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(71) Applicants:
- **Aruze Corp.**
  Tokyo 135-0063 (JP)
- **Seta Corp.**
  Koto-ku
  Tokyo
  135-0063 (JP)

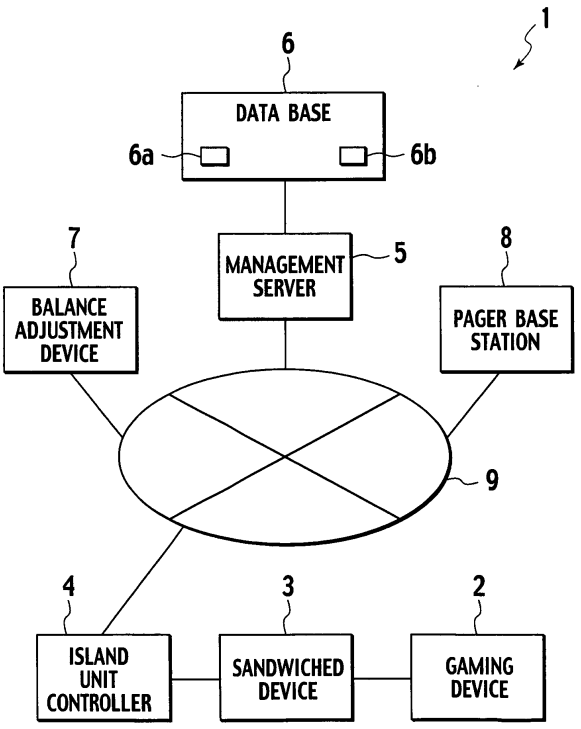
(72) Inventors:
- **Fujimoto, Jun**
  Tokyo 135-0063 (JP)
- **Yoshioka, Kazuei**
  Tokyo 135-0063 (JP)
- **Nakatsu, Tsuyoshi**
  Tokyo 135-0063 (JP)
- **Chiba, Hiroyuki**
  Tokyo 135-0063 (JP)

(74) Representative: **HOFFMANN EITLE**
Patent- und Rechtsanwälte
Arabellastrasse 4
81925 München (DE)

(54) Peripheral devices for gaming device, management server and gaming system therewith

(57) A peripheral device of a gaming device operating in connection with a management server to manage a balance deposited by a player as a balance data is disclosed. The peripheral device has a reader unit for reading a characteristic peculiar to the player, a reception unit for receiving an instruction of deposition to the balance and a request for withdrawal of the balance by the player, and a controller. The controller is to convert the characteristic into a characteristic data, transmit the instruction or the request with the characteristic or the characteristic data to the management server in response to the instruction or the request, and receive the balance data from the management server.

FIG. 1



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Description

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[0001] The present invention relates to peripheral devices for providing a service for a player of a gaming device and a gaming system therewith.

DESCRIPTION OF THE RELATED ART

[0002] Certain gaming devices are installed in a gaming arcade to be arranged in one or more rows referred to as "Islands". Being sandwiched in these gaming devices, peripheral devices for providing various services for a player of the gaming device, commonly called "Sandwiched Devices", are provided. The sandwiched devices provide services such as providing gaming media such as gaming balls or medals, or instructing the gaming device to provide the media, in response to depositing coins. Money in cash, prepaid cards and membership cards are available to the depositing.

SUMMARY OF THE INVENTION

[0003] If the player does not use up the deposited coins to leave a balance, the balance may be exposed to risk of being stolen particularly when the player temporarily leaves his/her seat.

[0004] An obj ect of the present invention is provision of security measurements for management of the balance deposited by the player of the gaming device.

[0005] In accordance with a first aspect of the present invention, a peripheral device of a gaming device operates in connection with a management server to manage a balance deposited by a player as a balance data. The peripheral device is provided with: a reader unit operable to read a characteristic peculiar to the player; a reception unit operable to receive an instruction of deposition to the balance and a request for withdrawal of the balance by the player; and a controller operable to convert the characteristic into a characteristic data, transmit the instruction or the request with the characteristic or the characteristic data to the management server in response to the instruction or the request, and receive the balance data from the management server.

[0006] Preferably, the controller is intended for a balance at a step where the balance has not been changed for a gaming medium.

[0007] More preferably, the reader unit is provided with a fingerprint imaging device.

[0008] In accordance with a second aspect of the present invention, a management server operates in connection with one or more peripheral devices and gaming devices to manage balances deposited by players in correlation with characteristics of the players. The management server is provided with: a data base including one or more records, each of the records including a characteristic field and a balance field, the characteristic field and the balance field being correlated with each other; and a controller operable to receive a data with an instruction of deposition or a request for withdrawal from one of the peripheral devices, write the characteristic and the balance in the received data respectively on the characteristic field and the balance field in one of the records in response to the instruction, and search a specific record having a specific characteristic coinciding with the characteristic in the received data to transmit a specific balance in the specific record to said one of the peripheral devices.

[0009] Preferably, the management server is further provided with a storage device storing the data base.

[0010] In accordance with a third aspect of the present invention, a peripheral device of a gaming device operates in connection with a management server to adjust a balance deposited by a player on the basis of characteristic data and balance data stored in the management server. The peripheral device is provided with: a reader unit operable to read a characteristic peculiar to the player; a reception unit operable to receive a request for adjustment of the balance by the player; a cash-out device operable to cash out a controlled number of bills and coins; and a controller operable to convert the characteristic into a characteristic data, transmit the request with the characteristic or the characteristic data to the management server in response to the request, and receive the balance data from the management server to cause the cash-out device to cash out the controlled number of the bills and the coins.

[0011] In accordance with a fourth aspect of the present invention, a gaming system manages a balance deposited by a player. The gaming system is provided with: one or more peripheral devices, each of the peripheral devices including; a reader unit operable to read a characteristic peculiar to the player, a reception unit operable to receive an instruction of deposition to the balance and a request for withdrawal of the balance by the player, and a controller operable to convert the characteristic into a characteristic data, transmit the instruction or the request with the characteristic or the characteristic data in response to the instruction or the request, and receive a balance data specific to the player; and a management server including; a data base including one or more records, each of the records including a characteristic field and a balance field, the characteristic field and the balance field being correlated with each other, and a controller operable to receive the instruction or the request with the characteristic or the characteristic data from one of the peripheral devices, renew the characteristic field and the balance field in one of the records in response to the instruction, and search a specific record having a specific characteristic coinciding with the characteristic in the received data to transmit a specific balance data in the specific record as the balance data specific to the player to said one of the peripheral devices.

[0012] Preferably, the gaming system is further provided with a second peripheral device provided with: a second peripheral device; a reader unit operable to read a characteristic peculiar to the player, a reception unit operable to receive a request for adjustment of the balance by the player, a cash-out device operable to cash out a controlled number of bills and coins, and a controller operable to convert the characteristic into a characteristic data, transmit the request with the characteristic or the characteristic data to the management server in response to the request, and receive a balance data specific to the player from the management server to cause the cash-out device to cash out the controlled number of the bills and the coins.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013]

Fig. 1 is a block diagram of a gaming system in accordance with an embodiment of the present invention;
Fig. 2 is a perspective view of a sandwiched device in accordance with the embodiment;
Fig. 3 is a block diagram of the sandwiched device;
Fig. 4 is a block diagram of a management server in accordance with the embodiment;
Fig. 5 is an illustration of a record structure in a fingerprint data base in accordance with the embodiment;
Fig. 6 is a block diagram of a balance adjustment device in accordance with the embodiment;
Fig. 7 is a flowchart with respect to a wait state of the sandwiched device;
Fig. 8 is a flowchart for operation of the sandwiched device with respect to accumulation of a balance;
Fig. 9 is a flowchart for operation of the sandwiched device with respect to withdrawal of the balance;
Fig. 10 is a flowchart for operation of the management server with respect to accumulation of the balance;
Fig. 11 is flowchart for operation of the management server with respect to withdrawal of the balance;
Fig. 12 is a flowchart for operation of the sandwiched device when receiving a disablement notification;
Fig. 13 is a flowchart for operation of the balance adjustment device;
Fig. 14 is a flowchart for operation of the management server with respect to balance adjustment; and
Fig. 15 is a flowchart for operation of the management server with respect to rationalization of the fingerprint data base.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0014] A sandwiched device, a management server and a gaming system therewith in accordance with an embodiment of the present invention will be described hereinafter with reference to the appended drawings.

(A-1)Constitution

[0015] The gaming system 1 in accordance with the embodiment is provided with gaming devices 2, sandwiched devices 3, island unit controllers 4, a management server 5, a data base 6, a balance adjustment device 7 and a pager base station 8. The island unit controllers 4, the management server 5, the balance adjustment device 7 and the pager base station 8 as peripheral devices are linked to a network 9 of a gaming arcade so as to communicate with each other.

[0016] Various gaming devices such as a pachinko, a slot machine or any gaming machines may be applied to the gaming device 2. The following description will be given to a case where the slot machine is applied to the gaming device 2.

[0017] The sandwiched devices 3 are arranged in rows with the gaming devices 2, referred to as islands, and are sandwiched between the gaming devices 2. The sandwiched devices 3 in accordance with the embodiment serve to change deposited coins in cash or a balance by the deposited cash into medals to play the slot machine, and provide security measures by fingerprint authentication, which uses fingerprints as physical characteristics respectively peculiar to players, in accumulation to the balance and withdrawal of the balance.

[0018] The island unit controller 4 is provided in each island and serves the plurality of gaming device 2 and the sandwiched devices 3 in the island in common as a relay of communication from and to the management server 5. The gaming device 2 and the sandwiched devices 3 may be configured to communicate with the management server 5 without the island unit controller 4.

[0019] Themanagement server 5 serves asmanagement of information of the respective sandwiched devices 3 and information with respect to gaming in the respective gaming devices 2, and checking with respect to fingerprint authentication. A storage device such as a hard disk for storing the data base 6 is provided in relation to the management server 5. The data base 6 contains a fingerprint data base 6a and a device data base 6b. The management server 5 may serve a plurality of gaming arcades and may be installed separately from the gaming arcades.

[0020] The balance adjustment device 7 is installed in, for example, the vicinity of a gift exchange or an entrance of the gaming arcade. The balance adj ustment device 7 serves for paying back a balance left not changed into gaming media.

[0021] The pager base station 8 is installed in the gaming arcade to communicate with pager terminals (not shown) which attendants of the gaming arcade carry around.

[0022] The management server 5 installed in a management room establishes various communications with

the gaming devices 2, the sandwiched devices 3, the island unit controller 4, the balance adjustment device 7 and the pager base station 8 installed in a hall of the gaming arcade via the network 9. Instead of the network 9, any private lines may be applied thereto.

[0023] A perspective view of the sandwiched device 3 is illustrated in Fig. 2. The sandwiched device 3 is provided with an alarm lamp 11, a plurality of state indicator LED 12a-12c (three in Fig. 2 as merely an example), a bill insertion slot 13, a coin insertion slot 14, a communication window 15 for remote control, an indicator LCD 16, a numeric keypad part 17, a coin return slot 18 and a fingerprint reading window 19, all of which are on a front face of the sandwiched device 3 when installed.

[0024] The alarm lamp 11 is to flash or blink so as to alarm anyone when the sandwiched device 3 encounters any difficulties (for example, any contradiction in fingerprint authentication).

[0025] The indicator LED 12a-12c are to indicate the current state of the sandwiched device 3 or the gaming device 2 by the respective flashing and blinking or by combinations of a plurality of flashing or blinking indicators. For example, a state of waiting fingerprint imaging and a state of processing after imaging of the fingerprint are indicated thereby.

[0026] The bill insertion slot 13 is to receive depositing bills and the coin insertion slot 14 is to receive depositing coins. The coin return slot 18 is to return coins which have been once deposited. The bill insertion slot 13 is also configured to return once deposited bills in response to operation of a cash-out key or detection of counterfeit bills as will be described later. Such a function is not given to the coin insertion slot 14 and instead the coin return slot 18 serves therefor. Either the bill insertion slot 13 or the coin insertion slot 14 may be omitted to limit accepting money to bills or coins.

[0027] The communication window 15 is to receive infrared signals from remote control transmitters (not shown) which attendants of the gaming arcade carry around to give instructions to the sandwiched device 3.

[0028] The indicator LCD 16 is to indicate management information which the management server 5 or the sandwiched device 3 issues. The numeric keypad part 17 is an input device including numeric keys, the cash-out key and such to receive commands from players or attendants. The indicator LCD 16 and the numeric keypad part 17 constitute an operation panel part.

[0029] The fingerprint reading window 19 is to read fingerprints placed in front thereof and is provided with a CCD camera part 29 (see Fig. 3) in the interior thereof.

[0030] Referring to Fig. 3, the sandwiched device 3 is provided with a controller part 20, a communication part 21, a remote-controller communication part 22, a bill processing part 23, a coin processing part 24, an alarm lamp driver part 25, a LED driver part 26, an indicator LCD driver part 27, a numeric keypad interface (IF) part 28, a CCD camera part 29 and such for electrical processing.

[0031] The controller part 20 is, for example, provided with a CPU, a ROM, a RAM and such to serve for total control of the sandwiched device 3. The controller part 20 controls respective parts of the sandwiched device 3 to carry out operations illustrated in flowcharts of Figs. 7-9 and 12. Further, the controller part 20 stores data necessary to the control. For example, the controller part 20 stores data of a balance left not changed into gaming media.

[0032] The controller part 20 is configured so as to process image signals (of fingers) given by the CCD camera part 29 into fingerprint data.

[0033] The communication part 21 is to execute communications with the gaming device 2, the island unit controller 4, the management server 5 and such under the control of the controller part 20. While illustrated as a whole in Fig. 3, the communication part for communication with the gaming device 2 may be separated from the communication part for communication with the other devices. The management server 5 uses a publicly known polling scheme to establish communications with the plurality of sandwiched devices 3, in which one device establishes communications with the other devices one by one. The communication part 21 establishes communication with the management server 5 by receiving such polling. The balance adjustment device 7 may be also subject to such communication in the polling scheme.

[0034] The remote-controller communication part 22 is to receive infrared signals from the remote control transmitters of the attendants via the communication window 15 and give instructions to the controller part 20.

[0035] The bill processing part 23 is to directly control conveyance, authentication, pooling and such of the deposited bills to carry out judgment of authenticity, face values and such of the bills and give information thereof to the controller part 20. In a case where the deposited bills are judged to be counterfeit, the bill processing part 23 controls the bill insertion slot 13 to return the bills back.

[0036] The coin processing part 24 is to directly control conveyance, authentication, pooling and such of the deposited coins to carry out judgment of authenticity, face values and such of the coins and give information thereof to the controller part 20. In a case where the deposited coins are judged to be counterfeit, the coin processing part 24 controls the coin return slot 18 to return the coins back.

[0037] The alarm lamp driver part 25 is to drive the alarm lamp 11 under the control of the controller part 20 and the LED driver part 26 is to drive the state indication LED 12a-12c under the control of the controller part 20.

[0038] The indicator LCD driver part 27 is to drive the indicator LCD 16 under the control of the controller part 20. The indicator LCD 16 indicates data of a player' s balance applicable to being changed into gaming media, the other data and messages to the player. The numeric keypad interface (IF) part 28 is to sense operation of the numeric keypad part 17 and gives operation signals to the controller 20.

[0039] The CCD camera part 29 takes image of fingers of players placed in front of the fingerprint reading window 19 under the control of the controller part 20 and gives image signals to the controller part 20.

[0040] The sandwiched device 3 in accordance with the present embodiment merely serves for booting up and control of the gaming device 2, which changes a deposited money into gaming media such as medals to play the slot machine, and, in itself, does not serve for changing a deposited money to the medals. However, it may be modified such that the sandwiched device 3 in itself serves for exchanging of medals.

[0041] Referring to Fig. 4, the management server 5 is provided with a controller part 30, a communication part 31 and a data base (DB) access part 32.

[0042] The controller part 30 is, for example, provided with a CPU, a ROM, a RAM and such to serve for total control of the management server 5. The controller part 30 controls respective parts of the management server 5 to carry out operations illustrated in flowcharts of Figs. 10, 11, 14 and 15. Further, the controller part 30 stores data necessary to the control.

[0043] The communication part 31 is to execute communications with the sandwiched device 3 (and a combination with the gaming device 2), the island unit controller 4, the balance adjustment device 7, and the pager base station 8 and such under the control of the controller part 30. While illustrated as a whole in Fig. 4, the communication part may be composed of a plurality of subparts for selective and individual communication with respective devices. The management server 5 uses the polling scheme to establish communications with the plurality of sandwiched devices 3.

[0044] The data base access part 32 is to access the data base 6 to read and write data thereon under the control of the controller part 20.

[0045] Referring to Fig. 5, the data base 6 includes the fingerprint data base 6a with a record structure shown therein. Each record of the fingerprint data base 6a includes fields of a fingerprint data, a registration time data, a balance data, and a history data, all of which are correlated with a specific player.

[0046] The fingerprint data is a data for expressing a feature of a fingerprint rendered from an image imaged by the sandwiched device 3. Any publicly known image data type such as what is disclosed in Japanese Patent Application Laid-open No. JP2003-274006, in which an image data is composed of characteristic points and relations, may be applied to the fingerprint data. Usage of such a fingerprint data in which a feature of a fingerprint is compressed leads to improvement of quality of security with respect to leakage of the fingerprint information. Meanwhile, the respective records of the fingerprint data base 6a are sorted in binary number order. This sorting contributes to ease of comparing the imaged fingerprint data with the data base and reduction in time required to the comparing, as this systemnot like the other ordinary fingerprint authentication systems cannot refer the other data to refine search the fingerprint data.

[0047] The registration time data is composed of a time (or a time and a date) when the record is formed. The registration time data is, for example, used for limiting a time limit for balance adjustment. The registration time data is used for determining whether the balance adjustment is allowed. For example, in such a scheme, a player cannot adjust his/her balance to get the balance in cash in a next day of the date when he/she accumulates the balance, or he/she is merely allowed to carry out balance adjustment for one month from the date.

[0048] The balance data is composed of a player's balance applicable to being changed into gaming media. When the player changes the balance into gaming media, it is further required that the imaged fingerprint coincides with the stored fingerprint data.

[0049] The history data is composed of a received data from which a fingerprint data is excluded and a receiving time when the management server 5 receives the data including the finger print data from one of the sandwiched devices 3.

[0050] The device data base 6b is composed of a plurality of data respectively correlated with the sandwiched devices 3. Each data includes a sum of the deposited money in cash and the time thereof composes the data for example. Further, the data base 6b may include flags whether the respective gaming devices 2 correspondent to the sandwiched devices 3 are in playing. However, the device data base 6b excludes the fingerprint data.

[0051] Referring to Fig. 6, the balance adjustment device 7 is provided with a controller part 40, a communication part 41, a bill processing part 42, a coin processing part 43, an alarm lamp driver part 44, an indicator LCD driver part 45, a keypad interface (IF) part 46, and a CCD camera part 47.

[0052] The controller part 40 is, for example, provided with a CPU, a ROM, a RAM and such to serve for total control of the balance adjustment device 7. The controller part 40 controls respective parts of the balance adjustment device 7 to carry out operations illustrated in flowcharts of Fig. 13. Further, the controller part 40 stores data necessary to the control.

[0053] The controller part 40 is configured so as to process image signals (of fingers) given by the CCD camera part 47 into fingerprint data.

[0054] The communication part 41 is to execute communications with the management server 5 under the control of the controller part 40. The management server 5 also uses the polling scheme to establish communications with the balance adjustment device 7 like as the sandwiched device 3. The communication part 41 establishes communication with the management server 5 by receiving such polling. The balance adjustment device 7 may use another scheme to establish communications with the management server 5.

[0055] The bill processing part 42 is to directly control apparatuses (not shown) for transporting, pooling and cashing out bills. The bill processing part 42 controls the

apparatuses to cash out the instructed number of bills to a bill cash-out slot under the control of the controller part 40 at a time of balance adjustment if bills are required.

[0056] The coin processing part 43 is to directly control apparatuses (not shown) for transporting, pooling and cashing out coins. The coin processing part 43 controls the apparatuses to cash out the instructed number of coins to a coin cash-out slot under the control of the controller part 40 at a time of balance adjustment if coins are required.

[0057] The alarm lamp driver part 44 is to drive an alarm lamp (not shown) under the control of the controller part 40.

[0058] The indicator LED driver part 45 is to drive one or more indicator LEDs (not shown) under the control of the controller part 40. The indicator LEDs are applied to prompting players to have their fingerprints imaged by flashing or blinking (or a combination thereof) of the LEDs. The keypad interface part 46 is to sense operation on an adjustment key or a call key (both not shown) to notify the operation as an operation signal to the controller part 40.

[0059] The CCD camera part 47 takes image of fingers of players placed in front of a fingerprint reading window (not shown) under the control of the controller part 40 and gives image signals to the controller part 40.

[0060] The gaming devices 2, the island unit controllers 4 and the pager base station 8 may be constituted in a similar way to publicly known gaming devices, island unit controllers and pager base station, and therefore the detailed description will be omitted.

(A-2)Operations

[0061] Operation of the gaming system 1 will be described hereinafter. As a feature of the present embodiment, fingerprint authentication is used for accumulation to and withdrawal of a deposited balance.

[0062] Referring to Fig. 7, a wait state of the sandwiched device 3 and operations thereafter will be described hereinafter.

[0063] The controller part 20 of the sandwiched device 3 in the wait state reciprocally monitors whether an instruction for changing the balance for medals is given, whether a deposit in cash is received, whether a deposit using fingerprint matching is called, and whether an instruction to cash out the balance is received (S100-S103).

[0064] In a case where a call key for providing medals of the sandwiched device 3 or of the gaming device 2 in combination with the sandwiched device 3 is operated, the controller part 20 verifies whether the balance is zero (S104). If zero, the controller part 20 returns to the wait state, and, if not zero, the controller part 20 processes provision of medals (S105) and then returns to the wait state. In the process of provision of medals, the controller part 20 collaborates with a medal emission device (not shown) to emit a predetermined number of medals to a tray of the gaming device 2 and in association decrease the balance in the stored balance data by one unit. The controller part 20 also carries out renewal of indication of the left balance on the indicator LCD 16 and notifies a change in the balance data to the management server 5. Then, the management server 5 renews the balance data of the device data base 6b related to the current sandwiched device 3.

[0065] The notification (communication) from the sandwiched device 3 to the management server 5 is executed at timing when the polling is given to the sandwiched device 3. The same applies to any communications described in the following description.

[0066] When the controller part 20 of the sandwiched device 3 receives notification of deposition in cash from the bill processing part 23 or the coin processing part 24, namely when the player deposits cash, the controller 20 causes increase of the balance in the balance data by a value correspondent to a sum of the cash. The controller part 20 also carries out renewal of indication of the left balance on the indicator LCD 16 and notifies a change in the balance data to the management server 5 so as to renew the balance data of the device data base 6b related to the current sandwiched device 3. Then, the controller part 20 returns to the wait state.

[0067] When the controller part 20 of the sandwiched device 3 receives an instruction to cash out the balance, the controller part 20 transits to cash-out processes shown in Fig. 8. When the controller part 20 receives an instruction to deposit using fingerprint matching, the controller part 20 transits to deposition processes with fingerprint matching shown in Fig. 9. Equivalent procedures will be executed in a case of receiving an instruction to accumulate the balance.

[0068] In a case where a cash-out key in the numeric keypad part 17 of the sandwiched device 3 or of the gaming device 2 is operated, namely when the player instructs to cash out the balance, the controller part 20 of the sandwiched device 3 verifies whether the balance is zero (S150) as shown in Fig. 8. If zero, the controller part 20 returns to the wait state shown in Fig. 7.

[0069] On the other hand, if the balance is not zero, the controller part 20 of the sandwiched device 3 causes the indicator LEDs 12a-12c to flash or blink (or carry out a combination of flashing and blinking; including merely one LED to flash or blink) so as to prompt the player to have his/her fingerprint imaged (S151). Subsequently the controller 20 causes the CCD camera part 29 to image the fingerprint (S152) as a characteristic of the player, convert the image into a fingerprint data (S153) as a characteristic data, and buffer the converted fingerprint data therein (S154). As the conversion scheme, the method disclosed in Japanese Patent Application Laid-open No. 2003-274006 can be applied.

[0070] The gaming device 2 correspondent to the sandwiched device 3 may be modified so as to deny cashing in the course of playing. More specifically, under reading the fingerprint, the other processes are denied

so as to regulate accurate timing for reading the fingerprint. Since information about the fingerprints belong to privacy of individuals, registration of the fingerprint is limited in occasions of cashing out and accumulation of the balance so as to omit unnecessary registration. While omitted in Fig. 8, if failure in conversion to the fingerprint data occurs, re-prompting by the indicator LEDs 12a-12c is carried out.

[0071] When the controller part 20 of the sandwiched device 3 obtains a priority for transmission, the controller part 20 transmits a request data for accumulation, which at least includes a data representative of being for accumulation, an ID of the sandwiched device 3, a balance data and a fingerprint data, to the management server 5 (S155). The controller part 20 subsequently clears the prompt indication of the indicator LEDs 12a-12c (S156), and waits a completion notification of accumulation from the management server 5 (S157). Meanwhile, the communication of the request data for accumulation may be ciphered.

[0072] When the controller part 30 of the management server 5 receives the request data for accumulation, the controller part 30 carries out processes for accumulation of the balance in the balance data in the fingerprint data base 6a (S200-S203). The controller part 30 subsequently clears the balance to be zero (S204), and, by the polling communication, further notifies completion of accumulation to the sandwiched device 3 which transmits the request data for accumulation in the polling communication (S205).

[0073] The processes by the controller part 30 of the management server 5 are for example as follows. The controller part 30 verifies whether the record of the fingerprint data coinciding with the received fingerprint data exists (S200). If found, the controller part 30 renew the balance data in the correspondent record into what the received balance data is added and adds a history relating to the current communication to the history data in the record (S201). If not found in the fingerprint data base 6a, the controller part 30 adds a new record for the received fingerprint data to the fingerprint data base 6a (S202). The controller part 30 subsequently inserts the received fingerprint data into the field for the fingerprint of the current record, the received time on the basis of a timer of the controller 30 into the field for the registered time, the received balance data into the field for the balance data, and the data related to the current communication into the field of the history data (S203). The new record is subject to sorting on the basis of the fingerprint data.

[0074] When the controller part 20 of the sandwiched device 3 is given the completion notification of accumulation from the management server 5, the controller part 20 clears the balance data to be zero (S158), and returns to the wait state shown in Fig. 7.

[0075] When a key for call for an accumulated balance in the numeric keypad part 17 of the sandwiched device 3 is operated in the wait state, namely when the deposit using fingerprint matching is instructed, the controller part of the sandwiched device 3 causes the indicator LEDs 12a-12c to flash or blink so as to prompt the player to have his/her fingerprint imaged (S250) as shown in Fig. 9. Subsequently the controller 20 causes the CCD camera part 29 to image the fingerprint (S251), convert the image into a fingerprint data (S252), and buffer the converted fingerprint data therein (S253).

[0076] The gaming device 2 correspondent to the sandwiched device 3 may be modified so as to deny cashing in the course of playing. More specifically, under reading the fingerprint, the other processes are denied so as to regulate accurate timing for reading the fingerprint. While omitted in Fig. 9, if failure in conversion to the fingerprint data occurs, re-prompting by the indicator LEDs 12a-12c is carried out.

[0077] When the controller part 20 of the sandwiched device 3 obtains a priority for transmission, the controller part 20 transmits a request data for withdrawal, which at least includes a data representative of being for withdrawal, an ID of the sandwiched device 3, a balance data and a fingerprint data, to the management server 5 (S254). The controller part 20 subsequently clears the prompt indication of the indicator LEDs 12a-12c (S255), and waits a notification of deposition and such from the management server 5 (S256-S259). Meanwhile, the communication of the request data for withdrawal may be ciphered.

[0078] When the controller part 30 of the management server 5 receives the request data for withdrawal, the controller part 30 carries out processes for withdrawal of the balance in the balance data in the fingerprint data base 6a as shown in Fig. 11.

[0079] The controller part 30 verifies whether the record of the fingerprint data coinciding with the received fingerprint data exists in the fingerprint data base 6a (S300).

[0080] If found, the controller part 30 further verifies whether the balance in the balance data of the record is zero or not (S301). If the balance is not zero, the controller part 30 of the management server 5 generates and transmits a notification of deposition including the balance data to the sandwiched device 3 (S302). The controller part 30 subsequently clears the balance data to be zero, adds a history to the history data, and renews the balance data correspondent to the current sandwiched device in the device data base 6b (S303).

[0081] In contrast, if the balance in the balance data of the record with respect to the fingerprint data correspondent to the received fingerprint data is zero, the controller part 30 of the management server 5 discriminates a previous sandwiched device (referred with a reference character 3X hereinafter), at which withdrawing the balance is carried out just prior to the current sandwiched device, and a time when the withdrawing is done on the basis of the history data. Then the controller part 30 determines whether any irregularity has been done at the previous sandwiched device 3X on the basis of stored

contents in the device data base 6b (S304).

[0082] In a case where a player plays a game by withdrawing the accumulated balance at the previous sandwiched device 3X, then moves to the other sandwiched device 3 and requests withdrawal of the accumulated balance while the balance is left in the previous sandwiched device 3X, the other next player may misappropriate the balance in the previous sandwiched device 3X. The controller part 30 of the management server 5 is capable of recognizing such a possibility by using the aforementioned scheme. The controller part 30 can check such a possibility of irregularity by detecting the balance left in the previous sandwiched device 3X while deposition of cash into the previous sandwiched device 3X is not done after the time of withdrawal at the previous sandwiched device 3X until the time of request for withdrawal at the current sandwiched device 3 on the basis of the stored contents of the fingerprint data base 6a and the device data base 6b.

[0083] When the controller part 30 finds any possibility of irregularities occurred at the previous sandwiched device 3X at which withdrawing the balance is carried out just prior to the current sandwiched device, the controller part 30 generates and transmits a disablement notification which requests disablement of use to the previous sandwiched device 3X (S305). The controller part 30 subsequently generates and transmits a notification of deposition including a balance data with respect to the previous sandwiched device 3X in the device data base 6b to the current sandwiched device 3 (S306). The controller part 30 further subsequently clears the balance in the balance data to be zero, adds the current contents to the history data, and renews the balance data with respect to the current sandwiched device 3 in the device data base 6b (S307). The controller part 30 still subsequently transmits a notification that a possibility of irregularities is found with respect to the previous sandwiched device 3X to the pager terminal which the attendant taking charge of the previous sandwiched device 3X carries about (S308).

[0084] The notification of deposition generated at the step S306 and the notification of regular deposition generated at the step S302 may include any information to discriminate these notifications.

[0085] In a case where the balance in the balance data is zero and any possibility of irregularities is not found with respect to the previous sandwiched device 3X, the controller part 30 of the management server 5 transmits a notification that the balance is zero to the sandwiched device 3 which is the source of the currently received data (S309).

[0086] In a case where the controller part 30 of the management server 5 judges that a record of a fingerprint data coinciding with the received fingerprint data does not exist in the fingerprint data base 6a, the controller part 30 increments the number CNT of failure in fingerprint authentication by one (S310), and determines whether the number CNT reaches an upper limit (for example, three) (S311). If not, the controller part 30 transmits a request for re-transmission to the sandwiched device 3, which requests the sandwiched device 3 to re-read the fingerprint image and re-transmit a converted data (S312). If the number CN reaches the upper limit, the controller part 30 transmits a notification of an authentication error to the sandwiched device 3 (S313).

[0087] When the controller part 20 of the sandwiched device 3 is given the notification of deposition by the management server 5, the controller part 20 increases the balance in the balance data by a value correspondent to a sum of the cash and carries out renewal of the indication of the balance by the indicator LCD 16 (S260). After this, the controller part 20 returns to the wait state shown in Fig. 7. Meanwhile, it may be modified so that reception of the notification of deposition generated at the step S306 and reception of the notification of regular deposition generated at the step S302 can be discriminated by flashing, blinking or its combination of the indicator LEDs 12a-12c.

[0088] When the controller part 20 of the sandwiched device 3 is given the notification of the balance to be zero from the management server 5, the controller part 20 causes the indicator LCD 16 and the indicator LEDs 12a-12c to indicate such (S261), and then returns to the wait state shown in Fig. 7.

[0089] When the controller part 20 of the sandwiched device 3 is given the request for re-transmission by the management server 5, the controller part 20 places processes back to the aforementioned step S250.

[0090] When the controller part 20 of the sandwiched device 3 is given the notification of the authentication error by the management server 5, the controller part 20 causes the indicator LCD 16 and the indicator LEDs 12a-12c to indicate such (S262), and returns to the wait state shown in Fig. 7.

[0091] Referring to Fig. 12, the previous sandwiched device 3X functions in accordance with the flowchart shown therein when receiving the disablement notification.

[0092] When the previous sandwiched device 3X receives the disablement notification, the previous sandwiched device 3X forcibly clears the balance in the balance data and the indicating balance data to be zero (S350), and issues an alert by flashing or blinking the alarm lamp 11 (S351). The alert may be issued by a buzzer.

[0093] Referring to Fig. 13, the balance adjustment device 7 can adjust balances of players, which are accumulated in relation to their fingerprint data, by cashing out. The balance adjustment device 7 may or may not limit a time limit for allowing balance adjustment. However, the following description will be given to a case where a player is limited to adjust his/her balance only in a first day when he/she accumulates his/her balance.

[0094] The controller part 40 of the balance adjustment device 7 waits operation of a balance adjustment key or a call key. When the balance adjustment key is operated,

the controller part 40 starts processes shown in Fig. 13. Meanwhile, operations when the call key is operated will be omitted.

[0095] When balance adjustment is instructed by operation of the balance adjustment key, the controller part 40 of the balance adjustment device 7 causes the not-shown indicator LEDs to flash or blink so as to prompt the player to have his/her fingerprint imaged (S400). The controller part 40 subsequently causes the CCD camera part 47 to image the fingerprint (401), convert the image into a fingerprint data (S402), and buffer the converted fingerprint data therein (S403). Meanwhile, it is given that the balance adjustment device 7, like as the sandwiched devices 3, is subject to communications in the polling scheme. Further, though omitted in Fig. 13, re-reading the fingerprint image is to be carried out when conversion to the fingerprint data is failed.

[0096] When the controller part 40 of the balance adjustment device 7 obtains a priority for transmission, the controller part 40 transmits a request data for balance adjustment which at least includes a data representative of being for balance adjustment, an ID of the balance adjustment device 7 and a fingerprint data, to the management server 5 (S404). The controller part 40 subsequently clears the prompt indication of the indicator LEDs (S405), and waits a reply of a notification of authentication from the management server 5 (S406-S409). Meanwhile, the communication of the request data for balance adjustment may be ciphered.

[0097] When the controller part 30 of the management server 5 receives the request data for balance adjustment, the controller part 30 carries out processes of fingerprint authentication as shown in Fig. 14.

[0098] The controller part 30 verifies whether the record of the fingerprint data coinciding with the received fingerprint data exits in the fingerprint data base 6a (S450).

[0099] If found, the controller part 30 further verifies whether the balance in the balance data of the record is zero or not (S451). If the balance is not zero, the controller part 30 of the management server 5 verifies whether the registration time data in the record is the current date or not (S452). If the registration time data is the current date, the controller part 30 generates and transmits a notification of affirmative authentication including the balance data in the record to the balance adjustment device 3 (S453). The controller part 30 subsequently waits a reply of completion of balance adjustment from the balance adj ustment device 7 (S454), and, after receiving the reply, deletes the correspondent record in the fingerprint data base 6a (S455).

[0100] If the balance in the balance data is zero, the controller part 30 of the management server 5 generates and transmits a notification of affirmative authentication representative of no balance to the balance adjustment device 7 (S456).

[0101] If the balance in the balance data is not zero and the registration time is not the current date, the controller part 30 of the management server 5 generates and transmits a notification of affirmative authentication representative of such (S457).

[0102] If a record of a fingerprint data coinciding with the received fingerprint data is not found in the fingerprint data base 6a, the controller part 30 of the management server 5 generates and transmits a notification of negative authentication to the balance adjustment device 7 (S458).

[0103] When the controller part 40 of the balance adjustment device 7 is given the notification of affirmative authentication including the balance data by the management server 5, the controller part 40 causes the bill processing part 42 and the coin processing part 43 to cash out money correspondent to the balance (S410), transmits a notification of completion of balance adjustment to the management server (S411), and, after this, returns to the wait state.

[0104] When the controller part 40 of the balance adjustment device 7 is given the notification of affirmative authentication representative of the balance to be zero, the controller part 40 causes the indicator LEDs (not shown) to flash or blink so as to report that the balance is zero (for a predetermined period of time such as five seconds; S412), and, after this, returns to the wait state.

[0105] Further, when the controller part 40 of the balance adjustment device 7 receives the notification of affirmative authentication representative of the balance not to be zero and the registration time not to be the current date, the controller part 40 causes the indicator LEDs (not shown) to flash or blink so as to report that balance adjustment cannot be carried out if out of the registered date (for a predetermined period of time such as five seconds; S413), and, after this, returns to the wait state.

[0106] Still further, when the controller part 40 of the balance adjustment device 7 receives the notification of negative authentication, the controller part 40 causes the indicator LEDs (not shown) to flash or blink so as to report that the fingerprint has not been authenticated (for a predetermined period of time such as five seconds; S414), and, after this, returns to the wait state. Meanwhile, re-reading the fingerprint image may be carried out at a time of failure in authentication of the fingerprint data.

[0107] As described above, adjustment of a balance can be carried out correlated with the fingerprint data on the day when the fingerprint data is registered.

[0108] Referring to Fig. 15, the controller part 30 of the management server 5 carries out rationalization of the fingerprint data base 6a.

[0109] When a predetermined time after opening hours, for example 11 p.m. , comes, the controller part 30 of the management server 5 automatically carries out the processes shown in Fig. 15. In a case where the management server 5 has man-machine interfaces such as a numerical keypad and a remote-controller receiver, the processes shown in Fig. 15 may be triggered by an instruction from a manager of the gaming arcade or the attendants.

[0110] After starting the processes shown in Fig. 15, the controller part 30 of the management server 5 first sets a leading record as a subject record (S500), verifies that a first rationalizing process (S502 and S503) is not finished on all the records (S501), and then determines whether the balance in the balance data of the subject record is zero or not (S502). If the balance in the balance data of the subject record is zero, after deleting the record (S503), or, if not zero, just after the determination, the controller part 30 sets a subsequent record as a subject record (S504), and returns to the step S501.

[0111] When finishing the first rationalizing process on all the records, the controller part 30 of the management server 5 sets a leading record among all the left records as a subject record (S505), verifies that a second rationalizing process (S507 and S508) is not finished on all the records (S506), and then determines whether the subject record has not been accessed for one month (this term may be variable) with referring to the registered time data and the history data in the subject record (S507). If the subject record is determined not to be accessed for one month, after deleting the record (S508), or, if accessed during the last one month, just after the determination, the controller part 30 set a subsequent record as a subject record (S509), and returns to the step S506.

[0112] When finishing the second rationalizing process on all the records, the controller part 30 of the management server 5 finishes a succession of the processes shown in Fig. 15.

[0113] As described above, rationalization of records having no balance or not accessed for one month whereas having any balance.

(A-3)Effects

[0114] The present embodiment provides the following effects since the balances correlated with the fingerprint data are stored in the management server and extracted by fingerprint matching.

[0115] Though any system using prepaid or membership cards is susceptible to theft if players temporarily leave their seat, the present system in accordance with the present embodiment is insusceptible to theft.

[0116] Since the system is free from a transport mechanism for such cards, reliability of the sandwiched device is assured.

[0117] Further, since mechanisms for transportation or pooling of the cards are replaced with smaller mechanisms of such imaging devices, the sandwiched device can be easier constituted and reduced in cost. Further, since the expendable cards are not used, further reduction in cost can be expected.

[0118] Provided that a player transits from one gaming device to another gaming device, in a case where a card system is applied, he/she must carry about and strictly avoid losing his/her card. In accordance with the present embodiment, by using fingerprint matching, he/she is not required to carry about and avoid losing any object. Further he/she can even leave the gaming arcade and later withdraw his/her balance.

[0119] Cards are difficult to be proved of being stolen. However, provided that a stranger is going to use or withdraw a player's balance in the absence of the player, the present system can prove the stranger's injustice by referring the history data.

[0120] In accordance with the present embodiment, the fingerprint data are sorted and then stored in the fingerprint data base. Therefore, authentication by the management server can be made more quick. In the other fingerprint matching systems, search for authentication uses another search scheme together. For example, the other system obtains predetermined data (an account data, a card ID and such) from the card and then carries out authentication. Therefore, a fingerprint data in the fingerprint data base provided for search is specified in only one clearly defined path. In contrast, in accordance with the present embodiment, any other information cannot be used to search and hence limiting the range of search cannot be carried out on the basis of the other information. Therefore, sorting of the fingerprint data in advance is meaningful.

(B) Another embodiment

[0121] The aforementioned embodiment and its modifications may be further modified in such ways as described later.

[0122] While the gaming devices per se provide gaming media in the system in accordance with the aforementioned embodiment, it may be modified such that sandwiched devices instead provide gaming media.

[0123] While reading of a fingerprint is carried out at merely one time in the system in accordance with the aforementioned embodiment, reading may be carried out two or more times. For example, a provisional registration is carried out on the basis of the first reading and a regular registration is carried out after verifying that the secondarily read fingerprint coincides with the first one. By this scheme, improved security is provided.

[0124] Further, while authentication of fingerprint matching merely determines coincidence or incoincidence of a read fingerprint with a stored fingerprint data in accordance with the aforementioned embodiment, a third state such as half-coincidence may be defined as the result of authentication. For example, if authentication results in half-coincidence, the management server may prompt the player to have a fingerprint of another finger imaged at a time of new accumulation and may prompt the player to have a fingerprint of the identical finger re-imaged at a time of re-accumulation.

[0125] Still further, while the sandwiched device converts the image of the fingerprint into the fingerprint data in accordance with the aforementioned embodiment, the sandwiched device may pass the bare image to the management server so that the management server converts the image into the fingerprint data. Thereby, load on the

sandwiched device can be reduced. Further, the island unit controller 4 serving as a repeater for communications may have conversion function from the bare image to the fingerprint data. Thereby, load on the sandwiched device and the management server can be reduced. Furhter, the bare image may be applied to the fingerprint data.

[0126] While the system in accordance with the aforementioned embodiment changes the balance to gaming media and permits re-accumulation to the left balances, re-accumulation may not be permitted.

[0127] Further, while the system in accordance with the aforementioned embodiment does not delete a record from the fingerprint data base even after reading the accumulated balance as re-accumulation is premised, the record may be deleted after reading the accumulated balance. In this case, at a time of re-accumulation, new record may be added as a new accumulation.

[0128] Still further, while the data transmitted from the sandwiched device to the management server includes both a fingerprint data and a balance data at a time of accumulation to the balance in accordance with the aforementioned embodiment, the fingerprint data and the balance data may be separately transmitted. In this case, either of the fingerprint data and the balance data may be precedently transmitted.

[0129] While accumulation to the balance is instructed by operation of the cash-out key and the deposited balance partly changed to the gaming media is applicable to being accumulated in accordance with the aforementioned embodiment, in addition thereto or instead thereof, the balance just after being deposited, namely before being changed to the gaming media, may be accumulated in correspondence to the fingerprint data. More specifically, a player may accumulate the balance in correspondence to the fingerprint data just after deposition and withdraw the accumulated balance to the sandwiched device.

[0130] Further, while all the balance is withdrawn in accordance with the aforementioned embodiment, merely a part of the balance may be subject to withdrawal by proper operation of the numeric keypad.

[0131] Still further, while the balance data as a data of money is directly transmitted and received between the sandwiched device and the management server in accordance with the aforementioned embodiment, the data of money may in another form may be transmitted and received and the balance data may be stored in the management server. For example, just at the time of deposition in cash, the sum of the money is given to the management server without correspondence with the fingerprint data but it is managed correlated with the ID of the sandwiched device by the management server. Further when the cash-out key is operated, the fingerprint data and a consumption data (a money data changed to the gaming media) are given to the management server, and then at first the calculated balance data correlated with the fingerprint data is made stored in the fingerprint data base. Moreover, at a time of withdrawal of the accumulated balance data, the balance data may be left in the fingerprint data base and the consumption data may be given to the management server at a time of re-accumulation. Transport of the balance data in the scope of claims is defined as what includes such the indirect case.

[0132] While a case where guidance for operation and alarms are visually indicated and reported is described in the above description of the present embodiment, instead, the guidance for operation and the alarms may be auditorily indicated and reported. Moreover, report of alarm may be not only made by a device alone such as the sandwiched device and the balance adjustment device but also made by using a unit of a group of the island units. For example, the alarm may be reported by means of patterns of illumination by using any illuminators which the respective devices have.

[0133] While a case where a fingerprint data of one finger is used in the aforementioned embodiment is described above, a plurality of fingers may be used as a fingerprint data. In this case, it is preferable in view of facility of comparison processing that the order of reading the respective fingers is not limited to be identical between a time of accumulation and a time of calling.

[0134] Further, while a case where merely fingerprint matching is used in accumulation of a balance and withdrawal of an accumulated balance is described in the above description of the present embodiment, the other authentication method in which any mobile item is not necessary may be used together. For example, an authenticationmethod using password input or another may be used together. Meanwhile, in a case where password input is used together, at a time of withdrawal of the accumulated balance, search of the scope of fingerprint matching is refined thereby so that a period of time can be shortened.

[0135] Still further, while a case where fingerprint authentication method is used as an authentication for individuality is described in the above description of the present embodiment, the other authentication method may be used. For example, veins or irises may be used as physical characteristic peculiar to the individual players for authentication.

[0136] While the sandwiched device has functions of storing and extracting balance data correlated with the fingerprint data in the management server in accordance with the aforementioned present embodiment, in addition, like as sandwiched devices of prior arts, the sandwiched device may also have functions of reading and writing balance data on cards. By such a sandwiched device, a player can use the numeric keypad to select either storing the balance data in the management data or writing the balance data on his/her card and extracting the card. Since occasions to extract the card are reduced to the extent that the data is stored in the management server, an effect by having the functions of storing and extracting balance data correlated with the fingerprint data in the management server (for example, reduction in the number of card jamming) can be exhibited even in

this case.

[0137] Further, while the polling scheme is applied to the communications among the management server and the sandwiched devices in the aforementioned present embodiment, any other schemes may be applied. For example, it may be carried out that, at a time of accumulation, a sandwiched device request a priority of communication and the management server arbitrates contention in communications so as to give a priority to any of the devices.

[0138] Although the invention has been described above by reference to certain embodiments of the invention, the invention is not limited to the embodiments described above. Modifications and variations of the embodiments described above will occur to those skilled in the art, in light of the above teachings.

Claims

1. A peripheral device (3) of a gaming device (2) operating in connection with a management server (5) to manage a balance deposited by a player as a balance data, the peripheral device (3) comprising:

reader means (19, 29) for reading a characteristic peculiar to the player;
reception means (17, 28) for receiving an instruction of deposition to the balance and a request for withdrawal of the balance by the player; and
control means (20, 21) for converting the characteristic into a characteristic data, transmitting the instruction or the request with the characteristic or the characteristic data to the management server (5) in response to the instruction or the request, and receiving the balance data from the management server (5).

2. The peripheral device (3) of claim 1, wherein the control means (20, 21) is intended for a balance at a step where the balance has not been changed for a gaming medium.

3. The peripheral device of any of claims 1 and 2, wherein the reader means (19, 29) includes a fingerprint imaging device.

4. A management server (5) operating in connection with one or more peripheral devices (3, 7) and gaming devices (2) to manage balances deposited by players in correlation with characteristics of the players, the management server (5) comprising:

a data base (6) including one or more records (6a), each of the records (6a) including a characteristic field and a balance field, the characteristic field and the balance field being correlated with each other; and
control means (30) for receiving a data with an instruction of deposition or a request for withdrawal from one of the peripheral devices (3, 7), writing the characteristic and the balance in the received data respectively on the characteristic field and the balance field in one of the records (6a) in response to the instruction, and searching a specific record (6a) having a specific characteristic coinciding with the characteristic in the received data to transmit a specific balance in the specific record (6a) to said one of the peripheral devices (3, 7).

5. The management server (5) of claim 4, further comprising:

a storage device storing the data base (6).

6. A peripheral device (7) of a gaming device (2) operating in connection with a management server (5) to adjust a balance deposited by a player on the basis of characteristic data and balance data stored in the management server (5), the peripheral device (7) comprising:

reader means (47) for reading a characteristic peculiar to the player;
reception means (46) for receiving a request for adjustment of the balance by the player;
cash-out means (42, 43) for cashing out a controlled number of bills and coins; and
control means (40) for converting the characteristic into a characteristic data, transmitting the request with the characteristic or the characteristic data to the management server (5) in response to the request, and receiving the balance data from the management server (5) to cause the cash-out device (42, 43) to cash out the controlled number of the bills and the coins.

7. A gaming system (1) for management of a balance deposited by a player, the gaming system (1) comprising:

one or more peripheral devices (3), each of the peripheral devices (3) including;

reader means (19, 29) for reading a characteristic peculiar to the player,
reception means (17, 28) for receiving an instruction of deposition to the balance and a request for withdrawal of the balance by the player, and
control means (20, 21) for converting the characteristic into a characteristic data, transmitting the instruction or the request with the characteristic or the characteristic

data in response to the instruction or the request, and receive a balance data specific to the player; and

a management server (5) including;

a data base (6) including one or more records (6a), each of the records (6a) including a characteristic field and a balance field, the characteristic field and the balance field being correlated with each other, and control means (30) for receiving the instruction or the request with the characteristic or the characteristic data from one of the peripheral devices (3), renew the characteristic field and the balance field in one of the records (6a) in response to the instruction, and search a specific record (6a) having a specific characteristic coinciding with the characteristic in the received data to transmit a specific balance data in the specific record (6a) as the balance data specific to the player to said one of the peripheral devices (3).

8. The gaming system (1) of claim 7, further comprising:

a second peripheral device (7);

reader means (47) for reading a characteristic peculiar to the player,
receptionmeans (46) for receiving a request for adjustment of the balance by the player,
cash-outmeans (42, 43) for cashing out a controlled number of bills and coins, and
control means (40) for converting the characteristic into a characteristic data, transmitting the request with the characteristic or the characteristic data to the management server (5) in response to the request, and receive a balance data specific to the player from the management server (5) to cause the cash-out device (42, 43) to cash out the controlled number of the bills and the coins.

FIG. 1

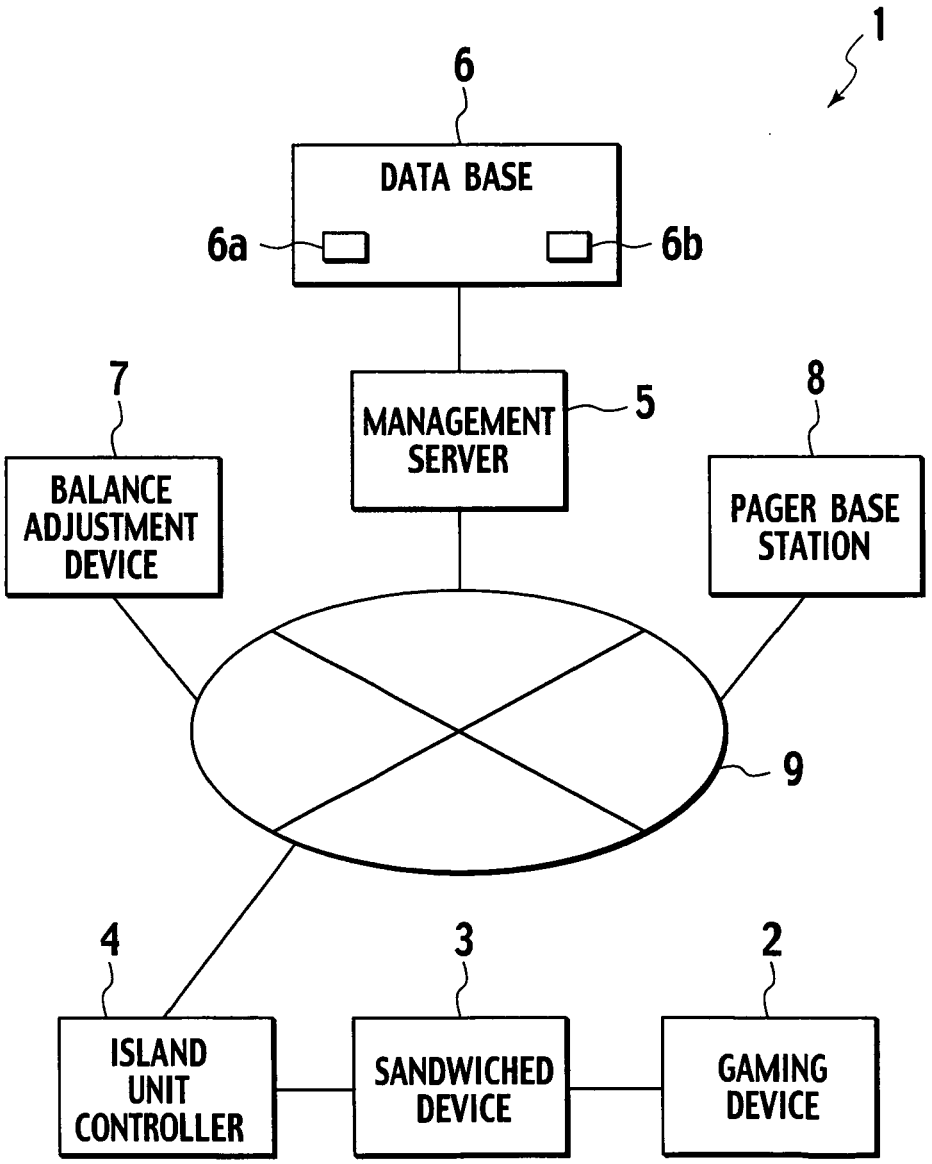

1
6
DATA BASE
6a
6b
7
MANAGEMENT SERVER
5
8
BALANCE ADJUSTMENT DEVICE
PAGER BASE STATION
9
4
3
2
ISLAND UNIT CONTROLLER
SANDWICHED DEVICE
GAMING DEVICE

FIG. 2

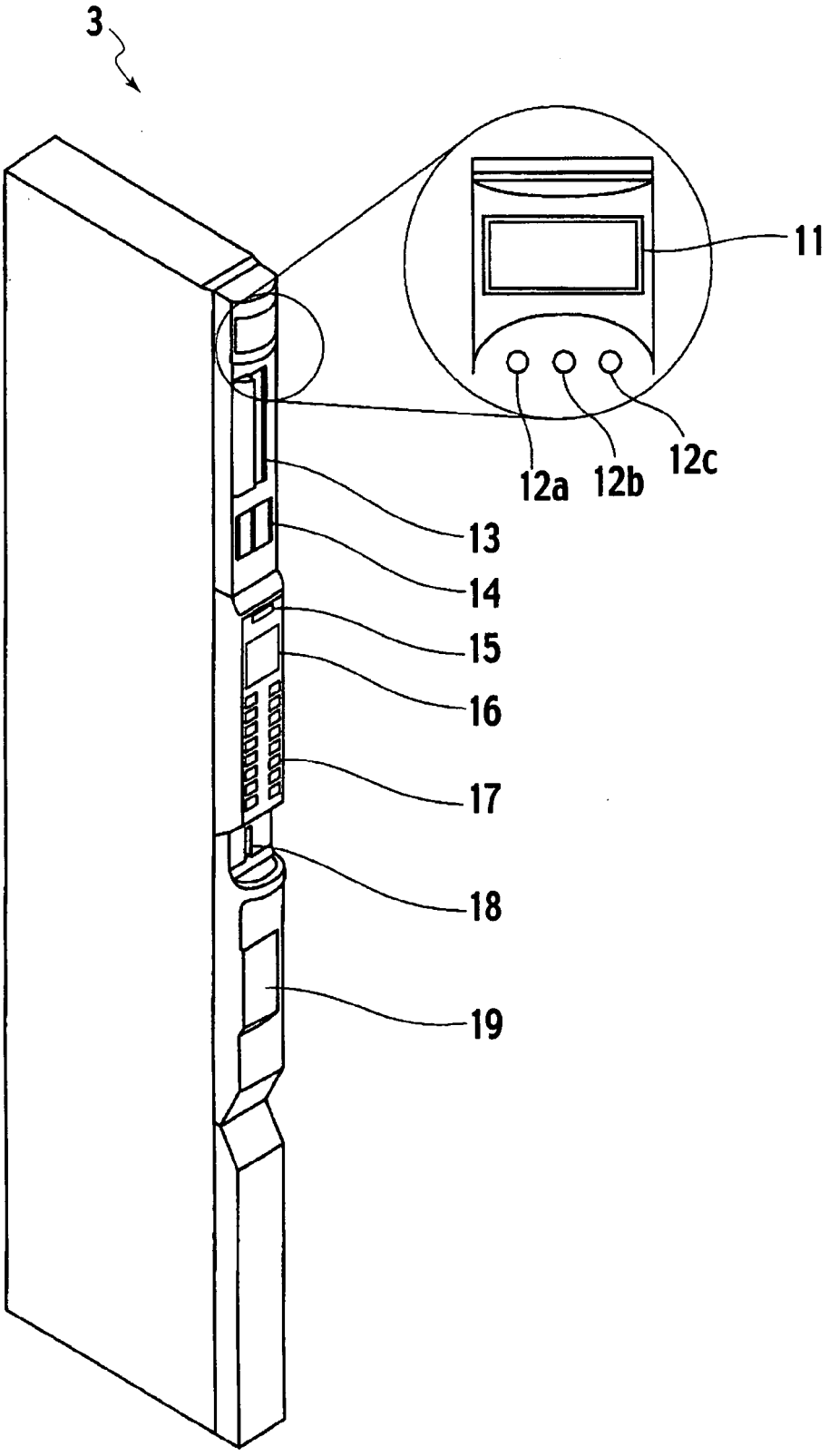


FIG. 3

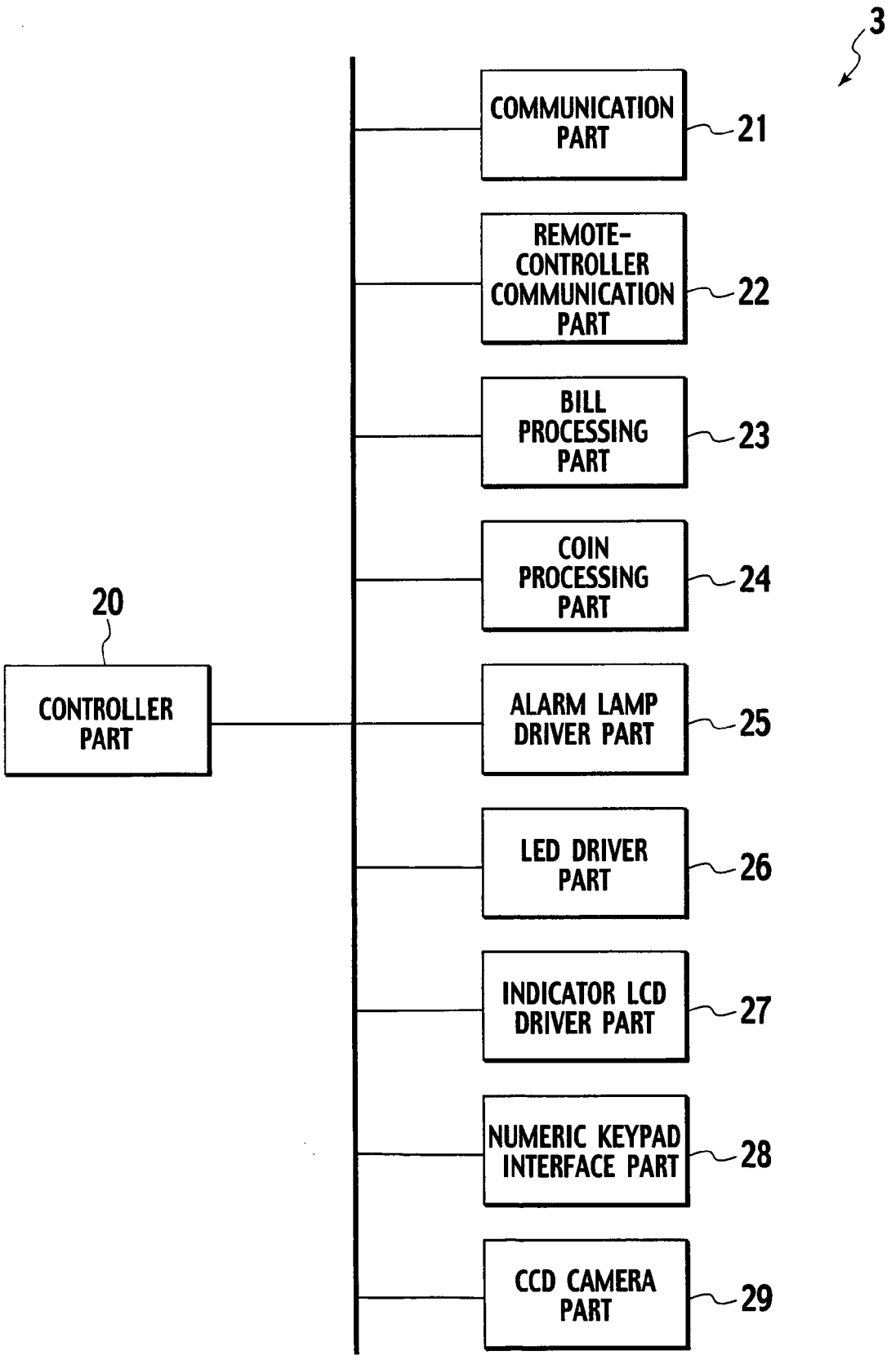

3
COMMUNICATION PART
21
REMOTE-CONTROLLER COMMUNICATION PART
22
BILL PROCESSING PART
23
COIN PROCESSING PART
24
20
CONTROLLER PART
ALARM LAMP DRIVER PART
25
LED DRIVER PART
26
INDICATOR LCD DRIVER PART
27
NUMERIC KEYPAD INTERFACE PART
28
CCD CAMERA PART
29

FIG. 4

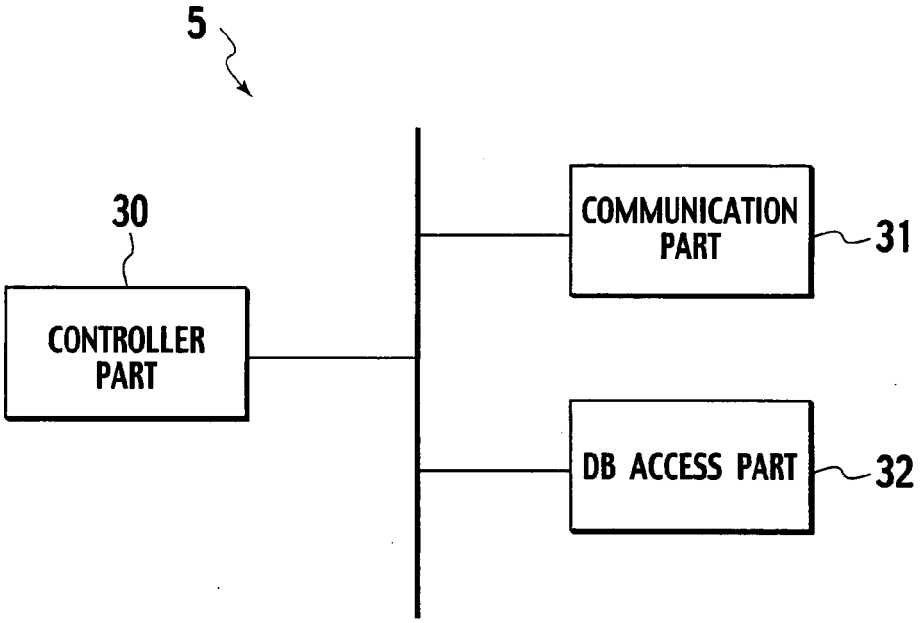

5
30
CONTROLLER PART
COMMUNICATION PART
31
DB ACCESS PART
32

FIG. 5

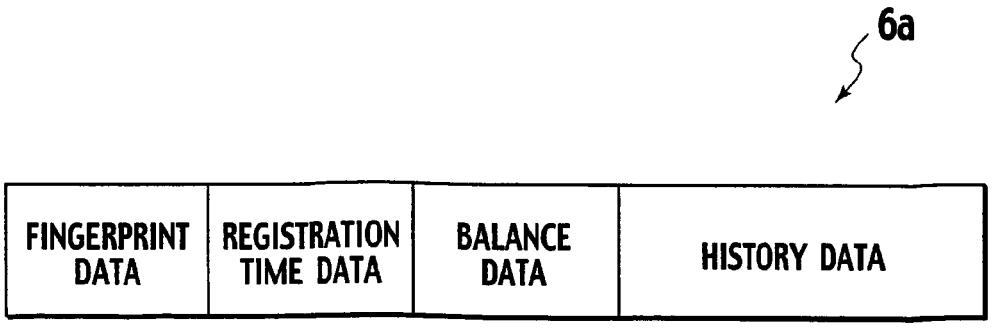

6a
FINGERPRINT DATA
REGISTRATION TIME DATA
BALANCE DATA
HISTORY DATA

FIG. 6

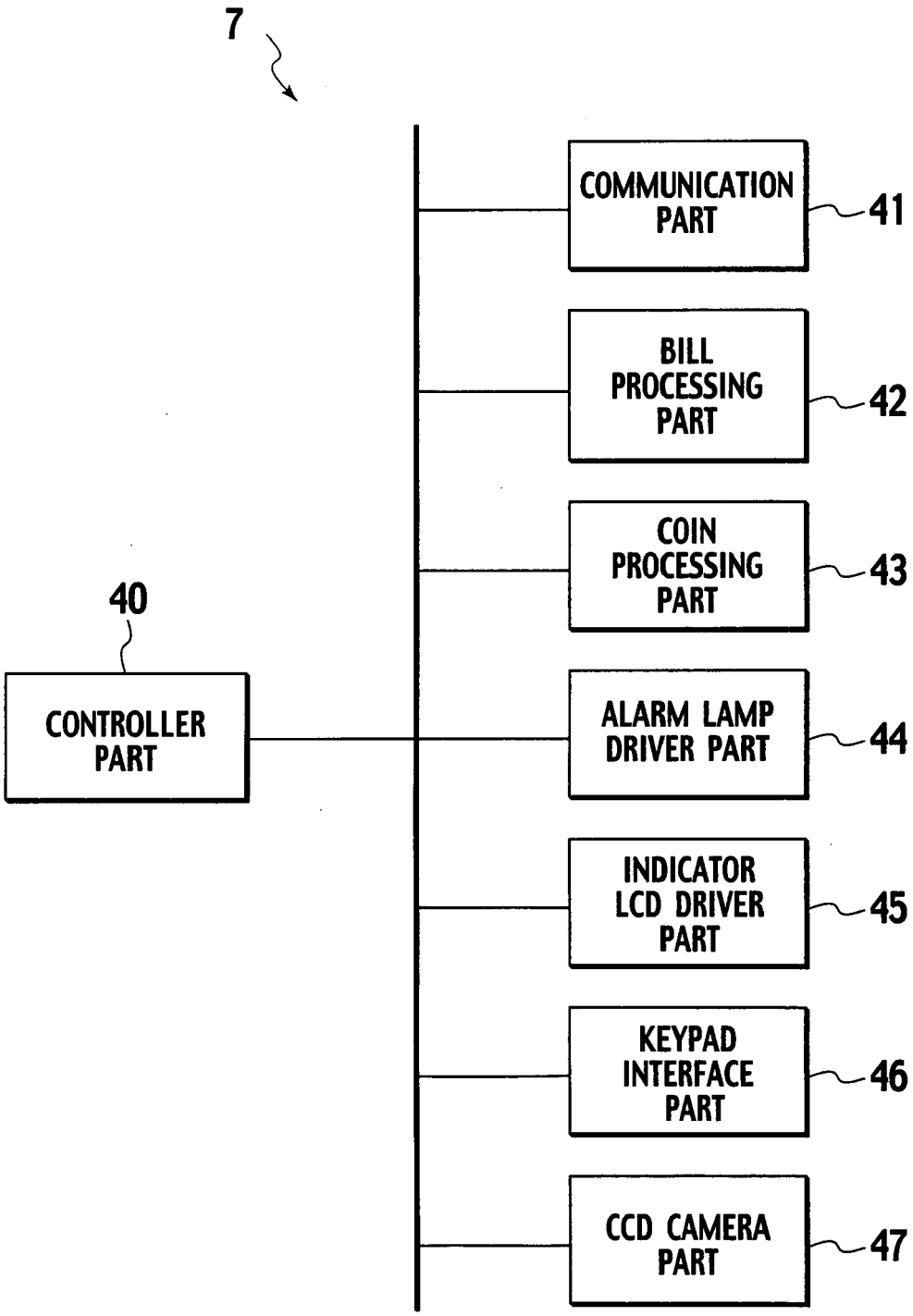

7
COMMUNICATION PART
41
BILL PROCESSING PART
42
COIN PROCESSING PART
43
40
CONTROLLER PART
ALARM LAMP DRIVER PART
44
INDICATOR LCD DRIVER PART
45
KEYPAD INTERFACE PART
46
CCD CAMERA PART
47

FIG. 7

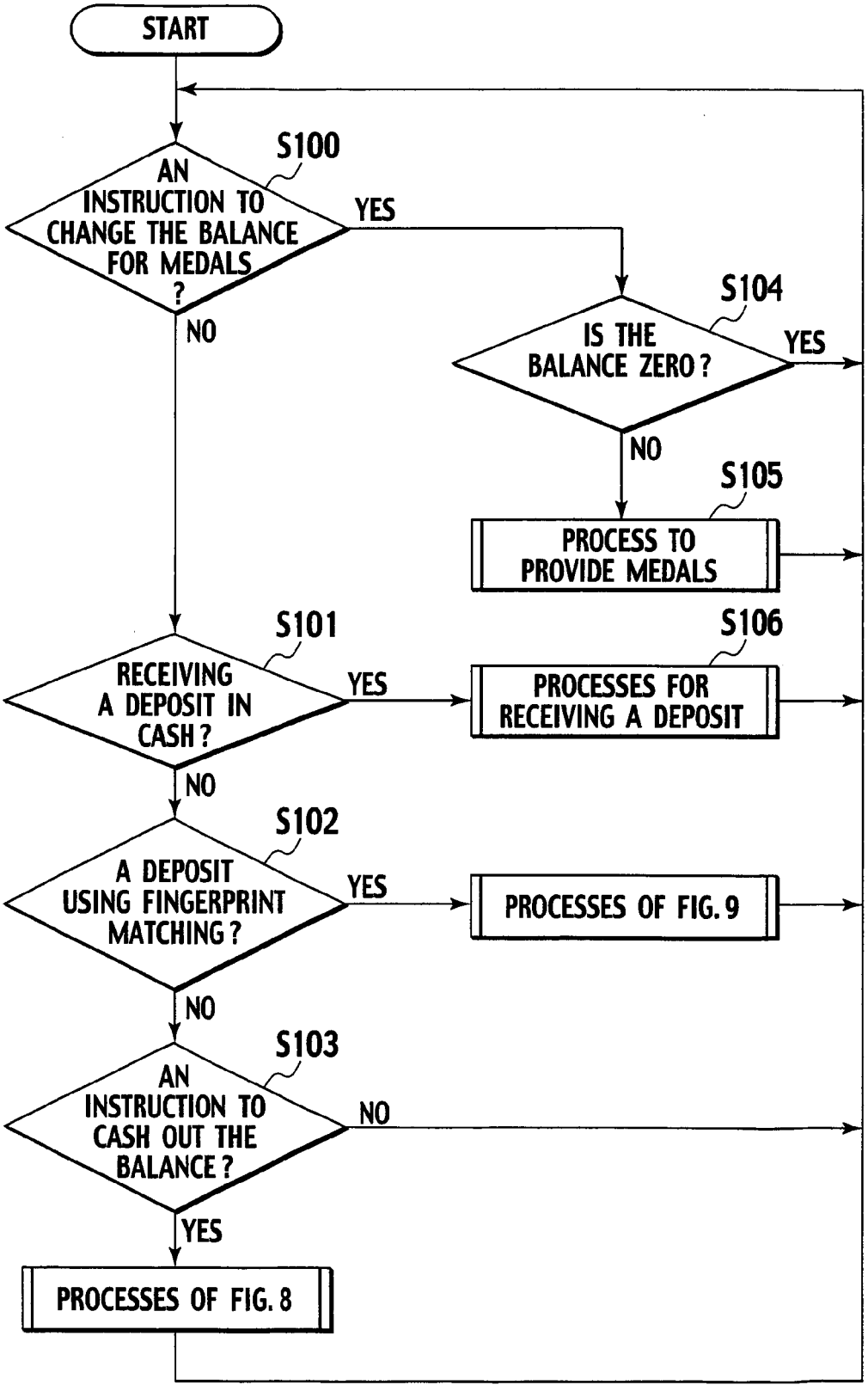

START
S100
AN INSTRUCTION TO CHANGE THE BALANCE FOR MEDALS ?
YES
NO
S104
IS THE BALANCE ZERO ?
YES
NO
S105
PROCESS TO PROVIDE MEDALS
S101
RECEIVING A DEPOSIT IN CASH ?
YES
S106
PROCESSES FOR RECEIVING A DEPOSIT
NO
S102
A DEPOSIT USING FINGERPRINT MATCHING ?
YES
PROCESSES OF FIG. 9
NO
S103
AN INSTRUCTION TO CASH OUT THE BALANCE ?
NO
YES
PROCESSES OF FIG. 8

FIG. 8

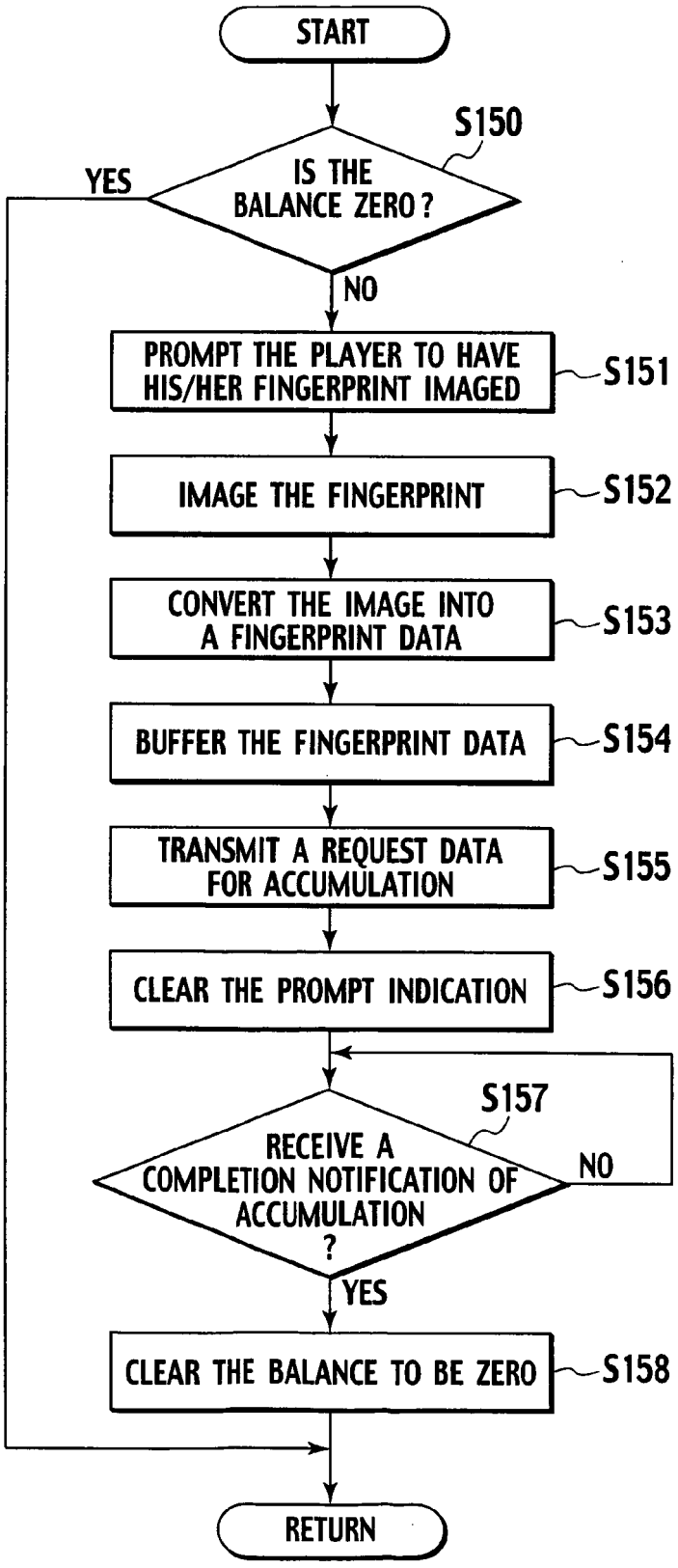

START
S150
IS THE BALANCE ZERO?
YES
NO
PROMPT THE PLAYER TO HAVE HIS/HER FINGERPRINT IMAGED
S151
IMAGE THE FINGERPRINT
S152
CONVERT THE IMAGE INTO A FINGERPRINT DATA
S153
BUFFER THE FINGERPRINT DATA
S154
TRANSMIT A REQUEST DATA FOR ACCUMULATION
S155
CLEAR THE PROMPT INDICATION
S156
S157
RECEIVE A COMPLETION NOTIFICATION OF ACCUMULATION ?
NO
YES
CLEAR THE BALANCE TO BE ZERO
S158
RETURN

FIG. 9

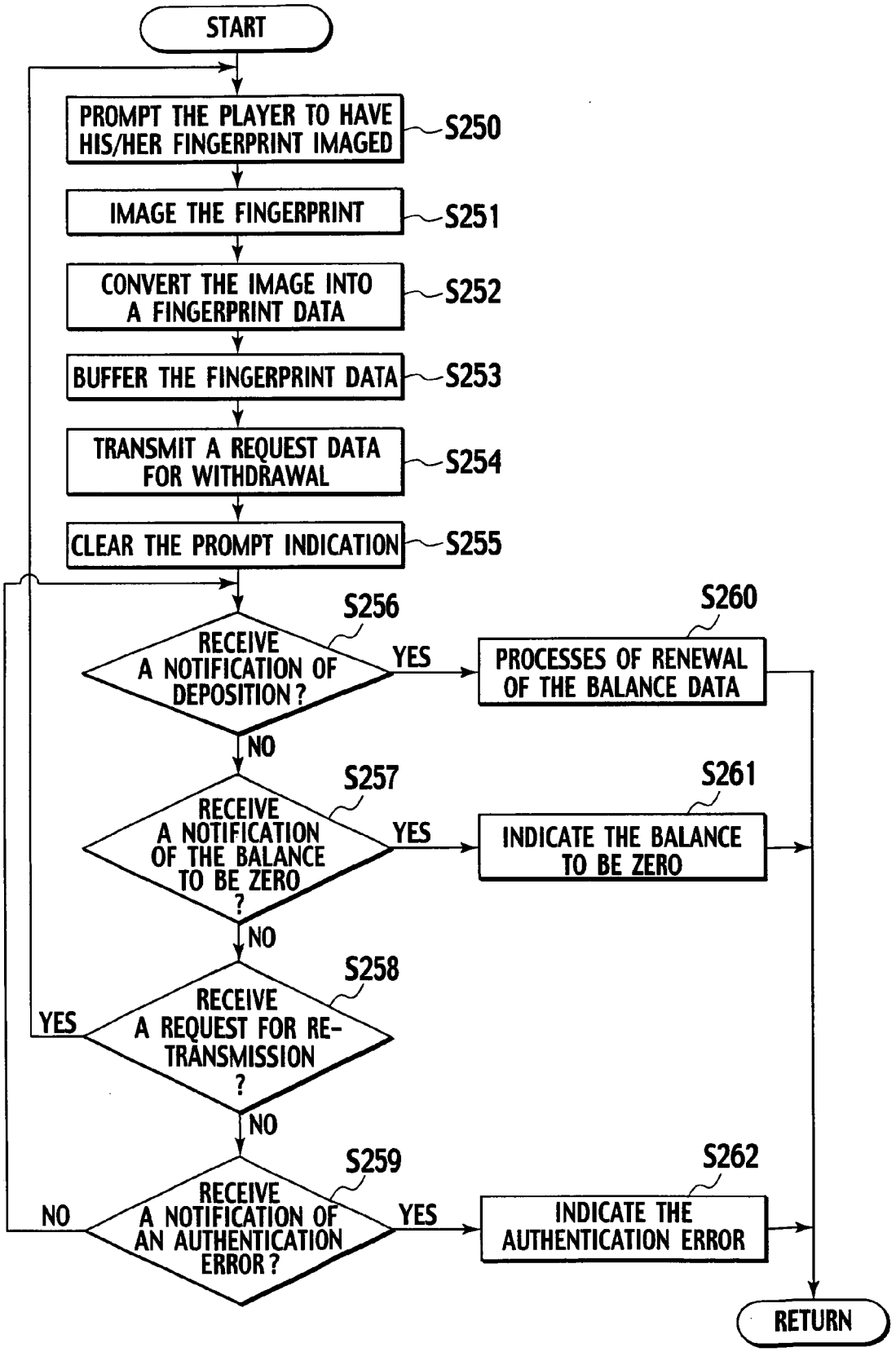

START
PROMPT THE PLAYER TO HAVE HIS/HER FINGERPRINT IMAGED
S250
IMAGE THE FINGERPRINT
S251
CONVERT THE IMAGE INTO A FINGERPRINT DATA
S252
BUFFER THE FINGERPRINT DATA
S253
TRANSMIT A REQUEST DATA FOR WITHDRAWAL
S254
CLEAR THE PROMPT INDICATION
S255
S256
RECEIVE A NOTIFICATION OF DEPOSITION?
YES
S260
PROCESSES OF RENEWAL OF THE BALANCE DATA
NO
S257
RECEIVE A NOTIFICATION OF THE BALANCE TO BE ZERO ?
YES
S261
INDICATE THE BALANCE TO BE ZERO
NO
S258
RECEIVE A REQUEST FOR RE-TRANSMISSION ?
YES
NO
S259
RECEIVE A NOTIFICATION OF AN AUTHENTICATION ERROR?
NO
YES
S262
INDICATE THE AUTHENTICATION ERROR
RETURN

FIG. 10

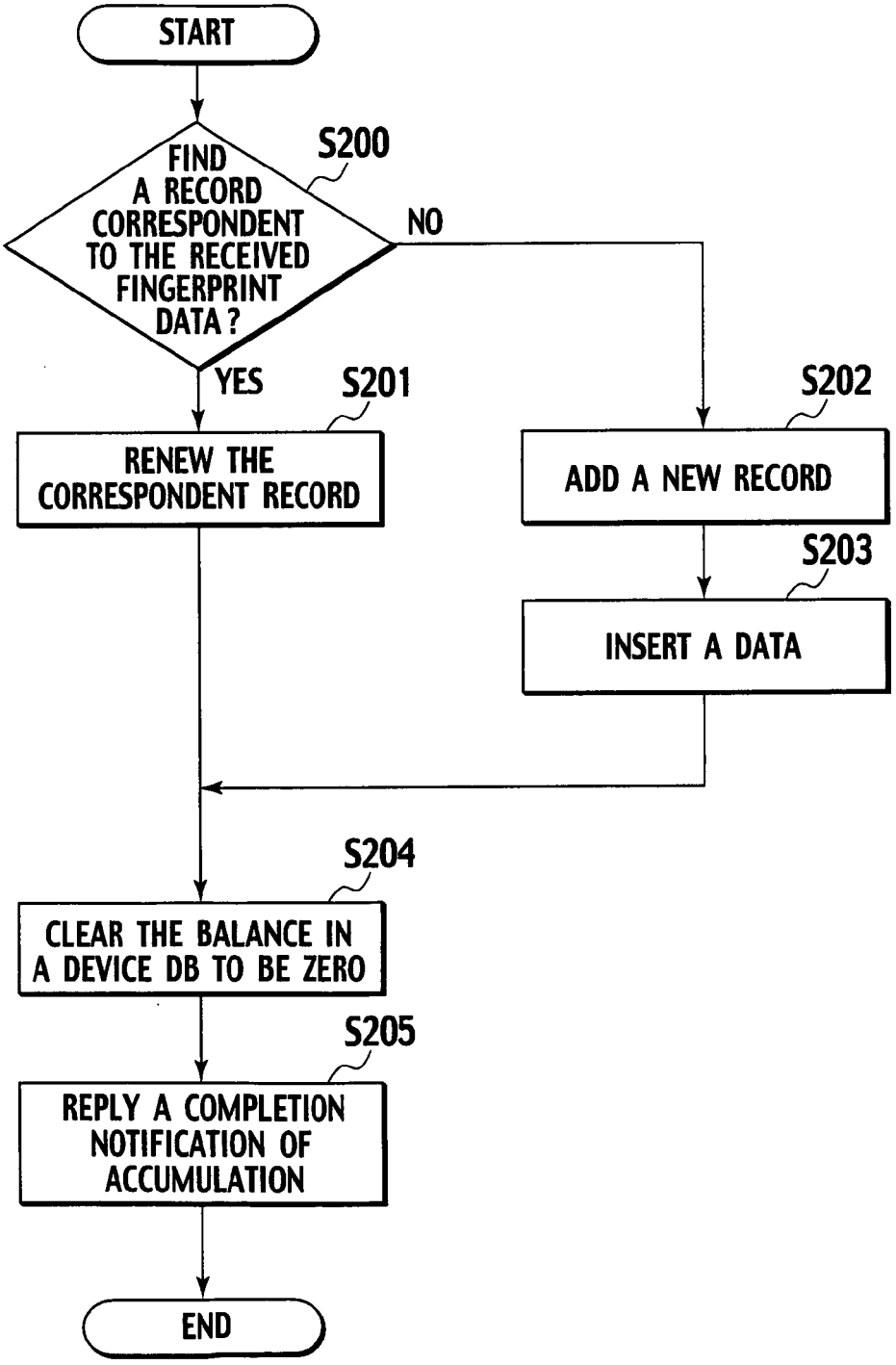

START
FIND A RECORD CORRESPONDENT TO THE RECEIVED FINGERPRINT DATA?
S200
NO
YES
S201
RENEW THE CORRESPONDENT RECORD
S202
ADD A NEW RECORD
S203
INSERT A DATA
S204
CLEAR THE BALANCE IN A DEVICE DB TO BE ZERO
S205
REPLY A COMPLETION NOTIFICATION OF ACCUMULATION
END

FIG. 11

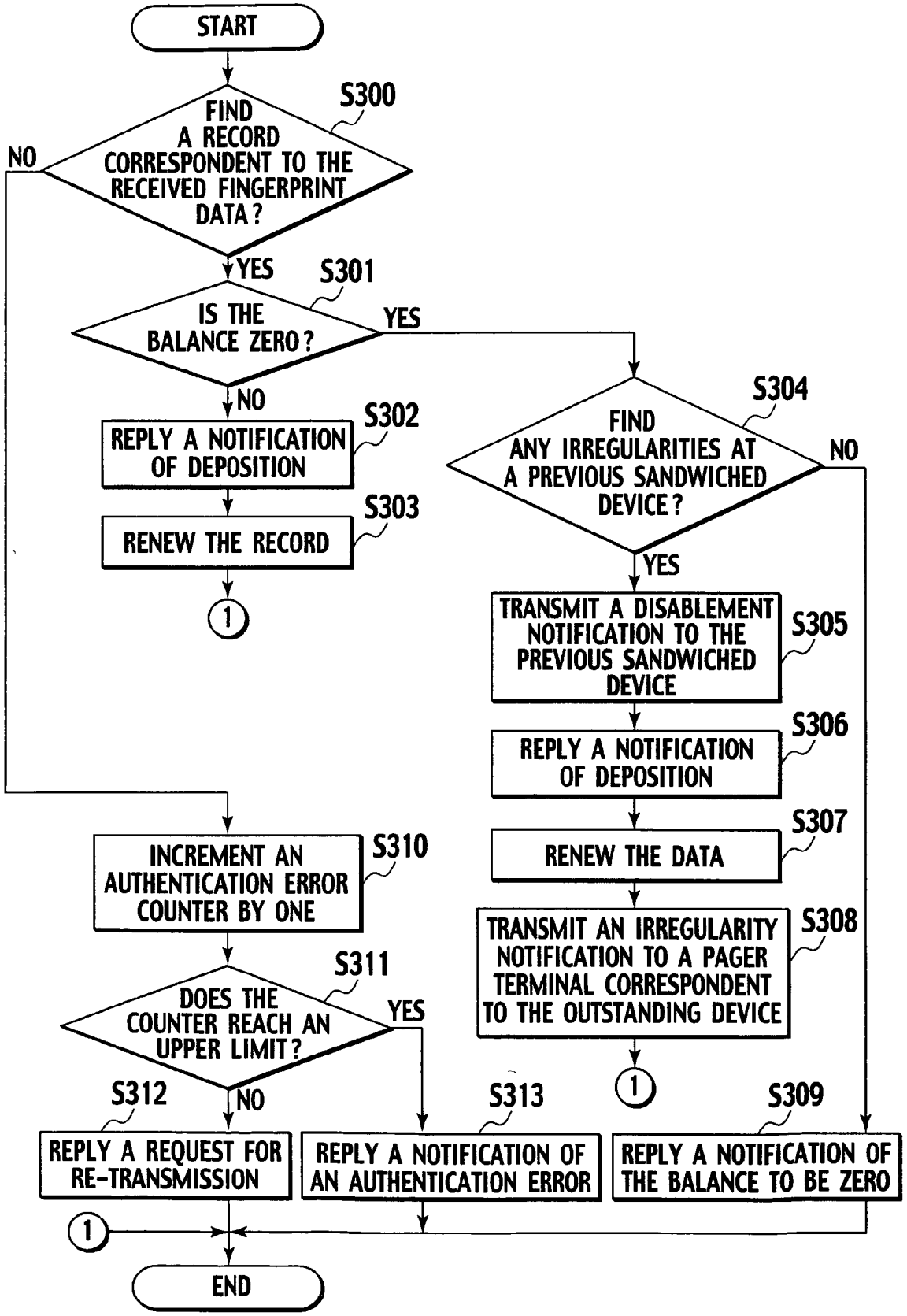

START
S300
FIND A RECORD CORRESPONDENT TO THE RECEIVED FINGERPRINT DATA?
NO
YES
S301
IS THE BALANCE ZERO?
YES
NO
S302
REPLY A NOTIFICATION OF DEPOSITION
S303
RENEW THE RECORD
1
S304
FIND ANY IRREGULARITIES AT A PREVIOUS SANDWICHED DEVICE?
NO
YES
S305
TRANSMIT A DISABLEMENT NOTIFICATION TO THE PREVIOUS SANDWICHED DEVICE
S306
REPLY A NOTIFICATION OF DEPOSITION
S307
RENEW THE DATA
S308
TRANSMIT AN IRREGULARITY NOTIFICATION TO A PAGER TERMINAL CORRESPONDENT TO THE OUTSTANDING DEVICE
1
S310
INCREMENT AN AUTHENTICATION ERROR COUNTER BY ONE
S311
DOES THE COUNTER REACH AN UPPER LIMIT?
YES
NO
S312
REPLY A REQUEST FOR RE-TRANSMISSION
S313
REPLY A NOTIFICATION OF AN AUTHENTICATION ERROR
S309
REPLY A NOTIFICATION OF THE BALANCE TO BE ZERO
1
END

FIG. 12

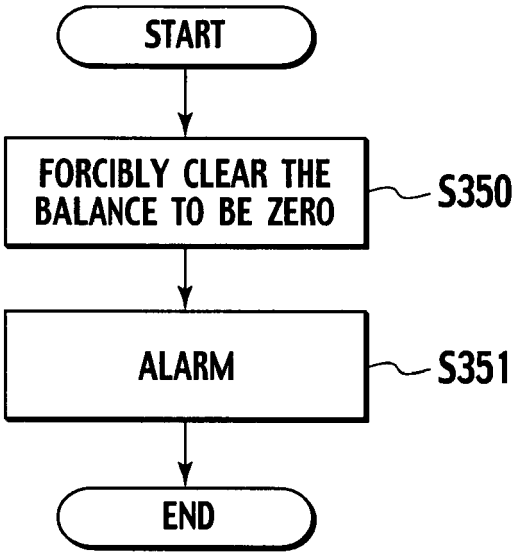

START
FORCIBLY CLEAR THE BALANCE TO BE ZERO
S350
ALARM
S351
END

FIG. 13

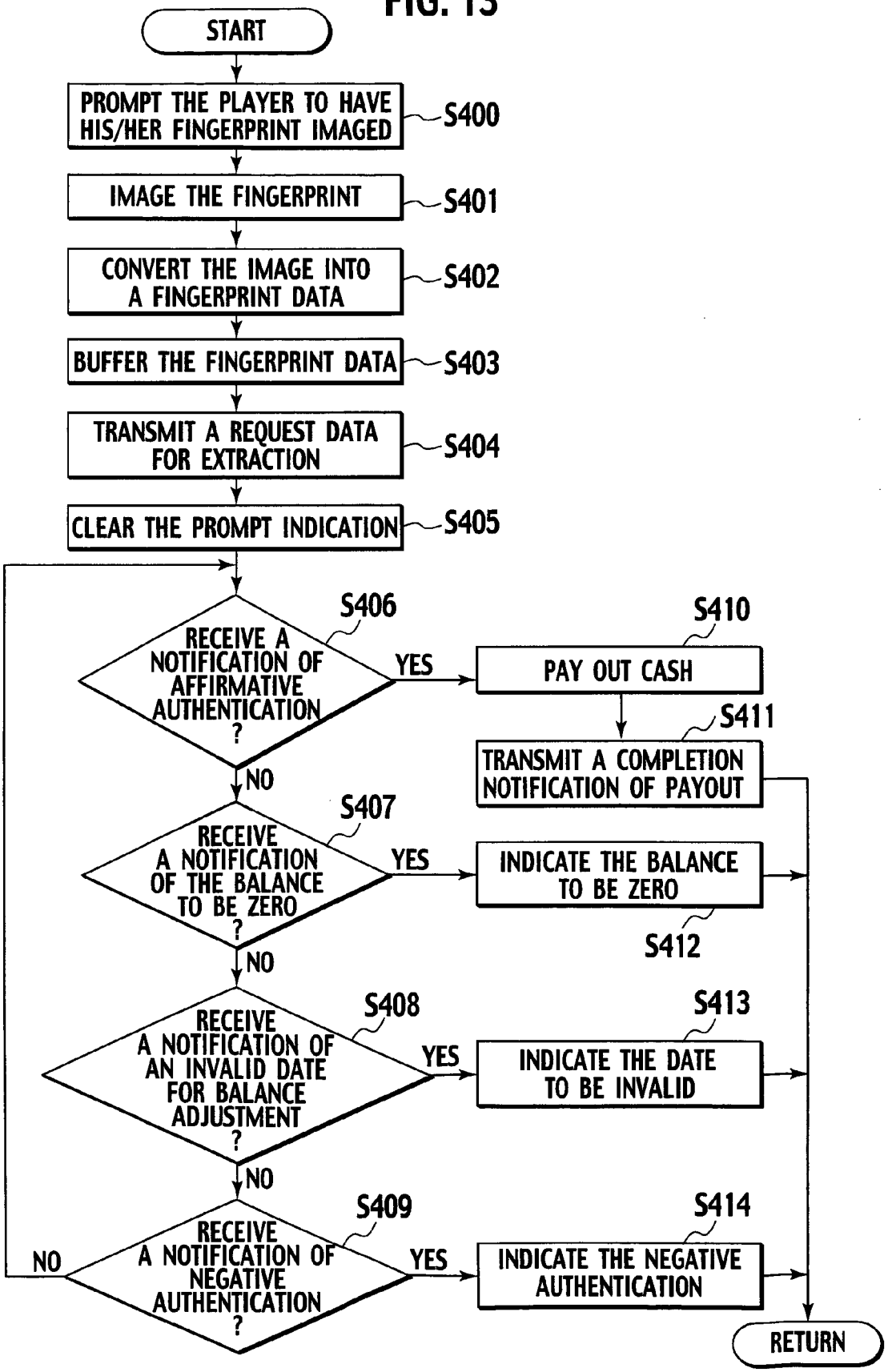

START
PROMPT THE PLAYER TO HAVE HIS/HER FINGERPRINT IMAGED
S400
IMAGE THE FINGERPRINT
S401
CONVERT THE IMAGE INTO A FINGERPRINT DATA
S402
BUFFER THE FINGERPRINT DATA
S403
TRANSMIT A REQUEST DATA FOR EXTRACTION
S404
CLEAR THE PROMPT INDICATION
S405
S406
RECEIVE A NOTIFICATION OF AFFIRMATIVE AUTHENTICATION ?
YES
S410
PAY OUT CASH
S411
TRANSMIT A COMPLETION NOTIFICATION OF PAYOUT
NO
S407
RECEIVE A NOTIFICATION OF THE BALANCE TO BE ZERO ?
YES
INDICATE THE BALANCE TO BE ZERO
S412
NO
S408
RECEIVE A NOTIFICATION OF AN INVALID DATE FOR BALANCE ADJUSTMENT ?
YES
S413
INDICATE THE DATE TO BE INVALID
NO
S409
RECEIVE A NOTIFICATION OF NEGATIVE AUTHENTICATION ?
NO
YES
S414
INDICATE THE NEGATIVE AUTHENTICATION
RETURN

FIG. 14

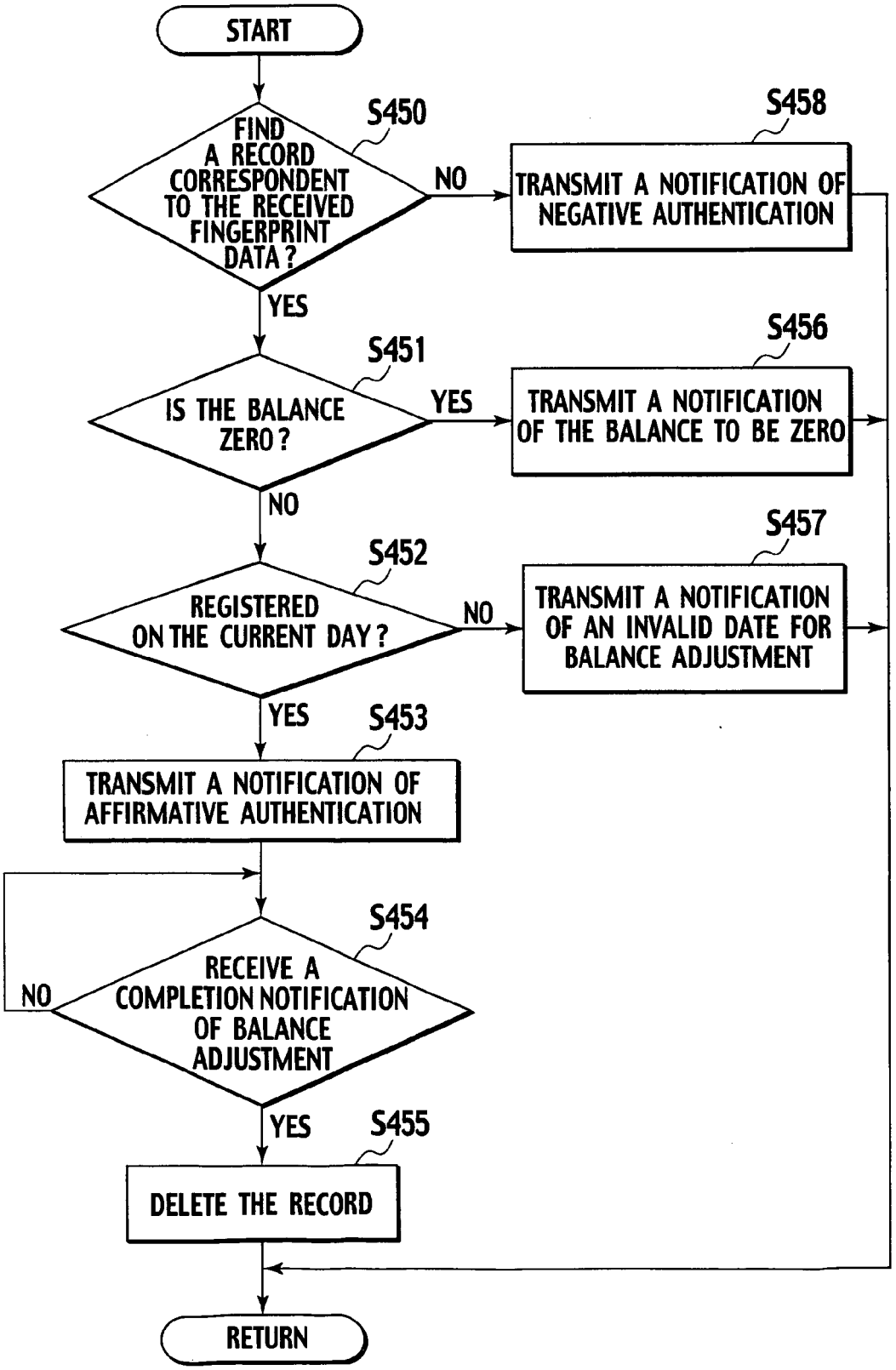
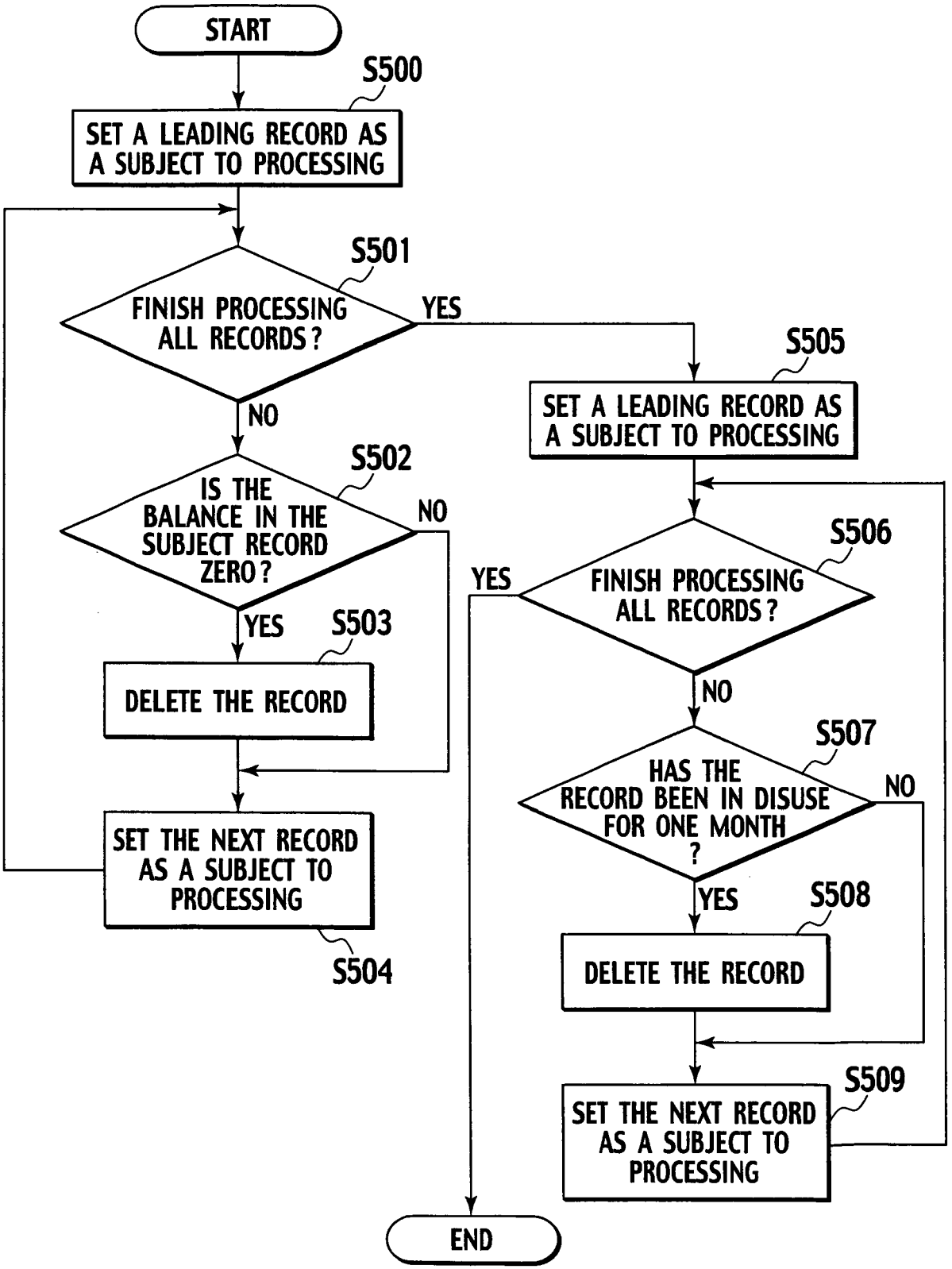

START
S450
FIND A RECORD CORRESPONDENT TO THE RECEIVED FINGERPRINT DATA?
NO
S458
TRANSMIT A NOTIFICATION OF NEGATIVE AUTHENTICATION
YES
S451
IS THE BALANCE ZERO?
YES
S456
TRANSMIT A NOTIFICATION OF THE BALANCE TO BE ZERO
NO
S452
REGISTERED ON THE CURRENT DAY?
NO
S457
TRANSMIT A NOTIFICATION OF AN INVALID DATE FOR BALANCE ADJUSTMENT
YES
S453
TRANSMIT A NOTIFICATION OF AFFIRMATIVE AUTHENTICATION
S454
RECEIVE A COMPLETION NOTIFICATION OF BALANCE ADJUSTMENT
NO
YES
S455
DELETE THE RECORD
RETURN

FIG. 15


START
S500
SET A LEADING RECORD AS A SUBJECT TO PROCESSING
S501
FINISH PROCESSING ALL RECORDS?
YES
NO
S502
IS THE BALANCE IN THE SUBJECT RECORD ZERO?
NO
YES
S503
DELETE THE RECORD
SET THE NEXT RECORD AS A SUBJECT TO PROCESSING
S504
S505
SET A LEADING RECORD AS A SUBJECT TO PROCESSING
S506
FINISH PROCESSING ALL RECORDS?
YES
NO
S507
HAS THE RECORD BEEN IN DISUSE FOR ONE MONTH ?
NO
YES
S508
DELETE THE RECORD
S509
SET THE NEXT RECORD AS A SUBJECT TO PROCESSING
END

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 02 4516

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 02/05077 A (MINK & ASSOCIATES INC [US]; MINK FRANKLIN L [US]; COLEMAN JAMES C II []) 17 January 2002 (2002-01-17) * page 5, line 9 - line 31 * * page 9, line 12 - page 13, line 31; figures 1-3 *	1-8	INV. G07F17/32
A	WO 02/47042 A (INT GAME TECH [US]) 13 June 2002 (2002-06-13) * abstract *	1-8	
A	WO 00/28484 A (NCR INT INC [US]; BAIRD JAMES BALLANTINE [GB]) 18 May 2000 (2000-05-18) * page 2, paragraph 3 - page 3, paragraph 6 * * page 5, paragraph 3 - page 6, paragraph 1 *	1-8	
			TECHNICAL FIELDS SEARCHED (IPC) G07C G06F G07B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	29 March 2007	Beatty, John

CATEGORY OF CITED DOCUMENTS

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29-03-2007

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