal amount of 100 euro in fit banknotes through the outlet 24, as shown in FIG. 4C.

[0063] When the banknote discharging instruction for the transaction amount of the bank account transaction is detected, the drive control unit 42 controls and drives the recycling stackers 25 and the transport unit 22 so that fit banknotes corresponding to the transaction amount of the bank account transaction that are stored in the recycling stackers 25 are discharged through the outlet 24. In the bank account transaction, fit banknotes are dis-

charged for any of the withdrawal service, the loan service, and the cashback service. The requirement of the ECB Article 6 can therefore be complied with.

[0064] When the discharging instruction for change banknotes for the transaction amount of the merchandise cash transaction is detected, the drive control unit 42 controls and drives the recycling stackers 25 and the transport unit 22 so that unfit banknotes corresponding to the transaction amount of the merchandise cash transaction that are stored in the recycling stackers 25 are discharged through the outlet 24.

[0065] When storing the banknotes inserted through the inlet 21 into the recycling stacker 25 or the transport cassette 26 based on the recognition result obtained by the recognition unit 23, the memory control unit 43 writes the denomination kind and the fitness kind of each banknote into the memory unit 32 in accordance with each storage position. The memory control unit 43 also writes current inventory amount information, which includes the denomination kinds and the fitness kinds of all the banknotes stored in the cash settlement apparatus 12, for each denomination kind and each fitness kind into the memory unit 32. The information creating unit 45 prepares, when banknotes of the designated denomination are stored into the transport cassette 26, the stored-banknotes breakdown information that includes the storage position, the denomination kind, the fitness kind, and a cash register number of each of the banknotes stored in the transport cassette 26. The memory control unit 43 further writes the stored-banknotes breakdown information into the IC tag 16C stuck to the transport cassette 26. When the transport cassette 16 that will be described later is mounted, the identifying unit 46 collects the stored-banknotes breakdown information written in the IC tag 16C of this transport cassette 16. The identifying unit 46 can recognize the storage position, the denomination kind, and the fitness kind of each of the banknotes stored in the transport cassette 16, based on the stored-banknotes breakdown information, without using the recognition unit 23.

[0066] The recycling stacker 25 of the tape and reel system stores therein banknotes of the designated denomination regardless of their fitness kinds. This means that it would require some time to feed banknotes of a designated denomination to the transport unit 22 by designating either one of fit banknotes and unfit banknotes. For example, a recycling stacker 25 stores therein unfit, fit, fit, fit, and unfit 20-euro banknotes in this order from a position closest to a not-shown storage opening. When the two unfit 20-euro banknotes are to be fed from the recycling stacker 25, the drive control unit 42 feeds the unfit note as the first banknote. Then, the drive control unit 42 sequentially feeds out the four fit banknotes as the second to fifth banknotes, and sequentially transports these fit banknotes to a different recycling stacker 25. The drive control unit 42 further feeds out the last unfit banknote as the sixth banknote. Consequently, the two unfit 20-euro banknotes are fed out. This means that six

banknotes in total need to be fed out to feed the two unfit 20-euro banknotes out. Because the four fit banknotes that are transported to the different recycling stacker 25 need to be returned to the original recycling stacker 25, it requires more time.

[0067] In general, when the drive control unit 42 feeds two unfit 20-euro banknotes out, time required for feeding out approximately four banknotes is considered to be allowable, and a certain load corresponding to this allowable time is imposed. Even when unfit banknotes of the change amount stored in the recycling stacker 25 are to be preferentially discharged through the outlet 24 in the cash settlement, if it requires time to feed the unfit banknotes from the recycling stacker 25, or in other words, if the load exceeds a predetermined level, the drive control unit 42 drives and controls the recycling stacker 25 and the transport unit 22 so that fit banknotes are discharged through the outlet 24 instead of the unfit banknotes. As a result, a processing load of discharging the banknotes of the change amount in the cash settlement can be reduced, and the discharging time can be significantly shortened.

[0068] Furthermore, when it requires time to feed the unfit banknotes from the recycling stacker 25 onto the transport unit 22, the drive control unit 42 drives and controls the recycling stacker 25 and the transport unit 22 so that, instead of the unfit banknotes, unfit banknotes of the same amount and of lower denominations that are stored in the different recycling stackers 25 can be discharged through the outlet 24. The unfit banknotes of the same amount and of lower denominations can be, in case of discharging banknotes of 40 euro, four 10-euro banknotes, or a 20-euro banknote and two 10-euro banknotes, instead of two 20-euro banknotes that are normally discharged. Also, if it requires time to feed the fit banknotes from the recycling stacker 25 onto the transport unit 22, the drive control unit 42 drives and controls the recycling stacker 25 and the transport unit 22 so that fit banknotes of the same amount and of lower denominations that are stored in the different recycling stackers 25 are discharged through the outlet 24 instead of the fit banknotes.

[0069] Even when a mode is set in which the unfit banknotes of the change amount stored in the recycling stacker 25 are preferentially discharged through the outlet 24 in the cash settlement, if all the banknotes inserted through the inlet 21 in the cash settlement are fit banknotes, the drive control unit 42 drives and controls the recycling stackers 25 and the transport unit 22 so that fit banknotes relevant to a transaction amount of the merchandise cash transaction that are stored in the recycling stackers 25 are discharged through the outlet 24.

[0070] When unfit banknotes of a designated denomination are determined as a collection target, the drive control unit 42 drives and controls the recycling stacker 25 and the transport unit 22 so that the unfit banknotes are preferentially transported from among the banknotes stored in the recycling stacker 25 to the transport cassette

26. Similarly, when fit banknotes of a designated denomination are determined as a collection target, the drive control unit 42 preferentially transports the fit banknotes from among the banknotes stored in the recycling stacker 25 to the transport cassette 26. Of course, multiple denominations can be designated.

[0071] When a certain number of unfit banknotes are designated as the collection target for each designated denomination, the drive control unit 42 drives and controls the recycling stackers 25 and the transport unit 22 so that the designated number of unfit banknotes of the designated denominations that are stored in the recycling stackers 25 are preferentially transported to the transport cassette 26. When a certain number of fit banknotes are designated as the collection target for each designated denomination, the drive control unit 42 preferentially transports to the transport cassette 26 the designated number of fit banknotes of each designated denomination that are stored in the recycling stacker 25.

[0072] When unfit banknotes summed up to a designated total amount are designated as the collection target, the drive control unit 42 drives and controls the recycling stacker 25 and the transport unit 22 so that the unfit banknotes corresponding to the designated total amount that are stored in the recycling stacker 25 are preferentially transported to the transport cassette 26. When fit banknotes of the designated total amount are designated as the collection target, the drive control unit 42 preferentially transports to the transport cassette 26 the fit banknotes corresponding to the designated total amount that are stored in the recycling stacker 25.

[0073] When an amount of unfit banknotes that exceeds the designated total amount is designated as the collection target, the drive control unit 42 drives and controls the recycling stacker 25 and the transport unit 22 so that the amount of unfit banknotes that exceeds the designated total amount from among the banknotes stored in the recycling stacker 25 is preferentially transported to the transport cassette 26. When an amount of fit banknotes that exceeds the designated total amount is designated as the collection target, the drive control unit 42 preferentially transports to the transport cassette 26 the amount of fit banknotes that exceeds the designated total amount from among the banknotes that are stored in the recycling stacker 25.

[0074] When the number of unfit banknotes that exceeds the designated number for each designated denomination is designated as the collection target, the drive control unit 42 drives and controls the recycling stackers 25 and the transport unit 22 so that the number of unfit banknotes stored in the recycling stacker 25 and exceeding the designated number for each designated denomination are preferentially transported to the transport cassette 26. When the number of fit banknotes that exceeds the designated number for each designated denomination is designated as the collection target, the drive control unit 42 preferentially transports the number of fit banknotes stored in the recycling stacker 25 and

exceeding the designated number for each designated denomination to the transport cassette 26.

[0075] The drive control unit 42 also controls and drives the transport cassette 26 and the transport unit 22 so that the banknotes stored in the transport cassette 26 are transported to the outlet 24 and to the recycling stackers 25. The control unit 33 realizes the designation of the collection target that is to be transported to the transport cassette 26, in accordance with a designation operation from a not-shown operation unit of the cash settlement apparatus 12 or the cash depositing/dispensing apparatus 13. The cash settlement apparatus 12 has a function of awarding incentive points, for example, to a customer membership card in accordance with the number of fit banknotes at the time of inserting the banknotes through the inlet 21 when the inserted banknotes are fit banknotes.

[0076] FIG. 5 is an explanatory diagram of an internal structure of the cash depositing/dispensing apparatus 13, and FIG. 6 is a block diagram of an internal structure of the cash depositing/dispensing apparatus 13. The cash depositing/dispensing apparatus 13 shown in FIG. 5 includes an inlet 51, a transport unit 52, a recognition unit 53, an outlet 54, recycling stackers 55, a transport cassette 56 (16), a reader/writer 57, an operation and display unit 58, and a control unit 63. The inlet 51 is an opening through which the banknotes are inserted into the cash depositing/dispensing apparatus 13. The transport unit 52 is a conveyer belt or the like, and transports the banknotes along a transport path running from the inlet 51 to the recycling stacker 55 and the transport cassette 56. Not-shown diverters are arranged at diverting points of the transport path. When a not-shown tracking sensor detects a tip end of a banknote that is being transported, a not-shown solenoid is driven to sort the transported banknote.

[0077] Nine recycling stackers 55 are arranged for designated denominations. Usually, one recycling stacker 55 is assigned to one designated denomination. However, the setting of the recycling stackers 55 can be freely made, for example, by assigning two recycling stackers 55 to one denomination that is frequently circulated, or setting a fit-banknote-only recycling stacker 55 for a denomination that is likely to be used for cashback. The recycling stackers 55 store therein the banknotes of the designated denominations inserted through the inlet 51, and also feed the stored banknotes when they are to be discharged through the outlet 54. The recycling stackers 55 use the tape and reel system. The transport cassette 56 has a mounting interface of the same type as that of the transport cassette 26 of the cash settlement apparatus 12. The transport cassette 56 can be mounted onto and detached from the cash depositing/dispensing apparatus 13 and also the cash settlement apparatus 12. The transport cassette 56 includes a designated banknote collecting unit 56A, which collects designated banknotes of a collection target, and the IC tag 16C, which is stuck to the surface of the cassette and stores therein

the stored-banknotes breakdown information that will be described later. The transport cassette 26 of the cash settlement apparatus 12 has a mounting interface of the same type as that of the transport cassette 56. Therefore, the transport cassette 26 can be mounted onto and detached even from the cash depositing/dispensing apparatus 13. The reader/writer 57 reads and writes the stored-banknotes breakdown information from and in the IC tag 16C stuck to the transport cassette 56 (16). The operation and display unit 58 is a touch-panel operation and display unit, and various kinds of information can be inputted to and displayed onto the operation and display unit 58.

[0078] The cash depositing/dispensing apparatus 13 shown in FIG. 6 includes a communication interface 61, a memory unit 62, and the control unit 63 in addition to the transport unit 52 and the recognition unit 53. The communication interface 61 is connected to the cash settlement apparatus 12 via a not-shown network to establish communications therebetween.

[0079] The memory unit 62 stores therein and manages, for each recycling stacker 55 and the transport cassette 56, the storage position, the denomination kind, and the fitness kind of each banknote stored in the corresponding recycling stacker 55 and the transport cassette 56. The memory unit 62 further stores therein and manages the current inventory amount information in accordance with the denomination kind and the fitness kind for each cash settlement apparatus 12. The control unit 63 identifies and manages each cash settlement apparatus 12 by a cash register number of the POS register 11 to which the cash settlement apparatus 12 is connected.

[0080] The control unit 63 includes a replenishment destination instruction detecting unit 71, a drive control unit 72, a memory control unit 73, a replenishment number calculating unit 74, an inventory amount information acquiring unit 75, an identifying unit 76, and an information creating unit 77. The replenishment destination instruction detecting unit 71 designates a replenishment destination, such as the cash settlement apparatus 12 and the ATM 14, of banknotes that are to be replenished by the cash depositing/dispensing apparatus 13.

[0081] The inventory amount information acquiring unit 75 collects the current inventory amount information for each denomination kind and each fitness kind from the cash settlement apparatuses 12 and the ATMs 14 through the communication interface 61 via a network. The memory control unit 73 writes the collected current inventory amount information of the cash settlement apparatuses 12 and the ATMs 14 into the memory unit 62. The identifying unit 76 collects the stored-banknotes breakdown information from the IC tag 16C of the transport cassette 26 when the transport cassette 26 of the cash settlement apparatus 12 is mounted onto the cash depositing/dispensing apparatus 13. The identifying unit 76 recognizes the storage position, the denomination kind, and the fitness kind of each banknote stored in the transport cassette 26 based on the collected stored-ban-

knotes breakdown information, without using the recognition unit 53. The information creating unit 77 creates, when each banknote of the designated denomination is stored in the transport cassette 56, the stored-banknotes breakdown information that includes the storage position, the denomination kind, and the fitness kind of the banknote stored in the transport cassette 56, and an identification number of the replenishment destination. The memory control unit 73 writes the stored-banknotes breakdown information into the IC tag 16C stuck to the transport cassette 56.

[0082] In an event that the replenishment destination instruction detecting unit 71 detects a replenishment instruction that designates the replenishment destination, the replenishment number calculating unit 74 calculates the number of banknotes to be replenished in the replenishment destination for each denomination kind and each fitness kind, as a replenishment breakdown number, based on the current inventory amount information of the replenishment destination and ideal inventory amount information of the replenishment destination. The control unit 63 also writes and manages the ideal inventory amount information and the like for each replenishment destination in the memory unit 62. The ideal inventory amount information of the replenishment destination corresponds to the number of banknotes that should be held in the replenishment destination, for each denomination kind and each fitness kind.

[0083] When a replenishment instruction is detected in which a cash settlement apparatus 12 having a bank account transaction function is designated as the replenishment destination, the drive control unit 72 controls and drives the recycling stacker 55 and the transport unit 52 so that the replenishment breakdown number of fit banknotes and unfit banknotes stored in the recycling stacker 55 are discharged through the outlet 54 based on the calculation result of the replenishment number calculating unit 74.

The drive control unit 72 can control and drive the recycling stacker 55 and the transport unit 52 so that, instead of discharging the replenishment breakdown number of fit banknotes and unfit banknotes through the outlet 54, the replenishment breakdown number of fit banknotes and unfit banknotes are transported to the transport cassette 56 as the collection target.

[0084] When a replenishment instruction is detected in which a cash settlement apparatus 12 having no bank account transaction function is designated as the replenishment destination, the drive control unit 72 controls and drives the recycling stacker 55 and the transport unit 52 so that the replenishment breakdown number of unfit banknotes stored in the recycling stacker 55 are discharged through the outlet 54 based on the calculation result of the replenishment number calculating unit 74. Only unfit banknotes have been described as the replenishment breakdown number of banknotes; however, these banknotes can be fit banknotes only, or mixed banknotes including fit banknotes and unfit banknotes. The

drive control unit 72 can control and drive the recycling stacker 55 and the transport unit 52 so that the replenishment breakdown number of unfit banknotes can be transported to the transport cassette 56 as the collection target.

[0085] When the replenishment instruction that designates the ATM 14 as a designated destination is detected, the drive control unit 72 controls and drives the recycling stacker 55 and the transport unit 52 so that the replenishment breakdown number of fit banknotes stored in the recycling stacker 55 are discharged through the outlet 54 based on the calculation result of the replenishment number calculating unit 74. The drive control unit 72 can control and drive the recycling stacker 55 and the transport unit 52 so that the replenishment breakdown number of fit banknotes is transported to the transport cassette 56 as the collection target.

[0086] If it requires time to feed the unfit banknotes from the recycling stacker 55 to the transport unit 52, the drive control unit 72 controls and drives the recycling stacker 55 and the transport unit 52 so that, instead of the unfit banknotes, unfit banknotes of the same amount and of lower denominations that are stored in the recycling stacker 55 are discharged through the outlet 54. The banknotes of the same amount and of lower denominations, which means, for example, in case of discharging banknotes of 40 euro, that four 10-euro banknotes, or a 20-euro banknote and two 10-euro banknotes, are used instead of two 20-euro banknotes which would be of a regular denomination. Furthermore, if it requires time to feed the fit banknotes from the recycling stacker 55 to the transport unit 52, the drive control unit 72 controls and drives the recycling stacker 55 and the transport unit 52 so that, instead of the fit banknotes, fit banknote of the same amount and of lower denominations that are stored in the recycling stacker 55 are discharged through the outlet 54.

[0087] When the unfit banknotes of a designated denomination are designated as the collection target, the drive control unit 72 controls and drives the recycling stacker 55 and the transport unit 52 so that the unfit banknotes stored in the recycling stacker 55 are preferentially transported to the transport cassette 56. Similarly, when the fit banknotes of the designated denomination are designated as the collection target, the drive control unit 72 preferentially transports the fit banknotes stored in the recycling stacker 55 to the transport cassette 56. Multiple denominations can be designated here.

[0088] When a certain number of unfit banknotes for each designated denomination are designated as the collection target, the drive control unit 72 controls and drives the recycling stacker 55 and the transport unit 52 so that the designated number of unfit banknotes of the designated denomination that are stored in the recycling stacker 55 are preferentially transported to the transport cassette 56. When a certain number of fit banknotes for each designated denomination are designated as the collection target, the drive control unit 72 preferentially trans-

ports the designated number of fit banknotes of the designated denomination that are stored in the recycling stacker 55 to the transport cassette 56.

[0089] When the unfit banknotes corresponding to a certain total amount are designated as the collection target, the drive control unit 72 controls and drives the recycling stacker 55 and the transport unit 52 so that the designated total amount of unfit banknotes stored in the recycling stacker 55 is preferentially transported to the transport cassette 56. When the fit banknotes corresponding to a certain total amount are designated as the collection target, the drive control unit 72 preferentially transports the designated total amount of fit banknotes stored in the recycling stacker 55 to the transport cassette 56.

[0090] When an amount of unfit banknotes that exceeds the designated total amount is designated as the collection target, the drive control unit 72 controls and drives the recycling stacker 55 and the transport unit 52 so that the amount of unfit banknotes in the recycling stacker 55 that exceeds the designated total amount is preferentially transported to the transport cassette 56. When an amount of fit banknotes that exceeds the designated total amount is designated as the collection target, the drive control unit 72 preferentially transports the amount of fit banknotes in the recycling stacker 55 that exceeds the designated total amount to the transport cassette 56.

[0091] When the number of unfit banknotes for each designated denomination that exceeds a certain number is designated as the collection target, the drive control unit 72 controls and drives the recycling stacker 55 and the transport unit 52 so that the number of unfit banknotes in the recycling stacker 55 that exceeds the designated number for each designated denomination are transported to the transport cassette 56. When the number of fit banknotes for each designated denomination that exceeds a certain number is designated as the collection target, the drive control unit 72 preferentially transports the number of fit banknotes in the recycling stacker 55 that exceeds the designated number for each designated denomination to the transport cassette 56.

[0092] The drive control unit 72 controls and drives the transport cassette 56 and the transport unit 52 so that the banknotes stored in the transport cassette 56 are transported to the outlet 54 and the recycling stacker 55. The control unit 63 realizes designation of banknotes as the collection target that are to be transported to the transport cassette 56 by a designation operation with the not-shown operation unit of the cash settlement apparatus 12 or the cash depositing/dispensing apparatus 13.

[0093] FIG. 7 is an explanatory diagram showing a relationship for transporting the transport cassette 16 (26, 56) between the cash settlement apparatus 12 and the cash depositing/dispensing apparatus 13. The transport cassette 26 of the cash settlement apparatus 12 can be mounted onto and detached from the cash depositing/dispensing apparatus 13. On the other hand, the trans-

port cassette 56 of the cash depositing/dispensing apparatus 13 can be mounted onto and detached from the cash settlement apparatus 12. When a banknote of the designated denomination is stored in the transport cassette 26, the information creating unit 45 of the cash settlement apparatus 12 creates the stored-banknotes breakdown information that includes the storage position, the denomination kind, the fitness kind, and the cash register number of the banknote stored in the transport cassette 26. After creating the stored-banknotes breakdown information, the memory control unit 43 of the cash settlement apparatus 12 writes this stored-banknotes breakdown information into the IC tag 16C stuck to the transport cassette 26. A store clerk removes the transport cassette 26 from the cash settlement apparatus 12 and carries this transport cassette 26 to a cash room. Then, the store clerk mounts the transport cassette 26 onto the cash depositing/dispensing apparatus 13. When the transport cassette 26 is mounted, the identifying unit 76 of the cash depositing/dispensing apparatus 13 acquires the stored-banknotes breakdown information from the IC tag 16C of the transport cassette 26. Based on this stored-banknotes breakdown information, the identifying unit 76 recognizes the storage position, the denomination kind, and the fitness kind of each banknote without the recognition unit 53 recognizing the banknote stored in the transport cassette 26. The memory control unit 73 writes and manages this stored-banknotes breakdown information in the memory unit 62.

[0094] When the banknote of the designated denomination is stored in the transport cassette 56, the information creating unit 77 of the cash depositing/dispensing apparatus 13 creates the stored-banknotes breakdown information that includes the storage position, the denomination kind, and the fitness kind of the banknote stored in the transport cassette 56 and also the identification number of the replenishment destination. After creating the stored-banknotes breakdown information, the memory control unit 73 of the cash depositing/dispensing apparatus 13 writes this stored-banknotes breakdown information into the IC tag 16C stuck to the transport cassette 56. The store clerk removes the transport cassette 56 from the cash depositing/dispensing apparatus 13 and carries the transport cassette 56 to the checkout counter. Then, the store clerk mounts the transport cassette 56 onto the cash settlement apparatus 12. When the transport cassette 56 is mounted, the identifying unit 46 of the cash settlement apparatus 12 acquires the stored-banknotes breakdown information from the IC tag 16C of the transport cassette 56. When the identification number of the replenishment destination in the stored-banknotes breakdown information agrees with the cash register number of the cash settlement apparatus 12, the identifying unit 46 recognizes the storage position, denomination kind, and fitness kind of each banknote based on the stored-banknotes breakdown information, without the recognition unit 23 recognizing each banknote stored in the transport cassette 56. The mem-

ory control unit 43 of the cash settlement apparatus 12 writes and manages the stored-banknotes breakdown information in the memory unit 32.

[0095] The cash settlement apparatus 12 and the cash depositing/dispensing apparatus 13 of the store need to hold a large number of fit banknotes to smoothly realize the bank account transactions in the store. To increase the circulation ratio of fit banknotes circulating in the store, the collecting machine 15 is installed at the entrance of the store or the like. When a customer inserts an unfit banknote through the inlet into the collecting machine 15, the collecting machine 15 discharges fit banknotes corresponding to the inserted amount to the customer through the outlet. Consequently, the customers' use of unfit banknotes can be reduced in the store, and therefore the circulation ratio of fit banknote in the store can be increased.

[0096] The operation performed by the in-store fund management system 1 according to the present embodiment is now explained. FIG. 8 is a flowchart of a processing operation of the change dispensing process performed by the control unit 33 of the cash settlement apparatus 12. As shown in FIG. 8, when the merchandise price of the purchased items is determined (Step S11), the control unit 33 of the cash settlement apparatus 12 judges whether a payment method is debit settlement (Step S12). The debit settlement corresponds to the cashback service in the bank account transaction. When the payment method is the debit settlement (Yes at Step S12), the change calculating unit 44 of the control unit 33 determines a cashback amount by subtracting the merchandise price from the withdrawal amount or the loan amount of the debit settlement (Step S13), and judges whether there are sufficient banknotes corresponding to the cashback amount (Step S13A).

[0097] When there are sufficient banknotes corresponding to the cashback amount (Yes at Step S13A), the control unit 33 judges whether fit banknotes corresponding to the cashback amount are stored in the recycling stacker 25 (Step S14). When the fit banknotes corresponding to the cashback amount are stored in the recycling stacker 25 (Yes at Step S14), the control unit 33 discharges the fit banknotes corresponding to the cashback amount in the recycling stacker 25 through the outlet 24 (Step S15). Then, the control unit 33 terminates the processing operation shown in FIG. 8.

[0098] When there are insufficient banknotes corresponding to the cashback amount (No at Step S13A), the control unit 33 terminates the processing operation shown in FIG. 8. When there are insufficient fit banknotes corresponding to the cashback amount in the recycling stacker 25 (No at Step S14), the control unit 33 discharges fit banknotes of lower denominations, which are stored in the recycling stacker 25, corresponding to the cashback amount through the outlet 24 (Step S16). Then, the control unit 33 terminates the processing operation shown in FIG. 8.

[0099] When the payment method is not the debit set-

tlement (No at Step S12), the control unit 33 judges that the payment method is the cash settlement (Step S17), and accepts the cash inserted through the inlet 21 (Step S18). The change calculating unit 44 of the control unit 33 judges whether the inserted cash amount is less than the merchandise price (Step S19).

[0100] When the inserted cash amount is less than the merchandise price (Yes at Step S19), the control unit 33 notifies the shortfall (Step S20). Then, the control proceeds to Step S18 where the control unit 33 waits for additional cash to be inserted through the inlet 21. The shortfall can be notified with a display, sound, or the like.

[0101] When there is no shortfall after subtracting the merchandise price from the inserted cash amount (No at Step S19), the control unit 33 determines a change amount (Step S21). When the change amount is determined, the control unit 33 judges whether there are any banknotes corresponding to the change amount (Step S22). When there are any banknotes corresponding to the change amount (Yes at Step S22), the control unit 33 judges whether all the banknotes inserted through the inlet 21 are fit banknotes (Step S23).

[0102] When all the inserted banknotes are fit banknotes (Yes at Step S23), the control unit 33 judges whether sufficient fit banknotes corresponding to the change amount are stored in the recycling stacker 25 (Step S24). When sufficient fit banknotes corresponding to the change amount are stored (Yes at Step S24), the control unit 33 discharges the fit banknotes corresponding to the change amount in the recycling stacker 25 through the outlet 24 (Step S25). Then, the control unit 33 terminates the processing operation shown in FIG. 8.

[0103] If there are insufficient banknotes corresponding to the change amount (No at Step S22), the control unit 33 terminates the processing operation shown in FIG. 8. When not all of the deposited banknotes are fit banknotes (No at Step S23), the control unit 33 judges whether there are sufficient unfit banknotes corresponding to the change amount in the recycling stacker 25 (Step S26). When there are sufficient unfit banknotes corresponding to the change amount (Yes at Step S26), the control unit 33 discharges the unfit banknotes stored in the recycling stacker 25 through the outlet 24 (Step S27). Then, the control unit 33 terminates the processing operation shown in FIG. 8.

[0104] If there are insufficient unfit banknotes corresponding to the change amount (No at Step S26), the control unit 33 judges whether there are sufficient unfit banknotes of lower denominations corresponding to the change amount in the recycling stacker 25 (Step S28). When there are sufficient unfit banknotes of lower denominations (Yes at Step S28), the control unit 33 discharges the unfit banknotes of lower denominations stored in the recycling stacker 25 through the outlet 24 (Step S29). Then, the control unit 33 terminates the processing operation shown in FIG. 8.

[0105] If there are insufficient unfit banknotes of lower denomination corresponding to the change amount (No

at Step S28), the control unit 33 does not have to limit the banknotes to unfit ones but discharges the fit banknotes, which are stored in the recycling stacker 25, corresponding to the change amount through the outlet 24 (Step S30). Then, the control unit 33 terminates the processing operation shown in FIG. 8.

[0106] If there are insufficient fit banknotes corresponding to the change amount in the recycling stacker 25 (No at Step S24), the control unit 33 does not have to limit the banknotes to fit ones but discharges the unfit banknotes, which are stored in the recycling stacker 25, corresponding to the change amount through the outlet 24 (Step S31). Then, the control unit 33 terminates the processing operation shown in FIG. 8.

[0107] In the change dispensing process shown in FIG. 8, if banknotes corresponding to the cashback are to be discharged when subtracting the merchandise price from the withdrawal amount or the loan amount in the debit settlement for the merchandise purchase, the banknotes corresponding to the cashback amount are discharged through the outlet 24 by using fit banknotes. Consequently, the cash settlement apparatus 12 can comply with the requirement of the ECB Article 6.

[0108] In the change dispensing process, if banknotes corresponding to the change amount are to be discharged when subtracting the merchandise price from the deposited amount in the cash settlement for the merchandise purchase, the banknotes corresponding to this change amount are discharged through the outlet 24 by using unfit banknotes. Consequently, the cash settlement apparatus 12 can reduce the circulation of fit banknotes and increase the number of fit banknotes held therein.

[0109] In the change dispensing process, if banknotes corresponding to the change amount are to be discharged when subtracting the merchandise price from the deposited amount in the cash settlement but there are insufficient unfit banknotes corresponding to this change amount, unfit banknotes of lower denominations corresponding to the change amount are discharged through the outlet 24. Consequently, the cash settlement apparatus 12 can return the change banknotes to the customer while reducing the circulation of fit banknotes.

[0110] In the change dispensing process, if banknotes corresponding to the change amount are to be discharged when subtracting the merchandise price from the deposited amount in the cash settlement but there are insufficient unfit banknotes corresponding to this change amount and also insufficient unfit banknotes of lower denominations corresponding to this change amount, banknotes of the change amount including not only unfit banknotes but also fit banknotes are discharged through the outlet 24. Consequently, the cash settlement apparatus 12 can return the change banknotes to the customer.

[0111] In the change dispensing process, if all the banknotes inserted in the cash settlement are fit banknotes, the banknotes corresponding to the change amount are

discharged through the outlet 24 by using fit banknotes. Consequently, the cash settlement apparatus 12 can give the change in fit banknotes to the customer who has used fit banknotes in the cash settlement.

[0112] FIG. 9 is a flowchart of the processing operation performed by the control unit 63 of the cash depositing/dispensing apparatus 13 regarding the banknote replenishing process. The replenishment destination instruction detecting unit 71 of the control unit 63 shown in FIG. 9 judges whether an operation of designating a replenishment destination is detected (Step S41). As the operation of designating the replenishment destination, an identification number of a replenishment destination machine, such as a cash register number that identifies the replenishment destination cash settlement apparatus 12, an ATM number that identifies a replenishment destination ATM 14, can be designated. When the operation of designating the replenishment destination is detected (Yes at Step S41), the control unit 63 judges whether the replenishment destination is the cash settlement apparatus 12 (Step S42).

[0113] When the replenishment destination is the cash settlement apparatus 12 (Yes at Step S42), the control unit 63 acquires the current inventory amount information and the ideal inventory amount information for the replenishment destination cash settlement apparatus 12 from the memory unit 62 (Step S43). The replenishment number calculating unit 74 of the control unit 63 calculates the replenishment breakdown number of banknotes for each denomination kind and each fitness kind in the cash settlement apparatus 12 that is the replenishment destination based on the current and ideal inventory amount information for the replenishment destination cash settlement apparatus 12 (Step S44). After calculating the replenishment breakdown number of banknotes for the replenishment destination cash settlement apparatus 12, the control unit 63 discharges the calculated replenishment breakdown number of banknotes through the outlet 54 (Step S45). Then, the control unit 63 terminates the processing operation shown in FIG. 9.

[0114] When the replenishment destination is not the cash settlement apparatus 12 (No at Step S42), the control unit 63 judges whether the replenishment destination is the ATM 14 (Step S46). When the replenishment destination is the ATM 14 (Yes at Step S46), the control unit 63 acquires the current inventory amount information and the ideal inventory amount information of the replenishment destination ATM 14 from the memory unit 62 (Step S47). The replenishment number calculating unit 74 of the control unit 63 calculates the replenishment breakdown number of banknotes for each denomination kind and each fitness kind in the replenishment destination ATM 14 based on the current and ideal inventory amount information of the replenishment destination ATM 14 (Step S48). The control unit 63 discharges the calculated replenishment breakdown number of fit banknotes through the outlet 54 (Step S49). Then, the control unit 63 terminates the processing operation shown in FIG. 9.

When the replenishment destination is not the ATM 14 (No at Step S46), the process returns to Step S41 where the control unit 63 judges whether the operation of designating the replenishment destination is detected. When the replenishment destination instruction detecting unit 71 does not detect any operation of designating the replenishment destination (No at Step S41), the control unit 63 terminates the processing operation shown in FIG. 9.

[0115] In the banknote replenishing process shown in FIG. 9, when the replenishment destination is the cash settlement apparatus 12, the replenishment breakdown number of banknotes that are to be replenished in the cash settlement apparatus 12 is calculated for each denomination kind and each fitness kind based on the current and ideal inventory amount information of the replenishment destination cash settlement apparatus 12, and the calculated replenishment breakdown number of banknotes are discharged through the outlet 54. Consequently, the cash depositing/dispensing apparatus 13 can discharge the replenishment breakdown number of banknotes that are to be replenished in the replenishment destination cash settlement apparatus 12.

[0116] In the banknote replenishing process, when the replenishment destination is the ATM 14, the replenishment breakdown number of banknotes (the number of fit banknotes) that are to be replenished in this ATM 14 is calculated for each denomination kind based on the current and ideal inventory amount information of the ATM 14, and the calculated replenishment breakdown number of fit banknotes are discharged through the outlet 54. Consequently, the cash depositing/dispensing apparatus 13 can discharge the replenishment breakdown number of fit banknotes that are to be replenished in the replenishment destination ATM 14.

[0117] The operation of transporting the transport cassette 16 (26, 56) from the cash settlement apparatus 12 to the cash depositing/dispensing apparatus 13 is now explained. FIG. 10 is a processing operation flowchart of the stored-banknotes breakdown information storing process performed by the control unit 33 of the cash settlement apparatus 12.

[0118] The control unit 33 of the cash settlement apparatus 12 shown in FIG. 10 judges whether a removal preparation operation for the transport cassette 26 is detected (Step S51). When the removal preparation operation for the transport cassette 26 is detected (Yes at Step S51), the control unit 33 acquires from the memory unit 32 the storage position, the denomination kind, and the fitness kind of each banknote stored in the transport cassette 26. Furthermore, the information creating unit 45 of the control unit 33 adds the cash register number, which identifies the cash settlement apparatus 12, to the acquired storage position, the denomination kind, and the fitness kind of the banknote, and thereby creates the stored-banknotes breakdown information (Step S52).

[0119] The memory control unit 43 of the control unit 33 writes the created stored-banknotes breakdown information into the IC tag 16C of the transport cassette 26

(Step S53). Then, the transport cassette 26 is removed from the cash settlement apparatus 12 (Step S54), and the control unit 33 terminates the processing operation shown in FIG. 10.

[0120] When the removal preparation operation for the transport cassette 26 is not detected (No at Step S51), the control unit 33 terminates this processing operation.

[0121] In the stored-banknotes breakdown information storing process shown in FIG. 10, when the removal preparation operation for the transport cassette 26 is detected, the stored-banknotes breakdown information with the cash register number added to the storage position, the denomination kind, and the fitness kind of each banknote stored in the transport cassette 26 is created. Then, the stored-banknotes breakdown information is written in the IC tag 16C of the transport cassette 26. Consequently, the cash settlement apparatus 12, which is the origin, can notify the cash depositing/dispensing apparatus 13, which is the destination, of the stored-banknotes breakdown information of the transport cassette 26 that is to be removed and transported.

[0122] FIG. 11 is a flowchart of a stored-banknotes breakdown information acquiring process performed by the control unit 63 of the cash depositing/dispensing apparatus 13. The control unit 63 shown in FIG. 11 judges whether mounting of the transport cassette 26 of the cash settlement apparatus 12 onto the cash depositing/dispensing apparatus 13 is detected (Step S61). When the mounting of the transport cassette 26 is detected (Yes at Step S61), the identifying unit 76 of the control unit 63 acquires the stored-banknotes breakdown information from the IC tag 16C of the transport cassette 26 (Step S62). Then, the memory control unit 73 of the control unit 63 writes this stored-banknotes breakdown information into the memory unit 62 (Step S63).

[0123] When the stored-banknotes breakdown information is written into the memory unit 62, the identifying unit 76 of the control unit 63 recognizes the storage position, the denomination kind, and the fitness kind of each banknote stored in the transport cassette 26 (Step S64). Then, the control unit 63 terminates the processing operation shown in FIG. 11. When the mounting of the transport cassette 26 of the cash settlement apparatus 12 onto the cash depositing/dispensing apparatus 13 is not detected (No at Step S61), the control unit 63 terminates the processing operation shown in FIG. 11.

[0124] In the stored-banknotes breakdown information acquiring process shown in FIG. 11, when the mounting of the transport cassette 26 is detected, the stored-banknotes breakdown information is acquired from the IC tag 16C of the transport cassette 26, and this stored-banknotes breakdown information is written in the memory unit 62. Consequently, the cash depositing/dispensing apparatus 13 can recognize the storage position, the denomination kind, and the fitness kind of each banknote written in the transport cassette 26, without using the recognition unit 53.

[0125] According to the present embodiment, the ban-

knoves inserted through the inlet 21 are stored into the recycling stacker 25 regardless of their fitness kinds. Therefore, the unfit banknotes as well as the fit banknotes that are inserted through the inlet 21 can be circulated, and the number of fit banknotes held in the cash settlement apparatus 12 can thereby be increased.

[0126] According to the present embodiment, upon detecting an instruction to discharge banknotes that correspond to a transaction amount of a bank account transaction such as a withdrawal amount, and a loan amount or a cashback amount, the fit banknotes corresponding to the banknotes of the transaction amount of the bank account transaction and stored in the recycling stacker 25 are discharged through the outlet 24. Consequently, fit banknotes can be dispensed at discharging of banknotes in the bank account transaction, and therefore the requirement of the ECB Article 6 can be complied with.

[0127] According to the present embodiment, upon detecting the instruction to discharge the banknotes of the transaction amount of the merchandise cash transaction, or in other words, of the change amount of the cash settlement, the unfit banknotes corresponding to the change amount that are stored in the recycling stacker 25 are preferentially discharged through the outlet 24. Consequently, the circulation of the fit banknotes can be reduced, and the number of fit banknotes held in the cash settlement apparatus 12 can be increased by discharging the unfit banknotes at the discharging of the change banknotes in the cash settlement.

[0128] According to the present embodiment, for example if a significant load would be imposed to preferentially discharge the unfit banknotes corresponding to the change amount through the outlet 24 in the cash settlement, fit banknotes corresponding to the amount of unfit banknotes are discharged through the outlet 24 in place of the unfit banknotes. Consequently, the cash settlement apparatus 12 can quickly provide the customer with the change banknotes in the cash settlement.

[0129] According to the present embodiment, for example, if a significant load would be imposed to preferentially discharge unfit banknotes corresponding to the change amount through the outlet 24 in the cash settlement, the unfit banknotes of the same amount but of lower denominations are discharged through the outlet 24 in place of these unfit banknotes. Consequently, the cash settlement apparatus 12 can quickly provide the customer with the change banknotes in the cash settlement.

[0130] According to the present embodiment, when unfit banknotes corresponding to the change amount are to be preferentially discharged through the outlet 24 in the cash settlement but there are insufficient unfit banknotes, the unfit banknotes of the same amount but of lower denominations are discharged through the outlet 24 in place of the insufficient unfit banknotes. Consequently, the cash settlement apparatus 12 can smoothly provide the customer with the change banknotes in the cash settlement.

[0131] According to the present embodiment, when the

fit banknotes are inserted through the inlet 21 in the cash settlement, the fit banknotes corresponding to the change amount are discharged through the outlet 24 even if settings are made such that the unfit banknotes corresponding to the change amount are preferentially discharged through the outlet 24 in the cash settlement. Consequently, the cash settlement apparatus 12 can provide the customer who uses fit banknotes in the cash settlement with fit banknotes for change.

[0132] According to the present embodiment, the unfit banknotes stored in the recycling stacker 25 are preferentially transported to the transport cassette 26. Consequently, the cash settlement apparatus 12 can preferentially collect the unfit banknotes by using the transport cassette 26.

[0133] According to the present embodiment, the number of unfit banknotes designated for each denomination kind are preferentially transported from the banknotes stored in the recycling stacker 25 to the transport cassette 26. Consequently, the cash settlement apparatus 12 can preferentially collect the number of unfit banknotes designated for each denomination kind by using the transport cassette 26.

[0134] According to the present embodiment, the designated total amount of unfit banknotes are preferentially transported from the banknotes stored in the recycling stacker 25 to the transport cassette 26. Consequently, the cash settlement apparatus 12 can preferentially collect the designated total amount of unfit banknotes by using the transport cassette 26.

[0135] According to the present embodiment, the amount of unfit banknotes that exceeds the designated total amount is preferentially transported from the banknotes stored in the recycling stacker 25 to the transport cassette 26. Consequently, the cash settlement apparatus 12 can preferentially collect the amount of unfit banknotes that exceeds the designated total amount by using the transport cassette 26.

[0136] According to the present embodiment, the number of unfit banknotes that exceeds the number designated for each denomination kind are preferentially transported from the banknotes stored in the recycling stacker 25 to the transport cassette 26. Consequently, the number of unfit banknotes that exceeds the designated number for each denomination kind can be preferentially collected by using the transport cassette 26.

[0137] According to the present embodiment, when the banknotes inserted through the inlet 21 in the cash settlement are fit banknotes, the customer is awarded incentive points on his/her membership card. Consequently, the number of fit banknotes held in the cash settlement apparatus 12 can be increased by encouraging the customer to insert fit banknotes.

[0138] In the above embodiment, when the instruction to discharge the change amount of banknotes in the cash settlement is detected, the unfit banknotes corresponding to the change amount are discharged through the outlet 24; however, the banknotes corresponding to the

change amount, regardless of their fitness kinds, can be discharged through the outlet 24. Consequently, the cash settlement apparatus 12 can quickly provide the customer with the change amount of banknotes in the cash settlement, regardless of their fitness kinds.

[0139] When the instruction to discharge the change amount of banknotes in the cash settlement is detected, the fit banknotes corresponding to the change amount can be preferentially discharged through the outlet 24. Consequently, when sufficient fit banknotes are held inside, the cash settlement apparatus 12 provides the customer with the change by using fit banknotes in the cash settlement.

[0140] According to the present embodiment, the unfit banknotes corresponding to the change amount are preferentially discharged through the outlet in the cash settlement. However, a setting can be made for the cash settlement apparatus 12 so that one of an unfit banknote preference mode, in which the unfit banknotes corresponding to the change amount are preferentially discharged, a fitness-kind independent mode, in which banknotes are preferentially discharged regardless of their fitness kinds, and a fit banknote preference mode, in which fit banknotes are preferentially discharged, can be selected. With this setting, the cash settlement apparatus 12 can deal with various kinds of the banknotes to be discharged for the change banknotes through the outlet 24.

[0141] The unfit banknote preference mode, the fitness-kind independent mode, and the fit banknote preference mode are established across the board regardless of the denomination kind of the banknote in the transaction. However, one of the unfit banknote preference mode, the fitness-kind independent mode, and the fit banknote preference mode can be selected for each denomination kind. Consequently, the cash settlement apparatus 12 can deal with various kinds of the banknotes to be discharged for each denomination kind of the banknotes in the transaction.

[0142] According to the present embodiment, when the banknotes are inserted through the inlet 21, insertion of the banknotes is accepted regardless of their fitness kinds. However, when the banknotes inserted through the inlet 21 in the cash settlement are unfit banknote, the unfit banknotes are transported to the outlet 24. Consequently, the cash settlement apparatus 12 can increase the number of fit banknotes held in the cash settlement apparatus 12 by rejecting the inserted unfit banknotes in the cash settlement and encouraging insertion of fit banknotes.

[0143] According to the present embodiment, the fitness kind is defined in accordance with the requirement of the ECB; however, fit banknotes can be defined as banknotes that are suitable for dispensing at the ATM 14, while unfit banknotes can be defined as bank counter banknotes that can be used for dispensing in bank counter service or the like although they are not suitable for dispensing at the ATM 14.

[0144] According to the present embodiment, the number of fit banknotes held in the cash settlement apparatus 12 and the cash depositing/dispensing apparatus 13 in the store can be increased by reusing the unfit banknotes, and thereby the requirement of ECB Article 6 that fit banknotes should be discharged at the cash settlement apparatus 12 in the bank account transaction can be complied with. For example, during transition from old version banknotes to new version banknotes, the cash settlement apparatus 12 and the cash depositing/dispensing apparatus 13 can be set so that the number of new version banknotes held in the cash settlement apparatus 12 and the cash depositing/dispensing apparatus 13 in the store is increased by reusing the old version banknotes and that the old version banknotes are gradually collected.

[0145] Furthermore, in an environment, for example, where foreign banknotes are used as well as country's own banknotes at a store near the border between countries, the cash settlement apparatus 12 and the cash depositing/dispensing apparatus 13 according to the present embodiment can be set so that the number of country's own banknotes held in the cash settlement apparatus 12 and the cash depositing/dispensing apparatus 13 of the store is increased by reusing the foreign banknotes, and that the foreign banknotes are gradually collected.

[0146] The collecting machine 15 according to the present embodiment collects unfit banknotes from customers who visit the store and gives them fit banknotes in return; however, a prepaid card worth the collected amount of unfit banknotes can be issued. This can further enhance the ratio of fit banknotes circulating in the store.

[0147] The collecting machine 15 according to the present embodiment can award incentive points in accordance with the amount of unfit banknotes deposited by the customer. By enhancing the use of the collecting machine for collecting unfit banknotes from the customers, the ratio of fit banknotes circulating in the store can be increased.

[0148] The collecting machine 15 according to the present embodiment can be set such that, upon detecting a fit banknote deposited by the customer, the fit banknote is rejected.

[0149] The collecting machine 15 according to the present embodiment collects the unfit banknotes based on their fitness kinds; however, the collecting machine 15 can collect old version banknotes based on the new/old printed versions. The ratio of new version banknotes circulating in the store can thereby be increased by collecting the old banknotes in the store.

[0150] Furthermore, the collecting machine 15 can be set such that foreign banknotes are collected based on issuing country. The ratio of the banknotes of the country's own banknotes circulating in the store can thereby be increased by collecting the foreign banknotes in the store. An area of collecting the foreign banknotes is not limited to the store, but can be applied to a larger area.

[0151] The transport cassette 16 (26, 56) is transported between the cash settlement apparatus 12 and the cash depositing/dispensing apparatus 13 according to the present embodiment, or in other words between a banknote handling machine that is a transport origin and a banknote handling machine that is a transport destination, and the banknote handling machine of the transport destination acquires the stored-banknotes breakdown information from the IC tag 16C of the transport cassette 16; however, for example, when the transport cassette 16 is transported from the banknote handling machine of the transport origin to the banknote handling machine of the transport destination, the banknote handling machine of the transport origin can notify the banknote handling machine of the transport destination of the stored-banknotes breakdown information, not by use of the IC tag 16C but through a network. Then, without an IC tag 16C attached to the transport cassette 16, the banknote handling machine of the transport destination can acquire the stored-banknotes breakdown information of the transport cassette 16 through the network and recognize the storage position, the denomination kind, and the fitness kind of each banknote stored in the transport cassette 16. Also, a receipt on which the stored-banknotes breakdown information is printed, a barcode, a QR code, and the like can be used in place of the IC tag 16C.

[0152] According to the present embodiment, the denomination kind and the fitness kind of each banknote are associated with the storage position of each banknote in the stored-banknotes breakdown information of the transport cassette 16; however, instead of the storage position of the banknote, the denomination kind and the fitness kind can be associated with a serial number that identifies the banknote and stored. In this case, the recognition unit 23 recognizes the serial number of the transported banknote.

[0153] According to the present embodiment, in the stored-banknotes breakdown information storing process shown in FIG. 10, the banknote handling machine of the transport origin is applied to the control unit 33 of the cash settlement apparatus 12; however, it can be applied to the control unit 63 of the cash depositing/dispensing apparatus 13. Similarly, in the stored-banknotes breakdown information acquiring process shown in FIG. 11, the banknote handling machine of the transport destination is applied to the control unit 63 of the cash depositing/dispensing apparatus 13; however, it can be applied to the control unit 33 of the cash settlement apparatus 12.

[0154] According to the present embodiment, the transport cassette 16 that can be mounted onto and demounted from the cash settlement apparatus 12 and the cash depositing/dispensing apparatus 13 has been used as an example; however, the transport cassette 16 can be mounted onto and demounted from the ATM 14, the collecting machine 15, and the like. In addition, the ATM 14 and the collecting machine 15 can serve as the banknote handling machine of the transport origin or the banknote handling machine of the transport destination.

[0155] The transport cassette 16 (26, 56) includes a single storage unit of the tape and reel system inside; however, as shown in FIG. 12, the transport cassette 16 (26, 56) can include multiple storage units, for example, two storage units 16A and 16B of the tape and reel system. The transport cassette 16 can store banknotes of designated denomination kinds, which are the collection targets, by sorting them in accordance with the fitness kinds and storing them into the storage units 16A and 16B.

[0156] In the transport cassette 26 of the cash settlement apparatus 12 and the transport cassette 56 of the cash depositing/dispensing apparatus 13 according to the present embodiment, the banknotes can be stored in the form of a rainbow according to the designated denomination kinds, which are the collection targets, and the fitness kinds of each denomination.

[0157] In the transport cassette 26 of the cash settlement apparatus 12 and the transport cassette 56 of the cash depositing/dispensing apparatus 13 according to the present embodiment, the stored-banknotes breakdown information of the stored banknotes is saved in the IC tag 16C; however, a receipt on which the stored-banknotes breakdown information is printed can be stuck thereto.

[0158] The control unit 63 according to the present embodiment identifies and manages each cash settlement apparatus 12 with the cash register number of the POS register 11 to which the cash settlement apparatus 12 is connected; however, the cash settlement apparatus 12 and the POS register 11 corresponding to this cash settlement apparatus 12 can be identified and managed with a cassette ID that identifies the transport cassette 16.

[0159] The tape and reel system, in which banknotes of a designated denomination are wound by the tape for collecting, is used for the recycling stackers 25 and the transport cassette 26 of the cash settlement apparatus 12, and the recycling stackers 55 and the transport cassette 56 of the cash depositing/dispensing apparatus 13 according to the present embodiment; however, a stacking storage system can be used in which the banknotes of the designated denomination are sequentially stacked.

[0160] The fit banknotes and the unfit banknotes are stored in a mixed manner in the recycling stacker 25 of the cash settlement apparatus 12 according to the present embodiment. If only the fit banknotes are to be discharged, the fit banknotes need to be discharged by sequentially feeding the stored banknotes and temporarily transporting the unfit banknotes to a different recycling stacker 25. After the discharging of the fit banknotes is completed, the unfit banknotes temporarily transported to the different recycling stacker 25 are returned to the original recycling stacker 25. The unfit banknotes, however, can be transported to the transport cassette 16 instead of a different recycling stacker 25. This operation is not limited to the recycling stackers 25, but the operation can be applied to the transport cassette 26 and also to the recycling stackers 55 and the transport cassette

56 of the cash depositing/dispensing apparatus 13.

[0161] In the recycling stacker 25 of the cash settlement apparatus 12 and the recycling stacker 55 of the cash depositing/dispensing apparatus 13 according to the present embodiment, the banknotes are stored in the tape and reel system in which the fitness kinds are mixed; however, the recycling stackers 25 (55) can be assigned individually for the fit banknotes and the unfit banknotes.

[0162] According to the present embodiment, the bank account transaction in using a bank account, such as the withdrawal service, the loan service, and the cashback service, has been discussed as an example; however, the present embodiment is also applicable to a service of discharging change banknotes, for example, by subtracting the merchandise price from an amount loaned by a credit company.

[0163] According to the present embodiment, for the sake of convenience, the change amount in the cash settlement, and the withdrawal amount, the loan amount, or the cashback amount in the bank account transaction have been explained as an amount that can be dealt with by using banknote denominations. If there is a fraction that cannot be dealt with by using the banknote denominations only, the fraction can be discharged by using coins from the coin processing unit 12B.

[0164] According to the present embodiment, the number of banknotes to be replenished at the replenishment destination for each denomination kind and each fitness kind is calculated as the replenishment breakdown number based on the current inventory amount information and the ideal inventory amount information of the replenishment destination; however, the number for the replenishment can be calculated based not on the current inventory amount information but on predicted inventory amount information that is prepared by predicting from the statistics of previous empirical inventory amounts.

[0165] The exemplary embodiments according to the present invention have been explained; however, these embodiments are not to limit the scope of the technical concepts of the present invention. Various embodiments can be accomplished without departing from the scope of the technical concepts that are disclosed in the appended claims. The effects of the present embodiments are not limited to the above explanation.

[0166] Among various operations that are automatically performed in the above explanation of the present embodiment, all or part of them can be manually performed. On the other hand, various operations that are manually performed in the above explanation of the present embodiment, all or part of them can be automatically performed. The order of processing and controlling, the exact names, and information including various kinds of data and parameters can be suitably modified, unless otherwise specified.

[0167] The structural components of the devices shown in the drawings are presented in a manner of functional concepts and do not necessarily have to be phys-

ically configured as shown in the drawings. Specific modes of these devices are not limited to the ones shown in the drawings.

[0168] Various processing functions are implemented by the devices; however, all or any part of the processing functions can be implemented on a CPU (central processing unit) (or on a microcomputer such as an MPU (micro processing unit) and an MCU (micro controller unit)), on a computer program that is analyzed and implemented by the CPU (or by the microcomputer such as the MPU and the MCU), or on hardware implemented by wired logic.

INDUSTRIAL APPLICABILITY

[0169] In the banknote storing and dispensing apparatus according to the present invention, banknotes inserted through the inlet are stored in denomination-wise storing and feeding units regardless of their fitness kinds. The fit banknotes and also the unfit banknotes that are inserted through the inlet can be reused when discharging the banknotes, and therefore the number of fit banknotes held in the apparatus can be increased. This is effective in cash settlement apparatuses in a store, for example.

[0170] Upon detecting a fit banknote discharging instruction for a transaction amount of a bank account transaction, the banknote storing and dispensing apparatus according to the present invention discharges the fit banknotes corresponding to the transaction amount of the bank account transaction that are stored in the denomination-wise storing and feeding unit, through the outlet. The requirement of ECB Article 6 can be complied with, and therefore this banknote storing and dispensing apparatus is effective for a cash settlement apparatus and the like used in the European distribution market.

EXPLANATIONS OF LETTERS OR NUMERALS

[0171]

- 12: cash settlement apparatus
- 13: cash depositing/dispensing apparatus
- 21: inlet
- 22: transport unit
- 23: recognition unit
- 24: outlet
- 25: recycling stacker
- 25: transport cassette
- 32: memory unit
- 33: control unit
- 41: discharging instruction detecting unit
- 42: drive control unit
- 43: memory control unit
- 44: change calculating unit

Claims

1. A banknote storing and dispensing apparatus comprising:

an inlet through which a banknote is inserted from outside;
 a transport unit that transports the banknote inserted through the inlet;
 a recognition unit that recognizes a denomination kind and a fitness kind for distinguishing a fit banknote and an unfit banknote of the banknote inserted through the inlet;
 a denomination-wise storing and feeding unit that stores therein the banknote transported by the transport unit based on a recognition result obtained by the recognition unit, and feeds out the stored banknote to the transport unit;
 an outlet through which the banknote fed out by the denomination-wise storing and feeding unit and transported by the transport unit is discharged to the outside;
 a discharging instruction detecting unit that detects a fit banknote discharging instruction to discharge fit banknotes for an amount of a bank account transaction, or a mixed banknote discharging instruction to discharge mixed banknotes that include at least one of the fit banknote and the unfit banknote for an amount of a merchandise cash transaction; and
 a control unit that, upon the discharging instruction detecting unit detecting the fit banknote discharging instruction, drives and controls the denomination-wise storing and feeding unit and the transport unit such that the fit banknotes, which correspond to the amount of the bank account transaction and are stored in the denomination-wise storing and feeding unit, are discharged through the outlet.

2. The banknote storing and dispensing apparatus according to Claim 1, wherein, upon the discharging instruction detecting unit detecting the mixed banknote discharging instruction, the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that the unfit banknotes, which correspond to the amount of the merchandise cash transaction and are stored in the denomination-wise storing and feeding unit, are preferentially discharged as the mixed banknotes through the outlet.

3. The banknote storing and dispensing apparatus according to Claim 1, further comprising a memory unit that, when sequentially storing the banknotes in the denomination-wise storing and feeding unit, records the fitness kind of the banknotes in association with storage position information, which represents a

storage position of the banknotes, based on the recognition result obtained by the recognition unit, wherein

the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that, when the unfit banknotes, which are designated as the corresponding amount of the merchandise cash transaction and are stored in the denomination-wise storing and feeding unit, are to be preferentially discharged through the outlet as the mixed banknotes, if a load of feeding the designated unfit banknotes from the denomination-wise storing and feeding unit to the transport unit exceeds a predetermined load based on the storage position information of the unfit banknotes recorded in the memory unit, the fit banknotes, which correspond to the designated unfit banknotes and are stored in the denomination-wise storing and feeding unit, are discharged through the outlet, instead of the designated unfit banknotes.

4. The banknote storing and dispensing apparatus according to Claim 1, further comprising a memory unit that, when sequentially storing banknotes in the denomination-wise storing and feeding unit, records the fitness kind of the banknotes in association with storage position information, which represents a storage position of the banknote, based on the recognition result obtained by the recognition unit, wherein
 the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that, when the unfit banknotes, which are designated as the corresponding amount of the merchandise cash transaction and are stored in the denomination-wise storing and feeding unit, are to be preferentially discharged through the outlet as the mixed banknotes, if a load of feeding the designated unfit banknotes from the denomination-wise storing and feeding unit to the transport unit exceeds a predetermined load based on the storage position information of the unfit banknotes recorded in the memory unit, instead of the designated unfit banknotes, unfit banknotes of the same amount and of lower denominations that are stored in the denomination-wise storing feeding unit are discharged through the outlet.

5. The banknote storing and dispensing apparatus according to Claim 1, wherein the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that, when the unfit banknote, which is designated as the corresponding amount of the merchandise cash transaction and is stored in the denomination-wise storing and feeding unit, is to be preferentially discharged through the outlet, if there is not the designated unfit banknote in the denomination-wise storing and feed-

ing unit, instead of the designated unfit banknote, unfit banknotes of the same amount and of lower denominations that are stored in the denomination-wise storing and feeding unit are discharged through the outlet.

6. The banknote storing and dispensing apparatus according to Claim 1, wherein the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that, even when an unfit banknote preference mode is set in which the unfit banknotes, which correspond to the amount of the merchandise cash transaction and are stored in the denomination-wise storing and feeding unit, are preferentially discharged as the mixed banknotes through the outlet, if the fit banknotes are inserted through the inlet in the merchandise cash transaction, fit banknotes, which correspond to the amount of the merchandise cash transaction and are stored in the denomination-wise storing and feeding unit, are discharged through the outlet.
7. The banknote storing and dispensing apparatus according to Claim 1, wherein, upon the discharging instruction detecting unit detecting the mixed banknote discharging instruction, the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that banknotes, which correspond to the amount of the merchandise cash transaction and are stored in the denomination-wise storing and feeding unit, are discharged through the outlet as the mixed banknotes.
8. The banknote storing and dispensing apparatus according to Claim 1, wherein, upon the discharging instruction detecting unit detecting the mixed banknote discharging instruction, the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that fit banknotes, which correspond to the amount of the merchandise cash transaction and are stored in the denomination-wise storing and feeding unit, are preferentially discharged as the mixed banknotes through the outlet.
9. The banknote storing and dispensing apparatus according to Claim 1, wherein, when discharging through the outlet banknotes, which correspond to the amount of the merchandise cash transaction and are stored in the denomination-wise storing and feeding unit, as the mixed banknotes, the control unit selectively sets one of an unfit banknote preference mode in which unfit banknotes corresponding to the amount are preferentially discharged, a fitness-kind independent mode in which banknotes corresponding to the amount are discharged regardless of a fitness kind thereof, and a fit banknote preference mode in which fit banknotes corresponding to the

amount are preferentially discharged.

10. The banknote storing and dispensing apparatus according to Claim 9, wherein the unfit banknote preference mode, the fitness-kind independent mode, and the fit banknote preference mode are selectively set based on denomination kinds of the banknotes which correspond to the amount of the merchandise cash transaction and are stored in the denomination-wise storing and feeding unit.
11. The banknote storing and dispensing apparatus according to any one of Claims 1 to 10, further comprising a banknote collecting unit that collects a designated banknote, wherein the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that the unfit banknotes stored in the denomination-wise storing and feeding unit are preferentially transported to the banknote collecting unit.
12. The banknote storing and dispensing apparatus according to any one of Claims 1 to 10, further comprising a banknote collecting unit that collects a designated banknote, wherein the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that a designated number of unfit banknotes for each denomination kind out of the banknotes stored in the denomination-wise storing and feeding unit are preferentially transported to the banknote collecting unit.
13. The banknote storing and dispensing apparatus according to any one of Claims 1 to 10, further comprising a banknote collecting unit that collects a designated banknote, wherein the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that unfit banknotes corresponding to a designated total amount out of the banknotes stored in the denomination-wise storing and feeding unit are preferentially transported to the banknote collecting unit.
14. The banknote storing and dispensing apparatus according to any one of Claims 1 to 10, further comprising a banknote collecting unit that collects a designated banknote, wherein the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that an amount of unfit banknotes that exceeds a designated total amount out of the banknotes stored in the denomination-wise storing and feeding unit are preferentially transported to the banknote collecting unit.

15. The banknote storing and dispensing apparatus according to any one of Claims 1 to 10, further comprising a banknote collecting unit that collects a designated banknote,
 wherein the control unit drives and controls the denomination-wise storing and feeding unit and the transport unit such that a number of unfit banknotes that exceeds a designated number of each denomination kind out of the banknotes stored in the denomination-wise storing and feeding unit are preferentially transported to the banknote collecting unit. 5
16. The banknote storing and dispensing apparatus according to any one of Claims 1 to 15, wherein, upon determining based on the recognition result obtained by the recognition unit that the banknote inserted through the inlet in the merchandise cash transaction is a fit banknote, the control unit awards incentive points to a customer's memory medium of the merchandise cash transaction. 10 15 20
17. The banknote storing and dispensing apparatus according to any one of Claims 1 to 16, wherein the outlet is used to reject and return the banknote inserted through the inlet, and
 the control unit drives and controls the transport unit such that, upon determining based on the recognition result obtained by the recognition unit that the banknote inserted through the inlet in the merchandise cash transaction is an unfit banknote, the unfit banknote is transported to the outlet. 25 30
18. A banknote discharging method realized by a banknote storing and dispensing apparatus that includes an inlet through which a banknote is inserted from outside, a transport unit that transports the banknote inserted through the inlet, a recognition unit that recognizes a denomination kind and a fitness kind for distinguishing a fit banknote and an unfit banknote of the banknote inserted through the inlet, a denomination-wise storing and feeding unit that stores therein the banknote transported by the transport unit based on a recognition result obtained by the recognition unit and feeds out the stored banknote to the transport unit, and an outlet through which the banknote fed by the denomination-wise storing and feeding unit and transported by the transport unit is discharged to the outside, the banknote discharging method comprising: 35 40 45 50
- detecting a fit banknote discharging instruction to discharge fit banknotes for an amount of a bank account transaction, or a mixed banknote discharging instruction to discharge mixed banknotes that include at least one of the fit banknote and the unfit banknote for an amount of a merchandise cash transaction; and
 driving and controlling the denomination-wise 55

storing and feeding unit and the transport unit such that, upon detecting the fit banknote discharging instruction at the detecting, fit banknotes, which correspond to the amount of the bank account transaction that are stored in the denomination-wise storing and feeding unit, are discharged through the outlet.

19. A banknote storing and dispensing apparatus comprising:

an inlet through which a banknote is inserted from outside;
 a transport unit that transports the banknote inserted through the inlet;
 a recognition unit that recognizes a denomination kind and a new/old version for distinguishing a new version banknote and an old version banknote of the banknote inserted through the inlet;
 a denomination-wise storing and feeding unit that stores therein the banknote transported by the transport unit based on a recognition result obtained by the recognition unit, and feeds out the stored banknote to the transport unit;
 an outlet through which the banknote fed out by the denomination-wise storing and feeding unit and transported by the transport unit is discharged to the outside;
 a discharging instruction detecting unit that detects a new version banknote discharging instruction to discharge new banknotes or a mixed version banknote discharging instruction to discharge mixed banknotes that include at least one of the new version banknote and the old version banknote; and
 a control unit that drives and controls the denomination-wise storing and feeding unit and the transport unit such that, upon the discharging instruction detecting unit detecting the new version banknote discharging instruction, new version banknotes stored in the denomination-wise storing and feeding unit are discharged through the outlet, and upon the discharging instruction detecting unit detecting the mixed version banknote discharging instruction, the mixed banknotes stored in the denomination-wise storing and feeding unit are discharged through the outlet.

FIG. 1

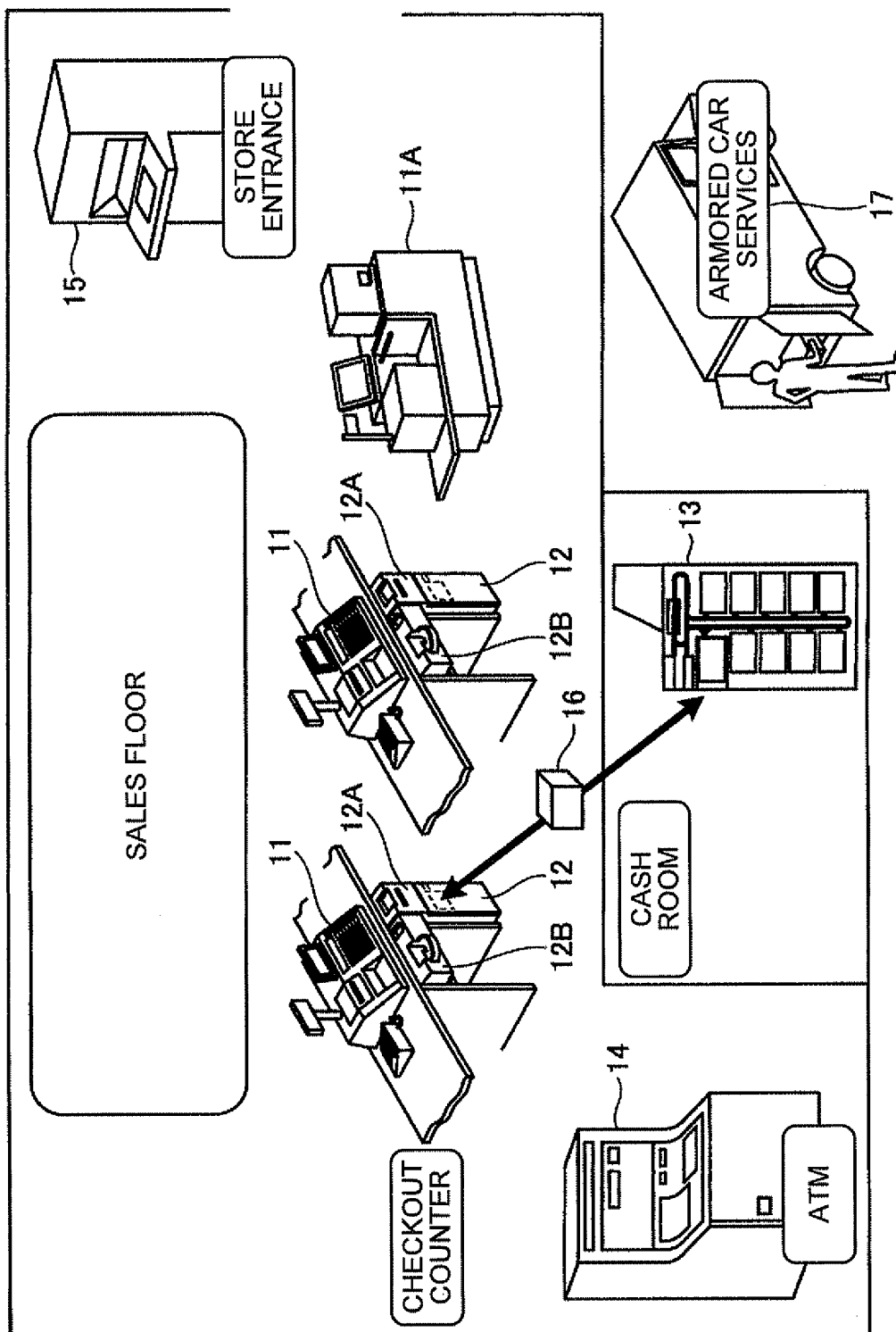


FIG.2

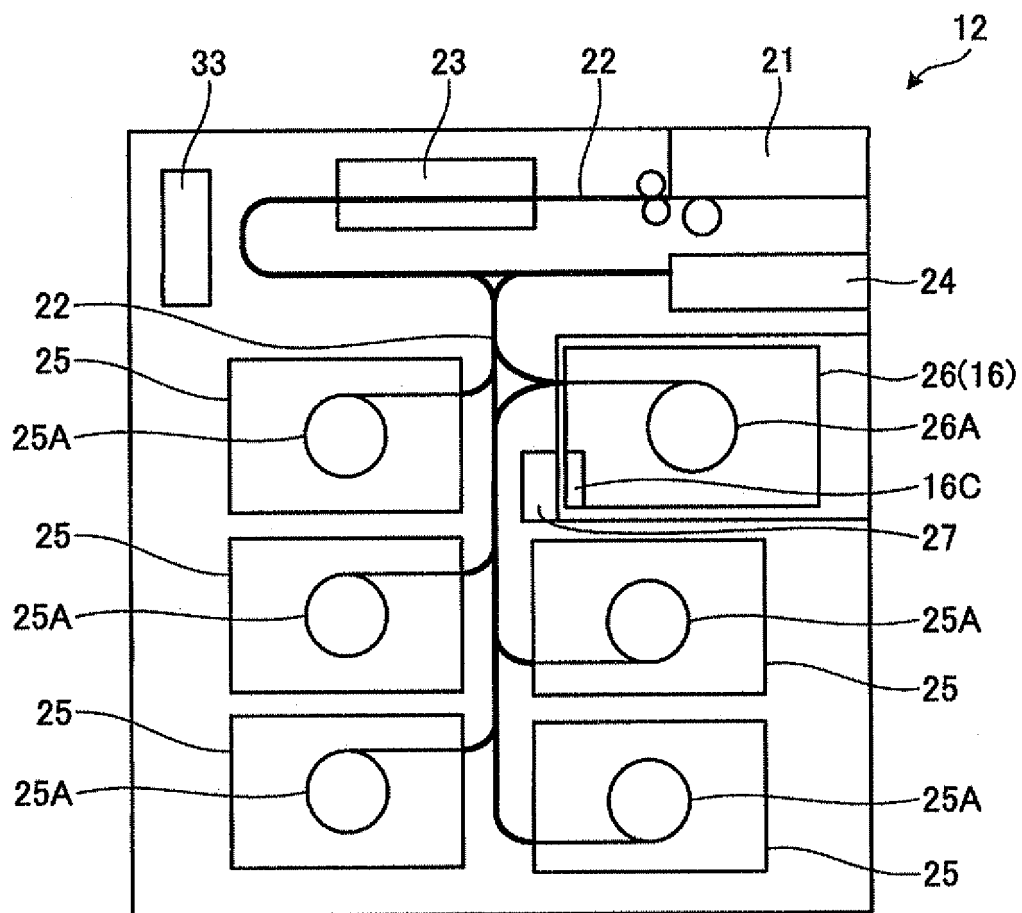


FIG.3

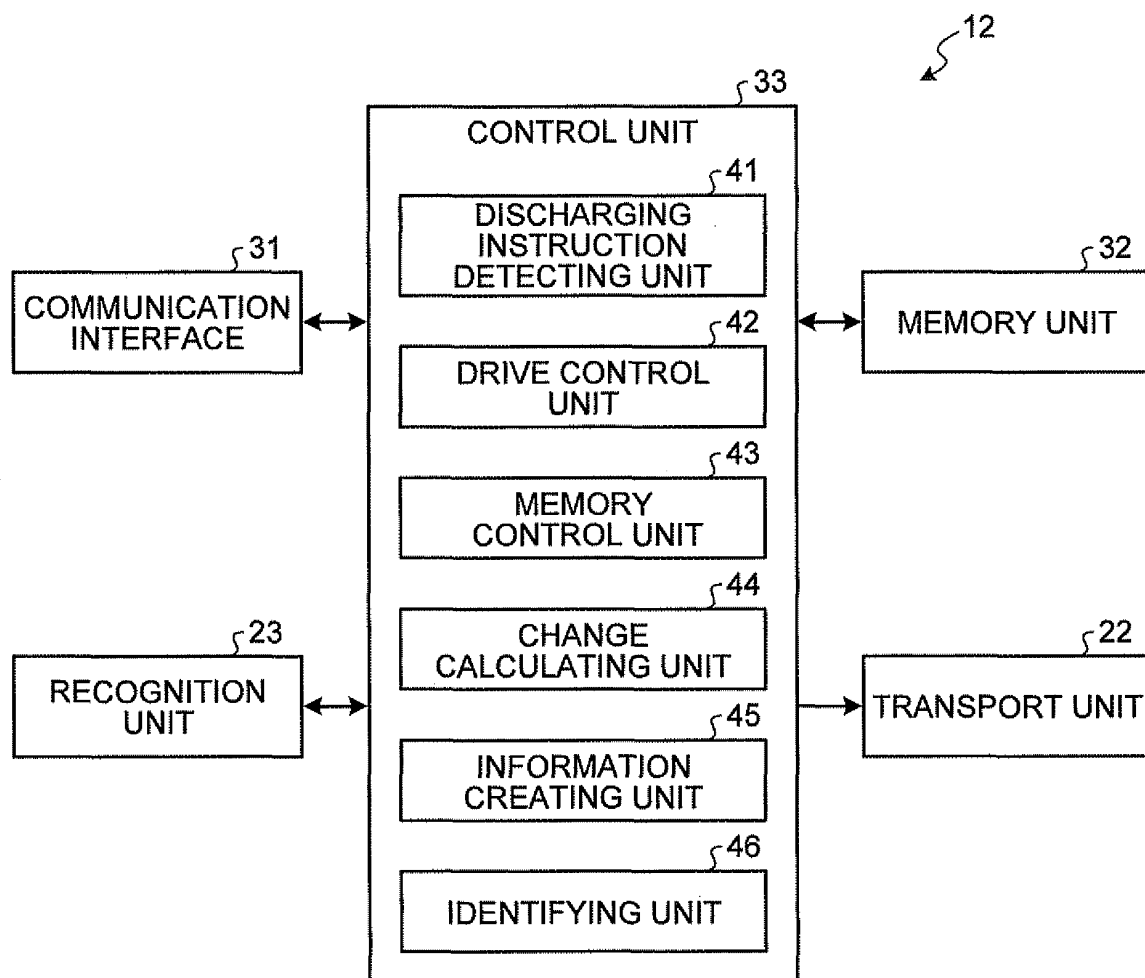


FIG.4A

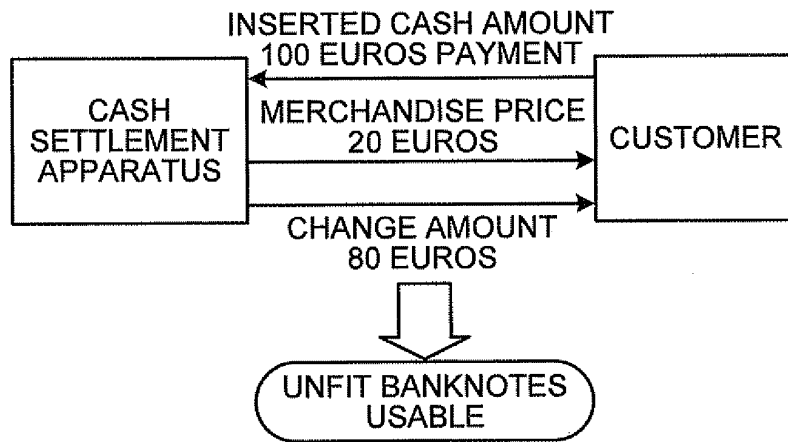


FIG.4B

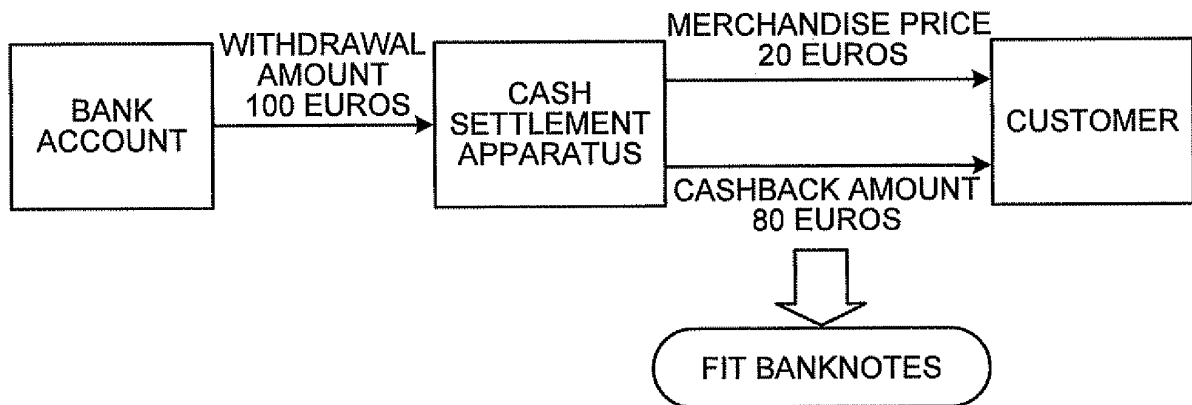


FIG.4C

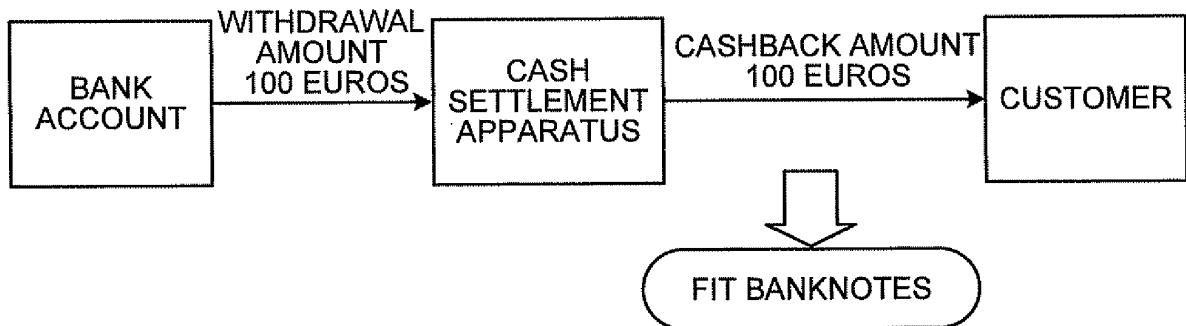


FIG.5

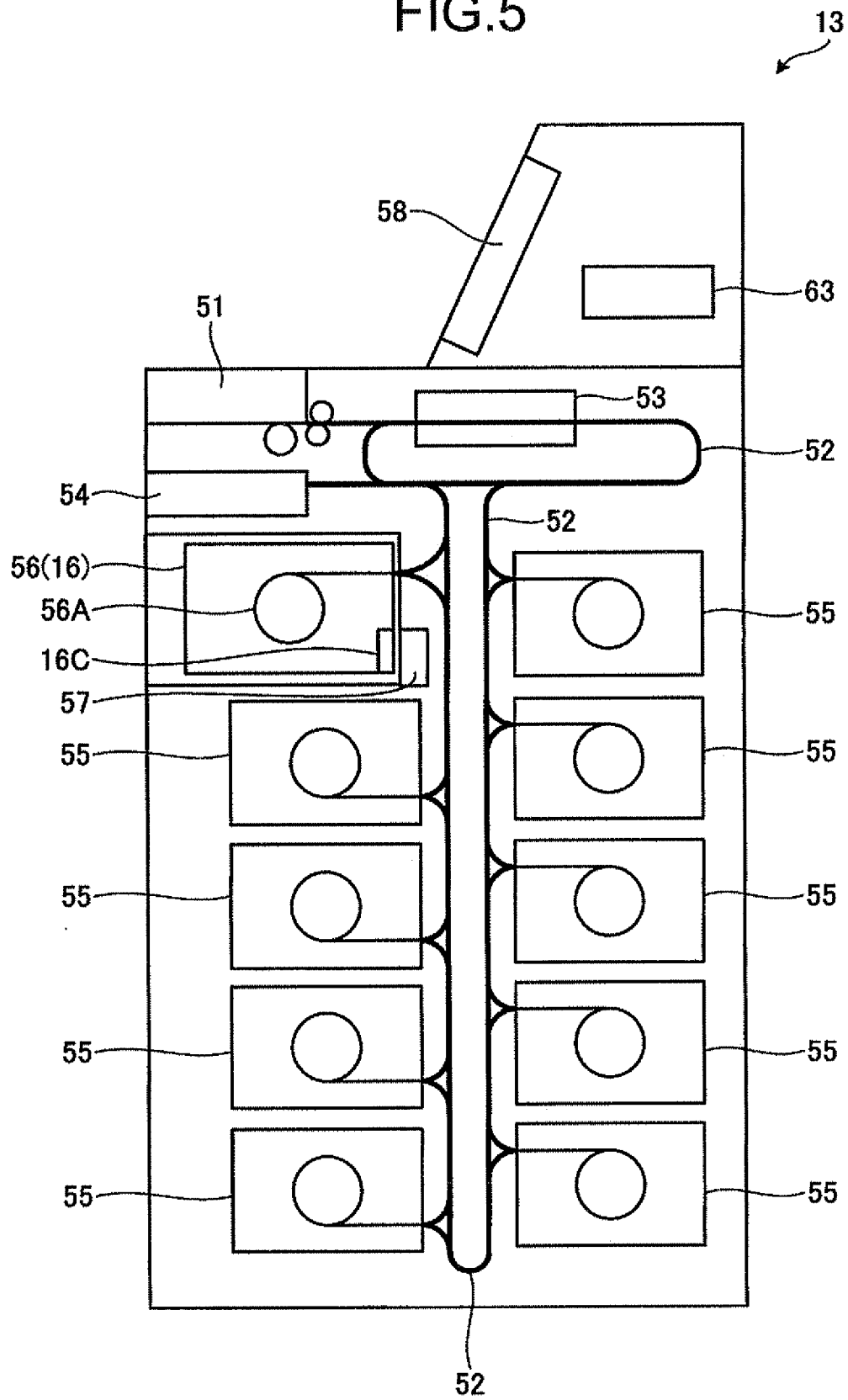


FIG.6

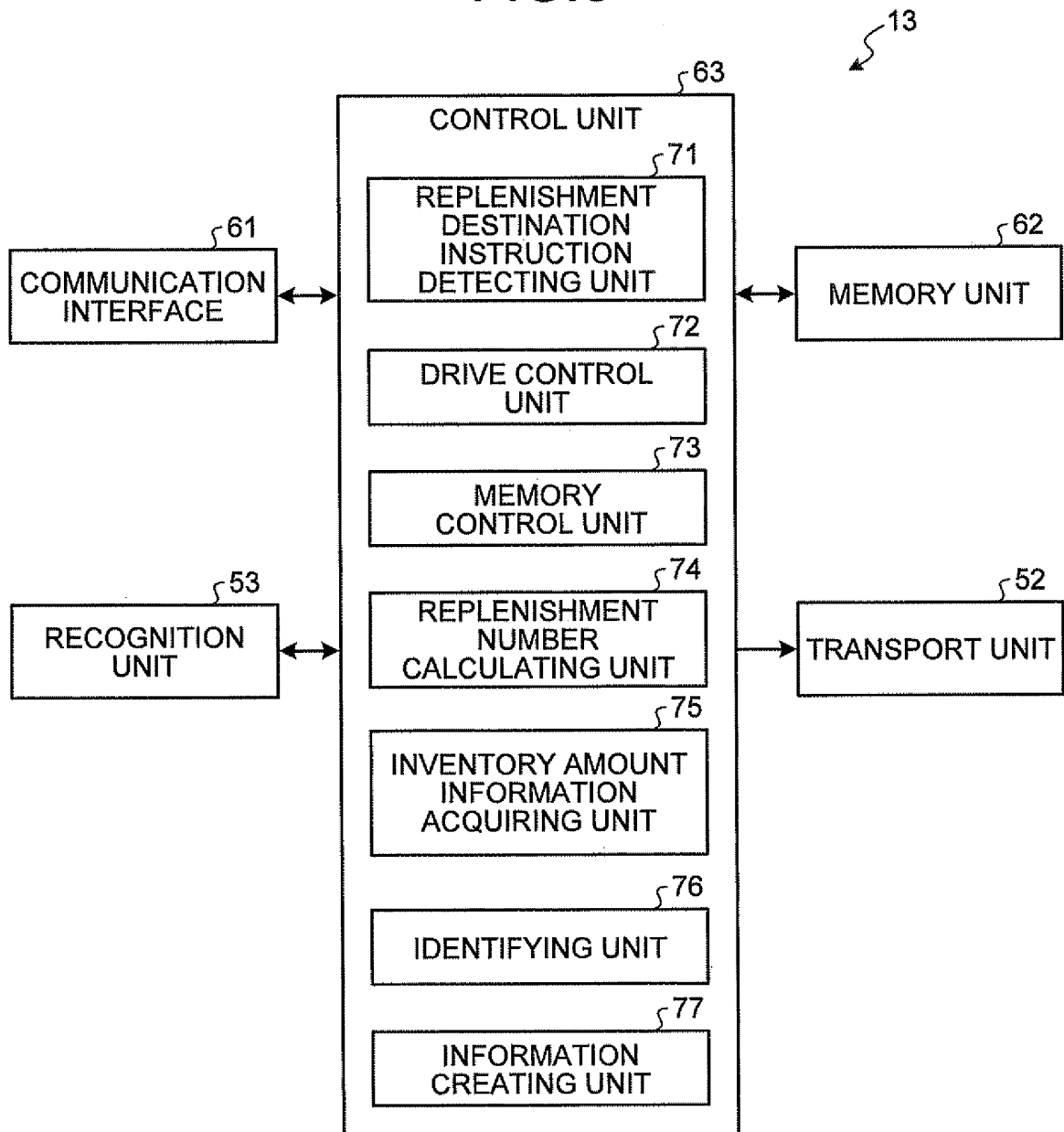


FIG.7

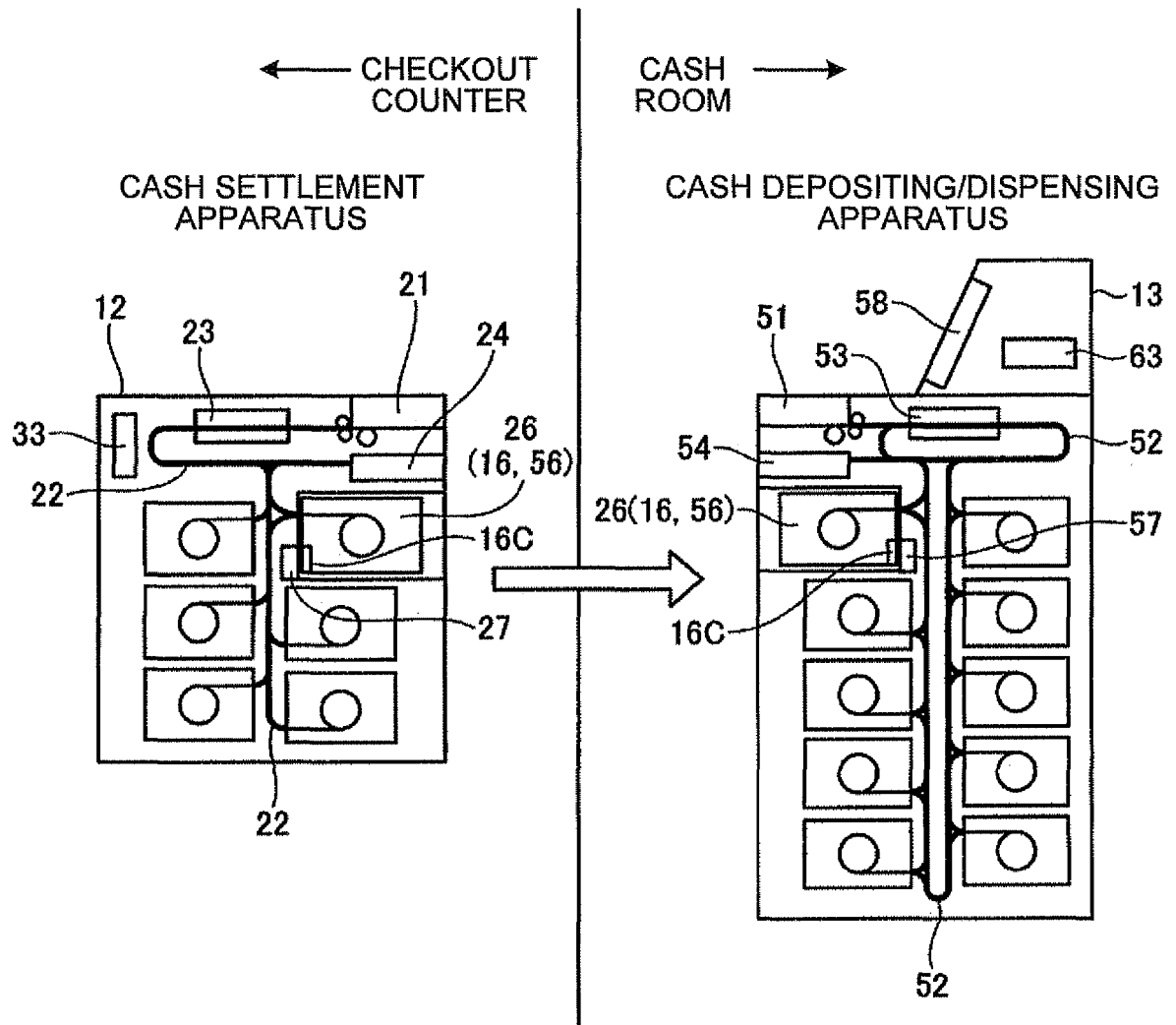


FIG.8

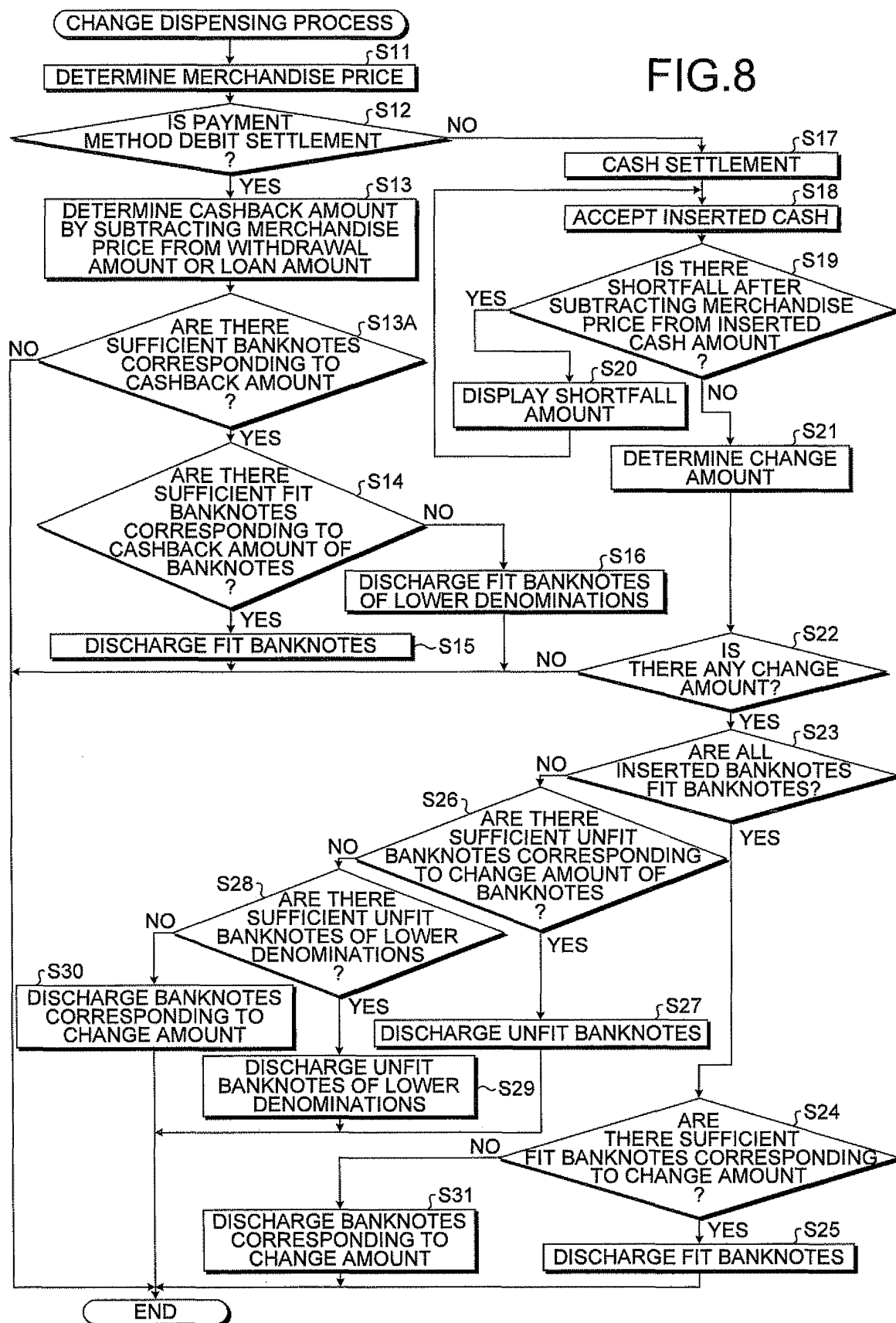


FIG.9

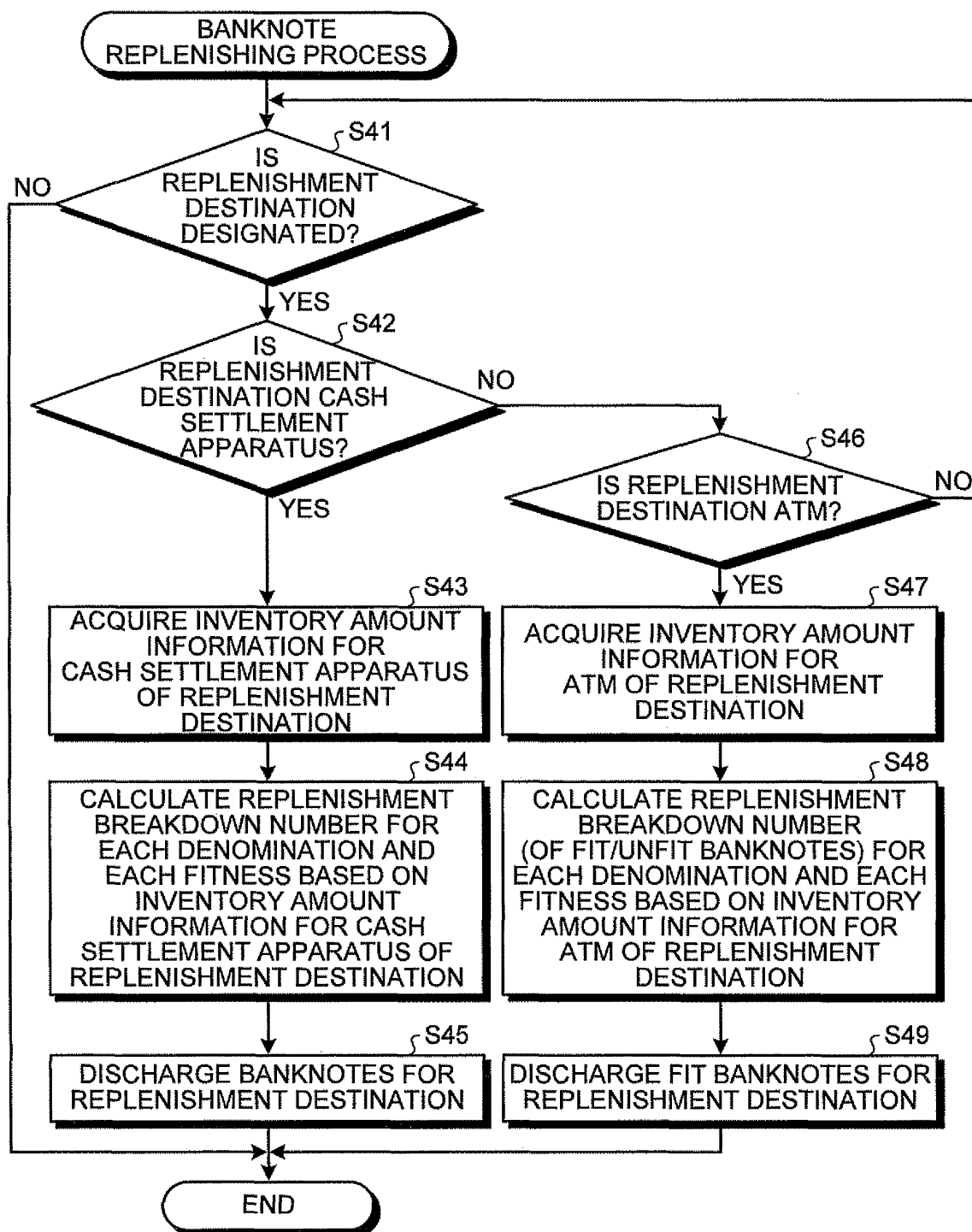


FIG.10

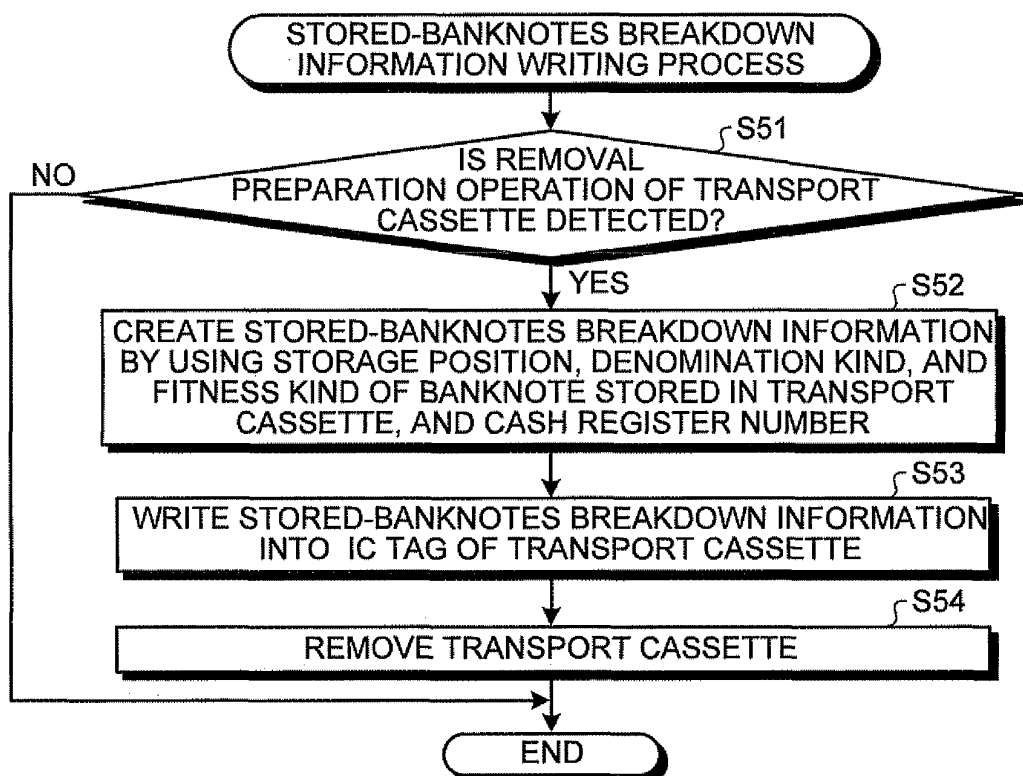


FIG.11

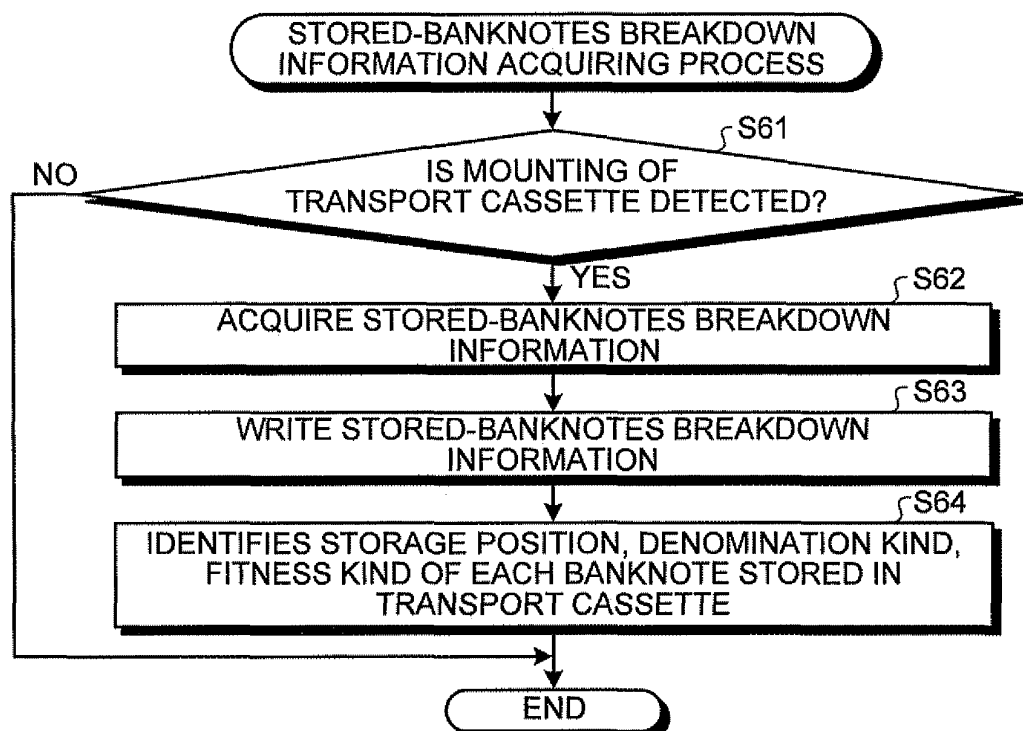
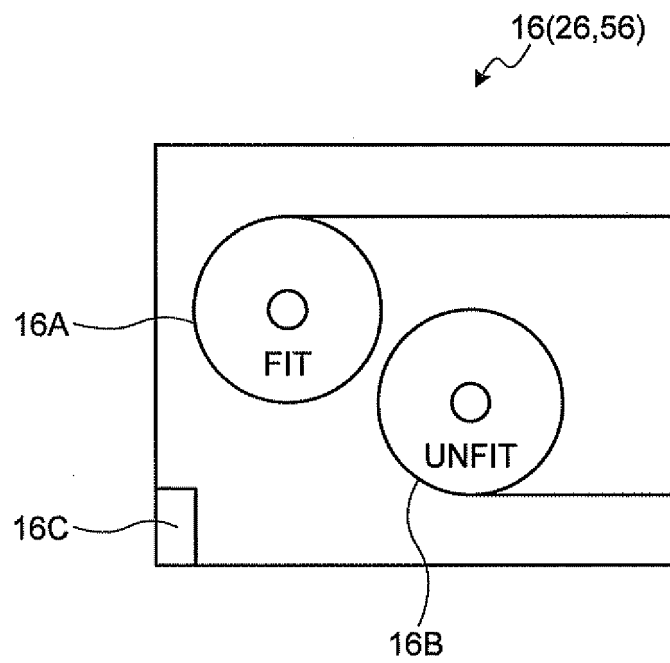


FIG.12



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/055723

A. CLASSIFICATION OF SUBJECT MATTER

G07D9/00 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G07D9/00-13/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2010

Kokai Jitsuyo Shinan Koho 1971-2010 Toroku Jitsuyo Shinan Koho 1994-2010

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 06-096325 A (Hitachi, Ltd. et al.), 08 April 1994 (08.04.1994), (Family: none)	1-18
A	JP 2002-373365 A (Oki Electric Industry Co., Ltd.), 26 December 2002 (26.12.2002), (Family: none)	1-18
A	JP 2004-252941 A (Oki Electric Industry Co., Ltd.), 09 September 2004 (09.09.2004), (Family: none)	19
A	JP 2004-355062 A (Hitachi, Ltd.), 16 December 2004 (16.12.2004), (Family: none)	19



Further documents are listed in the continuation of Box C.



See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search

30 April, 2010 (30.04.10)

Date of mailing of the international search report

18 May, 2010 (18.05.10)

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REFERENCES CITED IN THE DESCRIPTION

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- JP 11250350 A [0008]
- JP 3295288 B [0008]
- EC 11382001 [0009]