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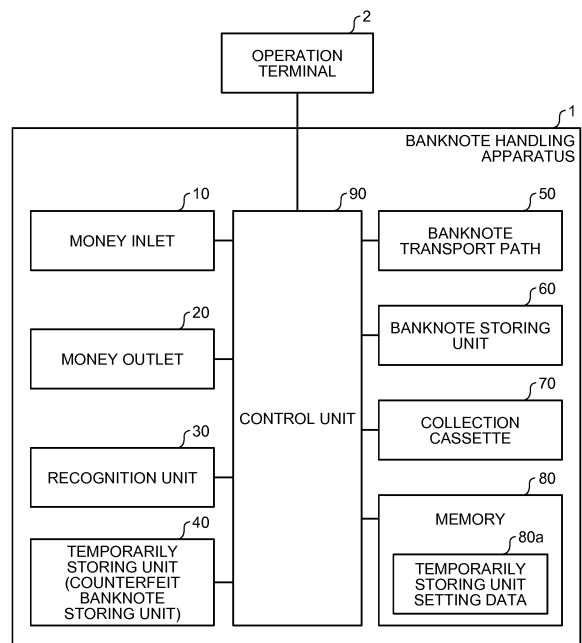
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(54) **PAPER CURRENCY PROCESSING APPARATUS**

(57) One object is to provide a banknote handling apparatus (1) in which a dedicated storing unit for the counterfeit banknote can be arranged only when a counterfeit banknote is found. The banknote handling apparatus (1) includes a money inlet (10) for receiving a banknote to be deposited, a transport path (50) that transports banknotes one by one fed inside the apparatus from the money inlet (10), a recognition unit (30) that recognizes the banknote transported on the transport path (50), a banknote storing unit (60) that stores deposited banknotes, a money outlet (20) that discharges the banknote to be dispensed, the banknote being fed from the banknote storing unit (60), a temporarily storing unit (40) that is used to temporarily store the banknote while handling the banknote; and a control unit (90) that switches use of the temporarily storing unit (40) between use as a usual temporarily storing unit (40) and use as a counterfeit banknote storing unit.

FIG.2



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Description

[Technical Field]

[0001] The present invention relates to a banknote handling apparatus having a temporarily storing unit for temporarily storing therein a banknote while the banknote is processed in a money deposit process or a money dispensing process. The present invention particularly relates to a banknote handling apparatus having a function to store a banknote that is recognized as a counterfeit banknote in a dedicated storing unit.

[Background Art]

[0002] A banknote handling apparatus capable of performing a money deposit process and a money dispensing process of a banknote is typically used in a financial institution such as a bank. For example, the money deposit process is performed by using the banknote handling apparatus when a customer requests a deposit in a certain account. In the money handling apparatus, the authenticity of the banknote received from the customer is recognized, a total amount of the deposited banknotes is calculated, and the deposited banknotes are stored in an internal banknote storing unit. The money dispensing process is performed by using the banknote handling apparatus when, for example, a customer requests dispensing from a certain account, and banknotes of an amount equivalent to the amount specified by the customer are dispensed from the banknote storing unit. In the banknote handling apparatus such as a TCR (Teller Cash Recycler) that is used by a teller at the counter of a financial institution and an ATM (Automated Teller Machine), when a banknote is recognized as reusable in the market in the money deposit process, the banknote is stored in the banknote storing unit. Then, the stored banknote is reused as a dispensing banknote in the money dispensing process.

[0003] If a fake banknote (counterfeit banknote) is included in the banknotes received from a customer in a financial institution, such a banknote may be kept within the financial institution without returning it to the customer. To handle such a situation, for example, the banknote handling apparatus disclosed in Patent Document 1 includes within the apparatus a dedicated stacking unit for storing therein the counterfeit banknote, and the banknote recognized as a counterfeit banknote is stored in this dedicated stacking unit during the money deposit process.

[Citation List]

[Patent Document]

[0004] [Patent Document 1] Japanese Patent Application Laid-Open No. 2005-92422

[Summary of Invention]

[Technical Problem]

5 **[0005]** However, though it is rare that a counterfeit banknote is found during the day-to-day work in the financial institution, it was necessary to arrange in the banknote handling apparatus the dedicated storing unit for the counterfeit banknotes in the conventional technology. It is unfavorable from the viewpoint of downsizing of the apparatus.

10 **[0006]** The present invention is made to address the problems in the conventional technology. One object of the present invention is to provide a banknote handling apparatus in which a dedicated storing unit for the counterfeit banknote can be arranged only when a counterfeit banknote is found.

[Means for Solving Problems]

20 **[0007]** To solve the above problem, and to achieve the above object, a banknote handling apparatus according to one aspect of the present invention includes a money inlet for receiving a banknote to be deposited; a transport path that transports banknotes one by one fed inside the apparatus from the money inlet; a recognition unit that recognizes the banknote transported on the transport path; a banknote storing unit that stores deposited banknotes; a money outlet that discharges the banknote to be dispensed, the banknote being fed from the banknote storing unit; a temporarily storing unit that is used to temporarily store a banknote while handling the banknote; and a control unit that switches use of the temporarily storing unit between use as a usual temporarily storing unit and use as a counterfeit banknote storing unit.

25 **[0008]** In the above banknote handling apparatus, when the banknote is recognized as a counterfeit banknote by the recognition unit, the control unit switches the use of the temporarily storing unit to the use as the counterfeit banknote storing unit and stores the banknote recognized as the counterfeit banknote in the temporarily storing unit.

30 **[0009]** In the above banknote handling apparatus, when the banknote is recognized as the counterfeit banknote by the recognition unit during a money deposit process, the control unit stores the counterfeit banknote in the temporarily storing unit, switches the use of the temporarily storing unit to the use as the counterfeit banknote storing unit, and keeps the counterfeit banknote in the temporarily storing unit after completing of the money deposit process.

35 **[0010]** In the above banknote handling apparatus, when all the counterfeit banknotes are discharged from the temporarily storing unit that is being used as the counterfeit banknote storing unit, the control unit switches the use of the temporarily storing unit to the use as the temporarily storing unit.

40 **[0011]** In the above banknote handling apparatus,

while the temporarily storing unit is being used as the counterfeit banknote storing unit, the control unit performs banknote processing, which is usually performed by using the temporarily storing unit, without using the temporarily storing unit.

[0012] In the above banknote handling apparatus, upon switching the use of the temporarily storing unit to the use as the counterfeit banknote storing unit, the control unit outputs information to notify this fact.

[0013] In the above banknote handling apparatus, the control unit does not start a next process unless all the counterfeit banknotes, which have been discharged in the money outlet from the temporarily storing unit that is being used as the counterfeit banknote storing unit, are removed from the money outlet.

[0014] In the above banknote handling apparatus, when the banknote is recognized as the counterfeit banknote by the recognition unit in the money deposit process, the control unit excludes a value of the counterfeit banknote from a deposited amount in the money deposit process.

[0015] In the above banknote handling apparatus, when the banknote is recognized as the counterfeit banknote by the recognition unit in the money deposit process, the control unit includes a value of the banknote in a deposited amount in the money deposit process.

[0016] In the above banknote handling apparatus, the control unit performs a discharge process of the counterfeit banknote from the temporarily storing unit that is being used as the counterfeit banknote storing unit only when the discharged process is approved through an authentication process.

[Advantageous Effects of Invention]

[0017] According to the present invention, the control unit automatically controls the use of the temporarily storing unit that is used to temporarily store a banknote during performing the banknote handling process such as the money deposit process, the money dispensing process, and the like between use as the temporarily storing unit and use as the dedicated counterfeit banknote storing unit for storing the counterfeit banknote. The banknote handling apparatus that had not initially had the counterfeit banknote storing unit can be used as a banknote handling apparatus having the counterfeit banknote storing unit as desired. By using the temporarily storing unit as the counterfeit banknote storing unit, the banknote handling apparatus can be downsized in comparison to a banknote handling apparatus in which a counterfeit banknote storing unit that is independent from the temporarily storing unit is arranged.

[0018] According to the present invention, for example, when a banknote recognized as a counterfeit banknote is found in the money deposit process, the control unit automatically switches the use of the temporarily storing unit to the use as the counterfeit banknote storing unit, and stores the counterfeit banknote in the temporarily

storing unit. Because this operation is performed without an operator of a banknote handling apparatus making any special operation, the banknote handling apparatus having the temporarily storing unit can be easily used as a banknote handling apparatus having the counterfeit banknote storing unit.

[0019] According to the present invention, when all the counterfeit banknotes are discharged from the temporarily storing unit that is being used as the counterfeit banknote storing unit, the control unit automatically switches the use of the temporarily storing unit from the use as the counterfeit banknote storing unit to the use as the temporarily storing unit. Therefore, in the banknote handling apparatus, it becomes possible again to perform the money deposit process and the money dispensing process by using the temporarily storing unit.

[0020] According to the present invention, while the temporarily storing unit is being used as the counterfeit banknote storing unit, if an instruction is received to perform the banknote handling process by using the temporarily storing unit, if it is possible to perform the instructed processing contents without using the temporarily storing unit, the control unit automatically performs the instructed processing without using the temporarily storing unit. Therefore, even while the temporarily storing unit is being used as the counterfeit banknote storing unit, most of the instructed banknote handling processes can be performed without hindrance without stopping the use of the banknote handling apparatus.

[0021] According to the present invention, when the use of the temporarily storing unit is switched to the use as the counterfeit banknote storing unit, this fact is notified by displaying information and the like on a displaying unit. Therefore, the operator of the banknote handling apparatus can recognize the switching of the usage state of the temporarily storing unit based on the reported information.

[0022] According to the present invention, when a process to discharge the counterfeit banknotes in the money outlet from the temporarily storing unit that is being used as the counterfeit banknote storing unit is performed, next process is not performed unless all the counterfeit banknotes are removed from the money outlet. Therefore, the counterfeit banknotes can be distinguished from other banknotes and handled with care.

[0023] According to the present invention, when a counterfeit banknote is found in the money deposit process, a value of the counterfeit banknote can be excluded from or included in a deposited amount. Therefore, an appropriate money deposit process can be performed according to the requirement of the financial institution that uses the banknote handling apparatus.

[0024] Further, according to the present invention, the counterfeit banknote cannot be discharged to the outside of the apparatus from the temporarily storing unit that is being used as the counterfeit banknote storing unit unless it is approved through an authentication process. Therefore, the counterfeit banknotes can be handled with

care.

[Brief Description of Drawings]

[0025]

FIG. 1 is a schematic diagram indicating an outline of a banknote handling apparatus according to the present embodiment.

FIG. 2 is a block diagram indicating an outline of a functional configuration of the banknote handling apparatus.

FIGS. 3A and 3B are schematic diagrams indicating an operation for a direct deposit process in which a banknote is deposited without using a temporarily storing unit.

FIG. 4 is a schematic diagram indicating a transport route of a banknote in a money deposit process.

FIG. 5 is a schematic diagram indicating a transport route of a banknote when discharging a counterfeit banknote stored in the temporarily storing unit to a money outlet.

FIGS. 6A to 6D are schematic diagrams indicating an operation for a non-direct deposit process in which a banknote is deposited by using the temporarily storing unit.

FIGS. 7A and 7B are schematic diagrams indicating an operation of a money dispensing process for dispensing a banknote from a banknote storing unit in which banknotes of a plurality of denominations are stored in a mixed state.

FIGS. 8A and 8B are schematic diagrams indicating a transport route of a banknote in the money dispensing process.

FIGS. 9A and 9B are schematic diagrams indicating an operation of a money dispensing process for dispensing a banknote from the banknote storing unit in which banknotes are stored according to a denomination thereof.

FIG. 10 is a flowchart of process procedures of the money deposit process and the money dispensing process.

FIGS. 11A and 11B are schematic diagrams indicating other embodiments of a storing process and a discharge process of a counterfeit banknote performed by the banknote handling apparatus.

[Description of Embodiments]

[0026] A banknote handling apparatus according to the present invention is explained below while referring to the accompanying drawings. At first, an outline of the banknote handling apparatus according to the present embodiment is explained. The banknote handling apparatus includes a temporarily storing unit which is used to temporarily store a banknote while predetermined banknote handling is being performed. If a banknote recognized as a counterfeit banknote is found while the ban-

knote handling is being performed, the temporarily storing unit is used as a counterfeit banknote storing unit which is a dedicated storing unit for a counterfeit banknote. That is, one feature of the present embodiment is that, the temporarily storing unit, which allows storing and feeding of a banknote, is used as the counterfeit banknote storing unit only when it becomes necessary to store a counterfeit banknote.

[0027] Specifically, usually the temporarily storing unit is used for one or both of the money deposit process and the money dispensing process; however, if a counterfeit banknote is found, the counterfeit banknote is stored in the temporarily storing unit, and the use of the temporarily storing unit is changed to the use as the counterfeit banknote storing unit. Moreover, even after the completion of the process in which the counterfeit banknote was found, the counterfeit banknote is stored in the temporarily storing unit until a process to discharge the counterfeit banknote is requested. The temporarily storing unit cannot be used for another purpose while it is being used as the counterfeit banknote storing unit. Therefore, even banknote handling that is usually performed by using the temporarily storing unit is performed without using the temporarily storing unit. When a process for discharging counterfeit banknotes is performed and all the counterfeit banknotes are discharged from the temporarily storing unit used as the counterfeit banknote storing unit, the use of the temporarily storing unit as the counterfeit banknote storing unit is now changed to the use as the temporarily storing unit, and the temporarily storing unit can be again used in the money deposit process and the money dispensing process. Each of the process to change the use of the temporarily storing unit to the use as the counterfeit banknote storing unit when a counterfeit banknote is found and the process to again change to the use as the temporarily storing unit after the counterfeit banknote is discharged are performed automatically. Moreover, an operator can confirm the fact that the process to make this change has been performed and the current use state of the temporarily storing unit, based on information displayed on a displaying unit and the like. In this manner, it is not necessary to provide a stacking unit as an independent component, which is dedicated for storing counterfeit banknotes and is not used until a counterfeit banknote is found, in the banknote handling apparatus. Therefore, the banknote handling apparatus can be downsized.

[0028] FIG. 1 is a schematic diagram indicating an outline of a banknote handling apparatus 1 according to the present embodiment. The banknote handling apparatus 1 includes a money inlet 10 for receiving a banknote to be deposited in the apparatus; a money outlet 20 for discharging a banknote to be dispensed from inside of the apparatus; a recognition unit 30 for recognizing a denomination, authenticity, fitness, and the like of the banknote; a temporarily storing unit 40 that is used to temporarily store a banknote when performing banknote handling including the money deposit process, the money dis-

pensing process, and the like; a plurality of banknote storing units 60a to 60h for sorting and storing banknotes based on a recognition result obtained in the recognition unit 30; a removable collection cassette 70 to be used for supplying banknotes to the banknote storing units 60a to 60h, collecting banknotes from the banknote storing units 60a to 60h, storing banknotes of denominations that are not allocated to the banknote storing units 60a to 60h, and the like; and a banknote transport path 50 for transporting a banknote between these components. When it becomes necessary to store a counterfeit banknote, the temporarily storing unit 40 functions as the counterfeit banknote storing unit. This will be explained in detail later. When it is not necessary to distinguish each of the banknote storing units 60a to 60h, an arbitrary one of them will be identified as a banknote storing unit 60 in the following explanation.

[0029] The temporarily storing unit 40, the banknote storing unit 60, and the collection cassette 70 are capable of storing a banknote that is transported on the banknote transport path 50 and feeding a stored banknote to the banknote transport path 50. The temporarily storing unit 40 and the banknote storing unit 60 are tape-type banknote storing units in which banknotes are sandwiched one by one between two tapes and the banknotes are stored by winding these two tapes around an outer peripheral surface of a rotatable drum, and a banknote stored between the two tapes is fed by rotating the rotatable drum in an opposite direction of the rotation direction when storing the banknote. By using the tape-type banknote storing unit, it is possible to surely store or feed the banknotes one by one. The collection cassette 70 is a stacking-type banknote storing unit in which banknotes are stored in a stacked manner. However, the manner in which the banknotes are stored in the temporarily storing unit 40, the banknote storing unit 60, and the collection cassette 70 is not particularly limited. As long as the banknotes can be stored in and fed out, a desired method such as the tape-type storing method, the stacking-type storing method can be used. Moreover, even the structure of the tape-type banknote storing unit is not limited to the structure in which the banknotes are stored between the two tapes. For example, a structure in which the banknotes are sandwiched between a guide member and one tape can be used.

[0030] Each of the banknote storing units 60a to 60h can be used to store banknotes of a specific denomination, or can be used to store banknotes of a plurality of denominations in a mixed state. In the banknote handling apparatus 1, it is possible to set the type of banknotes, such as a denomination and fitness of the banknote, to be stored in each of the banknote storing units 60a to 60h.

[0031] For example, setting can be made so that one banknote storing unit 60 can store in a mixed state banknotes of a plurality of denominations of which banknotes are generally processed in a small number. Alternatively, setting can be made so that a plurality of banknote storing units 60 can store banknotes of one denomination of

which banknotes are generally processed in a large number. When the setting is made such that banknotes of one denomination are stored in a plurality of banknote storing units 60, if the storing and the feeding of the banknotes are performed frequently in only one of the banknote storing units 60, the abrasion of the components advances only in this banknote storing unit 60. To avoid this situation, in the banknote handling apparatus 1, the destination for the storing and the source for the feeding of the banknotes can be controlled among the plurality of banknote storing units 60.

[0032] Specifically, for example, in the money deposit process, when there are a plurality of banknote storing units 60 as a destination for storing the banknotes to be deposited, a control is provided so that all banknotes to be deposited are stored in the banknote storing unit 60 that has stored therein the minimum number of the banknotes. Similarly, in the money dispensing process, when there are a plurality of banknote storing units 60 that can feed the banknotes to be dispensed, a control is provided so that all banknotes to be dispensed are fed from the banknote storing unit 60 that has stored therein the maximum number of the banknotes.

[0033] Various methods can be used to provide a control to make the frequency of use of the plurality of banknote storing units 60 equal. For example, one method is to select the banknote storing units 60 for each of the money deposit process and the money dispensing process. Another method is to select the banknote storing units 60 to be used depending on the number of the banknotes stored in each of them. For example, when storing the banknotes of the same denomination in a plurality of banknote storing units 60, a control can be provided to change a storing destination of the banknotes to be deposited and a feeding source of the banknotes to be dispensed per one banknote so that the number of banknotes stored in all the banknote storing units 60 is almost the same. Alternatively, it is allowable to change a storing destination of the banknotes to be deposited and a feeding source of the banknotes to be dispensed per a predetermined number of the banknotes. Specifically, for example, in the money deposit process, a control can be provided so that, if 100 banknotes to be deposited are stored in a certain banknote storing unit 60, then next 100 banknotes to be deposited are stored in a different banknote storing unit 60. In the money dispensing process, a control can be provided so that, if 100 banknotes to be dispensed are fed from a certain banknote storing unit 60, then next 100 banknotes to be dispensed are fed from a different banknote storing unit 60.

[0034] The banknote handling apparatus 1 is divided into an upper part in which the money inlet 10, the money outlet 20, the recognition unit 30, and the temporarily storing unit 40 are arranged, and a lower part in which the banknote storing unit 60 and the collection cassette 70 are arranged. The lower part has a door with a lock and functions as a safe. The banknote storing unit 60 and the collection cassette 70 are housed inside this safe.

The banknote storing unit 60 and the collection cassette 70 are arranged on a frame that can be pulled outside from inside the safe. The collection cassette 70 can be attached to and detached from the frame after opening the door of the safe and pulling the frame out. Moreover, inspection and repair of the banknote storing unit 60 can be performed in the state in which the frame has been pulled out.

[0035] A through-hole is provided in a partition wall that separates the upper part and the lower part of the banknote handling apparatus 1, namely an upper surface of the lower safe. The banknote transport path 50 passes through this through-hole allowing transportation of a banknote between the upper part and lower part. A memory 80 (see FIG. 2) that is a storage device such as a semiconductor memory or a hard disk is fixed in the lower safe with special screws that cannot be unscrewed without a dedicated screw driver. Information such as denominations and numbers of banknotes stored in the banknote storing unit 60 and the collection cassette 70 is stored in the memory 80. In the banknote handling apparatus 1, by fixing the memory 80, in which the information about the banknotes has been stored, in the safe, the security is secured as carrying away of the memory 80, manipulation of data in the memory 80, and the like cannot be performed.

[0036] FIG. 2 is a block diagram indicating an outline of a functional configuration of the banknote handling apparatus 1. In addition to the components such as the temporarily storing unit 40, which can also be used as the counterfeit banknote storing unit, and the like shown in FIG. 1, the banknote handling apparatus 1 includes a control unit 90 that controls operation of each of the components and the memory 80 that stores therein information that is necessary to control each of the components. The banknote handling apparatus 1 is connected to an operation terminal 2 that is a computer having an operation unit and a display unit. Various processes in the banknote handling apparatus 1 such as the money deposit process and the money dispensing process, can be performed by operating the operation terminal 2. However, the method of operation of the banknote handling apparatus 1 is not limited to the operation via the remote type operation terminal 2 that is connected to the banknote handling apparatus 1. For example, it is allowable to integrate together the banknote handling apparatus 1 and the operation terminal 2.

[0037] The control unit 90 includes a function to receive a setting operation and a designation operation, which are performed by using the operation terminal 2, and to control the operations of each the components labeled with reference numerals 10 to 80 based on the received operation. Various functions and operations mentioned below of the banknote handling apparatus 1 are realized under the control of the control unit 90.

[0038] The memory 80 is a storage device constituted by a semiconductor memory, a hard disk, and the like. The memory 80 stores therein temporarily storing unit

setting data 80a in which the usage method of the temporarily storing unit 40 is set. The temporarily storing unit setting data 80a contains setting information about the usage method of the temporarily storing unit 40. The control unit 90 determines the usage method of the temporarily storing unit 40 by referring to the temporarily storing unit setting data 80a. The memory 80 also stores therein various pieces of data in the same manner as a conventional banknote handling apparatus. For example, the memory 80 stores therein template data to be used in recognition processing of the banknote performed by the recognition unit 30, setting information such as a denomination to be stored in the banknote storing unit 60, information about a denomination and the number of banknotes stored in the banknote storing unit 60, data necessary to operate the control unit 90, and the like. The memory 80 is fixed in the lower safe of the banknote handling apparatus 1. The security of the data stored in the memory 80 is secured.

[0039] The money deposit process in which a banknote received in the money inlet 10 is transported by the banknote transport path 50 and stored in one of the banknote storing units 60 depending on a recognition result obtained by the recognition unit 30, and a money dispensing process in which a banknote specified by the operation terminal 2 is fed from the banknote storing unit 60, transported by the banknote transport path 50, recognized by the recognition unit 30 and discharged in the money outlet 20 are processes performed in the conventional technology. Accordingly, a detailed explanation of the operations performed in the various components relating to the money deposit process and the money dispensing process is omitted, and the operation that is necessary for the understanding of the present embodiment is mainly explained below.

[0040] FIGS. 3A and 3B are schematic diagrams for explaining an operation for a direct deposit in which a banknote is deposited without using the temporarily storing unit 40 in the banknote handling apparatus 1. FIG. 3A depicts an operation when only a genuine banknote (a true banknote that is not a counterfeit banknote) is handled, and FIG. 3B depicts an operation when a counterfeit banknote is found during the money deposit process.

[0041] In FIGS. 3A and 3B, the functional components related to the direct deposit process are shown, and the movement of the banknote between these functional components is shown with a solid arrow and a dotted arrow. Similarly, FIGS. 6A to 6D, FIGS. 7A and 7B, FIGS. 9A and 9B, and FIGS. 11A and 11B show functional components, and the movement of the banknote with arrows.

[0042] As shown in FIG. 3A, in the direct deposit process, the banknotes received in the money inlet 10 are transported one by one to the recognition unit 30, and a banknote that is recognized as being a genuine banknote by the recognition unit 30 is directly stored, without being stored in the temporarily storing unit 40, in the banknote storing unit 60 corresponding to the recognition result

(Step A11 in FIG. 3A).

[0043] As shown in FIG. 3B, in the direct deposit process, a banknote that is recognized as being a genuine banknote by the recognition unit 30 is stored in the banknote storing unit 60 as indicated with a solid arrow (Step A21), and when a banknote that is recognized as being a counterfeit banknote is found, it is stored in the temporarily storing unit 40 as indicated with a dotted arrow (Step A22).

[0044] FIG. 4 is a schematic diagram indicating a transport route of a banknote in the money deposit process. A transport route corresponding to Steps A11 and A21 shown in FIGS. 3A and 3B is shown with a solid arrow in FIG. 4. That is, the transport route of a genuine banknote is shown with a solid arrow in FIG. 4. The genuine banknote is transported from the money inlet 10, and after passing through the recognition unit 30, the genuine banknote is stored in the banknote storing unit 60 which is arranged in the lower part of the banknote handling apparatus 1. A transport route corresponding to Step A22 shown with a dotted arrow in FIG. 3B is shown with a dotted arrow in FIG. 4. That is, when a counterfeit banknote is found, a transport route of the counterfeit banknote is shown with a dotted arrow in FIG. 4. The counterfeit banknote is transported and stored in the temporarily storing unit 40 arranged in the upper part, without transporting to the lower part of the banknote handling apparatus 1. FIG. 4 depicts an example in which the banknote is transported to the banknote storing unit 60d; however, in actual practice, the banknote is stored in one of the banknote storing units 60a to 60h depending on the recognition results such as a denomination. Moreover, though not shown in FIGS. 3A, 3B, and 4, a deposit reject banknote such as a banknote whose denomination could not be recognized by the recognition unit 30 is transported from the recognition unit 30 to the money outlet 20 and returned from the money outlet 20 as in the conventional manner.

[0045] FIG. 5 is a schematic diagram indicating the transport route of the banknote when discharging the counterfeit banknote stored in the temporarily storing unit 40 to the money outlet 20. The counterfeit banknote stored in the temporarily storing unit 40, which is currently being used as the counterfeit banknote storing unit, is fed out to remove out of the apparatus by operating the operation terminal 2 at a predetermined timing. When doing so, as shown in FIG. 5, the banknote fed from the temporarily storing unit 40 is transported to the money outlet 20 on the shortest route. Occurrence of jamming of the counterfeit banknote can be suppressed by using the shortest-distance transport route when discharging the counterfeit banknote. Moreover, a detection sensor that detects removal of the banknote from the money outlet 20 is arranged in the money outlet 20. In the banknote handling apparatus 1, after the counterfeit banknote is discharged to the money outlet 20, until all the counterfeit banknotes are removed from the money outlet 20, no subsequent banknote handling can be performed.

Accordingly, the counterfeit banknote and other banknotes to be dispensed will never be stacked in a mixed state in the money outlet 20. That is, the counterfeit banknote is distinguished from other banknotes and handled with care.

[0046] It is necessary to handle the counterfeit banknote with care because the counterfeit banknote may be relevant to a crime. Therefore, in the banknote handling apparatus 1, a user authentication process is performed when performing a process for discharging the counterfeit banknote to the outside of the apparatus. When an operator operates the operation terminal 2 to start the discharge process of the counterfeit banknote, the user authentication process is started on the operation terminal 2. In the user authentication process, the operator has to input an operator ID and a password to recognize the operator. Operator IDs and passwords of the operators who are allowed to discharge a counterfeit banknote from the banknote handling apparatus 1 are previously registered in the temporarily storing unit setting data 80a stored in the memory 80. The counterfeit banknote is fed from the temporarily storing unit 40 and discharged to the outside of the apparatus only when the operator ID and the password input by operating the operation terminal 2 match with the information registered in the memory 80.

[0047] After storing the counterfeit banknote in the temporarily storing unit 40, the control unit 90 of the banknote handling apparatus 1 changes the use of the temporarily storing unit 40 from the use as the temporarily storing unit to the use as the counterfeit banknote storing unit. The control unit 90 stores status information, which indicates that the temporarily storing unit 40 is being used as the counterfeit banknote storing unit, in the temporarily storing unit setting data 80a of the memory 80. After the temporarily storing unit 40 becomes empty as a result of performing the process to discharge the counterfeit banknote from the temporarily storing unit 40, the control unit 90 changes the use of the temporarily storing unit 40 from the use as the counterfeit banknote storing unit to the use as the temporarily storing unit, and updates the status information to information indicating that the temporarily storing unit 40 is now being used as the temporarily storing unit. That is, to use the temporarily storing unit 40 as the counterfeit banknote storing unit only while the counterfeit banknote is stored in the temporarily storing unit 40, the control unit 90 uses the status information that indicates whether the temporarily storing unit 40 is being used as the temporarily storing unit or the counterfeit banknote storing unit.

[0048] When performing the money deposit process and the money dispensing process that use the temporarily storing unit 40, at first, the control unit 90 refers to the status information included in the temporarily storing unit setting data 80a. If the temporarily storing unit 40 can be used as the temporarily storing unit as usual, the money deposit process and the money dispensing process are performed as usual. However, if the temporarily

storing unit 40 is currently being used as the counterfeit banknote storing unit, even if the money deposit process and the money dispensing process require use of the temporarily storing unit 40, these processes are performed without using the temporarily storing unit 40. This will be explained in detail later.

[0049] The operator of the banknote handling apparatus 1 can understand how the temporarily storing unit 40 is currently being used based on the information displayed on the display unit of the operation terminal 2. Specifically, when the use of the temporarily storing unit 40 is switched from the use as the temporarily storing unit to the use as the counterfeit banknote storing unit, information indicating that the use of the temporarily storing unit 40 has been started as the counterfeit banknote storing unit is displayed on the display unit of the operation terminal 2. Also, when the use of the temporarily storing unit 40 is switched from the use as the counterfeit banknote storing unit to the use as the temporarily storing unit, information indicating this fact is displayed on the display unit of the operation terminal 2. The notifying method of the information to the operator is not particularly limited. For example, the information can be notified by using a sound or a light. Alternatively, the information can be notified by displaying on the display unit of the banknote handling apparatus 1. Also, the information can be notified by turning on a light emitting element such as an LED, and the like of the banknote handling apparatus 1.

[0050] An operation for a non-direct deposit process for depositing a banknote by using the temporarily storing unit 40 is explained below. FIGS. 6A to 6D are schematic diagrams for explaining the operation for the non-direct deposit process for depositing a banknote by using the temporarily storing unit. FIG. 6A depicts an operation when only a genuine banknote is handled, and FIG. 6B depicts an operation when a counterfeit banknote is found during the money deposit process. FIG. 6C depicts an operation for the non-direct deposit process that is performed successively after the counterfeit banknote is found as shown in FIG. 6B, and FIG. 6D depicts an operation for discharging the counterfeit banknote outside of the apparatus.

[0051] In the non-direct deposit process, as shown in FIG. 6A, after transporting the banknotes received from the money inlet 10 to the recognition unit 30 one by one. After the banknote is recognized, the banknote is stored in the temporarily storing unit 40 (Step B11). In the state in which all the banknotes ("genuine banknotes P11 to P13" in FIG. 6A) received in the money inlet 10 are stored in the temporarily storing unit 40, the result of recognition and counting is displayed on the display unit of the operation terminal 2. Subsequently, when an operation to approve the result of recognition and counting is performed by using the operation terminal 2, all the banknotes (genuine banknotes P11 to P13) stored in the temporarily storing unit 40 are fed out and stored in the corresponding one of the banknote storing units 60 (Step

B12). As a result, as shown in FIG. 6B, all the banknotes (genuine banknotes P11 to P13) are stored in the banknote storing unit 60.

[0052] The next non-direct deposit is started successively. Even if a banknote (counterfeit banknote P22) is recognized as a counterfeit banknote by the recognition unit 30 while this process is being performed, as shown in FIG. 6B, all the banknotes (genuine banknotes P21 and P23 and counterfeit banknote P22) received in the money inlet 10 are stored in the temporarily storing unit 40 (Step B21). The result of recognition and counting of this process is displayed on the operation terminal 2, and an operation to approve the same is performed.

[0053] When the result of recognition and counting is approved, all the banknotes stored in the temporarily storing unit 40 are fed out and stored in the corresponding one of the banknote storing units 60 usually. However, if the counterfeit banknote (P22) is included in the banknotes stored in the temporarily storing unit 40, the banknotes (genuine banknotes P21 and P23 and counterfeit banknote P22) present in the temporarily storing unit 40 are not fed but kept in the temporarily storing unit 40 even after completion of the process for the non-direct deposit. That is, a state shown in FIG. 6B is maintained after the result of recognition and counting is approved and the money deposit process is completed.

[0054] When the approval operation is performed in the state in which a counterfeit banknote and a genuine banknote are being stored in the temporarily storing unit 40, the control unit 90 switches the use of the temporarily storing unit 40 from the use as the temporarily storing unit to the use as the counterfeit banknote storing unit, and stores the status information indicating this fact in the temporarily storing unit setting data 80a in the memory 80.

[0055] As shown in FIG. 6B, when an operation to start the next non-direct deposit process is performed in the state in which the temporarily storing unit 40 is being used as the counterfeit banknote storing unit and stores the genuine banknote and the counterfeit banknote therein, the control unit 90 refers to the status information included in the temporarily storing unit setting data 80a in the memory 80, and recognizes that the temporarily storing unit 40 is not available for use as the temporarily storing unit because the temporarily storing unit 40 is being used as the counterfeit banknote storing unit. The control unit 90 starts the money deposit process without using the temporarily storing unit 40; nevertheless the control unit 90 recognizes that the start of the non-direct deposit is instructed. The information indicating that the temporarily storing unit 40 is currently being used as the counterfeit banknote storing unit, and the information indicating that the direct deposit process is performed without using the temporarily storing unit 40 for the designated money deposit process are displayed on the display unit of the operation terminal 2.

[0056] Specifically, as shown in FIG. 6C, the control unit 90 performs control to transport the banknotes re-

ceived in the money inlet 10 one by one to the recognition unit 30. The banknote is recognized by the recognition unit 30, a genuine banknote P31 is stored in the corresponding one of the banknote storing units 60 (Step B31), and a counterfeit banknote P32 is stored in the temporarily storing unit 40 that is being used as the counterfeit banknote storing unit (Step B32).

[0057] When an operator operates the operation terminal 2 to start a process to discharge the counterfeit banknotes outside of the apparatus in the storing state shown in FIG. 6C, all the banknotes (genuine banknotes P21 and P23 and counterfeit banknotes P22 and P32) stored in the temporarily storing unit 40 are fed out. The genuine banknotes P21 and P23 fed from the temporarily storing unit 40 are stored in the corresponding one of the banknote storing units 60, as shown in FIG. 6D, based on the recognition result thereof (Step B41). On the other hand, the counterfeit banknotes P22 and P32 fed from the temporarily storing unit 40 are transported on the transport route shown in FIG. 5 and discharged to the money outlet 20 as shown in FIG. 6D (Step B42).

[0058] In this manner, when the process to discharge the counterfeit banknotes from the temporarily storing unit 40 is performed and all the counterfeit banknotes are discharged to the money outlet 20, the control unit 90 switches the use of the temporarily storing unit 40 from the use as the counterfeit banknote storing unit to the use as the temporarily storing unit. Moreover, the control unit 90 updates the status information included in the temporarily storing unit setting data 80a in the memory 80 to the information indicating that the temporarily storing unit 40 is currently being used as the temporarily storing unit. As a result, when an operation to start the next non-direct deposit process is performed, the non-direct deposit process is performed as usual by using the temporarily storing unit 40 to temporarily store the deposited banknotes therein.

[0059] Though not shown in FIGS. 6A to 6D, the banknote whose denomination cannot be recognized by the recognition unit 30 is transported from the recognition unit 30 to the money outlet 20 as the deposited reject banknote in order to return it from the money outlet 20 as in the conventional manner. Moreover, as shown in FIG. 6B, in the state in which all the banknotes P21 to P23 received in the money inlet 10 are stored in the temporarily storing unit 40 (Step B21), if the money deposit process is canceled without being approved while the result of recognition and counting has been displayed on the operation terminal 2 and an approval operation is being waited, all the banknotes P21 to P23 stored in the temporarily storing unit 40 are returned. Specifically, all the banknotes P21 to P23 are fed from the temporarily storing unit 40, transported as shown in FIG. 5, and are returned by discharging from the money outlet 20. At this time, if a banknote recognized as a counterfeit banknote is included in the banknotes P21 to P23 that are to be returned from the money outlet 20, information about the counterfeit banknote is displayed on the display unit of

the operation terminal 2. Specifically, for example, a serial number of the counterfeit banknote P22 can be read with the recognition unit 30 during the money deposit process, and when returning this counterfeit banknote P22, the serial number of the counterfeit banknote P22, information indicating that the counterfeit banknote P22 is the second one from the top in the bunch of the banknotes P21 to P23 that are discharged in the money outlet 20, and the like are displayed on the display unit of the operation terminal 2. Even in the case where the money deposit process is canceled, if a counterfeit banknote is included in the returned banknotes, this fact can be notified to the operator. In such an event, the operator can identify the counterfeit banknote included in the returned banknotes and can handle the counterfeit banknote by a predetermined method.

[0060] One example of the money dispensing process performed in the banknote handling apparatus 1 is explained below. At first, a configuration in which a banknote is dispensed from the banknote storing unit 60, in which banknotes of a plurality of denominations are stored in mixed state, is explained. FIGS. 7A and 7B are schematic diagrams indicating an operation of a money dispensing process for dispensing a banknote from the banknote storing unit 60 in which banknotes of a plurality of denominations are stored in a mixed state. FIG. 7A shows an operation in case of the usual money dispensing process performed when the temporarily storing unit 40 is available for use as the temporarily storing unit, and FIG. 7B shows an operation in case of the money dispensing process performed when the temporarily storing unit 40 is used as the counterfeit banknote storing unit.

[0061] When an operator operates the operation terminal 2 to start the money dispensing process for dispensing the banknotes of a predetermined amount, the control unit 90 determines whether the temporarily storing unit 40 is available for use as the temporarily storing unit by referring to the status information included in the temporarily storing unit setting data 80a in the memory 80.

[0062] When the temporarily storing unit 40 is available for use as the temporarily storing unit, the control unit 90 feeds the banknotes one by one from the banknote storing unit 60 in which the banknotes of the plurality of denominations are stored in the mixed state and transports the banknotes to the recognition unit 30 as shown in FIG. 7A. If the banknote fed from the banknote storing unit 60 is usable as a banknote for dispensing, this banknote is discharged in the money outlet 20 (Step C11). On the other hand, if the banknote fed from the banknote storing unit 60 is not usable as a banknote for dispensing, this banknote is put aside in the temporarily storing unit 40 (Step C12). Moreover, if it is determined that the banknote fed from the banknote storing unit 60 should be rejected due to the occurrence of a transport error such as a skewed banknote or chained banknotes, this banknote is stored in the collection cassette 70 as a dispensing reject banknote (Step C13).

[0063] After discharging all the banknotes to be dispensed to the money outlet 20, the banknote that was put aside and stored in the temporarily storing unit 40 is fed from the temporarily storing unit 40 and returned to the original banknote storing unit 60. The dispensing reject banknote stored in the collection cassette 70 can be fed from the collection cassette 70 and returned to the original banknote storing unit 60 or can be kept as is in the collection cassette 70, and which method to follow can be set as desired.

[0064] In this manner, even if the banknotes of the plurality of denominations are stored in the mixed state in the banknote storing unit 60, the banknotes of the predetermined amount can be dispensed by discharging the banknote, which is to be dispensed, in the money outlet 20 while putting aside other banknote, which is other than the banknote to be dispensed, in the temporarily storing unit 40.

[0065] However, in the money dispensing process, if the temporarily storing unit 40 is being used as the counterfeit banknote storing unit, the temporarily storing unit 40 cannot be used to put aside the banknote. Therefore, the control unit 90 determines the banknote storing unit 60 as a feeding source of the banknote to be dispensed so that there is no banknotes that needs to be put aside in the temporarily storing unit 40. Then, as shown in FIG. 7B, the banknote to be dispensed fed from thus determined banknote storing unit 60 is discharged to the money outlet 20 after passing through the recognition unit 30 (Step C21). Moreover, the dispensing reject banknote is stored in the collection cassette 70 (Step C22).

[0066] The operations shown in FIGS. 7A and 7B are explained concretely while referring to FIGS. 8A and 8B. FIGS. 8A and 8B are schematic diagrams indicating a transport route of a banknote in the money dispensing process. FIG. 8A depicts an operation when the temporarily storing unit 40 can be used to store the put-aside banknote as shown in FIG. 7A, that is, when the temporarily storing unit 40 is available for use as the temporarily storing unit. In contrast, FIG. 8B shows an operation when the temporarily storing unit 40 cannot be used to store the put-aside banknote as shown in FIG. 7B, that is, when the temporarily storing unit 40 is currently being used as the counterfeit banknote storing unit.

[0067] For example, supposing that the euro banknotes are the processing object banknotes, the banknotes of the lower denominations of the value equal to or less than 50 euros are stored in the banknote storing units 60a to 60c and 60e to 60h by denomination, and the banknotes of the higher denominations of the value 100 euros or more are stored in the banknote storing unit 60d in the mixed state. Specifically, one of the 5-euro banknotes, the 10-euro banknotes, the 20-euro banknotes, and the 50-euro banknotes are stored in each of the banknote storing units 60a to 60c and 60e to 60h by denomination, and the 50-euro banknotes are stored in the banknote storing unit 60h. Moreover, the banknotes of the higher denominations of the 100-euro banknote,

the 200-euro banknote, and the 500-euro banknote are stored in the banknote storing unit 60d in the mixed state. The banknotes are fed in the order of the 200-euro banknote, the 500-euro banknote, and the 100-euro banknote when the feeding of the banknotes is started from the banknote storing unit 60d. In this state, supposing that an instruction is received to perform the money dispensing process to dispense banknotes of an amount equal to 100 euros, and no dispensing reject banknote is found during the process.

[0068] When the money dispensing process to dispense banknotes of the amount equal to 100 euros is instructed, the control unit 90, as a result of referring to the temporarily storing unit setting data 80a stored in the memory 80, recognizes that no counterfeit banknote has been stored in the temporarily storing unit 40, so that the temporarily storing unit 40 is available for use as the temporarily storing unit. Accordingly, the control unit 90 recognizes that the 100-euro banknote has been stored in the banknote storing unit 60d and starts the process to dispense one 100-euro banknote from the banknote storing unit 60d.

[0069] The 200-euro banknote, which is fed first from the banknote storing unit 60d, is transported from the banknote storing unit 60d to the recognition unit 30 as shown with a solid arrow in FIG. 8A and then stored in the temporarily storing unit 40 as a put-aside banknote as shown with a dotted arrow in FIG. 8A. The 500-euro banknote, which is fed next from the banknote storing unit 60d, is similarly put aside to and stored in the temporarily storing unit 40 after passing through the recognition unit 30. The 100-euro banknote, which is fed next from the banknote storing unit 60d, is the banknote to be dispensed, and therefore, discharged in the money outlet 20 after passing through the recognition unit 30 as shown with a solid arrow in FIG. 8A. In this manner, as instructed in the money dispensing process, the banknote of the 100-euro can be dispensed in the money outlet 20 as the banknotes of the amount equal to 100 euros.

[0070] On the other hand, when the money dispensing process to dispense banknotes of the amount equal to 100 euros is instructed, the control unit 90, as a result of referring to the temporarily storing unit setting data 80a stored in the memory 80, recognizes that a counterfeit banknote has been stored in the temporarily storing unit 40 and that the temporarily storing unit 40 is currently being used as the counterfeit banknote storing unit. Also, the control unit 90 recognizes that the 100-euro banknote has been stored in the banknote storing unit 60d, but the 200-euro banknote is fed first from the banknote storing unit 60d and cannot be put aside to the temporarily storing unit 40. Accordingly, the control unit 90 determines to perform substitute dispensing process to dispense banknotes of a denomination other than the banknote of the 100-euro to dispense banknotes of the amount equal to 100 euros, and refers to the information of the banknotes stored in other banknote storing units 60a to 60c and 60e to 60h.

[0071] For example, to dispense banknotes of the amount equal to 100 euros in the minimum number of banknotes, the control unit 90 determines to perform the substitute dispensing process with two 50-euro banknotes that have been stored in the banknote storing unit 60h, and starts the substitute dispensing process. As a result, two 50-euro banknotes are fed from the banknote storing unit 60h as shown with a solid arrow in FIG. 8B, and those banknotes are discharged in the money outlet 20 after passing through the recognition unit 30.

[0072] In this manner, in the banknote handling apparatus 1, when performing the money dispensing process by using the banknote storing unit 60 in which the banknotes of the plurality of denominations are stored in the mixed state, usually the banknote is dispensed from the banknote storing unit 60d while using the temporarily storing unit 40 to put aside other banknotes, but the substitute dispensing process is performed by using the other denominations when the temporarily storing unit 40 cannot be used to put aside the other banknotes when the temporarily storing unit 40 is currently being used as the counterfeit banknote storing unit. Accordingly, even if it is not possible to perform the money dispensing process that uses the temporarily storing unit 40 because the temporarily storing unit 40 is being used as the counterfeit banknote storing unit, the substitute dispensing process can be performed to dispense the designated money without stopping the use of the banknote handling apparatus 1.

[0073] If it is not possible to perform the money dispensing process that involves putting aside the banknotes in the temporarily storing unit 40 because the temporarily storing unit 40 is currently being used as the counterfeit banknote storing unit, information indicating this fact and information relating to a breakdown of the denominations and the numbers of the banknotes dispensed in the substitute dispensing process, and the like, are displayed on the display unit of the operation terminal 2.

[0074] In the banknote handling apparatus 1, the control unit 90 automatically determines as to whether the temporarily storing unit 40 is usable as a put-aside destination of the banknote, and the contents of banknotes to be dispensed in the substitute dispensing process. Also, the control unit 90 automatically starts the substitute dispensing process. However, a configuration is allowable in which the substitute dispensing process is performed after the operator approves the substitute dispensing process. In the configuration in which the substitute dispensing process is performed after the approval operation, after determining the processing contents of the substitute dispensing process, the information about a breakdown of the denominations and the numbers of the banknotes to be dispensed in the substitute dispensing process, and the like, is displayed on the operation terminal 2, and the process enters a waiting state for waiting the approval operation by the operator. The substitute dispensing process is started after the operator,

who checks the contents of the substitute dispensing process, performs the approval operation. If the operator performs a cancel operation, the substitute dispensing process is canceled.

[0075] Another example of the money dispensing process performed by the banknote handling apparatus 1 is explained below. Specifically, a case in which banknotes are dispensed from the banknote storing units 60 in which the banknotes are stored by denomination. FIGS. 9A and 9B are schematic diagrams indicating an operation of a money dispensing process for dispensing a banknote from the banknote storing unit 60 in which banknotes are stored by denomination. FIG. 9A shows an operation in case of the usual money dispensing process performed when the temporarily storing unit 40 is available for use as the temporarily storing unit, and FIG. 9B shows an operation in case of the money dispensing process performed when the temporarily storing unit 40 is used as the counterfeit banknote storing unit. When the banknotes are stored by denomination, because only the needed numbers of banknotes of needed denominations are dispensed from each of the banknote storing units 60, it is not necessary to use the temporarily storing unit 40 to store the put-aside banknote like in the case in which the banknotes of a plurality of denominations are stored in the mixed state.

[0076] When an operator operates the operation terminal 2 to start the money dispensing process for dispensing the banknotes of a predetermined amount, the control unit 90 determines whether the temporarily storing unit 40 is available for use as the temporarily storing unit by referring to the status information included in the temporarily storing unit setting data 80a in the memory 80.

[0077] When the temporarily storing unit 40 is available for use as the temporarily storing unit, the control unit 90 feeds the banknotes one by one from the banknote storing unit 60 in which the banknotes are stored by denomination and transports the banknotes to the recognition unit 30 as shown in FIG. 9A. If the banknote fed from the banknote storing unit 60 is usable as a banknote for dispensing, this banknote is discharged in the money outlet 20 (Step D11). On the other hand, if a dispensing reject banknote is found, this banknote is stored in the temporarily storing unit 40 (Step D12). After discharging all the banknotes to be dispensed to the money outlet 20, the dispensing reject banknote is fed from the temporarily storing unit 40 and returned to the original banknote storing unit 60. However, the dispensing reject banknote can be fed from the temporarily storing unit 40 and stored in the collection cassette 70, and which method to follow can be set as desired.

[0078] In the money dispensing process, if the temporarily storing unit 40 is currently being used as the counterfeit banknote storing unit, the temporarily storing unit 40 cannot be used to temporarily store the dispensing reject banknote. Therefore, as shown in FIG. 9B, the control unit 90 discharges the banknotes fed from the ban-

knote storing unit 60 to the money outlet 20 after passing through the recognition unit 30 (Step D21), while storing the dispensing reject banknote in the collection cassette 70 (Step D22).

[0079] In this manner, in the banknote handling apparatus 1, when performing the money dispensing process by using the banknote storing units 60 in which the banknotes are stored by denomination, usually the banknotes are dispensed from the banknote storing units 60 while using the temporarily storing unit 40 to temporarily store the dispensing reject banknote, but the money dispensing process is performed by using the collection cassette 70 when the temporarily storing unit 40 cannot be used to temporarily store the dispensing reject banknote because the same is currently being used as the counterfeit banknote storing unit. Accordingly, even if it is not possible to use the temporarily storing unit 40 to temporarily store the dispensing reject banknote because the temporarily storing unit 40 is being used as the counterfeit banknote storing unit, the money dispensing process can be performed without stopping the use of the banknote handling apparatus 1.

[0080] In the banknote handling apparatus 1, if the money dispensing process is to be performed while the temporarily storing unit 40 is being used as the counterfeit banknote storing unit, a determination value used to determine whether a banknote is to be rejected can be changed as a desired value to suppress the occurrence of a dispensing reject banknote. Specifically, for example, threshold values for recognition of the denomination, the authenticity, the fitness, and the like that are used to determine whether a banknote is to be rejected, and a threshold value for determination such as an amount of skew that is used to determine whether a banknote transported on the banknote transport path 50 is to be rejected can be changed to moderate values. Accordingly, only during a period in which the temporarily storing unit 40 cannot be used to store the dispensing reject banknote, a probability of finding a dispensing reject banknote can be lowered in comparison with the probability in a normal money dispensing process. It can be set as desired whether to change any one or more of the threshold values depending on how the temporarily storing unit 40 is being used, and changed values of the threshold values to be changed.

[0081] A flow of the banknote handling performed by the banknote handling apparatus 1 is explained below. FIG. 10 is a flowchart indicating the flow of the money deposit process and the money dispensing process performed by the banknote handling apparatus 1. When the money deposit process or the money dispensing process (hereinafter, "money deposit/dispensing process") is started, at first, the control unit 90 determines whether the temporarily storing unit 40 is currently being used as the counterfeit banknote storing unit (Step S10). If the temporarily storing unit 40 cannot be used in the money deposit/dispensing process because the temporarily storing unit 40 is currently being used as the counterfeit

banknote storing unit (YES at Step S10), the money deposit/dispensing process such as the direct deposit process or the substitute dispensing process is performed without using the temporarily storing unit 40 (Step S11), and the process is completed.

[0082] On the other hand, if the temporarily storing unit 40 can be used as the temporarily storing unit as usual because the temporarily storing unit 40 is not being used as the counterfeit banknote storing unit (NO at Step S10), the money deposit/dispensing process is started as usual by using the temporarily storing unit 40 as needed (Step S21). Moreover, while monitoring that there is no banknotes recognized as a counterfeit banknote by the recognition unit 30 (NO at Step S22), the money deposit/dispensing process is continued (NO at Step S23).

[0083] When the counterfeit banknote is found in the money deposit/dispensing process (YES at Step S22), the control unit 90 continues the money deposit/dispensing process for remaining banknotes, then switches the use of the temporarily storing unit 40 to the use as the counterfeit banknote storing unit (Step S24), and completes the process. The control unit 90 updates the status information included in the temporarily storing unit setting data 80a in the memory 80 to the information indicating that the temporarily storing unit 40 is currently being used as the counterfeit banknote storing unit.

[0084] After starting the money deposit/dispensing process by using the temporarily storing unit 40 (Step S21), if a counterfeit banknote is not found during the money deposit/dispensing process (NO at Step S22), the deposit/dispensing process is completed (YES at Step S23).

[0085] In the present embodiment, a configuration is explained in which only the counterfeit banknote is stored in the temporarily storing unit 40, and this counterfeit banknote is discharged to one unit of the money outlet 20 provided in the banknote handling apparatus 1; however, the present embodiment is not limited to this configuration. FIGS. 11A and 11B are schematic diagrams indicating other embodiments of a storing process and a discharge process of a counterfeit banknote performed by the banknote handling apparatus 1.

[0086] In the configuration in which the banknote handling apparatus 1 has two money outlets, a first money outlet 20 and a second money outlet 21, when discharging counterfeit banknotes from the temporarily storing unit 40, it is allowable to classify the counterfeit banknotes and discharge them in the first money outlet 20 and the second money outlet 21 according to the type of the counterfeit banknote as shown in FIG. 11A. It is possible that two or more counterfeit banknotes have the same serial number. Therefore, if the serial numbers of the counterfeit banknotes are registered in a counterfeit banknote database, when the serial number of the banknote is read by the recognition unit 30, and the read serial number matches with a serial number registered in the counterfeit banknote database, this banknote can be determined as a counterfeit banknote. For example, the counterfeit ban-

knote having the serial number that is already registered in the counterfeit banknote database is discharged in the first money outlet 20 (Step D11), and newly found counterfeit banknote is discharged in the second money outlet 21 (Step D12). In this case, a series of operations of removing the counterfeit banknote from the second money outlet 21, confirming that the banknote is really a counterfeit banknote, and registering the serial number of this counterfeit banknote in the counterfeit banknote database can be easily performed.

[0087] Even if the banknote handling apparatus 1 has only one money outlet 20, it is possible to discharge the counterfeit banknotes separately according to the type thereof. For example, the counterfeit banknotes can be discharged in the money outlet 20, and the discharging of the counterfeit banknotes is stopped when the type of the counterfeit banknote changes. Then, the discharging of the counterfeit banknotes is started after detecting that all the counterfeit banknotes that were discharged have been removed from the money outlet 20. With this method, the counterfeit banknotes can be discharged according to the type thereof. Moreover, in addition to the money outlet 20, the money inlet 10 can be used to discharge counterfeit banknotes. The counterfeit banknotes of different types are discharged separately in the money inlet 10 and the money outlet 20.

[0088] Moreover, when the temporarily storing unit 40 is used as the counterfeit banknote storing unit, it is allowable to store, in addition to a counterfeit banknote, a banknote that is likely to be a counterfeit banknote (suspect banknote), an unfit banknote, and the like, in the temporarily storing unit 40. For example, in the configuration in which the banknote handling apparatus 1 has two money outlets, the first money outlet 20 and the second money outlet 21, the temporarily storing unit 40 can be used to store the counterfeit banknote and the unfit banknote as shown in FIG. 11B. Then, the counterfeit banknote is discharged in the first money outlet 20 (Step D21), and the unfit banknote is discharged in the second money outlet 21 (Step D22). In this manner, the counterfeit banknote and the unfit banknote can be separated. In the banknote handling apparatus 1, when discharging a banknote from the temporarily storing unit 40 that is currently being used as the counterfeit banknote storing unit, information indicating a type and a destination of the banknote being discharged is displayed on the display unit of the operation terminal 2. Accordingly, the operator of the banknote handling apparatus 1 recognizes the types of the banknotes discharged in each of the money inlet 10, the first money outlet 20, the second money outlet 21, and the like, and can perform appropriate work on those banknotes.

[0089] Moreover, in the present embodiment, a configuration is explained in which, when a counterfeit banknote is found, the use of the temporarily storing unit 40 is automatically switched from the use as the temporarily storing unit to the use as the counterfeit banknote storing unit, and when all the counterfeit banknotes are dis-

charged from the temporarily storing unit 40, the use of the temporarily storing unit 40 is automatically switched from the use as the counterfeit banknote storing unit to the use as the temporarily storing unit; however, the usage method of the temporarily storing unit 40 can be fixed in the banknote handling apparatus 1. Specifically, the use of the temporarily storing unit 40 can be fixed to the use as the temporarily storing unit or to the use as the counterfeit banknote storing unit. This configuration can be realized by previously setting the setting information included in the temporarily storing unit setting data 80a in the memory 80.

[0090] Moreover, in the present embodiment, a configuration is explained in which the money deposit process and the money dispensing process are performed without using the temporarily storing unit 40 when the temporarily storing unit 40 is being used as the counterfeit banknote storing unit. However, there may be some processes that cannot be performed if the temporarily storing unit 40 cannot be used. For example, a sorting/counting process, in which banknotes of a denomination the same as the banknote recognized first are counted while storing them in the temporarily storing unit 40 and banknotes of the other denomination are discharged in the money outlet 20, cannot be performed if the temporarily storing unit 40 is not used. In the banknote handling apparatus 1, while the temporarily storing unit 40 is being used as the counterfeit banknote storing unit, if an instruction is received to perform a banknote handling that cannot be performed while the temporarily storing unit 40 is not used, such as the sorting/counting process, information indicating that it is impossible to perform the instructed banknote handling as the temporarily storing unit 40 is currently being used as the counterfeit banknote storing unit, and information indicating that the instructed banknote handling can be performed after discharging the counterfeit banknote from the temporarily storing unit 40 are displayed on the display unit of the operation terminal 2. The operator of the banknote handling apparatus 1 can check the information displayed on the display unit of the operation terminal 2, and can cancel the instructed banknote handling, can instruct to perform a process to discharge the counterfeit banknote from the temporarily storing unit 40 first and then instruct to perform the instructed banknote handling, and the like. As the banknote handling that cannot be performed if the temporarily storing unit 40 is not used, apart from the sorting/counting process, a left-behind collection process and a reconciliation process can be listed. In the left-behind collection process, while storing in the temporarily storing unit 40 the banknote that is desired to be left in the banknote storing unit 60, other banknotes are collected in the collection cassette 70, and after collecting all of the other banknotes in the collection cassette 70, the banknotes stored in the temporarily storing unit 40 are returned to the original banknote storing unit 60. In the reconciliation process, to confirm denominations and the number of banknotes stored in the banknote storing units 60, after

once storing in the temporarily storing unit 40 all the banknotes that were stored in the banknote storing units 60, each of the banknotes is fed one by one from the temporarily storing unit 40 to the recognition unit 30, recognized by the recognition unit 30, and returned to the original banknote storing unit 60.

[0091] In the present embodiment, a configuration is explained in which, if the use of the temporarily storing unit 40 is switched when a counterfeit banknote is found, this fact is notified to the operator of the banknote handling apparatus 1 by using the operation terminal 2; however, whether to notify this fact can be set as desired in the banknote handling apparatus 1. Specifically, if the setting information included in the temporarily storing unit setting data 80a in the memory 80 is set previously so that no notification is made when the usage method of the temporarily storing unit 40 is switched, the notifying process will not be performed by the operation terminal 2.

[0092] In the banknote handling apparatus 1, when a counterfeit banknote is found in the money deposit process, whether to add the value of the counterfeit banknote to the deposited amount can be set as desired. Various methods can be performed in the money deposit process if a banknote recognized as a counterfeit banknote is found. In one method, the value of the banknote recognized as the counterfeit banknote is added to the deposited amount for the time being, and later when it is confirmed that the banknote is a counterfeit banknote, an amount equal to the value of this banknote is deducted from the bank account of the customer. In another method, the value of the banknote recognized as the counterfeit banknote is deducted from the deposited amount for the time being, and later when it is confirmed that the banknote is a genuine banknote, an amount equal to the value of this banknote is transferred to the bank account of the customer. In the banknote handling apparatus 1, by previously setting the setting information contained in the temporarily storing unit setting data 80a in the memory 80, it is possible to include in or exclude from the deposited amount the value of the banknote recognized as the counterfeit banknote. Accordingly, an appropriate process can be performed according to the requirement of the financial institution that uses the banknote handling apparatus 1.

[0093] As mentioned earlier, according to the present embodiment, it is not necessary to provide a dedicated stacking unit to store a counterfeit banknote. Accordingly, the banknote handling apparatus 1 can be downsized in comparison to a banknote handling apparatus in which such a dedicated stacking unit is provided. When a counterfeit banknote is found, the temporarily storing unit 40 is used as the counterfeit banknote storing unit. Accordingly, a counterfeit banknote can be distinguished from other banknotes and stored like in an apparatus that includes a dedicated stacking unit for the counterfeit banknote.

[Industrial Applicability]

[0094] As explained above, in the banknote handling apparatus according to the present invention, while realizing the downsizing of the apparatus, a dedicated storing unit for the counterfeit banknote can be arranged only when a counterfeit banknote is found.

[Explanation of Reference Numerals]

[0095]

| | |
|----------------|--------------------------------------------------------------|
| 1 | banknote handling apparatus |
| 2 | operation terminal |
| 10 | money inlet |
| 20, 21 | money outlet |
| 30 | recognition unit |
| 40 | temporarily storing unit (counterfeit banknote storing unit) |
| 50 | banknote transport path |
| 60, 60a to 60h | banknote storing unit |
| 70 | collection cassette |
| 80 | memory |
| 90 | control unit |

Claims

1. A banknote handling apparatus comprising:
 - a money inlet for receiving a banknote to be deposited;
 - a transport path that transports banknotes one by one fed inside the apparatus from the money inlet;
 - a recognition unit that recognizes the banknote transported on the transport path;
 - a banknote storing unit that stores deposited banknotes;
 - a money outlet that discharges the banknote to be dispensed, the banknote being fed from the banknote storing unit;
 - a temporarily storing unit that is used to temporarily store the banknote while handling the banknote; and
 - a control unit that switches use of the temporarily storing unit between use as a usual temporarily storing unit and use as a counterfeit banknote storing unit.
2. The banknote handling apparatus as claimed in claim 1, wherein when the banknote is recognized as a counterfeit banknote by the recognition unit, the control unit switches the use of the temporarily storing unit to the use as the counterfeit banknote storing unit and stores the banknote recognized as the counterfeit banknote in the temporarily storing unit.

3. The banknote handling apparatus as claimed in claim 2, wherein, when the banknote is recognized as the counterfeit banknote by the recognition unit during a money deposit process, the control unit stores the counterfeit banknote in the temporarily storing unit, switches the use of the temporarily storing unit to the use as the counterfeit banknote storing unit, and keeps the counterfeit banknote in the temporarily storing unit after completing the money deposit process. 5 10
4. The banknote handling apparatus as claimed in claim 2 or 3, wherein, when all the counterfeit banknotes are discharged from the temporarily storing unit that is being used as the counterfeit banknote storing unit, the control unit switches the use of the temporarily storing unit to the use as the temporarily storing unit. 15
5. The banknote handling apparatus as claimed in any one of claims 2 to 4, wherein, while the temporarily storing unit is being used as the counterfeit banknote storing unit, the control unit performs banknote processing, which is usually performed by using the temporarily storing unit, without using the temporarily storing unit. 20 25
6. The banknote handling apparatus as claimed in any one of claims 2 to 5, wherein, upon switching the use of the temporarily storing unit to the use as the counterfeit banknote storing unit, the control unit outputs information to notify this fact. 30
7. The banknote handling apparatus as claimed in claim 4, wherein the control unit does not start a next process unless all the counterfeit banknotes, which have been discharged in the money outlet from the temporarily storing unit that is being used as the counterfeit banknote storing unit, are removed from the money outlet. 35 40
8. The banknote handling apparatus as claimed in any one of claims 2 to 7, wherein, when the banknote is recognized as the counterfeit banknote by the recognition unit in the money deposit process, the control unit excludes a value of the counterfeit banknote from a deposited amount in the money deposit process. 45
9. The banknote handling apparatus as claimed in any one of claims 2 to 7, wherein, when the banknote is recognized as the counterfeit banknote by the recognition unit in the money deposit process, the control unit includes a value of the counterfeit banknote in a deposited amount in the money deposit process. 50 55
10. The banknote handling apparatus as claimed in any one of claims 2 to 9, wherein, the control unit performs a discharge process of the counterfeit banknote from the temporarily storing unit that is being used as the counterfeit banknote storing unit only when the discharge process is approved through an authentication process.

FIG.1

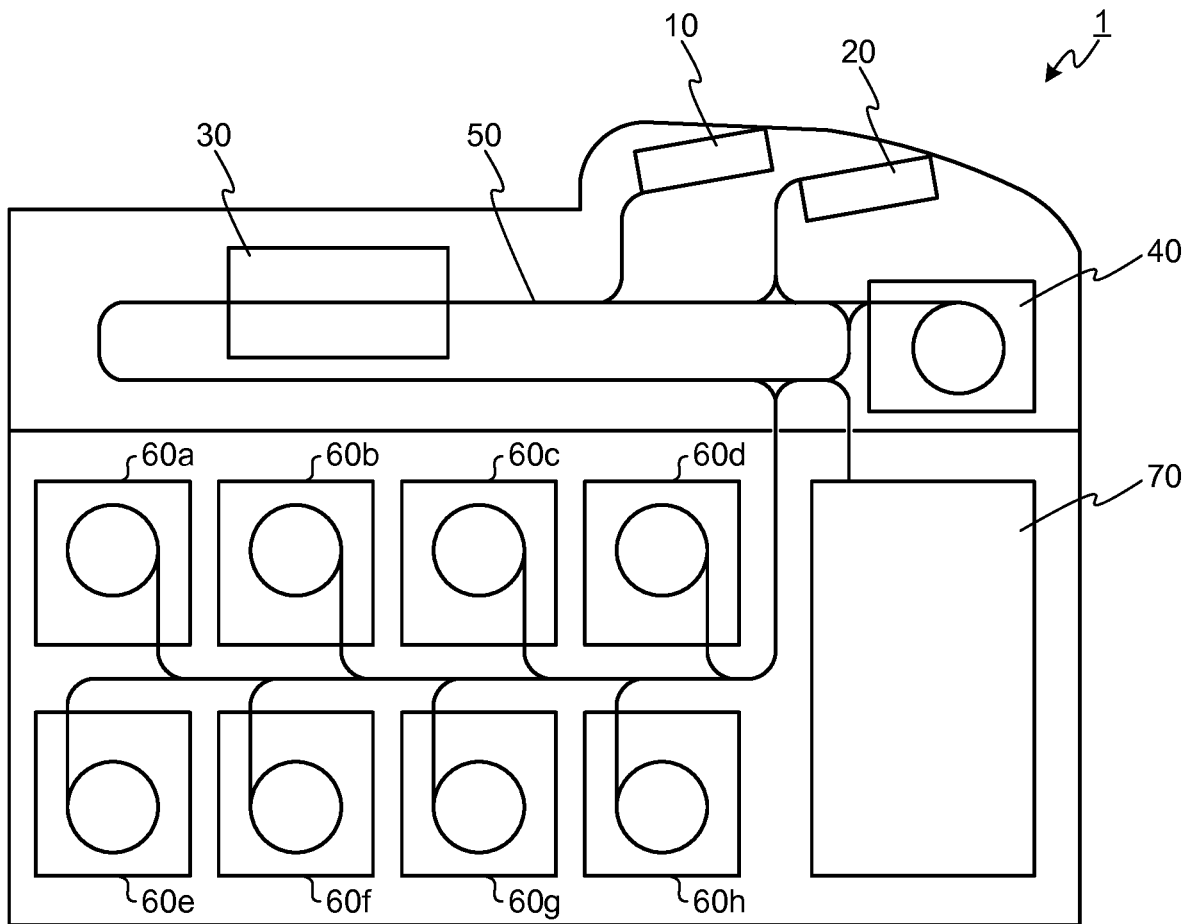


FIG.2

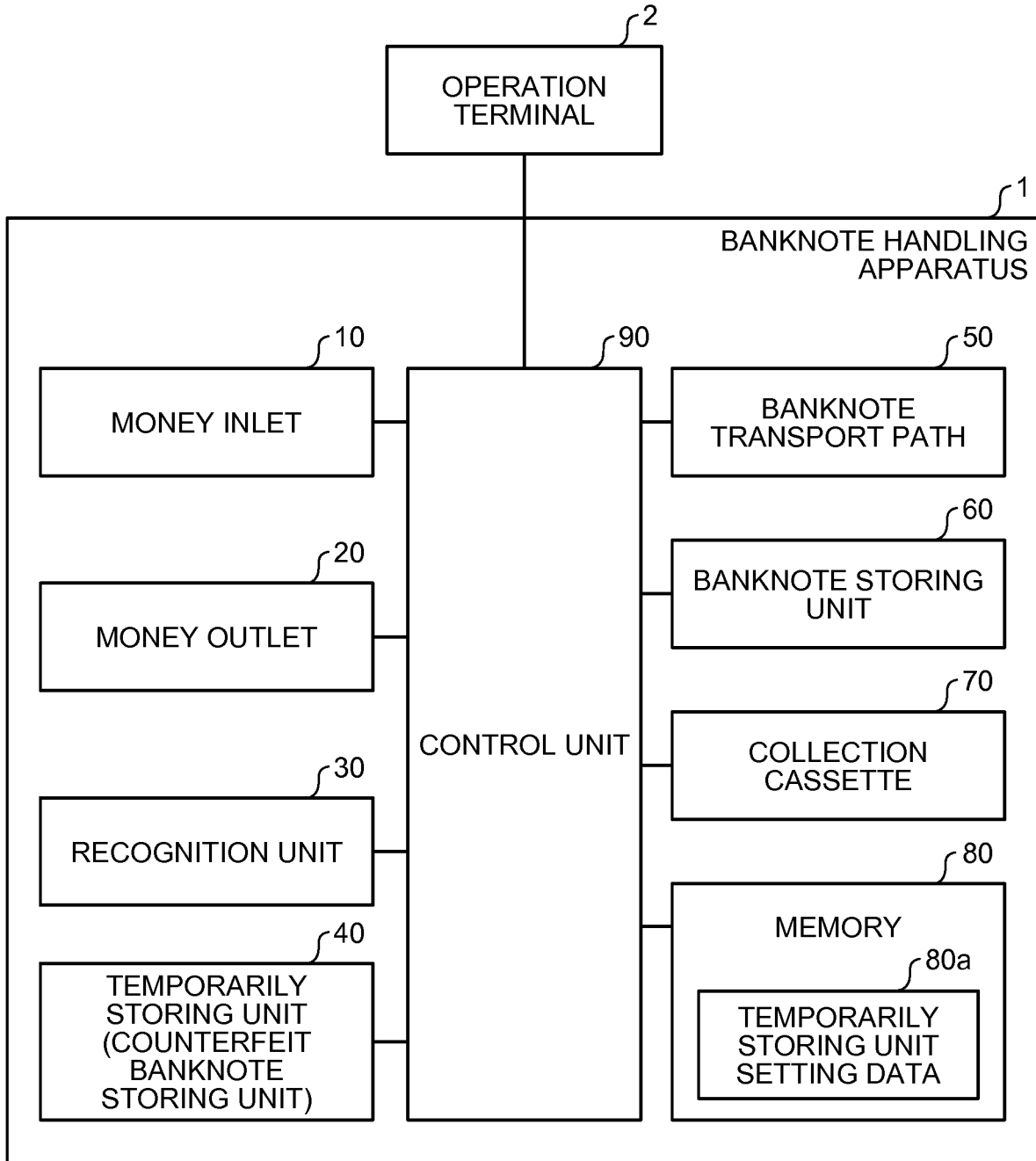


FIG.3A

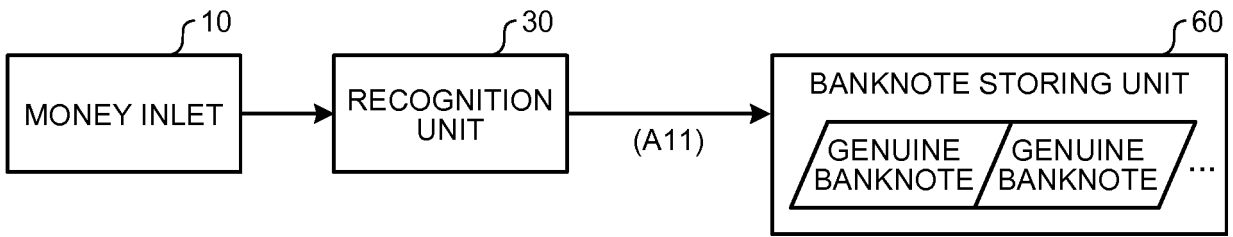


FIG.3B

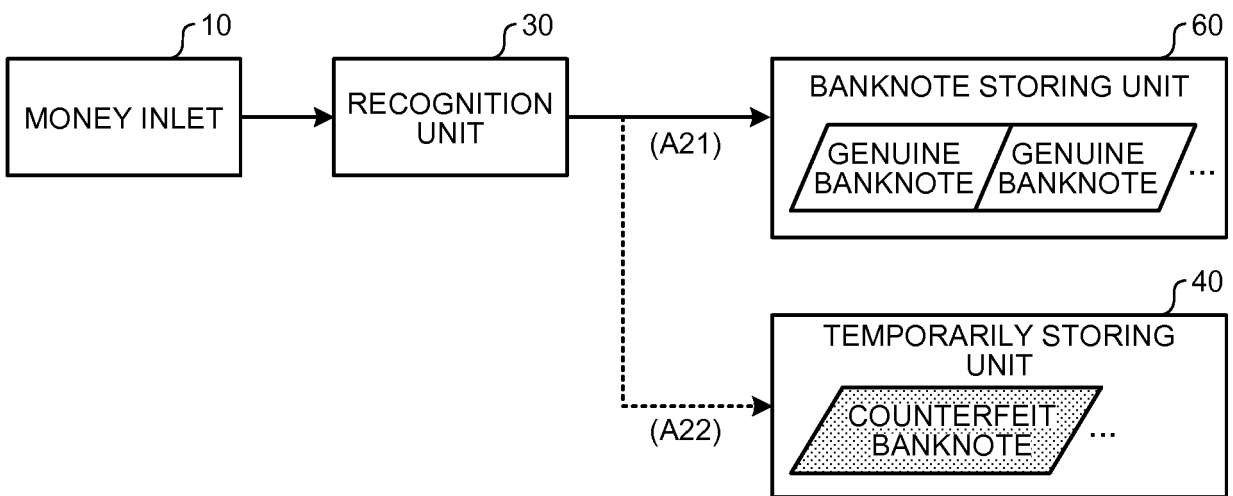


FIG.4

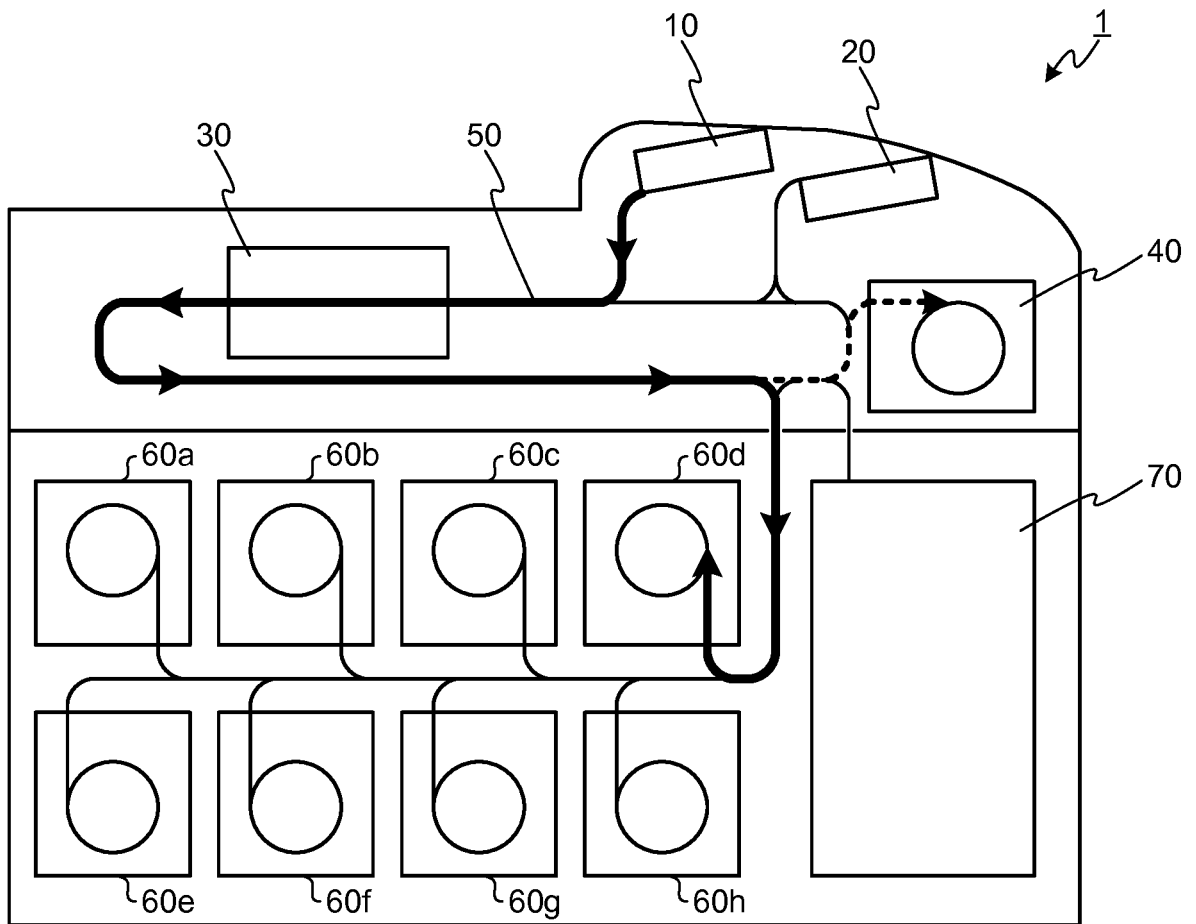


FIG.5

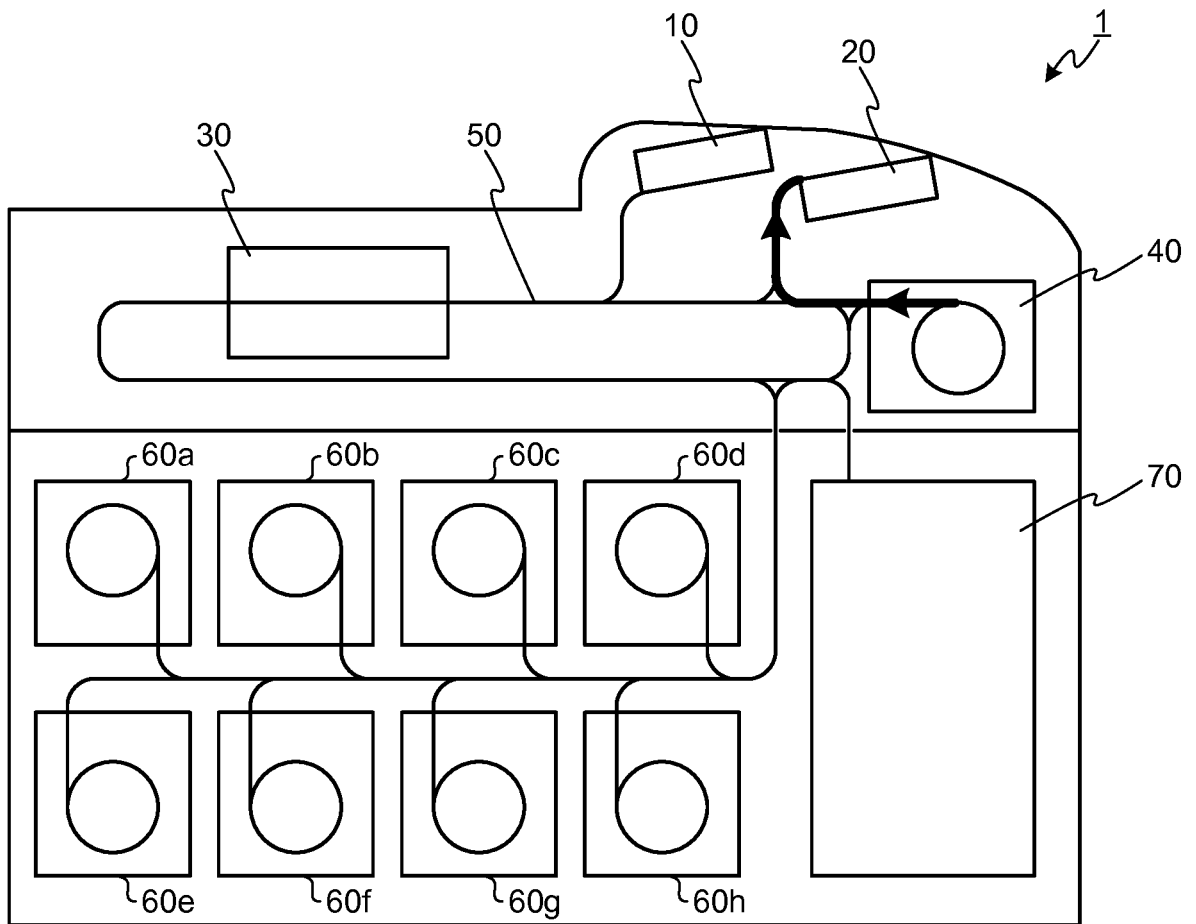


FIG.6A

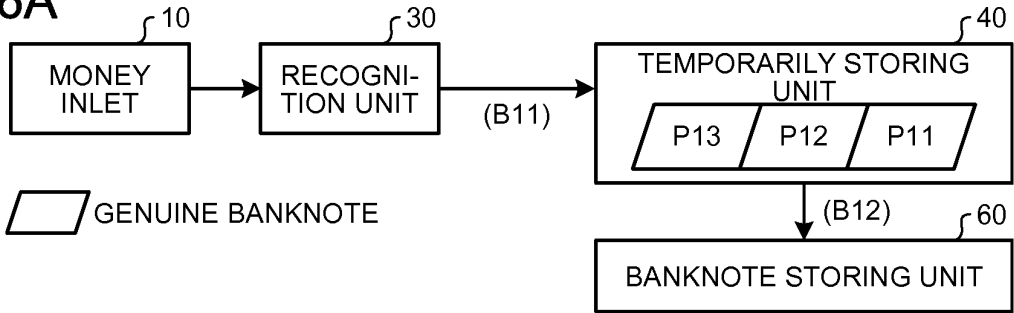


FIG.6B

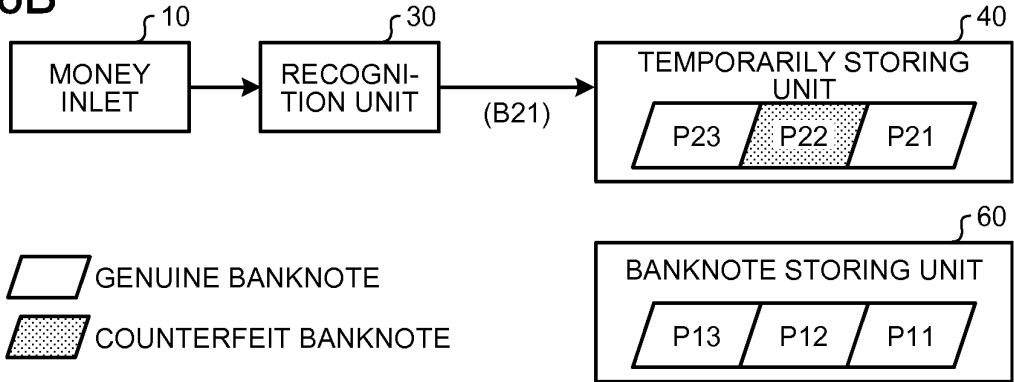


FIG.6C

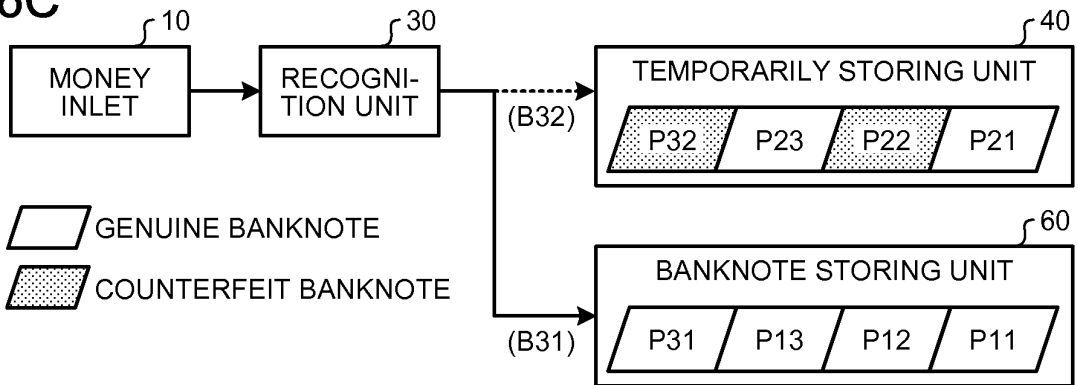


FIG.6D

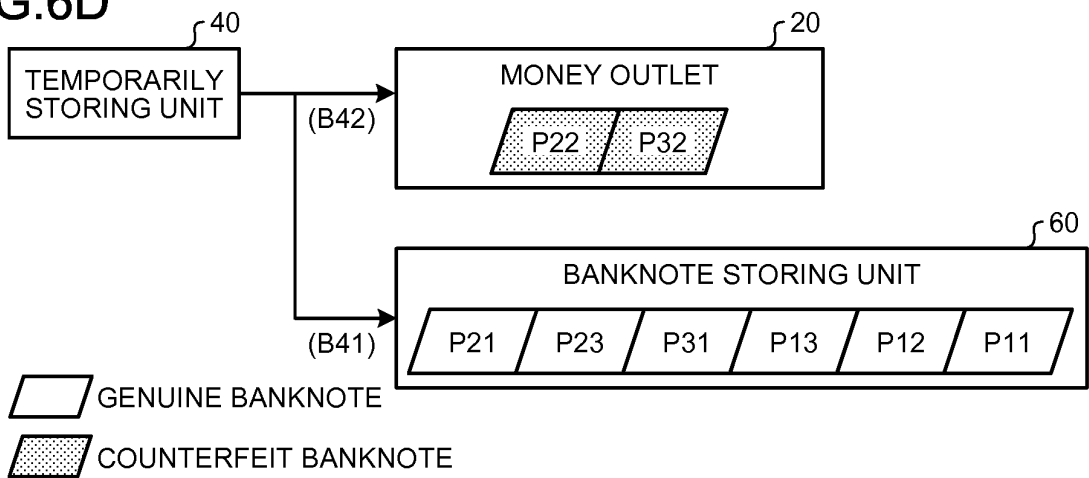


FIG.7A

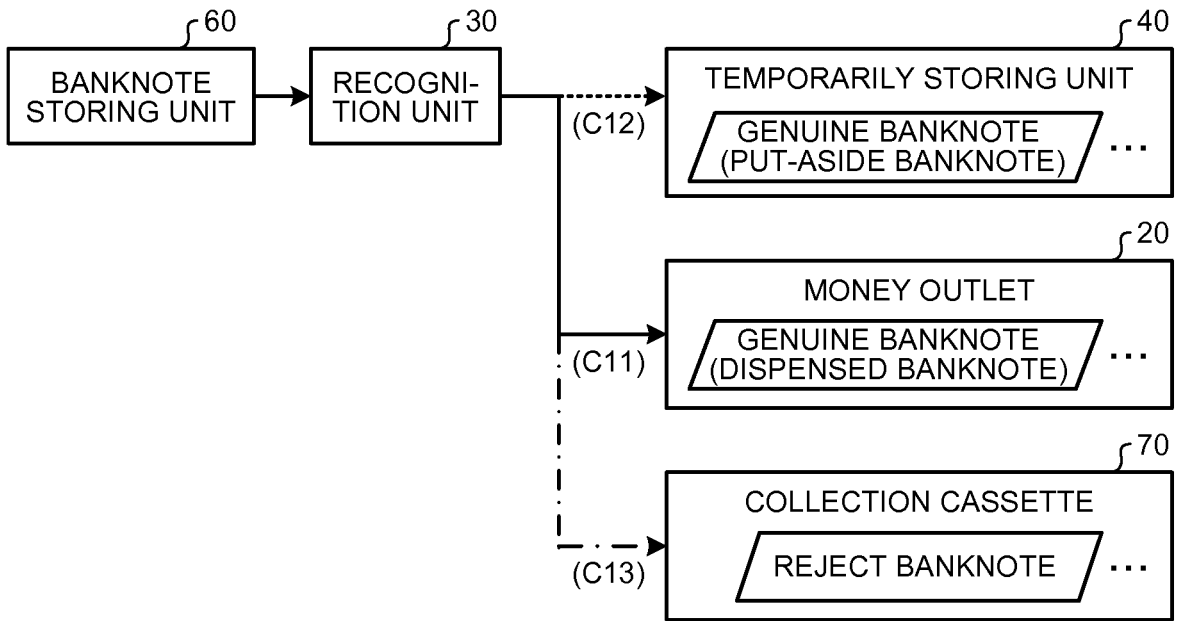


FIG.7B

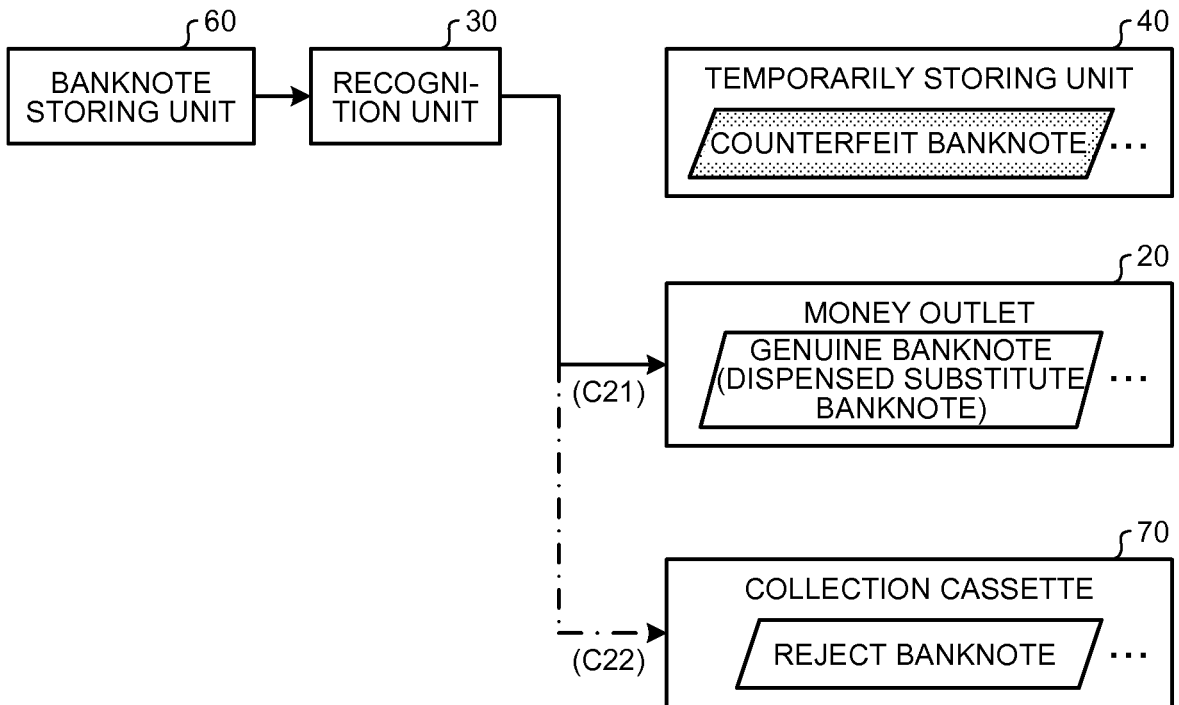


FIG.8A

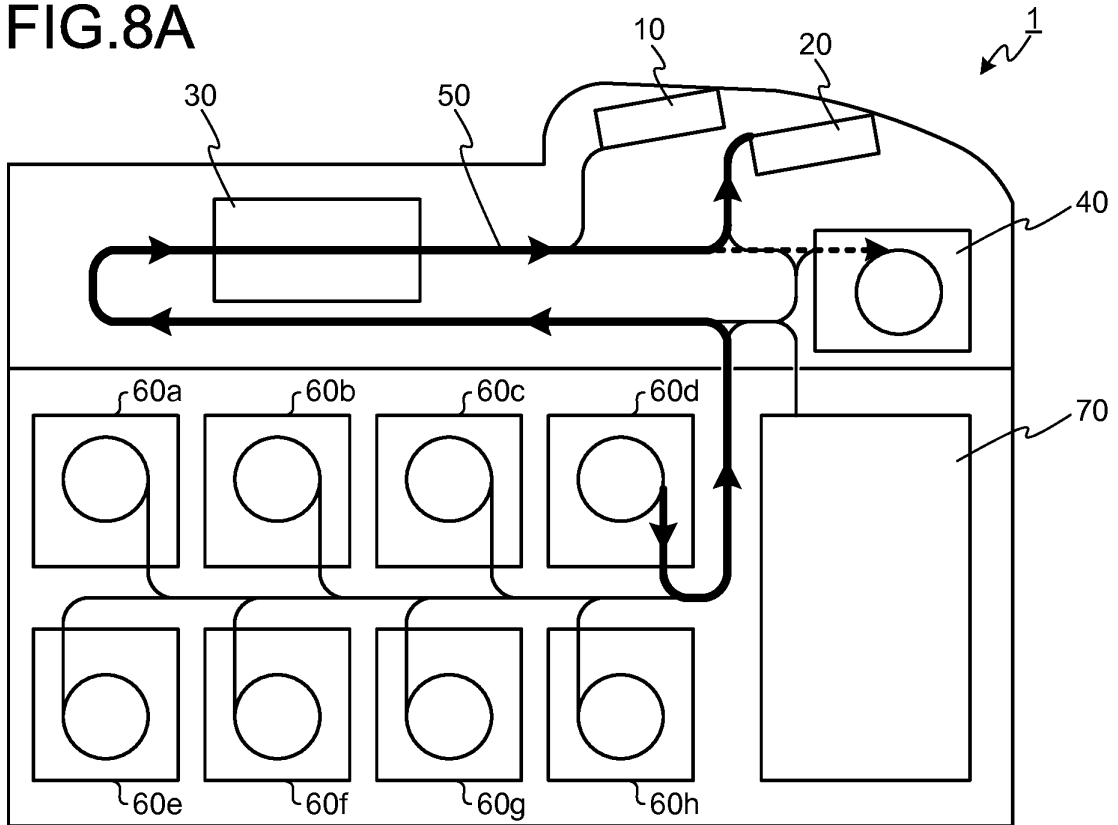


FIG.8B

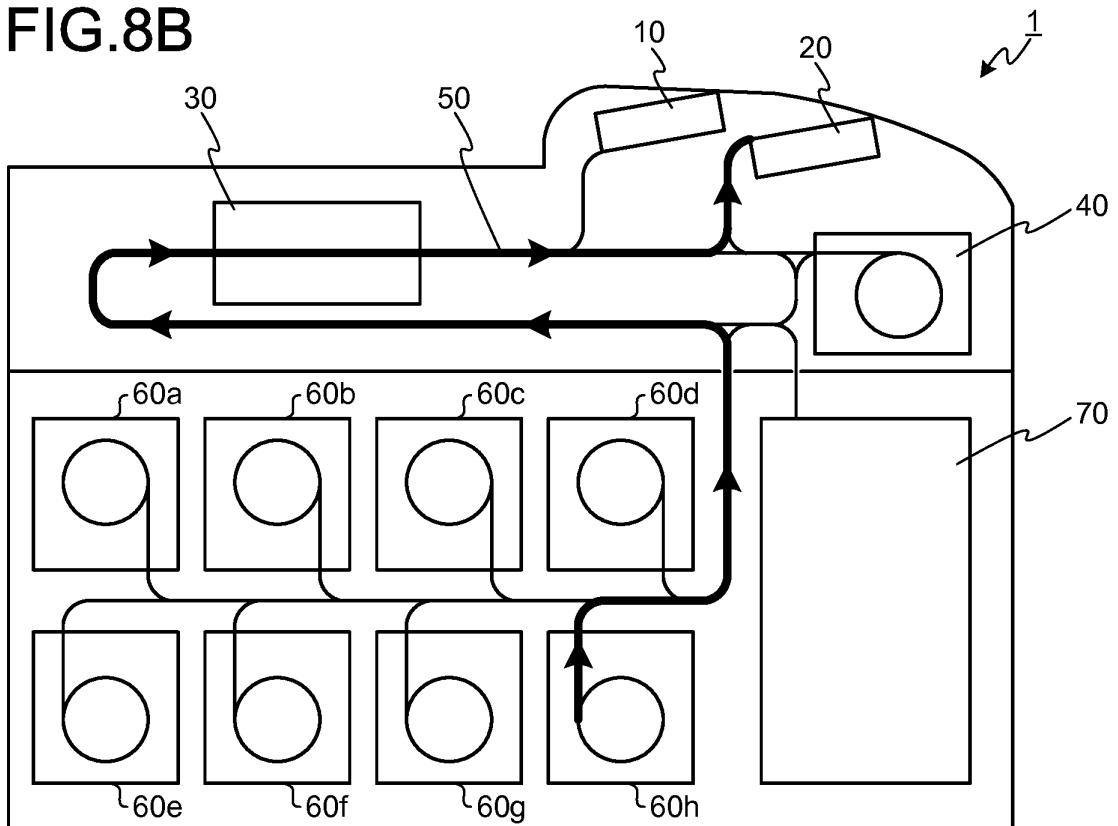


FIG.9A

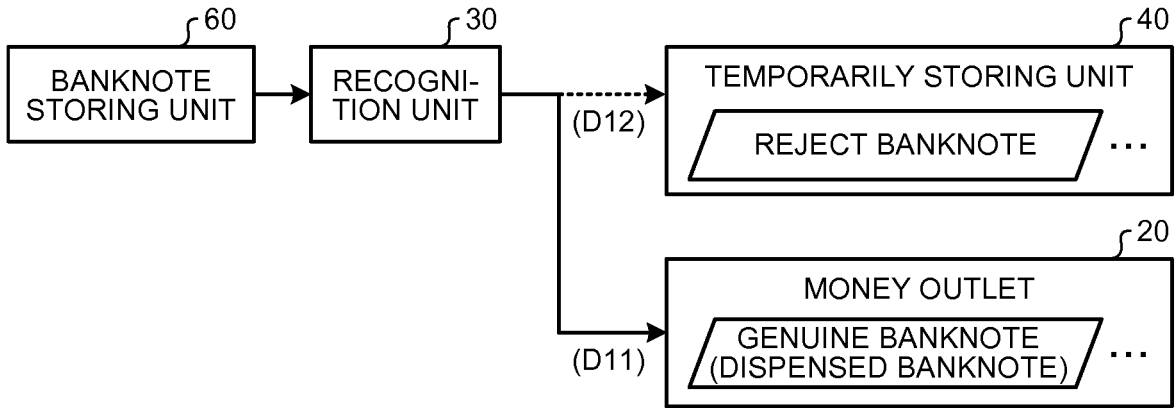


FIG.9B

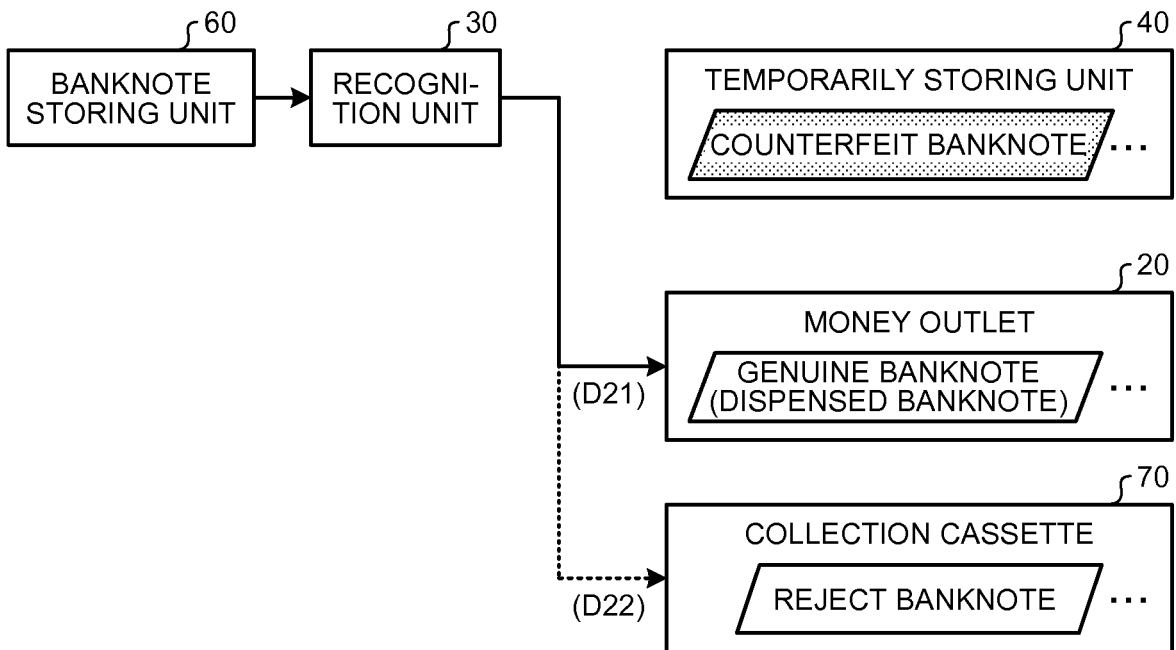


FIG.10

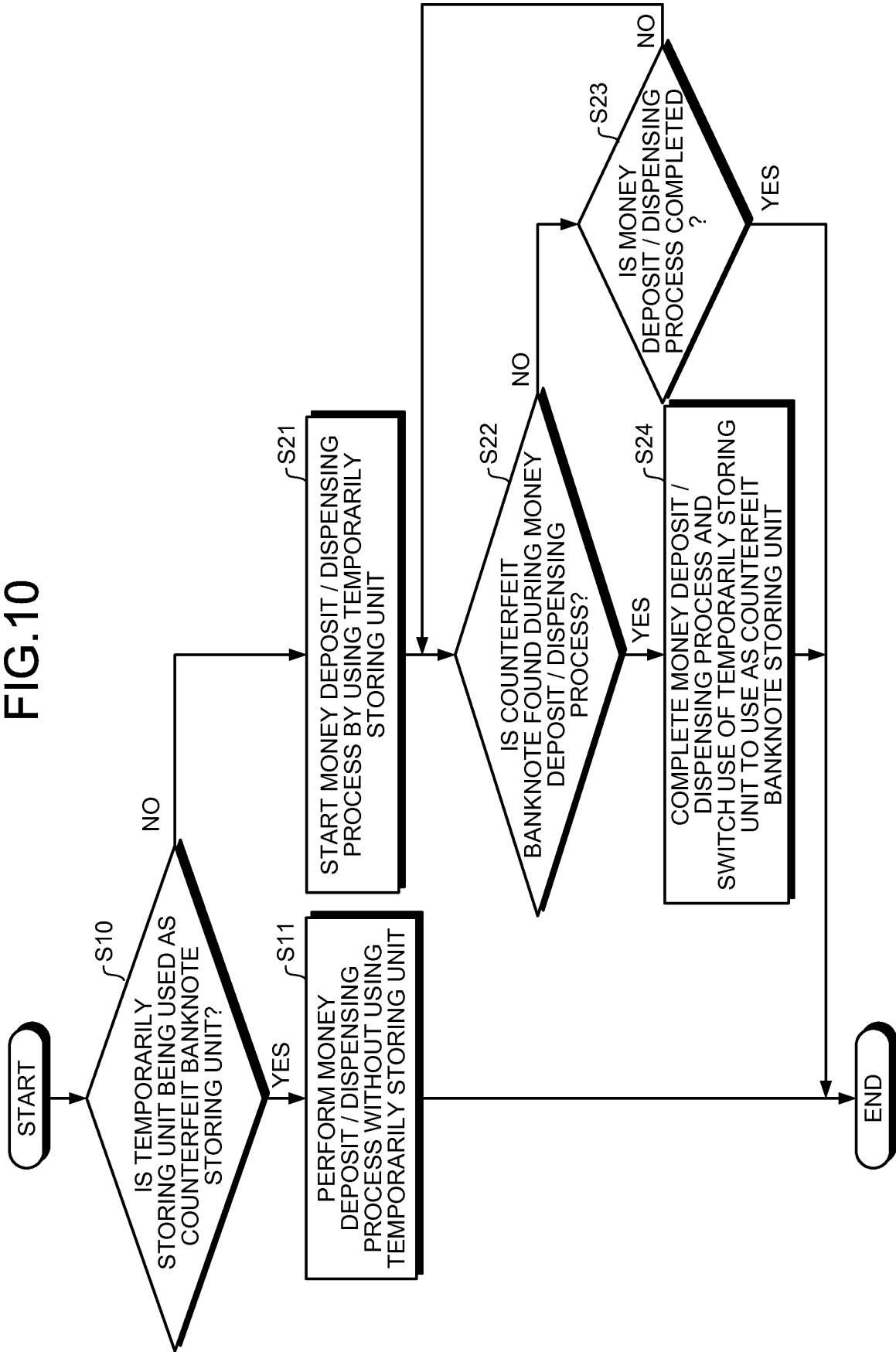


FIG.11A

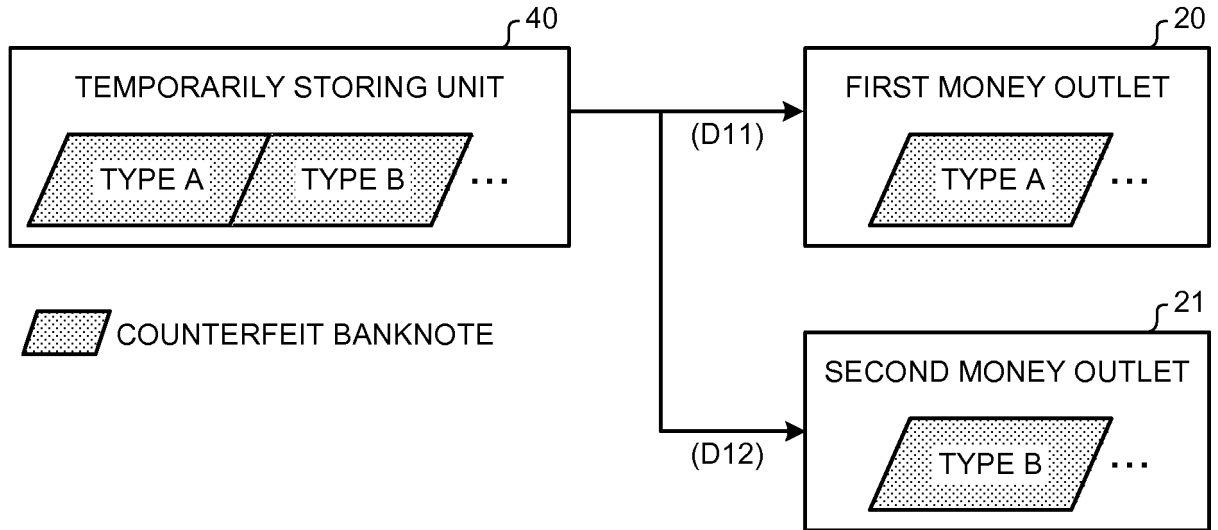
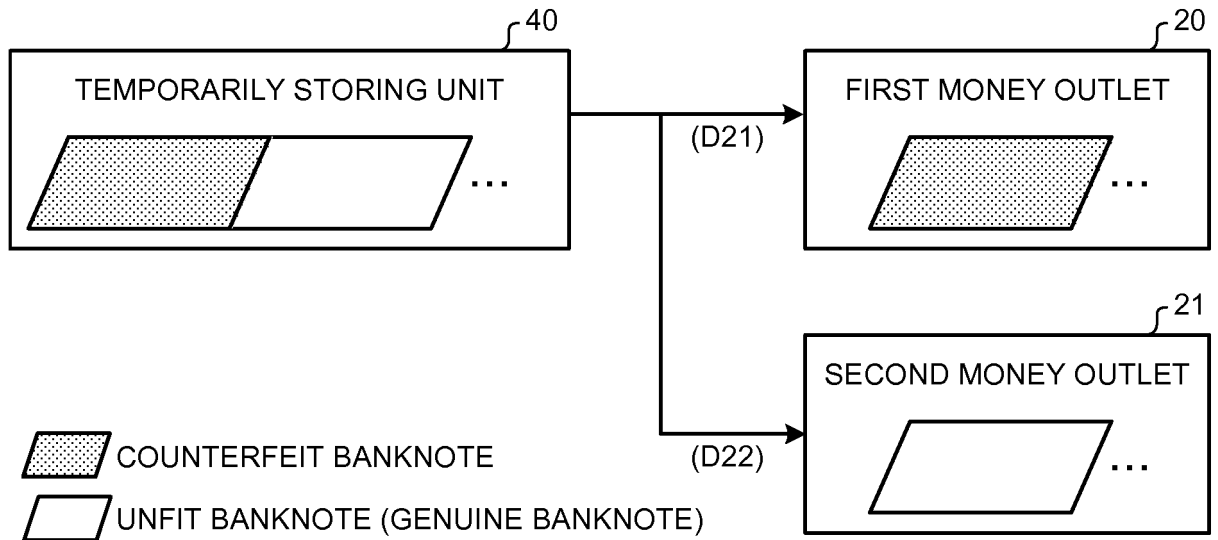


FIG.11B



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2015/077968

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| 5 | A. CLASSIFICATION OF SUBJECT MATTER G07D9/00(2006.01)i, G07D13/00(2006.01)i, G07F19/00(2006.01)i | |
| | According to International Patent Classification (IPC) or to both national classification and IPC | |
| 10 | B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) G07D9/00, G07D13/00, G07F19/00 | |
| 15 | 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 1996-2015 Kokai Jitsuyo Shinan Koho 1971-2015 Toroku Jitsuyo Shinan Koho 1994-2015 | |
| | Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) | |
| 20 | C. DOCUMENTS CONSIDERED TO BE RELEVANT | |
| | Category* | Citation of document, with indication, where appropriate, of the relevant passages |
| 25 | X A | JP 2013-117899 A (Oki Electric Industry Co., Ltd.), 13 June 2013 (13.06.2013), paragraphs [0027], [0036], [0099], [0103], [0119], [0121]; fig. 2, 9, 12 & US 2014/0291110 A1 paragraphs [0040], [0050], [0126], [0130], [0146], [0148]; fig. 2, 9, 12 & CN 103975368 A |
| 30 | A | JP 63-282595 A (Omron Tateisi Electronics Co.), 18 November 1988 (18.11.1988), page 3, lower right column, lines 6 to 18; page 4, upper left column, line 7 to upper right column, line 9; fig. 1, 4 (Family: none) |
| 35 | | Relevant to claim No. 1 2-10 1 |
| 40 | <input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex. | |
| 45 | * Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family | |
| 50 | Date of the actual completion of the international search 09 December 2015 (09.12.15) | Date of mailing of the international search report 22 December 2015 (22.12.15) |
| 55 | Name and mailing address of the ISA/ Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan | Authorized officer Telephone No. |

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2015/077968

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| C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT | | |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| A | JP 2000-268220 A (Glory Ltd.), 29 September 2000 (29.09.2000), paragraphs [0020] to [0021]; fig. 3 (Family: none) | 1 |

REFERENCES CITED IN THE DESCRIPTION

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