



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
22.08.2018 Bulletin 2018/34

(51) Int Cl.:
G07D 1/02 (2006.01) **G07D 1/04 (2006.01)**
G07D 1/06 (2006.01) **G07D 11/00 (2006.01)**

(21) Application number: **18155853.7**

(22) Date of filing: **08.02.2018**

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

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(30) Priority: **09.02.2017 JP 2017021910**
09.02.2017 JP 2017021911

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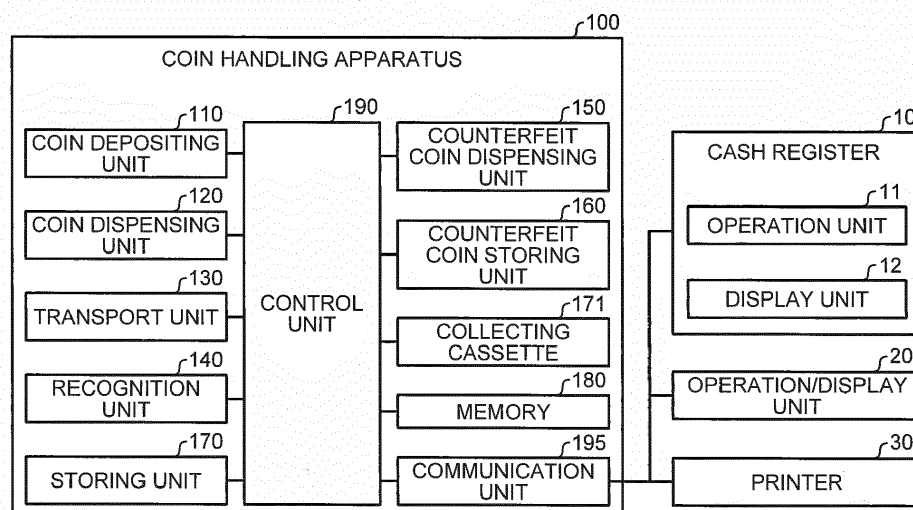
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(54) **MONEY HANDLING SYSTEM AND MONEY HANDLING APPARATUS**

(57) One object is to add an amount of counterfeit money found during a transaction in a deposited amount as needed. A money handling system that handles money includes a money depositing unit that receives money for a money depositing process; a recognition unit that recognizes a denomination and authenticity of each of

the money received by the money depositing unit; and a control unit that sums an amount of money recognized by the recognition unit as counterfeit or suspected of being counterfeit in a deposited amount and performs the money depositing process.

FIG.2



Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a money handling system and a money handling apparatus for performing a money depositing process of money.

2. Description of the Related Art

[0002] Conventionally, a money handling system for handling money is used in banks and retail shops of the distribution industry. Such a money handling system includes a money handling apparatus for performing a money depositing process of money (banknotes and coins). The money handling apparatus is used in various ways. For example, in some regions, if a fake banknote (counterfeit note) is included in the money received from a customer at a bank branch, the bank is obliged to collect the counterfeit notes without returning to the customers. A recognition unit arranged in the money handling apparatus recognizes authenticity of the banknotes, and a banknote that is recognized as a counterfeit note and a banknote (suspect note) that is recognized as suspected of being a counterfeit note can be stored in a storing unit to collect in the apparatus.

[0003] If counterfeit notes in circulation in the market are to be collected, it is desirable to collect the counterfeit notes not only in the bank branches but also in the retail shops. A cash settlement system disclosed in Japanese Patent Application Laid-Open No.2013-20301 allows a money handling apparatus installed in a retail shop to collect in the apparatus the banknotes that are recognized as the counterfeit notes and the banknotes that are recognized as the suspect notes without returning them to the customers.

[0004] However, the conventional technology cannot deal with methods that can be thought of as various handling methods of the counterfeit money. The handling method of the counterfeit money can vary depending on the legal system in each country, products and services offered to the customers, operation methods in the shops, and the like. For example, there may be a requirement in a shop to perform the money deposit process, when a predetermined condition is satisfied, in which even the amount of money recognized by the apparatus as the counterfeit notes or the suspect notes is added to the total amount of money to be deposited for the money deposit process. The conventional technology cannot respond to such a requirement.

SUMMARY OF THE INVENTION

[0005] The present invention is made to address the problems in the conventional technology. One object of the present invention is to provide a money handling sys-

tem and a money handling apparatus capable of adding the amount of money that is recognized by the apparatus as being counterfeit or that is recognized as suspected of being counterfeit to the total amount of money to be deposited for the money deposit process.

[0006] To solve the above problems and to achieve the above object, according to one aspect of the present invention, a money handling system that handles money includes a money depositing unit that receives depositing of money; a recognition unit that recognizes a denomination and authenticity of the money received by the money depositing unit; and a control unit that sums an amount of money recognized by the recognition unit as counterfeit or suspected of being counterfeit in a deposited amount and performs the money depositing process.

[0007] The above and other objects, features, advantages and technical and industrial significance of this invention will be better understood by reading the following detailed description of presently preferred embodiments of the invention, when considered in connection with the accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

[0008]

FIG. 1 is a schematic diagram of an external appearance of a money handling system according to one embodiment.

FIG. 2 is a block diagram for explaining a configuration of a coin handling apparatus.

FIG. 3 is a schematic diagram for explaining transport of a coin in the coin handling apparatus.

FIGS. 4A and 4B are schematic diagrams for explaining an example of storing a counterfeit coin and a suspect coin by transaction in a counterfeit coin storing unit.

FIGS. 5A and 5B are schematic diagrams for explaining another example of storing the counterfeit coin and the suspect coin by transaction in the counterfeit coin storing unit.

FIG. 6 is a view for explaining a handling method of the counterfeit coin and the suspect coin performed by the coin handling apparatus.

FIG. 7 is a view of an example of determination conditions used in automatically switching the handling methods of the physical counterfeit coin and the physical suspect coin and the amount thereof.

FIGS. 8A to 8C are schematic diagrams for explaining a situation in which the physical counterfeit coin is handled based on a return setting and the amount of the physical counterfeit coin is handled based on a non-addition setting.

FIGS. 9A to 9C are schematic diagrams for explaining a situation in which the physical counterfeit coins are handled based on a keep setting and the amount of the physical counterfeit coins is handled based on the non-addition setting.

FIGS. 10A and 10B are schematic diagrams for explaining a situation in which the physical counterfeit coins are handled based on the keep setting and the amount of the physical counterfeit coins is handled based on an addition setting.

FIG. 11 is a view for explaining a window for obtaining approval from a customer to renounce the proprietary rights in the counterfeit coin.

FIG. 12 is a view for explaining a receipt printed by a printer.

FIG. 13 is a view for explaining inventory amount information of the coins present in the coin handling apparatus.

FIG. 14 is a view for explaining transaction information about a transaction carried out by using the coin handling apparatus.

FIGS. 15A and 15B are examples of screens displayed on an operation/display unit.

EMBODIMENTS

[0009] Exemplary embodiments of a money handling system and a money handling apparatus according to the present invention are explained in detail below with reference to the accompanying drawings. The present embodiment is explained by taking an example of a money handling system installed at a checkout counter in a retail shop that sells products. FIG. 1 is a schematic diagram of an external appearance of a money handling system 1 according to one embodiment. The money handling system 1 includes a cash register 10 arranged at a checkout counter of a shop, an operation/display unit 20, a printer 30, and a money handling apparatus 2 including a coin handling apparatus 100 and a banknote handling apparatus 200. A customer performs cash settlement at the checkout counter for the products purchased by the customer. That is, a money depositing process of receiving the cash from the customer as the payment of the merchandise price and a money dispensing process of returning a change to the customer are performed on the money handling system 1.

[0010] Specifically, a salesclerk who is in charge of the cash settlement process at the checkout counter of the shop inputs the price of each of the products purchased by the customer into the cash register 10. The salesclerk operates an operation unit 11 of the cash register 10 to input the price by using an input device such as a barcode reader. Information such as the name and the price of each of the products, the total merchandise price obtained by calculating the sum of the price of each product, and the like, is displayed on both a screen of a display unit 12 installed facing the salesclerk and a screen of the operation/display unit 20 installed facing the customer. The customer confirms the screen of the operation/display unit 20 and inserts banknotes into a banknote depositing unit 210 of the banknote handling apparatus 200 and inserts coins into a coin depositing unit 110 of the coin handling apparatus 100. The banknotes and coins

are put therein as the payment of the merchandise price. The banknote handling apparatus 200 performs recognition and counting of the inserted banknotes and calculates the deposited amount of the banknotes. The coin handling apparatus 100 performs recognition and counting of the inserted coins and calculates the deposited amount of the coins. If the total of the deposited amount of the banknotes and the deposited amount of the coins exceeds the merchandise price, it is necessary to return the change to the customer. In this case, the banknotes constituting the change are discharged from a banknote dispensing unit 220 of the banknote handling apparatus 200, and the coins constituting the change are discharged from a coin dispensing unit 120 of the coin handling apparatus 100. The printer 30 outputs a receipt on which the information is printed. The information includes transaction date and time, product name and price of each of the products, merchandise price, deposited amount paid by the customer, change amount, and the like.

[0011] Thus, the money handling system 1 is capable of handling the coins and the banknotes by using the money handling apparatus 2 including the coin handling apparatus 100 and the banknote handling apparatus 200. Because the banknotes and the coins can be handled in the same manner, the details are explained below by taking the coin handling apparatus 100 that handles the coins as an example.

[0012] A configuration of the coin handling apparatus (money handling apparatus) 100 is explained while referring to FIGS. 2 to 5B. FIG. 2 is a block diagram for explaining the configuration of the coin handling apparatus 100. The coin handling apparatus 100, the cash register 10, the operation/display unit 20, and the printer 30 are communicably connected with each other. Although not specifically shown in FIGS. 1 and 2, the money handling system 1 can include a cash management apparatus that is connected communicably to the money handling apparatus 2 via a network such as a LAN. Such a cash management apparatus is installed, for example, in the backyard of the shop and used for managing the type, the number (amount), and the like of the banknotes and the coins stored in the money handling apparatus 2.

[0013] The cash register 10 includes the operation unit 11 for inputting various information and the display unit 12 comprising a liquid crystal display for displaying various information. Upon receiving an operation from the salesclerk, the cash register 10 calculates the merchandise price from the price of each of the products. The merchandise price is an amount of money to be demanded to the customer. For example, the cash register 10 is a POS register communicably connected to a not-shown POS server.

[0014] The operation/display unit 20 is, for example, a touch screen-type liquid crystal display installed facing the customer. The operation/display unit 20 functions as a display unit for displaying information to be confirmed by the customer, such as the merchandise price to be

demanding to the customer. The operation/display unit 20 functions, for example, as an operation unit for selecting approval or non-approval when requesting approval to the customer. Moreover, the operation/display unit 20 functions as an input unit for inputting information indicating the identity of the customer, such as a driver's license number, a social security number, and a customer number used to manage customers in the shop.

[0015] The printer 30 prints a receipt on which the information is printed. Information about the type and the price of the products purchased by the customer, information about the type and the number (amount) of coins inserted by the customer into the money handling apparatus 2, and the like are printed on the receipt. When a coin that is recognized as counterfeit or recognized as suspected of being counterfeit is detected by the coin handling apparatus 100, information about such a coin is also printed on the receipt.

[0016] The coin handling apparatus 100 includes the coin depositing unit 110, the coin dispensing unit 120, a transport unit 130, a recognition unit 140, a storing unit 170, and a collecting cassette 171, a counterfeit coin dispensing unit 150 and a counterfeit coin storing unit 160. Moreover, the coin handling apparatus 100 includes a control unit 190 that controls these structural components, a memory 180 that stores therein various computer programs and data, and a communication unit 195 that transmits/receives data to/from an external device.

[0017] The coin dispensing unit 120 discharges the coins, which were fed from the storing unit 170, to the outside of the apparatus. The transport unit 130 transports the coins on a transport path in the apparatus. When performing the money deposit process, the storing unit 170 stores the deposited coins therein by denomination. When performing the money dispensing process, the storing unit 170 feeds out the stored coins one by one to the transport path. The collecting cassette 171 stores therein the coins that could not be stored in the storing unit 170, and the like. When performing the money dispensing process to dispense the change, the storing unit 170 feeds the coins to the transport path, the transport unit 130 transports the fed coins to the coin dispensing unit 120, and the coin dispensing unit 120 discharges the coins to the outside of the apparatus.

[0018] The coin depositing unit 110 feeds the coins, which are put therein for the money depositing process, one by one to the transport path inside the apparatus. The transport unit 130 transports the coins fed to the transport path. FIG. 3 is a schematic diagram for explaining transport of a coin fed in the coin handling apparatus 100.

[0019] As shown with arrows in FIG. 3, during the money depositing process, the coins fed by the coin depositing unit 110 to the transport path inside the apparatus are transported to the recognition unit 140. The recognition unit 140 recognizes the denomination, the authenticity, the fitness, the version, the amount, and the like of the coins being transported.

[0020] In the following explanation, a coin that is recognized by the recognition unit 140 as genuine is described as a "genuine coin", a coin that is recognized by the recognition unit 140 as counterfeit is described as a "counterfeit coin", and a coin that is recognized by the recognition unit 140 as suspected of being the counterfeit coin is described as a "suspect coin". A coin that is recognized as a counterfeit coin or a suspect coin in the coin handling apparatus 100 is evaluated by a certain institution, such as the central bank, on a later date. In this evaluation, the counterfeit coin or the suspect coin may be evaluated as the genuine coin or the counterfeit coin. In the following explanation, it is assumed that the evaluation of whether a coin is a counterfeit coin or genuine coin is performed by the central bank.

[0021] Based on the recognition result obtained by the recognition unit 140, the transport unit 130 transports the coin to one of the coin dispensing unit 120, the counterfeit coin dispensing unit 150, the counterfeit coin storing unit 160, the storing unit 170, and the collecting cassette 171. Specifically, the recognition unit 140 considers a coin as a reject coin when the denomination and the like of the coin cannot be recognized. The reject coin is discharged from the coin dispensing unit 120 and the reject coin is returned to the customer. Among the coins whose denomination and the like could be recognized by the recognition unit 140, the genuine coins that can be reused for the dispensing process are transported to the storing unit 170 and stored therein by denomination. The genuine coin that could not be stored in the storing unit 170 because the storing unit 170 is full (full state) are stored in the collecting cassette 171. The genuine coin (unfit coin), which is not suitable for the dispensing process because it is damaged or dirty, are also stored in the collecting cassette 171. Among the coins whose denomination and the like could be recognized by the recognition unit 140, the counterfeit coins and the suspect coins are transported, depending on a setting relating to the counterfeit coin handling, to the counterfeit coin dispensing unit 150 or to the counterfeit coin storing unit 160. The details will be explained later.

[0022] The counterfeit coin dispensing unit 150 discharges the counterfeit coins and the suspect coins to the outside of the apparatus. When the counterfeit coins and the suspect coins are discharged to the outside of the apparatus at the time of the transaction, the salesclerk manages the counterfeit coins and the suspect coins by transaction. To allow the salesclerk to easily take out the counterfeit coins and the suspect coins from the apparatus, the counterfeit coin dispensing unit 150 is arranged on the side of the salesclerk in the checkout counter. For example, as shown in FIG. 1, in a configuration in which the customers themselves insert the coins in the coin depositing unit 110 from a front surface of the coin handling apparatus 100, the counterfeit coin dispensing unit 150 is arranged on a back surface of the coin handling apparatus 100. For example, in a configuration in which the salesclerk receives from the customer the coins to

be paid and inserts those coins in the coin depositing unit 110 arranged on the front surface of the coin handling apparatus 100, the counterfeit coin dispensing unit 150 is arranged on the front surface where the coin depositing unit 110 is also arranged. In this configuration, the reject coins are discharged from the coin dispensing unit 120, and the counterfeit coins and the suspect coins are discharged from the counterfeit coin dispensing unit 150. Therefore, for example, even when both the reject coins and the counterfeit coins are discharged during one transaction, it is possible to distinguish the counterfeit coins from the reject coins.

[0023] The counterfeit coin storing unit 160 stores therein the counterfeit coins and the suspect coins by transaction. FIGS. 4A and 4B are schematic diagrams for explaining an example of storing, by transaction, the counterfeit coins and the suspect coins in the counterfeit coin storing unit 160. The counterfeit coin storing unit 160 shown in FIG. 4A has a cylindrical shape with a bottom surface closed and an upper surface open. A counterfeit coin 400 and a suspect coin 400 that were transported by the transport unit 130 are stored in a stacked manner in the counterfeit coin storing unit 160. The inner diameter of the counterfeit coin storing unit 160 is greater than a diameter of a biggest coin having a maximum diameter among coins that can be handled by the coin handling apparatus 100 but smaller than two times of a diameter of a smallest coin having a minimum diameter among the coins handled by the coin handling apparatus 100. The coins 400 are stored one by one in the stacked manner in the counterfeit coin storing unit 160. Accordingly, it is possible to manage information about the counterfeit coins and the suspect coins, which were obtained at the time of each transaction, by transaction. The coins 400 of each of the transactions can be distinguished. For example, the bottommost coin 400 in the counterfeit coin storing unit 160 belongs to one transaction, and the second and the third coins 400 from the bottom belong to different one transaction.

[0024] The counterfeit coin storing unit 160 shown in FIG. 4B also has a cylindrical shape with a bottom surface closed and an upper surface open. The counterfeit coin 400 and the suspect coin 400 that were transported by the transport unit 130 are stored in the counterfeit coin storing unit 160. The counterfeit coin storing unit 160 shown in FIG. 4B is different from the counterfeit coin storing unit 160 shown in FIG. 4A in that, in the counterfeit coin storing unit 160 shown in FIG. 4B, the coins 400 are separately stored by transaction by using partition members 161. The thin plate-shaped partition members 161 are arranged on an outer side of the cylindrical counterfeit coin storing unit 160 at equal intervals in an axial direction of the cylindrical shape. Through-holes that extend in the circumferential direction are formed respectively corresponding to the partition members 161 in the side wall of the counterfeit coin storing unit 160. Each of the partition members 161 is provided so as to be capable of advancing and retreating. For example, when one coun-

terfeit coin 400a is stored in one transaction, as shown in FIG. 4B, a partition member 161a enters from the through-hole of the side wall toward the inside of the counterfeit coin storing unit 160. Subsequently, when two suspect coins 400b are stored in the next transaction performed thereafter, those two coins 400b are stored on the partition member 161a. Because the top surface of the two coins 400b stacked one above the other is higher than a position at which a partition member 161b is arranged, a partition member 161c enters from the through-hole of the side wall toward the inside of the counterfeit coin storing unit 160. Similarly, when a counterfeit coin 400c is stored in the next transaction performed thereafter, this coin 400c is stored on the partition member 161c, and a partition member 161d enters inside the counterfeit coin storing unit 160 to separate this transaction from the next transaction. Thus, by inserting the partition member 161 depending on the height of the coins 400 stored in the counterfeit coin storing unit 160, the coins 400 can be stored by transaction. The bottom surface of the counterfeit coin storing unit 160 is provided so as to be openable and closable. Therefore, one coin 400a can be taken out after opening the bottom surface. Then, the inserted partition members 161 are retreated sequentially from the bottom to the top to take out the two coins 400b, the one coin 400c, and so on. Accordingly, the coins 400 can be collected by transaction.

[0025] FIGS. 5A and 5B are schematic diagrams for explaining another example of storing the counterfeit coins and the suspect coins by transaction in the counterfeit coin storing unit 160. The counterfeit coin storing unit 160 shown in FIG. 5A is drum-shaped, and it is divided into a plurality of compartments 160a to 160d by partition walls that extend along a radial direction of the drum shape. One openable and closable lid member 162 (162a to 162d) is arranged on the wall portion of the counterfeit coin storing unit 160 corresponding to each of the compartments 160a to 160d. By controlling the rotation of the counterfeit coin storing unit 160 around the central axis thereof, the counterfeit coin storing unit 160 is stopped at a position at which the coin 400 transported by the transport unit 130 can be stored in the compartment 160a. When the counterfeit coin storing unit 160 stops at this position, the lid member 162a that is normally in a closed state is opened. Once the counterfeit coin 400 detected during the transaction is stored in the compartment 160a, the lid member 162a is closed, and the counterfeit coin storing unit 160 is rotated clockwise. Subsequently, the counterfeit coin storing unit 160 is stopped at a position at which the coin 400 transported by the transport unit 130 can be stored in another compartment 160b, and the lid member 162b is opened. By repeating this operation, the coins 400 can be stored in the compartments 160a to 160d by transaction.

[0026] The counterfeit coin storing unit 160 shown in FIG. 5B includes the plurality of compartments 160a to 160d separated by partition walls. The compartments 160a to 160d are box-shaped with a top surface thereof

open. The coins 400 can be stored in the compartments 160a to 160d by transaction. An openable and closable gate 163 (163a to 163d) is arranged, in the transport path on which the transport unit 130 transports the coin 400, corresponding to each of the compartments 160a to 160d. The top surface of the gate 163 is at the same height as an upper surface of the transport path. The gate 163 is opened when the coin 400 is transported above the counterfeit coin storing unit 160. The coin 400 falls in one of the appropriate compartments 160a to 160d and is stored therein. For example, when the counterfeit coin 400 is detected during the transaction, the gate 163a that is normally in a closed state is opened. The counterfeit coin 400 is stored in the compartment 160a, and the gate 163a is closed. If the counterfeit coin and/or the suspect coin is detected in another transaction performed subsequently, the gate 163b of the compartment 160b is opened, and the coin is stored in this compartment. By repeating this operation, the coins 400 can be stored in the compartments 160a to 160d by transaction.

[0027] The types of handling methods of the counterfeit coin and the suspect coin detected in the money depositing process will be explained next. FIG. 6 is a view for explaining a handling method of the counterfeit coins and the suspect coins executable in the coin handling apparatus 100. As shown under "physical handling" in FIG. 6, a setting relating to the handling method of the physical counterfeit coin and the physical suspect coin can be switched between "manual switching" and "automatic switching". Specifically, a "return setting (A1)" that indicates returning the counterfeit coin and the suspect coin to the customer, and a "keep setting (A2 to A5)" that indicates keeping the counterfeit coin and the suspect coin in the shop can be switched manually by performing a predetermined operation by the operation unit 11 of the cash register 10. Also, the control unit 190 of the coin handling apparatus 100 can automatically switch between the return setting (A6) and the keep setting (A7 to A10) based on a determination condition set previously. The return setting indicates a setting by which the physical counterfeit coins and the physical suspect coins detected during the transaction with the customer are returned as are to the customer. The keep setting indicates a setting by which the physical counterfeit coins and the physical suspect coins detected during the transaction with the customer are not returned to the customer but kept to manage in the shop. It can be set as desired whether the counterfeit coins and the suspect coins that were acquired during the handling based on the keep setting are to be stored in the counterfeit coin storing unit 160 by transaction or to be discharged from the counterfeit coin dispensing unit 150 to the outside of the apparatus. If the counterfeit coins and the suspect coins are to be discharged to the outside of the apparatus, the salesclerk manages the discharged counterfeit coins and the suspect coins by transaction.

[0028] As shown under "amount handling" in FIG. 6, when the physical handling setting is set to the return

setting, a setting will be "non-addition setting" (A1, A6) in which the amount of the counterfeit coins and the suspect coins is not added to the deposited amount. On the other hand, when the physical handling setting is set to the keep setting (A2 to A5, A7 to A10), it is possible to manually or automatically switch between an "addition setting" in which the amount of the counterfeit coins and the suspect coins is added to the deposited amount and the non-addition setting in which the amount of the counterfeit coins and the suspect coins is not added to the deposited amount. Specifically, the setting can be switched manually between the addition setting and the non-addition setting (A2 or A3, A7 or A8) by performing a predetermined operation by the operation unit 11 of the cash register 10. Also, the control unit 190 of the coin handling apparatus 100 can automatically switch between the addition setting and the non-addition setting (A4 or A5, A9 or A10) based on a determination condition set previously.

[0029] FIG. 7 is a view of an example of the determination conditions used in automatically switching the handling method of the physical counterfeit coins and the physical suspect coins and the amount thereof. Items shown under "determination item" shown in FIG. 7 are automatically switched when a condition shown under "determination condition" is satisfied. The control unit 190 manages in the memory 180 the determination conditions shown in FIG. 7.

[0030] For example, it can be set that, when a coin recognized as the counterfeit coin or the suspect coin in a transaction is of a target denomination, it is automatically switched whether this coin is to be handled based on the return setting or based on the keep setting. Also, it can be set that, when a coin recognized as the counterfeit coin or the suspect coin in a transaction is of a non-target denomination, it is automatically switched whether this coin is to be handled based on the return setting or based on the keep setting. One or more denominations can be set as the target denomination. Similarly, one or more denominations can be set as the non-target denomination.

[0031] Specifically, for example, when a 500-yen coin is set as the target denomination for the keep setting, if a coin recognized as the counterfeit coin or the suspect coin is a 500-yen coin, this coin is handled based on the keep setting; however, if this coin is a coin of some other denomination, this coin is handled based on the return setting. Moreover, for example, when a 1-yen coin and a 10-yen coin are set as the non-target denominations for the keep setting, if a coin recognized as the counterfeit coin or the suspect coin is a 1-yen coin or a 10-yen coin, this coin is handled based on the return setting; however, if this coin is a coin of some other denomination, this coin is handled based on the keep setting.

[0032] For the amount handling, it can be set that, when a coin recognized as the counterfeit coin or the suspect coin in a transaction is of a target denomination, it is automatically switched whether this coin is to be handled

based on the addition setting or based on the non-addition setting. Also, it can be set that, when a coin recognized as the counterfeit coin or the suspect coin in a transaction is of a non-target denomination, it is automatically switched whether this coin is to be handled based on the addition setting or based on the non-addition setting. One or more denominations can be set as the target denomination. Similarly, one or more denominations can be set as the non-target denomination.

[0033] Specifically, for example, when a 500-yen coin is set as the target denomination for the non-addition setting, if a coin recognized as the counterfeit coin or the suspect coin is a 500-yen coin, this coin is handled based on the non-addition setting; however, if this coin is a coin of some other denomination, this coin is handled based on the addition setting. Moreover, for example, when a 1-yen coin and a 10-yen coin are set as the non-target denominations for the non-addition setting, if a coin recognized as the counterfeit coin or the suspect coin is a 1-yen coin or a 10-yen coin, this coin is handled based on the addition setting; however, if this coin is a coin of any other denomination, this coin is handled based on the non-addition setting.

[0034] Moreover, it can be set that, when a total quantity (total amount or total number) of the coins recognized as the counterfeit coin and the suspect coin exceeds a predetermined quantity (predetermined amount or predetermined number) set previously, it is automatically set whether the counterfeit coin and the suspect coin are to be handled based on the keep setting or the return setting, and it is automatically set whether the counterfeit coin and the suspect coin are to be handled based on the addition setting or the non-addition setting.

[0035] Moreover, it can be set that, when a coin recognized as the counterfeit coin or the suspect coin is of a target currency set previously, it is automatically set whether this coin is to be handled based on the keep setting or the return setting, and it is automatically set whether this coin is to be handled based on the addition setting or the non-addition setting. Similarly, it can be set that, when a coin recognized as the counterfeit coin or the suspect coin is of a non-target currency set previously, it is automatically set whether this coin is to be handled based on the keep setting or the return setting, and it is automatically set whether this coin is to be handled based on the addition setting or the non-addition setting. One or more currencies can be set as the target currency. Similarly, one or more currencies can be set as the non-target currency.

[0036] Moreover, it can be set that, when a probability that a coin recognized as the counterfeit coin or the suspect coin is really a counterfeit coin is higher than a predetermined threshold value of probability set previously, it is automatically set whether this coin is to be handled based on the keep setting or the return setting, and it is automatically set whether this coin is to be handled based on the addition setting or the non-addition setting. The probability that a coin is the counterfeit coin is determined

based on the recognition result obtained by the recognition unit 140.

[0037] Moreover, it can be set that, depending on whether the customer who is trying to use a coin recognized as the counterfeit coin or the suspect coin possesses customer identification information that proves the identity of the customer, such as the driver's license number, the social security number, and the customer number used to manage customers in the shop, it is automatically set whether this coin is to be handled based on the keep setting or the return setting, and it is automatically set whether this coin is to be handled based on the addition setting or the non-addition setting. Moreover, it can be set that, depending on whether the customer who is trying to use a coin recognized as the counterfeit coin or the suspect coin is a repeat customer, a loyal customer of the shop, and the like, that is, depending on whether the customer is a particular customer who satisfies a predetermined condition, it is automatically set whether this coin is to be handled based on the keep setting or the return setting, and it is automatically set whether this coin is to be handled based on the addition setting or the non-addition setting.

[0038] The types of handling methods of the counterfeit coin and the suspect coin detected in the money depositing process will be concretely explained next. Because the coin recognized as the counterfeit coin and the coin recognized as the suspect coin are handled in the same manner, an explanation is given below by taking the coin recognized as the counterfeit coin as an example.

[0039] FIGS. 8A to 8C are schematic diagrams for explaining a situation in which the physical counterfeit coin is handled based on the return setting, and the amount of the counterfeit coin is handled based on the non-addition setting. This handling is performed based on the setting A1 and A6 shown in FIG. 6. FIG. 8A shows the money depositing process, FIG. 8B shows an additional money depositing process, and FIG. 8C shows a money depositing cancellation process.

[0040] After the transaction is started at the checkout counter, a merchandise price P yen of the products purchased by the customer is calculated by the cash register 10. As shown in FIG. 8A, when the customer inserts in the coin depositing unit 110 coins equivalent to X yen, which exceeds the merchandise price P yen, the recognition unit 140 in the coin handling apparatus 100 recognizes the denomination, the authenticity, and the like, of each of the coins. Based on the recognition result about the authenticity obtained by the recognition unit 140 and the return setting, the control unit 190 handles the counterfeit coins as the reject coins and returns those counterfeit coins to the customer from the coin dispensing unit 120. On the other hand, the control unit 190 performs control to store the genuine coins in the storing unit 170 by denomination. Moreover, based on the recognition result obtained by the recognition unit 140 and the non-addition setting, when the control unit 190 determines that the total amount of the counterfeit coins is Y yen, the

control unit 190 does not add this amount Y yen in the deposited amount, but calculates the deposited amount of the coins deposited in the coin handling apparatus 100 as (X-Y) yen.

[0041] If the deposited amount (X-Y) yen is less than the merchandise price P yen ($X-Y < P$) as shown in FIG. 8B, the additional money depositing process is performed. That is, the customer inserts in the coin depositing unit 110 the coins equivalent to Y yen in replacement of the returned counterfeit coins equivalent to Y yen, and the recognition unit 140 recognizes the denomination, the authenticity, and the like, of each of the coins. If the newly inserted coins are the genuine coins equivalent to Y yen, the control unit 190 performs control to store those coins in the storing unit 170 by denomination. Moreover, the control unit 190 updates the deposited amount to X yen from (X-Y) yen. If the deposited amount X yen is more than the merchandise price P yen ($X > P$), the control unit 190 calculates a change amount as (X-P) yen. Then, the control unit 190 performs control to feed the genuine coins equivalent to the change amount from the storing unit 170 and discharge those fed coins in the coin dispensing unit 120 as the change, and the transaction is completed. The final deposited amount at the end of the transaction is P yen that is equal to the merchandise price.

[0042] If the customer cancels the transaction at the state shown in FIG. 8A, the money depositing cancellation process shown in FIG. 8C is performed. When the customer informs the salesclerk to cancel the transaction, the salesclerk operates the operation unit 11 of the cash register 10 to cancel the money depositing process. When such an operation is received, the control unit 190 performs control to feed from the storing unit 170 the genuine coins equivalent to (X-Y) yen that have been deposited, and discharge those coins to the coin dispensing unit 120. In this manner, the coins equivalent to X yen including the counterfeit coins equivalent to Y yen and the genuine coins are returned to the customer, and the transaction is completed.

[0043] Thus, in the return setting, among the coins inserted by the customer in the coin handling apparatus 100, the counterfeit coins are returned from the coin dispensing unit 120 to the customer as the reject coins, and the genuine coins are stored in the storing unit 170 by denomination. In the non-addition setting, the total amount Y yen of the counterfeit coins is not added to the deposited amount, and the process is continued by calculating the deposited amount (X-Y) yen by subtracting the amount Y yen of the counterfeit coins from the inserted amount X yen which is the amount of inserted coins. That is, the process is continued by considering the amount of the genuine coins inserted by the customer as the deposited amount. Moreover, depending on need, the genuine coins equivalent to the change amount obtained by subtracting the merchandise price from the deposited amount are dispensed as the change. On the other hand, if the transaction that is being performed

based on the return setting and the non-addition setting is canceled in the middle, the counterfeit coins inserted by the customer in the coin handling apparatus 100 are returned as they are, and the genuine coins inserted by the customer are also returned. That is, the counterfeit coins are returned as the counterfeit coins, and also the coins equivalent to the entire inserted amount are returned to the customer.

[0044] FIGS. 9A to 9C are schematic diagrams for explaining a situation in which the physical counterfeit coins are handled based on the keep setting, and the amount of the counterfeit coins is handled based on the non-addition setting. This handling is performed based on the setting A2, A4, A7, and A9 shown in FIG. 6. FIG. 9A shows the money depositing process, FIG. 9B shows the additional money depositing process, and FIG. 9C shows the money depositing cancellation process. The counterfeit coins that are handled based on the keep setting can be managed by storing by transaction in the counterfeit coin storing unit 160 in the coin handling apparatus 100, or can be managed in the shop by transaction after discharging the coins from the counterfeit coin dispensing unit 150 to the outside of the apparatus. In the following explanation, it is assumed that the counterfeit coins are managed by storing in the counterfeit coin storing unit 160.

[0045] After the transaction is started at the checkout counter, the merchandise price P yen of the products purchased by the customer is calculated by the cash register 10. As shown in FIG. 9A, when the customer inserts in the coin depositing unit 110 coins equivalent to X yen, which exceeds the merchandise price P yen, the recognition unit 140 in the coin handling apparatus 100 recognizes the denomination, the authenticity, and the like, of each of the coins. Based on the recognition result about the authenticity obtained by the recognition unit 140 and the keep setting, the control unit 190 performs control to store the counterfeit coins in the counterfeit coin storing unit 160 by transaction. On the other hand, the control unit 190 performs control to store the genuine coins in the storing unit 170 by denomination. Moreover, based on the recognition result obtained by the recognition unit 140 and the non-addition setting, when the control unit 190 determines that the total amount of the counterfeit coins is Y yen, the control unit 190 does not add this amount Y yen in the deposited amount, and calculates the deposited amount of the coins deposited in the coin handling apparatus 100 as (X-Y) yen.

[0046] At this time, the proprietary rights in the counterfeit coin taken in the coin handling apparatus 100 are still with the customer. On a later date, the shop sends those counterfeit coins taken in the coin handling apparatus 100 to the central bank and requests the central bank to evaluate those coins. The shop returns the coins that are evaluated as the authentic coins to the customer, and the shop sends the coins that are evaluated as the counterfeit coins to the police station and the like.

[0047] If the deposited amount (X-Y) yen is less than

the merchandise price P yen ($X - Y < P$) as shown in FIG. 9B, the additional money depositing process is performed. That is, the customer inserts in the coin depositing unit 110 the coins equivalent to Y yen, and the recognition unit 140 recognizes the denomination, the authenticity, and the like, of each of the coins. If the newly inserted coins are the genuine coins equivalent to Y yen, the control unit 190 performs control to store those coins in the storing unit 170 by denomination. Moreover, the control unit 190 updates the deposited amount to X yen from $(X - Y)$ yen. If the deposited amount X yen is more than the merchandise price P yen ($X > P$), the control unit 190 calculates a change amount as $(X - P)$ yen. Then, the control unit 190 performs control to feed the genuine coins equivalent to change amount from the storing unit 170 and discharge those coins in the coin dispensing unit 120 as the change, and the transaction is completed. The final deposited amount at the end of the transaction is P yen that is equal to the merchandise price.

[0048] If the customer cancels the transaction at the state shown in FIG. 9A, the money depositing cancellation process shown in FIG. 9C is performed. When the customer informs the salesclerk to cancel the transaction, the salesclerk operates the operation unit 11 of the cash register 10 to cancel the money depositing process. When such an operation is received, the control unit 190 performs control to feed from the storing unit 170 the genuine coins equivalent to $(X - Y)$ yen that have been deposited, and discharge those coins to the coin dispensing unit 120. In this manner, the counterfeit coins equivalent to Y yen taken in the apparatus are kept in the apparatus, out of the coins equivalent to X yen inserted by the customer, and only the genuine coins equivalent to $(X - Y)$ yen other than the amount of the counterfeit coins are returned to the customer, and the transaction is completed.

[0049] Thus, in the keep setting, among the coins inserted by the customer in the coin handling apparatus 100, the counterfeit coins are taken in and kept in the coin handling apparatus 100 without returning to the customer, and the genuine coins are stored in the storing unit 170 by denomination. In the non-addition setting, the total amount Y yen of the counterfeit coins is not added to the deposited amount, and the process is continued by calculating the deposited amount $(X - Y)$ yen by subtracting the amount Y yen of the counterfeit coins from the inserted amount X yen which is the amount of inserted coins. That is, the process is continued by considering the amount of the genuine coins inserted by the customer as the deposited amount. Moreover, depending on need, the genuine coins equivalent to the change amount obtained by subtracting the merchandise price from the deposited amount are dispensed as the change. On the other hand, if the transaction that is being performed based on the keep setting and the non-addition setting is canceled in the middle, among the coins inserted by the customer in the coin handling apparatus 100, the counterfeit coins are taken in and kept in the coin handling

apparatus 100 and are not returned to the customer, while only the genuine coins are returned to the customer. That is, only the genuine coins equivalent to the amount obtained by subtracting an amount of the counterfeit coins from the inserted amount are returned to the customer.

[0050] FIGS. 10A and 10B are schematic diagrams for explaining a situation in which the physical counterfeit coins are handled based on the keep setting, and the amount of the counterfeit coins is handled based on the addition setting. This handling is performed based on the setting A3, A5, A8, and A10 shown in FIG. 6. FIG. 10A shows the money depositing process and FIG. 10B shows the money depositing cancellation process.

[0051] After the transaction is started at the checkout counter, the merchandise price P yen of the products purchased by the customer is calculated by the cash register 10. As shown in FIG. 10A, when the customer inserts in the coin depositing unit 110 coins equivalent to X yen, which exceeds the merchandise price P yen, the recognition unit 140 in the coin handling apparatus 100 recognizes the denomination, the authenticity, and the like, of each of the coins. Based on the recognition result about the authenticity obtained by the recognition unit 140 and the keep setting, the control unit 190 performs control to store the counterfeit coins in the counterfeit coin storing unit 160 by transaction. On the other hand, the control unit 190 performs control to store the genuine coins in the storing unit 170 by denomination. Moreover, based on the recognition result obtained by the recognition unit 140 and the addition setting, even if the control unit 190 determines that the total amount of the counterfeit coins is Y yen, the control unit 190 adds this amount Y yen in the deposited amount, and calculates the deposited amount of the coins deposited in the coin handling apparatus 100 as X yen.

[0052] At this time, the proprietary rights in the counterfeit coin taken in the coin handling apparatus 100 shift from the customer to the shop. On a later date, the shop sends those counterfeit coins taken in the coin handling apparatus 100 to the central bank and requests the central bank to evaluate those coins. For example, some shops may prefer to add in the store sales the amount of the coins that are recognized as the counterfeit coins before performing the evaluation of the coins in the central bank. In such shops, if an evaluation result that the coins are the genuine coins is obtained, the sales data is not changed. On the other hand, if an evaluation result that the coins are the counterfeit coins is obtained, those counterfeit coins are sent to the police station, and the amount of the counterfeit coins already added in the store sales before performing the evaluation of the coins is subtracted from the sales data. On the other hand, some shops may prefer to add in the store sales the amount of the counterfeit coins after performing the evaluation of the coins in the central bank. In such shops, if an evaluation result that the coins are the genuine coins is obtained, the amount of the counterfeit coins is added to

the sales data. On the other hand, if an evaluation result that the coins are the counterfeit coins is obtained, the sales data is not changed, and those counterfeit coins are sent to the police station.

[0053] In the addition setting, even if the counterfeit coins are included in the coins inserted by the customer in the coin handling apparatus 100, the amount of the counterfeit coins is added in the deposited amount, and therefore the customer needs not pay any additional money as in the examples shown in FIGS. 8A to 9C. If the deposited amount X yen of all the coins including the counterfeit coins is more than the merchandise price P yen ($X > P$), the control unit 190 calculates a change amount as $(X - P)$ yen. Then, the control unit 190 performs control to feed the genuine coins equivalent to the change amount from the storing unit 170 and discharge those coins in the coin dispensing unit 120 as the change, and the transaction is completed. The final deposited amount at the end of the transaction is P yen that is equal to the merchandise price.

[0054] If the customer cancels the transaction at the state shown in FIG. 10A, the money depositing cancellation process shown in FIG. 10B is performed. When the customer informs the salesclerk to cancel the transaction, the salesclerk operates the operation unit 11 of the cash register 10 to cancel the money depositing process. When such an operation is received, the control unit 190 performs control to feed from the storing unit 170 the genuine coins equivalent to X yen, and discharges those coins to the coin dispensing unit 120, and the transaction is completed. That is, even the counterfeit coins equivalent to Y yen are inserted by the customer, the genuine coins equivalent to Y yen are returned to the customer in place of the counterfeit coins.

[0055] Thus, in the keep setting, among the coins inserted by the customer in the coin handling apparatus 100, the counterfeit coins are taken in and kept in the coin handling apparatus 100 without returning to the customer, and the genuine coins are stored in the storing unit 170 by denomination. In the addition setting, even if the counterfeit coins equivalent to Y yen are included in the inserted coins of X yen, the amount Y yen of the counterfeit coins is added to the deposited amount, and the process is continued by considering the inserted amount X yen, which is the amount of inserted coins, as the deposited amount. That is, the process is continued by considering the total amount inserted by the customer with the genuine coins and the counterfeit coins as the deposited amount. Moreover, depending on need, the genuine coins equivalent to the change amount obtained by subtracting the merchandise price from the deposited amount is dispensed as the change. On the other hand, if the transaction that is being performed based on the keep setting and the addition setting is canceled in the middle, among the coins inserted by the customer in the coin handling apparatus 100, the counterfeit coins are taken in and kept in the coin handling apparatus 100 and are not returned to the customer, while the coins equiv-

alent to the entire amount is returned to the customer in the genuine coins. That is, the genuine coins equivalent to the entire inserted amount is returned to the customer.

[0056] When the handling based on the keep setting and the non-addition setting shown in FIGS. 9A to 9C is performed in the coin handling apparatus 100, it may be necessary to perform a process to obtain prior approval from the customer. The coin handling apparatus 100 performs a process to obtain approval from the customer that allows the shop not to add the total amount of the counterfeit coins detected at the time of the transaction in the deposited amount, and to keep such counterfeit coins in the apparatus and collect at the shop.

[0057] When the transaction is started based on the keep setting and the non-addition setting in the coin handling apparatus 100, at a time point before the customer inserts the coins in the coin handling apparatus 100, the control unit 190 displays a window on the screen of the operation/display unit 20 provided for the customer to obtain the approval from the customer. FIG. 11 is a view for explaining the window for obtaining the approval from the customer to renounce the proprietary rights in the counterfeit coins. When the customer confirms the window displayed on the screen shown in FIG. 11 and selects a "yes" button by operating the operation/display unit 20 to agree to renounce the proprietary rights in the counterfeit coins, only then the customer is allowed to use the coins for payment of the merchandise price. As a result, the process explained by referring to FIGS. 9A to 9C is continued. On the other hand, if the customer selects a "no" button in the window displayed on the screen shown in FIG. 11 to disagree to renounce the proprietary rights in the counterfeit coins, the customer is not allowed to use the coins for payment of the merchandise price. Specifically, the coin handling apparatus 100 does not take in the apparatus the coins inserted from the coin depositing unit 110, and the customer cannot make the payment using the coins. In this case, for example, the customer can make the payment of the merchandise price by using a valuable medium other than the coins such as the banknotes and the credit card.

[0058] When the counterfeit coins are detected in the coin handling apparatus 100, the shop sends the coins recognized as the counterfeit coins in the coin handling apparatus 100 to the central bank for evaluation on a later date. If the central bank evaluates those coins as the counterfeit coins, because the approval to renounce the proprietary rights in the counterfeit coins has been already obtained from the customer, the shop sends those counterfeit coins to a certain institution such as the police station. On the other hand, if the central bank evaluates those coins as the genuine coins, the shop returns those genuine coins to the customer.

[0059] To return the coins to the customer when those coins recognized as the counterfeit coins in the coin handling apparatus 100 are sent for evaluation and an evaluation result that those coins are genuine coins is obtained in the central bank, the control unit 190 of the coin

handling apparatus 100 performs control to print by the printer 30 a receipt to be given to the customer.

[0060] FIG. 12 is a view for explaining the receipt printed by the printer 30. A name 300 of the shop (company), a transaction date and time 301, branch shop identification information 302, and cash register identification information 303 are printed on the receipt. Thus, the date and time, the shop (company), the branch shop, and the cash register in which the receipt is printed can be identified from the receipt. Moreover, transaction information 304, such as a name of each of the products purchased by the customer, a price of each of the products, a total amount ("total" in the diagram) of the products, a deposited amount ("received" in the diagram) of the coins deposited in the coin handling apparatus 100, a change amount ("change" in the diagram) of the coins that were returned to the customer, is printed on the receipt.

[0061] Moreover, breakdown information 305 of the coins that are deposited by the customer in the coin handling apparatus 100, a transaction number 306, customer identification information 307 ("customer ID" in the diagram), and evaluation date information 308 are printed on the receipt. The breakdown information 305 includes a total amount of the coins that were recognized as the genuine coins by the recognition unit 140 of the coin handling apparatus 100, a total amount of the coins that were recognized as the counterfeit coins. The breakdown information 305 further includes the number of the counterfeit coins by denomination and an amount of the counterfeit coins by denomination.

[0062] The transaction number 306 is a number to distinguish each of the transactions performed in the shop. The customer identification information 307 includes information to recognize each of the customers, such as the driver's license number, the social security number, and the customer number used to manage customers in the shop. The customer identification information 307 is acquired from the customer at the time of the transaction. The evaluation date information 308 is the date on which the evaluation of the counterfeit coins is scheduled in the central bank. The customer can visit the shop on a date that is after the date in the evaluation date information 308, and confirm the evaluation result of the central bank based on the transaction number 306. If the evaluation result that the coins are the genuine coins is obtained from the central bank, the customer can claim to return those genuine coins. The embodiment is not limited to the one in which the scheduled evaluation date of the counterfeit coins is informed to the customer as the evaluation date information 308. For example, in another embodiment, the deadline that is, for example, the last date by which the shop shall return the genuine coins to the customer after the coins are evaluated as the genuine coins in the evaluation in the central bank is informed as the evaluation date information 308. Moreover, as still another embodiment, both the scheduled evaluation date and the deadline to return the coins can be informed as the evaluation date information 308.

[0063] FIG. 13 is a view for explaining inventory amount information of the coins present in the coin handling apparatus 100. The control unit 190 of the coin handling apparatus 100 separately manages an inventory amount of the storing unit 170 that stores therein the genuine coins and an inventory amount of the counterfeit coin storing unit 160 that stores therein the counterfeit coins in the memory 180 as shown in FIG. 13. For each of the storing units constituting the storing unit 170, the denomination of the coins to be stored therein is set previously as a denomination setting. The inventory amount of the storing unit 170 is managed based on the denomination, the number (quantity) and the amount of the coins stored in each of the storing units. On the other hand, the inventory amount of the counterfeit coin storing unit 160 is managed based on the transaction number of the counterfeit coins stored in each of the storing units, the total amount of the counterfeit coins, and the breakdown of the denomination and the number of the counterfeit coins as exemplified with a first counterfeit coin storing unit and a second counterfeit coin storing unit in FIG. 13.

[0064] FIG. 14 is a view for explaining the transaction information about the transactions carried out by using the coin handling apparatus 100. As shown in FIG. 14, in the memory, the control unit 190 of the coin handling apparatus 100 manages the transaction number, a transaction date, the branch shop identification information, the cash register identification information, the inserted amount, the deposited amount, and counterfeit coin information. The transaction numbers shown in FIGS. 12 to 14 correspond to each other. Therefore, from the transaction number, a correspondence among the counterfeit coins printed in the receipt shown in FIG. 12, the counterfeit coin storing unit 160 included in the inventory amount information shown in FIG. 13, and the transaction shown in the transaction information shown in FIG. 14 can be recognized.

[0065] The counterfeit coin information shown in FIG. 14 includes the amount, the denomination, the number (quantity), proprietary rights, the customer identification information, the evaluation date, the evaluation result, and customer return information. The counterfeit coin information is the information of the coins that are recognized by the recognition unit 140 of the coin handling apparatus 100 as the counterfeit coins in one transaction shown with the transaction number. If a plurality of counterfeit coins are detected in one transaction, the total amount of the counterfeit coins is recorded as the amount, and the denomination and the number of each of the counterfeit coins are recorded as the denomination and the number (quantity).

[0066] The item proprietary rights is information indicating the proprietary rights in the counterfeit coin. As explained with reference to FIGS. 9A to 9C, when the process is performed based on the non-addition setting in which the amount of the counterfeit coin is not added to the deposited amount, the customer is recorded as the proprietary rights owner. In contrast, as explained

with reference to FIGS. 10A and 10B, when the process is performed based on the addition setting in which the amount of the counterfeit coin is added to the deposited amount, the shop is recorded as the proprietary rights owner. Accordingly, even in the setting in which the control unit 190 can automatically switch the handling method of the counterfeit coins, it is possible to confirm whether the counterfeit coin has been handled based on the addition setting or the non-addition setting.

[0067] The item customer identification information includes the customer identification information that proves the identity of the customer such as the driver's license number, the social security number, and the customer number used to manage customers in the shop. For example, as explained with reference to FIGS. 9A to 9C, when the counterfeit coins detected at the time of the transaction in the coin handling apparatus 100 are taken in the apparatus and kept by the shop while the customer is still the proprietary rights owner, either the salesclerk operates the operation unit 11 of the cash register 10 or the customer operates the operation/display unit 20 to input the customer identification information. This input information is recorded in the transaction information as the customer identification information.

[0068] The item evaluation date includes the scheduled evaluation date on which the shop requests the evaluation of the counterfeit coins to the central bank, or the actual date on which the evaluation of the counterfeit coins is performed by the central bank. Specifically, when "not yet" is recorded as the evaluation result, the evaluation date represents the scheduled evaluation date on which the evaluation is requested to the central bank. For example, like month end, month end at every two months interval, if the scheduled evaluation date on which the evaluation will be requested to the central bank is set previously, the scheduled evaluation date is recorded automatically. The scheduled evaluation date is also printed on the receipt as shown in FIG. 12.

[0069] After the evaluation result is obtained from the central bank, the evaluation result is input by using the operation unit 11 of the cash register 10, the operation/display unit 20, and the like, and the transaction information is updated. The configuration is not limited to the embodiment in which the evaluation result is manually input by using the operation unit 11 or the operation/display unit 20. As another embodiment, the evaluation result can be input automatically. For example, data of a two-dimensional barcode and the like indicating the evaluation result can be read by using a reading device capable of reading the data allowing automatic input of the evaluation result. Moreover, as another embodiment, for example, the communication unit 195 of the coin handling apparatus 100 and an external device, such as a predetermined terminal and a device, installed in the central bank can be connected communicably. When the evaluation result is obtained in the central bank and input in the external device, the obtained result is automatically sent to the coin handling apparatus 100 via the commu-

nication unit 195. For example, when the central bank evaluates the coins as the counterfeit coins, if this evaluation result is input, the evaluation date is updated from the scheduled evaluation date to the actual evaluation date, and the evaluation result "not yet" is updated to "counterfeit". Because the counterfeit coins are not returned to the customer, the item customer return information is updated from "-" to "unnecessary". In contrast, when the central bank evaluates the coins as the genuine coins, the evaluation date is updated from the scheduled evaluation date to the actual evaluation date, and the evaluation result "not yet" is updated to "genuine". When the proprietary rights owner is the customer, because it is necessary to return the coins that are recognized as the genuine coins to the customer, the item customer return information is updated from "-" to "not yet". When the customer brings the receipt to the shop and receives the coins recognized as the genuine coins, information indicating this fact is input by using the operation unit 11 of the cash register 10, the operation/display unit 20, and the like, and the item customer return information of the corresponding transaction information is updated from "not yet" to "done".

[0070] When the proprietary rights in the counterfeit coins belongs to the shop, irrespective of the evaluation result obtained in the central bank, the evaluation date is updated from the scheduled evaluation date to the actual evaluation date, and the item customer return information is updated from "-" to "unnecessary". Moreover, the evaluation result "not yet" is updated to "counterfeit" or "genuine" indicating the evaluation result obtained in the central bank.

[0071] Thus, the coin handling apparatus 100 records the transaction information including the counterfeit coin information, and separately manages the physical coins as the genuine coins and the counterfeit coins in the coin handling apparatus 100. Moreover, the coin handling apparatus 100 controls the printer 30 to issue to the customer the receipt on which information about the counterfeit coins is printed. As a result, with the proprietary rights of the counterfeit coins is remaining to the customer, the shop can keep the counterfeit coins received from the customer and can manage those coins in the coin handling apparatus 100. Then, the shop requests the evaluation of the coins to the central bank, and depending on the evaluation result, returns the coins to the customer, sends those coins to the police station, and the like. The customer keeps the receipt issued by the shop. After the evaluation result of the central bank is obtained, the customer goes to the shop again with the receipt to confirm the evaluation result. If the evaluation result is that the coins are genuine coins, the customer receives those genuine coins from the shop.

[0072] When performing the transaction in the coin handling apparatus 100, information such as the merchandise price, the deposited amount, the change amount, and the like is displayed on the screen of the operation/display unit 20 arranged in the checkout coun-

ter. FIGS. 15A and 15B are examples of the screens displayed on the operation/display unit 20. If the counterfeit coin is not detected during the transaction, as shown in FIG. 15A, the merchandise price, the deposited amount that the customer deposited in the coin handling apparatus 100 to make the payment of the merchandise price, and the change amount to be dispensed from the coin handling apparatus 100 are displayed on the operation/display unit 20. On the other hand, if the counterfeit coin is detected during the transaction, as shown in FIG. 15B, the merchandise price, the inserted amount that the customer inserted in the coin handling apparatus 100 to make the payment of the merchandise price, the counterfeit coin amount indicating the total amount of the detected counterfeit coins, the deposited amount indicating the total amount of the coins deposited in the coin handling apparatus 100, and the change amount to be dispensed from the coin handling apparatus 100 are displayed on the operation/display unit 20. Even when returning the genuine coins in place of the counterfeit coins at the time of the money depositing cancellation as explained with reference to FIGS. 10A and 10B, because the amount of counterfeit coins is displayed on the screen of the operation/display unit 20, it is possible to notify the customer who inserted the counterfeit coins that the shop recognizes that the inserted coins are the counterfeit coins thereby preventing the use of the counterfeit coins in bad faith.

[0073] As has been explained above, in the money handling apparatus according to the present embodiment, the physical money that is recognized by the recognition unit 140 as counterfeit or suspected of being counterfeit can be handled based on the return setting in which the money is returned to the customer, or the keep setting in which the money is kept in the apparatus and managed in the shop. Moreover, the amount of the money that is recognized as counterfeit or suspected of being counterfeit can be handled based on the addition setting in which such amount is added to the deposited amount, or the non-addition setting in which such amount is not added to the deposited amount. Various combinations of the return setting and the keep setting and the addition setting and the non-addition setting can be set. Accordingly, the money that is recognized as counterfeit or suspected of being counterfeit can be handled by various methods. Moreover, by setting the determination conditions, the setting can be automatically switched depending on the set determination conditions. Accordingly, the money handling apparatus according to the present embodiment can respond to the various operation methods used in the shops.

[0074] To solve the problems in the conventional technology, according to one aspect of the present invention, a money handling system that handles money includes a money depositing unit that receives money for a money depositing process; a recognition unit that recognizes a denomination and authenticity of each of the money received by the money depositing unit; and a control unit

that sums an amount of money recognized by the recognition unit as counterfeit or suspected of being counterfeit in a deposited amount and performs the money depositing process.

[0075] In the above money handling system, the control unit switches a setting, on which the money depositing process is performed based, between an addition setting in which the amount of the money recognized by the recognition unit as counterfeit or suspected of being counterfeit is summed in the deposited amount, and a non-addition setting in which the amount of the money recognized by the recognition unit as counterfeit or suspected of being counterfeit is not summed in the deposited amount.

[0076] In the above money handling system, the control unit separately manages, by transaction, the amount of the money recognized by the recognition unit as counterfeit or suspected of being counterfeit, and the deposited amount including the amount of the money recognized as counterfeit or suspected of being counterfeit.

[0077] The above money handling system further includes a storing unit that stores therein money recognized by the recognition unit as genuine money; and a counterfeit money storing unit that stores therein the money recognized by the recognition unit as counterfeit or suspected of being counterfeit.

[0078] The above money handling system further includes a money dispensing unit that discharges money that is determined by the recognition unit to reject; and a counterfeit money dispensing unit that discharges the money recognized by the recognition unit as counterfeit or suspected of being counterfeit.

[0079] In the above money handling system, when a transaction, in which the money recognized by the recognition unit as counterfeit or suspected of being counterfeit is detected, is cancelled before the transaction is completed, the control unit returns an amount of genuine money equivalent to money recognized by the recognition unit as genuine money in the transaction without returning the money recognized as counterfeit or suspected of being counterfeit.

[0080] In the above money handling system, when a transaction, in which the money recognized by the recognition unit as counterfeit or suspected of being counterfeit is detected, is cancelled before the transaction is completed, the control unit returns an amount of genuine money equivalent to a total of the money recognized as counterfeit or suspected of being counterfeit and the money recognized by the recognition unit as genuine money in the transaction without returning the money recognized as counterfeit or suspected of being counterfeit.

[0081] The above money handling system further includes a display unit that displays the deposited amount and information about the money recognized by the recognition unit as counterfeit or suspected of being counterfeit.

[0082] The above money handling system further in-

cludes an input unit adapted to input customer identification information to identify a customer who had possessed the money recognized by the recognition unit as counterfeit or suspected of being counterfeit. The control unit manages the information about the money recognized by the recognition unit as counterfeit or suspected of being counterfeit and the customer identification information of the customer who had possessed the money in an associated manner.

[0083] In the above money handling system, when the money recognized by the recognition unit as counterfeit or suspected of being counterfeit satisfies a predetermined condition, the control unit performs the money depositing process summing in the deposited money the amount of the money recognized as counterfeit or suspected of being counterfeit.

[0084] In the above money handling system, when the money recognized by the recognition unit as counterfeit or suspected of being counterfeit does not satisfy the predetermined condition, the control unit performs the money depositing process without summing in the deposited money the amount of the money recognized as counterfeit or suspected of being counterfeit.

[0085] In the above money handling system, when a denomination of the money recognized by the recognition unit as counterfeit or suspected of being counterfeit is a predetermined denomination, the control unit determines that the predetermined condition is satisfied.

[0086] In the above money handling system, when a total quantity of the money recognized by the recognition unit as counterfeit or suspected of being counterfeit is lower than a predetermined threshold, the control unit determines that the predetermined condition is satisfied.

[0087] In the above money handling system, when a currency of the money recognized by the recognition unit as counterfeit or suspected of being counterfeit is a predetermined currency, the control unit determines that the predetermined condition is satisfied.

[0088] The above money handling system further includes an input unit adapted to input customer identification information to identify a customer who had possessed the money recognized by the recognition unit as counterfeit or suspected of being counterfeit, wherein when the customer identification information to identify the customer who had possessed the money recognized by the recognition unit as counterfeit or suspected of being counterfeit is input, the control unit determines that the predetermined condition is satisfied.

[0089] According to the present invention, when money that is recognized by the recognition unit as counterfeit or suspected of being counterfeit is detected during the money depositing process in which the money handling system receives the money depositing of at least one of the banknote and the coin, the money depositing process can be performed by adding the amount of the detected money in the deposited amount. As a result, for example, an operation in which, when the amount of the money that is detected as counterfeit or suspected of being coun-

terfeit at the time of the transaction in the shop is less than a predetermined amount, the transaction is performed by adding the amount of the detected money in the deposited amount can be performed. Even when the money that is recognized as counterfeit or suspected of being counterfeit is evaluated by a certain institution, such as the central bank, as genuine money, it is possible to prevent from causing any inconvenience to the customer and giving any trouble to the customer.

[0090] As explained above, the money handling system and the money handling apparatus according to the present invention are useful in adding the amount of the counterfeit money in the deposited amount as needed.

[0091] Although the invention has been explained with respect to specific embodiments for a complete and clear disclosure, the appended claims are not to be thus limited but are to be construed as embodying all modifications and alternative constructions that may occur to one skilled in the art that fairly fall within the basic teaching of the claims.

Claims

1. A money handling system (1) that handles money, comprising:
 - a money depositing unit (110) that receives money for a money depositing process;
 - a recognition unit (140) that recognizes a denomination and authenticity of each of the money received by the money depositing unit (110); and
 - a control unit (190) that sums an amount of money recognized by the recognition unit (140) as counterfeit or suspected of being counterfeit in a deposited amount and performs the money depositing process.
2. The money handling system (1) as claimed in claim 1, wherein the control unit (190) switches a setting, on which the money depositing process is performed based, between
 - an addition setting in which the amount of the money recognized as counterfeit or suspected of being counterfeit is summed in the deposited amount, and
 - a non-addition setting in which the amount of the money recognized as counterfeit or suspected of being counterfeit is not summed in the deposited amount.
3. The money handling system (1) as claimed in claim 1 or 2, wherein the control unit (190) separately manages, by transaction,
 - the amount of the money recognized as counterfeit or suspected of being counterfeit, and the deposited amount including the amount of the money recognized as counterfeit or suspected of being

4. The money handling system (1) as claimed in any one of claims 1 to 3, further comprising:

a storing unit (170) that stores therein money recognized as genuine money; and
a counterfeit money storing unit (160) that stores therein the money recognized as counterfeit or suspected of being counterfeit.

5. The money handling system (1) as claimed in any one of claims 1 to 4, further comprising:

a money dispensing unit (120) that discharges money that is determined by the recognition unit (140) to reject; and
a counterfeit money dispensing unit (150) that discharges the money recognized as counterfeit or suspected of being counterfeit.

6. The money handling system (1) as claimed in any one of claims 1 to 5, wherein

when a transaction, in which the money recognized as counterfeit or suspected of being counterfeit is detected, is cancelled before the transaction is completed,

the control unit (190) returns an amount of genuine money equivalent to money recognized by the recognition unit (140) as genuine money in the transaction without returning the money recognized by the recognition unit (140) as counterfeit or suspected of being counterfeit.

7. The money handling system (1) as claimed in any one of claims 1 to 5, wherein

when a transaction, in which the money recognized as counterfeit or suspected of being counterfeit is detected, is cancelled before the transaction is completed,

the control unit (190) returns an amount of genuine money equivalent to a total of the money recognized as counterfeit or suspected of being counterfeit and the money recognized by the recognition unit (140) as genuine money in the transaction without returning the money recognized as counterfeit or suspected of being counterfeit.

8. The money handling system (1) as claimed in any one of claims 1 to 7, further comprising

a display unit (12) that displays the deposited amount and information about the money recognized as counterfeit or suspected of being counterfeit.

9. The money handling system (1) as claimed in any one of claims 1 to 8, further comprising

an input unit (11) adapted to input customer identification information to identify a customer who had possessed the money recognized as counterfeit or suspected of being counterfeit,

wherein the control unit (190) manages the information about the money recognized as counterfeit or suspected of being counterfeit and the customer identification information in an associated manner.

10. The money handling system (1) as claimed in claim 1, wherein

when the money recognized as counterfeit or suspected of being counterfeit satisfies a predetermined condition, the control unit (190) performs the money depositing process summing in the deposited money the amount of the money recognized as counterfeit or suspected of being counterfeit.

11. The money handling system (1) as claimed in claim 10, wherein

when the money recognized as counterfeit or suspected of being counterfeit does not satisfy the predetermined condition, the control unit (190) performs the money depositing process without summing in the deposited money the amount of the money recognized as counterfeit or suspected of being counterfeit.

12. The money handling system (1) as claimed in claim 10 or 11, wherein

when a denomination of the money recognized as counterfeit or suspected of being counterfeit is a predetermined denomination, the control unit (190) determines that the predetermined condition is satisfied.

13. The money handling system (1) as claimed in any one of claims 10 to 12, wherein

when a total quantity of the money recognized as counterfeit or suspected of being counterfeit is lower than a predetermined threshold, the control unit (190) determines that the predetermined condition is satisfied.

14. The money handling system (1) as claimed in any one of claims 10 to 13, wherein

when a currency of the money recognized as counterfeit or suspected of being counterfeit is a predetermined currency, the control unit (190) determines that the predetermined condition is satisfied.

15. The money handling system (1) as claimed in any one of claims 10 to 14, further comprising

an input unit (11) adapted to input customer identification information to identify a customer who had possessed the money recognized as counterfeit or suspected of being counterfeit, wherein

when the customer identification information to identify the customer who possessed the money recognized by the recognition unit (140) as counterfeit or suspected of being counterfeit is input, the control unit (190) determines that the predetermined condition is satisfied.

FIG.1

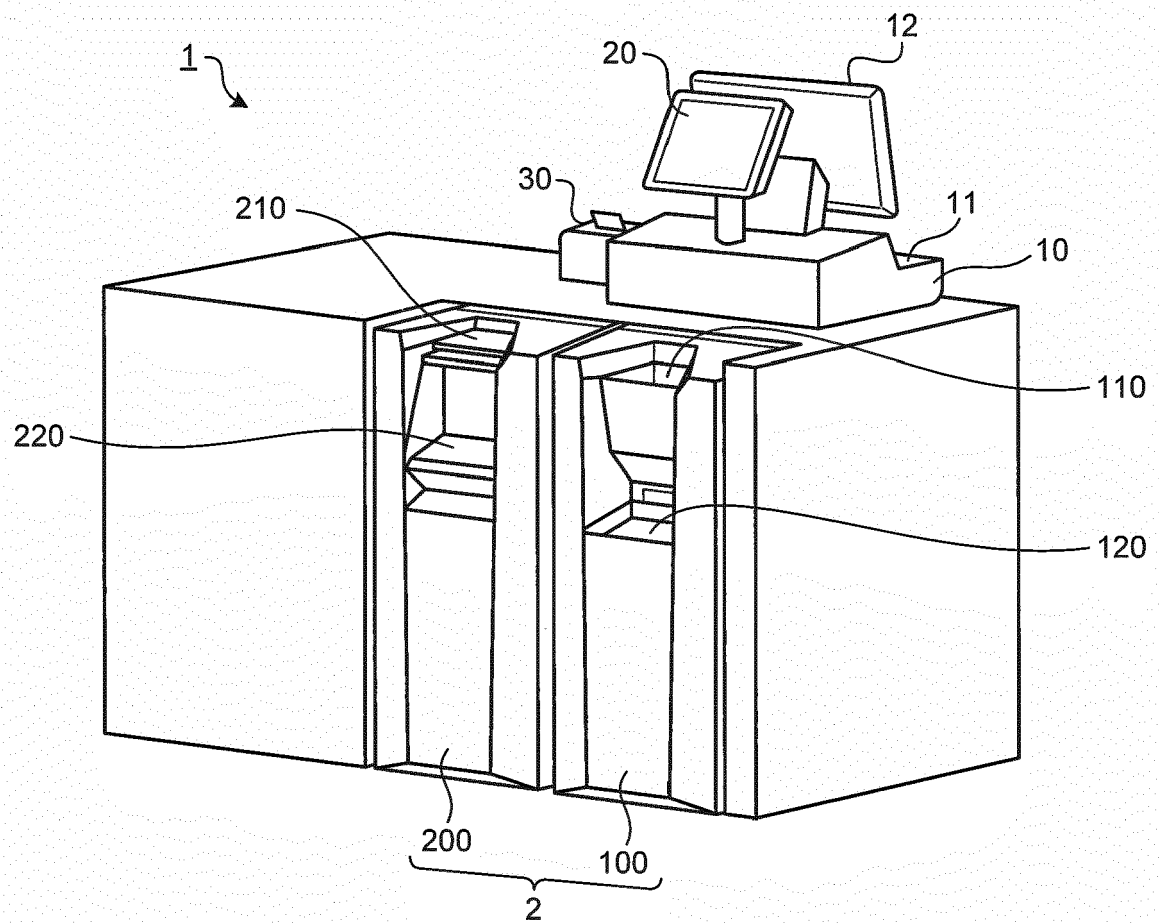


FIG.2

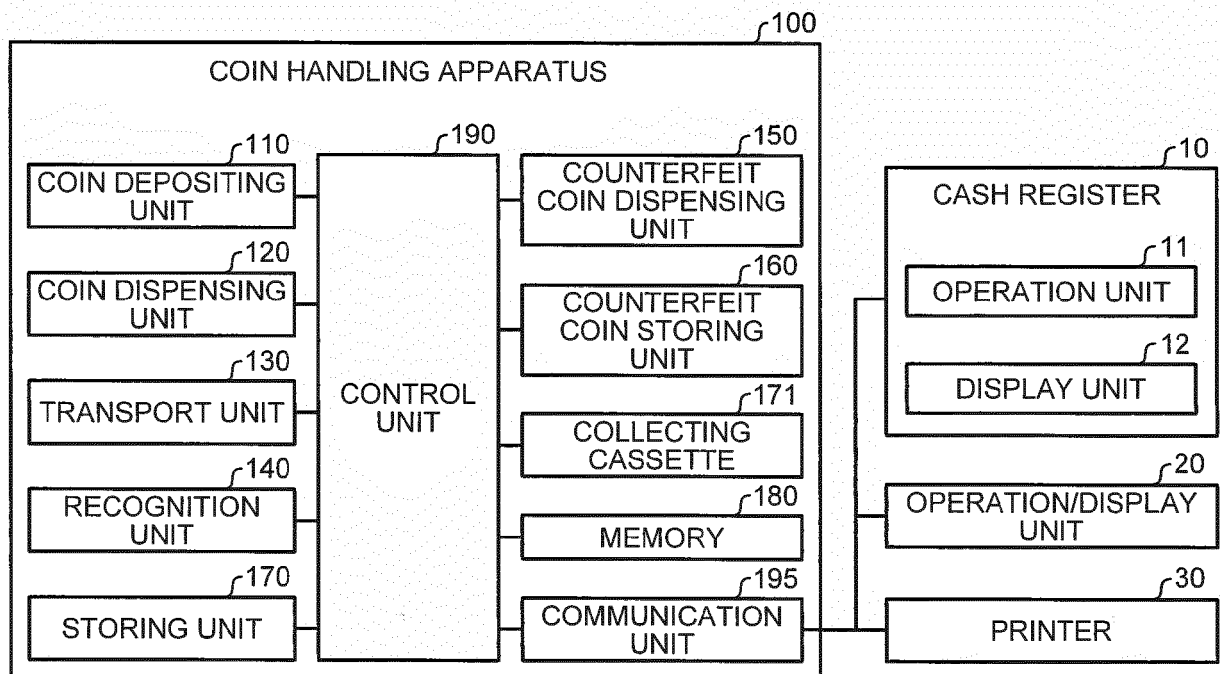
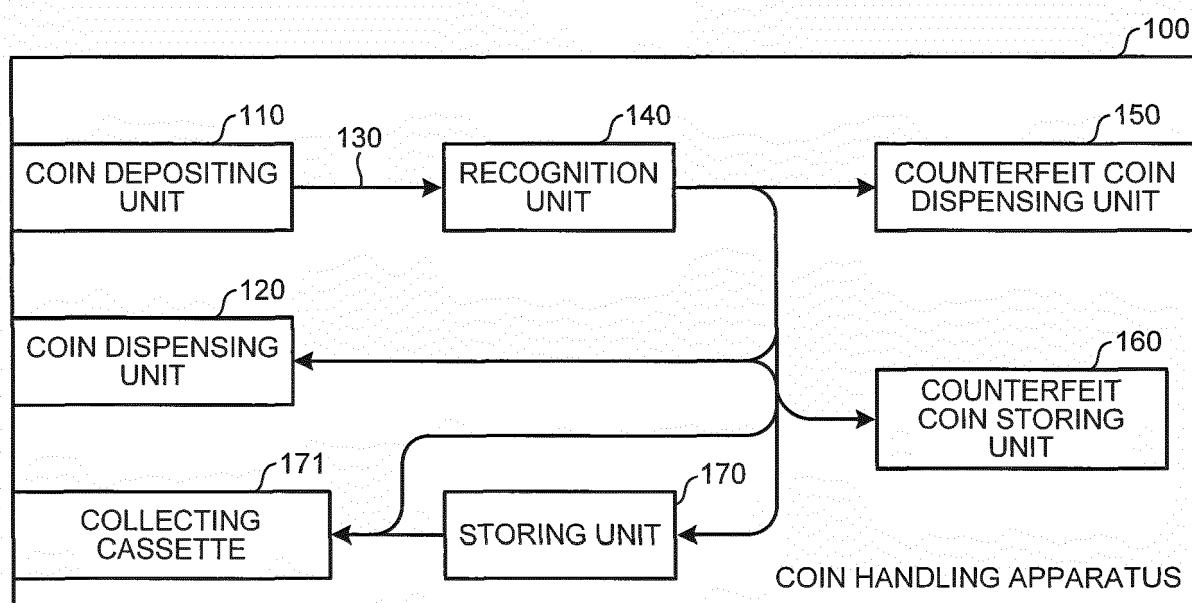


FIG.3



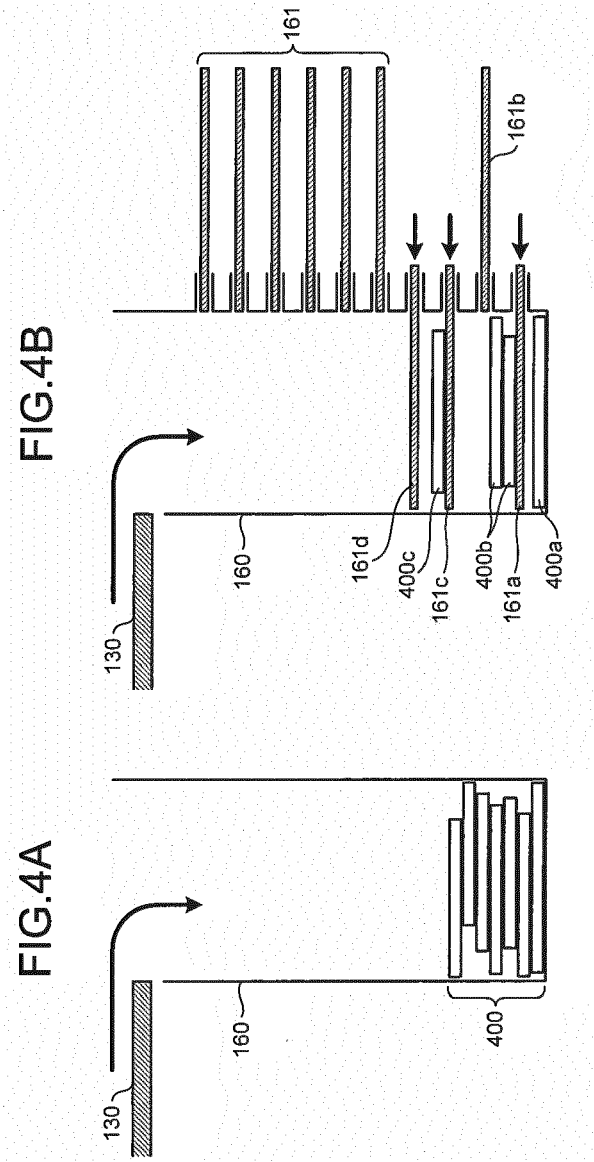


FIG.5A

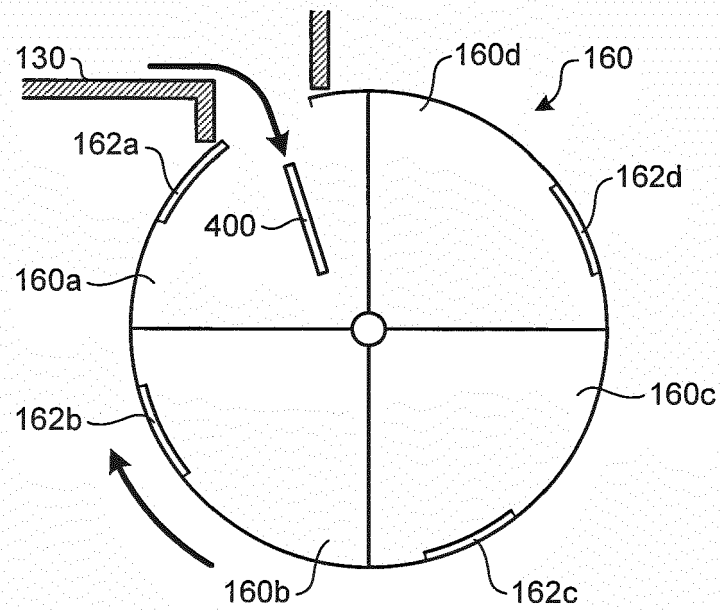


FIG.5B

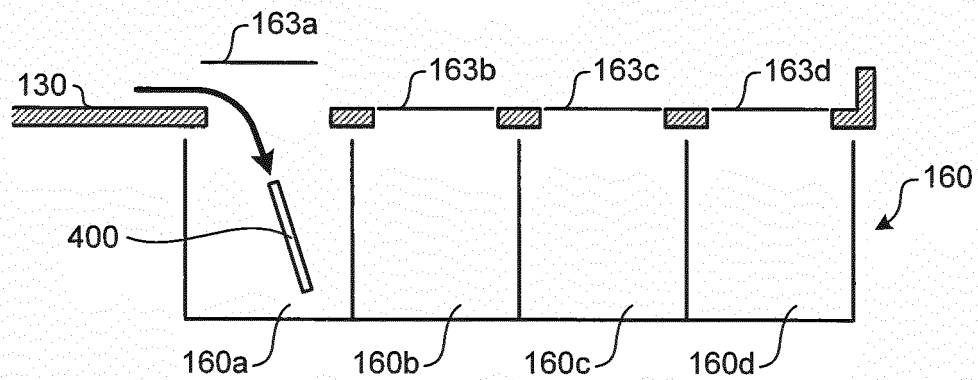


FIG.6

PHYSICAL HANDLING		AMOUNT HANDLING	
MANUAL SWITCHING	RETURN	NON-ADDITION (A1)	
	KEEP	MANUAL SWITCHING	NON-ADDITION (A2)
			ADDITION (A3)
		AUTOMATIC SWITCHING	NON-ADDITION (A4)
			ADDITION (A5)
	RETURN	NON-ADDITION (A6)	
AUTOMATIC SWITCHING	KEEP	MANUAL SWITCHING	NON-ADDITION (A7)
			ADDITION (A8)
		AUTOMATIC SWITCHING	NON-ADDITION (A9)
			ADDITION (A10)
	RETURN	NON-ADDITION (A6)	
	RETURN	NON-ADDITION (A6)	

FIG.7

DETERMINATION ITEM	DETERMINATION CONDITION
DENOMINATION	TARGET DENOMINATION, NON-TARGET DENOMINATION
TOTAL QUANTITY (AMOUNT, NUMBER)	THRESHOLD AMOUNT, THRESHOLD NUMBER
CURRENCY	TARGET CURRENCY, NON-TARGET CURRENCY
PROBABILITY	THRESHOLD OF PROBABILITY OF COUNTERFEIT COIN
CUSTOMER	WITH OR WITHOUT IDENTIFICATION, SPECIFIC CUSTOMER

FIG.8A

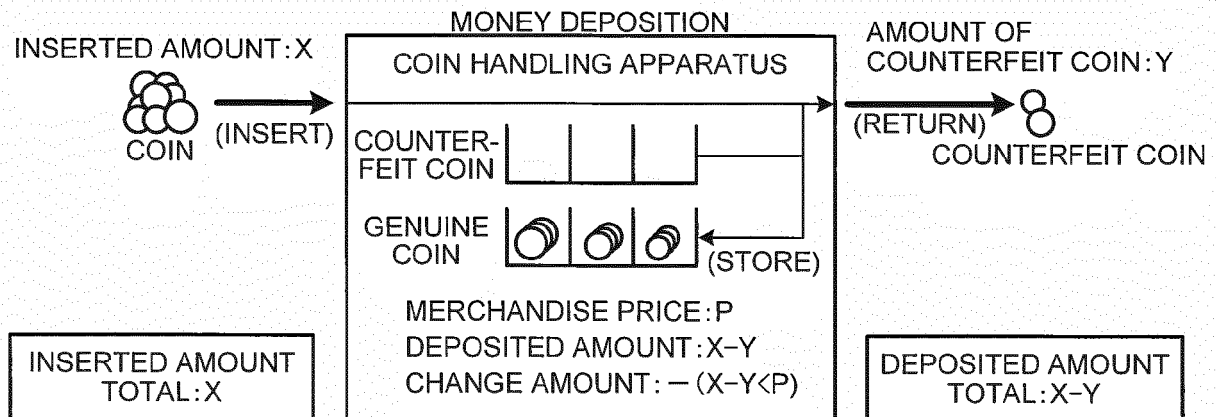


FIG.8B

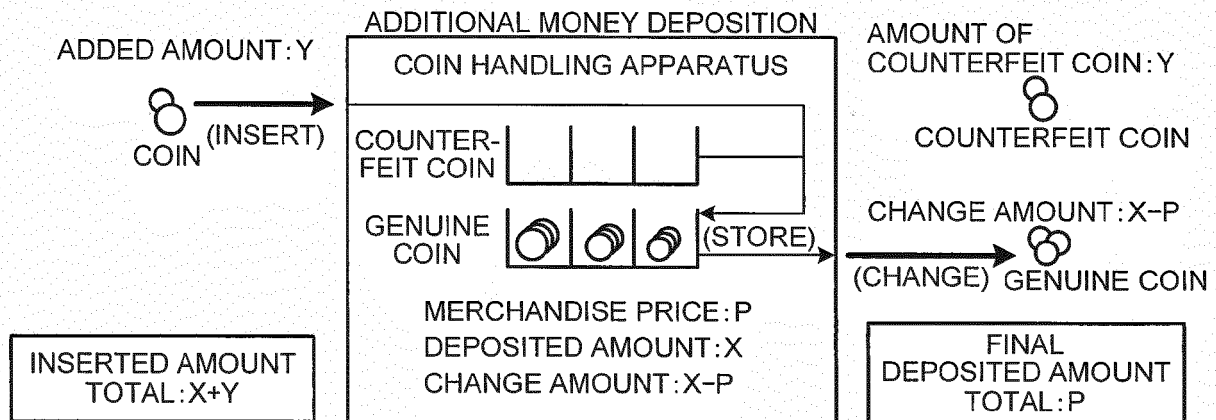


FIG.8C

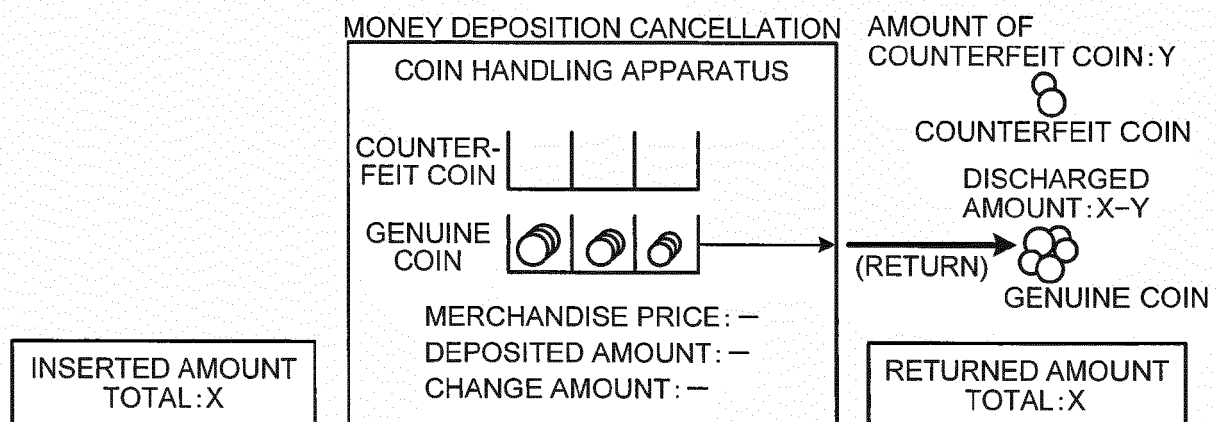


FIG.9A

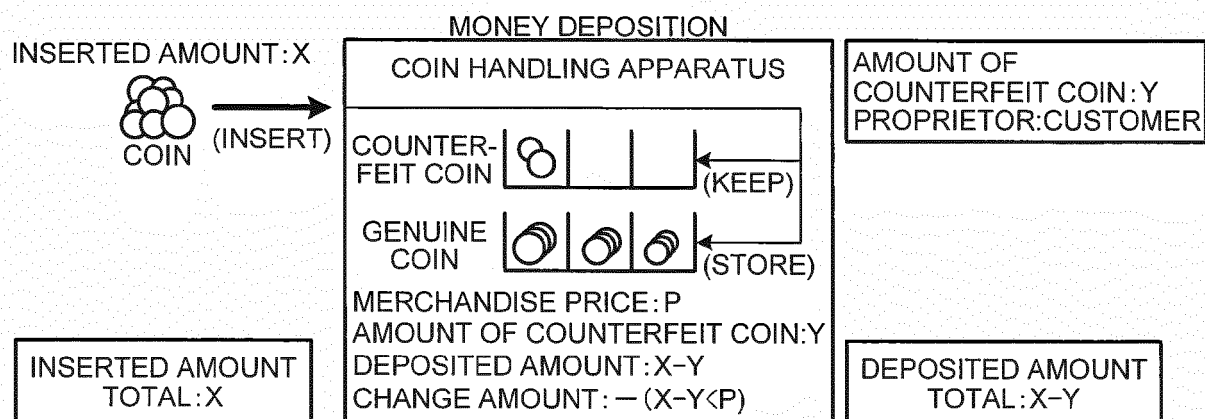


FIG.9B

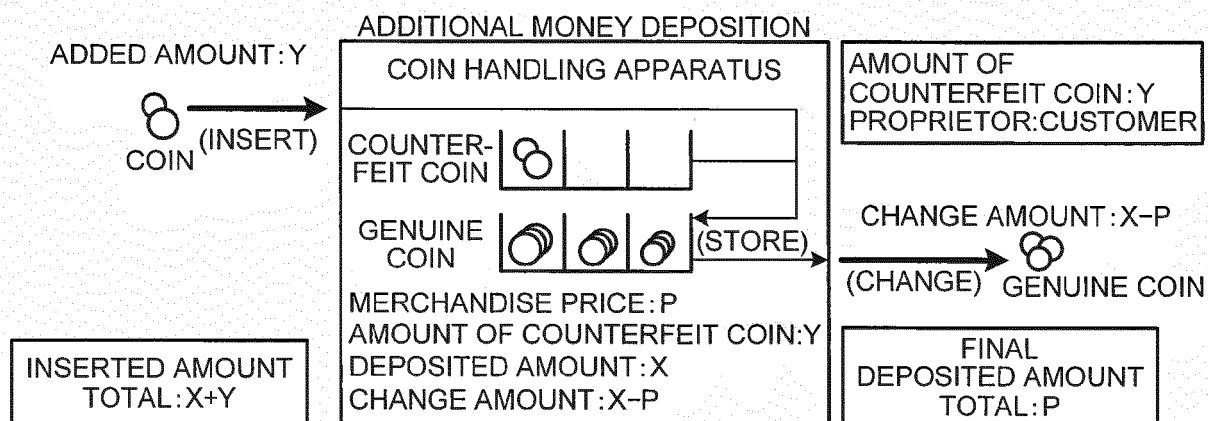


FIG.9C

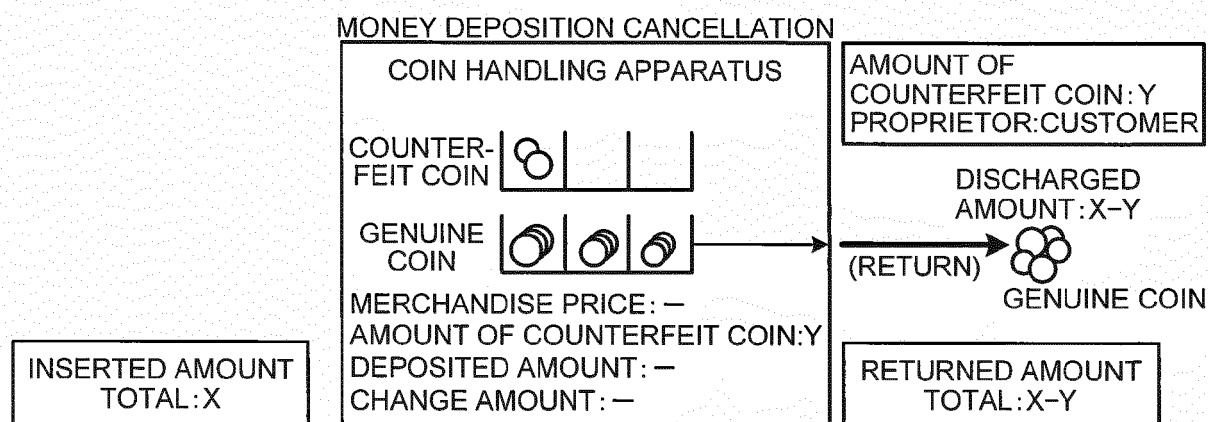


FIG.10A

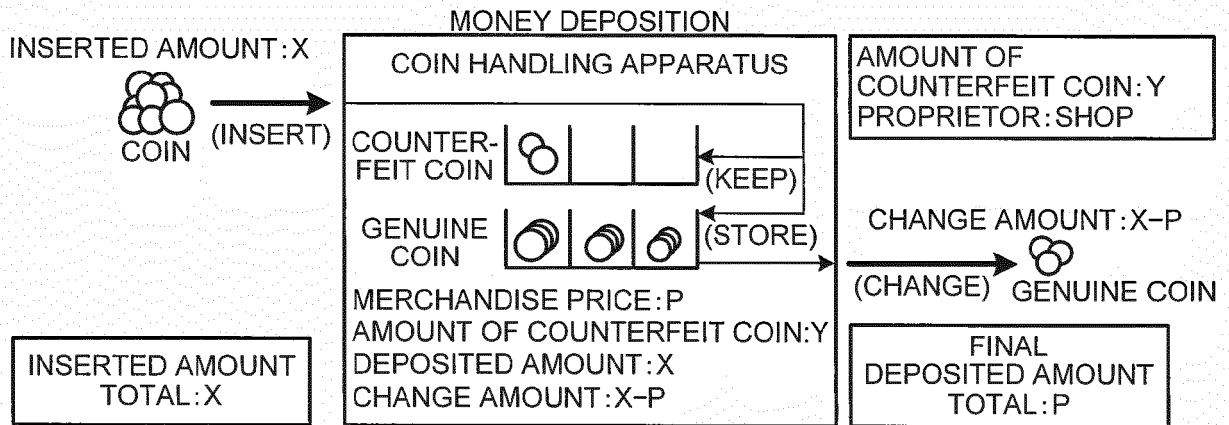


FIG.10B

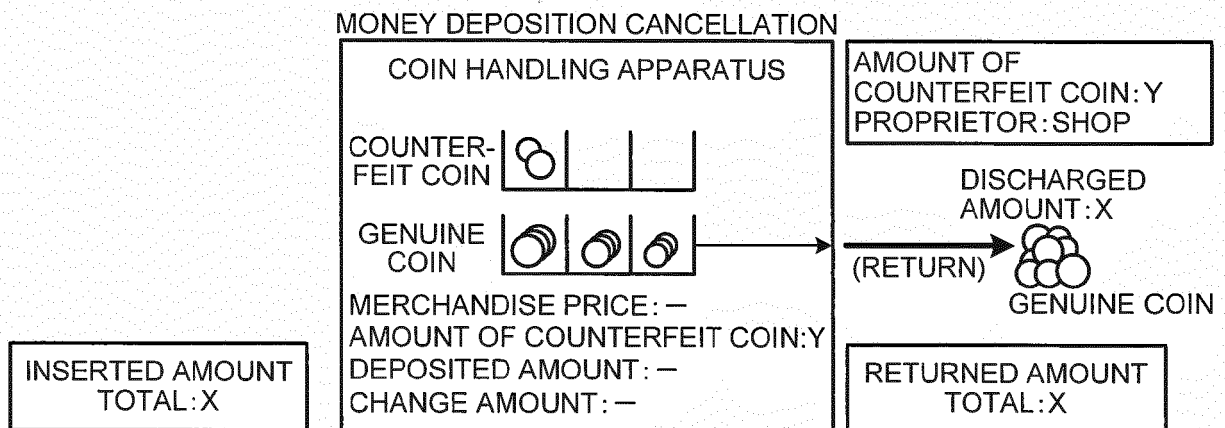


FIG.11

DO YOU AGREE TO RENOUNCE
PROPRIETARY RIGHTS
IN THE COUNTERFEIT COINS
IF DETECTED ?

SELECT ONE BUTTON

FIG.12

ABC 300

2017... 08:44 301

SHOP 001 302

CASH REGISTER NO. 001 303

PRODUCT	AMOUNT
PRODUCT P	¥ 00
⋮	⋮

304

TOTAL AMOUNT ¥ 00

RECEIVED ¥ 00

CHANGE ¥ 00

GENUINE COIN	AMOUNT
GENUINE COIN	¥ 00
COUNTERFERIT COIN	¥ 00
¥ 500 OPIECE(s)	¥ 0
⋮	⋮

305

TRANSACTION NUMBER 123... 306

CUSTOMER ID 987... 307

PLEASE KEEP THIS RECEIPT

EVALUATION OF COINS IS SCHEDULED ON MM MONTH / DD DAY 308

FIG.13

	DENOMINA-TION SETTING	QUANTITY	AMOUNT		TRANSACTION NUMBER	AMOUNT	BREAKDOWN
FIRST STORING UNIT	¥500	200	¥100,000	COUNTERFEIT COIN STORING UNIT	FIRST COUNTERFEIT COIN STORING UNIT	¥105	¥100 1 PIECE ¥5 1 PIECE
SECOND STORING UNIT	¥100	250	¥25,000		SECOND COUNTERFEIT COIN STORING UNIT	¥500	¥500 1 PIECE
	...				...		

FIG.14

TRANS- ACTION NUMBER	TRANS- ACTION DATE	BRANCH SHOP IDENTIFICATION INFORMATION	CASH REGISTER IDENTIFICATION INFORMATION	INSERTED AMOUNT	DEPOSITED AMOUNT	COUNTERFEIT COIN INFORMATION							RETURN TO CUSTOMER
						AMOUNT	DENOMI- NATION	QUANT- ITY	PROPRIETOR INFORMATION	CUSTOMER IDENTIFICATION INFORMATION	EVALUATION DATE	EVALUATION RESULT	
123...1	2017...	001	001	¥1...	¥1...	¥500	¥500	1	CUSTOMER	987...	2017...	NOT YET	—
⋮													
123...4	2017...	001	001	¥2...	¥2...	¥105	¥100 ¥5	1 1	CUSTOMER	987...2	2017...	COUNTER- FEIT	UN- NECESSARY
⋮													
123...7	2017...	001	001	¥2...	¥1...	¥500	¥500	1	CUSTOMER	987...5	2017...	GENUINE	NOT YET
⋮													

FIG.15A

MERCHANDISE PRICE	¥〇〇
DEPOSITED AMOUNT	¥〇〇
CHANGE AMOUNT	¥〇〇

FIG.15B

MERCHANDISE PRICE	¥〇〇
INSERTED AMOUNT	¥〇〇
AMOUNT OF COUNTERFEIT COIN	¥〇〇
DEPOSITED AMOUNT	¥〇〇
CHANGE AMOUNT	¥〇〇



EUROPEAN SEARCH REPORT

Application Number
EP 18 15 5853

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X	US 9 430 893 B1 (BLAKE JOHN R [US] ET AL) 30 August 2016 (2016-08-30) * column 3, line 15 - column 4, line 50 * * column 7, line 46 - column 10, line 63 * * column 16, line 59 - column 17, line 22 * * figures 1-3 *	1-15	INV. G07D1/02 G07D1/04 G07D1/06 G07D11/00
X	US 2015/356366 A1 (JONES WILLIAM J [US] ET AL) 10 December 2015 (2015-12-10) * paragraph [0192] - paragraph [0201] * * paragraph [0206] - paragraph [0214] * * paragraph [0228] * * paragraph [0270] - paragraph [0279] * * figures 1,2,8 *	1-15	
A	US 2016/086413 A1 (BLYTHIN ROBERT JAMES [GB] ET AL) 24 March 2016 (2016-03-24) * paragraph [0049] - paragraph [0052] * * paragraph [0075] - paragraph [0076] *	1-15	
A	WO 2016/002383 A1 (OKI ELECTRIC IND CO LTD [JP]) 7 January 2016 (2016-01-07) * paragraph [0018] - paragraph [0068] *	1-15	TECHNICAL FIELDS SEARCHED (IPC) G07D
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Place of search The Hague		Date of completion of the search 8 June 2018	Examiner Seifi, Mozhdeh
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